

# **Oracle® Fusion Applications**

Administrator's Guide

11g Release 7 Refresh 3 (11.1.7)

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Documentation for system administrators that describes how to administer the Oracle Fusion Applications environment, including how to start and stop components, change ports and passwords, monitor the environment, logging, back up and recovery, configure high availability, and move components across environments.

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# Preface

This guide describes how to administer the Oracle Fusion Applications environment, including how to start and stop components, change ports and passwords, manage the Oracle Database, monitor the environment, logging, back up and recover, configure high availability, move components across environments, and troubleshoot runtime issues.

## Audience

This document is intended for administrators of the Oracle Fusion Applications environment. The Oracle Fusion Applications administrator performs tasks to manage the Oracle Fusion Applications environment. These tasks are performed to the Oracle Fusion applications, Oracle Fusion Middleware components, and the Oracle Database.

## Documentation Accessibility

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## Related Documents

For more information, see the following documents in the Oracle Fusion Applications technology library:

- *Oracle Fusion Applications Administrator and Implementor Roadmap*
- *Oracle Fusion Applications Administrator's Troubleshooting Guide*
- *Oracle Fusion Applications Installation Guide*
- *Oracle Fusion Applications Post-Installation Guide*
- *Oracle Fusion Applications Enterprise Deployment Guide for Customer Relationship Management*
- *Oracle Fusion Applications Financials Enterprise Deployment Guide*

- *Oracle Fusion Applications Common Implementation Guide*
- *Oracle Fusion Applications Master Glossary*

## Conventions

The following text conventions are used in this document:

<b>Convention</b>	<b>Meaning</b>
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

UNIX is used as a generic reference to all UNIX-based platforms. Where information for a particular UNIX platform is different, this is noted in the text.

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# What's New in This Guide

The following topics introduce the new and changed features of Oracle Fusion Applications and other significant changes that are described in this guide, and provides pointers to additional information.

## New and Changed Features for 11g Release 7 Refresh 3 (11.1.7)

Oracle Fusion Applications 11g Release 7 Refresh 3 (11.1.7) includes the following new and changed administrative features for this document:

- Modified pre-installation steps for Language Pack Installer by running the Health Checker utility. See [Chapter 3](#).
- Modified steps for using the Password Change Utility. See [Section 4.6.1](#).
- Support for setting certain log profile options at the Product level in Oracle Fusion applications that are coded in Java. See [Section 15.4.1](#) and [Section 15.4.5](#).
- Support for the `AFLOG_EXTENDED_ENABLED` profile option in Oracle Fusion applications that are coded in PL/SQL and C. This profile option makes it possible to log certain extended attributes. See [Table 15-1](#).
- Changes to the procedure for configuring the `diagctl` command-line interface for diagnostic testing. See [Section 16.2.3](#).

## Other Significant Changes in this Document for 11g Release 7 Refresh 3 (11.1.7)

For 11g Release 7 Refresh 3 (11.1.7), this guide has been updated in several ways. Following are the sections that have been added or changed.

- Removed Content Movement chapter.
- Moved information about installing languages using Language Pack Installer from the *Oracle Fusion Applications Upgrade Guide* to this guide. See [Chapter 3](#).
- Added a section that describes how to configure the `diagctl` command-line interface for diagnostic testing. In previous releases, information about configuring `diagctl` was provided in Release Notes. See [Section 16.2.3](#).
- This document no longer contains a chapter about troubleshooting using incidents, logs, QuickTrace and diagnostic tests. See the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.





# Part I

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## Understanding Oracle Fusion Applications

This part provides an overview to Oracle Fusion Applications and its concepts as they relate to administering Oracle Fusion Applications.

Part I contains the following chapters:

- [Chapter 1, "Introduction to Oracle Fusion Applications for Systems Administrators"](#)



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# Introduction to Oracle Fusion Applications for Systems Administrators

Oracle Fusion Applications is Oracle's next-generation applications suite built on a service-oriented platform. It brings together next-generation enterprise technologies, applications, and services, including Oracle Fusion Applications and Oracle Fusion Middleware, to fundamentally change the dynamics in the applications marketplace and revolutionize business. This chapter provides an introduction to the architecture, components, and concepts of Oracle Fusion Applications.

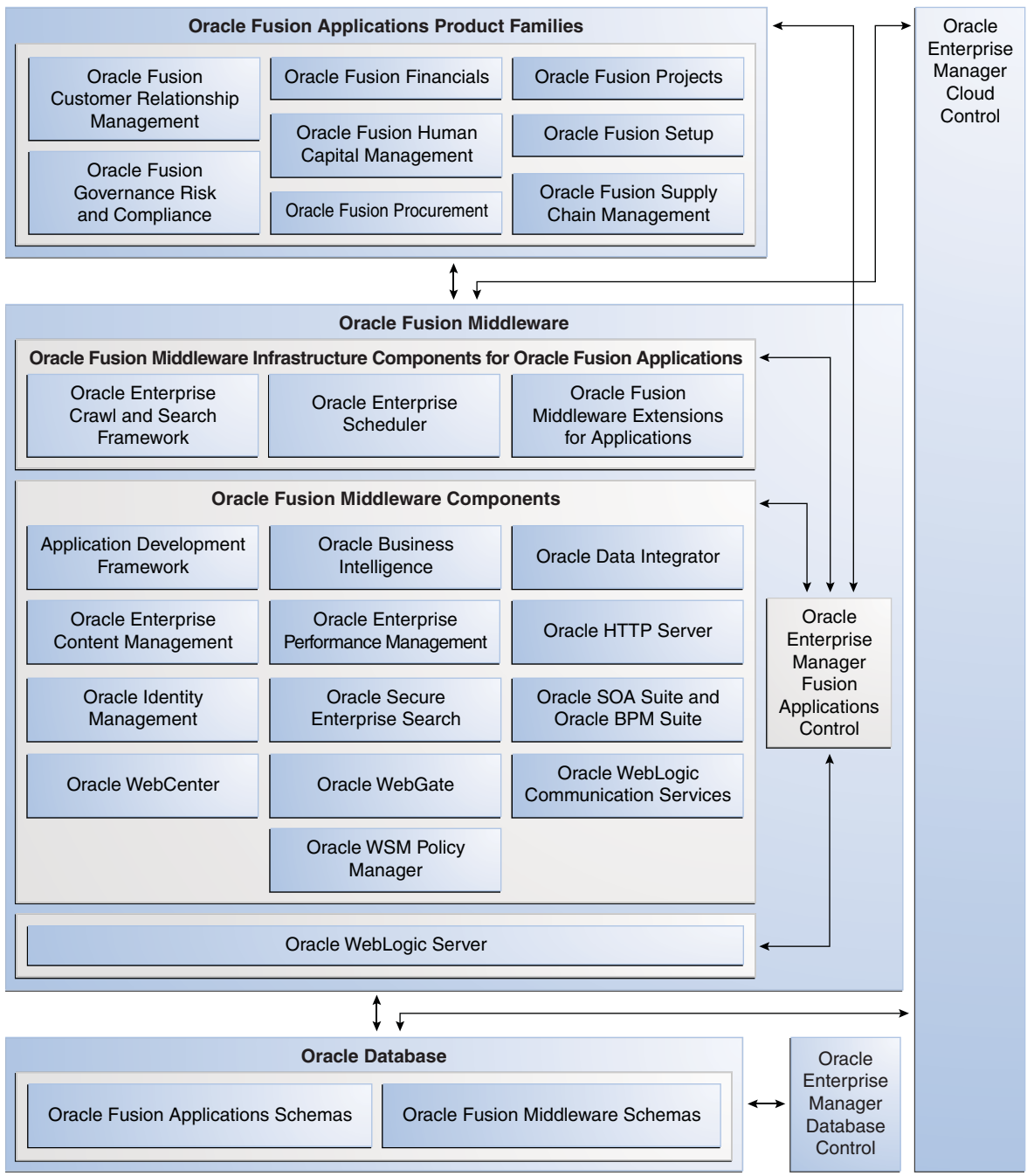
This chapter contains the following topics:

- [Section 1.1, "Architecture of Oracle Fusion Applications"](#)
- [Section 1.2, "Key Oracle Fusion Applications Concepts"](#)
- [Section 1.3, "Roadmap for Administering Oracle Fusion Applications"](#)

## 1.1 Architecture of Oracle Fusion Applications

Oracle Fusion applications are built on the Oracle Fusion Middleware stack and use the Oracle Database. This architecture is depicted in [Figure 1-1](#).

**Figure 1–1 Oracle Fusion Applications Architecture**



The section contains the following topics

- [Section 1.1.1, "Oracle Fusion Applications Product Families"](#)
- [Section 1.1.2, "Oracle Fusion Middleware Infrastructure Components"](#)
- [Section 1.1.3, "Oracle Fusion Middleware Components"](#)
- [Section 1.1.4, "Oracle Database"](#)
- [Section 1.1.5, "Oracle Enterprise Manager Fusion Applications Control"](#)
- [Section 1.1.6, "Oracle Enterprise Manager Cloud Control"](#)

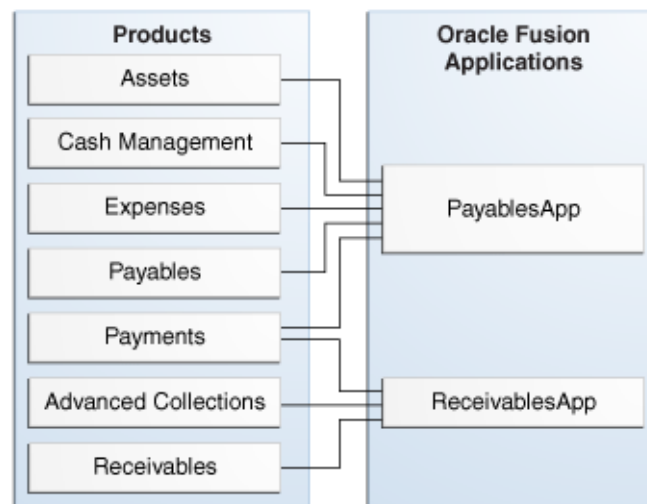
- [Section 1.1.7, "Oracle Enterprise Manager Database Control"](#)

## 1.1.1 Oracle Fusion Applications Product Families

An installation of Oracle Fusion Applications is logically broken up into groups of features. Each set of features is known as **product offerings**, which represent the highest-level collection of functionality that you can license and implement. A provisioning configuration is a collection of one or more product offerings. During installation, you select a product offering or a combination of offerings as a way to install the **product families**. Product families are comprised of one or more Java EE applications specific to Oracle Fusion Applications.

An application can contain multiple products, and a product can also span multiple applications. A product typically has a one-to-one correspondence with an EAR file. [Figure 1–2](#) shows two applications, PayablesApp and ReceivablesApp, each of which is mapped to the same product, Payments.

**Figure 1–2 Relationship of Products and Applications**



Oracle Fusion Applications includes the product families described in [Table 1–1](#).

**Table 1–1 Product Families**

Oracle Fusion Applications Product Families	Description
Oracle Fusion Customer Relationship Management	Manages customers, contacts, and resources, including data quality configuration.
Oracle Fusion Financials	Manages financial flows, including assets, ledgers, cash cycle, invoices and payments, accounts receivable, collections, and setup of subledger accounting and tax configuration.

**Table 1–1 (Cont.) Product Families**

<b>Oracle Fusion Applications Product Families</b>	<b>Description</b>
Oracle Fusion Governance, Risk, and Compliance	Provides critical business controls to manage risk, multi-regulatory compliance, and controls enforcement. The connector for Oracle Fusion Applications provides a prebuilt solution for managing Separation of Duties (SoD) within and across product families. You can also use Oracle Fusion Governance, Risk, and Compliance to analyze suspect transactions and configuration settings based on user defined conditions. This allows organizations to actively determine the risk that exists within their application that can materially impact the reliability of the information that exists for reporting and decision making purposes. Finally, Oracle Fusion Governance, Risk, and Compliance can apply preventive controls that will limit what a user can see and do within an Oracle Fusion Applications user interface according to user-defined conditions. The objective is to pro-actively mitigate the risk of extraneous access or improper transactions from existing.
Oracle Fusion Human Capital Management	Provides employee management for an organization.
Oracle Fusion Procurement	Manages the procurement process including requisitions, purchase orders, and supplier negotiations.
Oracle Fusion Project	Manages projects, including how to plan, budget, forecast, collect costs, bill customers, and report performance.
Oracle Fusion Supply Chain Management	Integrates and automates all key supply chain processes, from design, planning and procurement to manufacturing and fulfillment, providing a complete solution set to enable companies to power information-driven value chains.
Oracle Fusion Setup	<p>Supports the other product families.</p> <p>In addition to Oracle Fusion Functional Setup Manager for setting up functional data, this product family includes applications to assist application users:</p> <ul style="list-style-type: none"> <li>■ The Oracle Fusion Home page provides a Welcome dashboard with a collection of portlets and task flows for answering common questions.</li> <li>■ Oracle Fusion Applications Help delivers content users need to complete their tasks. You can optionally install a local version of Oracle Fusion Applications Help, enabling you to extend and customize the help. For more information about using and customizing a local install of the help, see the <i>Oracle Fusion Applications Installation Guide</i> and the <i>Oracle Fusion Applications Common Implementation Guide</i>.</li> </ul>

To aid with performing current-state analysis of the applications, you can use Oracle Transactional Business Intelligence, which is built on Oracle BI Enterprise Edition. For more information about configuring Oracle Transactional Business Intelligence, see the *Oracle Fusion Administrator's Guide for Transactional Business Intelligence*.

## 1.1.2 Oracle Fusion Middleware Infrastructure Components

The product families use the following common core framework and infrastructure for Oracle Fusion Applications described in [Table 1–2](#).

**Table 1–2 Oracle Fusion Middleware Infrastructure Components**

Oracle Fusion Middleware Infrastructure Components	Description
Oracle Fusion Middleware Extensions for Applications (Applications Core)	<p>Provides design time and runtime infrastructure to help standardize complex development patterns for Oracle Fusion Applications. It simplifies the development process of these patterns and provides a consistent user experience. Examples of these patterns include extensibility (Flexfields), hierarchical relationships (Trees), data security, and UI patterns. Applications Core creates simplified methods of implementing these complex requirements by providing robust metadata and comprehensive UI components and services. All of the Applications Core components have been intricately integrated with the rest of the Oracle Fusion Middleware infrastructure so they are available across every layer of the Oracle Fusion Applications platform.</p> <p>Applications Core provides shared libraries referenced by all the Oracle Fusion Applications, a standalone application for application setup and configuration, an Oracle JDeveloper extension to seamlessly integrate our components with the rest of the Oracle Fusion Applications technology stack, PLSQL APIs, C libraries, and common seed data.</p> <p>See the "Oracle Fusion Middleware Extensions for Applications" section in the <i>Oracle Fusion Applications Concepts Guide</i>.</p>
Oracle Enterprise Scheduler	<p>Enables you to manage and schedule jobs for Oracle Fusion Applications.</p> <p>See <a href="#">Chapter 7, "Managing Oracle Enterprise Scheduler Service and Jobs."</a></p>
Oracle Enterprise Crawl and Search Framework (ECSF)	<p>Oracle Enterprise Crawl and Search Framework (ECSF) enables Oracle Fusion Applications Search for performing full-text searches securely and simultaneously against multiple logical business objects. Any application that connects to multiple data sources or manages a significant amount of unstructured (non-database) information—or both—needs advanced search capabilities so that application users can easily locate and take action on data that is relevant to them.</p> <p>See <a href="#">Chapter 9, "Managing Search with Oracle Enterprise Crawl and Search Framework."</a></p>

### 1.1.3 Oracle Fusion Middleware Components

Oracle Fusion Middleware includes the following components described in [Table 1–3](#).

**Table 1–3 Oracle Fusion Middleware Components**

Oracle Fusion Middleware Components	Description
Oracle Application Development Framework (Oracle ADF)	<p>Provides an end-to-end application framework that builds on Java Platform, Enterprise Edition (Java EE) standards and open-source technologies to simplify and accelerate implementing service-oriented applications.</p> <p>See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Application Development Framework</i>.</p>

**Table 1–3 (Cont.) Oracle Fusion Middleware Components**

Oracle Fusion Middleware Components	Description
Oracle Business Intelligence	<p>Oracle Business Intelligence provides a complete, integrated solution of analytics and reporting for Oracle Fusion Applications.</p> <p>See the following documentation on Oracle Business Intelligence components in Oracle Fusion Applications:</p> <ul style="list-style-type: none"> <li>■ Oracle BI Enterprise Edition: <i>Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition</i></li> <li>■ Oracle Business Intelligence Publisher: <a href="#">Chapter 8</a></li> <li>■ Oracle Essbase: <i>Oracle Essbase Database Administrator's Guide</i> and <i>Oracle Essbase Technical Reference</i></li> <li>■ Oracle Enterprise Performance Management: <a href="http://www.oracle.com/technetwork/middleware/performance-management/documentation/index.html">http://www.oracle.com/technetwork/middleware/performance-management/documentation/index.html</a></li> <li>■ Oracle Real-Time Decisions: <i>Oracle Fusion Middleware Platform Developer's Guide for Oracle Real-Time Decisions</i></li> <li>■ Oracle Transactional Business Intelligence: <i>Oracle Fusion Administrator's Guide for Transactional Business Intelligence</i></li> </ul> <p>After the Oracle Fusion applications are running, you can configure the Oracle Business Intelligence Applications for analyzing historical data. See the <i>Oracle Fusion Middleware Installation and Configuration Guide for Oracle Business Intelligence Applications</i>.</p>
Oracle Data Integrator	<p>Oracle Data Integrator provides a comprehensive data integration platform that covers bulk data movement requirements for Oracle Fusion Applications.</p> <p>See the <i>Oracle Fusion Middleware Developer's Guide for Oracle Data Integrator</i>.</p>
Oracle HTTP Server	<p>Provides a web listener for applications and the framework for hosting static and dynamic pages and applications over the web. Based on the proven technology of the Apache HTTP Server, Oracle HTTP Server includes significant enhancements that facilitate load balancing, administration, and configuration.</p> <p>See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle HTTP Server</i>.</p>



**Table 1–3 (Cont.) Oracle Fusion Middleware Components**

Oracle Fusion Middleware Components	Description
Oracle Identity Management	<p>Provides a shared infrastructure for all applications, enabling developers to incorporate identity management into applications.</p> <p>For more information about documentation for Oracle Identity Management components in Oracle Fusion Applications, see the following guides:</p> <ul style="list-style-type: none"> <li>■ Oracle Platform Security Services (OPSS): <i>Oracle Fusion Middleware Application Security Guide</i> and <i>Oracle Fusion Middleware Security Overview</i></li> <li>■ Oracle Access Manager: <i>Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager with Oracle Security Token Service</i></li> <li>■ Oracle Authorization Policy Manager: <i>Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)</i></li> <li>■ Oracle Identity Manager: <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager</i></li> <li>■ Oracle Internet Directory: <i>Oracle Fusion Middleware Administrator's Guide for Oracle Internet Directory</i></li> <li>■ Oracle Virtual Directory: <i>Oracle Fusion Middleware Administrator's Guide for Oracle Virtual Directory</i></li> </ul>
Oracle SOA Suite	<p>Provides a complete set of service infrastructure components for designing, deploying, and managing composite applications. Oracle SOA Suite enables services to be created, managed, and orchestrated into composite applications and business processes. Composites enable you to easily assemble multiple technology components into one SOA composite application.</p> <p>An important component of Oracle SOA Suite is Oracle WSM Policy Manager. Oracle WSM Policy Manager provides the infrastructure for enforcing global security and auditing policies. By securing various endpoints and setting and propagating identity, it secures applications. Oracle WSM Policy Manager provides a standard mechanism for signing messages, performing encryption, performing authentication, and providing role-based access control. You also can change a policy without having to change the endpoints or clients for this endpoints, providing greater flexibility and security monitoring for your enterprise.</p> <p>The Oracle Business Process Management (Oracle BPM) Suite provides an integrated environment for developing, administering, and using business applications centered around business processes. The Oracle BPM Suite is layered on the Oracle SOA Suite and shares many of the same product components.</p> <p>See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite and Oracle Business Process Management Suite</i>.</p>

**Table 1–3 (Cont.) Oracle Fusion Middleware Components**

Oracle Fusion Middleware Components	Description
Oracle Secure Enterprise Search (Oracle SES)	<p>Provides a search engine for Oracle Fusion Applications Search. For more information on Oracle SES, see the following guides:</p> <ul style="list-style-type: none"> <li>■ <i>Oracle Secure Enterprise Search Administrator's Guide</i></li> <li>■ <i>Oracle Secure Enterprise Search Administration API Guide</i></li> <li>■ <i>Oracle Secure Enterprise Search Java API Reference</i></li> </ul> <p>For more information on how Oracle SES and ECSF provide Oracle Fusion Applications Search, see <a href="#">Chapter 9, "Managing Search with Oracle Enterprise Crawl and Search Framework."</a></p>
Oracle WebCenter Content	<p>Provides a comprehensive suite of digital content management tools. These tools can be used across the enterprise to cohesively track, manage, and dispose of content whether written, in digital images, or as email.</p> <p>For more information about documentation for Oracle Enterprise Content Management components in Oracle Fusion Applications, see:</p> <ul style="list-style-type: none"> <li>■ <i>WebCenter Content: Oracle WebCenter Content System Administrator's Guide for Content Server</i></li> <li>■ <i>Oracle WebCenter Content: Imaging: Oracle WebCenter Content Administrator's Guide for Imaging</i></li> </ul>
Oracle WebCenter Portal	<p>Enables you to create social applications, enterprise portals, collaborative communities, and composite applications, built on a standards-based, service-oriented architecture. Oracle WebCenter Portal combines dynamic user interface technologies with which to develop rich internet applications, the flexibility and power of an integrated, multichannel portal framework, and a set of horizontal Enterprise 2.0 capabilities delivered as services that provide content, collaboration, presence, and social networking capabilities. Based on these components, Oracle WebCenter Portal also provides an out-of-the-box, enterprise-ready customizable application, WebCenter Spaces, with a configurable work environment that enables individuals and groups to work and collaborate more effectively.</p> <p>See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle WebCenter Portal</i>.</p>
Oracle WebGate	<p>Acts as a communicator plug-in that accepts users requests through Oracle HTTP Server and communicates with Oracle Access Manager.</p> <p>See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager with Oracle Security Token Service</i>.</p>
Oracle WebLogic Communication Services	<p>Provides click-to-dial functionality for applications primarily through contextual actions. Contextual actions provide related information and actions to users within the immediate context of the object instances upon which they act.</p> <p>For more information for enabling these services, see <a href="#">Chapter 10, "Managing Oracle WebLogic Communication Services for Click-to-Dial Functionality."</a></p>
Oracle WebLogic Server	<p>Supports the deployment of mission-critical applications in a robust, secure, highly available, and scalable environment. Oracle WebLogic Server is an ideal foundation for building applications based on service-oriented architecture (SOA).</p> <p>See the <i>Oracle Fusion Middleware Introduction to Oracle WebLogic Server</i>.</p>

## 1.1.4 Oracle Database

The Oracle Database contains the schemas and tablespaces required for both the Oracle Fusion Applications and for your applications. Oracle Fusion Applications does not support other databases.

Oracle Fusion Applications encryption APIs mask data such as credit card numbers in application user interface fields. For encryption and masking beyond that, Transparent Data Encryption (TDE) and Oracle Database Vault (ODV) are certified but optional with Oracle Fusion Applications.

TDE and ODV provide information lifecycle protections, such as the following:

- Data access restrictions on database administrators and other privileged users
- Sensitive data at rest in database files and file backups
- Sensitive data in transit
- Sensitive attributes in non-production databases

ODV establishes limitations on the power of privileged users to access sensitive data through segregation of duties policies on DBA roles and by securely consolidating application data in the database. These limitations prevent DBAs and other privileged users from overriding the protections placed on sensitive data by the Virtual Private Database (VPD). Oracle Fusion Applications deploys with the ODV enabled when it is installed.

TDE prevents access to PII in the file system or on backups or disk. TDE protects confidential data, such as credit card and social security numbers. TDE encrypts sensitive table data stored in data files at the tablespace level.

For more information about ODV and TDE, see the *Oracle Fusion Applications Security Guide*.

## 1.1.5 Oracle Enterprise Manager Fusion Applications Control

Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) enables you to manage a single product family in an Oracle WebLogic Server domain for the Oracle Fusion Applications environment, including the products, applications, and Oracle Fusion Middleware components. As a part of management, you can monitor the runtime performance metrics for the various Oracle Fusion Applications and Oracle Fusion Middleware components. See [Section 2.5](#) for more information about Fusion Applications Control and [Section 2.2](#) for a comparison with Cloud Control.

## 1.1.6 Oracle Enterprise Manager Cloud Control

Oracle Enterprise Manager Cloud Control (Cloud Control) enables you to monitor and manage the complete IT infrastructure for Oracle Fusion Applications from a single console. You can monitor all the product families, Oracle Fusion Middleware components, and the Oracle Database. For example, you can monitor all the Oracle WebLogic Server domains for all the product families from one console. See [Section 2.7](#) for more information about Fusion Applications Control and [Section 2.2](#) for a comparison with Fusion Applications Control.

## 1.1.7 Oracle Enterprise Manager Database Control

Oracle Enterprise Manager Database Control (Database Control) enables you to manage the Oracle Database.

Using Database Control, you can perform administrative tasks such as creating schema objects (tables, views, indexes, and so on), managing user security, managing database memory and storage, backing up and recovering your database, and importing and exporting data. You can also view performance and status information about your database.

For more information, see the "Introduction to Oracle Enterprise Manager Database Control" section in the *Oracle Database 2 Day DBA*.

## 1.2 Key Oracle Fusion Applications Concepts

Before you begin administering Oracle Fusion Applications, it is important to understand the basics of installation, how Oracle WebLogic Server domains are configured, and the basic directory structure.

This section contains the following topics:

- [Section 1.2.1, "Provisioning and the Installation Process"](#)
- [Section 1.2.2, "Oracle WebLogic Server Domains Configuration"](#)
- [Section 1.2.3, "Provisioned Oracle Fusion Applications Home Directories"](#)

### 1.2.1 Provisioning and the Installation Process

Provisioning is the entire set of operations required to install, configure, and deploy applications product offerings from a system point of view. It performs these operations:

- Installation provides the operations related to laying down all the component needed to create an Oracle Fusion Applications environment.
- Configuration tailors components based on the applications topology, the creation of Oracle WebLogic Server Managed Servers and clusters, and the updating of endpoints and virtual hosts.
- Deployment starts the Managed Servers and clusters and facilitates the actual use of product offerings.

This orchestration by a single processing engine ensures that all components interact smoothly and consistently in the applications environment.

For detailed information about provisioning and installing an Oracle Fusion Applications environment, see *Oracle Fusion Applications Installation Guide*.

This section contains the following topics:

- [Section 1.2.1.1, "Installation Options"](#)
- [Section 1.2.1.2, "Installing an Oracle Database and Loading Content"](#)

#### 1.2.1.1 Installation Options

You choose options from the Provisioning Wizard menu to initiate one installation-related processes:

- Install an empty, single-instance Enterprise database
- Create a new provisioning plan
- Install, configure, and deploy the product offerings in a provisioning plan
- Uninstall an existing environment

### 1.2.1.2 Installing an Oracle Database and Loading Content

You must have installed and configured a transaction database before you install product offerings. You can use the Provisioning Wizard to create an empty, single-instance database instance. This is a discrete and separate task from the other provisioning options. Alternatively, you can install the database manually without using the wizard.

In either case, you finish the database installation by running the Oracle Fusion Applications Repository Creation Utility (Applications RCU) to load applications and middleware content into the database. This process creates the applications and middleware schemas, loads seed data, and creates the tablespaces, as well all other required packages.

For more information about creating a database with Applications RCU, see the *Oracle Fusion Applications Installation Guide*.

## 1.2.2 Oracle WebLogic Server Domains Configuration

See "What Is an Oracle WebLogic Server Domain?" in the *Oracle Fusion Middleware Administrator's Guide* to understand the following concepts for Oracle WebLogic Server:

- Oracle WebLogic Server domains
- Managed Servers and the Administration Server

During installation, the applications for a single product family are deployed to one **Oracle WebLogic Server domain**. Within a single domain, an **Administration Server** hosts the application for Fusion Applications Control and Oracle WebLogic Server Administration Console, and the **Managed Servers** host the Java EE applications for the product family. The Managed Servers are grouped together into a cluster for each application of the product family. [Figure 1–3](#) shows a domain with an Administration Server and three Managed Servers in clusters. If you want to scale out the Java EE application, you simply add new servers to the cluster. In an Oracle Fusion Applications environment, the domains are predefined so that the product families and their dependencies are always stored in a standardized arrangement.

**Figure 1–3 Oracle WebLogic Server Domain**



As an example of greater detail for a product family, [Figure 1–4](#) shows a portion of the domain for the Oracle Fusion Financials product family with an Administration Server and eight Managed Servers in a cluster. The applications are each deployed to a Managed Server within a cluster. In addition to the applications for Oracle Fusion Financials, the domain also contains an Oracle Enterprise Scheduler cluster and a SOA cluster. The Oracle Enterprise Scheduler (ESSAPP) application manages job requests for the product family. The SOA Infrastructure (*soa-infra*) application hosts the SOA composites for the applications in the product family.

**Figure 1–4 Oracle WebLogic Server Domain for the Oracle Fusion Financials Family**

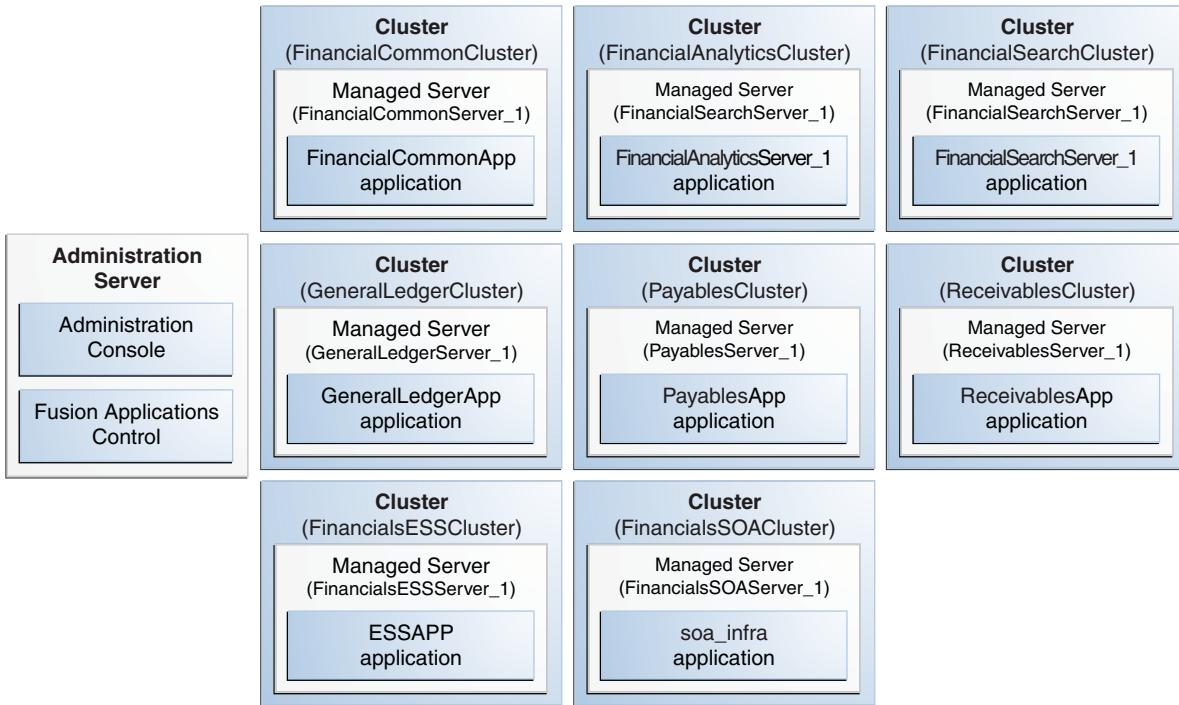
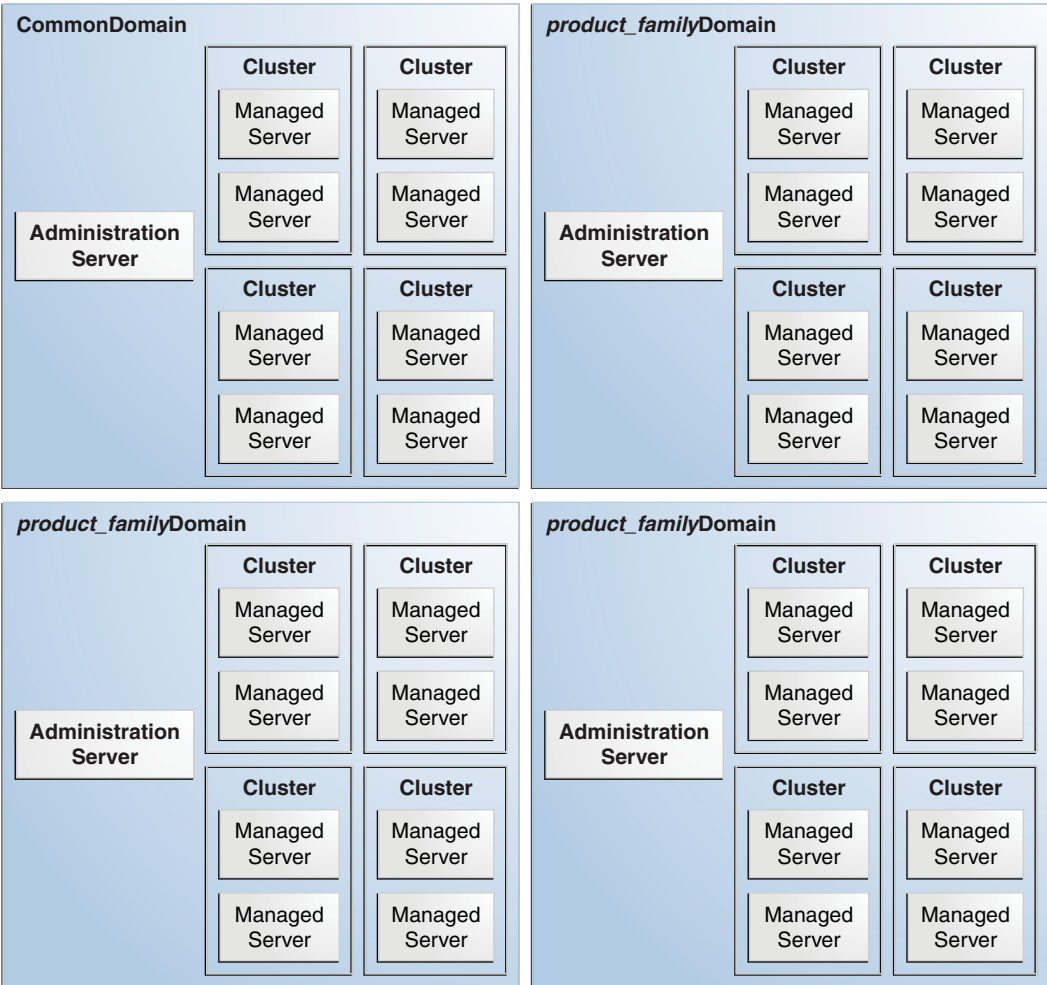


Figure 1–5 shows an Oracle Fusion Applications environment with multiple product families, each in separate Oracle WebLogic Server domains. The `CommonDomain` is the domain in the Oracle Fusion Setup product family.

Figure 1-5 Multiple Product Families



### 1.2.3 Provisioned Oracle Fusion Applications Home Directories

An installation of Oracle Fusion Applications contains two mount point directories, *APPLICATIONS\_BASE* for the binaries and *APPLICATIONS\_CONFIG* for the configuration files. The *APPLICATIONS\_BASE* and *APPLICATIONS\_CONFIG* directories contain various types of home directories. The home directories described in [Table 1-4](#).

**Table 1–4 Home Directories**

Home Directory	Description	Variable Representation
<b>Applications base</b>	This directory is the top-level directory for the Oracle Fusion Applications binaries. You specify the location of this top-level directory at the time of provisioning. <a href="#">Figure 1–6</a> represents this directory as <code>/net/mount1/appbase</code> to show an example directory structure.	<code>APPLICATIONS_BASE</code>
<b>Applications configuration</b>	This directory is the top-level directory for the Oracle Fusion Applications configuration files. You specify a location for this top-level directory at the time of provisioning. Provisioning automatically creates a subdirectory named <code>instance</code> as a container for the configuration files. <a href="#">Figure 1–6</a> represents this directory as <code>/net/mount2/instance</code> to show an example directory structure.	<code>APPLICATIONS_CONFIG</code>
<b>Middleware home</b>	<p>This directory provides a container for the Oracle WebLogic Server home, an Oracle Common home, and one or more Oracle homes for components. A Middleware home can reside on a local file system or on a remote shared disk that is accessible through Network File System (NFS).</p> <p>An installation of Oracle Fusion Applications creates two Middleware homes:</p> <ul style="list-style-type: none"> <li>▪ <code>fusionapps</code> for the Oracle WebLogic Server home and Oracle homes for Oracle Fusion Middleware components, such as Oracle Business Intelligence, Oracle SOA Suite, Oracle Data Integrator, WebCenter, Oracle Enterprise Content Management, Oracle Secure Enterprise Search, and Oracle Fusion Middleware Extensions for Applications (Applications Core)</li> <li>▪ <code>webtier_mwhome</code> for the system components, such as Oracle HTTP Server</li> </ul> <p>For operations on specific Middleware home directories, this guide refers to each Middleware home by its product name or specifies the directory. For example, the Middleware home for Oracle Fusion Applications is referred to as the Oracle Fusion Applications Middleware home or the <code>fusionapps</code> Middleware home directory and its variable is <code>FA_MW_HOME</code>, while the Middleware home for Oracle Web Tier is referred to as the Web Tier Middleware home or the <code>webtier_mwhome</code> Middleware home directory and its variable is <code>WT_MW_HOME</code>. In cases where differentiation is not necessary, this guide refers to the Middleware home and uses the <code>MW_HOME</code> variable.</p>	<code>MW_HOME</code> <code>FA_MW_HOME</code> <code>WT_MW_HOME</code>
<b>Oracle Business Intelligence configuration home</b>	This directory contains the configuration files for the Oracle Business Intelligence installation.	<code>BI_CONFIG_HOME</code>
<b>Oracle Common home</b>	This directory contains the binary and library files required for Fusion Applications Control, test to production, and Java Required Files (JRF). The Java Required Files include the Oracle ADF libraries, several other components shared by the product suites included in a given installation, and components such as Oracle Metadata Service (MDS) and Oracle Platform Security Services (OPSS).	<code>ORACLE_COMMON_HOME</code>

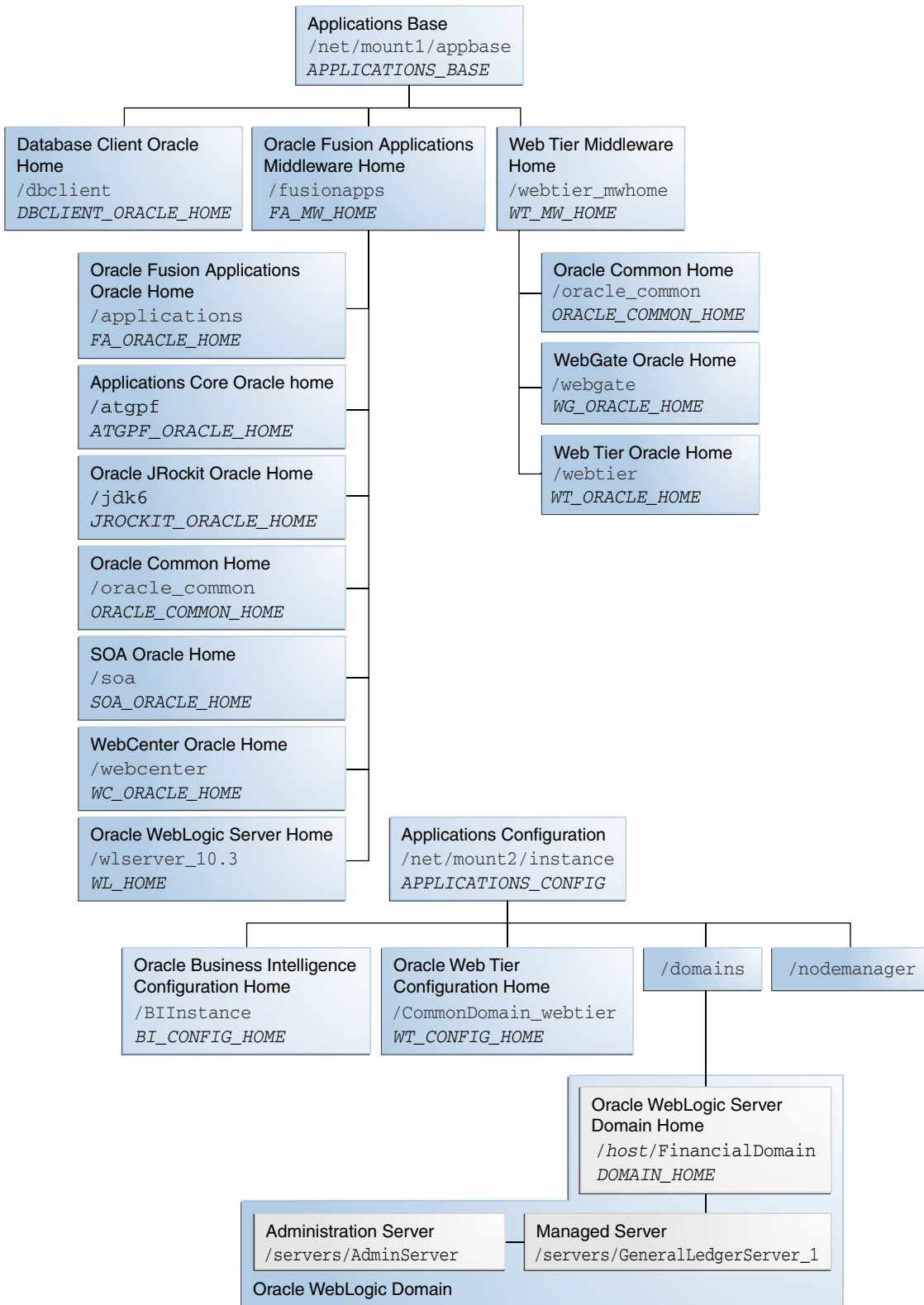


**Table 1–4 (Cont.) Home Directories**

Home Directory	Description	Variable Representation
<b>Oracle Database client home</b>	This directory provides a container for the Oracle Database client software files.	<i>DBCLIENT_ORACLE_HOME</i>
<b>Oracle WebLogic Server home</b>	This directory contains installed files necessary to host Oracle WebLogic Server. The Oracle WebLogic Server home directory is a peer of Oracle home directories and resides within the directory structure of the Middleware home.	<i>WL_HOME</i>
<b>Oracle home</b>	<p>This directory contains installed files necessary to host a specific component or software suite. For example, the files for Oracle SOA Suite are stored in an Oracle home directory named <i>soa</i>, and the application artifacts for Oracle Fusion Applications are stored in an Oracle home directory named <i>applications</i>.</p> <p>An Oracle home resides within the directory structure of the Middleware home. There can be multiple Oracle homes within each Middleware home.</p> <p>This guide refers to each Oracle home by product name or specifies the directory. For example, the Oracle home for Oracle SOA Suite is referred to as the SOA Oracle home or the <i>soa</i> Oracle home directory and its variable is <i>SOA_ORACLE_HOME</i>, while the Oracle home for Oracle Fusion Applications is referred to as the Oracle Fusion Applications Oracle home or the <i>applications</i> Oracle home and its variable is <i>FA_ORACLE_HOME</i>.</p>	<i>ATGPF_ORACLE_HOME</i> <i>FA_ORACLE_HOME</i> <i>JROCKIT_ORACLE_HOME</i> <i>SOA_ORACLE_HOME</i> <i>WC_ORACLE_HOME</i> <i>WG_ORACLE_HOME</i> <i>WT_ORACLE_HOME</i>
<b>Oracle Web Tier configuration home</b>	This directory contains the configuration files for the Oracle Web Tier installation.	<i>WT_CONFIG_HOME</i>
<b>Oracle WebLogic Server domain home</b>	This directory contains the configuration files for the Administration Server and the Managed Servers for the product family.	<i>DOMAIN_HOME</i>

Figure 1–6 shows the relationship of the home directories using the Oracle Fusion Financials product family on a UNIX environment as an example. This figure does not show all the subdirectories under *APPLICATIONS\_BASE* and *APPLICATIONS\_CONFIG* directory. For example, the *APPLICATIONS\_CONFIG* directory contains several more directories for component-specific configuration files. Also, the Oracle Database and Oracle Identity Management is not represented in this figure, as they are installed separately.

**Figure 1–6 Relationship of Home Directories**



For more information about the detailed directory structure, see the *Oracle Fusion Applications Installation Guide*.

## 1.3 Roadmap for Administering Oracle Fusion Applications

To gain a better understanding of where administration fits into the overall process for installing, administering, and implementing Oracle Fusion Applications, see the *Oracle Fusion Applications Administrator and Implementor Roadmap*.

Before using the administrative procedures in this guide, ensure the Oracle Fusion Applications environment is provisioned, as described in the *Oracle Fusion Applications Installation Guide*.

The following provides a summary of the steps to configure, manage, and perform ongoing maintenance of an Oracle Fusion Applications environment after you have installed the software:

1. Start components. See [Section 4.4](#).
2. Configure ports. See [Section 4.5](#).
3. Configure passwords. See [Section 4.6](#).
4. Manage the Oracle database. See [Section 4.7](#).
5. Configure security. See [Chapter 6](#).
6. Deploy customizations. See the *Oracle Fusion Applications Extensibility Guide for Developers*.
7. Monitor your environment. See [Chapter 11](#), [Chapter 12](#), [Chapter 13](#), and [Chapter 14](#).
8. Manage log files and diagnostic information. See [Chapter 15](#).
9. Backup your environment. See [Chapter 17](#).
10. Configure load balancing between different components or applications. See [Chapter 18](#).
11. Configure Oracle Transactional Business Intelligence to perform real-time analysis of the Oracle Fusion applications. See the *Oracle Fusion Administrator's Guide for Transactional Business Intelligence*.
12. After the Oracle Fusion applications are running, configure the Oracle Business Intelligence Applications applications for analyzing historical data. See the *Oracle Fusion Middleware Installation and Configuration Guide for Oracle Business Intelligence Applications*.

In addition to this guide, refer to the following guides for tasks that you may need to perform, depending on your business needs:

- *Oracle Fusion Applications Common Implementation Guide* for common setup and maintenance tasks for Oracle Fusion applications
- *Oracle Fusion Applications Post-Installation Guide* for configuration tasks to perform after installation
- *Oracle Fusion Applications Administrator's Troubleshooting Guide* for common issues in the runtime environment



# Part II

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## Basic Administration

This part describes basic administration tasks.

Part II contains the following chapters:

- [Chapter 2, "Getting Started with Administering Oracle Fusion Applications"](#)
- [Chapter 4, "Performing Routine Administrative Tasks"](#)
- [Chapter 6, "Securing Oracle Fusion Applications"](#)
- [Chapter 7, "Managing Oracle Enterprise Scheduler Service and Jobs"](#)
- [Chapter 8, "Managing Report Delivery Servers"](#)
- [Chapter 9, "Managing Search with Oracle Enterprise Crawl and Search Framework"](#)
- [Chapter 10, "Managing Oracle WebLogic Communication Services for Click-to-Dial Functionality"](#)



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# Getting Started with Administering Oracle Fusion Applications

This chapter provides information you need to get started administering your Oracle Fusion Applications environment, including information about the tools you use.

Before using the administrative procedures in this chapter and the rest of this guide, ensure the Oracle Fusion Applications environment is provisioned, as described in the *Oracle Fusion Applications Installation Guide*.

This chapter contains the following topics:

- [Section 2.1, "Introduction to the Tools Used to Administer Oracle Fusion Applications"](#)
- [Section 2.2, "Key Differences Between Fusion Applications Control and Cloud Control"](#)
- [Section 2.3, "When to Use Fusion Applications Control Tool, When to Use Oracle WebLogic Server Administration Console"](#)
- [Section 2.4, "Finding the Administration Server Port and Other Administrative URLs for Domains"](#)
- [Section 2.5, "Using Fusion Applications Control"](#)
- [Section 2.6, "Using Oracle WebLogic Server Administration Console"](#)
- [Section 2.7, "Using Cloud Control"](#)
- [Section 2.8, "Using Oracle Fusion Functional Setup Manager"](#)
- [Section 2.9, "Caution Against Using Database Tools to Modify Oracle Fusion Applications Data"](#)

## 2.1 Introduction to the Tools Used to Administer Oracle Fusion Applications

Oracle provides several tools to administer the Oracle Fusion Applications, the Oracle Fusion Middleware layer, and the Oracle Database within your Oracle Fusion Applications installations. Use these tools, rather than directly editing configuration files, to perform all administrative tasks unless a specific procedure requires you to edit a file. Editing a file may cause the settings to be inconsistent and generate problems.

The primary administration tools for Oracle Fusion Applications are described in [Table 2-1](#).

**Table 2–1 Administration Tools for Oracle Fusion Applications**

Tool	Description
Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control)	Enables you to monitor and administer a <b>product family</b> within the Oracle Fusion Applications environment. See <a href="#">Section 2.5</a> .
Oracle Enterprise Manager Cloud Control (Cloud Control)	Enables you to monitor and administer the entire Oracle Fusion Applications environment, including product families, Oracle Fusion Middleware components across all Oracle WebLogic Servers, and the Oracle Database. See <a href="#">Section 2.2</a> to understand the key difference between Cloud Control and Fusion Applications Control, and see <a href="#">Section 2.7</a> to get started with using Cloud Control.
Oracle Fusion Functional Setup Manager	Guides you through the tasks of setting up the functional data and reference data. See <a href="#">Section 2.5</a> .
Oracle Fusion Applications Diagnostic Dashboard	Enables you to register, execute, and monitor diagnostic tests for Oracle Fusion Applications, and also work with diagnostic test registration tags and purge diagnostic test results. See <a href="#">Chapter 15</a> .

The primary administration tools for Oracle Fusion Middleware are described in [Table 2–2](#).

**Table 2–2 Administration Tools for Oracle Fusion Middleware**

Tool	Description
Fusion Applications Control	Enables you to monitor and administer Oracle Fusion Middleware components within an <b>Oracle WebLogic Server domain</b> for a specific product family. Within a single domain, an <b>Administration Server</b> hosts the applications for Fusion Applications Control and Oracle WebLogic Server Administration Console. The <b>Managed Servers</b> in the domain host the Java EE applications for the product family. The Managed Servers are grouped together into a cluster for each application of the product family. See <a href="#">Section 2.5</a> .  Fusion Applications Control also includes a System MBean Browser that enables you browse the MBeans for an Oracle WebLogic Server or for a selected application. See "Getting Started Using the Fusion Middleware Control MBean Browsers" in the <i>Oracle Fusion Middleware Administrator's Guide</i> .
Oracle Enterprise Manager Cloud Control (Cloud Control)	Enables you to monitor and administer the entire Oracle Fusion Applications environment, including product families, Oracle Fusion Middleware components across all Oracle WebLogic Servers, and the Oracle Database. See <a href="#">Section 2.2</a> to understand the key difference between Cloud Control and Fusion Applications Control, and see <a href="#">Section 2.7</a> to get started with using Cloud Control.
Oracle Data Integrator Console	Enables you to manage and monitor an Oracle Data Integrator runtime architecture and browse design-time objects. For an overview of this console, see <i>Oracle Fusion Middleware Developer's Guide for Oracle Data Integrator</i> . For common modifications in an <b>Oracle Fusion Applications</b> environment, see <a href="#">Section 4.11</a> .
Oracle WebLogic Server Administration Console	Enables you to manage the Oracle WebLogic Server in each domain. The Administration Server hosts the application for the Oracle WebLogic Server Administration Console. See <a href="#">Section 2.3</a> to understand the when to use Administration Console, and see <a href="#">Section 2.7</a> to get started with using the Administration Console.



**Table 2–2 (Cont.) Administration Tools for Oracle Fusion Middleware**

Tool	Description
Oracle Fusion Middleware command-line tools	Enables you to manage Oracle Fusion Middleware components. See "Getting Started Using Command-Line Tools" in the <i>Oracle Fusion Middleware Administrator's Guide</i> to learn about the Oracle WebLogic Scripting Tool (WLST) and the Oracle Process Manager and Notification Server (OPMN).
Middleware support for application security	<p>The Oracle Fusion Applications environment includes the following tools for managing application security:</p> <ul style="list-style-type: none"> <li>■ Oracle Authorization Policy Manager enables you to manage application policies. See the <i>Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)</i>.</li> <li>■ Oracle Access Manager Administration Console enables you to manage system configurations, including Oracle Access Manager server instances and data sources, access policies, agent profiles, and other security elements. See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager with Oracle Security Token Service</i>.</li> <li>■ Oracle Identity Manager Administrative and User Console enables you to access the organization's resources (through self-service) and enable administrators to manage the access (by creating users and roles, and defining authorization policies). See the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Directory Integration Platform</i>.</li> <li>■ Oracle Web Service Policy Manager enables you manage and secure web services for SOA composite applications. See the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>.</li> </ul> <p>For an overview and information about Fusion security as it is relevant specifically to Oracle Fusion Applications, including details about how to interact with the Fusion Security infrastructure to implement and administer security for your enterprise, see the <i>Oracle Fusion Applications Security Guide</i>.</p>

The primary administration tools for the Oracle Database are described in [Table 2–3](#).

**Table 2–3 Administration Tools for the Oracle Database**

Tool	Description
Oracle Enterprise Manager Database Control	Enables you to monitor and manage the Oracle Database for the Oracle Fusion Applications. See the <i>Oracle Database 2 Day DBA</i> .
Cloud Control	Enables you to monitor historical data for the Oracle Database. See <a href="#">Section 2.7</a> .
SQL Plus	This is the command-line interface for administering databases.

## 2.2 Key Differences Between Fusion Applications Control and Cloud Control

You can manage your Oracle Fusion Applications environment using Fusion Applications Control or Cloud Control.

Fusion Applications Control organizes a wide variety of performance data and administrative functions into distinct, Web-based home pages for the farm, cluster, domain, servers, components, and applications. The Fusion Applications Control

home pages make it easy to locate the most important monitoring data and the most commonly used administrative functions all from your Web browser. Fusion Applications Control is automatically installed with each Oracle WebLogic Server domain for each product family during an Oracle Fusion Applications installation. For more information about this control, see [Section 2.5](#).

Managing several farms from different, distinct Fusion Applications Controls becomes very difficult in an Oracle Fusion Applications environment. For centralized management and additional management functionality (such as historical data collections for performance trending, email and page notifications for potential availability or performance problems, and service level management), you can use Cloud Control.

Cloud Control enables you to monitor all the product families, Oracle Fusion Middleware components, and the Oracle Database across the entire Oracle Fusion Applications environment from one console. To use Cloud Control, you need to separately install Oracle Enterprise Manager Cloud Control 12c (12.1.0.1) with the Application Management Pack for Oracle Fusion Applications. For more information about this control, see [Section 2.7](#). For more information about installing Cloud Control, see the following documentation:

- *Oracle Enterprise Manager Cloud Control Basic Installation Guide* for more information about the installation process
- *Oracle Enterprise Manager Licensing Information* for more information about the Application Management Pack

## 2.3 When to Use Fusion Applications Control Tool, When to Use Oracle WebLogic Server Administration Console

Fusion Applications Control and Oracle WebLogic Server Administration Console are graphical user interfaces that you can use to monitor and administer your environment. Use [Table 2-4](#) to locate the task you are performing.

**Table 2-4 Comparing Fusion Applications Control and WebLogic Server Administration Console**

Task	Tool to Use
<b>Manage Oracle WebLogic Server</b>	<b>Use:</b>
Create additional Managed Servers	WebLogic Server Administration Console
Clone Managed Servers	WebLogic Server Administration Console
Cluster Managed Servers	WebLogic Server Administration Console
Start and stop Oracle WebLogic Server	Fusion Applications Control or WebLogic Server Administration Console
Add users and groups	WebLogic Server Administration Console if using the default embedded LDAP; if using another LDAP server, use the LDAP server's tool
<b>Manage Data Sources</b>	<b>Use:</b>
Create data sources	WebLogic Server Administration Console
Create connection pools	WebLogic Server Administration Console
<b>Manage JMS Resources</b>	<b>Use:</b>
Create JMS queues	WebLogic Server Administration Console

**Table 2–4 (Cont.) Comparing Fusion Applications Control and WebLogic Server Administration Console**

<b>Task</b>	<b>Tool to Use</b>
Configure advanced queuing	WebLogic Server Administration Console
<b>Manage SOA environment</b>	<b>Use:</b>
Deploy and undeploy SOA Composite applications	Fusion Applications Control
Monitor SOA Composite applications	Fusion Applications Control
Modify Oracle BPEL Process Manager MBean properties	Fusion Applications Control
Debug applications such as Oracle BPEL Process Manager applications	Fusion Applications Control
<b>ADF Applications</b>	<b>Use:</b>
Deploy and undeploy ADF applications	Fusion Applications Control
<b>Java EE applications</b>	<b>Use:</b>
Deploy and undeploy Java EE applications	WebLogic Server Administration Console or Fusion Applications Control
<b>Security</b>	<b>Use:</b>
Configure and manage auditing	Fusion Applications Control
Configure SSL	WebLogic Server Administration Console for Oracle WebLogic Server  Fusion Applications Control for Java components and system components. See <a href="#">Chapter 6</a> .
Change passwords	WebLogic Server Administration Console
<b>Manage Components</b>	<b>Use:</b>
View and manage log files	Fusion Applications Control for most log files. See <a href="#">Section 15.3</a> .  WebLogic Server Administration Console for the following logs: <i>DOMAIN_HOME/servers/server_name/logs/access.log</i> <i>DOMAIN_HOME/servers/server_name/data/ldap/log/EmbeddedLDAP.log</i> <i>DOMAIN_HOME/servers/server_name/data/ldap/log/EmbeddedLDAPAccess.log</i>
Change ports	WebLogic Server Administration Console for Oracle WebLogic Server and Java components  For some system components, Fusion Applications Control.
Manage Oracle HTTP Server	Fusion Applications Control
Start and stop components	Fusion Applications Control
Start and stop applications	Fusion Applications Control
Manage Business Intelligence (BI) system components	Fusion Applications Control

## 2.4 Finding the Administration Server Port and Other Administrative URLs for Domains

Within a single Oracle WebLogic Server domain, an Administration Servers hosts the application for Fusion Applications Control and Oracle WebLogic Server Administration Console. To locate the port for the Administration Server and other administrative URLs for the Oracle WebLogic Server domains, use the provisioning summary file saved during provisioning.

During provisioning of Oracle Fusion Applications, on the Summary page of the Provisioning Wizard, you used the **Response File Name** and **Provisioning Summary** fields to specify the response and provisioning summary file locations. For more information about these files, see the "Summary" section in the *Oracle Fusion Applications Installation Guide*.

In the provisioning summary file, under the Admin Server entry for the domain, locate the following subentries:

- Managed Server Port for the Administration Server port
- Enterprise Manager Welcome Page for the URL for Fusion Applications Control
- Admin Console for the URL for the Oracle WebLogic Server Administration Console

[Example 2-1](#) shows an excerpt of the summary file.

### **Example 2-1 Summary File Excerpt**

```
...
Common Domain
  Admin Server
    Host: hostname.domain
    Managed Server Port: 7001
    Secure Managed Server Port: 7002
  Admin Console
    http://commoninternal.domain:7777/console
  Enterprise Manager Welcome Page
    http://commoninternal.domain:7777/em
  Functional Setup Manager
    Host: hostname.domain
    Managed Server Port: 7004
    Secure Managed Server Port: 7005
  Home Page
    Host: hostname.domain
    Managed Server Port: 7006
    Secure Managed Server Port: 7007
  Home Page
    Host: hostname.domain
    Managed Server Port: 7006
    Secure Managed Server Port: 7007
  Help Portal
    Host: hostname.domain
    Managed Server Port: 7008
    Secure Managed Server Port: 7009
  Business Process Server
    Host: hostname.domain
    Managed Server Port: 7010
    Secure Managed Server Port: 7011
  Content Server
    Host: hostname.domain
```

```

    Managed Server Port: 7012
    Secure Managed Server Port: 7013
Secure Enterprise Search
    Host: hostname.domain
    Managed Server Port: 7016
    Secure Managed Server Port: 7017
Enterprise Scheduler
    Host: hostname.domain
    Managed Server Port: 7020
    Secure Managed Server Port: 7021
WebCenter Spaces
    Host: hostname.domain
    Managed Server Port: 7022
    Secure Managed Server Port: 7023
WebCenter Collaboration
    Host: hostname.domain
    Managed Server Port: 7024
    Secure Managed Server Port: 7025
OWLCS Server
    Host: hostname.domain
    Managed Server Port: 7030
    Secure Managed Server Port: 7031
OWLCS SIP State Server
    Host: hostname.domain
    Managed Server Port: 7032
    Secure Managed Server Port: 7033
Web Tier
    Host: hostname.domain
CRM Domain
    Admin Server
        Host: hostname.domain
        Managed Server Port: 9001
        Secure Managed Server Port: 9002
        Admin Console
            http://crminternal.domain:7777/console
        Enterprise Manager Welcome Page
            http://crminternal.domain:7777/em
    ...
Financial Domain
    Admin Server
        Host: hostname.domain
        Managed Server Port: 7401
        Secure Managed Server Port: 7401
        Admin Console
            http://fininternal.domain:7777/console
        Enterprise Manager Welcome Page
            http://fininternal.domain:7777/em
    ...

```

## 2.5 Using Fusion Applications Control

Fusion Applications Control is a Web browser-based, graphical user interface that you can use to monitor a product family and its products. It also enables you to monitor and administer Oracle Fusion Applications and an Oracle Fusion Middleware farm.

A **farm** is a collection of components managed by Fusion Applications Control. It can contain an Oracle WebLogic Server domain, one Administration Server, one or more Managed Servers, clusters, and the Oracle Fusion Middleware components that are installed, configured, and running in the domain.

Fusion Applications Control organizes a wide variety of performance data and administrative functions into distinct, Web-based home pages for the product family, products, Oracle Fusion Applications, farm, domain, servers, and Oracle Fusion Middleware components. The Fusion Applications Control home pages make it easy to locate the most important monitoring data and the most commonly used administrative functions for various targets—all from your Web browser.

The section contains the following topics:

- [Section 2.5.1, "Understanding How Fusion Applications Control Compares with Fusion Middleware Control"](#)
- [Section 2.5.2, "Accessing Fusion Applications Control"](#)
- [Section 2.5.3, "Using Fusion Applications Control Help"](#)
- [Section 2.5.4, "Navigating within Fusion Applications Control"](#)
- [Section 2.5.5, "Understanding the Targets in the Target Navigation Pane"](#)
- [Section 2.5.6, "Navigating to the Product Family and Product Administration Pages"](#)
- [Section 2.5.7, "Viewing the Performance of Targets"](#)
- [Section 2.5.8, "Understanding Users and Roles for Fusion Applications Control"](#)

For information about the System MBean Browser, see the "Getting Started Using the Fusion Middleware Control MBean Browsers" section in the *Oracle Fusion Middleware Administrator's Guide*.

## 2.5.1 Understanding How Fusion Applications Control Compares with Fusion Middleware Control

If you have worked with Oracle Fusion Middleware, then you may already be familiar with Fusion Middleware Control. Fusion Middleware Control enables you to monitor and administer a farm. Fusion Applications Control provides all the functionality available in Fusion Middleware Control plus functionality specific to Oracle Fusion Applications.

Many procedures throughout this guide reference content in Oracle Fusion Middleware guides, which describes using Fusion Middleware Control. Where these references occur, the same procedures also apply to Fusion Applications Control. Where the controls vary, the procedures for Fusion Applications Control are contained within this guide.

## 2.5.2 Accessing Fusion Applications Control

To display Fusion Applications Control for a given Oracle WebLogic Server domain:

1. Enter the URL in your Web browser:

```
http://product_familyinternal.domain:port/em
```

where *product\_familyinternal.domain*. *port* is the host and domain of the Oracle HTTP Server or a Load Balancer.

During provisioning of Oracle Fusion Applications, on the Summary page of the Provisioning Wizard, you used the **Response File Name** and **Provisioning Summary** fields to specify the response and provisioning summary file locations. For more information about these files, see the "Summary" section in the *Oracle Fusion Applications Installation Guide*.

In the provisioning summary file, for the domain, find the Enterprise Manager Welcome Page entry to locate the URL. For example:

```
....
CommonDomain
    Enterprise Manager Welcome Page
    http://commoninternal.domain:7777/em
....
CRM Domain
    Enterprise Manager Welcome Page
    http://crminternal.domain:7777/em
....
Financial Domain
    Enterprise Manager Welcome Page
    http://fininternal.domain:7777/em
...
```

The login page displays.



2. Enter Oracle Fusion Middleware administrative user name and password, and then click **Login**.

In an Oracle Fusion Applications installation, this user is the super user specified on the Identity and Policy Management page of the Provisioning Wizard. See "Identity and Policy Management Configuration" section in the *Oracle Fusion Applications Installation Guide* for information about using the Identity and Policy Management Configuration page and [Section 6.8.5.2](#) to change the password.

### 2.5.3 Using Fusion Applications Control Help

At any time while using the Fusion Applications Control, you can click **Help** > **Enterprise Manager** at the top of the page to get more information. In most cases, the Help window displays a help topic about the current page. Click **Contents** in the Help window to browse the list of help topics, or click **Search** to search for a particular word or phrase.

## 2.5.4 Navigating within Fusion Applications Control

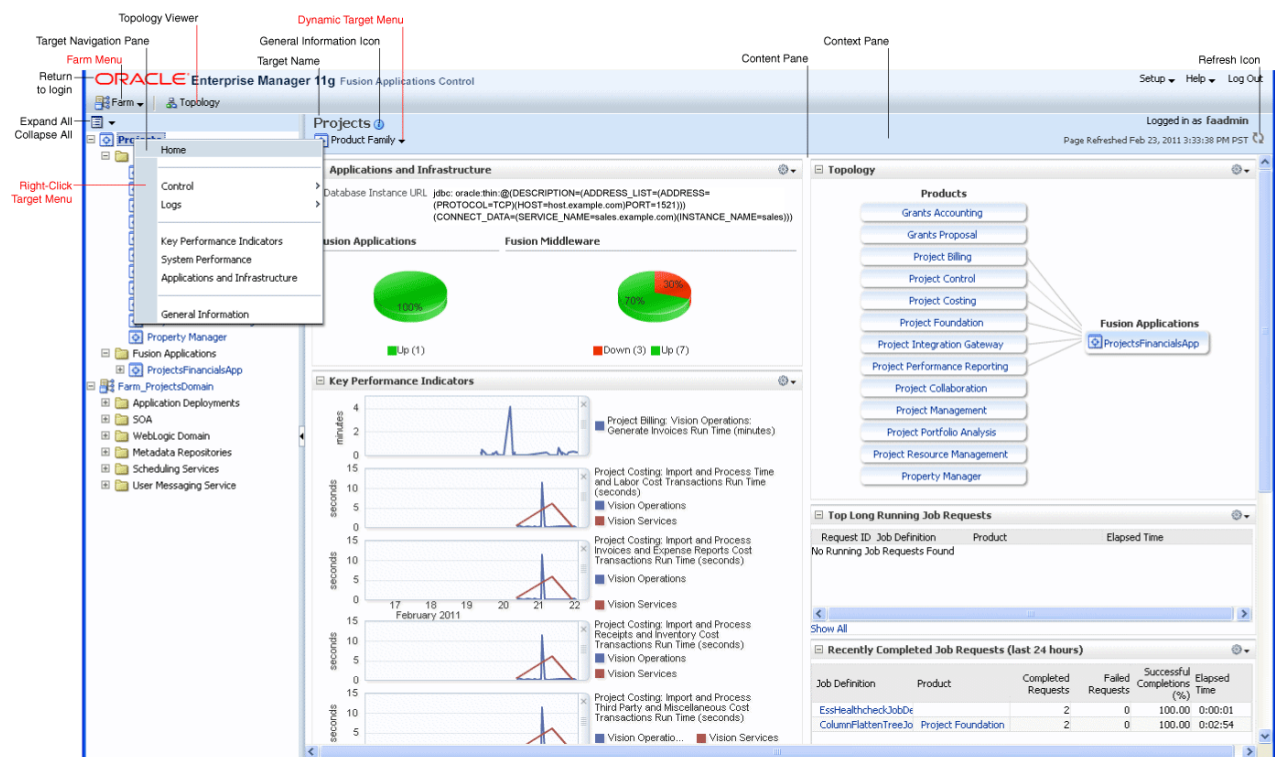
Fusion Applications Control displays the target navigation pane on the left and the content pane on the right. For example, when you first log in to Fusion Applications Control, the product family home page is displayed on the right.

From the target navigation pane, you can expand the tree and select either targets for the product family or the farm. See [Section 2.5.5](#) for more information about the target navigation pane.

When you select a target, the target home page displays in the content pane and that target's menu is displayed at the top of the page, in the context pane. For example, if you select a product family, the product family menu is displayed. You can also view the menu for a target by right-clicking the target in the navigation pane.

[Figure 2-1](#) shows the target navigation pane and the home page of a product family. Because a product family was selected, the dynamic target menu listed in the context pane is the product family menu.

**Figure 2-1 Overview of Fusion Applications Control**



In the preceding figure, the following items are called out:

- **Target Navigation Pane** lists all of the targets for an Oracle Fusion Applications product family and the farm navigation tree.
- **Content Pane** shows the current page for the target. When you first select a target, that target's home page is displayed.
- **Dynamic Target Menu** provides a list of operations that you can perform on the currently selected target. The menu that is displayed depends on the target you select. The menu for a specific target contains the same operations as those in the **Right-Click Target Menu**.



- **Right-Click Target Menu** provides a list of operations that you can perform on the currently selected target. The menu is displayed when you right-click the target name in the target navigation pane. In the figure, the user has right-clicked the product family.

The menu for a specific target contains the same operations as those in the **Dynamic Target Menu**.

- **Topology Viewer** displays the topology of the product family, including the middleware relationships and the products and applications in the product family.
- **Target Name** is the name of the currently selected target.
- **General Information Icon** provides information about the target. For example, for a domain, it displays the target name, the version, and the domain home.
- **Context Pane** provides the name of the target, the name of the current user, the host name, and the time of the last page refresh, as well as the Refresh icon.
- **Expand All/Collapse All** lets you expand or collapse the navigation tree.
- **Refresh** indicates when the page is being refreshed. Click it to refresh a page with new data. (Refreshing the browser window refreshes the page but does not retrieve new data.)
- **Go To Home** takes you to the product family home page, when you click the Oracle logo.

[Table 2–5](#) describes some common ways you can navigate within Fusion Applications Control.

**Table 2–5 Navigating within Fusion Applications Control**

To:	Take This Action:
View all of the targets in the farm	Click the <b>Expand All</b> icon at the top of the <b>target navigation pane</b> .
Navigate to a target	Select the target in the <b>target navigation pane</b> . Selecting the product family from the top of the displays the product family home page and selecting the farm displays the farm home page. You can expand the product family and the farm for additional targets.
Operate on a target	Right-click the target in the <b>target navigation pane</b> . The <b>target menu</b> display. Alternatively, you can select the target and use the <b>dynamic target menu</b> in the context pane.
Return to the target's home page	Click the <b>target name</b> at the top left-hand corner of the <b>context pane</b> .
Refresh a page with new data	Click the <b>Refresh</b> icon in the top right of the <b>context pane</b> .
Return to a previous page	Click the breadcrumbs, which appear below the context pane. The breadcrumbs appear when you drill down in a target. For example, from the WebLogic Server menu, choose <b>Logs &gt;View Log Messages</b> . Select a log file and click <b>View Log File</b> . The breadcrumbs show: <b>Log Messages &gt; Log Files &gt; View Log File: logfile_name</b>
View the host on which the target is running	Select the target in the <b>target navigation pane</b> and view the host name in the target's <b>context pane</b> . You can also view the host name by clicking the General Information icon.

**Table 2–5 (Cont.) Navigating within Fusion Applications Control**

<b>To:</b>	<b>Take This Action:</b>
Return to the product family home page	Click the <b>Oracle Enterprise Manager logo</b> at the top left of the page.
View the topology	Click <b>Topology</b> .
View a server log file	Right-click the server name in the <b>target navigation pane</b> . Choose <b>Logs &gt; View Log Messages</b> to see a summary of log messages and to search log files.

In addition, from Fusion Applications Control, from the home pages of targets such as the Administration Server or Managed Servers, you can access the WebLogic Server Administration Console. For information about configuring single sign-on between Fusion Middleware Control and the WebLogic Server Administration Console, see "Configuring Single Sign-On for Administration Consoles" in the *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management (Oracle Fusion Applications Edition)*.

## 2.5.5 Understanding the Targets in the Target Navigation Pane

Figure 2–2 shows the target navigation pane. The product family tree enables you to view an Oracle Fusion Applications product or application target. The farm tree enables you to select an Oracle WebLogic Server domain, an Oracle WebLogic Server Managed Server, an Oracle Fusion Middleware component, an application, or an Oracle Metadata Repository.

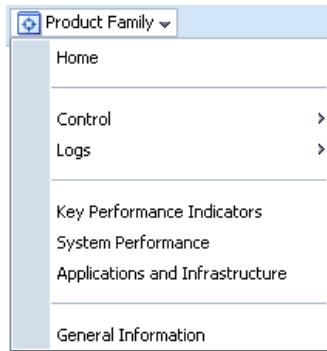
**Figure 2–2 Target Navigation Pane**

## 2.5.6 Navigating to the Product Family and Product Administration Pages

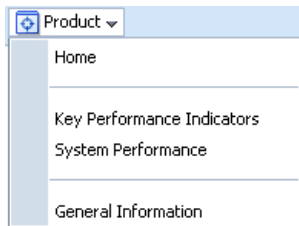
To navigate to the product family and product administration pages in Fusion Applications Control:

1. Navigate to the product family and product home page:
  - To access the product family home page, from the navigation pane, select the name of the product family.
  - To access the product home page, from the navigation pane, expand the product family, then **Products**, and then select the product.
2. Select the **Product Family** or **Product** menu.

The following figure shows the **Product Family** menu:



The following figure shows the **Product** menu:



The **Product Family** and **Product** menu displays the options described in [Table 2–6](#).

**Table 2–6 Product Family and Product Target Menu Options**

Menu Option	Description
<b>Home</b>	Displays the product family or product home page. For more information about this page, see <a href="#">Section 11.2</a> and <a href="#">Section 11.3</a> .
<b>Control</b>	This option provides options for starting and stopping all the cluster applications in the product family. These options do not start and stop the Managed Servers, which is recommended when starting and stopping all applications in a product family. Instead of these options, use one of the start and stop use cases described in <a href="#">Section 4.4</a> .
<b>Logs</b>	Displays the options to either view log messages or configure log messages for all the applications in the product family. For more information, see <a href="#">Section 15.3</a> .
<b>Key Performance Indicators</b>	Displays the Key Performance Indicators page for viewing the middle-tier metrics for the product family or product. see <a href="#">Section 2.5.7</a> , <a href="#">Section 11.9</a> , and <a href="#">Section 11.10</a> .
<b>System Performance</b>	Displays the System Performance page for viewing the middle-tier metrics for the product family, see <a href="#">Section 2.5.7</a> and <a href="#">Section 12.3.1</a> .
<b>Applications and Infrastructure</b>	Displays the Applications and Infrastructure page to view the status of Oracle Fusion Applications and Oracle Fusion Middleware components for the product family. See <a href="#">Section 11.8</a> for more information about using this page for monitoring applications, and see <a href="#">Section 12.2.1</a> for more information about using this page for monitoring Oracle Fusion Middleware.
<b>General Information</b>	Displays general details about the target.

## 2.5.7 Viewing the Performance of Targets

Fusion Applications Control automatically and continuously measures run-time performance. The performance metrics are automatically enabled; you do not need to set options or perform any extra configuration to collect them.

If you encounter a problem, such as an application that is running slowly or is hanging, you can view more detailed performance information, including performance metrics for a particular target, to find out more information about the problem. In many cases, these metrics are shown in interactive charts; other times they are presented in tabular format. The best way to use and correlate the performance metrics is from the Performance Summary page for the component or application you are monitoring.

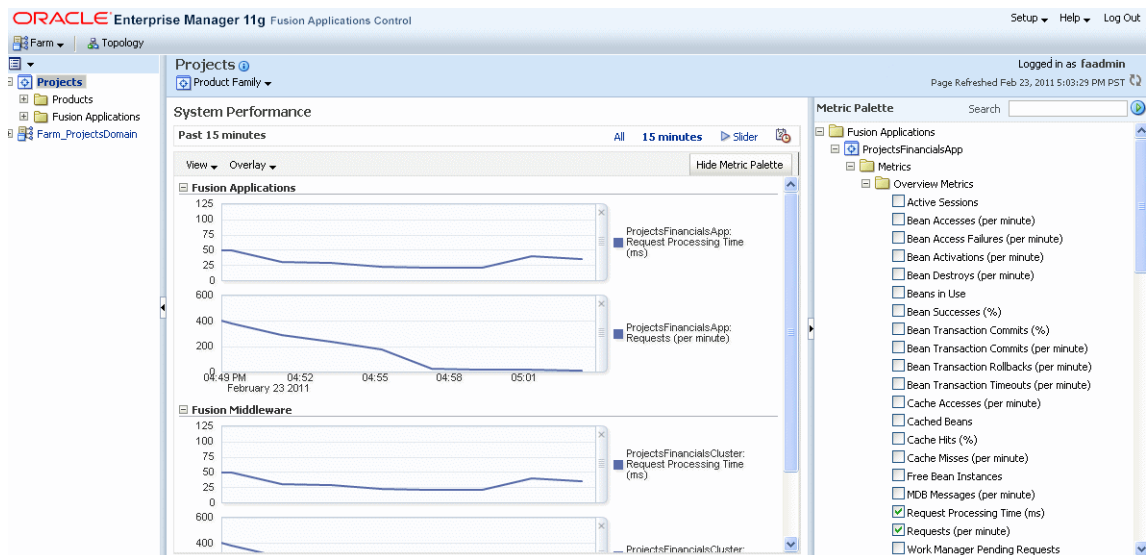
To view the performance of a target with Fusion Applications Control:

1. From the menu for a specific target, choose **Performance Summary**. If the target is a product family or product, choose **Key Performance Indicators** to view business metrics or **System Performance** to view middle tier metrics.

The Performance Summary page displays.

2. To see additional metrics, click **Show Metric Palette** and expand the metric categories.

The following figure shows the System Performance page for a product family with the Metric Palette displayed:



3. Select additional metrics to add them to the Performance Summary.
4. To re-organize the display of performance charts in the System Performance page, select **View > Reorder Chart Sets** and move charts up or down, or remove a particular chart from the page.
5. To overlay another target, click **Overlay**, and select the target. The target is added to the charts, so that you can view the performance of more than one target at a time, comparing their performance.

Alternatively, you can display historical business metrics of the same product instance. Select **Overlay > Today with Yesterday, This Week with Last Week or This Month with Last Month**.

6. To customize the time frame shown by the charts, you can:
  - Click **Slider** to display a slider tool that lets you specify that more or less time is shown in the charts. For example, to show the past 10 minutes, instead of the past 15 minutes, slide the left slider control to the right until it displays the last 10 minutes.
  - Click the **Enter Time** clock icon. Then, enter the **Start Time** and **End Time**, and click **OK**. If there is no data available from the earlier time point, a confirmation message displays, explaining the timeline will be automatically adjusted to the time period for which the data is available.
7. To save the chart set so as to preserve a specific set of metrics selected for display, as opposed to the default metrics, select **View > Save Chart Set** and enter a name for the chart set to be saved.

Use the Fusion Applications Control online help to obtain a definition of a specific performance metric. There are two ways to access this information:

- Browse or search for the metric in the Fusion Applications Control online help.
- Navigate to the Performance Summary page for your component or application and perform the following:
  - a. Click **Show Metric Palette**.
  - b. Browse the list of metrics available for the component or application to locate a specific metric.
  - c. Right-click the name of the metric and select **Help** from the context menu.

## 2.5.8 Understanding Users and Roles for Fusion Applications Control

To access Fusion Applications Control and perform tasks, you must have the appropriate role. Fusion Applications Control uses the Oracle WebLogic Server security realm and the roles defined in that realm. If a user is not granted one of these roles, the user cannot access Fusion Applications Control.

Each role defines the type of access a user has. For example, a user with the role Admin has full privileges. A user with the role Operator has privileges to perform essential day-to-day operations. A user with the role Monitor has privileges only to view the configuration.

For more information, see "Users, Groups, and Security Roles" in the *Oracle Fusion Middleware Securing Resources Using Roles and Policies for Oracle WebLogic Server*.

## 2.6 Using Oracle WebLogic Server Administration Console

Oracle WebLogic Server Administration Console is a Web browser-based, graphical user interface that you use to manage an Oracle WebLogic Server domain.

While Fusion Applications Control is the primary administrative interface, use Administration Console as specified by [Table 2-4](#) and wherever recommended in procedures in this guide.

The section contains the following topics:

- [Section 2.6.1, "Starting Oracle WebLogic Server Administration Console"](#)
- [Section 2.6.2, "Locking the WebLogic Server Configuration"](#)

## 2.6.1 Starting Oracle WebLogic Server Administration Console

To display Oracle WebLogic Server Administration Console for a given Oracle WebLogic Server domain:

1. Enter the URL in your Web browser:

```
http://product_familyinternal.domain:port/console
```

where *product\_familyinternal.domain*. *port* is the host and domain of the Oracle HTTP Server or a Load Balancer.

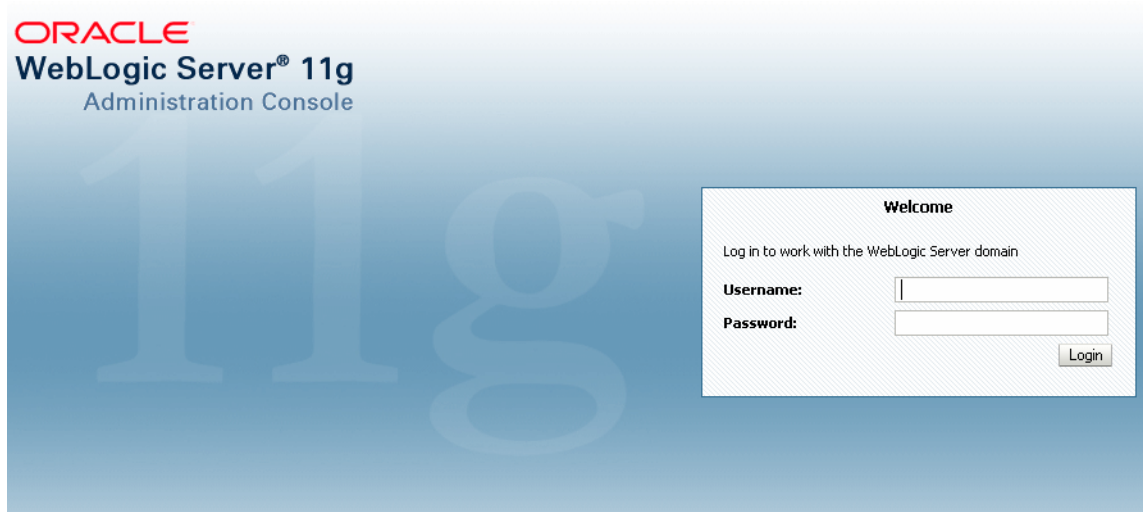
During provisioning of Oracle Fusion Applications, on the Summary page of the Provisioning Wizard, you used the **Response File Name** and **Provisioning Summary** fields to specify the response and provisioning summary file locations. For more information about these files, see the "Summary" section in the *Oracle Fusion Applications Installation Guide*.

In the provisioning summary file, for the domain, find the Admin Console entry to locate the URL. For example:

```
....
CommonDomain
  Admin Console
    http://commoninternal.domain:7777/console
....
CRM Domain
  Admin Console
    http://crminternal.domain:7777/console
....
Financial Domain
  Admin Console
    http://fininternal.domain:7777/console
...

```

The login page displays.

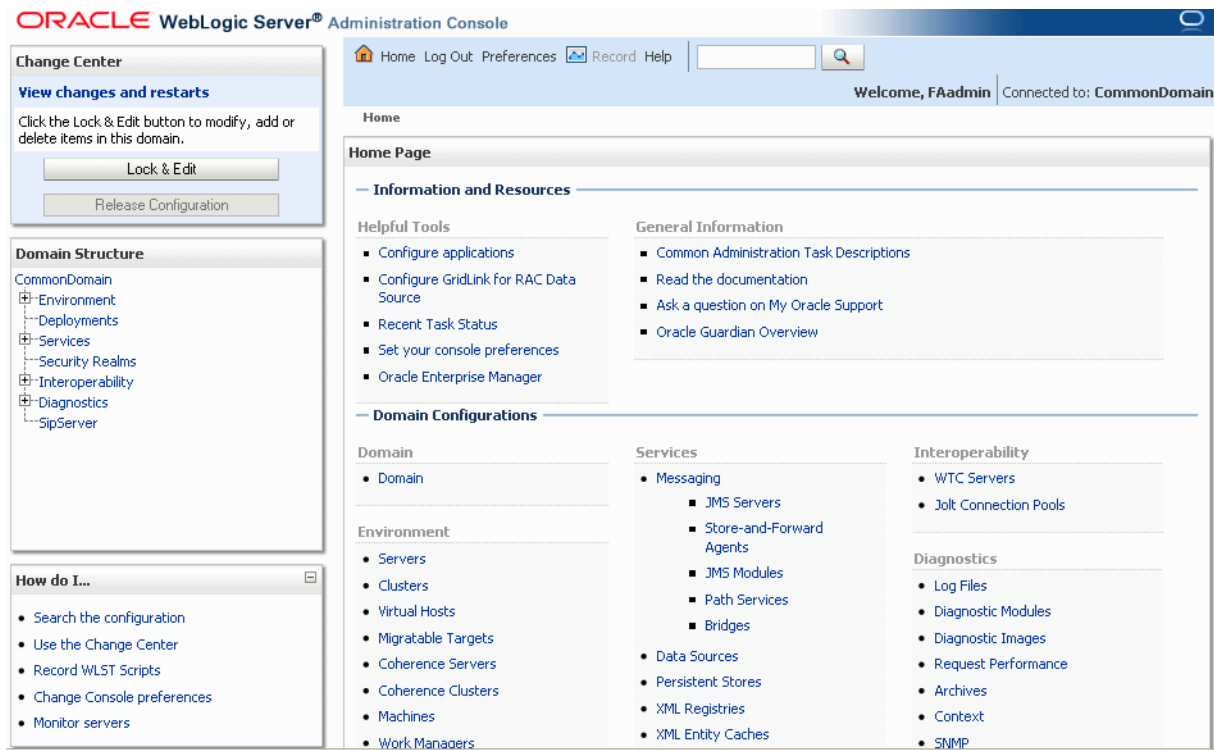


2. Enter Oracle Fusion Middleware administrative user name and password, and then click **Login**.

In an Oracle Fusion Applications installation, this user is the super user specified on the Identity and Policy Management page of the Provisioning Wizard. See "Identity and Policy Management Configuration" section in the *Oracle Fusion*

*Applications Installation Guide* for information about using the Identity and Policy Management Configuration page and [Section 6.8.5.2](#) to change the password.

The home page displays, as shown in the following figure:



Alternatively, you can access the Administration Console from Fusion Applications Control, from the home pages of targets such as the Administration Server or Managed Servers.

## 2.6.2 Locking the WebLogic Server Configuration

Before you make configuration changes, lock the domain configuration, so you can make changes to the configuration while preventing other accounts from making changes during your edit session. To lock the domain configuration:

1. Locate the **Change Center** in the upper left of the Administration Console screen.
2. Click **Lock & Edit** to lock the configuration edit hierarchy for the domain.

As you make configuration changes using the Administration Console, you click **Save** (or in some cases **Finish**) on the appropriate pages. This does not cause the changes to take effect immediately. The changes take effect when you click **Activate Changes** in the Change Center. At that point, the configuration changes are distributed to each of the servers in the domain. If the changes are acceptable to each of the servers, then they take effect. If any server cannot accept a change, then all of the changes are rolled back from all of the servers in the domain. The changes are left in a pending state; you can then either edit the pending changes to resolve the problem or revert to the previous configuration.



## 2.7 Using Cloud Control

Cloud Control enables you to monitor runtime and historical data for the Oracle Fusion applications, Oracle Fusion Middleware components, and Oracle Database across the entire environment.

For an overview of Cloud Control, see the "Overview of Enterprise Manager Cloud Control 12c" chapter in *Oracle Enterprise Manager Concepts*.

Application Management Pack for Oracle Fusion Application is required to be licensed with Oracle Fusion Applications, and must match the number of licenses for the associated Oracle WebLogic Suite and Oracle WebLogic Suite for Oracle Fusion Applications and Oracle SOA Suite for Oracle Middleware or Oracle SOA Suite for Oracle Middleware for Oracle Fusion Applications. For more information about other Oracle Enterprise Manager products that can be licensed with Oracle Fusion Applications, see the *Oracle Enterprise Manager Licensing Information*.

The section contains the following topics:

- [Section 2.7.1, "Starting to Use Cloud Control and Discovering Targets"](#)
- [Section 2.7.2, "Rediscovering Oracle Fusion Applications Targets"](#)
- [Section 2.7.3, "Removing Oracle Fusion Applications Targets"](#)
- [Section 2.7.4, "Navigating the Fusion Applications Target Home Page in Cloud Control"](#)
- [Section 2.7.5, "Using Cloud Control Help"](#)

For specific uses of Cloud Control with an Oracle Fusion Applications environment, see the following sections:

- [Section 12.5, "Performing Proactive Performance Monitoring with Cloud Control"](#)
- [Chapter 13, "Diagnosing the Oracle Fusion Applications Middle Tier Performance"](#)

### 2.7.1 Starting to Use Cloud Control and Discovering Targets

To use Cloud Control, you need to separately install Oracle Enterprise Manager Cloud Control 12c (12.1.0.2) with the Application Management Pack for Oracle Fusion Applications. For more information about installing Cloud Control, see the *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.

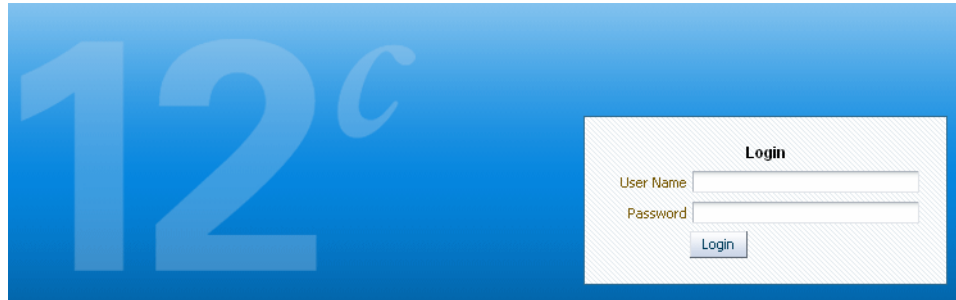
To display Cloud Control:

1. Enter the URL in your Web browser:

```
http://oms_hostname.domain:port/em
```

where *oms\_hostname* and *oms\_hostname* are the host and port number of the Oracle Management Service. Note that the OMS typically runs on a different machine/server than the one running Fusion Applications.

The login page displays.



2. Enter the default super administrator account, `SYSMAN`, that is created with the password you specified during the installation, and then click **Login**.

The home page displays. This page provides a high-level view of your entire enterprise. For more information about this page, see [Section 2.7.4](#) and click the **Help** link at the top of the page.

3. Enable licenses according to your licensing agreement with Oracle.

For more information, access the Enterprise Manager documentation library at the following URL and view the *Oracle Enterprise Manager Licensing Information Guide*: <http://www.oracle.com/technetwork/indexes/documentation/index.html>

4. To enable business metrics, perform the following before performing discovery:

- a. Install the agent on the host where the specified Administration Server is running.
- b. Give the agent read access to all the files in the directory that contains the `jps-config-jse.xml` file. The `jps-config-jse.xml` file is located in one of the following directories:

```
(UNIX) DOMAIN_HOME/config/fmwconfig
(Windows) DOMAIN_HOME\config\fmwconfig
```

The agent must be installed a host that has NFS access to the domain home directory using the path as would be used on the Administration Server host. In addition, the agent user must have read access to this file.

5. Discover the Oracle Fusion Applications environment:

- a. From the **Targets** menu, choose **Fusion Applications**.
- b. Click **Add Fusion Instance**.

The Add Fusion Instance: Functional Setup wizard displays.

- c. Enter the host name for the Administration Server for the CommonDomain is in the **Administration Server Host** field.
- d. Enter the Administration Server port in the **Port** field.
- e. In the **Username** and **Password** fields, enter the username and password for the Administration Server.
- f. In the **Unique Fusion Instance Identifier**, enter an intuitive name for the Fusion Instance. This name will be used to identify the Fusion Instance throughout Cloud Control. It must be unique and can include alphanumeric as well as dash (-), underscore (\_) or period (.) characters.

- g. If the Fusion Instance is deployed within a secured Functional Setup Domain, click **Secured**.
- h. Enter the host name and port for the Management Agent that will enable monitoring of the Fusion Instance targets. To search for an agent, click the icon next to the **Agent** field. Local Agents deployed on the WebLogic Admin Server host will be displayed first.
- i. Click **Next** to complete the configuration.

## 2.7.2 Rediscovering Oracle Fusion Applications Targets

As you work with your Oracle Fusion Applications environment, you may add additional targets through provisioning and scalability. When these types of changes occur, you can refresh the instance to add the new components as targets within a Fusion Instance already being managed by Cloud Control. You will typically do this because you need to:

- Add a new product family that is part of an already managed Fusion Instance as an additional target
- Add new instances within a product Family or an Oracle WebLogic Server domain that is already being managed by Cloud Control as new targets

To re-discover Oracle Fusion Applications environment:

1. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
2. From the table, choose the **Fusion Instance** you want to refresh.
3. From the **Fusion Instance** menu, choose **Refresh Fusion Instance**.  
The Refresh Fusion Instance wizard opens, pre-populated with existing data for the Fusion Instance.
4. Use the wizard to complete the refresh.

## 2.7.3 Removing Oracle Fusion Applications Targets

To re-discover the Oracle Fusion Applications environment:

1. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
2. From the table, choose the **Fusion Instance**, **Product Family**, or **Product** you want to remove.
3. From the **Fusion Instance**, **Product Family**, or **Product** menu, choose **Target Setup > Remove Target**.
4. In the Remove Target page, choose **Yes** to remove the target.

## 2.7.4 Navigating the Fusion Applications Target Home Page in Cloud Control

[Figure 2-3](#) shows the Fusion Applications target home page. This page displays the instance as a whole, product families, and products, giving an aggregate status of incidents and recent configuration changes.

Figure 2–3 Fusion Applications Target Home Page of Cloud Control

Name	Type	Database	Incidents				Configuration Changes (last 7 days)	Patches Applied
			Fatal	Critical	Warning	Escalation		
▼ Fusion1	Fusion Instance	Fusion1	0	21	88	0	0	0
▶ Orade Fusion Financials	Fusion Applications Financials Product F...		0	21	14	0	0	
▶ Orade Fusion Financials and Supply Chain Management	Fusion Applications Financials and Suppl...		0	0	2	0	0	
▼ Fusion2	Fusion Instance	Fusion2	0	9	18	0	0	0
▶ Orade Fusion Applications Technology	Fusion Applications ATF Product Family		0	3	0	0	0	
▶ Orade Fusion Common	Fusion Applications Common Product Fa...		0	1	0	0	0	
▶ Orade Fusion Governance, Risk, and Compliance	Fusion Applications GRC Product Family		0	1	0	0	0	
▶ Orade Fusion Incentive Compensation	Fusion Applications IC Product Family		0	1	2	0	0	
▶ Orade Fusion Projects	Fusion Applications Projects Product Fa...		0	1	0	0	0	
▶ Orade Fusion Setup	Fusion Applications SETUP Product Family		0	7	0	0	0	
▼ Fusion3	Fusion Instance	Fusion3	69	406	9	0	148	0
▶ Orade Fusion Customer Relationship Management	Fusion Applications CRM Product Family		0	362	3	0	18	
▶ Orade Fusion Financials	Fusion Applications Financials Product F...		2	21	0	0	53	
▶ Orade Fusion Financials and Supply Chain Management	Fusion Applications Financials and Suppl...		0	0	0	0	8	
▶ Orade Fusion Incentive Compensation	Fusion Applications IC Product Family		0	0	0	0	12	
▶ Orade Fusion Procurement	Fusion Applications Procurement Produ...		0	0	0	0	0	

To access the Fusion Applications target home page in Cloud Control:

1. From the **Targets** menu, choose **Fusion Applications**.

The Fusion Applications target home page displays. The table on the page lists the Fusion Instances, product families and products for the environment.

The **Targets** menu enables you to select the type of target you want to monitor. For more information about the **Middleware** option, see [Section 12.5.1](#).

2. View the current data reported for each target.

The Fusion Applications overview page displays a table of Fusion instances. You can expand a given Fusion instance to display the Fusion Applications product families deployed to that instance. Each Fusion Applications product family can be expanded to display the applications within each product family. The following information displays for each item in the table.

- **Name:** This column displays the name of the Fusion instance or Fusion Applications product family.
- **Type:** This column indicates whether the item in the row is a Fusion instance, a Fusion Applications product family or a product.
- **Database:** This column displays the name of the database to which the Fusion instance is written.
- **Incidents:** This column displays incidents that have occurred within the scope of each item in the table. Incidents are categorized in sub-columns from left to right as follows: fatal, critical, warning and escalation level.
- **Configuration Changes (last 7 days):** This column displays any configuration changes to the given item in the row during the last seven days.
- **Patches Applied:** This column displays the number of software patches applied to the Fusion instance.

The Fusion Applications overview page allows you to create and view Fusion instances. Use the **View** menu to expand and collapse instances in the table. Click

the **Add Instance** button to add a Fusion instance as a managed target in Cloud Control.

You can drill down to a Fusion instance, product family or product by clicking the relevant item in the table.

From this page, you can also access the global operations for the enterprise from the **Enterprise** menu:

- **Summary** enables to view the aggregate status of all managed targets, giving a big picture of system availability, alerts, and job status. Use this page to manage the grid by exception. Even with hundreds of managed targets, this page enables you to quickly detect and begin troubleshooting of problem areas without being distracted by noncritical issues.
- **Monitoring** provides options for global monitoring.
- **Job** provides information about all scheduled, currently running, and past jobs. It also enables you to display and manage jobs in the **job library**. The job library allows users to share and re-use library jobs that have been created.
- **Reports** enables you to manage all report definitions to which you have been granted access.
- **Configuration** enables you to manage configuration changes. For example, you can compare configuration to track down updates.
- **Compliance** enables you to view the policies for specific targets and obtain a summary of all the policy violations in your enterprise.
- **Quality Management** provide a complete testing solution for the Oracle Fusion applications.
- **My Oracle Support** provides access to software and patches.

### 2.7.5 Using Cloud Control Help

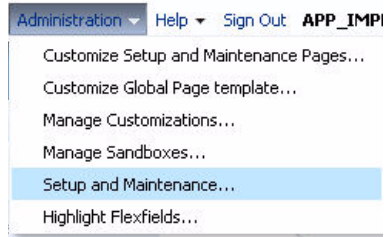
If you need information about the page or the use cases supported by a particular functionality exposed by the page, then click the **Help** link on that page at the top of the page. In most cases, the Help window displays a help topic about the current page. Click **Contents** in the Help window to browse the list of help topics, or click **Search** to search for a particular word or phrase

## 2.8 Using Oracle Fusion Functional Setup Manager

Oracle Fusion Functional Setup Manager guides you through the tasks of setting up the functional data and reference data after installation and helps you move the setup data from one environment to another (such as from the development environment to the production environment).

To access the administrative area of Oracle Fusion Functional Setup Manager:

1. Sign in to Oracle Fusion Applications with a user account that is provisioned with the necessary role. Contact your security administrator for details.
2. From the **Administration** menu in the work area of Oracle Fusion Applications, choose **Setup and Maintenance**.



The **Setup and Maintenance** options display:



The following table describes the options in the **Tasks** pane.

Option	Description
<b>Implementations</b>	
Getting Started	Research and review the different offerings or business solutions to determine which fit your requirements.
Configure Offerings	Select options and the related features associated with each offering to dynamically create an implementation task list based on just the functionality you are implementing. This enhances productivity by presenting a targeted list of tasks presented in the appropriate implementation order.
Manage Implementation Projects	Create implementation projects to define the structure of an implementation. They contain task lists and tasks required to implement the functionality you select. Multiple implementation projects may exist within a single instance and may be managed by one or more implementers.
<b>Setup Data Export and Import</b>	
Manage Configuration Packages	Create and manage configuration packages. A configuration package is the combined unit of an implementation project and its related setup data. Configuration packages can be exported, imported or uploaded from this page.

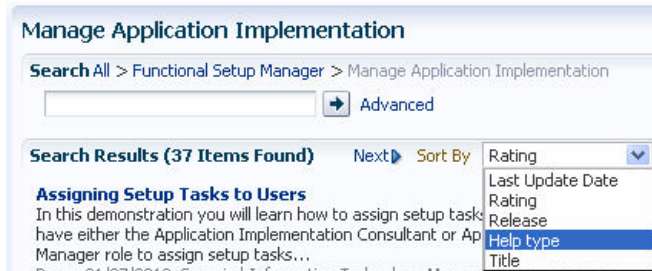
Option	Description
Manage Export and Import Processes	<p>Export a configuration package multiple times by creating multiple versions. While the export definition remains the same in each version, the setup data can be different if you modified the data in the time period between the different runs of the export process. Since each version of the configuration package has a snapshot of the data in the source instance, you can compare and analyze various versions of the configuration package to see how the setup data changed.</p> <p>In the target application instance, the setup import process will insert all new data from the source configuration package that does not already exist and update any existing data with changes from the source. Setup data that exists in the target instance but not in source will remain unchanged.</p>
<b>Implementation Objects</b>	
Manage Offerings and Options	Create and maintain offerings and options. Offerings are the highest level grouping of functionality and are the starting points for configuration decisions. Options represent specific pieces of functionality for offerings. The selection of the offerings and options begin to define the task lists and related implementation tasks required to complete an implementation.
Manage Features	Create and maintain features. A feature is a decision point a person evaluates to customize their business needs and processes. Features are the lowest level in this hierarchy: offering, option, feature. Features determine how and to what extent a specific business process is included in an implementation.
Manage Business Processes	Create and maintain business processes, detailed business processes and activities and the relationships within the business process hierarchies.
Manage Task Lists and Tasks	This is the entry point for managing setup task lists and tasks. You can edit tasks or create new ones and edit predecessor tasks. You can also view all occurrences of task lists and tasks and any associated features.
Manage Business Objects	Business objects and associated features can be created, edited and deleted from the search dialog.
<b>Topology Objects</b>	
Manage Domains	Manage the Oracle WebLogic Server domain in the Oracle Fusion Applications environment.
Manage Enterprise Applications	Register and manage enterprise applications.
Manage Modules	Register and manage modules for enterprise applications.
<b>Topology Registration</b>	
Review Topology	Display the topology of the Oracle WebLogic Server domains for the product families.

To review procedures and view demonstrations of the most common procedures:

1. Access the Oracle Fusion Applications Help.
2. In the **Search by Functional Setup** section, choose **Functional Setup Manager** and then **Manage Application Implementation**.



3. In the **Manage Application Implementation** section, from the **Sort By** list, choose **Help type**, as shown in the following figure:



4. Select the topic you want to review.
5. When the topic displays, use the **Viewing Options** section to either view the procedure in a demonstration or read the steps to perform the task.

For additional information about Oracle Fusion Functional Setup Manager, see *Oracle Fusion Functional Setup Manager User's Guide* and *Oracle Fusion Functional Setup Manager Developer's Guide*.

## 2.9 Caution Against Using Database Tools to Modify Oracle Fusion Applications Data

Do not use SQL\*Plus, Oracle Data Browser, database triggers, or any other tool to modify Oracle Fusion Applications data unless otherwise instructed.

Oracle provides powerful tools you can use to create, store, change, retrieve, and maintain information in an Oracle database. But if you use Oracle tools such as SQL\*Plus to modify Oracle Fusion Applications data, you risk destroying the integrity of your data and you lose the ability to audit changes to your data.

Because Oracle Fusion Applications tables are interrelated, any change you make using an Oracle Fusion Applications form can update many tables at once. But when you modify Oracle Fusion Applications data using anything other than Oracle Fusion Applications, you may change a row in one table without making corresponding changes in related tables.

If your tables get out of synchronization with each other, you risk retrieving erroneous information and you risk unpredictable results throughout Oracle Fusion Applications.

When you use Oracle Fusion Applications to modify your data, Oracle Fusion Applications automatically checks that your changes are valid. Oracle Fusion Applications also keeps track of who changes information. If you enter information into database tables using database tools, you may store invalid information. You also lose the ability to track who has changed your information because SQL\*Plus and other database tools do not keep a record of changes.



---

# Installing and Maintaining Oracle Fusion Applications Languages

This chapter provides an introduction to the tools you use to install and maintain a set of languages in Oracle Fusion Applications.

This chapter includes the following topics:

- [Installing and Upgrading Languages](#)
- [Pre-Installation Steps - Before Down Time](#)
- [Pre-Installation Steps - During Down Time](#)
- [Install a Language](#)
- [Complete the Post-Installation Tasks](#)
- [Troubleshoot Language Pack Installer Sessions](#)
- [Maintaining Language Content](#)

## 3.1 Installing and Upgrading Languages

Oracle Provisioning installs only the English language and Upgrade Orchestrator upgrades only the languages that were previously installed. To add a language, use Language Pack Installer. If patches containing translatable artifacts were previously applied to this environment, you may apply the translated versions of each of those patches after you install the new language.

This section provides an introduction to the following concepts related to language packs:

- [Language Packs](#)
- [Language Pack Installer](#)
- [Language in the Policy Store](#)
- [Language Pack Installer Configuration Assistants](#)

### 3.1.1 Language Packs

A language pack for a given language and release contains artifacts at the specific release level that are translated to the specific language. Translated artifacts include Oracle Fusion Applications seed data that is uploaded into Oracle Fusion Applications database, SOA resource bundles, JEE resource bundles, LDAP data, Diagnostics Test Framework, and BI Presentation Catalog data. You install language packs with Language Pack Installer.

### 3.1.2 Language Pack Installer

Language Pack Installer enables you to add a language in your Oracle Fusion Applications environment and delivers translated artifacts for that language. You can run Language Pack Installer in GUI mode or silent mode. In GUI mode, you proceed through the installation by providing information in the user interface when prompted. For more information, see Section A.1.2, "Installer User Interface" in the *Oracle Fusion Applications Upgrade Guide*. In silent mode, progress is reported to the console.

### 3.1.3 Language in the Policy Store

The policy store can maintain attributes in only one language. If you want to override the base English strings in the policy store, you set the `-DuplicateJAZNPolicyStore` option (`-DuplicateJAZNPolicyStore` for Windows) to true when you install the Language Pack. The Description and Displayname are the two attributes which are translatable and are loaded in JAZN files in the language pack.

### 3.1.4 Language Pack Installer Configuration Assistants

During the installation phase, Language Pack Installer copies all files from the language pack to the appropriate locations, such as Oracle Fusion Middleware home and Oracle Fusion Applications Oracle home. After the file copy is completed, Language Pack Installer calls Configuration Assistants to perform the remaining tasks required to update and deploy the artifacts included in the language pack. Language Pack Installer supports parallel processing of certain configuration assistants to improve performance. Parallel configuration assistants are organized by groups and all configuration assistants in a group start running at the same time.

If any tasks fail during the installation phase, refer to "Troubleshooting Failures During the Installation Phase" in the *Oracle Fusion Applications Upgrade Guide* for more information.

All mandatory configuration assistants must complete successfully before proceeding to the next configuration assistant. For more information, see "General Troubleshooting During the Configuration Phase in GUI Mode" and "General Troubleshooting During the Configuration Phase in Silent Mode" in the *Oracle Fusion Applications Upgrade Guide*.

Table 3–1 provides a list of possible configuration assistants, including steps within the configuration assistants. The Retry Behavior and Troubleshooting column describes what Language Pack Installer does after a configuration assistant fails and you select the **Retry** button or you restart Language Pack Installer in silent mode. If available, links are provided to relevant troubleshooting sections.

**Table 3–1 Configuration Assistants Run by Language Pack Installer**

Name	Mandatory	Description	Retry Behavior and Troubleshooting
Activate Language	Yes	Activates the language in the database.	Runs Activate Language again.

**Table 3–1 (Cont.) Configuration Assistants Run by Language Pack Installer**

Name	Mandatory	Description	Retry Behavior and Troubleshooting
Preverification	Yes	Performs the following validation checks: <ul style="list-style-type: none"> <li>■ Policy Store</li> <li>■ Check for Number of DB Workers</li> <li>■ Database Content Upload</li> <li>■ Taxonomy URL</li> <li>■ Flexfields</li> <li>■ LDAP Data (LDIF)</li> <li>■ SOA Resource Bundle</li> </ul>	Runs failed steps.
Synchronize Multilingual Tables	Yes	Runs the Maintain Multilingual Tables utility to maintain the tables related to the newly activated language. For more information, see "Maintaining Multi-lingual Tables" in the <i>Oracle Fusion Applications Patching Guide</i> .	Restart from failure.
Consolidate Repository And Downloaded Patches	Yes	Consolidates patches in the repository and the patches you download in <a href="#">Section 3.2.3, "Download Mandatory Post-Installation NLS Patches"</a> .	Starts from the beginning of the task.
Apply Middleware Language Patches	Yes	<ul style="list-style-type: none"> <li>■ Applies Language Repository Patches</li> <li>■ Applies Language Downloaded Patches, as described in <a href="#">Section 3.2.3, "Download Mandatory Post-Installation NLS Patches"</a>.</li> </ul>	Applies the failed patches. See "Troubleshooting Applying Middleware Patches" in the <i>Oracle Fusion Applications Upgrade Guide</i> .
Stop BI Presentation Server	Yes	Stops the BI Presentation server.	Retries stopping the BI Presentation server.
Load Database Components	Yes	Uploads the database content packaged in the language pack to the database.	Runs failed database commands. See "Troubleshooting Loading Database Components" in the <i>Oracle Fusion Applications Upgrade Guide</i> .
Deploy Applications Policies (jazn-data.xml)	Yes	<p>Performs the deployment of the updated applications policies, based on your selections during the Policy Store Analysis task.</p> <p>This task runs only if you chose to override the base English strings in the policy store by using the <code>-UpdateJAZNPolicyStore</code> option set to true when you install the language pack</p>	Deploys the failed stripes. See "Troubleshooting Deployment of Applications Policies" in the <i>Oracle Fusion Applications Upgrade Guide</i> .

**Table 3–1 (Cont.) Configuration Assistants Run by Language Pack Installer**

Name	Mandatory	Description	Retry Behavior and Troubleshooting
Deploy BI Publisher Artifacts	Yes	Using Catalog Manager: <ul style="list-style-type: none"> <li>Backs up BI Presentation Catalog under <code>APPLICATIONS_CONFIG/lcm/admin/version/fapatch/BIP/language_code</code> for example, <code>APPLICATIONS_CONFIG/lcm/admin/11.1.7.0.0/fapatch/BIP/en_US/webcat.zip</code>.</li> <li>Backs up captions under <code>APPLICATIONS_CONFIG/lcm/admin/version/fapatch/BIP/language_code/captions.zip</code>.</li> <li>Copies captions to the Oracle Business Intelligence repository.</li> <li>Deploys BI Presentation Catalog to the Oracle Business Intelligence repository.</li> </ul>	Starts from the beginning of the task. See "Troubleshooting Deployment of BI Publisher Artifacts" in the <i>Oracle Fusion Applications Upgrade Guide</i> .
Deploy Flexfields	No	Deploys flexfields to the domain that hosts the <code>FndSetup</code> application.	Starts from the beginning of the task.
Deploy LDAP Data (LDIF)	No	Uploads LDIF XLIFF translations to the identity store	Retries failed XLIFF files.
Deploy SOA Resource Bundles	Yes	Deploys SOA Resource Bundles to the corresponding SOA servers.	Deploys failed SOA resource bundles.
Activate SOA Language	Yes	Runs the SOA Human Workflow configuration script to activate the language of the language pack.	Starts from the beginning of the task.
Apply Downloaded Language Patches	Yes	Applies post-installation patches that you downloaded in the <code>11.1.7.0.0_post_repo_patches</code> directory. See <a href="#">Section 3.2.3, "Download Mandatory Post-Installation NLS Patches"</a> .	Applies failed patches.

## 3.2 Pre-Installation Steps - Before Down Time

This section describes the following preparation steps for installing a language pack, all of which can be performed before your scheduled down time.

- [Before You Begin](#)
- [Download the Language Pack Repository](#)
- [Download Mandatory Post-Installation NLS Patches](#)
- [Confirm Oracle Fusion Applications Installation is Complete](#)
- [Confirm Database Settings](#)
- [Maintain Versions of Customized BI Publisher Reports](#)
- [Run Health Checker for Pre-Down Time Checks](#)

### 3.2.1 Before You Begin

Before you begin the language pack installation, you should have access to the following documentation:

- Oracle Fusion Applications release notes from the current release.
- *Oracle Fusion Applications NLS Release Notes* from the current release.

You should also have a clear understanding of the following host and directories:

- **Primordial host:** The location of the Common domain (specifically the Administration Server of the Common domain). Only one primordial host exists in each environment.
- **APPLICATIONS\_CONFIG:** The top-level directory for the Oracle Fusion Applications configuration files.
- **APPLICATIONS\_BASE:** The top-level directory for the Oracle Fusion Applications binaries.
- **FA\_ORACLE\_HOME:** Directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.

For more information, see Figure 1–3, "Relationship of Home Directories" in the *Oracle Fusion Applications Upgrade Guide*.

### 3.2.2 Download the Language Pack Repository

The language pack repository contains the language pack installer, translated Oracle Fusion Middleware patches, and the Oracle Fusion Applications language pack contents that are required to install a language pack for a specific language. You download the repository from the Oracle Fusion Applications Product Media Package to a location of your choice. This directory is referred to as `REPOSITORY_LOCATION`.

1. Go to <http://edelivery.oracle.com/> and follow these instructions:
2. Complete the Export Validation process by entering basic identification information using the online form.
3. On the Media Pack Search page, specify Oracle Fusion Applications as the product pack and then select your platform to identify the media pack you want to download.
4. Choose the appropriate media pack from the search results, such as Release 7 (11.1.7.0.0) for your platform, and download the language pack repository (in zipped format). You can download the repository to a location of your choice. This directory is referred to as `REPOSITORY_LOCATION`.
5. Extract the contents of all zipped files to the same target directory. The directory must be on a networked drive or shared disk so that it will be accessible to all the hosts in your new environment. The installers are normally located in the `installers` subdirectory under `REPOSITORY_LOCATION`.

For more information, see "Obtaining the Software" in the *Oracle Fusion Applications Installation Guide*.

---

**Note:** You should avoid creating the repository in a deeply nested directory on Windows. The Windows PATH variable has a limited size, and long directory names may cause it to overflow. For example, `c:\work\my_repository` is a better choice than `c:\Work\WorkInProgress\FusionApps\FusionAppsv1\Nov2011\tempfiles\my_repository`.

---

Table 3–2 list the installers in the language pack repository.

**Table 3–2 Language Pack Installers**

Media Label Name	Staging Destination
Language Pack Installer	(UNIX) <code>REPOSITORY_LOCATION/language_code/installers/fusionapps/Disk1/runInstaller</code>  (Windows) <code>REPOSITORY_LOCATION/language_code\installers\fusionapps\Disk1\Setup.exe</code> or <code>REPOSITORY_LOCATION/language_code\installers\fusionapps\Disk1\install\Win64\Setup.exe</code>

### 3.2.3 Download Mandatory Post-Installation NLS Patches

---

**Note:** If there are no post-installation patches in the Oracle Fusion Applications NLS Release Notes when you run Language Pack Installer, there is no action required for this step and you can proceed to [Section 3.2.4, "Confirm Oracle Fusion Applications Installation is Complete"](#).

---

Language Pack Installer can apply mandatory post-installation patches that are required by Oracle Fusion Applications if you download the patches from My Oracle Support before you start the installation. Note that this feature relates only to patches that are documented in the Oracle Fusion Applications NLS Release Notes and that are specifically required for the language pack you are installing.

Perform the following steps to download the patches:

1. Create a directory named `11.1.7.0.0_post_repo_patches` in the parent directory of your `APPLICATIONS_BASE` directory. For example, if `APPLICATIONS_BASE` is `/u01/APPTOP`, the patch directory is `/u01/11.1.7.0.0_post_repo_patches`. For more information about the `APPLICATIONS_BASE` directory, see [Section 3.2.1, "Before You Begin"](#).
2. Copy `PostRepoPatchDirs.zip` from the `REPOSITORY_LOCATION/installerspreinstall` directory to the `11.1.7.0.0_post_repo_patches` directory.
3. Unzip `PostRepoPatchDirs.zip` in the `11.1.7.0.0_post_repo_patches` directory to create the directory structure for the patches you download.
4. Review the `README.txt` file that was created when you unzipped `REPOSITORY_LOCATION/installers/pre_install/PostRepoPatchDirs.zip`, in "Download and Unzip Mandatory Post-Release 7 Patches", to learn how the subdirectories under the `11.1.7.0.0_post_repo_patches` directory map to the corresponding

components, such as Oracle Fusion Middleware, database client, and database server components.

---

**Note:** If you choose to download the patches to a different directory, you must use the `-DpatchDownloadLocation` option when you start Language Pack Installer. See [Section 3.4, "Install a Language"](#) for more information.

---

5. Refer to Oracle Fusion Applications NLS Release Notes, 11g Release 7 (11.1.7) to find the patches to be downloaded from My Oracle Support.

[Table 3–3](#) describes the types of patches that you download, their location in the NLS release notes and which configuration assistant applies the patches.

**Table 3–3 Mandatory Patches to be Downloaded**

Type of Patches	Location in Oracle Fusion Applications NLS Release Notes	Configuration Assistant That Applies Patches
Oracle Fusion Middleware	Upgrade Known Issues, Pre-Upgrade Known Issues, Mandatory Patches to be Downloaded, Oracle Fusion Middleware	Apply Language Middleware Patches
Oracle Fusion Applications	Upgrade Known Issues, Pre-Upgrade Known Issues, Mandatory Patches to be Downloaded, Oracle Fusion Applications	Apply Downloaded Patches
Oracle Fusion Applications Release 7 Installer	Upgrade Known Issues, Pre-Upgrade Known Issues, Mandatory Patches to be Downloaded, Installer	Oracle Fusion Applications Upgrade Installer

6. Download and unzip the patches into the appropriate subdirectory under the `11.1.7.0.0_post_repo_patches` directory, based on the mapping information in the `README.txt` file described in Step 1. A failure could result if you do not download a patch to the correct directory. Note that when you download the Oracle Fusion Applications patches, you must create a patch plan by running the script in Step 7.
7. Run this step to create a patch plan. This step assumes that you have downloaded the patches as described in Step 6.

The perl script, `adCreateMosPlan.pl`, reads the patch metadata from the downloaded patches to generate the patch plan file, `mosdownload.xml`. To run this script, use the Perl executable from `APPLICATIONS_BASE/dbclient/perl/bin` for UNIX platforms and `APPLICATIONS_BASE\dbclient\perl\5.8.3\bin\MSWin32-x64-multi-thread` for Windows.

Use the following command syntax to create the patch plan file:

```
(UNIX)
setenv PERL5LIB $APPLICATIONS_BASE/dbclient/perl/lib/5.8.3:$APPLICATIONS_
BASE/dbclient/perl/lib/site_perl/5.8.3:
$APPLICATIONS_BASE/dbclient/perl/lib/site_perl

$APPLICATIONS_BASE/dbclient/perl/bin/perl
$APPLICATIONS_BASE/fusionapps/applications/lcm/ad/bin/adCreateMosPlan.pl
patches_download_location
```

```
(Windows)
SET PERL5LIB=%APPLICATIONS_BASE%\dbclient\perl\5.8.3;%APPLICATIONS_
```

```
BASE%\dbclient\perl\site\5.8.3\;  
%APPLICATIONS_BASE%\dbclient\perl\site  
  
%APPLICATIONS_BASE%\dbclient\perl\5.8.3\bin\MSWin32-x64-multi-thread\perl  
%APPLICATIONS_BASE%\fusionapps\applications\lcm\ad\bin\adCreateMosPlan.pl  
patches_download_location
```

### 3.2.4 Confirm Oracle Fusion Applications Installation is Complete

If you are installing a language pack on a freshly installed Oracle Fusion Applications environment, ensure that you performed all tasks described in "Postinstallation Tasks" in the *Oracle Fusion Applications Installation Guide*.

If you are installing a language pack on an upgraded environment, ensure that you completed all tasks described in "Completing Post-Upgrade Tasks" in the *Oracle Fusion Applications Upgrade Guide*.

In either case, you must also perform the steps in the "Post-Installation" section of *Technical Release Notes for Oracle Fusion Applications 11g Release 7 (11.1.7.0.0)*.

### 3.2.5 Confirm Database Settings

Refer to *Oracle Fusion Applications release notes* for information about database tuning parameters, to verify that your database and Sql\*Net tuning parameters are set properly to avoid time-out errors during the installation.

### 3.2.6 Maintain Versions of Customized BI Publisher Reports

Ensure that you have your own versions of any customized BI Publisher reports. If a language pack includes an update to a catalog object that was delivered with an Oracle Fusion application, the patch will overwrite any customizations applied to the original report.

### 3.2.7 Run Health Checker for Pre-Down Time Checks

You must run Health Checker directly from *APPLICATIONS\_BASE* and from the primordial host. You can run these checks any number of times prior to your down time. For information about the checks that Health Checker runs, see "Language Pack Readiness Health Checks" in the *Oracle Fusion Applications Upgrade Guide*.

Perform the following steps to run Health Checker:

1. Set the *APPLICATIONS\_BASE* and *REPOSITORY\_LOCATION* environment variables. Set the *APPLICATIONS\_BASE* environment variable to point to the directory that contains Oracle Fusion Applications. For example, if Oracle Fusion Applications is installed in `/server01/APPTOP/fusionapps`, then set the environment variable *APPLICATIONS\_BASE* to `/server01/APPTOP`. Set the *REPOSITORY\_LOCATION* environment variable to point to the root directory where the repository is staged.

Examples follow:

```
(UNIX)  
setenv APPLICATIONS_BASE /server01/APPTOP/  
setenv REPOSITORY_LOCATION /server01/REL7Repo/
```

```
(Windows)  
SET APPLICATIONS_BASE=\server01\APPTOP\  
SET REPOSITORY_LOCATION=\server01\REL7Repo\  

```

2. Run Health Checker.



```
(UNIX)
$APPLICATIONS_BASE/fusionapps/applications/lcm/hc/bin/hcplug.sh -manifest
$APPLICATIONS_
BASE/fusionapps/applications/lcm/hc/config/LanguagePackReadinessHealthChecks.xml
l [-DlogLevel=log_level]
```

```
(Windows)
%APPLICATIONS_BASE%\fusionapps\applications\lcm\hc\bin\hcplug.cmd -manifest
%APPLICATIONS_
BASE%\fusionapps\applications\lcm\hc\config\LanguagePackReadinessHealthChecks.x
ml [-DlogLevel=log_level]
```

Review the Health Checker log file or the HTML summary report to see if any errors occurred that require corrective action. The log file and the HTML summary are located in `APPLICATIONS_CONFIG/lcm/logs/release_version/healthchecker`.

After you resolve the issue that caused the error, start Health Checker again to run the failed tasks. You must rerun Health Checker until there are no more failed tasks.

### 3.3 Pre-Installation Steps - During Down Time

This section describes the following mandatory preparation steps for installing a language pack, all of which must be performed during your system down time. Language Pack Installer does not require any servers to be shut down. However, no users should be online, so it is still considered to be down time.

- [Verify the Status of Servers and Processes](#)
- [Back Up Oracle Fusion Applications](#)
- [Set Environment Variables](#)
- [Apply Mandatory Prerequisite Patches](#)

#### 3.3.1 Verify the Status of Servers and Processes

This section contains steps to follow for all platforms.

##### 3.3.1.1 Confirm All Servers Are Running

Confirm that all servers are up and running before installing the language pack.

##### 3.3.1.2 Confirm the OPMN Control Process and Node Manager Are Running

Confirm that the OPMN control process and Node Manager are running.

##### 3.3.1.3 Start The OPSS Security Store

Start the OPSS Security Store if it is not already running. The OPSS Security Store used here is an Oracle Internet Directory LDAP server instance. Before proceeding with the installation, the designated Oracle Internet Directory server instance must be up and running. If this server is not running prior to starting the installation, the related configuration assistants will fail.

For more information about starting, see "Starting and Stopping Oracle Internet Directory" in the *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle Identity Management (Oracle Fusion Applications Edition)*.

## 3.3.2 Back Up Oracle Fusion Applications

Back up your entire Oracle Fusion Applications environment by following the steps in "Backing Up and Recovering Oracle Fusion Applications" in the *Oracle Fusion Applications Administrator's Guide*. You should also back up your central inventory.

For additional back up steps that are specific to Windows, refer to [Section 3.3.2.1, "Back Up Steps for Windows Platforms"](#).

### 3.3.2.1 Back Up Steps for Windows Platforms

Back up the Oracle Fusion Applications environment, including `APPLICATIONS_BASE`, inventory, registry entries, Oracle Identity Management, the database and the System environment PATH variable of the Oracle Fusion Applications host machine.

1. `APPLICATIONS_BASE` contains many files whose path is more than 256 characters. The Microsoft Windows Copy function is limited to copying only those files with a path of less than 256 characters. Therefore, many files fail to copy.

Use Robust File Copy (Robocopy), which is available as part of the Windows Resource Kit, to copy `APPLICATIONS_BASE`. Use the following command:

```
robocopy <source> <destination> /MIR > <file>
```

Sample output from the robocopy command:

	Total	Copied	Skipped	Mismatch	FAILED	Extras
Dirs:	112640	112640	0	0	0	
Files:	787114	787114	0	0	0	
Bytes:	63.822 g	63.822 g	0	0	0	
Times:	2:22:20	2:19:00			0:00:00	0:03:19

2. Back up the inventory.

Back up the inventory location referenced in the registry `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\inst_loc`.

3. Back up the registry.

Use `Regedit.exe` to back up the following registries related to Oracle Fusion Applications.

- `HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services`
  - Web Tier service
  - BI Service
  - Node Manager service
- `HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE`
- `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Obliv`

4. Ensure that the System PATH has the following values:

```
C:\<APPLICATIONS_BASE>\dbclient\bin
C:\<APPLICATIONS_BASE>\webtier_mwhome\webtier\bin
C:\<APPLICATIONS_BASE>\webtier_mwhome\webtier\bin
C:\<APPLICATIONS_BASE>\webtier_mwhome\webtier\opmn\lib
C:\<APPLICATIONS_BASE>\webtier_mwhome\webtier\perl\bin
C:\<APPLICATIONS_BASE>\fusionapps\bi\products\Essbase\EssbaseServer\bin
```

```
C:\<APPLICATIONS_BASE>\fusionapps\bi\bin
C:\<APPLICATIONS_BASE>\fusionapps\bi\opmn\bin
C:\<APPLICATIONS_BASE>\fusionapps\bi\opmn\lib
C:\<APPLICATIONS_BASE>\fusionapps\bi\perl\bin
```

Add any of the previous values that are missing to the system PATH. Missing values cause failures in launching the OPMN services and BI Presentation Catalog deployment configuration assistants in RUP Installer.

5. Save the system PATH variable.

### 3.3.3 Set Environment Variables

Set the APPLICATIONS\_BASE environment variable to point to the directory that contains Oracle Fusion Applications. For example, if Oracle Fusion Applications is installed in /server01/APPTOP/fusionapps, then set the environment variable APPLICATIONS\_BASE to /server01/APPTOP.

```
(UNIX)
setenv APPLICATIONS_BASE /server01/APPTOP/
```

```
(Windows)
SET APPLICATIONS_BASE=\server01\APPTOP\
```

---

**Note:** Set this environment variable on all hosts that share the same APPLICATIONS\_BASE before executing all tools and utilities mentioned in this guide.

---

### 3.3.4 Apply Mandatory Prerequisite Patches

Download and apply any prerequisite patches listed in the Post-Installation and Post-Upgrade sections of *Oracle Fusion Applications release notes* prior to starting Language Pack Installer. Note that the only patches that need to be applied are those that have been added to the release notes since the last time you applied patches from this list.

## 3.4 Install a Language

Language Pack Installer does not require any servers to be shut down. However, no users should be online, so it is still considered to be down time. Oracle recommends that language packs be installed from a machine that is co-located in the same subnetwork as the database server to maximize performance. You must run Language Pack Installer on the primordial host. Primordial host is defined in [Section 3.2.1, "Before You Begin"](#).

Ensure that the steps in [Section 3.2, "Pre-Installation Steps - Before Down Time"](#) and [Section 3.3, "Pre-Installation Steps - During Down Time"](#) are successfully completed before you start Language Pack Installer.

Language Pack Installer supports GUI mode and silent mode. In GUI mode, you navigate through screens that display the progress of the upgrade, including log file locations and status messages. In silent mode, Language Pack Installer reports the progress of the upgrade as console output.

- [Run Language Pack Installer in GUI Mode](#)
- [Run Language Pack Installer in Silent Mode](#)

---



---

**Note:** If Language Pack Installer encounter errors, refer to [Section 3.6, "Troubleshoot Language Pack Installer Sessions"](#) before clicking any buttons in the Language Pack Installer user interface.

---



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### 3.4.1 Run Language Pack Installer in GUI Mode

Perform the following steps to run Language Pack Installer in GUI mode from the command line, using specific options to further define the necessary actions. You must run Language Pack Installer from the primordial host.

1. Set the `JAVA_HOME` environment variable as follows:

```
(UNIX) setenv JAVA_HOME APPLICATIONS_BASE/fusionapps/jdk6
```

```
(Windows) set JAVA_HOME=APPLICATIONS_BASE\fusionapps\jdk6
```

2. Confirm registration of the network location of `FA_ORACLE_HOME`.

If the Oracle Fusion Applications Oracle home directory (`FA_ORACLE_HOME`), which is `APPLICATIONS_BASE/fusionapps/applications`, is registered in the central inventory with a `/net` path, then provide the `oraInst.loc` location including `/net` when starting Language Pack Installer. An example follows:

```
(UNIX only)
$REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -jreLoc
APPLICATIONS_BASE/fusionapps/jdk6/
-invPtrLoc /net/APPLICATIONS_BASE/fusionapps/applications/oraInst.loc
```

If not triggered with a `/net` path, Language Pack Installer copies the `-invPtrLoc` file to `FA_ORACLE_HOME`. This results in a copy of the file to itself, which then becomes an empty or zero byte file. As a result, the copy phase will fail when `oracle_common` patches are applied. For more information, see "Inventory Pointer File is Empty" in the *Oracle Fusion Applications Upgrade Guide*.

3. Run the following command to start Language Pack Installer in GUI mode.

```
(UNIX) $REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -addLangs
-jreLoc APPLICATIONS_BASE/fusionapps/jdk6
[-invPtrLoc FA_ORACLE_HOME/oraInst.loc]
-noCheckForUpdates OR -updatesDir installer_patch_directory
[-DpatchStageLocation=directory_location_of_patch_stage
[-Dworkers=number_of_workers] [-DlogLevel=level]
[-DserverStartTimeout=timeout_period_for_server_in_seconds]
[-DpatchDownloadLocation=patch_directory] [-debug]
[-DupdateJAZNPolicyStore=true]
```

```
(Windows) %REPOSITORY_LOCATION%\installers\fusionapps\Disk1\setup.exe -addLangs
-jreLoc APPLICATIONS_BASE\fusionapps\jdk6
-noCheckForUpdates OR -updatesDir installer_patch_directory
[-DpatchStageLocation=directory_location_of_patch_stage
[-Dworkers=number_of_workers] [-DlogLevel=level]
[-DserverStartTimeout=timeout_period_for_server_in_seconds]
[-DpatchDownloadLocation=patch_directory] [-debug]
[-DupdateJAZNPolicyStore=true]
```

Table 3–4 shows valid options that can be used when running Language Pack Installer

**Table 3–4 Language Pack Installer Command Line Options**

Option Name	Description	Mandatory
-addLangs	Runs Language Pack Installer to install one language.	Yes
-jreLoc	Path where the Java Runtime Environment is installed. This option does not support relative paths, so you must specify the absolute path.	Yes
-noCheckForUpdates	Skips the application of the installer update patch, if there is no installer update patch available for this release.	No, this option cannot be used if the -updatesDir option is used. Either -noCheckForUpdates or -updatesDir must be used.
-updatesDir	The location of the installer update patch. When a valid installer patch is found, the installer automatically restarts itself after applying the patch.	No, this option cannot be used if the -noCheckForUpdates option is used. Either -noCheckForUpdates or -updatesDir must be used
-DpatchStageLocation	Location of patch stage. This is the directory where Middleware patches from a downloaded location, as well as the repository, are consolidated before applying.	No, the default directory is <code>APPLICATIONS_BASE/patch_stage</code> .
-invPtrLoc	The location of an overriding inventory pointer file. If the Oracle Fusion Applications Oracle home directory ( <code>FA_ORACLE_HOME</code> ), is registered in inventory with a <code>/net</code> path, then provide the location of <code>oraInst.loc</code> including <code>/net</code> in the path.	Recommended, use to override the default location of the inventory pointer file, located in <code>/etc/oraInst.loc</code> . This option can be used only on UNIX platforms.
-Dworkers	The number of workers to use for uploading database content. If you provide a value for the number of workers that is outside the calculated range, you are prompted to provide a value that is within the optimal range. If you do not use this option, a calculated optimal value is used.	No, overrides the default number of workers calculated by Language Pack Installer.
-DserverStartTimeout	Configures the timeout value for server in seconds.	No, overrides the default value for server timeout.
-DpatchDownloadLocation	The directory path where you downloaded mandatory prerequisite patches to be applied by Language Pack Installer. See <a href="#">Section 3.2.3, "Download Mandatory Post-Installation NLS Patches"</a> .	No, the default is <code>11.1.7.0.0_post_repo_patches</code> .
-DlogLevel	Records messages in the log file at the level you specify. Enter a value to override the default log level of <code>INFO</code> .	No, default value is <code>INFO</code> .
-DupdateJAZNPolicyStore=true	Updates the policy store with translated attributes so field descriptions, display names, and other attributes display their translated values.	No, use only when you do not want to use base English in the policy store.
-debug	Retrieve debug information from Language Pack Installer.	No

**Example 3–1 Language Pack Installation with no policy store translation**

```
(UNIX) $REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -addLangs
-jreLoc APPLICATIONS_BASE/fusionapps/jdk6
-invPtrLoc FA_ORACLE_HOME/oraInst.loc
-noCheckForUpdates OR -updatesDir installer_patch_directory

(Windows) %REPOSITORY_LOCATION%\installers\fusionapps\Disk1\setup.exe -addLangs
-jreLoc APPLICATIONS_BASE\fusionapps\jdk6

-noCheckForUpdates OR -updatesDir installer_patch_directory
```

**Example 3–2 Language Pack Installation with policy store translation**

```
(UNIX) $REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -addLangs
-jreLoc APPLICATIONS_BASE/fusionapps/jdk6
-invPtrLoc FA_ORACLE_HOME/oraInst.loc -DupdateJAZNPolicyStore=true
-noCheckForUpdates OR -updatesDir installer_patch_directory

(Windows) %REPOSITORY_LOCATION%\installers\fusionapps\Disk1\setup.exe -addLangs
-jreLoc APPLICATIONS_BASE\fusionapps\jdk6 -DupdateJAZNPolicyStore=true
-noCheckForUpdates OR -updatesDir installer_patch_directory
```

**Example 3–3 Language Pack installation when FA\_ORACLE\_HOME is registered with a /net path**

```
(UNIX) $REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -addLangs
-jreLoc APPLICATIONS_BASE/fusionapps/jdk6
-invPtrLoc /net/APPLICATIONS_BASE/fusionapps/applications/oraInst.loc
-noCheckForUpdates OR -updatesDir installer_patch_directory
```

Table 3–5 illustrates the tasks that Language Pack Installer runs. For information about troubleshooting Language Pack Installer errors and log files, see [Section 3.6, "Troubleshoot Language Pack Installer Sessions"](#). For examples of the screens, see [Appendix D, "Language Pack Installer Screens"](#).

**Table 3–5 Language Pack Installer Screen Sequence**

Screen	Description and Action Required
Welcome	Appears when you start Language Pack Installer. This screen does not appear if you restart Language Pack Installer after a failure. The standard Welcome screen is read-only. It contains a navigation pane on the left-hand side that summarizes the tasks the installer will take. Each item in the pane represents an installer screen, which contains prompts for the necessary information.  Click <b>Next</b> to continue.
Install Software Updates	Appears when you start Language Pack Installer. This screen does not appear if you supplied the <code>-nocheckforupdates</code> option, or after the installer restarts itself automatically after applying an installer patch. The screen displays two options: <ul style="list-style-type: none"> <li>■ Skip applying the installer update</li> <li>■ Search Local Directory for Updates</li> </ul> Select <b>Search Local Directory for Updates</b> . Specify the correct Installer update patch location or click <b>Browse</b> to locate the file. Then click <b>Search for Updates</b> to display the patch number and the type of patch.  Click <b>Next</b> to continue.

**Table 3–5 (Cont.) Language Pack Installer Screen Sequence**

Screen	Description and Action Required
Installation Location	<p>Specify the location of the existing Oracle Fusion Applications home (<i>FA_ORACLE_HOME</i>) where you want to install the language.</p> <p>Click <b>Next</b> to continue.</p>
Installation Summary	<p>Summarizes the selections you made during this installation session. It includes the Oracle home, required and available disk space, and the language to be installed. Review the information displayed to ensure that the installation details are what you intend.</p> <p>To make changes before installing, click <b>Back</b> to return to previous screens in the interview.</p> <p>Click <b>Install</b> to start installing this language.</p>
Installation Progress	<p>Displays a progress indicator that shows the percentage of the installation phase that is complete and indicates the location of the installation log file. The installation phase consists of copying files from the language pack to the appropriate Oracle homes.</p> <p>When the installation progress indicator shows 100 percent, click <b>Next</b> to continue.</p>

**Table 3–5 (Cont.) Language Pack Installer Screen Sequence**

Screen	Description and Action Required
Policy Store Analysis (Note that this screen displays only when the <code>-UpdateJAZNPolicyStore</code> option is set to true when you start Language Pack Installer.)	<p>Analysis is available for the following policy store stripes: hcm, crm, fscm, and obi. Select the stripes to be analyzed and then click <b>Run Analysis</b> to identify any conflicts or deletions. Only the stripes that are included in the language pack are enabled for analysis and the analysis could run for several minutes. After the analysis runs, review the results of the analysis to determine which deployment method you want Language Pack Installer to use for policy store changes to each stripe. Oracle recommends that you select <b>Apply safe changes only</b>. This is the safest method unless you have read and totally understood the consequences of the other three options. If you decide to resolve the conflicts or deletions before the actual JAZN upload from Language Pack Installer, you should run the Policy Store Analysis step again to get the most accurate analysis report. The choices for deployment method are:</p> <ul style="list-style-type: none"> <li>■ Apply safe changes only (choose this method if there are no conflicts)</li> <li>■ Apply all changes and overwrite customizations</li> <li>■ Append additive changes</li> <li>■ Manually resolve conflicts and upload changes using Authorization Policy Manager.</li> </ul> <p>If you choose <b>Apply safe changes only</b> or <b>Append additive changes</b>, then you must review the results of the analysis to manually upload any changes not applied by Language Pack Installer with the choice you selected, after the installation is complete. If you choose <b>Apply all changes and overwrite customizations</b>, then you may need to reapply the customizations that are overwritten after the installation is complete. If you choose one of these options, click <b>Next</b> after you make your selection.</p> <p>If you choose <b>Manually resolve conflicts and upload changes using Authorization Policy Manager (APM)</b>, you must pause the installation while you bring up the APM application and upload the changes. For more information, see the "Upgrading Oracle Fusion Applications Policies" chapter in the <i>Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)</i>. Note the location of the following files:</p> <ul style="list-style-type: none"> <li>■ Baseline file: <code>FA_ORACLE_HOME/admin/JAZN/stripes/baseline</code></li> <li>■ Patch file for fscm, crm, and hcm stripes: <code>FA_ORACLE_HOME/stripes/deploy/system-jazn-data.xml</code></li> <li>■ Patch file for the obi stripe: <code>FA_ORACLE_HOME/com/acr/security/jazn/bip_jazn-data.xml</code></li> </ul> <p>When you complete this task in APM, shut down the APM application, return to Language Pack Installer, and click <b>Next</b>.</p>
Configuration Progress	<p>Displays a progress indicator that shows the percentage of the configuration phase that is complete. It displays each configuration assistant in the message pane as it is performed. Configuration assistants that could be included in the configuration phase are described in <a href="#">Section 3.1.4, "Language Pack Installer Configuration Assistants"</a>.</p> <p>No additional user action is required in the Configuration Progress screen unless a failure occurs. For more information, see "General Troubleshooting During the Configuration Phase in GUI Mode" in the <i>Oracle Fusion Applications Upgrade Guide</i>. Links to troubleshooting specific failures are available in <a href="#">Table 3–1</a>.</p>



**Table 3–5 (Cont.) Language Pack Installer Screen Sequence**

Screen	Description and Action Required
Installation Complete	<p>Summarizes the installation just completed. If you want to save this configuration to a response file, click <b>Save</b>. For more information, see "How Response Files Work" in the <i>Oracle Database Installation Guide 11g Release 2 (11.2) for Linux</i>.</p> <p>To complete a successful installation, click <b>Finish</b>. The <b>Finish</b> button is activated only if all mandatory configuration assistants completed successfully. If you want to rerun this session after you resolve failed configuration assistants, click <b>Cancel</b>.</p>

4. Proceed to [Section 3.5, "Complete the Post-Installation Tasks"](#).

### 3.4.2 Run Language Pack Installer in Silent Mode

Perform the following steps to start Language Pack Installer in silent mode from the command line, using specific options to further define the necessary actions. You must run Language Pack Installer from the primordial host.

1. Create a response file named `silent.rsp` to be used in silent mode. This file can be located in any directory that is accessible while launching Language Pack Installer. An example follows:

```
ORACLE_HOME=/u01/APPLTOP/fusionapps/applications
CRM_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
FSCM_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
HCM_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
OBI_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
UCM_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
BPM_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
SOA_SELECTED_JAZN_MIGRATION_TYPE=PATCH_POLICY
```

---



---

**Note:** The `stripe_SELECTED_JAZN_MIGRATION_TYPE` properties allow you to choose which deployment method Language Pack Installer will use for policy store changes to each stripe. The following choices are available:

- `PATCH_POLICY`: Apply safe changes only. This is the recommended method. Choose this method if there are no conflicts.
- `MIGRATE_POLICY_OVERRIDE`: Apply all changes and overwrite customizations.
- `MIGRATE_POLICY_NO_OVERRIDE`: Append additive changes.
- `MIGRATE_POLICY_APM`: Manually resolve conflicts and upload changes using Authorization Policy Manager (APM)

If you choose `PATCH_POLICY` or `MIGRATE_POLICY_NO_OVERRIDE`, then you must review the results of the analysis to manually upload any changes not applied by Language Pack Installer, based on the choice you selected, after the upgrade is complete. If you choose `MIGRATE_POLICY_OVERRIDE`, then you may need to reapply the customizations that are overwritten after the upgrade is complete.

If you choose `MIGRATE_POLICY_APM`, you must pause the upgrade while you bring up the APM application and upload the changes. For more information, see the "Upgrading Oracle Fusion Applications Policies" chapter in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*. Note the location of the following files:

- Baseline file: `FA_ORACLE_HOME/admin/JAZN/stripe/baseline`
  - Patch file for fscm, crm, and hcm stripes: `FA_ORACLE_HOME/stripe/deploy/system-jazn-data.xml`
  - Patch file for the obi, ucm, bpm, and soa stripes: `FA_ORACLE_HOME/com/acr/security/jazn/bip_jazn-data.xml`
- 
- 

2. Set the `JAVA_HOME` environment variable as follows:

```
(UNIX) setenv JAVA_HOME APPLICATIONS_BASE/fusionapps/jdk6
```

```
(Windows) set JAVA_HOME=APPLICATIONS_BASE\fusionapps\jdk6
```

3. Confirm the registration of the network location of `FA_ORACLE_HOME`.

If the Oracle Fusion Applications Oracle home directory (`FA_ORACLE_HOME`), which is `APPLICATIONS_BASE/fusionapps/applications`, is registered in the central inventory with a `/net` path, then provide the `oraInst.loc` location including `/net` when starting Language Pack Installer. An example follows:

```
$REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -addLangs -jreLoc
APPLICATIONS_BASE/fusionapps/jdk6/
-invPtrLoc /net/APPLICATIONS_BASE/fusionapps/applications/oraInst.loc -silent
-response location_of_response_file
```

If not triggered with `/net` path, Language Pack Installer copies the `-invPtrLoc` file to `FA_ORACLE_HOME`. In the example, this results in a copy of the file to itself, which then becomes an empty or zero byte file. As a result, the copy phase

will fail when `oracle_common` patches are applied. For more information, see "Inventory Pointer File is Empty" in the *Oracle Fusion Applications Upgrade Guide*.

4. Run the following command to start Language Pack Installer in silent mode:

---

**Note:** If Language Pack Installer encounters errors in silent mode during the first installer, it terminates the session. You must resolve the issue that caused the failure and then restart Language Pack Installer, using the same command you used previously. Language Pack Installer then restarts from the first failed task. For more information, see "General Troubleshooting During the Configuration Phase in Silent Mode" in the *Oracle Fusion Applications Upgrade Guide*.

---

```
(UNIX) $REPOSITORY_LOCATION/installers/fusionapps/Disk1/runInstaller -addLangs
-jreLoc
APPLICATIONS_BASE/fusionapps/jdk6 [-invPtrLoc FA_ORACLE_HOME/oraInst.loc]
-silent
-response location_of_silent.rsp_file
-noCheckForUpdates OR -updatesDir installer_patch_directory
[-DpatchStageLocation=directory_location_of_patch_stage
[-Dworkers=number_of_workers] [-DlogLevel=level]
[-DserverStartTimeout=timeout_period_for_server_in_seconds]
[-DpatchDownloadLocation=patch_directory] [-debug]
```

```
(Windows)
%REPOSITORY_LOCATION%\installers\fusionapps\Disk1\setup.exe -addLangs -jreLoc
APPLICATIONS_BASE\fusionapps\jdk6 [-Dworkers=number_of_
workers] [-DlogLevel=level] -silent
-response location_of_silent.rsp_file
-noCheckForUpdates OR -updatesDir installer_patch_directory
[-DpatchStageLocation=directory_location_of_patch_stage
[-DpatchDownloadLocation=patch_directory]
[-DserverStartTimeout=timeout_period_for_server_in_seconds]
[-debug]
```

Table 3–6 shows valid options that can be used when running Language Pack Installer in silent mode.

**Table 3–6 Language Pack Installer Command Options in Silent Mode**

Option Name	Description	Mandatory
-addLangs	Runs Language Pack Installer to install one language.	Yes
-jreLoc	Path where the Java Runtime Environment is installed. This option does not support relative paths, so you must specify the absolute path.	Yes
-invPtrLoc	The location of an overriding inventory pointer file. If the Oracle Fusion Applications Oracle home directory ( <code>FA_ORACLE_HOME</code> ) is registered in inventory with a <code>/net</code> path, then provide the location of <code>oraInst.loc</code> including <code>/net</code> in the path.	Recommended, use to override the default location of the inventory pointer file, located in <code>/etc/oraInst.loc</code> . This option can be used only on UNIX platforms.
-silent	Run Language Pack Installer in silent mode.	Yes.
-response	The location of the response file, <code>silent.rsp</code> .	Yes.

**Table 3–6 (Cont.) Language Pack Installer Command Options in Silent Mode**

Option Name	Description	Mandatory
-noCheckForUpdates	Skips the application of the installer update patch, if there is no installer update patch available for this release.	No, this option cannot be used if the -updatesDir option is used. Either -noCheckForUpdates or -updatesDir must be used.
-updatesDir	The location of the installer update patch. When a valid installer patch is found, the installer automatically restarts itself after applying the patch.	No, this option cannot be used if the -noCheckForUpdates option is used. Either -noCheckForUpdates or -updatesDir must be used
-DpatchStageLocation	Location of patch stage. This is the directory where Middleware patches from a downloaded location, as well as the repository, are consolidated before applying.	No, the default directory is <code>APPLICATIONS_BASE/patch_stage</code> .
-DupdateJAZNPolicyStore=true	Updates the policy store with translated attributes so field descriptions, display names, and other attributes display their translated values.	No, use only when you do not want to use base English in the policy store.
-Dworkers	The number of workers to use for uploading database content. If you provide a value for the number of workers that is outside the calculated range, you are prompted to provide a value that is within the optimal range. If you do not use this option, a calculated optimal value is used.	No, overrides the default number of workers calculated by Language Pack Installer.
-DserverStartTimeout	Configures the timeout value for server in seconds.	No, overrides the default value for server timeout.
-DpatchDownloadLocation	The directory path where you downloaded mandatory prerequisite patches to be applied by Language Pack Installer. See <a href="#">Section 3.2.3, "Download Mandatory Post-Installation NLS Patches"</a> .	No, the default is <code>11.1.7.0.0_post_repo_patches</code> .
-DlogLevel	Records messages in the log file at the level you specify. Enter a value to override the default log level of <code>INFO</code> .	No, default value is <code>INFO</code> .
-debug	Retrieve debug information from Language Pack Installer.	No

- Proceed to [Section 3.5, "Complete the Post-Installation Tasks"](#).

## 3.5 Complete the Post-Installation Tasks

Perform the following required manual steps after Language Pack Installer completes successfully:

- [Confirm Database Artifact Deployments Were Successful](#)
- [Review Log Files for Errors or Exceptions](#)
- [Run Health Checker for Post Installation Checks](#)
- [Bounce All Servers and Verify the Status of Deployed Applications](#)
- [Reload Custom Templates for BI Publisher Reports](#)

- [Perform Steps in NLS Release Notes](#)

### 3.5.1 Confirm Database Artifact Deployments Were Successful

Confirm that all database artifact deployments were successful by reviewing the Diagnostics report and log files. For more information, see "Diagnostics Report" in the *Oracle Fusion Applications Patching Guide*.

### 3.5.2 Review Log Files for Errors or Exceptions

Confirm there are no unresolved errors or exceptions in the log files. For information about resolving errors, see [Section 3.6, "Troubleshoot Language Pack Installer Sessions"](#).

### 3.5.3 Run Health Checker for Post Installation Checks

Run Health Checker to perform post installation checks directly from `APPLICATIONS_BASE` and from the primordial host by performing the following steps. For information about the checks that Health Checker runs, see "Post-Upgrade Tasks Performed by Health Checker" in the *Oracle Fusion Applications Upgrade Guide*

1. Set the `APPLICATIONS_BASE` and `REPOSITORY_LOCATION` environment variables. Set the `APPLICATIONS_BASE` environment variable to point to the directory that contains Oracle Fusion Applications. For example, if Oracle Fusion Applications is installed in `/server01/APPTOP/fusionapps`, then set the environment variable `APPLICATIONS_BASE` to `/server01/APPTOP`. Set the `REPOSITORY_LOCATION` environment variable to point to the root directory where the repository is staged.

Examples follow:

```
(UNIX)
setenv APPLICATIONS_BASE /server01/APPTOP/
setenv REPOSITORY_LOCATION /server01/REL7Repo/
```

```
(Windows)
SET APPLICATIONS_BASE=%server01\APPTOP\
SET REPOSITORY_LOCATION=%server01\REL7Repo\
```

2. Run Health Checker.

```
(UNIX)
$APPLICATIONS_BASE/fusionapps/applications/lcm/hc/bin/hcplug.sh -manifest
$APPLICATIONS_
BASE/fusionapps/applications/lcm/hc/config/PostLanguagePackHealthChecks.xml
[-DlogLevel=log_level]
```

```
(Windows)
%APPLICATIONS_BASE%\fusionapps\applications\lcm\hc\bin\hcplug.cmd -manifest
%APPLICATIONS_
BASE%\fusionapps\applications\lcm\hc\config\PostLanguagePackHealthChecks.xml
[-DlogLevel=log_level]
```

Review the Health Checker log file or the HTML summary report to see if any errors occurred that require corrective action. The log file and the HTML summary are located in `APPLICATIONS_CONFIG/lcm/logs/release_version/healthchecker`.

After you resolve the issue that caused the error, start Health Checker again to run the failed tasks. You must rerun Health Checker until there are no more failed tasks. If the

JAZN Conflicts check fails, refer to [Section 3.6.1, "Resolve JAZN Conflicts Found by Health Checker"](#).

### 3.5.4 Bounce All Servers and Verify the Status of Deployed Applications

1. Bounce all servers using the `fastarstop` script "bounce" option. For more information, see "fastarstop Syntax" and "Starting Examples with fastarstop" in the *Oracle Fusion Applications Administrator's Guide*.

---

**Note:** If you are installing more than one language in an environment, you need to bounce servers only once at the end of installing all languages in that environment, to minimize time spent bouncing servers.

---

2. Verify that all deployed applications are up and running. You can check this from Fusion Applications Control, or by reviewing the server side log files. For more information, see "Starting Fusion Applications Control" in the *Oracle Fusion Applications Administrator's Guide* or [Table 3–7, "Log Directories for Language Pack Installer Activities"](#).

### 3.5.5 Reload Custom Templates for BI Publisher Reports

Follow this step if you have customized BI Publisher reports.

Reload custom templates for BI Publisher reports on Oracle-delivered BI Publisher reports.

### 3.5.6 Perform Steps in NLS Release Notes

Perform any steps listed in the Post-Installation Tasks section of NLS Release Notes.

## 3.6 Troubleshoot Language Pack Installer Sessions

See [Table 3–7](#) for a list of log directories for Language Pack Installer activities.

**Table 3–7 Log Directories for Language Pack Installer Activities**

Log directory name	Description
<code>APPLICATIONS_BASE/oraInstall_timestamp/log</code>	Installation phase logs
<code>APPLICATIONS_CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language</code>	Top level directory for Language Pack Installer logs
<code>APPLICATIONS_CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language/configlogs</code>	Top level log directory for configuration assistants. A log file exists for each configuration assistant.
<code>APPLICATIONS_CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language/PatchManager_DBPatch</code>	Log directory for the <b>Loading Database Components</b> configuration assistant
<code>APPLICATIONS_CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language/PatchManager_ActivateLanguage</code>	Log directory for the <b>Activate Language</b> configuration assistant

**Table 3–7 (Cont.) Log Directories for Language Pack Installer Activities**

Log directory name	Description
<code>APPLICATIONS_</code> <code>CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language/PatchManager_DownloadedPatches</code> directory contains the following <code>fapmgr</code> multi-apply logs: <ul style="list-style-type: none"> <li>■ <code>FAPMgr_Multiapply_apply_timestamp.log</code></li> <li>■ <code>FAPMgr_Multiapply_DiagnosticsSummary_timestamp.html</code></li> <li>■ <code>FAPMgr_Multiapply_DiagnosticsSummary_timestamp.xml</code></li> </ul>	Log directory for the <b>Apply Downloaded Language Patches</b> configuration assistant
<code>APPLICATIONS_</code> <code>CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language/Startstop</code>	StartStop utility logs
<code>APPLICATIONS_</code> <code>CONFIG/lcm/logs/11.1.7.0.0/LanguagePack/language/soalogs</code>	Log files from SOA Composite activities  Note that SOA server logs are located under respective domains. For example, the SOA server logs for CommonDomain are under <code>APPLICATIONS_</code> <code>CONFIG/domains/hostname/CommonDomain/servers/soa_server1/logs</code> . For more information, see "SOA Composite Log Files" in the <i>Oracle Fusion Applications Upgrade Guide</i> .

For troubleshooting issues that are generic to both RUP Installer and Language Pack Installer, refer to the appropriate sections in "Troubleshooting the Upgrade" in the *Oracle Fusion Applications Upgrade Guide*:

- Troubleshooting Failures During the Installation Phase
- General Troubleshooting During the Configuration Phase in GUI Mode
- General Troubleshooting During the Configuration Phase in Silent Mode
- Recovering From an Installer Session That Was Shut Down
- Troubleshooting Applying Middleware Patches
- Troubleshooting Loading Database Components
- Troubleshooting Deployment of Applications Policies
- Troubleshooting Deployment of BI Publisher Artifacts

### 3.6.1 Resolve JAZN Conflicts Found by Health Checker

This step is performed by Health Checker only if the `-DupdateJAZNPolicyStore` option is set to true.

Health Checker checks the JAZN Analysis reports for potential conflicts and deletions that are not patched automatically by Language Pack Installer. The reports are located in the following directory:

```
APPLICATIONS_
CONFIG/lcm/admin/11.1.7.0.0/fapatch/JAZN/stripedelta/report.txt
```

The *stripe* is `crm`, `fscm`, `hcm`, `obi`, `soa`, `ucm` or `bpm`.

Review the Modification section of the report to see the roles that Language Pack Installer did not update. For each conflict that displays in this report, you must evaluate and manually patch the role by using APM. For more information, see "Upgrading Oracle Fusion Applications Policies" in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

The following example shows a typical Applications Role conflict that has been modified by both the patch and production, therefore it will not be applied by Language Pack Installer.

MODIFICATION CONFLICTS

Artifact type: Application Role

Artifact Name: OBIA\_PARTNER\_CHANNEL\_ADMINISTRATIVE\_ANALYSIS\_DUTY

Description: This artifact is modified at attribute level in patch version and also in production.

Note the location of the following files for reference when using APM:

- Location of baseline files, where stripe is crm, fscm, hcm, obi, soa, ucm, or bpm:

`FA_ORACLE_HOME/admin/JAZN/stripe/baseline`

- Location of patch files for fscm, crm, or hcm stripes:

`FA_ORACLE_HOME/stripe/deploy/system-jazn-data.xml`

- Location of patch files for the obi, soa, ucm, or bpm stripes:

`FA_ORACLE_HOME/com/acr/security/jazn/bip_jazn-data.xml`

## 3.7 Maintaining Language Content

Oracle Fusion Applications content is translated to different languages and fixes are made available as individual patches. If your environment uses multiple languages, whenever you apply a patch with translatable content, you may choose to also apply the associated translated patch for each of your installed languages. If a patch does not contain any translated content, such as a PL/SQL package, only the English patch is available.

If an Oracle Fusion Applications environment contains languages other than English, the recommended method for applying patches is to apply the English patch first and then apply the translation patch for each installed language. For example, after you install a language pack for another language, such as Korean, whenever you apply a patch that involves translatable content, you must apply the base English patch and also the Korean patch for that fix.

For detailed information about how to apply a patch, see "Applying Patches" in the *Oracle Fusion Applications Patching Guide*.



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## Performing Routine Administrative Tasks

This chapter describes the common, essential tasks for administering your Oracle Fusion Applications environment.

This chapter contains the following topics:

- [Section 4.1, "Introduction to Performing Routine Administrative Tasks"](#)
- [Section 4.2, "Running Administration Servers and Managed Servers from Shared and Local Disks"](#)
- [Section 4.3, "Viewing and Managing Targets Across Domains \(Optional\)"](#)
- [Section 4.4, "Starting and Stopping"](#)
- [Section 4.5, "Viewing and Changing Ports for Components"](#)
- [Section 4.6, "Changing Passwords"](#)
- [Section 4.7, "Managing the Oracle Database"](#)
- [Section 4.8, "Patching"](#)
- [Section 4.9, "Managing Oracle Fusion Applications-Specific Labels in the Oracle Metadata Repository"](#)
- [Section 4.10, "Modifying Oracle Application Development Framework Connections in Oracle Fusion Applications"](#)
- [Section 4.11, "Modifying Oracle Data Integrator Configuration"](#)
- [Section 4.12, "Bulk Updating General User Preferences"](#)

### 4.1 Introduction to Performing Routine Administrative Tasks

An important aspect of system administration of the Oracle Fusion Applications environment is performing a range of maintenance life-cycle and management operations. [Section 1.3](#) provides a roadmap of when to perform these essential administrative tasks. In addition to following this roadmap, if you run into performance or security issues, then use the tasks in the chapter to maintain the environment.

In addition to the tasks in this guide, refer to the following documentation for tasks that you may need to perform, depending on your business needs:

- *Oracle Fusion Applications Common Implementation Guide* for common setup and maintenance tasks for Oracle Fusion applications
- *Oracle Fusion Applications Post-Installation Guide* for configuration tasks to perform after installation

- *Oracle Fusion Applications Administrator's Troubleshooting Guide* for common issues in the runtime environment

## 4.2 Running Administration Servers and Managed Servers from Shared and Local Disks

Configuration for domains is stored centrally on a shared disk. This location is accessible to all hosts, so the Administration Servers can run from this shared location. Managed Servers can run from either the shared location or from a local disk, that is, a non-network disk, visible only to the processes running on that host. During provisioning of Oracle Fusion Applications, in the Installation Location page of the Provisioning Wizard, you make this decision with the **Enable Local Application Configuration** option. When you select this option, provisioning copies the domain configuration from the shared server location to the specified local disk, and you run the Managed Servers from the local disk. If you chose not to select this option, then all the Managed Servers are configured to run from the shared disk. See the "Installation Location" section in the *Oracle Fusion Applications Installation Guide* for information about using the Installation Location page.

## 4.3 Viewing and Managing Targets Across Domains (Optional)

In Fusion Applications, certain business process flows or operational requirements can span domains and/or product families. (For example, a Customer Relationship Management (CRM) process can rely on the availability of certain Human Capital Management (HCM) components. Out-of-the-box tools (such as Fusion Applications Control) are limited to monitoring the domains within their product family.

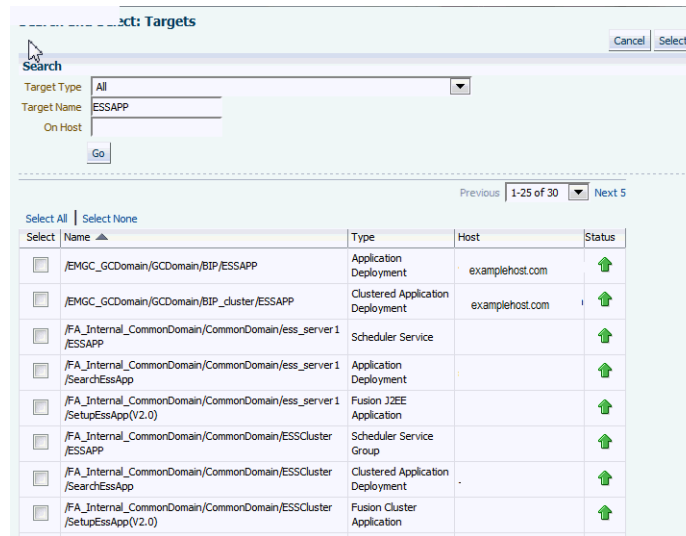
In addition, administrators might want to monitor by target type across domains. For example, they might want to monitor all of the J2EE application targets across multiple WebLogic Server domains.

The only way to accomplish this is via the Group functionality in Oracle Enterprise Manager Cloud Control. (Your system must have Cloud Control installed and configured.)

For general information on Groups, see "Managing Groups" in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

The following example shows how to create a Dashboard to view Enterprise Scheduling Service (ESS) components which are spread across the Common, HCM, CRM, and Financial Domains in the system. Use the same principles to create a Dashboard that fits your parameters.

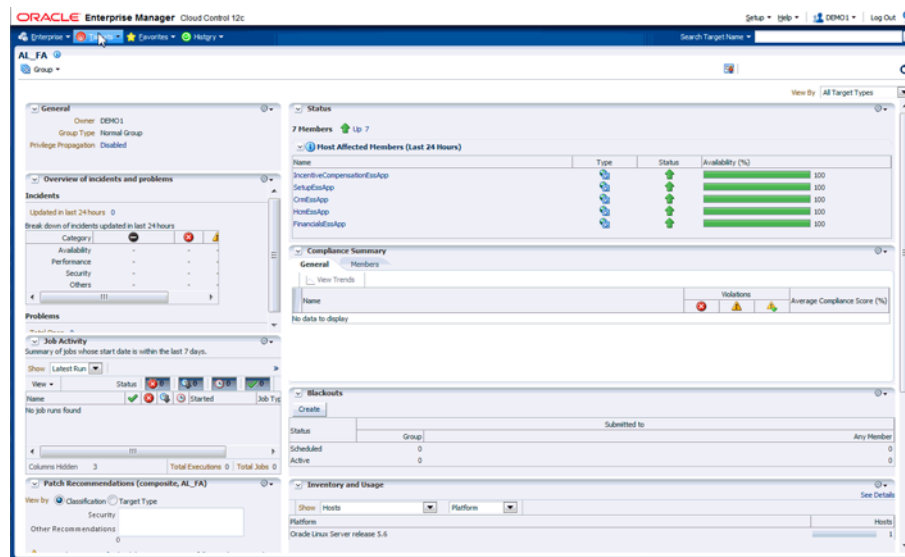
1. Log in to Enterprise Manager Cloud Control and select **Targets** and **Groups**.
2. Select **Create** and choose **Group** from the drop-down menu.
3. On the resulting *Create Group* page, enter a **Name** and click **Search** for Members.  
A list of all available Targets is displayed in a Group home page.
4. In the Search field at the top of the page, type *ESSAPP* to find all the Scheduler-related elements.



- Choose **Select All**, or selectively click the results you want to include, then click **OK**.

You see your Group with the chosen Members listed.

- If it is correct, click **OK**. The list of all Groups is displayed.
- Select your newly created Group by Name. The Group Dashboard is displayed.



## 4.4 Starting and Stopping

You start and stop the Oracle Fusion Applications environment and its components to perform a range of maintenance operations that require process downtime. Understanding the state (that is, up, down, starting, and stopping) of each component in the Oracle Fusion Applications environment is an essential activity when diagnosing and resolving availability and performance issues, and when performing life-cycle and management operations.

A typical Oracle Fusion Applications environment contains the applications, the Oracle Database, and the Oracle Fusion Middleware components. Depending on whether you need to start and stop an individual component or the entire

environment, there are many several supported scenarios for performing these operations correctly.

This sections contains the following topics:

- [Section 4.4.1, "Starting and Stopping Components in the Oracle Fusion Applications Environment"](#)
- [Section 4.4.2, "Understanding Starting and Stopping with the faststartstop Utility"](#)
- [Section 4.4.3, "Starting and Stopping the Entire Oracle Fusion Applications Environment"](#)
- [Section 4.4.4, "Starting and Stopping the Administration Servers and Managed Servers"](#)
- [Section 4.4.5, "Starting and Stopping Oracle HTTP Server"](#)
- [Section 4.4.6, "Starting and Stopping Oracle Business Intelligence"](#)
- [Section 4.4.7, "Starting and Stopping a Product Family Oracle WebLogic Server Domain"](#)
- [Section 4.4.8, "Starting and Stopping an Oracle WebLogic Server Cluster in a Product Family for a Configuration Change"](#)
- [Section 4.4.9, "Starting and Stopping Specific Applications"](#)

## 4.4.1 Starting and Stopping Components in the Oracle Fusion Applications Environment

For many of the Oracle Fusion Middleware components, you can start and stop in different ways, depending on your requirements.

[Table 4–1](#) describes the Oracle Fusion Applications, Oracle Fusion Middleware, and Oracle Database components you can start and stop, and provides information on where to find related documentation for each component.

The procedures referenced in the Oracle Fusion Middleware guides describe using Fusion Middleware Control. These procedure also apply to Fusion Applications Control.

**Table 4–1 Starting and Stopping**

Component	Description	Documentation
<b>Oracle Fusion Applications</b>		
Oracle Fusion applications	You can start and stop applications using the WLST command line, Fusion Applications Control, Cloud Control, or WebLogic Server Administration Console.	<a href="#">Section 4.4.9, "Starting and Stopping Specific Applications"</a> "Start applications and modules" and "Stop applications and modules" in the <i>Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help</i> for the WebLogic Server Administration Console
<b>Oracle Fusion Middleware</b>		

**Table 4–1 (Cont.) Starting and Stopping**

Component	Description	Documentation
Administration Server	<p>The <b>Administration Server</b> operates as the central control entity for the configuration of the entire Oracle WebLogic Server domain. It maintains the domain's configuration documents and distributes changes in the configuration documents to Managed Servers. The Administration Server serves as a central location from which to manage and monitor all resources in a domain.</p> <p>You can use the <code>fastartstop</code> utility to start the Administration Server in one or more domains.</p>	<p>Section 4.4.4.1, "Starting the Administration Servers and Managed Servers"</p> <p>Section 4.4.4.2, "Stopping the Administration Servers and Managed Servers"</p>
Managed Servers for the Oracle Fusion applications and Oracle Fusion Middleware components	<p>A <b>Managed Server</b> can host Oracle Fusion applications, application components, Web services, and their associated resources. Managed Servers also host applications for the following Oracle Fusion Middleware components:</p> <ul style="list-style-type: none"> <li>■ Oracle Business Intelligence</li> <li>■ Oracle Data Integrator</li> <li>■ Oracle Enterprise Scheduler</li> <li>■ Oracle Secure Enterprise Search</li> <li>■ Oracle SOA Suite</li> <li>■ Oracle WebCenter Content</li> <li>■ Oracle WebCenter Content: Imaging</li> <li>■ Oracle WebCenter Portal's Discussion Server</li> <li>■ Oracle WebCenter Portal: Spaces</li> </ul> <p>You can use the <code>fastartstop</code> utility to start one or more Managed Servers in one or more domains. Alternatively, you can use Fusion Applications Control or WebLogic Server Administration.</p>	<p>Section 4.4.4.1, "Starting the Administration Servers and Managed Servers"</p> <p>Section 4.4.4.2, "Stopping the Administration Servers and Managed Servers"</p>
Node Manager	<p><b>Node Manager</b> is an Oracle WebLogic Server utility that enables you to start, shut down, and restart the Administration Servers and the Managed Server instances.</p> <p>On Windows, Node Manager is configured to automatically start by default.</p>	<p>"Starting Node Manager" section in the <i>Oracle Fusion Middleware Node Manager Administrator's Guide for Oracle WebLogic Server</i></p> <p>Section 4.4.3.1.3, "Task 3: Start Node Manager"</p>
Oracle Business Intelligence Suite	<p>You can use Fusion Applications Control or the <code>opmnctl</code> command to start and stop Oracle Business Intelligence system components.</p> <p>You can use the <code>fastartstop</code> utility to start and stop the BI Presentation Server component.</p>	<p>"Starting and Stopping Oracle Business Intelligence" chapter in the <i>Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition</i></p>

**Table 4–1 (Cont.) Starting and Stopping**

Component	Description	Documentation
Oracle Enterprise Scheduler	You can use Fusion Applications Control to start and stop the Oracle Enterprise Scheduler.	<a href="#">Section 7.7, "Starting and Stopping Oracle Enterprise Scheduler Service Components"</a>
Oracle HTTP Server	You can use Fusion Applications Control or the <code>opmnctl</code> command to start and stop Oracle HTTP Server.	"Starting, Stopping, and Restarting Oracle HTTP Server" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle HTTP Server</i>
Oracle SOA Suite	You can use Fusion Applications Control to start and stop the SOA Infrastructure and the Managed Servers for Oracle SOA Suite.	"Stopping and Starting the Managed Server and SOA Infrastructure" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite and Oracle Business Process Management Suite</i>
Oracle WebCenter Portal: Spaces	Always ensure Content Server is running when starting Oracle WebCenter Portal: Spaces. If Content Server is not running when Spaces is started up Spaces will consider the Document service as unavailable. After Content Server is started, a restart of Spaces is needed for it to recheck if the Document service is configured.	"Starting Content Server" section in the <i>Oracle WebCenter Content System Administrator's Guide for Content Server</i>  "Starting and Stopping the Spaces Application" section in the <i>Oracle WebCenter Content System Administrator's Guide for Content Server</i>
Oracle WebLogic Server domain for a product family	When applying a patch that only applies to one <b>product family</b> , stop the <b>Oracle WebLogic Server domain</b> for the product family and restart it after you apply the patch without stopping the entire Oracle Fusion Applications environment.  Use the <code>fastartstop</code> utility for this task. You can alternatively use Fusion Applications Control.	<a href="#">Section 4.4.7, "Starting and Stopping a Product Family Oracle WebLogic Server Domain"</a>
Oracle WebLogic Server cluster for a product family	If you modify the Oracle WebLogic Server configuration, you must stop and restart the cluster for the configuration changes to take effect.  Use the <code>fastartstop</code> utility for this task. You can alternatively use Fusion Applications Control and WebLogic Server Administration Console.	<a href="#">Section 4.4.8, "Starting and Stopping an Oracle WebLogic Server Cluster in a Product Family for a Configuration Change"</a>
<b>Oracle Database</b>		
Oracle Database	You can start and stop the Oracle database with the Oracle Enterprise Manager Database Control.	"Accessing the Database Home Page" section in the <i>Oracle Database 2 Day DBA</i>

## 4.4.2 Understanding Starting and Stopping with the `fastartstop` Utility

The `fastartstop` script is installed with the Oracle Fusion Applications patching framework. After installation, the registry file for each product family is populated with Oracle WebLogic Server domain entries for all product families, including the Oracle Fusion Applications Common Domain in the Oracle Fusion Setup product family. You can use this utility to start all the domains or a select domain. When the `fastartstop` utility is used to start a domain, all the Managed Servers will be started and the Administration Server of the domain will be stopped after all the Managed Servers have been started. The `fastartstop` utility uses Node Manager to start and stop servers. `fastartstop` will fail if Node Manager is not already running.

While the utility starts and stops the domains, it does not start and stop Oracle Identity Management and the Oracle Database. Therefore, you must start these components separately.

This section contains the following topics:

- [Section 4.4.2.1, "fastartstop Syntax"](#)
- [Section 4.4.2.2, "fastartstop Examples"](#)

#### 4.4.2.1 fastartstop Syntax

If the Oracle Fusion Applications patching framework was installed, the `fastartstop` utility is available from the following directories:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is the Oracle Fusion Applications Oracle home located at:

```
(UNIX) APPLICATIONS_BASE/fusionapps/applications
(Windows) APPLICATIONS_BASE\fusionapps\applications
```

The `fastartstop` utility supports the following syntax:

```
(UNIX) ./fastartstop.sh -Start|-Stop|-Bounce|-componentType|-componentDomain
-all | -domains domain_name, domain_nameN, domain_nameN
|-domains "domain_name(server:all, server:managed_server_
name|AdminServer)", "domain_name(server:all, server:managed_server_name|Aserver)"
|-componentType <OHS or BI or GOP>
|-componentDomain <component's domain name>|-iasInstance instance_id|-iasComponent
component_id|-processType component_type
-username <username>
-fa_oracle_home <FA OracleHome>
[-clusterType <type of cluster>]
[-adminServersOnly|-startAdminServer <true or false>, default is false]
[-includeServers <ENABLED or DISABLED or ALL>, default is ENABLED]
[-loglevel <log level>]
[-timeout <timeout period for server in seconds>]
[-mode <mode value>]
[-version]
[--help]
```

```
(Windows) fastartstop.cmd -Start|-Stop|-Bounce|-componntTyp|-componentDomain
-all | -domains domain_name, domain_nameN, domain_nameN
|-domains "domain_name(server:all, server:managed_server_
name|AdminServer)", "domain_name(server:all, server:managed_server_name|Aserver)"
|-componentType <OHS or BI or GOP>
|-componentDomain <component's domain name>|-iasInstance instance_id|-iasComponent
component_id|-processType component_type
-username <username>
-fa_oracle_home <FA OracleHome>
[-clusterType <type of cluster>]
[-adminServersOnly|-startAdminServer <true or false>, default is false]
[-includeServers <ENABLED or DISABLED or ALL>, default is ENABLED]
[-loglevel <log level>]
[-timeout <timeout period for server in seconds>]
[-mode <mode value>]
[-version]
[--help]
```

[Table 4–2](#) describes the options for the `fastartstop` script.

**Table 4–2 Options for the faststartstop Script**

Options	Description
<code>-Start -Stop -Bounce -componentType -componentDomain</code>	<p>Specify the operation to execute:</p> <ul style="list-style-type: none"> <li>■ Use <code>-Start</code> to start Managed Servers.</li> <li>■ Use <code>-Stop</code> to stop Managed Servers.</li> <li>■ Use <code>-Bounce</code> to restart Managed Servers.</li> <li>■ Use <code>-componentType</code> to start Oracle Business Intelligence.</li> <li>■ Use <code>-componentDomain</code> to stop Oracle Business Intelligence.</li> </ul>
<code>-all -domains -componentType BI</code>	<p>Specify what to start, stop, or restart:</p> <ul style="list-style-type: none"> <li>■ Use <code>-all</code> for all components in all the domains. Components that are started include the Administration Server, Managed Servers, OPMN-based components Oracle Business Intelligence and Oracle HTTP Server.</li> <li>■ Use <code>-domains</code> for Managed Servers and the Administration Server in specific domains. Delineate the domain names with a comma, (<i>domain_name, domain_name</i>); white space is not allowed in the domain name list. This option does not manage OPMN-based components Oracle Business Intelligence and Oracle HTTP Server.</li> <li>■ Use <code>-componentType BI</code> for Oracle Business Intelligence components. This option is necessary with the <code>-componentType</code> or <code>-componentDomain</code> option.</li> <li>■ Use suboption <code>server</code> to specify the Administration Server or Managed Servers for the domains you want to start, stop, or bounce. When the <code>server</code> suboption is used, enclose the <code>-domains</code> argument in quotes: <ul style="list-style-type: none"> <li><code>-domains "domain_name(server:all,server:managed_server_name AdminServer) "</code></li> </ul> </li> </ul> <p>This <code>-domains</code> option is mutually exclusive to the following options:</p> <ul style="list-style-type: none"> <li>■ <code>-startAdminServer</code></li> <li>■ <code>-clusterType</code></li> <li>■ <code>-adminServersOnly</code></li> </ul> <p>You cannot include these options in the same <code>faststartstop</code> command as the <code>-domains</code> options.</p> <p>If you use the <code>server</code> suboption for one domain, you must use it for all domains. <a href="#">Example 4–21</a> shows a mix, which would generate an error.</p>



**Table 4–2 (Cont.) Options for the faststartstop Script**

Options	Description
-componentType   -componentDomain	<p>Specify the operation to execute:</p> <ul style="list-style-type: none"> <li>■ Use -componentType to start Oracle HTTP Server. It is a customized form of -componentDomain option.</li> <li>■ Use -componentDomain an alternative to starting or stopping Oracle HTTP Server managed through Oracle Process Manager and Notification (OPMN) component. You use the -iasInstance, -iasComponent, and -processType suboptions to completely specify a component. For general information about these attributes, see the <i>Oracle Fusion Middleware Oracle Process Manager and Notification Server Administrator's Guide</i>.</li> </ul> <p>- Use -iasInstance to specify the instance ID. Enter a value of CommonDomain_webtier for Oracle HTTP Server.</p> <p>- Use -iasComponent to specify the component ID for the component. The value is ohs for Oracle HTTP Server.</p> <p>- Use -processType to specify the component type. The valid value is OHS for Oracle HTTP Server.</p> <p>-iasComponent is a child of -iasInstance. Therefore, you cannot issue a faststartstop command using -iasComponent without its hierarchical parent command. You can use -iasInstance independent of -iasComponent commands.</p> <p>For example, -componentDomain CommonDomain -iasInstance CommonDomain_webtier will act upon all components under the CommonDomain_webtier instance ID. Similarly -componentDomain CommonDomain -iasInstance CommonDomain_webtier -iasComponent ohs1 will act upon all process types under ohs1 component ID. However, -componentDomain CommonDomain -iasComponent ohs1 will result in an error, as the hierarchy is not maintained. The component named ohs1 can be present under any instance, so the hierarchy must be maintained to ensure the correct Oracle HTTP Server.</p>
-clusterType	<p>Specify to start, stop, or restart Managed Servers within a cluster. This parameter is currently only supported for Oracle SOA Suite clusters (soa).</p> <p>This option is mutually exclusive to the server suboption of the -domain option. You cannot include this option in the same faststartstop command as the server suboption.</p> <p>This option is mutually exclusive to the following options:</p> <ul style="list-style-type: none"> <li>■ -adminServersOnly</li> <li>■ server suboption of the -domains option</li> </ul> <p>You cannot include the -clusterType option in the same faststartstop command as these options.</p>
-username	<p>Specify an user with Oracle Fusion Middleware administration user privileges.</p>
-fa_oracle_home	<p>Specify the complete directory path to the Oracle Fusion Applications Oracle home. This directory is located at:</p> <p>(UNIX) APPLICATIONS_BASE/fusionapps/applications  (Windows) APPLICATIONS_BASE\fusionapps\applications</p>

**Table 4–2 (Cont.) Options for the fastartstop Script**

Options	Description
<code>-adminServersOnly</code>	<p>Use to start, stop, or restart the Administration Servers only, leaving the Managed Servers untouched.</p> <p>This option is mutually exclusive to the following options:</p> <ul style="list-style-type: none"> <li>■ <code>-startAdminServer</code></li> <li>■ <code>-clusterType</code></li> <li>■ <code>server</code> suboption of the <code>-domains</code> option</li> </ul> <p>You cannot include the <code>-adminServersOnly</code> option in the same <code>fastartstop</code> command as these options.</p> <p>When used with <code>Bounce</code>, <code>fastartstop</code> performs a restart for Administration Servers. If some Administration Servers fail during the <code>Bounce</code> command, in next run, failed servers will be acted upon. The servers bounced successfully in the previous runs will be skipped in the next run.</p>
<code>-startAdminServer</code>	<p>Specify <code>true</code> to start the Administration Server; specify <code>false</code> to stop the Administration Server. The default is <code>false</code>.</p> <p>This option is mutually exclusive to the following options:</p> <ul style="list-style-type: none"> <li>■ <code>-adminServersOnly</code></li> <li>■ <code>server</code> suboption of the <code>-domains</code> option</li> </ul> <p>You cannot include the <code>-startAdminServer</code> option in the same <code>fastartstop</code> command as these options.</p>
<code>--help</code>	Specify to display the syntax.
<code>-loglevel</code>	<p>Specify the log level for the <code>fastartstop.log</code> file:</p> <ul style="list-style-type: none"> <li>■ <code>INFO</code>: Provides informational messages.</li> <li>■ <code>FINER</code>: Provides detailed log messages.</li> <li>■ <code>WARNING</code>: Provides messages for potentially problems.</li> </ul> <p><code>INFO</code> is the default.</p>
<code>-timeout</code>	<p>Specify the number of seconds to wait for the start, stop, or restart the domain or a server. When all the servers in the domain are started in parallel, the timeout is associated with the domain. When individual Administration Sever or Managed Sever are started instead of a domain, the timeout is associated with the server.</p> <p>The default timeout is 40 minutes. In addition, this option has a minimum guard value of 12 minutes. If you provides a value less than 12 minutes, then guard value will be used instead.</p>

**Table 4–2 (Cont.) Options for the faststartstop Script**

Options	Description
-mode	<p>Specify the mode value with which you want to run the faststartstop script. The &lt;mode-value&gt;_fass_control.properties file is located in the following directory (&lt;mode-value&gt; is any name):</p> <p>(UNIX) &lt;FA INSTANCE&gt;/lcm/admin/FASStartStop (Windows) &lt;FA INSTANCE&gt;\lcm\admin\FASStartStop</p> <p>The mode values supported by default are:</p> <ul style="list-style-type: none"> <li>▪ saas</li> <li>▪ rup</li> </ul> <p>By default, the following files will be available at the directory specified above:</p> <ul style="list-style-type: none"> <li>▪ saas_fass_control.properties</li> <li>▪ rup_fass_control.properties</li> </ul>

The faststartstop utility prompts you for the password for the user with Oracle Fusion Middleware administrator privileges specified by the -username argument. If you pass this argument to the faststartstop utility on the standard input, the utility will not prompt.

See [Section 6.8.5.2](#) for more information about changing this password.

The faststartstop utility generates faststartstop.log in the following subdirectories:

(UNIX) APPLTOP/instance/lcm/logs/11.1.7.0.0/RUP/StartStop  
(Windows) APPLTOP\instance\lcm\logs\11.1.7.0.0\RUP\StartStop

FA\_ORACLE\_HOME is the Oracle Fusion Applications Oracle home located at:

(UNIX) APPLICATIONS\_BASE/fusionapps/applications  
(Windows) APPLICATIONS\_BASE\fusionapps\applications

#### 4.4.2.2 faststartstop Examples

The following examples provide syntax examples for common scenarios:

- [Section 4.4.2.2.1, "Starting Examples with faststartstop"](#)
- [Section 4.4.2.2.2, "Stopping Examples with faststartstop"](#)
- [Section 4.4.2.2.3, "Bouncing Examples with faststartstop"](#)
- [Section 4.4.2.2.4, "Using the AdminServersOnly Option with faststartstop"](#)
- [Section 4.4.2.2.5, "Using Combination Commands with faststartstop"](#)

##### 4.4.2.2.1 Starting Examples with faststartstop

[Example 4–1](#) shows starting the Administration Server and all the Managed Servers in the SCMDomain domain.

#### **Example 4–1 Syntax Sample to Start the Administration Server and All Managed Servers in a Single Domain**

```
./faststartstop.sh -Start -domains "SCMDomain(server:all)" -username FAAdmin -fa_
oracle_home /scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4-2](#) shows starting the Administration Server and the soa\_server1 Managed Server in the SCMDomain domain.

**Example 4-2 Syntax to Start the Administration Server and Another Managed Server in a Single Domain**

```
./fastartstop.sh -Bounce -domains "SCMDomain(server:AdminServer,server:soa_
server1)" -username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4-3](#) shows starting Managed Servers soa\_server1 and AdvancedPlanningServer\_1 in the SCMDomain domain.

**Example 4-3 Syntax to Start Multiple Managed Servers in a Single Domain**

```
./fastartstop.sh -Start -domains "SCMDomain(server:soa_
server,server:AdvancedPlanningServer_1)" -username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4-4](#) shows starting Managed Servers soa\_server1 and AdvancedPlanningServer\_1 in the SCMDomain domain and soa\_server from the HCMDomain domain.

**Example 4-4 Syntax to Start Multiple Managed Servers in Multiple Domains**

```
./fastartstop.sh -Start -domains "SCMDomain(server:soa_
server,server:AdvancedPlanningServer_1),HCMDomain(server:soa_server)" -username
FAAdmin -fa_oracle_home /scratch/aime/work/APPTOP/fusionapps/applications
-loglevel FINER
```

[Example 4-5](#) shows starting all the Managed Servers and the Administration Server in the HCMDomain domain.

**Example 4-5 Syntax to Start the Managed Servers and Administration Server in the SOA Cluster of a Single Domain**

```
./fastartstop.sh -Start -domains HCMDomain -username username
appbase /scratch/aime1/appltop/fusionapps/applications
-clusterType soa -startAdminServer true
```

[Example 4-6](#) shows starting the CommonDomain domain. Starting a domain starts its Managed Servers and Administration Server. Starting a domain includes starting its Administration Server, followed by the Managed Servers. When all the Managed Servers are up, the Administration Server is stopped. If you want the Administration Server to continue to run, use `-startAdminServer true`, as shown in [Example 4-5](#). This command does not start OPMN-based components Oracle Business Intelligence and Oracle HTTP Server.

**Example 4-6 Syntax to Start a Specific Domain**

```
./fastartstop.sh -Start -domains CommonDomain -username FUSION_APPS_PROV_PATCH_
APPID -fa_oracle_home /slot/ems7770/oracle/apphome/fusionapps/applications
```

[Example 4-7](#) shows starting all the domains. Starting a domain includes starting its Administration Server, followed by the Managed Servers. When all the Managed Servers are up, the Administration Server is stopped. If you want the Administration Servers to continue to run, use `-startAdminServer true`, as shown in [Example 4-8](#). The `-all` option also starts OPMN-based components Oracle Business Intelligence and Oracle HTTP Server.

**Example 4–7 Syntax to Start All Domains**

```
./fastartstop.sh -Start -all -username FUSION_APPS_PROV_PATCH_APPID -fa_oracle_
home /slot/ems7770/oracle/apphome/fusionapps/applications
```

[Example 4–8](#) shows starting multiple domains. Starting domains starts all the Managed Servers and Administration Server for each product family domain.

**Example 4–8 Syntax to Start Multiple Domains**

```
./fastartstop.sh -Start -domains HCMDomain,BIDomain,ProjectsDomain -username
FUSION_APPS_PROV_PATCH_APPID -fa_oracle_home
/scratch/aime/VIHCM/APPTOP/fusionapps/applications -startAdminServer true
-clusterType soa
```

**4.4.2.2 Stopping Examples with fastartstop**

[Example 4–9](#) shows stopping the Administration Server and all the Managed Servers in the SCMDomain domain.

**Example 4–9 Syntax to Stop the Administration Server and All Managed Servers in a Single Domain**

```
./fastartstop.sh -Stop -domains "SCMDomain(server:all)" -username FAAdmin -fa_
oracle_home /scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4–10](#) shows stopping Managed Servers soa\_server1 and AdvancedPlanningServer\_1 in the SCMDomain domain.

**Example 4–10 Syntax to Stop Multiple Managed Servers in a Single Domain**

```
./fastartstop.sh - Stop -domains "SCMDomain(server:soa_
server,server:AdvancedPlanningServer_1)" -username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4–11](#) shows stopping Managed Servers soa\_server1 and AdvancedPlanningServer\_1 in the SCMDomain domain and soa\_server in the HCMDomain domain.

**Example 4–11 Syntax to Stop Multiple Managed Servers in Multiple Domains**

```
./fastartstop.sh - Stop -domains "SCMDomain(server:soa_
server,server:AdvancedPlanningServer_1),HCMDomain(server:soa_server)" -username
FAAdmin -fa_oracle_home /scratch/aime/work/APPTOP/fusionapps/applications
-loglevel FINER
```

[Example 4–12](#) shows stopping the CommonDomain domain. Stopping a domain stops its Managed Servers and Administration Server.

**Example 4–12 Syntax to Stop a Specific Domain**

```
./fastartstop.sh -Stop -domains CommonDomain -username FUSION_APPS_PROV_PATCH_
APPID -fa_oracle_home /slot/ems7770/oracle/apphome/fusionapps/applications
```

[Example 4–13](#) shows stopping all the product family domains. Stopping all the domains stops the Managed Servers, Administration Server, and the OPMN-based components Oracle Business Intelligence and Oracle HTTP Server for each domain.

**Example 4–13 Syntax to Stop All Domains**

```
./fastartstop.sh -Stop -all -username FUSION_APPS_PROV_PATCH_APPID -fa_oracle_home
```

```
/slot/ems7770/oracle/apphome/fusionapps/applications
```

[Example 4-14](#) shows stopping multiple domains. Stopping domains stops all the Managed Servers and Administration Server for each product family domain.

**Example 4-14 Syntax to Stop Multiple Domains**

```
./fastartstop.sh -Stop -domains HCMDomain,BIDomain,ProjectsDomain -username
FUSION_APPS_PROV_PATCH_APPID -fa_oracle_home
/scratch/aime/V1HCM/APPTOP/fusionapps/applications -startAdminServer true
-clusterType soa
```

#### 4.4.2.3 Bouncing Examples with fastartstop

[Example 4-15](#) shows restarting the Administration Server and all the Managed Servers in the SCMDomain domain.

**Example 4-15 Syntax to Bounce the Administration Server and All Managed Servers in a Single Domain**

```
./fastartstop.sh -Bounce -domains "SCMDomain(server:all)" -username FAAdmin -fa_
oracle_home /scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4-16](#) shows restarting Managed Servers soa\_server1 and AdvancedPlanningServer\_1 in the SCMDomain domain.

**Example 4-16 Syntax to Bounce Multiple Managed Servers in a Single Domain**

```
./fastartstop.sh - Bounce -domains "SCMDomain(server:soa_
server,server:AdvancedPlanningServer_1)" -username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

[Example 4-17](#) shows restarting Managed Servers soa\_server1 and AdvancedPlanningServer\_1 in the SCMDomain domain and soa\_server in the HCMDomain domain.

**Example 4-17 Syntax to Bounce Multiple Managed Servers in Multiple Domains**

```
./fastartstop.sh - Bounce -domains "SCMDomain(server:soa_
server,server:AdvancedPlanningServer_1),HCMDomain(server:soa_server)" -username
FAAdmin -fa_oracle_home /scratch/aime/work/APPTOP/fusionapps/applications
-loglevel FINER
```

[Example 4-18](#) shows restarting the CommonDomain domain. Restarting a domains restarts the Managed Servers and Administration Server in the domain.

**Example 4-18 Syntax to Bounce a Specific Domain**

```
./fastartstop.sh -Bounce -domains CommonDomain -username FUSION_APPS_PROV_PATCH_
APPID -fa_oracle_home /slot/ems7770/oracle/apphome/fusionapps/applications
```

#### 4.4.2.4 Using the AdminServersOnly Option with fastartstop

**Example 4-19 Syntax to Restart all the Administration Servers**

```
./fastartstop.sh -Bounce -all -username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
-adminServersOnly
```

#### 4.4.2.5 Using Combination Commands with fastartstop

If the server suboption is set to all and another Managed Server or Administration Server with the `-domain` option (Example 4-21), all will take precedence and the start, stop, or restart operation will occur on all servers.

**Example 4-20 Syntax with Contradicting server Suboption Settings**

```
./fastartstop.sh -Bounce -domains "SCMDomain(server:all,server:soa_server1)"
-username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
```

If you use the server suboption for one domain, you must use it for all domains. In addition, you cannot use the server suboption with the `-adminServersOnly` option. Example 4-21 shows `server:all` for the SCMDomain domain, but not for the HCMDomain domain. It also shows the `-adminServersOnly` option in combination with the server suboption. This syntax would generate an error.

**Example 4-21 Syntax with server Suboption Settings Not Consistently Used**

```
./fastartstop.sh -Start|Stop|Bounce -domains "SCMDomain(server:all),HCMDomain"
-username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
-adminServersOnly
```

If the server suboption of the `-domains` option is used, the following options cannot be used:

- `-startAdminServer`
- `-clusterType`
- `-adminServersOnly`

Example 4-22 shows incorrect combinations of these commands. If these examples are entered, you would see error messages.

**Example 4-22 Sample Syntax with Contradicting server Suboption Settings**

```
./fastartstop.sh -Start|Stop|Bounce -domains "SCMDomain(server:all)" -username
FAAdmin -fa_oracle_home /scratch/aime/work/APPTOP/fusionapps/applications
-loglevel FINER -clusterType SOA
```

```
./fastartstop.sh -Start|Stop|Bounce -domains "SCMDomain(server:all)" -username
FAAdmin -fa_oracle_home /scratch/aime/work/APPTOP/fusionapps/applications
-loglevel FINER -startAdminServer true
```

```
./fastartstop.sh -Start|Stop|Bounce -domains "SCMDomain(server:all)" -username
FAAdmin -fa_oracle_home /scratch/aime/work/APPTOP/fusionapps/applications
-loglevel FINER -adminServersOnly
```

```
./fastartstop.sh -Start|Stop|Bounce -domains "SCMDomain(server:all),HCMDomain"
-username FAAdmin -fa_oracle_home
/scratch/aime/work/APPTOP/fusionapps/applications -loglevel FINER
-adminServersOnly
```

### 4.4.3 Starting and Stopping the Entire Oracle Fusion Applications Environment

Some components in the Oracle Fusion Applications environment dependent on one another. Therefore, it is important to start and stop components in the proper order. In the course of normal IT operations, common operations include shutting down computers and starting them back up. Therefore, it is crucial to start and stop Oracle Fusion Applications in a sequential manner.

This section contains the following topics:

- [Section 4.4.3.1, "Starting an Oracle Fusion Applications Environment"](#)
- [Section 4.4.3.2, "Stopping an Oracle Fusion Applications Environment"](#)

#### 4.4.3.1 Starting an Oracle Fusion Applications Environment

To perform a complete start of the Oracle Fusion Applications environment, you must start the Oracle WebLogic Server domain for the Oracle Fusion Setup product family before the domains for the other product families.

Applications may not work correctly until all the Managed Servers in all domains have been started.

The section contains the following topics for performing a complete start of the Oracle Fusion Applications environment:

- [Task 1: Start the Oracle Database](#)
- [Task 2: Start the Oracle Identity Management Suite](#)
- [Task 3: Start Node Manager](#)
- [Task 4: Start the Key Oracle Fusion Middleware Components on the Provisioned Environment](#)

##### 4.4.3.1.1 Task 1: Start the Oracle Database

To start the Oracle database instance using Oracle Database Control:

1. Go to the Database Home page.  
For information about how to access the Database Home page in Oracle Enterprise Manager, see "Accessing the Database Home Page" section in the *Oracle Database 2 Day DBA*.
2. In the Database Home page, click **Startup**.  
The Startup/Shutdown Credentials page appears.
3. Enter credentials as follows:
  - a. Enter the host computer credentials of the user who installed Oracle Database, or of any user who is authorized to use SQL\*Plus.
  - b. Enter the database credentials consisting of the user name *SYS* and the password that you assigned to *SYS* during the installation.
  - c. From the **Connect As** list, select **SYSOPER**.
4. Click **OK**.  
A confirmation page appears.
5. Click **Yes**.  
The Startup page appears, indicating that the database is being started up. When startup is complete, the Login page appears.
6. Log in to the database.  
The Database Home page appears indicating that the database instance status is **Up**.

For information about shutting down and starting up the Oracle database instance, see the "Shutting Down and Starting Up the Oracle Instance" section in the *Oracle Database 2 Day DBA*.



#### 4.4.3.1.2 Task 2: Start the Oracle Identity Management Suite

To start the Oracle Identity Management system components:

1. Set the `ORACLE_HOME` environment variable to the Oracle home for the Oracle Identity Management components.
2. Start Oracle Process Manager and Notification Server (OPMN) and all system components:

```
opmnctl startall
```

#### 4.4.3.1.3 Task 3: Start Node Manager

Each host has its own copy of the Node Manager and all the Node Managers should be running before attempting to start any Administration Servers or Managed Servers.

Start Node Manager for each of the hosts for which you want to start the Administration Servers:

1. Set the `JAVA_OPTIONS` environment variable:

```
setenv JAVA_OPTIONS "${JAVA_OPTIONS} -Dserver.group=AdminServer"
```

2. Set the `WLST_PROPERTIES` environment variable:

```
setenv WLST_PROPERTIES "-Dweblogic.security.SSL.trustedCAKeyStore=APPLICATIONS_CONFIG/keystores/fusion_trust.jks"
```

where `APPLICATION_CONFIG` is one of the following directories:

```
(UNIX) APPLICATIONS_BASE/instance
(Windows) APPLICATIONS_BASE\instance
```

3. Start Node Manager with the `startNodeManagerWrapper` utility from the following locations:

```
(UNIX) APPLICATIONS_CONFIG/nodemanager/host_name/startNodeManagerWrapper.sh
(Windows) APPLICATIONS_CONFIG\nodemanager\host_name\startNodeManagerWrapper.cmd
```

4. For all the hosts, verify that Node Manager is running. For example, on UNIX platforms, enter the following command:

```
netstat -a|grep 5556
```

The 5556 port should be in a listening state. If your environment uses a different port, then use the port number in the System Port Allocation page during the creation of a provisioning plan. See the "System Port Allocation" section in the *Oracle Fusion Applications Installation Guide*.

#### 4.4.3.1.4 Task 4: Start the Key Oracle Fusion Middleware Components on the Provisioned Environment

To start the Administration Servers, Managed Servers, Oracle HTTP Server, and Oracle Business Intelligence on the provisioned environment:

1. At an operating system command prompt, navigate to the location of the `faststartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is the Oracle Fusion Applications Oracle home located at:

```
(UNIX) APPLICATIONS_BASE/fusionapps/applications
```

(Windows) `APPLICATIONS_BASE\fusionapps\applications`

- From the shared host location, run the `fastartstop` utility with the `-all` option for all the domains:

```
fastartstop.sh/fastartstop.cmd -Start -all
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

For more information about the `fastartstop` syntax, see [Table 4–2](#).

#### 4.4.3.2 Stopping an Oracle Fusion Applications Environment

You can follow these procedures when you need to completely shut down the Oracle Fusion Applications environment. For example, when preparing to perform a complete backup of your environment, or apply a patch.

The section contains the following topics for performing a complete stop of the Oracle Fusion Applications environment:

- [Task 1: Stop the Key Oracle Fusion Middleware Components on the Provisioned Environment](#)
- [Task 2: Stop the Oracle Identity Management Suite](#)
- [Task 4: Stop the Oracle Database](#)

##### 4.4.3.2.1 Task 1: Stop the Key Oracle Fusion Middleware Components on the Provisioned Environment

To start the Administration Servers, Managed Servers, Oracle HTTP Server, and Oracle Business Intelligence on the provisioned environment:

- At an operating system command prompt, navigate to the location of the `fastartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is the Oracle Fusion Applications Oracle home located at:

```
(UNIX) APPLICATIONS_BASE/fusionapps/applications
(Windows) APPLICATIONS_BASE\fusionapps\applications
```

- From the shared host location, run the `fastartstop` utility with the `-all` option for all the domains:

```
fastartstop.sh/fastartstop.cmd -Stop -all
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

For more information about the `fastartstop` syntax, see [Table 4–2](#).

##### 4.4.3.2.2 Task 2: Stop the Oracle Identity Management Suite

To stop the Oracle Identity Management system components:

- Set the `ORACLE_HOME` environment variable to the Oracle home for the Identity Management components.

2. Start OPMN and all system components:

```
opmnctl stopall
```

#### 4.4.3.2.3 Task 4: Stop the Oracle Database

To stop the Oracle database instance using Oracle Database Control:

1. Go to the Database Home page.

For information about how to access the Database Home page in Oracle Enterprise Manager, see "Accessing the Database Home Page" section in the *Oracle Database 2 Day DBA*.

2. In the Database Home page, click **Shutdown**.

The Startup/Shutdown Credentials page appears.

3. Enter credentials as follows:

- a. Enter the host computer credentials of the user who installed Oracle Database, or of any user who is authorized to use SQL\*Plus.
- b. Enter the database credentials consisting of the user name `SYS` and the password that you assigned to `SYS` during the installation.
- c. From the **Connect As** list, select **SYSOPER**.

4. (Optional) Select the **Save as Preferred Credential** option if you want these credentials to be automatically filled in for you the next time that this page appears.

5. Click **OK**.

A confirmation page appears.

6. Click **Yes** to start the `SHUTDOWN IMMEDIATE` operation on the database.

The Shutdown: Activity Information page appears, informing you that the database is being shut down.

7. After a short period (approximately 2 minutes), click **Refresh** to be returned to the Database Home page.

The Database Home page indicates that the database instance status is Down.

For information about shutting down and starting up the Oracle database instance, see the "Shutting Down and Starting Up the Oracle Instance" section in the *Oracle Database 2 Day DBA*.

## 4.4.4 Starting and Stopping the Administration Servers and Managed Servers

This section contains the following topics:

- [Section 4.4.4.1, "Starting the Administration Servers and Managed Servers"](#)
- [Section 4.4.4.2, "Stopping the Administration Servers and Managed Servers"](#)

### 4.4.4.1 Starting the Administration Servers and Managed Servers

You must start the Oracle WebLogic Server Administration Server for the `CommonDomain` domain in the Oracle Fusion Setup product family from a shared disk. The applications and other product families depend on topology information in the Administration Server in the Oracle Fusion Setup product family. For more information about running the Administration Server and Managed Servers from a shared location, see [Section 4.2](#).

Optionally, if you need to perform administration tasks for other product families, start the Administration Server for those product families.

When you start an Administration Server, you also start the applications that run on the Administration Server, including the WebLogic Server Administration Console and Fusion Applications Control.

To start the Administration Servers and Managed Servers:

1. At an operating system command prompt, navigate to the location of the `faststartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is a directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.

2. From the shared host location, run the `faststartstop` utility to start the Administration Servers and the Managed Servers:
  - To start only Administration Servers, use the `-adminServersOnly` option. Use the `-startAdminServer` option to keep Admin Servers running after starting/stopping Managed Servers. Use the `-all` option to start the Administration Servers for all the domains or the `-domains` option to start the Administration Server for specific domains.

```
faststartstop.sh/faststartstop.cmd -Start
-all|-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
-adminServersOnly
[-loglevel log_level]
[-timeout timeout_period]
```

```
faststartstop.sh/faststartstop.cmd -Start
-all|-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
-startAdminServer true
[-loglevel log_level]
[-timeout timeout_period]
```

```
faststartstop.sh/faststartstop.cmd -Start
-all|-domains "domain_name(server:AdminServer) , domain_name(server:AdminServer) "
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

When the server suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:AdminServer) , domain_name(server:AdminServer) "
```

- To start only the Managed Servers, use the `-domains` option with the `server` suboption to specify the Managed Servers to start:

```
faststartstop.sh/faststartstop.cmd -Start
-domains "domain_name(server:managed_server_name, server:managed_server_name) , domain_name(server:managed_server_name, server:managed_server_name) "
-username user_name
-fa_oracle_home APPLICATIONS_BASE
```

```
[-loglevel log_level]
[-timeout timeout_period]
```

When the server suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:managed_server_name,server:managed_server_
name),domain_name(server:managed_server_name,server:managed_server_name) "
```

- To start the Administration Servers and Managed Servers in one `faststartstop` command, use the `-domains` option to specify the domains and the `-startAdminServer true`, or use the `-domains` option with the `server:all` suboption:

```
faststartstop.sh/faststartstop.cmd -Start
-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
-startAdminServer true
[-loglevel log_level]
[-timeout timeout_period]
```

```
faststartstop.sh/faststartstop.cmd -Start
-domains domain_name(server:all), domain_name(server:all)
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

When the server suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:all), domain_name(server:all) "
```

For more information about the `faststartstop` syntax, see [Table 4-2](#).

---

**Note:** Do not use the following Oracle WebLogic Server scripts to start the Administration Servers:

```
(UNIX) DOMAIN_HOME/bin/startWebLogic.sh
(Windows) DOMAIN_HOME\bin\startWebLogic.cmd
```

---

### Starting Managed Servers with Fusion Applications Control

If you are working on a specific domain in Fusion Applications Control, you can also start the Managed Servers for that domain.

To start the Managed Servers for a specific domain with Fusion Applications Control:

1. From the navigation pane, expand the farm, **WebLogic Domain**.
2. From the **WebLogic Domain** menu, choose **Control**, then **Start Up**.

### Starting Managed Servers with WebLogic Server Administration Console

If you prefer to use the WebLogic Server Administration Console instead of Fusion Applications Control, see "Start Managed Servers from the Administration Console" and "Start Managed Servers in a cluster" in the *Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help*.

#### 4.4.4.2 Stopping the Administration Servers and Managed Servers

When stopping the Oracle Fusion Applications environment, stop the Administration Server for the product families other than the Oracle Fusion Setup product family first, and then stop the Administration Server for the Oracle Fusion Setup product family. The applications and other product families depend on topology information in the Administration Server in the Oracle Fusion Setup product family. Therefore, you need to stop the Administration Server in the Oracle Fusion Setup product family after the other product families. You stop the Administration Servers from a shared disk.

When you stop the Administration Server, you also stop the applications that run on the Administration Server, including the WebLogic Server Administration Console and Fusion Applications Control.

To stop the Administration Servers and Managed Servers:

1. At an operating system command prompt, navigate to the location of the `fastartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is a directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.

2. From the shared host location, run the `fastartstop` utility to stop the Administration Servers and the Managed Servers:
  - To stop only Administration Servers, use the `-adminServersOnly` option. Use the `-startAdminServer` option to keep Admin Servers up after starting/stopping managed servers. Use the `-all` option to stop the Administration Servers for all the domains or the `-domains` option to stop the Administration Servers for specific domains.

```
fastartstop.sh/fastartstop.cmd -Stop
-all|-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
-adminServersOnly
[-loglevel log_level]
[-timeout timeout_period]
```

```
fastartstop.sh/fastartstop.cmd -Stop
-all|-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
-startAdminServer false
[-loglevel log_level]
[-timeout timeout_period]
```

```
fastartstop.sh/fastartstop.cmd -Stop
-all|-domains "domain_name(server:AdminServer), domain_name(server:AdminServer)"
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

When the server suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:AdminServer), domain_name(server:AdminServer)"
```

- To stop only the Managed Servers, use the `-domains` option with the `server` suboption to specify the Managed Servers to stop:

```
fastartstop.sh/fastartstop.cmd -Stop
-domains "domain_name(server:managed_server_name,server:managed_server_name),domain_name(server:managed_server_name,server:managed_server_name)"
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

When the `server` suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:managed_server_name,server:managed_server_name),domain_name(server:managed_server_name,server:managed_server_name)"
```

- To stop the Administration Servers and Managed Servers in one `fastartstop` command, use the `-domains` option with the `server:all` suboption to stop the servers for specific domains.

```
fastartstop.sh/fastartstop.cmd -Stop
-domains domain_name,domain_nameN,domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

```
fastartstop.sh/fastartstop.cmd -Stop
-domains "domain_name(server:all),domain_name(server:all)"
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

When the `server` suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:all),domain_name(server:all)"
```

For more information about the `fastartstop` syntax, see [Section 4.4.2.1](#).

---



---

**Note:** Do not use the following Oracle WebLogic Server scripts to stop the Administration Servers:

```
(UNIX) DOMAIN_HOME/bin/stopWebLogic.sh
(Windows) DOMAIN_HOME\bin\stopWebLogic.cmd
```

---



---

### Stopping Managed Servers with Fusion Applications Control

If you are working on a specific domain in Fusion Applications Control, you can also stop the Managed Servers for that domain.

To stop the Managed Servers for a specific domain with Fusion Applications Control:

1. From the navigation pane, expand the farm, **WebLogic Domain**.
2. From the **WebLogic Domain** menu, choose **Control**, then **Shut Down**.

### Stopping Managed Servers with WebLogic Server Administration Console

If you prefer to use the WebLogic Server Administration Console, see "Start Managed Servers from the Administration Console" and "Shutdown servers in a cluster" in the *Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help*.

## 4.4.5 Starting and Stopping Oracle HTTP Server

This section contains the following topics:

- [Section 4.4.5.1, "Starting the Oracle HTTP Server"](#)
- [Section 4.4.5.2, "Stopping the Oracle HTTP Server"](#)

### 4.4.5.1 Starting the Oracle HTTP Server

To start Oracle HTTP Server:

- `fastartstop`
  1. At an operating system command prompt, navigate to the location of the `fastartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

---

**Note:** OPMN of the OHS instance must be running for `fastartstop` to start the OHS component.

---

`FA_ORACLE_HOME` is a directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.

2. From the shared host location, run the `fastartstop` utility with `-componentType` option:

Command to start:

```
fastartstop.sh/fastartstop.cmd -Start -componentType BI -fa_oracle_home
/APPTOP/fusionapps/applications/
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

Command to stop:

```
fastartstop.sh/fastartstop.cmd -Stop -componentType BI -fa_oracle_home
/APPTOP/fusionapps/applications/
```

The `-username` option is not needed for starting Oracle HTTP Server.

For more information about the `fastartstop` syntax, see [Table 4-2](#).

- `opmnctl`

```
(UNIX) WT_CONFIG_HOME/bin/opmnctl startproc process-type=OHS
(Windows) WT_CONFIG_HOME\bin\opmnctl startproc process-type=OHS
```
- Fusion Applications Control:
  1. From the navigation pane, expand the farm and then the **Web Tier** installation type.
  2. Select the Oracle HTTP Server.
  3. From the **Oracle HTTP Server** menu, choose **Control**, then **Start Up**.



### 4.4.5.2 Stopping the Oracle HTTP Server

To stop Oracle HTTP Server:

- `fastartstop`
  1. At an operating system command prompt, navigate to the location of the `fastartstop` script:
 

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

*FA\_ORACLE\_HOME* is a directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.
  2. From the shared host location, run the `fastartstop` utility with `-componentType` option:
 

```
fastartstop.sh/fastartstop.cmd -Stop -componentType OHS
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

The `-username` option is not needed for stopping Oracle HTTP Server.

For more information about the `fastartstop` syntax, see [Table 4–2](#).
- `opmnctl`

```
(UNIX) WT_CONFIG_HOME/bin/opmnctl stopproc process-type=OHS
(Windows) WT_CONFIG_HOME\bin\opmnctl stopproc process-type=OHS
```
- Fusion Applications Control:
  1. From the navigation pane, expand the farm and then the **Web Tier** installation type.
  2. Select the Oracle HTTP Server.
  3. From the **Oracle HTTP Server** menu, choose **Control**, then **Shut Down**.

## 4.4.6 Starting and Stopping Oracle Business Intelligence

This section contains the following topics:

- [Section 4.4.6.1, "Starting Oracle Business Intelligence"](#)
- [Section 4.4.6.2, "Stopping Oracle Business Intelligence"](#)

### 4.4.6.1 Starting Oracle Business Intelligence

To start Oracle Business Intelligence:

- `fastartstop`
  1. At an operating system command prompt, navigate to the location of the `fastartstop` script:
 

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

*FA\_ORACLE\_HOME* is a directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.
  2. From the shared host location, run the `fastartstop` utility with `-componentType` and `-componentType BI` options:

```
fastartstop.sh/fastartstop.cmd -componentType -componentType BI
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

These options start the BIDomain, including the Administration Server and all the Managed Servers, as well as the following Oracle Business Intelligence components:

- JavaHost
- Oracle BI Presentation Server
- Oracle BI Scheduler
- Oracle BI Server

For more information about the `fastartstop` syntax, see [Table 4-2](#).

- Other tools

See "Starting and Stopping Oracle Business Intelligence" in the *Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition*.

#### 4.4.6.2 Stopping Oracle Business Intelligence

To stop Oracle Business Intelligence:

- `fastartstop`

1. At an operating system command prompt, navigate to the location of the `fastartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is a directory named `applications`, located under the `fusionapps` Oracle Fusion Applications Middleware home.

2. From the shared host location, run the `fastartstop` utility with `-componentDomain` and `-componentType BI` options:

```
fastartstop.sh/fastartstop.cmd -componentDomain -componentType BI
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

These options stop the BIDomain, as well as the following Oracle Business Intelligence components:

- JavaHost
- Oracle BI Presentation Server
- Oracle BI Scheduler
- Oracle BI Server

For more information about the `fastartstop` syntax, see [Table 4-2](#).

- Other tools

See "Starting and Stopping Oracle Business Intelligence" in the *Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition*.

## 4.4.7 Starting and Stopping a Product Family Oracle WebLogic Server Domain

When applying a patch that only applies to a product family, you can stop the Oracle WebLogic Server domain for the product family and restart it after you apply the patch. Your environment may require a restart of a domain for reasons other than a patch.

This section contains the following topics:

- [Section 4.4.7.1, "Stopping an Oracle WebLogic Server Domain for a Product Family"](#)
- [Section 4.4.7.2, "Starting an Oracle WebLogic Server Domain for a Product Family"](#)

### 4.4.7.1 Stopping an Oracle WebLogic Server Domain for a Product Family

You stop an Oracle WebLogic Server domain for a product family before applying a patch.

This section contains the following topics for stopping an Oracle WebLogic Server domain for a product family:

- [Task 1, "Stop the Oracle HTTP Server"](#)
- [Task 2, "Stop the Product Family Domain"](#)

#### Task 1 Stop the Oracle HTTP Server

See [Section 4.4.5.2](#).

#### Task 2 Stop the Product Family Domain

When you stop an Oracle WebLogic Server domain for a product family, you stop all the applications on the cluster of Managed Servers in the domain. For example, the Oracle Enterprise Scheduler ESSAPP application and the SOA Infrastructure soa-infra application stop running.

To stop a product family domain, use the `fastartstop` utility with the `-domains` option.

```
fastartstop.sh/fastartstop.cmd -Stop
-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

For more information about the `fastartstop` syntax, see [Section 4.4.2.1](#).

To stop a product family domain using Fusion Applications Control:

1. From the navigation pane, expand the farm, then **WebLogic Domain**.
2. Select the Oracle WebLogic Server domain.
3. From the **WebLogic Domain** menu, choose **Control**, then **Shut Down**.

#### 4.4.7.2 Starting an Oracle WebLogic Server Domain for a Product Family

You start an Oracle WebLogic Server domain for a product family after applying a patch.

This section contains the following topics for starting an Oracle WebLogic Server domain for a product family:

- [Task 1, "Start the Oracle HTTP Server"](#)
- [Task 2, "Start the Product Family Domain"](#)

##### Task 1 Start the Oracle HTTP Server

See [Section 4.4.5.1](#).

##### Task 2 Start the Product Family Domain

When you start an Oracle WebLogic Server domain for a product family, you start the cluster of Managed Servers in the domain and all the applications.

To start a product family domain, use the `faststartstop` utility with the `-domains` option.

```
faststartstop.sh/faststartstop.cmd -Start
-domains domain_name, domain_nameN, domain_nameN
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

For more information about the `faststartstop` syntax, see [Section 4.4.2.1](#).

To start a product family domain using Fusion Applications Control:

1. From the navigation pane, expand the farm, then **WebLogic Domain**.
2. Select the Oracle WebLogic Server domain.
3. From the **WebLogic Domain** menu, choose **Control**, then **Start Up**.

### 4.4.8 Starting and Stopping an Oracle WebLogic Server Cluster in a Product Family for a Configuration Change

If you modify the Oracle WebLogic Server configuration, you must stop and restart the cluster for the configuration changes to take effect. Starting and stopping a cluster stops all the Managed Servers within that cluster.

This section contains the following topics:

- [Section 4.4.8.1, "Starting and Stopping an Oracle WebLogic Server Cluster Using faststartstop"](#)
- [Section 4.4.8.2, "Starting and Stopping an Oracle WebLogic Server Cluster Using Fusion Applications Control"](#)
- [Section 4.4.8.3, "Starting and Stopping an Oracle WebLogic Server Cluster Using WebLogic Server Administration Console"](#)

See "Using Node Manager to Start Managed Servers in a WebLogic Domain or Cluster" section in *Oracle Fusion Middleware Oracle WebLogic Scripting Tool*.

#### 4.4.8.1 Starting and Stopping an Oracle WebLogic Server Cluster Using fastartstop

The `fastartstop` utility enables you to start or stop a cluster in a product family domain. Starting and stopping a cluster stops all the Managed Servers within the cluster.

To start the Oracle WebLogic Server cluster:

1. At an operating system command prompt, navigate to the location of the `fastartstop` script:

```
(UNIX) FA_ORACLE_HOME/lcm/ad/bin
(Windows) FA_ORACLE_HOME\lcm\ad\bin
```

`FA_ORACLE_HOME` is a directory named `applications`, located under the Fusionapps Oracle Fusion Applications Middleware home.

2. From the shared host location, run the `fastartstop` utility.

From the shared host location, run the `fastartstop` utility with the `-domains` option with the `server` suboption to specify all the Managed Servers in the cluster to start:

```
fastartstop.sh/fastartstop.cmd -Start
-domains "domain_name(server:managed_server_name,server:managed_server_name)"
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

When the `server` suboption is used, enclose the `-domains` argument in quotes:

```
-domains "domain_name(server:managed_server_name,server:managed_server_name)"
```

For a SOA cluster, you can start all the Managed Servers in the cluster with the `-domains` option and the `-clusterType` option. The `-clusterType` option only supports SOA clusters.

```
fastartstop.sh/fastartstop.cmd -Start
-domains domain_name, domain_nameN, domain_nameN
-clusterType soa
-username user_name
-fa_oracle_home APPLICATIONS_BASE
[-loglevel log_level]
[-timeout timeout_period]
```

For more information about the `fastartstop` syntax, see [Section 4.4.2.1](#).

#### 4.4.8.2 Starting and Stopping an Oracle WebLogic Server Cluster Using Fusion Applications Control

To stop or restart a cluster using Fusion Applications Control:

1. Modify the Oracle WebLogic Server configuration as required.
2. From the navigation pane, expand the farm, **WebLogic Domain**, and then domain name.
3. Select the Oracle WebLogic Server cluster.
4. Expand the Oracle WebLogic Server cluster to show each target Managed Server.
5. From the **WebLogic Cluster** menu, choose **Control**, then **Shut Down** or **Start Up**.

### 4.4.8.3 Starting and Stopping an Oracle WebLogic Server Cluster Using WebLogic Server Administration Console

If you prefer to use the WebLogic Server Administration Console, see "Start Managed Servers in a cluster" and "Shutdown servers in a cluster" in the *Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help*.

## 4.4.9 Starting and Stopping Specific Applications

Applications may not work correctly until all Managed Servers in all domains have been started.

This section contains the following topics:

- [Section 4.4.9.1, "Starting and Stopping Java EE Applications Using WLST"](#)
- [Section 4.4.9.2, "Starting and Stopping an Individual Application Instance for a Cluster Using Fusion Applications Control or Cloud Control"](#)
- [Section 4.4.9.3, "Starting and Stopping All Application Instances for a Cluster Using Fusion Applications Control or Cloud Control"](#)

### 4.4.9.1 Starting and Stopping Java EE Applications Using WLST

To start or stop applications with the WebLogic Scripting Tool (WLST):

1. At an operating system command prompt, navigate to the location of the WLST script:

```
(UNIX) FA_MW_HOME/oracle_common/common/bin
(Windows) FA_MW_HOME\oracle_common\common\bin
```

*FA\_MW\_HOME* is named *fusionapps* and located under the *APPLICATIONS\_BASE*.

2. Run the *wlst* script:

```
(UNIX) wlst.sh
(Windows) wlst.cmd
```

3. Connect to Oracle WebLogic Server with the following WLST command:

```
connect([options])
```

See the "connect" section in the *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

4. Use the following WLST commands:

```
startApplication(appName, [options])
stopApplication(appName, [options])
```

The application must be fully configured and available in the domain. The *startApplication* command returns a *WLSTProgress* object that you can access to check the status of the command. In the event of an error, the command returns a *WLSTException*. For more information about the *WLSTProgress* object, see "WLSTProgress Object" in the *Oracle Fusion Middleware Oracle WebLogic Scripting Tool*.

### 4.4.9.2 Starting and Stopping an Individual Application Instance for a Cluster Using Fusion Applications Control or Cloud Control

To start or stop an application using Fusion Applications Control or Cloud Control:

1. Navigate to a product family home page:

- From Fusion Applications Control, from the navigation pane, select the product family.
- From Cloud Control:
  - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
  - b. In the table on the Fusion Applications target home page, click the appropriate **Product Family** target.
- 2. From the navigation pane, expand the product family, then **Fusion Applications**, and then the cluster application.
- 3. Select the application instance you want to stop.
- 4. From the **Fusion J2EE Application** menu, choose **Control**, then **Start Up** or **Shut Down**.

If you prefer to use the WebLogic Server Administration Console, see "Start applications and modules" and "Stop applications and modules" in the *Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help*.

#### 4.4.9.3 Starting and Stopping All Application Instances for a Cluster Using Fusion Applications Control or Cloud Control

To start or stop all the application instances in a cluster using Fusion Applications Control or Cloud Control.

1. Navigate to a product family home page:
  - From Fusion Applications Control, from the navigation pane, select the product family.
  - From Cloud Control:
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications target home page, click the appropriate **Product Family** target.
2. From the navigation pane, expand the product family, then **Fusion Applications**, and then the cluster application.
3. From the **Fusion Cluster Application** menu, choose **Control**, then **Start Up** or **Shut Down**.

## 4.5 Viewing and Changing Ports for Components

Oracle Database and Oracle Fusion Middleware components and services use ports. Most numbers are assigned during installation. As an administrator, it is important to know the numbers used by these services, and to ensure that the same number is not used by two services on your host.

For some ports, you can specify a number assignment during installation.

[Table 4–3](#) lists the port types and provides information on where to find documentation related to changing ports. The procedures referenced in the Oracle Fusion Middleware guides describe using Fusion Middleware Control. These procedure also apply to Fusion Applications Control.

**Table 4–3 Changing Ports**

Port Type	Documentation for Changing Ports
Oracle Database	"Changing the Oracle Database Net Listener Port" section in the <i>Oracle Fusion Middleware Administrator's Guide</i>
Oracle Business Intelligence Suite	"Using Fusion Middleware Control to Scale System Components" section in the <i>Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition</i>
Oracle Essbase	<p>"Using Fusion Middleware Control to Scale System Components" section in the <i>Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition</i></p> <p>You may also need to modify the port range used by Essbase Applications. These are managed separately from the rest of the ports.</p> <p>To modify the port range:</p> <ol style="list-style-type: none"> <li>At an operating system command prompt, navigate to the location of the <code>opmn.xml</code> file: <ul style="list-style-type: none"> <li>(UNIX) <code>APPLICATIONS_ BASE/instance/BIInstance/config/OPMN/opmn</code></li> <li>(Windows) <code>APPLICATIONS_ BASE\Instance\BIInstance\config\OPMN\opmn</code></li> </ul> <p>This is the port range used by Essbase Applications. These are allocated by the Essbase server as required. The Essbase server will use the ports, even if they are explicitly allocated elsewhere to another component. Therefore, it is important to not use the same port range as the rest of the Oracle Business Intelligence domain port range.</p> </li> <li>Modify the port range: <pre>&lt;port id="essbase-port-range" range="9500-9599"/&gt;</pre> </li> <li>Ensure that the OPMN server re-reads its configuration after changing the contents of <code>opmn.xml</code>: <ul style="list-style-type: none"> <li>(UNIX) <code>APPLICATIONS_ BASE/instance/BIInstance/bin/opmnctl reload</code></li> <li>(Windows) <code>APPLICATIONS_ BASE\instance\BIInstance\bin\opmnctl reload</code></li> </ul> </li> <li>Restart the Essbase server: <ul style="list-style-type: none"> <li>(UNIX) <code>APPLICATIONS_ BASE/instance/BIInstance/bin/opmnctl restartproc process-type=Essbase</code></li> <li>(Windows) <code>APPLICATIONS_ BASE\instance\BIInstance\bin\opmnctl restartproc process-type=Essbase</code></li> </ul> </li> </ol>
Oracle HTTP Server	"Manage Ports" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle HTTP Server</i>
Oracle Enterprise Content Management Suite	"Modifying Server Configuration Parameters for Content Server" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Internet Directory</i> for information about changing the for Oracle WebCenter Content Content Server



**Table 4–3 (Cont.) Changing Ports**

Port Type	Documentation for Changing Ports
Oracle Internet Directory	"Configuring Server Properties" section or the "Setting System Configuration Attributes by Using ldapmodify" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Internet Directory</i>
Oracle Virtual Directory	"Configuring Oracle Virtual Directory to Listen on Privileged Ports" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Virtual Directory</i>
Node Manager	"Overview of Node Manager Configuration" section in the <i>Oracle Fusion Middleware Node Manager Administrator's Guide for Oracle WebLogic Server</i>

## 4.6 Changing Passwords

Before you begin configuration, change the passwords for the various accounts to secure passwords. [Table 4–4](#) describes the accounts and provides information on where to find related documentation for each account. The procedures referenced in the Oracle Fusion Middleware guides describe using Fusion Middleware Control. These procedure also apply to Fusion Applications Control.

**Table 4–4 Changing Passwords**

Password Account	Description	Documentation for Changing the Passwords
Oracle Fusion Middleware administration for the Oracle WebLogic Server domain	During the Oracle Fusion Applications installation, you must provide a password for the Oracle Fusion Middleware administration user. By default, this administrator takes the Super User value you specified on the Identity Management page when creating the provisioning plan. The super user is described in the next row of this table.	<a href="#">Section 6.8.5.2</a>
Super User	<p>The super user has the following privileges:</p> <ul style="list-style-type: none"> <li>■ Administrative privileges for all Oracle WebLogic Server domains and all middleware.</li> <li>■ Functional setup privileges for all Oracle Fusion applications.</li> <li>■ Administrative privileges to Oracle Fusion applications. These do not include transactional privileges. You use this username and password to access the Fusion Applications Control and the Oracle WebLogic Server Administration Console.</li> </ul> <p>You can change the credentials using Fusion Applications Control or Oracle Platform Security Services (OPSS) scripts.</p> <p>This user is specified on the Identity and Policy Management page of the Provisioning Wizard during installation. See "Identity the Management Configuration" section in the <i>Oracle Fusion Applications Installation Guide</i> for information about this page. Installation establishes the same username and password for all the domains.</p>	<p><a href="#">Section 6.8.5.2</a> to change the administrative password</p> <p>"Managing the Credential Store" section in the <i>Oracle Fusion Middleware Application Security Guide</i></p>
Oracle Identity Management	The <code>password-reset-tool</code> utility enables you to modify the passwords for the <code>FAAdmin</code> , <code>IDROUser</code> , <code>IDRWUser</code> , <code>PolicyRWUser</code> , and <code>oamadminuser</code> users. For a configuration that does not use <code>FAAdmin</code> as the Oracle Fusion Middleware administrative user, use one of the methods described in <a href="#">Section 6.8.5.2</a> .	<a href="#">Section 6.8.5.3</a>
Oracle Metadata Repository schema	Oracle Metadata Services (MDS) repository contains metadata for the Oracle Fusion Applications and some Oracle Fusion Middleware component applications. The schema passwords are stored in the Oracle database.	"Changing Metadata Repository Schema Passwords" section in the <i>Oracle Fusion Middleware Application Security Guide</i>

**Table 4–4 (Cont.) Changing Passwords**

Password Account	Description	Documentation for Changing the Passwords
App IDs	Oracle Fusion Applications must rely on a type of credential known as the App ID. Each application has its own App ID which is initially provisioned for the application.	Section 6.8.5.1 <i>Oracle Fusion Applications Security Hardening Guide</i>
Node Manager	The Node Manager account authenticates the connection between a client (for example, the Administration Server) and Node Manager.  In an Oracle Fusion Applications installation, this user is specified on the Installation Location page of the Provisioning Wizard. See the "Installation Location" section in the <i>Oracle Fusion Applications Installation Guide</i> for information about using this page.	"Specify Node Manager Username and Password" section in the <i>Oracle Fusion Middleware Node Manager Administrator's Guide for Oracle WebLogic Server</i>
BISystemUser	The BISystemUser account provides access to the Oracle Business Intelligence system components.	"Default Users and Passwords" section in the <i>Oracle Fusion Middleware Security Guide for Oracle Business Intelligence Enterprise Edition</i>

### 4.6.1 Changing Oracle Fusion Applications Passwords in the Oracle Database

As part of routine maintenance, it is security best-practice to reset the schema passwords in an environment according to a schedule. Use the Password Change Utility for this purpose.

The Password Change Utility changes the passwords for critical schemas in the Fusion Applications Database. It also updates schema passwords stored outside of the database to match the new schema passwords in the database. Database schema passwords are stored outside the database in the Credential Store, in WLS data sources, and in other configuration files/repositories used by Fusion Middleware.

The Password Change Utility changes the passwords for all critical schemas at once. It cannot change the password for only a subset of schemas. However, it allows you to specify the existing password for a schema, so you can change the password for only one schema by specifying the existing passwords for all other schemas in the tool's input file and specifying a new password for the schema you want to modify.

The Password Change Utility can be run interactively or non-interactively. The steps required for running interactively and non-interactively are different and are explained in the following sections. Running the Password Change Utility interactively is simple, but may require more user input. Running the Password Change Utility non-interactively is more suitable for routine tasks and requires less user input.

The Password Change Utility can be run in a special mode in which it only ensures that all critical schemas are registered in the credential store. This special mode is called CSF-only mode. The CSF-only mode is not documented in detail in this document, because it is mainly used to ensure that the credential store is up-to-date before running the RUP Installer to upgrade to a new Fusion Applications release level. Running the Password Change Utility CSF mode is documented in detail in the "Register Database Schema Information" section of the Upgrade Guide. Running the Password Change Utility non-interactively in CSF-only mode is possible, but is not currently documented.

For most configurations, you can run the Password Change Utility on any Fusion Applications Middle Tier host. You must run the Password Change Utility on BI host also. If BI host is separate from FA middle tier host, then APPLTOP should be appropriately mounted on the BI host. If BI is installed on a separate host, the APPLTOP must be mounted on that host also.

Run the Password Change Utility to change the database schema passwords and update other artifacts/repositories to reflect the new schema passwords. The Password Change Utility prompts you for the password for decrypting the input file. Password can also be passed in a non-interactive way.

The Password Change Utility can be used to update DB, WLS data sources, and IDM data sources individually using different targets. In the default mode, only FAMW and IDM targets are run.

At a high level, running the Password Change Utility consists of the following six steps described in the sections [Section 4.6.1.1](#) to [Section 4.6.1.6](#).

#### 4.6.1.1 Step 1: Start/Stop the Oracle Fusion Applications Environment

To stop the environment before running the Password Change Utility:

1. Start/stop all incoming user requests by stopping the Oracle HTTP server. See [Section 4.4.5.1](#) and [Section 4.4.5.2](#).
2. Start/stop all incoming user requests by stopping the Oracle HTTP server. See [Section 4.4.5.1](#) and [Section 4.4.5.2](#).
3. Start up only Admin Servers. See [Section 4.4.4.1](#).

#### 4.6.1.2 Step 2: Create a template input file using the `templateGen` utility

Run the `templateGen` utility to create template input files appropriate for your current Fusion Applications Release version. The `templateGen` utility auto-fills most of the values from a process called auto-discovery of environment variables and the database wherever possible.

The `templateGen` utility generates template input files for both STANDARD mode and CSF mode, but only the STANDARD-mode template file is used for changing database schema passwords.

The template files are generated under `$APPLICATION_CONFIG/lcm/admin/pcu` directory.

---

**Note:** In local domain configurations, the *BIDomain* section is not auto-populated. The users must manually input this section because the *BIInstance* directory is not available in `$APPLICATION_CONFIG` directory, as this can reside in a different machine altogether.

---

#### 4.6.1.3 Step 3: Create an input file using the `iniGen` utility

The Password Change Utility relies on an input configuration file that specifies the new database schema passwords and other important information about your Fusion Applications installation. This input file is generated by the `iniGen` utility using template files produced by the `templateGen` utility. The `iniGen` utility writes password values to the input configuration file in encrypted format. It writes other values in plain text.

As part of running the Password Change Utility non-interactively, a temporary plain text file is created and is encrypted immediately. The file is later decrypted and the

contents are provided as input to `iniGen`. Oracle provides a tool named `lcmcrypt` to perform encryption and decryption on all platforms. You can use an alternative encryption tool if you prefer. If you use an alternative encryption tool (like `gpg` provided by Linux), you are responsible for using it properly. This document explains how to perform the required encryption/decryption using `lcmcrypt`.

The `iniGen` utility creates an *Oracle Wallet* file in addition to the encrypted input file. The Oracle Wallet file contains the same set of schemas and schema passwords as the encrypted input file. The Oracle Wallet file is used internally by Oracle in hosted environments.

#### 4.6.1.4 Step 4: Use Password Change Utility with DB Target

When you run the Password Change Utility with the DB target, the utility does not update the WLS data sources. The DB updates include opening the profile and changing the schema passwords.

You must set `JAVA_HOME` to a JDK6 folder, by default it is set to `$APPBASE/fusionapps/jdk6`.

The following is the command to use this utility:

```
schemaPasswordChangeTool.sh -appbase <location of appltop> -inputfile <path of
input file> -target <target from jobs.xml>
```

For example,

```
(UNIX) ./schemaPasswordChangeTool.sh -appbase /scratch/aime/work/APPTOP -inputfile
$APPTOP/instance/lcm/admin/pcu/config/input1335820380736.ini -target DB
```

```
(Windows) schemaPasswordChangeTool.cmd -appbase c:\at -inputfile
%APPTOP%\instance\lcm\admin\pcu\config\input1335829380736.ini -target DB
```

#### 4.6.1.5 Step 5: Use Password Change Utility in STANDARD Mode

When you run the Password Change Utility in the default mode, it runs all the updaters defined in the `jobs.xml` file for IDM and FAMW targets.

You must set `JAVA_HOME` to a JDK 6 folder. By default, it is set to `$APPBASE/fusionapps/jdk6`.

The following is the command to use this utility:

```
(UNIX) schemaPasswordChangeTool.sh -appbase <location of appltop> -inputfile <path
of input file> -nonInteractive
```

```
(Windows) schemaPasswordChangeTool.cmd -appbase <location of appltop> -inputfile
<path of input file> -nonInteractive
```

For example, in Interactive Mode:

```
(UNIX) ./schemaPasswordChangeTool.sh -appbase /scratch/aime/work/APPTOP -inputfile
$APPTOP/instance/lcm/admin/pcu/config/input1335820380736.ini
```

```
(Windows) schemaPasswordChangeTool.cmd -appbase c:\at -inputfile
%APPTOP%\instance\lcm\admin\pcu\config\input1335820380736.ini
```

For example, in Non-Interactive Mode:

```
(UNIX) echo pa55w0Rd | ./schemaPasswordChangeTool.sh -appbase
/scratch/aime/work/APPTOP -inputfile
$APPTOP/instance/lcm/admin/pcu/config/input1335820380736.ini -nonInteractive
```

```
(Windows) echo pa55w0Rd | schemaPasswordChangeTool.cmd -appbase c:\at -inputfile
%APPTOP%\instance\lcm\admin\pcu\config\input1335820380736.ini -nonInteractive
```

#### 4.6.1.6 Step 6: Use Password Change Utility with RESET\_PROF Target

When you run the Password Change Utility with RESET\_PROF target, the database profile modifications done to loosen the profile after running the DB target are restored.

You must set JAVA\_HOME to a JDK6 folder, by default it is set to \$APPBASE/fusionapps/jdk6.

The following is the command to run this utility:

```
schemaPasswordChangeTool.sh -appbase <location of appltop> -inputfile <path of
input file> -target <target from jobs.xml>
```

For example, in Interactive Mode:

```
(UNIX) ./schemaPasswordChangeTool.sh -appbase /scratch/aime/work/APPTOP -inputfile
$APPTOP/instance/lcm/admin/pcu/config/input1335820380736.ini -target RESET_PROF
```

```
(Windows) schemaPasswordChangeTool.cmd -appbase <location of appltop>
-inputfile<path of input file> -target RESET_PROF
```

For example, in Non-Interactive Mode:

```
(UNIX) echo pa55w0Rd | ./schemaPasswordChangeTool.sh -appbase
/scratch/aime/work/APPTOP -inputfile
$APPTOP/instance/lcm/admin/pcu/config/input1335820380736.ini -target RESET_PROF
-nonInteractive
```

```
(Windows) echo pa55w0Rd | schemaPasswordChangeTool.cmd -appbase c:\at -inputfile
%APPTOP%\instance\lcm\admin\pcu\config\input1335820380736.ini -target RESET_PROF
-nonInteractive
```

## 4.7 Managing the Oracle Database

To manage your Oracle database:

1. Start the Oracle database instance, if not already started. See [Section 4.4.3](#).
2. Review database initialization parameters. Modify initialization parameters as needed. See [Section 4.7.1](#).
3. Review your database storage structures: tablespaces and data files, online redo log files, and control files. Create or modify storage structures as needed. See [Section 4.7.2](#).
4. Review memory allocation and adjust as needed. See [Section 4.7.3](#).
5. Review, unlock, and reset passwords for predefined database users as needed. Create new users, and assign privileges and roles to them as needed. See [Section 4.7.4](#).
6. Create or review the backup strategy for the database and back up the database. See [Chapter 17](#).

## 4.7.1 Viewing and Modifying Initialization Parameters

Managing an Oracle instance includes configuring parameters that affect the basic operation of the Oracle instance. These parameters are called initialization parameters. The Oracle instance reads initialization parameters from a file at startup.

After being read from a file, initialization parameters are retained in memory, where the values for many of them can be changed dynamically. There are two types of parameter files. The type of file used to start the instance determines if dynamic initialization parameter changes persist across database shutdown and startup. The parameter file types are:

- Server parameter file

The **server parameter file** is a binary file that can be written to and read by the database. It *must not* be edited manually. It is stored on the host system on which Oracle Database is running. Changes are made when you use Database Control to modify one or more initialization parameters, or when Oracle Database itself makes changes for self-tuning purposes. Any changes to it persist across database shutdown and startup operations.

- Text initialization parameter file

A **text initialization parameter file** is a text file that can be read by the Oracle instance, but it is not written to by the instance. You can change a text initialization parameter file with a text editor, but changes do not take effect until you restart the Oracle instance. When you start the instance with this type of file, you can still change many initialization parameters dynamically with Database Control, but only for the current instance. Unless you also edit the text initialization parameter file and make the same change, the change is lost when you restart the database instance.

As the number of database users increases and the workload increases, you might have to alter some initialization parameters. You can make these changes using the Initialization Parameter page in Oracle Enterprise Manager Database Control, accessible from the **Database Configuration** section of the **Server** tab.

[Table 4–5](#) lists specific initialization parameters that you should set and their recommended values.

**Table 4–5 Initialization Parameters**

Parameter	Recommended Values
CONTROL_MANAGEMENT_PACK_ACCESS	Set this parameter to DIAGNOSTIC+TUNING (default) or DIAGNOSTIC to enable Automatic Database Diagnostic Monitor (ADDM).
STATISTICS_LEVEL	Set this parameter to TYPICAL (default) to enable the automatic performance tuning features of Oracle Database, including Automatic Workload Repository (AWR) and ADDM.

For information about viewing and modifying initialization parameters, see the "Viewing and Modifying Initialization Parameters" section in the *Oracle Database 2 Day DBA*.

## 4.7.2 Managing Database Storage Structures

Oracle Database is made up of physical and logical structures. Physical structures can be seen and operated on from the operating system, such as the physical files that store data on a disk.

Logical structures are created and recognized by Oracle Database and are not known to the operating system. The primary logical structure in a database, a tablespace, contains physical files. The applications developer or administrator may be aware of the logical structure, but may not be aware of the physical structure. The database administrator (DBA), however, must understand the relationship between the physical and logical structures of a database.

Oracle Database can automate much of the management of its structure. To view a database storage structure using Oracle Enterprise Manager Database Control, go to the **Storage** section of the **Server** tab, where you can access the following storage options:

- Control files
- Tablespaces
- Temporary tablespace groups
- Datafiles
- Rollback segments
- Redo log groups
- Archive logs
- Disk groups
- Other storage structures

For more information about managing database storage structures, see the "Managing Database Storage Structures" chapter in the *Oracle Database 2 Day DBA*.

### 4.7.3 Managing Memory

Memory management involves maintaining optimal sizes for the Oracle instance memory structures as demands on the database change. The memory that must be managed are the **System Global Area (SGA)** memory and the instance **Program Global Area (PGA)** memory. The instance PGA memory is the collection of memory allocations for all individual PGAs.

Oracle Database can manage the SGA memory and instance PGA memory automatically. You designate only the total memory size to be used by the instance, and Oracle Database dynamically exchanges memory between the SGA and the instance PGA as needed to meet processing demands. This capability is referred to as **automatic memory management**. In this memory management mode, the database also dynamically tunes the sizes of the individual SGA components and the sizes of the individual PGAs.

To have more direct control over the sizes of the SGA and instance PGA, use the Memory Advisors page of Oracle Enterprise Manager Database Control to disable automatic memory management and enable automatic shared memory management. With **automatic shared memory management**, you set target and maximum sizes for the SGA. Oracle Database then tunes the total size of the SGA to your designated target, and dynamically tunes the sizes of all SGA components. In this memory management mode, you also implicitly enable automatic PGA memory management. With **automatic PGA memory management** you set a target size for the instance PGA. The database then tunes the size of the instance PGA to your target, and dynamically tunes the sizes of individual PGAs.

If you want complete control of individual SGA component sizes, then use the Memory Advisors page of Oracle Enterprise Manager Database Control to disable



both automatic memory management and automatic shared memory management. This is called **manual shared memory management**. In this mode, you set the sizes of several individual SGA components, thereby determining the overall SGA size. You then manually tune these individual SGA components on an ongoing basis. Manual shared memory management mode is intended for experienced DBAs only. Note that in this mode, automatic PGA memory management remains enabled.

To manage memory, use the Memory Advisor page in Database Control, accessible from the **Database Configuration** section of the **Server** tab.

For more information about memory management, see the "Managing Memory" section in the *Oracle Database 2 Day DBA*.

#### 4.7.4 Administering User Accounts

For users to access your database, you must create user accounts and grant appropriate database access privileges to those accounts. A user account is identified by a user name and defines the attributes of the user, including the following:

- Authentication method
- Password for database authentication
- Default tablespaces for permanent and temporary data storage
- Tablespace quotas
- Account status (locked or unlocked)
- Password status (expired or not)

When you create a user account, you must not only assign a user name, a password, and default tablespaces for the account, but you must also do the following:

- Grant the appropriate system privileges, object privileges, and roles to the account.
- If the user will be creating database objects, then give the user account a space usage quota on each tablespace in which the objects will be created.

In addition, you may want to create user accounts that are used by applications only, such as Fusion Applications. Users do not log in with these accounts; instead, applications use these accounts to connect to the database, and users log in to the applications. This type of user account avoids giving application users the ability to log in to the database directly, where they could unintentionally cause damage.

To administer user accounts using Oracle Enterprise Manager Database Control, go to the **Security** section of the **Server** tab, where you can access users and roles.

For more information about administering user accounts, see the "Administering User Accounts and Security" chapter in the *Oracle Database 2 Day DBA*.

## 4.8 Patching

It is necessary to perform various maintenance actions on your applications, their middleware dependencies, and their database components. Maintenance actions include fixing issues that affect the way the applications perform, adding new functionality and features, updating to a higher maintenance level, or providing interoperability to new technology stacks. Patches may be required for maintenance of middleware artifacts, database artifacts, or both. [Table 4–6](#) describes the types of patching and provides information on where to find related documentation.

**Table 4–6 Patching**

Type of Patching	Description	Documentation for Patching
Oracle Fusion Applications	The Oracle Fusion Applications Patching Framework provides the tools needed to sup updates to Oracle Fusion Applications software between major or patch set releases. These tools manage the processes for applying individual patches, patch sets, and release update packs.	<i>Oracle Fusion Applications Patching Guide</i>
Oracle Fusion Middleware	OPatch patches any Oracle Fusion Middleware component, except Oracle WebLogic Server. For Oracle WebLogic Server, use Smart Update.	<i>Oracle Fusion Middleware Patching Guide</i> for information about patching middleware artifacts
Oracle Database	Oracle Universal Installer and OPatch manage the patching for Oracle database and third-party software.	<i>Oracle Universal Installer and OPatch User's Guide for Windows and UNIX</i>

## 4.9 Managing Oracle Fusion Applications-Specific Labels in the Oracle Metadata Repository

The Oracle Metadata Repository (MDS Repository) contains metadata for Oracle Fusion Middleware components. It can also contain metadata about the configuration of Oracle Fusion Middleware and metadata for your applications. For general instructions on managing the metadata for Oracle Fusion Middleware components in the Oracle Metadata Repository, see the "Managing the Metadata Repository" chapter in the *Oracle Fusion Middleware Administrator's Guide*.

As a part of MDS Repository management, you work with metadata labels. You select a version for the repository to select a particular version of each object from a metadata repository partition. Also, if you take actions that affect the MDS Repository, such as deploying, patching, or doing some customizations, you can potentially put the repository into a broken state. When this happens, you can rollback to a previous label. For example, when you roll back to a label, all objects within that repository move to that state. To manage labels, note the following prefixes for Oracle Fusion Applications in the MDS Repository:

- `postDeployLabel_` for labels created by MDS Repository at deployment time
- `Creation_` for labels created by Oracle Fusion Middleware Extensions for Applications (Applications Core) in the MDS Repository
- `PreMerge_` for labels created by Applications Core in the MDS Repository during sandbox creation.
- `composer_PostMerge_` for labels created by Applications Core in the MDS Repository during a sandbox publish operation
- `mds_` for labels created during a Flexfield changes applied during a patch
- `soa_` for labels created during SOA deployments
- `composer_` for labels created by Oracle Composer when using the **Save and Label** button. For more information about **Save and Label** button, see "Create Labels On Saving Application Customizations" in the *Oracle Fusion Middleware Developer's Guide for Oracle WebCenter Portal*.

For more information about managing labels, see the "Managing the Metadata Repository" section in the *Oracle Fusion Middleware Administrator's Guide*.

## 4.10 Modifying Oracle Application Development Framework Connections in Oracle Fusion Applications

A connection configuration (`connections.xml`) contains information that a client application uses to identify the Oracle Application Development Framework (Oracle ADF) application module's deployment scenario. For more information about modifying the configuration of a single application, see the following sections in the *Oracle Fusion Middleware Administrator's Guide for Oracle Application Development Framework*:

- How to Modify Connection Configurations
- How to Modify ADF Connections Using MBeanConfiguring Application Properties Using the MBean Browser

In an Oracle Fusion Applications environment, you may need to change the internal and external settings for several applications. For example, if there was an outage of the Oracle Fusion Customer Relationship Management (Oracle Fusion CRM) applications due to a lost Oracle HTTP Server host, then you would need update all the applications that depend on the Oracle Fusion CRM-provided web services. If all the applications in an Oracle WebLogic Server domain use the same `connections.xml`, which is the default behavior after provisioning, you can make this edit in one place using Fusion Applications Control.

To modify the connections for all the applications in an Oracle WebLogic Server domain using Fusion Applications Control:

1. From the navigation pane, expand the farm and then **WebLogic Domain**.
2. Click the domain.

The Oracle WebLogic Server Domain home page displays.

3. From the **WebLogic Domain** menu, choose **ADF Domain Configuration**.

The ADF Common Properties page displays.

4. In the **Property Sets** table, click the property set to modify, and in the **Details for Property Set** table, modify the property values.

These property sets and properties reside in the `adf-domain-config.xml` file, and are used in the ELs in the `connections.xml` file.

5. Click **Save**.

## 4.11 Modifying Oracle Data Integrator Configuration

Oracle Data Integrator (ODI) is installed with the following product families:

- Oracle Fusion Customer Relationship Management
- Oracle Fusion Human Capital Management
- Oracle Fusion Supply Chain Management

The Oracle Fusion applications use Oracle Application Development Framework and Oracle SOA Suite, which in turn use ODI for bulk data movement requirements. This section describes how to modify key aspects of ODI configuration without interrupting the service of the applications.

This section contains the following topics:

- [Section 4.11.1, "Editing the Oracle Data Integrator Topology for Database Endpoint Changes"](#)

- [Section 4.11.2, "Modifying ODI Agent Host and Port Configuration"](#)

### 4.11.1 Editing the Oracle Data Integrator Topology for Database Endpoint Changes

ODI moves data between two databases. In some cases, a database endpoint changes or the JDBC password changes for security reasons. When these types of changes occur, you must modify the configuration of the database topology.

To modify the database topology:

1. Log into Oracle Data Integrator Console.

`http://product_familyinternal.domain:port/odiconsole`

where `product_familyinternal.domain`. `port` is the host and domain of the Oracle HTTP Server or a Load Balancer.

2. From the **Browse** pane, expand **Topology** and then **Data Servers**.
3. Select the database server and click the **Edit** icon (✎).  
The Edit Data Server page displays.
4. Scroll to the **JDBC Details** section at the bottom of the page.
5. Modify the JDBC fields for the endpoint:

Field	Description
JDBC Driver	The JDBC driver for the data source connection. The value in this field must conform to the database specifications.
JDBC URL	The JDBC URL for the data source connection in the format of <code>jdbc:oracle:thin:@//DB_host_name.domain/sid</code> .
User	The Oracle Database schema name (user name) to log into the database.
JDBC Password	The password for the user.

6. Click **Save**.

### 4.11.2 Modifying ODI Agent Host and Port Configuration

The ODI agent connects to a master repository and connects to different technologies to move data. If the ODI agent host or port configuration has been modified in Oracle WebLogic Server, then you reflect those changes in ODI.

To modify the configuration of an agent:

1. Log into Oracle Data Integrator Console.

`http://product_familyinternal.domain:port/odiconsole`

where `product_familyinternal.domain`. `port` is the host and domain of the Oracle HTTP Server or a Load Balancer.

2. From the **Browse** pane, expand **Topologies**, **Agents**, and then **Physical Agents**.
3. Select an agent click the **Edit** icon (✎).  
The Edit Physical Agent page displays.

4. In the **Definition** section, modify the **Host Name** and **Port Number** fields.
5. Click **Save**.

## 4.12 Bulk Updating General User Preferences

Using the Functional Setup Manager UI, a system administrator can update general User Preference settings for all users in the system. Only the attributes that the administrator chooses to update will be written to the user profiles; values that will not be changed will be marked as "default."

1. Access the Functional Setup Manager. (On any page where you have appropriate access, the following options will appear: **Navigator > Tools > Setup and Maintenance** or **Administrator > Setup and Maintenance**.) Search for "Set User General Preferences."
2. Click the **Go to Task** icon. The Global Admin Preferences settings screen is displayed (Figure 4–1).
3. Adjust any of the settings that should apply to all current users in the system, and click **Save**. NOTE: If new users are subsequently added to the system, the default settings must be applied again to include them.

The general settings available are:

- Fusion Applications Language and Display Language
- Date Format
- Time Format
- Number Format
- Currency,
- Time Zone

**Figure 4–1** Setting General User Preference in Functional Setup Manager

The screenshot shows the 'Global Admin Preferences' window. It contains the following settings, each with a dropdown menu currently set to 'Default':

- Fusion Applications Language
- Display Name
- Date Format
- Time Format
- Number Format
- Currency
- Time Zone

Buttons for 'Save' and 'Cancel' are located in the top right corner of the window.

For more User Preferences information, see "How to Use the Most Common Preferences" in the *Oracle Fusion Applications Developer's Guide*.

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**Note:** Users still will be able to change their settings from the Personalization menu.

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# Managing Oracle Fusion Applications Configuration and Compliance

This chapter describes how to use the Enterprise Manager Cloud Control Configuration and Compliance Framework to enforce implementation and operational best practices for Fusion Applications. In particular, it describes the seeded Compliance Rules that are delivered in the Cloud Control Plug-in 12.1.0.3, for Oracle Fusion Applications.

This chapter includes the following topics:

- **Introduction: What Is Compliance?** (Section 5.1)  
*Understanding Rules, Standards, and Frameworks* (Section 5.1.1)  
*Prerequisites and Related Documentation* (Section 5.1.2)
- **Implement Compliance** (Section 5.2)  
*Access Rules, Standards, and Frameworks in the Compliance Library* (Section 5.2.1)  
*Apply Pre-Seeded Standards to Targets in Your Fusion Instance* (Section 5.2.2)
- **Monitor and Manage Compliance Activity** (Section 5.3)  
*Use the Compliance Results Interface* (Section 5.3.1)

## 5.1 Introduction: What Is Compliance?

Oracle has determined an array of configuration details that optimize the performance and handling of Oracle Fusion Applications, and now delivers seeded compliance rules with Cloud Control 12c. "Compliance" means having a system adhere to, or comply with, such performance standards. This chapter explains how compliance Rules are defined, and how they are organized (into Standards and Frameworks). It explains how to associate the Standards to your Fusion instance, how to create, edit, or delete configurations if desired, and how subsequently to monitor and respond to the results in Cloud Control.

### 5.1.1 Understanding Rules, Standards, and Frameworks

Compliance is implemented as a hierarchy, wherein configuration details -- such as cache sizes, connection time-outs, and more-- are codified into individual Rules. The Rules are collected into logical groups called Standards, which are further organized into a Framework.

Out of the box, you can associate the predefined compliance Standards to your own installation. Each of these components-- Rules, Standards, and Frameworks-- can also

be created, edited, or deleted by a Fusion Applications administrator who has the appropriate privileges. You can freely mix-and-match custom Rules or Standards with predefined ones.

### 5.1.1.1 What are Real-Time Monitoring Facets?

It is also possible to create "real-time monitoring facets" if you want to create security warnings associated with particular files on your system. Facets, which can be associated with multiple Rules, define particular entities that should be monitored on an ongoing basis. (Only critical files should be chosen, to avoid excess CPU load and data generation.) See [Section 5.2.2.2](#) for more information.

## 5.1.2 Prerequisites and Related Documentation

It is necessary to have the Fusion Applications plug-in for Oracle Enterprise Manager Cloud Control 12c, version 12.1.0.3 or above, installed and configured.

There are two additional guides that contain how-to steps on using the Compliance interface. This guide gives specific cross-references to them when needed. These guides are:

- Part VIII of the *Oracle Enterprise Lifecycle Management Guide*
- All of the *Oracle® Enterprise Manager Cloud Control Oracle Database Compliance Standards*

## 5.2 Implement Compliance

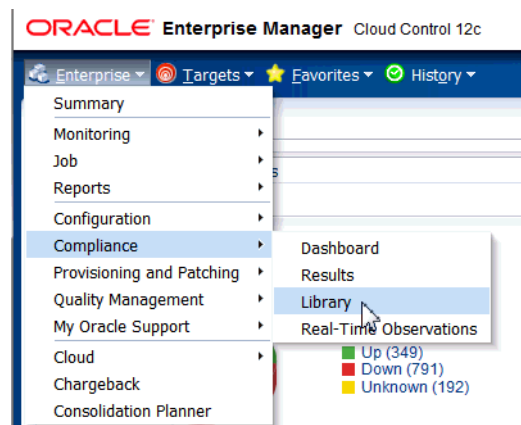
This section explains how to access and implement the Compliance components for Fusion Applications.

### 5.2.1 Understand the Rules, Standards, and Framework in the Compliance Library

The Compliance components are created, edited, and stored in the Compliance Library.

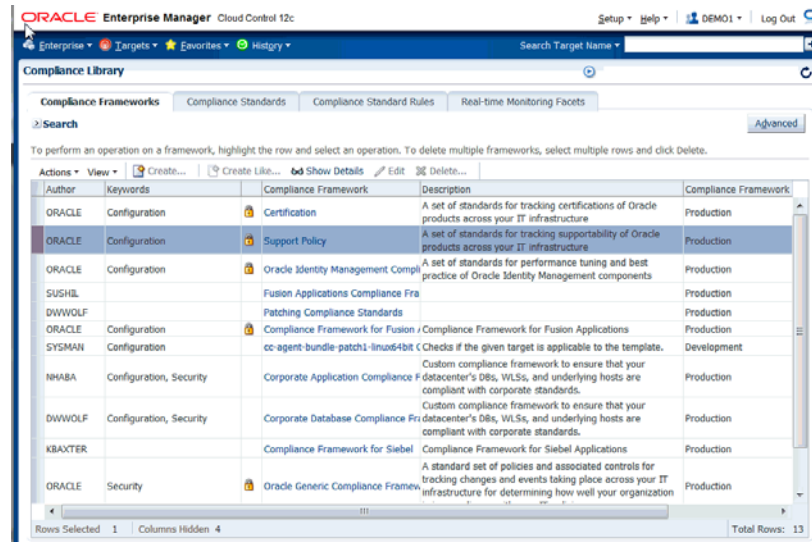
#### 5.2.1.1 Access the Compliance Library

1. Log in to the Cloud Control Console.
2. Select **Enterprise** and **Compliance** and **Library**.



The Compliance Library homepage is displayed.





3. Select the relevant tab for the Compliance component you want to use.

### 5.2.1.2 View the Pre-seeded Rules for Oracle Fusion Applications

To find the Rules delivered for Oracle Fusion Applications:

1. Access the Compliance Library, as described in [Section 5.2.1.1](#).
2. Select the **Compliance Standard Rules** tab.
3. Expand the **Search** item at the top left of the page, and select **Applicable To: Fusion Instance** in the Search drop-down.

The defined Rules for Oracle Fusion Applications are listed in the table.

4. To adjust the columns that you see, click **View**, and **Columns**. You can select/deselect items to include in the overview. Note: selecting **Manage Columns** has the same effect.
5. Follow the same steps to search for the Fusion Applications-specific Standards or Frameworks.

The 42 defined Rules are organized in four separate Standards. This section describes the primary details of the Rules delivered in:

- [Table 5–1, "Java Platform Security Standard Rules"](#)
- [Table 5–2, "Oracle HTTP Server Configuration Standard Rules"](#)
- [Table 5–3, "WebLogic Server Configuration Standard Rules"](#)
- [Table 5–4, "Java Virtual Machine Configuration Standard Rules"](#)

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**Note:** All the compliance Rules for Fusion Applications currently share the following attributes:

**Type:** *Repository Rule*

**Compliance Rule State:** *Production*

**Severity:** *Minor warning*

**Description:** *Fusion Applications Configuration Rule for <Rule name>.*

**Rationale:** *<Rule name>*

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**Table 5–1 Java Platform Security Standard Rules**

Rule Name	Recommended Value
JPS_jps.authz	ACC
JPS_jps.combiner.lazyeval	true
JPS_jps.combiner.optimize	true
Java Platform Security permission cache size	1000
Java Platform Security permission cache strategy	PERMISSION_FIFO
Java Platform Security Enable Policy Lazy Load Property	TRUE
JPS_jps.policystore.hybrid.mode	false
Java Platform Security rolemember cache size	1000
Java Platform Security rolemember cache strategy	FIFO
Java Platform Security rolemember cache type	'STATIC

**Table 5–2 Oracle HTTP Server Configuration Standard Rules**

Rule Name	Recommended Value
Oracle HTTP Server keep alive timeout	61
Oracle HTTP Server maximum clients	1000
Oracle HTTP Server maximum keep alive requests	0
Oracle HTTP Server server limit	20
Fusion Applications Configuration rule for Oracle HTTP Server StartServers	10
Oracle HTTP Server threads per child	50
Oracle HTTP Server WLIOTimeoutSecs	900

**Table 5–3 WebLogic Server Configuration Standard Rules**

Rule Name	Recommended Value
WebLogic domain log severity	Error
WebLogic log file severity	Warning
WebLogic memory buffer severity	Error

**Table 5–3 (Cont.) WebLogic Server Configuration Standard Rules**

Rule Name	Recommended Value
WebLogic stdout severity	Error

**Table 5–4 Java Virtual Machine Configuration Standard Rules**

Rule Name	Recommended Value
JVM_HTTPClient.socket.connectionTimeout	300000
JVM_HTTPClient.socket.readTimeout	300000
JVM_HeapDumpOnOutOfMemoryError	+HeapDumpOnOutOfMemoryError
JVM_VOMaxFetchSize	n/a
JVM_Xgc	genpar
JVM_Xmanagement	1
JVM_Xverbose	gc
JVM_jbo.ampool.minavailablesize	1
JVM_jbo.ampool.timetolive	-1
JVM_jbo.doconnectionpooling	true
JVM_jbo.load.components.lazily	true
JVM_jbo.max.cursors	5
JVM_jbo.recyclethreshold	75
JVM_jbo.txn.disconnect_level	1
JVM_jps.auth.debug	FALSE
JVM_jrockit	jrockit
JVM_weblogic.ProductionModeEnabled	true
JVM_weblogic.SocketReaders	3
JVM_weblogic.http.client.weblogic.http.client.defaultConnectTimeout	300000
JVM_weblogic.http.client.defaultReadTimeout	300000
JVM_weblogic.security.providers.authentication.LDAPDelegatePoolSize	20

## 5.2.2 Apply Standards to Targets in Your Fusion Instance

To associate the compliance Rules on your own Oracle Fusion Applications instance, it is necessary to apply the relevant Standards to the relevant targets.

To associate predefined Standards to targets:

1. Select **Enterprise**, then **Compliance**, then **Library**, and choose the **Compliance Standards** tab.
2. Expand the **Search** item at the top of the page and choose **Applicable To: Fusion Instance**. Click **Search**.

The predefined Standards are listed.

3. Select a Standard and click **Associate Targets**.
4. On the **Target Association** page, click **+Add**. A search page is displayed.
5. Choose the relevant target name(s) from the list and click **Select**.  
The host(s) appear in the Target Association page.
6. Select the host(s) and click **Enable**.

After a Compliance Standard is associated to a specific target, the results can be seen almost immediately in the Compliance Results page. See [Section 5.3](#) for details.

### 5.2.2.1 Optional: Create, Edit, or Delete Compliance Details

Rules, Standards, and Frameworks can all be created, edited, or deleted as desired. To do so requires having the correct user permissions. Thereafter, it is a simple matter to click the appropriate button (such as **Create**) and fill out the subsequent page.

For information on Compliance user permissions, see: "Privileges and Roles Needed to Use the Compliance Features", in the "**Managing Compliance**" chapter of the *Oracle® Enterprise Manager Lifecycle Management Administrator's Guide*.

For information on how to create, edit, or delete, see:

- "Operations on Compliance Frameworks,"
- "Operations on Compliance Standards," and
- "Operations on Compliance Standards Rules," in the *Oracle® Enterprise Manager Lifecycle Management Administrator's Guide*

### 5.2.2.2 Optional: Create Real-Time Monitoring Facets

Real-time monitoring facets allow an administrator to receive warnings that are generated on-the-fly, should certain sensitive files be accessed or changed. This is especially useful as a security alert in case of any potential unauthorized activity to important parts of the system.

There are no real-time monitoring facets delivered with Cloud Control 12c, version 12.1.0.3, for Fusion Applications. To create your own and apply them to your system, see "Real Time Monitoring Facets" in the "**Managing Compliance**" chapter of *Oracle® Enterprise Manager Lifecycle Management Administrator's Guide*

## 5.3 Monitor and Manage Compliance Activity

After a Standard is associated with your Fusion Applications target(s), the system begins to evaluate that target's adherence to the Compliance Rules. Violations to a Compliance Rule will be displayed in the Results page. Depending on the Severity level assigned in the Rule, violation warnings may be categorized as *minor*, *warning*, or *critical*. See below for links describing how to interpret and resolve any violations and other compliance reporting.

### 5.3.1 Use the Compliance Results Interface

After a Compliance Standard is associated to a specific target, the results can be seen almost immediately in the Compliance Results page.

From the **Enterprise** menu, select **Compliance**, then select **Results**.

If desired, search by **Fusion Instance**, **Standard**, or to narrow the list.

Results can be viewed by Compliance Framework, Compliance Standard, and Target. The Target Compliance tab shows the compliance score of a target across all compliance Standards. This allows users to focus on their least compliant targets by sorting by the average score column. Likewise the Compliance Standard tab shows the results of each Compliance Standard currently being evaluated. Compliance Standards that do not have any targets associated with them do not show in the list.

See "1.3 Viewing and Understanding Compliance Results," in the *Oracle Enterprise Manager Cloud Control Oracle Database Compliance Standards*, for details on interpreting the results and tips on how to research any violations and bring your system back into compliance.

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**Note:** It is also possible to select **Enterprise**, then **Compliance**, then **Dashboard** to see the same information in a more graphical display.

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# Securing Oracle Fusion Applications

This chapter explains the security features available to all Oracle Fusion applications. It explains the enterprise identity store, identity provisioning, authorization policies, roles, audit trail, SSL configuration, data masking, securing Web services, and customizing security.

This chapter contains the following topics:

- [Section 6.1, "Introduction to Security"](#)
- [Section 6.2, "About the Enterprise Identity Store"](#)
- [Section 6.3, "Provisioning Identities"](#)
- [Section 6.4, "Managing Authorization Policies"](#)
- [Section 6.5, "Configuring Roles"](#)
- [Section 6.6, "Configuring Audit Trail"](#)
- [Section 6.7, "Configuring SSL for Oracle Fusion Applications"](#)
- [Section 6.8, "Managing Wallets, Keystores, Credentials, and Certificates"](#)
- [Section 6.9, "Data Masking"](#)
- [Section 6.10, "Securing Web Services"](#)
- [Section 6.11, "Securing Oracle Fusion Middleware Products"](#)
- [Section 6.12, "Extracting Data from an LDAP- Based Store to a File"](#)
- [Section 6.13, "Customizing Security from Installation to Deployment"](#)

The high-level information presented in this chapter includes links to other documents where the topic is explained in detail.

For additional information about application security, see the following documents:

- *Oracle Fusion Applications Security Guide*
- *Oracle Fusion Applications Security Hardening Guide*

For a detailed list of administrative tasks and pointers to further documentation, see *Oracle Fusion Applications Administrator and Implementor Roadmap*.

## 6.1 Introduction to Security

Oracle Fusion Applications use the services of the Oracle Platform Security Services (OPSS) to secure applications.

OPSS is a security platform that provides enterprise product development teams, systems integrators, and independent software vendors with a standards-based enterprise-grade security framework for Java SE and Java EE applications. Using OPSS, Oracle Fusion Applications benefit from the same, uniform security, identity management, and audit services across the enterprise.

The intended audience for this chapter are application security administrators and system security administrators.

Oracle Fusion Applications provisioning sets up the security infrastructure, including:

- the identity store
- authorization policies
- enterprise roles
- SSL wiring and its support structure including keystores and certificates
- data masking
- setting protected URIs for the infrastructure to work as expected

For instructions about protected URIs and configuring Oracle ADF applications with Oracle Access Manager SSO, see the "Integration with Oracle ADF Applications" section in the *Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager with Oracle Security Token Service*.

For details about security tasks, including creating and managing users and roles, function and data security, audit, and compliance tasks, see the *Oracle Fusion Applications Security Guide*.

## 6.2 About the Enterprise Identity Store

Oracle Fusion applications run within a container in the Oracle WebLogic Server. This container handles authentication automatically for the application running in it by intercepting all requests to the application and ensuring that users are properly authenticated and the security context is propagated, as appropriate, before the request can proceed forward.

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**Note:** The Subject creation is automatic, but the security context propagation requires application configuration.

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Fusion Applications use LDAP-based authenticators; Fusion Application identity provisioning sets up and wires WebLogic domains with the appropriate authenticators during the Fusion Application installation.

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**Important:** Any LDAP-based authenticator, other than the DefaultAuthenticator, requires that the flag `UseRetrievedUserNameAsPrincipal` be set. During installation, this flag is automatically set in the DefaultAuthenticator.

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For details about bootstrap identity provisioning, such as super administrators for Fusion pillars, see [Section 6.3](#).



## 6.2.1 Supported LDAP Identity Providers

Fusion Applications support the following LDAP identity store types:

- Oracle Internet Directory 11g
- Active Directory 2008

## 6.2.2 Configuring the Identity Store

Multiple LDAP authenticators can be configured in a given context. For the algorithm that selects the identity store to initialize from a stack of authenticators, see the "Configuring the LDAP Identity Store Service" section in the *Oracle Fusion Middleware Application Security Guide*.

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**Note:** The Oracle WebLogic Server Administration Console is the recommended tool to configure authenticators, but this configuration can also be alternatively carried out with WLST commands. For the list of all available WLST commands, see *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

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The specification and configuration of LDAP authenticators is carried out with the Oracle WebLogic Administration Console. For details, see the "Configuring Authentication Providers" chapter in the *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

It is important to keep the username attribute on the authenticator synchronized with the corresponding identity store property. For details, see note at the end of the table of identity store properties in the "LDAP Identity Store Properties" section in the *Oracle Fusion Middleware Application Security Guide*.

It is also important that the following two time intervals be equal:

- The number of seconds that cached entries stay in the cache. This value is controlled by the WebLogic authenticator parameter `Group Hierarchy Cache TTL`, which by default is 60 seconds.
- The number of seconds after which group membership changes are in effect. This value is controlled by the system property `jps.subject.cache.ttl`, which by default is 60 seconds.

If the `Group Hierarchy Cache TTL` value is changed, then that new value must also be set with the system property `jps.subject.cache.ttl`. For example, if the value of `Group Hierarchy Cache TTL` is changed to 55,000 (milliseconds), then `jps.subject.cache.ttl` must be reset as follows:

```
-Djps.subject.cache.ttl 55000
```

## 6.3 Provisioning Identities

Provisioning as a whole encompasses all the operations required to install, configure, and deploy applications product offerings. Identity provisioning is a subset of this process which populates the users and groups needed for deployment and ongoing administration.

This section contains the following topics:

- [Section 6.3.1, "Identity Provisioning Concepts"](#)
- [Section 6.3.2, "WebLogic Authenticators and the Primary Identity Store"](#)

- [Section 6.3.3, "Provisioning Steps"](#)
- [Section 6.3.4, "Best Practices for the Administrator Groups"](#)
- [Section 6.3.5, "Managing Identities after Deployment"](#)

## 6.3.1 Identity Provisioning Concepts

During the identity provisioning stage of installation, Oracle Fusion Applications require the existence of certain users with specific privileges. These administrative users reside in a secure, central repository called the identity store. This section explains the phases of identity provisioning, what users or groups are needed for provisioning, and the users and groups that exist at the end of the process.

This section contains the following topics:

- [Section 6.3.1.1, "Administrators For Fusion Applications"](#)
- [Section 6.3.1.2, "Two Types of Users During Provisioning"](#)

### 6.3.1.1 Administrators For Fusion Applications

The application provisioning process bootstraps the provisioned environment with two administrator groups for each application family.

These two administrator groups are:

- A system administrator  
A directory group representing the WebLogic Server domain administrators for all the domains.
- An application administrator  
A directory group with an assigned enterprise role reflecting all the application roles and delegation privileges for all the applications in a given family.

The purpose of creating these "Super Administrators" during provisioning is to enable ongoing administration and/or delegation privileges.

The above process facilitates separation of duties between system administration and application administration responsibilities, but you are free to assign the same user to both hierarchies ("system admin" and "application admin").

[Table 6–1](#) shows the groups that are created for each application family:

**Table 6–1 Provisioned Administrator Groups**

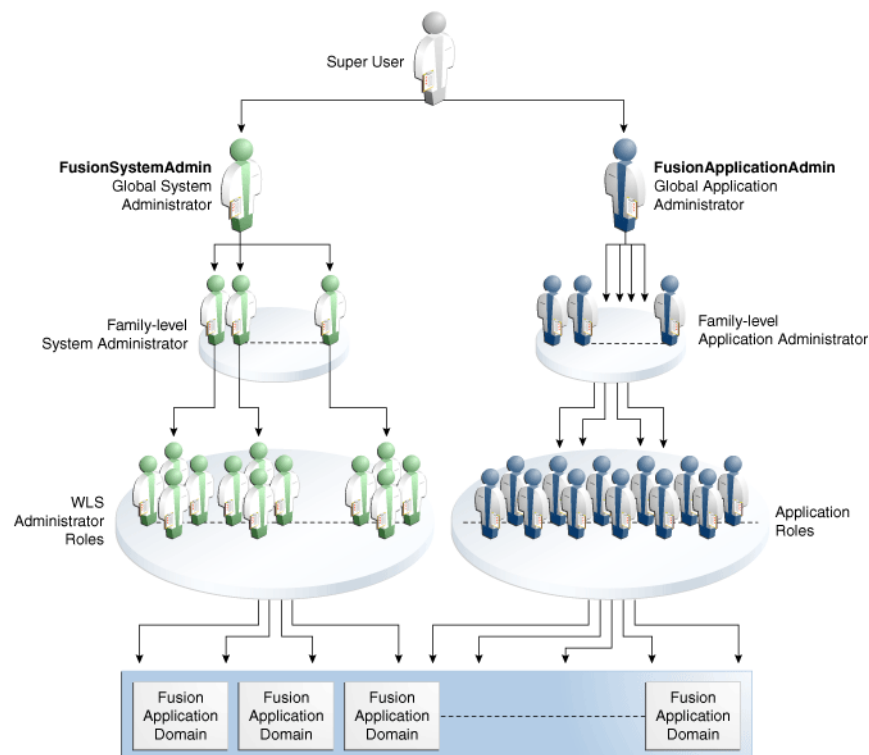
Product Family/Product	System Administrator Group	Application Administrator Group
Oracle Fusion Supply Chain Management	FSCMSysAdmin	FSCMAppAdmin
Oracle Fusion Customer Relationship Management	CRMSysAdmin	CRMAppAdmin
Oracle Fusion Human Capital Management	HCMSysAdmin	HCMAppAdmin
Oracle Fusion Financials	FINSysAdmin	FINAppAdmin

**Table 6–1 (Cont.) Provisioned Administrator Groups**

Product Family/Product	System Administrator Group	Application Administrator Group
Oracle Fusion Procurement	PRCSysAdmin	PRCAppAdmin
Oracle Fusion Project	PRJSysAdmin	PRJAppAdmin
Oracle Fusion Incentive Compensation	OICSysAdmin	OICAppAdmin

In addition a single user, known as the super user, is set up to belong to all the administrator groups. That user becomes the administrator for all middleware and the application administrator for all product families.

Figure 6–1 shows the relationship between these groups.

**Figure 6–1 Super-User and Administrators**

### 6.3.1.2 Two Types of Users During Provisioning

It is important to distinguish between the two types of super-administrators that exist in the provisioning process.

- Pre-seeded bootstrap user
- Designated super-user

In the context of the pre-seeded user, provisioning employs an identity known as the App ID that is required to bootstrap the WebLogic domains. The pre-configuration

phase of provisioning automatically generates the credential needed for this App ID user.

In the context of the designated super user, during the interview phase of provisioning, you are asked to specify the user ID of the designated "real" user who will be set up as the Middleware Administrator and Functional Setup Manager.

For example, if you want a "real" user such as "cn=john.doe,cn=users,cn=acme,cn=com" to be the super user, provide "john.doe" as the user ID during provisioning. This user will be set up as the super user in the identity store.

---

---

**Note:** It should be emphasized that the identity seed data that is used in the LDIF file to configure the WebLogic domains does not use real user DNs.

---

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### 6.3.2 WebLogic Authenticators and the Primary Identity Store

When Oracle WebLogic Server is installed, the default authenticator is based on an embedded LDAP store.

As part of Oracle Fusion Applications provisioning, the default authenticator based on the embedded LDAP is deleted. Upon completion of Oracle Fusion Applications provisioning, the primary and only identity store will be your external LDAP store. The bootstrap identity used to configure the domains during the provisioning process will be pre-seeded in the external LDAP through the LDIF file, as explained in [Section 6.3.1.2](#).

### 6.3.3 Provisioning Steps

The identity provisioning process consists of distinct phases.

In the interview phase, Provisioning Wizard collects the following information:

- The DN of the user designated as the super user. This user must already exist in the identity store.
- Whether the system administrators group exists or must be created.
- If the group exists, the DN of the group.
- The LDAP authenticator, either Oracle Internet Directory (`OIDAuthenticator`) or Oracle Virtual Directory (`OVDAuthenticator`) that will serve as the LDAP identity store.

The next step of the process verifies that the designated super-user exists in the identity store.

The system administrator group is created if needed, and the super user is made a member of the group.

Next, the application domains are created, the LDAP authenticator is enabled, and the WebLogic domain is started up.

Following configuration, the system administrator groups are assigned the appropriate family-level enterprise roles.

At the end of this process, the super user has:

- Administrator privileges for all WebLogic domains and all middleware.
- Function setup privileges for all Oracle Fusion applications.

- Administration privileges to Oracle Fusion Applications. These do not include transactional privileges.

For more information about identity provisioning and using the interview wizard to create a provisioning plan, see the *Oracle Fusion Applications Installation Guide*.

### 6.3.4 Best Practices for the Administrator Groups

While there are logical sets of "super" administrative groups (a set of two per application family, consisting of the super-user administrator and the application administrator) you can choose to distribute these functions among fewer individuals. The recommended best practice is to carefully plan the separation of duties, taking into account the real-world operational needs of your site.

### 6.3.5 Managing Identities after Deployment

Oracle Identity Manager is the best-in-class user provisioning and administration component in Oracle Fusion Middleware.

Oracle Identity Manager automates the process of adding, updating, and deleting user accounts from applications and directories.

Identities can be created and managed when user records are created through activities such as employee hiring and creation of contacts through Oracle Fusion CRM.

In addition, identities can also be created and managed administratively through the Oracle Identity Manager Administrative Console.

For more information about provisioning and managing identities, see:

- *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*
- *Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager*

## 6.4 Managing Authorization Policies

Authorization is the most sensitive and application-specific security concept. At its very core, authorization protects access to application resources through the enforcement of policies, which are stored in the domain policy store. Authorization determines what types of actions, tasks, or services a user can access.

In most cases, the definition of application policies begins during the design of the application. This definition includes identifying application privileges and application roles, the hierarchical relationships between application roles, and categorizing them into products and Java EE applications.

The policy model is based on several logical entities, such as resource types, resource instances, entitlements (also known as permission sets), application roles, and enterprise roles. For details about these entities and the logical model of a policy, see the "Terminology" section in the *Oracle Fusion Middleware Application Security Guide*.

This section includes the following topics:

- [Section 6.4.1, "Managing Oracle Fusion Application Policies"](#)
- [Section 6.4.2, "Managing System Policies"](#)
- [Section 6.4.3, "Reconciling GUIDs"](#)
- [Section 6.4.4, "Managing Data Security"](#)

## 6.4.1 Managing Oracle Fusion Application Policies

An Oracle Fusion application policy is either a functional policy or a data security policy. Both these policies define who can do what on a resource.

A data security policy includes a condition, while a functional policy does not. The condition identifies a row or a set of rows in a business object, and the privileges the data security grants are for *only* the data that meets the condition. A functional policy, instead, assigns permissions to resources or code artifacts (such as task flows, pages, Java methods, or UI components) and grants a specific set of actions on each resource.

Data security policies are stored in the transactional database; functional policies are stored in the domain policy store.

Oracle Authorization Policy Manager is the recommended tool to administer application policies after the application has been deployed. This graphical interface tool allows application security administrators to provision, search, and modify application functional and data security policies. Using this tool they can, for example, remove a resource from an entitlement or change the actions granted to a resource in an entitlement.

For details about the most frequently uses of Oracle Authorization Policy Manager, see the "Managing Policies and Policy Objects" section in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)* where the following typical administrative tasks are described:

- Managing application roles
- Managing application resource types
- Managing application resources
- Managing application entitlements
- Creating and modifying an application policy
- Viewing the enterprise role hierarchy
- Managing the application role hierarchy
- Mapping application roles to an enterprise role
- Mapping enterprise roles to an application role

For details about configuring application roles, see [Section 6.5.1](#).

## 6.4.2 Managing System Policies

Oracle Enterprise Manager Fusion Middleware Control is the recommended tool to administer system policies. These are policies that pertain to the whole domain, as opposed to application policies, which pertain a particular application.

A principal policy is a system policy that grants permissions to a list of users or enterprise groups. A codebase policy is a system policy that grants permissions to a piece of code or a URL (typically represented by an EAR or a JAR file); for example, an application using the Credential Store Framework requires an appropriate codebase policy.

Fusion Middleware Control allows the creation and modification of both these types of system policies. For details about the procedure to follow, see the "Managing System Policies" section in the *Oracle Fusion Middleware Application Security Guide*.

An alternative way to administer policies (both system and application policies), although not as convenient but occasionally useful, is using WLST commands. For a

complete list of security-related commands, see the "OPSS Scripts" appendix in the *Oracle Fusion Middleware Application Security Guide*.

### 6.4.3 Reconciling GUIDs

The recipient of a grant can be either an application role or an enterprise role. In Oracle Fusion Data Security and policy grants this recipient is identified by a GUID, and it is crucial for the security system to work as expected that these GUIDs be consistent. Since GUIDs are *not* preserved by migration, the GUIDs in the Oracle Fusion Data Security policies and in the policy store policies must be reconciled when, for instance, migrating to a staging or a production environment.

The java utility program `DSDataMigrator` reconciles GUIDs by modifying GUIDs in Oracle Fusion Data Security so that the GUIDs of the role entries in the identity and policy stores are consistent with those in Oracle Fusion Data Security.

`DSDataMigrator` needs not be run when:

- The user interface is used to create new policies or to modify existing ones.
- The system is provisioned for the first time (GUID reconciliation happens automatically in this case).
- A patch containing Grants Seed Data is applied to the environment (GUID reconciliation happens automatically in this case).

`DSDataMigrator` must be run when:

- A policy stripe was dropped or recreated.
- A role was dropped or recreated.
- An SQL script was used to upload grants data.
- Patching the infrastructure fails, such as, when the LDAP server went down.
- The LDAP server was swapped out.
- `FndGrantsSD.xml` data was loaded to the database using SDF programs directly bypassing the patching infrastructure.
- The file `jps-config-jse.xml` contains invalid or incorrect configurations.
- Security data was migrated to a staging or to a production environment.
- Enterprise roles in the identity store were dropped and imported again using a migration tool.

This section includes the following topics:

- [Section 6.4.3.1, "Prerequisites to Running DSDataMigrator"](#)
- [Section 6.4.3.2, "DSDataMigrator Syntax"](#)

#### 6.4.3.1 Prerequisites to Running DSDataMigrator

Before an administrator runs this command, it is assumed that:

- The Fusion Application has been installed (so that Oracle Fusion Data Security has been loaded).
- The XML policies (`jazn-data.xml`) have been migrated to an Oracle Internet Directory server.
- The `FND_GRANTS` table has been backed up, as illustrated in the following invocation:

```
>sqlplus sys as sysdba
create table FUSION.FND_GRANTS_OLD as select * from FUSION.FND_GRANTS;
```

- The classpath in the shell where the command is to be run contains the following JAR files:
  - MW\_HOME/atgpf/atgpf/modules/oracle.applcore.model\_11.1.1/Common-Model.jar.
  - MW\_HOME/atgpf/atgpf/modules/oracle.applcore.model\_11.1.1/DataSecurity-Model.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.model\_11.1.1/adfm.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.share\_11.1.1/adf-share-support.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.share.ca\_11.1.1/adf-share-ca.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.share.ca\_11.1.1/adf-share-base.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.share\_11.1.1/jsp-el-api.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.businesseditor\_11.1.1/adf-businesseditor.jar.
  - MW\_HOME/oracle\_common/modules/oracle.adf.share\_11.1.1/adfflogginghandler.jar.
  - MW\_HOME/oracle\_common/modules/oracle.jps\_11.1.1/jps-manifest.jar.
  - MW\_HOME/modules/javax.jsp\_1.3.0.0\_2-1.jar.
  - MW\_HOME/oracle\_common/modules/oracle.mds\_11.1.1/mdsrt.jar.
  - MW\_HOME/oracle\_common/modules/oracle.javatools\_11.1.1/resourcebundle.jar.
  - MW\_HOME/oracle\_common/modules/oracle.javatools\_11.1.1/javatools-nodeps.jar.
  - MW\_HOME/wlserver\_10.3/server/ext/jdbc/oracle/11g/ojdbc5.jar.
- Optionally, the identity store has been seeded.

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**Notes:** The files `Common-Model.jar` and `DataSecurity-Model.jar` are expected to be in the paths indicated above, but, depending on the environment, they could be installed in some other location. To find out the location of those files in your environment, invoke the following commands at the top of the `MW_HOME` directory:

```
>find . -name "Common-Model.jar"
>find . -name "DataSecurity-Model.jar"
```

`DSDDataMigrator` is executed automatically when (and only when) a patch containing the data security grants seed data file `FndGrantsSD.xml` is applied to the environment. In particular, the script is not executed automatically if the seed data file is applied manually.

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### 6.4.3.2 DSDataMigrator Syntax

DSDataMigrator is located in the directory `oracle.apps.fnd.applcore.dataSecurity.util`, and it has the following syntax (arguments are written in separate lines for the sake of clarity only):

```
java -classpath $CLASSPATH
-Doracle.security.jps.config=path to the jps-config-jse.xml file
-DFND_DS_GUID_RECON_LOG_DIR=path to the log output directory
DSDataMigrator -dsdburl dsdbURL
                -dsdbuser dsdbUser
                -silentMode <true_or_false>
                -forceProcessAllRows true|false
                -policyStripe FA policy stripe name
                -idStoreOnly true|false
                -validationMode true|false
```

When run and before processing security data, the command prompts the administrator for the database password.

The meaning of the arguments is as follows:

- `oracle.security.jps.config` specifies the location of the configuration file `jps-config-jse.xml` where the policy store and identity store are configured. This file must include the appropriate bootstrap credentials to access the policy store. The following fragment of a configuration file illustrates the specification of credentials for a policy store instance:

```
<serviceInstance provider="ldap.policystore.provider" name="policystore.ldap">
  <property value="OID" name="policystore.type" />
  <property value="bootstrap_123456" name="bootstrap.security.principal.key" />
  <property value="cn=myFarm123" name="oracle.security.jps.farm.name" />
  <property value="cn=FusionAppsPolicies"
name="oracle.security.jps.ldap.root.name" />
  <property value="ldap://example.com:33060" name="ldap.url" />
</serviceInstance>

<serviceInstance location="./bootstrap" provider="credstoressp"
name="bootstrap.cred">
  <property value="./bootstrap" name="location" />
</serviceInstance>
```

Typically, the file `jps-config-se.xml` is located in the directory `DOMAIN_HOME/servers/server_name/CommonDomain/config/fmwconfig`. If this file is moved to a different location, the bootstrap directory (which contains the file `cwallet.sso`) must also be moved to that new location.

- `dsdburl` specifies the URL of the data base where Oracle Fusion Data Security is stored.
- `dsdbuser` specifies the name of the user that can access the data base.
- `silentMode` specifies whether the command should raise exceptions when an entry is not found in the OID server. Set to `TRUE` to prevent raising these kind of exceptions; otherwise, set to `FALSE`. Default value: `FALSE`.
- `forceProcessAllRows` specifies whether all rows in the `FND_GRANTS` table should be processed. Set to `TRUE` to process all rows in that table; otherwise, set to `FALSE`. The default behavior is `FALSE` and processes just those rows with the `compile_flag` is set to `Y`.

- `policyStripe` specifies the name of the Oracle Fusion application stripe in the policy store. Typical values are `fscm`, `crm`, and `hcm`.
- `idStoreOnly` specifies whether only data security grants granting to enterprise roles should be processed. Set to `TRUE` to process only grants granting to enterprise roles; otherwise, set to `FALSE` to process all grants. When set to `TRUE`, the value of the argument `policyStripe` is ignored. Default value: `FALSE`.
- `validationMode` specifies to run the script in read only mode (validation mode). Set to `TRUE` to run the script *without* updating the database data. Set to `FALSE` to run the script and update database data. Default value: `FALSE`. A validation run of the script is useful to find out if any reconciliation is needed between the database and the LDAP store.

### 6.4.3.3 Examples of Use

Running the program without any arguments prints out the usage instructions; a sample invocation (in a non-multi-tenant environment) is the following:

```
java -classpath $CLASSPATH
-Doracle.security.jps.config=/home/sayarram/work/jps/jps-config-jse.xml
oracle.apps.fnd.applcore.dataSecurity.util.DSDataMigrator
-dsdburl myURL -dsdbuser fusion -silentMode true
-forceProcessAllRows true -policyStripe fscm
```

When run, the program generates a log file with the details of records processed, warnings, errors, and a summary of what has been processed.

A sample invocation in a multi-tenant environment is the following:

```
java -classpath $CLASSPATH
-Doracle.security.jps.config=/home/sayarram/work/jps/jps-config-jse.xml
oracle.apps.fnd.applcore.dataSecurity.util.DSDataMigrator
-dsdburl myURL -dsdbuser fusion -silentMode true -forceProcessAllRows true
-policyStripe fscm
```

## 6.4.4 Managing Data Security

For details on topics related to data security management, see the following documents:

- *Oracle Fusion Applications Security Guide*
- *Oracle Fusion Applications Security Hardening Guide*

For details about creating data role templates, see the "Oracle Fusion Applications Data Role Templates" chapter in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

## 6.5 Configuring Roles

An enterprise role or enterprise group is a collection of users and other enterprise roles, and it is stored in the domain identity store. An application role is a collection of users, enterprise roles, and application roles, and it is stored in the domain policy store.

In the Oracle Authorization Policy Manager environment, enterprise roles are referred to as external roles. In the Oracle WebLogic Administration Console, enterprise roles are referred to as enterprise groups.

Roles can be structured in a hierarchy by the relation "inherits." If a parent role inherits a child role, then the parent role can do anything that the child role can do (in addition to what the parent role can do).

Mapping an enterprise role to an application role establishes that the enterprise role inherits the application role, thus, the privileges of the enterprise role become the union of its privileges and those of the application roles to which it is mapped.

For details about managing the role mapping after the application has been deployed, see the following topics in *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*:

- Managing Role Mapping Policies
- Mapping External Roles to an Application Role

For details about managing data security policies in Oracle Fusion applications, see the "Managing Oracle Fusion Applications Data Security Policies" section in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

For details about generating data roles with data role templates, see the "Oracle Fusion Applications Data Role Templates" section in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

This section includes the following topics:

- [Section 6.5.1, "Configuring Oracle Fusion Application Roles"](#)
- [Section 6.5.2, "Configuring Enterprise Roles"](#)

## 6.5.1 Configuring Oracle Fusion Application Roles

Oracle Fusion applications use the following enterprise and application roles in their application policies and data security policies:

- Data role, an enterprise role used exclusively in data security policies. It can inherit Job, Duty, and Abstract roles. Several data roles are provisioned with each Oracle Fusion application.
- Job role, or Business role, is an enterprise role that corresponds with a job or business occupation. A Job role *must* inherit at least a Duty role.
- Duty role, or Task role, is an application role that corresponds with the duties of a job.
- Abstract role is an enterprise role that can be associated with any user, irrespective of his job or duties. Typical examples of this role are Employee, Manager, Customer, and Supplier. Several job roles are provisioned with each Oracle Fusion application. An Abstract role *must* inherit at least a Duty role.

Oracle Authorization Policy Manager is the recommended tool to manage application roles after the application has been deployed. Using this tool an administrator can, for example, create, remove, or modify an application role; or modify the hierarchy of application roles; or create, remove, or modify the application role category. For details about the tool, see the "Managing Applications" section in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

[Table 6–2](#) lists the equivalent terms used in the physical and reference implementations. The terminology in the physical implementation follows the one used in Oracle Fusion applications; the terminology in the reference implementation follows the one used in the Oracle Authorization Policy Manager graphic interface.

**Table 6–2 Equivalent Terminology**

Physical Implementation	Reference Implementation
Data role	Enterprise role used only in data security policies. Typically, the name of a data role has the suffix <code>_DATA</code> .
Job	Enterprise role mapped to application role. Typically, the name of this role has the suffix <code>_JOB</code> .
Abstract role	Enterprise role, which are persisted as LDAP groups and can be managed with Oracle Authorization Policy Manager and Oracle Identity Management.
Duty	Application role used only in application policies.
Privilege	Entitlement (or permission set).
FND Grant (or Foundation Grant)	Data security policy, which ties a data role or job role to a specific set of data.

For definitions and details about the terms in the reference implementation, see the "Understanding the Policy Model" section in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

## 6.5.2 Configuring Enterprise Roles

A security administrator uses integrated Oracle Identity Management pages to create and manage enterprise (job) roles in Oracle Fusion applications. For details, see the "Organization and Role Management" section in the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*.

## 6.6 Configuring Audit Trail

Auditing features are provided through Audit Trail, a history of the changes that have been made to data in Oracle Fusion Applications. Audit Trail enables you to track who made changes to data, at what time, and how the value changed.

For details, see "About Auditing" in the *Oracle Database Security Guide*.

Oracle Fusion Middleware Audit Framework is a separate service that provides a centralized audit framework for the middleware family of products. The service is configured and managed using Fusion Middleware Control.

For details about Oracle Fusion Middleware Audit Framework, see "Configuring and Managing Auditing" in the *Oracle Fusion Middleware Application Security Guide*.

## 6.7 Configuring SSL for Oracle Fusion Applications

SSL provides secure communication between the paths that connect endpoints. For example, the path between Oracle WebLogic Server and an LDAP directory server is secured through SSL.

This section contains the following topics:

- [Section 6.7.1, "SSL Configuration in Oracle Fusion Middleware"](#)
- [Section 6.7.2, "SSL Configuration for Oracle Fusion Applications"](#)
- [Section 6.7.3, "End-to-End SSL for Oracle Fusion Applications"](#)
- [Section 6.7.4, "Checklist of SSL Connections for IdM Components"](#)

- [Section 6.7.5, "Additional SSL Configuration"](#)
- [Section 6.7.6, "Enabling Secure Sockets Layer on ECSF"](#)

## 6.7.1 SSL Configuration in Oracle Fusion Middleware

Oracle Fusion Middleware provides SSL configuration features across the three tiers of the enterprise stack (Web, Middle, and Data tiers). SSL configuration is consistent and uniform across all Oracle Fusion Middleware system components and applications.

This section contains the following topics:

- [Section 6.7.1.1, "SSL and Infrastructure Hardening"](#)
- [Section 6.7.1.2, "Communication in the Three-Tier Model"](#)

### 6.7.1.1 SSL and Infrastructure Hardening

SSL-enabling communication paths is one element in a hardening process whose aim is to ensure that all appropriate security features are activated and configured correctly in the various major systems and subsystems that comprise Oracle Fusion Middleware.

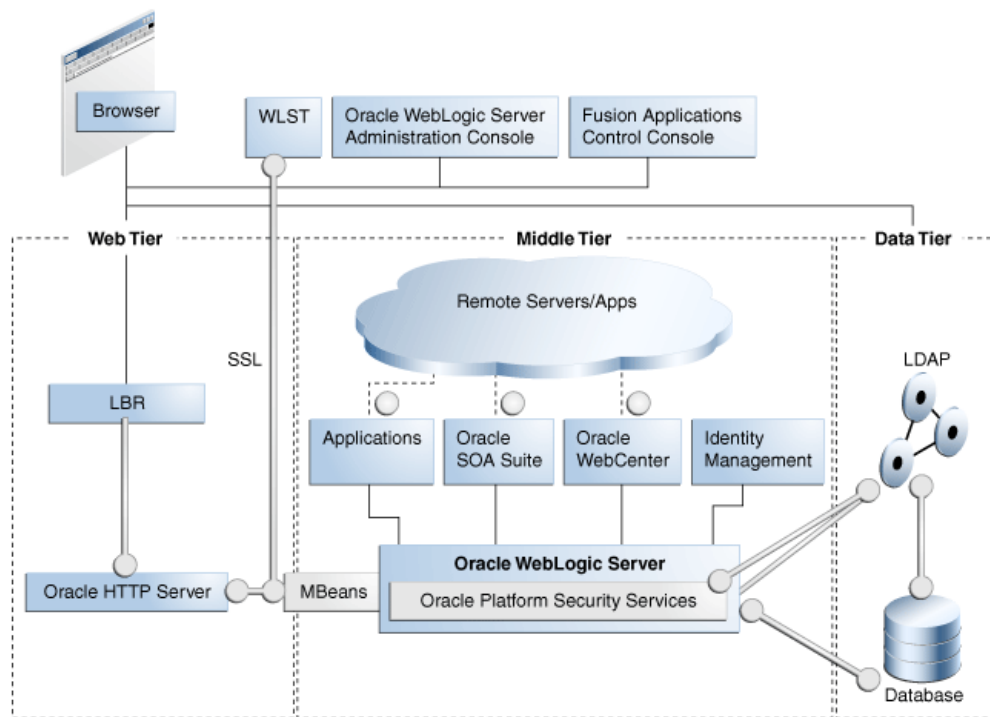
The discussion in this document is limited to SSL features available to Oracle Fusion applications. For information about other elements of hardening, see the *Oracle Fusion Applications Security Hardening Guide*.

### 6.7.1.2 Communication in the Three-Tier Model

Oracle Fusion Middleware supports a three-tier structure: the Web tier contains load balancers and other components outside the firewall, the middle tier hosts Oracle WebLogic Server and its applications, and the Data tier contains databases and directories. Different administration tools are shown at the top of the figure.

[Figure 6–2](#) shows the location of key elements in this architecture:

**Figure 6–2 Oracle Fusion Middleware and the Three-Tier Model**



In the figure, the vertical broken lines represent firewalls. The circles represent listeners that can be SSL-enabled for secure communication. As the figure shows, all critical communication paths can be protected with SSL regardless of the tier(s) involved.

For more information, see the "About SSL in Oracle Fusion Middleware" section in the *Oracle Fusion Middleware Administrator's Guide*.

## 6.7.2 SSL Configuration for Oracle Fusion Applications

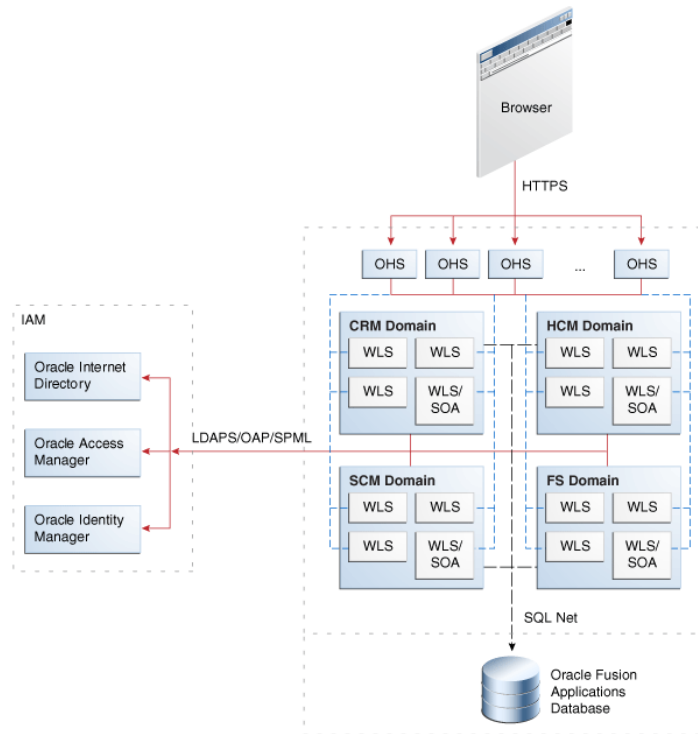
Key connections in Oracle Fusion Applications can be secured either during provisioning or post-provisioning.

This section contains the following topics:

- [Section 6.7.2.1, "Basic Network Topology"](#)
- [Section 6.7.2.2, "Provisioned SSL Connections"](#)

### 6.7.2.1 Basic Network Topology

[Figure 6–3](#) shows a high-level representation of a three-tier network topology in the typical Oracle Fusion Applications environment:

**Figure 6–3 SSL Connections for Basic Network Topology****Notes:**

- The diagram shows some representative domains.
- OAP is the Oracle Access Protocol used by Oracle Access Manager. LDAPS is the LDAP-over-SSL protocol.

Several approaches to configuring SSL are available in the Oracle Fusion Applications environment:

1. You can choose not to enable SSL connections during provisioning.
2. You can choose to SSL-enable connections to certain components during provisioning.

These connections are shown as solid lines (red) in the diagram and include IdM components like Oracle Access Manager and Oracle Internet Directory. [Table 6–3](#) lists these connections.

3. You can SSL-enable connections post-provisioning.

If you started with Option 2, you can now protect service-to-service connections like those shown in dotted lines (blue) in the diagram; this includes, for example, connections to Oracle Business Intelligence, ECSF, and external Web services. For details about this wiring, see [Section 6.7.5](#).

If you started with Option 1, you would SSL-enable Oracle Identity Management first (see [Section 6.7.3](#)), followed by the service-to-service connections (see [Section 6.7.5](#)).

Note the following assumptions about this topology:

- In most environments, the Fusion Applications middleware servers operate on an isolated network within the larger corporate network.  
This means that such components as Oracle HTTP Server (OHS), Oracle WebLogic Server, Oracle Business Intelligence, and others required for the Oracle Fusion Applications instance all run within a single isolated network.
- Likewise, the Oracle Fusion Applications database runs in either the same isolated network or on its own isolated network that can only be reached with the application's private network.
- Because most business applications do not face the extranet, the HTTP server (OHS) tier is typically not segregated into its own DMZ.
- External dependencies for Oracle Identity Management components, represented in the figure by Oracle Access Manager and Oracle Internet Directory servers, are assumed to reside outside this isolated network.

### 6.7.2.2 Provisioned SSL Connections

As mentioned earlier, Oracle Fusion applications are configured with SSL for client traffic inbound to OHS and traffic to and from the identity management zone.

[Table 6-3](#) shows the connections that are SSL-enabled at provisioning:

**Table 6-3 Provisioned SSL Connections**

Connection Path	Protocol	Default SSL Connection
Incoming HTTP Traffic (client to HTTP server)	HTTPS	One-way SSL (trust in server)
mod_webgate to Oracle Access Manager	OAP	One-way SSL (trust in server)
Oracle WebLogic Server to LDAP server (Oracle Internet Directory/Oracle Virtual Directory)	LDAPS	One-way SSL (trust in server)

SSL can also be enabled for these connections post-provisioning by following the instructions in [Section 6.7.3](#).

## 6.7.3 End-to-End SSL for Oracle Fusion Applications

This section provides step-by-step procedures to enable SSL between Oracle HTTP Server (OHS) and Oracle WebLogic Server (WLS). This includes SSL traffic to Oracle HTTP Server, on Oracle Fusion Applications domains, and between Oracle Fusion Applications domains and components in the Identity Management (IdM) domain. SSL is enabled using a self-signed certificate, with one-way SSL communication (server-auth mode).

Procedures for supplementary tasks like keystore and certificate maintenance are also included.

This document contains the following topics:

- [Background and Scope](#)
- [Enabling SSL on Oracle Fusion Applications Domains and Apps OHS](#)
- [Enabling SSL between Oracle Fusion Applications Domains and IdM Components](#)
- [Known Issues](#)

### 6.7.3.1 Background and Scope

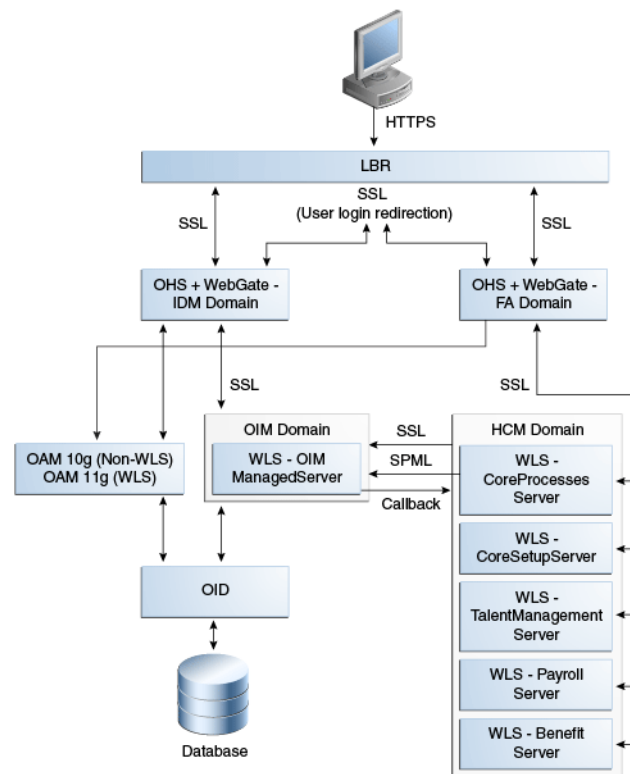
Keep the following points in mind as you work through this section:



- The procedures apply to Oracle Access Manager version 10g.
- The procedures are illustrated using the benefits server in HCMDomain but are generally applicable.
- The configuration tools prompt you for passwords when necessary. The examples shown here do not display password input or entry.
- The procedures typically rely on the self-signed certificates that are created by Oracle Fusion Application provisioning tools, and you do not need to recreate them again.
- APPLTOP is a placeholder that refers to the top-level directory where Oracle Fusion Applications is installed.

Figure 6–4 illustrates the SSL wiring:

**Figure 6–4 SSL Connections on Oracle Fusion Applications Domains**



Two distinct component stacks are pictured here. On the left is the identity management stack, front-ended by an Oracle HTTP Server which is referred to as the Authentication OHS or Auth OHS. On the right are WebLogic and the application stack, front-ended by an Oracle HTTP Server which is referred to as the Application OHS or Apps OHS.

### 6.7.3.2 Enabling SSL on Oracle Fusion Applications Domains and Apps OHS

We illustrate the steps using the Benefits managed server in the HCMDomain domain. The procedure can be applied to any managed server that must SSL-enabled.

This procedure consists of two distinct tasks:

- Enable SSL on your application's WebLogic managed server

- Enable SSL on the OHS which front-ends the Oracle Fusion Applications domain

This section contains these topics:

- [Section 6.7.3.2.1, "Enabling the SSL Listener on your application's WebLogic Managed Server"](#)
- [Section 6.7.3.2.2, "Enabling SSL on the Oracle HTTP Server for the Oracle Fusion Applications domain"](#)
- [Section 6.7.3.2.3, "Verify SSL Configuration"](#)
- [Section 6.7.3.2.4, "mod\\_ossll Directives for Inbound SSL Configuration to Oracle HTTP Server"](#)
- [Section 6.7.3.2.5, "List of Managed Servers for Oracle Fusion Applications Domains"](#)

#### 6.7.3.2.1 Enabling the SSL Listener on your application's WebLogic Managed Server

Take these steps to complete this task:

1. Log in to the Weblogic Administration Console as the "faadmin" user.
2. Navigate to **Environment**, then **Servers**, then BenefitsServer\_1.

---

---

**Note:** The Benefits server in HCMDomain is used as an example. Substitute the relevant server in your environment.

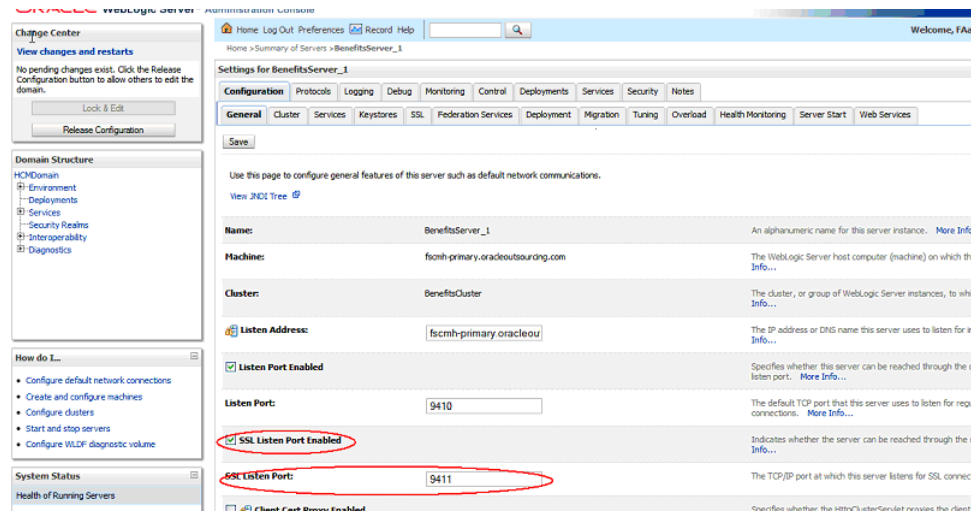
---

---

3. Check the "SSL Listener Port Enable" box. Make sure that the SSL listener port number you select is not in use. Remember this port number for later use in the OHS configuration file.
4. Scroll down the page and click **Advanced** to unhide the advanced server options.
5. Check the WebLogic Plug-In Enabled box so that the server can receive proxied requests.
6. Click **Save**.
7. Stop the managed server.
8. Restart the managed server to enable the SSL listener.
9. Repeat Steps 1 through 6 for each managed server in your domain that must be SSL-enabled. For tables of managed servers by domain, see [Section 6.7.3.2.5, "List of Managed Servers for Oracle Fusion Applications Domains"](#).

Figure 6-5 shows a sample configuration:

Figure 6–5 Enabling SSL on a Managed Server



### 6.7.3.2.2 Enabling SSL on the Oracle HTTP Server for the Oracle Fusion Applications domain

Take these steps to enable SSL on the Apps OHS server which front-ends the Oracle Fusion Applications domain:

1. Locate the configuration file `FusionVirtualHost_hcm.conf`, which resides in the following directory:

```
ohs_instance/CommonDomain_webtier/config/OHS/ohs1/moduleconf
/FusionVirtualHost_hcm.conf
```

This file is generated during provisioning. Out-of-the-box, SSL is not enabled and the file must be modified manually.

2. Update the virtual host file to enable SSL:
  - a. Open the `FusionVirtualHost_hcm.conf` file using a text editor.
  - b. Search for the string "External virtual host for hcm".
  - c. Include the SSL configuration file in the OHS configuration by adding a line similar to the following below this string, ensuring the correct path:

```
include "/root_dir/APPLTOP/instance/CommonDomain_
webtier/config/OHS/ohs1/FusionSSL.conf"
```

For example:

```
#External virtual host for hcm
<VirtualHost appohs.myoutsource.com:10620 >
```

```
ServerName https://hcmppbr.host.example.com
include "/u01/APPLTOP/instance/CommonDomain_
webtier/config/OHS/ohs1/FusionSSL.conf"
```

- d. Scroll down in the file to "Context roots for application HcmBenefits".
- e. Change the port number for WebLogicCluster configuration to the SSL listener port specified in the earlier task in [Section 6.7.3.2.1, "Enabling the SSL Listener on your application's WebLogic Managed Server"](#).
- f. Next, configure the outbound connection to Oracle WebLogic Server by adding the following two lines:

```
SecureProxy On
WlSSLWallet ~/fusionapps/wlserver_10.3/server/lib"
```

Here is an example for the hcmBenefits context root:

```
## Context roots for application HcmBenefits
<Location /hcmBenefits >
  SetHandler weblogic-handler
  WebLogicCluster fscmh-primary.myvhost.com:9411
  WLProxySSL ON
  WLProxySSLPassThrough ON
  RewriteEngine On
  RewriteOptions inherit
  SecureProxy On
  WlSSLWallet "/u01/APPLTOP/fusionapps/wlserver_10.3/server/lib"
</Location>
```

---



---

#### Note:

- The port number must match the SSL listen port on the managed server (as shown in [Figure 6-5](#)).
  - The directory "~/fusionapps/wlserver\_10.3/server/lib" is the location where `cwallet.sso` resides.
  - This directive assumes that the Web Tier shares the top-level directory with Oracle Fusion Application domains. If, however, the Web Tier is in a DMZ or it cannot share the drive with Oracle Fusion Application domains, do not perform this step. Instead, export all certificates from the wallet in "`/root_dir/APPLTOP/fusionapps/wlserver_10.3/server/lib`" and import them to the Web Tier wallet.
- 
- 

3. Save and close the file.
4. Stop and restart the OHS server:

```
/root_dir/APPTOP/instance/CommonDomain_webtier/bin/opmnctl stopall
/root_dir/APPTOP/instance/CommonDomain_webtier/bin/opmnctl startall
```

#### 6.7.3.2.3 Verify SSL Configuration

Take these steps to ensure SSL is operational:

1. Bring up the application URL and try to log in over the SSL protocol. For the Benefits application example:

```
https://hcmppbr.host.example.com/hcmBenefits/faces
/HcmBenefitsProcessesAdministerBenefitsWorkArea
```

2. Repeat for other application URLs for that managed server.

### 6.7.3.2.4 mod\_oss1 Directives for Inbound SSL Configuration to Oracle HTTP Server

mod\_oss1 is the plug-in to Oracle HTTP Server that enables the server to use SSL. This section describes certain key directives you configure for mod\_oss1 to configure secure inbound client connections to Oracle HTTP Server.

#### The SSLProtocol Directive

The SSLProtocol directive specifies SSL protocol(s) for mod\_oss1 to use when establishing the server environment. Clients can only connect with one of the specified protocols.

*Context:* server configuration, virtual host

*Syntax:*

```
SSLProtocol [+ -] protocol
```

where protocol is one of: SSLv3, TLSv1, TLSv1.1, TLSv1.2, ALL

*Default:* SSLProtocol ALL

*Example 1:* To specify only SSL version 3.0, set this directive to the following:

```
SSLProtocol +SSLv3
```

*Example 2:* To specify all flavors, but not SSL version 3.0, set this directive to the following:

```
SSLProtocol ALL -SSLv3
```

#### The SSLCipherSuite Directive

The SSLCipherSuite directive specifies the SSL cipher suit that the client can use during SSL handshake. This directive uses a colon-separated cipher specification string consisting of prefixes and tags to identify the cipher suite.

*Context:* server configuration, virtual host, directory

*Syntax:*

```
SSLCipherSuite cipher-spec
```

where cipher-spec is a colon-separated string consisting of prefixes plus allowed or excluded ciphers. The prefixes are shown in [Table 6-4](#):

**Table 6-4** Prefixes in SSLCipherSuite

Prefix	Description
none	Adds the cipher to the list .
+	Adds the cipher to the list and places it in the correct location in the list .
-	Removes the cipher from the list (it can be added later).
!	Removes the cipher from the list permanently.

*Default:* ALL: !ADH: +HIGH: +MEDIUM: +LOW

*Example:* To specify all ciphers except MD5 strength ciphers:

```
SSLCipherSuite ALL:!MD5
```

[Table 6–5](#) lists the available cipher suite tags:

**Table 6–5 Tags for Cipher Suite Specification**

Function	Tag	Description
Key Exchange	kRSA	RSA key exchange
Key Exchange	kDHR	Diffie-Hellman key exchange with RSA key
Authentication	aNULL	No authentication
Authentication	aRSA	RSA authentication
Authentication	aDH	Diffie-Hellman authentication
Encryption	eNULL	No encryption
Encryption	DES	DES encoding
Encryption	3DES	Triple DES encoding
Encryption	RC4	RC4 encoding
Encryption	ECC	Elliptic curve cryptography encoding
Data Integrity	MD5	MD5 hash function
Data Integrity	SHA	SHA hash function
Data Integrity	SHA256	SHA256 hash function
Data Integrity	SHA384	SHA384 hash function
Aliases	SSLv3	All SSL version 3 ciphers
Aliases	TLSv1.1	All TLS version 1.1 ciphers
Aliases	TLSv1.2	All TLS version 1.2 ciphers
Aliases	LOW	All low strength ciphers (export and single DES)
Aliases	MEDIUM	All ciphers with 128-bit encryption
Aliases	HIGH	All ciphers using triple DES
Aliases	AES	All ciphers using AES encryption.
Aliases	RSA	All ciphers using RSA key exchange
Aliases	DH	All ciphers using Diffie-Hellman key exchange

### 6.7.3.2.5 List of Managed Servers for Oracle Fusion Applications Domains

This section contains tables of the managed servers for each domain, showing which managed servers need to be SSL-enabled using the procedure shown in [Section 6.7.3.2.1, "Enabling the SSL Listener on your application's WebLogic Managed Server"](#).

**Table 6–6 Managed Servers in the Oracle Fusion Human Capital Management Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
BenefitsServer_1	Yes	<a href="https://hcmppbr.host.example.com/hcmBenefits/faces/HcmBenefitsProcessesAdministerBenefitsWorkArea">https://hcmppbr.host.example.com/hcmBenefits/faces/HcmBenefitsProcessesAdministerBenefitsWorkArea</a>
CompensationServer_1	Yes	<a href="https://hcmppbr.host.example.com/hcmCompensation/faces/HcmCompWorkbenchWorkarea">https://hcmppbr.host.example.com/hcmCompensation/faces/HcmCompWorkbenchWorkarea</a> <a href="https://hcmppbr.host.example.com/hcmCompensation/faces/HcmCompAdminWorkarea">https://hcmppbr.host.example.com/hcmCompensation/faces/HcmCompAdminWorkarea</a> <a href="https://hcmppbr.host.example.com/hcmCompensation/faces/HcmCompPersonStatementWorkArea">https://hcmppbr.host.example.com/hcmCompensation/faces/HcmCompPersonStatementWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmCompensation/faces/SetupMainPage">https://hcmppbr.host.example.com/hcmCompensation/faces/SetupMainPage</a>
CoreProcessesServer_1	Yes	<a href="https://hcmppbr.host.example.com/hcmCore/faces/MyPortrait">https://hcmppbr.host.example.com/hcmCore/faces/MyPortrait</a> <a href="https://hcmppbr.host.example.com/hcmCore/faces/PersonSearch">https://hcmppbr.host.example.com/hcmCore/faces/PersonSearch</a>
CoreSetupServer_1	Yes	<a href="https://hcmppbr.host.example.com/hcmCoreSetup/faces/HcmWSIntWA">https://hcmppbr.host.example.com/hcmCoreSetup/faces/HcmWSIntWA</a>
Ess_server1	No	
HCMAnalyticsServer_1	No	
Odi_server1	No	
PayrollServer_1	Yes	<a href="https://hcmppbr.host.example.com/hcmPayroll/faces/ChecklistUI">https://hcmppbr.host.example.com/hcmPayroll/faces/ChecklistUI</a> <a href="https://hcmppbr.host.example.com/hcmPayroll/faces/PayrollAdminWorkArea">https://hcmppbr.host.example.com/hcmPayroll/faces/PayrollAdminWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmPayroll/faces/PayrollCalculationWorkArea">https://hcmppbr.host.example.com/hcmPayroll/faces/PayrollCalculationWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmPayroll/faces/PaymentDistributionWorkArea">https://hcmppbr.host.example.com/hcmPayroll/faces/PaymentDistributionWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmPayroll/faces/AccountingWorkarea">https://hcmppbr.host.example.com/hcmPayroll/faces/AccountingWorkarea</a> <a href="https://hcmppbr.host.example.com/hcmPayroll/faces/StatutoryReportsWorkArea">https://hcmppbr.host.example.com/hcmPayroll/faces/StatutoryReportsWorkArea</a>
Soa_server1	No	
TalentManagementServer_1	Yes	<a href="https://hcmppbr.host.example.com/hcmTalent/faces/PerformanceWorkArea">https://hcmppbr.host.example.com/hcmTalent/faces/PerformanceWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmTalent/faces/ManageGoalsWorkArea">https://hcmppbr.host.example.com/hcmTalent/faces/ManageGoalsWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmTalent/faces/ManageProfilesWorkArea">https://hcmppbr.host.example.com/hcmTalent/faces/ManageProfilesWorkArea</a> <a href="https://hcmppbr.host.example.com/hcmTalent/faces/FacilitatorOverviewWorkArea">https://hcmppbr.host.example.com/hcmTalent/faces/FacilitatorOverviewWorkArea</a>

**Table 6–7 Managed Servers in the Oracle Fusion Financials Domain**

Managed Server	SSL?	Application URLs
Admin Server	No	

**Table 6–7 (Cont.) Managed Servers in the Oracle Fusion Financials Domain**

Managed Server	SSL?	Application URLs
Ess_server1	No	
FinancialAnalyticsServer_1	No	
FinancialCommonServer_1	Yes	<a href="https://hcmfinppbr.host.example.com/financialCommon/faces/LegalEntityDashboard">https://hcmfinppbr.host.example.com/financialCommon/faces/LegalEntityDashboard</a>
FinancialSearchServer_1	No	
GeneralLedgerServer_1	Yes	<a href="https://hcmfinppbr.host.example.com/ledger/faces/JournalEntryPage">https://hcmfinppbr.host.example.com/ledger/faces/JournalEntryPage</a> <a href="https://hcmfinppbr.host.example.com/ledger/faces/LedgerWorkArea">https://hcmfinppbr.host.example.com/ledger/faces/LedgerWorkArea</a> <a href="https://hcmfinppbr.host.example.com/ledger/faces/XlaEssMain">https://hcmfinppbr.host.example.com/ledger/faces/XlaEssMain</a>
PayableServer_1	Yes	<a href="https://hcmfinppbr.host.example.com/payables/faces/InvoiceWorkbench">https://hcmfinppbr.host.example.com/payables/faces/InvoiceWorkbench</a> <a href="https://hcmfinppbr.host.example.com/payables/faces/ExpenseShell">https://hcmfinppbr.host.example.com/payables/faces/ExpenseShell</a> <a href="https://hcmfinppbr.host.example.com/payables/faces/PaymentLandingPage">https://hcmfinppbr.host.example.com/payables/faces/PaymentLandingPage</a>
ReceivableServer_1	Yes	<a href="https://hcmfinppbr.host.example.com/receivables/faces/ReceiptsWorkArea">https://hcmfinppbr.host.example.com/receivables/faces/ReceiptsWorkArea</a> <a href="https://hcmfinppbr.host.example.com/receivables/faces/TransactionsWorkArea">https://hcmfinppbr.host.example.com/receivables/faces/TransactionsWorkArea</a>

**Table 6–8 Managed Servers in the Oracle Fusion Setup Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
Ess_server1	No	
FunctionalSetupServer_1	Yes	<a href="https://hcmcmppbr.host.example.com/setup/faces/TaskListManagerTop">https://hcmcmppbr.host.example.com/setup/faces/TaskListManagerTop</a>
HelpPortalServer_1	No	
HomePageServer_1	Yes	<a href="https://hcmcmppbr.host.example.com/homePage/faces/AtkHomePageWelcome">https://hcmcmppbr.host.example.com/homePage/faces/AtkHomePageWelcome</a>
IPM_server1	No	
Search_server1	No	
Soa_server1	No	
UCM_server1	No	
WC_Collaboration	No	
WC_Spaces	No	
Wlcs_server1	No	
Wlcs_sipstate1	No	



**Table 6–9 Managed Servers in the Oracle Fusion Customer Relationship Management Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
ContractManagementServer_1	Yes	<a href="https://hcmcrmppbr.host.example.com/contractManagement/faces/ContractsDashboard">https://hcmcrmppbr.host.example.com/contractManagement/faces/ContractsDashboard</a>
CRMANalyticsServer_1	No	
CRMCommonServer_1	Yes	<a href="https://hcmcrmppbr.host.example.com/crmCommon/faces/CdmFoundationResourcesWorkArea">https://hcmcrmppbr.host.example.com/crmCommon/faces/CdmFoundationResourcesWorkArea</a> <a href="https://hcmcrmppbr.host.example.com/crmCommon/faces/InteractionsDashBoard">https://hcmcrmppbr.host.example.com/crmCommon/faces/InteractionsDashBoard</a>
Ess_server1	No	
Odi_server1	No	
Soa_server1	No	

**Table 6–10 Managed Servers in the Oracle Fusion Supply Chain Management Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
AdvancedPlanningServer_1	Yes	<a href="https://hcmscmppbr.host.example.com/advancedPlanning/faces/ViewCollectedData">https://hcmscmppbr.host.example.com/advancedPlanning/faces/ViewCollectedData</a> <a href="https://hcmscmppbr.host.example.com/advancedPlanning/faces/MscCentralEssUi">https://hcmscmppbr.host.example.com/advancedPlanning/faces/MscCentralEssUi</a> <a href="https://hcmscmppbr.host.example.com/advancedPlanning/faces/testAtpRule">https://hcmscmppbr.host.example.com/advancedPlanning/faces/testAtpRule</a> <a href="https://hcmscmppbr.host.example.com/advancedPlanning/faces/testManageDataCollectionProcess">https://hcmscmppbr.host.example.com/advancedPlanning/faces/testManageDataCollectionProcess</a>

**Table 6–10 (Cont.) Managed Servers in the Oracle Fusion Supply Chain Management**

Managed Server	SSL?	Application URLs
CostManagementServer_1	Yes	<a href="https://hcmscmpbr.host.example.com/costManagement/faces/ItemCostProfileWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ItemCostProfileWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ManageCostElementWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/ManageCostElementWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ManageAnalysisGroupsWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ManageAnalysisGroupsWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ManageComponentGroupWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/ManageComponentGroupWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/CostOrganizationsWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/CostOrganizationsWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/DefaultCostProfileWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/DefaultCostProfileWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/CostElementGroupWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/CostElementGroupWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/RunControlWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/RunControlWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/CostAccountingWorkarea">https://hcmscmpbr.host.example.com/costManagement/CostAccountingWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ManageCostElementWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/ManageCostElementWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/CostProfilesWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/CostProfilesWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ValuationStructureWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ValuationStructureWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/CostProfilesWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/CostProfilesWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ValuationStructureWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ValuationStructureWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/CostProfilesWorkArea">https://hcmscmpbr.host.example.com/costManagement/faces/CostProfilesWorkArea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ExpensePoolWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ExpensePoolWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ValuationUnitsWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ValuationUnitsWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ExpensePoolWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ExpensePoolWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ValuationUnitsWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ValuationUnitsWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ExpensePoolWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ExpensePoolWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ReviewAccountingWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ReviewAccountingWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ReceiptAccountingWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ReceiptAccountingWorkarea</a> <a href="https://hcmscmpbr.host.example.com/costManagement/faces/ReviewDistributionsWorkarea">https://hcmscmpbr.host.example.com/costManagement/faces/ReviewDistributionsWorkarea</a>
Ess_server1	No	
GlobalizationServer_1	Yes	<a href="https://hcmscmpbr.host.example.com/globalization/faces/IntrastatWorkarea">https://hcmscmpbr.host.example.com/globalization/faces/IntrastatWorkarea</a>

**Table 6–10 (Cont.) Managed Servers in the Oracle Fusion Supply Chain Management**

Managed Server	SSL?	Application URLs
LogisticsServer_1	Yes	https://hcmscmppbr.host.example.com/logistics/faces/RcvWorkArea https://hcmscmppbr.host.example.com/logistics/faces/ScmInvWorkArea https://hcmscmppbr.host.example.comlogistics/faces/WshDeliveriesWorkarea
Odi_server1	No	
OrderOrchestrationServer_1	Yes	https://hcmscmppbr.host.example.com/orderOrchestration/faces/ProcessConstraintWorkarea https://hcmscmppbr.host.example.com/orderOrchestration/faces/DooOrchManageProcessDashBoard
ProductManagementServer_1	Yes	https://hcmscmppbr.host.example.com/productManagement/faces/ItemDashboard
SCMCommonServer_1	No	
SCM_PDQ	No	
Soa_server1	No	

**Table 6–11 Managed Servers in the Oracle Fusion Project Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
Ess_server1	No	
ProjectsFinancialsServer_1	Yes	https://hcmprjppbr.host.example.com/projectsFinancials/faces/PRJProjectWorkarea https://hcmprjppbr.host.example.com/projectsFinancials/faces/PrjCostWorkArea https://hcmprjppbr.host.example.com/projectsFinancials/faces/CapitalWorkArea https://hcmprjppbr.host.example.com/projectsFinancials/faces/InvoiceWorkareaUI https://hcmprjppbr.host.example.com/projectsFinancials/faces/RevenueWorkArea https://hcmprjppbr.host.example.com/projectsFinancials/faces/ProjectPerformanceDashboard
Soa_server1	No	

**Table 6–12 Managed Servers in the Oracle Fusion Procurement Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
Ess_server1	No	
ProcurementServer_1	Yes	https://hcmprcppbr.host.example.com/procurement/faces/NegotiationWorkarea https://hcmprcppbr.host.example.com/procurement/faces/PrcPozSuppliersDashboard

**Table 6–12 (Cont.) Managed Servers in the Oracle Fusion Procurement Domain**

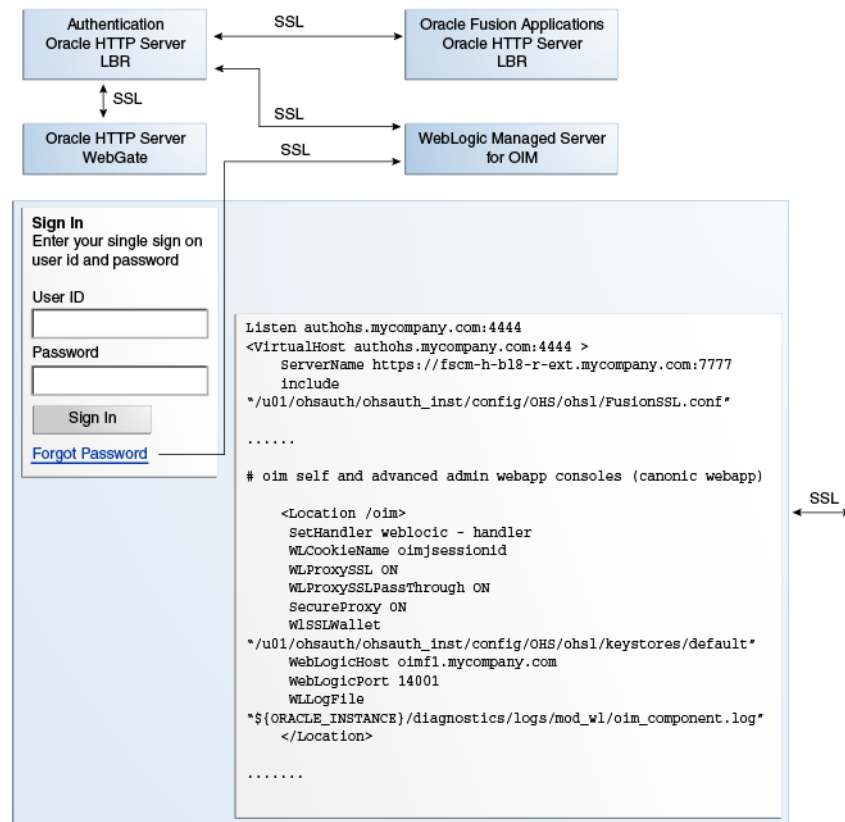
Managed Server	SSL?	Application URLs
Soa_server1	No	
SupplierPortalServer_1	Yes	https://hcmprcppbr.host.example.com/supplierPortal/faces/ /PrcPosSupplierPortalWorkarea

**Table 6–13 Managed Servers in the Business Intelligence Domain**

Managed Server	SSL?	Application URLs
AdminServer	No	
Bi_server1	Yes	https://hcmbippbr.host.example.com/xmlpsserver https://hcmbippbr.host.example.com/analytics https://hcmbippbr.host.example.com/workspace https://hcmbippbr.host.example.com/rtd

### 6.7.3.3 Enabling SSL between Oracle Fusion Applications Domains and IdM Components

As shown by the topology in [Figure 6–6](#), the Authenticating WebGate handles all the authentication requests on Oracle HTTP Server (OHS) host (identified by `authohs.example.com`), which also protects Oracle Identity Manager in the IdM domain. You must SSL-enable this Auth OHS host, communication between the Apps OHS host and the IDM domain, and the Oracle Identity Manager managed server itself using the instructions in this section.

**Figure 6–6 SSL to IdM Components**

This section contains these topics:

- [Section 6.7.3.3.1, "Create the Identity Keystore"](#)
- [Section 6.7.3.3.2, "Configure SSL on the Apps OHS Server on the IdM Domain"](#)
- [Section 6.7.3.3.3, "Configure SSL on the Authentication OHS Server"](#)
- [Section 6.7.3.3.4, "Configure SSL on the Managed Server for Oracle Identity Manager"](#)
- [Section 6.7.3.3.5, "Configure SSL for Oracle Access Manager"](#)

#### 6.7.3.3.1 Create the Identity Keystore

This section explains how to create a new Oracle Identity Manager identity keystore which is required to process incoming requests, and how to export a certificate from the new keystore.

The steps are as follows:

1. Log in to the IdM node as the Oracle Identity Manager administrator.
2. Create a new keystore with a self-signed certificate using the following `keytool` syntax:

```
MW_HOME/jdk6/bin/keytool -genkey -keyalg RSA -alias selfsigned
-keystore /root_dir/Certs/oimkeystore.jks -validity 360 -keysize 1024
```

You will be prompted to specify the keystore password.

Here is an example:

```
[applmgr@myhost u01]$ /u01/oim/jdk6/bin/keytool -genkey -keyalg RSA -alias
selfsigned -keystore /u01/Certs/oimkeystore.jks -validity 360
-keysize 1024
```

```
Enter password: *****
What is your first and last name?
  [Unknown]: Mycorp PPBR
What is the name of your organizational unit?
  [Unknown]: PPBR
What is the name of your organization?
  [Unknown]: Mycorp
What is the name of your City or Locality?
  [Unknown]: Anytown
What is the name of your State or Province?
  [Unknown]: CA
What is the two-letter country code for this unit?
  [Unknown]: CA
Is CN=Mycorp PPBR, OU=PPBR, O=Mycorp, L=Anytown, ST=CA, C=CA correct?
  [no]: yes
```

```
Enter key password for <selfsigned>
  (RETURN if same as keystore password):*****
Re-enter new password: *****
```

3. Export the self-signed certificate from the new keystore using the following keytool syntax:

```
/root_dir/oim/jdk6/bin/keytool -export -v -rfc -alias selfsigned
-keystore /root_dir/Certs/oimkeystore.jks
-file /root_dir/Certs/oimcert.crt -trustcacerts
```

You will be prompted for the keystore password.

For example:

```
/u01/oim/jdk6/bin/keytool -export -v -rfc -alias selfsigned -keystore
/u01/Certs/oimkeystore.jks
-file /u01/Certs/oimcert.crt -trustcacerts
```

```
Enter password: *****
```

```
Certificate stored in file </u01/Certs/oimcert.crt>
```

4. Verify that the certificate is exported:

```
[applmgr@OIM-node-a1 Certs]$ pwd
/u01/Certs
[applmgr@myhost Certs]$ ls -lrt
-rw-r--r-- 1 applmgr dba 1348 Nov 10 23:54 oimkeystore.jks
-rw-r--r-- 1 applmgr dba 833 Nov 10 23:56 oimcert.crt
```

5. Make a note of this certificate as you will need it in the next section for Oracle HTTP Server configuration.

### 6.7.3.3.2 Configure SSL on the Apps OHS Server on the IdM Domain

Take these steps to enable secure communication between the Application Oracle HTTP Server (Apps OHS) and IDM components:

1. Locate the Oracle Fusion Applications Oracle HTTP Server configuration file "APPLTOP/instance/CommonDomain\_

webtier/config/OHS/ohs1/FusionSSL.conf", and copy it to "OHS-Instance/config/OHS/ohs1/".

2. Locate the IDM configuration file "OHS-Instance/config/OHS/ohs1/moduleconf/idm.conf" and copy it to "OHS-Instance/config/OHS/ohs1/moduleconf/idm.ssl.conf".

---

**Note:** Be sure to use the new file name in the target location. Use descriptive file names; for example, you can specify `oam.ssl.conf` to indicate that you are configuring SSL for Oracle Access Manager only.

---

3. Add a `VirtualHost` block to the Oracle Identity Manager configuration file and include the `FusionSSL.conf` file in the block.

4. Modify each `Location` block in the `idm.ssl.conf` (or similar) file as follows:

```
WLProxySSL ON
WLProxySSLPassThrough ON
SecureProxy On
WLSSLWallet "/root_dir/ohsauth/ohsauth_inst/config/OHS/ohs1/keystores/default"
```

5. Modify "`WebLogicPort nnnn`" to point to Oracle Identity Manager's SSL managed server port (several occurrences).

6. After Steps 3 through 5, the configuration file appears like this:

```
## <start> Entries added as part of SSL configuration ##
Listen authohs.company.com:4446

<VirtualHost authohs.company.com:4446>
ServerName https://host.example.com
include "/root_dir/idm/ohsauth/ohsauth_inst1/config/OHS/ohs1/FusionSSL.conf"

## <End> Entries added as part of SSL configuration ##
```

```
# OAM Related Entries
# Admin Server and EM
<Location /console>
SetHandler weblogic-handler
WebLogicHost host.example.com
WebLogicPort nnnn <--- Set to Weblogic Admin SSL Port
WLProxySSL ON
WLProxySSLPassThrough ON
WLCookieName oimjsessionid
WLProxySSL ON
WLProxySSLPassThrough ON
SecureProxy On
WLSSLWallet "/root_dir/idm/ohsauth/ohsauth_
inst1/config/OHS/ohs1/keystores/default"
WLogFile "${ORACLE_INSTANCE}/diagnostics/logs/mod_wl/oam_component.log"

</Location>
```

Only the first of several `Location` blocks is shown in this file fragment. Additional `Location` blocks, for such components as `oamconsole`, Oracle Identity Manager admin consoles, and so on, must be similarly configured.

Note that `root_dir/idm/ohsauth/ohsauth_inst1/config/OHS/ohs1/keystores/default` is the SSL wallet used by OHS (`mod_wl_ohs`) containing the trusted certificate for Oracle Identity Manager server.

7. Create a new CA certificate for signing OHS wallets (Apps OHS and Auth OHS). The steps are as follows (the order of steps is critical when importing the root CA certificate):
  - a. Create an Oracle Wallet with certificates. For details, see the "Common Wallet Operations" section in the *Oracle Fusion Middleware Administrator's Guide*.
  - b. If you intend to use a Certificate Authority (CA) to sign Auth OHS and Apps OHS certificates, you must obtain the signed certificates from the CA. Here is an example of an Oracle Wallet, certificates and related files for a Microsoft CA:

```
[applmgr@myhost Certs]$ pwd
/root_dir/fa/Certs
[applmgr@myhost Certs]$ ls -ltr
total 27
-rw----- 1 applmgr dba 4976 Jan 12 14:51 ewallet.p12
-rw----- 1 applmgr dba 5053 Jan 12 14:51 cwallet.sso
-rw----- 1 applmgr dba 1022 Jan 12 14:51 ohserver01req.csr -->
certificate request
-rw-r--r-- 1 applmgr dba 2392 Jan 24 15:12 signingCA01.cer --> cert1
obtained from authority:Microsoft CA
-rw-r--r-- 1 applmgr dba 1834 Jan 24 15:12 rootca1.cer --> root
(trusted) cert obtained from :Microsoft CA
-rw-r--r-- 1 applmgr dba 2202 Jan 24 15:12 ohsServer.cer --> cert2 obtained
from authority:Microsoft CA
```

Create a Certificate Signing Request (CSR) based on the OHS Oracle Wallet. The CSR is a wildcard certificate as shown in this example:

```
[applmgr@myhost Certs]$ /root_dir/fa/APPLTOP/webtier_mwhome
/oracle_common/bin/orapki wallet display -wallet .
Oracle PKI Tool : Version 11.1.1.5.0
Copyright (c) 2004, 2011, Oracle and/or its affiliates. All rights
reserved.
```

Requested Certificates:

```
Subject:          CN=*.company.com,<your_organization>,O=<your_company>
,L=<your city>,ST=<your State>,C=US
```

User Certificates:

Trusted Certificates:

```
Subject:          OU=Class 1 Public Primary Certification
Authority,O=VeriSign, Inc.,C=US
Subject:          OU=Class 3 Public Primary Certification
Authority,O=VeriSign, Inc.,C=US
Subject:          OU=Class 2 Public Primary Certification
Authority,O=VeriSign, Inc.,C=US
Subject:          CN=GTE CyberTrust Global Root,OU=GTE CyberTrust Solutions,
Inc.,O=GTE Corporation,C=US
```

- c. Import the root CA certificate(s) into the wallet using orapki. For a root certificate file rootca1.cer, for example, the syntax is:

```
/root_dir/fa/APPLTOP/webtier_mwhome/oracle_common/bin/orapki
wallet add -wallet
/root_dir/fa/Certs/
/root_dir/fa/Certs/rootca1.cer -trusted_cert
```

- d. Import the CA's signing certificate into the wallet using orapki. For a signing certificate file signingca01.cer, for example, the syntax is:

```
/root_dir/fa/APPLTOP/webtier_mwhome/oracle_common/bin/orapki
```



```
wallet add -wallet
/root_dir/fa/Certs/
/root_dir/fa/Certs/signingCA01.cer -trusted_cert
```

- e. Import the OHS server certificate. For a certificate file ohsServer.cer, for example, the syntax is:

```
/root_dir/fa/APPLTOP/webtier_mwhome/oracle_common/bin/orapki
wallet add -wallet
/root_dir/fa/Certs/
/root_dir/fa/Certs/ohsServer.cer -user_cert
```

- f. Check the wallet using orapki:

```
/root_dir/fa/APPLTOP/webtier_mwhome/oracle_common/bin/orapki
wallet display -wallet .
Oracle PKI Tool : Version 11.1.1.5.0
Copyright (c) 2004, 2011, Oracle and/or its affiliates. All rights
reserved.
```

Requested Certificates:

User Certificates:

**Subject:** CN=\*.company.com,OU=<your\_organization>,O=<your\_company>  
,L=<your\_city>,ST=<your\_state>,C=US

Trusted Certificates:

**Subject:** CN=rootca1 <----- The root CA as a trusted cert

Subject: OU=Class 1 Public Primary Certification

Authority,O=VeriSign\, Inc.,C=US

Subject: CN=GTE CyberTrust Global Root,OU=GTE CyberTrust Solutions\  
Inc.,O=GTE Corporation,C=US

**Subject:** CN=signingCA,DC=company,DC=com <----- The signing CA  
as a trusted cert

Subject: OU=Class 3 Public Primary Certification

Authority,O=VeriSign\, Inc.,C=US

Subject: OU=Class 2 Public Primary Certification

Authority,O=VeriSign\, Inc.,C=US

- g. Check the listing of wallet files:

```
[applmgr@myhost Certs]$ pwd
/root_dir/fa/Certs/
[applmgr@myhost Certs]$ ls -ltr
total 60
-rw-r--r-- 1 applmgr dba 2392 Jan 24 15:12 myca01.cer
-rw-r--r-- 1 applmgr dba 1834 Jan 24 15:12 rootca1.cer
-rw-r--r-- 1 applmgr dba 2202 Jan 24 15:12 ohsServer.cer
-rw----- 1 applmgr dba 9816 Jan 24 23:15 ewallet.p12 <-- newly updated
-rw----- 1 applmgr dba 9893 Jan 24 23:50 cwallet.sso <-- newly updated
```

As shown here, both the required wallet files (ewallet.p12 and cwallet.sso) should have updated date stamps; they will be used for Apps OHS and Auth OHS.

8. Restart the Oracle HTTP Server:

```
[applmgr@myhost bin]$ pwd
/root_dir/fa/APPLTOP/instance/CommonDomain_webtier/bin
[applmgr@myhost bin]$ ./opmnctl stopall
opmnctl stopall: stopping opmn and all managed processes...
[applmgr@myhost bin]$ ./opmnctl startall
opmnctl startall: starting opmn and all managed processes...
```

9. Verify that a virtual server is running on the SSL port you configured:

```
OHS_instance/bin/opmnctl status -l
Processes in Instance: CommonDomain_webtier
-----+-----+-----+-----+-----+-----
ias-component | process-type | pid | status | uptime | ports
-----+-----+-----+-----+-----+-----
ohs1          | OHS          | 20088 | Alive  | 0:02:59 |
http:10621,https:10622,http:10615,https:10616,http:10605,https:10606,http:10617
,https:10618,http:10623,https:10624,https:7046,https:10604,http:10603
```

10. Repeat Steps 1 through 10 for any additional Apps OHS servers.

### 6.7.3.3.3 Configure SSL on the Authentication OHS Server

Take these steps to enable SSL on the Authentication Oracle HTTP Server (Auth OHS):

1. Replace the existing wallet files.
  - a. Navigate to the wallet directory located at `/root_dir/idm/ohsauth/ohsauth_inst1/config/OHS/ohs1/keystores/default`.
  - b. Move the existing `cwallet.sso` and `ewallet.p12` files to a backup location.
  - c. Copy over the new `cwallet.sso` and `ewallet.p12` files. For example:

```
[applmgr@myhost default]$ scp -p
applmgr@myhost:/root_dir/fa/Certs/cwallet.sso
/root_dir/idm/ohsauth/ohsauth_inst1/config/OHS/ohs1/keystores/default
applmgr@myhost's password:
cwallet.sso
100% 9893    9.7KB/s  00:00
[applmgr@myhost default]$ scp -p
applmgr@myhost:/root_dir/fa/Certs/ewallet.p12
/root_dir/idm/ohsauth/ohsauth_inst1/config/OHS/ohs1/keystores/default
applmgr@myhost's password:
ewallet.p12
100% 9816    9.6KB/s  00:00
[applmgr@myhost default]$
```

2. Import the certificate for the Oracle Identity Manager's managed server as a trusted certificate, `oimcert.crt`, into the default Auth OHS wallet:

- a. Confirm that `/root_dir/idm/Certs/oimcert.crt` is also accessible from the IDM node.
- b. List the contents of the `cwallet.sso` file for Auth OHS using `orapki`:

```
[applmgr@myhost default]$ /root_dir/idm/oim/oracle_common/bin/orapki
wallet display -wallet .
```

- c. Add the Oracle Identity Manager certificate, `oimcert.crt`, to the Auth OHS SSL wallet:

```
[applmgr@myhost default]$ /root_dir/idm/oim/oracle_common/bin/orapki
wallet add -wallet
/root_dir/idm/ohsauth/ohsauth_inst1/config/OHS/ohs1/keystores/default
-cert /root_dir/idm/Certs/oimcert.crt -trusted_cert
```

A listing of the directory shows the updated files:

```
[applmgr@myhost default]$ ls -ltr
total 23
drwxr-xr-x 2 applmgr dba    3 Jan 25 12:28 backup
```



3. Copy these certificates from the Apps OHS node to the node where the managed server for Oracle Identity Manager resides.

4. Set the environment as shown in this example:

```
[applmgr@myhost ~]$ export ORACLE_HOME=/root_dir/idm/oim/oim_home
[applmgr@myhost ~]$ export OIM_ORACLE_HOME=/root_dir/idm/oim/oim_home
[applmgr@myhost ~]$ export SOA_HOME=/root_dir/idm/oim/soa_home
[applmgr@myhost ~]$ export DOMAIN_HOME=/root_dir/idm/oim
/user_projects/domains/idm_domain
```

5. Create the trust store with the OHS server's CA chain using the keytool command. For example:

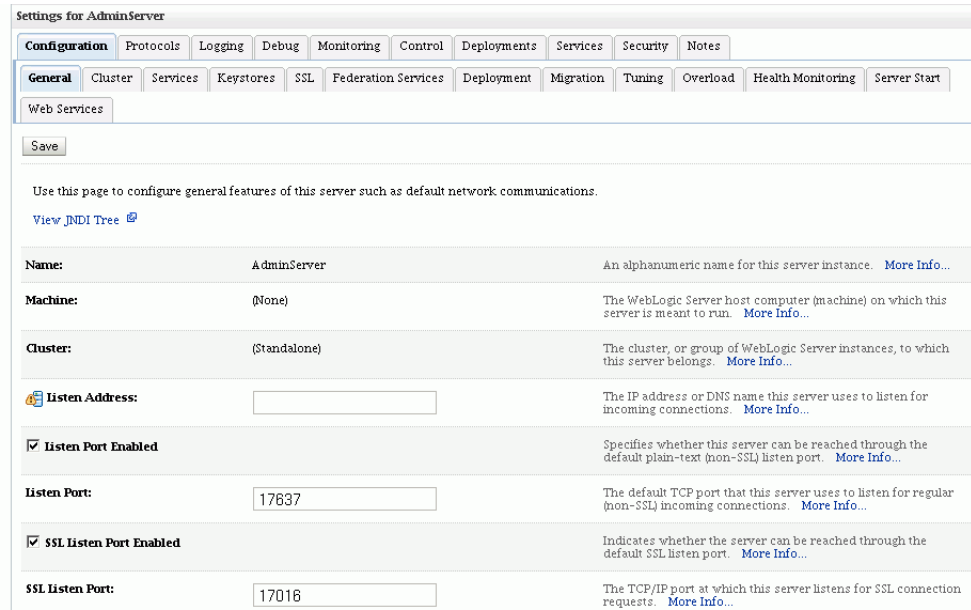
```
[applmgr@myhost Certs]$ /root_dir/idm/oim/jrockit-jdk1.6.0_24/bin/keytool
-import -v
-alias authohs.host.example.com
-keystore /root_dir/idm/Certs/trustkeystore.jks
-file //root_dir/idm/Certs/rootca1.cer -trustcacerts
```

```
[applmgr@myhost Certs]$ /root_dir/idm/oim/jrockit-jdk1.6.0_24/bin/keytool
-import -v
-alias authohs.host.example.com
-keystore /root_dir/idm/Certs/trustkeystore.jks
-file //root_dir/idm/Certs/signingCA1.cer -trustcacerts
```

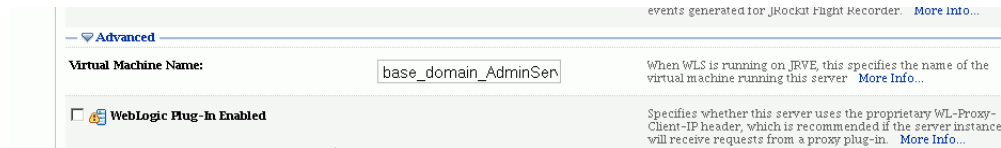
6. Confirm the new keystore is created:

```
[applmgr@myhost Certs]$ pwd
/root_dir/idm/Certs
[applmgr@myhost Certs]$ ls -ltr
total 9
-rw-r--r-- 1 applmgr dba 1349 Jan 24 13:39 oimkeystore.jks
-rw-r--r-- 1 applmgr dba 833 Jan 24 13:49 oimcert.crt
-rw----- 1 applmgr dba 2161 Jan 25 18:10 rootca1.cer
-rw----- 1 applmgr dba 2161 Jan 25 18:10 signingCA1.cer
-rw-r--r-- 1 applmgr dba 1636 Jan 25 19:12 trustkeystore.jks
```

7. Log in to the WebLogic domain console as the "oim\_admin" user.
8. Navigate to **Environment**, then **Servers**, then oim\_server1. Click the **Configuration** tab, then **General**.
9. Check the "SSL Listen Port Enabled" box and provide an SSL port, as in this example:



10. Scroll down to the Advanced portion of the page. Check the "WebLogic Plug-In Enabled" box:



11. Navigate to **Environment**, then **Servers**, then `oim_server1`, then **Configuration**, then **Keystores**. Here you will change the keystore type from "Demo Identity Demo Trust" to "Custom Identity Custom Trust".

12. Provide the keystore details as in this example:

For identity:

Custom Identity Keystore: `/root_dir/idm/Certs/oimkeystore.jks`  
 Custom Identity Keystore Type: `jks`

For trust:

Custom Trust Keystore: `/root_dir/idm/Certs/trustkeystore.jks`  
 Custom Trust Keystore Type: `jks`

13. Navigate to **Environment**, then **Servers**, then `oim_server1`, then **Configuration**, then **SSL**.

14. Provide the alias for the private key:

Private Key Alias: `selfsigned`

15. Save the changes.

16. Restart Oracle WebLogic Server if prompted to do so by the server.

### 6.7.3.3.5 Configure SSL for Oracle Access Manager

This section provides background for configuring 10g WebGates and the Oracle Access Manager server for secure communication.

You must provision a WebGate agent to use Oracle Access Manager 11g authentication and authorization services. After installation and registration, Oracle Access Manager 10g WebGates directly communicate with Oracle Access Manager 11g servers through a JAVA-based Oracle Access Manager proxy.

In Oracle Access Manager 11g, credential collection occurs using the HTTP(S) channel; authorization occurs over the NetPoint Access Protocol (NAP) channel, which is also referred to as the Oracle Access Manager Protocol (OAP) channel.

Securing communication between Oracle Access Manager servers and WebGate agents means defining the transport security mode for the NAP channel. There are two options for SSL communication between Oracle Access Manager 11g and Webgate 10g: Simple Mode and Cert Mode.

Oracle recommends enabling the secure sockets layer (SSL) for communication across the HTTP(S) channel to transport credentials and to exchange security tokens. Both functions require signing or encryption with certificates. Oracle Access Manager 11g provides a central facility to manage certificates used across all Oracle Access Manager components, including WebGates.

For WebGate configuration details, see the "Provisioning a 10g WebGate with OAM 11g" section in the *Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager*.

To configure SSL for the NAP channel to Oracle Access Manager 11g, see the "Securing Communication for Oracle Access Manager 11g" section in the *Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager*.

#### **6.7.3.4 Known Issues**

This section lists known issues with the SSL configurations described in this document. This section contains these topics:

- [Section 6.7.3.4.1, "Oracle Access Manager Operation Error"](#)
- [Section 6.7.3.4.2, "SSL connection Error"](#)
- [Section 6.7.3.4.3, "Issue 3: Webpage Not Available Error"](#)

##### **6.7.3.4.1 Oracle Access Manager Operation Error**

###### **Problem**

In Google Chrome, attempt to access the Benefits Server URL:  
`https://hcmppbr.host.example.com/hcmBenefits/faces/HcmBenefitsProcessesAdministerBenefitsWorkArea` displays SSL Warning. Upon clicking on "Continue Any Way", returns message:

```
Oracle Access Manager Operation Error
-----
The credentials
(Resource=/hcmBenefits/faces/HcmBenefitsProcessesAdministerBenefitsWorkArea
RequesterIP=141.147.0.3 HostTarget=https://hcmppbr.domain.com Operation=GET) used
in the login do not correspond to a user profile in the Identity System.
```

This issue is likely due to an authentication problem such as invalid credentials.

###### **Solution**

Contact your website administrator to remedy this problem.

##### **6.7.3.4.2 SSL connection Error**

**Problem**

Attempt to connect to Access Server URL: `https://hcmssoppbr.domain.com/` returns error:

```
SSL connection error
Unable to make a secure connection to the server. This may be a problem with the
server, or it may be requiring a client authentication certificate that you don't
have.
Error 107 (net::ERR_SSL_PROTOCOL_ERROR): SSL protocol error.
```

This issue is due to a configuration mismatch between client and server configurations.

**Solution**

Check for configuration issues such as mismatched authentication modes between client and server.

**6.7.3.4.3 Issue 3: Webpage Not Available Error****Problem**

Attempts to log in to URL:

`https://hcmfinppbr.domain.com/financialCommon/faces/LegalEntityDashboard`  
result in this error message:

```
This webpage is not available
Google Chrome's connection attempt to hcmfinppbr.host.example.com was rejected.
The website may be down, or your network may not be properly configured.
```

```
Issue: Direct URL to Benefits server:
https://myhost.example.com:10620/hcmBenefits/faces/HcmBenefitsProcessesAdministerB
enefitsWorkArea
```

**Report error:**

```
[2011-10-11T15:44:20.1733-04:00] [OHS] [INCIDENT_ERROR:32] [OHS-2171] [core.c]
[host_id: myhost] [host_addr: 10.200.12.63] [pid: 31977] [tid: 1425013056] [user:
applmgr] [VirtualHost: hcmsscppbr.domain.com:0] NZ Library Error: SSL protocol
error [Hint: the client probably speaks HTTPS over HTTP protocol]
```

From the Oracle HTTP Server error log in  
`/root_dir/ohsauth/ohsauth_inst/diagnostics/logs/OHS/ohs1/ohs1.log:`

```
[2011-10-11T16:08:34.3706-04:00] [OHS] [INCIDENT_ERROR:32] [OHS-2171] [core.c]
[host_id: myhost] [host_addr: 10.200.12.61] [pid: 28467] [tid: 1349544256] [user:
applmgr] [VirtualHost: hcmcrplsso.domain.com:0] NZ Library Error: SSL fatal alert
```

This problem occurs when the browser gets two SSL certificates with the same serial key. Mozilla Firefox shows this message:

```
Secure Connection Failed
...
...
Your certificate contains the same serial number as another certificate issued by
the certificate authority.
...
```

**Solution**

Take these steps to manually delete and recreate the Oracle Identity Manager trust key store with a new certificate (substitute actual paths for the samples shown here):

```

/root_dir/oim/jdk6/bin/keytool -list -keystore /root_dir/Certs/oimkeystore.jks
/root_dir/oim/jdk6/bin/keytool -list -keystore /root_dir/Certs/oimkeystore.jks -v
/root_dir/oim/jdk6/bin/keytool -list -keystore /root_dir/Certs/trustkeystore.jks
-v

/root_dir/oim/jdk6/bin/keytool -delete -keystore trustkeystore.jks -alias
authhsoim.example.com
/root_dir/oim/jdk6/bin/keytool -delete -keystore trustkeystore.jks -alias
authhsoim2.example.com
/root_dir/oim/jdk6/bin/keytool -import -keystore trustkeystore.jks -alias
authhsoim.example.com -file <location of cert.txt> -rfc
    
```

### 6.7.4 Checklist of SSL Connections for IdM Components

This section contains checklists of the SSL connections required by the various IdM components that can operate within the Oracle Fusion Applications environment.

For each component, there is a table listing the server, inbound client connections to that server, and outbound clients from the server, with links to the SSL configuration details for each path.

Table 6–14 shows the connections for Oracle Internet Directory:

**Table 6–14 Connections for Oracle Internet Directory**

Server Component	Inbound Clients to Server	Outbound Clients from Server
Oracle Internet Directory - See the "Enabling SSL on Oracle Internet Directory Listeners" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .	Oracle Identity Manager - See the "Enabling SSL for LDAP Synchronization" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager</i> .	Database - See the "Enabling Outbound SSL from Oracle Internet Directory to Oracle Database" section in the <i>Oracle Fusion Middleware Administrator's Guide</i>
	Oracle Access Manager - See the "Outbound SSL from LDAP Authenticator to LDAP" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .	



**Table 6–14 (Cont.) Connections for Oracle Internet Directory**

Server Component	Inbound Clients to Server	Outbound Clients from Server
	Oracle Directory Integration Platform - See the "Configuring Oracle Directory Integration Platform for SSL Mode 2 Server-Only Authentication" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Directory Integration Platform</i> .	
	Oracle Directory Services Manager - See the "Logging Into the Directory Server from Oracle Directory Services Manager Using SSL" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Internet Directory</i> .	
	Oracle Enterprise Manager - See the "Oracle Enterprise Manager Fusion Middleware Control" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .	

Table 6–15 shows the connections for Oracle Virtual Directory:

**Table 6–15 Connections for Oracle Virtual Directory**

Server Component	Inbound Clients to Server	Outbound Clients from Server
Oracle Virtual Directory - See the "Enabling SSL on Oracle Virtual Directory Listeners" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Virtual Directory</i> .	Oracle Identity Manager - See the "Enabling SSL for LDAP Synchronization" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager</i> .	LDAP - See the "Configuring LDAP Adapters" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Virtual Directory</i> .

Table 6–16 shows the connections for Oracle Access Manager:

**Table 6–16 Connections for Oracle Access Manager**

Server Component	Inbound Clients to Server	Outbound Clients from Server
Oracle Access Manager - <a href="#">Section 6.7.3.3.5, "Configure SSL for Oracle Access Manager"</a>	WebGate - See the "Configuring Cert Mode Communication for OAM 11g" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager with Oracle Security Token Service</i> .	Oracle Internet Directory - See the "Enable Inbound SSL on an Oracle Internet Directory Listener Using Fusion Middleware Control" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .
	mod_wl_ohs - See the "Enable SSL for Outbound Requests from Oracle HTTP Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .	Oracle Virtual Directory - See the "Enable SSL for Oracle Virtual Directory Using Fusion Middleware Control" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .

Table 6–17 shows the connections for Oracle Identity Manager:

**Table 6–17 Connections for Oracle Identity Manager**

Server Component	Inbound Clients to Server	Outbound Clients from Server
Oracle Identity Manager - See Section 6.7.3.3.4, "Configure SSL on the Managed Server for Oracle Identity Manager". Also see the "Enabling SSL for Oracle Identity Manager By Using Default Setting" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager</i> .	OHS through mod_wl_ohs - See the "Enable SSL for Outbound Requests from Oracle HTTP Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> .  SOA through SPML - See the "Changing OimFrontEndURL to Use SSL Port" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager</i> .	SOA managed server - See the "Enabling SSL for Oracle Identity Manager and SOA Servers" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Manager</i> .

Table 6–18 shows the connections for Oracle Identity Federation:

**Table 6–18 Connections for Oracle Identity Federation**

Server Component	Inbound Clients to Server	Outbound Clients from Server
Oracle Identity Federation - See the "Configuring Oracle Identity Federation as an SSL Server" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Federation</i> .	Oracle WebLogic Server - See the "Configuring Oracle WebLogic Server" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Federation</i> .	LDAP Server - See the "Connecting to an LDAP Server over SSL" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Identity Federation</i> .

Table 6–19 shows the connections for Oracle HTTP Server (OHS):

**Table 6–19 Connections for Oracle HTTP Server**

Server Component	Inbound Clients to Server	Outbound Clients from Server
OHS Server in Apps Domain - Section 6.7.3.2.2, "Enabling SSL on the Oracle HTTP Server for the Oracle Fusion Applications domain"  Auth OHS - Section 6.7.3.3.3, "Configure SSL on the Authentication OHS Server"	Section 6.7.3.2.4, "mod_ossl Directives for Inbound SSL Configuration to Oracle HTTP Server"	Applications OHS - Section 6.7.3.3.2, "Configure SSL on the Apps OHS Server on the IdM Domain"

## 6.7.5 Additional SSL Configuration

Besides the connections that are SSL-enabled during provisioning, there are additional connections in the Oracle Fusion Applications environment that can be SSL-enabled. For example, you can secure traffic to Oracle Database.

This section contains the following topics:

- [Section 6.7.5.1, "SSL-enable Oracle Business Intelligence"](#)
- [Section 6.7.5.2, "SSL-enable Oracle WebCenter Content"](#)
- [Section 6.7.5.3, "SSL to External Web Services"](#)

### 6.7.5.1 SSL-enable Oracle Business Intelligence

You can configure the components of Oracle Business Intelligence to communicate over SSL.

For configuration details, see "SSL Configuration in Oracle Business Intelligence" chapter in the *Oracle Fusion Middleware Security Guide for Oracle Business Intelligence Enterprise Edition*.

### 6.7.5.2 SSL-enable Oracle WebCenter Content

You can configure SSL for Oracle WebCenter Content applications running in a production or development environment.

For configuration details, see "Configuring SSL for Oracle WebCenter Content Applications" section in the *Oracle WebCenter Content Installation Guide*.

### 6.7.5.3 SSL to External Web Services

For information about securing Oracle Fusion Web Services, see the following:

- "Locking Down Web Services: Points to Consider" section in the *Oracle Fusion Applications Security Hardening Guide*
- "Hardening Web Services" section in the *Oracle Fusion Applications Security Hardening Guide*

## 6.7.6 Enabling Secure Sockets Layer on ECSF

Enable Secure Sockets Layer (SSL) on ECSF to secure all connections that transmit passwords. These include connections to Oracle WebLogic Server, the ECSF servlet, and the Oracle SES server.

To enable SSL for ECSF, perform the following tasks:

- [Task 1, "Generate a Certificate for the Oracle WebLogic Server Instance"](#)
- [Task 2, "Enabling SSL on the Oracle WebLogic Server Instance"](#)
- [Task 3, "Add the Oracle WebLogic Server's Certificate to Oracle SES's Trust Store"](#)
- [Task 4, "Enabling SSL for Oracle SES Services"](#)
- [Task 5, "Configure Search Engine Instances to Use SSL"](#)

### Task 1 Generate a Certificate for the Oracle WebLogic Server Instance

A certificate that contains the public key of the Oracle WebLogic Server instance hosting ECSF must be generated. This can be either a CA-signed certificate or a self-signed server certificate.

For information about how to generate the certificate, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

As described later (Task 3), if this is a self-signed certificate, then it must be imported to Oracle SES's truststore. If it is a CA-signed certificate, it likely already exists in the truststore; if not, you must import the CA certificate into Oracle SES's truststore.

## Task 2 Enabling SSL on the Oracle WebLogic Server Instance

Enabling SSL connections on the Oracle WebLogic Server instance, on which the ECSF application is running, secures the ECSF servlet connections used to access the feeds and the security service. For more information, see the "Configuring SSL" chapter in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

To enable SSL on Oracle WebLogic Server:

1. Configure SSL.
  - Select the server on which the ECSF application is running.
  - Make sure that the **Allow Unencrypted Null Cipher** checkbox is deselected (default).
2. Configure the listen ports to enable the SSL listen port (check the **SSL Listen Port Enabled** checkbox).

---

**Note:** The SSL Listen Port is usually set as 7002. You can use this port number to access the ECSF servlet through SSL (for example `https://mywlserver.host.com:7002/approot/searchfeedservlet/ConfigFeed`). Also note that the protocol in the URL must be `https`.

---

3. Save your changes.

## Task 3 Add the Oracle WebLogic Server's Certificate to Oracle SES's Trust Store

When Oracle SES initiates SSL connections to ECSF, the Oracle WebLogic Server instance on which the ECSF Servlet is running sends a digital certificate containing its public key to Oracle SES. If this certificate is a self-signed certificate, then the certificate must be extracted from Oracle WebLogic Server and added to Oracle SES's trust store. (If a CA certificate, ensure that it exists in the SES trust store.) For more information about adding the certificate to the trust store, see the *Oracle Secure Enterprise Search Administrator's Guide*.

To add the Oracle WebLogic Server certificate to the Oracle SES trust store:

1. Use the `keytool` utility (located in `ORACLE_HOME/jdk/bin`) to export the Oracle WebLogic Server's certificate from the keystore, for example:

```
keytool -export -alias weblogic -keystore JAVA_
HOME/jre/lib/security/cacerts -file /temp/weblogic.cer
```

where Oracle WebLogic Server's certificate, located in the keystore at `JAVA_HOME/jre/lib/security/cacerts`, is exported to the `weblogic.cer` file in the `/temp` directory; this file now contains the server's certificate.

2. Navigate to the Oracle SES installation directory, and use `keytool` to import the Oracle WebLogic Server's certificate into the Oracle SES keystore, for example:

```
keytool -import -alias weblogic -file weblogic.cer -keystore ORACLE_
HOME/jdk/jre/lib/security/cacerts
```

where Oracle WebLogic Server's certificate in the `weblogic.cer` file is imported into the Oracle SES keystore at `ORACLE_HOME/jdk/jre/lib/security/cacerts`.

## Task 4 Enabling SSL for Oracle SES Services

You must also enable SSL on Oracle SES Query and Admin Services. For more information about how to enable SSL, see *Oracle Secure Enterprise Search Administrator's Guide*.

Since the Oracle SES server's certificate has not been signed by a reputable certificate authority (CA) but instead is a self-signed certificate, you must extract the certificate from Oracle SES and add it to both Oracle WebLogic Server's trust store and ECSF Command Line Administration Utility's trust store using these steps:

1. Use `keytool` to add the extracted Oracle SES server's certificate to the trust store that Oracle WebLogic Server is configured to use, for example:

```
keytool -import -alias oses -file oses.cer -keystore WLS_keystore
```

where Oracle SES server's certificate in the `oses.cer` file is imported into `WLS_keystore`, which is the keystore that Oracle WebLogic Server is configured to use.

2. Add the extracted Oracle SES server's certificate to ECSF Command Line Administration Utility's trust store by modifying the `runCmdLineAdmin.bat` and `runCmdLineAdmin.sh` scripts, located in `ORACLE_HOME/jdeveloper/ecsfc`, so that `JAVA_HOME` points to the path of the keystore that Oracle WebLogic Server is using.

### Task 5 Configure Search Engine Instances to Use SSL

After SSL is enabled, you must reconfigure the search engine instance parameters that contain URLs that point to the ECSF server. These parameters are `ECSF_DATA_SERVICE`, `ECSF_SECURITY_SERVICE`, and `ECSF_REDIRECT_SERVICE`.

The protocol must change from `http` to `https`, and the `http` port must change from 7101 to 7002, the SSL port. For example, you need to change `http://wlsserver.com:7101/approot/searchfeedservlet` to `https://wlsserver.com:7002/approot/searchfeedservlet`.

You must also reconfigure the search engine instance parameters that contain URLs that point to the Oracle SES server. These parameters are `SES_ADMIN_SERVICE` and `SES_QUERY_SERVICE`.

The protocol must change from `http` to `https`. For example, you need to change `http://sesserver.com:7777/search/api/admin/AdminService` to `https://sesserver.com:7777/search/api/admin/AdminService`. You do not need to change the port number because the instructions will switch the current port to be an SSL port instead of adding a separate SSL port.

You can use Fusion Applications Control to configure the engine instance parameters. For information, see [Section 9.5.3.2](#).

## 6.8 Managing Wallets, Keystores, Credentials, and Certificates

Enabling SSL requires the use of several security artifacts such as certificates and keys, as well as the containers (keystores) where they are stored. Oracle Fusion Middleware provides several tools to create and maintain these artifacts.

This section contains the following topics:

- [Section 6.8.1, "Wallets and Keystores"](#)
- [Section 6.8.2, "Management Tools"](#)
- [Section 6.8.3, "Managing Wallets and their Contents"](#)
- [Section 6.8.4, "Managing Keystores and their Contents"](#)
- [Section 6.8.5, "Managing Credentials"](#)
- [Section 6.8.6, "Updating Certificates with the Certificate Renewal Utility"](#)
- [Section 6.8.5.3, "Changing Oracle Identity Management Passwords"](#)

## 6.8.1 Wallets and Keystores

Oracle Fusion Middleware provides various types of repositories for keys and certificates:

- [Section 6.8.1.1, "JKS Keystore and Truststore"](#)
- [Section 6.8.1.2, "Oracle Wallet"](#)
- [Section 6.8.1.3, "OPSS Keystore and Truststore"](#)

For more information about wallets and keystores, see "Types of Keystores" in *Oracle Fusion Middleware Administrator's Guide*.

### 6.8.1.1 JKS Keystore and Truststore

A JKS keystore is the default JDK implementation of Java keystores. In 11g Release 1 (11.1.1), some Java components and Java EE applications use the JKS-based keystore and truststore.

### 6.8.1.2 Oracle Wallet

An Oracle wallet is a type of keystore or container that stores your credentials, such as certificates, trusted certificates, certificate requests, and private keys. You can store Oracle wallets on the file system or in LDAP directories such as Oracle Internet Directory.

In the Oracle Fusion Applications environment, Oracle wallets are used by Oracle HTTP Server, LDAP clients, and SQL\*net clients.

When creating a wallet, you can pre-populate it with a self-signed certificate. Such a wallet is called a test wallet and is typically used in development and testing phases.

You can also create a certificate request and request a signed certificate back from a Certificate Authority (CA). After the CA sends the certificate back it is imported into the wallet. Such a wallet is called a third-party wallet.

For more information about creating and managing wallets, see the "Wallet Management" section in the *Oracle Fusion Middleware Administrator's Guide*.

### 6.8.1.3 OPSS Keystore and Truststore

The OPSS Keystore Service enables you to manage keys and certificates for SSL, message security, encryption, and related tasks. You use the Keystore Service to create and maintain keystores that contain keys, certificates, and other artifacts.

In the Oracle Fusion Applications environment, you use the Keystore Service when configuring remote taskflows and for operational planning. For details about configuring keys for cross-domain application, see the "Migrating Keystore Service Artifacts" section in the *Oracle Fusion Middleware Application Security Guide*.

### 6.8.1.4 Keystore Types Used by Products

[Table 6–20](#) shows the type of keystore used by various products:

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**Note:** This is a representative list only.

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**Table 6–20 Keystore Types for Products**

Product	Type of Keystore Used
Oracle HTTP Server	Oracle Wallet
Oracle Internet Directory	Oracle Wallet
Oracle Virtual Directory	JKS-based Keystore
Oracle WebLogic Server	JKS-based Keystore, KSS-based keystore
Oracle SES Services	JKS-based Keystore
Oracle ECM	JKS-based Keystore
Oracle Business Intelligence	JKS-based Keystore

See [Section 6.8.2](#) for a survey of common tools used to create and manage keystores. See the SSL references in [Section 6.7](#) for the keystore management tools used by individual products.

## 6.8.2 Management Tools

Oracle Fusion Middleware provides these tools for keystore operations:

- WLST, a command-line interface for JKS keystores, KSS keystores, and wallets
- orapki, a command-line tool for wallets
- Fusion Middleware Control, a graphical user interface for both JKS and KSS keystores
- Oracle Wallet Manager, a stand-alone GUI tool for wallets, recommended for managing PKCS#11 wallets
- the `keytool` utility

For more information about these management tools, see the "Keystore Management Tools" section in the *Oracle Fusion Middleware Administrator's Guide*.

## 6.8.3 Managing Wallets and their Contents

When working with certificates and the wallets in which they are stored, you must be aware of the operations that can be performed on these objects in the course of routine administration:

- [Section 6.8.3.1, "Wallet Lifecycle"](#)
- [Section 6.8.3.2, "Wallet Operations"](#)
- [Section 6.8.3.3, "Certificate Lifecycle"](#)
- [Section 6.8.3.4, "Certificate Operations"](#)

### 6.8.3.1 Wallet Lifecycle

Typical life cycle events for an Oracle wallet are as follows:

- The wallet is created. Wallets can be created directly, or by importing a wallet file from the file system.
- The list of available wallets is viewed and specific wallets are selected for update.
- Wallets are updated or deleted. Update operations for password-protected wallets require that you enter the wallet password.

- The wallet password can be changed for password-protected wallets.
- The wallet can be deleted.
- Wallets can be exported and imported.

### 6.8.3.2 Wallet Operations

Typical operations for the Oracle Wallet include the following:

- Creating wallets, including auto-login, self-signed, and password-protected wallets
- Changing a self-signed wallet to a third-party wallet

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**Note:** Third-party wallets contains certificates signed by a trusted Certificate Authority (CA).

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- Exporting and importing wallets to and from the file system
- Deleting a wallet.

### 6.8.3.3 Certificate Lifecycle

The following provides a summary of the steps in a certificate's lifecycle:

1. Create an empty wallet (that is, a wallet that does not contain a certificate request).
2. Add a certificate request to the wallet.
3. Export the certificate request.
4. Use the certificate request to obtain the corresponding certificate.
5. Import trusted certificates.
6. Import the certificate.

### 6.8.3.4 Certificate Operations

Common certificate operations include:

- Creating a certificate request
- Exporting a Certificate, Certificate Request, or a Trusted Certificate
- Importing a Certificate or a Trusted Certificate
- Deleting a Certificate Request, a Certificate, or a Trusted Certificate
- Converting a Self-Signed Certificate into a Third-Party Certificate.

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**Note:** Third-party certificates are signed by a trusted Certificate Authority (CA).

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## 6.8.4 Managing Keystores and their Contents

When working with JKS certificates and the keystores in which they are stored, you must be aware of the operations that can be performed on these objects in the course of routine administration:

- [Section 6.8.4.1, "Keystore Lifecycle"](#)
- [Section 6.8.4.2, "Keystore Operations"](#)



- [Section 6.8.4.3, "Certificate Lifecycle"](#)
- [Section 6.8.4.4, "Certificate Operations"](#)

#### 6.8.4.1 Keystore Lifecycle

Typical life cycle events for a JKS keystore are as follows:

- The keystore is created. Keystores can be created directly, or by importing a keystore file from the file system.
- The list of available keystores are viewed and specific keystores selected for update.
- Keystores are updated or deleted. Update operations require that the keystore password be entered.
- The keystore password can be changed.
- The keystore can be deleted.
- Keystores can be exported and imported.

#### 6.8.4.2 Keystore Operations

Typical keystore operations include the following:

- Creating or updating a keystore.
- Exporting and importing keystores.
- Deleting a keystore.
- Changing the keystore password.

#### 6.8.4.3 Certificate Lifecycle

Typical life cycle events for a certificate residing in a keystore are as follows:

- A self-signed certificate is automatically created for the keypair.
- A certificate signing request (CSR) is generated, and can then be exported to a file.
- Certificates are imported into the keystore. You can import both user certificates and trusted certificates (also known as CA certificates) in this way.
- Certificates or trusted certificates are exported from the keystore out to a file.
- Certificates or trusted certificates are deleted from the keystore.

#### 6.8.4.4 Certificate Operations

Common operations on JKS certificates include the following:

- Generating a new key (that is, a new self-signed certificate) for a keystore.
- Generating a certificate signing request.
- Importing/exporting a certificate or trusted certificate into/from a keystore.
- Deleting a certificate or trusted certificate from a keystore.

### 6.8.5 Managing Credentials

In Oracle Fusion Applications, user and role information such as passwords are maintained in a domain credential store. The tools you use to update existing

passwords (for routine administration or regulatory compliance), depend on the type of credentials:

- **WebLogic data sources**

These objects contain properties such as the URL or user name and password. Application components use data sources to obtain connections to a relational database.

You can create and manage JDBC data sources using the administration tools provided with Oracle WebLogic Server. For more information about managing data sources, see *Oracle Fusion Middleware Configuring and Managing JDBC Data Sources for Oracle WebLogic Server* and the "Configure JDBC data sources" topic in *Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help*.

- **Application-specific credentials**

These credentials provide access to different components of your application. An example is the credential associated with the designated super-user.

Application credentials are maintained through Fusion Middleware Control or Oracle WebLogic Scripting Tool (WLST). For details, see the "Managing the Credential Store" topic in the *Oracle Fusion Middleware Application Security Guide*.

This section contains the following topics:

- [Section 6.8.5.1, "Changing App ID Passwords"](#)
- [Section 6.8.5.2, "Changing the Oracle Fusion Middleware Administrative User Password"](#)

### **6.8.5.1 Changing App ID Passwords**

When invoking Web services, Oracle Fusion Applications must rely on a type of credential known as the Application ID or App ID. Each application has its own App ID which is initially provisioned for the application.

For information about resetting App ID passwords (a task typically done during scheduled downtime), see the Application Identity Password Reset And Password Policy Management section in the *Oracle Fusion Applications Security Guide*.

### **6.8.5.2 Changing the Oracle Fusion Middleware Administrative User Password**

During the Oracle Fusion Applications installation, you must provide a password for the Oracle Fusion Middleware administration user. By default, this administrator takes the Super User value you specified on the Identity Management page when creating the provisioning plan. The password is the one specified when adding the user to the identity store.

Then, you can use this account to log in to Fusion Applications Control and the Oracle WebLogic Server Administration Console for the first time. You can create additional administrative accounts using the WLST command line or the Oracle WebLogic Server Administration Console.

You can change the password of the administrative user using the Oracle WebLogic Server Administration Console or the WLST command line.

This section contains the following topics:

- [Section 6.8.5.2.1, "Changing the Oracle Fusion Middleware Administrative User Password Using the Command Line"](#)
- [Section 6.8.5.2.2, "Changing the Oracle Fusion Middleware Administrative User Password Using the Administration Console"](#)

If your configuration uses `FAAdmin` as the Oracle Fusion Middleware administrative user, you can also use the `password-reset-tool` script to change the password. See [Section 6.8.5.2](#).

#### 6.8.5.2.1 Changing the Oracle Fusion Middleware Administrative User Password Using the Command Line

To change the Oracle Fusion Middleware administrative user password or other user passwords using the command line, you invoke the `UserPasswordEditorMBean.changeUserPassword` method, which is extended by the security realm's `AuthenticationProvider` MBean.

For more information, see the `changeUserPassword` method in the *Oracle Fusion Middleware Oracle WebLogic Server MBean Reference*.

#### 6.8.5.2.2 Changing the Oracle Fusion Middleware Administrative User Password Using the Administration Console

To change the password of the Oracle Fusion Middleware administrative user using the Oracle WebLogic Server Administration Console:

1. Navigate to the Oracle WebLogic Server Administration Console. (For example, from the home page of the domain in Fusion Applications Control, select **To configure and managed this WebLogic Domain, use the Oracle WebLogic Server Administration Console**.)
2. From the target navigation pane, select **Security Realms**.  
The Summary of Security Realms page is displayed.
3. Select a realm, such as **myrealm**.  
The Settings for the realm page is displayed.
4. Select the **Users and Groups** tab, then the **Users** tab. Select the user.  
The Settings for *user* page is displayed.
5. Select the **Passwords** tab.
6. Enter the new password, then enter it again to confirm it.
7. Click **Save**.

#### 6.8.5.3 Changing Oracle Identity Management Passwords

In production environments, certain passwords are required to be reset periodically. For UNIX environments, the `password-reset-tool` utility provides a way to reset passwords of bind users used by Oracle Fusion applications and stored in Oracle Fusion Applications domains. Specifically, this tool can be used to reset passwords of the following users: `FAAdmin`, `IDROUser`, `IDRWUser`, `PolicyRWUser`, and `oamadminuser`. For a configuration that does not use `FAAdmin` as the Oracle Fusion Middleware administrative user, use one of the methods described in [Section 6.8.5.2](#).

---

**Notes:** Typically, a system outage is scheduled and expected while the `password-reset-tool` utility is running.

Make a note of the new passwords you submit to the tool (those passwords cannot be retrieved in plain text and may need to be provided later on).

---

### 6.8.5.3.1 Syntax and Example of Use

To use the `password-reset-tool` utility:

1. Prepare the Oracle Fusion Applications environment for the `password-reset-tool` utility by ensuring the following prerequisites are fulfilled:
  - Java is installed on the system and inserted in the path.
  - ANT is installed on the system and inserted in the path.
  - Ensure the provisioning plan is available at `APPLICATIONS_BASE/provisioning/plan/provisioning.plan`.
  - You know the password for `cn=orcladmin` (the administrative user for Oracle Identity Management).
2. Ensure the Administration Servers for all domains are up. See [Section 4.4.4](#).
3. At an operating system command prompt for the `CommonDomain` domain, navigate to the location of the `password-reset-tool` utility:

```
(UNIX) FA_ORACLE_HOME/lcm/idmpasswordreset/bin
```

`FA_ORACLE_HOME` is the Oracle Fusion Applications Oracle home located at:

```
(UNIX) APPLICATIONS_BASE/fusionapps/applications
```

The `password-reset-tool` utility is not available on Windows.

4. Run the `password-reset-tool` utility:

```
password-reset-tool.sh APPLICATIONS_BASE/provisioning/plan/provisioning.plan
```

where `provisioning.plan` is the file generated at the beginning of the preverify phase with the Provisioning Wizard. For more information about the preverify phase, see "Provisioning a New Applications Environment" table in the *Oracle Fusion Applications Installation Guide*.

5. When prompted, enter the password for `cn=orcladmin`.
6. When prompted, enter `Y` for the password of the users you want to change, and enter `N` for all other users.

If you are not using `faadmin` for the Oracle Fusion Middleware administrative user, then answer `N` for that user.

7. Provide the new password for the users.
8. Let the utility run to completion (without interruption).
9. Stop and restart all the Administration Servers. See [Section 4.4.4](#).

## 6.8.6 Updating Certificates with the Certificate Renewal Utility

Self-signed certificates created in Oracle Fusion Applications 11g Release 4 (11.1.4) and earlier provisioning versions have a six month life span. Beginning in Oracle Fusion Applications 11g Release 5 (11.1.5), certificates have a three year life span.

The Certificate Renewal Utility enables you to update your self-signed certificates. You must run this utility on pre-Release 5 environments to keep those environments working.

This section contains the following topics:

- [Section 6.8.6.1, "About the Certificate Renewal Utility"](#)

- [Section 6.8.6.2, "Location of the Certificate Renewal Utility"](#)
- [Section 6.8.6.3, "Before Using the Certificate Renewal Utility"](#)
- [Section 6.8.6.4, "Using the Certificate Renewal Utility"](#)
- [Section 6.8.6.5, "After Using the Certificate Renewal Utility"](#)

### 6.8.6.1 About the Certificate Renewal Utility

The certificate renewal utility updates and replaces old self-signed certificates with new self-signed certificates with a three year life span. The utility updates the following keystores:

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**Note:** For details about the home directories mentioned here, see [Table 1-4](#) and [Figure 1-6](#).

---

- OWSM keystore `default-keystore.jks` for all available domains under every host, that is, under:
  - (UNIX) `APPLICATIONS_CONFIG/domains/host_name/domain_home/config/fmwconfig`
  - (Windows) `APPLICATIONS_CONFIG\domains\host_name\domain_home\config\fmwconfig`
- OWSM keystore `owc_discussions.jks` for the `CommonDomain` domain only.
- `fusion_trust.jks` and `host_fusion_identity.jks` located in either `WL_HOME/server/lib` or `APPLICATIONS_CONFIG/keystores`.
- Oracle wallet `cwallet.sso` file present under `WL_HOME/server/lib`.

---

**Note:** In a multi-host environment, there are as many `host_fusion_identity.jks` files as there are hosts.

---

### 6.8.6.2 Location of the Certificate Renewal Utility

The certificate renewal utility is located at:

- (UNIX) `APPLICATIONS_BASE/fusionapps/applications/lcm/facertsutil`
- (Windows) `APPLICATIONS_BASE\fusionapps\applications\lcm\facertsutil`

The utility uses a properties file with path definitions. A reference properties file is located at:

- (UNIX)  
`APPLICATIONS_BASE/fusionapps/applications/lcm/facertsutil/config/crutil.properties`
- (Windows)  
`APPLICATIONS_BASE\fusionapps\applications\lcm\facertsutil\config\crutil.properties`

### 6.8.6.3 Before Using the Certificate Renewal Utility

Take these steps before running the certificate renewal utility:

1. If SSL is not enabled:
  - a. Stop all the Administration Servers, either manually or using the `fastartstop` utility.
  - b. Stop the Node Manager.
2. If SSL is enabled:
  - a. Stop all the Administration Servers.

- b. Stop middle tier components; however, the database and identity management components can continue running.
- 3. Navigate to the location of `fusion_trust.jks`, either:

```
(UNIX) APPLICATIONS_CONFIG/keystores
(Windows) APPLICATIONS_CONFIG\keystores
```

or

```
(UNIX) WL_HOME/server/lib
(Windows) WL_HOME\server\lib
```

- 4. Run `keytool` to check the validity of current certificates in the keystore:

```
keytool -list -keystore fusion_trust.jks
-alias fa-internal.example.com_fusion -v
```

`keytool` will prompt for the store password.

- 5. Ensure that the properties file is configured with the correct paths required during utility execution.

Here is an example properties file:

```
# For all the paths append _path as suffix so that the validation
# will be done at the time of loading the properties

# Uncomment either Old Path or New Path depending on your environment.

# Best practice to use '/' as path separator

# fusion trust, cwallet_sso and *_fusion identity keystore locations
# Old path
#wlks_path=APPLICATIONS_BASE/fusionapps/$WL_HOME/server/lib
# New path with flex clone changes
#wlks_path=APPLICATIONS_CONFIG/keystores

# Instance specific files FUSION_env and FUSION_prov properties files
# Old path
#fusion_props_path=APPLICATIONS_BASE/fusionapps/applications/admin
# New path with flex clone changes
#fusion_props_path=APPLICATIONS_CONFIG/fapatch

# default and owc_discussions keystore locations across all domains
#domains_path=APPLICATIONS_CONFIG/domains

# Certificate validity period in days, configured for 3 years by default.
# This value can be changed as per the renewal requirement
validity_period=1095

# Path of intermediate config property file generated by this utility
# which stores information of all the domains that must be updated
# generated with name "domains.properties"
config_prop_path=APPLICATIONS_BASE/fusionapps/applications/admin/

# Application config directory
appnconfig_path=APPLICATIONS_CONFIG

# domains folder suffix under
# APPLICATIONS_CONFIG/domains/<host_name>/<domains_suffix>
# Based on this suffix we identify the list of domain folders from this
# location
```

```
# NEED NOT BE CHANGED unless the convention is changed in creating domain
# folders
domains_suffix=Domain
```

#### 6.8.6.4 Using the Certificate Renewal Utility

Take these steps to execute the utility:

1. Navigate to:

```
(UNIX) APPLICATIONS_BASE/fusionapps/applications/lcm/facertsutil/bin
(Windows) APPLICATIONS_BASE\fusionapps\applications\lcm\facertsutil\bin
```

2. Set the JAVA\_HOME environment variable to:

```
(UNIX) APPLICATIONS_BASE/fusionapps/jdk6
(Windows) APPLICATIONS_BASE\fusionapps\jdk6
```

3. Run the certificate renewal utility using this syntax:

```
(UNIX)
./facertsutil.sh -inputfile path_to_properties_file -appbase APPLICATIONS_BASE

(Windows)
facertsutil.cmd -inputfile path_to_properties_file -appbase APPLICATIONS_BASE
```

For example:

```
./facertsutil.sh -inputfile ../config/crutil.properties -appbase APPLICATIONS_
BASE
```

#### 6.8.6.5 After Using the Certificate Renewal Utility

Take these steps after running the certificate renewal utility:

1. Navigate to the location of `fusion_trust.jks`, either:

```
(UNIX) APPLICATIONS_CONFIG/keystores
(Windows) APPLICATIONS_CONFIG\keystores
```

or

```
(UNIX) WL_HOME/server/lib
(Windows) WL_HOME\server\lib
```

2. Run `keytool` to check that certificate validity was extended by the period specified in the properties file:

```
keytool -list -keystore fusion_trust.jks
-alias fa-internal.example.com_fusion -v
```

`keytool` will prompt for the store password.

3. If SSL is not enabled:

- a. Start the Node Manager.
- b. Start all the Administration Servers either manually or using the `faststartstop` utility.

4. If SSL is enabled:

- a. Start all middle tier components.
- b. Start all the Administration Servers.

## 6.9 Data Masking

Data masking is the ability to replace sensitive data with realistic but false data on test and development databases. Features include:

- the ability to keep data properties (data type, width, and so on) intact and provide realistic data sets for analysis and testing.
- ensuring various constraints like (Primary Keys, Uniqueness, Foreign keys) are maintained, preserving relational integrity.
- using user specified formatting rules that ensure custom and packaged applications continue to work after the data is masked.

This section contains the following topics:

- [Section 6.9.1, "Introduction to Data Masking"](#)
- [Section 6.9.2, "Data Masking in Oracle Fusion Applications"](#)
- [Section 6.9.3, "Managing the Masking Definitions"](#)
- [Section 6.9.4, "Data Masking in Oracle Enterprise Manager Cloud Control"](#)
- [Section 6.9.5, "Best Practices when Masking Test Databases"](#)
- [Section 6.9.6, "References"](#)

### 6.9.1 Introduction to Data Masking

Data masking is an on-going activity for the Oracle Fusion Applications administrator.

Data masks and masking definitions are created and managed with Oracle Enterprise Manager Cloud Control.

Data masking requires an understanding of masking concepts, methodology, and the implementation tools. For background information, see "Overview of Oracle Data Masking" in *Oracle Database Real Application Testing User's Guide*.

### 6.9.2 Data Masking in Oracle Fusion Applications

The Oracle Fusion Applications administrator must take certain considerations into account when implementing data masking for an application. For example, free space requirements must be evaluated to ensure that adequate resources are available to the masking job. The following instructions provide guidelines:

- [Section 6.9.2.1, "Requirements for Data Masking"](#)
- [Section 6.9.2.2, "Sensitive Data in Oracle Fusion Applications"](#)
- [Section 6.9.2.3, "Masking Definitions"](#)

#### 6.9.2.1 Requirements for Data Masking

You should be aware of certain background information, prerequisites, and requirements before undertaking data masking operations in your environment.

This section contains the following topics:

- [Section 6.9.2.1.1, "Data Model Descriptions"](#)
- [Section 6.9.2.1.2, "Required Versions"](#)
- [Section 6.9.2.1.3, "Preliminary Steps"](#)
- [Section 6.9.2.1.4, "Temporary Space Requirements"](#)



- [Section 6.9.2.1.5, "Database Free Space Requirements"](#)
- [Section 6.9.2.1.6, "Database and Operating System Parameters"](#)
- [Section 6.9.2.1.7, "Role Requirements"](#)
- [Section 6.9.2.1.8, "Custom Field Masks"](#)
- [Section 6.9.2.1.9, "Production-to-Test Requirement"](#)

**6.9.2.1.1 Data Model Descriptions** You must understand the data model for your application data when deciding how and what to mask. For data model descriptions, see the product-specific documentation from Oracle Enterprise Repository for Oracle Fusion Applications.

#### 6.9.2.1.2 Required Versions

Data masking requires the following:

- Oracle Database 10g Release 2 or Oracle Database 11g Release 1
- Oracle Enterprise Manager Grid Control 10g Release 4 or Oracle Enterprise Manager Cloud Control 12c
- The Oracle Data Masking Pack

#### 6.9.2.1.3 Preliminary Steps

You must perform certain steps, such as installing a format library and configuring temp spaces, before using data masking in an Oracle Fusion Applications environment:

1. Install the FMTLIB package, which contains functions needed to perform data masking.
  - a. Locate these scripts in your Oracle Enterprise Manager installation:
 

```
$PLUGIN_HOME/sql/db/latest/masking/dm_fmtlib_pkgdef.sql
$PLUGIN_HOME/sql/db/latest/masking/dm_fmtlib_pkgbody.sql
```
  - b. Copy these scripts to a directory in your target database installation.
  - c. Execute the scripts using SQL\*Plus, connected as a user that can create packages in the DBSNMP schema (SYSTEM or SYS).
2. Apply any required patches. Data masking requires a specific Oracle Database version and patch set. See [Section 4.8](#).
3. Install the agent on the database host using Oracle Enterprise Manager.
4. Discover the database using Oracle Enterprise Manager.
5. Change the temp spaces used for data masking to "Auto Extend" from Cloud Control Console:
  - a. Click **Targets**, then Databases.
  - b. Select the database and log in.
  - c. Navigate to **Administration**, then **Storage**, then **Datafiles**.
  - d. On the Datafiles page, enter `temp` in the **Object Name** search box. Press **Go**. The temp spaces are displayed:

**Datafiles** Object Type: Datafile

**Search**  
Select an object type and optionally enter an object name to filter the data that is displayed in your results set.  
Object Name:    
By default Datafiles use case-sensitive searches. To run an exact match, double quote the search string. You can use the wildcard symbol (%) in a double quoted string.

Select	File Name	Tablespace	Status	Size (MB)	Used (MB)	Used (%)	Maximum File Size (MB)	Auto Extend
<input checked="" type="radio"/>	/test/srk432/mycorp/db/apps_st/data/adbstemp.dbf	ADBS_TEMP	ONLINE	100.000	0.000	<div style="width: 0%;"></div>	0.00	32,767.000 YES
<input type="radio"/>	/test/srk432/mycorp/db/apps_st/data/fusion_temp01.dbf	FUSION_TEMP	ONLINE	2,550.000	0.000	<div style="width: 0%;"></div>	0.00	32,767.000 YES
<input type="radio"/>	/test/srk432/mycorp/db/apps_st/data/fusion_temp02.dbf	FUSION_TEMP	ONLINE	4,096.000	0.000	<div style="width: 0%;"></div>	0.00	32,767.000 YES
<input type="radio"/>	/test/srk432/mycorp/db/apps_st/data/temp1_03.dbf	TEMP1	ONLINE	4,350.000	0.000	<div style="width: 0%;"></div>	0.00	32,767.000 YES
<input type="radio"/>	/test/srk432/mycorp/db/apps_st/data/temp1_04.dbf	TEMP2	ONLINE	2,550.000	3.000	<div style="width: 0%;"></div>	0.12	32,767.000 YES
<input type="radio"/>	/test/srk432/mycorp/db/apps_st/data/temp1_05.dbf	TEMP2	ONLINE	2,550.000	2.000	<div style="width: 0%;"></div>	0.08	32,767.000 YES
<input type="radio"/>	/test/srk432/mycorp/db/apps_st/data/temp1_06.dbf	TEMP1	ONLINE	4,200.000	1.000	<div style="width: 0%;"></div>	0.02	32,767.000 YES

When configured correctly for masking, as in this example, auto-extend is enabled for the temp spaces.

- e. If you need to set auto-extend, edit each temp space in turn by selecting its radio button and clicking **Edit**. Change the value for each space as shown here:

Datafiles > Edit Datafile: adbstemp.dbf  
**Edit Datafile: adbstemp.dbf**

File Name: adbstemp.dbf  
File Directory: /slot/abc4344/mycorp/db/apps/data  
Tablespace: ADBS\_TEMP  
Status:  Online  
 Offline  
File Size:  MB

**Storage**

Automatically extend datafile when full (AUTOEXTEND)  
Increment:  MB  
Maximum File Size:  Unlimited  
 Value:  MB

**6.9.2.1.4 Temporary Space Requirements** As shown in Step 3 of [Section 6.9.2.1.3](#) it is recommended that you auto extend your temp files as masking requires additional space for processing. The amount of additional space you need depends on your data. Broadly speaking, masking takes up approximately two times the size of the largest table being masked.

The temp space is needed for two reasons:

- To perform sort and join operations during masking.  
The space requirement is not straightforward to estimate as it depends on whether sorts and joins go to disk, which in turn depends on how much memory is available on the machine. Try to keep at least as much space as the size of your biggest masked table for sort and join processing.
- For space taken up in the default user tablespace for temporary masking tables.  
The size of the temp tables is twice the size of all the columns being masked. Since these tables are dropped after processing, the space is released after masking completes.

### 6.9.2.1.5 Database Free Space Requirements

Ensure that sufficient free space is available to the database before executing the masking job.

Calculate the free space requirements as follows:

```
largest table being masked +
total size of mapping tables for all columns in that table +
temporary tablespace (roughly twice the size of the largest mapping table, as
stated under Temporary Space Requirements above)
```

**6.9.2.1.6 Database and Operating System Parameters** The following database configuration is recommended:

```
max_dump_file_size = 200M
memory_target = 26G
pga_aggregate_target = 6G
sga_max_size = 26G
sga_target = 0
```

### Operating System Configuration (All Platforms)

The following operating system configuration is recommended:

- **Memory Address Space: Unlimited.** For example, in the `/etc/security/limits.conf` file:

```
oracle soft memlock unlimited
oracle hard memlock unlimited
```

- **Memory Map Areas: 200000.** For example,

```
[my@host ~/rhe]$ /usr/local/packages/aime/ias/run_as_root su
[root@host rhe]# echo 200000 > /proc/sys/vm/max_map_count
```

### Operating System Configuration (AIX Database Hosts)

The following operating system configuration is recommended:

```
core file size      (blocks, -c) unlimited
data seg size      (kbytes, -d) unlimited
file size          (blocks, -f) unlimited
max memory size    (kbytes, -m) unlimited
open files         (-n) unlimited
pipe size          (512 bytes, -p) 64
stack size         (kbytes, -s) unlimited
cpu time           (seconds, -t) unlimited
max user processes (-u) 16384
virtual memory     (kbytes, -v) unlimited
```

### 6.9.2.1.7 Role Requirements

The user executing the data masking script must have the `dba` role. If Virtual Private Database (VPD) security policies are used or Oracle Database Vault is enabled for the database, the user must be `SYS`.

Additionally, the user may need to have direct grants to objects for any PL/SQL objects provided to user-defined functions or post-processing scripts.

Optionally, you can grant EXEMPT ACCESS POLICY privilege to the masking user to bypass all VPD policies.

#### 6.9.2.1.8 Custom Field Masks

Oracle Fusion Applications include a set of out-of-the-box masking definitions to mask common sensitive data like employee information and credit card numbers. However, these default mask templates cannot account for custom data such as flex fields since these are specific to your application.

You can update the standard masking definitions to include additional flex fields and custom data. For details about viewing and updating masking templates, see [Section 6.9.3](#).

---

---

**Note:** Be aware that certain sensitive custom attributes may depend on tables in other product families. For example, Procurement masking is dependent on Oracle Fusion CRM (for Suppliers and related entities, and for Procurement Contract terms and deliverables), on Oracle Fusion Supply Chain Management (for Items), on Oracle Fusion HCM (for Workers and Organizations), on Oracle Fusion Financials (for Ledgers), and on Oracle Fusion Project (for Projects and related entities).

---

---

#### 6.9.2.1.9 Production-to-Test Requirement

During the production-to-test process, you must replace the production user names with dummy user names. This mandatory step is needed to avoid breaking anonymization.

#### 6.9.2.2 Sensitive Data in Oracle Fusion Applications

Oracle Fusion Applications identify the common sensitive data types for each product family.

You can use Oracle Enterprise Manager Cloud Control to view the sensitive attributes specified in the masking definitions. You can update the definitions with any additional desired sensitive attributes, such as flex fields or other customized fields.

For details about how to view and update masking templates, see [Section 6.9.3](#) and [Section 6.9.4](#).

For additional information about data masking, see the *Oracle Fusion Applications Security Guide*.

#### 6.9.2.3 Masking Definitions

A masking definition specifies the columns to be masked and the format of the masked data. Out-of-the-box "template" masking definitions are provided for each family of Oracle Fusion Applications.

Masking definitions in XML format masks enable the data masking utility to identify the database tables, columns, and column formats of the data being masked.

For details, see the *Oracle Fusion Applications Security Guide*.

## 6.9.3 Managing the Masking Definitions

You can modify the default masks provided with Oracle Fusion Applications, and create your own masking definitions. Use Oracle Enterprise Manager Cloud Control Console to manage and maintain the data masking definitions.

---

**Note:** To configure Cloud Control Console, see [Section 6.9.4](#).

---

This section contains the following topics:

- [Section 6.9.3.1, "Viewing and Modifying Data Masking Definitions"](#)
- [Section 6.9.3.2, "Generating the Masking Script"](#)
- [Section 6.9.3.3, "Customizing Mask Formats"](#)

Oracle Enterprise Manager Cloud Control Console online help provides more details on these topics.

---

**Note:** You must follow the instructions in [Section 6.9.2.1](#) before you can perform the operations described here.

---

### 6.9.3.1 Viewing and Modifying Data Masking Definitions

---

**Note:** The procedure in this section assumes that the masking template file has been imported. If you have not done so already, see [Section 6.9.4.1, "Importing the Masking Templates"](#).

---

You can view and modify out-of-the-box data masking definitions as follows with Cloud Control Console:

1. Ensure that the masking template file has been imported. For details about this task, see [Section 6.9.4.1, "Importing the Masking Templates"](#).
2. Navigate to **Enterprise**, then **Quality Management**, then **Data Masking Definition**.
3. Click the **Targets** tab.
4. Click the **Databases** secondary tab.
5. Select the database whose mask definition you are configuring from the list of databases.
6. Under **Related Links**, select **Data Masking Definitions**. The Data Masking Definitions page lists the current masks for the database:

**Data Masking Definitions**  
 Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic looking but false data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats.

---

Search

View	Edit	Generate Script	Schedule Job	Delete	Actions	Clone Database	Go
Select	Masking Definition ▲	Application Data Model	Description	Columns	Status	Most Recent Job Ended	SQL Performance Analyzer Task
<input checked="" type="checkbox"/>	CRM masking	crm adm2		41	Script Generated		

**Format Library**  
 A masking format defines the format of masked data. You can create a new masking format and reuse it later when creating a masking definition.  
[Format Library](#)

7. Select the mask definition you wish to view or update and click **Edit**.
8. Log in to the database.
9. The Edit Masking Definition page appears. It lists the columns included in the mask definition.

**Edit Masking Definition: CRM masking** Cancel OK

\* Name  🔍

\* Application Data Model  🔍

\* Reference Database  ▼

Description

---

**Workloads**

Capture files and SQL Tuning Sets may be masked along with the sensitive columns in the database. Use of the SQL Expression format and conditional masking is not allowed while Workload Masking is enabled.

Ensure Workload Masking Compatibility

---

**Columns**

Add columns you want to mask and define masking format for each column. Foreign key columns are automatically added to maintain referential integrity. Dependent columns are columns that do not have foreign key constraints defined, but reference a masked column due to application level constraints. You can manually add dependent columns to a masked column. Removing a column from this list will remove all foreign key and dependent columns. Add

Previous 1-10 of 41 Next 10

Select All | Select None

Select	Owner	Table	Column	Sensitive Column Type	Column Group	Data Type	Format	Foreign Key Columns	Dependent Columns
<input type="checkbox"/>	FUSION	MKL_LM_LEADS	BUDGET_AMOUNT	UNDEFINED		NUMBER		0	0
<input type="checkbox"/>	FUSION	MKL_LM_LEADS	DEAL_SIZE	UNDEFINED		NUMBER		0	0
<input type="checkbox"/>	FUSION	MKL_LM_LEADS	DESC_TEXT	UNDEFINED		VARCHAR2(2000)		0	0
<input type="checkbox"/>	FUSION	MKL_LM_LEADS	LEAD_NAME	UNDEFINED		VARCHAR2(250)		0	0
<input type="checkbox"/>	FUSION	MOO_OPTY	NAME	UNDEFINED		VARCHAR2(275)		0	0

10. Several operations are available on this page:
  - To add another column to the definition, click **Add**.
  - To modify a column format, click the **Format** icon.
  - To remove a column from the mask definition, check the box and click **Remove**.
11. To introduce a new column into the definition, for example, click **Add**. The Add Columns page appears.
12. To locate the column, enter the schema and table name and click **Search**.

In this example, we search the MOO\_REVN table in the FUSION schema:

Data Masking Definitions > Edit Masking Definition: CRM masking > Add Columns

**Add Columns**

Application Data Model  Database  Cancel Add Define Format And Add

Logged In As

---

Add one or more columns for masking. Foreign key columns will be added automatically. You can define masking format at once for all selected columns if they have the same data type.

**Search**

Schema  🔍

Table Name  🔍

Sensitive Column Type

Column Name

Column Comment

Enter a string in column comments.

---

Mask selected columns as a group

Select All | Select None

Select	Owner	Table Name	Column Name	Sensitive Column Type	Data Type	Comment
<input type="checkbox"/>	FUSION	MOO_REVN	COST_AMT	Undefined	NUMBER	Cost amount
<input type="checkbox"/>	FUSION	MOO_REVN	DOWNSIDE_AMT	Undefined	NUMBER	Worst case amount
<input type="checkbox"/>	FUSION	MOO_REVN	EXPECT_AMT	Undefined	NUMBER	Expected revenue amount.
<input checked="" type="checkbox"/>	FUSION	MOO_REVN	MARGIN_AMT	Undefined	NUMBER	Margin amount.
<input type="checkbox"/>	FUSION	MOO_REVN	QTY	Undefined	NUMBER	Product quantity.
<input type="checkbox"/>	FUSION	MOO_REVN	RECMD_REVN_AMT	Undefined	NUMBER	RECMD_REVN_AMT

13. Select the checkbox for the **MARGIN\_AMT** column and click **Add**.

The Edit Masking Definition page reappears, with **MARGIN\_AMT** added to the column list.

Unlike the other columns, the format toolbox icon for **MARGIN\_AMT** is displayed in red, which means that no mask format has yet been defined for the column. You must specify a format for this column to complete the definition.

14. Click on the toolbox icon. The Define Column Mask page appears.

Data Masking Definitions > Edit Masking Definition: CRM masking > Define Column Mask

**Define Column Mask**

Owner FUSION Table MOO\_REVN  
Column MARGIN\_AMT Data Type NUMBER

By default all records in the table will be masked using the specified format. You can optionally identify more than one subset of records using conditions. Each subset can be masked using a corresponding masking format. The subsets will be masked in the order they are specified. A subset will not be masked again even when it matches a subsequent condition.

Add Condition

Import Format Format Entry Random Numbers Add

Expand All Collapse All

Select	Condition	Format Entry Properties				Sample	Remove
		Property	Value	Property	Value		
	Conditions						
<input checked="" type="radio"/>	Default Condition						
	(Add a format entry)						

Cancel OK

15. You can now specify a mask format entry for **MARGIN\_AMT** using the drop-down box. Click **Add** to complete the process.

In this example we select a random number format and specify the start and end lengths. To see how the masked data will appear in this format, click the **Sample** icon.

Data Masking Definitions > Edit Masking Definition: CRM masking > Define Column Mask

**Define Column Mask**

Owner FUSION Table MOO\_REVN  
Column MARGIN\_AMT Data Type NUMBER

By default all records in the table will be masked using the specified format. You can optionally identify more than one subset of records using conditions. Each subset can be masked using a corresponding masking format. The subsets will be masked in the order they are specified. A subset will not be masked again even when it matches a subsequent condition.

Add Condition

Import Format Format Entry Random Numbers Add

Expand All Collapse All

Select	Condition	Format Entry Properties				Sample	Remove
		Property	Value	Property	Value		
	Conditions						
<input checked="" type="radio"/>	Default Condition					52	
	Random Numbers	Start Value	2	End Value	156		

Cancel OK

**Note:** You can use the **Import Format** button to import an existing format entry.

16. Click **OK**. Cloud Control checks that the entry is valid for the column's data type. The Edit Masking Definition page reappears, and the **MARGIN\_AMT** column now has a valid mask format.

Click **OK** to save the masking definition.

Likewise, starting at the Edit Masking Definition page (Step 7 above), you can modify the definition of an existing column by clicking its **Format** icon. This is useful, for

example, when you wish to customize the properties of a column's format entry, or specify a different format entry for the column.

### 6.9.3.2 Generating the Masking Script

When you modify a data masking definition by adding or removing columns, or by modifying an existing column's mask format, you must regenerate the SQL masking script to incorporate your changes. To generate the script:

1. Follow Steps 1 through 7 of [Section 6.9.3.1](#) to display the data masking definitions for the database.
2. After a masking definition is modified, its status is listed as `Script Not Generated.`

Select the definition and click **Generate Script**.

3. After processing is complete, you can:
  - Integrate the masking script with the clone database process
  - Schedule execution of the script to perform the masking operation.

**Script Generation Results: MASKING\_DEF\_437**

Database: mydb\_abc44  
 Logged In As: FUSION  
 Number of Tables: 1  
 Columns: 5

**Script Options**

Use script to clone and mask the database. [Clone And Mask](#)

Schedule the data masking job. The script will be executed by the job to perform the masking operation. [Schedule Job](#)

**Script**

The script summary is a list of the database commands that will be used to mask the selected columns. The full script is a PL/SQL script that includes functions, procedures, and other commands needed during the masking operation. [Save Full Script](#)

View  Script Summary  Full Script

```
-- Target database: mydb_abc44
-- Script generated at: 19-JUL-2012 14:43
COMMIT
ALTER SESSION ENABLE PARALLEL DML
DROP TABLE "MGMT_DM_TT_441" PURGE
declare
  adj number:=0;
  num number:=0;
begin
  select length(count(*)) into adj from (select distinct "EXPECT_AMT" from "FUSION"."MOO_REVN");
  num := adj;
  adj := greatest(adj - 3, 0);
  execute immediate 'create table MGMT_DM_TT_441
  (orig_val null, new_val null, delete_val null) NOLOGGING PARALLEL as
  select CAST(null AS NUMBER) orig_val, CAST(null AS NUMBER) new_val, CAST(0 AS NUMBER) delete_val from dual
  union all
  select s.orig_val,
```

[Impact Report](#)

[Return](#)

---

**Note:** The results page also displays the generated SQL script, which can be modified as well.

---

### 6.9.3.3 Customizing Mask Formats

The format library is a collection of common, ready-to-use masking formats you can use in masking definitions. Oracle Data Masking enables you to extend the default mask format library by tailoring the existing formats, or creating new formats to meet your own business needs.

Take these steps to add a new format:

1. Follow steps 1 through 3 of [Section 6.9.3.1](#) to select the database instance.
2. Under Related Links, select **Data Masking Format Library**.



Select	Format	Data Type	Sensitive Column Type	Sample	Description	Owner
<input checked="" type="radio"/>	American Express Credit Card Number	Character	CREDIT_CARD_NUMBER	3445515660539291	~10 billion unique American Express credit card numbers	SYSMAN
<input type="radio"/>	Discover Card Credit Card Number	Character	CREDIT_CARD_NUMBER	6011727168448068	~10 billion unique Discover Card credit card numbers	SYSMAN
<input type="radio"/>	MasterCard Credit Card Number	Character	CREDIT_CARD_NUMBER	5586461163748424	~10 billion unique MasterCard credit card numbers	SYSMAN
<input type="radio"/>	Visa Credit Card Number	Character	CREDIT_CARD_NUMBER	4485562152521154	~10 billion unique Visa credit card numbers	SYSMAN
<input type="radio"/>	Generic Credit Card Number	Character	CREDIT_CARD_NUMBER	4532790685807193	~10 billion unique generic credit card numbers	SYSMAN
<input type="radio"/>	Generic Credit Card Number Formatted	Character	CREDIT_CARD_NUMBER	2100-0984-2095-2078	~10 billion unique generic credit card numbers	SYSMAN
<input type="radio"/>	National Insurance Number Formatted	Character	NATIONAL_INSURANCE_NUMBER	ZZ 61 43 63 D	Generates unique UK National Insurance Numbers	SYSMAN
<input type="radio"/>	Social Insurance Number	Character	SOCIAL_INSURANCE_NUMBER	222467045	~1 billion unique Canadian Social Insurance Numbers	SYSMAN

3. When adding a new format, you can take an existing format as a starting point. For example, to create a new format for credit card number fields, you can select an existing credit card format and click **Create Like**.

**Create Format**

\* Name:

\* Sensitive Column Type:

Description:

---

**Format Entries**

Define masking format by adding one or more format entries of different types.

Add:

Type	Description	Edit	Remove
Random Digits	Digits Length Range: 10 - 10		

---

Post Processing Function:

The function can either be a standalone function (Example: scott.masking\_func) or a function specified inside of scott.masking\_pkg.checksum).

---

**Sample Masked Data**

Samples are generated using defined format. Use Refresh to re-generate samples.

- 4485597841583041
- 4927987596249961

4. Enter a descriptive name for the new format, and use the drop-down list under format entries to select a masking format. You may also specify a different post-processing function if desired.

Similarly, you can modify existing formats or create new formats on the Format Library page.

## 6.9.4 Data Masking in Oracle Enterprise Manager Cloud Control

This section contains these topics:

- [Section 6.9.4.1, "Importing the Masking Templates"](#)
- [Section 6.9.4.2, "Submitting the Masking Script"](#)

### 6.9.4.1 Importing the Masking Templates

Data masking on Cloud Control requires the following templates, which are shipped in the emfa sysman directory:

```
ADM_Oracle_Fusion_Applications_1.0_EM_12.1.0.1.0_Combined_Template.xml
Mask_Oracle_Fusion_Applications_1.0_EM_12.1.0.1.0_Combined_Template.xml
```

---

---

**Note:** Data masking templates will be made available in a future Oracle Database plug-in release through the Self Update feature in Cloud Control, which enables you to obtain information about new updates and to review, download and apply the updates.

---

---

Use the following procedure to import the out-of-the-box data masking templates on Cloud Control:

1. Grant Permissions.  
Use the `FUSION` user for all subsequent steps. Grant `select_catalog_role` and `select any dictionary` and `DBA` to the `FUSION` user.
2. Deploy the TDM package.
  - a. Navigate to **Enterprise**, then **Jobs**, then **Job Activity**.
  - b. From the **os command** list, select **Deploy Test Data management packages** and click **Go**.
  - c. Enter the job name, click **add**, and add the database where masking is to be run.
  - d. Click **parameters**. From the list, select **fusion driver**.
  - e. Click **credential** and enter the `FUSION` credentials. This user must have all the privileges specified in Step 1.
  - f. Click **parameters**. Change `Application Type` to `Oracle Fusion Applications`.
  - g. Click **submit**.
  - h. When the job completes, verify that it succeeded. Review the job details and make sure there are no errors.
3. Import the Application Data Model (ADM).
  - a. Navigate to **Enterprise**, then **Quality Management**, then **Data Discovery and Modelling** menu.
  - b. Click **Action**, then **Import**. Provide the ADM XML file `ADM_Oracle_Fusion_Applications_1.0_EM_12.1.0.1.0_Combined_Template.xml`, the ADM name, and the `FUSION` database.
  - c. If prompted for database credentials, provide the `FUSION` user credentials.
  - d. You might see one or more warnings indicating that duplicate sensitive types were not imported; these warnings can be safely ignored.
4. Create a verification job.
  - a. Navigate to **Enterprise**, then **Quality Management**, then **Data Discovery and Modeling**.
  - b. Select the ADM you just imported. Navigate to **Action**, then **Verify**.
  - c. Click **Create Verification Job**.
  - d. Provide a job name and job description.
  - e. Click **New Credential**, and provide the `FUSION` credentials.
  - f. Schedule the job to start immediately, and click **Submit**.
5. Check the job status.

- a. When the verification job completes, navigate to Enterprise, then Job Activity, then select all job status.
- b. Click **go** and check that your job completed successfully.
6. Import the masking template file.
  - a. Navigate to **Enterprise**, then **Quality Management**, then **Data Masking Definitions**. A list of masking definitions appears. Click **Import**.
  - b. Import the masking template file `Mask_Oracle_Fusion_Applications_1.0_EM_12.1.0.1.0_Combined_Template.xml`.
  - c. Provide the masking definition name.
  - d. For the ADM name, specify the name of the FUSION ADM you created.
  - e. For the database name, specify the FUSION database.
7. Select the mask definition and click the **generate script** button.
 

Script generation can take a few hours, so consider running it on VNC or on a terminal that will be available for a while to allow the job to complete. (If you run it on a laptop and have to disconnect it during execution, you will lose the browser that was generating the script.)
8. When the job completes, you can view the impact report and save or view the script.

#### 6.9.4.2 Submitting the Masking Script

After you have imported the masking template and generated the masking script by using the procedure described in [Section 6.9.4.1, "Importing the Masking Templates"](#), submit the masking script for execution by clicking **submit job** at the script generation page in Cloud Control.

### 6.9.5 Best Practices when Masking Test Databases

Identity data can reside in several repositories: the Oracle Database, the production identity store (an LDAP store), and the Oracle Identity Manager database.

In the current release, when you implement data masking, the identity attributes are only masked (anonymized) in the Oracle Fusion Applications database. To preserve masked values, ensure that these best practices are followed when using the masked data for a test database:

1. Do not run the Enterprise Scheduler Service (ESS) job to synchronize the LDAP identity store and the Oracle Fusion Applications database, since doing so would reset the identity attributes in the database to their unmasked values.
2. Set up "dummy" test users to perform the testing.
3. Do not:
  - Log in to the test database as a real user.
  - Update a user's attributes in either the LDAP identity store or the Oracle Identity Manager database.

Doing so will reset that user's attributes to their unmasked values, allowing them to see their own masked record in employee self-service, deduce other people's identities by following the hierarchy, and so on.

In short, it is essential that you maintain close access control to databases holding live cloned data, and make testers aware of their obligations and responsibilities regarding

the data. As far as is possible, the processes around test data based on live data should mirror the processes around the live data itself. In particular, testers must not use privileged access to look beyond what they need to perform the required tests. For example, they must not try to work out to whom the data pertains, or try and find private information to satisfy their own curiosity.

## 6.9.6 References

For a detailed tutorial of data masking:

1. Go to <http://www.oracle.com/technetwork/tutorials/index.html>.
2. Click the link to access the learning library.
3. In the search field, enter Replacing Sensitive Data Using the Data Masking Pack and press Return.
4. Select a lesson by clicking the link, then click **Begin OBE**.

For additional information about securing sensitive data, Oracle Fusion Applications data security policies, and related topics, see the *Oracle Fusion Applications Security Guide*. The Privacy chapter explains how Personally identifiable information (PII) is defined and protected.

For deployment guidelines, see *Oracle Fusion Applications Enterprise Deployment Guide for Customer Relationship Management*.

## 6.10 Securing Web Services

Oracle Web Services Manager (WSM) provides a policy framework to manage and secure Web services consistently across your organization. Oracle WSM is available to the following users:

- Developers, at design time through Oracle JDeveloper
- System administrators in production environments with Fusion Middleware Control and command-line tools

The Oracle WSM policy framework secures Web services with policies, which describe capabilities and requirements such as whether and how a message must be secured, whether and how a message must be delivered reliably, and so on.

This section contains the following topics:

- [Section 6.10.1, "Local Policy Attachment"](#)
- [Section 6.10.2, "Global Policy Attachment"](#)
- [Section 6.10.3, "Web Services Security Profiles"](#)
- [Section 6.10.4, "Key Exchange with the Domain Hosting Oracle Identity Manager"](#)
- [Section 6.10.5, "Web Services Security Hardening"](#)

For more information about the Oracle WSM policy framework, see the "Understanding Oracle WSM Policy Framework" section in the *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

### 6.10.1 Local Policy Attachment

A policy subject is the target resource to which the policies are attached. Examples include Web services endpoints, Web service clients, SOA service endpoints, SOA clients, and SOA components.

Directly attaching one or more policies to a policy subject is referred to as "Local Policy Attachment" (LPA). [Table 6–21](#) lists key tasks related to LPAs.

**Table 6–21 Common LPA Operations**

Operation	Reference
Configure LPA using Fusion Middleware Control and WLST	"Attaching a Policy to a Single Subject" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Attach "no behavior" policies for Web Services and Web Service Clients	"Disabling a Globally Attached Policy" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Remove LPAs for all Web services	"Attaching a Policy to a Single Subject" section, subsection titled Attaching a Policy to a Web Service Using WLST (Step 4) in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Troubleshoot Web service security	"Diagnosing Problems" chapter in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>

## 6.10.2 Global Policy Attachment

A policy set, which can contain multiple policy references, enables you to attach policies globally to a range of endpoints of the same type. By attaching policies globally in this way, referred to as **Global Policy Attachment (GPA)**, you can ensure that all subjects are secured by default. [Table 6–22](#) lists key tasks related to GPAs.

**Table 6–22 Common GPA Operations**

Operation	Reference
GPA concepts and usage; determining if a Web service or client is security-enabled	"Attaching Policies Globally Using Policy Sets" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Create GPAs using Fusion Middleware Control and WLST	"Creating and Managing Policy Sets" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Disable GPAs	"Enabling and Disabling a Policy Set" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Determine what policies are enforced when both LPA and GPA are defined	"How the Effective Set of Policies is Calculated" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
View policies attached to a Web service	"Viewing the Policies That are Attached to a Web Service" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Validate a policy set	"Validating a Policy Set" section in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>

## 6.10.3 Web Services Security Profiles

Oracle Web Services Manager supports three Web services security profiles:

- AuthN Profile
- SSL Profile - provides transport-level security
- Message Security Profile - provides message-level security

Out-of-the box, Oracle Fusion applications are provisioned with the AuthN profile. You can move your deployment to a different profile if needed.

## 6.10.4 Key Exchange with the Domain Hosting Oracle Identity Manager

During provisioning, all Oracle Fusion Applications domains are set up to use a common keystore and credential store, whereas the Oracle Identity Management domain (which includes Oracle Identity Manager) uses a separate keystore, and stores credentials in a logical domain. Provisioning does not set up trust between these keystores. This section explains how to exchange trust with the Oracle Identity Manager domain, enabling Web services security when this domain is involved.

For additional background and information on the certificate exchange needed to set up Web services security trust, see the *Oracle Fusion Applications Security Hardening Guide*.

### Exporting a Keystore Alias from Application Domain

Take these steps to export the keystore alias:

1. Navigate to the `DOMAIN_HOME/config/fmwconfig` directory of the domain.
2. Run the `keytool` command to export the alias into a file called `orakey.cert` using syntax like in this example:

```
JAVAHOME/bin/keytool -exportcert -alias orakey -file orakey.cert -keystore default-keystore.jks -storepass keystore-password
```

This command creates a file called `orakey.cert` containing the exported `orakey` alias.

When using this command, specify the alias name and keystore password applicable to your environment.

### Importing a Keystore Alias into Oracle Identity Manager Domain

Take these steps to import the keystore alias:

1. Copy the file generated by the export procedure (`orakey.cert` in the export example) into the `DOMAIN_HOME/config/fmwconfig` directory of the Oracle Identity Manager domain where you wish to import the alias.
2. Run the `keytool` command using the following syntax to import the certificate:

```
JAVA_HOME/bin/keytool -importcert -alias orakey -file orakey.cert -keystore default-keystore.jks -storepass keystore-password
```

This command imports the alias into the Oracle Identity Manager domain's keystore.

Similar steps are used to export the Oracle Identity Manager key and import it into the other domain.

## 6.10.5 Web Services Security Hardening

For detailed instructions about Web Services Security hardening, see the "Locking Down Web Services: Points to Consider" section in the *Oracle Fusion Applications Security Hardening Guide*.

## 6.11 Securing Oracle Fusion Middleware Products

This section describes security guidelines recommended for Oracle Fusion Middleware products in the context of Fusion Applications. These administrative tasks, typically carried out with Oracle Authorization Policy Manager, Oracle Enterprise Manager Fusion Middleware Control, or WLST scripts, apply only to a specific product.

### 6.11.1 Administrative Tasks and Features Specific to the IDCCS Stripe

This section describes administrative tasks and features specific to Oracle WebCenter Content in the IDCCS stripe of the policy store, and they do not apply to any other stripe.

The grants specified in the stripe IDCCS must conform to one of the grants described in [Section 6.11.1.1](#).

[Section 6.11.1.2](#) explains why not to delete groups or accounts in that stripe.

#### 6.11.1.1 Grants Supported by Oracle WebCenter Content

Oracle Authorization Policy Manager allows an administrator to specify grants to accounts and groups in several combinations, but not all these combinations are supported by Oracle WebCenter Content. The following list identifies the grants in the IDCCS stripe that are supported and unsupported.

- Grants to Accounts
  - User to account resource: supported.
  - Enterprise role to account resource: supported.
  - Application role to account resource: supported.
- Grants to Security Group Resources
  - User to security group resource: not supported.
  - Enterprise role to security group resource: not supported.
  - Application role to security group resource: supported.
- Grants to Entitlements
  - None supported.

Even though Oracle Authorization Policy Manager allows an administrator to define a non-supported grant in for Oracle WebCenter Content, such grants are ignored at runtime.

#### 6.11.1.2 Security Groups and Accounts Associated with Documents

Oracle Authorization Policy Manager allows deleting a security group or account associated with a document; but Oracle WebCenter Content does not allow deleting such artifacts.

Security administrators should be cautious never to delete a security group or account associated with a document stored in the Oracle Content Server. If, however, such deletion takes place accidentally, the deleted artifact will automatically reappear.

## 6.12 Extracting Data from an LDAP- Based Store to a File

This section describes the use of the OPSS script `migrateSecurityStore` to extract the contents of one stripe and save it in an XML file.

To extract the policies in a given application stripe from an LDAP-based store, proceed as follows:

1. Create a file with the following content and save it as, for example, `exported-jazn-data.xml` in the same directory where your `jps-config.xml` file is located:

```
<?xml version = '1.0' encoding = 'UTF-8' standalone = 'yes'?>
<jazn-data xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:noNamespaceSchemaLocation="http://xmlns.oracle.com/oracleas/schema/jazn-dat
a-11_0.xsd">
  <jazn-realm default="jazn.com">
    <realm>
      <name>jazn.com</name>
    </realm>
  </jazn-realm>
</jazn-data>
```

2. Copy of your `jps-config.xml` file to, for example, `copy-jps-config.xml`.
3. Edit the file `copy-jps-config.xml` to contain an instance and two contexts like the following:

```
<serviceInstance location="./exported-jazn-data.xml"
  provider="policystore.xml.provider"
  name="export.xml" />

<jpsContext name="ldap_source">
  <serviceInstanceRef ref="policystore.ldap" />
</jpsContext>

<jpsContext name="xml_target">
  <serviceInstanceRef ref="export.xml" />
</jpsContext>
```

4. Run the script `migrateSecurityStore` as in the following invocation (the arguments are written in separate lines for the sake of clarity only):

```
migrateSecurityStore(type="appPolicies",
  configFile="./copy-jps-config.xml",
  src="ldap_source",
  dst="xml_target",
  srcApp="hcm")
```

The above illustrates the extraction of the contents of the application stripe `hcm` to the XML file `exported-jazn-data.xml`. To extract the contents of any other stripe, specify the appropriate stripe name in the argument `srcApp`. No more than one stripe can be extracted at a time.

Note that in the above example, both `copy-jps-config.xml` and `exported-jazn-data.xml` are assumed to be located in the same directory.



## 6.13 Customizing Security from Installation to Deployment

This section describes the typical flow of application security data from the application installation to the application deployment to a production environment, and, in particular, how to handle GUIDs in application policies throughout that flow; its phases, performed by developers and administrators, are explained in the following sections:

- [Section 6.13.1, "Installing a New Oracle Fusion Application"](#)
- [Section 6.13.2, "Customizing and Testing Security with Oracle JDeveloper"](#)
- [Section 6.13.3, "Migrating to a Staging Environment"](#)
- [Section 6.13.4, "Migrating to a Production Environment"](#)

### 6.13.1 Installing a New Oracle Fusion Application

In this phase, an administrator installs a new Oracle Fusion environment whereby the following application-specific artifacts are installed and provisioned:

- An identity store, containing users and security enterprise roles.
- An LDAP-based policy store, containing functional policies.
- An Oracle Fusion Data Security policy store, containing database resources and data security policies.

### 6.13.2 Customizing and Testing Security with Oracle JDeveloper

In this phase, a developer uses Oracle JDeveloper to customize and test functional security artifacts in the installed application. First, the developer needs an XML version of the application stripe in the installed LDAP-based store, the XML format been required by JDeveloper.

To obtain this file, the administrator proceeds as follows:

1. Runs the OPSS script `migrateSecurityStore` with the argument `preserveAppRoleGuid` set to `True` to export the contents of the application stripe in the LDAP-based policy store to the XML file (called `jazn-data.xml` throughout this section). For details on this procedure, see [Section 6.12](#).

---

**Important Note:** The use of the argument `preserveAppRoleGuid` is strictly restricted to the scenario described above; in particular, that argument should not be used with `migrateSecurityStore` in a production environment or when migrating from a staging to a production environment.

---

2. Edits the generated file `jazn-data.xml` to replace the group principal for enterprise roles with the group principal required by Oracle JDeveloper. Specifically, it runs a command that replaces, in that file, every instance of the string `weblogic.security.WLSGroupImpl` with the string `oracle.security.jps.internal.core.principals.JpsXmlEnterpriseRoleImpl`.
3. Delivers the edited `jazn-data.xml` to the developer, who copies it to the directory `<jdevapphome>/src/META-INF`.

Then, within Oracle JDeveloper, the developer proceeds as follows:

1. Defines a data source to point to the installed database security policy store.

2. Uses the security policy overview editor to customize function security (in the XML-based policy store), as documented in the "Implementing Function Security" chapter of the *Oracle Fusion Applications Developer's Guide*.
3. Creates test users and test groups, and run the application within Oracle JDeveloper. When the application is run, the WebLogic Server integrated in Oracle JDeveloper, merges `jazn-data.xml` with the domain file-based store `system-jazn-data.xml`.
4. When customization and testing within Oracle JDeveloper are completed, hands the file `jazn-data.xml` back to the system administrator.

### 6.13.3 Migrating to a Staging Environment

In this phase, the administrator proceeds as follows:

1. If the staging environment already has a stripe for the application and that stripe is to be preserved, merges the file `jazn-data.xml` with the staging application policy store, using Oracle Authorization Policy Manager as described in the "Upgrading Oracle Fusion Applications Policies" chapter of the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*. The relevant artifacts involved in this merge are the baseline store, represented by the original XML file `jazn-data.xml`; the production store, represented by the staging policy store stripe; and the patch store, represented by the new, customized `jazn-data.xml` file

Otherwise, if the application stripe is not present or is present but need not be preserved, the administrator uses the OPSS script `migrateSecurityStore` with the argument `overWrite` set to `TRUE` to migrate application policies in the file `jazn-data.xml` to the staging policy store.

2. Reconciles GUIDs in the Oracle Fusion Data Security policy store with GUIDs in application roles by running the command `DSDataMigrator` as described in [Section 6.4.3](#). This operation does not modify the file `jazn-data.xml` but updates GUIDs in data security policies.

---

---

**Important Note:** When migrating to a staging environment, reconciling GUID's is required *only* before deploying the application in the staging environment that will merge policies (from a developer's file-based policy store) containing newly introduced custom application roles that are also referenced in data security policies.

---

---

3. Packs the file `jazn-data.xml` with the application EAR and deploys the application to the staging environment with the following system property set:

```
-Djps.deployment.handler.disabled="true"
```

The above setting disables the OPSS listeners and ensures that when the EAR is deployed, domain policies do not get overwritten or appended with those in the packed `jazn-data.xml` file.

---

---

**Note:** Typically, the application deployment is set so that users and groups are not migrated during deployment. For details about this setting within Oracle JDeveloper, see the "Implementing Function Security" chapter in the *Oracle Fusion Applications Developer's Guide*.

---

---

## 6.13.4 Migrating to a Production Environment

In this phase, the administrator proceeds as follows:

1. Migrates the staging policy store to the production policy store using Oracle Authorization Policy Manager as described in the Upgrading Oracle Fusion Applications Policies chapter of the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)* to merge the customized, pillar-level `jazn-data.xml` with the production policy store.
2. Reconciles GUIDs in the Oracle Fusion Data Security policy store with GUIDs in the Oracle Internet Directory LDAP-based policy store by running the command `DSDataMigrator` as described in [Section 6.4.3](#).

---

---

**Important Note:** When migrating to a production environment, reconciling GUID's is required *only* if application roles or data security have been modified in the production environment..

---

---

3. Packs the file `jazn-data.xml` with the application EAR and deploys the application to the production environment with the following system property set:

```
-Djps.deployment.handler.disabled="true"
```

The above setting disables the OPSS listeners and ensures that when the EAR is deployed, domain policies do not get overwritten or appended with those in the packed `jazn-data.xml` file.



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## Managing Oracle Enterprise Scheduler Service and Jobs

This chapter describes how to configure and manage Oracle Enterprise Scheduler and Oracle Enterprise Scheduler jobs. Oracle Enterprise Scheduler enables scheduling and running jobs within a particular time frame, or **workshift**, using rules to create **work assignments**. Oracle Enterprise Manager Fusion Applications Control enables you to define, control and manage Oracle Enterprise Scheduler job metadata. The job metadata includes job definitions, job requests, **job sets** (a collection of job requests), incompatibilities (job definitions and job sets that cannot run at the same time for a given application), and schedules governing the execution of job requests. Oracle Enterprise Manager Cloud Control (Cloud Control) enables you to manage a subset of Oracle Enterprise Scheduler components, including job requests, schedules, alerts, and the starting and stopping of request processors and dispatchers.

This chapter includes the following topics:

- [Section 7.1, "Introduction to Managing Oracle Enterprise Scheduler"](#)
- [Section 7.2, "Viewing the Oracle Enterprise Scheduler Administration Pages"](#)
- [Section 7.3, "The Scheduling Service Home Page"](#)
- [Section 7.4, "Configuring Oracle Enterprise Scheduler"](#)
- [Section 7.5, "Searching for Configuration Changes to Oracle Enterprise Scheduler in Cloud Control"](#)
- [Section 7.6, "Viewing General Oracle Enterprise Scheduler Instance Information"](#)
- [Section 7.7, "Starting and Stopping Oracle Enterprise Scheduler Service Components"](#)
- [Section 7.8, "Managing Oracle Enterprise Scheduler Requests"](#)
- [Section 7.9, "Monitoring Oracle Enterprise Scheduler Service Activity"](#)
- [Section 7.10, "Managing Purge Policies in Fusion Applications Control"](#)
- [Section 7.11, "Managing Job Metadata"](#)
- [Section 7.12, "Managing Work Assignments and Workshifts"](#)
- [Section 7.13, "Managing Oracle ADF Connections"](#)
- [Section 7.14, "Managing Application Properties"](#)
- [Section 7.15, "Managing Application and Role Policies"](#)
- [Section 7.16, "Managing Oracle Enterprise Scheduler Web Services"](#)
- [Section 7.17, "Managing Logging for Oracle Enterprise Scheduler"](#)

- [Section 7.18, "Managing Alerts for Oracle Enterprise Scheduler in Cloud Control"](#)
- [Section 7.19, "Managing Oracle Enterprise Scheduler Using Oracle WebLogic Scripting Tool Commands"](#)

## 7.1 Introduction to Managing Oracle Enterprise Scheduler

Oracle Enterprise Scheduler provides the ability to define, schedule, and run different types of jobs, including Java, PL/SQL, spawned jobs, and binary scripts. You can run jobs on demand, or schedule them to run in the future.

Oracle Enterprise Scheduler provides scheduling services for the following purposes:

- Distributing job request processing across a grid of application servers
- Running Java, PL/SQL, spawned, and binary script jobs
- Processing multiple jobs concurrently

Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) enables you to start and stop, monitor, configure, and manage Oracle Enterprise Scheduler services, components, and job requests.

The main Oracle Enterprise Scheduler page provides an overview of the status of the scheduler components, the top running, and completed scheduled job requests, and a performance summary of scheduled job requests. You can further monitor activity and diagnose problems by examining Oracle Enterprise Scheduler logs and comparing current to historical performance data.

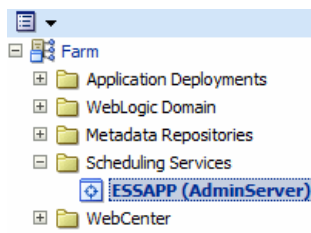
Drilling down to the main components of Oracle Enterprise Scheduler, you can configure job request processors and dispatchers. A job request processor is bound to a particular Oracle Enterprise Scheduler server, and is responsible for allocating threads for job requests. A job request dispatcher polls for job requests.

After the Oracle Enterprise Scheduler components are configured, you can define **work allocation** and purge policies. Work allocation definitions enable you to configure windows of time during which jobs can run (workshifts), rules that govern their execution and bindings to a particular server and request processor (work assignments). Purge policies enable you to define for a particular request processor the conditions for retaining and purging job requests associated with that request processor. You can define a schedule for managing the execution of work assignments, workshifts, and purge policies.

## 7.2 Viewing the Oracle Enterprise Scheduler Administration Pages

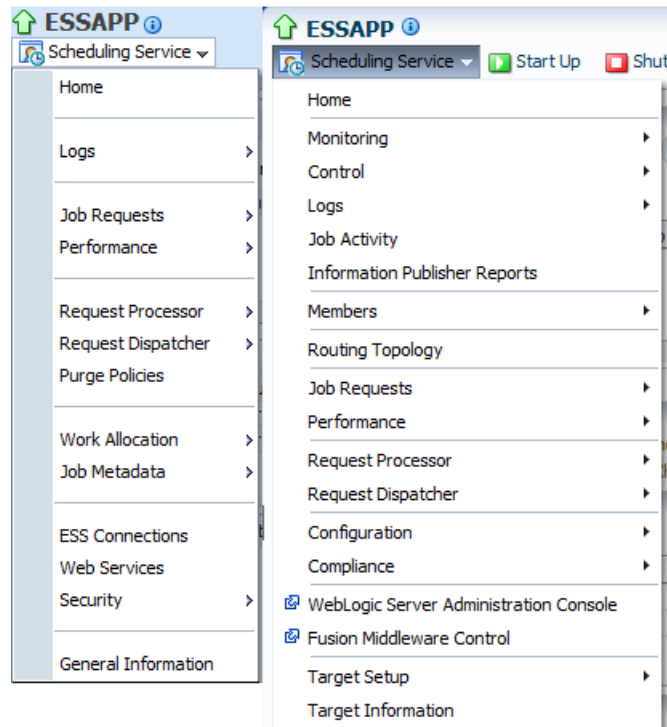
To view the Oracle Enterprise Scheduler administrative tasks in Fusion Applications Control or Cloud Control:

1. From the navigation pane, expand the farm name and then **Scheduling Services**, and select the Oracle Enterprise Scheduler component.



The Scheduling Service home page appears. For more information about the contents of the home page, see [Section 7.3](#).

2. Select the **Scheduling Service** menu.



The **Scheduling Service** menu displays the following options.

Menu Option	Description
Home	Displays the Scheduling Service home page. For more information about the contents of this page, see <a href="#">Section 7.3</a> .
Control	Displays the following options: <ul style="list-style-type: none"> <li>■ <b>Start Up:</b> This option runs the Oracle Enterprise Scheduler server. For more information, see <a href="#">Section 7.7</a>.</li> <li>■ <b>Shut Down:</b> This option shuts down the Oracle Enterprise Scheduler server. For more information, see <a href="#">Section 7.7</a>.</li> </ul>
Logs	The <b>View Log Message</b> option displays the Log Messages page for viewing the contents of event log files. For more information, see <a href="#">Section 7.17</a> . The log files are stored in the following directories: <ul style="list-style-type: none"> <li>■ <code>DOMAIN_HOME/servers/SERVER_HOME/logs</code></li> <li>■ <code>DOMAIN_HOME/servers/SERVER_HOME/logs/apps</code></li> <li>■ <code>DOMAIN_HOME/servers/SERVER_HOME/logs/owsm/msglogging/diagnostic.log</code></li> <li>■ <code>DOMAIN_HOME/servers/SERVER_HOME/sysman/log/emoms.log</code></li> </ul>

Menu Option	Description
Job Requests	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Search Job Requests:</b> This option enables you to search for job requests according to particular parameters. For more information, see <a href="#">Section 7.8.2</a>.</li> <li>▪ <b>Submit Job Request:</b> This option enables you to submit an execution request for a particular job. For more information, see <a href="#">Section 7.8.1</a>.</li> <li>▪ <b>Define Schedules:</b> This option enables you to create a schedule for submitting job requests. For more information, see <a href="#">Section 7.8.1.2</a>.</li> </ul>
Performance	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Service Summary:</b> This option displays a brief overview of the service performance. For more information, see <a href="#">Section 12.4.2.1</a>.</li> <li>▪ <b>Current Activity:</b> This option displays the current Oracle Enterprise Scheduler activity. For more information, see <a href="#">Section 12.4.2.2</a>.</li> <li>▪ <b>Historical Reports:</b> This option displays a chart or table depicting previous Oracle Enterprise Scheduler data. For more information, see <a href="#">Section 12.4.2.3</a>.</li> </ul>
Request Processor	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Start/Stop:</b> This option causes the request processor to start or stop running. For more information, see <a href="#">Section 7.7</a>.</li> <li>▪ <b>Configure:</b> This option displays the Configure Request Processor page, which enables the request processor, creates work assignment bindings, and so on. For more information, see <a href="#">Section 7.4</a>.</li> </ul>
Request Dispatcher	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Start/Stop:</b> This option causes the request dispatcher to start or stop running. For more information, see <a href="#">Section 7.7</a>.</li> <li>▪ <b>Configure:</b> This option displays the Configure Request Dispatcher page, which enables the request dispatcher, manages polling intervals, and so on. For more information, see <a href="#">Section 7.4</a>.</li> </ul>
Purge Policies	<p>This option enables you to configure and manage job request purge policies including job request purge criteria, retention criteria and purge policy schedules. For more information, see <a href="#">Section 7.10</a>. Available in Fusion Applications Control only.</p>
Work Allocation	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Work Assignments:</b> This option displays the Work Assignments page which enables you to create, edit, and delete work assignments. For more information, see <a href="#">Section 7.12</a>.</li> <li>▪ <b>Workshifts:</b> This option displays the Workshifts page which enables you to create, edit, and delete workshifts. For more information, see <a href="#">Section 7.12</a>.</li> <li>▪ <b>Schedules:</b> This option displays the Schedules page which enables you to create, edit, and delete schedules for work assignments, workshifts, and job request purge policies. For more information, see <a href="#">Section 7.12</a>.</li> </ul> <p>Available in Fusion Applications Control only.</p>



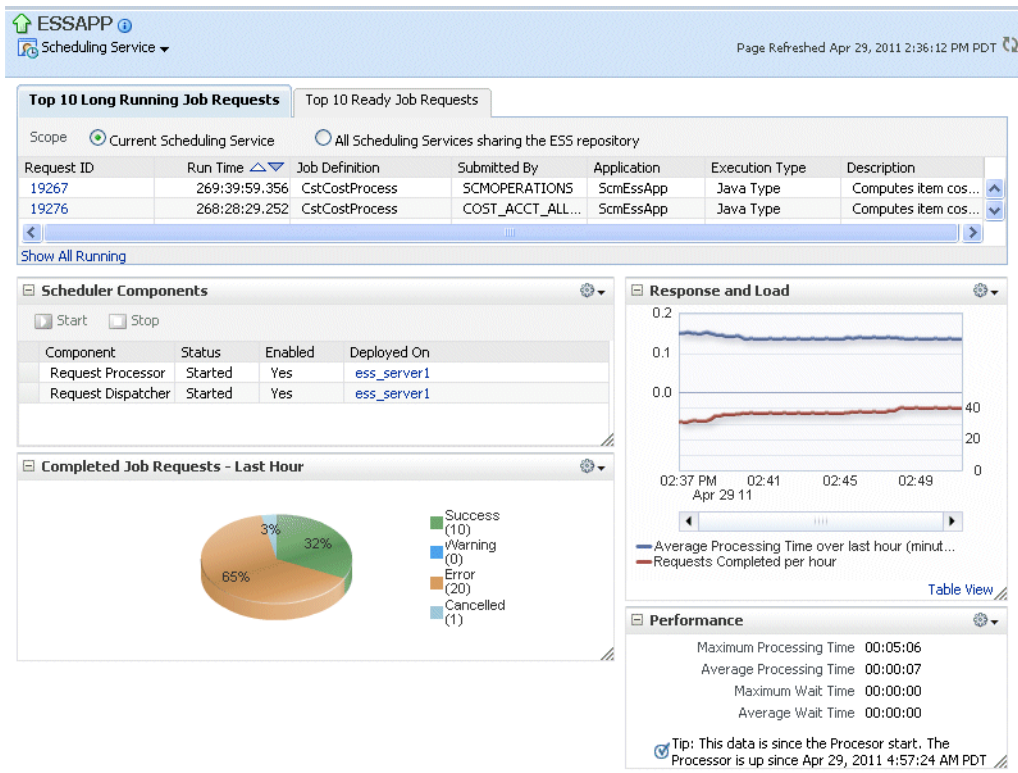
Menu Option	Description
Job Metadata	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Job Definitions:</b> This option displays the Job Definitions page, which enables you to manage job definitions. For more information, see <a href="#">Section 7.11.1</a>.</li> <li>▪ <b>Job Sets:</b> This option displays the Job Sets page, which enables you to create and edit job sets for a given application. For more information, see <a href="#">Section 7.11.2</a>.</li> <li>▪ <b>Incompatibilities:</b> This option displays the Incompatibilities page, which enables you to create and edit incompatibilities for a given application. For more information, see <a href="#">Section 7.11.3</a>.</li> </ul> <p>Available in Fusion Applications Control only.</p>
ESS Connections	<p>Displays a page that enables defining connections to Oracle ADF. For more information, see <a href="#">Section 7.13</a>.</p> <p>Available in Fusion Applications Control only.</p>
Web Services	<p>Displays a page that provides an overview of the web services in the application including web service endpoints and application-level metrics. For more information, see <a href="#">Section 7.16</a>.</p> <p>Available in Fusion Applications Control only.</p>
Security	<p>Displays the following options:</p> <ul style="list-style-type: none"> <li>▪ <b>Application Policies:</b> This option displays the authorization policies that an application relies upon for controlling access to its resources. For more information, see <a href="#">Section 7.15</a>.</li> <li>▪ <b>Application Roles:</b> This option displays the roles used by security aware applications specific to the application. For more information, see <a href="#">Section 7.15</a>.</li> </ul> <p>Available in Fusion Applications Control only.</p>
General Information Target Information	<p>Displays general details about the Oracle Enterprise Scheduler instance. Known as <b>Target Information</b> in Cloud Control. For more information, see <a href="#">Section 7.6</a>.</p>

## 7.3 The Scheduling Service Home Page

The Scheduling Service home page provides an overview of the performance of Oracle Enterprise Scheduler components and jobs, including the component status, the number of completed job requests in the last hour, and the processing times for running jobs.

You can use this page as a starting point for monitoring and administering Oracle Enterprise Scheduler. [Figure 7-1](#) shows a portion of the Scheduling Service home page.

Figure 7–1 Scheduling Service Home Page



This page contains the following regions:

- Section 7.3.1, "Top 10 Long Running Requests and Top 10 Ready Job Requests Regions"
- Section 7.3.2, "Scheduler Components Region"
- Section 7.3.3, "Completed Requests Region"
- Section 7.3.4, "Response and Load Region"
- Section 7.3.5, "Performance Region"
- Section 11.4.1.1, "Monitoring and Diagnostics Region" (Cloud Control only)

### 7.3.1 Top 10 Long Running Requests and Top 10 Ready Job Requests Regions

The Top 10 Long Running Requests region displays the top 10 long running scheduled job requests, including request ID, job runtime, job definition used, executing application, job execution type, and description. You can set the scope of the top 10 long running requests displayed to the current scheduling service only, or all scheduling services sharing the Oracle Enterprise Scheduler repository.

The **Top 10 Ready Job Requests** tab displays the top 10 scheduled job requests that await execution. The tab displays the same information as the **Top 10 Long Running Requests** tab, except the wait time is shown for each job rather than the runtime.

### 7.3.2 Scheduler Components Region

The Scheduler Components region displays the components of Oracle Enterprise Scheduler, including the job request processor and dispatcher. The tab shows the

status of each component, the name of the server to which it is deployed, and whether the component is enabled. You can start and stop each component as required.

### 7.3.3 Completed Requests Region

The Completed Requests region displays the scheduled jobs completed within the last hour.

### 7.3.4 Response and Load Region

The Response and Load region displays performance monitoring statistics regarding the time required to process job requests.

[Table 7-1](#) describes the performance monitoring statistics in the **Response and Load** region.

**Table 7-1 Response and Load Statistics**

Statistic	Description
Average processing time for last hour	This metric specifies the average time required to process jobs during the last hour.
Requests completed per hour	This metric specifies the number of scheduled job requests completed within the last hour.

### 7.3.5 Performance Region

The Performance region displays performance data for job requests, such as processing times and wait times.

[Table 7-2](#) describes the performance monitoring statistics in the **Performance** region.

**Table 7-2 Performance Statistics**

Statistic	Description
Maximum processing time	This metric specifies maximum amount of time required to process a scheduled job.
Average processing time	This metric specifies average amount of time required to process a scheduled job.
Maximum wait time	This metric specifies maximum amount of time during which a scheduled job waits before running.
Average wait time	This metric specifies the average amount of time during which a scheduled job waits before running.

## 7.4 Configuring Oracle Enterprise Scheduler

You can run Oracle Enterprise Scheduler as a single instance or as a cluster of servers. Each Oracle Enterprise Scheduler server includes a request processor and dispatcher, both of which must be configured.

Configuring Oracle Enterprise Scheduler involves the following main steps:

1. (Optional). Configure a cluster. Configure a cluster of Oracle Enterprise Scheduler servers. For more information about configuring a cluster, see the section "Expanding an Oracle Enterprise Scheduling Service Cluster" in the chapter "Performing Basic Administration Tasks" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

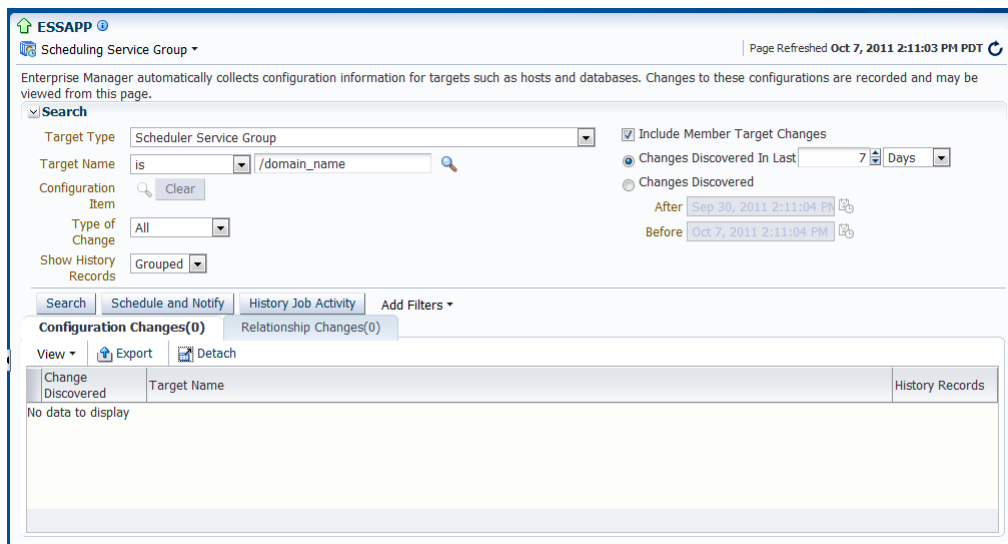
2. Configure the request processor. Configure the Oracle Enterprise Scheduler component that receives and manages job requests. For more information about configuring the request processor, see the section "Configuring a Request Processor" in the chapter "Performing Basic Administration Tasks" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.
3. Configure the request dispatcher. Configure the Oracle Enterprise Scheduler component that polls the request processor for job requests and dispatches jobs. For more information about configuring the request dispatcher, see the section "Configuring a Request Dispatcher" in the chapter "Performing Basic Administration Tasks" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

## 7.5 Searching for Configuration Changes to Oracle Enterprise Scheduler in Cloud Control

You can search for changes made to configurations using the search page in Cloud Control.

To search for changes to configurations to Oracle Enterprise Scheduler in Cloud Control:

1. Display the alerts for Oracle Enterprise Scheduler as described in [Section 7.18.2](#).
2. In the Monitoring and Diagnostics pane, click the number of configuration changes to display on the search page for configuration changes to Oracle Enterprise Scheduler alerts.



3. Configure your search.
  - **Target Type:** Select the **Scheduler Service** or **Scheduler Service Group**.
  - **Target Name:** Search for or enter the name of the target. From the dropdown list, select the criterion by which you want to search for the target name: **contains, is, is not, does not contain, starts with, ends with**.
  - **Type of Change:** From the dropdown list, select the type of configuration change for which you want to search.
  - **Show History Records:** From the dropdown list, select the way you want the records to display, **Grouped** or **Show All**.

- **Include Member Target Changes:** Select to display configuration changes made to members of the target.
  - **Changes Discovered in Last:** Select to search for changes discovered within a given number of days, weeks, or months.
  - **Changes Discovered:** Select to search for changes discovered within a particular time period. Use the **After** and **Before** fields to enter the relevant time period.
4. Click **Search** to search for the changes.

## 7.6 Viewing General Oracle Enterprise Scheduler Instance Information

Oracle Fusion Applications Control enables viewing information regarding the particular instance of Oracle Enterprise Scheduler. The general information popup window displays the locations of Oracle Fusion Middleware, the domain and the target application, and the version of Oracle Fusion Middleware currently running and the URI of the hosting server also are displayed.

To view general information about Oracle Enterprise Scheduler:

1. From the Scheduling Service menu, select one of the following:
  - In Fusion Applications Control, select **General Information**.
  - In Cloud Control, select **Target Information**.
2. Oracle Fusion Applications Control displays the following information:
  - **Target Name:** The location of the target application, in this case, Oracle Enterprise Scheduler, running on the domain.
  - **Version:** The version number of Oracle Fusion Middleware.
  - **Middleware Home:** The location of the Oracle Fusion Middleware directory.
  - **Domain Home:** The full path of the domain.
  - **Host:** The URI of the hosting server.

## 7.7 Starting and Stopping Oracle Enterprise Scheduler Service Components

You can start and stop an instance of Oracle Enterprise Scheduler from Oracle Fusion Applications Control.

The following components can be started and stopped:

- Oracle Enterprise Scheduler instance.
- Job request processor and dispatcher.

---

**Note:** Stopping an Oracle Enterprise Scheduler instance or component is not recommended. Stopping an Oracle Enterprise Scheduler component does not stop job requests from accumulating in the queue.

---

For more information about starting and stopping Oracle Enterprise Scheduler components, see the section "Starting and Stopping Oracle Enterprise Scheduling

Service Components" in the chapter "Performing Basic Administration Tasks" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

## 7.8 Managing Oracle Enterprise Scheduler Requests

A job request is a request sent from a deployed application to Oracle Enterprise Scheduler to execute a job. Jobs are configured using job definitions, which specify the parameters of the job and associate them with a particular application. A job set is a collection of job requests that is grouped together.

This section contains the following topics:

- [Section 7.8.1, "Submitting an Oracle Enterprise Scheduler Job Request"](#)
- [Section 7.8.2, "Searching for Oracle Enterprise Scheduler Job Requests"](#)

For more information about searching for jobs, viewing job request details, and holding and canceling jobs, see the section "Searching for Oracle Enterprise Scheduling Service Job Requests" in the chapter "Managing Oracle Enterprise Scheduler Requests" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

### 7.8.1 Submitting an Oracle Enterprise Scheduler Job Request

You can submit a job request for a particular application using a job definition and a schedule by which you want the job to run.

This section contains the following topics:

- [Section 7.8.1.1, "Creating a Job Request"](#)
- [Section 7.8.1.2, "Specifying a Job Request Schedule"](#)

#### 7.8.1.1 Creating a Job Request

To create a job request, select a job definition for the job request, then select or create a schedule.

You may want to configure system properties for the job request, such as the number of retries to attempt in the event of an execution error and a time out value for the job.

To submit a job request:

1. Use a pre-existing job definition, or create a new job definition, as described in [Section 7.11.1.2](#).
2. Go to the Submit job request page by clicking the Scheduling Service menu and selecting **Job Requests**. Then, select **Submit Job Request**.
3. Select the application for which you want to submit the job request.  
From the application dropdown list, select the Java EE application deployment name.
4. Under Job Request Details, enter information about the job request in the **Details** field.
5. Select a job definition.
  - a. Under Job Definition, click the search button next to the **Job Definition** field.
  - b. Search for the required job definition.

In the **Job Definition Name** field, enter the name of the job definition you want to find.

Click the arrow next to the field to search for the job definition.

- c. From the search results table, select the job definition name.
6. In the Parameters region, define any parameters you want to use with the scheduled job request.
    - a. In the Parameters region, click **Add** to add a parameter.  
Enter a name and value for the parameter.
    - b. You can set a value for any of the system properties available. [Table 7-3](#) lists the names and descriptions of system properties.  
  
For example, you may want to configure the number of permissible retries for the job (`SYS_retries`) or a time out value (`SYS_request_timeout`).
  7. Select a schedule by which the job is to run.
    - **Once:** Select a single date and time by clicking the calendar icon.
    - **Use existing schedule:** Click the search button to search for and select an existing schedule.
    - **Specify schedule:** Create your own schedule as you need it. Follow the instructions in [Section 7.8.1.2](#).

### 7.8.1.2 Specifying a Job Request Schedule

In the Submit Job Request page, select **Specify a Schedule** to enable configuring your own schedule for a job request. You can configure a recurring job request using a job request schedule. Alternatively, you can configure a job request to run immediately or before a specified end date. Use a pre-existing job definition, or create a new job definition, as described in [Section 7.11.1.2](#).

To specify a schedule:

1. In the Start section, select the starting date and time for the job request.  
Select **Immediately** to submit the job request right away.  
Select **Later** to select a subsequent start date.
2. In the Repeating section, select the desired frequency of the job request submission schedule.  
  
From the Repeat dropdown list, select **Every N minutes**, **Every N hours**, **Every N days** or **Every N weeks**.  
  
In the **Frequency** field, enter the number of minutes, hours, days, or weeks.
3. In the End Date section, select the date and time at which the schedule job is to end.
  - **No End Date:** Select to specify a continuous schedule for the job request.
  - **Specified End Date:** Select to specify a particular end date for the schedule. Click the calendar icon next to the **Date** field and select a date and time. You can save the schedule by selecting the **Save Schedule** checkbox and entering a name for the schedule in the **Name** field. You can also enter the package name and description.

## 7.8.2 Searching for Oracle Enterprise Scheduler Job Requests

The Request Search page enables searching for job requests. Using the Request Search page, you can:

- Conduct a simple search that returns a list of job request details, including job request ID, executing application, job request status, and so on.
- Conduct an advanced search that returns the same information as the simple search, and the date and time of execution, the runtime or wait time of the job request, the number of retries, and any error type that may have occurred during execution.
- Modify the column display in the search results table.

This section contains the following topics:

- [Section 7.8.2.1, "Searching for a Job Request Using Simple Search"](#)
- [Section 7.8.2.2, "Searching for a Job Request Using the Advanced Search Feature"](#)
- [Section 7.8.2.3, "Configuring the Display of Columns in the Search Results Table"](#)

### 7.8.2.1 Searching for a Job Request Using Simple Search

A simple search enables you to find a job request according to particular criteria such as job request ID, related application, job request status, and so on, or by any one of several preconfigured quick searches.

To search for a job request:

1. Go to the Request Search page by clicking the Scheduling Service menu and selecting **Job Requests**. Then select **Search Job Requests**.
2. Select the scope of the job request search by selecting one of the following options:
  - **Current Scheduling Service:** Select this option to search for job requests submitted only to the scheduling service with which you are currently working.
  - **All Scheduling Services sharing the ESS repository:** Select this option to search for job requests submitted to all scheduling services sharing the repository, for example all scheduling services in a cluster of scheduling services.
3. To run a fast search, from the **Quick Search** dropdown list, select a pre-configured search option as shown in the following list:
  - Requests submitted in the last hour
  - Pending requests submitted in the last 24 hours
  - Errored requests submitted in the last 24 hours
  - All running requests
  - All pending requests
  - Requests currently being retried
  - Requests retried in the last 24 hours
  - Requests that resulted in a system error in the last 24 hours
  - Requests that resulted in a business error in the last 24 hours

To run a regular job request search, skip this step.
4. Select the criteria by which to search for job requests:
  - **Request ID:** Enter the ID of the job request for which you want to search.



- **Application:** From the Application dropdown list, select the name of the application related to the job request for which you want to search. Alternatively, select **All** to search for job requests in all applications.
  - **Status:** Select the status of the job request for which you want to search. Alternatively, select **All** to search for job requests with all statuses. Statuses are listed here.
    - WAIT
    - READY
    - PENDING\_VALIDATION
    - EXPIRED
    - WARNING
    - VALIDATION\_FAILED
    - RUNNING
    - BLOCKED
    - SCHEDULE\_ENDED
  - **Execution Type:** Select `JAVA_TYPE`, `SQL_TYPE`, or `PROCESS_TYPE`.
  - **Submitted:** From the dropdown list, select the time period in which the job request to be searched has been submitted. Options include **Last Hour**, **Last 24 Hours**, **Last 7 Days**, and **Last 31 Days**.
  - **Submitted By:** In the field, enter the name of the user who submitted the job request you want to find.
  - **Job Definition:** Click the Search button next to the field and select the relevant job definition name.
  - **Work Assignment:** Click the Search button next to the field and select a work assignment from the list.
5. (Optional). Conduct an advanced search by clicking the **Advanced** button.
  6. Click **Search** to submit the job request search.

### 7.8.2.2 Searching for a Job Request Using the Advanced Search Feature

You can perform an advanced search in the Request Search page by clicking the **Advanced** button.

To search for a job request:

1. Enter a basic search for a job request. Go to the Request Search page by clicking the Scheduling Service menu and selecting **Job Requests**. Then Select **Search Job Requests**.
2. Select the scope of the job request search by selecting one of the following options:
  - **Current Scheduling Service:** Select this option to search for job requests submitted only to the scheduling service with which you are currently working.
  - **All Scheduling Services sharing the ESS repository:** Select this option to search for job requests submitted to all scheduling services sharing the repository, for example all scheduling services in a cluster of scheduling services.

3. Select your basic search criteria. For more information, see [Section 7.8.2.1](#).
4. Click **Advanced** to display the fields for the advanced search.
5. In the Date Range section, configure the date range in which to search for job requests. The date on the left is the beginning date and the date on the right is the end date. For each date, click the calendar icon to the right of the field to select the date and time.
  - **Submitted between:** Enter the start and end dates during which the job request was submitted.
  - **Scheduled between:** Enter the start and end dates during which the job request is scheduled to run.
  - **Completed between:** Enter the start and end dates during which the job request finished running.
6. In the Run Time/Wait Time section, select the run time or wait time of the job request for which you are searching, such as long or short running requests.
  - **None:** Select if no run time or wait time is to be specified.
  - **Long running requests:** Select to search for requests running longer than a specified number of seconds, minutes, hours, or days.  
 In the **Minimum Run Time** field, enter the lower limit of the time period for which the job request runs. From the dropdown list, select the required unit of time.
  - **Short running requests that waited:** Select to search for job requests running longer than a specified period and waiting less than a specified period.  
 In the **Maximum Run Time** field, enter the upper limit of the time period for which the job request runs. From the dropdown list, select **Seconds, Minutes, Hours, or Days**.  
 In the **Minimum Wait Time** field, enter the lower limit of the time period during which the job request waits to run. From the dropdown list, select **Seconds, Minutes, Hours, or Days**.
  - **Waiting requests by time:** Select to search for job requests waiting to run for a specified time period.  
 In the **Minimum Wait Time** field, enter the lower limit of the time period during which the job request waits to run. From the dropdown list, select **Seconds, Minutes, Hours, or Days**.  
 In the **Maximum Wait Time** field, enter the upper limit of the time period during which the job request waits to run. From the dropdown list, select **Seconds, Minutes, Hours, or Days**.
7. In the Retry of Failed Runs section, use the Number of Retries dropdown list to select an operator such as equal to, greater than, greater than or equal to, and so on.  
 In the field, enter the number of retries.
8. In the Error Type section, use the dropdown list to select the type of error:
  - **Business:** A job ends in a business error when it must stop prematurely due to unforeseen conditions, but the job is otherwise able to exit with its data in a consistent state. A job request might end in a business error due to an application setup or configuration condition, a functional conflict that requires

an early exit or corrupt or inconsistent data. You cannot retry running a job request that ends in a business error.

- **System:** A job ends in a system error when a technical problem occurs from which the job cannot recover, but the job otherwise exits on its own. Alternatively, the computer running the job fails. Examples include table space issues and unhandled runtime exceptions. You can retry running a job request that ends in a system error.

9. Click **Search** to submit the job request search.

### 7.8.2.3 Configuring the Display of Columns in the Search Results Table

After running a search for job requests, you can configure how the columns are displayed in the search results table.

To configure job request search results table display columns:

1. Display the main Oracle Enterprise Scheduler Request search page and display the search interface.
2. Display the list of available column names.  
Click the **View** dropdown list and select **Columns**, then **Show More Columns**.
3. Use the arrows between the columns to move the column names from the **Visible** to the **Hidden** column, or vice versa.
4. (Optional). Reorder the columns by selecting the relevant column names and using the vertical arrows on the right to move them up or down.
5. Alternatively, display all columns by clicking the **View** dropdown list and select **Columns**, then **Show All**.

## 7.9 Monitoring Oracle Enterprise Scheduler Service Activity

The main Oracle Enterprise Scheduler page displays information regarding the top 10 long running scheduled jobs and the top 10 job requests awaiting execution in two different tabs. By default, only the job requests within the current scheduling service appear. However, you can change the scope such that all relevant scheduled jobs running on all scheduling services sharing the Oracle Enterprise Scheduler repository appear in the tabs.

Each of the Oracle Enterprise Scheduler tabs includes a table that displays a short list of top 10 long running and waiting job requests, respectively. The Show All Ready or Show All Running link at the bottom of the region goes to a search page in which it is possible to search for a more comprehensive list of relevant job requests.

Each tab displays the following information about scheduled job requests:

- **Request ID:** The ID associated with the job request.
- **Run Time/Wait Time:** The period during which the job request has been running or awaiting execution, respectively.
- **Job Definition:** The job definition associated with the job request.
- **Submitted by:** The name of the user who submitted the job request.
- **Application:** The name of the application with which the job request is associated.
- **Execution Type:** The category of job being executed—Java, SQL, or process job.
- **Description:** An optional description of the scheduled job request.

You can also monitor Oracle Enterprise Scheduler job requests related to a product. For more information about viewing the top scheduled job requests related to a product, see [Section 11.2.4](#).

This section contains the following topics:

- [Section 7.9.1, "Viewing Top 10 Long Running Oracle Enterprise Scheduler Requests"](#)
- [Section 7.9.2, "Viewing Top 10 Oracle Enterprise Scheduler Jobs Ready to Be Executed"](#)

## 7.9.1 Viewing Top 10 Long Running Oracle Enterprise Scheduler Requests

Use the **Top 10 Long Running Job Requests** tab to view the job requests that have been running for the longest period on the Oracle Enterprise Scheduler service. You can alternatively change the scope of the region to display the top 10 long running job requests on all scheduling services sharing the same repository.

The job requests that are displayed will all have a status of `RUNNING`.

To view the top 10 long running requests:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. At the top of the Oracle Enterprise Scheduler page, click the **Top 10 Long Running Requests** tab to display the 10 job requests that have been running the longest.
3. To display all running job requests, click **Show All Running** at the bottom of the chart. This displays a search form that searches for all requests that are currently running. Click **Search** to display the requests.

## 7.9.2 Viewing Top 10 Oracle Enterprise Scheduler Jobs Ready to Be Executed

Use the **Top 10 Ready Job Requests** tab to view the job requests that are awaiting execution on the Oracle Enterprise Scheduler service. You can alternatively change the scope of the region to display the top 10 ready job requests on all scheduling services sharing the same repository.

The job requests that are displayed will have a status of `READY`.

To view the top 10 ready job requests:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. At the top of the Oracle Enterprise Scheduler page, click the **Top 10 Ready Requests** tab to display the 10 job requests with the status `READY`.
3. To display all ready job requests, click **Show All Ready** at the bottom of the chart. This displays a search form that searches for all requests with the status `READY`. Click **Search** to display the requests.

## 7.10 Managing Purge Policies in Fusion Applications Control

Purge policies enable the scheduling service to remove scheduled jobs according to specified criteria. For example, a purge policy might specify the retention of all Java job requests using a particular job definition submitted by an application for 3 days. Another purge policy might retain a particular type of job request, for example, all

SQL job requests in a successful state, for only 1 day. You can also specify the frequency at which the purge policy is to run.

For more information about managing purge policies, see the section "Managing Purge Policies" in the chapter "Managing Oracle Enterprise Scheduler Requests" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

## 7.11 Managing Job Metadata

Oracle Enterprise Scheduler job metadata refers to the components that form the basis of scheduled job requests.

These include the following:

- **Job definition:** A job definition is the smallest unit of work performed in the context of the application that executes the job. A job definition is defined by a job type, such as a Java or SQL job type.
- **Job set:** A job set is a sequential or parallel set of job steps; a job step can be a single job or another job set. A job set and each of its job set steps can have additional parameters, the values for which are provided when the job or job set is submitted as a job request.
- **Incompatibility:** An incompatibility enables you to specify job definitions and job sets that cannot run concurrently.

This section contains the following topics:

- [Section 7.11.1, "Managing Job Definitions"](#)
- [Section 7.11.2, "Managing Job Sets"](#)
- [Section 7.11.3, "Managing Incompatibilities"](#)

You can manage job metadata only in Fusion Applications Control.

### 7.11.1 Managing Job Definitions

The Job Definitions page in Oracle Enterprise Manager Fusion Applications Control enables you to view, create, edit, duplicate, delete, and search for job definitions.

[Figure 7-2](#) shows the **Manage Job Definitions** tab in the Job Definitions page. The tab displays a table of job definitions and their attributes, including name, description, location, execution type, and job type.

**Figure 7-2 Manage Job Definitions Tab**

ESSAPP | Scheduled Service Group | Logged in as weblogic | Page Refreshed Apr 10, 2011 11:47:00 PM PDT

Scheduling Service Home > Job Definitions

**Job Definitions**

Select the application (J2EE application deployment name) for which you want to view the job definitions.

Application:

**LedgerApp**

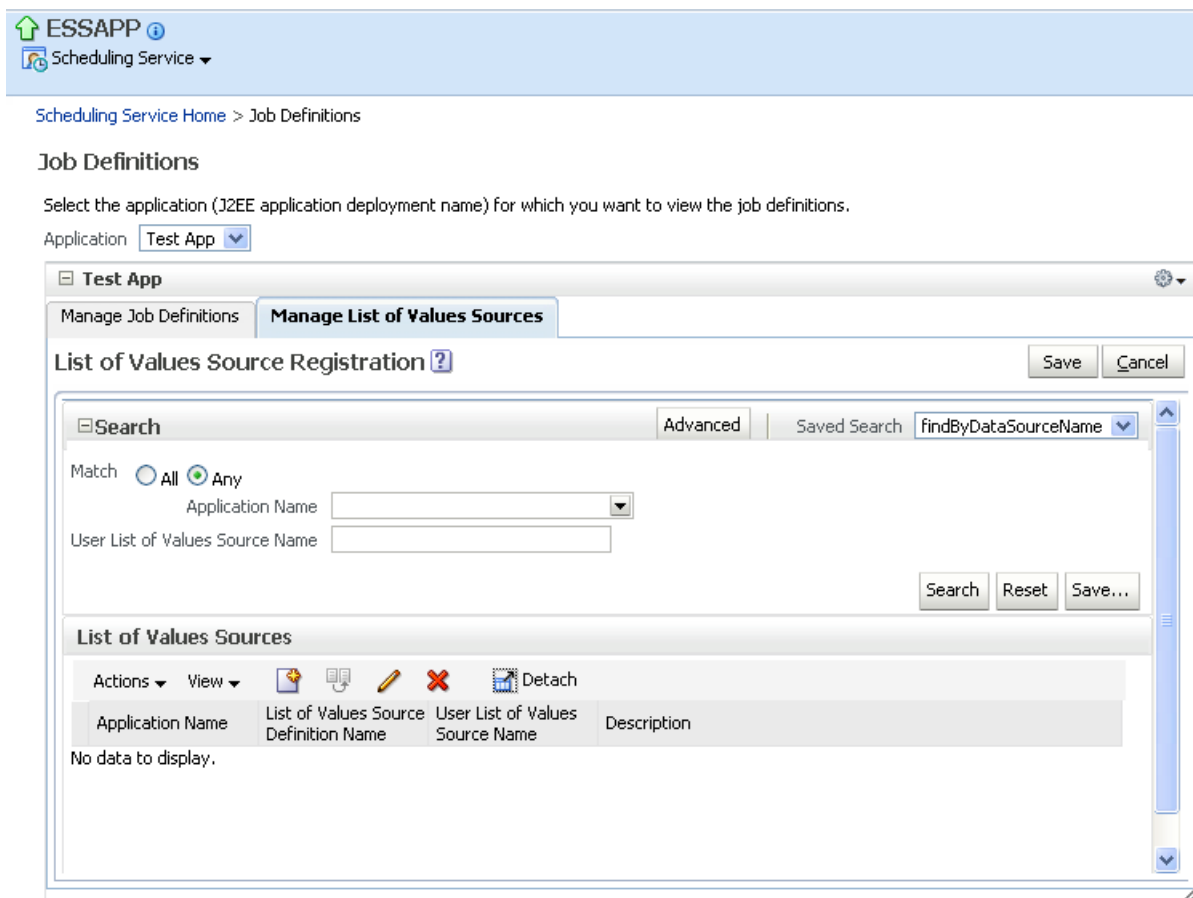
Manage Job Definitions | Manage List of Values Sources

Manage Job Definitions ?

Name	Display Name	Description	Path	Execution Type	Job Type
*APCSTTRF	Transfer Costs to Cost Management	Transfers cost	/oracle/apps/€	Java	JavaJobType
*APINVSEL	Payables Selected Installments Selection	Lists all invoice	/oracle/apps/€	Java	BIPJobType
*APMACR	Create Mass Additions	Transfers capit	/oracle/apps/€	PL SQL	PlsqlJobType
*APOPIRTRN	Open Items Revaluation Report	Lists changes in	/oracle/apps/€	Java	BIPJobType
*APTCMT	US 1099 Electronic Media Report	Generates sum	/oracle/apps/€	Java	BIPJobType
*APTERIAW	Terminate Approval Task Flow	Terminates the	/oracle/apps/€	PL SQL	PlsqlJobType
*APWHTXLT	Payables Withholding Tax Letter	Creates a with	/oracle/apps/€	Java	BIPJobType
*APXAPRVL	Validate Payables Invoice	Checks the ma	/oracle/apps/€	Java	BIPJobType
*APXATR	Apply Missing Conversion Rates	Applies missing	/oracle/apps/€	PL SQL	PlsqlJobType
*APXCRRCR	Payables Cash Requirement Report	Forecasts imme	/oracle/apps/€	Java	BIPJobType
*APXIAWRE	Initiate Approval Task Flow	Initiates the ap	/oracle/apps/€	PL SQL	PlsqlJobType
*APXIIMPT	Import Payables Invoices	Creates Payabl	/oracle/apps/€	Java	BIPJobType
*APXINAGE	Payables Invoice Aging Report	Lists unpaid in	/oracle/apps/€	Java	BIPJobType
*APXINDTL	Payables Discounts Taken and Lost Repo	Identifies paym	/oracle/apps/€	Java	BIPJobType

The Job Definitions page in Oracle Enterprise Manager Fusion Applications Control also enables you to register sources for lists of values related to job definitions and the applications that run job definitions. [Figure 7-3](#) shows the **Manage List of Values Sources** tab in the Job Definitions page.

Figure 7-3 Manage List of Values Sources Tab



This section contains the following topics:

- [Section 7.11.1.1, "Viewing Job Definitions"](#)
- [Section 7.11.1.2, "Creating Job Definitions"](#)

### 7.11.1.1 Viewing Job Definitions

You can view the job definitions created for an application. The table of job definitions displays information about the jobs related to an application such as the job definition name, the full path to which it is saved, the job type, and so on.

---

**Note:** In the Job Definitions page, an asterisk appears next to those jobs in the list that were seeded, and are not custom jobs. The asterisk also appears next to seeded jobs that you have customized.

---

To display job definitions:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. From the Scheduling Services menu, select **Job Metadata** and then select **Job Definitions**.

The Job Definitions page appears.

3. From the Applications dropdown list, select the name of the UI application whose job definitions you want to view.

The job definitions for that application appear in a table below the application dropdown list.

Column Name	Description
Name	This column displays the name of the job definition.
Display Name	This column displays the name of the job definition as it is shown.
Description	This column displays a description of the job definition.
Path	This column displays the full directory path to which the job definition is saved.
Execution Technology	This column displays the type of job request that you can create using the given job definition, such as a Java, C, PL/SQL, Perl, or hosted script job.
Job Type Name	This column displays the name of the job type upon which the job definition is based.

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**Note:** If there are applications with similar names, be sure to select the UI application. For example, you have applications called **ProjectFinancialsApp** and **ProjectFinancialsESSApp**. Select **ProjectFinancialsApp** as this is the UI application.

---



---

4. To view the details of a specific job definition, click the name of the relevant job definition.

### 7.11.1.2 Creating Job Definitions

You can create a new job definition, which you can then use to create a job request for a particular application. The job definition includes the directory path of the job to be run, the name of the application with which the job definition is associated and the job type used for the job definition.

Additional properties can be defined for a job definition as follows:

- **Parameters:** You can configure editable or read-only parameters to be submitted to the job request.
- **Application Defined properties:** You can configure properties to be filled in by users at runtime, such as Boolean, number, and string values. Application defined properties associate parameter view objects and parameter taskflows with a particular job definition or job set. For example, you can create an application defined property called `parameterVO` and define as its value the full name of the view object to be used in conjunction with the job definition. Alternatively, you can create an application defined property called `ParameterTaskFlow` with the task flow ID as its value. When the job definition runs, the application defined property defined for the job definition connects the relevant view object or task flow to the job request.
- **Lists of Values:** You can search for and register sources for lists of values to be used for parameters.

To create a job definition:



1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. From the Scheduling Services menu, select **Job Metadata** and then select **Job Definitions**.

The Job Definitions page displays.

3. From the Applications dropdown list, select the name of the UI application for which you want to create a job definition.

---

**Note:** If there are applications with similar names, be sure to select the UI application. For example, you have applications called **ProjectFinancialsApp** and **ProjectFinancialsESSApp**. Select **ProjectFinancialsApp** as this is the UI application.

---

4. Click **Create** to create a new job definition.
5. For the new job definition, configure the following required properties:
  - **Name:** Enter a name for the job definition.
  - **Display Name:** Enter the name to be shown for the job definition.
  - **Path:** Enter the path of the job to be run.
  - **Application Name:** From the dropdown list, select the name of the application with which you want to associate the job definition.
  - **Job Type Name:** From the dropdown list, select the job type you want to use for the job definition.
  - **Enable submission from Enterprise Manager:** Select this checkbox to allow the job definition to be submitted from Fusion Applications Control. When selecting this option, the Parameters tab is removed for the job definition. Any parameters for the job definition will need to be defined within EM, not in the 'create job definition' flow. [Within EM? Does this mean at run time? Or should this note go in the developer's guide?]

Additional properties may appear, depending on the job type selected.

6. (Optional). Configure parameters, application defined properties, system preferences, and access control. For more information, see [Section 7.11.1.2.1](#), [Section 7.11.1.2.2](#), [Section 7.11.1.2.3](#), and [Section 7.11.1.2.4](#).
7. Click **Save and Close**.

This section contains the following topics:

- [Section 7.11.1.2.1, "Configuring Parameters for a Job Definition"](#)
- [Section 7.11.1.2.2, "Configuring Application Defined Properties for a Job Definition"](#)
- [Section 7.11.1.2.3, "Registering Sources for Lists of Values"](#)
- [Section 7.11.1.2.4, "Searching for List of Value Sources"](#)

**7.11.1.2.1 Configuring Parameters for a Job Definition** A parameter enables passing data of type string, Boolean, number, or date time to the job request. Parameters can be passed using several display controls, such as a text box, date-time editor, choice list, or list of values.

To configure parameters for a job definition:

1. In the job definition creation user interface, click the **Parameters** tab.
2. Select **Actions** and then select **New** or click the **New** icon.  
The Create Parameter dialog box appears.
3. In the Create Parameter dialog box, enter the following information:
  - **Prompt:** Enter the text to be shown at the prompt that appears during runtime.
  - **Data Type:** From the dropdown list, select a data type for the parameter: String Numeric, DateTime, Number, or Boolean. This is required.
  - **Field Type:** Select **Editable** or **Read Only**.
  - **Value:** Enter a value for the parameter. This field appears for String type parameters. This is required.
  - **Default Value:** Enter a default value for the parameter.
  - **Tooltip Text:** Enter documentation for the parameter.
  - **Required:** Select this checkbox if the parameter must be entered.
  - **Do Not Display:** Select this checkbox if you want to hide the parameter in the user interface.
  - **Display Control:** From the dropdown list, select the control you want to appear in the user interface. Display control options include Text Box, Choicelist, List of Values (with search), Date Picker.
4. After you select a data type, you must configure its display.
  - **Boolean:** From the Default Value dropdown list, select true or false.
  - **DateTime:** Select **Date Only** or **Date and Time**.  
From the Date Format dropdown list, select the format in which to display the date.  
From the Default Value dropdown list, select any of the following values: **Today**, **Tomorrow**, **A week from now**, or **Specific date**.  
If you select Specific date, use the date editor to select a date. This is required.
  - **Numeric:** From the Number Format dropdown list, select the format in which to display the number.  
For the Data Alignment option, select **Left** or **Right**. This configures the alignment of the number value in the job request submission UI.  
In the **Default Value** field, enter a default value for the number.
  - **String:** From the Display Widget dropdown list, select **Text Box**, **Choicelist**, or **List of Values (with search)**. This is required.  
**Text Box:** When selecting this value from the Display Widget dropdown list, enter the default text in the **Default Value** field.  
**Choicelist/List of Values (with search):** From the List of Values Source dropdown list, select the source for the list of values. For the List of Values (with search), enter a default value in the field provided. In the Display Attributes list, select the attributes you want to appear. For information about searching for and registering a list of values, see [Section 7.11.1.2.3](#) and [Section 7.11.1.2.4](#).

5. Click **Save and Close** or **Save and Create Another**.

**7.11.1.2.2 Configuring Application Defined Properties for a Job Definition** If your job definition requires additional properties to be filled in by users at runtime, you can add these properties in the **Application Defined Properties** tab of the job definition creation user interface.

To configure application defined properties for a job definition:

1. In the job definition creation user interface, click the **Application Defined Properties** tab.
2. Select **Actions** and then select **New**, or click the **New** icon.  
The Create Application Defined Property dialog box appears.
3. In the Create Application Defined Property dialog box, enter the following information:
  - **Name:** Enter a name for the property.
  - **Data Type:** From the dropdown list, select a data type for the property. Data types include Boolean, Date, Number, and String.
  - **Default Value:** Enter a default value for the property.
  - **Read Only:** Select Read Only if you want the property to be shown only, not edited.

For more information about defining application defined properties, see [Section 7.11.1.2.1](#).

4. Click **Save and Close**.

**7.11.1.2.3 Registering Sources for Lists of Values** If you define a user property or parameter that uses a list of values, you must first register the source for the list of values.

To register a source for a list of values:

1. In the job definition creation user interface, click the **Manage List of Value Sources** tab.
2. Select **Actions** and then select **New**, or click the **New** icon.  
The Create List of Value Source dialog box appears.
3. In the Create List of Value Source dialog box, enter the following information:
  - **Application Name:** From the dropdown list, select the name of the application for the list of value. This is required.
  - **List of Values Source Definition Name:** Enter the name of the source definition file for the list of values. This is required.
  - **User List of Values Source Name:** Enter the name of the source for the list of values to be shown to users. This is required.
  - **Description:** Enter a description for the list of values.
4. Click **Save and Close**.

**7.11.1.2.4 Searching for List of Value Sources** When defining a user property or parameter using a list of values, you must register a source for the list of values. The **Search** field enables searching for a source for a list of values. You can also save the search for future use.

For information about registering a source for a list of values, see [Section 7.11.1.2.3](#).

To search for list of value sources:

1. In the job definition creation user interface, click the **Manage List of Value Sources** tab.
2. In the **Search** field, select any of the following:
  - **Match:** Select the **All or Any** option to search for any or all of the criteria.
  - **Application Name:** From the dropdown list, select the name of the application you want to search. Then, select an operator such as **Greater than or equal to**.
  - **User List of Values Source Name:** Enter text for the user list of values source name. Then, select an operator such as **Contains**.
3. (Optional). You can add additional fields to search by. Click **Add Fields** and select any of the following fields to search by:
  - Application ID
  - Created by
  - Creation Date
  - Data Source ID
  - Description
  - Last Update Date
  - Last Update Login
  - Last Updated By
  - List of Values Source Definition Name
  - Object Version Number
  - Product Short Name
  - User List of Values Source Name
4. Click **Search** to run the search, or **Save** to reserve the search for future use.

#### 7.11.1.2.5 Defining Parameters with Dependent Lists of Values in Oracle Fusion Functional Setup Manager

In some cases, it is necessary to capture dependencies between interdependent parameter lists of values in the Oracle Enterprise Scheduler job definition. For example, suppose the job definition has three parameters, namely Country, State and City. In this job definition, the value of the Country parameter determines the values available in the State parameter, which in turn determines the values available in the City parameter. In this sense, the job parameters are dependent upon each other.

To define job parameters with dependent lists of values, you must do the following:

1. Create a list of values view object with a data source and view criteria.
2. Define bind parameters for the view criteria and expose them.
3. Map the bind variable to the relevant job parameter value.

In the previous example, the City and State parameters defined in a job use the `CityLovVO` data source to display a list of cities in the UI. The `CityLovVO` data source includes a view criterion called `filterByState` with a bind variable called `state_code`. The bind variable `state_code` can be mapped to the value of the State parameter value

such that the list of cities shown in the UI is restricted by the state selected before invoking the City list of values.

To define parameters with dependent lists of values:

1. Create a job definition with parameters and a list of values view object with data source and bind variables. Be sure to mark as optional all the bind variables used for the dependent list of values view objects. For more information, see [Section 7.11.1.2](#), [Section 7.11.1.2.1](#), and [Section 7.11.1.2.3](#).
2. From the **Administration** menu in the global area of Oracle Fusion Applications, choose the **Setup and Maintenance** work area and click the **All Tasks** tab. Search for all tasks.
3. From the list of tasks that is displayed, select the relevant UI application you will use to host the job definitions and parameter view objects. This Oracle Fusion application is the portlet producer application for the job.

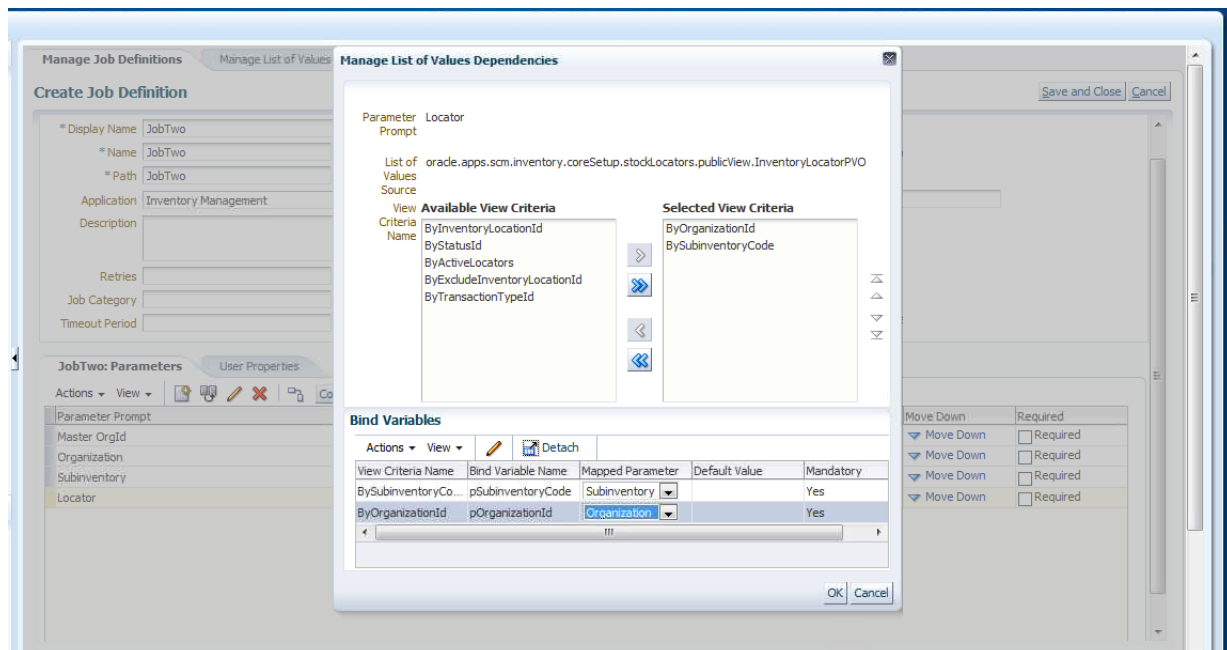
Click the **Go to Task** button.

The Manage Job Definitions tab is displayed.

4. From the **Manage Job Definitions** tab, select the job definition you want to edit and click the **Edit** button.
5. In the **Edit Job Definition** tab, click the **Parameters** tab and select the parameter you created that is associated with a list of values.
6. Click the **Manage Dependencies** button to the right-hand side of the **Delete** button.

The Manage List of Values Dependencies dialog is displayed, as shown in [Figure 7-4](#).

**Figure 7-4 The Manage List of Values Dependencies Dialog**



7. Bind the selected criteria to the relevant job parameters you defined earlier.

- a. From the **Available View Criteria** list, select the view criteria you want to use and use the buttons to shuttle them to the **Selected View Criteria** list.
- b. In the **Bind Variables** area, for each criteria name, from the **Mapped Parameter** drop-down list, select the job definition parameter to which you want to map the criteria name.
- c. Click **OK**.

### 7.11.1.3 Duplicating Job Definitions with their Parameters

You can duplicate existing job definitions, including parameters, using Oracle Fusion Functional Setup Manager. The parameters used in the duplicated job definition can be defined as lists of values. The UI creates two view definitions in MDS, one for the job definition and another for mapping parameters (this includes references to a list of values view object for each parameter). The Oracle Enterprise Scheduler job submission UI reads these view definitions from MDS to create the corresponding job with parameters at runtime.

After you have created a new job definition by duplicating an existing one, you can still take the following actions in the new job definition:

- Add a new parameter.
- Delete or modify the existing parameters.
- View the list of values source attached to a parameter, and change it if necessary.
- Add a list of values source to an existing parameter or change it.
- Attach multiple return values from a list of values defined for a parameter.

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**Note:** It is necessary to define a list of values data source in the system first, so as to use it in the parameters view object. When duplicating a job definition, there is no guarantee that those data sources have already been created in the system. If it is found that a list of values data source has not been defined, the relevant list of values data source is created programmatically.

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Note the following about duplicated job definitions:

- The attribute validations present on the attributes in the parameters view object are not copied over.
- If the list of values view object is a data secured polymorphic view object, then the view criteria defined in them cannot be read.
- The mapping of derived attributes from an expression may not be represented correctly.
- The job creation UI enables adding multiple return values from a list of values view object. To do so, the read-only record matching the list attribute should be the bottom most in the UI table as displayed in [Figure 7-5](#). Otherwise, there may be a mismatch in the derived attributes. All derived attributes should be marked hidden. In [Figure 7-5](#), `Attribute5` should be a hidden attribute in the UI.

**Figure 7–5 Managing Multiple Return Values**

View Attribute	List Attribute
ATTRIBUTES	LedgerId
Ledger or Ledger Set	Name

To duplicate an existing job definition:

1. From the **Administration** menu in the global area of Oracle Fusion Applications, choose the **Setup and Maintenance** work area and click the **All Tasks** tab. Search for all tasks.
2. From the list of tasks that is displayed, select the relevant UI application you will use to host the job definitions and parameter view objects. This Oracle Fusion application is the portlet producer application for the job.

Click the **Go to Task** button.

The Manage Job Definitions tab is displayed.

3. From the **Manage Job Definitions** tab, select the job definition you want to duplicate and click the **Duplicate** button.

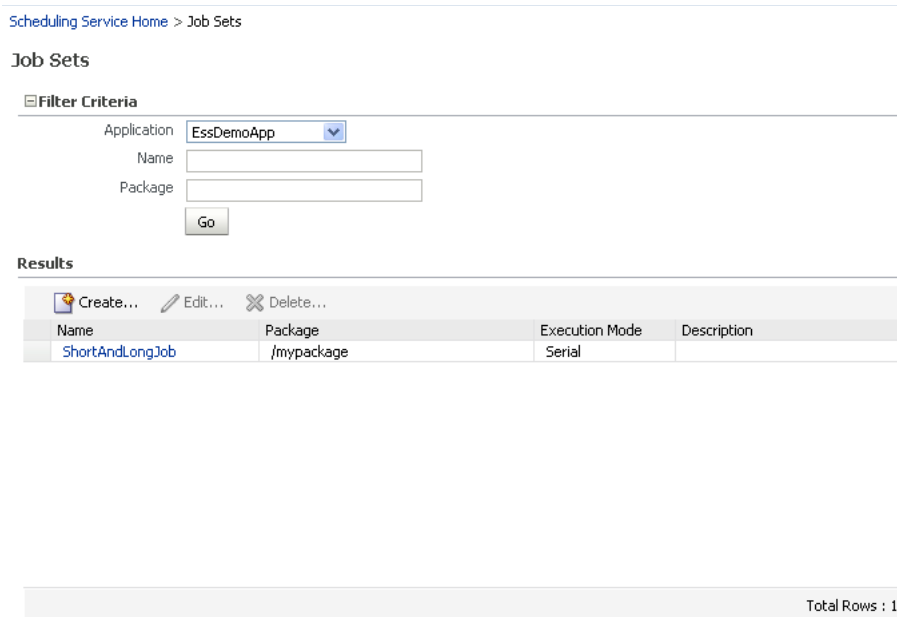
## 7.11.2 Managing Job Sets

The Job Sets page in Fusion Applications Control enables you to view, create, edit, delete, and search for job sets.

A job set is a collection of job requests that can be grouped together to run as a unit. A job set can be nested, such that it may contain a collection of job requests or one or more child job sets. Each job request or job set included within a job set is called a job set step.

[Figure 7–6](#) shows the Results table in the Job Sets page. The Results table displays job sets and their attributes, including name, package, execution mode, and description.

**Figure 7–6 The Job Sets Page and Results Table**



This section contains the following topics:

- [Section 7.11.2.1, "Viewing Job Sets"](#)
- [Section 7.11.2.2, "Creating or Editing Job Sets"](#)
- [Section 7.11.2.3, "Deleting Job Sets"](#)

### 7.11.2.1 Viewing Job Sets

You can view the job sets created for an application.

To display job sets:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. From the Scheduling Services menu, select **Job Metadata** and then select **Job Sets**.  
The Job Sets page appears.
3. From the Applications dropdown list, select the name of the application whose job sets you want to view.
4. Enter the name and package name of the job set you want to find, and click **Go**.  
The job sets for that application appear in a table below the application dropdown list.

Column Name	Description
Name	This column displays the name of the job set.
Display Name	This column displays a short descriptive title for the job set.
Package	This column displays the name of the Java package associated with the job set.
Execution Mode	This column displays the execution mode of the job set, Serial or Parallel.



Column Name	Description
Description	This column displays a description of the job set.

- To view the details of a specific job set, click the name of the relevant job set.

### 7.11.2.2 Creating or Editing Job Sets

A job set is defined as either a serial or a parallel job set. At runtime, Oracle Enterprise Scheduler runs parallel job set steps simultaneously, in parallel. When a serial job set runs, Oracle Enterprise Scheduler runs the steps one after another in a specific sequence. Using a serial job set Oracle Enterprise Scheduler supports conditional branching between steps based on the execution status of a previous step.

For each step in a job set, you can configure an action to be taken upon completion of the step, depending on the state of the step. You can also configure parameters and system properties for the job set, such as elevating access privileges to complete a particular job request or specifying the number of times a job can be retried in the event of a failure.

To create or edit a job set:

- From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
- From the Scheduling Services menu, select **Job Metadata** and then select **Job Sets**.  
The Job Sets page appears.
- Click **Create** to define a new job set, or click **Edit** to modify an existing job set.
- In the **Job Set** field, enter the name of the job set in the field provided. You can add a description in the **Description** field, and the name of the relevant job set Java package in the **Package** field.
- In the **Job Set Steps** field, select **Serial** or **Parallel** to create a serial or parallel job set.
- Add steps as required by clicking the **Add** icon. Define each step.
  - In the **Step** tab, in the **Step ID** field, enter a meaningful ID for the step.  
In the **Job** field, enter search text and click the browsing button. In the window that appears, select the job definition that you want to use for this step.
  - In the Effective Application region, select **Insert into main diagram** or **Add to list of available steps**. If you choose to add the step to the list of available steps, use the dropdown lists that appear to define an action for the possible job outcomes, namely **On Success**, **On Error**, and **On Warning**.
  - In the **Application Defined Properties** tab, click the **Add** icon to define any required properties and enter their initial values in the field provided. For more information about defining application defined properties, see [Section 7.11.1.2.1](#).
  - In the **System Properties** tab, click the **Add** icon to define any system parameters required for the step.  
From the Name dropdown list, select the system property you want to specify. Possible system properties are shown in [Table 7-3](#).  
In the **Initial Value** field, enter the value you want to assign to the system property.

**Table 7-3 System Properties**

System Property Name	Description
SYS_allowMultPending	This property specifies whether multiple pending requests for the same job definition are allowed. This property has no meaning for a job set step. True or false.
SYS_application	This property specifies the logical name of the <b>Scheduling Services</b> folder application used for request processing. This property is automatically set by Oracle Enterprise Scheduler during request submission.
SYS_bizErrorExitCode	This property specifies the process exit code for a process job request that denotes an execution business error. If this property is not specified, the system treats a process exit code of 4 as an execution business error.  This property is optional for a process job type. It is not used for other job types.
SYS_className	This property specifies the Java executable file for a Java job request. This is the name of a Java class that implements the <code>oracle.as.scheduler.Executable</code> interface. This property is required for a Java job type. It is not used for other job types.
SYS_cmdLine	This property specifies the command line used to invoke an external program for a process job request.  This property is required for a Process job type. It is not used for other job types.
SYS_effectiveApplication	This property specifies the logical name of the <b>Scheduling Services</b> folder application that will be the effective application used to process the request. A job definition, job type, or a job set step can be associated with a different application by defining the <code>EFFECTIVE_APPLICATION</code> system property. This property can only be specified through metadata and cannot be specified as a submission parameter.
SYS_environmentVariables	This property specifies the environment variables to be set for the spawned process of a process job request. The property value must be a comma-separated list of name value pairs (name=value) representing the environment variables to be set.  This property is optional for a Process job type. It is not used for other job types.
SYS_executePast	This property specifies whether instances of a repeating request with an execution time in the past is generated. Instances are never generated before the requested start time nor after the requested end time. To cause past instances to be generated, you must set this property to <code>TRUE</code> and specify the requested start time as the initial time from which instances is generated. Note that a null requested start time defaults to the current time.  Valid values for this property are: <ul style="list-style-type: none"> <li>■ <code>TRUE</code>: All instances specified by a schedule are generated regardless of the time of generation.</li> <li>■ <code>FALSE</code>: Instances with a scheduled execution time in the past (that is, before the time of generation) will not be generated.</li> </ul> Default: If this property is not specified, the system default is <code>TRUE</code> .
SYS_extensionListener	This property is for internal use only.
SYS_external_id	This property specifies an identifier for an external portion of an asynchronous Java job. For example, an asynchronous Java job usually invokes a remote process and then returns control to Oracle Enterprise Scheduler. This property can be used to identify the remote process. This property is set by the job implementation of asynchronous Java jobs when the identifier is known. It is never set by Oracle Enterprise Scheduler.

**Table 7-3 (Cont.) System Properties**

<b>System Property Name</b>	<b>Description</b>
<code>SYS_groupName</code>	This property specifies the name of the Oracle Enterprise Scheduler isolation group to which this request is bound. This property is automatically set by Oracle Enterprise Scheduler during request submission.
<code>SYS_inputList</code>	This property specifies input to a job request. The input to a serial job set is forwarded as input to the first step only. The input to a parallel job set is forwarded as input to all the parallel steps.  Oracle Enterprise Scheduler imposes no format on the value of this property.
<code>SYS_inputWorkDirectory</code>	This property specifies the working directory used during job request processing for input files. Oracle Enterprise Scheduler sets the value of this property during job request processing.
<code>SYS_listener</code>	This property specifies the event listener class associated with the request. This is the name of a Java class that implements the <code>oracle.as.scheduler.EventListener</code> interface.
<code>SYS_locale</code>	This property specifies a language code to apply to the job.
<code>SYS_logWorkDirectory</code>	This property specifies the logging working directory.
<code>SYS_outputList</code>	This property specifies output from a request.  The output of a serial job set is the <code>OUTPUT_LIST</code> of the last step. The output of a parallel job set is the concatenation of the <code>OUTPUT_LIST</code> of all the steps, in no order, with <code>oracle.as.scheduler.SystemProperty.OUTPUT_LIST_DELIMITER</code> as a separator.
<code>SYS_outputWorkDirectory</code>	This property specifies the working directory used during job request processing for output files. Oracle Enterprise Scheduler sets the value of this property during job request processing.
<code>SYS_postProcess</code>	This property specifies the postprocess callout handler class. This is the name of a Java class that implements the <code>oracle.as.scheduler.PostProcessHandler</code> interface.
<code>SYS_preProcess</code>	This property specifies the preprocess callout handler class. This is the name of a Java class that implements the <code>oracle.as.scheduler.PreProcessHandler</code> interface.
<code>SYS_priority</code>	This property specifies the request processing priority. The priority interval is [0..9] with 0 as the lowest priority and 9 as the highest.  Default: If this property is not specified, the system default value used is 4.
<code>SYS_procedureName</code>	This property specifies the name of the PL/SQL stored procedure to be called for a SQL job request. The stored procedure is specified using the <code>schema.name</code> format.  The property is required for a SQL job type. It is not used for other job types.
<code>SYS_product</code>	This property specifies the product within the application that submitted the request.
<code>SYS_redirectedOutputFile</code>	This property specifies the file where standard output and error streams are redirected for a Process job request. This represents the full path of the log file where the standard output and error streams are redirected for the spawned process when the request is executed.  This property is optional for Process job types. It is not used for other job types.
<code>SYS_reprocessDelay</code>	This property specifies the callout handler processing delay time. This represents the time, in minutes, to delay request processing when a delay is requested by a callback handler.  Default: If this property is not specified, the system default used is 5. Integer type.

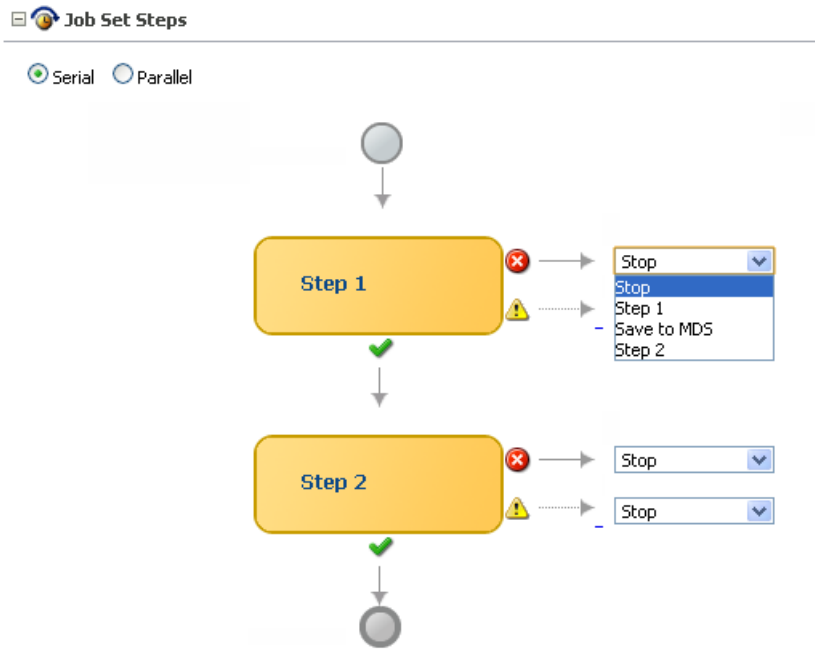
**Table 7–3 (Cont.) System Properties**

<b>System Property Name</b>	<b>Description</b>
<code>SYS_request_timeout</code>	This property enables the job request to time out.
<code>SYS_requestCategory</code>	This property specifies an application-specific label for a request. The label, defined by an application or system administrator, enables administrators to group job requests according to their own specific needs.
<code>SYS_requestedProcessor</code>	<p>This property specifies the request processor node on which the request is processed. This enables processor affinity to be specified for a job request. If this property is not specified, the request can run on any available request processor node. In general, this property should not be specified.</p> <p>If this property is specified for a request, the request processor's work assignments <code>oracle.as.scheduler.WorkAssignment</code> (specialization) must allow the execution of such requests; otherwise the request will never be executed. If the specified node is not running, the request will remain in READY state and will not be executed until the node is restarted.</p>
<code>SYS_requestExpiration</code>	<p>This property specifies the expiration time for a request. This represents the time, in minutes, that a request will expire after its scheduled execution time. A expiration value of zero (0) means that the request never expires. If this property is not specified, the system default value used is 0.</p> <p>Request expiration only applies to requests that are waiting to run. If a request waits longer than the specified expiration period, it does not run. After a request starts running, the request expiration no longer applies.</p>
<code>SYS_retries</code>	<p>This property specifies the retry limit for a failed request. If request execution fails, the request will be retried up to the number of times specified by this property until the request succeeds. If the retry limit is zero (0), a failed request will not be retried.</p> <p>If this property is not specified, the system default used is 0.</p>
<code>SYS_runasApplicationID</code>	<p>This property enables elevating access privileges for completing a scheduled job.</p> <p>Typically, a request runs as the submitting user. However, if this property is set in the metadata of the job associated with the request, then the request executes under the user identified by this property. This property can only be specified through metadata, and cannot be specified as a submission parameter.</p>
<code>SYS_selectState</code>	This property specifies whether the result state of a job set step affects the eventual state of its parent job set. For the state of a job set step to be considered when determining the state of the job set, the <code>SELECT_STATE</code> must be set to <code>true</code> . If <code>SELECT_STATE</code> is not specified on a job set step, the state of the step will be included in the determination of the state of the job set. The data type is Boolean.
<code>SYS_sqlJobClass</code>	<p>This property specifies an Oracle Enterprise Scheduler job class to be assigned to the Oracle Enterprise Scheduler job used to execute a SQL job request. This property need not be specified unless the job used for a job request is associated with a particular Oracle Database resource consumer group or has affinity to a database service.</p> <p>If this property is not specified, a default Oracle Enterprise Scheduler job class is used for the job that executes the SQL request. That job class is associated with the default resource consumer group. It belongs to the default service, such that it has no service affinity and, in an Oracle RAC environment, any one of the database instances within the cluster might run the job. No additional privileges or grants are required for an Oracle Enterprise Scheduler SQL job request to use that default job class.</p> <p>This property is optional for a SQL job type. It is not used for other job types.</p>
<code>SYS_submittingApplication</code>	This property specifies the logical name of the <b>Scheduling Services</b> folder application for the submitted (absolute parent) request. This property is automatically set by Oracle Enterprise Scheduler during request submission.

**Table 7–3 (Cont.) System Properties**

<b>System Property Name</b>	<b>Description</b>
SYS_substitutionHandlers	This property has been deprecated.
SYS_successExitCode	<p>This property specifies the process exit code for a process job request that denotes an execution success. If this property is not specified, the system treats a process exit code of 0 as execution success.</p> <p>This property is optional for a process job type. It is not used for other job types.</p>
SYS_userFileDir	<p>This property specifies a base directory in the file system where files, such as input and output files, may be stored for use by the request executable file.</p> <p>Oracle Enterprise Scheduler supports a configuration parameter that specifies a file directory where requests can store files. At request submission, a USER_FILE_DIR property is automatically added for the request if the configuration parameter is currently set and USER_FILE_DIR property was not specified for the request. If the property is added, it will be initialized to the value of the configuration parameter. The property will not be added if the configuration parameter is not set at the time of the request submission.</p>
SYS_userName	This property specifies the name of the user used to execute the request. Typically, this is the submitting user, unless the RUNAS_APPLICATIONID property was set in the job metadata. This property is automatically set by Oracle Enterprise Scheduler during the request submission.
SYS_warningExitCode	<p>This property specifies the process exit code for a process job request that denotes an execution warning. If this property is not specified, the system treats a process exit code of 3 as an execution warning.</p> <p>This property is optional for a Process job type. It is not used for other job types.</p>
SYS_workDirectoryRoot	<p>This property specifies the working directory for the spawned process of a Process job request.</p> <p>This property is optional for a Process job type. It is not used for other job types.</p>

- e. If you configured the step as a serial step, it appears in the job set flow diagram. Configure the action to be taken upon reaching the error and warning states, respectively. From the dropdown list for the error and warning icons, select **Stop** or the name of the job definition to run upon reaching an error or warning state.



7. Continue to define steps as required for the job set.
8. Define application defined properties and system properties as required towards the bottom of the job set window.

---

**Note:** These properties apply to the job set as a whole, as opposed to the properties configured earlier on the page that apply to specific steps in the job set.

---

9. Configure access control for the job set.
  - a. In the Access Control section of the Create Job Set page, click the **Add** icon to add access control to the job set.  
The Add Access Control dialog box appears.
  - b. From the Role dropdown list, select the name of the role you want to apply to the job set. The role defines the users with sufficient permissions to access the job set.
  - c. Select the actions you want to allow role members to take: **Read**, **Execute**, **Update**, and **Delete**.
10. Click **OK** to save the job set.

### 7.11.2.3 Deleting Job Sets

You can delete a job set.

To delete a job set:

1. Search for the relevant job set, as described in [Section 7.11.2.1](#).
2. In the Results table, select the job set you want to delete, and click the **Delete** icon.

## 7.11.3 Managing Incompatibilities

An Oracle Enterprise Scheduler incompatibility specifies which job definitions are incompatible with other job definitions. At runtime, when job definitions are specified in an incompatibility, any job requests associated with the job definitions that are incompatible cannot run simultaneously.

An incompatibility defines either a global incompatibility or a domain-specific, property-based incompatibility.

This section contains the following topics:

- [Section 7.11.3.1, "Viewing Incompatibilities"](#)
- [Section 7.11.3.2, "Creating or Editing an Incompatibility"](#)
- [Section 7.11.3.3, "Deleting an Incompatibility"](#)

### 7.11.3.1 Viewing Incompatibilities

The Incompatibilities page displays information about incompatibilities including name, the Java package associated with an incompatibility and a description of the incompatibility.

To view job incompatibilities:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. From the Scheduling Services menu, select **Job Metadata** and then select **Incompatibilities**.

The Incompatibilities page appears.

3. From the Applications dropdown list, select the name of the application whose incompatibilities you want to view.
4. Enter the name and package name of the incompatibilities you want to find, and click **Go**.

The incompatibilities for that application appear in a table below the application dropdown list.

Column Name	Description
Name	This column displays the name of the incompatibility.
Package	This column displays the name of the Java package associated with the incompatibility.
Incompatibility Type	This column displays the type of incompatibility, global or domain specific.
Description	This column displays a description of the incompatibility.

5. To view the details of a specific incompatibility, click the name of the relevant incompatibility.

### 7.11.3.2 Creating or Editing an Incompatibility

An incompatibility consists of two or more job definitions configured as incompatible, and the resource over which they need to be incompatible. A resource is not specified for a global incompatibility. This resource is represented by the property name that forms the incompatibility. The property name might be different across job definitions.

For example, if two job definitions, JobA and JobB, are made incompatible, then the property identified for incompatibility might have different names in JobA and JobB.

- **Domain-specific:** Two or more job definitions are marked as incompatible within the scope of a resource, where the resource is identified by a system property name or a user-defined parameter name. An incompatibility specifies two or more incompatible entities where each entity consists of a job definition, or a job set definition and a property name that represents the resource over which the entities are incompatible. Each entity can use the same property name or a different property name. A property-based incompatibility is used when the incompatible entities are incompatible over a property. For property-based incompatibility, a job definition or a job set and a property name must be specified for each entity. Oracle Enterprise Scheduler ensures that requests for the incompatible jobs or job sets, with a property that has the same property value, do not run at the same time.
- **Global:** Two or more job definitions cannot run together at one time. A global incompatibility is used when the incompatible entities are not to be run at the same time regardless of any property. For global incompatibility, only the job definition or job set is specified for each entity. Oracle Enterprise Scheduler ensures that requests for the incompatible jobs or job sets do not run at the same time.

Defining an incompatibility involves the following:

- **Package and scope:** Select a relevant Java package to use for the incompatibility and set the scope for the incompatibility (global or domain specific).
- **Jobs:** Select the jobs that are incompatible.
- **Parameters and properties:** Define parameters and properties as required.
- **Access control:** Define access control as required.

To create or edit an incompatibility:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.
2. From the Scheduling Services menu, select **Job Metadata** and then select **Incompatibilities**.

The Incompatibilities page appears.

3. Click **Create** to define a new incompatibility, or **Edit** to modify an existing incompatibility.

The Create Incompatibilities page appears.

4. Enter the following information:
  - **Name:** Enter a name for the incompatibility.
  - **Package:** Enter the name of the relevant incompatibility Java package.
  - **Description:** (Optional). Add descriptive text for the incompatibility.
  - **Type:** Configure the scope of the incompatibility by selecting **Global** or **Domain**.

5. In the **Entities** field, click the **Add** icon to add jobs to the incompatibility.

The Add Entity dialog box appears.

6. Select one or more jobs and click **OK**.



7. Define parameters and system properties, as required, toward the bottom of the incompatibility window. For more information about defining parameters and system properties, see [Section 7.11.2.2](#).
8. Configure access control for the incompatibility, as described in Step 9 of [Section 7.11.2.2](#).
9. Click **OK** to save the incompatibility.

### 7.11.3.3 Deleting an Incompatibility

Deleting an incompatibility results in the incompatible job requests or job sets becoming compatible again.

To delete an incompatibility:

1. Search for the relevant incompatibility, as described in [Section 7.11.3.1](#).
2. In the Results table, select the incompatibility you want to delete, and click the **Delete** icon.

## 7.12 Managing Work Assignments and Workshifts

Work allocation is the process of defining constraints on where and when jobs run and the amount of resources that can be used to process the jobs. This process includes creating a work assignment, and binding the work assignment to a request processor.

A work assignment consists of a specialization rule and one or more workshifts. The specialization rule defines restrictions on which jobs can be processed. A workshift defines the temporal windows when the jobs can be processed and what resources can be used during those periods. The resources defined in a workshift include threads, which are a local resource of the request processor, and asynchronous workers, a global resource. The number of asynchronous workers can be specified to balance the use of a shared global resource, such as database jobs.

Binding associates a work assignment with a request processor on a server, determining where the jobs can run. An exclusive binding mode is supported to not only determine when the jobs can run but to prevent them from running anywhere else.

By default, no work assignments are bound. When there is no bound or active work assignment, a virtual default work assignment will be started to process all jobs using all available resources.

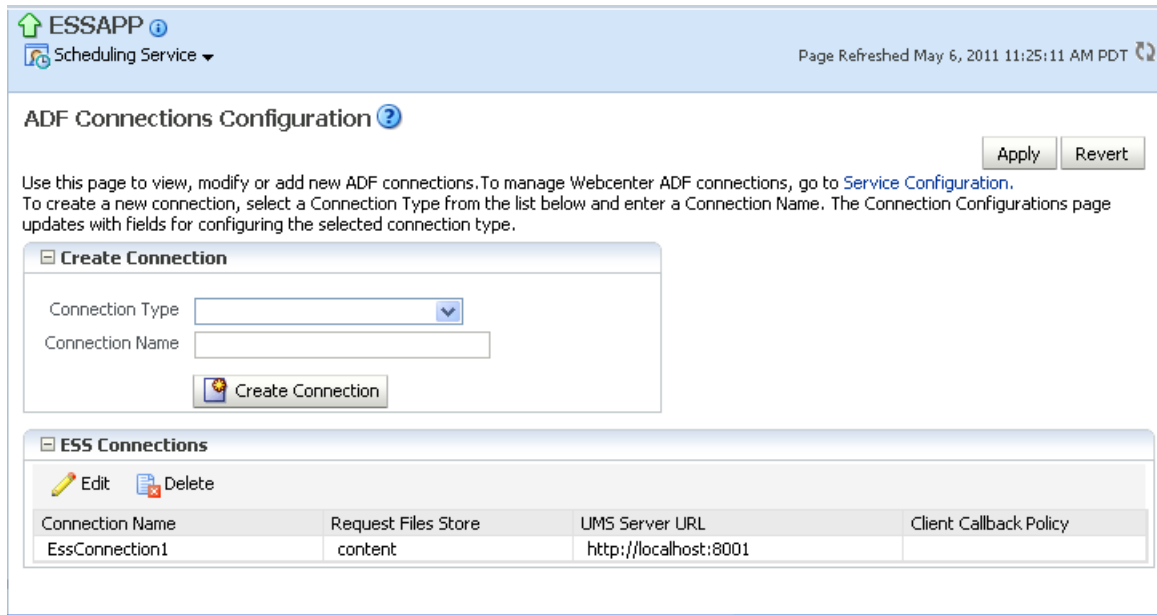
For more information about managing work assignments, workshifts, and schedules, see the section "Managing Work Assignments and Workshifts" in the chapter "Introduction to Managing the Work of Oracle Enterprise Scheduler Jobs" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

## 7.13 Managing Oracle ADF Connections

The ADF Connections Configuration page enables you to create connections to services such as ADF Business Components services, Oracle Business Activity Monitoring, Oracle Enterprise Scheduler, URLs, and web services.

[Figure 7-7](#) shows the ADF Connections Configuration page.

**Figure 7-7 The ADF Connections Configuration Page**



Use the ADF Connections Configuration page to configure the following properties for Oracle Enterprise Scheduler:

- Request Files Store (RequestFileDirectory):** From the dropdown list, select **File System** or **Content Repository** to store job request logs to the file system or a repository. This property is used for job requests submitted by Oracle ADF applications.

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**Note:** Ensure that the `requestFileDirectory` property is not configured to any location under the directory `/tmp` when running on a Linux server. When restarting the computer, the operating system may delete files from the `/tmp` directory, thus losing any related Oracle Enterprise Scheduler information stored there.

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- Request Files Location:** Configure this property to indicate the path of the folder to which job request logs are to be written. This property appears only when selecting **File System** from the **Request Files Store** dropdown list.
- UMS Server URL (NotificationServiceURL):** Configure this property when using the notification service with Oracle Enterprise Scheduler. Set the URL of this property to that of the UMS Server NotificationServiceURL.
- SAML Token Policy (SAMLTokenPolicyURI):** Set this property to the URI of the SAML policy used to secure job requests submitted by Oracle ADF applications.
- Client Callback Policy (EssCallbackClientSecurityPolicyURI):** Configure this property to enable the security policy used in the `WS-Security` headers for web service invocations from Oracle Enterprise Scheduler for web service callbacks.

You can manage ADF connections in Fusion Applications Control only.

To create or edit an ADF connection:

- From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.

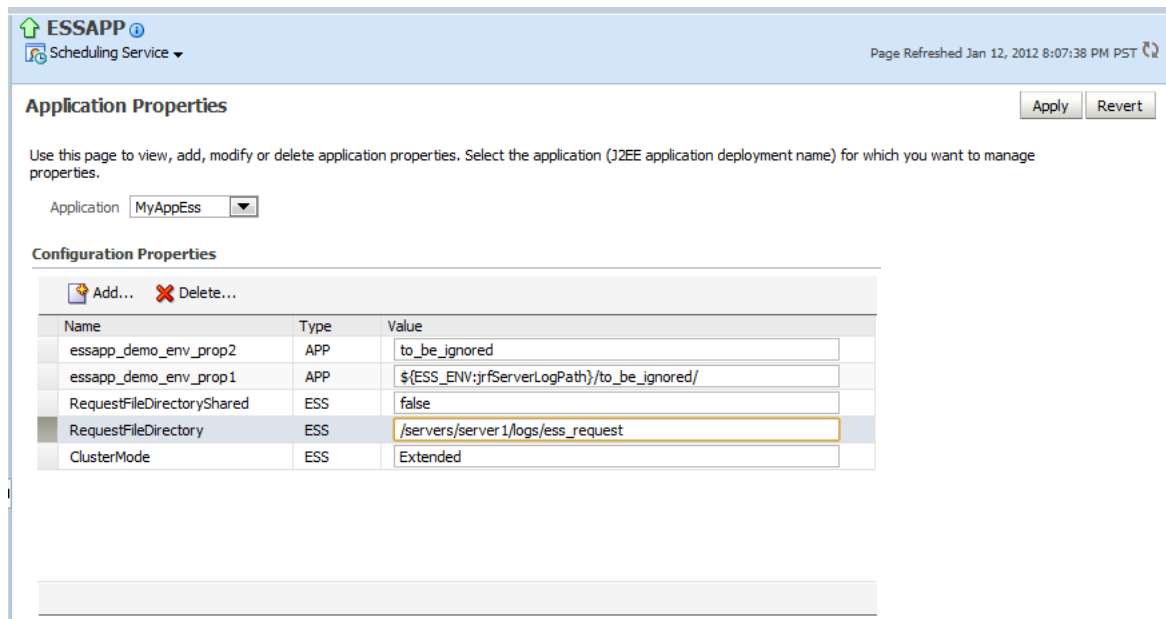
2. From the Scheduling Services menu, select **Configuration** and then select **ADF Connections**.  
The ADF Connections Configuration page appears.
3. In the **Create Connection** field, click the Connection Type dropdown list and select the type of connection you want to create.
4. In the **Connection Name** field, enter a name for the connection.
5. Click **Create Connection** to add the connection.  
The new connection appears under the relevant connection category.
6. To configure the connection, scroll down to the relevant connection category and select the new connection. Click **Edit**.  
The connection window appears.
7. Configure the connection accordingly. For more information about the attributes you can configure for each type of connection, see the online help by clicking the help icon on the ADF Connections Configuration page.
8. Click **Apply** to activate the connection.

## 7.14 Managing Application Properties

The Managing Application Properties page enables you to define Oracle Enterprise Scheduler or application properties for a deployed application.

Figure 7–8 shows the Applications Properties page.

**Figure 7–8 The Application Properties Page**



The screenshot shows the 'Application Properties' page for 'MyAppEss'. It includes a table of configuration properties:

Name	Type	Value
essapp_demo_env_prop2	APP	to_be_ignored
essapp_demo_env_prop1	APP	\${ESS_ENV:jrfServerLogPath}/to_be_ignored/
RequestFileDirectoryShared	ESS	false
RequestFileDirectory	ESS	/servers/server 1/logs/ess_request
ClusterMode	ESS	Extended

To create or edit an application property:

1. From the navigation pane, expand **Scheduling Services** and select the Oracle Enterprise Scheduler application.

2. From the Scheduling Services menu, select **Configuration** and then select **Application Properties**.  
The Application Properties page appears.
3. From the Application dropdown list, select the name of the application for which you want to configure a property.
4. In the Configuration Properties region, click **Add** to create a new property.  
The Add Property window appears.
5. In the Add Property window, configure the following.
  - **Type:** From the dropdown list, select **ESS** or **APP**.
  - **Name:** When configuring an application property, enter a name for the property in the field provided. When configuring an Oracle Enterprise Scheduler property, select a property from the dropdown list. Properties include **PerlCommand** and **EssCallbackClientSecurityPolicyURI** (for more information about this property, see [Section 7.13](#)).
  - **Value:** Enter a value for the property.Click **OK** to save the property.
6. Click **Apply** to activate the application property.

## 7.15 Managing Application and Role Policies

Oracle Enterprise Scheduler application and role policies are the same as other application and role policies. For more information about managing application and role policies, see [Chapter 6](#).

## 7.16 Managing Oracle Enterprise Scheduler Web Services

Oracle Enterprise Scheduler web services are the same as other Oracle Fusion application web services. For information about managing the web services related to Oracle Fusion Applications, see the "Understanding Oracle WSM Policy Framework" chapter in the *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

## 7.17 Managing Logging for Oracle Enterprise Scheduler

You can search for and view log data for individual job requests, and set log levels for Oracle Enterprise Scheduler. You can also save job request logs to a file, and trace job requests for additional troubleshooting information.

For more information about logging, see [Chapter 15](#) and the section "Managing Logging for Oracle Enterprise Scheduling Service" in the chapter "Monitoring Oracle Enterprise Scheduler" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*. For more information about managing log files and diagnostic data, see the chapter "Managing Log Files and Diagnostic Data" in the *Oracle Fusion Middleware Administrator's Guide*.

This section contains the following topics:

- [Section 7.17.1, "Finding Log Information for a Job Request"](#)
- [Section 7.17.2, "Setting Oracle Enterprise Scheduler Log Levels"](#)
- [Section 7.17.3, "Saving Job Request Logs"](#)

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**Note:** The Oracle WebLogic Server logger (`logging.xml`) only shows logs written by Oracle Enterprise Scheduler jobs running in Oracle WebLogic Server. After Oracle Enterprise Scheduler transfers control of running PL/SQL and C jobs to the PL/SQL or C processes, respectively, PL/SQL and C job logging data is not written to the Oracle Enterprise Scheduler logs as they run in separate processes.

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### 7.17.1 Finding Log Information for a Job Request

Job request logs can often be written to different files. You can find log data regarding a job request using its Execution Context Identifier (ECID), a unique identifier that enables finding log data for the job request.

For more information about finding the ECID for a job request, see the "Correlating Log Messages Across Log Files and Components" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

### 7.17.2 Setting Oracle Enterprise Scheduler Log Levels

It is possible to configure Oracle Enterprise Scheduler server logging for an Oracle WebLogic Server by modifying the `logging.xml` file of that Oracle WebLogic Server. By default, there is no explicit logger entry for Oracle Enterprise Scheduler. Oracle Enterprise Scheduler inherits the logging level and log handlers configured for the parent logger, typically the `oracle` logger or the root logger.

By default, the log messages for the Oracle Enterprise Scheduler logger can be found in the Oracle WebLogic Server diagnostic log file for that Oracle WebLogic Server. The `logging.xml` file is located under `DOMAIN_HOME/config/fmwconfig/servers/WebLogic_Server_Name`, where `DOMAIN_HOME` is the domain home directory for the Oracle WebLogic Server domain and `WebLogic_Server_Name` is the name of the Oracle WebLogic Server that uses the `logging.xml` file.

[Table 7-4](#) shows the Oracle Enterprise Scheduler logger names, log levels, and a description for each level.

**Table 7–4 Loggers and Log Levels for Oracle Enterprise Scheduler**

Logger Name	Log Level	Description
oracle.as.ess	SEVERE	Problems encountered by Oracle Enterprise Scheduler runtime in the context of request processing that result in the request errors. Errors include exceptions thrown by the job code, unchecked exceptions when running the job code, and exceptions when running Oracle Enterprise Scheduler code.  Problems encountered by Oracle Enterprise Scheduler runtime outside the context of request processing, such as dispatching, system event handling, and so on.
oracle.as.ess	WARNING	Less severe problems encountered by Oracle Enterprise Scheduler runtime during or outside of request processing, which might not cause requests to enter on error state.
oracle.as.ess	INFO	Messages for request state transitions. Messages related to work assignment activities. Messages about batch deletion failures. Messages about the starting and stopping of the Oracle Enterprise Scheduler resource adapter.
oracle.as.ess	CONFIG	Application endpoint activation and deactivation for Oracle Enterprise Scheduler resource adapter.
oracle.apps.fnd.applcp.srs	WARNING	Any problems that occur during UI rendering to submission.
oracle.apps.fnd.applcp.srs	INFO	Messages related to job fetch and submission API calls.
oracle.apps.fnd.applcp.srs	FINEST	Details tracing messages for the scheduled job request submission UI.
oracle.apps.fnd.applcp.monitor	WARNING	Any problems that occur during UI rendering to operations in the UI.
oracle.apps.fnd.applcp.monitor	INFO	Messages related to job request fetch and various API calls.
oracle.apps.fnd.applcp.monitor	FINEST	Details tracing messages for the job request monitoring UI.
oracle.apps.fnd.applcp	SEVERE	Records any errors that occurred when creating a session for Oracle Fusion Middleware Extensions for Applications, or when creating a file during preprocessing and postprocessing.
oracle.apps.fnd.applcp	WARNING	Records messages related to terminating sessions and closing files during preprocessing and postprocessing
oracle.apps.fnd.applcp	FINE	Messages related to preprocessing and postprocessing execution activity.

Two main types of logging can be used:

- Application Logging: Oracle Enterprise Scheduler job implementation can call standard Oracle Fusion Applications logging code. For proper operation, the `AFLOG_ENABLED` property must be set to `Y`. For PL/SQL jobs, set `AFLOG_PLSQL_FILENAME` to `Y`. For C jobs, set `AFLOG_FILENAME` to `Y`. For more information about

configuring log settings, see Section [Section 15.4](#) and the "Viewing Special Log Output for Oracle Fusion Incentive Compensation" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*. For more information about setting the `AFLOG_ENABLED` property, see the section "Enabling JBO Logging in the Provisioned Environment" in the "Debugging Oracle ADF and Oracle SOA Suite" chapter in the *Oracle Fusion Applications Developer's Guide*.

- **Request Logging:** Oracle Enterprise Scheduler job implementation can write business-specific job request execution log information to the job request log file. This log file is specific to each request, and is automatically enabled by default. For more information about viewing the log file for a job request, see the section "Viewing Job Request Logs" in the chapter "Monitoring Oracle Enterprise Scheduler" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

For information about setting the log levels for Oracle WebLogic Server, see the section "Tracing Oracle Enterprise Scheduling Service Jobs" in the chapter "Monitoring Oracle Enterprise Scheduler" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*. For more information about Oracle Diagnostic Logging levels, see [Section 15.4.3](#).

Set the log levels for the Oracle WebLogic Server running Oracle Enterprise Scheduler as described in the Oracle WebLogic Server documentation.

### 7.17.3 Saving Job Request Logs

By default, job request logs are written to the `fnd_log` API if Oracle Fusion Applications logging is set to `FINER`.

It is possible to save job request log data to the server log file. Job request logs are typically stored in Oracle WebCenter Content. However, when setting the log level to `FINER`, all job request logs are copied to the server log file.

To save job request logs to the server diagnostic file in Fusion Applications Control:

1. In Fusion Applications Control, in the navigation pane, select **WebLogic Domain**, and then select the domain and server names.
2. Click the **WebLogic Server** menu and select **Logs**, and then select **Log Configuration**.

The Log Configuration pane appears.

3. In the Log Configuration pane, click the **Log Levels** tab.
4. In the **Search** field, search for `oracle.as.scheduler`, and find the `oracle.as.scheduler.security.internal.SecurityExecutorFactory` logger.
5. Set the log level to `FINER` and click **Apply**.
6. Run a diagnostic test, as described in [Chapter 15](#). The log messages are now saved to the `<server>-diagnostic.log` file.

The logs are saved to the server diagnostic file, `<Oracle Enterprise Scheduler server name>-diagnostic.log`.

## 7.18 Managing Alerts for Oracle Enterprise Scheduler in Cloud Control

Cloud Control enables you to configure, view, and manage alerts for Oracle Enterprise Scheduler entities including the scheduling service itself, work assignments, and job definitions. Alerts are based on performance metrics for Oracle Enterprise Scheduler.

Each metric includes named objects with upper and lower thresholds that indicate warning or critical states for that particular metric. For example, you can configure an alert for all job requests that have entered a state of error, such that 10 errors constitute a warning state, and 20 errors are a critical state. After you configure alerts, you can view any existing alerts and any configuration changes made within a specified period.

Table 7–5 lists the alerts available for Oracle Enterprise Scheduler.

**Table 7–5 Oracle Enterprise Scheduler Alerts**

Alert	Scope	Collected Data	Alert Automatically Cleared?
Alert for job requests in the ready state and the average wait time for job requests in the ready state.	Work assignment	The number of job requests in the ready state and the average wait time of the ready job requests, by work assignment.	No. The alert is only cleared when the number of ready job requests is smaller than the threshold. The same is true for alerts pertaining to the average wait time of a ready job request.
Alert for job requests that are in an error state.	Work assignment	The number of job requests that are in an error state following the last collection.	Yes. The alert is automatically cleared if the change in value of the subsequent collection is below the threshold.
Alert for long running job requests.	Job definition	The longest running time of a job request listed by job definition. The data is queried for only those job definitions for which a threshold is specified.	No. The alert is only cleared when a job request runs for the job definition beyond the threshold value.
Alert for job requests that are in the ERROR_MANUAL_RECOVERY state.	Scheduling service	The number of job requests in the ERROR_MANUAL_RECOVERY state.	No. An administrator must recover the job request to clear the alert.
Alert for timed out job requests.	Scheduling service	The number of timed out job requests.	No. An administrator must cancel or recover the job request to clear the alert.
Alert for job requests that are in the ERROR state.	Scheduling service	The number of job requests that are in the ERROR state during the last hour.	Yes. The alert automatically clears if the change in value in the subsequent collection is below the threshold.
Alert for blocked job requests.	Scheduling service	The number of job requests in the BLOCKED state.	No. An administrator must cancel the job request, or the job request must be selected for processing to clear the alert.

This section contains the following topics:

- [Section 7.18.1, "Configuring Metric Alerts for Oracle Enterprise Scheduler in Cloud Control"](#)
- [Section 7.18.2, "Viewing Alerts for Oracle Enterprise Scheduler in Cloud Control"](#)

### 7.18.1 Configuring Metric Alerts for Oracle Enterprise Scheduler in Cloud Control

You can configure the thresholds for each object monitored by the metric. You can configure alert rules for a metric as follows:

- Select an object that the metric monitors, such as job requests in a state of error.
- Configure the values at which the object reaches warning and critical states, including an operator value such as greater than (>) or less than (<).
- Enter a corrective action to be taken when the alert criteria are fulfilled.
- Arrange the alert rules in the order you desire.

To configure metric alerts for Oracle Enterprise Scheduler in Cloud Control:



1. Navigate to the scheduling service.
  - a. From the **Targets** menu, select **Fusion Applications**.
  - b. In the table on the Fusion Applications page, click the relevant Oracle Fusion Applications instance with Oracle Enterprise Scheduler deployed.
  - c. In the **Target Navigation** pane, click the name of the domain where Oracle Enterprise Scheduler is deployed, and then click **Scheduling Services**.
2. Click the Oracle Enterprise Scheduler cluster or an individual Oracle Enterprise Scheduler server.
3. From the **Targets** menu, select **Monitoring** and then click **Metric and Collection Settings**.  
A list of metrics appears.
4. Select the metric for which you want to configure alert thresholds and click the **Edit** icon. For example, you can configure the thresholds for the **Average Wait Time for Requests in Ready State (in seconds)** metric.  
The **Edit Advanced Settings** page appears, including the Monitored Objects list.
5. In the **Edit Advanced Settings** page, click **Add** to add a row to the list of monitored objects.
6. Select the object you want to monitor.
  - a. In the **Name** field of the new row, click the **Search** button.  
The Search and Select Objects window appears.
  - b. Search for the object you want to use and click **Select**.
7. In the spaces provided, enter the values to be used for the Critical and Warning thresholds.
8. Click **Continue**, then click **OK** to save your settings.
9. Configure any additional thresholds, as required.

For more information about configuring alerts, see the following topics in the Cloud Control online help:

- "Incident Rules—Common Tasks"
- "Incident Rules—Advanced Tasks"

## 7.18.2 Viewing Alerts for Oracle Enterprise Scheduler in Cloud Control

The Oracle Enterprise Scheduler Service home page displays a summary of alerts. You can navigate to the Incident Manager page to view additional information about incidents by clicking the number of incidents that appear in the Monitoring and Diagnostics area.

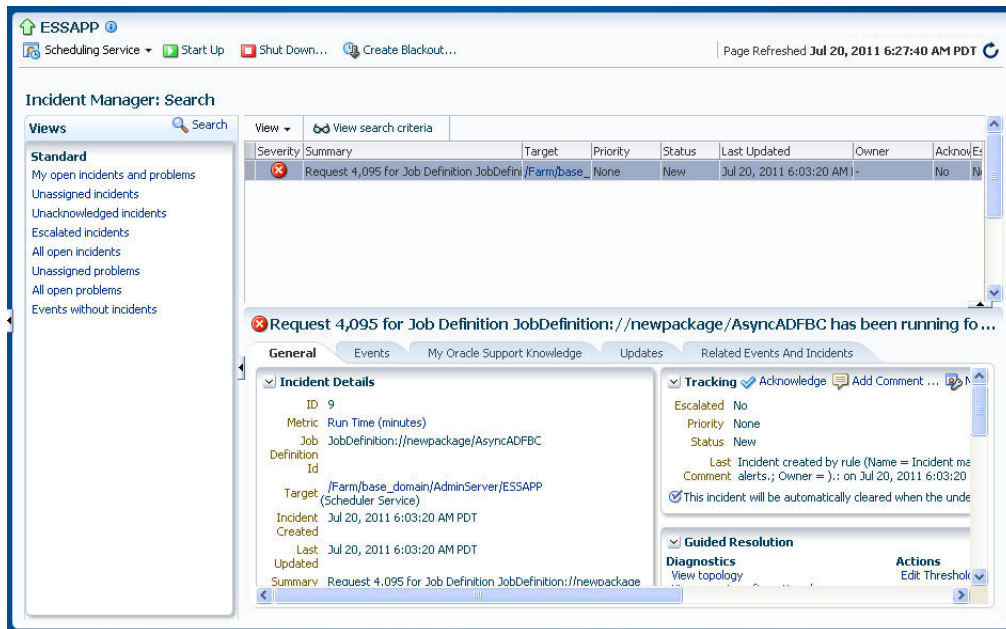
To view alerts for Oracle Enterprise Scheduler with Cloud Control:

1. Navigate to the scheduling service.
  - a. From the **Targets** menu, select **Fusion Applications**.
  - b. In the table on the Fusion Applications page, click the relevant Oracle Fusion Applications instance with Oracle Enterprise Scheduler deployed.
  - c. In the **Target Navigation** pane, click the name of the domain where Oracle Enterprise Scheduler is deployed, and then click **Scheduling Services**.

- Click the Oracle Enterprise Scheduler cluster or an individual Oracle Enterprise Scheduler server.

The Scheduling Service summary page appears. The Monitoring and Diagnostics pane displays the following information.

- Incidents: The number of incidents that occurred in the scheduling service instance appears here. The number of incidents is determined by those incidents collected due to configuring job request alerts. For more information about configuring job request alerts, see [Section 7.18.1](#). If the number of incidents is greater than zero, click the number for more information about the incidents that have occurred.
  - Descendant Target Incidents: The number of incidents that occurred anywhere in the scheduling service cluster appears here. If the number of incidents is greater than zero, click the number for more information about the incidents that have occurred.
  - Configuration Changes: The number of changes that were made to alert configurations appears here. Click the number of configuration changes to search for the changes made within a particular period. The default period is 7 days. For more information, see [Section 7.5](#).
- Click the number of incidents to display detailed information about the alerts in the Incident Manager pane.



The Incident Manager displays incidents in a table, with the following information listed for each incident: severity, summary, target, priority, status, last updated, owner, acknowledged, escalated, type, and category.

You can click an incident to display its details. For more information about using Incident Manager, see the following topics in the Cloud Control online help:

- "Incident Manager—Common Tasks"
- "Incident Manager—Advanced Tasks"

## 7.19 Managing Oracle Enterprise Scheduler Using Oracle WebLogic Scripting Tool Commands

You can manage Oracle Enterprise Scheduler applications, job requests, and parameters using customized Oracle WebLogic Scripting Tool commands.

For a list of commands, their syntax, and samples, see the chapter "Oracle Enterprise Scheduler Custom WLST Commands" in *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.



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# Managing Report Delivery Servers

This chapter describes report delivery server administration in Oracle Fusion Applications.

This chapter contains the following topics:

- [Section 8.1, "Introduction to Managing Report Delivery Servers"](#)
- [Section 8.2, "Navigating to the Oracle BI Publisher Administration Page"](#)
- [Section 8.3, "Configuring Report Delivery Servers"](#)
- [Section 8.4, "Understanding the Report and Delivery Processors"](#)
- [Section 8.5, "Managing Report Processing and Delivery Server Load"](#)
- [Section 8.6, "Scaling Out Report Processors"](#)
- [Section 8.7, "Diagnosing Report Processing Issues"](#)
- [Section 8.8, "Configuring System Properties for Reporting"](#)

## 8.1 Introduction to Managing Report Delivery Servers

Oracle Business Intelligence Publisher is the report generation and delivery engine for Oracle Fusion Applications. Oracle BI Publisher receives report requests from Oracle Fusion Applications in the following ways:

- Through Oracle Enterprise Scheduler
- Through the Reports and Analytics pane
- From an application page

Requests submitted through Oracle Enterprise Scheduler are processed by the Oracle BI Publisher scheduler. Requests submitted through the Reports and Analytics pane can be either real-time online requests or scheduled requests. Requests submitted through an application may invoke Oracle Enterprise Scheduler or may return report request results directly back to the application page.

After installing Oracle Fusion Applications, Oracle BI Publisher is configured to accept requests from Oracle Fusion Applications. However, before you can deliver report documents to their destinations you must define the delivery servers in Oracle BI Publisher. Use the Oracle BI Publisher Administration page to define your delivery servers.

After setup, you can then further configure the number of report processor and delivery threads to best handle your processing and delivery requirements. In addition, you can configure report properties for the system or at the report level to

tune performance of your reports. To diagnose report processing issues, BI Publisher provides a set of scheduler diagnostics.

## 8.2 Navigating to the Oracle BI Publisher Administration Page

Use the Oracle BI Publisher Administration page to:

- Configure delivery servers
- Manage report and delivery processors
- View scheduler diagnostics
- Set system properties and report runtime configuration properties

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**Note:** You must be assigned the BIAdministrator role to access the BI Publisher Administration page.

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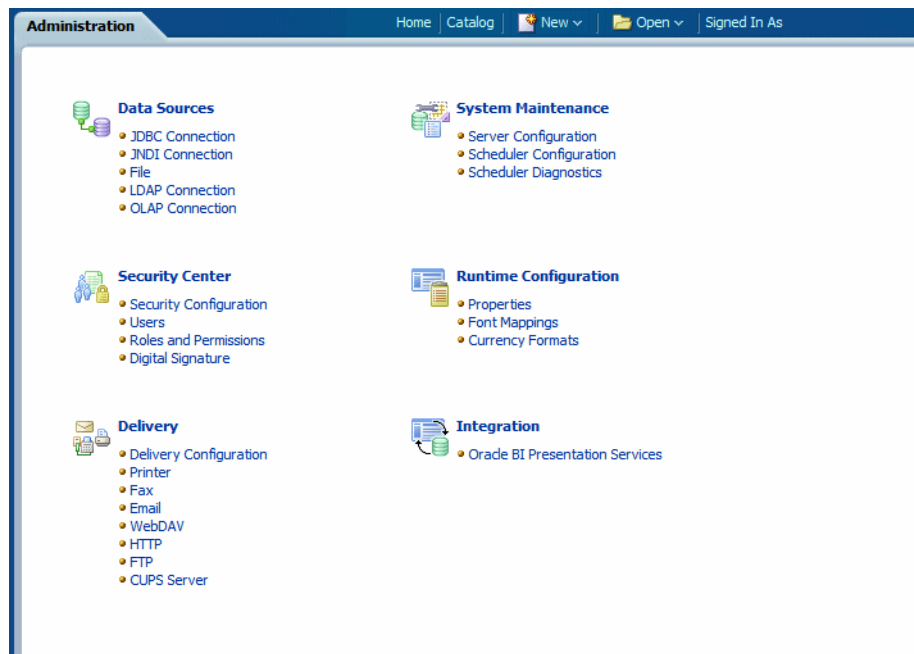
To navigate to the Oracle BI Publisher Administration page:

- From the Oracle Fusion Applications **Navigator**, under **Tools**, click **Reports and Analytics**. In the **Reports and Analytics** pane, click **Catalog** to display the Oracle Business Intelligence presentation catalog page. From here, click **Administration** and then click **Manage BI Publisher**.

Alternatively, log in to Oracle Business Intelligence directly (example: <http://example.com:port/analytics>). Click **Administration** and then click **Manage BI Publisher**.

Figure 8–1 shows the BI Publisher Administration page:

**Figure 8–1 BI Publisher Administration Page**



## 8.3 Configuring Report Delivery Servers

To configure delivery servers:

1. From the BI Publisher Administration page, click **Delivery Configuration**.
2. Enter values in the **Delivery Configuration Options** tab to set general properties for email deliveries and notifications. [Figure 8–2](#) shows the Delivery Configuration Options tab:

**Figure 8–2 Delivery Configuration Options Tab**

For more information about this tab see "Configuring Delivery Options" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Business Intelligence Publisher (Oracle Fusion Applications Edition)*.

3. To configure a delivery server, click the appropriate tab.

The following table lists the report delivery channels supported by Oracle BI Publisher. See the corresponding section in the *Oracle Fusion Middleware Administrator's Guide for Oracle Business Intelligence Publisher (Oracle Fusion Applications Edition)* for configuration information.

Delivery Type	Section
Printer and Fax	Adding a Printer or Fax Server
E-mail	Adding an E-mail Server
WebDAV	Adding a WebDAV Server
HTTP	Adding an HTTP Server
FTP	Adding an FTP Server

Note that printing is supported through Internet Printing Protocol (IPP). If Oracle BI Publisher is operating in a UNIX environment, you must set up the Common Unix Printing Service (CUPS) and then define your CUPS server to Oracle BI Publisher. For a Windows environment, you must set up Windows Print Server for IPP. For information on setting up CUPS and Windows IPP, see "Setting Up Print Servers" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Business Intelligence Publisher (Oracle Fusion Applications Edition)*.

## 8.4 Understanding the Report and Delivery Processors

When Oracle Enterprise Scheduler initiates a job, it is picked up by the BI Publisher scheduler queue. The processors perform as follows:

- **Job Processor** - listens for requests from the scheduler queue. When the job information is received, the job processor executes the data model (and splits the data for bursting jobs), stores the data in the shared temporary folder, and sends the report metadata to the report queue.
- **Report Processor** - listens for requests from the report queue. When the report information is received, the report processor generates the report documents, stores it in the shared temporary folder and puts the delivery information in the delivery queue.
- Delivery processors - each delivery processor listens to the delivery queue and handles the delivery of reports for its channel. The delivery processors are:
  - **Email Processor**
  - **File Processor**
  - **FTP Processor**
  - **Print Processor**
  - **WebDAV Processor**
  - **Fax Processor**

You can configure the number of threads dedicated to each processor.

## 8.5 Managing Report Processing and Delivery Server Load

Manage the processors in the BI Publisher Scheduler Configuration page. By default, each processor is enabled and the thread count for each is set to five. For each **Managed Server** that is running in the BI cluster, a table for that instance's processors will display. Use the table to enable or disable processors for the instance and configure the thread counts.

To configure processor threads:

1. From the BI Publisher Administration page, click **Scheduler Configuration**.
2. On the **Scheduler Configuration** page scroll to the **Cluster Instances** region.

[Figure 8–3](#) shows the Oracle BI Publisher **Scheduler Configuration** page, highlighting the **JMS Configuration** and **Cluster Instances** regions:



Figure 8–3 BI Publisher Scheduler Configuration Page

The screenshot shows the 'Scheduler Configuration' page. Under 'JMS Configuration', the 'JMS Provider' is set to 'WebLogic', the 'WebLogic JNDI URL' is 't3://host.example.com:7001', 'Threads Per JMS Processor' is '5', and the 'Shared Directory' is '/scratch/apphome/xmlpserver/wjms/shared'. A 'Test JMS' button is located below these fields. Under 'Cluster Instances', the 'Instance Name' is 'example'. A table lists various JMS processors with their 'Enable' status and 'Number Threads'.

JMS Processor	Enable	Number Threads
JobProcessor	<input checked="" type="checkbox"/>	
ReportProcessor	<input checked="" type="checkbox"/>	
EmailProcessor	<input checked="" type="checkbox"/>	
FileProcessor	<input checked="" type="checkbox"/>	
FTPProcessor	<input checked="" type="checkbox"/>	
PrintProcessor	<input checked="" type="checkbox"/>	
WebDavProcessor	<input checked="" type="checkbox"/>	
FaxProcessor	<input checked="" type="checkbox"/>	

3. Enter the **Number Threads** value in the processor configuration table.

Note that all processors will automatically be set to use the number of threads defined in the **Threads Per JMS Processor** value of the **JMS Configuration** region of the page. Enter a value in the **Number Threads** column to change the value from this default.

## 8.6 Scaling Out Report Processors

To add Managed Servers to enable more report and delivery processors to handle your reporting throughput see the "Scaling Out the Oracle Business Intelligence Domain" chapter in the *Oracle Fusion Applications Enterprise Deployment Guide for Customer Relationship Management*.

After performing the scale-out procedure, follow the steps in [Section 8.5](#) to configure the processor threads for each cluster instance.

## 8.7 Diagnosing Report Processing Issues

The following tools enable you to diagnose report processing and delivery issues:

- Scheduler Diagnostics page
- Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control)

### 8.7.1 Using the Scheduler Diagnostics Page

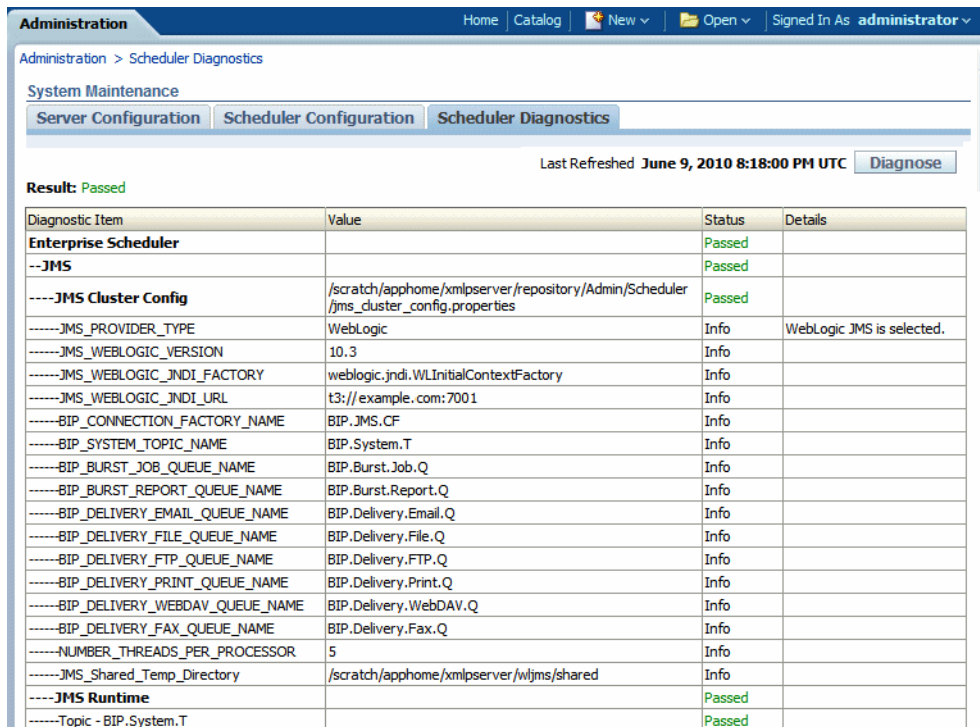
The Scheduler Diagnostics page provides the runtime status of the scheduler. It provides status of its JMS configuration, JMS queues, cluster instances, scheduler Database, Toplink, and Oracle Enterprise Scheduler.

To access the Scheduler Diagnostics page:

1. Navigate to the Oracle Business Intelligence Publisher **Administration** page.
2. In the **System Maintenance** group, click **Scheduler Diagnostics**.

The Scheduler Diagnostics page is shown in [Figure 8-4](#):

**Figure 8-4 BI Publisher Scheduler Diagnostics Page**



For more information about this page see the topic "Scheduler Diagnostics" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Business Intelligence Publisher (Oracle Fusion Applications Edition)*.

### 8.7.2 Using Fusion Applications Control

For information on using Fusion Applications Control to diagnose issues with Oracle BI Publisher, see "Diagnosing and Resolving Issues in Oracle BI Publisher" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Business Intelligence Publisher (Oracle Fusion Applications Edition)*.

## 8.8 Configuring System Properties for Reporting

Use the Oracle BI Publisher **Runtime Configuration** page to set the system-level runtime properties for reports.

To access the **Runtime Configuration** page:

1. Navigate to the Oracle Business Intelligence Publisher **Administration** page (see [Section 8.2, "Navigating to the Oracle BI Publisher Administration Page"](#)).
2. In the **Runtime Configuration** group, click **Properties**.

For more information about this page see the "Defining Runtime Configurations" chapter in the *Oracle Fusion Middleware Administrator's Guide for Oracle Business Intelligence Publisher (Oracle Fusion Applications Edition)*.



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# Managing Search with Oracle Enterprise Crawl and Search Framework

This chapter describes how to manage search using Oracle Enterprise Crawl and Search Framework (ECSF).

This chapter includes the following topics:

- [Section 9.1, "Introduction to Oracle Fusion Applications Search"](#)
- [Section 9.2, "Validating the Environment for ECSF"](#)
- [Section 9.3, "Getting Started with Managing ECSF with Fusion Applications Control"](#)
- [Section 9.4, "Administering Search"](#)
- [Section 9.5, "Performing Advanced Administration Tasks"](#)

## 9.1 Introduction to Oracle Fusion Applications Search

Knowledge workers can spend up to 24% of their time looking for information. Good search tools help them find this information more quickly. Expectations about the ease of use of search tools are high because searches are so easy to perform on the Internet. Oracle Fusion Applications Search is designed to exceed user expectations.

Oracle Fusion Applications Search is embedded within Oracle Fusion Applications. Any application that connects to multiple data sources or manages a significant amount of unstructured (non-database) information—or both—needs advanced search capabilities so that application users can easily locate and take action on data that is relevant to them. Powered by the Oracle Enterprise Crawl and Search Framework and Oracle Secure Enterprise Search, Oracle Fusion Applications Search not only provides a seamless search experience to the Oracle Fusion Applications end user for getting the right content at the right time, but also enhances the Oracle Fusion Applications developer's experience by providing a metadata-driven, declarative design time and runtime interface to manage enterprise search capabilities.

### 9.1.1 Oracle Fusion Applications Search Use Case Example

Simone Sterling is a new sales representative at Cobalt Inc. a computer hardware company. She is taking over for Jim Anderson, who just left the company. Simone needs to learn about Jim's interactions with his customers and about how to sell Cobalt's new line of energy-saving displays.

Simone starts by entering "Jim Anderson" in the Oracle Fusion Applications Search box that is available at the top of every Oracle Fusion Applications page. Simone

retrieves hundreds of documents pertaining to Jim Anderson and to people named "Jim" or "Anderson". Simone is only interested in documents related to sales or customers, so she de-selects all the search categories except Sales and Customers and then re-runs her search.

Now that Simone is only looking at potentially relevant records, she decides to start exploring the results for specific customers. Simone expands the Customer Account node under the Customer node in the Available Filters tree to display a list of customer accounts. Simone can only view the search results for documents to which she has been granted access. Likewise, she can only view the search categories and filters to which she has access.

Simone clicks "ABC Corporation" to display only the records that involve both Jim Anderson and ABC Corporation. Simone hovers her mouse pointer over result items for Customer Notes and Customer Interactions to see the first 244 characters of each document. She drills down to view details for a note about the new energy-saving displays.

Simone continues to explore her search results. She filters the results by selecting new customers from the Customer Accounts node, views result items in the Search Results window, then drills into Oracle Fusion Applications to view details for interesting items.

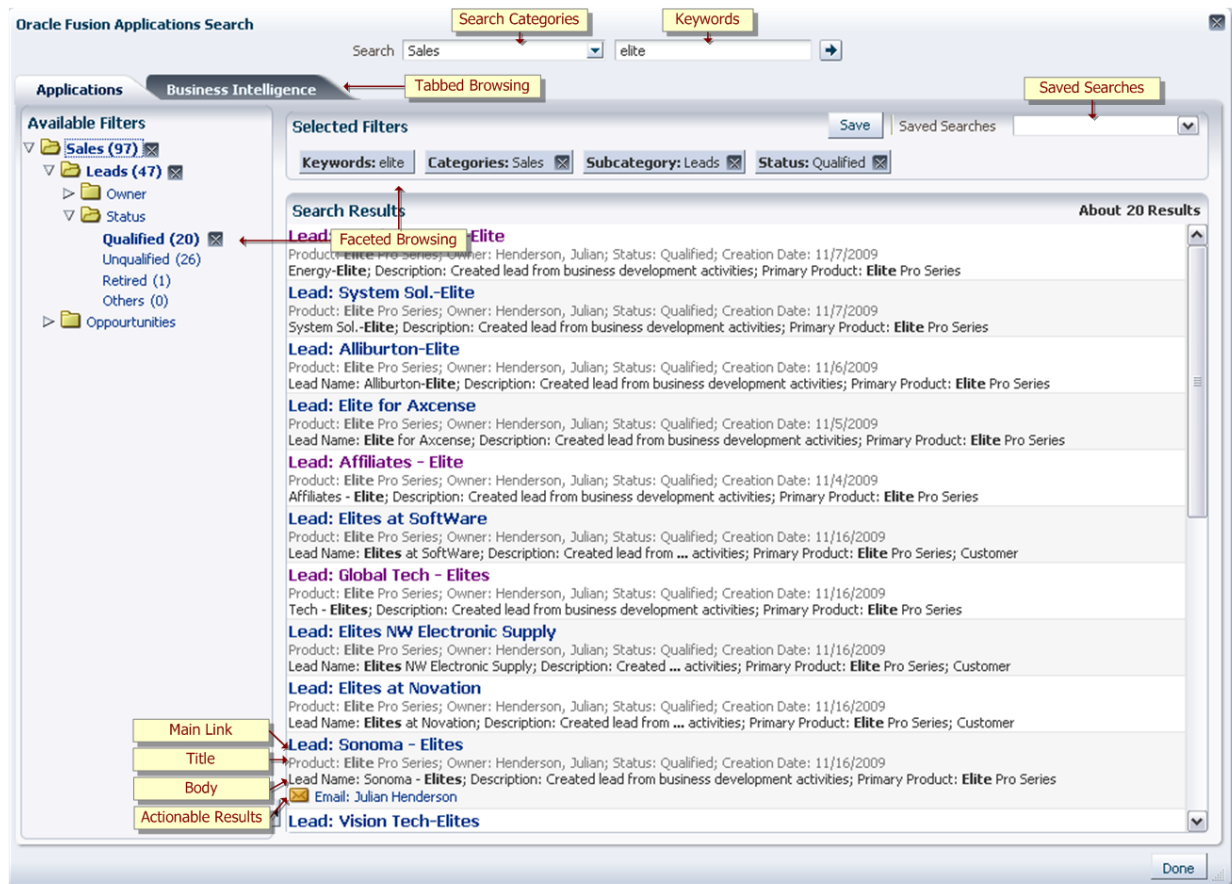
Simone finds a particularly useful set of results by searching for the new energy-saving displays, then filtering for recent customer interactions. She decides to save her search so she can monitor customer interactions around the energy-saving displays, so she clicks the Save... button and names her search "Energy Saver Interactions". This enables her to re-run her search at any time from any page within Oracle Fusion Applications.

Thus, Simone reaps the benefits of the powerful Oracle Fusion Applications Search feature that helps her tailor the search results to meet her specific business needs. She can also save the searches that she wants to reuse often.

## 9.1.2 Oracle Fusion Applications Search UI

The user interface for Oracle Fusion Applications Search, shown in [Figure 9-1](#), offers a variety of useful features.

Figure 9–1 Oracle Fusion Applications Search UI



In the preceding figure, the following features are called out:

- The **Search Categories** dropdown list allows Oracle Fusion Applications users to scope their searches to one or more selected categories. Each search category corresponds to one Oracle Secure Enterprise Search (Oracle SES) data source group. Search categories (Oracle SES data source groups) are used for display purposes and for organizing searchable objects (Oracle SES data sources).
- The **Keywords** field allow users to enter terms or Oracle SES-supported operators for search.
- **Tabbed Browsing** organizes the search results for Oracle Fusion Applications and Oracle Business Intelligence (BI) Catalog into separate tabs. In Oracle Fusion Applications V1, Oracle Fusion Applications Search federates queries to the Oracle SES instance that searches the Oracle Business Intelligence (BI) Catalog. Search results from the Oracle Fusion Applications Oracle SES instance appear on the Oracle Fusion Applications tab. Search results from the Oracle Business Intelligence (BI) Catalog Oracle SES instance appear on the Business Intelligence tab.
- **Faceted Browsing** allows Oracle Fusion Applications users to filter their search results by selecting nodes in the Available Filters tree. Applied filters are shown in bold in the Available Filters tree and as tiles in the Selected Filters region. The numbers in parentheses next to the applied filters in the Available Filters tree represent the number of documents in the search result set that have that facet value.

Users can filter by category (Oracle SES data source group), subcategory (searchable object /Oracle SES data source), and values of one or more facets defined for a given subcategory. Filtering on a facet value automatically filters on its parent subcategory and category.

Filters can be removed via the delete icons in the Available Filters tree and the Selected Filters region. Removing a parent filter also removes all its children.

- Saved Searches allows Oracle Fusion Applications users to save the searches they create. Saved searches comprise all characters in the Keywords field and all the filters the user applies. Selecting a saved search runs the query and display all filters in the Available Filters tree and the Selected Filters region.
- The Main Link identifies the object or page to which a search result item links. It is the primary link and search result item title, as defined in the Default Action Title by the Oracle Fusion Applications developer.
- The Title provides key information about each search result item in addition to the main link. The title is part of the search result item's fixed content that appears regardless of where the user's keywords match the searchable document.
- The Body of each search result item includes a context snippet that comprises one or more instances of the keywords and the surrounding text extracted from the body of the searchable document.
- The Actionable Results are the list of the action links that appear below the body of each search result item. The action links allow Oracle Fusion Applications users to navigate directly to the pages for the objects represented by the search result items so that they can take specific actions on those objects. Action links can also take the user to third party web sites or any page accessed by a fully qualified URL.

### 9.1.3 Oracle Enterprise Crawl and Search Framework

Oracle Fusion Applications Search functionality is fundamentally made possible by the integration of three systems, each playing a role in forming the complete search platform:

- Search engine, as provided by Oracle Secure Enterprise Search (Oracle SES), which provides the fundamental search capability that includes indexing, querying, as well as some value added functionalities such as security. For more information about Oracle SES, see *Oracle Secure Enterprise Search Administrator's Guide*.
- Source system, such as a relational database, where the searchable information resides
- Search development framework, such as Oracle Enterprise Crawl and Search Framework (ECSF), that supports the integration of applications with search engines

ECSF is an Oracle Fusion Middleware search framework that enables the exposure of application context information on various business objects to enable full-text transactional search. Benefits of ECSF include:

- Transparent integration of applications with search engines, which minimizes development time and maximizes the user experience with search
- Code reuse, through use of a well designed set of abstract classes, to reduce long design cycles
- Basic platform for developing search, which helps new developers to grasp the conceptual flow of work easily



- Centralized process and control mechanism, which enhances search functionality
- Wide range of optimizations that offer better control to leverage search results

### 9.1.3.1 ECSF Management Features

ECSF management features include:

- Runtime server, a metadata-driven runtime engine that serves as an integration framework between enterprise data sources and Oracle SES. It enables crawling, indexing, and the security service. It also serves as the semantic engine that provides "smart" search features, such as faceted navigation, actionable results, and related search.
- Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control), an administration user interface for configuring and administering the ECSF runtime server, managing the searchable object lifecycle, and synchronizing with Oracle SES. Support for a command line administration option is also provided. For more information, see the "ECSF Command Line Administration Utility" appendix in the *Oracle Fusion Applications Developer's Guide*.

### 9.1.3.2 Key ECSF Features

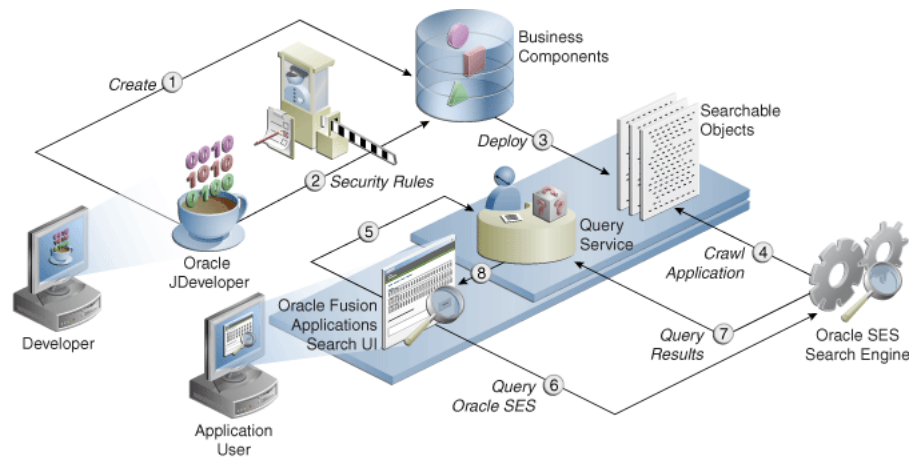
Key ECSF features that are built on top of Oracle SES and enhance the Oracle Fusion Applications user experience with search include:

- Basic search, which allows query based on keyword and search category.
- Advanced search, which allows query based on keyword, search category, and up to 100 attribute filters.
- Faceted navigation, which allows the filtering of search results based on attributes of the business objects. Users can navigate a search result set based on a set of predefined facets, or dimensions. This feature returns a list of facets and their associated set of available values with the search result. Users can select a value for each facet, which is then submitted with the search query to narrow down the result set.
- Actionable results, which are search results with action links associated with the searchable objects. From the search results users can either go straight to the page displaying the record they selected, or they can invoke a specific task on a search result.
- Saved searches, which allows saved search criteria for later use. Users can create new saved search entries, edit and delete existing saved search entries, and retrieve user-specified or public saved search entries.
- File attachments, which allow the crawling of attachments that are associated with Oracle Fusion Applications transactional objects or records.
- Crawling Oracle WebCenter Portal tags, which supports crawling searchable objects that contain Oracle WebCenter Portal tags.
- Crawling tree structures, which supports search functionality on source systems containing data that is organized in a tree structure (for example, Oracle Business Intelligence (BI) Catalog).
- Search support for external data sources, which allows querying against search groups that contain external data sources, which are non-ECSF related data sources, such as wiki pages and blogs, that are directly crawled by Oracle SES.

### 9.1.3.3 ECSF Process Flow

The process flow for search using the ECSF architecture, illustrated in [Figure 9–2](#), begins from the time the Oracle Fusion Applications developer makes a view object searchable to the time the Oracle Fusion Applications user receives the search results. The arrows indicate the direction of flow, and the numbered circles indicate the sequence of the steps, which correspond to the list immediately following the illustration.

**Figure 9–2 ECSF Process Flow**



The process flow includes the following steps:

1. The Oracle Fusion Applications developer creates a searchable object.
2. The Oracle Fusion Applications developer configures the security rules.
3. The Oracle Fusion Applications administrator deploys the searchable objects to the ECSF runtime environment by registering them in the Oracle Fusion Applications database.
4. The Oracle Fusion Applications administrator deploys the searchable objects to Oracle SES. The Oracle SES search engine crawls the searchable objects in the Oracle Fusion Applications and indexes them as documents.
5. The Oracle Fusion Applications administrator creates search categories containing the searchable objects and deploys them to Oracle SES. When the Oracle Fusion Applications user issues a search query, the Oracle Fusion Applications Search UI performs the query through the ECSF Query Service.
6. The Query Service applies the Oracle Fusion Applications-specific rules and sends the query to the Oracle SES search engine.
7. The Oracle SES search engine returns the result set to the Query Service.
8. The Query Service applies post query security rules and constructs the search hits, and the Oracle Fusion Applications Search UI renders the search results for the Oracle Fusion Applications user.

### 9.1.4 Item Business Object and Data Level Security

Oracle SES does not apply data level security to Item business objects to determine if the object can be viewed by the user. All qualified users will see a limited amount of information when the Item business object is enabled for search. The information displayed in the search results includes the item number and description. The Oracle

Product Information Management application checks the data level security when the user elects to view item details through the links within the search results.

Review your internal security policies before enabling the Item business object for search to determine if item information should be viewed by the end users.

## 9.2 Validating the Environment for ECSF

Before you begin to manage search with ECSF, make sure that the environment is set up properly for using ECSF.

To validate the ECSF setup, follow the procedures in the following tasks:

- [Task 1, "Make Sure That Oracle Fusion Applications Includes Search Functionality"](#)
- [Task 2, "Make Sure That Oracle SES Is Installed and Configured Properly"](#)
- [Task 3, "Make Sure That Fusion Applications Control Is Available"](#)
- [Task 4, "Provide Access to ECSF Pages in Fusion Applications Control"](#)
- [Task 5, "Validate the Application Identities"](#)

### Task 1 Make Sure That Oracle Fusion Applications Includes Search Functionality

Oracle Fusion Applications Search should be embedded within Oracle Fusion Applications, but it must be enabled in the user interface by setting the profile option `FUSION_APPS_SEARCH_ENABLED` to Y. For more information, see [Task 6, "Enable the Oracle Fusion Applications Search UI"](#).

To make sure that Oracle Fusion Applications includes search functionality:

1. Log in to Oracle Fusion Applications. If you cannot log in to Oracle Fusion Applications, contact your installation team.
2. Verify that the **Enterprise Search** box is available at the top of every Oracle Fusion Applications page.
3. View the **Search Categories** dropdown list. There should be no search categories listed.
4. Log out.

### Task 2 Make Sure That Oracle SES Is Installed and Configured Properly

Oracle SES provides the fundamental search capability that includes crawling, indexing, and querying. For more information about Oracle SES, see *Oracle Secure Enterprise Search Administrator's Guide*.

To make sure that Oracle SES is installed and configured properly:

1. Check the administration endpoint by logging in to the Oracle SES Administration GUI with the administration username and password at the following URL.

```
http: host_name:7777/search/admin/index.jsp
```

The default port number is 7777. Make sure that you use the correct port number for your installation. If you cannot access the Oracle SES search engine, contact your installation team.

2. Make sure that the Oracle SES identity plug-in has been registered.

3. Make sure that the federated trusted entities are created. Depending on what product families are installed, you should see one to three proxy users listed. The valid values are:
  - FUSION\_APPS\_CRM\_ECSF\_SEARCH\_APPID
  - FUSION\_APPS\_FSCM\_ECSF\_SEARCH\_APPID
  - FUSION\_APPS\_HCM\_ECSF\_SEARCH\_APPID

### **Task 3 Make Sure That Fusion Applications Control Is Available**

Fusion Applications Control must be available for configuring and administering the ECSF runtime server, managing the searchable object lifecycle, and synchronizing with Oracle SES.

To make sure that Fusion Applications Control is available:

1. Log in to Oracle Enterprise Manager.
2. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
3. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page, shown in [Figure 9-3](#).

The search engine types (Oracle SES) should be listed.

4. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, and validate the Oracle SES search engine instance parameters.
5. From the table of search engine instances, select a search engine instance record, and then select the **Searchable Objects** tab to view the table of searchable objects, and validate the list of searchable objects for the application. For a list of seeded searchable objects, see [Appendix C](#).
6. Select the **Search Categories** tab to view the table of search categories, and validate the list of search categories and objects associated with the search categories for the application. For a list of seeded search categories, see [Appendix C](#).
7. From the navigation pane, re-select the application to open the Enterprise Crawl and Search Framework Configuration Settings page, then click the **Search Application Service Component** link to open the Search Application Service Component administration page, and validate that the search applications for the product families are installed.

### **Task 4 Provide Access to ECSF Pages in Fusion Applications Control**

To access the ECSF pages in Fusion Applications Control, users must have Operator privileges in Oracle WebLogic Server. You must add the users to the Operator group and above on Oracle WebLogic Server. For more information, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

### **Task 5 Validate the Application Identities**

Oracle Fusion Applications include seven search-related application identities that are seeded and are stored in the identity store:

- FUSION\_APPS\_CRM\_SES\_CRAWL\_APPID
- FUSION\_APPS\_CRM\_ECSF\_SEARCH\_APPID

- FUSION\_APPS\_FSCM\_SES\_CRAWL\_APPID
- FUSION\_APPS\_FSCM\_ECSF\_SEARCH\_APPID
- FUSION\_APPS\_HCM\_SES\_CRAWL\_APPID
- FUSION\_APPS\_HCM\_ECSF\_SEARCH\_APPID
- FUSION\_APPS\_ECSF\_SES\_ADMIN\_APPID

ECSF is powered by Oracle SES. To integrate with Oracle SES, several integration identities known as application identities are used. For each Oracle Fusion Applications application, there are a pair of application identities, for example, FUSION\_APPS\_HCM\_SES\_CRAWL\_APPID and FUSION\_APPS\_HCM\_ECSF\_SEARCH\_APPID. The CRAWL application identities are used by Oracle SES to interact with ECSF for crawling and security requests, while the SEARCH application identities are used by Oracle SES to query Oracle SES as proxy users.

FUSION\_APPS\_ECSF\_SES\_ADMIN\_APPID is the application identity used by ECSF to integrate with Oracle SES for administration tasks, such as deployment, scheduling, and so on.

Application identities are provisioned as users in the Oracle Fusion Applications identity store. They often have high level privileges, and their credentials are generated and stored in the credential store. These users are used mainly for machine to machine (application to application) integration.

The Lightweight Directory Access Protocol (LDAP) credential store stores the passwords for the identities that Oracle Fusion Applications and ECSF uses to retrieve passwords for Oracle SES integration.

View the LDAP credential store to make sure the application identities exist.

## 9.3 Getting Started with Managing ECSF with Fusion Applications Control

Fusion Applications Control is an administration user interface that can be used for configuring and administering the ECSF runtime server, managing the searchable object lifecycle, and synchronizing with Oracle SES.

ECSF also provides support for a command line administration option. The ECSF Command Line Administration Utility offers a command line interface, and has no external dependencies on Oracle Enterprise Manager. The utility is available in the ECSF Library (`ecsf.jar`) and can be started as a Java program. For more information, see the "ECSF Command Line Administration Utility" appendix in the *Oracle Fusion Applications Developer's Guide*.

Both Fusion Applications Control and the ECSF Command Line Administration Utility require connection to the Oracle Fusion Applications database.

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**Note:** While both Fusion Applications Control and the ECSF Command Line Administration Utility can be used concurrently, it is recommended that ECSF be administered using one or the other to facilitate data control.

---

Key points of administration include:

- ECSF Configuration: ECSF currently supports only the Oracle SES search engine and its different versions. The Oracle SES search engine with its versions are

stored in the `ECSF_SEARCH_ENGINE_TYPE` table, which resides in the `FUSION` schema, and is rendered in Fusion Applications Control. Every Oracle SES search engine instance must be configured using a set of Oracle SES parameters. Every instance created for search must also be configured using a set of ECSF parameters. Both sets of parameters and their values are stored in the `ECSF_PARAMETER` table and are rendered in Fusion Applications Control. Parameter names are read-only, while parameter values can be updated.

- ECSF Administration
  - Search engine instances and parameters: ECSF supports more than one search engine instance of a given search engine type (currently only Oracle SES). It supports the declarative distribution of index over several search engine instances. Each search engine instance belongs to exactly one version of the Oracle SES search engine type. All the supported search engines instances are stored in the `ECSF_ENGINE_INSTANCE` table and managed using Fusion Applications Control.
  - Searchable objects: Searchable object definitions are configured at design time, and the information is stored in metadata XML files. This information is imported into the Oracle Fusion Applications database and rendered in Fusion Applications Control in the form of searchable objects.
  - Search categories: The metadata for search categories, also called search groups (for Oracle SES), is collected and rendered in Fusion Applications Control.
  - External search categories: Fusion Applications Control enables you to import external search categories (registered Oracle SES data source groups that are crawled and created directly using Oracle SES Administration UI) to be used directly for querying.
  - Index schedule: The index schedule is created in Fusion Applications Control. A corresponding Oracle SES index schedule is then created.

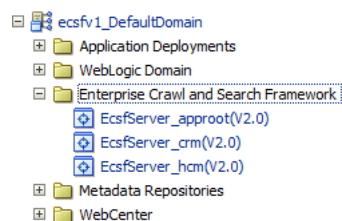
Security administration for ECSF is handled outside the framework and Fusion Applications Control.

For general information about Fusion Applications Control, see [Chapter 2](#).

### 9.3.1 Navigating to the ECSF Administration Pages

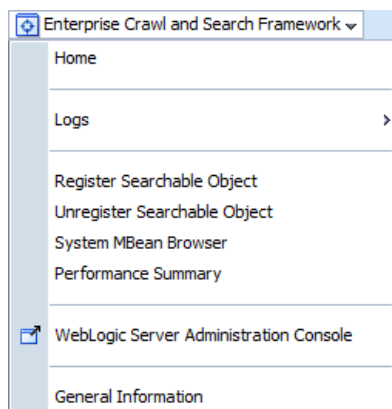
To navigate to the ECSF administration pages in Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder, and select the application engine instance that contains the searchable objects you want to manage.



The Enterprise Crawl and Search Framework Configuration Settings page displays. For more information about the Configuration Settings page, see [Section 9.3.2](#).

2. Expand the **Enterprise Crawl and Search Framework** target menu.



The menu displays the options described in [Table 9–1](#).

**Table 9–1 Enterprise Crawl and Search Framework Target Menu Options**

Menu Option	Description
Home	Displays the Enterprise Crawl and Search Framework Configuration Settings page. For more information about this page, see <a href="#">Section 9.3.2</a> .
Logs	Displays the options to either view log messages or access the Log Configuration page to configure basic and advanced log configuration settings. For more information, see "Managing Log Files and Diagnostic Data" chapter in <i>Oracle Fusion Middleware Administrator's Guide</i> .  The log files are stored in the following directory: <code>DOMAIN_HOME/sysman/log/emoms.log</code>
Register Searchable Object	Displays the Register Searchable Object page. For more information about the Register Searchable Object task, see <a href="#">Task 2, "Register the Searchable Objects"</a> .
Unregister Searchable Object	Displays the Unregister Searchable Object page. For more information about the Unregister Searchable Object task, see <a href="#">Task 4, "Unregister the Searchable Objects"</a> .
System MBean Browser	Displays the MBean browser that allows to you browse the MBeans for the selected application.
Performance Summary	Displays performance information for the selected component or application. For more information, see <a href="#">Section 12.4.1</a> .
WebLogic Server Administration Console	Launches the Oracle WebLogic Server Administration Console in a separate browser window.
General Information	Displays general information about the application instance.

### 9.3.2 Understanding the Enterprise Crawl and Search Framework Configuration Settings Page

The Enterprise Crawl and Search Framework Configuration Settings page, shown in [Figure 9–3](#), displays the search engine types and their corresponding search engine instance parameters. This page is your starting place for administering and managing search.

**Figure 9–3 Enterprise Crawl and Search Framework Configuration Settings Page**

To manage and configure ECSF Service Component Application, use this link [ECSF Service Component](#)

**ECSF Configuration Settings**

Click the search engine type for which you want to administer the search engine instances.

**Search Engine Types:**

Name	Version	Connector Class Name
Oracle SES	11.1.2.0.0	oracle.ecsf.ses.v11g.impl.SearchEngineImpl
Oracle SES	10.1.8.4	oracle.ecsf.ses.impl.SearchEngineImpl

Columns Hidden

Name	Required
SES_ADMIN_SERVICE	✓
SES_ADMIN_USERNAME	✓
SES_ADMIN_PASSWORD	✓
SES_ADMIN_SESSION_TIMEOUT	✓
SES_QUERY_SERVICE	✓
SES_QUERY_PROXY_USERNAME	✓
SES_QUERY_PROXY_PASSWORD	✓
SES_QUERY_SESSION_TIMEOUT	✓
ECSF_DATA_SERVICE	✓

From the Enterprise Crawl and Search Framework Configuration Settings page, you can navigate to the Search Application Service Component Administration page to create and configure Search Application Service Component instances.

You can also navigate to the Search Engine Instance Administration page (by selecting a search engine type) to define search engine instances, manage data sources and schedules, and extend search.

## 9.4 Administering Search

Administer search by managing data sources and schedules and modifying data sources.

---

**Note:** Administration of searchable objects, search categories, and index schedules must be performed using Fusion Applications Control. You can use the Oracle SES Administration GUI for all other Oracle SES related administration tasks.

To access the ECSF pages in Fusion Applications Control, you must have Operator privileges in Oracle WebLogic Server. For more information, see [Task 4, "Provide Access to ECSF Pages in Fusion Applications Control"](#).

---

You can perform the following procedures to administer search using Fusion Applications Control:

- [Section 9.4.1, "Making Seeded Searchable Objects Available for Search"](#)
- [Section 9.4.2, "Managing Index Schedules"](#)
- [Section 9.4.3, "Changing the Association of Searchable Objects with Search Categories"](#)



- [Section 9.4.4, "Renaming Search Categories"](#)
- [Section 9.4.5, "Deleting Search Categories"](#)
- [Section 9.4.6, "Making External Search Categories Available for Federated Search"](#)
- [Section 9.4.7, "Deleting External Search Categories"](#)
- [Section 9.4.8, "Modifying the Display Name of Deployed Searchable Objects"](#)
- [Section 9.4.9, "Undeploying Searchable Objects"](#)
- [Section 9.4.10, "Unregistering Searchable Objects from the Oracle Fusion Applications Database"](#)
- [Section 9.4.11, "Modifying Search Application Service Component Instance Parameters"](#)

To avoid disrupting running schedules, it is highly recommended that you administer search when the index schedules are not running.

### 9.4.1 Making Seeded Searchable Objects Available for Search

The Oracle Fusion Customer Relationship Management, Oracle Fusion Human Capital Management, and Oracle Fusion Supply Chain Management product families each has its own set of seeded searchable objects that are packaged into its corresponding search application. For example, the seeded searchable objects for Oracle Fusion Customer Relationship Management are packaged in the Oracle Fusion Customer Relationship Management search application. For more information, see [Appendix C](#).

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**Note:** While Oracle Fusion Financials searchable objects, search categories, and index schedules are seeded, they are not available for search. Do not use Oracle Fusion Financials searchable objects, search categories, and index schedules to enable search because they are not seeded.

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To manage the searchable objects for a particular product family, you must select the search application corresponding to that product family.

To make seeded searchable objects available for search, follow the procedures in the following tasks:

- [Task 1, "Deploy the Searchable Objects to the Oracle Secure Enterprise Search \(Oracle SES\) Instance"](#)
- [Task 2, "Activate the Searchable Objects"](#)
- [Task 3, "Deploy the Search Categories"](#)
- [Task 4, "Deploy the Index Schedules"](#)
- [Task 5, "Start the Index Schedules"](#)
- [Task 6, "Enable the Oracle Fusion Applications Search UI"](#)
- [Task 7, "Validate That Searchable Objects Are Available for Search"](#)

#### **Task 1 Deploy the Searchable Objects to the Oracle Secure Enterprise Search (Oracle SES) Instance**

Deploying searchable objects to the Oracle Secure Enterprise Search (Oracle SES) instance makes the objects available for the search engine instance to crawl. The

searchable objects deployed to Oracle SES must have a unique and fully qualified name, for example, `oracle.apps.crm.Opportunity` or `oracle.apps.hcm.Opportunity`.

To deploy searchable objects to the Oracle SES instance using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the **Oracle SES** search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, shown in [Figure 9-4](#).

**Figure 9-4 Search Engine Instance Administration Page**

**Administration: Search Engine Instance**

Define search engine instances for the selected search engine type. You can create, modify, and delete engine instances, and configure a search categories.

Search Engine Type: **Oracle SES**

Actions View Register Refresh Detach

Name	Comments
CRM Search Engine Instance	Instance for CRM Searchable Objects
FSCM Search Engine Instance	Instance for FSCM Searchable Objects
HCM Search Engine Instance	Instance for HCM Searchable Objects
Help Instance	Instance for Help Portal Objects

Columns Hidden

**Parameters** Searchable Objects Search Categories External Search Categories Index Schedules

Actions View Detach Deploy Parameters

Name	Required	Value
SES_ADMIN_SERVICE	✓	<input type="text" value="http://hostserver:5270/search/api/admin/AdminService"/>
SES_ADMIN_USERNAME	✓	<input type="text" value="searchsys"/>
SES_ADMIN_PASSWORD	✓	<input type="password" value="....."/>
SES_ADMIN_SESSION_TIMEOUT	✓	<input type="text" value="60"/>
SES_QUERY_SERVICE	✓	<input type="text" value="http://hostserver:5270/search/query/OracleSearch"/>
SES_QUERY_PROXY_USERNAME	✓	<input type="text" value="scott"/>
SES_QUERY_PROXY_PASSWORD	✓	<input type="password" value="....."/>
SES_QUERY_SESSION_TIMEOUT	✓	<input type="text" value="60"/>

(Columns Hidden 4)

4. From the table of search engine instances, select the record of the search engine instance that contains the searchable object you want to deploy, and then select the **Searchable Objects** tab, shown in [Figure 9-5](#), to view the table of searchable objects for the selected search engine instance.

Figure 9–5 Searchable Objects Tab

Display Name	Searchable Object Name	Version	Deployed	Active	Application ID	Parameters Applied	Customized
ECM Contracts	oracle.apps.contracts.dash...	1	✓	✓	contracts	✓	<input type="checkbox"/>
	is.dash...	1	✓	✓	contracts	✓	<input type="checkbox"/>
Contract Documents	oracle.apps.contracts.dash...	1	✓	✓	contracts	✓	<input type="checkbox"/>
Sourcing Contracts	oracle.apps.contracts.dash...	1	✓	✓	contracts	✓	<input type="checkbox"/>
Contracts	oracle.apps.contracts.dash...	1	✓	✓	customer	✓	<input type="checkbox"/>
References	oracle.apps.sales.baseSale...	1	✓	✓	sales	✓	<input type="checkbox"/>
Opportunities	oracle.apps.sales.opptyMg...	1	✓	✓	sales	✓	<input type="checkbox"/>

- Click the **Deploy** icon. Alternatively, select **Deploy** from the **Actions** menu or use the Ctrl+Shift+P keyboard shortcut.

A green check mark appears in the Deployed column of the selected searchable object to indicate that the source has been created in Oracle SES.

---

**Note:** When a searchable object is registered to ECSF, by default it is inactive and not deployed. You can deploy the searchable object to the search engine instance regardless of whether the searchable object is active or inactive. When deployed successfully, the searchable object is flagged as deployed and inactive until you activate it. When a searchable object is deployed, the search engine instance can crawl the searchable object. However, a query of that object will return no results until the object is activated.

---

## Task 2 Activate the Searchable Objects

A query of deployed and crawled searchable objects will return results only if the objects are activated.

To activate searchable objects using Fusion Applications Control:

- From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
- Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
- Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
- From the table of search engine instances, select the record of the search engine instance that contains the searchable object you want to activate, and then select the **Searchable Objects** tab, shown in to view the table of searchable objects for the selected search engine instance.
- Select the desired searchable object from the table, and click the **Activate** icon. Alternatively, select **Activate** from the **Actions** menu or use the Ctrl+Shift+T keyboard shortcut.

A green check mark appears in the Active column of the selected searchable object to indicate that the searchable object is available for search.

---

---

**Note:** A query of this object will return results only if the object has been deployed to a search engine instance and has been crawled.

---

---

### Task 3 Deploy the Search Categories

Deploying search categories pushes them to the Oracle SES instance. Only search categories with associated searchable objects that are activated can be deployed. Only deployed search categories appear in the Search Categories dropdown list in the Oracle Fusion Applications Search UI.

To deploy search categories using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance to which you want to deploy a search category, and then select the **Search Categories** tab to view the table of search categories for the selected search engine instance.
5. Select the record of the search category you want to deploy.
6. Set the scope of the search category to `GLOBAL` to display the search category on the Oracle Fusion Applications Search UI.
7. Click the **Deploy** icon. Alternatively, select **Deploy** from the **Actions** menu or use the `Ctrl+Shift+P` keyboard shortcut.

A green check mark appears in the **Deployed** column of the selected search category to indicate that the source group has been created in Oracle SES.

---

---

**Note:** You cannot deploy a search category that contains a searchable object that is not activated. All searchable objects in the search category must be activated. For more information, see [Task 2, "Activate the Searchable Objects"](#).

The Oracle Fusion Applications Search UI reflects this change after the ECSF cache expires and the user logs out and logs back in. The default is 30 minutes after the change is added to the cache.

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### Task 4 Deploy the Index Schedules

Deploying index schedules pushes them to the Oracle SES instance. Only index schedules with associated searchable objects can be deployed.

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---

**Caution:** Deploying index schedules to Oracle SES automatically sets the value for `recrawlPolicy` to `Process Documents That Have Changed in Oracle SES`. Do not change the value of `recrawlPolicy`. ECSF supports only incremental crawling.

---

---

To deploy index schedules using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance for which you want to deploy an index schedule, and then select the **Index Schedules** tab, shown in [Figure 9-6](#), to view the table of index schedules for the selected search engine instance.

**Figure 9-6 Index Schedules Tab**

Name	Status	Deployed	Frequency Type	Time Between Launches	Schedule Launch Day	Schedule Launch Time
Customers Schedule			hourly	1		
Contacts Schedule	Scheduled	✓	manual			
Customer Contracts Schedule	Scheduled	✓	manual			
Customer References Schedule	Scheduled	✓	manual			
References Schedule	Scheduled	✓	manual			
Opportunities Schedule	Scheduled	✓	manual			

5. Select the desired index schedule from the table, and click the **Deploy Index Schedule** icon. Alternatively, select **Deploy** from the **Actions** menu or use the Ctrl+Shift+P keyboard shortcut.

A green check mark appears in the **Deployed** column of the selected index schedule, and the **Status** column indicates *Scheduled*. This indicates that the schedule has been created in Oracle SES.

### Task 5 Start the Index Schedules

Starting an index schedule initiates the crawling and indexing of data. You cannot start an index schedule that has not been deployed. You must first deploy the index schedule to add it to the search engine instance. For more information, see [Task 4, "Deploy the Index Schedules"](#).

To start index schedules using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance for which you want to start an index schedule, and then select the **Index**

**Schedules** tab to view the table of index schedules for the selected search engine instance.

5. Select the desired index schedule from the table, and click the **Start Index Schedule** icon. Alternatively, select **Start** from the **Actions** menu or use the Ctrl+Shift+W keyboard shortcut.

The **Status** column of the selected index schedule indicates that the schedule is **Launching**. The date and time appear in the **Start Time** column when you start the index schedule.

You must manually refresh the page to view the status updates.

### **Task 6 Enable the Oracle Fusion Applications Search UI**

After you have configured search and started the crawl, enable the Oracle Fusion Applications Search UI by setting the value of the `FUSION_APPS_SEARCH_ENABLED` profile option to `Y`. This setting makes the search controls visible in the user interface. The default value is `N`, which disables the search controls in the user interface.

To set the `FUSION_APPS_SEARCH_ENABLED` profile option to `Y`:

1. Sign in to Oracle Fusion Applications with a user account that is provisioned with the Manage All Application Profile Values role. Contact your security administrator for details.
2. From the **Administration** menu in the work area of Oracle Fusion Applications, choose **Setup and Maintenance**.
3. From the Setup and Maintenance Overview page, search for profile tasks. The Manage Administrator Profile Values page displays.
4. Edit profile option values.
5. Query the profile option using the code `FUSION_APPS_SEARCH_ENABLED`.
6. Set the value to **Yes** at the site level. This profile option is defined at the site level only.

For more information about configuring profile options, see [Section 15.4.5](#).

### **Task 7 Validate That Searchable Objects Are Available for Search**

Make sure that you can see valid search results by running a query on a selected search category.

To validate that searchable objects are available for search using Fusion Applications Control:

1. Make sure that the index schedule you started has completed crawling and indexing the content for search, which is indicated by `Scheduled` in the **Status** column for the index schedule.
2. Log in to your application and expand the **Categories** field in the global area. You should see all the search categories you deployed.
3. Select one search category, enter \* (wildcard) in the **Search Term** field, and click the **Play** button to initiate the search.

Search results should appear, confirming the readiness for search.

## **9.4.2 Managing Index Schedules**

You can perform the following tasks to manage index schedules:

- [Section 9.4.2.1, "Creating the Index Schedules"](#)
- [Section 9.4.2.2, "Associating the Searchable Objects with Index Schedules"](#)
- [Section 9.4.2.3, "Deploying the Index Schedules"](#)
- [Section 9.4.2.4, "Starting the Index Schedules"](#)
- [Section 9.4.2.5, "Stopping Index Schedules"](#)
- [Section 9.4.2.6, "Disassociating Searchable Objects from Index Schedules"](#)
- [Section 9.4.2.7, "Starting Full Indexing"](#)
- [Section 9.4.2.8, "Undeploying Index Schedules"](#)
- [Section 9.4.2.9, "Deleting Index Schedules"](#)

---

**Note:** Repetitive deployment of index schedules is not supported.

---

### 9.4.2.1 Creating the Index Schedules

You can either create new index schedules for the new searchable objects or add the new searchable objects to existing index schedules. Creating an index schedule adds a new record to the `ECSF_INDEX_SCHEDULE` table in the Oracle Fusion Applications database.

To create index schedules using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance for which you want to create an index schedule, and then select the **Index Schedules** tab, shown in [Figure 9-6](#), to view the table of index schedules for the selected search engine instance.
5. Click the **New Index Schedule** icon. Alternatively, select **New Record** from the **Actions** menu or use the Ctrl+Shift+N keyboard shortcut.

A new record is added to the top of the table of index schedules.

6. Enter a value for the **Name** column.
7. From the **Frequency Type** dropdown list, select the desired value for how often you want the index schedule to run.
8. Complete the **Time Between Launches**, **Schedule Launch Days**, and **Schedule Launch Time** columns that become enabled based on your selection in the **Frequency Type** column. [Table 9-2](#) lists the valid values for the required columns based on the frequency type.

**Table 9-2** Index Schedule Frequency Values

Frequency Type	Time Between Launches	Schedule Launch Day	Schedule Launch Time
Manual	---	---	---

**Table 9–2 (Cont.) Index Schedule Frequency Values**

Frequency Type	Time Between Launches	Schedule Launch Day	Schedule Launch Time
Hourly	1 to 23	---	---
Daily	1 to 99	---	1:00 AM to 12:00 AM
Weekly	1 to 12	Monday to Sunday	1:00 AM to 12:00 AM
Monthly	1 to 12	1 to 31	1:00 AM to 12:00 AM

- Click the **Save Index Schedule** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+Shift+S keyboard shortcut.

---

**Caution:** A save will occur only for the selected record. You can only save one record at a time.

---



---

**Note:** To proceed with other operations, you must first select any record. Creating or deleting ECSF objects removes the focus from the window.

---

#### 9.4.2.2 Associating the Searchable Objects with Index Schedules

Associating searchable objects with an index schedule adds the objects to that index schedule. You can only associate each searchable object with one index schedule. Only a searchable object that is not already associated with an index schedule can be added to an index schedule. If the searchable object is already associated with an index schedule, you must disassociate it from that index schedule before you can associate it with another index schedule. For more information, see [Section 9.4.2.6](#).

You can only associate searchable objects with index schedules that are not already deployed. If the index schedule has already been deployed, you must undeploy it before you can associate searchable objects with it. For more information, see [Section 9.4.2.8](#).

To associate searchable objects with index schedules using Fusion Applications Control:

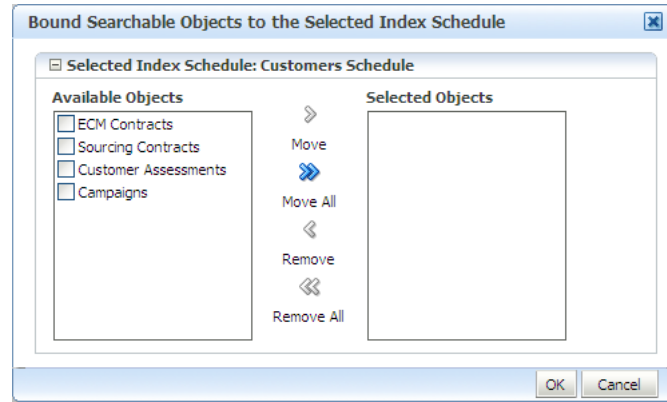
- From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
- Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
- Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
- From the table of search engine instances, select the record of the desired search engine instance, and then select the **Index Schedules** tab, shown in [Figure 9–6](#), to view the table of index schedules for the selected search engine instance.
- Select the desired index schedule to which you want to add searchable objects, and click the **Bind** icon.

The **Bind** icon is disabled if the index schedule is deployed. You cannot associate or disassociate searchable objects if the index schedule is deployed.



- In the Bound Searchable Objects to the Selected Index Schedule dialog, shown in [Figure 9-7](#), select the checkboxes of the desired searchable objects from the **Available Objects** list, and click the **Move** icon to add them to the **Selected Objects** list.

**Figure 9-7 Bound Searchable Objects to the Selected Index Schedule Dialog**



- Click **OK**.

The `IS_ID` column in the `ECSF_SEARCH_INDEX_OBJECT` table is populated with the Index Schedule ID.

---

**Note:** A searchable object can be assigned to only one index schedule. If a searchable object has been assigned to an index schedule, it will not be listed in the table of available searchable objects.

---

### 9.4.2.3 Deploying the Index Schedules

Deploying index schedules pushes them to the Oracle SES instance. For more information, see [Task 4, "Deploy the Index Schedules"](#).

### 9.4.2.4 Starting the Index Schedules

Starting an index schedule initiates the crawling and indexing of data. For more information, see [Task 5, "Start the Index Schedules"](#).

### 9.4.2.5 Stopping Index Schedules

Stopping an index schedule that has been started aborts the index process.

To stop index schedules using Fusion Applications Control:

- From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
- Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
- Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
- From the table of search engine instances, select the record of the search engine instance for which you want to stop an index schedule, and then select the **Index**

**Schedules** tab, shown in [Figure 9–6](#), to view the table of index schedules for the selected search engine instance.

5. Select the desired index schedule from the table, and click the **Stop Index Schedule** icon. Alternatively, select **Stop** from the **Actions** menu or use the Ctrl+Shift+O keyboard shortcut.

The **Status** column of the selected index schedule indicates that the schedule has **Failed**, or that the index process was aborted. The date and time appear in the **Stop Time** column when you stop the index schedule.

#### 9.4.2.6 Disassociating Searchable Objects from Index Schedules

Disassociating a searchable object from an index schedule removes it from that index schedule and makes it available to be added to another index schedule. You can only disassociate a searchable object from an index schedule with which it is associated. You can only disassociate a searchable object from an index schedule that is not deployed. If the index schedule has been deployed, you must undeploy it before you can disassociate a searchable object from it. For more information, see [Section 9.4.2.8](#).

To disassociating searchable objects from index schedules using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the desired search engine instance, and then select the **Index Schedules** tab, shown in [Figure 9–6](#), to view the table of index schedules for the selected search engine instance.
5. Select the desired index schedule from which you want to remove searchable objects, and click the **Bind** icon.

The **Bind** icon is disabled if the index schedule is deployed. You cannot associate or disassociate searchable objects if the index schedule is deployed.

6. In the Bound Searchable Objects to the Selected Index Schedule dialog, shown in [Figure 9–7](#), select the checkboxes of the desired searchable objects from the **Selected Objects** list, and click the **Remove** icon to remove them from the **Selected Objects** list and make them available for adding to an index schedule.
7. Click **OK**.

#### 9.4.2.7 Starting Full Indexing

Full indexing is the process by which the search engine creates indexes from all crawled and indexable documents for a particular data source. In contrast, incremental indexing builds indexes on top of existing indexes.

To start full indexing using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.

2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the desired search engine instance record, and then select the **Index Schedules** tab, shown in [Figure 9-6](#), to view the table of index schedules for the selected search engine instance.
5. From the table of index schedules, select the desired schedule for which you want to build a full index.
6. Click the **Start Full Indexing** icon. Alternatively, select **Full Index** from the **Actions** menu or use the Ctrl+Shift+L keyboard shortcut.

A confirmation dialog appears. Click **OK**.

The **Status** column indicates that the full indexing is **Launching**. Indexing will occur only on the active and deployed searchable objects.

#### 9.4.2.8 Undeploying Index Schedules

Undeploying an index schedule removes it from the Oracle SES instance. Only deployed index schedules can be undeployed.

To undeploy index schedules using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance for which you want to undeploy an index schedule, and then select the **Index Schedules** tab, shown in [Figure 9-6](#), to view the table of index schedules for the selected search engine instance.
5. Select the desired index schedule from the table, and click the **Undeploy Index Schedule** icon. Alternatively, select **Undeploy** from the **Actions** menu or use the Ctrl+Shift+U keyboard shortcut.

The green check mark disappears from the **Deployed** column of the selected index schedule, and **Scheduled** disappears from the **Status** column. This indicates that the schedule has been deleted from Oracle SES.

#### 9.4.2.9 Deleting Index Schedules

Deleting an index schedule disassociates it from the search engine instance and removes its corresponding record from the `ECSF_INDEX_SCHEDULE` table in the Oracle Fusion Applications database. Only undeployed index schedules can be deleted.

To delete index schedules using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.

2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance from which you want to delete an index schedule, and then select the **Index Schedules** tab, shown in [Figure 9–6](#), to view the table of index schedules for the selected search engine instance.
5. Select the record of the index schedule you want to delete.
6. Click the **Delete Index Schedule** icon. Alternatively, select **Delete Record** from the **Actions** menu or use the Ctrl+Shift+D keyboard shortcut.

The selected record is removed from the table of index schedules.

---

---

**Note:** To proceed with other operations, you must first select any record. Creating or deleting ECSF objects removes the focus from the window.

---

---

### 9.4.3 Changing the Association of Searchable Objects with Search Categories

Changing the association of searchable objects with a search category disassociates the searchable objects from the search category and or associates additional searchable objects with the search category.

To change the association of searchable objects with search categories, follow the procedures in the following tasks:

- [Task 1, "Undeploy the Search Categories"](#)
- [Task 2, "Disassociate the Searchable Objects from Search Categories"](#)
- [Task 3, "Associate Searchable Objects with the Search Categories"](#)
- [Task 4, "Deploy the Search Categories"](#)

#### **Task 1 Undeploy the Search Categories**

Undeploying a search category removes it from the Oracle SES instance. Only deployed search categories can be undeployed.

To undeploy search categories using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance in which you want to undeploy a search category, and then select the **Search Categories** tab, shown in [Figure 9–15](#), to view the table of search categories for the selected search engine instance.
5. Select the record of the search category you want to undeploy.

6. Click the **Undeploy** icon. Alternatively, select **Undeploy** from the **Actions** menu or use the Ctrl+Shift+U keyboard shortcut.

The green check mark disappears from the **Deployed** column of the selected search category to indicate that the source group has been removed from Oracle SES.

---

**Note:** The Oracle Fusion Applications Search UI reflects this change after the ECSF cache expires and the user logs out and logs back in. The default is 30 minutes after the change is added to the cache.

---

### Task 2 Disassociate the Searchable Objects from Search Categories

Disassociating a searchable object from a search category removes it from that search category. The searchable object is still available for association to other search categories.

To disassociate searchable objects from search categories using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the desired search engine instance, and then select the **Search Categories** tab, shown in [Figure 9-15](#), to view the table of search categories for the selected search engine instance.
5. Select the desired search category from which you want to remove searchable objects, and click the **Bind** icon.

The **Bind** icon is disabled if the search category is deployed. You cannot associate or disassociate searchable objects if the search category is deployed.

6. In the Bound Searchable Objects to the Selected Search Category dialog, shown in [Figure 9-16](#), select the checkboxes of the desired searchable objects from the **Selected Objects** list, and click the **Remove** icon to remove them from the **Selected Objects** list.
7. Click **OK**.

### Task 3 Associate Searchable Objects with the Search Categories

Associate searchable objects with a search category to add the objects to that search category. For more information, see [Task 8, "Associate the Searchable Objects with Search Categories"](#).

### Task 4 Deploy the Search Categories

Deploy the search categories to push them to the Oracle SES instance. For more information, see [Task 3, "Deploy the Search Categories"](#).

## 9.4.4 Renaming Search Categories

Renaming a search category changes the name of the search category.

To change the name of a search category using Fusion Applications Control:

1. If the search category is deployed, you must undeploy it. For more information, see [Task 1, "Undeploy the Search Categories"](#).
2. In the **Name** column of the Search Categories tab, edit the value corresponding to the record of the search category you want to modify.
3. Click the **Save Search Category** icon. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+Shift+S keyboard shortcut.
4. If the search category was deployed before renaming it, redeploy it. For more information, see [Task 4, "Deploy the Search Categories"](#).

## 9.4.5 Deleting Search Categories

Deleting a search category disassociates it from the search engine instance and removes its corresponding record from the `ECSF_SEARCH_INDEX_GROUP` table in the Oracle Fusion Applications database.

To delete search categories using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance from which you want to delete a search category, and then select the **Search Categories** tab, shown in [Figure 9-15](#), to view the table of search categories for the selected search engine instance.
5. Select the record of the search category you want to delete.
6. Click the **Delete Search Category** icon. Alternatively, select **Delete Record** from the **Actions** menu or use the Ctrl+Shift+D keyboard shortcut.

The selected record is removed from the table of search categories.

---

---

**Note:** To proceed with other operations, you must first select any record. Creating or deleting ECSF objects removes the focus from the window.

---

---

## 9.4.6 Making External Search Categories Available for Federated Search

External search categories are the registered Oracle SES data source groups that contain external data sources (that is, data sources created using Oracle SES administration). External data sources are not registered in the `ECSF_SEARCH_INDEX_OBJECT` table. They include data sources such as Intranet, mail, database, and federated data sources (that is, data sources from another search engine instance). Oracle SES data source groups can also contain federated ECSF data sources. For more information, see [Section 9.5.4](#).

External search categories are directly used for querying. Executing the import operation pulls all the external search categories into the Oracle Fusion Applications

database. All external search categories in the Oracle Fusion Applications database are available during ECSF query time through the ECSF query API.

---

**Note:** Since external search categories are not managed by ECSF, you must use Oracle SES to modify the external search categories.

---

To make external search categories available for federated search, follow the procedures in the following tasks:

- [Task 1, "Import the External Search Categories"](#)
- [Task 2, "Set the Application ID Value"](#)
- [Task 3, "Associate the Application ID with an Active Search Application"](#)

### Task 1 Import the External Search Categories

Importing external search categories adds new records to the `ECSF_SEARCH_INDEX_GROUP` table in the Oracle Fusion Applications database. The import also automatically sets the `IS_EXTERNAL` flag to `TRUE` to indicate that the search category is an external search category.

To import external search categories using Fusion Applications Control:

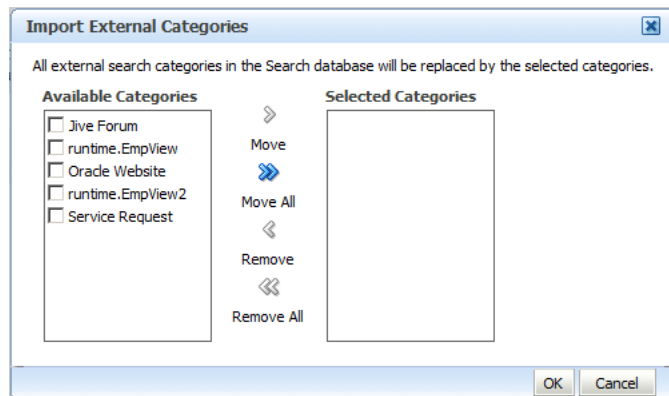
1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance that points to an Oracle SES instance, and then select the **External Search Categories** tab, shown in [Figure 9–8](#), to view the table of external search categories for the selected search engine instance.

**Figure 9–8 External Search Categories Tab**

Name	Application ID
runtime.EmpView	<input type="text"/>
runtime.EmpView2	<input type="text"/>
Service Request	<input type="text"/>

5. Click the **Import** button.

The Import External Categories dialog, shown in [Figure 9–9](#), appears.

**Figure 9–9 Import External Categories Dialog**

6. In the Available Categories column, select the checkbox of the external search categories you want to import and click the **Move** icon to shuttle your selection to the Selected Categories column.
7. Click **OK** to import the selected external search categories.

---

**Note:** All existing external search categories in the Oracle Fusion Applications database are replaced by the latest import from Oracle SES.

Clicking **OK** without selecting any external search categories also deletes all the existing external search categories in the Oracle Fusion Applications.

---

The selected search categories from the selected Oracle SES instance display in the table of external search categories. Fusion Applications Control currently only displays the name of each external search category that is imported.

Clicking **Cancel** cancels the import operation, preserves any existing external search categories in the Oracle Fusion Applications database, and returns you to the External Search Categories page.

### Task 2 Set the Application ID Value

Setting the Application ID value allows the external search categories to be queried using the GLOBAL scope, which is the default scope for Oracle Fusion Applications.

To set the Application ID value using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance that points to an Oracle SES instance, and then select the **External Search Categories** tab, shown in [Figure 9–8](#), to view the table of external search categories for the selected search engine instance.



5. From the table of external search categories, select the record of the external search category that you want to modify.
6. In the **Application ID** column corresponding to the external search category you want to modify, enter an application ID (for example, CRM) based on the desired Service Component to which this category is to be assigned.
7. Click the **Save External Search Category** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+Shift+S keyboard shortcut.

### Task 3 Associate the Application ID with an Active Search Application

The application ID set for the external search category must be associated with an active search application in order for the external search category to be available for federated search.

To associate the application ID with an active search application, update the ECSF\_QUERY\_SERVICE\_APP\_IDS parameter value to include the application ID in the comma separated string. For more information, see [Section 9.4.11](#).

## 9.4.7 Deleting External Search Categories

You can delete individual external categories after they are imported into the Oracle Fusion Applications database. Deleting an external search category removes its corresponding record from the ECSF\_SEARCH\_INDEX\_GROUP table in the Oracle Fusion Applications database, and will make it unavailable for querying.

To delete external search categories using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance from which you want to delete an external search category from the Oracle Fusion Applications database, and then select the **External Search Categories** tab, shown in [Figure 9-8](#), to view the table of external search categories for the selected search engine instance.
5. Select the record of the external search category you want to delete.
6. Click the **Delete Search Category** icon. Alternatively, select **Delete Record** from the **Actions** menu or use the Ctrl+Shift+D keyboard shortcut.

The selected record is removed from the table of external search categories.

---

**Note:** This deletion removes the external search category from the Oracle Fusion Applications database. It does not undeploy the search group from Oracle Secure Enterprise Search (Oracle SES).

---

## 9.4.8 Modifying the Display Name of Deployed Searchable Objects

You can change a deployed searchable object's display name and application ID without first having to deactivate and undeploy the searchable object.

---

---

**Caution:** Do not modify the Oracle Fusion Applications Help searchable object named `TopicSearchPVO`.

---

---

To change the display name and application ID using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance that contains the searchable object you want to modify, and then select the **Searchable Objects** tab, shown in [Figure 9-5](#), to view the table of searchable objects for the selected search engine instance.
5. In the **Display Name** column, edit the value corresponding to the searchable object you want to modify.
6. In the **Application ID** column, edit the value corresponding to the searchable object you want to modify.
7. Click the **Save Searchable Object** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+Shift+S keyboard shortcut.

### 9.4.9 Undeploying Searchable Objects

Undeploying searchable objects from the Oracle SES instance makes the objects unavailable for the search engine instance to crawl. While undeployed, the searchable object is still associated with the search engine instance record and can be redeployed to the physical engine. When a searchable object is undeployed, any association to a search category or index schedule is removed.

To undeploy searchable objects from the Oracle SES instance, follow the procedures in the following tasks:

- [Task 1, "Deactivate the Searchable Object"](#)
- [Task 2, "Undeploy the Searchable Object from the Oracle SES Instance"](#)

#### **Task 1 Deactivate the Searchable Object**

Deactivated searchable objects are still available for the search engine instance to crawl, but a query of the deactivated searchable objects will return no results.

To deactivate searchable objects on search engine instances using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.

3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance that contains the searchable object you want to deactivate, and then select the **Searchable Objects** tab, shown in [Figure 9–5](#), to view the table of searchable objects for the selected search engine instance.
5. Select the desired searchable object from the table, and click the **Deactivate** icon. Alternatively, select **Deactivate** from the **Actions** menu or use the Ctrl+Shift+I keyboard shortcut.

The green check mark disappears from the **Active** column of the selected searchable object to indicate that the searchable object is not available for search.

---

**Note:** When the searchable object is inactive, a query of that object will return no results until the object is activated.

---

### Task 2 Undeploy the Searchable Object from the Oracle SES Instance

Undeploy searchable objects from the Oracle SES instance to make the objects unavailable for the search engine instance to crawl. While undeployed, the searchable object is still associated with the search engine instance record and can be redeployed to the physical engine. You can undeploy only searchable objects that are inactive.

---

**Note:** When a searchable object is undeployed, any association to a search category or index schedule is removed.

---

To undeploy searchable objects from the Oracle SES instance using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance that contains the searchable object you want to undeploy, and then select the **Searchable Objects** tab, shown in [Figure 9–5](#), to view the table of searchable objects for the selected search engine instance.
5. Select the desired searchable object from the table, and click the **Undeploy** icon. Alternatively, select **Undeploy** from the **Actions** menu or use the Ctrl+Shift+U keyboard shortcut.

The green check mark disappears from the **Deployed** column of the selected searchable object to indicate that the source has been deleted from Oracle SES.

## 9.4.10 Unregistering Searchable Objects from the Oracle Fusion Applications Database

Unregistering searchable objects removes the searchable object records from the Oracle Fusion Applications database. Using Fusion Applications Control, you can remove records of searchable objects from the Oracle Fusion Applications database.

Only those searchable objects that are inactive, undeployed, and not associated with any engine instance can be unregistered.

To remove searchable object records from the Oracle Fusion Applications database, follow the procedures in the following tasks:

- [Task 1, "Deactivate the Searchable Objects"](#)
- [Task 2, "Undeploy the Searchable Objects from the Oracle SES Instance"](#)
- [Task 3, "Disassociate the Searchable Objects from Search Engine Instances"](#)
- [Task 4, "Unregister the Searchable Objects"](#)

### **Task 1 Deactivate the Searchable Objects**

Deactivate the searchable object you want to remove from the Oracle Fusion Applications database. For more information, see [Task 1, "Deactivate the Searchable Objects"](#).

### **Task 2 Undeploy the Searchable Objects from the Oracle SES Instance**

Undeploy the searchable object you want to remove from the Oracle Fusion Applications database. For more information, see [Task 2, "Undeploy the Searchable Object from the Oracle SES Instance"](#).

### **Task 3 Disassociate the Searchable Objects from Search Engine Instances**

Disassociating a searchable object from the search engine instance removes that object from the specified instance and makes it available for association to another search engine instance.

To delete searchable objects from search engine instances using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance to which you want to add a searchable object, and then select the **Searchable Objects** tab, shown in [Figure 9-5](#), to view the table of searchable objects for the selected search engine instance.
5. Select the desired searchable object from the table, and click the **Delete Searchable Object** icon. Alternatively, select **Delete Record** from the **Actions** menu or use the Ctrl+Shift+D keyboard shortcut.

The selected searchable object is removed from the table for the selected search engine instance, but it is not deleted from the Oracle Fusion Applications database. It can be assigned to another search engine instance. When assigned, you can deploy and activate the searchable object.

---

**Note:** To proceed with other operations, you must first select any record. Creating or deleting ECSF objects removes the focus from the window.

---

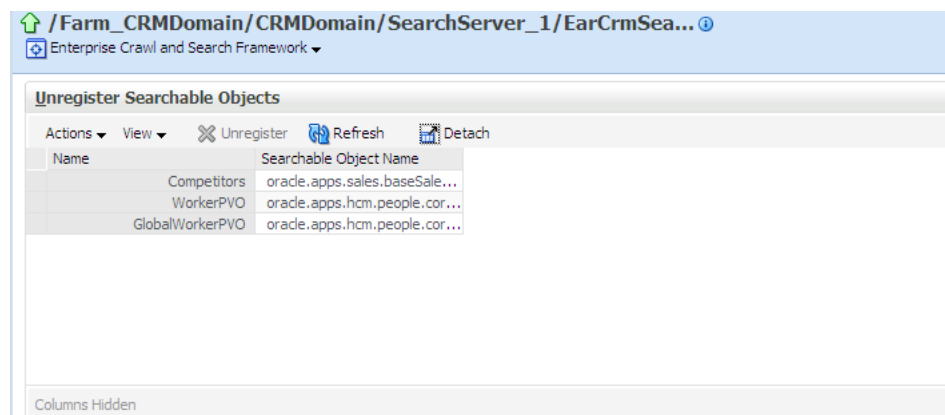
#### Task 4 Unregister the Searchable Objects

Unregistering a searchable object removes its record from the Oracle Fusion Applications database.

To unregister the searchable object using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage containing searchable objects to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. From the Enterprise Crawl and Search Framework target menu, select **Unregister Searchable Object**.
4. On the Unregister Searchable Objects page, shown in [Figure 9–10](#), select the searchable object you want to unregister.

**Figure 9–10 Unregister Searchable Objects Page**



5. Click the **Unregister** icon.  
A dialog with a confirmation message appears.

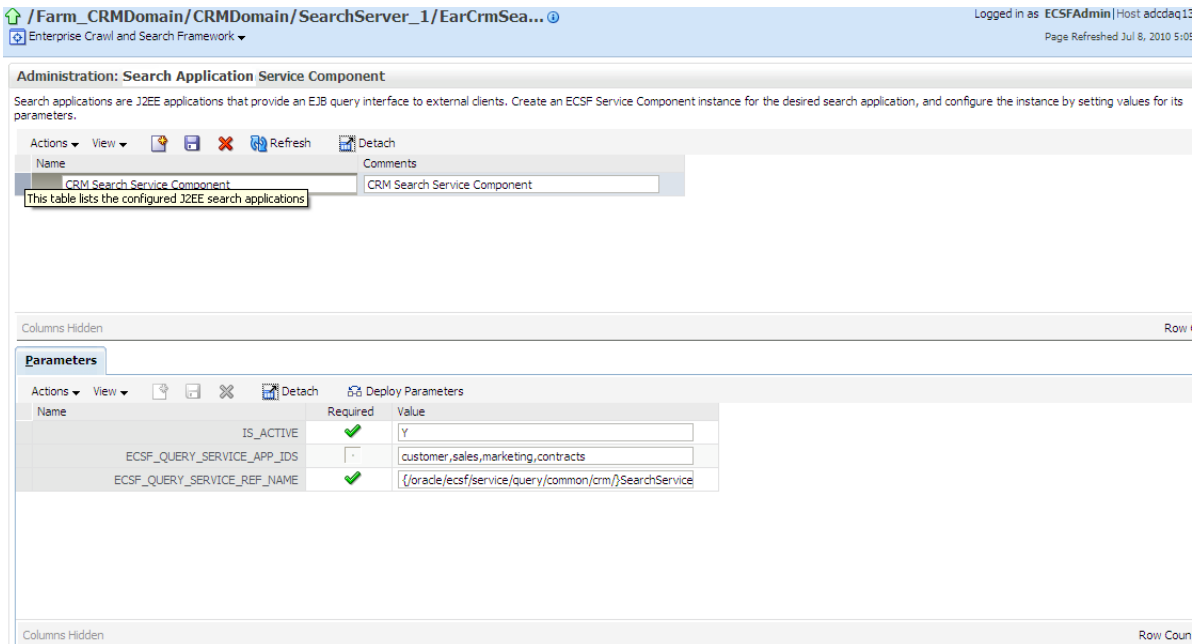
#### 9.4.11 Modifying Search Application Service Component Instance Parameters

You can modify the Search Application Service Component instance parameters to edit the query web service reference name and activate or deactivate the search application.

To modify Search Application Service Component instance parameters using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the **Search Application Service Component** link.
4. On the Search Application Service Component administration page, shown in [Figure 9–11](#), select the desired Search Application Service Component instance record.

**Figure 9–11 Search Application Service Component Administration Page**



5. On the Parameters tab, modify the value for the desired parameter of the Search Application Service Component instance.
6. Save.

## 9.5 Performing Advanced Administration Tasks

You can extend search by performing any of the following tasks:

- [Section 9.5.1, "Modifying the Title, Body, Keyword, and Action Title of Searchable Objects"](#)
- [Section 9.5.2, "Making New Searchable Objects Available for Search"](#)
- [Section 9.5.3, "Defining Search Engine Instances"](#)
- [Section 9.5.4, "Enabling Search on External Data Sources"](#)
- [Section 9.5.5, "Adding Product Families for Federated Search"](#)

---

**Note:** Administration of searchable objects, search categories, and index schedules must be performed using Fusion Applications Control. You can use the Oracle SES Administration GUI for all other Oracle SES related administration tasks. Oracle Enterprise Crawl and Search Framework only exposes the Oracle SES functionality for deploying and undeploying index schedules.

To access the ECSF pages in Fusion Applications Control, you must have Operator privileges in Oracle WebLogic Server. For more information, see [Task 4, "Provide Access to ECSF Pages in Fusion Applications Control"](#).

---

## 9.5.1 Modifying the Title, Body, Keyword, and Action Title of Searchable Objects

You can customize searchable objects by changing the title, body, keywords, and search result action title using Fusion Applications Control.

---

---

**Caution:** Do not modify the Oracle Fusion Applications Help searchable object named `TopicSearchPVO`.

---

---

To change the title, body, keywords, and action title of searchable objects, follow the procedures in the following tasks:

- [Task 1, "Deactivate the Searchable Object"](#)
- [Task 2, "Undeploy the Searchable Object"](#)
- [Task 3, "Edit the Title, Body, Keywords, and Action Title"](#)
- [Task 4, "Enable the Customization"](#)
- [Task 5, "Deploy the Searchable Object"](#)
- [Task 6, "Activate the Searchable Object"](#)
- [Task 7, "Validate the Changes"](#)

### Task 1 Deactivate the Searchable Object

If the searchable object that you want to customize is active, deactivate it. For more information, see [Task 1, "Deactivate the Searchable Object"](#).

### Task 2 Undeploy the Searchable Object

If the searchable object that you want to customize is deployed, undeploy it. For more information, see [Task 2, "Undeploy the Searchable Object from the Oracle SES Instance"](#).

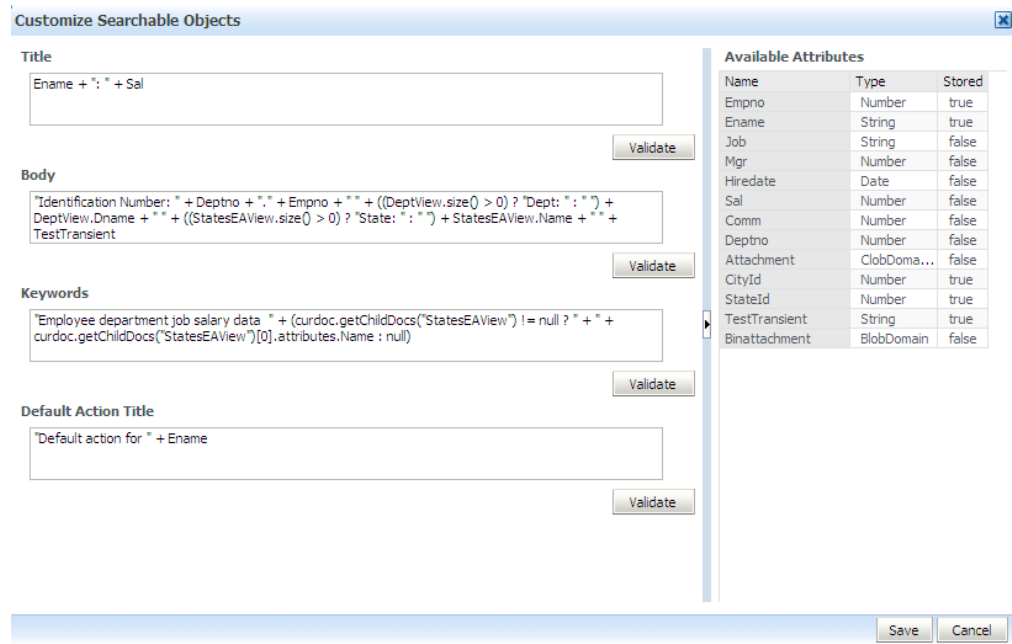
### Task 3 Edit the Title, Body, Keywords, and Action Title

Edit the title, body, keywords, and search result action title to customize the searchable objects.

To edit the title, body, keywords, and action title of a searchable object using Fusion Applications Control:

1. From the **Actions** menu on the Searchable Objects tab, select **Modify**. Alternatively, use the Ctrl+Shift+Z keyboard shortcut.
2. In the Customize Searchable Objects dialog, shown in [Figure 9-12](#), edit the Groovy expression in the field for the property you want to modify.

**Figure 9–12 Customize Searchable Objects Dialog**



The Available Attributes table displays the attributes of the parent view object.

---

**Note:** You can use only stored attributes (for example, SRNumber) in the default action title. Using unstored attributes in the default action title results in an error during validation.

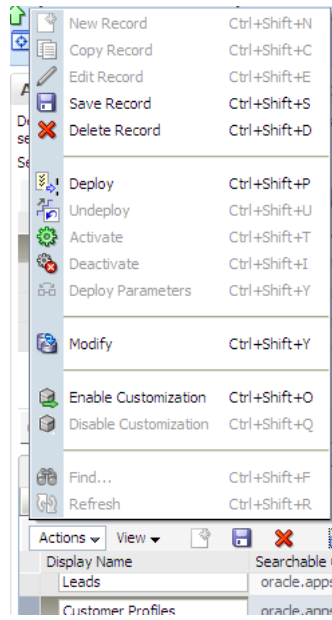
---

3. Click the **Validate** button to validate the Groovy expression.
4. Click the **Save** button to save your input to the database.

**Task 4 Enable the Customization**

Enable the customization by selecting **Enable Customization** from the **Actions** menu, or using the Ctrl+Shift+O keyboard shortcut.





This validates all the modified expressions for title, body, keywords, and action title and sets the customization flag. A green check mark appears in the Customized column to indicate that the searchable object is customized.

You can remove the customization flag by selecting **Disable Customization** from the **Actions** menu, or using the Ctrl+Shift+Q keyboard shortcut.

#### Task 5 Deploy the Searchable Object

Deploy the searchable object to the Oracle SES instance to make it crawlable. For more information, see [Task 1, "Deploy the Searchable Objects to the Oracle Secure Enterprise Search \(Oracle SES\) Instance"](#).

#### Task 6 Activate the Searchable Object

Activate the searchable object so that a query of that object will return results. For more information, see [Task 2, "Activate the Searchable Objects"](#).

#### Task 7 Validate the Changes

Validate that the Oracle Fusion Applications Search UI reflects the changes you made.

To validate your changes to the searchable objects title, body, keywords, and action title:

1. Log in to the search application.
2. Select the single category that contains the object.
3. Perform a query using the \* wild card.
4. Check the search results for your changes to the title, body, keywords, and action title.

## 9.5.2 Making New Searchable Objects Available for Search

New searchable objects are objects in addition to the set of transactional objects that are available out of the box.

To make new searchable objects available for search, follow the procedures in the following tasks:

- [Task 1, "Obtain the Necessary Information"](#)
- [Task 2, "Register the Searchable Objects"](#)
- [Task 3, "Associate the Searchable Objects with Search Engine Instances"](#)
- [Task 4, "Deploy the Searchable Objects to the Oracle SES Instance"](#)
- [Task 5, "Activate the Searchable Objects"](#)
- [Task 6, "Create the Search Categories"](#)
- [Task 7, "Undeploy the Search Categories"](#)
- [Task 8, "Associate the Searchable Objects with Search Categories"](#)
- [Task 9, "Deploy the Search Categories"](#)
- [Task 10, "Create the Index Schedules"](#)
- [Task 11, "Undeploy the Index Schedules"](#)
- [Task 12, "Associate the Searchable Objects with Index Schedules"](#)
- [Task 13, "Deploy the Index Schedules"](#)
- [Task 14, "Start the Index Schedules"](#)

### **Task 1 Obtain the Necessary Information**

To more efficiently make new searchable objects available for search, you should collect information from the Oracle Fusion Applications developer who creates the searchable objects, as well as from the business unit to which the new objects belong.

Obtain the following information before you begin the process of making new searchable objects available for search:

- Fully qualified object name of the searchable object (for example, `oracle.ecsf.demo.model.UX_CustomerVO`)
- Display name of the searchable object (for example, `Customer`)
- Name of the search category (existing or new) to which the searchable object must be associated (for example, `Customers`)
- Name of the index schedule (existing or new) to which the searchable object must be associated (for example, `CRM_Customers`)
- Name of the search engine instance with which the searchable object must be associated (for example, `CRMSES1`)
- Name of the search engine type to which the search engine instance belongs (for example, `SES11.2.1`)

### **Task 2 Register the Searchable Objects**

Registering searchable objects creates searchable object records in the Oracle Fusion Applications database.

To create searchable object records in the Oracle Fusion Applications database using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.

2. Select the application engine instance that contains the searchable objects you want to manage containing searchable objects to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. From the Enterprise Crawl and Search Framework target menu, select **Register Searchable Object**.
4. On the Register Searchable Object page, shown in [Figure 9–13](#), enter a display name for the searchable object in the **Display Name** field.

**Figure 9–13 Register Searchable Object Page**

The screenshot shows a web browser window with the address bar displaying the path: /Farm\_CRMDomain/CRMDomain/SearchServer\_1/EarCrmSea... The page title is "Register Searchable Object:". Below the title, there is a description: "Register searchable objects in the ECSF database by providing a searchable object name and a fully qualified view object as specified in your application." There are two input fields: "\* Display Name" and "\* Searchable Object Name". To the right of the input fields are two buttons: "Register" and "Cancel".

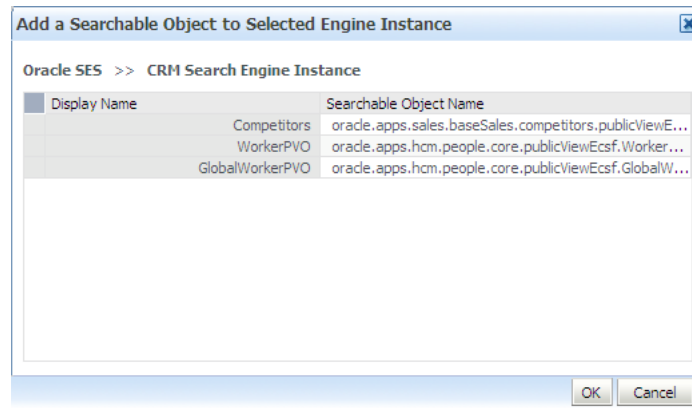
5. In the **Searchable Object Name** field, enter the fully qualified searchable object name that is defined in your application.
6. Click the **Register** button.

### Task 3 Associate the Searchable Objects with Search Engine Instances

Associating a searchable object with a search engine instance adds that object to the specified instance. Only an unassigned object, which is a searchable object that is not associated with a search engine instance, can be added to a search engine instance, so a searchable object can only be associated with one search engine instance at a time.

To associate searchable objects with search engine instances using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the search engine instance to which you want to add a searchable object, and then select the **Searchable Objects** tab, shown in [Figure 9–5](#), to view the table of searchable objects for the selected search engine instance.
5. Click the **Add** button to open the Add a Searchable Object to Selected Engine Instance dialog, shown in [Figure 9–14](#).

**Figure 9–14 Add a Searchable Object to Selected Engine Instance Dialog**

6. Select the desired searchable object from the table, and click **OK**.

The searchable object you selected appears in the table of searchable objects on the Searchable Objects tab. The value in the **Application ID** column indicates the application with which the searchable object is associated.

---

**Note:** A searchable object can be assigned to only one search engine instance. If a searchable object has been assigned to a search engine instance, it will not be listed in the table of available searchable objects.

To proceed with other operations, you must first select any record. Creating or deleting ECSF objects removes the focus from the window.

---

#### **Task 4 Deploy the Searchable Objects to the Oracle SES Instance**

Deploy the searchable objects to the Oracle SES instance to make the objects available for the search engine instance to crawl. For more information, see [Task 1, "Deploy the Searchable Objects to the Oracle Secure Enterprise Search \(Oracle SES\) Instance"](#).

#### **Task 5 Activate the Searchable Objects**

Activate the searchable objects so that a query of the deployed and crawled searchable objects will return results. For more information, see [Task 2, "Activate the Searchable Objects"](#).

#### **Task 6 Create the Search Categories**

You can either create new search categories for the new searchable objects or add the new searchable objects to existing search categories. Creating a search category adds a new record to the `ECSF_SEARCH_INDEX_GROUP` table in the Oracle Fusion Applications database.

To create search categories using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.

4. From the table of search engine instances, select the record of the search engine instance for which you want to add a search category, and then select the **Search Categories** tab, shown in [Figure 9–15](#), to view the table of search categories for the selected search engine instance.
5. Click the **New Search Category** icon. Alternatively, select **New Record** from the **Actions** menu or use the Ctrl+Shift+N keyboard shortcut.  
A new record named CHANGE\_ME is added to the table of search categories.
6. Enter a new value in the **Name** column.
7. Select a value (LOCAL or GLOBAL) from the **Scope** column dropdown list.
8. Click the **Save Search Category** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+Shift+S keyboard shortcut.

---

**Caution:** A save will occur only for the selected record. You can only save one record at a time.

---



---

**Note:** To proceed with other operations, you must first select any record. Creating or deleting ECSF objects removes the focus from the window.

---

### Task 7 Undeploy the Search Categories

To add the new searchable objects to existing search categories, you must first undeploy the search categories. For more information, see [Task 1, "Undeploy the Search Categories"](#).

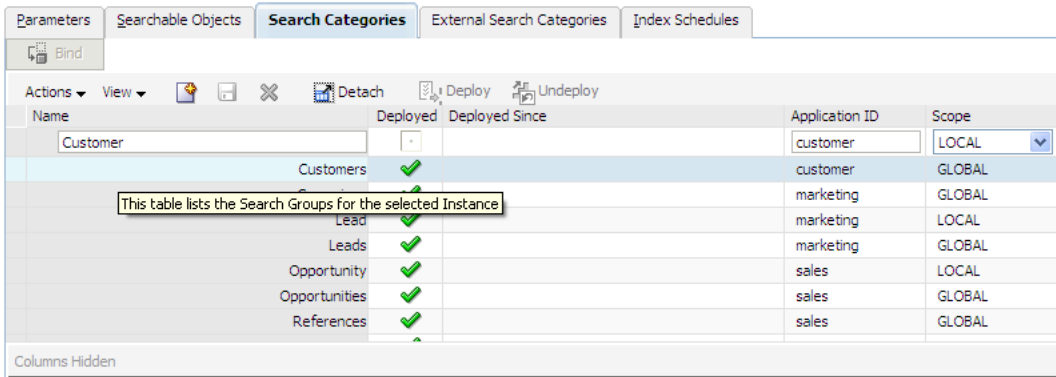
### Task 8 Associate the Searchable Objects with Search Categories

Associating searchable objects with a search category adds the objects to that search category. You can only associate deployed searchable objects with search categories. You can associate the same searchable object with multiple search categories. You cannot associate searchable objects with search categories that have been deployed. If the search category has been deployed, you must undeploy it before you can associate searchable objects with it. For more information, see [Task 1, "Undeploy the Search Categories"](#).

To associate searchable objects with search categories using Fusion Applications Control:

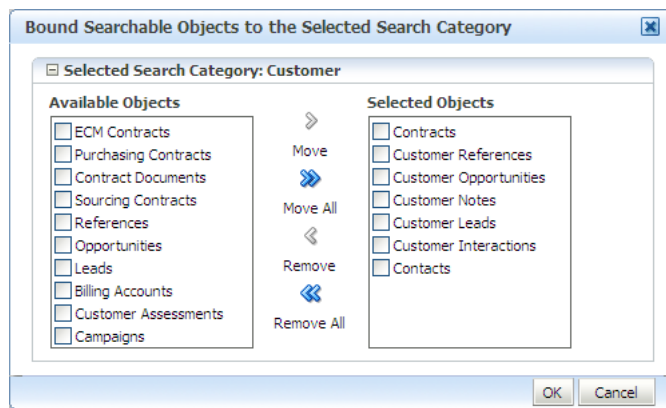
1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page.
4. From the table of search engine instances, select the record of the desired search engine instance, and then select the **Search Categories** tab, shown in [Figure 9–15](#), to view the table of search categories for the selected search engine instance.

**Figure 9–15 Search Categories Tab**



5. Select the desired search category to which you want to add searchable objects, and click the **Bind** icon.  
The **Bind** icon is disabled if the search category is deployed. You cannot associate or disassociate searchable objects if the search category is deployed.
6. In the Bound Searchable Objects to the Selected Search Category dialog, shown in [Figure 9–16](#), select the checkboxes of the desired searchable objects from the **Available Objects** list, and click the **Move** icon to add them to the **Selected Objects** list. Only deployed searchable objects are listed as available objects.

**Figure 9–16 Bound Searchable Objects to the Selected Search Category Dialog**



7. Click **OK**.  
A new record is created in the ECSF\_SIO\_SIG\_INT intersection table.

**Task 9 Deploy the Search Categories**

Deploy the search category. For more information, see [Task 4, "Deploy the Search Categories"](#).

**Task 10 Create the Index Schedules**

You can either create new index schedules for the new searchable objects or add the new searchable objects to existing index schedules. For more information on how to create index schedules, see [Section 9.4.2.1](#).

**Task 11 Undeploy the Index Schedules**

To add the new searchable objects to existing index schedules, you must first undeploy the index schedules. For more information, see [Section 9.4.2.8](#).

**Task 12 Associate the Searchable Objects with Index Schedules**

Associate the new searchable object to either the newly created index schedule or an existing, undeployed index schedule. For more information, see [Section 9.4.2.2](#).

**Task 13 Deploy the Index Schedules**

Deploy the index schedules. For more information, see [Task 4, "Deploy the Index Schedules"](#).

**Task 14 Start the Index Schedules**

Start the index schedules. For more information, see [Task 5, "Start the Index Schedules"](#).

**9.5.3 Defining Search Engine Instances**

ECSF supports multiple search engine instances for each search engine type. Each search engine instance belongs to exactly one version of the Oracle SES search engine type and is stored in the `ECSF_ENGINE_INSTANCE` table.

You can perform the following tasks to define search engine instances:

- [Section 9.5.3.1, "Creating Search Engine Instances"](#)
- [Section 9.5.3.2, "Configuring Search Engine Instance Parameters"](#)
- [Section 9.5.3.3, "Modifying Search Engine Instances"](#)
- [Section 9.5.3.4, "Modifying Search Engine Instance Parameters"](#)

**9.5.3.1 Creating Search Engine Instances**

Creating a search engine instance adds a new search engine instance to the specified search engine type.

To create search engine instances using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, shown in [Figure 9-4](#).
4. In the Search Engine Instance toolbar, click the **New Engine Instance** icon. Alternatively, select **New Record** from the **Actions** menu or use the Ctrl+N keyboard shortcut.

A new record is added to the top of the table of search engine instances.

5. Enter values for the **Name** and **Comments** columns.

**Caution:** A save will occur only for the selected record. You can only save one record at a time.

6. Click the **Save Engine Instance** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+S keyboard shortcut.
7. Configure the search engine instance parameters. For more information, see [Section 9.5.3.2](#).
8. Click the **Register** icon to register the identity plug-in and create the federated trusted entity for the selected search engine instance. Alternatively, select **Register** from the **Actions** menu or use the Ctrl+G keyboard shortcut.

A dialog with a confirmation message appears.

Registering the identity plug-in for search engine instances allows users to perform secure searches.

### 9.5.3.2 Configuring Search Engine Instance Parameters

Configuring search engine instance parameters sets parameter values to the search engine instance.

To configure search engine instance parameters using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, shown in [Figure 9-4](#).
4. From the table of search engine instances, select the record of the search engine instance for which you want to configure the parameters.

The parameters of the selected search engine instance appears in the Parameters table, shown in [Table 9-3](#).

**Table 9-3 Search Engine Instance Parameters**

Parameter Name	Description	Sample Value
SES_ADMIN_SERVICE	URL to Oracle SES administrative web service endpoint.	http://example.com:7777/search/api/admin/AdminService
SES_ADMIN_USERNAME	Oracle SES user for logging into Oracle SES administrative web service.	searchsys
SES_ADMIN_PASSWORD	Password for user SES_ADMIN_PROXY_USERNAME.	password



**Table 9–3 (Cont.) Search Engine Instance Parameters**

Parameter Name	Description	Sample Value
SES_ADMIN_SESSION_TIMEOUT	Time, in minutes, allowed by ECSF to keep administration session to Oracle Secure Enterprise Search (Oracle SES) before forcing to re-login/reestablish session with Oracle SES. This timeout is independent of Oracle SES's internal administration session timeout.	60
SES_QUERY_SERVICE	URL to Oracle SES Query web service endpoint.	http://example.com:7777/search/query/OracleSearch
SES_QUERY_PROXY_USERNAME	ECSF/Fusion user used by Oracle SES as a proxy user for queries.	scott
SES_QUERY_PROXY_PASSWORD	Password for ECSF user used by Oracle SES as a proxy user.	password
SES_QUERY_SESSION_TIMEOUT	Time, in minutes, allowed by ECSF to keep query session to Oracle SES before forcing to re-login/reestablish session with Oracle SES. This timeout is independent of Oracle SES's internal query session timeout.	60
ECSF_DATA_SERVICE	URL to ECSF servlets. This URL is used to construct configuration feeds for Oracle SES.	http://example.com:7101/aproot/searchfeedservlet
ECSF_SECURITY_USERNAME	ECSF/Fusion user used by Oracle SES to invoke ECSF Security Service.	password
ECSF_SECURITY_PASSWORD	Password for ECSF/Fusion user used by Oracle SES to invoke ECSF Security Service.	password
ECSF_SECURITY_SERVICE	URL to ECSF servlets. This URL is used to construct configuration feeds for Oracle SES. ECSF runtime URL and ECSF Security Service URL can be set to 2 different servers, which is also what Oracle SES supports.	http://example.com:7101/aproot/searchfeedservlet
ECSF_REDIRECT_SERVICE	URL to ECSF feed servlets. This URL is used to redirect drilldowns/actionable results.	http://example.com:7101/aproot/searchfeedservlet

5. Select the record for the desired parameter, and modify the entry in the corresponding **Value** column.

---

---

**Caution:** A save will occur only for the selected record. You can only save one record at a time.

---

---

6. Click the **Save Engine Instance Parameter** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+Shift+S keyboard shortcut.

### 9.5.3.3 Modifying Search Engine Instances

Modifying a search engine instance edits the properties of an existing search engine instance.

To modify search engine instances using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, shown in [Figure 9-4](#).
4. Modify the entries in the **Name** and **Comments** columns.

---

---

**Caution:** A save will occur only for the selected record. You can only save one record at a time.

---

---

5. Click the **Save Engine Instance** icon to save the selected record. Alternatively, select **Save Record** from the **Actions** menu or use the Ctrl+S keyboard shortcut.

### 9.5.3.4 Modifying Search Engine Instance Parameters

Modifying search engine instance parameters updates the parameter values. When the parameter values are updated, you must update all the deployed searchable objects of the same search engine instance with the latest search engine instance parameters on the Oracle SES server. Only searchable objects that have been deployed can be updated with the latest search engine instance parameters on the Oracle SES server.

To modify search engine instance parameters, follow the procedures in the following tasks:

- [Task 1, "Edit the Search Engine Instance Parameters"](#)
- [Task 2, "Deploy the Parameters to All Deployed Searchable Objects"](#)
- [Task 3, "Deploy the Parameters to Individual Deployed Searchable Objects"](#)

#### Task 1 Edit the Search Engine Instance Parameters

You can edit the search engine instance parameters to change their values.

To change the values of the search engine instance parameters using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.

2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, shown in [Figure 9–4](#).
4. From the table of search engine instances, select the record of the search engine instance for which you want to modify the parameters.

The parameters of the selected search engine instance appears in the Parameters tab.

5. Select the record for the desired parameter, and modify the entry in the corresponding Value column.

**Tip:** It is recommended that you modify these parameters during system downtime. It is also recommended that you update the objects when all the parameters are set.

### Task 2 Deploy the Parameters to All Deployed Searchable Objects

After you update the search engine instance parameter values, you must update all the deployed searchable objects of the same search engine instance with the latest search engine instance parameters on the Oracle SES server.

To deploy the new values of the search engine instance parameters to all the deployed searchable objects in the search engine instance using Fusion Applications Control:

1. From the Parameters tab, click the **Deploy Parameters** icon to update all the deployed searchable objects with the latest search engine instance parameter values. Alternatively, select **Deploy Parameters** from the **Actions** menu or use the Ctrl+Shift+Y keyboard shortcut.

A confirmation dialog appears.

2. Validate that all deployed searchable objects have been updated with the latest parameter values by selecting the **Searchable Objects** tab and viewing the Parameters Applied column.

A green check mark indicates that the searchable object is updated with the latest parameter values. A red X indicates that the searchable object is not updated with the latest parameter values. A gray box indicates that the searchable object is not deployed.

### Task 3 Deploy the Parameters to Individual Deployed Searchable Objects

For any deployed searchable objects that were not updated with the latest parameter values, update them individually.

To deploy the parameters to individual deployed searchable objects using Fusion Applications Control:

1. From the Searchable Objects tab, select the record corresponding to a searchable object that was not updated with the new parameter value.

A green check mark indicates that the searchable object is updated with the latest parameter values. A red X indicates that the searchable object is not updated with the latest parameter values. A gray box indicates that the searchable object is not deployed.

2. Click the **Deploy Parameters** icon to update the parameter values for that deployed searchable object. Alternatively, select **Deploy Parameters** from the **Actions** menu or use the Ctrl+Shift+Y keyboard shortcut.

A confirmation dialog appears.

A green check mark will replace the red X when the latest search engine instance parameters are updated for the searchable object.

### 9.5.3.5 Deleting Search Engine Instances

Deleting search engine instances removes them from the specified search engine type.

To delete search engine instances using Fusion Applications Control:

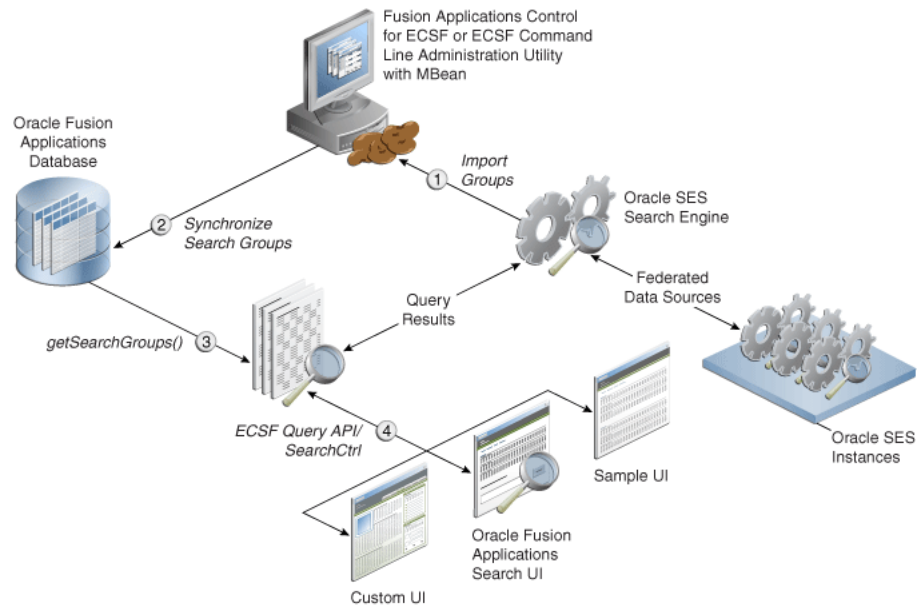
1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the Oracle SES search engine type name link in the Search Engine Types table to open the Search Engine Instance administration page, shown in [Figure 9-4](#).
4. From the table of search engine instances, select the record you want to delete.
5. Click the **Delete Engine Instance** icon to delete the selected record. Alternatively, select **Delete Record** from the **Actions** menu or use the Ctrl+D keyboard shortcut.

## 9.5.4 Enabling Search on External Data Sources

In addition to providing search against ECSF data sources (that is, view object based data sources deployed from ECSF administration) and data sources that are crawled via ECSF, ECSF supports search against all registered Oracle SES data source groups that contain external data sources. External data sources include data sources such as Intranet, mail, database, and federated data sources (data sources crawled in separate engine instances). Oracle SES data source groups can also contain federated ECSF data sources (data sources created in different logical engine instances via the ECSF administration tools).

ECSF Administration synchronizes categories with the data source groups on Oracle SES. The data sources are not synchronized.

[Figure 9-17](#) illustrates the process flow for enabling search on external data sources.

**Figure 9–17 Process Flow for Search on External Data Sources**

The process flow includes the following steps:

1. Data source groups are imported from Oracle SES via the Fusion Applications Control. For more information, see [Task 1, "Import the External Search Categories"](#).
2. The Oracle Fusion Applications database is synchronized with the data source groups from Oracle SES.  
ECSF sets the `IS_EXTERNAL` flag to `true` on records in the `ECSF_SEARCH_INDEX_GROUP` table to identify them as external search categories.
3. ECSF-created search categories and external search categories are both accessible via `getSearchGroups()`.
4. `SearchCtrl` can query any search category, and the underlying data may actually be federated to other Oracle SES instances.

---

**Note:** ECSF supports multiple search engine instances for each application. However, each query can only contain search categories deployed on the same search engine instance.

---

Search categories containing ECSF data sources are represented in the `ECSF_SEARCH_INDEX_GROUP` table and linked to one or more searchable objects through an intersection table. Search results are usually grouped by the searchable object name stored in the `ECSF_SO_NAME` custom attribute that is returned in each search result.

---

**Note:** ECSF currently does not support querying search categories that contain mixed data sources. Each search category must contain either only ECSF data sources or only external data sources.

---

External search categories are not linked to searchable objects. Instead, ECSF creates the `ExternalSearchableObject` searchable object type for external search categories. Search results from external search categories are assigned to the external searchable

object, named `oracle.ecsf.meta.ExternalSearchableObject`, that is created during runtime.

**Example 9–1** queries an external category called "Oracle Website."

**Example 9–1 Sample Code for Querying External Categories**

```
public void federationTest()
{
    SearchCtrl searchCtrl = new SearchCtrl();
    SearchHits searchHits = null;
    SearchContext searchContext = null;
    SearchEngineInstance engineInstance = null;
    SearchGroup[] sgs = new SearchGroup[1];

    QueryMetaDataImpl queryMetaData = new QueryMetaDataImpl();
    queryMetaData.setQueryString("%");
    queryMetaData.setPageSize(10);
    queryMetaData.setCurrentPage(1);

    ArrayList<SearchEngineInstance> engineInstances =
        (ArrayList<SearchEngineInstance>)searchCtrl.getEngineInstances();
    for (int i = 0; i < engineInstances.size(); i++)
    {
        if (engineInstances.get(i).getId() == 1)
        {
            engineInstance = engineInstances.get(i);
            break;
        }
    }

    ArrayList<SearchGroup> groups =
        (ArrayList<SearchGroup>)engineInstance.getSearchGroups();
    for (int j = 0; j < groups.size(); j++)
    {
        if (groups.get(j).getName().equals("Oracle Website"))
        {
            sgs[0] = groups.get(j);
            break;
        }
    }

    queryMetaData.setSearchGroups(sgs);
    searchContext = ContextFactory.getSearchContext();
    searchContext.bindUser("scott");
    try
    {
        searchHits = searchCtrl.runQuery(searchContext, queryMetaData);
    }
    catch (Exception e)
    {
        fail("Failed runQuery due to "+e.getMessage());
    }

    IndexedDocument doc = searchHits.getDocument(0);
    String url = null;
    try
    {
        url = doc.getDefaultAction().getRedirectURL();
        ActionURLResolver resolver = new ActionURLResolver();
        url = resolver.resolveURL(searchContext, doc.getDefaultAction());
    }
}
```

```

    }
    catch (Exception e)
    {
    }
}

```

Since there is no view object or search object definition file where actions can be defined, the URL attribute of the resulting object returned from Oracle SES will be used to generate a default action with the name `Default`.

Advanced search and faceted navigation are not supported for external data sources.

## 9.5.5 Adding Product Families for Federated Search

To include a new product family for federated search, you must add a Search Application Service Component instance to engine type `Oracle Search Application` and configure the instance.

---

**Note:** Manage credentials via the MBean using JConsole. For more information, see *Oracle Fusion Middleware Fusion Developer's Guide for Oracle Application Development Framework*.

---

Each product family (Oracle Fusion Customer Relationship Management, Oracle Fusion Human Capital Management, and Oracle Fusion Supply Chain Management) has its own search application. Each search application provides the data service, query web service, authentication service, and authorization service for the product family. Each search application also contains all the searchable objects and its dependencies for the product family as well as the references to the ECSF shared libraries.

To create and configure a Search Application Service Component instance using Fusion Applications Control:

1. From the navigation pane, expand the farm and then the **Enterprise Crawl and Search Framework** folder.
2. Select the application engine instance that contains the searchable objects you want to manage to open the Enterprise Crawl and Search Framework Configuration Settings page.
3. Click the **Search Application Service Component** link.
4. On the Search Application Service Component administration page, shown in [Figure 9-11](#), click the **New Engine Instance** icon. Alternatively, select **New Record** from the **Actions** menu or use the Ctrl+Shift+N keyboard shortcut.

A new Search Application Service Component instance record is added to the top of the table of configured search applications.

5. Enter a value for the **Name** column.
6. On the Parameters tab, set the value for the `ECSF_QUERY_SERVICE_REF_NAME` parameter of the Search Application Service Component instance. Use the following format:

```
{/oracle/ecsf/service/query/common/componentname/}SearchService
```

replacing *componentname* with the name of the Search Application Service Component.

7. Set the value for the `IS_ACTIVE` parameter of the Search Application Service Component instance.

Set the value to `Y` to specify that the Search Application Service Component is active. The component is skipped during global search related functions when you set the value to `N`. If the `IS_ACTIVE` parameter value is not defined for the component in the database, the component is treated as active.

8. Save.



---

---

## Managing Oracle WebLogic Communication Services for Click-to-Dial Functionality

Oracle WebLogic Communication Services provides click-to-dial functionality for applications primarily through contextual actions. Contextual actions provide related information and actions to users within the immediate context of the object instances upon which they act. This chapter explains how to enable and configure these services.

It includes the following topics:

- [Section 10.1, "Introduction to Third Party Call Web Service"](#)
- [Section 10.2, "Modifying Third Party Call Web Service Default Settings Using the System MBean Browser"](#)
- [Section 10.3, "Call Routing Through a Session Border Controller"](#)

### 10.1 Introduction to Third Party Call Web Service

The Third Party Call Web service in Oracle WebLogic Communication Services enables click-to-dial functionality in applications by providing an interface to initiate a call between two parties. The Web service is an implementation of the Parlay X 2.1 Third Party Call Interface.

The Third Party Call Web service can:

- Set up a call between two parties
- Query the status of an ongoing call
- Cancel a call it is creating
- Terminate an ongoing call it created

The Third Party Call Web service is provided through the `thirdpartycall` application, which is installed with default configuration settings in the domain for the each product family.

### 10.2 Modifying Third Party Call Web Service Default Settings Using the System MBean Browser

You can use the System MBean Browser to modify the default configuration settings for the `thirdpartycall` application for the product family domains.

To modify the MBeans for the `thirdpartycall` application with the System MBean Browser from the Fusion Applications Control:

1. From the target navigation pane, expand the farm and then **Application Deployments**.
2. Select the application `thirdpartycall`.
3. From the **Application Deployment** menu, select **System MBean Browser**.  
Fusion Applications Control displays the **System MBean Browser** page.
4. Scroll down to the node that displays `oracle.ucs.thirdpartycall`. Expand the `oracle.ucs.thirdpartycall` node and drill down to the node that displays the `ThirdPartyCallConfiguration` MBean.
5. Click the `ThirdPartyCallConfiguration` MBean node. The configuration settings for the `thirdpartycall` application appear on the right pane. Select the **Attributes** tab to display the details for this group of attributes.  
  
For more information about the configurable attributes for the `thirdpartycall` application, see [Table 10-1](#).
6. Update values of the attributes to modify by entering the new value in the **Value** field.
7. Click **Apply**.

For general information about the System MBean Browser, see the "Getting Started Using Oracle Enterprise Manager Fusion Middleware Control" section in *Oracle Fusion Middleware Administrator's Guide*.

[Table 10-1](#) contains a list of attributes for configuring the Third Party Call Web service

**Table 10-1 Configuration Attributes for Third Party Call Web Service**

Attribute	Format	Description	Values
<code>ChargingAllowed</code>	String	Specifies if charging is allowed.	Default: False  <b>Note:</b> No server restart is required if you change the value.
<code>ControllerUri</code>	String in URI format	Specifies the Third Party controller Session Initiation Protocol (SIP) URI that is used to establish the third party call. If this value is set, a call appears to the callee to come from this URI.	<b>Default:</b> empty  By default, no controller URI is used to establish the call. In this case, the call appears to the callee to come from the caller.  <b>Note:</b> You must restart the server if you change this value.
<code>MaximumCallDuration</code>	int	Specifies the maximum time (in minutes) for an ongoing call. If this time expires, the call is terminated.	<b>Default:</b> 1440 (24 hours) <b>Minimum:</b> -1 (0 and -1 means that call-length supervision is disabled) <b>Maximum:</b> Unbounded  <b>Note:</b> No server restart is required if you decrease this value. You must restart the server if you increase the value or set the value to 0 or -1.

**Table 10–1 (Cont.) Configuration Attributes for Third Party Call Web Service**

Attribute	Format	Description	Values
PAssertedIdentityUri	String in URI format	Specifies the SIP URI used in the P-Asserted-Identity header added by the Third Party Call service. If left blank the P-Asserted-Identity header is not added.	<b>Default:</b> empty <b>Note:</b> You must restart the server if you change this value.
StatusRetentionTime	int	Specifies the time (in minutes) for retaining the status information about a call after it was terminated.	<b>Default:</b> 5 <b>Minimum:</b> -1 (0 and -1 means that the status information is removed when the call is terminated). <b>Maximum:</b> Unbounded <b>Note:</b> No server restart is required if you change the value.
PreloadedRouteUri	String in URI format	Specifies the SIP URI to put in a route header of outgoing SIP INVITE requests during a call setup.	<b>Default:</b> empty <b>Note:</b> You must restart the server if you change this value.

## 10.3 Call Routing Through a Session Border Controller

The Third Party Call Web service interfaces on the backend with SIP infrastructure, such as a SIP-enabled switch or a SIP-to-PSTN gateway. When the SIP infrastructure lies outside the enterprise network, such as in the case of a hosted SIP trunking service or if the switch is in an external network, a Session Border Controller (SBC) is typically used to secure and control the interaction. A SBC is a piece of equipment that is deployed at the border of the network and controls the signaling and media across network address translation (NAT) devices and firewall boundaries. In addition, it prevents unauthorized access and denial of service (DoS) attacks.

You can route the Third Party Call Control (TPCC) requests through an SBC either by setting up an outbound proxy server or by configuring one TPCC attribute.

This section contains the following topics:

- [Section 10.3.1, "Setting Up an Outbound Proxy Server"](#)
- [Section 10.3.2, "Configuring the PreLoadedRouteUri Attribute"](#)

### 10.3.1 Setting Up an Outbound Proxy Server

You can set up the SBC as an outbound proxy server and route TPCC requests through the outbound proxy server. If you define an outbound proxy server (SBC) for a SIP Servlet container, any request from all SIP servlet applications (including the `thirdpartycall` application) on this SIP Servlet container is routed through the SBC.

Oracle WebLogic SIP Server provides Oracle WebLogic Administration Console extensions that allow you to modify the SIP Servlet container properties. To set up an outbound proxy:

1. Enter the following URL in a browser:

```
http://hostname:port_number/console
```

where the *hostname* and the *port\_number* correspond to the Administration Server for the domain.

2. Log in using the Oracle Fusion Middleware administrative user name and password.
3. Select the **SipServer** node in the left pane. The right pane of the console displays the tabbed pages that are used for configuring and monitoring WebLogic SIP Server.
4. Select the **Proxy** tab.
5. Select the **Proxy Routing Policy** as proxy.
6. In the **Proxy Routing URIs** section, enter the URI as `sip:SBC_hostname:SBC_portnumber`, where `SBC_hostname` and `SBC_portnumber` represent the host and port of the Session Border Controller, respectively.
7. Click **Save**.

For more information, see the "SIP Server: Configuration: Proxy" topic in the Oracle WebLogic Administration Console Help.

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**Note:** Oracle recommends that you use the Administration Console to modify `sipserver.xml` indirectly, rather than editing the file by hand. Using the Administration Console ensures that the `sipserver.xml` document always contains valid XML.

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### 10.3.2 Configuring the PreLoadedRouteUri Attribute

To route requests only from the `thirdpartycall` application through SBC, set the value of the `PreLoadedRouteUri` attribute as `sip:SBC_hostname:SBC_portnumber`, where `SBC_hostname` and `SBC_portnumber` represent the host and port of the SBC, respectively.

For more information about modifying the `PreLoadedRouteUri` attribute, see [Section 10.2](#).

# Part III

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## Monitoring

This part provides information about how to monitor the Oracle Fusion Applications environment. It explains how to find information about the cause of an error and its corrective action, and how to view and manage log files to assist in monitoring system activity and to diagnose problems.

Part III contains the following chapters:

- [Chapter 11, "Monitoring Oracle Fusion Applications"](#)
- [Chapter 12, "Monitoring the Oracle Fusion Applications Middle Tier"](#)
- [Chapter 13, "Diagnosing the Oracle Fusion Applications Middle Tier Performance"](#)
- [Chapter 14, "Monitoring and Tuning Oracle Database for Oracle Fusion Applications"](#)
- [Chapter 15, "Managing Oracle Fusion Applications Log Files"](#)
- [Chapter 16, "Managing Oracle Fusion Applications Diagnostic Tests"](#)



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# Monitoring Oracle Fusion Applications

This chapter describes how to manage Oracle Fusion web applications using Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) and Oracle Enterprise Manager (Cloud Control).

This chapter includes the following topics:

- [Section 11.1, "Introduction to Monitoring Oracle Fusion Applications"](#)
- [Section 11.2, "The Product Family Home Page and Sections in Fusion Applications Control"](#)
- [Section 11.3, "The Product Home Page and Sections in Fusion Applications Control"](#)
- [Section 11.4, "The Fusion Instance Overview Page and Sections in Cloud Control"](#)
- [Section 11.5, "The Product Family Home Page and Sections in Cloud Control"](#)
- [Section 11.6, "The Product Home Page and Sections in Cloud Control"](#)
- [Section 11.7, "Monitoring Product Families and Products"](#)
- [Section 11.8, "Monitoring the Detailed Status of Oracle Fusion Applications"](#)
- [Section 11.9, "Monitoring Business Performance Metrics for a Product Family"](#)
- [Section 11.10, "Monitoring Business Performance Metrics for a Product"](#)
- [Section 11.11, "Viewing the Routing Topology of an Oracle Fusion Applications Instance, Product Family, or Product"](#)
- [Section 11.12, "Viewing the Configuration Topology of an Oracle Fusion Applications Instance, Product Family, or Product"](#)

## 11.1 Introduction to Monitoring Oracle Fusion Applications

Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) is a tool used to monitor Oracle Fusion Applications product families and products deployed to Oracle WebLogic Server. Oracle Enterprise Manager Cloud Control (Cloud Control) is a tool used in much the same way, but viewing Oracle Fusion Applications product families and products within the larger context of Oracle Fusion Middleware.

Oracle Enterprise Manager Fusion Applications Control provides a large picture view of your deployments, while also allowing you to drill down for more detailed information. You can monitor the status of the servers to which product families are deployed and the databases that store product information, the status of all scheduled job requests running in the system, as well as the overall state and performance of

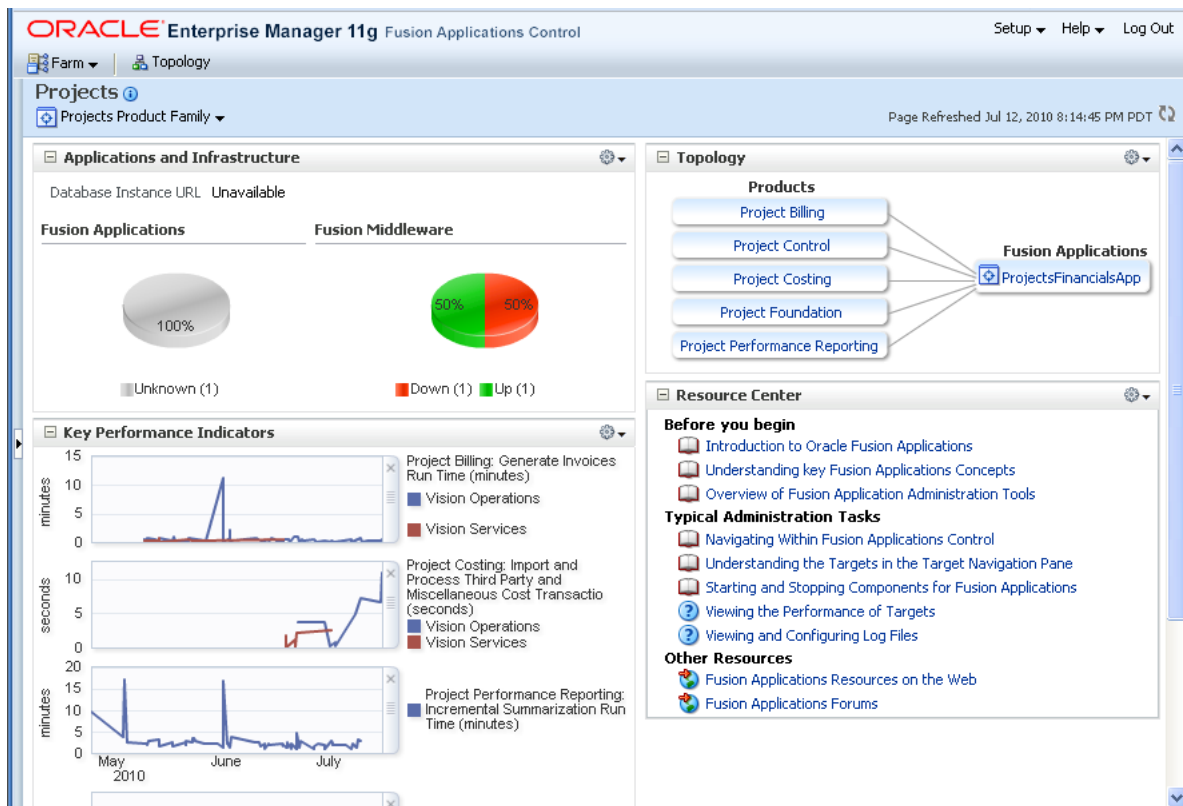
product families and products. The customizable performance summary pages allow you to monitor product performance and diagnose problems. You can modify these charts to display statistics that are relevant to your deployment, or add a product to the chart so as to compare the performance information for two components in one chart.

Using a topographical chart, you can examine the relationship between a deployed **product family** and its products, and drill down to view the status of individual product instances. Out-of-the-box performance metrics provided for each Oracle Fusion Applications product allow detailed monitoring of the state and performance of all product families and each individual product.

## 11.2 The Product Family Home Page and Sections in Fusion Applications Control

The product family home page provides an overview of the products belonging to a product family. An example of a product family home page is shown in [Figure 11-1](#).

**Figure 11-1 The Product Family Home Page in Fusion Applications Control**



The Product Family home page displays the following sections:

- [Section 11.2.1, "Applications and Infrastructure Section"](#)
- [Section 11.2.2, "Key Performance Indicators Section"](#)
- [Section 11.2.3, "Topology Section"](#)
- [Section 11.2.4, "Oracle Enterprise Scheduler Sections"](#)



## 11.2.1 Applications and Infrastructure Section

The Applications and Infrastructure section displays the status of the database, deployed Oracle Fusion Applications and Oracle Fusion Middleware itself. The Fusion Applications and Fusion Middleware pie charts display the percentage of Oracle Fusion Applications and Oracle Fusion Middleware servers that are currently up or down. The number of applications and servers that are running or down is shown below each pie chart.

## 11.2.2 Key Performance Indicators Section

The Key Performance Indicators section displays the main performance metrics related to the product family or product. By default, these metrics display in graphical format. Alternatively, you can display the performance metrics in tabular format instead. Mousing over a particular metric causes the performance graph to display only the data for that metric.

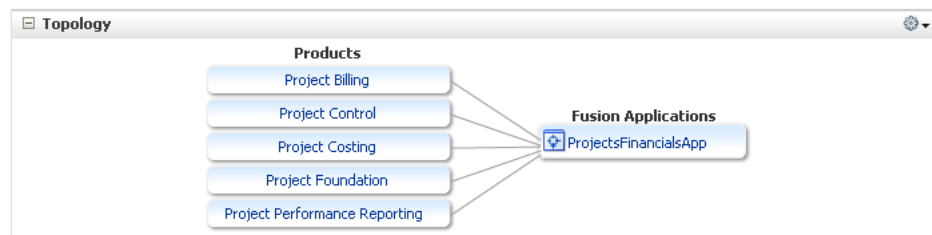
You can add or remove metrics from the Key Performance Indicators section. You can also change the order in which metrics display. For more information about monitoring business metrics for a product family or product, see [Section 11.10](#)

## 11.2.3 Topology Section

The Topology section displays the components of the product family or product. In the Product home page, the Topology section displays the same information, with the irrelevant products and **Java EE applications** grayed out.

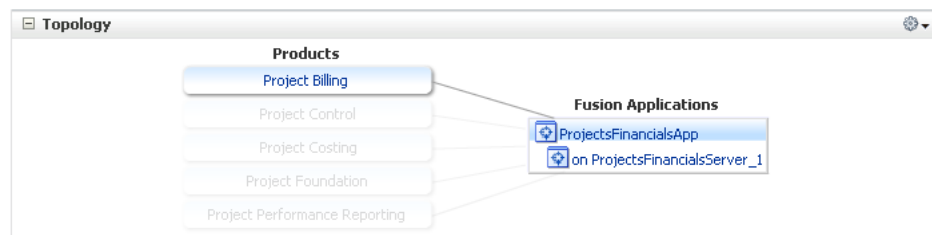
The Product Family home page Topology section is shown in [Figure 11-2](#).

**Figure 11-2 Product Family Home Page Topology Region**



The Product home page Topology section is shown in [Figure 11-3](#).

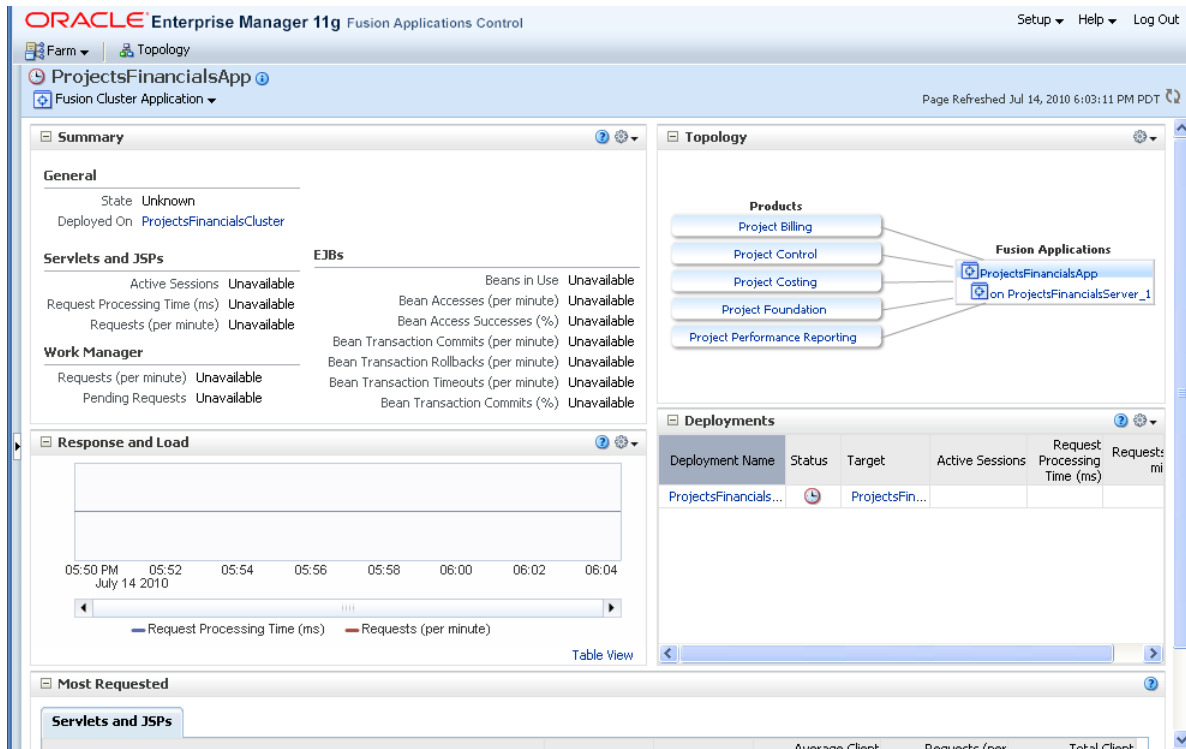
**Figure 11-3 Product Home Page Topology Section**



Mousing over a component under the Oracle Fusion Applications heading highlights the related product under the Product heading, and vice versa. In the Product Family home page, clicking a product in the Topology section displays the Product home page for that product. Clicking the name of the Oracle Fusion Applications product family in the Topology section displays the Oracle Fusion application instances running on

servers in the application cluster. The Fusion Cluster Application home page displays, as shown in [Figure 11-4](#).

**Figure 11-4 Fusion Cluster Application Home Page**



For more information about viewing topology information, see [Section 12.2.3.1](#)

## 11.2.4 Oracle Enterprise Scheduler Sections

The Oracle Enterprise Scheduler sections display information pertaining to scheduled jobs running in relation to the product or product family. The Oracle Enterprise Scheduler sections are as follows.

- **Top Long Running Job Requests:** This section displays information about the top ten long running scheduled job requests, including request ID, job definition used, the product and time elapsed since the job executed.
- **Recently Completed Job Requests (Last 24 Hours):** This section displays information about the most recent scheduled jobs completed within the last 24 hours, including job definition used, the product, the number of completed and failed requests, the percentage of successfully completed job requests and the time elapsed from execution.
- **Ready Job Requests:** This section displays the scheduled job requests that are awaiting execution, including the job definition used, the product and the number of jobs that are ready to run.

For more information about this section, see the online help.

## 11.2.5 SOA Composite Section

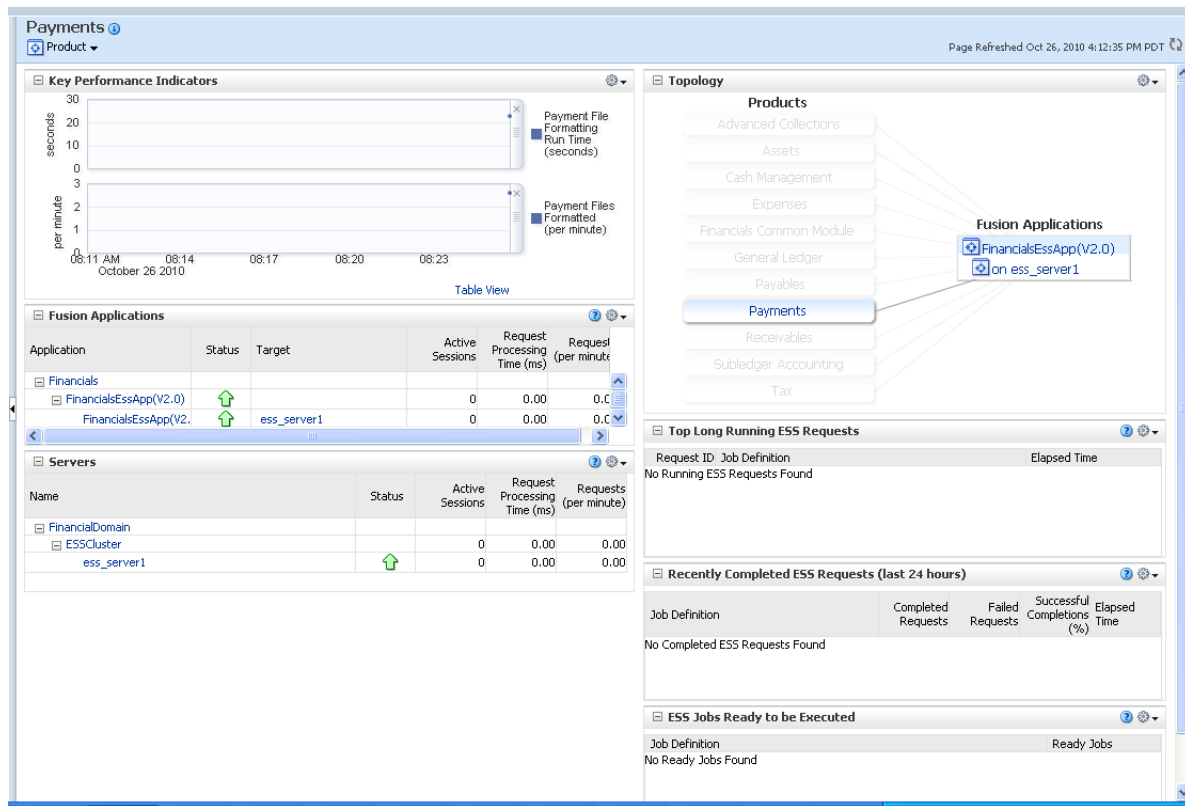
The Recently Completed [SOA Composite Requests \(Last 24 Hours\)](#) section displays information about the most recent SOA composite execution requests completed

within the last 24 hours, including the name of the SOA composite, the name of the partition to which the composite is deployed, the number of completed instances, the percentage of successfully completed instances and the response time in milliseconds for synchronously executed SOA composites.

## 11.3 The Product Home Page and Sections in Fusion Applications Control

The product home page provides an overview of the Oracle Fusion Applications required to run a given product. An example of a product home page is shown in Figure 11–5.

**Figure 11–5 The Product Home Page in Fusion Applications Control**



The Oracle Fusion Applications Product Home page displays the following sections:

- Section 11.2.2, "Key Performance Indicators Section"
- Section 11.3.1, "Fusion Applications Section"
- Section 11.3.2, "Servers Section"
- Section 11.2.3, "Topology Section"
- Section 11.2.4, "Oracle Enterprise Scheduler Sections"

### 11.3.1 Fusion Applications Section

The Oracle Fusion Applications section displays the Oracle Fusion Applications that are part of the product and have been installed. Each application may include instances running on other servers in the domain.

For more information about this section, see the online help.

### 11.3.2 Servers Section

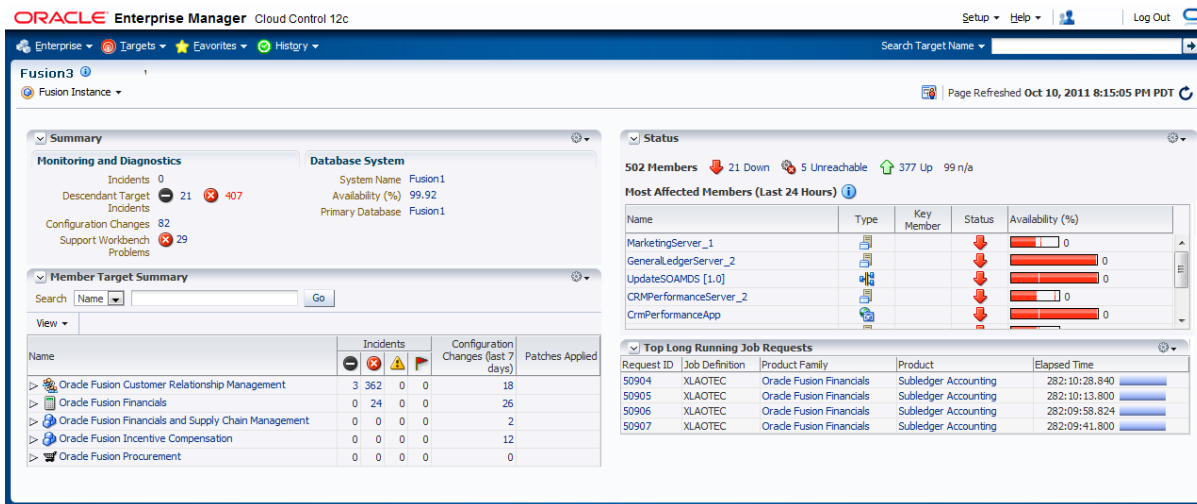
The Servers section displays the names of the domain, clusters and servers running the Oracle Fusion Application. The table listing the clusters and servers displays the status of each item, indicating whether they are up or down. Additionally, the table displays other data such as the number of sessions currently active, the number of requests received per minute and the time required to process a request.

For more information about this section, see the online help.

## 11.4 The Fusion Instance Overview Page and Sections in Cloud Control

The Fusion Instance home page allows you to monitor a whole instance at a glance, including diagnostic values, a summary of member targets, the status of members and top long running job requests. The Fusion Instance menu provides several administrative options for managing all the product families.

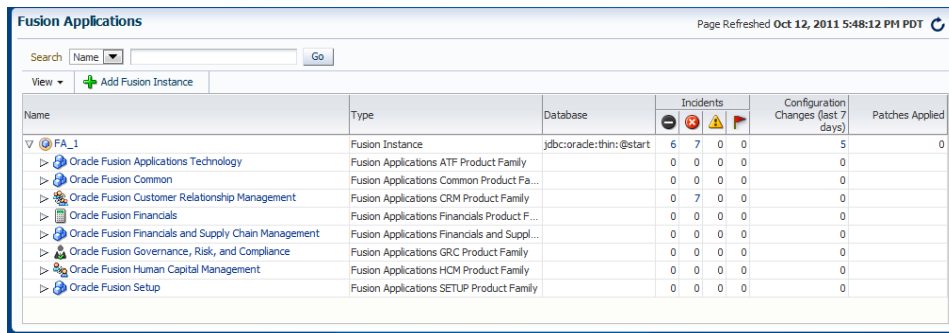
Figure 11–6 The Fusion Instance Overview Page in Cloud Control



To display the Cloud Control Fusion Instance overview page:

1. From the **Targets** menu, choose **Fusion Applications**.

The Fusion Applications target home page displays.



2. In the table on the Fusion Applications page, click the **Fusion Instance** whose overview page you want to display.

The Fusion Instance page displays, as shown in [Figure 11–6](#).

The Fusion Instance overview page displays the following sections:

- [Section 11.4.1, "Summary Section"](#)
- [Section 11.4.2, "Member Target Summary Section"](#)
- [Section 11.4.3, "Status Section"](#)
- [Section 11.4.4, "Top Long Running Job Requests"](#)

## 11.4.1 Summary Section

The Summary section displays an overview of the Fusion instance as a whole, including diagnostic and database information.

The following sub-sections display in the Summary section:

- [Section 11.4.1.1, "Monitoring and Diagnostics Region"](#)
- [Section 11.4.1.2, "Database System Region"](#)

### 11.4.1.1 Monitoring and Diagnostics Region

The Monitoring and Diagnostics sub-section displays major incidents and changes that have occurred in the Fusion instance, including incidents at the instance level, incidents that have occurred in descendant targets, any configuration changes that have occurred over the last seven days and any support workbench problems. Incidents are listed by severity, namely fatal, critical, warning and escalation levels.

### 11.4.1.2 Database System Region

The Database System sub-section displays database information related to the Fusion instance, including the name of the database system, the percentage of available space on the system and the name of the database to which the Fusion instance writes its data.

## 11.4.2 Member Target Summary Section

The Member Target Summary section displays an overview of the member targets of the Fusion instance, including product families and products. The type of information displayed in this sub-section is similar to that displayed in the Cloud Control Fusion Applications overview page described in [Section 2.7.4](#).

## 11.4.3 Status Section

The Status section displays status information regarding the members of the Fusion instance. The numbers at the top of the Status section indicate how many members of the instance are up, down or unavailable. You can click a number or status for more information.

The table in the Status section displays members that have been affected the most within the last 24 hours. This includes Oracle WebLogic Servers, application deployments, clustered application deployments, Fusion Java EE applications, and so on. The table displays the status and percent availability for each member. You can click individual member items for more information.

## 11.4.4 Top Long Running Job Requests

This section displays the same information described in [Section 11.2.4](#).

## 11.5 The Product Family Home Page and Sections in Cloud Control

When selecting a product family from the Fusion Applications overview page or the Fusion Instance page, Cloud Control directs you to the product family home page for the selected product family, as shown in [Figure 11–7](#). The Cloud Control Product Family home page displays an overview of the product family at a glance, including the products and Oracle Fusion applications comprising the product family.

**Figure 11–7 The Product Family Home Page in Cloud Control**



The Product Family home page includes the following sections:

- [Section 11.2.1, "Applications and Infrastructure Section"](#)
- [Section 11.2.2, "Key Performance Indicators Section"](#)
- [Section 11.2.5, "SOA Composite Section"](#)
- [Section 11.2.3, "Topology Section"](#)
- [Section 11.2.4, "Oracle Enterprise Scheduler Sections"](#)

The Product Family menu provides several administrative options for managing the product family, which are similar to those in Fusion Applications Control.

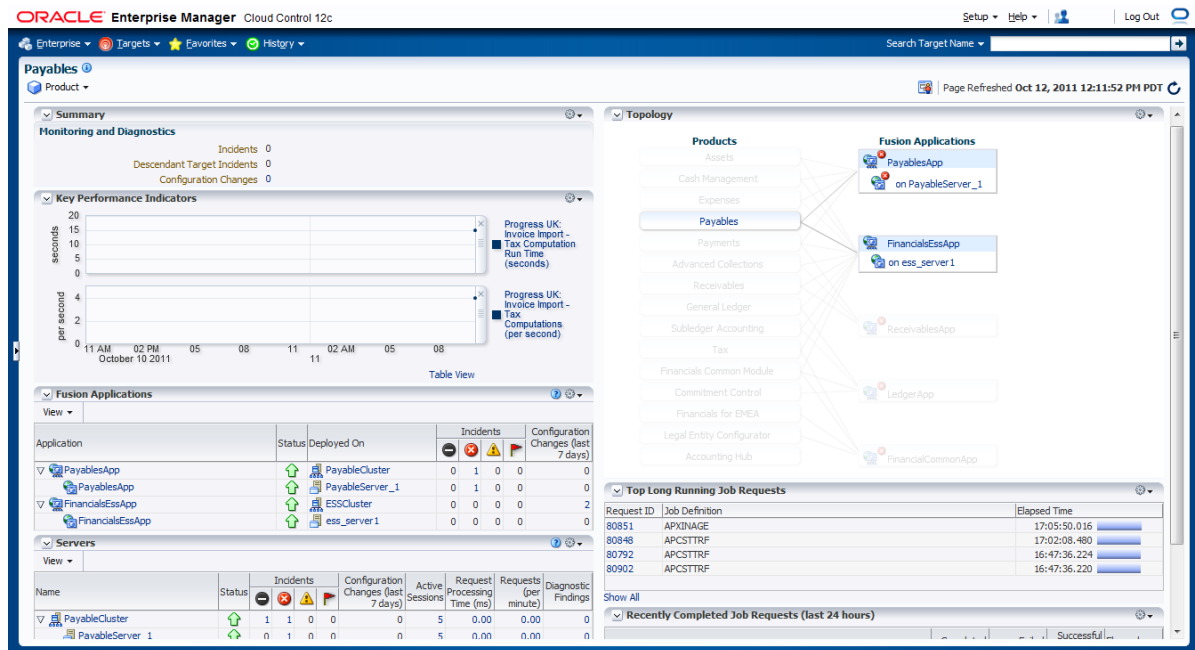
You can click a particular product to display the Cloud Control product home page.

## 11.6 The Product Home Page and Sections in Cloud Control

When selecting a product from the Fusion Applications overview page, Fusion Instance page, or Product Family home page, Cloud Control directs you to a home page for the selected product, as shown in [Figure 11–8](#). The Cloud Control Product

home page displays an overview of a product at a glance, including the Oracle Fusion applications that compose the product and the servers on which they run.

**Figure 11–8 The Product Home Page in Cloud Control**



The Cloud Control Product home page displays the following sections:

- Section 11.4.1, "Summary Section"
- Section 11.2.2, "Key Performance Indicators Section"
- Section 11.3.1, "Fusion Applications Section"
- Section 11.3.2, "Servers Section"
- Section 11.2.3, "Topology Section"
- Section 11.2.4, "Oracle Enterprise Scheduler Sections"

The Product menu provides several administrative options for managing the product, which are similar to those in Fusion Applications Control.

## 11.7 Monitoring Product Families and Products

The product family and product home pages allow you to monitor various aspects of your servers and applications.

The main steps in monitoring product families and products are as follows:

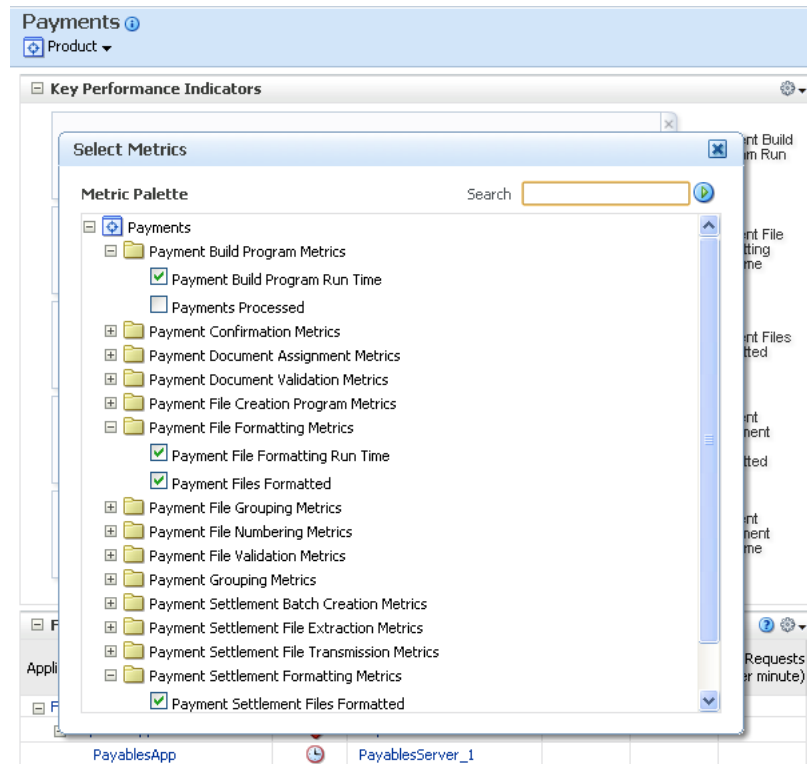
- Verify component status.
- View and modify performance metrics.
- Monitor the status of any scheduled jobs.

To monitor a product family or product in Fusion Applications Control or Cloud Control:

1. Navigate to the product family home page:

- **Fusion Applications Control:** From the navigation pane, select the name of the product family.
  - **Cloud Control:**
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications page, click the **Fusion Instance** whose overview page you want to display.  
The Fusion Instance page displays.
    - c. In the Fusion Instance overview page, expand the Fusion instance and click the name of the product family.
2. Alternatively, navigate to the product home page:
- **Fusion Applications Control:** From the navigation pane, expand the product family, then **Products**, and then select the product.
  - **Cloud Control:**
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications page, click the **Fusion Instance** whose overview page you want to display.  
The Fusion Instance page displays.
    - c. In the Fusion Instance overview page, expand the Fusion instance and the product family. Click the name of the product whose home page you want to display.
3. Use the following sections on the main product family or product page to verify the status of various components.
- **Applications and Infrastructure:** Verify the availability of Fusion Applications and Oracle Fusion Middleware.
  - **Topology:** View the complete topology of the product or product family. Click a node to view the home page of the selected component.
  - **Fusion Applications:** Verify the status of Fusion cluster applications, Fusion applications and the relationship between domain and server.
  - **Servers:** Verify the status of Fusion cluster applications and all related servers.
- For more information about the individual sections on the product family and product home pages, see [Section 11.2](#) and [Section 11.3](#).
- For more information about monitoring Fusion applications, see [Section 11.8](#).
4. In the **Key Performance Indicators** section, view the product or product family main performance metrics. Click the **View Actions** menu to perform any of the following tasks.
- **Modifying performance metrics:** You can view and modify the performance metrics in this section by clicking the **View Actions** menu in the section and selecting **Select Metrics**.  
The Select Metrics popup window displays.





In the Select Metrics dialog, you can search for a particular metric in the Search field and select or remove the metrics you want to display or hide in the **Key Performance Indicators** section.

For more information about monitoring and modifying performance metrics, see [Section 11.9](#).

- **Saving charts:** You can save metric charts to a file by selecting **View Actions > Save charts**.
  - **Restoring default charts:** You can restore the metric charts to their defaults such that only the default metrics display, by selecting **View Actions > Restore default charts**.
5. Monitor the status of any scheduled jobs by using the Oracle Enterprise Scheduler sections described [Section 11.2.4](#). You can view more scheduled jobs displayed in these sections by clicking **Show All** at the bottom of each section.

Clicking **Show All** displays the Oracle Enterprise Scheduler section in a larger pane such that a larger number of relevant jobs display.

## 11.8 Monitoring the Detailed Status of Oracle Fusion Applications

The Applications and Infrastructure page allows you to verify the status of a given Oracle Fusion application.

To verify the status of a given Oracle Fusion application:

1. Display the Product Family home page.
  - In Fusion Applications Control, from the navigation pane, select the product family.
  - In Cloud Control, from the **Targets** menu, choose **Fusion Applications**.

In the **Fusion Applications** table, click the desired product family.

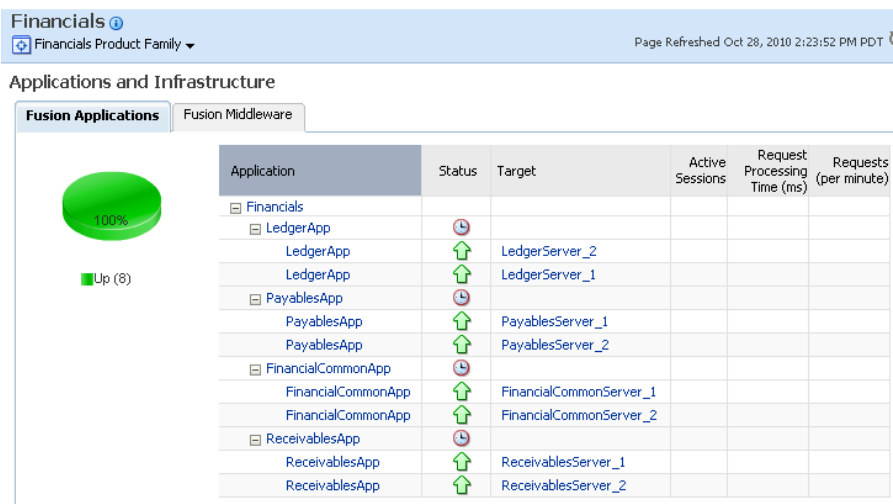
2. Display the Applications and Infrastructure page.
  - In Fusion Applications Control, from the **Product Family** menu, choose **Applications and Infrastructure**
  - In Cloud Control, from the **Product Family** menu, choose **Monitoring** and then select **Applications and Infrastructure**.

The Applications and Infrastructure page displays.

3. Click the **Fusion Applications** tab.

This tab shows the status of a given clustered Oracle Fusion J2EE application. When expanding an application, the individual instances of the Oracle Fusion application are displayed, each running on different servers. A status appears for each of these individual application deployments.

A pie chart indicates the percentage of Fusion applications in the product family that are up and running within the **farm** domain.



## 11.9 Monitoring Business Performance Metrics for a Product Family

The Key Performance Indicators page displays an overview of the performance metrics of a given product family. Typically, several default metrics display on the page in the form of graphs. Multiple metrics are tracked, and these can be added to the Key Performance Indicators page. Each product belonging to a given product family has its own set of metrics.

You can modify the Key Performance Indicators page as follows:

- Add or remove metrics from the page.
- Display performance data in tabular format.
- Save or delete a set of performance charts.
- Re-organize the display of charts, for example move charts up or down.
- Display the performance metrics of another instance of the product on top of the current chart sets, or display earlier metrics of the same product instance on top of current metrics.

- Toggle on or off the grid display on the performance chart set.
- Modify the performance time period.

To view and modify a product family's business performance summary page in Fusion Applications Control or Cloud Control:

1. Navigate to the product family home page.
  - **Fusion Applications Control:** From the navigation pane, choose the product family.
  - **Cloud Control:**
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications target home page, click the product family.
2. Display the Key Performance Indicators page.
  - **Fusion Applications Control:** From the **Product Family** menu, select **Key Performance Indicators**.
  - **Cloud Control:** From the **Product Family** menu, select **Monitoring** and then select **Key Performance Indicators**.

The product family home page displays. You can view the key metrics for the product family in the **Key Performance Indicators** page.

3. Display the metrics pane by clicking **Show Metric Palette**.
4. You can modify the metrics that display on the Key Performance Indicators pane.  
In the Metrics Palette, select the metrics you want to display in the Key Performance Indicators pane.
5. You can search for a particular metric.  
In the **Metrics Palette Search** field, enter the name of the metric you want to find and click the **Search** button.
6. You can change the order in which metrics display on the Key Performance Indicators pane, or delete a metric from the display.
  - Click the bar to the left of the metric name and drag the metric up or down.
  - Click the **Close** button on the upper right corner of the metric to delete it from the display.
7. You can optionally click a metric name for more information about that metric.  
The Additional Information dialog displays. From this dialog, you can view more details about the metric using the following links:
  - **Problem Analysis:** Directs to the Problem Analysis page. This page enables you to see a metric with other related metrics, which are affecting the metrics being analyzed. It also shows the related targets and the related targets topology. The Problem Analysis is only available for request-related metrics, such as the Request Processing Time (ms) and Request (per minute).
  - **Analyze Logs:** Displays a message that enables you to view the logs for a target on which the metric is viewed.
  - **Metric Details:** Enables you view historical metric data.

- **Target Home:** Directs you to the home page.

When used together, Problem Analysis and Analyze Logs can help you inspect metrics, target status information, and logs during troubleshooting. These links are not available for all metrics. For more information about these links, see the "Working with Cloud Control Problem Analysis and the Analyze Logs Options" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

For information about viewing and modifying the display of product family performance indicators, see [Section 2.5.7](#).

## 11.10 Monitoring Business Performance Metrics for a Product

The Performance Summary page displays an overview of the performance metrics for a given product. Typically, several default metrics display on the page in the form of graphs. Multiple metrics are tracked, and these can be added to the Performance Summary page. Each product belonging to a given product family has its own set of metrics.

You can modify the performance page as follows:

- Add or remove metrics from the page.
- Display performance data in tabular format.
- Save or delete a set of performance charts.
- Re-organize the display of charts, for example move charts up or down.
- Display the performance metrics of another product family on top of the current chart sets, or display earlier metrics of the same product family on top of current metrics.
- Toggle on or off the grid display on the performance chart set.
- Modify the performance time period.

To view and modify a product's business performance summary page in Fusion Applications Control or Cloud Control:

1. Navigate to the product home page.
  - **Fusion Applications Control:** From the navigation pane, expand the product family, then **Products**, and then select the product.
  - **Cloud Control:**
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications target home page, expand a product family and click an individual product.
2. Display the Key Performance Indicators page.
  - **Fusion Applications Control:** From the **Product** menu, choose **Key Performance Indicators**.
  - **Cloud Control:** From the **Product** menu, choose **Monitoring** and then select **Key Performance Indicators**.

The product family home page displays. You can view the key metrics for the product family in the **Key Performance Indicators** page.

3. To modify the display of metrics in the Key Performance Indicators page, follow the procedure in [Section 11.9](#), beginning with Step 3.

## 11.11 Viewing the Routing Topology of an Oracle Fusion Applications Instance, Product Family, or Product

Cloud Control provides a routing topology viewer, which provides a graphical representation of routing relationships across targets, components and elements. It shows you the routing details for the Oracle Fusion Applications environment, from Oracle HTTP Server (OHS) to the Oracle WebLogic Servers to the Oracle Database. Targets are annotated to indicate status and incidents. Tool tips show additional information about entities and relationships. You can pan and zoom the graph, as in popular map programs, and also expand and collapse desired areas of the graph. The graph can be filtered to show only desired nodes. The topology graph is highly interactive. You can hover over and click on various parts of the graph. The topology graph provides visibility into the runtime environment.

You can also print the topology or save it to a .png file.

To view the topology with Cloud Control:

1. Navigate to a Fusion Instance, product family, or product home page:
  - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
  - b. In the table on the Fusion Applications page, click the appropriate target, the instance for the Oracle Fusion Applications or product family. You can also expand a product family to select an individual product.
2. From the **Fusion Instance, Product Family, or Product** menu, choose **Routing Topology**.  
The Routing Topology page displays.
3. From the **View** menu, choose one of the following topology views:
  - **Routing: Group by Application:** Choose to view the topology of the applications as they relate to the Oracle WebLogic Server domains and servers, as well as the Oracle Database.
  - **Routing: Group by Middleware:** Choose to view the topology for the middleware targets, such as Oracle WebLogic Server.
  - **Routing: Group by Host:** Choose to view the topology of the targets on the hosts in the enterprise.
  - **Products:** Choose this view the topology of Oracle Fusion Applications products.
4. To see information about a particular target, place your mouse over the target. To view additional information, click **More**. For example, for an **Oracle WebLogic Server domain**, you can view general information about the domain home location, incidents, and configuration.
5. From the **Products** menu, select and deselect specific products to narrow or expand the scope of the graph.
6. From the **Node Type** menu, select or deselect specific node types to narrow or expand the focus of the graph.

7. From the **Options** menu, you can save or print the image, expand or collapse all of the nodes, change the orientation of the topology to be left to right or top to bottom, or reload the routing navigator.

In addition, you can refresh the status and the metrics or update the topology. To refresh the status and metrics, click **Refresh Target Status and Metrics**. To update the topology shown in the viewer, click **Recreate Topology**. If a target has been added or deleted, the target list and relationships are updated. This option also updates the status and metrics.

8. With Topology Viewer, you can also:
  - Search for specific target or node or type of target or node within the topology with the **Toggle Find Toolbar** widget from the toolbar at top of the page. This makes it easier to find a target if you have many targets. After the target is found, it is highlighted in the topology and the topology is repositioned. This enables you to see the target, if it was not previously visible in the viewing area.
  - View the targets by status. Choose **Show Up Targets**, **Show Down Targets**, **Show Targets with Fatal Incidents**, and **Show Targets with Critical Incidents** from the toolbar at top of the page.
  - Navigate to the home page of a target. Right-click the target, and choose **Home**.
  - Hide or show the status or metrics. From the **Annotations** menu, choose **Status** or **Metrics**.

If you select **Metrics**, one key performance metric for the component is displayed. (You cannot change the metric that is displayed.)
  - View the routing relationships between components.
  - Perform operations directly on the target by right-clicking. The right-click target menu is displayed.
9. Interact with a topology graph.

For more information, see "Interactive Gestures" in the Cloud Control online help.

## 11.12 Viewing the Configuration Topology of an Oracle Fusion Applications Instance, Product Family, or Product

With Cloud Control, you can view the configuration topology of the IT environment in a graphical format for the Fusion instance, product family, or individual product. The inter-relationships between targets are used to answer questions such as:

- On what targets does this target rely?
- What targets will be affected if this target goes down?
- How are the members of my system related?

To view a configuration topology:

1. Navigate to a Fusion Instance, product family, or product home page:
  - a. From the **Targets** menu, choose **Fusion Applications**.

The Fusion Applications target home page displays.







---

# Monitoring the Oracle Fusion Applications Middle Tier

This chapter describes how to monitor the middle tier using Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) and Oracle Enterprise Manager (Cloud Control).

This chapter includes the following topics:

- Section 12.1, "Introduction to Monitoring the Middle Tier"
- Section 12.2, "Monitoring and Viewing Performance Status of Oracle Fusion Middleware"
- Section 12.3, "Monitoring System Performance Metrics for a Fusion Instance, Product Family, or a Product"
- Section 12.4, "Monitoring Performance for Key Oracle Fusion Middleware Components with Fusion Applications Control"
- Section 12.5, "Performing Proactive Performance Monitoring with Cloud Control"
- Section 12.6, "Tuning Middle Tiers for Oracle Fusion Applications"

The procedures referenced in the Oracle Fusion Middleware guides describe using Fusion Middleware Control. These procedures also apply to Fusion Applications Control.

## 12.1 Introduction to Monitoring the Middle Tier

Both Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) and Oracle Enterprise Manager Cloud Control (Cloud Control) automatically and continuously measure run-time performance. The performance metrics are automatically enabled; you do not need to set options or perform any extra configuration to collect them.

You can monitor the following aspects of the middle tier with this control:

- Monitor the state and performance of the Oracle Fusion Applications products and applications and an Oracle Fusion Middleware targets by providing out-of-the-box performance metrics
- Monitor CPU usage, heap usage, Work Manager, **JMS** servers, and JDBC and JTA usage for Oracle WebLogic Server
- Monitor **JVM** performance in terms of heap versus non-heap usage, garbage collection, and threads performance
- Monitor applications and web services deployed to an Oracle WebLogic Server

- Monitor a wide range of application metrics for servlets, JSPs, and EJBs are available, as well as web services metrics for faults, invocations, and violations. Such metrics are accessible from a target's home page.
- Access customizable performance summary pages to help administrators monitor performance and diagnose problems. These charts can be modified to display content that is relevant to your domain. A target or component might be added to the chart so that you can compare the performance information for two targets in one chart.

You can also monitor a specific set of metrics for performance tuning information. With Cloud Control, you can also view historical data. See [Section 12.5](#) for more specific information about usage of Cloud Control.

Use the following sections for specifics on using Fusion Applications Control:

- [Section 12.2, "Monitoring and Viewing Performance Status of Oracle Fusion Middleware"](#)
- [Section 12.3, "Monitoring System Performance Metrics for a Fusion Instance, Product Family, or a Product"](#)
- [Section 12.5, "Performing Proactive Performance Monitoring with Cloud Control"](#)

Use the following sections for specifics on using Cloud Control:

- [Section 12.2, "Monitoring and Viewing Performance Status of Oracle Fusion Middleware"](#)
- [Section 12.3, "Monitoring System Performance Metrics for a Fusion Instance, Product Family, or a Product"](#)
- [Section 12.4, "Monitoring Performance for Key Oracle Fusion Middleware Components with Fusion Applications Control"](#)

## 12.2 Monitoring and Viewing Performance Status of Oracle Fusion Middleware

Monitoring the health of the underlying Oracle Fusion Middleware environment and ensuring that it performs optimally is an important task.

This section contains the following topics:

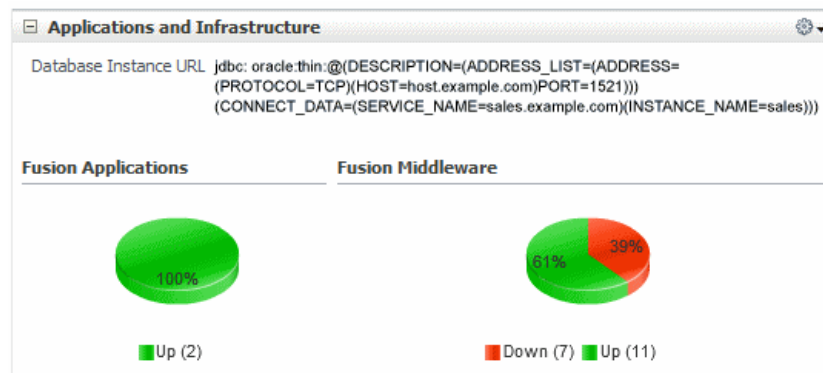
- [Section 12.2.1, "Viewing the General Status of Oracle Fusion Middleware Components for a Product Family"](#)
- [Section 12.2.2, "Viewing the Detailed Status of Oracle Fusion Middleware Components for a Product Family"](#)
- [Section 12.2.3, "Viewing the Routing Topology of Oracle Fusion Middleware"](#)
- [Section 12.2.4, "Viewing the Performance of an Oracle WebLogic Server"](#)
- [Section 12.2.5, "Monitoring the System Performance of Oracle Fusion Applications Deployed to a Cluster"](#)

### 12.2.1 Viewing the General Status of Oracle Fusion Middleware Components for a Product Family

You can view the overall status of the underlying Oracle Fusion Middleware components from the home page of the [product family](#).

To view the general status with either Fusion Applications Control or Cloud Control:

1. Navigate to a product family home page:
  - From Fusion Applications Control, in the navigation pane, select the product family.
  - From Cloud Control:
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications target home page, click the appropriate **Product Family** target.
2. View the **Applications and Infrastructure** section. The following figure shows an example of the tab from Fusion Applications Control.



The pie charts in the **Fusion Middleware** section displays the percentage of Oracle Fusion Middleware components that are currently up or down.

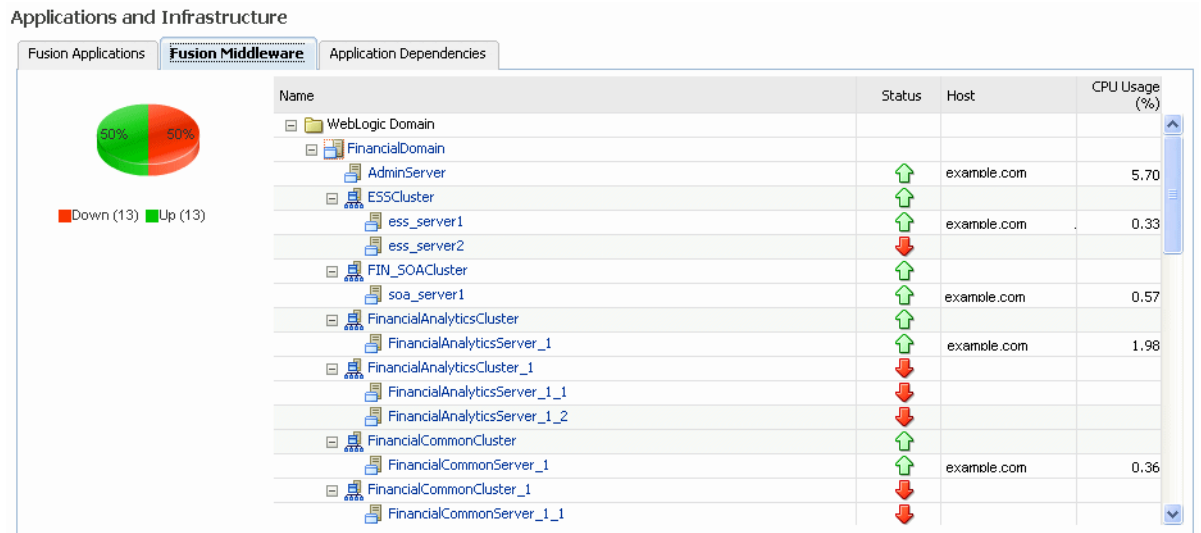
## 12.2.2 Viewing the Detailed Status of Oracle Fusion Middleware Components for a Product Family

You can view the detailed status of Oracle Fusion Applications and Oracle Fusion Middleware components, including the [Administration Server](#) and the Managed Servers in the [Oracle WebLogic Server domain](#) and specific Oracle Fusion Middleware components.

To view detailed status with Oracle Fusion Middleware components:

1. Navigate to a product family home page:
  - From Fusion Applications Control, from the navigation pane, select the product family.
  - From Cloud Control:
    - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
    - b. In the table on the Fusion Applications target home page, click the appropriate **Product Family** target.
2. From the **Product Family** menu, choose **Applications and Infrastructure**.
3. From the Applications and Infrastructure page, click the **Fusion Middleware** tab.

This tab shows the status of the various components, associated host, and the percentage of CPU that is being used the component. The following figure shows an example of the tab from Fusion Applications Control.



#### 4. Select a specific component to gain more insight.

For example, if you select the Oracle WebLogic Server domain, Fusion Applications Control directs you to the domain home page. This page shows the following.

- A general summary of the domain, along with a link to the Oracle WebLogic Server Administration Console
- Information about the servers, both the Administration Server and the Managed Servers in the domain
- Information about the clusters in the domain
- Information about the deployments in the domain

## 12.2.3 Viewing the Routing Topology of Oracle Fusion Middleware

This section contains the following topics:

- [Section 12.2.3.1, "Viewing the Routing Topology of Oracle Fusion Middleware Using Fusion Applications Control"](#)
- [Section 12.2.3.2, "Viewing the Routing Topology of Oracle Fusion Middleware Using Cloud Control"](#)

### 12.2.3.1 Viewing the Routing Topology of Oracle Fusion Middleware Using Fusion Applications Control

Fusion Applications Control provides a Topology Viewer for the [farm](#). The Topology Viewer is a graphical representation of routing relationships across components and elements of the farm. You can easily determine how requests are routed across components.

The Topology Viewer enables you to easily monitor your Oracle Fusion Applications environment. You can see which entities are up and which are down.

You can also print the topology or save it to a .png file.

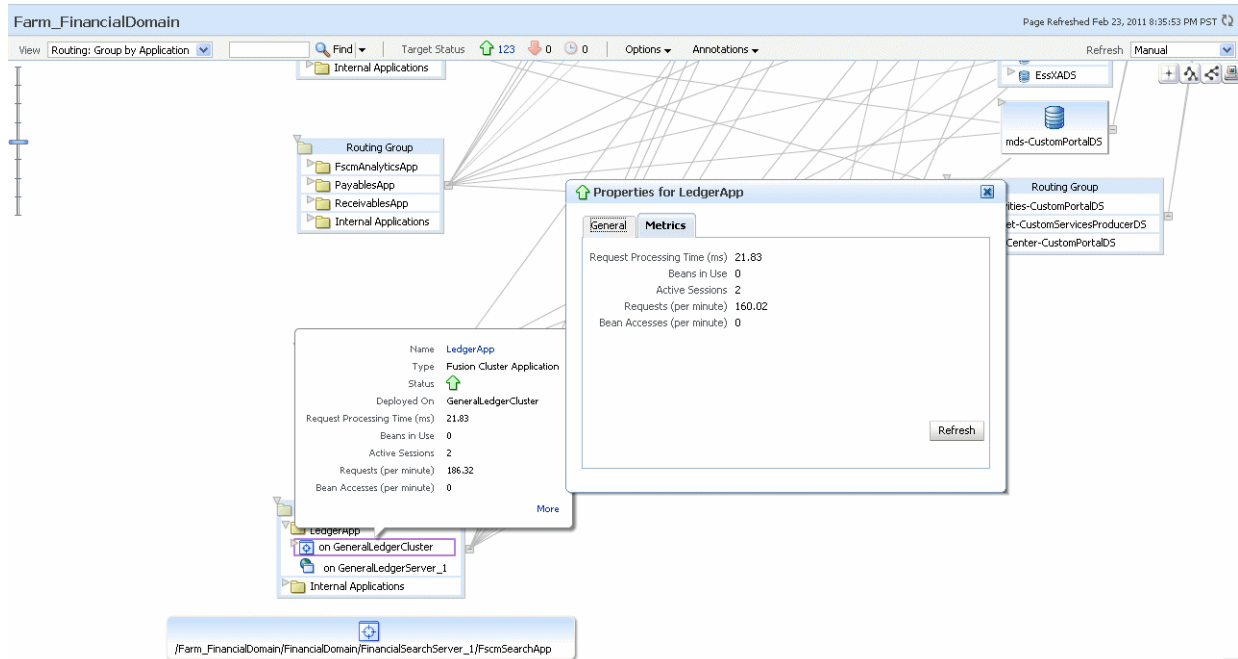
To view the topology with Fusion Applications Control:

1. Click **Topology**.

The Topology Viewer is displayed in a separate window.

2. From the **View** menu, choose **Routing: Group By Application** to view the topology of applications or choose **Routing: Group by Middleware** to view the topology for the middleware.

3. To see information about a particular target, place your mouse over the target. To view additional information, click **More**. The following figure shows additional information for the **LedgerApp** target.



4. From the **Options** menu, you can save or print the image, expand or collapse all of the nodes, change the orientation of the topology to be left to right or top to bottom, or show and hide the routing navigator.

In addition, you can refresh the status and the metrics or update the topology. To refresh the status and metrics, click **Refresh Target Status and Metrics**. To update the topology shown in the viewer, click **Recreate Topology**. If a target has been added or deleted, the target list and relationships are updated. This option also updates the status and metrics.

5. With Topology Viewer, you can also:

- Search for a target within the topology. This makes it easier to find a target if you have many targets. Enter the name in the **Find** box. The target is highlighted and the topology is repositioned so you can see the target if it was not previously visible in the viewing area.

You can also specify criteria for the search. From **Find**, choose the one or more types of **Status** or one or more of **Target Type**, or both.

- View the targets by status. Choose **Up**, **Down**, or **Unknown** from the Target Status at the top of the page.
- Navigate to the home page of a target. Right-click the target, and choose **Home**.

- Hide or show the status or metrics. From the **Annotations** menu, choose **Status** or **Metrics**.  
If you select **Metrics**, one key performance metric for the component is displayed. (You cannot change the metric that is displayed.)
  - View the routing relationships between components.
  - Perform operations directly on the target by right-clicking. The right-click target menu is displayed.
6. To change what is visible in the topology view, drag the shaded section in the navigator window, which is located in the bottom right.

---

**Notes:**

- If you use Mozilla Firefox, when you click an entity in Topology Viewer to take you back to the main Fusion Applications Control window, focus is not returned to the main window. For example, if you right-click an entity and choose logs from menu, the focus remains on the Topology Viewer window. (If you go back to the main window, the Logs page is correctly displayed.)

To workaroud this problem, make the following change in Firefox:

From the **Tools** menu, choose **Options**, and then **Content**. Click **Advanced**. In the Advanced JavaScript Settings dialog box, select **Raise and lower windows**.

- If you use Internet Explorer, turn off the **Always Open Popups in New Tab** option.
- 

### 12.2.3.2 Viewing the Routing Topology of Oracle Fusion Middleware Using Cloud Control

See [Section 11.11](#).

## 12.2.4 Viewing the Performance of an Oracle WebLogic Server

See the following resources in the *Oracle Fusion Middleware Administrator's Guide* to monitor the Oracle WebLogic Server:

- "Monitoring an Oracle WebLogic Server Domain" section to view the status of a domain, including the servers, clusters, and deployments in the domain
- "Monitoring an Oracle WebLogic Server Administration or Managed Server" section to view the status of an Oracle WebLogic Server Administration Server or Managed Server in Fusion Applications Control
- "Monitoring a Cluster" section to view the status of a cluster, including the servers and deployments in the cluster

For information on locating specific metrics to monitor, see [Section 12.4.4.1](#).

## 12.2.5 Monitoring the System Performance of Oracle Fusion Applications Deployed to a Cluster

During installation, Oracle Fusion Applications automatically deploys each application to a Managed Server in a cluster. For each Managed Server in the cluster, there is an instance of the application on each Oracle WebLogic Server.

There are times when you want to monitor the system performance of the application on an individual server, and times when you want to monitor the overall performance of the application across all the servers in the cluster.

For example, normally, you would manage the overall performance of the application to determine if there are any performance issues affecting all users of the application, regardless of which instance users access. If you notice a performance problem, you can then drill down to a specific instance of the application to determine if the problem is affecting one or all of the application instances in the cluster. Cloud Control and Fusion Applications Control provides monitoring pages for both of these scenarios.

This section contains the following topics:

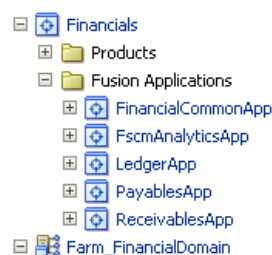
- [Section 12.2.5.1, "Monitoring the Performance of Oracle Fusion Applications Cluster Applications Using Fusion Applications Control"](#)
- [Section 12.2.5.2, "Monitoring the Performance of Oracle Fusion Applications Cluster Applications Using Cloud Control"](#)
- [Section 12.2.5.1, "Monitoring the Performance of Oracle Fusion Applications Cluster Applications Using Fusion Applications Control"](#)
- [Section 12.2.5.3, "Monitoring the Performance of Oracle Fusion Application Instances Using Fusion Applications Control"](#)

### 12.2.5.1 Monitoring the Performance of Oracle Fusion Applications Cluster Applications Using Fusion Applications Control

To monitor the overall performance of the Oracle Fusion Applications cluster applications with Fusion Applications Control:

1. From the navigation pane, expand the product family, then **Fusion Applications**.

Fusion Applications Control lists the applications deployed in the current domain, as shown in the following figure:



2. Monitor the overall performance of the applications on a cluster by clicking the cluster application name, for example, **PayablesApp**.

The Fusion Cluster Application page displays.

3. View performance metrics. From the **Fusion Cluster Application** menu, choose **Performance Summary**.

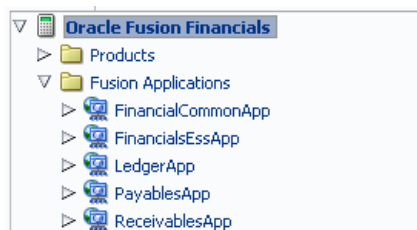
The Performance Summary page displays. For more information about using this page, see [Section 2.5.7](#).

### 12.2.5.2 Monitoring the Performance of Oracle Fusion Applications Cluster Applications Using Cloud Control

To monitor the overall performance of the Oracle Fusion Applications cluster applications with Cloud Control:

1. Navigate to a product family home page:
  - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
  - b. In the table on the Fusion Applications page, click the appropriate **Product Family** target.
2. From the navigation pane, expand **Fusion Applications**.

Cloud Control lists the applications deployed in the current domain, as shown in the following figure:



3. Monitor the overall performance of the applications on a cluster by clicking the cluster application name, for example, **PayablesApp**.  
The Fusion Cluster Application page displays.
4. View performance metrics. From the **Fusion Cluster Application** menu, choose **Monitoring > Performance Summary**.  
The Performance Summary page displays. For more information about using this page, see the topic "Using Performance Summary" in the Cloud Control online help.
5. From the Performance Summary page, you can optionally click on a metric name.  
The Additional Information dialog displays. From this dialog, you can view more details about the metric with the following links:
  - **Problem Analysis:** Directs to the Problem Analysis page. This page enables you to see a metric with other related metrics, which are affecting the metrics being analyzed. It also shows the related targets and the related targets topology. The **Problem Analysis** is only available for request-related metrics, such as the **Request Processing Time (ms)** and **Request (per minute)**.
  - **Analyze Logs:** Displays a message that enables you to view the logs for a target on which the metric is viewed.
  - **Metric Details:** Enables you view historical metric data.
  - **Target Home:** Directs you to the home page.

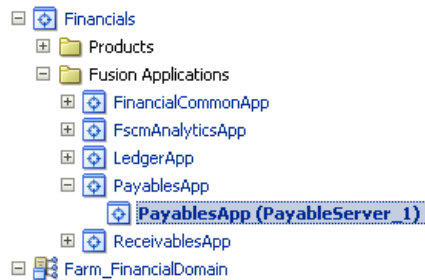
When used together, **Problem Analysis** and **Analyze Logs** can help you inspect metrics, target status information, and logs during troubleshooting. These links are not available for all metrics. For more information about these links, see the "Troubleshooting Using the Diagnostic Testing Framework" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.



### 12.2.5.3 Monitoring the Performance of Oracle Fusion Application Instances Using Fusion Applications Control

To monitor a specific instance of the application with Fusion Applications Control:

1. From the navigation pane, expand the product family, then **Fusion Applications**.
2. Expand the cluster application you want to monitor to show each instance of the application, as shown in the following figure:



3. Monitor the overall performance of an application instance in cluster by clicking one of the application deployment instances, for example, **PayablesApp (PayablesSever\_1)**.

The Fusion J2EE Application page displays.

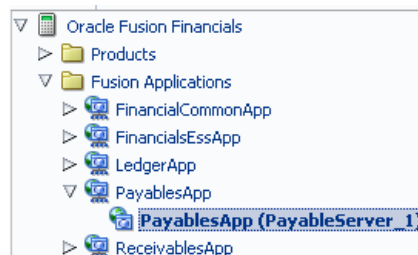
4. View performance metrics. From the **Fusion J2EE Application** menu, choose **Performance Summary**.

The Performance Summary page displays. For more information about using this page, see [Section 2.5.7](#).

### 12.2.5.4 Monitoring the Performance of Oracle Fusion Application Instances Using Cloud Control

To monitor a specific instance of the application with Cloud Control:

1. Navigate to a product family home page:
  - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
  - b. In the table on the Fusion Applications target home page, click the appropriate **Product Family** target.
2. From the navigation pane, expand the product family, then **Fusion Applications**.
3. Expand the cluster application you want to monitor to show each instance of the application, as shown in the following figure:



4. Monitor the overall performance of an application instance in cluster by clicking one of the application deployment instances, for example, **PayablesApp (PayablesSever\_1)**.

The Fusion J2EE Application page displays.

5. View performance metrics. From the **Fusion J2EE Application** menu, choose **Performance Summary**.

The Performance Summary page displays. For more information about using this page, see the topic "Using Performance Summary" in the Cloud Control online help.

6. From the Performance Summary page, you can optionally click on a metric name.

The Additional Information dialog displays. From this dialog, you can view more details about the metric with the following links:

- **Problem Analysis:** Directs to the Problem Analysis page. This page enables you to see a metric with other related metrics, which are affecting the metrics being analyzed. It also shows the related targets and the related targets topology. The **Problem Analysis** is only available for request-related metrics, such as the **Request Processing Time (ms)** and **Request (per minute)**.
- **Analyze Logs:** Displays a message that enables you to view the logs for a target on which the metric is viewed.
- **Metric Details:** Enables you view historical metric data.
- **Target Home:** Directs you to the home page.

When used together, **Problem Analysis** and **Analyze Logs** can help you inspect metrics, target status information, and logs during troubleshooting. These links are not available for all metrics. For more information about these links, see the "Working with Cloud Control Problem Analysis and the Analyze Logs Options" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

## 12.3 Monitoring System Performance Metrics for a Fusion Instance, Product Family, or a Product

If you encounter a problem, such as a product running slowly or hanging, you can view more detailed performance information, including aggregate system performance metrics for all the product families or an individual product family. You can also view metrics specific to a particular product, to find out more information about the problem. You can only view aggregate system performance metrics for all the product families with Cloud Control.

This section contains the following topics:

- [Section 12.3.1, "Monitoring System Performance Metrics for a Product Family or a Product with Fusion Applications Control"](#)
- [Section 12.3.2, "Monitoring System Performance Metrics for a Fusion Instance, Product Family, or a Product with Cloud Control"](#)

### 12.3.1 Monitoring System Performance Metrics for a Product Family or a Product with Fusion Applications Control

With Fusion Applications Control, you can view detailed aggregate system performance metrics for the product family or view metrics specific to a particular product.

To view the performance metrics for the product family with Fusion Applications Control:

1. From the navigation pane, select the name of the product family.
2. From the **Product Family** menu, choose **System Performance Summary**.  
The System Performance page displays. For more information about using this page, see [Section 2.5.7](#).

To view the performance metrics for a particular product with Fusion Applications Control:

1. From the navigation pane, expand the product family, then **Products**.
2. Select the product you want to monitor.
3. From the **Product** menu, choose **System Performance Summary**.  
The System Performance page displays. For more information about using this page, see [Section 2.5.7](#).

### 12.3.2 Monitoring System Performance Metrics for a Fusion Instance, Product Family, or a Product with Cloud Control

With Cloud Control, you can view aggregate system performance metrics for all the product families by monitoring the Fusion instance or an individual product family. You can also view metrics specific to a particular product.

To view the performance metrics for the product family with Cloud Control:

1. Navigate to a Fusion Instance, product family, or product home page:
  - a. From the **Targets** menu, choose **Fusion Applications**.  
The Fusion Applications target home page displays.
  - b. In the table on the Fusion Applications target home page, click the appropriate target, the instance for the Oracle Fusion Applications or product family. You can also expand a product family to select an individual product.
2. From the **Fusion Instance**, **Product Family**, or **Product** menu, choose **Monitoring > System Performance**.

The Performance Summary page displays. For more information about using this page, see the topic "Using Performance Summary" in the Cloud Control online help.

3. From the Performance Summary page, you can optionally click on a metric name.

The Additional Information dialog displays. From this dialog, you can view more details about the metric with the following links:

- **Problem Analysis:** Directs to the Problem Analysis page. This page enables you to see a metric with other related metrics, which are affecting the metrics being analyzed. It also shows the related targets and the related targets topology. The **Problem Analysis** is only available for request-related metrics, such as the **Request Processing Time (ms)** and **Request (per minute)**.
- **Analyze Logs:** Displays a message that enables you to view the logs for a target on which the metric is viewed.
- **Metric Details:** Enables you view historical metric data.
- **Target Home:** Directs you to the home page.

When used together, **Problem Analysis** and **Analyze Logs** can help you inspect metrics, target status information, and logs during troubleshooting. These links are not available for all metrics. For more information about these links, see the "Working with Cloud Control Problem Analysis and the Analyze Logs Options" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

## 12.4 Monitoring Performance for Key Oracle Fusion Middleware Components with Fusion Applications Control

Monitoring Oracle Fusion Middleware performance involves monitoring any Oracle WebLogic Server Managed Servers for a component and as available, performance metrics. The Oracle Fusion Middleware layer of Oracle Fusion Applications automatically and continuously measures run-time performance for middle tier components. Use [Table 12-1](#) to find information on where to find related documentation for the main Oracle Fusion Middleware components in most Oracle Fusion Applications environments. As mentioned previously in this chapter, references to Fusion Middleware Control in the Oracle Fusion Middleware documents apply to Fusion Applications Control.

**Table 12-1** *Monitoring Oracle Fusion Middleware Components*

Component	Documentation
Oracle Business Intelligence Suite	<p>Status of an Oracle WebLogic Server Managed Server for Oracle Business Intelligence Suite: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.</p> <p>Performance metrics: "Monitoring Service Levels" section in the <i>Oracle Fusion Middleware System Administrator's Guide for Oracle Business Intelligence Enterprise Edition</i></p>
Oracle Enterprise Content Management Suite, Content Server	<p>Status of an Oracle WebLogic Server Managed Server for Content Server: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.</p> <p>Performance Metrics: "Viewing Performance Information for Content Server" section in the <i>Oracle WebCenter Content System Administrator's Guide for Content Server</i></p>
Oracle Enterprise Crawl and Search Framework	Performance metrics: <a href="#">Section 12.4.1</a>
Oracle Enterprise Scheduler Service	<p>Status of an Oracle WebLogic Server Managed Server for Oracle Enterprise Scheduler: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.</p> <p>Performance metrics: <a href="#">Section 12.4.2.4</a> and <a href="#">Section 12.4.4.3</a></p>

**Table 12–1 (Cont.) Monitoring Oracle Fusion Middleware Components**

Component	Documentation
Oracle Identity Management, Oracle Access Manager	Status of an Oracle WebLogic Server Managed Server for Oracle Access Manager: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.  Performance metrics: "Viewing Performance in Fusion Middleware Control" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Access Manager with Oracle Security Token Service</i>
Oracle Identity Management, Oracle Identity Manager	Status of an Oracle WebLogic Server Managed Server for Oracle Identity Management: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.  Performance metrics: <a href="#">Section 12.4.3</a>
Oracle Identity Management, Oracle Internet Directory	Status of an Oracle WebLogic Server Managed Server for Oracle Identity Management: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.  Performance Metrics: "Monitoring Oracle Internet Directory" in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Internet Directory</i>
Oracle Identity Management, Oracle Virtual Directory	Status of an Oracle WebLogic Server Managed Server for Oracle Virtual Directory: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.  Performance Metrics: "Monitoring Oracle Virtual Directory Using Fusion Middleware Control Metrics" in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle Virtual Directory</i>
Oracle SOA Suite	Performance metrics: "Monitoring Message Delivery Processing Requests" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite and Oracle Business Process Management Suite</i> and <a href="#">Section 12.4.4.2</a>
Oracle WebCenter Portal	Status of an Oracle WebLogic Server Managed Server for Oracle WebCenter Portal: "Monitoring an Oracle WebLogic Server Administration or Managed Server" section in the <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on accessing the server home page. Specifically, review the Summary section of the page.  Performance metrics: "Monitoring Oracle WebCenter Portal Performance" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle WebCenter Portal</i>
Oracle Web Tier, Oracle HTTP Server	Performance metrics: "Monitoring Oracle HTTP Server Performance" section in the <i>Oracle Fusion Middleware Administrator's Guide for Oracle HTTP Server</i>
Oracle WebLogic Server	<a href="#">Section 12.2.4</a> and <a href="#">Section 12.4.4.1</a>

The section contains the following topics:

- [Section 12.4.1, "Monitoring Oracle Enterprise Crawl and Search Framework"](#)

- [Section 12.4.2, "Monitoring the Performance of a Single Oracle Enterprise Scheduler Instance"](#)
- [Section 12.4.3, "Monitoring Oracle Identity Manager Performance Metrics"](#)
- [Section 12.4.4, "Locating Key Performance Metrics for Specific Components"](#)

### 12.4.1 Monitoring Oracle Enterprise Crawl and Search Framework

Fusion Applications Control automatically and continuously measures the runtime performance of Oracle Enterprise Crawl and Search Framework. If you encounter a problem, you can view the performance metrics to find out more information about the problem.

To monitor performance metrics for Oracle Enterprise Crawl and Search Framework with Fusion Applications Control:

1. From the navigation pane, expand **Enterprise Crawl and Search Framework**.
2. Select the Oracle Enterprise Crawl and Search Framework application for the product family.
3. From the **Enterprise Crawl and Search Framework** menu, choose **Performance Summary** to view detailed performance metrics.

The Performance Summary page displays. For more information about using this page, see [Section 2.5.7](#).

### 12.4.2 Monitoring the Performance of a Single Oracle Enterprise Scheduler Instance

You can monitor the performance of an Oracle Enterprise Scheduler instance, specifically current and historical performance data, as well as a summary of all performance data. Performance data displays in a chart set, which you save, delete and reorder. Additionally, you can modify the time period for which performance data displays.

This section contains the following topics:

- [Section 12.4.2.1, "Viewing a Summary of Oracle Enterprise Scheduler Activity"](#)
- [Section 12.4.2.2, "Viewing Current Oracle Enterprise Scheduler Activity"](#)
- [Section 12.4.2.3, "Viewing Historical Oracle Enterprise Scheduler Reports"](#)
- [Section 12.4.2.4, "Viewing Oracle Enterprise Scheduler Metrics"](#)
- [Section 12.4.2.5, "Managing Chart Sets"](#)
- [Section 12.4.2.6, "Selecting the Performance Time Period"](#)

#### 12.4.2.1 Viewing a Summary of Oracle Enterprise Scheduler Activity

The Oracle Enterprise Scheduler Performance Summary page displays current charts of job requests such as requests completed per hour, running requests, requests by processing time and requests by status.

To view a summary of Oracle Enterprise Scheduler activity:

1. From the **Scheduling Service** menu, choose **Performance > Service Summary**.

By default, this page displays job requests running during a selected time period in the following categories:

- Requests completed per hour

- Processing times, average, minimum and maximum
- Running requests and maximum running requests
- Requests over the past hour with the status SUCCESS, WARNING, ERROR or CANCEL.

You can change the metrics displayed on the Service Summary performance page. Click the **Show Metric Palette** button to display the metric palette for Oracle Enterprise Scheduler.

2. You can change the duration for which performance data display.
3. Optionally, you can change the display format of performance data on the page. Choose **View > Grid** to remove the grid display format from the charts. Click the **Table View** link to display the performance data in table format.
4. You can overlay an additional scheduler service over the current service performance metrics.
  - a. Choose **Overlay > Another Scheduler Service**.  
In the Search and Select: Targets window, enter the name of the target and host server and click **Go** to search for the relevant service.
  - b. From the search results table, select the relevant service and click **Select** to choose the scheduler service to overlay.
5. Additionally, you can take any of the following actions.
  - Save the chart set, as described in [Section 12.4.2.5.1](#).
  - Reorder the chart set, as described in [Section 12.4.2.5.3](#).
  - Revert to an old chart set, as described in [Section 12.4.2.5.4](#).
  - Delete a chart set, as described in [Section 12.4.2.5.2](#).

### 12.4.2.2 Viewing Current Oracle Enterprise Scheduler Activity

The Oracle Enterprise Scheduler Current Activity page displays pending and running requests by user and application.

To view current Oracle Enterprise Scheduler activity:

1. From the **Scheduling Service** menu, choose **Performance > Current Activity**.
2. You can view pending and running requests by user or application, or workload by work assignment.

To view pending and running requests by user, choose **View > Requests By User**.

To view pending and running requests by application, choose **View > Requests By Application**.

To view workloads by work assignment, choose **View > Workload By Work Assignment**. For more information about work assignment details, see the "Creating or Editing a Work Assignment" section in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

### 12.4.2.3 Viewing Historical Oracle Enterprise Scheduler Reports

The Oracle Enterprise Scheduler Historical Reports page displays completed job requests by user, application and work assignment.

To view historical Oracle Enterprise Scheduler reports:

1. From the **Scheduling Service** menu, choose **Performance > Historical Reports**.
2. From the **View** list, choose one of the following report views:
  - Completed Request Statistics By Job Name
  - Completed Request Statistics By User
  - Request Metrics By Work Assignment
  - Completed Request Statistics
3. Adjust the filter criteria as required. The filter criteria vary depending on the report view you choose.

**Table 12–2 Completed Request Statistics by Job Name**

Filter Criterion	What to Do...
Application	From the list, choose the application whose statistics you want to view.
Minimum Run Time	Enter the shortest run time period for jobs whose statistics you want to view. Use the text field to enter a number, and select a unit of time from the list: <b>Seconds, Minutes, Hours</b> or <b>Days</b> .
Completed between	Use the calendar icons on either side of the text fields to select a start and end date and time.

**Table 12–3 Completed Request Statistics by User**

Filter Criterion	What to Do...
Application	From the list, choose the application whose statistics you want to view.
Minimum Total Run Time	Enter the shortest total time period for jobs whose statistics you want to view. Use the text field to enter a number, and select a unit of time from the list: <b>Seconds, Minutes, Hours</b> or <b>Days</b> .
Completed between	Use the calendar icons on either side of the text fields to select a start and end date and time.

**Table 12–4 Request Metrics By Work Assignment**

Filter Criterion	What to Do...
Application	From the list, choose the application whose statistics you want to view.
Completed after	Use the calendar icon to choose the date and time after which the work assignment has completed.

**Table 12–5 Completed Request Statistics**

Filter Criterion	What to Do...
Application	From the list, choose the application whose statistics you want to view.
Completed between	Use the calendar icons on either side of the text fields to choose a start and end date and time.

4. Click **Go** to search for and display the historical data.

#### 12.4.2.4 Viewing Oracle Enterprise Scheduler Metrics

You can view performance metrics for specific components of Oracle Enterprise Scheduler. Each set of metrics displays performance data that is relevant to the component.



To view Oracle Enterprise Scheduler performance metrics:

1. From the Scheduling Service menu, choose **Performance > Service Summary**.
2. Click **Key Performance Indicators**.
3. Click **Show Metric Palette** and select the metrics you want to display for each component.

#### 12.4.2.5 Managing Chart Sets

You can save or delete the chart set displayed in the Oracle Enterprise Scheduler Performance Summary page. You can also re-organize the order of a chart and revert to an old chart set.

This section contains the following topics:

- [Section 12.4.2.5.1, "Saving a Chart Set"](#)
- [Section 12.4.2.5.2, "Deleting a Chart Set"](#)
- [Section 12.4.2.5.3, "Reordering Charts"](#)
- [Section 12.4.2.5.4, "Reverting to an Old Chart Set"](#)

**12.4.2.5.1 Saving a Chart Set** You can save the chart set displayed in the Oracle Enterprise Scheduler Performance Summary page. Saving a chart set allows preserving a specific set of metrics selected for display, as opposed to the default metrics.

To save a chart set:

1. Display the Oracle Enterprise Scheduler Performance Summary page.
2. Choose **View > Save Chart Set**.
3. In the Save Chart Set dialog box, enter a name for the chart set and click **OK**.
4. When you have saved the chart set, you can display it by choosing **Chart Set > My Chart Set**.

**12.4.2.5.2 Deleting a Chart Set** You can delete saved chart set files created in the Oracle Enterprise Scheduler Performance Summary page.

To delete a chart set:

1. Display the Oracle Enterprise Scheduler Performance Summary page.
2. Choose **View > Delete Chart Sets**.
3. In the Delete Chart Sets dialog box, select the name of the chart set to be deleted and click **OK**.

**12.4.2.5.3 Reordering Charts** You can organize the display of performance charts in the Oracle Enterprise Scheduler Performance Summary page. Charts can be moved up or down, or removed entirely.

To reorder chart sets:

1. Display the Oracle Enterprise Scheduler Performance Summary page.
2. Choose **View > Reorder Charts**.
3. In the Reorder Charts popup window, select the chart you want to move and click **Move Up** or **Move Down**, respectively.

To delete a chart from the Performance Summary page, select the chart and click **Delete**.

4. Click **OK**.

**12.4.2.5.4 Reverting to an Old Chart Set** If you have re-organized your chart sets, you can revert to the chart set as you had originally saved it.

To revert chart sets:

1. Display the Oracle Enterprise Scheduler Performance Summary page.
2. From the **Chart Set** list, choose the chart you want to revert to its original display.
3. Choose **View > Revert Chart Set**.

#### **12.4.2.6 Selecting the Performance Time Period**

In the Oracle Enterprise Scheduler Performance Summary page, you can change the time period for which the performance summary displays.

To select the performance time period:

1. Display the Oracle Enterprise Scheduler Performance Summary page.
2. Change the duration for which job requests display.
  - **All**: Click to display all job requests within a specified, finite period.
  - **2 hours**: Click to display all job requests within the past two hours.
  - **15 minutes**: Click to display all job requests within the past fifteen minutes.
  - **Slider**: Click to display a slider that enables scrolling horizontally to show job requests from a specified period. The slider defaults to whichever time segment is selected, all, 2 hours, or 15 minutes.
  - **Calendar**: Click the calendar icon to select a time period for which you want to display job requests.

### **12.4.3 Monitoring Oracle Identity Manager Performance Metrics**

To monitor performance metrics for Oracle Identity Manager with Fusion Applications Control:

1. From the navigation pane, expand **Identity and Access** and **OIM**.
2. Select the Oracle Identity Management server.
3. From the Oracle Identity Management home page, view the overall metrics.
4. From the **Oracle Identity Manager** menu, choose **Performance Summary** to view detailed performance metrics.

The Performance Summary page displays. For more information about using this page, see [Section 2.5.7](#).

### **12.4.4 Locating Key Performance Metrics for Specific Components**

For each component in the Oracle Fusion Applications environment, there are performance metrics. This section helps you locate the key performance metrics related to software monitoring and configuration.

This section contains the following topics:

- [Section 12.4.4.1, "Monitoring Key Performance Metrics for Oracle WebLogic Server"](#)
- [Section 12.4.4.2, "Monitoring Key Performance Metrics for Oracle SOA Suite"](#)
- [Section 12.4.4.3, "Monitoring Key Performance Metrics for Oracle Enterprise Scheduler"](#)

### 12.4.4.1 Monitoring Key Performance Metrics for Oracle WebLogic Server

Use [Table 12–6](#) to locate the key performance metrics for Oracle WebLogic Server.

**Table 12–6 Oracle WebLogic Server Key Performance Metrics**

Category	Metric Name	Location in Fusion Applications Control
JMS	Messages Pending Messages Received	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>Performance Summary</b>.</li> <li>4. From the Performance Summary page, click <b>Show Metric Palette</b>.</li> <li>5. From the Metric Palette, expand the <b>JMS Server Metrics</b> folder.</li> <li>6. Select the metrics to view the charts.</li> </ol>
JDBC	Available Connections Connection Leaks (per minute) Connection Pool Size Connection Requests (per minute) Connections Requests Waiting Connections in Use	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>Performance Summary</b>.</li> <li>4. From the Performance Summary page, click <b>Show Metric Palette</b>.</li> <li>5. From the Metric Palette, expand the <b>Datasource Metrics</b> folder.</li> <li>6. Select the metrics view the charts.</li> </ol>
JVM Memory	Heap Usage (MB) Non Heap Usage (MB)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>JVM Performance</b>.</li> <li>4. In the <b>Memory</b> section, view the charts.</li> </ol>
JVM Garbage Collections	Collections (per minute)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>JVM Performance</b>.</li> <li>4. In the <b>Memory</b> section, view the <b>Collections (per minute)</b> in the <b>Garbage Collectors</b> table.</li> </ol>

**Table 12–6 (Cont.) Oracle WebLogic Server Key Performance Metrics**

Category	Metric Name	Location in Fusion Applications Control
	Heap Usage (%)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>Performance Summary</b>.</li> <li>4. From the Performance Summary page, click <b>Show Metric Palette</b>.</li> <li>5. From the Metric Palette, expand the <b>JVM Metrics</b> folder.</li> <li>6. Select the metric to view the chart.</li> </ol>
Oracle WebLogic Server	CPU Usage (%) Active Threads	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>Performance Summary</b>.</li> <li>4. From the Performance Summary page, click <b>Show Metric Palette</b>.</li> <li>5. From the Metric Palette, expand the <b>JVM Metrics</b> folder.</li> <li>6. Select the metric to view the chart.</li> </ol>
	Deadlocked Threads	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>Performance Summary</b>.</li> <li>4. From the Performance Summary page, click <b>Show Metric Palette</b>.</li> <li>5. From the Metric Palette, expand the <b>JVM Threads</b> folder.</li> <li>6. Select the metric to view the chart.</li> </ol>
	Threads	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>JVM Performance</b>.</li> <li>4. View the thread metrics in the <b>Threads</b> section.</li> </ol>
Server Work Manager	Work Manager Pending Requests Work Manager Requests (per minute) Work Manager Stuck Threads	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand the farm, then <b>WebLogic Domain</b>, and then the domain.</li> <li>2. Expand the Managed Server. The Managed Server home page displays.</li> <li>3. From the <b>WebLogic Server</b> menu, choose <b>Performance Summary</b>.</li> <li>4. From the Performance Summary page, click <b>Show Metric Palette</b>.</li> <li>5. From the Metric Palette, expand the <b>Work Manager</b> folder.</li> <li>6. Select the metrics to view the charts.</li> </ol>

### 12.4.4.2 Monitoring Key Performance Metrics for Oracle SOA Suite

Use [Table 12-7](#) to locate the key performance metrics for Oracle SOA Suite.

**Table 12-7 Oracle SOA Suite Key Performance Metrics**

Metric Name	Location in Fusion Applications Control
Audit Trail Threshold (for BPEL)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. From the <b>SOA Infrastructure</b> menu, choose <b>SOA Administration &gt; BPEL Properties</b>.</li> <li>3. From the BPEL Service Engine Properties page, view the <b>Audit Trail Threshold</b>.</li> </ol> <p>From the BPEL Service Engine Properties page, adjust the <b>Audit Trail Threshold</b> to bolster BPEL engine performance and avoid performance overheads of capturing audit information. From the <b>Audit Level</b> list, you can also level of information collected by the instance tracking infrastructure.</p>
Composite-level rate metrics	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. Expand the partitions.</li> <li>3. Select a specific <b>SOA</b> composite application.</li> <li>4. From the <b>SOA Composite</b> menu, choose <b>Monitoring &gt; Performance Summary</b>.</li> <li>5. From the BPEL Service Engine Properties page, view the <b>Audit Trail Threshold</b>.</li> </ol>
Dispatcher System Threads Dispatcher Invoke Threads Dispatcher Engine Threads (for BPEL)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. From the <b>SOA Infrastructure</b> menu, choose <b>SOA Administration &gt; BPEL Properties</b>.</li> <li>3. From the BPEL Service Engine Properties page, view the settings for <b>Dispatcher System Threads</b>, <b>Dispatcher Invoke Threads</b>, and <b>Dispatcher Engine Threads</b>.</li> </ol> <p>Adjust these thresholds when the response-time is high.</p> <p>Tune the thread configuration to either increase or decrease the number depending upon the BPEL engine processing requirement.</p>
Average Request Processing Time (synchronous requests) Average Request processing time (asynchronous requests)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. From the <b>SOA Infrastructure</b> menu, choose <b>Monitoring &gt; Request Processing</b>.</li> <li>3. From the Request Processing page, in the <b>Service Engines</b> and <b>Service Infrastructure</b> sections, view the <b>Average Request Processing Time - Synchronous Requests</b> and the <b>Average Request Processing Time - Asynchronous Requests</b> columns.</li> </ol>

**Table 12–7 (Cont.) Oracle SOA Suite Key Performance Metrics**

Metric Name	Location in Fusion Applications Control
Audit trail	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. Expand the partitions.</li> <li>3. Select a specific SOA composite application.</li> <li>4. In the Oracle SOA Composite page, in the <b>Recent Instances</b> section, select an instance.</li> <li>5. In the Flow Trace window, select a component instance in the <b>Trace</b> section. The audit trail for the instance displays.</li> </ol>
State (for a BPEL instance)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. Expand the partitions.</li> <li>3. Select a specific SOA composite application.</li> <li>4. In the Oracle SOA Composite page, in the <b>Component Metrics</b> section, select a BPEL instance.</li> <li>5. In the BPEL Component page, in the <b>Recent Instances</b> table, view the <b>State</b> column.</li> </ol>
State (for an Oracle Mediator instance)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>SOA</b> and then <b>soa-infra</b>.</li> <li>2. Expand the partitions.</li> <li>3. Select a specific SOA composite application.</li> <li>4. In the Oracle SOA Composite page, in the <b>Component Metrics</b> section, select an Oracle Mediator instance.</li> <li>5. In the Mediator Component page, in the <b>Recent Instances</b> table, view the <b>State</b> column.</li> </ol>

### 12.4.4.3 Monitoring Key Performance Metrics for Oracle Enterprise Scheduler

Use [Table 12–8](#) to locate the key performance metrics for Oracle Enterprise Scheduler.

**Table 12–8 Oracle Enterprise Scheduler Key Performance Metrics**

Metric Name	Location in Fusion Applications Control
Number of active processor threads for each instance	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>Scheduling Services</b>.</li> <li>2. Select the Oracle Enterprise Scheduler component.</li> <li>3. From the <b>Scheduling Service</b> menu, choose <b>Performance &gt; Current Activity</b>.</li> <li>4. From the <b>View</b> list, choose <b>Workload by Work Assignment</b>.</li> <li>5. In the <b>work assignments with active workshift</b> report, view the <b>Thread Allocation</b> columns.</li> </ol>
Processing Time (for jobs)	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>Scheduling Services</b>.</li> </ol>
Wait Time	<ol style="list-style-type: none"> <li>2. Select the Oracle Enterprise Scheduler component.</li> <li>3. From the <b>Scheduling Service</b> menu, choose <b>Performance &gt; Historical Reports</b>.</li> <li>4. In the Historical Reports page, from the <b>View</b> list, choose <b>Request Metrics By Work Assignment</b>.</li> <li>5. In the <b>Results</b> section, view the <b>Wait Time</b> and <b>Processing Time</b> columns.</li> </ol>
Job running time	<ol style="list-style-type: none"> <li>1. From the navigation pane, expand <b>Scheduling Services</b>.</li> <li>2. Select the Oracle Enterprise Scheduler component.</li> <li>3. From the Scheduling Service home page, in the <b>Top 10 Long Running Request</b> tab, select a job.</li> <li>4. In the Request Detail page, under <b>Execution Trail</b>, view the <b>Run Time</b> metric.</li> </ol>

## 12.5 Performing Proactive Performance Monitoring with Cloud Control

Managing applications and the underlying middleware technology can be difficult and IT organizations often have to rely on a variety of specialized tools. This can lead to inefficiency and may introduce complexities and risks.

Cloud Control enables you to discover middleware targets. To access these pages, see the following topic:

- [Section 12.5.1, "Monitoring Middle Tier Targets"](#)

In addition to drilling down to specific targets for performance metrics, Oracle recommends the following best practices:

- [Section 12.5.2, "Creating Monitoring Templates"](#)
- [Section 12.5.3, "Creating Blackouts"](#)
- [Section 12.5.4, "Setting Up Notifications"](#)

### 12.5.1 Monitoring Middle Tier Targets

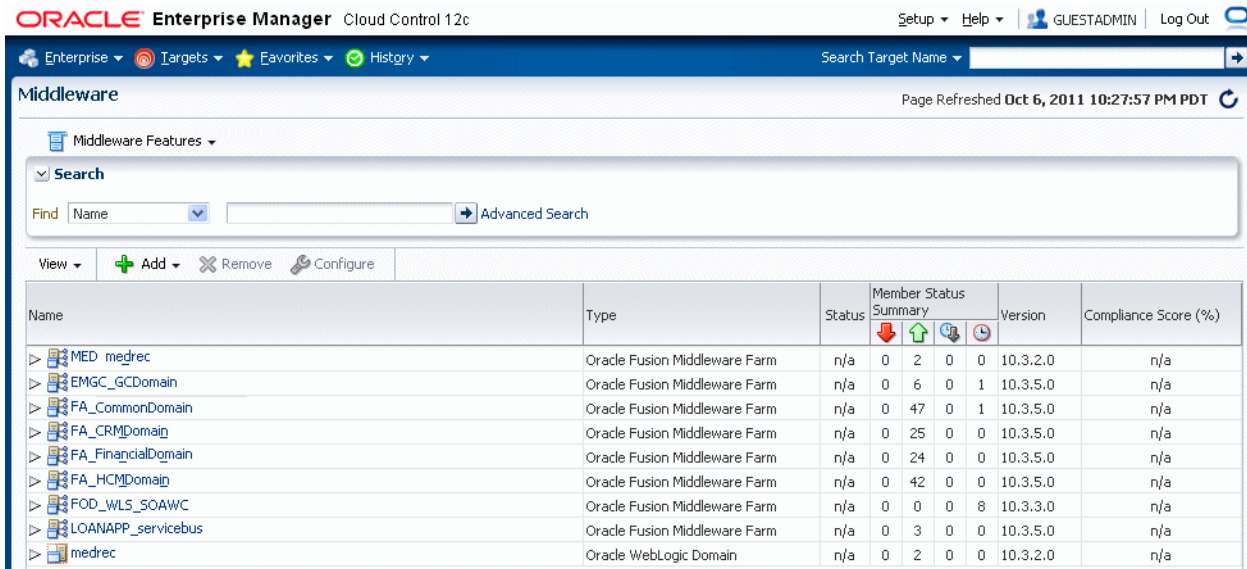
After you have added a middle tier target through discovery, you can view general information about the targets, including their status and availability on the **Middleware** page. You can select a specific type of target, such as Oracle WebLogic Server domain, to narrow the view. You then can drill down into each target to get further details like how the target is performing, where it is deployed, the version, location of its home directory, and so on.

You can also view the number of critical, warning, and error alerts generated for the past 24 hours. These alerts indicate that a particular metric condition has been encountered. For example, an alert is triggered when a metric threshold is reached. Using these details, you can drill down to investigate the target and the problem that triggered the alert.

You can also use Cloud Control to monitor performance metrics as a current real time value (30 seconds, 1 minute, or 5 minutes) or a previous value (past 24 hours, 7 days, or 31 days). The historical information is displayed as graphs and a table. By using graphs, you can easily watch for trends, and by using tables, you can examine details of past metric severity history.

[Figure 12–1](#) shows the **Middleware** page for Oracle WebLogic Server domains in the Oracle Fusion Applications environment.

Figure 12–1 Middleware Target Home Page of Cloud Control



To access the Middleware target home page in Cloud Control:

1. From the **Targets** menu, choose **Middleware**.
2. From the **Search** area, click **Advanced Search**.
3. From the **Type** list, choose a specific target type to monitor, and then click **Search**.  
In Figure 12–1, the target selected is **Oracle WebLogic Domain**.

For more information about discovering and monitoring middleware targets, see the chapters in the "Managing Oracle Fusion Middleware" part in the *Oracle Enterprise Manager Getting with Fusion Middleware Management*.

## 12.5.2 Creating Monitoring Templates

Monitoring templates simplify the task of setting up monitoring for large numbers of targets by allowing you to specify the monitoring and policy settings once and applying them as often as needed. You can save, edit, and apply these templates across one or more targets or groups. A monitoring template is specified for a particular target type and can only be applied to targets of the same type. For example, you can configure a monitoring template for Oracle WebLogic Server domains.

To create a monitoring template from Cloud Control:

1. From the **Enterprise** menu, choose **Monitoring > Monitoring Templates** to access the Monitoring Templates main page.
2. Modify a pre-built monitoring template, or create a new template without any data from another template:

To modify a pre-build monitoring template:

- a. In the **Template Name** field, enter `Fusion Apps` or `FMW`.
- b. Click option **Display Oracle provided templates and Oracle Certified templates**.
- c. Click **Go**.
- d. From the table, select the template, and click **Edit**.



To create a new template, click **Create**.

3. Fill out the tabs accordingly.

In the **Metric Threshold** tab, select the metrics to add to the template. Use the following tables in the *Oracle Fusion Applications Performance and Tuning Guide* for tips on recommended metrics to add to the template:

- Host Metrics
- Oracle Enterprise Scheduler Metrics
- Oracle HTTP Metrics
- Oracle Identity Manager Metrics
- Oracle Internet Directory Metrics
- Oracle SOA Composite Metrics
- Oracle SOA Infrastructure Metrics
- Oracle WebLogic Server Metrics

### 12.5.3 Creating Blackouts

Blackouts allow you to suspend collection of metrics on a target when performing scheduled maintenance on the target. Blacking out a target suspends monitoring on the target for the duration of the blackout. Blackouts are named entities that mainly consist of a list of targets that participate in the blackout and the schedule that defines when the blackout is in effect. Blackouts may be defined on a single target or on aggregate targets such as groups, hosts, systems, or web applications.

To create a blackout from Cloud Control:

1. From the **Enterprise** menu, choose **Monitoring** > **Blackouts** to access the Blackouts main page.
2. From the table, click **Create**.

Cloud Control displays a wizard page to guide you through the steps required to create a blackout. Click **Help** from any wizard page for more information on specific steps.

### 12.5.4 Setting Up Notifications

You can associate corrective actions with metrics whose alerts trigger them.

To register corrective actions for these notifications from Cloud Control. From the **Setup** menu, choose **Notifications** > **Notification Methods** access the Notifications Methods page.

See the "Notifications" chapter in the *Oracle Enterprise Manager Cloud Control Administrator's Guide* to complete the configuration.

## 12.6 Tuning Middle Tiers for Oracle Fusion Applications

One of the most challenging aspects of performance tuning is knowing where to begin. Start with the following documentation resources:

- *Oracle Fusion Applications Performance and Tuning Guide*
- *Oracle Fusion Middleware Fusion Developer's Guide for Oracle Application Development Framework*

- "Managing Log Files and Diagnostic Data" in the *Oracle Fusion Middleware Administrator's Guide*

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# Diagnosing the Oracle Fusion Applications Middle Tier Performance

This chapter describes how to diagnose Java applications in the middle tier using Oracle Enterprise Manager Cloud Control (Cloud Control):

This chapter includes the following topics:

- Section 13.1, "Introduction to Java Diagnostics in the Middle Tier"
- Section 13.2, "Diagnosing the Oracle Fusion Applications Middle Tier"
- Section 13.3, "Working with Class Histograms"
- Section 13.4, "Deploying/Upgrading Bulk Diagnostics Agents"
- Section 13.5, "Upgrading/Redeploying ADP and JVM D Engines"
- Section 13.6, "Working with Pool Threshold Violations"

## 13.1 Introduction to Java Diagnostics in the Middle Tier

Mission critical Java applications often suffer from availability and performance problems. Developers and IT administrators spend a lot of time diagnosing the root cause of these problems. Many times, the problems occurring in production environments either cannot be reproduced or may take too long to reproduce in other environments. This can cause severe impact on the business.

Oracle Enterprise Manager Cloud Control (Cloud Control) enables you to diagnose performance problems in Java applications in the production environment. By eliminating the need to reproduce problems, it reduces the time required to resolve these problems. This improves application availability and performance. Using Java Virtual Machine (JVM) diagnostics, you can identify the root cause of performance problems in the production environment without having to reproduce them in the test or development environment. It does not require complex instrumentation or restarting of the application to get in-depth application details. Application administrators will be able to identify Java problems or Database issues that are causing application downtime without any detailed application knowledge.

To configure your environment for **JVM** Diagnostics, see the "Using JVM Diagnostics" chapter in the *Oracle Enterprise Manager Getting Started with Fusion Middleware Management*.

## 13.2 Diagnosing the Oracle Fusion Applications Middle Tier

This section describes how to diagnose Java applications in the middle tier using Cloud Control:

- [Section 13.2.1, "Viewing JVM Pool Summary Information on a Domain"](#)
- [Section 13.2.2, "Viewing JVM Summary Information on a Managed Server"](#)
- [Section 13.2.3, "Viewing JVM Pool Summary Information on a JVM"](#)
- [Section 13.2.4, "Finding the Top Java Methods"](#)
- [Section 13.2.5, "Finding the Top SQL Queries"](#)
- [Section 13.2.6, "Analyzing Live Stuck Threads"](#)
- [Section 13.2.7, "Analyzing Stuck Threads from Specific Time Periods"](#)
- [Section 13.2.8, "Drilling Down from JVM Diagnostics to SQL Instances"](#)
- [Section 13.2.9, "Analyzing Potential Memory Leaks"](#)

### 13.2.1 Viewing JVM Pool Summary Information on a Domain

To get started with monitoring **Java Virtual Machine (JVM)** Pool on a Domain using Cloud Control:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select **Oracle WebLogic Domain** and deselect the other options.
  - c. Click **Search**.
3. Select a domain which has the JVM Diagnostics Agent deployed on it:
  - a. From the Target Navigation area, select Java Virtual Machine Pools and expand it.

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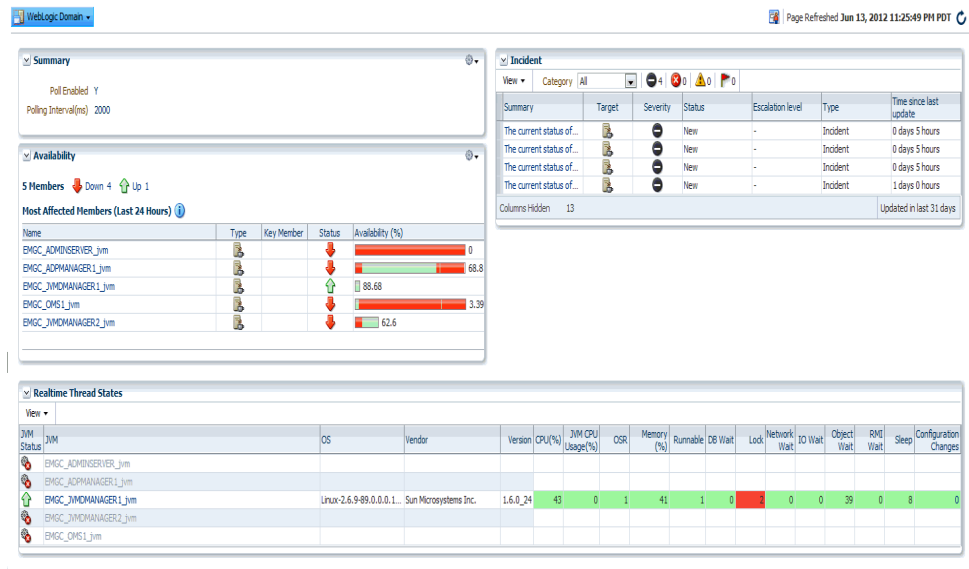
**Note:** All the WebLogic Domains that have a JVM Diagnostics Agent deployed on it appear under this folder.

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4. From the **WebLogic Domain**, choose **Diagnostics > Java Virtual Machine Pool Home**.

The JVM Pool Home page displays.

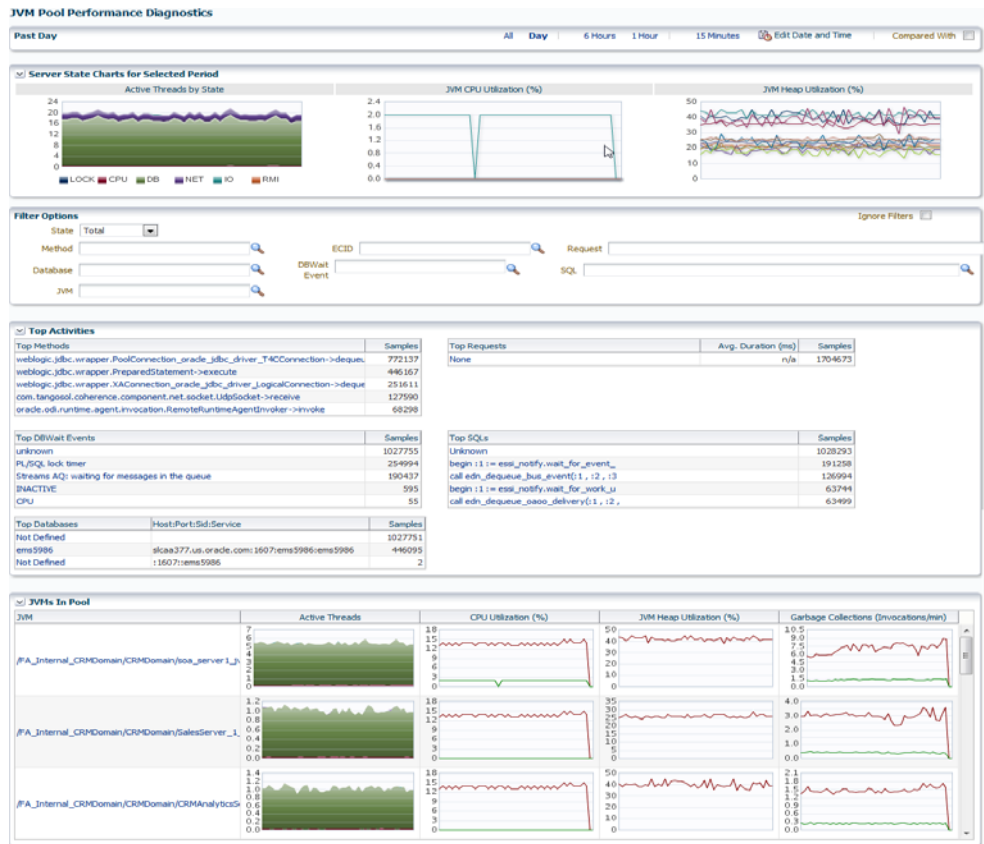


5. Take note of the following:

- In the **Summary** section, Poll indicates if polling of that domain has been enabled. Polling Interval denotes the time interval (in milli seconds) at which the domain is polled.
- In the **Availability** section, the JVMs in that pool are listed along with their availability status.
- In the **Realtime Thread States** section, view the overall state of the threads including locks.
- In the Incident section, the servers in the domain whose target status is Down are listed. The incidents will be automatically cleared when the underlying issues are resolved.
- a. From the **WebLogic Domain** menu, choose **Diagnostics > JVM Performance Diagnostics**.

The JVM Pool Performance Diagnostics page displays. This page provides information for the pool of JVMs in the domain for the selected time period. You can also modify the time period using Edit Date and Time option at the top of the page.

The following figure shows the JVM Pool Performance Diagnostics page for the domain:



**b. View the various charts:**

**Server State Charts For Selected Period section**

This section displays the Active Threads, CPU Utilization, and Heap Utilization of IO, CPU, lock, and network resources during the selected time. The number of Java threads (daemon and non-daemon) that are currently running in the virtual machine for this Oracle WebLogic Domain:

**Active Threads by State:** This chart displays the number of Java threads that are currently running in the domain or server. It is color-coded by thread state.

**JVM CPU Utilization (%):** This chart shows the CPU utilization across the JVMs in the pool.

**JVM Heap Utilization (%):** This chart shows the heap utilization across the JVMs in the pool.

**Filter Options section**

This section displays various options by which you can filter the JVMs in the pool.

<b>Top Activities</b> section	<p>This section displays the top activities in the pool:</p> <p><b>Top Methods:</b> This chart shows the most expensive Java methods in the selected time period.</p> <p><b>Top Requests:</b> This chart shows the top page requests in the selected time period.</p> <p><b>Top DBWait Events:</b> This chart shows the cross-tier correlation with the database.</p> <p><b>Top SQLs:</b> This chart displays the list of SQL calls ordered by their cost (the number of samples).</p> <p><b>Top Databases:</b> This chart shows the top impacted databases by the JVMs in this pool.</p>
<b>JVMs In Pool</b> section	<p>This section displays the Active Threads, CPU Utilization, and JVM Heap Utilization of IO, CPU, lock, and network resources during the selected time.</p> <p><b>Active Threads:</b> This chart displays the number of active Java threads that are currently running in the domain. It is color-coded by thread state.</p> <p><b>CPU Utilization (%):</b> This chart shows the CPU utilization across the JVMs in the pool.</p> <p><b>JVM Heap Utilization (%):</b> This chart shows the heap utilization across the JVMs in the pool.</p> <p><b>Garbage Collections (Invocations/min):</b> This chart shows the number of times the JVM garbage collector was invoked in the time period. It includes both major and minor garbage collections.</p>

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**Note:** The **Compared with** feature enables you to compare the diagnostics across two specified periods of time.

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## 13.2.2 Viewing JVM Summary Information on a Managed Server

To get started with monitoring Java Virtual Machine (JVM) on a [Managed Server](#) within a domain using Cloud Control:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select **Oracle WebLogic Domain** and deselect the other options.
  - c. Click **Search**.
3. Select a domain which has the JVM Diagnostics Agent deployed on it:
  - a. From the Target Navigation area, select Java Virtual Machine Pools and expand it.

**Note:** All the WebLogic Domains and Servers that have JVM Diagnostics Agents deployed on them appear under this folder.

4. Expand the WebLogic Domain and select a Managed Server.
5. From the **WebLogic Server** menu, choose **Diagnostics > Java Virtual Machine Home**.

The JVM Home page displays.

The screenshot displays the Oracle WebLogic Server JVM Home page. The interface includes several sections:

- Summary:** Displays JVM Pool, Host, OS, JVM Vendor, JVM Version, Maximum JVM Heap Size, Minimum JVM Heap Size, JVM Agent Optimization Level, JVM Agent Log Level, and JVM Agent Build Number.
- Availability:** Shows a green bar indicating 100% availability.
- Host Affected Members (Last 24 Hours):** A table with columns for Name, Type, Key Member, Status, and Availability (%). It currently shows "No Members".
- Active Threads (Last 24 Hours):** A line graph showing thread activity over time, with a legend for LOCK, CPU, DB, NET, IO, and RMI.
- Realtime Thread States:** A table with columns for JVM Status, JVM, OS, Vendor, Version, CPU (%), JVM CPU Usage(%), OSR, Memory (%), Runnable, DB Wait, Lock, Network Wait, IO Wait, Object Wait, RMI Wait, Sleep, and Configuration Changes.

JVM Status	JVM	OS	Vendor	Version	CPU (%)	JVM CPU Usage(%)	OSR	Memory (%)	Runnable	DB Wait	Lock	Network Wait	IO Wait	Object Wait	RMI Wait	Sleep	Configuration Changes
🟢	/EMGC_EMGC_DOMAIN/EMGC_DOM...	Linux-2.6.32-100.28.5.el6.x86_64	Sun Microsystems Inc.	1.6.0_24	28	683	10	19	1	0	0	1	0	65	0	4	0

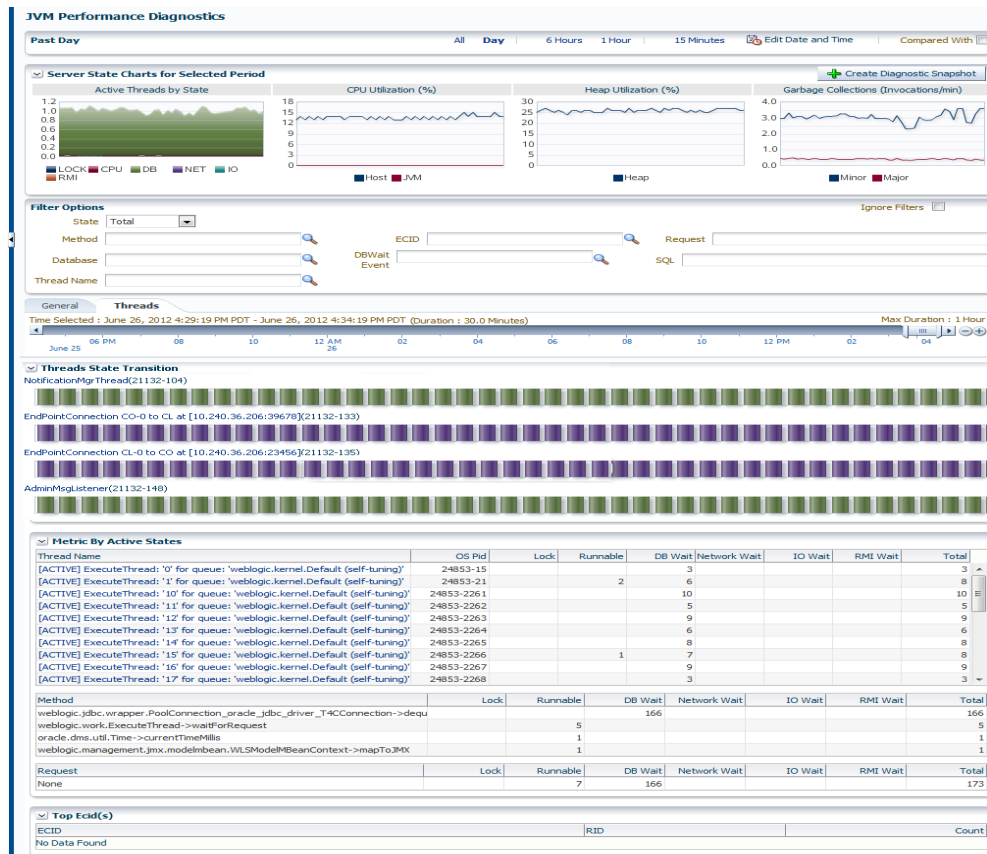
6. Take note of the following:
  - In the **Summary** section, the details of the JVM are displayed. The details contain the following information:
    - JVM Pool
    - Host machine
    - Operating System (OS) running on the host machine
    - JVM Vendor
    - JVM Version
    - Maximum JVM Heap Size
    - Minimum JVM Heap Size
    - JVM Agent Optimization Level
    - JVM Agent Log Level
    - JVM Agent Build Number
    - WebLogic Server.
  - In the **Availability** section, the availability status of the JVM is listed.
  - In the **Realtime Thread States** section, view the overall state of the threads including locks.



- In the **Incident** section, the JVM corresponding to the server whose target status is Down is listed. This incident will be automatically cleared when the underlying issue is resolved.
- In the **Active Threads (Last 24 Hours)** section, view a graph analyzing the active threads in the JVM in the last 24 hours.
- a. From the **WebLogic Server** menu, choose **Diagnostics > JVM Performance Diagnostics**.

The JVM Performance Diagnostics page displays. This page provides information for a single JVM for the selected time period. You can also modify the time period using Edit Date and Time option at the top of the page.

The following figure shows the JVM Performance Diagnostics page for a single JVM:



The **Thread Transition Graph** is displayed as ADF Bar Graph. By default, the data is shown for 30 minutes and the maximum time window is one hour.

b. View the various charts:

<b>Server State Charts For Selected Period</b> section	<p>This section displays the Active Threads, CPU Utilization, and Heap Utilization of IO, CPU, lock, and network resources during the selected time. The number of Java threads (daemon and non-daemon) that are currently running in the virtual machine for this Oracle WebLogic Server:</p> <p><b>Active Threads by State:</b> This chart displays the number of Java threads that are currently running in the server. It is color-coded by thread state.</p> <p><b>CPU Utilization (%):</b> This chart shows the CPU utilization for the JVM.</p> <p><b>Heap Utilization (%):</b> This chart shows the heap utilization for the JVM.</p> <p><b>Garbage Collections (Invocations/min):</b> This chart shows the number of times the JVM garbage collector was invoked in the time period. It includes both major and minor garbage collections.</p>
<b>Filter Options</b> section	<p>This section displays various options by which you can filter the JVM.</p>
<b>General tab</b>	<p>This tab displays data from the JVM:</p> <p><b>Active Threads by State:</b> This chart displays the number of Java threads that are currently running in server. It is color-coded by thread state.</p> <p><b>Top Requests:</b> This chart shows the top page requests in the selected time period.</p> <p><b>Top Methods:</b> This chart shows the top methods in the selected time period.</p> <p><b>Top SQLs:</b> This chart shows the top SQLs in the selected time period.</p> <p><b>Top DBWait Events:</b> This chart shows the top DB Wait Events in the selected time period.</p> <p><b>Top Databases:</b> This chart shows the top impacted databases by the JVMs in this pool.</p>
<b>Threads tab</b>	<p>This tab displays data from the JVM.</p> <p><b>Threads State Transition:</b> This chart shows how the threads have transitioned from one state to the other in the selected period. You can change the time interval and move it to a different time period by using the quick time selection control at the top of the page. You can hover over the colored bars to see the transition changes from one state to the other, for example from Runnable to Not Active or to Runnable. Click a bar graph in the State column to view a detailed analysis on the state of the thread. This feature allows you to analyze each sample (JVM snapshot at a specific time) in the monitored data.</p> <p><b>Metric By Active States:</b> This chart shows how long each of the threads have been in the various states.</p>

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**Note:** The **Compared with** feature enables you to compare the diagnostics across two specified periods of time.

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### 13.2.3 Viewing JVM Pool Summary Information on a JVM

To get started with monitoring a Java Virtual Machine (JVM) in a Pool using Cloud Control:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select **Oracle WebLogic Domain** and deselect the other options.
  - c. Click **Search**.
3. Select a domain which has the JVM Diagnostics Agent deployed on it:
  - a. From the **Target Navigation** area, select **Java Virtual Machine Pools** and expand it.

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**Note:** All the WebLogic Domains and Servers that have JVM Diagnostics Agents deployed on them appear under this folder.

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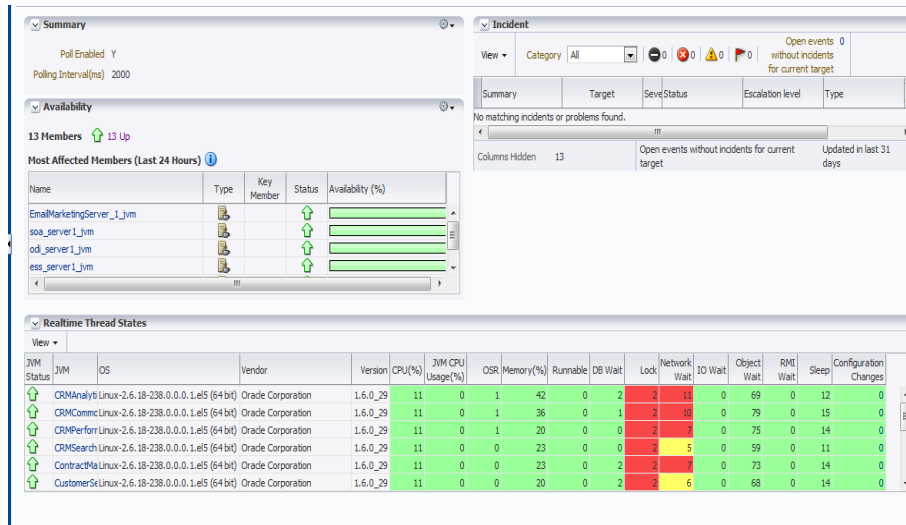
**Note:** The WebLogic Domain is suffixed with *\_jvmpool* and the WebLogic Servers are suffixed with *\_jvm*.

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- b. Select a WebLogic Domain or WebLogic Server under this folder.
4. When you select a WebLogic Domain, select **Java Virtual Machine Pool Home** from the **Java Virtual Machine Pool menu**.

The JVM Pool Summary page displays.



5. Take note of the following:

- In the **Summary** section, Poll indicates if polling of that JVM Pool has been enabled. Polling Interval denotes the time interval (in milli seconds) at which the JVM Pool is polled.
- In the **Availability** section, the availability status of all the JVMs is listed.
- In the **Realtime Thread States** section, view the overall state of the threads including locks.
- In the **Incident** section, the servers in the domain whose target status is Down are listed. The incidents will be automatically cleared when the underlying issues are resolved.
- a. From the **Java Virtual Machine Pool** menu, choose **JVM Performance Diagnostics**.

The JVM Pool Performance Diagnostics page displays. This page provides information about all the JVMs in the pool for the selected time period. You can also modify the time period using Edit Date and Time option at the top of the page.

The following figure shows the JVM Pool Performance Diagnostics page for the domain:



b. View the various charts:

**Server State Charts For Selected Period section**

This section displays the Active Threads, CPU Utilization, and Heap Utilization of IO, CPU, lock, and network resources during the selected time. The number of Java threads (daemon and non-daemon) that are currently running in the virtual machine for this Oracle WebLogic Domain:

**Active Threads by State:** This chart displays the number of Java threads that are currently running in the server. It is color-coded by thread state.

**CPU Utilization (%):** This chart shows the CPU utilization across the JVM.

**Heap Utilization (%):** This chart shows the heap utilization across the JVM.

**Garbage Collections (Invocations/min):** This chart shows the number of times the JVM garbage collector was invoked in the time period. It includes both major and minor garbage collections.

**Filter Options section**

This section displays various options by which you can filter the JVMs in the pool.

**Top Activities**  
section

This section displays the top activities in the pool:

**Top Methods:** This chart shows the most expensive Java methods in the selected time period.

**Top Requests:** This chart shows the top page requests in the selected time period.

**Top DBWait Events:** This chart shows the cross-tier correlation with the database.

**Top SQLs:** This chart displays the list of SQL calls ordered by their cost (the number of samples).

**Top Databases:** This chart shows the top impacted databases by the JVMs in this pool.

**JVMs In Pool**  
section

This section displays the Active Threads, CPU Utilization, and JVM Heap Utilization of IO, CPU, lock, and network resources during the selected time.

**Active Threads:** This chart displays the number of active Java threads that are currently running in the domain. It is color-coded by thread state.

**CPU Utilization (%):** This chart shows the CPU utilization across the JVMs in the pool.

**JVM Heap Utilization (%):** This chart shows the heap utilization across the JVMs in the pool.

**Garbage Collections (Invocations/min):** This chart shows the number of times the JVM garbage collector was invoked in the time period. It includes both major and minor garbage collections.

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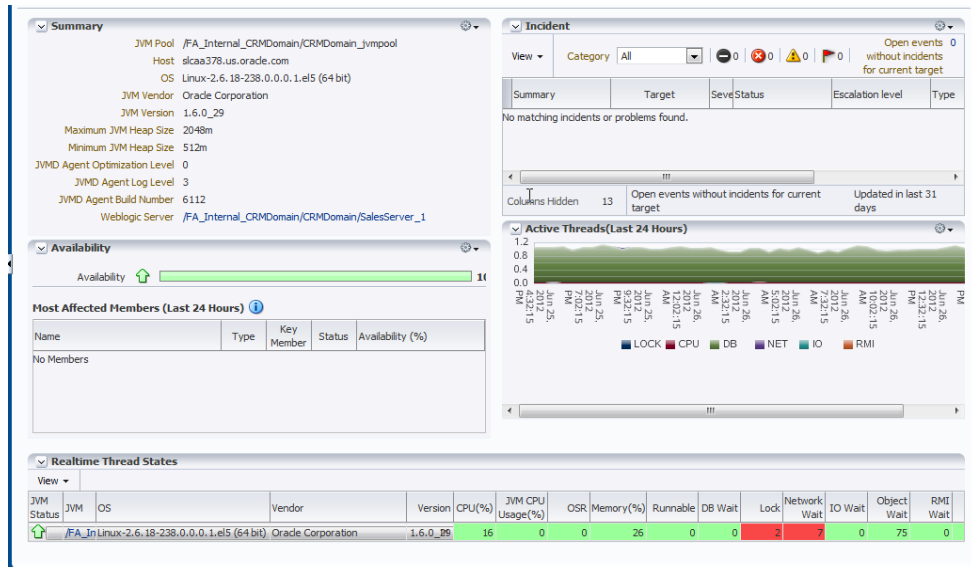
**Note:** The **Compared with** feature enables you to compare the diagnostics across two specified periods of time.

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6. When you select a WebLogic Server, select **Java Virtual Machine Home** from the **Java Virtual Machine** menu.

The JVM Summary page displays.

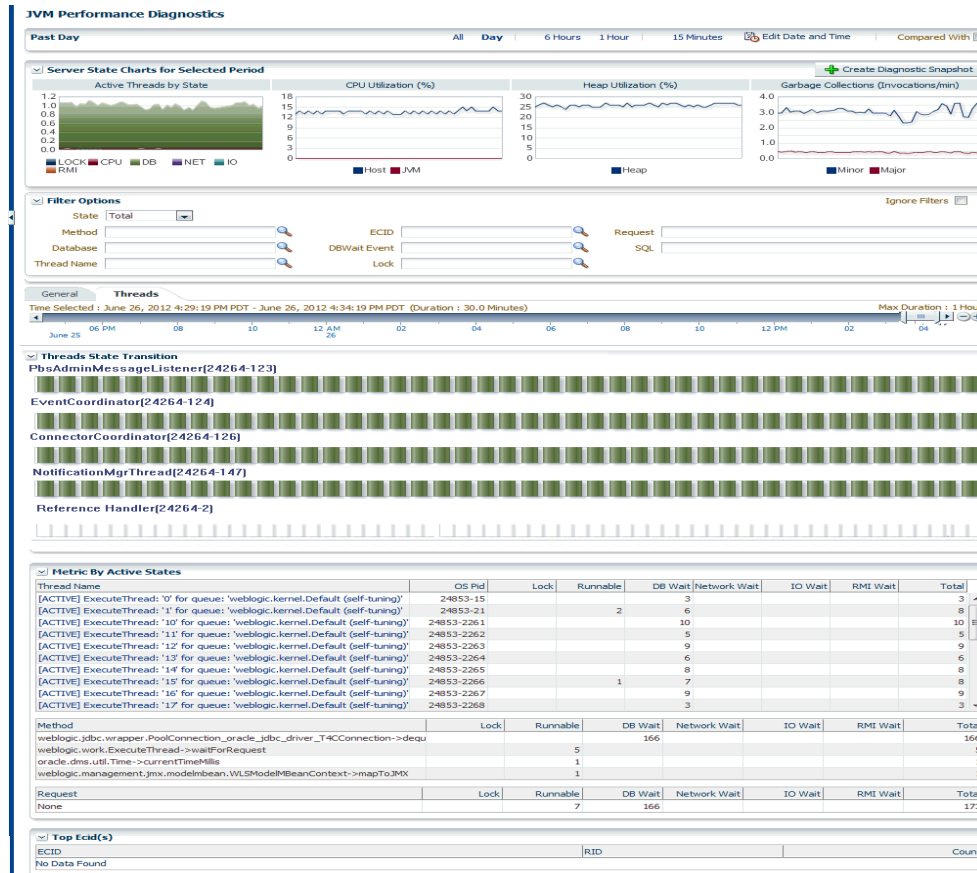


7. Take note of the following:

- a. From the **Java Virtual Machine** menu, choose **JVM Performance Diagnostics**.

The JVM Performance Diagnostics page displays. This page provides information for a single JVM for the selected time period. You can also modify the time period using Edit Date and Time option at the top of the page.

The following figure shows the JVM Performance Diagnostics page for the JVM:



The **Thread Transition Graph** is displayed as ADF Bar Graph. By default, the data is shown for 30 minutes and the maximum time window is one hour.

**b.** View the various charts:

**Server State Charts For Selected Period section**

This section displays the Active Threads, CPU Utilization, and Heap Utilization of IO, CPU, lock, and network resources during the selected time. The number of Java threads (daemon and non-daemon) that are currently running in the virtual machine for this Oracle WebLogic Server:

**Active Threads by State:** This chart displays the number of Java threads that are currently running in the server. It is color-coded by thread state.

**CPU Utilization (%):** This chart shows the CPU utilization for the JVM.

**Heap Utilization (%):** This chart shows the heap utilization for the JVM.

**Garbage Collections (Invocations/min):** This chart shows the number of times the JVM garbage collector was invoked in the time period. It includes both major and minor garbage collections.

**Filter Options section**

This section displays various options by which you can filter the JVM.



<b>General tab</b>	<p>This tab displays data from the JVM:</p> <p><b>Active Threads by State:</b> This chart displays the number of Java threads that are currently running in server. It is color-coded by thread state.</p> <p><b>Top Requests:</b> This chart shows the top page requests in the selected time period.</p>
<b>Threads tab</b>	<p>This tab displays data from the JVM:</p> <p><b>Threads State Transition:</b> This chart shows how the threads have transitioned from one state to the other in the selected period. You can change the time interval and move it to a different time period by using the quick time selection control at the top of the page. You can hover over the colored bars to see the transition changes from one state to the other, for example from Runnable to Not Active or to Runnable. Click a bar graph in the State column to view a detailed analysis on the state of the thread. This feature allows you to analyze each sample (JVM snapshot at a specific time) in the monitored data.</p> <p><b>Metric By Active States:</b> This chart shows how long each of the threads have been in the various states.</p>

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**Note:** The **Compared with** feature enables you to compare the diagnostics across two specified periods of time.

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### 13.2.4 Finding the Top Java Methods

If you have a slow-running application, locate the Java method causing the potential issue.

To find the top Java methods with Cloud Control:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Server domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select Oracle WebLogic Domain or **Oracle WebLogic Server**; deselect the other options.
  - c. Click **Search**.
3. Click a domain or one of its servers which has JVM Diagnostics agents deployed. For more information about installing JVM Diagnostics, see "Installing JVM Diagnostics" in *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.  
The WebLogic Server Domain Home page or WebLogic Server Home page displays.
4. From the **WebLogic Domain** menu or **WebLogic Server** menu, choose **Diagnostics > JVM Performance Diagnostics**.  
The JVM Pool Performance Diagnostics page displays for an Oracle WebLogic Domain and the JVM Performance Diagnostics page displays for a Managed Server.

5. In the **Top Methods** section, review the list of methods ordered by their cost (the number of samples).
6. In the **Top Methods** section, click a method to add it as a filter.
7. In the Method Stack Tree dialog, click the plus sign next to the method to investigate further.
8. The Method Stack Tree dialog displays with a call stack that you can traverse.
9. In the Method Stack Tree dialog, select the method, and then click **OK**.

The **Filter Options** section auto-fills the information on the method and the charts update to reflect that method, for example:

- Heavy use of IO, CPU, lock, and network resources (**Active Threads** chart)
  - Request causing it to be invoked (**Top Requests** chart)
  - SQL or database state it causes (**Top DBStates** and **Top SQLs** charts)
10. After you are done with viewing the method, in **Filter Options** section, clear out the **Method** text box filter and click anywhere to remove the filter.

### 13.2.5 Finding the Top SQL Queries

If you suspect a slow SQL query is causing a network requests or IO issue, find the slowest SQL queries.

To find the top SQL calls using JVM diagnostics with Cloud Control:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Server domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select Oracle WebLogic Domain or **Oracle WebLogic Server**; deselect the other options.
  - c. Click **Search**.
3. Click a domain or one of its servers which has JVM Diagnostics agents deployed. For more information about installing JVM Diagnostics, see "Installing JVM Diagnostics" in *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.  
The WebLogic Server Domain Home page or WebLogic Server Home page displays.
4. From the **WebLogic Domain** menu or **WebLogic Server** menu, choose **Diagnostics > JVM Performance Diagnostics**.  
The JVM Pool Performance Diagnostics page displays for an Oracle WebLogic Domain and the JVM Performance Diagnostics page displays for a Managed Server.
5. In the **Top SQLs** section, review the list of SQL calls ordered by their cost (the number of samples).
6. In the **Top SQLs** section, click a SQL call to view the charts for that call.  
The **Filter Options** section auto-fills the information on the method and the charts update to reflect that method. Adding the statement as a filter enables you to see everything related to that SQL call, for example:

- Methods that invoke it (**Top Methods** chart)
  - Request causing it to be invoked (**Top Requests** chart)
  - Database state it causes (**Top Databases** chart)
7. After you are done viewing the method, in **Filter Options** section, clear out the SQL field and click anywhere to remove the filter.

### 13.2.6 Analyzing Live Stuck Threads

If application users report a spinning status indication after clicking in the application, investigate the live stuck threads. Follow the procedure given below to find and analyze the live stuck threads.

To find and analyze the live stuck threads:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Server domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select **Oracle WebLogic Domain** or **Oracle WebLogic Server**; deselect the other options.
  - c. Click **Search**.
3. Click a domain or one of its servers which has JVM Diagnostics agents deployed. For more information about installing JVM Diagnostics, see "Installing JVM Diagnostics" in *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.  
The WebLogic Server Domain Home page or WebLogic Server Home page displays.
4. From the **WebLogic Domain** menu, choose **Diagnostics > Live Thread Analysis**.  
The Live Thread Analysis page displays.

**Live Thread Analysis**

**JVMs**

JVM	OS	Vendor	Version	CPU(%)	JVM CPU Usage(%)	OSR	Memory (%)	Runnable	DB Wait	Lock	Network Wait	IO Wait	RMI Wait	Object Wait	Sleep
CRMAU_CRHDomain/CRHDomain/CRHAnalyticsServer_1	Linux-2.6.32-302.23.1.el5 (64 bit)	Oracle Corporation	1.6.0_29	1	0	0	0	0	2	0	0	0	0	74	12

**JVM Threads : (CRMAU\_CRHDomain/CRHDomain/CRHAnalyticsServer\_1\_jvm)**

Thread Name	Request	OS Pid	Current Call	File Name	Line	State	Waiting On	Wait Request	Wait Time (sec)
Main Thread		21074-1	weblogic.t3.srvr.T3Srvr->waitForDeath	T3Srvr.java	981	Object			
Finalizer		21074-7	jdk.internal.misc.Finalizer->waitForFinalize	Native Method		Object			
Reference Handler		21074-8	java.lang.ref.Reference->waitForActivationQueue	Native Method		Object			
JFR request timer		21074-13	java.lang.Object->wait	Native Method		Object			
RMI TCP Accept-17020		21074-15	sun.rmi.transport.tcp.TCPEndpoint->accept	TCPEndpoint.java	369	Object			

**Thread Details : Main Thread (OS Pid : 21074-1)**

**Thread Info**

Current Call : weblogic.t3.srvr.T3Srvr->waitForDeath      State : Object Wait  
 Request :  
 ECID :      Waiting On :  
 Wait Request :

**Thread Stack**

Depth	Method	File Name	Line
0	java.lang.Object->wait	Native Method	
1	java.lang.Object->wait	Object.java	485
2	weblogic.t3.srvr.T3Srvr->waitForDeath	T3Srvr.java	981
3	weblogic.t3.srvr.T3Srvr->run	T3Srvr.java	490
4	weblogic.Server->main	Server.java	71

**Information**  
 Time spent in JVM for processing request: 47.176 msec

5. In the **JVMs** section, select a thread to display details in the **JVM Threads** section.
6. In the **JVM Threads** section, look for a thread having the prefix **[STUCK]** and click it.

- In the **Thread Info** and **Thread Stack** sections, look at the **Current Call**, **File Name**, **Line**, and **State** for the thread.

This information provides you with the key information on how to locate the code that is causing the problem:

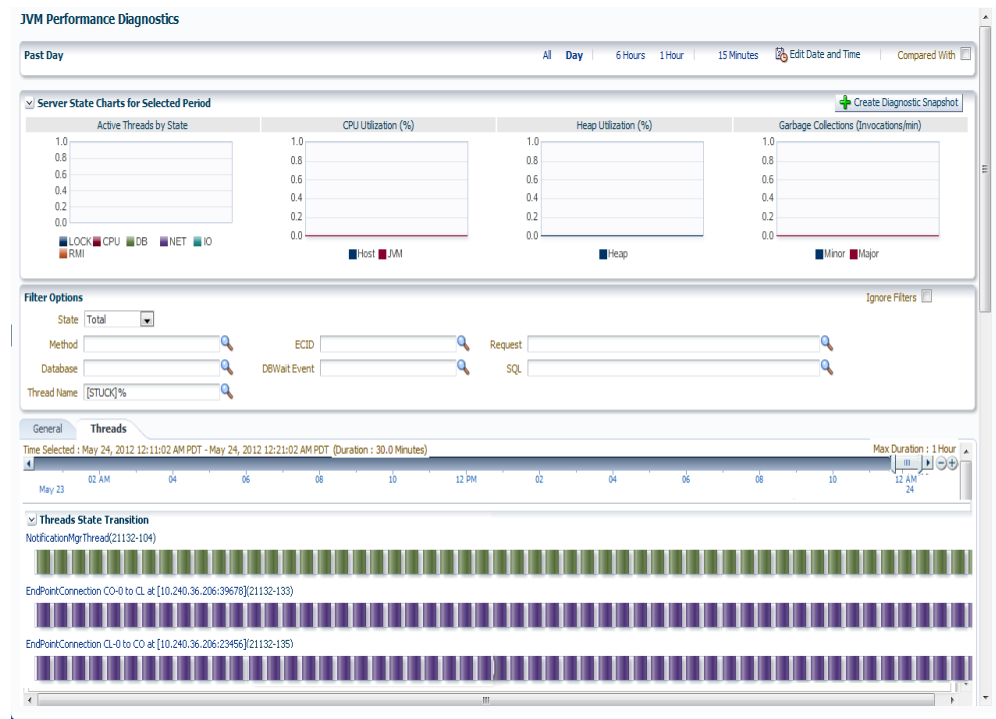
- **Current Call:** This field displays the name of the method call where the code is stuck.
  - **File Name:** This column identifies the file with the problem.
  - **Line:** This column identifies the line number in the file where the problematic code is.
  - **State:** This column displays the state of the thread (for example, CPU, IO, Network, DB Wait, Lock, and so on).
- Look for the **Lock Held** in the **Thread Info** section.
  - If the stuck thread is in the **DB Wait** state, then click the link and go directly to the database session to see what that thread is doing in the database, or use the technique described in [Section 13.2.8](#).

### 13.2.7 Analyzing Stuck Threads from Specific Time Periods

The procedure listed in this section allows you to find and analyze the stuck threads in the historical context.

To find the stuck threads in the historical context:

- In **Target Navigation** area, expand **Java Virtual Machine Pools > domain\_name\_jvmpool**.
- Select a Java Virtual Machine.
- From the **Java Virtual Machine** menu, choose **JVM Performance Diagnostics**.



- In the **Filter Options**, enter **[STUCK]%** in the **Thread Name** field.

5. In the **Threads** sub-tab, drag the pointer to select the timeline.

---

**Note:** Scroll left and right to select the appropriate date. After you select the date, select the required duration.

---

### 13.2.8 Drilling Down from JVM Diagnostics to SQL Instances

If you issue an SQL query and it does not return, then analyze the SQL statement.

To analyze SQL from Cloud Control:

1. From the **Targets** menu, choose **Targets > Middleware**.

The Middleware target home page displays.

2. Search for the Oracle WebLogic Server domains:

- a. From the **Search** area, click **Advanced Search**.

- b. From the **Type** list, select **Oracle WebLogic Domain** or **Oracle WebLogic Server**; deselect the other options.

- c. Click **Search**.

3. Click a domain or one of its servers which has JVM Diagnostics agents deployed. For more information about installing JVM Diagnostics, see "Installing JVM Diagnostics" in *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.

The WebLogic Server Domain Home page or WebLogic Server Home page displays.

4. From the **WebLogic Domain** menu or **WebLogic Server** menu, choose **Diagnostics > JVM Performance Diagnostics**.

The JVM Pool Performance Diagnostics page displays for an Oracle WebLogic Domain and the JVM Performance Diagnostics page displays for a Managed Server.

5. In the **Top SQLs** section, click a SQL call to view the charts for that call.

6. In **Filter Options** section, in the **SQL** field, copy the ID of the SQL call.

7. Click **Databases** in secondary navigator.

8. Select the relevant target database.

9. Click the **Performance** tab.

10. In the **Additional Instance Monitoring Links** section, click **Search SQL**.

11. Paste the ID of the SQL call into the relevant field with any other choices you may need and then click **Search**.

12. Analyze the SQL.

### 13.2.9 Analyzing Potential Memory Leaks

To find and analyze memory leaks, you can use Cloud Control to take and analyze snapshots of the heap.

Analyzing heap requires a large amount of free space in the Oracle Database tablespace being used. As a standard practice, ensure you have five times the size of heap dump file being loaded in the tablespace. Since you know the size of your dump

file, make sure that there is adequate space to accommodate the dump file before it is loaded into the database.

To use heap snapshot to analyze memory leaks:

- [Task 1, "Review Metrics for a Potential Memory Leak"](#)
- [Task 2, "Perform a Live Heap Analysis"](#)
- [Task 3, "Create a Heap Snapshot"](#)

### **Task 1 Review Metrics for a Potential Memory Leak**

To create a snapshot of the heap for later loading and examination for leaks:

1. From the **Targets** menu, choose **Targets > Middleware**.  
The Middleware target home page displays.
2. Search for the Oracle WebLogic Server domains:
  - a. From the **Search** area, click **Advanced Search**.
  - b. From the **Type** list, select Java Virtual Machine; deselect the other options.
  - c. Click **Search**.
3. Click a Java Virtual Machine with JVM Diagnostics agents deployed. For more information about installing JVM Diagnostics, see "Installing JVM Diagnostics" in *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.  
The Java Virtual Machine Home page displays.
4. From the **Java Virtual Machine** menu, choose **Performance Summary**.  
The Performance Summary page displays.
5. Review the following metrics for any periods of time where the **Warning Thresholds** or **Critical Thresholds** were reached:

<b>JVM GC Overhead</b>	This metric shows the percentage of CPU the JVM is using for garbage collections in relation to total CPU usage including servicing application workload (the lower, the better). This metric and its trending can help determine when the garbage collector is making the CPU spin on garbage collection instead of on application workload.
<b>JVM Heap Usage (%)</b>	This metric shows the heap utilization for the JVM. This metric provides an indicator of heap size as they fluctuate between garbage collections.
<b>JVM Heap Used After GC</b>	This metric shows the percent of heap utilization used after garbage collection. This metric and its trend over time can provide a good indication that there is a leak. For example, if the chart trending up while the application load is stable, then it is possible there is a leak.

If any of the metrics exceed the **Warning Thresholds** or **Critical Thresholds**, it could indicate memory is a factor in the JVM performance and availability. It could mean there is a memory leak or that the JVM heap configuration is too small for the application load. If the heap configuration is correct, assume there is a leak and investigate the cause.

6. If any of the metrics exceed the **Warning Thresholds** or **Critical Thresholds**, proceed to [Task 2](#).

**Task 2 Perform a Live Heap Analysis**

To create a snapshot of the heap for later loading and examination for leaks:

1. From the **Java Virtual Machine** menu, choose **Live Heap Analysis**.

The Live Heap Analysis page displays.

2. Review the top portion of the page to analyze the heap and the number of objects added to the garbage collector; review the **JVM Class Detail** table to review the largest-size objects in the heap.

For more information about using this page, see the topic "Viewing the Real-Time Heap Data" in the Cloud Control online help.

**Task 3 Create a Heap Snapshot**

To create a snapshot of the heap for later loading and examination for leaks:

1. On the Live Heap Analysis page, click **Create Heap Snapshot**.

The Heap Snapshot page displays.

2. Provide the settings for your environment.

Notice the **Heap Snapshot Type** under **Heap Snapshot Only** option enables you to pick either Oracle's JVM D format or a HROFF for use with other tools.

For more information about using this page, see the topic "Taking a Heap Snapshot" in the Cloud Control online help.

3. If you selected **Heap Snapshot Only** option, click **Take Snapshot**.

The heap snapshot is generated and the file name in which it is stored is displayed. You can upload the heap snapshot and analyze it using appropriate options from the Heap Snapshots menu.

4. From the **Java Virtual Machine** menu, choose **Heap Snapshots**.

The Available Heap Snapshots page displays.


5. Select the heap you created from the table, and then click **Detail**.

The Heaps > Roots page displays. The **Roots** tab displays the objects reachable by roots, which are objects that are directly reachable from the JVM itself.

Heaps > Roots

Roots Usage Dominator Roots

View ▾ Compare with ... Swap Detach

adc4110056:17727:ssl 05-MAR-12 21:10:02 : 722/1365 MB  Change Heap

Root	Objects	Total Memory(KB)	Adjusted Memory(KB)
System Classes	5339964	409,947	409,947
ThreadOther	4560698	331,726	6
System Other	4550196	330,965	1
JNI	4550200	330,965	0
Thread Handles	4550172	330,964	0
ObjectMonitor	4550175	330,964	0

6. Click a root name to drill down and view the objects that consume a lot of memory.

The Top 40 Objects page displays.

7. In the Heaps > Roots page, click **Compare with** to compare the current heap with another previously taken heap dump.

When comparing heaps, select the bigger one first. Otherwise you may see negative deltas.

8. In the Select a heap record dialog, select the second heap, and then click **OK**.
9. Compare both the heaps. Compare the number of objects (**Objects**) and the occupied memory size (**Adjusted Memory**) in each heap dump. This measure indicates the objects that are growing over the period when the snapshots were taken.
10. Drill down into the root which had the largest delta to find the biggest memory leak.

## 13.3 Working with Class Histograms

A class histogram is displayed in the form of a table when the optimization level of the jamagent is 0. The histogram displays the top 300 data rows sorted by the size. This feature allows you to monitor histograms for the analysis of the Virtual Machine.

This section contains the following sections:

- [Section 13.3.1, "Viewing Class Histogram"](#)
- [Section 13.3.2, "Saving Class Histogram"](#)
- [Section 13.3.3, "Scheduling Histogram Jobs"](#)
- [Section 13.3.4, "Comparing Class Histograms"](#)
- [Section 13.3.5, "Deleting Class Histograms"](#).

### 13.3.1 Viewing Class Histogram

To get started with viewing the Class Histogram:

1. From the **Targets** menu, choose **Targets > Middleware**.

The Middleware target home page displays.

2. Select a Java Virtual Machine which is up and running.

The Java Virtual Machine Home page displays.



Java Virtual Machine • JVM Performance Diagnostics • Live Thread Analysis Page Refreshed Sep 25, 2012 3:44:34 AM PDT

### Summary

JVM Pool /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN\_jmpool  
 Host adx2121178.us.oracle.com  
 OS Linux-2.6.32-100.28.5.el6.x86\_64  
 JVM Vendor Sun Microsystems Inc.  
 JVM Version 1.6.0\_24  
 Maximum JVM Heap Size 1024m  
 Minimum JVM Heap Size 256m  
 JWD Agent Optimization Level 1  
 JWD Agent Log Level 3  
 JWD Agent Build Number 6486  
 Weblogic Server /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_OMS1

### Incident

View Category All 0 0 0 0

Summary	Target	Severity	Status	Escalation level	Type	Time since last update
No matching incidents or problems found.						

Columns Hidden 13 Updated in last 31 days

### Availability

Availability ↑  99.5%

### Host Affected Members (Last 24 Hours)

Name	Type	Key Member	Status	Availability (%)
No Members				

### Active Threads (Last 24 Hours)

### Realtime Thread States

JVM Status	JVM	OS	Vendor	Version	CPU (%)	JVM CPU Usage (%)	OSR	Memory (%)	Runnable	DB Wait	Lock	Network Wait	IO Wait	Object Wait	RMI Wait	Sleep	Configuration Changes
↑	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1_jvm	Linux-2.6.32-100.28.5.el6.x86_64	Sun Microsystems Inc.	1.6.0_24	35	1475	10	38	1	5	2	3	0	96	1	35	0

### 3. Select Live Heap Analysis from the Java Virtual Machine menu.

The Live Heap Analysis summary page displays. The JVM Class Details are displayed in the form of a table on this page.

### Live Heap Analysis

[Take Heap Snapshot](#)

#### Garbage Collections Count

Type	Count
Major GC Count	7
Minor GC Count	2070

#### JVM Class Details

View Export Save Schedule View Saved Histograms

Class Name	Instance	Size (KB)
[C	1427126	149390
Ljava/lang/String;	1402063	43814
Ljava/lang/Class;	47149	37568
[Ljava/lang/Object;	429208	36475
[B	102178	36401
Ljava/util/HashMap\$Entry;	805045	25157
[Ljava/util/HashMap\$Entry;	188778	17601
[I	160222	15682
[S	64887	14694
Ljava/util/Hashtable\$Entry;	345705	10803
Loracle/jm/parser/v2/NM\$Text;	272286	8540
Ljava/util/HashMap;	153745	7206
Loracle/jm/parser/v2/NM\$Element;	210741	6585
Ljava/util/TreeMap\$Entry;	112989	4413
Ljava/util/LinkedHashMap\$Entry;	112395	4390

**Information**  
Time spent in JVM for processing collection: 1.666.597 msec

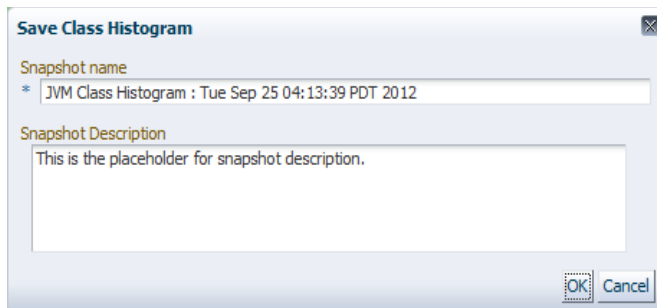
## 13.3.2 Saving Class Histogram

To get started with saving the Class Histogram:

1. From the **Targets** menu, choose **Targets > Middleware**.

The Middleware target home page displays.

2. Select a Java Virtual Machine which is up and running.  
The Java Virtual Machine home page displays.
3. Select **Live Heap Analysis** from the **Java Virtual Machine** menu.  
The JVM Class Details are displayed in a tabular form.
4. Click **Save**.

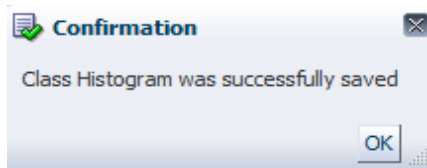


The dialog box titled "Save Class Histogram" contains the following fields:

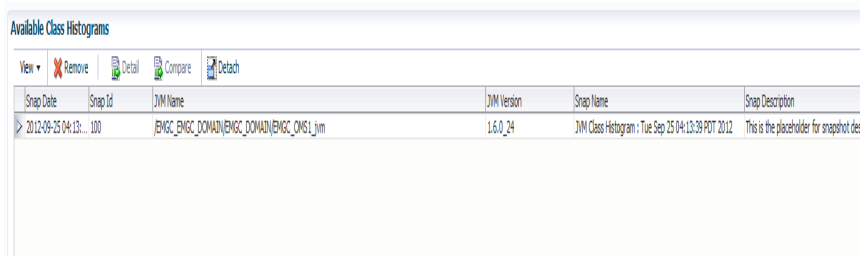
- Snapshot name:** A text field containing the text "JVM Class Histogram : Tue Sep 25 04:13:39 PDT 2012".
- Snapshot Description:** A text area containing the placeholder text "This is the placeholder for snapshot description."

At the bottom right, there are "OK" and "Cancel" buttons.

5. Enter a name for the Snapshot in the corresponding field.
6. Provide a description for the snapshot.
7. A confirmation window appears.



8. Click **View Saved Histograms** to view a list of available Class Histograms.



The "Available Class Histograms" window shows a table with the following data:

Snapshot Date	Snapshot Id	JVM Name	JVM Version	Snapshot Name	Snapshot Description
2012-09-25 04:13:39...	100	/BNGC_EHGCC_DOMAIN\BNGC_DOMAIN\BNGC_OMS1_jvm	1.6.0_24	JVM Class Histogram : Tue Sep 25 04:13:39 PDT 2012	This is the placeholder for snapshot desc...

### 13.3.3 Scheduling Histogram Jobs

Scheduling will allow you to insert JVM Class Histogram data into the repository by running the job at the defined time.

To get started with scheduling the running of histogram jobs:

1. Navigate to Live Heap Analysis summary page.
2. Click **Schedule** under the **JVM Class Details**.

The Schedule Settings window appears.

**Schedule Settings**

\* Job Name: JVM Class Histogram Job : Tue Sep 25 04:49:31 PDT 2012

Description:

Start:  Immediately  Later

Repeat: Do not repeat

Grace Period:  Do not run if it cannot start within 1 hours of the scheduled start time

OK Cancel

3. Enter a name and description for the job to be scheduled.
4. Select when to start the job.
  - If you want to schedule the job with immediate effect, select **Immediately**.
  - If you want to save the job to be run in future, select **Later**. Enter a date and time for the job.

**Schedule Settings**

\* Job Name: JVM Class Histogram Job : Tue Sep 25 04:49:31 PDT 2012

Description:

Start:  Immediately  Later

Repeat: Do not repeat

Grace Period:  Do not run if it cannot start within 1 hours of the scheduled start time

OK Cancel

5. Select the frequency at which you want to repeat the job from the **Repeat** drop-down list.
6. Select the option for the **Grace Period**. If you select the grace period, the job will remain active and run within the specified grace period.
7. Click **OK** to schedule the histogram job.
8. A confirmation window appears.

**Confirmation**

JVM Class Histogram Job : Tue Sep 25 04:49:31 PDT 2012 has been submitted successfully!

OK

### 13.3.4 Comparing Class Histograms

The compare functionality allows you to compare any two class histogram snapshots listed in the table.

To get started with comparing the class histogram snapshots:

1. Navigate to Live Heap Analysis page.

2. Click **View Saved Histograms** under **JVM Class Details**.
3. Select any two class histograms (using the *Ctrl* key) under **Available Class Histograms** and click **Compare**.

The Compare Class Histograms page appears.

Compare Class Histograms

View ▾

Classname	Instance Size (KB)		Number of Instances	
	Snap Id (121)	Snap Id (120)	Snap Id (121)	Snap Id (120)
Lcom/sacsera/common/ProbePoint;	31	31	443	443
Lcom/sacsera/common/RuleProperty;	18	18	333	333
Lcom/sacsera/javaagent/ClassPrepLoaderEntry;	33	33	715	715
Lcom/sacsera/util/TwoWayMapEntry;	42	42	1090	1090
Lcom/bea/common/security/iaact/Type;	23	23	762	762
Lcom/bea/logging/BaseLogRecord;	25	25	203	203
Lcom/bea/logging/LogFileRotator\$FileInfo;	11	11	494	494
Lcom/bea/etaxdb/builder/internal/obj/BindingType\$Name;	70	70	2997	2997
Lcom/bea/etaxdb/builder/internal/obj/By\$Name\$Bean;	39	39	1013	1013
Lcom/bea/etaxdb/builder/internal/obj/JavaType\$Name;	33	33	1446	1446
Lcom/bea/etaxdb/builder/internal/obj/Method\$Name;	421	421	17996	17996
Lcom/bea/etaxdb/builder/internal/obj/ClassName\$Property;	327	327	5997	5997
Lcom/bea/etaxdb/builder/internal/obj/IntType\$Name;	80	80	3424	3424
Lcom/bea/etaxdb/builder/internal/obj/ByteType\$Name;	113	113	1038	1038

**Information**  
Blank column values means that the class was either not part of the class heap, or was not one of the top used classes for the snapshot

The comparison table displays the following details:

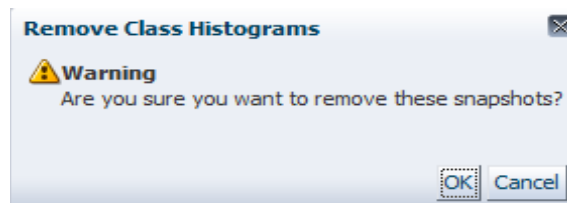
- Class name
- Instance size for both the snapshots
- Number of instances for both the snapshots.

### 13.3.5 Deleting Class Histograms

The remove functionality allows you to delete the saved class histograms from the repository.

To get started with deleting class histograms:

1. Navigate to the Live Heap Analysis summary page.
2. Click **Views Saved Histograms** under **JVM Class Details**.
3. Select the class histogram you want to delete from **Available Class Histograms**.
4. Click **Remove**.
5. Select **OK** in the confirmation window that appears.



## 13.4 Deploying/Upgrading Bulk Diagnostics Agents

Bulk deployment/upgradation of JVM D Agents overcomes the limitation of deploying/upgrading a JVM D agent on a single domain. This feature facilitates the management of deploying/upgrading JVM D agents on all discovered WebLogic domains using a single wizard.

To get started with deploying bulk diagnostic agents:

1. From the **Setup** menu, select **Application Performance Management**.

The Application Performance Management page appears. The number of JVM D Agents and ADP Agents deployed is displayed under **Application Performance Management Agents**.

Name	Host	Port	SSL Port	Availability (%)	Status	Server	Version
RUEI Systems (1)							
BTM Systems (0)							
17 JVM Diagnostics Engines (1)							
jamanagerEMGC_JMCMANAGER1	ad2121178.us.oracle.com	3800	3801	97.17	↑	EMGC_JMCMANAGER1	6390
17 ADP Engines (2)							
ADPManager_EMGC_ADPMANAGER1	ad2121178.us.oracle.com	51099	n/a	97.06	↑	EMGC_ADPMANAGER1	0981
ADPManager_EMGC_ADPMANAGER2	ad2121178.us.oracle.com	52099	n/a	94.26	↑	EMGC_ADPMANAGER2	0981

2. Click **Manage Diagnostic Agents** to deploy diagnostic agents.

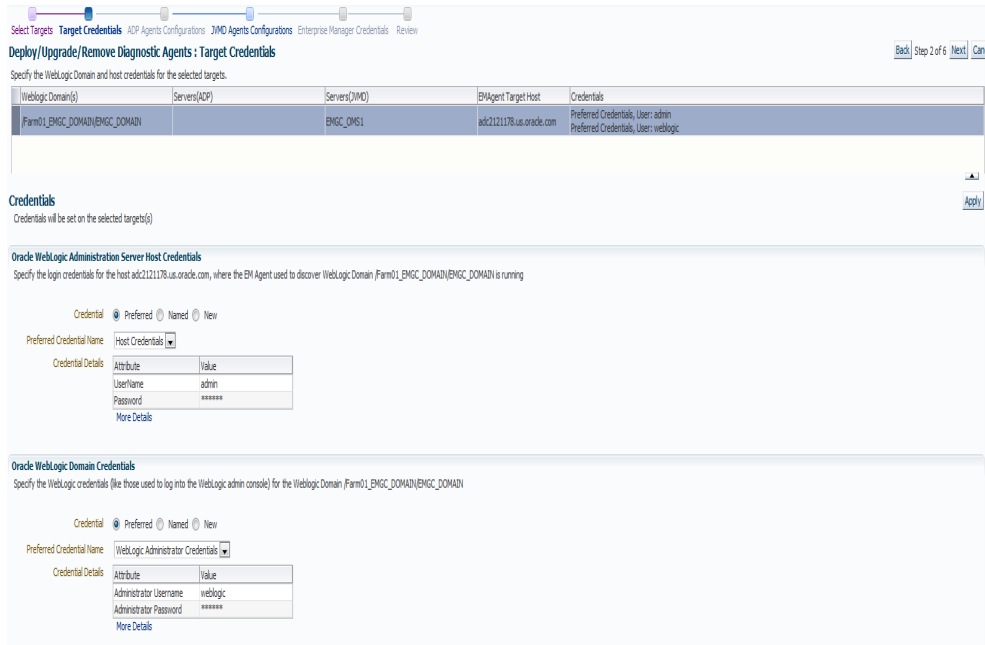
The **Select Targets** page appears.

Name	Type	Target Host	Status	OS Platform	ADP Detail			JVM D Detail			
					Status	Deployed Version	Available Version	Status	Deployed Version	Available Version	
17 /Fam01_EMGC_DOMAIN/EMGC_DOMAIN	Oracle WebLogic Domain										
EMGC_JMCMANAGER6	Oracle WebLogic Server	ad2180734.us.oracle.com	↑	n/a			✓				✓
EMGC_JMCMANAGER1	Oracle WebLogic Server	ad2180734.us.oracle.com	↑	n/a			✓				✓
EMGC_JMCMANAGER2	Oracle WebLogic Server	ad2180734.us.oracle.com	↑	n/a			✓				✓
EMGC_ADPMANAGER2	Oracle WebLogic Server	ad2121178.us.oracle.com	↓	Linux-x86_64							
EMGC_ADPMANAGER1	Oracle WebLogic Server	ad2180734.us.oracle.com	↑	n/a							✓
EMGC_ADMINSERVER (admin)	Oracle WebLogic Server	ad2180734.us.oracle.com	↑	n/a							
EMGC_ADPMANAGER4	Oracle WebLogic Server	ad2121178.us.oracle.com	↓	Linux-x86_64							
EMGC_OMS1	Oracle WebLogic Server	ad2180734.us.oracle.com	↑	n/a			✓				✓
17 /EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Oracle WebLogic Domain										
EMGC_OMS1	Oracle WebLogic Server	ad2121178.us.oracle.com	↑	Linux-x86_64			✓				✓

3. Select **Deploy** under **Operation**.

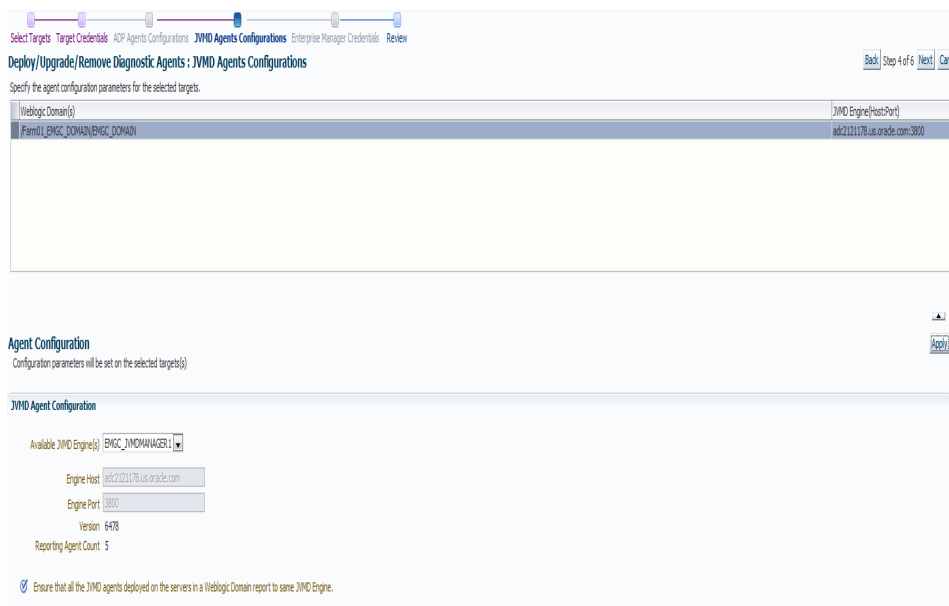
4. Select the targets on which you want to deploy ADP and JVMD agents and click **Next**.

The Target Credentials page appears.



5. Select each target and specify the WebLogic Administration Server Host Credentials and Weblogic Domain Credentials.
6. Click **Apply** to save the changes made to the target credentials and click **Next**.
7. Select each domain and specify ADP Agent Configuration details. Click **Next**.

The JVMD Agents Configurations page appears.



8. Select each domain and specify the JVMD Agent Configuration details. Click **Apply**.
9. Click **Next**.

10. Specify the Host and WebLogic domain credentials for Enterprise Manager OMS.
11. Click **Save** to apply the changes made to the credentials and click **Next**.
12. Review all the target details, credentials, and engine details and click **Deploy**.
13. Click **JVMD Agent Deployment Job** on Diagnostics Agents Deployment Status to view the progress of the job.

**Diagnostics Agents Deployment status**  
Monitor the progress of deployments of diagnostics agents from here

**Targets for ADP Agent deployment**  
/Farm01\_EMGC\_DOMAIN/EMGC\_DOMAIN, /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN

**Targets for JVMD Agent deployment**  
/Farm01\_EMGC\_DOMAIN/EMGC\_DOMAIN, /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN

The links to the results of the submitted jobs are below:

- [ADP Agent Deployment 2012-06-27 04:07:32](#)
- [JVMD Agent Deployment 2012-06-27 04:07:28](#)

Wait while the operation is in progress. This operation cannot be canceled. It will continue even if the browser window is closed.

In order to complete the ADP agent deployment procedure, the corresponding weblogic server(s) need to be restarted after the ADP agent deployment job finishes successfully

One of the job will be in suspended state if jobs for both agents are submitted. Once job for one agent finishes, the other one will automatically start

#### 14. A summary of the JVMD Agent Job progress appears.

Job Activity > Job Run: JVMD AGENT DEPLOYMENT Page Refreshed Oct 3, 2012 3:08:45 AM PDT

Execution: JVMD AGENT DEPLOYMENT [Delete Run](#) [Edit](#) [View Definition](#)

**Summary** [Log Report](#)

Status: Succeeded  
 Scheduled: Oct 3, 2012 9:54:31 PM GMT-07:00  
 Started: Oct 3, 2012 9:54:32 PM GMT-07:00  
 Ended: Oct 3, 2012 10:07:33 PM GMT-07:00  
 Elapsed Time: 13 minutes, 1 seconds

Type: JVMD Agent Deployment  
 Owner: SYSMAN  
 Description: JVMD Agent Deployment  
 Execution ID: C3B1E4D89F936C3E2D40E3D4D046AE2

Targets:   
 Status: All

Name	Targets	Status	Started	Ended	Elapsed Time
Execution: 2 targets	2	Succeeded	Oct 3, 2012 9:54:32 PM GMT-07:00	Oct 3, 2012 10:07:33 PM GMT-07:00	13 minutes
Previous					
Step: Create Script Directory on Target	/Farm01_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:32 PM GMT-07:00	Oct 3, 2012 9:54:34 PM GMT-07:00	2 seconds
Step: Create Script Directory on Target	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:32 PM GMT-07:00	Oct 3, 2012 9:54:35 PM GMT-07:00	3 seconds
Step: Copy JVMD Zip to Target	/Farm01_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:35 PM GMT-07:00	Oct 3, 2012 9:54:36 PM GMT-07:00	0 seconds
Step: Copy JVMD Zip to Target	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:35 PM GMT-07:00	Oct 3, 2012 9:54:36 PM GMT-07:00	0 seconds
Step: Copying Deployer Zip	/Farm01_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:36 PM GMT-07:00	Oct 3, 2012 9:54:39 PM GMT-07:00	3 seconds
Step: Copying Deployer Zip	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:36 PM GMT-07:00	Oct 3, 2012 9:54:39 PM GMT-07:00	3 seconds
Step: Extract MTM Deploy Scripts	/Farm01_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:43 PM GMT-07:00	Oct 3, 2012 9:54:45 PM GMT-07:00	2 seconds
Step: Extract MTM Deploy Scripts	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:43 PM GMT-07:00	Oct 3, 2012 9:54:45 PM GMT-07:00	2 seconds
Step: Checking Existence of Required Jars	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Oct 3, 2012 9:54:45 PM GMT-07:00	Oct 3, 2012 9:54:47 PM GMT-07:00	2 seconds

To get started with upgradation of ADP and JVMD Agents:

1. Select **Upgrade** under **Operation** on Select Targets page to upgrade ADP and JVMD Agents to the latest version.

---

**Note:** You can upgrade agents only for WebLogic Server targets.

---

2. Specify Target Credentials.

3. Specify Agent Configuration details.
4. Review the target details, credentials, and engine details. Click **Upgrade**.  
You can view the progress of the agent deployment job.

## 13.5 Upgrading/Redeploying ADP and JVM D Engines

You can upgrade/redeploy the selected ADP/JVMD Engines on local or existing remote WebLogic Servers to the latest available version. When the upgrade is completed, the upgraded engine(s) gets redeployed.

To get started with upgrading the selected ADP/JVMD Engines:

1. From the **Setup** menu, select **Application Performance Management**.

The Application Performance Management page appears. The available JVMD Engines and ADP Engines are listed under **Application Performance Management Engines**.

Application Performance Management Engines							
Name	Host	Port	SSL Port	Availability (%)	Status	Server	Version
RUEI Systems (0)							
BTM Systems (0)							
JVMD Engines (4)							
jammanagerEMGC_JVMDMANAGER2	sk01mtv.us.oracle.com	16010	16011	82.34		EMGC_JVMDMANAGER2	6123
jammanagerEMGC_JVMDMANAGER3	sk01mtv.us.oracle.com	16020	16021	82.34		EMGC_JVMDMANAGER3	6123
jammanagerEMGC_JVMDMANAGER4	sk01mtv.us.oracle.com	16030	16031	82.34		EMGC_JVMDMANAGER4	6123
jammanagerEMGC_JVMDMANAGER1	sk01mtv.us.oracle.com	16000	16001	92.48		EMGC_JVMDMANAGER1	6123
ADP Engines (4)							
ADPManager_EMGC_ADPMANAGER1	sk01mtv.us.oracle.com	51099	n/a	86.46		EMGC_ADPMANAGER1	EMCC12-20980
ADPManager_EMGC_ADPMANAGER3	sk01mtv.us.oracle.com	53099	n/a	69.1		EMGC_ADPMANAGER3	EMCC12-20980
ADPManager_EMGC_ADPMANAGER2	sk01mtv.us.oracle.com	52099	n/a	69.67		EMGC_ADPMANAGER2	EMCC12-20980
ADPManager_EMGC_ADPMANAGER4	sk01mtv.us.oracle.com	54099	n/a	69.2		EMGC_ADPMANAGER4	EMCC12-20980

2. Click the **Upgrade** icon next to JVMD Engines or ADP Engines to upgrade the corresponding engine(s) or click the **Upgrade** button.
3. Select the engine you want to upgrade.

**Redeploy/Upgrade ADP Engines** [Upgrade](#) [Cancel](#)

You can upgrade ADP Diagnostics Engines on local or existing remote weblogic servers, which are part of EMGC domain. Please click on select checkbox to select the engines for Redeploy/Upgrade and you need to highlight the row for setting the Management Agent Host Credential.

Select	Engine Name	Host	Port	Deployed Version	Available Version	Status	Availability (%)	Server	Credential Set	Server Target	Remote Server	Reporting Agents(Count)
<input checked="" type="checkbox"/>	ADPManager_EMGC_ADPMANAGER1	ad02121178.us.oracle.com	51099	EMCC12-30	EMCC12-30			0 EMGC_ADPMANAGER1	no	yes	no	0

**Host Credentials** [Apply](#)

Specify Management Agent Host Credentials for selected Engine

Select credential from one of the following options.

Credential  Preferred  Named  New

\* Username:

\* Password:

\* Confirm Password:

Save As:

Set As Preferred Credentials

[Test](#)

**Admin Weblogic Credentials**

Specify WebLogic domain credentials (like those used to access the WebLogic admin console) for the EMGC domain

Select credential from one of the following options.

Credential  Preferred  Named  New

\* Administrator Username:

\* Administrator Password:

\* Confirm Administrator Password:

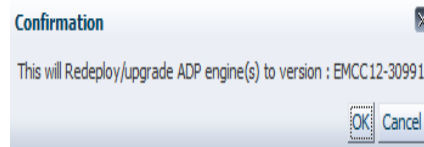
Save As:

Set As Preferred Credentials

[Test](#)



4. Specify the Management Agent Host and WebLogic domain credentials for the selected engine(s). Click **Apply** and then **Upgrade**.
5. Click **OK** on the confirmation window to redeploy the selected engine.



6. Click the job link to view the upgrade job progress.  
The summary of job execution is displayed.
7. When you navigate back to Application Performance Management page, you can see that the selected engines have been upgraded to the latest available version.

Application Performance Management Engines								
View ▾ Add + Remove Remove Configure								
Name	Host	Port	SSL Port	Availability (%)	Status	Server	Version	
RULES Systems (0)								
BTM Systems (0)								
JVM Diagnostics Engines (4)								
jammanagerEMGC_JMCMANAGER2	sk01mtv.us.oracle.com	16010	16011	80.59	↑	EMGC_JMCMANAGER2	6452	
jammanagerEMGC_JMCMANAGER3	sk01mtv.us.oracle.com	16020	16021	79.76	↓	EMGC_JMCMANAGER3	6123	
jammanagerEMGC_JMCMANAGER4	sk01mtv.us.oracle.com	16030	16031	79.76	↓	EMGC_JMCMANAGER4	6123	
jammanagerEMGC_JMCMANAGER1	sk01mtv.us.oracle.com	16000	16001	89.91	↓	EMGC_JMCMANAGER1	6123	
ADP Engines (4)								
ADPManager_EMGC_ADPMANAGER1	sk01mtv.us.oracle.com	51099	n/a	83.88	↓	EMGC_ADPMANAGER1	EMCC12-20980	
ADPManager_EMGC_ADPMANAGER3	sk01mtv.us.oracle.com	53099	n/a	66.67	↓	EMGC_ADPMANAGER3	EMCC12-20980	
ADPManager_EMGC_ADPMANAGER2	sk01mtv.us.oracle.com	52099	n/a	67.89	↓	EMGC_ADPMANAGER2	EMCC12-20980	
ADPManager_EMGC_ADPMANAGER4	sk01mtv.us.oracle.com	54099	n/a	66.95	↑	EMGC_ADPMANAGER4	EMCC12-30985	

When there is no newer version available for upgrade, you have the option to redeploy the same engine.

To redeploy the selected ADP/JVMD Engines:

1. From the **Setup** menu, select **Application Performance Management**.  
The Application Performance Management page appears. The available JVMD Engines and ADP Engines are listed under **Application Performance Management Engines**.
2. Click the **Redeploy** button to redeploy the corresponding engine(s).

The screenshot shows the Oracle Enterprise Manager Cloud Control 12c interface. The page title is "Application Performance Management". Under "Application Performance Management Agents", it shows "JVM Agents Count: 1" with a green checkmark and "ADP Agents Count: 0". Under "Application Performance Management Engines", there are buttons for "View", "Add", "Redeploy", "Remove", and "Configure". A table lists the engines:

Name	Host	Port	SSL Port	Availability (%)	Status	Server	Version
RUEI Systems (0)							
BTM Systems (0)							
JVM Diagnostics Engines (1)							
jamanagerEMGC_JVMDMANAGER1	sic03zkg.us.oracle.com	3800	3801	95.14	↑	EMGC_JVMDMANAGER1	6593
ADP Engines (1)							
ADPManager_EMGC_ADPMANAGER1	sic03zkg.us.oracle.com	51099	n/a	93.93	↓	EMGC_ADPMANAGER1	EMCC12-30991

3. Select the engine you want to redeploy.

The screenshot shows the "Redeploy JVM Engines" dialog in Oracle Enterprise Manager Cloud Control 12c. It includes a table with the following columns: "Select", "Engine Name", "Host", "Port", "SSL Port", "Deployed Version", "Status", "Remote Server", "Server", and "Reporting Agents(Count)". The row for "jamanagerEMGC\_JVMDMANAGER1" is selected. Below the table, there are sections for "Host Credentials" and "Admin WebLogic Credentials".

**Host Credentials:** Specify Management Agent Host Credentials for highlighted Engine and press 'Apply' button to set it. Select credential from one of the following options. Credential: Preferred (selected), Named, New. Preferred Credential Name: Normal Host Credentials. Credential Details: Attribute | Value, Username: azurite, Password: \*\*\*\*\*.

**Admin WebLogic Credentials:** Specify WebLogic domain credentials (like those used to access the WebLogic admin console) for the EMGC domain: [EMGC\_DOMAIN]/EMGC\_DOMAIN. Select credential from one of the following options. Credential: Preferred (selected), Named, New. Preferred Credential Name: WebLogic Administrator Credentials. Credential Details: Default preferred credentials are not set.

4. Specify the Management Agent Host and WebLogic domain credentials for the selected engine(s). Click **Apply** and then **Redeploy**. The selected engine is redeployed.

- Click the job link to view the job progress.

**Figure 13–1 Progress Page for JVM D Engine Redeployment**

Job Activity > Execution: /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_OMS1 Page Refreshed Nov 8, 2012 10:46:55 PM PST

Execution: /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_OMS1 [Delete Run](#) [Edit](#) [View Definition](#)

**Summary** [Log Report](#)

Status: Succeeded  
 Scheduled: Nov 8, 2012 10:29:05 PM GMT-08:00  
 Started: Nov 8, 2012 10:29:08 PM GMT-08:00  
 Ended: Nov 8, 2012 10:30:45 PM GMT-08:00  
 Elapsed Time: 1 minutes, 36 seconds

Type: Redeploy JVM Engines  
 Owner: SYSMAN  
 Description:  
 Execution ID: CE360970C1114789E146F40A7B9159C7

Targets:   
 Status: All   
 Expand All | Collapse All

Name	Targets	Status	Started	Ended	Elapsed Time
Execution: /EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:08 PM GMT-08:00	Nov 8, 2012 10:30:45 PM GMT-08:00	1.6 minutes
Step: Create Stage Directory	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:08 PM GMT-08:00	Nov 8, 2012 10:29:09 PM GMT-08:00	0 seconds
Step: Copying JVM D Engine	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:09 PM GMT-08:00	Nov 8, 2012 10:29:09 PM GMT-08:00	0 seconds
Step: Unzipping JVM D zip file	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:10 PM GMT-08:00	Nov 8, 2012 10:29:11 PM GMT-08:00	0 seconds
Step: Run Prerequisite Checks	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:11 PM GMT-08:00	Nov 8, 2012 10:29:11 PM GMT-08:00	0 seconds
Step: Repackage policy	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:11 PM GMT-08:00	Nov 8, 2012 10:29:12 PM GMT-08:00	0 seconds
Step: Redeploy JVM D Engines	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:29:12 PM GMT-08:00	Nov 8, 2012 10:30:32 PM GMT-08:00	1.3 minutes
Step: Checking Status		Succeeded	Nov 8, 2012 10:30:32 PM GMT-08:00	Nov 8, 2012 10:30:33 PM GMT-08:00	0 seconds
Step: Refresh targeted WebLogic domain	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN	Succeeded	Nov 8, 2012 10:30:33 PM GMT-08:00	Nov 8, 2012 10:30:40 PM GMT-08:00	7 seconds
Step: Refresh target data in cache	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:30:43 PM GMT-08:00	Nov 8, 2012 10:30:44 PM GMT-08:00	0 seconds
Step: Cleanup	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:30:44 PM GMT-08:00	Nov 8, 2012 10:30:45 PM GMT-08:00	0 seconds

[Delete Run](#) [Edit](#) [View Definition](#)

**Figure 13–2 Progress Page for ADP Engine Redeployment**

Job Activity > Execution: /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_OMS1 Auto Refresh: Off

Execution: /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_OMS1 [Debug](#) [Delete Run](#) [Edit](#) [View Definition](#)

**Summary** [Log Report](#) [Stop](#)

Suspend will wait for the currently running steps to complete. Resume will resume a previously suspended job at the next step. Stop will stop running steps if it can.

Status: Running  
 Scheduled: Nov 8, 2012 10:50:23 PM GMT-08:00  
 Started: Nov 8, 2012 10:50:26 PM GMT-08:00  
 Ended:  
 Elapsed Time: 1 minutes, 36 seconds

Type: ADP Engines Redeploy  
 Owner: SYSMAN  
 Description:  
 Execution ID: CE3B32AF36365CC8E146F40A7B9109F6

Targets:   
 Status: All   
 Expand All | Collapse All

Name	Targets	Status	Started	Ended	Elapsed Time
Execution: /EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Running	Nov 8, 2012 10:50:26 PM GMT-08:00		1.6 minutes
Previous					
Step: Create Stage Directory on Local Host	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:26 PM GMT-08:00	Nov 8, 2012 10:50:26 PM GMT-08:00	0 seconds
Step: Push JVM D zip file to EM Agent	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:26 PM GMT-08:00	Nov 8, 2012 10:50:27 PM GMT-08:00	0 seconds
Step: Unzip JVM D zip file	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:27 PM GMT-08:00	Nov 8, 2012 10:50:28 PM GMT-08:00	0 seconds
Step: Validate Engine Properties	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:28 PM GMT-08:00	Nov 8, 2012 10:50:35 PM GMT-08:00	7 seconds
Step: Run Prerequisite Checks	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:36 PM GMT-08:00	Nov 8, 2012 10:50:36 PM GMT-08:00	0 seconds
Step: Copy Configuration Files	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:36 PM GMT-08:00	Nov 8, 2012 10:50:37 PM GMT-08:00	0 seconds
Step: Unzip ADP Engine zip file	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:37 PM GMT-08:00	Nov 8, 2012 10:50:39 PM GMT-08:00	2 seconds
Step: Modify WebLogic Policy File	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:39 PM GMT-08:00	Nov 8, 2012 10:50:39 PM GMT-08:00	0 seconds
Step: Modify Configuration Files	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:40 PM GMT-08:00	Nov 8, 2012 10:50:40 PM GMT-08:00	0 seconds
Step: Repackage Dummy Application	/EMGC_EMGC_DOMAIN/EMGC_DOMAIN/EMGC_OMS1	Succeeded	Nov 8, 2012 10:50:40 PM GMT-08:00	Nov 8, 2012 10:50:40 PM GMT-08:00	0 seconds

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## 13.6 Working with Pool Threshold Violations

This feature allows you to monitor the Pool Threshold Violations and take corrective actions for the violations. The Threshold Violations and the corresponding Corrective

Actions are displayed on the EM Event page. You have the option to setup the required corrective action for each of the threshold violations.

### 13.6.1 Viewing Threshold Violations

To get started with viewing the threshold violations:

1. From the **Enterprise** menu, select **Monitoring > Incident Manager**.
2. Select **Events without incidents** from the **Views** navigation pane.

The Incident Manager: Events without incidents page appears.

The screenshot shows the Oracle Enterprise Manager Incident Manager interface. The left navigation pane has 'Events without incidents' selected. The main area displays a table of events with columns: Severity/Message, Target Name, Target Type, Event Reported, Category, Last Updated, and Incident ID. One event is selected, and its details are shown in a pop-up window. The event details include: Target: /EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_ADMINSERVER\_jvm (Java Virtual Machine), Event: Oct 4, 2012 4:50:08 AM PDT, Reported: Oct 4, 2012 4:50:16 AM PDT, Updated: Oct 4, 2012 4:50:16 AM PDT, Message: JVM Heap Usage (%) exceeds Critical level threshold (>30). A heap dump was triggered, the file is heapdump\_\_EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_ADMINSERVER\_jvm\_1349351488236.txt, Last: JVM Heap Usage (%) exceeds Critical level threshold (>30). A heap dump was triggered, the file is heapdump\_\_EMGC\_EMGC\_DOMAIN/EMGC\_DOMAIN/EMGC\_ADMINSERVER\_jvm\_1349351488236.txt on Oct 4, 2012 4:50:08 AM PDT, Internal: Heap Usage, Event Name, Event Type: JVM Diagnostics Threshold Violation, Category: Performance, Recorded: Oct 4, 2012 4:50:08 AM PDT. The 'Guided Resolution' section shows 'Edit JVM Pool threshold values' as an action.

3. Select any message to view its details.
4. Select **Edit JVM Pool threshold values** under **Actions** within the **General** tab to setup corrective actions for the selected threshold violation.

The JVM Pool threshold value page appears. You can also navigate to this page through the **Configure JVM Pool** option in the context menu.

The pool threshold tree table contains information of threshold values and corresponding corrective actions for a Java Virtual Machine Pool target. Values of Threshold and Trigger Samples values can be changed inline on the table.

Metric	Comparison Operator	Threshold	Trigger Samples	Corrective Actions
/EMGC_EMGC_DOMAIN/EMGC_DOMAIN_jvmpool ▾ Host CPU Usage (%)				
Critical	>=	<input type="text" value="90"/>	<input type="text" value="50"/>	<None>  Add
Warning	>=	<input type="text"/>	<input type="text"/>	<None>  Add
▾ DB Wait (thread count)				
Critical	>=	<input type="text" value="6"/>	<input type="text" value="50"/>	<None>  Add
Warning	>=	<input type="text" value="3"/>	<input type="text" value="50"/>	<None>  Add
▾ GC Overhead(%)				
Critical	>=	<input type="text" value="90"/>	<input type="text" value="50"/>	<None>  Add
Warning	>=	<input type="text" value="70"/>	<input type="text" value="50"/>	<None>  Add

Save Cancel

- Click **Add** to add a corrective action for the corresponding threshold value.

The Add Corrective Action window appears. Corrective actions are of three types: *No Action*, *TraceDump*, *Heap Dump*.

**Add Corrective Action**

Action Type:

Ok Cancel

- Select the action type you want to add.

**Add Corrective Action**

Action Type:

Poll Interval (ms):

Poll Duration (sec):

Description: Action type is Trace Dump.

Thread Details  Include Network Waits  Allow Trace Interrupt

Try Changing Threads  All Threads

Ok Cancel

**Add Corrective Action**

Action Type:

Heap Snapshot Type:

Ok Cancel

Provide the necessary details for the corresponding action type and click **Ok**.

- Click **Save** to commit the changes made to the threshold violations.

---

**Note:** If a corrective action was triggered by the threshold violation, the trace/heap dump files will be displayed under **Event Details**. A link to navigate to the trace/heap snapshot page will also be available.

---

- After you have defined the corrective actions, click **View Heap Snapshot** under **Diagnostics** within the **General** tab of the Incident Manager: Events without incidents page.

This action takes you to the snapshot page of the heap dump.

Date	JVM	Vendor	Version	Heap Snap Name	Description	Size(MB)	Used(MB)	%
> Oct 4, 2012 4:50:21 AM	EMGC_EMGC_DOMAIN/ENG...			heapdump_EMGC_EMGC_DOMAIN_EMGC_DOMAIN_EMGC_OMS1_jvm_1349351421887.txt	This heap is not loaded			

### 13.6.2 Loading the Heaps

You can trigger a corrective action to perform the heap analysis. The heap created on the snapshot page is not loaded by default.

To get started with loading the heaps:

- Navigate to the Java Virtual Machine Pool Home page.
- Select **Heap Snapshots** from the **Java Virtual Machine Pool** menu.
- Select the heap you want to load to the repository.

Date	JVM	Vendor	Version	Heap Snap Name	Description	Size(MB)	Used(MB)	%
> Oct 4, 2012 4:50:21 AM	EMGC_EMGC_DOMAIN/ENG...			heapdump_EMGC_EMGC_DOMAIN_EMGC_DOMAIN_EMGC_OMS1_jvm_1349351421887.txt	This heap is not loaded			

- Click **Load**.

The Load Heap Snapshot page appears.

**Load Heap Snapshot** Load Heap Cancel

**Enter JVM Diagnostics Agent Host Credentials**  
Specify credentials for host where JVM Diagnostics Agent is running  
Select credential from one of the following options.

Credential  Preferred  Named  New

Preferred Credential Name: Normal Host Credentials

Attribute	Value
UserName	admin
Password	*****

[More Details](#)

---

**Select Heap Loader**

This option requires EM agent to be running on both JVM Diagnostics Agent & Heap Loader Hosts. The Load Heap step has significant memory requirement on JVM Diagnostics Heap Loader Host.  
If you want to configure a Heap Loader Host, Click on Add Button.

Available Heap Loaders: heapLoader + Add Edit Remove

Attribute	Value
Heap Loader Name	heapLoader
Heap Loader Host	adc2121178.us.oracle.com
Db Client Home	DBClient

**Credentials**

This operation requires JVM Diagnostics Heap Loader Host & Database User Credentials

**Enter Heap Loader Host Credentials**  
Specify credentials for host where JVM Diagnostics Heap Loader is running  
Select credential from one of the following options.

Credential  Preferred  Named  New

Preferred Credential Name: Normal Host Credentials

Attribute	Value
UserName	admin
Password	*****

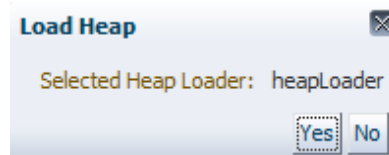
[More Details](#)

**Enter JVM Diagnostics DB User Credentials**  
Specify credentials for JVM Diagnostics DB User  
Select credential from one of the following options.

Credential  Preferred  Named  New

Preferred Credential Name:

5. Configure the following details before you load the heap dump:
  - JVM Diagnostics Agent Host credentials
  - Host and path of the selected Heap loader
  - Credentials for Heap Loader Host and JVM Diagnostics DB User.
6. Click **Load Heap** on the Load Heap Snapshot page.
7. Click **Yes** on the confirmation window to load the selected heap.



The selected heap is loaded to the repository.

8. Navigate to the Available Heap Snapshots page.
9. Select the loaded heap from the Heap Snapshots table and click **Detail** to analyze the heap dump.

The heap details are displayed.

Heaps > Roots

Roots Usage Dominator Roots

View ▾ Compare with ... Swap Detach

Root	Objects	Total Memory(KB)	Adjusted Memory(KB)
adc4110056:17727:ssl 05-MAR-12 21:10:02 : 722/1365 MB <a href="#">Change Heap</a>			
System Classes	5339964	409,947	409,947
ThreadOther	4560698	331,726	6
System Other	4550196	330,965	1
JNI	4550200	330,965	0
Thread Handles	4550172	330,964	0
ObjectMonitor	4550175	330,964	0



---

# Monitoring and Tuning Oracle Database for Oracle Fusion Applications

This chapter describes how to monitor, diagnose, tune, and test changes to Oracle Database using Oracle Enterprise Manager Database Control. Oracle Database provides several tools that enable you to monitor performance, diagnose and tune problems, and test database changes on a test system before implementing them to a production system. Most of these tools are accessible using Oracle Enterprise Manager Database Control.

This chapter includes the following sections:

- [Section 14.1, "Monitoring Oracle Database"](#)
- [Section 14.2, "Tuning Oracle Database"](#)
- [Section 14.3, "Testing Oracle Database Changes"](#)

## 14.1 Monitoring Oracle Database

Instructions for how to monitor Oracle Database using Database Control is provided in the following topics:

- [Section 14.1.1, "Database Statistics"](#)
- [Section 14.1.2, "Monitoring Database Alerts"](#)
- [Section 14.1.3, "Monitoring User and Session Activity"](#)
- [Section 14.1.4, "Monitoring the Database Instance"](#)
- [Section 14.1.5, "Monitoring the Host System"](#)

### 14.1.1 Database Statistics

Database statistics provide information about the type of load on the database and the internal and external resources used by the database. To accurately diagnose performance problems with the database using [Automatic Database Diagnostic Monitor \(ADDM\)](#), statistics must be available.

Oracle Database generates many types of cumulative statistics for the system, sessions, and individual SQL statements. Oracle Database also tracks cumulative statistics about segments and services. [Automatic Workload Repository \(AWR\)](#) automates database statistics gathering by collecting, processing, and maintaining performance statistics for database problem detection and self-tuning purposes.

By default, the database gathers statistics every hour and creates an [AWR snapshot](#), which is a set of data for a specific time that is used for performance comparisons. The

delta values captured by the snapshot represent the changes for each statistic over the time period. Statistics gathered by AWR are queried from memory. The gathered data can be displayed in both reports and views.

The database statistics collected and processed by AWR include:

- Time model statistics  
Time model statistics measure the time spent in the database by operation type. The most important time model statistic is **database time (DB time)**. Database time represents the total time spent in database calls by foreground sessions, and is an indicator of the total instance workload.
- Wait event statistics  
Wait events are incremented by a session to indicate that the session had to wait for an event to complete before being able to continue processing. When a session has to wait while processing a user request, the database records the wait by using one of a set of predefined wait events. The events are then grouped into wait classes.
- Session and system statistics  
A large number of cumulative database statistics are available on a system and session level. Some of these statistics are collected by AWR.
- Active session history statistics  
The Active Session History (ASH) statistics are samples of session activity in the database. The database samples active sessions every second and stores them in a circular buffer in the System Global Area (SGA). Any session that is connected to the database and using CPU, or is waiting for an event that does not belong to the idle wait class, is considered an active session.
- High-load SQL statistics  
SQL statements that are consuming the most resources produce the highest load on the system, based on criteria such as elapsed time and CPU time.

For more information about database statistics, see the "Gathering Database Statistics Using the Automatic Workload Repository" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

## 14.1.2 Monitoring Database Alerts

Oracle Database includes a built-in alerts infrastructure to notify you of impending problems with the database. By default, Oracle Database enables the following alerts:

- Tablespace Usage
- Snapshot Too Old
- Recovery Area Low on Free Space
- Resumable Session Suspended

In addition to these default alerts, you can use performance alerts to detect any unusual changes in database performance.

This section contains the following topics:

- [Section 14.1.2.1, "Configuring Database Alerts"](#)
- [Section 14.1.2.2, "Responding to Database Alerts"](#)

For more information about database alerts, see the "Monitoring Performance Alerts" chapter in the *Oracle Database 2 Day + Performance Tuning Guide*.

#### 14.1.2.1 Configuring Database Alerts

A **metric** is the rate of change in a cumulative statistic. This rate can be measured against a variety of units, including time, transactions, or database calls. For example, the number of database calls per second is a metric. You can set thresholds on a metric so that an alert is generated when the threshold is passed.

Performance alerts are based on metrics that are performance-related. These alerts are either environment-dependent or application-dependent.

Environment-dependent performance alerts may not be relevant on all systems. For example, the `AVERAGE_FILE_READ_TIME` metric generates an alert when the average time to read a file exceeds the metric threshold.

Application-dependent performance alerts are typically relevant on all systems. For example, the `BLOCKED_USERS` metric generates a performance alert when the number of users blocked by a particular session exceeds the metric threshold.

To obtain the most relevant information from performance alerts, set the threshold values of performance metrics to values that represent desirable boundaries for your system. You can then fine-tune these values over time until your system meets or exceeds your performance goals.

To set thresholds for alerts, use the Metric and Policy Settings page, accessible from Related Links on the Database Home page.

#### 14.1.2.2 Responding to Database Alerts

When an alert is generated by Oracle Database, it appears under Alerts on the Database Home page.

To respond to a database alert, locate the alert that you want to investigate under Alerts on the Database Home page and click the **Message** link. Follow the recommendations provided on the page.

After taking the necessary corrective measures, you can acknowledge an alert by clearing or purging it. Clearing an alert sends the alert to the Alert History, which can be viewed from the Database Home page under Related Links. Purging an alert removes it from the Alert History.

### 14.1.3 Monitoring User and Session Activity

The Database Performance page displays information in three sections that enable you to assess the overall performance of the database in real time.

The Average Active Sessions chart of the Performance page shows the average load on the database. The **average active sessions** for a time period equals the total DB time of all sessions during this period divided by the elapsed time (wall clock time) for this period. The chart shows which active sessions are running on the CPU or waiting on an event.

The wait classes show how much database activity is consumed by waiting for a resource such as disk I/O. Values that use a larger block of active sessions represent bottlenecks caused by a particular wait class, as indicated by the corresponding color in the legend. To identify each wait class, move your cursor over the block in the Average Active Sessions chart corresponding to the class.

Click the block of color on the chart or its corresponding wait class in the legend to drill down to the wait class. The Active Sessions Working page for the wait class appears. From this page, you can view the details of wait classes in the following dimensions:

- Top SQL

On the Active Sessions Working page, the Top Working SQL table shows the database activity for actively running SQL statements that are consuming CPU resources. If one or several SQL statements are consuming most of the activity, then you should investigate them.

- Top sessions

On the Active Sessions Working page, the Top Working Sessions table displays the top sessions waiting for the corresponding wait class during the selected time period.

A **session** is a logical entity in the database instance memory that represents the state of a current user login to the database. A session lasts from the time a user logs in to the database until the user disconnects. If a single session is consuming the majority of database activity, then you should investigate it.

- Top services

The Top Services table displays the top services waiting for the corresponding wait event during the selected time period.

A **service** is a group of applications with common attributes, service-level thresholds, and priorities. If a service is using the majority of the wait time, then you should investigate it.

- Top modules

The Top Modules table displays the top modules waiting for the corresponding wait event during the selected time period.

Modules represent the applications that set the service name as part of the workload definition. If a single module is using the majority of the wait time, then it should be investigated.

- Top actions

The Top Actions table displays the top actions waiting for the corresponding wait event during the selected time period.

Actions represent the jobs that are performed by a module. If a single action is using the majority of the wait time, then you should investigate it.

- Top clients

The Top Clients table displays the top clients waiting for the corresponding wait event during the selected time period. A client can be a Web browser or any client process that initiates requests for an operation to be performed by the database. If a single client is using the majority of the wait time, then you should investigate it.

- Top PL/SQL

The Top PL/SQL table displays the top PL/SQL subprograms waiting for the corresponding wait event during the selected time period. If a single PL/SQL subprogram is using the majority of the wait time, then you should investigate it.

- Top files

The Top Files table displays the average wait time for specific files during the selected time period. This data is available from the Active Sessions Waiting: User I/O page.

- Top objects

The Top Objects table displays the top database objects waiting for the corresponding wait event during the selected time period. This data is available from the Active Sessions Waiting: User I/O page.

For more information about monitoring user and session activity, see the "Monitoring User Activity" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

## 14.1.4 Monitoring the Database Instance

In the Average Active Sessions section of the Performance page, you can use the instance charts to monitor database instance activity in the following dimensions:

- Throughput

Database **throughput** measures the amount of work the database performs in a unit of time. The Throughput charts show any contention that appears in the Average Active Sessions chart. The Throughput charts on the Performance page display:

- Number of logons, transactions, physical reads, and redo size per second
- Number of physical reads and redo size per transaction

Compare the peaks on the Throughput charts with the peaks on the Average Active Sessions chart. If the Average Active Sessions chart displays a large number of sessions waiting, indicating internal contention, and throughput is low, then consider tuning the database.

- I/O

The I/O charts show I/O statistics collected from all database clients. The I/O wait time for a database process represents the amount of time that the process could have been doing useful work if a pending I/O had completed. Oracle Database captures the I/O wait times for all important I/O components in a uniform fashion so that every I/O wait by any Oracle process can be derived from the I/O statistics.

The Latency for Synchronous Single Block Reads chart shows the total perceived **I/O latency** for a block read, which is the time difference between when an I/O request is submitted and when the first byte of the transfer arrives. Most systems are performing satisfactorily if latency is fewer than 10 milliseconds.

You can also monitor I/O by function, type, and consumer groups using the various charts provided.

- Parallel executions

The Parallel Execution charts show system metrics related to parallel queries. **Metrics** are statistical counts per unit. The unit could be a time measure, such as seconds, or per transaction, or session.

A parallel query divides the work of executing a SQL statement across multiple processes. The charts show parallel queries that were waiting for a particular wait event that accounted for the highest percentages of sampled session activity.

- Services

The Services charts show services waiting for the corresponding wait event during the time period shown. Services represent groups of applications with common attributes, service-level thresholds, and priorities. Only active services are shown.

For more information about monitoring the database instance, see the "Monitoring Instance Activity" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

### 14.1.5 Monitoring the Host System

The Host chart on the Performance page displays utilization information about the system hosting the database.

Using the Host chart, you can view CPU, memory, and disk utilization for the host system. To determine if the host system has enough resources available to run the database, establish appropriate expectations for the amount of CPU, memory, and disk resources that your system should be using. You can then verify that the database is not consuming too many of these resources.

For more information about monitoring the host system, see the "Monitoring Host Activity" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

## 14.2 Tuning Oracle Database

Performance tuning is an iterative process. Removing the first bottleneck (a point where resource contention is highest) may not lead to performance improvement immediately because another bottleneck might be revealed that has an even greater performance impact on the system.

Oracle Database provides several tools that enable you to diagnose and tune performance problems. Automatic Database Diagnostic Monitor (ADDM) analyzes statistics to provide automatic diagnosis of major performance problems. You can also perform your own analysis using statistics from AWR and ASH reports, wait events, and SQL trace files to identify other bottlenecks in the database.

Instructions for diagnosing and tuning performance problems are provided in the following sections:

- [Section 14.2.1, "Creating a Baseline of the Database"](#)
- [Section 14.2.2, "Diagnosing and Tuning Database Performance Problems Using ADDM"](#)
- [Section 14.2.3, "Diagnosing and Tuning Database Performance Problems Reactively"](#)
- [Section 14.2.4, "Tuning SQL Statements"](#)

### 14.2.1 Creating a Baseline of the Database

Before you can tune your database, you need to have an established performance baseline that can be used for comparison if a performance problem arises. Oracle Database automatically maintains a system-defined moving window baseline that contains all AWR data within the AWR retention period, which by default is 8 days. Using Database Control, you can also create your own baseline by specifying and preserving a pair or a range of snapshots as a baseline. The snapshots contained in a baseline are excluded from the automatic AWR purging process and are retained indefinitely.

Before creating a baseline, carefully consider the time period you choose as a baseline because it should represent the database operating at an optimal level. In the future,

you can compare these baselines with other baselines or snapshots to compare performance. You can create a single baseline captured at a single, fixed time interval, or a repeating baseline that repeats during a time interval over a specific period.

To create a baseline of the database, use the AWR Baselines page in Database Control, accessible from the Statistics Management section of the Server tab.

For more information about creating a baseline of the database, see the "Managing Baselines" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

## 14.2.2 Diagnosing and Tuning Database Performance Problems Using ADDM

Automatic Database Diagnostic Monitor (ADDM) is self-diagnostic software built into Oracle Database. ADDM examines and analyzes data captured in the AWR to identify possible database performance problems.

An ADDM analysis is performed after each AWR snapshot (every hour by default), and the results are saved in the database. The results of ADDM analysis are displayed as ADDM findings under Diagnostic Summary on the Database Home page in Oracle Database Control.

Each ADDM finding belongs to one of three types: problem, symptom, and information. Each problem finding is quantified with an estimate of the portion of DB time that resulted from the performance problem. When a specific problem has multiple causes, ADDM may report multiple findings. In this case, the impacts of these multiple findings can contain the same portion of DB time.

A problem finding can be associated with a list of recommendations for reducing the impact of a performance problem. Each recommendation has a benefit that is an estimate of the portion of DB time that can be saved if the recommendation is implemented. When multiple recommendations are associated with an ADDM finding, the recommendations may contain alternatives for solving the same problem. If this is the case, then choose the easiest solution to implement that yields the greatest benefit.

Recommendations are composed of actions and rationales. You must apply all the actions of a recommendation to gain its estimated benefit. The rationales explain why the set of actions was recommended, and provide additional information for implementing them.

You should review ADDM findings and implement the recommendations as part of regular database maintenance. Even when the database is operating at an optimal performance level, you should continue to use ADDM to monitor database performance on an ongoing basis.

For more information about using ADDM, see the "Automatic Database Performance Monitoring" chapter in the *Oracle Database 2 Day + Performance Tuning Guide*.

## 14.2.3 Diagnosing and Tuning Database Performance Problems Reactively

While ADDM enables you to proactively diagnose database performance problems when they happen, there may be times when you want to identify database performance problems reactively. For example, you may want to compare database performance over time, or analyze a very short duration for short-lived performance problems. You may also want to examine wait events to determine if user response time can be improved by reducing the time that is spent waiting by server processes.

Oracle Database provides various tools, aside from ADDM, to enable you to diagnose and tune database performance problems reactively. The instructions are provided in the following topics:

- [Section 14.2.3.1, "Comparing Database Performance Over Time Using AWR Reports"](#)
- [Section 14.2.3.2, "Identifying Transient Performance Problems Using ASH Reports"](#)
- [Section 14.2.3.3, "Identifying Wait Time Using Wait Events"](#)

### 14.2.3.1 Comparing Database Performance Over Time Using AWR Reports

Performance degradation of the database occurs when your database was performing optimally in the past, such as 6 months ago, but has gradually degraded to a point where it becomes noticeable to the users. The Automatic Workload Repository (AWR) Compare Periods report enables you to compare database performance between two periods of time to identify any performance degradation that may have occurred over time.

The AWR Compare Periods report compares a new baseline or a pair of snapshots to an existing baseline. Before generating this report, you should have an existing baseline that represents the system operating at an optimal level, as described in ["Creating a Baseline of the Database"](#) on page 14-6. If an existing baseline is unavailable, you can use this report to compare two periods of time using two pairs of snapshots. To generate the AWR Compare Periods report, use the Automatic Workload Repository page in Database Control, accessible from the Database Server page.

For more information about generating AWR Compare Periods reports, see the ["Running the AWR Compare Periods Reports"](#) section in the *Oracle Database 2 Day + Performance Tuning Guide*.

### 14.2.3.2 Identifying Transient Performance Problems Using ASH Reports

ADDM tries to report the most significant performance problems during an analysis period in terms of their impact on DB time. If a particular problem lasts for a very short duration, then its severity might be averaged out or minimized by other performance problems in the analysis period. Therefore, the problem may not appear in the ADDM findings. Whether a performance problem is captured by ADDM depends on its duration compared to the interval between the AWR snapshots.

To capture a detailed history of database activity, Oracle Database samples active sessions each second with the Active Session History (ASH) sampler. ASH gathers sampled data at the session level rather than at the instance level. By capturing statistics for only active sessions, the size of the sampled data is directly related to the work being performed.

To generate the ASH report, under Average Active Sessions on the Database Performance page, click **Run ASH Report**.

For more information about generating ASH reports, see the ["Running Active Session History Reports"](#) section in the *Oracle Database 2 Day + Performance Tuning Guide*.

### 14.2.3.3 Identifying Wait Time Using Wait Events

Wait events are statistics that are incremented by a server process or thread to indicate that it had to wait for an event to complete before being able to continue processing. Whenever an Oracle Database process waits for something, it records the wait using one of a set of predefined wait events. Wait event data reveals various symptoms of problems that might be impacting performance, such as latch contention, buffer contention, and I/O contention.

Wait event statistics include the number of times an event was waited for and the time waited for the event to complete. To minimize user response time, reduce the time spent by server processes waiting for event completion. Not all wait events have the



same wait time. Therefore, it is more important to examine events with high wait time rather than wait events with a high number of occurrences.

You can query wait event statistics from various v\$ dynamic performance views. For more information about using wait events, see the "Using Wait Event Statistics to Drill Down to Bottlenecks" section in the *Oracle Database Performance Tuning Guide*.

## 14.2.4 Tuning SQL Statements

When Oracle Database executes a SQL statement, the query optimizer (also called the optimizer) first determines the best and most efficient way to retrieve the results. It compares the cost of all possible approaches and chooses the approach with the least cost. The access method for physically executing a SQL statement is called an execution plan, which the optimizer is responsible for generating. The determination of an execution plan is an important step in the processing of any SQL statement, and can greatly affect execution time.

The optimizer can also help you tune SQL statements. By using SQL Tuning Advisor and SQL Access Advisor, you can run the optimizer in advisory mode to examine a SQL statement or set of statements and determine how to improve their efficiency. SQL Tuning Advisor and SQL Access Advisor can make various recommendations. SQL Access Advisor is primarily responsible for making schema modification recommendations, such as adding or dropping indexes and materialized views. SQL Tuning Advisor makes other types of recommendations, such as creating SQL profiles and restructuring SQL statements. Using Database Control, you can accept and implement many of these recommendations.

Review the following topics for information on tuning SQL statements:

- [Section 14.2.4.1, "Collecting Optimizer Statistics"](#)
- [Section 14.2.4.2, "SQL Tuning Sets"](#)
- [Section 14.2.4.3, "SQL Profiles"](#)
- [Section 14.2.4.4, "Using SQL Tuning Advisor"](#)
- [Section 14.2.4.5, "Using SQL Access Advisor"](#)
- [Section 14.2.4.6, "Using SQL Tracing"](#)

### 14.2.4.1 Collecting Optimizer Statistics

Oracle Database can execute an SQL statement in many different ways. The optimizer determines the most efficient way to execute an SQL statement after considering many factors related to the objects referenced and the conditions specified in the query. For the query optimizer to produce an optimal execution plan, the statistics in the data dictionary should accurately reflect the volume and data distribution of the tables and indexes.

Oracle Fusion Applications uses the `DBMS_STATS` package to automatically gather optimizer statistics. In this case, the database automatically collects optimizer statistics for tables with absent or stale statistics. If fresh statistics are required for a table, then the database collects them both for the table and associated indexes. For any on-demand gathering statistics on a particular table, you can use Database Control.

The output from the optimizer is an execution plan that describes an optimal method of execution. The plans shows the combination of the steps Oracle Database uses to execute an SQL statement. Each step either retrieves rows of data physically.

For more information about the optimizer, see "The Query Optimizer" chapter in the *Oracle Database Performance Tuning Guide*.

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**Note:** Oracle Fusion Applications require several database initialization parameters to be set correctly to ensure optimal performance. For more information about these database initialization parameters and Fusion Applications best practices, see MOS document 1270340.1.

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#### 14.2.4.2 SQL Tuning Sets

A SQL tuning set is a database object that includes one or more SQL statements and their execution statistics and context. You can use the set as an input for advisors such as SQL Tuning Advisor, SQL Access Advisor, and SQL Performance Analyzer. You can load SQL statements into a SQL tuning set from different SQL sources, such as AWR, the cursor cache, or high-load SQL statements that you identify. SQL tuning sets are transportable, enabling SQL workloads to be transferred between databases for remote performance diagnostics and tuning. When high-load SQL statements are identified on a production system, it may not be desirable to perform investigation and tuning activities directly on this system. This feature enables you to transport the high-load SQL statements to a test system, where they can be safely analyzed and tuned.

To create a SQL tuning set, use SQL Tuning Sets page, accessible from Additional Monitoring Links on the Database Performance page.

For more information about SQL tuning sets, see the "Managing SQL Tuning Sets" in the *Oracle Database 2 Day + Performance Tuning Guide*.

#### 14.2.4.3 SQL Profiles

A SQL profile is a set of auxiliary information that is built during automatic tuning of a SQL statement. A SQL profile is to a SQL statement what statistics are to a table.

During SQL profiling, the optimizer uses the execution history of the SQL statement to create appropriate settings for optimizer parameters. After SQL profiling completes, the optimizer uses the information in the SQL profile and regular database statistics to generate execution plans. The additional information enables the database to produce well-tuned plans for corresponding SQL statements.

After running a SQL Tuning Advisor task with a comprehensive scope, a SQL profile may be recommended. If you accept the recommendation, then the database creates the SQL profile and enables it for the SQL statement.

To manage SQL profiles, use the Plan Control tab, accessible from the SQL Details page of the SQL statement that is using a SQL profile.

For more information about SQL profiles, see the "Managing SQL Profiles" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

#### 14.2.4.4 Using SQL Tuning Advisor

Oracle Database can generate SQL tuning reports automatically. Automatic SQL Tuning runs during system maintenance windows as an automated maintenance task, searching for ways to improve the execution plans of high-load SQL statements.

ADDM also automatically identifies high-load SQL statements. If ADDM identifies such statements, then click **Schedule/Run SQL Tuning Advisor** on the Recommendation Detail page to run SQL Tuning Advisor on these statements.

For more information about SQL Tuning Advisor, see the "Tuning SQL Statements Using SQL Tuning Advisor" section in the *Oracle Database 2 Day + Performance Tuning Guide*.

#### 14.2.4.5 Using SQL Access Advisor

To achieve optimal performance for data-intensive queries, materialized views and indexes are essential for SQL statements. However, implementing these objects does not come without cost. Creation and maintenance of these objects can be time-consuming. Space requirements can be significant. SQL Access Advisor enables you to optimize query access paths by recommending materialized views and view logs, indexes, SQL profiles, and partitions for a specific workload.

To run SQL Access Advisor, use the **SQL Access Advisor** link on the SQL Advisors page, accessible from the Advisor Central page under Related Links on the Database Home page.

For more information about SQL Access Advisor, see the "Optimizing Data Access Paths" chapter in the *Oracle Database 2 Day + Performance Tuning Guide*.

#### 14.2.4.6 Using SQL Tracing

You can use the SQL Trace facility to monitor Oracle Fusion Applications running against Oracle Database by assessing the efficiency of the SQL statements that Oracle Fusion applications are running. The SQL Trace facility provides performance information for individual SQL statements and generates detailed statistics for each statement.

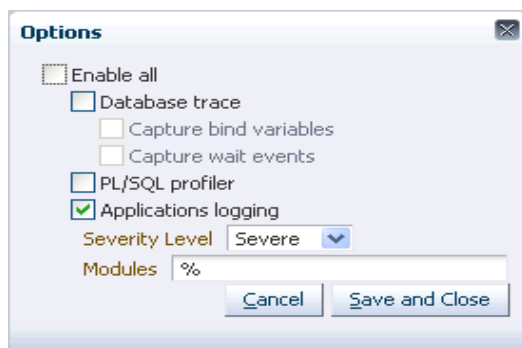
You can then run the TKPROF program to format the contents of the SQL trace file and place the output into a readable output file. TKPROF reports each statement executed with the resources it has consumed, the number of times it was called, and the number of rows which it processed. This information lets you easily locate SQL statements that are using the greatest resource.

For more information about using SQL tracing, see the "Using the SQL Trace Facility and TKPROF" section in the *Oracle Database Performance Tuning Guide*.

If a performance problem is reported for a particular business transaction for a given session in Oracle Fusion Applications, you can instruct the user of the session to enable a SQL trace for that transaction.

To enable SQL trace for a specific business transaction that is reported to be causing performance problem:

1. Sign in to Oracle Fusion Applications with a user account that is provisioned with the necessary role. Contact your security administrator for details.
2. From the **Help** menu, choose **Troubleshooting**, then **Troubleshooting Options**.
3. In the Options page, select **Database Trace**.
4. Select **Capture bind variables**, **Capture wait events** as appropriate.



5. Click **Save and Close**.

This enables SQL trace for the selected transaction and does not affect transactions that belong to other sessions.

## 14.3 Testing Oracle Database Changes

Oracle Real Application Testing enables you to perform real-world testing of Oracle Database. By capturing production workloads and assessing the impact of system changes on a test system before production deployment, Oracle Real Application Testing minimizes the risk of instabilities associated with changes.

See the following sections for more information about Oracle Real Application Testing:

- [Section 14.3.1, "Testing SQL Changes"](#)
- [Section 14.3.2, "Testing Database Changes"](#)

### 14.3.1 Testing SQL Changes

System changes—such as a upgrading a database or adding an index—may cause changes to execution plans of SQL statements, resulting in a significant impact on SQL performance. In some cases, the system changes may cause SQL statements to regress, resulting in performance degradation. In other cases, the system changes may improve SQL performance. Being able to accurately forecast the potential impact of system changes on SQL's performance by identifying regressed and improved SQLs, enables you to tune the system beforehand.

Also we can validate and measure the performance gain of the SQL and the system.

SQL Performance Analyzer automates the process of assessing the overall effect of a change on the full SQL workload by identifying performance divergence for each SQL statement. A report that shows the net impact on the workload performance due to the change is provided. For regressed SQL statements, SQL Performance Analyzer also provides appropriate executions plan details along with tuning recommendations. Thus, you can remedy any negative changes before the end users are affected.

To use SQL Performance Analyzer, under Real Application Testing on the Software and Support page, click **SQL Performance Analyzer**.

For more information about SQL Performance Analyzer, see the "SQL Performance Analyzer" part in the *Oracle Database Real Application Testing User's Guide*.

### 14.3.2 Testing Database Changes

Before system changes are made, such as hardware and software upgrades, extensive testing is usually performed in a test environment to validate the changes. However, despite the testing, the new system often experiences unexpected behavior when it enters production because the testing was not performed using a realistic workload. The inability to simulate a realistic workload during testing is one of the biggest challenges when validating system changes.

Database Replay enables realistic testing of system changes by essentially re-creating the production workload environment on a test system. Using Database Replay, you can capture a workload on the production system and replay it on a test system with the exact timing, concurrency, and transaction characteristics of the original workload. This enables you to fully assess the impact of the change, including undesired results, new contention points, or plan regressions. Extensive analysis and reporting is

provided to help identify any potential problems, such as new errors encountered and performance divergence.

To use Database Replay, under Real Application Testing on the Software and Support page, click **Database Replay**.

For more information about Database Replay, see the "Database Replay" part in the *Oracle Database Real Application Testing User's Guide*



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# Managing Oracle Fusion Applications Log Files

This chapter describes how to use incidents, log files, and QuickTrace to support normal operations for Oracle Fusion Applications and to prepare for future troubleshooting.

This chapter contains the following topics:

- [Section 15.1, "Overview of Oracle Fusion Applications Incidents, Logging, and QuickTrace"](#)
- [Section 15.2, "Understanding Oracle Fusion Applications Log Files and Log Messages"](#)
- [Section 15.3, "Viewing and Searching Log Files During Normal Operation"](#)
- [Section 15.4, "Configuring Settings for Log Files During Normal Operation"](#)

For information about using diagnostics tests to support normal operations for Oracle Fusion Applications, see [Chapter 16](#). For information about troubleshooting using log settings, log files, the QuickTrace feature (in-memory logging), diagnostic tests, and incidents, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

## 15.1 Overview of Oracle Fusion Applications Incidents, Logging, and QuickTrace

Incidents, log files, and QuickTrace can all help you administer Oracle Fusion Applications. If your Oracle Fusion Applications environment includes Oracle Enterprise Manager Cloud Control (Cloud Control), then you can also use Support Workbench to help you investigate, report, and resolve problems.

**Incidents** are collections of information about error conditions. It is strongly recommended that you follow Information Technology Infrastructure Library (ITIL) best practices by establishing a help desk or service desk within your organization to support Oracle Fusion Applications, and have the help desk personnel use incidents to track the troubleshooting and resolution of all problems. Some incidents are created and gather information automatically when problems occur. For example, the information associated with an automatically created incident may include detailed operational information collected by the QuickTrace (in-memory logging) feature for Oracle Fusion Applications. For problems that do not automatically create incidents, administrators or help desk personnel can manually create incidents and manually gather and add related system information.

**Log files** contain information about both normal and problematic events. Log files can help you both to monitor normal operations and to diagnose and address some problems yourself. For example, log messages that state that a service cannot be reached might indicate a hardware failure. If you discover a more complex issue, then Oracle Support personnel may use log files to trace the execution code paths of relevant requests, as part of diagnosing the problem. Log files are particularly helpful if your Oracle implementation contains custom code that needs debugging, especially when using a debugger is not feasible, such as on a production system.

The **QuickTrace** (in-memory logging) feature continuously records a specified level of log detail in an area of memory. The memory is recycled on an ongoing basis, with the oldest information being deleted or overwritten first. Because QuickTrace writes to memory instead of to a log file, it can gather operational information continuously without significantly affecting system performance. The information that QuickTrace stores in memory is written to disk only when an incident occurs or when an administrator manually dumps the contents of a QuickTrace buffer.

In Cloud Control, **Support Workbench** helps you investigate, report, and resolve problems (critical errors). You can use Support Workbench to perform the following kinds of operations:

- View summary information about recent problems and incidents.
- View detailed diagnostic data that was gathered automatically.
- Manually trigger additional dumps of diagnostic data.
- Connect to the Oracle Fusion Applications Diagnostic Dashboard application (Diagnostic Dashboard), which provides you with additional diagnostic tests that you can run. For information about using Diagnostic Dashboard, see [Chapter 16](#) and the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.
- Create or update service requests with Oracle Support, including uploading diagnostic data to Oracle

For information about using Support Workbench to administer Oracle Fusion Applications targets, specifically, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*. For general information about using Support Workbench, see the topic "Support Workbench Page" in the Cloud Control online help and the chapter on investigating, reporting, and resolving problems in *Oracle Database 2 Day DBA*.

## 15.2 Understanding Oracle Fusion Applications Log Files and Log Messages

Log files can help you administer and support Oracle Fusion Applications over time. Oracle developers use mechanisms such as application programming interface (API) calls in Oracle Fusion Applications code to record application operations in log files and to provide error messages as appropriate.

This section contains the following topics:

- [Section 15.2.1, "Standard Log File Administration Tasks and Tools"](#)
- [Section 15.2.2, "Log Files and Settings"](#)
- [Section 15.2.3, "Log Message Structure"](#)



You can set system log levels to determine how much information is logged. For more information about setting log levels, see [Section 15.4](#).

For more information about monitoring log files, see [Section 15.3](#) and [Section 15.4.4](#). For more information about using logs to help diagnose a problem, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

It is important to be familiar with the following additional concepts that are related to log files:

- **Seed data** is information that Oracle provides to you in the form of database records. Error messages are included in seed data.
- **Profiles** are settings that you can select to determine details of how the application operates. Oracle Fusion applications include profile options that affect how much information to log either for an entire site or for a specific user. Oracle Fusion applications that are written in Java also support some profile options that affect how much information to log for a specific product.

For more information about profiles, see [Section 15.4](#) and the chapter about maintaining common reference objects in the *Oracle Fusion Applications Common Implementation Guide*.

### 15.2.1 Standard Log File Administration Tasks and Tools

Under ordinary circumstances, the following administrative tasks are part of the necessary setup and maintenance of Oracle Fusion Applications log files:

- Tuning system performance by adjusting configuration settings for logs
- Reviewing log files for general monitoring of system health
- Searching for specific information in log files
- Managing available disk space for log files

If your Oracle Fusion Applications environment includes Cloud Control, then you may find it convenient to use Cloud Control to monitor log files in multiple domains, simultaneously.

You can use the Oracle Enterprise Manager Fusion Applications Control (Fusion Applications Control) user interface to complete all of the tasks listed in this section, but only for one WebLogic domain at a time. In particular, you can use Fusion Applications Control to configure log profile option values for Oracle Fusion Applications, although you can also configure profile options by using the Manage Administrator Profile Values screen in the Setup and Maintenance work area. You can use either Cloud Control or Fusion Applications Control to view and search Oracle Fusion Applications log files.

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**Note:** Fusion Applications Control and Cloud Control are compliant with Information Technology Infrastructure Library (ITIL) best practices.

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During troubleshooting activities, additional log administration tasks may include downloading log files from servers and packaging incidents for transmittal to Oracle Support. For more information about these activities and the tools for accomplishing them, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs,

QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

## 15.2.2 Log Files and Settings

Oracle provides settings that determine the amount of information that is gathered into the log files for your Oracle Fusion applications. You can either use the default setting values or change one or more values to adjust how much information is gathered. When your system is operating correctly, you may need log entries only for particularly important kinds of events. If your system experiences a problem, then you can temporarily increase the amount of information that is logged to get more detailed information while you attempt to reproduce and resolve the problem.

Most Oracle Fusion applications write log output in **Oracle Diagnostic Logging (ODL)** format. For information about the attributes that appear in standard log files for Oracle Fusion Applications, see the "Understanding ODL Messages and ODL Log Files" section in the *Oracle Fusion Middleware Administrator's Guide*.

Some Oracle Fusion applications use nonstandard logging mechanisms that are disabled by default. For these applications, you must turn on the logging facility when you need it and specify the kind of information that you want to record in the log file. For more information about these special logging mechanisms, see [Section 15.4.6](#).

## 15.2.3 Log Message Structure

A typical log message consists of three parts:

- Attributes that are logged by the Oracle Fusion Middleware layer or the Oracle Database layer
- Attributes that are logged by logging APIs for Oracle Fusion Applications, including AppsLogger
- Message text

This section contains the following topics:

- [Section 15.2.3.1, "Log Message Attributes Supplied by the Oracle Fusion Middleware and Oracle Database Layers"](#)
- [Section 15.2.3.2, "Log Message Attributes Supplied by Logging APIs for Oracle Fusion Applications"](#)
- [Section 15.2.3.3, "Log Message Attributes Supplied by the Application Session"](#)
- [Section 15.2.3.4, "Log Message Attributes Supplied by Oracle Enterprise Scheduler Job Requests"](#)
- [Section 15.2.3.5, "Log Message Attributes Supplied by SOA"](#)

### 15.2.3.1 Log Message Attributes Supplied by the Oracle Fusion Middleware and Oracle Database Layers

The log message attributes logged by the Oracle Fusion Middleware layer or the Oracle Database layer may include the following:

- Date/time: The date and time when the message was recorded in the log.
- Component ID: The component or Oracle WebLogic Server (WebLogic Server) instance from which the message originated. For the Oracle Fusion Middleware layer, a typical value is the name of the Oracle WebLogic Server that was executing

the Oracle Fusion application when the message was generated. For the database layer, a typical value is `rdbms`.

- **Message Type:Level:** Shows the level being logged for the particular message
- **Message ID:** A unique identifier for a seeded message, composed of the product code and a message number. A typical value for a message ID might be `FND-12343`.
- **Module ID:** The system or application module that generated the message. This is usually the name of the logger object that generated the message. In some cases, the logger name may reflect the full Java class name of the application code module that was executing when the message was logged. In other cases, the logger object may generate messages for multiple Java classes.
- **Execution context ID (ECID):** A global unique identifier and a sequence number of the thread of execution in which the originating component participates. The identifier can be used to correlate messages from several components that may be involved in the same thread of execution.
- **Host:** The name of the host from which the message originates. For Java, this should be the value returned by the `java.net.InetAddress.getLocalHost().getHostName()` method.
- **Thread ID (TID):** A unique identifier for the thread within the Java process where the message was generated.
- **Java EE application name:** Name of a Java EE application that was executing when the message was logged.
- **User name:** A unique identifier that the user enters when signing in to an Oracle Fusion application. This attribute is logged both by Oracle Fusion Middleware and by the logging APIs for Oracle Fusion Applications.
- **Selective trace ID (labeled `ODL_TRACE_ID` in the log file):** An identifier for operations in the Oracle Fusion Middleware layer that match criteria an administrator supplied as part of a request to log additional information.

---

**Note:** Selective trace operations do not affect the information that is logged from the Oracle Fusion Applications layer, but the Oracle Fusion Middleware log messages that selective tracing operations obtain are stored in the same log files as log messages from the Oracle Fusion Applications layer. Similarly, log messages from the Oracle Fusion Applications layer are listed with Oracle Fusion Middleware log messages in selective trace output if those log messages match the trace criteria that the administrator specified. For more information about selective tracing, see the "Configuring and Using Selective Tracing" section in the *Oracle Fusion Middleware Administrator's Guide*.

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### 15.2.3.2 Log Message Attributes Supplied by Logging APIs for Oracle Fusion Applications

The log message attributes logged by logging APIs for Oracle Fusion Applications include the following:

- **User Name:** A unique identifier that the user enters when signing in to an Oracle Fusion application. This attribute is logged both by Oracle Fusion Middleware and by the logging APIs for Oracle Fusion Applications.
- **User GUID:** A global unique identifier representing the user.

- Role IDs: A list of IDs representing the job roles granted to the user.
- Session ID: A unique identifier for the application user session.
- Thread Name: A name that identifies the thread generating the log in Java Virtual Machine (JVM). Applies only to Oracle Fusion applications that are written in Java. Logging APIs for Oracle Fusion applications that are written in C and PL/SQL do not populate this attribute.
- Apps Source: The portion of the Oracle Fusion Applications code that is executing when the message is logged.
- Apps Auto Log: Indicates whether the message being logged was logged implicitly.
- DB Connection URL: The URL connection string for the application database data source.

Depending on the value of the `AFLOG_EXTENDED_ENABLED` profile option, the following supplemental attributes may also be logged:

- Message Cause: The reason that the message is being logged.
- Admin Action: Recommended follow-up action for Oracle Fusion Applications administrators.
- Admin Details: Additional information for administrators about the condition being logged.
- User Action: Recommended follow-up action for Oracle Fusion Applications users.
- User Details: Additional information for users about the condition being logged.

For more information about how the `AFLOG_EXTENDED_ENABLED` profile option affects the logging of these supplemental attributes, see [Section 15.4.1](#).

### 15.2.3.3 Log Message Attributes Supplied by the Application Session

The log message attributes logged by the application session include the following:

- Product Family: The name of the **product family** that is executing when the message is logged.
- Product: The name of the product that is executing when the message is logged.

### 15.2.3.4 Log Message Attributes Supplied by Oracle Enterprise Scheduler Job Requests

The following attributes appear in the log if the log entry is written from an Oracle Enterprise Scheduler job request.

- Job Request ID: The identifier of the Oracle Enterprise Scheduler job request that is being executed when this message is logged.
- Job Definition Name: The name of the Oracle Enterprise Scheduler job definition. A job definition is the smallest unit of work that is performed in the context of the client application.
- Job Package Name: The package location of the Oracle Enterprise Scheduler job definition that is executing when this message is logged.
- Job Definition Application: The application that owns the Oracle Enterprise Scheduler job.

### 15.2.3.5 Log Message Attributes Supplied by SOA

The following attributes appear in the log if the log entry is written from SOA:

- SOA Composite Name: The name of the SOA Composite that is executing when the message is logged
- SOA Component Name: The name of the SOA Component that is executing when the message is logged
- SOA Composite Instance ID: The instance ID of the SOA Composite that is executing when the message is logged
- SOA Component Instance ID: The instance ID of the SOA Component that is executing when the message is logged
- Log Token Map: One or more primary key values for the logical entity that a BPEL process is handling when the message is logged. Oracle Support may require this information for troubleshooting purposes.

## 15.3 Viewing and Searching Log Files During Normal Operation

To view and search Oracle Fusion application log files effectively, it is important to be familiar with the software that is available for working with log files. You may also find it helpful to know where log files are stored for various application modules.

This section contains the following topics:

- [Section 15.3.1, "Viewing Logs from Fusion Applications Control"](#)
- [Section 15.3.2, "Searching for Specific Information in Log Files within a Single Domain"](#)
- [Section 15.3.3, "Searching for Specific Information in Log Files Across Multiple Domains"](#)
- [Section 15.3.4, "Saving Log Search Criteria for Reuse"](#)
- [Section 15.3.5, "Reusing Saved Log Search Criteria"](#)
- [Section 15.3.6, "Typical Log File Locations"](#)
- [Section 15.3.7, "Location of Logged Information When Using Multiple Managed Servers"](#)

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**Note:** Each Oracle Fusion Applications module is written in one of the following code languages: Java, SOA, PL/SQL, or C. Details of logging vary depending on the coding language of the application module.

In general, you can administer logging for Oracle Fusion Applications without knowing which programming language implements particular modules. However, it is important to become familiar with the configuration settings and log file locations used for each language, so you can monitor or adjust all relevant parts of the system when necessary.

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### 15.3.1 Viewing Logs from Fusion Applications Control

When you want to view log files for one Oracle Fusion Applications product family or product that uses standard logging functionality, one typical way that you can view the log files is to use Fusion Applications Control.

By default, you can use Fusion Applications Control to view standard log files for the Oracle WebLogic Servers that host Oracle Fusion applications and standard log files generated by Java code within Oracle Fusion applications. In addition, you can configure your system to allow Fusion Applications Control to view log files generated by PL/SQL or C code within Oracle Fusion applications. For more information about how to configure this capability, see [Section 15.4.7](#).

From Fusion Applications Control, you can view log messages for different system components by selecting different targets. In the product family part of the navigation tree, the following target types allow viewing of log messages for Oracle Fusion Applications:

- An entire product family. When you select this target type and view log files, you view the aggregated logs for all of the servers and clusters in the selected product family's domain.
- A particular Oracle Fusion application, such as Procurement, sometimes called an Oracle Fusion Applications cluster application. When you select this target type and view log files, you view the aggregated logs for all of the servers in the selected cluster.
- A particular instance of an Oracle Fusion application deployed to a Managed Server. When you select this target type and view log files, you view the log for the selected individual Managed Server.

The Fusion Applications Control page also gives you access to log files for the following target types in the farm part of the navigation tree, but the functionality used to view those logs is part of Fusion Middleware Control.

- A particular Oracle WebLogic Server domain
- A particular server cluster
- A particular server within a particular server cluster

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**Note:** For information about viewing Oracle Fusion Middleware log files, including log files for Oracle Enterprise Scheduler and Oracle Enterprise Crawl and Search Framework, see the "Viewing and Searching Log Files" and "Viewing Log Files and Their Messages Using Fusion Middleware Control" sections in the *Oracle Fusion Middleware Administrator's Guide*.

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To view the contents of Oracle Fusion Applications logs from Fusion Applications Control:

1. From the navigation pane, select the target for which you want to display log contents.

In the part of the navigation tree for the product family, you can display logs for the following kinds of targets:

- A product family target lets you display the aggregated log entries for all of the Oracle Fusion applications in the selected product family. For example, **Financials** is a product family target that appears as a top-level folder in the navigation tree.
- An Oracle Fusion Applications cluster application target lets you display the aggregated logs for all of the Managed Servers that run the selected application, including the logs for any other Oracle Fusion applications that run on those Managed Servers. For example, if you expand the product family,

**Financials**, and then expand **Fusion Applications**, then **PayablesApp** is a cluster application target.

- An Oracle Fusion application instance target lets you display the log entries for the selected application on the selected sever. For example, if you expand the product family, **Financials**, and then expand **Fusion Applications**, and then expand **PayablesApp**, then **PayablesApp (PayablesServer\_1)** is an application instance target.

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**Note:** When you select a target, the header of the context pane displays a dropdown menu name that depends on the target type:

- For a product family target, the menu name is **Product Family**.
  - For an Oracle Fusion Applications cluster application target, the menu name is **Fusion Cluster Application**.
  - For an Oracle Fusion application instance target, the menu name is **Fusion J2EE Application**.
- 

Alternatively, if you want to view a log file for an Oracle Fusion Middleware target, then you can select such a target from the farm part of the navigation tree. For more information about viewing log files for Oracle Fusion Middleware components, see the "Viewing Log Files and Their Messages Using Fusion Middleware Control" section in the *Oracle Fusion Middleware Administrator's Guide*.

2. In the context pane, from the dynamic target menu, choose **Logs > View Log Messages** to display the log messages screen.

## 15.3.2 Searching for Specific Information in Log Files within a Single Domain

For most Oracle Fusion applications, you can use Fusion Applications Control to search for log messages that have specific characteristics. Searches that use Fusion Applications Control are similar to searches that use Fusion Middleware Control. For more information about these searches, see the "Viewing and Searching Log Files" section in the *Oracle Fusion Middleware Administrator's Guide*.

By default, you can use Fusion Applications Control to search standard log files for Oracle Fusion applications that are written in Java and the Oracle WebLogic Servers that host those applications. You can configure your system to allow Fusion Applications Control to search log files for Oracle Fusion applications that are written in PL/SQL or C. For more information about the necessary configuration steps for PL/SQL and C logs, see [Section 15.4.7](#).

To search standard Oracle Fusion Applications log files using Fusion Applications Control:

1. From the navigation pane for Fusion Applications Control, select the target for which you want to search log contents.

For your target, you can select a product family such as **Financials**, an Oracle Fusion Applications cluster application such as **LedgerApp**, or an Oracle Fusion application instance such as **LedgerApp (LedgerServer\_1)**. For information about searching log files in multiple domains, using a Fusion Instance target, see [Section 15.3.3](#).

---

**Note:** When you select a target, the header of the context pane displays a dropdown menu name that depends on the target type:

- For a product family target, the menu name is **Product Family**.
  - For an Oracle Fusion Applications cluster application target, the menu name is **Fusion Cluster Application**.
  - For an Oracle Fusion application instance target, the menu name is **Fusion J2EE Application**.
- 

For example, if you want to search the aggregated log entries for all of the Oracle Fusion applications in the **Financials** product family, then you select the **Financials** entry in the navigation tree. The **Product Family** dropdown menu appears under **Financials** in the context pane header.

If you want to search the aggregated logs for the Ledger cluster application, then you expand the **Financials** entry in the navigation tree, then expand the **Fusion Applications** entry, and then select **LedgerApp**. The **Fusion Cluster Application** dropdown menu appears under **LedgerApp** in the context pane header.

If you would rather search the Ledger application log entries for only a particular server, then you expand the **Financials** entry in the navigation tree, then expand the **Fusion Applications** entry, then expand the **LedgerApp** entry, and then select the individual **LedgerApp** Managed Server for the log you want to search. The **Fusion J2EE Application** dropdown menu appears under **LedgerApp** in the context pane header.

2. In the context pane, from the dynamic target menu, choose **Logs > View Log Messages**.

If you selected an Oracle Fusion application as your target, then the content pane displays the aggregated log messages from all of the servers for the Oracle Fusion application that you selected.

If you selected an individual Oracle Fusion application instance running on a particular Managed Server as your target, then the content pane displays the log messages for the selected Oracle Fusion application operations that were handled by the selected server.

If you selected a product family such as **Financials** as your target, then the content pane displays the aggregated log messages for all of the Managed Servers that handle Oracle Fusion applications in the selected product family.

3. If necessary, expand the **Search** area of the content pane.
4. If you selected an Oracle Fusion application instance in Step 1, skip to Step 5.

If you selected a product family or Oracle Fusion Applications cluster application in Step 1, then complete the following substeps to determine which members of the selected target will be included in the log search:

- a. Expand the **Selected Targets** section of the **Search** area.
- b. If you want to search the log files for only some of the listed target members, then select the ones you want to omit from the search and click **Remove**.
- c. If you want the log search operation to search log files that are not currently listed, then click **Add**, select the additional targets that you want to search, and click **Select**.
- d. Go to Step 5.



5. Enter or select applicable search criteria in any visible search fields, such as the following fields that are visible by default:
  - In the **Date Range** fields, specify the time period for which you want to display log messages.
 

To specify a specific number of the most recent minutes, hours, or days, select **Most Recent** from the dropdown list, enter your preferred number, and select the appropriate time units.

To specify the time period using starting and ending dates and times, select **Time Interval** from the dropdown list and enter the starting and ending dates and times.
  - In the **Message Types** field, select one or more checkboxes to specify the kinds of log messages that you want to display.
  - In the **Message** fields specify some or all of the message text in the log messages that you want to display.

If you select either the **matches** search operator or the **does not match** search operator, then you must either specify the full text of the message, or you must use a standard Java language expression to specify the characteristics of the missing text. For example, in standard Java expressions, the period (.) acts as a wildcard that matches most single characters, and the combination of a period and an asterisk (.\* ) acts as a wildcard to match any string of characters.

In contrast, the following search operators contain implicit wildcard semantics. You do not need wildcard characters or other Java expressions when you use any of these operators to search for a part of the text of a message:

- **contains**
- **does not contain**
- **starts with**
- **does not start with**
- **ends with**
- **does not end with**

---

**Note:** If you search for multiple values within a single search field, using commas to separate the values, then the search results display log entries that match any of the criteria specified for that field (logical OR). However, if you specify criteria in multiple search fields, then the search results display only log entries that match specified criteria in all of those search fields (logical AND).

---

6. If you want to use search criteria in fields that are not currently visible, then complete the following substeps; otherwise, skip this step.
  - a. Click **Add Fields**.
  - b. Select one or more checkboxes for the additional fields you want to use in your search, and then click **Add**.

For example, you might select **ECID** to search for all log messages that are associated with a particular execution context identifier.

- c. In each field that you added, specify the value that you want the search to match.

For example, you might enter the **ECID** value of  
004bYSyedEi3v1A5Jb8Dyf0002kx003Xff.

7. Click **Search**.

### 15.3.3 Searching for Specific Information in Log Files Across Multiple Domains

If your Oracle Fusion Applications environment includes Cloud Control, then you can use Cloud Control to search for information in the log files of multiple domains within a single Fusion instance.

To search standard Oracle Fusion Applications log files in multiple domains using Cloud Control:

1. In Cloud Control, from the **Target** menu, choose **Fusion Applications**.
2. In the list of Oracle Fusion instances and Oracle Fusion Applications product families, click the name of the instance that interests you.
3. From the dynamic Fusion Instance target menu, choose **Logs > View Log Messages**.
4. If it is collapsed, then expand the **Search** area of the **Log Messages** pane.
5. Expand the **Selected Targets** part of the **Search** area, and make sure that it lists the targets for all of the log files that you want to search:
  - If you want to search the log files for only some of the listed target members, then select the ones you want to omit from the search and click **Remove**.
  - If you want the log search operation to search log files that are not currently listed, then click **Add**, select the additional targets that you want to search, and click **Select**.
6. Enter or select applicable search criteria in any of the visible search fields, such as the following fields that are visible by default:
  - In the **Date Range** fields, specify the time period for which you want to display log messages.

To specify a specific number of the most recent minutes, hours, or days, select **Most Recent** from the dropdown list, enter your preferred number, and select the appropriate time units.

To specify the time period using starting and ending dates and times, select **Time Interval** from the dropdown list and enter the starting and ending dates and times.
  - In the **Message Types** field, select one or more checkboxes to specify the kinds of log messages that you want to display.
  - In the **Message** fields, specify some or all of the message text in the log messages that you want to display.

If you select either the **matches** search operator or the **does not match** search operator, then you must either specify the full text of the message, or you must use a standard Java language expression to specify the characteristics of the missing text. For example, in standard Java expressions, the period (.) acts as a wildcard that matches most single characters, and the combination of a period and an asterisk (.\* ) acts as a wildcard to match any string of characters.

In contrast, the following search operators contain implicit wildcard semantics. You do not need wildcard characters or other Java expressions when you use any of these operators to search for a part of the text of a message:

- **contains**
- **does not contain**
- **starts with**
- **does not start with**
- **ends with**
- **does not end with**

---

**Note:** If you search for multiple values within a single search field, using commas to separate the values, then the search results display log entries that match any of the criteria specified for that field (logical OR). However, if you specify criteria in multiple search fields, then the search results display only log entries that match specified criteria in all of those search fields (logical AND).

---

7. If you want to use search criteria in fields that are not currently visible, then complete the following substeps; otherwise, skip this step.

a. Click **Add Fields**.

b. Select one or more checkboxes for the additional fields you want to use in your search, and then click **Add**.

For example, you might select **ECID** to search for all log messages that are associated with a particular execution context identifier.

c. In each field that you added, specify the value that you want the search to match.

For example, you might enter the **ECID** value of  
004bYSyedEi3v1A5Jb8Dyf0002kx003XFf.

8. Click **Search**.

### 15.3.4 Saving Log Search Criteria for Reuse

If your Oracle Fusion Applications environment includes Cloud Control, then you can use Cloud Control to save log search criteria so that repeating the same search is more convenient in the future.

To save log search criteria using Cloud Control:

1. Make sure that you are logged into Cloud Control as the user who will need to reuse the criteria that you plan to save.

Only the user who saves a set of log search criteria can reuse that set.

2. Decide upon the target for which you expect to need repeated log searches.

For example, you might want to save a log search for a target about which you have repeatedly received alert notifications.

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**Note:** For maximum flexibility when reusing search criteria, you may want to use the highest level target that you expect to be applicable. Such a saved log search can be reused for the selected target or any target beneath it in the hierarchical navigation tree.

For example, if you save log search criteria for a particular Oracle Fusion Applications cluster application, then you can reuse those saved search criteria for that same cluster application or for any Managed Server within that cluster.

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3. Use either of the following methods to navigate to a screen where you can specify log search criteria for your preferred target:
  - From the **Target** menu, choose **Fusion Applications**, and then expand the hierarchical navigation tree, select your preferred target, and choose **Logs > View Log Messages** from the dynamic target menu.
  - From the **Enterprise** menu, choose **Monitoring > Logs**, and then expand the **Selected Targets** section and add your preferred target.
4. Enter or select the desired search criteria in all applicable search fields.  
For more information about these fields, see [Section 15.3.3](#).
5. Click **Search**.
6. Review the search results to make sure that you specified the target and search criteria that you want to save, then click **Save Search**.

A confirmation message appears, including the default name for the saved search, which can include lengthy information about the criteria you used.

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**Note:** If the **Save Search** button is not available, then the system has not detected any change in target or search criteria since your last log search. To reenabte the **Save Search** button, select a different target or specify different search criteria.

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7. To assign the saved search a more convenient name, complete the following sub-steps:
  - a. From the **Saved Searches** dropdown list, select **Manage Saved Searches**.
  - b. In the Manage Favorites dialog, click the first column of the table row that lists the saved search that you want to rename.

If the list of saved searches is long, you can click the query by example button and use standard techniques to help you locate the saved search that interests you.

- c. In the **Name** field, enter a new name for the saved search.

Saved log search names can be up to 256 characters long. It is recommended that you specify a name that will help you remember the target that the search applies to, as well as the search criteria.

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**Note:** The name is the only characteristic of a saved log search that you can modify. To save different search criteria, or to save the same criteria for a different target, you must create a new saved search by repeating all steps of this procedure, starting with Step 1.

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- d. Click **OK**.

For information about using saved log search criteria, see [Section 15.3.5](#)

### 15.3.5 Reusing Saved Log Search Criteria

If your Oracle Fusion Applications environment includes Cloud Control, then you can reuse saved log search criteria. For information about saving log search criteria, see [Section 15.3.4](#).

To repeat a log search that you previously saved using Cloud Control:

1. Make sure that you are logged into Cloud Control as the user who saved the search criteria that you want to reuse.

Only the user who saved a set of log search criteria can reuse that set.

2. Use either of the following methods to navigate to a screen where you can specify log search criteria for your preferred target:
  - From the **Target** menu, choose **Fusion Applications**, and then expand the hierarchical navigation tree, select your preferred target, and choose **Logs > View Log Messages** from the dynamic target menu.
  - From the **Enterprise** menu, choose **Monitoring > Logs**, and then expand the **Selected Targets** section and add your preferred target.

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**Note:** For the search to be effective, the target that you select must be either the target for which the search criteria were originally saved, or a target that is below the original target in the hierarchical navigation tree.

For example, if you originally saved the search for a cluster application target, you can reuse that search only for the same cluster or for a Managed Server that belongs to that cluster.

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3. From the **Saved Searches** dropdown list, select the saved search for the search criteria that you want to reuse.

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**Note:** The **Saved Searches** dropdown list contains all of the log searches that the current user previously saved, regardless of the saved or current target contexts.

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Provided that the current target is either the target for which the selected search was saved or a target that is below the original target in the hierarchical navigation tree, then the search is reexecuted as soon as you select the saved search that you want to reuse.

If the current target is below the originally saved target in the navigation tree, then the reexecuted search uses only the saved search criteria that apply to the subsidiary target.

If the current target is not either the target for which the selected search was saved or a target that is below the original target in the hierarchical navigation tree, then the search is not executed.

4. If some of the saved search criteria did not apply to your currently selected target, and if you want to save just the applicable search criteria and current target context, then click **Save Search**.
5. To assign the new saved search a more convenient name, complete the following sub-steps:
  - a. From the **Saved Searches** dropdown list, select **Manage Saved Searches**.
  - b. In the Manage Favorites dialog, click the first column of the table row that lists the saved search that you want to rename.

If the list of saved searches is long, you can click the query by example button and use standard techniques to help you locate the saved search that interests you.

- c. In the **Name** field, enter a new name for the saved search.

It is recommended that you choose a name that will help you remember the target that the search applies to, as well as the search criteria.
- d. Click **OK**.

### 15.3.6 Typical Log File Locations

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**Note:** The following information is provided for reference purposes. For maximum clarity and convenience, it is recommended that you use Fusion Applications Control to work with Oracle Fusion Applications log files, rather than working directly with the log files.

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Each Oracle Fusion application runs in one or more logical Managed Servers. Each Managed Server is dedicated to a single Oracle Fusion application. Different Managed Servers do not typically share log files with each other, even if they are running on the same physical server computer.

Most Oracle Fusion Applications code modules use standard logging code. On each Managed Server, all Java and SOA application code modules that use standard logging code write log entries to a single file. The location of this file is specified by a `log_handler` entry in a `logging.xml` file. The default location for the `logging.xml` file is as follows, where `DOMAIN_HOME` is the path to your Oracle WebLogic Server (WebLogic Server) domain, and `WebLogic_Server_Name` is the name of the WebLogic Server that uses the `logging.xml` file:

```
DOMAIN_HOME/config/fmwconfig/servers/WebLogic_Server_Name/logging.xml
```

**Example 15-1** shows a typical `log_handler` entry in the `logging.xml` file, which includes the path and file name of the log file.

**Example 15-1 Typical log\_handler Entry Showing Log File Name and Location**

```
<log_handlers>
  <log_handler name='apps-handler'
class='oracle.core.ojdl.logging.ODLHandlerFactory'>
    <property name='path'
value='${domain.home}/servers/${weblogic.Name}/logs/apps/
```

```

    ${weblogic.Name}-diagnostic.log' />
    <property name='maxFileSize' value='10485760' />
    <property name='maxLogSize' value='104857600' />
    <property name='encoding' value='UTF-8' />
    <property name='supplementalAttributes' value='APPS_USER_NAME,
APPS_SESSION_ID, APPS_THREAD_NAME, APPS_SOURCE, APPS_USER_ID, APPS_AUTO_LOG,
APPS_JOB_REQUEST_ID, APPS_JOB_DEFINITION_NAME, APPS_JOB_PACKAGE_NAME,
APPS_JOB_DEFINITION_APP, APPS_COMPOSITE_NAME, APPS_COMPONENT_NAME,
APPS_COMPOSITE_INSTANCE_ID, APPS_COMPONENT_INSTANCE_ID, APPS_PRODUCT_FAMILY,
APPS_PRODUCT, APPS_INDUSTRY, APPS_TERRITORY, APPS_DB_CONNECTION_URL,
APPS_MESSAGE_CAUSE, APPS_USER_ACTION, APPS_ADMIN_ACTION, APPS_USER_DETAILS,
APPS_ADMIN_DETAILS, APPS_LOG_TOKEN_MAP' />
  </log_handler>
</log_handlers>

```

**Example 15–2** shows the default location for the standard log file is as follows, for Oracle Fusion application that are implemented in Java and SOA, where *DOMAIN\_HOME* is the path to your Oracle WebLogic Server domain:

**Example 15–2 Default Log File Location for Oracle Fusion Applications Implemented in Java and SOA**

```
DOMAIN_HOME/servers/domain_name/logs/apps/server_name-diagnostic.log
```

For Oracle Fusion Applications code modules that are implemented in PL/SQL, the location of the standard log file is set by the *AFLOG\_PLSQL\_FILENAME* profile option. By default, the value of this profile option is *APPLLOG\_DIR/diagnostic.log*, where *APPLLOG\_DIR* is a directory object that was defined as a custom variable with the Oracle Fusion Applications Repository Creation Utility during installation. For more information about directory objects, see the section about the *CREATE DIRECTORY* command in the *Oracle Database SQL Language Reference*.

For Oracle Fusion Applications code modules that are implemented in C, the location of the standard log file is set by the *AFLOG\_FILENAME* profile option. By default, the value of this profile option is *diagnostic.log*, but it is recommended that you set the value to *directory\_path/Cdiagnostic.log*, where *directory\_path* is a location that can be written to by all system users and by the Managed Server where Oracle Enterprise Scheduler is deployed for your Oracle Fusion applications. For example, you might set the value of *directory\_path* to */tmp*, or to an explicitly specified directory path that corresponds to the value of the *APPLCP\_DIR* custom variable that was defined with the Oracle Fusion Applications Repository Creation Utility during installation.

By default, the following Oracle Fusion Applications code modules do not write log entries. If you configure these modules to write log entries, then the entries for those modules are written to nonstandard log file locations. These modules do not specify any configuration settings using the standard *logging.xml* file:

- Oracle Fusion Global Payroll

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**Note:** For optimum performance, it is recommended that you use the logging functionality that is available in the Oracle Fusion Global Payroll application only when troubleshooting an existing problem. For more information about using this feature and viewing the results, see the "Adjusting Oracle Fusion Global Payroll Log Settings for Troubleshooting" section and the "Viewing Special Log Output for Oracle Fusion Global Payroll" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

---

- The following kinds of batch jobs for Oracle Fusion Incentive Compensation:
  - Calculation
  - Classification
  - Collection
  - Crediting
  - Rollup

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**Note:** For optimum performance, it is recommended that you use the logging functionality that is available for these kinds of Oracle Fusion Incentive Compensation batch jobs only when troubleshooting an existing problem. For more information about using this feature and viewing the results, see the "Adjusting Oracle Fusion Incentive Compensation Batch Jobs Log Settings for Troubleshooting" section and the "Viewing Special Log Output for Oracle Fusion Incentive Compensation" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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- The following kinds of batch jobs for Oracle Fusion General Ledger:
  - OpenPeriod
  - Posting
  - Translation
  - Close Process - Create Income Statement Closing Journals
  - Close Process - Create Balance Sheet Closing Journals

---

---

**Note:** For optimum performance and log file sizes, it is recommended that you use the logging functionality for these kinds of Oracle Fusion General Ledger batch jobs only when troubleshooting an existing problem. For more information about using this feature and viewing the results, see the "Adjusting Oracle Fusion General Ledger Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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- The AutoInvoice portion of the Oracle Fusion Receivables application

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**Note:** The amount of information that is logged for AutoInvoice depends on the value of the Log File Message Level system option setting for each business unit. Any AutoInvoice log messages that meet the level requirements are written to the standard log file for Oracle Enterprise Scheduler.

For more information about configuring the Log File Message Level system option setting, see [Section 15.4.6.4](#). For more information about adjusting this setting for troubleshooting and viewing the results, see the "Adjusting Oracle Fusion Receivables AutoInvoice Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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### 15.3.7 Location of Logged Information When Using Multiple Managed Servers

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**Note:** The following information is provided for reference purposes. For maximum clarity and convenience, it is recommended that you use Fusion Applications Control to work with Oracle Fusion Applications log files, rather than working directly with the log files.

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If an Oracle Fusion application is deployed to multiple Managed Servers in a cluster domain, each Managed Server records log entries in its own log file, for the transactions or other operations handled by that server.

For your convenience in monitoring Oracle Fusion applications that run on multiple Managed Servers, Fusion Applications Control lets you view either individual standard log files for individual Managed Servers or the aggregated contents of the standard log files of all of the servers in the cluster domain. The aggregated log is especially useful if you need to find a particular log entry but do not know which Managed Server recorded it. For more information about viewing log files, see [Section 15.3.1](#).

Fusion Applications Control does not currently support viewing the contents of any nonstandard log files generated by Oracle Fusion Incentive Compensation, Oracle Fusion General Ledger, or the AutoInvoice portion of the Oracle Fusion Receivables application.

For information about viewing nonstandard log files for Oracle Fusion Incentive Compensation, see the "Viewing Special Log Output for Oracle Fusion Incentive Compensation" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

For information about viewing nonstandard log files for Oracle Fusion General Ledger, see the "Adjusting Oracle Fusion General Ledger Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

Log entries for the AutoInvoice portion of Oracle Fusion Receivables are placed in the standard log file for Oracle Enterprise Scheduler. For information about viewing Oracle Fusion Middleware log files, including log files for Oracle Enterprise Scheduler, see the "Viewing and Searching Log Files" section in the *Oracle Fusion Middleware Administrator's Guide*. For information about viewing nonstandard log files for Oracle Fusion Global Payroll, see the "Viewing Special Log Output for Oracle Fusion Global Payroll" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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**Note:** When an Oracle Fusion application is deployed to multiple Managed Servers in a cluster domain, it is recommended that you set the log level to the same value for all of the Managed Servers, so that all of the servers will log comparable amounts and kinds of information. However, you can configure each Managed Server's log level independently, if you have a reason to do so.

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## 15.4 Configuring Settings for Log Files During Normal Operation

Although critical business logic sections of Oracle Fusion applications may write more information to log files than less critical areas of the application code, the amount of information that Oracle Fusion applications log depends primarily on how the

environment is configured. Oracle supplies default values for log settings, but you can specify different setting values if you want to adjust the amount of information to be logged. Most Oracle Fusion Applications components use a standard set of log configuration settings. For information about the selected components that use nonstandard log settings, see [Section 15.4.6](#).

This section contains the following topics:

- [Section 15.4.1, "Default System Log Settings"](#)
- [Section 15.4.2, "When Changes to Log File Configuration Settings Take Effect"](#)
- [Section 15.4.3, "Standard Logging Levels"](#)
- [Section 15.4.4, "Managing Log File Size and Disk Space Usage"](#)
- [Section 15.4.5, "Using Profile Options to Configure Standard Log Settings"](#)
- [Section 15.4.6, "Using Additional Settings to Configure Logs for Selected Components"](#)
- [Section 15.4.7, "Configuring Access to Logs for Fusion Applications Control"](#)

The concepts of logging levels and profile options apply to most Oracle Fusion applications. Logging levels are thresholds that can be set to control how much information to log.

To set logging levels either for a whole site or for a particular user, administrators change profile option values from either the Log Configuration dialog in Fusion Applications Control or the Manage Administrator Profile Values screen in the Setup and Maintenance work area. For more information, see the chapter on maintaining common reference objects in the *Oracle Fusion Applications Common Implementation Guide* and [Section 15.4.5](#).

To set logging levels for a particular product (for Oracle Fusion applications written in Java, only), administrators change profile option values from the Manage Administrator Profile Value screen in the Setup and Maintenance work area. For more information, see [Section 15.4.5](#).

Under certain specific conditions, Oracle Fusion Applications users can set their own profile option for logging levels, from the Troubleshooting Options dialog under the Oracle Fusion Applications **Help > Troubleshooting** menu. Setting a logging level for a particular user is useful if you want only that user to gather more detailed log information while attempting to reproduce a problem. However, the **Help > Troubleshooting** menu displays the **Troubleshooting Options** command only for Oracle Fusion Applications users who have a job role that is mapped to the following three duty roles:

- Supportability Level Management Duty (CRM) (FND\_SET\_SUPPORTABILITY\_LEVEL\_DUTY\_CRM)
- Supportability Level Management Duty (FSCM) (FND\_SUPPORTABILITY\_LEVEL\_MANAGEMENT\_DUTY\_FSCM)
- Supportability Level Management Duty (HCM) (FND\_SUPPORTABILITY\_LEVEL\_MANAGEMENT\_DUTY\_HCM)

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**Note:** Oracle Fusion Applications seed data does not include a preconfigured job role that maps to these three duty roles. It is recommended that you define such a job role when you first need to give an Oracle Fusion Applications user access to the Troubleshooting Options dialog. You can reuse the same job role for other users who subsequently need the same access.

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For more information about making the **Troubleshooting Options** command and dialog available to selected Oracle Fusion Applications users, and about working with those users to gather troubleshooting data, see the "Assisting Users in Gathering Data Using Troubleshooting Options" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

The following types of settings affect how logging is done, including the effective logging level:

- `AFLOG_SettingName` profile option values. For information about the `AFLOG_SettingName` profile options, see [Section 15.4.1](#) through [Section 15.4.5](#). For general information about working with profile options at both the `SITE` and `USER` levels, see the "Setting and Accessing Profile Values" and "Managing Profile Definitions" sections in the *Oracle Fusion Applications Developer's Guide*.

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**Note:** Among `AFLOG_SettingName` profile options, the following options currently support the use of the `PRODUCT` level in Oracle Fusion applications that are coded in Java or SOA: `AFLOG_ENABLED`, `AFLOG_LEVEL`, `AFLOG_MODULE`, and `FND_MESSAGE_MODE`.

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- Oracle Diagnostics Logging Level: The log level for Oracle Fusion applications that are written in Java or SOA. The value for this setting is specified in each Managed Server's `logging.xml` file, in the `oracle.apps.appslogger` entry. Log levels for most entries are adjusted using the Managed Server's **Log Configuration** page in Fusion Middleware Control, rather than by directly editing the `logging.xml` file. However, the log level for the `oracle.apps.appslogger` entry should remain set to the default value of `All` unless Oracle Support gives you specific instructions to change it. For more information about this setting, see "Setting the Level of Information Written to Log Files" in the *Oracle Fusion Middleware Administrator's Guide*.

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**Caution:** The logging framework for Oracle Fusion Applications is designed to work with the Log Level for the `oracle.apps.appslogger` logger set to the default value of `All`. If you use other values for this setting, the diagnostic framework may not appear to work correctly, because setting values other than `All` can interfere with normal logging operations.

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## 15.4.1 Default System Log Settings

The seed data for Oracle Fusion Applications contains default values for many profile option settings. Normal operation settings for log files are described in [Table 15-1](#). For information about default system settings for incidents and QuickTrace, see the "Default System Settings for Incident Creation and QuickTrace" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

**Table 15–1 Profile Options for Oracle Fusion Applications Logging**

Profile Option Name (and Display Name)	Environment	Description	Possible Values or Example	Applicable Profile Hierarchy Levels	Default Value for Site Level
AFLOG_BUFFER_MODE (FND: Buffer Mode for PL/SQL)	PL/SQL only	Asynchronous buffer mode for PL/SQL logging. A value of 0 disables buffering; a value greater than 0 enables buffering for messages that have levels lower than WARNING. PL/SQL log messages that have SEVERE level or WARNING level are not buffered.  You may want to use asynchronous buffering if you have set your log levels to collect detailed information and find that your system is running slowly. When asynchronous buffering is enabled, log messages from PL/SQL code that are at the INFO log level or below are written to a buffer rather than being immediately written to a log file. This reduces disk I/O activity. The buffer is written to the log file only when it contains the number of records specified in the AFLOG_BUFFER_SIZE setting.	0, 1	Site, User	0
AFLOG_BUFFER_SIZE (FND: Buffer Size for PL/SQL)	PL/SQL only	Number of PL/SQL log records that are buffered in memory before they are written to the log file, when AFLOG_BUFFER_MODE is set to enable asynchronous buffering. Increasing the number of records to be buffered may improve performance by reducing disk I/O activity.	1024	Site, User	1000
AFLOG_ENABLED (FND: Log Enabled)	Java, PL/SQL, C, and SOA	Enables or disables standard logging functionality for Oracle Fusion Applications. If the value of this profile option is N, and if the profile option sets the effective logging level, then standard Oracle Fusion Applications logging does not occur at runtime for application modules written in Java, PL/SQL, SOA, or C. This profile option does not affect the configuration for Oracle Fusion Middleware.	Y, N	Site, User Product level is supported for Oracle Fusion applications that are coded in Java or SOA.	Y

**Table 15–1 (Cont.) Profile Options for Oracle Fusion Applications Logging**

Profile Option Name (and Display Name)	Environment	Description	Possible Values or Example	Applicable Profile Hierarchy Levels	Default Value for Site Level
AFLOG_EXTENDED_ENABLED (FND: Log Extension Enabled)	Java, PL/SQL, C, and SOA	<p>Determines whether to log the following extended attributes:</p> <ul style="list-style-type: none"> <li>▪ Message cause (APPS_MESSAGE_CAUSE)</li> <li>▪ User action (APPS_USER_ACTION)</li> <li>▪ User details (APPS_USER_DETAILS)</li> <li>▪ Admin action (APPS_ADMIN_ACTION)</li> <li>▪ Admin details (APPS_ADMIN_DETAILS)</li> </ul> <p>When the value of this profile option is Y, all of these extended attributes are logged. When the value of this profile option is N, none of these extended attributes are logged.</p>	Y, N	Site	Y
AFLOG_FILENAME (FND: Log File for C)	C only	<p>Full path and file name of the log file for all of the Oracle Fusion applications that are written in C and that use standard logging functionality.</p> <p>It is recommended that you set the value of this profile option to <i>directory_path/Cdiagnostic.log</i>, where <i>directory_path</i> is a location that can be written to by all system users and by the Managed Server where Oracle Enterprise Scheduler is deployed for your Oracle Fusion applications. For example, you might set the value of <i>directory_path</i> to /tmp, or to an explicitly specified directory path that corresponds to the value of the <i>APPLCP_DIR</i> custom variable that was defined through use of the Oracle Fusion Applications Repository Creation Utility during installation.</p> <p>If you do not set a directory path for this log file, the file is written to the default location specified by Oracle Enterprise Scheduler.</p>	/tmp/ Cdiagnostic.log	Site, User	diagnost ic.log

**Table 15–1 (Cont.) Profile Options for Oracle Fusion Applications Logging**

Profile Option Name (and Display Name)	Environment	Description	Possible Values or Example	Applicable Profile Hierarchy Levels	Default Value for Site Level
AFLOG_LEVEL (FND: Log Level)	Java, PL/SQL, C, and SOA	Minimum level of information detail to be logged for Oracle Fusion applications that use standard logging functionality. If no value is set for this profile option, the default value is 1000 (SEVERE).  For more information about log levels, see <a href="#">Section 15.4.3</a> .	1000, 900, 800, 700, 500, 400, 300	Site, User  Product level is supported for Oracle Fusion applications that are coded in Java or SOA.	1000
AFLOG_MAX_FILE_SIZE (FND: Maximum size for log file in MB.)	PL/SQL	Specifies the size in megabytes beyond which the current standard log file for Oracle Fusion applications that are written in PL/SQL is automatically renamed and a new log file is started.	10	Site	10
AFLOG_MODULE (FND: Log Module Filter)	Java, PL/SQL, C, and SOA	Specifies the Oracle Fusion applications for which logging takes place. Use a comma-separated list of modules for the value of this setting, and use % as a wildcard. If no value is specified, all modules are logged.	%, %financial%	Site, User  Product level is supported for Oracle Fusion applications that are coded in Java or SOA.	%

**Table 15–1 (Cont.) Profile Options for Oracle Fusion Applications Logging**

Profile Option Name (and Display Name)	Environment	Description	Possible Values or Example	Applicable Profile Hierarchy Levels	Default Value for Site Level
AFLOG_NUMBER_OF_LOG_FILES  (FND: Number of old log files)	PL/SQL	The maximum number of PL/SQL log files the system keeps at any one time.	Any integer greater than 0.	Site	10
AFLOG_PLSQL_FILENAME  (FND: Log File for PL/SQL)	PL/SQL only	<p>The location and name of the log file for standard Oracle Fusion Applications log messages that are generated from PL/SQL. The location must be expressed as a directory object.</p> <p>By default, the <code>SITE</code> level value for this profile option is set to <code>APPLLOG_DIR/diagnostic.log</code>, where <code>APPLLOG_DIR</code> is a directory object that was defined using the <b>Oracle Fusion Applications Repository Creation Utility</b> during installation.</p> <p>If you want the log file name to indicate that the log messages are generated from PL/SQL, then you can change the <code>AFLOG_PLSQL_FILENAME</code> profile option value to a value such as <code>APPLLOG_DIR/plsqldiagnostic.log</code>.</p> <p>For more information about directory objects, see the section about the <code>CREATE DIRECTORY</code> command in the <i>Oracle Database SQL Language Reference</i>.</p>	<code>APPLLOG_DIR/mylog.log</code>	Site, User	<code>APPLLOG_DIR/diagnostic.log</code>
FND_MESSAGE_MODE  (Message Mode)	Java, PL/SQL, C, and SOA	For error conditions that use messages from the message dictionary, this setting determines whether administrator-level or user-level message details and suggested actions are displayed and logged.	ADMIN, USER	Site, Product, User  Product level is supported for Oracle Fusion applications that are coded in Java or SOA.	User

## 15.4.2 When Changes to Log File Configuration Settings Take Effect

For PL/SQL and C processes such as scheduled jobs, changes to log file profile options take effect in the same ways as changes to any Oracle Fusion Applications profile option values. For more information, see the chapter on maintaining common reference objects in the *Oracle Fusion Applications Common Implementation Guide*.

For user sessions, users may need to log out from an Oracle Fusion application and log in again to have changes to log profile options take effect.

## 15.4.3 Standard Logging Levels

Seven severity levels are used for log messages in Oracle Fusion Applications, and each level is associated with a number. In circumstances where the effective logging level depends on the `AFLOG_LEVEL` logging profile option (rather than a lower `odlLevel` setting value), then, after the profile option level is set, only application messages that have a predefined severity level greater than or equal to the value of the `AFLOG_LEVEL` profile option are logged.

You can set the value of the `AFLOG_LEVEL` profile option to one value for the site as a whole and to another value for any user whose operations you want to log at a different level of detail. For Oracle Fusion applications that are written in Java or SOA, you can also set a separate value for the `AFLOG_LEVEL` profile option for a specific product.

For example, setting the level to the lowest severity, 300 (FINEST), for a particular user means that messages of all seven severities are logged for that user's operations. Similarly, setting the level to the lowest severity, 300 (FINEST), for a particular product means that messages of all seven severities are logged for that product's operations. Setting the level to 900 (WARNING) for the site means that logging occurs for 900 (WARNING) and 1000 (SEVERE) messages for all site operations except for operations of users or products that have different values for the `AFLOG_LEVEL` profile option.

---

**Note:** The default severity level for the site level of Oracle Fusion Applications is 1000 (SEVERE). For optimum performance, it is recommended that you use this logging level for your sites unless you need to investigate a problem that specifically requires a change to a site's severity level. Gathering detailed log information for an entire site (rather than a single user) can decrease system performance and make it difficult to find relevant information in a log file.

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[Table 15–2](#) describes the three severity levels that are used for logging failures and normal events in Oracle Fusion Applications. The messages in the log file identify the severity of errors using the ODL Message Type/Level value.

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**Note:** Oracle Fusion applications that are written in PL/SQL have logging level names that start with `LEVEL_`. Oracle Fusion applications that are written in Java, SOA, and C do not use this `LEVEL_` prefix for level names. For example, the log level that is called `LEVEL_SEVERE` in PL/SQL application code is comparable to the log level that is called `SEVERE` in Java, SOA, or C code.

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**Table 15–2 Severity Levels for Logging Failures and Normal Events**

ODL Message Type/Level (in Log Files)	Log Level Name (in Oracle Enterprise Manager Fusion Applications Control and Help > Troubleshooting > Troubleshooting Options)	AFLOG_LEVEL Profile Option Value (internal values stored in database tables)	Usage and Examples
ERROR:1	SEVERE	1000	<p>Highest severity level. Unexpected errors that occur during normal execution. Irrecoverable exceptions or any other serious problems that require immediate attention from the System Administrator. An error at this level may also create an incident. For example, the following error messages might be associated with this log level:</p> <p>The process cannot be started now because another process is using the data.</p> <p>The participant's rate could not be found. Contact your benefits administrator to validate the standard rate for this compensation object.</p>
WARNING:1	WARNING	900	<p>Internal software failures. Exceptions or errors that allow processing to continue without requiring immediate attention from an administrator. Any potential problem that should be reviewed by the System Administrator.</p> <p>For example, the following error message might be associated with this log level:</p> <p>You must change your password before date.</p>
NOTIFICATION:1	INFO	800	<p>Errors, warnings, and other kinds of information that allow processing to continue. May include key flow steps, high-level functional progress messages, and major life cycle events such as the activation or deactivation of a primary subcomponent or feature.</p>

Table 15–3 describes the four severity levels that are used for tracing and reporting progress in Oracle Fusion Applications. The messages in the log file identify the severity of errors using the ODL Message Type/Level value.

**Note:** Oracle Fusion applications that are written in PL/SQL have logging level names that start with `LEVEL_`. Oracle Fusion applications that are written in Java, SOA, and C do not use this `LEVEL_` prefix for level names. For example, the log level that is called `LEVEL_CONFIG` in PL/SQL application code is comparable to the log level that is called `CONFIG` in Java, SOA, or C code.

Most log levels provide information that is useful to Oracle Fusion Applications administrators. However, the information that is logged at the `FINER` and `FINEST` log levels is primarily intended for use by Oracle.

**Table 15–3 Severity Levels for Tracing and Reporting Progress in Logs**

ODL Message Type/Level (in Log Files)	Log Level Name	AFLOG_LEVEL Profile Option Value (internal values stored in database tables)	Usage and Examples
NOTIFICATION:16	CONFIG	700	Configuration properties and environment settings. This is a finer level of granularity for reporting normal events.
TRACE:1	FINE	500	<p>High-level technical progress messages; more detailed than INFO level. Trace or debugging information for events that are meaningful to users of the product, such as public application programming interface (API) entry or exit points.</p> <p>For example, the following error message might be associated with this log level:</p> <pre>User has chosen to cancel the Purge operation.</pre>
TRACE:16	FINER	400	<p>Logging messages that are called at the beginning and end of a routine. Detailed trace or debugging information that can help Oracle Support diagnose problems with a particular subsystem.</p> <p>For example, the following error message might be associated with this log level:</p> <pre>Entering validateLogin.</pre>
TRACE:32	FINEST	300	<p>Very detailed trace or debugging information that would be useful to an Oracle developer who is working on the product and who is familiar with implementation details of the subsystem that generates the message.</p> <p>For example, the following error message might be associated with this log level:</p> <pre>Copying string from buffer xyz to buffer zzz.</pre>

---

**Note:** Whenever an incident is created, a different log level, `INCIDENT_ERROR`, automatically appears in the corresponding log entry. This is the only context in which the `INCIDENT_ERROR` log level is used. For more information about working with incidents, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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#### 15.4.4 Managing Log File Size and Disk Space Usage

In busy computing environments, the amount of disk space used by log files can become a concern. Large log files can also affect system performance. Oracle Fusion applications that are written in Java, SOA, or PL/SQL address this concern using automatic log file rotation.

This section contains the following topics:

- [Section 15.4.4.1, "Managing Rotating Log File Space Usage for Java and SOA Applications"](#)
- [Section 15.4.4.2, "Managing Rotating Log File Space Usage for PL/SQL Applications"](#)
- [Section 15.4.4.3, "Managing Log File Space Usage for C Applications"](#)

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**Note:** Oracle Fusion applications that are written in C require you to monitor the space used and manually discard log files that are no longer needed.

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#### 15.4.4.1 Managing Rotating Log File Space Usage for Java and SOA Applications

For Oracle Fusion Applications modules that are implemented using Java or SOA and that use standard logging, when a the log file reaches a specific size or when a specific time period has passed, the file is automatically renamed, and a new log file is created.

You can use any of the following methods to adjust the settings that determine the maximum log file size and the maximum length of time that a log file covers:

- Use Fusion Middleware Control commands to change the log rotation policies for the `oracle.apps.appslogger` logger. For more information, see the "Specifying Log File Rotation Using Fusion Middleware Control" section in the *Oracle Fusion Middleware Administrator's Guide*.
- Edit the settings in the `log_handler` section of the ODL configuration file, at the following location, where `DOMAIN_HOME` is the domain home directory for the Oracle WebLogic Server domain, and `WebLogic_Server_Name` is the name of the WebLogic Server that uses the `logging.xml` file:
 

```
DOMAIN_HOME/config/fmwconfig/servers/WebLogic_Server_Name/logging.xml
```
- Use Oracle WebLogic Scripting Tool (WLST) Log Configuration commands to change the log rotation policies for the `apps-handler` log handler. For more information, see the section about the `configureLogHandler` command in the chapter on logging commands in the *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference* and "Specifying Log File Rotation Using WLST" in the *Oracle Fusion Middleware Administrator's Guide*.

The `maxFileSize` or Maximum Log File Size setting determines the maximum size that a standard Java or SOA log file can reach before being renamed. The default value is 10,485,760 bytes.

The `rotationFrequency` or Frequency setting determines the maximum amount of time that can pass before a standard Java or SOA log file is renamed. There is no default value for this setting. If no value is specified, then the log file is not renamed after any particular time period, but only when it reaches its maximum allowed size. Valid values for the `rotationFrequency` setting are numbers representing the length of the time period in minutes, and the following case-insensitive values:

- Hourly
- Daily
- Weekly

When a standard Java or SOA log file is renamed, the new name is of the format `log_file_name-n.log`, where `n` is a positive integer and `log_file_name` is the file name

specified for the path property of the apps-handler log handler in the logging.xml file. (By default, `log_file_name` is set to `server_name-diagnostic.log`.)

In `log_file_name-n.log`, the value of `n` depends on the names of the log files that are already present in the directory. If the directory contains no previously renamed log files, then the first renamed log file is called `log_file_name-1.log`. If other log files exist, then `n` is set to the next higher integer after the highest integer that is already in use. For example, if the directory contains `log_file_name-1.log` through `log_file_name-8.log` at the time when `log_file_name.log` reaches a time or size limit, then the `log_file_name.log` file is renamed to `log_file_name-9.log`.

When the aggregated size of current and older log files reaches a specific value, older log files are deleted automatically, to keep the disk space usage of the log file directory below that specific value.

The `maxLogSize` or Maximum Size of All Log Files setting determines the directory size at which older log files begin to be deleted. The default value is 104,857,600 bytes.

#### 15.4.4.2 Managing Rotating Log File Space Usage for PL/SQL Applications

For Oracle Fusion Applications modules that are implemented using PL/SQL, when a `diagnostic.log` file reaches a specific size, the `diagnostic.log` file is automatically renamed, and a new `diagnostic.log` file is created. If the `AFLOG_PLSQL_FILENAME` profile option is set so that the logging framework uses a log file name other than `diagnostic.log`, then the file name that the profile option specifies is used, instead of `diagnostic.log`.

Use the following profile options settings to specify the maximum log file size:

- `AFLOG_MAX_FILE_SIZE`: This setting specifies the size in megabytes beyond which a PL/SQL log file name is automatically renamed and a new log file is started. The default value is 10 megabytes.

---

**Note:** If the `AFLOG_BUFFER_MODE` profile option is set to a value larger than 0, enabling asynchronous buffering of PL/SQL log entries, then the actual maximum size of any single PL/SQL log file is the value of `AFLOG_MAX_FILE_SIZE` plus the number of megabytes that are flushed from the buffer. This value is approximate, because the amount of information that can accumulate in the buffer is set using the `AFLOG_BUFFER_SIZE` setting, which specifies a specific number of log records, rather than a specific number of megabytes.

---

- `AFLOG_NUMBER_OF_LOG_FILES`: This setting specifies the maximum number of PL/SQL log files the system keeps at any one time. The default value is 10 files.

PL/SQL log rotation is currently done only on the basis of file size, not on the basis of the passage of a specified amount of time.

When a PL/SQL log file is renamed, the new name depends on whether the `AFLOG_PLSQL_FILENAME` profile option is set:

- If the profile option is set, then the new log file name is of the format `AFLOG_PLSQL_FILENAME_value-n.log`, where `n` is a positive integer.
- If the profile option is not set, then the new log file name is of the format `diagnostic-n.log`, where `n` is a positive integer.

The value of `n` depends on the names of the log files that are already present in the directory. If the directory contains no previously renamed log files, then the first

renamed log file is called `diagnostic-1.log` or `AFLOG_PLSQL_FILENAME_value-1.log`. If other log files exist, then *n* is set to the next higher integer after the highest integer that is already in use. For example, if the directory contains `diagnostic-1.log` through `diagnostic-8.log` at the time when the `diagnostic.log` file surpasses the size limit set in the `AFLOG_MAX_FILE_SIZE` profile option, then the `diagnostic.log` file is renamed to `diagnostic-9.log`.

When the number of log files reaches the value specified using the `AFLOG_NUMBER_OF_LOG_FILES` profile option, then older log files are deleted automatically, to prevent the disk space usage of the log file directory from getting too large.

Over time, the value of *n* in `diagnostic-n.log` or `AFLOG_PLSQL_FILENAME_value-n.log` can become large enough to cause usability challenges or exceed the number of characters that the operating system allows in a file name. If you want to have the value of *n* start over at 1, you can move all existing log files except the currently active `diagnostic.log` file or `AFLOG_PLSQL_FILENAME_value.log` file into another directory. When the active file surpasses the size limit and the log rotation code finds no previously renamed log files in the directory, the active file is renamed using a value of 1 for *n*.

---

**Note:** If your Oracle Fusion Applications environment includes multiple database nodes such as Oracle Real Application Clusters (RAC), then each database node corresponds to a server instance that has its own location for log files.

If an incident is created, then the server instance that creates the incident handles all subsequent jobs related to that incident. Identifiers for incidents are unique within a specific instance, but not across instances. For more information about working with incidents, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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#### 15.4.4.3 Managing Log File Space Usage for C Applications

Oracle Fusion Applications modules that are implemented in C currently produce log files that continually increase in size.

To manage log file space usage for log files created by Oracle Fusion Applications modules that are written in C:

1. Navigate to the directory that contains the log files:
  - If the `AFLOG_FILENAME` profile option is set, then navigate to the location designated by the profile option value.
  - If the `AFLOG_FILENAME` profile option is not set, then navigate to the location set by Oracle Enterprise Scheduler Service.

You can use Fusion Applications Control to determine the location of Oracle Enterprise Scheduler log files, as follows:

- a. In the navigation pane, expand the farm part of the navigational tree, then expand **Scheduling Services**, and then select an Oracle Enterprise Scheduler server as your target.
- b. In the context pane, from the **Scheduling Service** dropdown menu, choose **Logs > View Log Messages**.

- c. Click **Target Log Files** to view a list of log files associated with the selected server.

For example, a typical path and file name might be the following, where *DOMAIN\_HOME* is the domain home directory, *SERVER\_HOME* is the server home directory, and *serverName* is the name of the Oracle Enterprise Scheduler server:

```
DOMAIN_HOME/servers/SERVER_HOME/logs/serverName-diagnostic.log
```

2. Rename the log file that is currently in use.

For example, if the current log file is called `Cdiagnostic.log`, you might rename it to `Cdiagnostic_MMDDYYYY.log`, where *MMDDYYYY* is the current date.

3. Delete any previously renamed log files that you no longer need.

### 15.4.5 Using Profile Options to Configure Standard Log Settings

Oracle Fusion applications that use standard logging functionality use profile option values to configure how much information to log. Ordinarily, these profile options are set at the *Site* level, but some can also be set at the *Product* or *User* level, to gather more information into the log file for a particular product or user.

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**Note:** For information about configuring Oracle Fusion Middleware log settings, including settings for Oracle Enterprise Scheduler and Oracle Enterprise Crawl and Search Framework, see "Configuring Settings for Log Files" in the *Oracle Fusion Middleware Administrator's Guide*. For information about configuring profile option values for incident and QuickTrace settings, see the "Configuring Log, QuickTrace, and Incident Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

---

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You can use either Fusion Applications Control or the Setup and Maintenance work area to configure most profile options for standard Oracle Fusion Applications logging functionality. However, some settings may be available in only one of those two locations. For example, you can set the `AFLOG_FILENAME` profile option for an individual user by using the Manage Administrator Profile Values screen in the Setup and Maintenance work area, but not by using Fusion Applications Control. For information about how to use the Setup and Maintenance work area for setting profile option values, see the chapter on maintaining common reference objects in the *Oracle Fusion Applications Common Implementation Guide*.

---

**Note:** To set logging profile option values that affect other users, you must log in as a user who has the Manage All Application Profile Values function security privilege. By default, this privilege is carried by the Applications Common Application Profile Value Administration Duty role, which the predefined Application Administrator job role inherits. You can use Oracle Identity Manager to determine whether you have the Application Administrator job role.

If you want to change profile option values for others without being provisioned with the Application Administrator job role or the Applications Common Application Profile Value Administration Duty role, then you can use Oracle Authorization Policy Manager to determine which other duty roles have the Manage All Application Profile Values function security privilege and which job roles inherit those duty roles. You can use Oracle Identity Manager to make sure that you have a job role that inherits one of those duty roles.

For more information about working with roles and privileges, see the *Oracle Fusion Applications Security Guide*, the *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*, and the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*.

---

To use Fusion Applications Control to configure profile options for standard Oracle Fusion Applications logging functionality:

1. From the navigation pane, select any of the following target types:
  - A product family target that lets you configure the log profile options for all of the Oracle Fusion applications in the selected product family. For example, you could select the **Financials** product family target.
  - An Oracle Fusion Applications cluster application target that lets you configure the log profile options for the selected application on all of the servers in the selected cluster. For example, you could expand **Financials** and **Fusion Applications** and then select the **PayablesApp** cluster application target.
  - An Oracle Fusion application instance target that lets you configure the log profile options for the selected application on the selected sever. For example, you could expand **Financials** and **Fusion Applications** and **PayablesApp** and then select the **PayablesApp (PayablesServer\_1)** application instance target.

To configure logging profile options at the product level, skip to Step 6.

2. In the context pane, from the target type dropdown menu, choose **Logs > Log Configuration**.
3. In the Logging Profile Configuration dialog, click one of the following tabs to determine whether you set the logging level for the whole site or for a single user:
  - **Site-Level**
  - **User-Level**
4. If you clicked **Site-Level**, then skip to Step 5.

If you clicked **User-Level**, then complete the following substeps:

- a. Inspect the table on the **User-Level** tab for the user name for which you want to change logging levels.

If the user name is listed, then select it and click **Edit** to display the Edit User-Level Configuration dialog.

If the user name is not listed, then click **Add** and enter it in the **Name** field of the Add Logging Profile Configuration dialog.

- b. From the **Log Level** dropdown list, select the log level that corresponds to the kinds of information you want to gather.

For more information, see [Table 15-2](#) and [Table 15-3](#).

- c. In the **Logging Enabled** field, make sure that the checkbox is selected.
- d. In the **Module Filters** field, indicate if you want Oracle Fusion Applications to log only for a particular code module for the selected user—by default, log entries are written for all Oracle Fusion Applications code modules that use standard logging implementation for Oracle Fusion Applications.

---

**Note:** If you specify that logging for the selected user should be done only for a particular code module, that setting will not affect the information that is logged for other users.

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- e. If you want to change whether PL/SQL modules buffer log entries of levels lower than Warning, then expand the **Advanced profile configuration** section of the dialog and select **Enabled** or **Disabled** for the **Buffer Mode** setting.
- f. If **Buffer Mode** is set to **Enabled** and you want to change the number of PL/SQL log records that will be buffered in memory before they are written to the log file, then enter the number of records to buffer in the **Buffer Size** field.
- g. If you want PL/SQL log records to be written to a log file location other than the default, then enter the path and file name in the **File Name** field in the **PL/SQL Settings** section.

---

**Note:** If you want a particular user's C log records to be written to a log file location other than the default, then you must change the value of the user's `AFLOG_FILENAME` profile option using the Manage Administrator Profile Values screen in the Setup and Maintenance work area, rather than Fusion Applications Control. For information about how to use the Setup and Maintenance work area for setting profile option values, see the chapter on maintaining common reference objects in the *Oracle Fusion Applications Common Implementation Guide*.

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- h. Click **OK**.

Skip all remaining steps of this procedure.

5. If you clicked **Site-Level**, complete the following substeps:
  - a. From the **Log Level** dropdown list, select the log level that corresponds to the kinds of information you want to gather.  
For more information, see [Table 15-2](#) and [Table 15-3](#).
  - b. Make sure that both **Logging Enabled** and **Incident Enabled** are selected.



- c. In the **Module Filters** field, indicate if you want Oracle Fusion Applications to log only for a particular code module—by default, log entries are written for all Oracle Fusion Applications code modules that use standard logging implementation for Oracle Fusion Applications.
  - d. Expand the **Advanced profile configuration** section of the dialog.
  - e. In the **Java Settings** section of the dialog, for purposes of normal operation, verify that the **QuickTrace Enabled** checkbox is selected and that **QuickTrace Level** is set to **Fine**.  
  
For more information about changing QuickTrace settings for troubleshooting, see the "Adjusting QuickTrace Configuration Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.
  - f. If you want to change whether PL/SQL modules buffer log entries of levels lower than **Warning**, then select **Enabled** or **Disabled** for the **Buffer Mode** setting.
  - g. If **Buffer Mode** is set to **Enabled** and you want to change the number of PL/SQL log records that will be buffered in memory before they are written to the log file, then enter the number of records to buffer in the **Buffer Size** field.
  - h. If you want PL/SQL log records to be written to a log file location other than the default, then enter the path and file name in the **File Name** field in the **PL/SQL Settings** section.
  - i. If you want C log records to be written to a log file location other than the default, then enter the path and file name in the **File Name** field in the **C Settings** section.
  - j. Click **Apply**.
  - k. Skip all remaining steps of this procedure.
6. To configure logging profile options at the product level, complete the following sub-steps:
- a. Choose **Setup and Maintenance** from the **Navigator** menu of the relevant Oracle Fusion application.
  - b. In the **Profiles** section of the **Tasks** pane, click **Manage Administrator Profile Values**.
  - c. In the **Profile Option Code** field of the **Search: Profile Options** pane, enter **AFLOG%** and then click **Search**.
  - d. In the **Search Results** pane, locate and select the profile option that you want to set at the product level.

The following log profile options currently support the use of the product level in Oracle Fusion applications that are coded in Java or SOA: **AFLOG\_ENABLED**, **AFLOG\_LEVEL**, **AFLOG\_MODULE**, and **FND\_MESSAGE\_MODE**.

- e. Inspect the pane that lists the values of the selected profile option.

If there is a row in which the **Profile Level** column contains the value **Product**, and in which the **Product Name** column contains the name of the product for which you are changing settings, then enter your chosen value in the **Profile Value** field for that row.

If there is no row in which the **Profile Level** column contains the value **Product**, and in which the **Product Name** column contains the name of the

product for which you are changing settings, then click the plus sign icon (+) to create a new row, and complete the fields.

- f. Click **Save**.

## 15.4.6 Using Additional Settings to Configure Logs for Selected Components

Some functionality areas in Oracle Fusion Applications use nonstandard logging mechanisms that are disabled by default. For these areas, you must turn on the logging facility when you need it and specify the kind of information that you want to record in the log file. Some other functionality areas use nonstandard logging mechanisms that are usually set to gather minimal amounts of information. You may want to change those settings when troubleshooting.

This section contains the following topics:

- [Section 15.4.6.1, "Configuring Additional Log Settings for Oracle Fusion Global Payroll"](#)
- [Section 15.4.6.2, "Configuring Additional Log Settings for Oracle Fusion Incentive Compensation Batch Jobs"](#)
- [Section 15.4.6.3, "Configuring Additional Log Settings for Oracle Fusion General Ledger"](#)
- [Section 15.4.6.4, "Configuring Additional Log Settings for Oracle Fusion Receivables AutoInvoice"](#)

### 15.4.6.1 Configuring Additional Log Settings for Oracle Fusion Global Payroll

The logging functionality for the Oracle Fusion Global Payroll application is separate from the standard logging functionality for Oracle Fusion Applications. By default, the Oracle Fusion Global Payroll application does not write log entries. For optimum performance and log file sizes, it is recommended that you use Oracle Fusion Global Payroll logging functionality only when troubleshooting an existing problem. For more information, see the "Adjusting Oracle Fusion Global Payroll Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

### 15.4.6.2 Configuring Additional Log Settings for Oracle Fusion Incentive Compensation Batch Jobs

The logging functionality for certain Oracle Fusion Incentive Compensation batch jobs is separate from the standard logging functionality for Oracle Fusion Applications. By default, the following kinds of Oracle Fusion Incentive Compensation batch jobs do not write log entries:

- Calculation
- Classification
- Collection
- Crediting
- Rollup

For optimum performance and log file sizes, it is recommended that you use the logging functionality for these areas only when troubleshooting an existing problem. For more information, see the "Adjusting Oracle Fusion Incentive Compensation Batch Jobs Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

### 15.4.6.3 Configuring Additional Log Settings for Oracle Fusion General Ledger

In the Oracle Fusion Financials product family, some logging functionality for the Oracle Fusion General Ledger application is separate from the standard logging functionality for Oracle Fusion Applications. By default, the following kinds of Oracle Fusion General Ledger batch jobs do not write log entries:

- OpenPeriod
- Posting
- Translation
- Close Process - Create Income Statement Closing Journals
- Close Process - Create Balance Sheet Closing Journals

For optimum performance and log file sizes, it is recommended that you use the logging functionality for these areas only when troubleshooting an existing problem. For more information, see the "Adjusting Oracle Fusion General Ledger Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

### 15.4.6.4 Configuring Additional Log Settings for Oracle Fusion Receivables AutoInvoice

In the Oracle Fusion Financials product family, logging functionality for the AutoInvoice portion of the Oracle Fusion Receivables application is separate from the standard logging functionality for Oracle Fusion Applications. The amount of information that is logged for AutoInvoice depends on the value of the Log File Message Level system option setting.

To set the amount of information that the Oracle Fusion Receivables application logs for the AutoInvoice functionality area:

1. In the Oracle Fusion Receivables application, choose **Setup and Maintenance** from the **Navigator** menu.
2. Complete the following substeps to navigate to the **Edit System Options** screen for the **Manage Receivables System Options** task.
  - a. Expand the **Search: Tasks** pane.
  - b. Enter `Manage Receivables System Options` in the **Name** field and click **Search**.
  - c. In the **Manage Receivables System Options** row of the **Search Results** table, click **Go to Task**.
  - d. In the **Search** area of the **Manage Receivables System Options** screen, select **Business Unit** from the dropdown list, enter the name of a business unit for which you want to set up the amount of AutoInvoice information to be logged, and then click **Search**.  
 Alternately, you can click **Search** without specifying a business unit name to display a list of the available business units.
  - e. In the **Search Results** table, click the name of the business unit for which you want to set up the amount of AutoInvoice information to be logged.
3. In the **Edit System Options** screen, scroll down to display the **AutoInvoice** area of the screen, and then set **Log File Message Level** to the value of 0, which is the recommended value for normal operations.

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**Note:** For optimum performance and log file sizes, it is recommended that you keep the **Log File Message Level** system option set to the lowest value that meets your everyday needs, and increase the value of the setting only when troubleshooting an existing problem. For more information about using this setting when troubleshooting, see the "Adjusting Oracle Fusion Receivables AutoInvoice Log Settings for Troubleshooting" section in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

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4. Click **Save** to put your changes into effect.

Repeat this entire procedure for each additional business unit for which you want to configure AutoInvoice system options.

For information about configuring the **Maximum Memory in Bytes** system option for AutoInvoice, see your product-specific documentation in Oracle Fusion Applications Help.

### 15.4.7 Configuring Access to Logs for Fusion Applications Control

By default, you can use Fusion Applications Control to view log file entries that are generated by Java code in Oracle Fusion applications. To make it possible to view log file entries that are generated by PL/SQL or C code, you must perform the following configuration steps.

To make PL/SQL and C log file entries visible in Fusion Applications Control:

1. Determine the locations of the PL/SQL and C log files written by your Oracle Fusion applications.

If the values of the `AFLOG_PLSQL_FILENAME` and `AFLOG_FILENAME` profile options have been set, then those values determine log file locations for PL/SQL and C log files, respectively. For more information about these profile options and the log file locations that are used when these profile options are not set, see [Section 15.3.6](#) and [Section 15.4.1](#).

2. Decide which Managed Server you want to use to view PL/SQL log files, C log files, or both, and make sure that the server has read access to all of the log file locations that you determined in Step 1.

It is recommended that you use an Oracle WebLogic Server that runs Oracle Enterprise Scheduler for this purpose.

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**Note:** If you want to use more than one Managed Server to view PL/SQL log files, C log files, or both, then you can do so, provided that each server has read access to the log files that you want to view through that server. However, it is not especially valuable to use multiple servers to view a particular log file, because each server is providing access to the same data.

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3. On the Managed Server that you picked in Step 2, navigate to the following location, where `DOMAIN_HOME` is the domain home for the Managed Server and `server_name` is the name of the Managed Server:

`DOMAIN_HOME/config/fmwconfig/servers/server_name/diagnostics-registration`

If this location does not currently exist, create it now.

4. In the `diagnostics-registration` subdirectory, for each log file that you determined in Step 1 and want to view using this server, use a text editor to create and save a file that contains the following lines, using any file name that has the format `yourChosenFileName.xml`:

```
<?xml version='1.0' encoding='UTF-8'?>
<logs xmlns='http://www.oracle.com/ias/EMComponent/ojdl'>
  <log path="path_to_log_file">
    <logreader class="oracle.core.ojdl.reader.ODLLogReaderFactory">
  </logreader>
  </log>
</logs>
```

Substitute the full path and name of the log file for `path_to_log_file`, using the form of the path that is correct for the current server to use when accessing the file:

- For a PL/SQL log, make sure that the value for `path_to_log_file` corresponds to the same location and file name as the value that you have set for the `AFLOG_PLSQL_FILENAME` profile option.

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**Note:** You must resolve and enter the full path to the `path_to_log_file` location, explicitly, rather than entering the directory object that is used to set the value of the `AFLOG_PLSQL_FILENAME` profile option.

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- For a C log, make sure that the value for `path_to_log_file` indicates the same location and file name as the value that you have set for the `AFLOG_FILENAME` profile option.

Repeat this step, as needed, to create an individual `.xml` file for each log file that you determined in Step 1 and want to view using this server. You can save each file using any unique valid file name that ends in `.xml`. For example, the file name might be `plsqlfndlog.xml` for a PL/SQL log and `cfndlog.xml` for a C log.

5. In Fusion Applications Control, verify that each log file from Step 1 is now listed in an appropriate **Target Log Files** list:
  - a. From the navigation pane, select a target for which you created an `.xml` file.
 

For example, you might expand the **Financials** product family entry, and then expand the **Fusion Applications** and **PayablesApp** entries, and then select the **PayablesApp (PayablesServer\_1)** application instance target.
  - b. In the context pane, from the dynamic target menu, choose **Logs > View Log Messages** to display the log messages for the selected target.
  - c. Click **Target Log Files**.
  - d. Verify that the resulting list includes the all of the log files that are applicable for the selected target, including any applicable log files for which you created `.xml` files.
 

The View Log Message page includes information from all log files that appear on this list.
6. Repeat Step 5 for any other targets for which you created an `.xml` file.



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# Managing Oracle Fusion Applications Diagnostic Tests

This chapter describes how to use diagnostics tests to support normal operations for Oracle Fusion Applications and to prepare for future troubleshooting.

This chapter contains the following topics:

- [Section 16.1, "Understanding Oracle Fusion Applications Diagnostic Tests and the Diagnostic Framework"](#)
- [Section 16.2, "Configuring the Diagnostic Testing Framework for Normal Operation"](#)
- [Section 16.3, "Using Diagnostic Tests to Monitor Normal System Health"](#)

For information about troubleshooting using diagnostic tests, incidents, log files, and QuickTrace, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*. For more information about using incidents, log files, and QuickTrace during normal operation, see [Chapter 15](#).

## 16.1 Understanding Oracle Fusion Applications Diagnostic Tests and the Diagnostic Framework

**Diagnostic tests** are executables that are designed to exercise particular aspects of Oracle Fusion applications, to determine whether they are operating correctly and to help identify and resolve any problems. The Oracle Fusion Applications Diagnostic Testing Framework (Diagnostic Testing Framework) lets you execute diagnostic tests and collects the results into detailed diagnostic reports. Oracle provides diagnostics tests that are installed along with Oracle Fusion Applications releases and patches.

This section contains the following topics:

- [Section 16.1.1, "Relationships Between Diagnostic Tests, Incidents, and Log Messages"](#)
- [Section 16.1.2, "Standard Diagnostic Testing Administration Tasks and Tools"](#)

### 16.1.1 Relationships Between Diagnostic Tests, Incidents, and Log Messages

Oracle developers create diagnostic tests that you can use to help diagnose and resolve Oracle Fusion application problems.

Oracle developers use mechanisms such as application programming interface (API) calls in Oracle Fusion Applications code to record application operations in log files

and to provide error messages as appropriate. A diagnostic test may or may not be associated with a particular error message.

If an Oracle Fusion application handles a particular error in a way that triggers the creation of an incident, then any diagnostic tests that are associated with the error message for the incident run automatically. Oracle developers accomplish this by setting the value of each diagnostic test's `APPS_MSG_ID` tag to match the identifier of any error message that should trigger the automatic execution of that test. There is no configuration setting for disabling this automatic execution of diagnostic tests.

The results of any automatically run diagnostic test are automatically associated with the related incident, and the identity of the user who received the error message is recorded.

For more information about using diagnostic tests specifically for troubleshooting, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.

For more information about using logs to help diagnose a problem, see the "Troubleshooting Oracle Fusion Applications Using Incidents, Logs, QuickTrace, and Diagnostic Tests" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*. For more information about configuring and using log files during normal operation, see [Chapter 15](#).

It is important to be familiar with the following additional concept that is related to diagnostic tests:

**Seed data** is information that Oracle provides to you in the form of database records. Diagnostic tests are included in seed data.

## 16.1.2 Standard Diagnostic Testing Administration Tasks and Tools

Under ordinary circumstances, the following administrative tasks are associated with Oracle Fusion Applications diagnostic tests:

- Configuring security to provide appropriate access to diagnostic tests. You can assign job roles to particular users to grant those users the ability to perform various diagnostic operations. For more information, see [Section 16.2.1](#).

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**Note:** In the current release, a job role for diagnostic operations grants the user the ability to perform the specified operations for all diagnostic tests that are provided with Oracle Fusion Applications. When choosing whether to grant a diagnostic job role to specific users, be aware that some diagnostic tests may include sensitive information in their results.

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- Running diagnostic tests. You can use diagnostic tests for the following purposes:
  - Routinely checking the health of your Oracle Fusion applications
  - Troubleshooting a problem with an Oracle Fusion application
  - Collecting detailed data that may help Oracle Support to resolve a problem for you

Some diagnostic tests require a specific Oracle Fusion application to be running while the test is performed—these diagnostic tests are called **internal** diagnostic tests. Other



diagnostic tests can perform their functions even if the Oracle Fusion application to be tested is not running—these tests are called **external** diagnostic tests.

The distinction between internal and external tests is important because it affects both when you can run the tests and which interfaces you can use to run the tests. The Diagnostic Testing Framework provides two interfaces:

- The Oracle Fusion Applications Diagnostic Dashboard application (Diagnostic Dashboard) provides a graphical user interface that lets you perform the following tasks:
  - Execute and monitor both internal and external diagnostic tests for Oracle Fusion applications
  - Purge diagnostic test results
  - Register any special-purpose diagnostic tests that Oracle Support may provide to you
- The `diagctl` command-line interface lets you perform the following tasks:
  - Execute external diagnostic tests (tests that do not require a specific Oracle Fusion application to be running)

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**Note:** Technical constraints prevent the `diagctl` command-line interface from returning useful results for internal diagnostic tests (tests that require a specific Oracle Fusion application to be running when the test is performed). You must use Diagnostic Dashboard to run any internal diagnostic tests.

You must also use Diagnostic Dashboard to determine whether a particular test is an internal or an external test. For more information about making this determination, see Step 9 through Step 11 in [Section 16.3.1.1](#).

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- View diagnostic test results
- Register any special-purpose diagnostic tests that Oracle Support may provide to you

## 16.2 Configuring the Diagnostic Testing Framework for Normal Operation

You can use diagnostic tests to check normal system health and to troubleshoot system problems. You can configure your Oracle Fusion Applications environment to run all Oracle Fusion Applications diagnostic tests using the Diagnostic Dashboard application, and to run external diagnostic tests using the `diagctl` command-line interface.

This section contains the following topics:

- [Section 16.2.1, "Controlling Access to Diagnostic Testing Functionality"](#)
- [Section 16.2.2, "Navigating to the Diagnostic Dashboard Application"](#)
- [Section 16.2.3, "Configuring Required Variables for the `diagctl` Command Line Interface"](#)

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**Note:** Technical constraints prevent the `diagctl` command-line interface from returning useful results for internal diagnostic tests (tests that require a specific Oracle Fusion application to be running when the test is performed). You must use Diagnostic Dashboard to run any internal diagnostic tests.

You must also use Diagnostic Dashboard to determine whether a particular test is an internal or an external test. For more information about making this determination, see Step 9 through Step 11 in [Section 16.3.1.1](#).

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Both the Diagnostic Dashboard application and the `diagctl` command-line interface are automatically installed as part of the Oracle Fusion Applications installation. However, you must assign appropriate job roles to specific users to give them the ability to display and perform operations using the Diagnostic Dashboard application. Access to the `diagctl` command-line interface is controlled at the level of the server operating system. For more information about granting appropriate access, see [Section 16.2.1](#).

For proper operation of the `diagctl` command-line interface, you must also set certain environment variables. For more information about setting these variables, see [Section 16.2.3](#).

To help you locate diagnostic tests for specific purposes, the diagnostic tests that you receive with Oracle Fusion applications are all assigned to predefined categories.

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**Note:** You cannot change the tag name and tag value assignments that Oracle uses to categorize diagnostic tests, and you cannot remove those tag names or tag values from the database. The following related links in the Task pane of the Diagnostic Dashboard application are intended for use by Oracle personnel only:

- Add New Tag
  - Add New Tag Value
  - Assign Tags to Tests
  - Unassign Tags from Tests
  - Remove Tag
  - Remove Tag Value
- 
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**Caution:** Do not attempt to modify the diagnostic test seed data provided to you by Oracle. Unauthorized modification of this seed data may prevent diagnostic tests from functioning correctly, lengthening the amount of time required to resolve both current and future problems.

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## 16.2.1 Controlling Access to Diagnostic Testing Functionality

Access to diagnostic testing functionality is controlled separately for Diagnostic Dashboard and the `diagctl` command-line interface.

For the `diagctl` command-line interface, access is controlled at the level of the server operating system. If a user can log in to the server where `diagctl` is stored, and if that user has operating system permissions to read and execute `diagctl`, then that user can use `diagctl` to perform all diagnostic operations that the command-line interface supports.

For Diagnostic Dashboard, you can use Oracle Identity Manager to assign specific users to any of the four preconfigured job roles that grant users access to Diagnostic Dashboard. Each of these four job roles provides access to a different amount of the functionality of the dashboard.

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**Note:** Oracle Fusion applications display the **Troubleshooting > Run Diagnostic Tests** command in the **Help** menu only for users who are associated with the preconfigured job roles that grant access to Diagnostic Dashboard operations.

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- The `Diagnostic Viewer` job role can view and analyze diagnostic test results for Oracle Fusion applications.
- The `Diagnostic Regular User` job role can execute diagnostic test runs and view diagnostic test results for Oracle Fusion applications, and cancel diagnostic test runs that were started by the current user.
- The `Diagnostic Advanced User` job role can schedule and execute diagnostic test runs, view diagnostic test results, attach test results to application incidents for Oracle Fusion applications, and cancel diagnostic test runs that were started by the current user. In general, this job role is recommended for running Oracle Fusion Applications diagnostic tests, because its added capabilities allow users to work with administrators more flexibly during troubleshooting.
- The `Diagnostic Administrator` job role can use all of the diagnostic testing functionality provided for Oracle Fusion applications, including purging test results from the database and canceling test runs started by other users.

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**Note:** In the current release, any job role for diagnostic operations grants the user the ability to perform the role's specified operations for all diagnostic tests that are provided with Oracle Fusion applications. When choosing whether to grant any diagnostic job role to specific users, be aware that some diagnostic tests may include sensitive information in their results.

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To grant specific users permission to use Diagnostic Dashboard:

1. Decide which users need the capabilities of each of the four preconfigured job roles for diagnostic operations.
2. Use Oracle Identity Manager to assign the appropriate job role to each user.

## 16.2.2 Navigating to the Diagnostic Dashboard Application

The Diagnostic Dashboard application for Oracle Fusion Applications provides a graphical user interface that lets you execute and monitor diagnostic tests, display and purge test results, and register any special-purpose diagnostic tests that Oracle Support may provide to you. Each product family within Oracle Fusion Applications has its own instance of Diagnostic Dashboard. Provided that you are assigned to an

appropriate job role, you can navigate to Diagnostic Dashboard from any Oracle Fusion application or from Oracle Enterprise Manager Cloud Control (Cloud Control).

### 16.2.2.1 Navigating to the Diagnostic Dashboard Application from an Oracle Fusion Application

If you want to use Diagnostic Dashboard to execute or monitor diagnostic tests or display or purge test results while you are using an Oracle Fusion application, you can navigate to Diagnostic Dashboard directly from the application.

To display the Diagnostic Dashboard application from an Oracle Fusion application:

1. Sign in to the relevant Oracle Fusion application as a user who has access to the specific Diagnostic Dashboard operations that you need.

For more information about the job roles that grant access to Diagnostic Dashboard operations, see [Section 16.2.1](#).

2. From the **Help** menu in the application, choose **Troubleshooting > Run Diagnostic Tests** to display Diagnostic Dashboard.

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**Note:** Oracle Fusion applications display the **Troubleshooting > Run Diagnostic Tests** command in the **Help** menu only for users who are assigned to the preconfigured jobs roles that grant access to Diagnostic Dashboard operations. For more information about these job roles, see [Section 16.2.1](#).

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### 16.2.2.2 Navigating to the Diagnostic Dashboard Application from Cloud Control

If you want to use the Diagnostic Dashboard application to execute or monitor diagnostic tests or display or purge test results while you are using Cloud Control, such as while you are using Support Workbench to gather additional information about an existing incident, you can navigate to Diagnostic Dashboard directly from Cloud Control.

To display to Diagnostic Dashboard from Cloud Control:

1. In Oracle Enterprise Manager, select the product family or cluster application for which you want to run diagnostic tests or view diagnostic test results.
2. From the dynamic dropdown menu, choose **Diagnostics > Fusion Applications Diagnostic Dashboard**.

A login screen for Diagnostic Dashboard appears in a new window.

3. Log in using an account for the Oracle Fusion Applications product family that you intend to test.

The account that you use must also be assigned to a job role that provides access to Diagnostic Dashboard. For more information, see [Section 16.2.1](#).

## 16.2.3 Configuring Required Variables for the `diagctl` Command Line Interface

To operate properly, the `diagctl` command-line interface requires you to set certain environment variables.

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**Note:** You must set the required environment variables for each session that plans to use the `diagctl` command-line interface. For your convenience, you may want to add the commands that define these variables to the `.profile` or `.bashrc` files of all users who will run `diagctl`.

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To set environment variables for a user of the `diagctl` command-line interface:

1. Log in to the operating system of the Administration Server of the Common domain.
2. Use a command such as the following to set the `DIAGJPSCONFIGFILE` environment variable to the location of the `jps-config-jse.xml` file, making these substitutions:

Replace `APPLICATIONS_CONFIG` with the location of the top-level directory of Oracle Fusion Applications configuration files.

Replace `primordial_host_name` with the host name of the Administration Server of the Common domain).

```
(UNIX) export DIAGJPSCONFIGFILE=APPLICATIONS_CONFIG/domains/  
primordial_host_name/CommonDomain/config/fmwconfig/jps-config-jse.xml
```

```
(Windows) set DIAGJPSCONFIGFILE=APPLICATIONS_CONFIG\domains\  
primordial_host_name\CommonDomain\config\fmwconfig\jps-config-jse.xml
```

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**Note:** Command syntax for UNIX environments may vary depending on which shell you are using. Whenever you define an environment variable, use the command syntax for your chosen shell.

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3. Use a command such as the following to set the `JAVA_HOME` environment variable to the location of the directory that contains Java files, where `APPLICATIONS_BASE` is the top-level directory for the Oracle Fusion Applications binaries.

```
(UNIX) export JAVA_HOME=APPLICATIONS_BASE/fusionapps/jdk6
```

```
(Windows) set JAVA_HOME=APPLICATIONS_BASE\fusionapps\jdk6
```

4. Use a command such as the following to set the `MW_HOME` environment variable to the location of the directory that contains Oracle Fusion Middleware files.

```
(UNIX) export MW_HOME=APPLICATIONS_BASE/fusionapps
```

```
(WINDOWS) set MW_HOME=APPLICATIONS_BASE/fusionapps
```

After you complete this step, you can use the `diagctl` command-line interface to run diagnostic tests. For more information, see [Section 16.3.1.2](#).

## 16.3 Using Diagnostic Tests to Monitor Normal System Health

Oracle Fusion Applications diagnostic tests are designed to help you to monitor the health of your system and to help you troubleshoot when necessary.

This section contains the following topics:

- [Section 16.3.1, "Running Diagnostic Tests"](#)

- [Section 16.3.2, "Searching for Diagnostic Tests by Name, Categorization Tag, or Module"](#)
- [Section 16.3.3, "Checking Diagnostic Test Availability"](#)
- [Section 16.3.4, "Providing Input Parameters for Diagnostic Tests"](#)
- [Section 16.3.5, "Running Diagnostic Tests Immediately"](#)
- [Section 16.3.6, "Scheduling Diagnostic Tests to Run Later"](#)
- [Section 16.3.7, "Checking the Status of a Diagnostic Test"](#)
- [Section 16.3.8, "Canceling Diagnostic Test Runs"](#)
- [Section 16.3.9, "Viewing the Results of Diagnostic Tests"](#)
- [Section 16.3.10, "Identifying Diagnostic Test Start Methods from Test Run Names"](#)
- [Section 16.3.11, "Purging the Results of Selected Diagnostic Test Runs"](#)

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**Note:** The user name that you use to sign in to an Oracle Fusion application affects which diagnostic operations are available to you. Be sure that you sign in using an account that has a job role for the diagnostic operations that you need. For more information, see [Section 16.2.1](#).

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Some diagnostic tests can be used with all Oracle Fusion applications. Other tests apply to specific product families within Oracle Fusion Applications. For information about the individual diagnostic tests that are provided with this release, see the *Oracle Fusion Applications Common User Guide* in Oracle Fusion Applications Help.

## 16.3.1 Running Diagnostic Tests

You can use either Diagnostic Dashboard or the `diagctl` command-line interface to run external diagnostic tests—tests that do not depend on the availability of any specific Oracle Fusion application. However, for technical reasons, you must use Diagnostic Dashboard to run internal diagnostic tests—tests that require a specific Oracle Fusion application to be running at the time when the test is run. For information about determining whether a particular test is an internal or an external test, see Step 9 through Step 11 in [Section 16.3.1.1](#).

This section contains the following topics:

- [Section 16.3.1.1, "Using Diagnostic Dashboard to Run Diagnostic Tests"](#)
- [Section 16.3.1.2, "Using the `diagctl` Command-Line Interface to Run Diagnostic Tests"](#)

### 16.3.1.1 Using Diagnostic Dashboard to Run Diagnostic Tests

The Diagnostic Dashboard application provides a graphical user interface that lets you execute and monitor diagnostic tests, display and purge test results, and register any special-purpose diagnostic tests that Oracle Support may provide to you.

To run a diagnostic test from Diagnostic Dashboard:

1. Navigate to Diagnostic Dashboard for the Oracle Fusion applications you are administering, and log in using an account for the application you intend to test that has one of the following job roles:
  - Diagnostic Regular User

- Diagnostic Advanced User
- Diagnostic Administrator

For more information about these job roles, see [Section 16.2.1](#). For more information about navigating to Diagnostic Dashboard, see [Section 16.2.2](#).

2. In the Regional area on the left side of Diagnostic Dashboard, locate, and, if necessary, expand one of the following panels:
  - **Search by Tests**
  - **Search by Tags**
3. In the search panel, use standard Oracle query techniques to specify the test characteristics that you want to search for, and then click **Search**.

For information about the kinds of test characteristics that you can specify, see [Section 16.3.2](#).

The results of the search appear in a table below the **Search** button.

---

**Note:** In the current release, you can search for and display information about all diagnostic tests that are associated with a tag name that you specify. You cannot currently limit those searches to particular pairs of tag names and tag values. If you need to locate diagnostic tests that are associated with a particular tag name and tag value, you must search for the tag name and then scan the results for the tag value you require.

---

4. In the search results table, select the checkbox for each test that you want to run, then click **Add To Run**.

The **Choose Tests to Run and Supply Inputs** table appears in the upper Local area of the screen, listing characteristics of the tests you selected.

5. From the **View** menu, use standard techniques to adjust how the table displays its data.

If you want to display nested tests and test steps, you can also expand the tree structure in the **Choose Tests to Run and Supply Inputs** table.

6. In the **Choose Tests to Run and Supply Inputs** table, inspect the **Input Status** column and perform the appropriate action for the value you find:
  - For any root level test that displays the message `Required Input Values Missing`, either clear the checkbox to omit that test (and its nested tests and test steps) from the test run and skip to Step 8, or click the alert icon in the **Input Status** column to display the Input Parameters dialog and go to Step 7.
  - For any root level test that displays the message `Required Input Values Validated` or the message `Input Values Validated`, consider whether you want to inspect the parameter values the test is currently set to use. If so, or if you know that you want to change an existing input parameter value, click the check mark icon in the **Input Status** column to display the Input Parameters dialog and go to Step 7.

---

**Note:** You can use the Input Parameters dialog to override current input parameter values, including in tests that have a valid input status.

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- For any root level test that displays the message `No Inputs Required`, skip to Step 8. A test that displays this message does not use input parameters.
7. If you clicked the alert icon in the **Input Status** column to display the Input Parameters dialog, specify new parameter values as needed, according to the parameter type, as follows; otherwise, skip this step.
    - For Boolean parameters, click the appropriate button in the **New Value** field.
    - For numerical parameters and general text parameters, enter the appropriate value in the **New Value** field.
    - For date parameters, click the icon in the **New Value** field to display a calendar pop-up menu, and then select an appropriate year, month, and day.
    - For parameters that must be supplied from a list of values (LOV), click the magnifying glass icon in the **New Value** field to display the Search and Select dialog. In the Search and Select dialog, select the appropriate value for the parameter and click **OK**.

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**Note:** The values that are available in the list of values are determined in the metadata for the diagnostic test.

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- If you want to save your current input values for convenient future use, then click **Save** to display the Save As Input Set dialog. Supply a name for the set of values that you are saving, plus any additional information about the input set that you want to store, and then click **OK**.
- If you want to use a set of previously stored input values, then select the appropriate set from the **Input Set** dropdown list, and click **Load**.
- If you want to revert to the default values for all parameters in the current test, then click **Defaults**. The Diagnostic Test Framework removes all values for text parameters and resets other parameter types to default values.

After you finish setting input parameters for the current test, click **OK**.

8. Repeat Step 6 through Step 7 for any other tests that are missing input values, or that have parameter values that you want to override in your test run.
9. From the **View** menu for the **Choose Tests to Run and Supply Inputs** table, choose **Availability** to display the Diagnostic Test Availability dialog.
10. In the **Select a Diagnostic Test for Details** table, select each test and inspect the icon displayed in its **Availability** column:
  - If the **Availability** column shows a check mark icon, then the selected test is currently available to be run.
  - If the **Availability** column shows a triangular warning icon, or if you want to determine whether the test is internal or external, then click **Detach** in the **Available Details** table header to display the **Available Details** table in a larger window, and then go to Step 11.

If all of the listed tests are available to be run and if you do not need to know whether they are internal or external, then skip to Step 13.

11. Inspect the expanded **Detached Table** for messages about whether the selected test depends on particular Oracle Fusion applications or about why the test is not available, and take the appropriate action:



- If you want to know whether the selected test is internal or external, then inspect the **Details of Required Test Components** column of the **Web Applications Accessible** row.
  - If that cell of the **Detached Table** contains the name of an Oracle Fusion application, then the test is an **internal** diagnostic test that you can run only by using Diagnostic Dashboard when the specified application is available. You cannot run an internal diagnostic test by using the `diagctl` command-line interface or when the application is not present.
  - If that cell of the **Detached Table** does not list an application, then the test is an **external** diagnostic test.
- If the text in the **Error** column is "The following Java classes were not loadable," then this message indicates that the diagnostic testing framework cannot locate the JAR file that contains the selected test. Contact your help desk for assistance in searching for a solution in the My Oracle Support Knowledge Base. If the Knowledge Base does not provide a solution, ask your help desk to open an Oracle Support service request.
- If the text in the **Error** column is "The following PL/SQL procedures were not located in the database," then this message indicates that the diagnostic testing framework cannot locate the test code for the selected PL/SQL diagnostic test in your database. Contact your help desk for assistance in searching for a solution in the My Oracle Support Knowledge Base. If the Knowledge Base does not provide a solution, ask your help desk to open an Oracle Support service request.
- If the text in the **Error** column is "The following Web Applications were inaccessible," then use the Oracle WebLogic Server console or Fusion Applications Control to check whether the listed applications are running correctly. This message indicates that the Diagnostic Testing Framework must have access to running instances of the listed Oracle Fusion applications to run the selected diagnostic test—the test is an internal test.

For more information about installing and deploying Oracle Fusion Applications, see the "Provisioning a New Applications Environment" chapter of the *Oracle Fusion Applications Installation Guide*.

If the problem persists when the listed Oracle Fusion applications and the relevant database instance are all running, contact Oracle Support for assistance.

- If the text in the **Error** column is "The current user does not have execution privileges for the following tests," then you must log in as a user who has appropriate privileges to execute the selected test. For information about the privileges required, see [Section 16.2.1](#).
- If the text in the **Error** column is "The current user does not have privileges to view reports for the following tests," then you must log in as a user who has appropriate privileges to view the results of the selected test. For information about the privileges required, see [Section 16.2.1](#).

---

**Note:** It is possible to have the necessary privileges to view diagnostic test results without having the necessary privileges to run those tests. Use an appropriate user account for the actions you want to perform.

---

12. If you have not already done so, close the Detached Table window and the Diagnostic Test Availability dialog, repeat Step 9 and Step 10 to verify that all listed tests are now available to be run, and then go to Step 13.
13. If you wish, enter a name for your test run in the **Run Name** field in the control bar.

---

---

**Note:** Do not use the word `error` in your test run name. If you use the word `error`, or if you leave the **Run Name** field blank, the Diagnostic Testing Framework automatically assigns the test run a name. For information about the formats used in automatically assigned test run names, see [Section 16.3.10](#).

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---

14. When the **Input Status** column of the **Choose Tests to Run and Supply Inputs** table displays `Required Input Values Validated` in all of the selected rows, choose one of the following from the **Run Options** menu:

- **Run Now:** Runs the selected test or tests immediately after you click **Run**.

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**Note:** Do not click **Run** until you have completed Step 15 and Step 16.

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- **Run Later:** Schedules when the test or tests will be run. This option is integrated with Oracle Enterprise Scheduler Service.

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**Note:** The ability to schedule diagnostic tests is supported only if the Oracle Fusion Applications configuration that you have provisioned includes Oracle Enterprise Scheduler.

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When you select this option, the **Run** button on the toolbar changes to a **Schedule Run** button. Complete the following substeps to schedule when the test or tests will be run:

- a. Click the **Schedule Run** button to display a Schedule Tests dialog.
- b. Click the **Schedule** tab and then select **Use a schedule**.
- c. From the **Frequency** dropdown list, select how often to run the selected test or tests.
- d. In the **Start** field, specify the date and time to start the testing.
- e. Click **Submit**.

15. Adjust option settings to determine whether to run the prerequisite tests for the diagnostic tests you selected:
  - If you want to run prerequisite tests, make sure that the **No Prerequisites** option in the **Run Options** menu is *not* selected.
  - If you do *not* want to run prerequisite tests, make sure that the **No Prerequisites** option in the **Run Options** menu *is* selected.
16. Adjust option settings to determine how many threads to use when running the selected diagnostic tests:

- To use multiple threads, choose **Run in Parallel** from the **Run Options** menu. Then choose **Number of Threads** from the **Run Options** menu and select a value from 2 through 5. The default number of threads for running in parallel is 3.
  - To use a single thread, choose **Run Synchronously** from the **Run Options** menu.
17. If you chose **Run Now** in Step 14, then click **Run** to start executing the test run.
- If you chose **Run Later** in Step 14, then the test run starts executing at the time you set in the Schedule Tests dialog.

### 16.3.1.2 Using the `diagctl` Command-Line Interface to Run Diagnostic Tests

The Diagnostic Test Framework command-line utility, `diagctl`, lets you specify which tests to run in several different ways: by test name, by associated product codes, by associated tag names and tag values, and by associated module IDs or module keys.

You can run one or more diagnostic tests using a single `diagctl` command. It is particularly appropriate to use `diagctl` when you do not have access to a WebLogic Server.

---

**Note:** Technical constraints prevent the `diagctl` command-line interface from returning useful results for internal diagnostic tests (tests that require a specific Oracle Fusion application to be running when the test is performed). You must use Diagnostic Dashboard to run any internal diagnostic tests.

You must also use Diagnostic Dashboard to determine whether a particular test is an internal or an external test. For more information about making this determination, see Step 9 through Step 11 in [Section 16.3.1.1](#).

---

To run Diagnostic Tests from the `diagctl` command-line interface:

1. Obtain the user name and password for the Oracle Fusion Applications account that will run the diagnostic test or tests, and the password for that account.
 

A user name and password is required for any diagnostic test that you run using the `diagctl` command-line interface. The command-line syntax for specifying the user name and password is `un=user_name` and `pwd=password`.
2. Decide which of the following methods to use to specify the diagnostic test or tests that you want to run:
  - Specify a single test name: To run a single specific test without specifying input parameters, the command-line syntax is `test=test_name`
  - Specify a test name and parameters: To run a single specific test with one or more input parameters, the command-line syntax is `test=test_name input:parameter_name1=parameter_value1 input:parameter_name2=parameter_value2`
  - Specify multiple test names: To run several specific tests, the command-line syntax is `test=test_name1, test_name2, test_name3`

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**Note:** If you are specifying multiple tests on a single command line, then you cannot specify input parameters on that command line.

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- Specify by product codes: To run all of the tests that are associated with one or more specific product codes in the Applications taxonomy, the command-line syntax is `app=product_code1,product_code2,product_code3`
- Specify by module ID: To run all of the tests that are associated with specific module IDs in the Applications taxonomy, and all of the tests that are associated with child modules of the module that you specify, the command-line syntax is `modid=moduleID1,moduleID2,moduleID3`
- Specify by module key: To run all of the tests that are associated with specific module keys in the Applications taxonomy, the command-line syntax is `modkey=module_key1,module_key2,module_key3`
- Specify by tag name and tag value: To run all of the tests that are associated with a specific tag and tag value in the diagnostic test repository, and to run any tests that are associated with any child tag values of the tag name and tag value that you specify, the command-line syntax is `tag:tagname1=tagvalue1 tag:tagname2=tagvalue2 tag:tagname3=tagvalue3`

You must use at least one of these options in each command to run a diagnostic test from `diagctl`. You can include more than one of these options in a single command, if you prefer.

3. Decide whether to use any, some, or all of the following additional options for the test run:
  - Specify a test run name: To specify a particular name for the test run, use the command-line syntax `runname=run_name`.

---

---

**Note:** Do not include the word *error* in your test run name. If you include the word *error*, or if you do not specify a test run name, the command-line utility automatically generates a name for the test run. Automatically generated test run names start with the test name, product code, module ID, module key, or tag name and value that you specified, followed by a colon, a timestamp, another colon, and a sequence number.

---

---

- Specify whether to test recursively: To run all of the specified tests recursively, use the command-line syntax `recurse=Y`. The default value is `N`.
- Specify whether to run prerequisite tests: To identify and run any tests that are prerequisites before running the specified tests, use the command-line syntax `prereq=Y`. The default value is `N`.
- Specify the monitoring interval: To specify how often the status of the test run is uploaded to the test repository, use the command-line syntax `moninterval=time_in_seconds`. The default value is 30 seconds.
- Specify the number of threads: To specify the number of parallel threads to spawn for processing this test run, use the command-line syntax `nthreads=number_of_threads`. The default value is 5. A value of 1 directs the utility to run the tests serially.

4. Log in to the operating system of the Administration server and make sure that the following required environment variables are correctly set for the current session:

- DIAGJPSCONFIGFILE
- JAVA\_HOME
- MW\_HOME

For information about setting these variables, see [Section 16.2.3](#).

5. At an operating system command prompt, navigate to the location of the `diagctl` executable:

```
(UNIX) ATGPF_ORACLE_HOME/bin/diagctl.sh
(Windows) ATGPF_ORACLE_HOME\bin\diagctl.cmd
```

6. Enter `diagctl.sh run` (for UNIX) or `diagctl run` (for Windows) followed by the user name and password from Step 1 and the options that you decided upon in Step 2 and Step 3, using the syntax described in those steps.

---

**Note:** You can list command arguments that appear after the word `run` in any order. If you do not specify the password on the command line, the utility prompts you to supply it. For detailed help about running diagnostic tests, enter `diagctl.sh run help` (for UNIX) or `diagctl run help` (for Windows)

---

For example, to run a single test with two input parameter values specified, you enter a command such as the following:

```
(UNIX) diagctl.sh run test=oracle.apps.fnd.appltest.sampleTest
input:param1=value1 input:param2=value2 un=sysadmin
```

```
(WINDOWS) diagctl run test=oracle.apps.fnd.appltest.sampleTest
input:param1=value1 input:param2=value2 un=sysadmin
```

---

**Note:** If you specify an invalid parameter value, the command-line interface returns an error message and does not run the test.

---

To run all of the tests that belong to the Application Object Library (FND) and Oracle Fusion General Ledger products, and to run them recursively and with prerequisite analysis, you enter a command such as:

```
(UNIX) diagctl.sh run app=FND,GL recurse=Y prereq=Y un=sysadmin
(WINDOWS) diagctl run app=FND,GL recurse=Y prereq=Y un=sysadmin
```

To run all of the tests that are associated with the given module ID, you enter:

```
(UNIX) diagctl.sh run modid=module1,module2 un=sysadmin
(WINDOWS) diagctl run modid=module1,module2 un=sysadmin
```

## 16.3.2 Searching for Diagnostic Tests by Name, Categorization Tag, or Module

You can use Diagnostic Dashboard to search for available diagnostic tests.

One way you can search is to use **Search by Tags** to search for diagnostic tests that are associated with a particular categorization tag name that you specify.

Another way you can search is to use **Search by Tests** to search for tests with values that you specify for one or more of the following characteristics:

- Test name
- Test description
- Name of the Oracle Fusion Applications code module that the test checks.

The Diagnostic Testing Framework treats any search value that you enter as a case-insensitive matching pattern, returning the result if the pattern appears anywhere in the specified field. However, if you specify more than one search value to match, the framework returns results only for diagnostic tests that match all of the values that you specify (logical AND).

In general, searching for diagnostic tests is done as a portion of the process of running diagnostic tests from Diagnostic Dashboard. For more information, see [Section 16.3.1.1](#).

### 16.3.3 Checking Diagnostic Test Availability

Whether you can run a diagnostic test at any given time depends on both the specific requirements of the test and the current state of your Oracle Fusion Applications system. Any of the following factors can prevent a test from being available:

- Java class availability
- PL/SQL procedure availability
- Oracle Fusion Applications accessibility
- Execution privileges for the test
- Report viewing privileges for the test

In general, checking the availability of diagnostic tests is done as a portion of the process of running diagnostic tests. For more information, see [Section 16.3.1.1](#).

---

---

**Note:** Some diagnostic tests require a specific Oracle Fusion application to be running while the test is performed—these diagnostic tests are called **internal** diagnostic tests. Other diagnostic tests can perform their functions even if the Oracle Fusion application to be tested is not running—these tests are called **external** diagnostic tests.

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### 16.3.4 Providing Input Parameters for Diagnostic Tests

Diagnostic tests often have input parameters. Oracle supplies default values for some input parameters. When you are preparing to run one or more diagnostic tests, you can change the values for input parameters that have default values and enter values for input parameters that do not have default values. If you know that you will use the same parameter values more than once, you can save those values into an input set that you can reuse for later test runs.

All required input parameters must have values assigned before you can run a diagnostic test. If there are required parameter values missing, the Diagnostic Dashboard application displays *Required Input Values Missing* in the **Input Status** column of the **Choose Tests to Run** and **Supply Inputs** table.

To specify input parameter values, click the icon in the **Input Status** column to display the Input Parameters dialog. Then, you can either enter parameter values individually in the **New Value** column of the **Edit Input Set** table, or you can select a previously saved set of values from the **Input Set** dropdown list. After you specify all of the required input parameters, the Diagnostic Dashboard application displays a check mark icon with the message `Inputs Edited: Required Input Values Validated`. For more information, see [Section 16.3.1.1](#).

### 16.3.5 Running Diagnostic Tests Immediately

You can use either Diagnostic Dashboard or the `diagctl` command-line interface to run diagnostic tests immediately.

In Diagnostic Dashboard, you specify that you want to run a diagnostic test immediately by choosing **Run Now** from the **Run Options** menu.

For the `diagctl` command-line interface, you specify that you want to run a diagnostic test immediately by entering the command to run the test from an interactive session prompt.

For more information, see [Section 16.3.1](#).

### 16.3.6 Scheduling Diagnostic Tests to Run Later

If the Oracle Fusion Applications configuration that you have provisioned includes Oracle Enterprise Scheduler, you can specify a particular time to run diagnostic tests.

In Diagnostic Dashboard, you schedule diagnostic tests by choosing **Run Later** from the **Run Options** menu. For more information, see [Section 16.3.1.1](#).

To run a delayed diagnostic test using the `diagctl` command-line interface, create a script that calls `diagctl.sh` (for UNIX) or `diagctl.cmd` (for Windows), and then use standard Oracle Enterprise Scheduler techniques to schedule when the script runs. For information about submitting and monitoring Oracle Enterprise Scheduler jobs, see [Chapter 7](#).

### 16.3.7 Checking the Status of a Diagnostic Test

You can check the status of a diagnostic test from Diagnostic Dashboard or from the `diagctl` command-line interface. The command-line interface is primarily intended for use if the Diagnostic Dashboard application is temporarily unavailable.

This section contains the following topics:

- [Section 16.3.7.1, "Using the Diagnostic Dashboard Application to Check the Status of a Diagnostic Test"](#)
- [Section 16.3.7.2, "Using the diagctl Command-Line Interface to Check the Status of a Diagnostic Test"](#)

#### 16.3.7.1 Using the Diagnostic Dashboard Application to Check the Status of a Diagnostic Test

In Diagnostic Dashboard, the Diagnostic Test Run Status table displays two types of status information:

- **Execution Status:** This column displays status information about whether a test run request can be executed successfully.
- **Diagnostic Status:** This column displays status information about whether individual diagnostic tests detect problems.

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**Note:** After running a diagnostic test using Diagnostic Dashboard, you may need to click **Refresh** to display the latest status information, including rows for the following kinds of test runs:

- Test runs that were run immediately from Diagnostic Dashboard
- Test runs that were scheduled to be run later from Diagnostic Dashboard
- Test runs that were submitted using the `diagctl` command-line interface

When you click **Refresh**, Diagnostic Dashboard lists any additional test runs that you or other users have submitted in your current Oracle WebLogic Server domain. If your Oracle Fusion Applications deployment uses Global Single Instance (GSI), then Diagnostic Dashboard also lists test runs that were submitted in other domains.

---

---

To check the status of a diagnostic test using Diagnostic Dashboard:

1. If you started the diagnostic test from your current Diagnostic Dashboard application session, then the **Diagnostic Test Run Status** table automatically displays in the lower right portion of the screen after you click **Run**. Skip to Step 4.
2. If you are not already displaying Diagnostic Dashboard for the Oracle Fusion applications you are administering, navigate to the dashboard and log in using an account for the application you are testing. For more information, see [Section 16.2.2](#).
3. In the Regional area of your screen, expand the **Tasks** panel and click **Run Status**.
4. If you want the **Diagnostic Test Run Status** table to display only certain types of rows, then select one of the following options from the **Find** dropdown list:
  - **All Runs Submitted in Last Hour**
  - **All Runs Submitted in Last 24 Hours**
  - **All Running**
  - **All Running Submitted in Last Hour**
  - **All Runs with Diagnostic Failures in Last 24 Hours**
  - **All Runs with Diagnostic Failures**
  - **All Runs with Diagnostic Warnings**
  - **All Runs with Execution Errors**
  - **All Completed**
  - **All Completed with No Issues**
  - **All Runs**
  - **All Runs Run By the Current User in the Last Hour**
  - **All Runs Run By the Current User**
5. If you want to search for specific rows in the **Diagnostic Test Run Status** table, then click the **Search Test Runs** icon, enter the search criteria, and click **OK**.

The available search criteria include:

- Test run dates



- Test run names
  - Test display names
  - User names of those who started test runs
  - Execution status
6. If you want to display additional columns in the **Diagnostic Test Run Status** table, then choose the additional columns from the **View** menu.
  7. Expand the test run nodes as needed to view the list of test executions for each test, and then inspect the **Execution Status** column for information about whether tests and test runs have completed or encountered execution errors.
  8. Inspect the **Diagnostic Status** column for information about whether completed tests and test runs encountered any issues before completing.
  9. For additional information about any test execution, click the icon in the **Report** column of the appropriate row of the table.

### 16.3.7.2 Using the `diagctl` Command-Line Interface to Check the Status of a Diagnostic Test

The Diagnostic Test Framework command-line utility, `diagctl`, provides three different ways that you can specify the diagnostic test for which you want status information: by test run name, by test run ID, and by test execution ID.

To check the status of a diagnostic test using the `diagctl` command-line interface:

1. Obtain the user name and password for the Oracle Fusion Applications account that will run the diagnostic test or tests, and the password for that account.
 

A user name and password is required whenever you use the `diagctl` command-line interface to check the status of a diagnostic test. The command-line syntax for specifying the user name and password is `un=user_name` and `pwd=password`.
2. Decide which of the following methods to use to specify the diagnostic test run for which you want status information:
  - Specify a test run name: To check the status of a diagnostic test run for which you have the run name, the command-line syntax is `runName=run_name`
  - Specify a test run ID: To check the status of a diagnostic test for which you have the test run ID, the command-line syntax is `runid=run_ID`
  - Specify a test execution ID: To check the status of a diagnostic test for which you have the execution ID, the command-line syntax is `execid=execution_ID`

You must use at least one these options in each command to check the status of a diagnostic test using `diagctl`.

3. Decide whether you want to view the status of nested test runs.

To check the status of all diagnostic tests that are nested within the specified test, the command-line syntax is `printtree=Y`. This setting defaults to a value of `N`, meaning that the status is reported only for the specified test.

4. At a command prompt for your operating system, navigate to the location of the `diagctl` executable under the `fusionapps` Oracle Fusion Middleware home directory:

```
(UNIX) FA_MW_HOME/atgpf/bin/diagctl.sh
(Windows) FA_MW_HOME\atgpf\bin\diagctl.cmd
```

5. Enter `diagctl.sh status` (for UNIX) or `diagctl status` (for Windows) followed by the user name and password from Step 1 and the options that you decided upon in Step 2 and Step 3, using the syntax described in those steps.

---

---

**Note:** You can list command arguments that appear after the word `status` in any order. If you do not specify the password as part of the command, the utility will prompt you to supply it. For detailed help about getting status information, enter `diagctl.sh status help` (for UNIX) or `diagctl status help` (for Windows).

---

---

For example, to check the status of a test by using a test run name, you enter a command such as:

```
(UNIX) diagctl.sh status runName=TrialsRun1 un=sysadmin
(Windows) diagctl status runName=TrialsRun1 un=sysadmin
```

To check the status of a test and its nested test runs by using a run ID, you enter a command such as:

```
(UNIX) diagctl.sh status runid=RunID1 printtree=Y un=sysadmin
(Windows) diagctl status runid=RunID1 printtree=Y un=sysadmin
```

To check the status of a test by using an execution key, you enter:

```
(UNIX) diagctl.sh status execid=TestExecID1 un=sysadmin
(Windows) diagctl status execid=TestExecID1 un=sysadmin
```

### 16.3.8 Canceling Diagnostic Test Runs

From time to time, you may want to stop a diagnostic test or test run that is running. Several constraints affect your ability to cancel a diagnostic test or test run:

- In the current release, you must use Diagnostic Dashboard to cancel a diagnostic test or test run that is running. The `diagctl` command-line interface does not provide this capability.
- To cancel a test or test run that you started, you must use an account that has been assigned the Diagnostic Regular User, Diagnostic Advanced User, or Diagnostic Administrator job role.
- To cancel a test or test run that another user started, you must use an account that has been assigned the Diagnostic Administrator job role.
- When a diagnostic test is scheduled to run at a later time, it is immediately submitted to the Oracle Enterprise Scheduler Service. The procedure for canceling this type of test depends on whether the test has already started to execute when you want to cancel it:
  - To cancel a scheduled diagnostic test that has not yet started to execute, use standard Oracle Enterprise Scheduler techniques to cancel the job. For more information about canceling scheduled jobs, see the "Canceling Oracle Enterprise Scheduler Job Requests" section in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.
  - To cancel a scheduled diagnostic test that the Diagnostic Test Run Status dashboard panel indicates is already running, use Diagnostic Dashboard to cancel it in the same way that you would cancel a test that ran immediately.

When you cancel a diagnostic test or test run, the consequences may vary depending on how much of the test run has executed and the language in which the test code is written:

- If you cancel a diagnostic test run while a test step from that test run is in progress, the test step that is currently running is canceled. No additional tests or test steps in the remainder of the canceled test run are executed. The Diagnostic Test Run Status panel displays an Execution Status of **Canceled** for the run, and a pop-up window displays a message such as the following, but no log messages are recorded to indicate that a diagnostic test run was canceled:

```
Test Run "test_name" has been canceled.
Please check the test run report for further details.
```

- When you cancel a diagnostic test step that is implemented in Java, the diagnostic framework automatically closes the test step's database connection, using an asynchronous command to terminate the thread. However, when you cancel a diagnostic test step that is implemented using PL/SQL, the diagnostic framework cannot interrupt the test step and use the existing database connection to close that connection. To reclaim the resources allocated to a canceled PL/SQL diagnostic test step, you must establish a separate connection to the database and use an `alter system kill session` command to close the connection that the canceled test step was using, as described later in this section.

To cancel a diagnostic test using Diagnostic Dashboard:

1. If you started the diagnostic test from your current Diagnostic Dashboard application session, then the **Diagnostic Test Run Status** table automatically displays in the lower right portion of the screen after you click **Run**. Skip to Step 4.
2. If you are not already displaying Diagnostic Dashboard for the Oracle Fusion applications you are administering, then navigate to the dashboard and log in using an account for the application you are testing. For more information, see [Section 16.2.2](#).
3. In the Regional area of your screen, expand the **Tasks** panel and click **Run Status**.
4. In the **Diagnostic Test Run Status** panel, locate and select the test run that you want to cancel, verify that its **Execution Status** is **Running**, and then click **Cancel**.
5. In the **Diagnostic Test Run Status** panel, click the **Report** icon for the canceled test run.
6. Inspect the test run report to determine whether the canceled test step was implemented using Java or PL/SQL.
  - If the canceled test step was implemented using Java, then skip all of the remaining steps in this procedure.
  - If the canceled test step was implemented using PL/SQL, then go to Step 7.
7. If the canceled test step was implemented using PL/SQL, then make a note of the session ID and serial number for the database connection that the step was using.

For example, the report might display information similar to the following:

**Step Report - Diagnostics\_Engine\_Log**

**Session Information**

```
The test test_name is using a database connection with Session Id 944 and
Serial Number 817
```

- Using your preferred database client or database monitoring application and a separate connection to the database, determine whether the database connection for the canceled test step is still open.

For example, you could use a SQL client to execute the following query, substituting the session identifier and serial number values that you obtained in Step 7 for *session\_Id* and *serial\_number*:

```
select * from v$session where sid = session_Id and serial# =  
serial_number
```

If this query returns a row that contains the session ID and serial number that you specified, then the database connection from the canceled test is still open and using resources. Go to Step 9.

If the query does not return a row that contains the session ID and serial number that you specified, then the database connection from the canceled test has been closed. In this case, skip Step 9.

- If the database connection for the canceled test step is still open, use a command such as the following to close that connection, substituting the correct session identifier and serial number values for *session\_Id* and *serial\_number*.

```
alter system kill session 'session_Id, serial_number';
```

## 16.3.9 Viewing the Results of Diagnostic Tests

You can use either Diagnostic Dashboard or the `diagctl` command-line interface to view reports that show the results of diagnostic tests, whichever you prefer.

This section contains the following topics:

- [Section 16.3.9.1, "Using the Diagnostic Dashboard Application to View the Results of Diagnostic Tests"](#)
- [Section 16.3.9.2, "Using the diagctl Command-Line Interface to View the Results of Diagnostic Tests"](#)

### 16.3.9.1 Using the Diagnostic Dashboard Application to View the Results of Diagnostic Tests

You can view the results of a diagnostic test in the dashboard by checking the status of the test and then clicking the icon in the **Report** column of the selected table row. For more information, see [Section 16.3.7.1](#).

### 16.3.9.2 Using the diagctl Command-Line Interface to View the Results of Diagnostic Tests

The `diagctl` command-line utility provides three different ways of requesting the results of diagnostic test results: by test run name, by test run ID, and by test execution ID.

To view diagnostic test result reports using the `diagctl` command-line interface:

- Obtain the user name and password for the Oracle Fusion Applications account that you will use to view the test results, and the password for that account.

A user name and password is required whenever you use the `diagctl` command-line interface to view the results of a diagnostic test. The command-line syntax for specifying the user name and password is `un=user_name` and `pwd=password`.

2. Decide which of the following methods to use to specify the diagnostic test run for which you want to view results:

- Specify a test run name: To view the results of a diagnostic test run for which you have the run name, the command-line syntax is `runName=run_name`. This option includes results for all of the executions in the test run.
- Specify a test run ID: To view the results of a diagnostic test for which you have the test run ID, the command-line syntax is `runid=run_ID`. This option includes results for all of the executions in the run.
- Specify a test execution ID: To view the results of a diagnostic test for which you have the execution ID, the command-line syntax is `execid=execution_ID`. This option includes results for the specified execution and any nested executions.

You must use at least one of these options in each command to view the results of a diagnostic test using `diagctl`.

3. Decide whether you want to use one or more of the following additional options:

- Specify a destination directory for results: To write the test results to a specific directory, the command-line syntax is `destdir=destination_directory`. If you do not specify a directory, reports are placed in the `java.io.tmpdir/user.name/diagfwk` directory where `java.io.tmpdir` and `user.name` are Java system properties.
- Specify a format for the result report: Valid values are XML and HTML. The default value is HTML. XML report files are created as a step toward creating HTML report files. These XML report files remain in the same directory as the HTML report files.
- Specify if the report should be translated: Valid values are Y and N. If the value is Y, any NLS keys that are specified in the report are translated to your session language. If the value is N, no translation is performed. The default value is Y.

4. At a command prompt for your operating system, navigate to the location of the `diagctl` executable under the `fusionapps` Oracle Fusion Middleware home directory:

```
(UNIX) FA_MW_HOME/atgpf/bin/diagctl.sh
(Windows) FA_MW_HOME\atgpf\bin\diagctl.cmd
```

5. Enter `diagctl.sh report` (for UNIX) or `diagctl report` (for Windows), followed by the user name and password from Step 1 and the options that you decided upon in Step 2 and Step 3, using the syntax described in those steps.

---

**Note:** You can list command arguments that appear after the word `report` in any order. If you do not specify the password as part of the command, the utility will prompt you to supply it. For detailed help about viewing reports, enter `diagctl.sh report help` (for UNIX) or `diagctl report help` (for Windows).

---

For example, to view the results of a test by using a run name, and to place the results in a particular directory, you enter a command such as:

```
(UNIX) diagctl.sh report runName=TrialRun1 destdir=/d1/testreport un=sysadmin
(Windows) diagctl report runName=TrialRun1 destdir=/d1/testreport un=sysadmin
```

To view the results of a test run by using a run ID, with the results placed in the default location, you enter a command such as:

```
(UNIX) diagctl.sh report runid=RunID1 un=sysadmin  
(Windows) diagctl report runid=RunID1 un=sysadmin
```

To check the status of a test by using an execution key, with the results placed in the default location, you enter:

```
(UNIX) diagctl.sh report execid=TestExecID1 un=sysadmin  
(Windows) diagctl report execid=TestExecID1 un=sysadmin
```

6. Navigate to the location of the results file, and use a browser or text editor of your choice to view it.

### 16.3.10 Identifying Diagnostic Test Start Methods from Test Run Names

Any test run name that the Diagnostic Testing Framework supplies follows naming conventions that reflect how the test was started. If you find that an unfamiliar diagnostic test run occurred at an unexpected time, then knowing the test run naming conventions can help you to understand the circumstances in which the test run was started:

- When you submit a test run to run immediately, without specifying a run name, the name that is automatically assigned to the test run has the format `TestRun_runID`, where *runID* is a unique string of alphanumeric characters generated by the Diagnostic Testing Framework, such as `TestRun_91D818BA54BB29C8E040578C495D6956`. This naming convention applies both when tests are submitted from Diagnostic Dashboard and when tests are submitted using `diagctl`.
- When you schedule a diagnostic test run to run later, using Oracle Enterprise Scheduler Service, the name that is automatically assigned to the test run has the format `[TestRunName_]ESS_requestID_timestamp`, where *TestRunName* is an optional name that the you may specify when submitting the test, *requestID* is a unique identifier supplied by the Oracle Enterprise Scheduler when it schedules the job, and *timestamp* indicates the time when the job is scheduled to run. This naming convention applies to tests that are submitted from Diagnostic Dashboard to run later. (Tests that are submitted using `diagctl` always run immediately.)

For example, if you enter the test run name `routine`, the full test run name might be:

```
routine_ESS-417-2010-09-09T17:07:09.115-0700
```

- When a test run is submitted automatically because an incident occurred, the name that is automatically assigned to the test run has the format `AppsLogger-DiagnosticTestingFrameworkIntegration_id_timestamp`, where *id* is a number that uniquely identifies the incident, and *timestamp* indicates when the diagnostic test run starts.

### 16.3.11 Purging the Results of Selected Diagnostic Test Runs

From time to time, you may want to remove diagnostic test run results from your database, to keep the Run Status table from becoming too large.

---

**Note:** To remove the results of one or more diagnostic test runs from your database, you must use the Diagnostic Dashboard application with an account that has been assigned the `Diagnostic Administrator` job role.

The `diagctl` command-line interface does not currently provide a way to purge test run results.

---

To purge selected diagnostic test run results from the database:

1. If you started the diagnostic test from your current application session, then the **Diagnostic Test Run Status** table automatically displays in the lower right portion of the screen after you click **Run**. Skip to Step 4.
2. If you are not already displaying Diagnostic Dashboard for the Oracle Fusion applications you are administering, then navigate to the dashboard and log in using an account for the application that needs its test results purged. For more information see [Section 16.2.2](#).
3. In the Regional area of your screen, expand the **Tasks** panel and click **Run Status**.
4. In the **Diagnostic Test Run Status** table header, use either of the following methods to locate the test run status records that represent the test results that you want to remove from the database:
  - Select any appropriate filter from the **Find** dropdown list.
  - Click the search button, enter search criteria, and click **OK**.
5. After searching or filtering, inspect the listings displayed in the **Diagnostic Test Run Status** table, and decide whether you want to remove listed test results from the database individually or as a group:
  - To remove listed test results from the database individually, go to Step 6.
  - To remove all of the listed test results from the database, skip to Step 7.
6. To remove a single test run status result record from the database, complete the following substeps in the **Diagnostic Test Run Status** table:
  - a. Select the test run status record that represents the results that you want to remove from the database, and click the delete button in the **Diagnostic Test Run Status** table header.
  - b. In the Delete Test Run dialog, select `Delete test run "TestRunName"` and click **OK**.

The selected record is removed from the database immediately.

Skip Step 7 and Step 8.

7. To remove all of the listed test run status result records from the database, click the delete button in the **Diagnostic Test Run Status** table header.
 

Depending on whether you selected a record in the **Diagnostic Test Run Status** table, either the Delete Test Run dialog or the Confirm Test Run Delete dialog appears.
8. Complete the purge process using the appropriate instructions for the dialog displayed on your screen:

- If your screen displays the Delete Test Run dialog, then select **Delete all** test runs in the list and click **OK** to remove all of the listed test run results from the database immediately.
- If your screen displays the Confirm Test Run Delete dialog, then click **Yes** to remove all of the listed test run results from the database immediately.



# Part IV

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## Advanced Administration

This part describes advanced administration tasks that involve reconfiguring the Oracle Fusion Applications environment.

Part IV contains the following chapters:

- [Chapter 17, "Backing Up and Recovering Oracle Fusion Applications"](#)
- [Chapter 18, "Configuring High Availability and Scaling Out Oracle Fusion Applications"](#)



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# Backing Up and Recovering Oracle Fusion Applications

This chapter describes recommended back up and recovery strategies and procedures for recovering your Oracle Fusion Applications environment from different types of failures and outages, such as data loss or corruption, host failure, or media failure.

This chapter contains the following topics:

- Section 17.1, "Introduction to Backup and Recovery"
- Section 17.2, "Overview of Backing Up Your Environment"
- Section 17.3, "Overview of Recovering Your Environment"
- Section 17.4, "Prerequisites for Using Cloud Control to Back Up or Restore Your Environment"
- Section 17.5, "Backup and Recovery Recommendations for Oracle Fusion Applications"
- Section 17.6, "Performing a Backup"
- Section 17.7, "Creating a Record of Your Oracle Fusion Applications Configuration"
- Section 17.8, "Recovering Using Cloud Control"
- Section 17.9, "Recovering After Data Loss, Corruption, or Media Failure"
- Section 17.10, "Recovering After Loss of Host"
- Section 17.11, "A Case Study: Recovering Oracle Fusion Customer Relationship Management"

## 17.1 Introduction to Backup and Recovery

An Oracle Fusion Applications environment can consist of different Oracle Fusion Applications product families. It is built on Oracle Fusion Middleware, which contains Oracle WebLogic Server domains with Java components, such as Oracle SOA Suite, and system components, such as Oracle HTTP Server. It also contains a separate Oracle WebLogic Server domain with Identity Management components, such as Oracle Internet Directory and Oracle Virtual Directory.

Oracle Fusion Applications and some Oracle Fusion Middleware components use Oracle Database instances to store data and metadata.

Note that Oracle Fusion Applications uses at least three databases:

- A database that holds the **LDAP** repository

- A database that holds the Oracle Fusion Applications data
- A database that holds the Oracle Identity Manager repository

The installations of an Oracle Fusion Applications environment are interdependent in that they contain configuration information, applications, and data that are kept in synchronization.

It is, therefore, important to consider your entire Oracle Fusion Applications environment when performing backup and recovery. You should back up your entire Oracle Fusion Applications environment as soon as you have installed and configured it, then periodically. If a loss occurs, you can restore your environment to a consistent state.

## 17.2 Overview of Backing Up Your Environment

You should back up your environment when you install and configure Oracle Fusion Applications and on a regular basis. You can back up your full environment or you can back up only parts of it. You can perform the backups in online or offline mode.

This section includes the following topics:

- [Section 17.2.1, "Tools to Use to Back Up Your Environment"](#)
- [Section 17.2.2, "Modes of Backup"](#)
- [Section 17.2.3, "Types of Backups"](#)
- [Section 17.2.4, "Recommended Backup Strategy"](#)

### 17.2.1 Tools to Use to Back Up Your Environment

To back up your Oracle Fusion Applications environment, you can use:

- Oracle Enterprise Manager Cloud Control

With Cloud Control, you can back up the directories and databases that comprise a Oracle Fusion Applications installation. Because Cloud Control uses Oracle Secure Backup to perform Oracle Fusion Applications backups, all backups are done to tape, which is the media supported by Oracle Secure Backup.
- Any operating system or third-party tool which provides a consistent image back up of the file system, which you can later restore. If your storage has features such as storage snapshot, this is recommended. If your storage system does not provide such features, you can use file copy utilities such as `copy`, `xcopy`, `tar`, or `jar`. However, these utilities may result in an inconsistent backup unless the system is in a quiesced state. In addition, make sure that the utilities:
  - Preserve symbolic links
  - Support long file names
  - Preserve the permissions and ownership of the files

For example:

- On Windows, for online backups, you can use `copy`; for offline backups, you can use `copy`, `xcopy`, `tar`, or `jar`. Ensure that the backup utility you use can support long and unicode file names and extensions. Many of the early archiving utilities did not have this support.

Note that for some versions of Windows, any file name with more than 256 characters will fail. You can use the `xcopy` command with the following switches to work around this issue:

```
xcopy /s/e "C:\Temp\*.*)" "C:\copy"
```

See the `xcopy` help for more information about syntax and restrictions.

- On UNIX, for online and offline backups, you can use `tar`.

See [Section 17.2.2](#) for descriptions of online and offline backups.

- Oracle **Recovery Manager (RMAN)** to back up database-based metadata repositories and any databases used by Oracle Fusion Applications. With RMAN, you can perform full backups or incremental backups. See *Oracle Database Backup and Recovery User's Guide* for information about using RMAN to back up a database.

If you want to retain your backups for a longer duration, consider backing up to tape, for example using Oracle Secure Backup.

For optimized backup time and fast restore times for the file system, you can use a storage snapshot feature provided by a storage vendor. Snapshots are point-in-time, read-only copies of the file system. Snapshots normally use copy-on-write mechanisms and hence do not occupy any space at the beginning. When new data is written, the old copy is written to the snapshot. Most of the storage vendors support an unlimited number of snapshots and allow creating snapshots manually or automatically without any user interventions. Snapshots can be taken quickly, thus reducing the time taken when performing a backup. Taking regular snapshots of the Oracle Fusion Applications configuration helps you restore the Oracle Fusion Applications environment quickly in the event of configuration corruption or data loss. Snapshots provide rollback capabilities. When a rollback occurs, any newer snapshots (and clones of newer snapshots) are destroyed, and the active data reverts to the state when the snapshot was taken.

## 17.2.2 Modes of Backup

You can back up your Oracle Fusion Applications environment offline or online:

- With an **offline backup**, you must shut down the environment before performing the backup. When you perform an offline backup, the **Administration Server**, all Managed Servers in the domain, and all system components in the Oracle instances should be shut down.

Back up the environment offline immediately after installation and after applying upgrades.

- With an **online backup**, you do not shut down the environment before backing up the files. To avoid an inconsistent backup, do not make any configuration changes until the backup is completed. To ensure that no changes are made in the WebLogic Server domain, lock the WebLogic Server configuration, as described in [Section 2.6.2](#).

During an online backup, applications can continue to run during the backup, so your business is not affected.

## 17.2.3 Types of Backups

You should back up your Oracle Fusion Applications file system and your Oracle Fusion Applications databases.

For the Oracle Fusion Applications file system, you can perform a full backup or you can perform a partial backup. See [Figure 1–6](#) for a graphic of the directory structure in the Oracle Fusion Applications file system.

To perform a full backup of the file system, you should back up the **binary files**, as well as the **configuration files**.

**Binary files** are static files and directories that do not change frequently. These include:

- The Applications base directory, which is the top-level directory containing Oracle Fusion Applications, Middleware homes, and Oracle homes.
- The Middleware home (*MW\_HOME*). A Middleware home consists of a WebLogic Server home, an Oracle Common home, and optionally one or more Oracle homes and one or more Oracle instances.

- OraInventory

- On UNIX, the `OraInst.loc` file, which is located in the following directory:

```
(Linux and IBM AIX) /etc
(Other UNIX systems) /var/opt/oracle
```

- On UNIX, the `oratab` file, which is located in the following directory:

```
/etc
```

- The `beahomelist` file, which is located at:

```
(UNIX) user_home/boa/beahomelist
(Windows) C:\boa\beahomelist
```

- On Windows, the following registry key:

```
HKEY_LOCAL_MACHINE\Software\oracle
```

In addition, for system components, such as Oracle HTTP Server, you must back up the following Windows Registry key:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services
```

**Configuration files** are those files that change frequently. Back up these files when you perform a full backup and on a regular basis. Configuration files include:

- The Applications configuration directory, which is the top-level directory containing domains and Oracle instances.
- Domain directories of the Administration Server and the Managed Servers. The Oracle Fusion Applications environment can consist of multiple domains (for example, `CRMDomain` and `FinancialDomain`). Each domain consists of an Administration Server and one or more Managed Servers.

Unless stated in the backup recommendations for a particular type of Oracle Fusion application, you do not need to back up **Managed Server** directories separately because the Administration Server contains information about all of the Managed Servers in its domain.

- All Oracle instance homes, which reside by default in the *MW\_HOME*, but can be configured to be in a different location.

For the Oracle Fusion Applications database and related databases, you can perform full or incremental backups. You use Oracle Recovery Manager to back up an Oracle Database instance.

Note that you must keep the databases synchronized when you restore them.

## 17.2.4 Recommended Backup Strategy

This section outlines the recommended strategy for performing backups. Using this strategy ensures that you can perform the recovery procedures in this book.

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**Note:** Store your backups in a secure location, that is, not on the same hardware that contains your Oracle Fusion Applications environment.

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- **Perform a full offline backup:** Back up the binary files and directories and the configuration files described in [Section 17.2.3](#). If the Applications base directory is shared, you only need to back it up once. If the Applications base directory is not shared, back it up on each host in your Oracle Fusion Applications environment. Perform a full offline backup at the following times:
  - Immediately after you install Oracle Fusion Applications
  - Immediately after an operating system software upgrade.
  - Immediately before upgrading your Oracle Fusion Applications environment
  - Immediately after upgrading your Oracle Fusion Applications environment
  - Immediately before patching your Oracle Fusion Applications environment.
- **Perform an online backup of configuration files:** Back up the configuration files described in [Section 17.2.3](#). Backing up the configuration files enables you to restore your environment to a consistent state as of the time of your most recent configuration and metadata backup. You can back up the configuration files at the following granularity:
  - The Applications configuration directory.
  - The domain.
  - The instance. You should back up the files in the following directories:
    - For the CRM Domain: `instance/domains/host_name/CRMDomain`
    - For the HCM Domain: `instance/domains/host_name/HCMDomain`
    - For the FIN Domain: `instance/domains/host_name/FinancialDomain`
    - For the PRJ Domain: `instance/domains/host_name/PRJDomain`
    - For the Webtier home: `instance/CommonDomain_webtier`
    - For the BI Instance: `instance/BIInstance`

To avoid an inconsistent backup, do not make any configuration changes until the backup completes.

Perform an online backup of configuration files at the following times:

- On a regular basis. Oracle recommends that you back up configuration files nightly.
- Before making configuration changes to an Administration Server, a Managed Server, or application.
- Immediately after patching your Oracle Fusion Applications environment.
- After making configuration changes to an Administration Server, a Managed Server, Oracle instance, or application.

- After a major change to the deployment architecture, such as creating servers or clusters.
- **Perform a full or incremental backup of your databases:** Use RMAN to backup your databases. See the *Oracle Database Backup and Recovery User's Guide* for information about using RMAN and for suggested methods of backing up the databases.

Note the following recommendations:

- To ensure that no changes are made in the WebLogic Server domains, lock the WebLogic Server configuration for all the domains in Oracle Fusion Applications environment, as described in "Locking the WebLogic Server Configuration" in the *Oracle Fusion Middleware Administrator's Guide*.
- When you create the backup, name the archive file with a unique name. Consider appending the date and time to the name. For example, if you create a backup of the Applications base directory on March 2 2012, name the backup:

```
ApplBase_backup_030212.tar
```

## 17.3 Overview of Recovering Your Environment

If your environment suffers from critical failures that involve actual data corruption, data loss, or loss of host, you must recover all or part of your environment.

This section includes the following topics:

- [Section 17.3.1, "Tools to Use to Recover Your Environment"](#)
- [Section 17.3.2, "Types of Recovery"](#)
- [Section 17.3.3, "Recommended Recovery Strategies"](#)

### 17.3.1 Tools to Use to Recover Your Environment

To recover your Oracle Fusion Applications environment, you can use:

- Oracle Enterprise Manager Cloud Control  
With Cloud Control, you can restore the directories and databases that comprise a Oracle Fusion Applications installation.
- Any operating system or third-party tool which provides a consistent image backup of the file system, which you can later restore. If your storage has features such as storage snapshot, this is recommended. If your storage system does not provide such features, you can use file copy utilities such as `copy`, `xcopy`, `tar`, or `jar`. However, these utilities may result in an inconsistent backup unless the system is in a quiesced state. In addition, make sure that the utilities:

When you restore the files, use your preferred tool to extract the compressed files.

For example, for online recovery on Windows, you can use `copy`; for offline recovery on Windows, you can use `copy`, `xcopy`, or `jar`. Ensure that the utility you use can support long and unicode file names and extensions. Many of the early archiving utilities did not have this support."

For example, for UNIX, you can use `tar`.

- Oracle Recovery Manager (RMAN) to recover database-based metadata repositories and Oracle Fusion Applications databases. See the *Oracle Database Backup and Recovery User's Guide* for information about using RMAN to recover a database.



## 17.3.2 Types of Recovery

Recovery strategies enable you to recover from critical failures that involve actual data corruption, data loss, or loss of host. Depending on the type of loss, you can recover your Oracle Fusion Applications environment in part or in full. You can recover the following:

- The Applications base directory
- The Oracle WebLogic Server domains containing Oracle Fusion Applications
- The Administration Server for the Oracle Fusion Applications domains
- Managed Servers
- The Middleware home
- An Oracle home
- An Oracle instance home
- Any database used by Oracle Fusion Applications. You use Oracle Recovery Manager (RMAN) to recover an Oracle Database instance. See *Oracle Database Backup and Recovery User's Guide* for information about using RMAN to recover a database.

Note that with Oracle Fusion Applications, you can install all or some of the files on shared storage. Some of the procedures will differ depending on whether all files are on shared storage. The options are:

- All files are on a shared file system.
- All binary files are on a shared file system as well as all Administration Servers. Managed Servers are on local file systems.

## 17.3.3 Recommended Recovery Strategies

Note the following key points about recovery:

- All or part of your Oracle Fusion Applications environment must be offline while you are performing recovery.

Stop the relevant processes. The processes you stop depends on the granularity of the recovery. For example, if you are recovering only one domain, shut down the corresponding Administration Server and Managed Servers.

- Rename existing files and directories before you begin restoring the files from backup so that you do not unintentionally override necessary files.
- Although, in some cases, it may appear that only one or two files are lost or corrupted, you should restore the directory structure for the entire element, such as an Oracle instance home or a component, rather than just restoring one or two files. In this way, you are more likely to guarantee a successful recovery.
- If you need to recover a database, perform a complete recovery to recover the database to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database as close to the current time as possible. (You can use point-in-time recovery if the database is configured in Archive Log Mode. This is typically a time right before the database failure occurred.) Oracle recommends using Archive Log Mode for production databases.

You must keep the databases synchronized. See [Section 17.9.9](#) for procedures for recovering them to the same point in time and reconciling differences.

## 17.4 Prerequisites for Using Cloud Control to Back Up or Restore Your Environment

Before you back up or restore an Oracle Fusion Applications environment using Oracle Enterprise Manager Cloud Control, ensure the following prerequisites are met:

- Cloud Control 12c Agents must be installed on all hosts in the Oracle Fusion Applications environment where components (such as Oracle WebLogic Server Administration and Managed Servers) are running, and the hosts must be discovered in Cloud Control. (Although it is possible to monitor an Oracle Fusion Applications environment without having Agents on every host, backup and restore requires a local Agent on each host). For more information on installing and configuring Cloud Control, refer to the *Oracle Enterprise Manager Cloud Control Basic Installation Guide*.
- An Oracle Secure Backup domain target must be discovered in Cloud Control. This requires an Oracle Secure Backup server installation, and all hosts that are part of the Oracle Fusion Applications environment must be configured as Oracle Secure Backup client hosts. For more information on installing Oracle Secure Backup, refer to the *Oracle Secure Backup Installation and Configuration Guide*.
- A Fusion Instance target representing the Oracle Fusion Applications environment must be discovered in Cloud Control. The Fusion Instance target must be discovered through a local Agent that is running on one of the hosts in the Oracle Fusion Applications environment.
- You must create a backup configuration using Cloud Control. A backup configuration contains the settings that will be used for the database and file backups, and is required to perform an Oracle Fusion Applications backup. See [Section 17.6.1.1](#) for more details on creating a backup configuration.
- Before you perform a backup or restore through Cloud Control, you must properly shut down all Oracle WebLogic Server instances and other components in the Oracle Fusion Applications environment. Refer to [Section 17.9](#) and [Section 17.10](#) for details on what components must be shut down and how to shut them down. Optionally, scripts that perform the required shutdown of components on each host can be invoked as user-specified pre-backup or pre-restore scripts within the Cloud Control backup procedure. (See [Section 17.6.1.2](#) for more details on user-specified scripts.)
- If the Oracle Fusion Applications repository or other databases are included in an Oracle Fusion Applications restore, the databases must be started in mounted mode before submitting the restore procedure. If a complete restore of the databases is required, it may be necessary to first perform a SPFILE or controlfile restore or both for the individual databases through the database Perform Recovery wizard, which can be accessed from the Availability menu on the Cloud Control database home page. (Go to the home page of the database that must be restored, select **Availability**, then select **Backup and Recovery**, then select **Perform Recovery**.)

For information about using Cloud Control to back up and recover your Oracle Fusion Applications environment, see:

- [Section 17.6.1, "Performing a Backup Using Cloud Control"](#)
- [Section 17.8, "Recovering Using Cloud Control"](#)

## 17.5 Backup and Recovery Recommendations for Oracle Fusion Applications

The topics in this section describe backup and recovery recommendations for specific Oracle Fusion Applications components and for components that are related to Oracle Fusion Applications.

The topics include information about configuration files for each application or component. Note that the list of files is not an exhaustive list. You do not back up or recover the individual files. Generally, you back up or recover the Applications base directory, the Applications configuration directory, Middleware home, domain, Oracle home, or an Oracle instance, as described in [Section 17.6](#), [Section 17.9](#), and [Section 17.10](#).

The configuration files and database schemas are for information purposes only. You must back up the entire database.

This section includes the following topics:

- [Section 17.5.1, "Backup and Recovery Recommendations for Oracle Fusion Customer Relationship Management"](#)
- [Section 17.5.2, "Backup and Recovery Recommendations for Oracle Fusion Financials"](#)
- [Section 17.5.3, "Backup and Recovery Recommendations for Oracle Fusion Human Capital Management"](#)
- [Section 17.5.4, "Backup and Recovery Recommendations for Oracle Fusion Supply Chain Management"](#)
- [Section 17.5.5, "Backup and Recovery Recommendations for Oracle Fusion Project"](#)
- [Section 17.5.6, "Backup and Recovery Recommendations for Oracle Fusion Procurement"](#)
- [Section 17.5.7, "Backup and Recovery Recommendations for Oracle Fusion Incentive Compensation"](#)
- [Section 17.5.8, "Backup and Recovery Recommendations for Oracle Fusion Applications Technology"](#)
- [Section 17.5.9, "Backup and Recovery Recommendations for Oracle Fusion Setup"](#)
- [Section 17.5.10, "Backup and Recovery Recommendations for Oracle Enterprise Scheduler"](#)
- [Section 17.5.11, "Backup and Recovery Recommendations for Oracle Enterprise Crawl and Search Framework"](#)
- [Section 17.5.12, "Backup and Recovery Recommendations for Oracle Authorization Policy Manager"](#)
- [Section 17.5.13, "Backup and Recovery Recommendations for Java Servers for Oracle E-Mail and Web Marketing"](#)

### 17.5.1 Backup and Recovery Recommendations for Oracle Fusion Customer Relationship Management

This section describes the Oracle Fusion Customer Relationship Management data that must be backed up and restored.

### **Configuration Files**

Most configuration data is stored in the Oracle WebLogic Server domain.

In addition, Oracle Fusion Customer Relationship Management uses configuration data for Java servers for Oracle E-Mail and Web Marketing. See [Section 17.5.13](#) for information about backing up and recovering Oracle E-Mail and Web Marketing.

### **Dependencies on Oracle Fusion Middleware Components**

Oracle Metadata Services, Oracle Business Intelligence metadata, Oracle Real-Time Decisions, an LDAP provider such as Oracle Internet Directory, Oracle WebCenter Portal (including tagging, group spaces, and the Oracle WebCenter Portal schemas), portlet metadata, Oracle SOA Suite, Oracle ADF user interface, Oracle Essbase, Oracle WebCenter Content, Oracle Enterprise Crawl and Search Framework metadata and data, including Oracle Secure Enterprise Search, Oracle Product Data Quality

### **Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

### **Backup Recommendations**

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Customer Relationship Management is deployed. Back up the standalone Java servers used for Oracle E-Mail and Web Marketing, as described in [Section 17.5.13](#).

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

### **Recovery Recommendations**

Recover the Managed Server to which the application is deployed. If needed, recover the standalone Java servers used for Oracle E-Mail and Web Marketing, as described in [Section 17.5.13](#).

Depending upon the extent of failure, recovery should be performed at the desired granularity. For the steps to recover Oracle Fusion Customer Relationship Management, including for loss of host, see [Section 17.9.10.1](#).

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases containing the Oracle Fusion Applications, Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

## 17.5.2 Backup and Recovery Recommendations for Oracle Fusion Financials

This section describes the Oracle Fusion Financials data that must be backed up and restored.

### Configuration Files

Configuration data is stored in the Oracle WebLogic Server domain.

### Dependencies on Oracle Fusion Middleware Components

Oracle Application Development Framework, Oracle BPEL Process Manager, Oracle WebCenter Portal (portlets), Oracle Metadata Services, Oracle WebCenter Content: Imaging, Oracle Enterprise Scheduler, Oracle BI Enterprise Edition, Oracle Essbase, and Applications Technology Group

### Dependencies on Third-Party Products

None

### Database Repository Dependencies

The databases containing the Oracle Fusion Applications, the LDAP store, Oracle Essbase, and Oracle Fusion Middleware schemas

### Backup Recommendations

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Financials is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the Oracle Fusion Applications, Oracle Essbase, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content.

### Recovery Recommendations

Recover the Managed Server to which the application is deployed. For information about recovering Oracle Essbase, see "Recovering Oracle Essbase After Loss of Host" in the *Oracle Fusion Middleware Administrator's Guide*.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#).

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

### 17.5.3 Backup and Recovery Recommendations for Oracle Fusion Human Capital Management

This section describes the Oracle Fusion Human Capital Management data that must be backed up and restored.

#### Configuration Files

Most configuration data is stored in the Oracle WebLogic Server domain.

#### Dependencies on Oracle Fusion Middleware Components

Oracle Application Development Framework, Oracle BPEL Process Manager, Oracle WebCenter Portal (portlets), Oracle Metadata Services, Oracle Enterprise Scheduler, Oracle Business Intelligence Publisher, an LDAP provider such as Oracle Internet Directory, Oracle Fusion Middleware Extensions for Applications, Oracle WebCenter Content

#### Dependencies on Third-Party Products

None

#### Database Repository Dependencies

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

#### Backup Recommendations

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Human Capital Management is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the LDAP store, Oracle Fusion Applications, Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

#### Recovery Recommendations

Recover the Managed Server to which the application is deployed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#).

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed. Note that the databases, including the LDAP store, the database containing Oracle Fusion Human Capital Management schemas and the Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content must be kept synchronized. If you restore one, restore the others to the same point in time.

There may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

## 17.5.4 Backup and Recovery Recommendations for Oracle Fusion Supply Chain Management

This section describes the Oracle Fusion Supply Chain Management data that must be backed up and restored.

### Configuration Files

Configuration data is stored in the Oracle WebLogic Server domain.

### Dependencies on Oracle Fusion Middleware Components

Oracle Application Development Framework, Oracle SOA Suite, Oracle Enterprise Scheduler

### Dependencies on Third-Party Products

None

### Database Repository Dependencies

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

### Backup Recommendations

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Supply Chain Management is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

### Recovery Recommendations

Recover the Managed Server to which the application is deployed.

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#). For the steps specific to recovering from loss of host, see [Section 17.10.6.1](#).

## 17.5.5 Backup and Recovery Recommendations for Oracle Fusion Project

This section describes the Oracle Fusion Project data that must be backed up and restored.

### Configuration Files

Most configuration data is stored in the Oracle WebLogic Server domain. In addition, configuration data is stored in the Oracle Essbase database.

### **Dependencies on Oracle Fusion Middleware Components**

Oracle Metadata Services, an LDAP provider such as Oracle Internet Directory, Oracle WebCenter Portal (including tagging, group spaces, and the Oracle WebCenter Portal schemas), Oracle SOA Suite, Oracle Application Development Framework user interface, Oracle Enterprise Crawl and Search Framework metadata and data, Oracle Enterprise Scheduler, Oracle Essbase

### **Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

The databases containing the Oracle Fusion Applications, Oracle Essbase, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

### **Backup Recommendations**

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Project is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the Oracle Essbase database used by Oracle Fusion Project. Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas.

### **Recovery Recommendations**

Recover the Managed Server to which the application is deployed.

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#).

## **17.5.6 Backup and Recovery Recommendations for Oracle Fusion Procurement**

This section describes the Oracle Fusion Procurement data that must be backed up and restored.

### **Configuration Files**

Most configuration data is stored in the Oracle WebLogic Server domain. In addition, the certificate file, which is determined by the Profile Option, contains a certificate for [SSL](#) connections made to supplier web sites to let requisitioners search or browse catalogs.

### **Dependencies on Oracle Fusion Middleware Components**

Oracle Application Development Framework, Oracle BPEL Process Manager, Oracle B2B, Oracle Fusion Middleware Extensions for Applications, Oracle Enterprise Scheduler, Oracle Business Intelligence Publisher, Oracle Streams, [Advanced Queuing \(AQ\)](#), [Java Message Service \(JMS\)](#), JMS queues with Oracle B2B



**Dependencies on Third-Party Products**

**CUPS** software, a portable printing layer for UNIX systems

**Database Repository Dependencies**

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

**Backup Recommendations**

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Procurement is deployed. Back up the certificate file.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

**Recovery Recommendations**

Recover the Managed Server to which the application is deployed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. For the steps to recover Oracle Fusion Procurement, see [Section 17.9.10.2](#). For the steps specific to recovering from loss of host, see [Section 17.10.6.2](#).

For information about recovering JMS, see "Backup and Recovery Recommendations for Oracle WebLogic Server JMS" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

**17.5.7 Backup and Recovery Recommendations for Oracle Fusion Incentive Compensation**

This section describes the Oracle Fusion Incentive Compensation data that must be backed up and restored.

**Configuration Files**

Configuration data is stored in the Oracle WebLogic Server domain.

**Dependencies on Oracle Fusion Middleware Components**

Oracle Application Development Framework, Oracle SOA Suite, Oracle Data Integrator, Oracle BI Enterprise Edition, Oracle Enterprise Scheduler, Oracle Enterprise Crawl and Search Framework, Oracle Secure Enterprise Search

**Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

### **Backup Recommendations**

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Incentive Compensation is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

### **Recovery Recommendations**

Recover the Managed Server to which the application is deployed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#).

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

## **17.5.8 Backup and Recovery Recommendations for Oracle Fusion Applications Technology**

This section describes the Oracle Fusion Applications Technology data that must be backed up and restored.

### **Configuration Files**

Configuration data is stored in the Oracle WebLogic Server domain.

### **Dependencies on Oracle Fusion Middleware Components**

Oracle Application Development Framework, Oracle SOA Suite, Federated Worklist, Oracle WebCenter Portal (including portlets, tagging, group spaces, and forums), Oracle WebCenter Portal, MDS, portlet metadata, Oracle Enterprise Crawl and Search Framework metadata and data, and Oracle Secure Enterprise Search, Oracle BI Enterprise Edition, Oracle Fusion Topology Manager, Applications Technology Group

### **Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

**Backup Recommendations**

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Applications Technology is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

**Recovery Recommendations**

Recover the Managed Server to which the application is deployed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#).

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases to the most recent point in time, if needed.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

**17.5.9 Backup and Recovery Recommendations for Oracle Fusion Setup**

This section describes the Oracle Fusion Setup data that must be backed up and restored.

**Configuration Files**

Configuration data is stored in the Oracle WebLogic Server domain.

**Dependencies on Oracle Fusion Middleware Components**

Oracle Application Development Framework, Oracle BPEL Process Manager, Oracle WebCenter Content, Oracle WebCenter Portal (portlets), Oracle Enterprise Scheduler, Identity Governance Framework

**Dependencies on Third-Party Products**

None

**Database Repository Dependencies**

The databases containing Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

**Backup Recommendations**

Back up the Applications base directory and the Administration Server domain in which Oracle Fusion Setup is deployed.

Back up Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

### **Recovery Recommendations**

Recover the Managed Server to which the application is deployed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. See [Section 17.9](#).

Recover Oracle WebCenter Content, as described in "Backup and Recovery Recommendations for Oracle WebCenter Content" in the *Oracle Fusion Middleware Administrator's Guide*.

Recover the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas, including those for Oracle WebCenter Content.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

## **17.5.10 Backup and Recovery Recommendations for Oracle Enterprise Scheduler**

This section describes the Oracle Enterprise Scheduler data that must be backed up and restored.

### **Configuration Files**

Configuration data is stored in the Oracle WebLogic Server domain.

### **Dependencies on Oracle Fusion Middleware Components**

None

### **Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

The databases containing Oracle Fusion Applications, Oracle Enterprise Scheduler, LDAP store, and Oracle Fusion Middleware schemas, including Oracle WebCenter Content

### **Backup Recommendations**

Back up the Oracle home and the domain home.

Back up the databases containing the Oracle Fusion Applications, the LDAP store, and Oracle Fusion Middleware schemas.

### **Recovery Recommendations**

Recover the domain home and the Oracle home, as needed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. For the steps to recover Oracle Enterprise Scheduler, including for loss of host, see [Section 17.9.11.2](#).

Recover the databases to the most recent point in time, if needed.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

### 17.5.11 Backup and Recovery Recommendations for Oracle Enterprise Crawl and Search Framework

This section describes the Oracle Enterprise Crawl and Search Framework data that must be backed up and restored.

#### Configuration Files

Configuration data is stored in the Oracle WebLogic Server domain.

#### Dependencies on Oracle Fusion Middleware Components

Oracle Application Development Framework

#### Dependencies on Third-Party Products

None

#### Database Repository Dependencies

The database containing Oracle Fusion Applications schemas

#### Backup Recommendations

Back up the domain in which Oracle Enterprise Crawl and Search Framework is deployed.

Back up the database containing the Oracle Fusion Applications schemas.

#### Recovery Recommendations

Recover the domain in which Oracle Enterprise Crawl and Search Framework is deployed.

Depending upon the extent of failure, recovery should be performed at the desired granularity. For the steps to recover Oracle Enterprise Crawl and Search Framework, including for loss of host, see [Section 17.9.11.3](#).

Recover the database containing the Oracle Fusion Applications schemas.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

### 17.5.12 Backup and Recovery Recommendations for Oracle Authorization Policy Manager

This section describes the Oracle Authorization Policy Manager data that must be backed up and restored.

#### Configuration Files

The configuration files are located in the Oracle instance home.

### **Dependencies on Oracle Fusion Middleware Components**

An LDAP provider, such as Oracle Internet Directory

### **Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

The databases used by Oracle Authorization Policy Manager and the LDAP store

### **Backup Recommendations**

Back up the Oracle Authorization Policy Manager Domain home and its Oracle home.

Back up the database used by Oracle Authorization Policy Manager and the LDAP store.

### **Recovery Recommendations**

Recover the domain in which Oracle Authorization Policy Manager is deployed.

Recover the Oracle home, if necessary.

Depending upon the extent of failure, recovery should be performed at the desired granularity. For the steps to recover Oracle Authorization Policy Manager, including for loss of host, see [Section 17.9.11.4](#).

Recover the databases used by Oracle Authorization Policy Manager and the LDAP store, if needed, to the same point in time.

If needed, perform a complete recovery to recover the databases to the most current state. However, there may be some situations where you do not have all the required logs to accomplish complete recovery. In that situation, perform an incomplete recovery (point-in-time recovery) to recover the database to as close to the current time as possible. Then, reconcile the databases, as described in [Section 17.9.9](#).

## **17.5.13 Backup and Recovery Recommendations for Java Servers for Oracle E-Mail and Web Marketing**

Oracle E-Mail and Web Marketing is provided with Oracle Fusion Customer Relationship Management. Oracle E-Mail and Web Marketing provides three components: [Email Sending Daemon \(ESD\)](#), [Click -Through Daemon \(CTD\)](#), and [bounce handling daemon \(BHD\)](#).

This section describes the Oracle E-Mail and Web Marketing data that must be backed up and restored.

### **Configuration Files**

Configuration data is stored in the Oracle WebLogic Server domain.

### **Dependencies on Oracle Fusion Middleware Components**

None

### **Dependencies on Third-Party Products**

None

### **Database Repository Dependencies**

None

**Backup Recommendations**

Back up the Managed Servers to which **ESD** and **CTD** are deployed. Back up the directory for BHD.

**Recovery Recommendations**

Restore the Managed Servers to which ESD and CTD are deployed. Restore the directory for BHD.

Depending upon the extent of failure, recovery should be performed at the desired granularity. For the steps to recover Oracle E-Mail and Web Marketing, including for loss of host, see [Section 17.9.11.5](#).

## 17.6 Performing a Backup

You can perform a full offline backup or an online or offline backup of configuration files.

This section includes the following topics:

- [Section 17.6.1, "Performing a Backup Using Cloud Control"](#)
- [Section 17.6.2, "Performing a Full Offline Backup Using the Command Line"](#)
- [Section 17.6.3, "Performing an Online Backup of Configuration Files Using the Command Line"](#)

### 17.6.1 Performing a Backup Using Cloud Control

You can use Cloud Control to back up Oracle Fusion Applications, as described in the following topics:

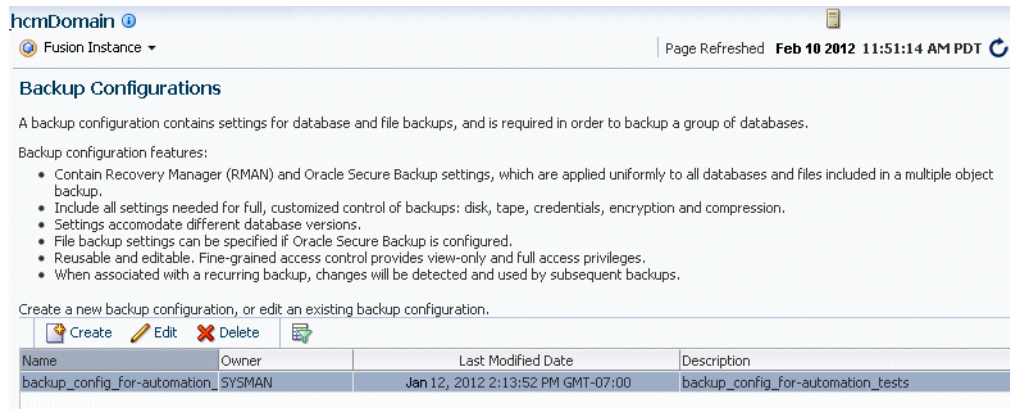
- [Section 17.6.1.1, "Configuring Cloud Control Backups"](#)
- [Section 17.6.1.2, "Backing Up Oracle Fusion Applications Using Cloud Control"](#)

#### 17.6.1.1 Configuring Cloud Control Backups

You must create a backup configuration before you perform a backup or restore using Cloud Control. A backup configuration contains settings for database and file backups. You create the configuration using the Backup Configurations page. You can create multiple backup configurations, using different settings. Then, you can use the configurations in subsequent backup and restore operations.

To create a new backup configuration using Cloud Control:

1. From the **Targets** menu, select **Fusion Applications**.  
The Fusion Applications target home page is displayed.
2. Click the **Fusion Instance** that you want to back up.  
The Fusion Instance home page is displayed.
3. From the **Fusion Instance** menu, choose **Control**, then **Backup Configurations**.  
The Backup Configurations page is displayed, as shown in the following figure:



4. Click **Create**.

The Create Backup Configurations page is displayed. It contains three tabs: **Storage**, **Policy**, and **Recovery Catalog**. You can use the default settings or customize individual settings. For more information on the database backup settings in these pages, refer to the *Oracle Database Backup and Recovery Reference*. (For information on the Oracle Secure Backup settings in these pages, refer to the obtool backup command options in the *Oracle Secure Backup Reference*.)

5. On the **Storage** tab, you specify settings related to disk and tape backup. Because Cloud Control always backs up Oracle Fusion Applications to tape, the disk settings are not applicable.

To specify tape settings, first select an **Oracle Secure Backup Domain**, after which separate tape settings for database and files are shown. Database settings include datafile and archived log copies, backup type, and media management parameters. File settings include media family and devices. Specify **Oracle Secure Backup** domain and host credentials.

The following figure shows the **Storage** tab:



hcmDomain ⓘ  
 Fusion Instance ▼ | Page Refreshed Feb 10 2012 1:12:23 PM PDT ↻

### Create Backup Configuration

\* Name:   
 Description:

**Storage** | Policy | Recovery Catalog

#### Disk Settings

##### Database Backups

Parallelism:   
 Backup Location:   
 Disk Backup Type:  Backup Set  
 Compressed Backup Set  
 Image Copy

##### Tape Settings

Specify the Oracle Secure Backup domain to use for file backup and recovery, and database backup and recovery to tape.  
 Oracle Secure Backup Domain:

##### Oracle Secure Backup Domain Credentials

Specify login credentials for the Oracle Secure Backup domain administrative server.

Credential:  Preferred  Named  New  
 Preferred Credential Name:

Attribute	Value
Username	admin
Password	*****

[More Details](#)

##### Oracle Secure Backup Host Credentials

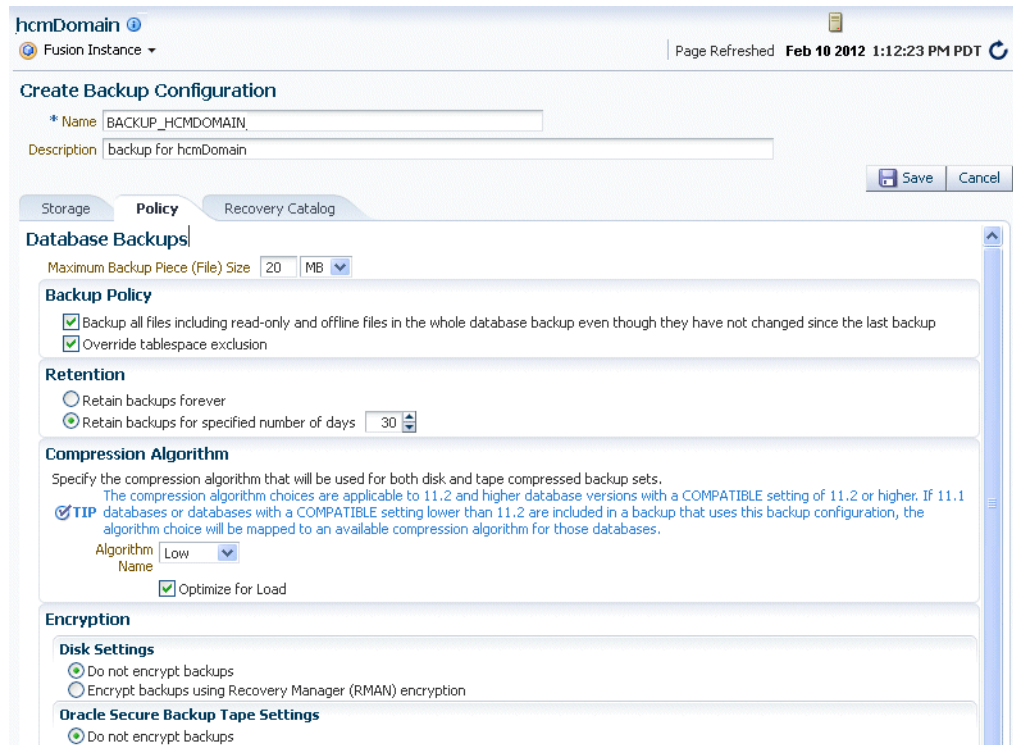
Specify operating system credentials to use for file backup and restore operations on all hosts in the Oracle Secure Backup domain.

Credential:  Preferred  Named  New  
 Preferred Credential Name:

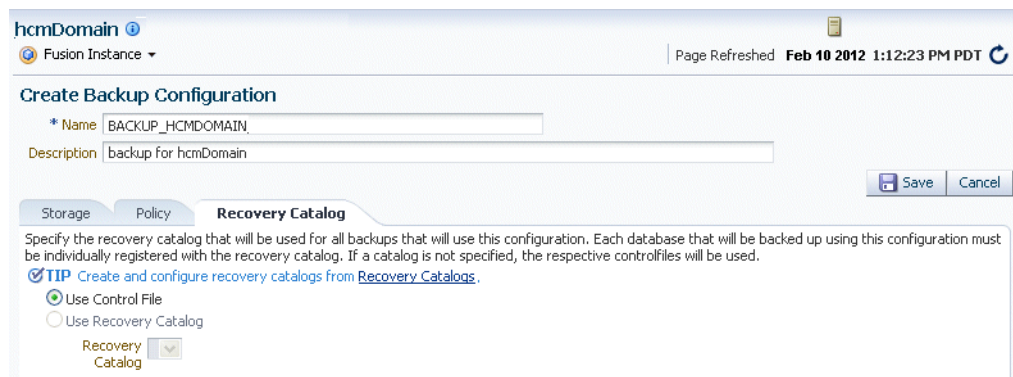
Attribute	Value

6. On the **Policy** tab, you specify policy settings for database and tape backups. Database settings include backup retention, compression, and encryption. Separate database encryption settings are specified for disk and tape backups. File settings include Oracle Secure Backup job and encryption settings.

The following figure shows the **Policy** tab:



7. If you are using a recovery catalog for database backups, specify the catalog on the **Recovery Catalog** tab, which is shown in the following figure:



8. Click **Save**.

### 17.6.1.2 Backing Up Oracle Fusion Applications Using Cloud Control

By default, Cloud Control backs up the core directories and databases that comprise a Oracle Fusion Applications installation. You can include additional files and databases in the backup. It also allows you to execute user-defined pre-backup and post-backup scripts.

Because Cloud Control uses Oracle Secure Backup to perform the backups, all backups are done to tape, which is the media supported by Oracle Secure Backup.

To back up a Oracle Fusion Applications environment using Cloud Control:

1. Ensure that you have met the prerequisites, as described in [Section 17.4](#).
2. From the **Targets** menu, choose **Fusion Applications**.

The Fusion Applications target home page is displayed.

3. Click the **Fusion Instance** that you want to back up.

The Fusion Instance home page is displayed.

4. From the **Fusion Instance** menu, choose **Control**, then **Schedule Backup**.

The Schedule Backup wizard is displayed, with the first step, Backup Scope, as shown in the following figure:

5. In the Backup Scope step:

- a. Select the **Oracle Secure Backup** domain to use for the backup.

- b. Select the scope of the backup. You can select:

- **Software and Configuration Directories:** Backs up all directories in the Oracle Fusion Applications installation, including the Applications Home directory (the root of the Oracle Fusion Applications installation) and any other directories (for example, Domain homes) that may be installed in a different location. Cloud Control will determine the distinct file systems that comprise the installation across all hosts in the environment, and will include the top-level directories needed to constitute a complete backup.
- **Configuration Directories:** Backs up only the configuration-related directories, including the Domain home of the Administrative Server for each Oracle WebLogic Server domain. You can select the following options:

**All:** Back up all configuration directories.

**Custom:** Narrow the scope of the backup by selecting specific Oracle Fusion Applications components. (On the next page, you can further select which of their associated directories to include in the backup.)

Click **Next**.

6. In the Directories step, specify the Oracle Fusion Applications directories to include in the backup. By default, the directories that correspond to the backup scope choice (made on the Backup Scope page) are included. If you chose the Custom option, you can remove directories from the list. (The list of directories that correspond to the backup scope are automatically determined by Cloud Control. It is not possible to individually select or remove subdirectories from the backup.) Click **Add** to specify additional files or directories to include in the backup from outside the core Oracle Fusion Applications installation. Any directories or files that reside on a discovered Oracle Secure Backup client host can be included.

Click **Next**.

7. In the Databases step, click **Add** to specify additional databases to add to the backup. By default, the Oracle Fusion Applications repository database is included in the backup.

Click **Next**.

8. In the Configuration step, select the backup configuration to use for the backup. (See the [Section 17.6.1.1](#) for details on creating a backup configuration.)

Click **Next**.

9. In the Options step:

- a. Select the backup type:

- **Full:** A full backup of the databases and files will be performed. If the database portion of the backup is to be used as the base of an incremental backup strategy, select the **Use as the base of an incremental backup strategy** option.
- **Incremental:** An incremental backup of the databases and files will be performed.

See the *Oracle Database Backup and Recovery User's Guide* for a description of the backup types.

**b.** Select the backup mode:

- **Online:** The databases will remain running during the backup. You must manually quiesce or shut down the Oracle Fusion Applications processes before submitting the backup, as this is not done automatically by Cloud Control.
- **Offline:** The databases will be shutdown automatically before the backup. You must manually shut down the Oracle Fusion Applications processes before submitting the backup, as this is not done automatically by Cloud Control.

See [Section 4.4](#) for information about stopping Oracle Fusion Applications processes. Alternatively, you can specify scripts to shutdown the processes in Step 10.

Click **Next**.

- 10.** In the **Scripts** step, specify the host name and path of scripts to be run before and after the backup. Post-backup scripts can be specified to run upon success or failure of the backup. The scripts can be run on any discovered host. The scripts must be executable files that exist on the specified hosts. Any type of executable file can be specified.

Click **Next**.

- 11.** In the **Credentials** step, if one or more databases is included in the backup, specify the database and host credentials that will be used to back up the databases.

Click **Next**.

- 12.** In the **Schedule** step, specify the procedure name, description, and scheduling information.

Click **Next**.

- 13.** In the **Review** step, verify all the input specified in the wizard. Make changes as needed and click **Submit**. A Cloud Control deployment procedure is submitted to perform the backup, and a confirmation page appears with a link to the deployment procedure status page.

## 17.6.2 Performing a Full Offline Backup Using the Command Line

To perform a full offline backup, you copy the file system artifacts and database repositories corresponding to Oracle Fusion Applications. You use your preferred tool for archiving and compressing, as described in [Section 17.2](#). Ensure that the tool you are using preserves the permissions of the files.

To perform a full offline backup:

1. Stop all processes. See [Section 4.4.3.2](#).
2. Back up the Applications base directory on all hosts. For example:

```
(UNIX) tar -cpf ApplBase_backup_030212.tar APPLICATIONS_BASE/*
(Windows) jar cf ApplBase_backup_030212.tar APPLICATIONS_BASE\*
```

**3. Back up the Applications configuration directory on all hosts. For example:**

```
(UNIX) tar -cpf ApplConfig_backup_030212.tar APPLICATIONS_CONFIG/*
(Windows) jar cf ApplConfig_backup_030212.tar APPLICATIONS_CONFIG\*
```

**4. If a domain is not located within the Applications configuration home, back up the domains separately. This backs up the Managed Servers that are running Java components such as Oracle SOA Suite and Oracle WebCenter Portal.**

For example:

```
(UNIX) tar -cpf domain_home_backup_030212.tar APPLICATIONS_
CONFIG/instance/domains/domain_name/*
(Windows) jar cf domain_home_backup_030212.jar APPLICATIONS_
CONFIG\instance\domains\domain_name\*
```

In most cases, you do not need to back up the Managed Server directories separately, because the Administration Server domain contains information about the Managed Servers in its domain. See [Section 17.2.4](#) for information about what you need to back up.

**5. If the Oracle instance home is not located within the Applications base home, back up the Oracle instance home. The Oracle instance home contains configuration information about system components, such as the Global Order Promising component of Oracle Fusion Supply Chain Management.**

For example:

```
(UNIX) tar -cpf instance_home_backup_030212.tar ORACLE_INSTANCE/*
(Windows) jar cf instance_home_backup_030212.jar ORACLE_INSTANCE\*
```

**6. If a Managed Server is not located within the domain, back up the Managed Server directory. For example:**

```
(UNIX) tar -cpf man_server1_backup_030212.tar APPLICATIONS_
CONFIG/instance/domains/domain_name/servers/server_name/*
(Windows) jar cf man_server1_backup_030212.jar APPLICATIONS_
CONFIG\instance\domains\domain_name\servers\server_name\*
```

**7. Back up the OraInventory directory. For example:**

```
(UNIX) tar -cpf Inven_home_backup_030212 /scratch/oracle/OraInventory
(Windows) jar cf Inven_home_backup_030212.jar C:\Program Files\Oracle\Inventory
```

**8. On UNIX, back up the OraInst.loc file, which is located in the following directory:**

```
(Linux and IBM AIX) /etc
(Other UNIX systems) /var/opt/oracle
```

**9. On UNIX, back up the oratab file, which is located in the following directory:**

```
/etc
```

Note that the oratab file is located on the database host.

**10. Back up the databases using the Oracle Recovery Manager (RMAN). For detailed steps, see the *Oracle Database Backup and Recovery User's Guide*.**

**11. On Windows, export the following registry key:**

```
HKEY_LOCAL_MACHINE\Software\oracle
```

In addition, for system components, export the following Windows Registry key:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services
```

To export a key, use the following command:

```
regedit /E filename key
```

For example:

```
regedit /E C:\oracleregistry.reg HKEY_LOCAL_MACHINE/oracle
```

You can also use the Registry Editor to export the key. See the Registry Editor Help for more information.

12. Create a record of your Oracle Fusion Applications environment. See [Section 17.7](#).

### 17.6.3 Performing an Online Backup of Configuration Files Using the Command Line

You should perform a backup of configuration files on a regular basis and at the times described in [Section 17.2.4](#).

To back up configuration files:

1. To avoid an inconsistent backup, do not make any configuration changes until the backup is completed. To ensure that no changes are made in the WebLogic Server domain, lock the WebLogic Server configuration, as described in [Section 2.6.2](#).
2. Back up the domain directories. This backs up the Managed Servers that are running Java components such as Oracle SOA Suite and Oracle WebCenter Portal. For example:

```
(UNIX) tar -cpf domain_home_backup_030212.tar APPLICATIONS_
CONFIG/instance/domains/domain_name/*
(Windows) jar cf domain_home_backup_030212.jar APPLICATIONS_
CONFIG\instance\domains\domain_name\*
```

3. Back up the Oracle instance home. This backs up the system components, such as Oracle HTTP Server. For example:

```
(UNIX) tar -cpf instance_home_backup_030212.tar ORACLE_INSTANCE/*
(Windows) jar cf instance_home_backup_030212.jar ORACLE_INSTANCE\*
```

4. Back up the databases using the Oracle Recovery Manager (RMAN). For detailed steps, see the *Oracle Database Backup and Recovery User's Guide*.

## 17.7 Creating a Record of Your Oracle Fusion Applications Configuration

If you need to restore and recover your Oracle Fusion Applications environment, it is important to have all the necessary information at your disposal. This is especially true in the event of a hardware loss that requires you to reconstruct all or part of your Oracle Fusion Applications environment on a new disk or host.

You should maintain an up-to-date record of your Oracle Fusion Applications environment that includes the information listed in this section. You should keep this information both in hardcopy and electronic form. The electronic form should be stored on a host or email system that is completely separate from your Oracle Fusion Applications environment.

Your Oracle Fusion Applications hardware and software configuration record should include:

- The following information for each host in your environment:
  - Host name
  - Virtual host name (if any)
  - Domain name
  - IP address
  - Hardware platform
  - Operating system release level and patch information
- The following information for each Oracle Fusion Applications installation in your environment:
  - Installation type (for example, Oracle SOA Suite, Oracle Fusion Supply Chain Management)
  - Host on which the installation resides
  - User name, user ID number, group name, group ID number, environment profile, and type of shell for the operating system user that owns the Oracle home (`/etc/passwd` and `/etc/group` entries)
  - Directory structure, mount points, and full path for the Applications base directory, Applications configuration directory, Middleware home, Oracle Common home, Oracle homes, Oracle WebLogic Server domain homes, and the Oracle instance homes
  - Amount of disk space used by the installation
  - Port numbers used by the installation
- The following information for the databases containing the metadata for components and any other databases used by Oracle Fusion Applications:
  - Host name
  - Database version and patch level
  - Base language
  - Character set
  - Global database name
  - SID
- The following information about backups:
  - The time of the backup.
  - The contents of the backup. For example, a full backup, a backup of a domain.
  - The tool used to create the backup.
  - Where the backup is stored.

## 17.8 Recovering Using Cloud Control

You can recover an Oracle Fusion Applications environment with Cloud Control. Cloud Control restores the directories and databases of a Oracle Fusion Applications

backup. All directories and databases of the backup are restored by default. Optionally, you can select individual directories and databases to be restored.

The restore capability provided by Cloud Control is one part of a larger process that must be performed to recover a Oracle Fusion Applications environment or individual Oracle Fusion Applications components. After you restore Oracle Fusion Applications directories and databases using Cloud Control, you must perform additional manual steps depending on the component that your are restoring. Those steps are described in [Section 17.9](#) and [Section 17.10](#).

To recover Oracle Fusion Applications with Cloud Control:

1. Ensure that you have met the prerequisites, as described in [Section 17.4](#).
2. From the **Targets** menu, choose **Fusion Applications**.

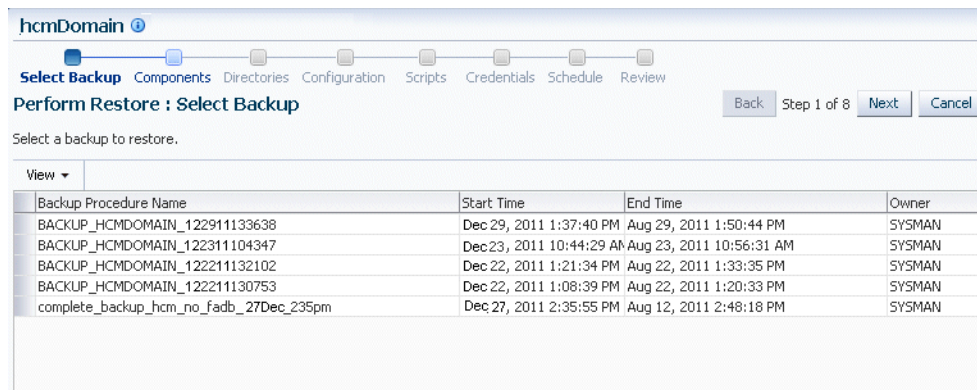
The Fusion Applications target home page is displayed.

3. Click the **Fusion Instance** that you want to recover.

The Fusion Instance home page is displayed.

4. From the **Fusion Instance** menu, choose **Control**, then **Perform Restore**.

The Perform Restore wizard is displayed, as shown in the following figure:



5. In the Select Backup step, select the backup to restore from the list of available backups for the Fusion Instance target.

Click **Next**.

6. In the Components step, the Oracle Fusion Applications components and databases included in the selected backup are listed. Select one or more components to include in the restore. The directories that correspond to the selected components will be shown on the next page. If multiple components are selected that have common directories, those common directories will be included along with any directories that are specific to individual components.

Click **Next**.

7. In the Directories step, the directories that correspond to the selected Oracle Fusion Applications components are listed in the first table. By default, they will all be restored to their original locations. You can remove directories that should not be included in the restore from the table. You can change the destination host name and path where the directories will be restored. (Note that Oracle Fusion Applications directories must be restored to their original paths to successfully recover the environment. However, restoring to different paths is supported to provide the option of restoring to a temporary staging location in preparation for eventual movement to the final location.)



While you can remove complete directories from the list, you cannot select or remove individual subdirectories or files under the top-level directories shown in the list. If a more fine-grained restore granularity is desired, individual files and subdirectories can be restored by using the Perform Restore wizard available from the Oracle Secure Backup Domain home page. (From that home page, select **Manage**, then **File System Backup/Restore**, and then **Perform Restore**.)

In addition, any additional files or directories included in the backup are listed in a separate table, and will be restored to their original locations by default. Directories and files can be removed from the table and you can change the destination host name and path.

Click **Next**.

8. In the Configuration step, the original backup configuration used to create the backup is displayed. If the backup configuration is still available it will be used by default and no user action is required on this page. If the configuration is not available, select an alternate backup configuration that has settings similar to backup configuration used to create the backup.

Click **Next**.

9. In the Scripts step, specify pre-restore and post-restore scripts that will be executed as part of the restore operation. Scripts can be run on any discovered host. The scripts must be executable files that exist on the specified hosts.

The Oracle Fusion Applications components being restored must be shut down before being restored. Because this is not done automatically by Cloud Control, the appropriate shutdown scripts can be executed as part of the restore procedure by specifying them as pre-restore scripts.

Click **Next**.

10. In the Credentials step, if one or more databases is included in the restore operation, specify both database and host credentials that will be used to restore the databases.

Click **Next**.

11. In the Schedule step, specify the procedure name, description, and scheduling information.

Click **Next**.

12. In the Review step, verify all the input specified in the wizard. Make changes as needed and click **Submit**.

## 17.9 Recovering After Data Loss, Corruption, or Media Failure

This section describes recovery strategies for outages that involve actual data loss or corruption, or media failure where the disk cannot be restored. It also describes recovery strategies for applications that are no longer functioning properly. This type of failure requires some type of data restoration before the Oracle Fusion Applications environment can be restarted and continue with normal processing.

Depending on the extent of the failure, you can recover the Applications base directory, the Middleware homes, the Administration Server, a Managed Server, or the database. Some Oracle Fusion Applications components require additional steps, which are described in subsequent sections.

This section includes the following topics:

- [Section 17.9.1, "Recovering the Applications Base Directory"](#)
- [Section 17.9.2, "Recovering a Middleware Home"](#)
- [Section 17.9.3, "Recovering an Oracle WebLogic Server Domain"](#)
- [Section 17.9.4, "Recovering an Oracle Home"](#)
- [Section 17.9.5, "Recovering an Oracle Instance Home"](#)
- [Section 17.9.6, "Recovering the Administration Server Configuration"](#)
- [Section 17.9.7, "Recovering a Managed Server"](#)
- [Section 17.9.8, "Recovering the Databases"](#)
- [Section 17.9.9, "Reconciling the Data"](#)

This section also includes the following topics which describe additional considerations you may need to take for particular components:

- [Section 17.9.10, "Recovering Oracle Fusion Applications"](#)
- [Section 17.9.11, "Recovering Components Related to Oracle Fusion Applications"](#)

See the "Recovering Your Environment" section in the *Oracle Fusion Middleware Administrator's Guide* for information about recovering Oracle Fusion Middleware components, such as Oracle SOA Suite.

## 17.9.1 Recovering the Applications Base Directory

To recover an Applications base directory that was corrupted or from which files were deleted:

1. Stop all relevant processes. That is, stop all processes that are related to Oracle Fusion Applications, such as the Administration Server, [Node Manager](#), Managed Servers, and Oracle instances, as described in [Section 4.4.3.2](#).
2. Recover the Applications base directory from the backup file. For example:  

```
(UNIX) tar -xf ApplBase_backup_030212.tar  
(Windows) jar xtf ApplBase_backup_030212.jar
```
3. Start all relevant processes. That is, start all processes that run in the Applications base home, as described in [Section 4.4.3.1](#).

## 17.9.2 Recovering a Middleware Home

To recover a Middleware home that was corrupted or from which files were deleted:

1. Stop all relevant processes. That is, stop all processes that run in the Middleware home, such as the Administration Server, Node Manager, Managed Servers, and Oracle instances, as described in [Section 4.4.3.2](#).
2. Recover the Middleware home directory from the backup file. For example:  

```
cd MW_HOME  
(UNIX) tar -xf mw_home_backup_030212.tar  
(Windows) jar xtf mw_home_backup_030212.jar
```
3. Start all relevant processes. That is, start all processes that run in the Middleware home, as described in [Section 4.4.3.1](#).

### 17.9.3 Recovering an Oracle WebLogic Server Domain

To recover an Oracle WebLogic Server domain that was corrupted or deleted from the file system:

1. Stop all relevant processes. That is, stop all processes that are related to the domain, such as the Administration Server and Managed Servers, as described in [Section 4.4.3.2](#).
2. Recover the domain directory from the backup file:
 

```
cd DOMAIN_HOME
(UNIX) tar -xf domain_backup_030212.tar
(Windows) jar xtf domain_backup_030212.jar
```
3. Start all relevant processes. That is, start all processes that are related to the domain, as described in [Section 4.4.3.1](#).
4. If you cannot start the Administration Server, recover it, as described in [Section 17.9.6](#).
5. If you cannot start a Managed Server, recover it, as described in [Section 17.9.7](#).

### 17.9.4 Recovering an Oracle Home

To recover an Oracle home from the backup file:

1. Recover the Oracle home to the original directory from a backup file. For example:
 

```
cd ORACLE_HOME
(UNIX) tar -xf Oracle_home_backup_030212.tar
(Windows) jar xtf Oracle_home_backup_030212.jar
```
2. Restart the Managed Server to which applications are deployed, using the **WLST** start command. For example:
 

```
wls:/mydomain/serverConfig> start('myserver', 'Server')
```

### 17.9.5 Recovering an Oracle Instance Home

An Oracle instance home contains configuration information for system components, such as Oracle HTTP Server or Oracle Internet Directory.

This section includes the following topics:

- [Section 17.9.5.1, "Recovering After Oracle Instance Home Deleted from File System"](#)
- [Section 17.9.5.2, "Recovering After Oracle Instance Home Deregistered"](#)

#### 17.9.5.1 Recovering After Oracle Instance Home Deleted from File System

To recover an Oracle instance home that was corrupted or deleted from the file system:

1. Stop all relevant processes. That is, kill all processes that are related to that Oracle instance.
2. Recover the Oracle instance home directory from a backup file. For example:

```
cd ORACLE_INSTANCE
(UNIX) tar -xf instance_home_backup_030212.tar
(Windows) jar xtf instance_home_backup_030212.jar
```

3. Start all relevant processes. That is, start all processes that are related to that Oracle instance:

```
opmnctl startall
```

### 17.9.5.2 Recovering After Oracle Instance Home Deregistered

An Oracle instance must be registered with the domain. To recover an Oracle instance home that was deregistered from the domain:

1. Recover the Oracle instance home directory from a backup file. For example:

```
cd ORACLE_INSTANCE
(UNIX) tar -xf instance_home_backup_030212.tar
(Windows) jar xtf instance_home_backup_030212.jar
```

2. Register the Oracle instance, along with all of its components, with the Administration Server, using the `opmnctl registerinstance` command. For example:

```
opmnctl registerinstance -adminHost admin_server_host
                        -adminPort admin_server_port -adminUsername username
                        -adminPassword password
                        -oracleInstance ORACLE_INSTANCE_dir -oracleHome ORACLE_HOME_dir
                        -instanceName Instance_name -wlsServerHome Middleware_Home
```

## 17.9.6 Recovering the Administration Server Configuration

If the Administration Server configuration has been lost because of file deletion or file system corruption, the Administration Server console continues to function if it was already started when the problem occurred. The Administration Server directory is regenerated automatically, except for security information. Consequently, whenever you start the Administration Server, it prompts for a user name and password. To prevent this, you can recover the configuration.

---

---

**Caution:** Performing a domain-level recovery can impact other aspects of a running system and all of the configuration changes performed after the backup was taken will be lost.

---

---

To recover the Administration Server configuration:

1. Stop all processes, including the Administration Server, Managed Servers, and Node Manager, if they are started, as described in [Section 4.4.3.2](#).
2. Recover the Administration Server configuration by recovering the domain home backup to a temporary location. Then, restore the `config` directory to the following location:

```
(UNIX) DOMAIN_HOME/config
(Windows) DOMAIN_HOME\config
```

3. Start the Administration Server as described in [Section 4.4.4.1](#).
4. Verify that the Administration Server starts properly and is accessible.
5. Start other processes, as described in [Section 4.4.3.1](#).

On the next configuration change, the configuration from the Administration Server is pushed to the Managed Servers. On each Managed Server restart, the configuration is retrieved from the Administration Server.

## 17.9.7 Recovering a Managed Server

For many Oracle Fusion Applications, you recover the Managed Server in which the application is deployed. In addition, for some components, you may need to take additional steps, which are described in [Section 17.9.10](#) and [Section 17.9.11](#).

In this scenario, the Managed Server does not operate properly or cannot be started because the configuration has been deleted or corrupted or the configuration was mistakenly changed and you cannot ascertain what was changed.

To recover a Managed Server:

1. If the Administration Server is not reachable, recover the Administration Server, as described in [Section 17.9.6](#).
2. If the Managed Server fails to start or if the file system is lost:
  - a. Recover the Middleware home from the backup file, if required. For example:

```
(UNIX) tar -xf mw_home_backup_030212.tar
(Windows) jar xtf mw_home_backup_030212.jar
```

- b. Create a domain template jar file for the Administration Server, using the pack utility.

For example, on UNIX:

```
pack.sh -domain=APPLICATIONS_CONFIG/instance/domains/domain_name
        -template=/scratch/temp.jar -template_name=domain1
        -template_author=myname -log=/scratch/logs/my.log -managed=true
```

For example, on Windows:

```
pack.cmd -domain=APPLICATIONS_CONFIG\instance\domains\domain_name
         -template=C:\temp\temp.jar -template_name=domain1
         -template_author=myname -log=C:\temp\logs\my.log -managed=true
```

Specifying the `-managed=true` option packs up only the Managed Servers. If you want to pack the entire domain, omit this option.

- c. Unpack the domain template JAR file, using the unpack utility.

For example, on UNIX:

```
unpack.sh -template=/scratch/temp.jar
          -domain=APPLICATIONS_CONFIG/instance/domains/domain_name
          -log=/scratch/logs/new.log -log_priority=info
```

For example, on Windows:

```
unpack.cmd -template=C:\temp\temp.jar
           -domain=APPLICATIONS_CONFIG\instance\domains\domain_name
           -log=C:\temp\logs\new.log -log_priority=info
```

- d. Ensure that the application artifacts are accessible from the Managed Server host. That is, if the application artifacts are not on the same server as the Managed Server, they must be in a location accessible by the Managed Server.

---

**Note:**

- For stage mode applications, the Administration Server copies the application bits to the staged directories on the Managed Server hosts.
- For nostage and external-stage mode applications, ensure that application files are available in the stage directories of the Managed Server.

See *Oracle Fusion Middleware Deploying Applications to Oracle WebLogic Server* for information about stage, nostage, and external-stage mode applications.

---

- e. Start the Managed Server, as described in [Section 4.4.4.1](#).

The Managed Server connects to the Administration Server and updates its configuration changes.

## 17.9.8 Recovering the Databases

You can recover the databases used by Oracle Fusion Applications using RMAN. You can recover the databases at whatever level is appropriate by performing a restore and recover of the full database, a tablespace, or a data file.

Oracle Fusion Customer Relationship Management uses the following databases: Oracle Fusion Applications database, LDAP database, Oracle WebCenter Content, and Oracle Identity Manager database. You must maintain consistency among the databases. If any of these databases are recovered to a different point in time, you may need to reconcile the databases.

For information about recovering databases, see the *Oracle Database Backup and Recovery User's Guide*.

For information about reconciling the databases, see [Section 17.9.9](#).

## 17.9.9 Reconciling the Data

The following topics describe how to recover and reconcile the databases to maintain consistency among the Oracle Fusion Applications database, LDAP database, and Oracle Identity Manager database.

- [Section 17.9.9.1, "Recovering the Oracle Identity Manager Database and Reconciling It with the LDAP Database"](#)
- [Section 17.9.9.2, "Recovering the Oracle Fusion Applications Database and Reconciling It with the LDAP Database"](#)
- [Section 17.9.9.3, "Recovering the LDAP Database Using Multimaster Replication"](#)

### 17.9.9.1 Recovering the Oracle Identity Manager Database and Reconciling It with the LDAP Database

Oracle Identity Manager users, role categories, role hierarchies, and role memberships are stored in the Oracle Identity Manager database. When a change in the information about users or roles takes place in Oracle Identity Manager, this information is propagated to the LDAP identity store. If the change takes place in the LDAP identity store directly, these changes are synchronized into Oracle Identity Manager. The LDAP

identity store can be Oracle Internet Directory or any third party solutions such as Active Directory.

To recover the Oracle Identity Manager database, use RMAN to perform a point-in-time recovery of the Oracle Identity Manager database. See *Oracle Database Backup and Recovery User's Guide* for information on recovering a database.

If you restore the Oracle Identity Manager database to a different point in time than the LDAP store, the reconciliation engine checks the change logs and reapplies all the changes that happened in the time period between the restore of the LDAP store and the Oracle Identity Manager database. For example, if the Oracle Identity Manager database is restored so that is 10 hours behind the LDAP store, the reconciliation engine checks the change logs and reapplies all the changes that happened in the last 10 hours in the LDAP store to the Oracle Identity Manager database.

You do not need to explicitly trigger the reconciliation. LDAP synchronization is set up as a scheduled task to submit reconciliation events periodically. You can also start the reconciliation process manually and monitor the reconciliation events from the Oracle Identity Manager console. See "Reconciliation Configuration" in *Oracle Fusion Middleware User's Guide for Oracle Identity Manager*.

---



---

**Note:** Oracle recommends that you make sure that the Oracle Identity Manager application is unavailable to the end users when a bulk reconciliation is occurring (as in the above recovery scenario). When the bulk reconciliation is complete, make sure that the Oracle Identity Manager application is again available to the end users. You can monitor the reconciliation with the Oracle Identity Manager console.

---



---

### 17.9.9.2 Recovering the Oracle Fusion Applications Database and Reconciling It with the LDAP Database

If the Oracle Fusion Applications database fails, and you restore it to a different point in time than the Oracle Identity Manager database, you may lose some user and roles data. For example, if you have created some users and roles in the Oracle Identity Manager database before the Oracle Fusion Applications database is restored, those users and roles will also exist in the LDAP database, but they will not exist in the Oracle Fusion Applications database.

To reconcile the Oracle Fusion Applications database with the Oracle Identity Manager and LDAP databases:

1. Restore the Oracle Fusion Applications database using RMAN to perform a point-in-time recovery. See *Oracle Database Backup and Recovery User's Guide* for information about recovering a database.
2. Synchronize the user and role information:
  - a. Log in to the HcmCore application as the HR\_SPEC\_ALL user.
  - b. Click **EssLink**.
  - c. Click **Retrieve Latest LDAP Changes**.
  - d. Click **Submit**.

This is an asynchronous process that runs in the background.

3. When the process completes, find the users that were created in Oracle Identity Manager before the Oracle Fusion Applications database was restored. Use the

following SQL command, where *creation\_date* is the time you started running the synchronization process in Step 2:

```
select * from per_users where creation_date > creation_date
```

4. For each user returned in the previous step, you create the user in Oracle Fusion Human Capital Management. For information, see "Creating and Updating Person and Employment Records" in the HCM Foundation help.
5. For each user, create the user's roles, as described in "User and Role Provisioning" in the HCM Foundation help.

### 17.9.9.3 Recovering the LDAP Database Using Multimaster Replication

Oracle recommends that you use multi-master replication for your LDAP database, as described in the "Setting up Multimaster Replication" section in the *Oracle Fusion Middleware High Availability Guide*.

When you use multimaster replication, if one LDAP node fails, the LDAP traffic is automatically routed to another node. You do not need to take any further action.

## 17.9.10 Recovering Oracle Fusion Applications

In most cases, to recover Oracle Fusion Applications, you recover a Middleware home, a domain, a server, an Oracle home, or an Oracle instance, depending on the extent of the failure. However, you may need to take additional steps for particular components.

This section includes the following topics:

- [Section 17.9.10.1, "Recovering Oracle Fusion Customer Relationship Management"](#)
- [Section 17.9.10.2, "Recovering Oracle Fusion Procurement"](#)

### 17.9.10.1 Recovering Oracle Fusion Customer Relationship Management

To recover Oracle Fusion Customer Relationship Management:

1. Recover the Managed Server to which Oracle Fusion Customer Relationship Management is deployed, as described in [Section 17.9.7](#).
2. Recover the Java servers for Oracle E-Mail and Web Marketing, as described in [Section 17.9.11.5](#).
3. Note that the Oracle Product Data Quality repository (the FUSION\_DQ schema) and the customer source must be kept synchronized. If you restore one, restore the other to the same point in time. In addition, the Data Quality engine server artifacts in the file system, the Data Quality Admin Configuration data in the customer master (*fusion*), and the deployment topology must be kept synchronized.

For a complete case study for recovering Oracle Fusion Customer Relationship Management in different recovery scenarios, see [Section 17.11](#).

### 17.9.10.2 Recovering Oracle Fusion Procurement

To recover Oracle Fusion Procurement:

1. Recover the Managed Server to which the application is deployed, as described in [Section 17.9.7](#).



2. If you use a certificate file to make SSL connections to supplier's web sites, make sure that the certificate file exists in the location that you specified. If it does not, recover it from the backup file.

## 17.9.11 Recovering Components Related to Oracle Fusion Applications

You may need to recover components related to Oracle Fusion Applications.

This section includes the following topics:

- [Section 17.9.11.1, "Recovering Oracle HTTP Server"](#)
- [Section 17.9.11.2, "Recovering Oracle Enterprise Scheduler"](#)
- [Section 17.9.11.3, "Recovering Oracle Enterprise Crawl and Search Framework"](#)
- [Section 17.9.11.4, "Recovering Oracle Authorization Policy Manager"](#)
- [Section 17.9.11.5, "Recovering Oracle E-Mail and Web Marketing"](#)

### 17.9.11.1 Recovering Oracle HTTP Server

To recover Oracle HTTP Server, you recover the Oracle instance that contains Oracle HTTP Server, as described in [Section 17.9.5](#).

### 17.9.11.2 Recovering Oracle Enterprise Scheduler

To recover Oracle Enterprise Scheduler:

1. Recover the domain directory from the backup file, as described in [Section 17.9.3](#).
2. Recover the Oracle home to the original directory from the backup file, as described in [Section 17.9.4](#).
3. Recover the database containing the Oracle Fusion applications and MDS schemas to the most recent point in time, if needed, as described in [Section 17.9.8](#).

### 17.9.11.3 Recovering Oracle Enterprise Crawl and Search Framework

To recover Oracle Enterprise Crawl and Search Framework:

1. Recover the domain directory from the backup file, as described in [Section 17.9.3](#).
2. Recover the database containing schemas related to Oracle Enterprise Crawl and Search Framework, as described in [Section 17.9.8](#).

### 17.9.11.4 Recovering Oracle Authorization Policy Manager

To recover Oracle Authorization Policy Manager:

1. Stop all relevant processes. That is, stop all processes that are related to the domain, such as the Administration Server and Managed Servers, as described in [Section 4.4.3.2](#).
2. Recover the domain directory from the backup file, as described in [Section 17.9.3](#).
3. Recover the Oracle home to the original directory from the backup file, as described in [Section 17.9.4](#).
4. Recover the LDAP store, if necessary.

See the "Recovering Components" section in the *Oracle Fusion Middleware Administrator's Guide*.

5. Recover the database, if necessary. See [Section 17.9.8](#).

6. Start all relevant processes. That is, start all processes that are related to the domain, as described in [Section 4.4.3.1](#).

#### 17.9.11.5 Recovering Oracle E-Mail and Web Marketing

To recover Oracle E-Mail and Web Marketing:

1. Recover the Managed Servers to which the Email Sending Daemon and Click Thru Daemon are deployed, as described in [Section 17.9.7](#).
2. Recover the installation directory for the Bounce Handling Daemon.

## 17.10 Recovering After Loss of Host

This section describes recovery strategies after losing the original operating environment. For example, you could have a serious system malfunction or loss of media.

Depending on the extent of the failure, you can recover the Applications base directory, the Administration Server, a Managed Server, or the database. Some Oracle Fusion Applications components require additional steps, which are described in subsequent sections.

This section includes the following topics:

- [Section 17.10.1, "Recovering the Applications Base Directory After Loss of Host"](#)
- [Section 17.10.2, "Recovering After Loss of Administration Server Host"](#)
- [Section 17.10.3, "Recovering After Loss of Managed Server Host"](#)
- [Section 17.10.4, "Recovering the Databases After Loss of Host"](#)
- [Section 17.10.5, "Additional Actions for Recovering Entities After Loss of Host"](#)

This section also includes the following topics, which describe additional considerations you may need to take for Oracle Fusion Applications components:

- [Section 17.10.6, "Recovering Oracle Fusion Applications After Loss of Host"](#)
- [Section 17.10.7, "Recovering Components Related to Oracle Fusion Applications"](#)

### 17.10.1 Recovering the Applications Base Directory After Loss of Host

You can recover the Applications base directory if you lose the host that contains the directory.

To recover the Applications base directory:

1. Recover the Applications base directory from the backup file. For example:

```
cd APPLICATIONS_BASE
(UNIX) tar -xf ApplBase_backup_030212.tar
(Windows) jar xtf ApplBase_backup_030212.jar
```

2. Start all relevant processes. That is, start all processes that run in the Applications base home, as described in [Section 4.4.3.1](#).

### 17.10.2 Recovering After Loss of Administration Server Host

If you lose a host that contains the Administration Server, you can recover it to the same host or a different host.

This section includes the following topics:

- [Section 17.10.2.1, "Recovering the Administration Server to the Same Host"](#)
- [Section 17.10.2.2, "Recovering the Administration Server to a Different Host"](#)

### 17.10.2.1 Recovering the Administration Server to the Same Host

In this scenario, you recover the Administration Server either to the same host after the operating system has been reinstalled or to a new host that has the same host name. For example, the Administration Server is running on Host A and the Managed Server is running on Host B. Host A has failed for some reason and the Administration Server must be recovered.

To recover the Administration Server:

1. Recover the file system. For example, recover the domain containing the Administration Server, as described in [Section 17.9.3](#).
2. Attempt to start the Administration Server, as described in [Section 4.4.4.1](#).  
If the Administration Server starts, you do not need to take any further steps.
3. If the Administration Server fails to start, take the following steps on Host A:
  - a. Stop all relevant processes. That is, stop all processes that are related to the domain, such as the Administration Server and Managed Servers, as described in [Section 4.4.3.2](#).

- b. Recover the domain directory from the backup file:

```
cd DOMAIN_HOME
(UNIX) tar -xf domain_backup_030212.tar
(Windows) jar xtf domain_backup_030212.jar
```

This restores the Administration Server as well as the Managed Servers in the domain.

- c. Start the Administration Server and Managed Servers, as described in [Section 4.4.4.1](#).
    - d. Start the Node Manager:

```
java weblogic.WLST
wls:/offline> startNodeManager()
```

### 17.10.2.2 Recovering the Administration Server to a Different Host

In this scenario, the Administration Server is running on Host A and the Managed Server is running on Host B. Host A has failed for some reason and the Administration Server must be moved to Host C.

---

**Note:** Note that this scenario assumes that the shared location containing the binary files and the Administration Server configuration is intact. If it is not, follow the steps in [Section 17.9.2](#) through [Section 17.9.5](#).

---

To recover the Administration Server to a different host:

1. Because you have included a new host, mount the file system to the new host, Host C.
2. If the Administration Server has a Listen address, create a new machine with the new host name, as described in [Section 17.10.5.3](#).

- When you move .jks files to another host, you may receive warnings from the host name verification. You can regenerate those SSL certificates in the new host to set up SSL and configure a custom host name verifier. See the "Configure a Custom Host Name Verifier" section in the Oracle WebLogic Server Administration Console Help, which is located at:

[http://download.oracle.com/docs/cd/E21764\\_01/apirefs.1111/e13952/taskhelp/security/ConfigureACustomHostNameVerifier.html](http://download.oracle.com/docs/cd/E21764_01/apirefs.1111/e13952/taskhelp/security/ConfigureACustomHostNameVerifier.html)

Also, see the "Configuring SSL" chapter in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

The .jks files are located in the following directory:

(UNIX) `APPLICATIONS_BASE/fusionapps/wlserver_10.3/server/lib`  
 (Windows) `APPLICATIONS_BASE\fusionapps\wlserver_10.3\server\lib`

- Start the Node Manager on Host C if it was configured on the original host:

```
java weblogic.WLST
wls:/offline> startNodeManager()
```

- Start the Administration Server, as described in [Section 4.4.4.1](#).
- If the Managed Servers are on the same failed host as the Administration Server, restore the Managed Servers, as described in [Section 17.10.3.2](#).
- Start the Managed Servers, as described in [Section 4.4.4.1](#).

The "Restarting a Failed Administration Server" section in the *Oracle Fusion Middleware Managing Server Startup and Shutdown for Oracle WebLogic Server* describes different ways to restart them, depending on how they were configured.

- Ensure that additional application artifacts are available. For example, if the deployment mode is nostage or external-stage, applications may reside in directories outside of the domain directory. Make your application files available to the new Administration Server by copying them from backups or by using a shared disk. Your application files should be available in the same relative location on the new file system as on the file system of the original Administration Server.

If the application is staged, the Administration Server copies the application bits to the staged directories on the Managed Server hosts.

- If your environment contains Oracle HTTP Server, modify the `FusionVirtualHost_x.conf` file, as described in [Section 17.10.5.2](#).
- Update Oracle Inventory, as described in [Section 17.10.5.4](#).
- Edit the `targets.xml` file for Fusion Middleware Control, as described in [Section 17.10.5.1](#).

### 17.10.3 Recovering After Loss of Managed Server Host

If you lose a host that contains a Managed Server, you can recover it to the same host or a different host.

This section includes the following topics:

- [Section 17.10.3.1, "Recovering a Managed Server to the Same Host"](#)
- [Section 17.10.3.2, "Recovering a Managed Server to a Different Host"](#)

### 17.10.3.1 Recovering a Managed Server to the Same Host

In this scenario, you recover a Managed Server to the same host after the operating system has been reinstalled or to a new host that has the same host name. The Administration Server is running on Host A and the Managed Server is running on Host B. Host B failed for some reason and the Managed Server must be recovered to Host B.

1. Start the Node Manager on Host B:

```
java weblogic.WLST
wls:/offline> startNodeManager()
```

2. Start the Managed Server, as described in [Section 4.4.4.1](#).

If the Managed Server starts, it connects to the Administration Server and updates its configuration changes. You do not need to take any further steps.

3. If the Managed Server fails to start or if the file system is lost:

- a. Stop the Node Manager:

```
java weblogic.WLST
wls:/offline> stopNodeManager()
```

- b. Recover the Middleware home to Host B from the backup file, if required:

```
cd MW_HOME
(UNIX) tar -xf mw_home_backup_030212.tar
(Windows) jar xtf mw_home_backup_030212.jar
```

- c. Create a domain template jar file for the Administration Server running in Host A, using the pack utility.

For example, on UNIX:

```
pack.sh -domain=APPLICATIONS_CONFIG/instance/domains/domain_name
-template=/scratch/temp.jar -template_name=domain1
-template_author=myname -log=/scratch/logs/my.log -managed=true
```

For example, on Windows:

```
pack.cmd -domain=APPLICATIONS_CONFIG\instance\domains\domain_name
-template=C:\temp\temp.jar -template_name=domain1
-template_author=myname -log=C:\temp\logs\my.log -managed=true
```

Specifying the `-managed=true` option packs up only the Managed Servers. If you want to pack the entire domain, omit this option.

- d. Unpack the domain template jar file in Host B, using the unpack utility.

For example, on UNIX:

```
unpack.sh -template=/scratch/temp.jar
-domain=APPLICATIONS_CONFIG/instance/domains/domain_name
-log=/scratch/logs/new.log -log_priority=info
```

For example, on Windows:

```
unpack.cmd -template=C:\temp\temp.jar
-domain=APPLICATIONS_CONFIG\instance\domains\domain_name
-log=C:\temp\logs\new.log -log_priority=info
```

- e. Ensure that the application artifacts are accessible from the Managed Server host. That is, if the application artifacts are not on the same server as the Managed Server, they must be in a location accessible by the Managed Server.

---



---

**Note:**

- For applications that are deployed in nostage or external-stage mode, copy the application artifacts from the Administration Server host directory.
- For applications that are deployed in stage mode, the Administration Server copies the application bits to the staged directories on the Managed Server hosts.

See *Oracle Fusion Middleware Deploying Applications to Oracle WebLogic Server* for information about deploying applications.

---



---

- f. If the Node Manager is not started, start it:

```
java weblogic.WLST
wls:/offline> startNodeManager()
```

- g. Start the Managed Server, as described in [Section 4.4.4.1](#).

The Managed Server connects to the Administration Server and updates its configuration changes.

### 17.10.3.2 Recovering a Managed Server to a Different Host

In this scenario, the Administration Server is running on Host A and the Managed Server is running on Host B. Host B failed for some reason and the Managed Server must be recovered to Host C.

---



---

**Important:** Recover the Middleware home to the same location as the original.

---



---

To recover a Managed Server to a different host:

1. If the Managed Server configuration files are local to the host (that is, they are not on a shared file system):

- a. Recover the Middleware home for the Managed Server to Host C.

```
cd MW_HOME
(UNIX) tar -xf mw_home_backup_030212.tar
(Windows) jar xtf mw_home_backup_030212.jar
```

Note that when you restore the Middleware home, you are restoring all of the domains because they are on a shared file system.

- b. Create a domain template jar file from the Administration Server running in Host A, using the pack utility.

For example, on UNIX:

```
pack.sh -domain=APPLICATIONS_CONFIG/instance/domains/domain_name
        -template=/scratch/temp.jar -template_name=domain1
        -template_author=myname -log=/scratch/logs/my.log -managed=true
```

For example, on Windows:

```
pack.cmd -domain=APPLICATIONS_CONFIG\instance\domains\domain_name
-template=C:\temp\temp.jar -template_name=domain1
-template_author=myname -log=C:\temp\logs\my.log -managed=true
```

Specifying the `-managed=true` option packs up only the Managed Servers. If you want to pack the entire domain, omit this option.

- c. Unpack the domain template jar file on Host C, using the `unpack` utility.

For example, on UNIX:

```
unpack.sh -template=/scratch/temp.jar
-domain=APPLICATIONS_CONFIG/instance/domains/domain_name
-log=/scratch/logs/new.log -log_priority=info
```

For example, on Windows:

```
unpack.cmd -template=C:\temp\temp.jar
-domain=APPLICATIONS_CONFIG\instance\domains\domain_name
-log=C:\temp\logs\new.log -log_priority=info
```

If you are recovering to a different domain home, use the `-app_dir` switch in the `unpack` command.

2. Ensure that the application artifacts are accessible from the Managed Server host. That is, if the application artifacts are not on the same server as the Managed Server, they must be in a location accessible by the Managed Server.

---



---

**Note:**

- For applications that are deployed in *nostage* or *external-stage* mode, copy the application artifacts from the Administration Server host directory.
- For applications that are deployed in *stage* mode, the Administration Server copies the application bits to the staged directories on the Managed Server hosts.

See *Oracle Fusion Middleware Deploying Applications to Oracle WebLogic Server* for information about deploying applications.

---



---

3. If the Managed Server is *not* co-located with the Administration Server, take the following steps. (These steps are not needed if the Managed Server is co-located with the Administration Server.)
  - a. Edit the `nodemanager.domains` file, specifying the domain names and domain directories. Use the following format:

```
domain_name=domain_directory
```

- b. Start the Node Manager on Host C, if it is not started:

```
java weblogic.WLST
wls:/offline> startNodeManager()
```

- c. Using WLST, connect to the Administration Server and then enroll the Node Manager running in the new host with the Administration Server:

```
connect('username', 'password', 'host:port')
nmEnroll('APPLICATIONS_CONFIG/instance/domains/domain_name',
'MW_HOME/wlserver_n/common/nodemanager/instance_name')
```

- d. Change the Managed Server configuration to point to the new host:
  - In the WebLogic Server Administration Console, create a machine, which is a logical representation of the computer that hosts one or more WebLogic Servers, and point it to the new host. (From the Home page, select **Machines**. Then, click **New**.) Follow the directions in the Administration Console help.

If you identify the Listen Address by IP address, you must disable Host Name Verification on the Administration Servers that access Node Manager. For more information, see the "Using Host Name Verification" section in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

- Change the Managed Server configuration to point to the new machine. (From the left pane of the Console, expand **Environment** and then **Servers**. Then, select the name of the server. Select the **Configuration** tab, then the **General** tab. In the **Machine** field, select the machine to which you want to assign the server.)

Change **Listen Address** to the new host. (If the listening address was set to blank, you do not need to change it.)

You only need to take these steps once for all Managed Servers on the same host.

4. When you move .jks files to another host, you may receive warnings from the host name verification. You can regenerate those SSL certificates in the new host to set up SSL and configure a custom host name verifier. See the "Configure a Custom Host Name Verifier" section in the Oracle WebLogic Server Administration Console Help. Also, see the "Configuring SSL" chapter in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

The .jks files are located in the following directory:

```
(UNIX) APPLICATIONS_BASE/fusionapps/wlserver_10.3/server/lib
(Windows) APPLICATIONS_BASE\fusionapps\wlserver_10.3\server\lib
```

5. Start the Managed Server, as described in [Section 4.4.4.1](#).

The Managed Server connects to the Administration Server and updates its configuration changes.

6. If your environment contains Oracle HTTP Server, modify the FusionVirtualHost\_x.conf file, as described in [Section 17.10.5.2](#).
7. Edit the targets.xml file for Fusion Middleware Control, as described in [Section 17.10.5.1](#).

Now you can start and stop the Managed Server on Host C using the Administration Server running on Host A.

## 17.10.4 Recovering the Databases After Loss of Host

If the physical host where your database resides is lost, you can recover the database using RMAN.

See "Restoring a Database on a New Host" in the *Oracle Database Backup and Recovery User's Guide* to learn how to use RMAN to recover your database in the event of a complete failure on the primary database host computer.

Oracle Fusion Customer Relationship Management uses the following databases: Oracle Fusion Applications database, LDAP database, Oracle WebCenter Content, and



Oracle Identity Manager database. You must maintain consistency among the databases. If any of these databases are recovered to a different point in time, you may need to reconcile the databases.

For information about reconciling the LDAP database, the Oracle Fusion Applications database, and the Oracle Identity Manager database, see [Section 17.9.9](#).

## 17.10.5 Additional Actions for Recovering Entities After Loss of Host

Depending on the entity that you are recovering, you may need to take additional actions after loss of host. The sections about each entity may require you to follow one or more of the following procedures. If so, that is noted in the section describing how to recover the entity.

This section includes the following topics:

- [Section 17.10.5.1, "Changing the Host Name in the targets.xml File for Fusion Middleware Control"](#)
- [Section 17.10.5.2, "Modifying the FusionVirtualHost\\_x.conf File"](#)
- [Section 17.10.5.3, "Creating a New Machine for the New Host Name"](#)
- [Section 17.10.5.4, "Updating Oracle Inventory"](#)

### 17.10.5.1 Changing the Host Name in the targets.xml File for Fusion Middleware Control

When you recover a component to a different host, you must update the targets.xml file for Fusion Middleware Control. The file is located at:

```
(UNIX) APPLICATIONS_CONFIG/instance/domains/hostname/domain_name/sysman/state/targets.xml
(Windows) APPLICATIONS_CONFIG\instance\domains\hostname\domain_name\sysman\state\targets.xml
```

In the file, change the host name to the new host name for components that are recovered to a different host.

### 17.10.5.2 Modifying the FusionVirtualHost\_x.conf File

When you recover an Administration Server or a Managed Server to a different host and your environment includes Oracle HTTP Server, you must modify the FusionVirtualHost\_x.conf file on the new host. There is a separate file for each domain, for example FusionVirtualHost\_fin.conf. The files are located in:

```
(UNIX) APPLICATIONS_CONFIG/instance/CommonDomain_webtier/config/OHS/ohs_name/moduleconf/FusionVirtualHost_x.conf
(Windows) APPLICATIONS_CONFIG\instance\CommonDomain_webtier\config\OHS\ohs_name\moduleconf\FusionVirtualHost_x.conf
```

Modify all of the instances of the host name and clusters (elements such as WebLogicHost and WebLogicCluster) entries in that file. For example:

```
<Location /console>
  SetHandler weblogic-handler
  WebLogicHost Admin_Host
  WeblogicPort Admin_Port
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>
.
.
.
```

```
<Location /soa-infra>
  SetHandler weblogic-handler
  WebLogicCluster SOAHOST1:8001,*SOAHOST2*:*8001*
  WLProxySSL ON
  WLProxySSLPassThrough ON
</Location>
```

### 17.10.5.3 Creating a New Machine for the New Host Name

If the Administration Server has an Listen address, you must create a new machine with the new host name and set the Listen address, before you start the Administration Server. A machine is a logical representation of the computer that hosts one or more WebLogic Servers.

To create a new machine:

1. Create a new machine with the new host name. Use the following WLST commands, in offline mode:

```
readDomain('Domain_Home')
machine = create('newhostname', 'Machine')
cd('/Machine/newhostname')
nm = create('newhostname', 'NodeManager')

cd('/Machine/newhostname/NodeManager/newhostname')
set('ListenAddress', 'newhostname')
updateDomain()
```

2. For the Administration Server, set the machine with the new host name, using the following WLST command, in offline mode:

```
readDomain('DomainHome')
cd('/Machine/newhostname')
machine = cmo
cd('/Server/AdminServer')
set('Machine', machine)
updateDomain()
```

3. Set the Listen address for the Administration Server:

```
readDomain("DomainHome")
cd("servers/AdminServer")
cmo.setListenPort(8001)
updateDomain()
exit()
```

### 17.10.5.4 Updating Oracle Inventory

For many components, when you recover to a different host, as in the case of loss of host, you must update the Oracle Inventory on UNIX. To do so, execute the following script:

```
ORACLE_COMMON_HOME/oui/bin/attachHome.sh
```

In addition, you must update beahomelist to edit the location of a Middleware home. Edit the following file to update the Middleware home information:

```
(UNIX) user_home/boa/beahomelist
(Windows) C:\bea\beahomelist
```

## 17.10.6 Recovering Oracle Fusion Applications After Loss of Host

In most cases, to recover Oracle Fusion Applications, you recover the entire Middleware home, a domain, a server, an Oracle home, or an Oracle instance, depending on the extent of the failure. However, you may need to take additional steps you for particular components.

This section includes the following topics:

- [Section 17.10.6.1, "Recovering Oracle Fusion Supply Chain Management After Loss of Host"](#)
- [Section 17.10.6.2, "Recovering Oracle Fusion Procurement After Loss of Host"](#)

### 17.10.6.1 Recovering Oracle Fusion Supply Chain Management After Loss of Host

If you lose a host that contains Oracle Fusion Supply Chain Management, you can recover it to the same host or a different host.

To recover Oracle Fusion Supply Chain Management to the same host, recover the Managed Server to which the application is deployed, as described in [Section 17.10.3](#).

To recover Oracle Fusion Supply Chain Management to a different host:

1. Recover the Managed Server to which the application is deployed, as described in [Section 17.10.3](#).
2. Recover the Oracle instance for Global Order Promising, as described in [Section 17.9.5](#).

### 17.10.6.2 Recovering Oracle Fusion Procurement After Loss of Host

If you lose a host that contains Oracle Fusion Procurement, you can recover it to the same host or a different host.

To recover Oracle Fusion Procurement to the same host, recover the Managed Server to which the application is deployed, as described in [Section 17.10.3](#).

To recover Oracle Fusion Procurement to a different host:

1. Recover the Managed Server to which the application is deployed, as described in [Section 17.10.3](#).
2. Ensure that Oracle Business Intelligence Publisher and CUPS IP address and port number reflects the different host.

## 17.10.7 Recovering Components Related to Oracle Fusion Applications

In most cases, to recover components related to Oracle Fusion Applications, you recover the entire Middleware home, a domain, a server, an Oracle home, or an Oracle instance, depending on the extent of the failure. You may need to take additional steps for particular components related to Oracle Fusion Applications.

This section includes the following topics:

- [Section 17.10.7.1, "Recovering Oracle HTTP Server After Loss of Host"](#)
- [Section 17.10.7.2, "Recovering Oracle Enterprise Scheduler After Loss of Host"](#)
- [Section 17.10.7.3, "Recovering Oracle Enterprise Crawl and Search Framework After Loss of Host"](#)
- [Section 17.10.7.4, "Recovering Oracle Authorization Policy Manager After Loss of Host"](#)

- [Section 17.10.7.5, "Recovering Oracle E-Mail and Web Marketing After Loss of Host"](#)
- [Section 17.10.7.6, "Recovering Oracle Essbase In Clustered Environment After Loss of Host"](#)

### 17.10.7.1 Recovering Oracle HTTP Server After Loss of Host

To recover Oracle HTTP Server to the same host, recover the Oracle instance, as described in [Section 17.9.5](#).

To recover Oracle HTTP Server to a different host:

1. Recover the Middleware home, as described in [Section 17.9.2](#).
2. Start all relevant processes, as described in [Section 4.4.1](#).
3. Update the registration of the Oracle instance with the Administration Server, using the `opmnctl updateinstanceregistration` command on the new host. For example:

```
opmnctl updateinstanceregistration -adminHost admin_server_host
```

This command updates the **OPMN** `instance.properties` file.

4. Update the registration of the component with the Administration Server, using the `opmnctl updatecomponentregistration` command on the new host. For example, to update the registration for Oracle HTTP Server, use the following command:

```
opmnctl updatecomponentregistration -Host new_host -Port nonSSLPort
    -componentName ohs1 -componentType OHS
```

5. Edit the `targets.xml` file for Fusion Middleware Control, as described in [Section 17.10.5.1](#).
6. Modify the `ServerName` entry in the following file to have the new host name:

```
(UNIX) ORACLE_INSTANCE/config/OHS/ohs_name/httpd.conf
(Windows) ORACLE_INSTANCE\config\OHS\ohs_name\httpd.conf
```

7. Modify the `FusionVirtualHost_x.conf` file, as described in [Section 17.10.5.2](#).
8. If the Managed Server is in a cluster, modify the following files (there is more than one file, with the name `ear_name.ear`):

```
(UNIX) APPLICATIONS_CONFIG/fusionapps/applications/domain_name/deploy/ear_
name.ear/APP-INF/classes/wf_client_config.xml
(Windows) APPLICATIONS_CONFIG\fusionapps\applications\domain_name\deploy\ear_
name.ear\APP-INF\classes\wf_client_config.xml
```

Change the `rootEndPointURL` element so that it points to the Oracle HTTP Server or Load Balancer for the cluster on the new environment.

### 17.10.7.2 Recovering Oracle Enterprise Scheduler After Loss of Host

To recover Oracle Enterprise Scheduler, follow the procedure in [Section 17.9.11.2](#).

### 17.10.7.3 Recovering Oracle Enterprise Crawl and Search Framework After Loss of Host

To recover Oracle Enterprise Crawl and Search Framework to a different host, follow the procedure in [Section 17.9.11.3](#).

#### 17.10.7.4 Recovering Oracle Authorization Policy Manager After Loss of Host

To recover Oracle Authorization Policy Manager, follow the procedure in [Section 17.9.11.4](#).

#### 17.10.7.5 Recovering Oracle E-Mail and Web Marketing After Loss of Host

To recover Oracle E-Mail and Web Marketing, follow the procedure in [Section 17.9.11.5](#).

#### 17.10.7.6 Recovering Oracle Essbase In Clustered Environment After Loss of Host

To recover Oracle Essbase after loss of host, you recover the entire Middleware home, a domain, a server, an Oracle home, or an Oracle instance, depending on the extent of the failure.

However, if the failed node contained Oracle Essbase and was clustered, you must configure secondary instances of Oracle Essbase Agent so that they are distributed for high availability. For more information, see "Configuring Oracle Essbase Clustering" in the *Oracle Fusion Applications Enterprise Deployment Guide for Customer Relationship Management*.

## 17.11 A Case Study: Recovering Oracle Fusion Customer Relationship Management

This section provides a case study of recovering Oracle Fusion Customer Relationship Management and all of the other Oracle Fusion Applications offerings and Oracle Fusion Middleware components that are installed when you install Oracle Fusion Customer Relationship Management.

You can recover all or part of your Oracle Fusion Applications environment, as described in [Section 17.3](#).

This section includes the following topics:

- [Section 17.11.1, "The Recovery Case Study Scenario"](#)
- [Section 17.11.2, "Recovering the Middleware Home Containing Java EE Components"](#)
- [Section 17.11.3, "Recovering the Web Tier Middleware Home"](#)
- [Section 17.11.4, "Recovering the Oracle Fusion Customer Relationship Management Domain"](#)
- [Section 17.11.5, "Recovering Servers When the Installation Directory Is Shared Between Hosts"](#)
- [Section 17.11.6, "Recovering Servers When the Managed Server Configuration Is Local"](#)
- [Section 17.11.7, "Recovering an Oracle Instance in an Oracle Fusion Customer Relationship Management Installation"](#)
- [Section 17.11.8, "Recovering an Oracle Fusion Customer Relationship Management Cluster"](#)
- [Section 17.11.9, "Recovering Databases for Oracle Fusion Customer Relationship Management"](#)

### 17.11.1 The Recovery Case Study Scenario

In this case study, the following domains were created when you installed and provisioned Oracle Fusion Customer Relationship Management:

Oracle Fusion Applications Component	Domain Name
Oracle Fusion Customer Relationship Management	CRMDomain
Oracle Fusion Financials	FinancialDomain
Oracle Fusion Human Capital Management	HCMDomain
Oracle Fusion Supply Chain Management	SCMDomain
Oracle Fusion Setup	CommonDomain

In addition, Oracle Fusion Customer Relationship Management uses the following Oracle Fusion Middleware components:

- Oracle WebCenter Portal
- Oracle Business Intelligence
- Oracle Essbase
- Oracle Enterprise Scheduler
- Oracle SOA Suite
- Oracle WebCenter Content
- Oracle Application Development Framework

Oracle Fusion Customer Relationship Management is installed in the following directory:

```
/scratch/oracle/APPLICATIONS_BASE
```

The *APPLICATIONS\_BASE* directory contains:

- The Oracle Fusion Applications Middleware home directory, which is located at:  

```
/scratch/oracle/APPLICATIONS_BASE/fusionapps
```
- One Middleware home that hosts the **Java EE** components, including Oracle SOA Suite and Oracle WebCenter Portal, and is located at:  

```
/scratch/oracle/APPLICATIONS_BASE/fusionapps
```
- A second Middleware home that hosts system components such as Oracle HTTP Server and is located at:

```
/scratch/oracle/APPLICATIONS_BASE/webtier_mw_home
```

---

**Note:** In this case study, the Oracle Fusion application files are installed in shared storage, which is mounted on all hosts that run the applications. A single copy of binary files is shared across multiple hosts. The Administration Server configuration is also shared. However, the Managed Server configurations are not shared.

---

### 17.11.2 Recovering the Middleware Home Containing Java EE Components

In this scenario, you recover the Oracle Fusion Applications Middleware home, which contains Oracle Fusion Applications instances, and the Java EE components, Oracle SOA Suite and Oracle WebCenter Portal, after data loss or corruption.

To recover the Middleware home:

1. Stop all relevant processes using Fusion Applications Control. That is, stop all Managed Servers that are related to Oracle SOA Suite and Oracle WebCenter Portal. For example, stop the `FINSOAServer_1` (in the `FinancialDomain`), `CRMSOAServer_1` (in the `CRMDomain`), `SCMSOAServer_1` (in the `SCMDomain`), and `FSSOAServer` (in the `HCMDomain`). Stop the Administration Server, as described in [Section 4.4.4.2](#).

2. From the original Middleware home directory, move the files to a backup directory:

```
mv /scratch/oracle/APPLICATIONS_BASE/fusionapps
   /scratch/oracle/APPLICATIONS_BASE/fusionapps_backup
```

This ensures that any needed files are not overwritten.

3. Create a staging directory and restore the Applications base directory to that directory:

```
cd /scratch/stage/
tar -xvf crm_ApplBase_backup_030212.tar
```

4. From that stage directory, copy the Middleware home to the original location:

```
cp /scratch/stage/APPLICATIONS_BASE/fusionapps
   /scratch/oracle/APPLICATIONS_BASE/fusionapps
```

5. Start all relevant processes, as described in [Section 4.4.3.1](#).

### 17.11.3 Recovering the Web Tier Middleware Home

In this scenario, you recover the Web tier Middleware home that contains system components, such as Oracle HTTP Server, after data loss or corruption.

To recover the Middleware home:

1. Stop all relevant processes, such as all processes running in the Oracle instance, using the following command:

```
opmnctl stopall
```

2. From the original Middleware home directory, move the files to a backup directory:

```
mv /scratch/oracle/APPLICATIONS_BASE/webtier_mw_home
   /scratch/oracle/APPLICATIONS_BASE/webtier_mw_home_backup
```

This ensures that any needed files are not overwritten.

3. Create a staging directory and restore the Applications base directory to that directory:

```
cd /scratch/stage
tar -xvf crm_ApplBase_backup_030212.tar
```

4. From that stage directory, copy the Middleware home to the original location:

```
cp /scratch/stage/APPLICATIONS_BASE/webtier_mwhome  
/scratch/oracle/APPLICATIONS_BASE/webtier_mwhome
```

5. Start all relevant processes, using the following command:

```
opmnctl startall
```

### 17.11.4 Recovering the Oracle Fusion Customer Relationship Management Domain

In this scenario, you recover the domain that contains Oracle Fusion Customer Relationship Management after data loss or corruption. This procedure shows recovering the domain CRMDomain, but you can use the same procedure for other Oracle Fusion Applications domains.

To recover the domain:

1. Stop all Managed Servers in the CRMDomain, as described in [Section 4.4.4.2](#).
2. Stop the Administration Server for the CRMDomain, as described in [Section 4.4.4.2](#).
3. From the original domain directory, move the files to a backup directory:

```
mv /scratch/oracle/APPLICATIONS_CONFIG/instance/domains/CRMDomain  
/scratch/oracle/APPLICATIONS_CONFIG/instance/domains/CRMDomain_backup
```

This ensures that any needed files are not overwritten.

4. Create a staging directory and restore the Applications base directory to that directory:

```
cd /scratch/stage  
tar -xvf crm_ApplBase_backup_030212.tar
```

5. From that stage directory, copy the domain to the original location:

```
cp /scratch/stage/APPLICATIONS_CONFIG/instance/domains/CRMDomain  
/scratch/oracle/APPLICATIONS_CONFIG/instance/domains/CRMDomain
```

6. Start the Administration Server, as described in [Section 4.4.4.1](#).
7. Start all Managed Servers, as described in [Section 4.4.4.1](#).

### 17.11.5 Recovering Servers When the Installation Directory Is Shared Between Hosts

When the applications directory is shared between hosts, and you need to recover an Administration Server or a Managed Server, you must recover the entire domain.

The following table shows a sample domain mapping and provides guidelines for recovering an Oracle WebLogic Server Administration Server or any Managed Server running in the domain. The list of servers in the table is not complete. Refer to the particular Oracle Fusion application offering for the complete list of servers.



Domain Name	Servers Running in Domain	What to Recover
CRMDomain	AdminServer CRMCommonServer_1 CRMPerformanceServer_1 CRMANalyticsServer_1 CRMSearchServer_1 CRMODIServer_1 CRMSoAServer_1 CustomerServer_1 SalesServer_1 MarketingServer_1 OrderCaptureServer_1	The entire CRMDomain. For example: <i>APPLICATIONS_</i> <i>CONFIG/instance/domains/CRMDomain</i>
FinancialDomain	AdminServer FinCommonServer_1 FinAnalyticsServer_1 FinSOAServer_1 LedgerServer_1 ESSServer_1	The entire FinancialDomain. For example: <i>APPLICATIONS_</i> <i>CONFIG/instance/domains/FinancialDomain</i>
SCMDomain	AdminServer ProductManagementServer_1 SCMSOAServer_1	The entire SCMDomain. For example: <i>APPLICATIONS_</i> <i>CONFIG/instance/domains/SCMDomain</i>
HCMDomain	AdminServer CoreSetupServer_1 FINSOAServer_1 TalentServer_1 ESSServer_1 HCMAnalyticsServer_1	The entire HCMDomain. For example: <i>APPLICATIONS_</i> <i>CONFIG/instance/domains/HCMDomain</i>
SetupDomain	AdminServer HomePageServer_1 HelpPortalServer_1 FunctionalSetupServer_1 WCservices_1 SpacesServer_1	The entire SetupDomain. For example: <i>APPLICATIONS_</i> <i>CONFIG/instance/domains/SetupDomain</i>

### 17.11.6 Recovering Servers When the Managed Server Configuration Is Local

If domain directory of the Managed Server is different than the Administration Server domain directory, and you need to recover a Managed Server, you use `pack` and `unpack` to recover the Managed Server.

For example, to pack and unpack the Managed Server `FinCommonServer_1`:

1. If the Administration Server is not reachable, recover the Administration Server, as described in [Section 17.9.6](#).
2. If the Managed Server fails to start or if the file system is lost:
  - a. Recover the Middleware home from the backup file, if required. For example:

```
cd MW_HOME
tar -xf mw_home_backup_030212.tar
```

- b. Create a domain template jar file for the FinancialDomain Administration Server, using the pack utility. For example:

```
pack.sh -domain=APPLICATIONS_CONFIG/instance/domains/FinancialDomain
-template=/scratch/temp.jar -template_name=domain1
-template_author=myname -log=/scratch/logs/my.log -managed=true
```

Specifying the `-managed=true` option packs up only the Managed Servers. If you want to pack the entire domain, omit this option.

- c. Unpack the domain template JAR file, using the unpack utility. For example:

```
unpack.sh -template=/scratch/temp.jar
-domain=APPLICATIONS_CONFIG/instance/domains/FinancialDomain
-log=/scratch/logs/my.lognew.log -log_priority=info
```

- d. Ensure that the application artifacts are accessible from the Managed Server host. That is, if the application artifacts are not on the same server as the Managed Server, they must be in a location accessible by the Managed Server.

---

---

**Note:**

- For stage mode applications, the Administration Server copies the application bits to the staged directories on the Managed Server hosts.
- For nostage and external-stage mode applications, ensure that application files are available in the stage directories of the Managed Server.

See *Oracle Fusion Middleware Deploying Applications to Oracle WebLogic Server* for information about stage, nostage, and external-stage mode applications.

---

---

- e. Start the Managed Server, as described in [Section 4.4.4.1](#).

The Managed Server connects to the Administration Server and updates its configuration changes.

## 17.11.7 Recovering an Oracle Instance in an Oracle Fusion Customer Relationship Management Installation

To recover the Oracle instance ohs in an Oracle Fusion Customer Relationship Management installation:

1. Stop all relevant processes using `opmnctl` or kill all processes that are related to that Oracle instance. For example:

```
opmnctl stopall
```

2. Copy the original Oracle instance to a backup location in case you need to retrieve some configuration data:

```
cp /scratch/CRM/APPLICATIONS_CONFIG/webtier_mw_home/webtier/ohs
/scratch/CRM/APPLICATIONS_CONFIG/webtier_mw_home/webtier/ohs_backup
```

- Restore the Oracle instance home from the backup file to a stage directory by restoring the Applications configuration directory:

```
mkdir stage
cd stage
tar -xvf crm_ApplConfig_backup_030212.tar
```

- Copy the restored Oracle instance from step 3 to the original location:

```
cp /scratch/stage/APPLICATIONS_CONFIG/webtier_mw_home/webtier/ohs/
   /scratch/CRM/APPLICATIONS_CONFIG/webtier_mw_home/webtier/ohs
```

- Start all relevant processes. That is, start all processes that are related to that Oracle instance:

```
opmnctl startall
```

---

**Note:** If you are recovering the Oracle instance containing Oracle HTTP Server to a new host after loss of host, see [Section 17.10.7.1](#).

---

### 17.11.8 Recovering an Oracle Fusion Customer Relationship Management Cluster

In this scenario, the cluster CRMPerformanceCluster has been erroneously deleted or the cluster-level configuration, such as the JMS configuration or container-level data sources, was mistakenly changed and committed. The server CRMPerformanceServer\_1 cannot be started or does not operate properly or the services running inside the server are not starting. You cannot ascertain what was changed.

---

**Caution:** Performing a domain-level recovery can impact other aspects of a running system and all of the configuration changes performed after the backup was taken will be lost.

---

If the configuration changes are few, then the easiest way is to redo the configuration changes. If that is not feasible, restore the domain to which the cluster belongs. (See the table in [Section 17.11.5](#) for Managed Servers to domain mappings.) Take the following steps:

- Stop the cluster:

```
stop('CRMPerformanceCluster', 'Cluster')
```

- Stop the Administration Server, as described in [Section 4.4.4.2](#).

- Copy the original CRMDomain to a backup location in case you need to retrieve some configuration data:

```
cp /scratch/CRM/APPLICATIONS_CONFIG/instance/domains/CRMDomain
   /scratch/CRM/APPLICATIONS_CONFIG/instance/domains/CRMDomain_backup
```

- Restore the CRMDomain home from the backup file to a stage directory by restoring the Applications configuration directory:

```
mkdir stage
cd stage
tar -xvf crm_ApplConfig_backup_030212.tar
```

- Copy the restored CRMDomain from step 4 to the original location:

```
cp /scratch/stage/APPLICATIONS_CONFIG/instance/domains/CRMDomain
```

```
/scratch/CRM/APPLICATIONS_CONFIG/instance/domains/CRMDomain
```

6. Start the Administration Server, as described in [Section 4.4.3.1](#).
7. Start the cluster. You can use the Oracle WebLogic Server Administration Console or WLST. For example, to use the WLST `start` command:

```
start('CRMPerformanceCluster', 'Cluster')
```

---

---

**Note:** You can use this procedure to recover a cluster if the membership is mistakenly deleted.

---

---

### 17.11.9 Recovering Databases for Oracle Fusion Customer Relationship Management

You can recover the databases using RMAN. You can recover the databases at whatever level is appropriate by performing a restore and recovery of either the full databases, a tablespace, or a data file.

Oracle Fusion Customer Relationship Management uses the following databases: Oracle Fusion Applications database, LDAP database, Oracle WebCenter Content, and Oracle Identity Manager database. You must maintain consistency among the databases. If any of these databases are recovered to a different point in time, you may need to reconcile the databases, as described in [Section 17.9.9](#).

For more information, see the following topics:

- For data loss, corruption, or media failure loss, see [Section 17.9.8](#).
- For loss of host, see [Section 17.10.4](#).

---

---

# Configuring High Availability and Scaling Out Oracle Fusion Applications

This chapter describes how to configure Oracle Fusion Applications for high availability and how to scale out an Oracle Fusion Applications environment.

This chapter contains the following topics:

- [Section 18.1, "Introduction to Oracle Fusion Applications High Availability Architecture"](#)
- [Section 18.2, "Oracle WebLogic Cluster Configuration for Oracle Fusion Applications"](#)
- [Section 18.3, "Oracle Fusion Applications High Availability"](#)
- [Section 18.4, "Oracle RAC Database Configuration for Oracle Fusion Applications Repositories"](#)
- [Section 18.5, "Scaling Out Oracle Fusion Applications"](#)

The following appendixes describe additional high availability topics:

- [Appendix A, "High Availability for Oracle Fusion Middleware Extensions for Applications"](#)
- [Appendix B, "High Availability for Oracle Enterprise Scheduler"](#)

## 18.1 Introduction to Oracle Fusion Applications High Availability Architecture

Providing high availability for Oracle Fusion Applications involves configuring an Oracle WebLogic cluster for high availability of the middle tiers and configuring **Oracle Real Application Clusters (RAC)** for high availability of the Oracle Database. It also involves scaling out Oracle Fusion Applications and Oracle RAC database instances.

Oracle Fusion Applications is built on standards-based Oracle Fusion Middleware. Therefore, it benefits from the high availability solutions for Oracle Fusion Middleware.

Characteristics of an Oracle Fusion Applications high availability configuration are:

- Oracle Fusion Applications are Oracle Application Development Framework (Oracle ADF) applications running on Oracle WebLogic Server Clusters.
- Oracle Fusion Applications connect to Oracle RAC databases using multi data sources.

- Oracle Fusion Applications use Enterprise JavaBeans (EJBs) for inter-cluster communication within the same domain.
- Oracle Fusion Applications use Web services for inter-domain communication.
- Oracle Fusion Applications use the **Java Message Service (JMS)** operational interface (shared interfaces) to Oracle Streams **Advanced Queuing (AQ)**, known as AQ JMS, for inter-domain communication.

This chapter assumes that you have a basic understanding of high availability concepts such as active-active deployments, active-passive deployments, and disaster recovery deployments. For information about these concepts, see the "Oracle Fusion Middleware High Availability Framework" chapter in the *Oracle Fusion Middleware High Availability Guide*.

See the following documentation resources to learn more about high availability for Oracle Fusion Middleware and Oracle Database:

- *Oracle Fusion Middleware High Availability Guide*
- *Oracle Database High Availability Overview*
- *Oracle Database High Availability Best Practices*

## 18.2 Oracle WebLogic Cluster Configuration for Oracle Fusion Applications

Oracle Fusion Applications runs on Oracle WebLogic Server. During an Oracle Fusion Applications installation, each individual **product family** installs into its own WebLogic Server domain. At the time of **provisioning**, a WebLogic cluster (with one Oracle WebLogic Server) is created for each **Java EE** application that is part of the product family. If you want to scale out any of the **Java EE applications**, new Managed Servers can be added to the application's WebLogic cluster.

## 18.3 Oracle Fusion Applications High Availability

This section provides a description of the single instance architecture of Oracle Fusion Applications, and then provides information that helps you deploy Oracle Fusion Applications in a high availability configuration.

If you have not already done so, read [Chapter 1](#) for an introduction to:

- Oracle Fusion Applications
- Oracle Fusion Applications product families and components
- Key Oracle Fusion Applications concepts

### 18.3.1 Oracle Fusion Applications Single Instance Architecture

[Figure 1–1](#) shows an Oracle Fusion Applications single instance architecture. These are stateful applications that maintain session state.

Oracle Fusion applications are built using the following technologies:

- Oracle Application Development Framework (Oracle ADF), Oracle Middleware Extensions for Applications (Applications Core), and Oracle WebCenter framework, which run as JavaEE applications on WebLogic Server

- Clustered EJBs. Inter-cluster communication within one domain is done using EJBs. Inter-cluster communication across different domains is done using web services (**SOAP**).
- **Event Delivery Network (EDN)** queues are used for event propagation. EDN uses Advanced Queuing (AQ) database queues.

This section contains the following topics that describe high availability details:

- [Section 18.3.1.1, "Oracle Fusion Applications External Dependencies"](#)
- [Section 18.3.1.2, "Oracle Fusion Applications Run-Time Processes"](#)
- [Section 18.3.1.3, "Oracle Fusion Applications Request Flow"](#)
- [Section 18.3.1.4, "Oracle Fusion Applications Configuration Artifacts"](#)
- [Section 18.3.1.5, "Oracle Fusion Applications Deployment Artifacts"](#)
- [Section 18.3.1.6, "Oracle Fusion Applications Log File Location"](#)

### 18.3.1.1 Oracle Fusion Applications External Dependencies

The following lists shows some of the external entities that Oracle Fusion Applications depends on that are relevant from a high availability perspective:

- Oracle Fusion Applications repository database
- Oracle Metadata Repository (MDS Repository) repository database
- Oracle Enterprise Scheduler repository database and queues
- EDN data source (AQ queues)
- Identity Management infrastructure (for authentication/authorization)
- **LDAP** store for users, roles, and policies.
- Oracle Business Intelligence Foundation, which includes Essbase
- Web Services invocation (mostly asynchronous)
- Java Message Service (JMS), for Asynchronous Web Services invocation
- Oracle Data Integrator (for replication framework)
- Oracle Universal Content Management system

---

**Note:** When you configure Oracle Identity Manager for Fusion Applications in a high availability environment, Oracle recommends that you use Multimaster Replication. See [Setting up Multimaster Replication](#).

---

### 18.3.1.2 Oracle Fusion Applications Run-Time Processes

All Oracle Fusion Applications components run as JavaEE applications in WebLogic Server and do not start a process of their own. Standard WebLogic tools such as the Administration Console, **Oracle WebLogic Scripting Tool (WLST)**, and Oracle Enterprise Manager Fusion Middleware Control start, stop, and manage the applications.

Oracle Fusion Applications also has C components such as Oracle Global Order Promising (GOP) and the **bounce handling daemon (BHD)**. Oracle Process Manager and Notification Server (OPMN) manage these.

### 18.3.1.3 Oracle Fusion Applications Request Flow

The typical client HTTP request goes from the web browser or Web Services client to Oracle HTTP Server to JDBC/RMI/WS (HTTP). [Table 18–1](#) shows the Oracle Fusion Applications clients, the protocols they use to connect, and their high availability configuration.

**Table 18–1 Oracle Fusion Applications Client Connection Protocols for High Availability**

Client	Connection Protocol	High Availability Configuration
Web browser	HTTP	Load balancer
Oracle Enterprise Scheduler	HTTP (WS SOAP <sup>1</sup> over HTTP)	Load balancer
Web Services invocation	HTTP (WS SOAP over HTTP)	Load balancer
Inter-cluster communication	<b>EJB</b> (RMI <sup>2</sup> over T3)	Clustered provider URL
Oracle Data Integrator	JDBC <sup>3</sup>	Oracle RAC/multi data source

<sup>1</sup> Web Services Simple Object Access Protocol

<sup>2</sup> Remote Method Invocation

<sup>3</sup> Java Database Connectivity

### 18.3.1.4 Oracle Fusion Applications Configuration Artifacts

All configuration for Oracle Fusion Applications is stored in the Oracle Fusion Applications repository database or MDS repository.

Configuration for Oracle WebLogic is stored in the domain configuration.

### 18.3.1.5 Oracle Fusion Applications Deployment Artifacts

The Oracle Fusion applications are deployed using the nostaged deployment model. This allows you to install a single copy of the Oracle Fusion Applications binaries on a NAS or SAN shared storage and then run Fusion Applications from multiple computers using that single copy on the shared storage. Typically, application extensions get deployed on a different **Managed Server** than the application itself.

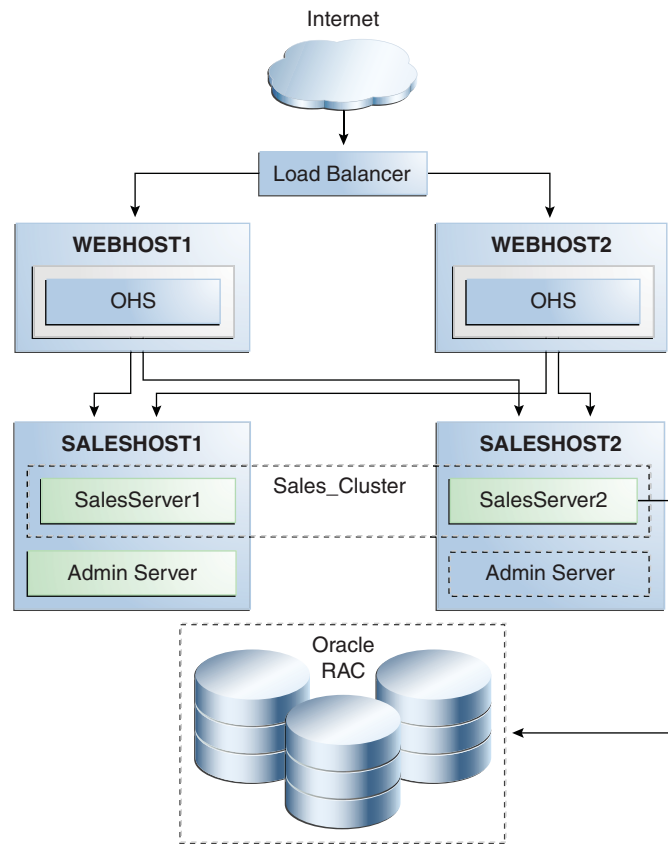
### 18.3.1.6 Oracle Fusion Applications Log File Location

For detailed information about Oracle Fusion Applications log file locations, see [Section 15.3.6](#).

## 18.3.2 Oracle Fusion Applications High Availability Architecture and Failover Considerations

[Figure 18–1](#) shows the high availability architecture of an Oracle Fusion Applications cluster deployment.



**Figure 18–1 Oracle Fusion Applications High Availability Cluster Deployment**

Some of the key characteristics of this architecture are:

- It is an active-active clustered architecture.
- It stores product binaries on shared storage.
- Each computer in the cluster has its own copy of the domain configuration on local storage.
- The application tier includes hosts SALESHOST1 and SALESHOST2, which comprise a WebLogic cluster with two Managed Servers running the Sales application.
- The WebLogic cluster is front-ended in the web tier by hosts WEBHOST1 and WEBHOST2 running Oracle HTTP Server. Oracle HTTP Server provides sticky routing by default.
- It has a hardware load balancer in front of the two Oracle HTTP Servers configured with sticky routing.
- The Oracle RAC repository in the data tier has multi data source configuration.
- ADF session state replication is enabled by default. The following high availability session state replication settings are enabled out of the box:
  - In `weblogic.xml`, the `replicate_if_clustered` option is specified:
 

```
<session-descriptor>
<persistent-store-type>replicated_if_clustered</persistent-store-type>
</session-descriptor>
```
  - In `adf-config.xml`, the `adf-scope-ha` parameter is set to `true`:

```
<adf-controller-config
xmlns="http://xmlns.oracle.com/adf/controller/config">
<adf-scope-ha-support>true</adf-scope-ha-support>
</adf-controller-config>
```

- In `adf-config.xml`, the `adf-scope-ha-support` parameter is set to `true`:

```
<adfc:adf-controller-config>
<adfc:adf-scope-ha-support>true</adfc:adf-scope-ha-support>
</adfc:adf-controller-config>
```

- The `jbo.dofailover` parameter is set to `true`, either in the startup environment as `-D` or in the ADF Business Component configuration file (`bc4j.xcfg`):

```
<AppModuleConfig ...
<AM-Pooling jbo.dofailover="true" />
</AppModuleConfig>
```

- In the `setDomainEnv.sh` file, change `JAVA_PROPERTIES` to the following value and then export `JAVA_PROPERTIES`:

```
JAVA_PROPERTIES="-Dplatform.home=${WL_HOME} -Dwls.home=${WLS_HOME}
-Dweblogic.home=${WLS_HOME} -Djbo.ampool.doampooling=true"
```

- EJBs used for inter-cluster communication within the same domain deploy uniformly to the WebLogic cluster and leverage WebLogic Server clustering capabilities.
- Web services inter-domain communication is routed through the load balancer.
- It uses the external dependency high availability configuration that [Table 18–1](#) describes.

This section contains the following topics about Oracle Fusion Applications changes and failover considerations:

- [Section 18.3.2.1, "Starting and Stopping the Oracle Fusion Applications Cluster"](#)
- [Section 18.3.2.2, "Oracle Fusion Applications Cluster-Wide Configuration Changes"](#)
- [Section 18.3.2.3, "Oracle Fusion Applications Failures and Expected Behaviors"](#)

### 18.3.2.1 Starting and Stopping the Oracle Fusion Applications Cluster

See [Section 2.5](#) for descriptions of the various scenarios for starting and stopping the Oracle Fusion Applications environment.

### 18.3.2.2 Oracle Fusion Applications Cluster-Wide Configuration Changes

All Oracle Fusion Applications configuration changes can be done at the cluster level. You do not need to make configuration changes to individual instances in a cluster.

### 18.3.2.3 Oracle Fusion Applications Failures and Expected Behaviors

This section describes the different types of failures that can occur in an Oracle Fusion Applications high availability deployment, and the expected behaviors when these failures occur. This section contains the following topics:

- [Section 18.3.2.3.1, "Process Failure"](#)
- [Section 18.3.2.3.2, "Machine Failure"](#)

- [Section 18.3.2.3.3, "External Dependency Failures \(Oracle RAC Instance, Web Services Provider\)"](#)
- [Section 18.3.2.3.4, "Troubleshooting Oracle Fusion Applications"](#)

**18.3.2.3.1 Process Failure Node Manager** detects Managed Server failures and restarts the Managed Server automatically. If repeated restart attempts fail, then in a simple active-active deployment, surviving cluster members continue to service the request. The `ORACLE_INSTANCE/config/OHS/ohsName/mod_wl_ohs.conf` file for Oracle HTTP Server redirects user requests to a server which has the replica of the session state. The Node Manager `RestartInterval` parameter specifies the amount of time Node Manager attempts to start a failed server. The `RestartMax` parameter specifies the number of times Node Manager attempts to start a failed server.

The server promotes the state to primary, creates a replica elsewhere in the cluster, and services the user request.

WebLogic Server clustering provides EJB failover for inter-cluster communication within the domain.

Web services inter-domain communication is routed through the load balancer, which also provides failover.

If a cluster member fails, messages continue to be available to surviving cluster members because AQ JMS is used for inter-domain communication.

When system components fail, **OPMN** attempts to restart the process in place.

**18.3.2.3.2 Machine Failure** When a computer fails, the expected behavior is the same as for process failure that [Section 18.3.2.3.1](#) describes except that Node Manager and OPMN do not attempt restarts.

**18.3.2.3.3 External Dependency Failures (Oracle RAC Instance, Web Services Provider)** This section describes external dependency failures.

- **Oracle RAC Instance Failure.** When an Oracle RAC instance fails, multi data sources and built-in application retry logic provide failover. Under certain circumstances, an Oracle RAC database outage generates the following message on your Web browser:

```
Encountered database recoverable exception. Please retry your request.
```

If this message appears, retry the ongoing session after logging in again (if required).

- **Web Services Provider Failure.** If the failure occurs before the Web Services stack is invoked, the application receives an error and can retry. If failure occurs after the acknowledgement is received, then the Asynchronous Web Services infrastructure guarantees a successful response.

**18.3.2.3.4 Troubleshooting Oracle Fusion Applications** If you experience issues with your Oracle Fusion Applications high availability deployment, check the WebLogic Server log. See [Section 18.3.1.6](#) for details.

## 18.4 Oracle RAC Database Configuration for Oracle Fusion Applications Repositories

Oracle Real Application Clusters (Oracle RAC) enables you to cluster servers to provide resilient and scalable access to a database. A **cluster** comprises multiple

interconnected computers or servers that appear as if they are one server to end users and applications. Oracle RAC simultaneously provides a highly available and scalable database for Oracle Fusion Applications.

This section provides an overview of Oracle RAC and information about setting up a highly available deployment for Oracle Fusion Applications configured with an Oracle RAC database as the persistent store for data.

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**Note:** This chapter discusses configuring Oracle RAC databases only. Other persistent repositories that connect with Oracle Fusion Applications, such as Oracle Hyperion, are configured implicitly and transparently.

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For complete information about Oracle RAC, see the *Oracle Real Application Clusters Administration and Deployment Guide*.

This section contains the following topics:

- [Section 18.4.1, "Oracle Real Application Clusters"](#)
- [Section 18.4.2, "Providing High Availability for Oracle Fusion Applications Repositories"](#)
- [Section 18.4.3, "Best Practices for Deploying JDBC Multi Data Sources on Servers and Clusters"](#)

## 18.4.1 Oracle Real Application Clusters

Oracle RAC and Oracle Clusterware<sup>1</sup> allow the Oracle Database to run any packaged or custom application across a set of clustered servers. This capability provides the highest levels of availability and the most flexible scalability. If a clustered server fails, Oracle Database continues running on the surviving servers. When more processing power is needed, you can add another server without interrupting access to data.

Oracle RAC enables multiple database instances that are linked by an interconnect to share access to an Oracle database. In an Oracle RAC environment, the Oracle Database runs on two or more systems (nodes) in a cluster while concurrently accessing a single shared database. The result is a single database system that spans multiple hardware systems and enables Oracle RAC to provide high availability and redundancy during failures in the cluster. Oracle RAC accommodates all system types, from read-only data warehouse (DSS) systems to update-intensive **Online Transaction Processing (OLTP)** systems.

The clusters that are typical of Oracle RAC environments can provide continuous service for both planned and unplanned outages. Oracle RAC builds higher levels of availability on top of the standard Oracle features. All single-instance high availability features, such as the Oracle Flashback technologies and online reorganization, also apply to Oracle RAC. Applications scale in an Oracle RAC environment to meet increasing data processing demands without changing the application code. In addition, allowing maintenance operations to occur on a subset of components in the cluster while the application continues to run on the rest of the cluster can reduce planned downtime.

---

<sup>1</sup> Oracle Clusterware is software that enables the servers to be bound together to operate as if they are one server and manages the availability of user applications and Oracle databases.

## 18.4.2 Providing High Availability for Oracle Fusion Applications Repositories

Providing high availability requires detailed planning to ensure there are no single points of failure throughout the infrastructure. Even though Oracle RAC makes your database highly available, if a critical application becomes unavailable, then your business can be negatively affected.

For example, because Oracle Fusion Applications uses the **Lightweight Directory Access Protocol (LDAP)** for authentication, the best practice is to make the LDAP server highly available. If the database is up but the LDAP server is down, users cannot connect to the applications and the entire system appears to be down.

The following sections describe deploying Oracle RAC for high availability in an Oracle Fusion Applications environment:

- [Section 18.4.2.1, "Preparing the System to Use Oracle RAC"](#)
- [Section 18.4.2.2, "Providing High Availability Through Multi Data Sources"](#)
- [Section 18.4.2.3, "Failover Processing and Recovery for Oracle RAC Node or Instance Failures"](#)
- [Section 18.4.2.4, "Load Balancing Across Oracle RAC Nodes"](#)
- [Section 18.4.2.5, "Retry Logic to Protect Read-Only Operations"](#)

### 18.4.2.1 Preparing the System to Use Oracle RAC

Use Oracle Fusion Applications provisioning to orchestrate the integration process, including the specification of your Oracle RAC database.

For more information about the provisioning and installation process and installing Oracle Database, see [Section 1.2.1.2](#).

### 18.4.2.2 Providing High Availability Through Multi Data Sources

Oracle Fusion Applications support only multi data source configurations for Oracle RAC. Multi data sources encapsulate individual data sources that pool connections to specific instances of Oracle RAC.

A **data source** is a Java object that application components use to obtain connections to a relational database. Specific connection information, such as the URL or user name and password, are set on a data source object as properties and do not need to be explicitly defined in an application's code. This abstraction allows applications to be built in a portable manner, because the application is not tied to a specific back-end database. The database can change without affecting the application code.

A **multi data source** is like a pool of data sources that provides failover processing and recovery. It also provides load balancing between nodes of a highly available database system, such as an Oracle RAC database. When an Oracle RAC instance fails, a multi data source determines which data source to use to satisfy application requests. If you are using an Oracle RAC database, you must configure multi data sources.

The data source member list for a multi data source supports dynamic updates. This allows Oracle RAC environments to add and remove database nodes and corresponding data sources without redeployment, and it provides the ability to:

- Grow (scale) and shrink Oracle RAC clusters in response to throughput
- Shut down Oracle RAC nodes temporarily to perform planned maintenance

See [Section 18.4.3](#) for best practices when configuring multi data sources for Oracle RAC and Oracle Fusion Applications.

### 18.4.2.3 Failover Processing and Recovery for Oracle RAC Node or Instance Failures

WebLogic Server periodically checks the status of data sources in a multi data source. If an Oracle RAC node or instance fails, application connection requests are managed as follows:

- Existing connections

There is no failover of existing connections. In-flight transactions are typically rolled back when the database is the transaction manager. When the WebLogic Server is the Transaction Manager, in-flight transactions are failed over; they are driven to completion or rolled back based on the transaction state at the time of failure.

- New connection requests

New session requests are redirected to a working Oracle RAC instance in the cluster, either by Oracle WebLogic Server or by the Oracle Thin driver.

For information about multi data source failover limitations and requirements, see the "Configuring JDBC Multi Data Sources" chapter in *Oracle Fusion Middleware Configuring and Managing JDBC Data Sources for Oracle WebLogic Server*.

### 18.4.2.4 Load Balancing Across Oracle RAC Nodes

Load balancing involves distributing requests among two or more processes. Oracle WebLogic Server provides a load balancing algorithm for multi data sources. If an application requires load balancing across Oracle RAC nodes, then WebLogic Server supports this capability with JDBC multi-data sources that have been configured for load balancing.

WebLogic accesses the data sources that form a multi data source using a round-robin scheme. When switching connections, WebLogic Server selects a connection from the next data source in the order listed.

See [Section 18.4.3](#) for recommendations when configuring load balancing with WebLogic Server.

### 18.4.2.5 Retry Logic to Protect Read-Only Operations

Under certain circumstances, an Oracle RAC database outage generates the following message:

```
Encountered database recoverable exception. Please retry your request.
```

If this message appears, retry the ongoing session after logging in again (if required).

See [Section 18.4.3](#) to configure retry properties with WebLogic Server.

## 18.4.3 Best Practices for Deploying JDBC Multi Data Sources on Servers and Clusters

When you create an Oracle Fusion Applications environment using an Oracle RAC database, the provisioning tool configures automatically a multi data source to use each Oracle RAC database instance.

The default configuration uses these best practices that provide optimal availability:

- Deploys a multi data source to a cluster or server by selecting the server or cluster as a deployment target in the WebLogic Server Administration Console.

When a multi data source is deployed on a server, WebLogic Server creates an instance of the multi data source on the server. When you deploy a multi data

source to a cluster, WebLogic Server creates an instance of the multi data source on each server in the cluster.

- Deploys all data sources that are used by a multi data source to satisfy connection requests on the same servers and clusters as the multi data source.

Multi data sources do not route connection requests to other servers in a cluster or in a domain.

- Sets the load-balancing properties as shown in [Table 18–2](#).

**Table 18–2 Recommended Property Settings for the Load-Balancing**

Property Name	Recommended Value
test-frequency-seconds	120
algorithm-type	Load-Balancing

- If the data sources require support for non-XA drivers, then the properties for the individual data sources are set as shown in [Table 18–3](#).

**Table 18–3 Recommended Data Source Property Settings for Non-XA Drivers**

Property Name	Recommended Value
Driver	oracle.jdbc.OracleDriver
Property command	<property> <name>oracle.net.CONNECT_TIMEOUT</name> <value>10000</value> </property>
connection-creation-retry-frequency-seconds	60
test-frequency-seconds	120
test-connections-on-reserve	true
test-table-name	SQL SELECT 1 FROM DUAL
seconds-to-trust-an-idle-pool-connection	0
global-transactions-protocol	None

For more information about configuring JDBC multi data sources, see "Configuring JDBC Multi Data Sources" in *Oracle Fusion Middleware Configuring and Managing JDBC Data Sources for Oracle WebLogic Server*.

## 18.5 Scaling Out Oracle Fusion Applications

Scale-out enables organizations to improve application performance, scalability, and availability on an incremental, as-needed basis by adding multiple replicated servers.

Oracle Fusion Applications is always deployed in a cluster. Even in a single instance deployment, the Oracle Fusion Applications instance is part of a cluster with one member.

You can use a scale out operation to move from a non-high availability deployment to a high availability deployment. You can scale up or scale out the Oracle Fusion Applications topology. When you *scale up* the topology, you add a new Managed

Server to computers that are already running one or more Managed Servers. When you *scale out* the topology, you add a new Managed Server to new computers.

Before you run *scale up* or *scale out* steps, check that you meet these requirements:

- There must be at least one existing computer running at least one Managed Server configured with Oracle Fusion Applications within the topology. The computer contains an `APPLICATIONS_BASE` home directory (`/oracle` in [Figure 1-6](#)) and an Oracle Fusion Applications Middleware home directory (`/oracle/fusionapps` in [Figure 1-6](#)) in shared storage.
- The computer on which the new Managed Server is deployed can access the existing home directories for Oracle Fusion Applications. Use the existing installations in shared storage for creating a new Managed Server.

For *scale up*, you do not need to install Oracle Fusion Applications binaries in a new location, and you do not need to run `pack` and `unpack` to bootstrap the domain configuration.

For *scale out*, you must run `pack` and `unpack` to bootstrap the domain configuration in the new computer.

---



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**Note:** The steps below assume that Oracle Fusion Applications clusters such as the Sales cluster do not use WebLogic JMS or XA.

The *scale up* steps for Oracle Fusion Middleware components such as Oracle SOA Suite and Oracle WebCenter are in the *scale up* section of the component's chapter in the *Oracle Fusion Middleware High Availability Guide*. *Scale out* steps for Oracle Fusion Middleware components such as Oracle SOA and Oracle WebCenter are in the *scale out* section of the component's chapter in the *Oracle Fusion Middleware High Availability Guide*. To make Oracle HTTP Server highly available, see the Oracle HTTP Server chapter in the *Oracle Fusion Middleware High Availability Guide*.

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This section includes the following topics:

- [Section 18.5.1, "Scaling Up the Topology \(Adding Managed Servers to Existing Machines\)"](#)
- [Section 18.5.2, "Scaling Out the Topology \(Adding Managed Servers to New Machines\)"](#)
- [Section 18.5.3, "Scaling Out Oracle RAC Databases"](#)

### 18.5.1 Scaling Up the Topology (Adding Managed Servers to Existing Machines)

In this case, you have a computer that runs a Managed Server configured with Oracle Fusion Applications components and you want to add another Managed Server to that computer. Use the steps in this section to add a second Managed Server to a computer and to add subsequent Managed Servers on that computer.

Follow these steps to *scale up* the topology. This example uses the Oracle Fusion Customer Relationship Management application; you can also use these steps to *scale up* other Oracle Fusion Applications clusters:

1. Using the Administration Console, clone the source Managed Server (for example, `SalesServer1`) into a new Managed Server. The source Managed Server to clone



should be one that already exists on the computer where you want to run the new Managed Server.

To clone a Managed Server:

- a. Select **Environment** -> **Servers** from the Oracle WebLogic Server Administration Console.
- b. Select the Managed Server that you want to clone (for example, `SalesServer1`).
- c. Select **Clone**.

Name the new Managed Server `server_nameN` (for example, `SalesServer2`), where `N` is a number to identify the new Managed Server.

2. For the listen address, assign the host name to use for this new Managed Server.

Ensure that the port number (9001, in this example, so as not to conflict with the current port 8001 that the existing Managed Server, `SalesServer1`, uses) for the new Managed Server is not used on this computer.

3. Update the cluster address to include the new server:

- a. Select **Environment** -> **Cluster** from the Administration Console.
- b. Click on the `Sales_Cluster` server.
- c. In the Change Center, click **Lock & Edit**.
- d. Add the new server's address and port to the **Cluster Address** field. For example:

```
SALESHOST1:8001,SALESHOST1:9001
```

4. Disable host name verification for the new Managed Server. Before starting and verifying the `SalesServern` Managed Server, you must disable host name verification. You can re-enable it after you configure server certificates for the communication between the Oracle WebLogic **Administration Server** and the Node Manager in `SALESHOSTn`. If the source server from which the new one has been cloned had already disabled hostname verification, these steps are not required; the hostname verification setting propagates to the cloned server.

To disable host name verification:

- a. Start the Oracle WebLogic Administration Console.
  - b. Expand the **Environment** node in the Domain Structure window.
  - c. Click **Servers**.
  - d. Select `SalesServern` in the Names column of the table in the Summary of Servers page.
  - e. Click the **SSL** tab in the Settings page for the server.
  - f. Click **Advanced**.
  - g. Set Hostname Verification to **None**.
  - h. Click **Save**.
5. Change JDBC LLR Table Name:
    - a. In the Oracle EM, expand the Environment node in the Domain Structure window
    - b. Click **Servers**.

- c. Select the scaled out server.
  - d. In the General tab, click **Advanced**.
  - e. Change the JDBC LLR Table Name to the next higher number so that it doesn't conflict with the number of the original server.
  - f. Click **Save**.
6. Ensure that the Node Manager is running on the computer. To start the Node Manager, use the installation in shared storage from the existing computer and start Node Manager by passing the host name of the computer as a parameter as follows:

```
SALESHOST1> WL_HOME/server/bin/startNodeManager computer_ip
```

7. Start and test the new Managed Server from the Oracle WebLogic Server Administration Console:
  - a. Ensure that the newly created Managed Server (SalesServer2 in this example) is running.
  - b. Access the application on the newly created Managed Server (<http://SALESHOST1:9001/sales/faces/index>). The application should be functional.
8. Configure Oracle HTTP Server to route to the Administration Server that contains the new Managed Server; set the `WebLogicCluster` parameter to the list of computers in the cluster. Follow these steps for all Oracle HTTP Server hosts in your deployment:

- a. cd to the following directory in the Web Tier configuration home:

```
(UNIX) APPLICATIONS_BASE/instance/SetupDomain_webtier/config/OHS/ohs1/moduleconf
```

```
(Windows) APPLICATIONS_BASE\instance\CommonDomain_webtier\config\OHS\ohs1\moduleconf
```

- b. Create a backup of the `FusionVirtualHost_crm.conf` file and then make these edits to the file (the example is for the Sales server):

```
<Location /sales>  
    SetHandler weblogic-handler  
    WebLogicCluster SALESHOST1:8001,SALESHOST1:9001  
</Location>
```

Where `portn` is a different port number than the port used for the first Managed Server.

- c. Restart the Oracle HTTP Server by following these steps:

```
(UNIX) cd APPLICATIONS_BASE/instance/SetupDomain_webtier/bin  
opmnctl stopall  
opmnctl startall
```

```
(Windows) cd APPLICATIONS_BASE\instance\SetupDomain_webtier\bin  
opmnctl stopall  
opmnctl startall
```

- d. Check that both the `SALESHOST1:8001/sales/faces/index` and `SALESHOST1:9001/sales/faces/index` are accessible.
  - e. Check the Sales servers from Oracle HTTP Server:

WEBHOST1:7777/sales/faces/index

This example assumes 7777 is being used for the Oracle HTTP Server port.

- f. Login to the WebLogic Server Administration Console and navigate to **CRMDomain > Environments > Servers**.

### 18.5.1.1 Testing the Routing from Oracle HTTP Server to the New Managed Server

To test the routing from Oracle HTTP Server to the new Managed Server.

1. If desired, shut down the existing Managed Server (in this case, `SalesServer1`).
2. Access the application using `WEBHOST1:7777/sales/faces/index` through the web server, which should access the application on the new Managed Server (in this case, `SalesServer2`).

This step should show that Oracle HTTP Server routed the request to the new Managed Server (`SalesServer2`) while `SalesServer1` was down, and that `SalesServern` serviced the request.

3. If you have not already done so, restart the Managed Server that you shut down.

## 18.5.2 Scaling Out the Topology (Adding Managed Servers to New Machines)

When you *scale out* the topology, you add new Managed Servers configured with Oracle Fusion Applications to new computers where no Oracle Fusion Applications Managed Servers are configured.

You scale out the topology using Enterprise Manager Cloud Control. Benefits of Cloud Control include:

- **Ease of use.** Cloud Control automatically completes the provisioning and deployment processes. It gives you all the information you need about a Fusion Instance, Fusion Product Family, Fusion Product, and Fusion Application instances.
- **Increased reliability.** The Cloud Control process uses a job system to automatically and regularly rediscover WebLogic domains.
- **Enhanced interface.** Home pages enable you to monitor instances and product families at a glance. The interface makes transparent the relationship between the server and application deployment details. Cloud Control shows cluster applications from a product perspective.

Enterprise Manager Cloud Control enables you scale out a Fusion Product or a specific Fusion Application by:

- Provisioning a new WebLogic Server instance within the cluster
- Deploying an instance of the Fusion Application on the new WebLogic Server instance

There are two ways to scale out Fusion Applications:

- To scale out a Fusion Product Family, Product, or Fusion Cluster Application target, see ["Scaling Out a Fusion Product Family, Product, or Fusion Cluster Application Target"](#).
- To scale out a Fusion Instance target, see the topic "Fusion Application Instance Scale Out - Scale Out Selections" in the Cloud Control online help.

### Scaling Out a Fusion Product Family, Product, or Fusion Cluster Application Target

After you provide the information required to provision the new WebLogic Server instance, Enterprise Manager invokes a deployment procedure to automatically complete the provisioning and deployment processes.

To scale out a Fusion Product Family, Product, or Fusion Cluster Application target:

1. From the **Targets** menu, choose **Fusion Applications** to open the Fusion Applications target home page.
2. Select one of the following: **Fusion Product Family**, **Product**, or **Fusion Cluster Application**.
3. Choose **Provisioning > Scale Out** from the **Product Family**, **Product**, or **Fusion Cluster Application** menu for the selected target.
4. Click on the Fusion Product or Fusion Application you want to scale out in the topology view in the region on the left.

Note that some Fusion Products may be associated with up to two Fusion Applications in the topology view.

The WebLogic Server cluster(s) that the selected Fusion Product or Fusion Application is currently deployed appears in the region on the right.

5. Click **Scale Out** in the row for a cluster you want to add an instance to.
6. Enter the credentials for the Administration Server user in the **WebLogic Domain Administrator Username** and **Password** fields.

The Administration Server is a WebLogic Server instance that manages the WebLogic Server domain the cluster belongs to.

7. Specify a directory to store temporary data files during the scale out operation in the **Administration Host Server Working Directory** field; for example, `/tmp`.
8. Enter the credentials required to access the Administration Server host.
9. Specify the following for the new WebLogic Server instance:
  - The hostname for the host that the instance will be provisioned to.
  - A unique identifier for the new instance.
  - The port that the instance will use.
10. Click **Configure More Details**.
11. Enter any additional information required to access the host machine that the new WebLogic Server instance will be created on. Required information includes:
  - The credentials required to access the host.
  - The directory to store temporary data files during the scale out operation; for example, `/tmp`
  - The port that the WebLogic Server instance will use.
12. Click **OK**.
13. Click **Scale Out**.

Enterprise Manager creates a Deployment Procedure job to provision the new WebLogic Service instance, add it to the cluster, and deploy the Fusion Application instance to it.

---

---

**Note:** Follow the preceding steps to scale out infrastructure applications (SOA, ESS).

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### 18.5.3 Scaling Out Oracle RAC Databases

This section provides guidance on how to add nodes to existing Oracle RAC environments by using Oracle cloning, and then configuring the multi data source to route database requests to the new Oracle RAC instance.

This section contains the following topics:

- [Section 18.5.3.1, "Cloning Oracle RAC Nodes to Scale Out Oracle Fusion Applications"](#)
- [Section 18.5.3.2, "Configuring the Multi Data Source to Include New Oracle RAC Nodes"](#)

#### 18.5.3.1 Cloning Oracle RAC Nodes to Scale Out Oracle Fusion Applications

The Oracle RAC cloning procedures assume that you successfully installed and configured an Oracle RAC environment that you want to add nodes and instances to. To add nodes to an Oracle RAC environment using cloning, you must first extend the Oracle Clusterware configuration, then extend the Oracle Database software with Oracle RAC, and then add the listeners and instances by running the Oracle assistants.

For more information about cloning nodes within the same cluster, see the chapter about "Using Cloning to Extend Oracle RAC to Nodes in the Same Cluster" in *Oracle Real Application Clusters Administration and Deployment Guide*.

For Oracle cloning that is specific to UNIX system environments, see the chapter about "Adding and Deleting Oracle RAC from Nodes on Linux and UNIX Systems" in *Oracle Real Application Clusters Administration and Deployment Guide*.

For Oracle cloning that is specific to Windows system environments, see the chapter about "Adding and Deleting Oracle RAC from Nodes on Windows Systems" in *Oracle Real Application Clusters Administration and Deployment Guide*.

#### 18.5.3.2 Configuring the Multi Data Source to Include New Oracle RAC Nodes

After adding an Oracle RAC node to the database cluster as a part of scaling out the database, you must configure the multi data source to route database requests to the new Oracle RAC instance. You do this by adding a data source to each of the multi data sources that will route database requests to the newly added instance of the database.

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**Note:** Verify that the property values of the data source that you add match the property values in the other peer data source of the multi data source. See [Table 18–3, "Recommended Data Source Property Settings for Non-XA Drivers"](#) for a list of property values.

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The example configures a multi data source with the properties shown in [Table 18–4](#) but you can substitute the names and properties to scale any Oracle Fusion Applications cluster.

**Table 18–4 Multi Data Source Example to Scale Out Oracle RAC with Oracle Fusion Applications**

Property Name	Property Value
name	ApplicationDB
Jndi-name	jdbc/ApplicationDBDS
Data Sources	ApplicationDB01, ApplicationDB02
Target	Sales_Cluster

To configure the new Oracle RAC instance in a multi data source:

1. Log in to the Oracle WebLogic Administration Console.
2. Create a new data source, as follows:
  - a. Navigate to *domain\_name* > **Services** > **Data Sources**  
For example, navigate to **CRM\_Domain** > **Services** > **Data Sources**.
  - b. In the Change Center, click **Lock & Edit** (if needed).
  - c. On the Summary of JDBC Data Sources page, click **New** to create a new data source. (Choose **Generic Data Source**.)
  - d. In the **Name** field, enter the name of the computer (ApplicationDB03) and enter the JNDI Name. The Database Type is **Oracle**.
  - e. Click **Next**.
  - f. For the Database Driver, choose the driver of type **Thin** and **RAC Server-Instance Connection**.
  - g. On the next screen, add details for this data source by providing Oracle RAC instance details for the new Oracle RAC instance, plus other properties matching its peer datasource in the Multi Data Source.
  - h. Click **Finish**.
  - i. In the Change Center, click **Activate Changes**.
  - j. In the Change Center, click **Lock & Edit**.
  - k. Navigate to *domain\_name* > **Services** > **Data Sources**.
  - l. On the Summary of JDBC Data Sources page, choose the multi data source ApplicationDB.
  - m. On the right-hand pane for Settings for ApplicationDB, click the **Data Sources** tab.
  - n. In the Available list, find the newly created data source (ApplicationDB03) and click it to add it to the multi data source.
  - o. In the Change Center, click **Save and Activate Changes**.

# Part V

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## Appendixes

This part contains the following appendixes:

- [Appendix A, "High Availability for Oracle Fusion Middleware Extensions for Applications"](#)
- [Appendix B, "High Availability for Oracle Enterprise Scheduler"](#)
- [Appendix C, "Seeded Searchable Objects, Search Categories, Index Schedules, and Facets"](#)





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# High Availability for Oracle Fusion Middleware Extensions for Applications

This appendix describes high availability considerations for Oracle Fusion Middleware Extensions for Applications (Applications Core). For more information about Oracle Fusion Applications high availability, see [Chapter 18](#). For more information on Oracle Fusion Middleware Extensions for Applications, see the "Oracle Fusion Middleware Extensions for Applications" section in the *Oracle Fusion Applications Concepts Guide*.

High availability refers to the ability of users to access a system without loss of service. Oracle Fusion Middleware has an extensive set of high availability features, which protect its components and applications from unplanned down time and minimize planned downtime.

This appendix includes the topic, [Section A.1, "How Oracle Fusion Middleware Extensions Components Use Fusion Middleware Components for High Availability and Failover."](#)

## A.1 How Oracle Fusion Middleware Extensions Components Use Fusion Middleware Components for High Availability and Failover

With the approach of only building with use of other existing or lower level components, Applications Core obtains complete high availability without the need to implement any high availability features itself. However, it is then important to know what the base features each component is built upon, to understand how it behaves for high availability.

### A.1.1 Oracle Metadata Repository

Applications Core relies almost entirely on MDS for storage of metadata used by Customization, Flexfields, and Menus. It is very important that MDS is configured for high availability. MDS for these operations should be based on a database rather than file based MDS architecture.

The MDS database-based repository can be configured for high availability Oracle database access. With this configuration, failure detection, recovery, and retry by MDS, as well as by the WebLogic infrastructure, result in the application's read-only MDS operations being protected from Oracle RAC database planned and unplanned downtimes.

## A.1.2 Oracle Application Development Framework

Most runtime state information of an application is held in Oracle ADF. Applications Core does not create its own components, so it can achieve failover support by following the ADF rules for high availability development. When you are designing an application to run in a clustered environment, you must:

- Ensure that all managed beans with a life span longer than one request are serialized. When the Fusion web application runs in a clustered environment, a portion of the application's state is serialized and copied to another server or a data store at the end of each request so that the state is available to other servers in the cluster.
- Ensure that Oracle ADF is aware of changes to managed beans stored in ADF scopes (view scope and page flow scope) and enable the tracking of changes to ADF memory scopes. When a value within a managed bean in either view scope or page flow scope is modified, the application needs to notify Oracle ADF so that it can ensure the bean's new value is replicated.

## A.1.3 WebLogic Server Failover for Session Content

Applications Core Session Management does cache the `AppSession` using the `HttpSession`, but it is marked as non-serializable so that it does not get persisted in the event of failover/replication. The `AppSession` will be re-established from the session cookie from the client that is set when the session is first created.

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## High Availability for Oracle Enterprise Scheduler

This chapter describes how to configure and manage a highly available Oracle Enterprise Scheduler environment.

This appendix includes the following topics:

- [Section B.1, "Introduction to High Availability for Oracle Enterprise Scheduler"](#)
- [Section B.2, "Oracle Enterprise Scheduler Concepts"](#)
- [Section B.3, "Configuring High Availability for Oracle Enterprise Scheduler"](#)
- [Section B.4, "Managing an Oracle Enterprise Scheduler Cluster"](#)

### B.1 Introduction to High Availability for Oracle Enterprise Scheduler

A highly available cluster of Oracle Enterprise Scheduler servers is recommended for optimal job performance. This is especially useful for running asynchronous jobs remotely, which may require returning a status message upon completion.

For example, suppose an asynchronous Oracle ADF Business Components job runs remotely. Oracle Enterprise Scheduler expects the job to send a status upon completion using a web services callback. If Oracle Enterprise Scheduler runs on only one node, if that node is down, the callback message does not arrive and the status of the job is unknown. The job would then require manual intervention to mark its status as complete.

A two node cluster, however, allows all callbacks to process and arrive at their destination even if one server is down. A clustered Oracle Enterprise Scheduler environment allows callbacks to be delivered as required, and jobs to complete with the correct status automatically assigned by the system.

The main steps required for configuring a highly available Oracle Enterprise Scheduler environment are as follows:

1. Use the Oracle Fusion Applications Install and Configuration Wizard to set up a domain and configure a cluster.
2. Add nodes to the cluster as required to enhance scalability, allowing more processing power for jobs.

When a cluster node is added, the new node's processor configuration might have to be adjusted to assign appropriate [work assignments](#).

For more information, see the Oracle WebLogic Server documentation.

3. Configure the load balancer. For more information, see the Oracle HTTP Server documentation.

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**Note:** For information about troubleshooting an Oracle Enterprise Scheduler cluster, see the following chapters:

- "Troubleshooting Oracle Enterprise Scheduler" chapter in the *Oracle Fusion Applications Administrator's Troubleshooting Guide*.
  - "Troubleshooting Oracle Enterprise Scheduler" in the *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.
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## B.2 Oracle Enterprise Scheduler Concepts

To configure an Oracle Enterprise Scheduler environment, it helps to understand concepts such as the architecture of Oracle Enterprise Scheduler, its components and life cycle.

For more information about Oracle Enterprise Scheduler architecture, components, life cycle and life cycle tools, see the section "Oracle Enterprise Scheduler Concepts" in the chapter "High Availability for Oracle Enterprise Scheduler" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

## B.3 Configuring High Availability for Oracle Enterprise Scheduler

To enable a highly available environment, it is recommended to run Oracle Enterprise Scheduler in a cluster of at least two nodes.

This section includes the following topics:

- [Section B.3.1, "Oracle Enterprise Scheduler Configuration and Deployment Artifacts"](#)
- [Section B.3.2, "Oracle Enterprise Scheduler Logging"](#)
- [Section B.3.3, "Backup and Recovery"](#)

For more information about cluster architecture, failover requirements, scalability, and load balancing for Oracle Enterprise Scheduler, see the section "Configuring High Availability for Oracle Enterprise Scheduler" in the chapter "High Availability for Oracle Enterprise Scheduler" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

### B.3.1 Oracle Enterprise Scheduler Configuration and Deployment Artifacts

Configuration files are as follows:

- `ess.xml`: This file is part of the Oracle Enterprise Scheduler **EAR** file deployed to the Oracle Enterprise Scheduler cluster.
- `connections.xml`: This file is part of the Oracle Enterprise Scheduler EAR file deployed to the Oracle Enterprise Scheduler cluster. This file is used only with Oracle Enterprise Scheduler deployments running in an Oracle Fusion Applications environment.
- **MDS repository**: The Oracle Metadata repository stores Oracle Enterprise Scheduler job metadata. Oracle Enterprise Scheduler supports both database and file-based MDS repositories.

Deployment artifacts are as follows:

- J2EE application for core runtime and hosting applications.
- Job metadata within Oracle MDS for core runtime and jobs loaded at startup.

The Oracle WebLogic Server deployment is non-staged.

### B.3.2 Oracle Enterprise Scheduler Logging

Use standard Oracle WebLogic Server logging for an Oracle Enterprise Scheduler cluster. Use logs in Oracle WebCenter Content to examine Oracle Enterprise Scheduler behavior. Oracle Enterprise Scheduler logging is configured by default in Oracle WebLogic Server.

The default location for log files for Oracle Enterprise Scheduler spawned jobs on UNIX servers is `/tmp/ess/requestFileDirectory`. Oracle Enterprise Scheduler operational log files can be found under `DOMAIN_HOME/servers/SERVER_HOME>/logs/server name>-diagnostic.log`, and `MW_HOME\user_projects\domains\DOMAIN_HOME\servers\SERVER_HOME\logs\server name-diagnostic.log` on Windows.

### B.3.3 Backup and Recovery

Following are the backup and recovery guidelines for various components:

- Components stored on the file system: Product binaries, deployed application EAR files and standard Oracle WebLogic Server files in the domain root.
- Changes to the file system: The file system artifacts change when new EAR files are deployed or when the product is patched.
- Data stored in the database: The database stores all metadata and runtime data.
- Changes to database artifacts: Metadata changes when metadata is created and deployed from Oracle JDeveloper or Fusion Applications Control. Run time data changes when jobs are submitted, undergo state changes, and so on.

There is no consistency requirement between the artifacts stored on the file system and those in database. The file system stores EAR files and temporarily stores scheduled job output and log files. Job output and log files are saved to Oracle WebCenter Content upon job completion. Only one database is used, and two phase commit is not used in an Oracle Fusion Applications environment.

## B.4 Managing an Oracle Enterprise Scheduler Cluster

Managing an Oracle Enterprise Scheduler cluster involves starting the cluster, propagating configuration changes throughout the cluster, deploying applications and handling unexpected behavior.

For more information about managing an Oracle Enterprise Scheduler cluster, see the section "Managing an Oracle Enterprise Scheduler Cluster" in the chapter "High Availability for Oracle Enterprise Scheduler" in *Oracle Fusion Middleware Administrator's Guide for Oracle Enterprise Scheduler*.

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**Note:** Regarding failures in Oracle Java Transaction **API** migration and Oracle **Java Message Service (JMS)**, Oracle JTA migration is unnecessary. When a node fails, there is no need to failover the node on another machine. Oracle Fusion Applications uses Oracle Enterprise Scheduler in a way does not require JTA recovery.

Oracle Enterprise Scheduler does not use Oracle Java Message Service (JMS) such that **JMS** recovery is not needed.

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## Seeded Searchable Objects, Search Categories, Index Schedules, and Facets

This appendix provides information about the searchable objects, search categories, index schedules, and facets that are available in Oracle Fusion Applications. These searchable objects, search categories, index schedules, and facets are available for Oracle Fusion Applications Search.

This appendix includes the following topics:

- [Section C.1, "Searchable Objects by Product Family"](#)
- [Section C.2, "Search Categories by Product Family"](#)
- [Section C.3, "Index Schedules by Product Family"](#)
- [Section C.4, "Facets by Product Family"](#)

The Searchable View Objects (SVOs) are stored in the JAR files in the following fusionapps Middleware subdirectories:

```
(UNIX) FA_MW_HOME/applications/product_family/deploy/Earproduct_
familySearch.ear/APP-INF/lib
(Windows) FA_MW_HOME\applications\product_family\deploy\Earproduct_
familySearch.ear\APP-INF\lib
```

### C.1 Searchable Objects by Product Family

Searchable objects are sets of data that make view objects available for text search. They are used in an abstract way for exposing business data to search engines.

[Table C-1](#) provides a list of searchable objects available for Oracle Fusion Applications Search. The list is organized by **product family** and indicates the scope (global, focused, or both) of the search.

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**Note:** While Oracle Fusion Financials searchable objects are seeded, they are not available for search. Do not use Oracle Fusion Financials searchable objects to enable search because they are not seeded.

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**Table C-1 Searchable Objects by Product Family**

<b>Product Family</b>	<b>Searchable Object Name</b>	<b>Scope</b>	<b>Notes</b>
Oracle Fusion Applications Help	TopicSearchPVO	Global	Do not modify this searchable object.
Oracle Fusion Customer Relationship Management	Billing Accounts - oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerAccountPVO	Both	
	Campaigns - oracle.apps.marketing.coreMarketing.campaigns.publicViewEcsf.CampaignsPVO	Global	
	Competitors - oracle.apps.sales.baseSales.competitors.publicViewEcsf.CompetitorPVO	Global	
	Contacts - oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerContactPVO	Both	
	Contract Documents - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.ContractDocumentSearchVO	Focused	
	Customer Assessments - oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerAssessmentPVO	Both	
	Customer Contracts - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.Customer360ContractPVO	Focused	
	Customer Interactions - oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerInteractionPVO	Both	
	Customer Leads - oracle.apps.marketing.leadMgmt.leads.publicViewEcsf.MklCustomer360LeadPVO	Focused	
	Customer Notes - oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerNotePVO	Both	
	Customer Opportunities - oracle.apps.sales.opptyMgmt.opportunities.publicViewEcsf.Customer360OpportunityPVO	Focused	
	Customer Profiles - oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerPVO	Both	
	Customer References - oracle.apps.sales.baseSales.references.publicViewEcsf.Customer360ReferencePVO	Focused	
Enterprise Contracts - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.ContractHeaderSearchVO	Both		



**Table C-1 (Cont.) Searchable Objects by Product Family**

<b>Product Family</b>	<b>Searchable Object Name</b>	<b>Scope</b>	<b>Notes</b>
	Leads - oracle.apps.marketing.leadMgmt.leadMgmt.publicViewEcsf.MklLeadPVO	Both	
	Opportunities - oracle.apps.sales.opptyMgmt.opportunities.publicViewEcsf.OpportunityPVO	Both	
	Partner Profiles - oracle.apps.partnerFinder.publicViewEcsf.view.PartnerProfilePVO	Focused	
	Partners - oracle.apps.partnerMgmt.partnerCenter.publicViewEcsf.view.PartnerPVO	Global	
	Purchasing Contract Documents - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.PoDocumentSearchVO	Focused	
	Purchasing Contracts - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.PoHeaderSearchVO	Focused	
	References - oracle.apps.sales.baseSales.references.publicViewEcsf.ReferencePVO	Global	
	Sourcing Contract Documents - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.AuctionDocumentSearchVO	Focused	
	Sourcing Contracts - oracle.apps.contracts.dashBoard.textSearch.publicModel.view.AuctionHeaderSearchVO	Focused	
Oracle Fusion Financials	Payables Credit Memo	Global	This searchable object is not available for search.
	Payables Payment	Global	This searchable object is not available for search.
	Payables Prepayment	Global	This searchable object is not available for search.
	Payables Refund	Global	This searchable object is not available for search.
	Payables Standard Invoice	Global	This searchable object is not available for search.
	Receivables Adjustment	Global	This searchable object is not available for search.
	Receivables ChargeBack	Global	This searchable object is not available for search.
	Receivables Credit Memo	Global	This searchable object is not available for search.
	Receivables Debit Memo	Global	This searchable object is not available for search.
	Receivables Invoice	Global	This searchable object is not available for search.

**Table C-1 (Cont.) Searchable Objects by Product Family**

<b>Product Family</b>	<b>Searchable Object Name</b>	<b>Scope</b>	<b>Notes</b>
	Receivables Miscellaneous Receipt	Global	This searchable object is not available for search.
	Receivables Standard Receipt	Global	This searchable object is not available for search.
	Collections Delinquency	Global	This searchable object is not available for search.
	Expense	Global	This searchable object is not available for search.
	Expense Report	Global	This searchable object is not available for search.
	Fixed Asset	Global	This searchable object is not available for search.
	Intercompany Transaction	Global	This searchable object is not available for search.
	Journal	Global	This searchable object is not available for search.
	Miscellaneous Receipt	Global	This searchable object is not available for search.
Oracle Fusion Human Capital Management	Worker	Global	Like Aria.
	Worker	Global	Secure.
Oracle Fusion Procurement	Purchase Requisitions - oracle.apps.prc.por.publicViewEcsf.RequisitionHeaderPVO	Global	
	Purchase Orders - oracle.apps.prc.po.publicViewEcsf.PurchaseOrderHeaderPVO	Global	
	Purchase Agreements - oracle.apps.prc.po.publicViewEcsf.PurchaseAgreementHeaderPVO	Global	
	Negotiations - oracle.apps.prc.pon.publicViewEcsf.NegotiationHeaderPVO	Global	
	Suppliers - oracle.apps.prc.poz.publicViewEcsf.SupplierPVO	Global	
Oracle Fusion Project	ProjectSearchPVO	Global	
	ProjectBudgetSearchPVO	Global	
	ProjectAssetPVO	Global	
	ProjectContractInvoicePVO	Global	
	ProjectEventPVO	Global	
	ProjectExpenditureItemPVO	Global	
	ProjectForecastSearchPVO	Global	
	ProjectTaskPVO	Global	

**Table C-1 (Cont.) Searchable Objects by Product Family**

Product Family	Searchable Object Name	Scope	Notes
Oracle Fusion Supply Chain Management	Orchestration Orders - oracle.apps.scm.doo.workbench.publicViewEcsf.view.OrchestrationOrderPVO	Global	
	Items - oracle.apps.scm.productModel.publicViewEcsf.ItemPVO	Global	
	Cost Adjustments - oracle.apps.scm.costing.distProcessors.reviewDistributions.publicViewEcsf.CostAdjustmentsPVO	Global	
	Material Transactions - oracle.apps.scm.costing.distProcessors.reviewDistributions.publicViewEcsf.MaterialTransactionsPVO	Global	
	Item Costs - oracle.apps.scm.costing.itemCosts.publicViewEcsf.ItemCostsPVO	Global	
	COGS Transactions - oracle.apps.scm.costing.distProcessors.reviewDistributions.publicViewEcsf.CogsTransactionPVO	Global	
	Receiving Transactions - oracle.apps.scm.receiptAccounting.receiptAccounting.reviewAccounting.publicViewEcsf.RecptAcctgPVO	Global	
	Accrual Adjustments - oracle.apps.scm.receiptAccounting.accrualClearing.adjustAccruals.publicViewEcsf.AdjustAccrualsPVO	Global	
	Receipts - oracle.apps.scm.receiving.publicViewEcsf.ReceiptPVO	Global	
	Inbound Shipments - oracle.apps.scm.receiving.publicViewEcsf.InboundShipmentPVO	Global	
Outbound Shipments - oracle.apps.scm.shipping.shipConfirm.deliveries.publicViewEcsf.ShipmentPVO	Global		

## C.2 Search Categories by Product Family

Search categories are logical collections of searchable objects that facilitate group search on related items.

[Table C-2](#) provides a list of search categories available for Oracle Fusion Applications Search. The list is organized by product family and includes the business objects for each search category.

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**Note:** While Oracle Fusion Financials search categories are seeded, they are not available for search. Do not use Oracle Fusion Financials search categories to enable search.

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**Table C-2 Search Categories by Product Family**

<b>Product Family</b>	<b>Search Category Name</b>	<b>Business Object</b>	<b>Scope</b>	
Oracle Fusion Applications Help	Help	TopicSVO	GLOBAL	
Oracle Fusion Customer Relationship Management	All Contracts	Enterprise Contracts	LOCAL	
		Purchasing Contracts		
		Sourcing Contracts		
		Campaigns	Campaigns	GLOBAL
		Competitors	Competitors	GLOBAL
		Contacts	Contacts	GLOBAL
		Contract Documents	Sourcing Contract Documents	LOCAL
		Purchasing Contract Documents		
		Contract Documents		
	Customer	Customer Interactions	LOCAL	
		Contacts		
		Billing Accounts		
		Customer Assessments		
		Customer Contracts		
		Customer Profiles		
		Customer References		
		Customer Opportunities		
		Customer Notes		
		Customer Leads		
	Customers	Customer Profiles	GLOBAL	
	Contacts			
	Customer Assessments			
	Customer Notes			
	Billing Accounts			
	Customer Interactions			
ECM Contracts	Enterprise Contracts	GLOBAL		
Lead	Leads	LOCAL		
Leads	Leads	GLOBAL		
Opportunities	Opportunities	GLOBAL		
Opportunity	Opportunities	LOCAL		
Partners	Partners	GLOBAL		
Public Partners	Public Partners	LOCAL		
References	References	GLOBAL		

**Table C-2 (Cont.) Search Categories by Product Family**

<b>Product Family</b>	<b>Search Category Name</b>	<b>Business Object</b>	<b>Scope</b>
Oracle Fusion Financials	Payables	Payables Standard Invoice	GLOBAL
		Payables Payment	
		Payables Credit Memo	
		Payables Prepayment	
		Payables Refund	
	Expenses	Expense Report	GLOBAL
		Expense	GLOBAL
	Fixed Assets	Fixed Asset	GLOBAL
	General Accounting	Journal	GLOBAL
		InterCompany Transaction	GLOBAL
	Account Receivables	Receivables Invoice	GLOBAL
		Receivables Miscellaneous Receipt	GLOBAL
		Receivables Receipt	GLOBAL
		Receivables Credit Memo	GLOBAL
		Receivables Debit Memo	GLOBAL
		Receivables Adjustments	GLOBAL
		Receivables ChargeBack	GLOBAL
		Collections	Collections Delinquency
	Oracle Fusion Human Capital Management	Worker	Worker
Global Worker			GLOBAL
Oracle Fusion Partner Relationship Management	Partners	PartnerProfileSVO	
Oracle Fusion Procurement	Procurement	Purchase Requisitions	GLOBAL
		Purchase Agreements	GLOBAL
		Purchase Orders	GLOBAL
		Negotiations	GLOBAL
		Suppliers	GLOBAL
Oracle Fusion Project	Projects	Project	GLOBAL
		Project Task	GLOBAL
		Project Asset	GLOBAL
		Project Contract Invoice	GLOBAL
		Project Budget Version	GLOBAL
		Project Forecast Version	GLOBAL
		Project Event	GLOBAL
		Project Expenditure Item	GLOBAL
Oracle Fusion Supply Chain Management	Cost Accounting	Cost Adjustments	GLOBAL

**Table C-2 (Cont.) Search Categories by Product Family**

Product Family	Search Category Name	Business Object	Scope
		Material Transactions	GLOBAL
		COGS Transactions	GLOBAL
		Item Costs	GLOBAL
	Receipt Accounting	Receiving Transactions	GLOBAL
		Accrual Adjustments	GLOBAL
	Orchestration Order	Orchestration Orders	GLOBAL
	Receiving	Receipts	GLOBAL
		Inbound Shipments	GLOBAL
	Shipping	Outbound Shipments	GLOBAL
	Items	Items	GLOBAL

### C.3 Index Schedules by Product Family

Index schedules define the frequency at which the Oracle Secure Enterprise Search search engine crawls the searchable objects in Oracle Fusion Applications and indexes them as documents.

The following tables provide a list of index schedules available for Oracle Fusion Applications Search. The tables are organized by product family.

- [Table C-3, " Index Schedules for Oracle Fusion Customer Relationship Management"](#)
- [Table C-4, " Index Schedules for Oracle Fusion Applications Help"](#)
- [Table C-5, " Index Schedules for Oracle Fusion Human Capital Management"](#)
- [Table C-6, " Index Schedules for Personal Information Manager \(PIM\)"](#)
- [Table C-7, " Index Schedules for Oracle Fusion Procurement"](#)
- [Table C-8, " Index Schedules for Oracle Fusion Project"](#)
- [Table C-9, " Index Schedule for Oracle Fusion Supply Chain Management"](#)

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**Note:** While Oracle Fusion Financials index schedules are seeded, they are not available for search. Do not use Oracle Fusion Financials index schedules to enable search.

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**Table C-3 Index Schedules for Oracle Fusion Customer Relationship Management**

Schedule Name	Searchable Object	Business Object	Repeat Interval
Campaigns	Campaigns	oracle.apps.marketing.coreMarketing.campaigns.publicViewEcsf.CampaignsPVO	Manual
Competitors	Competitors	oracle.apps.sales.baseSales.competitors.publicViewEcsf.CompetitorPVO	Manual
Contacts	Contacts	oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerContactPVO	Manual
Contract Documents	Contract Documents	oracle.apps.contracts.dashboard.textSearch.publicModel.view.ContractDocumentSearchVO	Manual
Customer Assessments	Customer Assessments	oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerAssessmentPVO	Manual
Billing Accounts	Billing Accounts	oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerAccountPVO	Manual
Customer Contracts	Customer Contracts	oracle.apps.contracts.dashboard.textSearch.publicModel.view.Customer360ContractPVO	Manual
Customer Interactions	Customer Interactions	oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerInteractionPVO	Manual
Customer Leads	Customer Leads	oracle.apps.marketing.leadMgmt.leads.publicViewEcsf.MklCustomer360LeadPVO	Manual
Customer Notes	Customer Notes	oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerNotePVO	Manual
Customer Opportunities	Customer Opportunities	oracle.apps.sales.opptyMgmt.opportunities.publicViewEcsf.Customer360OpportunityPVO	Manual
Customer References	Customer References	oracle.apps.sales.baseSales.references.publicViewEcsf.Customer360ReferencePVO	Manual
Customer Profiles	Customer Profiles	oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerPVO	Manual
Enterprise Contracts	Enterprise Contracts	oracle.apps.contracts.dashboard.textSearch.publicModel.view.ContractHeaderSearchVO	Manual

**Table C-3 (Cont.) Index Schedules for Oracle Fusion Customer Relationship Management**

Schedule Name	Searchable Object	Business Object	Repeat Interval
Leads	Leads	oracle.apps.marketing.leadMgmt.leads.publicViewEcsf.MkLeadPVO	Manual
Opportunities	Opportunities	oracle.apps.sales.opptyMgmt.opportunities.publicViewEcsf.OpportunityPVO	Manual
Partner Profiles	Partner Profiles	oracle.apps.partnerFinder.publicViewEcsf.view.PartnerProfilePVO	Manual
Partners	Partners	oracle.apps.partnerMgmt.partnerCenter.publicViewEcsf.view.PartnerPVO	Manual
Purchasing Contracts	Purchasing Contracts	oracle.apps.contracts.dashboard.textSearch.publicModel.view.PoHeaderSearchVO	Manual
References	References	oracle.apps.sales.baseSales.references.publicViewEcsf.ReferencePVO	Manual
Sourcing Contracts	Sourcing Contracts	oracle.apps.contracts.dashboard.textSearch.publicModel.view.AuctionHeaderSearchVO	Manual

**Table C-4 Index Schedules for Oracle Fusion Applications Help**

Schedule Name	Searchable Object	Business Object	Repeat Interval
Help Schedule	TopicSearch	oracle.apps.atk.helpPortal.publicView.TopicSearchVO	Manual

**Table C-5 Index Schedules for Oracle Fusion Human Capital Management**

Schedule Name	Searchable Object	Business Object	Repeat Interval
All Workers Schedule	GlobalWorker	GlobalWorkerPVO	Manual
My Reports Schedule	Worker	WorkderPVO	Manual

**Table C-6 Index Schedules for Personal Information Manager (PIM)**

Product	Schedule Name	Search Category	Business Object	Repeat Interval
Product Management	Items Schedule	Items	oracle.apps.scm.productModel.publicViewEcsf.ItemPVO	Manual



**Table C-7 Index Schedules for Oracle Fusion Procurement**

Schedule Name	Searchable Object	Business Object	Repeat Interval
Negotiations Schedule	Negotiations	NegotiationsPVO	Manual
Purchase Agreement Schedule	Purchase Agreements	PurchaseAgreementPVO	Manual
Purchase Order Schedule	Purchase Orders	PurchaseOrderPVO	Manual
Purchase Requisition Schedule	Purchase Requisitions	PurchaseRequisitionPVO	Manual
Suppliers Schedule	Suppliers	SuppliersPVO	Manual

**Table C-8 Index Schedules for Oracle Fusion Project**

Schedule Name	Searchable Object	Business Object	Repeat Interval	Repeat Interval Unit	Schedule Launch Interval	Schedule Launch Time
Projects	ProjectSearch	ProjectSearchPVO	1	Daily		12:00 AM
Project Assets	ProjectAsset	ProjectAssetPVO	1	Weekly	Saturday	12:00 PM
Project Budgets	ProjectBudgetSearch	ProjectBudgetSearchPVO	1	Daily		12:00 AM
Project Contract Invoices	ProjectContractInvoice	ProjectContractInvoicePVO	2	Weekly	Saturday	12:00 PM
Project Events	ProjectEvent	ProjectEventPVO	2	Weekly	Saturday	12:00 PM
Project Expenditure Items	ProjectExpenditureItem	ProjectExpenditureItemPVO	1	Daily		12:00 AM
Project Forecasts	ProjectForecastSearch	ProjectForecastSearchPVO	1	Daily		12:00 AM
Project Tasks	ProjectTask	ProjectTaskPVO	1	Daily		12:00 AM

**Table C-9 Index Schedule for Oracle Fusion Supply Chain Management**

Schedule Name	Product	Search Category	Business Object	Repeat Interval
Inbound Schedule	Receiving	Receiving	oracle.apps.scm.receiving.publicViewEcsf.InboundShipmentPVO	Manual
Receipt Schedule	Receiving	Receiving	oracle.apps.scm.receiving.publicViewEcsf.ReceiptPVO	Manual
Shipping Schedule	Shipping	Shipping	oracle.apps.scm.shipping.shipConfirm.deliveries.publicViewEcsf.ShipmentPVO	Manual
Orchestration Orders Schedule	DOO	Orchestration Orders	oracle.apps.scm.doo.workbench.publicViewEcsf.view.OrchestrationOrderPVO	Manual

**Table C–9 (Cont.) Index Schedule for Oracle Fusion Supply Chain Management**

Schedule Name	Product	Search Category	Business Object	Repeat Interval
Cost Adjustments Schedule	Cost Management	Cost Accounting	oracle.apps.scm.costing.distProcessors.reviewDistributions.publicViewEcsf.CostAdjustmentsPVO	Manual
Cogs Transactions Schedule	Cost Management	Cost Accounting	oracle.apps.scm.costing.distProcessors.reviewDistributions.publicViewEcsf.CogsTransactionPVO	Manual
Material Transactions Schedule	Cost Management	Cost Accounting	oracle.apps.scm.costing.distProcessors.reviewDistributions.publicViewEcsf.MaterialTransactionsPVO	Manual
Item Costs Schedule	Cost Management	Cost Accounting	oracle.apps.scm.costing.itemCosts.publicViewEcsf.ItemCostsPVO	Manual
Accrual Adjustments Schedule	Cost Management	Receipt Accounting	oracle.apps.scm.receiptAccounting.accrualClearing.adjustAccruals.publicViewEcsf.AdjustAccrualsPVO	Manual
Receiving Transactions Schedule	Cost Management	Receipt Accounting	oracle.apps.scm.receiptAccounting.reviewAccounting.publicViewEcsf.RecptAcctgPVO	Manual

## C.4 Facets by Product Family

Facets are predefined aspects, or dimensions, of a searchable object. Facet-based navigation of the search results, or Faceted Navigation, allows end users to narrow down their search by navigating through structured search results.

[Table C–10](#) provides a list of facets available for Oracle Fusion Applications Search. The list is organized by product family and includes the facets for each search category.

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**Note:** While Oracle Fusion Financials facets are predefined, they are not available for search. Do not use Oracle Fusion Financials facets to enable search.

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**Table C-10 Facets by Product Family**

<b>Product Family</b>	<b>Search Category</b>	<b>Facet</b>
Oracle Fusion Customer Relationship Management		oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerInteractionPVO
		oracle.apps.customerCenter.infrastructure360.publicViewEcsf.CustomerNotePVO
		oracle.apps.sales.opptyMgmt.opportunities.publicViewEcsf.OpportunityPVO
Oracle Fusion Supply Chain Management	Shipping	oracle.apps.scm.shipping.shipConfirm.deliveries.publicViewEcsf.ShipmentPVO
	Receiving	oracle.apps.scm.receiving.publicViewEcsf.ReceiptPVO
		oracle.apps.scm.receiving.publicViewEcsf.InboundShipmentPVO
	Projects	oracle.apps.projects.foundation.publicView.ecsf.ProjectAssetPVO
		oracle.apps.projects.foundation.publicView.ecsf.ProjectBudgetSearchPVO
		oracle.apps.projects.foundation.publicView.ecsf.ProjectContractInvoicePVO
		oracle.apps.projects.foundation.publicView.ecsf.ProjectEventPVO
		oracle.apps.projects.foundation.publicView.ecsf.ProjectExpenditureItemPVO
		oracle.apps.projects.foundation.publicView.ecsf.ProjectForecastSearchPVO



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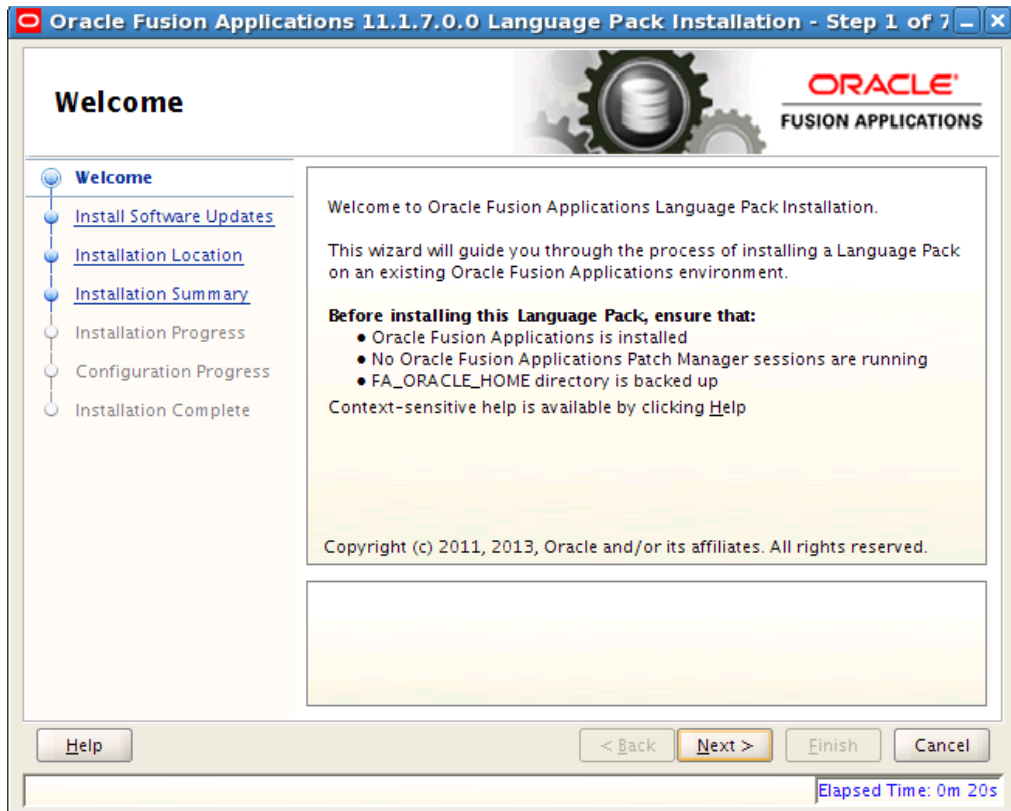
## Language Pack Installer Screens

This appendix presents the Language Pack Installer screens and describes their purpose.

This appendix describes the following screens:

- [Welcome](#)
- [Install Software Updates](#)
- [Installation Location](#)
- [Installation Summary](#)
- [Installation Progress](#)
- [Configuration Progress](#)
- [Installation Complete](#)

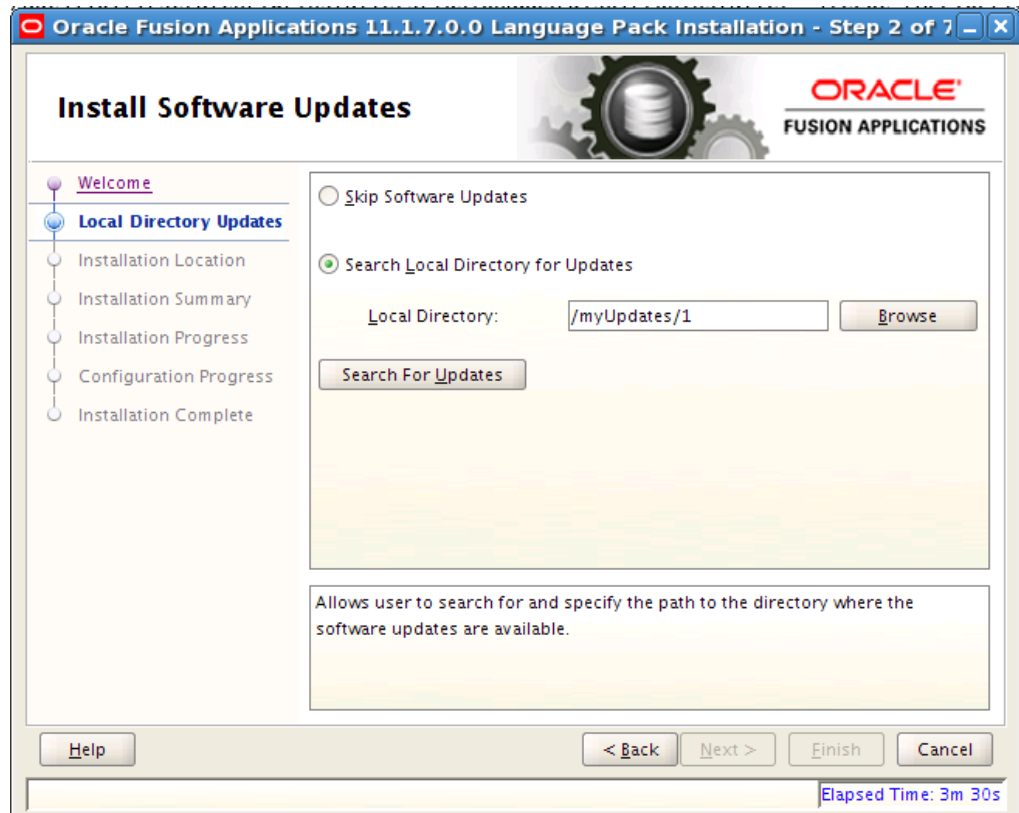
## D.1 Welcome



This screen appears each time you start Language Pack Installer. This screen does not appear if you restart Language Pack Installer after a failure. The standard Welcome screen is read-only. It contains a navigation pane on the left-hand side that summarizes the tasks the installer will take. Each item in the pane represents an installer screen, which contains prompts for the necessary information.

Click **Next** to continue.

## D.2 Install Software Updates



Appears when you start Language Pack Installer. This screen does not appear if you supplied the `-nocheckforupdates` option, or after the installer restarts itself automatically after applying an installer patch. The screen displays two options:

- Skip Software Updates
- Search Local Directory for Updates

Select **Search Local Directory for Updates** and **Browse** to the `SHARED_LOCATION/11.1.7.0.0_post_repo_patches/installer` directory. Then click **Search for Updates** to display the patch number and the type of patch.

Select **Skip Software Updates** if there are no installer patches, in which case the `SHARED_LOCATION/11.1.7.0.0_post_repo_patches/installer` directory is empty.

Click **Next** to continue.

## D.3 Installation Location



Specify the location of the existing Oracle Fusion Applications home (*FA\_ORACLE\_HOME*) where you want to install the language.

Click **Next** to continue.



## D.4 Installation Summary

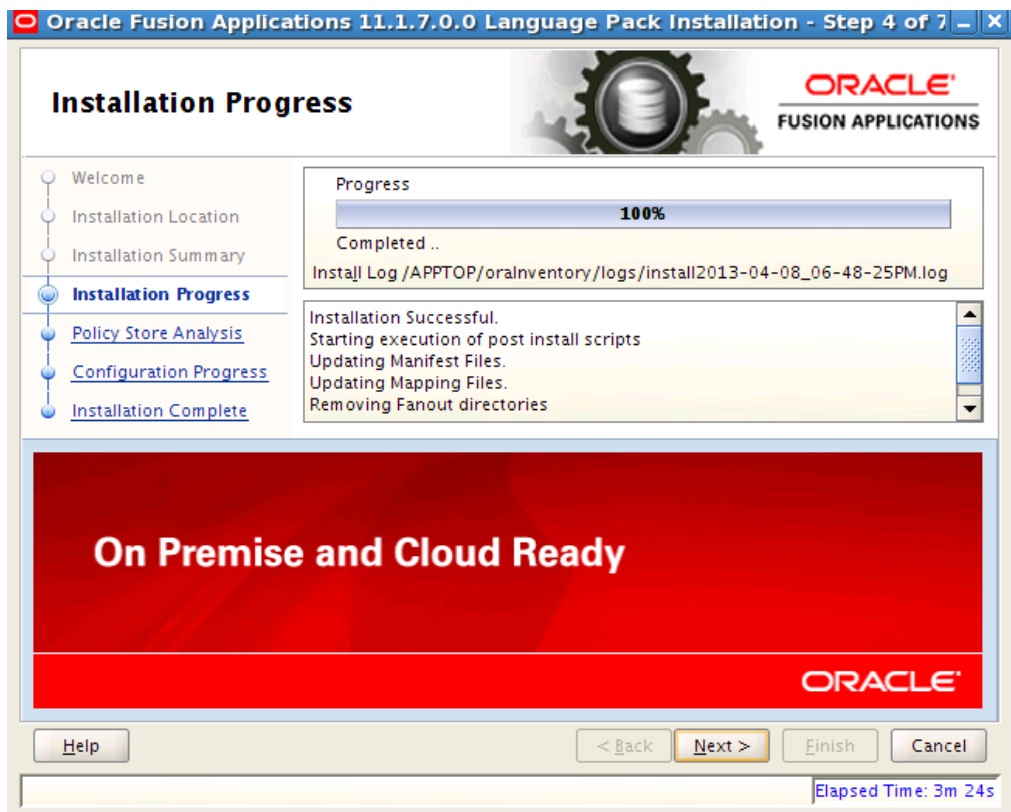


Summarizes the selections you made during this installation session. It includes the Oracle home, required and available disk space, and the language to be installed. Review the information displayed to ensure that the installation details are what you intend.

To make changes before installing, click **Back** to return to previous screens in the interview.

Click **Install** to start installing this language.

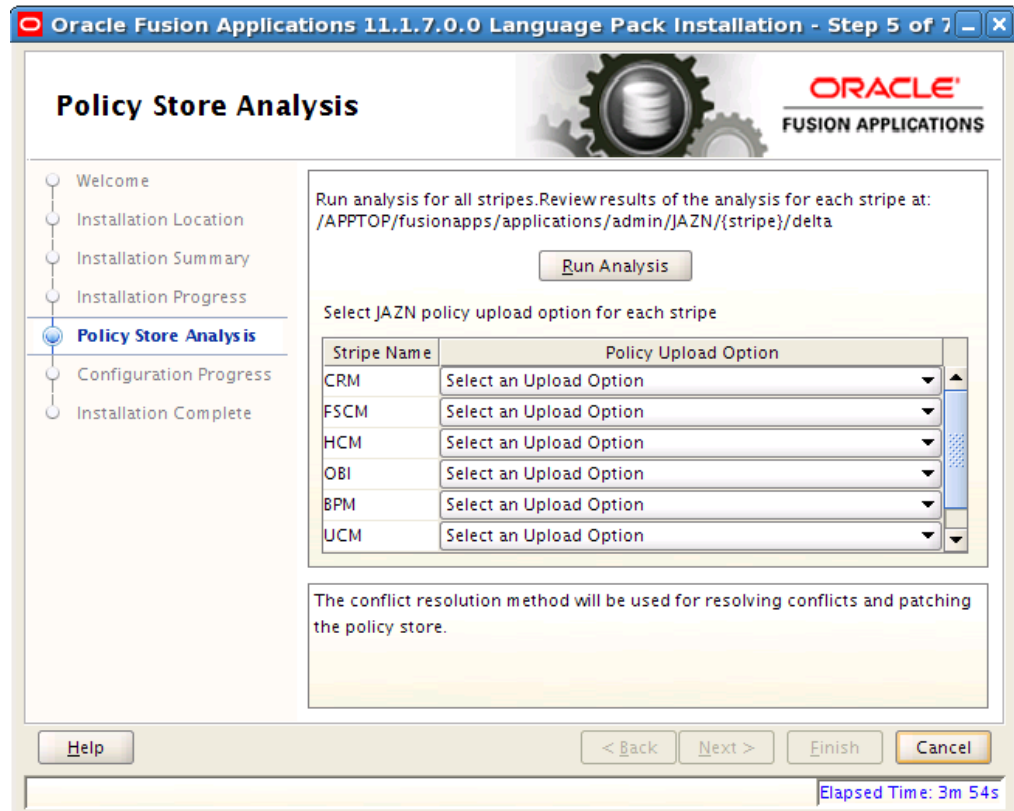
## D.5 Installation Progress



Displays a progress indicator that shows the percentage of the installation that is complete and indicates the location of the installation log file. The installation task consists of copying files from the Language Pack to the appropriate Oracle homes.

When the installation progress indicator shows 100 percent, click **Next** to continue.

## D.6 Policy Store Analysis




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**Note:** This screen displays only when the `J-DuplicateJAZNPolicyStore` option is set to `true` with the `runInstaller` command.

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Analysis is available for the following policy store stripes: `hcm`, `crm`, `fscm`, `soa`, `ucm`, `bpm`, and `obi`. Select the stripes to be analyzed and then click **Run Analysis** to identify any conflicts or deletions. Only the stripes that are included in the language pack are enabled for analysis and the analysis could run for several minutes. After the analysis runs, review the results of the analysis to determine which deployment method you want Language Pack Installer to use for policy store changes to each stripe. Oracle recommends that you select **Apply safe changes only**. This is the safest method unless you have read and totally understood the consequences of the other three options. If you decide to resolve the conflicts or deletions before the actual JAZN upload from Language Pack Installer, you should run the Policy Store Analysis step again to get the most accurate analysis report. The choices for deployment method are:

- Apply safe changes only (choose this method if there are no conflicts).
- Apply all changes and overwrite customizations (not available for `soa`, `ucm`, and `bpm` stripes).
- Append additive changes.
- Manually resolve conflicts and upload changes using Authorization Policy Manager.

If you choose **Apply safe changes only** or **Append additive changes**, then you must review the results of the analysis to manually upload any changes not applied by

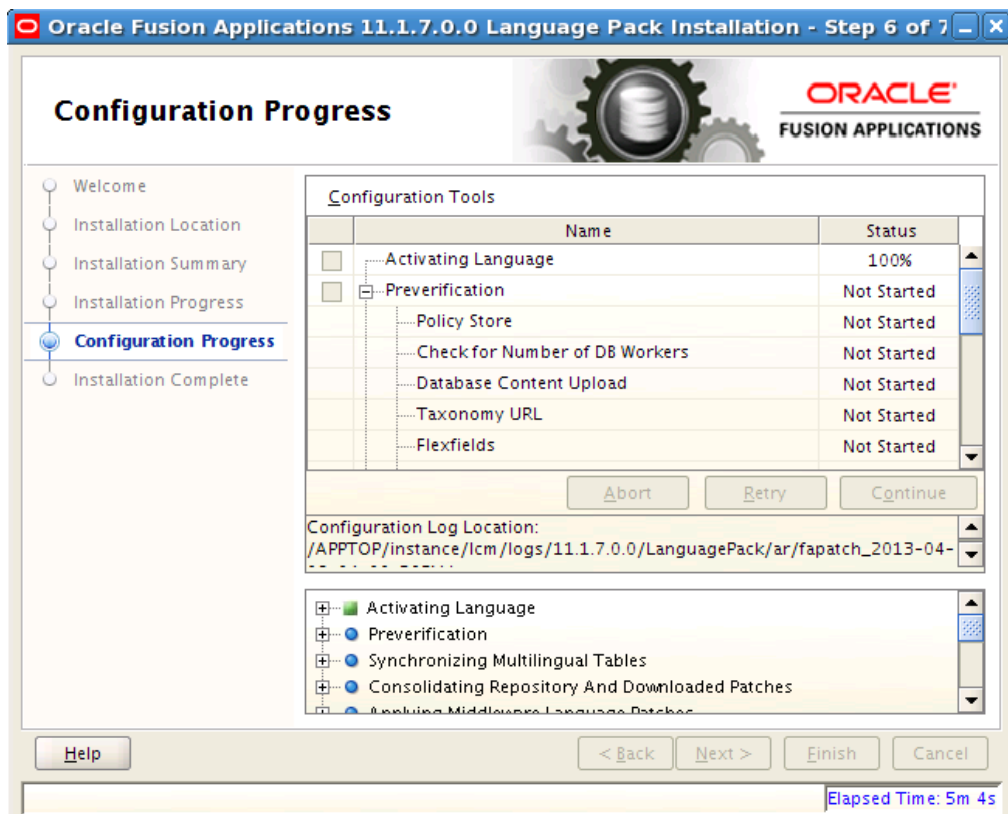
Language Pack Installer with the choice you selected, after the installation is complete. If you choose **Apply all changes and overwrite customizations**, then you may need to reapply the customizations that are overwritten after the installation is complete. If you choose one of these options, click **Next** after you make your selection.

If you choose **Manually resolve conflicts and upload changes using Authorization Policy Manager (APM)**, you must pause the installation while you bring up the APM application and upload the changes. For more information, see the "Upgrading Oracle Fusion Applications Policies" chapter in the *Oracle Fusion Middleware Oracle Authorization Policy Manager Administrator's Guide (Oracle Fusion Applications Edition)*. Note the location of the following files:

- Baseline file: `FA_ORACLE_HOME/admin/JAZN/stripes/baseline`
- Patch file for fscm, crm, and hcm stripes: `FA_ORACLE_HOME/stripes/deploy/system-jazn-data.xml`
- Patch file for the obi, ucm, soa, and bpm stripes: `FA_ORACLE_HOME/com/acr/security/jazn/bip_jazn-data.xml`

When you complete this task in APM, shut down the APM application, return to Language Pack Installer, and click **Next**.

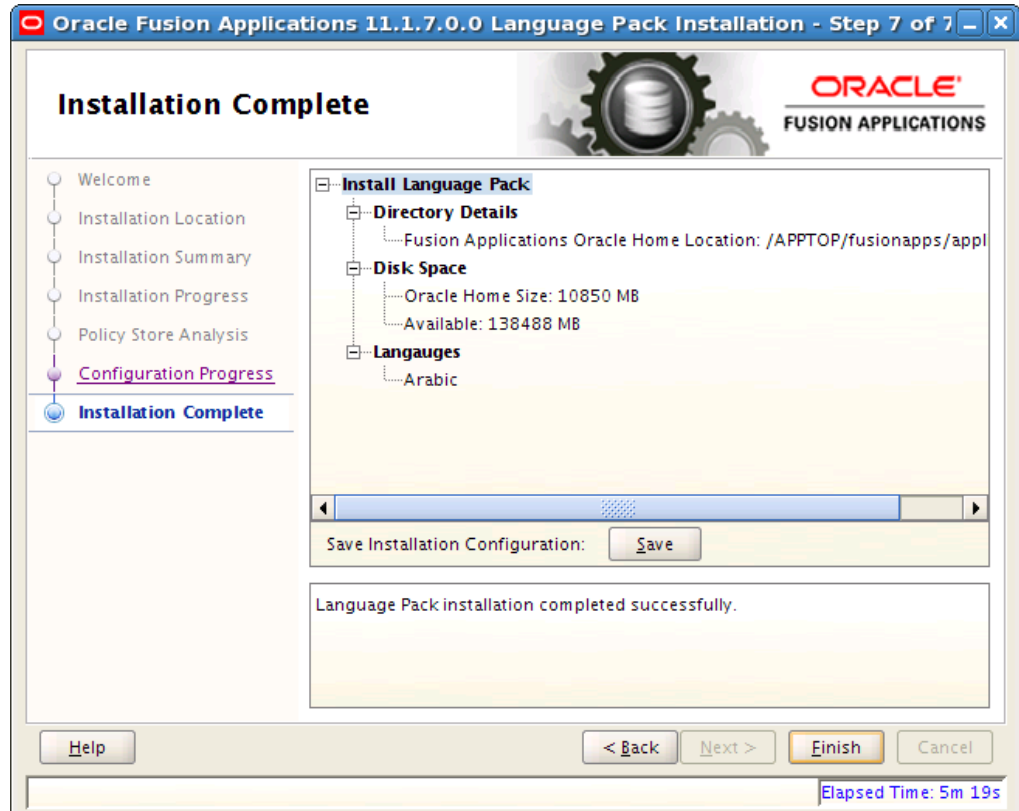
## D.7 Configuration Progress



Displays a progress indicator that shows the percentage of the configuration that is complete. It displays each configuration assistant in the message pane as it is performed. Configuration assistants that could be included in the configuration phase are described in "Language Pack Installer Configuration Assistants" in the *Oracle Fusion Applications Upgrade Guide*.

No additional user action is required in the Configuration Progress screen unless a failure occurs. For more information, see "General Troubleshooting During the Configuration Phase in GUI Mode" in the Oracle Fusion Applications Upgrade Guide.

## D.8 Installation Complete



Summarizes the installation just completed. If you want to save this configuration to a response file, click **Save**. For more information, see "How Response Files Work" in the *Oracle Database Installation Guide 11g Release 2 (11.2) for Linux*.

To complete a successful installation, click **Finish**. The **Finish** button is activated only if all mandatory tasks completed successfully. If you want to rerun this session after you resolve failed tasks, click **Cancel**.



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# Glossary

## **abstract role**

An enterprise role that can be associated with any user, irrespective of his or her job or duties. Typical examples of this role are Employee, Manager, Customer, and Supplier. Several job roles are provisioned with each Oracle Fusion application. An abstract role *must* inherit at least a **duty role**.

## **Active Session History (ASH)**

See [ASH](#).

## **ADDM**

Automatic Database Diagnostic Monitor. Analyzes statistics to provide automatic diagnosis of major performance problems.

## **Administration Server**

Part of the [Oracle WebLogic Server domain](#) and runs the processes that manage Oracle Business Intelligence components. The Administration Server includes the Oracle WebLogic Server Administration Console, Oracle Fusion Middleware Control, and JMX MBeans. For a Simple Install type, the Administration Server also includes Java components for Oracle Business Intelligence such as Oracle BI Publisher and Oracle Real-Time Decisions.

## **ADR**

Automatic Diagnostic Repository. A file-based repository that stores database diagnostic data such as trace files, the alert log, and Health Monitor reports. It enables customers and Oracle Support to correlate and analyze diagnostic data across multiple Oracle instances, components, and products. ADR is located outside the database, which enables Oracle Database to access and manage ADR when the physical database is unavailable. An instance can create ADR before a database has been created.

## **adrci**

Automatic Diagnostic Repository Command Interpreter. A standard incident administration tool, you can use it for viewing and packaging incidents. It is provided with each instance of the Automatic Diagnostic Repository (ADR) in Oracle Fusion Applications, Oracle Fusion Middleware, and Oracle Database.

## **Advanced Queuing (AQ)**

See [AQ](#).

**aggregate storage option (ASO)**

See [ASO](#).

**API**

Application Programming Interface. A set of exposed data structures and functions that an application can use to invoke services on an application object, such as a portlet.

**application programming interface (API)**

See [API](#).

**application role**

A configuring role which is a collection of users, enterprise roles, and application roles, and is stored in the domain policy store.

**AQ**

Advanced Queuing. AQ provides database-integrated message queuing functionality. It leverages the functions of the Oracle database so that messages can be stored persistently, propagated between queues on different machines and databases, and transmitted using Oracle Net Services, HTTP (S), and SMTP.

**ASH**

Active Session History. Active Session History (ASH) statistics are samples of session activity in the database. The database samples active sessions every second and stores them in a circular buffer in the System Global Area (SGA). Any session that is connected to the database and using CPU, or is waiting for an event that does not belong to the idle wait class, is considered an active session

**ASO**

Aggregate Storage Option. The option to use Aggregate Storage as opposed to Block Storage.

**automatic memory management**

A database memory-management mode whereby the database dynamically tunes the sizes of the individual SGA components and the sizes of the individual [Program Global Area \(PGA\)](#).

**automatic PGA memory management**

A database memory-management mode whereby you set a target size for the instance PGA. The database then tunes the size of the instance [PGA](#) to your target, and dynamically tunes the sizes of individual PGAs.

**automatic shared memory management**

A database memory-management mode whereby you set target and maximum sizes for the SGA. Oracle Database then tunes the total size of the SGA to your designated target, and dynamically tunes the sizes of all SGA components. In this memory management mode, you also implicitly enable automatic PGA memory management.

**Automatic Database Diagnostic Monitor (ADDM)**

See [ADDM](#).

**Automatic Diagnostic Repository (ADR)**

See [ADR](#).



**Automatic Diagnostic Repository Command Interpreter (adrci)**

See [adrci](#).

**Automatic Workload Repository (AWR)**

See [AWR](#).

**AWR**

Automatic Workload Repository. Automates database statistics gathering by collecting, processing, and maintaining performance statistics for database problem detection and self-tuning purposes.

**AWR snapshot**

A set of data for a specific time that is used for performance comparisons.

**BHD**

Bounce Handling Daemon. A daemon that tracks e-mail messages that cannot be delivered, parses the returned e-mail messages, and records the cause of the e-mail bounce.

**bounce handling daemon (BHD)**

See [BHD](#).

**BPEL**

Business Process Execution Language. An XML-based markup language for composing a set of discrete web services into an end-to-end process flow.

**BSO**

Block storage option. The option to use block storage as opposed to aggregate storage.

**Business Process Execution Language (BPEL)**

See [BPEL](#).

**business role**

See [job role](#).

**CA**

Certificate Authority. A trusted third party that issues, renews, and revokes digital certificates. The CA essentially vouches for a entity's identity, and may delegate the verification of an applicant to a Registration Authority (RA). Some well known Certificate Authorities (CAs) include Digital Signature Trust, Thawte, and VeriSign.

**Certificate Authority (CA)**

See [CA](#).

**Click -Through Daemon (CTD)**

See [CTD](#).

**Common Unix Printing Service (CUPS)**

See [CUPS](#).

**CRM**

Customer relationship management. A portfolio of CRM solutions that addresses customer touch-points and provides functionality to support an organization's business needs.

**CSF**

Credential store framework. A set of APIs that applications can use to create, read, update, and manage credentials securely. A typical use of the credential store is to store credentials (user name and password) to access some external system, such as a database or an LDAP-base repository.

**CSR**

Customer Service Representative. Customer service representatives resolve low risk customer issues originating from customer calls. CSRs have limited access to OAAM Admin.

**credential store framework (CSF)**

See [CSF](#).

**CTD**

Click -Through Daemon. It passes details about the HTTP requests it serviced (tracked URLs, Forward to a Friend and so on) to the Marketing Server through SOAP protocol. The communication between the CTD and the Marketing Server requires you to define a way for the SOAP messages top ass through the inner DMZ firewall.

**CUPS**

Common Unix Printing Service. A modular printing system for Unix-like computer operating systems which allows a computer to act as a print server.

**customer relationship management (CRM)**

See [CRM](#).

**customer service representative (CSR)**

See [CSR](#)

**DAL**

Data Access Layer. A layer which provides simplified access to data stored in persistent storage, such as a database.

**Data Access Layer (DAL)**

See [DAL](#)

**data role**

An enterprise role used exclusively in data security policies. It can inherit job roles, duty roles, and abstract roles. Several data roles are provisioned with each Oracle Fusion application.

**data security policy**

An Oracle Fusion application policy which includes a condition that identifies a row or a set of rows in a business object, and the privileges the data security grants are for *only* the data that meets the condition. Data security policies are stored in the transactional database.

**Database Administrator (DBA)**

See [DBA](#).

**DBA**

Database Administrator. A user belonging to the DBA group. By default, members in the DBA group have access to all Oracle Portal product pages, and have the Manage privilege for all pages, page groups, database providers, and administration.

**diagnostic administrator job role**

A [job role](#) which can use all diagnostic testing functionality provided for Oracle Fusion applications, including purging test results from the database and canceling test runs started by other users.

**diagnostic advanced user job role**

A [job role](#) which can schedule and execute diagnostic test runs, view diagnostic test results, attach test results to application incidents for Oracle Fusion applications, and cancel diagnostic test runs that were started by the current user. In general, this job role is recommended for running Oracle Fusion Applications diagnostic tests, since its added capabilities allow users to work with administrators more flexibly during troubleshooting.

**diagnostic regular User job role**

A [job role](#) which can schedule and execute diagnostic test runs, view diagnostic test results for Oracle Fusion applications, and cancel diagnostic test runs that were started by the current user.

**diagnostic viewer job role**

A [job role](#) which can view and analyze diagnostic test results for Oracle Fusion applications.

**Distinguished Names (DN)**

See [DN](#).

**distributed**

The term for any environment that is not a non-distributed environment.

**DMS**

Dynamic Monitoring Service. Enables Oracle Fusion Middleware components to provide administration tools, such as Oracle Enterprise Manager, with data regarding the component's performance, state and on-going behavior. Fusion Middle components push data to DMS and in turn DMS publishes that data through a range of different components. Specifically, DMS is used by Oracle HTTP Server, Oracle Application Development Framework, WebLogic Diagnostic Framework (WLDF), and JDBC. DMS measures and reports metrics, trace events and system performance and provides a context correlation service for these components.

**DN**

Distinguished Names. Common entries between the source and destination directories.

**duty role**

An application role that corresponds with the duties of the job.

### **Dynamic Monitoring Service (DMS)**

See [DMS](#).

### **EAR**

Enterprise Archive file. A Java EE archive file that is used in deploying applications on a Java EE application server. WebCenter Portal applications are deployed using both a generic EAR file, which contains the application and the respective runtime customization, and a targeted EAR file, which contains only the application for deployment to the application server. EAR files simplify application deployment by reducing the possibility of errors when moving an application from development to test, and test to production.

### **ECID**

Execution Context Identifier. A global unique identifier and a sequence number of the thread of execution that the originating component participates in. The identifier can be used to correlate messages from several components that may be involved in the same thread of execution.

### **EDN**

Event Delivery Network. A type of queue used for event Propagation. EDN uses Advanced Queuing (AQ) database queues.

### **EJB**

Enterprise Java Beans. It is the server-side component architecture for Java Platform, Enterprise Edition (Java EE). EJB technology enables rapid and simplified development of distributed, transaction, secure and portable applications based on Java Technology.

### **Email Sending Daemon (ESD)**

See [ESD](#).

### **Enterprise Archive file (EAR)**

See [EAR](#).

### **enterprise group**

The term used for enterprise roles in the Oracle WebLogic Administration Console.

### **Enterprise Java Beans (EJB)**

See [EJB](#).

### **enterprise role**

A configuring role which is a collection of users and other enterprise roles. It is stored in the domain identity store.

### **Enterprise Scheduler Application (ESSAPP)**

See [ESSAPP](#).

### **ESD**

Email Sending Daemon. Assembles each outbound email message for a campaign using the email template (HTML or text) and the recipient list, and then sends each message to your company's outbound MTAs for delivery.

**ESSAPP**

Enterprise Scheduler Application. The Oracle Enterprise Scheduler Application manages job requests for the Oracle Fusion Financials product family.

**ETL**

Extract, Transform, and Load. ETL refers to the methods involved in accessing and manipulating source data and loading it into a data warehouse. The order in which these processes are performed varies. Note that ETT (extraction, transformation, transportation) and ETM (extraction, transformation, move) are sometimes used instead of ETL.

**Event Delivery Network (EDN)**

See [EDN](#).

**exclusive binding mode**

A method of binding a work assignment to a request processor in which job requests specialized to the work assignment are processed exclusively by that work assignment when it is active. These job requests are excluded from all other work assignments, including the default work assignment. If the work assignment does not have an active workshift, then the job request can be processed by another work assignment.

**Execution Context Identifier (ECID)**

See [ECID](#).

**External roles**

The term used for enterprise roles in the Oracle Authorization Policy Manager environment.

**extract, transform, and load (ETL)**

See [ETL](#).

**farm**

A collection of components managed by Fusion Applications control. It can contain an Oracle WebLogic Server Domain, one Administration Server, one or more Managed Servers, clusters, and the Oracle Fusion Middleware components that are installed, configured, and running in the domain.

**FAST**

Find, assess, secure, test. A methodology required during data masking.

**Find, assess, secure, test (FAST)**

See [FAST](#).

**FND Grant**

Foundation Grant. A data security policy, which ties a data role or job role to a specific set of data.

**Foundation Grant (FND Grant)**

See [FND Grant](#).

**full-movement scenario**

A scenario that may occur when moving Oracle Fusion Applications components from one environment to another. In a full-movement scenario, the target environment does

not exist. First, the source environment is created, configured, customized, and tested. Then, the target environment is created by moving all the components along with their configurations from the source environment.

**functional policy**

An Oracle Fusion application policy which does *not* include a condition. Instead, a function policy assigns permission to resources or code artifacts (such as task flows, pages, Java methods, or UI components) and grants a specific set of actions on each resource. Functional policies are stored in the domain policy store.

**global policy attachment (GPA)**

See [GPA](#).

**global unique identifier (GUID)**

See [GUID](#).

**GPA**

Global Policy Attachment. A policy set in which policies are attached globally to a range of endpoints of the same type. By using GPA, you can ensure that all subjects are secured by default.

**GUID**

Global unique identifier. An identifier generated by the system and inserted into an entry when the entry is added to the directory. In a multimaster replicated environment, the GUID, not the DN, uniquely identifies an entry. The GUID of an entry cannot be modified by a user.

**IDE**

Integrated Development Environment. A visual application development tool containing editors, debuggers, screen painters, object browsers, and the like. Oracle JDeveloper is an example of an IDE.

**initialization parameter file**

A text file that can be read by the Oracle instance, but it is not written to by the instance. You can change a text initialization parameter file with a text editor, but changes do not take effect until you restart the Oracle instance. When you start the instance with this type of file, you can still change many initialization parameters dynamically with Database Control, but only for the current instance. Unless you also edit the text initialization parameter file and make the same change, the change is lost when you restart the database instance.

**Integrated Development Environment (IDE)**

See [IDE](#).

**Internet Printing Protocol (IPP)**

See [IPP](#).

**IPP**

Internet Printing Protocol. A standard network protocol for remote printing as well as for managing print jobs, media size, resolution, and so forth.

**Java EE**

Also known as Java EE 5. Java Enterprise Edition 5 Platform. A platform that enables application developers to develop, deploy, and manage multitier, server-centric, enterprise-level applications. The Java EE platform offers a multi-tiered distributed application model, integrated XML-based data interchange, a unified security model, and flexible transaction control. You can build your own Java EE portlets and expose them through web producers.

**Java EE applications**

Applications that run in Java Enterprise Edition (Java EE).

**Java Message Service (JMS)**

See [JMS](#).

**Java Required Files (JRF)**

See [JRF](#).

**Java Virtual Machine (JVM)**

See [JVM](#).

**JKS keystore**

The default JDK implementation of Java keystores.

**JMS**

Java Message Service. A Java API that allows applications to create, send, receive, and read messages using reliable, asynchronous, loosely coupled communication.

**job role**

An enterprise role that corresponds with a job or business occupation. A Job role *must* inherit at least a Duty role.

**job sets**

A collection of job requests.

**JRF**

Java Required Files. The JRF include the Oracle ADF libraries, several other components shared by the product suites included in a given installation, and components such as Oracle Metadata Service (MDS) and Oracle Platform Security Services (OPSS).

**JVM**

Java Virtual Machine. A virtual machine that can execute Java bytecode.

**LBR**

Load-balancing router. A very fast network device that distributes Web requests to a large number of servers. It provides portal users with a single published address, without their having to send each request to a specific middle tier server.

**LDAP**

Lightweight Directory Access Protocol. A standard, extensible directory access protocol. It is a common language that LDAP clients and servers use to communicate. The framework of design conventions supporting industry-standard directory products, such as the Oracle Internet Directory.

**LDAP Data Interchange Format (LDIF)**

See [LDIF](#).

**LDIF**

LDAP Data Interchange Format. The set of standards for formatting an input file for any of the LDAP command-line utilities.

**Lightweight Directory Access Protocol (LDAP)**

See [LDAP](#)

**load-balancing router (LBR)**

See [LBR](#).

**Local Policy Attachment (LPA)**

See [LPA](#).

**LPA**

Local Policy Attachment. The act of directly attaching one or more policies to a policy subject.

**Managed Server**

In a production environment, a Managed Server hosts applications and the resources needed by those applications. A domain, which is a logically related group of Oracle WebLogic Server resources, can have any number of managed Servers. An Administration Server manages these servers.

**manual shared memory management**

A database memory-management mode whereby you set the sizes of several individual [System Global Area \(SGA\)](#) components, thereby determining the overall SGA size. You then manually tune these individual SGA components on an ongoing basis. Manual shared memory management mode is intended for experienced DBAs only. Note that in this mode, automatic PGA memory management remains enabled.

**move plan**

A single XML file, derived from multiple configuration archives, that provides the properties required to copy content from one installation to another.

**NAT**

Network Address Translation. The process of modifying IP address information in IP packet headers while in transit across a traffic routing device.

**Network Address Translation (NAT)**

See [NAT](#).

**Network File System (NFS)**

See [NFS](#).

**NFS**

Network File System. A distributed file system protocol which allows you to access files over a network in a manner similar to how local storage is accessed.



**Node Manager**

An Oracle WebLogic Server utility that enables you to start, shut down, and restart [Administration Server](#) and [Managed Server](#) instances from a remote location. Although Node Manager is optional, it is recommended if your Oracle WebLogic Server environment hosts applications with high availability requirements.

**non-distributed**

The term for an environment in which the Administration Servers of all the domains and all the system component instances run on the same host.

**non-XA transaction**

A non-XA transaction always involves just one resource and generally cannot participate in a global transaction.

**ODL**

Oracle Diagnostic Logging. A method of logging which attempts to harmonize the different logging standards that are used by Oracle products.

**ODV**

Oracle Database Vault. ODV establishes limitations on the power of privileged users to access sensitive data through segregation of duties policies on DBA roles and by securely consolidating application data in the database. These limitations prevent DBAs and other privileged users from overriding the protections placed on sensitive data by the Virtual Private Database (VPD). Oracle Fusion Applications deploys with the ODV enabled when it is installed.

**offline backup**

A mode of backup for your Oracle Fusion Applications Environment in which you must first shut down the environment. The Administration Server, all Managed Servers in the domain, and all system components in the Oracle instances should be shut down.

**OLTP**

Online Transaction Processing. OLTP systems are one of the most common data processing systems in today's enterprises. They are primarily characterized through a specific data usage that is different from data warehousing environments, yet some of the characters, such as having large volumes of data and lifecycle-related data usage and importance, are identical. Main characteristics of OLTP are short response time, small transactions, data maintenance operations, large user populations, high concurrency, large data volumes, high availability, and lifecycle related data usage.

**online backup**

A mode of backup for your Oracle Fusion Applications environment in which you do not shut down the environment before backing up the files. To avoid an inconsistent backup, do not make any configuration changes until the backup is completed. To ensure that no changes are made in the Oracle WebLogic Server Domain, lock the WebLogic Server configuration.

**Online Transaction Processing (OLTP)**

See [OLTP](#).

**OPMN**

Oracle Process Manager and Notification Server. A process management tool that manages all system components (server processes), and supports both local and distributed process management, automatic process recycling and the communication of process state (up, down, starting, stopping). OPMN detects process unavailability and automatically restarts processes).

**Oracle Database Vault (ODV)**

See [ODV](#).

**Oracle Diagnostic Logging (ODL)**

See [ODL](#).

**Oracle Process Manager and Notification Server (OPMN)**

See [OPMN](#).

**Oracle Real Application Clusters (RAC)**

See [RAC](#).

**Oracle WebLogic Server domain**

The basic administration unit for WebLogic Server instances. A domain consists of one or more WebLogic Server instances (and their associated resources) that you manage with a single [Administration Server](#). You can define multiple domains based on different system administrators' responsibilities, application boundaries, or geographical locations of servers. Conversely, you can use a single domain to centralize all WebLogic Server administration activities.

**Oracle WebLogic Scripting Tool (WLST)**

See [WLST](#).

**PEM**

Privacy-enhanced Electronic Mail. An encryption technique that provides encryption, authentication, message integrity, and key management.

**personally Identifiable Information (PII)**

See [PII](#)

**PGA**

Program Global Area. A memory buffer that contains data and control information for a server process. A PGA is created when a server process is started.

**PII**

Personally identifiable information. Information that can be used to uniquely identify, contact, or locate a single person or can be used with other sources to uniquely identify an individual.

**post-processing function (PPF)**

See [PPF](#).

**PPF**

Post-processing function. This is a special case of a user-defined function. A post processing function is called after the mask value is generated using the specified

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format. The function takes the generated mask value and further modifies it to produce the actual mask value.

**Privacy-enhanced Electronic Mail (PEM)**

See [PEM](#).

**privilege**

Entitlement (or permission set).

**product family**

Combinations of one or more Java EE applications specific to Oracle Fusion Applications.

**product offering**

Groups of features within an installation of Oracle Fusion Applications which represent the highest-level collection of functionality that you can license and implement.

**Program Global Area (PGA)**

See [PGA](#).

**provisioning**

The entire set of operations required to install, configure, and deploy applications product offerings from a system point of view. It performs these operations:

- Installation provides the operations related to laying down all the component needed to create an Oracle Fusion Applications environment.
- Configuration tailors components based on the applications topology, the creation of Oracle WebLogic Server Managed Servers and clusters, and the updating of endpoints and virtual hosts.
- Deployment starts the Managed Servers and clusters and facilitates the actual use of product offerings.

**purge policies**

Allow the scheduling service to remove scheduled jobs according to specified criteria. For example, a purge policy might specify the retention of all Java type job requests using a particular job definition submitted executed by a given application for three days. Another purge policy might retain a particular type of job request, say, all SQL job requests in a successful state, for only one day. You can also specify the frequency at which the purge policy is to run.

**query optimizer**

Determines the best and most efficient way to retrieve the results of an SQL statement. It compares the cost of all possible approaches and chooses the approach with the least cost. The query optimizer is responsible for generating an execution plan.

**RAC**

Real Application Clusters. Oracle RAC allows the Oracle Database to run any packaged or custom application across a set of clustered servers. This capability provides the highest levels of availability and the most flexible scalability. If a clustered server fails, Oracle Database continues running on the surviving servers. When more processing power is needed, you can add another server without interrupting access to data.

**RCU**

Repository Creation Utility. Oracle Fusion Applications RCU is a utility that loads applications and middleware content into the database. The process of running Applications RCU creates the applications and middleware schemas, loads seed data, and creates the tablespaces, as well as other required packages.

**RDA**

Remote Diagnostic Agent. Provides a suite of data collection and diagnostic scripts that aid in the analysis and support of Oracle products.

**Recovery Manager (RMAN)**

See [RMAN](#).

**Remote Diagnostic Agent (RDA)**

See [RDA](#).

**Repository Creation Utility (RCU)**

See [RCU](#).

**RMAN**

Recovery Manager. You can use Oracle Recovery Manager to recover database-based metadata repositories and Oracle Fusion Applications Databases.

**SAML**

Security Assertion Markup Language. Defines a framework for exchanging security information between online business partners.

**SBC**

Session Border Controller. A piece of equipment that is deployed at the border of the network and controls the signaling and media across network address translation (NAT) devices and firewall boundaries. In addition, it prevents unauthorized access and denial of service (DoS) attacks.

**Security Assertion Markup Language (SAML)**

See [SAML](#).

**Secure Socket Layer (SSL)**

See [SSL](#).

**server parameter file**

A binary file that can be written to and read by the database. It *must not* be edited manually. It is stored on the host system on which Oracle Database is running. Changes are made when you use Database Control to modify one or more initialization parameters, or when Oracle Database itself makes changes for self-tuning purposes. Any changes to it persist across database shutdown and startup operations.

**Service-Oriented Architecture (SOA)**

See [SOA](#).

**Session Border Controller (SBC)**

See [SBC](#).

**SGA**

System Global Area. A group of shared memory structures that contains data and control information for one Oracle Database instance. If multiple users are concurrently connected to the same instance, the data in the instance SGA is shared among the users. Consequently, the SGA is sometimes referred to as the shared global area. The combination of the background processes and memory buffers is called an Oracle instance.

**Simple Object Access Protocol (SOAP)**

See [SOAP](#).

**snapshot (in Content Movement)**

An image of a Fusion Applications instance at a moment in time, which can be used as the source for a content movement. Used in the Enterprise Manager Cloud Control interface.

**SOA**

Service-Oriented Architecture. A design methodology aimed at maximizing the reuse of application services.

**SOAP**

Simple Object Access Protocol. A protocol for sending and receiving requests and responses across the Internet. It is based on XML and simple transport protocols, so it is not blocked by firewalls. SOAP is independent of operating system, implementation language, or any single object model.

**SSL**

Secure Socket Layer. An industry standard protocol designed by Netscape Communications Corporation for securing network connections. SSL provides authentication, encryption, and data integrity using public key infrastructure (PKI).

**standard binding mode**

The default mode of binding a work assignment to a request processor. Standard binding mode allows the request processor to process job requests as defined by the specialization rules when an active workshift is defined. If a job request is specialized to two different work assignments, either of those work assignments or the default work assignment can process the job request.

**System Global Area (SGA)**

See [SGA](#).

**task role**

See [duty role](#).

**TDE**

Transparent Data Encryption. TDE prevents access to PII in the file system or on backups or disk. It also protects confidential data, such as credit card and social security numbers. TDE also encrypts sensitive table data stored in data files at the tablespace level.

**Thread ID (TID)**

See [TID](#)

**TID**

Thread ID. A unique identifier for the thread within the java process where the message was generated.

**Transparent Data Encryption (TDE)**

See [TDE](#).

**UDF**

User-Defined Function. Takes the original value, the row id, and column name to generate the mask value. A single column format can be a combination of one or more formats including UDF.

**User-Defined Function (UDF)**

See [UDF](#).

**Virtual Private Database (VPD)**

See [VPD](#).

**VPD**

Virtual Private Database. A feature for ASPs that want to leverage the Oracle database to host their customers. Essentially, it uses one physical database instance for all customers, but to each customer it looks as if they have their own database. Users cannot see any information that is not meant for them and complete customer isolation is achieved. It requires little to no changes in the core application to take effect as most of the work is done at the database level. Implementing VPD basically requires two key steps: adding a context column (for example, company name) to all the database tables, and implementing a policy to restrict queries on each table based on the context of the logged in user. VPD provides highly secure, full subscriber isolation using this method.

**WLST**

Oracle WebLogic Scripting Tool. A command line tool for managing Oracle Fusion Middleware components, such as Oracle WebCenter.

**work allocation**

The process of defining constraints on where and when jobs run as well as the amount of resources that can be used to process the jobs. This process includes creating a work assignment, and the binding the work assignment to a request processor.

**work assignments**

Rules that govern the execution and binding of jobs to a particular server and request processor.

**workshift**

Temporal window of time during which jobs can be processed and what resources can be used during those periods. The resources defined in a workshift include threads, which are a local resource of the request processor, and asynchronous workers, a global resource. The number of asynchronous workers can be specified to throttle the use of a shared global resource, such as database jobs.

**XA transaction**

An XA transaction is a global transaction that may span multiple resources.