

Oracle® Fusion Middleware

Administrator's Guide for Oracle SOA Suite and Oracle Business Process Management Suite

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Documentation for system administrators that describes how to administer Oracle Service-Oriented Architecture (SOA) composite applications consisting of binding components and Oracle BPEL process, human task, business rule, Oracle Mediator, and Oracle Business Process Management Notation (BPMN) service components in Oracle Enterprise Manager Fusion Middleware Control. Includes additional information on administering Oracle B2B, Oracle Business Activity Monitoring (BAM), Oracle JCA Adapters, Oracle User Messaging Service, and business events.

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Primary Author: Oracle Corporation

Contributor: Oracle SOA Suite and Oracle Fusion Middleware development, product management, and quality assurance teams

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Preface

Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite and Oracle Business Process Management Suite describes how to administer the components of Oracle SOA Suite and Oracle Business Process Management Suite, including

- The SOA Infrastructure and SOA composite applications
- Composite components and service engines such as the BPEL service engine, BPMN Process service engine, Oracle Mediator service engine, human workflow service engine, and business rules service engine
- Oracle B2B, Oracle Adapters, Oracle Business Activity Monitoring, and Oracle User Messaging Service

Audience

This document is intended for administrators managing applications on a SOA platform.

Documentation Accessibility

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

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Related Documents

For more information, see the following Oracle resources:

- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*
- *Oracle Fusion Middleware User's Guide for Oracle B2B*
- *Oracle Fusion Middleware Healthcare Integration User's Guide for Oracle SOA Suite*
- *Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring*
- *Oracle Fusion Middleware User's Guide for Technology Adapters*

- *Oracle Fusion Middleware User's Guide for Oracle Business Rules*
- *Oracle Fusion Middleware Language Reference Guide for Oracle Business Rules*
- *Oracle Fusion Middleware Modeling and Implementation Guide for Oracle Business Process Management*
- *Oracle Fusion Middleware User's Guide for Oracle Business Process Management*
- *Oracle Fusion Middleware Business Process Composer User's Guide for Oracle Business Process Management*
- *Oracle Fusion Middleware Performance and Tuning Guide*
- *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite*
- *Oracle Fusion Middleware High Availability Guide*
- *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<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.

What's New in This Guide

This guide has been updated in several ways. The following table lists the sections that have been added or changed.

For a list of known issues (release notes), see the "Known Issues for Oracle SOA Products and Oracle AIA Foundation Pack" at
<http://www.oracle.com/technetwork/middleware/docs/soa-aiafp-knownissuesindex-364630.html>.

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Chapter 2 Getting Started with Administering Oracle SOA Suite and Oracle BPM Suite						
Section 2.2.1, "Navigating Through the SOA Infrastructure Home Page and Menu" and Section 2.2.2, "Navigating Through the SOA Composite Application Home Page and Menu"	Sections revised to describe the Home options in the SOA Infrastructure menu and SOA Composite menu that enable you to directly navigate to a selected tab of the SOA Infrastructure and SOA composite application home page, respectively.	X				
Chapter 3 Configuring the SOA Infrastructure						
Section 3.1, "Configuring SOA Infrastructure Properties"	Section revised to describe the bpelRecoveryAlertDurationInDays key of the AuditConfig property in the System MBean Browser. This key limits the BPEL Message Recovery Required inline warning message to be displayed only when recoverable BPEL messages have been created in the last seven days. The default setting of seven days can be changed.	X				
Section 3.4.2, "Configuring Logging to Diagnose Performance Issues in Oracle Enterprise Manager Fusion Middleware Control Pages"	Section added to describe how you can trace the performance of costly API calls to the Oracle Enterprise Manager Fusion Middleware Control page that made them.	X				

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 3.8, "Managing Global Token Variables for Multiple SOA Composite Applications"	Section added to describe how you can define global token variables for specific URIs in SOA composite applications in Oracle Enterprise Manager Fusion Middleware Control Console. This provides an alternative to substituting values in each configuration plan.	X				
Chapter 4 Monitoring the SOA Infrastructure						
Section 4.1, "Discovering the Oracle SOA Suite Routing Topology"	Section added to describe how to use the Topology Viewer to view the routing relationships across components and elements.	X				
Section 4.2, "Monitoring SOA Infrastructure Performance Summary Metrics"	Section added to describe how to view a summary of SOA Infrastructure performance metrics on the Performance Summary page.	X				
Chapter 5 Securing SOA Composite Applications						
Section 5.2, "Mapping the SOAOperator and SOAMonitor Roles to Oracle WebLogic Server Groups or Users"	Section added to describe how to map the SOAMonitor and SOAOperator roles to Oracle WebLogic Server groups or users in Oracle Enterprise Manager Fusion Middleware Control.		X			
Chapter 6 Monitoring SOA Composite Applications						
Section 6.1, "Monitoring SOA Composite Application Performance Summary Metrics"	Section added to describe how to view a summary of SOA composite application performance metrics on the Performance Summary page.	X				
Chapter 7 Deploying and Managing SOA Composite Applications						
Section 7.2, "Updating Instance, Fault, and Rejected Message States to Stale During Undeployment or Redeployment"	Section added to describe how instances, faults, and rejected messages are marked as stale during undeployment and redeployment.	X				
Chapter 8 Managing SOA Composite Application Instances						
Section 8.3, "Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level"	Section revised to describe the ability to search for composite sensors in the instances of all SOA composite applications in the SOA Infrastructure.	X				

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 8.2, "Monitoring and Deleting SOA Composite Application Instances from the Application Home Page" through Section 8.5, "Recovering from SOA Composite Application Faults in the Application Home Page"	Sections revised to indicate that instances and faults are not displayed by default the first time you access the Instances pages and Faults and Rejected Messages pages of the SOA Infrastructure and SOA composite applications. You must click Search to display any instances and faults.	X				
Section 8.8, "Migrating Instances Between Different SOA Composite Application Revisions"	Section added to describe how to migrate running SOA composite application instances from one revision to another revision (for example, migrate an instance of CreditRatingService 1.0 to CreditRatingService 2.0).	X				
Chapter 9 Developing a Database Growth Management Strategy		X				
Chapter 9, "Developing a Database Growth Management Strategy"	Chapter added to describe how to manage database growth, including determining the profile or size of the database; monitoring space usage, hardware resources, and database performance; understanding growth management challenges and testing strategies; and understanding space management.	X				
Chapter 10 Managing Database Growth						
Section 10.1, "Introduction to Managing Database Growth"	Table added to describe the methods for managing database growth.	X				
Section 10.3.1, "Looped Purge Script"	Section updated to describe the ignore_state parameter. When set to true, all open and closed instances within the specified date range are purged.	X				
Section 10.5, "Removing Records from the Runtime Tables Without Dropping the Tables"	Section added to describe how to use the truncate script to remove all records from all Oracle SOA Suite tables without dropping the tables.	X				
Section 10.6, "Recreating Tables with Open Composite Instances and Reclaiming Database Space"	Section added to describe how to use the table recreation script (TRS) to recreate Oracle SOA Suite tables while preserving open composite flows and reclaim space all at once without shrinking or rebuilding database segments (tables and indexes).	X				

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 10.7, "Purging Instances on Microsoft SQL Server"	Section added to describe how to purge database instances in Microsoft SQL Server.	X				
Section 10.7.3, "Running the Purge Scripts on Microsoft SQL Server"	Section updated to indicate that English is the only supported language for running the purge scripts on Microsoft SQL Server.				X	
Chapter 11 Programmatically Managing SOA Composite Applications with the Facade API						
Section 11.1.1, "Security Credentials Required when Creating the Locator Object"	Section added to describe how the creation of the locator object requires additional security credentials.	X				
Chapter 12 Diagnosing Problems with SOA Composite Applications						
Section 12.1.3, "Predefined Incident Processing Rules"	Section revised to describe how to dynamically load the rules file into the SOA Infrastructure without restarting the server and how to configure incident processing rules files through either the Diagnostic Framework or the SOA server home directory.		X			
Section 12.5.1, "Enabling Preconfigured Rules and Watches"	Note added about contacting Oracle Support Services about patch number 2248452 if you experience issues with large numbers of incidents being created due to OWS-04086 errors.				X	
Section 12.2.4, "Deployed Composite Metadata Diagnostic Dumps (soa.composite)"	Section revised to describe the ecid dump parameter that matches SOA composite applications associated with the execution context ID (ECID).	X				
Section 12.2.5, "Instance Audit Trail Diagnostic Dumps (soa.composite.trail)"	Section revised to describe how the dump captures the top level audit trail associated with the ECID and the audit trails at the composite instances and service component instances levels. All are written in a file per composite instance/service component instance.	X				

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 12.2.8, "Dispatcher Static Configuration Diagnostic Dumps (bpel.dispatcher)," Section 12.2.9, "Average Instance Processing Time Diagnostic Dumps (bpel.apt)," Section 12.2.10, "Average Instance Processing Delay Diagnostic Dumps (bpel.apd)," Section 12.2.11, "Synchronous Process Statistics Diagnostic Dumps (bpel.sps)," Section 12.2.12, "Asynchronous Process Statistics Diagnostic Dumps (bpel.aps)," and Section 12.2.13, "Request Statistics Diagnostic Dumps (bpel.rs)"	<p>Sections added to describe how to perform BPEL process diagnostic dumps for the following:</p> <ul style="list-style-type: none"> ▪ Dispatcher configuration information about the static (system, invoke, engine, and audit thread counts) and runtime scheduled and working message count ▪ Average instance processing time information ▪ Average instance processing delay information (for asynchronous processes) ▪ Minimum, maximum, and average processing time information (in milliseconds) and the count of instances processed (for synchronous processes) ▪ Minimum, maximum, and average processing time information (in milliseconds) and the count of instances processed (for asynchronous processes) ▪ Minimum, maximum, and average processing time information (in milliseconds) and count of requests processed as the request flows through various layers of the BPEL process service engine 	X				
Section 12.2.14, "Resequencer Group Processing Delay Diagnostic Dumps (mediator.resequencer)"	<p>Section added with information about finding Mediator diagnostic information about resequencer groups that have been pending for a certain period.</p>	X				
Section 12.2.15, "Adapter Diagnostic Dumps (soa.adapter.ra)," Section 12.2.16, "Adapter Diagnostic Dumps (soa.adapter.connpool)," and Section 12.2.17, "Adapter Diagnostic Dumps (soa.adapter.stats)"	<p>Sections added to describe how to perform adapter diagnostic dumps for the following:</p> <ul style="list-style-type: none"> ▪ Connection factory configuration information ▪ Adapter connection pool information ▪ Dynamic Monitoring Service (DMS) statistics such as message size and fault count 	X				
Section 12.3, "Executing Diagnostic Framework Thread Dumps for SOA Composite Applications"	<p>Section added to describe how to execute Diagnostic Framework thread dumps for SOA composite applications.</p>	X				

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 12.5.1, "Enabling Preconfigured Rules and Watches"	Section added to describe how to enable preconfigured rules and watches with the <code>sca_createWatches</code> WLST command.	X				
Section 12.5.3, "Creating a Watch to Identify the Elapsed Time of Web Service Binding Calls"	Section added to describe how to manually create a watch that keeps track of the time it takes for web service binding calls from a composite to an external references to complete.	X				
Section 12.5.4, "Creating a Watch to Identify if Processing Delays Exceed a Specified Time Limit"	Section added to describe how to create a watch that alerts you if the counts or message wait times or processing delays exceed a certain limit.	X				
Section 12.5.5, "Creating Resequencer Watches and Notifications"	Section added to describe how to create a watch that tracks how long it takes for resequencer groups to process messages.	X				
Chapter 14 Monitoring BPEL Process Service Components and Engines						
Section 14.3, "Monitoring BPEL Process Service Component Instances" and Section 14.7, "Monitoring BPEL Process Service Engine Instances"	Sections revised to indicate that instances are not displayed by default the first time you access the Instances pages of the BPEL process service component and BPEL process service engine. You must click Search to display any instances.	X				
Section 14.6.1, "Viewing Low Level Request Breakdown Table Details" and Section 14.9, "Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine"	Section added to describe how you can configure the Request Breakdown part of the Statistics page to display lower level details about the time a request spends in various service engine layers during processing.	X				
Chapter 15 Managing BPEL Process Service Components and Engines						
Section 15.1, "Recovering from BPEL Process Service Component Faults" and Section 15.3, "Recovering from BPEL Process Service Engine Faults"	Sections revised to indicate that faults are not displayed by default the first time you access the Faults pages of the BPEL process service component and BPEL process service engine. You must click Search to display any faults.	X				

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 15.4, "Performing BPEL Process Service Engine Message Recovery"	<p>Section revised to describe the following options on the Recovery page of the BPEL process service engine:</p> <ul style="list-style-type: none"> ▪ The Abort option enables you to terminate the entire composite instance flow in the context of the ECID. All composite instances and component instances associated with the flow are terminated. ▪ The Cancel Without Abort option enables you to cancel the delivery of the selected BPEL process messages, and not the entire composite instance flow in which the messages are included. 	X				
Section 15.5, "Storing Instance and Message Data in Oracle Coherence Distributed Cache on Oracle Exalogic Platforms"	<p>Sections revised to describe properties for configuring the storage of the audit trail and invocation messages to Oracle Coherence cache.</p>	X				
Chapter 17 Monitoring Oracle Mediator Service Components and Engines						
Section 17.2.2, "Monitoring Oracle Mediator Service Component Instances" and Section 17.3.2, "Monitoring Oracle Mediator Service Engine Instances"	<p>Sections revised to indicate that instances are not displayed by default the first time you access the Instances pages of the Oracle Mediator service component and Oracle Mediator service engine. You must click Search to display any faults.</p>	X				
Section 17.4.1.4, "Mediator Resequencing Group Dialog"	<p>Section revised to include information about the new skip feature for standard resequencer groups. This option allows you to skip the next ID in the sequence to expedite processing.</p>	X				
Chapter 18 Managing Oracle Mediator Service Components and Engines						
Section 18.1, "Recovering From Oracle Mediator Service Component Faults" and Section 18.3, "Recovering From Oracle Mediator Service Engine Faults"	<p>Sections revised to indicate that faults are not displayed by default the first time you access the Faults pages of the Oracle Mediator service component and Oracle Mediator service engine. You must click Search to display any faults.</p>	X				
Chapter 20 Managing Oracle Mediator Service Components and Engines						

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 20.3, "Monitoring Business Rules Service Engine Instances" and Section 20.4, "Monitoring Business Rules Service Engine Faults"	Sections revised to indicate that instances and faults are not displayed by default the first time you access the Instances page and Faults page, respectively, of the business rule service engine. You must click Search to display any faults.	X				
Chapter 22 Monitoring Human Workflow Service Components and Engines						
Section 22.3, "Monitoring Human Task Service Component Instances" and Section 22.6, "Monitoring Human Workflow Service Engine Instances"	Sections revised to indicate that instances are not displayed by default the first time you access the Instances pages of the human task process service component and human workflow service engine. You must click Search to display any instances.	X				
Chapter 23 Managing Human Workflow Service Components and Engines						
Section 23.2, "Recovering from Human Workflow Service Engine Faults" and Section 23.4, "Recovering from Human Task Service Component Faults"	Sections revised to indicate that faults are not displayed by default the first time you access the Faults pages of the human workflow service engine and human task process service component. You must click Search to display any faults.	X				
Chapter 36 Configuring Service and Reference Binding Components						
Section 36.1.2.6, "Oracle MQ Series Adapter"	Note added indicating that the MQ Series adapter does not support browsing messages in the queue for service binding components.				X	
Chapter 39 Monitoring Human Workflow Service Components and Engines						
Section 40.3, "Monitoring BPMN Process Service Component Instances" and Section 40.6, "Monitoring BPMN Process Service Engine Instances"	Sections revised to indicate that instances are not displayed by default the first time you access the Instances pages of the BPMN process service component and BPMN process service engine. You must click Search to display any instances.	X				
Chapter 40 Managing Human Workflow Service Components and Engines						

Sections	Changes Made	February 2013	May 2013	August 2013	September 2013	October 2013
Section 41.1, "Recovering from BPMN Process Service Component Faults" and Section 41.3, "Recovering from BPMN Process Service Engine Faults"	Sections revised to indicate that faults are not displayed by default the first time you access the Faults pages of the BPMN process service component and BPMN process service engine. You must click Search to display any faults.	X				
Appendix A Installing the Demo User Community in the Database		X				
Appendix A, "Installing the Demo User Community in the Database"	Section revised to include the steps for installing the demo user community in the database. These steps were previously only included in the <code>README.txt</code> file that is part of the <code>workflow-001-DemoCommunitySee.dApp</code> sample available from the Oracle SOA Suite samples site.	X				
Appendix C Roles and Privileges for Oracle SOA Suite Users in Oracle Enterprise Manager		X				
Section C.1, "Roles and Privileges"	Selected revised to indicate that the actions that you can perform in Oracle Enterprise Manager Fusion Middleware Control are protected using Oracle WebLogic Server enterprise roles (Monitor, Operator, and Administrator). To get the appropriate behavior in Oracle Enterprise Manager Fusion Middleware Control, you must correctly map either the user or enterprise role to the SOA application role.	X				
Appendix C, "Roles and Privileges for Oracle SOA Suite Users in Oracle Enterprise Manager"	Table headers in appendix revised to indicate the mapping required between Oracle WebLogic Server enterprise roles and Oracle SOA Suite application roles	X				

Part I

Introduction to Oracle SOA Suite and Oracle Business Process Management Suite

This part describes Oracle SOA Suite and Oracle Business Process Management Suite.

This part includes the following chapter:

- [Chapter 1, "Introduction and Concepts"](#)

Introduction and Concepts

This chapter describes Oracle Fusion Middleware, Oracle Service-Oriented Architecture (SOA) Suite, and Oracle Business Process Management (BPM) Suite and the types of Oracle SOA Suite and BPM Suite administration tasks you perform from Oracle Enterprise Manager Fusion Middleware Control. Oracle Enterprise Manager 11g Grid Control and the Oracle SOA Management Pack are also briefly described.

This chapter includes the following sections:

- [Section 1.1, "What Is Oracle Fusion Middleware?"](#)
- [Section 1.2, "What Is Oracle SOA Suite?"](#)
- [Section 1.3, "What Is Oracle Business Process Management Suite?"](#)
- [Section 1.4, "Administration of Oracle SOA Suite and Oracle BPM Suite"](#)
- [Section 1.5, "Administration for Application Developers"](#)
- [Section 1.6, "Administration with Oracle Enterprise Manager 11g Grid Control and the Oracle SOA Management Pack"](#)

For more information about Oracle Enterprise Manager Fusion Middleware Control administrative tasks and Oracle Fusion Middleware concepts, see the following documents:

- *Oracle Fusion Middleware Performance and Tuning Guide*
- *Oracle Fusion Middleware Administrator's Guide*
- *Oracle Fusion Middleware 2 Day Administration Guide*
- *Oracle Fusion Middleware Concepts*

1.1 What Is Oracle Fusion Middleware?

Oracle Fusion Middleware is a collection of standards-based software products that spans a range of tools and services: from Java EE and developer tools, to integration services, business intelligence, and collaboration. Oracle Fusion Middleware offers complete support for development, deployment, and management of applications.

1.2 What Is Oracle SOA Suite?

Oracle SOA Suite is a middleware component of Oracle Fusion Middleware. Oracle SOA Suite provides a complete set of service infrastructure components for designing, deploying, and managing SOA composite applications. Oracle SOA Suite enables services to be created, managed, and orchestrated into SOA composite applications. Composites enable you to easily assemble multiple technology components into one

SOA composite application. Oracle SOA Suite plugs into heterogeneous IT infrastructures and enables enterprises to incrementally adopt SOA.

You can administer Oracle SOA Suite from Oracle Enterprise Manager Fusion Middleware Control. The following sections provide an overview of the components of Oracle SOA Suite:

- [Section 1.2.1, "Introduction to the SOA Infrastructure Application"](#)
- [Section 1.2.2, "Introduction to SOA Composite Applications"](#)
- [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#)
- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.5, "Introduction to Binding Components"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)
- [Section 1.2.7, "Introduction to the Service Infrastructure"](#)
- [Section 1.2.8, "Introduction to the Contents of SOA Composite Applications"](#)

For introductory information about Oracle SOA Suite, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

1.2.1 Introduction to the SOA Infrastructure Application

The SOA Infrastructure is a Java EE-compliant application running in Oracle WebLogic Server. The application manages composites and their lifecycle, service engines, and binding components.

You deploy SOA composite applications designed in Oracle JDeveloper to a partition of your choice on the SOA Infrastructure. Partitions are separate sections of your SOA Infrastructure that enable you to logically group the composite applications for ease of management.

In the example shown in [Figure 1–1](#), many SOA composite applications are deployed to the SOA Infrastructure and are visible in Oracle Enterprise Manager Fusion Middleware Control.

From the SOA Infrastructure home page, you can perform administration tasks such as monitoring SOA composite applications, monitoring individual composite instances, and updating the state of SOA composite applications and individual composite instances. You can also perform corrective actions such as fault recovery.

Figure 1–1 SOA Composite Applications Deployed in the SOA Infrastructure

The screenshot shows the Oracle SOA Infrastructure dashboard. At the top, there's a banner with a green arrow icon and the text "soa-infra". To its right, it says "Logged in as weblogic" and "Page Refreshed Oct 9, 2012 9:17:28 AM PDT". Below the banner, there's a navigation bar with tabs: "BPEL Message Recovery Required", "Deployed Composites" (which is selected), "Instances", and "Faults and Rejected Messages". A message below the tabs says: "The following SOA composite revisions are currently deployed. To deploy a new composite revision, click Deploy. To perform additional tasks, select a composite and click the appropriate button." To the right of this message is a link "Recent Instances and Faults for the last 24 hours". Below the message is a search bar with "Search" and "Composite" dropdown, and a "Deploy..." button. There are also buttons for "Start Up...", "Activate ...", "Set As Default ...", "Undeploy...", and "Redeploy...". A checkbox labeled "Show only active composites" is checked. The main area is a table titled "Composite" with columns: Composite, Partition, Status, Mode, Instances, Faulted Instances, and Deploy. The table lists several composites:

Composite	Partition	Status	Mode	Instances	Faulted Instances	Deploy
B2BX12OrderGateway [1.0]	soaFusionOrderDemo		Active	0	0	Sep 20, 2012
OrderSDOComposite [1.0]	soaFusionOrderDemo		Active	0	0	Sep 20, 2012
PartnerSupplierComposite [1.0]	soaFusionOrderDemo		Active	0	0	Sep 20, 2012
OrderBookingComposite [1.0]	soaFusionOrderDemo		Active	0	0	Sep 20, 2012
BPELSyncWaitAssertActivity [1.0]	default		Active	0	0	Sep 17, 2012
CompositeTest [1.0]	default		Active	90	18	Sep 17, 2012
SingleTokenWSDL [1.0]	default		Active	0	0	Sep 13, 2012
service [4.0]	default		Active	0	0	Sep 12, 2012
E2EOrderProcessingComposite [1.0]	default		Active	n	n	Sep 9, 2012

You can click a specific SOA composite application in the **Composite** table to access its home page. [Figure 1–2](#) shows the upper part of the home page for a SOA composite application. From the SOA composite application home page, you can perform administration tasks such as monitoring instances, recovering from faults, managing the state of application instances, and attaching policies. You can also perform a limited number of configuration tasks at the SOA composite application level, such as specifying the composite audit level and payload validation. These tasks are displayed as buttons at the top of the page.

Figure 1–2 SOA Composite Application Home Page (Upper Part)

The screenshot shows the upper part of the SOA Composite Application Home Page. At the top, it displays "CompositeTest [1.0]" and "Logged in as weblogic". Below this is a navigation bar with tabs for "Dashboard", "Instances", "Faults and Rejected Messages", "Unit Tests", and "Policies". A prominent yellow banner at the top indicates "BPEL Message Recovery Required". The main content area is titled "Recent Instances and Faults for the last 24 hours". It contains two sections: "Recent Instances" and "Recent Faults and Rejected Messages".

Recent Instances:

Instance ID	Name	Conversation ID	Instance State	Start Time
40010			---	Oct 9, 2012 4:13:03 AM
40009			---	Oct 9, 2012 4:13:02 AM
40008			---	Oct 9, 2012 4:13:02 AM
40007			---	Oct 9, 2012 4:13:02 AM
40006			---	Oct 9, 2012 4:13:02 AM

Recent Faults and Rejected Messages:

Error Message	Recovery	Fault Time	Fault Location	Composite Instance ID	Logs
<bpelFault><faultType>0</i		Oct 9, 2012 4:13:04 AM	LoanBroker	40007	Logs
<bpelFault><faultType>0</i		Oct 9, 2012 2:25:04 AM	LoanBroker	30110	Logs
<bpelFault><faultType>0</i		Oct 9, 2012 2:20:04 AM	LoanBroker	30110	Logs
<bpelFault><faultType>0</i		Oct 9, 2012 2:07:46 AM	LoanBroker	30110	Logs

If messages are awaiting recovery, a **BPEL Message Recovery Required** message is displayed at the top of the Dashboard page and all other SOA composite application home pages.

Figure 1–3 shows the lower part of the home page for this SOA composite application. The service components and service and reference binding components included in the composite are shown.

Figure 1–3 SOA Composite Application Home Page (Lower Part)

The screenshot shows the lower part of the SOA Composite Application Home Page. It includes two sections: "Component Metrics" and "Services and References".

Component Metrics:

Name	Component Type	Total Instances	Running Instances	Faulted Instances	
				Recoverable	Non Recoverable
LoanBroker	BPEL	122	0	0	0
CreditRatingService	BPEL	72	0	0	0
LoanService	BPEL	63	0	0	0

Services and References:

Name	Type	Usage	Faults	Total Messages	Average Processing Time (sec)
client	Web Service	Service	0	0	0.000

For more information, see the following sections:

- [Section 1.2.2, "Introduction to SOA Composite Applications"](#)
- [Part III, "Administering the SOA Infrastructure"](#)
- [Section 6.2, "Monitoring SOA Composite Application Recent Instances and Faults and Rejected Messages"](#)

1.2.2 Introduction to SOA Composite Applications

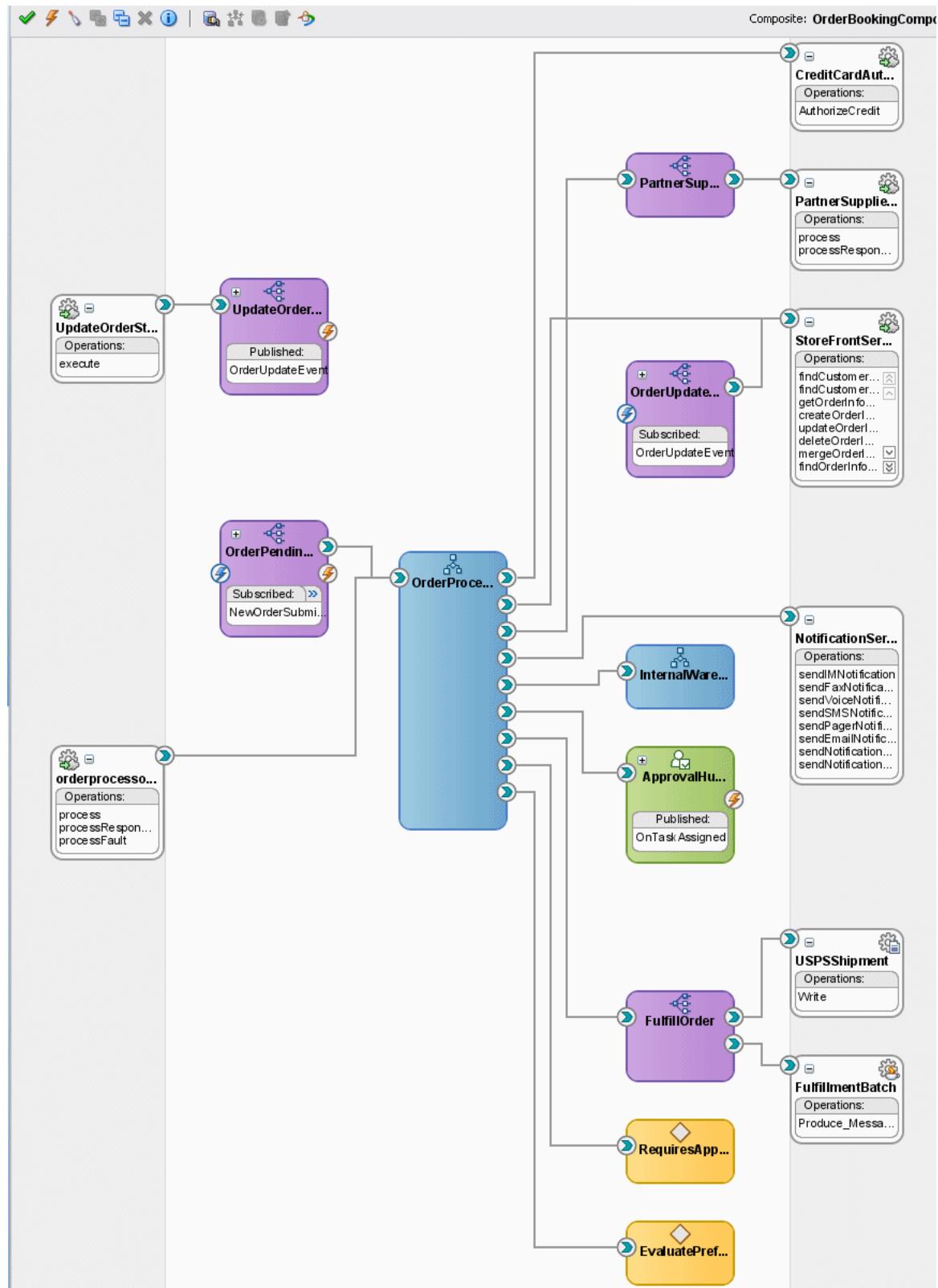
SOA composite applications such as those shown in the Deployed Composites page in [Figure 1–1](#) consist of the following:

- Service components such as Oracle Mediator for routing, BPEL processes for orchestration, BPMN processes for orchestration (if Oracle BPM Suite is also installed), human tasks for workflow approvals, spring for integrating Java interfaces into SOA composite applications, and decision services for working with business rules.
- Binding components (services and references) for connecting SOA composite applications to external services, applications, and technologies.

These components are assembled into a single SOA composite application. Having the components assembled into one unit of deployment (the application) greatly simplifies the management and lifecycle of SOA applications.

[Figure 1–4](#) provides an example of a SOA composite application in the SOA Composite Editor in Oracle JDeveloper. Service binding components (such as **orderprocessor_client_ep**) advertise their capabilities to external consumers. The service exposes a public interface of the SOA composite application (**OrderBookingComposite**) consisting of BPEL process, Oracle Mediator, human task, and decision service components. A wire connects the service to a specific component or reference in the composite. Reference binding components (such as **CreditCardAuthorizationService** and **PartnerSupplierService**) enable messages to be sent from the SOA composite application to external services. The service binding components, service components, and reference binding components are wired (connected) for communication.

Figure 1–4 SOA Composite Application



The service components and binding components included in a SOA composite application appear in the lower part of an application home page, as shown in

Figure 1–3 and **Figure 1–5**. The example in **Figure 1–5** shows three BPEL process service components in the **Component Metrics** section and one binding component in the **Services and References** section. You can click a specific service component or binding component to access its home page.

Figure 1–5 Service Components and Binding Components of a SOA Composite Application

The screenshot shows two sections of a management interface:

- Component Metrics:** A table showing three BPEL process service components. The columns are Name, Component Type, Total Instances, Running Instances, and Faulted Instances (with sub-columns Recoverable and Non Recoverable). The data is as follows:

Name	Component Type	Total Instances	Running Instances	Faulted Instances
LoanBroker	BPEL	122	0	0
CreditRatingService	BPEL	72	0	0
LoanService	BPEL	63	0	0
- Services and References:** A table showing one binding component. The columns are Name, Type, Usage, Faults, Total Messages, and Average Processing Time (sec). The data is as follows:

Name	Type	Usage	Faults	Total Messages	Average Processing Time (sec)
client	Web Service	Service	0	0	0.000

For more information, see the following documentation:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.5, "Introduction to Binding Components"](#)
- [Part IV, "Administering SOA Composite Applications and Instances"](#)
- [Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite](#)

1.2.3 Introduction to SOA Composite Application Instances

When a SOA composite application is invoked, a new composite instance is created. This instance is identified by a unique instance ID that is displayed in pages of Oracle Enterprise Manager Fusion Middleware Control. For example, [Figure 1–6](#) shows instance IDs displayed for SOA composite applications in the Instances page of the SOA Infrastructure. When you first access this page, instances do not display. You must first click **Search** to display instances. You can click these IDs to access more specific details about the state of SOA composite application instances. From the Instances page, you can also monitor the state of SOA composite application instances.

Instances that you create as unit tests from the Test Runs page of a SOA composite application are distinguished from those created automatically or created manually from the Test Web Service page by a little yellow box. This box is displayed to the left of the instance ID. This box is visible in both the Instances page and in the **Recent Instances** table of the Dashboard page of the SOA Infrastructure and SOA composite application.

For some SOA composite applications, conversation IDs are also generated. Conversation IDs provide another method for distinctly identifying a set of generated instances. As shown in [Figure 1–6](#), conversation IDs are not automatically displayed for all instances. To see a conversation ID generated, perform one of the following tasks:

- Programmatically invoke the service and pass a unique ID through a WS-Addressing header (`messageId`).
- Create an instance using the Test Web Service page. The only exception to this is when the **Enable Stress Test** checkbox of the **Additional Test Options** section of

the Test Web Service page is selected. In that case, a conversation ID is not created for the instance.

Figure 1–6 SOA Composite Application Instance IDs

The screenshot shows the Oracle SOA Infrastructure BPEL Message Recovery Required page. At the top, it says "Logged in as weblogic" and "Page Refreshed Oct 9, 2012 9:42:49 AM PDT". The main header includes "BPEL Message Recovery Required", "Show Details...", "Go to BPEL Recovery Console", "Set Time Threshold...", and "Disable Alert...". Below the header, there are tabs for "Dashboard", "Deployed Composites", "Instances" (which is selected), and "Faults and Rejected Messages". A search bar is present with fields for "Instance ID", "Name", "ECID", "Conversation ID", "Start Time From" (set to 2012-10-08 09:42:49 AM), "Start Time To" (set to 2012-10-08 09:42:49 AM), "Sensor", and "Execution State" (set to All). There is also a "Fault State" dropdown set to "BPEL Recovery". Below the search bar is a "View" dropdown and buttons for "Delete Selected ...", "Delete With Options ...", and "Abort...". The main area displays a table of SOA composite instances:

Instance ID	Composite	Name	Conversation ID	Instance State	
40010	CompositeTest [1.0]			---	Oct 9, 2012
40009	CompositeTest [1.0]			---	Oct 9, 2012
40008	CompositeTest [1.0]			---	Oct 9, 2012
40007	CompositeTest [1.0]			---	Oct 9, 2012
40006	CompositeTest [1.0]			---	Oct 9, 2012
40005	CommonsiteTest [1.0]			---	Oct 9, 2012

For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Part IV, "Administering SOA Composite Applications and Instances"](#)
- [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#)

1.2.4 Introduction to Service Components and Service Component Instances

SOA composite applications include service components. Service components are the basic building blocks of SOA composite applications. Service components implement a part of the overall business logic of the SOA composite application.

The following service components can be used in a SOA composite application:

- BPEL process: For process orchestration of synchronous and asynchronous processes
- BPMN process (if Oracle BPM Suite is installed): For creating and modeling business processes using Business Process Management Notation and Modeling (BPMN)
- Oracle Mediator: For content transformation and routing events (messages) between service producers and consumers
- Human task: For modeling a human task (for example, manual order approval) that describes the tasks for users or groups to perform as part of an end-to-end business process flow

- Spring: For integrating Java interfaces into SOA composite applications
- Decision service: For making a decision or for processing based on business rules

From the service component home page in Oracle Enterprise Manager Fusion Middleware Control, you can perform administration tasks such as monitoring instances, recovering from faults, and attaching policies.

As described in [Section 1.2.3, "Introduction to SOA Composite Application Instances,"](#) each application instance has its own instance ID. Each service component instance included in a SOA composite application instance also has its own instance ID that is displayed in Oracle Enterprise Manager Fusion Middleware Control. [Figure 1-7](#) shows instance IDs displayed in the **Instance ID** column for the **LoanBroker** BPEL process service component of the SOA composite application. You can monitor the state of that service component instance from the Instances page. You can also click this instance to access more specific details about the service component.

Figure 1-7 Service Component Instance IDs

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface for the 'CompositeTest [1.0]' application. The 'Instances' tab is selected. A search bar at the top allows filtering by Instance ID, Modified Date To, Start Time From, Start Time To, and State. Below the search bar is a table listing ten service component instances. The columns are: Instance ID, State, Start Date, Last Modified Date, and Logs. The instances listed are:

Instance ID	State	Start Date	Last Modified Date	Logs
bpel:70010	✓ Completed	Oct 9, 2012 4:13:03 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70009	✓ Completed	Oct 9, 2012 4:13:03 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70008	✓ Completed	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70007	✗ Faulted	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:04 AM	[Logs]
bpel:70006	✓ Completed	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70005	✓ Completed	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70003	✗ Faulted	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:04 AM	[Logs]
bpel:70002	✓ Completed	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70001	✓ Completed	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:05 AM	[Logs]
bpel:70004	✓ Completed	Oct 9, 2012 4:13:02 AM	Oct 9, 2012 4:13:05 AM	[Logs]

For more information about administering service components, see the following sections:

- [Part V, "Administering BPEL Process Service Components and Engines"](#)
- [Part VI, "Administering Oracle Mediator Service Components and Engines"](#)
- [Part VII, "Administering Decision Service Components and Business Rules Service Engines"](#)
- [Part VIII, " Administering Human Task Service Components and Human Workflow Service Engines"](#)
- [Part XV, "Administering Oracle BPMN Process Service Components and Engines"](#)

1.2.4.1 Spring Service Component Support

Oracle SOA Suite provides support for the spring service component. Note the following details about spring support in Oracle Enterprise Manager Fusion Middleware Control:

- There are no spring service engine management pages.
- A spring composite is displayed in the flow trace, but there is no audit trail for it.
- Spring composite metrics are shown in the composite application home page (for example, in the **Component Metrics** section of the Dashboard page).
- The spring service component does not support the running and terminated instance states. Because the spring service component is synchronous, by design, there is no support to terminate the synchronous, running instance. Therefore, you cannot abort the running instance and cannot have a terminated state for the spring service component.

1.2.5 Introduction to Binding Components

Binding components connect SOA composite applications to external services, applications, and technologies (such as messaging systems or databases). Binding components are organized into two groups:

- Services: Provide the outside world with an entry point to the SOA composite application. The WSDL file of the service advertises its capabilities to external applications. The service bindings define how a SOA composite service can be invoked (for example, through SOAP).
- References: Enable messages to be sent from the SOA composite application to external services (for example, the same functionality that partner links provide for BPEL processes, but at the higher SOA composite application level).

In Oracle Enterprise Manager Fusion Middleware Control, you can perform binding component administration tasks such as attaching policies, monitoring rejected messages, and setting binding component properties. [Figure 1–8](#) shows the home page of a service binding component (in this example, a JCA adapter).

Figure 1–8 Binding Components

For more information, see [Section XIV, "Administering Binding Components."](#)

1.2.6 Introduction to Service Engines

The SOA Infrastructure includes a set of service engines (BPEL process, human workflow, decision service, Oracle Mediator, and spring) that execute the business logic of their respective components within the SOA composite application (for example, a BPEL process). If Oracle BPM Suite is installed, the SOA Infrastructure also includes the BPMN process service engine.

[Figure 1–9](#) provides an example in Oracle Enterprise Manager Fusion Middleware Control of the BPEL process service engine. In this service engine, the **LoanService** and **CreditRatingService** BPEL process service components run. Note the multiple instance IDs for **LoanService** and **CreditRatingService**. The BPEL process service components are included in the **CompositeTest** SOA composite application. When you first access this page, instances do not display. You must first click **Search** to display instances.

Each BPEL process service component runs in the *same* BPEL process service engine. You can click the links on the page to see more details about each BPEL process service component instance, the service component itself, or the SOA composite application in which it is included.

Figure 1–9 Service Components Running in a Service Engine

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface for the SOA Infrastructure Home > BPEL Engine Home. The top navigation bar includes links for Dashboard, Statistics, Instances (selected), Faults, Deployed Components, and Recovery. A search bar is present with fields for Instance ID, Start Time From (2012-10-08 10:18:40 AM), Start Time To, Modified Date From, Modified Date To (UTC-08:00) PST8PDT, State (Any), Component, and buttons for Search and Reset. Below the search bar is a table titled 'View' showing a list of service engine instances. The table columns are Instance ID, Component, Composite, State, Start Date, and Last. The data in the table is as follows:

Instance ID	Component	Composite	State	Start Date	Last
bpel:70025	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70024	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70023	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70022	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70021	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70020	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70019	LoanService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70018	CreditRatingService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9
bpel:70017	CreditRatingService	CompositeTest [1.0]	Completed	Oct 9, 2012 4:13:04 AM	Oct 9

In Oracle Enterprise Manager Fusion Middleware Control, you can perform service engine administration tasks such as monitoring instances, recovering from faults, manually recovering (BPEL) failed messages, and configuring properties specific to a service engine. These configuration properties impact all service components that execute in the service engine, no matter the SOA composite application in which the service components are included. The service engine pages also include service engine-specific statistics and performance metrics.

For more information about administering service engines, see the following sections:

- [Part V, "Administering BPEL Process Service Components and Engines"](#)
- [Part VI, "Administering Oracle Mediator Service Components and Engines"](#)
- [Part VII, "Administering Decision Service Components and Business Rules Service Engines"](#)
- [Part VIII, " Administering Human Task Service Components and Human Workflow Service Engines"](#)
- [Part XV, "Administering Oracle BPMN Process Service Components and Engines"](#)

Note: Oracle Enterprise Manager Fusion Middleware Control does not include pages for managing the spring service engine.

1.2.7 Introduction to the Service Infrastructure

The service infrastructure provides the internal message transport infrastructure for connecting components and enabling data flow. The service infrastructure is

responsible for routing messages along the wire connections between services, service components, and references.

For more information, see the following sections:

- [Section 4.4, "Monitoring Message Delivery Processing Requests"](#)
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite* for details about wiring

1.2.8 Introduction to the Contents of SOA Composite Applications

Your SOA composite application can consist of a variety of service components, binding components, and services that you administer from Oracle Enterprise Manager Fusion Middleware Control:

- BPEL processes
- BPMN processes (if Oracle BPM Suite is installed)
- Human workflows
- Oracle Mediator
- Decision services (Oracle Business Rules)
- Spring
- JCA adapters
- HTTP binding
- EJB service
- Direct binding service
- Oracle Application Development Framework (ADF) Business Component service
- Oracle BAM
- Oracle B2B
- Oracle Healthcare
- Business events
- Oracle User Messaging Service

For conceptual information about these service components, binding components, and services, see *Oracle Fusion Middleware Getting Started with Oracle SOA Suite* and *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

1.3 What Is Oracle Business Process Management Suite?

Oracle BPM Suite provides an integrated environment for developing, administering, and using business applications centered around business processes.

Oracle BPM Suite provides the following:

- Enables you to create process models based on standards with user-friendly applications. It enables collaboration between process developers and process analysts. Oracle BPM supports BPMN 2.0 and BPEL from modeling and implementation to runtime and monitoring.
- Enables process analysts and process owners to customize business processes and Oracle Business Rules.

- Provides a web-based application for creating business processes, editing Oracle Business Rules, and task customization using predefined components.
- Expands business process management to include flexible, unstructured processes. It adds dynamic tasks and supports approval routing using declarative patterns and rules-driven flow determination.
- Enables collaboration with process space, which drives productivity and innovation.
- Unifies different stages of the application development lifecycle by addressing end-to-end requirements for developing process-based applications. Oracle BPM Suite unifies the design, implementation, runtime, and monitoring stages based on a service component architecture (SCA) infrastructure. This allows different personas to participate through all stages of the application lifecycle.

Oracle BPM Suite provides a seamless integration of all stages of the application development lifecycle from design-time and implementation to runtime and application management.

Oracle BPM Suite is layered on Oracle SOA Suite and shares many of the same product components, including:

- Oracle Business Rules
- Human workflow
- Oracle adapter framework for integration

1.4 Administration of Oracle SOA Suite and Oracle BPM Suite

You can perform a variety of Oracle SOA Suite and Oracle BPM Suite administration (configuration, monitoring, and management) tasks from Oracle Enterprise Manager Fusion Middleware Control. This section provides an overview of these tasks:

- [Section 1.4.1, "Configuration of Oracle SOA Suite and Oracle BPM Suite"](#)
- [Section 1.4.2, "Monitoring of Oracle SOA Suite and Oracle BPM Suite"](#)
- [Section 1.4.3, "Management of Oracle SOA Suite and Oracle BPM Suite"](#)
- [Section 1.4.4, "Performance and Tuning of Oracle SOA Suite and Oracle BPM Suite"](#)

The administrative tasks that you can perform are based on the roles to which you are mapped; each role corresponds to a different set of privileges. Certain users can be mapped to simple monitoring privileges (for instance view-only access), while other users can be granted full access, including the ability to update configurations, restart servers, and so on. For more information about roles in Oracle Enterprise Manager Fusion Middleware Control, see [Appendix C, "Roles and Privileges for Oracle SOA Suite Users in Oracle Enterprise Manager."](#)

Note: While this guide primarily describes how to use Oracle SOA Suite with Oracle WebLogic Server, most of the information is also applicable to using Oracle SOA Suite with other third-party application servers. However, there may be some differences with using third-party application servers.

For information about these differences, see *Oracle Fusion Middleware Third-Party Application Server Guide*.

1.4.1 Configuration of Oracle SOA Suite and Oracle BPM Suite

You can perform Oracle SOA Suite and Oracle BPM Suite configuration tasks in Oracle Enterprise Manager Fusion Middleware Control. Configuration tasks consist of setting properties such as audit levels and payload validation for your environment. Properties can be set at the following levels:

- SOA Infrastructure (impacting all SOA composite applications)
- Service engines (impacting all service components that execute in the service engine, no matter the SOA composite application in which they are included)
- SOA composite application (impacting all service components that are included in that composite application)
- Oracle B2B bindings
- Service and reference binding components message header properties

In terms of order of precedence, inherited SOA composite application property settings (such as audit level settings and payload validation) take the highest precedence, followed by service engine settings, followed by SOA Infrastructure settings. However, most properties do not have this type of precedence to consider.

For more information about Oracle SOA Suite and Oracle BPM Suite tuning configuration properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

1.4.1.1 Introduction to the Order of Precedence for Audit Level Settings

Audit tracking enables you to select the level of information to be collected by the message tracking infrastructure. Audit level tracking can be set at the following levels:

- BPEL process or BPMN process service component
- SOA composite application
- Service engine
- SOA Infrastructure

If you set audit tracking at multiple levels, it is important to understand which setting takes precedence. [Table 1–1](#) provides examples of the order of precedence for audit level settings.

Table 1–1 Examples of Order of Precedence

Component	Composite	Service Engine	SOA Infrastructure	Which Setting Takes Precedence?
No property	Off	Production	Development	Composite. The audit level is set to Off. The service engine and SOA Infrastructure audit levels do not take effect.
No property	Inherit	Development	Production	Service engine. The audit level is set to Development. The payload is shown in the assign activity. The SOA Infrastructure audit level does not take effect.
No property	Inherit	Inherit	Production	SOA Infrastructure. The audit level is set to Production.

Table 1–1 (Cont.) Examples of Order of Precedence

Component	Composite	Service Engine	SOA Infrastructure	Which Setting Takes Precedence?
No property	Inherit	Production/ Development /Off/Inherit	Off	The overall audit is not shown. The composite inherits the audit level from the SOA Infrastructure. The payload is shown in the assign activity based on the service engine audit level setting.
Development	Off	Production	Development	Composite. Since the composite audit level is set to Off , the overall audit is not shown. The service engine audit level is shown, but the Development setting for the component takes precedence. The payload is shown in the assign activity based on the component audit level setting of Development .
Inherit	Off	Production	Development	Composite. Since the composite audit level is set to Off , the overall audit is not shown. The service engine audit level is not shown because Off is inherited from the composite.

Notes:

- When the composite audit level is set to **Off**, there is no audit trail generated for this composite and all service engines used within the composite.
- When the composite audit level is set to **Inherit**, it always inherits the settings of the SOA Infrastructure.
- When the composite audit level is set to **Off**, the component inherits the service engine settings.

For more information, see the following sections:

- [Chapter 3, "Configuring the SOA Infrastructure"](#)
- [Section 13.1, "Configuring BPEL Process Service Engine Properties"](#)
- [Section 13.6, "Setting the Audit Level at the BPEL Process Service Component Level"](#)
- [Chapter 21, "Configuring Human Workflow Service Components and Engines"](#)
- [Chapter 36, "Configuring Service and Reference Binding Components"](#)
- [Section 39.1, "Configuring BPMN Process Service Engine Properties"](#)

1.4.2 Monitoring of Oracle SOA Suite and Oracle BPM Suite

You can perform Oracle SOA Suite and Oracle BPM Suite monitoring tasks in Oracle Enterprise Manager Fusion Middleware Control, including monitoring the following:

- Instances, faults, and rejected messages in the SOA Infrastructure, SOA composite applications, service components, service engines, and service and reference binding components.
- Service engine, service infrastructure, and binding component processing request performance.
- Service and reference binding component message processing totals and average processing times.
- Audit trail and process flow behavior in service components. For BPMN processes, the entire BPMN process flow is displayed, and the path taken by the process instance is highlighted.
- Service engine request and thread states in BPEL processes, BPMN processes, and human workflows.

Note: You can also monitor and diagnose problems in Oracle SOA Suite through use of the WebLogic Diagnostic Framework (WLDF) and Diagnostics Framework. For more information, see [Chapter 12, "Diagnosing Problems with SOA Composite Applications."](#)

1.4.3 Management of Oracle SOA Suite and Oracle BPM Suite

You can perform Oracle SOA Suite and Oracle BPM Suite management tasks in Oracle Enterprise Manager Fusion Middleware Control, including managing the following:

- Creation and deletion of partitions. Once you create partitions, you can deploy a composite to the appropriate partition. This action enables you to logically group SOA composite applications into partitions. This is similar to the concept of domains in the 10.1.x releases of Oracle BPEL Process Manager.
- Composite state (activating, retiring, starting, stopping, and setting the default composite version).
- Deletion and termination of composite instances.
- Deployment, undeployment, and redeployment actions for SOA composite applications.
- Export of a deployed SOA composite application to a JAR file.
- Manual initiation of SOA composite application test instances from the Test Web Service page.
- Recovery from faults in SOA composite applications, service components, service engines, and business events.
- Manual recovery of failed messages in BPEL processes.
- Automated unit testing of SOA composite applications.
- Attachment of policies to SOA composite applications, service components, and binding components.
- Incoming and outgoing notification messages in human workflow.
- Subscriptions to business events and testing of event publications.
- Publication of web services to the Universal Description, Discovery, and Integration (UDDI) registry.

- Disabling of business monitors (BPEL sensors, BPEL monitors, and BPMN measurements).
- Storage of instance and callback message data in Oracle Coherence distributed cache on Oracle Exalogic platforms.
- Management of the Oracle SOA Suite plug-in introspected by Oracle Virtual Assembly Builder. Oracle Virtual Assembly Builder is a tool for virtualizing installed Oracle components, modifying these components, and deploying them to an environment. Using Oracle Virtual Assembly Builder, you capture the configuration of existing software components in artifacts called software appliances that can then be grouped and their relationships defined into artifacts called software assemblies. For more information about the Oracle SOA Suite plug-in, see *Oracle Virtual Assembly Builder User's Guide*.

The following sections provide a more specific overview of several management tasks:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)
- [Section 1.4.3.2, "Introduction to Policies"](#)
- [Section 1.4.3.3, "Introduction to the Lifecycle State of SOA Composite Applications"](#)
- [Section 1.4.3.4, "Introduction to SOA Composite Application Automated Testing"](#)
- [Section 1.4.3.5, "Introduction to Partitioning of the SOA Infrastructure"](#)

Notes:

- Backup and recovery of Oracle SOA Suite is described in *Oracle Fusion Middleware Administrator's Guide*.
- GridLink data sources and multidata sources protect the SOA Infrastructure against database failures. You typically configure GridLink and multidata sources during system setup (defining multipools directly at installation time). When an Oracle Real Application Clusters (Oracle RAC) database instance fails, the connections are reestablished with available database instances. For more information about Gridlink and Oracle SOA Suite, see "Configuring High Availability for Oracle SOA Suite" of *Oracle Fusion Middleware High Availability Guide*.

1.4.3.1 Introduction to Fault Recovery

You can perform fault recovery actions on BPEL process, BPMN process, Oracle Mediator, human workflow, and business event subscription faults (which include database and component subscription faults) identified as recoverable in Oracle Enterprise Manager Fusion Middleware Control. The following types of fault recovery are supported.

- Recovery from individual faults, where you have access to the most granular recovery options specific to each type of fault
- Recovery from multiple (bulk) faults, where you select multiple faults for recovery

You can perform individual and bulk recovery actions on recoverable faults at the following levels:

- Faults occurring in all SOA composite applications in the SOA Infrastructure
- Faults occurring in an individual SOA composite application

- Faults occurring in service components
- Faults occurring in service engines
- Faults occurring in business events

You perform fault recovery on faults identified as recoverable in Oracle Enterprise Manager Fusion Middleware Control. For BPEL process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the `fault-bindings.xml` file) and which triggers the action `ora-human-intervention`. A BPEL component fault can be recovered in only this case. If no fault policy is defined as part of the composite, then a recoverable BPEL process fault is not possible.

You define a fault recovery policy in the `fault-policies.xml` and `fault-bindings.xml` files outside of Oracle Enterprise Manager Fusion Middleware Control. These files are packaged with the SOA composite application that you deploy to the SOA Infrastructure and administer in Oracle Enterprise Manager Fusion Middleware Control.

Oracle Mediator and human workflow faults do not have the same behavior; they can create recoverable faults without any fault policy. For errors in human task service components or human workflow service engines, you perform fault recovery on faults identified as recoverable from Oracle BPM Worklist.

The following types of faults can be displayed in Oracle Enterprise Manager Fusion Middleware Control:

- Business: Application-specific faults that are generated when there is a problem with the information being processed (for example, a social security number is not found in the database).
- System: Network errors or other types of errors such as a database server or a web service being unreachable.
- Oracle Web Service Manager (OWSM): Errors on policies attached to SOA composite applications, service components, or binding components. Policies apply security to the delivery of messages.

Faults can also be classified as either of the following:

- Recoverable or nonrecoverable:

Only certain types of faults are identified as recoverable. [Table 1–2](#) provides examples of several recoverable and nonrecoverable faults.

- Rejected Messages:

A fault is classified as a rejected message based on where it occurs. If a fault occurs before entering a SOA composite, without generating a composite instance, it is classified as a rejected message. A system or a policy fault can be identified as a rejected message.

Table 1–2 Faults

Recoverable Faults	Nonrecoverable Faults
<ul style="list-style-type: none"> ■ Business faults and some specific system faults ■ Oracle Mediator input file path and output directory mismatch ■ An Oracle BPM Worklist user is not authorized to perform relevant (expected) actions 	<ul style="list-style-type: none"> ■ Rejected messages ■ Most system faults ■ Non-existent references ■ Service invocation failures ■ Policy faults

For more information on performing fault recovery, see the following sections:

- [Section 8.4, "Recovering from SOA Composite Application Faults at the SOA Infrastructure Level"](#)
- [Section 8.5, "Recovering from SOA Composite Application Faults in the Application Home Page"](#)
- [Section 15.1, "Recovering from BPEL Process Service Component Faults"](#)
- [Section 15.3, "Recovering from BPEL Process Service Engine Faults"](#)
- [Section 18.3, "Recovering From Oracle Mediator Service Engine Faults"](#)
- [Section 23.2, "Recovering from Human Workflow Service Engine Faults"](#)
- [Section 23.4, "Recovering from Human Task Service Component Faults"](#)
- [Section 35.4, "Recovering from Business Event Faults"](#)
- [Section 41.1, "Recovering from BPMN Process Service Component Faults"](#)
- [Section 41.3, "Recovering from BPMN Process Service Engine Faults"](#)

1.4.3.2 Introduction to Policies

You can attach and detach policies at the following levels in Oracle Enterprise Manager Fusion Middleware Control:

- SOA composite applications
- Service components
- Service and reference binding components

Policies apply security to the delivery of messages. Oracle Fusion Middleware uses a policy-based model to manage web services. The following types of policies are supported:

- Security: Implements WS-Security 1.0 and 1.1 standards. They enforce authentication and authorization of users, identity propagation, and message protection (message integrity and message confidentiality).
- Reliable Messaging: Supports the WS-ReliableMessaging protocol, guaranteeing the end-to-end delivery of messages.
- Message Transmission Optimization Mechanism (MTOM): Ensures that attachments are in MTOM format, a format for efficiently sending binary data to and from web services.
- WS-Addressing: Verifies that SOAP messages include WS-Addressing headers in conformance with the WS-Addressing specification. Transport-level data is included in the XML message rather than relying on the network-level transport to convey this information.
- Management: Logs request, response, and fault messages to a message log. Management policies can include custom policies.

Policies are part of an enterprise policy framework that allows policies to be centrally created and managed.

For more information, see the following documentation:

- [Section 7.7, "Managing SOA Composite Application Policies"](#)
- [Section 15.2, "Managing BPEL Process Service Component Policies"](#)
- [Section 18.2, "Managing Oracle Mediator Policies"](#)

- [Section 23.1, "Managing Human Task Service Component Policies"](#)
- [Section 38.1, "Managing Binding Component Policies"](#)
- [Section 41.2, "Managing BPMN Process Service Component Policies"](#)
- *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which policies to use for your environment

1.4.3.2.1 Introduction to How Policies are Executed Policies are executed *before* a message reaches the component with the attached policy. This causes the error to be displayed in the component preceding the component with the attached policy. For example:

- A policy attached to an Oracle Mediator service component is executed on the wire before the message is passed to Oracle Mediator. This causes the fault to be displayed in the service binding component instead of Oracle Mediator.
- A policy attached to a human task service component is executed in the preceding BPEL process service component before the message is passed to the human task service component. This causes the fault to be displayed in the BPEL process service component instead of the human task service component.
- A policy attached to a human task service component is executed inside the BPMN process in the human steps associated with the human service component before the message is passed to the human task service component. This causes the fault to be displayed in the BPMN process service component instead of the human task service component.

To see the exact location of the policy error, view the audit trail.

1.4.3.3 Introduction to the Lifecycle State of SOA Composite Applications

You can administer the lifecycle state of deployed SOA composite applications from Oracle Enterprise Manager Fusion Middleware Control. An application is automatically activated when you deploy it to the SOA Infrastructure. During deployment, you can specify a specific revision number for the application. A revision is a specific deployed version of the application. You can deploy multiple revisions of an application, enabling all to run at the same time.

This is a key benefit of revisions. For example, you may have an older revision of an application running with one customer that is still valid. You then begin a partnership with a different customer that requires a slight modification to the design of the application. At some point, you plan to migrate the old customer to the newer revision of the application, but for now that is not necessary. Revisions enable you to run both applications.

The revision value is added to the application name in Oracle Enterprise Manager Fusion Middleware Control. For example, in [Figure 1-1](#), revision 1.0 is the version for many deployed SOA composite applications. If a new request comes in for a specific composite application revision, that composite application revision is invoked. If a new request comes in without specifying a revision, the default revision is invoked. A small green dot distinguishes the default revision from other revisions.

You can perform the following lifecycle administration tasks on a SOA composite application from Oracle Enterprise Manager Fusion Middleware Control:

- Create an instance.
- Stop and restart application revisions. An application revision is typically started instantly after deployment.

- Retire and activate application revisions. Application revisions are instantly activated upon deployment.
- Set an application as the default version.
- Deploy, undeploy, and redeploy application revisions.
- Delete specific instances of an application revision.

With the addition of Oracle SOA Governance tools for lifecycle management, you can perform additional lifecycle management tasks on a SOA composite application, or any component or service within the composite:

- Collect important information on each component in an Oracle Enterprise Repository to help producers, providers, consumers, or other participants in the lifecycle for better understanding. For example, you can show the relationships between the previous and next versions.
- Associate a lifecycle stage categorization to components or service endpoints (for example, build, test, stage, or production).
- Automatically advance and track components and service endpoints through various lifecycle stages, automatically publishing them to an appropriate UDDI service registry for their lifecycle stage.
- Manage their lifecycle and associated approvals using repeatable processes.
- Manage their performance in production, and inform prospective consumers of services for better design-time decisions.

SOA Governance Suite provides Oracle SOA Suite and Oracle BPM Suite users with options to specify and automate a complete lifecycle for applications and their components (for example, planning, design, implementation, testing, staging, production, changes, and retirement).

For more information about administering the lifecycle states of a SOA composite application and SOA governance, see the following sections:

- [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#)
- [Section 7.5, "Managing the State of Deployed SOA Composite Applications"](#)
- [Section 8.2, "Monitoring and Deleting SOA Composite Application Instances from the Application Home Page"](#)
- [Section 8.3, "Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level"](#)
- *Oracle Fusion Middleware User Guide for Oracle Enterprise Repository*
- *Oracle Fusion Middleware Integration Guide for Oracle Enterprise Repository*
- *Oracle Fusion Middleware Configuration Guide for Oracle Enterprise Repository*

1.4.3.4 Introduction to SOA Composite Application Automated Testing

You can create, deploy, and run test cases that automate the testing of SOA composite applications. Test cases enable you to simulate the interaction between a SOA composite application and its references before deployment in a production environment. Test suites consist of a logical collection of one or more test cases. Each test case contains a set of commands to perform as the test instance is executed. The execution of a test suite is known as a test run. Each test corresponds to a single SOA composite application instance. You can also create BPEL process service component test cases in the SOA composite application test case. Instances generated by the

execution of these tests are distinguished as test instances by a little yellow box next to their instance ID on the Instances page of the SOA Infrastructure.

The test suite framework provides the following features:

- Uses emulations to simulate the behavior of components with which your SOA composite application interacts during execution. Instead of invoking a specific component, you can specify a response from the component.
- Uses assertions to validate data during process execution.

For information about the following:

- Creating and running test cases, see [Section 7.6, "Automating the Testing of SOA Composite Applications"](#)
- Designing test cases for SOA composite applications, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*

1.4.3.5 Introduction to Partitioning of the SOA Infrastructure

You can deploy SOA composite applications into separate sections of the SOA Infrastructure known as partitions. Deploying to partitions enables you to logically group SOA composites and perform bulk lifecycle management tasks on large numbers of composites. Partitioning is similar to the concept of domains in the 10.1.x releases of Oracle BPEL Process Manager. However, note that you *cannot* perform specific configuration tasks on partitions, such as restricting login access to a specific partition or configuring partitions (such as configuring threading).

At least one partition is required for deploying SOA composite applications. A default partition named **default** is automatically included with Oracle SOA Suite.

Once you create a partition, you can perform the following tasks:

- Deploy SOA composite applications into the partition using Oracle Enterprise Manager Fusion Middleware Control, Oracle JDeveloper, WebLogic Scripting Tool (WLST) commands, or ant commands.
- Access the partition and its deployed composites through the navigation tree.
- Perform the following bulk lifecycle management tasks on the composites in a specific partition:
 - Start all composites
 - Shut down all composites
 - Undeploy all composites
 - Retire all composites
 - Activate all composites
 - List all composites

Note: Partitions are *not* associated with a particular state such as started, stopped, activated, or retired. Only the composites within the partition are associated with a particular state. Therefore, you *cannot* start, stop, activate, or retire a partition.

For more information, see [Section 7.9, "Grouping SOA Composite Applications into Partitions."](#)

1.4.4 Performance and Tuning of Oracle SOA Suite and Oracle BPM Suite

Many of the configuration parameters that you set can impact performance. For example, you can set configuration parameters in the BPEL process service engine for the dispatcher system, invoke, and engine threads.

For more information, see *Oracle Fusion Middleware Performance and Tuning Guide*.

1.5 Administration for Application Developers

If your role is that of an application developer, manage and test SOA composites using a combination of Oracle JDeveloper and Oracle Enterprise Manager Fusion Middleware Control. See the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite* to develop SOA composite applications with Oracle JDeveloper, and refer to the following sections to deploy, monitor, and initiate a test instance of the composite application with Oracle Enterprise Manager Fusion Middleware Control:

- [Chapter 6, "Monitoring SOA Composite Applications"](#)
- [Chapter 7, "Deploying and Managing SOA Composite Applications"](#)
- [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#)

To create and model business processes with Oracle BPM Suite, see *Oracle Fusion Middleware Modeling and Implementation Guide for Oracle Business Process Management*.

1.6 Administration with Oracle Enterprise Manager 11g Grid Control and the Oracle SOA Management Pack

Oracle Enterprise Manager 11g Grid Control enables you to monitor runtime and historical data for multiple Oracle Fusion Middleware farms and Oracle WebLogic Server domains. Oracle Enterprise Manager 11g Grid Control supports the discovery, monitoring, and central management of the entire family of Oracle Fusion Middleware components, including Oracle SOA Suite through the Oracle SOA Management Pack.

Oracle Enterprise Manager 11g Grid Control is a separately licensed and installed component that is not part of the Oracle Fusion Middleware installation.

For information about the Oracle SOA Management Pack, visit the following URL:

<http://www.oracle.com/us/products/middleware/soa/management-pack/overview/index.html>

Part II

Getting Started with Administration

This part describes how to navigate to Oracle SOA Suite and Oracle BPM Suite administration tasks in Oracle Enterprise Manager Fusion Middleware Control.

This part includes the following chapter:

- [Chapter 2, "Getting Started with Administering Oracle SOA Suite and Oracle BPM Suite"](#)

Getting Started with Administering Oracle SOA Suite and Oracle BPM Suite

This chapter describes how to log in to and navigate the menus of Oracle Enterprise Manager Fusion Middleware Control to perform Oracle SOA Suite and Oracle BPM Suite configuration, monitoring, and management tasks. It also describes how to access the System MBean Browser and Oracle WebLogic Server Administration Console from Oracle Enterprise Manager Fusion Middleware Control.

This chapter includes the following sections:

- [Section 2.1, "Logging In to Oracle Enterprise Manager Fusion Middleware Control"](#)
- [Section 2.2, "Navigating to Oracle SOA Suite and Oracle BPM Suite Administration Tasks"](#)
- [Section 2.3, "Navigating to the System MBean Browser"](#)
- [Section 2.4, "Logging Out of Oracle Enterprise Manager Fusion Middleware Control"](#)

For more information about service engines, service components, binding components, and the SOA Infrastructure, see [Chapter 1, "Introduction and Concepts."](#)

2.1 Logging In to Oracle Enterprise Manager Fusion Middleware Control

This section describes how to log in to Oracle Enterprise Manager Fusion Middleware Control.

To log in to Oracle Enterprise Manager Fusion Middleware Control:

1. Use Microsoft Internet Explorer 7, Mozilla Firefox 2.0.0.2, Apple Safari 4.0, or Mozilla Firefox 3.0.x to access the following URL:

`http://host_name:port/em`

Where *host_name* is the name of the host on which Oracle Enterprise Manager Fusion Middleware Control is installed and *port* is a number that is dynamically set during installation. This port is typically 7001, but is the HTTP port associated with Oracle HTTP Server. For environments in which the SSL port was enabled during configuration, the default port is 7002.

2. Enter *weblogic*/*password* and click **Login**.

where:

- *weblogic* is the default administrator user name for Oracle Enterprise Manager Fusion Middleware Control (you can change this during installation).
 - *password* is the password you entered during Oracle SOA Suite installation.
- The Accessibility Preference dialog appears the first time you log in. If you want, you can select to not display this dialog again.
3. Select an appropriate action and click **Continue**.
- The farm home page is displayed. From there, you can navigate to Oracle SOA Suite and Oracle BPM Suite in several different ways, as described in the following sections.

For more information about installation, see *Oracle Fusion Middleware Installation Guide for Oracle SOA Suite and Oracle Business Process Management Suite*.

2.2 Navigating to Oracle SOA Suite and Oracle BPM Suite Administration Tasks

This section describes methods for navigating to Oracle SOA Suite and Oracle BPM Suite administration tasks in Oracle Enterprise Manager Fusion Middleware Control:

- [Section 2.2.1, "Navigating Through the SOA Infrastructure Home Page and Menu"](#)
- [Section 2.2.2, "Navigating Through the SOA Composite Application Home Page and Menu"](#)
- [Section 2.2.3, "Navigating Through the Partition Home Page and Menu"](#)
- [Section 2.2.4, "Navigating to Deployed Java EE Applications"](#)
- [Section 2.2.5, "Navigating to the Oracle WebLogic Server Administration Console and Other Pages"](#)
- [Section 2.2.6, "Navigating to the SOA Infrastructure or SOA Composite Application Home Page from the Farm Home Page"](#)

Note: The **Farm** menu is always displayed at the top of the navigator. As you expand the **SOA** folder in the navigator and click the links displayed beneath it, the **SOA Infrastructure** menu becomes available at the top of the page.

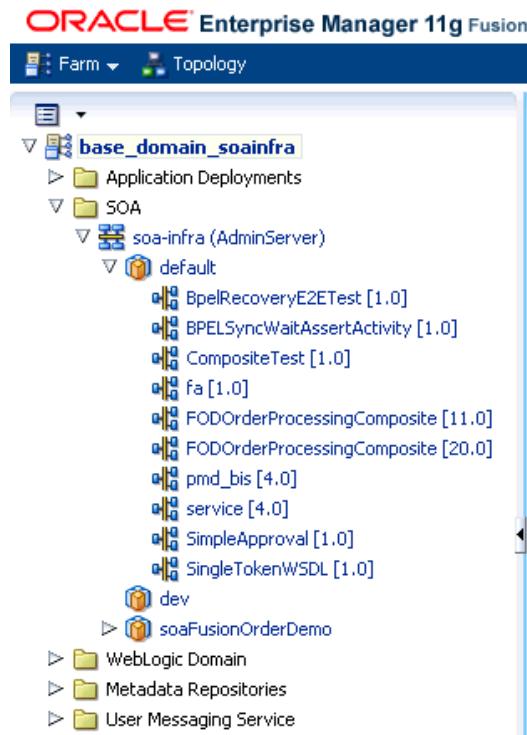
2.2.1 Navigating Through the SOA Infrastructure Home Page and Menu

You can navigate to Oracle SOA Suite and Oracle BPM Suite administration tasks through the SOA Infrastructure home page and menu. The SOA Infrastructure provides you with access to all deployed SOA composite applications, service engines, service components, business events, and other elements.

To navigate through the SOA Infrastructure home page and menu:

1. Expand **SOA > soa-infra** in the navigator.
2. Expand the specific partition (for example, **default**).

This displays all SOA composite applications running in the selected partition of the SOA Infrastructure for that managed server. SOA composite applications are grouped into the partition in which they are deployed.



3. Click **soa-infra.**

This displays the Dashboard page of the SOA Infrastructure. Click the help icon at the top of this page to access the Resource Center for the entire Oracle SOA Suite.

The upper part of the page displays details about recently deployed SOA composite application instances, deployed composites, recent faults, and rejected messages. You can click a specific SOA composite application name or instance ID to access additional details. You can also click **Show More** at the bottom of each section to see more information about all items.

The screenshot shows the Oracle SOA Infrastructure administration dashboard. At the top, there is a banner indicating "BPEL Message Recovery Required". Below the banner, there are tabs for "Dashboard", "Deployed Composites", "Instances", and "Faults and Rejected Messages". The "Recent Composite Instances" section shows a table with columns for Instance ID, Composite, Start Date, and Status. The "Deployed Composites" section shows a table with columns for Composite, Status, Mode, Instances, and Faulted Instances. The "Recent Faults and Rejected Messages" section shows a table with columns for Error Message, Recovery, Fault Time, Composite, Fault Location, Composite Instance ID, and Logs.

Composite	Status	Mode	Instances	Faulted Instances
B2BX12OrderGateway	Active		0	0
OrderSDOComposite	Active		0	0
PartnerSupplierComp	Active		0	0
OrderBookingCompo	Active		0	0
BPELSyncWaitAssert	Active		0	0
CompositeTest [1.0]	Active		90	18
SingleTokenWSDL [1]	Active		0	0
service [4.0]	Active		0	0

The lower part of the page displays details about the service engines provided by the SOA Infrastructure and a graphical representation of the number of instances and faults for all SOA composite applications hosted in the SOA Infrastructure. You must expand these sections to see this information. Click a service engine name to access more specific details.

4. Note that the **SOA Infrastructure** menu appears below the **soa-infra** name at the top of the page.

Note: Depending upon your current location, the context of this menu changes to provide you with the administrative options most relevant to your current location. For example, when you are within the pages of a SOA composite application, the **SOA Composite** menu is displayed, or on the home page of a specific partition, the **SOA Partition** menu is displayed.

5. Select the **SOA Infrastructure** menu.



These administrative options enable you to perform the following tasks:

Option	Description
Home	<p>This option enables you to directly navigate to the selected tab of the SOA Infrastructure:</p> <ul style="list-style-type: none"> Dashboard: This option enables you to monitor <i>all</i> SOA composite applications deployed to the SOA Infrastructure. For more information, see Section 4.3, "Monitoring SOA Infrastructure Recent Instances and Faults and Deployed Composites." Deployed Composites: This option enables you to manage the state of all SOA composite applications in the SOA Infrastructure. For more information, see Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level." Instances: This option enables you to monitor and delete any number of instances across <i>all</i> deployed SOA composite applications in the SOA Infrastructure. For more information, see Section 8.3, "Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level." Faults and Rejected Messages: This option enables you to monitor and perform individual and bulk fault recoveries across any number of SOA composite applications in the SOA Infrastructure. For more information, see Section 8.4, "Recovering from SOA Composite Application Faults at the SOA Infrastructure Level."
Monitoring	<p>This option displays the following details:</p> <ul style="list-style-type: none"> A summary of performance statistics in the SOA infrastructure. Request processing details that show the breakup of time spent in handshaking requests between the binding components, service infrastructure, and service engines. <p>For more information, see Section 4.4, "Monitoring Message Delivery Processing Requests."</p>
Logs	<p>This option enables you to view and configure the logging levels for runtime loggers.</p> <p>For more information, see Section 3.4, "Configuring Log Files" and Section B.1, "Setting Logging Levels for Troubleshooting."</p>
SOA Deployment	<p>This option enables you to deploy, undeploy, or redeploy SOA composite applications.</p> <p>For more information, see Chapter 7, "Deploying and Managing SOA Composite Applications."</p>

Option	Description
Manage Partitions	This option enables you to logically group your SOA Infrastructure into separate sections known as partitions in which you deploy your SOA composite applications. This helps you to logically group composites so that you can perform bulk lifecycle management tasks on large numbers of SOA composite applications. For more information, see Section 1.4.3.5, "Introduction to Partitioning of the SOA Infrastructure" and Section 7.9, "Grouping SOA Composite Applications into Partitions."
Service Engines	This option provides access to monitoring and management tasks for the BPEL process, Oracle BPMN, Oracle Mediator, human workflow, and business rules service engines.
Bindings	This option displays details about recently active document types and trading partners, and inbound and outbound endpoints for Oracle B2B. For more information, see Section 33.1, "Monitoring the Oracle B2B Infrastructure."
Services and References	This option displays message processing metrics for service and reference binding components in all SOA composite applications. For more information, see Section 4.5, "Monitoring Service and Reference Binding Components in the SOA Infrastructure."
Business Events	This option displays available business events, current event subscribers, and fault details. For more information, see Chapter 35, "Managing Business Events."

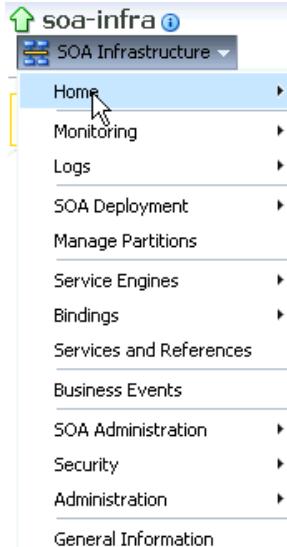
Option	Description
SOA Administration	<p>This option provides access to the following configuration tasks for the SOA Infrastructure and each service engine:</p> <ul style="list-style-type: none"> ▪ Common Properties: For setting properties that impact the entire SOA Infrastructure, such as viewing and setting the SOA Infrastructure audit level, capturing the state of the SOA composite application instance, enabling the payload validation of incoming messages, specifying the callback server and server URLs, setting Universal Description, Discovery and Integration (UDDI) registry properties, viewing the data source JNDI locations, setting the nonfatal connection retry count, setting web service binding properties, and optimizing the loading performance of pages. <p>For more information, see Section 3.1, "Configuring SOA Infrastructure Properties."</p> <ul style="list-style-type: none"> ▪ BPEL Properties: For setting the audit trail size, maximum document size for a variable, payload validation for incoming and outgoing messages, audit trail level, BPEL monitor and sensor disabling status, and dispatcher thread level for invoke message threads, system threads, and service engine threads. <p>For more information, see Section 13.1, "Configuring BPEL Process Service Engine Properties."</p> <ul style="list-style-type: none"> ▪ BPMN Properties: For setting the audit trail size, maximum document size for a variable, payload validation for incoming and outgoing messages, audit trail level, and dispatcher thread level for invoke message threads, system threads, and service engine threads. <p>For more information, see Section 39.1, "Configuring BPMN Process Service Engine Properties"</p> <ul style="list-style-type: none"> ▪ Mediator Properties: For setting the audit level, metrics level, number of parallel worker threads, number of maximum rows retrieved for parallel processing, parallel thread sleep values, error thread sleep values, container ID refresh time, and container ID lease timeout values. <p>For more information, see Section 16.1, "Configuring Oracle Mediator Service Engine Properties."</p> <ul style="list-style-type: none"> ▪ Workflow Config: Displays the following tabs: <p>Mailer tab: For setting the workflow service notification mode and actionable email address value. For more information, see Section 21.1, "Configuring Human Workflow Notification Properties."</p> <p>Task tab: For setting the actionable email account, adding the worklist application URL, selecting the pushback assignee, adding portal realm mapping, and adding the task auto release configuration priority. For more information, see Section 21.3, "Configuring Human Workflow Task Service Properties."</p> <ul style="list-style-type: none"> ▪ B2B Server Properties: For enabling Dynamic Monitoring Service (DMS) metrics. For more information, see Section 32.1, "Configuring Oracle B2B Server Properties." ▪ Cross References: For selecting cross-reference values. For more information, see Section 19, "Managing Cross-References."
Security	<p>This option displays the following selections:</p> <ul style="list-style-type: none"> ▪ Application Policies: For creating application policies that an application relies upon for controlling access to resources. ▪ Application Roles: For creating application roles for applications. <p>For more information about application roles, see <i>Oracle Fusion Middleware Application Security Guide</i>.</p> <p>This option is available for all deployed Java EE applications, including the SOA Infrastructure (soa-infra) application. These options do <i>not</i> configure security policies for SOA composites.</p> <p>For more information about attaching policies to composite applications, see Section 7.7, "Managing SOA Composite Application Policies."</p>

Option	Description
Administration	<p>This option displays the following selections:</p> <ul style="list-style-type: none"> ▪ MDS Connections: For managing metadata service (MDS) connections. ▪ TopLink Sessions: For managing cache for the Oracle TopLink persistence framework. ▪ System MBean Browser: For advanced configuration of properties across applications and components. <p>For more information, see Section 2.3, "Navigating to the System MBean Browser" and <i>Oracle Fusion Middleware Administrator's Guide</i> for instructions on using the System Mean Browser.</p> <p>In addition to configuring the System MBean Browser from Oracle Enterprise Manager Fusion Middleware Control, you also can invoke SOA configuration MBean operations with the WebLogic Scripting Tool (WLST). For information, see <i>Oracle Fusion Middleware Oracle WebLogic Scripting Tool</i>.</p> <p>Note: The System MBean Browser includes an MBean for Oracle BPMN, even if Oracle BPM Suite is not installed. If Oracle BPM Suite is not installed, this MBean cannot be used, and should be ignored. The presence of this MBean does not impact the runtime behavior of other Oracle SOA Suite components.</p>
General Information	This option displays general details about the SOA Infrastructure, such as the Oracle Enterprise Manager Fusion Middleware Control version, Oracle home, and Oracle instance.

Note: Starting with 11g Release 1 (11.1.1.4.0), you can no longer stop and start the SOA Infrastructure from the **SOA Infrastructure** menu.

6. Select a specific SOA composite application from the **soa-infra** list shown in Step 2.

The **SOA Infrastructure** menu is now displayed above the navigator, providing you with access to the same high-level administrative options, even when you are within the pages of a SOA composite application. This menu changes positions when you select a composite application.



7. Right-click **soa-infra** in the navigator. The menu that is displayed provides you with access to the same administrative options that appear in the **SOA Infrastructure** menu.

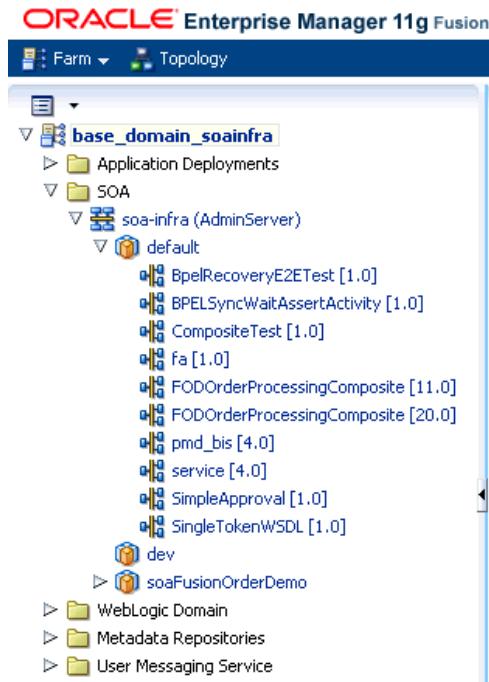
2.2.2 Navigating Through the SOA Composite Application Home Page and Menu

You can navigate directly to Oracle SOA Suite and Oracle BPM Suite administration tasks for a specific SOA composite application.

To navigate through the SOA composite application home page and menu:

1. Expand **SOA > soa-infra** in the navigator.
2. Expand the partitions.

This displays all SOA composite applications running in the partitions of the SOA Infrastructure.



3. Select a specific SOA composite application.

This displays the home page for the selected SOA composite application. The upper part of the page displays details about recent instances and faults and rejected messages. This part of the page also provides you with access to important administrative and configuration tasks at the composite level.

The screenshot shows the Oracle SOA Composite application interface for 'CompositeTest [1.0]'. At the top, there's a banner indicating 'BPEL Message Recovery Required' with options to 'Show Details...', 'Go to BPEL Recovery Console', 'Set Time Threshold...', and 'Disable Alert...'. Below this is a navigation bar with tabs for 'Dashboard', 'Instances', 'Faults and Rejected Messages', 'Unit Tests', and 'Policies'. The main content area is divided into sections:

- Recent Instances:** Shows a table of running instances. One instance, '40007', has a red error icon and is marked as faulty.
- Recent Faults and Rejected Messages:** Shows a table of recent faults, all of which are BPEL faults related to the 'LoanBroker' service.

- Click **Show More** at the bottom of each section to see more of these items. You can also click links to access more details about a specific composite instance or fault.

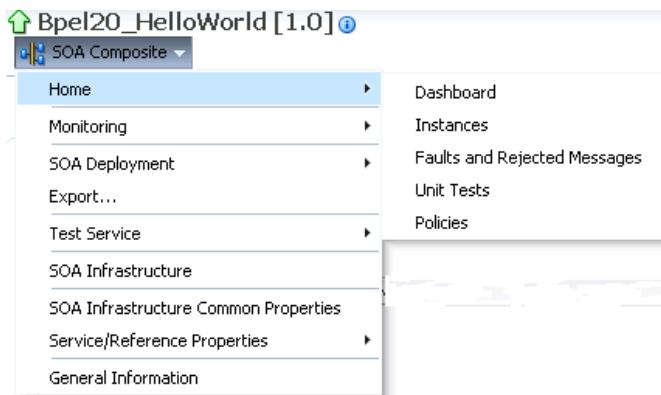
The lower part of the page displays details about the service components (in this example, BPEL processes) and binding components (services and references) included in the SOA composite application. You can click a specific service component or service or reference binding component in the **Name** column to access more specific details.

The screenshot continues to show the SOA Composite application interface. Below the previous sections, there are two more tables:

- Component Metrics:** Shows the total number of instances for each component type. All components are BPEL and currently have 0 recoverable faults.
- Services and References:** Shows the usage statistics for a single Web Service named 'client'.

When you are within the pages of a SOA composite application, the **SOA Composite** menu appears below the application name at the top of the page. This menu provides you with administrative tasks specific to the current composite application.

- Select the **SOA Composite** menu.



These administrative options enable you to perform the following tasks.

Option	Description
Home	<p>This option enables you to directly navigate to the selected tab of the SOA composite application:</p> <ul style="list-style-type: none"> ▪ Dashboard: This option enables you to manage the state of an individual SOA composite application from the application's home page. For more information, see Section 7.5.2, "Managing the State of an Application from the SOA Composite Application Home Page." ▪ Instances: This option enables you to manage the lifecycle state of SOA composite applications. You can also monitor and delete specific SOA composite application instances with this option. For more information, see Section 8.2, "Monitoring and Deleting SOA Composite Application Instances from the Application Home Page." ▪ Faults and Rejected Messages: This option enables you to monitor and perform individual and bulk fault recoveries for a SOA composite application. For more information, see Section 8.5, "Recovering from SOA Composite Application Faults in the Application Home Page." ▪ Unit Tests: This option enables you to run test cases that simulate the interaction between the current SOA composite application and its web service partners before deployment to a production environment. This option generates test instances of the composite. For more information, see Section 1.4.3.4, "Introduction to SOA Composite Application Automated Testing" and Section 7.6, "Automating the Testing of SOA Composite Applications." ▪ Policies: This option enables you to view and attach or detach policies to or from the SOA composite application. For more information, see Section 1.4.3.2, "Introduction to Policies" and Section 7.7, "Managing SOA Composite Application Policies."
Monitoring	This option displays the performance summary statistics for the selected SOA composite application.
SOA Deployment	<p>This option enables you to undeploy or redeploy this SOA composite application, or deploy another SOA composite application.</p> <p>For more information, see Section 7.1, "Deploying SOA Composite Applications."</p>
Export	<p>This option enables you to export a deployed SOA composite application to a JAR file.</p> <p>For more information, see Section 7.8, "Exporting a Deployed SOA Composite Application."</p>
Test Service	<p>This option enables you to manually initiate an instance of this deployed SOA composite application through the Test Web Service page.</p> <p>For more information, see Section 8.1, "Initiating a SOA Composite Application Test Instance."</p>

Option	Description
SOA Infrastructure	This option takes you to the SOA Infrastructure home page.
SOA Infrastructure Common Properties	This option enables you to view and set the audit level, capture the state of the SOA composite application instance, enable the payload validation of incoming messages, set UDDI registry properties, specify the callback server and server URLs, view the data source JNDI locations, set the nonfatal connection retry counts, set web service binding properties, and optimize the loading performance of pages. The SOA composite application typically inherits the settings defined at the SOA Infrastructure level. For more information, see Section 3.1, "Configuring SOA Infrastructure Properties."
Service/ Reference Properties	This option enables you to configure WSDL file properties for the service and reference binding components included in the SOA composite application. For more information, see Section 36.1, "Configuring Service and Reference Binding Component Properties."
General Information	This option displays general details about this SOA composite application, such as Oracle Enterprise Manager Fusion Middleware Control version, Oracle home, Oracle instance, and partition in which the composite is deployed.

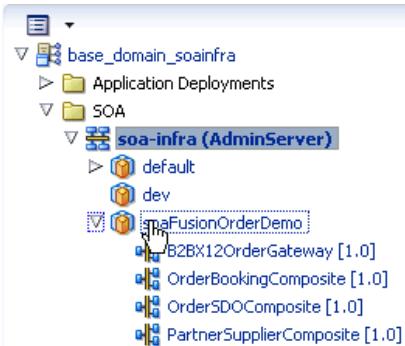
6. Right-click the name of a SOA composite application in the navigator. A menu is displayed that provides you with access to the same administrative options that appear in the **SOA Composite** menu.

2.2.3 Navigating Through the Partition Home Page and Menu

You can navigate to administrative tasks for a specific partition in the SOA Infrastructure.

To navigate through the partition home page and menu:

1. Expand **SOA > soa-infra** in the navigator.
2. Click a specific partition.



3. At the top of the page, select the **SOA Partition** menu.



These administrative options enable you to perform the following tasks:

Option	Description
Home	<p>This option displays the following details for the partition home page:</p> <ul style="list-style-type: none"> ▪ SOA composite applications in this partition. ▪ Status of the SOA composite applications in this partition (either Up (on) or Down (off)). ▪ Mode of the SOA composite applications in this partition (active or retired). ▪ Total number of instances and faulted instances of the SOA composite applications in this partition. ▪ Time at which the SOA composite applications in this partition were last deployed, redeployed, or reconfigured.
Composites Control	<p>This option displays the following bulk lifecycle management tasks:</p> <ul style="list-style-type: none"> ▪ Start Up All: Invokes a dialog for starting all composites in this partition. ▪ Shut Down All: Invokes a dialog for shutting down all composites in this partition. ▪ Activate All: Invokes a dialog for activating all composites in this partition. ▪ Retire All: Invokes a dialog for retiring all composites in this partition.
	<p>For information about these composite states, see Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level."</p>
SOA Deployment	<p>This option displays the following management tasks:</p> <ul style="list-style-type: none"> ▪ Deploy To This Partition: Invokes the Deploy SOA Composite wizard for selecting a composite to deploy in this partition. ▪ Undeploy All From This Partition: Invokes a dialog for undeploying all composites in this partition. ▪ Redeploy: Invokes the Redeploy SOA Composite wizard to select composites to redeploy in this partition.
	<p>For more information, see Chapter 7, "Deploying and Managing SOA Composite Applications."</p>
Delete This Partition	<p>This option invokes a dialog to delete this partition. All composites in the partition are automatically undeployed before the partition is deleted.</p>
General Information	<p>This option displays general details about the partition, such as the partition (target) name, Oracle Fusion Middleware version, Oracle Fusion Middleware home directory, domain home directory, hostname, and deployed server.</p>

4. Right-click the name of a partition in the navigator. A menu is displayed that provides you with access to the same administrative options that appear in the **SOA Partition** menu.

Note: You can also access the partition home page from the **Related Topics** menu on the home page of a SOA composite application.

For information about partitions, see [Section 1.4.3.5, "Introduction to Partitioning of the SOA Infrastructure"](#) and [Section 7.9, "Grouping SOA Composite Applications into Partitions."](#)

2.2.4 Navigating to Deployed Java EE Applications

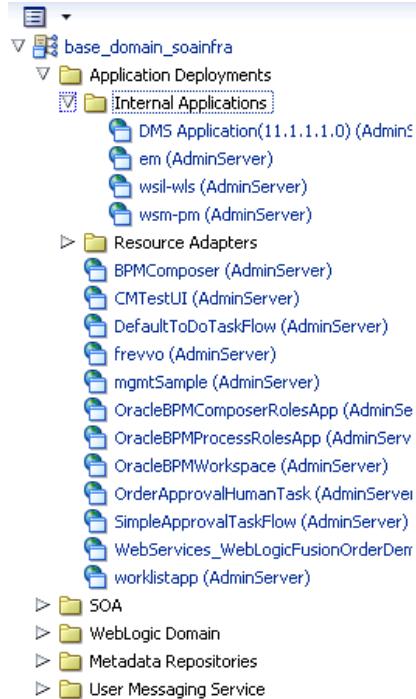
You can navigate to deployed Java EE applications related to Oracle SOA Suite and (if installed) Oracle BPM Suite components. These applications are Java EE applications that represent the SOA system components, such as the technology adapters, Oracle B2B, Oracle BPM Worklist, and so on. You can deploy a web service and see it listed here. You can also click individual applications (for example, the deployed web

service), and manage and test that you can deploy WAR and EAR files from here. If you have deployed your own Java EE applications, they are also displayed here.

To navigate to deployed Java EE applications:

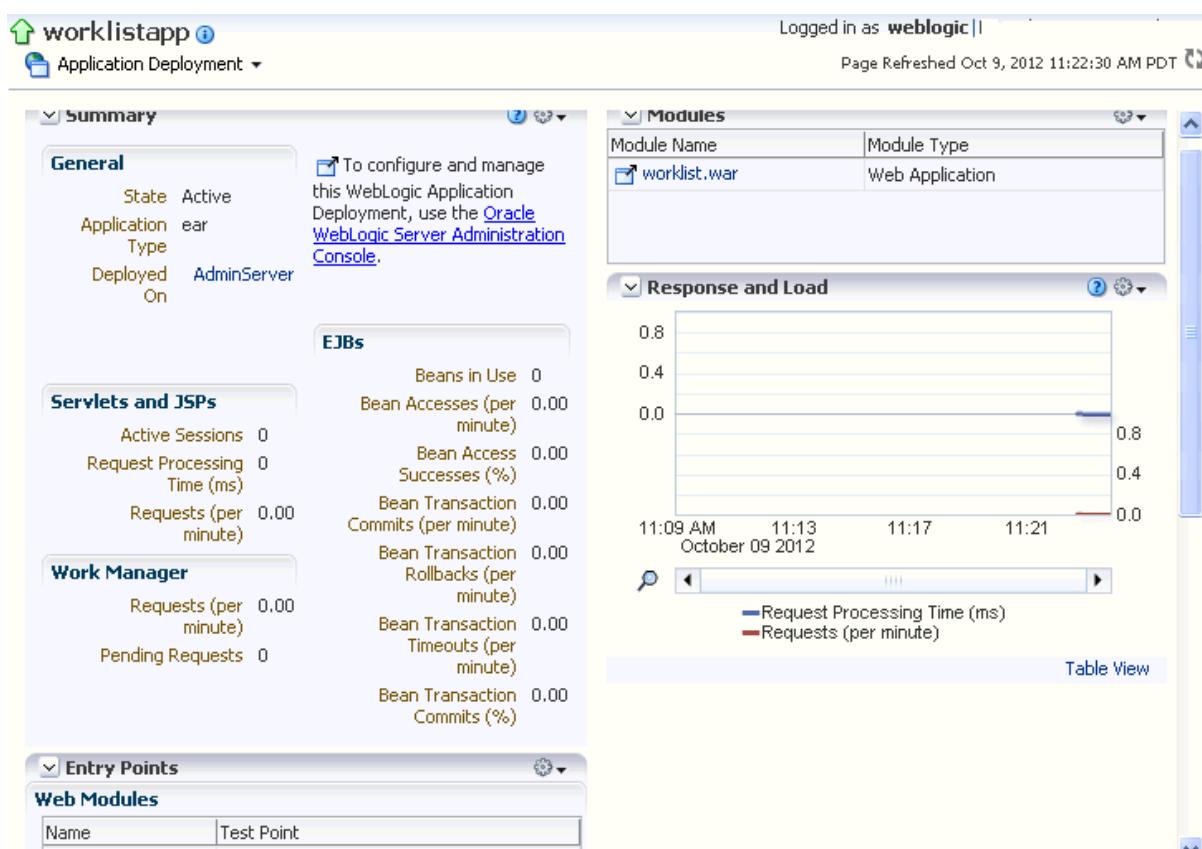
1. Expand **Application Deployments** in the navigator.
2. Expand **Internal Applications**.
3. Expand **Resource Adapters**.

A list of deployed Java EE applications related to Oracle SOA Suite and Oracle BPM Suite components appears.



4. Click a specific application (for this example, **worklistapp** is selected).

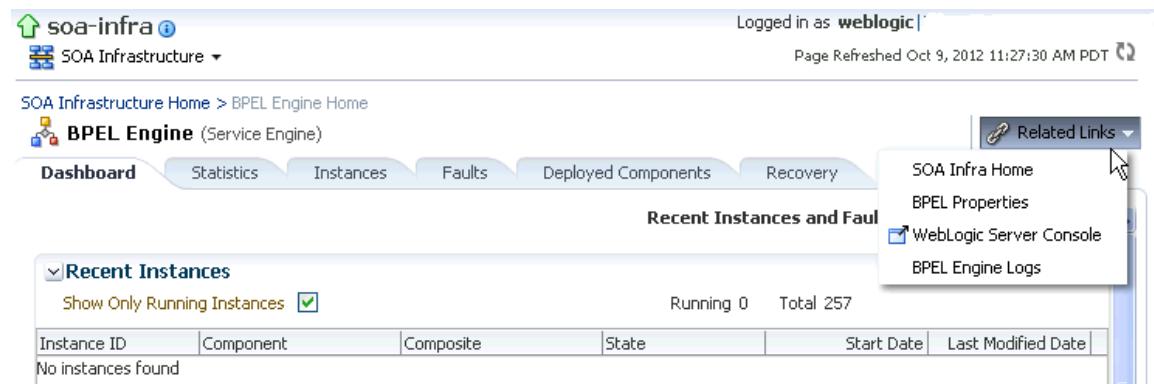
The page displays details about application performance.



While Oracle Enterprise Manager Fusion Middleware Control displays the URLs for all deployed modules, you cannot directly invoke them from this page.

2.2.5 Navigating to the Oracle WebLogic Server Administration Console and Other Pages

Most pages in Oracle Enterprise Manager Fusion Middleware Control include a **Related Links** menu in the upper right-hand corner. Depending upon your current location, the context of the menu changes to provide links to relevant pages. For example, when you are on the BPEL process service engine page, the **Related Links** menu provides links to the SOA Infrastructure home page, the BPEL process configuration properties page, the Oracle WebLogic Server Administration Console, and a page for service engine log files. [Figure 2–1](#) provides details. You can also click **soa-infra** at the top of the BPEL service engine page to go directly to the SOA Infrastructure home page.

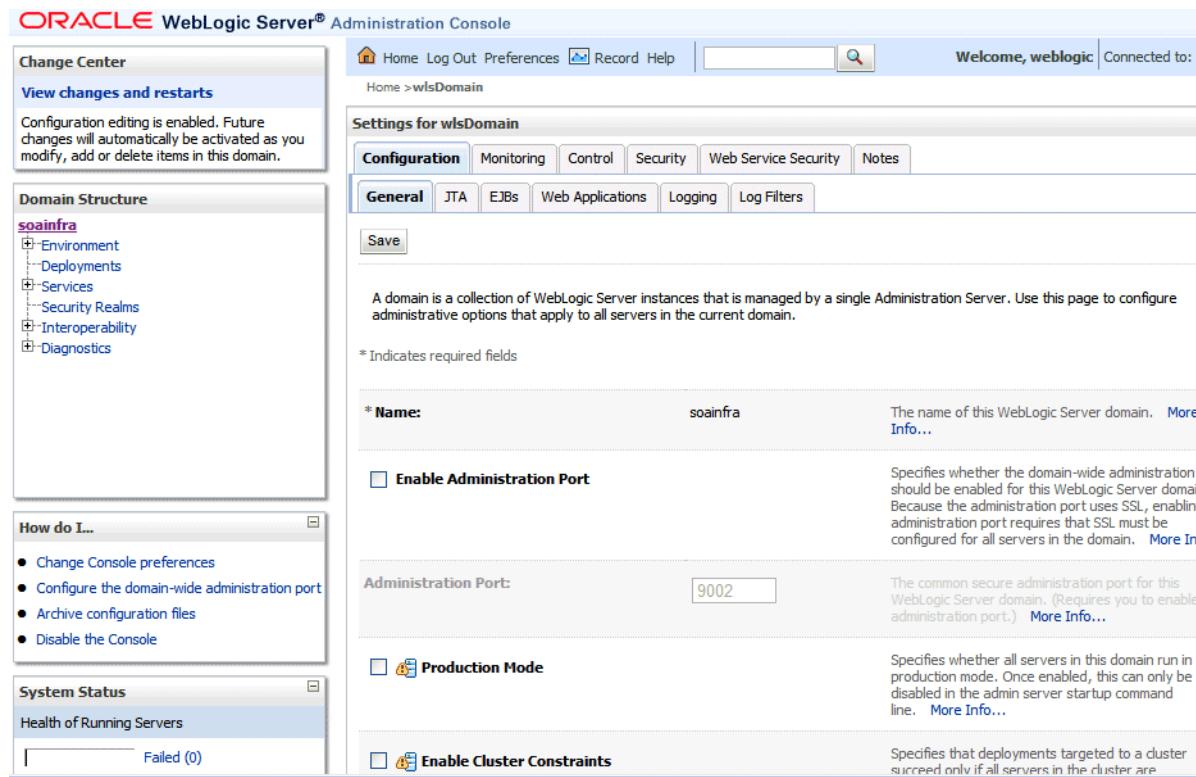
Figure 2–1 Related Links Menu for a SOA Composite Application

When you are on the page of a service component of a SOA composite application, several navigational menus and links are available:

- The **Related Links** menu provides links to the SOA Infrastructure home page and the applicable service engine home page. [Figure 2–2](#) provides details.
- Breadcrumbs are displayed in the upper left-hand corner as you traverse further into a SOA composite application.
- Within any SOA composite application page (including the service component pages), links to the SOA Infrastructure pages also remain available through the **SOA Infrastructure** menu that is displayed next to the **Farm** menu above the navigator. For example, this enables you to go from the home page of a specific BPEL service component directly to the BPEL service engine configuration properties page.
- Names at the top of the page can be clicked to navigate to parent pages. For example, clicking the name of a composite at the very top of a service component page enables you to go to the composite that includes that component.

Figure 2–2 Related Links Menu for a Service Component of a SOA Composite Application

The service engines, SOA administration (such as the SOA Infrastructure Common Properties page), and business event pages all provide access to Oracle WebLogic Server Administration Console from the **Related Topics** list. Selecting **WebLogic Server Console** opens a new browser page and takes you to the login prompt for the Oracle WebLogic Server Administration Console. Your current page in Oracle Enterprise Manager Fusion Middleware Control is not lost. After logging in, the home page is displayed. [Figure 2–3](#) provides details.

Figure 2–3 Oracle WebLogic Server Administration Console

You can perform the following Oracle SOA Suite tasks from Oracle WebLogic Server Administration Console:

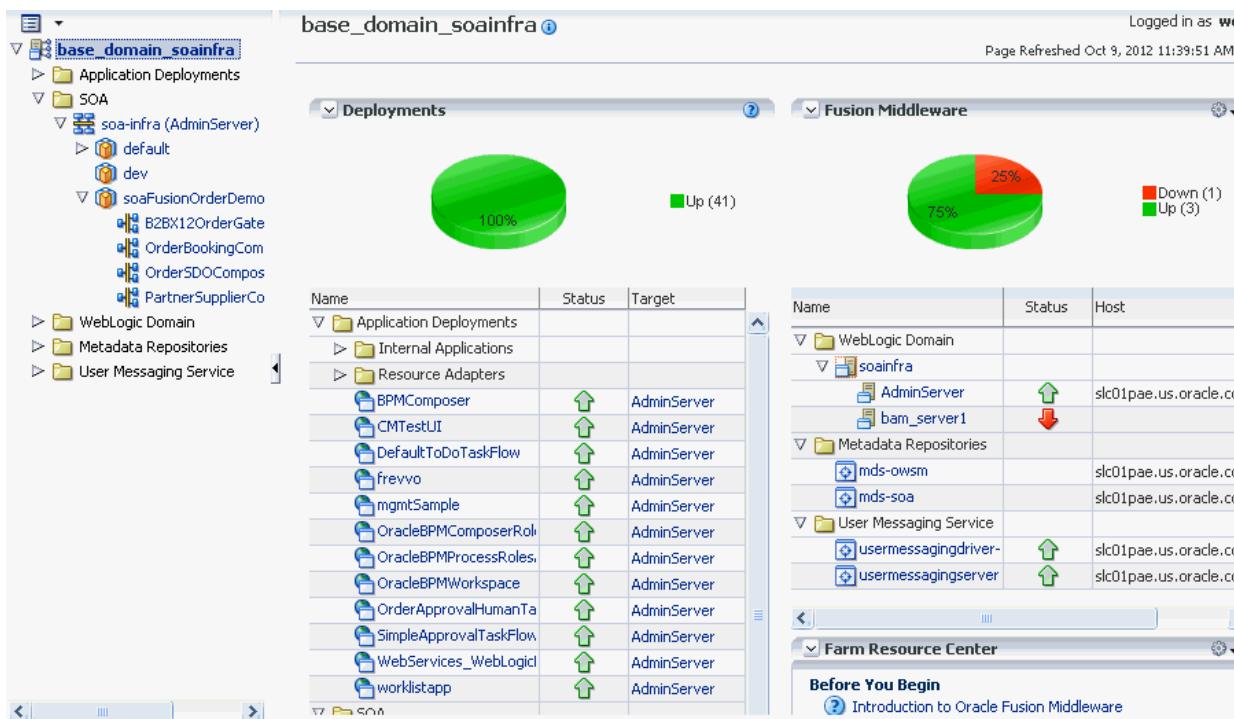
- Configure adapter connections for composite references.
- Create and manage data sources used by adapters.
- Create and manage JMS resources used by adapters.
- Manage SOA Infrastructure data sources (for example, modifying connection pool settings).
- Administer security of human workflow users.
- Manage Oracle WebLogic Server transaction (JTA) settings (for example, the transaction timeout value).
- Deploy human task user interfaces.

2.2.6 Navigating to the SOA Infrastructure or SOA Composite Application Home Page from the Farm Home Page

You can access the home page of the SOA Infrastructure, a specific SOA partition, or a specific SOA composite application from the Farm home page.

To navigate to the SOA Infrastructure or SOA composite application home page:

1. In the **Deployments** section of the Farm home page, click **soa-infra** or a specific SOA composite application.



The home page for your selection is displayed.

2.3 Navigating to the System MBean Browser

Some configuration parameters for Oracle SOA Suite are not exposed in any Oracle Enterprise Manager Fusion Middleware Control property page. These parameters can nonetheless be modified using the System MBean Browser.

A managed bean (MBean) is a Java object that represents a Java Management Extensions (JMX) manageable resource in a distributed environment, such as an application, a service, a component, or a device. Oracle Enterprise Manager Fusion Middleware Control provides the System MBean Browser for managing MBeans that perform specific monitoring and configuration tasks.

This section describes the various ways to access the System MBean Browser, and provides references to documentation that describes how to edit specific SOA Infrastructure and service component properties.

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

2.3.1 Accessing the System MBean Browser from the Main Page

You can directly access the main System MBean Browser page. The main page provides you with access to all properties in the System MBean Browser. You must then traverse the navigational tree to the section that you want to manage.

To access the System MBean Browser from the main page:

1. In the navigator, right-click **soa-infra**.
2. Select **Administration > System MBean Browser**.

The System MBean Browser is displayed.

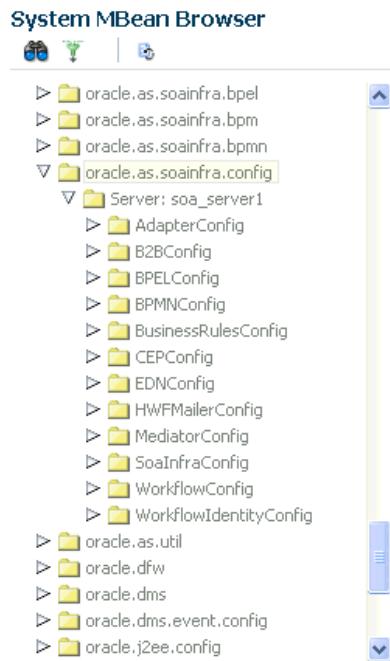
The screenshot shows the Oracle SOA Infrastructure System MBean Browser. On the left, a tree view shows the navigation path: Farm_WLS_SOAWC > Application Deployments > SOA > soa-infra (soa_server) > default. The main panel displays the 'System MBean Browser' for the 'soa-infra (soa_server)' node. The left sidebar lists 'Configuration MBeans' under 'com.bea' and 'AppDeployment'. The right panel shows the 'Configuration MBeans' for the 'AppDeployment' section, specifically for 'soa-infra (soa_server)'. The table has two tabs: 'Attributes' (selected) and 'Operations'. The 'Attributes' tab lists eight entries:

Name	Description
1 AbsoluteInstallDir	The fully resolved location of this on the Administration Server.
2 AbsolutePlanDir	The fully resolved location of this directory on the Administration Server.
3 AbsolutePlanPath	The fully resolved location of this on the Administration Server.
4 AbsoluteSourcePath	The fully resolved location of this on the Administration Server.
5 ApplicationIdentifier	The Application Identifier of the application version across all versions. If the application is not versioned, the Application name.
6 ApplicationName	The name of the application. Note that the name of the current application.
7 CompatibilityName	This is only set for beans created for applications configured using Application Adapter.
8 DeploymentOrder	An integer value that indicates whether other deployable units on a server values are deployed before those.

3. Scroll down to Application Defined MBeans.

The screenshot shows the Oracle SOA Infrastructure System MBean Browser. The navigation path is identical to the previous screenshot: Farm_WLS_SOAWC > Application Deployments > SOA > soa-infra (soa_server) > default. The main panel displays the 'System MBean Browser' for the 'soa-infra (soa_server)' node. The left sidebar now shows the expanded 'Application Defined MBeans' section, which includes sub-folders like EMDomain, TopLink, com.oracle, etc. The right panel shows the same 'Configuration MBeans' table as the previous screenshot, with the 'Attributes' tab selected.

4. Expand the Application Defined MBeans to access specific sections.



This section contains properties for many Oracle SOA Suite components, including the following:

- **oracle.as.soainfra.bpel**
 - **oracle.as.soainfra.bpm**
 - **oracle.as.soainfra.bpmn**
 - **oracle.as.soainfra.config**
5. Expand the component that includes the properties you want to configure. For example, expand **oracle.as.soainfra.config > Server: server_name > BPELConfig > bpel**. You can also access this location by clicking the **More BPEL Configuration Properties** short cut described in Step 3 of [Section 2.3.2, "Accessing the System MBean Browser from the Component Property Pages."](#)

The screenshot shows the 'System MBean Browser' interface with the 'oracle.as.soainfra.config' component expanded. Under 'Server: soa_server1 > BPELConfig', the 'bpel' node is selected. On the right, the 'Application Defined MBeans: BPELConfig:bpel' dialog is open, showing the 'Attributes' tab of the 'Show MBean Information' panel. The table lists seven attributes:

Name	Description
1 AsyncAuditBatchSize	(Exalogic Only) When using async messages will be stored in a batch when using async strategy, the audit queue and a separate pool of that audit data, this flag needs to be turned on to prevent being generated and cpu utilization.
2 AsyncAuditPersisterThreads	when using async audit strategy, in-memory queue, use this flag to basically controlling number of entries being generated and cpu utilization.
3 AsyncAuditQueueSize	when using async audit strategy, in-memory queue, use this flag to basically controlling number of entries being generated and cpu utilization.
4 AuditDetailThreshold	The maximum size (in bytes) an audit event is stored separately from the audit log.
5 AuditFlushByteThreshold	use this flag to control how often audit events are flushed to disk. basically after adding an audit event to the audit engine would check if current batch size reaches this threshold or not.
6 AuditFlushEventThreshold	use this flag to control how often audit events are flushed to disk. basically when it reaches this threshold size needs to be turned off.
7 AuditLevel	Controls the amount of audit events to be logged. supported logging levels are: 'off', 'error', 'warning', 'info', 'debug'.

The *Oracle Fusion Middleware Administrator's Guide for Oracle SOA Suite and Oracle Business Process Management Suite* provides many examples of navigating the System MBean Browser from the main page to configure properties. Here are several examples:

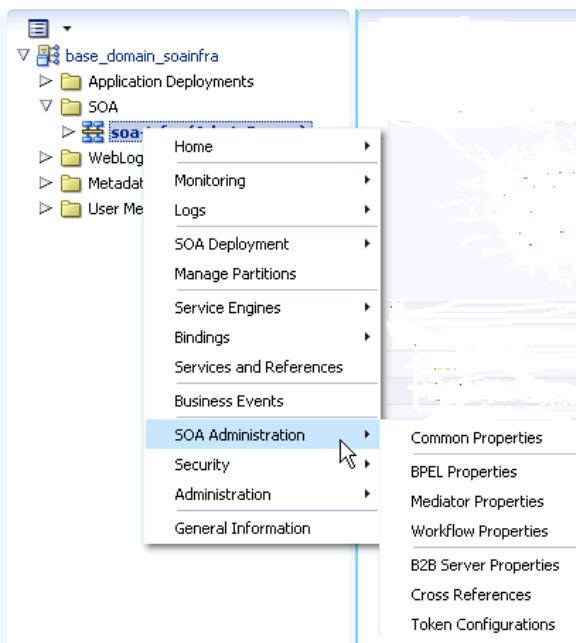
- For BPEL processes, see [Section 13.6, "Setting the Audit Level at the BPEL Process Service Component Level."](#)
- For Oracle Mediator, see [Section 16.1, "Configuring Oracle Mediator Service Engine Properties."](#)
- For human workflow, see [Section 21.7, "Globally Disabling the Automatic Release Timers for Oracle BPM Worklist Tasks."](#)
- For BPMN processes, see [Section 39.2.2, "Task 2: Enable Oracle BAM on the Oracle BPM Server."](#)

2.3.2 Accessing the System MBean Browser from the Component Property Pages

You can also access the System MBean Browser from various menus in the Oracle SOA Suite component property pages. These shortcuts provide you with direct access to specific sections of the MBean tree, including the `oracle.as.soainfra.config` section of the **Application Defined MBeans** group. This provides you with quick access to many common properties of the SOA Infrastructure and service components.

To access the System MBean Browser from the component property pages:

1. In the navigator, right-click **soa-infra**.
2. Select **SOA Administration**.

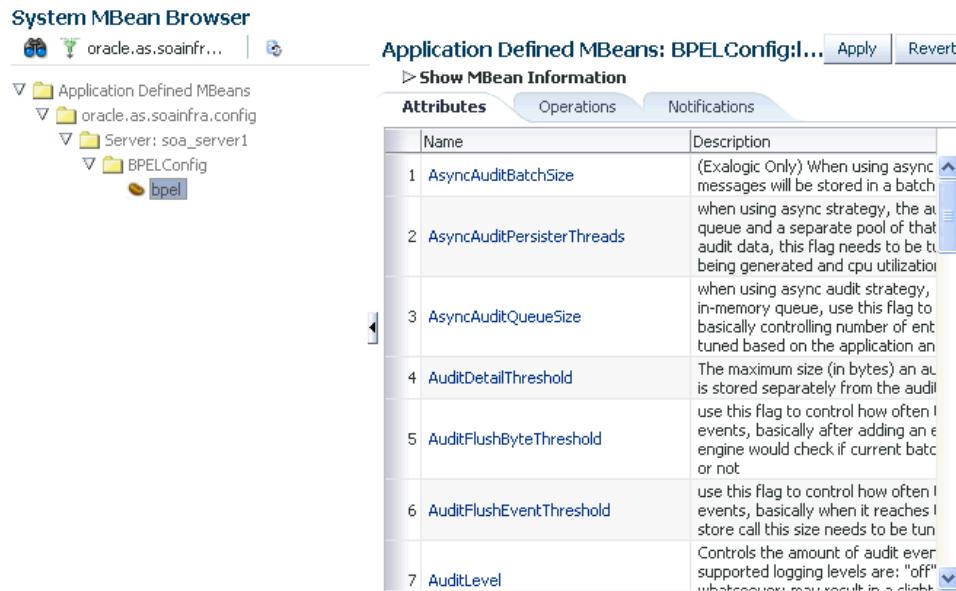


3. Select the appropriate component for which to manage System MBean Browser properties, then scroll down the page to access the short cut.

Select...	Scroll Down and Click...	See...
Common Properties (for the SOA Infrastructure)	More SOA Infra Advanced Configuration Properties	Section 3.1, "Configuring SOA Infrastructure Properties"

Select...	Scroll Down and Click...	See...
BPEL Properties	More BPEL Configuration Properties	Section 13.1, "Configuring BPEL Process Service Engine Properties"
Mediator Properties	More Mediator Configuration Properties	Section 16.1, "Configuring Oracle Mediator Service Engine Properties"
Workflow Properties > Mailer tab	More Workflow Notification Configuration Properties	Section 21.1, "Configuring Human Workflow Notification Properties"
Workflow Properties > Task tab	More Workflow Task Service Configuration Properties	Section 21.3, "Configuring Human Workflow Task Service Properties"
B2B Server Properties	More B2B Configuration Properties	Section 32.1, "Configuring Oracle B2B Server Properties"
BPMN Properties Note: This option is only displayed for selection if Oracle BPM Suite is installed.	More BPMN Configuration Properties	Section 39.1, "Configuring BPMN Process Service Engine Properties"

For example, if you select the **More BPEL Configuration Properties** link, you are automatically placed into the **oracle.as.soainfra.config > Server: server_name > BPELConfig > bpel** section of the System MBean Browser. Properties that you can configure are displayed on the right side of the page.



2.4 Logging Out of Oracle Enterprise Manager Fusion Middleware Control

This section describes how to log out of Oracle Enterprise Manager Fusion Middleware Control.

To log out of Oracle Enterprise Manager Fusion Middleware Control:

1. Note the following details about logging out.

- If multiple pages are open (for example, the help dialog, topology viewer, and flow trace), logging out of any page logs you out of the entire application in all open pages.
 - If you log out with any unsaved configuration changes, you receive no warning message and your changes are lost.
2. In the upper right-hand corner of any page, click the **Log Out** link.

Part III

Administering the SOA Infrastructure

This part describes how to administer the SOA Infrastructure.

This part includes the following chapters:

- [Chapter 3, "Configuring the SOA Infrastructure"](#)
- [Chapter 4, "Monitoring the SOA Infrastructure"](#)

Configuring the SOA Infrastructure

This chapter describes how to configure the properties of the SOA Infrastructure, including audit levels, composite instance states, and payload validation. These property settings can apply to all SOA composite applications running in the SOA Infrastructure. It also describes how to configure local optimization, stop and start the managed server and SOA Infrastructure, and create global token variables.

This chapter includes the following sections:

- [Section 3.1, "Configuring SOA Infrastructure Properties"](#)
- [Section 3.2, "Stopping and Starting the Managed Server and SOA Infrastructure"](#)
- [Section 3.3, "Changing the SOA Infrastructure Server URL Property Port in the System MBean Browser"](#)
- [Section 3.4, "Configuring Log Files"](#)
- [Section 3.5, "Changing the Driver Name to Support Custom XA Drivers"](#)
- [Section 3.6, "Specifying a Nondefault XA Transaction Timeout Value for XA Data Sources"](#)
- [Section 3.7, "Configuring Local Optimization"](#)
- [Section 3.8, "Managing Global Token Variables for Multiple SOA Composite Applications"](#)

For more information, see [Section 1.2.1, "Introduction to the SOA Infrastructure Application."](#)

3.1 Configuring SOA Infrastructure Properties

You can configure the following properties for the SOA Infrastructure:

- Audit level
- Composite instance state to capture
- Payload validation
- Universal Description, Discovery, and Integration (UDDI) registry
- Callback server and server URLs
- Display of recent instances, faults, and count metrics on pages
- Search criteria for the retrieval of recent instances and faults
- Java Naming and Directory Interface (JNDI) data source
- Web service binding properties

The properties set at this level impact all deployed SOA composite applications, except those composites for which you explicitly set different audit level values at the composite application or service engine levels.

Additional advanced properties for the SOA Infrastructure can be configured through the System MBean Browser. You can access these properties from the **More SOA Infra Advanced Configuration Properties** link on the Common Properties page as described in this section or from the **SOA Infrastructure** menu by selecting **Administration > System MBean Browser > Application Defined MBeans > oracle.as.soainfra.config**.

SOA Infrastructure properties are stored in the Oracle Metadata Services (MDS) Repository associated with the SOA Infrastructure. For Oracle SOA Suite, the MDS Repository is configured by default to store its contents in the database.

To configure SOA Infrastructure properties:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select SOA Administration > Common Properties .	1. Right-click soa-infra . 2. Select SOA Administration > Common Properties .	1. Select SOA Infrastructure Common Properties .

The SOA Infrastructure Common Properties page displays the following properties.

Note: Some property fields are designated with an icon showing green and red arrows. If you change these properties (for example, **Server URL**), you must restart the SOA Infrastructure.

The screenshot shows the 'SOA Infrastructure Common Properties' page. At the top, there's a navigation bar with 'soa-infra' and 'SOA Infrastructure'. The right side shows a user 'weblogic' is logged in, and the page was refreshed on July 22, 2012, at 1:51:21 PM PDT.

Audit Level: Production (dropdown menu)

Capture Composite Instance State:

Payload Validation:

UDDI Registry Properties:

- Inquiry URL:
- User:
- Password:

Server URLs:

- Callback Server URL:
- Server URL:

Data Display Options:

- Disable fetching of instance and fault count metrics. Each metric can still be retrieved on demand.
- Restrict display of instances and faults to the last hours

Advanced:

Configuring the Common SOA Infrastructure Properties

- Audit Level**: "Production" (default): Composite instances and payload details are collected by the message tracking infrastructure. This information is collected in the instance data store (database) associated with the SOA Infrastructure. This setting has no impact on what gets written to log files.
 - Off**: No composite instance tracking and payload tracking information is collected. No more composite instances can be created. No logging is performed. Disabling logging and the display of instances in Oracle Enterprise Manager Fusion Middleware Control can result in a slight performance increase for processing instances. Instances are created, but are not displayed.
 - Development**: Enables both composite instance tracking and payload detail tracking. However, this setting may impact performance. This level is useful largely for testing and debugging purposes.
 - Production**: Composite instance tracking is collected, but the Oracle Mediator service engine does not collect payload details and the BPEL process service engine does not collect payload details for assign activities (payload details for other BPEL activities are collected). This level is optimal for most normal production operations.
- Capture Composite Instance State**: Turning this feature on will allow for separate tracking of composite instances. However, it may impact the performance of the system.
- Payload Validation**: Select to enable validation of incoming and outgoing payloads.

Descriptions for the properties at the top of the page are provided in the following table.

Element	Description
Audit Level	Select the level of information to be collected by the message tracking infrastructure. This information is collected in the instance data store (database) associated with the SOA Infrastructure. This setting has no impact on what gets written to log files. <ul style="list-style-type: none"> Off: No composite instance tracking and payload tracking information is collected. No more composite instances can be created. No logging is performed. Disabling logging and the display of instances in Oracle Enterprise Manager Fusion Middleware Control can result in a slight performance increase for processing instances. Instances are created, but are not displayed. Development: Enables both composite instance tracking and payload detail tracking. However, this setting may impact performance. This level is useful largely for testing and debugging purposes. Production: Composite instance tracking is collected, but the Oracle Mediator service engine does not collect payload details and the BPEL process service engine does not collect payload details for assign activities (payload details for other BPEL activities are collected). This level is optimal for most normal production operations.

For more information about reducing the audit level for SOA composite applications and the data written to the Oracle SOA Suite schema, see [Section B.2.3, "Reducing Audit Levels."](#)

Element	Description
Capture Composite Instance State	<p>Select to capture the SOA composite application instance state. Enabling this option may result in additional runtime overhead during instance processing. This option provides for separate tracking of the running instances. All instances are captured as either running or not running. This information appears later in the State column of the composite instances tables for the SOA Infrastructure and SOA composite application, where:</p> <ul style="list-style-type: none"> ■ It shows the counts of running instances versus total instances ■ You can also limit the view to running instances only
	<p>Valid states are running, completed, faulted, recovery needed, stale, terminated, and state not available.</p>
	<p>The running and completed states are captured only if this checkbox is selected. Otherwise, the state is set to unknown. The conditional capturing of these states is done mainly to reduce the performance overhead on SOA Infrastructure runtime.</p>
	<p>Note: If this property is disabled and you create a new instance of a SOA composite application, a new instance is created. However, the instance does not display as running, faulted, stale, terminated, completed, or requiring recovery in the Dashboard page table of the composite application. This is because capturing the composite state of instances is a performance-intensive process.</p>
	<p>For example, if you enable this property and create a SOA composite application instance in the Test Web Service page, a new instance appears in the Dashboard page of the composite application. If you click Show Only Running Instances in the Dashboard page, the instance is displayed as running. If you then disable this property and create another instance of the same composite application, a new, running instance is created. However, if you then select Show Only Running Instances, the new instance is <i>not</i> listed in the running instances table.</p>
	<p>In addition, to terminate a running instance, the instance must have a state (for example, running, faulted, and so on). This activates the Abort button on the Instances page of a SOA composite application. If this checkbox is not enabled before creating an instance, the Abort button is inactive, and you cannot terminate the instance.</p>
	<p>For more information about reducing the audit level by disabling instance state tracking, see Section B.2.3, "Reducing Audit Levels."</p>
Payload Validation	<p>Select to enable validation of incoming and outgoing messages. Nonschema-compliant payload data is intercepted and displayed as a fault.</p>

2. Make changes appropriate to your environment.

The **UDDI Registry Properties** section displays the following properties. You can integrate SOA composite applications running in the SOA Infrastructure with the UDDI registry. The UDDI registry provides a standards-based foundation for locating published services and managing metadata about services (security, transport, or quality of service). You can browse and select published services that meet your needs.

The **User** and **Password** properties are applicable if the UDDI registry is secured. These are only used for the secure HTTP configuration of Oracle Service Registry (OSR). The **Inquiry URL** property is public.

Element	Description	Example
Inquiry URL	Enter the URL of the master registry you want to query. The URL must not refer to the slave registry itself. Otherwise, you can lose some data. The inquiry URL obtains full-standard UDDI version 3 structures. This is the same UDDI inquiry URL that you specified in the Create UDDI Registry Connection wizard.	<code>http://master.mycompany.com:8888/registry/uddi/inquiry</code>
User	Enter the registry inquiry user.	admin
Password	Enter the password for the master registry inquiry user.	Enter a password that uses good security practices.

For information about setting the endpoint reference and service key, see [Section 36.1.3, "Changing the Endpoint Reference and Service Key for Oracle Service Registry Integration."](#)

3. Make changes appropriate to your environment.

The **Server URLs** section displays the following properties. If not explicitly set here, these values are determined at runtime by querying the Oracle WebLogic Server cluster, the web server, or the local server properties.

Element	Description
Callback Server URL	Enter the callback server URL. This setting applies to all SOA composite application service or reference callbacks. This setting typically takes the format of <code>http://host:port</code> and is used to construct the SOAP service URL (for example, <code>http://host:port/endpoint-context-uri</code> for a service callee to asynchronously send back responses to the caller).
Server URL	<p>Enter the server URL. This URL is published as part of the SOAP address of a service in the concrete WSDL file.</p> <p>Note: In 10.1.x releases, you manually configured SOAP optimization with the <code>optSoapShortcut</code> property. For release 11g, SOAP optimization is automatically configured. Therefore, if you upgrade to 11g and are using the optimized shortcut approach in existing applications, optimized calls are activated only when the hostname value (as referred to in the WSDL URL in the <code>composite.xml</code> file) matches the Server URL value. Either set both values to the hostname (for example, <code>myhost</code>) or to the full domain name (for example, <code>myhost.domain.com</code>). If these values do not match, a regular SOAP call is performed instead of an optimized local call.</p> <p>For information about local optimization, see Section 3.7, "Configuring Local Optimization."</p>

Note: If you change the **Callback Server URL** and **Server URL** values (for example, when moving from a test to a production environment), you must restart Oracle WebLogic Server for the WSDLs to be regenerated.

4. Make changes appropriate to your environment.

The **Data Display Options** section displays the following properties for improving the time it takes to load pages.

Note: Any changes to these properties impact all SOA farms associated with this Oracle Enterprise Manager instance.

Element	Description
Disable fetching of instance and fault count metrics. Each metric can still be retrieved on demand.	<p>Select to disable the display of instance and fault count metrics on the Dashboard pages of the SOA Infrastructure, SOA composite applications, service engines, and service components.</p> <p>Instead, these metrics are replaced with links that you click to retrieve the instance and fault count metrics when you need this information. This setting can improve the time it takes to load pages.</p> <p>If you click a link to retrieve instance and fault count metrics, and Oracle Enterprise Manager Fusion Middleware Control times out, increase the transaction timeout property. For more information, see Section B.3.1, "Resolving Connection Timeouts" and Section B.7.1, "Optimizing the Loading of Pages with Instance and Fault Metrics."</p>
Restrict display of instances and faults to the last time period	<p>Select this checkbox and specify a time period during which to retrieve recent instances, faults, and count metrics for display on the following pages:</p> <ul style="list-style-type: none"> ▪ Dashboard pages of the SOA Infrastructure, SOA composite applications, service engines, and service components ▪ Deployed Composites page of the SOA Infrastructure and service engines ▪ Partition home page <p>By default, this checkbox is selected and the time period duration is set to 24 hours (one day). If this checkbox is not selected, all instances and faults (including count metrics) in the SOA Infrastructure since the last purging are displayed.</p> <p>Note: It is highly recommended that you set a time period duration because it has a significant impact on the performance of multiple Oracle Enterprise Manager Fusion Middleware Control pages and queries.</p> <p>The time period you specify appears by default in the Fault Time From field on faults pages on which you can search for faults and the Start Time From field on instances pages on which you can search for instances.</p>

For additional details, see [Section B.7.1, "Optimizing the Loading of Pages with Instance and Fault Metrics."](#)

5. Make changes appropriate to your environment.
6. Expand the **Advanced** section.



The **Data Sources** section displays the following properties. A data source enables you to retrieve a connection to a database server.

Element	Description	Example
Server Data Source JNDI	Displays the JNDI location for the server data source. Click Configure to go to the data source configuration page of the Oracle WebLogic Server Administration Console. Global transaction support should be disabled for this data source.	jdbc/SOALocalTxDataSource
Server Transaction Data Source JNDI	Displays the JNDI location for the server transactional data source. Click Configure to go to the data source configuration page of the Oracle WebLogic Server Administration Console. You must configure the data source for global transactions.	jdbc/SOADatasource
Nonfatal Connection Retry Count	Enter the maximum number of times a nonfatal connection error can be retried before failing. These type of errors occur for any connection error with the dehydration store (for example, Oracle Real Application Clusters failover, database shutdown, and so on).	10

7. Make changes appropriate to your environment.

The **Web Service Binding Properties** section displays the following options.

Element	Description	Example
Oracle SSL Ciphers	Enter the list of supported Oracle ciphers. A cipher suite is a set of algorithms that provide security for data transmissions. Before data can flow through an SSL connection, both sides of the connection must negotiate common algorithms to use.	SSL_RSA_WITH_RC4_128_MD5
Oracle Wallet Password	Enter the wallet password for the keystore. Enter a password that uses good security practices.	--
Use Chunking	Select to enable chunking of data for SOAP over HTTP deliveries.	--
Chunk Size	Specify a chunk size. The value must be less than or equal to 999. The size is used for SOAP over HTTP deliveries and is specified in bytes.	500

8. Make changes appropriate to your environment.
9. Click **Apply**.
10. If you make changes and want to reset these properties to their previous values, click **Revert**.
11. To change advanced parameters, click **More SOA Infra Advanced Configuration Properties**. This opens the System MBean Browser. The properties that display include, but are not limited to, the following. Descriptions are provided for each property.

- **AuditConfig:** The status of BPEL message recovery. This property includes the following keys:
 - **bpelRecoveryStatus** key: If there are BPEL messages requiring recovery in the Recovery page of the BPEL process service engine, this setting enables a **BPEL Message Recovery Required** inline warning message and recovery icon to display in the **Trace** table of the Flow Trace page and at the top of the home pages of the SOA Infrastructure and SOA composite applications. By default, this key is set to **All**. If this key is set to **Off**, no message recovery information is displayed. For more information, see the following sections:
 - [Section 4.3, "Monitoring SOA Infrastructure Recent Instances and Faults and Deployed Composites"](#)
 - [Section 6.2, "Monitoring SOA Composite Application Recent Instances and Faults and Rejected Messages"](#)
 - [Section 14.1, "Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component"](#)
 - **excludeBpelMaxCreationTime** key: Enables you to set the time period for excluding messages that require recovery. For more information, see [Section 4.3, "Monitoring SOA Infrastructure Recent Instances and Faults and Deployed Composites."](#)
 - **bpelRecoveryAlertDurationInDays** key: Limits the **BPEL Message Recovery Required** inline warning message to be displayed only when recoverable BPEL messages have been created in the last seven days. The default setting of seven days can be changed. You cannot set this property to negative values such as -1 or to 0. In such cases, the key uses its default value (seven days). To disable the alert message, use the **bpelRecoveryStatus** key. The duration value is not applicable to the flow trace alert message.

Note: By default, the audit messages are logged to the database synchronously. You can improve performance by changing the audit policy mode from **Immediate** to **Deferred**. Setting the mode to **Deferred** can improve performance.

However, as the audit data is written to the database asynchronously in **Deferred** mode, if a server instance goes down, you can potentially lose some audit data that isn't yet committed when the server goes down.

- **CreateWSTrackingMBean:** Controls the creation of a MBean for tracking the elapsed time of web service calls. If the elapsed time threshold is exceeded, an incident is created. When set to **true**, you can create a watch. This setting applies to all SOA composite applications in the SOA Infrastructure. For more information, see [Section 12.5, "Creating Watches and Notifications."](#)
- **GlobalTxMaxRetry:** The maximum number of times an invocation exception can be retried.
- **GlobalTxRetryInterval:** The number of seconds between retries for an invocation exception.
- **HttpProxyAuthRealm:** The HTTP proxy authentication realm.

- **HttpProxyAuthType:** The HTTP proxy authentication type.
- **HttpProxyHost:** The HTTP proxy host.
- **HttpProxyPassword:** The password for HTTP proxies that require authentication.
- **HttpProxyPort:** The HTTP proxy port number.
- **HttpProxyUsername:** The user name for HTTP proxies that require authentication.
- **HttpServerURL:** The HTTP protocol URL published as part of the SOAP address of a process in the WSDL file.
- **HttpsServerURL:** The HTTPS protocol URL published as part of the SOAP address of a process in the WSDL file.
- **KeystoreLocation:** The path to the Oracle SOA Suite keystore.
- **UddiCacheLifetime:** The UDDI endpoint cache life span.

3.1.1 Disabling Instance and Fault Count Metrics Retrieval with the System MBean Browser

As described in [Section 3.1, "Configuring SOA Infrastructure Properties,"](#) you can disable the retrieval of instance and fault count metrics in the **Data Display Options** section of the SOA Infrastructure Common Properties page. You can also change this property through the System MBean Browser.

To disable instance and fault count metrics retrieval with the System MBean Browser.

1. Select **Application Defined MBeans > emom.props > Server:AdminServer > Application: em > Properties > emoms.properties.**

Note that **emoms.properties** is *only* available for selection if you previously modified the **Disable fetching of instance and fault count metrics** option of the **Data Display Options** section of the SOA Infrastructure Common Properties page.

2. In the **Name** column of the **Attributes** tab, click **Properties**.
3. In the **Value** column, expand **Element_20**.
4. In the **Element** column, enter **false** to disable metrics retrieval.
5. Click **Apply**.
6. Restart the SOA Infrastructure. A restart is not required if you instead change the **Disable fetching of instance and fault count metrics** option through the **Data Display Options** section of the SOA Infrastructure Common Properties page.

3.2 Stopping and Starting the Managed Server and SOA Infrastructure

You can stop and start the SOA Infrastructure in Oracle Enterprise Manager Fusion Middleware Control for maintenance or for configuration restarts. To do so, stop and start the managed server on which the SOA Infrastructure is installed. This restarts both the managed server and the SOA Infrastructure.

Notes:

- Starting with 11g Release 1 (11.1.1.4.0), you can no longer stop and start the SOA Infrastructure from the **soa-infra** menu in the navigator.
- You can also have a developer configuration that only includes an administration server, and no managed servers.

For more information about server startup issues, see [Section B.8, "Server Troubleshooting."](#)

To stop and start the managed server and SOA Infrastructure:

1. Access this page through one of the following options:

From the WebLogic Server Menu...	From the WebLogic Domain Folder in the Navigator...
<ol style="list-style-type: none"> 1. Select Control. 	<ol style="list-style-type: none"> 1. Right-click the managed server (for example, soa_server1). 2. Select Control.

2. To shut down the managed server and SOA Infrastructure, select **Shut Down**.
3. Click **OK** when prompted to shut down the managed server and SOA Infrastructure.
4. Wait for shutdown to complete.
5. To start the managed server and SOA Infrastructure, select **Start Up**.

For information on stopping and starting managed servers with Node Manager, see *Oracle Fusion Middleware Node Manager Administrator's Guide for Oracle WebLogic Server*.

For information on starting and stopping managed servers with WLST commands, see *Oracle Fusion Middleware Administrator's Guide*.

3.2.1 Waiting for SOA Infrastructure Startup Initialization to Complete

After the SOA Infrastructure is started, it may not be completely initialized to administer incoming requests until all deployed composites are loaded. Therefore, the response metrics that are displayed on some Oracle Enterprise Manager Fusion Middleware Control pages may not reflect their actual status. This is most apparent when the SOA Infrastructure is in a cluster with multiple managed servers and a large number of deployed composites.

During the initialization stage, Oracle Enterprise Manager Fusion Middleware Control does *not* prevent you from executing operations such as composite deployment, composite undeployment, and others, even though these operations may not complete successfully. Instead, a warning message is displayed at the top of the Oracle Enterprise Manager Fusion Middleware Control pages shown in [Table 3-1](#). Do not perform operations such as composite deployment, composite undeployment, and others while this message is displayed. Once initialization completes, the message is no longer displayed. You see this after you refresh the page. You can then perform operations.

Table 3–1 SOA Infrastructure Initialization Message

This Warning Message Is Displayed...	At the Top of These Pages...
<p>Initializing SOA</p> <p>Even though the soa-infra target is up, some SOA Fabric components and composite applications are still loading. You may need to allow some time for the initialization to complete, and later click the Refresh Page icon. It is not advisable to execute any operations on this soa-infra until this warning goes away.</p>	<ul style="list-style-type: none"> ■ SOA Infrastructure home page ■ SOA composite application home page ■ Manage Partitions page ■ Partition home page

3.2.2 SOA Composite Application States and SOA Infrastructure Shutdown

SOA composite application states are not updated to indicate that they are down after SOA Infrastructure shutdown. If you attempt to access the composite, you receive an error message stating that composite details cannot be retrieved:

```
soa-infra runtime connection error An error happened while connecting to
soa-infra runtime at t3://152.61.150.106:8001/soa-infra.
```

This message may lead you to believe that another issue exists in the system. However, this is not the case.

These composite states display as up or, in some cases, pending because this metric indicates whether the composite is enabled, and is independent of whether the SOA Infrastructure is started. In addition, the composite is still active and can receive requests on other managed servers in a cluster.

3.2.3 Restarting the SOA Infrastructure Does Not Activate Endpoints When a Retired Composite is Activated

If a SOA composite application with adapter endpoints is in a retired state, the endpoints are not activated if you perform the following actions:

- Restart the SOA Infrastructure
- Activate the SOA composite application

This is because files, records, and so on are not picked up by the endpoint adapters. As a workaround, redeploy the SOA composite application after restarting the SOA Infrastructure.

3.2.4 SOA Infrastructure Startup Failure When cwallet.sso Includes the SOA Map

When cwallet.sso has the SOA map, you receive an error message similar to the following when attempting to start the SOA Infrastructure.

```
Caused By: java.security.UnrecoverableKeyException: Password verification
failed
        at
sun.security.provider.JavaKeyStore.engineLoad(JavaKeyStore.java:769)
        at
sun.security.provider.JavaKeyStore$JKS.engineLoad(JavaKeyStore.java:38)
        at
java.security.KeyStore.load(KeyStore.java:1185)
        at
oracle.j2ee.ws.saaj.util.SSLUtil.loadKeyStore(SSLUtil.java:73)
        at
oracle.j2ee.ws.saaj.util.SSLUtil.getKeyManagerFactory(SSLUtil.java:88)
        at
oracle.j2ee.ws.saaj.util.SSLUtil.getKeyManagers(SSLUtil.java:97)
        at
```

```
oracle.j2ee.ws.saaj.util.SSLUtil.createSSLFactory(SSLUtil.java:50)
    at
oracle.integration.platform.common.SSLSocketFactoryManagerImpl.getSSLFactory(SSLSocketFactoryManagerImpl.java:58)
    at oracle.fabric.common.wsdl.WSDLManager.init(WSDLManager.java:356)
    at oracle.fabric.common.wsdl.WSDLManager.<init>(WSDLManager.java:101)
    at
oracle.fabric.common.metadata.MetadataManagerImpl.getWSDLManager(MetadataManagerImpl.java:283)
    at
oracle.fabriccomposite.model.CompositeModel.getWSDLManager(CompositeM
```

Perform the following steps to resolve this issue.

1. Perform one of the following actions:
 - Delete the SOA map in `cwallet.sso`.
 - Remove `$DOMAIN_HOME/config/fmwconfig/default-keystore.jks`. Oracle Web Services Manager (OWSM) uses this file.
2. Restart the SOA Infrastructure.

3.3 Changing the SOA Infrastructure Server URL Property Port in the System MBean Browser

In addition to the SOA Infrastructure Common Properties page described in [Section 3.1, "Configuring SOA Infrastructure Properties,"](#) you can also change the SOA Infrastructure **ServerURL** property port in the System MBean Browser of Oracle Enterprise Manager Fusion Middleware Control.

When changing the port, note the following details:

- If the SOA Infrastructure and managed Oracle WebLogic Server port numbers are different, you receive a `ConnectException` error when trying to connect to Oracle BPM Worklist. Ensure that these port numbers match.
- You *cannot* change the SOA Infrastructure port from the Oracle WebLogic Server Administration Console. Only the port for the managed Oracle WebLogic Server can be changed from the Oracle WebLogic Server Administration Console.

To change the SOA Infrastructure port:

1. From the **SOA Infrastructure** menu, select **Administration > System MBean Browser**.
2. Under **Application Defined MBeans**, expand **oracle.as.soainfra.config > Server: server_soa > SoaInfraConfig > soa-infra**.
where `server_soa` is the name of the server provided during post installation configuration. By default, this name is `soa_server1`.
3. In the **Name** column, click **ServerURL**.

The Attribute: ServerURL page appears.

The screenshot shows the Oracle SOA Infrastructure System MBean Browser. The left pane displays a tree view of MBeans under the 'soa-infra' root, including 'emomslogging.props', 'java.lang', 'java.util.logging', 'oracle.adf.share.config', 'oracle.as.soainfra.bpm', 'oracle.as.soainfra.bpmn', 'oracle.as.soainfra.config', 'Server: AdminServer' (which contains 'AdapterConfig', 'B2BConfig', 'BPELConfig', 'BPMNConfig', 'BusinessRulesConfig', 'CEPConfig', 'EDNConfig', 'HWFMailerConfig', 'MediatorConfig', and 'SoaInfraConfig'), and 'soa-infra'. The right pane is titled 'Attribute: ServerURL' and shows the following details:

- MBean Name:** oracle.as.soainfra.config:Location=AdminServer,name=soa-infra,type=SoaInfraConfig,Application=soa-infra
- Attribute Name:** ServerURL
- Description:** This URL is published as part of the SOAP address of a process in the WSDL file. The hostname and port for this URL should be customized to match the hostname of your system and the port of your HTTP gateway.
- Type:** java.lang.String
- Readable / Writable:** RW
- Value:** myhost.us.example.com:8001/
- Buttons:** Apply, Revert, Return

4. In the **Value** field, change the port.
5. Click **Apply**.
6. Change the managed Oracle WebLogic Server port in the Oracle WebLogic Server Administration Console to the same value.

In environments in which a load balancer is used in front of an Oracle WebLogic Server cluster, the **ServerURL** property host and port can be different from the Oracle WebLogic Server host and port. This is typical for enterprise deployment environments in which a load balancer distributes requests across the managed servers in the Oracle WebLogic Server cluster. For more details, see *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite*.

3.4 Configuring Log Files

Oracle SOA Suite components generate log files containing messages that record all types of events, including startup and shutdown information, errors, warning messages, access information on HTTP requests, and additional information.

To configure log files:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Logs > Log Configuration.	1. Right-click soa-infra . 2. Select Logs > Log Configuration.

The Log Configuration page displays the following details:

- A **View** list for selecting the type of loggers for which to view information:

- Persistent: Loggers that become active when a component is started. Their configuration details are saved in a file and their log levels are persisted across component restarts.
- Active runtime: Loggers that are automatically created during runtime and become active when a particular feature area is exercised (for example, `oracle.soa.b2b` or `oracle.soa.bpmel`). Their log levels are not persisted across component restarts.
- A table that displays the logger name, the Oracle Diagnostic Logging (ODL) level for setting the amount and type of information to write to a log file, the log file, and the log level state.

The screenshot shows the 'Log Configuration' page in the Oracle SOA Infrastructure interface. The 'Log Levels' tab is selected. The page header indicates 'Logged in as weblogic|Host' and the page was refreshed on Jul 22, 2012 at 2:03:18 PM PDT. Below the header, there's a note: 'Use this page to configure basic and advanced log configuration settings.' The main content is a table titled 'View Runtime Loggers'. The table has columns for 'Logger Name', 'Oracle Diagnostic Logging Level (Java Level)', and 'Log File'. The table lists various loggers under the 'oracle.soa' category, each with its ODL level set to 'NOTIFICATION:1 (INFO) [Inherit]' and the log file set to 'odl-handler'. There are also entries for 'oracle.bpm', 'oracle.fabric.common.wsdl', 'oracle.integration', 'oracle.sdp', and 'oracle.sdptinternal'.

Logger Name	Oracle Diagnostic Logging Level (Java Level)	Log File
oracle.bpm	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.fabric.common.wsdl	WARNING:1 (WARNING) [Inherit]	odl-handler
oracle.integration	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.sdp	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.sdptinternal	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.adapter	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.b2b	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.bpmel	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.bpmn.engine	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.bpmn.jpa	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.bpmn.system	NOTIFICATION:1 (INFO) [Inherit]	odl-handler

2. Perform the following log file tasks on this page:
 - a. In the **Logger Name** column, expand a logger name. This action enables you to specify more specific logging levels within a component.
 - b. In the **Oracle Diagnostic Logging Level** columns, select the level and type of information to write to a log file.
 - c. In the **Log File** column, click a specific log file to create and edit log file configurations.

For more information about ODL log files and the level and type of logging information to write to a log file, see *Oracle Fusion Middleware Administrator's Guide*.

3. Click the **Log Files** tab.

This page enables you to create and edit log file configurations, including the log file in which the log messages are logged, the format of the log messages, the

rotation policies used, and other parameters based on the log file configuration class.

Handler Name	Log Path	Log File Format	Rotation Policy
em-log-handler	\${domain.home}/servers/\${weblogic.Name}/sysman/log/emom	Oracle Diagnostics Logging - Text	Size Based
em-trc-handler	\${domain.home}/servers/\${weblogic.Name}/sysman/log/emom	Oracle Diagnostics Logging - Text	Size Based
odl-handler	\${domain.home}/servers/\${weblogic.Name}/logs/\${weblogic.N}	Oracle Diagnostics Logging - Text	Size Based
owsm-message-handl	\${domain.home}/servers/\${weblogic.Name}/logs/owsm/msglog	Oracle Diagnostics Logging - Text	Size Based
soa-tracking-trc-hanc	\${domain.home}/servers/\${weblogic.Name}/logs/\${weblogic.N}	Oracle Diagnostics Logging - Text	Size Based

For information on setting logging levels and Oracle SOA Suite logging files to view, see [Section B.1, "Setting Logging Levels for Troubleshooting."](#)

3.4.1 Configuring the Logging File Encoding Property

The oracle-soa-handler log handler property of the soa-diagnostic.log file has no encoding property specified in the *SOA_Domain/config/fmwconfig/servers/server_soa/logging.xml* file. Instead, the soa-diagnostic.log file is written in the operating system's default encoding format. This can cause the following problems:

- Non-ASCII error messages can become unreadable because logging information is written to soa-diagnostic.log in the server's default encoding format.
- On Windows operating systems, writing in the default encoding format can lead to non-ASCII data loss.

To avoid this problem, specify a value of UTF-8 for the oracle-soa-handler log handler property in the *logging.xml* file.

```
<?xml version='1.0'?>
<logging_configuration>
<log_handlers>
  <log_handler name='wls-domain'
    class='oracle.core.ojdl.weblogic.DomainLogHandler' level='WARNING' />
  <log_handler name='oracle-soa-handler'property name='encoding' value='UTF-8' />
  </log_handler>
</log_handlers>
...

```

Log files are written with ODL. You can view the content of log files from Oracle Enterprise Manager Fusion Middleware Control.

For more information about logging, see *Oracle Fusion Middleware Administrator's Guide*.

3.4.2 Configuring Logging to Diagnose Performance Issues in Oracle Enterprise Manager Fusion Middleware Control Pages

Oracle SOA Suite can log performance metrics for API calls. You can trace the performance of costly API calls to the Oracle Enterprise Manager Fusion Middleware Control page that made them. This tracing is useful when an API call does not perform efficiently. The view id is logged with other information to the following file:

`FMW_HOME/user_projects/domains/domain_name/servers/weblogic_name/logs/weblogic_name-soa-tracking.trc`

For example, you can enable logging at the **FINE** level for the root logger associated with the `weblogic_name-soa-tracking.trc` file, reproduce the problem to diagnose, and set the logging level back to **SEVERE**. The content of the log can be analyzed to pinpoint the underlying operations performed by Oracle SOA Suite.

To configure logging to diagnose performance issues:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> Select Logs > Log Configuration. 	<ol style="list-style-type: none"> Right-click <code>soa-infra</code>. Select Logs > Log Configuration.

- The Log Configuration page is displayed.
- In the **Logger Name** column, expand `oracle.soa > oracle.soa.sql.trc.fabric`.
 - Set the logging level to **FINE**.

Logger Name	Oracle Diagnostic Logging Level (Java Level)	Log File
oracle.soa.scheduler	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.services.cmds	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.services.common	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.services.identity	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.services.notification	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.services.rules	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.services.workflow	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.sql.trc.fabric	TRACE:1 (FINE)	soa-tracking-tr
oracle.soa.wsif	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.xref	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.sysman	NOTIFICATION:32	em-log-handler em-trc-handler
oracle.wsm	NOTIFICATION:1 (INFO) [Inherit]	odl-handler

- Click **Apply**.

The Oracle Enterprise Manager Fusion Middleware Control page that generated the API call is logged to the `weblogic_name-soa-tracking.trc` file. For this example, `/ai/soa/composite` (SOA composite application home page) is identified as the page.

```
[2012-08-07T23:21:04.488-07:00] [soa_server1] [TRACE:32] []
[oracle.soa.sql.trc.fabric.toplink_session.tracking_session] [tid:
[ACTIVE].ExecuteThread: '1' for queue: 'weblogic.kernel.Default
(self-tuning)'] [userId: weblogic] [ecid:
6fec0e67fb81939:-7d87fd84:138e67064fb:-8000-000000000000dd6,1:24469]
[SRC_CLASS: oracle.integration.platform.instance.store.ToplinkSessionLogger]
[APP: soa-infra] [SOA.toplink.session_name: tracking_session]
[SOA.logging.category: query] [SOA.call_origin_category: /ai/soa/composite]
[SOA.call_origin: em] [SRC_METHOD: log] execute_query
```

3.5 Changing the Driver Name to Support Custom XA Drivers

The default SOA Infrastructure data source is always XA-enabled. If your data sources require support for custom drivers, you must change the driver name on Oracle WebLogic Server.

To change the driver name through one of the following methods:

- Edit in Oracle WebLogic Server Administration Console.
 1. Log in to Oracle WebLogic Server Administration Console.
 2. In the left pane, select **Domain Structure**.
 3. Select **Services > JDBC > Data Source > SOADatasource > Connection Pool**.
 4. For the **Driver Class Name**, change the value to a custom data source (for example, `oracle.jdbc.xa.client.myDataSource`).
 5. Restart the server.
- Edit the `soaDataSource-jdbc.xml` file.
 1. Open the `soaDataSource-jdbc.xml` file on Oracle WebLogic Server.
 2. Change the SOADatasource driver name from `oracle.jdbc.OracleDriver` to `oracle.jdbc.xa.client.myDataSource`.

```
<?xml version="1.0" encoding="UTF-8"?>
<jdbc-data-source
. . .
. . .
/  <name>SOADatasource</name>
<jdbc-driver-params>
    <url>jdbc:oracle:thin:myhost.us.example.com:1537:co0yd570</url>
    <driver-name>*oracle.jdbc.xa.client.myDataSource*</driver-name>
<properties>
    <property>
        <name>user</name>
        <value>fusion_soainfra</value>
    </property>
</properties>
/  . . .
. . .
</jdbc-driver-params>
. . .
. . .
</jdbc-data-source>
```

3.6 Specifying a Nondefault XA Transaction Timeout Value for XA Data Sources

The default XA transaction timeout value for XA data sources is 0 seconds. You can change the default value in the Oracle WebLogic Server Administration Console. Follow these steps.

To specify a nondefault XA transaction timeout value for XA data sources:

1. Log in to Oracle WebLogic Server Administration Console.
2. Under **Domain Structure** on the left side of the page, select **Services > JDBC > Data Sources**.
3. In the **Name** column of the **Data Sources** table, select **EDNDataSource** (for event delivery network transactions) or **SOADatasource** (for all other types of transactions).
4. Under the **Configuration** tab at the top, click the **Transaction** subtab.
5. In the **XA Transaction Timeout** field, enter a value in seconds.
6. Select the **Set XA Transaction Timeout** checkbox. You *must* select this checkbox for the new XA transaction timeout value to take effect.
7. Click **Save**.

3.7 Configuring Local Optimization

Local optimization is the process of one SOA composite application invoking another SOA composite application through direct Java invocations in an environment in which both composites are on the same SOA server (JVM).

Direct Java invocations are generally more efficient than SOAP over HTTP calls. Therefore, whenever the conditions are met for direct Java invocations, Oracle SOA Suite optimizes the service calls for the co-located composites.

3.7.1 Condition Checks for Using Local Optimization

Oracle SOA Suite performs the following condition checks to determine if local optimization is possible.

- It must be a composite-to-composite invocation. This is the most fundamental criteria that makes direct Java calls possible when both the client and target services are implemented based on the same SOA Infrastructure (that is, the same SOA server).
- The composite implementing the reference (target) service must be *active*. This condition requires the target composite to be up and running, which in turn ensures that the reference service is available.

Note: The state of the target composite must be on and active. A stopped or retired state is *not* eligible for local optimization.

- The client and target composites must be co-located on the same server. This is an obvious requirement for direct Java invocations. It is also a critical step in which Oracle SOA Suite compares the server (on which the client composite is deployed) host configuration with the host and port values specified in the reference (target) service endpoint URI. If the host and port values match, it can be concluded that

the client and target composites are located on the same server. However, the comparison is not necessarily straightforward given that working with both standalone and clustered server setups and potential load balancer configurations is necessary. Therefore, here are the step-by-step condition checks that determine the correct server configuration on all platforms:

- Checks the **Server URL** configuration property value on the SOA Infrastructure Common Properties page, as described in [Section 3.1, "Configuring SOA Infrastructure Properties."](#)
- If not specified, checks the **FrontendHost** and **FrontendHTTPPort** (or **FrontendHTTPSPort** if SSL is enabled) configuration property values from the cluster MBeans.
- If not specified, checks the **FrontendHost** and **FrontendHTTPPort** (or **FrontendHTTPSPort** if SSL is enabled) configuration property values from the Oracle WebLogic Server MBeans.
- If not specified, uses the DNS-resolved Inet address of localhost.
- Checks if the port value specified in the reference service endpoint URL matches the configured server port value. If no port value is specified in the endpoint URL, Oracle SOA Suite assumes 80 for HTTP and 443 for HTTPS URLs.
- If the port values match, the server URL (that is, `http(s)://host:port`, where `host` and `port` are obtained from the checks mentioned above) is then compared to the server URL in the reference endpoint address. The URLs are resolved to canonical values and the comparison also takes into account the cases in which the endpoint URL host is `localhost` or `127.0.0.1`.
- Oracle SOA Suite concludes that the composites are co-located if the server URL comparison returns a value of true.
- The security policy configurations, if applied on either or both the client and server composites, must allow for local optimization. For information about policy configurations and local optimization, see [Section 7.7.2, "Policy Attachments and Local Optimization in Composite-to-Composite Invocations."](#)

You can confirm if a call went over local optimization in the **Trace** section of the Flow Trace page. The **(Local Invocation)** text for the reference and service of the invoking and invoked composites is displayed, as shown in [Figure 3–1](#).

Figure 3–1 Local Optimization Details in the Trace Section of the Flow Trace Page

Trace					
Click a component instance to see its detailed audit trail.					
Instance	Type	Usage	State	Time	Composite Instance
orderprocessor_client_ep	Web Service	Service	Completed	Oct 20, 2012 7:41	OrderBookingComposite c
└─ OrderProcessor	BPEL Component	Referer	Running	Oct 20, 2012 7:41	OrderBookingComposite c
└─ StoreFrontService	Web Service	Local Invocation	Completed	Oct 20, 2012 7:41	OrderBookingComposite c
└─ StoreFrontService	Web Service	Local Invocation	Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5
└─ CustomerAndOrderService	BPEL Component	Referer	Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5
└─ StoreFrontService	Web Service	Local Invocation	Completed	Oct 20, 2012 7:41	OrderBookingComposite c
└─ StoreFrontService	Web Service	Local Invocation	Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5

For more information about the Flow Trace page, see [Section 14.1, "Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component."](#)

3.7.2 Overriding or Forcing Local Optimization

Two configuration properties are provided for either overriding or forcing local optimization.

- `oracle.webservices.local.optimization`

By default, Oracle SOA Suite prefers local optimization. However, you can override this behavior with the `oracle.webservices.local.optimization` binding property in the `composite.xml` file. When this property is set to `false`, local optimization is not performed and cross-composite calls are performed through SOAP and HTTP. Use this property where appropriate. For information about setting this property, see [Section 7.7.2, "Policy Attachments and Local Optimization in Composite-to-Composite Invocations."](#)

- `oracle.soa.local.optimization.force`

You can override the `oracle.webservices.local.optimization` property and force optimization to be performed by setting the `oracle.soa.local.optimization.force` property to `true`. Use this property in the following scenarios:

- The server configuration is sufficiently complicated (for example, there are fire wall or proxy settings in an intranet), which may cause the co-location checks described in [Section 3.7.1, "Condition Checks for Using Local Optimization"](#) to not deliver the correct result.
- You clearly understand the semantics of local optimization, the system setup qualifies for local optimization, and local optimization is absolutely preferred.

There can be other scenarios for forcing optimization that are not described in this section.

Note: If `oracle.webservices.local.optimization` is set to `false` and `oracle.soa.local.optimization.force` is set to `false`, local optimization is *not* performed.

The `oracle.soa.local.optimization.force` property has a default value of `false`. When this property is set to `true`, Oracle SOA Suite skips the condition checks described in [Section 3.7.1, "Condition Checks for Using Local Optimization,"](#) except for policy configuration checking, which is necessary to ensure and enforce the integrity of service invocations.

Another important note about this property is that Oracle SOA Suite always honors the setting of this property (if policy checks allow the optimization). However, if local invocation fails due to nonapplication faults or exceptions (that is, runtime errors mostly related to the direct Java invocation), the value of this setting is ignored for subsequent invocations on the configured endpoint and for all the valid endpoint addresses configured on the endpoint.

To enable the `oracle.soa.local.optimization.force` property:

1. Add `oracle.soa.local.optimization.force` as a binding component level property in the reference section of the composite being invoked. For example, if composite `comp_comp2` invokes `comp_comp1`, then define this property in the reference section of the `composite.xml` file of `comp_comp2`.

```
<reference name="Service1"
ui:wsdlLocation="http://localhost:8001/soa-infra/services/default/comp_
comp1!1.0/BPELProcess1.wsdl">
```

```

<interface.wsdl interface="http://xmlns.oracle.com/comp_comp/comp_
comp1/BPELProcess1#wsdl.interface(BPELProcess1)"
                  callbackInterface="http://xmlns.oracle.com/comp_
comp/comp_comp1/BPELProcess1#wsdl.interface(BPELProcess1Callback) "/>
<binding.ws port="http://xmlns.oracle.com/comp_comp/comp_
comp1/BPELProcess1#wsdl.endpoint(bpelprocess1_client_ep/BPELProcess1_pt)"
location="http://localhost:8001/soa-infra/services/default/comp_
comp1!1.0/bpelprocess1_client_ep?WSDL">
<property name="oracle.webservices.local.optimization">false</property>
<property name="oracle.soa.local.optimization.force">true</property>
</binding.ws>
```

To force local optimization on the reference service callback:

1. Add the `oracle.soa.local.optimization.force` property to the `<callback>` element in the `<service>` definition of the corresponding reference service.

For example, if composite1 invokes composite2, add `oracle.soa.local.optimization.force` property in the `<service>` definition of composite2 as follows to force the asynchronous callback from composite2 to composite1 to be optimized locally:

```

<service ui:wsdlLocation="composite2.wsdl">
  . .
  <callback>
    <binding.ws
      port="http://xmlns.oracle.com/example#wsdl.endpoint(FooService/FooPort)">
        <property
          name="oracle.soa.local.optimization.force">true</property>
      </binding.ws>
    </callback>
  </service>
```

For information about optimization and WS-Atomic Transaction (WS-AT) transactions, see Section "WS-AT Transactions are Not Supported When Optimization is Enabled" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

3.7.3 Local Optimization Logging

Oracle SOA Suite provides **NOTIFICATION:1(INFO)** level logging for every critical decision made for local optimization versus SOAP processing. For more details or debugging information, set the `oracle.integration.platform.blocks.local` and `oracle.integration.platform.blocks.soap` loggers at the **TRACE:1(FINE)** level in Oracle Enterprise Manager Fusion Middleware Control.

3.7.4 Local Optimization Calls Use Case

This local optimization calls use case describes the following:

- How local optimization calls work in an environment in which composite A calls a co-located composite B on the same server, and composite B is unreachable ([Table 3-2](#)).
- What happens when you create a load balancer address with a port value that is not the port on which the Oracle WebLogic Servers are listening ([Table 3-3](#)).

Table 3–2 Local Optimization Calls When a Composite is Unreachable

Scenario	Description
What happens when a local optimization call fails?	A check of composite B is performed <i>before</i> trying a local optimization call. If the check fails (composite B is unreachable), an exception is thrown in the SOA Infrastructure that is converted to a BPEL fault. The BPEL fault contains information about composite B being unreachable.
Is it possible to retry the co-located call?	After the basic check is performed, a local optimization call is tried. If that call fails, it is reinvoked over SOAP. However, the following conditions must be met for the reinvocation over SOAP to occur: <ul style="list-style-type: none"> ■ The <code>oracle.soa.local.optimization.force</code> WS-binding property must be set to <code>true</code> to force local optimization. This condition is provided for backward compatibility. ■ The exception must not be a business exception.
If a retry of the co-located call is possible (for example, the fault policy is set to retry on the composite or endpoint), is the call optimized again or does it attempt to leave the local container and access the load balancer?	If the call fails the first time you attempt to send it locally, the information is cached (that it failed locally). For subsequent calls, the call is sent over SOAP (the local optimization call is not retried this time).

Table 3–3 Creating a Load Balancer Address with a Port Value That is Not the Port on which the Oracle WebLogic Servers are Listening

Scenario	Description
If you want to create a load balancer address with a port value that is not the port on which the Oracle WebLogic Servers are listening, can you specify the server URL (in the SOA Infrastructure Common Properties page) and the frontend host/port (in the Oracle WebLogic Server HTTP tab) as the address of the load balancer?	Yes. The server URL or frontend host/port are more identifiers of the address for the local optimization rules than the actual addresses to which to send network requests.
Does local optimization not use the port to make a call (for example, composite A calling composite B over port 2011)?	Yes, the port is used only to make comparisons to see if the target is co-located, so as to make a local call.

3.8 Managing Global Token Variables for Multiple SOA Composite Applications

Configuration plans are composite-specific. Therefore, when you move a SOA composite application from one environment to another, some values require substitution in each configuration plan. To avoid substituting values in each plan, you can define global token variables for specific URIs in SOA composite applications in Oracle Enterprise Manager Fusion Middleware Control Console.

Global token variables provide the following benefits:

- If multiple SOA composite applications invoke different services hosted on a specific server, you can use a single global token variable to reference this server

across the composites. This simplifies development because individual configuration plans are not required; only a single set of token values must be updated. For example, instead of updating the host name of the server in ten different configuration plans, you set the name globally with global token variables. The value is retrieved and replaces the value of the global token variable for the host name in the binding.ws element of the composite.xml file of the deployed SOA composite application.

- Usage of global token variables means that Oracle SOA Suite metadata deployed on the runtime server does not include any environment-specific values.
- In a clustered environment, global token variable changes are made on the administration server and propagated to all managed servers.

The following options for managing global token variables are available:

- Manage (create, edit, and delete) global token variables through the Token Configurations page in Oracle Enterprise Manager Fusion Middleware Control Console.
- Tokens are only supported for the host, port, and protocol at the ws.binding location and any property under the reference tag.
- Use a predefined global token variable named serverURL.

Notes:

- Do not create a token name that contains special characters such as dashes (for example, host-name). During invocation, special characters cause the SOA composite application to fail with a Null Pointer Exception error.
 - You can only create tokens used in the composite.xml file.
 - The use of global token variables in the import element of the composite.xml file is not supported.
-

3.8.1 Managing Global Token Variables in the Token Configurations Page

You can manage global token variables on the Token Configuration page. This page enables you to do the following:

- Append variables from a local mdm-url-resolver.xml file to variables from the system's mdm-url-resolver.xml file, and then make appropriate edits.
- Manage variables in the system's mdm-url-resolver.xml file.

To manage token variables on the Token Configurations page:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > Token Configurations.	1. Right-click soa-infra. 2. Select SOA Administration > Token Configurations.

The Token Configurations page is displayed.

2. Select the global token variable configuration action to perform:

To...	Go to Step...
Select to append variables from a local <code>mdm-url-resolver.xml</code> file to variables from the system's <code>mdm-url-resolver.xml</code> file.	3
Manage variables in the system's <code>mdm-url-resolver.xml</code> .	4

3. Perform the following steps to append variables from a local file:
- Click **Bulk Append Tokens**.
 - Click **Browse** to select the `mdm-url-resolver.xml` file from the local file system. The local file must adhere to the following format to be successfully uploaded. In this example, global token variables are defined for host name, port, and protocol.
- ```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE properties SYSTEM "http://java.sun.com/dtd/properties.dtd">
<properties>
 <comment>
 URL Resolver file used by the Metadata manager to resolve $<variable>
 in URLs
 </comment>
 <entry key="host">mymachine.us.example.com</entry>
 <entry key="port">8001</entry>
 <entry key="protocol">http</entry>
</properties>
```
- Click **Append**.
- The contents of the local file are appended to the contents of the system's `mdm-url-resolver.xml` file. Global token variables that already exist in the system's `mdm-url-resolver.xml` file are not overwritten.
- If you want to edit the variables, click **Modify Configuration File**, and go to Step 4.
4. Perform the following steps to manage variables in the system's `mdm-url-resolver.xml` file:
- Click **Modify Configuration File**.
- If you first selected **Bulk Append Tokens** and uploaded a file, the global token variables in the local `mdm-url-resolver.xml` file and the system's `mdm-url-resolver.xml` file are displayed in a tabular token name and value format. There is no duplication of variables; any variables in the local file that already exist in the system file are not displayed.
- If you first selected **Modify Configuration File**, the global token variables from the system's `mdm-url-resolver.xml` file are displayed in a tabular token name and value format.

Token Name	Token Value
key3	val3
key2	val2
key1	val1

- b. Select the global token variable to manage, and perform a specific task.

---

**Note:** After making changes, you must click **Commit** before switching to **Bulk Append Tokens** mode or navigating away from this page. These actions cause uncommitted changes to be lost.

---

Element	Description
	<ol style="list-style-type: none"> <li>1. Click to invoke the Add Token dialog for adding a new token name and value. If you attempt to add a token name that already exists, you are prompted with a message asking you to specify a different name. Either enter a different name or close this dialog and click the <b>Edit</b> icon to change the existing name.</li> <li>2. Click <b>OK</b> to save your changes in the Add Token dialog.</li> <li>3. Click <b>Commit</b> to save your changes in the system's <code>mdm-url-resolver.xml</code> file.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click to invoke the Edit Token dialog for editing a selected token name, value, or both.</li> <li>2. Click <b>OK</b> to save your changes in the Edit Token dialog.</li> <li>3. Click <b>Commit</b> to save your changes in the system's <code>mdm-url-resolver.xml</code> file.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click to remove an existing token name and value.</li> <li>2. Click <b>OK</b> to confirm.</li> <li>3. Click <b>Commit</b> to save your changes to the system's <code>mdm-url-resolver.xml</code> file.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click to commit all changes you made to the token configuration. This persists any new, edited, or removed token names and values. This action commits your changes in the system's <code>mdm-url-resolver.xml</code> file.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Click to undo all changes you have made since you last clicked <b>Commit</b>.</li> <li>2. Click <b>Yes</b> when prompted to confirm.</li> </ol>

- c. Restart the SOA Infrastructure after adding, modifying, or deleting token values. For information, see [Section 3.2, "Stopping and Starting the Managed Server and SOA Infrastructure."](#)

Your updates are propagated across the cluster.

- d. For information about how global token variables are substituted at runtime, see section [Section 3.8.2, "How Global Token Variables are Substituted at Runtime."](#)

### 3.8.2 How Global Token Variables are Substituted at Runtime

---

**Note:** When you deploy a SOA composite application in Oracle Enterprise Manager Fusion Middleware Control Console that uses global token variables, a warning message is displayed asking you to verify that all tokens are configured in the system's `mdm-url-resolver.xml` file. For more information, see [Section 7.1, "Deploying SOA Composite Applications."](#)

---

The token names and the replacement values that you specified in the Token Configuration page are added to the system's `mdm-url-resolver.xml` file in the following directory:

```
$MIDDLEWARE_HOME/user_projects/domains/domain_name/config/fmwconfig/
mdm-url-resolver.xml
```

For example, assume four global token variable names and values were defined through the Token Configuration page.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE properties SYSTEM "http://java.sun.com/dtd/properties.dtd">
<properties>
 <comment>
 URL Resolver file used by the Metadata manager to resolve $<variable> in
 URLs
 </comment>
 <entry key="myprotocol">http</entry>
 <entry key="myhost">mymachine.us.example.com</entry>
 <entry key="myport">8001</entry>
</properties>
```

When the `composite.xml` for the deployed SOA composite application is loaded during runtime and the resources indicated by URIs within the file are retrieved, any values of global token variables within the URIs are replaced with the values specified in the Token Configuration page.

For example, the following `composite.xml` file specifies a URI using these tokens in the `binding.ws` element:

```
<?xml version="1.0" encoding="UTF-8"?>
<composite...>
 . . .
 . . .
 <reference name="Service" ui:wsdlLocation="...">
 . . .
 <binding.ws port="..." location="{$myprotocol}://${myhost}:${myport}/soa-infra/services/default/
 mycomposite/bpelprocess1_client_ep?WSDL" soapVersion="1.1">
 </binding.ws>
 </reference>
 . . .
</composite>
```

When the WSDL definition file is retrieved during runtime, the tokens are replaced by the values in the `mdm-url-resolver.xml` configuration file to create the following URI:

```
http://mymachine.us.example.com:8001/soa-infra/services/default/myComposite/bpelprocess1_client_ep?WSDL
```

### 3.8.3 Using Predefined Global Token Variables

You can use a predefined global token variable named `serverURL` in resource URLs. During runtime, this token is replaced by the setting for the **Server URL** property of the SOA Infrastructure Common Properties page in Oracle Enterprise Manager Fusion Middleware Control.

To use predefined global token variables:

1. In the **Server URL** field of the SOA Infrastructure Common Properties page, enter a value (for example, `my.host.com:8080`). A restart of the server is required when changing this property. [Figure 3–2](#) provides details.

**Figure 3–2 Server URL Field of the SOA Infrastructure Common Properties Page**



2. Enter the `serverURL` token in the `composite.xml` file.

```
 ${serverURL}/somePath/someResource.xml
```

The `serverURL` token includes the protocol (http or, if SSL is enabled, https).

This results in the following URI after the token is replaced during deployment:

```
 http://my.host.com:8080/somePath/someResource.xml
```

For more information about the **Server URL** property and the SOA Infrastructure Common Properties page, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)



---

## Monitoring the SOA Infrastructure

This chapter describes how to monitor the Oracle SOA Suite routing topology, SOA Infrastructure performance summary metrics, recent instances and faults, deployed SOA composite applications, message delivery processing requests, and service and reference binding components in the SOA Infrastructure. All SOA composite applications are deployed to the SOA Infrastructure. It also describes how to display details about BPEL process messages that require recovery and how to access the Recovery page of the BPEL process service engine to perform message recovery.

This chapter includes the following sections:

- [Section 4.1, "Discovering the Oracle SOA Suite Routing Topology"](#)
- [Section 4.2, "Monitoring SOA Infrastructure Performance Summary Metrics"](#)
- [Section 4.3, "Monitoring SOA Infrastructure Recent Instances and Faults and Deployed Composites"](#)
- [Section 4.4, "Monitoring Message Delivery Processing Requests"](#)
- [Section 4.5, "Monitoring Service and Reference Binding Components in the SOA Infrastructure"](#)
- [Section 4.6, "Using SOA Health Check"](#)

For more information, see [Section 1.2.1, "Introduction to the SOA Infrastructure Application."](#)

### 4.1 Discovering the Oracle SOA Suite Routing Topology

The Topology Viewer is useful for when you are tasked to administer an existing Oracle SOA Suite environment. The Topology Viewer quickly provides you with a graphical representation of the deployed resources (servers, databases and data sources, SOA composite applications, and so on) and their relationships.

The Topology Viewer shows the routing relationships across components and elements. The Topology Viewer enables you to discover your Oracle Enterprise Manager Fusion Middleware Control environment and identify how requests are routed across components.

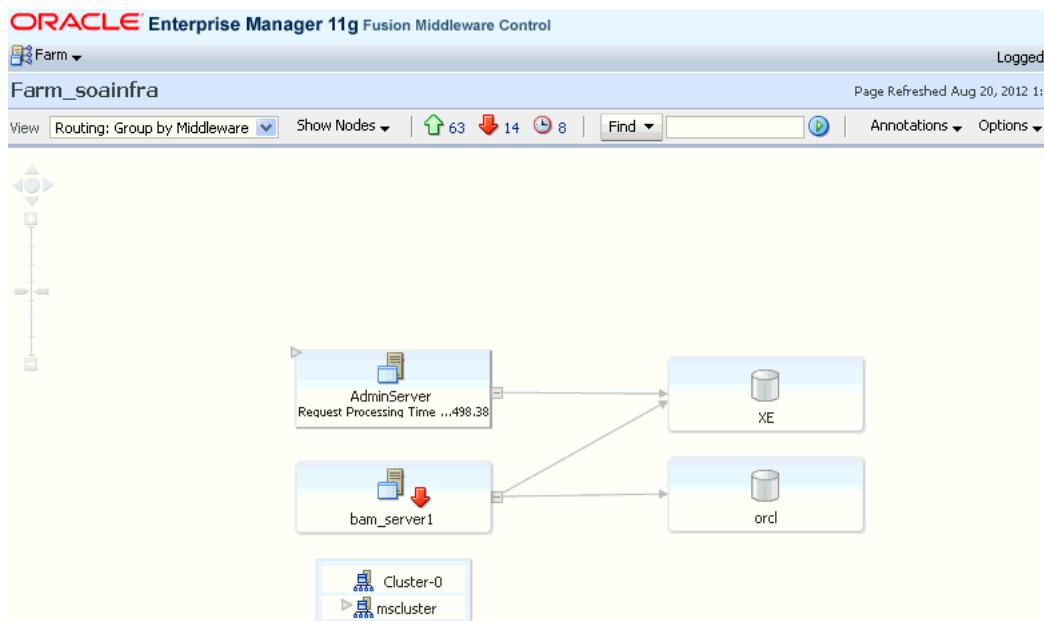
For example, you can use the Topology Viewer to understand the following:

- Which databases your SOA servers rely on
- Which data sources are used to connect to these databases
- Which entities such as SOA servers are up and down

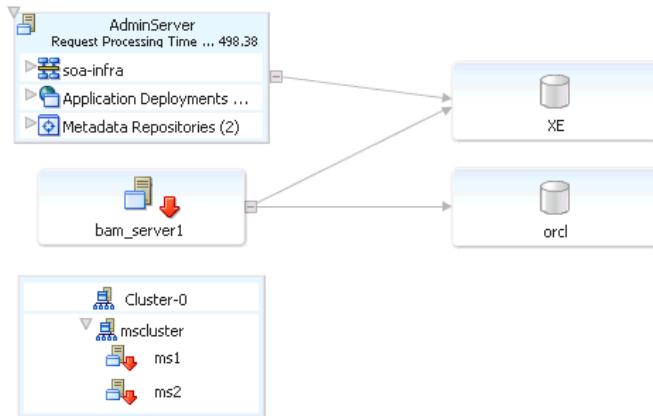
- Performance metrics for components, such as the request processing time for the administration server.
1. Above the navigator, click **Topology**.



The Topology Viewer opens in a separate window. The Topology Viewer shows the routing relationships between Oracle Fusion Middleware components (servers, clusters, and databases).

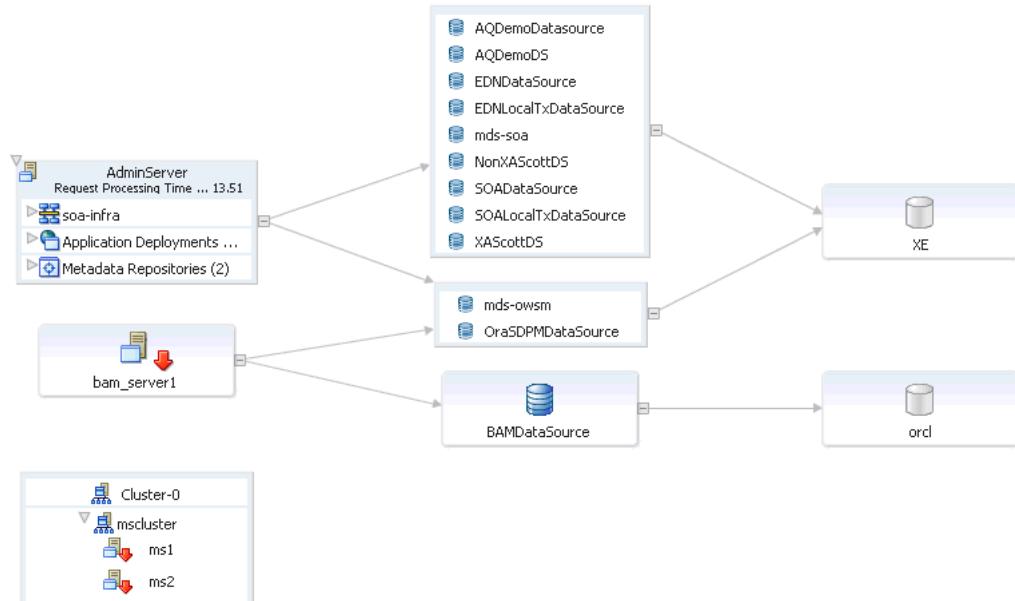


2. Expand the handles on the left sides of the **AdminServer** and **Cluster** icons to display additional details.

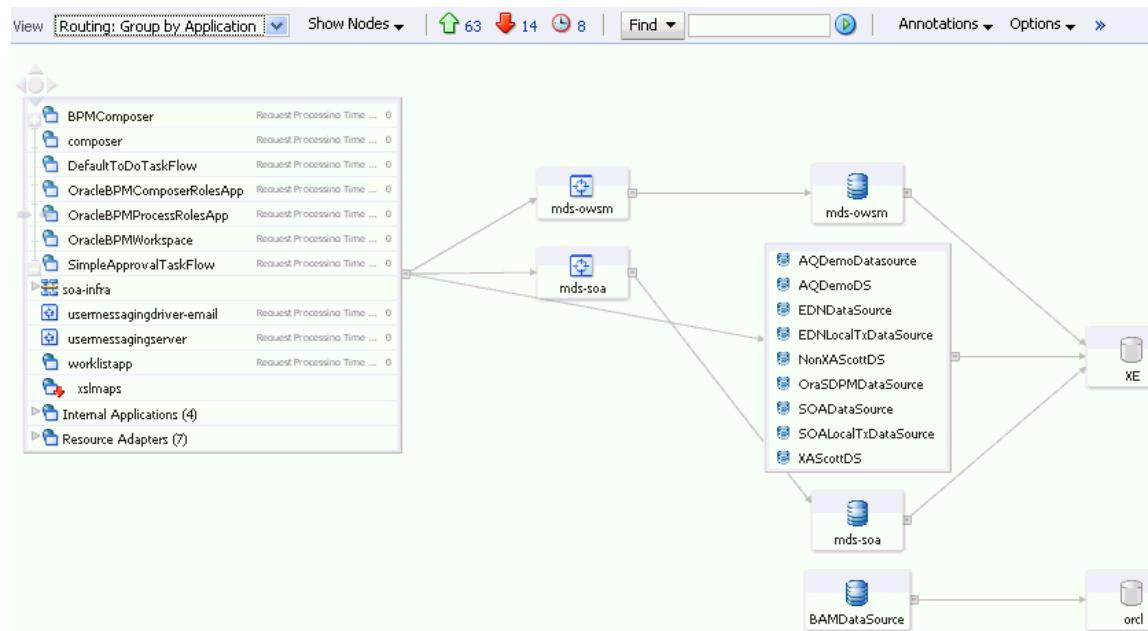


You can further expand the **soa-infra**, **Application Deployments**, and **Metadata Repositories** icons to display additional details. For example, if you expand **soa-infra**, you can view the partitions and the SOA composite applications deployed to those partitions in the SOA Infrastructure.

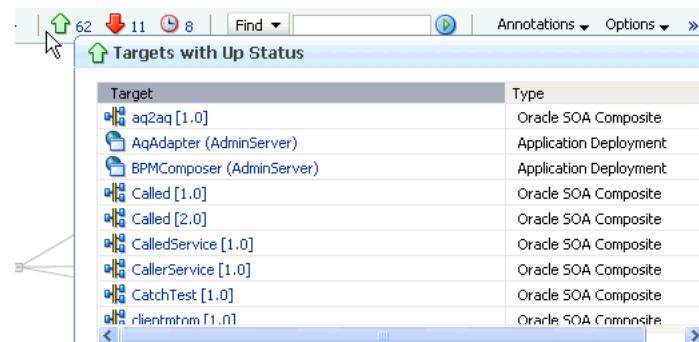
3. From the **Show Nodes** list, select **Data Sources** to display the defined data sources.



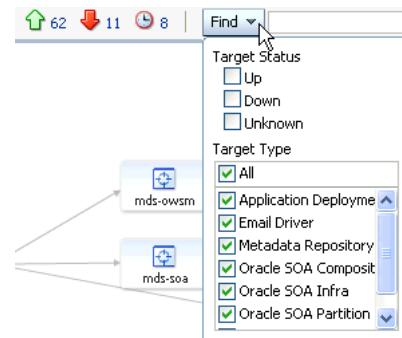
4. From the **View** list, select **Routing: Group by Application**. This displays the routing relationships between the applications. The configured Oracle Metadata Services (MDS) repositories are also displayed.



- Click the **Up** arrow to display targets whose status is running, the **Down** arrow to display targets whose status is down, or the **Clock** icon to display targets whose status is unknown.

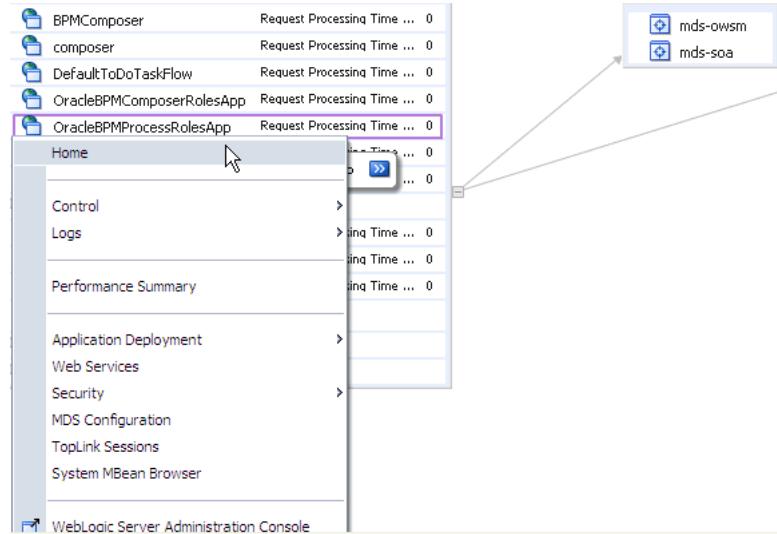


- From the **Find** list, select the target status (up, down, or unknown) or target type for which to search, and click the **Search** icon. You can also manually enter the name of entities for which to search, such as a SOA composite application name.

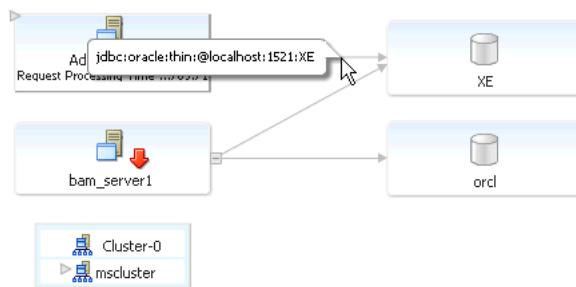


- From the **Annotations** list, click **Status** or **Metrics** to display applicable details. For example:

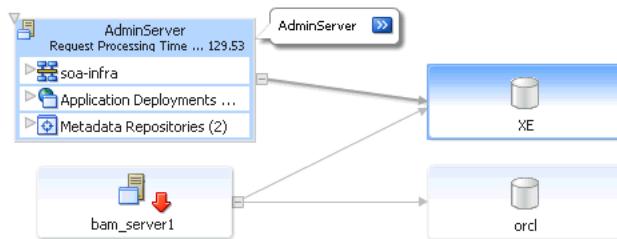
- If you select **Metrics**, key performance metrics for the component are displayed, such as the request processing time for the **AdminServer**.
  - If you select **Status**, details about the state of various entities are displayed, such as which servers are down.
8. Right-click a component (such as an application) to invoke a menu for performing operations. For example, you can select **Performance Summary** to display performance details about the selected component or select **Home** to access the Dashboard page of the application.



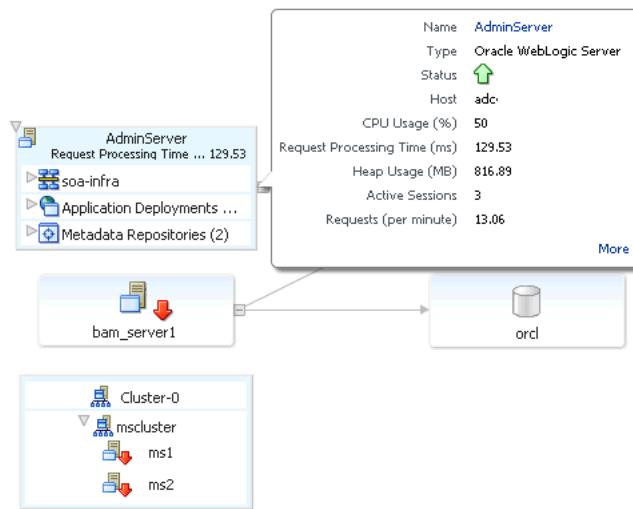
9. Click a line between components to view the JDBC routing relationship, such as the host, port, and database being used.



10. Place the cursor over the edge of one of the entities (for example, the **AdminServer**) to invoke a small icon.



11. Expand the icon to display details about server status, host name, CPU usage, request processing time, heap usage, active sessions, and message requests per minute.



12. From the **Refresh** list, select to manually or automatically refresh the status and metrics. By default, the Topology Viewer refreshes metrics every five minutes.

For more information about the Topology Viewer, see Section "Viewing the Routing Topology" of *Oracle Fusion Middleware Administrator's Guide*.

## 4.2 Monitoring SOA Infrastructure Performance Summary Metrics

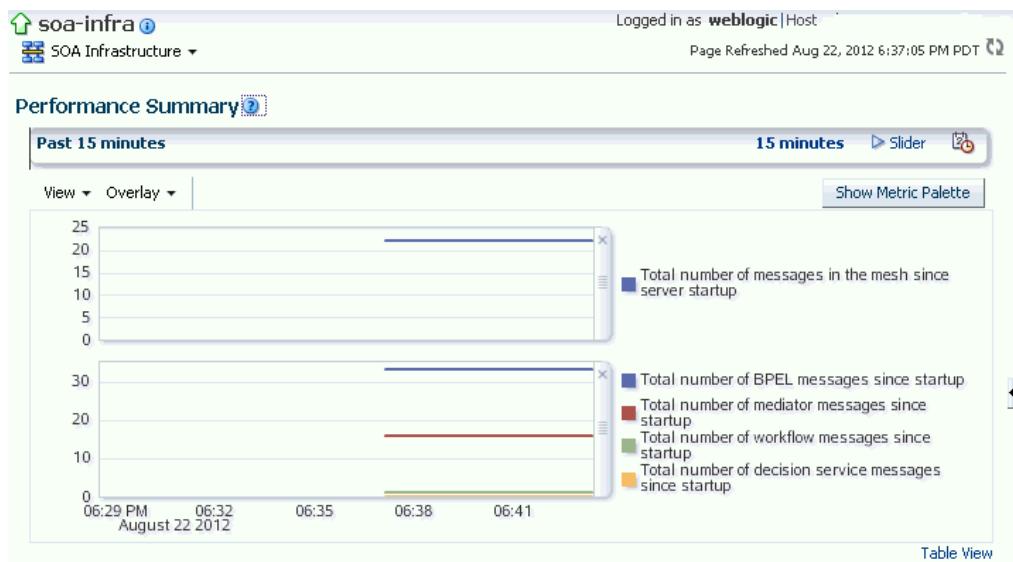
You can view a summary of SOA Infrastructure performance metrics on the Performance Summary page.

1. Access this page through one of the following options:

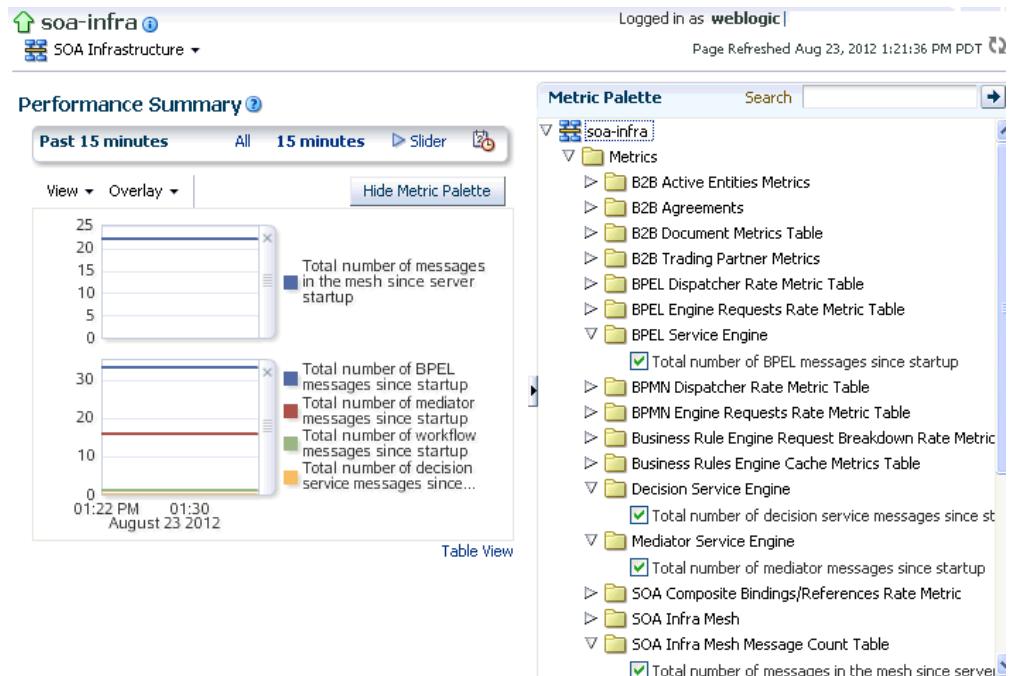
From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Monitoring &gt; Performance Summary</b>	1. Right-click <b>soa-infra</b> . 2. Select <b>Monitoring &gt; Performance Summary</b> .

The Performance Summary page provides a graphical representation of the following information by default:

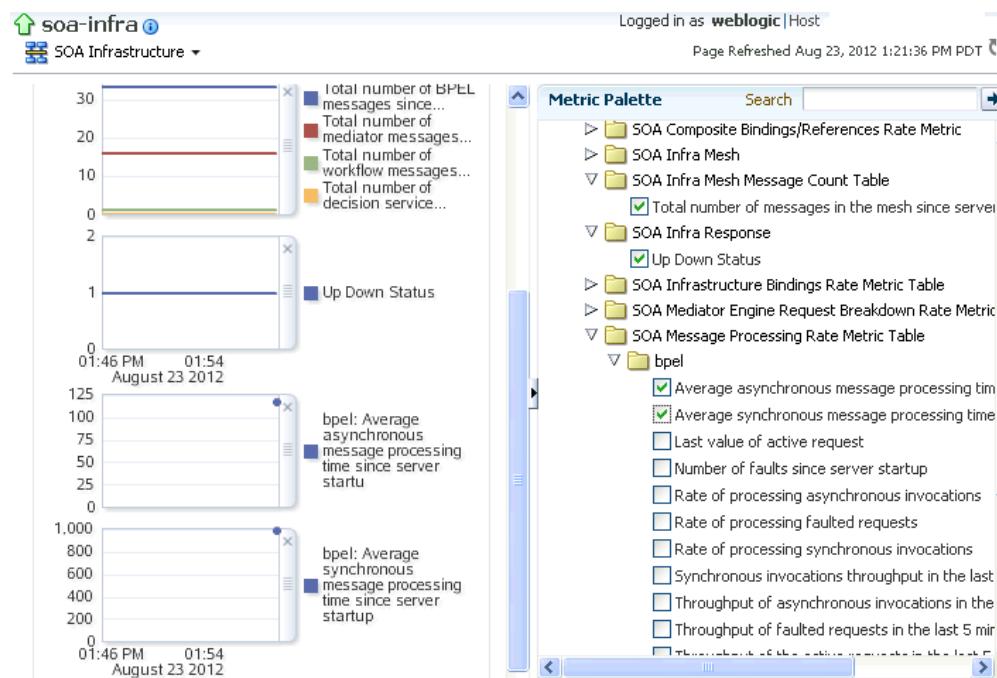
- Total number of messages in the SOA Infrastructure since the last server restart.
- Total number of service component messages (BPEL process, Oracle Mediator, human workflow, and business rule (decision service)) since the last server restart.



- Click **Show Metric Palette** to display a hierarchical tree of all metrics for the SOA Infrastructure. The tree organizes the metrics into various categories of performance data.



- Expand a folder and select a metric in the **Metric Palette** to display a performance chart that shows the changes in the metric value over time. The chart refreshes automatically to show updated data.



- Click **Slider** to display a slider tool that lets you specify the time frame for the data shown in the charts.

For more information about the Performance Summary page, see the online Help for the Performance Summary page and Section "Viewing the Performance of Oracle Fusion Middleware" of *Oracle Fusion Middleware Administrator's Guide*.

For information about monitoring message delivery processing requests, see [Section 4.4, "Monitoring Message Delivery Processing Requests."](#)

For information about monitoring SOA composite application summary metrics, see [Section 6.1, "Monitoring SOA Composite Application Performance Summary Metrics."](#)

For information about monitoring service engine statistics, see the following:

- [Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics"](#)
- [Section 17.3.3, "Monitoring Request Breakdown Statistics"](#)
- [Section 20.2, "Monitoring Business Rules Service Engine Performance Statistics"](#)
- [Section 22.5, "Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics"](#)
- [Section 40.5, "Monitoring BPMN Process Service Engine Request and Thread Performance Statistics"](#)

## 4.3 Monitoring SOA Infrastructure Recent Instances and Faults and Deployed Composites

You can monitor the SOA composite applications deployed to the SOA Infrastructure.

To monitor SOA Infrastructure recent instances and faults:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select Home.	1. Select soa-infra.	1. Select SOA Infrastructure.

The upper part of the SOA Infrastructure Dashboard page displays the following details:

- A message indicating that the retrieval of recent instances and faults that are displayed on this page is restricted to the specified time period. This message is displayed if the **Restrict display of instances and faults to the last time\_period** checkbox is selected on the SOA Infrastructure Common Properties page (it is selected by default). The default time period value is 24 hours, but you can change this value. If this checkbox is not selected, all instances and faults (including count metrics) in the SOA Infrastructure since the last purging are displayed.
- Recent SOA composite application instances, instance IDs, and starting times. By default, only running instances are shown.
- The status of deployed SOA composite applications and their revision numbers, the number of instances created for each application, and the number of faulted instances in each application. The total number of deployed composites also is displayed in parentheses next to the **Show More** link.
- Recent faults and rejected messages, including the error message, whether you can recover from the fault, the time at which the fault occurred, the SOA composite application in which the fault occurred, the location of the fault (service binding component, service component, or reference binding component), the instance ID of the SOA composite application, and a link to log messages describing the fault or rejected message. You can recover from faults identified as recoverable at the SOA Infrastructure, SOA composite application, service engine, and service component levels.

If messages are awaiting recovery from the Recovery page of the BPEL process service engine, a message is displayed at the top of each SOA Infrastructure home page.

The screenshot shows the SOA Infrastructure home page with the following sections:

- BPEL Message Recovery Required:** A yellow banner at the top left.
- Recent Composite Instances:** A table showing 90 instances, all running, with a total of 90. One instance is selected: 40010 CompositeTest [1.0] from Oct 9, 2012 4:13:03.
- Deployed Composites:** A table listing 9 deployed composites, all active, with 90 instances and 18 faulted instances.
- Recent Faults and Rejected Messages:** A table showing 14 messages, with a link to "Show More".

**Note:** After the SOA Infrastructure is started, it may not be completely initialized to administer incoming requests until all deployed composites are loaded. During SOA Infrastructure initialization, a warning message is displayed at the top of the SOA Infrastructure home page. Do not perform operations such as composite deployment, composite undeployment, and others while this message is displayed. For more information, see [Section 3.2.1, "Waiting for SOA Infrastructure Startup Initialization to Complete."](#)

2. If BPEL process messages require recovery from the Recovery page of the BPEL process service engine, the **BPEL Message Recovery Required** message is displayed at the top of each SOA Infrastructure home page.

The display of this message recovery information is controlled by the **bpelRecoveryStatus**, **excludeBpelMaxCreationTime**, and **bpelRecoveryAlertDurationInDays** keys of the **AuditConfig** property in the System MBean Browser. This property is accessible from the **More SOA Infra Advanced Configuration Properties** section of the SOA Infrastructure Common Properties page. By default, these keys have the following values:

- **bpelRecoveryStatus** is set to All.
  - **excludeBpelMaxCreationTime** is set to exclude the display of messages requiring recovery in the last five minutes.
  - **bpelRecoveryAlertDurationInDays** is set to only show the **BPEL Message Recovery Required** warning message when recoverable BPEL messages have been created in the last seven days.
- a. Perform the following tasks:

Click This Link...	To...
Show Details	View a message showing the number of invoke, callback, and activity messages that require recovery from the Recovery page of the BPEL process service engine. Manual recovery is not required if automatic recovery of BPEL messages is enabled. In that case, only exhausted messages must be manually recovered. Click Refresh to recalculate the number of invoke, callback, and activity messages requiring recovery.
Go to BPEL Recovery Console	Access the Recovery page of the BPEL process service engine to perform message recovery.  You can also access the Recovery page later by selecting <b>Service Engines &gt; BPEL</b> from the <b>SOA Infrastructure</b> menu and clicking the <b>Recovery</b> tab in the resulting page.
Set Time Threshold	View a message showing the time period for excluding messages that require recovery. By default, this setting excludes the last five minutes of messages. This value is controlled by the <b>excludeBpelMaxCreationTime</b> key of the <b>AuditConfig</b> property on the SOA Infrastructure Common Properties page. To change this value, click Yes to access this property in the System MBean Browser.
Disable Alert	View a message enabling you to prevent the display of this message recovery information on the Dashboard page. If you click Yes, this message recovery information is not displayed.  To display this information again on the Dashboard page, set the <b>bpelRecoveryStatus</b> key to All for the <b>AuditConfig</b> property in the <b>More SOA Infra Advanced Configuration Properties</b> section of the SOA Infrastructure Common Properties page. For more information, see <a href="#">Section 3.1, "Configuring SOA Infrastructure Properties."</a>

3. In the **Recent Composite Instances** section, perform the following tasks:
  - a. Click the **Number of Instances** link to display a message showing the numbers of running and total instances in the SOA Infrastructure. The link is not displayed by default. To enable this link to be displayed, select the **Disable fetching of instance and fault count metrics. Each metric can still be retrieved on demand** checkbox in the SOA Infrastructure Common Properties page.  
  
If you selected the **Restrict display of instances and faults to the last *time\_period*** checkbox on the SOA Infrastructure Common Properties page and specified a time period or accepted the default value of 24 hours, the numbers of running and total instances in the SOA Infrastructure for that time period are displayed. If you did not select this checkbox, all instances and faults in the SOA Infrastructure since the last purging are displayed. Click **Recalculate** to recalculate the numbers.
  - b. In the **Instance ID** column, click a specific instance ID to show the message flow through the various service components and binding components.
  - c. In the **Composite** column, click a specific SOA composite application to access its home page.
  - d. Click **Show More** below the section to access the Instances page of the SOA Infrastructure.
4. In the **Deployed Composites** section, perform the following tasks:
  - a. In the **Composite** column, click a specific SOA composite application to access its home page.

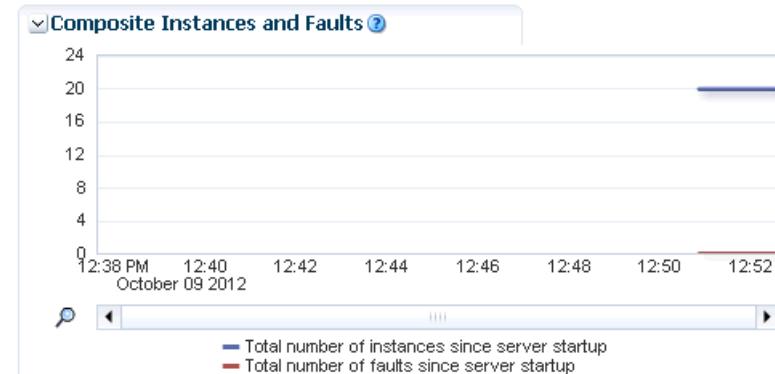
- b. Click **Show More** below the section to access the Deployed Composites page of the SOA Infrastructure.
5. In the **Recent Faults and Rejected Messages** section, perform the following tasks:
- a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery.
  - b. In the **Recovery** column, if a fault is identified as recoverable, click **Recover** to perform fault recovery.
  - c. In the **Composite** column, click a SOA composite application to access its home page.
  - d. In the **Fault Location** column, click a specific location to access the home page of the service, component, or reference in which the fault occurred.
  - e. In the **Composite Instance ID** column, click a composite instance ID to access the flow trace of the message that contains that fault.
  - f. In the **Logs** column, click a specific log to access the Log Messages page, with the search criteria prefiltered to display any log messages related to the fault.
  - g. Click **Show More** below the section to access the Recent Faults and Rejected Messages page of the SOA Infrastructure.

The lower part of the SOA Infrastructure Dashboard page displays the following details:

- The number of service components running in the service engines (BPEL process, BPMN process (if Oracle BPM Suite is installed), Oracle Mediator, human workflow, business rules, and spring) and the number of faulted instances for each service engine.

Service Engines		Composite Instances and Faults	
Name	Number of Components	Faults	
BPEL Engine	16	52	
Mediator Engine	10	0	
Human Workflow Engine	9	0	
Business Rules Engine	4	0	
Spring Engine	1	0	

- A graphical representation of the total number of instances and faults for all SOA composite applications since the SOA Infrastructure was last restarted.



6. In the **Name** column of the **Service Engines** section, click a specific service engine to access its home page. If you click **Spring Engine**, a message is displayed indicating that it cannot be managed.

For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)
- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)
- [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#)
- [Section 15.4, "Performing BPEL Process Service Engine Message Recovery"](#)
- *Oracle Fusion Middleware Administrator's Guide* for details about viewing and searching log files

## 4.4 Monitoring Message Delivery Processing Requests

You can monitor SOA Infrastructure message delivery processing requests. These are metrics for the message delivery between the service engines, service infrastructure, and binding components. Once a message is handed over to a service engine, the amount of time it takes to process that message (instance processing time) is *not* captured in these metrics.

To monitor message delivery processing requests:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Monitoring &gt; Request Processing</b> .	1. Right-click <b>soa-infra</b> . 2. Select <b>Monitoring &gt; Request Processing</b> .

The Request Processing page enables you to monitor the following details:

- The average request processing time for both synchronous and asynchronous messages, active requests, requests processed, and faulted requests in the service engines and service infrastructure.
- The average request processing time, requests processed, and errors occurring in service (inbound) and reference (outbound) binding components.

The screenshot shows the SOA Infrastructure Request Processing page. At the top, it says "Logged in as weblogic" and "Page Refreshed Oct 9, 2012 12:54:37 PM PDT". The main content area is divided into three sections:

- Service Engines**: A table showing service engine statistics. The BPEL Engine has an average request processing time of 250.062 ms (synchronous) and 26.000 ms (asynchronous), with 0 active requests and 116 processed requests.
- Service Infrastructure**: A table showing service infrastructure statistics. The Service Infrastructure has an average request processing time of 46.444 ms (synchronous) and 0 ms (asynchronous), with 0 active requests and 360 processed requests.
- Binding Components**: A table showing binding component statistics. It lists Web Service (WS) Inbound and Web Service (WS) Outbound components, both with 0.000 ms average request processing time and 0.0 requests processed, and 0 errors.

2. In the **Service Engines** section, click a specific service engine (for example, **BPEL Engine**) to access details such as recent instances using this service engine, components using this service engine, and recent fault occurrences.

For more information, see the following sections:

- [Section 1.2.5, "Introduction to Binding Components"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)
- [Section 1.2.7, "Introduction to the Service Infrastructure"](#)

## 4.5 Monitoring Service and Reference Binding Components in the SOA Infrastructure

You can monitor all service and reference binding components used in all SOA composite applications deployed to the SOA Infrastructure. Services provide the outside world with an entry point to the SOA composite application. The WSDL file of the service advertises its capabilities to external applications. References enable messages to be sent from the SOA composite application to external services in the outside world.

To monitor service and reference binding components in the SOA Infrastructure:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Services and References.	1. Right-click <b>soa-infra</b> . 2. Select <b>Services and References</b> .

The Services page displays details about the names and types of the services, the SOA composite applications in which the services are used, the partitions in which the SOA composite applications are deployed, the total number of messages processed, the average processing time, and the number of faults occurring in the services.

Service	Type	Composite	Partition	Total Messages	Average Processing Time (sec)	Faults
bpelprocess20_client_ep	Service	BPELSyncWaitAssertActiviti	default	0	0.000	0
BugTriage.service	Service	pmd_bis [4.0]	default	0	0.000	0
service	JCA Adapter	fa [1.0]	default	0	0.000	0
B2B_po_X12_inbound	B2B Binding	B2BX12OrderGateway [1 soaFusionOrderDemo]		0	0.000	0
OrderFulfillment_ep	Service	FODOrderProcessingCom	default	0	0.000	0
client	Service	SimpleApproval [1.0]	default	0	0.000	0
client	Service	CompositeTest [1.0]	default	0	0.000	0
bpelprocess1_client_ep	Service	SingleTokenWSDL [1.0]	default	0	0.000	0
StoreFrontService	Service	OrderSDOComposite [1 soaFusionOrderDemo]		0	0.000	0
OrderFulfillment_ep	Service	FODOrderProcessingCom	default	0	0.000	0
IInternalPartnerSupplier	Service	PartnerSupplierComposite	soaFusionOrderDemo	0	0.000	0
client	Service	FODOrderProcessingCom	default	0	0.000	0
bpelprocess1_client_ep	Service	service [4.0]	default	0	0.000	0

2. In the **Service** column, click a specific service to access its home page.
3. In the **Composite** column, click a specific SOA composite application to access its home page.
4. In the **Partitions** column, click a specific partition to access its home page.
5. Click the **References** tab.

The References page displays details about the names and types of the references, the SOA composite applications in which the references are used, the partitions in which the SOA composite applications are deployed, the total number of messages processed, the average processing time, and the number of faults occurring in the references.

Reference Service	Type	Composite	Partition	Total Messages	Average Processing Time (sec)	Faults
USPS	JCA Adapter	FODOrderProcessingComp/default		0	0.000	0
StoreFrontService	Reference	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
GetOrderInfo	JCA Adapter	FODOrderProcessingComp/default		0	0.000	0
FileWrite	JCA Adapter	BpelRecoveryE2ETest [1.0] default		0	0.000	0
FulfillmentBatch	JCA Adapter	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
CreditCardAuthorizationService	Reference	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
BAM_ProcessTimeDO	JCA Adapter	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
StoreFrontService	Reference	B2BX12OrderGateway [1.0 soaFusionOrderDemo]		0	0.000	0
B2B_orderconfirmation_x12	B2B Binding	B2BX12OrderGateway [1.0 soaFusionOrderDemo]		0	0.000	0
GetCustomerInfo	JCA Adapter	FODOrderProcessingComp/default		0	0.000	0
USPSShipment	JCA Adapter	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
BAM_ProcessTimeDO_ECID	JCA Adapter	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
PartnerSupplierService	Reference	OrderBookingComposite [1 soaFusionOrderDemo]		0	0.000	0
OrderBookingService	Reference	B2BX12OrderGateway [1.0 soaFusionOrderDemo]		0	0.000	0
FedEx	JCA Adapter	FODOrderProcessingComp/default		0	0.000	0

6. In the **Reference** column, click a specific reference to access its home page.
7. In the **Composite** column, click a specific SOA composite application to access its home page.
8. In the **Partitions** column, click a specific partition to access its home page.

For more information about services and references, [Section 1.2.5, "Introduction to Binding Components."](#)

## 4.6 Using SOA Health Check

The SOA Health Check framework provides a number of health checks and health check categories to monitor the health of your system. Checks include memory checks, data source checks, SOA-related service checks, SOA application-targeting checks, BPEL-related checks, and so on.

Startup checks execute automatically at server startup, and periodic checks can be scheduled to run at periodic intervals. You can also execute individual health checks or health check categories using WLST.

This section includes the following topics:

- [SOA Health Checks](#)
- [Health Check Categories](#)
- [Invoking SOA Health Checks](#)

### 4.6.1 SOA Health Checks

[Table 4-1](#) summarizes the SOA health checks that are available in this release.

**Table 4–1 SOA Health Checks**

Health Check Name	Description
BPELAsyncRequestCheck	Checks if the BPEL asynchronous request count is within the configured threshold of 1000.
BPELComponentInstance Check	Checks if the number of open BPEL component instances are within the threshold of 1000. Also checks if the number of faulted BPEL component instances are within the threshold of 500.
DatasourceCheck	Checks if the data sources are appropriately targeted for use by the soa-infra application.  For each data source, the check verifies if the targets of the data source cover all targets of the soa-infra application. If any of the soa-infra application targets is missing from any of the data source targets, an error is raised.
DBStatsCheck	Checks if the MDS database statistics are current.
EDNMessageCheck	Checks if the pending messages count in the EDN event queue and OAOO queue are within thresholds. The threshold limit used for the EDN event queue is 2000 and the threshold limit used for the OAOO queue is 5000.
JDBC Pools Check	Checks if the SOA, EDN, and MDS data sources are healthy at runtime.
SOAAppCheck	Verifies targeting of SOA applications. SOA applications should at least target all of the soa-infra application targets.
SOALibraryCheck	Verifies the targeting of SOA, and related, libraries. SOA libraries should at least target all of the soa-infra application targets.
ServiceCheck	Verify if SOA-related services are functional. Currently, this check verifies if the OWSM Policy Manager service is functional.
MemoryCheck	Checks if the available (free) heap memory is above the configured threshold of 25%.

A health check ends with one of the following states:

- **Success:** The check completed, and passed.
- **Error:** The check completed, but did not pass.
- **Warning:** The check completed and passed, but something may need user attention.
- **Failure:** The check could not be completed/executed.
- **Skipped:** The check is not applicable for the environment.
- **Disabled:** The check is disabled and cannot be run.

## 4.6.2 Health Check Categories

The SOA health check framework logically groups health checks into health check categories. A health check can be part of more than one category.

When you execute a health check category, using the WLST command for example, all health checks in the category automatically get executed. Certain health check categories are automatically executed. For example, the Startup category, if enabled, runs all the startup health checks at server startup.

[Table 4–2](#) summarizes the SOA health check categories and their constituent health checks.

**Table 4–2 SOA Health Check Categories**

Health Check Category	Description	Default health checks included in the Category
Startup	Runs at server startup	DatasourceCheck, JDBC Pools Check, SOA App Check, SOA Library Check, Service Check, Memory Check
Quick	Lightweight set of checks	JDBC Pools Check, Service Check, Memory Check
Intermediate	Intermediate set of checks	BPEL Async Request Check, BPEL Component Instance Check, DB Stats Check, EDN Message Check
Extensive	Extensive set of checks	For future use
Config	Configuration checks	DatasourceCheck, SOA App Check, SOA Library Check

### 4.6.3 Invoking SOA Health Checks

The SOA health checks can be invoked in a number of ways, as described in the following sections:

#### 4.6.3.1 Server Startup

When a production SOA server starts, health checks in the Startup category are automatically run. The startup health check is enabled by default. The result of the startup run is logged in the SOA server logs.

You can choose to disable the startup run using WLST commands. You can also change the category of tests run at startup using the appropriate WLST command. See "enableHCStartupRun" and "setHCStartupRunCategory" in *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

#### 4.6.3.2 Periodic Invocation

SOA health check is pre-configured with periodic runs that automatically run on the production SOA server. **Table 4–3** lists the pre-configured periodic runs.

**Table 4–3 Pre-Configured Periodic Runs**

Periodic Run Name	Category	Scheduling	Enabled by Default?
Frequently	Quick	Every two hours at :07	Yes
Daily	Intermediate	Every day at 05:15	Yes
Weekly	Extensive	Every Sunday at 03:30	No (for future use)

Periodic runs are enabled by default. The result of the periodic runs are logged in the SOA server logs.

You can disable periodic runs, or change the health-check category associated with a periodic run. You can also change the scheduling, or add new periodic runs. See "createHCPeriodicRun", "enableHCPeriodicRun", "setHCPeriodicRunInterval", "setHCPeriodicRunSchedule", and "setHCPeriodicRunCategory" in *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

#### 4.6.3.3 WLST Invocation

You can use WLST commands to:

- List health checks

- Configure health checks
- List health check categories
- Execute a health check by name
- Execute a category of health checks
- Get results (Returned as an HTML report at the specified location)
- Purge results

See "SOA Health Check Commands" in *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference* for details on all health check commands.

The WLST commands need to be executed in the online mode. You must be connected to the SOA server.



# **Part IV**

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## **Administering SOA Composite Applications and Instances**

This part describes how to administer SOA composite applications and instances.

This part includes the following chapters:

- [Chapter 5, "Securing SOA Composite Applications"](#)
- [Chapter 6, "Monitoring SOA Composite Applications"](#)
- [Chapter 7, "Deploying and Managing SOA Composite Applications"](#)
- [Chapter 8, "Managing SOA Composite Application Instances"](#)
- [Chapter 9, "Developing a Database Growth Management Strategy"](#)
- [Chapter 10, "Managing Database Growth"](#)
- [Chapter 11, "Programmatically Managing SOA Composite Applications with the Facade API"](#)
- [Chapter 12, "Diagnosing Problems with SOA Composite Applications"](#)



# 5

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## Securing SOA Composite Applications

This chapter describes security configuration procedures unique to SOA composite applications, such as mapping the SOAOperator and SOAMonitor roles to Oracle WebLogic Server groups or users. Most SOA composite application security procedures do not require SOA-unique configuration steps. References are provided to additional documentation for performing those tasks.

This chapter includes the following sections:

- [Section 5.1, "Introduction to Securing SOA Composite Applications"](#)
- [Section 5.2, "Mapping the SOAOperator and SOAMonitor Roles to Oracle WebLogic Server Groups or Users"](#)
- [Section 5.3, "Configuring Oracle HTTP Server with Oracle BPM Worklist"](#)
- [Section 5.4, "Setting up SAML Message-Protected Policy Configuration for the SOA Infrastructure"](#)
- [Section 5.5, "Automatically Authenticating Oracle BPM Worklist and Oracle Business Process Management Users"](#)
- [Section 5.6, "Setting the Authentication Provider"](#)
- [Section 5.7, "Invoking a Web Service that Requests NTLM Authentication"](#)
- [Section 5.8, "Configuring SSL"](#)
- [Section 5.9, "Configuring Security for Human Workflow WSDL Files"](#)

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**Note:** See the following sections for information on attaching and detaching policies:

- [Section 7.7, "Managing SOA Composite Application Policies"](#)
  - [Section 15.2, "Managing BPEL Process Service Component Policies"](#)
  - [Section 18.2, "Managing Oracle Mediator Policies"](#)
  - [Section 23.1, "Managing Human Task Service Component Policies"](#)
  - [Section 38.1, "Managing Binding Component Policies"](#)
- 

### 5.1 Introduction to Securing SOA Composite Applications

This chapter describes security procedures unique to SOA composite applications. Most SOA composite application security procedures do not require SOA-unique steps and can be performed by following the documentation listed in [Table 5-1](#).

**Table 5–1 Security Documentation**

For Information On...	See The Following Guide...
Securing Oracle Fusion Middleware, including Oracle Single Sign-On (SSO) configuration	<i>Oracle Fusion Middleware Application Security Guide</i>
Securing and administering web services	<i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i>
Understanding Oracle WebLogic Server security	<i>Oracle Fusion Middleware Understanding Security for Oracle WebLogic Server</i>
Securing an Oracle WebLogic Server production environment	<i>Oracle Fusion Middleware Securing a Production Environment for Oracle WebLogic Server</i>
Securing Oracle WebLogic Server	<i>Oracle Fusion Middleware Securing Oracle WebLogic Server</i>
Developing new security providers for use with Oracle WebLogic Server	<i>Oracle Fusion Middleware Developing Security Providers for Oracle WebLogic Server</i>
Securing web services for Oracle WebLogic Server	<i>Oracle Fusion Middleware Securing WebLogic Web Services for Oracle WebLogic Server</i>
Programming security for Oracle WebLogic Server	<i>Oracle Fusion Middleware Programming Security for Oracle WebLogic Server</i>
Securing Oracle Business Activity Monitoring	<a href="#">Section 24.9, "Configuring Security"</a>
Securing Oracle User Messaging Service	<a href="#">Section 27.6, "Securing the Oracle User Messaging Service"</a>

## 5.2 Mapping the SOAOperator and SOAMonitor Roles to Oracle WebLogic Server Groups or Users

There is *no* default mapping of the SOAMonitor and SOAOperator roles to Oracle WebLogic Server groups or users. These roles must be manually mapped in Oracle Enterprise Manager Fusion Middleware Control.

You have the following options:

- Mapping the SOAMonitor role to the Oracle WebLogic Server Monitors group or to an individual user that you created.
- Mapping the SOAOperator role to the Oracle WebLogic Server Operators group or to an individual user that you created.

Create the mapping option that is best for your environment. The instructions in this section describe how to create both options.

---

**WARNING:** Only the SOAAdmin role is automatically mapped to the Oracle WebLogic Server Administrator role. Possessing only the Oracle WebLogic Server groups (Monitors/Operators) does *not* provide you with access to Oracle SOA Suite content until the corresponding Oracle WebLogic Server group or user is mapped to the Oracle SOA Suite application role (SOAMonitor/SOAOperator).

---

Perform the following steps to map the SOAMonitor and SOAOperator roles to groups or users.

1. Log in to Oracle Enterprise Manager Fusion Middleware Control as a user with the Administrators role.
2. In the navigator, expand the **SOA** folder.
3. Right-click **soa-infra**, and select **Security > Application Roles**.
4. To the right of the **Role Name** field, click the **Search** icon.

The list of roles appears.
5. Click **SOAMonitor**, and select **Edit**.

The Edit Application Role : SOAMonitor page appears.
6. Click the **Add** icon.

The Add Principal dialog is displayed.
7. From the **Type** list, select to map **SOAMonitor** to either a group or an individual user:
  - **Group:** For mapping to the **Monitors** group.
  - **User:** For mapping to an individual user you created.
8. Click the **Search** icon.

If you selected **Group**, the **Monitors** group is displayed in the list. If you selected **User**, the individual user is displayed in the list.
9. Make your selection in the list, and click **OK**.

The user or group you selected is added to the **Members** section of the Edit Application Role : SOAMonitor page.
10. Click **OK** to save the changes and return to the Application Roles page.
11. To the right of the **Role Name** field, click the **Search** icon.

The list of roles appears.
12. Click **SOAOperator**, and select **Edit**.

The Edit Application Role : SOAOperator page appears.
13. Click the **Add** icon.

The Add Principal dialog is displayed.
14. From the **Type** list, select to map **SOAOperator** to either a group or an individual user:
  - **Group:** For mapping to the **Operators** group.
  - **User:** For mapping to an individual user you created.
15. Click the **Search** icon.

If you selected **Group**, the **Operators** group is displayed in the list. If you selected **User**, the individual user is displayed in the list.
16. Make your selection in the list, and click **OK**.

The user or group you selected is added to the **Members** section of the Edit Application Role : SOAOperator page.
17. Click **OK** to save the changes and return to the Application Roles page.

## 5.3 Configuring Oracle HTTP Server with Oracle BPM Worklist

You must add the /integration location in the mod\_wl\_ohs.conf file of Oracle HTTP Server for Oracle BPM Worklist to work through Oracle HTTP Server.

```
<Location /integration>
 SetHandler weblogic-handler
 # PathTrim /weblogic
 ErrorPage http:/WEBLOGIC_HOME:WEBLOGIC_PORT/
</Location>
```

## 5.4 Setting up SAML Message-Protected Policy Configuration for the SOA Infrastructure

This section describes how to set up and validate Security Assertion Markup Language (SAML) message-protected policy configuration for the SOA Infrastructure with the Oracle WebLogic Scripting Tool (WLST). The example in this section describes task query service configuration. However, these instructions are relevant to all human workflow services that support SAML-token ports:

- Activity guide query service
- Activity guide metadata service
- Activity guide admin service
- Task query service
- Task service
- Task metadata service
- Runtime config service
- Task evidence service
- User metadata service

If you want to change the policy for another service, you must apply the same WLST commands to that service's SAML-token port.

To set up an SAML message-protected policy configuration:

1. Log in to the SOA domain (for example, named `base_domain`) using WLST.
2. Detach the existing out-of-the-box service policy named `wss10_saml_token_service_policy`.

```
wls:/base_domain/domainRuntime> detachWebServicePolicy('/base_domain/soa_server1/soa-infra','integration/services/TaskQueryService','web','WorkflowProvider','TaskQueryServicePortSAML','oracle/wss10_saml_token_service_policy')
```

3. Restart the application to activate any policy or configuration change.
4. Attach the new policy. In this case, the policy is named `oracle/wss10_saml_token_with_message_protection_service_policy`.

```
wls:/base_domain/domainRuntime> attachWebServicePolicy('/base_domain/soa_server1/soa-infra','integration/services/TaskQueryService','web','WorkflowProvider','TaskQueryServicePortSAML','oracle/wss10_saml_token_with_message_protection_service_policy')
```

5. Restart the application to activate any policy or configuration change.

6. List the policy to validate.

```
wls:/base_domain/domainRuntime> listWebServicePolicies('/base_domain/soa
_server1/soa-infra','integration/services/TaskQueryService',
'web','WorkflowProvider','TaskQueryServicePortSAML')
 TaskQueryServicePortSAML :
 security :
 oracle/wss10_saml_token_with_message_protection_service_policy,
 enabled=true
Attached policy or policies are valid; endpoint is secure.
```

7. Create a keystore, add the orakey alias, and run the Oracle Web Service Manager (OWSM) configuration to activate the SAML message-protected policy. For example:

```
keytool -genkeypair
 -keystore domain_home/config/fmwconfig/default-keystore.jks
 -keyalg RSA
 -dname "cn=consumer,dc=example,dc=com"
 -alias clientalias
 -keypass password
 -storepass password
 -validity 3600

keytool -exportcert
 -keystore domain_home/config/fmwconfig/default-keystore.jks
 -v
 -alias clientalias
 -storepass password
 -rfc
 -file domain_home/config/fmwconfig/certificate.cer

keytool -importcert
 -keystore domain_home/config/fmwconfig/default-keystore.jks
 -alias orakey
 -file domain_home/config/fmwconfig/certificate.cer
 -storepass password
 createCred(map="oracle.wsm.security", key="keystore-csf-key",
 user="owsm", password="welcome1", desc="Keystore key")
 createCred(map="oracle.wsm.security", key="enc-csf-key",
 user="clientalias", password="welcome1", desc="Encryption key")
 createCred(map="oracle.wsm.security", key="sign-csf-key",
 user="clientalias", password="welcome1", desc="Signing key")
```

8. Restart the servers.

## 5.5 Automatically Authenticating Oracle BPM Worklist and Oracle Business Process Management Users

This section describes how to authenticate Oracle BPM Worklist and Oracle Business Process Management users in different environments.

### 5.5.1 Automatically Authenticating Oracle BPM Worklist Users in SAML SSO Environments

To be automatically authenticated when accessing a second Oracle BPM Worklist from a first Oracle BPM Worklist in SAML SSO environments, you must perform the following steps. Otherwise, you are prompted to log in again when you access the

second Oracle BPM Worklist. In these environments, the first Oracle BPM Worklist is configured as the SAML identity provider and the second Oracle BPM Worklist that you access is configured as the SAML service provider.

To automatically authenticate Oracle BPM Worklist users in SAML SSO environments:

1. Add `/integration/worklistapp/*` as the redirect URL for `worklistapp` to the SAML service provider site's `SAML2IdentityAssertion` configuration as follows.
  - a. In the Oracle WebLogic Server Administration Console, select **Security Realms**.
  - b. Click the realms for the service providers.
  - c. Select the **Providers** tab, and then the **Authentication** subtab.
  - d. From the provider list, select the provider with the description **SAML 2.0 Identity Assertion Provider**.

If you do not see the SAML identity assertion provider configuration, follow the instructions in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

- e. Select the **Management** tab.

Under the **Management** tab, you see a list of identity provider partners. These are hosts that have been configured as the SAML identity provider partners for this SAML identity service provider site. Remember that this configuration step is performed on the identity service provider site on which Oracle BPM Worklist is hosted.

- f. Select the identity provider site where you want the user to perform the initial login.
- g. Scroll down the page until you see the field **Redirect URIs**.
- h. Add `/integration/worklistapp/*` to the list.

After performing this step, you can log in to Oracle BPM Worklist at the SAML identity provider site through the regular URL of `/integration/worklistapp`. If necessary, you can then navigate to the URL `/integration/worklistapp/ssologin` at the SAML service provider site, where you gain access to Oracle BPM Worklist and are automatically authenticated.

For more information about `SAML2IdentityAssertion` and configuring SSO with web browsers and HTTP clients, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

## 5.5.2 Automatically Authenticating Oracle BPM Workspace Users in SAML SSO Environments

To be automatically authenticated when accessing a second Oracle BPM Workspace from a first Oracle BPM Workspace in SAML SSO environments, you must perform the following steps. Otherwise, you are prompted to log in again when you access the second Oracle BPM Workspace. In these environments, the first Oracle BPM Workspace is configured as the SAML identity provider and the second Oracle BPM Workspace that you access is configured as the SAML service provider.

To automatically authenticate Oracle BPM Workspace users in SAML SSO environments:

1. Add `/bpm/workspace/*` as the redirect URL for `workspace` to the SAML service provider site's `SAML2IdentityAssertion` configuration as follows.

- a. In the Oracle WebLogic Server Administration Console, select **Security Realms**.
- b. Click the realms for the service providers.
- c. Select the **Providers** tab, and then the **Authentication** subtab.
- d. From the provider list, select the provider with the description **SAML 2.0 Identity Assertion Provider**.

If you do not see the SAML identity assertion provider configuration, follow the instructions in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

- e. Select the **Management** tab.

Under the **Management** tab, you see a list of identity provider partners. These are hosts that have been configured as the SAML identity provider partners for this SAML identity service provider site. Remember that this configuration step is performed on the identity service provider site on which Oracle BPM Workspace is hosted.

- f. Select the identity provider site where you want the user to perform the initial login.
- g. Scroll down the page until you see the field **Redirect URIs**.
- h. Add `/bpm/workspace/*` to the list.

After performing this step, you can log in to Oracle BPM Workspace at the SAML identity provider site through the regular URL of `/bpm/workspace`. If necessary, you can then navigate to the URL `/bpm/workspace/ssologin` at the SAML service provider site, where you gain access to Oracle BPM Workspace and are automatically authenticated.

For more information about `SAML2IdentityAsserter` and configuring SSO with web browsers and HTTP clients, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

### 5.5.3 Automatically Authenticating Oracle Business Process Composer Users in SAML SSO Environments

To be automatically authenticated when accessing a second Oracle Business Process Composer from a first Oracle Business Process Composer in SAML SSO environments, you must perform the following steps. Otherwise, you are prompted to log in again when you access the second Oracle Business Process Composer. In these environments, the first Oracle Business Process Composer is configured as the SAML identity provider and the second Oracle Business Process Composer that you access is configured as the SAML service provider.

To automatically authenticate Oracle Business Process Composer users in SAML SSO environments:

1. Add `/bpm/composer/*` as the redirect URL for composer to the SAML service provider site's `SAML2IdentityAsserter` configuration as follows.
  - a. In the Oracle WebLogic Server Administration Console, select **Security Realms**.
  - b. Click the realms for the service providers.
  - c. Select the **Providers** tab, and then the **Authentication** subtab.

- d. From the provider list, select the provider with the description **SAML 2.0 Identity Assertion Provider**.

If you do not see the SAML identity assertion provider configuration, follow the instructions in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

- e. Select the **Management** tab.

Under the **Management** tab, you see a list of identity provider partners. These are hosts that have been configured as the SAML identity provider partners for this SAML identity service provider site. Remember that this configuration step is performed on the identity service provider site on which Oracle Business Process Composer is hosted.

- f. Select the identity provider site where you want the user to perform the initial login.
- g. Scroll down the page until you see the field **Redirect URIs**.
- h. Add `/bpm/composer/*` to the list.

After performing this step, you can log in to Oracle Business Process Composer at the SAML identity provider site though the regular URL of `/bpm/composer`. If necessary, you can then navigate to the URL `/bpm/composer/ssologin` at the SAML service provider site, where you gain access to Oracle Business Process Composer and are automatically authenticated.

For more information about `SAML2IdentityAssertion` and configuring SSO with web browsers and HTTP clients, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

#### 5.5.4 Automatically Authenticating Oracle BPM Worklist Users in Windows Native Authentication Environments

For Windows native authentication through Kerberos to work with Oracle BPM Worklist, you must use the `/integration/worklistapp/ssologin` protected URL. For example, after configuring Windows native authentication, you access Oracle BPM Worklist as follows:

`http://host_name.domain_name:8001/integration/worklistapp/ssologin`

For information on configuring SSO with Microsoft clients, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

#### 5.5.5 Automatically Authenticating Oracle Business Process Composer Users in Windows Native Authentication Environments

For Windows native authentication through Kerberos to work with Oracle Business Process Composer, you must use the `bpm/composer/ssologin` protected URL. For example, after configuring Windows native authentication, you access Process Composer as follows:

`http://host_name.domain_name:8001/bpm/composer/ssologin`

For information on configuring SSO with Microsoft clients, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

## 5.6 Setting the Authentication Provider

This section describes how to set the first authentication provider.

### 5.6.1 Listing Oracle Internet Directory as the First Authentication Provider

Oracle BPM Worklist and workflow services use Java Platform Security (JPS) and the User and Role API. For this reason, the Oracle Internet Directory authenticator must be the first provider listed when workflow is used with Oracle Internet Directory. If Oracle Internet Directory is not listed first (for example, it is listed below DefaultAuthenticator), login authentication fails.

For information about changing the order of authentication providers, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

### 5.6.2 Accessing Web-based Applications with the Default Authentication Provider

Logging in to web-based applications may fail when using Oracle Internet Directory authentication. This is caused when the Oracle WebLogic Server configuration is set to use the Oracle Internet Directory authentication before default authentication.

This may produce the following error:

```
"@ User "weblogic" is not found in configuration "jazn.com" Check if the user exists in the repository specified by the configurations. Check the error stack and fix the cause of the error. Contact oracle support if error is not fixable."
```

The order of the security providers should be:

1. Default authentication
2. Oracle Internet Directory/LDAP authentication

## 5.7 Invoking a Web Service that Requests NTLM Authentication

When attempting to invoke a web service that requests NT LAN Manager (NTLM) authentication, you must set the following properties in the composite.xml file:

- oracle.webservices.auth.username
- oracle.webservices.auth.password
- oracle.webservices.preemptiveBasicAuth

You must set oracle.webservices.preemptiveBasicAuth to false.

[Example 5-1](#) provides details.

#### **Example 5-1 composite.xml File Configured for NTLM Authentication**

```
<reference name="Service1" ui:wsdlLocation="test1.wsdl">
 <interface.wsdl
 interface="http://tempuri.org/#wsdl.interface(IService1)" />
 <binding.ws

 port="http://tempuri.org/#wsdl.endpoint(Service1/BasicHttpBinding_IService1)"
 location="test1.wsdl" soapVersion="1.1">
 <property name="weblogic.wsee.wsat.transaction.flowOption"
 type="xs:string" many="false">WSDLDriven</property>

 <property name="oracle.webservices.auth.username"
 type="xs:string" many="false">test</property>
 <property name="oracle.webservices.auth.password"
 type="xs:string" many="false">password</property>
 <property name="oracle.webservices.preemptiveBasicAuth"
 type="xs:string" many="false">false</property>
 </binding.ws>
```

```
</reference>
```

Not setting these properties results in the following error when the BPEL process attempts to invoke the web service.

```
setting preemptive basic auth" and "invoke failed...Bad response: 401 Unauthorized
```

## 5.8 Configuring SSL

This section describes how to configure secure socket layer (SSL) in Oracle SOA Suite and Oracle Business Process Management environments.

### 5.8.1 Using SSL Certificates When the SOA/BPM Server Is Configured with an HTTPS Port

If the SOA/BPM server is configured with an HTTPS port, ensure that your SSL certificate adheres to the following standards:

- The certificate that the server presents to SSL clients (the browser or other internal clients such as the notification senders) is a trusted certificate by its own trust store (the CA store).
- If the certificate for the server is self-signed, ensure that you add it to the trust store. That is, the certificate that the server presents must validate itself against the server trust store.

Not doing so can cause problems when task notifications are sent. For example, you can receive the error message shown in [Example 5–2](#) in the server out log (for example, `soa_server1.out`).

#### ***Example 5–2 Task Notification Error***

```
<Sep 13, 2011 12:59:41 AM PDT> <Error> <oracle.soa.services.workflow.common>
<BEA-000000> <>.
ORABPEL-0
 at
oracle.bpel.services.workflow.task.notification.
TaskNotifications.getEmailPayload
(EmailNotifications.java:1354)
 at
oracle.bpel.services.workflow.task.notification.
TaskNotifications.getEmailNotificationContent
(EmailNotifications.java:987)
 at
weblogic.jms.client.JMSSession$UseForRunnable.run
(JMSSession.java:5170)
 at
weblogic.work.SelfTuningWorkManagerImpl$WorkAdapterImpl.run(SelfTuningWorkManagerImpl.java:528)
 at weblogic.work.ExecuteThread.execute(ExecuteThread.java:209)
 at weblogic.work.ExecuteThread.run(ExecuteThread.java:178)
Caused By: javax.net.ssl.SSLKeyException: [Security:090477]Certificate chain received from myhost.us.example.com - 10.232.152.78 was not trusted causing SSL handshake failure.
 at
com.certicom.tls.interfaceimpl.TLSConnectionImpl.
fireException(UnknownSource)
 at
com.certicom.tls.interfaceimpl.TLSConnectionImpl.
fireAlertSent(UnknownSource)
```

```

 at
com.certicom.tls.record.handshake.HandshakeHandler.
fireAlert(Unknown Source).
ficationContent(TaskNotifications.java:987)
 at
weblogic.jms.client.JMSSession$UseForRunnable.run(JMSSession.java:5170)
 at
weblogic.work.SelfTuningWorkManagerImpl$WorkAdapterImpl.run(SelfTuningWorkManagerI
mpl.java:528)
 at weblogic.work.ExecuteThread.execute(ExecuteThread.java:209)
 at weblogic.work.ExecuteThread.run(ExecuteThread.java:178)
Caused By: javax.net.ssl.SSLKeyException: [Security:090477]Certificate chain
received from myhost.us.example.com - 10.232.152.78 was not trusted causing
SSL handshake failure.
 at
com.certicom.tls.interfaceimpl.TLSConnectionImpl.
fireException(UnknownSource)
 at
com.certicom.tls.interfaceimpl.TLSConnectionImpl.
fireAlertSent(UnknownSource)
 at
com.certicom.tls.record.handshake.HandshakeHandler.
fireAlert(Unknown Source)

```

For more information about concepts and configuration details, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

### 5.8.2 Recommendation to Configure Either All or No Managed Servers with SSL

As a best practice, Oracle recommends that you configure either *all* managed servers or *no* managed servers with SSL (SOA, BAM, and so on). Configuring some managed servers with SSL, while not configuring others, may lead to undesirable results in Oracle BPM Worklist and Oracle Web Services Manager (OWSM). For example, if there is an SSL-configured, managed server (`bam_server`), servers not configured with SSL are not used by OWSM. In cases in which an SSL-configured server is down, it causes OWSM to be in a down state, which in turn causes Oracle BPM Worklist to be in a down state.

### 5.8.3 Switching from Non-SSL to SSL Configurations with Oracle BPM Worklist

Switching from non-SSL to SSL configurations with Oracle BPM Worklist requires the **Frontend Host** and **Frontend HTTPS Port** fields to be set in Oracle WebLogic Server Administration Console. Not doing so results in exception errors when you attempt to create to-do tasks.

To switch from non-SSL to SSL configurations with Oracle BPM Worklist:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Environment** section, select **Servers**.
3. Select the name of the managed server (for example, `soa_server1`).
4. Select **Protocols**, then select **HTTP**.
5. In the **Frontend Host** field, enter the hostname on which Oracle BPM Worklist is located.
6. In the **Frontend HTTPS Port** field, enter the SSL listener port.
7. Click **Save**.

## 5.8.4 Configuring SOA Composite Applications for Two-Way SSL Communication

Oracle SOA Suite uses both Oracle WebLogic Server and Oracle Secure Socket Layer (SSL) stacks for two-way SSL configurations.

- For the inbound web service bindings, Oracle SOA Suite uses the Oracle WebLogic Server infrastructure and, therefore, the Oracle WebLogic Server libraries for SSL.
- For the outbound web service bindings, Oracle SOA Suite uses JRF HttpClient and, therefore, the Oracle JDK libraries for SSL.

Due to this difference, start Oracle WebLogic Server with the following JVM option.

To configure SOA composite applications for two-way SSL communication:

1. Open the following file:
  - On UNIX operating systems, open \$MIDDLEWARE\_HOME/user\_projects/domains/*domain\_name*/bin/setDomainEnv.sh.
  - On Window operating systems, open MIDDLEWARE\_HOME\user\_projects\domains\domain\_name\bin\setDomainEnv.bat.
2. Add the following line in the JAVA\_OPTIONS section, if the server is enabled for one-way SSL (server authorization only):

```
-Djavax.net.ssl.trustStore=your_truststore_location
```

For two-way SSL, the keystore information (location and password) is not required.

In addition, perform the following steps to enable two-way SSL for a SOA composite application to invoke another SOA composite application or another non-SOA application.

---

**Note:** Both the server and client are assumed to have been configured for SSL with mutual authentication.

---

To enable two-way SSL for a SOA composite application to invoke another application:

1. On the client side, provide the keystore location.
  - a. From the **SOA Infrastructure** menu, select **SOA Administration > Common Properties**.
  - b. At the bottom of the page, click **More SOA Infra Advanced Configuration Properties**.
  - c. Click **KeystoreLocation**.
  - d. In the **Value** column, enter the keystore location.
  - e. Click **Apply**.
  - f. Click **Return**.
2. During design time in Oracle JDeveloper, update the reference section in the composite.xml file with the oracle.soa.two.way.ssl.enabled property.

```
<reference name="Service1"
 ui:wsdlLocation=". . .">
 <interface.wsdl interface=". . ." />
 <binding.ws port=". . .">
```

```

<property name="oracle.soa.two.way.ssl.enabled">true</property>
</binding.ws>
</reference>

```

3. In Oracle Enterprise Manager Fusion Middleware Control, select **WebLogic Domain** > *domain\_name*.
4. Right-click *domain\_name* and select **Security** > **Credentials**.
5. Click **Create Map**.
6. In the **Map Name** field, enter a name (for example, SOA), and click **OK**.
7. Click **Create Key**.
8. Enter the following details.

Field	Description
Select Map	Select the map created in Step 6 (for this example, SOA).
Key	Enter the key name (KeystorePassword is the default).
Type	Select <b>Password</b> .
User Name	Enter the keystore user name (KeystorePassword is the default).
Password	Enter the password that you created for the keystore.

**Note:** When you set up SSL in Oracle WebLogic Server, a key alias is required. You must enter `mykey` as the alias value. This value is required.

9. Set the keystore location in Oracle Enterprise Manager Fusion Middleware Control. See Step 1 for instructions.
10. Modify `composite.xml` to use `https` and `sslport` to invoke a SOA composite application. For example, change the syntax shown in bold:

```

<?xml version="1.0" encoding="UTF-8" ?>
<!-- Generated by Oracle SOA Modeler version 1.0 at [4/1/09 11:01 PM]. -->
<composite name="InvokeEchoBPELSync"
revision="1.0"
label="2009-04-01_23-01-53_994"
mode="active"
state="on"
xmlns="http://xmlns.oracle.com/sca/1.0"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy"
xmlns:orawsp="http://schemas.oracle.com/ws/2006/01/policy"
xmlns:ui="http://xmlns.oracle.com/soa/designer/">
<import
namespace="http://xmlns.oracle.com/CustomApps/InvokeEchoBPELSync/BPELProcess1"
location="BPELProcess1.wsdl" importType="wsdl"/>
<import namespace="http://xmlns.oracle.com/CustomApps/EchoBPELSync/
BPELProcess1"location="http://hostname:port/soa-infra/services/default/EchoBPEL
Sync/BPELProcess1.wsdl"
importType="wsdl"/>

```

to use `https` and `sslport`:

```
location="https://hostname:sslport/soa-infra/services/default/EchoBPELSync
```

---

```
/BPELProcess1.wsdl"
```

## 5.8.5 Invoking References in One-Way SSL Environments in Oracle JDeveloper

When invoking a web service as an external reference from a SOA composite application in one-way SSL environments, ensure that the certificate name (CN) and the hostname of the server exactly match. This ensures a correct SSL handshake.

For example, if a web service is named adfbc and the certificate has a server name of myhost05, the following syntax results in an SSL handshake exception.

```
<import namespace="/adfbc1/common/"

location="https://myhost05.us.example.com:8002/CustomApps-adfbc1-context-root/AppModuleService?WSDL"
 importType="wsdl"/>
<import namespace="/adfbc1/common/" location="Service1.wsdl"
 importType="wsdl"/>
```

If you switch the order of import, the SSL handshake passes.

```
<import namespace="/adfbc1/common/" location="Service1.wsdl"
 importType="wsdl"/>
<import namespace="/adfbc1/common/"

location="https://myhost05.us.example.com:8002/CustomApps-adfbc1-context-root/AppModuleService?WSDL"
 importType="wsdl"/>
```

Note the following restrictions around this issue:

- There are no options for ignoring hostname verification in Oracle JDeveloper as exist with the Oracle WebLogic Server Administration Console. This is because the SSL kit used by Oracle JDeveloper is different. Only the trust store can be configured from the command line. All other certificate arguments are not passed.
- In the WSDL file, `https://hostname` must match with that in the certificate, as described above. You cannot perform the same procedures as you can with a browser. For example, if the hostname is `myhost05.us.example.com` in the certificate's CN, then you can use `myhost05`, `myhost05.us.example.com`, or the IP address from a browser. In Oracle JDeveloper, always use the same name as in the certificate (that is, `myhost05.us.example.com`).

## 5.8.6 Configuring Oracle SOA Suite and Oracle HTTP Server for SSL Communication

Follow these steps to configure SSL communication between Oracle SOA Suite and Oracle HTTP Server.

### 5.8.6.1 Configuring Oracle HTTP Server for SSL Communication

To configure Oracle HTTP server for SSL communication:

1. Update `mod_ssl.conf` with the `<Location /integration/services>` location directive.

```
LoadModule weblogic_module ${ORACLE_HOME}/ohs/modules/mod_wl_ohs.so

<IfModule mod_weblogic.c>
 WebLogicHost host.domain.com
 WLLogFile <logdir>/ohs_ssl.log
 Debug ALL
```

```
 DebugConfigInfo ON
 SecureProxy ON
 MatchExpression *.jsp
 WLSSLWallet <OHS_
HOME>/instances/instance1/config/OHS/ohs1 keystores/default
</IfModule>

<Location /soa-infra>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /b2bconsole>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /b2b>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /integration/worklistapp>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /integration/services>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /DefaultToDoTaskFlow>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /OracleBAM>
 WebLogicPort 9002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /OracleBAMWS>
 WebLogicPort 9002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>

<Location /sdpmessaging/userprefs-ui/>
 WebLogicPort 8002
 SetHandler weblogic-handler
 ErrorPage http://host.domain.com:port/error.html
</Location>
```

2. Start the Oracle WebLogic Servers as described in [Section 5.8.4, "Configuring SOA Composite Applications for Two-Way SSL Communication."](#)

#### **5.8.6.2 Configuring Certificates for Oracle Client, Oracle HTTP Server, and Oracle WebLogic Server**

To configure certificates for Oracle Client, Oracle HTTP Server, and Oracle WebLogic Server:

1. Export the user certificate from the Oracle HTTP Server wallet.

```
orapki wallet export -wallet . -cert cert.txt -dn 'CN=\"Self-Signed
Certificate for ohs1 \",OU=OAS,O=ORACLE,L=REDWOODSHORES,ST=CA,C=US'
```

2. Import the above certificate into the Oracle WebLogic Server trust store as a trusted certificate.

```
keytool -file cert.txt -importcert -trustcacerts -keystore DemoTrust.jks
```

3. Export the certificate from the Oracle WebLogic Server trust store.

```
keytool -keystore DemoTrust.jks -exportcert -alias wlscertgencab -rfc -file
certgencab.crt
```

4. Import the above certificate to the Oracle HTTP Server wallet as a trusted certificate.

```
orapki wallet add -wallet . -trusted_cert -cert certgencab.crt -auto_login_only
```

5. Restart Oracle HTTP Server.

6. Restart the Oracle WebLogic Servers as described in [Section 5.8.4, "Configuring SOA Composite Applications for Two-Way SSL Communication."](#)

#### **5.8.7 Configuring SSL Between SOA Composite Application Instances and Oracle WebCache**

The Test Web Service page in an Oracle WebCache and Oracle HTTP Server environment may require communication back through Oracle WebCache. Therefore, SSL must be configured between the SOA composite application instance and Oracle WebCache (that is, export the user certificate from the Oracle WebCache wallet and import it as a trusted certificate in the Oracle WebLogic Server trust store).

#### **5.8.8 Using a Custom Trust Store for One-Way SSL During Design Time**

To invoke a SOA composite application from another composite over HTTPS when using a custom trust store created with a tool such as keytool or orapki, perform the following actions in Oracle JDeveloper.

To use a custom trust store for one-way SSL during design time:

1. To fetch a WSDL file in the reference section, set the trust store information in **Tools > Preferences > Http Analyzer > HTTPS Setup > Client Trusted Certificate Keystore**.
2. During deployment to an SSL-enabled server, use the JSSE property at the command line:

```
jdev -J-Djavax.net.ssl.trustStore=your_trusted_location
```

## 5.8.9 Enabling an Asynchronous Process Deployed to an SSL-Enabled, Managed Server to Invoke Another Asynchronous Process Over HTTP

Assume you create the following environment:

- Asynchronous BPEL process A invokes asynchronous BPEL process B
- Asynchronous BPEL process A is deployed to a one-way SSL enabled, managed server
- All WSDL reference and bindings use plain HTTP

At runtime, the WSDL is looked for over HTTPS, and the callback message from asynchronous BPEL process B fails.

To resolve this issue, the `callbackServerURL` property must be passed at the reference binding level in the `composite.xml` file. This explicitly indicates the value of the callback URL for the given reference invocation. If the client composite is running in an SSL-managed server, then the callback defaults to SSL.

```

<reference name="Service1"
ui:wsdlLocation="http://localhost:8000/soa-infra/services/default/AsyncSecondB
PELMTO/BPELProcess1.wsdl">
 <interface.wsdl
 interface="http://xmlns.oracle.com/Async/AsyncSecondBPELMTO/BPELProcess1#wsdl
 .interface(BPELProcess1)"
 callbackInterface="http://xmlns.oracle.com/Async/AsyncSecondBPELMTO/BPELPro
cess1#wsdl.interface(BPELProcess1Callback)"/>
 <binding.ws
 port="http://xmlns.oracle.com/Async/AsyncSecondBPELMTO/BPELProcess1#wsdl.endp
oint(bpelprocess1_client_ep/BPELProcess1_pt)"

 location="http://localhost:8000/soa-infra/services/default/AsyncSecondBPELMTO
/bpelprocess1_client_ep?WSDL">
 <wsp:PolicyReference URI="oracle/wss_username_token_client_policy"
 orawsp:category="security"
 orawsp:status="enabled"/>
 <wsp:PolicyReference URI="oracle/wsaddr_policy"
 orawsp:category="addressing"
 orawsp:status="enabled"/>
 .
 <property name="callbackServerURL">http://localhost:8000/</property>
 .
 </binding.ws>
 .
 <callback>
 <binding.ws
 port="http://xmlns.oracle.com/Async/AsyncSecondBPELMTO/BPELProcess1#wsdl.endp
oint(bpelprocess1_client_ep/BPELProcess1Callback_pt)">
 <wsp:PolicyReference
 URI="oracle/wss_username_token_service_policy"
 orawsp:category="security"
 orawsp:status="enabled"/>
 </binding.ws>
 </callback>
 .
 </reference>
```

## 5.9 Configuring Security for Human Workflow WSDL Files

If the WSDL files for human workflow services are not exposed to external consumers, then set the flag that exposes the WSDL to false for each of the services:

```
<expose-wsdl>false</expose-wsdl>
```

# 6

---

## Monitoring SOA Composite Applications

This chapter describes how to monitor SOA composite application performance summary metrics, recent instances, and recent faults and rejected messages in SOA composite applications. It describes how to display details about BPEL process messages that require recovery and how to access the Recovery page of the BPEL process service engine to perform message recovery.

This chapter includes the following sections:

- [Section 6.1, "Monitoring SOA Composite Application Performance Summary Metrics"](#)
- [Section 6.2, "Monitoring SOA Composite Application Recent Instances and Faults and Rejected Messages"](#)

For more information, see [Section 1.2.2, "Introduction to SOA Composite Applications."](#)

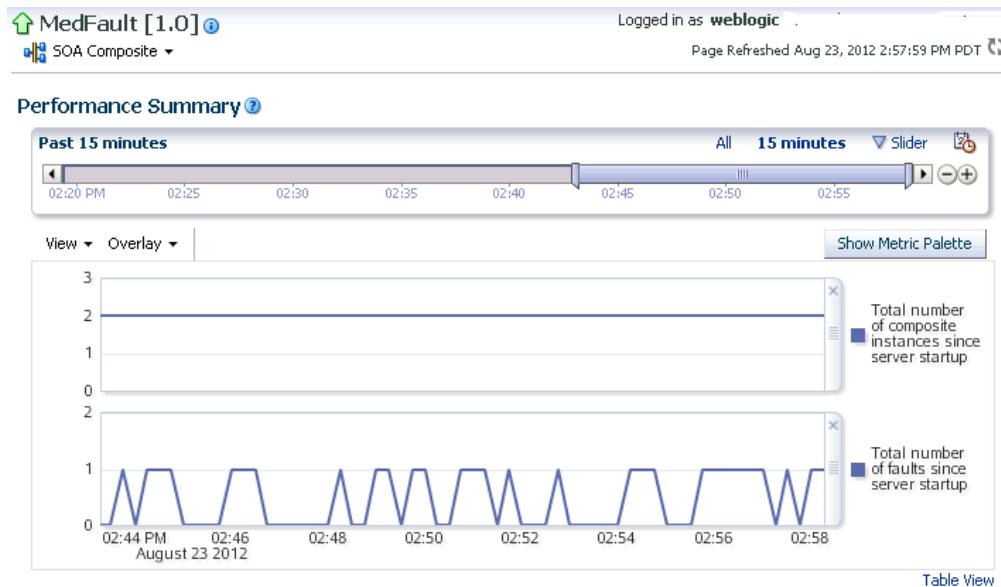
### 6.1 Monitoring SOA Composite Application Performance Summary Metrics

You can view a summary of SOA composite application performance metrics on the Performance Summary page.

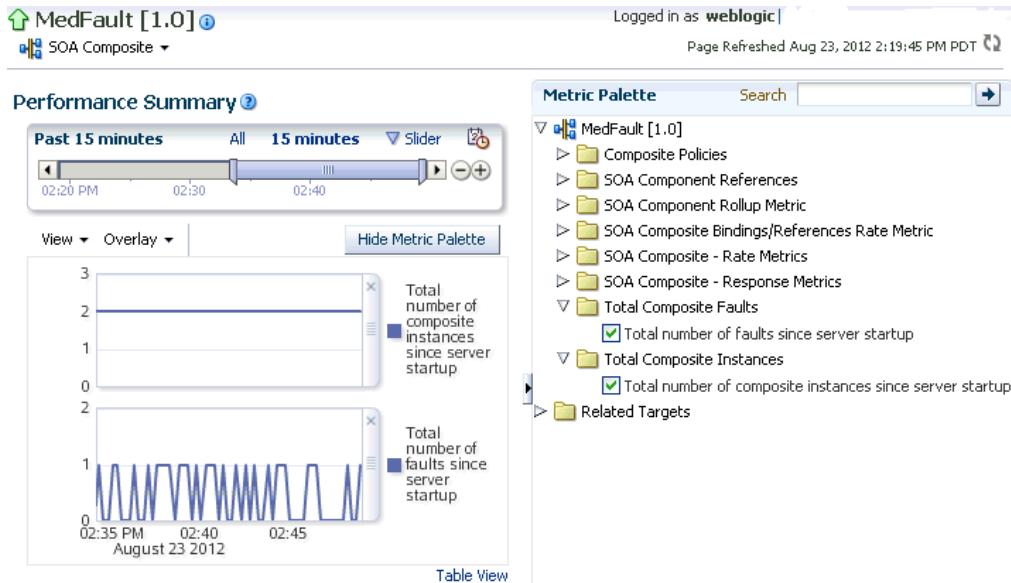
1. Access this page through one of the following options:

From the SOA Composite Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"><li>1. Select Monitoring &gt; Performance Summary.</li></ol>	<ol style="list-style-type: none"><li>1. Under <b>soa-infra</b>, expand the partition.</li><li>2. Select a specific SOA composite application.</li><li>3. From the <b>SOA Composite</b> menu, select <b>Monitoring &gt; Performance Summary</b>.</li></ol>

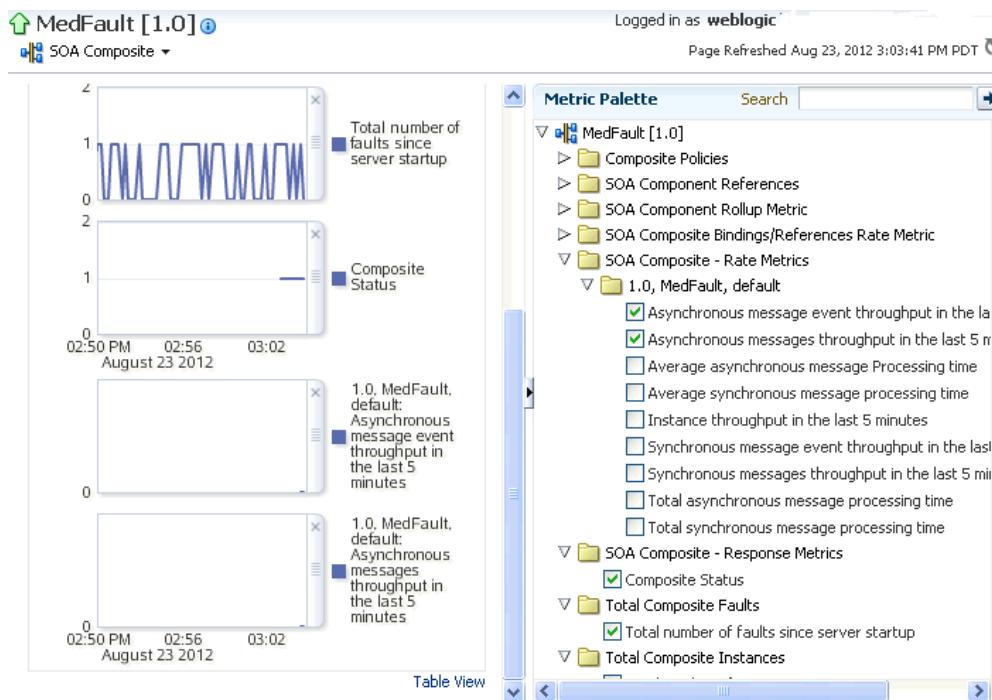
The Performance Summary page provides a graphical representation of the following information by default:

[Table View](#)

- Total number of SOA composite application instances since the last server restart.
  - Total number of faults since the last server restart.
2. Click **Show Metric Palette** to display a hierarchical tree of all metrics for the SOA composite application. The tree organizes the metrics into various categories of performance data.



3. Expand a folder and select a metric in the **Metric Palette** to display a performance chart that shows the changes in the metric value over time. The chart refreshes automatically to show updated data.



- Click **Slider** to display a slider tool that lets you specify the time frame shown in the charts.

For more information about the Performance Summary page, see the online Help for the Performance Summary page and Section "Viewing the Performance of Oracle Fusion Middleware" of *Oracle Fusion Middleware Administrator's Guide*.

For information about monitoring SOA Infrastructure performance summary metrics, see [Section 4.2, "Monitoring SOA Infrastructure Performance Summary Metrics."](#)

For information about monitoring message delivery processing requests, see [Section 4.4, "Monitoring Message Delivery Processing Requests."](#)

For information about monitoring service engine statistics, see the following:

- [Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics"](#)
- [Section 17.3.3, "Monitoring Request Breakdown Statistics"](#)
- [Section 20.2, "Monitoring Business Rules Service Engine Performance Statistics"](#)
- [Section 22.5, "Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics"](#)
- [Section 40.5, "Monitoring BPMN Process Service Engine Request and Thread Performance Statistics"](#)

## 6.2 Monitoring SOA Composite Application Recent Instances and Faults and Rejected Messages

You can monitor SOA composite application recent instances and faults and rejected messages from the SOA composite application Dashboard page. This page provides a high-level overview of the most recent state of the application.

To monitor SOA composite application recent instances and faults and rejected messages:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

- Click **Dashboard** (if it is not selected).

The upper part of the Dashboard page displays the following details:

- A summary of composite lifecycle states at the top of the Dashboard page, such as the number of running instances, total instances, and mode of the composite (active or retired).
- A message indicating that the retrieval of recent instances and faults that are displayed on this page is restricted to the specified time period. This message is displayed if the **Restrict display of instances and faults to the last *time\_period*** checkbox is selected on the SOA Infrastructure Common Properties page (it is selected by default). The default time period value is 24 hours, but you can change this value. If this checkbox is not selected, all instances and faults (including count metrics) in the SOA Infrastructure since the last purging are displayed.
- Recent SOA composite application instances, including the instance ID, name, conversation ID, state (for example, faulted or completed), and start time.
- Recent faults and rejected messages, including the error message, whether you can recover from the fault, the time at which the fault occurred, the fault location (service, service component, or reference), the instance ID of the SOA composite application, and a link to log files describing the fault.

If messages are awaiting recovery from the Recovery page of the BPEL process service engine, a message is displayed at the top of each SOA composite application home page.

The screenshot shows the SOA Infrastructure home page for a composite application named "CompositeTest [1.0]". At the top, there is a banner indicating "BPEL Message Recovery Required". Below the banner, there are tabs for "Dashboard", "Instances", "Faults and Rejected Messages", "Unit Tests", and "Policies". The "Instances" tab is selected. A table titled "Recent Instances and Faults for the last 24 hours" displays the following data:

Recent Instances and Faults for the last 24 hours				
Recent Instances		Recent Faults and Rejected Messages		
Instance ID	Name	Conversation ID	Instance State	Start Time
40020			---	Oct 9, 2012 12:10:58 PM
40019			---	Oct 9, 2012 12:10:58 PM
40018			---	Oct 9, 2012 12:10:57 PM
40017			?	Oct 9, 2012 12:10:57 PM
40016			---	Oct 9, 2012 12:10:57 PM

**Recent Instances:**

Instance ID	Name	Conversation ID	Instance State	Start Time
40020			---	Oct 9, 2012 12:10:58 PM
40019			---	Oct 9, 2012 12:10:58 PM
40018			---	Oct 9, 2012 12:10:57 PM
40017			?	Oct 9, 2012 12:10:57 PM
40016			---	Oct 9, 2012 12:10:57 PM

**Recent Faults and Rejected Messages:**

Error Message	Recovery	Fault Time	Fault Location	Composite Instance ID
<bpelFault><faultType>0</faultType>		Oct 9, 2012 12:10:58 PM	LoanBroker	40017
<bpelFault><faultType>0</faultType>		Oct 9, 2012 4:13:04 AM	LoanBroker	40007
<bpelFault><faultType>0</faultType>		Oct 9, 2012 2:25:04 AM	LoanBroker	30110
<bpelFault><faultType>0</faultType>		Oct 9, 2012 2:20:04 AM	LoanBroker	30110

3. If BPEL process messages require recovery from the Recovery page of the BPEL process service engine, the **BPEL Message Recovery Required** message is displayed at the top of each SOA Infrastructure home page.

The screenshot shows the SOA Infrastructure home page for a composite application named "CompositeTest [1.0]". At the top, there is a banner indicating "BPEL Message Recovery Required". Below the banner, there are tabs for "Dashboard", "Instances", "Faults and Rejected Messages", "Unit Tests", and "Policies". The "Instances" tab is selected. A table titled "Recent Instances and Faults for the last 24 hours" displays the following data:

Recent Instances and Faults for the last 24 hours				
Recent Instances		Recent Faults and Rejected Messages		
Instance ID	Name	Conversation ID	Instance State	Start Time
40020			---	Oct 9, 2012 12:10:58 PM
40019			---	Oct 9, 2012 12:10:58 PM
40018			---	Oct 9, 2012 12:10:57 PM
40017			?	Oct 9, 2012 12:10:57 PM
40016			---	Oct 9, 2012 12:10:57 PM

**Recent Instances:**

Instance ID	Name	Conversation ID	Instance State	Start Time
40020			---	Oct 9, 2012 12:10:58 PM
40019			---	Oct 9, 2012 12:10:58 PM
40018			---	Oct 9, 2012 12:10:57 PM
40017			?	Oct 9, 2012 12:10:57 PM
40016			---	Oct 9, 2012 12:10:57 PM

**Recent Faults and Rejected Messages:**

Error Message	Recovery	Fault Time	Fault Location	Composite Instance ID
<bpelFault><faultType>0</faultType>		Oct 9, 2012 12:10:58 PM	LoanBroker	40017
<bpelFault><faultType>0</faultType>		Oct 9, 2012 4:13:04 AM	LoanBroker	40007
<bpelFault><faultType>0</faultType>		Oct 9, 2012 2:25:04 AM	LoanBroker	30110
<bpelFault><faultType>0</faultType>		Oct 9, 2012 2:20:04 AM	LoanBroker	30110

The display of this message recovery information is controlled by the **bpelRecoveryStatus**, **excludeBpelMaxCreationTime**, and **bpelRecoveryAlertDurationInDays** keys of the **AuditConfig** property in the System MBean Browser. This property is accessible from the **More SOA Infra Advanced Configuration Properties** section of the SOA Infrastructure Common Properties page. By default, these keys have the following values:

- **bpelRecoveryStatus** is set to All.
  - **excludeBpelMaxCreationTime** is set to exclude the display of messages requiring recovery in the last five minutes.
  - **bpelRecoveryAlertDurationInDays** is set to only show the **BPEL Message Recovery Required** warning message when recoverable BPEL messages have been created in the last seven days.
- a. Perform the following tasks:

Click This Link...	To...
Show Details	<p>View a message showing the number of invoke, callback, and activity messages that require recovery from the Recovery page of the BPEL process service engine. Manual recovery is not required if automatic recovery of BPEL messages is enabled. In that case, only exhausted messages must be manually recovered. Click <b>Refresh</b> to recalculate the number of invoke, callback, and activity messages requiring recovery.</p>
Go to BPEL Recovery Console	<p>Access the Recovery page of the BPEL process service engine to perform message recovery.</p> <p>You can also access the Recovery page later by selecting <b>Service Engines &gt; BPEL</b> from the <b>SOA Infrastructure</b> menu and clicking the <b>Recovery</b> tab in the resulting page.</p> <p>For more information, see <a href="#">Section 15.4, "Performing BPEL Process Service Engine Message Recovery."</a></p>
Set Time Threshold	<p>View a message showing the time period for excluding messages that require recovery. By default, this setting excludes the last five minutes of messages. This value is controlled by the <b>excludeBpelMaxCreationTime</b> key of the <b>AuditConfig</b> property on SOA Infrastructure Common Properties page. To change this value, click <b>Yes</b>.</p>
Disable Alert	<p>View a message enabling you to prevent the display of this message recovery information on the Dashboard page. If you click <b>Yes</b>, this message recovery information is not displayed.</p> <p>To display this information again on the Dashboard page, set the <b>bpelRecoveryStatus</b> key to <b>All</b> for the <b>AuditConfig</b> property in the <b>More SOA Infra Advanced Configuration Properties</b> section of the SOA Infrastructure Common Properties page. For more information, see <a href="#">Section 3.1, "Configuring SOA Infrastructure Properties."</a></p>

4. In the **Recent Instances** section, perform the following tasks:
  - a. Click the **Number of Instances** link to display a message showing the numbers of running and total instances for this SOA composite application. The link is not displayed by default. To enable this link to be displayed, select the **Disable fetching of instance and fault count metrics. Each metric can still be retrieved on demand** checkbox in the SOA Infrastructure Common Properties page.  
 If you selected the **Restrict display of instances and faults to the last *time\_period*** checkbox on the SOA Infrastructure Common Properties page and specified a time period or accepted the default value of 24 hours, the numbers of running and total instances for this SOA composite application for that time period are displayed. If you did not select this checkbox, all instances and faults for this SOA composite application since the last purging are displayed. Click **Recalculate** to recalculate the numbers.
  - b. In the **Instance ID** column, click a specific instance ID to receive all instance details (flow trace and individual component audit trails) about the composite application. This displays the faults in the continuous context of a message flow from instance to instance.

---

**Note:** If you disable the **Capture Composite Instance State** checkbox, the **Recent Instances** section does not show instances requiring fault recovery as running. However, these instances in need of recovery are still running and display in the **Recoverable** column of the **Component Metrics** section of this page, regardless of whether the instances state is captured or not.

---

- c. Click **Show More** below the section to access the Instances page of the SOA composite application.
5. In the **Recent Faults and Rejected Messages** section, perform the following tasks:
- a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery.
  - b. In the **Recovery** column, if a fault is identified as recoverable, click **Recover** to perform fault recovery at the component instance level.
  - c. In the **Fault Location** column, click a specific location to access the Dashboard page for the service, service component, or reference.
  - d. In the **Composite Instance ID** column, click a composite instance ID to access the flow trace of the message that contains the fault. This displays the faults in the continuous context of a message flow from instance to instance.
  - e. In the **Logs** column, click a specific log to access the Log Messages page filtered for the specific faulted instance.
  - f. Click **Show More** below the section to access the Faults and Rejected Messages page of the SOA composite application.

The lower part of the Dashboard page displays the following details:

- The name and type of service components used in this SOA composite application, the number of running and total instances, and the number of recoverable and nonrecoverable faulted instances for each service component.
- The name and type of service (inbound) and reference (outbound) binding components used in this SOA composite application, the number of binding component faults, the total messages processed, and the average message processing time.

<b>Component Metrics</b>						
Name	Component Type	Total Instances	Running Instances	Faulted Instances		
				Recoverable	Non Recoverable	
LoanBroker	BPEL	132	0	0	0	
CreditRatingService	BPEL	80	0	0	0	
LoanService	BPEL	70	0	0	0	

<b>Services and References</b>						
Name	Type	Usage	Faults	Total Messages	Average Processing Time (sec)	
client	Web Service	Service	0	0	0.000	

The **Faulted Instances** columns of the **Component Metrics** section count faults that are recoverable and nonrecoverable. Component instances associated with a recoverable fault are not considered faulted. These instances are considered to be running because they have not reached the end of the lifecycle. These instances can be recovered through a recovery option such as retry, rethrow, abort, and so

on. This fault count can differ from the **Recent Instances** section of this page and the Faults and Rejected Messages page, which list faults without making a distinction between recoverable and nonrecoverable.

6. In the **Name** column of the **Component Metrics** section, click a service component. This displays its home page for viewing specific details about instances, faults, and policies.
7. In the **Name** column of the **Services and References** section, click a service or reference. This displays its home page for viewing specific details about instances, faults, policies, rejected messages, and message header configuration properties.

---

**Note:** You can also go to the Instances page and the Faults and Rejected Messages page of the SOA Infrastructure to monitor instances and faults across all deployed composites, respectively. From there, you can click a specific composite for additional details.

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For more information, see the following sections:

- [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#)
- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.5, "Introduction to Binding Components"](#)
- [Section 8.4, "Recovering from SOA Composite Application Faults at the SOA Infrastructure Level"](#)
- [Section 8.5, "Recovering from SOA Composite Application Faults in the Application Home Page"](#)
- *Oracle Fusion Middleware Administrator's Guide* for details about viewing and searching log files

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## Deploying and Managing SOA Composite Applications

This chapter describes how to deploy and manage SOA composite applications, including managing the states of deployed composites; deploying, redeploying, and undeploying a SOA composite application from Oracle Enterprise Manager Fusion Middleware Control; automating the testing of SOA composite applications; managing policies; exporting deployed composites; grouping composites into partitions; and managing BPEL and BPMN monitors.

This chapter includes the following sections:

- [Section 7.1, "Deploying SOA Composite Applications"](#)
- [Section 7.2, "Updating Instance, Fault, and Rejected Message States to Stale During Undeployment or Redeployment"](#)
- [Section 7.3, "Redeploying SOA Composite Applications"](#)
- [Section 7.4, "Undeploying SOA Composite Applications"](#)
- [Section 7.5, "Managing the State of Deployed SOA Composite Applications"](#)
- [Section 7.6, "Automating the Testing of SOA Composite Applications"](#)
- [Section 7.7, "Managing SOA Composite Application Policies"](#)
- [Section 7.8, "Exporting a Deployed SOA Composite Application"](#)
- [Section 7.9, "Grouping SOA Composite Applications into Partitions"](#)
- [Section 7.10, "Disabling and Enabling BPEL and BPMN Business Monitors"](#)

For information on the following:

- Creating SOA composite application archives and configuration plans in which you define the URLs and property values to use for test, development, and production environments, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*
- Deploying with ant scripts, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*
- Deploying with Oracle WebLogic Scripting Tool (WLST), see *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*

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**Note:** If Oracle Enterprise Manager Fusion Middleware Control is run in a single sign-on (SSO)-enabled environment, you are again prompted to enter the user name and password credentials as part of the last step of the Deploy SOA Composite, Undeploy SOA Composite, and Redeploy SOA Composite wizards. This information is only requested once per Oracle Enterprise Manager Fusion Middleware Control session.

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## 7.1 Deploying SOA Composite Applications

You can deploy SOA composite applications from Oracle Enterprise Manager Fusion Middleware Control with the Deploy SOA Composite wizard. You must first create a deployable archive in Oracle JDeveloper or with the ant or WLST command line tool. Use the Deploy SOA Composite wizard to deploy any of the following:

- A new SOA composite application for the first time.
- A new revision (for example, 2.0) alongside an older revision (for example, 1.0) without having an impact on the latter. The revision deployed last becomes the new default revision of that composite (unless you specify otherwise at a later step during deployment).
- A SOA bundle (ZIP file) containing multiple revisions (for example, revisions 2.0, 3.0, and 4.0) of a SOA composite application that has different revisions currently deployed (for example, 1.0). This option enables you to deploy revisions 1.0, 2.0, 3.0, and 4.0 together. When deploying a SOA bundle, all composite are deployed in sequential order. For example:

```
deploy Composite1 + activate Composite1 -> deploy CompositeN + activate CompositeN
```

The bundle can also contain revisions of different composites. There is no restriction that all revisions must be of the same composite application. There should not be any cross references between the composites in the same bundle. For example, composite A revision 1.0 should not reference composite B revision 1.0.

Deployment extracts and activates the composite application in the SOA Infrastructure. After an application is deployed, you can perform administration tasks, such as creating instances, configuring properties, monitoring performance, managing instances, and managing policies and faults.

---

### Notes:

- If you want to redeploy an *existing* revision of an application, do *not* use this wizard. Instead, use the Redeploy SOA Composite wizard.
  - Do not remove the user OracleSystemUser. This user is required for the proper functioning of Oracle SOA Suite, including deployment of SOA composite applications.
- 

To deploy SOA composite applications:

1. Access the Deploy SOA Composite wizard through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Infrastructure Home Page...	From the SOA Composite Menu...
1. Select SOA Deployment > Deploy.	1. Right-click soa-infra. 2. Select SOA Deployment > Deploy.	1. Click the Deployed Composites tab. 2. Above the Composite table, click Deploy.	1. Select SOA Deployment > Deploy Another Composite.

**Note:** You can also access the Deploy SOA Composite wizard in the following ways:

- Selecting **Deploy To This Partition** from the **Deployment** dropdown list on the Manage Partitions page or home page of a specific partition
- From the **SOA Partition** menu at the top of the home page of a specific partition
- Right-clicking a specific partition in the navigator

The Select Archive page appears.

2. In the **Archive or Exploded Directory** section, specify the archive of the SOA composite application to deploy. The archive contains the project files of the composite to be deployed (for example, **HelloWorld\_rev1.0.jar** for a single archive or **OrderBooking\_rev1.0.zip** for multiple archives). This information is required.
3. In the **Configuration Plan** section, optionally specify the configuration plan to include with the archive. The configuration plan enables you to define the URL and property values to use in different environments. During process deployment, the configuration plan is used to search the SOA project for values that must be replaced to adapt the project to the next target environment.
4. Click **Next**.

The Select Target page appears.

This page lists the Oracle SOA Suite managed server or cluster to which to deploy the SOA composite application archive.

5. Select the partition into which to deploy this SOA composite application.

Partitions enable you to logically group SOA composite applications into separate sections. Even if there is only one partition available, you must explicitly select it. Once deployed, a composite cannot be transferred to a different partition.

If you want to deploy a SOA composite application to a partition that does not exist, exit the wizard and create the partition *before* deploying the composite. You create partitions in the Manage Partitions page, accessible from the **SOA Infrastructure** menu.

If the server contains no partitions, you cannot deploy composite applications to that server. Also, if the server is not in a *running* state, you cannot deploy this archive. By default, a partition named **default** is automatically included with Oracle SOA Suite. You can delete the default partition.

---

**Note:** Human workflow artifacts such as task mapped attributes (previously known as flex field mappings) and rules (such as vacation rules) are defined based on the namespace of the task definition.

Therefore, the following issues are true when the same SOA composite application with a human workflow task is deployed into multiple partitions:

- For the same task definition type, mapped attributes defined in one partition are visible in another partition.
  - Rules defined on a task definition in one partition can apply to the same definition in another partition.
- 

If you invoke the Deploy SOA Composite wizard by selecting **Deploy To This Partition** from the **Deployment** dropdown list on the Manage Partitions page or home page of a specific partition, the partition to which to deploy is selected. Therefore, the Select Target page is skipped.

6. Click **Next**.

The Confirmation page appears.

7. Review your selections.

If your SOA composite application is using global token variables, a warning message is displayed asking you to verify that all tokens are configured in the system's `mdm-url-resolver.xml` file. If the token is not configured in the system or is defined in an incorrect location (for example, the `import` section of the `composite.xml` file), the SOA composite application does not deploy and an error message is displayed. For information about managing global token variables, see [Section 3.8, "Managing Global Token Variables for Multiple SOA Composite Applications."](#)

8. Select whether to deploy the SOA composite application as the default revision. The default revision is instantiated when a new request comes in.

9. Click **Deploy**.

Processing messages are displayed.

At this point, the deployment operation cannot be canceled. Deployment continues even if the browser page is closed.

10. When deployment has completed, the home page of the newly deployed composite revision is displayed automatically. A confirmation message at the top of the page tells you that the composite has been successfully deployed. In the case of a bundle deployment, the Deployed Composites page of the SOA Infrastructure is displayed.

For information about creating configuration plans and deploying applications from Oracle JDeveloper, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

### 7.1.1 PermGen Memory Requirements for Multiple ADF Task Form Deployments

Memory consumption in the SOA and BPM servers increases with the deployment of each ADF task form. As a general recommendation, use Oracle JRockit when there is no requirement to set PermGen memory for production environments.

If you must use Oracle JDK for production environments, deploy multiple task forms, and encounter a `java.lang.OutOfMemoryError: PermGen space` error, update the PermGen memory in `$Domain/bin/setSOADomainEnv.sh` file (for Unix) or `DOMAIN_HOME\bin\setSOADomainEnv.cmd` file (for Windows) to a value appropriate to your environment.

### 7.1.2 Deploying SOA Composite Applications with Task Flows

When you deploy a SOA composite application with a task flow Enterprise Resource Archive (EAR) file from Oracle Enterprise Manager Fusion Middleware Control or Oracle WebLogic Server Administration Console to a multiple partition environment, you cannot specify partition details. To specify a partition, modify the `hwtaskflow.xml` file to include the partition name in the generated EAR file (the project version of the file remains unchanged). This file is located under the `TaskForm` project `adfmsrc` directory (for example, `HelpDeskRequestTaskFlow\adfmsrc\hwtaskflow.xml`). [Example 7-1](#) provides details.

#### *Example 7-1 hwtaskflow.xml File*

```
<hwTaskFlows
 xmlns="http://xmlns.oracle.com/bpel/workflow/hwTaskFlowProperties">
 <ApplicationName>worklist</ApplicationName>
 <LookupType>LOCAL</LookupType>
 <TaskFlowDeploy>false</TaskFlowDeploy>
 <PartitionName>partition2</PartitionName>
```

### 7.1.3 Deploying SOA Composite Applications with ant Scripts and the WLST Command Line Tool

You can also deploy SOA composite applications with ant scripts and the WLST command line tool.

- For information about deploying with ant scripts, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
- For information about deploying with WLST, see *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

## 7.2 Updating Instance, Fault, and Rejected Message States to Stale During Undeployment or Redeployment

When you undeploy or redeploy a SOA composite application, the behavior of some states of instances, faults, and rejected messages is updated to stale. This section describes which states are updated to stale for the following instances, faults, and rejected messages:

- SOA composite application instances
- Oracle Mediator instances
- BPEL process instances
- Oracle BPMN instances
- Human workflow task instances
- Business rules instances
- Oracle B2B instances
- Reference binding component instances
- Rejected messages
- Composite instance faults

---

**Note:** Note the following details about SOA composite application instances:

- Instances no longer marked as stale can still be purged.
  - Instances that complete with or without a fault are no longer changed to stale during undeployment or redeployment. This is a change from Release 11g R1 (11.1.1.6) and earlier.
- 

Table 7–1 shows the states that are updated to stale during a SOA composite application redeployment or undeployment.

**Table 7–1 Instance, Fault, and Rejected Message States Updated to Stale During Undeployment or Redeployment**

Element	Instance, Fault, And Rejected Message States Updated to Stale
SOA composite application instances	<p>The following instance states are updated to stale:</p> <ul style="list-style-type: none"> <li>▪ Running</li> <li>▪ Requires recovery</li> <li>▪ Suspended</li> </ul> <p>The specific state numbers and states that are updated to stale are as follows:</p> <ul style="list-style-type: none"> <li>▪ 0 Running</li> <li>▪ 2 Running with faults</li> <li>▪ 4 Running with recovery required</li> <li>▪ 5 Completed with recovery required</li> <li>▪ 6 Running with faults and recovery required</li> <li>▪ 7 Completed with faults and recovery required</li> <li>▪ 8 Running with suspended</li> <li>▪ 9 Completed with suspended</li> <li>▪ 10 Running with faults and suspended</li> <li>▪ 11 Completed with faults and suspended</li> <li>▪ 12 Running with recovery required and suspended</li> <li>▪ 13 Completed with recovery required and suspended</li> <li>▪ 14 Running with faults, recovery required, and suspended</li> <li>▪ 15 Completed with faults, recovery required, and suspended</li> <li>▪ 16 Running with terminated</li> <li>▪ 18 Running with faults and terminated</li> <li>▪ 20 Running with recovery required and terminated</li> <li>▪ 21 Completed with recovery required and terminated</li> <li>▪ 22 Running with faults, recovery required, and terminated</li> <li>▪ 23 Completed with faults, recovery required, and terminated</li> <li>▪ 24 Running with suspended and terminated</li> <li>▪ 25 Completed with suspended and terminated</li> <li>▪ 26 Running with faulted, suspended, and terminated</li> <li>▪ 27 Completed with faulted, suspended, and terminated</li> <li>▪ 28 Running with recovery required, suspended, and terminated</li> <li>▪ 29 Completed with recovery required, suspended, and terminated</li> <li>▪ 30 Running with faulted, recovery required, suspended, and terminated</li> <li>▪ 31 Completed with faulted, recovery required, suspended, and terminated</li> <li>▪ 36 Recovery required</li> <li>▪ 38 Faulted with recovery required</li> </ul>

**Table 7–1 (Cont.) Instance, Fault, and Rejected Message States Updated to Stale During Undeployment or Redeployment**

Element	Instance, Fault, And Rejected Message States Updated to Stale
Oracle Mediator instances	<p>The following instance states are updated to stale when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> <li>▪ Running</li> <li>▪ Requires recovery</li> </ul> <p>The specific state numbers and states that are updated to stale are as follows:</p> <ul style="list-style-type: none"> <li>▪ 4 Recovery required</li> <li>▪ 5 Aborted and recovery required</li> <li>▪ 6 Faulted and recovery required</li> <li>▪ 7 Aborted, faulted, and recovery required</li> <li>▪ 8 Running</li> <li>▪ 9 Running with aborted</li> <li>▪ 10 Running with faulted</li> <li>▪ 11 Running with aborted and faulted</li> <li>▪ 12 Running with recovery required</li> <li>▪ 13 Running with aborted and recovery required</li> <li>▪ 14 Running with faulted and recovery required</li> <li>▪ 15 Running with aborted, faulted, and recovery required</li> </ul>
BPEL process instances	<p>The following instance states are updated to stale when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> <li>▪ Running</li> <li>▪ Requires recovery</li> </ul>
Oracle BPMN	<p>The following instance states are updated to stale when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> <li>▪ Running</li> <li>▪ Requires recovery</li> </ul>
Human workflow task instances	<p>The following tasks instance states are updated to stale when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> <li>▪ Assigned</li> <li>▪ Information requested</li> <li>▪ Outcome updated</li> <li>▪ Suspended</li> <li>▪ Alerted</li> </ul>
Business rule instances	<p>The following instance states are updated to stale when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> <li>▪ Running</li> <li>▪ Completed successfully</li> <li>▪ Faulted</li> </ul>

**Table 7-1 (Cont.) Instance, Fault, and Rejected Message States Updated to Stale During Undeployment or Redeployment**

Element	Instance, Fault, And Rejected Message States Updated to Stale
Reference binding component instances	Reference binding component instances are <i>not</i> updated to stale. Instead, the original state for the reference binding component is retained: <ul style="list-style-type: none"> <li>■ 2 Completed successfully</li> <li>■ 3 Policy faulted</li> <li>■ 31 Business faulted</li> <li>■ 32 Faulted (neither policy or business)</li> </ul>
Rejected messages	The following error categories associated with the rejected message are updated to stale: <ul style="list-style-type: none"> <li>■ System</li> <li>■ Business</li> <li>■ Policy</li> <li>■ Stale</li> <li>■ Unknown</li> </ul>
Composite instance faults	The following error categories associated with the composite instance fault are updated to stale: <ul style="list-style-type: none"> <li>■ System</li> <li>■ Business</li> <li>■ Policy</li> <li>■ Stale</li> <li>■ Unknown</li> </ul>

For information about redeployment and undeployment, see [Section 7.3, "Redeploying SOA Composite Applications"](#) and [Section 7.4, "Undeploying SOA Composite Applications."](#)

## 7.3 Redeploying SOA Composite Applications

You can redeploy SOA composite applications from Oracle Enterprise Manager Fusion Middleware Control with the Redeploy SOA Composite wizard. Use of the Redeploy SOA Composite wizard has the following consequences:

- A new version of a revision of a currently deployed SOA composite application is redeployed on the same deployment target (for example, old version 1.0 is redeployed as new version 1.0).
- If the older, currently deployed version of this revision has running instances, you can select whether to change the state of those instances to stale. See Step 6 for a description of the **Running Instances** section of the Redeploy SOA Composite wizard and limitations on this option.

The instance state is available in the instance listing, and you can access audit and flow trace details.

For information about instance, fault, and rejected message states that are updated to stale during redeployment, see [Section 7.2, "Updating Instance, Fault, and Rejected Message States to Stale During Undeployment or Redeployment."](#)

**Notes:**

- If you want to maintain multiple revisions of a deployed application (for example, revisions 1.0 and 2.0), do *not* use this wizard. Instead, use the Deploy SOA Composite wizard.
- Redeploying multiple SOA composite applications at once is not supported.

To redeploy applications:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Infrastructure Home Page...	From the SOA Composite Menu...
<p>1. Select SOA Deployment &gt;Redeploy. The Select Composite page appears.</p> <p>2. In the SOA Composite Deployments section, select the SOA composite application revision you want to redeploy, and click Next.</p>	<p>1. Right-click soa-infra.</p> <p>2. Select SOA Deployment &gt; Redeploy. The Select Composite page appears.</p> <p>3. In the SOA Composite Deployments section, select the SOA composite application revision you want to redeploy, and click Next.</p>	<p>1. Click the Deployed Composites tab.</p> <p>2. In the Composite table, select a specific SOA composite application. Only one application can be redeployed at a time.</p> <p>3. Above the Composite table, click Redeploy.</p>	<p>1. Select SOA Deployment &gt; Redeploy.</p>

**Note:** You can also access the Redeploy SOA Composite wizard by right-clicking a partition and selecting **SOA Deployment > Redeploy**.

The Select Archive page appears.

2. In the **Archive or Exploded Directory** section, select the location of the SOA composite application revision you want to redeploy.
3. In the **Configuration Plan** section, optionally specify the configuration plan to include with the archive.
4. Click **Next**.

The Confirmation page appears.

5. In the **Default Revision** section, select whether to redeploy the SOA composite application as the default revision.
6. In the **Running Instances** section, select whether to continue running the current instances of a redeployed SOA composite application.
  - **Change states of running instances to stale:**
    - Select to change the states of currently running instances to stale after redeployment of the SOA composite application.

---

**Note:** Even if the state of a SOA composite application instance becomes stale, the instance states of BPEL process service components included in this composite remain as completed and not as stale. This is done for performance reasons, and is the expected behavior.

---

- Continue instances on redeploy (current instance states will not be changed):

---

**Note:** This option is displayed if Oracle BPM Suite is installed in the SOA Infrastructure, and only supported for the deployment of BPM composites. Do not select this option if you are deploying:

- A SOA composite application from a SOA Infrastructure environment in which Oracle BPM Suite is also installed.
- A BPM composite that includes a durable BPEL process, regardless of whether that process has been modified. Durable BPEL processes are those that take time to complete execution. Examples of durable BPEL processes are asynchronous processes (which are always durable) and synchronous processes that include a durable activity such as a wait activity.

If you select this option and attempt to redeploy a durable BPEL process, then deployment fails.

---

- Select to continue running instances after redeployment of the BPM composite application. This prevents these instance states from being changed to stale.

Instances of different service components behave differently after redeployment. Ensure that you understand the following details:

---

For...	Description
Oracle Business Process Management Notation (BPMN) instances	You must manually migrate instances. BPMN service component instances are displayed as running in Oracle Enterprise Manager Fusion Middleware Control after redeployment. However, to ensure that your redeployed application is running correctly, search for instances with the pending migration state in Oracle BPM Workspace and manually migrate these instances to the new component definition.

---

For...	Description
Oracle BPEL process, decision service (business rule), Oracle Mediator, and human workflow instances	<p>Instances are automatically migrated.</p> <p>Oracle Enterprise Manager Fusion Middleware Control attempts to automatically migrate the instances of these components. If the migration is successful, your SOA composite application is redeployed. However, if some of the following component instances cannot be migrated, redeployment of the entire composite fails.</p> <ul style="list-style-type: none"> <li>▪ BPEL instances: This capability is not supported if the composite includes a BPEL process service component that has changed from the previous revision.</li> <li>▪ Oracle Mediator: Checks the new component definition for compatibility. If it is incompatible with the existing component definition, the redeployment of the composite revision fails. However, if at the time of redeployment all Oracle Mediator processes within the running instances of this composite have completed, the definition change has no impact and redeployment is successful. Because Oracle Mediator instances take a short time to complete, their migration does not pose a high risk of redeployment failure.</li> <li>▪ Decision service: If the component definition has changed and is incompatible with the existing component definition, this may cause the redeployment of the composite revision to fail. However, if at the time of redeployment all decision service processes within the running instances of this composite have completed, the definition change has no impact and redeployment is successful. Because decision service instances take a short time to complete, their migration does not pose a high risk of redeployment failure.</li> <li>▪ Human workflow: Changes in human workflow do not impact any existing user task that has been created. Newly created human tasks after redeployment can use a new routing slip.</li> </ul>

**7. Click **Redeploy**.**

Processing messages are displayed.

At this point, the deployment operation cannot be canceled. Deployment continues even if the browser page is closed.

**8. When redeployment has completed, click **Close**.**

When redeployment has completed, the home page of the newly redeployed composite revision is displayed. A confirmation message at the top of the page tells you that the composite has been successfully redeployed.

## 7.4 Undeploying SOA Composite Applications

You can undeploy SOA composite applications from Oracle Enterprise Manager Fusion Middleware Control with the Undeploy SOA Composite wizard. Use of the Undeploy SOA Composite wizard has the following consequences:

- You can no longer configure and monitor this revision of the application.
- You can no longer process instances of this revision of the application.
- The state of currently running instances is changed to stale and no new messages sent to this composite are processed.
- The instance state of the undeployed composite application is set to stale. The instance state is available in the instance listing, and you can access audit trail and flow trace details.

- If you undeploy the default revision of the SOA composite application (for example, 2.0), the next active, available revision of the application is automatically designated as the new default (for example, 1.0).
- A warning message is displayed at the end of this wizard when you undeploy the default composite revision.

If no active revision is available and the default revision is undeployed, your composite may be unable to process new incoming requests. It is recommended that you have at least one active revision of this composite deployed before you undeploy the default revision.

If you undeploy this revision and no active revisions of this composite are found, a retired revision is automatically designated as the new default revision. A warning message is displayed after this wizard closes. Although all currently executing instances complete normally in retired composites, they cannot process any incoming requests. To process new incoming requests for this composite after the current default revision is undeployed, you must deploy a new revision or reactivate a previously retired revision.

For information about instance, fault, and rejected message states that are updated to stale during undeployment, see [Section 7.2, "Updating Instance, Fault, and Rejected Message States to Stale During Undeployment or Redeployment."](#)

---

**Note:** If you want to undeploy and then redeploy an existing revision of this application, do *not* use this wizard. Instead, use the Redeploy SOA Composite wizard. The Redeploy SOA Composite wizard enables you to redeploy an existing revision of a SOA composite application and remove (overwrite) the older, currently deployed version of the revision.

---

To undeploy applications:

---

**Note:** You can undeploy multiple SOA composite applications together if they are located in the same partition. For information, see [Section 7.9, "Grouping SOA Composite Applications into Partitions."](#)

---

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Infrastructure Home Page...	From the SOA Composite Menu...
<p>1. Select SOA Deployment &gt;Undeploy.</p> <p>The Select Composite page appears.</p> <p>2. In the SOA Composite Deployments section, select a specific SOA composite application to undeploy, and click Next.</p>	<p>1. Right-click <b>soa-infra</b>.</p> <p>2. Select SOA Deployment &gt; Undeploy.</p> <p>The Select Composite page appears.</p> <p>3. In the <b>SOA Composite Deployments</b> section, select a specific SOA composite application to undeploy, and click <b>Next</b>.</p>	<p>1. Click the <b>Deployed Composites</b> tab.</p> <p>2. In the <b>Composite</b> table, select a specific SOA composite application. Only one application can be undeployed at a time.</p> <p>3. Above the <b>Composite</b> table, click <b>Undeploy</b>.</p>	<p>1. Select SOA Deployment &gt; Undeploy.</p>

---

**Note:** You can also access the Undeploy SOA Composite wizard through these additional partition options:

- Right-clicking a partition and selecting **SOA Deployment > Undeploy All From This Partition**
  - Selecting **Deployment > Undeploy All From This Partition** on the partition home page
  - Selecting **Deployment > Undeploy All From This Partition** for the selected partition from the Manage Partitions page
- 

The Confirmation page appears.

2. If you are satisfied, click **Undeploy**. You are warned if you are about to undeploy the last remaining revision of a deployed composite application.  
Processing messages are displayed.  
At this point, the undeploy operation cannot be canceled. Undeployment continues even if the browser page is closed.
3. When undeployment has completed, the SOA Infrastructure Deployed Composites page is displayed automatically. A confirmation message at the top of the page tells you that the composite has been successfully undeployed.

---

**Note:** When a partition is deleted, all SOA composite applications in it are automatically undeployed. A message is displayed indicating that all the applications in that partition are to be undeployed.

---

## 7.5 Managing the State of Deployed SOA Composite Applications

You can manage the lifecycle state of deployed SOA composite applications from either of two pages:

- From the Deployed Composites page of the SOA Infrastructure, which lists all SOA composite applications deployed to the SOA Infrastructure
- From the application home page of a specific SOA composite application (all tabs)

The management tasks that you can perform are based on the page you are on. [Table 7–2](#) provides details.

**Table 7–2 Application State Actions**

Action	Perform on the Deployed Composites Page of the SOA Infrastructure?	Perform on the Application Home Page (All Tabs)?
<b>Shut Down and Start Up</b>	Yes	Yes
<b>Retire and Activate</b>	Yes	Yes
<b>Set as Default</b>	Yes	<ul style="list-style-type: none"> <li>▪ No: If only one version of the composite application is set as the default.</li> <li>▪ Yes: If there are multiple versions of the same composite application, this option is visible for all other versions of the same composite except the one that is the default.</li> </ul>
<b>Deploy</b>	Yes	Yes (through the <b>Composite</b> menu by selecting <b>SOA Deployment &gt; Deploy Another Composite</b> )
<b>Undeploy</b>	Yes	Yes (through the <b>Composite</b> menu by selecting <b>SOA Deployment &gt; Undeploy</b> )
<b>Redeploy</b>	Yes	Yes (through the <b>Composite</b> menu by selecting <b>SOA Deployment &gt; Redeploy</b> )
<b>Test</b>	No	Yes
<b>Composite Audit Level</b>	No	Yes
<b>Payload Validation</b>	No	Yes
<b>Enable/Disable Business Monitoring</b>	No	Yes
<b>Show WSDL and Endpoint URI (icon)</b>	No	Yes
<b>Show XML Definition (icon)</b>	No	Yes

See the following section based on the action you want to perform:

- [Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level"](#)
- [Section 7.5.2, "Managing the State of an Application from the SOA Composite Application Home Page"](#)

For more information, see [Section 1.2.2, "Introduction to SOA Composite Applications."](#)

## 7.5.1 Managing the State of All Applications at the SOA Infrastructure Level

You can manage the state of *all* SOA composite applications from the Deployed Composites page at the SOA Infrastructure level.

To manage the state of all applications at the SOA Infrastructure level:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select <b>Home</b> .	1. Click <b>soa-infra</b> .	1. Select <b>SOA Infrastructure</b> .

- Click the **Deployed Composites** tab.

The Deployed Composites page displays the following details:

- A utility for searching for a specific SOA composite application by specifying a full or partial composite name and clicking **Search**. You can also search for SOA composite applications by partition.
- A list of all SOA composite applications deployed in the SOA Infrastructure, including the partition in which they are deployed, current mode (active or retired), number of instances, number of faulted instances, and last modification date (deployment time, redeployment time, or any composite configuration change). The green dot to the left of the composite name indicates that this is the default revision of the application.

The following SOA composite revisions are currently deployed. To deploy a new composite revision, click Deploy. To perform additional tasks, select a composite and click the appropriate button.

**BPEL Message Recovery Required** [Show Details...](#) | [Go to BPEL Recovery Console](#) | [Set Time Threshold...](#) | [Disable Alert...](#)

Composite	Partition	Status	Mode	Instances	Faulted Instances	Deployed
B2BX12OrderGateway [1.0]	soaFusionOrderDemo	Active	Active	0	0	Sep 20, 2012 6:05:18 A
OrderSDOComposite [1.0]	soaFusionOrderDemo	Active	Active	0	0	Sep 20, 2012 6:04:50 A
PartnerSupplierComposite [1.0]	soaFusionOrderDemo	Active	Active	0	0	Sep 20, 2012 6:04:46 A
OrderBookingComposite [1.0]	soaFusionOrderDemo	Active	Active	0	0	Sep 20, 2012 6:03:09 A
BPELSyncWaitAssertActivity [1.0]	default	Active	Active	0	0	Sep 17, 2012 11:01:29 P
CompositeTest [1.0]	default	Active	Active	100	20	Sep 17, 2012 11:00:57 P
SingleTokenWSDL [1.0]	default	Active	Active	0	0	Sep 13, 2012 1:18:57 A
service [4.0]	default	Active	Active	0	0	Sep 12, 2012 11:28:51 P
FODOrderProcessingComposite [11.0]	default	Active	Active	0	0	Sep 9, 2012 10:02:27 P
pmd_bis [4.0]	default	Active	Active	0	0	Sep 9, 2012 9:52:04 P

**Note:** To always see the latest details about deployed SOA composite applications, click the **Refresh** icon in the upper right corner or navigate away from this page and return to it.

3. Click **Deploy** to deploy a new application. For all other options listed above the **Composite** section, first select the composite application by clicking the column to the left of the name, then select a specific option to perform.



The following table describes the available options:

Action	Description
<b>Shut Down</b>	<p>Shuts down a running SOA composite application revision. Any request (initiating or a callback) to the composite is rejected if the composite is shut down. New incoming requests cannot be processed. All existing instances are allowed to complete as usual (the same as when a composite is retired).</p> <p><b>Note:</b> The behavior differs based on which binding component is used. For example, if it is a web service request, it is rejected back to the caller. A JCA adapter binding component may do something else in this case (for example, put the request in a rejected table).</p> <p>This option is displayed when the composite application has been started.</p>
<b>Start Up</b>	<p>Restarts a composite application revision that was shut down. This action enables new requests to be processed (and not be rejected). No recovery of messages occurs.</p> <p>This option is displayed when the composite application has been stopped.</p>
<b>Retire</b>	<p>Retires the selected composite revision. If the process lifecycle is retired, you cannot create a new instance. Existing instances are allowed to complete normally.</p> <p>An initiating request to the composite application is rejected back to the client. The behavior of different binding components during rejection is as described for the shut down option.</p> <p>A callback to an initiated composite application instance is delivered properly.</p> <p>This option is displayed when the composite application is active.</p> <p>Note the following details when you attempt to retire the default composite revision, or have already retired a default composite revision. A warning page is also displayed with these details.</p> <ul style="list-style-type: none"> <li>▪ When you attempt to retire the default composite revision, if another active revision of the composite is found, it is designated as the new default revision. If there are multiple active revisions, the active composite that was deployed most recently (based on the time stamp) is designated as the default revision. If you then re-activate the retired revision, it does not automatically become the default revision again. You must explicitly make it the default revision again.</li> <li>▪ If you retire the default composite revision and no active revision of this composite is found, a new default revision is not designated and a warning message is displayed. The retired revision remains the default revision. However, this composite can no longer process any incoming requests. To process new incoming requests for this composite, you must deploy a new revision or re-activate one of the previously retired revisions.</li> </ul>

Action	Description
<b>Activate</b>	<p>Activates the retired composite application revision. Note the following behavior with this option:</p> <ul style="list-style-type: none"> <li>▪ All composite applications are automatically active when deployed.</li> <li>▪ Other revisions of a newly deployed composite application remain active (that is, they are not automatically retired). If you want, you must explicitly retire them.</li> </ul> <p>This option is displayed when the application is retired.</p>
<b>Set As Default</b>	<p>Sets the selected composite application revision to be the default. Default revisions are indicated by a green dot in the <b>Composite</b> table. If a new request comes in for a specific composite application revision, that composite application revision is invoked. If a new request comes in without specifying a revision, the default revision is invoked.</p> <p>The default revision can change when a composite application is retired. The change is based on whether there is another active revision of the composite. For details, see the description for the <a href="#">Retire</a> action in this table.</p> <p>The default revision is changed automatically when a default composite application revision is undeployed.</p> <p>The default composite revision also changes automatically when you redeploy a composite application. The newly redeployed revision automatically becomes the default revision, unless at the time of redeployment, you specify to keep the previous default revision unchanged. For details, see the description of the <a href="#">Undeploy</a> action in this table.</p> <p>Inbound adapters are activated only on the default revision.</p>
<b>Deploy</b>	<p>Deploys a revision. Deployment activates the composite application in the SOA Infrastructure. Use this selection when you want to deploy:</p> <ul style="list-style-type: none"> <li>▪ A new SOA composite application for the first time.</li> <li>▪ A new revision (for example, 2.0) of a SOA composite application that has a different revision that is currently deployed (for example, 1.0). This option enables both revisions 1.0 and 2.0 to be deployed at the same time.</li> </ul> <p>If you specify a revision that exists, you receive an error. You must change this revision outside of the Deploy SOA Composite wizard.</p> <p>For more information, see <a href="#">Section 7.1, "Deploying SOA Composite Applications"</a> and <a href="#">Section 7.9, "Grouping SOA Composite Applications into Partitions."</a></p>

Action	Description
<b>Undeploy</b>	<p>Undeploys the selected composite application revision. The consequences of this action are as follows:</p> <ul style="list-style-type: none"> <li>▪ You can no longer configure and monitor this revision of the composite application.</li> <li>▪ You can no longer process instances of this revision of the composite application.</li> <li>▪ You cannot view previously completed processes.</li> <li>▪ The state of currently running instances is changed to stale and no new messages sent to this composite application are processed.</li> <li>▪ If you undeploy the default revision of the composite application (for example, 2.0), the next available, active revision of the composite application becomes the default (for example, 1.0).</li> </ul> <p>If no active revision is available and the old default revision is undeployed, your composite may be unable to process new incoming requests. It is recommended that you have at least one active revision of this composite deployed before you undeploy the default revision.</p> <p>If you undeploy the default revision and no active revisions of this composite are found, a retired revision is automatically designated as the new default revision. A warning message is displayed after this wizard closes. Although all currently executing instances complete normally in retired composites, they cannot process any incoming requests. To process new incoming requests for this composite after the current default revision is undeployed, you must deploy a new revision or reactivate a previously retired revision.</p> <p><b>Note:</b> Undeploying multiple SOA composite applications at the same time is supported if they are in the same partition.</p> <p>For more information, see <a href="#">Section 7.4, "Undeploying SOA Composite Applications"</a> and <a href="#">Section 7.9, "Grouping SOA Composite Applications into Partitions."</a></p>
<b>Redeploy</b>	<p>Redeploys an existing revision of a SOA composite application. The consequences of this action are as follows:</p> <ul style="list-style-type: none"> <li>▪ A new version of a revision of a currently deployed SOA composite application is redeployed (for example, old version 1.0 is redeployed as new version 1.0).</li> <li>▪ The older, currently deployed version of this revision is removed (overwritten).</li> <li>▪ If the older, currently deployed version of this revision has running instances, you can select whether to change the state of those instances to stale.</li> </ul> <p>For more information, see <a href="#">Section 7.3, "Redeploying SOA Composite Applications."</a></p>

For more information, see [Section 1.4.3.3, "Introduction to the Lifecycle State of SOA Composite Applications."](#)

## 7.5.2 Managing the State of an Application from the SOA Composite Application Home Page

You can manage the state of an individual SOA composite application from the application's home page.

To manage the state of an application from the SOA composite application home page:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. Select a specific SOA composite application.	

The Dashboard page of the selected SOA composite application is displayed.

The screenshot shows the Oracle SOA Suite Dashboard for the composite application "CompositeTest [1.0]".

- BPEL Message Recovery Required:** An alert is present at the top.
- Recent Instances:** Shows 100 total instances, with 0 running. A table lists instance details:
 

Instance ID	Name	Conversation ID	Instance State	Start Time
40020			---	Oct 9, 2012 12:10:58 PM
40019			---	Oct 9, 2012 12:10:58 PM
40018			---	Oct 9, 2012 12:10:57 PM
40017			---	Oct 9, 2012 12:10:57 PM
40016			---	Oct 9, 2012 12:10:57 PM
- Recent Faults and Rejected Messages:** A table lists recent faults:
 

Error Message	Recovery	Fault Time	Fault Location	Composite Instance ID	Logs
<bpelFault><faultType>0</faultType><		Oct 9, 2012 12:10:58 PM	LoanBroker	40017	<a href="#">View Log</a>
<bpelFault><faultType>0</faultType><		Oct 9, 2012 4:13:04 AM	LoanBroker	40007	<a href="#">View Log</a>
<bpelFault><faultType>0</faultType><		Oct 9, 2012 2:25:04 AM	LoanBroker	30110	<a href="#">View Log</a>
<bpelFault><faultType>0</faultType><		Oct 9, 2012 2:20:04 AM	LoanBroker	30110	<a href="#">View Log</a>

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**Notes:**

- The **Total** field of the **Recent Instances** section sometimes does not display the correct number of total instances despite instances having completed successfully. In these cases, click the **Refresh** icon in the upper right corner to view the actual number of total instances.
  - When the **Capture Composite Instance State** checkbox is enabled on the SOA Infrastructure Common Properties page, created instances are displayed immediately even if you have defined a constraint that appears to prevent an instance from being displayed immediately (for example, you have defined a flush delay of 10 minutes or specified a batch size of 100 records to write to a database). This is because instance tracking is moved to the immediate mode since the state of the composites must be captured.
  - After the SOA Infrastructure is started, it may not be completely initialized to administer incoming requests until all deployed composites are loaded. During SOA Infrastructure initialization, a warning message is displayed at the top of the SOA composite application home page. Do not perform operations such as composite deployment, composite undeployment, and others while this message is displayed. For more information, see [Section 3.2.1, "Waiting for SOA Infrastructure Startup Initialization to Complete."](#)
- 

2. From the list of options at the top of the page, select a specific action to perform. These options are also displayed at the top of the Instances, Faults and Rejected Messages, Unit Tests, and Policies pages of the SOA composite application.

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Action	Description
<b>Shut Down</b>	See the table under Step 3 of <a href="#">Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level"</a> for a description of this option.
<b>Start Up</b>	See the table under Step 3 of <a href="#">Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level"</a> for a description of this option.
<b>Retire</b>	See the table under Step 3 of <a href="#">Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level"</a> for a description of this option.
<b>Activate</b>	See the table under Step 3 of <a href="#">Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level"</a> for a description of this option.
<b>Test</b>	Enables you to initiate a test instance from the Test Web Service page.  <b>Note:</b> This button is disabled when the SOA composite application is stopped or retired. This is because you cannot create an instance for a stopped or retired application. This button is also disabled when there are no web services available for the application. Only composite applications having services with web service bindings can be tested from this page.  For more information, see <a href="#">Section 8.1, "Initiating a SOA Composite Application Test Instance."</a>

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Action	Description
<b>Settings: Composite Audit Level</b>	<p>Sets the level of audit tracking to perform at the SOA composite application level. This setting <i>can</i> override the audit level defined at the SOA Infrastructure level. By default, the value is <b>Inherit</b>, which does not override the SOA Infrastructure level setting.</p> <p>If you select to set the audit tracking level, the following options are available:</p> <ul style="list-style-type: none"> <li>▪ <b>Inherit:</b> Logging matches the SOA Infrastructure audit level that you set on the SOA Infrastructure Common Properties page. This is the default setting.</li> <li>▪ <b>Production:</b> Minimal information for SOA composite application instances is collected. For example, the BPEL process and Oracle Mediator service engines do not capture the payload. Therefore, the payload details are not available in the flow audit trails. The BPEL process service engine collects payload details for all activities except assign activities. This level is optimal for most standard operations and testing.</li> <li>▪ <b>Development:</b> Complete information for SOA composite application instances is collected. This option allows both composite instance tracking and payload tracking. This setting may have an impact on performance because the payload is stored at each step in the message flow. This setting is useful for debugging purposes.</li> <li>▪ <b>Off:</b> No logging is performed. Composite instance tracking information and payload tracking information are not collected.</li> </ul> <p>Setting audit level tracking at the SOA composite application level overrides the same tracking set at the SOA Infrastructure level. By default, the settings are the same at the SOA composite application and SOA Infrastructure levels. SOA composite application settings are automatically changed when the global SOA Infrastructure settings are changed. By choosing any other setting at the SOA composite application level, you are overriding the inherited settings.</p> <p>One form of overriding is when you explicitly select the same local composite value that happens to be the current global value. If the SOA Infrastructure setting is then changed, this specific composite application does not inherit the new value. For example, assume the SOA Infrastructure setting is <b>Off</b>. Therefore, all composite applications have their audit tracking set to <b>Off</b>. Then, you explicitly set composite application XYZ to <b>Off</b>. Then, go to the SOA Infrastructure and change the setting to <b>Production</b>. The tracking levels for all composite applications are now <b>Production</b>; except for XYZ, which is still set to <b>Off</b>.</p> <p>Note the following impact of instance tracking changes on message flows that span several SOA composite applications (for example, a composite application invoking another composite application through a reference binding component or an event published in one composite application and subscribed to in another composite application).</p> <ul style="list-style-type: none"> <li>▪ If an intermediate composite application has disabled instance tracking, then a single message flow across multiple composite application instances appears as separate, unconnected flows. For example, assume a message flows through composite applications C1, C2, and C3. C1 and C3 have enabled instance tracking, while C2 has disabled it. Two separate flows for C1 and C3 are displayed in Oracle Enterprise Manager Fusion Middleware Control.</li> <li>▪ Sources or targets of events or messages may not be displayed. For example, assume you have two composite applications: C1 and C2. If C1 has disabled instance tracking, the flow trace does not show the origin of the message flow and makes it appear as if C2 were directly invoked.</li> </ul>

Action	Description
<b>Settings: Payload Validation</b>	Validates the XML schema-based payload at the inbound and outbound points of the composite application revision. If you enable payload validation and there is an invalid payload (that does not follow the schema), a fault is generated for that message.  The exception to this is the response message of a synchronous service. That message is not validated, even with payload validation enabled. The inbound message is still validated; only the outbound message is not.
<b>Settings: Enable/Disable Business Monitoring</b>	Select an option to invoke a confirmation dialog that displays the current status of the sensors. <ul style="list-style-type: none"> <li>▪ <b>Disable:</b> Select to disable BPEL sensors for all BPEL components in this SOA composite application.</li> <li>▪ <b>Enable:</b> Select to enable BPEL sensors for all BPEL components in this SOA composite application.</li> </ul> <p>The <b>Enable/Disable Business Monitoring</b> selection is only displayed for composites that have a BPEL service component, regardless of whether that component includes sensors.</p> <p>When BPEL sensors are disabled at the service engine level, you cannot enable or disable BPEL sensors at the SOA composite application level. You can enable or disable BPEL monitors and sensors at the service engine level in the BPEL Service Engine Properties page.</p> <p>For more information, see <a href="#">Section 7.10, "Disabling and Enabling BPEL and BPMN Business Monitors"</a> and <a href="#">Section 13.1, "Configuring BPEL Process Service Engine Properties."</a></p>
<b>Show WSDL and endpoint URI (icon)</b>	Click to display the endpoint addresses and WSDLs of all external services for this SOA composite application.  <b>Note:</b> If you are using the Safari Browser to view this information, see <a href="#">Section B.9.1, "Limitation on Using the Safari Browser to View WSDL File Content."</a>
<b>Show Composite XML Definition (... icon)</b>	Click to show the XML definition of the SOA composite application.

For more information, see the following sections:

- [Section 1.4.3.3, "Introduction to the Lifecycle State of SOA Composite Applications"](#)
- [Section 3.1, "Configuring SOA Infrastructure Properties"](#)

### 7.5.3 Starting and Stopping a Managed Oracle WebLogic Server on Which the SOA Infrastructure is Deployed in the Middle of BPEL Processing

If you start and stop a managed Oracle WebLogic Server on which the SOA Infrastructure is deployed in the middle of BPEL processing in a SOA composite application, note the following issues:

- For synchronous BPEL processes

The whole scenario is synchronous and the instances that are in a running state (after server restart) are pending in the BPEL wait activity. Therefore, the flow thread ends with the server (while sleeping in the wait activity). When the server is restarted, the same instance is not restarted because the flow is synchronous.

Therefore, these instances always remain in a running state because no processing can happen on them after server restart.

- For asynchronous BPEL processes

If server shutdown occurred in the middle of a BPEL invoke activity, the messages received by BPEL are not handled. BPEL does not automatically recover these messages during restart; they must be recovered manually using Facade API calls. For more information about the Facade API, see [Chapter 11, "Programmatically Managing SOA Composite Applications with the Facade API."](#)

#### 7.5.4 Setting the Composite Instance Name

You can set the instance name of a SOA composite application during design time for Oracle Mediator and Oracle BPEL Process Manager. For more information, see Section "How to Set the Composite Instance Name at Design Time" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

### 7.6 Automating the Testing of SOA Composite Applications

You can create, deploy, and run test cases that automate the testing of SOA composite applications. Test cases enable you to simulate the interaction between a SOA composite application and its web service partners before deployment in a production environment. This helps to ensure that a process interacts with web service partners as expected by the time it is ready for deployment to a production environment. You create test cases in Oracle JDeveloper and include them in a SOA composite application that is then deployed and administered from Oracle Enterprise Manager Fusion Middleware Control. You can also create BPEL process service component test cases in the SOA composite application test case.

To automate the testing of SOA composite applications:

---

**Note:** Before testing SOA composite applications or BPEL process service components from Oracle Enterprise Manager Fusion Middleware Control, see Chapter "Automating Testing of SOA Composite Applications" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite* for instructions on creating test cases.

---

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select <b>Deployed Composites</b>.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> <li>4. Click the <b>Unit Tests</b> tab.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, expand the partition.</li> <li>2. Select a specific SOA composite application.</li> <li>3. Click the <b>Unit Tests</b> tab.</li> </ol>	<ol style="list-style-type: none"> <li>1. Select <b>Unit Test</b>.</li> </ol>

The test cases that are displayed were designed in Oracle JDeveloper and included in a deployed SOA composite application.

2. Select the entire test suite or individual tests of a suite to run, and click **Execute**.

Select one or more test cases to run and click Execute. Test cases enable you to simulate the interactions between a composite and its web service partners in a test environment.

Name	Description	Select
assert-element.xml		<input type="checkbox"/>
assert-message.xml		<input type="checkbox"/>
assert-output.xml		<input type="checkbox"/>
assert-part.xml		<input type="checkbox"/>
assert.xml		<input type="checkbox"/>
asserts.xml		<input type="checkbox"/>
emulate-callback.xml		<input type="checkbox"/>
emulate-fault.xml		<input type="checkbox"/>
emulate-output.xml		<input type="checkbox"/>
initiate.xml		<input type="checkbox"/>

You are prompted to create a test.

3. Enter the following values, and click OK.

Field	Description
<b>Test Run Name</b>	Enter a name for the test instance. When testing is complete, report details are captured under this name.
<b>Timeout</b>	Enter a value in seconds in which to complete this test. If the test does not complete within this time limit, then testing is terminated.
<b>Number of Concurrent Test Instances</b>	Enter the number of test instances to create.

The Test Runs page is automatically displayed for tracking the running tests.

The Test Runs page enables you to track running test cases and view test results. Test suites consist of a logical collection of one or more test cases. Each test case contains a set of commands to perform as the test instance is executed. The execution of a test suite is known as a test run.

The screenshot shows the Oracle SOA Suite interface with the following details:

- Header:** Logged in as **weblogic** | Page Refreshed Oct 9, 2012 1:48:54 PM PDT
- Breadcrumbs:** SOA Composite >
- Alert Bar:** BPEL Message Recovery Required (Show Details... | Go to BPEL Recovery Console | Set Time Threshold... | Disable Alert...)
- Top Navigation:** Running Instances 0 | Total 100 | Active | Retire... | Shut Down... | Test | Settings... | Related Links
- Sub-Navigation:** Dashboard, Instances, Faults and Rejected Messages, Unit Tests (selected), Policies
- Test Cases:** Test Runs
- Search:** Test Run Name, Start Time, End Time, Test Run ID, Composite Instance ID, Search, Reset
- Table:** Test Run Summary
 

Test Run Name	Test Run ID	Start Time	End Time	Status	Success Rate
praca123	d0da85764c2	Oct 9, 2012 12:10:56 PM	Oct 9, 2012 12:10:58 PM	Passed	100% (of 10 tests)
sdf	d0da85764c2	Oct 9, 2012 4:13:01 AM	Oct 9, 2012 4:13:04 AM	Passed	100% (of 10 tests)
test3	d0da85764c2	Oct 9, 2012 2:07:45 AM	Oct 9, 2012 2:07:46 AM	Passed	100% (of 10 tests)
k3	d0da85764c2	Oct 8, 2012 11:33:15 PM	Oct 8, 2012 11:33:16 PM	Passed	100% (of 10 tests)
k3	d0da85764c2	Oct 8, 2012 11:32:56 PM	Oct 8, 2012 11:32:57 PM	Passed	100% (of 10 tests)
k1	d0da85764c2	Oct 8, 2012 11:32:43 PM	Oct 8, 2012 11:32:45 PM	Passed	100% (of 10 tests)
test4	d0da85764c2	Oct 8, 2012 11:31:26 PM	Oct 8, 2012 11:31:28 PM	Passed	100% (of 10 tests)

- In the **Test Run Name** column, click a specific test run to display details in the **Results of Test Run** section. If you want to create more test runs, you can switch back to the Test Cases page at any time.

The **Results of Test Run** section displays details about the executed test run, such as a test summary and the success rate. Click the **Help** icon for additional details.

#### Results of Test Run : praca123 (Test Run ID : d0da85764c2e70ff:71b0325b:13a4512d4e0:-7c22)

Total	Running	Passed	Failed	Unknown	Success Rate
10	0	10	0	0	100%

Expand a test suite to view the status of each test case. Click a test suite or test case to view assertion details.

Test suites and test cases	Status
mytestsuite	
initiate.xml	Passed
emulate-callback.xml	Passed
assert.xml	Passed
emulate-fault.xml	Passed
asserts.xml	Passed
assert-element.xml	Passed
emulate-output.xml	Passed

- View assertion details at the bottom of the page. Assertions enable you to verify variable data or process flow.

Assertion details for mytestsuite								
<input type="checkbox"/> Show failures only								
Composite Instance	Location	Type	Status	Expected Value	Actual Value	Description	Error Message	
40012	client	Wire	True	Qing Zhong	Qing Zhong			
40014	client	Wire	True	111222333	111222333			
40014	client	Wire	True	Qing Zhong	Qing Zhong			
40016	client	Wire	True	[XML]	[XML]			
40015	client	Wire	True	[XML]	[XML]			
40018	client	Wire	True	[XML]	[XML]			
40019	client	Wire	True	[XML]	[XML]			

- Click a composite instance number to view specific test details.

The composite instances created by executing unit test runs are displayed with a yellow square next to the instance ID in the Instances page of a SOA composite application and in the **Recent Instances** tables of the SOA Infrastructure and SOA composite application. This yellow box distinguishes these instances from test instances created on the Test Web Service page or automatically created by external consumers of the application.

For more information, see the following documentation:

- [Section 1.4.3.4, "Introduction to SOA Composite Application Automated Testing"](#)
- [Chapter "Automating Testing of SOA Composite Applications" of \*Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite\* for instructions on creating test cases for SOA composite applications and BPEL process service components in Oracle JDeveloper](#)

## 7.7 Managing SOA Composite Application Policies

You can attach or detach security policies to and from currently deployed SOA composite applications. Policies apply security to the delivery of messages.

---

**Note:** Before attaching policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use in your environment.

---

To manage SOA composite application policies:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select Home.	1. Under <b>soa-infra</b> , expand the partition.	1. Select Policies.
2. Select Deployed Composites.	2. Select a specific SOA composite application.	
3. In the Composite section, select a specific SOA composite application.	3. Click the Policies tab.	
4. Click the Policies tab.		

The Policies page enables you to attach and detach policies to and from SOA composite applications. The policies table displays the attached policy name, the component to which the policy is attached, the policy reference status (enabled or disabled) that you can toggle, the category (Management, Reliable Messaging, MTOM Attachment, Security, or WS-Addressing), the violations, and the authentication, authorization, confidentiality, and integrity failures since the SOA Infrastructure was last restarted.

FODOrderProcessingComposite [11.0] i

Logged in as **weblogic** i

Page Refreshed Oct 9, 2012 4:00:13 PM PDT i

SOA Composite i

Running 0 | Total 0 | Active | Retire ... | Shut Down... | Test | Settings... | Related Links i

Dashboard Instances Faults and Rejected Messages Unit Tests Policies

You can view and manage the list of policies attached to the web service bindings and components of this SOA composite application. Click 'Attach To/Detach From' to update the list of attached policies. ?

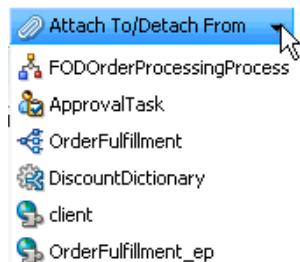
View | i Attach To/Detach From

Policy Name	Attached To	Policy Reference Status	Category	Total Violations	Action
No policies attached.					

**2. Click **Attach/Detach To**.**

If multiple services or components are available, you are prompted to select the service or component for which to perform the attachment or detachment.

**3. Select the component to or from which to attach or detach a policy.**



This invokes a dialog for attaching or detaching policies.

Currently attached policies appear in the **Attached Policies** section. Additional policies available for attachment appear in the **Available Policies** section.

Attach/Detach Policies(FODOrderProcessingComposite/11.0/Component/Apprc... | OK | Validate | Cancel |

**Globally Attached Policies**

Name	Category	Policy Set	Enabled	Description
No rows yet				

**Directly Attached Policies**

Name	Category	Enabled	Description	View Detail
No rows yet				

**Attach** | **Detach**

**Available Policies**

Search Category All

Name	Category	Enabled	Description	View Detail
oracle/log_policy	Management	✓	This policy causes the req...	⊕
oracle/component_authorization_denyall_policy	Security	✓	This policy is a special c...	⊕
oracle/component_authorization_permitall_policy	Security	✓	This policy is a special c...	⊕
oracle/component_permission_authorization_policy	Security	✓	This policy is a special c...	⊕
oracle/no_authorization_component_policy	Security	✓	This policy facilitates t...	⊕

4. Select policies to attach that are appropriate to your environment.

5. Click **Attach**.

The attached policy appears in the **Directly Attached Policies** section.

**Directly Attached Policies**

Name	Category	Enabled	Description	View Detail
oracle/component_permission_authorization_policy	Security	✓	This policy is a special c...	⊕

6. Attach additional policies as needed.

7. When you are finished attaching policies, click **Validate**.

8. If an error message appears, make the necessary corrections until you no longer have any validation errors.

9. Click **OK**.

The attached policy is displayed in the policies table.

FODOrderProcessingComposite [11.0] | Logged in as **weblogic** | Page Refreshed Oct 9, 2012 4:12:19 PM PDT

SOA Composite

Running 0 | Total 0 | Active | Retire ... | Shut Down... | Test | Settings... | Related Links

Dashboard Instances Faults and Rejected Messages Unit Tests Policies

You can view and manage the list of policies attached to the web service bindings and components of this SOA composite application. Click 'Attach To/Detach From' to update the list of attached policies.

View | Attach To/Detach From

Policy Name	Attached To	Policy Reference Status	Category	Total Violations
oracle/component_permission_authorization_p	ApprovalTask	Disable	Security	0

For more information about policies, see the following documentation:

- [Section 1.4.3.2, "Introduction to Policies"](#)
- *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use for your environment

## 7.7.1 WS-RM Sessions

Multiple requests from Oracle SOA Suite in a single WS-RM session are not currently supported. Each request is in an individual WS-RM session.

## 7.7.2 Policy Attachments and Local Optimization in Composite-to-Composite Invocations

OWSM supports an Oracle SOA Suite local optimization feature for composite-to-composite invocations in which the reference of one composite specifies a web service binding to a second composite. Local optimization enables you to bypass the HTTP stack and SOAP/normalized message conversions during runtime. Local optimization is not used if the composites are in different containers. If a policy is attached to the web service binding, the policy may not be invoked if local optimization is used.

By default, an OWSM security policy includes a `local-optimization` property that identifies if the policy supports local optimization. You can view the setting for a policy in Oracle Enterprise Manager Fusion Middleware Control.

To view the local optimization setting for policies:

1. In the navigator, expand the **WebLogic Domain** folder.
2. Right-click **WLS\_SOAWC**, and select **Web Services > Policies**.
3. Select a policy and click **Export to File**.
4. Open the file with a text editor and search for `local-optimization` to identify the value. This property supports the following values:
  - `on`: Local optimization is used in the attached policy, and the policy is not applied at runtime.
  - `off`: Local optimization is not used in the attached policy, and the policy is applied at runtime.
  - `check-identity`: If a JAAS subject exists in the current thread, local optimization is used. Otherwise, local optimization is not used.

For information on the default local optimization settings for security policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

You can override the local optimization setting for a policy by adding the `oracle.webservices.local.optimization` property in the binding section of the `composite.xml` file. The following values are supported:

- `true` (default value): Local optimization is used, and the policy is applied if it is applicable to optimized calls (details are defined in the individual policy file).
- `false`: Local optimization is not used, regardless of the default setting for the `local-optimization` property at the OWSM policy level. This setting forces the policy to be applied.

For example, the following setting of `false` causes `oracle/wss_username_token_client_policy` to be applied.

```

<binding.ws
 port="http://xmlns.oracle.com/CalledBPELProcessApp_
jws/CalledBPELProcess/CalledBPELProcess#wsdl.endpoint(calledbpelprocess_client_
ep/CalledBPELProcess_pt)"

 location="http://myhost.us.example.com:8001/soa-infra/services/default/CalledBPEL
Process!1.0/calledbpelprocess_client_ep?WSDL">
 <wsp:PolicyReference URI="oracle/wss_username_token_client_policy"
 orawsp:category="security"
 orawsp:status="enabled"/>
 <wsp:PolicyReference URI="oracle/log_policy"
 orawsp:category="management"
 orawsp:status="enabled"/>
 <property
 name="oracle.webservices.local.optimization">false</property>
</binding.ws>

```

For more information about local optimization, see [Section 3.7, "Configuring Local Optimization."](#)

## 7.8 Exporting a Deployed SOA Composite Application

You can export the contents of a deployed SOA composite application to an archive JAR file. The file can include some or all of the following data:

- The original design-time composite
- Postdeployment changes in the rules dictionary and domain value maps (DVMs)
- Postdeployment property changes such as binding component properties, composite properties such as audit level settings and payload validation status, and policy attachments

---

### Notes:

- SOA composite application exporting is currently only allowed at the individual SOA composite level.
  - Shared data is not exported as part of the composite export SOA archive (SAR).
- 

To export a running SOA composite application:

1. Go to the home page of the SOA composite application to export.
2. From the **SOA Composite** menu, select **Export**.

The Export Composite page appears.

The screenshot shows the 'Export Composite' dialog for the FODOrderProcessingComposite [20.0] composite. At the top, it displays the composite name, revision, and deployment target. Below this, four options for exporting are listed, each with a description. The 'SAR File' section allows specifying the archive name, with 'Export With Default Archive Name' selected. A text input field for 'Specify Custom Extension Text' contains 'MyText'.

**You have chosen to export the following composite revision.**

Composite Name: FODOrderProcessingComposite  
Composite Revision: 20.0  
Current Deployment Target: /base\_domain\_soainfra/soainfra/AdminServer/default

**Option 1: Export with all post-deploy changes**  
This option will generate a composite archive file containing the original, design-time definitions of the composite; as well as all post-deployment information listed in Option 2 and 3.

**Option 2: Export with runtime/metadata changes only**  
The composite archive file will include the original composite plus such post-deployment changes as task definitions, rule changes, etc..

**Option 3: Export with property changes only**  
The composite archive file will include the original composite plus any post-deployment property changes, such as binding properties or policy settings.

**Option 4: Export with no post-deploy changes**  
This option will generate a composite archive file containing only the pre-deployment, design-time definitions of the composite. Any property settings you may have made on a running composite, or any runtime metadata, will be ignored in the export operation.

**SAR File**  
A composite archive (SAR) file will be generated with a standard name, shown below. Alternatively, you can specify your own name for the file. The file is first exported to the server where Enterprise Manager is running. When the export operation completes, you will be asked to specify a directory to save the file locally on the machine where this web browser is running. When downloading completes, click Done.

Export With Default Archive Name: sca\_FODOrderProcessingComposite\_rev20.0.jar

Specify Custom Extension Text-EXAMPLE: sca\_FODOrderProcessingComposite\_rev20.0-**MyText**.jar

3. Select an option.
    - **Option 1:** Generates an archive file containing the original design-time composite and the postdeployment details described in **Option 2** and **Option 3**.
    - **Option 2:** Includes the original design-time composite and postdeployment changes in the rules dictionary and DVMs.
    - **Option 3:** Includes the original design-time composite and postdeployment property changes such as binding component properties, composite properties such as audit level settings and payload validation status, and policy attachments.
    - **Option 4:** Generates an archive file containing only the original design-time composite. Options 2 and 3 are not included.
  4. If you want to append an additional name to the existing file, select **Specify Custom Extension Text**. For example, adding MyText to a file named sca\_OrderBookingComposite\_rev1.0.jar names the exported file as sca\_OrderBookingComposite\_rev1.0-MyText.jar.
  5. Click **Export**.
- The Processing: Export Composite dialog displays the progress of archive file generation. When generation completes, you are prompted to save the file.
6. Click **Save File**.

A dialog appears for either opening or saving the file to a directory on your local host.

---

**Note:** It is important that you click the **Save File** button. Do not close this dialog. Although the composite is exported, you cannot retrieve the actual exported file.

---

7. Specify the local directory in which to save the JAR file.
8. In the upper right of the Processing: Export Composite dialog, click the x icon to close the dialog.
9. On the Export Composite page, note that the Cancel button has changed to **Done**.
10. Click **Done**.

The Export Composite is closed and you are returned to the SOA composite application home page.

## 7.9 Grouping SOA Composite Applications into Partitions

You can deploy SOA composite applications into separate sections of the SOA Infrastructure known as partitions. Deploying to partitions enables you to logically group SOA composites and perform bulk lifecycle management tasks on all SOA composite applications within a specific partition. Partitions are similar to the domain feature that was part of 10.1.x releases of Oracle BPEL Process Manager. However, you *cannot* perform specific configuration tasks on partitions, such as restricting login access to a specific partition or configuring partitions (such as configuring threading).

At least one partition is required for deploying SOA composite applications. A default partition named **default** is automatically included with Oracle SOA Suite.

You can manage partitioning from either of two pages:

- From the Manage Partitions page of the SOA Infrastructure, which lets you create partitions, delete partitions, and perform bulk lifecycle management tasks on all SOA composite applications in a specific partition
- From the partition home page, which also enables you to perform bulk lifecycle management tasks on all SOA composite applications in a specific partition

---

**Note:** If SOA composite applications using the same inbound resource are deployed to different partitions, it cannot be guaranteed which partition picks up the message for processing.

For example, assume you are using the file adapter and /home/Directory1 is the inbound directory for the composite SOAComposite1. If this composite is deployed to both Partition1 and Partition2, when a file is placed in /home/Directory1, either the composite in Partition1 or Partition2 may pick up the file.

With the socket adapter, however, there is a limitation that does not permit you to deploy any composite that uses the same inbound port. In that case, an exception is thrown indicating that the inbound port is in use.

---

Table 7–3 provides more specific details on the tasks you can perform from both pages.

**Table 7–3 Partition Management Actions**

Action	Perform on the Manage Partitions Page?	Perform on the Partition Home Page?
Create a partition	Yes	No
Delete a partition	Yes	<p>Yes.</p> <ol style="list-style-type: none"> <li>1. Select the <b>SOA Partition</b> menu.</li> <li>2. Select <b>Delete This Partition</b>.</li> </ol> <p><b>Note:</b> You can also delete a partition by right-clicking it in the navigator and selecting <b>Delete This Partition</b>.</p>
Perform bulk lifecycle management tasks on all composites deployed to a specific partition:  <ul style="list-style-type: none"> <li>■ Start all</li> <li>■ Shut down all</li> <li>■ Retire all</li> <li>■ Activate all</li> <li>■ Undeploy all</li> </ul>	Yes	Yes

**Notes:**

- Partitions are *not* associated with a particular state such as started, stopped, activated, or retired. Only the composites within the partition are associated with a particular state. Therefore, you *cannot* start, stop, activate, or retire a partition.
- After the SOA Infrastructure is started, it may not be completely initialized to administer incoming requests until all deployed composites are loaded. During SOA Infrastructure initialization, a warning message is displayed at the top of the Manage Partitions and Partitions home pages. Do not perform operations such as composite deployment, composite undeployment, and others while this message is displayed. For more information, see [Section 3.2.1, "Waiting for SOA Infrastructure Startup Initialization to Complete."](#)

See the following section based on the tasks you want to perform:

- [Section 7.9.1, "Creating and Deleting Partitions"](#)
- [Section 7.9.2, "Performing Bulk Lifecycle Management Tasks on Composites in Partitions"](#)

For more information about partitions, see [Section 1.4.3.5, "Introduction to Partitioning of the SOA Infrastructure."](#)

## 7.9.1 Creating and Deleting Partitions

You can create and delete partitions on the Manage Partitions page. A default partition named **default** is automatically included with Oracle SOA Suite. You can delete the **default** partition. You cannot rename existing partitions; only creation and deletion of partitions is supported.

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the Home Page of a Specific Partition...
1. Select <b>Manage Partitions</b> .	1. From the <b>Related Links</b> list of a specific partition, select <b>Manage Partitions</b> .

The Manage Partitions page displays the following details:

- The name of each partition, the number of active and retired SOA composite application revisions in each partition, the name of the composites contained in each partition (under the **View** link), and the total number of running and faulted instances in each partition.
- A utility for searching for a specific partition. Enter a full or partial partition name and click the **Search** icon or press the **Return** key. The search is not case-sensitive.

SOA Partition	Composites			Instances	
	Active	Retired	View	Total	Faulted
default	10	0	68	0	0
dev	0	0	68	0	0
soaFusionOrderDemo	4	0	68	0	0

- To add a partition, click **Create**.

The Create New SOA Partition dialog is displayed.



- In the **Name** field, enter a partition name, and click **Create**.

---

**Note:** The name must conform to the following conventions:

- ASCII letters and numbers are permitted.
- Underscores (\_) are permitted.
- Hyphens (-) are permitted (except as the first character).
- Non-ASCII letters are permitted.
- Spaces are *not* permitted.

Examples of valid names are mypartition, partition2, dept-a, customer\_services, and 22. Examples of invalid names are -part2, /partition, and null or empty names.

---

You cannot rename an existing partition or later transfer the composite applications you deployed to it to a different partition.

The new partition is displayed in both the navigator under **soa-infra** and the **SOA Partition** column of the Manage Partitions page. You can now deploy composites to this partition by selecting **Deploy to This Partition** from the **Deployment** dropdown list or right-clicking a specific partition in the navigator and clicking **Deploy to This Partition**.

When a composite is deployed to a partition, it is displayed beneath the partition in the navigator. Once deployed, a composite cannot be transferred to a different partition.

The screenshot shows the Oracle Fusion Middleware Administration interface. On the left, the SOA Infrastructure navigator displays a tree structure with nodes like 'base\_domain\_soainfra', 'Application Deployments', 'SOA', and 'soa-infra (AdminServer)'. Under 'soa-infra (AdminServer)', there are partitions: 'default' (containing composites like 'BpelRecoveryE2ETest [1.0]', 'BPELSyncWaitAssertActivity [1.0]', etc.) and 'dev' (containing 'soaFusionOrderDemo' which includes 'B2BX12OrderGateway [1.0]', 'OrderBookingComposite [1.0]', etc.). Other collapsed nodes include 'WebLogic Domain', 'Metadata Repositories', and 'User Messaging Service'. On the right, a 'Manage Partitions' table lists the available partitions:

SOA Partition	Active
default	10
dev	0
soaFusionOrderDemo	4

3. To delete a partition, select a specific partition and click **Delete**. You can also right-click a specific partition in the navigator and click **Delete This Partition**.

The Delete SOA Partition dialog is displayed. Note the following:

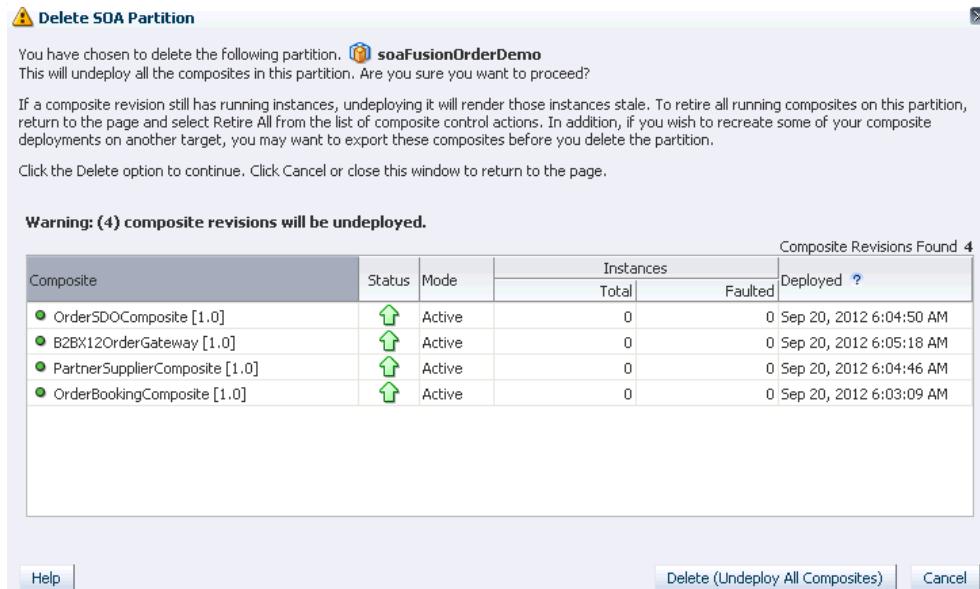
- If you want to re-create some of your composite deployments in another partition, you can export those composites to a JAR file *before* you delete this partition.

- Before deleting the selected partition, all SOA composite application revisions in the partition are undeployed. The states of all undeployed instances of these revisions become stale.

---

**Note:** You must have at least one partition. If you delete all partitions, you cannot deploy a SOA composite application.

---



**a. Click Delete (Undeploy All Composites).**

All composites that were deployed in the partition are undeployed and no longer appear in the navigator. The partition is then deleted from both the navigator under **soa-infra** and the **SOA Partition** column of the Manage Partitions page.

For information about performing bulk lifecycle management tasks from the **Composites Control** and **Deployment** lists, see [Section 7.9.2, "Performing Bulk Lifecycle Management Tasks on Composites in Partitions."](#)

You can also create partitions with the Oracle WebLogic Scripting Tool (WLST) and ant commands. For information, see *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference* and *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## 7.9.2 Performing Bulk Lifecycle Management Tasks on Composites in Partitions

You can perform bulk lifecycle management tasks on all SOA composite applications in a specific partition on the Manage Partitions page, on the home page of a specific partition, and from the menu that is displayed when you right-click a partition in the navigator.

Bulk lifecycle management tasks impact not one, but many, composites at once. If a composite has running instances and a lifecycle changing operation is performed on the composite, the instances may not complete. For information about how different lifecycle operations impact the composite instances, see Step 3 of [Section 7.5.1, "Managing the State of All Applications at the SOA Infrastructure Level."](#)

To perform bulk lifecycle management tasks on all SOA composite applications in a specific partition:

- Access either page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Manage Partitions</b> .	1. Under <b>soa-infra</b> , select a specific partition.

**Note:** As a shortcut, you can also right-click a specific partition in the navigator to display a menu for selecting the bulk lifecycle management actions described in this section. For more information about this menu, see Step 3 of [Section 2.2.3, "Navigating Through the Partition Home Page and Menu."](#)

Two dropdown lists that are displayed on either page enable you to perform bulk lifecycle management actions:

- Composites Control** list
- Deployment** list

On the home page of a specific partition, these lists are displayed at the top of the page.

Recent Instances and Faults for the last 24 hours					
Partitions are logical groupings of composites to help you manage large deployments. The following SOA composite revisions are deployed in this partition.					
SingleTokenWSDL [1.0]	Active	Total	Faulted	Deployed	
CompositeTest [1.0]	Active	100	0	Sep 17, 2012 11:00:57 PM	
fa [1.0]	Active	0	0	Aug 16, 2012 4:25:13 AM	
service [4.0]	Active	0	0	Sep 12, 2012 11:28:51 PM	
FODOrderProcessingComposite [20.0]	Active	0	0	Sep 9, 2012 9:43:18 PM	
FODOrderProcessingComposite [11.0]	Active	0	0	Sep 9, 2012 10:02:27 PM	
SimpleApproval [1.0]	Active	0	0	Aug 16, 2012 3:29:27 AM	
BpelRecoveryE2ETest [1.0]	Active	0	0	Aug 28, 2012 6:28:05 AM	
BPELSyncWaitAssertActivity [1.0]	Active	0	0	Sep 17, 2012 11:01:29 PM	
pmd_bis [4.0]	Active	0	0	Sep 9, 2012 9:52:04 PM	

Composite Revisions Found 10					
Composite	Status	Mode	Instances	Deployed	
			Total	Faulted	?
SingleTokenWSDL [1.0]	Active		0	0	Sep 13, 2012 1:18:57 AM
CompositeTest [1.0]	Active		100	0	Sep 17, 2012 11:00:57 PM
fa [1.0]	Active		0	0	Aug 16, 2012 4:25:13 AM
service [4.0]	Active		0	0	Sep 12, 2012 11:28:51 PM
FODOrderProcessingComposite [20.0]	Active		0	0	Sep 9, 2012 9:43:18 PM
FODOrderProcessingComposite [11.0]	Active		0	0	Sep 9, 2012 10:02:27 PM
SimpleApproval [1.0]	Active		0	0	Aug 16, 2012 3:29:27 AM
BpelRecoveryE2ETest [1.0]	Active		0	0	Aug 28, 2012 6:28:05 AM
BPELSyncWaitAssertActivity [1.0]	Active		0	0	Sep 17, 2012 11:01:29 PM
pmd_bis [4.0]	Active		0	0	Sep 9, 2012 9:52:04 PM

On the Manage Partitions page, these lists are displayed above the **SOA Partition** table:

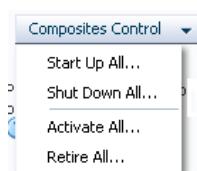
SOA Partition	Composites			Instances	
	Active	Retired	View	Total	Faulted
default	10	0	66	0	0
dev	0	0	66	0	0
soaFusionOrderDemo	4	0	66	0	0

---

**Note:** You can also select to deploy composites to a partition and perform bulk lifecycle management tasks by selecting the **SOA Partition** menu at the top of the partition home page.

---

2. To perform one of the following bulk lifecycle management tasks for all SOA composite applications contained in the selected partition, select the **Composites Control** list:
  - Start all composites.
  - Shut down all composites.
  - Activate all composites.
  - Retire all composites.



- a. Select an operation to perform.

A dialog is displayed that prompts you to confirm your selection. When the operation completes, a confirmation message is displayed at the top of the page.

---

**Note:** Be aware that when you select **Retire All** from the **Composite Control** list, all composites in that partition are retired with no warning message to indicate that the default, last active composite is being retired.

This is the expected behavior when performing a bulk retirement of all composites in a partition.

---

3. To perform one of the following management tasks, select the **Deployment** list:
  - Specify a composite to deploy to this partition. This selection invokes the Deploy SOA Composite wizard where you specify a composite revision to deploy.
  - Undeploy all composites in this partition.

A dialog is displayed that prompts you to confirm your selection. When the operation completes, a confirmation message is displayed at the top of the page.



## 7.10 Disabling and Enabling BPEL and BPMN Business Monitors

The term business monitoring consists of different types of sensors that can be defined for some types of SOA components, such as the following:

- BPEL sensors: Enable you to create sensors in BPEL faults, activities, and variables.
- BPEL monitors: Enable you to capture BPEL process metrics that are sent to Oracle BAM Server, and then used for analysis and graphic display.
- BPMN measurements: Enable you to measure a business indicator at a certain point in the process or in a section of the process.

At the SOA composite application level, you set the same status for all sensors defined for all types of service components comprising the selected composite. You cannot selectively enable or disable sensors defined for a specific type of service component for just one composite. However, you can globally disable service component-type specific sensors for all composites in the respective BPEL Service Engine Properties page or BPMN Service Engine Properties page.

By default, BPEL and BPMN sensors defined in SOA composite applications are enabled. Disabling sensors means that sensor values are not captured during runtime. For example, this results in the values not being displayed in the **Sensor Values** section of the BPEL audit trail.

To disable sensors at the service engine level:

1. Access the BPEL Service Engine Properties page by following the steps in [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)
2. Select the **Disable BPEL Monitors and Sensors** checkbox.
3. Click **Apply**.
4. Access the BPMN Service Engine Properties page by following the steps in [Section 39.1, "Configuring BPMN Process Service Engine Properties."](#)

---

**Note:** The BPMN Service Engine Properties page is only displayed if Oracle BPM Suite is installed.

---

5. Select the **Disable BPMN Measurements** checkbox.

6. Click **Apply**.

To disable or enable sensors at the SOA composite application level:

1. Go to the home page of the SOA composite application in which you want to disable or enable sensors.
2. From the **Settings** menu, select **Enable/Disable BPEL Business Monitoring**. This selection is only displayed for composites that have at least one BPEL or BPMN service component, regardless of whether those components include sensors.



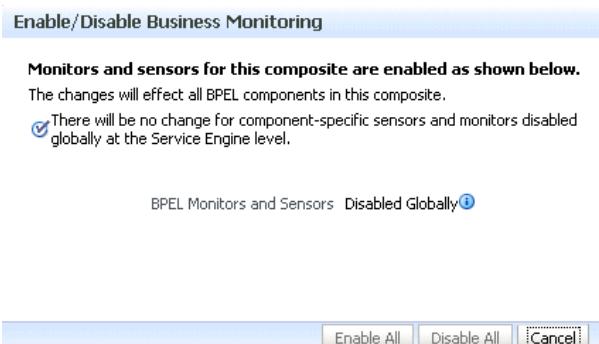
A dialog is invoked that displays the current status of sensors and enables you to change that status. The dialog only displays the options applicable to the component types present in the selected composite. For example, if the composite contains only BPEL components and not BPMN components, you see only the option to set the status of BPEL sensors.

The following steps describe the types of dialogs that can be displayed and the available actions.

- a. If sensors are disabled at both service engine levels, the message **Disabled Globally** is displayed for each. You cannot select **Enable All** or **Disable All** in this dialog. Both buttons are disabled.

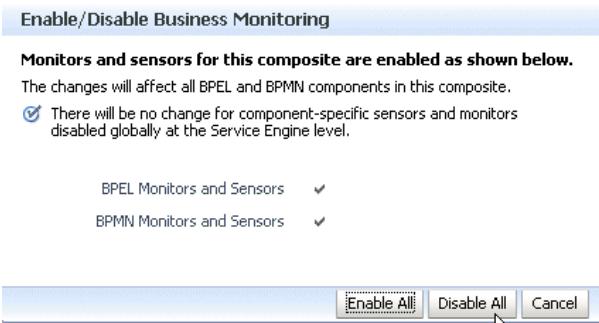


In addition, if sensors are disabled at the BPEL service engine level and the BPMN service engine does not appear because Oracle BPM Suite is not installed, you cannot select **Enable All** or **Disable All** in this dialog. Both buttons are disabled.



- b. If sensors are not disabled at the composite level, checkmarks are displayed. If sensors are also not disabled at both the BPEL and BPMN service engine levels, the message **Disabled Globally** does *not* display.

Click **Disable All** to disable all types of sensors defined for service components that comprise the selected composite. (If sensors are disabled at the service engine level, they remain disabled.)



- c. If sensors are disabled at a specific service engine level, the sensor status you set for those types of sensors at the composite application level only takes

effect when the corresponding **Disable BPEL Monitors and Sensors** or **Disable BPMN Measurements** checkbox in the service engine Properties page is deselected.

For example, if sensors are disabled at the BPMN service engine level (as shown below), and you select **Enable All** for all sensors at the selected composite level, that status is only applied to other types of sensors, such as BPEL. BPMN sensors and monitors remain disabled. However, if you later change the BPMN service engine setting, BPMN sensors are automatically enabled in this composite.



- d. If sensors are disabled at the composite level, no checkmark is displayed. Click **Enable All** to enable all types of sensors defined for service components that comprise the selected composite. (Sensors disabled at the service engine level remain disabled until you change the service engine level setting.) Because the composite does not include BPMN service components, BPMN is not displayed.



After you select an action, an inline message is displayed in the page confirming that sensors were enabled or disabled.

For more information about BPEL sensors and monitors, see Section "Using Oracle BPEL Process Manager Sensors" and Section "Using Oracle BAM Monitor Express With BPEL Processes" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

For more information about BPMN measurements, see *Oracle Fusion Middleware Modeling and Implementation Guide for Oracle Business Process Management*.

---

# Managing SOA Composite Application Instances

This chapter describes how to manage SOA composite application instances, including initiating a test instance of an application, monitoring and deleting instances, recovering from faults, deleting rejected messages, and migrating instances between different SOA composite application revisions.

This chapter includes the following sections:

- [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#)
- [Section 8.2, "Monitoring and Deleting SOA Composite Application Instances from the Application Home Page"](#)
- [Section 8.3, "Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level"](#)
- [Section 8.4, "Recovering from SOA Composite Application Faults at the SOA Infrastructure Level"](#)
- [Section 8.5, "Recovering from SOA Composite Application Faults in the Application Home Page"](#)
- [Section 8.6, "Deleting Rejected Messages at the SOA Infrastructure Level"](#)
- [Section 8.7, "Deleting Rejected Messages from the Application Home Page"](#)
- [Section 8.8, "Migrating Instances Between Different SOA Composite Application Revisions"](#)

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**Note:** The procedures in this guide describe how to access Oracle Enterprise Manager Fusion Middleware Control pages from the **SOA Infrastructure** menu, **soa-infra** icon in the navigator, **SOA Composite** menu, and **SOA Partition** menu. You can also access many pages from the Farm home page. For more information, see [Section 2.2.6, "Navigating to the SOA Infrastructure or SOA Composite Application Home Page from the Farm Home Page."](#)

---

## 8.1 Initiating a SOA Composite Application Test Instance

This section describes how to initiate a test instance of a deployed SOA composite application.

To initiate a SOA composite application test instance:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the Composite Menu...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> <li>4. At the top of the page, click <b>Test</b>.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, expand the partition.</li> <li>2. Select a specific SOA composite application.</li> <li>3. At the top of the page, click <b>Test</b>.</li> </ol>	<ol style="list-style-type: none"> <li>1. Select <b>Test Service &gt; client</b>.</li> </ol>

**Note:** The **Test** button is disabled in the following situations:

- The SOA composite application revision is stopped or retired.
- There are no web services available for the application. Only composites having services with web service bindings can be tested from this page.

2. If the composite includes multiple services, the **Test** button has a drop-down list to select the service to test.

The Test Web Service page for initiating an instance appears.

This page provides many options for initiating an instance. At a minimum, you must specify the XML payload data to use in the **Input Arguments** section.

The WSDL file and endpoint URL are populated automatically based on the service you selected to test. The endpoint URL is derived from the WSDL and can be overridden to invoke that service at a different location. If the service selected has multiple ports, a drop-down list is displayed. Otherwise, the port of the current service is displayed.

CompositeTest [1.0] ①

Logged in as **weblogic** ②

Page Refreshed Oct 9, 2012 6:51:34 PM PDT ⌚

**Test Web Service** ③

Use this page to test any WSDL, including WSDLs that are not in the farm. To test a Web service, enter the WSDL and click Parse WSDL. When the page refreshes with the WSDL details, first select the Service, then select the Port, and then select the Operation that you want to test. Specify any input parameters, and click Test Web Service.

WSDL:  🔍

**Parse WSDL**

HTTP Basic Auth Option for WSDL Access

Service	LoanBroker
Port	LoanBrokerPort
Operation	initiate <span>④</span>

Endpoint URL:  Edit Endpoint URL □

3. Accept the default values for these fields or provide values appropriate to your test environment.
4. If you change the WSDL file, click **Parse WSDL** to reload the WSDL file.

If the WSDL URL does not contain the revision number, it is processed by the default composite application. For example, if there are two revisions of a composite application named `HelloWorld`, then the following endpoints are exposed by them:

- `http://host:port/soa-infra/services/default/HelloWorld!1.0/client`
- `http://host:port/soa-infra/services/default/HelloWorld!2.0/client`

However, if the WSDL specified for web service invocation does not contain the revision details (for example,

`http://host:port/soa-infra/services/default/HelloWorld/client`), it is processed by the composite revision that is set as default.

5. Select the operation that you want to test from the **Operation** menu. The available operations are determined from the WSDL.

To test a RESTful web service, select the **GET** or **POST** service port operation.

6. If you want to edit the endpoint URL, click **Edit Endpoint URL** and make appropriate changes.

The lower part of the Test Web Service page consists of the **Request** tab. This tab enables you to specify security, quality of service, HTTP transport, stress testing options, and XML input arguments:

The **Security** section includes the following fields for passing security properties with messages:

Field	Description
<b>OWSM Security Policies</b>	Inserts a WS-Security SOAP header. The <b>Username</b> field is required, and the <b>Password</b> field is optional.

Field	Description
<b>HTTP Basic Auth</b>	Inserts the username and password credentials in the HTTP transport header. Both the <b>Username</b> and <b>Password</b> fields are required.
<b>Advanced</b>	Uses a custom policy to authenticate the user (specifies the URI for the custom policy). The <b>Username</b> and <b>Password</b> fields are optional.
<b>None</b>	Select to not specify security credentials. This is the default selection.

When testing RESTful Web services, because the SOAP protocol is not used, the only security options are **HTTP Basic Auth** or **None**.

- Accept the default values for these fields or provide values appropriate to your test environment.

The **Quality of Service** section includes the following fields. Oracle Fusion Middleware uses a policy-based model to manage web services. A policy applies behavior requirements to the delivery of messages. This section is not available when testing RESTful web services. For additional details about using the Test Web Service page, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

Field	Description
<b>WS-RM</b>	Select one of the following options for testing WS-Reliable Messaging (RM) protocol policies. Reliable messaging policies support this protocol, which guarantees the end-to-end delivery of messages. <ul style="list-style-type: none"> <li>■ <b>WSDL Default:</b> Executes the default behavior of the WSDL. For example, if the WSDL contains a reference to a WS-RM policy, then the policy is enforced. If the WSDL does not contain a reference to a WS-RM policy, then reliable messaging is not tested.</li> <li>■ <b>None:</b> No policy for WS-RM is tested even if the WSDL contains a reference to a policy.</li> <li>■ <b>Custom:</b> Enforces a custom policy. Specify the URI of the custom policy in the <b>Policy URI</b> field. If a WS-RM policy is referenced in the WSDL, it is ignored, and the policy specified in the <b>Policy URI</b> field is used instead.</li> </ul>
<b>MTOM</b>	Select one of the following options for testing Message Transmission Optimization Mechanism (MTOM) policies. MTOM policies ensure that attachments are in MTOM format, a format for efficiently sending binary data to and from web services. <ul style="list-style-type: none"> <li>■ <b>WSDL Default:</b> Executes the default behavior of the WSDL. For example, if the WSDL contains a reference to an MTOM policy, then the policy is enforced. If the WSDL does not contain a reference to an MTOM policy, then MTOM is not tested.</li> <li>■ <b>None:</b> No policy for MTOM is tested, even if the WSDL contains a reference to a policy.</li> <li>■ <b>Custom:</b> Enforces a custom policy. Specify the URI of the custom policy in the <b>Policy URI</b> field. If an MTOM policy is referenced in the WSDL, it is ignored, and the policy specified in the <b>Policy URI</b> field is used instead.</li> </ul>

Field	Description
<b>WS-Addressing</b>	Select one of the following options for testing WS-Addressing policies. WS-Addressing policies verify that SOAP messages include WS-Addressing headers in conformance with the WS-Addressing specification. <ul style="list-style-type: none"> <li>▪ <b>WSDL Default:</b> Executes the default behavior of the WSDL. For example, if the WSDL contains a reference to a WS-Addressing policy, then the policy is enforced. If the WSDL does not contain a reference to a WS-Addressing policy, then WS-Addressing is not tested.</li> <li>▪ <b>None:</b> No policy for WS-Addressing is tested even if the WSDL contains a reference to a policy.</li> <li>▪ <b>Custom:</b> Enforces a custom policy. Specify the URI of the custom policy in the <b>Policy URI</b> field. If a WS-Addressing policy is referenced in the WSDL, it is ignored, and the policy specified in the <b>Policy URI</b> field is used instead.</li> </ul>

8. Accept the default values for these fields or provide values appropriate to your test environment.

The **HTTP Transport Options** section includes the following fields:

Field	Description
<b>Enable SOAP Action</b>	Specifies whether the WSDL soap:operation has a soapAction attribute. This flag is enabled if a soapAction attribute exists. If you do not want to send a request with the SOAP action HTTP header, then clear the checkbox.
<b>SOAP Action</b>	Displays the soapAction attribute of the WSDL soap:operation, if one exists. You may specify a different SOAP action in this text box.

This section is not available when testing RESTful web services.

9. Accept the default values for these fields or provide values appropriate to your test environment.

The **Additional Test Options** section includes the following fields. This section provides a simple stress test that simultaneously invokes multiple instances.

---

**Note:** This is *not* a real stress test tool. Therefore, do not enter huge values for both concurrent threads and the number of times to invoke the operation. Doing so can result in errors.

---

Field	Description
<b>Enable Stress Test</b>	Click <b>Enable</b> to create a simple stress test. With this enabled, no conversation ID is displayed.
<b>Concurrent Threads</b>	Enter the number of concurrent threads on which to send the invocations. The default is 5 threads.
<b>Loops per Thread</b>	Enter the number of times to invoke the operation. The default is 10 times.
<b>Delay in Milliseconds</b>	Specify the delay of milliseconds to wait between operation invocations. The default is 1000 milliseconds (1 second).

10. Accept the default values for these fields or provide values appropriate to your test environment.

The **Input Arguments** section includes the following fields for entering XML payload data.

Field	Description
<b>Tree View</b>	Displays a graphical interface of text fields in which to enter information. This field automatically generates the required headers and XML structure.
<b>XML View</b>	Displays the XML file format for inserting values. You can paste the raw XML payload of your message into this field.

---

**Note:** If you are using Oracle Enterprise Manager Grid Control, you can save the payload you enter. This feature is not available with Oracle Enterprise Manager Fusion Middleware Control.

---

11. Click **Test Web Service**.

The test results appear in the **Response** tab upon completion.

Name	Type	Value
payload	payload	
result	string	Hello Joe

---

**Note:** The **Response** tab does not display payload data if you are performing a stress test or are testing an asynchronous service.

---

12. Click **Launch Message Flow Trace** to access the flow trace of the instance.
13. To return to the composite home page, click the name of the composite that appears at the top of the page or select **Home** from the composite target menu.
14. Return to the Dashboard page of the SOA composite application.

The **Recent Instances** table lists recent SOA composite application instances. Each created instance has its own unique ID.

For more information, see the following sections:

- [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#) for conceptual details about instances
- [Section 1.4.3.2, "Introduction to Policies"](#) for an overview of policies
- [Oracle Fusion Middleware Security and Administrator's Guide for Web Services](#) for specific details about policies and testing web services from the Test Web Service page

### 8.1.1 Specifying RPC/Literal-Style WSDL Files on the Test Web Service Page

If you are specifying an RPC/literal-style WSDL file with a message defined by "element=" in the Test Web Service page in Oracle Enterprise Manager Fusion Middleware Control, use the **XML View** option of the **Input Arguments** section to modify the SOAP message. The SOAP body should look as shown in [Example 8-1](#).

**Example 8-1 SOAP Body**

```
<soap:Body>
 <ns:initiate>
 <payload>
 <value xmlns="...">3</value>
 </payload>
 </ns:initiate>
</soap:Body>
```

where `initiate` is the operation name, `payload` is the part name, and `value` is the element defined in the WSDL message/part.

## 8.2 Monitoring and Deleting SOA Composite Application Instances from the Application Home Page

[Section 7.5, "Managing the State of Deployed SOA Composite Applications"](#) describes how to manage the lifecycle state of SOA composite applications. You can also monitor and delete specific SOA composite application instances from the Instances page of the application home page.

To monitor and delete SOA composite application instances from the application home page:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. Select a specific SOA composite application.	

2. Click the **Instances** tab.

The Instances page displays the following details:

- A utility for searching for a specific instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- SOA composite application instance ID, name, conversation ID, most recent known state of each instance since the last data refresh of the page (for example, completed successfully, running, unknown, and so on), instance start time, and a log file describing any faults. A unique instance ID is created whenever a new instance of a SOA composite application is initiated either automatically by an external consumer of the application, or manually by an administrator from the Test Web Service page.

If a ? icon is displayed, the **Capture Composite Instance State** checkbox was not enabled on the SOA Infrastructure Common Properties dialog. Therefore, the instance state was not evaluated. Determining the composite instance state

requires evaluating the states of the underlying component. Therefore, this option can be disabled to improve performance.

Instance ID	Name	Conversation ID	Instance State	Start Time	Logs
40020			?	Oct 9, 2012 12:10:58 PM	<a href="#">View</a>
40019			?	Oct 9, 2012 12:10:58 PM	<a href="#">View</a>
40018			?	Oct 9, 2012 12:10:57 PM	<a href="#">View</a>
40017			?	Oct 9, 2012 12:10:57 PM	<a href="#">View</a>

**Note:** It is possible to generate orphaned service component instances. These instances are generated without any associated composite application instances. The orphaned component instances are generated under the following circumstances:

- The SOA Infrastructure audit level is set to **Off** or the composite audit level is set to **Off**. Even in such cases, the BPEL process service engine can generate instance data for the service components that are included in the SOA composite application.
- The SOA Infrastructure audit level is set to **Off**. However, the BPEL process or Oracle Mediator service engine audit level is set to a value other than **Off**.
- All the audit levels are set to **Off**, but some faults are generated in one of the service engines. In these cases, the component instance is generated.

To delete orphaned instances or large numbers of instances, use the purge script described in [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."](#) Selecting the **Delete All Instance** options in the **Delete with Options** dialog does *not* delete orphaned component instances.

If composite sensors are included in your SOA composite application, the **Instances** tab has the following differences:

- The **Add Fields** button appears next to **Search** and **Reset** in the search utility. This button enables you to add sensor values to your search criteria.

- A **Composite Sensors** column appears in the **Instances** table. Click the sensor icon in that column to display the details about sensor values available in a given instance of the composite.
3. From the **Add Fields** list, select composite sensors to add to the search criteria. In this example, three have been selected (**CustomerForOrder**, **OrderProcessingStart**, and **CreditCardAuthResultSensor**).
  4. Input specific values by which each sensor searches. Only the composite instances in which the sensor values match your specified criteria are returned.

The screenshot shows the Oracle SOA Composite Application Home Page. At the top, it displays "OrderBookingComposite [1.0]" and "Logged in as weblogic". Below the header, there's a toolbar with buttons for "Running Instances" (1), "Total 2", "Active", "Retire...", "Shut Down...", "Test", "Settings...", "Related Links", and "Dashboard" (selected). The main area is titled "Instances" and contains a search form. The search form includes fields for "Instance ID", "Name", "ECID", "Conversation ID", "Start Time To", and "CustomerForOrder", "OrderProcessingStart", "CreditCardAuthResultSensor" dropdowns with "Equals" selected. It also has a "Start Time From" date picker set to "2012-10-20 02:30:09 PM". Below the search form, a message says "This page lets you search for instances of this SOA composite. [More Info ...]". A note below states "All instances of this SOA composite are listed below. To include composite sensor values in your search for composite instances, click Add Fields." A "Search" button is visible.

The **Composite Sensors** column indicates that this SOA composite application includes composite sensors.

Instance ID	Name	Conversation ID	Instance State	Composite Sensors	Start Time	Logs
50037		urn:BE476D101B2811	✓ Completed	(	Oct 20, 2012 7:41:07 PM	

Columns Hidden 2

5. Click **Reset** to remove all composite sensor fields from the search criteria or click the **Remove** icon to the right of the field to remove an individual sensor.

You can also search for composite sensors in the instances of SOA composite applications in the SOA Infrastructure. You specify the sensor name and value for which to search using a `[sensor name]=[sensor value]` format. For information, see [Section 8.3, "Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level."](#)

6. Select a specific instance to delete by clicking a row in the **Instances** table. To select multiple instances, press Ctrl-Click or Shift-Click for the rows you want to select.
7. Select a specific action to perform.

Action	Description
<b>Filter By</b>	<p>Specify criteria for displaying composite instance states:</p> <ul style="list-style-type: none"> <li>▪ <b>Execution State</b> Filter the display of instances by execution state (running, completed, terminated, or stale).</li> <li>▪ <b>Fault State</b> Filter the display of instances by fault state (with or without faults). You can further customize the faulted state by selecting to display faults requiring recovery or nonrecoverable faults. If you select <b>Stale</b> from the <b>Execute State</b> list, the <b>Fault State</b> list is disabled.</li> <li>▪ <b>BPEL Recovery</b> Filter the display of instances by whether a recovery action is required. By default, this filter excludes all messages and instances created in the last five minutes, and displays the rest. You can control the number of minutes with the <b>excludeBpelMaxCreationTime</b> key of the <b>AuditConfig</b> property in the System MBean Browser. This property is available in the <b>More SOA Infra Advanced Configuration Properties</b> section of the SOA Infrastructure Common Properties page. For more information, see <a href="#">Section 3.1, "Configuring SOA Infrastructure Properties."</a></li> </ul>
<b>Delete Selected</b>	<p>Deletes the selected instance.</p> <p>After deleting an instance, instance details are no longer available for review.</p>
<b>Delete With Options</b>	<p>Prompts you to first specify criteria for deleting the selected instance directly from the database.</p> <p>Use this option to delete running, rolled back instances. However, this option does not delete the associated invoke messages that are awaiting recovery. As a result, there are orphaned messages pending in BPEL message recovery. To delete these messages, go to the Recovery page of the BPEL process service engine.</p> <ul style="list-style-type: none"> <li>▪ <b>Common Delete Options:</b> Select a preset range of instances to delete from a list (for example, older than 24 hours).</li> <li>▪ <b>Delete All Instances Of This Composite:</b> Select to delete all instances of the composite. This option deletes the rejected messages associated and all component, service, and reference instances associated with the composite, including those not associated with any composite instance ID.</li> </ul> <p><b>Note:</b> If this composite has thousands of instances to delete, do not use this option. Instead, use the purge script described in <a href="#">Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."</a></p> <ul style="list-style-type: none"> <li>▪ <b>Delete All Instances That Match These Criteria:</b> Specify criteria for deleting instances, including the start and stop times, and instance state.</li> </ul> <p>Any selections you may have made in the Instances page (such as specifying and executing a search criteria) are ignored for this operation.</p> <p>To monitor the progress of instance deletion, you must check the log files. For information about log files, see <a href="#">Section 3.4, "Configuring Log Files."</a></p>
<b>Abort</b>	Terminates the selected instance. However, instance details are still available for review.

8. From the **View** list, select **Columns > Partition** to display the partition in which the instance of the SOA composite application revision is contained.
9. From the **View** list, select **Columns > ECID** to display execution context IDs (ECIDs). The ECID enables you to track a message flow that crosses instances of different composites.
10. In the **Instances** table, perform the following additional tasks:
  - a. In the **Instance ID** column, click a specific instance ID to show the message flow through the various service components and binding components. If an instance ID is listed as unavailable, you can click the **Unavailable** link for details.
  - b. In the **State** column, if an instance state is marked as **Unknown**, click it to display more details.
  - c. If the **Composite Sensors** column is available, click a sensor icon to display details about composite sensors included in the instance, such as name, location, and value.
  - d. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

---

**Note:** Multiple revisions of a SOA composite application that includes inbound JCA adapters are displayed as running. However, only the most recent revision (the default version) is considered active. All previous revisions are not considered active. This is because for inbound JCA adapters, there can only be one active revision of a SOA composite application at any time. The JCA adapter endpoints in all previous revisions are de-activated.

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For more information, see the following sections:

- [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#)
- [Section 1.4.3.3, "Introduction to the Lifecycle State of SOA Composite Applications"](#)
- [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#)
- [\*Oracle Fusion Middleware Administrator's Guide\*](#) for details about viewing and searching log files

### 8.2.1 Mismatch Between the Number of SOA Composite Application Instances and Service Component Instances

The number of SOA composite application instances may not always match the number of service component instances displayed in Oracle Enterprise Manager Fusion Middleware Control.

A SOA composite application instance is first created when the composite is invoked. When the service components within the composite receive a subsequent invocation, a corresponding service component instance is created that refers to the composite instance ID previously created.

There can be scenarios under which the composite instance is created, but the underlying service component instance is not created. For example:

- The composite instance is created, but the invocation has not yet reached the service component due to a system failure.
- The composite instance is created, but the invocation fails payload validation and is rejected. In this case, invocation does not reach the underlining service components.

You can also have orphaned service component instances for which no SOA composite application instance has been created.

### 8.2.2 Instance States of Service Components and SOA Composite Applications

Assume you have a SOA composite application with multiple service components (for example, two BPEL process service components). If these service components are marked with the following instance states:

- Instance state of one BPEL process is marked as completed.
- Instance state of the other BPEL process is marked as faulted.

This results in the overall composite instance state being marked as faulted. This behavior differs from 11g Release 1 (11.1.1.2), in which the same scenario resulted in the overall composite instance state being marked as completed.

Assume you have a parent SOA composite application that calls a child SOA composite application, and a fault occurs in the child composite (and is handled by the parent composite). This results in the following instance states:

- The instance state of the child composite is marked as faulted.
- The instance state of the parent composite is marked as completed.

## 8.3 Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level

[Section 7.5, "Managing the State of Deployed SOA Composite Applications"](#) described how to manage the lifecycle state of all instances of a specific SOA composite application. You can also monitor and delete any number of instances *across* all deployed SOA composite applications by using the Instances page of the SOA Infrastructure home page. You can also search for composite sensors in the instances of all SOA composite applications. This page lists all SOA composite application instances deployed to the SOA Infrastructure.

To monitor and delete SOA composite application instances at the SOA infrastructure level:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select <b>Home</b> .	1. Click <b>soa-infra</b> .	1. Select <b>SOA infrastructure</b> .

2. Click the **Instances** tab.

The Instances page displays the following details:

- A utility for searching for a specific instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.

- All SOA composite application instances in the SOA Infrastructure, including instance and conversation IDs, composite name and revision, SOA composite application instance state, and instance start time.

The screenshot shows the 'BPEL Message Recovery Required' page in the SOA Infrastructure. The top navigation bar includes 'soa-infra' and 'SOA Infrastructure'. The header displays 'Logged in as weblogic' and the date 'Page Refreshed Oct 9, 2012 9:42:49 AM PDT'. A banner at the top left says 'BPEL Message Recovery Required' with a warning icon. On the right, there are buttons for 'Show Details...', 'Go to BPEL Recovery Console', 'Set Time Threshold...', 'Disable Alert...', 'Dashboard', 'Deployed Composites', 'Instances' (which is selected), and 'Faults and Rejected Messages'. Below the tabs, a message says 'This page lets you search for instances of all SOA composites.' with a link '[More Info ...]'. A search section follows, with fields for 'Instance ID', 'Name', 'ECID', 'Conversation ID', 'Start Time From' (set to 2012-10-08 09:42:49 AM), 'Start Time To' (set to (UTC-08:00) PST8PDT), 'Sensor', and 'Execution State' (set to All). There are also 'Fault State' and 'BPEL Recovery' filters. Buttons for 'Search' and 'Reset' are present. At the bottom, there are links for 'View', 'Delete Selected ...', 'Delete With Options ...', and 'Abort...'. A table below lists composite instances:

Instance ID	Composite	Name	Conversation ID	Instance State	
40010	CompositeTest [1.0]			?	Oct 9, 2012
40009	CompositeTest [1.0]			?	Oct 9, 2012
40008	CompositeTest [1.0]			?	Oct 9, 2012
40007	CompositeTest [1.0]			?	Oct 9, 2012
40006	CompositeTest [1.0]			?	Oct 9, 2012
40005	CompositeTest [1.0]			?	Oct 9, 2012

You can also terminate and delete instances from this page.

- Select a specific instance by clicking a row in the **Instances** table. To select multiple instances, press Ctrl-Click or Shift-Click for the rows you want to select.
- Select a specific action to perform.

Action	Description
Composite sensor search in <b>Search</b> utility	<p>You can search for composite sensors in the instances of SOA composite applications in the SOA Infrastructure. Specify the sensor name and value for which to search using a [sensor name]=[sensor value] format (the brackets are required). The format to specify is also displayed when you click the <b>Sensor</b> field. The search results display instances that include the specified sensor name and value.</p> <p>If the sensor pattern specified does not match any composite sensors in the SOA composite applications, no instances are displayed. If matches are found, instances of the composites are displayed.</p> <p>Note the following composite sensor search conventions:</p> <ul style="list-style-type: none"> <li>■ An equal sign (=) is the only supported operator.</li> <li>■ Sensor names and string values are case sensitive and must be entered exactly as they appear in the <b>Composite Sensors</b> column of the Instances page for a SOA composite application or the <b>Sensors</b> table of the Flow Trace page for an instance.</li> <li>■ Filtering based on the date type of sensors is not supported.</li> <li>■ To specify a numeric sensor value, you must input the exact value without any trailing zeros. For example, if the value of a numeric sensor is displayed as 3.230 in the Instances page of the SOA composite application, input the sensor string without the 0: [numeric_sensor]=[3.23]</li> <li>■ Do not enter the commas of composite sensor values that are displayed with commas in the Instances page or Flow Trace page (for example, enter 2011 instead of 2,011).</li> </ul> <p>For information about obtaining sensor names and values at the SOA composite application level, see <a href="#">Section 8.2, "Monitoring and Deleting SOA Composite Application Instances from the Application Home Page"</a> and <a href="#">Section 14.1, "Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component."</a></p>
<b>Filter By</b>	Specify criteria for displaying composite instance states: <ul style="list-style-type: none"> <li>■ <b>Execution State</b> Filter the display of instances by execution state (running, completed, terminated, or stale).</li> <li>■ <b>Fault State</b> Filter the display of instances by fault state (with or without faults). You can further customize the faulted states by selecting to display faults requiring recovery or nonrecoverable faults. If you select <b>Stale</b> from the <b>Execute State</b> list, the <b>Fault State</b> list is disabled.</li> <li>■ <b>BPEL Recovery</b> Filter the display of instances by whether a recovery action is required. By default, this filter excludes all messages and instances created in the last five minutes, and displays the rest. You can control the number of minutes with the <b>excludeBpelMaxCreationTime</b> key of the <b>AuditConfig</b> property in the System MBean Browser. This property is available in the <b>More SOA Infra Advanced Configuration Properties</b> section of the SOA Infrastructure Common Properties page. For more information, see <a href="#">Section 3.1, "Configuring SOA Infrastructure Properties."</a></li> </ul>
<b>Delete Selected</b>	Deletes the selected instance.

Action	Description
<b>Delete With Options</b>	<p>Prompts you to first specify criteria for deleting the selected instance directly from the database.</p> <p>Use this option to delete running, rolled back instances. However, this option does not delete the associated invoke messages that are awaiting recovery. As a result, there are orphaned messages pending in BPEL message recovery. To delete these messages, go to the Recovery page of the BPEL process service engine.</p> <ul style="list-style-type: none"> <li>▪ <b>Common Delete Options:</b> Select a preset range of instances to delete from a list (for example, older than 24 hours).</li> <li>▪ <b>Delete All Instances That Match These Criteria:</b> Specify criteria for deleting instances, including the start and stop times, and instance state.</li> </ul> <p>Any instance state selections you made at the top of the Instances page are ignored for this operation.</p> <p>To monitor the progress of instance deletion, you must check the log files. For information about log files, see <a href="#">Section 3.4, "Configuring Log Files."</a></p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>▪ If this composite has thousands of instances to delete, do not use this option. Instead, use the purge script described in <a href="#">Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."</a></li> <li>▪ If you delete an instance with faults, those faults are no longer displayed in the Faults and Rejected Messages page.</li> <li>▪ This option does not purge BPEL process service engine recoverable invoke and callback messages. To completely purge those messages, use the purge scripts described in <a href="#">Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."</a></li> </ul>
<b>Abort</b>	<p>Terminates the selected instance. However, instance details are still available for review.</p> <p><b>Note:</b> If you delete an instance with faults, those faults are no longer displayed in the Faults and Rejected Messages page. In addition, if a terminated instance (shown as aborted) had a fault, it is not added to the fault count.</p>

5. In the **Instances** table, perform the following additional tasks:
  - a. From the **View** list, select **Columns > Partition** to display the partition in which the instance of the SOA composite application revision is contained.
  - b. From the **View** list, select **Columns > ECID** to display ECIDs. An ECID enables you to track a message flow that crosses instances of different composites.
  - c. In the **Instance ID** column, click a specific instance ID to show the message flow through the various service components and binding components. If the instance ID is unavailable, the message flow cannot be accessed. However, you can still click the link for details.
  - d. In the **Composite** column, click a specific SOA composite application to access its home page.
  - e. In the **Instance State** column, click the **Recovery** icon to access the Faults and Rejected Messages page with faults filtered based on the composite instance ID. There can be multiple faults for a composite instance ID.

- f. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

## 8.4 Recovering from SOA Composite Application Faults at the SOA Infrastructure Level

You can monitor and perform individual and bulk fault recoveries for BPEL process and Oracle Mediator service components across any number of SOA composite applications. For BPEL process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the `fault-bindings.xml` file) and which triggers the action `ora-human-intervention`. However, without defining any fault policies, the fault takes its standard course as either a recoverable or nonrecoverable fault. Examples of performing both individual and bulk recovery are provided in this section. Human task service component or human workflow service engine faults are recovered from Oracle BPM Worklist.

You can also perform a manual recovery of undelivered BPEL process invoke or callback messages. For more information, see [Section 15.4, "Performing BPEL Process Service Engine Message Recovery."](#)

To recover from SOA composite application faults at the SOA Infrastructure level:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select Home.	1. Click <code>soa-infra</code> .	1. Select SOA Infrastructure.

2. Click the **Faults and Rejected Messages** tab.

The Faults and Rejected Messages page displays the following details for all SOA composite application faults:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Options for selecting instance recovery actions (for example, retry, abort, replay, and others), deleting rejected messages, and performing bulk message recovery.
- Faults and rejected messages, including the error message, whether you can recover from the fault, the time of the fault, if the fault message is classified as a rejected message (if so, a checkmark is displayed), the SOA composite application in which the fault occurred, the fault location, the instance ID, and a link to log files describing the fault.

This screenshot shows the 'Faults and Rejected Messages' page in the SOA Infrastructure interface. The page header indicates the user is logged in as 'weblogic'. The main content area displays a search form with fields for 'Error Message Contains', 'Composite Instance ID', 'Fault ID', 'Composite Name', 'Fault Time From' (set to 2012-10-10 08:27:21 AM), and 'Fault Time To' (set to (UTC-08:00) PST8PDT). Below the search form is a table listing three recoverable faults:

Error Message	Recovery	Fault Time	Rejected Message	Composite	Fault Location
✗ FaultName: {{http://schema...}}		Oct 10, 2012 3:06:09 PM		FaultCodeBPELProces...	client
✗ <bpelFault><FaultType>0</Fa...		Oct 10, 2012 3:06:09 PM		FaultCodeBPELProces...	FaultCodeBP...
✗ Correlation definition not re...		Oct 10, 2012 3:05:26 PM		HelloWorldProj [1.0]	bpelprocess

**Note:** You cannot search for human workflow error messages by entering details in the **Error Message Contains** field because these faults do not persist in the dehydration store.

Faults identified as recoverable can be recovered.

3. Select faults for recovery using one of the following options. Fault recovery selection at the SOA Infrastructure level matches the SOA composite application level and BPEL process and Oracle Mediator service component levels.

For...	Then...
Single fault recovery	<p>There are three options from which to choose for single fault recovery:</p> <ol style="list-style-type: none"> <li>1. Click the row of the fault that has been identified as recoverable. With the row highlighted, select a specific action from the <b>Recovery Action</b> list, as described in Step 4.</li> <li>2. In the <b>Recovery</b> column, click the <b>Recover</b> link to access the Faults page of the instance audit trail to perform fault recovery.</li> <li>3. In the <b>Error Message</b> column, click the message of a fault that has been identified as recoverable. This displays complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. A <b>Recover Now</b> option is displayed for recoverable faults. Click <b>Recover Now</b> to access the Faults page of the instance audit trail to perform fault recovery.</li> </ol>

For...	Then...
Bulk fault recovery	<p>There are two options from which to choose for bulk fault recovery:</p> <ol style="list-style-type: none"> <li>1. Use Shift+Click or Control+Click to select specific faults in the rows.</li> <li>or</li> <li>2. From the <b>Select</b> menu, choose <b>Select All Recoverable</b>. Then use Shift+Click or Control+Click to deselect the faults to <i>not</i> include in the recovery operation.</li> </ol> <p>Then:</p> <ol style="list-style-type: none"> <li>3. Select an action from the <b>Recovery Action</b> list, as described in Step 4.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>
Recovery of all faults	<ol style="list-style-type: none"> <li>1. From the <b>Select</b> menu, choose <b>Select All Recoverable</b>.</li> <li>2. Select an action from the <b>Recovery Action</b> list, as described in Step 4.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>

4. Select an action from the **Recovery Action** list.

Action	Description	Action is Available for...
<b>Retry</b>	Retries the instance directly. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.	BPEL process and Oracle Mediator
<b>Abort</b>	Terminates the entire instance.	BPEL process and Oracle Mediator
<b>Replay</b>	Replays the entire scope again in which the fault occurred.	BPEL process
<b>Rethrow</b>	Rethrows the current fault. BPEL fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.	BPEL process
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).	BPEL process

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**Note:** In most cases, fault policy actions are automatically executed. The only exception is if you defined a fault policy that uses the action `ora-human-intervention`. This action creates a recoverable fault that can be recovered from Oracle Enterprise Manager Fusion Middleware Control.

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5. If you want to delete rejected messages for all composites in the SOA Infrastructure, see [Section 8.6, "Deleting Rejected Messages at the SOA Infrastructure Level."](#)
6. If you want to perform a bulk recovery of messages, click **Recover with Options**.

This displays the Recover with Options dialog for specifying criteria for recovering BPEL and Oracle Mediator messages of all composites directly from the database. Human workflow messages can be recovered manually from Oracle BPM Worklist. Business event and business rule messages cannot be recovered.

Specify the criteria for selecting and recovering faults directly from the database. Any selections you may have made in the Faults and Rejected Messages page will be ignored for this operation. This operation will not recover any Human Workflow faults; you can recover these faults using the Worklist application.

Common Recovery Action

Common Recovery Options

Preset Batches

Recover All  
This will recover all recoverable faults of all the composites using the common recovery action specified above.

Recover All Recoverable Faults that Match These Criteria

Fault Time From

Fault Time To

Error Message Contains

7. Specify criteria. **Retry** and **Abort** are the only recovery actions permitted.

---

**Note:** For bulk fault recovery at the SOA Infrastructure level, a check of the state of composites cannot be performed. If the state of a composite is set to off, a recovery of its faults cannot be performed. However, no error or warning message is displayed. Upon submission of the bulk fault recovery request, the server checks if the originating composite's state is set to off. That fact is then noted in the log, and the fault is skipped.

You are also not notified when a fault has been skipped during recovery for any other reason (for example, an unsupported service engine, an unrecoverable fault, and so on).

---

8. Click **Recover**. Depending upon the number of messages, recovery can take some time.
9. Perform the following additional tasks from within the **Faults** table:
  - a. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - b. In the **Composite** column, click a specific SOA composite application to access its home page.
  - c. In the **Fault Location** column, click a specific location to access the faults page for the location of the fault. The location can be a service, service component, or reference.
  - d. In the **Composite Instance ID** column, click a specific ID to access the flow trace of the instance.

- e. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
10. See the following sections for examples of single and bulk fault recovery with BPEL processes and Oracle Mediator.
- [Section 8.4.1, "Examples of Fault Recovery for BPEL Processes"](#)
  - [Section 8.4.2, "Examples of Fault Recovery for BPMN Processes"](#)
  - [Section 8.4.3, "Examples of Fault Recovery for Oracle Mediator"](#)

For more information about concepts and instructions on designing a fault policy, see the following documentation:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)
- Section "Handling Faults with the Fault Management Framework" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*

## 8.4.1 Examples of Fault Recovery for BPEL Processes

This section provides examples of how to define a fault policy that enables human intervention on a BPEL process fault and perform single and bulk fault recovery on a BPEL process service component.

- [Section 8.4.1.1, "Example: Single Fault Recovery for BPEL Processes"](#)
- [Section 8.4.1.2, "Example: Bulk Fault Recovery for BPEL Processes"](#)

In this example, you define a fault policy by specifying that a fault can be manually recovered through human intervention. If an invalid social security number is submitted from a loan broker BPEL process to a credit rating service, the credit rating service returns a negative credit fault. This human intervention action is defined with the `ora-human-intervention` action in the `fault-policies.xml` file. Without fault policies, BPEL instances do not generate recoverable faults (instead they are nonrecoverable); the `ora-human-intervention` action makes the fault recoverable. [Example 8–2](#) shows the fault policy file.

### **Example 8–2 Fault Policy File**

```
<faultPolicies xmlns="http://schemas.oracle.com/bpel/faultpolicy">
<faultPolicy version="2.0.1"
 id="CRM_ServiceFaults"
 xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xs="http://www.w3.org/2001/XMLSchema"
 xmlns="http://schemas.oracle.com/bpel/faultpolicy"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <Conditions>
 <faultName xmlns:credit="http://services.otn.com"
 name="credit:NegativeCredit">
 <!-- get this fault when SSN starts with 0-->
 <condition>
 <test>$fault.payload="Bankruptcy Report"</test>
 <action ref="ora-human-intervention"/>
 </condition>
 </faultName>
 </Conditions>
</faultPolicy>
</faultPolicies>
```

The fault-bindings.xml file shown in [Example 8–3](#) associates the fault policies defined in the fault-policies.xml file with the CRM\_ServiceFaults composite application.

#### **Example 8–3 Fault Policy Bindings File**

```
<faultPolicyBindings version="2.0.1"
 xmlns="http://schemas.oracle.com/bpel/faultpolicy"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <composite faultPolicy="CRM_ServiceFaults"/>
</faultPolicyBindings>
```

Because human intervention is defined as an action, you perform BPEL process fault recovery in Oracle Enterprise Manager Fusion Middleware Control.

For more information about creating and designing fault-policies.xml and fault-bindings.xml files, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

For information about BPEL process message recovery, see [Section 15.4, "Performing BPEL Process Service Engine Message Recovery."](#)

#### **8.4.1.1 Example: Single Fault Recovery for BPEL Processes**

This example assumes the following:

- An instance was initiated on the Test Web Service page shown in [Section 8.1, "Initiating a SOA Composite Application Test Instance."](#)
- An invalid social security number that begins with 0 was entered.

To perform single fault recovery for BPEL processes:

1. From the **SOA Infrastructure** menu, select **Home**.
2. Click the **Faults and Rejected Messages** tab.
3. In the **Faults** table, locate the fault that has been identified as recoverable. You can use the search utility to locate the specific fault.
4. In the **Recovery** column, click **Recover**. If you first want to see details about the fault, click the error message. Then, click **Recover Now**.

The Faults page for that BPEL process instance is displayed.

5. In the **Recovery** column, click **Recoverable**.

The page refreshes to display the fault recovery section at the bottom of the page.

Choose one of the available recovery options, modify the variable information as appropriate, and click "Recover".

Recovery Action	<input style="width: 100px; height: 25px; border: 1px solid #ccc; border-radius: 5px; padding: 2px 10px; margin-right: 10px;" type="button" value="Retry"/>	<input style="width: 100px; height: 25px; border: 1px solid #ccc; border-radius: 5px; padding: 2px 10px; margin-right: 10px;" type="button" value="After Successful Retry"/>	<input style="width: 100px; height: 25px; border: 1px solid #ccc; border-radius: 5px; padding: 2px 10px;" type="button" value="None"/>
Variable	<input style="width: 25px; height: 25px; border: 1px solid #ccc; border-radius: 5px;" type="button" value="▼"/> <input style="width: 100%; height: 150px; border: 1px solid #ccc; border-radius: 5px; margin-top: 10px;" type="text"/>		
Value			

6. From the **Recovery Action** list, select **Retry**.
7. Select **None** from the **Chain Action Upon Successful Retry** list. This list enables you to select Java callout recovery actions. For more information, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
8. Select a variable from the **Variable** list. The content of this variable is displayed in the **Value** field. For this example, the variable **crInput** is selected. This variable is used in an invoke activity and contains an incorrect social security number value.
9. Enter the correct value in the **Value** field. For this example, the social security number is edited to begin with 1:  

```
<ssn xmlns="http://service.otn.com">123456789</ssn>
```
10. Click **Set Value**, and click **Yes** when prompted to continue.
11. Click **Recover** to recover from the fault, and then click **Yes** when prompted to continue.

The page refreshes to indicate that no faults occurred.

#### 8.4.1.2 Example: Bulk Fault Recovery for BPEL Processes

For the social security number example, selecting **Retry** is not an option for performing a bulk recovery, because the value for the social security number is incorrect and requires correction. An example of performing a bulk recovery with the **Retry** option is if the social security number is correct, but the system providing the credit rating service was temporarily unavailable and caused a composite reference fault. This prevents the messages from being delivered. Once the credit rating service is available again, selecting **Retry** attempts the invocation to the credit rating service through the composite reference again.

To perform bulk fault recovery for BPEL processes:

1. Perform Step 1 and Step 2 of [Section 8.4.1.1, "Example: Single Fault Recovery for BPEL Processes."](#)
2. In the search utility, enter criteria based on known fault parameters (for example, the time range, composite name, component type (BPEL process), and so on).
3. If the search returns too many results, limit it by selecting the **Show only recoverable faults** checkbox.
4. From the **Select** list, choose **Select All Recoverable**.
5. From the **Recovery Action** list, select **Abort**.

All selected faults are manually terminated.

#### 8.4.2 Examples of Fault Recovery for BPMN Processes

This section provides examples of how to define a fault policy that enables human intervention on a BPMN process fault and perform single and bulk fault recovery on a BPMN process service component.

---

**Note:** When a multi-instance process has met the conditions for its completion, it raises a nonrecoverable system fault (to cancel remaining instances). Although this fault appears in Oracle Enterprise Manager Fusion Middleware Control, you do not need to take any action. It appears simply to notify you that the multi-instance process was finalized because the condition was completed.

---

- [Section 8.4.2.1, "Example: Single Fault Recovery for BPMN Processes"](#)
- [Section 8.4.2.2, "Example: Bulk Fault Recovery for BPMN Processes"](#)

In this example, you define a fault policy specifying that a fault be manually recovered through human intervention. If an invalid social security number is submitted from a loan broker BPMN process to a credit rating service, the credit rating service returns a negative credit fault. This human intervention action is defined with the ora-human-intervention action in the fault-policies.xml file. Without fault policies, BPMN instances do not generate recoverable faults (instead they are nonrecoverable); the ora-human-intervention action makes the fault recoverable. [Example 8–4](#) shows the fault policy file.

#### **Example 8–4 Fault Policy File**

```
<faultPolicies xmlns="http://schemas.oracle.com/bpmn/faultpolicy">
<faultPolicy version="2.0.1"
 id="CRM_ServiceFaults"
 xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xs="http://www.w3.org/2001/XMLSchema"
 xmlns="http://schemas.oracle.com/bpmn/faultpolicy"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <Conditions>
 <faultName xmlns:credit="http://services.otn.com"
 name="credit:NegativeCredit">
 <!-- get this fault when SSN starts with 0-->
 <condition>
 <test>$fault.payload="Bankruptcy Report"</test>
 <action ref="ora-human-intervention"/>
 </condition>
 </faultName>
 </Conditions>
</faultPolicy>
</faultPolicies>
```

The fault-bindings.xml file shown in [Example 8–5](#) associates the fault policies defined in the fault-policies.xml file with the CRM\_ServiceFaults composite.

#### **Example 8–5 Fault Policy Bindings File**

```
<faultPolicyBindings version="2.0.1"
 xmlns="http://schemas.oracle.com/bpmn/faultpolicy"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <composite faultPolicy="CRM_ServiceFaults" />
</faultPolicyBindings>
```

Because human intervention is defined as an action, you perform BPMN process fault recovery in Oracle Enterprise Manager Fusion Middleware Control.

For more information about creating and designing fault-policies.xml and fault-bindings.xml files, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

#### 8.4.2.1 Example: Single Fault Recovery for BPMN Processes

This example assumes the following:

- An instance was initiated on the Test Web Service page shown in [Section 8.1, "Initiating a SOA Composite Application Test Instance."](#)
- An invalid social security number that begins with 0 was entered.

To perform single fault recovery for BPMN processes:

1. From the **SOA Infrastructure** menu, select **Home**.
2. Click the **Faults and Rejected Messages** tab.
3. In the **Faults** table, locate the fault that has been identified as recoverable. You can use the search utility to locate the specific fault.
4. In the **Recovery** column, click **Recover**. If you first want to see details about the fault, click the error message. Then, click **Recover Now**.

The Faults page for that BPMN process instance is displayed.

5. In the **Recovery** column, click **Recoverable**.

The page refreshes to display the fault recovery section at the bottom of the page.

Choose one of the available recovery options, modify the variable information as appropriate, and click "Recover".

Recovery Action	<input style="width: 100%; height: 100%;" type="button" value="Retry"/>	After Successful Retry	<input style="width: 100%; height: 100%;" type="button" value="None"/>
Variable	<input style="width: 100%; height: 100%;" type="button" value="crInput"/> <b>Value</b>		

6. From the **Recovery Action** list, select **Retry**.
7. From the **Chain Action Upon Successful Retry** list, select **None**. This list enables you to select Java callout recovery actions. For more information, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
8. From the **Variable** list, select a variable. The content of this variable is displayed in the **Value** field. For this example, the variable **crInput** is selected. This variable is used in an invoke activity and contains an incorrect social security number value.
9. In the **Value** field, enter the correct value. For this example, the social security number is edited to begin with 1:  

```
<ssn xmlns="http://service.otn.com">123456789</ssn>
```
10. Click **Set Value**, and click **Yes** when prompted to continue.
11. Click **Recover** to recover from the fault, then click **Yes** when prompted to continue.

The page refreshes to indicate that no faults occurred.

### 8.4.2.2 Example: Bulk Fault Recovery for BPMN Processes

For the social security number example, selecting **Retry** is not an option for performing a bulk recovery because the value for the social security number is incorrect and requires correction. An example of performing a bulk recovery with the **Retry** option is if the social security number is correct, but the system providing the credit rating service was temporarily unavailable and caused a composite reference fault. This prevents the messages from being delivered. Once the credit rating service is available again, selecting **Retry** re-attempts the invocation to the credit rating service through the composite reference.

To perform bulk fault recovery for BPMN processes:

1. Perform Steps 1 through 2 of [Section 8.4.2.1, "Example: Single Fault Recovery for BPMN Processes."](#)
2. In the search utility, enter criteria based on known fault parameters (for example, the time range, composite name, component type (BPMN process), and so on).
3. If the search returns too many results, limit it by selecting the **Show only recoverable faults** checkbox.
4. From the **Select** list, choose **Select All Recoverable**.
5. From the **Recovery Action** list, select **Abort**.

All selected faults are manually terminated.

### 8.4.3 Examples of Fault Recovery for Oracle Mediator

This section provides an example of how to perform single and bulk fault recovery on an Oracle Mediator service component.

- [Section 8.4.3.1, "Example: Single Fault Recovery for Oracle Mediator"](#)
- [Section 8.4.3.2, "Example: Bulk Fault Recovery for Oracle Mediator"](#)

In this example, a service binding component for an inbound Siebel adapter submits a payload message to Oracle Mediator for transformation. The processed payload message is then delivered to a reference binding component for an outbound file adapter. However, the outbound directory into which to write the payload message is not configured with write permissions. This causes a fault to occur. The fault policy defined during design time specifies that the fault be manually recovered through human intervention. Three retries are attempted, as defined with the `retryCount` attribute. The condition and action are defined as follows in the `fault-policies.xml` file.

Recoverable Oracle Mediator faults do not require a fault policy (though it is one way to make faults recoverable, as described through an `ora-human-intervention` action). Any parallel routing rule that receives a remote fault from the outbound endpoint also creates a recoverable fault (in this specific example, the fault policy is not required if the Oracle Mediator uses a parallel routing rule to invoke the outbound file adapter). [Example 8–6](#) shows the fault policy file.

#### **Example 8–6 Fault Policy File**

```
<faultPolicies xmlns="http://schemas.oracle.com/bpel/faultpolicy">
<faultPolicy version="2.0.1"
 id="ConnectionFaults"
 xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"
 xmlns:xs="http://www.w3.org/2001/XMLSchema"
 xmlns="http://schemas.oracle.com/bpel/faultpolicy">
```

```
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <Conditions>
 <faultName xmlns:medns="http://schemas.oracle.com/mediator/faults"
 name="medns:mediatorFault">
 <condition>
 <test>contains($fault.mediatorErrorCode, "TYPE_FATAL_
 MESH")</test>
 <action ref="ora-retry"/>
 </condition>
 </faultName>
 </Conditions>
 . . .
 . . .
 <Action id="ora-retry">
 <retry>
 <retryCount>3</retryCount>
 <retryInterval>5</retryInterval>
 <retryFailureAction ref="ora-human-intervention"/>
 <retrySuccessAction ref="ora-terminate"/>
 </retry>
 </Action>
</Actions>
</faultPolicy>
</faultPolicies>
```

Processing is set to retry 3 times before terminating.

The fault policies are associated with the `ConnectionFaults` composite application in the `fault-bindings.xml` file shown in [Example 8-7](#):

#### **Example 8-7 Fault Policy Bindings File**

```
<faultPolicyBindings version="2.0.1" xmlns="http://schemas.oracle.com/bpel/fault
policy" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <composite faultPolicy="ConnectionFaults"/>
</faultPolicyBindings>
```

##### **8.4.3.1 Example: Single Fault Recovery for Oracle Mediator**

For this example, the `sap` output directory is set to read-only. An inbound file adapter retrieves the `sender.xml` file from the `siebel` directory and the message is routed through Oracle Mediator to an outbound file adapter reference for placing a file in the `sap` directory.

To perform single fault recovery for Oracle Mediator:

1. Change the directory permissions at the operating system command prompt.

```
chmod 000 sap
cp sender.xml siebel/
```

2. From the **SOA Infrastructure** menu, select **Home**.

3. Click the **Faults and Rejected Messages** tab.

Three faults appear, based on three retries being attempted. In this case, you see three retries only because the fault policy on the Oracle Mediator interaction with the outbound file adapter defines three retries. Without the fault policy, there is only one fault (no automated retries).

4. Click the specific instance ID in the **Composite Instance ID** column.

The Flow Trace appears. The faults table at the top of the page displays the fault messages. If you want to see where the faulted Oracle Mediator instance is located in the overall message flow, select the fault in the **Faults** table. This highlights the associated instance in the trace table. You can then click the instance to access its audit trail to see more details about the faulted flow.

---

**Note:** Steps 4 through 10 represent one way to recover this single fault. The fault can also be recovered directly from the Oracle Mediator Faults page through the **Recovery Action** list.

---

5. Locate the Oracle Mediator component instance fault you want to recover in the **Faults** table and click **Recover** in the **Recovery** column.

6. From the **Payload Part** list, select **Sender**.

The payload is automatically displayed in the **Payload** field. If necessary, payload modifications can be performed in this field. For this example, payload modification is not necessary.

7. Change the sap directory to be writable at the operating system command prompt.

```
chmod 777 sap
```

8. Return to the **Faults** tab and click the **Refresh** icon in the upper right corner of the page.

9. Click **Retry**.

10. Click **Yes** when prompted to resubmit the selected fault for recovery.

The page refreshes to indicate that no faults occurred.

11. Click the **Audit Trail** tab.

The final message indicates that manual recovery was successful and the message payload was written to the sap directory.

onMessage	
26-Jul-07 12:00:49 EDT	Input payload received
onCase "SAP.Write"	
26-Jul-07 12:00:49 EDT	Transformed message part "Receiver" using "xsl/Sender_To_Receiver.xsl"
26-Jul-07 12:00:50 EDT	Error during invoking 1-way operation "Write" on target service "SAP"
26-Jul-07 12:00:56 EDT	Retry no. 1 for case "SAP.Write"
26-Jul-07 12:00:57 EDT	Transformed message part "Receiver" using "xsl/Sender_To_Receiver.xsl"
26-Jul-07 12:00:57 EDT	Error during invoking 1-way operation "Write" on target service "SAP"
26-Jul-07 12:01:03 EDT	Retry no. 2 for case "SAP.Write"
26-Jul-07 12:01:04 EDT	Transformed message part "Receiver" using "xsl/Sender_To_Receiver.xsl"
26-Jul-07 12:01:04 EDT	Error during invoking 1-way operation "Write" on target service "SAP"
26-Jul-07 12:01:09 EDT	Retry no. 3 for case "SAP.Write"
26-Jul-07 12:01:09 EDT	Transformed message part "Receiver" using "xsl/Sender_To_Receiver.xsl"
26-Jul-07 12:01:09 EDT	Error during invoking 1-way operation "Write" on target service "SAP"
26-Jul-07 12:04:24 EDT	Recovering manually...
26-Jul-07 12:04:25 EDT	Transformed message part "Receiver" using "xsl/Sender_To_Receiver.xsl"
26-Jul-07 12:04:25 EDT	Invoked 1-way operation "Write" on target service "SAP"

#### 8.4.3.2 Example: Bulk Fault Recovery for Oracle Mediator

Assume the sap directory to which to write the sender.xml payload message is again configured with read-only permissions at the operating system command prompt. Three copies of the sender.xml file are placed in the siebel directory of the service binding component for the inbound Siebel adapter. This creates three instances.

```
chmod 000 sap
cp sender.xml siebel/
cp sender.xml siebel/
cp sender.xml siebel/
```

To perform bulk fault recovery for Oracle Mediator:

1. Change the sap directory to be writable.
2. From the **SOA Infrastructure** menu, select **Home**.
3. Click the **Faults and Rejected Messages** tab.
4. In the search utility, enter criteria based on known fault parameters (for example, the time range, composite name, and so on).
5. If the search returns too many results, limit it by selecting the **Show only recoverable faults** checkbox.
6. Change the sap directory to be writable at the operating system command prompt.  

```
chmod 777 sap
```
7. Select all the faults to be recovered.
8. Select **Retry** from the **Recovery Action** list.
9. Select **Yes** when prompted to perform fault recovery.
10. Click the **Audit Trail** tab.

The final message indicates that manual recovery was successful and the message payload was successfully written to the sap directory.

## 8.5 Recovering from SOA Composite Application Faults in the Application Home Page

You can monitor and perform individual and bulk fault recoveries in a SOA composite application. For BPEL process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the fault-bindings.xml file) and which triggers the action ora-human-intervention. However, without defining any fault policies, the fault takes its standard course as either a recoverable or nonrecoverable fault. Human workflow faults can also be recovered, but not directly from Oracle Enterprise Manager Fusion Middleware Control. Instead, the audit trail provides a link to Oracle BPM Worklist, from which the fault can be addressed.

To recover from SOA composite application faults in the application home page:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Under <b>soa-infra</b> , expand the partition.
2. Select Deployed Composites.	2. Select a specific SOA composite application.
3. In the Composite section, select a specific SOA composite application.	

**2. Click the **Faults and Rejected Messages** tab.**

The Faults and Rejected Messages page displays the following details for the selected SOA composite application:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Options for selecting instance recovery actions (for example, retry, abort, replay, and others), deleting rejected messages, and performing bulk message recovery.
- Faults and rejected messages in SOA composite application instances, including the error message, whether you can recover from the fault, the time of the fault, if the fault message is classified as a rejected message (if so, a checkmark is displayed), the fault location, the composite instance ID, and links to log files that describe the fault.

This screenshot shows the Oracle SOA Composite Application Home Page. At the top, there's a header bar with the project name "HelloWorldProj [1.0]" and a user status "Logged in as weblogic". Below the header, there's a toolbar with buttons for "Running Instances" (0), "Total 1", "Active", "Retire ...", "Shut Down...", "Test", "Settings...", and some icons. The "Faults and Rejected Messages" tab is currently selected. A sub-header below it says "This page lets you search for faults that occurred in this SOA composite. [More Info ...]". Below that is a search form with fields for "Error Message Contains" and "Composite Instance ID", and dropdowns for "Fault ID" and "Fault Time From/To". There are also "Search" and "Reset" buttons. At the bottom, there's a table with columns: "Error Message", "Recovery", "Fault Time", "Rejected Message", "Fault Location", and "Composite Insta ID". One row in the table is highlighted with a red cross icon and the text "Correlation definition not re".

**Note:** You cannot search for human workflow error messages by entering details in the **Error Message Contains** field because these faults do not persist in the dehydration store.

Faults identified as recoverable can be recovered.

- 3. Select faults for recovery.** As with fault recovery at the SOA Infrastructure level and BPEL process and Oracle Mediator service component levels, you can perform single fault recovery, bulk fault recovery, and recovery of all faults. See Step 3 of

Section 8.4, "Recovering from SOA Composite Application Faults at the SOA Infrastructure Level" for instructions on selecting faults to perform these types of recovery.

4. Select an action from the **Recovery Action** list.

Action	Description	Action is Available for...
<b>Retry</b>	Retries the instance directly. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.	BPEL process and Oracle Mediator
<b>Abort</b>	Terminates the entire instance.	BPEL process and Oracle Mediator
<b>Replay</b>	Replays the entire scope again in which the fault occurred.	BPEL process
<b>Rethrow</b>	Rethrows the current fault. BPEL fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.	BPEL process
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).	BPEL process

---

**Note:** In most cases, fault policy actions are automatically executed. The only exception is if you defined a fault policy that uses the action ora-human-intervention. This action creates a recoverable fault that can be recovered from Oracle Enterprise Manager Fusion Middleware Control.

---

5. If you want to delete rejected messages for the current SOA composite application, see [Section 8.7, "Deleting Rejected Messages from the Application Home Page."](#)
6. If you want to perform a bulk recovery of messages, click **Recover with Options**.

This displays the Recover with Options dialog for specifying criteria for recovering BPEL and Oracle Mediator messages of the current composite directly from the database. Human workflow messages can be recovered manually from Oracle BPM Worklist. Business event and business rule messages cannot be recovered.

Specify the criteria for selecting and recovering faults directly from the database. Any selections you may have made in the Faults and Rejected Messages page will be ignored for this operation. This operation will not recover any Human Workflow faults; you can recover these faults using the Worklist application.

7. Specify criteria. **Retry** and **Abort** are the only recovery actions permitted.

---

**Note:** For bulk fault recovery at the SOA composite application level, a check of the state of the composite is performed. If the state of the composite is set to off, a message is displayed warning you that a recovery cannot be performed.

You are not notified when a fault has been skipped during recovery for any reason (for example, an unsupported service engine, an unrecoverable fault, and so on).

---

8. Click **Recover**. Depending upon the number of messages, recovery can take some time.
9. Perform the following additional monitoring tasks from within the **Faults** table:
  - a. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - b. In the **Fault Location** column, click a specific location to access the faults page for the location of the fault. The location can be a service, component, or reference.
  - c. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.
  - d. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)

- [Section 8.4.1, "Examples of Fault Recovery for BPEL Processes"](#)
- [Section 8.4.3, "Examples of Fault Recovery for Oracle Mediator"](#)

## 8.6 Deleting Rejected Messages at the SOA Infrastructure Level

You can delete rejected messages for all composites in the SOA Infrastructure directly from the database by specifying a criteria in the Delete: Rejected Messages dialog.

To delete rejected messages for all composites at the SOA Infrastructure level:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select Home.	1. Click <b>soa-infra</b> .	1. Select <b>SOA Infrastructure</b> .

2. Click the **Faults and Rejected Messages** tab.

The Faults and Rejected Messages page displays the following details for all SOA composite application faults:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Options for selecting instance recovery actions (for example, retry, abort, replay, and others), deleting rejected messages, and performing bulk message recovery.
- Faults and rejected messages, including the error message, whether you can recover from the fault, the time of the fault, if the fault message is classified as a rejected message (if so, a checkmark is displayed), the SOA composite application in which the fault occurred, the fault location, the instance ID, and a link to log files describing the fault.

Error Message	Recovery	Fault Time	Rejected Message	Composite	Fault Location
✗ FaultName: {{http://schema}}		Oct 10, 2012 3:06:09 PM	✗	FaultCodeBPELProces	bpelclient
✗ <bpelFault><faultType>0<		Oct 10, 2012 3:06:09 PM	✗	FaultCodeBPELProces	FaultCodeBP
✗ Correlation definition not re		Oct 10, 2012 3:05:26 PM	✗	HelloWorldProj [1.0]	bpelprocess1

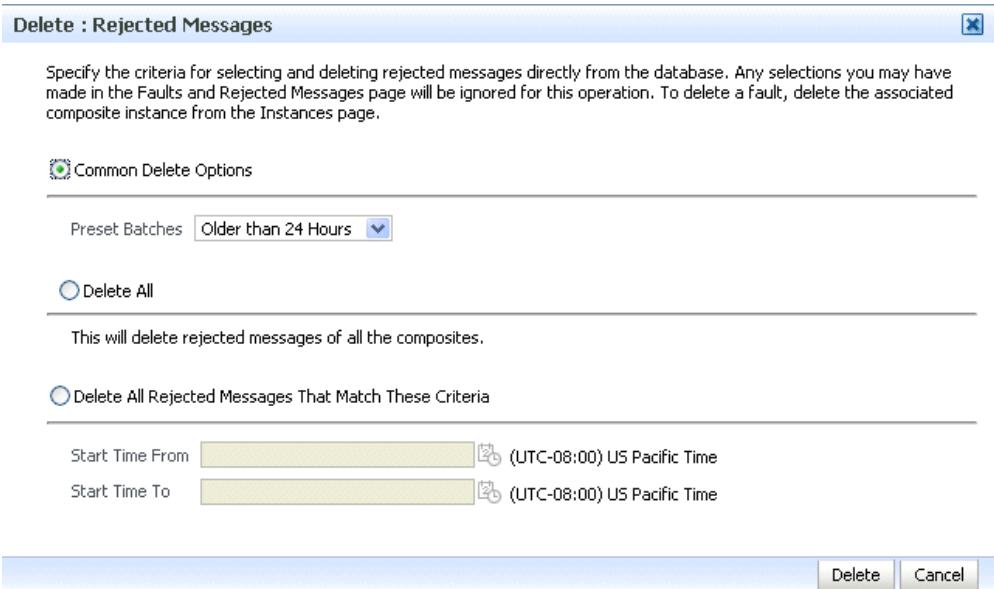
3. Click **Delete Rejected Messages**.

---

**Note:** Oracle recommends that you run the purge scripts to delete composite instances in production environments. The purge scripts have better performance and scalability. Only use the **Delete Rejected Messages** option to manage exceptions not covered by the purge scripts. For more information about the purge scripts, see [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."](#)

---

This displays the Delete: Rejected Messages dialog for specifying criteria for deleting rejected messages of all the composites directly from the database.



4. Specify criteria and click **Delete**.

For information about recovering from faults at the SOA Infrastructure level, see [Section 8.4, "Recovering from SOA Composite Application Faults at the SOA Infrastructure Level."](#)

## 8.7 Deleting Rejected Messages from the Application Home Page

You can delete rejected messages for the current SOA composite application directly from the database by specifying a criteria in the Delete: Rejected Messages dialog.

To delete rejected messages for the current SOA composite application:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select <b>Deployed Composites</b> .	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

2. Click the **Faults and Rejected Messages** tab.

The Faults and Rejected Messages page displays the following details for all SOA composite application faults:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Options for selecting instance recovery actions (for example, retry, abort, replay, and others), deleting rejected messages, and performing bulk message recovery.
- Faults and rejected messages, including the error message, whether you can recover from the fault, the time of the fault, if the fault message is classified as a rejected message (if so, a checkmark is displayed), the SOA composite application in which the fault occurred, the fault location, the instance ID, and a link to log files describing the fault.

This page lets you search for faults that occurred in this SOA composite. [\[More Info ...\]](#)

**Search**

Error Message Contains:  Composite Instance ID:   
 Fault ID:   
 Fault Time From: 2012-10-10 08:37:14 AM    
 Fault Time To: 2012-10-10 08:37:14 AM

Faults and Rejected Messages					
<input type="checkbox"/> Show only recoverable faults <input type="radio"/> Fault Type All Faults					
Select <input type="button" value="View"/> <input type="button" value="Recovery Actions"/> <input type="button" value="Delete Rejected Messages..."/> <input type="button" value="Recover With Options..."/>					
Error Message	Recovery	Fault Time	Rejected Message	Fault Location	Composite Instance ID
Correlation definition not re		Oct 10, 2012 3:05:26 PM	<input checked="" type="checkbox"/>	bpelprocess1_cler	10009

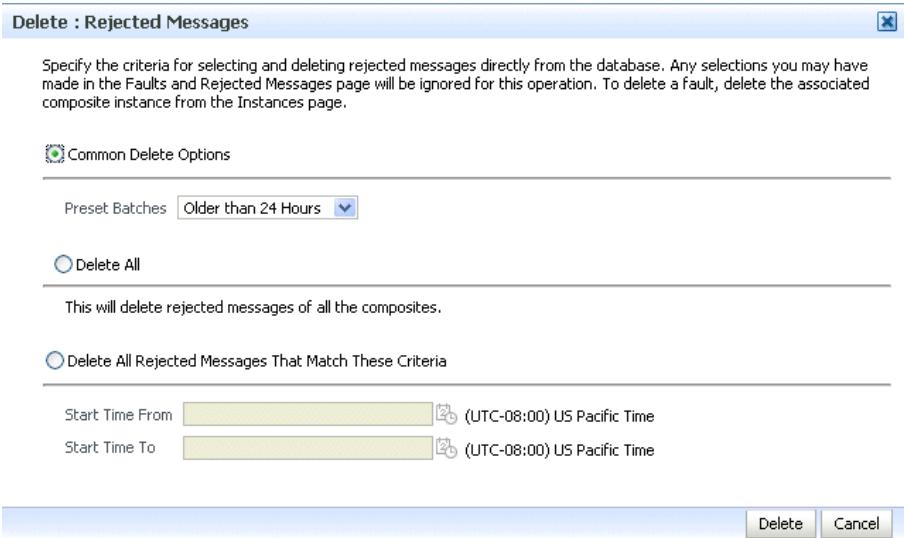
### 3. Click **Delete Rejected Messages**.

---

**Note:** Oracle recommends that you run the purge scripts to delete composite instances in production environments. The purge scripts have better performance and scalability. Only use the **Delete Rejected Messages** option to manage exceptions not covered by the purge scripts. For more information about the purge scripts, see [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."](#)

---

The Delete: Rejected Messages dialog is displayed for specifying criteria for deleting rejected messages of the current composite directly from the database.



**4. Specify criteria and click **Delete**.**

For information about recovering from faults on the SOA composite application home page, see [Section 8.5, "Recovering from SOA Composite Application Faults in the Application Home Page."](#)

## 8.8 Migrating Instances Between Different SOA Composite Application Revisions

You can migrate running SOA composite application instances from one revision of a composite to another revision (for example, migrate an instance of the deployed CreditRatingService revision 1.0 composite to an instance of the deployed CreditRatingService revision 2.0 composite). This action migrates instances without impacting the old revision, and enables the instances of both revisions to run side by side. The migrated instance is visible under the target revision of the SOA composite application. All service component instances in the SOA composite application instance are also migrated.

The reasons for migrating instances include the following:

- Design or implementation errors are discovered in the initial revision of the process or potentially invalid data provided by external services has placed the process in a bad state.
- Processes are taking too long to complete. For example, you may have instances that run for months or years. Because of this:
  - Changes may need to be applied while the instances are in-flight.
  - Changes are unknown beforehand so they cannot always be modeled as rules or short-lived subprocesses.
  - Regulation or policy changes (applying new or modified enforcement of policies) require additional steps to be added to all processes.

The following restrictions apply to instance migration:

- Both composite revisions must be deployed.

- Only running instances can be migrated. You cannot migrate completed, suspended, or faulted instances, except for Oracle Mediator, which can be in a faulted state and still successfully migrated.
- Only compatible instances can be successfully migrated. Compatibility depends upon the compatibility of the associated service component in the composite. Nontrivial changes cannot be migrated.
- There is a transaction boundary per composite instance. You typically operate on batches of instances related to a specific composite. Each composite instance is bound to a single transaction. Migration of one or more composite instances can fail without failing the entire batch.

Two migration methods are supported:

- Automatic migration: For trivial changes between revisions. Each composite instance is bound to a single transaction. You can migrate a batch of composite instances.
- Manual migration using a migration plan (Oracle BPM only): This is for nontrivial changes between revisions. The migration plan describes how to perform the migration.

### 8.8.1 Migration Compatibility

Composite migration compatibility depends on the service components defined inside the application. If changes to any service component are not compatible, then the entire instance is not eligible for migration. The SOA composite application instance is only migrated if the associated service component instances can be migrated.

The following service components are eligible for migration:

- Nondurable BPEL processes
- Oracle Mediator
- Human workflow
- Business rules
- Oracle BPMN

The participating service engines are coordinated to migrate their respective instances. Instance tracking data is migrated to the new revision.

[Table 8–1](#) describes how the following service component instances are migrated to a new instance. If not compatible, the overall composite instance migration is reported as incompatible, and you cannot migrate it.

**Table 8–1 Service Component Instance Migration Details**

Service Component	Supported Migration Types	Migration Restrictions
BPEL process	Automatic migration of BPEL process instances to a new revision	<ul style="list-style-type: none"> <li>▪ Only nondurable BPEL processes are supported (processes without checkpoint or breakpoint activities). Durable processes include asynchronous processes or synchronous processes with timers or activities that dehydrate before completing.</li> <li>▪ Only completed component instances are migrated.</li> </ul>

**Table 8–1 (Cont.) Service Component Instance Migration Details**

Service Component	Supported Migration Types	Migration Restrictions
Oracle Mediator	Automatic migration of Oracle Mediator instances to a new revision	Request-only, request-response, and sequential routing rules are the only supported message patterns. This means that only one-way and synchronous Oracle Mediator components are eligible for migration.
Human workflow	Automatic migration of human workflow instances to a new revision	Running and completed human workflow instances can be migrated if they are part of the running composite instance.
Business rules	Automatic migration of business rules to a new revision (there is no concept of rules instances)	None.
Oracle BPM	Both manual (through use of a migration plan) and automatic migration of Oracle BPM instances to a new revision	<p>You cannot migrate instances between incompatible models. Examples of incompatible instances include:</p> <ul style="list-style-type: none"> <li>▪ Removing or changing the behavior of a subprocess</li> <li>▪ Changing the levels of any activities</li> <li>▪ Removing gateways (except exclusive gateways)</li> <li>▪ Changing the interface</li> <li>▪ Adding or removing a boundary event on any activity</li> </ul> <p>Adding or removing activities means you must manually migrate them with a migration plan.</p>

---

**Notes:** Instance migration fails for a composite instance that includes an Oracle Mediator service component with parallel routing rules and an Oracle BPMN service component. The following values are returned:

- For the instance migration as a whole, `CompositeInstanceMigrationResult.migrated()` returns a value of `false`.
- For the Oracle Mediator service component, `ComponentInstanceMigrationResult.migrated()` returns a value of `false`.

However, for the Oracle BPMN service component, `ComponentInstanceMigrationResult.migrated()` returns a value of `true`, even though migration was unsuccessful.

---

There are two instance migration methods:

- [Migrating Instances with the Facade API](#)
- [Migrating Instances with the ant Script](#)

## 8.8.2 Migrating Instances with the Facade API

You can migrate instances with the Facade API.

Two basic API categories are provided:

- For generating a migration report that provides the following information:
  - Feasibility of migrating some sets of composite instances before attempting a migration
  - Number and feasibility of composite instances to migrate
  - Number and feasibility of associated service component instances to migrate
  - Overall feasibility of instance migration: manual migration is required, automatic migration is required, or migration is incompatible
  - Reason that manual migration is required or migration is incompatible
- For providing the results of instance migration:
  - Result of migration attempt: which composite and service component instances were successfully or unsuccessfully migrated
  - Reasons for any failures

Both synchronous and asynchronous versions are provided by the Facade API.

For more information about the Facade API, see *Oracle Fusion Middleware Infrastructure Management Java API Reference for Oracle SOA Suite* and [Chapter 11, "Programmatically Managing SOA Composite Applications with the Facade API."](#)

### 8.8.2.1 Bulk Migration Evaluation

[Example 8–8](#) shows the Façade API that obtains a composite instance migration summary. The summary describes the potential for migration of composite instances that match a specified filter criteria.

#### **Example 8–8 Bulk Migration Evaluation**

```
/**
 * Synchronously generates a migration report. The results would be limited to some
 * fixed number of composite instances to avoid EJB time-outs.
 * We should probably provide a way for the client to specify an even smaller
 * maximum number of instances.
 *
 * @param filter - The composite instance selection criteria
 * @param targetRevision - The revision to which the composite instances should be
 * migrated
 *
 * @return A MigrationReport
 */
MigrationReport generateMigrationReport(CompositeInstanceFilter filter, String
 targetRevision);
/**
 * Asynchronously generates a migration report. There is no limit on the number of
 * composite instances included in the result.
 *
 * @param filter - The composite instance selection criteria
 * @param targetRevision - The revision to which the composite instances should be
 * migrated
 * @return A unique report identifier, which can be used to subsequently retrieve
 * the report.
 */
```

```

String initiateMigrationReport(CompositeInstanceFilter filter, String
 targetRevision);
/**
 * Retrieves an asynchronously-generated migration report.
 *
 * @param reportId - A unique report identifier; the result of the
 * initiateMigrationReport method.
 *
 * @return The MigrationReport for the specified report identifier
 */
MigrationReport getMigrationReport(String reportId);

```

The report includes the following information:

Composite instance details:

- Component instance name
- Component instance ID
- Component instance state
- Migrate status: automatic or a migration plan is required (and the required change plan, where applicable)
- Component instance data details:

Summary data:

- The target revision
- Total number of matching composite instances
- Number of composite instances that can be automatically migrated
- Number of composite instances that cannot be automatically migrated
- If the results were truncated, then there must be some indication of that fact

### 8.8.2.2 Migration Report

The migration report describes the migration feasibility of composite instances. [Example 8–9](#) provides details.

#### *Example 8–9 Migration Report*

```

package oracle.soa.management.facade;

public interface MigrationReport {
 /**
 * @return The detailed migration feasibility description
 */
 MigrationFeasibility getFeasibility();
 /**
 * @return The revision to which the composite(s) will be migrated.
 */
 String getTargetRevision();
 /**
 * @return The number of composite instances matching the criteria for which
 * this report was generated.
 */
 long getCompositeInstanceCount();
 /**
 * @return The composite instances matching the criteria for which this
 * report was generated.
 */
}

```

```
 */
List<CompositeInstanceMigrationReport> getCompositeInstances();
```

### 8.8.2.3 Bulk Migration Execution

The Façade API migrates the instances (with a configurable batch size). [Example 8–10](#) provides details.

#### **Example 8–10 Bulk Migration Execution**

```
/**
 * Asynchronously attempt to migrate the composite instances described in the
 * specified migration report.
 * @param report - A MigrationReport, describing which composite instances should
 * be migrated.
 * @param plan - A MigrationPlan, specifying how those instances that cannot be
 * automatically migrated should be handled.
 *
 * @return A unique migration result identifier, which can be used to subsequently
 * retrieve the migration result.
 */
String migrateCompositeInstances(MigrationReport report, MigrationPlan plan).
/**
 * Retrieves the migration result for the specified migration attempt.
 *
 * @param resultId - The unique identifier for a particular migration attempt; the
 * result of invoking migrateCompositeInstances
 * @return A MigrationResult, describing the results of the migration attempt.
 */
MigrationResult getMigrationResult(String resultId);
/**
 * Synchronously attempts to migrate those composite instances that match the
 * specified filter criteria
 * to the specified target revision, applying the specified migration plan.
 *
 * The number of composite instances for which migration is attempted will be
 * limited to some fixed number,
 * unless a lesser maximum is otherwise specified. (TBD, can this be specified via
 * the filter?)
 *
 * @param filter - The composite instance selection criteria
 * @param targetRevision - The revision to which the composite instances should be
 * migrated
 * @param plan - The plan for handling those composites that cannot be
 * automatically migrated
 *
 * @return A MigrationResult, describing the results of the migration attempt.
 */
MigrationResult migrateCompositeInstances(CompositeInstanceFilter filter, String
targetRevision,MigrationPlan plan);
```

### 8.8.2.4 Migration Results

The MigrationResult interface describes the outcome of the attempt to migrate composite instances. [Example 8–11](#) provides details.

#### **Example 8–11 Migration Result**

```
package oracle.soa.management.facade;
public interface MigrationResult extends Serializable {
/**
```

```

 * @return The revision to which the composite instances were to be migrated.
 */
 String getTargetRevision();
 /**
 * @return The total number of composite instances included in the migration
 * attempt.
 */
 long getCompositeCount();
 /**
 * @return The number of composite instances for which migration succeeded.
 */
 long getMigratedCount();
 /**
 * @return The number of composite instances for which migration failed.
 */
 long getFailedCount();
 /**
 * @return The list of composite instances that were successfully migrated.
 */
 List<CompositeInstanceMigrationResult> getMigratedInstances();
 /**
 * @return The list of composite instances for which migration failed.
 */
 List<CompositeInstanceMigrationResult> getFailedInstances();
}

```

### 8.8.2.5 Migration Plan

The `MigrationPlan` interface provides the XML description of what to do with nontrivial composite or component changes. [Example 8–12](#) provides details.

#### **Example 8–12 Migration Plan**

```

public interface MigrationPlan extends Serializable {
 /**
 * @param componentDN A component distinguished name (less any label)
 *
 * @return The migration plan element for the specified componentDN
 */
 org.w3c.dom.Element getComponentPlan(String componentDN);
 /**
 * @return The migration plan for the composite instances
 */
 org.w3c.dom.Element getCompositePlan();
}

```

### 8.8.2.6 Migration API

The `CompositeInstance` Facade type includes methods to support the migration of a single composite instance. The bulk operations available directly from the `Locator` interface invoke the methods on individual composite instances. [Example 8–13](#) provides details.

#### **Example 8–13 Migration API**

```

CompositeInstanceMigrationReport checkCompatibility(String revision);
 /**
 * Calls suspend on all the associated component instances
 * Calls migrate for those same component instances
 * Calls resume on all those same component instances
 * The migration plan may contain component-specific directives.
}

```

```

*/
CompositeInstanceMigrationResult migrate(MigrationPlan plan);
public interface CompositeInstanceMigrationReport extends Serializable {
String getPartition();
String getCompositeName();
String getCompositeId();
String getRevision();
String getTargetRevision();
MigrationFeasibility getFeasibility();
long getComponentInstanceCount();
List<ComponentInstanceMigrationReport> getComponentInstances();
String getIncompatibilityReason();
}
public interface ComponentInstanceMigrationReport extends Serializable {
String getComponentName();
String getComponentId();
MigrationFeasibility getMigrationFeasibility();
String getIncompatibilityReason();
}
public class MigrationFeasibility implements Serializable {
public static MigrationFeasibility Automatic;
public static MigrationFeasibility MigrationPlanRequired;
public static MigrationFeasibility Incompatible;
public boolean isAutomatic();
public boolean isMigrationPlanRequired();
public boolean isIncompatible();
}
public interface CompositeInstanceMigrationResult extends Serializable {
/**
 * @return true, if the composite instance and all its components were
 * successfully migrated; otherwise, false.
 */
boolean migrated();
/**
 *
 * @return The name of the partition to which the composite is deployed
 */
String getPartition();
/**
 * @return The composite name
 */
String getName();
/**
 * @return The composite instance identifier
 */
String getId();
/**
 * @return The previous revision
 */
String getRevision();
/**
 * @return The revision to which the instance was to be migrated
 */
String getTargetRevision();
/**
 * @return The migration results for the associated component instances
 */
List<ComponentInstanceMigrationResult> getComponentInstances();
/**
 * @return The reason why the migration failed, if it failed; otherwise, null
*/
}

```

```

*/
String getFailureReason();
}
public interface ComponentInstanceMigrationResult extends Serializable {
/**
 * @return true, if the component instance was successfully migrated; otherwise,
 * false.
 */
boolean migrated();
/**
 * @return The component name
 */
String getName();
/**
 * @return The component instance identifier
 */
String getId();
/**
 * @return The reason why the migration failed, if it failed; otherwise, null
 */
String getFailureReason();
}

```

#### 8.8.2.6.1 Retrieving the List of Failed Migration Components

When migration fails, you use the Java code shown in [Example 8–14](#) to retrieve the list of failed components. If a composite instance state is marked as completed faulted and migration of the composite instance to another revision fails, `f.getComponentInstances()` returns a list of `ComponentInstanceMigrationResult` objects that can retrieve details about the component instances.

##### ***Example 8–14 Retrieving the List of Failed Migration Components***

```

private static void validateMigrationResult(MigrationResult mr)
{
if (mr != null)
{
List<CompositeInstanceMigrationResult> failed =
mr.getFailedInstances();

for (CompositeInstanceMigrationResult f: failed)
{
List<ComponentInstanceMigrationResult> failedComponents =
f.getComponentInstances();
System.out.println("Failed components list size: " +
failedComponents.size() + " Failed components list: " +
failedComponents);
}
}
}

```

### 8.8.3 Migrating Instances with the ant Script

You can migrate instances using the `$Middleware_Home/SOA_Suite_Home/bin/ant-bpm-migration.xml` script shown in [Example 8–15](#).

##### ***Example 8–15 ant-bpm-migration.xml Script***

```

<?xml version="1.0" encoding="iso-8859-1"?>
<project name="ant-migration" basedir=". ">
```

```

<property environment="env"/>
<property name="name" value="${ant.project.name}"/>
<dirname property="imported.basedir" file="${ant.file.ant-migration}"/>
<property name="mw.ora.home" location="${imported.basedir}/.."/>
<property name="mw.home" location="${imported.basedir}/..."/>
<!--
 <path id="ant-extensions.classpath">
 <pathelement
path="${bpm.home}/generated/lib/oracle.bpmn.runtime.public-tools.jar"/>
 <pathelement path="${bpm.home}/../pcbpel/fabric/lib/soa-infra-mgmt.jar"/>
 <pathelement path="${bpm.home}/../pcbpel/fabric/lib/fabric-common.jar"/>
 <pathelement path="${bpm.home}/../pcbpel/fabric/lib/xmlparserv2.jar"/>
 <pathelement path="${bpm.home}/main/libraries/batik-1.7/lib/xerces_2_5_
0.jar"/>
 <pathelement
 path="${bpm.home}/../pcbpel/fabric/lib/fabric-runtime.jar"/>
 <pathelement path="${bpm.home}/tools/lib/apb-ext/wlfullclient.jar"/>
 <pathelement path="${bpm.home}/../pcbpel/generated/jrf/wsclient_
extended.jar"/>
 </path>
-->
 <path id="ant-extensions.classpath">
 <pathelement
path="${mw.ora.home}/soa/modules/oracle.bpmn.runtime.public-tools.jar"/>
 <pathelement path="${mw.home}/oracle_common/soa/modules/oracle.soa.mgmt_
11.1.1/soa-infra-mgmt.jar"/>
 <pathelement path="${mw.home}/oracle_common/modules/oracle.fabriccommon_
11.1.1/fabric-common.jar"/>
 <pathelement path="${mw.home}/oracle_common/modules/oracle.xdk_
11.1.0/xmlparserv2.jar"/>
 <pathelement path="${mw.ora.home}/soa/modules/oracle.soa.fabric_
11.1.1/fabric-runtime.jar"/>
 <pathelement path="${mw.home}/wlserver_10.3/server/lib/wlfullclient.jar"/>
 <pathelement path="${mw.home}/oracle_common/webservices/wsclient_
extended.jar"/>
 </path>
<!--
=====
-->
 <typedef name="locatorConfig"
classname="oracle.bpmn.engine.tools.pub.migration.LocatorConfig"
loaderRef="soa-infra-tools-loader">
 <classpath refid="ant-extensions.classpath"/>
 </typedef>
 <taskdef name="locatorSession"
classname="oracle.bpmn.engine.tools.pub.migration.LocatorSession"
loaderRef="soa-infra-tools-loader">
 <classpath refid="ant-extensions.classpath"/>
 </taskdef>
 <typedef name="compositeInstanceFilterDef"
classname="oracle.bpmn.engine.tools.pub.migration.CompositeInstanceFilterDef"
loaderRef="soa-infra-tools-loader">
 <classpath refid="ant-extensions.classpath"/>
 </typedef>
 <typedef name="generateMigrationReport"
classname="oracle.bpmn.engine.tools.pub.migration.GenerateMigrationReport"
loaderRef="soa-infra-tools-loader">
 <classpath refid="ant-extensions.classpath"/>
 </typedef>
 <typedef name="migrateCompositeInstances"
classname="oracle.bpmn.engine.tools.pub.migration.MigrateCompositeInstances"

```

```

loaderRef="soa-infra-tools-loader">
 <classpath refid="ant-extensions.classpath"/>
</typedef>
<!--<taskdef name="secure-input"
classname="oracle.fabric.management.deployedcomposites.ant.TempInputTask">-->
<!--<classpath>-->
 <!--<pathelement path="${handler.class.path}" />-->
<!--</classpath>-->
<!--</taskdef>-->
<!--<target name="..."-->
 <!--<secure-input message="Please enter password:">-->
 addproperty="password">-->
 <!--<handler
classname="oracle.fabric.management.deployedcomposites.ant.SecureInputHandler">-->
 <!--<classpath refid="handler.class.path"/>-->
 <!--</handler>-->
 <!--</secure-input>-->
 <!--</target>-->
 <!-- -->
<!--
=====
<target name="help">
 <echo message="res=${myresource}" />
 <echo
message="mw=${mw.ora.home}/soa/modules/oracle.bpm.runtime.public-tools.jar"/>
 <echo message="
=====
<echo message="Usage : " />
 <echo
message="=====
</target>
</project>

```

The ant-bpm-migration.xml script requires the wlfullclient.jar file in the \$Middleware\_Home/wlserver\_10.3/server/lib directory. You can generate this client library JAR by performing the following tasks:

1. Change to the following directory:

```
cd $fmw.home/wlserver_10.3/server/lib
```

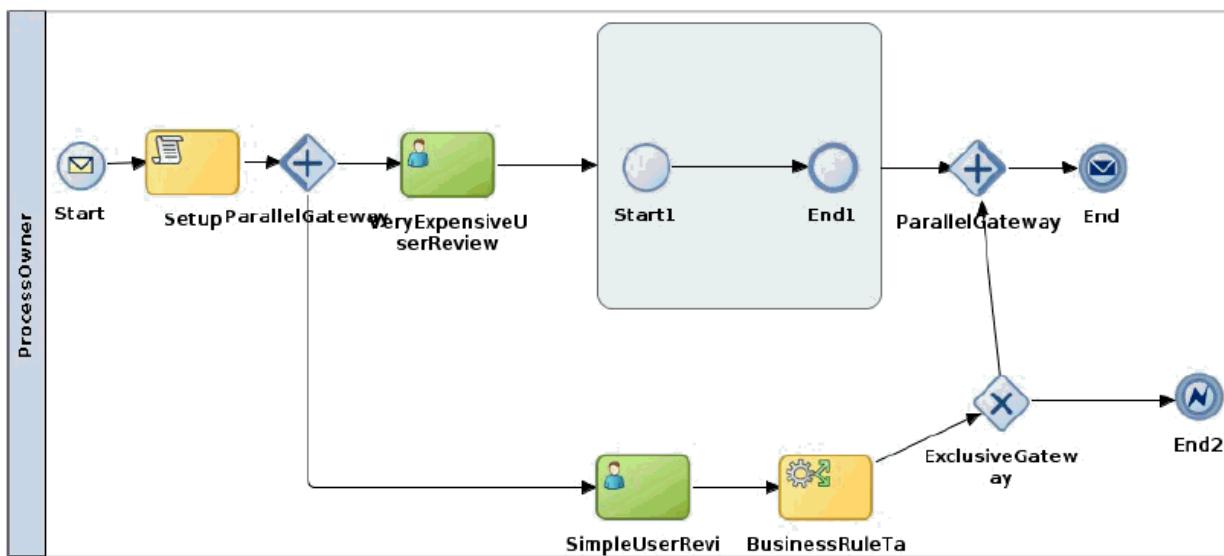
2. Run the following command to build the client library JAR.

```
java -jar wljarbuilder.jar
```

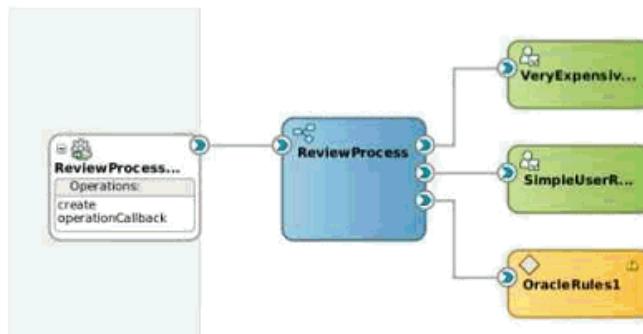
#### 8.8.4 Example of Migrating a Revision Instance for Oracle BPM

This section provides an example of migrating a revision instance of the **ReviewProcess** composite that includes Oracle BPM. Because a human workflow approval task is removed in this example, a migration plan is required.

[Figure 8–1](#) shows the instance flow for revision 1.0 of the composite. There are two human tasks in this revision of the composite, including **VeryExpensiveUserReview**, which is a time-consuming, user approval task.

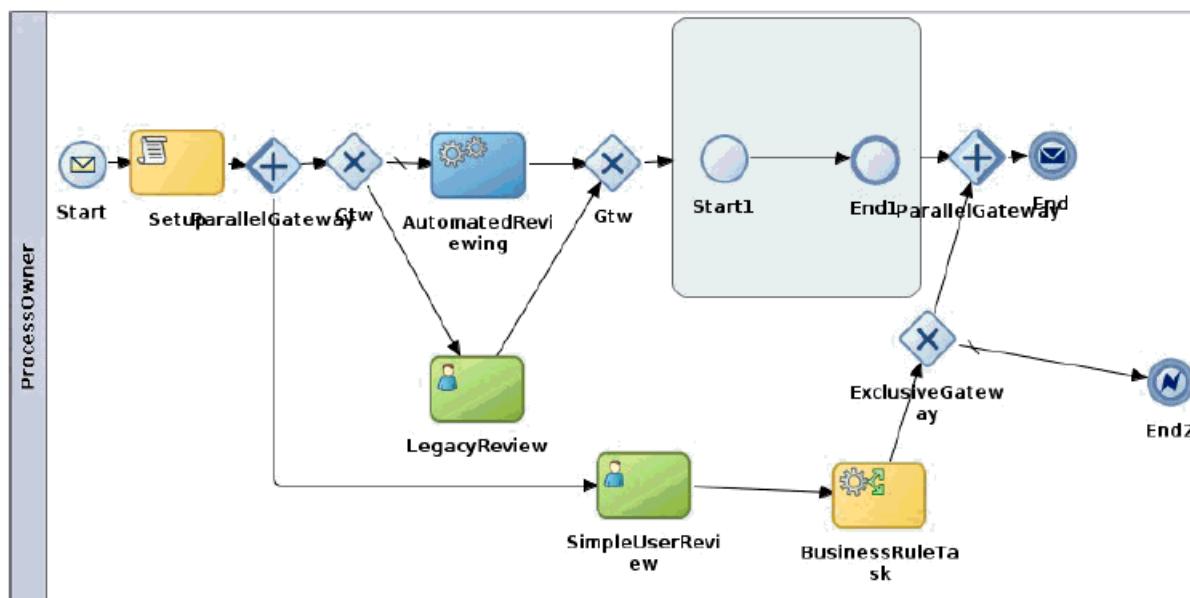
**Figure 8–1 Oracle BPM Instance Flow for Revision 1.0**

[Figure 8–2](#) shows revision 1.0 of the composite in the SOA Composite Editor.

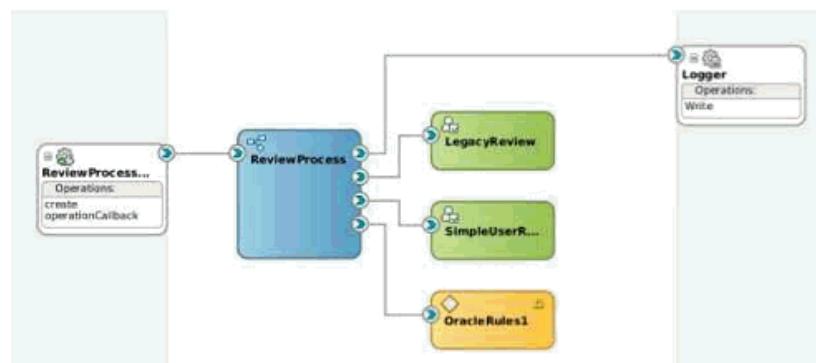
**Figure 8–2 Composite Application for Revision 1.0**

[Figure 8–3](#) shows the improved instance flow for revision 2.0 of the composite application.

The time-consuming **VeryExpensiveUserReview** human approval task has been removed. Instead, an automatic review with a service task is used. The service task delegates the review approval to an external web service.

**Figure 8–3 Oracle BPM Instance Flow for Revision 2.0**

[Figure 8–4](#) shows revision 2.0 of the composite application in the SOA Composite Editor.

**Figure 8–4 Composite Application for Revision 2.0**

The following tasks occur during migration:

- A new 2.0 revision is deployed, with an improved definition of **ReviewProcess**.
- The new 2.0 revision runs side-by-side with the old 1.0 revision.
- In-flight instances are migrated from one revision to another, as required.

To migrate a revision instance for Oracle BPM:

1. Generate a migration feasibility report that decides:
  - Whether the selected composite instances are feasible to migrate.
  - Whether migration is automatic or manual with a migration plan. Since instances running in an activity are being removed, a migration plan is required.

The migration plan specifies:

- A flow update from the **VeryExpensiveUserReview** task in the old revision to the **LegacyReview** task in the new component.
  - An instance data update with a new value, later used in the **LegacyReview** task title.
2. Create a migration plan in which the following tasks are performed:
- The data object is updated.
  - The instance title value is updated.
  - The **VeryExpensiveUserReview** task flow is replaced with the **LegacyReview** task flow.

You can place the migration plan in any directory location. A sample migration plan is provided at the following URL.

<http://java.net/projects/oraclebpmsuite11g/pages/Samples>

You can use the sample or create your own migration plan based on the XSD. You specify the path to the file when running the build.xml file to migrate the instance.

```

<mig:migrationPlan xmlns:mig="http://xmlns.oracle.com/bpm/migration">
 <compositeMigrationPlan>
 </compositeMigrationPlan>
 <componentMigrationPlan componentDN="default/Project3!1.0/ReviewProcess">
 <alt:alterflow xmlns:alt="http://xmlns.oracle.com/bpmn/alterflow">
 <dataObjectUpdate>
 <name>dataObject1</name>
 <value><![CDATA[<dataObject1 xmlns:def="http://www.w3.org/2001/XMLSchema" ns0:type="string" xmlns:ns0="http://www.w3.org/2001/XMLSchema-instance">ok</dataObject1>]]></value>
 </dataObjectUpdate>
 <instanceAttributeUpdate>
 <name>title</name>
 <value><![CDATA[<title>after migration Title</title>]]></value>
 </instanceAttributeUpdate>
 <validateVariables>true</validateVariables>
 <flowUpdate>
 <source>
 <id>activity0</id>
 <displayName>VeryExpensiveUserReview</displayName>
 </source>
 <target>
 <id>activity2</id>
 <displayName>LegacyReview</displayName>
 </target>
 </flowUpdate>
 <comments>migration to new revision</comments>
 </alt:alterflow>
 </componentMigrationPlan>
</mig:migrationPlan>

```

3. Execute the Facade APIs in either of two ways:
- Run the Facade APIs directly. For more information, see [Section 8.8.2, "Migrating Instances with the Facade API."](#)
  - Create a build.xml file for use with ant. For this example, ant is used. You can place the build.xml file anywhere in the directory structure. You must run ant from the same directory or run ant -f and specify the directory path location for build.xml.

```

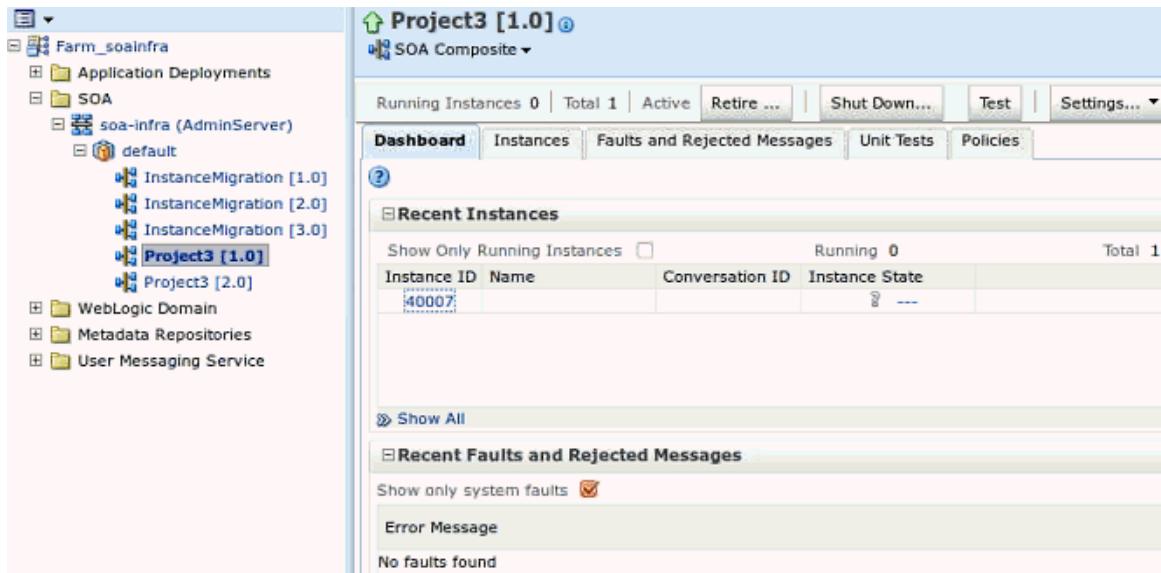
<property name="migrationPlanPath" value="${basedir}/migration_plan.xml"/>

locatorConfig id="c1" host="${wls.host}" port=${wls.port}
 user="${wls.user}" password="${wls.password}"/>
compositeInstanceFilterDef id="f1" domainName="default"
compositeName="Project3" compositeInstanceId="40001"/>

<target name="test">
 <locatorSession configId="c1">
 <generateMigrationReport filterId="f1" revision="2.0">
 <migrateReportedCompositeInstances migrationPlanPath=
 "${migrationPlanPath}"/>
 </generateMigrationReport>
 </locatorSession>
</target>

```

4. Create an instance of revision 1.0 of the SOA composite application. To migrate instances, both revisions 1.0 and 2.0 must be deployed. For more information about creating an instance, see [Section 8.1, "Initiating a SOA Composite Application Test Instance."](#)



5. Click the instance ID of revision 1.0 (for this example, 40007).
6. Click the **ReviewProcess** instance.

This page shows the flow of the message through various composite and component instances. [?](#)

**Faults (0)**

**Faults**  
Select a fault to locate it in the trace view.  
Error Message  
No faults found

**Sensors (0)**

**Trace**  
Click a component instance to see its detailed audit trail.  
Show Instance IDs

Instance	Type	Usage	State	Time	Composite
ReviewProcess.service	Web Service	Service	Completed	Apr 23, 2012 9:28:09 A	Project3 of
ReviewProcess	BPMN Component		Running	Apr 23, 2012 9:28:11 A	Project3 of
SimpleUserReview	Human Workflow Comp.		Running	Apr 23, 2012 9:28:11 A	Project3 of
VeryExpensiveUserReview	Human Workflow Comp.		Running	Apr 23, 2012 9:28:11 A	Project3 of

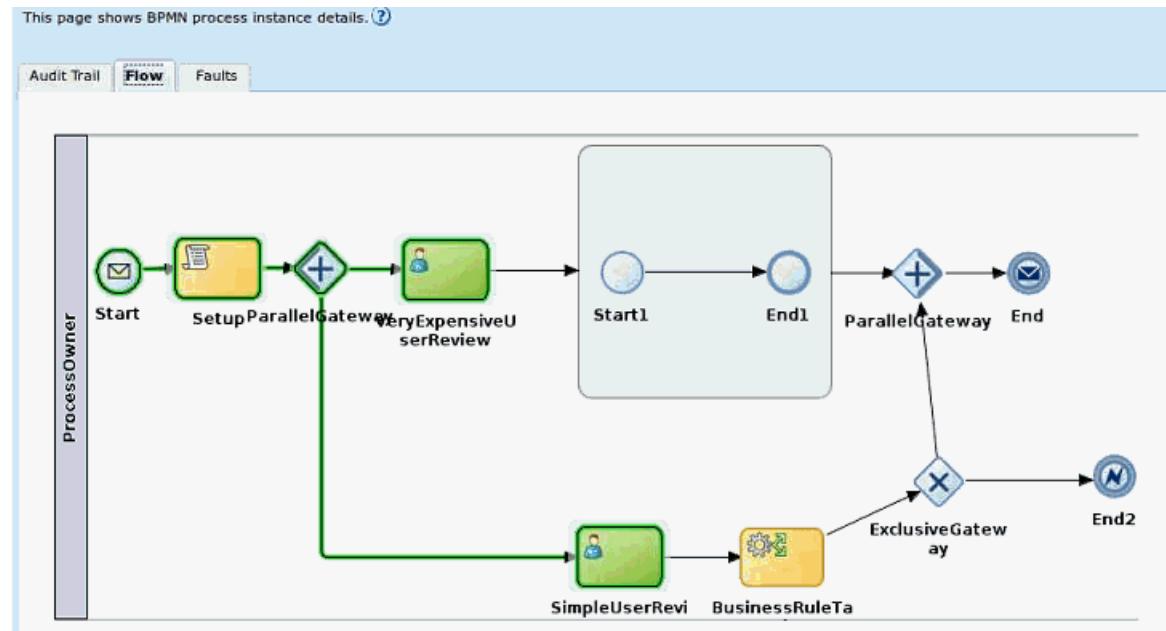
7. Click the Flow tab.

This page shows BPMN process instance details. [?](#)

**Audit Trail** **Flow** **Faults**

Activity	Loop Count	Event	Date
		Instance created	Apr 23, 2012 9:28:10 A
Start	0	Activity completed	Apr 23, 2012 9:28:10 A
Setup	0	Activity completed	Apr 23, 2012 9:28:10 A
ParallelGateway	0	Activity completed	Apr 23, 2012 9:28:10 A
		Thread Grouped	Apr 23, 2012 9:28:10 A

Revision 1.0 of the flow is shown. The instance is waiting on the parallel approval of the two instance tasks.



8. Go to the location for the build.xml file.
9. Change the **compositeInstanceId** value to migrate to 40007.

```

<@ MigrationReportActionContext.java > <@ MigrationReportAction.java > <@ MigrateReportedCompositeInstances.java >
build.xml <@ CompositeInstanceFilterDef.java > <@ LocatorConfig.java > <@ InstanceFilter.class > <@ LocatorSession.java >

-->
<ttypedef name="LocatorConfig" classname="oracle.fabric.management.migration.LocatorConfig" loaderRef="soa-infra-tools-loc">
 <classpath refid="ant-extensions.classpath"/>
</ttypedef>
<taskdef name="locatorSession" classname="oracle.fabric.management.migration.LocatorSession" loaderRef="soa-infra-tools-1">
 <classpath refid="ant-extensions.classpath"/>
</taskdef>

<ttypedef name="compositeInstanceFilterDef" classname="oracle.fabric.management.migration.CompositeInstanceFilterDef" loaderRef="soa-infra-tools-1">
 <classpath refid="ant-extensions.classpath"/>
</ttypedef>

<ttypedef name="generateMigrationReport" classname="oracle.fabric.management.migration.GenerateMigrationReport" loaderRef="soa-infra-tools-1">
 <classpath refid="ant-extensions.classpath"/>
</ttypedef>
<ttypedef name="migrateReportedCompositeInstances" classname="oracle.fabric.management.migration.MigrateReportedCompositeInstances" loaderRef="soa-infra-tools-1">
 <classpath refid="ant-extensions.classpath"/>
</ttypedef>
<ttypedef name="migrateCompositeInstances" classname="oracle.fabric.management.migration.GenerateMigrationReport" loaderRef="soa-infra-tools-1">
 <classpath refid="ant-extensions.classpath"/>
</ttypedef>

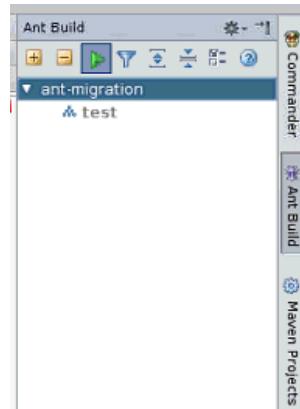
<locatorConfig id="c1" host="v8.ar.oracle.com" port="7001" user="weblogic" password="weblogic1">
</locatorConfig>

<compositeInstanceFilterDef id="f1" domainName="default" compositeName="Project3" compositeInstanceId="40007"/>

<target name="test">
 <locatorSession configId="c1">
 <generateMigrationReport filterId="f1" revision="2.0">
 <migrateReportedCompositeInstances migrationPlanPath="/scratch/pbarlett/work/ps6/MigrationPlan.xml"/>
 </generateMigrationReport>
 </locatorSession>
</target>

```

10. In the upper right corner, run the ant script.



11. View the ant build report to see that migration was successful.

```

Messages Ant Build (ant-migration)
Detected Java version: 1.6 in: /usr/lib/jvm/java-6-sun-1.6.0.26/jre
Detected OS: Linux
parsing buildfile /home/patricio/work/ps6/migration/cl-tools/PRO-4437/scripts/build.xml with URI = file:/home/patricio/work/ps6/migration/
Project base dir set to: /home/patricio/work/ps6/migration/cl-tools/PRO-4437/scripts
Task: property
Task: path
Task: ttypedef
Task: taskdef
Task: typedef
Task: typedef
Task: typedef
Task: typedef
Task: typedef
Task: locatorConfig
Task: compositeInstanceFilterDef
Build sequence for target(s) "test" is [test]
Complete build sequence is [test,]
Target: test
Ant build completed successfully in 5s at 4/23/12 1:29 PM

```

12. Return to the Instances page in Oracle Enterprise Manager Fusion Middleware Control.
13. Click the **Refresh** icon, and note that the old instance is no longer displayed. This is because it was migrated to the new instance.

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface. The title bar says "Project3 [1.0]". The left sidebar lists "fra on Deployments", "fra (AdminServer) fault", "InstanceMigration [1.0]", "InstanceMigration [2.0]", "InstanceMigration [3.0]", "Project3 [1.0]", and "Project3 [2.0]". The main pane has tabs for "Dashboard", "Instances", "Faults and Rejected Messages", "Unit Tests", and "Policies". Under "Instances", there's a section titled "Recent Instances" with a table:

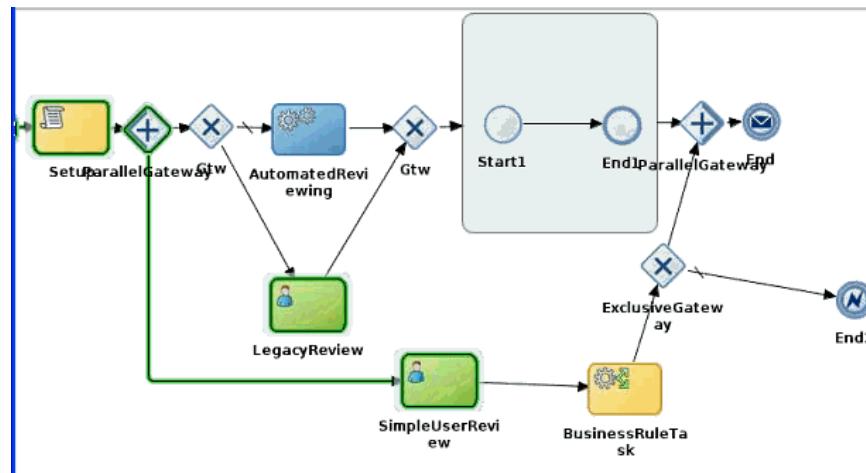
Instance ID	Name	Conversation ID	Instance State
No composite instances found.			

14. In the navigator, click revision 2.0.
15. Note that the migrated instance is displayed for the revision.

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface for revision 2.0. The title bar says "Project3 [2.0]". The left sidebar lists "fra on Deployments", "fra (AdminServer) fault", "InstanceMigration [1.0]", "InstanceMigration [2.0]", "InstanceMigration [3.0]", "Project3 [1.0]", and "Project3 [2.0]". The main pane has tabs for "Dashboard", "Instances", "Faults and Rejected Messages", "Unit Tests", and "Policies". Under "Instances", there's a section titled "Recent Instances" with a table:

Instance ID	Name	Conversation ID	Instance State
40007			---

16. Click the instance.
  17. In the Trace table, click **ReviewProcess**.
- The **LegacyReview** human workflow component is shown as running and the **VeryExpensiveUserReview** human workflow component is shown as withdrawn.
18. Click the Flow tab.
  19. View the new flow with **LegacyReview**.



20. Log in to Oracle Business Process Workspace.

The screenshot shows the Oracle Business Process Workspace interface. The title bar reads 'ORACLE Business Process Workspace'. The top navigation bar includes links for 'Tasks', 'Activity Guides', 'Process Tracking', and 'Standard Dashboards'. Below the navigation is a search bar and an 'Advanced' button. The main area displays a list titled 'My Tasks(5)' containing five entries: 'Approval request', 'Approval request', 'Very Expensive Review', 'SimpleUserReview', and 'Project3'. The interface has a clean, modern design with blue and grey colors.

21. Click Process Tracking to refresh the page.

The screenshot shows the 'Process Tracking' section of the Oracle Business Process Workspace. The title bar reads 'ORACLE Business Process Workspace'. The top navigation bar includes links for 'Tasks', 'Activity Guides', 'Process Tracking', and 'Standard Dashboards'. The main area features a grid table with columns for 'Title', 'Number', 'Initiator', 'Process Name', and 'Initiated'. The table currently contains no data. On the left side, there is a sidebar with sections for 'Applications' (which shows 'No applications available.') and 'Views (List filters)' (which includes 'Inbox' and 'History' with options for 'Last day', 'Last week', 'Last month', and 'Three months ago').

22. Note that version ReviewProcess 2.0 is running.

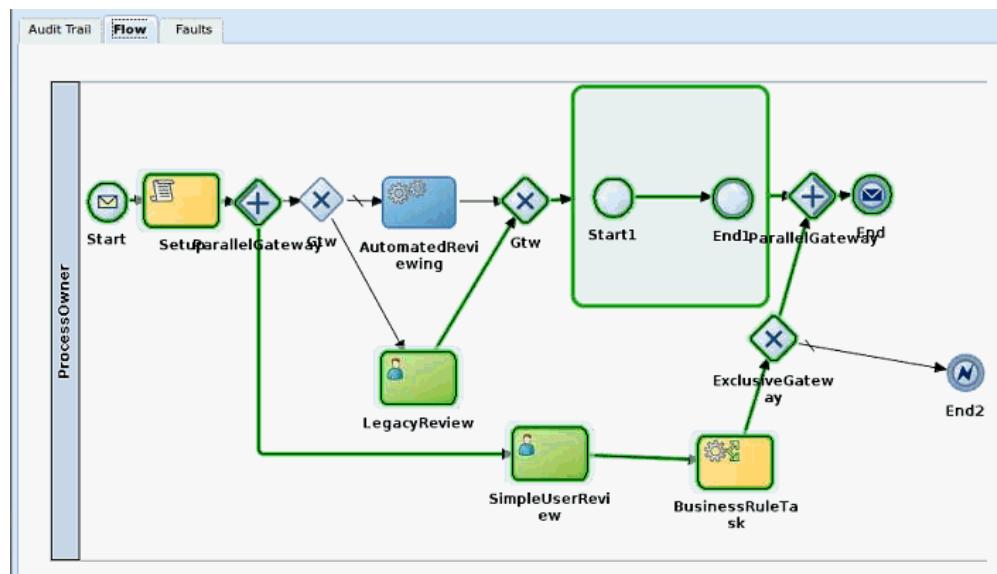
Title	Number	Initiator	Process Name
Instance #60005 of InstanceMigration	60005	[InstanceMigration v1.0] Instance	[InstanceMigration v1.0] Instance
Instance #60006 of InstanceMigration	60006	[InstanceMigration v3.0] Instance	[InstanceMigration v3.0] Instance
after migration Title	60007	[Project3 v2.0] ReviewProcess	[Project3 v2.0] ReviewProcess

23. Go to the task to approve, and select **Approve**.

24. Return to the instance in Oracle Enterprise Manager Fusion Middleware Control.

25. Click the **Flow** tab.

26. Note that the activity is displayed as approved.



## 8.8.5 Example of Migrating a Revision Instance with All Service Components

This example describes how to migrate a revision with a variety of service components:

- Oracle Mediator
- BPEL process
- Human workflow
- Business rules
- Oracle BPM

To migrate a revision instance with all service components:

1. Go to the Instances page in Oracle Enterprise Manager Fusion Middleware Control. For this example, there are three deployed revisions of the composite. Revision 1.0 has one instance (for this example, **40005**).

Instance ID	Name	Conversation ID	Instance State
40005			...

2. Click the instance ID and note the different service components in the revision.

Instance	Type	Usage	State	Time	Composite Instance
Mediator_ep	Web Service	Service	Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
Mediator	Mediator Component		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
InstanceMigration	BPMN Component		Running	Apr 23, 2012 8:44:31 AM	InstanceMigration of 40005
Approval	Human Workflow Compon...		Running	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
OracleRules1	Decision Service Compon...		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
BPELInstanceMigration	BPEL Component		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005

3. Invoke the Facade API to perform the following tasks:

- Generate a migration report for migrating an instance from revision 1.0 to 2.0.
- Attempt the actual migration.

For this example, a simple JavaServer Page (JSP) interface is used to invoke the Facade APIs. You can create your own JSP interface. For information about the Facade API, see [Section 8.8.2, "Migrating Instances with the Facade API."](#)

4. In the **Target Revision** field, enter a revision to which to migrate (for this example, **2.0**).

CompositeDN:	default/InstanceMigration!1.0	<input type="button" value="X"/>
Target Revision:	2.0	<input type="button" value="Submit"/>
<hr/>		
<b>MigrationReport</b>		
Target Revision: 3.0		
Candidate Composite Instance Count = 2		
Feasibility: Automatic		
<b>default/InstanceMigration!2.0 (40004) -- Automatic</b>		
BPELInstanceMigration	bpel:70003	Automatic
Approval	workflow:200043	Automatic
InstanceMigration	bpmn:60004	Automatic
Mediator	mediator:B0C902208D5711E1BFDADDCCDE9795A3	Automatic
<b>default/InstanceMigration!2.0 (40002) -- Automatic</b>		
Approval	workflow:200039	Automatic
BPELInstanceMigration	bpel:70001	Automatic
InstanceMigration	bpmn:60002	Automatic
Mediator	mediator:B0C902208D5711E1BFDADDCCDE9795A3	Automatic
<hr/>		
<b>MigrationResult</b>		
Migrated Count = 2		
<b>InstanceMigration (40004)</b>		
BPELInstanceMigration	bpel:70003	bpel

5. Click **Submit**.

The report is completed and displayed in the following sections:

- The **Migration Report** section indicates that all service components are eligible for automatic migration.
- The **Migration Result** section indicates that all service components were successfully migrated.

CompositeDN:	default/InstanceMigration!1.0	
Target Revision:	2.0	
<input type="button" value="Submit"/>		
<b>MigrationReport</b>		
Target Revision: 2.0		
Candidate Composite Instance Count = 1		
Feasibility: Automatic		
<b>default/InstanceMigration!1.0 (40005) -- Automatic</b>		
BPELInstanceMigration	bpel:70004	Automatic
InstanceMigration	bpmn:60005	Automatic
Mediator	mediator:375715E08D5B11E1BFDADDCCDE9795A3	Automatic
OracleRules1	decision:4dec2856-0295-48a1-979e-133566d77524	Automatic
Approval	workflow:200045	Automatic
<b>MigrationResult</b>		
Migrated Count = 1		
<b>InstanceMigration (40005)</b>		
BPELInstanceMigration	bpel:70004	bpel
InstanceMigration	bpmn:60005	bpmn
Mediator	mediator:375715E08D5B11E1BFDADDCCDE9795A3	mediator
OracleRules1	decision:4dec2856-0295-48a1-979e-133566d77524	decision
Approval	workflow:200045	workflow

6. Return to the Instances page in Oracle Enterprise Manager Fusion Middleware Control.
7. Refresh the page and note that the revision 1.0 instance is no longer available.
8. Click revision 2.0 of the composite and note that instance 4005 is running.

Instance ID	Name	Conversation ID	Instance State
40005			<span style="color: red;">*</span>

9. Click the instance ID and note that all service components were migrated. The Oracle BPMN service component is awaiting approval.

Instance	Type	Usage	State	Time	Composite Instance
Mediator_ep	Web Service	Service	Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
Mediator	Mediator Component		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
InstanceMigration	BPMN Component		Running	Apr 23, 2012 9:43:13 AM	InstanceMigration of 40005
Approval	Human Workflow Compon...		Running	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
OracleRules1	Decision Service Compon...		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
BPELInstanceMigration	BPEL Component		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005

**10.** Log in to Oracle Business Process Workspace.

**11.** From the **Actions** list, select **Approve**.

Title	Process Name
Approval request	InstanceMigration
Approval request	InstanceMigration

**12.** Return to the instance in Oracle Enterprise Manager Fusion Middleware Control and note that the service component instances have completed.

Instance	Type	Usage	State	Time	Composite Instance
Mediator_ep	Web Service	Service	Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
Mediator	Mediator Component		Completed	Apr 23, 2012 9:46:20 AM	InstanceMigration of 40005
InstanceMigration	BPMN Component		Completed	Apr 23, 2012 9:46:20 AM	InstanceMigration of 40005
OracleRules1	Decision Service Compon...		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
BPELInstanceMigration	BPEL Component		Completed	Apr 23, 2012 8:44:30 AM	InstanceMigration of 40005
Approval	Human Workflow Compon...		Completed	Apr 23, 2012 9:46:20 AM	InstanceMigration of 40005

## 8.8.6 Example of Migrating a Revision with Incompatible Service Components

This example shows how migration is not possible because the BPEL process is using a durable wait activity.

- Using the Facade API, attempt to migrate an instance of revision 3.0 to 1.0. For this example, the JSP page used in [Section 8.8.5, "Example of Migrating a Revision Instance with All Service Components"](#) is again used.
- In the **Target Revision** field, enter a revision number (for this example, 1.0).
- Click **Submit**.

CompositeDN:	default/InstanceMigration!3.0	
Target Revision:	1.0	
<input type="button" value="Submit"/>		
<hr/>		
<b>MigrationReport</b>		
Target Revision: 2.0		
Candidate Composite Instance Count = 1		
Feasibility: Automatic		
<b>default/InstanceMigration!1.0 (40005) -- Automatic</b>		
BPELInstanceMigration	bpel:70004	Automatic
InstanceMigration	bpmn:60005	Automatic
Mediator	mediator:375715E08D5B11E1BFDADDCCDE9795A3	Automatic
OracleRules1	decision:4dec2856-0295-48a1-979e-133566d77524	Automatic
Approval	workflow:200045	Automatic
<hr/>		
<b>MigrationResult</b>		
Migrated Count = 1		
<b>InstanceMigration (40005)</b>		
BPELInstanceMigration	bpel:70004	bpel
InstanceMigration	bpmn:60005	bpmn
Mediator	mediator:375715E08D5B11E1BFDADDCCDE9795A3	mediator
OracleRules1	decision:4dec2856-0295-48a1-979e-133566d77524	decision
Approval	workflow:200045	workflow

The report is completed and displayed in the following sections:

- The **Migration Report** section indicates that migration is incompatible due to an unsupported, durable BPEL process.
- The **Migration Result** indicates that the subsequent migration attempt has failed.

CompositeDN:	<input type="text" value="default/InstanceMigration!3.0"/>		
Target Revision:	<input type="text" value="1.0"/>		
<input type="button" value="Submit"/>			
<b>MigrationReport</b>			
Target Revision: 1.0			
Candidate Composite Instance Count = 1			
Feasibility: Incompatible			
<b>default/InstanceMigration!3.0 (40006) -- Incompatible</b>			
BPELInstanceMigration	bpel:70005	Incompatible	The process is durable
InstanceMigration	bpmn:60006	Automatic	
OracleRules1	decision:2a5f25f1-8455-4b2f-987f-eaa57c876f8d	Automatic	
Approval	workflow:200047	Automatic	
Mediator	mediator:436099108D5B11E1BFDADDCCDE9795A3	Automatic	
<b>MigrationResult</b>			
Migrated Count = 0			
Failed Count = 1			
<b>InstanceMigration (40006)</b>			
BPELInstanceMigration	bpel:70005	bpel	The process is durable
InstanceMigration	bpmn:60006	bpmn	
OracleRules1	decision:2a5f25f1-8455-4b2f-987f-eaa57c876f8d	decision	
Approval	workflow:200047	workflow	
Mediator	mediator:436099108D5B11E1BFDADDCCDE9795A3	mediator	

4. Return to the Instances page in Oracle Enterprise Manager Fusion Middleware Control.
5. Click the **Refresh** icon, and note that the old instance was not migrated to the new instance.

---

# Developing a Database Growth Management Strategy

This chapter describes how to develop a database growth management strategy, including determining the optimal profile or size for the database; monitoring disk space usage, hardware resources, and database performance; understanding growth management challenges and testing strategies; and understanding space management.

This chapter includes the following sections:

- [Section 9.1, "Introduction to Planning for Database Growth"](#)
- [Section 9.2, "Identifying the Profile or Size of the Database"](#)
- [Section 9.3, "Monitoring Space Usage, Hardware Resources, and Database Performance"](#)
- [Section 9.4, "Understanding Growth Management Challenges and Testing Strategies"](#)
- [Section 9.5, "Understanding Space Management"](#)

For information about managing database growth with the purge scripts and component table partitioning, see [Chapter 10, "Managing Database Growth."](#)

For information about troubleshooting, see [Section B.2, "Parallel Purging and Table Partitioning Issues."](#)

---

**Note:** This chapter is intended for database administrators.

---

## 9.1 Introduction to Planning for Database Growth

An Oracle SOA Suite 11g installation presents several challenges for database administrators, including managing the growth of the Oracle SOA Suite database. Underestimating the importance of managing the database can lead to issues when the database is moved to a production environment. This chapter helps you determine an appropriate strategy and highlights the need for capacity planning, testing, and monitoring.

The recommended strategies are based on the profile or the predicted size of the Oracle SOA Suite installation. The tools and techniques that implement the strategies are straight forward, which helps to simplify the recommendations. However, this does restrict administrators to a set of tools that must be implemented as designed.

Testing and monitoring are required to determine the effectiveness and resource requirements of a growth management strategy. Thorough testing ensures that the

tools, the database, and hardware resources all come together to meet the needs of current and future database growth estimates.

## 9.2 Identifying the Profile or Size of the Database

This section describes how to identify the profile or size of the Oracle SOA Suite database to determine an optimal growth management strategy. For more information, see [Section 9.4, "Understanding Growth Management Challenges and Testing Strategies."](#)

The calculations detailed in this section to approximate disk space usage are not a replacement for conducting a thorough space capacity plan. However, the estimates are sufficient to draw conclusions on the appropriate growth management strategy, while highlighting the need for disk space planning.

---

**Note:** This section provides frequent references to [Section 9.3, "Monitoring Space Usage, Hardware Resources, and Database Performance"](#) for details about space calculation instructions.

---

[Table 9–1](#) provides a profile of small, medium, and large installations based on the composite space persisted daily and the minimum retention space. These two metrics are related in an and/or condition because the retention policy may not retain more than several days of data, but composite inflow may be high.

**Table 9–1 Oracle SOA Suite Database Profiles**

Database Profile	Composite Space Persisted Daily	Minimum Retention of Space
Small	< 10 GB	< 100 GB
Medium	10-30 GB	100-300 GB
Large	> 30 GB	> 300 GB

### 9.2.1 Identifying the Inflow of Data

The rate of composite inflow and space usage is best understood as an average derived after many days of load testing. This allows for allocated space (segment extents) to be better utilized. To understand inflow, the following data points are investigated:

- [Section 9.2.1.1, "Identifying the Number of Composites Produced Daily."](#)
- [Section 9.2.1.2, "Identifying the Disk Space Used by Each Composite."](#)
- [Section 9.2.1.3, "Identifying the Composite Space Persisted Daily."](#)
- [Section 9.2.1.4, "Analyzing Space Distribution of Oracle SOA Suite Segments."](#)

#### 9.2.1.1 Identifying the Number of Composites Produced Daily

Use the following formula to identify the number of composites produced daily:

Daily-inflow-composite = (Composite Total / Period)

For example, calculate the average number of composites produced daily based on 5 days of load testing with a total composite count of 100,000:

$$(20,000 = (100,000 / 5))$$

For more information, see [Section 9.3.1.1, "Determining the Growth Trend of Components."](#)

### **9.2.1.2 Identifying the Disk Space Used by Each Composite**

Use the following formula to identify the disk space used by each composite:

$$\text{Inflow-space-per-composite} = (\text{SOA Schema Size} / \text{Composite Total})$$

For example, calculate the average disk space used by each composite with a total of 100,000 composites and an Oracle SOA Suite schema size of around 200 GB:

$$(2\text{MB} = (200 \text{ GB} / 100,000))$$

For more information, see [Section 9.3.1.2, "Determining the Growth Trend of the Oracle SOA Suite Schema."](#)

### **9.2.1.3 Identifying the Composite Space Persisted Daily**

Use the following formula to identify the composite space persisted daily:

$$\text{Daily-inflow-composite-space} = (\text{Daily-inflow-composite} * \text{Inflow-space-per-composite})$$

For example, calculate the average disk space used by composites daily with 20,000 composites daily of 2 MB each:

$$(40 \text{ GB} = (20,000 * 2 \text{ MB}))$$

Alternatively:

$$\text{Daily-inflow-composite-space} = (\text{SOA Schema Size} / \text{Period})$$

### **9.2.1.4 Analyzing Space Distribution of Oracle SOA Suite Segments**

Analyze the shape of the Oracle SOA Suite schema so that the distribution of segment space (tables, indexes, and large objects (LOBs)) is understood and segments that may be problematic are identified:

- Determine the growth trend of the components. For more information, see [Section 9.3.1.1, "Determining the Growth Trend of Components."](#)
  - Collect component statistics after each day of load testing so that growth averages can be determined.
- Determine the growth trend of the Oracle SOA Suite schema. For more information, see [Section 9.3.1.2, "Determining the Growth Trend of the Oracle SOA Suite Schema."](#)
  - Collect schema sizing statistics after each day of load testing so that growth averages can be determined.
- Determine the largest segments. For more information, see [Section 9.3.1.3, "Determining the Largest Segments."](#)
- Determine the growth trend of tables and indexes. For more information, see [Section 9.3.1.4, "Determining the Growth Trend of Tables and Indexes."](#)
  - The growth statistics for table and indexes are automatically gathered through the Automatic Workload Repository (AWR).

For more information, see [Section 9.3.1.1, "Determining the Growth Trend of Components."](#)

## 9.2.2 Developing a Retention Policy

You must consider how long composites are retained in the database. This affects the size of the Oracle SOA Suite schema and the performance of the purge scripts. The following factors drive the retention policy:

- Legal requirements
- Line of business requirements
- Overall company policy on retention of data

The longer the retention policy, the greater the volume of data that must be stored and, correspondingly, the higher the disk capacity requirements.

### 9.2.2.1 Determining the Minimum Retained Disk Space

Use the following formula to identify the minimum retained disk space. For information about identifying Daily-inflow-composite-space, see [Section 9.2.1.3, "Identifying the Composite Space Persisted Daily."](#)

$\text{Min-space-retain} = \text{Daily-inflow-composite-space} * \text{Retention Period in days}$

For example, calculate the minimum retained disk space with 40 GB of composite space persisted daily and a retention period of 10 days:

$(400 \text{ GB} = (40 \text{ GB} * 10))$

### 9.2.2.2 Determining the Minimum Number of Retained Composites

Use the following formula to identify the minimum number of retained composites. For information about identifying Daily-inflow-composite, see [Section 9.2.1.1, "Identifying the Number of Composites Produced Daily."](#)

$\text{Min-composites-retain} = \text{Daily-inflow-composite} * \text{Retention Period in days}$

For example, calculate the minimum number of retained composites with 20,000 composites created daily and a retention period of 10 days:

$(200,000 = (20,000 * 10))$

From this, it can be stated that 200,000 composites retain on average 400 GB of data based on a 10 day retention policy.

---

**Note:** The above calculation defines an approximation on the minimum disk space usage. The actual minimum disk space usage is more accurately determined through quality assurance testing. For more information, see [Section 9.4.2, "Quality Assurance Testing."](#)

---

## 9.2.3 Identifying the Outflow of Data

The outflow of composites is a measurement of the number of composites that are deleted. It is not a factor when determining the database profile, but is an important metric when evaluating the effectiveness of the growth management strategy.

The goal of measuring outflow is to ensure the following:

- That the inflow can be deleted.
- A steady state for space usage, hopefully just above the minimum retained disk space usage.

For more information, see [Section 9.2.2.1, "Determining the Minimum Retained Disk Space."](#)

There are two cycles that must first be defined:

- The purge cycle: Refers to a period that may involve multiple executions of the purge scripts.
- The maintenance cycle: Refers to the number of days required to perform all space management operations. For more information, see [Section 9.5.1, "Introduction to the Components of a Data File."](#)

The appropriate growth management strategy may include both purging and partitioning. Therefore, outflow should not be measured until eligible partitions have been dropped. The dropping of partitions is a maintenance operation. Therefore, it makes little sense to measure outflow metrics until the maintenance cycle has finished.

The following metrics can be captured before and after the completion of the maintenance cycle to understand the effectiveness of the strategy and to re-evaluate space distribution:

- Determine the growth trend of the components. For more information, see [Section 9.3.1.1, "Determining the Growth Trend of Components."](#)
- Determine the growth trend of the Oracle SOA Suite schema. For more information, see [Section 9.3.1.2, "Determining the Growth Trend of the Oracle SOA Suite Schema."](#)
- Determine the largest segments. For more information, see [Section 9.3.1.3, "Determining the Largest Segments."](#)
- Determine the growth trend of tables and indexes. For more information, see [Section 9.3.1.4, "Determining the Growth Trend of Tables and Indexes."](#)

---

**Note:** If a steady state has been reached, then the difference between the before and after metrics for components and schema growth should be near zero or negative. Otherwise, the purge strategy may not be coping or the inflow of data may have increased.

---

## 9.2.4 Identifying Long Running Composites and Table Partitioning

Long running composites are composites that remain open beyond the retention period. These composites do not have significant implications for the purge scripts, but their impact is felt when table partitioning is implemented. ([Section 9.4, "Understanding Growth Management Challenges and Testing Strategies"](#) recommends that table partitioning be considered for medium and large installations.)

The partitioned tables are (should be) excluded from the purge scripts because their space is reclaimed through the database ALTER TABLE ... DROP PARTITION command. Long running composites remain open beyond the desired retention period, preventing the partition from being dropped and the space from being reclaimed. Therefore, when estimating the size of the partitioned tables, the retention period that is used should equal the longest running composite:

Retention period = Longest Running Composite.

Understanding space implications of long running transactions and the size of the partitioned tables is best understood through quality assurance testing, as described in [Section 9.4, "Understanding Growth Management Challenges and Testing Strategies."](#)

However, use the calculations in the following sections to estimate the space used by each table that is partitioned.

#### 9.2.4.1 Recommendations for Each Table to Partition

It is best to load the tables over a period of several days to produce reasonable averages. [Table 9–2](#) provides details.

**Table 9–2 Table Partitioning Recommendations**

Action	Command
Determine the average number of rows generated daily for each table.	$(\text{Total rows} / \text{period})$
Estimate the number of rows based on the longest running composite.	$((\text{Total rows} / \text{period}) * \text{Longest running composite in days})$
Estimate space usage for the table and index based on row calculations.	See <a href="#">Section 9.3.1.5, "Estimating Table Size"</a> and <a href="#">Section 9.3.1.6, "Estimating Index Size."</a>

---

**Note:** As of Oracle SOA Suite Release 11g R1 (11.1.1.6), a new set of scripts called row migration have been provided. These scripts can move long running composites from one partition to another, thereby facilitating the removal of the partition. However, it is a best practice to plan for the space requirements of the partition tables and not rely on the row migration scripts.

---

## 9.3 Monitoring Space Usage, Hardware Resources, and Database Performance

The following sections describe how to monitor space usage:

- [Section 9.3.1.1, "Determining the Growth Trend of Components"](#)
- [Section 9.3.1.2, "Determining the Growth Trend of the Oracle SOA Suite Schema"](#)
- [Section 9.3.1.3, "Determining the Largest Segments"](#)
- [Section 9.3.1.4, "Determining the Growth Trend of Tables and Indexes"](#)
- [Section 9.3.1.5, "Estimating Table Size"](#)
- [Section 9.3.1.6, "Estimating Index Size"](#)
- [Section 9.3.1.7, "Monitoring Unused Indexes"](#)

The following sections describe how to monitor hardware resources and database performance:

- [Section 9.3.2.1, "Hardware - OSWatcher Black Box"](#)
- [Section 9.3.2.2, "Database – AWR / ADDM"](#)
- [Section 9.3.2.3, "Disk I/O - Oracle Orion"](#)

### 9.3.1 Monitoring Space Usage

Monitoring space is an essential task of database and system administrators to avoid unplanned outages. This section provides advice to help with capacity planning and determine the effectiveness of the growth management strategy. It is *not* meant to be a comprehensive guide on all aspects of monitoring and capacity planning.

For more information on capacity planning and threshold monitoring, see *Oracle Database Administrator's Guide* for more information.)

#### 9.3.1.1 Determining the Growth Trend of Components

The component master tables record the creation date of each row to use to determine growth trends over a given period:

- COMPOSITE\_INSTANCE: CREATED\_TIME
- CUBE\_INSTANCE: CREATION\_DATE
- MEDIATOR\_INSTANCE: CREATED\_TIME

However, querying the component master tables is limited as purging constantly removes data, making trend predictions difficult. To determine a trend over a given period requires data to be regularly collected with an associated time stamp. This can be achieved with a simple component history table that is populated each day. This table should be sufficient to determine the effectiveness of the growth management strategy and growth trends.

- For performance reasons, it may be best to create a history table per component, as shown in [Example 9–1](#).

#### **Example 9–1 History Table Creation**

```
SQL> CREATE TABLE SOA_FABRIC_HIST (SFH_DATE TIMESTAMP, SFH_COUNT NUMBER);

SQL> INSERT INTO SOA_FABRIC_HIST SELECT SYSTIMESTAMP, COUNT(*) FROM
COMPOSITE_INSTANCE GROUP BY SYSTIMESTAMP;

SQL> CREATE TABLE SOA_BPEL_HIST (SBH_DATE TIMESTAMP, SBH_COUNT NUMBER);

SQL> INSERT INTO SOA_BPEL_HIST SELECT SYSTIMESTAMP, COUNT(*) FROM CUBE_INSTANCE
GROUP BY SYSTIMESTAMP;
```

and so on.

- An alternate to counting the rows in each component table is to query the NUM\_ROWS column from USER\_TABLES as long as the tables are analyzed.

#### 9.3.1.2 Determining the Growth Trend of the Oracle SOA Suite Schema

The objects (table, index, and LOBs) created for the Oracle SOA Suite schema may be spread over many tablespaces, but all have the same owner (\*soainfra) to use to group space usage. When trying to determine the space requirements of each composite, measuring the whole schema allows for better space metrics because indexes and LOB segments are taken into account.

To monitor the growth of the Oracle SOA Suite schema, a simple history table can be populated daily. This table should be sufficient to determine the effectiveness of space management. For more information, see [Section 9.5, "Understanding Space Management."](#)

- Create a schema growth table based on object type, as shown in [Example 9–2](#).

**Example 9–2 Schema Growth Table Creation**

```
SQL> CREATE TABLE SOA_SIZE_SCHEMA_HIST (SSCH_DATE TIMESTAMP, SSCH_SUM_MB NUMBER);

SQL> INSERT INTO SOA_SIZE_SCHEMA_HIST SELECT SYSTIMESTAMP, SUM(BYTES)/1024/1024
 FROM DBA_SEGMENTS WHERE OWNER='<SOA_OWNER>' GROUP BY SYSTIMESTAMP;
```

- Optionally, a history table by object type (for example, table, index, and LOB) may be helpful when coupled with the largest segment to verify which tables may need partitioning or lack space management. [Example 9–3](#) provides details.

**Example 9–3 History Table Creation**

```
SQL> CREATE TABLE SOA_SIZE_TYPE_HIST (SSCH_DATE TIMESTAMP, SSCH_TYPE VARCHAR2(18), SSCH_SUM_MB NUMBER);

SQL> INSERT INTO SOA_SIZE_TYPE_HIST SELECT SYSTIMESTAMP, SEGMENT_TYPE,
 SUM(BYTES)/1024/1024 FROM DBA_SEGMENTS WHERE OWNER='SOA_OWNER' GROUP BY
 SYSTIMESTAMP, SEGMENT_TYPE;
```

**9.3.1.3 Determining the Largest Segments**

Understanding which segments are the largest in the schema helps to determine the tables that may be better managed as range partitioned tables. In addition, monitoring the largest segments may uncover missing space management operations or inappropriate audit settings.

- Identify the largest 20 segments for the Oracle SOA Suite schema, as shown in [Example 9–4](#),

**Example 9–4 Identification of 20 Largest Segments**

```
SQL> SELECT SEGMENT_NAME, SEGMENT_TYPE, (SUM(BYTES)/1024/1024) MB_SIZE FROM
 DBA_SEGMENTS WHERE OWNER='SOA_OWNER' AND ROWNUM < 20 GROUP BY SEGMENT_NAME,
 SEGMENT_TYPE ORDER BY 3 DESC;
```

- The largest segments may be LOB segments, as shown in [Example 9–5](#).

**Example 9–5 LOB Segments are Largest Segments**

```
SQL> SELECT L.TABLE_NAME, S.SEGMENT_NAME, (SUM(BYTES)/1024/1024) MB_SIZE FROM
 DBA_LOBS L, DBA_SEGMENTS S WHERE S.OWNER='<SOA_OWNER>' AND S.SEGMENT_TYPE =
 'LOBSEGMENT' AND S.SEGMENT_NAME = L.SEGMENT_NAME AND S.OWNER='SOA_OWNER'
 GROUP BY L.TABLE_NAME, S.SEGMENT_NAME;
```

or

```
SQL> SELECT L.TABLE_NAME FROM DBA_LOBS L WHERE L.OWNER ='<SOA_OWNER>' AND
 L.SEGMENT_NAME = 'SEGMENT_NAME';
```

- To determine the size of an individual segment:

```
SQL> SELECT SEGMENT_NAME, (SUM(BYTES)/1024/1024) MB_SIZE FROM DBA_SEGMENTS
 WHERE OWNER='SOA_OWNER' AND SEGMENT_NAME = 'TABLE_NAME' GROUP BY SEGMENT_
 NAME;
```

**9.3.1.4 Determining the Growth Trend of Tables and Indexes**

Use the OBJECT\_GROWTH\_TREND function of the DBMS\_SPACE package to show the trend in space growth for a table. For more information, see *Oracle Database Administrator's Guide*.

The OBJECT\_GROWTH\_TREND function of the DBMS\_SPACE package produces a table of one or more rows, where each row describes the space use of the object at a specific time. The function retrieves the space totals from the AWR or computes current space and combines it with historic space changes retrieved from AWR.

The following example displays the growth in used and allocated space over time for the COMPOSITE\_INSTANCE table.

```
SQL> SELECT TIMEPOINT, SPACE_USAGE, SPACE_ALLOC, QUALITY FROM TABLE (DBMS_
SPACE.OBJECT_GROWTH_TREND ('DEV_SOAINFRA', 'COMPOSITE_INSTANCE', 'TABLE'));
```

**Example 9–6** shows the complete syntax for the dbms\_space.object\_growth\_trend procedure:

**Example 9–6 DBMS\_SPACE.OBJECT\_GROWTH\_TREND Procedure**

```
dbms_space.object_growth_trend (
 object_owner in varchar2,
 object_name in varchar2,
 object_type in varchar2,
 partition_name in varchar2 default null,
 start_time in timestamp default null,
 end_time in timestamp default null,
 interval in dsinterval_unconstrained default null,
 skip_interpolated in varchar2 default 'false',
 timeout_seconds in number default null,
 single_datapoint_flag in varchar2 default 'true')
```

Table 9–3 describes the object\_growth\_trend function parameters.

**Table 9–3 OBJECT\_GROWTH\_TREND Function Parameters**

Parameter	Description
object_owner	The schema containing the object.
object_name	The name of the object.
OBJECT_TYPE	The type of the object.
partition_name	The name of the table or index partition, if relevant. Otherwise, specify NULL.
start_time	A time stamp value indicating the beginning of the growth trend analysis.
end_time	A time stamp value indicating the end of the growth trend analysis. The default is NOW.
interval	The interval (yes) or not (no). This setting is useful when the result table is displayed as a table rather than a chart. This is because you can see more clearly how the actual recording interval relates to the requested reporting interval. The function returns a table, each row of which provides space use information on the object for one interval. If the return table is very large, the results are pipelined so that another application can consume the information as it is being produced.
skip_interpolated	Specify whether to skip interpolation of missing values (true or false).
timeout_seconds	The timeout value for the function in seconds.
single_data_point_flag	Specify whether in the absence of statistics to sample the segment.

Returned values are shown in [Example 9–7](#).

#### **Example 9–7 Returned Values**

```
TYPE object_growth_trend_row IS RECORD(
 timepoint timestamp,
 space_usage number,
 space_alloc number,
 quality varchar(20));
```

[Table 9–4](#) describes the object\_growth\_trend\_row return values.

**Table 9–4 OBJECT\_GROWTH\_TREND\_ROW Return Values**

Parameter	Description
timepoint	A timestamp value indicating the time of the reporting interval. Records are not produced for values of time that precede the oldest recorded statistics for the object.
space_usage	The number of bytes actually being used by the object data.
space_alloc	The number of bytes allocated to the object in the tablespace at that time.
quality	<p>A value indicating how well the requested reporting interval matches the actual recording of statistics. This information is useful because there is no guaranteed reporting interval for object size use statistics, and the actual reporting interval varies over time and from object to object.</p> <ul style="list-style-type: none"> <li>■ <b>good:</b> The value whenever the value of time is based on recorded statistics with a recorded timestamp within 10% of the interval specified in the input parameters. (The output returned by this function is an aggregation of values recorded across all instances in an Oracle Real Application Clusters environment. Each value can be computed from a combination of good and interpolated values. The aggregate value returned is marked good if at least 80% of that value was derived from good instance values.)</li> <li>■ <b>interpolated:</b> The value did not meet the criteria for good, but was based on recorded statistics before and after the value of time. Current in-memory statistics can be collected across all instances in a cluster and treated as the recorded value for the present time.</li> <li>■ <b>projection:</b> The value of time is in the future (the time the table was produced). In an Oracle Real Application Clusters environment, the rules for recording statistics allow each instance to choose independently which objects are selected.</li> </ul>

#### **9.3.1.5 Estimating Table Size**

The create\_table\_cost procedure of the dbms\_space package allows the size of a table to be estimated using the predicted number of rows for an existing table or based on a table column definition. The size of tables can vary widely based on the tablespace storage attribute that is accounted for by this procedure. There are two overloads of this procedure:

- The first procedure takes the column information of the table.
- The second procedure takes the average row size of the table.

Because the Oracle SOA Suite tables already exist, it is the second variant that is most useful. The following example estimates the size of the CUBE\_INSTANCE table with 10,000 rows, an average row length of 360, and a PCT FREE of 10.

1. Execute the following command. The average row length and current PCT\_FREE is derived from DBA\_TABLES after ensuring that the table has been analyzed:

```
SQL> SELECT AVG_ROW_LEN, PCT_FREE FROM DBA_TABLES WHERE TABLE_NAME =
'CUBE_INSTANCE' AND OWNER = 'DEV_SOAINFRA';
```

2. Execute the dbms\_space.create\_table\_cost procedure:

```
set serverout on
declare

 v_used number(10);
 v_alloc number(10);

begin
 dbms_space.create_table_cost
 ('SOA1_SOAINFRA',360,10000,10, v_used,v_Alloc);
 dbms_output.put_line('used bytes: ' || to_char(v_used));
 dbms_output.put_line('allocated bytes: ' || to_char(v_alloc));

end;
/
```

[Example 9–8](#) estimates the space usage of a table based on its column definition.

#### **Example 9–8 Space Usage Estimates**

```
set serveroutput on
declare

 v_used_bytes number(10);
 v_allocated_bytes number(10);
 v_type sys.create_table_cost_columns;

begin

 v_type := sys.create_table_cost_columns
 (sys.create_table_cost_colinfo('number',9),
 sys.create_table_cost_colinfo('varchar2',50),
 sys.create_table_cost_colinfo('varchar2',15),
 sys.create_table_cost_colinfo('date'f,null),
 sys.create_table_cost_colinfo('date'f,null));
 dbms_space.create_table_cost
 ('users',v_type,10000,7,v_used_bytes,v_allocated_bytes);
 dbms_output.put_line('used bytes: ' || to_char(v_used_bytes));
 dbms_output.put_line('allocated bytes: ' || to_char(v_allocated_bytes));
end;
/
```

Complete syntax for the dbms\_space.create\_table\_cost procedure is shown in [Example 9–9](#) and [Example 9–10](#).

- First overload:

#### **Example 9–9 First Overload**

```
dbms_space.create_table_cost (tablespace_name in varchar2,
 colinfos in create_table_cost_columns, row_count in number,
 pct_free in number, used_bytes out number,
 alloc_bytes out number); create type
 create_table_cost_colinfo is object (col_type varchar(200),
 col_size number);
```

- Second overload:

**Example 9–10 Second Overload**

```
dbms_space.create_table_cost (tablespace_name in varchar2,
avg_row_size in number, row_count in number, pct_free in number,
used_bytes out number, alloc_bytes out number);
```

Both variants require the input values shown in [Table 9–5](#) and [Table 9–6](#).

**Table 9–5 CREATE\_TABLE\_COST Procedure Parameters**

Parameter	Description
tablespace_name	The tablespace in which the object is created. The default is the SYSTEM tablespace.
row_count	The anticipated number of rows in the table.
pct_free	The percentage of free space you want to reserve in each block for future expansion of existing rows due to updates.  In addition, the first variant also requires as input a value for avg_row_size, which is the anticipated average row size in bytes.
	The second variant also requires for each anticipated column values for colinfos, which is an object type comprising the attributes col_type (the data type of the column) and col_size (the number of characters or bytes in the column).

**Table 9–6 CREATE\_TABLE\_COST Procedure Return Values**

Parameter	Description
used_bytes	The actual bytes used by the data, including overhead for block metadata, PCT_FREE space, and so forth.
alloc_bytes	The amount of space anticipated to be allocated for the object taking into account the tablespace extent characteristics.

### 9.3.1.6 Estimating Index Size

The `create_index_cost` procedure of the `dbms_space` package enables you to estimate the space use cost of creating an index on an existing table. Use this to determine the cost of adding an index to the Oracle SOA Suite schema.

[Example 9–11](#) estimates the size of a new index based on the data definition language (DDL).

**Example 9–11 New Index Size**

```
set serveroutput on
declare
v_used_bytes number(10);
v_allocated_bytes number(10);
begin
dbms_space.create_index_cost(
'create index cube_index on cube_instance(cikey)'
v_used_bytes, v_allocated_bytes);
dbms_output.put_line('used bytes: ' || to_char(v_used_bytes));
dbms_output.put_line('allocated bytes: '|| to_char(v_allocated_bytes));
end; /
```

The complete syntax for DBMS\_SPACE.CREATE\_INDEX\_COST procedure is as follows:

```
dbms_space.create_index_cost (ddl in varchar2, used_bytes out number,
 alloc_bytes out number, plan_table in varchar2 default null);
```

The procedure requires the input values shown in [Table 9–7](#).

**Table 9–7 DBMS\_SPACE.CREATE\_INDEX\_COST Values**

Parameter	Description
ddl	The CREATE INDEX statement that creates the index. The DDL statement must be against an existing table.
plan_table	(Optional) The name of the plan table to use. The default is null. The results returned by this procedure depend on statistics gathered on the segment. Therefore, be sure to obtain statistics shortly before executing this procedure. In the absence of recent statistics, the procedure does not issue an error, but it may return inappropriate results. The procedure returns the following values: <ul style="list-style-type: none"> <li>■ used_bytes The number of bytes representing the actual index data.</li> <li>■ alloc_bytes The amount of space allocated for the index in the tablespace.</li> </ul>

Usage notes:

- The table on which the index is created must already exist.
- The computation of the index size depends on statistics gathered on the segment.
- It is imperative that the table has been analyzed recently.
- In the absence of correct statistics, the results may be inaccurate.

### 9.3.1.7 Monitoring Unused Indexes

The Oracle database provides a means of monitoring indexes to determine whether they are used. If an index is not used, it can be dropped, eliminating unnecessary statement overhead.

1. Enter the following statement to start monitoring the usage of an index:

```
SQL> ALTER INDEX INDEX_NAME MONITORING USAGE;
```

2. Enter the following statement to stop monitoring.

```
SQL> ALTER INDEX INDEX_NAME NOMONITORING USAGE;
```

The view V\$OBJECT\_USAGE can be queried for the index being monitored to see if the index has been used. The view contains a USED column whose value is YES or NO, depending upon if the index has been used within the time period being monitored. The view also contains the start and stop times of the monitoring period, and a MONITORING column (YES/NO) to indicate if usage monitoring is currently active. Each time that you specify MONITORING USAGE, the V\$OBJECT\_USAGE view is reset for the specified index. The previous usage information is cleared or reset, and a new start time is recorded. When you specify NOMONITORING USAGE, no further monitoring is performed, and the end time is recorded for the monitoring period. Until the next ALTER INDEX...MONITORING USAGE statement is issued, the view information is left unchanged.

## 9.3.2 Monitoring the Hardware Resources and Database

The hardware resource must be able to support the tools selected to implement the growth strategy. It is important to monitor hardware resource during online transaction processing (OLTP) and maintenance periods and especially when these periods overlap.

### 9.3.2.1 Hardware - OSWatcher Black Box

To monitor CPU, disk, memory, and network O/S resources, Oracle provides OSWatcher Black Box, which must be installed on all tiers in the Oracle SOA Suite installation.

OSWatcher Black Box is a collection of UNIX shell scripts intended to collect and archive operating system and network metrics to aid Oracle Support Services in diagnosing performance issues. OSWatcher Black Box operates as a set of background processes on the server and gathers OS data on a regular basis, invoking such UNIX utilities as vmstat, netstat, and iostat.

The *OSWatcher Black Box User Guide* and product can be downloaded through Metalink Support note 301137.1.

<https://support.oracle.com>

### 9.3.2.2 Database – AWR / ADDM

Oracle provides AWR and the Automatic Database Diagnostic Monitor (ADDM) to gather and analyze database performance statistics.

AWR can be configured to automatically collect performance statistical snapshots at regular intervals, or it can be manually triggered. The ADDM utility can then analyze the statistics between two snapshot intervals to produce a performance summary report that includes the following:

- CPU bottlenecks
- Undersized memory structures
- I/O capacity issues
- High load SQL statements
- High load PL/SQL execution and compilation issues, and high-load Java usage
- Oracle Real Application Clusters specific issues
- Suboptimal use of the Oracle database by the application
- Database configuration issues
- Concurrency issues
- Hot objects

The AWR and ADDM utilities can be executed manually or through Oracle Enterprise Manager Database Control. For more information, see *Oracle Database 2 Day + Performance Tuning Guide*.

### 9.3.2.3 Disk I/O - Oracle Orion

A complete Oracle SOA Suite I/O design plan is beyond the scope of this chapter. However, good advice can be found in the *Oracle Database Performance Tuning Guide*. A well designed I/O plan considers capacity, availability, and performance.

The AWR reports identify segments, data files, and tablespaces that are accessed frequently. OSWatcher identifies lengthy I/O queues. The combination of these tools identify the disk devices and files of concern. This may identify a need to redistribute files to balance I/O or to modify the redundant arrays of inexpensive disks (RAID) levels on slow volumes.

The I/O calibration feature (Oracle Orion) of the Oracle database issues random I/O using the Oracle data files to access the storage media. This produces results that closely match the actual performance of the database. Oracle Orion is expressly designed for simulating Oracle database I/O workloads using the same I/O software stack as Oracle. Oracle Orion can also simulate the effect of striping performed by Oracle Automatic Storage Management. For more information, see *Oracle Database Performance Tuning Guide*.

## 9.4 Understanding Growth Management Challenges and Testing Strategies

This section provides recommendations on the appropriate tools to manage the growth of the Oracle SOA Suite database. The provided advice is for new installations or existing installations whose current strategy may lack procedures such as monitoring and space management. For additional advice, see [Section B.2, "Parallel Purging and Table Partitioning Issues."](#)

It is advisable to read [Section 9.3, "Monitoring Space Usage, Hardware Resources, and Database Performance"](#) before this section to become familiar with the Oracle SOA Suite purging and partitioning tools.

### 9.4.1 Database Growth Management Challenges

The challenges described in this section provide background by describing situations that have contributed to the recommended strategies.

#### 9.4.1.1 Excessive Growth of Oracle SOA Suite Tables Due to an Ineffective Management Strategy

When an ineffective purging strategy has been implemented, the Oracle SOA Suite tables may grow very large. This leads to an urgent need to reclaim space. The larger the tables, the harder it is to delete rows and reclaim space.

The performance of the parallel purge script relies on factors such as CPU resources and the speed of disk I/O. However, very large tables have proven to be challenging. The challenge is due to the amount of data that must be parsed to determine composites that can be deleted. This parsing can monopolize the elapsed time of the entire purge script. For more information, see [Section B.2.1.3, "Using Parallel Query Slaves."](#)

This situation highlights the need to constantly monitor the effectiveness of the growth management strategy and to take corrective actions as soon as possible before the tables become very large.

#### 9.4.1.2 Tuned Parallel Purge Script Cannot Handle the Inflow

To help the performance of the parallel purge script, tables with long elapsed times can be range partitioned and excluded from the script. However, this raises concerns about downtime, if table partitioning is necessary in a live production environment. While tables can be partitioned online through the redefinition packages, this operation may not complete in a reasonable time when presented with a very large table.

As of Oracle SOA Suite Release 11g R1 (11.1.1.6), the granularity of tables that can be partitioned has improved. It is now possible to partition high volume tables with only their master table. This should make partitioning more attractive and feasible. For more information, see [Section 10.4.8, "Partial Partitioning of Components."](#)

#### **9.4.1.3 Table Partitions Cannot Be Dropped Due to Long Running Composites**

Long running composites are composites that remain open beyond the retention period. This has implications for Oracle SOA Suite table partitions because they cannot be dropped until all composites they contain are closed. Only a few open composites can prevent a partition from being dropped and space reclaimed. This situation has given rise to the row migration scripts that are available in Oracle SOA Suite Release 11g R1 (11.1.1.6). For more information, see [Section 10.4.7, "Moving Active, Long Running Instances to a Different Partition."](#)

Plan for sufficient disk space to accommodate partitioned tables that include the retention period of the longest running composites. The row migration scripts are recommended for corrective actions when there is an urgent need to reclaim space.

The movement of composite data by the row migration script raises the following concerns:

- The scripts were written with an assumption that around 5% of the data in a partition be moved to avoid performance concerns with the script.
  - To maintain the requirements of equipartitioning requires the movement of 5% of the rows across many tables. For more information about equipartitioning, see [Section B.2.2.1, "Referential Integrity and Equipartitioning."](#)
  - The arbitrary figure of 5% does not convey the size of the partition, which depends on inflow rate and partition period (daily, weekly, and monthly).
- Repeated migration of long running composites to either the latest partition or to a partition specifically created to pool active composites may lead to an accumulation.
  - A given partition may become very large and require purging that has other implications. For more information, see [Section B.2.2.5, "Partition Pruning."](#)

## **9.4.2 Quality Assurance Testing**

Testing the growth management strategies is essential to ensure that tools and techniques are practiced and understood.

The hardware resources available for quality assurance testing are unlikely to be identical to a production environment. Therefore, administrators must make conservative predictions when projecting results onto the production host.

The following topics are described:

- [Section 9.4.2.1, "Reviewing Metalink Support Note 1384379.1"](#)
- [Section 9.4.2.2, "Configuring the Production Audit Level Setting"](#)
- [Section 9.4.2.3, "Creating an Oracle SOA Suite Schema - Test Environment"](#)
- [Section 9.4.2.4, "Executing the Parallel or Single Threaded Script and Reclaiming Space"](#)
- [Section 9.4.2.5, "Reviewing the Testing Results"](#)
- [Section 9.4.2.6, "Partitioning the Tables Causing a Bottleneck"](#)

- Section 9.4.2.7, "Repeating Purge Testing and Review and Excluding the Partitioned Table"

#### **9.4.2.1 Reviewing Metalink Support Note 1384379.1**

Review support note *Doc ID 358.1 Maintenance and Administration Advisor: Oracle Fusion Middleware (FMW) SOA 11g Infrastructure Database.*

<https://support.oracle.com>

#### **9.4.2.2 Configuring the Production Audit Level Setting**

Ensure that audit settings are appropriate for a production environment. For more information, see [Section B.2.3, "Reducing Audit Levels."](#)

#### **9.4.2.3 Creating an Oracle SOA Suite Schema - Test Environment**

Though difficult, it is important to create a test environment that is comparable to a production environment. The performance of the purge scripts are adversely affected by the amount of data that requires parsing. Therefore, a well-sized test environment is important to understand purge performance. For more information, see [Section B.2.1.3, "Using Parallel Query Slaves."](#)

The workload mix that populates the schema must resemble a production environment in payload size and number of composite invocations. The data must simulate many days of loading, so that space averages and size estimates can be better determined.

**9.4.2.3.1 Measure Inflow and Space Estimations** During the loading of data, take time to determine the space used per table and respective space distribution. For more information, see [Section 9.2.1, "Identifying the Inflow of Data"](#) for calculations on inflow.

- Determine the growth trend of the components. For more information, see [Section 9.3.1.1, "Determining the Growth Trend of Components."](#)
- Determine the growth trend of the Oracle SOA Suite schema. For more information, see [Section 9.3.1.2, "Determining the Growth Trend of the Oracle SOA Suite Schema."](#)

Collect metrics with partitioning in mind:

- Determine the largest segments. For more information, see [Section 9.3.1.3, "Determining the Largest Segments."](#)
- Determine the growth trend of tables and indexes. For more information, see [Section 9.3.1.4, "Determining the Growth Trend of Tables and Indexes."](#)
- Estimate the table size. For more information, see [Section 9.3.1.5, "Estimating Table Size."](#)
- Estimate the index size. For more information, see [Section 9.3.1.6, "Estimating Index Size."](#)

#### **9.4.2.3.2 Base Point Backup of Test Environment**

Perform a backup of the test environment.

#### **9.4.2.4 Executing the Parallel or Single Threaded Script and Reclaiming Space**

There are two cycles that must first be understood:

- The purge cycle: Refers to a period that may involve multiple executions of the purge scripts.
- The maintenance cycle: Refers to the number of days required to perform all space management operations. For more information, see [Section 9.5.1, "Introduction to the Components of a Data File."](#)

The goal is to execute the purge scripts and maintenance operations to determine the optimal cycle for each, ensuring that the purge has room to grow. The purge script may need to be executed multiple times per day and maintenance operations may span multiple days.

The following sections describe how to tune, monitor, and reclaim space:

- Parallel purge. For more information, see [Section B.2.1, "Executing the Parallel Purge Script."](#)
- Hardware and database monitoring. For more information, see [Section 9.3.2, "Monitoring the Hardware Resources and Database."](#)
- Space management operations. For more information, see [Section 9.5.1, "Introduction to the Components of a Data File."](#)

#### **9.4.2.5 Reviewing the Testing Results**

The goals should be as follows:

- Determine if the purge can delete and reclaim space, either equal to or above the inflow. For more information, see [Section 9.2.2, "Developing a Retention Policy"](#) and [Section 9.2.3, "Identifying the Outflow of Data."](#)
- Determine how many times the purge must be executed and the total elapsed time of the purge cycle to meet purging requirements. This purge cycle must complete within 80% of the time allocated for its execution.
- Determine the bottleneck tables. For more information, see [Section B.2.1.4, "Debugging and Tracing Purging Operations."](#)
- Review database and O/S reports for resource contention and waits. For more information, see [Section 9.3.2, "Monitoring the Hardware Resources and Database."](#)

#### **9.4.2.6 Partitioning the Tables Causing a Bottleneck**

Large installations should consider partitioning the tables identified as difficult to purge. These tables may also be the largest tables. Table partitioning is a proven method of removing bulk data. The Oracle SOA Suite schema is instrumented with a partition key to facilitate range partitioning.

As of Oracle SOA Suite Release 11g R1 (11.1.1.6), the granularity of tables that can be partitioned has improved. It is now possible to partition high volume tables with only their master table. This should make partitioning more attractive and feasible:

- Partial partitioning. For more information, see [Section 10.4.8, "Partial Partitioning of Components."](#)
- Long running composites. For more information, see [Section 9.2.4, "Identifying Long Running Composites and Table Partitioning."](#)

##### **9.4.2.6.1 Base Point Backup with Partitioned Table**

Perform a backup that includes the partitioned table.

#### **9.4.2.7 Repeating Purge Testing and Review and Excluding the Partitioned Table**

Repeat the purge testing and test results review described in [Section 9.4.2.4, "Executing the Parallel or Single Threaded Script and Reclaiming Space"](#) and [Section 9.4.2.5, "Reviewing the Testing Results."](#) Exclude the partitioned table.

### **9.4.3 Recommended Growth Management Strategies**

The following recommended growth management strategies are based on the Oracle SOA Suite database profile:

- [Section 9.4.3.1, "Recommendations for Large Database Profiles."](#)
- [Section 9.4.3.2, "Recommendations for Medium Database Profiles."](#)
- [Section 9.4.3.3, "Recommendations for Small Database Profiles."](#)

The strategies require testing to determine their effectiveness. The testing must ensure the following:

- Purge scripts have room to grow.
- Partitioned tables have sufficient disk space.
- Growth is monitored.
- Maintenance is performed with minimal impact to OLTP performance.

#### **9.4.3.1 Recommendations for Large Database Profiles**

Installations with large database profiles must seriously consider table partitioning as part of their strategy. Table range partitioning is a proven method for managing large tables:

1. Execute the parallel purge excluding the tables that are partitioned. For more information, see [Section 10.3.2, "Looped Purge in Parallel Script with dbms\\_scheduler."](#)
2. Partition the bottleneck tables to the purge script. For more information, see [Section 10.4, "Partitioning Component Tables."](#)
3. Reclaim space as part of the maintenance cycle. For more information, see [Section 9.5.1, "Introduction to the Components of a Data File."](#)
4. Drop eligible partitions as part of the maintenance cycle. For more information, see [Section 10.4.5, "Running the Verification Script."](#)
5. Monitor the inflow and outflow. For more information, see [Section 9.2.2, "Developing a Retention Policy"](#) and [Section 9.2.3, "Identifying the Outflow of Data."](#)
6. Monitor database and hardware resources. For more information, see [Section 9.5.2, "Reclaiming Segment and Data File Space."](#)

#### **9.4.3.2 Recommendations for Medium Database Profiles**

Installations with medium database profiles have the potential to grow large. Therefore, the recommendations are the same as for large profiles. For more information, see [Section 9.4.3.1, "Recommendations for Large Database Profiles."](#)

It is important in medium installations to perform rigorous quality assurance testing and monitoring because table partitioning in a live production environment may require downtime.

The only additional recommendation is that the table recreation script (TRS script) may be an alternative to purging. This depends on the size of the database being truly medium and the availability of downtime during the maintenance windows.

For information about the TRS script, see [Section 10.6, "Recreating Tables with Open Composite Instances and Reclaiming Database Space."](#)

#### **9.4.3.3 Recommendations for Small Database Profiles**

Small installations with limited CPU, memory, and disk space should start with the single threaded purge and then move to the parallel purge:

1. Execute the single threaded purge. For more information, see [Section 10.3.1, "Looped Purge Script."](#)
2. Execute the parallel purge. For more information, see [Section 10.3.2, "Looped Purge in Parallel Script with dbms\\_scheduler."](#)
  - a. If the single threaded purge is not performing, then the parallel purge should be tested.
3. Monitor the inflow and outflow. For more information, see [Section 9.2.2, "Developing a Retention Policy"](#) and [Section 9.2.3, "Identifying the Outflow of Data."](#)
4. Monitor database and hardware resources. For more information, see [Section 9.5.2, "Reclaiming Segment and Data File Space."](#)

The only additional recommendation is that the TRS script may be an alternative to purging. This depends on the size of the database being truly small and the availability of downtime during the maintenance windows.

## **9.5 Understanding Space Management**

Much of the information in this section can be found in the various Oracle Database administration guides. The space management concepts and commands summarized in this section address a common misconception that the Oracle SOA Suite purge scripts reclaim space. To reclaim space, database maintenance operations must be executed.

By default, the Oracle SOA Suite schema is created on locally managed tablespaces with automatic segment space management (ASSM). Therefore, all advice is limited by this situation. This section is not meant as a comprehensive guide to all database space management features.

### **9.5.1 Introduction to the Components of a Data File**

A data file scan can be divided into the following components:

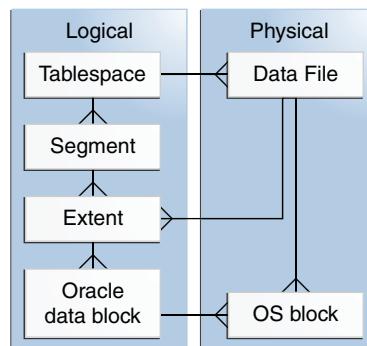
- Segment: Contains a specific type of database object. That is, a table is stored in a table segment, and an index is stored in an index segment.
- Extent: A contiguous set of data blocks within a segment. The Oracle database allocates space for segments in units of one extent.
- Data block: Also called a database block, this is the smallest unit of I/O-to-database storage. An extent consists of several contiguous data blocks.
- Tablespace: Consists of one or more physical data files. A locally managed tablespace maintains a bitmap in the data file header to track free and used space in the data file body. Each bit corresponds to a group of blocks. When space is

allocated or freed, the Oracle database changes the bitmap values to reflect the new status of the blocks.

Segments, extents, and data blocks are all logical structures.

[Figure 9–1](#) shows the relationship between logical and physical storage.

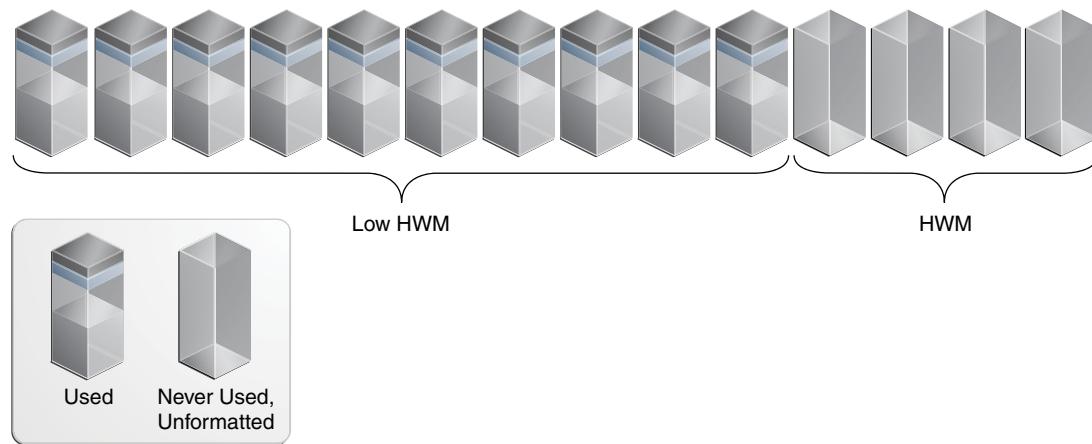
**Figure 9–1 Logical and Physical Storage**



### 9.5.1.1 Segment High Water Mark

To manage space, the Oracle database tracks the state of blocks in the segment. The high water mark (HWM) is the point in a segment beyond which data blocks are unformatted and have never been used. When the blocks between the HWM and low HWM are full, the HWM advances to the right and the low HWM advances to the location of the old HWM. [Figure 9–2](#) provides details. As the database inserts data over time, the HWM continues to advance to the right, with the low HWM always trailing behind it. Unless you manually rebuild, truncate, or shrink/deallocate the object, the HWM never retreats.

**Figure 9–2 HWM**



### 9.5.2 Reclaiming Segment and Data File Space

The following sections provide instructions on common techniques used to reclaim segment and data file space.

- [Section 9.5.2.1, "Performing an Online Segment Shrink"](#)
- [Section 9.5.2.2, "Deallocating Unused Space"](#)

- [Section 9.5.2.3, "Coalescing or Rebuilding indexes"](#)
- [Section 9.5.2.4, "Dropping Table Partitions"](#)
- [Section 9.5.2.5, "Configuring Secure File LOBs"](#)
- [Section 9.5.2.6, "Additional Database Management Methods"](#)

### 9.5.2.1 Performing an Online Segment Shrink

The purge scripts delete rows from database segments (tables and indexes) and release space within the data blocks for reuse, but may also cause fragmentation with some space too small for reuse. The space can be defragmented and the extents reclaimed by performing an online segment shrink. The shrink operation consolidates free space below the HWM and compacts the segment. After this, it then moves the HWM and deallocates the space above the HWM.

Data manipulation language (DML) can still be issued during the data movement phase of segment shrink. However, DML operations are blocked for a short time at the end of the shrink operation when the space is deallocated. Indexes are maintained during the shrink operation and remain usable.

The Segment Advisor can identify segments that benefit from online segment shrink. However, after constant purging most Oracle SOA Suite segments should be candidates for online segment shrink operations. For more information on the Segment Advisor, see *Oracle Database Administrator's Guide*.

The general online segment shrink steps are as follows:

- Before executing the shrink command, row movement must be enabled:  

```
SQL> ALTER TABLE TABLE_NAME ENABLE ROW MOVEMENT;
```
- To shrink a segment:  

```
SQL> ALTER TABLE TABLE_NAME SHRINK SPACE;
```
- The COMPACT clause lets you divide the shrink segment operation into two phases. When you specify COMPACT, the segment space is defragmented and rows are compacted, but it postpones the resetting of the HWM and the deallocation of space. Dividing the operations into two phases is useful for large tables and reduces the impact on the blocking of DML during the deallocation phase.

You can reissue the shrink space without the COMPACT clause during off-peak hours to complete the second phase:

```
SQL> ALTER TABLE TABLE_NAME SHRINK SPACE COMPACT;
```

- The CASCADE clause extends the segment shrink operation to all dependent segments of the object. For example, if you specify CASCADE when shrinking a table segment, all indexes of the table are also shrunk:  

```
SQL> ALTER TABLE TABLE_NAME SHRINK SPACE COMPACT CASCADE;
```
- For very large tables, it is advisable to perform the shrink in two phases and not to use the CASCADE clause. Perform the COMPACT operation first, perhaps even compact the basic LOBs before that, then execute the normal shrink command to reclaim the unused space.
- All segment types are eligible for online segment shrink, except the following:
  - Index-organized table (IOT) mapping tables
  - Tables with row ID-based materialized views

- Tables with function-based indexes
- Secure file LOBs
- Compressed tables

**Table 9–8** provides online segment shrinking examples.

**Table 9–8 Online Segment Shrink Examples**

Scenario	Example
Shrink a large table in two phases.	SQL> ALTER TABLE <i>TABLE_NAME</i> ENABLE ROW MOVEMENT; SQL> ALTER TABLE <i>TABLE_NAME</i> SHRINK SPACE COMPACT; SQL> ALTER TABLE <i>TABLE_NAME</i> SHRINK SPACE;
Shrink a table and all its dependent segments (including BASICFILE LOB segments).	SQL> ALTER TABLE <i>TABLE_NAME</i> SHRINK SPACE CASCADE;
Shrink a BASICFILE LOB segment only.	SQL> ALTER TABLE <i>TABLE_NAME</i> MODIFY LOB ( <i>LOB_NAME</i> ) (SHRINK SPACE);
Shrink a single partition of a partitioned table.	SQL> ALTER TABLE <i>TABLE_NAME</i> MODIFY PARTITION <i>P1</i> SHRINK SPACE;

### 9.5.2.2 Deallocating Unused Space

The DEALLOCATE UNUSED command can be used to manually deallocate unused space. This command frees unused space above the HWM. The online segment shrink also releases space above HWM.

```
SQL> ALTER TABLE TABLE_NAME DEALLOCATE;
```

Use the optional KEEP clause to specify the amount of space retained in the segment of table, index, or cluster:

```
SQL> ALTER TABLE TABLE_NAME DEALLOCATE UNUSED KEEP INTEGER;
SQL> ALTER INDEX INDEX_NAME DEALLOCATE UNUSED KEEP INTEGER;
```

---

**Note:** The UNUSED\_SPACE procedure of the DBMS\_SPACE package returns information about the position of the HWM and the amount of unused space in a segment. For segments in locally managed tablespaces with ASSM, use the SPACE\_USAGE procedure for more accurate information on unused space. (Use the DBA\_FREE\_SPACE view to verify the deallocated space.)

---

### 9.5.2.3 Coalescing or Rebuilding indexes

Whether to rebuild BTREE indexes is a point of contention for database administrators. Unfortunately, over time the Oracle SOA Suite purge scripts fragment most of the Oracle SOA Suite BTREE indexes in a manner that requires them to be rebuilt to maintain SQL performance.

The purge scripts delete only closed composites, leaving the open ones in each index data block. Because many of the Oracle SOA Suite index keys are monotonically increasing, the free space in the data block is not reused.

```
SQL> ALTER INDEX INDEX_NAME REBUILD OR COALESCE
```

**Table 9–9** describes the costs and benefits of coalescing or rebuilding indexes.

**Table 9–9 Costs and Benefits of Coalescing or Rebuilding Indexes**

<b>Rebuild Index</b>	<b>Coalesce Index</b>
Quickly moves index to another tablespace.	Cannot move index to another tablespace.
Higher costs: Requires more disk space.	Lower costs: does not require more disk space.
Creates new tree and shrinks height, if applicable.	Coalesces leaf blocks within the same branch of the tree.
Enables you to quickly change storage and tablespace parameters without having to drop the original index.	Quickly frees up index leaf blocks for use.

One method to combat the need for index rebuilding is to convert them to global hash indexes. Hashing monotonically increasing keys distributes them randomly across data blocks, thereby improving space reuse. There are other improvements that include a reduction in buffer busy waits for hot index blocks. However, not all Oracle SOA Suite indexes are good candidates for conversion. See the *Oracle FMW 11g R1 SOA with Oracle Database Real Application Clusters Assessment*:

<http://www.oracle.com/technetwork/database/availability/maa-fmw-soa-racanalysis-427647.pdf>

#### 9.5.2.4 Dropping Table Partitions

Table partitions can be dropped to remove table data in bulk and reclaim space. Within Oracle SOA Suite, do not drop the partitions unless identified as eligible. For more information, see [Section 10.4.5, "Running the Verification Script."](#)

##### 9.5.2.4.1 Dropping a Partition

SQL> ALTER TABLE TABLE\_NAME DROP PARTITION P1;

Although the DROP PARTITION operation takes longer, it is worth specifying the UPDATE INDEXES clause to avoid the need to rebuild indexes.

Many table maintenance operations on partitioned tables invalidate (mark UNUSABLE) the corresponding indexes or index partitions. You must then rebuild the entire index or, for a global index, each of its partitions. The database lets you override this default behavior if you specify UPDATE INDEXES in your ALTER TABLE statement for the maintenance operation. Specifying this clause tells the database to update the indexes at the time it executes the maintenance operation DDL statement. This provides the benefits described in this section.

The following operations support the UPDATE INDEXES clause:

- ADD PARTITION
- COALESCE PARTITION
- DROP PARTITION
- EXCHANGE PARTITION
- MERGE PARTITION
- MOVE PARTITION
- SPLIT PARTITION

- TRUNCATE PARTITION

Under certain circumstances, the partition operations shown in [Table 9–10](#) may be required to assist with issues.

**Table 9–10 Partition Operations**

Partition Operation	Description
Shrink table partition	SQL> ALTER TABLE <i>TABLE_NAME</i> MODIFY PARTITION <i>P1</i> SHRINK SPACE;
Truncate table partition	SQL> ALTER TABLE ... TRUNCATE PARTITION
Compress table partition	SQL> ALTER TABLE <i>TABLE_NAME</i> MOVE PARTITION <i>PART_NAME</i> TABLESPACE <i>TABLESPACE_NAME</i> NOLOGGING COMPRESS FOR OLTP;  Notable restrictions: <ul style="list-style-type: none"> <li>■ Online segment shrinking is not supported for compressed tables.</li> <li>■ Secure file LOBs have their own compression methods.</li> <li>■ Compression technology increases CPU resource usage.</li> <li>■ Altering a partition to enable compression applies only to new data. To compress existing data, you must <i>move</i> the partition. Moving table partitions drops the old partition segment and creates a new segment, even if you do not specify a new tablespace.</li> </ul>

### 9.5.2.5 Configuring Secure File LOBs

Secure files are a LOB storage architecture that provides performance benefits that many factor as faster and better than traditional LOB access. Secure files are a complete rewrite of the original LOB storage architecture, now called basic files.

Secure files support the following advanced features:

- Deduplication: Stores only one copy of identical secure file data.
- Compression: Reduces storage, I/O, redo log, and encryption overhead. The online segment shrink command is *not* supported for secure file LOBs due to compression.
- Encryption

As secure files are a relatively new feature introduced in the Oracle 11g database, it is recommended that the highest available database patch set be applied to avoid known problems.

**9.5.2.5.1 Secure File Requirements** The following settings are required to use secure files.

1. Set the COMPATIBLE initialization parameter higher than 11.0.0.0.0.

```
SQL> show parameter COMPATIBLE;
```

2. The DB\_SECUREFILE initialization parameter controls the default action of the database with regards to LOB storage (default is PERMITTED):

```
SQL> ALTER SYSTEM SET DB_SECUREFILE = 'ALWAYS';
SQL> SHOW PARAMETER DB_SECUREFILE
```

Parameter	Description
ALWAYS	All LOBs in ASSM tablespaces are created as secure file LOBs. LOBs in non-ASSM tablespaces are created as basic file LOBs unless explicitly specified as secure files. Basic file storage options are ignored, and secure file default storage options are used for any unspecified options.
FORCE	All LOBs are created as secure file LOBs. If the LOB is being created in a non-ASSM tablespace, an error is thrown. Basic file storage options are ignored, and secure file default storage options are used for any unspecified options.
PERMITTED	The default setting that enables secure file LOB storage when the SECUREFILE keyword is used. The default storage method is BASICFILE.
NEVER	Secure file LOBs are not permitted.
IGNORE:	Prevents creation of secure file LOBs, and ignores any errors associated with secure file storage options.

3. Configure the tablespace to support ASSM:

```
SQL> SELECT SEGMENT_SPACE_MANAGEMENT FROM DBA_TABLESPACES WHERE TABLESPACE_NAME
= 'TABLESPACE_NAME';
```

**9.5.2.5.2 Converting Secure Files** The Repository Creation Utility (RCU) that creates the Oracle SOA Suite tables by default also creates basic files. However, secure file LOBs can also be created at the time of SOA schema creation. The process below is only for the time of creation. Otherwise, see [Section 9.5.2.5.3, "Migrating Secure Files."](#)

1. Ensure the requirements are met and the DB\_SECUREFILE database initialization parameter is set to ALWAYS or FORCE. For more information about requirements, see [Section 9.5.2.5.1, "Secure File Requirements."](#)
2. Run the appropriate Oracle SOA Suite RCU utility to create the schema. Although the LOBs are defined as basic, they are created as secure files. The basic file LOB storage parameters are ignored.

The advanced features of compression, deduplication, and encryption are *not* enabled by default.

3. Enter the following command to determine if the advanced features are enabled for the secure file LOB column:

```
SQL> SELECT TABLE_NAME, COLUMN_NAME, SECUREFILE, RETENTION, ENCRYPT,
COMPRESSION, DEDUPLICATION FROM DBA_LOBS;
```

The ALTER command to enable the advanced features must be performed immediately after using RCU:

```
SQL> ALTER TABLE LOB_TABLE MODIFY LOB(LOB_COLUMN) (COMPRESS);
SQL> ALTER TABLE LOB_TABLE MODIFY LOB(LOB_COLUMN) (DEDUPLICATE);
```

---

**Note:** Oracle recommends that you enable compression, deduplication, or encryption through the CREATE TABLE statement and/or online redefinition. For existing data, if you enable these features through the ALTER TABLE statement, all secure file LOB data in the table is read, modified, and written. This causes the database to lock the table during a potentially lengthy operation. Therefore, the ALTER table command is not recommended for converting populated tables, and causes locking.

---

**9.5.2.5.3 Migrating Secure Files** The online redefinition is the recommended online method for converting to secure file LOBs. However, there are offline methods:

- Create Table as Select (CTAS) script
- Insert Table as Select (ITAS)
- Export/import
- TRS script

For information, see [Section 10.6, "Recreating Tables with Open Composite Instances and Reclaiming Database Space."](#)

Advantages of online redefinition:

- No requirement to take the table or partition offline.
- Can be performed in parallel.

Disadvantages of online redefinition:

- Additional storage equal to the entire table or partition and all LOB segments must be available.
- Global indexes must be rebuilt.

For best practices about executing the online REDFINITON package, including preventing redo generation and parallel execution, see Section "Migrating Columns from BasicFiles LOBs to SecureFiles LOBs" of the *Oracle Database SecureFiles and Large Objects Developer's Guide*.

#### 9.5.2.6 Additional Database Management Methods

This section describes additional methods available for managing database growth.

**9.5.2.6.1 Table Recreation Script** The TRS script only selects open composites and therefore by default drops all closed composites beyond a given retention period. The process of recreating the table and indexes also reorganizes and reclaims space. For more information, see [Section 10.6, "Recreating Tables with Open Composite Instances and Reclaiming Database Space."](#)

**9.5.2.6.2 TRUNCATE Statement** The truncate statement removes all rows from a table. Therefore, this is unlikely to be performed or required in a Oracle SOA Suite production environment. For more information, see [Section 10.5, "Removing Records from the Runtime Tables Without Dropping the Tables."](#)

### 9.5.3 Resizing Data Files

To first avoid application errors and the need for manual intervention when a tablespace runs out of space, set the data files to AUTOEXTEND.

1. To determine whether a data file is auto-extensible, query the DBA\_DATA\_FILES view column AUTOEXTENSIBLE:

```
SQL> SELECT AUTOEXTENSIBLE FROM DBA_DATA_FILES
```

2. Specify automatic file extension by specifying an AUTOEXTEND ON clause when the data file is created or altered:

```
SQL> ALTER TABLESPACE TABLESPACE_NAME ADD DATAFILE '/U01/DATAFILE.DBF' SIZE 10M
 AUTOEXTEND ON;
```

```
SQL> ALTER DATABASE DATAFILE '/U01/DATAFILE.DBF' AUTOEXTEND ON;
```

If the initial allocation of the data files was excessive or segments were allowed to grow excessively, the data file can be resized.

1. Resize the data file. However, this is assuming that the space is not used by segments.

```
SQL> ALTER DATABASE DATAFILE '/U01/DATAFILE.DBF' RESIZE 50M;
```

It is not always possible to decrease the size of a file to a specific value. In which case, the database returns the following error.

```
ORA-03297: file contains used data beyond requested RESIZE value
```

# 10

---

## Managing Database Growth

This chapter describes how to manage database growth with the purge scripts for deleting large numbers of instances, table partitioning for enabling schema tables to be range-partitioned on time intervals, truncate script for removing all records from runtime tables without dropping the tables, and the table recreation script (TRS script) for recreating tables with open composite instances and reclaiming database space.

This chapter includes the following sections:

- [Section 10.1, "Introduction to Managing Database Growth"](#)
- [Section 10.2, "Developing a Purging and Partitioning Methodology"](#)
- [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts"](#)
- [Section 10.4, "Partitioning Component Tables"](#)
- [Section 10.5, "Removing Records from the Runtime Tables Without Dropping the Tables"](#)
- [Section 10.6, "Recreating Tables with Open Composite Instances and Reclaiming Database Space"](#)
- [Section 10.7, "Purging Instances on Microsoft SQL Server"](#)

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**Note:** Table partitioning is an advanced database task and must only be performed by an experienced database administrator (DBA).

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For additional information about troubleshooting database growth issues, see [Section B.2, "Parallel Purging and Table Partitioning Issues,"](#) [Section B.7.4, "Extending Tablespaces to Avoid Problems at Runtime,"](#) and [Section B.7.5, "Resolving Database Growth Issues Caused by a High Volume of Transactions."](#)

For information about database growth management strategies, see [Chapter 9, "Developing a Database Growth Management Strategy."](#)

### 10.1 Introduction to Managing Database Growth

When the amount of data in the Oracle SOA Suite database grows very large, maintaining the database can become difficult. To address this challenge, several methods for managing database growth are provided, as described in [Table 10-1](#).

**Table 10–1 Database Growth Strategies**

Environment	Use	See Section
Small development installations with less than 100K rows in the database	<b>Delete With Options</b> button of Oracle Enterprise Manager Fusion Middleware Control	<a href="#">Section 8.2, "Monitoring and Deleting SOA Composite Application Instances from the Application Home Page"</a> and <a href="#">Section 8.3, "Monitoring and Deleting SOA Composite Application Instances at the SOA Infrastructure Level"</a>
Small development installations with more than 100K rows in the database	Looped purge script	<a href="#">Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts"</a>
Medium installations that generate less than 10 GB of data per day <i>and</i> retain less than 500 GB of data	Scheduled parallel purge with optimal thread count	<a href="#">Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts"</a>
Large installations that generate more than 10 GB of data per day <i>or</i> retain more than 500 GB of data	<ul style="list-style-type: none"> <li>▪ Partitioning (for infrequent, long running processes).</li> <li>▪ Combination of parallel purge and partitioning (for long running processes that span several months). For example, perform daily purges and monthly partition dropping.</li> </ul>	<a href="#">Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts"</a> <a href="#">Section 10.4.1, "Partitioning the Component Database Tables"</a> <a href="#">Section 10.4, "Partitioning Component Tables"</a>
<ul style="list-style-type: none"> <li>▪ For recreating and rerunning test scenarios</li> <li>▪ For creating a production or test environment clone in which to keep the schemas from the production environment so that the production customizations and new job definitions are kept, but all instance data is truncated, regardless of state</li> </ul>	Truncate scripts	<a href="#">Section 10.5, "Removing Records from the Runtime Tables Without Dropping the Tables"</a>
For smaller installations with significant maintenance downtime periods in which corrective actions are required to move your installation to a more efficient database growth management strategy	TRS script	<a href="#">Section 10.6, "Recreating Tables with Open Composite Instances and Reclaiming Database Space"</a>

**Table 10–1 (Cont.) Database Growth Strategies**

Environment	Use	See Section
Microsoft SQL Server databases	Looped purge script	<a href="#">Section 10.7, "Purging Instances on Microsoft SQL Server"</a>

## 10.2 Developing a Purging and Partitioning Methodology

This section summarizes the main points into an action plan that you can follow to purge and partition the dehydration store. Purging is an essential part of any plan and should be performed when data is consuming too much space or you have some other reason for removing the data.

There are three main strategies for reducing the size of the schemas:

- Purge script
- Purge script + partitioning (or, more correctly, dropping table partitions)
- Partitioning all tables

In the first two cases, the same purge script is used, although if you are partitioning, you must edit the purge script to comment out your partitioned tables.

The purge script uses standard SQL `DELETE` statements to remove rows from the BPEL tables. For most sites, this is sufficient. However, some sites accumulate so much data that the purge script takes too long to run. In this case, partitioning becomes the better solution. The trade off is that partitioning involves significantly more database maintenance. Moreover, partitioning is an advanced technique and requires a knowledgeable and skilled DBA. By contrast, running the purge script is straightforward and does not require significant DBA knowledge.

Try to profile the input messages, database growth rate, and how much data is purged in the purge process. If the input rate and purge rate match, then regular purging is sufficient. Otherwise, consider partitioning.

If you use partitioning, Oracle recommends that you add disk space and eventually drop the partition. However, this creates additional requirements for managing disk capacity, deciding on the correct partition size, and so on. Do not use partitioning and then rely on the purge script to reclaim disk space.

## 10.3 Deleting Large Numbers of Instances with the Purge Scripts

Deleting thousands of instances with the **Delete With Options** button on the Instances page of a SOA composite application in Oracle Enterprise Manager Fusion Middleware Control takes time and may result in a transaction timeout. Instead, use the purge scripts for deleting instances. Note the following details about the purge scripts:

- The purge scripts delete instances that have completed or are in error (have faulted). For more information, see [Section 10.3.3, "Purge States."](#)

---

**Note:** For Oracle Mediator resequencer tables, faulted messages are not purged. For more information, see [Section 10.3.4, "Resequenced Message Purge States for Oracle Mediator."](#)

---

- The purge scripts do not delete instances that are in-flight or can be recovered (are in a recovery required state).
- The purge scripts delete all Oracle SOA Suite-related tables *except* for Oracle B2B. If you have an installation in which Oracle SOA Suite and Oracle B2B are co-located, ensure that you also invoke the Oracle B2B purge scripts. If you have separate Oracle SOA Suite and Oracle B2B installations, you must run only the appropriate purge scripts on the respective product schemas. For information about purging Oracle B2B, see Chapter "Purging Data" and Chapter "B2B Command-Line Tools" of the *Oracle Fusion Middleware User's Guide for Oracle B2B*.

The following sections provide examples of how to use the script:

- [Section 10.3.1, "Looped Purge Script"](#)
- [Section 10.3.2, "Looped Purge in Parallel Script with dbms\\_scheduler"](#)
- [Section 10.3.3, "Purge States"](#)
- [Section 10.3.4, "Resequenced Message Purge States for Oracle Mediator"](#)
- [Section 10.3.5, "Purging the Instances of a Specific SOA Composite Application"](#)
- [Section 10.3.6, "Running the Purge Scripts"](#)

---

**Notes:**

- There is no purge script support on the IBM DB2 database. Starting with release 11g Release 1 (11.1.1.7), a new purge script is provided that enables you to purge instances on Microsoft SQL Server. For more information, see [Section 10.7, "Purging Instances on Microsoft SQL Server."](#)
- The `purge_soainfra_oracle.sql` PL/SQL purge script provided in pre-11.1.1.4 releases has been deprecated. If you are an existing user of this script, you can continue to use it against your database in 11g Release 1 (11.1.1.4 or later). However, starting with 11g Release 1 (11.1.1.4), this script is no longer shipped. Oracle recommends that you use the purge script provided with 11g Release 1 (11.1.1.4 or later).
- When upgrading from 11g Release 1 (11.1.1.3) to 11g Release 1 (11.1.1.4) or later, ensure that you run the purge setup scripts from the 11.1.1.4 or later location, respectively, as this contains the latest purge details. For more information about upgrade, see *Oracle Fusion Middleware Upgrade Guide for Oracle SOA Suite, WebCenter, and ADF*.

---

### 10.3.1 Looped Purge Script

The master purge script includes a looping construct that allows for a batched purge. You can also provide this script with a `max_runtime` parameter that stops looping after the value for this parameter is exceeded.

The master script drives the purge of SOA database tables. You can use the `delete_instances` procedure to purge SOA database tables.

---

**Note:** Set `max_runtime` to a higher value if there are many instances to purge. In this case, you should expect to wait for a longer time before the script exits. Alternatively, use a smaller batch size if you want the purge script to exit sooner.

---

### 10.3.1.1 `delete_instances` Procedure

Use the `delete_instances` procedure to delete instances. [Example 10-1](#) shows the syntax.

**Example 10-1 `delete_instances` Procedure Syntax**

```
procedure delete_instances (
 min_creation_date in timestamp,
 max_creation_date in timestamp,
 batch_size in integer,
 max_runtime in integer,
 retention_period in timestamp,
 purge_partitioned_component in boolean
 ignore_state in boolean
 composite_name in varchar2
 composite_revision in varchar2
 soa_partition_name in varchar2
);
```

[Table 10-2](#) describes the script parameters.

**Table 10-2 `delete_instances` Procedure Parameter Descriptions**

Parameter	Description
<code>min_creation_date</code>	Beginning creation date for the composite instances.
<code>max_creation_date</code>	Ending creation date for the composite instances.
<code>batch_size</code>	Batch size used to loop the purge. The default value is 20000.
<code>max_runtime</code>	Expiration at which the purge script exits the loop. The default value is 60. This value is specified in minutes.
<code>retention_period</code>	Retention period is only used by the BPEL process service engine (in addition to using the creation time parameter). This functionality is not extended to other components.  This parameter checks for and deletes records in the <code>cube_instance</code> table. The value for this parameter must be greater than or equal to <code>max_creation_date</code> . The default value is <code>null</code> .  Specify a retention period if you want to retain the composite instances based on the <code>modify_date</code> of the BPEL instances ( <code>cube_instance</code> ).  In this example, the <code>modify_date</code> of the BPEL instances table, which can be different than the composite <code>created_date</code> , is used as a second level of filtering:  <code>min_creation_date = 1st June 2011</code> <code>max_creation_date = 30 June 2011</code> <code>retention_period = 1st July 2011</code>
	This deletes all composite instances in which the <code>creation_time</code> of the composite is between 1st June 2011 and 30 June 2011 and the <code>modify_date</code> of the <code>cube_instance</code> is less than 1st July 2011

**Table 10–2 (Cont.) delete\_instances Procedure Parameter Descriptions**

Parameter	Description
purge_partitioned_component	You can invoke the same purge to delete partitioned data. The default value is false.
ignore_state	When set to true, purges all open and closed instances within the specified date range. This parameter is <i>not</i> supported with the parallel purge script described in <a href="#">Section 10.3.2, "Looped Purge in Parallel Script with dbms_scheduler."</a> The default value is false.  <b>Note:</b> Use this parameter cautiously because purging open instances may leave your system in an inconsistent state.
composite_name	The name of the SOA composite application. This parameter, along with the composite_revision and soa_partition_name parameters, enables you to purge the instances of a specific SOA composite application. For more information, see <a href="#">Section 10.3.5, "Purging the Instances of a Specific SOA Composite Application."</a>
composite_revision	The revision number of the SOA composite application.
soa_partition_name	The partition in which the SOA composite application is included.

**Notes:**

- If you do not provide a value for retention\_period, the value for this property defaults to the value of max\_creation\_date (this is, if retention\_period equals null, then retention\_period = max\_creation\_date). This consequence also applies to the script parameters described in [Section 10.3.2, "Looped Purge in Parallel Script with dbms\\_scheduler."](#)
- The purge scripts are restricted to purging only the database and existing rows in a table. There is no way for the purge script to look at runtime execution. Therefore, assume you attempt an automatic recovery immediately after an active row has been deleted with the purge scripts (with the ignore\_state parameter set to true). Because of this, a row is created after the purge has been executed. This row remains dangling because the COMPOSITE\_INSTANCE table row has already been deleted.

### 10.3.2 Looped Purge in Parallel Script with dbms\_scheduler

This script is functionally the same as the looped purge script described in [Section 10.3.1, "Looped Purge Script."](#) However, this script uses the dbms\_scheduler package to spawn multiple purge jobs, with each job working on subset data.

You can use the following procedure to purge SOA database tables.

---

**Note:** If you have a multiple CPU host, use of the parallel script can be beneficial. However, Oracle recommends that you enable the parallel script only during off hours. In addition, when purging data during off hours, Oracle recommends that you drop indexes before purging large amounts of data and then add the indexes back in. This speeds up the purge process, and also keeps indexes from becoming unbalanced.

---

### 10.3.2.1 delete\_instances Procedure in Parallel

Use the `delete_instances` procedure in parallel to delete instances. [Example 10–2](#) shows the syntax.

**Example 10–2 delete\_instances Procedure in Parallel Syntax**

```
PROCEDURE delete_instances_in_parallel (
 min_creation_date in timestamp,
 max_creation_date in timestamp,
 batch_size in integer,
 max_runtime in integer,
 retention_period in integer,
 DOP in integer
 max_count integer,
 purge_partitioned_component in boolean)
composite_name in varchar2
composite_revision in varchar2
soa_partition_name in varchar2
```

[Table 10–3](#) describes the script parameters.

**Table 10–3 delete\_instances in Parallel Procedure Parameter Descriptions**

Parameter	Description
<code>min_creation_date</code>	Beginning creation date for the composite instances.
<code>max_creation_date</code>	Ending creation date for the composite instances.
<code>batch_size</code>	Batch size used to loop the purge. The default value is 20000.
<code>max_runtime</code>	Expiration time at which the purge script exits the loop. The default value is 60. This value is specified in minutes.
<code>retention_period</code>	Retention period is only used by the BPEL process service engine (in addition to using the creation time parameter). The default value is null. For more information about this parameter, see <a href="#">Table 10–2</a> .
<code>DOP</code>	Defines the number of parallel jobs to schedule. The default value is 4.
<code>max_count</code>	Defines the number of rows processed ( <i>not</i> the number of rows deleted). A big <code>temp</code> table is created and then jobs are scheduled to purge based on the data. This is the maximum purge row count to use; it defaults to one million. The default value is 1000000.
<code>purge_partitioned_component</code>	You can invoke the same purge to delete partitioned data. The default value is false.
<code>composite_name</code>	The name of the SOA composite application. This parameter, along with the <code>composite_revision</code> and <code>soa_partition_name</code> parameters, enables you to purge the instances of a specific SOA composite application. For more information, see <a href="#">Section 10.3.5, "Purging the Instances of a Specific SOA Composite Application."</a>

**Table 10–3 (Cont.) delete\_instances in Parallel Procedure Parameter Descriptions**

Parameter	Description
composite_revision	The revision number of the SOA composite application.
soa_partition_name	The partition in which the SOA composite application is included.

### 10.3.2.2 Resolving Dead Locks After Running the Looped Purge in Parallel Script

You may observe a dead lock in the thread logs for one thread after running the looped purge in parallel script. [Example 10–3](#) provides details.

#### **Example 10–3 Dead Lock Error in the Thread Logs**

```
SOA_PURGE_LOG_THREAD1 (total of 4 threads)
17-JUL-2012 03:03:48
: Purge AUDIT_DETAILS. Error Code = -60, Error Message = ORA-00060: deadlock
detected while waiting for resource
17-JUL-2012 03:03:48
: ERROR(delete_inst_in_parallel_job. Error Code = -60, Error Message =
ORA-00060: deadlock detected while waiting for resource
```

To resolve the dead lock issue, rebuild the AUDIT\_DETAILS table and increase the values for either of the following:

- Increase PCTFREE (to allow for more interested transaction list (ITL) allocation).
- Increase INITTRANS (initial ITLs). This option is described below.

To recreate the AUDIT\_DETAILS table and increase the INITTRANS value:

1. Create a temporary table and increase the value for INITTRANS (for this example, a table named AUDIT\_DETAILS\_TMP is created).

```
SQL> CREATE TABLE "PS6_SOAINFRA"."AUDIT_DETAILS_TMP"
 ("CIKEY" NUMBER(*,0),
 "DETAIL_ID" NUMBER(*,0),
 "BIN_CSIZE" NUMBER(*,0),
 "BIN_USIZE" NUMBER(*,0),
 "DOC_REF" VARCHAR2(300),
 "BIN" BLOB,
 "CI_PARTITION_DATE" TIMESTAMP (6)
) SEGMENT CREATION IMMEDIATE
 PCTFREE 0 PCTUSED 1 INITTRANS 4 MAXTRANS 255 NOCOMPRESS LOGGING
 STORAGE(INITIAL 331350016 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 6 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE
 DEFAULT CELL_FLASH_CACHE DEFAULT)
 TABLESPACE "PS6_SOAINFRA"
 LOB ("BIN") STORE AS BASICFILE (
 TABLESPACE "PS6_SOAINFRA" ENABLE STORAGE IN ROW CHUNK 8192 PCTVERSION 0
 CACHE
 STORAGE(INITIAL 16384 NEXT 8192 MINEXTENTS 1 MAXEXTENTS 2147483645
 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE
 DEFAULT CELL_FLASH_CACHE DEFAULT)) ;
SQL> INSERT /*+ APPEND */ into audit_details_TMP select * from audit_details;
SQL> COMMIT;
```

2. Drop the AUDIT\_DETAILS table.

```
SQL> DROP TABLE PS6_SOAINFRA.AUDIT_DETAILS CASCADE CONSTRAINTS;
```

3. Rename the AUDIT\_DETAILS\_TMP temporary table to AUDIT\_DETAILS.

```
SQL> ALTER TABLE PS6_SOAINFRA.AUDIT_DETAILS_TMP RENAME TO AUDIT_DETAILS;
```

4. Create a unique index on AUDIT\_DETAILS.

```
SQL> CREATE UNIQUE INDEX "PS6_SOAINFRA"."AD_PK" ON "PS6_SOAINFRA"."AUDIT_DETAILS" ("CIKEY", "DETAIL_ID");
```

5. Add a constraint and primary key to AUDIT\_DETAILS.

```
SQL> ALTER TABLE "PS6_SOAINFRA"."AUDIT_DETAILS" ADD CONSTRAINT "AD_PK" PRIMARY KEY ("CIKEY", "DETAIL_ID") ENABLE;
```

### 10.3.3 Purge States

Instances in the following states are purged with the purge scripts:

- Completed successfully
- Faulted
- Terminated by user
- Stale
- Unknown (instance tracking is disabled)

Purging of the following instance states is not supported:

- Instances pending recovery at the BPEL process service engine level or SOA composite application level
- Running instances

To purge these instances, you must first move them to one of the instance states supported by the purge scripts.

### 10.3.4 Resequenced Message Purge States for Oracle Mediator

The purge scripts include purge commands to purge the information persisted in the Oracle Mediator resequencer tables (`mediator_group_status` and `mediator_resequencer_message`). The following information is purged from the resequencer tables when you run the purge scripts:

- Completed and aborted messages for all resequencer types
- Timed out messages for standard resequencers
- Groups in a ready state for best effort and FIFO (first in/first out) resequencers (these are the only groups that can be purged)

To allow fault recovery and message processing to be completed, the purge scripts do not purge all resequenced message information. In addition, standard resequencer groups store information that should not be purged. The following are not purged when you run the purge scripts:

- Faulted messages for all resequencer types
- Running messages for all resequencer types
- Group information for standard resequencers
- Groups in a state other than ready for best effort and FIFO resequencers

---

**Note:** The purge scripts for the Oracle Mediator resequencer purge messages first and then move on to groups. If there are messages for a group in the `mediator_resequencer_message` table, the group cannot be deleted.

---

The above describes processing for both looped and parallel processing of the purge scripts, and regardless of whether instance tracking is enabled or disabled. Before any sequence groups are purged, a check is performed to verify that all messages associated with the group are processed.

Below is a list of group state codes used in the resequencer tables:

- 0: Ready
- 1: Locked
- 2: Error
- 4: Timed out
- 6: Group error

Below is a list of message state codes used in the resequencer tables:

- 0: Ready
- 1: Locked
- 2: Completed
- 3: Error
- 4: Timed out (this is ignored)
- 5: Aborted

### 10.3.5 Purging the Instances of a Specific SOA Composite Application

You can purge the instances of a specific SOA composite application and leave the instances of other composites unpurged. This action enables you to purge certain flows more frequently than others due to high volume or retention period characteristics.

The purge scripts include an option for purging based on `COMPOSITE_DN`. Purging based on `COMPOSITE_DN` is supported with the parameters `composite_name` and `composite_revision`.

The purge logic is based on flows (execution context IDs (ECIDs)), and not `COMPOSITE_IDs`. Therefore, apart from the intended `COMPOSITE_DNs`, other composites sharing the same ECID may get deleted. The following scenarios may occur:

- A composite instance is closed, but the flow is still open:  
In a scenario in which composite A calls composite B, the purge intends to delete instances of composite A. However, there may be a case in which an instance of composite A is closed, but the corresponding composite B instance is still open. Therefore, because the overall flow is still in an open state, the composite A instance (even though closed) is not purged.
- The composite instance is closed and the flow is also closed:  
Composite A again calls composite B. The purge intends to delete instances of composite A. Therefore, in a case in which composite A is closed and composite B

is also closed, because the overall flow is closed, both composite instances A and B are purged.

These scenarios maintain the consistency of the flow.

For information about the `composite_name` and `composite_revision` parameters, see [Section 10.3.1, "Looped Purge Script"](#) and [Section 10.3.2, "Looped Purge in Parallel Script with dbms\\_scheduler."](#)

### 10.3.6 Running the Purge Scripts

This section describes how to execute the purge scripts.

To execute the purge scripts:

1. In SQL\*Plus, connect to the database AS SYSDBA:

```
CONNECT SYS AS SYSDBA
```

2. Execute the following SQL commands:

```
GRANT EXECUTE ON DBMS_LOCK TO USER;
GRANT CREATE ANY JOB TO USER;
```

where `USER` is the `soainfra` account to execute the scripts. These privileges are required to run the scripts.

3. Load the purge scripts by running the main purge script in the `MW_HOME/SOA_ORACLE_HOME/rcu/integration/soainfra/sql/soa_purge` directory.

For a parallel purge, the debug logs from the jobs spawned by a parallel purge are logged into files created in the directory named `SOA_PURGE_DIR`. This directory must be accessible to the Oracle database.

4. Create `SOA_PURGE_DIR` and grant write permissions to the `soainfra` user.

```
mkdir -p /tmp/purgelog
CREATE OR REPLACE DIRECTORY SOA_PURGE_DIR AS 'SERVER_DIRECTORY'
```

where `SERVER_DIRECTORY` is the name of the directory to create (for example, `'/tmp/purgelog/'`). Note the required single quotes around the directory path.

5. If you want to execute the scripts in debug mode, run `common/debug_on.sql` and set `serverout` to `on` in SQL\*Plus. This step is optional.

```
SET SERVEROUTPUT ON
```

The logs from the spawned jobs are logged into the directory created in Step 4 (separate files per job). The rest of the logs are displayed on `stdout` (or the spool file, if configured).

There are two options for purging:

- Looped purge
  - Parallel purge
6. Execute the purge scripts as shown below. Examples are provided for both options.
    - a. For looped purge:

```
DECLARE
 MAX_CREATION_DATE timestamp;
```

```
MIN_CREATION_DATE timestamp;
batch_size integer;
max_runtime integer;
retention_period timestamp;

BEGIN

 MIN_CREATION_DATE := to_timestamp('2010-01-01','YYYY-MM-DD');
 MAX_CREATION_DATE := to_timestamp('2010-01-31','YYYY-MM-DD');
 max_runtime := 60;
 retention_period := to_timestamp('2010-01-31','YYYY-MM-DD');
 batch_size := 10000;
 soa.delete_instances(
 min_creation_date => MIN_CREATION_DATE,
 max_creation_date => MAX_CREATION_DATE,
 batch_size => batch_size,
 max_runtime => max_runtime,
 retention_period => retention_period,
 purge_partitioned_component => false);
END;
/
```

**b.** For parallel purge:

```
DECLARE

 max_creation_date timestamp;
 min_creation_date timestamp;
 retention_period timestamp;
BEGIN

 min_creation_date := to_timestamp('2010-01-01','YYYY-MM-DD');
 max_creation_date := to_timestamp('2010-01-31','YYYY-MM-DD');
 retention_period := to_timestamp('2010-01-31','YYYY-MM-DD');

 soa.delete_instances_in_parallel(
 min_creation_date => min_creation_date,
 max_creation_date => max_creation_date,
 batch_size => 10000,
 max_runtime => 60,
 retention_period => retention_period,
 DOP => 3,
 max_count => 1000000,
 purge_partitioned_component => false);

END;
```

## 10.4 Partitioning Component Tables

The runtime and schema code for the following components has been modified to store the flow creation date column with their transactional tables.

- Oracle BPEL Process Manager
- Oracle Mediator
- Human workflow
- Oracle B2B
- SOA Infrastructure (includes component instances)

- Oracle BPM Suite

The CPST\_CREATED\_DATE column contains the flow creation date time populated by the instance tracking code. This is available as the normalized message property oracle.integration.platform.instance.CommonConstants.COMPOSITE\_INSTANCE\_CREATED\_TIME.

All SOA components are partitioned on the same partition key. These partitioned components use the same time range and partition ID.

---

**Note:** Before performing complete or partial partitioning, run the purge scripts.

---

#### 10.4.1 Partitioning the Component Database Tables

Oracle SOA Suite has been instrumented with partition keys that enable DBAs to take advantage of Oracle RDBMS partitioning features and capabilities. This action enables the schema tables to be range-partitioned on time intervals. This is useful when you must reduce the database maintenance window of large tables. (Though not discussed in this chapter, this also provides for the possibility of archiving partitioned data.)

The task of partitioning the Oracle SOA Suite tables must be performed by an experienced DBA. Since partitioning tables is considered a core DBA skill, this chapter does not provide detailed, step-by-step instructions on how to partition tables. Rather, it provides the DBA with the knowledge and understanding of Oracle SOA Suite schemas and their associated scripts. With this knowledge, the DBA can customize any partitioning strategy for their environment, and incorporate any tuning parameters in response to the performance of their database. Tuning is never a one-size-fits-all proposition or a one-off configuration change. Rather, it is an iterative process of monitoring and tuning.

The partitioning schemes discussed in this chapter can only be used with Oracle SOA Suite 11g Release 1 (11.1.1.4 or later).

The following components are associated with their own database schemas:

- Oracle BPEL Process Manager
- Oracle Mediator
- Human workflow
- Oracle B2B
- SOA Infrastructure
- Oracle BPM Suite

For more information about table partitioning, see the Oracle database administration documentation library located at the following URL:

<http://www.oracle.com/technetwork/indexes/documentation/index.html>

---

**Notes:**

- A hash subpartition is an option the DBA may want to explore, especially for tables with large object (LOB) segments. This can assist with high water (HW) enqueue contention.
- A global hash index on primary keys that are monotonically increasing (like CIKEY) may relieve block contention.

### 10.4.1.1 Referential Integrity and Equipartitioning

For performance reasons, the Oracle BPEL Process Manager, Oracle Mediator, human workflow, Oracle B2B, SOA Infrastructure, and Oracle BPM Suite schemas have no foreign key constraints to enforce integrity. This fact discounts the use of the 11g RDBMS feature known as referential partitioning. This feature provides significant benefits because it equipartitions master and detail tables across foreign key constraints. Equipartitioning means that the associated dependent table rows are in a database partition with the same partition key interval as their master table rows.

One benefit of this feature is that the state (for example, completed, faulted, and so on) of each detail row in the equipartition can be inferred from its associated master table row.

Although the 11g RDBMS referential partitioning feature cannot be used, similar behavior can be mimicked to achieve some of the same benefits. The Oracle BPEL Process Manager, Oracle Mediator, human workflow, Oracle B2B, SOA Infrastructure, and Oracle BPM Suite components ensure that the partition key of every detail table row is the same as the partition key of its master table row (that is, the date (timestamp) that is the partition key is pushed down). To then complete the setup, the DBA must ensure that the master and detail tables are range-partitioned on the same intervals. Some examples are provided in subsequent sections of this chapter.

---

**Note:** You may decide that referential integrity of aged partitions is not a concern for your site. For example, the site may have ample disk space, allowing data to significantly age, or there may be no apparent, adverse impact of allowing unreferenced data to be stored in the dependent tables.

---

### 10.4.1.2 Introduction to Partition Key Selection

The following factors were considered when selecting the schema partition keys:

- Convey or imply state (for example, completed) for referential integrity
- Allow range partitioning on time intervals for maintenance operations
- Be static to avoid row movement that may lead to unreferenced data
- Be static to avoid row movement when table maintenance operations are performed
- Provide performance benefits for console queries through partition pruning

## 10.4.2 Configuring Partitions

Partitioning is *not* configured by default; it is a postinstallation step that must be performed manually. Once you decide to implement partitioning of the database, you must perform some initial configuration tasks only once:

- Using the information in this chapter, decide which groups you want to partition.
- For each of those groups, decide which tables you want to partition, remembering that there are some mandatory tables in each group that must be partitioned.
- For each group, decide on the partition interval.
- Create the partition scripts to partition the Oracle SOA Suite schemas. No scripts are supplied; each DBA is responsible for creating the partition scripts appropriate for their environment.

- Edit the purge script and remove references to any tables that you partitioned.

### 10.4.3 Introduction to the Verification Script

A verification script is provided for a DBA to identify when to drop a partition and its equipartitioned dependent table. The verification script also identifies if there are active, long running instances. You can then move these instances to a different partition, and then drop the original partition.

---

**Note:** The verification script does not drop any partitions; it just ensures that partitions are eligible to be dropped.

---

### 10.4.4 Component Tables

This section describes partitioning constraints and lists the component tables, the groups to which they belong, and their partition key.

#### 10.4.4.1 Partitioning Constraints

Note the following table partitioning constraints:

- You have the choice of the following approach to partitioning:
  - Complete partitioning: All tables of a service component/service engine are partitioned.
  - No partitioning: No tables of a service component/service engine are partitioned.
  - Partial partitioning: Restrict partitioning to specific tables with a high growth rate. [Table 10-4](#) lists the master and dependent tables that can be partitioned.

**Table 10-4 Partial Partitioning**

Master Table	Dependent Table of Master Table
COMPOSITE_INSTANCE	REFERENCE_INSTANCE
CUBE_INSTANCE	CUBE_SCOPE
XML_DOCUMENT	None
MEDIATOR_INSTANCE	MEDIATOR_CASE_INSTANCE
MEDIATOR_PAYLOAD	None

You can partition any of the tables in [Table 10-4](#) by following these constraints:

- \* If you want to partition a dependent table, you must also partition its master table.
- \* All tables should be equipartitioned along the same date ranges and the same name.
- \* Always partition the COMPOSITE\_INSTANCE table. This constraint is essential when the **Audit Level** property is set to **Development** or **Production** for any of the composites. The verification script checks for active flows based on the active composite instances within that partition. Therefore, if the COMPOSITE\_INSTANCE table is not partitioned, the entire verification script logic based on the equipartitioning of all the tables fails.

- Regardless of the group and component, all tables that are partitioned use the same time range and the partition ID.

#### 10.4.4.2 Component Tables, Range Partition Keys, and Groups

[Table 10–5](#) through [Table 10–10](#) are divided into three groups.

- Group 1: This includes tables that are directly related to the end-to-end flow trace of a composite. A majority of the tables fall into this group.
- Group 1A: This includes a small set of tables that are not directly related to the flow trace (for example, REJECTED\_MESSAGE).
- Group 2: This includes a small set of tables that have a dependency on multiple tables from Group 1 and 1A tables. You must first execute the group 1 verification script and drop the group 1 partitions before running the group 2 verification script.

---

**Note:** Groups 1 and 1A are combined in the verification script. Running the verification script does not require you to have knowledge of this classification.

---

**Table 10–5 Component: SOA Infrastructure**

Table	Range Partition Key	Group
COMPOSITE_INSTANCE	PARTITION_DATE	1
REFERENCE_INSTANCE	CPST_PARTITION_DATE	1
COMPOSITE_INSTANCE_FAULT	CPST_PARTITION_DATE	1
COMPOSITE_SENSOR_VALUE	CPST_PARTITION_DATE	1
COMPONENT_INSTANCE	CPST_PARTITION_DATE	1
REJECTED_MESSAGE	CREATED_TIME	1A
REJECTED_MSG_NATIVE_PAYLOAD	RM_PARTITION_DATE	1A
INSTANCE_PAYLOAD	CREATED_TIME	2
COMPOSITE_INSTANCE_ASSOC	CREATED_TIME	2

**Table 10–6 Component: Oracle BPEL Process Manager**

Table	Range Partition Key	Group
CUBE_INSTANCE	CPST_INST_CREATED_TIME	1
CI_INDEXES	CI_PARTITION_DATE	1
CUBE_SCOPE	CI_PARTITION_DATE	1
DOCUMENT_CI_REF	CI_PARTITION_DATE	1
AUDIT_TRAIL	CI_PARTITION_DATE	1
AUDIT_DETAILS	CI_PARTITION_DATE	1
DLV_SUBSCRIPTION	CI_PARTITION_DATE	1

**Table 10–6 (Cont.) Component: Oracle BPEL Process Manager**

Table	Range Partition Key	Group
WORK_ITEM	CI_PARTITION_DATE	1
AUDIT_COUNTER	CI_PARTITION_DATE	1
WI_FAULT	CI_PARTITION_DATE	1
DLV_MESSAGE	RECEIVE_DATE	1A
HEADERS_PROPERTIES	DLV_PARTITION_DATE	1A
DOCUMENT_DLV_MSG_REF	DLV_PARTITION_DATE	1A
XML_DOCUMENT	DOC_PARTITION_DATE	2

**Table 10–7 Component: Oracle Mediator**

Table Name	Range Partition Key	Group
MEDIATOR_INSTANCE	COMPOSITE_CREATION_DATE	1
MEDIATOR_CASE_INSTANCE	MI_PARTITION_DATE	1
MEDIATOR_CASE_DETAIL	MI_PARTITION_DATE	1
MEDIATOR_AUDIT_DOCUMENT	MI_PARTITION_DATE	1
MEDIATOR_DEFERRED_MESSAGE	CREATION_DATE	1A
MEDIATOR_PAYLOAD	CREATION_TIME	2

**Table 10–8 Component: Human Workflow**

Table	Range Partition Key	Group
WFTASK	COMPOSITECREATEDTIME	1
WFTask_TL	COMPOSITECREATEDTIME	1
WFTaskHistory	COMPOSITECREATEDTIME	1
WFTaskHistory_TL	COMPOSITECREATEDTIME	1
WFComments	COMPOSITECREATEDTIME	1
WFMensajeAttribute	COMPOSITECREATEDTIME	1
WFAttachment	COMPOSITECREATEDTIME	1
WFAssignee	COMPOSITECREATEDTIME	1
WFReviewer	COMPOSITECREATEDTIME	1
WFCollectionTarget	COMPOSITECREATEDTIME	1
WFRoutingSlip	COMPOSITECREATEDTIME	1
WFNotification	COMPOSITECREATEDTIME	1
WFTaskTimer	COMPOSITECREATEDTIME	1
WFTaskError	COMPOSITECREATEDTIME	1
WFHeaderProps	COMPOSITECREATEDTIME	1

**Table 10–8 (Cont.) Component: Human Workflow**

Table	Range Partition Key	Group
WFEvidence	COMPOSITECREATEDTIME	1
WFTaskAssignmentStati	COMPOSITECREATEDTIME	1
WFTaskAggregation	COMPOSITECREATEDTIME	1

**Table 10–9 Component: Oracle B2B**

Table	Range Partition Key	Group
B2B_BUSINESS_MESSAGE	CPST_INST_CREATED_TIME	1
B2B_APP_MESSAGE	CPST_INST_CREATED_TIME	1
B2B_WIRE_MESSAGE	CPST_INST_CREATED_TIME	1
B2B_DATA_STORAGE	CPST_INST_CREATED_TIME	1
B2B_EXT_BUSINESS_MESSAGE	CPST_INST_CREATED_TIME	1

**Table 10–10 Component: Oracle BPM Suite**

Table	Range Partition Key	Group
BPM_AUDIT_QUERY	CI_PARTITION_DATE	1
BPM_MEASUREMENT_ACTIONS	CI_PARTITION_DATE	1
BPM_MEASUREMENT_ACTION_EXCEPS	CI_PARTITION_DATE	1
BPM_CUBE_AUDITINSTANCE	CIPARTITIONDATE	1
BPM_CUBE_TASKPERFORMANCE	CIPARTITIONDATE	1
BPM_CUBE_PROCESSPERFORMANCE	CIPARTITIONDATE	1

## 10.4.5 Running the Verification Script

A verification script is provided for the DBA to identify when to drop a partition and its equipartitioned dependent table. The verification script is located in *MW\_HOME/SOA\_ORACLE\_HOME/rcu/integration/soainfra/sql/verify*.

To execute the verification script:

1. Create a directory with the SQL command PART\_DIR. For example:

```
CREATE DIRECTORY PART_DIR AS '/tmp/verify'
```

2. Provide the soainfra user with write privileges on this directory. The log and SQL files are generated in this directory.
3. Delete the temporary tables by calling the following stored procedures. This is because active instances are captured in a set of temporary tables that get processed by the row movement script.

For group 1 tables:

```

DECLARE
BEGIN
verify_soa.trunc_verify1_temp_tables;
END;

```

For group 2 tables:

```

DECLARE
BEGIN
verify_soa.trunc_verify2_temp_tables;
END;

```

4. For running the stored procedure, the client script `soa_exec_verify.sql` can be used. Edit `soa_exec_verify.sql` and enter the partition names that require verification in the array `mySoa_drv_list`.
  - a. To execute function `verify_soa.verify_1`, pass 1 as the parameter.
  - b. To execute function `verify_soa.verify_2`, pass 2 as the parameter.
5. Review the logs and SQL files generated in the `PART_DIR` directory.

---

**Note:** A verification script is not provided for business rules.

---

#### 10.4.6 Verifying and Dropping Partitions

To verify and drop partitions:

1. Execute function `verify_soa.verify_1`.
2. Check the log file in the `PART_DIR` folder with the name `SOA_PARTITION_NAME_LOG_1` for any failures. If you have active, long running instances, see [Section 10.4.7, "Moving Active, Long Running Instances to a Different Partition."](#)
3. Drop the partitions that can be dropped by using the script generated in the `PART_DIR` folder with the name `SOA_PARTITION_NAME_RESULT_1.sql`.
4. Execute `verify_soa.verify_2`.
5. Check the log file in the `PART_DIR` folder with the name `SOA_PARTITION_NAME_LOG_2` for any failures.
6. Drop the droppable partitions using the script generated in the `PART_DIR` folder with the name `SOA_PARTITION_NAME_RESULT_2.sql`.

---

**Note:** There is an issue caused by the existence of foreign key constraints in the Oracle B2B table. When dropping the partition, the B2B partition purge is invoked, the foreign key constraints must be disabled before dropping the partition and enabled afterward. To perform this action, execute the PL/SQL procedures `b2b_disable_constraints` and `b2b_enable_constraints` at the appropriate steps in the above procedure. Because foreign keys are enabled and disabled in these procedures, it is not recommended to run them on a live system.

---

#### 10.4.7 Moving Active, Long Running Instances to a Different Partition

The verification script checks if there are active instances in the partition. When no instances are active, the partition can be dropped. However, you may have active, long running instances present in the partition. These active instances prevent a partition

from being dropped. To avoid this problem, you can move long running instances to a different partition.

The Oracle database provides an option for enabling and disabling row movements across partitions. When you create or alter a partitioned table, a row movement clause, either `ENABLE ROW MOVEMENT` or `DISABLE ROW MOVEMENT`, can be specified. This clause either enables or disables the movement of a row to a new partition if its key is updated. This option can handle long-running processes that prevent partition drops.

The verify scripts provide a count of total instances, open instances, and the percentage of open instances in a partition. Based on this information, you now have a choice of running the row movement procedure. This updates the partition keys of the targeted tables, which in turn initiates a row movement of these instances to a different partition. Once all active instances from all partitioned tables have been moved to a different partition, the targeted partition can be dropped.

---

#### Notes:

- Create a separate partition for active, long running transactions. You can then move these instances from the current partition to the new partition by providing the `new_partition_date` that falls into that partition range. It is recommended that you run a periodical purge on these long-running instances.
  - Row movement involves expensive updates to multiple rows. Only exercise row movement when the number of active processes is small. While the verification script provides a count of active instances, many of the dependent tables have a many-to-one relationship with the master tables. This can become a larger set of rows to move between partitions (if the dependent tables are also partitioned). Use row movement discretely based on the tables partitioned, the active instances in the partition, the data shape, and the available infrastructure setup.
  - Enabling row movement between partitions can significantly degrade runtime performance if the partition key is updated frequently. However, a partition key column is never changed for the Oracle SOA Suite database tables once they are created. Therefore, no row movement at runtime occurs.
- 

To move long running instances to a different partition:

1. Run the verification script for group 1. This script is described in [Section 10.4.5, "Running the Verification Script."](#)
2. Check the log scripts to see if there are any active instances preventing the partition drop.
3. Run the row movement procedure. Based on the logs from step 2, check the count of open instances. Based on this count, decide if the row movement script should be executed or if dropping of partitioning should be postponed.

- a. Log in to SQL\*Plus as the SOAINFRA user:

```
CONNECT SOAINFRA/password
```

- b. Execute the following PL/SQL procedure to move rows for group 1 tables:

```
SQL> PROCEDURE exec_row_movement_1(partition_name in varchar2,
 new_partition_date in timestamp);
```

where:

*partition\_name* is the name of the partition on which to execute row movement.

*new\_partition\_date* is the new date with which to update the partition key column.

4. Execute the purge script to delete nonpartitioned tables as described in [Section 10.3.6, "Running the Purge Scripts."](#) The `purge_partitioned_component` parameter of the purge procedures must be set to false.
5. Drop the group 1 partitions (based on step 3).
6. Run the verification script for group 2.
7. Check if there are any active instances holding back the partition drop.
8. Run the row movement procedure. Based on the logs from step 7, check the count of open instances. Based on this count, decide if the row movement script should be executed or if dropping of partitioning should be postponed.
  - a. Return to SQL\*Plus as the SOAINFRA user.

```
CONNECT SOAINFRA/password
```

- b. Execute the following PL/SQL procedure to move rows for group 2 tables:

```
SQL> PROCEDURE exec_row_movement_2(partition_name in varchar2,
 new_partition_date in timestamp);
```

where:

*partition\_name* is the name of the partition on which to execute row movement.

*new\_partition\_date* is the new date with which to update the partition key column.

9. Drop the group 2 partitions (based on step 8).

#### 10.4.8 Partial Partitioning of Components

If you have an environment in which some components are partitioned, while other components are not partitioned, the nonpartitioned data set must be purged using the purge scripts described in [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts."](#)

For example, assume human workflow is not partitioned, while other components are partitioned. The verification script reports that all SOA partitions can be dropped using the command for dropping partitions. However, the human workflow tables continue to hold workflow data until the data is purged using the loop/parallel purge scripts.

### 10.5 Removing Records from the Runtime Tables Without Dropping the Tables

The truncate script enables you to remove all records from all Oracle SOA Suite runtime tables without dropping the tables. You cannot reclaim database space with the truncate scripts.

The truncate script is useful for the following scenarios:

- To create a production or test environment clone (test-to-production or production-to-test) in which you want to keep the schemas from the production environment so that the production customizations and new job definitions are kept, but all instance data in the SOA Infrastructure (that is, in the cloned database) must be truncated, regardless of state.
- For testing purposes in which test scenarios must be recreated and rerun.

The truncate script provides this option by including truncate statements covering all the runtime tables of the following components:

- Oracle BPEL Process Manager
- Oracle Mediator
- Business rules
- Oracle B2B
- SOA Infrastructure
- Oracle BPM Suite

To remove records from the runtime tables without dropping the tables:

1. Start SQL\*Plus:

```
sqlplus
```

2. In SQL\*Plus, connect to the database as the SOAINFRA user:

```
CONNECT SYS AS SOAINFRA
```

3. Execute the truncate script located in the *MW\_HOME/SOA\_ORACLE\_HOME/rcu/integration/soainfra/sql/truncate* directory:

```
SQL> @truncate_soa_oracle.sql
```

## 10.6 Recreating Tables with Open Composite Instances and Reclaiming Database Space

For some Oracle SOA Suite environments, the purge scripts may not always remove a sufficient number of composite instances to reclaim database space. This can lead to performance issues. The table recreation script (TRS script) is provided to perform the following tasks:

- Delete all closed composite instances with respect to a retention policy that you specify.
- Recreate the Oracle SOA Suite tables while preserving only open composite instances.
- Reclaim space all at once for database tables that have grown too large without shrinking or rebuilding database segments (tables and indexes).

The deletion of all closed composite instances and the reorganization and reclamation of space are performed in a single step.

You can use the TRS script to get your database growth strategy back on track. The TRS script is provided to help installations reclaim space when the Oracle SOA Suite schema tables have been allowed to grow excessively, possibly without ever having been purged (with the looped or parallel script). Once the TRS script is used to reclaim

space, you must implement an appropriate purge and partitioning strategy to maintain database growth. The TRS script is provided for corrective actions, and is not a replacement for the purge scripts.

The TRS script preserves data for open composites and service components and honors the specified retention policy. In addition, TRS generates DDL scripts to recreate the tables from the onsite Oracle SOA Suite schema, which therefore preserves any onsite customizations. (It is mandatory that the DDL is parsed and tested in collaboration with the onsite database administrator.)

TRS is executed in two phases:

- Phase one: Populates a set of temporary tables that contain the *closed* composite and service component IDs to ignore (drop) when the tables are rebuilt. This phase also generates a DDL script to rebuild the tables.
- Phase two: Executes the generated DDL script to recreate the specified Oracle SOA Suite tables. The script should be parsed and tested before execution and can be customized. Database backups are required before and after phase two.

### 10.6.1 Considerations for Using the TRS Script

Review the following requirements to determine if the TRS script is suitable for your Oracle SOA Suite environment.

---

**Note:** You must first tune and use the Oracle SOA Suite purge scripts described in [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts"](#) before using the TRS script.

---

- The TRS script is provided for performing corrective actions, and is *not* a replacement for the purge scripts. Corrective actions are those required to move your installation to a more efficient database growth management strategy. This includes range partitioning tables and reducing the size of individual tables that have grown too large due to a lack of a purging strategy. Use the TRS script only to get your Oracle SOA Suite environment back on track. You must develop a growth management strategy that is best handled with the purge scripts. Once tuned, return to using the purge scripts as your primary method for deleting instances.
- Though the TRS script implements direct path inserts, parallel query slaves, and no logging, it is expected to take longer than the purge scripts. The purge scripts only delete a subset of closed composites, but TRS removes *all* closed composites. The TRS script still must parse the composites in a similar manner to purge scripts, but does this for all composites (with consideration for the retention period).
- The TRS script requires Oracle SOA Suite downtime because the tables must be recreated (dropped/created/inserted). This is the main reason the TRS script is not an alternative to the purge scripts. Many installations are 24 hours-by -7 days with small maintenance windows and unlikely to use these scripts to fully maintain the growth of the Oracle SOA Suite database.
- If there is no urgency to reclaim space, but there is a need to range partition SOA tables or modify their structure, then the TRS script may not be the best option. It may be preferable to rebuild the table using a plain CTAS (CREATE TABLE AS SELECT) or ITAS (INSERT TABLE AS SELECT) command, which copies *all* (closed and open) composites within the given table. Custom scripts can be written by the database administrator and are likely to be faster than TRS because they do not need to parse the composite to determine which are closed.

In addition, to avoid any dangling references, some tables (master tables such as COMPOSITE\_INSTANCE, more later) may also require dependent tables to be rebuilt. A custom CTAS or ITAS script preserves all rows within the given master table, therefore avoiding the need to rebuild dependent tables. Therefore, TRS may not be the best option when space does not need to be reclaimed.

- You must back up the Oracle SOA Suite database before and after the execution of the TRS DDL-generated script in phase two. This is especially important when no logging is specified by setting the redo\_flag parameter to false in the trs\_instances PL/SQL procedure in [Section 10.6.4, "Phase One - Creating the TRS Script."](#)
- The dynamically created DDL script must be checked and tested thoroughly in a quality assurance (QA) environment by a database administrator *before* execution in a production environment.
- The TRS script can rebuild all runtime tables except for the Oracle B2B tables in the Oracle SOA Suite schema.
- The TRS script cannot be executed on non-Oracle databases.
- Oracle SOA Suite tables not mentioned in the Oracle SOA Suite 11g purge scripts cannot be deleted.

## 10.6.2 TRS Script Features

The TRS script can rebuild very large tables and has been designed with the following features:

- Performance features:
  - Parallel query slaves manage and traverse large tables.
  - The data manipulation language (DML) script is generated.
  - Minimal redo/undo logging reduces the number of redo logs generated.
  - Direct path input/output (I/O) reduces the number of redo and undo logs generated. Direct I/O also bypasses the database buffer cache. The TRS script uses a direct path insert with a subquery to populate the recreated table. The subquery selects only open composite flows from the source table and ignores (deleted) closed composites. As a biproduct of recreating the table, disk space is also reclaimed and reorganized.
- Onsite table and index definitions (data definition language (DDL)) are preserved, regardless of customizations that you make to the base table and index definitions.
- The TRS script can be customized before execution, therefore facilitating table partitioning. The onsite database administrator must modify the generated DDL script.
- Fine-grained table rebuilds target large tables. This is the primary purpose of the TRS script. This helps to avoid the significant escalations that arise when a purging strategy has not been implemented.
- A drop\_flag parameter determines if the source (original) table can be dropped. This helps with space estimations and validation.

The TRS script is executed in two phases, as described in [Table 10-11](#).

**Table 10–11 Two Phase Execution of the TRS Script**

Phase One Tasks	Phase Two Tasks
<p>You execute the <code>trs_instances</code> PL/SQL procedure to create the TRS DDL script. This phase can be executed a few days in advance with an appropriate retention period setting.</p> <p>The PL/SQL procedure performs the following tasks:</p> <ul style="list-style-type: none"> <li>■ Reads input parameters.</li> <li>■ Reads table names from a parameter table (<code>TRS_PARAMETER</code>).</li> <li>■ Populates temporary ID tables (using direct path inserts) with the keys on which to rebuild the Oracle SOA Suite tables in phase two. The temporary ID tables contain the component IDs that are closed and ignored when the source tables are rebuilt with the generated DDL script.</li> <li>■ Generates the table recreation DDL script to be executed to perform the rebuild in phase two. This script preserves any onsite table and index modifications you have made to the Repository Creation Utility (RCU)-generated Oracle SOA Suite schema. For example, you may have partitioned a table or changed large objects (LOBs) from basic files to secure files. The generated DDL script includes these changes.</li> <li>■ Generates the log files.</li> </ul> <p><b>Note:</b> If phase one fails, the DDL script is not generated or only partially generated.</p>	<p>You execute the DDL script during Oracle SOA Suite installation downtime after testing it thoroughly in a QA environment.</p> <p>The DDL script can be customized before execution. The script performs the following tasks:</p> <ul style="list-style-type: none"> <li>■ Drops, creates, and inserts rows into the table based on composite flows (ECIDs) not in the temporary ID tables.</li> <li>■ Recreates the dependent objects. This script contains the table, index, and constraint definitions and the direct path insert to populate the Oracle SOA Suite tables.</li> </ul>

### 10.6.3 Prerequisites for Rebuilding the XML\_DOCUMENT Table

You specify the tables to recreate with open composite instances in [Section 10.6.4, "Phase One - Creating the TRS Script."](#) The `XML_DOCUMENT` table is among the tables that you can specify. The `XML_DOCUMENT` table is shared by components across the SOA Infrastructure, with document IDs present in the following tables:

- `INSTANCE_PAYLOAD`
- `DOCUMENT_DLV_MSG_REF`
- `DOCUMENT_CI_REF`
- `MEDIATOR_AUDIT_DOCUMENT` (only used in development mode)
- `B2B_DATA_STORAGE`

The `XML_DOCUMENT` table is a master table by itself. Unlike the logic used to rebuild the other tables, this table is rebuilt on document IDs that are still present in the above tables. Therefore, it is necessary to purge the above tables or recreate them with the TRS script *before* rebuilding the `XML_DOCUMENT` table.

This may require multiple executions of the TRS script (if the purge script is not used on the above tables). The first task is to remove all *closed* document IDs from the above tables and the second task is to reduce the size of the `XML_DOCUMENT` table based on what is still present in these tables.

The XML\_DOCUMENT table is not rebuilt based on closed composite and service component IDs because of a foreign key association with the B2B\_DATA\_STORAGE table. The document IDs that are closed in Oracle B2B cannot be removed because the TRS script, and therefore the need to rebuild this table, is based on what is still present.

Before rebuilding XML\_DOCUMENT either:

1. Execute the purge script to remove rows from the INSTANCE\_PAYLOAD, DOCUMENT\_DLV\_MSG\_REF, DOCUMENT\_CI\_REF, and MEDIATOR\_AUDIT\_DOCUMENT tables.  
and/or:
  1. Execute the TRS script to remove rows from the INSTANCE\_PAYLOAD, DOCUMENT\_DLV\_MSG\_REF, and DOCUMENT\_CI\_REF tables.
  2. Execute the Oracle B2B purge script to remove rows from B2B\_DATA\_STORAGE.

#### 10.6.4 Phase One - Creating the TRS Script

---

**Note:** The XML\_DOCUMENT table is among the tables that you can recreate with open composite instances. Before recreating the XML\_DOCUMENT table, there are specific prerequisites that you must understand. For more information, see [Section 10.6.3, "Prerequisites for Rebuilding the XML\\_DOCUMENT Table."](#)

---

Use the `trs_instances` PL/SQL procedure to create the TRS DDL script. The script accepts input parameters and reads database tables to determine the tables to recreate. [Example 10–4](#) shows the syntax.

**Example 10–4 trs\_instances Procedure**

```
PROCEDURE trs_instances (i_older IN TIMESTAMP DEFAULT NULL,
 drop_flag IN BOOLEAN DEFAULT FALSE,
 redo_flag IN BOOLEAN DEFAULT FALSE,
 DOP IN NUMBER DEFAULT 0,
 sql_trace IN BOOLEAN DEFAULT FALSE);
```

[Table 10–12](#) describes the TRS script parameters.

**Table 10–12 Parameter Descriptions**

Parameter	Description
i_older	Specifies the date to implement your retention policy. That is; any composite instances with creation dates older than this date are candidates for removal as long as they are closed.  Any composites with creation dates earlier than this date are retained whether open or closed. This is a mandatory parameter. There is no default value.

**Table 10–12 (Cont.) Parameter Descriptions**

Parameter	Description
drop_flag	<p>Specifies if the original (source) table is dropped as part of the TRS script. Use this flag to perform a trial run to ensure that there is enough database space to perform the TRS operation. The TRS operation requires enough space to accommodate an additional table equal in size to the original table.</p> <ul style="list-style-type: none"> <li>▪ true: The original (source) table is immediately dropped after recreation. The temporary table is renamed to the original. Therefore, the database requires enough space to accommodate the largest table in the DDL script.</li> <li>▪ false (the default value): The original table is not dropped. However, a temporary table is created that contains only open composites. Therefore, the database requires enough space to accommodate the original (source) and temporary (target) tables for all tables in the DDL script.</li> </ul>
redo_flag	<p>Specifies if database redo logging is performed when the selected table is recreated. Avoiding the generation of redo logging can significantly improve the performance of the TRS script operation, but has implications for database backup and recovery. It is recommended that you perform a backup before and after TRS script execution, regardless of this parameter setting.</p> <ul style="list-style-type: none"> <li>▪ true: (the default value) Database redo logging is performed.</li> <li>▪ false: Database redo logging is not performed. A database backup must be performed immediately after the TRS script is executed if no logging is specified (that is, <code>redo_flag</code> is set to false).</li> </ul>
DOP	<p>Specifies the degree of parallel used in setting the number of parallel query slaves for the TRS script operation. The parallel query slaves help with TRS performance on multi-CPU hardware. If set to 0 or 1 (the default value), then no parallel query slaves are specified in the script.</p>
sql_trace	<p>Used for SQL tuning and debugging because it produces the SQL trace for the SQL statements executed by the <code>trs_instances</code> PL/SQL procedure. The SQL trace is also set in the generated DDL script. The SQL trace files can be found in the database user dump destination:</p> <pre>SQL&gt; SHOW PARAMETER DUMP</pre> <p>A SQL trace provides a significant overhead to SQL execution. The default value is false.</p>

RCU initially installs the TRS script. To complete TRS script installation, the following steps are required.

To complete TRS script installation:

1. Create a directory to capture the DDL script and log files:

```
mkdir -p /.../trs_output
```

2. In SQL\*Plus, connect to the database AS SYSDBA:

```
SQL> CONNECT SYS AS SYSDBA
```

3. Create the `trs_dir` database directory:

```
SQL> CREATE OR REPLACE DIRECTORY trs_dir AS '/.../trs_output';
```

4. Grant privileges to the Oracle SOA Suite schema owner:

```
SQL> GRANT READ, WRITE ON DIRECTORY trs_dir TO soa_owner;
```

5. For SQL tracing, the Oracle SOA Suite schema owner may require the ALTER SESSION privilege:

```
SQL > GRANT ALTER SESSION TO soa_owner;
```

6. Insert the table names of the Oracle SOA Suite tables to recreate into the TRS\_PARAMETER table.

- [Table 10-13](#) shows the master component table name that you can insert and the corresponding tables that are automatically included with your selection.
- [Table 10-14](#) shows the individual tables that you can insert and the corresponding tables that are automatically included with your selection.

The table has one column called TABLE\_NAME that accepts the name of any Oracle SOA Suite tables mentioned in the purge script. One or more tables can be inserted into the TRS\_PARAMETER table, but some tables that are considered master tables within the Oracle SOA Suite schema may require additional tables to be rebuilt to avoid dangling references. (TRS automatically determines table dependencies.)

```
SQL> CREATE TABLE TRS_PARAMETER (TABLE_NAME VARCHAR2(200));
SQL> INSERT INTO TABLE TRS_PARAMETER VALUES ('COMPOSITE_INSTANCE');
SQL> COMMIT;
```

If the COMPOSITE\_INSTANCE table is inserted into the TRS\_PARAMETER table, then all component runtime tables must be rebuilt because the COMPOSITE\_INSTANCE table holds the state (open, closed) of all composite flows. To avoid dangling references, the service component tables for Oracle BPEL Process Manager, Oracle Mediator, human workflow, and decision services (business rules) are rebuilt. This is automatically handled by the TRS script when the DDL is generated.

In addition, if only the Oracle BPEL Process Manager master table CUBE\_INSTANCE is inserted in the TRS\_PARAMETER table, only the Oracle BPEL Process Manager runtime table is rebuilt. Therefore, the runtime tables for the SOA Infrastructure, Oracle Mediator, human workflow, and decision services (business rules) are untouched and the closed composites may still appear in Oracle Enterprise Manager Fusion Middleware Control through the SOA Infrastructure tables (COMPOSITE\_INSTANCE). You must run the purge script described in [Section 10.3, "Deleting Large Numbers of Instances with the Purge Scripts"](#) to remove the closed SOA composite applications. (As stated, TRS is for corrective action so that purge and partitioning can be implemented.)

---

**Note:** Though any individual Oracle SOA Suite table within the purge scripts can be recreated, some tables within the Oracle SOA Suite schema are considered master tables and others have dependencies. To avoid dangling references, the TRS script automatically includes dependent tables.

---

**Table 10-13 Master Component Tables and TRS\_PARAMETER Table**

Master Component Table Names	Automatically Included Tables
COMPOSITE_INSTANCE	Recreates all SOA Infrastructure, Oracle BPEL Process Manager, Oracle Mediator, human workflow, and business rule (decision service) component runtime tables.
CUBE_INSTANCE	Recreates all Oracle BPEL Process Manager runtime tables (including Oracle BPM Suite runtime tables).
MEDIATOR_INSTANCE	Recreates all Oracle Mediator runtime tables.
WFTASK	Recreates all human workflow runtime tables.
BRDECISIONINSTANCE	Recreates all business rule (decision service) runtime tables.

**Table 10–13 (Cont.) Master Component Tables and TRS\_PARAMETER Table****Master Component Table Names Automatically Included Tables**

XML_DOCUMENT <sup>1</sup>	Recreates the XML_DOCUMENT table.
<sup>1</sup> This table typically grows large in size. Before recreating the XML_DOCUMENT table, there are specific prerequisites that you must perform. For more information, see <a href="#">Section 10.6.3, "Prerequisites for Rebuilding the XML_DOCUMENT Table."</a>	

**Table 10–14 Individual Tables and TRS\_PARAMETER Table**

Table Name	Automatically Included Tables
INSTANCE_PAYLOAD <sup>1</sup> or REJECTED_MSG_NATIVE_PAYLOAD	<ul style="list-style-type: none"> <li>■ INSTANCE_PAYLOAD<sup>1</sup></li> <li>■ REJECTED_MSG_NATIVE_PAYLOAD</li> <li>■ REFERENCE_INSTANCE<sup>1</sup></li> <li>■ COMPOSITE_INSTANCE_FAULT</li> <li>■ REJECTED_MESSAGE</li> <li>■ COMPONENT_INSTANCE</li> </ul>
ATTACHMENT or ATTACHMENT_REF	<ul style="list-style-type: none"> <li>■ ATTACHMENT</li> <li>■ ATTACHMENT_REF</li> </ul>
DLV_MESSAGE or DOCUMENT_DLV_MSG_REF or HEADER_PROPERTIES	<ul style="list-style-type: none"> <li>■ DLV_MESSAGE</li> <li>■ DOCUMENT_DLV_MSG_REF</li> <li>■ HEADERS_PROPERTIES</li> </ul>
BPM_AUDIT_QUERY or BPM_CUBE_AUDITINSTANCE or BPM_CUBE_PROCESSPERFORMANCE or BPM_CUBE_TASKPERFORMANCE or BPM_MEASURE_ACTION_EXCEPS or BPM_MEASUREMENT_ACTIONS	<ul style="list-style-type: none"> <li>■ BPM_AUDIT_QUERY</li> <li>■ BPM_CUBE_AUDITINSTANCE</li> <li>■ BPM_CUBE_PROCESSPERFORMANCE</li> <li>■ BPM_CUBE_TASKPERFORMANCE</li> <li>■ BPM_MEASURE_ACTION_EXCEPS</li> <li>■ BPM_MEASUREMENT_ACTIONS</li> </ul>
MEDIATOR_PAYLOAD <sup>1</sup>	<ul style="list-style-type: none"> <li>■ MEDIATOR_DEFERRED_MESSAGE</li> <li>■ MEDIATOR_CASE_INSTANCE</li> <li>■ MEDIATOR_RESEQUENCER_MESSAGE</li> <li>■ MEDIATOR_GROUP_STATUS</li> <li>■ MEDIATOR_PAYLOAD</li> </ul>
MEDIATOR_DEFERRED_MESSAGE	<ul style="list-style-type: none"> <li>■ MEDIATOR_DEFERRED_MESSAGE</li> <li>■ MEDIATOR_PAYLOAD</li> </ul>
MEDIATOR_CASE_INSTANCE	<ul style="list-style-type: none"> <li>■ MEDIATOR_CASE_INSTANCE</li> <li>■ MEDIATOR_PAYLOAD</li> </ul>
MEDIATOR_RESEQUENCER_MESSAGE	<ul style="list-style-type: none"> <li>■ MEDIATOR_RESEQUENCER_MESSAGE</li> <li>■ MEDIATOR_GROUP_STATUS</li> <li>■ MEDIATOR_PAYLOAD</li> </ul>

<sup>1</sup> This table typically grows large in size.

## 7. Generate the log file in database directory `trs_dir`.

```
SQL> @debug_on
```

8. Capture any API statement failures in a log file.

```
SQL> SET SERVEROUTPUT ON
```

---

**Notes:**

---

- Phase one takes time to execute.
  - You can monitor phase one progress by viewing the log in the `trs_dir` directory if debugging is on.
  - You can also monitor phase one SQL progress by examining the SQL trace file in the database user dump destination if `SQL_TRACE` is set to true.
- 

9. Exit to flush the last buffer to the log and SQL script files.

```
SQL> EXIT
```

## 10.6.5 Phase Two - Running the TRS Script

Run the generated DDL script found in the database directory `trs_dir`. This script contains the statements to recreate the Oracle SOA Suite tables that you generated in [Section 10.6.4, "Phase One - Creating the TRS Script."](#)

1. In SQL\*Plus, connect to the database AS SYSDBA:

```
SQL> CONNECT SYS AS SYSDBA
```

2. Execute the generated DDL script in the `trs_dir` directory:

```
SQL> @SOA_TRS_20120711091958.sql
```

This creates a spool file named `SOA_TRS_20120711091958.log`.

## 10.6.6 Logging and Debugging

You can record an audit trail of the current procedure and SQL statement being executed. The audit trail is written to a log file named `soa_trs_DATE.log` in the `trs_dir` directory.

To enable logging and debugging:

1. Change directories to the following location:

```
$ cd .../trs_common
```

2. Turn on debugging:

```
SQL> @debug_on.sql;
```

3. When DDL script execution is complete, turn off debugging:

```
SQL> @debug_off.sql;
```

You can trace errors that occur during DDL script creation and execution. Note the following details about the `sql_trace` flag.

- SQL trace is set (event 10046) for statements in the `trs_instances` procedure.
- The SQL trace file is located in the database user dump destination.

- SQL statements can be correlated with the DEBUG log setting to determine the procedure.
- A SQL trace is set (event 10046) at the top of the TRS script.

## 10.7 Purging Instances on Microsoft SQL Server

You can execute the looped (single thread) purge script described in section [Section 10.3.1, "Looped Purge Script"](#) to purge database instances on Microsoft SQL Server.

Before running the looped purge script, note the following details:

- There is no support for running the parallel purge script or for partitioning on Microsoft SQL Server.
- The following Microsoft SQL Server versions are supported:
  - 2005 (all service pack levels included)
  - 2008 (all service pack levels included)
  - 2008 R2 (all service pack levels included)
- The Oracle PL/SQL purge scripts are translated to Microsoft SQL Server Transact-SQL (T-SQL).
- The scripts are executed slightly differently than on an Oracle database because of differences in T-SQL. These differences are described in subsequent sections.

### 10.7.1 Understanding Microsoft SQL Server Features

This section describes several basic Microsoft SQL Server features. For more specific details, see your Microsoft SQL Server documentation.

- Microsoft SQL Server has separate databases that do not share disk files. This differs from an Oracle database, in which one database instance can have many users and schemas, and tablespaces are shared by users.
- Microsoft SQL Server uses logins to provide access to an instance. Each database has users that map to a login to obtain individual access to tables, view, and so on.
- Each user has a default schema and can have access to other schemas.
- Logins with the sysadmin role have the default schema assigned to the database owner (dbo).
- T-SQL is equivalent to Oracle PL/SQL.
- Each login has access to multiple databases and schemas in the database. Access to any object must be with a fully qualified name:  
`[DATABASE_NAME] . [SCHEMA_NAME] . [TABLE_NAME]`
- You can default to a database name before accessing the database objects:
  1. Use the `[DATABASE_NAME]` command.
  2. Access schema objects as `[SCHEMA_NAME] . [TABLE_NAME]`.
- If the object is in the default schema specified for the user, it can be directly accessed without qualifying it with the schema name.

## 10.7.2 Purge Script Differences on Microsoft SQL Server

This section describes the different aspects of using the purge script on Microsoft SQL Server.

- Microsoft SQL Server does not support packages, while the purge scripts rely on separate packages for each component. Schemas in Microsoft SQL Server are used to achieve this functionality.
- T-SQL does not directly support logging (`dbms_putline` and `utl_file.put_line`). The `xp_cmdshell` logs purge details to a file. This functionality requires additional configuration changes described in [Section 10.7.3, "Running the Purge Scripts on Microsoft SQL Server."](#)
- T-SQL does not support compiler flags, which are used for switching debugging on and off in an Oracle database. An additional table manages the debugging settings.
- Accessing tables from Microsoft SQL Server requires them to be qualified with the schema name. Additional procedures are provided for Microsoft SQL Server to create and drop synonyms for evading schema name prefixes in the main scripts.
- The `xp_cmdshell` spawns a Windows command shell and passes a string for execution. The `sysadmin` role is required to execute this statement.

## 10.7.3 Running the Purge Scripts on Microsoft SQL Server

You run the purge script with the `SQLCMD` utility. This utility enables you to enter T-SQL statements, system procedures, and script files at the command prompt in the following locations:

- The Query Editor in `SQLCMD` mode
- A Windows script file
- An operating system (`cmd.exe`) job step of a SQL Server Agent job

Since the purge script is packaged in different SQL files in different directories and accessed through their related path, the `SQLCMD` utility is the best method for loading it.

The purge script is located in the `MW_HOME/SOA_ORACLE_HOME/rcu/integration/soainfra/mssql/soa_purge` directory.

1. Connect to Microsoft SQL Server using the `SQLCMD` utility as a user with `sysadmin` privileges. For example:

```
sqlcmd -S myhost.us.example.com\Instance_Name -D database_name -U user_name -P password
```

2. Set the `DATEFORMAT` command to run the purge scripts in English.

---

**Note:** English is the only supported language for running the purge scripts on Microsoft SQL Server.

---

```
'set DATEFORMAT mdy'
```

For example:

```
'set DATEFORMAT 08122013'
```

3. Load the purge scripts.

```
:r soa_purge_scripts.sql
<1 rows affected>
```

**4.** Change the configuration to support xp\_cmdshell.

```
sp_configure 'xp_cmdshell', 1;
GO
RECONFIGURE;
GO
```

**5.** If required, enable debugging.

```
:r common\debug_on.sql
```

**6.** Create synonyms to target the purge on a specific schema.

```
exec soa.create_synonyms
@schema_name = 'SS1_SOAINFRA'
GO
```

**7.** Execute the purge script.

```
Exec soa.delete_instances
@min_creation_date ='01 Jan 2012',
@max_creation_date ='30 Jan 2012',
@batch_size = 50 ,
@max_runtime = 15 ,
@retention_period = '31 Dec 2012',
@write_file = 'C:\temp\out1.txt'
GO
```

The parameters to specify are the same as those described in [Table 10–1](#) for running the looped purge script on an Oracle database, except that the `purge_partitioned_component` parameter is not supported.

**Notes:**

- The purge script option for purging based on COMPOSITE\_DN described in [Section 10.3.5, "Purging the Instances of a Specific SOA Composite Application"](#) is not supported.
- Partitioning is not supported.
- The parallel purge script described in [Section 10.3.2, "Looped Purge in Parallel Script with dbms\\_scheduler"](#) is not supported.



---

# Programmatically Managing SOA Composite Applications with the Facade API

This chapter describes the Facade API, which exposes operations and attributes such as composites, components, services, and references for programmatically managing SOA composite applications during runtime. The Facade API is part of Oracle SOA Suite's Infrastructure Management Java API.

This chapter includes the following sections:

- [Section 11.1, "Introduction to Programmatically Managing SOA Composite Applications"](#)
- [Section 11.2, "Facade API Interfaces"](#)
- [Section 11.3, "Facade API Examples"](#)

For more information about the Infrastructure Management Java API, see *Oracle Fusion Middleware Infrastructure Management Java API Reference for Oracle SOA Suite*.

## 11.1 Introduction to Programmatically Managing SOA Composite Applications

You can programmatically manage your SOA composite applications during runtime with the Facade API. The Facade API is part of Oracle SOA Suite's Infrastructure Management Java API. The Facade API exposes operations and attributes of composites, components, services, references and so on. The Facade API provides an alternative to managing composites with Oracle Enterprise Manager Fusion Middleware Control.

The `oracle.soa.management.facade.Locator` interface exposes a method interface as the top level entry point for most Facade APIs. The `oracle.soa.management.facade.Locator` interface exposes a method, `createConnection`, which returns a `DirectConnection` to a composite. You can use the `LocatorFactory` implementation to obtain the `DirectConnection`. For more information about the `LocatorFactory` and `DirectConnection`, see section "Introduction to the Direct Binding Invocation API" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*. The `DirectConnection` and `DirectConnectionFactory` (for creating direct binding connections) classes are in the `oracle.soa.api.invocation` package.

Partition management APIs are not exposed by the Locator. Instead, the top level entry point for partition management APIs is the `ServerManager`. You use the `ServerManagerFactory` implementation shown in [Example 11-1](#) to create `ServerManager` objects for managing the SOA server.

**Example 11–1 ServerManagerFactory**

```
ServerManagerFactory smf = ServerManagerFactory.getInstance();
Hashtable jndiProps = new Hashtable();

jndiProps.put(Context.PROVIDER_URL, "server_JNDI_provider_url");
jndiProps.put(Context.INITIAL_CONTEXT_FACTORY, "server_initial_context_factory_classname");
jndiProps.put(Context.SECURITY_PRINCIPAL, "jndi_user");
jndiProps.put(Context.SECURITY_CREDENTIALS, "jndi_password");
ServerManager sm = smf.createInstance(jndiProps);
```

For more information about the Facade API, see *Oracle Fusion Middleware Infrastructure Management Java API Reference for Oracle SOA Suite*.

---

**Note:** The Infrastructure Management Java API also includes the Direct Binding Invocation API for inbound invocation of SOA composite applications and outbound invocations of Oracle Service Bus (OSB) or another SOA composite application. For information on using the Direct Binding Invocation API, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

---

### 11.1.1 Security Credentials Required when Creating the Locator Object

Starting with 11g Release 1 (11.1.1.7), you must set the subject credential or have a valid subject established in the invocation context when creating the locator object.

[Example 11–2](#) shows how to create a locator object.

**Example 11–2 Security Credentials for Creating the Locator Object**

```
Hashtable<String, String> jndiProps = new Hashtable<String, String>();
jndiProps.put(Context.INITIAL_CONTEXT_FACTORY, initialContextFactory);
jndiProps.put(Context.PROVIDER_URL, providerURL);
jndiProps.put(Context.SECURITY_PRINCIPAL, principal);
jndiProps.put(Context.SECURITY_CREDENTIALS, creds);
Locator locator = LocatorFactory.createLocator(jndiProps);
```

If you do not specify the user credentials with `jndiProps.put`, a locator object is created, but when this object is used to invoke a method in the locator, a runtime exception is displayed because the caller does not have enough permissions to call the method:

```
Exception in thread "Main Thread" java.lang.RuntimeException
```

## 11.2 Facade API Interfaces

[Table 11–1](#) provides an overview of the Facade API interfaces.

**Table 11–1 Facade API Interfaces**

Interface	Description
AsynchronousJob	Retrieves details about asynchronous job types. <b>Note:</b> This interface has been deprecated.
AsynchronousResult	Retrieves the results of asynchronous processes.
B2BBinding	Retrieves B2B binding details such as type and document reference.

**Table 11-1 (Cont.) Facade API Interfaces**

<b>Interface</b>	<b>Description</b>
Binding	Retrieves binding details such as URI, type and subtype.
BindingComponent	Retrieves the binding type and the list of faults specified by the given fault filter.
BusinessEventInfo	Retrieves business event details such as the consistency level, filter type, local name, namespace URI, and prefix.
Component	Retrieves component details such as distinguished name (DN); active, faulted, and total instances; deployment time; and so on.
ComponentInstance	Retrieves component instance details such as the audit trail, component instance state (for example, successfully completed, faulted, or running), conversation ID, creation date, and so on).
ComponentInstanceMigrationReport	Provides information about the feasibility of component instance migration for a specific candidate component instance.
ComponentInstanceMigrationResult	Provides information about the result of an attempt to migrate a specific component instance.
Composite	Retrieves composite details such as the distinguished name (DN); active, faulted, and total instances; deployment time; and so on.
CompositeInstance	Retrieves the composite instance state (for example, successfully completed, faulted, running, and so on).
CompositeInstanceMigrationReport	Provides information about the feasibility of composite instance migration for a specific candidate composite instance.
CompositeInstanceMigrationResult	Provides information about the result of an attempt to migrate a specific composite instance.
Fault	Retrieves fault details such as the binding type if the fault occurred in a binding component, the component instance ID, the name of the component in which the fault occurred, the time at which the fault was generated, the service engine type if the fault occurred in a service engine, and so on.
FaultRecoveryActionTypes	Provides action types such as terminating instances, marking a faulted activity as complete, storing the rejected message in a file, marking a faulted activity to be recovered, retrying an activity, and so on.
FaultRecoveryResult	Retrieves faults, errors, recoverable faults, nonrecoverable faults, and so on.
FaultRecoveryServiceEngine	Provides the fault recovery service engine.
ImportInfo	Retrieves the location of the imported resource and the import type.
InstanceMigrationContext	Provides instance migration context data.
InterfaceType	Retrieves the callback interface and interface properties.
Locator	Exposes a method interface as an entry point for Facade API clients.
Message	Retrieves message details such as the component name, composite DN, content of the message, conversation ID, message storage location, message recoverable state, and so on.
MigrationPlan	Provides details for handling supported incompatibilities during instance migration attempts.

**Table 11–1 (Cont.) Facade API Interfaces**

Interface	Description
MigrationReport	Provides details about a proposed composite instance migration attempt.
MigrationResult	Provides details about an instance migration attempt.
Partition	Performs partitioning lifecycle management tasks such as starting, stopping, activating, and retiring all the composites in a partition.
Property	Retrieves property details such as the default value, name, override attribute value of the property, property value source, and so on.
Reference	Retrieves reference details such as the WSDL URL for the target service, properties for the reference, reference name, reference bindings, and so on.
ReferenceInstance	Retrieves the type of the binding, DN of the composite, composite instance ID, time of instance creation, and so on.
ServerManager	Gets and creates partitions.
Service	Retrieves service details such as bindings, composite DN, interface type, name, multiplicity, and so on.
ServiceEngine	Retrieves the list of deployed components in the service engine, engine type, and list of faults specified by the given fault filter.
ServiceInstance	Retrieves service instance details such as the type of the binding, DN of the composite, composite instance ID, time of creation, and so on.
WebServiceBinding	Retrieves the default address URI, endpoint address URI, port, transport type, and so on.
WebServiceBindingPort	Retrieves the port name, port URI, service name, and so on.
WireInfo	Retrieves the wire reference, wire service, source URI, and target URI.
WSDLInterfaceBinding	Retrieves the WSDL URL.

## 11.3 Facade API Examples

This section provides several examples of using the Facade API to perform composite management.

### 11.3.1 Retrieving the State of a Composite

You can retrieve the state of a composite with the Facade API.

- Mode: active | retired

This setting decides whether new instances can be created (active) or old ones are allowed to finish without new ones being allowed to be created (retired).

- State: on | off

This setting is the composite state and overrides the active or retired composite modes in either, which allows call access (invoke/callback) to the composite revision (on) or not allowing call access (off).

Use `oracle.soa.management.facade.Locator#getComposite(compositeDN)` to get a reference to a composite of interest.

From the composite reference, you can query the mode and state using the following methods:

- `String getMode()`
- `String getState()`

### 11.3.2 Finding Composite and Component Instances

You can find composite and component instances with the Facade API.

Use the Locator interface to find a Composite (`locator.lookupComposite(compositeDN)`). If the composite has not yet been invoked, there are no instances.

You can then find its instances and get related information (for example, the instance ID, which components were executed, and so on).

[Example 11-3](#) provides details.

#### **Example 11-3 Finding Composite and Component Instances**

```
Composite composite = locator.lookupComposite("default/OrderBookingComposite!1.0");

// The context is already the composite, so there is no need to set the DN as a filter criterion
CompositeInstanceFilter filter = new CompositeInstanceFilter();
filter.setMinCreationDate(new java.util.Date((System.currentTimeMillis() - 20000)));

// Get composite instances by filter
List compositeInstances = composite.getInstances(filter);

// for each of the returned composite instances..
for (CompositeInstance instance : compositeInstances) {
 long instanceId = instance.getId();
 Date created = instance.getCreationDate();
 String state = instance.getState();

 // Configure a component instance filter
 ComponentInstanceFilter cInstanceFilter =
 new ComponentInstanceFilter ();

 // Get the child component instances
 List componentInstances =
 instance.getChildComponentInstances(cInstanceFilter);

 for (ComponentInstance compInstance : componentInstances) {
 String compName = compInstance.getComponentName();
 long compInstanceId = compInstance.getId();
 String type = compInstance.getServiceEngine().getEngineType();

 // State values correspond to constants defined by the ComponentInstance interface
 int state = compInstance.getState();
 }

 // Retrieve composite sensors
 List sensorData = instance.getSensorData();
}
```



---

## Diagnosing Problems with SOA Composite Applications

This chapter describes how to diagnose Oracle SOA Suite problems early and take the proper corrective actions with the assistance of the WebLogic Diagnostic Framework (WLDF) for monitoring diagnostic scenarios using watches and notifications and the Oracle Fusion Middleware Diagnostic Framework for gathering SOA-specific diagnostic scenarios into data dumps that are formatted for viewing and analyzing.

This chapter includes the following sections:

- [Section 12.1, "Introduction to the Diagnostic Frameworks"](#)
- [Section 12.2, "Executing Oracle SOA Suite Diagnostic Dumps"](#)
- [Section 12.3, "Executing Diagnostic Framework Thread Dumps for SOA Composite Applications"](#)
- [Section 12.4, "Supported DMS Metrics"](#)
- [Section 12.5, "Creating Watches and Notifications"](#)
- [Section 12.6, "Manually Triggering and Executing Dumps"](#)
- [Section 12.7, "Viewing Incident Packages with ADR Tools"](#)
- [Section 12.8, "Querying Problems and Incidents"](#)

For information about troubleshooting, see [Appendix B, "Troubleshooting Oracle SOA Suite and Oracle BPM Suite."](#)

---

**Note:** The information in this chapter applies only to Oracle databases. Your experience may differ if using a non-Oracle database.

---

### 12.1 Introduction to the Diagnostic Frameworks

When you monitor and diagnose problems in Oracle SOA Suite, you face the following challenges:

- Capturing diagnostic data at the moment of occurrence (also known as just-in-time diagnostics), especially for intermittent issues such as obtaining multiple thread dumps when the system hangs or obtaining heap dumps before a system runs out of memory.
- Obtaining advanced information such as data shape (counts by state and growth patterns for the SOA schema and MDS schema).

- Communicating back and forth with Oracle Support Services to provide basic information such as versions, logs, configuration files, patches applied, and so on.
- Detecting problems and taking corrective actions early before they escalate.

To address these challenges, Oracle SOA Suite is integrated with the following diagnostic frameworks that assist you in identifying problems early and taking the proper corrective actions:

- WLDF: For monitoring diagnostic scenarios using watches and notifications.
- Diagnostic Framework: For gathering SOA-specific diagnostic scenarios into data dumps that are formatted for viewing and analyzing. These data dumps can be made accessible through the Support Work Bench and uploadable as part of a service request (SR).

## 12.1.1 Introduction to WLDF

WLDF is a monitoring and diagnostics framework included with Oracle WebLogic Server that defines and implements a set of services that run within server processes and participate in the standard server life cycle.

Using WLDF, you can capture diagnostic data from Oracle SOA Suite. You configure WLDF watches and notifications from Oracle WebLogic Server Administration Console to collect diagnostic data to identify problems. This data enables you to isolate and diagnose faults when they occur.

For more information about WLDF, see *Oracle Fusion Middleware Configuring and Using the Diagnostics Framework for Oracle WebLogic Server*.

### 12.1.1.1 Introduction to Watches and Notifications

Watches monitor server and application states and send notifications based on criteria that you set. Watches and notifications are configured as part of a diagnostic module targeted to one or more server instances in a domain. When you create a watch, you build rule expressions for monitoring using the attributes of Oracle SOA Suite and Oracle WebLogic Server MBeans in Oracle WebLogic Server Administration Console.

For example, assume you want to be notified when the percentage of free heap memory falls below 100%. You create a watch that uses the Oracle WebLogic Server MBean `weblogic.management.runtime.JRockitRuntimeMBean` and its attribute `HeapFreePercent`. You then define logic indicating that when `HeapFreePercent` is less than 100%, you want to receive a notification. You can also use the MBean `JVMRuntimeMBean` when running with a non-JRockit virtual machine (VM).

For information about creating watches and notifications in Oracle WebLogic Server Administration Console, see [Section 12.5, "Creating Watches and Notifications"](#) and [Section "Configuring the Diagnostic Framework" of \*Oracle Fusion Middleware Administrator's Guide\*](#).

### 12.1.1.2 Introduction to Diagnostic Scenarios and MBeans

The watch rule expressions that you create use the attributes of Oracle SOA Suite and Oracle WebLogic Server MBeans to collect data and perform monitoring. You diagnose scenarios with available MBeans to provide statistics about that scenario or to log messages. Managed beans (MBeans) are Java objects that represent JMX manageable resources in a distributed environment. The attributes of the following MBeans are available for defining in watches to monitor scenarios:

- Oracle WebLogic Server MBeans

- Diagnostic Oracle SOA Suite MBeans
- Dynamic Monitoring Service (DMS) metrics exposed as MBeans

Oracle SOA Suite provides several diagnostic scenarios that you can monitor with watches and notifications. [Table 12–1](#) provides details about the supported diagnostic scenarios and the MBeans to use for monitoring.

**Table 12–1 Supported Diagnostic Scenarios and MBeans**

Scenario	Description	Diagnostic Data Source
Memory issues (startup, deployment, and runtime)	Monitor the free heap available. If the free heap percentage is below a threshold, a notification is triggered to generate a thread stack dump and heap dump.	Oracle WebLogic Server MBean
Deployment hanging	Monitor the elapsed time of a deployment. If it exceeds a threshold, a notification is triggered.	Oracle SOA Suite deployment MBean
Data source issues	Monitor the suspension and connection pool/transaction timeouts	JDBC MBeans
Server overload	Monitor the server's self-health.	Oracle WebLogic Server MBean
Stuck threads	Monitor stuck threads. If any are found, a notification is triggered.	A stuck thread watch/Diagnostic Framework notification is automatically included. Diagnostic Framework incident packages can be created with a tool such as the ADR Command Interpreter (ADRCI). Incidents are created automatically.

[Table 12–2](#) lists some of the available MBeans and DMS Metrics to select when creating watches for monitoring and collecting diagnostic data.

**Table 12–2 MBeans and DMS Metrics**

Diagnostic Data Source (MBean) and Usage	Description	Oracle WebLogic Server MBean	SOA MBean or DMS Metric
weblogic.management.runtime.JVMRuntimeMBean/ weblogic.management.runtime.JRockitRuntimeMBean	For memory statistics	Yes	--
oracle.fabric.management.wldf.mbean.DeploymentW atchMXBeanImpl	For deployment elapsed time	--	SOA MBean
weblogic.management.runtime.ServerRuntimeMBean	For health state information	Yes	--
weblogic.management.runtime.JDBCDataSourceRunti meMBean	For JDBC data sources and for accessing transaction runtime characteristics	Yes	--
weblogic.management.runtime.JTARuntimeMBean			

For more information about Oracle WebLogic Server MBeans, see *Oracle Fusion Middleware Oracle WebLogic Server MBean Reference*.

## 12.1.2 Introduction to the Diagnostic Framework

The Diagnostic Framework is an Oracle Fusion Middleware feature that aids in detecting, diagnosing, and resolving problems. The problems that are targeted are critical errors such as those caused by code bugs, metadata corruption, customer data corruption, deadlocked threads, and inconsistent state. The Diagnostic Framework detects critical failures and captures dumps of relevant diagnostics information (logs, metrics, server images, and so on). WLDF watches and notifications trigger events for which the Diagnostic Framework listens and generates appropriate data dumps. The dumps are formatted into incident packages for viewing and analysis.

The problems captured as incidents include critical errors such as those described in [Table 12–1](#). Each incident package is identified by a unique ID. When a critical error occurs, it is assigned this unique ID known as an incident number. Diagnostic data for the error (such as log files) is immediately captured and tagged with this number.

The data is then stored in the Automatic Diagnostic Repository (ADR). ADR is a file-system repository for cataloging occurrences of failures and storage of associated diagnostic data. The data is retrieved by incident package number, formatted, viewed with Oracle database tools such as ADRCI, and analyzed.

ADRCI enables you to view the names of the dump files and the alert log with XML tags stripped. This viewing enables you to investigate problems, and package and upload first-failure diagnostic data to Oracle Support Services.

You can also use the Diagnostic Framework WLST commands to perform the following tasks:

- Query problems
- View incident dump files
- Create manual incidents
- Manually execute dumps

The Diagnostic Framework is supported on all JRF-supported platforms.

The Diagnostic Framework automatically includes several dumps. For information about these dumps, see Section "Investigating, Reporting, and Solving a Problem" of *Oracle Fusion Middleware Administrator's Guide*.

In addition to these dumps, several Oracle SOA Suite dumps are also supported. For information about Oracle SOA Suite dumps, see [Section 12.2, "Executing Oracle SOA Suite Diagnostic Dumps."](#)

For more information about solving problems, incidents, and WLDF and Diagnostic Framework integration, see Chapter "Diagnosing Problems" of *Oracle Fusion Middleware Administrator's Guide*.

For more information about ADR, see [Section 12.7, "Viewing Incident Packages with ADRCI Tools."](#)

### 12.1.2.1 Controlling the Number of Incident Packages

If you have a recurring problem in Oracle SOA Suite, this can cause for the creation of multiple incident packages. To prevent the server from being overloaded when many failures are occurring, the Diagnostic Framework automatically flood controls some incidents. To avoid this problem, you can configure the Diagnostic Framework to control the number of incident packages. For more information, see Section "Configuring the Diagnostic Framework" of *Oracle Fusion Middleware Administrator's Guide*.

### 12.1.3 Predefined Incident Processing Rules

When you create a watch in the Oracle WebLogic Server Administrator's Console, you also define a notification. A notification named **FMWDFW notification** is automatically available for selection. While you can create your own notifications, Oracle recommends that you select **FMWDFW notification** because it creates the Oracle SOA Suite dumps described in [Section 12.2, "Executing Oracle SOA Suite Diagnostic Dumps."](#)

When an error is detected, the FMWDFW notification handler creates an incident and the Diagnostic Framework takes over incident processing semantics. These semantics are controlled by incident processing rules. The incident processing rules are defined in an XML file and loaded and registered with the Diagnostic Framework during SOA Infrastructure startup.

If you encounter scenarios different from those listed in [Table 12-1](#), you must work with Oracle Support Services to obtain a copy of the customized incident processing rules file.

#### 12.1.3.1 Configuring Incident Processing Rules Files Through the Diagnostic Framework

You can configure a customized incident processing rules file through the Diagnostic Framework. Place the customized rules file in either of the following locations:

- Server level configuration: *FMW\_HOME/user\_projects/domains/domain\_name/config/fmwconfig/servers/server\_name/dfw*
- Domain level configuration: *FMW\_HOME/user\_projects/domains/domain\_name/config/fmwconfig/dfw*

The Diagnostic Framework automatically loads the file on server start up. All dumps are registered as system scoped unless an application name is prefixed to the file name:

- *myrules.xml*: System scoped. This means the rules file applies to all applications deployed on Oracle WebLogic Server.
- *application\_name#name.xml*: Application scoped. This means the rules file applies only to a specific SOA composite application. Everything before the # is treated as the application name deployed in Oracle WebLogic Server (for example, *loanApplication#custom-rules.xml*). If *soa-infra#custom-rules.xml* is specified, it applies to all SOA composite applications deployed in the SOA Infrastructure.

For more information, see section "Configuring Custom Diagnostic Rules" of the *Oracle Fusion Middleware Administrator's Guide*.

#### 12.1.3.2 Configuring Incident Processing Rules Files in the SOA Server Home Directory

---

**Note:** While configuration in the SOA server home directory is supported for 11g Release 1 (11.1.1.9), Oracle Corporation recommends that you configure incident processing rules files through the Diagnostic Framework, as described in [Section 12.1.3.1, "Configuring Incident Processing Rules Files Through the Diagnostic Framework."](#)

---

Oracle Support Services can place a customized rules file (named `custom-rules.xml`) under the SOA server instance home directory (for example, `FMW_HOME/user_projects/domains/domain_name/servers/server_name`).

**Example 12-1** shows a sample custom rules file. When an `ERROR` level message is detected in the `*-diagnostic.log` from the `oracle.soa.bpel.engine.ws` module, the `soa.composite.trail` dump is executed. A restart of the system to load the rules actually disturbs the accuracy of diagnostic data collected.

#### **Example 12-1 Sample Custom Rules File**

```
<?xml version="1.0" encoding="UTF-8"?>
<diagnosticRules xmlns="http://www.oracle.com/DFW/DiagnosticsFrameworkRules"
 xmlns:xs="http://www.w3.org/2001/XMLSchema-instance">
 <logDetectionConditions>
 <condition module="oracle.soa.bpel.engine.ws"/>
 </logDetectionConditions>

 <defaultActions>
 <dumpAction name="soa.composite.trail">
 <argument name="ecid" value="ECID" valueType="Fact" mandatory="true"/>
 </dumpAction>
 </defaultActions>

</diagnosticRules>
```

#### **12.1.3.3 Dynamically Loading the Custom Rules File**

In addition, you can dynamically load the rules file into the SOA Infrastructure without restarting the server. A dynamic reload is important because a server restart can disturb the accuracy of the diagnostic data collected.

To dynamically reload the file without restarting the server, enter the following WLST command:

```
wls:/soainfra/serverConfig> reloadCustomRules(name='rule_file')
```

For more information about `reloadCustomRules`, see Chapter "Diagnostic Framework Custom WLST Commands" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

## **12.2 Executing Oracle SOA Suite Diagnostic Dumps**

In addition to the diagnostic dumps available with Oracle WebLogic Server, Oracle SOA Suite supports the creation of the diagnostic dumps shown in [Table 12-3](#).

**Table 12-3 Oracle SOA Suite Diagnostic Dumps**

Dump	Description
<code>soa.env</code>	Runtime environment dumps.
<code>soa.config</code>	Runtime platform configuration dumps.
<code>soa.db</code>	Database dumps.
<code>soa.composite</code>	Deployed composite metadata dumps.
<code>soa.composite.trail</code>	Instance audit trail dumps.
<code>soa.edn</code>	Event dumps.
<code>soa.wsdl</code>	Deployed composite WSDL/schema cache dumps.

**Table 12-3 (Cont.) Oracle SOA Suite Diagnostic Dumps**

Dump	Description
bpel.dispatcher	Static dumps (system, invoke, engine, and audit thread counts) and runtime scheduled and working message count dumps.
bpel.apt	Average instance processing time dumps.
bpel.apd	Average instance processing delay dumps (for asynchronous processes).
bpel.sps	Synchronous business processes dump statistics such as minimum, maximum, and average processing time (in milliseconds) and count of instances processed.
bpel.aps	Asynchronous BPEL process dump statistics such as minimum, maximum, and average processing time (in milliseconds) and count of instances processed.
bpel.rs	Request level dump statistics such as minimum, maximum, and average processing time (in milliseconds) and count of requests processed as the request flows through various layers of the BPEL process service engine.
mediator.resequencer	Resequencer group processing delay dumps.
soa.adapter.ra	Adapter connection factory configurations. Use to identify if the same Java Naming and Directory Interface (JNDI) is being used by multiple composites.
soa.adapter.connpool	JCA adapter connection pool statistics and connection pool leaks. The current open connection statistics are displayed, enabling tuning of the connection pool.
soa.adapter.stats	Adapter DMS statistics such as message size and fault count.

The Diagnostic Framework outputs and records the diagnostic dumps. You can list details about all the diagnostic dumps with the WLST `listDumps` and `describeDump` commands.

---

**Note:** You must start WLST from `MW_HOME/oracle_common/common/bin`. Otherwise, the ODF functions are missing.

`./wlst.sh`

---

To list the dumps:

1. Connect to the server on which the SOA Infrastructure is installed.

```
wls:/offline> connect('user_name', 'password',
't3://myhost:8001')
Connecting to t3://myhost:8001 with userid user_name ...
Successfully connected to managed Server 'soa_server1' that belongs to
domain 'soainfra'.
```

2. List the Diagnostic Framework dumps.

```
wls:/soainfra/serverConfig> listDumps()
odl.activeLogConfig
jvm.classhistogram
dms.ecidctx
jvm.flightRecording
wls.image
odl.logs
```

```
dms.metrics
odl.quicktrace
http.requests
jvm.threads
```

Use the command `describeDump(name=<dumpName>)` for help on a specific dump.

**3. List the Oracle SOA Suite dumps.**

```
wls:/soainfra/serverConfig> listDumps(appName='soa-infra')
adf.ADFConfigDiagnosticDump
soa.composite
soa.composite.trail
soa.config
soa.db
soa.edn
soa.env
soa.wsdl
bpel.dispatcher
bpel.apt
bpel.apd
bpel.sps
bpel.aps
bpel.rs
mediator.resequencer
soa.adapter.ra
soa.adapter.connpool
soa.adapter.stats
```

Use the command `describeDump(name=<dumpName>)` for help on a specific dump.

The Oracle SOA Suite dumps are described in the following subsections.

For more information about `listDumps` and `describeDump`, see Chapter "Diagnostic Framework Custom WLST Commands" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

For more information about Diagnostic Framework dumps, see Chapter "Diagnosing Problems" of *Oracle Fusion Middleware Administrator's Guide*.

### 12.2.1 Runtime Environment Diagnostic Dumps (soa.env)

[Table 12–4](#) provides details about runtime environment diagnostic dumps.

**Table 12–4 Runtime Environment Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.env	<ul style="list-style-type: none"> <li>▪ Dump parameters:</li> <li>▪ None</li> <li>▪ Dump Mode:</li> <li>▪ ASYNC_SYNC</li> </ul>	<ul style="list-style-type: none"> <li>▪ SOA runtime version, label (can be obtained from the Discovery MBean), and topology (information about the cluster of which the runtime version is a member).</li> <li>▪ Topology: Cluster and Oracle Coherence information such as cluster name, member name, whether the cluster is the leader, local members, machine ID, rack ID, and so on.</li> <li>▪ The leader is generally the oldest node in the cluster. This may change over time as members leave and join the cluster. This senior member is responsible for maintaining cluster membership and making other decisions for the cluster. It also acts as the final arbiter in various protocols, such as the panic protocol.</li> <li>▪ Patch inventory</li> <li>▪ Oracle Coherence messaging mode: Either unicast or multicast.</li> </ul>

### 12.2.1.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of soa.env.

```
wls:/soainfra/serverConfig> describeDump(name='soa.env', appName='soa-infra')
Name: soa.env
Description: SOA diagnostic dump that captures SOA runtime environment info:
version, label, topology. ...
Mandatory Arguments:
Optional Arguments:

wls:/soainfra/serverConfig> executeDump(name='soa.env', appName='soa-infra')
Begin dumping EMInstanceProperties
key=soaClusterName
value=NULL
key=label
value=PCBPEL_11.1.1.6.0_GENERIC_111018.1315.1477
key=CompositeLabel
value=NULL
key=version
value=11.1.1.6.0
key-HttpUrl
value=http://myhost.us.example.com:8001
End dumping EMInstanceProperties
Cluster Info:

cluster name:null
cluster is leader:true
cluster is standalone:true
```

### 12.2.2 Runtime Platform Configuration Diagnostic Dumps (soa.config)

Table 12–5 provides details about runtime platform configuration diagnostic dumps.

**Table 12–5 Runtime Platform Configuration Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.config	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>zip: (Optional) Supports the following values:               <ul style="list-style-type: none"> <li>- true: (Default value) Zips the output file and artifacts into one ZIP file.</li> <li>- false: Writes the dump text file and artifacts to the dump path location without compressing them into one ZIP file.</li> </ul> </li> <li>output: (Optional) Specifies the alternate directory location to which to write dump files. If not specified, the diagnostic dump uses the Diagnostic Framework dump path.</li> </ul> </li> <li>▪ Dump Mode:           <ul style="list-style-type: none"> <li>ASYNC_SYNC</li> </ul> </li> </ul>	<p>deployed-composites.xml - A catalog of deployed composites, including their revisions.</p> <p>Service engine configurations: The following configurations are persisted in MDS (soa/configuration/default/*.xml):</p> <ul style="list-style-type: none"> <li>▪ adapter-config.xml</li> <li>▪ b2b-config.xml</li> <li>▪ bpel-config.xml</li> <li>▪ bpmn-config.xml</li> <li>▪ businessrules-config.xml</li> <li>▪ cep-config.xml</li> <li>▪ edn-config.xml</li> <li>▪ mediator-config.xml</li> <li>▪ soa-infra-config.xml</li> <li>▪ workflow-config.xml</li> <li>▪ workflow-identity-config.xml</li> <li>▪ workflow-notification-config.xml</li> </ul>

### 12.2.2.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of soa.config:

```
wls:/soainfra/serverConfig> describeDump(name='soa.config',
appNamed='soa-infra')
Name: soa.config
Description: SOA diagnostic dump that captures SOA runtime
configuration info, such as deployed-composites.xml, service engine
configurations, etc.
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 zip BOOLEAN Boolean flag (default to 'true') indicating if the dump
 files need to be compressed into one single zip file,
 true - compress dump result into a single zip, false,
 otherwise, default: true
 output STRING Path to Output destination, a directory where the dump
 content will be written to, default to DFW dump path if
 not specified ...
wls:/soainfra/serverConfig> executeDump(name='soa.config', appName='soa-infra')

. . .
. . .
Start dumping artifacts from MDS
URI:deployed-composites/deployed-composites.xml to /tmp/soa_
dumps139780820495.tmp/soa_config734535543.d

Finished dumping specified MDS metadata to /tmp/soa_dumps139780820495.tmp/soa_
config734535543.d

Start dumping artifacts from MDS URI:soa/configuration/default/ to /tmp/soa_
dumps139780820495.tmp/soa_config734535543.d/se-configurations
```

```
Finished dumping specified MDS metadata to: /tmp/soa_dumps139780820495.tmp/soa_
config734535543.d/se-configurations
MDS artifacts dumped, next, compressing all dump files into:
/tmp/oracle-dfw--1770056289547048694.tmp/soa_config364634563344231671.zip
```

The executeDump command dumps deployed-composites.xml from the MDS repository and service engine configurations for all installed service engines into a single, compressed ZIP file (soa\_config364634563344231671.zip).

2. Enter the following WLST command line syntax to execute a dump of soa.config with the zip parameter set to false. This setting writes the dump text file and artifacts to the dump path location without compressing them into one ZIP file.

```
. . .
. . .
wls:/soainfra/serverConfig> executeDump(name='soa.config', appName='soa-infra',
args={'zip':'false'})
Start dumping artifacts from MDS
 URI:deployed-composites/deployed-composites.xml to:
 /tmp/oracle-dfw-7178460573556479044.tmp/soa_config199325881615155981.d
Finished dumping specified MDS metadata to:
 /tmp/oracle-dfw-7178460573556479044.tmp/soa_config199325881615155981.d
Start dumping artifacts from MDS URI:soa/configuration/default/ to:
 /tmp/oracle-dfw-7178460573556479044.tmp/soa_
config199325881615155981.d/se-configurations
Finished dumping specified MDS metadata to:
 /tmp/oracle-dfw-7178460573556479044.tmp/soa_
config199325881615155981.d/se-configurations
```

3. Examine the contents under the default dump path:

```
[jdoe@myhost /tmp]$ ls -alR oracle-dfw-7178460573556479044.tmp
oracle-dfw-7178460573556479044.tmp:
total 52
drwxr---- 3 jdoe dba 4096 Oct 24 15:43 .
drwxrwxrwt 104 root root 36864 Oct 24 15:37 ..
drwxr---- 4 jdoe dba 4096 Oct 24 15:43 soa_config199325881615155981.d
-rw-r---- 1 jdoe dba 561 Oct 24 15:43 soa_config199325881615155981.txt

oracle-dfw-7178460573556479044.tmp/soa_config199325881615155981.d:
total 16
drwxr---- 4 jdoe dba 4096 Oct 24 15:43 .
drwxr---- 3 jdoe dba 4096 Oct 24 15:43 ..
drwxr---- 2 jdoe dba 4096 Oct 24 15:43 deployed-composites
drwxr---- 2 jdoe dba 4096 Oct 24 15:43 se-configurations

oracle-dfw-7178460573556479044.tmp/soa_
config199325881615155981.d/deployed-composites:
total 12
drwxr---- 2 jdoe dba 4096 Oct 24 15:43 .
drwxr---- 4 jdoe dba 4096 Oct 24 15:43 ..
-rw-r---- 1 jdoe dba 1437 Oct 24 15:43 deployed-composites.xml

oracle-dfw-7178460573556479044.tmp/soa_
config199325881615155981.d/se-configurations:
total 56
drwxr---- 2 jdoe dba 4096 Oct 24 15:43 .
drwxr---- 4 jdoe dba 4096 Oct 24 15:43 ..
-rw-r---- 1 jdoe dba 267 Oct 24 15:43 adapter-config.xml
-rw-r---- 1 jdoe dba 425 Oct 24 15:43 b2b-config.xml
```

```
-rw-r----- 1 jdoe dba 2040 Oct 24 15:43 bpel-config.xml
-rw-r----- 1 jdoe dba 1525 Oct 24 15:43 bpmn-config.xml
-rw-r----- 1 jdoe dba 895 Oct 24 15:43 businessrules-config.xml
-rw-r----- 1 jdoe dba 119 Oct 24 15:43 cep-config.xml
-rw-r----- 1 jdoe dba 215 Oct 24 15:43 edn-config.xml
-rw-r----- 1 jdoe dba 836 Oct 24 15:43 mediator-config.xml
-rw-r----- 1 jdoe dba 1148 Oct 24 15:43 soa-infra-config.xml
-rw-r----- 1 jdoe dba 2693 Oct 24 15:43 workflow-config.xml
-rw-r----- 1 jdoe dba 2146 Oct 24 15:43 workflow-identity-config.xml
-rw-r----- 1 jdoe dba 605 Oct 24 15:43 workflow-notification
```

- Enter the following WLST command line syntax to execute a dump of soa.config that compresses all dump into a ZIP file in the specified output directory.

```
wls:/soainfra/serverConfig> executeDump(name='soa.config', appName='soa-infra', args={'output':'/home/myhome/CFG_DUMP_DIR_APP_ZIP'})
```

### 12.2.3 Database Diagnostic Dumps (soa.db)

**Table 12–6** provides details about database diagnostic dumps. The types of database information captured include data shape information such as counts by state and growth patterns for Oracle SOA Suite schemas and the MDS schema.

**Table 12–6 Database Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.db	<ul style="list-style-type: none"> <li>▪ Dump parameters: None</li> <li>▪ Dump Mode: ASYNC_SYNC</li> </ul>	<p>BPEL database table growth data using JDBC-based access to execute the query and dump the result:</p> <pre><b>SELECT</b> dt.table_name table_name,ds.bytes/1024/1024 segment_size_mb, ds.extents extents_used, dt.num_rows total_rows, to_char(dt.last_analyzed,'YYYY-MM-DD HH24:MI:SS') last_analyzed_date <b>FROM</b> dba_segments ds, dba_tables dt <b>WHERE</b> dt.owner = ds.owner and dt.owner = 'schema_user_name' and dt.tablespace_name = ds.tablespace_name and dt.table_name = ds.SEGMENT_NAME and ds.segment_type = 'TABLE' and dt.table_name in ( 'CUBE_INSTANCE', 'MEDIATOR_CASE_INSTANCE', 'COMPOSITE_ INSTANCE', 'AUDIT_TRAIL', 'WORK_ITEM', 'DLV_MESSAGE', 'XML_DOCUMENT', 'DOCUMENT_CI_REF' )</pre>

#### 12.2.3.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to display a dump description and execute a dump of soa.db:

```
wls:/soainfra/serverConfig> describeDump(name='soa.db', appName='soa-infra')
Name: soa.db
Description: SOA diagnostic dump for SOA runtime DB usage info, e.g. bpel
growth statistics
Mandatory Arguments:
Optional Arguments:

wls:/soainfra/serverConfig> executeDump(name='soa.db', appName='soa-infra')
EXECUTE QUERY
SELECT dt.table_name table_name,ds.bytes/1024/1024 segment_size_mb, ds.extents
extents_used, dt.num_rows total_rows, to_char(dt.last_analyzed,
'YYYY-MM-DD HH24:MI:SS') last_analyzed_date FROM dba_segments ds,
dba_tables dt WHERE dt.owner = ds.owner and dt.owner = 'schema_user_name'
and dt.tablespace_name = ds.tablespace_name and dt.table_name = ds.SEGMENT_NAME
```

```

and ds.segment_type = 'TABLE' and dt.table_name in ('CUBE_INSTANCE',
'MEDIATOR_CASE_INSTANCE', 'COMPOSITE_INSTANCE', 'AUDIT_TRAIL', 'WORK_ITEM',
'DLV_MESSAGE', 'XML_DOCUMENT', 'DOCUMENT_CI_REF')
COMMENT: BPEL DB GROWTH DATA.
TABLE_NAME SEGMENT_SIZE_MB EXTENTS_USED TOTAL_ROWS LAST_ANALYZED_DATE

ResultSet Metadata:weblogic.jdbc.wrapper.ResultSetMetadata_oracle_jdbc_driver_
OracleResultSetMetadata@76a4b0
RECORD #1:
TABLE_NAME: COMPOSITE_INSTANCE
SEGMENT_SIZE_MB:0
EXTENTS_USED:1
TOTAL_ROWS:9
LAST_ANALYZED_DATE:2011-09-30 22:02:25
RECORD #2:
TABLE_NAME:DOCUMENT_CI_REF
SEGMENT_SIZE_MB:0
EXTENTS_USED:1
TOTAL_ROWS:0
LAST_ANALYZED_DATE:2011-09-30 22:02:34
RECORD #3:
TABLE_NAME:WORK_ITEM
SEGMENT_SIZE_MB:0
EXTENTS_USED:1
TOTAL_ROWS:0
LAST_ANALYZED_DATE:2011-09-30 22:02:36
RECORD #4:
TABLE_NAME:AUDIT_TRAIL
SEGMENT_SIZE_MB:0
EXTENTS_USED:1
TOTAL_ROWS:8
LAST_ANALYZED_DATE:2011-09-30 22:02:39

```

This dump shows the query string and records from the result set.

#### 12.2.4 Deployed Composite Metadata Diagnostic Dumps (`soa.composite`)

[Table 12-7](#) provides details about deployed composite metadata diagnostic dumps. The types of information captured include the current composite processed when an incident occurs, MDS artifact references (for example, namespace exports), and abnormal transactions.

**Table 12-7 Deployed Composite Metadata Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.composite	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>ecid: (Optional) Matches SOA composite applications associated with the execution context ID (ECID). When ecid is specified, compositeName, partition, and revision are not used. When ecid is not specified, but other parameters are present, those parameters are used to match the composites. When no parameters are specified, an attempt is made to obtain the ECID from the dump context.</li> <li>compositeName: (Optional) Composite name that includes MDS recorded artifacts to dump. If a value is not specified (null or blank), compositeName assumes a wild card (*). You can also enter a wild card (*) to match any composite name.</li> <li>partition: (Optional) Partition name in which the composite is deployed. If not specified, the partition of the default composite specified in the deployed-composites.xml file is assumed (for example, default, partition_01, and my_partition). A wild card (*) to match any partition is supported.</li> <li>revision: (Optional) Composite revision (for example, 1.0) that includes MDS recorded artifacts to dump. If not specified, the revision of the default composite as specified in the deployed-composites.xml file is assumed. A wild card (*) to match any revision is supported.</li> <li>zip: (Optional) Whether to compress the dump output into a ZIP file. The following values are supported:           <ul style="list-style-type: none"> <li>- true: (Default value) Compresses dump files into one ZIP file.</li> <li>- false: Writes dump to a text file and artifacts to the dump path location without compressing them into one ZIP file.</li> </ul> </li> <li>- output: (Optional) Alternate directory location to which to write dump files. If not specified, the diagnostic dump uses the Diagnostic Framework dump path.</li> </ul> </li> <li>▪ Dump Mode:           <ul style="list-style-type: none"> <li>ASYNC_SYNC</li> </ul> </li> </ul>	<p>Per composite metadata from MDS:</p> <ul style="list-style-type: none"> <li>▪ All the MDS recorded artifacts for the specified composites.</li> <li>▪ The text dump file contains logging information about which composite's MDS artifacts are dumped and to where.</li> <li>▪ All dump files compressed into one ZIP file.</li> <li>▪ User-specified output file location for WLST use.</li> <li>▪ One or more generated scratch_entries.txt files. The scratch_entries.txt file is a per composite file containing directory listing of the scratch area for that deployed composite. A scratch area for a deployed composite is for holding those artifacts generated when the composite is deployed (for example, the JAXB code generated).</li> </ul> <p>The location of the scratch area is indicated by the composite-revision element in deployed-composites/deployed-composites.xml.</p> <ul style="list-style-type: none"> <li>▪ The soa.composite dump calls the soa.adapter.ra dump when the composite has a JCA binding in it. It dumps the connection factory properties under the soa_adapter_ra/adAPTER-cF-CONFIG-PROPERTIES.txt file</li> </ul>

#### 12.2.4.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of soa.composite:

```
wls:/soainfra/serverConfig> describeDump(name='soa.composite'
, appName='soa-infra')
Name: soa.composite
Description: SOA diagnostic dump that captures composite MDS artifacts, and
scratch area entries listing for composite's scratch area, dump MDS artifacts
for composites that either match specified parameters.
```

composite name/partition/revision, or associated with an ECID (Execution Context ID identifying a message flow across multiple composite instance(s), support wild card '\*' as composite name/partition/revision, meaning matching composites with any composite name/any partition/any revision.

Rules for actual parameter evaluation:

```
if ecid is specified, use it to match composites associated with the ECID,
composite name/partition/revision not used. ;
if ecid is not specified, then use composite name/partition/revision to match
composites;
if composite name/partition/revision are not specified (all missing), try to
get ECID from dump context;
if ECID is obtained from dump context, use it to match composites associated
with it,
if no ECID from dump context, try to obtain composite name from dump context,
if composite name obtained from dump context, then apply dump to all deployed
composites.
```

Mandatory Arguments:

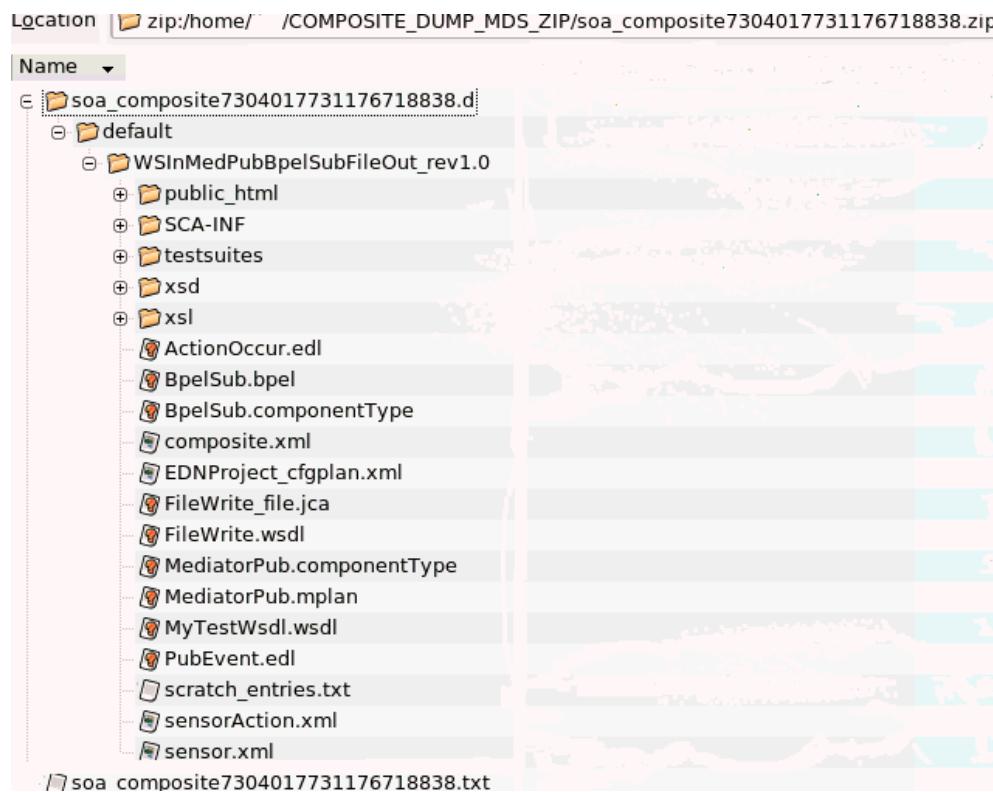
Optional Arguments:

Name	Type	Description
ecid	STRING	ECID (Execution Context ID - for tracking message flow across multiple composite instances), when present, will be used to locate composites associated with it, and other composite matching parameters ignored; it can be obtained from dump context if not specified as dump parameter, see rules for actual parameter evaluation for details.
zip	BOOLEAN	Boolean flag (default to 'true') indicating if the dump files need to be compressed into one single zip file, true - dump into a single zip file, false, otherwise, default: true.
revision	STRING	Revision of composite , e.g. '1.0', '2.0', can be wild card meaning matching any revision, when missing, assume default composite's revision in the composite series.
partition	STRING	Partition of composite, default to partition(s) associated with resolved revision(s) can be wild card '*', meaning matching any partition.
compositeName	STRING	Composite name, e.g., 'OrderProcessing', can be wild card '*', meaning matching any composite.
output	STRING	Output destination directory where dump contents are written to, default to DFW dump path.

```
wls:/soainfra/serverConfig> executeDump(name='soa.composite',
appName='soa-infra',args={'compositeName':'WSInMedPubBpelSubFileOut',
'revision':'1.0','partition':'default','output':'/home/myhome/COMPOSITE_DUMP_
MDS_ZIP'})
. .
. .
Start dumping composite [name=WSInMedPubBpelSubFileOut, partition=partition_1,
revision= 1.0] MDS metadata to :/tmp/soa_dumps1019331262763443905.tmp/
soa_composite4533356433976235311.d/partition_1/WSInMedPubBpelSubFileOut_
rev1.0
Finished dumping composite MDS metadata to :/tmp/soa_dumps
1019331262763443905.tmp/soa_composite4533356433976235311.d/default
/WSInMedPubBpelSubFileOut_rev1.0
```

A dump output file is created at the specified dump location of /home/myhome/COMPOSITE\_DUMP\_MDS\_ZIP.

The **Location** field shows the dump results compressed at the specified location. In the navigator on the left are the MDS artifacts of the ZIP file (for example, the .edl file, .bpel file, and so on). The .txt file at the bottom is the main dump file in the ZIP file.



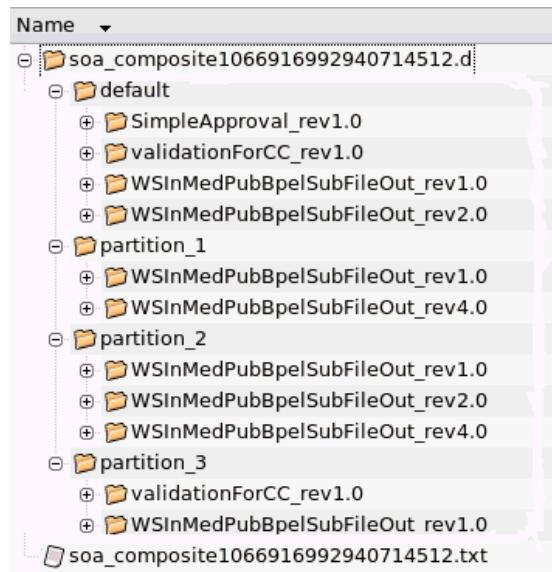
2. Enter the following WLST command line syntax to execute a dump of soa.composite that includes all SOA composite applications, revisions, and partitions.

```
wls:/soainfra/serverConfig> executeDump(name='soa.composite',
appNames='soa-infra',args={'compositeName':'*',
'revision':'*','partition':'*','output':'/home/myhome//COMPOSITE_DUMP_
DIR_ALLCOMP_ALL_REV_ALL_PART'})
```

The **Location** field shows the dump result compressed at the specified location.

Location: zip:/home/ /COMPOSITE\_DUMP\_DIR\_ALLCOMP\_ALL\_REV\_ALL\_PART/soa\_composite1066916992940714512.zip/

All SOA composite applications from all partitions with all revisions are dumped.



### 12.2.5 Instance Audit Trail Diagnostic Dumps (`soa.composite.trail`)

Table 12–8 provides details about instance audit trail diagnostic dumps. The type of information captured includes the SOA composite application instance audit trail, individual service component audit trails, faults, sensors, and event delivery network (EDN) information associated with the message flow identified by the ECID.

**Table 12–8 Instance Audit Trail Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.composite.trail	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>ecid (Optional): The execution content ID for tracking message flow across multiple SOA composite application instances.</li> <li>▪ zip (Optional): The following values are supported:               <ul style="list-style-type: none"> <li>- true: (Default value) Compresses dump files into one ZIP file.</li> <li>- false: Writes dump to a text file and artifacts to the dump path location without compressing them into one ZIP file.</li> </ul> </li> </ul> </li> <li>▪ Dump Mode: ASYNC_SYNC</li> </ul>	<ul style="list-style-type: none"> <li>▪ The top level audit trail associated with the ECID and the audit trails at the composite instances and service component instances levels. All are written in a file per composite instance/service component instance. The main dump file logs entries for each of the individual dump artifacts (for example, for a composite instance/service component instance associated with the ECID). The entries are written in the main dump file recording the name, type, created date, location of the dump artifact, and so on (for example, the path to the file where the audit trail raw XML is located).</li> </ul> <p>This dump is for the execution of message routing triggered by an inbound message. The top level audit trail is an XML CLOB obtained by calling the following Facade API in the current runtime context:</p> <pre>oracle.soa.management.facade.Locator.getAuditTrail(ECID ecid)</pre> <ul style="list-style-type: none"> <li>▪ Composite instances information.</li> <li>▪ Component instances information for each composite instance.</li> <li>▪ Faults related to the ECID are dumped into a dedicated faults file.</li> <li>▪ EDN information from the Facade API.</li> <li>▪ Sensor instances information for each composite instance.</li> </ul>

### 12.2.5.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of soa.composite.trail:

```
wls:/soainfra/serverConfig> describeDump(name='soa.composite.trail'
, appName='soa-infra')
Name: soa.composite.trail
Description: SOA diagnostic dump for a given ECID (Execution Context ID
identifying a message flow across multiple composite instances),
captures composite application instances audit trail, components
audit trail, faults, sensors, etc. associated with the message
flow identified by the ECID;
Rules for actual parameter evaluation:
if ecid is specified, use it to match composites associated
with the ECID, if ecid is not specified, try to get ECID
from dump context, if ECID is obtained from dump context, use
it to match composites associated with it, if no ECID from
dump context, throw exception.
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 ecid STRING ECID (Execution Context ID- for tracking message flow
 across multiple composite instances).
 zip BOOLEAN Boolean flag (default to 'true') indicating if the
 dump files need to be compressed into one single zip
 file, true - compress dump result into a single zip,
```

```

 false, otherwise, default: true

wls:/soainfra/serverConfig> executeDump(name='soa.composite.trail',
app_name='soa-infra',args={'ecid':'cf1cec292805f383:-598c1140:1388238a4ce:-8000-
00000000000028c1'})

Executing SOA Diagnostic Dump: soa.composite.trail
Description: SOA diagnostic dump that, for a given ECID (Execution Context ID
identifying a message flow across multiple composite instances), captures
composite application instances audit trail, components audit trail, faults,
sensors, etc. associated with the message flow indentified by the ECID;
Rules for actual parameter evaluation:
if ecid is specified, use it to match composites associated with the ECID,
if ecid is not specified, try to get ECID from dump context,
if ECID is obtained from dump context, use it to match composites associated
with it, if no ECID from dump context, throw exception.
Parameters:
Optional::ecid::STRING::ECID(Execution Context ID - for tracking message flow
across multiple composite instances),
Optional::zip::BOOLEAN::Boolean flag (default to 'true') indicating if the dump
files need to be compressed into one single zip file, true - compress dump
result into a single zip, false, otherwise, default: true.
Parameter Values:
parameter::ecid=cf1cec292805f383:-598c1140:1388238a4ce:-8000-00000000000028c1
parameter::zip=NULL
Normalized dump parameters:
ecid=cf1cec292805f383:-598c1140:1388238a4ce:-8000-00000000000028c1
zip=true
Start dumping audit trails for ECID =
[cf1cec292805f383:-598c1140:1388238a4ce:-8000-00000000000028c1], to destination
: /tmp/oracle-dfw-3352979816637176191.tmp
FAULTS=
Trail data =>/tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_trail14522512822868494030.d/audit_
trail.xml
EDN.INFO = /tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_trail14522512822868494030.d/edn_
info.txt
composite.1.DN=default/CompositeWithEDN_11G!1.0
composite.1.ID=3
composite.1.TenantID=-1
composite.1.Created=Fri Jul 13 15:32:03 PDT 2012
composite.1.State=-1
composite.1.StateAsString=STATE_UNKNOWN
composite.1.Status=null
No trail found...
composite.1.component.1.Name=BpelSub
composite.1.component.1.Type=bpel
composite.1.component.1.ID=bpel:1
composite.1.component.1.State=5
composite.1.component.1.StateAsString=STATE_SUSPENDED
composite.1.component.1.Status=completed
Trail data =>/tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_
trail14522512822868494030.d/default/CompositeWithEDN_11G_1.0_3/BpelSub_bpel_1_
component.xml
SENSOR.INFO = /tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_
trail14522512822868494030.d/default/CompositeWithEDN_11G_1.0_3_sensor.txt
composite.2.DN=partition_1/CompositeWithEDN_11G!1.0

```

```
composite.2.ID=2
composite.2.TenantID=-1
composite.2.Created=Fri Jul 13 15:31:58 PDT 2012
composite.2.State=-1
composite.2.StateAsString=STATE_UNKNOWN
composite.2.Status=null
No trail found...
composite.2.component.1.Name=BpelSub
composite.2.component.1.Type=bpel
composite.2.component.1.ID=bpel:2
composite.2.component.1.State=5
composite.2.component.1.StateAsString=STATE_SUSPENDED
composite.2.component.1.Status=completed
Trail data =>/tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_
trail4522512822868494030.d/partition_1/CompositeWithEDN_11G_1.0_2/BpelSub_bpel_
2_component.xml
SENSOR.INFO = /tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_
trail4522512822868494030.d/partition_1/CompositeWithEDN_11G_1.0_2_sensor.txt
composite.3.DN=partition_1/CompositeWithEDN_11G!1.0
composite.3.ID=1
composite.3.TenantID=-1
composite.3.Created=Fri Jul 13 15:31:24 PDT 2012
composite.3.State=-1
composite.3.StateAsString=STATE_UNKNOWN
composite.3.Status=null
No trail found...
composite.3.component.1.Name=MediatorPub
composite.3.component.1.Type=mediator
composite.3.component.1.ID=mediator:7CC2E450CD3A11E1BF3F897791557FF9
composite.3.component.1.State=2
composite.3.component.1.StateAsString=STATE_COMPLETED_SUCCESSFULLY
composite.3.component.1.Status=null
Trail data =>/tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_
trail4522512822868494030.d/partition_1/CompositeWithEDN_11G_1.0_1/MediatorPub_
mediator_7CC2E450CD3A11E1BF3F897791557FF9_component.xml
SENSOR.INFO = /tmp/oracle-dfw-3352979816637176191.tmp/soa_
dumps2431385805259626695.tmp/soa_composite_
trail4522512822868494030.d/partition_1/CompositeWithEDN_11G_1.0_1_sensor.txt
Number of composite instance associated with the ECID
[cf1cec292805f383:-598c1140:1388238a4ce:-8000-00000000000028c1]: 3
Audit trails dumped for ECID =
[cf1cec292805f383:-598c1140:1388238a4ce:-8000-00000000000028c1], at the
location :/tmp/oracle-dfw-3352979816637176191.tmp
Compressing dump files from directory:
[/tmp/oracle-dfw-3352979816637176191.tmp/soa_dumps2431385805259626695.tmp/soa_
composite_trail4522512822868494030.d] to
[/tmp/oracle-dfw-3352979816637176191.tmp/soa_composite_
trail4522512822868494030.zip].
```

For information about obtaining the ECID, see [Section 14.1, "Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component."](#)

## 12.2.6 Event Diagnostic Dumps (soa.edn)

[Table 12-9](#) provides details about event diagnostic dumps. The types of information captured include EDN business event bus status information and EDN database log records.

**Table 12–9 Event Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.edn	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>dumpEDNDBLOG: Supports the following values:               <ul style="list-style-type: none"> <li>- true: Dumps EDN database message logs.</li> <li>- false (Default value): Does not dump EDN database message logs.</li> </ul> </li> </ul> </li> <li>▪ Dump Mode:           <ul style="list-style-type: none"> <li>ASYNC_SYNC</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ EDN event bus state variables.</li> <li>▪ EDN subscriber/publisher information for all deployed composites, and so on.</li> <li>▪ EDN database message logs.</li> <li>▪ Cluster information (cluster name, member name, isLeader value, local members, machine ID, rack ID, and so on).</li> </ul> <p>All information is written to the dump text file.</p>

### 12.2.6.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of soa.edn:

```
wls:/soainfra/serverConfig> describeDump(name='soa.edn', appName='soa-infra')
Name: soa.edn
Description: SOA diagnostic dump that captures EDN BusinessEventBus status
info, and optionally, EDN DB Log records.
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 dumpEDNDBLOG BOOLEAN Flag indicating whether EDN DB logs included; false:
 EDN DB log not included. default: false.
```

```
wls:/soainfra/serverConfig> executeDump(name='soa.edn', appName='soa-infra')

Executing SOA Diagnostic Dump: soa.edn
Description: SOA diagnostic dump that captures EDN BusinessEventBus status
info, and optionally, EDN DB Log records.
Parameters:
Optional::dumpEDNDBLOG::BOOLEAN::Flag indicating whether EDN DB log included
or not, true: EDN DB log included, false: EDN DB log not included, default:
false.
Parameter Values:
parameter::dumpEDNDBLOG=NULL
Type:oracle.integration.platform.blocks.event.saq.SAQBusinessEventBus
Configuration:null
Status: running=true started=true
ThreadCount:3
RetryCount:3
In Global: Tx:false
Cluster Info:oracle.integration.platform.blocks.cluster.CoherenceCluster
Interface1mppt@163bd717
SharedEDN:false
OOAO Queue Name:edn_ooao_queue
Java Subscriber Name:edn java subscriber
Subscription Info:
No namespace subscription...
QName subscriptions:
=====
qname={http://schemas.oracle.com/events/edl/ActionOccur}ADEvent
subscriptions=
id=default/WSInMedPubBpelSubFileOut!1.0*soa_
```

```
7a055d6a-8402-49c2-ac56-5f85cbf3d7f/
BpelSub, consistencyLevel=ONE_AND_ONLY_ONE, filter=XPath Filter: starts-with(/be:business-event/be:content/ns0:ActionOccurrence/ns0:ParentEntityType/@value, 'A'), runAsRoles=[${publisher}]
id=partition_1/WSInMedPubBpelSubFileOut!1.0*soa_80a169ab1-395a-4b87-9986-9fa2742a8bd3/
BpelSub, consistencyLevel=ONE_AND_ONLY_ONE, filter=XPath Filter: starts-with(/be:business-event/be:content/ns0:ActionOccurrence/ns0:ParentEntityType/@value, 'A'), runAsRoles=[${publisher}]
EventThreadContextInfo:
EventTargets:
Event:partition_
1/WSInMedPubBpelSubFileOut!1.0*soa0a169ab1-395a-4b87-9986-9fa2742a9bd3/
BpelSub:::oracle.fabric.BPELServiceEngine@163bd6b5
Event:default/WSInMedPubBpelSubFileOut!1.0*soa7a055d6a-8402-49c2-ac56-5f85cbf3d7f/BpelSub:::oracle.fabric.BPELServiceEngine@163bd6b5
EDN DB Log enabled:false
```

The executeDump command dumps the event bus status variables (1mpt@163bd717) and event publish and subscription information. No log messaging information is dumped because the edn-db-log is set to false. You can enable the edn-db-log at the following URL:

[http://host\\_name:port/soa-infra/events/edn-db-log](http://host_name:port/soa-infra/events/edn-db-log)

---

#### Notes:

- You must have the administrator privilege to enable/disable the edn-db-log.
  - Always disable the edn-db-log after a debugging session to disable logging. This prevents excessive database growth in the EDN database log table. If the edn-db-log remains enabled, then debugging messages related to events that are published/enqueued into the database and subscribed to/dequeued from the database continue to be persisted into certain EDN database log tables. This causes the table to grow indefinitely.
- 

### 12.2.7 Deployed Composite WSDL/Schema Cache Diagnostic Dumps (soa.wsdl)

Table 12–10 provides details about service definition information cached for composites that match the specified parameters: composite name, partition, and revision.

**Table 12-10 Deployed Composite WSDL/Schema Cache Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.wsdl	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>ecid: (Optional) ECID for tracking message flow across multiple composite instances. When present, this parameter locates any associated composites. Other composite matching parameters are ignored. The ECID can be obtained from the dump context if not specified as a dump parameter.</li> <li>compositeName: (Optional) Composite name that includes key service definition information (WSDLs) to dump, including WSDLs referenced and XSDs referenced. If a value is not specified (null or blank), compositeName assumes a wild card (*). A wild card (*) to match any composite is supported.</li> <li>partition: (Optional) Partition name in which the composite is deployed. If not specified, the partition of the default composite specified in the deployed-composites.xml file is assumed. A wild card (*) to match any partition is supported.</li> <li>revision: (Optional) Composite revision (for example, 1.0) that includes the service definition information (from WSDLs) to dump. If not specified, the revision of the default composite as specified in the deployed-composites.xml file is assumed. A wild card (*) to match any revision is supported.</li> </ul> </li> <li>▪ Dump Mode:           <ul style="list-style-type: none"> <li>ASYNC_SYNC</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Composite distinguished name (DN). For example: compositeDN:partition_1/WSInMedPubBpelSubFileOut!1.0*soa_8a169ab1-395a-4b87-9986-9fa2742a8bd3.</li> <li>▪ Is it the default in the series.</li> <li>▪ Composite name.</li> <li>▪ Composite state (on or off).</li> <li>▪ Composite mode (active or retired).</li> <li>▪ The qualified name and the target namespace for all service definitions (including those from shared WSDLs): javax.wsdl.Definition objects:           <ul style="list-style-type: none"> <li>- Service name: QName javax.wsdl.Definition.getQName()</li> <li>- Target namespace: javax.wsdl.Definition.getTargetNamespace()</li> </ul> </li> <li>▪ SchemaManager state variables:           <ul style="list-style-type: none"> <li>- SchemaManager.isPostDeploy()</li> <li>- SchemaManager.isShared()</li> <li>- SchemaManager.schemaAddedSinceLastBuild()</li> </ul> </li> <li>▪ XML schema definitions referenced by service definitions:           <ul style="list-style-type: none"> <li>- The message type QName</li> <li>- The message type SchemaTargetNamespace</li> <li>- The message type TargetNS</li> </ul> </li> </ul>

### 12.2.7.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of soa.wsdl:

```
wls:/soainfra/serverConfig> describeDump(name='soa.wsdl', appName='soa-infra')
```

```
Name: soa.wsdl
Description: SOA diagnostic dump that captures services definition info cached
for composite(s) that match specified parameters: composite namme
partition/revision, support wild card '*' as composite name/
partition/revision, meaning matching composites with any
composite name/any partition/any revision.
```

Rules for actual parameter evaluation:  
 if ecid is specified, use it to match composites associated with the ECID,  
 composite name/partition/revision not used. ;

```
if ecid is not specified, then use composite name/partition/revision to match
composites;
if composite name/partition/revision are not specified (all missing), try to
get ECID from dump context;
if ECID is obtained from dump context, use it to match composites associated
with it,
if no ECID from dump context, try to obtain composite name from dump context,
if composite name obtained from dump context, then apply dump to all deployed
composites.
```

Mandatory Arguments:

Optional Arguments:

Name	Type	Description
ecid	STRING	ECID (Execution Context ID - for tracking message flow across multiple composite instances), when present, will be used to locate composites associated with it and other composite matching parameters are ignored; it can be obtained from dump context if not specified as dump parameter; see rules for actual parameter evaluation for details.
revision	STRING	Revision of composite , e.g. '1.0', '2.0', can be wild card meaning matching any revision, when missing, assume default composite's revision in the composite series.
partition	STRING	Partition of composite, default to partition(s) associated with resolved revision(s) can be wild card '*', meaning matching any partition.
compositeName	STRING	Composite name, e.g., 'OrderProcessing', can be wild card '**', meaning matching any composite.

```
wls:/soainfra/serverConfig> executeDump(name='soa.wsdl', appName='soa-infra'
,arg=({'compositeName':'WSInMedPubBpelSubFileOut',
'revision':'1.0','partition':'partition_1'})compositeDN:partition_
1/WSInMedPubBpelSubFileOut!1.0*soa_8a169ab1-2060-4b87-9fa2742a8bd3
. . .
. . .

is default in series:true
composite application name:partition_1
composite name:WSInMedPubBpelSubFileOut
composite state:on
composite mode:active
WSDLManager Instance:oracle.fabric.common.wsdl.WSDLManager@164ec201
Cached wsdl Definitions for the specified composite: including any shared
wsdls if there are any:
key=http://xmlns.oracle.com/bpel/workflow/taskService
value=QName:{http://xmlns.oracle.com/bpel/workflow/taskService}
TaskServicetarget name space:http://xmlns.oracle.com/bpel/workflow/taskService
key=urn:MyTestWsdl
value=QName:{urn:MyTestWsdl}target name space:urn:MyTestwsdl
key=http://xmlns.oracle.com/adapter/file/LixinSandboxes/WSInMedPubBpelSubFile
Out/FileWrite
value=QName:{http://xmlns.oracle.com/pcbpel/adapter/file/LixinSandboxes/
WSInMedPubBpelSubFileOut/FileWrite}FileWritetarget name space:http:
//xmlns.oracle.com/pcbpel/adapter/file/LixinSandboxes/
WSInMedPubBpelSubFileOut/FileWrite
count of all cached entries:3
SchemaManager instance:oracle.fabric.common.wsdl.SchemaManager@164ec1f8
SchemaManager.isPostDeploy():true
SchemaManager.isShared():false
SchemaManager.schemaAddressSinceLastBuild():false
```

```

Cached schema count:0
WSDLManager instance:oracle.fabric.common.wsdl.WSDLManager@14b5b8b0
cached wsdl definitions for the specified composite: including shared wsdls
if there is any:

key=http://xmlns.oracle.com/bpel/workflow/taskService
value=QName:{http://xmlns.oracle.com/bpel/workflow/taskService}
TaskServicetarget name space:http://xmlns.oracle.com/bpel/workflow/taskService
count of all cached entries:1
SchemaManager instance:oracle.fabric.common.wsdl.SchemaManager@145b8cc
SchemaManager.isPostDeploy():false
SchemaManager.isShared():true
SchemaManager.schemaAddressSinceLastBuild():true
Cached schema count:0

WSDLManager instance:oracle.fabric.common.wsdl.WSDLManager@14b58b0
WSDLManager instance:oracle.fabric.common.wsdl.WSDLManager@14b58b0
cached wsdl definitions for the specified composite: including shared wsdls
if there is any:

key=http://xmlns.oracle.com/bpel/workflow/taskService
value=QName:{http://xmlns.oracle.com/bpel/workflow/taskService}
TaskServicetarget name space:http://xmlns.oracle.com/bpel/workflow/taskService
count of all cached entries:1
SchemaManager instance:oracle.fabric.common.wsdl.SchemaManager@145b8cc
SchemaManager.isPostDeploy():false
SchemaManager.isShared():true
SchemaManager.schemaAddressSinceLastBuild():true
Cached schema count:0

```

## 12.2.8 Dispatcher Static Configuration Diagnostic Dumps (`bpel.dispatcher`)

[Table 12–11](#) provides details about dispatcher static configuration diagnostic dumps.

**Table 12–11 Dispatcher Static Configuration Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
<code>bpel.dispatcher</code>	<ul style="list-style-type: none"> <li>▪ Dump parameters: format: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format.</li> <li>▪ Dump Mode: <code>ASYNC_SYNC</code> It is safe to mark this SOA diagnostic dump as <code>ASYNC_SYNC</code> if the dump can be executed as follows: (1) In the thread context of an incident (synchronous) and (2) Not in the context of the incident, but still produce diagnostic information.</li> </ul>	<ul style="list-style-type: none"> <li>Static pool configurations (dispatcher configurations)</li> <li>▪ Audit, invoke, and nonblocking invoke thread counts</li> <li>▪ Engine and system threads</li> <li>Runtime message queue sizes: <ul style="list-style-type: none"> <li>▪ Total scheduled (messages in the queue awaiting processing) message counts</li> <li>▪ Total working (messages currently being processed) message counts</li> </ul> </li> <li>Runtime message queue breakdown sizes (total processed and erred messages, and average message pending and execution time): <ul style="list-style-type: none"> <li>▪ Audit queue</li> <li>▪ Engine queue</li> <li>▪ Invoke queue</li> <li>▪ Nonblocking invoke queue</li> <li>▪ System queue</li> </ul> </li> </ul>

### 12.2.8.1 WLST Command Dump Description and Execution

In addition to the WLST command described in this section, you can also obtain dispatcher static configuration diagnostic information through the System MBean Browser. This option enables you to obtain more specific details about invoke queue, delivery queue, and instance queue scheduled and working messages. For more information, see [Section 12.2.8.2, "Obtaining Dispatcher Static Configuration Diagnostic Dumps with the System MBean Browser."](#)

1. Enter the following WLST command line syntax to display a dump description and execute a dump of bpel.dispatcher:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.dispatcher',
appName='soa-infra')

Name: bpel.dispatcher
Description: BPEL dispatcher config info.
This dumps the information about the static (System, Invoke, Engine and Audit
thread counts) and runtime Scheduled and Working Message Counts
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 format STRING passing value of 'xml' will produce the output in xml
format - args={'format':'xml'}

wls:/soainfra/serverConfig> executeDump(name='bpel.dispatcher',
appName='soa-infra')
BPEL Service Engine Dispatcher Info:

Static Pool Configurations

 Audit Thread Count: 3
 Engine Threads: 30
 Invoke Thread Count: 20
 Non-Blocking Invoke Thread Count: 2
 System Threads: 2

Runtime Message Queue Sizes

 Total Scheduled Message Count: 352
 Total Working Message Count: 50

Runtime Message Queue Breakdown Sizes

Audit Queue :
 Total Processed Messages :0
 Total Errorred Messages :0
 Average Message Pending Time :n/a
 Average Message Execution Time :n/a

----- | ----- | -----
audit | 0 | 0

Engine Queue :
 Total Processed Messages :879
 Total Errorred Messages :0
 Average Message Pending Time :2304.08
 Average Message Execution Time :905.56

----- | ----- | -----
 | Scheduled | Working
```

```

----- | ----- | -----
 domain | 0 | 0
 process | 0 | 0
 delivery | 253 | 19
 instance | 56 | 11

Invoke Queue :
 Total Processed Messages :714
 Total Errorred Messages :0
 Average Message Pending Time :1385.2
 Average Message Execution Time :954.33

 | Scheduled | Working
----- | ----- | -----
 invoke | 0 | 0

Non-Blocking Invoke Queue :
 Total Processed Messages :0
 Total Errorred Messages :0
 Average Message Pending Time :n/a
 Average Message Execution Time :n/a

 | Scheduled | Working
----- | ----- | -----
non-block-invoke | 0 | 0

System Queue :
 Total Processed Messages :1
 Total Errorred Messages :1
 Average Message Pending Time :272
 Average Message Execution Time :11014

 | Scheduled | Working
----- | ----- | -----
 system | 0 | 0
 maintenance | 0 | 0

```

2. Enter the following WLST command line syntax to execute a dump of `bpel.dispatcher` in XML format:

```

executeDump(name='bpel.dispatcher', appName='soa-infra', args={'format':'xml'})

<dispatcher-trace invokeThreadCount="20" systemThreadCount="2"
nonBlockInvokeThreadCount="2" auditThreadCount="5" engineThreadCount="30">
<systemSet totalErroredMsgs="1" avgMsgPendingTime="277"
avgMsgExecTime="11014" totalProcessedMsgs="1">
<systemQueue>
<scheduled count="0"/>
<working count="0"/>
</systemQueue>
<maintenanceQueue>
<scheduled count="0"/>
<working count="0"/>
</maintenanceQueue>
</systemSet>
<invokeSet totalErroredMsgs="0" avgMsgPendingTime="803.82"
avgMsgExecTime="987.51" totalProcessedMsgs="385">
<invokeQueue>
<scheduled count="43"/>
<working count="20"/>

```

```
</invokeQueue>
</invokeSet>
<engineSet totalErroredMsgs="0" avgMsgPendingTime="2391.25"
avgMsgExecTime="1127.45" totalProcessedMsgs="343">
<domainQueue>
<scheduled count="0"/>
<working count="0"/>
</domainQueue>
<processQueue>
<scheduled count="43"/>
<working count="20"/>
</processQueue>
<deliveryQueue>
<scheduled count=147"/>
<working count="14"/>
</deliveryQueue>
<instanceQueue>
<scheduled count="75"/>
<working count="16"/>
</instanceQueue>
</engineSet>
<auditSet totalErroredMsgs="0" avgMsgPendingTime="n/a"
avgMsgExecTime="n/a" totalProcessedMsgs="0">
<auditQueue>
<scheduled count="0"/>
<working count="0"/>
</auditQueue>
</auditSet>
<non-block-invokeSet totalErroredMsgs="0" avgMsgPendingTime="n/a"
avgMsgExecTime="n/a" totalProcessedMsgs="0">
<non-block-invokeQueue>
<scheduled count="0"/>
<working count="20"/>
</non-block-invokeQueue>
</non-block-invokeSet>
</dispatcher-trace>
```

### 12.2.8.2 Obtaining Dispatcher Static Configuration Diagnostic Dumps with the System MBean Browser

You can also display dispatcher static configuration diagnostic dumps in the System MBean Browser by invoking the **readXMLDispatcherTrace** property. This option enables you to obtain more specific details about invoke queue, delivery queue, and instance queue messages currently being processed or scheduled to be processed than you receive with the WLST executeDump command described in [Section 12.2.8.1, "WLST Command Dump Description and Execution."](#)

1. In the navigation tree, expand the **SOA** folder.
2. Right-click **soa-infra**, and select **Administration > System MBean Browser**.
3. Select **Application Defined MBeans > oracle.as.soainfra.bpm > Server: *server\_name* > bpel > CubeDispatcher**.
4. Click **readXMLDispatcherTrace**.
5. Click **Invoke**.

Results are displayed in the property window.

 Confirmation  
Operation executed successfully.

**Operation: readXMLDispatcherTrace**

MBean Name: oracle.as.soa.infra.bpm:Location=AdminServer,name=CubeDispatcher,type=bpel

Operation Name: readXMLDispatcherTrace

Description: XML dispatcher trace.

Return Type: java.lang.String

**Return Value**

```
<dispatcher-trace invokeThreadCount='20' systemThreadCount='2' nonBlockInvokeThreadCount='2' auditThreadCount='5' engineThreadCount='30'><systemSet totalErroredMsgs='0' avgMsgPendingTime='83.5' avgMsgExecTime='2452' totalProcessedMsgs='2'><systemQueue><scheduled count='0'><scheduled><working count='0'></working></systemQueue><maintenanceQueue><scheduled count='0'><scheduled><working count='0'></working></maintenanceQueue></systemSet><invokeSet totalErroredMsgs='0' avgMsgPendingTime='n/a' avgMsgExecTime='n/a' totalProcessedMsgs='0'><invokeQueue><invokeSet totalErroredMsgs='0' avgMsgPendingTime='n/a' avgMsgExecTime='n/a' totalProcessedMsgs='0'><domainQueue><scheduled count='0'><scheduled><working count='0'></working></domainQueue><processQueue><scheduled count='0'><scheduled><working count='0'></working></processQueue><deliveryQueue><scheduled count='0'><scheduled><working count='0'></working></instanceQueue><engineSet><auditSet totalErroredMsgs='0' avgMsgPendingTime='n/a' avgMsgExecTime='n/a' totalProcessedMsgs='0'><auditQueue><scheduled count='0'><scheduled><working count='0'></working></auditQueue></auditSet><non-block-invokeSet totalErroredMsgs='0' avgMsgPendingTime='n/a' avgMsgExecTime='n/a' totalProcessedMsgs='0'><non-block-invokeQueue><sc scheduled count='0'><scheduled><working count='0'></working></non-block-invokeQueue></non-block-invokeSet></dispatcher-trace>
```

### 12.2.9 Average Instance Processing Time Diagnostic Dumps (bpel.apt)

Table 12–12 provides details about average instance processing time diagnostic dumps. This information is obtained from the creation and last modified timestamp for the instance persisted in the BPEL process service engine.

**Table 12–12 Average Instance Processing Time Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
bpel.apt	<ul style="list-style-type: none"> <li>▪ Dump parameters: format: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format.</li> <li>▪ Dump Mode: <code>ASYNC_SYNC</code> It is safe to mark this diagnostic dump as <code>ASYNC_SYNC</code> if the dump can be executed as follows: (1) In the thread context of an incident (synchronous) and (2) Not in the context of the incident, but still produce diagnostic information.</li> </ul>	The average time that instances for various processes take during execution. This information is obtained from the persistence store and includes the time taken by any partners invoked by the process. The average time is in seconds.

#### 12.2.9.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to display a dump description and execute a dump of `bpel.apt`:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.apt', appName='soa-infra')
```

```
Name: bpel.apt
Description: BPEL Instance Average Processing Time information.
This information is obtained from the creation and last modify timestamp for the instance in the BPEL Engine persistence repository
Mandatory Arguments:
```

```
Optional Arguments:
 Name Type Description
 format STRING passing value of 'xml' will produce the output in xml
 format - args={'format':'xml'}
```

```
wls:/soainfra/serverConfig> executeDump(name='bpel.apt',
appNamed='soa-infra')
```

BPEL Service Engine Instance Average Processing Time Info:

Composite	Component	Instances	Average Processing Time (secs)
forEach	DummyService	2	0.01
	Test	3	0.09
LinkInvoke	AsynchBPEL	1	0.01
	LinkInvoke	2	0.11
	SyncBPEL	2	0.01
RelaxSyntax	SyncBPELService	2	0.02

2. Enter the following WLST command line syntax to execute a dump of bpel.apt in XML format:

```
executeDump(name='bpel.apt', appName='soa-infra', args={'format':'xml'})
```

```
<AvgInstanceProcessingTime timestamp="2012-03-15 13:11:40.442">
 <Composite name="forEach">
 <Component name="DummyService" instances="2" Avg="0.01"/>
 <Component name="Test" instances="3" Avg="9.09"/>
 </Composite>
 <Composite name="LinkInvoke">
 <Component name="AsynchBPEL" instances="1" Avg="0.01"/>
 <Component name="LinkInvoke" instances="2" Avg="0.11"/>
 <Component name="SyncBPEL" instances="2" Avg="0.01"/>
 </Composite>
 <Composite name="RelaxSyntax">
 <Component name="SyncBPELService" instances="2" Avg="0.02"/>
 </Composite>
</AvgInstanceProcessingTime>
```

## 12.2.10 Average Instance Processing Delay Diagnostic Dumps (bpel.apd)

Table 12–13 provides details about average instance processing delay diagnostic dumps for asynchronous processes. This dump provides the average time taken by the BPEL process service engine to retrieve the persisted message from the database and start processing that message. The statistics are generated from the database and not from in-memory.

**Table 12-13 Average Instance Processing Delay Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
bpel.apd	<ul style="list-style-type: none"> <li>▪ Dump parameters: format: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format.</li> <li>▪ Dump Mode: <code>ASYNC_SYNC</code> It is safe to mark this SOA diagnostic dump as <code>ASYNC_SYNC</code> if the dump can be executed as follows: (1) In the thread context of an incident (synchronous) and (2) Not in the context of the incident, but still produce diagnostic information.</li> </ul>	<p>Average invoke processing delay between the receipt of the incoming message that triggers the process instance and the time at which the BPEL service engine actually started processing the message.</p> <p><b>Note:</b> The dump described in <a href="#">Section 12.2.9, "Average Instance Processing Time Diagnostic Dumps (bpel.apt)"</a> provides the total execution time for a process instance, which is a function of the time for processing of activities, and also includes the time that the partner takes (if it involves calling one or more). However, because the incoming message is first stored in the database for asynchronous communications before being processed, more specific details are sometimes required to diagnose system bottlenecks. Therefore, details about the delay in the BPEL process service engine selecting the message from the database is also provided with the <code>bpel.apd</code> dump.</p> <p>This dump information is generated from the database and not from in-memory. For further details and better analysis about delays at various layers of the BPEL process service engine, see <a href="#">Section 14.6.1, "Viewing Low Level Request Breakdown Table Details."</a></p>

### 12.2.10.1 WLST Command Dump Description and Execution

---

**Notes:**

- Because this dump is executed against the database, the query may run slow if you have very large records.
  - There are no filters for limiting the data to query.
  - The dump runs queries provided as database views external to the normal BPEL process service engine persistence schema. You can tune the view directly and receive better results.
- 

1. Enter the following WLST command line syntax to display a dump description and execute a dump of `bpel.apd`:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.apd', appName='soa-infra')
```

```
Name: bpel.apd
Description: BPEL Instance Average Processing Delay information (for
Asynchronous Processes).
This provides dump for information regarding the following:
Average Invoke Processing Delay:
Time delay between receipt of incoming message that triggers the
process instance and the time engine actually start processing the message.
```

Mandatory Arguments:

Optional Arguments:

Name	Type	Description
format	STRING	passing value of 'xml' will produce the output in xml format - args={'format':'xml'}

```
wls:/soainfra/serverConfig> executeDump(name='bpel.apd',
```

```

appName='soa-infra')

*****Average Invoke Processing Delay*****

Composite| Component| Partner Link| Operation| Avg Invoke Processing Delay
 | | | | (secs)
-----|-----|-----|-----|-----
 Call | AsynchBP | asynchBP_client| process| 0.05
-----|-----|-----|-----|-----
 Test | Caller2 | caller2_client| process| 0.04
-----|-----|-----|-----|-----
 EvnTest | EDNProc | null| null| 0.03
-----|-----|-----|-----|-----
 forEach | Echo | client| initiate| 0.07
-----|-----|-----|-----|-----

```

2. Enter the following WLST command line syntax to execute a dump of bpel.apd in XML format:

```

executeDump(name='bpel.apd', appName='soa-infra', args={'format':'xml'})

<AvgInstanceProcessingDelays timestamp="2012-03-15 13:11:40.442">
 <AvgInvokeProcessingDelays>
 <Composite name="Call">
 <Component name="AsynchBP">
 <Partner Link name="asynchBP_client">
 <Operation name="process" Avg="0.05"/>
 </Partner Link>
 </Component>
 </Composite>
 <Composite name="Test">
 <Component name="Caller2">
 <Partner Link name="Caller2_client">
 <Operation name="process" Avg="0.04"/>
 </Partner Link>
 </Component>
 </Composite>
 <Composite name="EvnTest">
 <Component name="EDNProc">
 <Partner Link name="null">
 <Operation name="null" Avg="0.03"/>
 </Partner Link>
 </Component>
 </Composite>
 <Composite name="forEach">
 <Component name="Echo">
 <Partner Link name="client">
 <Operation name="initiate" Avg="0.07"/>
 </Partner Link>
 </Component>
 </Composite>
 </AvgInvokeProcessingDelays>
</AvgInstanceProcessingDelays>

```

### 12.2.11 Synchronous Process Statistics Diagnostic Dumps (bpel.sps)

Table 12–14 provides details about synchronous process statistics diagnostic dumps. This dump provides the minimum, maximum, and average processing time (in milliseconds) and the count of instances processed. You must configure the **StatsLastN** System MBean Browser property described in [Section 14.6.1, "Viewing Low Level](#)

[Request Breakdown Table Details](#)" to obtain this diagnostic dump. However, if the optional dump parameters duration and buffer are specified and **StatsLastN** is not configured, this dump command provides statistics for throughput (transactions per second) information.

**Table 12–14 Synchronous Process Statistics Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
bpel.sps	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>buffer: (Optional) Specify a value for the buffer range (100-100000).</li> <li>duration: (Optional) Specify a value for the time duration (1 - 10000).</li> <li>format: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format.</li> </ul> </li> <li>▪ Dump Mode:</li> </ul> <p><code>ASYNC_SYNC</code></p>	The minimum, maximum, and average processing time (in milliseconds) and the count of instances processed for synchronous processes.

#### **12.2.11.1 WLST Command Dump Description and Execution**

1. Enter the following WLST command line syntax to display a dump description and execute a dump of bpel.sps:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.sps', appName='soa-infra')
```

Description: Statistics for Synchronous Business Processes  
This dump provides process level (Synchronous BPEL Processes only) statistics such as min, max and average processing time (in milli-secs) and count of instances processed. Note that statsLastN must be configured to obtain this output. However, if optional parameters duration and buffer are specified and statsLastN is not configured, this dump command would enable the stats for the throughput (transaction per sec) information

Run Mode: asynchronous

## Mandatory Arguments:

## Optional Arguments:

Name	Type	Description
------	------	-------------

buffer STRING Range for buffer: 100-100000. Example: args={'buffer': '100'}

duration STRING Range for duration: 1-10000. Example: args={'duration':'1'}

format STRING Passing value of 'xml' will produce the output in xml format

Example: args={'format':'xml'}

2. Enter the following WLST command line syntax to execute a dump of bpel.sps with StatsLastN configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.sps',
appname='soa-infra')
```

## Synchronous Process Stats

Process Id:

```
default/Synchronous!1.0*soa_13036d87-f3ec-4954-9777-e93248c43086/BPELProcess1
```

Minimum(m-sec)	Maximum(m-sec)	Average(m-sec)	Count
3	3	3.0	1

3. Enter the following WLST command line syntax to execute a dump of bpel.sps in XML format with **StatsLastN** configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.sps', appName='soa-infra',
args={'format':'xml'})

<statistics>
<stats key="default/Synchronous!1.0*soa_13036d87-f3ec-4954-9777-
e93248c43086/BPELProcess1" min="3" max="3" average="3.0" count="1">
</stats>
</statistics>
```

4. Enter the following WLST command line syntax to execute a dump of bpel.sps with throughput values for the duration and buffer parameters.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.sps', appName='soa-infra',
args={'duration':'10', 'buffer':'1000'})
```

Synchronous Process Stats (with Throughput)

```
Timestamp Start: 2012-07-25 10:41:16.457
Timestamp End: 2012-07-25 10:42:16.462
Sampling Window (seconds): 60
Buffer Size: 1000
```

Process Id:

default/MsgProps20!1.0*soa_fe114dd1-fcfa-494a-920d-6ebd9b670/SyncM	default/MsgProps!1.0*soa_78ab10-e820-4aa-86e3-87b8c88a1/SyncMsg			
-----	-----			
Minimum(m-sec)	Maximum(m-sec)	Average(m-sec)	Count	Throughput (tps)
125	125	125.0	1	0.01
15	15	15.0	1	0.01

5. Enter the following WLST command line syntax to execute a dump of bpel.sps in XML format with throughput values for the duration and buffer parameters and **StatsLastN** not configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.sps', appName='soa-infra',
args={'format':'xml', 'duration':'10', 'buffer':'1000'})

<statistics timestamp-start ='2012-07-25 10:10:09.128' timestamp-end
='2012-07-25 10:10:19.13'
<stats key="default/MtomTestClient!1.0*soa_65dc8543-3e2949e1-a07a-637c25c722
a1/BPELProcess1" min="1292" max="1292" average="1292.0" count="1" throughput=
"0.1">
</stats>
<stats key="default/WSBPELFAProj!1.0*soa_
352731eb-44c5-4db6-aff1-e6a440f3a343/WSBPELFAProcess" min="287" max="287"
average="287.0" count="1" throughput="0.1">
</stats>
</statistics>
```

## 12.2.12 Asynchronous Process Statistics Diagnostic Dumps (bpel.aps)

[Table 12–15](#) provides details about asynchronous process statistics diagnostic dumps. This dump provides process level (asynchronous BPEL processes only) statistics such as minimum, maximum, and average processing time (in milliseconds) and count of

instances processed. You must configure the **StatsLastN** System MBean Browser property described in [Section 14.6.1, "Viewing Low Level Request Breakdown Table Details"](#) to obtain this output. However, if the optional parameters duration and buffer are specified and **StatsLastN** is not configured, this dump command provides statistics for throughput (transactions per second) information.

**Table 12–15 Asynchronous Process Statistics Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
bpel.aps	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>buffer: (Optional) Specify a value for the buffer range (100-100000).</li> <li>duration: (Optional) Specify a value for the time duration (1 - 10000).</li> <li>format: (Optional) Specify a value of xml to display dump diagnostics output in XML format.</li> </ul> </li> <li>▪ Dump Mode:           <ul style="list-style-type: none"> <li>ASYNC_SYNC</li> </ul> </li> </ul>	The minimum, maximum, and average processing time (in milliseconds) and count of instances processed for asynchronous processes.

### 12.2.12.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of bpel.aps:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.aps', appName='soa-infra')

Name: bpel.aps
Description: Statistics for Asynchronous Business Processes
This dump provides process level (Asynchronous BPEL Processes only) statistics
such as min, max and average processing time (in milli-secs) and count of
instances processed. Note that statsLastN must be configured to obtain this
output. However, if optional parameters duration and buffer are specified and
statsLastN is not configured, this dump command would enable the stats for the
throughput (transaction per sec) information
Run Mode: asynchronous
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 buffer STRING Range for buffer: 100-100000 .Example: args={'buffer':'100'}
 duration STRING Range for duration: 1-10000 .Example: args={'duration':'1'}
 format STRING Passing value of 'xml' will produce the output in xml
 format. Example: args={'format':'xml'}
```

2. Enter the following WLST command line syntax to execute a dump of bpel.aps with **StatsLastN** configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.aps',
appNamed='soa-infra')
```

Asynchronous Process Stats

Process Id:

```
-----|-----|-----|
default/Asynchronous!1.0*soa_5c3b99b2-e1ad-4a24-9d13-f02dd8a268e/BPELProcess1 |-----|-----|
default/Asynchronous!1.0*soa_5c3b99b2-e1ad-4a24-9d13-f02dd8a268e/BPELProcessC |-----|-----|
```

Minimum(m-sec)	Maximum(m-sec)	Average(m-sec)	Count
4	4	4.0	0
70	70	70.0	1

3. Enter the following WLST command line syntax to execute a dump of bpel.aps in XML format with **StatsLastN** configured:

```
executeDump(name='bpel.aps', appName='soa-infra', args={'format':'xml'})

<statistics>
<stats key="default/Asynchronous!1.0*soa_5c3b99b2-e1ad-4a24-9d13-f02dd8a268e/
BPELProcess1 min="4" max="4" average="4.0" count="0">
</stats>
<stats key="default/Asynchronous!1.0*soa_5c3b99b2-e1ad-4a24-9d13-f02dd8a268e/
BPELProcess1Client min="70" max="70" average="70.0" count="1">
</stats>
</statistics>
```

4. Enter the following WLST command line syntax to execute a dump of bpel.aps with throughput values for the duration and buffer parameters.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.aps', appName='soa-infra',
args={'duration':'60', 'buffer':'1000'})
Asynchronous Process Stats (with Throughput)
```

Timestamp Start: 2012-07-25 10:15:31.207  
 Timestamp End: 2012-07-25 10:16:31.232  
 Sampling Window (seconds): 60  
 Buffer Size: 1000

Process Id:	Minimum(m-sec)		
default/ch10.4fromParts2!1.0*soa_86cfa7a5-76f3-49fa-908a-1f9b8c	3111		
Maximum(m-sec)	Average(m-sec)	Count	Throughput (tps)
3111	3111.0	1	0.01

5. Enter the following WLST command line syntax to execute a dump of bpel.aps with throughput values for the duration and buffer parameters in XML format and **StatsLastN** not configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.aps', appName='soa-infra',
args={'format':'xml', 'duration':'60', 'buffer':'1000'})

<statistics timestamp-start ="2012-07-25 10:19:10.937' timestamp-end
 ='2012-07-25 10:21:10.946">
<stats key="/default/ch11.6flow!1.0*soa_
bb2b4125-068b-40d8-9eed-28b71fef6c36f/Test"
 min="322" max="322" average="322.0" count="1" throughput="0.01">
</stats>
<stats key="default/ch11.7forEachSeq!1.0*soa_
c7bb5f85-dcbc-4c96-a3aa-977fe5ef17cd/Test"
 min="356" max="356" average="356.0" count="1" throughput="0.01">
</stats>
<stats key="default/ch11.7forEachPar!1.0*soa_
8271932d-5af1-4ebe-b8ed-e1d8b3302b75/Test"
 min="2492" max="2492" average="2492.0" count="1" throughput="0.01">
</stats>
</statistics>
```

## 12.2.13 Request Statistics Diagnostic Dumps (bpel.rs)

[Table 12–16](#) provides details about request diagnostic dumps. This dump provides the minimum, maximum, and average processing time (in milliseconds) and count of requests processed as the request flows through various layers of the BPEL process service engine. You must configure the **StatsLastN** System MBean Browser property described in [Section 14.6.1, "Viewing Low Level Request Breakdown Table Details"](#) to obtain this diagnostic dump. However, if the optional dump parameters duration and buffer are specified and **StatsLastN** is not configured, this dump command provides statistics for throughput (transactions per second) information.

**Table 12–16 Request Statistics Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
bpel.rs	<ul style="list-style-type: none"> <li>▪ Dump parameters:           <ul style="list-style-type: none"> <li>buffer: (Optional) Specify a value for the buffer range (100 - 100000).</li> <li>duration: (Optional) Specify a value for the time duration (1 - 10000).</li> <li>format: (Optional) Specify a value of xml to display dump diagnostics output in XML format.</li> </ul> </li> <li>▪ Dump Mode:           <ul style="list-style-type: none"> <li>ASYNC_SYNC</li> </ul> </li> </ul>	The minimum, maximum, and average processing time (in milliseconds) and count of requests processed as the request flows through various layers of the BPEL process service engine.

### 12.2.13.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and execute a dump of `bpel.rs`:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.rs', appName='soa-infra')
```

```
Name: bpel.rs
Description: Statistics for Requests processing by Engine.
This dump provides request level statistics such as min, max and average
processing time (in milli-secs) and count of requests processed as the request
flows though various layers of engine. Note that statsLastN must be configured
to obtain this output. However, if optional parameters duration and buffer are
specified and statsLastN is not configured, this dump command would enable the
stats for the defined interval duration and return statistics which will also
include the throughput (transaction per sec) information
Run Mode: asynchronous
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 buffer STRING Range for buffer: 100-100000. Example: args={'buffer':'100'}
 duration STRING Range for duration: 1-10000 .Example: args={'duration':'1'}
 format STRING Passing value of 'xml' will produce the output in xml
 format. Example: args={'format':'xml'}
```

2. Enter the following WLST command line syntax to execute a dump of `bpel.rs` with **StatsLastN** configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.rs', appName='soa-infra')
```

or

```
wls:/soainfra/serverConfig> executeDump(name='bpel.rs', appName='soa-infra',
args={'format':'xml'})

<stats key="eng-composite-request" min="0" max="0" average="0.0" count="0">
<stats key="eng-single-request" min="2" max="3059" average="62.58" count="51">
<stats key="create-andInvoke" min="2" max="3059" average="62.54" count="51">
<stats key="glue-requests-store" min="0" max="1016" average="20.84" count="51">
<stats key="storeBatchEvent" min="0" max="42" average="1.31" count="51">
</stats>
<stats key="scope-serialize" min="0" max="857" average="16.92" count="51">
</stats>
</stats>
<stats key="create-instance" min="0" max="117" average="2.47" count="51">
<stats key="get-process-descriptor" min="0" max="0" average="0.0" count="51">
</stats>
<stats key="factory-create" min="0" max="86" average="1.72" count="51">
</stats>
<stats key="init-root-scope" min="0" max="22" average="0.52" count="51">
</stats>
<stats key="declare-wi-lookup-table" min="0" max="1" average="0.01" count="51">
</stats>
<stats key="init-request-context" min="0" max="0" average="0.0" count="51">
</stats>
</stats>
<stats key="log-sync-stats" min="0" max="3" average="0.05" count="51">
</stats>
<stats key="lookup-process" min="0" max="0" average="0.0" count="51">
</stats>
<stats key="log-requests-stats" min="0" max="1" average="0.01" count="51">
</stats>
<stats key="recycle-objects" min="0" max="0" average="0.0" count="153">
</stats>
<stats key="invoke-method" min="0" max="1445" average="28.58" count="51">
<stats key="audit-counter-create" min="0" max="1430" average="28.23" count="51">
<stats key="eng-manage" min="0" max="499" average="9.9" count="51">
<stats key="sensor-send-activity-data" min="0" max="0" average="0.0" count="102">
</stats>
<stats key="monitor-send-activity-data" min="0" max="0" average="0.0" count="102">
</stats>
</stats>
<stats key="monitor-send-activity-data" min="0" max="0" average="0.0" count="51">
</stats>
<stats key="sensor-send-activity-data" min="0" max="1" average="0.01" count="51">
</stats>
</stats>

<stats key="check-access-control" min="0" max="15" average="0.1" count="153">
</stats>
<stats key="check-block-conditions" min="0" max="42" average="0.59" count="153">
<stats key="eng-finalize" min="0" max="42" average="0.55" count="153">
<stats key="eng-manage" min="0" max="9" average="0.13" count="102">
</stats>
<stats key="eng-until" min="0" max="41" average="0.35" count="153">
```

```

<stats key="monitor-send-activity-data" min="0" max="0" average="0.0"
count="153">
</stats>
<stats key="sensor-send-activity-data" min="0" max="0" average="0.0"
count="153">
</stats>
</stats>
<stats key="check-expirable" min="0" max="1" average="0.0" count="153">
</stats>
<stats key="get-node" min="0" max="1" average="0.0" count="153">
</stats>
</stats>
<stats key="get-workitem" min="0" max="35" average="0.24" count="153">
<stats key="load-workitem" min="0" max="5" average="0.03" count="153">
</stats>
<stats key="load-instance-for-workitem" min="0" max="30" average="0.2"
count="153">
<stats key="load-instance" min="0" max="25" average="0.16" count="153">
<stats key="actual-instance-load" min="0" max="25" average="0.16" count="153">
<stats key="cube-instance-load-context" min="0" max="0" average="0.0"
count="153">
</stats>
</stats>
</stats>
<stats key="check-bpel-process-state" min="0" max="1" average="0.0"
count="153">
</stats>
<stats key="populate-context" min="0" max="25" average="0.0" count="153">
</stats>
</stats>
</stats>
</stats>
</stats>
<stats key="recycle-objects" min="0" max="1" average="0.01" count="51">
</stats>
</stats>
</stats>
</stats>
</statistics>

```

3. Enter the following WLST command line syntax to execute a dump of bpel.rs with throughput values for the duration and buffer parameters and **StatsLastN** not configured.

```
wls:/soainfra/serverConfig> executeDump(name='bpel.rs', appName='soa-infra',
args={'duration':'10', 'buffer':'1000'})
```

or

```
wls:/soainfra/serverConfig> executeDump(name='bpel.rs', appName='soa-infra',
args={'format':'xml','duration':'10', 'buffer':'1000'})
```

```

<statistics timestamp-start ='2012-07-25 10:12:27.536' timestamp-end
='2012-07-25 10:12:27.546'
<stats key="eng-composite-request" min="0" max="0" average="0.0" count="0">
<stats key="eng-single-request" min="19" max="55" average="31.75" count="4">
<stats key="create-and-invoke" min="19" max="55" average="31.75" count="4">
<stats key="glue-requests-store" min="2" max="14" average="5.75" count="4">
<stats key="storeBatchEvent" min="1" max="2" average="1.75" count="4">
</stats>

```

```
<stats key="scope-serialize" min="8" max="18" average="2.5" count="4">
</stats>
</stats>
<stats key="create-instance" min="0" max="9" average="2.5" count="4">
<stats key="get-process-descriptor" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="factory-create" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="init-root-scope" min="0" max="9" average="2.5" count="4">
</stats>
<stats key="declare-wi-lookup-table" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="init-request-context" min="0" max="0" average="0.0" count="4">
</stats>
</stats>
<stats key="log-sync-stats" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="lookup-process" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="log-requests-stats" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="recycle-objects" min="0" max="0" average="0.0" count="23">
</stats>
<stats key="invoke-method" min="1" max="9" average="3.0" count="4">
<stats key="audit-counter-create" min="1" max="1" average="1.0" count="4">
<stats key="eng-manage" min="0" max="1" average="0.5" count="4">
<stats key="sensor-send-activity-data" min="0" max="0" average="0.0" count="8">
</stats>
<stats key="monitor-send-activity-data" min="0" max="0" average="0.0"
count="8">
</stats>
</stats>
<stats key="monitor-send-activity-data" min="0" max="0" average="0.0"
count="4">
</stats>
<stats key="sensor-send-activity-data" min="0" max="0" average="0.0" count="4">
</stats>
```

### 12.2.14 Resequencer Group Processing Delay Diagnostic Dumps (mediator.resequencer)

[Table 12–17](#) provides details about resequencer group processing delay diagnostic dumps.

**Table 12-17 Resequencer Group Processing Delay Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
mediator.resequencer	<ul style="list-style-type: none"> <li>▪ Dump parameter: resequencerMaxUnprocessTime: (Required) Specify the number of minutes a resequencer group should be inactive before being included in the diagnostic dump.</li> <li>▪ Dump Mode: ASYNC_SYNC</li> </ul>	<p>Group information:</p> <ul style="list-style-type: none"> <li>▪ Component DN (name)</li> <li>▪ Operation</li> <li>▪ Group ID</li> <li>▪ Group status</li> <li>▪ Component status</li> <li>▪ Last received time</li> <li>▪ Container ID</li> <li>▪ Pending message count</li> <li>▪ Last refresh time</li> </ul> <p>Container information:</p> <ul style="list-style-type: none"> <li>▪ Container ID</li> <li>▪ Resequencer type</li> </ul>

#### 12.2.14.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description of mediator.resequencer:

```
wls:/soainfra/serverConfig> describeDump(name='mediator.resequencer',
appName='soa-infra')
```

The following information appears:

```
Name: mediator.resequencer
Description: diagnostic information about the groups, which have not been
processed beyond user specified maximum unprocess time
Run Mode: asynchronous
Mandatory Arguments:
Name Type Description
resequencerMaxUnprocessTime INTEGER maximum duration for which the group has
 not been processed, duration should be
 specified in minutes
Optional Arguments:
```

2. Enter the following WLST command line syntax to execute a dump of mediator.resequencer:

```
wls:/soainfra/serverConfig> executeDump(name='mediator.resequencer',
appName='soa-infra', args={'resequencerMaxUnprocessTime':'minutes'})
```

For *minutes*, substitute the number of minutes a resequencer group can be pending before it appears in the dump. Information similar to the following appears:

```
Database Timestamp in UTC :2012-03-29 06:29:31.0
Max unprocess time condition:1
Mediator Resquencer pending group data
COMPONENT_DN,OPERATION,GROUP_ID,STATUS,COMPONENT_STATUS,LAST_RECEIVED_TIME,
CONTAINER_ID, PENDING MESSAGE COUNT
default/Standard!2.0/Mediator1,execute,1001,0,0,2012-03-29
06:24:22.509394,EC09D271796511E18F5CBD26553417B4,1

Containerid Data
```

```

containerId,renewalTime
EC09D271796511E18F5CBD26553417B4,java.util.GregorianCalendar[time=1333002526625
,areFieldsSet=true,areAllFieldsSet=true,lenient=true,zone=sun.util.calendar.Zon
eInfo[id="GMT-07:00",offset=-25200000,dstSavings=0,useDaylight=false,transition
s=0,lastRule=null],firstDayOfWeek=1,minimalDaysInFirstWeek=1,ERA=1,YEAR=2012,MO
NTH=2,WEEK_OF_YEAR=13,WEEK_OF_MONTH=5,DAY_OF_MONTH=28,DAY_OF_YEAR=88,DAY_OF_
WEEK=4,DAY_OF_WEEK_IN_MONTH=4,AM_PM=1,HOUR=11,HOUR_OF_
DAY=23,MINUTE=28,SECOND=46,MILLISECOND=625,ZONE_OFFSET=-25200000,DST_OFFSET=0]

```

## 12.2.15 Adapter Diagnostic Dumps (soa.adapter.ra)

[Table 12-18](#) provides details about connection factory configuration dumps.

**Table 12-18 Adapter Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.adapter.ra	<ul style="list-style-type: none"> <li>■ Dump parameters: ecid: (Optional) Specify the ecid jndiName and adapterType.</li> <li>■ Dump Mode: ASYNC</li> </ul>	<p>Dumps the connection factory information:</p> <ul style="list-style-type: none"> <li>■ Managed connection factory properties</li> <li>■ Connection pool properties</li> <li>■ Transaction support property</li> </ul> <p>Indicates if the same JNDI is being used by multiple composites.</p>

### 12.2.15.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description of soa.adapter.ra:

```
wls:/soainfra/serverConfig> describeDump(name='soa.adapter.ra',
appName='soa-infra')
```

The following information appears:

```

Name: soa.adapter.ra
Description: SOA adapter diagnostic dump that captures connection factory
configurations.
Rules for actual parameter evaluation:
if ecid is specified, use it to match composites associated with the ECID,
composite name/partition/revision not used;
if ecid is not specified, then use jndiName & adapterType to retrieve the
connection factory attributes;
if jndiName and adapterType are not specified, then use composite
name/partition/revision to match composites;
if no composite name/partition/revision are specified, then all the composites
with jca binding are dumped.
Mandatory Arguments:
Optional Arguments:
 Name Type Description
 ecid STRING ECID(Execution Context ID - for tracking message flow
across multiple composite instances), when presents, will be used to locate
composites associated with it, and other composite matching parameters ignored;
it can be obtained from dump context if not specified as dump parameter, see
rules for actual parameter evaluation for details.
 revision STRING Revision of composite, e.g. '1.0', '2.0', can be wild
card '*', meaning matching any revision, when missing, assume default
composite's revision in the composite series.
 adapterType STRING Resource Adapter type
 partition STRING Partition of composite, default to partition(s)
associated with resolved revision(s), can be wild card '*', meaning matching

```

```

any partition.
compositeName STRING Composite name, e.g., 'OrderProcessing', can
be wild card '*', meaning matching any composite.
jndiName STRING Adapter Connection Pool JNDI

```

2. Enter the following WLST command line syntax to execute a dump of soa.adapter.ra:

```
wls:/soainfra/serverConfig> executeDump(name='soa.adapter.ra',
appName='soa-infra', args={'compositeName':'fa', 'partition':'default',
'revision':'1.0'})
```

The following information appears:

```

CompositeDN = default/fa!1.0*soa_7ce2ebd9-ce17-4b5a-b436-2567eab33af2
Endpoint Name = service
Endpoint type = Service
JNDI Name = eis/FileAdapter
Adapter Type = FileAdapter

Pool Parameters -
=====
initial-capacity = 10
test-connections-on-create = false
test-connections-on-reserve = false
connection-creation-retry-frequency-seconds = 2
shrinking-enabled = true
ignore-in-use-connections-enabled = true
highest-num-waiters = 0
shrink-frequency-seconds = 60
connection-reserve-timeout-seconds = 5
highest-num-unavailable = 0
max-capacity = 2147483647
profile-harvest-frequency-seconds = 300
capacity-increment = 100
test-connections-on-release = false
match-connections-supported = false
test-frequency-seconds = 0

Transaction Support = NoTransaction

Connection Factory Properties -
=====
outboundDataSource = none
outboundDataSourceLocal = none
outboundLockTypeForWrite = none
controlDir = ${user.dir}
inboundDataSource = none
workingDirectory = default

=====
CompositeDN = default/fa!1.0*soa_7ce2ebd9-ce17-4b5a-b436-2567eab33af2
Endpoint Name = reference
Endpoint type = Reference
JNDI Name = eis/FileAdapter
Adapter Type = FileAdapter

Pool Parameters -

```

```
=====
initial-capacity = 10
test-connections-on-create = false
test-connections-on-reserve = false
connection-creation-retry-frequency-seconds = 2
shrinking-enabled = true
ignore-in-use-connections-enabled = true
highest-num-waiters = 0
shrink-frequency-seconds = 60
connection-reserve-timeout-seconds = 5
highest-num-unavailable = 0
max-capacity = 2147483647
profile-harvest-frequency-seconds = 300
capacity-increment = 100
test-connections-on-release = false
match-connections-supported = false
test-frequency-seconds = 0

Transaction Support = NoTransaction

Connection Factory Properties -
=====

outboundDataSource = none
outboundDataSourceLocal = none
outboundLockTypeForWrite = none
controlDir = ${user.dir}
inboundDataSource = none
workingDirectory = default
```

## 12.2.16 Adapter Diagnostic Dumps (soa.adapter.connpool)

Table 12–19 identifies the adapter connection pool dump.

**Table 12–19 Adapter Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.adapter.connpool	<ul style="list-style-type: none"><li>▪ Dump parameters: ecid: (Optional) Specify the ecid jndiName, adapterType compositeName, partition, revision adapterType, and jndiName.</li><li>▪ Dump Mode: ASYNC</li></ul>	Dumps the connection pool statistics for the configured connection factory JNDI.

### 12.2.16.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description of soa.adapter.connpool:

```
wls:/soainfra/serverConfig> describeDump(name='soa.adapter.connpool',
appName='soa-infra')
```

The following information appears

```
Name: soa.adapter.connpool
Description: SOA adapter diagnostic dump that captures the Connection pool
stats for configured adapters JNDI.
```

Rules for actual parameter evaluation:

- if ecid is specified, use it to match composites associated with the ECID, composite name/partition/revision not used;
- if ecid is not specified, then use jndiName & adapterType to retrieve the connection pool attributes;
- if jndiName and adapterType are not specified, then use composite name/partition/revision to match composites;
- if no composite name/partition/revision are specified, then all the composites with jca binding are dumped.

Mandatory Arguments:

Optional Arguments:

Name	Type	Description
ecid	STRING	ECID(Execution Context ID - for tracking message flow across multiple composite instances), when presents, will be used to locate composites associated with it, and other composite matching parameters ignored; it can be obtained from dump context if not specified as dump parameter, see rules for actual parameter evaluation for details.
revision	STRING	Revision of composite, e.g. '1.0', '2.0', can be wild card '*', meaning matching any revision, when missing, assume default composite's revision in the composite series.
adapterType	STRING	Resource Adapter type
partition	STRING	Partition of composite, default to partition(s) associated with resolved revision(s), can be wild card '*', meaning matching any partition.
compositeName	STRING	Composite name, e.g., 'OrderProcessing', can be wild card '*', meaning matching any composite.
jndiName	STRING	Adapter Connection Pool JNDI

2. Enter the following WLST command line syntax to execute a dump of soa.adapter.connpool:

```
wls:/soainfra/serverConfig> executeDump(name='soa.adapter.connpool',
appNames='soa-infra', args={'compositeName':'fa', 'partition':'default',
'revision':'1.0'})
```

The following information appears:

```
CompositeDN=default/fa!1.0*soa_7ce2ebd9-ce17-4b5a-b436-2567eab33af2
Endpoint Name = service
Endpoint type = Service
JNDI Name =eis/FileAdapter
Adapter Type =FileAdapter
```

ConnectionPool Attributes:

```
=====
```

Important ConnectionPool Attributes:

```
=====
```

```
InitialCapacity = 10
MaxCapacity = 2147483647
CurrentCapacity = 10
State = Running
FreeConnectionsCurrentCount = 10
NumUnavailableCurrentCount = 0
NumberDetectedLeaks = 0
ConnectionsDestroyedByErrorTotalCount = 0
ConnectionsRejectedTotalCount = 0
```

Other ConnectionPool Attributes:

```
=====
```

```
ActiveConnectionsCurrentCount = 0
```

```
FreePoolSizeHighWaterMark = 0
PoolSizeLowWaterMark = 0
ConnectionsMatchedTotalCount = 0
LastShrinkTime = 0
FreeConnectionsHighCount = 10
ConnectionsDestroyedTotalCount = 0
ConnectionsDestroyedByShrinkingTotalCount = 0
ShrinkingEnabled = true
ConnectionsCreatedTotalCount = 10
NumUnavailableHighCount = 0
MaxIdleTime = 0
LoggingEnabled = true
ConnectionIdleProfileCount = 0
ConnectionProfilingEnabled = false
ShrinkCountDownTime = -10565
FreePoolSizeLowWaterMark = 0
ActiveConnectionsHighCount = 0
ProxyOn = false
NumWaitersCurrentCount = 0
NumWaiters = 0
CloseCount = 0
PoolSizeHighWaterMark = 0
AverageActiveUsage = 0
RecycledTotal = 0
ConnectionLeakProfileCount = 0
HighestNumWaiters = 0
ShrinkPeriodMinutes = 1
NumberDetectedIdle = 0
CapacityIncrement = 1

=====
CompositeDN=default/fa!1.0*soa_7ce2ebd9-ce17-4b5a-b436-2567eab33af2
Endpoint Name = reference
Endpoint type = Reference
JNDI Name =eis/FileAdapter
Adapter Type =FileAdapter

ConnectionPool Attributes:
=====

Important ConnectionPool Attributes:
=====
InitialCapacity = 10
MaxCapacity = 2147483647
CurrentCapacity = 10
State = Running
FreeConnectionsCurrentCount = 10
NumUnavailableCurrentCount = 0
NumberDetectedLeaks = 0
ConnectionsDestroyedByErrorTotalCount = 0
ConnectionsRejectedTotalCount = 0

Other ConnectionPool Attributes:
=====
ActiveConnectionsCurrentCount = 0
FreePoolSizeHighWaterMark = 0
PoolSizeLowWaterMark = 0
ConnectionsMatchedTotalCount = 0
LastShrinkTime = 0
FreeConnectionsHighCount = 10
```

```

ConnectionsDestroyedTotalCount = 0
ConnectionsDestroyedByShrinkingTotalCount = 0
ShrinkingEnabled = true
ConnectionsCreatedTotalCount = 10
NumUnavailableHighCount = 0
MaxIdleTime = 0
LoggingEnabled = true
ConnectionIdleProfileCount = 0
ConnectionProfilingEnabled = false
ShrinkCountDownTime = -10565
FreePoolSizeLowWaterMark = 0
ActiveConnectionsHighCount = 0
ProxyOn = false
NumWaitersCurrentCount = 0
NumWaiters = 0
CloseCount = 0
PoolSizeHighWaterMark = 0
AverageActiveUsage = 0
RecycledTotal = 0
ConnectionLeakProfileCount = 0
HighestNumWaiters = 0
ShrinkPeriodMinutes = 1
NumberDetectedIdle = 0
CapacityIncrement = 1

```

### 12.2.17 Adapter Diagnostic Dumps (soa.adapter.stats)

[Table 12–20](#) identifies the adapter diagnostic dump.

**Table 12–20 Adapter Diagnostic Dumps**

Dump Name	Dump Parameters/Dump Mode	Information Captured
soa.adapter.stats	<ul style="list-style-type: none"> <li>▪ Dump parameters: format: (Optional) Specify a value of xml to display dump diagnostics output in XML format.</li> <li>▪ Dump Mode: ASYNC</li> </ul>	Based on the soa.adapter.stats metrics, DMS statistics such as message size and fault count are available.

#### 12.2.17.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description of soa.adapter.stats:

```
wls:/soainfra/serverConfig> describeDump(name='soa.adapter.stats',
appname='soa-infra')
```

The following information appears:

```

Name: soa.adapter.stats
Description: SOA adapter diagnostic dump that captures DMS adapter
statistics.Rules for actual parameter evaluation:
if composite name/partition/revision are specified, dumps the DMS stats for
that composite;
if no composite name/partition/revision are specified, then all the composites
with jca binding are dumped.
Mandatory Arguments:
Optional Arguments:

```

Name	Type	Description
------	------	-------------

```
revision STRING Revision of composite, e.g. '1.0', '2.0', can be wild
card '*', meaning matching any revision, when missing, assume default
composite's revision in the composite series.

partition STRING Partition of composite, default to partition(s)
associated with resolved revision(s), can be wild card '*', meaning matching
any partition.

compositeName STRING Composite name, e.g., 'OrderProcessing', can be
wild card '*', meaning matching any composite.
```

2. Enter the following WLST command line syntax to execute a dump of soa.adapter.stats:

```
wls:/soainfra/serverConfig> wls:/soainfra/serverConfig>
executeDump(name='soa.adapter.stats', appName='soa-infra',
args={'compositeName':'fa',
'partition':'default', 'revision':'1.0'})
```

The following information appears:

```
CompositeDN -default/fa!1.0
Service Name -service
Process Incoming Message Metrics -
=====
processIncomingMessages.time (Elapsed time in milliseconds) - 4787 msecs
processIncomingMessages.completed (Elapsed time in milliseconds) - 2 ops
processIncomingMessages.minTime (Elapsed time in milliseconds) - 32 msecs
processIncomingMessages.maxTime (Elapsed time in milliseconds) - 4755 msecs
processIncomingMessages.avg (Elapsed time in milliseconds) - 2393.5 msecs
processIncomingMessages.active (Elapsed time in milliseconds) - 0 threads
processIncomingMessages.maxActive (Elapsed time in milliseconds) - 1 threads
Error Metrics -
=====
Errors.count (Number of events errored during binding processing) - 0 ops
Process Incoming Message Events -
=====
processIncomingMessagesEvents.count (Number of processed events) - 2 ops
```

## 12.3 Executing Diagnostic Framework Thread Dumps for SOA Composite Applications

When diagnosing a problem that requires a thread dump, it is useful to have sufficient context around the thread activity. The Diagnostic Framework dump `jvm.threads` provides DMS execution context (EC) thread stack data for SOA composite applications. The following properties are inserted when the SOA composite application instance starts executing and reset when the HTTP request completes.

- `composite_name`
- `component_name`
- `composite_instance_id`
- `activity_name` (Lists the activities executed in the BPEL process. Activities that do not have names, such as scope activities, are not captured.)

This information is output in tabular form when the `jvm.threads` dump is executed. This dump identifies where each thread is during execution of the `jvm.threads` dump. This is useful for diagnosing which SOA composite applications are processing slowly.

### 12.3.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to execute a dump of jvm.threads:

```
executeDump(name='jvm.threads')
```

===== THREAD CONTEXT INFORMATION =====

id	ECID	RID	Context Values
id=23	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000001d3f 0:1	WEBSERVICE_ PORT.name=CatchException_pt composite_name=ExceptionHandler!1.0 J2EE_MODULE.name=fabric component_name=CommsUtilityWS WEBSERVICE_NAMESPACE.name=http://xmlns.oracle.com/ExceptionHandler/CatchException J2EE_APP.name=soa-infraWEBSERVICE.name=catchexception_client_ep composite_instance_id=1	
id=61	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-000000000000003c 0		
id=70	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000001e84 0		
id=2170	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000001d3f 0	DSID=0000J^2fPtuDSc Y5Hro2yf1G8M9Z000002	
id=1616	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000000004 0		
id=2179	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000000002b 0	dbRID=0:10	
id=2195	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000001e7e 0	dbRID=0:2	
id=2196	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000001e82 0	dbRID=0:2	
id=2197	e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000001e80 0	dbRID=0:5	
===== END OF THREAD CONTEXT INFORMATION =====			

This information is also available in the AdminServer-diagnostic.log file log.

For more information about the jvm.threads dump, see Chapter "Diagnosing Problems" of *Oracle Fusion Middleware Administrator's Guide*.

## 12.4 Supported DMS Metrics

DMS metrics with noun types are exposed as Oracle SOA Suite MBeans to use for diagnosing problems. This section describes the supported DMS metrics. DMS nouns can be used to create watches in Oracle WebLogic Server Administration Console.

The DMS metrics provide graphical details that appear on the Statistics page of the BPEL process service engine. For more information, see [Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics"](#) and [Section 14.9, "Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine."](#)

Table 12-21 shows the supported service engine sensors.

**Table 12–21 Service Engine Sensors**

Noun Path	Noun Type and Description	Sensor	Type
/soainfra/engines/dispatcher/queuestats/[REQUEST_TYPE]	soainfra_cube_engine_dispatcher_queue_stats: Provides the active and scheduled count for the queues of various dispatcher sets.  The various request types are audit, delivery, domain, instance, invoke, maintenance, non-block-invoke, process, and system.	active schedule	
/soainfra/engines/[bpel workflow mediator decision]/message_processing	soainfra_message_processing: Provides information about the total number (count) and average time taken to process various message types. The two message types are synchronous and asynchronous requests.	faultedRequestProcessingTime faultedPostProcessingTime requestProcessingTime postProcessingTime activeRequests	Phase Event Phase Event Phase Event Phase Event State
/soainfra/engines/bpel/requests/[REQUEST_TYPE]	soainfra_bpel_requests	active scheduled	State State
The request types are audit, engine, invoke, non-block-invoke, and system.			
/soainfra/engines/workflow/w/Task/service	soainfra_wfRequest	time count	Phase Event
/soainfra/engines/workflow/w/Task/[METHOD_NAME]		time count	Phase Event
/soainfra/engines/workflow/w/TaskQuery/[METHOD_NAME]		time count	Phase Event
/soainfra/engines/workflow/w/TaskMetadata/getTaskDefinition		time count	Phase Event
/soainfra/engines/workflow/Verification/[METHOD_NAME] (only methods: authenticateUser, getPermissibleTaskActions, and canUserPerformTaskAction)		time count	Phase Event
/soainfra/engines/workflow/TaskNotification/notifyForTask		time count	Phase Event
/soainfra/engines/workflow/AssignmentRules/executeRules		time count	Phase Event
/soainfra/engines/bpel/dispatcher/	soainfra_bpel_dispatcher	maxThreads avgLifeTime avgRequestCountPerSecond, and so on	State State State

[Table 12–22](#) shows the supported binding sensors.

**Table 12–22 Binding Sensors**

Noun Path	Noun Type	Sensor	Type
/soainfra/bindings/[inbound outbound]/[ws sdo jca b2b]	soainfra_binding	processRequests	Phase
		requests	Phase
		errors	Phase

[Table 12–23](#) shows the supported composite sensors.

**Table 12–23 Composite Sensors**

Noun Path	Noun Type	Sensor	Type
/soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[REVERSION]/[COMPONENT_NAME]	soainfra_decision_interaction	executed	Event
		executionTime	Phase
/decision/[INTERACTION_PATTERN]/[INTERACTION_PATTERN_NAME]			
/soainfra/apps/[COMPOSITE_DN]/[COMPONENT_NAME]/[ACTIVITY_NAME] (for bpel)	soainfra_bpel_activity: Provides details about the activity level execution times	started	Event
		executionTime	Phase
		faultedExecutionTime	Phase
		Standard deviation (the user interface calculates this as it comes through)	
/soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[VERSION]/[COMPONENT_NAME]/state/	soainfra_wfStateEvent	ASSIGNED	Event
		COMPLETED	
		ERRORED	
		EXPIRED	
		SUSPENDED	
/soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[VERSION]/[COMPONENT_NAME]/outcome/	soainfra_wfOutcomeEvent	[OUTCOME NAME]	Event
/soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[VERSION]/[COMPONENT_NAME]/taskCompletion/	soainfra_wfTaskCompletionTime	time	Phase

[Table 12–24](#) shows the supported reference and service sensors.

**Table 12–24 Reference and Service Sensors**

Noun Path	Noun Type	Sensor	Type
/soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[REVERSION]/[REFERENCE_NAME]	soainfra_reference	processOutboundMessagesEvents	Event
		Errors	Event
		processOutboundMessages	Phase
/soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[REVERSION]/[SERVICE_NAME]	soainfra_service	processInboundMessagesEvents	Event
		Errors	Event
		processInboundMessages	Event

[Table 12–25](#) shows the supported Oracle B2B binding sensors.

**Table 12–25 Oracle B2B Binding Sensors**

Noun Path	Noun Type	Sensor	Type
/soainfra/bindings/b2b/document_type/[inbound outbound] / [DOCUMENT_NAME]	soainfra_b2b_document	processMessagesEvents	Event
		processMessagesErrors	Event
		processMessages	Phase Event
/soainfra/bindings/b2b/[inbound outbound]	soainfra_b2b_document_dir	processMessageSize	State
		processMessagesEvents	Event
		processMessagesErrors	Event
/soainfra/bindings/b2b/trading_partner/[from to] / [TRADING_PARTNER_NAME]	soainfra_b2b_tradingPartner	processMessages	Phase Event
		processMessageSize	State
	soainfra_b2b_tradingPartner_dir	processMessagesEvents	Event
/soainfra/bindings/b2b/endpoint/[inbound outbound] / [END_POINT]	soainfra_b2b_endpoint	endPointProtocol	State
		endPointStatus	State
	soainfra_b2b_endpoint_dir	processMessagesEvents	Event
/soainfra/bindings/b2b/agreement / [AGREEMENT_NAME]	soainfra_b2b_agreement	processMessagesEvents	Event
/soainfra/bindings/b2b/activeEntities	soainfra_b2b_active_entities	activeTradingPartners	State
		activeAgreements	State
		activeDocuments	State
/soainfra/apps/[APP_NAME] / [COMPOSITE_NAME] / [REVERSION] / [SERVICE_NAME] / [TRADING_PARTNER_NAME]	soainfra_service_b2b_tradingPartner	processMessagesEvents	Event
		processMessagesErrors	Event
		processMessages	Phase Event
		processMessageSize	State
/soainfra/apps/[APP_NAME] / [COMPOSITE_NAME] / [REVERSION] / [REFERENCE_NAME] / [TRADING_PARTNER_NAME]	soainfra_reference_b2b_tradingPartner	processMessagesEvents	Event
		processMessagesErrors	Event
		processMessages	Phase Event
		processMessageSize	State

[Table 12–26](#) shows the supported Oracle User Messaging Service sensors.

**Table 12–26 Oracle User Messaging Service Event Bridge Metrics**

Noun Path	Noun Type	Sensor	Type
/soainfra/eventBridge/rfidBridge	soinfra_rfidBridge	eventsIn	Event
		eventsOut	Event
		eventsProcess	Phase Event
		errors	Event
/soainfra/eventBridge/rfidBridge/device/[SERVER_NAME] / [DEVICE_NAME]	soinfra_rfidBridge_device	eventsIn	Event
		eventsOut	Event
		eventsProcess	Phase Event
		status	State
/soainfra/eventBridge/rfidBridge/server/[SERVER_NAME]	soinfra_rfidBridge_server	status	State

## 12.5 Creating Watches and Notifications

You can create watches and send notifications around diagnosable conditions based on metrics collected from Oracle SOA Suite MBeans. When a watch expression evaluates to true (for example, heap space exceeds a specified amount), a notification is sent.

There are several options for creating watches:

- Enable preconfigured rules and watches for deployment, memory, and elapsed time of web service calls with the `sca_createWatches` WLST command
- Manually create Oracle SOA Suite watches in Oracle WebLogic Server Administration Console

The message IDs shown in [Table 12–27](#) have been assigned for diagnostic purposes.

- When you manually create a watch in Oracle WebLogic Server Administrator's Console, you must follow the naming conventions in [Table 12–27](#). The prefix for Oracle SOA Suite-related watches is `SOA-message_ID`.
- When you enable the preconfigured watches, the names are automatically created for you.

**Table 12–27 Message Prefixes**

Scenario	Message-ID	Dumps Executed	Watch Preconfigured?
Memory	SOA-900000	<ul style="list-style-type: none"> <li>▪ <code>soa.env</code></li> <li>▪ <code>soa.config</code></li> <li>▪ <code>java.sysprops</code></li> </ul>	Yes, see <a href="#">Section 12.5.1, "Enabling Preconfigured Rules and Watches."</a>
Deployment hang	SOA-900001	<ul style="list-style-type: none"> <li>▪ <code>soa.env</code></li> <li>▪ <code>soa.config</code></li> </ul>	Yes, see <a href="#">Section 12.5.1, "Enabling Preconfigured Rules and Watches."</a>
Data source	SOA-900002	<ul style="list-style-type: none"> <li>▪ <code>soa.env</code></li> <li>▪ <code>soa.config</code></li> <li>▪ <code>soa.db</code></li> </ul>	No, see <a href="#">Section 12.5.2, "Manually Creating Oracle SOA Suite Watches and Notifications"</a> for creation instructions.
Elapsed time of web service calls	SOA-900003	<ul style="list-style-type: none"> <li>▪ <code>soa.env</code></li> <li>▪ <code>soa.config</code></li> <li>▪ <code>soa.wsdl</code></li> </ul>	Yes, see <a href="#">Section 12.5.1, "Enabling Preconfigured Rules and Watches."</a>

**Table 12–27 (Cont.) Message Prefixes**

Scenario	Message-ID	Dumps Executed	Watch Preconfigured?
Resequencer groups pending	MED-900000	mediator.resequencer	No, see <a href="#">Section 12.5.2, "Manually Creating Oracle SOA Suite Watches and Notifications"</a> for creation instructions.

You can also link a WLDF notification to the watch. If you link the out-of-the-box Oracle Fusion Middleware Diagnostic Framework notification (named **FMWDFW notification**), then a set of SOA-specific dumps are executed. These dumps provide runtime information about the situation and environment. The list of dumps to execute is determined by predefined XML incident rules files.

Other notifications (like email) can also be linked to the watch.

### 12.5.1 Enabling Preconfigured Rules and Watches

The following preconfigured Diagnostic Framework rules are automatically installed with Oracle SOA Suite:

- Log detection condition rule for creating an incident when an OWS-04086 error is encountered.

---

**Note:** If you experience issues with large numbers of incidents being created due to OWS-04086 errors, contact Oracle Support Services about patch number 2248452.

---

- Condition rule that checks for the presence of the SOA composite application name in the DMS execution context (EC) and adds the soa.wsdl and soa.composite.trail diagnostic dumps to the list of dumps executed.

To enable these rules for use and generate the following watches, you must run the sca\_createWatches WLST command after domain creation.

- Deployment watch (with a threshold of 5 minutes)
- Memory watch (heap free percent with a threshold of 25 percent)
- Elapsed time of web service calls watch (with a threshold of 5 minutes)

To enable the preconfigured watches:

1. Connect using WLST to the Oracle WebLogic Server instance and start an editing session. For information about connecting and starting an editing session, see Chapter "WLST Command and Variable Reference" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.
2. Execute the following WLST command to enable the preconfigured watches.

```
wls:/soainfra/serverConfig> sca_createWatches()
```

The watches are enabled and displayed along with any watches you manually create at the bottom of the Settings for *Module\_Name* page in Oracle WebLogic Server Administration Console.

For information about executing WLST commands in Oracle SOA Suite, see Chapter "Oracle SOA Suite Custom WLST Commands" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

## 12.5.2 Manually Creating Oracle SOA Suite Watches and Notifications

To manually create Oracle SOA Suite watches and notifications:

1. Log in to Oracle WebLogic Server Administration Console.

`http://host:port/console`

2. In the **Domain Structure**, expand **Diagnostics**, and select **Diagnostic Modules**.

The Summary of Diagnostic Modules page appears.

You configure a diagnostic system module to monitor an aspect of a server or server resource. You can configure multiple system modules to monitor different aspects of a server, but only one such module can be active on a server.

3. In the **Diagnostic System Modules** section, click **Module-[Module\_Name]** (for example, **Module-FMWDFW**).
4. On the Settings for *Module\_Name* page, select **Watches and Notifications > Watches**.
5. In the **Watches** section, click **New**.

The Create a Diagnostic Watch page is displayed.

6. Enter the following details to create a watch, and click **Next**.

Field	Description
<b>Watch Name</b>	<p>Enter a name for the watch (for this example, SOA-900000#soa-infra#MemoryWatch is entered).</p> <p>The name of the watch must conform to the following pattern:  <code>message-id#soa-infra#some_other_text</code></p> <p>For example, SOA-900000#soa-infra#MemoryWatch.</p> <p>This is necessary because the watch name coordinates the Diagnostic Framework incident processing actions when watch conditions evaluate to true. Not following this pattern results in Oracle SOA Suite dumps not getting triggered when Oracle SOA Suite incidents are created.</p> <p>For additional information, see <a href="#">Table 12–27</a>.</p> <p>If the watch is set up with the <b>FMWDFW notification</b>, the notification handler creates an incident that corresponds to the <code>message-id</code> specified in the watch name.</p>
<b>Watch Type</b>	Select an option: <ul style="list-style-type: none"> <li>▪ <b>Collected Metrics:</b> Sets a watch based on metrics collected from MBean attributes. It is recommended that you select this option because it works for the scenarios described in <a href="#">Table 12–1</a>.</li> <li>▪ <b>Server Log:</b> Sets a watch based on data written to server logs. This type is only useful for extending an existing log watch such as <code>StuckThread</code> to include Oracle SOA Suite dumps.</li> <li>▪ <b>Event Data:</b> This option is not applicable because Oracle SOA Suite is not using any WLDF-based instrumentation.</li> </ul>
<b>Enable Watch</b>	Select to enable a watch.

The Configure Watch Rule Expressions page for adding an expression to the watch is displayed.

7. Click **Add Expressions**.

The Add Expression wizard is displayed.

8. In the **MBean Server location** list, select the Oracle WebLogic Server MBean server for the expression you want to configure (for example, **ServerRuntime**).
9. Click **Next**.
10. Click the **Select an MBean Type from the following list** button.
11. In the **MBean Type** list, select the MBean to use for collecting diagnostic information (for this example, Oracle WebLogic Server MBean **weblogic.management.runtime.JRockitRuntimeMBean** is selected).

The screenshot shows the 'Create Watch' dialog box. At the top, there are buttons for Back, Next, Finish, and Cancel. Below this is a section titled 'Add Expression' with the sub-instruction 'The following expressions will be used to identify your Watch rule.' A question 'What MBean type would you like to select?' is followed by two options: 'Select an MBean Type from the following list' (which is selected, showing 'MBean Type: weblogic.management.runtime.JRockitRuntimeMBean') and 'Enter a custom MBean Type' (with a text input field 'Custom MBean Type:' which is empty). At the bottom of the dialog are the same Back, Next, Finish, and Cancel buttons.

---

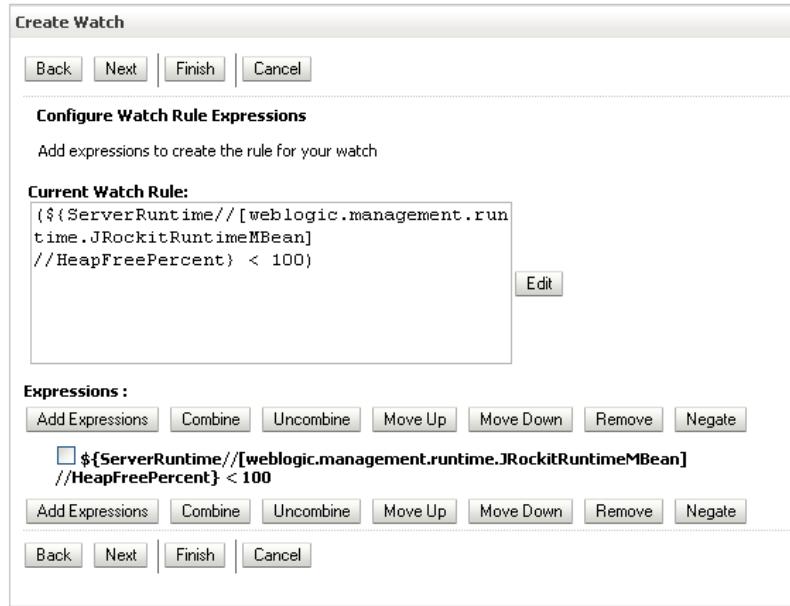
**Note:** If you want to create an automatic notification when a composite state is set to off, select **oracle.fabric.managementcomposite.mbean.Composite** from the **MBean Type** list.

---

12. Click **Next**.  
The Select Instances page is displayed.
13. From the **Instance** list, select the instance name or specify an instance name pattern to use to identify the metric for the expression.
14. Click **Next**.
15. Enter the following details to create a watch rule expression, and click **Finish**.

Field	Description
<b>Message Attribute</b>	Select a message attribute (for this example, <b>HeapFreePercent</b> is selected). The attributes that are displayed for selection are part of the MBean that you selected in Step 11. For example, if you selected: <b>oracle.dms.name=/soainfra/engines/bpel/request/system.type=soa_infra_bpel_requests</b> You see assigned attributes such as <b>active_count</b> , <b>active_maxValue</b> , <b>active_minValue</b> , <b>scheduled_count</b> , and others.
<b>Operator</b>	Select an operator (for this example, <b>&lt;</b> is selected).
<b>Value</b>	Enter a value (for this example, <b>100</b> is specified).

The Configure Watch Rule Expressions page is displayed with the watch rule expression you created.



**16. Click Next.**

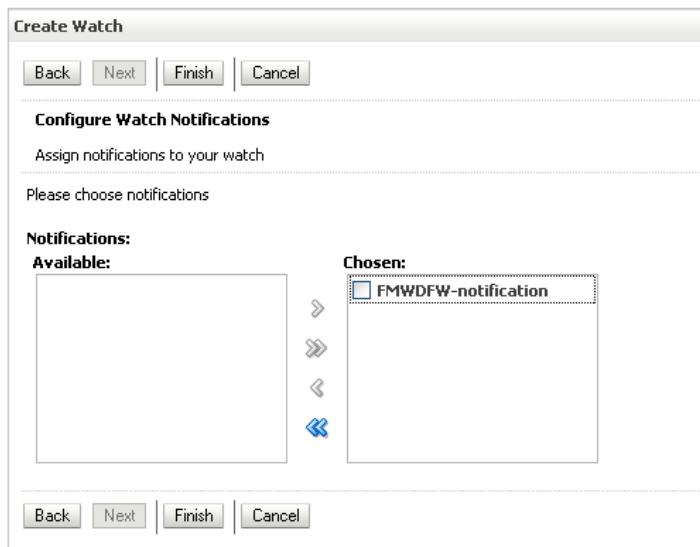
The Config Watch Alarm page is displayed.

**17. Optionally specify an alarm and the alarm's reset value for the watch.**

**18. Click Next.**

The Configure Watch Notifications page is displayed.

**19. In the Available table, select a notification to assign to the watch and click >.**



When a watch rule expression evaluates to true, a notification is triggered. This notification is handled by the Diagnostic Framework if the **FMWDFW notification** is selected, which links it to the watch. The **FMWDFW notification** is automatically shipped with Oracle SOA Suite. Oracle recommends that you select this notification because it creates the Oracle SOA Suite dumps described in

### [Section 12.2, "Executing Oracle SOA Suite Diagnostic Dumps."](#)

The notification handler creates a problem incident package that contains appropriate Oracle SOA Suite dumps in the ADR. The incident package name corresponds to the message ID specified in the watch name. The incident package dumps can be viewed later using standard ADR tools. This feature enables you to take corrective actions for the problem scenario.

**20. Click Finish.**

The watch you created is displayed at the bottom of the Settings for *Module\_Name* page. In addition, three WLDF watches that are automatically shipped with Oracle WebLogic Server (**Deadlock**, **StuckThread**, and **UncheckedException**) are also displayed.

<input type="checkbox"/>	Name	Type	Enabled	Alarm Type
<input type="checkbox"/>	Deadlock	Server Log	true	Automatic Reset
<input type="checkbox"/>	SOA-90000#soa-infra#MemoryWatch	Collected Metrics	true	N/A
<input type="checkbox"/>	SOA-900001#soa-infra#DeploymentWatch	Collected Metrics	true	Automatic Reset
<input type="checkbox"/>	StuckThread	Server Log	true	Automatic Reset
<input type="checkbox"/>	UncheckedException	Server Log	true	Automatic Reset

**21. In the Name column, click the specific watch name to display configuration details about the watch.**

### 12.5.3 Creating a Watch to Identify the Elapsed Time of Web Service Binding Calls

You can create a watch that keeps track of the time it takes for web service binding calls from a composite to an external references to complete. When the specified time threshold is exceeded, an incident can be created or an alert can be triggered. This watch is useful for the following scenarios:

- Identify scenarios in which an invoked external reference is operating too slowly, which causes messages to collect while waiting for processing by this reference
- Have high service level agreements (SLAs) and want to be notified if the SLAs are being violated from the invoked services

To create a watch to identify the elapsed time of web service binding calls:

Follow the steps described in [Section 12.5.2, "Manually Creating Oracle SOA Suite Watches and Notifications"](#) and use these guidelines to create a watch:

- Set the **CreateWSCallTrackingMBean** property to true under the **More SOA Infra Advanced Configuration Properties** section of the SOA Infrastructure Common Properties page. This property controls the creation of MBeans for tracking the elapsed time of web service binding calls, and applies globally to *all*

SOA composite applications in the SOA Infrastructure. For each web service binding call to an external reference, a new MBean is registered to keep track of the time, and then unregistered. This property is set to false by default. Do not set this property to true until you see problems in your system.

For more information about accessing the SOA Infrastructure Common Properties page, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

- Specify SOA-900003#soa-infra#WSExtElapsedTimewatch as the watch name.
- Select **Collected Metrics** from the **Watch Type** list.
- Specify CreateWSCallTrackingMBean in the **Custom MBean Types** field. This MBean is *not* available for selection from the **MBean Type** field.

The screenshot shows the 'Create Watch' dialog box. At the top, there are 'Back', 'Next', 'Finish', and 'Cancel' buttons. Below them is the 'Add Expression' section with the instruction: 'The following expressions will be used to identify your Watch rule.' Under 'What MBean type would you like to select?', there are two options: 'Select an MBean Type from the following list' (radio button is unselected) and 'Enter a custom MBean Type' (radio button is selected). In the 'Custom MBean Type' field, 'CreateWSCallTrackingMBean' is entered. At the bottom of the dialog are 'Back', 'Next', 'Finish', and 'Cancel' buttons.

- Specify an expression rule for tracking the elapsed time it takes in milliseconds for web service binding calls from a SOA composite application to an external references to complete (in minutes). For example, this expression creates an incident when the watch is triggered.

```
(${ServerRuntime//oracle.fabric.management.wldf.mbean.WSExternalBindingWatchMX
BeanImpl}//ElapsedTime} > 2
```

- An incident is created in the Oracle SOA Suite ADR directory when the watch is triggered. A readme file in the directory displays information about the incident. For this example, BPEL service component instance 20004 was calling the WSDL-defined port CommsUtilityPort. The elapsed time was 244013 (2.44013 minutes, which was above the elapsed time of 2 minutes set in the rule expression of the watch). [Example 12–2](#) provides details.

#### **Example 12–2 Incident Details**

```
WatchDomainName: soainfra
Watch Data:
ServerRuntime//oracle.fabric.management.wldf.mbean.WSExternalBindingWatch
MXBeanImpl}//ElapsedTime : oracle.soa.config:Application=soa-infra.j2eeType=
CompositeReferenceWatch.name=bpel#20004/soainfra/AdminServer/soainfra/default/
ExceptionHandler/1.0/soa.2075e8a1-5c69-4e50-a679-c0ba2f6ae6/REFERENCES/
CommsUtilityS/PORTs/CommsUtilityPort//ElapsedTime:244013
```

You can also create this watch automatically with the `sca_createWatches` WLST command. For information, see [Section 12.5.1, "Enabling Preconfigured Rules and Watches."](#)

#### 12.5.4 Creating a Watch to Identify if Processing Delays Exceed a Specified Time Limit

You can create a watch that alerts you if the counts of message wait times or processing delays exceed a certain limit.

This watch is controlled by the `DispatcherStatsMap` attribute of the `CubeDispatcher` System MBean Browser property. You can access this setting as follows:

1. Right-click `soa-infra`, and select **Administration > System MBean Browser**.
2. Expand **Application Defined MBeans > oracle.as.soainfra.bpm > Server : server\_name > bpel > CubeDispatcher**.
3. Click **CubeDispatcher**.

Follow the steps described in [Section 12.5.2, "Manually Creating Oracle SOA Suite Watches and Notifications"](#) and use these guidelines to create a watch in the **Add Expressions** section of the Create Watch wizard:

- Select **ServerRuntime**, and click **Next**.
- Specify `com.collaxa.cube.engine.dispatch.DispatcherMXBeanAdapter` in the **Custom MBean Types** field, and click **Next**. This MBean is *not* available for selection from the **MBean Type** field.
- Specify `oracle.as.soainfra.bpm:Application=soa-infra, name=CubeDispatcher, type=bpel` in the **Custom Instance** field, and click **Next**.
- Specify `DispatcherStatsMap(invokerSet)(invoke)(scheduled)` in the **Attribute Expression** field.
- Complete the remaining fields on this page, and click **Next**.

#### 12.5.5 Creating Resequencer Watches and Notifications

You can create a watch that tracks how long it takes for resequencer groups to process messages. When the time threshold you specify is exceeded, a notification can be generated.

To create resequencer watches and notifications:

Follow the steps described in [Section 12.5.2, "Manually Creating Oracle SOA Suite Watches and Notifications"](#) using the following guidelines:

- Create the watch and notification in the **Module-FMWDFW** module.
- On the Create a Diagnostic Watch page, the name of the watch must conform to the following pattern:

`MED-900000#soa-infra#some_other_text`

For example, `MED-900000#soa-infra#PendingGroups`.

- When you create the expression, select the following MBean type:

`oracle.tip.mediator.dfw.MediatorDiagnostic`

There is only once choice for the instance in the expression:

`oracle.mediator:name=MediatorDiagnostic, type=MediatorDiagnostic`

- For the **Message Attribute** field, select ResequencerMaxUnprocessTime. For the value, enter the number of minutes a group can be pending before triggering a notification.
- For the operator, select the greater than symbol (>).

The completed expression should look similar to the following:

```
(${ServerRuntime// [oracle.tip.mediator.dwf.MediatorDiagnostic]oracle.mediator:name
=MediatorDiagnostic,type=MediatorDiagnostic//resequencerMaxUnprocessTime} > '15')
```

To create a sample custom rules file:

The watch rules expression is not provided in the dump context, so the criteria specified when generating a dump are not available. You can use a custom file named `soa-infra#custom-rules.xml` to register the dump generation rules. For more information, see [Section 12.1.3, "Predefined Incident Processing Rules."](#)

1. Create a watch, as described above.
2. Create a file named `soa-infra#custom-rules.xml` in one of the following locations:
  - Server level configuration: `FMW_HOME/user_projects/domains/domain_name/config/fmwconfig/servers/server_name/dfw`
  - Domain level configuration: `FMW_HOME/user_projects/domains/domain_name/config/fmwconfig/dfw`
3. Define the rules in the new file. [Example 12–3](#) provides a resequencer sample file.
4. Restart the domain or load the file dynamically. For information about dynamic loading, see [Section 12.1.3, "Predefined Incident Processing Rules."](#)

The WLDF generates the dump.

[Example 12–3](#) shows a sample custom rules file that generates a diagnostic dump when the length of time a group stops processing messages reaches 10 minutes.

#### **Example 12–3 Sample Custom Rules File for Resequencer Dumps**

```
<?xml version="1.0" encoding="UTF-8"?>
<diagnosticRules
 xmlns="http://www.oracle.com/DFW/DiagnosticsFrameworkRules"
 xmlns:xs="http://www.w3.org/2001/XMLSchema-instance">
<processingRules>
 <rule name="memory diagnosis rule">
 <ruleCondition>
 <condition name="MESSAGE_ID" value="MED-900000"
 operator="EQ"/>
 </ruleCondition>
 <ruleActions>
 <dumpAction name="mediator.resequencer">
 <argument name="resequencerMaxUnprocessTime" value="10"
 valueType="literal"/>
 </dumpAction>
 </ruleActions>
 </rule>
</processingRules>
</diagnosticRules>
```

## 12.6 Manually Triggering and Executing Dumps

You can manually execute existing dumps with the WLST command `executeDump` and create incidents when one has not been automatically created.

To manually trigger and execute dumps:

- Specify the `executeDump` command to place dump contents in a file (for this example, `soa.config` is the dump executed). This creates the following output:

```
wls:/soainfra/serverConfig> executeDump(name='soa.config', appName='soa-infra')
```

```
Start Dumping deployedCompositesCatalog from MDS
URI:deployed-composites/deployed-composites.xml to: /myhome/fmwhome/user_
projects/domains/mydomain/servers/myserver/adr/diag/ofm/mydomain/
myserver/incident/incdir_9/deployedCompositesCatalog
```

```
Finished dumping specified MDS metadata to : /myhome/fmwhome/user_
projects/domains/mydomain/servers/myserver/adr/diag/ofm/mydomain/myserver/incident/
incdir_9/deployedCompositesCatalog
```

```
Start Dumping soaServiceEnginesConfigurations from MDS
URI:soa/configuration/default to: /myhome/fmwhome/user_projects/
domains/mydomain/servers/myserver/AdminServer/adr/diag/ofm/mydomain/
myserver/incident/incdir_9/soaServiceEnginesConfigurations
```

```
Finished dumping specified MDS metadata to : /myhome/fmwhome/user_projects/
domains/mydomain/servers/myserver/AdminServer/adr/diag/ofm/mydomain/
myserver/incident/incdir_9/soaServiceEnginesConfigurations
```

- Specify the `executeDump` command to display dump contents to the screen.

```
executeDump(name='soa.edn')
```

```
Type:oracle.integration.platform.blocks.event.saq.SAQBusinessEventBus
Configuration:null
Status: running=true started=true
ThreadCount:3
RetryCount:3
In Global: Tx:false
Cluster Info:oracle.integration.platform.blocks.cluster.CoherenceCluster
Interface1mpt@163bd717
SharedEDN:false
OOAO Queue Name:edn_ooao_queue
Java Subscriber Name:edn java subscriber
Subscription Info:
No namespace subscription...
QName subscriptions:
=====
qname={http://schemas.oracle.com/events/edl/ActionOccur}ADEvent
subscriptions=
id=default/WSInMedPubBpelSubFileOut!1.0*soa_
7a055d6a-8402-49c2-ac56-5f85cbf3d7f/
BpelSub, consistencyLevel=ONE_AND_ONLY_ONE, filter=XPath Filter: starts-with(/_
be:business-event/be:content/ns0:ActionOccurrence/ns0:ParentEntityType/@value,
'A'), runAsRoles=[$publisher]
id=partition_1/WSInMedPubBpelSubFileOut!1.0*soa_
80a169ab1-395a-4b87-9986-9fa2742a8bd3/
BpelSub, consistencyLevel=ONE_AND_ONLY_ONE, filter=XPath Filter: starts-with(/_
be:business-event/be:content/ns0:ActionOccurrence/ns0:ParentEntityType/@value,
'A'), runAsRoles=[$publisher]
EventThreadContextInfo:
```

```

EventTargets:
Event:partition_
1/WSInMedPubBpelSubFileOut!1.0*soa0a169ab1-395a-4b87-9986-9fa2742a9bd3/
BpelSub:::oracle.fabric.BPELServiceEngine@163bd6b5
Event:default/WSInMedPubBpelSubFileOut!1.0*soa7a055d6a-8402-49c2-ac56-5f85cbf3
d7f/BpelSub:::oracle.fabric.BPELServiceEngine@163bd6b5
EDN DB Log enabled:false

```

You can also manually create incidents when one has not been automatically created. For example, this is useful when you notice performance issues and want to create an incident to send to Oracle Support Services. The incident can include SOA dumps, according to the SOA message ID mapping.

This can be performed with the following WLST command:

```
createIncident(messageId="SOA-90000", appName="soa-infra")
```

This has the same effect as WLDF watch notification execution, in which the watch has the message ID of SOA-90000 and application name of soa-infra.

For more information about `executeDump`, see Chapter "Diagnostic Framework Custom WLST Commands" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

## 12.7 Viewing Incident Packages with ADR Tools

ADRCI is a command-line utility that enables you to investigate problems and package and upload first-failure diagnostic data to Oracle Support Services. ADRCI also enables you to view the names of dump files in the ADR, and to view the alert log with XML tags stripped, with and without content filtering.

ADRCI is installed in the following directory:

```
MW_HOME/wlserver_10.3/server/adr
```

For more information about ADRCI, see Chapter "ADRCI: ADR Command Interpreter" of *Oracle Database Utilities*.

For information about other tools, see Chapter "Managing Diagnostic Data" of *Oracle Database Administrator's Guide*

## 12.8 Querying Problems and Incidents

The Diagnostic Framework provides WLST commands that you can use to view information about problems and incidents, including the following:

- Querying problems across Oracle WebLogic Servers
- Querying incidents across Oracle WebLogic Servers
- Viewing dump files associated with an incident on an Oracle WebLogic Server

For more information about these WLST commands, see Section "Understanding the Diagnostic Framework" of *Oracle Fusion Middleware Administrator's Guide* and Chapter "Diagnostic Framework Custom WLST Commands" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.



# **Part V**

---

## **Administering BPEL Process Service Components and Engines**

This part describes how to administer BPEL process service components and engines.

This part includes the following chapters:

- [Chapter 13, "Configuring BPEL Process Service Components and Engines"](#)
- [Chapter 14, "Monitoring BPEL Process Service Components and Engines"](#)
- [Chapter 15, "Managing BPEL Process Service Components and Engines"](#)



---

## Configuring BPEL Process Service Components and Engines

This chapter describes how to configure BPEL process service components and service engines, including configuring properties such as audit level, audit trail threshold, and dispatcher thread values; automatic recovery for BPEL processes; master node recovery scheduling; automatic recovery attempts for invoke and callback messages; and callback message order preservation.

This chapter includes the following sections:

- [Section 13.1, "Configuring BPEL Process Service Engine Properties"](#)
- [Section 13.2, "Configuring Automatic Recovery for Oracle BPEL Process Manager"](#)
- [Section 13.3, "Configuring Master Node Recovery Scheduling"](#)
- [Section 13.4, "Configuring Automatic Recovery Attempts for Invoke and Callback Messages"](#)
- [Section 13.5, "Preserving the Order of Callback Messages"](#)
- [Section 13.6, "Setting the Audit Level at the BPEL Process Service Component Level"](#)

For more information about Oracle SOA Suite and Oracle BPEL process tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

### 13.1 Configuring BPEL Process Service Engine Properties

You can configure BPEL process service engine properties, which are used by the BPEL process service engine during processing of BPEL process service components.

To configure BPEL process service engine properties:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > BPEL Properties.	1. Right-click <code>soa-infra</code> . 2. Select SOA Administration > BPEL Properties.

The BPEL Service Engine Properties page displays properties for setting audit trail and large document thresholds, setting dispatcher thread properties, validating payload schema, and setting the audit trail level.

soa-infra SOA Infrastructure

Logged in as **weblogic** | Page Refreshed Sep 22, 2012 6:37:28 PM PDT

SOA Infrastructure Home > BPEL Properties

### BPEL Service Engine Properties

**Properties**

Edit property values and click **Apply**.

* Audit Level	Inherit
* Audit Trail Threshold (Byte)	50000
* Large Document Threshold (Byte)	100000
* Dispatcher System Threads	2
* Dispatcher Invoke Threads	20
* Dispatcher Engine Threads	30
* Payload Validation	<input type="checkbox"/>
* Disable BPEL Monitors and Sensors	<input type="checkbox"/>

More BPEL Configuration Properties...

2. Make changes to the service engine properties that are appropriate to your environment.

Property	Description
<b>Audit Level</b>	Select one of the following options: <ul style="list-style-type: none"> <li>▪ <b>Off:</b> Composite instance tracking and payload tracking information is not collected.</li> <li>▪ <b>Inherit:</b> Logging equals the SOA Infrastructure audit level. This setting enables the BPEL process audit level to automatically change when the global setting is changed. Setting a different audit level tracking on this page overrides the tracking set at the SOA Infrastructure level.</li> <li>▪ <b>Minimal:</b> The BPEL process service engine does not capture any audit details. Therefore, they are not available in the flow audit trails. All other events are logged.</li> <li>▪ <b>Production:</b> The BPEL process service engine does not capture the payload. The payload details are not available in the flow audit trails. Payload details for other BPEL activities are collected, except for assign activities. This level is optimal for most standard operations and testing.</li> <li>▪ <b>Development:</b> Allows both composite instance tracking and payload tracking. All events are logged. However, it may have an impact on performance. This level is useful mostly for debugging purposes.</li> </ul>
<b>Audit Trail Threshold</b>	Enter the maximum size in bytes of an instance audit trail before it is chunked and saved in a dehydration store table separate from the audit trail. If the threshold is exceeded, the <b>View XML</b> link is shown in the audit trail instead of the payload.
<b>Large Document Threshold</b>	Enter the maximum size of a generated document within a BPEL process component instance before it is stored in a separate table in the dehydration store.

Property	Description
<b>Dispatcher System Threads</b>	<p>Specify the total number of threads allocated to process system dispatcher messages. System dispatcher messages are general cleanup tasks that are typically processed quickly by the server (for example, releasing stateful message beans back to the pool). Typically, only a small number of threads are required to handle the number of system dispatch messages generated during runtime.</p>
	<p>The default value is 2 threads. Any value less than 1 thread is changed to the default.</p>
	<p>For information about monitoring these threads, see <a href="#">Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics."</a></p>
<b>Dispatcher Invoke Threads</b>	<p>Specify the total number of threads allocated to process invocation dispatcher messages. Invocation dispatcher messages are generated for each payload received and are meant to instantiate a new instance. If the majority of requests processed by the service engine are instance invocations (as opposed to instance callbacks), greater performance may be achieved by increasing the number of invocation threads. Higher thread counts may cause greater CPU utilization due to higher context switching costs.</p>
	<p>The default value is 20 threads. Any value less than 1 thread is changed to the default.</p>
	<p>For information about monitoring these threads, see <a href="#">Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics."</a></p>
<b>Dispatcher Engine Threads</b>	<p>Specify the total number of threads allocated to process engine dispatcher messages. Engine dispatcher messages are generated whenever an activity must be processed asynchronously. If most of the processes deployed are durable with a large number of dehydration points (midprocess receive, onMessage, onAlarm, and wait activities), greater performance may be achieved by increasing the number of dispatcher engine threads. Higher thread counts can cause greater CPU utilization due to higher context-switching costs.</p>
	<p>The default value is 30 threads. Any value less than 1 thread is changed to the default.</p>
	<p>For information about monitoring these threads, see <a href="#">Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics."</a></p>
<b>Payload Validation</b>	<p>Select to enable validation of inbound and outbound messages. Nonschema-compliant payload data is intercepted and displayed as a fault.</p> <p><b>Note:</b> This setting is independent of the SOA composite application and SOA Infrastructure payload validation level settings. If payload validation is enabled at both the service engine and SOA Infrastructure levels, data is checked twice: once when it enters the SOA Infrastructure, and again when it enters the service engine.</p>
<b>Disable BPEL Monitors and Sensors</b>	<p>Select this checkbox to disable all BPEL monitors and sensors defined for all BPEL components across all deployed SOA composite applications.</p>

3. Click **Apply**.
4. If you want to configure advanced BPEL properties in the System MBean Browser, click **More BPEL Configuration Properties**. Properties that display include, but are not limited to, the following. Descriptions are provided for each property.
  - **AsynchAuditBatchSize**: Stores multiple audit trail messages (across instances) in a single transaction on Oracle Exalogic platforms. For more information, see

[Section 15.5, "Storing Instance and Message Data in Oracle Coherence Distributed Cache on Oracle Exalogic Platforms."](#)

- **BpelcClasspath:** The extra BPEL class path to include when compiling BPEL-generated Java sources. For more information, see Section "How to Add Custom Classes and JAR Files" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
- **DisableAsserts:** Disables the execution of assertions in BPEL, including the bpelx:assert activity. For more information, see Section "How to Disable Assertions" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
- **DisableSensors:** Disables all calls to sensors.
- **DispatcherNonBlockInvokeThreads:** The total number of threads allocated to process nonblocking invocation dispatcher messages. If your system has many nonblocking invokes, the value of this property can be incremented. The default value is 2. Any value less than 1 is automatically changed to the default value.
- **ExecuteCallbacksInOrder:** Preserves BPEL process callbacks in the order of received time of the callback inside the BPEL process service engine (when set to true). For more information, see [Section 13.5, "Preserving the Order of Callback Messages."](#)
- **ExpirationMaxRetry:** The maximum number of times a failed expiration call (wait/onAlarm) is retried before failing.
- **ExpirationRetryDelay:** The delay between expiration retries.
- **InstanceKeyBlockSize:** The size of the block of instance IDs to allocate from the dehydration store during each fetch.
- **MaximumNumberOfInvokeMessagesInCache:** The number of invoke messages stored in the in-memory cache.
- **MaxRecoverAttempt:** The number of automatic recovery attempts to submit in the same recoverable instance. For more information, see [Section 13.4, "Configuring Automatic Recovery Attempts for Invoke and Callback Messages"](#) and [Section 15.5.4, "Configuring the Storage of Multiple Audit Trail Messages in One Transaction."](#)
- **MinBPELWait:** The minimum time duration for a BPEL process to perform a real wait that involves a dehydration. For more information, see Section "Creating a Wait Activity to Set an Expiration Time" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
- **OneWayDeliveryPolicy:** Changes whether one-way invocation messages are delivered.
- **QualityOfService:** Enables or disables Oracle Coherence cache for the BPEL process service engine. For more information, see [Section 15.5.3, "Configuring Oracle Coherence Caching."](#)
- **RecoveryConfig:** Configures automatic recovery of activities and configures clustered environments to use master node recovery scheduling. For more information, see [Section 13.2, "Configuring Automatic Recovery for Oracle BPEL Process Manager"](#) and [Section 13.3, "Configuring Master Node Recovery Scheduling."](#)
- **StatsLastN:** The size of the most recently processed request list. Change this value to a value such as 1000. This enables you to view low level statistics in

the Statistics page. For more information, see [Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics."](#)

- **SyncMaxWaitTime:** The maximum time a request and response operation takes before timing out. For more information about this property, see Section "Specifying Transaction Timeout Values in Durable Synchronous Processes" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
5. Make changes appropriate to your environment.

For more information about Oracle BPEL process tuning and performance parameters, see *Oracle Fusion Middleware Performance and Tuning Guide*.

## 13.2 Configuring Automatic Recovery for Oracle BPEL Process Manager

Oracle SOA Suite provides an automatic recovery feature in Oracle Enterprise Manager Fusion Middleware Control that enables you to configure and recover:

- All activities (for example, wait activities and OnAlarm branches of pick activities) that have an associated expiration date and are scheduled with the SOA Infrastructure to be rescheduled
- All activities that are not complete over a provided threshold time
- All invoke and callback messages that are unresolved

To configure automatic recovery:

1. In the navigator, right-click **soa-infra** and select **SOA Administration > BPEL Properties**.
2. Click **More BPEL Configuration Properties**.
3. In the **Name** column, click **RecoveryConfig**.
4. Expand **RecurringScheduleConfig**.

This section enables you to configure recurring recovery attempts.

5. Set the following properties to values appropriate to your environment, and click **Apply**.

Property	Description
<b>maxMessageRaiseSize</b>	The maximum number of messages to submit for each recurring recovery attempt. Use this property to limit the impact of recovery on the server. This value specifies the maximum number of messages to filter from activity, invoke, and callback queries; that is, 50 messages from each of the activity, invoke, and callback tables.  The default value is 50. A 0 value causes no messages to be selected from the database (effectively disabling recovery).  <b>Warning:</b> Specifying a negative value causes all messages selected from the database to be submitted for recovery. This value can potentially overload your system. Do not specify this value.
<b>startWindowTime</b>	The start time for the daily recovery window, specified in a 24-hour notation. Therefore, 2:00 pm is specified as 14:00. The leading zero does not need to be specified for single digit hour values (1:00-9:00).  The default value is midnight (00:00). Any invalid parsed time value is defaulted to midnight.

Property	Description
<b>stopWindowTime</b>	<p>The stop time for the daily recovery window, specified in a 24-hour notation. Therefore, 2:00 pm is specified as 14:00. The leading zero does not need to be specified for single digit hour values (1:00-9:00).</p>
	<p>If you do not want daily recovery, set the start and stop window times to be the same value. If the stop window time is earlier than the start window time, both the start and stop window times are changed to their respective default values.</p>
	<p>The default value is midnight (04:00), effectively setting recurring recovery to run until 04:00.</p>
	<p>Any invalid parsed time values default to 00:00.</p>
<b>subsequentTriggerDelay</b>	<p>The number of seconds between recovery attempts during daily recurring startup recovery periods. If the next recovery trigger falls outside of the current recovery period, that trigger is not scheduled until the next recurring recovery period (tomorrow).</p>
	<p>The default value is 300 (five minutes). A negative value causes the default to be selected.</p>
<b>threshHoldTimeInMinutes</b>	<p>This is the threshold time in minutes to ignore for automatic recovery processing. For automatic invoke and callback recovery, this value is used for picking messages with a received date less than the threshhold time.</p>
	<p>For automatic activities recovery, this value is used for picking activities with a modification date less than the threshhold time.</p>
	<p>This property prevents the message contention scenario in which a BPEL process service engine picks up a message for recovery while another thread on the service engine is in the middle of processing the message. This property ensures that the recovery part of the service engine only attempts recovery on messages older than the value for <b>threshHoldTimeInMinutes</b>.</p>
	<p>The default value is 10 minutes. A negative value causes the default to be selected.</p>

**6. Expand **StartupScheduleConfig**.**

This section enables you to configure server startup recovery attempts.

**7. Set the following properties to values appropriate to your environment, and click **Apply**.**

Property	Description
<b>maxMessageRaiseSize</b>	<p>The maximum number of messages to submit for each startup recovery attempt. Use this property to limit the impact of recovery on the server. This value specifies the maximum number of messages to filter from activity, invoke, and callback queries; that is, 50 messages from each of the activity, invoke, and callback tables.</p>
	<p>The default value is 50. A negative value causes all messages selected from the database to be submitted for recovery. A zero value causes no messages to be selected from the database (effectively disabling recovery).</p>

Property	Description
<b>startupRecoveryDuration</b>	Specifies the number of seconds that the startup recovery period lasts. After the server starts, it goes into a startup recovery period. During this period, pending activities and undelivered callback and invocation messages are resubmitted for processing. The default value is 600 (ten minutes). A negative or zero value disables startup recovery.
<b>subsequentTriggerDelay</b>	The number of seconds between recovery attempts during the server startup recovery period. If the next recovery trigger falls outside the server startup period, that trigger is not scheduled and the server moves into the recurring recovery period. The default value is 300 (five minutes). A negative value causes the default to be selected.

---

**Note:** In a cluster, it is possible for different nodes to concurrently attempt an automatic recovery of the same items. The first node to lock the item attempts the recovery, while other nodes may raise an exception that can be safely ignored.

---

### 13.3 Configuring Master Node Recovery Scheduling

You can configure a clustered environment to use master node recovery scheduling. In this environment, the master node is dedicated to performing recovery for all nodes in the cluster.

---

**Note:** This feature does not work if you are using a pre-Oracle Fusion Middleware Release 1 (11.1.1.3) database schema.

---

Master node recovery scheduling enables you to perform the following tasks:

- Recover activities with expiration dates (for example, a wait activity or an OnAlarm branch of a pick activity) that are past due. The master node picks expired work items and reschedules them.
- Recover stranded work items
- Recover callback messages
- Recover invoke messages
- Fail over expired activities: When the master node detects a failed node, it tries to reschedule work items that have an expiration date.

To configure master node recovery scheduling:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Right-click **soa-infra**.
3. Select **SOA Administration > BPEL Properties**.
4. Click **More BPEL Configuration Properties**.
5. In the **Name** column, click **RecoveryConfig**.
6. Expand **ClusterConfig**. The **ClusterConfig** properties work in association with the recurring recovery attempt properties and server startup recovery attempt

properties that you set for **RecurringScheduleConfig** and **StartupScheduleConfig**, respectively.

7. Set the following properties to values appropriate to your environment, and click **Apply**.

---

**Note:** Once an instance/message becomes recoverable, a recovery is attempted. However, the number of retries is not tracked. If a recovery fails, it continues to pick the same record, retry, and fail again.

---

Property	Description
<b>clusterDbTimeRefresh</b>	Specifies how often to refresh the local copy of the database time. This takes into account the clock drift on different computers. All nodes in the cluster rely on the database time, regardless of its accuracy.  The default value is 12 hours (specified as 43200 seconds).
<b>heartBeatInterval</b>	Specifies how often a node polls the cluster message table to check for messages published by other nodes in the cluster.  The default value is 5 seconds.  The following tasks are performed each interval: <ul style="list-style-type: none"> <li>▪ Updates the node's last updated time in the <code>cluster_node</code> table.</li> <li>▪ Attempts to claim ownership of the master role.</li> <li>▪ If the master role is claimed, the recovery manager resumes work.</li> <li>▪ Checks for all nodes that have update times not updated for the <b>nodeReapThreshold</b> value, deletes those nodes from the <code>cluster_node</code> table, and reschedules all expiring work items from this node.</li> </ul>
<b>masterAliveThreshold</b>	Specifies the number of seconds a master node is considered to be active. Master nodes that have not checked in with the cluster for this number of seconds are considered to be terminated. Whichever node gets an exclusive lock on the <code>cluster_master</code> table after this point can claim the master role.  The default value is 15 minutes (specified as 900 seconds).
<b>nodeReapInterval</b>	Specifies how often the heartbeat thread is borrowed to mark old cluster nodes. Only the master node performs this job.  The default value is 2 hours (specified as 7200 seconds).
<b>nodeReapThreshold</b>	Specifies the number of seconds a node is considered to be active. Nodes that have not checked in with the cluster for this number of seconds are considered to be terminated. During its heartbeat cycle, the master node tries to clean up the <code>cluster_node</code> table.  The default value is 15 minutes (specified as 900 seconds).

## 13.4 Configuring Automatic Recovery Attempts for Invoke and Callback Messages

You can configure the number of automatic recovery attempts to submit in the same recoverable instance. The value you provide specifies the maximum number of times invoke and callback messages are recovered. If the value is 2 (the default value), it recovers all messages. Once the number of recovery attempts on a message exceeds the specified value, a message is marked as nonrecoverable.

To configure automatic recovery attempts for invoke and callback messages:

1. In the navigator, right-click **soa-infra** and select **SOA Administration > BPEL Properties**.
2. Click **More BPEL Configuration Properties**.
3. Go to **MaxRecoverAttempt**.
4. In the **Value** field, enter a value.

The recovery behavior for invoke and callback messages is different when **MaxRecoverAttempt** is set. For example, assume **MaxRecoverAttempt** is set to 4.

- Invoke message recovery is retried 4 ( $N$ ) times before moving the message to the exhausted state.
- Callback message recovery is retried 5 times ( $N + 1$ ) before moving the message to the exhausted state.

This is the expected behavior. The first attempt is not counted as a recovery attempt. The recovery attempts are incremented by the BPEL process service engine. If **MaxRecoverAttempt** is set to 1, you see one default resolution process and then one recovery attempt.

5. Click **Apply**.

For information about recovering invoke and callback messages, see [Section 15.4, "Performing BPEL Process Service Engine Message Recovery."](#)

## 13.5 Preserving the Order of Callback Messages

You can preserve the order of callback messages in a BPEL process and ensure that they are delivered to the BPEL process instance in the correct order by setting the **ExecuteCallbacksInOrder** property to true in the System MBean Browser.

**ExecuteCallbacksInOrder** enables callbacks to be delivered in the order in which they were received by the BPEL process service engine for a given BPEL process service component instance. This setting impacts all SOA composite applications deployed in the BPEL process service engine.

For information about accessing and configuring the **ExecuteCallbacksInOrder** property, see [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)

## 13.6 Setting the Audit Level at the BPEL Process Service Component Level

You can set the audit level for a BPEL process service component. This setting takes precedence over audit level settings at the SOA Infrastructure, service engine, and SOA composite application levels. The service component level setting is only available for BPEL processes and is *not* supported for the Oracle Mediator, human workflow, and business rule service components.

There are two ways to set the audit level for BPEL process service components. Supported values are **Off**, **Minimal**, **Inherit**, **Development**, and **Production**.

To set the audit level for BPEL process service components:

- In the System MBean Browser of Oracle Enterprise Manager Fusion Middleware Control:
  1. In the navigation tree, expand the **SOA** folder.

2. Right-click **soa-infra**, and select **Administration > System MBean Browser**.
  3. Select **Application Defined MBeans > oracle.soa.config > Server: server\_name > SCAComposite > Composite\_Name > SCAComposite.SCAComponent > BPEL\_Service\_Component > Properties**.
  4. Click the **Add** icon.
  5. Expand the **Element\_number** folder.
  6. From the **many** list, select **false**.
  7. In the **name** field, enter `bpel.config.auditlevel`.
  8. In the **value** field, enter a value.
  9. Click **Apply**.
- In Oracle JDeveloper:
    1. Set the `bpel.config.auditLevel` property to an appropriate value in the `composite.xml` file of your SOA project.

```
<component name="BPELProcess">
 <implementation.bpel src="BPELProcess.bpel" />
 <property name="bpel.config.auditLevel">Off</property>
</component>
```

For more information about audit levels, see [Section 1.4.1.1, "Introduction to the Order of Precedence for Audit Level Settings."](#)

---

## Monitoring BPEL Process Service Components and Engines

This chapter describes how to monitor BPEL process service components and service engines, including monitoring the audit trail and process flow; service component and service engine instances and faults; fault, activity, and variable sensor data; service engine requests and thread performance statistics; deployed BPEL process service components; and time a request spends in the service engine.

This chapter includes the following sections:

- [Section 14.1, "Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component"](#)
- [Section 14.2, "Monitoring BPEL Process Service Component Recent Instances and Faults"](#)
- [Section 14.3, "Monitoring BPEL Process Service Component Instances"](#)
- [Section 14.4, "Monitoring Fault, Activity, and Variable Sensor Data in BPEL Process Service Components"](#)
- [Section 14.5, "Monitoring BPEL Process Service Engine Instances and Faults"](#)
- [Section 14.6, "Monitoring BPEL Process Service Engine Request and Thread Performance Statistics"](#)
- [Section 14.7, "Monitoring BPEL Process Service Engine Instances"](#)
- [Section 14.8, "Monitoring Deployed BPEL Process Service Components in the Service Engine"](#)
- [Section 14.9, "Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine"](#)

For conceptual information about service components and service engines, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)
- [\*Oracle Fusion Middleware Performance and Tuning Guide\*](#)

## 14.1 Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component

This section describes how to view the audit trail and process flow of a BPEL process service component in a SOA composite application instance.

---

**Note:** This section assumes a SOA composite application instance has been initiated. If not, see [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#) for instructions.

---

To view the audit trail and process flow of a BPEL process service component:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

The Dashboard page for the selected composite application appears.

2. Use one of the following methods to select an instance of the application:
  - For recent instances of this application, click the instance number of an instance in the **Instance ID** column of the **Recent Instances** section.
  - For all instances of this application, click the **Instances** tab, then click a specific instance in the **Instance ID** list.

The Flow Trace page displays the following details:

- The **Faults** section shows the faults occurring in the services, service components, and references that comprise the SOA composite application. Sensors enable you to monitor BPEL process activities, variables, and faults during runtime. Selecting a fault highlights the row in the **Trace** section in which the fault occurred. Closing the fault clears the selection in the **Trace** section.
- The **Sensors** section displays details about composite sensors included in the service and reference binding components of the SOA composite application. The total number of sensors is shown in the section header. Composite sensors can be added to service and reference binding components and service components that have subscribed to business events during design time in Oracle JDeveloper. Selecting a composite sensor in this section highlights the service or reference in the **Trace** section in which composite sensor data was collected. Closing the sensor clears the selection in the **Trace** section.

---

**Note:** Expand the **Faults** or **Sensors** sections one at a time. The fault or sensor information is only displayed for viewing in this way.

---

- The **Trace** section shows the sequence of the message flow through the services, service components, and references that comprise the SOA composite application.

The flow trace is a runtime trail of a message flow identified by an execution context ID (ECID) that is displayed in the upper right-hand corner of the page. An ECID enables you to track a message flow that crosses instances of different composite applications. The flow trace lists all services, references, and components across composite applications participating in the flow.

**Flow Trace**

This page shows the flow of the message through various composite and component instances. ECID f57364c1829af6ab:6aa6f563:13a7869390e:-8000-00000000  
Started Oct 20, 2012 7:41:07 PM

**Faults (0)**

**Faults**  
Select a fault to locate it in the trace view.

Error Message	Recovery	Fault Time	Fault Location	Composite Instance
No faults found				

Sensors (3)

**Trace**  
Click a component instance to see its detailed audit trail.  
Show Instance IDs

Instance	Type	Usage	State	Time	Composite Instance
orderprocessor_client_ep	Web Service	Service	Completed	Oct 20, 2012 7:41	OrderBookingComposite
└ OrderProcessor	BPEL Component		Running	Oct 20, 2012 7:41	OrderBookingComposite
└ StoreFrontService	Web Service(Local Invocation)	Referer	Completed	Oct 20, 2012 7:41	OrderBookingComposite
└ StoreFrontService	Web Service(Local Invocation)	Service	Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5
└ CustomerAndOrderService	BPEL Component		Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5
└ StoreFrontService	Web Service(Local Invocation)	Referer	Completed	Oct 20, 2012 7:41	OrderBookingComposite
└ StoreFrontService	Web Service(Local Invocation)	Service	Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5
└ CustomerAndOrderService	BPEL Component		Completed	Oct 20, 2012 7:41	OrderSDOComposite of 5
└ CreditCardAuthorizationService	Web Service	Referer	Completed	Oct 20, 2012 7:41	OrderBookingComposite
└ RequiresApprovalRule	Decision Service Component		Completed	Oct 20, 2012 7:41	OrderBookingComposite
└ ApprovalHumanTask	Human Workflow Component		Running	Oct 20, 2012 7:41	OrderBookingComposite

For the flow example in the **Trace** section, the service binding component, service components, and reference binding component involved in the flow have successfully received and processed messages.

3. Select a fault in the **Faults** section.
- This highlights the row in the **Trace** section in which the fault occurred.
4. Close the fault to clear the selection in the **Trace** section.
  5. Expand the **Sensors** section to display composite sensors.

**Flow Trace**

This page shows the flow of the message through various composite and component instances. ECID f57364c1829af6ab:6aa6f563:13a7869390e:-8000-00000000  
Started Oct 20, 2012 7:41:07 PM

**Faults (0)**

**Sensors (3)**

**Sensors**  
Composite Sensors for this flow.

Composite Instance	Sensor Name	Value	Location	Action
50034	OrderProcessingStart	Order 1003	orderprocessor_client_ep	process
50034	CreditCardAuthResultSensor	APPROVED	CreditCardAuthorizationService	AuthorizeCredit
50037	AssignedUserForApprovalSensor	<a href="#">View XML...</a>	BAM_ProcessTimeDO_ECID	writetoBAM

6. Select a sensor in the **Sensors** section.

This highlights the row in the **Trace** section in which the composite sensor data was collected.

If there are BPEL process messages that require recovery from the Recovery page of the BPEL process service engine, a **BPEL Message Recovery Required** inline warning message and recovery icon are displayed.

Instance	Type
Mediator1_ep	Web Service
Mediator1	Mediator Component
BPELProcess1	BPEL Component
BPELProcess2	BPEL Component
FileWrite	JCA Adapter

- Click **Show Details** or the recovery icon to display a Warning dialog with the following recovery details:
  - The number of invoke, callback, and activity recoverable message types
  - The ECID value

**Warning**

**BPEL Message Recovery Required**

This flowtrace contains BPEL messages pending recovery. To view and recover these messages, navigate to the Recovery tab on the BPEL Service Engine home page.

Invoke: 0  
Callback: 1  
Activity: 0

To locate these messages in the BPEL Recovery tab, select message type and filter by this ECID:  
53aa6c8f0050dff7:631d71e:12eb9caf6df:-8000-0000000000006e6f

Use this information for creating search criteria for filtering the recoverable messages on the Recovery page of the BPEL process service engine. You can copy the ECID number from the Warning dialog, paste it into the **ECID** field, and select the recoverable message type from the **Type** list. For more information about creating search criteria with the ECID number in the Recovery page, see [Section 15.4, "Performing BPEL Process Service Engine Message Recovery."](#)

The display of this message recovery information on the Flow Trace page is controlled by the **AuditConfig** property in the System MBean Browser. By default, this property is set to **All**, which enables this information to be displayed. To prevent this information from displaying on the Flow Trace page, set the **bpelRecoveryStatus** key to **Off** for the **AuditConfig** property in the **More SOA Infra Advanced Configuration Properties** section of the SOA Infrastructure Common Properties page. For more information, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

Note the following restrictions with ECIDs:

- A separate ECID is displayed for each instance of a composite application and not for the composite level ECID that can track the complete flow of any instances for the composite application.

- To get complete flow information, you must find the composite level ECID in the log files. Use that value to get all information for a particular composite and therefore all its executed instances.
  - ECIDs are not propagated through business events. This can limit the amount of logging information that is collected. For example, if you publish an event that is subscribed to in the same composite application, limited logging information is available.
8. In the **Instance** column of the **Trace** section, click a specific BPEL process service component instance. Service component instances can be accessed from this section; services and references cannot be accessed.

The Instance page appears.

The screenshot shows the 'Instance of OrderProcessor' page under 'Flow Trace'. The top navigation bar includes 'Audit Trail', 'Flow', 'Sensor Values', and 'Faults'. The 'Audit Trail' tab is selected. The page displays a hierarchical log of BPEL process steps:

- process**: Received "process" call from partner "orderprocessor\_client\_ep".
- main (192)**: Contains **receiveInput** and **Scope RetrieveOrder (199)**.
  - receiveInput**: Occurred on Oct 20, 2012 at 7:40:57 PM.
  - Scope RetrieveOrder (199)**: Contains **sequence**.
    - findOrderId**: Occurred on Oct 20, 2012 at 7:40:57 PM.
    - Assign \_IVariableForSensor**: Occurred on Oct 20, 2012 at 7:40:57 PM. Updated variable "ITmpOrderInfoVariable".
    - Completed assign**: Occurred on Oct 20, 2012 at 7:40:57 PM.
- Scope RetrieveCustomerForOrder (219)**: Contains **sequence**.
  - AssignCustomerId**: Occurred on Oct 20, 2012 at 7:40:57 PM. Updated variable "IFindCustomerInfo\_InputVariable".
  - Multiple entries for **AssignCustomerId** (Oct 20, 2012 at 7:40:57 PM) show updated variables: "IFindCustomerInfo\_InputVariable", "IFindCustomerInfo\_InputVariable", "IFindCustomerInfo\_InputVariable", "IFindCustomerInfo\_InputVariable", "IFindCustomerInfo\_InputVariable".
  - Completed assign**: Occurred on Oct 20, 2012 at 7:40:57 PM.
- InvokeFindCustomer**: Started invocation of operation "findCustomerInfoVO1CustomerInfoVOCriteria" on partner "StoreFrontService".

Use these four pages to view the audit trail, flow, sensor values, and faults of a BPEL process service component instance. The following links provide additional details about the instance:

- **Flow Trace link:** Click the breadcrumbs in the upper left-hand corner of the page to access the flow trace for the ECID (composite instance) that contains this BPEL component instance.
- **Information icon:** Click the information icon to the right of the name of the BPEL component (in the page title) to see biographical information about this BPEL instance. This information includes a summary of the instance, including instance ID, ECID, instance startup time or last modification time, instance state (for example, running), and number of faults.

This icon is only displayed on the Audit Trail pages of BPEL processes and Oracle Mediators, and not on the pages of human tasks and business rules.

- **Audit Level Settings:** Click to display information details, such as the audit level used by this instance.
- **View Raw XML:** Click to display the raw XML of the audit trail.

The Audit Trail page displays execution details about the activities in the BPEL process.

9. Scroll through the audit trail to check for errors and expand the payload links to view their contents at a given point in the flow.
- 

#### Notes:

- Canceled onMessage branches of pick or scope activities that did not execute are displayed in the audit trail. However, the flow diagram does not show these same canceled onMessage branches. This is the expected behavior.
- The following error message appears when a transaction is displayed as rolled back in the Audit Trail page:

The transaction was rolled back. The work performed for bpel instance "instance\_number" was rolled back to the previous dehydration point, but the audit trail has been saved.

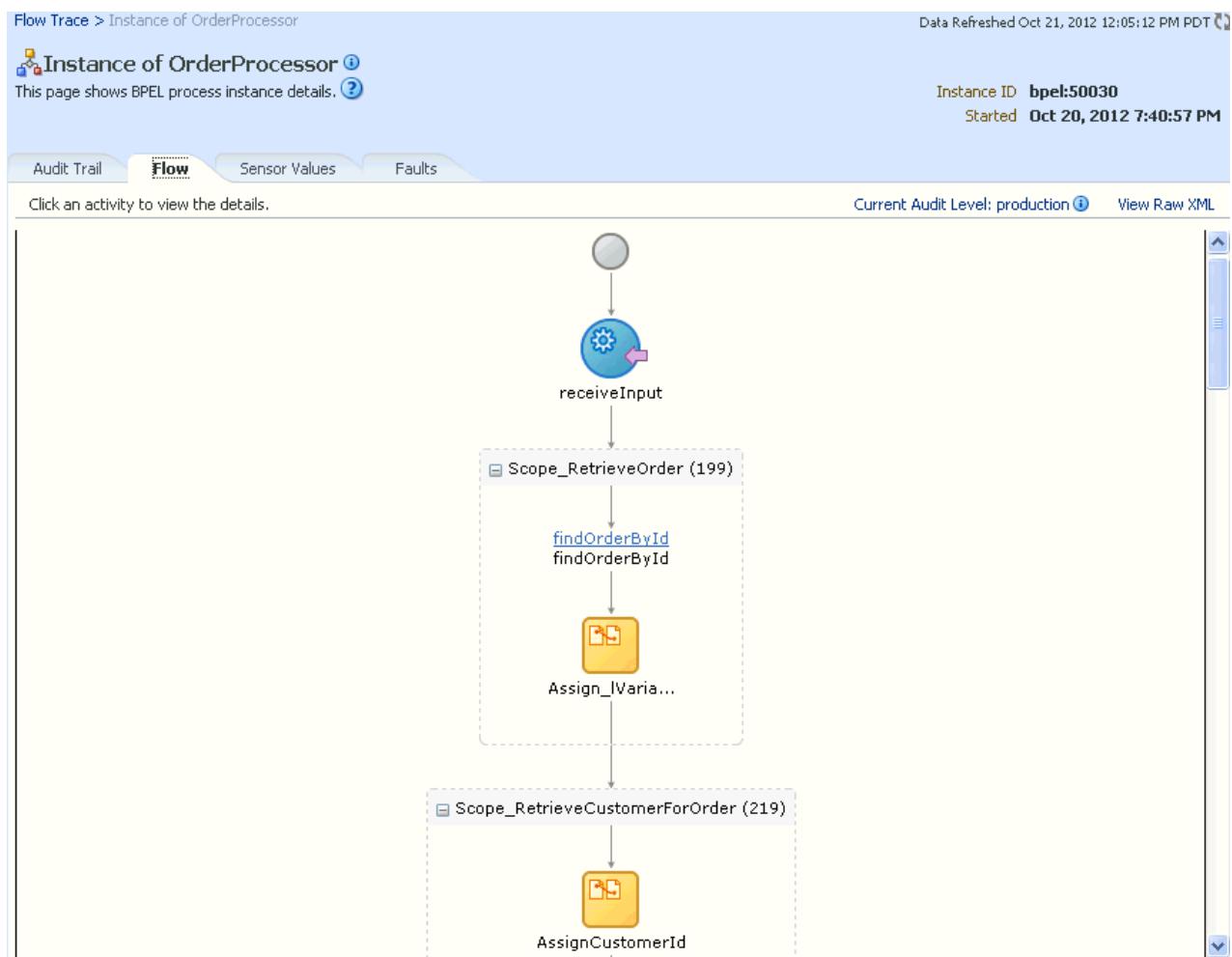
You can recover the instance from the recovery console by resubmitting the callback message or activity for execution

This message does not specifically state whether recovery should happen on either the activity or the callback. This is the intended behavior. Oracle recommends that you do not recover each instance through the audit messages. Instead, set up automatic recovery to recover these instances.

---

10. Click the **Flow** tab.

A flow diagram of the BPEL process activities appears. This flow diagram shows a fault highlighted in a BPEL process activity.



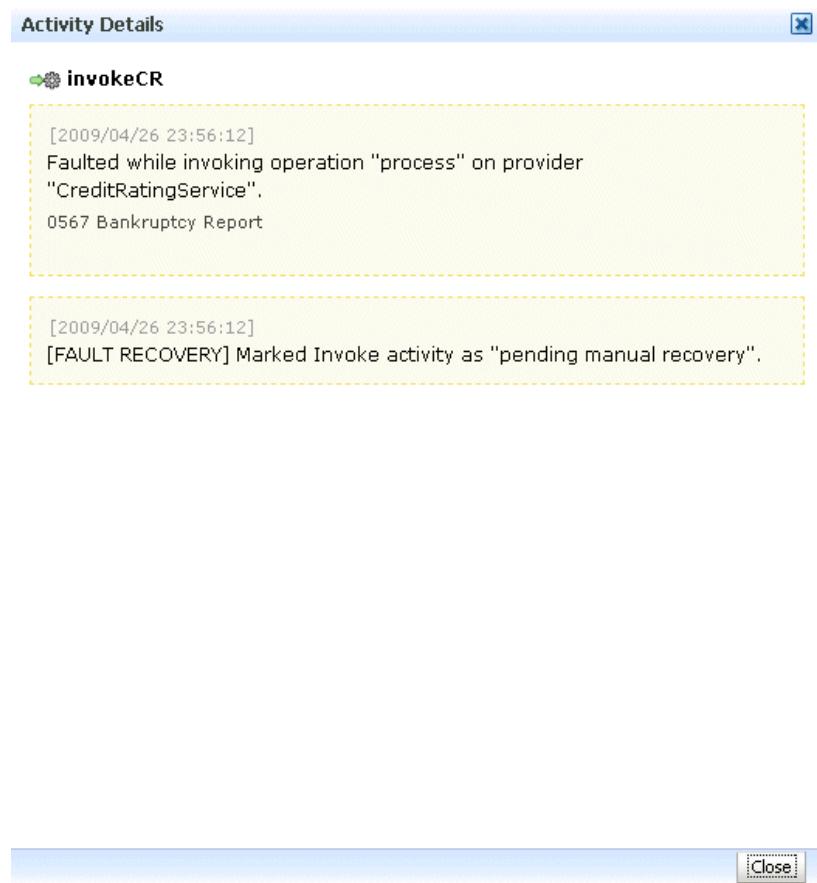
11. Click an activity to view the flow of the payload through the process.

---

**Note:** If using Microsoft Internet Explorer, you can click **Copy details to clipboard** to copy the activity details to the clipboard. If using Mozilla Firefox, this link does not appear. Instead, you must manually select the text, and copy and paste it to a file.

---

12. Scroll through the flow diagram to check for errors and click a highlighted activity to view error messages.



**13.** Close the message.

**14.** Click the **Faults** tab.

This page shows the error message, whether you can recover from the fault, the time at which the fault occurred, and the activity in which the fault occurred. This page displays the faults in the BPEL component instance (but not the faults that occurred in a service or reference binding component).

If a fault occurs when processing activities, the activity location of the fault is not usually shown in the **Activity** column.

- For Oracle BPEL Process Manager, this column only shows a receive activity that has timed out. In all other cases, this column is empty.
- For Oracle BPM, this column is always empty.

This is the expected behavior.

You can recover from instance faults identified as recoverable. This page lists all instance faults, recoverable or not. The component instance faults that occurred in a service or reference are not listed here.

This page enables you to target individual faults from which to recover, and provides a degree of fault recovery granularity not available on other pages.

The screenshot shows the 'Flow Trace > Instance of OrderProcessor' page. At the top right, it says 'Data Refreshed Oct 21, 2012 12:05:12 PM PDT'. Below that, 'Instance ID: bpel:50030' and 'Started: Oct 20, 2012 7:40:57 PM'. The 'Faults' tab is selected. A message at the top states: 'This page lists all faults that have occurred in this component instance. If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance and attempts to recover the fault.' Below this, there's a table with columns: Error Message, Recovery, Fault Time, and Activity. The table is empty with the message 'No Faults found'.

However, you cannot perform bulk fault recoveries on this page. To perform bulk fault recovery, use one of the following pages:

- Faults and Rejected Messages page of a specific SOA composite application or of the SOA Infrastructure
  - Faults page of the BPEL process service engine or of a specific BPEL process service component
- 15.** Select a fault for recovery that has been identified as recoverable through one of the following methods. The page refreshes to display a fault recovery section at the bottom of the page.
- If you click a fault in the **Error Message** column, a popup message displays details about the fault, including the fault ID, fault time, fault location, fault type, and complete error message text. If the fault is identified as recoverable, a clickable **Recover Now** button is displayed.
  - You click a fault identified as recoverable in the **Recovery** column.
- 16.** Select an action from the **Recovery Action** list.

Action	Description
<b>Retry</b>	Retries the instance with an option to provide a retry success action. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope activity again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault. BPEL fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).

Your selection causes additional fields to appear. For example, the following fields are displayed if you select **Rethrow**:

**Recover Fault: default/FaultFlow!1.0\*c9b27cb0-d239-4290-a85e-a81660476134/FaultFlow/10-BpInv0-BpSwt0.10**

Choose one of the available recovery options, modify the variable information as appropriate, and click "Recover".

Recovery Action	<input type="button" value="Retry"/>	After Successful Retry	<input type="button" value="None"/>
Variable	<input type="button" value="crInput"/>		
Value	<ssn xmlns="http://services.oten.com">0567</ssn>		

17. Use the **After Successful Retry** list to select defined actions to invoke after a successful retry. If you select a variable in the **Variable** list, you can edit the value in the **Value** text box.
18. Click the **Back** button of your browser to exit the flow diagram.

#### 14.1.1 Replay Activity Is Displayed as Faulted Even Though No Fault Occurred

When a replay activity in a BPEL process is invoked, it is displayed as faulted under the **Faults** tab of the BPEL process instance, even though an actual fault did not occur.

This is the expected behavior. The fault is displayed because the BPEL process service engine is re-executing the scope activity. When you add a replay activity to a BPEL process, the internal implementation of `<bpelx:replay name="replay_name" />` uses the underlying BPEL fault `<throw faultName="bpelx:replay" />`.

Because the service engine executes the activity by throwing a fault and builds an implicit catch block for the enclosing scope activity, this fault is displayed.

#### 14.1.2 Flow Traces for Composite-to-Composite Invocations on Multiple Servers

When you have multiple SOA composite applications on multiple servers invoking one another, the BPEL process flow trace cannot be rendered to show the correct parent-child relationship. For example, assume you have the following scenario:

- Composite 1 invokes composite 2, which invokes composite 3.
- Each composite includes a BPEL process service component.
- Composite 1 and composite 3 are on server 1, while composite 2 is on server 2.

In this environment, the parent ID of component 3 is set to component 2. However, because composite 2 is on a separate server, the flow trace does not show composite 3 as having a parent. Therefore, composite 3 is placed at the root of the flow trace.

#### 14.1.3 Monitoring BPEL 2.0 Activities in the Audit Trail and Process Flow

You can view the audit trail and process flow for BPEL process service component instances that support version 2.0 of the BPEL specification. The following BPEL 2.0 activities can be viewed:

- Process structural flow-related activities: These activities are similar to other workflow or programming languages for sequencing, iteration, and branching:

- forEach: This activity is the same as the Oracle extension flowN activity in BPEL 1.1. This activity supports processing multiple sets of activities in both parallel and serial fashion.
- if: This activity is the same as the switch activity in BPEL 1.1.
- repeatUntil: This activity provides for repeated execution of a contained activity until the given Boolean condition evaluates to true.
- Exception handling and recovery activities:
- compensateScope: This activity starts compensation on a specified inner scope that has completed successfully.
- rethrow: This activity rethrows the fault that was originally caught by the immediately enclosing fault handler.
- Other activities
- exit: This activity is the same as the terminate activity in BPEL 1.1.
- dehydrate: This activity enables you to dehydrate an instance. This activity is also available in BPEL 1.1.

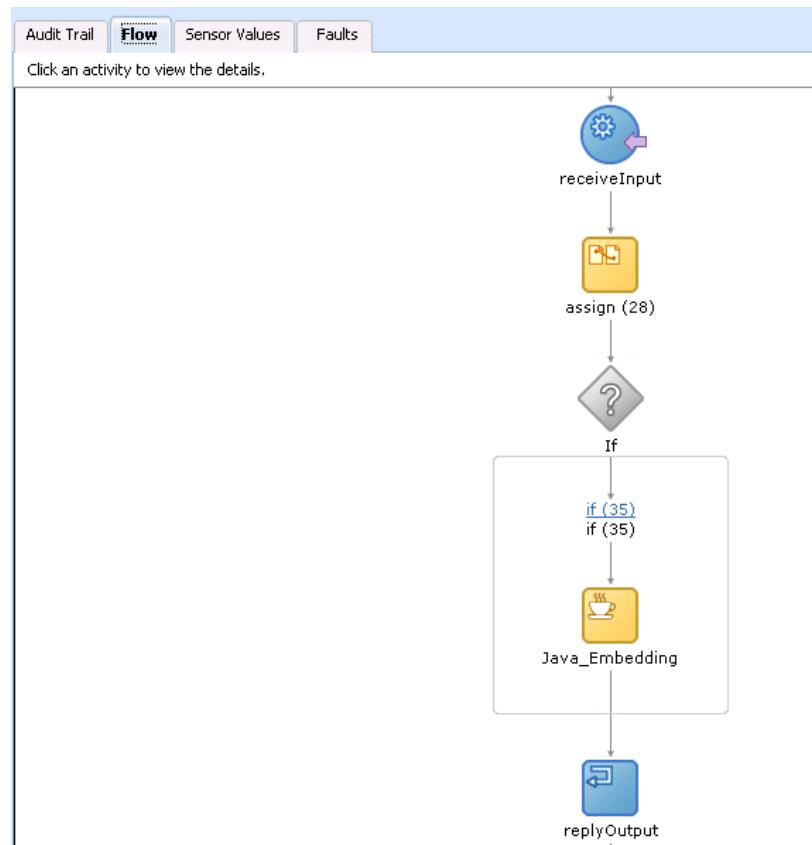
For example, [Figure 14–1](#) shows an **if** activity in the audit trail of a BPEL process.

**Figure 14–1 if Activity in the Audit Trail of a BPEL Process**

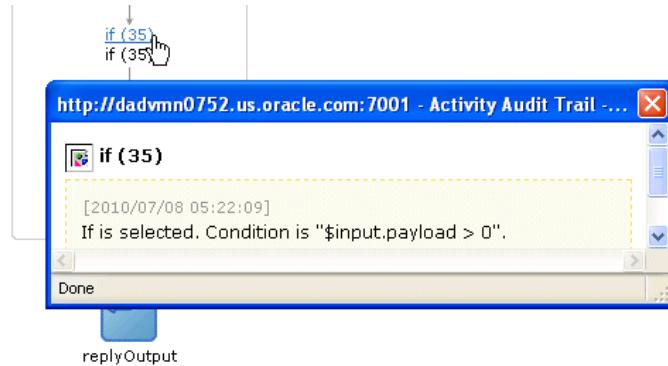
The screenshot displays the Audit Trail interface for monitoring BPEL process activity. The top navigation bar includes tabs for Audit Trail, Flow, Sensor Values, and Faults. Below the navigation is a search bar with the placeholder "Expand a payload node to view the details." The main content area shows a hierarchical tree of process steps:

- <process>
  - <sequence>
    - receiveInput
      - Jul 8, 2010 5:22:09 AM Received "process" call from partner "client"
      - <payload>
    - assign (28)
      - Jul 8, 2010 5:22:09 AM Updated variable "output"
      - <payload>
    - Completed assign
  - if(35)
    - if (35)
      - Jul 8, 2010 5:22:09 AM If is selected. Condition is "\$input.payload > 0".
      - Java\_EMBEDDING
        - Jul 8, 2010 5:22:09 AM bpelx:exec executed
  - replyOutput
    - Jul 8, 2010 5:22:09 AM Reply to partner "client".
    - <payload>
  - Jul 8, 2010 5:22:09 AM BPEL process instance "20931" completed

[Figure 14–2](#) shows the same **if** activity in the flow of the BPEL process.

**Figure 14–2 if Activity in the Flow of a BPEL Process**

Clicking the **if** activity displays the condition defined for this activity.

**Figure 14–3 if Activity Condition**

For more information about BPEL 2.0, see the *Web Services Business Process Execution Language Version 2.0* specification located at the following URL:

<http://www.oasis-open.org>

For more information about designing BPEL process service components that support version 2.0 of the BPEL specification, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## 14.2 Monitoring BPEL Process Service Component Recent Instances and Faults

You can monitor recent instances and faults for BPEL process service components. Each service component in a SOA composite application has its own instance ID. These IDs are different from the overall instance ID of the SOA composite application of which each service component is a part.

To monitor BPEL process service component instances and faults:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

- In the **Component Metrics** section, select the BPEL process service component.
- Click **Dashboard**.

The upper part of the Dashboard page displays the following details:

- Recent instances of the BPEL process service component, including the instance ID, the state of the instance (for example, completed successfully or faulted), the start time, the last modification time, and the logs describing the instance.
- Recent faults in the BPEL process service component, including the error message, whether you can recover from the fault, the time at which the fault occurred, the instance ID of the BPEL service component, the BPEL activity in which the fault occurred, and the logs describing the fault.
- The average processing time for each activity in the BPEL process service component.

The screenshot shows the Oracle SOA Suite Dashboard for the 'OrderBookingComposite [1.0]' application. At the top, there are tabs for 'Instances', 'Faults and Rejected Messages', 'Unit Tests', and 'Policies'. The 'Instances' tab is selected. Below it, the 'Recent Instances' section displays two running instances: one completed instance (ID 50037) and one active instance (ID 50034). The 'Recent Faults and Rejected Messages' section shows no faults found.

Instance ID	Name	Conversation ID	Instance State	Start Time
50037		urn:BE476D101B2811	Completed	Oct 20, 2012 7:41:07 PM
50034		urn:uuid:79a072e6-9	Running	Oct 20, 2012 7:40:56 PM

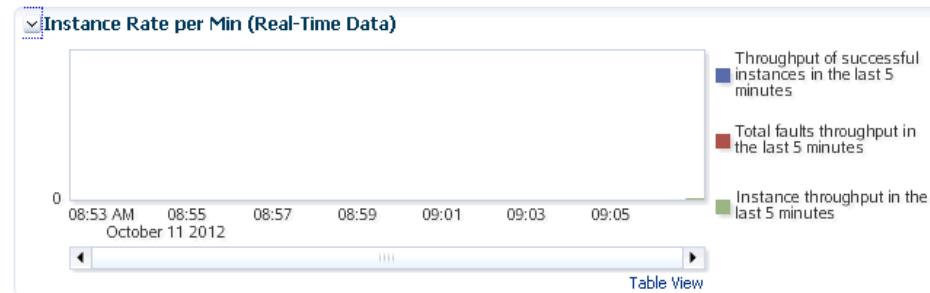
4. In the **Recent Instances** section, perform the following tasks:
  - a. In the **Instance ID** column, click an instance ID for a service component to view its audit trail, process flow, sensor values, and faults.
  - b. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - c. Click **Show More** below the section to access the Instances page of the service component.
5. In the **Recent Faults and Rejected Messages** section, perform the following tasks:
  - a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery.
  - b. In the **Recovery** column, click a fault identified as **Recoverable** to perform fault recovery at the component instance level.
  - c. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - d. Click **Show More** below the section to access the Faults page of the service component.

The lower part of the Dashboard page displays the following details:

- Details about the time distribution for activities, including the activity name, the total number of activities for all instances, and the average execution time.

Name	Count	Average Execution Time (ms)
Throw_1	0	0.000
receiveInput	2	0.001
Assign1	2	0.013

- A graphical representation of the number of successful, faulted, and incoming (pending) instances of the BPEL process service component over a specific time range. Click **Table View** to display throughput details for the last five minutes, including the throughput for successful instances, the total faults throughput, and the instance throughput.



For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#) and [Oracle Fusion Middleware Administrator's Guide](#) for details about viewing and searching log files.

## 14.3 Monitoring BPEL Process Service Component Instances

You can monitor BPEL process service component instances. Each service component has its own unique instance ID. This ID is in addition to the instance ID of the overall SOA composite application of which this service component is a part.

To monitor BPEL process service component instances:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

- Select the BPEL process service component in the **Component Metrics** section.
- Click **Instances**.

The Instances page displays the following details:

- A utility for searching for a specific BPEL service component instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- BPEL process service component instances, including the instance ID, instance state (for example, completed or faulted), instance start time, last instance modification time, and log files describing the instance.

Instance ID	State	Start Date	Last Modified Date	Logs
bpel:10007	Faulted	Oct 10, 2012 3:06:09 PM	Oct 10, 2012 3:06:09 PM	

- In the **Instance ID** column, click an instance ID for a service component to view its audit trail, process flow, sensor values, and faults.
- In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 14.4 Monitoring Fault, Activity, and Variable Sensor Data in BPEL Process Service Components

You can view the fault, activity, and variable sensor data of a BPEL process service component. You design sensors in BPEL processes and trackable fields in Oracle JDeveloper. Sensors enable you to monitor BPEL process activities, variables, and faults during runtime.

To monitor sensor data and values in BPEL process service components:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

2. Use one of the following methods to select an instance of the application:
  - For recent instances of this application, click the instance number of an instance in the **Instance ID** column of the **Recent Instances** section.
  - For all instances of this application, click the **Instances** tab, then click a specific instance in the **Instance ID** column.

The Flow Trace page appears.

3. Click a specific BPEL process service component in the **Instance** column of the **Trace** section.
4. Click the **Sensor Values** tab.
5. Select a sensor to view details.

If you created JMS sensors in your BPEL process, JMS sensor values are not displayed in Oracle Enterprise Manager Fusion Middleware Control. Only sensor values in which the sensor action is to store the values in the database appear (for example, database sensor values).

Flow Trace > Instance of OrderProcessor

Instance of OrderProcessor [?](#)  
This page shows BPEL process instance details. [?](#)

Data Refreshed Oct 21, 2012 12:51:44 PM PDT [↻](#)

Instance ID **bpel:50030**  
Started Oct 20, 2012 7:40:57 PM

Audit Trail Flow **Sensor Values** Faults

Select a sensor to view its values.

**Activity Sensors**

Sensor	Activity
No sensor data available.	

**Variable Sensors**

Sensor	Variable
No sensor data available.	

**Fault Sensors**

Sensor	Fault
No sensor data available.	

**Sensor Values**

Sensor	Type

For more information about sensors, see Chapter "Using Oracle BPEL Process Manager Sensors" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

#### 14.4.1 Behavior of Activity Sensors in Compensate and CompensateScope Activities in BPEL 2.0

Assume you have an activity sensor in a BPEL 2.0 compensateScope activity with the evaluation time set to completion and have also configured the activity's variable sensor to point to a variable. You may expect that when the sensor is triggered, the compensation activity completes and the variable shows the state that it is in at the completion of the compensation activities.

However, note that the compensateScope activity (and also a compensate activity) ends immediately after passing control to the compensation activities. As a result, the activity's variable sensor shows the state that it is in at the beginning of the compensation activities, rather than at the end.

This is the expected behavior.

As a workaround for obtaining the variable state upon completion of compensation, add an empty activity after the compensate or compensateScope activity and set the activity sensor on the empty activity with an evaluation time set to activation.

## 14.5 Monitoring BPEL Process Service Engine Instances and Faults

You can monitor instances and faults of all BPEL process service components running in the BPEL process service engine. These BPEL process service components can be part of separate SOA composite applications.

To monitor BPEL process service engine instances and faults:

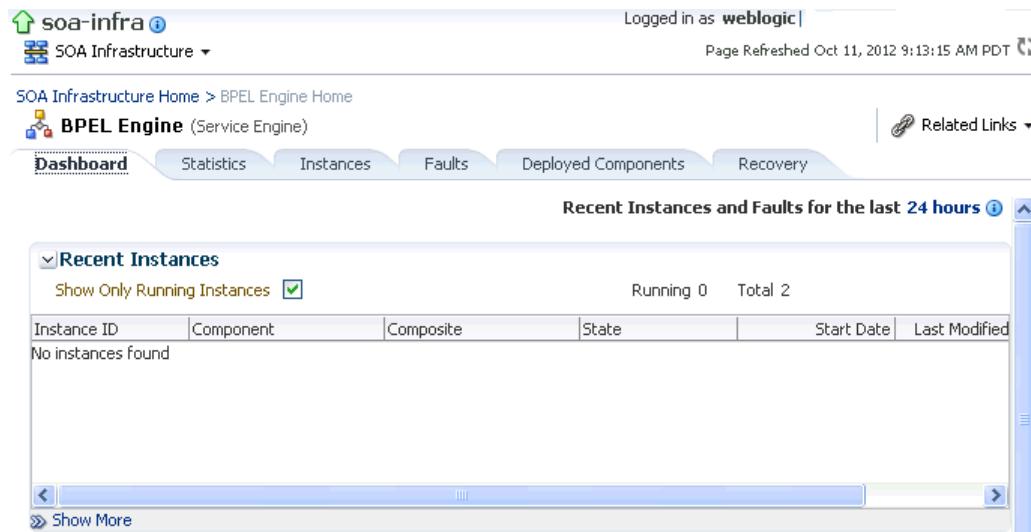
- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPEL.	1. Right-click soa-infra. 2. Select Service Engines > BPEL.

- Click Dashboard.

The upper part of the Dashboard page displays the following details:

- A message indicating that the retrieval of recent instances and faults that are displayed on this page is restricted to the specified time period. This message is displayed if the **Restrict display of instances and faults to the last time period** checkbox is selected on the SOA Infrastructure Common Properties page (it is selected by default). The default time period value is 24 hours, but you can change this value. If this checkbox is not selected, all instances and faults (including count metrics) for this service engine since the last purging are displayed.
- Recent instances of all BPEL process service components running in the BPEL process service engine, including the instance ID of the service component, the service component name, the SOA composite application of which the service component is a part, the state of the instance (for example, completed successfully or faulted), the instance start time, the last modification time, and the logs describing the instance.



The screenshot shows the Oracle SOA Infrastructure BPEL Engine Home page. At the top, there's a header with the user logged in as 'weblogic' and the date 'Page Refreshed Oct 11, 2012 9:13:15 AM PDT'. Below the header, the navigation bar includes 'SOA Infrastructure Home > BPEL Engine Home' and 'BPEL Engine (Service Engine)'. The main content area has tabs for 'Dashboard', 'Statistics', 'Instances', 'Faults', 'Deployed Components', and 'Recovery'. The 'Instances' tab is currently selected. A sub-section titled 'Recent Instances and Faults for the last 24 hours' is displayed. It includes a table with columns: Instance ID, Component, Composite, State, Start Date, and Last Modified. A checkbox 'Show Only Running Instances' is checked. The table shows 'Running 0' and 'Total 2'. Below the table, a message says 'No instances found'. At the bottom of the table, there are 'Show More' and 'Show Less' buttons.

- In the **Recent Instances** section, perform the following monitoring tasks:

- Click the **Number of Instances** link to display a message showing the numbers of running and total instances for this service engine. The link is not displayed by default. To enable this link to be displayed, select the **Disable fetching of instance and fault count metrics**. Each metric can still be

**retrieved on demand** checkbox in the SOA Infrastructure Common Properties page.

If you selected the **Restrict display of instances and faults to the last time period** checkbox on the SOA Infrastructure Common Properties page and specified a time period or accepted the default value, the number of running and total instances for this service engine for that time period are displayed. If you did not select this checkbox, all instances and faults for this service engine since the last purging are displayed. Click **Recalculate** to recalculate the numbers.

- b. In the **Instance ID** column, click an instance ID for a service component to view its audit trail, process flow, sensor values, and faults.
- c. In the **Component** column, click a specific service component to access its home page.
- d. In the **Composite** column, click a specific SOA composite application to access its home page.
- e. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
- f. Click **Show More** below the section to access the Instances page of the service engine.

The lower part of the Dashboard page displays the following details:

- The service components running in the service engine, the SOA composite applications of the service components, the state of the applications (for example, running), and the total, running, and faulted instances in the service engine.
- The recent faults in the service engine, including the error message, whether you can recover from the fault, the time at which the fault occurred, the SOA composite application in which the fault occurred, the service component, the instance ID of the service component, the activity in which the fault occurred, and the log files describing the fault.

The screenshot shows the Oracle SOA Suite Dashboard. The top section, 'Components', lists various service components and their status. The bottom section, 'Recent Faults', lists a single fault entry.

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances	
					Recoverable	Non Recoverable
ExternalPartnerSupplier	PartnerSupplierComposite [1.0]		0	0	0	0
FaultCodeBPELProcess	FaultCodeBPELProcess [1.0]		1	0	0	0
BPELProcess1	HelloWorldProj [1.0]		0	0	0	0
BPELProcess1	TestClientWSBPELMEDWS [2.0]		0	0	0	0
CustomerAndOrderService	OrderSDOComposite [1.0]		0	0	0	0

**Show More**

Recent Faults							
Show only system faults <input checked="" type="checkbox"/>							
Error Message	Recovery	Fault Time	Composite	Component	Component Instance ID	Activity	Logs
<bpelFault><faultType>0</>		Oct 10, 2012 3:06:09 PM	FaultCodeBPELProcess		FaultCodeBPELProcess:10007		

4. In the **Components** section, perform the following tasks:
  - a. In the **Name** column, click a specific service component to access its home page.
  - b. In the **Composite** column, click a specific SOA composite application to access its home page.

- c. Click **Show More** below the section to access the Deployed Components page of the service engine.
5. In the **Recent Faults** section, perform the following tasks:
- a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery.
  - b. In the **Recovery** column, click a fault identified as **Recoverable** to perform fault recovery at the component instance level.
  - c. In the **Composite** column, click a specific SOA composite application to access its home page.
  - d. In the **Component** column, click a specific service component to access its home page.
  - e. In the **Component Instance ID** column, click an instance ID for a service component to view its audit trail, process flow, sensor values, and faults.
  - f. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that fault.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 14.6 Monitoring BPEL Process Service Engine Request and Thread Performance Statistics

You can monitor request and thread performance statistics for all BPEL process service components running in the service engine.

To monitor BPEL process service engine request and thread performance statistics:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Service Engines &gt; BPEL</b> .	1. Right-click <b>soa-infra</b> . 2. Select <b>Service Engines &gt; BPEL</b> .

2. Click **Statistics**.

The **Pending Requests** and **Active Requests** sections of the Statistics page display the following details. Click the **Help** icon for additional details.

- Pending requests in the service engine
- Active requests in the service engine
- Thread statistics for the service engine

**Pending Requests**

Last scheduled request value

- Activity Execution Request
- BPEL Process Management Requests
- New Instance Requests
- Low Level System Requests
- Delivery Service Requests

**Active Requests**

Last active request value

- Activity Execution Request
- BPEL Process Management Requests
- New Instance Requests
- Low Level System Requests
- Delivery Service Requests

**Thread Statistics**

Name	Statistics
Active threads	0
Highest number of active threads	1

The **Request Breakdown** part of the Statistics page displays details about the count and minimum, maximum, and average request processing times.

Name	Count	Min Request Processing Time (ms)	Max Request Processing Time (ms)	Avg Request Processing Time (ms)
eng-composite-request	407	4.000	23,021.000	682.470
eng-single-request	620	0.000	23,021.000	553.500
load-workitem	212	2.000	435.000	34.910
load-wi-datasource	212	-1.000	27.000	1.200
eng-callback	212	0.000	408.000	31.950
initiate-correlation-set	161	-1.000	22.000	1.210
update-audit-trail	1	-1.000	-1.000	-1.000
eng-until	160	-1.000	1.000	0.040
sensor-send-activity-data	51	0.000	0.000	0.000
concurrent-variable-data	52	n.nnn	n.nnn	n.nnn

For more information about BPEL process tuning and performance, see *Oracle Fusion Middleware Performance and Tuning Guide*.

#### 14.6.1 Viewing Low Level Request Breakdown Table Details

You can configure the **Request Breakdown** part of the Statistics page to display lower level details about the time a request spends in various service engine layers during processing. Configure the **StatsLastN** property under the **More BPEL Configuration Properties** link on the BPEL Service Engine Properties page. By default, this property is set to -1. You can set this property to a more appropriate value (for example, 1000). This property provides information that helps you analyze and isolate areas that may become potential trouble spots. For information about accessing and configuring this property, see [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)

The information that is displayed on the **Request Breakdown** part of the Statistics page after configuring the **StatsLastN** property is also displayed with the following System MBean Browser properties:

- **AsyncProcessStats:** Provides low level asynchronous process statistics.
- **SyncProcessStats:** Provides low level synchronous process statistics.
- **RequestStats:** Provides a low level request breakdown.

For information about accessing these properties, see [Section 14.9, "Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine."](#)

## 14.7 Monitoring BPEL Process Service Engine Instances

You can monitor all BPEL process service component instances running in the service engine. These BPEL process service components can be part of separate SOA composite applications.

To monitor BPEL process service engine instances:

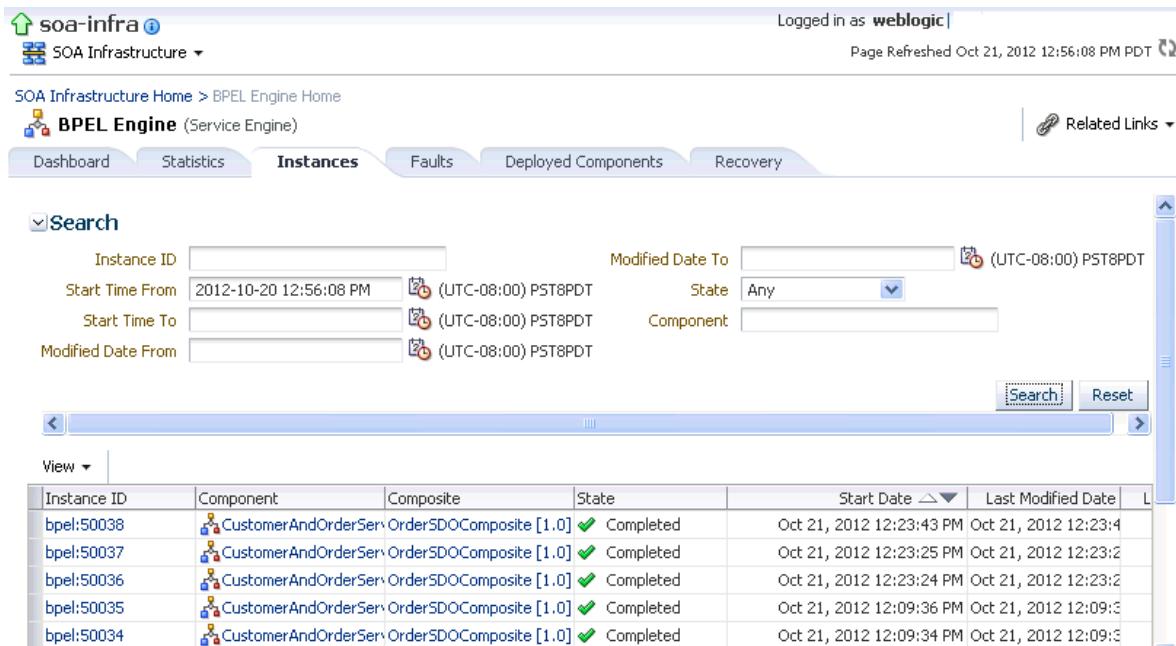
1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPEL.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > BPEL.

2. Click **Instances**.

The Instances page displays the following details:

- A utility for searching for a specific instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- Instances, including the instance ID of the service component, the service component name, the SOA composite application name, the state of the instance (for example, completed successfully, running, or faulted), the instance start time, the last modification time, and the log files describing the instance.



The screenshot shows the Oracle SOA Infrastructure BPEL Engine Home page. At the top, there's a navigation bar with links for SOA Infrastructure Home, BPEL Engine (Service Engine), Dashboard, Statistics, Instances (which is the active tab), Faults, Deployed Components, and Recovery. On the right, there are Related Links and a search bar. The main content area has a search panel titled 'Search' with fields for Instance ID, Start Time From, Start Time To, Modified Date From, Modified Date To, State, Component, and buttons for Search and Reset. Below the search panel is a table with columns: Instance ID, Component, Composite, State, Start Date, Last Modified Date, and Log. The table lists five BPEL instances, all of which are 'Completed'. The table also includes a 'View' dropdown menu.

Instance ID	Component	Composite	State	Start Date	Last Modified Date	Log
bpel:50038	CustomerAndOrderService	OrderSDOComposite [1.0]	Completed	Oct 21, 2012 12:23:43 PM	Oct 21, 2012 12:23:4	
bpel:50037	CustomerAndOrderService	OrderSDOComposite [1.0]	Completed	Oct 21, 2012 12:23:25 PM	Oct 21, 2012 12:23:2	
bpel:50036	CustomerAndOrderService	OrderSDOComposite [1.0]	Completed	Oct 21, 2012 12:23:24 PM	Oct 21, 2012 12:23:2	
bpel:50035	CustomerAndOrderService	OrderSDOComposite [1.0]	Completed	Oct 21, 2012 12:09:36 PM	Oct 21, 2012 12:09:3	
bpel:50034	CustomerAndOrderService	OrderSDOComposite [1.0]	Completed	Oct 21, 2012 12:09:34 PM	Oct 21, 2012 12:09:3	

---

**Note:** Undeploying a SOA composite application instance does not cause the instance to complete. Undeployment marks running service component instances of that composite as stale. However, service component instances of that composite instance that are complete are not marked as stale.

---

3. In the **Instances** section, perform the following monitoring tasks:
  - a. In the **Instance ID** column, click an instance ID for a service component to view its audit trail, process flow, sensor values, and faults.
  - b. In the **Component** column, click a specific service component to access its home page.
  - c. In the **Composite** column, click a specific SOA composite application to access its home page.
  - d. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 14.8 Monitoring Deployed BPEL Process Service Components in the Service Engine

You can monitor all deployed SOA composite applications with BPEL process service components running in the service engine.

To monitor deployed BPEL processes in service engines:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPEL.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > BPEL.

2. Click **Deployed Components**.

The Deployed Components page displays the following details:

- A utility for searching for a specific deployed SOA composite application by specifying criteria and clicking **Search**.
- Details about deployed SOA composite applications with BPEL process service components running in this service engine, including the service component name, the SOA composite application, the current status, and the total, running, and faulted instances in the service engine.

The screenshot shows the SOA Infrastructure Home > BPEL Engine Home interface. At the top, there are tabs for Dashboard, Statistics, Instances, Faults, Deployed Components (which is selected), and Recovery. A search bar is present with fields for Name and Composite Name, and buttons for Search and Reset. Below the search bar is a table titled 'Recent Instances and Faults for the last 24 hours'. The table has columns for Name, Composite, Status, Total Instances, Running Instances, and Rec. The data in the table is as follows:

Name	Composite	Status	Total Instances	Running Instances	Rec
B2BOrderProcessingEngine	B2BX12OrderGatewa		0	0	
ExternalPartnerSupplier	PartnerSupplierCompi		0	0	
BPELProcess1	service [4.0]		0	0	
LoanService	CompositeTest [1.0]		0	0	
LoanBroker	CompositeTest [1.0]		8	0	
CreditRatingService	CompositeTest [1.0]		0	0	
OrderProcessor	OrderBookingCompos		0	0	
InternalWarehouseService	OrderBookingCompos		0	0	

3. In the **Name** column, click a specific service component to access its home page.
4. In the **Composite** column, click a specific SOA composite application to access its home page.

## 14.9 Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine

You can display lower level details about the time a request spends in various service engine layers during processing with several System MBean Browser properties.

1. In the navigation tree, expand the SOA folder.
2. Right-click **soa-infra**, and select **Administration > System MBean Browser**.
3. Select **Application Defined MBeans > oracle.as.soainfra.bpel > Server: *server\_name* > BPELEngine > BPELEngine**.

The following properties can be configured.

- **AsyncProcessStats:**
- **RequestStats:**
- **SyncProcessStats:**

4. View the content of the **AsyncProcessStats** property.

**Attribute: AsyncProcessStats**

MBean Name: oracle.as.soainfra.bpel:Location=AdminServer,name=BPELEngine,type=BPELEngine,Application=soa-infra  
 Attribute Name: AsyncProcessStats  
 Description: Asynchronous process statistics.  
 Type: java.lang.String  
 Readable / Writable: R

**Value**

```
<statistics>
<stats key="default/Asynchronous!1.0*soa_dec981d8-d6d2-4470-a7fe-06e32c507ed9/BPELProcess1" min="34414" max="34414" average="34414.0" count="1">
</stats>
<stats key="default/Asynchronous!1.0*soa_dec981d8-d6d2-4470-a7fe-06e32c507ed9/BPELProcess1Client" min="38674" max="38674" average="38674.0" count="1">
</stats>
<stats key="default/Asynchronous!1.0*soa_dec981d8-d6d2-4470-a7fe-06e32c507ed9/BPELProcess2" min="265" max="265" average="265.0" count="1">
</stats>
</statistics>
```

**5.** View the content of the **RequestStats** property.

**Attribute: RequestStats**

MBean Name: oracle.as.soainfra.bpel:Location=AdminServer,name=BPELEngine,type=BPELEngine,Application=soa-infra  
 Attribute Name: RequestStats  
 Description: Request breakdown.  
 Type: java.lang.String  
 Readable / Writable: R

**Value**

```
<statistics>
<stats key="eng-composite-request" min="0" max="0" average="0.0" count="0">
<stats key="eng-single-request" min="34" max="3627" average="1351.5" count="6">
<stats key="load-workitem" min="5" max="5" average="5.0" count="1">
<stats key="eng-finalize" min="0" max="0" average="0.0" count="1">
<stats key="eng-until" min="0" max="0" average="0.0" count="1">
</stats>
<stats key="eng-manage" min="0" max="0" average="0.0" count="1">
</stats>
<stats key="monitor-send-activity-data" min="0" max="0" average="0.0" count="1">
</stats>
<stats key="load-wi-datasource" min="2" max="2" average="2.0" count="1">
</stats>
<stats key="sensor-send-activity-data" min="0" max="0" average="0.0" count="1">
</stats>
<stats key="populate-context" min="0" max="0" average="0.0" count="4">
</stats>
<stats key="create-and-invoke" min="268" max="3627" average="1401.66" count="3">
</stats>
</statistics>
```

**6.** View the content of the **SyncProcessStats** property.

**Attribute: SyncProcessStats**

MBean Name: oracle.as.soainfra.bpel:Location=AdminServer,name=BPELEngine,type=BPELEngine,Application=soa-infra  
 Attribute Name: SyncProcessStats  
 Description: Synchronous process statistics.  
 Type: java.lang.String  
 Readable / Writable: R

**Value**

```
<statistics>
<stats key="default/Synchronous!1.0*soa_a2c7e9f0-799c-4a25-b83b-c1ea3175486a/BPELProcess1" min="19" max="19" average="19.0" count="1">
</stats>
</statistics>
```

For information on configuring this information with the **StatsLastN** property on the BPEL Service Engine Properties page, see [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)



# 15

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## Managing BPEL Process Service Components and Engines

This chapter describes how to manage BPEL process service components and service engines, including recovering from service component and service engine faults, managing service component policies, performing BPEL process message recovery of undelivered invoke and callback messages, and storing instance and message data in Oracle Coherence cache.

This chapter includes the following sections:

- [Section 15.1, "Recovering from BPEL Process Service Component Faults"](#)
- [Section 15.2, "Managing BPEL Process Service Component Policies"](#)
- [Section 15.3, "Recovering from BPEL Process Service Engine Faults"](#)
- [Section 15.4, "Performing BPEL Process Service Engine Message Recovery"](#)
- [Section 15.5, "Storing Instance and Message Data in Oracle Coherence Distributed Cache on Oracle Exalogic Platforms"](#)

For conceptual information about service components and service engines, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)

### 15.1 Recovering from BPEL Process Service Component Faults

You can monitor and perform individual and bulk fault recoveries for BPEL process service components that are identified as recoverable. For BPEL process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the `fault-bindings.xml` file) and which triggers the action `ora-human-intervention`. However, without defining any fault policies, the fault takes its standard course as either a recoverable or nonrecoverable fault.

To recover from BPEL process service component faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

2. Select the BPEL process service component in the **Component Metrics** section.  
 3. Click **Faults**.

The Faults page displays the following details:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the service component, including the fault ID, error message, whether you can recover from the fault, time at which the fault occurred, service component instance ID, activity in which the fault occurred, and a link to a log file describing the fault.

The screenshot shows the 'OrderBookingComposite [1.0]' page. In the top navigation bar, there is a dropdown for 'SOA Composite' and a status message 'Logged in as weblogic'. Below the navigation bar, the breadcrumb path is 'OrderBookingComposite [1.0] > OrderProcessor'. On the right side, there is a 'Related Links' dropdown. The main content area has tabs for 'Dashboard', 'Instances', 'Faults' (which is selected), and 'Policies'. A note below the tabs states: 'If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance in which the fault occurred and attempts to recover from it. You can also perform a batch recovery by selecting multiple faults and choosing a recovery action. For additional recovery options, click the Recoverable link for an individual fault.' Below this note is a search section with fields for 'Error Message Contains' and 'Fault ID', and date/time filters for 'Fault Time From' and 'Fault Time To'. There are also checkboxes for 'Show only recoverable faults' and 'Fault Type' (set to 'All Faults'). At the bottom of the search section are 'Search' and 'Reset' buttons. Below the search section is a table with columns: Error Message, Recovery, Fault Time, Component Instance ID, Activity, and Logs. The table header says 'No faults found'.

BPEL process service component faults identified as recoverable can be recovered.

4. Select faults for recovery using one of the following methods. Fault recovery selection at the BPEL process service component level equals the SOA Infrastructure level, SOA composite application level, and Oracle Mediator service component level.

For...	Then...
Single fault recovery	<p>There are three options from which to choose for single fault recovery:</p> <ol style="list-style-type: none"> <li>Click the row of the fault that has been identified as recoverable. With the row highlighted, select a specific action from the <b>Recovery Action</b> list, as described in Step 5.</li> <li>In the <b>Recovery</b> column, click the <b>Recover</b> link to access the <b>Faults</b> page of the instance audit trail to perform fault recovery.</li> <li>In the <b>Error Message</b> column, click the message of a fault that has been identified as recoverable. This displays complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. A <b>Recover Now</b> option is displayed for recoverable faults. Click <b>Recover Now</b> to access the <b>Faults</b> page of the instance audit trail to perform fault recovery.</li> </ol>
Bulk fault recovery	<p>There are two options from which to choose for bulk fault recovery:</p> <ol style="list-style-type: none"> <li>Use Shift+Click or Control+Click to select specific faults in the rows. or</li> <li>From the <b>Select</b> menu, choose <b>Select All Recoverable</b>. Then use Shift+Click or Control+Click to deselect the faults to <i>not</i> include in the recovery operation.</li> </ol> <p>Then:</p> <ol style="list-style-type: none"> <li>Select an action from the <b>Recovery Action</b> list, as described in Step 5.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>
Recovery of all faults	<ol style="list-style-type: none"> <li>From the <b>Select</b> menu, choose <b>Select All Recoverable</b>.</li> <li>Select an action from the <b>Recovery Action</b> list, as described in Step 5.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>

---

**Note:** In most cases, fault policy actions are automatically executed. The only exception is if you defined a fault policy that uses the action ora-human-intervention. This action creates a recoverable fault that can be recovered from Oracle Enterprise Manager Fusion Middleware Control.

---

##### 5. Select an action from the **Recovery Action** list.

Action	Description
<b>Retry</b>	Retries the instance directly. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope activity again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault. BPEL fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).

##### 6. Perform the following additional monitoring tasks from within the **Faults** table:

- a. Click the **Show only recoverable faults** checkbox to display only faults from which you can recover.
- b. From the **Fault Type** list, select to display all faults, system faults, business faults, or Oracle Web Services Manager (OWSM) faults in the **Faults** table. Click the **Help** icon for a description of these fault types.
- c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
- d. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.
- e. In the **Logs** column, click a link to access the Log Messages page with filtered messages specific to that instance.

For more information, see the following documentation:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)
- [Section 8.4.1, "Examples of Fault Recovery for BPEL Processes"](#)
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*
- *Oracle Fusion Middleware Administrator's Guide* for details about viewing and searching log files

## 15.2 Managing BPEL Process Service Component Policies

You can attach and detach policies to and from BPEL process service components in currently deployed SOA composite applications. Policies apply security to the delivery of messages. Oracle Fusion Middleware uses a policy-based model to manage web services.

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**Note:** Before attaching policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use in your environment.

---

To manage BPEL process service component policies:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, expand the partition.</li> <li>2. Select a specific SOA composite application.</li> </ol>

2. Select the BPEL process service component in the **Component Metrics** section.
3. Click **Policies**.

The Policies page enables you to attach and detach policies to and from BPEL process service components. The **Policies** table displays the attached policy name, the policy reference status (enabled or disabled) that you can toggle, the category (Management, Reliable Messaging, MTOM Attachment, Security, or

WS-Addressing), the violations, and the authentication, authorization, confidentiality, and integrity failures since the SOA Infrastructure was last restarted.

Policy Name	Policy Reference Status	Category	Total Violations	Security Violations		
				Authentication	Authorization	Confidentiality
oracle/log_policy	Disable	Management	0	N/A	N/A	N/A

**4. Click Attach/Detach.**

If multiple components are available, you are prompted to select the service or component for which to perform the attachment or detachment.

**5. Select the service or component to which to attach or detach a policy.**

This invokes a dialog for attaching or detaching policies.

Policies currently attached appear in the **Attached Policies** section. Additional policies available for attachment appear in the **Available Policies** section.

**6. Select to attach policies appropriate to your environment.**

**7. Click Attach.**

**8. When you are finished attaching policies, click Validate.**

**9. If an error message appears, make the necessary corrections until you no longer have any validation errors.**

**10. Click OK.**

The attached policy is displayed in the **Policies** table.

For more information, see the following documentation:

- [Section 1.4.3.2, "Introduction to Policies"](#)
- [Section 7.7, "Managing SOA Composite Application Policies"](#) for the dialogs that are displayed during policy attachment
- [Oracle Fusion Middleware Security and Administrator's Guide for Web Services](#) for definitions of available policies and details about which ones to use for your environment

## 15.3 Recovering from BPEL Process Service Engine Faults

You can monitor and perform individual and bulk recoveries of faults occurring in BPEL process service engines that are identified as recoverable. All BPEL process service component faults, regardless of the SOA composite application instance of which they are a part, can be viewed in the BPEL process service engine. For BPEL process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the `fault-bindings.xml` file) and which triggers the

action ora-human-intervention. However, without defining any fault policies, the fault takes its standard course as either a recoverable or nonrecoverable fault.

To recover from BPEL process service engine faults:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPEL.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > BPEL.

- Click **Faults**.

The Faults page displays the following details:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the service engine, including the fault ID, the error message, whether you can recover from the fault, the time at which the fault occurred, the SOA composite application and service component in which the fault occurred, and the service component instance ID.

The screenshot shows the Oracle SOA Infrastructure BPEL Engine Home page. At the top, there's a navigation bar with links for Dashboard, Statistics, Instances, Faults (which is the active tab), Deployed Components, and Recovery. To the right of the navigation bar, it says "Logged in as weblogic" and "Page Refreshed Oct 21, 2012 1:21:44 PM PDT". Below the navigation bar, there's a search section titled "Search" with fields for "Error Message Contains" and "Fault ID". There are also filters for "Composite Instance ID" and "Component Instance ID". Under these, there are date/time filters for "Fault Time From" (set to 2012-10-20 01:21:44 PM) and "Fault Time To" (set to the same time). Below the search section, there are buttons for "Search" and "Reset". Further down, there are dropdowns for "Show only recoverable faults" (unchecked) and "Fault Type" (set to "All Faults"). At the bottom, there are buttons for "Select" and "View", and a "Recovery Actions" dropdown. A table below lists faults with columns for Error Message, Recovery, Fault Time, Composite, Component, Component Instance ID, and Activity. A message at the bottom of the table says "No faults found".

BPEL process service engine faults identified as recoverable can be recovered.

- Select faults for recovery using one of the following options. As with fault recovery at the SOA Infrastructure level, SOA composite application level, and Oracle Mediator service component level, you can perform single fault recovery, bulk fault recovery, and recovery of all faults. See Step 4 of [Section 15.1, "Recovering from BPEL Process Service Component Faults"](#) for instructions on selecting faults to perform these types of recovery.

---

**Note:** In most cases, fault policy actions are automatically executed. The only exception is if you defined a fault policy that uses the action ora-human-intervention. This action creates a recoverable fault that can be recovered from Oracle Enterprise Manager Fusion Middleware Control.

---

4. Select an action from the **Recovery Action** list.

Action	Description
<b>Retry</b>	Retries the instance with an option to provide a retry success action. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope activity again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault. BPEL fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).

5. Perform the following additional monitoring tasks from within the **Faults** table:

- a. Click the **Show only recoverable faults** checkbox to only display faults from which you can recover.
- b. From the **Fault Type** list, select to display all faults, system faults, business faults, or OWSM faults in the **Faults** table. Click the **Help** icon for a description of these fault types.
- c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
- d. In the **Composite** column, click a specific SOA composite application to access its home page.
- e. In the **Component** column, click a specific service component to access its home page.
- f. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.

For more information, see the following sections:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#) for conceptual details about faults
- [Section 8.4.1, "Examples of Fault Recovery for BPEL Processes"](#)

## 15.4 Performing BPEL Process Service Engine Message Recovery

You can perform a manual recovery of undelivered invoke or callback messages due to a transaction rollback in the process instance. Recovery of invoke messages applies to asynchronous BPEL processes only. Synchronous BPEL processes return an error to the

calling client and are not recoverable from the Recovery page. Recoverable activities are activities that failed and can be recovered. For example, if you are using the file adapter to initiate an asynchronous BPEL process and your system fails while the instance is processing, you can manually perform recovery when the server restarts to ensure that all message records are recovered.

You can also manage messages that have failed automatic recovery attempts by the BPEL process service engine. To ensure that automatic recovery of these messages is not attempted multiple times, these messages are placed in the exhausted state. You can then perform one of the following actions on these messages:

- Return them to the automatic recovery queue
- Never attempt a recovery on them again
- Attempt to recover them immediately

For example, assume you have a BPEL process that writes to a database adapter. If the database is down, these messages are sent to a recovery queue. Automatic recovery of these messages fails while the database is down. Such messages are marked with the exhausted state so that automatic recovery is not attempted on them again. When the database begins running again, you can reset these messages (return them to the automatic recovery queue) so that an automatic recovery is attempted on them again.

To perform BPEL process service engine message recovery:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Service Engines &gt; BPEL</b> .	1. Right-click <b>soa-infra</b> . 2. Select <b>Service Engines &gt; BPEL</b> .

2. Click **Recovery**.

The Recovery page displays the following details:

- A **Refresh Alarm Table** button for resynchronizing lost, in-memory, Quartz-scheduled jobs in the database. For example, assume a timer on a wait activity or an onAlarm branch of a pick activity was initiated, but the transaction was rolled back. You can resynchronize these jobs with the BPEL instances residing in the wait activity/onAlarm branch in the database.
- A utility for searching for a specific message failure by specifying criteria and clicking **Search**. Click the **Help** icon for details.

You can enter the execution context ID (ECID) value in the **ECID** field. The ECID value enables you to track a message flow that crosses instances of different composite applications. If there are BPEL process messages requiring recovery and the **AuditConfig** property in the System MBean Browser is set to **All** (the default value), the following message is displayed in the **Trace** table of the Flow Trace page:

BPEL Message Recovery Required

Clicking **Show Details** or the recovery icon that appears next to this message displays a Warning dialog with information about the number of invoke, callback, and activity recoverable message types and the ECID value. You can copy the ECID value from the Warning dialog, paste it into the **ECID** field, and select the recoverable message type from the **Type** list as part of creating your search criteria on the Recovery page.

For more information, see [Section 14.1, "Monitoring the Audit Trail and Process Flow of a BPEL Process Service Component."](#)

---

**Note:** Oracle recommends that you add an index on the DLV\_MESSAGE.ECID column of the DLV\_MESSAGE table to improve SQL query performance when searching messages for a specific ECID value. This is because if there are too many entries in the DLV\_MESSAGE table, the search query may be slow and may also overload the database. For information on adding an index, see Chapter "Creating Indexes" of the *Oracle Database Administrator's Guide*.

---

- Message failures in the service engine, including the conversation ID, whether you can recover from the message failure, the service component and composite application in which the failure occurred, and the time at which the fault occurred. Depending on the state, you can recover these messages immediately, cancel these messages, or reset these messages for automatic recovery.

soa-infra [?](#)

Logged in as **weblogic** | Page Refreshed Dec 27, 2012 9:20:50 AM PST

SOA Infrastructure Home > BPEL Engine Home

**BPEL Engine** (Service Engine)

Related Links [?](#)

Dashboard Statistics Instances Faults Deployed Components **Recovery**

You can recover or abort or cancel selected messages marked as Recoverable. If messages are marked as Exhausted, you can select them and click Reset to return them to the auto-recovery queue, click Abort or Cancel so that recovery is never attempted on them, or click Recover to attempt to recover them immediately.

**Search** [?](#)

Type: **Invoke** Duration: **Exclude past 5 minutes** Message State: **Undelivered**

Composite Name:  Component Name:  ECID:

**Refresh Alarm Table** **Search** **Reset**

Select [▼](#) View [▼](#) **Recover** **Abort...** **Reset** **Cancel Without Abort**

Conversation ID	Recovery	Component	Composite
No recoverable items found			

---

**Notes:**

- You can recover callback messages in resolved and undelivered states. These messages can be displayed for recovery when you execute search criteria in which you select **Callback** from the **Type** list and either **Resolved** or **Undelivered** from the **Message State** list. When a callback message first enters the BPEL process service engine, its state is undelivered. When this message is resolved to the target BPEL process instance either through matching a conversation ID or a correlation, the state is switched to resolved. In both of these states, the messages have not yet been consumed. Messages in these two states can be recovered (redelivered into the BPEL process service engine for consumption). In other situations, the callback messages can become stranded in both of these states. Messages in these states can also be recovered. However, there is no guarantee that stranded callback messages always remain in an undelivered state.
  - If you select **Invoke** from the **Type** list and **Undelivered** from the **Message State** list, and then click **Recover**, a recovery is performed. However, the **Last Modified Date** column remains empty for this instance on the Dashboard page of the Oracle BPEL Process Manager service component or service engine. This is the expected behavior. The last modified date is not displayed because the initial Oracle BPEL Process Manager instance (for example, **bpel:70004**) is created by the first invocation (that is, it is created, but has not yet been modified). The recovery of the undelivered invocation message always creates a *new* instance (for example, **bpel:70005**). The previously created instance (**bpel:70004**) is not used and remains permanently in the same status (the **Last Modified Date** column is empty). This information is provided for auditing purposes only.
  - The **Message States** list is applicable only to callback and invoke message type recovery, and not for activity message type recovery.
- 

3. Select a fault in the table.
4. Select one of the following options:

Action	Description
Recover	<p>Retries the message in which the fault occurred.</p> <p>If you select messages in the exhausted state and click this button, an attempt is made to recover them immediately. Should this recovery attempt also fail, the message is returned to the exhausted state. You must then select the message and click <b>Reset</b> to return the message to the automatic recovery queue.</p> <p>If an asynchronous BPEL process encounters a transaction rollback scenario because of any underlying exception error, it rolls back to the last dehydration activity. If this is a new instance, and a receive activity was the first dehydration activity, the BPEL process service engine creates a recoverable invoke. When you click <b>Recover</b> to recover the invoke, the service engine creates a new instance. This instance may run to completion with no exception error. However, you continue to see the older instance identified as faulted.</p>

---

Action	Description
Abort	<p>Select to display a confirmation message that enables you to terminate the entire flow in which the message marked as cancelled is included, and update the composite instance state. Message cancellation is executed in the context of the ECID. If multiple composite instances are linked using this ECID, all composite and service component instances are terminated. An ECID enables you to track a message flow that crosses instances of different composite applications.</p> <p>If you select messages in the exhausted state and click this button, recovery is never attempted on them.</p>
Reset	<p>Select to reset exhausted messages to the undelivered state. This returns the message to the automatic recovery queue. The messages that are displayed in the exhausted state disappear from the messages table. If you select <b>Undelivered</b> from the <b>Message State</b> list and click <b>Search</b>, these messages are displayed. Callback messages in the exhausted state can also be reset to the resolved state and still remain recoverable.</p>
Cancel Without Abort	<p>Select to cancel the delivery of the selected BPEL process messages, and not the entire composite instance flow in which the messages are included. Canceling BPEL process messages does not change the state of the corresponding composite instance. This option has limited applications, such as removing duplicate messages received for the same callback. If you select messages in the exhausted state and click this button, recovery is never attempted on them.</p> <p><b>Note:</b> The <b>Recover</b> and <b>Cancel Without Abort</b> buttons are enabled in the following situations:</p> <ul style="list-style-type: none"> <li>▪ For users with the administrator or operator role. These buttons are disabled for users with the monitor role.</li> <li>▪ In the context of a recoverable message. You must select a recoverable message for these buttons to be enabled.</li> </ul> <p>For more information about roles, see <a href="#">Appendix C.1, "Roles and Privileges."</a></p>

Once a message is submitted for recovery, the BPEL process service engine may take time to complete the action. This typically takes less than several seconds. During this time, the message remains visible in the Recovery page. Duplicate attempts to recover the same message in that period are ignored. Refresh the page every few seconds to receive the latest recovery status.

---

**Note:** If you define a fault policy in a BPEL process with an ora-retry action and a fault occurs, the BPEL process attempts to recover from the fault the number of times you specified with the retryCount parameter. After this period, the process continues to be in a running state. The status of an activity in the process that has not completed (such as an invoke or receive) shows as pending a manual recovery. This is the expected behavior.

---

For information about configuring the maximum number of times to attempt an invoke and callback message recovery, see [Section 13.4, "Configuring Automatic Recovery Attempts for Invoke and Callback Messages."](#)

## 15.5 Storing Instance and Message Data in Oracle Coherence Distributed Cache on Oracle Exalogic Platforms

With BPEL processes, a potential performance issue is the number of database interactions required per instance. This factor is the main reason for synchronous transient flows outperforming asynchronous durable flows. You can design around this issue by utilizing synchronous transient flows in situations where low response times are required. However, you may be unable to design this type of flow for business reasons.

If you are running Oracle SOA Suite 11g Release 1 11.1.1.6 or later on an Oracle Exalogic platform, you can use the distributed cache feature of Oracle Coherence to store instance and message data from BPEL processes. This eliminates database reads, thereby reducing the number of database interactions.

Oracle Coherence is a component of Oracle Fusion Middleware that enables organizations to scale mission-critical applications by providing access to frequently used data. Oracle Coherence includes a distributed cache feature that provides scalability for both read and write access. Data is automatically, dynamically, and transparently partitioned across nodes. The distribution algorithm minimizes network traffic and avoids service pauses by incrementally shifting data.

Oracle Exalogic is an integrated hardware and software system designed to provide a platform for a range of application types and varied workloads. Oracle Exalogic is intended for large-scale, performance-sensitive, mission-critical application deployments.

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**Note:** If your environment is not using Oracle Exalogic, Oracle Coherence distributed cache is not available.

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The potential performance gains of using a distributed cache for BPEL processes are as follows:

- Eliminates the read operation required for messages (invoke and callback) from the database after initial delivery
- Eliminates the read operation required for cube instances after a dehydration point

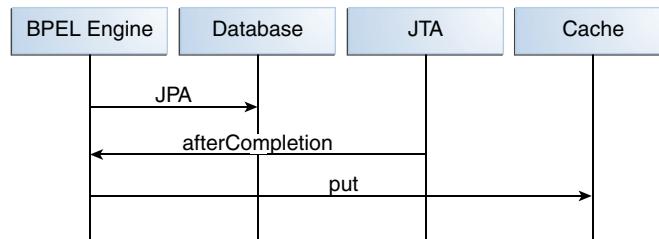
For more information about Oracle Coherence, see the *Oracle Coherence Getting Started Guide* and *Oracle Coherence Developer's Guide*.

For more information about Oracle Exalogic, see the *Oracle Exalogic Machine Owner's Guide*.

### 15.5.1 Introduction to the Oracle Coherence Caching Architecture

During dehydration, instance objects are stored in the database using the Java Persistence API (JPA) in a container-managed Enterprise JavaBeans (EJB) transaction. The BPEL process service engine registers the transaction afterCompletion listener for post-transaction processing. Instance objects modified during a transaction are tracked and made available to the afterCompletion listener, which updates the cache.

[Figure 15–1](#) provides details about the dehydration process.

**Figure 15–1 Dehydration Process**

During rehydration, instance objects are read from cache. Implementations do not provide XA guarantees for transaction completion notification, and cache eviction may delete the object from cache. Implementations account for these two scenarios and address the issues of cache not returning an object or returning an older version of the object.

Cache lookup usually provides a valid object. In this scenario, performance gain for dehydration and rehydration using cache over direct writes (the default) equals the following:

$$(\text{database read time} + \text{relational to object mapping}) - (\text{Object serialization} + \text{reading from serialized form} + \text{Coherence network overhead} + \text{query to database for reading CACHE\_VERSION})$$

It also reduces activity on the database server.

If Oracle Coherence cache is not available due to a network issue, the BPEL process service engine continues to work. If there are no errors, business process instances continue to progress.

### 15.5.2 Running with Default SOA Cluster Nodes and Coherence Cache Grid Nodes

BPEL process caches are not created on an Oracle SOA Suite cluster node. You must start the BPEL cache servers, which host the BPEL caches, by following the instructions in [Section 15.5.7, "Starting the BPEL Process Cache Servers."](#) Start at least four servers to observe an increase in performance.

There is no requirement for ordering of an Oracle SOA Suite cluster and BPEL cache servers. The BPEL process service engine continues to function without BPEL cache servers, even when the **QualityOfService** property is set to **CacheEnabled** in Oracle Enterprise Manager Fusion Middleware Control.

For more information about Oracle Coherence, see the *Oracle Coherence Getting Started Guide* and *Oracle Coherence Developer's Guide*.

### 15.5.3 Configuring Oracle Coherence Caching

The System MBean Browser property **QualityOfService** enables you to configure Oracle Coherence for dehydration. You can configure this property on one of the nodes in the SOA cluster.

To configure Oracle Coherence caching for dehydration:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<p>1. Select <b>SOA Administration &gt; BPEL Properties.</b></p>	<p>1. Right-click <b>soa-infra.</b></p> <p>2. Select <b>SOA Administration &gt; BPEL Properties.</b></p>

- The BPEL Service Engine Properties page is displayed.
2. Click **More BPEL Configuration Properties.**
  3. In the **Attributes** tab, click **QualityOfService.**
  4. In the **Value** field, enter a value appropriate to your environment. This change does not require a SOA Infrastructure restart.

**Table 15–1 QualityOfService Values**

Value	Description
DirectWrite	No cache is used for dehydration and rehydration. Read and write operations are done to the database. This is the default setting.
CacheEnabled	During dehydration, the instance data is stored in the database using an XA data source connection; the placement of objects into cache is part of post-transaction processing.  During rehydration, data is fetched from the cache. If the data is not found (for example, the BPEL process cache servers are not available) or the version is stale, data is read from the database.

5. Click **Apply**.

#### 15.5.4 Configuring the Storage of Multiple Audit Trail Messages in One Transaction

For asynchronous flows, performance gains can be achieved by storing multiple audit trail messages in one transaction. To improve performance, you can store multiple audit trail messages (across instances) in a single transaction by setting the System MBean Browser property **AsynchAuditBatchSize** in Oracle Enterprise Manager Fusion Middleware Control.

Setting this property to an appropriate value reduces audit trail transaction commits. Instead, a commit is only performed when a specified limit is reached.

To configure the storage of multiple audit trail messages in one transaction:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<p>1. Select <b>SOA Administration &gt; BPEL Properties.</b></p>	<p>1. Right-click <b>soa-infra.</b></p> <p>2. Select <b>SOA Administration &gt; BPEL Properties.</b></p>

- The BPEL Service Engine Properties page is displayed.
2. Click **More BPEL Configuration Properties.**
  3. In the **Attributes** tab, click **AsynchAuditBatchSize.**
  4. In the **Value** field, enter a value appropriate to your environment. The default value of -1 indicates that there is no audit trail message batching. Each audit message is persisted in its own transaction.

The recommended value range is 5 to 25. For example, if you set this property to 8, this indicates that when eight audit trail messages have accumulated, a transaction is created with these messages and committed to the dehydration store.

This parameter only impacts Oracle Exalogic environments. For other environments, it is not operational.

This change does not require a SOA Infrastructure restart.

5. Click **Apply**.

### 15.5.5 Configuring the Storage of the Audit Trail to Oracle Coherence Cache

You can store the audit trail in Oracle Coherence cache by setting the following System MBean Browser properties to these values in Oracle Enterprise Manager Fusion Middleware Control:

- **AuditStorePolicy** is set to `async`.
- **QualityOfService.AuditStorePolicy.UseDistributedCache** is set to `true`.
- **QualityOfService** is set to `CacheEnabled`. For instructions, see [Section 15.5.3, "Configuring Oracle Coherence Caching."](#)

These settings enable the following to occur:

- Oracle Coherence cache acts as a queue and writes the audit trail to the database.
- The SOA server node heap and threads do not process the audit trail.

If one of these properties is set to a different value, the heap and dispatcher threads are used for writing to the database.

To configure the storage of the audit trail into Oracle Coherence cache:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > BPEL Properties.	1. Right-click <code>soa-infra</code> . 2. Select SOA Administration > BPEL Properties.

The BPEL Service Engine Properties page is displayed.

2. Click **More BPEL Configuration Properties**.
3. In the **Attributes** tab, click **AuditStorePolicy**.
4. In the **Value** field, enter `async`.

---

**Note:** If the server crashes (the SOA/BPEL cache server), some audit trail messages are not persisted to the database. This results in loss of the audit log. Failover is not supported. This is true for both Oracle Coherence and memory/heap caches.

---

5. Click **Apply**.
6. Click **Return**.
7. In the **Attributes** tab, click **QualityOfService.AuditStorePolicy.UseDistributedCache**.

8. From the **Value** list, select **true**.
9. Click **Apply**.

### 15.5.6 Configuring the Storage of Invocation Messages to Oracle Coherence Cache

You can store invocation messages in Oracle Coherence cache by setting the following System MBean Browser properties to these values in Oracle Enterprise Manager Fusion Middleware Control:

- **OneWayDeliveryPolicy** is set to `async.cache`.
- **QualityOfServiceOneWayDeliveryPolicyUseDistributedCache** is set to `true`.
- **QualityOfService** is set to `CacheEnabled`. For instructions, see [Section 15.5.3, "Configuring Oracle Coherence Caching."](#)

If one of these properties is set to a different value, local memory is used for cache, and *not* Oracle Coherence cache.

---

**Note:** Invocation messages in the middle of execution at the time of a server crash (both SOA and BPEL process cache servers) can be lost or duplicated. Failover is not supported. This is true for both Oracle Coherence and memory/heap caches.

---

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>SOA Administration &gt; BPEL Properties</b> .	1. Right-click <code>soa-infra</code> . 2. Select <b>SOA Administration &gt; BPEL Properties</b> .

The BPEL Service Engine Properties page is displayed.

2. Click **More BPEL Configuration Properties**.
3. In the **Attributes** tab, click **OneWayDeliveryPolicy**.
4. In the **Value** field, enter `async.cache`.
5. Click **Apply**.
6. Click **Return**.
7. In the **Attributes** tab, click **QualityOfServiceOneWayDeliveryPolicyUseDistributedCache**.
8. From the **Value** list, select **true**.
9. Click **Apply**.

### 15.5.7 Starting the BPEL Process Cache Servers

Run the `start-bpel-cache.sh` script to start the BPEL process cache servers on UNIX machines on which Oracle SOA Suite is installed.

The only requirement is network connectivity. The Oracle SOA Suite nodes must be reachable from the host on which the BPEL process cache servers are installed.

This script joins an Oracle SOA Suite cluster with a multicast, default address and port. These values match with the corresponding values in the \$FMW\_HOME/user\_projects/domains/domain\_name/bin/setDomainEnv.sh file.

If you choose multicast for a cluster, but use a different address and port, you can override it in the bpelCacheEnv.sh file by using an environment variable or setting a shell variable. Use the same values for SOA managed servers (in setDomainEnv.sh).

The default cache configuration for the Oracle SOA Suite cluster must be unicast, and not multicast. For more information about this recommended cache configuration for Oracle SOA Suite clusters for Oracle Coherence, see the *Oracle Fusion Middleware High Availability Guide* or *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite* for details.

To start the BPEL process cache servers:

1. Go to the \$FMW\_HOME/SOA\_ORACLE\_HOME/bin directory.
2. Open the start-bpel-cache.sh file.
3. Follow the instructions inside the start-bpel-cache.sh file to create the bpelCacheEnv.sh file and configure various environment variables.  
Environment/shell variable names and value formats are described in the initial notes section of the start-bpel-cache.sh file.
4. Ensure that you first set the **QualityOfService** property to **CacheEnabled** in Oracle Enterprise Manager Fusion Middleware Control, as described in [Section 15.5.3, "Configuring Oracle Coherence Caching."](#)
5. Run the following script:

```
start-bpel-cache.sh
```



# **Part VI**

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## **Administering Oracle Mediator Service Components and Engines**

This part describes how to administer Oracle Mediator service components and engines.

This part includes the following chapters:

- [Chapter 16, "Configuring Oracle Mediator Service Components and Engines"](#)
- [Chapter 17, "Monitoring Oracle Mediator Service Components and Engines"](#)
- [Chapter 18, "Managing Oracle Mediator Service Components and Engines"](#)
- [Chapter 19, "Managing Cross-References"](#)



# 16

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## Configuring Oracle Mediator Service Components and Engines

This chapter describes how to configure runtime properties for Oracle Mediator service components and service engines using Oracle Enterprise Manager Fusion Middleware Control. You can also configure advanced and custom properties for Mediator.

This chapter includes the following sections:

- [Section 16.1, "Configuring Oracle Mediator Service Engine Properties"](#)
- [Section 16.2, "Configuring Resequenced Messages"](#)

For more information about Oracle Mediator tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

### 16.1 Configuring Oracle Mediator Service Engine Properties

Mediator service engine properties are used by the Mediator service engine during processing of Mediator service components.

To configure Mediator service engine properties:

1. Access the Mediator Service Engine Properties page using one of the following methods:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > Mediator Properties.	1. Right-click <code>soa-infra</code> . 2. Select SOA Administration > Mediator Properties.

The Mediator Service Engine Properties page displays a list of Mediator properties, as shown in the following figure.

The screenshot shows the 'Mediator Service Engine Properties' configuration page. At the top, there are dropdown menus for 'Audit Level' (Inherit) and 'Metrics Level' (Enabled). Below these are several input fields for parallel worker threads (4), maximum rows retrieved (200), and locker thread sleep times (2 seconds for parallel and error lockers). There's also a 'Parameters' section and a list of container and resequencer properties with their respective values (e.g., Container ID Refresh Time: 60 seconds, Container ID Lease Timeout: 300 seconds). A link 'More Mediator Configuration Properties...' is at the bottom.

2. Make changes to the service engine properties that are appropriate to your environment.

The properties are described in [Table 16–1](#) below.

**Table 16–1 Mediator Service Engine Properties**

Property	Description
<b>Audit Level</b>	<p>The Mediator-specific audit level. The value of this property overrides the value of the global SOA Infrastructure audit level property. The possible values of this property are:</p> <ul style="list-style-type: none"> <li>▪ <b>Off:</b> Switches off auditing for Mediator. Composite instance tracking and payload tracking information are not collected.</li> <li>▪ <b>Inherit:</b> The level of audit is the same as the SOA infrastructure. This setting enables the Mediator audit level to automatically change, when the global setting is changed. Setting a different audit level tracking, for this page, overrides the tracking set at the SOA Infrastructure level.</li> <li>▪ <b>Production:</b> All events are logged. All audit details, except the details of assign activities, are logged. Instance tracking information is collected, but payload details are not captured and these details are not available in the flow audit trails. This level is optimal for most typical operations and testing.</li> <li>▪ <b>Development:</b> All events and all audit details are logged. In addition, payload details are captured and are available in the flow audit trails. This level is useful for debugging purposes, but may impact performance.</li> </ul> <p>The default value of this flag is <b>Inherit</b>.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>▪ You do not need to restart the server after changing these properties.</li> <li>▪ Audit levels were known as instance tracking levels in the Oracle Application Server 10g releases.</li> </ul>

**Table 16–1 (Cont.) Mediator Service Engine Properties**

Property	Description
Metrics Level	<p>The Mediator-specific property for configuring the Dynamic Monitoring Service (DMS) metrics level. DMS metrics are used to measure the performance of application components. The possible values of this property are:</p> <ul style="list-style-type: none"> <li>▪ <b>Enabled:</b> Enables DMS metrics tracking</li> <li>▪ <b>Disabled:</b> Disables DMS metrics tracking</li> </ul>
Parallel Worker Threads	<p>The number of parallel dispatchers for message processing. Increase this parameter to increase the number of outbound threads for parallel processing.</p>
Parallel Maximum Rows Retrieved	<p>The number of rows retrieved per iteration for parallel processing. You can set the value of this parameter to 50 to 100 times the <b>Parallel Worker Threads</b> property, depending on the memory consumption limit.</p>
	<p><b>Note:</b> A large value for this property can result in memory exhaustion.</p>
Parallel Locker Thread Sleep (sec)	<p>The idle time between two successive iterations for retrieving rows, when there is no message for parallel processing. The time is measured in seconds.</p>
Error Locker Thread Sleep (sec)	<p>The idle time between two successive iterations for retrieving errored messages when there is no errored message from parallel processing. The time is measured in seconds. You can configure the error/retry infrastructure by setting this property.</p>
Parameters	<p>Custom configuration properties. For an example, see <a href="#">Section 16.2, "Configuring Resequenced Messages."</a></p>

**Table 16–1 (Cont.) Mediator Service Engine Properties**

<b>Property</b>	<b>Description</b>
<b>Container ID Refresh Time (sec)</b>	Heartbeat infrastructure properties. The heartbeat infrastructure is a part of the Mediator service engine and detects the absence of a Mediator service engine instance due to failure or shutdown of a node. The heartbeat infrastructure creates a unique identifier for each instance of the Mediator service engine and performs the necessary housekeeping tasks, if a Mediator service engine fails. The heartbeat infrastructure consists of a heartbeat thread. The heartbeat thread periodically updates the time stamp associated with each Mediator service engine's unique identifier. By updating the time stamp associated with it, a Mediator service engine announces its presence to the other Mediator service engines. The heartbeat thread also checks if there are unique identifiers that have not been updated for a particular period. You can configure the heartbeat framework by setting the following parameters: <ul style="list-style-type: none"> <li>▪ <b>Container ID Refresh Time (sec):</b> The time interval at which the heartbeat thread periodically updates the time stamp associated with each Mediator service engine's unique identifier.</li> </ul> <p><b>Notes:</b> The default value is 60 seconds. In case of unplanned outages, you must wait the amount of time specified for this property after restarting the server.</p> <p>You can set this parameter to a smaller value, like 30 seconds, if you need to ensure more frequent refreshes.</p>
<b>Container ID Lease Timeout (sec)</b>	<ul style="list-style-type: none"> <li>▪ <b>Container ID Lease Timeout (sec):</b> The time interval at which the heartbeat thread periodically checks if there are unique identifiers that have not been updated for a particular period. A node is considered to be timed out if it has not refreshed itself for a duration longer than the amount of time specified here.</li> </ul> <p><b>Notes:</b> The default value is 300 seconds. You can set this parameter to a larger value, like 600 seconds, if you find your nodes being timed out because of slow-running SQL statements, for example.</p> <p>By configuring these parameters, you can specify the period used by the heartbeat thread to detect the failure of a Mediator service engine.</p>
<b>Resequencer Locker Thread Sleep (sec)</b>	The sleep interval for the locker threads in seconds. When the resequencer is unable to find a group with messages that can be processed, the locker thread sleeps for the specified duration. The locker thread does not sleep between each iteration of a database seek, as long as it finds groups with messages that can be processed. The default value is 10.
<b>Resequencer Maximum Groups Locked</b>	The number of groups to be retrieved for processing in a single iteration of a database seek. Once retrieved, the groups are assigned to worker threads for processing. The default value is 4.
<b>Resequencer Worker Threads</b>	The number of worker threads (dispatchers) for processing resequencing groups in parallel. Each worker thread is assigned a group, and then processes messages for the group in sequence. When there are a large number of groups waiting for messages to be processed, increasing this parameter can improve performance. The default value is 4.

3. To configure advanced Mediator properties in the System MBean Browser, click **More Mediator Configuration Properties**.

You can also access Mediator properties in the System MBean Browser through the navigator, as described below.

To access System MBean Browser properties:

1. From the **SOA Infrastructure** menu, point to **Administration** and then select **System MBean Browser**.  
The System MBean Browser page appears.
2. In the System MBean Browser navigation pane on the left, expand **oracle.as.soainfra.config**, expand **Server: server\_name**, expand **MediatorConfig**, and then select **mediator**.  
The properties of the MBean appear in the right pane.
3. To change the value of a property, modify its **Value** field and then click **Apply**.

---

**Note:** Not all values can be modified. The System MBean properties generally correspond to the properties listed in [Table 16–1](#), with some additional read-only properties for the MBean. An additional property, **ContainerInitRetries**, is not listed in [Table 16–1](#). This property indicates the number of attempts that are made to create an Oracle Mediator service engine instance ID.

---

## 16.2 Configuring Resequenced Messages

For Mediator service components to resequence messages, you must configure the following:

- The worker thread count
- The maximum number of groups that can be locked by a thread
- The sleep interval

If the Mediator service component is configured to use best effort resequencing and the messages to process in each batch are based on a time window rather than a maximum number of rows, you can also configure the buffer window.

To configure resequenced messages:

1. Access the Mediator Service Engine Properties page or the System MBean Browser using one of the methods described in [Section 16.1, "Configuring Oracle Mediator Service Engine Properties."](#)
2. Enter a value for the following Mediator properties:
  - **Resequencer Worker Threads:** The number of threads used by resequencers.
  - **Resequencer Maximum Groups Locked:** The maximum number of group rows retrieved for each locking cycle.
  - **Resequencer Locker Thread Sleep:** The length of time in seconds for the resequencer locker to sleep when there are no messages in the database.

---

**Note:** For more information about these properties, see [Table 16–1](#).

---

3. To configure the buffer window for the time window in best effort resequencing, enter the following for the **Parameters** property value:

```
buffer.window=x
```

Where  $x$  is the percentage of the configured time window to add to the buffer. For example, `buffer.window=20` means that 20% of the length of the time window is added as a buffer.

4. Click **Apply**.

# Monitoring Oracle Mediator Service Components and Engines

This chapter describes how to monitor runtime instance information, component states, and faults for Oracle Mediator service components and engines using Oracle Enterprise Manager Fusion Middleware Control.

This chapter includes the following sections:

- [Section 17.1, "Introduction to the Oracle Mediator Dashboard Pages"](#)
- [Section 17.2, "Monitoring Oracle Mediator Service Component Instances and Faults"](#)
- [Section 17.3, "Monitoring Oracle Mediator Service Engine Instances and Faults"](#)
- [Section 17.4, "Monitoring Resequenced Messages"](#)

For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)

In addition to monitoring Mediator components using Oracle Enterprise Manager Fusion Middleware Control, you can also set up watches and notifications for resequencing groups have stopped processing but still have messages pending. You can also run a diagnostic dump with this information. For more information, see [Chapter 12, "Diagnosing Problems with SOA Composite Applications."](#)

## 17.1 Introduction to the Oracle Mediator Dashboard Pages

The Mediator Component Dashboard lets you view information about the current state of the selected Mediator service component, and to manage faulted instances and messages. The Mediator Engine Dashboard lets you view the same information, but for all Mediator service components running on the Mediator service engine.

Each section of the dashboard includes links to further information that can help you monitor the status of your environment. The following sections describe the instance information in the different sections of the Dashboard page.

---

**Note:** When viewing instances for Mediator service components that use message resequencing, additional fields appear on some of the tabbed pages. These fields provide additional information about the resequencing groups.

---

### 17.1.1 Recent Instances Section

This section describes the types of information you can view for recent Mediator instances. You can select whether to view all instances or only running instances.

- **Instance ID:** The unique ID of a specific Mediator instance.
- **Component:** The name of the Mediator service component for which the instance was initiated (Mediator Engine Dashboard only).
- **Composite:** The name of the composite application in which the instance was initiated (Mediator Engine Dashboard only).
- **State:** The state of the specific Mediator instance. The possible states are described below.
  - **Stale:** The composite for which this Mediator instance was created is undeployed.
  - **Terminated by User:** The instance was terminated manually through Oracle Enterprise Manager Fusion Middleware Control, or automatically by a fault policy.
  - **Faulted:** The instance is faulted and cannot be recovered.
  - **Completed successfully:** Everything is fine with this instance and it ran successfully.
  - **Recovery required:** The instance is faulted and can be recovered manually through Oracle Enterprise Manager Fusion Middleware Control.
- For more information about recovering a fault, see [Section 18.3, "Recovering From Oracle Mediator Service Engine Faults"](#).
- **Running:** One or more routing rules of the Mediator instance are still running.
- **Start Date:** The date when the Mediator instance was started.
- **Last Modified Date:** The date when the Mediator instance was last modified.
- **Source:** The operation or event that triggered the Mediator instance.
- **Logs:** The location of the log file containing the log messages related to the Mediator instance.

### 17.1.2 Components Section

This section appears on the Mediator Engine Dashboard only, and displays the following information about the Mediator service components running on the Mediator service engine.

- **Name :** The name of each Mediator service component running on the service engine.
- **Composite:** The name of each composite that includes a Mediator service component running on the service engine.
- **Status:** An indicator of whether the Mediator service component is up or down.
- **Total Instances:** The number of total instances processed or being processed for the service component.
- **Running Instances:** The number of instance currently being processed for the service component.
- **Recoverable Instances:** The number of faulted instances that are recoverable.

- **Non Recoverable Instances:** The number of faulted instances that are not recoverable.

### 17.1.3 Recent Faults Section

This section provides the following information about the recent faults that occurred while the Mediator service component or service engine was running:

- **Error Message:** The detailed error message associated with the faulted instance.
- **Recovery:** An indicator of whether the fault is recoverable or not. If a fault is marked as recoverable on the Mediator Component Dashboard, you can select it and choose a recovery action from the **Recovery Actions** list. You can also click **Recover** for that fault to access more recovery options at the service component instance level.
- **Fault Time:** The time when the fault occurred in the instance.
- **Component:** The name of the Mediator service component in which the fault occurred (on the Mediator Engine Dashboard only).
- **Component Instance ID:** The unique ID of the Mediator service component instance.
- **Case:** The routing source case where the fault occurred.
- **Logs:** The log file containing the log message related to the fault. Click this link to see more details about the fault and potential causes of the fault.

For more details about the information available on the Faults page, see [Section 18.3, "Recovering From Oracle Mediator Service Engine Faults"](#).

### 17.1.4 Routing Statistics Section

This section is on the Mediator Component Dashboard only, and provides the following information about the routing data of a source operation or subscribed event.

- **Number of Successfully Processed Messages:** The number of messages successfully processed for the selected route source.
- **Number of Faulted Messages:** The number of messages that threw faults for the selected route source.
- **Number of Incoming Messages:** The total number of incoming messages for the selected route source.
- **Average Processing Time for Successful Messages:** The average time taken to process each successful message for the selected route source.
- **Average Processing Time for Faulted Messages** -The average time taken to process each faulted message.

The **Route Target** subsection in the **Routing Statistics** section displays statistics of the target routes for the Mediator service component. This section provides the following information about an Mediator service component instance:

- **Name:** The name of the route target of the Mediator service component.
- **Error:** The number of errors that occurred during routing.
- **Average Processing Time:** The average processing time for the instances of the Mediator service component. This field has two subfields, **Success** and **Failure**. The Success subfield shows the average processing time for the instances of the

Mediator service component that were processed successfully. The Failure subfield shows the average processing time for the instances of the specific Mediator service component that failed to process successfully.

- **Average Invocation Time:** The average invocation time for the instances of the Mediator service component.

### 17.1.5 Instance Rate Per Min Section

This section provides information about the execution rate of the Mediator instances per minute. This section displays a graph that shows real-time data for successful, faulted, and incoming instances in the last five minutes.

You can view the instance rate for the last five minutes in tabular form by clicking **Table View**.

## 17.2 Monitoring Oracle Mediator Service Component Instances and Faults

You can perform any of the following component-level monitoring tasks from the Mediator Component home page on Oracle Enterprise Manager Fusion Middleware Control:

- [Monitoring Oracle Mediator Service Component Recent Instances and Faults](#)
- [Monitoring Oracle Mediator Service Component Instances](#)
- [Monitoring Oracle Mediator Service Component Faults](#)
- [Monitoring Oracle Mediator Routing Statistics](#)
- [Monitoring Audit Trail and Fault Details for an Oracle Mediator Component Instance](#)

### 17.2.1 Monitoring Oracle Mediator Service Component Recent Instances and Faults

The Mediator Component Dashboard displays information about recent instances and faults. Each service component in a SOA composite application has its own instance ID. These IDs are different from the overall instance ID of the SOA composite application of which each service component is a part.

To monitor Mediator service component instances and faults:

1. Access the SOA Composite home Page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select Home.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Expand <b>soa-infra</b>, and then select a specific SOA composite application.</li> </ol>

2. In the **Component Metrics** section, select the Mediator service component.
3. Click the **Dashboard** tab.

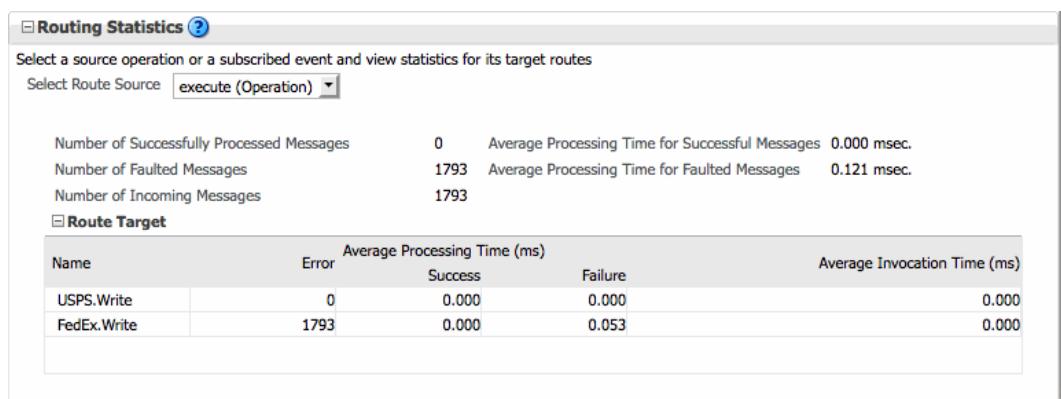
The screenshot shows the Oracle Mediator Dashboard for the FODOrderProcessingComposite [20.0] service component. The top navigation bar includes 'Topology', 'FODOrderProcessingComposite [20.0] (Mediator Component)', 'SOA Composite', 'Logged in as weblogic', and 'Page Refreshed Aug 25, 2010 3:08:27 PM PDT'. Below the navigation is a breadcrumb trail: FODOrderProcessingComposite [20.0] > OrderFulfillment. The main content area has tabs for 'Dashboard' (selected), 'Instances', 'Faults', and 'Policies'. The 'Recent Instances' section displays a table with columns: Instance ID, State, Start Date, Last Modified Date, Source, and Logs. It shows five running instances, all labeled 'execute'. The 'Recent Faults' section displays a table with columns: Error Message, Recovery, Fault Time, Component Instance ID, Case, and Logs. It shows five recoverable faults, all related to 'FedEx.Write' and 'Exception occurred when binding'. There are also sections for 'Routing Statistics' and 'Instance Rate per Min (Real-Time Data)'.

The Dashboard page displays the information described in [Section 17.1, "Introduction to the Oracle Mediator Dashboard Pages."](#)

4. In the **Recent Instances** section, perform any of the following tasks:
  - a. In the **Instance ID** column, click an instance ID to view its instance details, including an audit trail and faults.
  - b. In the **Logs** column, click a log icon to access the Log Messages page with messages specific to that instance.
  - c. Click **Show Only Running Instances** to view only those instances that are in the running state.
  - d. Click **Show More** below the section to access the Instances page of the service component and view all instances of the service component.
5. In the **Recent Faults** section, perform any of the following tasks:
  - a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click **Recover Now** to perform fault recovery.
  - b. In the **Recovery** column, click a fault identified as **Recoverable** to perform fault recovery at the service component instance level.

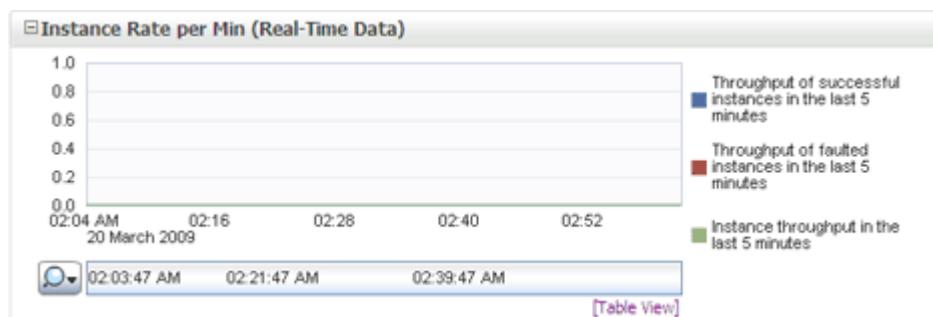
- c. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - d. Click **Show only system faults** to display only the faults that were caused by a system error. System faults are related to system failure issues, such as a database or network being inaccessible.
  - e. Click **Show More** below the section to access the Faults page of the service component and view all component faults.
6. Expand the **Routing Statistics** section and select an operation or event in the **Select Route Source** field.

View the statistics for the selected operation or event. To view additional information, expand the **Route Target** section.



7. Expand the **Instance Rate per Min (Real-Time Data)** section to view a graphical representation of the number of successful, faulted, and incoming (pending) instances of the Mediator service component over a specific time range.

Click **Table View** to display the same information in a tabular format.



For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#). For information about viewing and searching log files, see *Oracle Fusion Middleware Administrator's Guide*.

## 17.2.2 Monitoring Oracle Mediator Service Component Instances

The Instances page on the Mediator Component home page lets you search for a Mediator service component instance and view information about an instance based on the criteria specified.

To monitor the instance statistics of a Mediator service component:

1. Access the SOA Composite home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Expand <b>soa-infra</b> , and then select a specific SOA composite application.
2. Select the <b>Deployed Composites</b> tab.	
3. In the <b>Composite</b> section, select a specific SOA composite application.	

2. In the **Component Metrics** section, select the Mediator service component.
3. Click the **Instances** tab.

The screenshot shows the SOA Composite OrderFulfillment page. At the top, there's a search bar with fields for Instance ID, Start Time From, Start Time To, Modified Date From, and Modified Date To. Below the search bar is a table titled 'View' containing 11 rows of mediator instance data. The columns are: Instance ID, State, Start Date, Last Modified Date, Source, and Logs. All instances listed have a red 'X' icon next to their state, indicating they are faulted. The 'Logs' column contains small blue icons for each instance.

Instance ID	State	Start Date	Last Modified Date	Source	Logs
mediator:35ED05AC	Faulted	Aug 25, 2010 3:55:01 AM	Aug 25, 2010 3:55:02 AM	execute	
mediator:831BE450	Faulted	Aug 25, 2010 3:50:01 AM	Aug 25, 2010 3:50:01 AM	execute	
mediator:D04C70BC	Faulted	Aug 25, 2010 3:45:01 AM	Aug 25, 2010 3:45:02 AM	execute	
mediator:1D71D98C	Faulted	Aug 25, 2010 3:40:01 AM	Aug 25, 2010 3:40:01 AM	execute	
mediator:6A9C7270	Faulted	Aug 25, 2010 3:35:01 AM	Aug 25, 2010 3:35:01 AM	execute	
mediator:B7C3FE21	Faulted	Aug 25, 2010 3:30:01 AM	Aug 25, 2010 3:30:01 AM	execute	
mediator:04F06BD1	Faulted	Aug 25, 2010 3:25:01 AM	Aug 25, 2010 3:25:01 AM	execute	
mediator:521D75C0	Faulted	Aug 25, 2010 3:20:01 AM	Aug 25, 2010 3:20:01 AM	execute	
mediator:9F4A5BA0	Faulted	Aug 25, 2010 3:15:01 AM	Aug 25, 2010 3:15:01 AM	execute	
mediator:EC73B910	Faulted	Aug 25, 2010 3:10:01 AM	Aug 25, 2010 3:10:01 AM	execute	
mediator:399D4090	Faulted	Aug 25, 2010 3:05:01 AM	Aug 25, 2010 3:05:01 AM	execute	
mediator:86C4A530	Faulted	Aug 25, 2010 3:00:01 AM	Aug 25, 2010 3:00:01 AM	execute	

4. To perform a search, enter criteria into any of the available fields, and then click **Search**. For the date and time fields, you can click the calendar icon next to the field to select a date or time. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.

For information about the fields displayed on the Instances page, see [Section 17.1.1, "Recent Instances Section."](#)

### 17.2.3 Monitoring Oracle Mediator Service Component Faults

The Faults page of the Mediator Component home page lets you search for faults based on the specified criteria, to view information about faulted instances, and to recover or terminate multiple faults.

To monitor the faults for a Mediator service component:

1. Access the SOA Composite home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>Select <b>Home</b>.</li> <li>Select the <b>Deployed Composites</b> tab.</li> <li>In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>Expand <b>soa-infra</b>, and then select a specific SOA composite application.</li> </ol>
	<ol style="list-style-type: none"> <li>In the <b>Component Metrics</b> section, select the Mediator service component.</li> </ol>
<ol style="list-style-type: none"> <li>Click the <b>Faults</b> tab.</li> </ol>	

The screenshot shows the Oracle SOA Composite interface for the 'FileInToFileOut' mediator component. The 'Faults' tab is selected. The page header indicates the page was refreshed on 18 Mar, 2009 at 2:03:31 PM PDT. The main content area displays a table of recent faults. The columns include Error Message, Recovery, Fault Time, Component Instance ID, Case, and Logs. Each row shows a fault entry with a recoverable icon and a link to the fault details.

Error Message	Recovery	Fault Time	Component Instance ID	Case	Logs
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:33:06 AM	mediator:7C59A7...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:33:01 AM	mediator:79651F...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:32:56 AM	mediator:7646C8...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:32:51 AM	mediator:734B80...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:32:46 AM	mediator:70530A...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:31:51 AM	mediator:4F7D95...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:31:46 AM	mediator:4C80A9...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:31:41 AM	mediator:49803A...	FileOut....	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Bind...	Recover...	13 Mar, 2009 6:31:36 AM	mediator:4681EE...	FileOut....	<a href="#">Logs</a>

- To perform a search, enter criteria into any of the available fields, and then click **Search**. For the date and time fields, you can click the calendar icon next to the field to select a date or time. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.

For information about the fields displayed on the Faults page, see the [Section 17.1.3, "Recent Faults Section."](#) For information on handling faults, see [Section 18.1, "Recovering From Oracle Mediator Service Component Faults."](#)

## 17.2.4 Monitoring Oracle Mediator Routing Statistics

The **Routing Statistics** section of the Dashboard page in the Mediator Component home page displays the routing data of a source operation or subscribed event.

To monitor the routing statistics of a Mediator service component:

- Access the SOA Composite home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>Select <b>Home</b>.</li> <li>Select the <b>Deployed Composites</b> tab.</li> <li>In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>Expand <b>soa-infra</b>, and then select a specific SOA composite application.</li> </ol>

2. In the **Component Metrics** section, select the Mediator service component.
3. Click the **Dashboard** tab.
4. In the **Routing Statistics** section, select a routing source from the **Select Route Source** list.

The screenshot shows the 'Routing Statistics' page with the following details:

Select a source operation or a subscribed event and view statistics for its target routes  
Select Route Source: execute (Operation)

	0	Average Processing Time for Successful Messages	0.000 msec.
Number of Successfully Processed Messages	0	Average Processing Time for Successful Messages	0.000 msec.
Number of Faulted Messages	1793	Average Processing Time for Faulted Messages	0.121 msec.
Number of Incoming Messages	1793		

**Route Target**

5. Expand the **Route Target** table.

The screenshot shows the 'Routing Statistics' page with the 'Route Target' table expanded:

Select a source operation or a subscribed event and view statistics for its target routes  
Select Route Source: execute (Operation)

	0	Average Processing Time for Successful Messages	0.000 msec.
Number of Successfully Processed Messages	0	Average Processing Time for Successful Messages	0.000 msec.
Number of Faulted Messages	1793	Average Processing Time for Faulted Messages	0.121 msec.
Number of Incoming Messages	1793		

**Route Target**

Name	Error	Average Processing Time (ms)		Average Invocation Time (ms)
		Success	Failure	
USPS.Write	0	0.000	0.000	0.000
FedEx.Write	1793	0.000	0.053	0.000

6. View the routing statistics for all targets in the **Route Target** table.

For information about the fields displayed in the **Routing Statistics** section, see [Section 17.1.4, "Routing Statistics Section."](#)

### 17.2.5 Monitoring Audit Trail and Fault Details for an Oracle Mediator Component Instance

You can click the links on the Mediator Component Dashboard, Instances, and Faults pages to view audit trail and fault information for the instance. You can also access this information from the Mediator Engine Dashboard, Instances, and Faults pages.

To view audit trail and fault details:

1. Access the SOA Composite home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Expand <b>soa-infra</b> , and then select a specific SOA composite application.
2. Select the <b>Deployed Composites</b> tab.	
3. In the <b>Composite</b> section, select a specific SOA composite application.	

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
2. In the <b>Component Metrics</b> section, select the Mediator service component.	
3. Click the <b>Dashboard</b> tab, or click the <b>Instances</b> or <b>Faults</b> tab and perform a search.	

- Select the instance ID of the instance you want to view. On the Dashboard tab, you can click the instance ID from the Recent Instances or the Recent Faults section.

The Mediator Instance Details dialog appears with the audit trail displayed.

**Figure 17–1 Mediator Component Instance Audit Trail**

Flow Trace > Instance of Mediator1 Data Refreshed Mar 7, 2012 4:06:34 PM PST

**Instance Details of Mediator1** This page shows Mediator component instance details. Instance ID: mediator:55B6A03068A511E1BF3A938AA57BBAD8 Started: Mar 7, 2012 2:31:51 PM

**Audit Trail** **Faults**

Expand the payload nodes to view the details of the instance audit trail. Current Audit Level: development View Raw XML

- **onMessage**
  - Mar 7, 2012 2:31:51 PM Input payload received
  - + <payload>
  - Mar 7, 2012 2:31:51 PM **onCase "FileOut.Write"**
    - Mar 7, 2012 2:31:51 PM Evaluation of xpath condition "No Filter" resulted true
    - + <payload>
    - Mar 7, 2012 2:31:51 PM Transformed message part "body" using "xsl/purchaseOrder\_To\_purchaseOrder.xsl"
    - + <payload>
    - Mar 7, 2012 2:31:51 PM **Error during invoking 1-way operation "Write" on target service "FileOut"** Element 'items' not expected.
    - + <payload>

- To view a list of faults, click the **Faults** tab.
- To view detailed information about a specific fault, click the fault in the Message column.

**Figure 17–2 Mediator Component Instance Fault Details**

Flow Trace > Instance of Mediator1 Data Refreshed Mar 7, 2012 4:06:34 PM PST

**Instance Details of Mediator1** This page shows Mediator component instance details. Instance ID: mediator:55B6A03068A511E1BF3A938AA57BBAD8 Started: Mar 7, 2012 2:31:51 PM

**Audit Trail** **Faults**

This page lists all faults that have occurred in this component instance. If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance and attempts to recover from the fault.

<b>Error Message: ORAMED-03302</b>
Fault ID: 55B6A03068A511E1BF3A938AA57BBAD8
Fault Time: Mar 7, 2012 2:31:51 PM
<b>Non Recoverable System Fault:</b> ORAMED-03302:[Exception in oneway execution]Unexpected exception in one-way operation "Write" on reference "FileOut".Possible Fix:Check whether the reference service is properly configured and running or look at exception for analyzing the reason or contact Oracle Support Services. Cause:Schema validation failed for message part body. Please ensure at the message sender level that the data sent is schema compliant. Element 'items' not expected.

## 17.3 Monitoring Oracle Mediator Service Engine Instances and Faults

You can perform the following monitoring tasks at the Mediator service engine level from the Dashboard tab of the Mediator Engine home page in Oracle Enterprise Manager Middleware Control.

- Monitoring Oracle Mediator Service Engine Recent Instances and Faults
- Monitoring Oracle Mediator Service Engine Instances
- Monitoring Request Breakdown Statistics
- Monitoring Deployed Oracle Mediator Service Components in the Service Engine

### 17.3.1 Monitoring Oracle Mediator Service Engine Recent Instances and Faults

To monitor Mediator service engine instances and faults:

1. Access the Mediator Engine home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines and then select Mediator.	1. Right-click <b>soainfra</b> , point to <b>Service Engines</b> and then select <b>Mediator</b> .

2. Click the **Dashboard** tab.

The screenshot shows the Oracle SOA Infrastructure Home > Mediator Engine Home dashboard. The top navigation bar includes links for SOA Infrastructure, SOA Infrastructure Home, and Mediator Engine (Service Engine). The main content area has tabs for Dashboard, Statistics, Instances, Faults, and Deployed Components. The Dashboard tab is selected.

**Recent Instances:** Shows 36 running instances. A table lists instance details such as Instance ID, Component, Composite, State, Start Date, Last Modified Date, Source, and Logs. Examples include mediator:AE1CB5CC, mediator:A8259C40, mediator:A22E0D90, mediator:9C3916F0, and mediator:D177B980.

**Components:** Shows 4 components: Mediator1, FifoMediator, SOAPCustomerHeaderMediator, and AdminToLab\_Med. It displays metrics like Total Instances, Running Instances, and Faulted Instances (Recoverable and Non Recoverable).

**Recent Faults:** Shows a single fault entry: ORAMED-03302:[Exception in onew]. It includes columns for Error Message, Recovery, Fault Time, Composite, Component, Component Instance ID, Case, and Logs.

The Dashboard page displays the information described in [Section 17.1, "Introduction to the Oracle Mediator Dashboard Pages."](#)

3. In the **Recent Instances** section, perform any of the following tasks:
  - a. In the **Instance ID** column, click an instance ID to view its instance details, including an audit trail and faults.

- b. In the **Component** column, click a service component name to view the home page for that component.
  - c. In the **Composite** column, click a composite name to view the home page for the SOA composite.
  - d. In the **Logs** column, click a log icon to access the Log Messages page with messages specific to that instance.
  - e. Click **Show Only Running Instances** to view only those instances that are in the running state.
  - f. Click **Show More** below the section to access the Instances page of the service engine and view all instances of the service engine.
4. In the **Components** section, perform any of the following tasks:
  - a. In the **Name** column, click a service component name to view the Mediator Component Dashboard for that service component.
  - b. In the **Composite** column, click the name of a SOA composite to view the home page for that composite.
  - c. Click **Show More** below the section to access the Deployed Components page of the service engine and view all deployed Mediator components.
5. In the **Recent Faults** section, perform any of the following tasks:
  - a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click **Recover Now** to perform fault recovery.
  - b. In the **Recovery** column, click a fault identified as **Recoverable** to perform fault recovery at the service engine level.
  - c. In the **Composite** column, click a composite name to view the home page for the SOA composite.
  - d. In the **Component** column, click a service component name to view the home page for that component.
  - e. In the **Component Instance ID** column, click an instance ID to view its instance details, including an audit trail and faults.
  - f. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - g. Click **Show only system faults** to display only the faults that were caused by a system error. System faults are related to system failure issues, such as a database or network being inaccessible.
  - h. Click **Show More** below the section to access the Faults page of the service engine and view all service engine faults.

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#). For information about viewing and searching log files, see *Oracle Fusion Middleware Administrator's Guide*.

### 17.3.2 Monitoring Oracle Mediator Service Engine Instances

You can monitor all Mediator service component instances running in the service engine from the Mediator Engine home page. These service components can be part of several SOA composite applications.

To monitor Mediator service engine instances:

- Access the Mediator Engine home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > Mediator.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > Mediator.

- Click the **Instances** tab.

The Instances page includes two sections. The upper section lets you search for the instances to view and the lower section displays information about the instances returned by the search.

Instance ID	Component	Composite	State	Start Date	Last Modified Date	Source	Logs
mediator:AE1CB5C068D71	Mediator1	LargePayloadXslMedProj [2.0]	Completed	Mar 7, 2012 8:32:14 PM	Mar 7, 2012 8:32:14 PM	Read	<a href="#">Logs</a>
mediator:A8259C4068D71	Mediator1	AdminToLab_comp [1.0]	Completed	Mar 7, 2012 8:32:04 PM	Mar 7, 2012 8:32:04 PM	Read	<a href="#">Logs</a>
mediator:A22E0D9068D71	Mediator1	FIFO [1.0]	Completed	Mar 7, 2012 8:31:54 PM	Mar 7, 2012 8:31:54 PM	Read	<a href="#">Logs</a>
mediator:9C3916F068D71	Mediator1	LargePayloadXslMedProj [2.0]	Faulted	Mar 7, 2012 8:31:44 PM	Mar 7, 2012 8:31:44 PM	Read	<a href="#">Logs</a>
mediator:D177B98068D61	Mediator1	SOAPCustHeader [1.0]	Completed	Mar 7, 2012 8:26:04 PM	Mar 7, 2012 8:26:04 PM	Read	<a href="#">Logs</a>
mediator:BF948FE068D61	Mediator1	AdminToLab_comp [1.0]	Completed	Mar 7, 2012 8:25:34 PM	Mar 7, 2012 8:25:34 PM	Read	<a href="#">Logs</a>
mediator:B99D766068D61	Mediator1	FIFO [1.0]	Completed	Mar 7, 2012 8:25:24 PM	Mar 7, 2012 8:25:24 PM	Read	<a href="#">Logs</a>
mediator:78059F7068D61	Mediator1	LargePayloadXslMedProj [2.0]	Faulted	Mar 7, 2012 8:23:34 PM	Mar 7, 2012 8:23:34 PM	Read	<a href="#">Logs</a>
mediator:D24203D068D51	Mediator1	AdminToLab_comp [1.0]	Completed	Mar 7, 2012 8:18:56 PM	Mar 7, 2012 8:18:56 PM	Read	<a href="#">Logs</a>
mediator:CC663A8068D51	Mediator1	SOAPCustHeader [1.0]	Faulted	Mar 7, 2012 8:18:46 PM	Mar 7, 2012 8:18:46 PM	Read	<a href="#">Logs</a>
mediator:3644805068AF1	Mediator1	LargePayloadXslMedProj [2.0]	Stale	Mar 7, 2012 3:42:33 PM	Mar 7, 2012 3:42:33 PM	Read	<a href="#">Logs</a>
mediator:304DB4F068AF1	Mediator1	FIFO [1.0]	Stale	Mar 7, 2012 3:42:23 PM	Mar 7, 2012 3:42:23 PM	Read	<a href="#">Logs</a>

**Note:** Undeploying a SOA composite application instance does not cause the instance to complete. Undeployment marks running service component instances of that composite as stale. However, service component instances of that composite instance that are complete are not marked as stale.

- In the **Search** section, enter any of the search criteria and click **Search**. To clear the search fields, click **Reset**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- In the **Instances** section, perform any of the following monitoring tasks:
  - In the **Instance ID** column, click an instance ID for a service component to view its audit trail, process flow, and faults.
  - In the **Component** column, click a specific service component to access its home page.

- c. In the **Composite** column, click a specific SOA composite application to access its home page.
- d. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

### 17.3.3 Monitoring Request Breakdown Statistics

You can assess the efficiency level of the Mediator service engine by monitoring the request breakdown statistics.

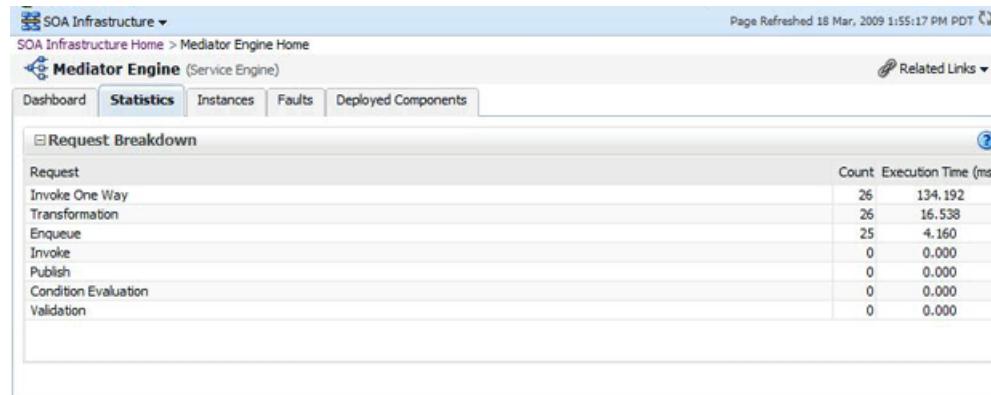
To monitor the request breakdown statistics of the currently deployed Mediator service components:

1. Access the Mediator Engine home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > Mediator.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > Mediator.

The Mediator Engine home page appears.

2. Click the **Statistics** tab.
3. View the request breakdown statistics.



The screenshot shows the Mediator Engine Statistics page. At the top, there are tabs for Dashboard, Statistics (which is selected), Instances, Faults, and Deployed Components. Below the tabs is a section titled 'Request Breakdown' with a table. The table has columns for Request type, Count, and Execution Time (ms). The data is as follows:

Request	Count	Execution Time (ms)
Invoke One Way	26	134.192
Transformation	26	16.538
Enqueue	25	4.160
Invoke	0	0.000
Publish	0	0.000
Condition Evaluation	0	0.000
Validation	0	0.000

The **Request Breakdown** section provides information about the count and the average time taken for processing the following actions:

- **Invoke One Way:** One-way invocations from the Mediator service engine.
- **Transformation:** Transforming messages in the Mediator service engine.
- **Enqueue:** Dehydrating messages for parallel routing rules.

---

**Note:** Dehydrating of messages means storing the incoming messages in the database for parallel routing rules for processing later by worker threads.

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- **Invoke:** Request-response invocations from the Mediator Service Engine.

- **Publish:** Publishing events from the Mediator service engine.
- **Condition Evaluation:** Filtering conditions for evaluation by the Mediator service engine.
- **Validation:** Message validations by the Mediator service engine.

#### 17.3.4 Monitoring Deployed Oracle Mediator Service Components in the Service Engine

You can monitor all deployed SOA composite applications with Mediator service components running in the service engine.

To monitor deployed Mediator components in service engines:

1. Access the Mediator Engine home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > Mediator.	1. Right-click <b>soa-infra</b> .
	2. Select Service Engines > Mediator.

2. Click the **Deployed Components** tab.

The Deployed Components page includes two sections. The upper section lets you search for the components to view and the lower section displays information about the components returned by the search.

Name	Composite	Status	Total Instance	Running Instances	Faulted Instances	Recoverable	Non Recoverable
Mediator1	LargePayloadXslMedProj [2.0]	Up	36	3	0	1	0
Mediator	AsyncMediatorSample [1.0]	Up	12	1	0	0	0
lookupDVMMediator	simpleDVMProj [1.0]	Up	20	2	3	0	0
LookupMultiplevaluesMediator	MultivalueProj [1.0]	Up	32	6	0	0	0
OrderPublisher	EventMediatorDemo [1.0]	Up	17	3	0	0	0
EventMediator	EventMediatorDemo [1.0]	Up	12	2	0	0	0
Mediator1	FiFo [1.0]	Up	7	0	0	0	0
SOAPCustomerHeaderMediator	SOAPCustomerHeaderTest [1.0]	Up	20	3	0	0	0
Mediator1	AdminToLab_comp [1.0]	Up	12	0	0	0	0
ProcessOrders	HierarchicalValue [1.0]	Up	17	6	1	0	0

3. In the **Name** column, click a specific service component to access its home page.
4. In the **Composite** column, click a specific SOA composite application to access its home page.

## 17.4 Monitoring Resequenced Messages

You can monitor the resequenced messages from the Mediator Component home page and the Mediator Instance Dialog. The following topics describe the monitoring processes:

- [Section 17.4.1, "Monitoring Resequenced Messages from the Mediator Service Component Home Page"](#)
- [Section 17.4.2, "Monitoring Resequenced Messages from the Mediator Instance Dialog"](#)

### 17.4.1 Monitoring Resequenced Messages from the Mediator Service Component Home Page

On the Mediator Component home page, the Dashboard, Instances, and Faults pages include additional fields for monitoring components that use the resequencing feature. These additional fields only appear when the Mediator service component you are monitoring includes a resequencer.

#### 17.4.1.1 Dashboard Page

The Dashboard page of the Mediator Component home page has one additional column, **Group**, in the **Recent Instances** and **Recent Faults** tables. This field contains the group ID of the resequenced messages. If you click the group ID for a row, additional information about the group appears. For more information, see [Section 17.4.1.4, "Mediator Resequencing Group Dialog."](#) For more information about the Dashboard page, see [Section 17.1, "Introduction to the Oracle Mediator Dashboard Pages."](#)

#### 17.4.1.2 Instances Page

As shown in [Figure 17–3](#), the Instances page of the Mediator Component home page provides an additional search field, **Resequencing Group**, so you can search for a Mediator component instance based on group criteria. The **Instances** section, which displays information about Mediator service component instances that match the search criteria, has one additional column, **Group**. This column contains the group ID of the resequenced messages. If you click the group ID for a row, additional information about the group appears. For more information, see [Section 17.4.1.4, "Mediator Resequencing Group Dialog."](#) For more information about the Instances page, see [Section 17.2.2, "Monitoring Oracle Mediator Service Component Instances."](#)

**Figure 17–3 Instances Page for Resequenced Messages**

The screenshot shows the 'Instances' tab of the Mediator component's home page. At the top, there is a search bar with fields for Instance ID, Start Time From, Start Time To, Modified Date From, and Modified Date To. Below the search bar is a table with columns: Group, Instance ID, State, Start Date, Last Modified Date, Source, and Logs. The table contains several rows of data, each representing a mediator instance with its status and timestamp.

Group	Instance ID	State	Start Date	Last Modified Date	Source	Logs
san4	mediator:85D930...	Completed	6 Aug, 2009 11:35:39 PM	7 Aug, 2009 4:55:25 AM	execute	
san3	mediator:80DE9F...	Completed	6 Aug, 2009 11:35:31 PM	8 Aug, 2009 1:22:24 AM	execute	
san2	mediator:7CB7B2...	Terminated	6 Aug, 2009 11:35:24 PM	6 Aug, 2009 11:35:34 PM	execute	
san1	mediator:64F3B6...	Recovery Needed	6 Aug, 2009 11:34:44 PM	6 Aug, 2009 11:34:54 PM	execute	
grp1	mediator:6FAD12...	Completed	6 Aug, 2009 12:12:01 AM	6 Aug, 2009 12:17:19 AM	execute	
grp1	mediator:5C3A33...	Completed	6 Aug, 2009 12:11:55 AM	6 Aug, 2009 12:17:19 AM	execute	
grp1	mediator:402D31...	Completed	6 Aug, 2009 12:10:41 AM	6 Aug, 2009 12:10:48 AM	execute	
grp1	mediator:3CBEBE...	Completed	6 Aug, 2009 12:10:35 AM	6 Aug, 2009 12:10:38 AM	execute	
grp1	mediator:2FEF7A...	Completed	6 Aug, 2009 12:10:14 AM	6 Aug, 2009 12:10:20 AM	execute	

#### 17.4.1.3 Faults Page

As shown in [Figure 17–4](#), the Faults page of the Mediator Component home page provides an additional search field, **Resequencing Group**, so you can search for Mediator service component instances based on group criteria. The **Faults** section, which displays information about Mediator component instances that match the search criteria, provides one additional column, **Group**. This column contains the group ID of the resequenced messages. If you click the group ID for a row, additional information about the group appears. For more information, see [Section 17.4.1.4, "Mediator Resequencing Group Dialog."](#) For more information about the Faults page, see [Section 18.3, "Recovering From Oracle Mediator Service Engine Faults."](#)

**Figure 17–4 Faults Page for Resequenced Messages**

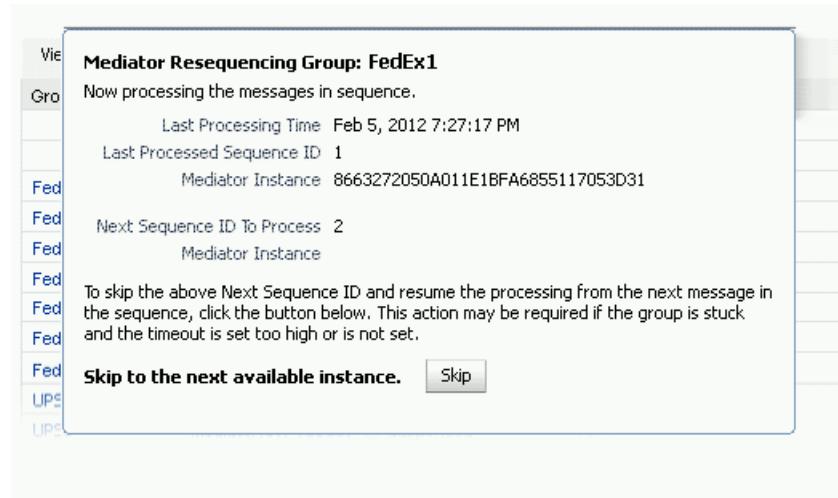
The screenshot shows the 'Faults' tab of the Mediator component's home page. At the top, there is a search bar with fields for Error Message Contains, Fault ID, Fault Time From, Fault Time To, Composite Instance ID, Component Instance ID, and Resequencing Group. Below the search bar is a table with columns: Group, Error Message, Recovery, Fault Time, Component Instance ID, Case, and Logs. The table contains one row of data, representing a fault with its details.

Group	Error Message	Recovery	Fault Time	Component Instance ID	Case	Logs
san1	Exception occurred when binding was invoked: Exception occurred during invocation of JCA binding: *JCA Binding execute of Reference oper	Recover...	6 Aug, 2009 11:34:44 PM	mediator:64F3B6...	FileOut....	

#### 17.4.1.4 Mediator Resequencing Group Dialog

If all the messages in a group are processed without any fault or timeout interval, the Mediator Resequencing Group dialog displays a message indicating that the group is working. For standard resequencer groups, this dialog also provides an option to skip the next sequence ID and resume processing from the following message in the sequence. In this case, the group is still running, but might be waiting for a message that will never arrive. [Figure 17–5](#) illustrates the dialog.

**Figure 17–5 Mediator Resequencing Group Dialog**



The Mediator Resequencing Group dialog provides the following information about a group:

- Whether the group is timed-out or faulted
- The blocking message in the group, if any
- The next message to be processed after the group is unlocked
- The time after which the processing of the messages in the group stopped
- The instruction text to unlock the group

When processing of messages in a group is suspended due to a fault or a timeout, the Mediator Resequencing Group dialog provides information about the suspended group. The processing of messages in a group can be suspended for the following reasons:

- [Group Is Faulted](#)
- [Group Is Timed-out](#)
- [Group Is Faulted Due to a System Error](#)

#### Group Is Faulted

A group is in the faulted state when one of its messages throws an error while it is processed, as shown in [Figure 17–6](#). The following information is displayed for a faulted group:

- The sequence ID of the faulted message
- The sequence ID of the next message to be processed, along with its Mediator Instance ID

Click **Recover Now** to access the Faults page of the Mediator Instance Details page to perform single fault recovery.

**Figure 17–6 Group Is Faulted**

**Mediator Resequencing Group: FedEx1**

**Faulted:** The processing of messages in this group is suspended due to a fault.

Fault Time: Jun 15, 2009 1:16:27 PM  
Faulted Sequence ID: 2  
Mediator Instance: 79A4CB4059FB11DEBFEAD9610458E24D

Next Sequence ID To Process: 3  
Mediator Instance: 7B4A3DE059FB11DEBFEAD9610458E24D

The processing of the messages in the group will resume from the next Sequence ID after the faulted instance is recovered.

**Recover the faulted instance:**

### Group Is Timed-out

A group is in the timed-out state when processing of the group stops while waiting for an expected message, as shown in [Figure 17–7](#). The following information is displayed for a timed-out group:

- The sequence ID of the last processed message
- The sequence ID of the next message to be processed, along with its Mediator Instance ID

Click **Skip** to unlock the group and start processing the next available instances in the group.

**Figure 17–7 Group Is Timed Out**

**Mediator Resequencing Group: UPS3**

**Timed Out:** The processing of messages in this group is suspended due to a timeout.

Last Processing Time: Jun 10, 2009 11:27:42 AM  
Last Processed Sequence ID: 1  
Mediator Instance: 6639F25059AB305E90W2JET305U734FW

Next Sequence ID To Process: 2  
Mediator Instance: 6B2D306059AB305E90W2JET305U734FW

To resume the processing of the messages in the group, you must skip to the next available Sequence ID. Any messages with Sequence IDs between the Last and the Next will not be processed.

**Skip to the next available instance:**

### Group Is Faulted Due to a System Error

A group can be in a faulted state when processing of the group is suspended due to a system error, as shown in [Figure 17–8](#). This is a special case for a Faulted Group; the group is not timed out and there is no faulted message for the group. The groups in this state can be described as Errored Groups. The following information is displayed for an Errored Group:

- The sequence ID of the last processed message
- The sequence ID of the next message to be processed, along with its Mediator Instance ID

Click **Retry** to unlock the group and start processing the next instances in the group.

**Figure 17–8 Group Is Faulted Due to a System Error**



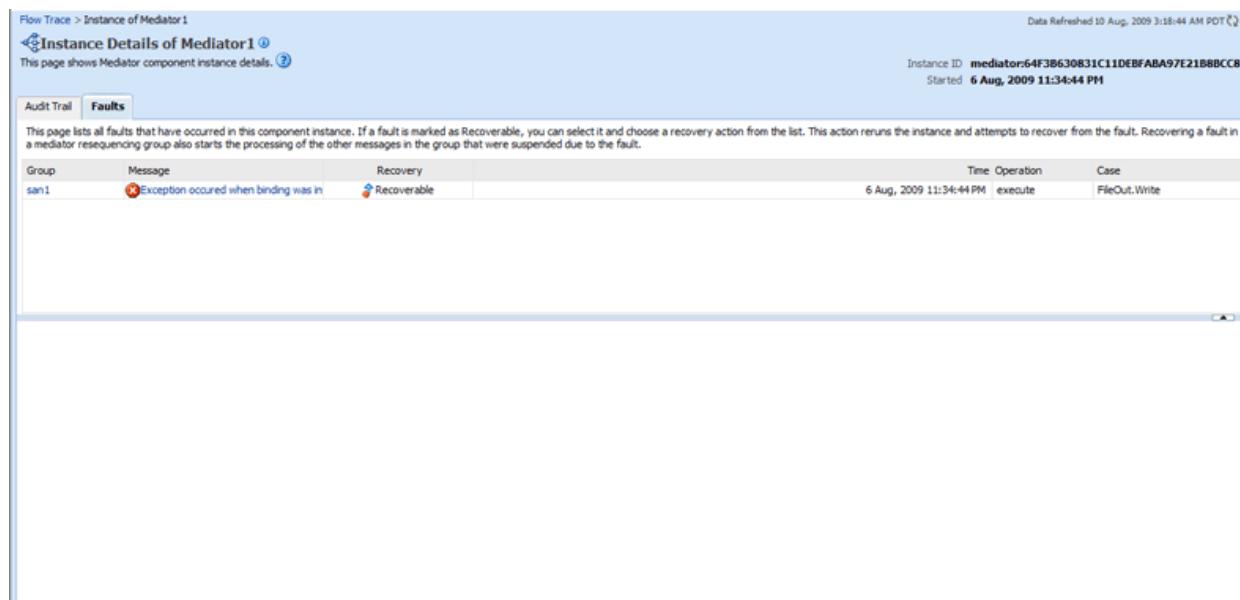
## 17.4.2 Monitoring Resequenced Messages from the Mediator Instance Dialog

The Faults page of the Mediator Instance Details dialog provides the following resequencer-specific information:

- Group ID of the resequenced message
- Operation performed on the resequenced message (Figure 17–9)

For more information about the Mediator Instance Details dialog, see Figure 17.2.5.

**Figure 17–9 Resequenced Message Faults on the Mediator Instance Details Dialog**



If you click a fault message, more information about the fault appears, as shown in Figure 17–10. If you click **Retry**, the Mediator service engine tries to reprocess the message. If you click **Abort**, the Mediator service engine terminates the faulted message, unlocks the group, and then resumes processing from the next message in the sequence.

**Figure 17–10 Fault Message Details for Resequenced Messages**

Flow Trace > Instance of Mediator1 Data Refreshed 10 Aug. 2009 3:15:18 AM PDT

**Instance Details of Mediator1** This page shows Mediator component instance details.

Audit Trail Faults

This page lists all faults that have occurred in this component instance. If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance and attempts to recover from the fault. Recovering a fault in a mediator resequencing group also starts the processing of the other messages in the group that were suspended due to the fault.

Time	Operation	Case
6 Aug, 2009 11:34:44 PM	execute	FileOut,Write

**Error Message:** Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Binding execute of Reference operation 'Write' failed due to: Invalid Output Directory. Invalid Out Fault ID: 6A567EF0831C11DEBFABA97E21B88CC8 Fault Time: 6 Aug, 2009 11:34:44 PM

**System Fault:** Exception occurred when binding was invoked. Exception occurred during invocation of JCA binding: "JCA Binding execute of Reference operation 'Write' failed due to: Invalid Output Directory, Invalid Output Directory. The value specified for the output (Physical/Logical) Directory interaction parameter or jca binding property has an invalid value: "/tmp/test". The invoked JCA adapter raised a resource exception. Please examine the above error message carefully to determine a resolution.

**This fault can be recovered.** To recover, select this fault in the table and choose a recovery action from the recovery panel.

Recover Fault:6A567EF0831C11DEBFABA97E21B88CC8 Modify the variable information and choose one of the available recovery actions.

Retry Abort

Resubmit Location Request  
Payload Part request  
Payload

```
<ns1:odata xmlns:ns1="http://www.example.org">
<ns1:group0><ns1:group0>
<ns1:group0>001</ns1:group0>
</ns1:group0>
```



---

# Managing Oracle Mediator Service Components and Engines

This chapter describes how to manage Oracle Mediator service components and engines using Oracle Enterprise Manager Fusion Middleware Control. It provides instructions for viewing recovering faults, and attaching and detaching Mediator policies.

This chapter includes the following sections:

- [Section 18.1, "Recovering From Oracle Mediator Service Component Faults"](#)
- [Section 18.2, "Managing Oracle Mediator Policies"](#)
- [Section 18.3, "Recovering From Oracle Mediator Service Engine Faults"](#)

## 18.1 Recovering From Oracle Mediator Service Component Faults

You can monitor Mediator service component faults and perform individual and bulk recoveries for faults that are identified as recoverable.

To manage Mediator service component faults:

1. Access the SOA Component home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"><li>1. Select Home.</li><li>2. Select the Deployed Composites tab.</li><li>3. In the Composite section, select a specific SOA composite application.</li></ol>	<ol style="list-style-type: none"><li>1. Expand <b>soa-infra</b>, and then select a specific SOA composite application.</li></ol>

2. Select the Mediator service component in the **Component Metrics** section.
3. Click **Faults**.

The Faults page displays the following information:

- A utility that you can use to search for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for more information. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the service component, including the error message, whether you can recover from the fault, the time at which the fault occurred, service component instance ID, activity in which the fault occurred, and a link to a log file describing the fault.

If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance in which the fault occurred and attempts to recover from it. You can also perform a batch recovery by selecting multiple faults and choosing a recovery action. For additional recovery options, click the Recoverable link for an individual fault. To recover from a Human Workflow fault, select it and click Recover and then click the link to the Worklist application.

**Search**

Error Message Contains  Composite Instance ID   
 Fault ID  Component Instance ID   
 Fault Time From  (UTC-08:00) US Pacific Time  
 Fault Time To  (UTC-08:00) US Pacific Time

Show only recoverable faults  Fault Type All Faults

Select View Recovery Actions

Error Message	Recovery	Fault Time	Composite	Component	Component Instance ID	Case	Logs
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:33:06 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:7C59A7...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:33:01 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:79651F...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:32:56 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:7646C8...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:32:51 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:734E8B0...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:32:46 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:705304...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:31:51 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:4F7D95...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:31:46 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:4C80A9...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:31:41 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:49803A...	FileOut....	<a href="#">View</a>
Exception occurred when binding was invoked. Exception occurred	<a href="#">Recover...</a>	13 Mar, 2009 6:31:36 AM	TestResubmit [2.0]	<a href="#">FileInToFileOut</a>	mediator:4681EE...	FileOut....	<a href="#">View</a>

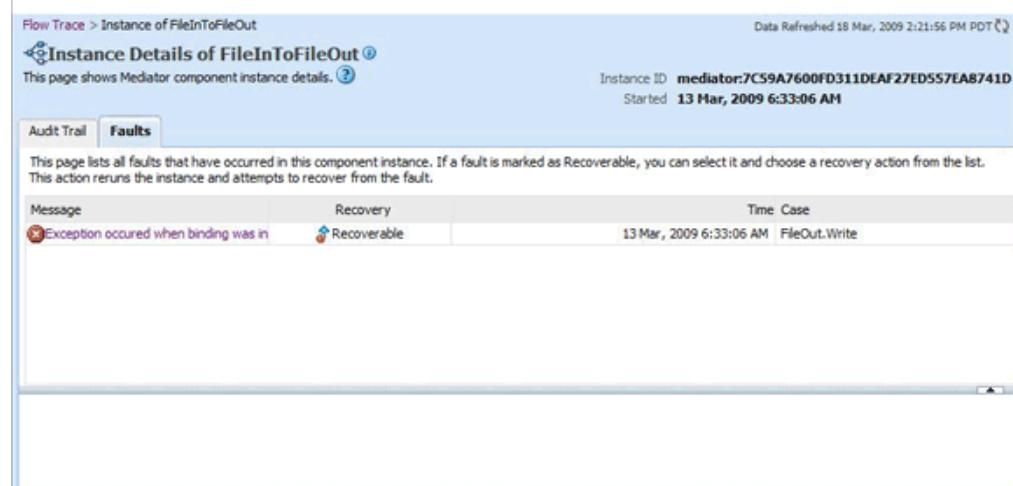
Mediator service component faults that are marked as recoverable can be recovered.

#### 4. Select faults for recovery using one of the following methods.

For...	Then...
Single fault recovery	<p>There are three options from which to choose for single fault recovery. Perform any of the following actions to recover a single fault.</p> <ul style="list-style-type: none"> <li>■ Click the row of the fault that has been identified as recoverable. With the row highlighted, select a specific action from the <b>Recovery Action</b> list, as described in Step 5.</li> <li>■ In the <b>Recovery</b> column, click the <b>Recover</b> link to access the Faults page of the instance audit trail to perform fault recovery. <a href="#">Figure 18-1</a> illustrates the fault page.</li> <li>■ In the <b>Error Message</b> column, click the message of a fault that has been identified as recoverable. This displays complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. Click <b>Recover Now</b> to access the Faults page of the instance audit trail to perform fault recovery. If there is no <b>Recover Now</b> option, the fault is not recoverable.</li> </ul>
Bulk fault recovery	<p>There are two options from which to choose for bulk fault recovery. Perform the following steps to recover multiple faults.</p> <ol style="list-style-type: none"> <li>1. Do one of the following:           <ul style="list-style-type: none"> <li>■ Use Shift+Click or Control+Click to select specific faults in the rows.</li> <li>■ From the <b>Select</b> menu, choose <b>Select All Recoverable</b>. Then use Shift+Click or Control+Click to deselect the faults to <i>not</i> include in the recovery operation.</li> </ul> </li> <li>2. Select an action from the <b>Recovery Action</b> list, as described in Step 5.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>

For...	Then...
Recovery of all faults	<p>Perform the following steps to recover all faults.</p> <ol style="list-style-type: none"> <li>1. From the <b>Select</b> menu, choose <b>Select All Recoverable</b>.</li> <li>2. Select an action from the <b>Recovery Action</b> list, as described in Step 5.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>

**Figure 18-1 Fault Tab on the Mediator Instance Detail Dialog**



5. If you did not already select a recovery method in the above step, select one of the following actions from the **Recovery Action** list.

Action	Description
<b>Retry</b>	Retries the instance directly. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope activity again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault. BPEL fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).

For more information, see the following documentation:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*
- *Oracle Fusion Middleware Administrator's Guide* for details about viewing and searching log files

## 18.2 Managing Oracle Mediator Policies

Oracle Fusion Middleware uses a policy-based model to manage web services. Policies apply behavioral requirements and security to the delivery of messages. You can view, attach, and detach policies for Mediator service components in currently deployed SOA composite applications.

The Policies page of the Mediator Component Home page provides the following information about a Mediator component instance:

- **Policy Name:** The name of the policy.
- **Policy Reference Status:** A toggle button that allows you to enable or disable a policy. Disabling a policy temporarily turns it off without detaching it. If the button says **Disable**, the policy is enabled; if it says **Enable**, the policy is disabled.
- **Category:** The category of the policy. It has the following values: Management, Reliable Messaging, MTOM Attachments, Security, and WS-Addressing.
- **Total Violations:** The total number of violations since the SOA Infrastructure was restarted.
- **Security Violation:** The number of violations in each category. Category can have the following values: Authentication, Authorization, Confidentiality, and Integrity.

---

**Note:** Before attaching policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use in your environment.

---

To manage Mediator policies:

1. Access the SOA Composite home page through one of the following options:

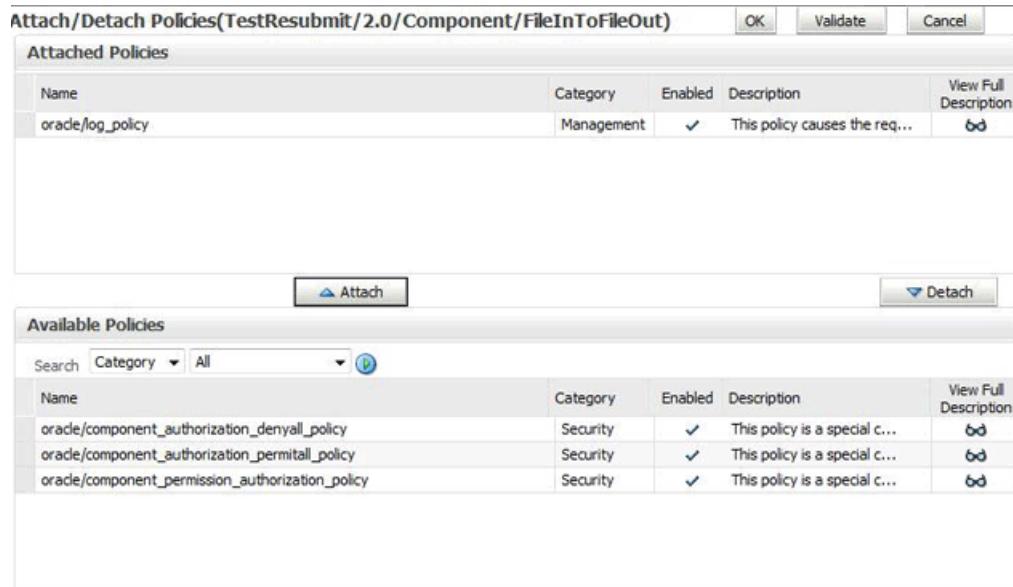
From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. Select the Mediator service component in the **Component Metrics** section.
3. Click the **Policies** tab.
4. View the policies attached to a Mediator component.

5. Click **Attach/Detach** to attach or detach a policy.

6. If multiple components are available, select the service or component to which you want to attach the policy.

The Attach/Detach Policies page appears with all attached policies displayed in the upper pane and all available policies displayed in the lower pane.



7. To attach a policy, select the policy in the lower pane and then click **Attach**.
8. To detach a policy, select the policy in the upper pane and then click **Detach**.
9. When you finish attaching or detaching policies, click **Validate**.
10. If any validation errors occur, make the necessary corrections and run the validation until no more errors occur.
11. Click **OK**.

The dialog closes and the attached policies appear in the policies table.

For more information, see the following documentation:

- [Section 1.4.3.2, "Introduction to Policies"](#)
- [Section 7.7, "Managing SOA Composite Application Policies"](#) for the dialogs that are displayed during policy attachment
- *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use for your environment

## 18.3 Recovering From Oracle Mediator Service Engine Faults

You can monitor and perform individual and bulk fault recoveries for Mediator service engines that are identified as recoverable. All Mediator service component faults, regardless of the SOA composite application instance of which they are a part, can be viewed in the Mediator service engine.

To manage Mediator service engine faults:

1. Access the SOA Composite home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>Select Service Engines &gt; Mediator.</li> </ol>	<ol style="list-style-type: none"> <li>Right-click <b>soa-infra</b>.</li> <li>Select Service Engines &gt; Mediator.</li> </ol>

The Mediator Engine home page appears.

## 2. Click **Faults**.

The Faults page displays the following:

- A utility so you can search for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for more information. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the service component, including the error message, whether you can recover from the fault, the time at which the fault occurred, service component instance ID, activity in which the fault occurred, and a link to a log file describing the fault.

If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance in which the fault occurred and attempts to recover from it. You can also perform a batch recovery by selecting multiple faults and choosing a recovery action. For additional recovery options, click the Recoverable link for an individual fault. To recover from a Human Workflow fault, select it and click Recover and then click the link to the Worklist application.

Error Message	Recovery	Fault Time	Composite	Component	Component Instance ID	Case	Logs
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:33:06 AM	TestResubmit [2.0]	FileInToFileOut	mediator:7C59A7...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:33:01 AM	TestResubmit [2.0]	FileInToFileOut	mediator:79651F...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:32:56 AM	TestResubmit [2.0]	FileInToFileOut	mediator:7646C8...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:32:51 AM	TestResubmit [2.0]	FileInToFileOut	mediator:734B80...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:32:46 AM	TestResubmit [2.0]	FileInToFileOut	mediator:70530A...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:31:51 AM	TestResubmit [2.0]	FileInToFileOut	mediator:4F7095...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:31:46 AM	TestResubmit [2.0]	FileInToFileOut	mediator:4C80A9...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:31:41 AM	TestResubmit [2.0]	FileInToFileOut	mediator:49803A...	FileOut...	
Exception occurred when binding was invoked. Exception occurred	Recover...	13 Mar, 2009 6:31:36 AM	TestResubmit [2.0]	FileInToFileOut	mediator:4681EE...	FileOut...	

Mediator service engine faults that are marked as recoverable can be recovered.

## 3. Select a fault or faults.

As with fault recovery at the SOA Infrastructure level, SOA composite application level, and Mediator service component level, you can perform single fault recovery, bulk fault recovery, and recovery of all faults. See Step 4 of [Section 18.1, "Recovering From Oracle Mediator Service Component Faults"](#) for instructions on selecting faults to perform these types of recovery.

## 4. If you did not select a recovery action in the previous step, select an action from the **Recovery Action** list.

Action	Description
<b>Retry</b>	Retries the instance with an option to provide a retry success action. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope activity again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulted activity as a success).

5. Perform the following additional monitoring tasks from within the faults table:
  - a. Click the **Show only recoverable faults** check box to only display faults from which you can recover.
  - b. From the **Fault Type** list, select to display all faults, system faults, business faults, or OWSM faults in the faults table. Click **Help** for a description of these fault types.
  - c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - d. In the **Composite** column, click a specific SOA composite application to access its home page.
  - e. In the **Component** column, click a specific service component to access its home page.
  - f. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Note that rejected messages do not have a component instance ID.

For more information, see the following documentation:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#) for conceptual details about faults
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*

## 18.4 Skipping Resequenced Messages

When a resequencing group is in the timed out state, you can skip the message that is blocking the group to begin processing again. In some cases, such as when there is no timeout duration set, a standard resequencing group might wait indefinitely without timing out and remain in the running state. In this case, you can skip the sequence ID it is waiting for even though the group has not yet timed out.

### 18.4.1 Skipping to the Next Sequence ID in a Running Group

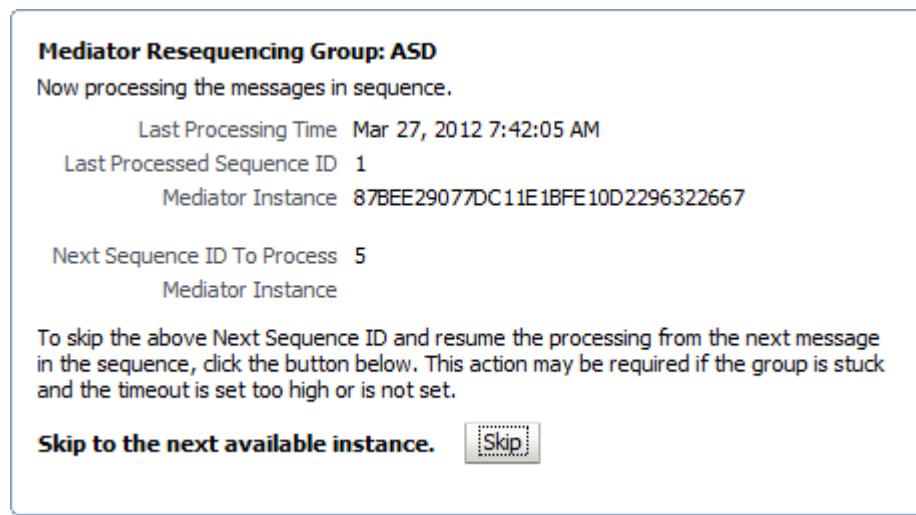
When a standard resequencing group is running and you know the next message is not going to arrive within the specified timeout duration (or there is no timeout duration), perform the following steps to skip the next expected sequence ID and begin processing the next available message.

To skip to the next sequence ID in a running group:

1. Access the SOA Component home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Expand <b>soa-infra</b> , and then select a specific SOA composite application.
2. Select the <b>Deployed Composites</b> tab.	
3. In the <b>Composite</b> section, select a specific SOA composite application.	
	2. Select the Mediator service component in the <b>Component Metrics</b> section.
	3. Do one of the following:
	<ul style="list-style-type: none"> <li>▪ In the <b>Recent Instances</b> list, click the group ID of the group for which you want to skip sequence IDs.</li> <li>▪ Click the <b>Instances</b> tab, perform a search for the instance, and in the results list, click the group ID of the group for which you want to skip sequence IDs.</li> </ul>
	The Mediator Resequencing Group Dialog appears.

**Figure 18–2 Mediator Resequencing Group Dialog with Skip Option (Running)**



4. To skip to the next sequence ID, click **Skip**.

---

**Note:** The Skip button only appears on the dialog for groups configured for the standard resequencer, and not best effort or FIFO resequencers. When you skip a message, it is always in the skipped state and is not purged by the purge scripts.

---

#### 18.4.2 Skipping to the Next Sequence ID in a Timed Out Group

When processing of a resequencing group stops while waiting for an expected message, the group is in a timed out state and no messages are processed. To remedy this, you need to skip the message that caused the timeout and move on to the next available sequence ID.

To skip to the next sequence ID in a timed out group:

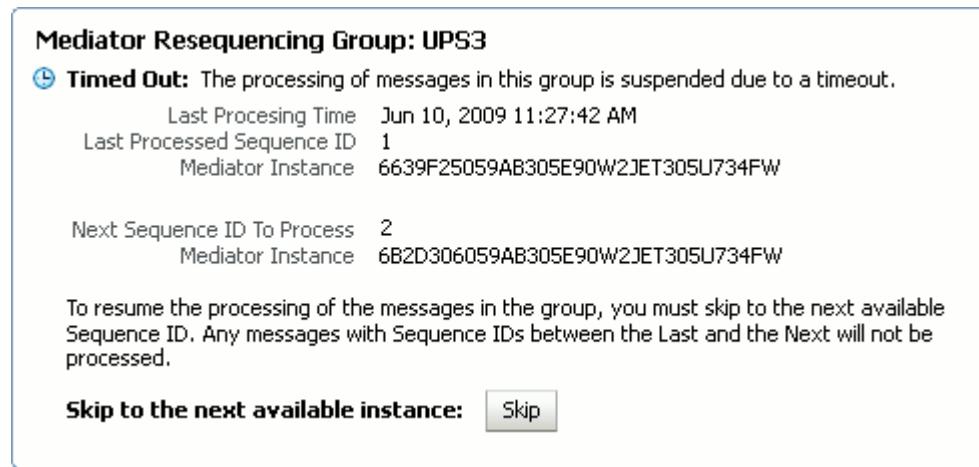
1. Access the SOA Component home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select Home.</li> <li>2. Select the Deployed Composites tab.</li> <li>3. In the Composite section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Expand <b>soa-infra</b>, and then select a specific SOA composite application.</li> </ol>

2. Select the Mediator service component in the **Component Metrics** section.
3. Do one of the following:
  - In the **Recent Instances** list, click the group ID of the group that is timed out.
  - Click the **Instances** tab, perform a search for the instance, and in the results list, click the group ID of the group that is timed out.

The Mediator Resequencing Group Dialog appears.

**Figure 18–3 Mediator Resequencing Group Dialog with Skip Option (Timed Out)**



4. To unlock the group and start processing the next instance in the group, click **Skip**.

---

**Note:** Mediator will not process any messages with sequence IDs between the sequence ID of the last message processed and the next message processed.

---



---

## Managing Cross-References

This chapter describes how to delete obsolete information from cross reference tables. Cross references are used to associate identifiers for equivalent entities created in different applications.

This chapter includes the following section:

- [Section 19.1, "Deleting Cross-Reference Values"](#)

For more information about cross-references, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

### 19.1 Deleting Cross-Reference Values

You can use the Cross References page to select tables and columns from which you want to delete the values.

To delete values from cross-reference tables:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > Cross References.	1. Right-click <code>soa-infra</code> . 2. Select SOA Administration > Cross References.

The Cross References page appears.

The screenshot shows the 'Cross References' page in the Oracle SOA Infra interface. At the top right, it says 'Logged in as weblogic' and 'Page Refreshed Sep 24, 2008 4:50:24 AM PDT'. The main area has a heading 'Cross References' with a note: 'Cross references enable you to dynamically map values for equivalent entities created in different applications. Select cross reference values using one of the following options. Click Delete to purge all selected values. This action permanently deletes the selected values from the database.' Below this is a section titled 'Select Tables and Columns' with two radio button options: 'All tables' (unchecked) and 'Select a table and columns' (checked). Under 'Tables', 'XREF\_ORDER' is selected. Under 'Columns', 'COL1' is checked. At the top right of this section is a 'Delete' button with a question mark icon. Below this is a 'Select Values' section with three radio button options: 'All' (checked), 'Marked for delete', and 'Updated between'. It includes 'From' and 'To' date fields with calendar icons.

2. In the **Select Tables and Columns** section, select one of the following options:
  - **All tables:** To delete values from all tables.
  - **Select a table and columns:** To select either a specific table from which to delete values, or to select one or more columns from a specific table from which to delete values.
3. In the **Select Values** section, select one of the following options:
  - **All:** To delete all values from the selected table and columns.
  - **Marked for delete:** To delete only the values that have been marked for deletion from the selected table and columns.
  - **Updated between:** To delete values updated between a specific time periods.
4. If you select the **Updated between** option in Step 3, enter a starting date in the **From** field and an ending date in the **To** field.
5. Click **Delete**.

# **Part VII**

---

## **Administering Decision Service Components and Business Rules Service Engines**

This part describes how to administer Decision Service components and Business Rules service engines.

This part includes the following chapter:

- [Chapter 20, "Monitoring Decision Service Components and Engines"](#)



# 20

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## Monitoring Decision Service Components and Engines

This chapter describes how to monitor decision service components, including service engine instances, faults, performance statistics, and deployed composites; deployed decision service component instances; business rule tracing; and log files. Decision service components are also called business rules service components in the Oracle Fusion Middleware documentation.

This chapter includes the following sections:

- [Section 20.1, "Monitoring Business Rules Service Engine Recent Instances and Faults"](#)
- [Section 20.2, "Monitoring Business Rules Service Engine Performance Statistics"](#)
- [Section 20.3, "Monitoring Business Rules Service Engine Instances"](#)
- [Section 20.4, "Monitoring Business Rules Service Engine Faults"](#)
- [Section 20.5, "Monitoring Business Rules Service Engine Deployed Components"](#)
- [Section 20.6, "Monitoring Decision Service Component Instances of a Composite Application"](#)
- [Section 20.7, "Monitoring Business Rule Tracing"](#)
- [Section 20.8, "Monitoring Decision Service Component Logs"](#)

For information about business rules tuning and performance parameters, see *Oracle Fusion Middleware Performance and Tuning Guide*.

---

**Note:** The business rules service engine does not support any user level configuration.

---

### 20.1 Monitoring Business Rules Service Engine Recent Instances and Faults

Using the business rules service engine home page Dashboard page, you can monitor recent instances and faults of decision service components running in the SOA Infrastructure. These decision service components can be part of separate SOA composite applications. Decision service components are also called business rules components in the Oracle Fusion Middleware documentation.

To monitor business rules service engine instances and faults:

1. Access the business rules service engine home page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > Business Rules.	1. Select <b>soa-infra</b> . 2. Right-click and select Service Engines > Business Rules.

2. Click **Dashboard**.

The **Recent Instances** section of the Dashboard page displays recent instances of all decision service components, including the instance ID of the decision service component, the decision service component name, the SOA composite application of which the decision service component is a part, the state of the instance (for example, completed successfully or faulted, the instance start time, the last modification time, and a **Logs** icon (clicking the **Logs** icon shows the Log Messages page with filtered messages specific to that instance)).

---

**Note:** To see the state with the correct information, you must set the **Capture Composite Instance State** property. You can change this setting on the SOA Administration Common Properties page. Turning this feature on allows for separate tracking for running instances. However, this may impact performance. For information on setting this property, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

---

**Recent Instances**

Show Only Running Instances

Instance ID	Component	Composite	Status	Start Date	Last Modified Date	Logs
No instances found						

**Components**

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances
EvaluatePreferredSupplierRule	OrderBookingComposite		0	0	0
RequiresApprovalRule	OrderBookingComposite		0	0	0
RatingRules	WlsRulesFaultProject		0	0	0

**Recent Faults**

Show only system faults

3. In the **Instance ID** column, click an instance ID for a decision service component to view its audit trail.

---

**Note:** The contents of the audit trail page depends on the **Audit Level** settings. When the **Audit Level** property is set to **Production**, the audit trail shows only the activity names. When the **Audit Level** is set to **Development** mode, the audit trail shows the decision service instance payload details. In other modes, for example **Off**, the audit trail does not show decision service details. You can change the **Audit Level** on the SOA Infrastructure Common Properties page. Additionally, this option can be set for a specific composite from the home page for the composite.

---

4. In the **Component** column, click a specific decision service component to access its home page.
5. In the **Composite** column, click a specific SOA composite application to access its home page.
6. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
7. Click **Show More** to access the Instances page of the service engine.

The lower section of the **Dashboard** page displays the following:

- The **Components** section shows the decision service components deployed on the business rules service engine across SOA composites. It also shows the status of the SOA composites and the instance count information in the respective instance state columns.
- The **Recent Faults** section lists the recent faults in the service engine, including the error message, the time at which the fault occurred, the SOA composite application in which the fault occurred, the decision service component, the instance ID of the decision service component, and a **Logs** icon (clicking the **Logs** icon shows the Log Messages page with filtered messages specific to that instance).

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 20.2 Monitoring Business Rules Service Engine Performance Statistics

Using the business rules service engine Statistics page, you can monitor business rules service engine performance and metrics. This page shows service engine-level, not component-level, details. Business rules service components are also called decision service components in the Oracle Fusion Middleware documentation.

To monitor business rules service engine statistics:

1. Access the business rules service engine statistics page through one of the following options:

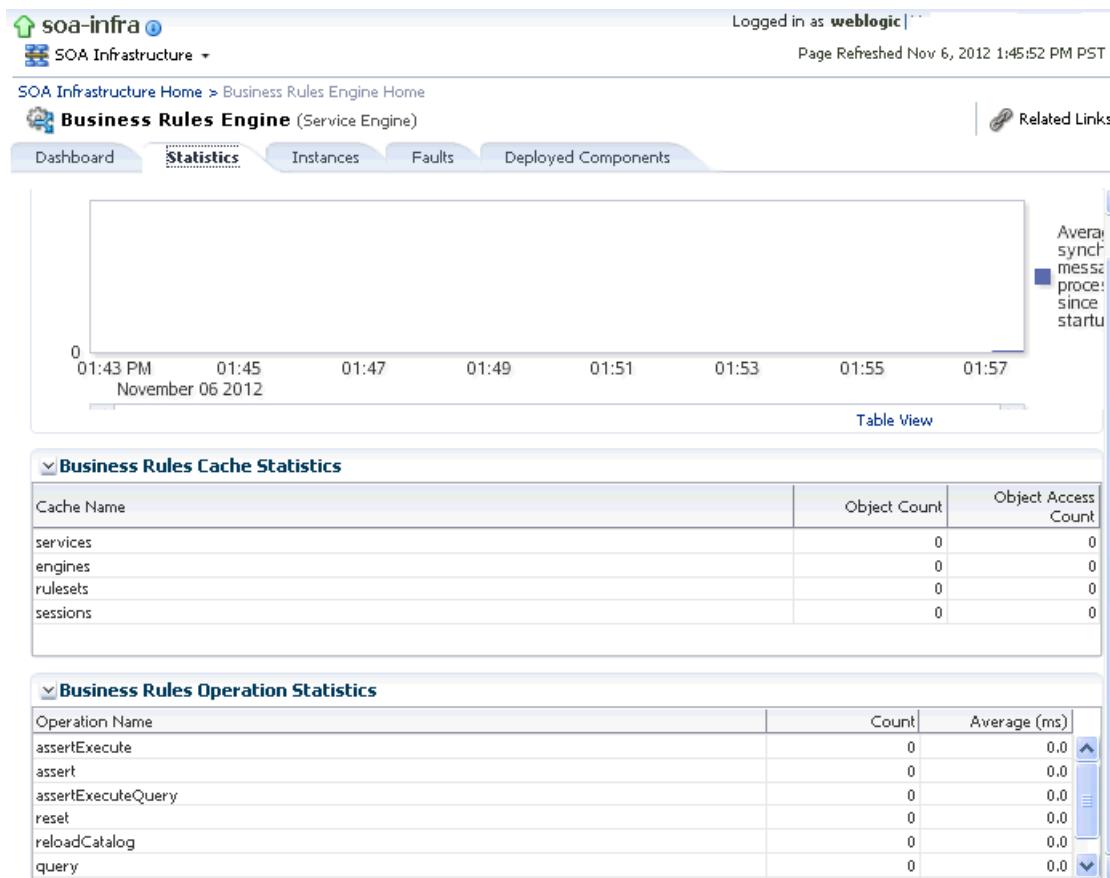
From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
Select Service Engines > Business Rules.	<ol style="list-style-type: none"> <li>1. Select <b>soa-infra</b>.</li> <li>2. Right-click and select <b>Service Engines &gt; Business Rules</b>.</li> </ol>

2. Click **Statistics**.

The **Statistics** page displays the following:

- **Average Request Processing Time:** This chart displays the average request processing time of the business rules service engine since server startup. That is, how many requests were processed by the service engine per unit of time.
- **Business Rules Cache Statistics:** This section provides details about the service engine cache. This section lists the types of caches used by the service engine and the object count in each of the caches. All these metrics are based on the object count since server startup.
- **Business Rules Operation Statistics:** This section shows the operation statistics. Using the operation statistics, you can determine the number of calls to Oracle Business Rules decision functions since server startup, and determine the total time spent in Decision Functions since server startup.

**Note:** When you view business rules operation statistics for composite applications created with Oracle Fusion Middleware 11g Release 1 (11.1.1), the only operation shown is the **callFunction** operation. In this release, the decision service only calls Oracle Business Rules using decision functions, and this operation is indicated with values for the operation named **callFunction** (with **Count** and **Average(ms)** fields). With composite applications that were migrated from older releases, the decision service performs **callFunction** operations and the other operations listed in the **Business Rules Operation Statistics** section. For these migrated projects, you can debug the flow of the request through various important operations within the service engine. Also, you can find any long-running operations and take the necessary actions. These metrics also are since server startup.



For information about business rules tuning and performance parameters, see *Oracle Fusion Middleware Performance and Tuning Guide*.

## 20.3 Monitoring Business Rules Service Engine Instances

Using the business rules service engine **Instances** page, you can monitor all decision service component instances. These decision service components can be part of separate SOA composite applications. Decision service components are also called business rules service components in the Oracle Fusion Middleware documentation.

To monitor business rule service engine instances:

- Access the business rules service engine Instances page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
Select Service Engines > Business Rules.	<ol style="list-style-type: none"> <li>Select <b>soa-infra</b>.</li> <li>Right-click and select <b>Service Engines &gt; Business Rules</b>.</li> </ol>

**2. Click Instances.**

The Instances page displays the following:

- A utility for searching for a specific instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- A list of instances, including the instance ID of the decision service component, the decision service component name, the SOA composite application name, the state of the instance (for example, completed successfully, running, or faulted), the instance start time, the last modification time, and a **Logs** icon (clicking the **Logs** icon shows the instance log messages).

Instance ID	Component	Composite	State	Start Date	Last Modified Date
decision:9dc40d71-b81a-4c23-868c-65161f1e0	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:43:06 AM	Mar 27, 2009 10:43:06 AM
decision:8d67ed23-997f-4996-afbb-64515e1	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:43:01 AM	Mar 27, 2009 10:43:01 AM
decision:8ea2718a-5594-45fe-9ee3-42553f1	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:42:58 AM	Mar 27, 2009 10:42:58 AM
decision:77088e04-03a1-4d75-bd79-971c5f1	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:42:55 AM	Mar 27, 2009 10:42:55 AM
decision:dfc8e66d-ed9d-4b77-95f7-f37b83	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:42:52 AM	Mar 27, 2009 10:42:52 AM
decision:58ac9d7c-5617-4095-bee8-a0ab1	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:41:00 AM	Mar 27, 2009 10:41:00 AM
decision:5c820df5-622a-40b8-ae37-40584f1	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:40:46 AM	Mar 27, 2009 10:40:46 AM
decision:e60007d1-81e4-414a-80e5-607fd	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:40:25 AM	Mar 27, 2009 10:40:25 AM
decision:cf1eb0ea-24be-4536-9b22-7cd8dc	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:40:21 AM	Mar 27, 2009 10:40:21 AM
decision:e6e69e67-7a01-425d-9925-40ce0	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:40:18 AM	Mar 27, 2009 10:40:18 AM
decision:98b33576-715c-45db-bd5e-489c7	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:40:13 AM	Mar 27, 2009 10:40:13 AM
decision:b0e49c1f-f867-49a4-a28b-c9c5bc	OracleRules1	SOAComposite1 [4.0]	Completed	Mar 27, 2009 10:39:52 AM	Mar 27, 2009 10:39:52 AM

- In the **Instance ID** column, click an instance ID for a decision service component to view its audit trail details.

---

**Note:** The contents of the audit trail page depends on the **Audit Level** settings. When the **Audit Level** property is set to **Production**, the audit trail shows only the activity names. When the **Audit Level** is set to **Development** mode, the audit trail shows the decision service instance payload details. You can change the **Audit Level** on the SOA Infrastructure Common Properties page. Additionally, this option can be set for a specific composite from the home page for the composite.

---

4. In the **Component** column, click a specific decision service component to access its home page.
5. In the **Composite** column, click a specific SOA composite application to access its home page.
6. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 20.4 Monitoring Business Rules Service Engine Faults

Using the business rules service engine Faults page, you can monitor all decision service component faults. The Faults page shows this information for decision service components that can be part of separate SOA composite applications. Decision service components are also called business rules components in the Oracle Fusion Middleware documentation.

To monitor business rules service engine faults:

---

**Note:** Decision service component faults are always nonrecoverable.

---

1. Access the business rules service engine Faults page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
Select <b>Service Engines &gt; Business Rules</b> .	<ol style="list-style-type: none"> <li>1. Right-click <b>soa-infra</b>.</li> <li>2. Select <b>Service Engines &gt; Business Rules</b>.</li> </ol>

2. Click **Faults**.

The Faults page displays the following:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- A list of faults that occurred in the decision service component, including the error message, the time at which the fault occurred, the SOA composite application and decision service component in which the fault occurred, the decision service component instance ID, and a **Logs** icon (clicking the **Logs** icon shows the instance log messages).

Decision service component instance faults cannot be recovered.

Error Message	Fault Time	Composite	Component	Component Instance ID	Logs
>Error while executing a rule session	Mar 25, 2009 10:25:35 AM	SOAComposite1 [1.0]	rules	b2e13614-d	<a href="#">Logs</a>
>Error while executing a rule session	Mar 24, 2009 4:51:02 PM	SOAComposite1 [1.0]	rules	cdbf34c4-5c	<a href="#">Logs</a>
>Error while executing a rule session	Mar 24, 2009 4:48:32 PM	SOAComposite1 [1.0]	rules	25fb9d9f-ba	<a href="#">Logs</a>

3. You can perform the following monitoring tasks from within the Faults page:
  - a. From the **Fault Type** list, select to display all Faults, system faults, business faults, or Oracle Web Services Manager faults in the Faults page.
  - b. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each fault. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - c. In the **Component** column, click a specific decision service component to access its home page.
  - d. In the **Component Instance ID** column, click a specific decision service component instance ID to view the audit trail.

---

**Note:** The contents of the audit trail page depend on the **Audit Level** settings. When the **Audit Level** property is set to **Production**, the audit trail shows only the activity names. When the **Audit Level** is set to **Development** mode, the audit trail shows the decision service instance payload details. You can change the **Audit Level** on the SOA Infrastructure Common Properties page. Additionally, this option can be set for a specific composite from the home page for the composite.

---

4. In the **Error Message** column, click to view the fault details.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 20.5 Monitoring Business Rules Service Engine Deployed Components

Using the business rules service engine home page Deployed Components page, you can monitor all decision service components deployed across SOA composite applications. Decision service components are also called business rules components in the Oracle Fusion Middleware documentation.

To monitor business rule service engine deployed components:

1. Access the business rules service engine Deployed Components page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
Select Service Engines > Business Rules.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > Business Rules.

2. Click **Deployed Components**.

The Deployed Components page displays the following:

- A utility for searching for a specific component by specifying criteria and clicking **Search**.
- A list of components, including the name, the SOA composite application name, the status (up or down), and the instances count (total, running, and faulted).

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances	
					Recoverable	Non Recoverable
OracleRules1	SOAComposite1 [1.1]	↑	2	0	0	0
LoanAdvisorRules	AutoLoanComposite	↑	11	0	0	0
CreditRatingRules	AutoLoanComposite	↑	11	0	0	0
OracleRules1	SOAComposite1 [4.0]	↑	33	0	0	0
OracleRules1	SOAComposite1 [1.0]	↑	0	0	0	0

3. In the **Name** column, click a name to navigate to the Component home page and view component details.
4. In the **Composite** column, click a specific SOA composite application to access its home page.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 20.6 Monitoring Decision Service Component Instances of a Composite Application

You can monitor decision service component instances of a composite application. Each decision service component instance has its own unique instance ID. This ID is in addition to the instance ID of the overall SOA composite application of which this decision service component is a part. Decision service components are also called business rules components in the Oracle Fusion Middleware documentation.

---

**Note:** To see the state with the correct information, you must set the **Capture Composite Instance State** option. You can change this setting on the SOA Infrastructure Common Properties page. Turning this feature on allows for separate tracking for running instances. However, this may impact performance. For information on setting the option, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

---

To monitor decision service component instances from a composite application:

1. Access a decision service component from a composite application through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"><li>1. In the navigator, select <b>soa-infra</b>.</li><li>2. From the <b>SOA Infrastructure</b> menu, Select <b>Home</b>.</li><li>3. Click <b>Deployed Composites</b> tab.</li><li>4. In the <b>Composite</b> table, select a specific SOA composite application that includes a decision service component.</li></ol>	<ol style="list-style-type: none"><li>1. Expand <b>soa-infra</b>.</li><li>2. Select a specific SOA composite application that includes a decision service component.</li></ol>

The screenshot shows the SOA Composite dashboard with the following sections:

- Recent Instances:** Displays 34 total instances, all of which are completed. The table includes columns for Instance ID, Name, Conversation ID, State, and Start Time.
- Recent Faults and Rejected Messages:** Shows no faults found.
- Component Metrics:** Displays metrics for the OracleRules1 decision service component, showing 34 total instances, 0 running instances, and 0 faulted instances (both recoverable and nonrecoverable).

2. The **Component Metrics** section on the composite dashboard provides a high-level overview of each decision service component. This table includes columns showing the **Component Type**, the **Total Instances**, the **Running Instances**, and the **Faulted Instances** (recoverable and nonrecoverable).
3. Select a decision service component in the **Component Metrics** section to display the corresponding decision service component page.

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface for monitoring SOA Composite applications. The top navigation bar includes 'SOA Composite' and 'Page Refreshed Mar 27, 2009 12:35:05 PM PDT'. The main title is 'OracleRules1 (Decision Service Component)'. Below the title, there are tabs for 'Dashboard', 'Instances', 'Faults', and 'Policies', with 'Dashboard' selected.

**Recent Instances:**

Instance ID	State	Start Date	Last Modified Date	Logs
decision:9dc40d71-b	Completed	Mar 27, 2009 10:43:	Mar 27, 2009 10:43:06 AM	<a href="#">View Logs</a>
decision:8d67ed23-9	Completed	Mar 27, 2009 10:43:	Mar 27, 2009 10:43:01 AM	<a href="#">View Logs</a>
decision:8ea2718a-5	Completed	Mar 27, 2009 10:42:	Mar 27, 2009 10:42:58 AM	<a href="#">View Logs</a>
decision:77088e04-0	Completed	Mar 27, 2009 10:42:	Mar 27, 2009 10:42:55 AM	<a href="#">View Logs</a>
decision:dfc8e66d-e	Completed	Mar 27, 2009 10:42:	Mar 27, 2009 10:42:52 AM	<a href="#">View Logs</a>

**Recent Faults:**

Error Message	Fault Time	Component Instance ID	Logs
No Faults found			

**Instance Rate per Min (Real-Time Data):**

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances."](#)

## 20.7 Monitoring Business Rule Tracing

You can use Oracle Enterprise Manager Fusion Middleware Control to perform rule execution tracing. For more information about accessing and using Fusion Middleware Control, see [Chapter 2, "Getting Started with Administering Oracle SOA Suite and Oracle BPM Suite."](#)

A rule execution trace is a mechanism of tracing business rules service engine events that occur during the evaluation of rules. The types of events traced are:

- Fact operations (assert, retract, and modify)
- Rules execution
- Rule activation
- Ruleset stack changes
- Rule compilation
- Reset (required for maintaining state during analysis)

Each trace contains information about the event that it traces. For example, a rule trace entry for an executed rule consists of:

- Rule name (RL name)

- Execution sequence number
- List of fact IDs for the facts that matched this rule
- Timestamp in milliseconds

Rule execution trace audit levels are the same as the audit levels supported in the SOA Infrastructure:

- **Off:** Rule execution tracing is disabled. The decision component instance is not created at all.
- **Development:** Full rule execution tracing that contains all the details about facts (listing, operations such as modify and assert), rule activation, pop or push rulesets, and so on. It also provides a list of fact IDs on which the executed rules are matched. See [Section 20.7.1, "Tracing Rule Execution at the Development Audit Level"](#) for an example.
- **Production:** The executed rules are traced. All the details about facts, rule activation, pop or push ruleset are not available. The trace do not contain a list of the matching facts IDs. See [Section 20.7.2, "Tracing Rule Execution at the Production Audit Level"](#) for an example.

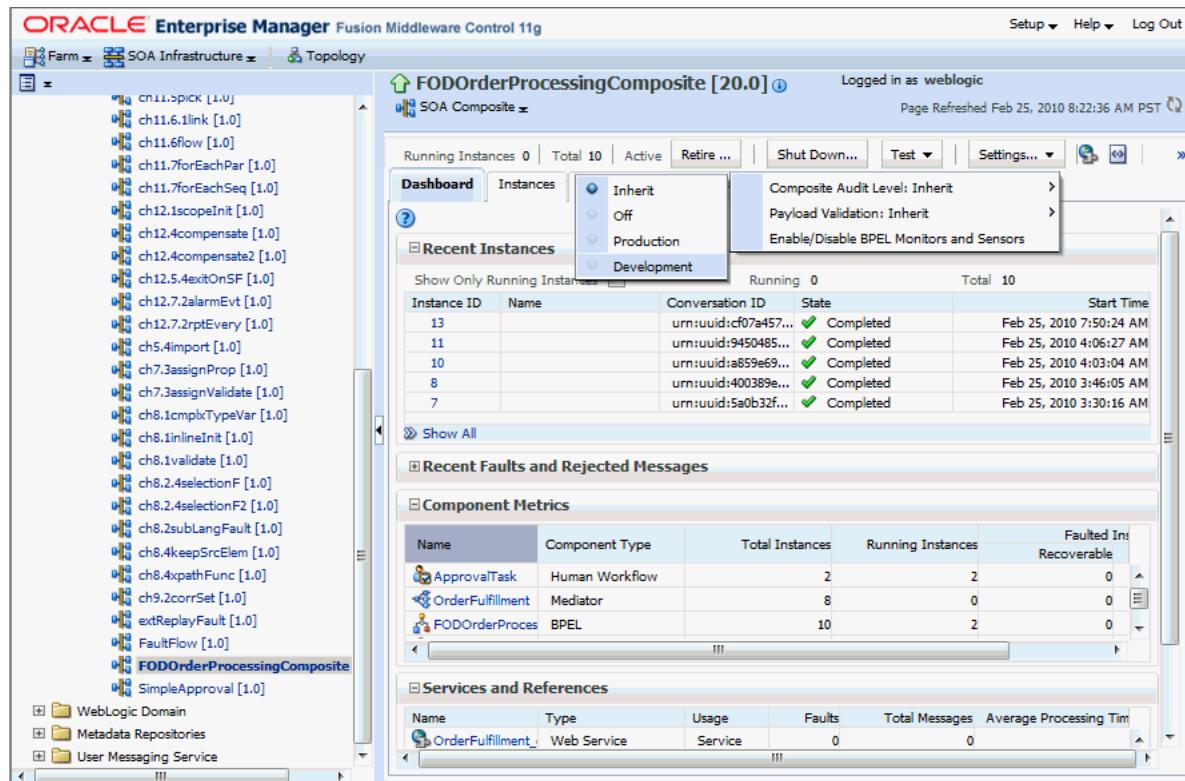
You can set audit levels either at the SOA Infrastructure level or at the composite level. See [Section 3.1, "Configuring SOA Infrastructure Properties"](#) for SOA Infrastructure audit level configuration information. See [Section 1.4.1.1, "Introduction to the Order of Precedence for Audit Level Settings"](#) for a discussion about audit level precedence when set at the SOA Infrastructure level and the composite level. The following sections discuss setting audit levels at the composite level for the purposes of rule execution tracing.

## 20.7.1 Tracing Rule Execution at the Development Audit Level

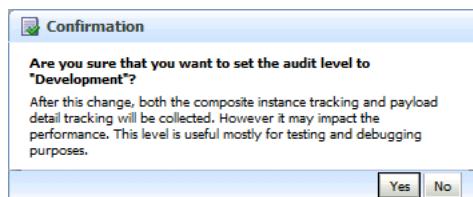
Setting the audit level to Development enables you to view all the details pertaining to a rule that has been executed.

To perform a development-level rule execution trace:

1. Open the composite application in Oracle Enterprise Manager Fusion Middleware Control.  
A list of the recent composite instances is shown on the composite Dashboard page.
2. Click the **Settings** list, select **Composite Audit Level**, > **Development** to set the trace level as Development at the composite level.



- Click **Yes** in the Confirmation dialog.



- Click **Test** and then **client** to invoke a test instance of the composite to view the decision traces corresponding to different input parameters, such as the Order ID.

FODOrderProcessingComposite [20.0] (20) Logged in as weblogic  
Page Refreshed Feb 25, 2010 8:22:36 AM PST

**Dashboard** Instances Faults and Rejected Messages Unit Tests Policies OrderFulfillment\_ep client

**Recent Instances**

Instance ID	Name	Conversation ID	State	Start Time
13		urn:uuid:cf07a457...	Completed	Feb 25, 2010 7:50:24 AM
11		urn:uuid:9450485...	Completed	Feb 25, 2010 4:06:27 AM
10		urn:uuid:a859e69...	Completed	Feb 25, 2010 4:03:04 AM
8		urn:uuid:400389e...	Completed	Feb 25, 2010 3:46:05 AM
7		urn:uuid:5a0b32f...	Completed	Feb 25, 2010 3:30:16 AM

**Recent Faults and Rejected Messages**

**Component Metrics**

Name	Component Type	Total Instances	Running Instances	Faulted Instances
ApprovalTask	Human Workflow	2	2	0
OrderFulfillment	Mediator	8	0	0
FODOrderProces	BPEL	10	2	0

**Services and References**

Name	Type	Usage	Faults	Total Messages	Average Processing Time
OrderFulfillment	Web Service	Service	0	0	
client	Web Service	Service	0	12	
FedEx	JCA Adapter	Reference	0	3	

5. Enter an Order ID, for example 1001, in the Value field in the Input Arguments section on the Test Web Service page and click the Test Web Service button.

FODOrderProcessingComposite [20.0] (20) Logged in as weblogic  
Page Refreshed Feb 25, 2010 8:50:24 AM PST

**Additional Test Options**

Enable Stress Test   
Concurrent Threads: 5  
Loops per Thread: 10  
Delay in Milliseconds: 1000

**Input Arguments**

Tree View

Name	Type	Value
* payload	payload	
* input	string	1001

**Request** **Response** **Test Web Service**

Based on the input Order ID, the service invokes a BPEL process instance containing the details of the Order ID, and the rule that is relevant to the order details is executed.

6. Click **Launch Message Flow Trace** under the **Response** tab to open the Flow Trace page.

The screenshot shows the Oracle SOA Suite interface. On the left, there's a tree view of composite components and their sub-components. The main panel displays the 'Test Web Service' for the 'FODOrderProcessingComposite [20.0]'. The 'Response' tab is active, showing a green 'Passed' status and a response time of 208 ms. Below this, there's a link labeled 'Launch Message Flow Trace'.

7. Click the decision service component instance called **DiscountDictionary** in the **Trace** section to view the actual rule execution trace.

The screenshot shows the 'Flow Trace' page. At the top, it says 'Data Refreshed Feb 25, 2010 9:18:46 AM PST'. Below that, there's a 'Faults' section and a 'Trace' section. In the 'Trace' section, there's a table showing component instances and their details. One row for 'DiscountDictionary' is highlighted, indicating it's the selected instance for viewing its rule execution trace.

Instance	Usage	Type	State	Time	Composite Instance
client	Service	Web Service	Completed	Feb 25, 2010 9:01:35 AM	FODOrderProcessingComposite
FODOrderProcessingProcess		BPEL Component	Completed	Feb 25, 2010 9:01:36 AM	FODOrderProcessingComposite
GetOrderInfo	Reference	JCA Adapter	Completed	Feb 25, 2010 9:01:35 AM	FODOrderProcessingComposite
GetCustomerInfo	Reference	JCA Adapter	Completed	Feb 25, 2010 9:01:35 AM	FODOrderProcessingComposite
DiscountDictionary		Decision Service Component	Completed	Feb 25, 2010 9:01:36 AM	FODOrderProcessingComposite
OrderFulfillment		Mediator Component	Completed	Feb 25, 2010 9:01:36 AM	FODOrderProcessingComposite
USPS	Reference	JCA Adapter	Completed	Feb 25, 2010 9:01:36 AM	FODOrderProcessingComposite

---

**Note:** You can also view the values of composite variables before and after invocation of business rule component. You must click the BPEL process component instance in the Flow Trace page, and then click the relevant payload. In this case, the BPEL component name is FODOrderProcessingProcess.

---

The following graphic shows the execution trace for the decision service component called **DiscountDictionary**.

The screenshot displays the 'Instance Detail Of DiscountDictionary' page. At the top, it shows the instance ID as `decision:a379dad6-3f37-4ab2-a0d7-f2a59d8557ab` and the start time as `Feb 25, 2010 9:01:36 AM`. Below this, the 'Audit Trail' section is expanded, showing two main sections: `onMessage` and `Fired rules in Ruleset "Ruleset_1"`. The `onMessage` section details the invocation of the 'DiscountDictionary' service with an asserted fact: `"orderbookingdiscount.Discountandshipping [1]"`. The `Fired rules in Ruleset "Ruleset_1"` section details the firing of the rule `"Ruleset_1.Rule_1"` with facts: `"orderbookingdiscount.Discountandshipping [1]"` and a modified fact: `"orderbookingdiscount.Discountandshipping [1]"`.

8. Click the **Show rule set stack states in audit trail** checkbox to view further details of the rule execution.

The screenshot shows a detailed trace report for a business rule execution. At the top, it displays the instance ID as `decision:a379dad6-3f37-4ab2-a0d7-f2a59d8557ab` and the start time as `Feb 25, 2010 9:01:36 AM`. The audit trail section shows the following sequence:

- onMessage**: An event triggered by the system.
- Invoked Decision Service "DiscountDictionary"**: The service was invoked at [25-Feb-10 07:50:24 PST].
- Asserted fact: "orderbookingdiscount.Discountandshipping [1]"**: A fact was asserted.
- Activated rule: "Ruleset\_1.Rule\_1"**: A rule was activated.
- Facts: "orderbookingdiscount.Discountandshipping [1]"**: Facts were passed to the rule.
- Modified fact: "orderbookingdiscount.Discountandshipping [1]"**: A modified fact was generated.
- Pushed ruleset: "main"**: The main ruleset was pushed onto the stack.
- Fired rules in Ruleset "Ruleset\_1"**: The ruleset was fired.
- Fire rule: "Ruleset\_1.Rule\_1"**: The specific rule within the ruleset was fired.
- Facts: "orderbookingdiscount.Discountandshipping [1]"**: Facts were passed to the fired rule.
- Modified fact: "orderbookingdiscount.Discountandshipping [1]"**: A modified fact was generated.
- Popped ruleset: "Ruleset\_1"**: The ruleset was popped from the stack.
- Popped ruleset: "main"**: The main ruleset was popped from the stack.

The development-level trace report displays the fact name, activated rule, and the pushed and popped ruleset names.

The following table lists the entries of the trace report:

Element	Description
<b>Invoked Decision Service Name</b>	Displays the name of the decision service component that is invoked.
<b>Asserted Fact</b>	Displays the name of the fact that is passed by the BPEL service to the decision service component. This is based on the input parameter provided by the user, which according to the example is the Order ID 1001.
<b>Activated Rule</b>	Displays the name of the rule that is activated, along with the name of the fact that activated the rule.
<b>Pushed ruleset</b>	Displays the name of the ruleset that has been invoked when the fact is asserted.
<b>Fired rules in Ruleset</b>	Displays the name of the ruleset whose rule is executed.
<b>Fired rule</b>	Displays the name of the rule that is executed.
<b>Modified fact</b>	Displays the name of the fact that has been modified because of the rule execution. This modified fact is then passed by the decision service component to the BPEL service.
<b>Popped ruleset</b>	Displays the name of the ruleset for which execution is complete and so, the ruleset is taken out of the execution queue.

---

**Notes:** The entry Invoked Decision Service Name appears differently in different scenarios:

- For AS10.1.3.x to AS11 upgraded rules dictionaries with AssertExecuteWatch patterns, the entry appears in the trace report as Invoked Decision Service.
  - For AS10.1.3.x to AS11 upgraded rules dictionaries with CallFunction patterns, the entry appears in the trace report as Invoked Decision Function.
  - For AS11 created dictionaries, the entry is displayed as Invoked Decision Function.
- 

## 20.7.2 Tracing Rule Execution at the Production Audit Level

Setting the audit level to **Production** provides a truncated report on the rule execution trace. It only displays the ruleset and the rules that have been fired and does not display details about facts, rule activation, and so on.

The process of production-level tracing is similar to the development-level tracing. However, for Production-level tracing, you must do the following:

In Fusion Middleware Control, after opening the composite, select **Production** from the **Composite Audit Level** of the **Settings** menu.

The following graphic shows the Flow Trace page that displays the trace report.

Flow Trace > Instance Of DiscountDictionary Data Refreshed Feb 25, 2010 11:31:54 AM PST

**Instance Detail Of DiscountDictionary** This page shows the Decision component instance details.

Instance ID: decision:ef13ce26-a4b2-49a2-b19d-29e9c353801f  
Started: Feb 25, 2010 11:19:25 AM

Audit Trail Audit Level: PRODUCTION View Raw XML

onMessage  
Invoked Decision Service "DiscountDictionary" [25-Feb-10 09:01:36 PST]  
Fired rules in Ruleset "main"  
Fired rule: "Ruleset\_1.Rule\_1"

The Production-level trace report contains only the name of the ruleset and the rules that were fired. In addition, the **Show rule set stack states in audit trail** checkbox that provides a drill-down detailed trace report is unavailable in the Production-level trace report.

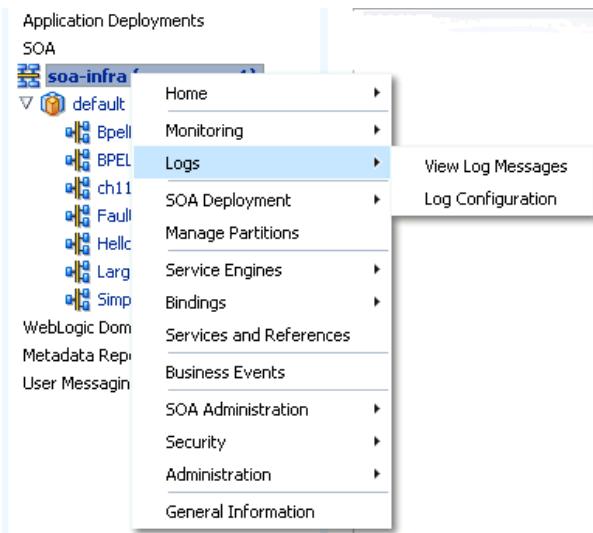
## 20.8 Monitoring Decision Service Component Logs

You can monitor decision service component logs. Decision service components are also called business rules service components in the Oracle Fusion Middleware documentation.

### 20.8.1 Viewing Decision Service Component Logs

To view decision service component logs:

1. In the navigation tree, select and right-click **soa-infra**.
2. Select **Logs > View Log Messages**. This displays the Log Messages page.



The Log Messages page opens. Use this page to select target log files.

3. To access a prefiltered list of log files for each instance or fault, click in the **Logs** column from any specific page (for example, in the decision service engine or component's faults or instances tables).

For example, from the Faults table, click the **Logs** column.

The screenshot shows the SOA Infrastructure Home > Business Rules Engine Home interface. The 'Faults' tab is selected. A message states: 'The Decision Service faults cannot be recovered.' Below this is a search form with fields for Error Message Contains, Fault ID, Fault Time From, Fault Time To, Composite Instance ID, Component Instance ID, and Fault Type (set to 'All Faults'). A 'Search' button is present. The main area displays a table of faults:

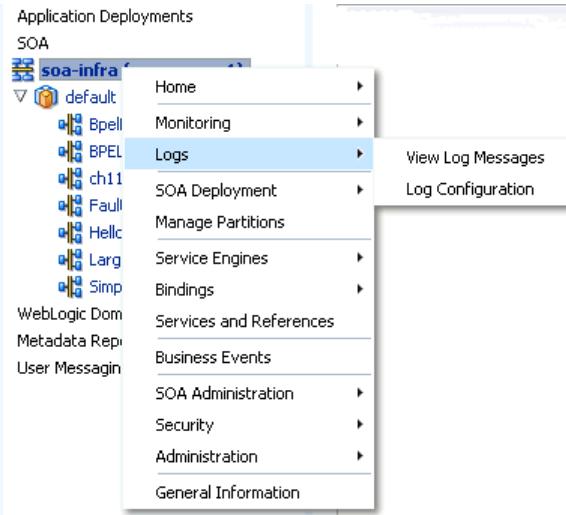
Error Message	Fault Time	Composite	Component	Component Instance ID	Logs
>Error while executing a rule session	Mar 25, 2009 10:25:35 AM	SOAComposite1 [1.0]	rules	decision:b2e13614-d	<a href="#">View Log</a>
>Error while executing a rule session	Mar 24, 2009 4:51:02 PM	SOAComposite1 [1.0]	rules	decision:cdbf34c4-5c	<a href="#">View Log</a>
>Error while executing a rule session	Mar 24, 2009 4:48:32 PM	SOAComposite1 [1.0]	rules	decision:25fb9d9f-ba	<a href="#">View Log</a>

## 20.8.2 Setting the Diagnostic Logging Level with a Log Configuration

Use the Log Configuration page to configure the logging level.

To set the diagnostic logging level with a log configuration:

1. Right-click **soa-infra**, and select **Logs > Log Configuration**.



2. To configure the decision service component logging level, expand the **oracle.soa.service.rules** and the **oracle.soa.services.rules.obrtrace** loggers and set the notification level.

**Log Configuration**

Use this page to configure basic and advanced log configuration settings.

**Log Levels****Log Files**

This page allows you to configure the log level for both persistent loggers and active runtime loggers. Persistent loggers are loggers that are saved in a configuration file and become active when the component is started. The log levels for these loggers are persisted across component restarts. Runtime loggers are automatically created during runtime and become active when a particular feature area is exercised. For example, oracle.j2ee.ejb.deployment.Logger is a runtime logger that becomes active when an EJB module is deployed. Log levels for runtime loggers are not persisted across component restarts.

**Apply****Revert**View **Runtime Loggers**Search **All Categories**

Logger Name	Oracle Diagnostic Logging Level (Java Level)	Log File
oracle.soa.mediator	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.scheduler	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.services.cmds	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.services.common	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.services.identity	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.services.notification	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.services.rules	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.services.rules.obrtrace	TRACE:1 (FINE) ▾	odl-handler
oracle.soa.services.workflow	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.sql.trc.fabric	ERROR:1 (SEVERE) ▾	soa-tracking-trc-handler
oracle.soa.wsif	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler
oracle.soa.xref	NOTIFICATION:1 (INFO) [Inherit ▾]	odl-handler

# **Part VIII**

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## **Administering Human Task Service Components and Human Workflow Service Engines**

This part describes how to administer human task service components and human workflow service engines.

This part includes the following chapters:

- [Chapter 21, "Configuring Human Workflow Service Components and Engines"](#)
- [Chapter 22, "Monitoring Human Workflow Service Components and Engines"](#)
- [Chapter 23, "Managing Human Workflow Service Components and Engines"](#)



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## Configuring Human Workflow Service Components and Engines

This chapter describes how to configure human task service components and the human workflow service engine, including how to configure the notification mode for messages and actionable addresses. It also describes how to configure task service properties such as the actionable email account name and an alternative authentication provider such as Oracle Internet Directory, Microsoft Active Directory, or Oracle iPlanet.

This chapter includes the following sections:

- [Section 21.1, "Configuring Human Workflow Notification Properties"](#)
- [Section 21.2, "Configuring the Notification Service to Send Notifications to a Test Address"](#)
- [Section 21.3, "Configuring Human Workflow Task Service Properties"](#)
- [Section 21.4, "Configuring Oracle HTTP Server for Task Form Attachments"](#)
- [Section 21.6, "Configuring the Pluggable Notification Service"](#)
- [Section 21.7, "Globally Disabling the Automatic Release Timers for Oracle BPM Worklist Tasks"](#)
- [Section 21.8, "Configuring the Number of Email Notification Messages"](#)
- [Section 21.9, "Configuring Multiple Send Addresses"](#)
- [Section 21.10, "Configuring Notification Retries"](#)
- [Section 21.11, "Configuring the Identity Service"](#)
- [Section 21.12, "Seeding Users, Groups, and Application Roles using LDAP Tools"](#)
- [Section 21.13, "Enabling Case Agnostic Group Names in Human Tasks"](#)
- [Section 21.14, "Configuring Security Policies for Human Workflow Web Services"](#)

For information about installing and using the organizational hierarchy of users and groups known as the demo user community, see [Appendix A, "Installing the Demo User Community in the Database."](#)

For more information about human workflow tuning and performance properties, see [Oracle Fusion Middleware Performance and Tuning Guide](#).

## 21.1 Configuring Human Workflow Notification Properties

You can configure human workflow notification properties, such as setting the notification mode for messages and setting actionable addresses. These properties are used to notify users of changes to the state of a task. Workflow notifications can use three types of addresses:

- From address: For sending notifications.
- Actionable address: For receiving actionable responses.
- Reply to address: For receiving reply notifications.

---

**Note:** In the following procedures, you must configure your channel drivers before configuring your workflow notification properties. Ensure that you know all necessary driver addresses before beginning (for example, the incoming IMAP and outgoing SMTP email servers).

---

To configure human workflow notification properties:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>SOA Administration &gt; Workflow Properties &gt; Mailer tab</b>	1. Right-click <b>soa-infra</b> . 2. Select <b>SOA Administration &gt; Workflow Properties &gt; Mailer tab</b>

The Workflow Notification Properties page appears.

The screenshot shows the Oracle SOA Infrastructure Home > Workflow Notification Properties page. At the top, there's a navigation bar with 'soa-infra' and 'SOA Infrastructure'. On the right, it says 'Logged in as weblogic' and 'Page Refreshed Nov 6, 2012 3:54:11 PM PST'. Below the navigation, the breadcrumb path is 'SOA Infrastructure Home > Workflow Notification Properties'. A tabs section shows 'Mailer' is selected. Under 'Mailer', there's an 'Information' section with a note about server restarts. The main content area is titled 'Workflow Notification Properti' with a question mark icon. It has a note about configuring the Messaging Service Driver and a link to 'Go to the Messaging Driver page'. Below this, there's a form for 'Notification Mode' set to 'None'. The 'Notification Service' section contains fields for 'Email : From Address' (accountId@yourdomain.com), 'Email : Actionable Address' (respondToaccountId@yourdomain), and 'Email : Reply To Address' (no.reply@yourdomain.com). At the bottom, there's a link to 'More Workflow Notification Configuration Properties...'.

You now configure Oracle User Messaging Service to send and receive notifications. During configuration, you provide the addresses that are used by human workflow.

2. Click **Go to the Messaging Driver Page**.

The Associated Drivers page is displayed.

3. In the **Configure Driver** column of the **Local** tab, select the driver to configure. For this example, the **User Messaging Email Driver** is selected.

The screenshot shows a web-based interface titled "Associated Drivers". At the top, it says "Logged in as weblogic" and "Page Refreshed Dec 4, 2012 3:36:19 PM PST". The interface has tabs for "Associated Drivers", "Local", and "All". Under the Local tab, there is a table with columns: Name, Driver Type, Status, and Configure Driver. A single row is selected, showing "/Farm\_soa\_infra/soa\_infra/soa\_server1/usermessagingdriver-email" in the Name column, "User Messaging Email Driver" in the Driver Type column, a green up arrow icon in the Status column, and a blue "Configure Driver" button with a pencil icon in the Configure Driver column. A cursor is hovering over the Configure Driver button.

This takes you to a page to configure the selected messaging service driver.

4. See the following section based on the messaging service driver you selected in Step 3.

---

For This Driver...	See...
Messaging Extension	<a href="#">Section 27.4.1.3, "Configuring the Messaging Extension Driver."</a> <b>Note:</b> This driver is not selectable from the <b>Local</b> tab, but is available for configuration.
Email	<a href="#">Section 27.4.1.4, "Configuring the Email Driver"</a>
SMPP	<a href="#">Section 27.4.1.5, "Configuring the SMPP Driver"</a>
XMPP	<a href="#">Section 27.4.1.6, "Configuring the XMPP Driver"</a>
VoiceXML	<a href="#">Section 27.4.1.7, "Configuring the VoiceXML Driver"</a>
Worklist	<a href="#">Section 27.4.1.8, "Configuring the Worklist Driver"</a>
Proxy	<a href="#">Section 27.4.1.9, "Configuring the Proxy Driver"</a>

---

For example, if you selected the email driver, properties such as the following are displayed for you to configure:

- Incoming IMAP and outgoing SMTP email servers.
- Outgoing server user names and passwords.
- List of sender addresses and the default sender address. (The addresses you specify for these properties must match the addresses you specify in the **Email: From Address** and **Email: Actionable Address** fields of the Workflow Notification Properties page.)

For handling incorrect email responses, the email driver should be configured to handle incoming mail. This action enables human workflow participants to receive and forward notifications. Messaging drivers support the various messaging transports.

usermessagingdriver-email

Logged in as **weblogic** | Page Refreshed Dec 4, 2012 3:44:08 PM PST

**i Information**  
All changes made in this page require a server restart to take effect.

**Email Driver Properties**

For detailed description of the driver properties, refer to the Administrator's Guide for Oracle SOA Suite.

**Common Configuration**

Supported Delivery Types	Supported Protocols
Capability SEND, RECEIVE	Supported Carriers
Cost	Supported Content Types
Speed	text/plain, text/html, multipart/mixed, multipart/alternative, multipart/related
Sender Addresses	Supported Status Types
Default Sender Address	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE, USER_REPLY_ACKNOWLEDGEMENT_SUCCESS, OraSDPMP/QueueConnectionFactory:OraSDPMP/Queues/OraSDPMDriverDefSndQ1
Sending Queues Info	

**Driver-Specific Configuration**

Name	Description	Mandatory	Encoded Credential	Value
MailAccessProtocol	E-mail receiving protocol. The possible values are IMAP and POP3. Required only if e-mail receiving is supported on the driver instance			IMAP
RetryLimit	This value specifies the number of times to retry connecting to the incoming mail server, if the connection is lost due to a temporary error			-1

**Notes:**

- The hostname and IP address of the email server with which you configure must also be added to the /etc/hosts file of the server on which Oracle SOA Suite is running. For example, if the hostname is xyz.example.com and the IP address is aa.bb.cc.dd, then add this information to the /etc/hosts file.
- After you configure the inbound (IMAP) email server, the outbound (SMTP) email server, or both, you must restart the managed Oracle WebLogic Server on which the SOA Infrastructure is configured for these setting to take effect.

5. Click **Apply** when driver configuration is complete.
6. Return to the Workflow Notification Properties page.
7. Specify the mode of the notification service. The possible values are:
  - **ALL:** The email, short message service (SMS), instant message (IM), and voice channels are configured and notification is sent through any channel that you use.
  - **EMAIL:** Only the email channel is configured for sending notification messages.
  - **NONE:** No channel is configured for sending notification messages. This is the default setting.
8. Specify notification channel values:

Field	Description	Example
<b>Email: From Address</b>	<p>Enter the outgoing email address from which end users receive notifications.</p> <p>The address you specify must match the sender addresses and the default sender address that you specify on the Email Driver Properties page of the Oracle User Messaging Service.</p> <p><b>Note:</b> You can only receive error messages when the outgoing email address is also configured to receive incoming messages. This ensures that error messages from incorrect or nonexistent email addresses are captured by the server. Even if you configure a separate incoming account in the <b>Email: Reply To Address</b> field, error messages do not appear in the server logs.</p>	workflow.notifications@mycompany.com
<b>Email: Actionable Address</b>	<p>Enter the incoming email address for performing task actions. The actionable email account is the account in which task action-related emails are received and processed by human workflow.</p> <p>The address you specify must match the sender addresses and the default sender address that you specify on the Email Driver Properties page of the Oracle User Messaging Service.</p>	workflow.actions@mycompany.com
<b>Email: Reply To Address</b>	<p>Enter the address to display in emails sent out from Oracle SOA Suite. It can be a dummy address such as no.reply@mycompany.com or a valid address. If a valid address is provided, and configured in the Messaging Driver page, then if a user replies to actionable emails, human workflow sends an automated email indicating the correct usage. This is another incoming email account.</p>	workflow.no.reply@mycompany.com

9. Click **Apply**.
10. To configure advanced notification properties in the System MBean Browser, click **More Workflow Notification Configuration Properties**. Properties that are displayed include, but are not limited to, the following. Descriptions are provided for each property.
  - **ASNSDriverIMAddress**: The address at which to receive incoming instant messages (IMs).
  - **CustomNSDriverPropertyNames**: Returns custom notification services property names.
  - **FaxCoverPageCount**: The return number of configured fax cover pages.
  - **RetryNotificationMessageThrottle**: The number of email notification messages that can be processed during notification retry cycles. For more information, see [Section 21.8, "Configuring the Number of Email Notification Messages."](#)

- 
11. Make changes appropriate to your environment.

---

**Note:** If your IM message contains content that appears to be actionable, then acting upon the task from within the message does not cause any action to be taken. For example, acting upon the task in the following IM message does not cause any action to occur.

Help desk request for wf Faulk Task Help desk request for wf Faulk requires your attention. NOTE: You can act on the task by copy-pasting one of following lines as your response.

```
RESOLVED : [[NID]] :
Pt12uRUu9H+Xem4NYS2o7dKDtgNLs42d4YIs8yS08Gn0ZVYFsb1SQVenRukRE+
IcE7c4Xdb+tPazvP v9T2iA0qylDg0bTaVxX13HhsrCYAg= : [[NID]]
UNRESOLVED : [[NID]] :
xT9106rbgraey+BtgQyJIXk62mkFtCe7ocKxwNLIsPzyE5/7AnGwX1BodEgQxr6
jorvsw2F54k/C1 r5mvyAJpAp4I4IekOHi4ghQ3eSbBhdzET1IL4F3qV/KZ/BAUsq :
[[NID]]
```

---

For information about managing incoming and outgoing notifications through email in human workflow, including testing that outgoing messages are arriving at the correct destination, see [Section 23.5, "Managing Outgoing Notifications and Incoming Email Notifications."](#)

For more information about notifications and the User Messaging Service, see the following documentation:

- [Part X, "Administering Oracle User Messaging Service"](#)
- Part "Using Oracle User Messaging Service" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*

## 21.2 Configuring the Notification Service to Send Notifications to a Test Address

You can configure the Oracle Human Workflow Notification Service to send all notifications to a test address instead of to a production address. To do this, you use the System MBean Browser in Oracle Enterprise Manager.

### To configure the Notification Service to send notifications to a test address:

1. Navigate to the System MBean Browser in Oracle Enterprise Manager. To do this:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Administration > System MBean Browser.	1. Right-click soa-infra. 2. Select Administration > System MBean Browser.

2. Search for the HWFMailerConfig Mbean. To do this click the **Find** icon in the System MBean Browser navigator pane. From the **Find** list, select **MBean Name**, and, in the text box to the right of the list, enter `HWFMailerConfig`. Click the **Find** arrow.

The corresponding information appears in the right pane.

3. Select the Operations page.

**To set a test address:**

- a. In the Operations page, select **addTestNotificationAddress**. The Operation: addTestNotificationAddress page appears in the right pane.
- b. In the **Parameters** table, in the **Channel** row, in the **Value** column, specify the channel through which to send notifications, for example, Email, SMS, FAX, IM, Voice, Pager.
- c. In the **Parameters** table, in the **testNotificationAddress** row, in the **Value** column, enter the address of the test recipient, for example, testAddress@yourDomain.com.
- d. Click **Invoke**.

**To remove a test address:**

- a. In the Operations page, select **removeTestNotificationAddress**. The Operation: removeTestNotificationAddress page appears in the right pane.
- b. In the **Parameters** table, in the **Channel** row, in the **Value** column, specify the channel you want to remove for the notification, for example, Email, SMS, FAX, IM, Voice, Pager.
- c. Click **Invoke**.

## 21.3 Configuring Human Workflow Task Service Properties

You can assign the actionable email account name, specify workflow session timeout and custom class path URL properties values, configure dynamic assignment and task escalation functions of the assignment service, and set additional human workflow properties.

Dynamic assignment functions select a particular user or group from either a group, or from a list of users or groups. The selection is made according to criteria specific to the particular dynamic assignment function.

To configure human workflow task service properties:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > Workflow Properties > Task tab.	1. Right-click <b>soa-infra</b> . 2. Select SOA Administration > Workflow Properties > Task tab.

The upper part of the Workflow Task Service Properties page displays the field for the actionable email account and the automatically defined dynamic assignment functions.

**Workflow Task Service Properties**

\* Actionable Email Account: Default

\* Workflow Service Session Timeout (in minutes): 60

Workflow Custom Classpath URL: [empty]

**Dynamic Assignment and Task Escalation Functions**

Register custom dynamic assignment functions with the Workflow Service by specifying the class implementing the function and optional parameters.

View	Add Function	Remove Function
Function Name	Classpath	
ROUND_ROBIN	oracle.bpel.services.workflow.assignment.dynamic.patterns.RoundRobin	
LEAST_BUSY	oracle.bpel.services.workflow.assignment.dynamic.patterns.LeastBusy	
MANAGERS_MANAGER	oracle.bpel.services.workflow.assignment.dynamic.patterns.TaskEscalationManagersManager	
MOST_PRODUCTIVE	oracle.bpel.services.workflow.assignment.dynamic.patterns.MostProductive	

**Parameters:**

No parameters found

- Enter the following details.

Function	Description
Actionable Email Account	<p>Enter the incoming, actionable email account to use. The default account name is <b>Default</b>, which is the account configured in <a href="#">Section 21.1, "Configuring Human Workflow Notification Properties."</a> If a different account name is specified in this field, then create and configure the account as described in <a href="#">Section 21.9, "Configuring Multiple Send Addresses."</a></p>
Workflow Service Session Timeout (in minutes)	<p>Enter the length of time that users logged in to Oracle BPM Worklist can remain inactive before their session expires, and they are required to log in again. This also applies to authenticated sessions created through one of the TaskQueryService authentication methods.</p>
Workflow Custom Classpath URL	<p>Enter the URL class path. This is the class path used by workflow services to look up classes implementing custom dynamic assignment and task escalation functions, custom callbacks, and customized instances of the system resource bundle, <code>WorkflowLabels.properties</code>. This can be any valid URL (either a local file path or remote URL). The class path can specify either a directory or a JAR file. If the URL specifies a directory, it must include a trailing slash ('/') character.</p>

- Go to the **Dynamic Assignment and Task Escalation Functions** section.

The dynamic assignment functions are defined in the following table. You can also create your own functions and register them with the workflow service.

Function	Type	Description
ROUND_ROBIN	Dynamic assignment	This function picks each user or group in turn. This function uses the initialization parameter MAX_MAP_SIZE. This parameter specifies the maximum number of sets of users or groups for which the function can maintain ROUND_ROBIN counts. The dynamic assignment function holds a list of users and groups in memory for each group (or list of users and groups) on which it is asked to execute the ROUND_ROBIN function.
LEAST_BUSY	Dynamic assignment	This function picks the user or group with the least number of tasks currently assigned to it.
MANAGERS_MANAGER	Task escalation	This function picks the manager's manager for the task.
MOST_PRODUCTIVE	Dynamic assignment	This function picks the user or group that has completed the most tasks over a certain time period (by default, the last seven days). This function uses the initialization parameter DEFAULT_TIME_PERIOD. This parameter specifies the length of time (in days) over which to calculate the user's productivity. This value can be overridden when calling the MOST_PRODUCTIVE dynamic assignment function. Use an XPath function by specifying an alternative value as the third parameter in the XPath function call.

4. Click a function to display its parameters and values in the **Parameters** section.
5. Click **Add** to add a function. You are prompted to specify the following:

- Function name
- Class path
- Function parameter name
- Function parameter value

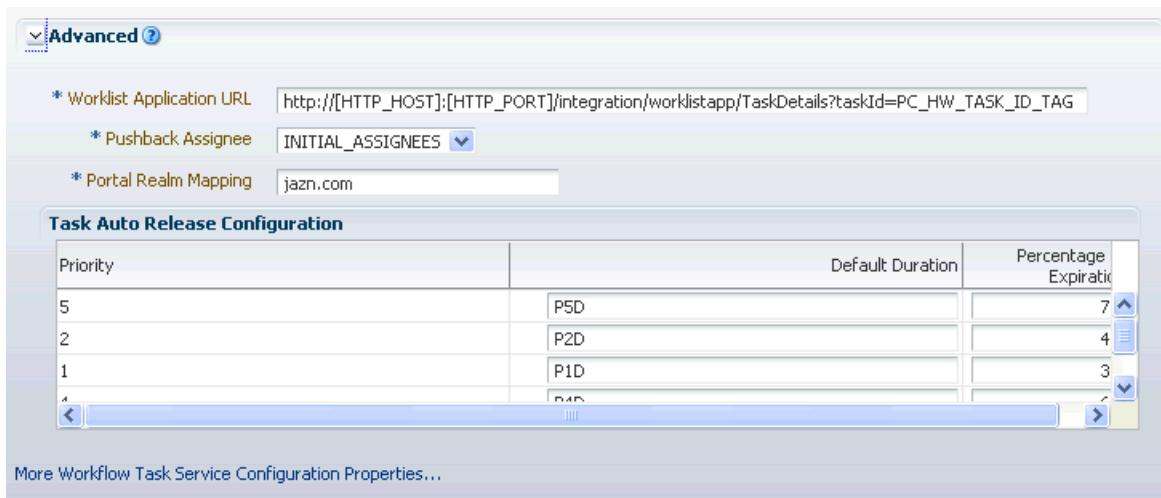
You cannot add multiple properties to a function on this page. To do that, use the System MBean Browser, which is available by selecting **Administration > System MBean Browser** from the **SOA Infrastructure** menu.

6. Click **OK**.
7. To update the value of a parameter in a function, select the function in the **Dynamic Assignment and Task Escalation Functions** table.

The parameter value is displayed for editing.

8. Update the value.
9. Expand the **Advanced** section.

The **Advanced** section displays the following properties:



These properties are defined in the following table.

Properties	Description
<b>Worklist Application URL</b>	In the emails that are sent for tasks, the link to Oracle BPM Worklist is read from this property. This element identifies the URL. Configuring this is useful if the custom Oracle BPM Worklist is built. The tag <code>PC_HW_TASK_ID_TAG</code> in this URL is replaced with the task ID when constructing the URL for the email.
<b>Pushback Assignee</b>	A task can be pushed back to the previous approver or previous initial assignees. The original assignees do not need to be the approver because they may have reassigned the task, escalated the task, and so on. The possible values for this element are <code>INITIAL_ASSIGNEES</code> and <code>APPROVER</code> .
<b>Portal Realm Mapping</b>	This property is used when authenticating a user from an HTTP servlet request through the task query service method <code>createContext</code> (for example, when Oracle BPM Worklist runs in a single sign-on (SSO) environment). The HTTP servlet request does not carry information about the identity service realm to which the remote user belongs; this parameter is used to configure which realm to use to authenticate the user in an HTTP servlet request remote user.

Properties	Description
<b>Task Auto Release Configuration</b>	<p>When a task is assigned to a group, application role, or multiple users, a user must first acquire the task before working on it. Once the task is acquired, other users cannot work on the task. If a user acquires a task, but does not act on it, the task is eventually automatically released, allowing other users to acquire the task. This prevents a user from acquiring tasks, then forgetting to work on them. This prevents others from working on them. Task automatic release enables you to configure the time period that elapses after a user acquires a task and before the system automatically releases the task and makes it available again to other users. The automatic release durations can be configured as a default duration and as a percentage of the expiration duration of a given task. The automatic release durations can also be configured differently for tasks of different priority.</p> <p>For example, assume the task automatic release duration for priority 2 tasks is set to 50%, with a default duration of 12 hours. If a priority 2 task is set to expire in two days, the task is automatically released after one day (which is 50% of the expiration duration). If no expiration date is set for the task, then the task is automatically released after 12 hours (which is the default automatic release duration).</p>

10. Make changes appropriate to your environment.
11. Click **Apply**.
12. To configure advanced task service properties in the System MBean Browser, click **More Workflow Taskservice Configuration Properties**. See Step 10 of [Section 21.1, "Configuring Human Workflow Notification Properties"](#) for a list of some advanced properties that are displayed.
13. Make changes appropriate to your environment.

For more information about the task service and assignment service, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## 21.4 Configuring Oracle HTTP Server for Task Form Attachments

When adding an attachment to the task form through Oracle HTTP Server (OHS), the location, `/ADFAttachmentHelper`, must be included in the OHS configuration. For example, add the following to the `mod_wl_ohs.config` file of OHS, under `instance_home/config/OHS/ohs_instance`:

```
<Location /ADFAttachmentHelper>
 SetHandler weblogic-handler
 PathTrim /weblogic
 ErrorPage http://WEBLOGIC_HOME:WEBLOGIC_PORT/
</Location>
```

## 21.5 Configuring Oracle Advanced Queuing for Oracle Human Workflow Notifications

To configure Oracle Advanced Queuing for Oracle Human Workflow notification, set the managed bean property `UseAQ` under `HWFMailer` configuration in Oracle Enterprise Manager Fusion Middleware Control to TRUE, then restart the SOA server. After the server restarts, new notification messages are enqueued Oracle Advanced Queuing. The pending messages in the JMS queue are enqueued into the Oracle Advanced Queuing by the notification retry thread.

## 21.6 Configuring the Pluggable Notification Service

Custom notification service implementations can be plugged in and used instead of the default notification service providers. You can plug in a custom notification service for all channels or selectively for specific channels. For example, the notification service provides the ability to plug in an existing SMS implementation instead of the default SMS notification service.

### 21.6.1 Pluggable Notification Service Implementation

To plug in a notification service, perform one of the following tasks:

- Implement interface  
`oracle.bpel.services.notification.ICustomNotificationService`
- Extend the abstract class  
`oracle.bpel.services.notification.AbstractCustomNotificationServiceImpl`

This interface has methods for the following channels:

- Email
- Voice
- SMS
- Instant messaging (IM)

The plugged-in notification service can override the default providers for one or more channels. When the custom notification service is overriding the default implementation for a subset of channels, the methods corresponding to the other channels (channels that are not overridden) are not called by the notification service. Those methods can just return a null value. Alternatively, the implementation can extend the following abstract class:

```
oracle.bpel.services.notification.AbstractCustomNotificationServiceImpl
```

This class provides empty implementations for each of the channels. In that case, the implementation can just extend the methods for the appropriate channels.

The implementation and its dependent classes must be available in the class path of Oracle WebLogic Server.

### 21.6.2 Pluggable Notification Service Registration

Once the implementation is available, you register it in the System MBean Browser.

To register the pluggable notification service:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. In the navigator, expand the **SOA** folder.
3. Right-click **soa-infra**, and select **Administration > System Mbean Browser**.  
The System MBean Browser is displayed on the right side of the page.
4. Expand **Application Defined MBeans > oracle.as.soainfra.config > Server: server\_name > HWFMailerConfig > human-workflow**.
5. Click the **CustomNSDriverPropertyNames** property on the right side of the page.
6. Record the values displayed by **CustomNSDriverPropertyNames** for the **All**, **Voice**, **Email**, **Fax**, **Pager**, **SMS**, and **IM** properties.

7. Click **Return**.
8. Click the **Operations** tab.
9. Click **setCustomNSDriverPropertyValue**.

**System MBean Browser**

**Operation: setCustomNSDriverPropertyValue**

MBean: oracle.as.soainfra.config:Location=soa\_server1,name=human-workflow,  
Name: type=HWFMailerConfig,Application=soa-infra

Operation: setCustomNSDriverPropertyValue  
Name:

Description: Set custom notification services property value  
Return Type: java.lang.String

Parameters		
Name	Description	Type
propertyName	A Key for identifying and setting properties	java.lang.String
propertyValue	A Configuration Property Value	java.lang.String

**Return Value**

10. In the **Value** field for **propertyName**, enter one of the values you noted down for the **All**, **Voice**, **Email**, **Fax**, **Pager**, **SMS**, and **IM** properties on the **CustomNSDriverPropertyNames** page. Note the following details:
  - If you are overriding the default implementation for only the email channel, use the **Email** value in the **Value** field for **propertyName** and the complete class name of your implementation in the **Value** field for **propertyValue**.
  - The override for other channels is configured the same way as the email channel.
  - Using the value of the **All** property in the **Value** field for **propertyName** refers to an implementation for all specified channels.
11. In the **Value** field for **propertyValue**, provide the complete class name of your implementation.
12. Click **Invoke**.
13. Restart Oracle WebLogic Server.

## 21.7 Globally Disabling the Automatic Release Timers for Oracle BPM Worklist Tasks

If automatic release timers are enabled for all Oracle BPM Worklist tasks and this is creating overhead for the database and JVM, you can globally disable the timers.

To globally disable the automatic release timers for Oracle BPM Worklist tasks:

1. Right-click **soa-infra**, and select **Administration > System Mbean Browser**.  
The System MBean Browser is displayed on the right side of the page.
2. Expand **Application Defined MBeans > oracle.as.soainfra.config > Server: server\_name > WorkflowConfig > human-workflow > WorkflowConfig.TaskAutoReleaseConfiguration**.
3. Select the task priority to modify. Each task instance has a priority.
  - **Priority[1]**
  - **Priority[2]**
  - **Priority[3]**
  - **Priority[4]**
  - **Priority[5]**
4. In the **Attributes** tab, click **DefaultDuration**.
5. In the **Value** field, enter **P0D** to indicate zero days. The default value is **P1D** (one day).
6. Click **Apply**.
7. Perform Steps 3 through 6 for any remaining priorities for which you want to disable automatic release.

When complete, the automatic release timers for newly created task instances with the priority you modified are disabled.

## 21.8 Configuring the Number of Email Notification Messages

You can control the number of email notification messages that can be processed during notification retry cycles with the System MBean Browser

**RetryNotificationMessageThrottle** property. This property prevents the overloading of messages in the queue and reduces the memory size of the notification message payload.

To configure the number of email notification messages:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>SOA Administration &gt; Workflow Properties</b>	1. Right-click <b>soa-infra</b> . 2. Select <b>SOA Administration &gt; Workflow Properties</b>

2. Click **More Workflow Notification Configuration Properties**.
3. Click **RetryNotificationMessageThrottle**.
4. In the **Value** field, enter a value. The default is 200000 messages.

5. Click **Apply**.

## 21.9 Configuring Multiple Send Addresses

It may be necessary in some processes to distinguish email notification based on the from address of the email. For example, a human resources BPEL process sends emails with the from address set as `HR@yourcompany.com`, while a finance BPEL process sends emails with the from address set as `finance@yourcompany.com`.

To configure multiple send addresses:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. In the navigator, expand the **SOA** folder.
3. Right-click **soa-infra**, and select **Administration > System Mbean Browser**.  
The System MBean Browser is displayed on the right side of the page.
4. Expand **Application Defined MBeans > oracle.as.soainfra.config > Server: server\_name > HWFMailerConfig > human-workflow**.
5. Under the **Attributes** tab, record the value of the **ASNSDrivers** attribute. By default, only the **Default** value is available.
6. Click **Return**.
7. Click the **Operations** tab.
8. Click **setASNSDriver**.
9. For **propertyName**, enter a value (for this example, `EmailFromAddress`).
10. For **propertyValue**, enter a value (for this example, `HR@yourcompany.com`).
11. For **driverName**, enter a value (for this example, `HR`).
12. Click **Invoke**.
13. Add as many accounts as the number of from addresses needed:
  - For **propertyName**, enter a value (for this example, `EmailFromAddress`).
  - For **propertyValue**, enter a value (for this example, `finance@yourdomain.com`).
  - For **driverName**, enter a value (for this example, `Finance`).
14. Click **Invoke**.  
The **ASNSDriver** attribute now shows all the accounts created in the previous steps and the **getASNSDriverAddresses** operation now shows the addresses being used for each of the drivers. For more information, see [Chapter 27, "Configuring Oracle User Messaging Service."](#)
15. Using Oracle WebLogic Server Administration Console, install multiple Oracle User Messaging Service email drivers, one for each from address.
16. Configure the email drivers to use the required from address for sending outgoing emails.
17. In Oracle JDeveloper during design time, use `HR` as the account name to configure an email activity for an HR BPEL process and `Finance` as the account name to configure an email activity for the finance BPEL process.

## 21.10 Configuring Notification Retries

Oracle SOA Suite provides support for reliable notifications. The outbound notification creates a notification message with a unique notification ID and stores the message and unique ID in the dehydration store. It then enqueues this unique ID in the JMS queue and commits the transaction. A message-driven bean (MDB) listening on this queue dequeues the message and sends a notification to the user. If there is any notification failure, the notification retries three times. If the retries all fail, it marks this notification as being in error.

## 21.11 Configuring the Identity Service

By default, the identity service uses the embedded LDAP server in Oracle WebLogic Server as the default authentication provider. You can, however, configure Oracle WebLogic to use an alternative authentication provider, such as Oracle Internet Directory, Microsoft Active Directory, or Oracle iPlanet, along with the default authenticator.

---

**Note:** For more information on configuring and using Oracle Virtual Directory plug-ins, see *Oracle Fusion Middleware Administrator's Guide for Oracle Virtual Directory*, "Understanding Oracle Virtual Directory Plug-Ins".

---

This section describes how to add an authentication provider and create users and groups in the authentication provider using either Oracle WebLogic Administration Console or Oracle Directory Services Manager.

For more information on configuring multiple LDAP authentication providers, see Oracle Fusion Middleware Application Security Guide, "Configuring the Identity Store Service"

This section describes the following topics:

- [Section 21.11.1, "Adding an Authentication Provider"](#)
- [Section 21.11.2, "Creating Users and Groups in the Authentication Provider"](#)
- [Section 21.11.3, "Configuring the Directory Service"](#)

For information about installing and using the organizational hierarchy of users and groups known as the demo user community, see [Appendix A, "Installing the Demo User Community in the Database."](#)

---

**Note:** Oracle Fusion Middleware supports providers that enable the User and Role API to interact with custom identity stores.

For more information, see Chapter "Developing with the User and Role API" of the *Oracle Fusion Middleware Application Security Guide*.

---

### 21.11.1 Adding an Authentication Provider

You can add an authentication provider to a security realm using the Oracle WebLogic Server Administration Console.

To add an authentication provider:

1. Log in to the Oracle WebLogic Server Administration Console.

2. Click **Security Realms** in the **Domain Structure** pane, and click the name of a realm in the list (**myrealm**, for example).
3. Click **Providers, Authentication**.

The Authentication Providers page appears.

**Settings for myrealm**

**Authentication Providers**

Name	Description	Version
DefaultAuthenticator	WebLogic Authentication Provider	1.0

4. Click **New** to add a new authentication provider.

The Create a New Authentication Provider page appears.

**Create a New Authentication Provider**

**Create a new Authentication Provider**

The following properties will be used to identify your new Authentication Provider.

\* Indicates required fields

The name of the authentication provider.

\* **Name:**

This is the type of authentication provider you wish to create.

**Type:**

5. In the **Name** field, type a name for the provider, choose the authenticator type using the **Type** drop-down list, and click **OK**.

For example, you can type **OIDAuthenticator** as the name and choose **OracleInternetDirectoryAuthenticator** as the type for a provider that authenticates users using the Oracle Internet Directory.

Similarly, you can type a name and choose **ActiveDirectoryAuthenticator**, **iPlanetAuthenticator**, **openLDAPAuthenticator**, or **NovellAuthenticator** from the list to specify the corresponding authenticator.

---

**Note:** When using Oracle Internet Directory as the authentication provider, you must set the `orclsslinteropmode` attribute to 0 (zero) using Oracle Directory Services Manager. See [Section 21.11.3, "Configuring the Directory Service"](#) for more information.

---

6. On the **Providers > Authentication** page, click the authenticator that you just created.

The settings for the authentication provider appears.

Settings for ActiveDirectoryAuthenticator

Configuration    Performance

Common    Provider Specific

Save

Use this page to define the common configuration of this Active Directory Authentication provider.

Name:	ActiveDirectoryAuthenticator	The name of this Active Directory Authentication provider. <a href="#">More Info...</a>
Description:	Provider that performs LDAP authentication	A short description of this Active Directory Authentication provider. <a href="#">More Info...</a>
Version:	1.0	The version number of this Active Directory Authentication provider. <a href="#">More Info...</a>
Control Flag:	SUFFICIENT	Specifies how this Realm Adapter Authentication provider fits into the login sequence. <a href="#">More Info...</a>

Save

7. From the **Control Flag** drop-down list, choose **SUFFICIENT**, and click **Save**.

This specifies that if a user is authenticated successfully using this authenticator, WebLogic should accept the authentication and not continue to invoke any additional authenticators. If the authentication fails, Oracle WebLogic Server attempts to authenticate the user using the next authenticator in the list.

If you set the **Control Flag** to **SUFFICIENT**, ensure that all subsequent authenticators also have the **Control Flag** set to **SUFFICIENT**. Likewise, ensure that the **Control Flag** of the default authenticator is set to **SUFFICIENT** as well.

8. Click **Provider Specific** to enter the details for the authenticator server.
9. Enter the provider-specific information about the authentication provider, check the **Use Retrieved User Name as Principal** checkbox, and click **Save**.

You must specify the following information. Use the default setting for the rest of the fields.

Field	Description
Host	The hostname or IP address on which the authenticator server is running.
Port	The port number on which the authenticator server is running.

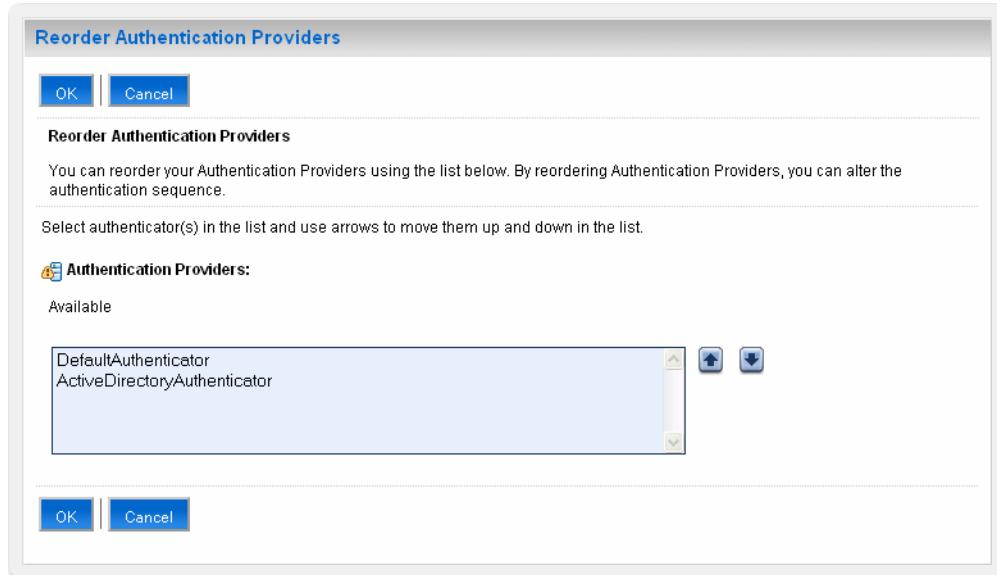
Field	Description
<b>Principal</b>	The Distinguished Name (DN) of the authenticator server user that Oracle WebLogic Server should use when connecting to the server.
<b>Credential</b>	The credential (usually a password) used to connect to the authenticator server.
<b>User Base DN</b>	The base Distinguished Name (DN) of the tree in the LDAP directory that contains users.
<b>Group Base DN</b>	The base Distinguished Name (DN) of the tree in the LDAP directory that contains groups.
<b>Use Retrieved User Name as Principal</b>	Specifies whether to use the user name retrieved from the LDAP server as the principal in the subject.
<b>User Name Attribute</b>	The attribute of an LDAP user object class that specifies the name of the user (for example, UID, CN, MAIL).

**Note:** The same user name attribute must be used for the fields: **All User Filter**, **User from Name Filter** and **User Name Attribute**.

- Click **Security Realms > Providers > Authentication** to return to the list of authentication providers.

- Click **Reorder**.

The Reorder Authentication Providers page appears.



- Select the new authentication provider, click the **Up** arrow to move the provider to the top of the list, and click **OK**.

After reordering, the **DefaultAuthenticator** should appear at the bottom of the list. This action enables the system to handle logins as `weblogic` that are not typically in an LDAP directory, but still must be authenticated to start the server.

If multiple authentication providers are configured, authentication falls through the list of authenticators according to the control flags set. But the Java Portlet

Specification (JPS) provides authorization against only the first entry in the list of providers.

#### 21.11.1.1 Updating the User Attribute

You can modify the settings of the authentication provider in Oracle WebLogic Server Administration Console to use your email address as your login user (user attribute). You must perform the following steps:

1. Log in to Oracle WebLogic Server Administration Console
2. Under the **Domain Structure** pane, select **Security Realms**. The **Summary of Security Realms** page appears with a list of available realms.
3. From the list, click the name of the realm you want to modify. The Settings tab for that realm appears
4. Select **Providers, Authentication**
5. In the **Authentication** tab, select the Authentication Provider you want to modify. The Settings tab for that Authentication Provider appears
6. Select **Configuration, Provider Specific** and update the following fields:
  - **All Users Filter:** set value to `(&(mail=) (objectclass=person)`
  - **User From Name Filter:** set value to `(&(mail=%u) (objectclass=person))`
  - **User Name Attribute:** set value to `mail`

---

**Note:** Note: The same user name attribute must be used for the fields: **All User Filter**, **User from Name Filter** and **User Name Attribute**.

---

7. Click **Save**.

#### 21.11.2 Creating Users and Groups in the Authentication Provider

You can create users and groups in the authentication provider using either Oracle WebLogic Server Administration Console or Oracle Directory Services Manager.

##### 21.11.2.1 Creating Users and Groups Using WebLogic Console

You can create users and groups for a specific provider, and define user and group membership, using the Oracle WebLogic Server Administration Console.

To create a user using WebLogic Console:

1. Log in to the Oracle WebLogic Console.
2. Click **Security Realms** in the **Domain Structure** pane, and click the name of a realm in the list (`myrealm`, for example).
3. Click **Users and Groups > Users**.

The **Users** page appears.

This page displays information about each user that has been configured in this security realm.

[Customize this table](#)

**Users**

<input type="checkbox"/>	Name	Description	Provider
<input type="checkbox"/>	weblogic	This user is the default administrator.	DefaultAuthenticator

4. Click **New** to add a new user. The Create a New User page appears.

5. Enter the required information about the user, and click **OK**.

You must specify the following information.

Field	Description
<b>Name</b>	(Required) The name of the new user.
<b>Description</b>	A description of the new user.
<b>Provider</b>	The provider for the user.
<b>Password</b>	The password associated with the login name for the new user.
<b>Confirm Password</b>	Confirmation of the password.

The system creates the new user in the specified provider and shows the Users page. You can configure group membership for the user, as required.

6. To specify group membership for the user, click the newly-created user in the list. The settings for the new user page appear.

7. Click **Groups** to specify group membership for the user.

8. Select a group in the **Available** list and click the right arrow to move it to the **Chosen** list.

You can press Ctrl-Click to select multiple groups to move.

9. Click **Save**.

To create a group using WebLogic Console:

1. Click **Users and Groups > Groups**.

The Groups page appears.

This page displays information about each group that has been configured in this security realm.

[Customize this table](#)

**Groups**

<input type="checkbox"/>	Name	Description	Provider
<input type="checkbox"/>	AdminChannelUsers	AdminChannelUsers can access the admin channel.	DefaultAuthenticator
<input type="checkbox"/>	Administrators	Administrators can view and modify all resource attributes and start and stop servers.	DefaultAuthenticator
<input type="checkbox"/>	AppTesters	AppTesters group.	DefaultAuthenticator
<input type="checkbox"/>	CrossDomainConnectors	CrossDomainConnectors can make inter-domain calls from foreign domains.	DefaultAuthenticator
<input type="checkbox"/>	Deployers	Deployers can view all resource attributes and deploy applications.	DefaultAuthenticator
<input type="checkbox"/>	Monitors	Monitors can view and modify all resource attributes and perform operations not restricted by roles.	DefaultAuthenticator
<input type="checkbox"/>	Operators	Operators can view and modify all resource attributes and perform server lifecycle operations.	DefaultAuthenticator

New Delete

Showing 1 to 7 of 7 Previous | Next

2. Click **New** to add a new group. The Create a New Group page appears.
3. Enter the required information about the group, and click **OK**.

You must specify the following information.

Field	Description
<b>Name</b>	(Required) The name of the new group.
<b>Description</b>	A description of the new group.
<b>Provider</b>	The provider for the group.

The system creates the new group in the specified provider and shows the Groups page. You can configure group membership for the group, as required.

4. To specify group membership for the group (specify parent groups), click the newly-created group in the list. The settings for the new group page appear.
  5. Click **Membership** to add the group to other groups.
  6. Select a parent group in the **Available** list and click the right arrow to move it to the **Chosen** list.
- You can press Ctrl-Click to select multiple groups to move.
7. Click **Save**.

### 21.11.2.2 Creating Users and Groups Using Oracle Internet Directory

You can create users and groups using Oracle Internet Directory through the Oracle Directory Services Manager.

To connect to Oracle Internet Directory from the Oracle Directory Services Manager:

1. Launch the Oracle Directory Services Manager by navigating to the following URL using a web browser:

`http://host_name:port/odsm/faces/odsm.jspx`

where `host_name` and `port` are the hostname and the managed server port number on which Oracle Internet Directory is running.

2. Click the **Connect to a directory** link and choose **Create a New Connection** in the drop-down menu. The New Connection dialog appears.
3. Select **OID** as the directory type, enter values in the required fields, and click **Connect**.

You can specify the following information.

Field	Description
<b>Name</b>	The name of the connection.
<b>Server</b>	(Required) The hostname or IP address of the system on which Oracle Internet Directory is running.
<b>Port</b>	(Required) The port number on the system on which Oracle Internet Directory is running.
<b>SSL Enabled</b>	Select to enable Secure Sockets Layer (SSL) communication.
<b>User Name</b>	(Required) The user name used to log in to Oracle Internet Directory.
<b>Password</b>	(Required) The password associated with the user name.
<b>Start Page</b>	The start page after logging into Oracle Internet Directory.

The Oracle Directory Services Manager Home page appears.

4. Click the **Data Browser** tab. You can use this page to create and remove entries.

To create a domain:

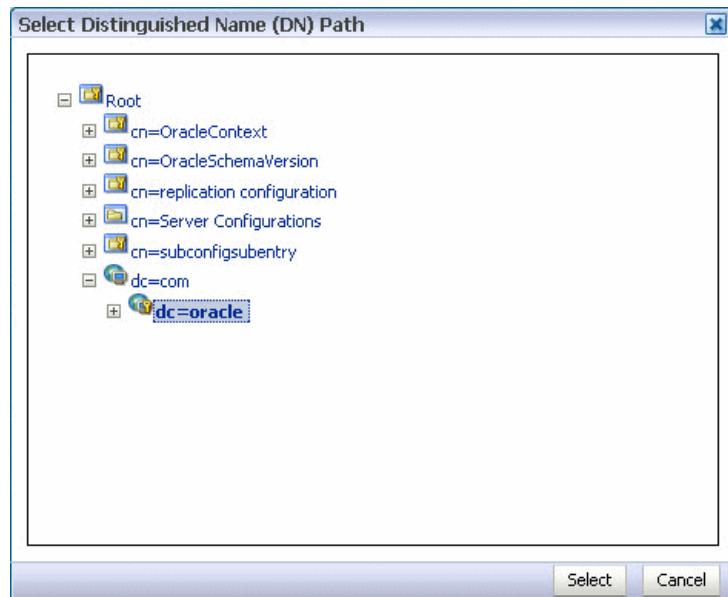
1. Click the **Create a new entry** button in the **Data Tree** pane. The Entry Properties page of the Create New Entry wizard appears.
2. Click the **Add** button to add the required object class for the domain. The Add Object Class dialog appears.
3. Enter the name of the object class. When the correct object class appears in the **Name** list, select it, and click **OK**.
4. Repeat Steps 2 and 3 to add all the required object classes for the domain. Generally, **top**, **domain**, and **orclContainer** are the object classes required for a domain.

---

**Note:** LDAP operations from Oracle SOA Suite can take a long time to complete if you do not index the correct LDAP attributes. The recommended searchable attribute list for indexing is **cn**, **sn**, **givenName**, **uid**, **manager**, **title**, **mail**, and **telephoneNumber**.

---

5. Click **Browse** to choose the parent of the domain. The Select Distinguished Name (DN) Path dialog appears.



6. Select the parent of the domain and click **Select**. You can create a hierarchy of entries by selecting the appropriate parent domains.
7. Click **Next** in the Create New Entry dialog. The Mandatory Properties page of the Create New Entry wizard appears.
8. Enter and select values for the required fields, and click **Next**.

You can specify the following information.

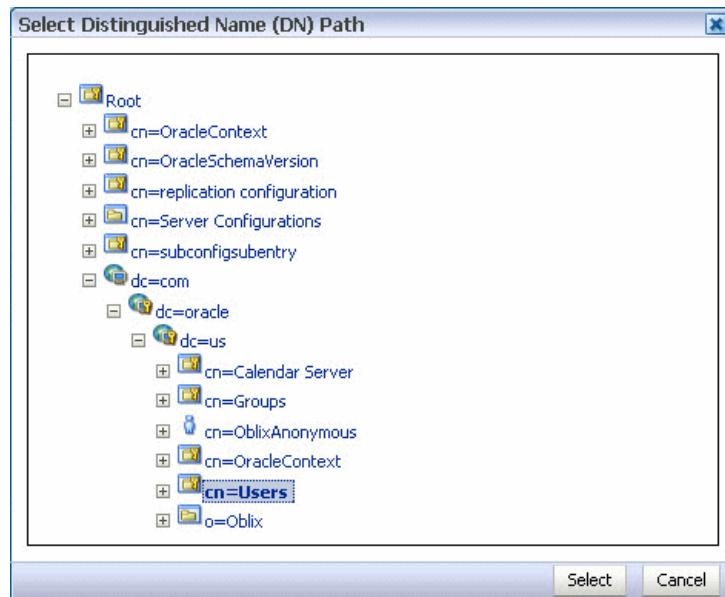
Field	Description
<b>dc</b>	(Required) The domain component.
<b>Relative Distinguished Name</b>	(Required) The relative distinguished name of the user.

The Status page of the Create New Entry wizard appears.

9. Verify the status of the new domain, and click **Finish** to create the new domain.

To create a user:

1. Click the **Create a new entry** button in the **Data Tree** pane. The Entry Properties page of the Create New Entry wizard appears.
2. Click the **Add** button to add the required object class for the user. The Add Object Class dialog appears.
3. Enter the name of the object class. When the correct object class appears in the **Name** list, select it, and click **OK**.
4. Repeat Steps 2 and 3 to add all the required object classes for the user. Generally, **top**, **person**, **inetorgperson**, **organizationalPerson**, and **orcluser** are the object classes required for a user.
5. Click **Browse** to choose the parent of the user. The Select Distinguished Name (DN) Path dialog appears.



6. Select the parent of the user and click **Select**.
7. Click **Next** in the Create New Entry dialog. The Mandatory Properties page of the Create New Entry wizard appears.
8. Enter and select values for the required fields, and click **Next**.

You can specify the following information.

Field	Description
<b>cn</b>	(Required) The common name.
<b>sn</b>	(Required) The surname (last name).
<b>Relative Distinguished Name</b>	(Required) The relative distinguished name of the user.

The Status page of the Create New Entry wizard appears.

9. Verify the status of the new user, and click **Finish** to create the new user.
10. Click the entry for the newly-created user in the **Data Tree** pane. The **Person** page for the user appears.

Distinguished Name: cn=user1,cn=Users,dc=us,dc=oracle,dc=com

Created by: cn=orcladmin Modified by: cn=orcladmin  
Created at: March 16, 2009 6:49:29 AM PDT Modified at: March 16, 2009 6:49:29 AM PDT

**Person** Attributes Subtree Access Local Access

**Basic User Information**

User Name	user1
First Name	<input type="text"/>
Last Name	user1
Title	<input type="text"/>
Manager	<input type="text"/>
Employee Number	<input type="text"/>
Email Address	<input type="text"/>
Upload Photo	<input type="button" value="Browse..."/>

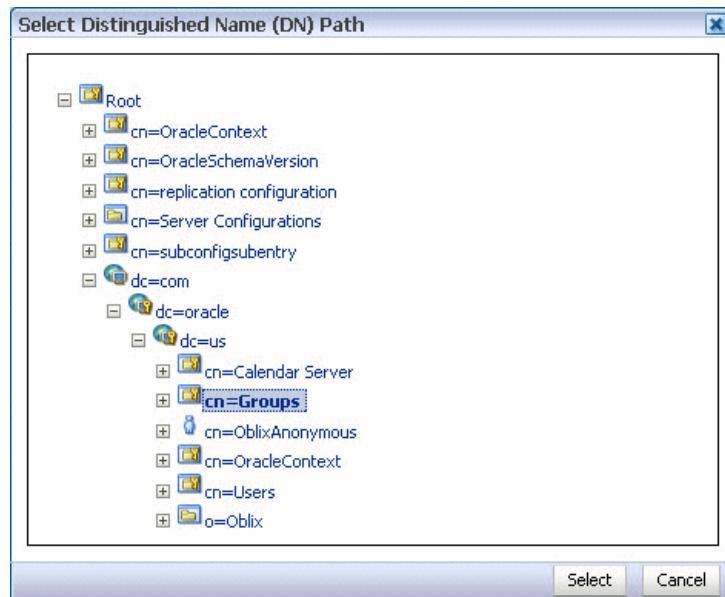
**Contact Information**

Postal Address	<input type="text"/>	Telephone Number	<input type="text"/>
Home Postal Address	<input type="text"/>	Mobile	<input type="text"/>

11. Enter details about the user, and click **Apply**.

To create a group:

1. Click the **Create a new entry** button in the **Data Tree** pane. The Entry Properties page of the Create New Entry wizard appears.
2. Click the **Add** button to add the required object class for the group. The Add Object Class dialog appears.
3. Enter the name of the object class. When the correct object class appears in the **Name** list, select it, and click **OK**.
4. Repeat Steps 2 and 3 to add all the required object classes for the group. Generally, **top**, **groupOfUniqueNames**, and **orclGroup** are the object classes required for a group.
5. Click **Browse** to choose the parent of the group. The Select Distinguished Name (DN) Path dialog appears.



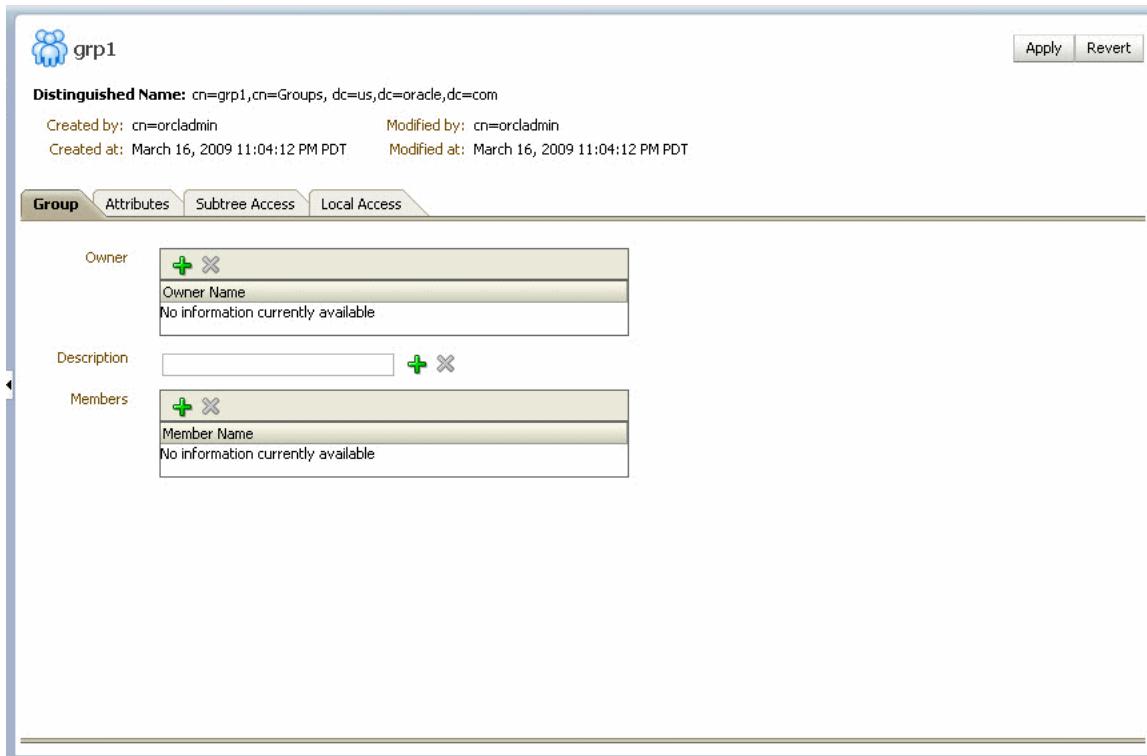
6. Select the parent of the group and click **Select**.
7. Click **Next** in the Create New Entry dialog. The Mandatory Properties page of the Create New Entry wizard appears.
8. Enter and select values for the required fields, and click **Next**.

You can specify the following information.

Field	Description
<b>cn</b>	(Required) The common name.
<b>Relative Distinguished Name</b>	(Required) The relative distinguished name of the group.

The Status page of the Create New Entry wizard appears.

9. Verify the status of the new group, and click **Finish** to create the new group.
10. Click the entry for the newly-created group in the **Data Tree** pane. The **Group** page for the group appears.



11. Specify details about the group, and click **Apply**.

To delete an entry:

1. Select an entry in the **Data Tree** pane.
2. Click the **Delete** this entry button in the **Data Tree** pane.

### 21.11.3 Configuring the Directory Service

When using Oracle Internet Directory as the authentication provider, you must set the **orcIsslInteropmode** attribute to 0 (zero) using Oracle Directory Services Manager.

---

**Note:** If the GUID attribute in the LDAP server is set to a binary value, which cannot be properly handled in the identity service, you must map it to a *unique* attribute that exists in both the user and group object classes and cannot have a binary value. For example, if the cn attribute is unique, it can be used because it satisfies both of these requirements.

You map GUID to cn in the jps-config.xml file:

```
<property value="GUID=cn" name="PROPERTY_ATTRIBUTE_MAPPING" />
```

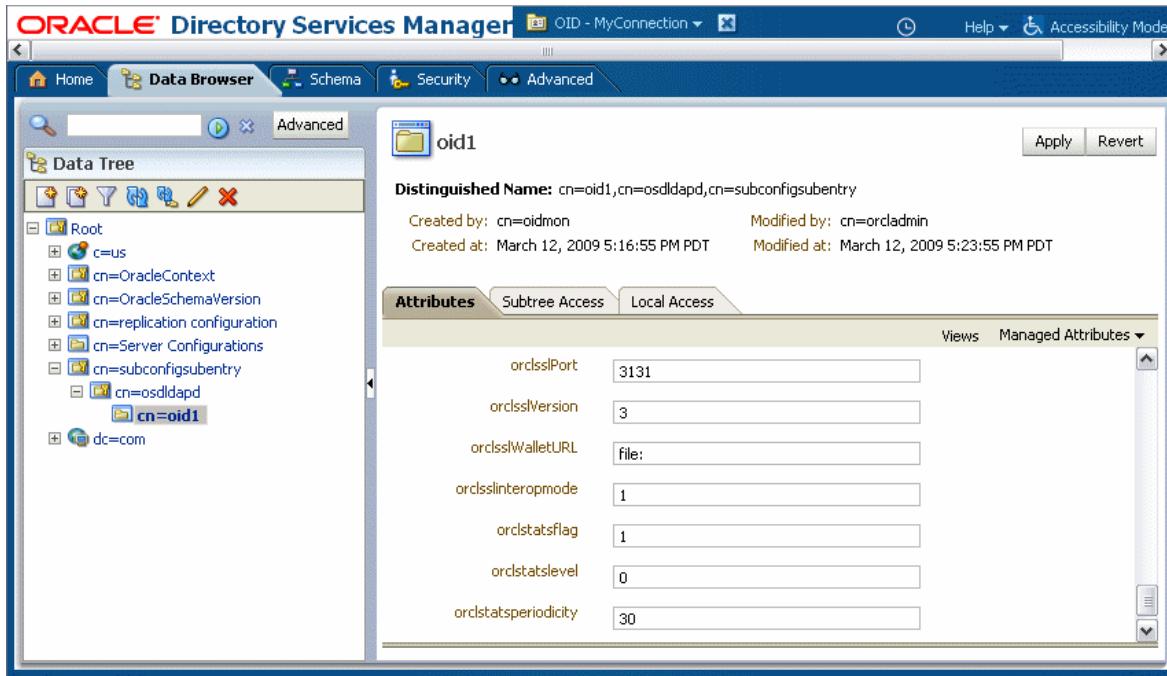
For more information about identity store attribute mapping, see Chapter "Developing with the User and Role API" of the *Oracle Fusion Middleware Application Security Guide*.

---

To configure the directory service:

1. Launch Oracle Directory Services Manager and choose an Oracle Internet Directory connection using the drop-down list.
2. Click the **Data Browser** tab.

3. Expand the **cn=subconfigsubentry > cn=osdldapd > cn=oid1** nodes.



4. In the Attributes page, set the **orclssInteropmode** attribute to 0.
5. Click the **Apply** button.

#### 21.11.4 Customizing the Identity Provider

To customize the identity provider (for example, to handle user and role information stored in home grown solutions), visit the following URL:

<http://www.oracle.com/technetwork/middleware/id-mgmt/overview/index.html>

### 21.12 Seeding Users, Groups, and Application Roles using LDAP Tools

This section provides an overview of the procedures required for seeding users, groups, and application roles with LDAP tools.

When you create a task, you assign humans to participate in and act upon the task. Participants can perform actions upon tasks during runtime from Oracle BPM Worklist, such as approving a vacation request, rejecting a purchase order, providing feedback on a help desk request, or some other action. There are three types of participants:

- Users
- Groups
- Application roles

For more information, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

#### 21.12.1 Changing the Default Password in the Embedded LDAP Server

The password credential is accessible from the Oracle WebLogic Server Administration Console by selecting **Security > Embedded LDAP** for your domain.

For instructions on changing the default password credential, see Chapter 9, "Managing the Embedded LDAP Server" of *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

## 21.12.2 Seeding Users or Groups through the LDAP Browser

To seed users or groups through the LDAP browser:

1. Start an LDAP browser (for example, openLdap browser, ldapbrowser, jXplorer, and so on). See the documentation for your browser for instructions.
2. Connect to the LDAP server by providing the hostname, port number on which the server is running, and the administration user credentials with which to log in.
  - For Embedded LDAP:
    - a. The default managed server port number is 7001.
    - b. The administration credential username is cn=admin.
    - c. The administration credential password is what you set in [Section 21.12.1, "Changing the Default Password in the Embedded LDAP Server."](#)
  - For OIDm:
    - a. The default port number is 3060.
    - b. The administration username is cn=orcladmin.
    - c. The administration password is the password for the LDAP server.
3. Seed a user or group through the browser by performing the following steps:
  - a. Select a parent under which to add a user or group.
  - b. Select the **Edit** menu and choose an appropriate option to add a new entry.
  - c. Enter all required attribute values for the entry.
4. Seed users or groups through the LDIF file by performing the following steps:
  - a. Select the domain under which to seed the users or groups.
  - b. Select the **LDIF** menu and choose to import an LDIF file.
  - c. In the Import LDIF File dialog, browse for and select the LDIF file and click **Import**.

Similarly, the users or groups seeded on the LDAP server can be exported to an LDIF file by selecting the **Export** option from the **LDIF** menu.

5. Add attributes to the users or groups by performing the following steps:
  - a. Select an entry for which to add a new attribute.
  - b. Right-click and choose the option to add a new attribute.
  - c. In the Add Attribute dialog, provide the name and value of the attribute.  
You can only add attributes that are defined in the LDAP server schema.
6. Delete attributes for users or groups by performing the following steps:
  - a. Select an entry for which to delete a new attribute.
  - b. Select an attribute from the list of attributes and delete it.

### 21.12.3 Seeding Application Roles using WLST Scripts

For instructions on using the WebLogic Scripting Tool (WLST) to seed application roles, see Chapter 4, "Infrastructure Security Custom WLST Commands" of *Oracle Fusion Middleware WebLogic Scripting Tool Command Reference*.

### 21.12.4 Managing Application Roles in Oracle Enterprise Manager Fusion Middleware Control

This section describes how to manage application roles in Oracle Enterprise Manager Fusion Middleware Control.

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**Note:** Follow these steps to provide nonadministrators with access to Oracle SOA Composer. This is accomplished by assigning the **SOADesigner** role to users or groups on the Edit Application Role page. The users must exist in the Oracle WebLogic Server realm.

---

To manage application roles in Oracle Enterprise Manager Fusion Middleware Control:

1. In the navigator, select the appropriate Oracle WebLogic Server under **WebLogic Domain > Farm\_Domain\_name**.
2. Right-click the domain name, and select **Security > Application Roles**.
3. Create an application role by performing the following steps:
  - a. Select the **Create** option in the Application Roles page.  
The Create Application Role page appears.
  - b. In the **Application** list, select the application name (*server\_name/soa-infra*) under which to create a role.
  - c. Enter the role name, display name, and description for the application role.
  - d. Add members by selecting **Add Role** in the **Roles** section and **Add User** in the **Users** section.
  - e. Click **OK** to create the application role.
4. Edit application roles by performing the following steps:
  - a. In the **Select Application Name to Search** list of the **Search** section of the Application Roles page, select an appropriate application (for example, **soa\_server1/soa-infra**).
  - b. To the right of the **Role Name** list, click the **Search** icon.  
This action lists all the application roles created for that application.
  - c. Select the application role to edit (for example, select **SOADesigner**).
  - d. Click **Edit**.  
The Edit Application Role page appears.
  - e. Add application roles and groups in the **Roles** section and users in the **Users** section (for example, assign **SOADesigner** to a user to which to provide access to Oracle SOA Composer). The user must be defined in the Oracle WebLogic Server realm.
  - f. Click **OK**.

5. Delete application roles by performing the following steps:
  - a. In the **Select Application Name to Search** list of the **Search** section of the Application Roles page, select an appropriate application.
  - b. To the right of the **Role Name** list, click the **Search** icon.  
This action lists all the application roles created for that application.
  - c. Select the application role to delete.
  - d. Click the **Delete** button to delete the application role.
  - e. Click **Yes** in the Confirmation dialog.

## 21.13 Enabling Case Agnostic Group Names in Human Tasks

By default, only user names in human tasks are case agnostic (case insensitive). This behavior is controlled by the value of the **caseSensitive** property in the System MBeans Browser for users, which is set to `false` by default. Group names in human tasks must be identical to what is seeded in the user directory. However, if you also want group names in human tasks to be case agnostic, you must set the **caseSensitiveGroups** property to `false`.

To enable case agnostic behavior for group names in human tasks:

1. Right-click **soa-infra**, and select **Administration > System Mbean Browser**.  
The System MBean Browser is displayed on the right side of the page.
2. Expand **Application Defined MBeans > oracle.as.soainfra.config > Server: server\_name > WorkflowIdentityConfig > human-workflow > WorkflowIdentityConfig.PropertyType > caseSensitiveGroups**.
3. Click the **Operations** tab.
4. Click **setValue**.
5. In the **Value** field, enter `false`.
6. Click **Invoke**.

## 21.14 Configuring Security Policies for Human Workflow Web Services

A policy set, which can contain multiple policy references, enables you to attach policies globally to a range of endpoints of the same type. Attaching policies globally using policy sets enables you to ensure that all subjects are secured in situations in which multiple users, such as a developer, assembler, or deployer, did not explicitly specify the policies to attach. Policies that are attached using a policy set are considered externally attached.

For example, if the developer did not specify policies in annotations or include policy references in deployment descriptors, then the deployer must attach them or risk a potential security risk. By attaching policies globally to a set of subjects by type, the administrator can ensure that all subjects are secured by default independent of, and even before, deployment. For example, the administrator can define a policy set that attaches a security policy to all web service endpoints in a domain. In this case, any new services added to the domain automatically inherit the security configuration defined in the policy set.

For more information about attaching policies globally using policy sets, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

## 21.15 Supporting Additional Locales for Current Task Instances

When a new locale is added, new Human Workflow task instances added after the locale was registered are created with localization data for that locale.

However, the instance data will be missing for task instances that were created before the new locale was added. These instances will not be found by queries using the new locale.



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## Monitoring Human Workflow Service Components and Engines

This chapter describes how to monitor human task service components and the human workflow service engine, including monitoring workflow service component and service engine instances and faults, viewing task status, monitoring active requests and operation performance statistics, and monitoring deployed human workflows.

This chapter includes the following sections:

- [Section 22.1, "Monitoring Recent Human Task Service Component Instances and Faults"](#)
- [Section 22.2, "Viewing the Status of Human Workflow Tasks"](#)
- [Section 22.3, "Monitoring Human Task Service Component Instances"](#)
- [Section 22.4, "Monitoring Human Workflow Service Engine Recent Instances and Faults"](#)
- [Section 22.5, "Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics"](#)
- [Section 22.6, "Monitoring Human Workflow Service Engine Instances"](#)
- [Section 22.7, "Monitoring Deployed Human Workflows in the Service Engine"](#)

For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)

### 22.1 Monitoring Recent Human Task Service Component Instances and Faults

You can monitor recent instances and faults for human task service components. Each service component in a SOA composite application has its own instance ID. These IDs are different from the overall instance ID of the SOA composite application of which each service component is a part.

To monitor human task service component instances and faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> . 2. Select the <b>Deployed Composites</b> tab. 3. In the <b>Composite</b> section, select a specific SOA composite application.	1. Under <b>soa-infra</b> , select a specific SOA composite application.
2. Select the human task service component in the <b>Component Metrics</b> table.	

The upper part of the Dashboard page displays the following details:

- Recent instances of the human task service component, including the instance ID of the service component, the state of the instance (for example, completed or running), the instance start time, the last modification time, and links to log files describing the instances.
- Recent faults in the human task service component, including the error message, whether the fault is recoverable, the time at which the fault occurred, the instance ID of the human task service component, and links to log files describing the faults.

The screenshot shows the Oracle Fusion Middleware SOA Composite interface. At the top, it says "testall [1.0]". On the left, there's a sidebar with "SOA Composite" and "Task1 (Human Workflow Component)". The main area has tabs for "Dashboard", "Instances", "Faults", "Policies", and "Administration". The "Dashboard" tab is selected. It shows two sections: "Recent Instances" and "Recent Faults".

**Recent Instances:**

Instance ID	State	Start Date	Last Modified Date	Logs
workflow:200000	Running	Apr 16, 2009 11:00:	Apr 16, 2009 11:00:55 AM	<a href="#">Logs</a>

**Recent Faults:**

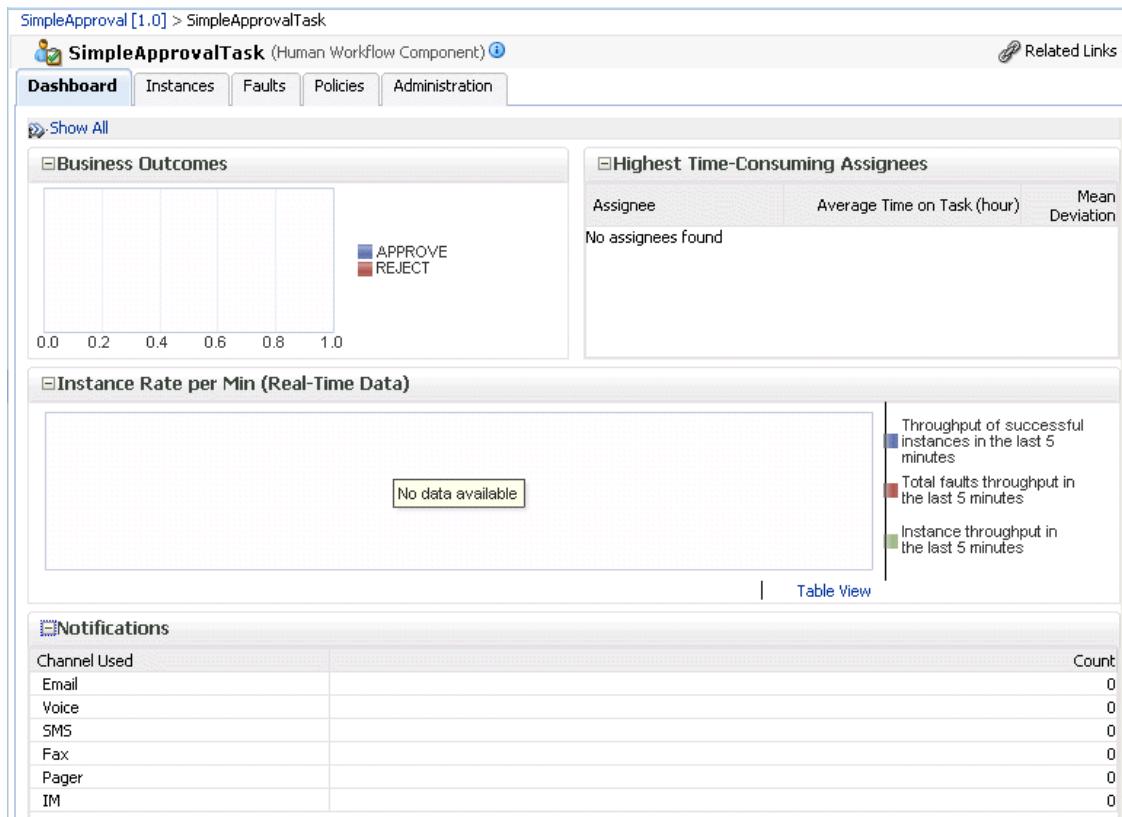
Error Message	Recovery	Fault Time	Component Instance ID	Logs
No faults found				

3. In the **Recent Instances** section, perform the following tasks:
  - a. In the **Instance ID** column, click an instance ID for a service component to monitor the current status of a task on which approval actions are being taken.
  - b. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - c. Click **Show More** below the section to access the Instances page of the service component.
4. In the **Recent Faults** section, perform the following tasks:
  - a. In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery.

- b. In the **Recovery** column, click a fault identified as **Recoverable** to perform fault recovery at the component instance level.
- c. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
- d. Click **Show More** below the section to access the Faults page of the service component.

The lower part of the Dashboard page displays the following details:

- A graphical representation of business outcomes.
- Assignees that take the longest time to respond to and act upon tasks.
- The number of successful, faulted, and instantiated instances processed per minute. Click **Table View** to display throughput details for the last five minutes, including the throughput for successful instances, the total faults throughput, and the instance throughput.
- The notification channels used for task approval in the human task service component.



For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#) and [Oracle Fusion Middleware Administrator's Guide](#) for details about viewing and searching log files.

## 22.2 Viewing the Status of Human Workflow Tasks

You can monitor the current status of human workflow tasks being acted upon by participants.

To view the status of human workflow tasks:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Under <b>soa-infra</b> , select a specific SOA composite application.
2. Select the <b>Deployed Composites</b> tab.	
3. In the <b>Composite</b> section, select a specific SOA composite application.	

- Select the human task service component in the **Component Metrics** table.

The Dashboard page appears.

Instance ID	State	Start Date	Last Modified Date	Logs
workflow:200000	Running	Apr 16, 2009 11:00:00	Apr 16, 2009 11:00:55 AM	<a href="#">Logs</a>

No faults found

- In the **Instance ID** column, click an instance ID of a service component to monitor the current status of a task on which approval actions are being taken.

The Task Details page displays the following details:

- Task details about the selected service component instance ID (task number), including the current state (for example, assigned), task outcome (if completed), task priority, creation date, updated date, expiration date, and task assignee.
- A flow of the current status of a task (for example, assigned or approved).

Task Number	workflow:200002	Creator	fmwadmin
State	ASSIGNED	Created Date	Aug 26, 2008 2:33:45 AM
Outcome		Updated Date	Aug 26, 2008 2:33:45 AM
Priority	3	Expiration Date	

**onMessage**  
Initiated  
Aug 26, 2008 2:33:45 AM User:fmwadmin; State:ASSIGNED

As the task is acted upon by participants, the flow is updated.

The screenshot shows a task details page. At the top, it displays the task number (workflow:200000), state (COMPLETED), outcome (APPROVE), priority (3), creator (fmwadmin), created date (Aug 21, 2008 4:36:10 AM), updated date (Aug 21, 2008 4:53:07 AM), and expiration date. Below this, there's a section titled "onMessage" with three entries: "Initiated" (Aug 21, 2008 4:36:10 AM, User:fmwadmin; State:ASSIGNED), "Outcome Updated" (Aug 21, 2008 4:53:07 AM, User:fmwadmin; State:OUTCOME\_UPDATED; Outcome:APPROVE), and "Completed" (Aug 21, 2008 4:53:07 AM, User:fmwadmin; State:COMPLETED; Outcome:APPROVE).

4. In the upper right-hand corner of the page, click **Worklist Application** to access the login page for Oracle BPM Worklist.

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances."](#)

## 22.3 Monitoring Human Task Service Component Instances

You can monitor human task service component instances. Each service component has its own unique instance ID. This ID is in addition to the instance ID of the overall SOA composite application of which this service component is a part.

---

**Note:** Human workflow invocations from the BPEL service engine use different transactions than BPEL processes. Therefore, if a BPEL transaction is rolled back for any reason, the workflow task instances are still created.

---

To monitor human task service component instances:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select Home.</li> <li>2. Select the Deployed Composites tab.</li> <li>3. In the Composite section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. Select the human task service component in the **Component Metrics** table.
3. Click **Instances**.

The Instances page displays the following details:

- A utility for searching for a specific human task service component instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- Instances, including the instance ID of the service component, the state of the instance (for example, completed successfully or faulted), the instance start time, the last modification time, and links to log files describing the instance.

Instance ID	State	Start Date	Last Modified Date	Logs
workflow:200029	Completed	Apr 20, 2009 11:51:14 AM	Apr 20, 2009 11:58:25 AM	

4. In the **Instance ID** column, click a specific ID for a service component to monitor the current status of a task on which approval actions are being taken.
5. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#) and *Oracle Fusion Middleware Administrator's Guide* for details about viewing and searching log files.

## 22.4 Monitoring Human Workflow Service Engine Recent Instances and Faults

You can monitor instances and faults of all human task service component instances running in the human workflow service engine. These human task service components can be part of separate SOA composite applications.

To monitor human workflow service engine instances and faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Service Engines &gt; Human Workflow</b> .	1. Right-click <b>soa-infra</b> . 2. Select <b>Service Engines &gt; Human Workflow</b> .

2. Click **Dashboard**.

The upper part of the Dashboard page displays the following details:

- Recent instances of all human task service components running in the human workflow service engine, including the instance ID of the service component, the service component, the SOA composite application of which the service component is a part, the state of the instance (for example, completed, running, or faulted), the instance start time, and the last modification time.

- Service components, including the service component name, SOA composite application, state of the service component, and total, running, and faulted instances.

The screenshot shows the Oracle SOA Infrastructure Human Workflow Engine Dashboard. At the top, there's a header bar with the title 'soa-infra' and a user status 'Logged in as weblogic | Page Refreshed Apr 27, 2009 7:03:20 AM PDT'. Below the header, the navigation path is 'SOA Infrastructure Home > Human Workflow Engine Home'. The main content area has tabs: 'Dashboard' (selected), 'Statistics', 'Instances', 'Faults', 'Deployed Components', and 'Notification Management'. The 'Recent Instances' section is expanded, showing a table of 17 instances. The columns are: Instance ID, Component, Composite, State, Start Date, Last Modified Date, and Logs. The table data is as follows:

Instance ID	Component	Composite	State	Start Date	Last Modified Date	Logs
workflow:200066	rc2Task	rc2 [1.0]	Running	Apr 24, 2009 3:34:3	Apr 24, 2009 3:40:16 PM	<a href="#">View Log</a>
workflow:200060	rc2Task	rc2 [1.0]	Running	Apr 24, 2009 3:23:3	Apr 24, 2009 3:27:47 PM	<a href="#">View Log</a>
workflow:200036	Task1	testall [4.0]	Running	Apr 21, 2009 2:02:2	Apr 21, 2009 2:02:25 PM	<a href="#">View Log</a>
workflow:200024	Task1	testall [3.0]	Running	Apr 16, 2009 3:26:5	Apr 16, 2009 3:26:52 PM	<a href="#">View Log</a>
workflow:200000	Task1	testall [1.0]	Running	Apr 16, 2009 11:00:	Apr 16, 2009 11:00:55 AM	<a href="#">View Log</a>

A link 'Show All' is available to view more instances. Below the instances is the 'Components' section, which is also expanded. It shows a table of components with columns: Name, Composite, Status, Total Instances, Running Instances, and Faulted Instances (subdivided into Recoverable and Non Recoverable). The table data is as follows:

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances	
					Recoverable	Non Recoverable
HumanTask1	Project1 [2.0]		1	0	0	1
Task1	testall [1.0]		1	1	0	0
Task2	testall [1.0]		0	0	0	0
ApproveDealStructure	SalesQuoteComposite		1	0	0	0
FillProposalDetails	SalesQuoteComposite		1	0	0	0

3. In the **Recent Instances** section, perform the following tasks:
  - a. In the **Instance ID** column, click an instance ID for a service component to monitor the current status of a task on which approval actions are being taken.
  - b. In the **Component** column, click a specific service component to access its home page.
  - c. In the **Composite** column, click a specific SOA composite application to access its home page.
  - d. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - e. Click **Show More** below the section to access the Instances page of the service engine.
4. In the **Components** section, perform the following tasks:
  - a. In the **Name** column, click a specific service component to access its home page.
  - b. In the **Composite** columns, click a specific SOA composite application to access its home page.
  - c. Click **Show More** below the section to access the Deployed Components page of the service engine.

The lower part of the Dashboard page displays the following details:

- Recent faults, including the error message, the time at which the fault occurred, the SOA composite application, the service component, and the service component instance ID.

- Task assignees who take the longest time to act upon a task and who have the highest backlog of pending tasks to which to respond.

The screenshot shows two main sections:

- Recent Faults:** A table with columns: Error Message, Recovery, Fault Time, Component, Component Instance ID, and Logs. A checkbox "Show only system faults" is checked. The message "No faults found" is displayed.
- Users with Highest Backlog:** A table with columns: Assignee, Average Time on Task (hour), Mean Deviation, and Pending Tasks. The data is as follows:

Assignee	Average Time on Task (hour)	Mean Deviation	Pending Tasks
mtwain	0.14731482	0.21622057	0
jstein	0.14537036	0.14261186	5
California	0.10583334	0.0	0
jcooper	0.09212963	0.09625161	3
jlondon	0.03222223	0.0	1

- In the **Recent Faults** section, perform the following additional tasks:
  - In the **Error Message** column, click an error message to display complete information about the fault. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery. Clicking this link invokes the human workflow audit trail page for the instance. The audit trail page has a link to Oracle BPM Worklist called **Go to Worklist Application**, where you can go to recover from the fault. This link does not take you directly to the fault; you must manually locate the fault.
  - In the **Recovery** column, click a fault identified as **Recoverable** to perform fault recovery at the component instance level.
  - In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.
  - Click **Show More** below the section to access the Faults page of the service engine.

## 22.5 Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics

You can view details about active requests in the human workflow service engine and operational statistics, such as service used, operations performed, and active and completed requests.

To monitor human workflow service engine active requests and operation statistics:

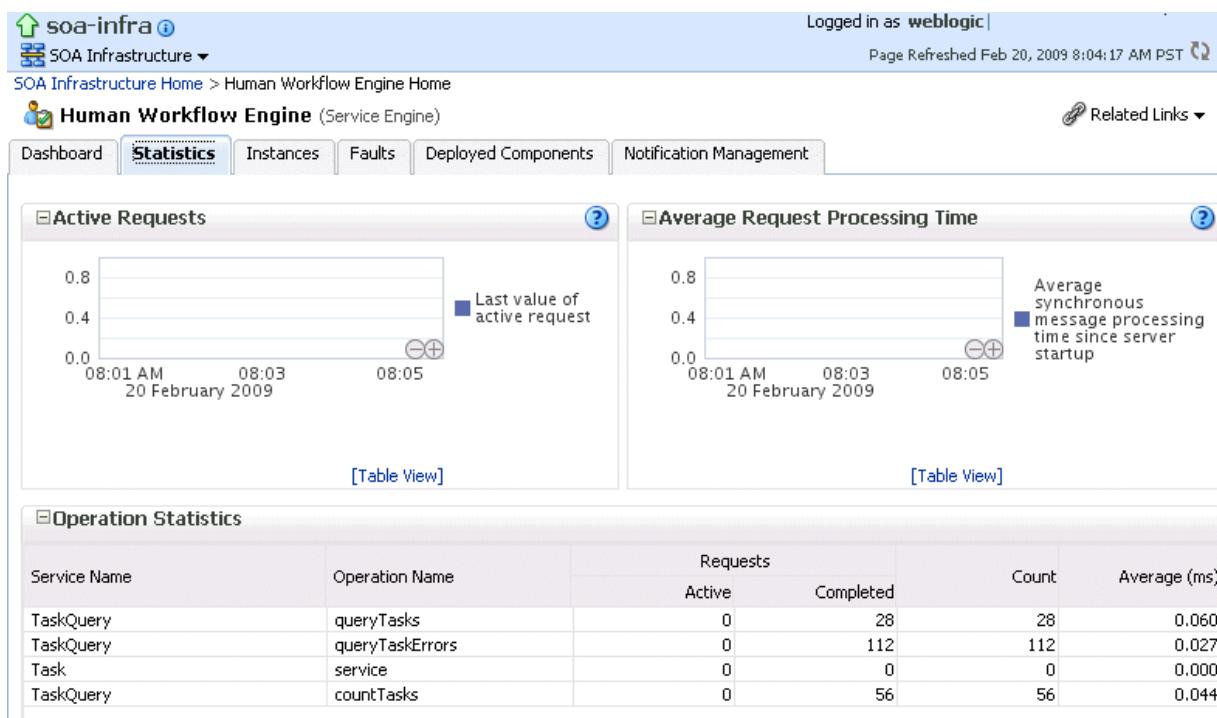
- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>Select <b>Service Engines &gt; Human Workflow</b>.</li> </ol>	<ol style="list-style-type: none"> <li>Right-click <b>soa-infra</b>.</li> <li>Select <b>Service Engines &gt; Human Workflow</b>.</li> </ol>

## 2. Click Statistics.

The Statistics page displays the following details:

- Active requests in the service engine. Use this graph to get an idea of the current service engine load. Only under extreme load conditions is there data shown in the graph. This is because most requests are processed instantaneously by the service engine. The data is collected by a Dynamic Monitoring Service (DMS) state sensor. Once the requests are processed by the service engine, the count goes to zero. This action enables you to know the current load on the service engine (for example, if it is too high).
- Average request message processing time in the service engine since the last startup of the SOA Infrastructure. Use this graph to check service engine performance. While the processing time is calculated based on the last startup of the SOA Infrastructure, the data that is displayed in the graph is gathered only from the time at which you first accessed this page. The graph does not continue calculating and displaying data if you have not accessed this page. The DMS phase event sensor calculates the average request processing time and provides the processing time data.
- Operation statistics about human workflow services used in the service engine, including the human workflow service used, the operation performed by the service, the number of active and completed requests, the count, and the average processing time.



For more information, see the following documentation:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite* for details about human workflow services and operations
- *Oracle Fusion Middleware Performance and Tuning Guide* for more details about human workflow tuning and performance properties

## 22.6 Monitoring Human Workflow Service Engine Instances

You can monitor all human task service component instances running in the service engine. These human task service components can be part of separate SOA composite applications.

To monitor human workflow service engine instances:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>Select Service Engines &gt; Human Workflow.</li> </ol>	<ol style="list-style-type: none"> <li>Right-click <b>soa-infra</b>.</li> <li>Select Service Engines &gt; Human Workflow.</li> </ol>

- Click **Instances**.

The Instances page displays the following details:

- A utility for searching for a specific instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- Instances, including the instance ID of the service component, the service component, the SOA composite application of which the service component is a part, the state of the instance (for example, completed, running, or faulted), the instance start time, the last modification time, and links to log files that describe the instance.

Instance ID	Component	Composite	State	Start Date	Last Modified Date	Logs
workflow:200035	ApprovePricing	SalesQuoteComposite [1.0]	Faulted	Apr 21, 2009 11:14:30 AM	Apr 25, 2009 11:14:30 AM	<a href="#">Logs</a>
workflow:200066	rc2Task	rc2 [1.0]	Running	Apr 24, 2009 3:34:38 PM	Apr 24, 2009 3:40:12 PM	<a href="#">Logs</a>
workflow:200063	rc2Task	rc2 [1.0]	Completed	Apr 24, 2009 3:28:13 PM	Apr 24, 2009 3:31:42 PM	<a href="#">Logs</a>
workflow:200060	rc2Task	rc2 [1.0]	Running	Apr 24, 2009 3:23:31 PM	Apr 24, 2009 3:27:42 PM	<a href="#">Logs</a>
workflow:200036	Task1	testall [4.0]	Running	Apr 21, 2009 2:02:25 PM	Apr 21, 2009 2:02:25 PM	<a href="#">Logs</a>
workflow:200034	FillProposalDetails	SalesQuoteComposite [1.0]	Completed	Apr 21, 2009 10:50:40 AM	Apr 21, 2009 11:14:30 AM	<a href="#">Logs</a>
workflow:200033	ApproveDealStructure	SalesQuoteComposite [1.0]	Completed	Apr 21, 2009 10:50:28 AM	Apr 21, 2009 11:06:12 AM	<a href="#">Logs</a>
workflow:200029	DocumentReviewHuman	DocumentReviewComposite	Completed	Apr 20, 2009 11:51:14 AM	Apr 20, 2009 11:58:12 AM	<a href="#">Logs</a>
workflow:200024	Task1	testall [3.0]	Running	Apr 16, 2009 3:26:52 PM	Apr 16, 2009 3:26:52 PM	<a href="#">Logs</a>
workflow:200019	Task1	testall [3.0]	Stale	Apr 16, 2009 3:22:39 PM	Apr 16, 2009 3:22:39 PM	<a href="#">Logs</a>
workflow:200014	Task2	testall [2.0]	Stale	Apr 16, 2009 3:10:23 PM	Apr 16, 2009 3:10:23 PM	<a href="#">Logs</a>
workflow:200013	Task1	testall [2.0]	Stale	Apr 16, 2009 3:10:19 PM	Apr 16, 2009 3:10:19 PM	<a href="#">Logs</a>

- In the **Instances** section, perform the following additional tasks:

- In the **Instance ID** column, click an instance ID for a service component to monitor the current status of a task on which approval actions are being taken.

- b.** In the **Component** column, click a specific service component to access its home page.
- c.** In the **Composite** column, click a specific SOA composite application to access its home page.
- d.** In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances"](#) and [Oracle Fusion Middleware Administrator's Guide](#) for details about viewing and searching log files.

## 22.7 Monitoring Deployed Human Workflows in the Service Engine

You can monitor all deployed SOA composite applications with human task service components running in the service engine.

To monitor deployed human workflows in service engines:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > <b>Human Workflow</b> .	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > <b>Human Workflow</b> .

2. Click **Deployed Components**.

The Deployed Components page displays the following details:

- A utility for searching for a specific deployed SOA composite application by specifying the full name and clicking **Search**.
- Details about deployed human task service components running in this service engine, including the service component name, the SOA composite application, the current status, and the number of total, faulted, and running instances.

The screenshot shows the Oracle SOA Infrastructure Human Workflow Engine Home page. At the top, there's a navigation bar with links for Dashboard, Statistics, Instances, Faults, Deployed Components (which is selected), and Notification Management. Below the navigation bar is a search section with fields for Name and Composite Name, and buttons for Search and Reset. A 'View' dropdown menu is also present. The main content area displays a table of deployed components. The columns are: Name, Composite, Status, Total Instances, Running Instances, and Faulted Instances (with sub-categories Recoverable and Non Recoverable). The table lists various components like HumanTask1, Task1, Task2, ApproveDealStructure, etc., along with their status and instance counts.

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances	
					Recoverable	Non Recoverable
HumanTask1	Project1 [2.0]		1	0	0	1
Task1	testall [1.0]		1	1	0	0
Task2	testall [1.0]		0	0	0	0
ApproveDealStructure	SalesQuoteComposit		1	0	0	0
FillProposalDetails	SalesQuoteComposit		1	0	0	0
ApprovePricing	SalesQuoteComposit		1	0	0	1
Task1	testall [3.0]		2	1	0	0
Task2	testall [3.0]		0	0	0	0
Task1	testall [4.0]		1	1	0	0
Task2	testall [4.0]		0	0	0	0
HumanTask1	Project1 [1.0]		2	0	0	2
Task1	testall [2.0]		2	0	0	0

3. In the **Name** column, click a specific service component to access its home page.
4. In the **Composite** column, click a specific SOA composite application to access its home page.

## Managing Human Workflow Service Components and Engines

This chapter describes how to manage human task service components and the human workflow service engine, including managing policies, recovering from workflow faults, managing the task details application URI, managing outgoing and incoming email notifications, and moving workflow data from test to production environments.

This chapter includes the following sections:

- [Section 23.1, "Managing Human Task Service Component Policies"](#)
- [Section 23.2, "Recovering from Human Workflow Service Engine Faults"](#)
- [Section 23.3, "Managing the URI of the Human Task Service Component Task Details Application"](#)
- [Section 23.4, "Recovering from Human Task Service Component Faults"](#)
- [Section 23.5, "Managing Outgoing Notifications and Incoming Email Notifications"](#)
- [Section 23.6, "Moving Human Workflow Data from a Test to a Production Environment"](#)

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**Note:** Human task service components are also known as human workflow service components in Oracle Enterprise Manager Fusion Middleware Control.

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For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)

### 23.1 Managing Human Task Service Component Policies

You can attach and detach security policies to and from human task service components of currently deployed SOA composite applications. Policies apply security to the delivery of messages. Oracle Fusion Middleware uses a policy-based model to manage web services.

**Notes:**

- Before attaching policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use in your environment.
- Human tasks have a port that is protected by default using the SAML policy `oracle/wss10_saml_token_service_policy`. Oracle recommends that you *not* use this policy in a production environment.

To manage human task service component policies:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. Select the human task service component in the **Component Metrics** table.
3. Click **Policies**.

The Policies page enables you to attach and detach security policies to and from a human task service component. The policies table displays the attached policy name, the policy reference status (enabled or disabled) that you can toggle, the category (Management, Reliable Messaging, MTOM Attachment, Security, or WS Addressing), the total violations, and the authentication, authorization, confidentiality, and integrity failures since the SOA Infrastructure was last restarted.

The screenshot shows the Oracle SOA Suite interface. At the top, it says "SimpleApproval [1.0]". On the right, it shows "Logged in as weblogic" and "Page Refreshed Dec 24, 2012 10:33:05 AM PST". Below the header, there's a breadcrumb trail: "SimpleApproval [1.0] > SimpleApprovalTask". The main content area has tabs: "Dashboard", "Instances", "Faults", "Policies" (which is selected), and "Administration". A note below the tabs says: "You can view and manage the list of policies attached to this component. Click 'Attach/Detach' to update the list of attached policies." There's a "View" dropdown and an "Attach/Detach" button. The "Policies" table has columns: Policy Name, Policy Reference Status, Category, Total Violations, Authentication, and Authorization. One row is shown: "oracle/log\_policy" with "Disable" under Policy Reference Status, "Management" under Category, "0" under Total Violations, and "N/A" under both Authentication and Authorization.

4. Click **Attach/Detach**.

If multiple components are available, you are prompted to select the service or component for which to perform the attachment or detachment.

5. Select the service or component to which to attach or detach a policy.

This invokes a dialog for attaching or detaching policies.

Policies currently attached appear in the **Attached Policies** section. Additional policies available for attachment appear in the **Available Policies** section.

6. Select to attach policies appropriate to your environment.
7. Click **Attach**.
8. When you are finished attaching policies, click **Validate**.
9. If an error message appears, make the necessary corrections until you no longer have any validation errors.
10. Click **OK**.

The attached policy is displayed in the policies table.

For more information, see the following documentation:

- [Section 1.4.3.2, "Introduction to Policies"](#)
- [Section 7.7, "Managing SOA Composite Application Policies"](#) for the dialogs that are displayed during policy attachment
- *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use for your environment

## 23.2 Recovering from Human Workflow Service Engine Faults

You can view and recover from faults in the human workflow service engine. All human task service component faults, regardless of the SOA composite application instance of which they are a part, can be viewed in the human workflow service engine.

Human workflow invocations from the BPEL service engine use different transactions than BPEL processes. Therefore, if a BPEL transaction is rolled back for any reason, the workflow task instances are still created.

To view and recover from human workflow service engine faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select Service Engines &gt; Human Workflow.</li> </ol>	<ol style="list-style-type: none"> <li>1. Right-click <code>soa-infra</code>.</li> <li>2. Select Service Engines &gt; Human Workflow.</li> </ol>

2. Click **Faults**.

The Faults page displays the following details:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the human workflow service engine, including the fault ID, error message, whether you can recover from the fault, the time at which the fault occurred, the SOA composite application and human task service component in which the fault occurred, the instance ID of the human task service component, and a link to a log file describing the fault.

The screenshot shows the Oracle SOA Infrastructure Human Workflow Engine Home page. At the top, there are links for Dashboard, Statistics, Instances, **Faults**, Deployed Components, and Notification Management. The **Faults** tab is selected. A message states: "If a fault is marked as Recoverable, you can select it and click Recover to open the instance audit trail; from there, click the link to the Worklist application. There you can take an appropriate action (e.g. reassigning to a correct user), after which the Human Workflow engine will attempt to rerun the instance in which the fault occurred and recover from it." Below this is a search form with fields for Fault ID, Component Instance ID, Fault Time From, Fault Time To, and Composite Instance ID. Buttons for Search and Reset are present. Below the search form is a checkbox for "Show only recoverable faults" and a dropdown for "Fault Type" set to "All Faults". A "Select" dropdown and a "View" dropdown are also shown. The main area displays a table of recoverable faults:

Error Message	Recovery	Fault Time	Composite	Component	Component Instance ID	Logs
Error in routing slipThe task	Recover...	Apr 21, 2009 2:02:25 PM testall [4.0]		Task1	workflow:200037	
Error in routing slipThe task	Recover...	Apr 16, 2009 3:26:52 PM testall [3.0]		Task1	workflow:200025	

Human task service engine faults identified as recoverable can be recovered from Oracle BPM Worklist.

3. Perform fault recovery through either of the following methods:
  - a. In the **Error Message** column, click a specific message to display complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. If the fault is recoverable, a **Recover Now** button is displayed that you can click to recover from the fault. Clicking this button invokes the human workflow audit trail page for the instance. The audit trail page has a link to Oracle BPM Worklist called **Go to Worklist Application**, where you can go to recover from the fault. The Oracle BPM Worklist link does not take you directly to the fault; you must manually locate the fault.
  - b. In the **Recovery** column, click a fault that is marked as recoverable to invoke the human workflow audit trail page for the instance. The audit trail page provides the same link to Oracle BPM Worklist called **Go to Worklist Application**.
4. Perform the following additional monitoring tasks from within the faults table:
  - a. Click the **Show only recoverable faults** checkbox to display only faults from which you can recover.
  - b. From the **Fault Type** list, select to display all faults, system faults, business faults, or Oracle Web Services Manager (OWSM) faults in the faults table. Click the **Help** icon for a description of these fault types.
  - c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - d. In the **Composite** column, click a specific SOA composite application to access its home page.
  - e. In the **Component** column, click a specific service component to access its home page.

- f. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.
- g. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

### 23.3 Managing the URI of the Human Task Service Component Task Details Application

You can add or remove the URI of the task details application used in human workflow.

To manage the URI of the human task service component task details application:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. Select the human task service component in the **Component Metrics** table.
3. Click **Administration**.

The Administration page shows the URI for the task details application.

Application Name	Host Name	HTTP Port	HTTPS Port	URI
worklist	myhost.us.example.com	8001		/SimpleApproval

**Note:** If the SOA server is SSL enabled or disabled, then you must manually enable or disable SSL for any already deployed workflow task detail applications. Change the workflow task display URL to use the correct protocol and port number. To enable the use of the SSL (HTTPS) URL, ensure that the HTTP port setting is left blank.

4. Click the **Add** icon to specify the following details for the URI:
  - Application name
  - Hostname
  - HTTP port

- HTTPS port (optional)
  - URI
5. Click **Apply**.

## 23.4 Recovering from Human Task Service Component Faults

You can view and recover from human task service component faults. The human task service component is also known as the human workflow service component.

To view and recover from human task service component faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. Select the human task service component in the **Component Metrics** table.
3. Click **Faults**.

The Faults page displays the following details:

- A utility for searching for a specific human task service component fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the human task service component, including the fault ID, error message, whether you can recover from the fault, the time at which the fault occurred, the instance ID of the human task service component, and a link to a log file describing the fault.

If a fault is marked as Recoverable, you can select it and click Recover to open the instance audit trail; from there, click the link to the Worklist application. There you can take an appropriate action (e.g. reassigning to a correct user), after which the Human Workflow engine will attempt to rerun the instance in which the fault occurred and recover from it.

Human workflow service engine faults identified as recoverable can be recovered from Oracle BPM Worklist.

4. Perform fault recovery through either of the following methods:
  - a. In the **Error Message** column, click a specific message to display complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. If the fault is recoverable, a **Recover Now** button is displayed that you can click to recover from the fault. Clicking this button invokes the human workflow audit trail page for the instance. The audit trail page has a link to Oracle BPM Worklist called **Go to Worklist Application**, where you can go to recover from the fault. The Oracle BPM Worklist link does not take you directly to the fault; you must manually locate the fault.
  - b. In the **Recovery** column, click a fault that is marked as recoverable to invoke the human workflow audit trail page for the instance. The audit trail page provides the same link to Oracle BPM Worklist called **Go to Worklist Application**.
5. Perform the following additional monitoring tasks from within the faults table:
  - a. Click the **Show only recoverable faults** checkbox to display only faults from which you can recover.
  - b. From the **Fault Type** list, select to display all faults, system faults, business faults, or OWSM faults in the faults table. Click the **Help** icon for a description of these fault types.
  - c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - d. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.

- e. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

## 23.5 Managing Outgoing Notifications and Incoming Email Notifications

You can manage incoming and outgoing notifications through email in human workflow, including testing messages, resending messages, and identifying messages as spam.

Incoming and outgoing notifications are sent to and from human workflow. Incoming notifications are responses to actionable notifications. For example, an outgoing notification is sent to the manager of an employee requesting vacation leave. The manager approves the request by clicking the **Approve** link in the actionable notification email. This action sends an incoming notification to human workflow for possible additional processing.

To manage outgoing notifications and incoming email notifications:

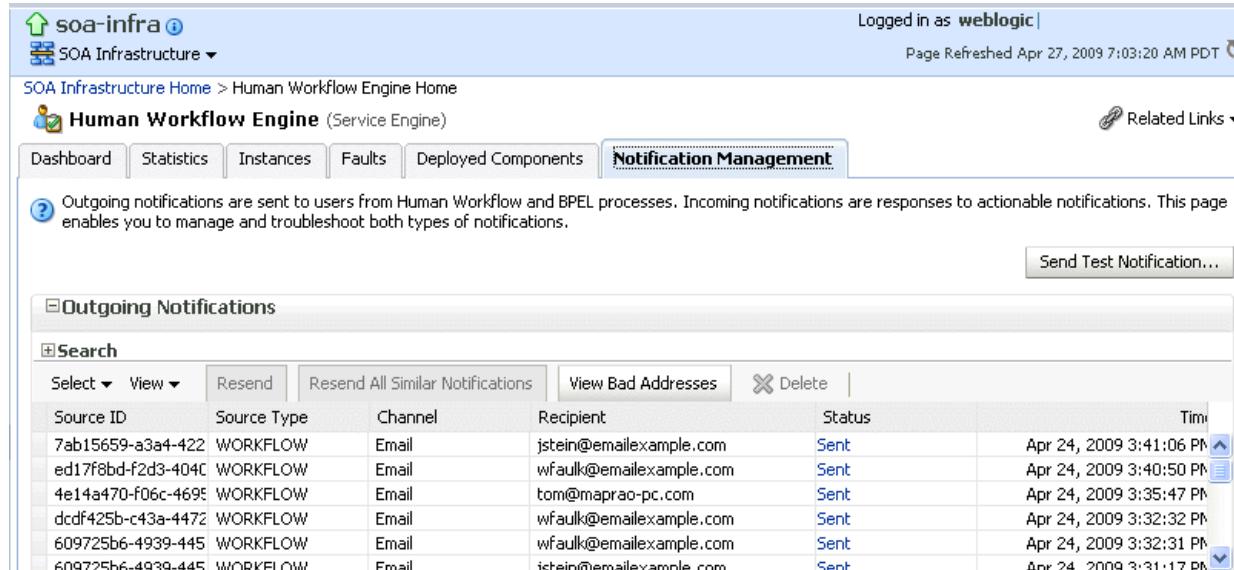
1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > Human Workflow.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > Human Workflow.

2. Click **Notification Management**.

The upper part of the Notification Management page displays the following details:

- A utility for searching for a specific message by specifying criteria and clicking **Search**. You must expand the **Search** icon to display this utility.
- Outgoing notifications, including the source ID, the source type (for example, if a notification is sent by a BPEL service component, the type is BPEL), the channel used (for example, email, SMS, instant messenger, or voice), the address of the message recipient, the message status (for example, error, send, retry, sent), and the time at which the message was sent.



Source ID	Source Type	Channel	Recipient	Status	Time
7ab15659-a3a4-422	WORKFLOW	Email	jstein@emailexample.com	Sent	Apr 24, 2009 3:41:06 PM
ed17f8bd-f2d3-404c	WORKFLOW	Email	wfaulk@emailexample.com	Sent	Apr 24, 2009 3:40:50 PM
4e14a470-f06c-4695	WORKFLOW	Email	tom@maprao-pc.com	Sent	Apr 24, 2009 3:35:47 PM
ddcf425b-c43a-4472	WORKFLOW	Email	wfaulk@emailexample.com	Sent	Apr 24, 2009 3:32:32 PM
609725b6-4939-4445	WORKFLOW	Email	wfaulk@emailexample.com	Sent	Apr 24, 2009 3:32:31 PM
609725b6-4939-4445	WORKFLOW	Email	jstein@emailexample.com	Sent	Apr 24, 2009 3:31:17 PM

The lower part of the Notification Management page displays the following details:

- A utility for searching for a specific message by specifying criteria and clicking **Search**. You must expand the **Search** icon to display this utility.
- Incoming notifications, including the message ID, the channel used (same types as for outgoing notifications), the address of the message sender, the address of the message recipient, the message status (replied email notification, unsolicited email, unknown email content, response not processed, and response processed), a link to the content of the message, and the time at which the message was received.

The screenshot shows a user interface for managing incoming notifications. At the top, there's a header with a dropdown arrow and the text 'Incoming Notifications'. Below this is a section titled 'Search' with several input fields: 'Sender' (text box), 'Recipient' (text box), 'Date From' (calendar icon with '(UTC-08:00) PST8PDT'), 'Date To' (calendar icon with '(UTC-08:00) PST8PDT'), and 'Channel' (dropdown menu). To the right of these fields are 'Search' and 'Reset' buttons. Below the search area is a toolbar with buttons for 'Select', 'View', 'Mark as Spam', 'Not Spam', and 'Delete'. Underneath the toolbar is a table with the following columns: Message ID, Channel, Sender, Recipient, Status, and Content. A message at the bottom of the table states 'No incoming notifications found'.

**3.** Perform the following actions on outgoing notifications.

Action	Description
<b>Send Test Notification</b>	<p>Test that outgoing messages are arriving at the correct destination. This ensures that the destination is reachable and messages are arriving. Selecting this option invokes a dialog for specifying the following destination details:</p> <ul style="list-style-type: none"> <li>▪ Destination address</li> <li>▪ Delivery channel (for example, email)</li> <li>▪ Message subject and content</li> </ul> <p><b>Note:</b> You cannot send test notification messages with the messaging extension driver because it requires the following:</p> <ul style="list-style-type: none"> <li>▪ Specific data to be manually entered into the test page (such as the URI of the task details)</li> <li>▪ URI-specific headers (such as time, user, and so on)</li> </ul>
<b>Resend</b>	Select specific outgoing notification messages in the table and click <b>Resend</b> to resend. Use this option if you believe that messages are not arriving at their correct destination. For example, you may have incorrectly configured a recipient address. After correcting the address, click <b>Resend</b> to test the delivery.
<b>Resend All Similar Notifications</b>	Resend all error notification messages having the same recipient address as the selected one.
<b>View Bad Addresses</b>	Click to display a list of bad or invalid addresses. The addresses are automatically removed from the bad address list after one hour. If you do not want to wait an hour, you can explicitly select and delete them.
<b>Delete icon</b>	Click to delete a selected message.

If outgoing notifications are sent to an incorrect address of a message recipient, they are displayed as errors in the **Recipient** column. You can correct the recipient's address and resend the notification.

4. In the **Recipient** column, click the email address and correct the address.
5. Perform the following actions on incoming notifications.

Action	Description
<b>Mark as Spam</b>	Mark the message sender's address of the selected notification as spam. This action prevents incoming notifications from the same sender address from being delivered again.
<b>No Spam</b>	Mark incoming messages as not being spam. This action enables new messages from the sender's address to be delivered again.
<b>Delete icon</b>	Click to delete a selected message.

For more information about notifications, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## 23.6 Moving Human Workflow Data from a Test to a Production Environment

You can migrate Human Workflow user metadata, such as views, mapped attribute (previously known as flex field) mappings, and vacation rules, from a test environment to a production environment using the Human Workflow User Config Data Migrator. The Data Migrator is available as an ant target that can be executed at the command line. You specify the input parameters for the migration of data in a properties file, `migration.properties`.

For example, assume you have two SOA servers installed:

- SOAServer\_A  
A test server that includes human workflow user-configurable data (user views, standard views, user rules, group rules, attribute labels, and task payload mapped attribute mappings).
- SOAServer\_B  
A production server to which you want to move the data on SOAServer\_A.

Since you have a significant amount of data on SOAServer\_A, it can be time consuming to manually migrate all of the data to SOAServer\_B.

You can use the Data Migrator to move the data from the test server to the production server. You run the ant target at the command line of SOAServer\_A to migrate data to SOAServer\_B.

Migration is always performed through an XML file. The Data Migrator supports the following operations:

- Export operation: Stores all the human workflow user-configurable data from the source SOA server to the XML file.
- Import operation: Creates all the human workflow user-configurable data in the target SOA server by reading from the XML file.

The Data Migrator consists of the following files:

- `migration.properties`: Contains all required input properties in terms of key-value pairs for migration operations.
- `build.xml`: Contains the ant target `runHwfMigrator` that executes the Data Migrator.

### 23.6.1 Moving Human Workflow Data from Test to Production Environments

Perform the following steps to move data from a test to a production environment.

To move human workflow data from test to production environments:

1. Ensure that the PATH environment variable contains the JAVA\_HOME and ANT\_HOME environment variables and that they point to the locations within the Oracle SOA Suite installation.
2. Create a `migration.properties` file in any location to export user metadata for the worklist application (for example, group rules, views, mapped attribute mappings, and vacation rules) from the test environment. See [Section 23.6.2.1, "Migration Property File Examples"](#) for instructions on how to specify properties.

Note the following:

- You can export mapped attribute mappings.
- You can export attribute labels.
- You can only export one type of data at a time.
- When you export data for a particular user or group, you must export each in separate operations.
- You must export attribute labels before you export mapped attribute mappings.

To export attribute labels, use the following values in the `migration.properties` file:

```
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
migrateAttributeLabel = true
```

To export mapped attribute mappings, use the following values in the `migration.properties` file:

```
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
migrateAttributeLabel = false
```

3. Export the data with the ant script. The following example shows how to invoke the command and specify the parameters:

```
ant -f ant-t2p-worklist.xml
-Dbea.home=/scratch/oracle/MW_HOME
-Dsoa.home=/scratch/oracle/MW_HOME/AS11gR1SOA
-Dmigration.properties.file=migration.properties
-Dsoa.hostname=hostname -Dsoa.rmi.port=7001
-Dsoa.admin.user=weblogic
-Drealm=jazn.com
-Dmigration.file=/tmp/export_all_userRules.xml
-Dmap.file=/tmp/export_all_userRules_mapper.xml
```

---

**Note:** After specifying the Admin user name, enter the password when prompted.

---

See [Section 23.6.3, "ant Script Data Migration Syntax"](#) for instructions on specifying ant properties.

4. Ensure that the application is deployed to the production system.

---

**Note:** Human workflow artifacts such as task mapped attribute mappings, rules, views, and approval groups are defined based on namespace. The Data Migrator migrates human workflow artifacts based on namespace. Therefore, it is not possible to migrate human workflow artifacts based on a partition.

---

5. Create the migration.properties file to import user metadata for the worklist application to the production environment.

Note the following:

- You can only import one type of data at a time.
- When you import data for a particular user or group, you must import it in separate operations.
- You must import attribute labels before you import mapped attribute mappings.

To import attribute labels, use the following values in the migration.properties file:

```
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
migrateAttributeLabel = true
```

To import mapped attribute mappings, use the following values in the migration.properties file:

```
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
migrateAttributeLabel = false
```

6. Import the data to the production environment from the file export\_all\_userRules.xml, which you created with the map.file property in Step 3. The following example shows how to invoke the command and specify the properties:

```
ant -f ant-t2p-worklist.xml
-Dbea.home=/scratch/oracle/MW_HOME
-Dsoa.home=/scratch/oracle/MW_HOME/AS11gR1SOA
-Dmigration.properties.file=migration.properties
-Dsoa.hostname=hostname
-Dsoa.rmi.port=7001
-Dsoa.admin.user=weblogic
-Dsoa.admin.password=password
-Drealm=jazn.com
-Dmigration.file=/tmp/export_all_userRules.xml
-Dmap.file=/tmp/export_all_userRules_mapper.xml
```

If the data, such as rules and views, are attached to the user, then the user must be an available user in the production SOA server.

7. Deploy J2EE human task forms, as you would deploy any .ear file.

8. If necessary, update the workflow notification configuration with production mail server and inbound and outbound email accounts. See [Section 21.1, "Configuring Human Workflow Notification Properties."](#)

### 23.6.2 migration.properties File Syntax

The `migration.properties` file specifies the input parameters for data migration. The template for this file is located in the following directory:

The `migration.properties` file contains the following input parameters:

```
operationType = {EXPORT | IMPORT}
objectType = {VIEW | RULE | TASK_PAYLOAD_FLEX_FIELD_MAPPING}
name = name of VIEW or TASK_PAYLOAD_FLEX_FIELD_MAPPING
user = username of VIEW or RULE
group = groupname for RULE
grantPermission = {true | false}
migrateAttributeLabel = {true | false}
override = {true | false}
skip = {true | false}
migrateToActiveVersion = {true | false}
```

Argument	Definition
operationType	<p>Specify to perform one of the following actions:</p> <ul style="list-style-type: none"> <li>■ EXPORT: Data is migrated from a SOA server instance into an XML file.</li> <li>■ IMPORT: Data is migrated from the XML file into the SOA server instance.</li> </ul>
objectType	<p>Specify the type of object to migrate:</p> <ul style="list-style-type: none"> <li>■ VIEW: Migrates views.</li> <li>■ RULE: Migrates vacation rules.</li> <li>■ TASK_PAYLOAD_FLEX_FIELD_MAPPING: Migrates mapped attribute mappings.</li> </ul>
name	<p>Specify the object name if you specified VIEW or TASK_PAYLOAD_FLEX_FIELD_MAPPING values for the objectType property. This property refers to the following:</p> <ul style="list-style-type: none"> <li>■ viewName for VIEW</li> <li>■ taskDefinitionId for TASK_PAYLOAD_FLEX_FIELD_MAPPING</li> </ul> <p>Specify ALL to identify all objects of this type.</p>
user	<p>Specify the user name only if you specified the VIEW or RULE value for the objectType property. If a user is not specified for VIEW, it implies STANDARD_VIEW.</p>
group	<p>Specify this property only if you specified the RULE value of the objectType property. It identifies the group name (for example, LoanAgentGroup).</p>
grantPermission	<p>Specify this property only if you specified the VIEW value of the objectType property.</p> <ul style="list-style-type: none"> <li>■ true: Migrates view definitions and grants.</li> <li>■ false: Migrates only view definitions.</li> </ul>

Argument	Definition
migrateAttributeLabel	Specify one of the following values: <ul style="list-style-type: none"><li>▪ true: Migrates only attribute labels. Payload mappings are <i>not</i> migrated.</li><li>▪ false: Does not migrate attribute labels and payload mappings.</li></ul>
override	Specify whether to override the data on the target SOA server: <ul style="list-style-type: none"><li>▪ true: Overrides the existing workflow user-configurable data on the target SOA server.</li><li>▪ false: Does not override the target SOA server instance that has the workflow user-configurable data.</li></ul>
skip	Specify error handling details. <ul style="list-style-type: none"><li>▪ true: Errors are skipped and the migration utility continues processing.</li><li>▪ false: Any encountered error halts the migration.</li></ul>
migrateToActiveVersion	Specify a value for mapping task definition IDs. <ul style="list-style-type: none"><li>▪ true: Maps task definition IDs to the active version in the target SOA server instance.</li><li>▪ false: Does not map task definitions.</li></ul>

### 23.6.2.1 Migration Property File Examples

This section provides examples how to configure the `migration.properties` file.

**23.6.2.1.1 Exporting All Attribute Labels** The following example exports all attribute labels.

```
operationType = EXPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = true
override = true
skip = true
migrateToActiveVersion = true
```

**23.6.2.1.2 Importing All Attribute Labels** The following example imports all attribute labels.

```
operationType = IMPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = true
override = true
skip = true
migrateToActiveVersion = true
```

**23.6.2.1.3 Exporting Specific Attribute Labels** The following example exports specific attribute labels.

```
operationType = EXPORT
```

```

objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name = cb801c91-4605-4e96-a234-aeb8441f0388
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = true
override = true
skip = true
migrateToActiveVersion = true

```

**23.6.2.1.4 Importing Specific Attribute Labels** The following example imports specific attribute labels.

```

operationType = IMPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name = cb801c91-4605-4e96-a234-aeb8441f0388
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = true
override = true
skip = true
migrateToActiveVersion = true

```

**23.6.2.1.5 Exporting Task Payload Mapped Attribute Mappings for All Task Definition IDs** The following example exports task payload mapped attribute mappings for all task definition IDs.

```

operationType = EXPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = true

```

**23.6.2.1.6 Importing Task Payload Mapped Attribute Mappings for All Task Definition IDs** The following example imports task payload mapped attribute mappings for all task definition IDs. Task payload mapped attribute mappings use attribute labels. As a prerequisite, find out the attribute labels involved in the task payload mapped attribute mappings to import. These attribute labels must be available in the target SOA server before the import of task payload mapped attribute mappings into the target SOA server.

The recommended steps are as follows:

- Import the attribute labels into the target SOA server.
- Import the task payload mapped attribute mappings into the target SOA server.

```

operationType = IMPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true

```

```
skip = true
migrateToActiveVersion = true
```

#### 23.6.2.1.7 Exporting Task Payload Mapped Attribute Mappings for a Specific Task Definition ID

The following example exports task payload mapped attribute mappings for a specific task definition ID.

```
operationType = EXPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name =
default/HelpDeskRequestComposite!1.0*c9856b8b-bc9e-46a4-8aef-698e539ba1d7/HelpDesk
RequestHumanTask
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = true
```

#### 23.6.2.1.8 Importing Task Payload Mapped Attribute Mappings for a Specific Task Definition ID

The following example imports task payload mapped attribute mappings for a specific task definition ID. Task payload mapped attribute mappings make use of attribute labels. As a prerequisite, find out the attribute labels that are involved in the task payload mapped attribute mappings to import. These attribute labels must be available in the target SOA server before the import of task payload mapped attribute mappings into the target SOA server.

The recommended steps are as follows:

- Import the attribute labels into the target SOA server.
- Import the task payload mapped attribute mappings into the target SOA server.

```
operationType = IMPORT
objectType = TASK_PAYLOAD_FLEX_FIELD_MAPPING
name =
default/HelpDeskRequestComposite!1.0*c9856b8b-bc9e-46a4-8aef-698e539ba1d7/HelpDesk
RequestHumanTask
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = true
```

#### 23.6.2.1.9 Exporting All Rules for a Specific User

This example exports all rules for a specific user. The group property is left blank when you export rules for a specific user.

```
operationType = EXPORT
objectType = RULE
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

**23.6.2.1.10 Importing All Rules for a Specific User** This example imports all rules for a specific user. The group property is left blank when you import rules for a specific user.

```
operationType = IMPORT
objectType = RULE
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

**23.6.2.1.11 Exporting All Rules for a Specific Group** This example exports all rules for a specific group. The user property is left blank when you export rules for a specific group.

```
operationType = EXPORT
objectType = RULE
name = ALL
user =
group = LoanAgentGroup
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

**23.6.2.1.12 Importing All Rules for a Specific Group** This example imports all rules for a specific group. The user property is left blank when you import rules for a specific group.

```
operationType = IMPORT
objectType = RULE
name = ALL
user =
group = LoanAgentGroup
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

**23.6.2.1.13 Exporting All User Views** This example exports all user views.

```
operationType = EXPORT
objectType = VIEW
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

**23.6.2.1.14 Importing All User Views** This example imports all user views.

```
operationType = IMPORT
```

```
objectType = VIEW
name = ALL
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

#### **23.6.2.1.15 Exporting a Specific User View** This example exports a specific user view.

```
operationType = EXPORT
objectType = VIEW
name = jcooperUserView1
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

#### **23.6.2.1.16 Importing a Specific User View** This example imports a specific user view.

```
operationType = IMPORT
objectType = VIEW
name = jcooperUserView1
user = jcooper
group =
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

#### **23.6.2.1.17 Export All Standard Views** This example exports all standard views.

```
operationType = EXPORT
objectType = VIEW
name = ALL
user =
group = LoanAgentGroup
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

#### **23.6.2.1.18 Importing All Standard Views** This example imports all standard views.

```
operationType = IMPORT
objectType = VIEW
name = ALL
user =
group = LoanAgentGroup
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

---

**23.6.2.1.19 Exporting a Specific Standard View** This example exports a specific standard view.

```
operationType = EXPORT
objectType = VIEW
name = MyStandardView1
user =
group = LoanAgentGroup
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

**23.6.2.1.20 Importing a Specific Standard View** This example imports a specific standard view.

```
operationType = IMPORT
objectType = VIEW
name = MyStandardView1
user =
group = LoanAgentGroup
grantPermission = true
migrateAttributeLabel = false
override = true
skip = true
migrateToActiveVersion = false
```

### 23.6.3 ant Script Data Migration Syntax

Use the ant script for data migration. The script is located in the following directory:

*ORACLE\_HOME/bin/ant-t2p-worklist.xml*

The script uses the following format to migrate human workflow configurable data from one SOA server to another:

```
ant -f ant-t2p-worklist.xml
-Dbea.home=BEA_HOME
-Dsoa.home=SOA_HOME
-Dmigration.properties.file=MIGRATION_PROPERTY_FILE_PATH
-Dsoa.hostname=SOA_HOSTNAME
-Dsoa.rmi.port=SOA_RMI_PORT
-Dsoa.admin.user=SOA_ADMIN_USER
-Dsoa.admin.password=SOA_ADMIN_PASSWORD
-Drealm=REALM -Dmigration.file=MIGRATION_FILE
-Dmigration.file=<MIGRATION_FILE>
-Dmap.file=MAP_FILE
```

---

Argument	Definition
bea.home	The absolute path of the installation directory for Oracle WebLogic Server.
soa.home	The absolute path of the Oracle SOA Suite home directory.
migration.properties.file	The absolute path to the migration.properties file.
soa.hostname	The hostname of the SOA server instance.  <b>Note:</b> You must specify the complete domain name, such as myhost.us.example.com, instead of myhost.

---

Argument	Definition
soa.rmi.port	The remote method invocation (RMI) port of the SOA server instance.
soa.admin.user	The Admin user name to connect to the SOA server instance.
soa.admin.password	The Admin user password to connect to the SOA server instance.
realm	The realm of the SOA server instance.
migration.file	The complete path location of the migration file in which all user-configurable data from the SOA server is exported to or imported from.
map.file	The full path location of the map file in which all the TaskDefinitionId mappings in the target SOA server are provided. This file enables you to customize the mapping.

For example:

```
ant -f ant-t2p-worklist.xml
-Dbea.home=/net/myhost/jsmith/fmwhome
-Dsoa.home=/net/myhost/jsmith/fmwhome/AS11gR1SOA
-Dmigration.properties.file=migration.properties
-Dsoa.hostname=myhost.us.example.com -Dsoa.rmi.port=7001
-Dsoa.admin.user=weblogic
-Drealm=jazn.com
-Dmigration.file=/tmp/export_all_userRules.xml
-Dmap.file=/tmp/export_all_userRules_mapper.xml
```

---

**Note:** After specifying the Admin user name, enter the password when prompted.

---

# **Part IX**

---

## **Administering Oracle Business Activity Monitoring**

This part describes how to administer Oracle Business Activity Monitoring.

This part includes the following chapters:

- [Chapter 24, "Configuring Oracle Business Activity Monitoring"](#)
- [Chapter 25, "Monitoring Oracle Business Activity Monitoring"](#)
- [Chapter 26, "Managing Oracle Business Activity Monitoring"](#)



# 24

---

## Configuring Oracle Business Activity Monitoring

This chapter describes how to configure basic properties of Oracle Business Activity Monitoring (Oracle BAM) Server components and Oracle BAM web applications using Oracle Enterprise Manager Fusion Middleware Control, advanced properties using System MBean Browser, and Oracle BAM Adapter properties and connection factories using Oracle WebLogic Server Administration Console. It also explains how to configure logging and log levels, security, distribution lists for alerts and reports, and Oracle User Messaging Service to send email notifications to Oracle BAM users.

This chapter includes the following sections:

- [Section 24.1, "Introduction to Configuring Oracle BAM"](#)
- [Section 24.2, "Configuring Oracle BAM Web Basic Properties"](#)
- [Section 24.3, "Configuring Oracle BAM Server Basic Properties"](#)
- [Section 24.4, "Configuring the Logger"](#)
- [Section 24.5, "Configuring Oracle User Messaging Service"](#)
- [Section 24.6, "Configuring Oracle BAM Distribution Lists"](#)
- [Section 24.7, "Configuring Oracle BAM Adapter"](#)
- [Section 24.8, "Configuring Oracle BAM Batching Properties"](#)
- [Section 24.9, "Configuring Security"](#)
- [Section 24.10, "Configuring Advanced Properties"](#)
- [Section 24.11, "Oracle BAM Configuration Property Reference"](#)

For more information about Oracle BAM tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

### 24.1 Introduction to Configuring Oracle BAM

Oracle BAM Server is the collection of the components Oracle BAM Active Data Cache (Oracle BAM ADC), Oracle BAM Report Cache, Oracle BAM Enterprise Message Sources (EMS), and Oracle BAM Event Engine.

The Oracle BAM web applications are a collection of thin clients (Active Studio, Architect, Administrator, and Active Viewer) and Oracle BAM Report Server.

For more information about each of the subcomponents of Oracle BAM Server and Oracle BAM web applications, see the *Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring*.

At runtime, the Oracle BAM application checks the configuration property values. If they are set to DEFAULT, Oracle BAM dynamically determines the values of all the parameters by querying the JRF API, that in turn queries the MBean Server. This feature enables you to set up Oracle BAM on any port number and work out of the box without any configuration changes. By default all of the parameters are set to DEFAULT.

If the administrator provides the configuration values during initial postinstallation configuration then Oracle BAM honors them as the values going forward. If for some reason the parameters are not present, Oracle BAM first looks for host and port details in JRF. If Oracle BAM is not able to access JRF, hard-coded default values are provided from the code.

The most commonly used Oracle BAM Server and web applications properties are configured in Oracle Enterprise Manager Fusion Middleware Control. For more information, see [Section 24.3, "Configuring Oracle BAM Server Basic Properties"](#) and [Section 24.2, "Configuring Oracle BAM Web Basic Properties"](#).

Security configuration is discussed in [Section 24.9, "Configuring Security"](#), and adding and managing Oracle BAM roles (permissions) and user accounts is discussed in [Section 26.3, "Managing Oracle BAM Users."](#)

Oracle User Messaging Service (UMS) must be configured so that alerts are delivered to Oracle BAM users. For more information, see [Section 24.5, "Configuring Oracle User Messaging Service"](#).

When using Oracle BAM in a SOA composite application, the Oracle BAM Adapter configuration must be completed. For more information, see [Section 24.7, "Configuring Oracle BAM Adapter"](#).

Advanced properties are located in configuration files that must be edited using the System MBean Browser. For more information, see [Section 24.10, "Configuring Advanced Properties"](#). Also, see [Section 24.11, "Oracle BAM Configuration Property Reference"](#) for a listing of all properties available for Oracle BAM configuration.

Oracle BAM distribution lists are used to send alerts and reports to multiple Oracle BAM users, rather than having to specify several individual recipients. Distribution lists are configured in the Oracle BAM Administrator application. For more information, see [Section 24.6, "Configuring Oracle BAM Distribution Lists"](#).

For performance tuning information for Oracle BAM, see the *Oracle Fusion Middleware Performance and Tuning Guide*.

For Oracle BAM high availability configuration information, see the *Oracle Fusion Middleware High Availability Guide*.

## 24.2 Configuring Oracle BAM Web Basic Properties

Some basic Oracle BAM web applications properties are configured using Oracle Enterprise Manager Fusion Middleware Control.

Oracle BAM web applications must be restarted when changes are made to any Oracle BAM properties. For information about restarting Oracle BAM, see [Section 26.2, "Managing Oracle BAM Availability"](#).

The following topics describe how to configure each property:

- [Section 24.2.1, "Configuring Oracle BAM Web Applications Properties"](#)
- [Section 24.2.2, "Configuring the Application URL"](#)
- [Section 24.2.3, "Configuring the Report Loading Indicator"](#)

- [Section 24.2.4, "Configuring the Server Name"](#)

For information about configuring advanced properties, see [Section 24.10, "Configuring Advanced Properties"](#) and [Section 24.11, "Oracle BAM Configuration Property Reference."](#)

### 24.2.1 Configuring Oracle BAM Web Applications Properties

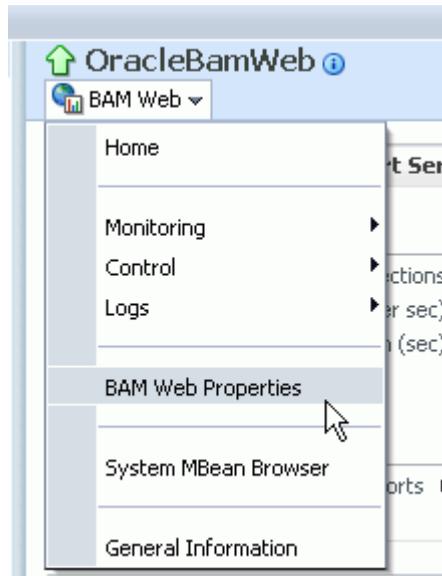
The Oracle BAM web applications properties are configured in the BAM Web Properties page in Fusion Middleware Control.

To configure Oracle BAM web applications properties:

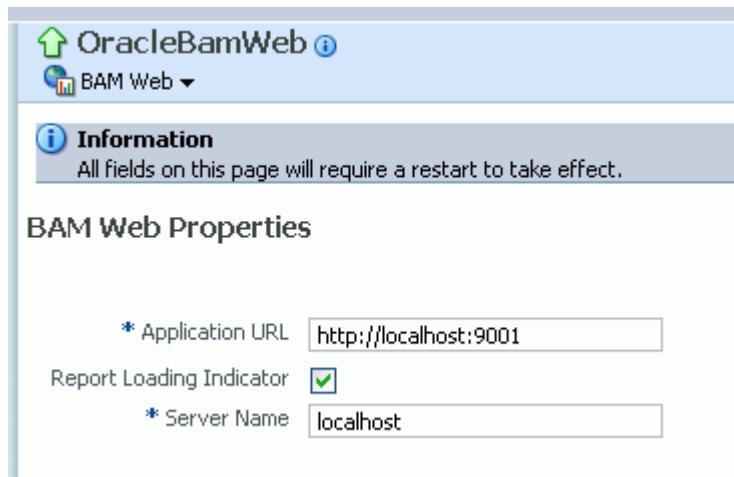
1. Go to the BAM Web Properties page in Fusion Middleware Control by selecting the **OracleBamWeb** node in the **BAM** folder.



2. Choose **BAM Web Properties** from the **BAM Web** menu.



The BAM Web Properties page opens.



3. Enter the appropriate values in each of the fields provided.

See the following sections for information about configuring each of the properties:

- [Section 24.2.2, "Configuring the Application URL"](#)
- [Section 24.2.3, "Configuring the Report Loading Indicator"](#)
- [Section 24.2.4, "Configuring the Server Name"](#)

4. Click **Apply**.

You must restart Oracle BAM after any property changes.

## 24.2.2 Configuring the Application URL

The **Application URL** property value must be updated from localhost to the actual hostname to generate the correct URLs for reports and alerts.

The **Application URL** property is configured in both the Oracle BAM web applications properties page and the Oracle BAM Server properties page. In Oracle BAM web applications page, the URL is used to generate the full URL for reports and alerts.

This property is common to both Oracle BAM web applications and Oracle BAM Server. If it is configured on one page, the same value appears on the other configuration page.

## 24.2.3 Configuring the Report Loading Indicator

The **Report Loading Indicator** property specifies whether the report loading indicator is enabled or disabled by default when viewing reports in Oracle BAM Active Studio and Oracle BAM Active Viewer.

With this property enabled, the report loading indicator is shown by default when a report is viewed; however, individual users can choose to disable the report loading indicator in their user preferences configuration. For more information, see the *Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring*.

## 24.2.4 Configuring the Server Name

The **Server Name** property provides the hostname of Oracle BAM Server. Oracle BAM web applications are separate applications that require the location of Oracle BAM

Server to get data from the Active Data Cache and Report Cache for the Oracle BAM Report Server.

## 24.3 Configuring Oracle BAM Server Basic Properties

Some basic Oracle BAM Server properties are configured using Oracle Enterprise Manager Fusion Middleware Control.

Oracle BAM Server must be restarted after any changes to Oracle BAM properties. For information about restarting Oracle BAM, see [Section 26.2, "Managing Oracle BAM Availability"](#).

The following topics describe how to configure each property:

- [Section 24.3.1, "Configuring Oracle BAM Server Properties"](#)
- [Section 24.3.2, "Configuring the Data Source JNDI"](#)
- [Section 24.3.3, "Configuring the Application URL"](#)
- [Section 24.3.4, "Configuring Viewset Sharing"](#)
- [Section 24.3.5, "Configuring the Report Cache Persistence Manager"](#)
- [Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"](#)
- [Section 24.3.7, "Configuring the Outbound Email Account"](#)

For information about configuring advanced properties, see [Section 24.10, "Configuring Advanced Properties"](#) and [Section 24.11, "Oracle BAM Configuration Property Reference."](#)

### 24.3.1 Configuring Oracle BAM Server Properties

Oracle BAM Server properties are configured in the BAM Server Properties page in Oracle Enterprise Manager Fusion Middleware Control.

To configure Oracle BAM Server properties:

1. Go to the BAM Server Properties page by selecting the **OracleBamServer** node in Fusion Middleware Control **BAM** folder.



2. Choose **BAM Server Properties** from the **BAM** Server menu.



The BAM Server Properties page opens.

The screenshot shows the 'BAM Server Properties' configuration page. At the top, there is an information banner: **Information** - All changes made in this page require a server restart to take effect. Below the banner, the section title is **BAM Server Properties**. The configuration fields include:

- \* Data Source JNDI:** `jdbc/oracle/bam/adc`
- Advanced** section:
  - \* Application URL:** `http://localhost:9001`
  - Viewset Sharing:**
  - Report Cache Persistence Manager:** `File Based`
  - ODI User:**
  - ODI Password:** `*****`
  - ODI Work Repository Name:** `WORK_DEV`
  - ODI Agent Host:** `localhost`
  - ODI Agent Port:** `20910`
  - \* Outbound Email Account:** `BAM-NOTIFICATION_AR@oracle.com`

3. Enter the appropriate values in each of the fields provided.

See the following sections for information about configuring each of the properties:

- [Section 24.3.2, "Configuring the Data Source JNDI"](#)
- [Section 24.3.3, "Configuring the Application URL"](#)
- [Section 24.3.4, "Configuring Viewset Sharing"](#)

- [Section 24.3.5, "Configuring the Report Cache Persistence Manager"](#)
  - [Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"](#)
  - [Section 24.3.7, "Configuring the Outbound Email Account"](#)
4. Click **Apply**.

You must restart the Oracle BAM application after any property changes.

### 24.3.2 Configuring the Data Source JNDI

The **Data Source JNDI** property specifies the database used by Oracle BAM ADC. Enter the data source JNDI name created for Oracle BAM ADC. For general information about configuring data sources see *Oracle Fusion Middleware Configuring and Managing JDBC Data Sources for Oracle WebLogic Server*

### 24.3.3 Configuring the Application URL

The **Application URL** property is used only by Oracle BAM web applications. This configuration property is no longer used by Oracle BAM Server. For information about configuring this property for Oracle BAM web applications, see [Section 24.2.2, "Configuring the Application URL"](#).

### 24.3.4 Configuring Viewset Sharing

The **Viewset Sharing** property enables view set sharing when possible. A view set is an object that represents a query to a given Oracle BAM data object. A view set can include fields (which can be columns from the data object or lookups from other data objects), aggregates, groups, or calculated fields. A view set can also be sorted, filtered, and row-level security is applied implicitly to it.

Typically, a particular view set can be shared with other users if they are trying to access the same Oracle BAM dashboard, if the view sets are not dissimilar due to factors such as row-level security, prompts or parameters used in filters, and so on.

A snapshot is a query result set that can be created by the view set. Snapshots can be produced from a view set after it is opened. Because snapshot generation is so performance-intensive, view set sharing allows Oracle BAM Server to take only one snapshot of a given view to share across multiple users of the same dashboard.

Sharing view sets between users of the same views improves performance, but requires that new users wait for view sets to be synchronized as each new user begins sharing the view set.

The first user who opens an Oracle BAM dashboard receives a new snapshot (which is cached) and immediately receives active data in real time. Changes for active data, called change lists, are cached.

When additional users open the same dashboard, they receive the cached snapshot that was generated for the first user, and they receive cached change lists (more rapidly than the first user) while the Synchronizing Active Data message is displayed.

By default, up to 50 change lists are cached, so if multiple users open a dashboard, secondary users must wait for up to 50 change lists to be sent to the dashboard before they begin receiving real-time active data.

The **ElementsCountLimit** property can be set to allow fewer change lists to be cached. For information about configuring advanced properties, see [Section 24.11, "Oracle BAM Configuration Property Reference"](#).

### 24.3.5 Configuring the Report Cache Persistence Manager

The **Report Cache Persistence Manager** property specifies the persistence location (file based or memory based). Select the appropriate persistence location for your Oracle BAM Report Cache.

### 24.3.6 Configuring Oracle Data Integrator Integration Properties

The Oracle Data Integrator integration properties specify values for integrating Oracle Data Integrator with Oracle BAM Server.

Enter the appropriate values for the following properties:

**ODI User:** The user that executes the scenarios in Oracle Data Integrator.

**ODI Password:** The encoded Oracle Data Integrator password.

**ODI Work Repository Name:** The name of the Oracle Data Integrator work repository database.

**ODI Agent Host:** The IP address or hostname of the server where the Oracle Data Integrator agent is running.

**ODI Agent Port:** The Transmission Control Protocol (TCP) port on which the Oracle Data Integrator agent is listening.

### 24.3.7 Configuring the Outbound Email Account

This section explains how to configure the email address that appears in the From header of email notifications sent by the Oracle BAM Event Engine.

The **Outbound Email Account** property on Oracle BAM Server must point to a dedicated email account for delivering Oracle BAM alert notification email messages and Oracle BAM report link email messages.

If an Oracle BAM alert configured with a secondary action to send an email notification fails on the primary action, this property must be configured with an email address that Oracle UMS can access at runtime. Creating a dedicated email account for this purpose is recommended.

---

**Note:** Administrators should not use personal email accounts to test alerts, because Oracle UMS may delete email notifications in the mail box and continue deleting messages as they arrive.

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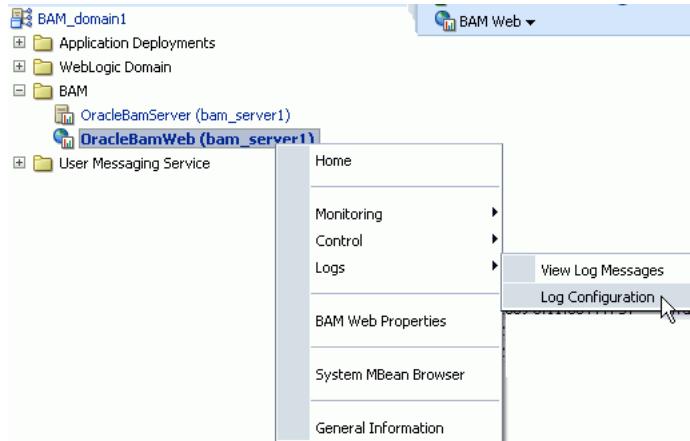
To complete the configuration, you must configure the Oracle UMS `usermessagingdriver-email` driver. For details, see [Section 24.5, "Configuring Oracle User Messaging Service"](#).

Oracle BAM Event Engine has another configuration property, `TimeoutPeriodToGetFailedStatusesInMins`, which is the time interval for which the Event Engine waits after delivering an email notification, to see if it receives any failure notification from Oracle UMS. The default value for this property is 10 minutes. If a failure notification does not arrive within this time, the Event Engine assumes that email delivery was successful, and the failover action is discarded. Failure notifications arriving after this time are ignored by the Event Engine. For information about configuring `TimeoutPeriodToGetFailedStatusesInMins`, see [Section 24.11, "Oracle BAM Configuration Property Reference"](#).

## 24.4 Configuring the Logger

Use the Log Configuration page to configure logging levels. For information about viewing the logs, see [Section 25.6, "Monitoring Oracle BAM Logs."](#) Also, see [Section 3.4, "Configuring Log Files"](#) and the *Oracle Fusion Middleware Administrator's Guide* for general information about logging and log levels.

To open the Log Configuration page, right-click the **OracleBamServer** node or **OracleBamWeb** node in the navigation tree and choose **Logs > Log Configuration**.



For each logger, select the desired notification level.

The screenshot shows the 'Log Configuration' page with the 'Log Levels' tab selected. At the top, it says 'This page allows you to configure the log level for both persistent loggers and active runtime loggers. Persistent loggers are logged configuration file and become active when the component is started. The log levels for these loggers are persisted across component restarts.' Below this is a search bar with 'bam' entered. The main area is a table with columns for 'Logger Name', 'Oracle Diagnostic Logging Level (Java Level)', and 'Log F'. The table lists loggers such as oracle.bam, oracle.bam.adc, oracle.bam.common, oracle.bam.configuration.common.BAMCommon, oracle.bam.configuration.integration.mbeans.BM, oracle.bam.configuration.server.BAMServerApp, oracle.bam.configuration.server.mbeans.BAMS, oracle.bam.configuration.util.BAMMBeanHelper, oracle.bam.configuration.web.BAMWebApplicati, oracle.bam.configuration.web.mbeans.BAMWeb, oracle.bam.ems, oracle.bam.eventengine, and oracle.bam.middleware. Each logger has a dropdown menu next to its log level. For example, for oracle.bam, the dropdown shows 'NOTIFICATION:1 (INFO) [Inherited from parent]'. A mouse cursor is hovering over the 'TRACE:1 (FINE)' option for oracle.bam.middleware. At the bottom of the table, there is a checkbox for 'Persist log level state across component restarts'.

## 24.5 Configuring Oracle User Messaging Service

Oracle User Messaging Service (UMS) must be configured properly in Fusion Middleware Control to send email notifications when alerts are issued.

The UMS email driver monitors the outbound email account configured for Oracle BAM Server for any delivery failures, including rejected emails. Email delivery failure

notifications are asynchronous, that is, there is no definite time within which email rejection notification is received.

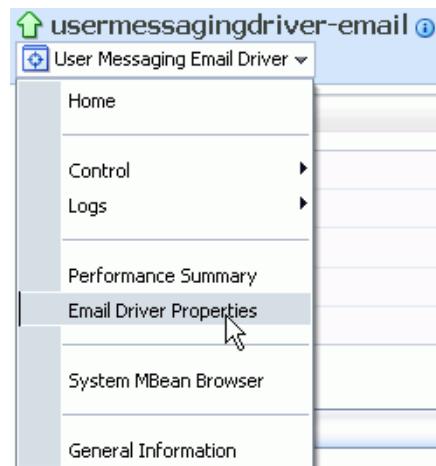
To configure the outbound email account see [Section 24.3.7, "Configuring the Outbound Email Account."](#)

To configure the service:

1. In Fusion Middleware Control, go to the `usermessagingdriver-email` (User Messaging Email Driver) page by expanding the **User Messaging Service** folder, then selecting the `usermessagingdriver-email` (`bam_server1`) node.



2. From the User Messaging Email Driver shortcut menu, choose **Email Driver Properties**.



3. In the **Driver-Specific Configuration** section, the properties `IncomingMailServer`, `IncomingUserIDs`, and `IncomingUserPasswords` must be provided with the Internet Message Access Protocol (IMAP) server name (Oracle UMS also supports POP3), email account name, and password to access this email account.

Driver-Specific Configuration				
Name	Description	Mandatory	Encoded Credential	Value
IncomingMailServer	The host name of the incoming mail server. Required only if e-mail receiving is supported on the driver instance.			<input type="text"/>
IncomingUserIDs	The list of user names of the mail accounts the driver instance is polling from. Each name must be separated by a comma, for example, Foo,bar. Required only if e-mail receiving is supported on the driver instance.			<input type="text"/>
IncomingUserPasswords	The list of passwords corresponding to the user names. Each password is separated by a comma and must reside in the same position in the list as their corresponding user name appears on the usernames list. Required only if e-mail receiving is supported on the driver instance.	✓	Type of Password Indirect Password, Create New User	<input type="text"/> <input type="password"/>

For more information, see [Section 27.4, "Configuring User Messaging Service Drivers"](#). [Table 27-7, "Custom Email Properties"](#) contains specific information about the properties you must configure.

4. Click **Apply** to save the changes.
5. Enter the email account in the **Outbound Email Account** property in the Oracle BAM Server configuration. For details, see [Section 24.3.7, "Configuring the Outbound Email Account"](#).

## 24.6 Configuring Oracle BAM Distribution Lists

Oracle BAM distribution lists are used to send alerts and reports to multiple Oracle BAM users, rather than having to specify several individual recipients. Oracle BAM distribution lists are configured using the Oracle BAM Administrator application.

To configure distribution lists:

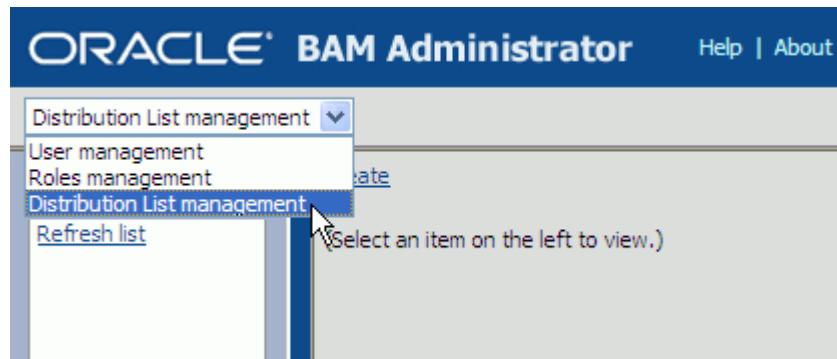
1. Go to the Oracle BAM start page, log in, and select **Administrator**.



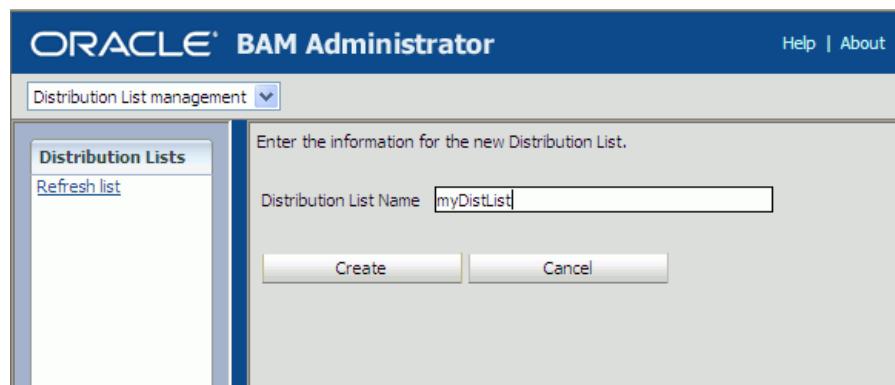
The Oracle BAM start page is located at:

`http://host_name:port_number/OracleBAM/`

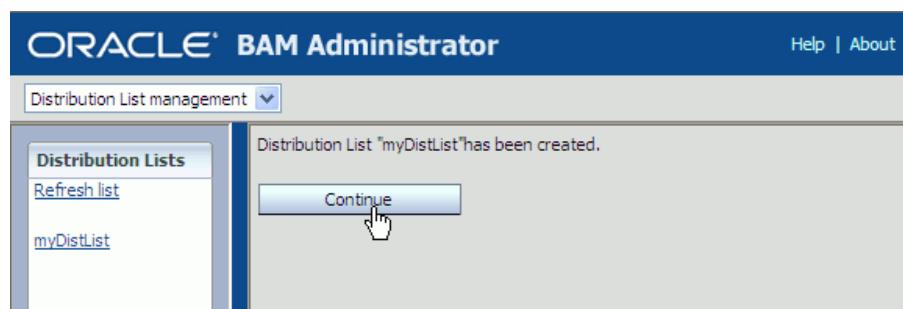
2. Select **Distribution List management** from the list.



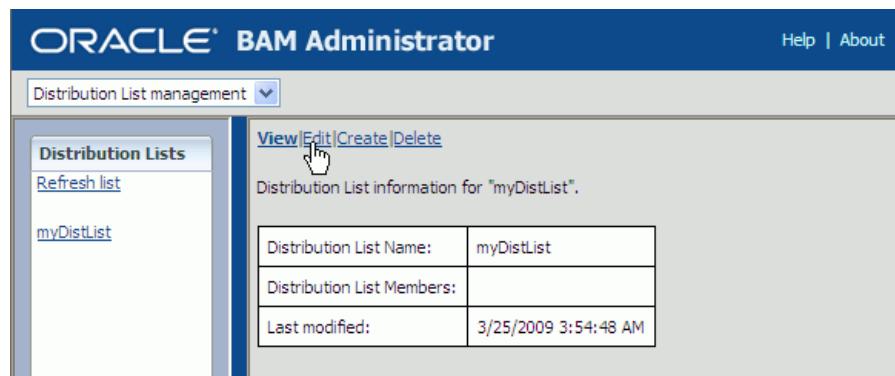
3. Click **Create**.
4. Enter a unique **Distribution List Name** and click **Create**.



5. Click **Continue** to save the distribution list name.

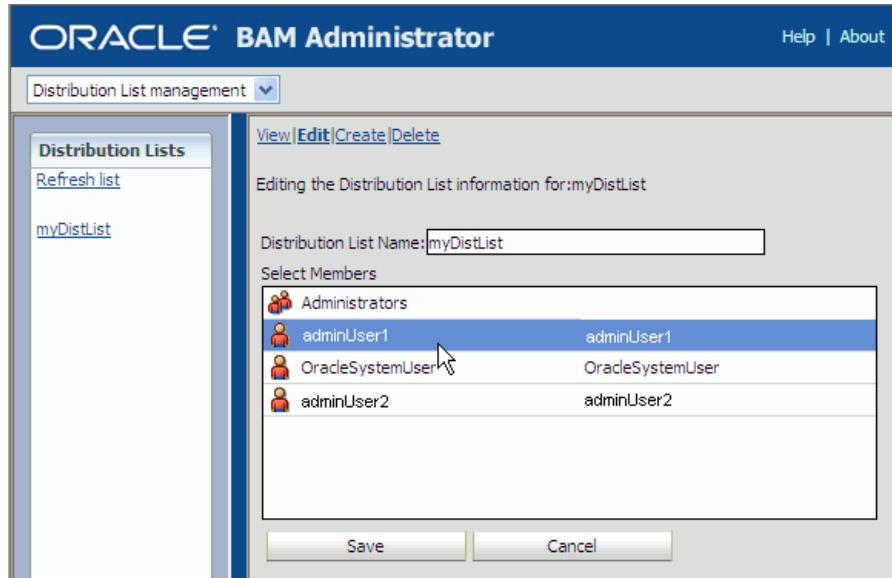


6. Select the new distribution list that is displayed in the **Distribution Lists** list on the left side of the page, and click **Edit**.



7. Select user accounts to add to the distribution list from the **Select Members** list.

You can select multiple users by clicking on several user names. The highlighted user names are added to the distribution list.



8. Click **Save**.

The users are added to the distribution list.

## 24.7 Configuring Oracle BAM Adapter

Oracle BAM Adapter properties, including the adapter batching properties, are configured in Oracle WebLogic Server Administration Console. For details, see [Section 24.7.1, "Configuring Oracle BAM Adapter Properties"](#).

Some issues that must be considered when Oracle BAM Adapter (including Oracle BAM sensor actions in a BPEL process) is used in a SOA composite application are configuring connection factories, trusted domains, and credential mapping.

Before deploying applications that use Oracle BAM Adapter, a connection factory to Oracle BAM Server must be configured. You can configure both Remote Method Invocation (RMI) and Simple Object Access Protocol (SOAP) connection factories. For details, see [Section 24.7.2, "Configuring Oracle BAM Connection Factories"](#).

When using the RMI connection between a SOA composite application and Oracle BAM Server, that is when they are deployed in different domains, trusted domain configuration must be done in Oracle WebLogic Server Administration Console. For more information, see [Section 24.7.3, "Configuring Trusted Domains"](#).

If the Oracle BAM Adapter is using credentials rather than a plain text user name and password, in order for Oracle BAM Adapter (including Oracle BAM sensor actions in a BPEL process) to connect to Oracle BAM Server, the credentials must also be established and mapped. For more information, see [Section 24.7.4, "Configuring Credential Mapping"](#).

The `oracle.bam.adapter` logger should be configured to troubleshoot issues with Oracle BAM Adapter. For information about logger configuration, see [Section 24.4, "Configuring the Logger"](#).

---

**Notes:** Use plain text user names and passwords only in nonproduction mode. Do not mix using credential mapping and plain text user information; apply one at a time to avoid confusion.

Because Oracle BAM and Oracle SOA Infrastructure use different identity stores, an Oracle BAM user must be configured in the service infrastructure identity store if there is not a common service infrastructure user and Oracle BAM user.

Oracle BAM Adapter does not support transactional behavior. Even though there is a section in Oracle WebLogic Server Administration Console for configuring transaction support, Oracle BAM Adapter must remain at the No Transaction level.

---

### 24.7.1 Configuring Oracle BAM Adapter Properties

Oracle BAM Adapter properties are configured in Oracle WebLogic Server Administration Console.

To configure Oracle BAM Adapter properties:

1. Go to the Oracle WebLogic Server Administration Console ([http://host\\_name:port\\_number/console](http://host_name:port_number/console)), and log on.
2. In the **Domain Structure** menu, select **Deployments**.



3. In the **Deployments** summary table, search for **OracleBamAdapter** and click it.

	Name
<input type="checkbox"/>	oracle.soa.uddi(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.soa.workflow(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.soa.worklist(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.webcenter.composer(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.wsm.seedpolicies(11.1.1,11.1.1)
<input type="checkbox"/>	OracleAppsAdapter
<input type="checkbox"/>	OracleBamAdapter

4. In the Settings for OracleBamAdapter page, click the **Configuration** tab, and then the **Properties** tab in the second row.

Property Name	Property Type	Property Value
Batch_Lower_Limit	java.lang.Integer	1000
Batch_Timeout	java.lang.Integer	5000
Batch_Upper_Limit	java.lang.Integer	5000
Block_On_Batch_Full	java.lang.Boolean	false
Connection_Retry_Interval	java.lang.Integer	2000
Number_Batches	java.lang.Integer	10
Number_of_Connection_Retries	java.lang.Integer	0
SOAP_Batch_Lower_Limit	java.lang.Integer	1000
SOAP_Batch_Timeout	java.lang.Integer	5000

5. Enter the new values, select the checkboxes for each updated value, and click **Save**.

For information about each property, see [Table 24–1, "Oracle BAM Adapter Configuration Properties"](#).

Also, see [Section 24.8, "Configuring Oracle BAM Batching Properties"](#) for general information about configuring batching properties.

---

**Note:** To commit these changes to the deployment plan you must click **Activate Changes** in the Change Center. If the **Activate Changes** button does not appear, see the "Oracle BAM Issues With Oracle WebLogic Server Administrative Console" section in the *Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring* for a workaround.

---

6. Restart the SOA domain server.

It must be restarted because that is where the Oracle BAM Adapter is deployed.

[Table 24–1](#) lists the Oracle BAM Adapter configuration properties.

**Table 24–1 Oracle BAM Adapter Configuration Properties**

RMI Property	SOAP Property	Default	Description
Batch_Lower_Limit	SOAP_Batch_Lower_Limit	1000	The minimum amount of elements in a batch before it is sent out.
Batch_Upper_Limit	SOAP_Batch_Upper_Limit	5000	The maximum amount of elements in a batch before it is sent out.
Batch_Timeout	SOAP_Batch_Timeout	5000	The timeout in milliseconds after which the batch is sent out even if it is not full.

**Table 24–1 (Cont.) Oracle BAM Adapter Configuration Properties**

RMI Property	SOAP Property	Default	Description
Block_On_Batch_Full	SOAP_Block_On_Batch_Full	false	The default setting for block on batch full, which indicates whether batching operations should block when the batch is full. If true then batching calls block until room is freed up in the batch for the operation. If false then BatchIsFullException exception is thrown.
Number_Batches	SOAP_Number_Batches	10	The limit of the number of pending calls allowed.

#### 24.7.1.1 Configuring the Adapter to Retry Sending Messages

If messages from BPEL process monitors are published when Oracle BAM Server is unavailable, the messages are not persisted and therefore are not published to the Oracle BAM data objects when Oracle BAM Server comes back online.

You can change this behavior by setting the Oracle BAM Adapter property **Block\_On\_Batch\_Full** to true in Oracle BAM Adapter configuration as described in [Section 24.7.1, "Configuring Oracle BAM Adapter Properties."](#)

For more information about BPEL process monitors see the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

#### 24.7.2 Configuring Oracle BAM Connection Factories

Some configuration in the Oracle WebLogic Server Administration Console is necessary before using Oracle BAM Adapter.

Use the Oracle WebLogic Server Administration Console to configure the Oracle BAM connection factories for connections with Oracle BAM Server.

To configure Oracle BAM connection factories:

1. Go to the Oracle WebLogic Server Administration Console ([http://host\\_name:port\\_number/console](http://host_name:port_number/console)), and log on.
2. In the **Domain Structure** menu, select **Deployments**.

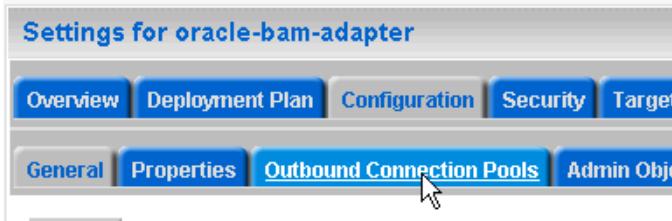


3. In the **Deployments** summary table, search for **OracleBamAdapter** and click it.

**Deployments**

<input type="checkbox"/>	Name
<input type="checkbox"/>	oracle.soa.udb(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.soa.workflow(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.soa.worklist(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.webcenter.composer(11.1.1,11.1.1)
<input type="checkbox"/>	oracle.wsm.seedpolicies(11.1.1,11.1.1)
<input type="checkbox"/>	OracleAppsAdapter
<input type="checkbox"/>	OracleBamAdapter

4. In the Settings for oracle-bam-adapter page, click the **Configuration** tab, and then the **Outbound Connection Pools** tab in the second row.



5. Configure the connection factory interface that you intend to use in Oracle JDeveloper, by expanding the appropriate **Group and Instance** target and clicking the Java Naming and Directory Interface (JNDI) name.

**Outbound Connection Pool Configuration Table**

<input type="button" value="New"/>	<input type="button" value="Delete"/>
<input type="checkbox"/>	<b>Groups and Instances</b>
<input type="checkbox"/>	+ oracle.bam.adapter.adc.RMIConnectionFactory
<input type="checkbox"/>	+ oracle.bam.adapter.adc.soap.SOAPConnect
<input type="button" value="New"/>	<input type="button" value="Delete"/>

To configure the connection factory for RMI-based calls, click to expand the **oracle.bam.adapter.adc.RMIConnectionFactory** group and select the JNDI name that the user uses in Oracle JDeveloper. The **eis/bam/rmi** connection factory is provided out of the box.

To configure the connection factory for SOAP-based calls, click to expand the **oracle.bam.adapter.adc.SOAPConnectionFactory** group and select the JNDI name that the user uses in Oracle JDeveloper. The **eis/bam/soap** connection factory is provided out of the box.

**Outbound Connection Pool Configuration Table**

<input type="checkbox"/>	<a href="#">Groups and Instances</a>
<input type="checkbox"/>	<a href="#">oracle.bam.adapter.adc.RMICConnectionFactory</a>
<input type="checkbox"/>	<a href="#">eis/bam/rmi</a>
<input type="checkbox"/>	<a href="#">oracle.bam.adapter.adc.soap.SOAPConnectionFactory</a>
<input type="checkbox"/>	<a href="#">eis/bam/soap</a>

6. Configure each of the properties by clicking in the table cells and entering the values.

**Settings for oracle.bam.adapter.adc.soap.SOAPConnectionFactory**

<a href="#">General</a>	<a href="#">Properties</a>	<a href="#">Transaction</a>	<a href="#">Authentication</a>	<a href="#">Connection Pool</a>	<a href="#">Logging</a>
-------------------------	----------------------------	-----------------------------	--------------------------------	---------------------------------	-------------------------

This page allows you to view and modify the configuration properties of this outbound connection pool. Properties you modify here are saved to a deployment plan.

**Outbound Connection Properties**

<input type="checkbox"/>	<a href="#">Property Name</a>	<a href="#">Property Type</a>	<a href="#">Property Value</a>
<input type="checkbox"/>	HostName	java.lang.String	<input type="text" value="localhost"/>
<input type="checkbox"/>	IsHTTPSEnabledWebService	java.lang.String	false
<input type="checkbox"/>	Password	java.lang.String	password
<input type="checkbox"/>	PortNumber	java.lang.String	9001
<input type="checkbox"/>	UserName	java.lang.String	bamuser

**Save**

Showing 1 to 5 of 5 Previous | Next

---

**Note:** Press Enter after entering a value in the table.

---

**Note:** The **UserName** field should contain an Oracle BAM user who is a member of application-level role Administrator or Report Architect. For information about assigning users to Oracle BAM application roles, see [Section 26.3.3, "Adding Members to Application Roles"](#) and [Section 26.3.4, "Introduction to Oracle BAM Application Roles"](#).

---

This configuration creates the connection factory with HTTP. To configure an HTTPS connection factory, see [Section 24.7.2.1, "Configuring HTTPS for Oracle BAM Adapter"](#).

The RMI protocol has different configuration properties. You must provide **InstanceName** and **IsClustered** in addition to the standard connection properties.

Property Name	Property Type	Property Value
HostName	java.lang.String	localhost
InstanceId	java.lang.String	ADCServer1
IsClustered	java.lang.String	false
Password	java.lang.String	.....
PortNumber	java.lang.String	9001
UserName	java.lang.String	.....

7. Select the checkboxes next to the values you have updated and click **Save**.

---

**Note:** To commit these changes to the deployment plan you must click **Activate Changes** in the Change Center. If the **Activate Changes** button does not appear, see the "Oracle BAM Issues With Oracle WebLogic Server Administrative Console" section in the *Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring* for a workaround.

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#### 24.7.2.1 Configuring HTTPS for Oracle BAM Adapter

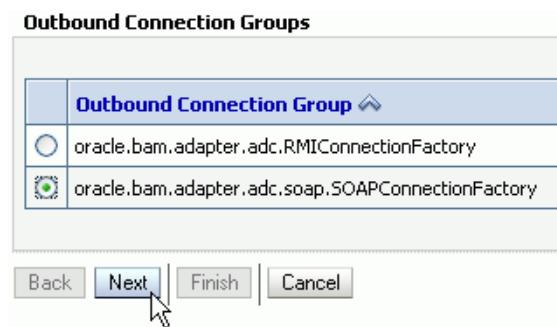
To configure HTTPS:

1. Locate the **oracle.bam.adapter.adc.soap.SOAPConnectionFactory** connection factory in the Oracle WebLogic Server Administration Console as described in Section 24.7, "Configuring Oracle BAM Adapter".

2. Click to expand the **oracle.bam.adapter.adc.soap.SOAPConnectionFactory** node, select the **eis/bam/soap** option, and click **New**.



- Select the **oracle.bam.adapter.adc.soap.SOAPConnectionFactory** option and click **Next**.



- Enter a JNDI name for this connection factory and click **Finish**.

The Outbound Connection instance represents a connection pool. The JNDI name can be used to obtain the pool at runtime.

 * <b>JNDI Name:</b>	eis/bam/https
<input type="button" value="Back"/> <input type="button" value="Next"/> <input type="button" value="Finish"/> <input type="button" value="Cancel"/>	

- Select the **eis/bam/https** connection pool instance in the **Groups and Instances** list.



- Complete the configuration properties as shown in [Section 24.7, "Configuring Oracle BAM Adapter,"](#) and change the **IsHTTPSEnabledWebService** value to true.

#### Outbound Connection Properties

Save Showing 1 to 5 of 5 Previous   Next			
	Property Name	Property Type	Property Value
<input type="checkbox"/>	HostName	java.lang.String	localhost
<input type="checkbox"/>	IsHTTPSEnabledWebService	java.lang.String	true
<input type="checkbox"/>	Password	java.lang.String	password
<input type="checkbox"/>	PortNumber	java.lang.String	9002
<input type="checkbox"/>	UserName	java.lang.String	username

### 24.7.3 Configuring Trusted Domains

When using the RMI connection between a SOA composite application and Oracle BAM Server, that is when they are deployed in different domains, trusted domain configuration must be done in Oracle WebLogic Server Administration Console.

To configure trusted domains:

1. Using the Oracle WebLogic Server Administration Console, in both SOA and Oracle BAM Server domains, go to **base\_domain > Security > General**, and expand the **Advanced** settings.

The screenshot shows the 'Advanced' section of the 'Security Interoperability Mode' configuration. It includes a dropdown menu set to 'default', a description of the security mode for XA calls, and two fields for entering a credential: 'Credential' and 'Confirm Credential', both containing masked text.

2. Enter the credential for the Oracle WebLogic Server domain in the **Credential** and **Confirm Credential** fields.

Enter the same credential in both the SOA and Oracle BAM Server domains to establish trust between the domains.

3. Save and activate the changes, then restart Oracle WebLogic Server.

For more information about trusted domains see "Enabling Global Trust" in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

### 24.7.4 Configuring Credential Mapping

Configure Oracle BAM Adapter to securely store user name and password properties using Oracle WebLogic Server credential mapping functionality.

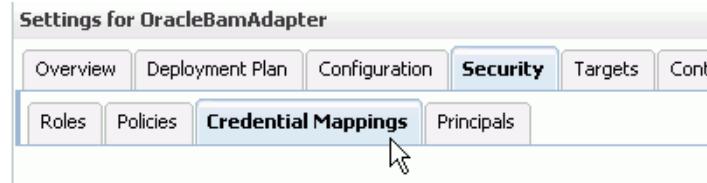
---

**Note:** Use plain text user names and passwords only in nonproduction mode. Do not mix using credential mapping and plain text user information; apply one at a time to avoid confusion.

---

To configure credential mapping:

1. Using the Oracle WebLogic Server Administration Console, go to **Deployment > OracleBamAdapter > Security > Credential Mappings**.



2. Click **New** and select an outbound connection pool instance for which to create a credential mapping entry, then click **Next** (By default, Oracle BAM is installed with two connection pools, **eis/bam/rmi** and **eis/bam/soap**).

**Create a New Security Credential Map Entry for:**

		Showing 1 to 5 of 5 Previous   Next
<input type="checkbox"/>	<b>Outbound Connection Pool</b> ↗	
<input type="checkbox"/>	eis/bam/https	
<input checked="" type="checkbox"/>	eis/bam/rmi	
<input type="checkbox"/>	eis/bam/soap	

---

**Note:** Ensure that a separate credential mapping entry for each outbound connection pool is created. If there are any additional outbound connection pools other than the defaults, you must create corresponding credential mappings for them as well.

---

3. Select **Unauthenticated WLS User**, and click **Next** (Unauthenticated WLS User is similar to an anonymous user).

**Create a New Security Credential Mapping**

Back	Next	Finish	Cancel
<b>WebLogic Server User</b>			
Select the WebLogic Server User that you would like started. Selecting 'Default User' will configure the user that will be used for an unauthenticated WebLogic Server user.			
<input type="radio"/> <b>User for creating initial connections</b> <input type="radio"/> <b>Default User</b> <input checked="" type="radio"/> <b>Unauthenticated WLS User</b> <input type="radio"/> <b>Configured User Name</b>			

4. Specify a corresponding user name and password for connecting to Oracle BAM Server, then click **Finish** to complete the credential mapping.

**Create a New Security Credential Mapping**

**EIS User Name and Password**

Configure the EIS User Name and Password that you would like to map the WebLogic Server User to:  
 \* Indicates required fields

Enter the EIS User Name:

\* **EIS User Name::**

Enter the EIS Password:

\* **EIS Password::**

\* **Confirm Password::**

5. Repeat these steps to create the credential mapping for the other Oracle BAM connection pool entries.

After you configure the credential mappings for each of the outbound connection pool entries, the mappings appear in the **Credential Mappings** table.

**Credential Mappings**

New	Delete	Showing 1 to 2 of 2 Previous   Next		
	WLS User	EIS User	Outbound Connection Pool	
<input type="checkbox"/>	Anonymous	user	eis/bam/rmi	
<input type="checkbox"/>	Anonymous	user	eis/bam/soap	

6. For these changes to take effect, Oracle WebLogic Server must be restarted.

## 24.8 Configuring Oracle BAM Batching Properties

The batch processor batches operations (for example, insert, update, upsert, and delete) between the client and the Active Data Cache server to improve performance by limiting the number of remote calls. For example, 10 update operations could be processed in a single remote call with batching enabled, rather than making 10 remote calls.

---

**Note:** Batching is used only on incoming data, not on internal Oracle BAM processes.

---

For Oracle BAM Adapter, the batching properties are configured using the Oracle BAM Adapter configuration page in the Oracle WebLogic Server Administration Console.

Oracle BAM batching properties are located in the `BAMWebConfig.xml` file for configuring batching to send data from Oracle BAM web applications (that is, to send data using Oracle BAM Architect), and to send data from the Oracle BAM `DataObjectOperation` web service using the batch method.

Oracle BAM configuration files are located in the following directory:

```
WL_HOME/user_projects/domains/base_domain/config/fmwconfig/servers/bam_server
1/applications/oracle-bam_11.1.1/config/
```

Oracle BAM must be restarted after any changes to Oracle BAM properties. For information about restarting Oracle BAM, see [Section 26.2, "Managing Oracle BAM Availability"](#).

---

**Note:** The Oracle BAM ADC API properties are the properties used by all Oracle BAM clients (such as ICommand and Oracle Data Integrator), and the SOAP properties are only used by Oracle BAM Adapter when configured to use SOAP.

---

[Table 24–2](#) lists the batching properties for Oracle BAM ADC API and SOAP.

**Table 24–2 Active Data Cache API and SOAP (Oracle BAM Adapter) Batching Properties**

Oracle BAM ADC API Property	SOAP Property	Default	Description
ActiveDataCache_Datasets_Batching_Limit_PendingCalls	Adapter_SOAP_Batching_Limit_PendingCalls	10	The limit of the number of pending calls allowed.
ActiveDataCache_Datasets_Batching_Limit_Lower	Adapter_SOAP_Batching_Limit_Lower	1000	The minimum number of elements in a batch before it is sent out.
ActiveDataCache_Datasets_Batching_Limit_Upper	Adapter_SOAP_Batching_Limit_Upper	5000	The maximum number of elements in a batch before it is sent out.
ActiveDataCache_Datasets_Batching_Timeout	Adapter_SOAP_Batching_Timeout	5000	The timeout interval in milliseconds after which the batch is sent out even if it is not full.
ActiveDataCache_Datasets_Batching_BlockOnBatchFull	Adapter_SOAP_Batching_BlockOnBatchFull	false	The block on batch full properties indicate whether batching operations should block when the batch is full. If set to true, then batching calls block until room is freed up in the batch for the operation. If set to false, a BatchIsFullException exception is thrown.
ActiveDataCache_Datasets_Batching_RetryInterval	Adapter_SOAP_Batching_RetryInterval	30000	The interval in milliseconds at which batch processing should attempt to retry failed flush attempts.
ActiveDataCache_Datasets_Batching_MaxRetryInterval	Adapter_SOAP_Batching_MaxRetryInterval	3600000	The maximum interval in milliseconds at which batch processing should attempt to retry failed flush attempts.

**Table 24–2 (Cont.) Active Data Cache API and SOAP (Oracle BAM Adapter) Batching**

<b>Oracle BAM ADC API Property</b>	<b>SOAP Property</b>	<b>Default</b>	<b>Description</b>
ActiveDataCache_Datasets_Batching_MaximumRetries	Adapter_SOAP_Batching_MaximumRetries	Integer.MAX_VALUE	The maximum number of times batch processing should attempt to retry failed flush attempts. Zero indicates no retry.
ActiveDataCache_Datasets_Batching_SuspendOnDisconnect	Adapter_SOAP_Batching_SuspendOnDisconnect	false	Suspend on disconnect, which indicates whether batching operations should be permanently suspended if and when the connection to Oracle BAM Server is lost.

### Batching Retry Mechanism

The batching retry mechanism is designed to retry remote calls to the server in the event communication with the server is lost due to, for example, network problems or Oracle BAM Server going offline. The operation of this retry mechanism is governed by the configuration properties detailed in this section. The term *flush* refers to the attempt to send the batch calls to the Oracle BAM Server for processing.

The `RetryInterval` property specifies the interval between retry attempts in milliseconds. If the `MaxRetryInterval` value is unspecified (0), then the code continues retrying at the `RetryInterval` value until the batch flush is successful or the `MaximumRetries` value is exceeded.

If the `MaxRetryInterval` value is specified, then the retry interval value is doubled on each retry up to the `MaxRetryInterval` value. It stays at the `MaxRetryInterval` rate until the batch flush is successful, or the `MaximumRetries` value is exceeded. This allows the retry rate to decline over time to a more reasonable long-term rate. If the server does not recover quickly, do not continue to retry at a rapid rate.

If the `MaximumRetries` value is 0, then no retries are attempted and failed batches are discarded.

If the `SuspendOnDisconnect` value is `true`, then all batching is permanently suspended until the client application is restarted, regardless of whether communication with Oracle BAM Server is reestablished.

If the pending batch limit is reached and the current batch is full (maximum size reached), then batch calls are blocked. There is no place to queue the operation from the current call, so Oracle BAM blocks the client until the condition resolves itself.

Table 24–2 describes the configuration properties that can be specified for the Active Data Cache API batching (which is used by the RMI connection factory, configured in Section 24.7.2, "Configuring Oracle BAM Connection Factories").

The Oracle BAM Adapter batching mechanism (used by the SOAP connection factory) has an identical set of configuration properties and default values.

## 24.9 Configuring Security

Security is configured in Oracle WebLogic Server. For information about the topics listed in this section, see *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

General information about Oracle WebLogic Server security is available in *Oracle Fusion Middleware Understanding Security for Oracle WebLogic Server*.

This section address the following security topics as they relate to Oracle BAM:

- [Section 24.9.1, "Configuring Credential Mapping"](#)
- [Section 24.9.2, "Configuring Oracle BAM User Permissions"](#)
- [Section 24.9.3, "Configuring Secure Socket Layer"](#)
- [Section 24.9.4, "Using Oracle Internet Directory With Oracle BAM"](#)
- [Section 24.9.5, "Securing Oracle BAM JMS Resources"](#)
- [Section 24.9.6, "Calling Secure Web Services"](#)

## 24.9.1 Configuring Credential Mapping

Credential mapping is used to securely store user name and password properties when using the Oracle BAM Adapter. For information see [Section 24.7.4, "Configuring Credential Mapping."](#)

## 24.9.2 Configuring Oracle BAM User Permissions

To provide secure access to the Oracle BAM applications, users are assigned to roles that provide the necessary permissions. For more information, see [Section 26.3, "Managing Oracle BAM Users".](#)

## 24.9.3 Configuring Secure Socket Layer

Oracle WebLogic Server provides the facilities needed to enable Secure Socket Layer (SSL) on any Oracle SOA Suite and Oracle WebCenter Portal connections into Oracle WebLogic Server.

Use the Java Development Kit (JDK) keytool utility to create and manage keystores and certificates, and use the Oracle WebLogic Server Administration Console to configure Oracle WebLogic Server listeners.

For more information, see "Configuring SSL" in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

Although Oracle WebLogic Server lets you configure the Oracle BAM web applications on both SSL and non-SSL ports, and Oracle BAM can also be configured to run on both SSL and non-SSL ports, it causes issues with the URL configured for Oracle BAM alerts. When Oracle BAM is running on both SSL and non-SSL ports, it cannot send two Oracle BAM report URLs to the alert email receiver. It is the responsibility of the administrator to decide which mode of access (SSL or non-SSL) to use for the Oracle BAM report URL recipients.

To start Oracle BAM in SSL mode, and enable Oracle BAM clients (like ICommand) to invoke Oracle BAM ADC, invoke EJBs, JMS resources, and JDBC resources using SSL, you must configure the following Oracle BAM properties:

- Communication\_Protocol in the `BAMCommonConfig.xml`, `BAMServerConfig.xml`, and `BAMICCommandConfig.xml` files, as follows:

Default value: `<Communication_Protocol>t3</Communication_Protocol>`

For SSL using t3s: `<Communication_Protocol>t3s</Communication_Protocol>`
- ListenPort in `BAMCommonConfig.xml` file, as follows:

Default value: <ListenPort>ListenPort</ListenPort>  
 For SSL: <ListenPort>SSLListenPort</ListenPort>

#### 24.9.4 Using Oracle Internet Directory With Oracle BAM

For general information about configuring Oracle Internet Directory, see "Configuring Users and Groups in the Oracle Internet Directory and Oracle Virtual Directory Authentication Providers" in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

To use Oracle Internet Directory with Oracle BAM:

1. Configure Oracle Internet Directory using the Oracle WebLogic Server Administration Console.
2. Create **OracleSystemUser** in Oracle Internet Directory, by connecting to Oracle Internet Directory with a Lightweight Directory Access Protocol (LDAP) browser and creating a user in the same base user Distinguished Name that was provided in the Oracle WebLogic Server Administration Console while configuring Oracle Internet Directory.
3. Run the following SQL statements to nullify the user global unique identifiers (GUID) in the Oracle BAM schema:

```
UPDATE "SysIterUser" SET "SysIterUser"."GUID" = NULL,
"SysIterUser"."Inactive" = NULL;
```

#### 24.9.5 Securing Oracle BAM JMS Resources

This is an optional procedure to restrict access to the Oracle BAM system JMS topics.

To secure Oracle BAM JMS resources:

1. Create a group with any group name using Oracle WebLogic Server Administration Console. For example, `OracleSystemGroup`.
2. Go to `WL_HOME/AS11gR1SOA/bam/bin` and invoke `secure_jms_system_resource.py` using Oracle WebLogic Scripting Tool (WLST).

The usage should be:

```
<JAVA_HOME>/bin/java -classpath <weblogic.jar_location> weblogic.WLST
./secure_jms_system_resource.py --username admin_user_name --password
admin_password --url admin_server_t3_url --jmsSystemResource
JMS_system_resource_name --group security_group_to_use
```

3. Assign `OracleSystemUser` to this group.
4. Assign all those Oracle BAM users to this group.

#### 24.9.6 Calling Secure Web Services

Currently, the Oracle BAM Alerts **Call a Web Service** action supports invoking web services protected by one-way SSL. In one-way SSL, the web service to be invoked presents a digital certificate to its client (the Oracle BAM Alert action client in this case), and the client verifies whether certificate presented to it can be trusted. If the client trusts the server certificate, then further communication between client and server continues over a secure SSL channel.

To accomplish one-way SSL, the Alert web service client must be pointed to a trust store in which it can perform a lookup, to determine if the certificate presented to it

exists in it or not. This can be done by adding the following properties in `BAMCommonConfig.xml`.

```
<SSL.TrustStore.Location>wls.home/lib/DemoTrust.jks</SSL.TrustStore.Location>
<SSL.TrustStore.Type>JKS</SSL.TrustStore.Type>
<SSL.TrustStore.Password>password</SSL.TrustStore.Password>
<SSL.TrustStore.Provider>SUN</SSL.TrustStore.Provider>
```

By default, if these properties are not specified in the configuration file, the values mentioned above are used (except for `password`, in which no value is used). You can provide different values to these properties to override the default trust store configuration. Currently you must edit the configuration files to set these properties, as they are not exposed in Oracle Enterprise Manager Fusion Middleware Control.

The default trust store is Java Key Store (JKS), which is file based. Certificates can be added and deleted using the Java keytool command-line utility.

For information about configuring the Call a Web Service alert action, see "Call a Web Service" in the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

#### 24.9.6.1 Example: Protecting Oracle BAM Web Services

The following is an example illustrating how to invoke SSL protected Oracle BAM web services. It is specific to the **Call a Web Service** alert action calling the Oracle BAM `ManualRuleFire` web service. The steps in this section do not need to be done if you are invoking external one-way SSL-protected non-BAM web services.

---

**Note:** After this configuration the entire Oracle BAM application is behind the SSL layer and must be accessed using the SSL port number and HTTPS protocol.

---

To configure properties for calling secure web services:

1. Open Oracle WebLogic Server Administration Console and go to **Domain Structure** > **Environment** > **Servers** > **BAM\_Server** > **General**.
2. Check **SSL Listen Port** checkbox and specify the **SSL Listen Port** number to use.
3. Modify the Oracle BAM configuration properties.
  - a. These properties must be modified in `BAMCommonConfig.xml`:
 

```
<Communication_Protocol>t3s</Communication_Protocol>
<ListenPort>SSLListenPort</ListenPort>
<ApplicationURL>http://SSL_HOST:SSL_PORT</ApplicationURL>
```
  - b. This property must be modified in `BAMWebConfig.xml`:
 

```
<ServerPort>SSL_PORT</ServerPort>
```
4. Restart Oracle WebLogic Server.
5. Open Oracle BAM Active Studio or Oracle BAM Architect, and go to **Alerts**.
6. Create an alert with the **Call a Web Service** action using a secure web service, such as
 

`https://host_name:SSL_port_number/OracleBAMWS/WebServices/ManualRuleFire?wsdl`

as the WSDL URL for the action.
7. Map the parameters and save the alert.

## 24.10 Configuring Advanced Properties

Oracle BAM provides many advanced properties not available for configuration using the BAM Web Properties and BAM Server Properties pages in Fusion Middleware Control. These advanced properties are configured using the System MBean Browser.

For a listing of all properties available for Oracle BAM configuration, see [Section 24.11, "Oracle BAM Configuration Property Reference"](#).

To configure the advanced properties using the System MBean Browser:

1. Choose **System MBean Browser** from the menu on the OracleBAMWeb or OracleBAMServer page.



2. Select the path to the appropriate Application Defined MBeans page:
  - For properties common to all Oracle BAM components select **Application Defined MBeans > oracle.bam.common > Server: bam\_server1 > Application: oracle-bam > Config > BAMCommonConfig** (see [Figure 24-1](#)).
  - For Oracle BAM Server-specific properties select **Application Defined MBeans > oracle.bam.server > Server: bam\_server1 > Application: oracle-bam > Config > BAMServerConfig**.
  - For Oracle BAM web applications-specific properties select **Application Defined MBeans > oracle.bam.web > Server: bam\_server1 > Application: oracle-bam > Config > BAMWebConfig**.

**Figure 24–1 System MBean Browser Navigation Tree**

The associated configuration properties are displayed in the System MBean Browser.

Application Defined MBeans: Config:BAMCommonConfig			
		Apply	
		Show MBean Information	
Attributes		Notifications	
Name	Description	Access	Value
1 Adapter_SOAP_Batching_FlushOnDemand	This designates the limit for Flushing on demand for the BAM adapter.	RW	1000
2 Adapter_SOAP_Batching_Limit_Lower	This designates the lower limit for SOAP batching for the BAM adapter.	RW	1000
3 Adapter_SOAP_Batching_Limit_Upper	This designates the lower limit for SOAP batching for the BAM adapter.	RW	5000
4 Adapter_SOAP_Batching_Timeout	This designates the timeout for SOAP batching for the BAM adapter.	RW	50
5 ApplicationURL	This designates the Application URL	RW	http://localhost:9001
6 ConfigMBean	If true, it indicates that this MBean is a Config MBean.	R	true
7 eventProvider	If true, it indicates that this MBean is an event provider as defined by JSR-77.	R	true
8 eventTypes	All the event's types emitted by this MBean.	R	jmx.attribute.change
9 objectName	The MBean's unique JMX name	R	oracle.bam.common:name=BAMComm
10 ReadOnly	If true, it indicates that this MBean is a read only MBean.	R	false
11 RestartNeeded	Indicates whether a restart is needed.	R	false
12 SystemMBean	If true, it indicates that this MBean is a System MBean.	R	false

3. Edit property values in the **Values** column, and click **Apply**.
4. Oracle BAM must be restarted after any changes to Oracle BAM properties. For information about restarting Oracle BAM, see [Section 26.2, "Managing Oracle BAM Availability"](#).

### Oracle BAM Configuration Property Files

All Oracle BAM properties are located in configuration files. These files are located in the following directory on the host where the Oracle BAM components are installed:

```
WL_HOME/user_projects/domains/base_domain/config/fmwconfig/servers/bam_server
1/applications/oracle-bam_11.1.1/config
```

The configuration properties usually go into the `BAMCommonConfig.xml` file, which contains the properties global to all Oracle BAM components. These properties can also be specified in component-specific configuration files:

- Oracle BAM Server-specific properties are configured in `BAMServerConfig.xml`
- Oracle BAM web applications-specific properties are configured in `BAMWebConfig.xml`
- Oracle BAM ICommand utility-specific properties are configured in `BAMICommandConfig.xml`

The properties set in the `BAMCommonConfig.xml` file are always loaded. Any additional configuration files must be loaded explicitly. Oracle BAM Server explicitly loads the `BAMServerConfig.xml` file, Oracle BAM web applications explicitly load the `BAMWebConfig.xml` file, and `ICommand` explicitly loads the `BAMICommandConfig.xml` file. When a configuration file is loaded, its properties override any properties previously set, that is properties specified in `BAMServerConfig.xml` override properties set in `BAMCommonConfig.xml`.

## 24.11 Oracle BAM Configuration Property Reference

This section provides a brief description of each Oracle BAM configuration property that may be used in the Oracle BAM configuration files.

Advanced properties are configured in the Fusion Middleware Control System MBean Browser. For information about configuring properties that do not appear in the Oracle BAM configuration pages in Fusion Middleware Control, see [Section 24.10, "Configuring Advanced Properties"](#).

Some of these properties correspond to properties you can set in the Fusion Middleware Control and Oracle WebLogic Server Administration Console, and references to specific sections about these configuration procedures are provided in [Table 24-3](#).

---

**Note:** The Oracle BAM ADC API properties are the properties used by all Oracle BAM clients (such as `ICommand` and Oracle Data Integrator), and the SOAP properties are only used by Oracle BAM Adapter when configured to use SOAP.

---

**Table 24–3 Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
ActiveDataCache.API.Batching.ThreadPool.CoreSize	Indicates how many threads to keep in the Oracle BAM ADC API thread pools when idle. Default: 5
ActiveDataCache.API.Batching.ThreadPool.KeepAliveTimeInSecs	Amount of time (in seconds) to keep an idle thread in the Oracle BAM ADC API thread pools. Default: 20
ActiveDataCache.API.Batching.ThreadPool.MaxValue	Maximum number of threads in the Oracle BAM ADC API thread pools. Default: 100
ActiveDataCache.API.Batching.ThreadPool.QueueSize	Maximum number of messages that can be queued in the Oracle BAM ADC API thread pools. Default: 30
ActiveDataCache.API.BufferedDataReader.ThreadPool.CoreSize	Indicates how many threads to keep in the Oracle BAM ADC buffered data reader thread pools when idle. Default: 10
ActiveDataCache.API.BufferedDataReader.ThreadPool.KeepAliveTimeInSecs	Amount of time (in seconds) to keep an idle thread in the Oracle BAM ADC buffered data reader thread pools. Default: 20
ActiveDataCache.API.BufferedDataReader.ThreadPool.MaxValue	Maximum number of threads in the Oracle BAM ADC Buffered Data Reader Thread Pools. Default: 100
ActiveDataCache.API.BufferedDataReader.ThreadPool.QueueSize	Maximum number of messages that can be queued in the Oracle BAM ADC Buffered Data Reader Thread Pools. Default: 30
ActiveDataCache.Kernel.ActiveDataQueue.ThreadPool.CoreSize	Indicates how many threads to keep in the Oracle BAM ADC Active Data Queue Thread Pools when idle. Default: 20
ActiveDataCache.Kernel.ActiveDataQueue.ThreadPool.KeepAliveTimeInSecs	Amount of time (in seconds) to keep an idle thread in the Oracle BAM ADC Active Data Queue Thread Pools. Default: 20
ActiveDataCache.Kernel.ActiveDataQueue.ThreadPool.MaxValue	Maximum number of threads in the Oracle BAM ADC Active Data Queue Thread Pools. Default: 100
ActiveDataCache.Kernel.ActiveDataQueue.ThreadPool.QueueSize	Maximum number of messages that can be queued in the Oracle BAM ADC Active Data Queue Thread Pools. Default: 30
ActiveDataCache_Datasets_Batching_BlockOnBatchFull	Block on batch full properties indicate whether batching operations should block when the batch is full. If set to true, then batching calls block until room is freed up in the batch for the operation. If set to false, a BatchIsFullException exception is thrown. Default: false

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

Property Name	Description
ActiveDataCache_Datasets_Batching_Limit_Lower	<p>The minimum amount of elements in a batch before it is sent to the server. Depending on the load, batches may contain more than this minimum (up to the maximum), but they never contain less than this minimum (unless the timeout expires).</p> <p>See ActiveDataCache_Datasets_Batching_Timeout for the exception to this rule.</p> <p>See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.</p> <p>Default: 1000</p>
ActiveDataCache_Datasets_Batching_Limit_PendingCalls	<p>The limit of the number of pending batches that are waiting to be sent to the server. When this limit is reached and the current batch is full (at its upper limit), further batched operations become blocking calls until this condition is cleared. This limit throttles the client and keeps it from overrunning the server.</p> <p>See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.</p> <p>Default: 10</p>
ActiveDataCache_Datasets_Batching_Limit_Upper	<p>The maximum amount of elements in a batch before it is sent out. A batch never contains more than this maximum.</p> <p>See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.</p> <p>Default: 5000</p>
ActiveDataCache_Datasets_Batching_MaximumRetries	<p>The maximum number of times batch processing retries failed attempts to send the batch to the server. A value of 0 (zero) indicates no retry.</p> <p>Default: 2147483647</p>
ActiveDataCache_Datasets_Batching_MaxRetryInterval	<p>The maximum interval in milliseconds at which batch processing retries failed attempts to send the batch to the server. If this maximum retry interval is specified, the retry interval is doubled on each retry attempt until the interval reaches this maximum value. Further retries use this maximum value. This interval enables the configuration of retry attempts that taper off should the failure not resolve itself quickly. If a maximum retry interval of 0 (zero) is specified, the retry interval does not change.</p> <p>Default: 3600000</p>
ActiveDataCache_Datasets_Batching_RetryInterval	<p>The interval in milliseconds at which batch processing retries failed attempts to send the batch to the server. Retry is attempted when the failure is due to server connectivity problems such as the server being restarted.</p> <p>Default: 30000</p>
ActiveDataCache_Datasets_Batching_SuspendOnDisconnect	<p>Indicates whether batching operations are permanently suspended if and when the connection to Oracle BAM Server is lost.</p> <p>Default: false</p>
ActiveDataCache_Datasets_Batching_ThreadPoolSize	<p>The constant size thread pool (that is, containing a fixed number of threads).</p> <p>Default: 25</p>

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
ActiveDataCache_Datasets_Batching_Timeout	The timeout in milliseconds after which the batch is sent out even if it is not full (has less than the configured minimum in ActiveDataCache_Datasets_Batching_Limit_Lower).  The timeout ensures that operations are not waiting overlong in a batch due to inactivity. A batched operation never waits longer than this timeout to be sent to the server.  See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.  Default: 50
ActiveDataCache_Query_Command_Timeout	The configuration key for a query command timeout in seconds. If the time to execute a query command exceeds this timeout, an exception is thrown.  Default: 60
ActiveDataCache_Update_Command_Timeout	The configuration key for an update command timeout in seconds. If the time to execute an update command exceeds this timeout, an exception is thrown.  Default: 60
Adapter_SOAP_Batching_BlockOnBatchFull	Block on batch full properties indicate whether batching operations should block when the batch is full. If set to true, then batching calls block until room is freed up in the batch for the operation. If set to false, a BatchIsFullException exception is thrown.  Default: false
Adapter_SOAP_Batching_Limit_Lower	The minimum amount of elements in a batch before it is sent out.  See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.  Default: 1000
Adapter_SOAP_Batching_Limit_Upper	The maximum amount of elements in a batch before it is sent out.  See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.  Default: 5000
Adapter_SOAP_Batching_Timeout	The timeout interval in milliseconds after which the batch is sent out even if it is not full.  See <a href="#">Section 24.8, "Configuring Oracle BAM Batching Properties"</a> for more information.  Default: 50
ADC_PassThrough_Import_BatchSize	The maximum number of rows that are imported from an external data object.  Default: 50
ADC_PassThrough_Import_MaxRowsToImportAtOnce	Maximum number of rows imported by ExternalDataManager at one time.  Default: 100
ADC_PassThrough_Import_MaxSize	Maximum size imported by ExternalDataManager.  Default: -1

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

Property Name	Description
ADCBatchSize	Refers to JDBC statement batching. When the Oracle BAM ADC executes SQL statements it uses JDBC batching to reduce the number of calls to the database, improving performance. Each call executes a batch of statements rather than a single statement.
	Default: 100
ADCChannelName	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.
	Default: invm:topic/oracle.bam.messaging.activedatacache.activedata
ADCDataSource	The data source for the Active Data Cache. See <a href="#">Section 24.3.2, "Configuring the Data Source JNDI"</a> for more information.
	Default: jdbc/oracle/bam/adc
ADCLogBatchInsertLocks	Indicates whether to log Oracle BAM ADC batch insert locks.
	Default: false
ADCLogFolderLocks	Indicates whether to log Oracle BAM ADC folder locks.
	Default: false
ADCLogSqlStatements	Indicates whether to log Oracle BAM ADC SQL statements.
	Default: false
ADCLogTransactionLocks	Indicates whether to log Oracle BAM ADC transaction locks.
	Default: false
ADCMaxViewsetRowCount	The default limit for rows of data displayed in a view with this property. The higher you set this value, the more performance is impacted.
	Default: 64000
ADCPreloadDataObjectIDs	Indicates whether data objects should be loaded at Oracle BAM ADC startup rather than on-demand as they are accessed. Pre-loading the data objects increases startup time but decreases initial data object access time. Not pre-loading the data objects decreases startup time but increases initial data object access time. Also, pre-loading all data objects where many data objects are rarely referenced may needlessly increase memory requirements.
ADCPushInterval	The rate at which Oracle BAM Active Data Cache pushes events to Oracle BAM Report Server. This is one factor that affects the frequency at which active events occur on Oracle BAM dashboard pages. Increasing this interval reduces the load on Oracle BAM Server. However, larger intervals increase the likelihood of multiple updates in the dashboard being collapsed into single updates.
	You can override the default ADCPushInterval within particular reports by setting the Active Data Retrieval Interval property in the Report Properties dialog for a particular Oracle BAM dashboard or report. Open a report in Active Studio, then select <b>Edit &gt; Change Report Properties &gt; Advanced</b> to set the active data retrieval interval. Nonzero values override the ADCPushInterval value for that particular report.
	Default: 1000
ADCPushThreadPoolSize	Indicates the size of the threadpool for Oracle BAM ADC push functionality.
	Default: 10

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
ADCRetryCount	Number of times to retry the Oracle BAM Active Data Cache connection. Default: 2
ADCSecurityFiltersEnabled	Indicates whether Oracle BAM ADC security filters are to be enabled. Default: true
ADCViewsetTimeoutSec	Specifies the timeout for retrieving a view set. Default: 0
ADCWaitTime	Interval between Active Data Cache connection attempts. Default: 20
ApplicationURL	URL for Oracle BAM web applications and Oracle BAM Server. See <a href="#">Section 24.3.3, "Configuring the Application URL"</a> and <a href="#">Section 24.2.2, "Configuring the Application URL"</a> for more information. Default: DEFAULT
Architect_Content_PageSize	Controls how many rows are shown when viewing data object contents in Oracle BAM Architect. Default: 100
AutoIncrementBlockSize	Indicates amount of increment for block size. Default: 100
BAM_Server_Singleton_Enforcement	For high availability purposes. Configures locking and unlocking of the BAM schema in the event of a node failure. Can be set to true or false. If set to true, then the BAM schema must wait if another process holds the lock. If the property is set to false, then other BAM server instances can start without locking the schema if another process already holds the lock. To allow multiple BAM servers to be run using the same BAM schema, use false as the default behavior.
CacheDirectory	Designates the directory used by Report Cache to cache snapshots and active data. Default: cache
ChangeListDelay	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 1
ChannelName	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: OracleBAM
CheckViewsFallingBehindInterval	Indicates the interval to check whether views are falling behind. Default: 20
CollaborationNILogin	Whether NI Login is used. Default: false
ColumnarTimeout	Indicates the columnar timeout. Default: 0

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
Communication_Protocol	<p>Specifies the communication protocol for JNDI communication.</p> <p>For SSL using t3: &lt;Communication_Protocol&gt;t3s&lt;/Communication_Protocol&gt;</p> <p>See <a href="#">Section 24.9.3, "Configuring Secure Socket Layer."</a></p> <p>Default: DEFAULT</p>
ConnectionFactoryName	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p> <p>Default: jms/QueueConnectionFactory</p>
DeletesActiveDataSize	<p>InsertsActiveDataSize, UpdatesActiveDataSize, and DeletesActiveDataSize determine how many inserts, updates, upserts, and deletes, respectively, should be executed before releasing and then requiring the lock on the data object being modified. This keeps the operation from holding the data object lock for long periods of time when there are view sets open on this data object.</p> <p>Default: 50</p>
DisplayUIStackTrace	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p> <p>This property enables user interface stack traces (by setting this property value to true). This property is used for temporary diagnostic purposes only because exposing a stack with internal details is a potential security threat.</p> <p>Default: false</p>
DistributionListGroupType	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p> <p>Default: none</p>
EDS_Query_Timeout	<p>The timeout in seconds after which the execution of BAM report queries on external data objects stop because it is taking too long to retrieve the information for display. Also set Import_MaxSize, which determines the maximum number of rows that are pulled from the external data object (the larger the number, the slower the performance).</p> <p>Default: 180</p>
ElementsCountLimit	<p>The number of change lists that are cached before rewriting the cache file.</p> <p>The default value is 50. When the 51st change list is received, it is cached by replacing the 1st change list.</p> <p>Default: 50</p>
ElementsSizeLimit	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p> <p>Default: 500</p>
EmailIDForSender	<p>Email address that appears in the From header of notifications sent by the Event Engine. See <a href="#">Section 24.3.7, "Configuring the Outbound Email Account"</a> for more information.</p> <p>Default: BAM-NOTIFICATION_AR@example.com</p>
EMSConnectionRecoveryDuration	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p>

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
EnableADCDataSetLockTimeout	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Indicates whether data set lock timeout is enabled. Default: false
EnableDataTruncationMsg	Indicates whether to enable the data truncation message. Default: false
Enable GetAllViewsInOneRoundTrip	Allows all views to be retrieved in one round trip. Default: true
EvaluatorMaxExpressionDepth	Maximum number of nested logical expressions that can be included in one method in the class that gets compiled to evaluate a filter expression. Default: 200  When opening a view that uses a filter with a large number of distinct values, the compiler could run out of memory and you would get the error: BAM-01317: Compilation for class ... failed with error 3. If this error continues to happen, lower the value for EvaluatorMaxExpressionDepth and restart the server.  Although this property does not significantly affect performance, you can turn it off by setting EvaluatorMaxExpressionDepth to zero, which would result in one method in the evaluator class for the entire filter expression.
EventEngine.Action.ThreadPool.CoreSize	Indicates how many threads to keep in the Event Engine Action Thread Pools when idle. Default: 4
EventEngine.Action.ThreadPool.KeepAliveTimeInSec	Amount of time (in seconds) to keep an idle thread in the Event Engine Action Thread Pools. Default: 20
EventEngine.Action.ThreadPool.MaxValue	Maximum number of threads in the Event Engine Action Thread Pools. Default: 100
EventEngine.Action.ThreadPool.QueueSize	Maximum number of messages that can be queued in the Event Engine Action Thread Pools. Default: 4
EventEngine.AlertHistory.ThreadPool.CoreSize	Indicates how many threads to keep in the Event Engine Alert History Thread Pools when idle. Default: 4
EventEngine.AlertHistory.ThreadPool.KeepAliveTimeInSecs	Amount of time (in seconds) to keep an idle thread in the Event Engine Action Thread Pools. Default: 20
EventEngine.AlertHistory.ThreadPool.MaxValue	Maximum number of threads in the Event Engine Alert History Thread Pools. Default: 100
EventEngine.AlertHistory.ThreadPool.QueueSize	Maximum number of messages that can be queued in the Event Engine Rule Fire Thread Pools. Default: 10

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

Property Name	Description
EventEngineAlertHistoryEventLogging	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: false
EventEngineAlertHistoryRecordsPerWrite	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 10
EventEngine.RuleFire.ThreadPool.CoreSize	Indicates how many threads to keep in the Event Engine Rule Fire Thread Pools when idle. Default: 4
EventEngine.RuleFire.ThreadPool.KeepAliveTimeInSecs	Amount of time (in seconds) to keep an idle thread in the Event Engine Rule Fire Thread Pools. Default: 20
EventEngine.RuleFire.ThreadPool.MaxValue	Maximum number of threads in the Event Engine Rule Fire Thread Pools. Default: 100
EventEngine.RuleFire.ThreadPool.QueueSize	Maximum number of messages that can be queued in the Event Engine Rule Fire Thread Pools. Default: 4
EventEngineCheckADCIntervalSecs	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 5
EventEngineMaxConnections	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 25
EventEngineMaxShutdownWaitInterval	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 10
EventEngineSaveLastFireIntervalSecs	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 10
FileHandleCacheSize	Used by Oracle BAM Report Cache to cache file <i>handles</i> of the files used for caching when file-based persistence is used (see <a href="#">Section 24.3.5, "Configuring the Report Cache Persistence Manager"</a> for information about persistence management).  Handle caching increases the speed of reading and writing active data and snapshots. Each view set has two file handles—one for the snapshot and another for active data.
	The value for this property sets the number of file handles that are cached by default.
	To disable file handle caching, set this property value to zero (0).
	The cost of file handle caching is that all of the cached file handles remain open, and so a) on servers configured for a very small number of concurrent open file handles, and b) on servers heavily loaded with open file handle count reaching the maximum value, this could create a problem. For these scenarios, reduce FileHandleCacheSize to an appropriate smaller value.
	Default: 100

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
FractionInIntegerDivision	<p>Setting this property to true shows fractions in Integer divisions in calculations.</p> <p>Saved reports must be re-saved after a server restart (following configuration change) to see this behavior.</p> <p>Default: false</p>
GenericSatelliteChannelName	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p> <p>Default:</p> <pre>invmjms:topic/oracle.bam.messaging. systemobjectnotification</pre>
GenericSatelliteSystemObjectNames	<p>This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services.</p> <p>Default values:</p> <pre>SystemObjectName=SysIterReport,MonitorColumnName=SysIterLastModified,MessageColumn1=SysIterID,MessageColumn2=SysIterLastModified;  SystemObjectName=SysIterUser,MonitorColumnName=SpecificTimeZoneOffset,MessageColumn1=SysIterID;  SystemObjectName=SysIterUser,MonitorColumnName=AdjustTimeZoneSetting,MessageColumn1=SysIterID;  SystemObjectName=SysIterUser,MonitorColumnName=AdjustDaylightSavingsSetting,MessageColumn1=SysIterID;  SystemObjectName=SysIterDataset,MonitorColumnName=SysIterLastModified,MessageColumn1=SysIterID;</pre>
HelpAppLocation	This property is no longer used in Oracle BAM.
iActiveDataCloseReportsTimeout	<p>Timeout to close reports.</p> <p>Default: 500</p>
iActiveDataMaxDiffCounter	<p>The maximum difference counter for iActiveData.</p> <p>Default: 10</p>
iActiveDataMinIntervalsToWait	<p>The minimum interval to wait for iActiveData.</p> <p>Default: 5</p>
iActiveDataReloadOnSecsBehindThreshold	<p>The threshold value for reloading iActiveData.</p> <p>Default: 10</p>
iActiveDataRestartInterval	<p>The restart interval for iActiveData.</p> <p>Default: 3000</p>
iActiveDataRestartTimeout	<p>The restart timeout value for iActiveData.</p> <p>Default: 10000</p>

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

Property Name	Description
iActiveDataScriptsCleanupFactor	A property to address a Microsoft Internet Explorer memory leak, when active data is coming into the dashboard at a fast pace, by forcing periodic browser refreshes. This value may be further increased when active data is coming to the dashboard at a rate of 25 events per second or greater. You can monitor the Microsoft Internet Explorer memory consumption to determine an appropriate value.
	Default: 1048576
ICommand_Default_User_Name	Specifies default security credentials for running ICommand operations. See <i>Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite</i> for more information.
ICommand_Default_Password	Specifies default security credentials for running ICommand operations. See <i>Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite</i> for more information.
Import_BatchSize	Batch size for import by ExternalDataManager.
	Default: 50
Import_MaxRowsAtOnce	Maximum number of rows imported by ExternalDataManager at one time.
	Default: 100
Import_MaxSize	Maximum size imported by ExternalDataManager.
	Default: -1
InsertsActiveDataSize	InsertsActiveDataSize, UpdatesActiveDataSize, UpsertsActiveDataSize, and DeletesActiveDataSize determine how many inserts, updates, upserts, and deletes, respectively, should be executed before releasing and then requiring the lock on the data object being modified. This keeps the operation from holding the data object lock for long periods of time when there are view sets open on this data object.
	Default: 50
ListenPort	For SSL: <ListenPort>SSLListenPort</ListenPort>
	See <a href="#">Section 24.9.3, "Configuring Secure Socket Layer."</a>
	Default: ListenPort
MaxDBNodeFailoverRetries	Used in Oracle RAC High Availability configuration. Indicates the number of retries Oracle BAM Server attempts in an event of an Oracle RAC failover.
	Default: 5
MTTimerThreadPoolSize	Oracle BAM has a timer implementation that dispatches timer events using a thread pool. This allows timer events to be processed in parallel. This property determines the thread pool size for this timer implementation.
	Default: 5
ODIAgentHost	The IP address or hostname of the server where the Oracle Data Integrator agent is running. See <a href="#">Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"</a> for more information.
	Default: localhost

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
ODIAgentPort	The TCP port on which the Oracle Data Integrator agent is listening. See <a href="#">Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"</a> for more information. Default: 20910
ODIPassword	The encoded Oracle Data Integrator password. See <a href="#">Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"</a> for more information. Default: SUNOPSIS
ODIUser	The user that executes the scenarios in Oracle Data Integrator. See <a href="#">Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"</a> for more information. Default: SUPERVISOR
ODIWorkRepositoryName	The name of the Oracle Data Integrator work repository database. See <a href="#">Section 24.3.6, "Configuring Oracle Data Integrator Integration Properties"</a> for more information. Default: WORK_DEV
oracle.bam.common.messaging.util.MessageConsumerRegistryQueuedPusher_CorePoolSize	Indicates how many threads to keep in Message Registry Thread Pool when idle. Default: 20
oracle.bam.common.messaging.util.MessageConsumerRegistryQueuedPusher_KeepAliveTime	Amount of time (in seconds) to keep an idle thread in the Message Registry Thread Pool. Default: 60
oracle.bam.common.messaging.util.MessageConsumerRegistryQueuedPusher_MaximumPoolSize	Maximum number of threads in the Message Registry Thread Pool. Default: 100
oracle.bam.common.messaging.util.MessageConsumerRegistryQueuedPusher_MaximumQueueSize	Maximum number of messages that can be queued in the Message Registry Thread Pool. Default: 30
RecordsLimitForEmail	The number of rows allowed in a List view or Columnar report used in an email attachment before a limit error is displayed. Attachments containing reports can become large because they include data compared to a report link that accesses the report and data on Oracle BAM Server. Default: 1000
RecordsLimitForSaveOffline	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 0
RecordsLimitForValueBrowser	Number of values that are presented in values browser for constructing filter expressions. Default: 50
ReportCache.ViewSets.ThreadPool.CoreSize	Number of threads to keep in Report Cache Thread Pool when idle. Default: 5
ReportCache.ViewSets.ThreadPool.KeepAliveTimeInSecs	Amount of time (in seconds) to keep an idle thread in the Report Cache Thread Pool. Default: 20

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

<b>Property Name</b>	<b>Description</b>
ReportCache.ViewSets.ThreadPool.MaxValue	Maximum number of threads in the Report Cache Thread Pool. Default: 100
ReportCache.ViewSets.ThreadPool.QueueSize	Maximum no. of messages that can be queued in the Report Cache Thread Pool. Default: 30
ReportCacheChannelName	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: <code>invmjms:topic/oracle.bam.messaging.reportcache.activedata</code>
ReportCacheMaxConnections	The maximum number of connections allowed by Report Cache to its clients. Default: 25
ReportCacheMaxShutdownWaitInterval	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 10
ReportCachePersistenceManager	See <a href="#">Section 24.3.5, "Configuring the Report Cache Persistence Manager"</a> for more information. Default: <code>FileBasedPersistenceManager</code>
ReportLoadingSetting	The report loading indicator to be enabled. See <a href="#">Section 24.2.3, "Configuring the Report Loading Indicator"</a> for more information. Default: <code>on</code>
SensorFactory	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: <code>oracle.bam.common.statistics.noop.SensorFactoryImpl</code>
ServerName	The Oracle BAM Server hostname. See <a href="#">Section 24.2.4, "Configuring the Server Name"</a> for more information. Default: <code>DEFAULT</code>
ServerPort	The Oracle BAM Server port number. Default: <code>DEFAULT</code>
UpdatesActiveDataSize	<code>InsertsActiveDataSize</code> , <code>UpdatesActiveDataSize</code> , <code>UpsertsActiveDataSize</code> , and <code>DeletesActiveDataSize</code> determine how many inserts, updates, upserts, and deletes, respectively, should be executed before releasing and then requiring the lock on the data object being modified. This keeps the operation from holding the data object lock for long periods of time when there are view sets open on this data object. Default: 50
UpsertsActiveDataSize	<code>InsertsActiveDataSize</code> , <code>UpdatesActiveDataSize</code> , <code>UpsertsActiveDataSize</code> , and <code>DeletesActiveDataSize</code> determine how many inserts, updates, upserts, and deletes, respectively, should be executed before releasing and then requiring the lock on the data object being modified. This keeps the operation from holding the data object lock for long periods of time when there are view sets open on this data object. Default: 50

**Table 24–3 (Cont.) Oracle BAM Configuration Properties**

Property Name	Description
UseDBFailover	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: true
ViewSetExpiryTimeout	This property is for Oracle BAM internal use only. Do not change it unless instructed to do so by Oracle Support Services. Default: 120
ViewSetSharing	See <a href="#">Section 24.3.4, "Configuring Viewset Sharing"</a> for more information. Default: true

# Monitoring Oracle Business Activity Monitoring

This chapter describes how to use Oracle Enterprise Manager Fusion Middleware Control to view Oracle Business Activity Monitoring (Oracle BAM) performance statistics and logs, and monitor Oracle BAM web services counters, and Oracle BAM server and web components such as Active Data Cache, Event Engine, Report Cache, Enterprise Message Sources, and Report Server.

This chapter includes the following sections:

- [Section 25.1, "Introduction to Monitoring Oracle BAM"](#)
- [Section 25.2, "Monitoring Oracle BAM Server Components"](#)
- [Section 25.3, "Monitoring Oracle BAM Web Applications"](#)
- [Section 25.4, "Monitoring Oracle BAM Web Services"](#)
- [Section 25.5, "Monitoring Oracle BAM Performance"](#)
- [Section 25.6, "Monitoring Oracle BAM Logs"](#)

## 25.1 Introduction to Monitoring Oracle BAM

You can monitor several aspects of the Oracle BAM components using Oracle Enterprise Manager Fusion Middleware Control.

The OracleBamServer page in Fusion Middleware Control enables you to monitor each of the Oracle BAM Server Components: Active Data Cache, Event Engine, Report Cache, and Enterprise Message Sources. For more information, see [Section 25.2, "Monitoring Oracle BAM Server Components"](#).

The OracleBamWeb page in Fusion Middleware Control enables you to monitor Oracle BAM Report Server. For more information, see [Section 25.3, "Monitoring Oracle BAM Web Applications"](#).

In addition, the Performance Summary pages for each component allow you to track specific statistics of your choosing. For more information, see [Section 25.5, "Monitoring Oracle BAM Performance"](#).

Also, you can configure and monitor Oracle BAM logs using Fusion Middleware Control. For more information, see [Section 25.6, "Monitoring Oracle BAM Logs"](#).

## 25.2 Monitoring Oracle BAM Server Components

Oracle BAM Server components are monitored on the Fusion Middleware Control page for Oracle BAM Server.

To monitor Oracle BAM Server components:

Go to the Oracle BAM Server home page by selecting **BAM > OracleBamServer** in the navigation tree.

In the OracleBamServer page, you can select each tab (Active Data Cache, Event Engine, Report Cache, Enterprise Message Sources) to monitor the individual Oracle BAM Server components.

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**Note:** Alternatively, on the farm home page, you can also select the Oracle BAM targets from the right side page content area, where it displays details of the farm.

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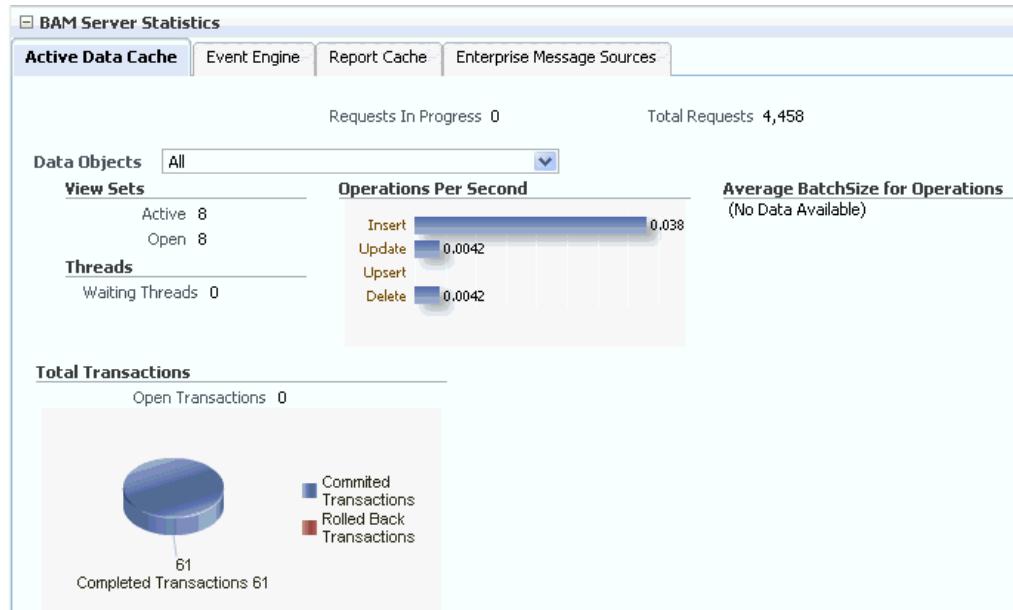
### 25.2.1 Monitoring Oracle BAM Active Data Cache

Oracle BAM Active Data Cache (Oracle BAM ADC) is designed and optimized to handle large amounts of data in real time. Data coming into Oracle BAM ADC immediately updates all defined calculations and aggregates in real time in an in-memory cache so that this data can be pushed as quickly as possible to Oracle BAM dashboards and reports. Data fed to the Oracle BAM ADC is received from a combination of sources, from Java Message Service (JMS) topics and queues to more traditional data queries and databases. Oracle BAM ADC ensures that no matter the source, when Oracle BAM Server is aware of the incoming data, it is streamed to Oracle BAM alerts and dashboards as incremental changes.

There are two key components to the Oracle BAM ADC, data sets and view sets. Oracle BAM ADC receives transactions (insert, update, upsert, delete) into the data sets. These data sets are constructed based on the design that an Oracle BAM developer defines for data relationships when data objects are defined in Oracle BAM Architect. Data objects can be reflective of flat tables of data, or more complex, star-schema relationships between data objects, which are represented in Oracle BAM as data object look-ups.

After data is updated in the data sets, view sets that are listening on these data sets go into action. The view sets have knowledge of all of the open Oracle BAM dashboards and alerts that users are viewing in the Oracle BAM system. View sets ensure that data updates to these open objects are incrementally updated first, using a push-based mechanism to publish updates to open dashboards and alerts, providing users with the latest information.

Use the Oracle BAM pages in Fusion Middleware Control to monitor statistics for all data objects in Oracle BAM ADC as a group, or select a particular data object from the **Data Objects** list to monitor.



**Note:** When you select a data object from the list, cached data is displayed to preserve performance. You must refresh the page (using the Refresh icon) to display the latest data associated with the selected data object.

Page Refreshed Apr 15, 2009 7:41:54 AM PDT

## View Sets

Active view sets are those which are typically seen in Oracle BAM reports. Open view sets are the sum of active and static open view sets.

Oracle BAM reports and alerts use active view sets. Oracle BAM Server uses static view sets for internal process. There are also internal parts of the code that use static view sets on system objects (metadata tables). It is possible that if Oracle BAM Server is not closing the static view sets, you observe different values for them.

Static view sets do not support active data generation and are used to fetch data from data objects, therefore, they are kept open for only a very short time when data is fetched. For that reason, in the **Open** counter, the values appearing most of the time are from active view sets.

## View Set Count Variation

You can monitor the view set count for Oracle BAM components Active Data Cache, Report Cache, and Report Server. You may see that view set counts do not match between Active Data Cache, Report Cache, and Report Server metrics.

The Report Server opens view sets through the Report Cache for all of the views contained in the reports opened in browsers. The Active Data Cache opens more view sets than the Report Cache. One such view set opened is in the Active Data Cache through the Event Engine.

Whenever the Event Engine starts, it loads all the defined alerts, and for those alerts that are defined to monitor data changes in the Active Data Cache, corresponding view sets are opened in the Active Data Cache. That is why more view sets are

displayed in the Active Data Cache monitoring page than on the Report Cache and Report Server pages.

For most of the views in a report, there is a corresponding view set in the Active Data Cache. View sets opened by the report are shared with the subsequent instances of that report, except for Crosstab views. In reports using the Crosstab view, the view set call is different than the one used by other views. When a report containing a Crosstab view is opened, three view sets are opened in the Active Data Cache. Two of the view sets are closed immediately after fetching the data, while one is kept open to monitor the incoming changes.

#### **Operations Per Second**

This statistic includes all of the insert, update, upsert, and delete operations occurring on the selected data object. The accompanying graph displays statistics for the last 5 minutes.

#### **Average Batch Size for Operations**

This statistic is the average number of records included in each batch operation on the selected data object. The accompanying graph displays statistics for the last 5 minutes.

#### **Waiting Threads**

Certain operations must be synchronized, requiring a data object to be locked. This statistic displays the number of threads that are blocked, waiting for the data object to be unlocked to perform subsequent operations.

#### **Total Transactions**

This statistic displays the number of transactions on Oracle BAM data objects. It is the sum of committed and rolled back transactions. The accompanying graph also displays the number of open and completed transactions.

For example, if you add a row in an Oracle BAM data object and save it (commit), it is one transaction. This metric is useful only if the client of Oracle BAM Server is using transactions.

Transactions can also be used by an EMS, when connecting to a JMS topic or queue.

You can configure this metric to track transactions in the Oracle BAM sensor actions in BPEL and in the Oracle Data Integrator knowledge modules.

In regard to **Rolled Back Transactions**, if an invalid insert operation is attempted on an Oracle BAM data object, Oracle BAM Server rolls back the transaction.

### **25.2.2 Monitoring the Event Engine Component**

The Event Engine is used by Oracle BAM Server to evaluate and execute Oracle BAM alerts. The Event Engine monitors complex data conditions and implements specified rules. Rules can include a series of conditions and actions attached to an event. The Event Engine continuously monitors the information in the Active Data Cache for certain conditions and executes the related actions defined in associated rules.

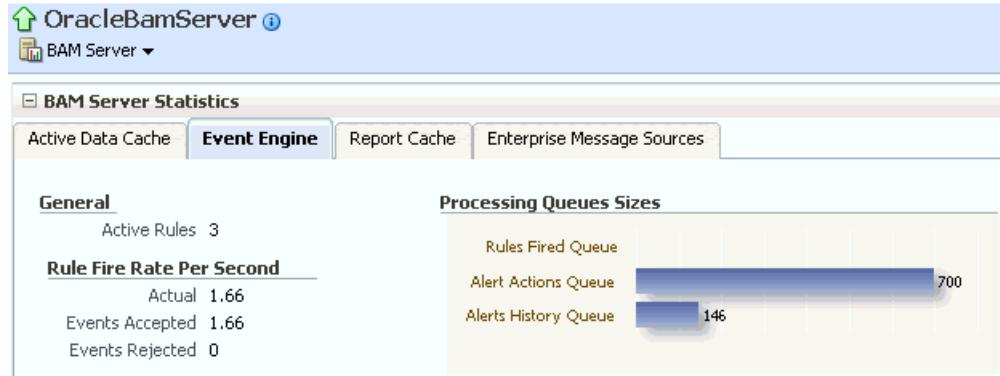
The Event Engine is responsible for tracking events based on date, time, or data changes. The Event Engine design employs a satellite concept, in which there are four different systems (satellites) within which event clauses can be registered and tracked.

The Date and Time satellites are both based on a scheduler, and they are used for time based alerts, for example, "Email a snapshot of this Oracle BAM dashboard to me every morning at 8 a.m."

The Manual satellite is used to *manually* send alerts by name (using a web service call).

The Data satellite is used to track alerts that are based on specific changes in the data of a given data object, such as "Call this web service when SUM(Sales) > 10000 in the MediaSales data object," or "Let me know when anything in this dashboard changes."

You can monitor statistics for active Event Engine rules, condition met rates, and processing queues.



### Active Rules

This statistic displays the number of alert rules that are active (not expired or invalid) in Oracle BAM Event Engine. It displays the total number of alert rules in Oracle BAM Event Engine, which is the sum of alerts created for all of the Oracle BAM users.

### Rule Fire Rate Per Second

This group of statistics displays the rates of events over the last 5 minutes for **Actual**, **Events Accepted**, and **Events Rejected** rates.

**Actual** rule fire rate per second is the number of events fired per second in Event Service. It is the number of events fired per second, taking into account number of times alerts fired events in the previous 5 minutes. For example, if when the OracleBamServer page was loaded, only 2 alerts fired in previous 5 minutes, the value shown would be  $2/(5 \times 60)$ , that is 0.0067. So, if fired twice in 300 seconds, it would fire 0.0067 times in one second.

**Events Accepted** is the number of events fired per second from the satellite. That is, the number of events fired per second from alerts configured, that were accepted (for further processing), taking into account events that were accepted in the previous 5 minutes. The value shown is calculated in the same way as **Actual**. Unless the Event Engine's queue thresholds are exceeded, all events fired are accepted and processed further.

**Events Rejected** is the number of rejecting events per second. That is, the number of events fired per second from alerts configured, that were rejected (for further processing), taking into account events that were rejected in the previous 5 minutes. The value shown is calculated the same way as **Actual**. Fired events are rejected when the Event Engine's queue thresholds are exceeded. Ideally this value should be zero.

### Processing Queues Sizes

This graph displays the size of the event processing queue, that is, the number of events waiting to be processed. These queues are emptied as soon as the events are processed, so there would have to be a large number of events being generated simultaneously to see alerts waiting for processing in the queues.

The **Processing Queues Sizes** graph displays statistics for the last 5 minutes. The graph displays **Rules Fired Queue**, **Alert Actions Queue**, and **Alerts History Queue** health.

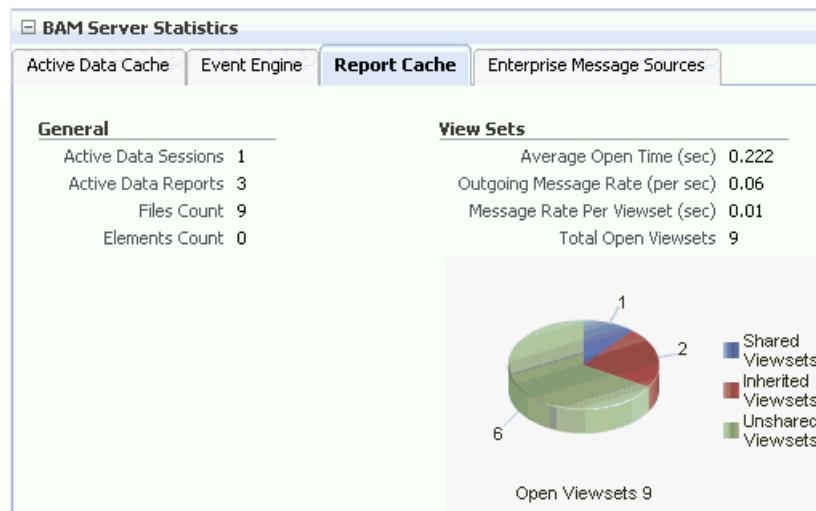
The **Rules Fired Queue** displays the number of events that were fired that are waiting to be processed. The Event Engine maintains internal in-memory queue for fired events where all the events are placed temporarily, before being pulled out from here for further processing, as soon as the Event Engine resources are available. This metric shows the number of events fired waiting in queue to be picked by the system.

The **Alert Actions Queue** displays the number of actions waiting to be processed. The Event Engine maintains internal in-memory queue for actions where all the actions are placed temporarily, before being pulled out from here for further processing, as soon as the Event Engine resources are available. This metric shows the number of actions waiting in queue to be picked by the system.

The **Alerts History Queue** displays the number of alert history items to be saved. The Event Engine maintains internal in-memory queue for all history items, where all the items are temporarily placed, and before picking them up to save to back end. This metric shows the number of history items waiting in queue to be picked by the system.

### 25.2.3 Monitoring the Report Cache Component

The Report Cache assists the Active Data Cache with maintenance of the view set snapshots in memory. The Report Cache opens view sets in the Active Data Cache for the Report Server (an Oracle BAM web applications component). It then caches the snapshot (in small parts) and the active data before sending it to the Report Server. This allows for random access into the snapshot and recovery from losing the connection to Oracle BAM Server. The Report Cache also, along with the Active Data Cache, supports view set sharing.



#### Active Data Sessions

This statistic displays the total number of Report Cache sessions with active data.

When a user opens multiple browser windows on a single computer to view Oracle BAM reports, all of the open browser windows share the same active data session. It does not matter whether the user opens the same report or different reports in each browser window, the **Active Data Sessions** count is always 1.

### Active Data Reports

This statistic displays the total number of open reports requesting active data.

### Files Count

This statistic displays the total number of files currently managed by `FileBasedPersistenceManager` when the Oracle BAM Server is configured to use a file-based persistence manager. For more information, see [Section 24.3.5, "Configuring the Report Cache Persistence Manager"](#).

### Elements Count

This statistic displays the total number of elements currently managed by `InMemoryPersistenceManager` when the Oracle BAM Server is configured to use a memory-based persistence manager. For more information, see [Section 24.3.5, "Configuring the Report Cache Persistence Manager"](#).

### View Sets

This group of statistics displays the following counters:

**Average Open Time (sec)** is the average time taken to open a view set.

**Outgoing Message Rate (per sec)** is the number of change lists delivered per second by Report Cache to all of its clients.

**Message Rate Per Viewset (sec)** the number of change lists delivered per second per view set.

**Total Open Viewsets** is the total number of view sets (that is, the sum of shared, unshared, and inherited view sets) maintained in Report Cache for all of the views contained in the reports opened in browsers.

The **Open Viewsets** graph displays shared, inherited, and unshared view sets.

**Shared Viewsets** are the parent view sets (these are the view sets that are opened first).

**Inherited Viewsets** are the child view sets (these view sets are opened later).

**Unshared Viewsets** (independent view sets) are neither shared or inherited.

View set sharing occurs whenever possible for performance reasons (the consumers require the exact same view sets, so the view sets can be shared). If the view sets cannot be shared, they are unshared.

When users who do not have any differences in row-level security open the same report at close to the same time, the view sets that are created for them in the Active Data Cache are shared in the Report Cache.

---

**Note:** View set counts may not match between Active Data Cache, Report Cache, and Report Server metrics. For more information, see ["View Set Count Variation" on page 25-3](#).

---

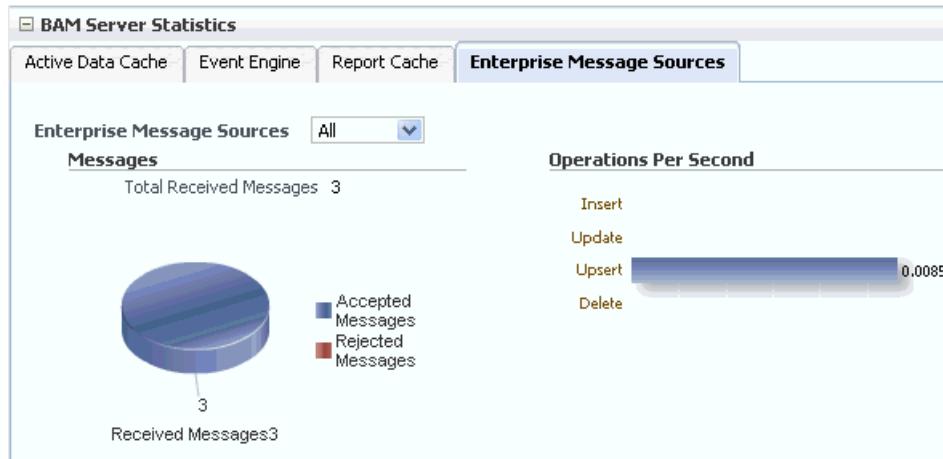
### 25.2.4 Monitoring the Enterprise Message Sources

Enterprise Message Sources (EMS) are used by applications to provide direct Java Message Service (JMS) connectivity to Oracle BAM Server by mapping messages directly to Oracle BAM data objects. Oracle BAM Server can read data directly from any JMS-based message queue or topic. This option offers guaranteed messaging. It is more difficult to configure and not as fast to perform rigorous data transformations in

XML Stylesheet Language (XSL) than in an Extract Transform and Load (ETL) tool like Oracle Data Integrator.

The EMS feature does not configure ETL scenarios, but rather maps from a message directly to a data object on Oracle BAM Server; however, you can still use XSL transformations before the data is inserted (updated, upserted, or deleted) into the data object. Each EMS reads from a specific JMS topic or queue, and the information is delivered into a data object in the Active Data Cache. The Oracle BAM Architect web application is used to configure EMS definitions.

For more information about configuring EMS definitions, see the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.



**Note:** Data is displayed in the Enterprise Message Source page only when EMS definitions are created and started in Oracle BAM Architect. Fusion Middleware Control may take some time to fetch the data and display the statistic in the Enterprise Message Source page.

Refreshing the page displays the latest EMS data. You can refresh the page using the Refresh icon.

Page Refreshed Apr 15, 2009 7:41:54 AM PDT

## Enterprise Message Sources

Select the EMS to monitor from the list. You can choose to display aggregated statistics for all EMS definitions, or select a particular EMS to monitor from the list provided.

### Messages

Monitor the number of messages received by the selected EMS. You can find rejection statistics in the Performance Summary metrics page.

The accompanying graph displays the number of **Received Messages** broken down into **Accepted Messages** and **Rejected Messages**, and at the top of the graph the number of **Total Received Messages** is displayed.

### Operations Per Second

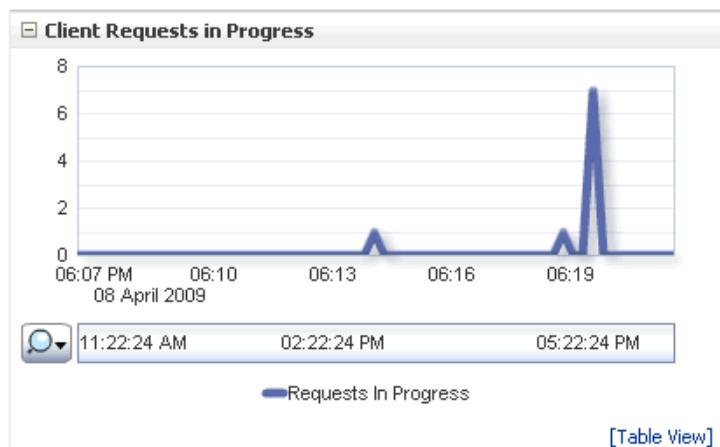
Monitor the rate of insert, update, upsert, and delete operations performed by the selected EMS.

The Operations Per Second graph displays statistics for last 5 minutes.

For more granular detail about the rates for each type of operation, go to the Performance Summary page. For more information, see [Section 25.5, "Monitoring Oracle BAM Performance"](#).

### 25.2.5 Monitoring the Client Requests in Progress

The Oracle BAM Client Requests in Progress chart is displayed in the lower right corner of the Oracle BAM Server home page. Client requests include all of the requests made to the Oracle BAM Server Enterprise Java Beans (EJB).

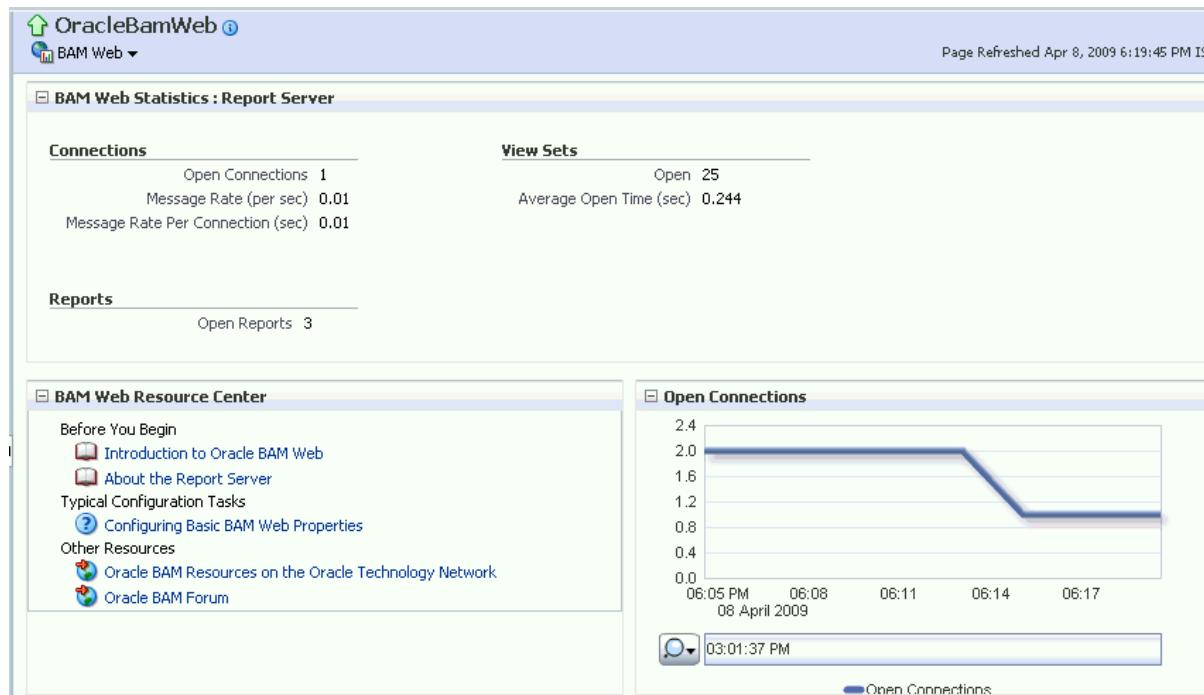


There are a lot of internal requests made when opening a single report (for permissions, the report metadata, the views data, and so on); however, the user may or may not see those internal requests displayed in this chart.

## 25.3 Monitoring Oracle BAM Web Applications

Oracle BAM web applications are monitored in the OracleBAMWeb page of Fusion Middleware Control.

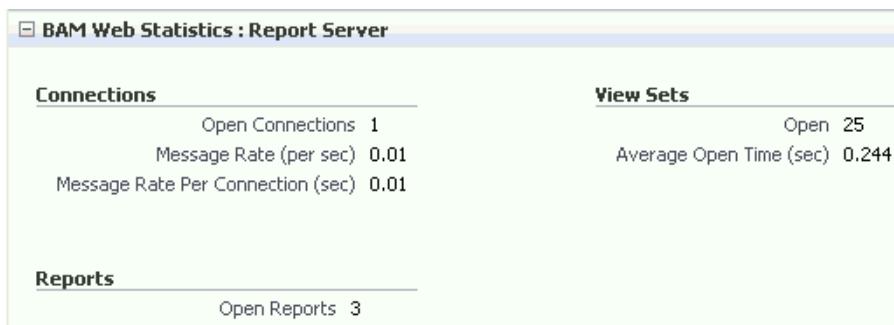
To monitor Oracle BAM Report Server go to the OracleBAMWeb page by selecting **BAM > OracleBamWeb** in the navigation tree.

**Figure 25–1 BAM Web Statistics**

### 25.3.1 Monitoring Oracle BAM Report Server

Oracle BAM Report Server applies the report definitions to the data sets retrieved from the Oracle BAM ADC for presentation in a browser. It manages information paging for viewing and printing reports. After reports are created, they are stored in the Oracle BAM ADC so that report creation is not repeated each time. Most reporting views are designed to support live, active displays of data changing in real time.

You can monitor statistics for Oracle BAM Report Server connections, view sets, and reports.



#### Connections

This group of statistics displays the following:

**Open Connections** is the number of connections open on the Report Server. An open connection corresponds to each user per session. It is different from the number of reports opened, because one user could at most have one connection open at a time regardless of how many reports the user has opened.

**Message Rate (per sec)** is the total number of messages (view set change lists) delivered per second to all users (connections).

**Message Rate Per Connection (sec)** is the number of messages (view set change lists) delivered per second per user (connection).

### View Sets

This group of statistics displays the number of open view sets, and the average amount of time (in seconds) that it takes to open the view sets on the server.

**Average Open Time (sec)** is a measure of the average length of time the server requires to construct the view set and send it to the web browser. This statistic does not consider the amount of time required to render the HTML and load the Javascript on the client-side web browser.

---

**Note:** View set counts may not match between Active Data Cache, Report Cache, and Report Server metrics. For more information, see ["View Set Count Variation" on page 25-3](#).

---

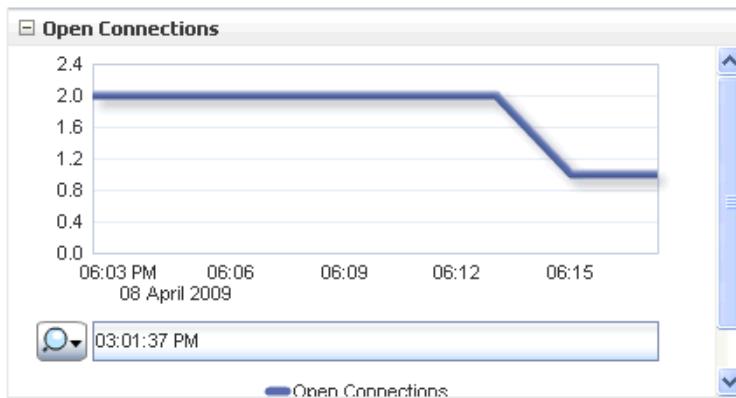
### Reports

This statistic displays the total number of open reports. The **Open Connections** graph displays open connections to Oracle BAM web applications. You can use the zoom axis to zoom in on a particular time in which you are interested to see the open connections statistic.

The total number of reports includes the count of duplicate reports opened by the same user. Even if the same report is opened in multiple browser windows, each instance is considered a separate report, because a new view set is opened in Report Server (through Oracle BAM Report Cache) for each report instance, though the view sets are shared.

#### 25.3.2 Monitoring Open Connections

The Oracle BAM **Open Connections** chart is displayed in the lower right corner of the Oracle BAM Server home page.



## 25.4 Monitoring Oracle BAM Web Services

Oracle BAM web services details are not listed in the Oracle BAM pages in Fusion Middleware Control. Oracle BAM web services counters are available by selecting **WebLogic Domain > soa\_bam\_domain > BAM\_Server** in the navigation tree, and selecting the **JEE Web Services** tab in the **Most Requested** region as shown in [Figure 25-2](#).

Oracle BAM provides DataObjectDefinition, DataObjectOperationsByName, DataObjectOperationsByID, DataObjectOperations10131, ManualRuleFire, and ICommand web services. For more information, see "Using Oracle BAM Web Services" in the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

You can see the following statistics in JEE Web Services table: **Invocation Count**, **Response Count**, **Response Error Count**, **Average Response Time (ms)**, **Average Execution Time (ms)**, and **Dispatch Time Total**.

**Figure 25–2 Oracle BAM Web Services Counters**

The screenshot shows the Oracle Enterprise Manager 11g Fusion Middleware Control interface. The left sidebar shows a tree view of the farm, topology, and specific components like the SOA domain, WebLogic Domain, and the BAM component containing the soa\_bam\_domain and the bam\_server1. The main pane displays two tables. The top table, titled 'Application Deployments', lists various applications and their status, active sessions, request processing time, and bean accesses per minute. The bottom table, titled 'Most Requested', lists JEE Web Services with their application, port name, and invocation count.

Name	Status	Active Sessions	Request Processing Time (ms)	Bean Accesses (per minute)
DMS Application(11.1.1.0)	Up	0	0.00	0.00
oracle-bam(11.1.1)	Up	1	0.00	0.00
OracleBamServer	Unavailable		Unavailable	Unavailable
OracleBamWeb	Unavailable		Unavailable	Unavailable
usermessagingdriver-email	Up	0	0.00	0.00
usermessagingserver	Up	0	0.00	0.00

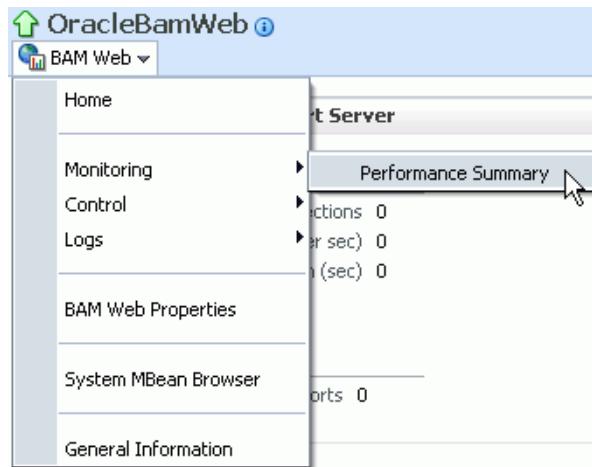
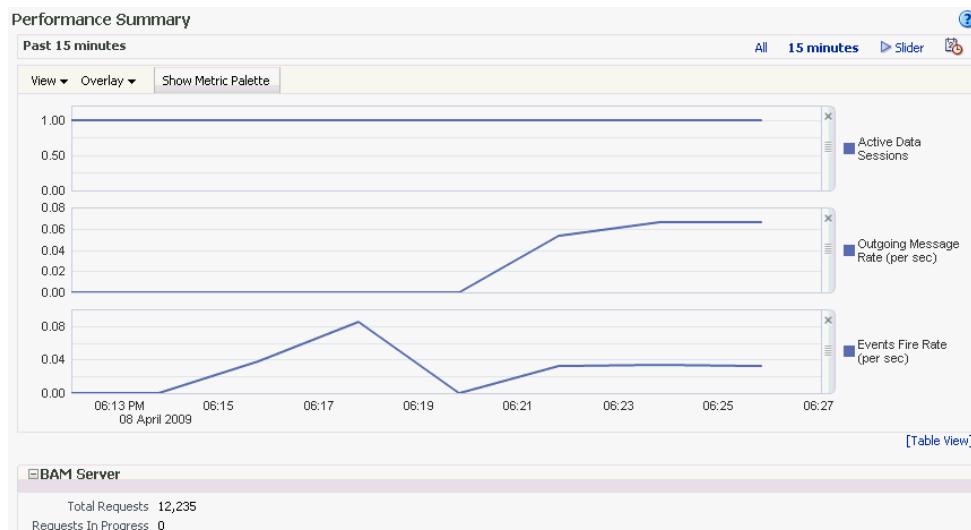
  

Name	Application	Port Name	Invocation Count
oracle-bam#11.1.1#1!DataObjectDefinition	oracle-bam(11.1.1)	DataObjectDefinition	0
oracle-bam#11.1.1#1!DataObjectOperationsByName	oracle-bam(11.1.1)	DataObjectOperation	0
oracle-bam#11.1.1#1!DataObjectOperationsByID	oracle-bam(11.1.1)	DataObjectOperation	0
usermessagingserver#1!ReceiveMessageService	usermessagingserver	ReceiveMessage	0
oracle-bam#11.1.1#1!ManualRuleFire	oracle-bam(11.1.1)	ManualRuleFire	0
usermessagingserver#1!ReceiveMessageManagerService	usermessagingserver	ReceiveMessageMan	0
oracle-bam#11.1.1#1!ICommand	oracle-bam(11.1.1)	ICommand	0

## 25.5 Monitoring Oracle BAM Performance

The performance of Oracle BAM applications is reflected in metrics and statistics. There are separate Performance Summary pages with appropriate metrics for Oracle BAM Server and Oracle BAM web applications.

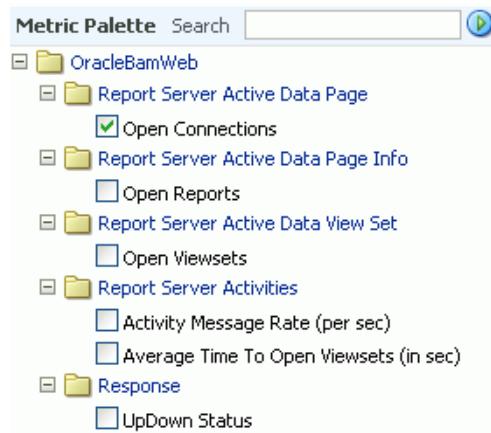
When you select the **Monitoring > Performance Summary** menu item in each of the Oracle BAM component menus (as shown in [Figure 25–3](#)), the Performance Summary page appears as shown in [Figure 25–4](#).

**Figure 25–3 Monitoring Shortcut Menu****Figure 25–4 Performance Summary Page**

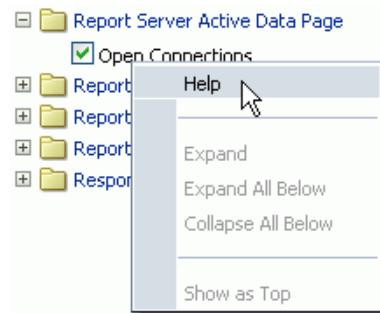
Many metrics are available for capture and display (most of which are also displayed in the Oracle BAM component home pages). Descriptions of each metric are available in the metrics help pages.

To get the most valuable, focused information, use the Metric Palette. Click **Show Metric Palette** to display the Metric Palette, shown in [Figure 25–5](#).

Choose the metrics in which you are most interested. As you select or deselect metrics from the palette, the metrics graph at the left is updated automatically.

**Figure 25–5 Metric Palette for Oracle BAM Web Applications**

Right-click the metric label and select **Help**, as shown in [Figure 25–6](#), to find more information about each of the metrics.

**Figure 25–6 Metrics Shortcut Menu**

## 25.6 Monitoring Oracle BAM Logs

Oracle BAM logs are configured and viewed using Fusion Middleware Control.

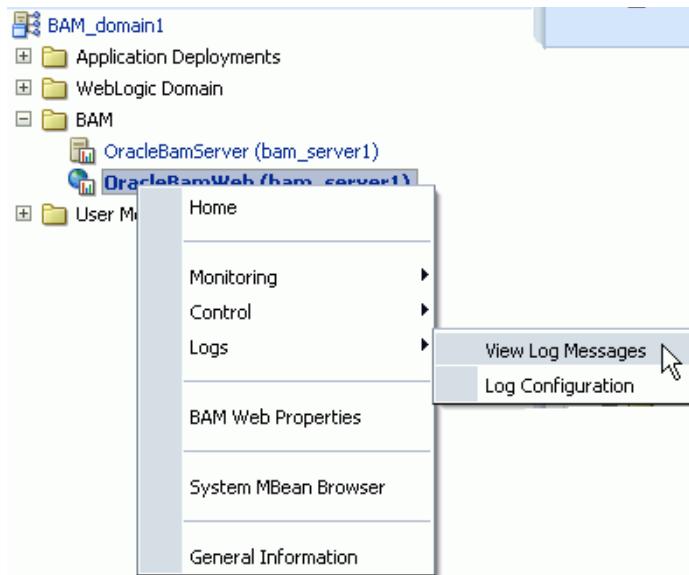
---

**Note:** Despite having separate log pages for Oracle BAM Server and Oracle BAM web applications, each page displays the logs for all Oracle BAM application components.

---

For information about using the logger features see the online Help page. For information about configuring the logger, see [Section 24.4, "Configuring the Logger."](#)

To view the logs, right-click the **OracleBamServer** node or **OracleBamWeb** node in the navigation tree and select **Logs > View Log Messages** as shown in [Figure 25–7](#).

**Figure 25–7 Logs Shortcut Menu**

The log viewer page opens as shown in [Figure 25–8](#). Use this page to query for information about the component. Fields and lists are used to customize the query.

**Figure 25–8 Log Messages Page**

The screenshot shows the 'Log Messages' page. At the top, there are search filters: 'Broaden Target Scope', 'Target Log Files...', 'Manual Refresh', and a search bar with fields for 'Date Range' (set to 'Most Recent 24 Hours'), 'Message Types' (checkboxes for Incident Error, Error, Warning, Notification, Trace, Unknown), and 'Message' (a dropdown and input field). Below the search bar is a table with columns: Time, Message Type, Message ID, Message, and Log File. The table contains three entries from February 11, 2009, all of which are 'Warning' type messages from 'bam\_server1.log'.

Time	Message Type	Message ID	Message	Log File
Feb 11, 2009 6:11:03 PM PST	Warning	BEA-050006	An attempt was made to look up versioned object "f"	bam_server1.log
Feb 11, 2009 6:11:47 PM PST	Warning	BEA-050006	An attempt was made to look up versioned object "f"	bam_server1.log
Feb 11, 2009 6:49:58 PM PST	Warning	BEA-050006	An attempt was made to look up versioned object "f"	bam_server1.log

After entering your search criteria, click **Target Log Files**. The Log Files page appears as shown in [Figure 25–9](#). You can view specific log information (shown in [Figure 25–10](#)) or download the log.

**Figure 25–9 Log Files Page**

The screenshot shows the 'Log Files' page. It has a header with 'View', 'View Log File', and 'Download' buttons. Below is a table with columns: Name, Directory, Log Type, Last Modified, and Size (KB). The table lists five log files: 'bam\_server1.log', 'bam-diagnostic.log', 'owsm-diagnostic.log', 'bam\_server1-diagnostic.log', and 'diagnostic.log'. The 'bam\_server1.log' file is selected, indicated by a blue highlight.

Name	Directory	Log Type	Last Modified	Size (KB)
bam_server1.log	/scratch/c.../as11wls/user_projects/domains/domair	Server	Feb 11, 2009 6:49:58 PM PST	219.82
bam-diagnostic.log	/scratch/c.../as11wls/user_projects/domains/domair	Server	Feb 11, 2009 7:02:10 PM PST	524.03
owsm-diagnostic.log	/scratch/c.../as11wls/user_projects/domains/domair	Server	Feb 9, 2009 12:34:54 PM PST	0.74
bam_server1-diagnostic.log	/scratch/c.../as11wls/user_projects/domains/domair	Server	Feb 11, 2009 7:02:10 PM PST	549.90
diagnostic.log	/scratch/c.../as11wls/user_projects/domains/domair	Server	Feb 9, 2009 12:32:24 PM PST	0.00

**Figure 25–10 Log File bam\_server1.log**

Log Messages > Log Files > View Log File: bam\_server1.log

**View Log File: bam\_server1.log**

Name: /scratch/c.../as11wls/user\_projects/domains/domain1/servers/bam\_server1/logs/bam\_server1.log  
Last Modified: Feb 11, 2009 6:49:58 PM PST

Download Log Type: Server Size (KB): 219.61

Date Range: Time Interval: Start Date: 2009/02/09 12:32:08 PM End Date: 2009/02/11 06:49:58 PM Search

Time	Message Type	Message ID	Message
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-000214	WebLogic Server "bam_server1" version: WebLogic Server 10.3.1.0 Wed J
Feb 9, 2009 12:32:08 PM PST	Warning	BEA-000808	Executing thread is a non WLS thread. Please modify the application to use
Feb 9, 2009 12:32:08 PM PST	Warning	BEA-170019	The server log file /scratch/c.../as11wls/user_projects/domains/
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-170023	The Server Logging is initialized with Java Logging API implementation.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-320001	The ServerDebug service initialized successfully.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-280050	Persistent store "WLS_DIAGNOSTICS" opened: directory="/scratch/c.../
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "t3" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "t3s" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "http" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "https" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "iiop" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "ilops" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "ldap" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "ldaps" is now configured.
Feb 9, 2009 12:32:08 PM PST	Notification	BEA-002622	The protocol "cluster" is now configured.

Total Rows : 600

# 26

---

## Managing Oracle Business Activity Monitoring

This chapter describes how to start and stop Oracle Business Activity Monitoring (Oracle BAM) components, create users and groups, grant Oracle BAM application permissions using application-level roles, and set up data access permissions on data objects and folders, and reports.

This chapter includes the following sections:

- [Section 26.1, "Introduction to Managing Oracle BAM"](#)
- [Section 26.2, "Managing Oracle BAM Availability"](#)
- [Section 26.3, "Managing Oracle BAM Users"](#)

### 26.1 Introduction to Managing Oracle BAM

Use Oracle Enterprise Manager Fusion Middleware Control to manage Oracle BAM availability. For more information, see [Section 26.2, "Managing Oracle BAM Availability"](#).

Oracle BAM users and groups are created in Oracle WebLogic Server Administration Console (or in a security provider configured for your Oracle WebLogic Server); application-level roles are administered and new groups/roles and policies/grants can be created in Fusion Middleware Control (in **Application Policies**); and the users' Oracle BAM objects are managed in Oracle BAM Administrator. For more information, see [Section 26.3, "Managing Oracle BAM Users"](#).

### 26.2 Managing Oracle BAM Availability

Oracle BAM Server and web applications can be started and stopped using Fusion Middleware Control, or, as a convenience, the entire Oracle BAM application (or the Oracle WebLogic Server to which it is deployed) can be restarted in the Oracle WebLogic Server Administration Console.

---

**Note:** On all UNIX installations of Oracle BAM, due to a behavior of the Java AWT APIs that Oracle BAM uses, Oracle BAM Server must be started with the `DISPLAY` environment variable *unset*.

```
$ unsetenv DISPLAY
```

---

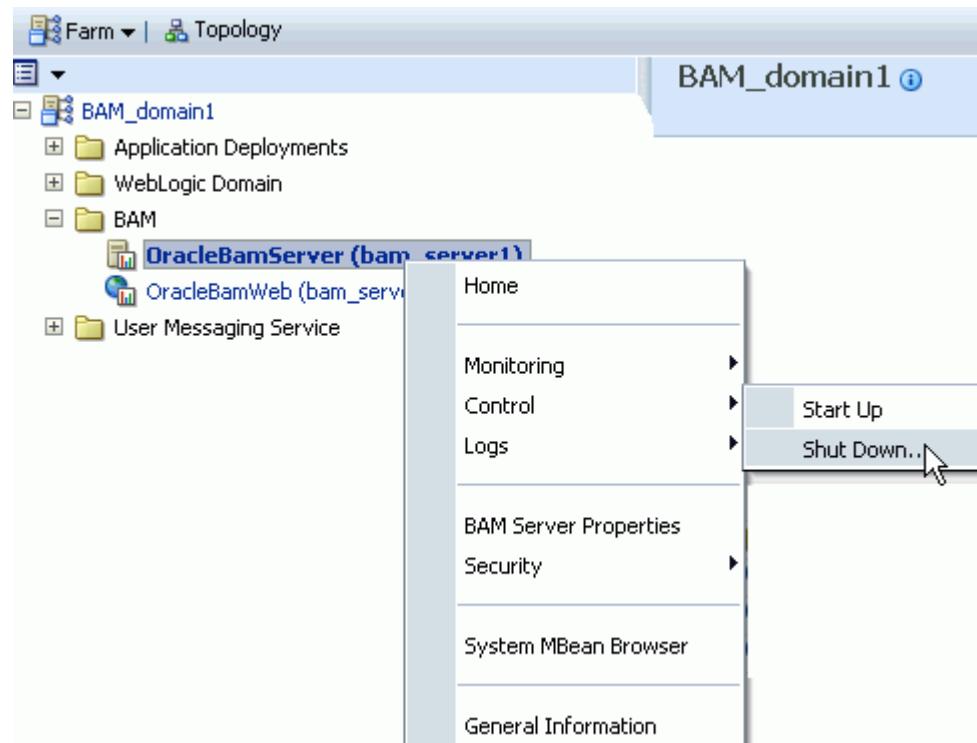
Restarting is required for any configuration changes made in the Fusion Middleware Control properties pages for Oracle BAM or its configuration files.

To start or stop Oracle BAM components in Fusion Middleware Control:

1. In Fusion Middleware Control locate the **OracleBamServer** or **OracleBamWeb** node in the navigation tree.



2. Right-click the node to open the shortcut menu, and select **Control**.



**Start Up** starts the component.

**Shut Down** shuts down the component.

---

**Note:** Do not use **Start Up** alone to restart the component. To restart the component, you must stop the component using **Shut Down** before using **Start Up** to start the component or an error occurs.

---

## 26.3 Managing Oracle BAM Users

These are the main steps for managing Oracle BAM users:

### 1. Configure the Security Provider

Users, groups, or both, to be used with Oracle BAM users must be present in a security provider configured for your Oracle WebLogic Server. For the main steps and links to

detailed information about configuring security for Oracle WebLogic Server, see the *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

---

**Note:** You can use Oracle WebLogic Server to configure the Active Directory Authentication provider for authenticating Oracle BAM users instead of using the default embedded LDAP (also known as the default authenticator). To use Active Directory, you must also do some additional steps to change the OracleSystemUser default user. For more information, see "Changing the OracleSystemUser Default User" in the *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

---

## 2. Create Users and Groups

Users and groups are defined in the configured security provider (for example, in the Oracle WebLogic Server embedded LDAP server). Refer to your specific security provider documentation for details on defining users and groups. For more information, see [Section 26.3.1, "Defining Users and Groups"](#) and [Section 26.3.2, "Using Previously Seeded Group Members"](#).

For example instructions about using Oracle WebLogic Server Administration Console to create users and groups, see [Section 26.3.5, "Configuring Oracle WebLogic Server Embedded LDAP Server"](#).

## 3. Assign Users and Groups to Application Roles

In turn, these users, groups, or both, are assigned to Oracle BAM application-level roles that grant those users, groups, or both, specific permissions for using Oracle BAM applications. Users and groups are granted Oracle BAM application permissions based on their Oracle BAM role membership.

For a detailed description of the Oracle BAM application roles and their associated Oracle BAM application permissions, see [Section 26.3.3, "Adding Members to Application Roles"](#).

Membership in Oracle BAM application roles is administered from the Application Roles page for Oracle BAM provided by Fusion Middleware Control. This page allows users and groups to be added as members to the various Oracle BAM application roles and allows creation of new application roles. For more information, see [Section 26.3.4, "Introduction to Oracle BAM Application Roles"](#).

---

**Note:** Oracle BAM does not support assigning Oracle BAM application permissions directly to users and groups. Oracle BAM application permissions can only be granted to Oracle BAM application roles.

The only way to grant Oracle BAM application permissions to users and groups is to make those users and groups members of an Oracle BAM application role associated with the desired Oracle BAM application permissions.

---

Except for the Administrator role, membership in an Oracle BAM application role does not imply any Oracle BAM data access permissions. The Oracle BAM application roles only grant the user access to the associated Oracle BAM user interface as described in [Section 26.3.4, "Introduction to Oracle BAM Application Roles."](#)

When the user logs on to the Oracle BAM start page, there is a button for each of the Oracle BAM applications. Whether these buttons are enabled or not is based on the user's Oracle BAM application role membership.

---

**Note:** Changes to a user's group and role membership could take as long as 5 minutes to propagate throughout the system.

---

#### 4. Populate Users In Oracle BAM Applications

Users are not visible from Oracle BAM Administrator until they have logged into Oracle BAM for the first time. Oracle BAM also provides a utility that you can run to populate the users in Oracle BAM Administrator. For more information, see [Section 26.3.6, "Populating Users in Oracle BAM Administrator"](#).

#### 5. Set Up Data Access Permissions on Oracle BAM

Specific data access permissions can be granted to users and groups using Oracle BAM Architect and Oracle BAM Active Studio. Users and groups can be granted read, update, and delete operation permissions on specific data objects and folders. For more information, see "Creating Permissions on Data Objects" and "Using Data Object Folders" in the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

Data access permissions can also be granted to users and groups at the row level for data objects. For information about row-level data security, see "Creating Security Filters" in the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

Individual report authors can control which Oracle BAM users have access to reports. For more information, see "Setting Folder Permissions" in the *Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring*.

#### 6. Manage Oracle BAM Object Ownership

When Oracle BAM users are removed from the security provider, the user accounts still appear in Oracle BAM Administrator because they may own Oracle BAM objects that must be transferred to other users before the user is completely removed from Oracle BAM. Object ownership is managed using Oracle BAM Administrator (see [Section 26.3.7, "Managing Oracle BAM Object Ownership"](#)).

#### 7. Remove Users From Oracle BAM

The administrator must also remove users from Oracle BAM Administrator after they are deactivated in the security provider (see [Section 26.3.8, "Removing Invalid Users from Oracle BAM Administrator"](#)).

##### OracleSystemUser

OracleSystemUser is the default owner of all Oracle BAM objects. It is required by Oracle BAM Server and must not be deleted.

### 26.3.1 Defining Users and Groups

Users are defined in the configured security provider's identity store (for example, Oracle WebLogic Server embedded LDAP server).

Groups, also referred to as enterprise-level roles, are also defined in this identity store. Groups are referred to as enterprise-level roles to distinguish them from application-level roles.

The enterprise-level roles are global to Oracle WebLogic Server, and they are applicable to all applications running on that server, including Oracle BAM. The application-level roles are specific to each application.

For example instructions about using Oracle WebLogic Server Administration Console to create users and groups, see [Section 26.3.5, "Configuring Oracle WebLogic Server Embedded LDAP Server"](#).

---

**Note:** When you delete a user you cannot reuse that user name until you resolve the old instance with Oracle BAM. Oracle BAM marks the deleted user inactive when you delete the user in Oracle WebLogic Server.

If you attempt to reuse the same user name for a new account, Oracle BAM does not consider the newly added user to be the same user as the one previously deleted. You must delete the original user from Oracle BAM using Oracle BAM Administrator (and optionally transfer the user's Oracle BAM objects to another valid user). Once the inactive user is removed from Oracle BAM you can reuse the user name.

For information about removing users from Oracle BAM, see [Section 26.3.8, "Removing Invalid Users from Oracle BAM Administrator"](#).

---

### 26.3.2 Using Previously Seeded Group Members

The following Oracle WebLogic Server groups have been previously seeded in the Oracle BAM application policy:

- BamAdministrators: Member of application role Administrator.
- BamReportArchitects: Member of application role Report Architect.
- BamReportCreators: Member of application role Report Creator.
- BamReportViewers: Member of application role Report Viewer.

[Application Roles](#) > Edit Application Role

#### Edit Application Role : Report Architect

##### General

Application	oracle-bam(11.1.1)
Role Name	Report Architect
Display Name	Has access to features for creating
Description	

##### Members

An application role may need to be mapped to users or groups defined in

##### Roles

	Add Role		Delete...
	Name BamReportArchitects	Type Group	

These members are a convenience. If you define these groups in your configured security provider, you can then assign Oracle BAM application-level roles to specific users and groups by placing them into these groups. All of this can be done from your security provider and does not require any Oracle BAM application policy modifications.

You must create these groups manually in the security provider because Oracle BAM does not automatically seed users or groups in the configured security provider.

### 26.3.3 Adding Members to Application Roles

The Oracle BAM application policy defines the Oracle BAM application-level roles described in [Section 26.3.4, "Introduction to Oracle BAM Application Roles"](#) including role membership. The Oracle BAM application policy is managed in Fusion Middleware Control. The default policy store provider is the XML file-based policy store.

#### Application Policies

Application policies are the authorization policies that an application relies upon for controlling access to its resources.

To manage users and groups in the WebLogic Domain, use the [Oracle WebLogic Server Security Provider](#).

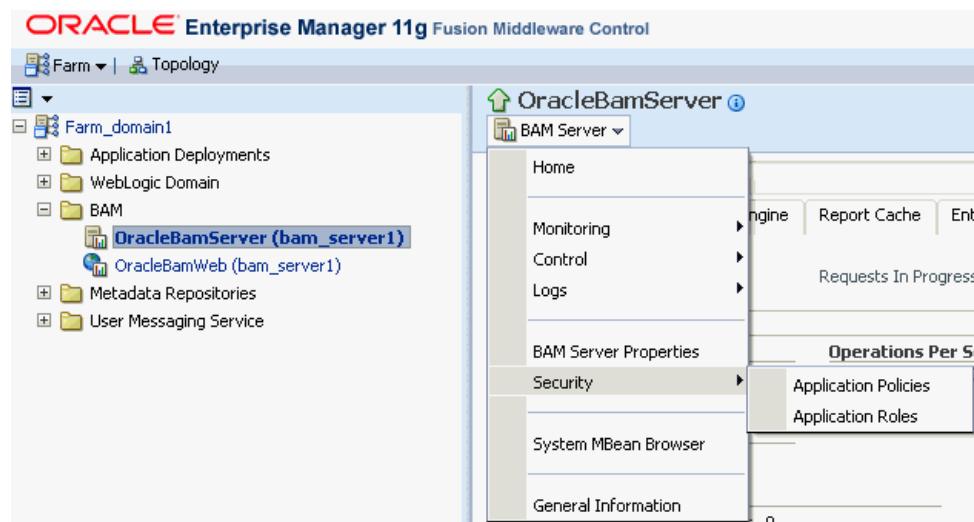
**Policy Store Provider**

**Search**

Principal	Permission
Administrator	oracle.bam.common.security.BAMPermission ( Administrator ) oracle.bam.common.security.BAMPermission ( CreateDataObject ) oracle.bam.common.security.BAMPermission ( ActiveViewer ) oracle.bam.common.security.BAMPermission ( ActiveStudio ) oracle.bam.common.security.BAMPermission ( Architect ) oracle.bam.common.security.BAMPermission ( CreateReport ) oracle.bam.common.security.BAMPermission ( CreateAlertRule ) oracle.bam.common.security.BAMPermission ( EmailRenderedReport )
Report Architect	oracle.bam.common.security.BAMPermission ( CreateDataObject ) oracle.bam.common.security.BAMPermission ( ActiveViewer ) oracle.bam.common.security.BAMPermission ( ActiveStudio ) oracle.bam.common.security.BAMPermission ( Architect ) oracle.bam.common.security.BAMPermission ( CreateReport ) oracle.bam.common.security.BAMPermission ( CreateAlertRule ) oracle.bam.common.security.BAMPermission ( EmailRenderedReport )
Report Creator	oracle.bam.common.security.BAMPermission ( ActiveViewer ) oracle.bam.common.security.BAMPermission ( ActiveStudio ) oracle.bam.common.security.BAMPermission ( CreateReport ) oracle.bam.common.security.BAMPermission ( CreateAlertRule ) oracle.bam.common.security.BAMPermission ( EmailRenderedReport )
Report Viewer	oracle.bam.common.security.BAMPermission ( ActiveViewer )

To add members to the Oracle BAM application-level roles, you must add entries to the membership list of the desired role using Fusion Middleware Control.

Shown here is the navigation required to open the Oracle BAM Application Roles page in Fusion Middleware Control:



Select a role in the Role Name list:

#### Application Roles

Application roles are the roles used by security aware applications that are specific to the application. These are also application roles that are created in the context of end users accessing the application.

To manage users and groups in the WebLogic Domain, use the [Oracle WebLogic Server](#).

#### [Policy Store Provider](#)

#### [Search](#)

<a href="#">Create...</a>   <a href="#">Create Like...</a> <a href="#">Edit...</a> <a href="#">Delete...</a>	
Role Name	Members
Administrator	Administrators, BamAdministrators, OracleSystem1
<a href="#">Report Architect</a>	BamReportArchitects
<a href="#">Report Creator</a>	BamReportCreators
Report Viewer	BamReportViewers

Add a member to the role:

Application Roles > Edit Application Role

### Edit Application Role : Report Architect

**General**

Application	oracle-bam(11.1.1)
Role Name	Report Architect
Display Name	Has access to features for creating
Description	

**Members**  
An application role may need to be mapped to users or groups defined in the system.

**Roles**

Name	Type
BamReportArchitects	Group

**Users**

Name
No users added.

Select an available user and move it to the **Selected Users** list:

**Add User**

Specify criteria to search and select WebLogic users that you want to grant permissions to.

**Search**

Select users **Available Users**

<input type="checkbox"/> OracleSystemUser
<input checked="" type="checkbox"/> UserA

**Selected Users**

--

Move   
 Move All   
 Remove   
 Remove All

OK Cancel

### 26.3.3.1 Extending Oracle BAM to a SOA Domain that Uses a DB-Based Policy Store

Although the out-of-the-box policy store is file-based, you can extend Oracle BAM to an Oracle SOA Suite domain that uses a DB-based policy store.

This section provides general, high-level steps for extending Oracle BAM in this way.

#### To extend Oracle BAM to a SOA domain that uses a DB-based policy store:

1. Install Oracle SOA Suite.
2. Configure the DB-based policy store for the domain, as described in ["Managing the RDBMS Security Store"](#) in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.
3. Extend the domain to include Oracle BAM.

4. Start Oracle WebLogic Server and Oracle SOA Suite.
5. Target the OPSS data source to the Oracle BAM server.
6. Start the Oracle BAM server.
7. Log in to the Oracle BAM server.

#### **26.3.4 Introduction to Oracle BAM Application Roles**

Oracle BAM defines the following application-level roles:

- Administrator: Has access to all features.
- Report Architect: Has access to features for creating data objects and reports.
- Report Creator: Has access to features for creating reports.
- Report Viewer: Has access to features for viewing reports.

The application roles determine the permissions granted to specific users or groups. If a user or group is a member of one of these Oracle BAM application roles, then they are granted the associated Oracle BAM permissions.

The Oracle BAM application roles are granted the following permissions:

##### **Administrator Permissions**

- Administrator: Has full access to Oracle BAM Administrator application functionality.
- CreateDataObject: Can create data objects in Oracle BAM Architect.
- ActiveViewer: Has full access to Oracle BAM Active Viewer application functionality.
- ActiveStudio: Has full access to Oracle BAM Active Studio application functionality.
- Architect: Has full access to Oracle BAM Architect application functionality.
- CreateReport: Can create reports in Oracle BAM Active Studio.
- CreateAlertRule: Can create alerts in Oracle BAM Architect and Oracle BAM Active Studio.
- EmailRenderedReport: Can email report attachments to Oracle BAM users.

##### **Report Architect Permissions**

- CreateDataObject: Can create data objects in Oracle BAM Architect.
- ActiveViewer: Has full access to Oracle BAM Active Viewer application functionality.
- ActiveStudio: Has full access to Oracle BAM Active Studio application functionality.
- Architect: Has full access to Oracle BAM Architect application functionality.
- CreateReport: Can create reports in Oracle BAM Active Studio.
- CreateAlertRule: Can create alerts in Oracle BAM Architect and Oracle BAM Active Studio.
- EmailRenderedReport: Can email report attachments to Oracle BAM users.

### Report Creator Permissions

- ActiveViewer: Has full access to Oracle BAM Active Viewer application functionality.
- ActiveStudio: Has full access to Oracle BAM Active Studio application functionality.
- CreateReport: Can create reports in Oracle BAM Active Studio.
- CreateAlertRule: Can create alerts in Oracle BAM Active Studio.
- EmailRenderedReport: Can email report attachments to Oracle BAM users.

### Report Viewer Permissions

- ActiveViewer: Has full access to Oracle BAM Active Viewer application functionality.

## 26.3.5 Configuring Oracle WebLogic Server Embedded LDAP Server

The Oracle WebLogic Server embedded LDAP server is the default security provider for Oracle WebLogic Server. This section describes the procedures for adding new users and groups to the Oracle WebLogic Server embedded LDAP server.

For information about configuring the embedded LDAP server, see "Managing the Embedded LDAP Server" in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

### 26.3.5.1 Using the Oracle WebLogic Server Administration Console

Oracle WebLogic Server administration is performed using the Oracle WebLogic Server Administration Console at

`http://host_name:port_number/console`

Oracle WebLogic Server must be running to access the administration console. This console requires the user to log in with Oracle WebLogic Server administrator credentials. After successfully logging in, the user is placed at the Oracle WebLogic Server Administration Console home page.

### 26.3.5.2 Adding a Group

To add a group:

1. Go to **Home > Security Realms > myrealm > Users and Groups** in Oracle WebLogic Server Administration Console.
2. Select the **Groups** tab, and click **New**.
3. Enter the group name and description. Do not change the provider.
4. Click **OK**.

### 26.3.5.3 Adding a User

To add a user:

1. Go to **Home > Security Realms > myrealm > Users and Groups** in Oracle WebLogic Server Administration Console.
2. Select the **Users** tab, and click **New**.
3. Enter the user name, description, and login password. Do not change the provider.
4. Click **OK**.

#### 26.3.5.4 Adding a User to a Group

To add a user to a group:

1. Go to **Home > Security Realms > *myrealm* > Users and Groups** in Oracle WebLogic Server Administration Console.
2. Select the **Users** tab, and select the user.
3. Select the **Groups** tab.
4. Move the groups from the **Available** list to the **Chosen** list. The **Chosen** list represents the list of groups of which the user is now a member.
5. Click **Save**.

#### 26.3.6 Populating Users in Oracle BAM Administrator

Users are not automatically populated in Oracle BAM Administrator by the security provider. The system administrator must either run the `registerusers` utility, or have users log in to the Oracle BAM start page by using the provided credentials, before they can be managed in Oracle BAM Administrator.

Oracle BAM is a monitoring and analytics application that in implementation can support requirements to secure data, not only at the user and permissions level, but also at the row level for specific analytic data. Because of this requirement, Oracle BAM users require some management in Oracle BAM Administrator that is not provided in the standard Oracle WebLogic Server user management tool set. To configure these additional security features for a specific user, that user must be defined in Oracle BAM Administrator.

See the following topics for more information:

- [Section 26.3.6.1, "Using the Registerusers Utility"](#)
- [Section 26.3.6.2, "Populating By User Login"](#)

##### 26.3.6.1 Using the Registerusers Utility

The `registerusers` utility is a standalone Java application for registering users with Oracle BAM Server. Normally, Oracle BAM is not aware of a particular defined user until that user logs into Oracle BAM for the first time. On initial login, Oracle BAM looks up the user in the configured security provider, and synchronizes Oracle BAM's definition for that user with that of the configured security provider. This includes the user name, role membership, group membership, user properties (for example, email address), and so on.

Because Oracle BAM is not aware of defined users until they have logged in at least one time, it is not possible to perform certain Oracle BAM user configuration related to that user. For example, when defining data object permissions in Oracle BAM, the user is not present in the list of known users presented by the permission editor.

The `registerusers` utility allows a user with Oracle BAM administrator-level privileges to register a list of users with Oracle BAM. The result of this registration is that these users are fully defined in Oracle BAM and available for further Oracle BAM user configuration, such as defining data object permissions.

The users are only added to Oracle BAM if they are successfully authenticated with the security provider. The input to this utility is a simple list of white-space delimited user names.

The registerusers utility confirms the successful registration of each user to standard out, and the failed registration of any user to standard error. The following is sample output from the registerusers utility:

```
>registerusers -file cmd_file.txt
Enter Password:
Connecting to BAM server as user weblogic.
Registering users...
Registration Succeeded For User: james.
Registration Failed For User: jane. Reason: BAM-00400: Authentication failed.
Registration Succeeded For User: adam.
Registration Failed For User: bob. Reason: BAM-00400: Authentication failed.
Registration Succeeded For User: bill.
Registration Succeeded For User: barbara.
Registration Succeeded For User: lynn.
```

If the utility is executed without any arguments, then the command syntax is displayed to standard out.

The syntax of the command is:

```
registerusers -adminuser adminusername -host host
-port port -protocol protocol [-file filename]... [username]...
```

where:

*adminusername* specifies the name of a user with Oracle BAM administrator privileges.

*host* specifies the hostname or IP address of the target Oracle BAM Server. Default: localhost

*port* specifies the port number of the target Oracle BAM server. Default: 7001

*protocol* specifies the communication protocol to be used. Can be t3 or t3s for SSL. Default: t3

*filename* specifies a file containing command line arguments. The -file option is replaced by the contents of the specified file.

*username* specifies the name of a user to be registered with Oracle BAM.

For example:

```
>registerusers -adminuser weblogic -host localhost -port 7001 -protocol t3 -file
cmd_file.txt smith jones
```

If the -adminuser option is omitted, then it is prompted for from standard input. The password for the BAM Administrator specified by -adminuser is prompted for from standard input using a password prompt where typed characters are hidden.

The file represented by <filename> should contain white-space delimited command-line arguments. White space is defined as blanks, EOL characters, and commas. Both single- and double-quoted strings are supported.

The file can also contain double-slash and slash-asterisk comments for documentation purposes. These comments are ignored.

If a command-line argument must contain any white-space characters (including commas), forward slashes (/) (as in file paths), or asterisks (\*), then it must be quoted. For example, "/dir1/dir2/file.txt".

The file can contain further -file options. The file should be in UTF-8 format to support extended character sets.

The following is a sample command file:

```
// Specify Oracle BAM administrator account to execute command. Password is not
// provided so that the user is securely prompted for the password.
-adminuser user_name
// Configure the target BAM server.
-host localhost -port 7001 -protocol t3
// Register the following users.
jones /* This is Mr. Jones. */
smith /* This is Ms. Smith. */
// Register users from another file.
-file "/dir1/dir2/user_list.txt"
```

Default values for `-host`, `-port`, and `-protocol` arguments are included in the `UserRegisterConfig.xml` file. These defaults are only used if the option is not specified on the command line. If these options are not specified on the command line, or in the `UserRegisterConfig.xml` configuration file, then the defaults are used. The command syntax output shows the default values that are in effect.

The defaults are:

```
-host localhost -port 7001 -protocol t3
```

The following is an example of a `UserRegisterConfig.xml` file.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<UserRegister>
 <ServerName>localhost</ServerName>
 <ServerPort>7001</ServerPort>
 <Communication_Protocol>t3</Communication_Protocol>
 <ServerPlatform>weblogic</ServerPlatform>
</UserRegister>
```

The `-host` default is picked up from the `ServerName` property, the `-port` default is picked up from the `ServerPort` property, and the `-protocol` default is picked up from the `Communication_Protocol` element. Information about these properties can be found in [Table 24–3](#). `ServerPlatform` configuration is required for standalone applications. The value of this is `weblogic` or `websphere`, depending on the type of application server Oracle BAM Server is running on.

### 26.3.6.2 Populating By User Login

To populate users in Oracle BAM Administrator:

1. Have each Oracle BAM user open the Oracle BAM start page and log in using the credentials specified by the security provider.

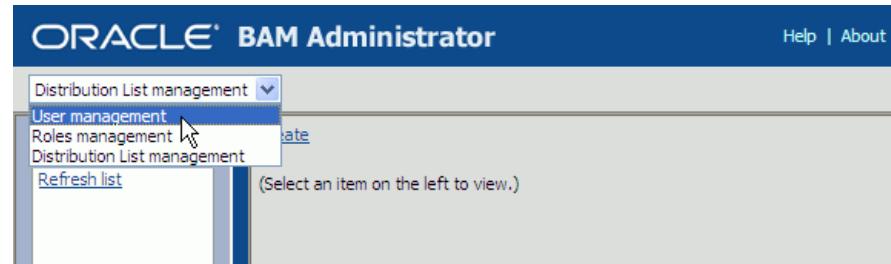


The Oracle BAM start page can be found at:

`http://host_name:port_number/OracleBAM/`

2. The administrator opens the Oracle BAM start page, logs in, and selects **Administrator**.
3. Select **User management** from the list, if the User Management page is not displayed in Oracle BAM Administrator.

**Figure 26–1 Oracle BAM Administrator Function List**



4. Verify that each Oracle BAM user appears in the **Users** list (use the **Refresh list** link to show the latest data).

### 26.3.7 Managing Oracle BAM Object Ownership

When Oracle BAM users are removed from the security provider, the user accounts continue to appear in the Oracle BAM Administrator application with an exclamation mark (!) icon to indicate that they are not valid.

These users do not have access to Oracle BAM applications, but remain visible because they may *own* objects in Oracle BAM that must be transferred to other users before the user is completely removed from Oracle BAM.

Object ownership is managed using Oracle BAM Administrator.

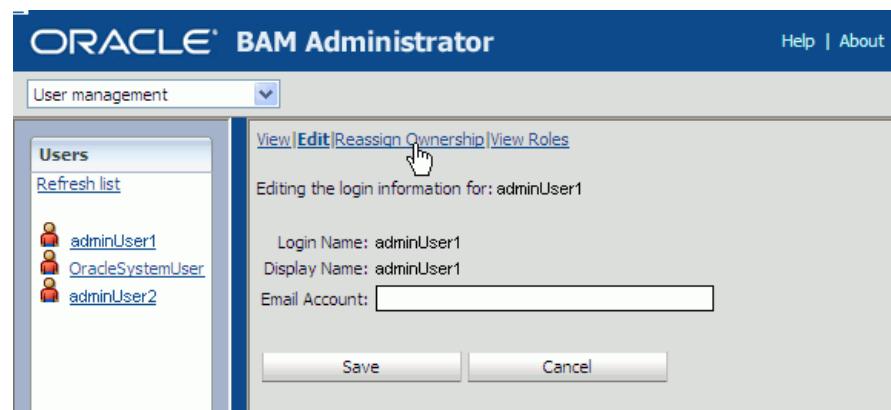
To transfer object ownership:

1. Go to the Oracle BAM start page, log in, and select **Administrator**.

The Oracle BAM start page can be found at:

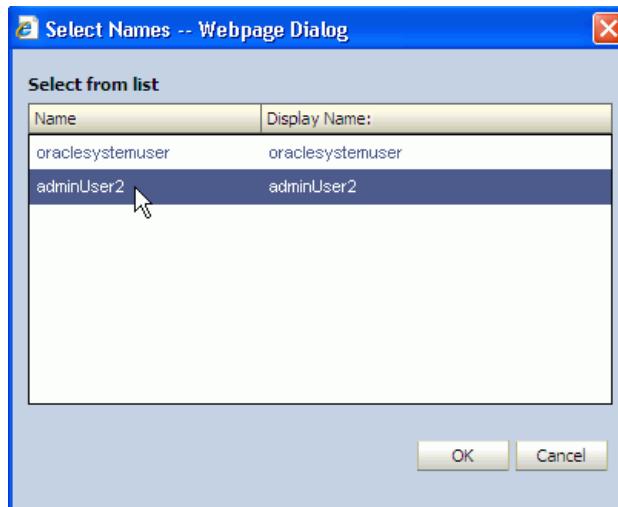
`http://host_name:port_number/OracleBAM/`

2. Select **User management** from the list (see [Figure 26–1](#)).
3. Select the user in the **Users** list that currently owns the objects you can reassign.
4. Click **Reassign Ownership**.



The **Select Names** dialog displays a list of users.

5. Select a user account in the list that becomes the new owner of the objects.



6. Click **OK**.

Reports are moved to a subfolder named after the selected user name.

Alerts are moved, and a zero (0) is appended to the alert name if the selected owner has an alert with the same name. If the alert needs an item updated or specified, an exclamation mark (!) is displayed on the alert icon in Oracle BAM Architect and Oracle BAM Active Studio Alerts pages.

Shared reports and folders change ownership but are not moved.

### 26.3.8 Removing Invalid Users from Oracle BAM Administrator

Invalid users are not automatically removed from Oracle BAM because they may own reports and alerts that must be transferred to active Oracle BAM users. After those objects are transferred, an invalid user may be deleted from Oracle BAM Administrator.

To remove invalid users:

1. Go to the Oracle BAM start page, log in, and select **Administrator**.

The Oracle BAM start page can be found at:

`http://host_name:port_number/OracleBAM/`

2. Select **User management** from the list (see Figure 26-1).

3. Select an invalid user in the **Users** list whose objects have been reassigned.

For information about reassigning objects, see [Section 26.3.7, "Managing Oracle BAM Object Ownership"](#).

An inactive user has an exclamation point (!) icon next to the user name.

4. Click **Delete**.



# **Part X**

---

## **Administering Oracle User Messaging Service**

This part describes how to administer Oracle Messaging Service.

This part includes the following chapters:

- [Chapter 27, "Configuring Oracle User Messaging Service"](#)
- [Chapter 28, "Monitoring Oracle User Messaging Service"](#)
- [Chapter 29, "Managing Oracle User Messaging Service"](#)



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# Configuring Oracle User Messaging Service

This chapter describes the features and architecture of Oracle User Messaging Service (UMS). It also describes how to configure and secure Oracle UMS in your environment.

This chapter includes the following sections:

- [Section 27.1, "Introduction to User Messaging Service"](#)
- [Section 27.2, "Introduction to Oracle User Messaging Service Configuration"](#)
- [Section 27.3, "Accessing User Messaging Service Configuration Pages"](#)
- [Section 27.4, "Configuring User Messaging Service Drivers"](#)
- [Section 27.5, "Configuring User Messaging Service Access to the LDAP User Profile"](#)
- [Section 27.6, "Securing the Oracle User Messaging Service"](#)
- [Section 27.7, "Troubleshooting Oracle User Messaging Service"](#)

For more information about Oracle User Messaging Service tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

## 27.1 Introduction to User Messaging Service

Oracle User Messaging Service enables two-way communication between users and deployed applications. Key features include:

- Support for a variety of messaging channels: Messages can be sent and received through email, instant messaging (IM) (XMPP), short message service (SMS) (SMPP), and voice. Messages can also be delivered to a user's SOA/Oracle WebCenter Portal worklist.
- Two-way messaging: In addition to sending messages from applications to users (referred to as *outbound* messaging), users can initiate messaging interactions (*inbound* messaging). For example, a user can send an email or text message to a specified address; the message is routed to the appropriate application that can then respond to the user or invoke another process according to its business logic.
- User messaging preferences: End users can use a web interface to define preferences for how and when they receive messaging notifications. Applications immediately become more flexible; rather than deciding whether to send to a user's email address or IM client, the application can simply send the message to the user, and let UMS route the message according to the user's preferences.

---

**Note:** The User Messaging Preferences UI is available at:

`http://host:port/sdpmessaging/userprefs-ui`

The User Messaging Preferences UI is also embedded in Oracle BPM Worklist. You can access it by choosing **Preferences > Notification**.

---

- Robust message delivery: UMS keeps track of delivery status information provided by messaging gateways, and makes this information available to applications so that they can respond to a failed delivery. Or, applications can specify one or more *failover* addresses for a message in case delivery to the initial address fails. Using the failover capability of UMS frees application developers from having to implement complicated retry logic.
- Pervasive integration within Oracle Fusion Middleware: UMS is integrated with other Fusion Middleware components providing a single consolidated bi-directional user messaging service.
  - Integration with Oracle BPEL Process Manager: Oracle JDeveloper includes prebuilt BPEL activities that enable messaging operations. Developers can add messaging capability to a SOA composite application by dragging and dropping the desired activity into any workflow.
  - Integration with human workflow: UMS enables the human workflow service engine to send actionable messages to and receive replies from users over email. For information about configuring human workflow with UMS from the Workflow Notification Properties page, see [Section 21.1, "Configuring Human Workflow Notification Properties."](#)
  - Integration with Oracle BAM: Oracle BAM uses UMS to send email alerts in response to monitoring events.
  - Integration with Oracle Oracle WebCenter Portal: UMS APIs are available to developers building applications for Oracle WebCenter Portal: Spaces. The API is a realization of Parlay X Web Services for Multimedia Messaging, version 2.1, a standard web service interface for rich messaging.

### 27.1.1 Components

There are three types of components that comprise Oracle User Messaging Service. These components are standard Java EE applications, making it easy to deploy and manage them using the standard tools provided with Oracle WebLogic Server.

- UMS Server: The UMS Server orchestrates message flows between applications and users. The server routes outbound messages from a client application to the appropriate driver, and routes inbound messages to the correct client application. The server also maintains a repository of previously sent messages in a persistent store, and correlates delivery status information with previously sent messages.
- UMS Drivers: UMS Drivers connect UMS to the messaging gateways, adapting content to the various protocols supported by UMS. Drivers can be deployed or undeployed independently of one another depending on what messaging channels are available in a given installation.
- UMS Client applications: UMS client applications implement the business logic of sending and receiving messages. A UMS client application might be a SOA application that sends messages as one step of a BPEL workflow, or a WebCenter Portal Spaces application that can send messages from a web interface.

In addition to the components that comprise UMS itself, the other key entities in a messaging environment are the external gateways required for each messaging channel. These gateways are not a part of UMS or Oracle WebLogic Server. Since UMS Drivers support widely-adopted messaging protocols, UMS can be integrated with existing infrastructures such as a corporate email servers or XMPP (Jabber) servers. Alternatively, UMS can connect to outside providers of SMS or text-to-speech services that support SMPP or VoiceXML, respectively.

### 27.1.2 Architecture

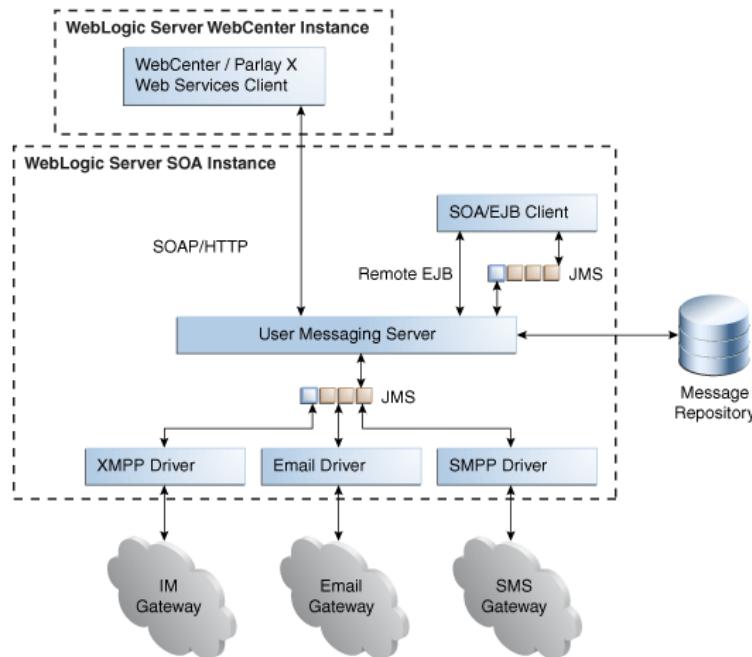
The system architecture of Oracle User Messaging Service is shown in [Figure 27–1](#).

For maximum flexibility, the components of UMS are separate Java EE applications. This allows them to be deployed and managed independently of one another. For example, a particular driver can be stopped and reconfigured without affecting message delivery on all other channels.

Exchanges between UMS client applications and the UMS Server occur as SOAP/HTTP web service requests for web service clients, or through remote Enterprise JavaBeans (EJB) and JMS calls for BPEL messaging activities. Exchanges between the UMS Server and UMS drivers occur through JMS queues.

Oracle UMS server and drivers are installed alongside Oracle SOA Suite or Oracle BAM in their respective Oracle WebLogic Server instances. An Oracle WebCenter Portal installation includes the necessary libraries to act as a UMS client application, invoking a server deployed in a SOA instance.

**Figure 27–1 UMS Architecture**



## 27.2 Introduction to Oracle User Messaging Service Configuration

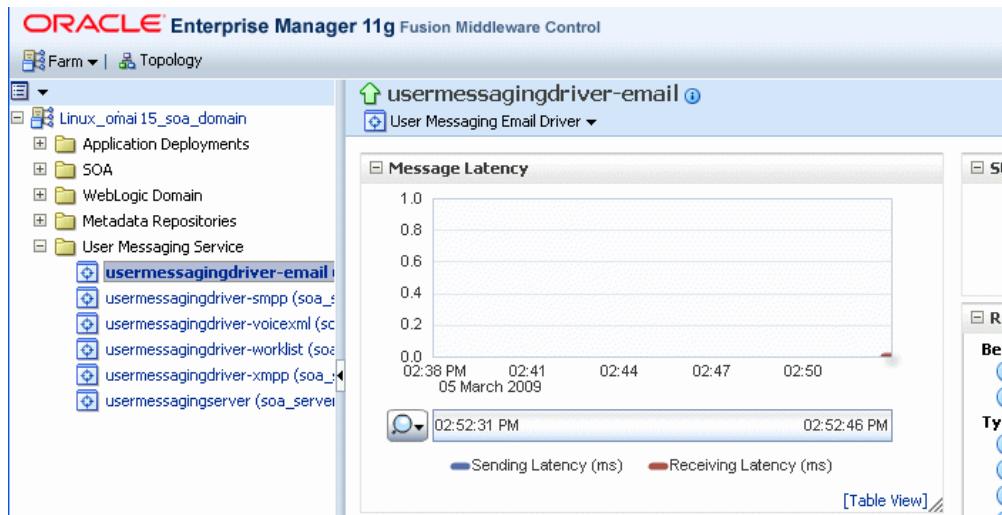
Oracle User Messaging Service enables users to receive notifications sent from SOA applications that are developed and deployed to the Oracle WebLogic Server using Oracle JDeveloper.

At the application level, there is notification activity for a specific delivery channel (such as SMS or email). For example, when you build a SOA application that sends email notification, you drag and drop an Email activity from the Oracle JDeveloper Component Palette to the appropriate location within a workflow. The application connects then sends notifications.

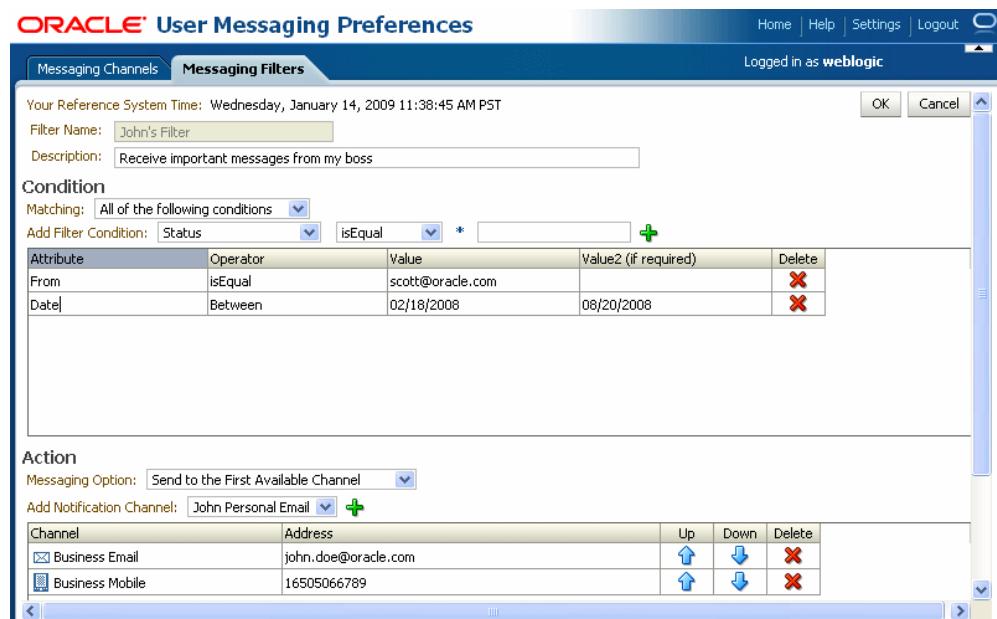
For more information about Oracle JDeveloper, see your Oracle JDeveloper documentation.

To enable the workflow participants to receive and forward notifications, use Oracle Enterprise Manager Fusion Middleware Control to set the Oracle User Messaging Service environment by configuring the appropriate driver instances that reside on the same Oracle WebLogic Server on which you deploy the workflow application ([Figure 27–2](#)). Oracle User Messaging Service includes drivers that support messaging through email, IM, SMS, and voice channels. For more information, see [Section 27.4, "Configuring User Messaging Service Drivers."](#)

**Figure 27–2 Oracle Enterprise Manager Fusion Middleware Control**



For workflow participants to receive the notifications, they must register the devices that they use to access messages through User Messaging Preferences ([Figure 27–3](#)).

**Figure 27-3 User Messaging Preferences**

## 27.3 Accessing User Messaging Service Configuration Pages

You configure Oracle User Messaging Service through Oracle Enterprise Manager Fusion Middleware Control.

### 27.3.1 Setting the Storage Method

Use the Server Properties page to set the deployment type for the Messaging Server (that is, select the storage method for runtime and management data) and add (or remove) the User Messaging Preference Business Terms that are used for creating message filters.

Select **Persistent** (the default) to enable entries and the Messaging Store to persist when the server has been restarted. In the **Transient** mode (which is recommended for lightweight deployments), the Messaging Server does not maintain any data stored in the Messaging Store after a restart.

### 27.3.2 Adding or Removing User Messaging Preferences Business Terms

The Server Properties page enables you to add or remove the business terms used to construct the message filters in User Message Preferences. For more information about building messaging filters with business terms, see [Section 27.3.2.1, "Adding Business Terms."](#)

#### 27.3.2.1 Adding Business Terms

---

**Note:** Business terms are stored per server instance. If there are multiple instances (as in a cluster), then new business terms must be added to each instance individually.

---

To add a business term to User Messaging Preferences:

1. Click **Add**.
2. Enter a descriptive name for the business term.
3. Select a data type (string, number, or date).
4. Click **Apply**.

### 27.3.2.2 Removing Business Terms

To remove a business term from User Messaging Preferences:

1. Select the business term.
2. Click **Delete**.
3. Click **Apply** to confirm the new term.

## 27.4 Configuring User Messaging Service Drivers

Oracle User Messaging Service includes the following drivers.

- [Configuring the Messaging Extension Driver](#)
- [Configuring the Email Driver](#)
- [Configuring the SMPP Driver](#)
- [Configuring the XMPP Driver](#)
- [Configuring the VoiceXML Driver](#)
- [Configuring the Worklist Driver](#)
- [Configuring the Proxy Driver](#)

---

**Note:** For the cluster environment, when you use separate messaging drivers for separate managed server nodes, all the drivers must be configured separately.

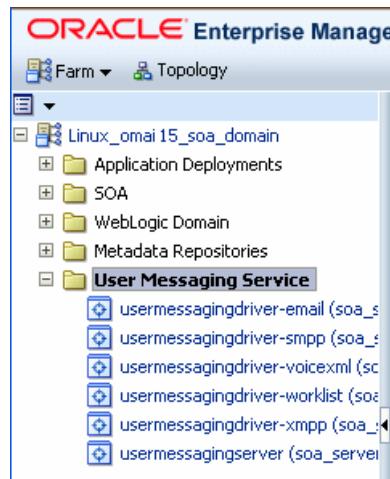
UMS Messaging Drivers are configured per instance. Configuring only one does not populate the configuration values to the drivers on the other cluster nodes.

---

### 27.4.1 Configuring a Driver

To configure a driver:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control as an administrator.
2. Expand the **Fusion Middleware** folder.
3. Navigate to the User Messaging Service home page.



4. Click **usermessagingserver(soa\_server1)**. The Associated Drivers page appears.

Name	Driver Type	Status	Configure Driver
/Linux_omai15_soa_domain/soa_domain/soa_server1/usermessagingdriver-worklist	User Messaging Worklist Driver		
/Linux_omai15_soa_domain/soa_domain/soa_server1/usermessagingdriver-xmpp	User Messaging XMPP Driver		
/Linux_omai15_soa_domain/soa_domain/soa_server1/usermessagingdriver-email	User Messaging Email Driver		
/Linux_omai15_soa_domain/soa_domain/soa_server1/usermessagingdriver-voicexml	User Messaging VoiceXML Driver		
/Linux_omai15_soa_domain/soa_domain/soa_server1/usermessagingdriver-smpp	User Messaging SMPP Driver		

5. Select the **Local** tab to access the drivers collocated with the UMS server instance. These drivers may or may not be registered with the UMS server depending on whether they are properly configured. The **ALL** tab lists all drivers that are deployed in the domain and registered to all the UMS server instances.
6. Find the email driver in the list, and then click the adjacent **Configure Driver** icon. The configuration page is displayed.

usermessagingdriver-email User Messaging Email Driver Logged in as weblogic | Page Refreshed Mar 5, 2009 2:55:41 PM PST

**Information** All fields on this page will require a restart to take effect.

Email Driver Properties

For detailed description of the driver properties, refer to the Administrator's Guide for Oracle SOA Suite.

**Common Configuration**

Supported Delivery Types	EMAIL	Supported Protocols	<input type="text"/>
Capability	SEND, RECEIVE	Supported Carriers	<input type="text"/>
Cost	<input type="button" value="▼"/>	Supported Content Types	text/plain, text/html, multipart/mixed, multipart/alternative, multipart/related
Speed	<input type="button" value="▼"/>	Supported Status Types	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE, USER_REPLY_ACKNOWLEDGEMENT_SUCCESS,
Sender Addresses	<input type="text"/>	Sending Queues Info	OraSDPM/QueueConnectionFactory::OraSDPM/Queues/OraSDPMDriverDefSndQ1
Default Sender Address	<input type="text"/>		

**Driver-Specific Configuration**

Name	Description	Mandatory	Encoded Credential	Value
MailAccessProtocol	E-mail receiving protocol. The possible values are IMAP and POP3. Required only if e-mail receiving is supported on the driver instance This value specifies the number of times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="IMAP"/>

7. If needed, expand the **Driver-Specific Configuration** section and configure the driver parameters. For more information, see [Section 27.4.1.1, "Introduction to](#)

[Driver Properties."](#)

#### 27.4.1.1 Introduction to Driver Properties

Oracle User Messaging Service drivers share common properties (listed in [Table 27-1](#)) that are used by the Messaging Engine when routing outbound messages. Typically, administrators set such Quality of Service (QoS) properties as driver cost (Cost) and driver speed (Speed), supported carriers (SupportedCarriers), and supported protocols (SupportedProtocols). Driver developers configure properties that typically do not require modification by the administrator, such as supported delivery types (SupportedDeliveryTypes), and supported content types (SupportedContentTypes).

---

**Note:** Properties such as `SendingQueuesInfo` are for advanced use and only require modification for advanced deployment topologies.

---

**Table 27-1 Common Driver Properties**

Name	Description	Mandatory Property?
Capability	Sets the driver's capability to send or receive messages. The values are SEND, RECEIVE, and BOTH.	Yes
Cost	The cost level of the driver (from 0 - 10). 0 is least expensive; 10 is most expensive. If the value is not in this range, cost is considered to be 0.	No
DefaultSenderAddress	The default address of the sender. The driver uses these addresses when sending a message that has no sender address specified, or when the specified sender address is not in the sender addresses list and the driver does not support using the application-provided sender address.	No
SenderAddresses	The list of sender addresses that the driver supports. If provided by the driver, the messaging engine can use this to route a sending message to the driver by matching against the sender address of the message.	No
SendingQueuesInfo	The information for the driver sending queue.	Yes
Speed	The speed level of the driver (from 0-10, with 10 being the fastest).	No
SupportedCarriers	A comma-delimited list of supported carriers.	No
SupportedContentTypes	The content type supported by the driver.	Yes
SupportedDeliveryType s	The delivery types supported by the driver.	Yes
SupportedProtocols	A comma-delimited list of supported protocols. Enter an asterisk (*) for any protocol.	No
SupportedStatusTypes	The status types supported by the driver.	No
SupportsCancel	Supports a cancel operation on a message.	No
SupportsReplace	Supports a replace operation on a message.	No
SupportsStatusPolling	For certain protocols, an active polling of the remote gateway must be performed to check the status of a message previously sent. This property indicates whether the driver supports such status polling. If set to true, the messaging engine invokes the driver connection's <code>getStatus()</code> operation.	No
SupportsTracking	Supports a tracking operation on a message.	No

### 27.4.1.2 Securing Passwords

Sensitive driver properties (namely, passwords) can be stored securely in the credential store using Oracle Enterprise Manager Fusion Middleware Control. Properties are marked with the flag **Encoded Credential** and have a custom entry form field.

To store a sensitive driver property securely:

1. Go to the driver configuration page of the selected driver.
2. In the **Driver-Specific Configuration** section, locate the property with the **Encoded Credential** flag set.
3. Select the credential type. (Depending on the selected credential type, you are prompted to enter the username and/or password.) There are three options:
  - Indirect password, create new user (default option): specify the username and real password; the password is stored in the credential store with the username as part of the key. The key and a fixed folder (map name) are stored in the driver deployment's `driverconfig.xml` file.
  - Indirect password, use existing user: choose an existing username/key in the credential store (to reference the password you stored previously).
  - User a clear text password: specify the password, and it is stored directly in the `driverconfig.xml` file.
4. Click **Apply** to save the changes.
5. Restart the driver application or the container for the changes to take effect.

You can check the password in the driver deployment directory's `driverconfig.xml` file. For an indirect password, the format is:

```
value="->mapName:keyName" (mapName is the driver target name, and the key is
<parameter_name>.<username>)
```

For example, here is a sample entry in `driverconfig.xml` for an email driver's `OutgoingPassword` property:

```
<Property value="->
/Farm_base_domain/base_domain/server_soa/usermessagingdriver-email:
OutgoingPasswordouser" encodedCredential="true"
type="java.lang.String" mandatory="no" name="OutgoingPassword"
description="oracle.sdp.messaging.EmailDriverConfig.outgoingPassword"/>
```

### 27.4.1.3 Configuring the Messaging Extension Driver

The extension driver extends the messaging capability of the User Messaging Service by enabling support for arbitrary administrator-defined channels (protocols) and delivering the notifications for such channels to an administrator-defined web service listener endpoint.

---

**Note:** An instance of this driver is deployed, but not targeted to any servers in the default installation. To enable this driver instance, it must be targeted to the appropriate servers where UMS (`usermessagingserver`) is running.

---

**27.4.1.3.1 Driver Application Archive (EAR)** The EAR file is `$oracle_home/communications/applications/sdpmessagingdriver-extension.ear`.

**27.4.1.3.2 Common Properties** These are common driver properties that are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties (such as `sendingqueuesinfo`) are for advanced use and only require modification for advanced deployment topologies. See [Table 27–2](#). For a complete description of these properties and available values, see the JavaDoc for `driverconfigpropertynames`.

**Table 27–2 Extension Driver Common Properties**

Name	Description	Mandatory?	Default Value
InstanceName	Instance name (for internal use only)	Yes	Extension-Driver
Capability	Message sending and receiving capability	Yes	SEND
SupportedDeliveryTypes	Supported delivery types	Yes	URI
SupportedContentTypes	Supported content types	Yes	text/plain, text/html, text/xml
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE
Cost	Cost	No	
Speed	Speed	No	
SupportedCarriers	Supported carriers	No	
SupportedProtocols	Supported protocols	No	popup
SupportsCancel	Supports cancel operation on the message	No	False
SupportsReplace	Supports replace operation on the message	No	False
SupportsTracking	Supports tracking operation on the message	No	False
SupportsStatusPolling	Supports status polling operation on the message	No	False
SenderAddresses	Sender addresses	No	
DefaultSenderId	Default sender address	No	

**Table 27-2 (Cont.) Extension Driver Common Properties**

Name	Description	Mandatory?	Default Value
SendingQueuesInfo	Driver sending queue info	Yes	OraSDPM/QueueConnectionFactory:0 raSDPM/Queues/OraSDPMDriverDefSndQ1

**27.4.1.3.3 Custom Properties** This driver supports multiple configuration groups called extension endpoint groups. An extension endpoint group holds the configuration for a remote endpoint at which to deliver extension notifications. Each endpoint must have a distinct combination of protocol and mapped domain. The properties of the extension endpoint group are listed in [Table 27-3](#):

**Table 27-3 Extension Driver Custom Properties**

Name	Description	Mandatory?
Group Name	The name of this extension endpoint configuration group.	Yes
Endpoint URL	Remote endpoint listener URL.	Yes
Mapped Domain	The extension endpoint used to deliver messages where the domain part of the recipient URI matches this value.	No
Protocol	The extension endpoint used to deliver messages where the protocol (scheme) part of the recipient URI matches this value.	Yes
Security Policies	Comma-separated list of WS-Security policies to apply to this endpoint.	No
Username	Username to propagate through WS-Security headers.	No
Keystore Alias	Keystore alias to use for looking up WS-Security policy public keys.	No
Credential Store Key	Key to use for looking up the WS-Security username and password from the Oracle Web Services Management credential store map.	No

**27.4.1.3.4 Extension Driver Security** If the remote extension endpoint is secured using WS-Security, then additional configuration of the extension driver is required. There are two typical WS-Security configurations that are supported. The extension driver can either use SAML tokens or username tokens.

To use extension driver security:

1. To use SAML tokens, the Security Policies configuration property should contain value `oracle/wss11_saml_token_identity_switch_with_message_protection_client_policy`, and the Keystore Alias configuration property should contain a valid alias for keystore entries that is accepted by the remote extension endpoint.
2. To use username tokens, the Security Policies configuration property should contain value `oracle/wss11_username_token_with_message_protection_client_policy`, and the Credential Store Key configuration property should contain a valid alias for a credential store entry that is accepted by the remote extension endpoint.

For more details about using WS-Security policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

**27.4.1.3.5 Client API Messageinfo Support** Table 27–4 describes whether the protocol or driver implementation honors the following message delivery-related properties that are specified through the client API.

**Table 27–4 Client API MessageInfo Support**

Name	Description	Supported?
Expiration	Expiration means how much later in seconds for the message to expire.	False
Delay	Delay means how much later to send the message out.	False

**27.4.1.3.6 Usage Instructions** Perform the following steps to use the extension driver:

To use the extension driver:

1. Implement and deploy a web service listener endpoint based on the MessagingNotifyService WSDL (umsnotify.wsdl):

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<wsdl:definitions xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
 xmlns:tns="http://xmlns.oracle.com/ucs/messaging/extension"
 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 name="MessagingNotifyService"

targetNamespace="http://xmlns.oracle.com/ucs/messaging/extension">

<wsdl:types>

<xsd:schema
targetNamespace="http://xmlns.oracle.com/ucs/messaging/extension">
 <xsd:element name="notification">
 <xsd:complexType>
 <xsd:sequence>
 <xsd:element name="messageId" type="xsd:string" minOccurs="0"
maxOccurs="1">
 <xsd:annotation>
 <xsd:documentation>Unique message identifier from User
Messaging Service.</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 <xsd:element name="sender" type="xsd:string">
 <xsd:annotation>
 <xsd:documentation>The sender address.</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 <xsd:element name="recipient" type="xsd:string">
 <xsd:annotation>
 <xsd:documentation>The recipient address (typically
username).</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 <xsd:element name="subject" type="xsd:string" minOccurs="0"
maxOccurs="1">
 <xsd:annotation>
 <xsd:documentation>The subject of the message, if
available.</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 <xsd:element name="contentType" type="xsd:string">
```

```

default="text/plain">
 <xsd:annotation>
 <xsd:documentation>The MIME type of the message. e.g.
text/plain, text/html, text/xml.</xsd:documentation>
 </xsd:annotation>
</xsd:element>
<xsd:element name="content" type="xsd:string">
 <xsd:annotation>
 <xsd:documentation>The main body of the message. Textual
content only (no binary content).</xsd:documentation>
 </xsd:annotation>
</xsd:element>
<xsd:element name="parameters" type="tns:parameter" minOccurs="0"
maxOccurs="unbounded">
 <xsd:annotation>
 <xsd:documentation>Additional key-value pairs. This interface
does not define any specific key-value pair meanings. Use of such parameters
is defined on a private basis by particular implementations of this interface.
 </xsd:documentation>
 </xsd:annotation>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:complexType name="parameter">
 <xsd:sequence>
 <xsd:element name="name" type="xsd:string">
 <xsd:annotation>
 <xsd:documentation>Parameter name</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 <xsd:element name="value" type="xsd:string">
 <xsd:annotation>
 <xsd:documentation>Parameter value</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 </xsd:sequence>
</xsd:complexType>
<xsd:element name="notificationResponse">
 <xsd:complexType>
 <xsd:sequence>
 <xsd:element name="messageId" type="xsd:string" minOccurs="0"
maxOccurs="1">
 <xsd:annotation>
 <xsd:documentation>A message identifier returned in response to
successfully accepting the message. If returned, the identifier should be
unique. Note: A fault is raised if the message cannot be
accepted.</xsd:documentation>
 </xsd:annotation>
 </xsd:element>
 </xsd:sequence>
 </xsd:complexType>
</xsd:element>
<xsd:element name="notificationFault">
 <xsd:complexType>
 <xsd:sequence>
 <xsd:element name="code" type="xsd:string"/>
 <xsd:element name="message" type="xsd:string"/>
 </xsd:sequence>
 </xsd:complexType>
</xsd:element>

```

```

 </xsd:schema>
 </wsdl:types>
 <wsdl:message name="notifyRequest">
 <wsdl:part element="tns:notification" name="parameters" />
 </wsdl:message>
 <wsdl:message name="notifyResponse">
 <wsdl:part element="tns:notificationResponse" name="parameters" />
 </wsdl:message>
 <wsdl:message name="notifyException">
 <wsdl:part element="tns:notificationFault" name="parameters" />
 </wsdl:message>
 <wsdl:portType name="Notify">
 <wsdl:operation name="invoke">
 <wsdl:input message="tns:notifyRequest" />
 <wsdl:output message="tns:notifyResponse" />
 <wsdl:fault message="tns:notifyException" name="NotifyException" />
 </wsdl:operation>
 </wsdl:portType>
 <wsdl:binding name="NotifySOAPBinding" type="tns:Notify">
 <soap:binding style="document"
 transport="http://schemas.xmlsoap.org/soap/http" />
 <wsdl:operation name="invoke">
 <soap:operation
 soapAction="http://www.oracle.com/ucs/messaging/extension" />
 <wsdl:input>
 <soap:body use="literal" />
 </wsdl:input>
 <wsdl:output>
 <soap:body use="literal" />
 </wsdl:output>
 <wsdl:fault name="NotifyException">
 <soap:fault name="NotifyException" use="literal" />
 </wsdl:fault>
 </wsdl:operation>
 </wsdl:binding>

 <wsdl:service name="NotifyService">
 <wsdl:port binding="tns:NotifySOAPBinding" name="Notify">
 <soap:address location="http://localhost:8001/NotifyService"/>
 </wsdl:port>
 </wsdl:service>

```

**2. Configure the extension driver.**

- a. Target the predeployed extension driver called `usermessagingdriver-extension` or a new deployment to the appropriate servers where UMS (`usermessagingserver`) is running and start the driver.
- b. In Enterprise Manager Fusion Middleware Control, navigate to the `usermessagingserver` home page.
- c. Click **User Messaging Service > Driver Properties**.
- d. Select and Edit the driver `usermessagingdriver-extension` or create a new driver with the same name as your new driver deployment.
- e. Under **Driver-Specific Configuration**, add a new extension endpoint configuration group and specify the correct properties: **EndpointURL** is the URL to the web service listener endpoint created in Step 1. **Protocol** is the

value of the new messaging channel for which you want to add notification support (for example, **popup**).

- f. Under **Common Configuration**, update **Supported Protocols** with a comma-separated list of protocols defined in each Extension Endpoint group.
- g. Click **OK** to save the configuration.

This completes the configuration and integration of a new messaging channel (protocol) in UMS using the extension driver.

To send notifications to this new channel (protocol), recipients must be specified for the URI delivery type using the URI addressing format:

*URI:scheme:scheme-specific-address-value*

where *scheme* is the protocol. The URI delivery type is optional. For example, if the extension driver was configured to support the protocol *popup*, an application can compose a message to *popup:john.doe@example.com*.

End users can also declare their messaging preferences by creating a new messaging channel for the new channel type in the Worklist/UMS Preferences UI. User preferences are only applied when applications send user-based notifications (that is, to recipients of the form *USER:username*).

---

**Note:** Proper configuration of SSL/TLS in the Oracle WebLogic Server container is a prerequisite for secure connections between UMS and the email server. See "Configuring SSL" in *Oracle Fusion Middleware Securing Oracle WebLogic Server*.

---

#### 27.4.1.4 Configuring the Email Driver

The email driver both sends and receives messages (that is, its **capability** property is set to **both** by default). The email driver sends messages over SMTP and uses either IMAP or POP3 for receiving messages.

---

**Note:** For information about configuring the email driver with human workflow from the Workflow Notification Properties page, see [Section 21.1, "Configuring Human Workflow Notification Properties."](#)

For troubleshooting Human Workflow Notification issues, see [Table 27–29, "Troubleshooting UMS"](#).

---

**27.4.1.4.1 Email Driver Interoperability** This section details interoperability features of the email driver.

The email driver is compatible with these protocols: POP3, IMAP4, and SMTP.

---

**Note:** Oracle suggests that you specify IMAP as the protocol in a high-availability environment.

---

Email driver features include:

- Automatic connection retry
- SMTP for message sending
- IMAP4 and POP3 for message receiving (using polling)

- scalable, highly available
- Message loss prevention and duplication avoidance

The gateway vendors and versions in [Table 27–5](#) have been verified.

**Table 27–5 Email Driver Gateway Vendors and Versions**

Vendor	Version
Oracle Beehive	Release 1 (1.4.3)
Oracle Collaboration Suite	10g Release 1 (10.1.2)
Microsoft Exchange	2003
Dovecot (IMAP4/POP3)	0.99.11
sendmail (SMTP)	8.13.1

**27.4.1.4.2 Common Properties** [Table 27–6](#) lists common driver properties that are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties such as `sendingqueuesinfo` are for advanced use and only require modification for advanced deployment topologies. For a complete description of these properties and available values, see the JavaDoc of `driverconfigpropertynames`.

**Table 27–6 Common Email Properties**

Name	Description	Mandatory	Default Value
InstanceName	Instance name (for internal use only)	Yes	Email-Driver
Capability	Message sending and receiving capability	Yes	Both
SupportedDeliveryTypes	Supported delivery types	Yes	Email
SupportedContentTypes	Supported content types	Yes	text/plain, text/html, multipart/mixed, multipart/alternative, multipart/related
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE, USER_REPLY_ACKNOWLEDGEMENT_SUCCESS, USER_REPLY_ACKNOWLEDGEMENT_FAILURE
Cost	Cost	No	N/A
Speed	Speed	No	N/A
SupportedCarriers	Supported carriers	No	N/A
Supported Protocols	Supported protocols	No	N/A
SupportsCancel	Supports cancel operation on the message	No	False

**Table 27–6 (Cont.) Common Email Properties**

Name	Description	Mandatory	Default Value
SupportsReplace	Supports replace operation on the message	No	False
SupportsTracking	Supports tracking operation on the message	No	False
SupportsStatusPolling	Supports status polling operation on the message	No	False
SenderAddresses	Sender addresses	No	N/A
DefaultSenderAddress	Default sender address	No	N/A
SendingQueuesInfo	Driver sending queue info	Yes	OraSDPM/QueueConnectionFactory:OraSDPM/Queues/OraSDPMDriverDefSndQ1

**27.4.1.4.3 Email Custom Properties** Table 27–7 lists properties specific to this driver and generally associated with configuring access to the remote gateway and certain protocol or channel-specific behavior.

---

**Note:** The following fields must be configured if UMS is used for incoming emails:

- IncomingMailServer
  - IncomingMailServerPort
  - IncomingMailIDs
  - IncomingUserIDs
  - IncomingUserPasswords
- 

**Table 27–7 Custom Email Properties**

Name	Description	Mandatory?	Default Value
MailAccessProtocol	Email receiving protocol. The possible values are IMAP and POP3. Required only if email receiving is supported on the driver instance.	No	IMAP
RetryLimit	This value specifies the number of times to retry connecting to the incoming mail server, if the connection is lost for some reason. The default value is <b>-1</b> , which means there is no limit to the number of tries.	No	-1

\* These fields must be configured only if UMS is used for incoming emails.

**Table 27–7 (Cont.) Custom Email Properties**

Name	Description	Mandatory?	Default Value
MailDelFreq	The frequency to permanently remove deleted messages. The unit is in seconds and the default value is 600 seconds. A negative value indicates the messages should not be expunged. For the POP3 protocol, the message is expunged after it is processed.	No	600
AutoDelete	This value indicates if the driver should mark the messages deleted after they have been processed. The default is Disabled. For the POP3 protocol, the messages are always deleted right after they are processed.	No	Disabled
Debug	This value indicates if the driver is running in Debug mode. When enabled, JavaMail prints out requests and responses between the email driver and the mail server to Fusion Middleware Control. The default is Disabled.	No	Disabled
CheckMailFreq	The frequency with which to retrieve messages from the mail server. The unit is in seconds and the default value is 30 seconds.	No	30
ReceiveFolder	The name of the folder from which the driver is polling messages. The default value is INBOX.	No	INBOX
OutgoingMailServer	The name of the SMTP server. This is mandatory only if email sending is required.	No	N/A
OutgoingMailServerPort	The port number of the SMTP server; typically 25.	No	25
OutgoingMailServerSecurity	The security setting used by the SMTP server. Possible values are None, TLS, and SSL. The default value is None.	No	None
OutgoingDefaultFromAddress	The default FROM address (if one is not provided in the outgoing message).	No	N/A
OutgoingUsername	The username used for SMTP authentication. Required only if SMTP authentication is supported by the SMTP server.	No	N/A

\* These fields must be configured only if UMS is used for incoming emails.

**Table 27-7 (Cont.) Custom Email Properties**

Name	Description	Mandatory?	Default Value
OutgoingPassword	The password used for SMTP authentication. This is required only if SMTP authentication is supported by the SMTP server. This includes Type of Password (choose from Indirect Password/Create New User, Indirect Password/Use Existing User, and Use Cleartext Password) and Password.	No	N/A
IncomingMailServer	The hostname of the incoming mail server. Required only if email receiving is supported on the driver instance.	No*	N/A
IncomingMailServerPort	Port number of IMAP4 (that is, <b>143</b> or <b>993</b> ) or POP3 (that is, <b>110</b> or <b>995</b> ) server.	No*	N/A
IncomingMailServerSSL	Indication to enable SSL when connecting to IMAP4 or POP3 server. The default is Disabled.	No*	Disabled
IncomingMailIDs	The email addresses corresponding to the user names. Each email address is separated by a comma and must reside in the same position in the list as their corresponding user name appears on the usernames list. Required only if email receiving is supported on the driver instance.	No*	N/A
IncomingUserIDs	The list of user names of the mail accounts from which the driver instance is polling. Each name must be separated by a comma, for example, foo,bar. This is required only if email receiving is supported on the driver instance.	No*	N/A
IncomingUserPasswords	The list of passwords corresponding to the user names. Each password is separated by a comma and must reside in the same position in the list as their corresponding user name appears on the usernames list. This is required only if email receiving is supported on the driver instance. This includes Type of Password (choose from Indirect Password/Create New User, Indirect Password/Use Existing User, and Use Cleartext Password) and Password.	No*	N/A

\* These fields must be configured only if UMS is used for incoming emails.

**Table 27–7 (Cont.) Custom Email Properties**

Name	Description	Mandatory?	Default Value
ProcessingChunkSize	The number of messages processed during each message polling. The default is 100.	No	100
ImapAuthPlainDisable	Indication to disable or enable plain text authentication (AUTHENTICATE PLAIN command) for IMAP user authentication. The default is Disabled.	No	Disabled. When this property is disabled, that means that plain text is allowed.

\* These fields must be configured only if UMS is used for incoming emails.

**27.4.1.4.4 Client API Messageinfo Support** These properties are message delivery-related that are specified through client API. Table 27–8 describes if the protocol or driver implementation honors such properties.

**Table 27–8 Client API MessageInfo Support**

Name	Description	Support
Expiration	Expiration means how long the message may exist until it expires.	False
Delay	Delay means the amount of time that must elapse before the message is sent.	False

#### 27.4.1.5 Configuring the SMPP Driver

Short Message Peer-to-Peer (SMPP) is a popular GSM SMS protocols. User Messaging Service includes a prebuilt implementation of the SMPP protocol as a driver that can send and receive short messages. If the sending feature is enabled, the SMPP driver opens one TCP connection to the Short Message Service Center (SMS-C) as a transmitter for sending. If the driver's receiving feature is enabled, it opens another connection to the SMS-C as a receiver for receiving. Only two TCP connections (both initiated by the driver) are needed for all communication between the driver and the SMS-C.

---

**Note:** The SMPP Driver implements Version 3.4 of the SMPP protocol and only supports connections to an SMS-C or an SMS gateway that supports this version.

---

##### 27.4.1.5.1 SMPP Driver Interoperability

This section details interoperability features of the SMPP Driver.

The SMPP driver is compatible with this protocol: SMPP v3.4.

SMPP driver features include:

- Automatic connection retry
- HTTP proxy for firewall traversal
- Authentication configuration
- Configurable chunk size

- Bulk Sending
- Encoding: UCS2, IA5, GSM\_DEFAULT
- Priority Setting
- Configurable Window size
- Plain text content only

The Gateway vendors in [Table 27–9](#) have been verified.

**Table 27–9 SMPP Driver Gateway Vendors**

Vendor
Syniverse
Clickatell
Logica CMG
OpenSMPP (simulator)

**27.4.1.5.2 Common Properties** [Table 27–10](#) lists common driver properties that are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties such as `SendingQueuesInfo` are for advanced use and only require modification for advanced deployment topologies. For a complete description of these properties and available values see the JavaDoc of `DriverConfigPropertyNames`.

**Table 27–10 Common SMPP Properties**

Name	Description	Mandatory	Default Value
InstanceName	Instance name (for internal use only)	Yes	SMPP-Driver
Capability	Message sending and receiving capability	Yes	Both
SupportedDeliveryTypes	Supported delivery types	Yes	SMS
SupportedContentTypes	Supported content types	Yes	text/plain
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE
Cost	Cost	No	N/A
Speed	Speed	No	N/A
SupportedCarriers	Supported carriers	No	N/A
Supported Protocols	Supported protocols	No	N/A
SupportsCancel	Supports cancel operation on the message	No	False
SupportsReplace	Supports replace operation on the message	No	False
SupportsTracking	Supports tracking operation on the message	No	False

**Table 27–10 (Cont.) Common SMPP Properties**

Name	Description	Mandatory	Default Value
SupportsStatusPolling	Supports status polling operation on the message	No	False
SenderAddresses	Sender addresses	No	N/A
DefaultSenderId	Default sender address	No	N/A
SendingQueuesInfo	Driver sending queue info	Yes	OraSDPM/QueueConnectionFactory:OraSDPM/Queues/OraSDPMDriverDefSndQ1

**27.4.1.5.3 Custom Properties** Table 27–11 lists properties specific to this driver and generally associated with configuring access to the remote gateway and certain protocol or channel-specific behavior.

**Table 27–11 Custom SMPP Properties**

Name	Description	Mandatory?	Default Value
SmsAccountId	The Account Identifier on the SMS-C.	Yes	N/A
SmsServerHost	The name (or IP address) of the SMS-C server.	Yes	N/A
TransmitterSystemId	The account ID that is used to send messages.	Yes	N/A
ReceiverSystemId	The account ID that is used to receive messages.	Yes	N/A
TransmitterSystemType	The type of transmitter system. The default is Logica.	Yes	The default value is Logica.
ReceiverSystemType	The type of receiver system. The default is Logica.	Yes	The default value is Logica.
TransmitterSystemPassword	The password of the transmitter system. This includes Type of Password (choose from Indirect Password/Create New User, Indirect Password/Use Existing User, and Use Cleartext Password) and Password.	Yes	N/A
ReceiverSystemPassword	The password for the receiver system. This includes Type of Password (choose from Indirect Password/Create New User, Indirect Password/Use Existing User, and Use Cleartext Password) and Password.	Yes	N/A
ServerTransmitterPort	The TCP port number of the transmitter server.	Yes	N/A
ServerReceiverPort	The TCP port number of the receiver server.	Yes	N/A

**Table 27–11 (Cont.) Custom SMPP Properties**

Name	Description	Mandatory?	Default Value
DefaultEncoding	The default encoding of the SMPP driver. The default is IA5. Choose from the drop-down list: IA5, UCS2, and GSM_DEFAULT.	No	IA5
EncodingAutoDetect	If enabled, the SMPP driver encodes automatically. The default is Enabled.	No	Enabled
LocalSendingPort	The local TCP port used by the SMPP driver to send messages to the SMS-C.	No	N/A
LocalReceivingPort	The local TCP port used by the SMPP driver to receive messages from the SMS-C.	No	N/A
LocalAddress	The hostname (or IP address) of the server that hosts the SMPP driver.	No	N/A
WindowSize	The window size for SMS. This value must be a positive number. Default is 1.	No	1
EnquireInterval	The interval, in seconds, to send an enquire message to the SMS-C. The default is 30 seconds.	No	30
ThrottleDelay	The delay, in seconds, between throttles. Default is 30.	No	30
BindRetryDelay	The minimum delay, in seconds, between bind entry attempts. Default is 30.	No	30
ResponseTimer	Time lapse allowed between SMPP request and response, in seconds. The default is 30.	No	30
RegisteredDeliveryMask	The registered delivery bit mask. The default is 0xFF, which does not change the delivery flag value.	No	0xFF
RangeSetNull	Set to true to set the address range field of BIND_RECEIVER to null. Set to false (the default value) to set the address range field to SmsSystemId. The default is Disabled.	No	Disabled
PriorityAllowed	The highest priority allowed for the SMPP driver. The range is 0 (normal) to 3 (highest). The default is 0.	No	0
BulkSending	Setting this value to enabled (the default) enables sending messages in bulk to the SMS-C.	No	Enabled

**Table 27–11 (Cont.) Custom SMPP Properties**

Name	Description	Mandatory?	Default Value
PayloadSending	If you enable this property, the SMPP driver always uses the message_payload parameter that is defined in the SMPP specification, while sending a message to the SMS-C. The default is Disabled.	No	Disabled
SourceTon	The type of number (TON) for ESME address(es) served through SMPP receiver session. The default is 0.	No	0
SourceNpi	The numbering plan indicator (NPI) for ESME address(es) served through the SMPP receiver session. The default is 0.	No	0
DestinationTon	The TON for destination. The default is 0.	No	0
DestinationNpi	The NPI for destination. The default is 0.	No	0
ExtraErrorCode	A comma-separated list of error codes.	No	N/A
MaxChunks	The maximum SMS chunks for a message. The default is -1 (no maximum).	No	-1 (no maximum)
ChunkSize	The size of each SMS message chunk. Default is 160.	No	160
LongMessageSending	Supports sending long messages. The default is Disabled.	No	Disabled
DatagramMessageMode	Supports datagram message mode. The default is Disabled.	No	Disabled

**27.4.1.5.4 Client API MessageInfo Support** These properties are message delivery-related that are specified through client API. [Table 27–12](#) describes if the protocol or driver implementation honors such properties.

**Table 27–12 Client API MessageInfo Support**

Name	Description	Support
Expiration	Expiration means how long the message may exist until it expires.	True
Delay	Delay means the amount of time that must elapse before the message is sent.	False

#### 27.4.1.6 Configuring the XMPP Driver

The XMPP Driver provides unidirectional and bidirectional access from Oracle Fusion Middleware to end users for real-time IM through the Extensible Messaging and

Presence Protocol (XMPP). This driver enables end users to receive alert notifications or interactively chat with applications through their IM client of choice.

**27.4.1.6.1 Introduction to XMPP** XMPP is an open, XML-based protocol for IM and Presence. XMPP-based software is deployed on thousands of servers across the Internet and is used by millions of people worldwide. XMPP consists of a client/server architecture, which resembles the ubiquitous email network. XMPP servers are completely decentralized, allowing anyone to set up their own server. Messaging is achieved as in the email network, where recipients are addressed by an XMPP ID (or Jabber ID or JID) with the following form:  
`[username]@domain[/resource]`. See RFC 3920 for details on the addressing scheme.

In an XMPP network, users identified by their XMPP IDs as mentioned above (which typically consist of a username and the domain of the XMPP server to which the user connects). An end user of XMPP connects to an XMPP server using an XMPP client to send instant messages to other XMPP users. XMPP, however, is not the only protocol network available for IM. XMPP has an extensible and modular architecture. It integrates with proprietary IM networks, enabling XMPP users to communicate with those on other networks.

To use the XMPP Driver in UMS, you must have access to a Jabber/XMPP server and an XMPP account for the UMS XMPP Driver instance with which to log in.

**27.4.1.6.2 XMPP Driver Interoperability** This section details interoperability features of the XMPP Driver.

The XMPP driver is compatible with these protocols: XMPP (RFC 3920, 3921).

XMPP Driver features include:

- Automatic connection retry
- HTTP proxy for firewall traversal
- Plain text content only

The gateway vendors and versions in [Table 27–13](#) have been verified.

**Table 27–13 XMPP Driver Gateway Vendors and Versions**

Vendor	Version
ejabberd	2.1.3
jabberd2	2.2.14
jabberd14	1.6.1.1-p1
Oracle Beehive	2.0.1.2.1

**27.4.1.6.3 Third-Party Software** The XMPP Driver uses or requires the following third-party software (you may optionally choose to install and configure your own XMPP server):

**Table 27–14 Required Third-Party Software**

Name	Instructions	Version(s)
Apache Smack	This driver uses the Apache Smack XMPP Java library to connect to a Jabber/XMPP IM Server. This driver includes a licensed copy of Smack (version 3.0.4).	3.0.4

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**Note:** You are not required to install your own XMPP Server if you have access to an existing server. For a list of public servers, see <http://www.jabber.org>.

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**27.4.1.6.4 Driver Application Archive (EAR)** The EAR file is \$ORACLE\_HOME/communications/applications/sdpmessagingdriver-xmpp.ear.

**27.4.1.6.5 Common Properties** Table 27–15 lists common driver properties that are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties such as SendingQueuesInfo are for advanced use and only require modification for advanced deployment topologies. For a complete description of these properties and available values, see the JavaDoc of DriverConfigPropertyNames.

**Table 27–15 Common XMPP Properties**

Name	Description	Mandatory	Default Value
InstanceName	Instance name (for internal use only)	Yes	XMPP-IM-Driver
Capability	Message sending and receiving capability	Yes	Both
SupportedDeliveryTypes	Supported delivery types	Yes	IM
SupportedContentTypes	Supported content types	Yes	text/plain
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE
Cost	Cost	No	N/A
Speed	Speed	No	N/A
SupportedCarriers	Supported carriers	No	N/A
Supported Protocols	Supported protocols	No	N/A
SupportsCancel	Supports a cancel operation on the message	No	False
SupportsReplace	Supports a replace operation on the message	No	False
SupportsTracking	Supports a tracking operation on the message	No	False
SupportsStatusPolling	Supports a status polling operation on the message	No	False
SenderAddresses	Sender addresses	No	N/A
DefaultSenderId	Default sender address	No	N/A
SendingQueuesInfo	Driver sending queue information	Yes	OraSDPM/QueueConnectionFactory:OraSDPM/Queues/OraSDPMDriverDefSndQ1

**27.4.1.6.6 XMPP Custom Properties** The XMPP Driver includes the custom properties shown in [Table 27–16](#).

**Table 27–16 Custom XMPP Properties**

Name	Description	Mandatory	Default Values
IMServerHost	Jabber/XMPP server hostname.	No	N/A
IMServerPort	Corresponding Jabber/XMPP server port. The default is 5222.	Yes	5222
IMServerUsername	Jabber/XMPP username with which you log in. You may also enter a complete Jabber ID if its domain name is different from the Jabber/XMPP server hostname (for example: myUserName or myUserName@ <i>xmpp-domain</i> ).  <b>Note:</b> An attempt is made to register this user account if it does not exist and the server supports account registration.	No	N/A
IMServerPassword	Corresponding password for the username listed above. Includes Type of Password (choose from Indirect Password/Create New User, Indirect Password/Use Existing User, Use Cleartext Password) and Password.	No	N/A
SecurityMode	Security mode to use when making a connection to the server. Available options are: None (Security is disabled and only unencrypted connections are used), TLS (Security through TLS encryption is used whenever it is available), and SSL (Security through SSL encryption is used). The default is TLS.	No	TLS
SASLAuthenticationEnabled	Whether to use SASL authentication when logging into the server. If SASL authentication fails, then the driver tries to use non-SASL authentication. By default, SASL is enabled.	No	Enabled

**27.4.1.6.7 Client API MessageInfo Support** These properties are message delivery-related that are specified through the client API. [Table 27–17](#) describes if the protocol or driver implementation honors such properties.

**Table 27–17 Client API MessageInfo Support**

Name	Description	Support
Expiration	Expiration means how long the message may exist until it expires.	False
Delay	Delay means the amount of time that must elapse before the message is sent.	False

### 27.4.1.7 Configuring the VoiceXML Driver

The VoiceXML Driver supports the Genesys VoiceGenie gateway's outbound call protocol to send messages authored in VoiceXML. The gateway delivers the message using text-to-speech synthesis.

#### 27.4.1.7.1 VoiceXML Driver Interoperability

This section details interoperability features of the VoiceXML Driver.

The VoiceXML driver is compatible with this protocol: VoiceXML over HTTP (VoiceGenie gateway protocol).

The VoiceXML driver features include:

- VoiceXML content only

The gateway vendor and version in [Table 27–18](#) has been verified.

**Table 27–18 VoiceXML Driver Gateway Vendor and Version**

Vendor	Version
Genesys VoiceGenie	6.4.2

**27.4.1.7.2 Common Properties** [Table 27–19](#) lists common driver properties that are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties such as SendingQueuesInfo are for advanced use and only require modification for advanced deployment topologies. For a complete description of these properties and available values, see the JavaDoc of DriverConfigPropertyNames.

**Table 27–19 Common VoiceXML Properties**

Name	Description	Mandatory	Default Value
InstanceName	Instance name (for internal use only)	Yes	VoiceXML-Driver
Capability	Message sending and receiving capability	Yes	SEND
SupportedDeliveryType s	Supported delivery types	Yes	VOICE
SupportedContentTypes	Supported content types	Yes	text/vxml, text/x-vxml
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_ GATEWAY_SUCCESS, DELIVERY_TO_ GATEWAY_FAILURE
Cost	Cost	No	N/A
Speed	Speed	No	N/A
SupportedCarriers	Supported carriers	No	N/A
Supported Protocols	Supported protocols	No	N/A
SupportsCancel	Supports cancel operation on the message	No	False
SupportsReplace	Supports replace operation on the message	No	False

**Table 27–19 (Cont.) Common VoiceXML Properties**

Name	Description	Mandatory	Default Value
SupportsTracking	Supports tracking operation on the message	No	False
SupportsStatusPolling	Supports status polling operation on the message	No	False
SenderAddresses	Sender Addresses	No	N/A
DefaultSenderIdAddress	Default Sender Address	No	N/A
SendingQueuesInfo	Driver Sending Queue Info	Yes	OraSDPM/QueueConnectionFactory:OraSDPM/Queues/OraSDPMDriverDefSndQ1

**27.4.1.7.3 VoiceXML Custom Properties** The VoiceXML Driver includes the custom properties shown in [Table 27–20](#).

**Table 27–20 Custom VoiceXML Properties**

Name	Description	Mandatory	Default Values
VoiceXMLOutboundServletURI	The URL of the VoiceXML gateway.	Yes	N/A
VoiceXMLOutboundServletUserName	The user name of the VoiceXML gateway.	No	N/A
VoiceXMLOutboundServletPassword	The password of the user of the VoiceXML gateway.	No	N/A
VoiceXMLOutboundServletDNIS	The number that should appear in the recipient's caller ID display.	No	N/A
VoiceXMLReceiveURL	The URL of this driver's servlet that handles incoming requests from the VoiceXML Gateway. The format is <code>http://host:port/usermessagingdriver-voicexml/receive</code> . The default behavior, if this property is not set, is to use the local container's HTTP listener host and port. The default behavior only works for the first driver instance. For additional instances, the context root is different and this property must be configured using the correct context root replacement for <code>/sdpmessagingdriver-voicexml</code> .	No	N/A

---

**Note:** In a clustered (high-availability) environment with Oracle HTTP Server (OHS) configured, do not use the OHS port to configure the VoiceXML driver receive URLs. Using the OHS port to configure the VoiceXML driver receive URLs causes a conflict with the drivers.

Each VoiceXML driver must be configured with its own WLS server's port.

---

**27.4.1.7.4 Client API MessageInfo Support** These properties are message delivery related which are specified through client API. [Table 27–21](#) describes if the protocol or driver implementation honors such properties.

**Table 27-21 Client API MessageInfo Support**

Name	Description	Support
Expiration	Expiration means how long the message may exist until it expires.	False
Delay	Delay means the amount of time that must elapse before the message is sent.	False

#### 27.4.1.8 Configuring the Worklist Driver

The Worklist driver enables notifications from all sources to be sent to users in the form of worklist tasks for integration into the users' WebCenter Portal Unified Worklist.

---

**Note:** Worklist message tasks are accessible both through an Oracle WebCenter Portal that has been configured to search the BPEL connection to which the worklist message driver is sending messages, and through Oracle BPM Worklist. Oracle BPM Worklist also shows these message-based tasks as worklist items.

---

This integration is achieved by exposing a worklist channel (delivery type) to applications and end users. Messages sent through the user's worklist channel are processed by the worklist driver.

---

**Note:** The worklist channel supports all rich text tags supported by the af:richTextEditor for the text/html content type. For more information about the Rich Text Editor, see <af:richTextEditor>.

---

The User Messaging Service API semantics are the same as those for existing channels such as IM or email. *This driver handles sending messages only.* The driver Application Archive (EAR) is located at: \$ORACLE\_HOME/communications/applications/sdpmessagingdriver-worklist.ear

You can install the Worklist Driver onto an Oracle WebLogic platform, or onto an IBM WebSphere platform. Choose the appropriate installation instructions below.

**27.4.1.8.1 Install the Worklist Driver on the Oracle WebLogic Server Platform** To enable the messaging worklist feature, the WebLogic SOA domain must be extended using the extension template available at \$ORACLE\_HOME/common/templates/applications/oracle.ums.driver.worklist\_template\_11.1.1.jar.

To extend a SOA domain using the Oracle Fusion Middleware Configuration Wizard:

1. Launch Oracle Fusion Middleware Configuration Wizard (\$ORACLE\_HOME/common/bin/config.sh or %ORACLE\_HOME%\common\bin\config.cmd).
2. Select the *Extend an existing WebLogic domain* option.
3. Select the desired SOA domain directory.
4. Select the *Extend my domain using an existing extension template* option.
5. Click **Browse**, and navigate to \$ORACLE\_HOME/common/templates/applications
6. Select oracle.ums.driver.worklist\_template\_11.1.1.jar

7. Complete the remaining steps of the Oracle Fusion Middleware Configuration Wizard, and restart the SOA servers.

---

**Note:** *Special Considerations if the SOA managed server is on a remote computer:* The oracle.ums.driver.worklist\_template\_11.1.1.jar extension template includes a SOA composite application (sca\_sdpmessagingsca-worklist-composite\_rev1.0.jar) that is copied to \$DOMAIN\_HOME/soa/autodeploy, and is auto-deployed by the SOA Infra runtime upon server restart. However, if the SOA Infra runtime is on a remote computer, and the domain is packed with the -managed=true option (the correct option to use), this directory is not included in the archive. Thus, the composite is not deployed upon restarting the SOA managed server.

To complete the installation, copy the contents of \$DOMAIN\_HOME/soa/autodeploy from the AdminServer computer to the corresponding location on the remote computer with the SOA managed server, and restart the SOA managed server. You may have to create the directory structure soa/autodeploy under \$DOMAIN\_HOME on the remote computer.

---

**27.4.1.8.2 Install the Worklist Driver on IBM WebSphere Platform** To enable the messaging worklist feature, the WebSphere SOA cell must be extended using the extension template available at \$ORACLE\_HOME/common/templates/was/oracle.ums.driver.worklist\_template\_11.1.1.jar.

To extend a SOA cell using the Oracle Fusion Middleware Configuration Wizard:

1. Set the environment variable CONFIG\_JVM\_ARGS with the value -DTemplateCatalog.enable.selectable.all=true. For example, in Linux bash shell: export CONFIG\_JVM\_ARGS="-DTemplateCatalog.enable.selectable.all=true"  
At the Windows command prompt: set CONFIG\_JVM\_ARGS=-DTemplateCatalog.enable.selectable.all=true
2. Launch Oracle Fusion Middleware Configuration Wizard (\$ORACLE\_HOME/common/bin/was\_config.sh or %ORACLE\_HOME%\common\bin\was\_config.cmd).
3. Click **Select and Configure Existing Cell**.
4. Select the desired SOA cell and click **Next**.
5. Select **Oracle User Messaging Service Worklist Driver** on the *Add Products to Cell* screen and click **Next**.
6. Complete the remaining steps of the Oracle Fusion Middleware Configuration Wizard with default selections, and restart the SOA cell.

**27.4.1.8.3 Common Properties** The common driver properties shown in [Table 27-22](#) are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties such as SendingQueuesInfo are for advanced use and only require modification for advanced deployment topologies. For a complete description of these properties and available values, see the JavaDoc of DriverConfigPropertyNames.

**Table 27–22 Common Worklist Properties**

Name	Description	Mandatory?	Default Value
InstanceName	Instance name (for internal use only)	Yes	Worklist-Driver
Capability	Message sending and receiving capability	Yes	SEND
SupportedDeliveryTypes	Supported delivery types	Yes	WORKLIST
SupportedContentTypes	Supported content types	Yes	text/plain, text/html
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE
Cost	Cost	No	N/A
Speed	Speed	No	N/A
SupportedCarriers	SupportedCarriers	No	N/A
SupportedProtocols	SupportedProtocols	No	N/A
SupportsCancel	Supports cancel operation on the message	No	False
SupportsReplace	Supports replace operation on the message	No	False
SupportsTracking	Supports tracking operation on the message	No	False
SupportsStatusPolling	Supports status polling operation on the message	No	False
SenderAddresses	Sender addresses	No	N/A
DefaultSenderId	Default sender address	No	N/A
SendingQueuesInfo	Driver sending queue information	Yes	OraSDPM/QueueConnectionFactory:OraSDPM/Queues/OraSDPMDriverDefSendQ1

**27.4.1.8.4 Custom Properties** The custom property shown in [Table 27–23](#) is available.

**Table 27–23 Custom Worklist Property**

Name	Description	Mandatory	Default Value
BPELConnectionURL	The URL of the BPEL server to connect to. The format is 'http://<bpel-host>:<bpel-port>'. The default behavior, if this property is not set, is to use the local container's HTTP connection URL.		

**27.4.1.8.5 Client API MessageInfo Support** Table 27–24 shows if the protocol or driver implementation honor the following message delivery-related properties that are specified through the client API.

**Table 27–24 Client API MessageInfo Support**

Name	Description	Support
Expiration	Expiration means how long the message may exist until it expires.	False
Delay	Delay means the amount of time that must elapse before the message is sent.	False

#### 27.4.1.9 Configuring the Proxy Driver

The Proxy Driver acts as a Messaging Web Service client to a Fusion Middleware Messaging server hosted elsewhere in the intranet or Internet. It uses SOAP over HTTP (the Parlay X Multimedia Web Service protocol) to send messages and receive messages and return message delivery status. The ParlayX Web Service relays messages from one UMS instance to another. It can relay traffic from multiple instances in an Intranet to a terminating instance that has all of the protocol-specific drivers configured to an external gateway such as an SMSC, or to an SMTP or IMAP mail server.

**27.4.1.9.1 Common Properties** Table 27–25 shows common driver properties that are indicative of the capabilities of this driver for use by the messaging engine when routing outbound messages. Some properties are set by the driver developer and do not normally require modification, while others can be modified by the administrator to change the routing behavior. Some properties such as SendingQueuesInfo are for advanced use and only require modification for advanced deployment topologies. For a complete description of these properties and available values, see the JavaDoc of DriverConfigPropertyNames.

**Table 27–25 Common Proxy Properties**

Name	Description	Mandatory	Default Value
InstanceName	Instance name (for internal use only)	Yes	Proxy-Driver
Capability	Message sending and receiving capability	Yes	SEND
SupportedDeliveryTypes	Supported delivery types	Yes	EMAIL, SMS, VOICE, IM, WORKLIST
SupportedContentTypes	Supported content types	Yes	*
SupportedStatusTypes	Supported status types	No	DELIVERY_TO_GATEWAY_SUCCESS, DELIVERY_TO_GATEWAY_FAILURE
Cost	Cost	No	N/A
Speed	Speed	No	N/A
SupportedCarriers	Supported carriers	No	N/A
Supported Protocols	Supported protocols	No	N/A
SupportsCancel	Supports cancel operation on the message	No	False

**Table 27–25 (Cont.) Common Proxy Properties**

Name	Description	Mandatory	Default Value
SupportsReplace	Supports replace operation on the message	No	False
SupportsTracking	Supports tracking operation on the message	No	False
SupportsStatusPolling	Supports status polling operation on the message	No	False
SenderAddresses	Sender addresses	No	N/A
DefaultSenderId	Default sender address	No	N/A
SendingQueuesInfo	Driver sending queue information	Yes	OraSDPM/QueueConnectionFactory:OraSDPM/Queues/OraSDPMDriverDefSendQ1

**27.4.1.9.2 Proxy Custom Properties** The Proxy Driver includes the custom properties shown in [Table 27–26](#).

**Table 27–26 Custom Proxy Properties**

Name	Description	Mandatory	Default Values
GatewayURL	The URL to the hosted 11g UMS Web Service gateway. The URL is in the following format:  http://<host>:<port>/sdpmessaging/parlayx /SendMessageService	Yes	N/A
Username	Username of the messaging gateway.	No	N/A
Password	The password of the username	No	N/A
Policies	Comma-delimited list of Oracle Web Services Manager WS-Security policies to be attached to proxy driver requests	No	N/A

**27.4.1.9.3 Client API MessageInfo Support** These properties are message delivery related which are specified through client API. [Table 27–27](#) describes if the protocol or driver implementation honors such properties.

**Table 27–27 Client API MessageInfo Support**

Name	Description	Support
Expiration	<i>Expiration</i> means how long the message may exist until it expires.	False
Delay	<i>Delay</i> means the amount of time that must elapse before the message is sent.	False

## 27.5 Configuring User Messaging Service Access to the LDAP User Profile

As part of the LDAP provider setup in a SOA deployment, you configure the "User Name Attribute" through the WebLogic Server Administration Console. If you configure that attribute with a value other than the default "cn" or if the user's email address is stored in an LDAP attribute which is different from "mail", you must make

an additional configuration change in Oracle Platform Security Services (OPSS) for UMS to successfully access the user profile to obtain the list of communication channels provisioned in LDAP, such as business email.

For more information about Oracle Platform Security Services (OPSS), see *Oracle Fusion Middleware Application Security Guide*.

To configure access to the LDAP user profile:

1. Modify the `jps-config.xml` file in the `$DOMAIN_HOME/config/fmwconfig` directory by adding a `<property>` element in the `idstore.ldap serviceInstance` section.

- To use the value of the User Name Attribute while searching the back-end LDAP server for user profile, add the following element:

```
<property name="username.attr" value="username_attribute_value"/>
```

where `username_attribute_value` is the value of the User Name Attribute property in the LDAP provider configuration. For instance, if the value of the User Name Attribute is `mail`, add the following line:

```
<property name="username.attr" value="mail"/>
```

The following sample code shows the above line inserted in the `jps-config.xml` file:

```
<!-- JPS WLS LDAP Identity Store Service Instance -->

<serviceInstance name="idstore.ldap" provider="idstore.ldap.provider">

 <property name="idstore.config.provider"
 value="oracle.security.jps.wls.internal.idstore.WlsLdapIdStoreConfigProvide
r"/>

 <property name="CONNECTION_POOL_CLASS"
 value="oracle.security.idm.providers.stdldap.JNDIPool"/>

 <property name="username.attr" value="mail"/>

</serviceInstance>
```

- If the LDAP attribute containing the user's business email addresses is something other the `mail` attribute, add the following element:

```
<property name="PROPERTY_ATTRIBUTE_MAPPING" value="BUSINESS_EMAIL=attr_
containing_email"/>
```

where `attr_containing_email` is the attribute name in the LDAP provider that contains the user's email address. For instance, if the user attribute containing the email address is `externalEmail`, add the following line:

```
<property name="PROPERTY_ATTRIBUTE_MAPPING" value="BUSINESS_
EMAIL=externalEmail"/>
```

The following sample code shows the above line inserted in the `jps-config.xml` file:

```
<!-- JPS WLS LDAP Identity Store Service Instance -->

<serviceInstance name="idstore.ldap" provider="idstore.ldap.provider">

 <property name="idstore.config.provider"
 value="oracle.security.jps.wls.internal.idstore.WlsLdapIdStoreConfigProvide
```

```

r"/>

<property name="CONNECTION_POOL_CLASS"
value="oracle.security.idm.providers.stdldap.JNDIPool"/>

<property name="PROPERTY_ATTRIBUTE_MAPPING" value="BUSINESS_
EMAIL=externalEmail"/>

</serviceInstance>

```

---

**Note:** You may have other properties defined in the same section.

---

2. Restart your domain.

## 27.6 Securing the Oracle User Messaging Service

The User Messaging Preferences User Interface and the Parlay X Web Services can be secured at the transport-level using Secure Sockets Layer (SSL). By default, all deployed web services are unsecured. Web Service Security should be enabled for any services that are deployed in a production environment.

- To enable SSL in the Oracle WebLogic Server, see "Configure SSL for Oracle WebLogic Server" in the *Oracle Fusion Middleware Administrator's Guide*. This step is sufficient to secure the User Messaging Preferences User Interface.
- To secure the Parlay X Web Services, see "Configuring Transport-Level Security" in the *Securing WebLogic Web Services*.

UMS supports the use of Oracle Web Services Manager WS-Security policies to protect UMS web services. For more information about Oracle Web Services Manager, see "Using Oracle Web Service Security Policies", in *Oracle Fusion Middleware Securing WebLogic Web Services for Oracle WebLogic Server*.

The recommended security configuration for web services uses Security Assertion Markup Language (SAML) tokens to pass identities between web service clients and UMS. With SAML tokens, instead of the web service client passing a username and password to UMS, a trust relationship is established between the client and UMS because of exchanging certificates. Once this keystore configuration is in place, the web service client passes only the user identity, and vouches for the fact that it has authenticated the user appropriately.

The recommended policies to use for UMS web services are:

- oracle/wss11\_saml\_token\_with\_message\_protection\_service\_policy  
(server-side)
- oracle/wss11\_saml\_token\_with\_message\_protection\_client\_policy  
(client-side)
- oracle/wss11\_saml\_token\_identity\_switch\_with\_message\_protection\_client\_policy  
(client-side)

---

**Note:** The choice of client-side policy depends on the security context in which your application is executing.

- If the thread that is making the web service call has the intended Subject associated with it (for example, from a web application that performs user authentication, or a Java EE module with a *run-as* identity defined), then use the policy `oracle/wss11_saml_token_with_message_protection_client_policy`.

The current thread Subject is passed through using the SAML Policy WS-Security headers. In this case you should not specify the parameter `javax.xml.ws.BindingProvider.USERNAME_PROPERTY` when creating your web service client instance.

- If the thread that is making the web service call has an undefined Subject associated with it, or if you must programmatically supply a different identity, then use the policy `oracle/wss11_saml_token_identity_switch_with_message_protection_client_policy`, and specify the parameter `javax.xml.ws.BindingProvider.USERNAME_PROPERTY` when creating your web service client instance. If you want to perform dynamic identity switching, you must grant additional code permissions to your application. For more information, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.
- 

### 27.6.1 Web Service Security on Notification

The different web services include corresponding notification web services (`MessageNotification`, `PresenceNotification`) that run on the client side and receive notifications (message delivery status, message receipt, presence status change) when the appropriate event occurs.

This implementation does not provide for the use of Web Service security (WS-Security) by default during notification of the clients. That is, the server assumes that the notification web services running on the client side do not use WS-Security, and makes no attempt to authenticate itself when sending notifications. If you enable WS-Security on the client side, the notification from the server fails because the notification SOAP request is missing the required headers.

### 27.6.2 Enabling UMS Service Security

To enable a policy for a UMS web service, follow the steps in "Configuring Oracle WSM Security Policies in Administration Console" in *Oracle Fusion Middleware Securing WebLogic Web Services for Oracle WebLogic Server*, selecting policy `oracle/wss11_saml_token_with_message_protection_service_policy`. This configuration must be repeated for each service you want to secure.

### 27.6.3 Enabling Client Security

Web service client security must be enabled programmatically. When using the client libraries described in *Parlay X Messaging Client API and Client Proxy Packages* (in *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*), WS-Security policy configuration is provided when a client object is constructed. The client constructors take an argument of type `Map<String, Object>`. In general when using SAML authentication, the key/value pairs ([Table 27–28](#)) should be added to the configuration

map in addition to other required properties such as the endpoint address.

**Table 27–28 Client Security Keys**

Key	Type	Typical Value
oracle.sdp.parlayx.ParlayXConstants.POLICIES	String[]	oracle/wss11_saml_token_with_message_protection_client_policy
javax.xml.ws.BindingProvider.USERNAME_PROPERTY	String	(optional) <valid username> Note: Do not specify this key while using oracle/wss11_saml_token_with_message_protection_client_policy.
oracle.wsm.security.util.SecurityConstants.Configuration.KEYSTORE_RECIPIENT_ALIAS_PROPERTY	String	(optional) keystore alias for target service. See <a href="#">Client Aliases</a> .

#### **Example 27–1 Web Service Client Security**

```
import oracle.sdp.parlayx.multimedia.messaging.send.SendMessageClient

...
Map<String, Object> config = new HashMap<String, Object>();
config.put(javax.xml.ws.BindingProvider.ENDPOINT_ADDRESS_PROPERTY, ums_url);
config.put(oracle.sdp.parlayx.ParlayXConstants.POLICIES, new String[]
 {"oracle/wss11_saml_token_with_message_protection_client_policy"});

SendMessageClient sendClient = new SendMessageClient(config);
```

#### **27.6.4 Keystore Configuration**

To use the recommended WS-Security policy, you must configure a keystore containing the public and private key information required by OWSM. Refer to "Configuring the Credential Store Using WLST" in *Oracle Fusion Middleware Securing WebLogic Web Services for Oracle WebLogic Server* for information on how to configure the keystore and corresponding credential store entries.

- If both your web service client and UMS server are in the same domain, then they share a keystore and credential store.
- If your web service client and UMS server are in different domains, then you must import the UMS public key into your client domain's keystore, and must import your client domain's public key into the UMS keystore.

#### **27.6.5 Client Aliases**

When using certain WS-Security policies such as the SAML policy recommended here, the client must use the server's public key to encrypt the web service request. However, there is generally only one keystore configured per domain. Therefore, if you have a domain in which there are web service clients that communicate with web services in multiple other domains, then you may be required to override the default keystore entry used by OWSM.

For example, if you have a domain in which application "A" is a web service client to a UMS web service, and application "B" is a web service client to a web service in another domain, then A's requests must be encrypted using the public key of the UMS

domain, and B's requests must be encrypted using the public key of the other domain. You can accomplish this goal by overriding the keystore alias used by OWSM for each request:

- Import (for example) the UMS public key with alias "ums\_public\_key", and the other public key with alias "other\_public\_key".
- When creating an UMS web service client, specify the recipient keystore alias parameter, setting the key to `oracle.wsm.security.util.SecurityConstants.Config.KEYSTORE_RECIPIENT_ALIAS_PROPERTY` and the value to "ums\_public\_key" as shown in [Example 27–2](#).

#### **Example 27–2 Client Aliases**

```
import oracle.sdp.parlayx.multimedia.messaging.send.SendMessageClient

...
Map<String, Object> config = new HashMap<String, Object>();
config.put(javax.xml.ws.BindingProvider.ENDPOINT_ADDRESS_PROPERTY, ums_url);
config.put(oracle.sdp.parlayx.ParlayXConstants.POLICIES, new String[]
{"oracle/wss11_saml_token_with_message_protection_client_policy"});
config.put(javax.xml.ws.BindingProvider.USERNAME_PROPERTY, "test.user1");
config.put(oracle.wsm.security.util.SecurityConstants.Config.KEYSTORE_RECIPIENT_
ALIAS_PROPERTY, "ums_public_key")
SendMessageClient sendClient = new SendMessageClient(config);
```

- The other web service client similarly must override the keystore alias, but the exact mechanism may differ. For example if using a JAX-WS client stub directly, then you can add the override property to the JAX-WS request context. See "Policy Configuration Overrides for the Web Service Client" in *Oracle Fusion Middleware Securing WebLogic Web Services for Oracle WebLogic Server* for more details.

### **27.6.6 Securing JMS Resources**

This (optional) procedure enables administrators to restrict access to the Oracle User Messaging Service's JMS resources (such as queues) for enhanced security.

---

**Note:** This section details steps to follow to secure JMS Resources. If you are starting with a new installation (11g Release 1 11.1.1.3) of Oracle User Messaging Service, then follow these steps.

If you are not upgrading to 11g Release 1 11.1.1.3, then these instructions are not to be used.

If you previously created a domain in an earlier release and are upgrading, but have not already done so, then complete the steps in the latest Release Notes before proceeding.

---

To secure the JMS system resources, lock all JMS sub-deployments that start with the name *UMSJMSSystemResource* (there may be multiple automatically-created resources for UMS in a multi-server or cluster deployment) with the role *OracleSystemRole*. Do this using the Oracle WebLogic Server Administration Console, or you may run a WLST script (available at `$ORACLE_HOME/communications/bin/secure_jms_system_resource.py`) as follows:

```
$ORACLE_HOME/common/bin/wlst.sh
$ORACLE_HOME/communications/bin/secure_jms_system_resource.py
```

```
--username=<admin_username> --password=<password>
--url=t3://<admin-host>:<admin-port> --jmsSystemResource
<UMSJMSSystemResource> --role OracleSystemRole
```

For example:

```
$ORACLE_HOME/common/bin/wlst.sh
$ORACLE_HOME/communications/bin/secure_jms_system_resource.py
--username=weblogic --password=<password> --url=t3://localhost:7001
--jmsSystemResource UMSJMSSystemResource --role OracleSystemRole
```

By default, the UMS system runs as the user *OracleSystemUser* for accessing JMS resources. If the user *OracleSystemUser* does not exist, or you secure the UMS JMS resources with any other role that some other user has been granted, you must override the default user identity used by the UMS system by specifying an alternate username for the following JVM system property when you start the container:

```
oracle.ums.system.user=<username>
```

For example, if the user is *MySystemUser*, you can pass the JVM system property on command line as: -Doracle.ums.system.user=MySystemUser

## 27.7 Troubleshooting Oracle User Messaging Service

To debug User Messaging Service, first check the server diagnostic logs. The logs may contain exception, error, or warning messages that provide details about incorrect behavior along with actions to remedy the problem. [Table 27–29](#) describes additional methods for debugging common User Messaging Service problems.

**Table 27–29 Troubleshooting UMS**

Symptom	Possible Causes	Solutions
Notifications are not being sent from BPEL or Human Workflow components in SOA.	Notification Mode is set to NONE in SOA Workflow Notification configuration.	Change the Notification Mode setting to EMAIL or ALL using Oracle Fusion Middleware Control.
Email notification is not being sent.	The Outgoing (SMTP) Mail Server settings in the UMS Email Driver are incorrect.	<p>Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li>▪ OutgoingMailServer</li> <li>▪ OutgoingMailServerPort</li> </ul> <p><b>Note:</b> Validate the values by using them in any email client for connecting to the SMTP server.</p>
	The SMTP server requires authentication or a secure connection (TLS or SSL).	<p>Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li>▪ OutgoingUsername</li> <li>▪ OutgoingPassword</li> <li>▪ OutgoingMailServerSecurity</li> </ul>

**Table 27-29 (Cont.) Troubleshooting UMS**

Symptom	Possible Causes	Solutions
Notifications are not being sent because of error message: No matching drivers found for sender address = <address>	<p>The UMS Driver for the appropriate channel is configured with a specific list of <i>SenderAddresses</i>, and the message sent by the application has set a non-matching Sender Address.</p> <p><b>Note:</b> UMS Server matches the outbound message's sender address, if set, against the available drivers' <i>SenderAddresses</i> to find a matching driver to use for delivering the message. If a driver has set one or more <i>SenderAddresses</i>, then the UMS Server only sends messages with the matching sender address to it.</p>	<ul style="list-style-type: none"> <li>Check the following settings in the appropriate UMS Driver using Oracle Fusion Middleware Control: <i>SenderAddresses</i>   <b>Note:</b> The format for <i>SenderAddresses</i> is a comma-delimited list of &lt;<i>DeliveryType</i>&gt;:&lt;<i>Address</i>&gt;. For example: EMAIL:sender@example.com, EMAIL:sender@example2.com</li> <li>Leave this property blank, if you want this driver to service outbound messages for all sender addresses for this channel (delivery type).</li> <li>If there are multiple driver instances deployed for the same channel (delivery type) with different configurations, use the <i>SenderAddresses</i> to differentiate the driver instances. For example, one instance can be set with a value in <i>SenderAddresses</i> to only service outbound messages with that matching sender address, while the other instance can keep the <i>SenderAddresses</i> blank to service all outbound messages that do not specify any sender address or one that does not match that of the first driver instance.</li> <li>SenderAddresses that are configured with the incorrect syntax (such as missing &lt;<i>DeliveryType</i>&gt;:) are ignored by the UMS Server for driver selection.</li> </ul>
The email client inconsistently receives notifications.	<p>The Incoming Mail Server settings in the UMS Email Driver are configured with the same email account to which notifications are being sent.</p> <p>If the notification is sent to the same account, the UMS Email Driver may download and process the email before the email client can display it.</p>	<p>Use an exclusive email account for Incoming Mail Server settings. Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li><i>IncomingMailIDs</i></li> <li><i>IncomingUserIDs</i></li> </ul>
SOA Human Workflow notifications are sent, but are not actionable.	The Actionable Email Address is not configured in SOA Workflow Notification Properties.	Set the Actionable Email Address in SOA Workflow Notification Properties with the address of the email account configured in the UMS Email Driver.

**Table 27–29 (Cont.) Troubleshooting UMS**

Symptom	Possible Causes	Solutions
	The Human Workflow task is not set to send actionable notifications.	Set the <i>actionable</i> attribute for the Human Workflow task in JDeveloper and redeploy the SOA composite application.
SOA Human Workflow actionable notifications are sent, but no action is taken after responding.	The Incoming Mail Server settings in the UMS Email Driver are incorrect.	<p>Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li>■ <code>MailAccessProtocol</code> (<i>IMAP</i> or <i>POP3</i>, in uppercase)</li> <li>■ <code>ReceiveFolder</code></li> <li>■ <code>IncomingMailServer</code></li> <li>■ <code>IncomingMailServerPort</code></li> <li>■ <code>IncomingMailServerSSL</code></li> <li>■ <code>IncomingUserIDs</code></li> <li>■ <code>IncomingUserPasswords</code></li> <li>■ <code>ImapAuthPlainDisable</code></li> </ul> <p><b>Note:</b> Validate the values by using them in any email client for connecting to an IMAP or POP3 server.</p>
	The mail access protocol is incorrect.	<p>Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li>■ <code>MailAccessProtocol</code> (<i>IMAP</i> or <i>POP3</i>, in uppercase)</li> </ul>
	The email server is SSL-enabled.	<p>Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li>■ <code>IncomingMailServerSS</code></li> </ul>
	The receive folder name is incorrect.	<p>Check the following settings in the UMS Email Driver using Oracle Fusion Middleware Control:</p> <ul style="list-style-type: none"> <li>■ <code>ReceiveFolder</code></li> </ul> <p><b>Note:</b> Some email servers may expect the value <code>INBOX</code> to be <code>inbox</code> or <code>Inbox</code> (that is, case-sensitive). Based on your email server, use an appropriate value.</p>
	A nondefault email client is configured for receiving notifications. When the user clicks the approval link, the default mail client page opens, which may send emails to a different email server.	Configure the default email client to receive actionable notifications.

**Table 27-29 (Cont.) Troubleshooting UMS**

<b>Symptom</b>	<b>Possible Causes</b>	<b>Solutions</b>
SOA BPEL User Notification or Human Workflow notifications are sent to the correct delivery type (email, sms, and so on) but to the wrong address.	A self-provisioned messaging channel was created by the user in User Messaging Preferences for use in BPEL User Notification or Human Workflow use cases.  <b>Note:</b> The User Messaging Preferences UI allows the end user to create his or her own messaging channel for various use cases, but these are not to be used for BPEL User Notification and Human Workflow.	Do not use a self-provisioned messaging channel for BPEL User Notification or Human Workflow use cases (that is, do not set as Default channel, and do not use in a messaging filter for such use cases). BPEL User Notification and Human Workflow use User Messaging Preferences only for the delivery type preference, and the actual address is retrieved from the user profile in the identity management system.  <b>Note:</b> Addresses from the user profile in the identity management system are available through User Messaging Preferences using predefined channel names, such as <i>Business Email</i> , <i>Business Mobile</i> , <i>Business Phone</i> , <i>Instant Messaging</i> . Use these predefined messaging channels instead for BPEL User Notification and Human Workflow use cases.



---

# Monitoring Oracle User Messaging Service

This chapter describes how to monitor Oracle User Messaging Service by using Oracle Enterprise Manager Fusion Middleware Control.

This chapter includes the following sections:

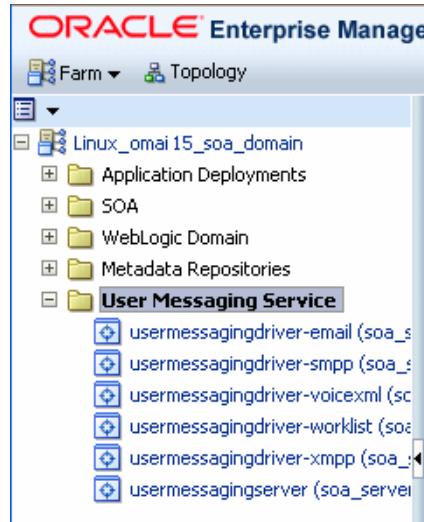
- [Section 28.1, "Monitoring Oracle User Messaging Service"](#)
- [Section 28.2, "Viewing Log Files"](#)
- [Section 28.3, "Viewing Metrics and Statistics"](#)

## 28.1 Monitoring Oracle User Messaging Service

You can monitor Oracle User Messaging Service logs and metrics using Oracle Enterprise Manager Fusion Middleware Control.

To monitor Oracle User Messaging Service:

1. Go to the Oracle Enterprise Manager Fusion Middleware Control page for your SOA farm.



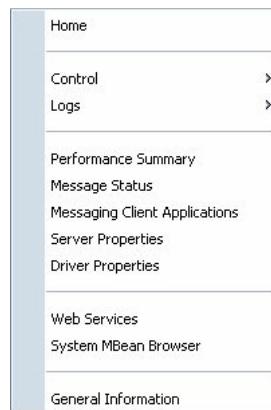
2. Select **Fusion Middleware > SOA > User Messaging Service**.
3. Select the server or driver of your choice.

If you select a driver, quick statistics are displayed that indicate the state and performance of the driver.

If you select a server, you see a list of associated drivers, in addition to the quick statistics. You can select one of the drivers to view its statistics, or you can click the Configure Driver icon to configure it. For more information on configuring drivers, see [Chapter 27, "Configuring Oracle User Messaging Service."](#)

Associated Drivers			
Name	Driver Type	Status	Configure Driver
/Farm_soa/soa/server_soa/sdpmessagingdriver-voicexml	User Messaging VoiceXML Driver		

4. Right-click the server to select an action.



Selection	Action
Home	The home page lists the quick statistics for the selected driver.
Control	Start Up or Shut Down driver.
Logs	View and configure message logs for the selected driver.
Performance Summary	Displays performance statistics on a customizable metrics page. Use this page to view statistics for this driver. Customize this page using the Metric Palette. The Metric Palette enables you to choose from all of the available metrics so that you see only the information that is most valuable to you.
Message Status	Check the delivery status of messages sent and received, and resend selected messages. You can filter the search by adding more search fields and setting the desired operator and search value. Some fields can be added multiple times to use them with different and complementary operators, or with the <i>Contains</i> operator.
Messaging Client Applications	Messaging client applications registered with the User Messaging Service can be manually deregistered in cases where the applications have been undeployed and are holding onto access points that must be made available to other applications.
Server Properties	Configure message storage method and business terms for message filter creation. See <a href="#">Chapter 27, "Configuring Oracle User Messaging Service"</a> for more information.
System MBean Browser	System MBean Browser and its configuration settings.

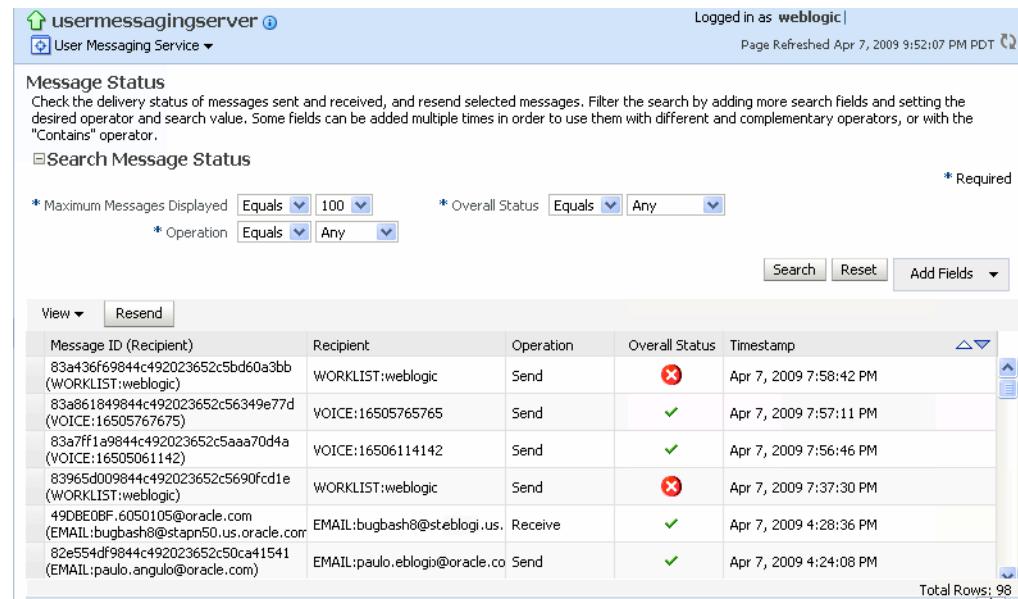
Selection	Action
General Information	General Information displays the name, version, Oracle home, and host for the selected driver.
	

### 28.1.1 Using Message Status

You can check the delivery status of messages sent and received, and resend selected messages.

To check message status:

1. In the navigation tree, right-click the UMS target for which you want to view message status.
2. Select **Message Status**. The *Message Status* page appears.
3. Click **Search** to search the messages using the default criteria. The search returns a listing for the messages.



Message ID (Recipient)	Recipient	Operation	Overall Status	Timestamp
83a436f69844c492023652c5bd60a3bb (WORKLIST:weblogic)	WORKLIST:weblogic	Send	✗	Apr 7, 2009 7:58:42 PM
83a861849844c492023652c56349e77d (VOICE:16505767675)	VOICE:16505765765	Send	✓	Apr 7, 2009 7:57:11 PM
83a7ff1a9844c492023652c5aaea70d4a (VOICE:16505061142)	VOICE:165061114142	Send	✓	Apr 7, 2009 7:56:46 PM
83965d009844c492023652c5690fc1e (WORKLIST:weblogic)	WORKLIST:weblogic	Send	✗	Apr 7, 2009 7:37:30 PM
49DBE0BF.6050105@oracle.com (EMAIL:bugbash@steblogi.us)	EMAIL:bugbash@steblogi.us	Receive	✓	Apr 7, 2009 4:28:36 PM
82e554df9844c492023652c50ca41541 (EMAIL:paulo.angulo@oracle.com)	EMAIL:paulo.angulo@oracle.com	Send	✓	Apr 7, 2009 4:24:08 PM

You can customize the search by adding more search fields and setting the desired operator and search value. Some fields can be added multiple times to use them with different and complementary operators, or with the Contains operator. To customize the search:

1. Click **Add Fields**.
2. Select the field(s) on which you want to search.
3. Choose operators and fill in variables as needed.
4. Click **Search**. The customized search is done and results returned.

**Message Status**

Check the delivery status of messages sent and received, and resend selected messages. Filter the search by adding more search fields and setting the desired operator and search value. Some fields can be added multiple times in order to use them with different and complementary operators, or with the "Contains" operator.

**Search Message Status**

\* Required

* Maximum Messages Displayed	Equals	100	Recipient	Contains	bug	X
* Operation	Equals	Any	Driver Instance Name	Contains	email	X
* Overall Status	Equals	Any				

[Search] [Reset] [Add Fields ▾]

**View ▾ Resend**

Message ID (Recipient)	Recipient	Operation	Overall Status	Timestamp
49DBE0BF.6050105@oracle.com (EMAIL:buglceiv8@sash850.us.oracle.com)	EMAIL:buglceiv8@sash850.us.	Receive	✓	Apr 7, 2009 4:28:36 PM
49DBDFDF.7080902@oracle.com (EMAIL:buglceiv8@sash850.us.oracle.com)	EMAIL:buglceiv8@sash850.us.	Receive	✓	Apr 7, 2009 4:21:45 PM
49DBDE7A.4070408@oracle.com (EMAIL:buglceiv8@sash850.us.oracle.com)	EMAIL:buglceiv8@sash850.us.	Receive	✓	Apr 7, 2009 4:17:29 PM
49DBDAFD.8000305@oracle.com (EMAIL:buglceiv8@sash850.us.oracle.com)	EMAIL:buglceiv8@sash850.us.	Receive	✓	Apr 7, 2009 4:00:48 PM
49DBD637.90602@oracle.com (EMAIL:buglceiv8@sash850.us.oracle.com)	EMAIL:buglceiv8@sash850.us.	Receive	✓	Apr 7, 2009 3:41:10 PM
49DBD557.5050501@oracle.com (EMAIL:buglceiv8@sash850.us.oracle.com)	EMAIL:buglceiv8@sash850.us.	Receive	✓	Apr 7, 2009 3:37:18 PM

Total Rows: 15

- If you want to resend a message, select the message in the list and click **Resend**.

### 28.1.2 Deregistering Messaging Client Applications

You can manually deregister Messaging Client Applications after the applications have been undeployed and are holding onto access points that must be made available to other applications. To deregister Messaging Client Applications:

- Right-click a target in the navigation tree, and select **Messaging Client**. The Messaging Client page appears.
- Select the message to deregister.
- Click **De-register**.

usermessagingserver ⓘ  
User Messaging Service ▾

Logged in as weblogic | Page Refreshed Apr 7, 2009 9:53:58 PM PDT

**Messaging Client Applications**

Messaging client applications registered with the User Messaging Service can be manually de-registered in cases where the applications have been undeployed and are holding onto access points that need to be made available to other applications.

Name	Version	Client Type	Listener End Point	Receiving Queues	Access
UMSSampleApp	11.1.1.1.0	EJB	MessageListener: [JNDI Name=null, Home Class=null], StatusListener: [JNDI Name=null, Home Class=null]	[JNDI Name=OraSDPM/Queues /OraSDPMApplDefRcvQ1, Connection Factory=OraSDPM/QueueConnectionFactory]	EMAIL
ParlayX	11.1.1.1.0	EJB	MessageListener: [JNDI Name=null, Home Class=null], StatusListener: [JNDI Name=null, Home Class=null]	[JNDI Name=OraSDPM/Queues /OraSDPMWSRcvQ1, Connection Factory=OraSDPM/QueueConnectionFactory]	
<anonymous>@ParlayX	2.1	PARLAYX			

A confirmation box appears asking you to confirm your choice.

- Confirm your choice.

### 28.1.3 Monitoring Drivers Using the All Tab

The **All** tab only lists successfully-registered drivers in the domain (not all drivers that exist).

Since the drivers are not configured out-of-the-box, they are not registered unless you configure them. To ensure that you see all of the drivers in the **All** tab, configure the

SMPP, VoiceXML and XMPP drivers (if you plan to use them). Once configured, they are registered with the engine and are displayed in the All tab.

## 28.2 Viewing Log Files

You can view log files.

To view log files:

1. Right-click the driver (or server) for which you want to view log information, then choose Logs > View Log Files.

The Log Messages page appears.

Incident Errors	Errors	Warnings	Notifications	Traces	Unknowns	Log File
0	55				0	<a href="#">Log File</a>

Use this page to query for log information about a driver (or server). Fields and lists are used to customize the query.

2. After entering your search criteria, click Log Files. The Log Files page appears.

Time	Message Type	Message ID	Message	Log File
Apr 6, 2009 12:21:48 AM PDT	Notification	SDP-25105	Initializing Messaging Store in TOPLINK mode.	soa_server1<
Apr 6, 2009 12:22:05 AM PDT	Notification		TopLink, version: Oracle TopLink - 11g Release 1 (11.1.1.1.0) (Build 090304)	soa_server1<
Apr 6, 2009 12:22:05 AM PDT	Notification		Server: WebLogic Server 10.3.1.0 Sun Mar 8 21:45:15 MDT 2009 1199850	soa_server1<
Apr 6, 2009 12:22:06 AM PDT	Notification		messaging_store login successful	soa_server1<
Apr 6, 2009 12:22:08 AM PDT	Notification	SDP-25034	There are total 1 registered User Messaging Drivers. Driver(s): 1, n: Farm_soa_bam_em_dr	soa_server1<
Apr 6, 2009 12:22:16 AM PDT	Notification		ADF Config instance implementation: oracle.adf.share.config.MDSConfigFactory	soa_server1<
Apr 6, 2009 1:10:27 AM PDT	Notification	ADFC-54008	ADFc: Initializing ADF Page Lifecycle for the JSF environment, LifecycleContextBuilder is 'ora'	soa_server1<
Apr 6, 2009 1:10:28 AM PDT	Nnhfirahini	ADFC-50011	ADFc: Configuration parameter adfc-scone-ha-sunroot set to 'true'.	soa_server1<

Rows Selected 1 Total Rows : 31

**Apr 6, 2009 12:21:48 AM PDT (Notification)**

Message ID	SDP-25105	Host	stbcw19-3
Message Level	1	Host IP Address	152.68.199.15
Relationship ID	0	User	<anonymous>
Argument 1	TOPLINK	Thread ID	[ACTIVE].ExecuteThread: '2' for queue: 'weblogic.kernel.Default (self-tuning)'
Component	soa_server1	ECID	00001uJUuUCgoAJvaYBV119qQIU000004
Module	oracle.sdp.messaging.engine.store		
Message	Initializing Messaging Store in TOPLINK mode.		

3. View log information or download the log.

### 28.2.1 Configuring Logging

Use Oracle Enterprise Manager Fusion Middleware Control to configure log levels, as shown in [Figure 28–1](#).

**Figure 28–1 Configuring Log Levels**

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface. The left sidebar lists components: Farm\_soa\_bam\_em\_domain, Application Deployments, SOA, WebLogic Domain, Metadata Repositories, User Messaging Service, and usermessagingserver (soa\_server1). The main panel is titled "usermessagingserver" and "User Messaging Service". It displays the "Log Configuration" page with the "Log Levels" tab selected. A sub-header says "Use this page to configure basic and advanced log configuration settings." Below it, a table lists loggers with their Java levels and log files. One row is highlighted for "oracle.sdp.messaging" with "NOTIFICATION:1 (INFO) [Inherit]" and "odl-handler".

Logger Name	Oracle Diagnostic Logging Level (Java Level)	Log File	Persist
oracle.sdp.messaging	NOTIFICATION:1 (INFO) [Inherit]	odl-handler	

For each logger, set the notification level, as shown in [Figure 28–2](#).

**Figure 28–2 Select Notification Level**

This screenshot shows the "Log Levels" configuration page. The left sidebar has "Runtime Loggers" selected. The main area lists loggers with their Java levels and log files. A tooltip for "oracle.sdp.messaging" indicates the current level is "NOTIFICATION:1 (INFO) [Inherit]". The "oracle.sdp.messaging.driver.base" logger is expanded, showing its child loggers and their levels. The "oracle.sdp.messaging.dispatcher" logger has a tooltip indicating it inherits its level from its parent.

Logger Name	Oracle Diagnostic Logging Level (Java Level)	Log File
oracle.sdp.messaging	NOTIFICATION:1 (INFO) [Inherit]	odl-handler wls-domain
oracle.sdp.messaging.benchmark	NOTIFICATION:1 (INFO) [Inherit]	odl-handler wls-domain
oracle.sdp.messaging.client	NOTIFICATION:1 (INFO) [Inherit]	odl-handler wls-domain
oracle.sdp.messaging.driver.base	NOTIFICATION:1 (INFO) [Inherit]	odl-handler wls-domain
oracle.sdp.messaging.driver.base	NOTIFICATION:1 (INFO) [Inherit] INCIDENT_ERROR:1 (SEVERE+INFO) ERROR:1 (SEVERE) WARNING:1 (WARNING)	odl-handler wls-domain
oracle.sdp.messaging.dispatcher	NOTIFICATION:1 (INFO) [Inherited from parent]	
oracle.sdp.messaging.driver.email	NOTIFICATION:1 (INFO)	er in
oracle.sdp.messaging.driver.management	NOTIFICATION:16 (CONFIG) TRACE:1 (FINE) TRACE:16 (FINER)	er in

As a result of your configuration actions, notifications appear according to your specification. [Figure 28–3](#) and [Figure 28–4](#) provides details.

**Figure 28–3 Viewing Log Files**

usermessagingserver

Logged in as weblogic | Page Refreshed Apr 6, 2009 8:05:21 AM PDT

Log Messages > Log Files > View Log File: soa\_server1-diagnostic.log

View Log File: soa\_server1-diagnostic.log

Name: /scratch/ocmsuser/Oracle/Middleware/user\_projects/domains/soa\_bam\_em\_domain/servers/soa\_server1/logs/soa\_server1-diagnostic.log

Last Modified: Apr 6, 2009 7:18:18 AM PDT

Date Range: Time Interval  4/6/09 12:18 AM  4/6/09 12:25 AM

Time	Message Type	Message ID	Message
Apr 6, 2009 12:22:05 AM PDT	Notification		TopLink, version: Oracle TopLink - 11g Release 1 (11.1.1.1.0) (Build 090304)
Apr 6, 2009 12:22:05 AM PDT	Notification		Server: WebLogic Server 10.3.1.0 Sun Mar 8 21:45:15 MDT 2009 1199850
Apr 6, 2009 12:22:06 AM PDT	Notification		messaging_store login successful
Apr 6, 2009 12:22:08 AM PDT	Notification	SDP-25034	There are total 1 registered User Messaging Drivers. Driver(s): 1, n: Farm_soa_bam_em_domain
Apr 6, 2009 12:22:10 AM PDT	Notification	SDP-26007	Received inbound queue info from messaging engine: [QueueInfo[QueueConnectionFactoryJNDI
Apr 6, 2009 12:22:16 AM PDT	Notification		ADF Config instance implementation: oracle.adf.share.config.MDSConfigFactory
Apr 6, 2009 12:22:18 AM PDT	Notification		Read metric configuration file "/scratch/ocmsuser/Oracle/Middleware/user_projects/domains/soa_bam_em_domain/metrics/MDS-50982: Registered metric rules "server-oracle_eps_server-11.0.xml".
Apr 6, 2009 12:22:19 AM PDT	Notification		

Rows Selected: 1 Total Rows: 204

**Apr 6, 2009 12:22:05 AM PDT (Notification)**

Message Level: 1 Host: stecut19-3  
ECID: 0000I1uJUuJCgoAJvaYBV119qQLU000004 Host IP Address: 199.68.199.19  
Relationship ID: 0 User: <anonymous>  
Component: soa\_server1 Thread ID: [ACTIVE].ExecuteThread: '2' for queue:  
Module: oracle.toplink.default 'weblogic.kernel.Default (self-tuning)'  
Message: TopLink, version: Oracle TopLink - 11g Release 1 (11.1.1.1.0) (Build 090304)

**Figure 28–4 Error Messages**

usermessagingserver

Logged in as weblogic | Page Refreshed Apr 6, 2009 8:07:28 AM PDT

Log Messages > Log Files > View Log File: soa\_server1-diagnostic.log

View Log File: soa\_server1-diagnostic.log

Name: /scratch/ocmsuser/Oracle/Middleware/user\_projects/domains/soa\_bam\_em\_domain/servers/soa\_server1/logs/soa\_server1-diagnostic.log

Last Modified: Apr 6, 2009 7:18:18 AM PDT

Date Range: Time Interval  4/6/09 12:18 AM  4/6/09 12:25 AM

Time	Message Type	Message ID	Message
Apr 6, 2009 12:19:07 AM PDT	Error	SDP-26003	AMPP Driver not configured. Configure and restart this driver. Required properties: AMPPServerHost
Apr 6, 2009 12:19:10 AM PDT	Error	SDP-26160	SMPP Driver not configured. Configure and restart this driver. Required Properties: SmsAccountId, SmsServerHost, TransmitterSystemId, ReceiverSystemId, Trans
Apr 6, 2009 12:19:13 AM PDT	Error	SDP-26360	VoiceXML Driver not configured. Configure and restart this driver. Required Properties: VoiceXMLDriverName
Apr 6, 2009 12:19:18 AM PDT	Warning	SDP-26024	Registration of driver Email-Driver did not complete; will retry periodically until messaging server r
Apr 6, 2009 12:19:22 AM PDT	Notification		Application [soa-infra] is being deployed, start policy migration.

Rows Selected: 1 Total Rows: 204

**Apr 6, 2009 12:19:10 AM PDT (Error)**

Message ID: SDP-26160 Host IP Adr  
Message Level: 1  
ECID: 0000I1uIo^MCgoAJvaYBV119qQLU000001  
Relationship ID: 0 Thread  
Component: soa\_server1  
Message: SMPP Driver not configured. Configure and restart this driver. Required Properties: SmsAccountId, SmsServerHost, TransmitterSystemId, ReceiverSystemId, Trans

## 28.3 Viewing Metrics and Statistics

The performance of your applications is reflected in metrics and statistics.

To view metrics and statistics:

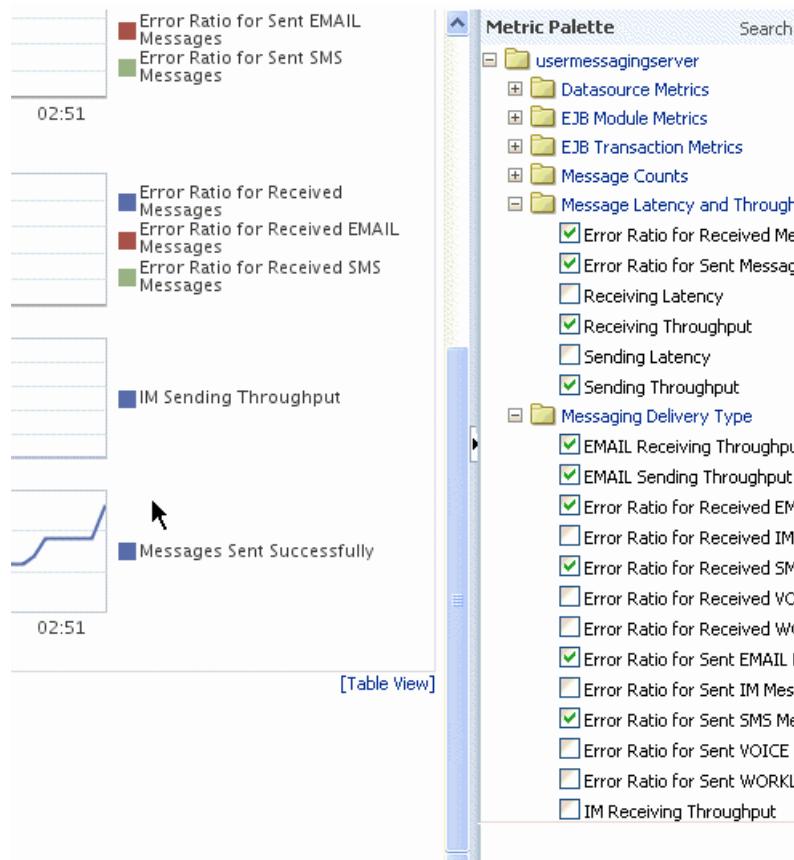
1. Select the Performance Summary for a driver (or server).

The Performance Summary page appears.



Many metrics are available for capture and display. To get the most valuable, focused information, use Metric Palette.

2. Click **Show Metric Palette** to display the Metric Palette.
3. Choose the metrics in which you are most interested. As you select or deselect metrics from the palette, the metrics display is automatically updated.



---

# Managing Oracle User Messaging Service

This chapter describes how to deploy Oracle User Messaging Service (UMS) drivers by using Oracle WebLogic Scripting Tool (WLST), Oracle Enterprise Manager Fusion Middleware Control, Oracle Fusion Middleware Configuration Wizard, and the `wsadmin` utility of IBM WebSphere Application Server. It also describes how to undeploy and register Oracle UMS drivers.

This chapter includes the following sections:

- [Section 29.1, "Deploying Drivers"](#)
- [Section 29.2, "Undeploying and Unregistering Drivers"](#)

## 29.1 Deploying Drivers

When you install Oracle UMS, preinstalled drivers are included (Email, XMPP, SMPP, and VoiceXML). Among these drivers, only the Email driver is deployed to the WebLogic Server. To deploy other drivers, target that driver to the WebLogic Server (using Oracle WebLogic Server Administration Console, or you can target the drivers when creating or extending the domain using the Oracle Fusion Middleware Configuration Wizard).

The Worklist driver must be deployed to a SOA Server to make use of the UMS integration with Worklist. Because this integration involves multiple JEE applications and a SOA composite, there is a special extension template you must use to enable this feature in one step. See [Install the Worklist Driver on the Oracle WebLogic Server Platform](#) and [Install the Worklist Driver on IBM WebSphere Platform](#) for more information.

You can deploy additional drivers in a variety of ways using: WLST commands (recommended), `wsadmin` tool, Oracle Enterprise Manager Fusion Middleware Control, and through the Oracle Fusion Middleware Configuration Wizard.

The section includes the following topics:

- [Section 29.1.1, "Deploying Drivers Using WLST Commands"](#)
- [Section 29.1.2, "Deploying Drivers Using Oracle Enterprise Manager Fusion Middleware Control"](#)
- [Section 29.1.3, "Deploying Drivers Using the Oracle Fusion Middleware Configuration Wizard"](#)
- [Section 29.1.4, "Deploying Drivers Using the wsadmin Tool"](#)

---

**Note:** To deploy two or more driver instances of a particular driver EAR, you must use the custom deployment plan templates available at \$ORACLE\_HOME/communications/plans. Deploying drivers using WLST commands is recommended because these commands automatically modify your deployment plans for you; using other methods requires you to manually modify your deployment plans.

---

## 29.1.1 Deploying Drivers Using WLST Commands

You can deploy drivers using the WLST command `deployUserMessagingDriver`.

### 29.1.1.1 `deployUserMessagingDriver`

Command Category: UMS

Use with WLST: Online

**29.1.1.1.1 Description** `deployUserMessagingDriver` is used to deploy additional instances of user messaging drivers.

Specify a base driver type (for example: email, xmpp, voicexml, and others) and a short name for the new driver deployment. The string `usermessagingdriver-` is prepended to the specified application name. Any valid parameters for the `deploy` command can be specified, and is passed through when the driver is deployed.

**29.1.1.1.2 Syntax** `deployUserMessagingDriver(baseDriver, appName, [targets], [stageMode], [options])`

Argument	Definition
<code>baseDriver</code>	Specifies the base messaging driver type. Must be a known driver type, such as email, proxy, smpp, voicexml, or xmpp.
<code>appName</code>	A short descriptive name for the new deployment. The specified value is prepended with the string <code>usermessagingdriver-</code> .
<code>targets</code>	Optional. Additional arguments that are valid for the <code>deploy</code> command can be specified and passed through when the new driver is deployed.
<code>stageMode</code>	
<code>options</code>	

**29.1.1.1.3 Examples** To deploy a second instance of an email driver with name `myEmail`.

```
wls:/base_domain/serverConfig> deployUserMessagingDriver(baseDriver='email',
appName='myEmail')
```

To deploy a second instance of an email driver, specifying deployment targets.

```
wls:/base_domain/serverConfig> deployUserMessagingDriver(baseDriver='email',
appName='email2', targets='server1,server2')
```

## 29.1.2 Deploying Drivers Using Oracle Enterprise Manager Fusion Middleware Control

To deploy drivers using Oracle Enterprise Manager Fusion Middleware Control:

1. Retrieve a deployment template (for example: ORACLE\_HOME/communications/plans)

2. Copy the plan to a location of your choice (to the same directory or any other directory).

3. Edit the plan:

Replace `DriverDeploymentName` with whichever name you want to use (ensure you replace all instances of the name).

Replace `DriverShortName` with any name you like.

Replace the `@RunAsPrincipalName@` token with a valid principal for use by UMS. In a default deployment, the system principal `OracleSystemUser` is available for this purpose.

4. Start Oracle Enterprise Manager Fusion Middleware Control.

5. Enter the location of the .ear file.

The screenshot shows the Oracle Enterprise Manager 11g Fusion Middleware Control interface. The title bar says "ORACLE Enterprise Manager 11g Fusion Middleware Control". Below it, the navigation bar shows "AdminServer (Oracle WebLogic Server) : Deploy" and the tabs "Select Archive", "Select Target", "Application Attributes", and "Deployment Settings". The "Select Archive" tab is selected. The main content area has a heading "Select Archive ?" and a sub-section "Archive or Exploded Directory". It explains that Java EE archive, Web Modules (WAR files), EJB Modules (EJB JAR files) and Resource Adapter Modules (RAR files) can be deployed. It also mentions that an exploded archive can be deployed if present on the server. Two radio buttons are shown: one for "Archive is on the machine where this web browser is running" and another for "Archive or exploded directory is on the server where Enterprise Manager is running". The second option is selected, and the input field shows the path "/scratch/oracle/middleware/as11gr1soa/communications/applications/sdpmessagingdriver-email.ear". Below this is a "Deployment Plan" section. It explains that a deployment plan is a file containing deployment settings. It can be a previously saved plan or created automatically. Three radio buttons are shown: one for "Create a new deployment plan when deployment configuration is done", one for "Deployment plan is on the machine where this web browser is running", and one for "Deployment plan is on the server where Enterprise Manager is running". The third option is selected, and the input field shows the path "/scratch/oracle/middleware/as11gr1soa/communications/plans/usermessagingdriver-email2\_Plan.xml".

6. Click Next.

The Select Target page appears.

7. Enter the location of the deployment plan.

The screenshot shows the Oracle Enterprise Manager 11g Fusion Middleware Control interface. The title bar says "ORACLE Enterprise Manager 11g Fusion Middleware Control". Below it, the navigation bar shows "domain2 (Oracle WebLogic Domain) : Deploy" and the tabs "Select Archive", "Select Target", "Application Attributes", and "Deployment Settings". The "Select Target" tab is selected. The main content area has a heading "Select Target" and a sub-section "Select the WebLogic server or cluster that you want this application to be deployed to.". A table lists the available targets: "AdminServer" (Oracle WebLogic Server) and "soa\_server1" (Oracle WebLogic Server). Both have checkboxes next to them. The "AdminServer" row shows "Deployed Applications" as "DMS Application#11.1.1.0, wsl-wls". The "soa\_server1" row shows "Deployed Applications" as "AqAdapter, FtpAdapter, usermessagingdriver-email, JmsAdapter, OracleAppsAdapter, DMS Application#11.1.1.0, SocketAdapter, FileAdapter, MQSeriesAdapter, usermessagingserver, DbAdapter, b2bui, soa-infra, worklistapp, wsl-wls, OracleBamAdapter, wsm-pm". At the bottom right of the table are buttons for "Cancel", "Back", "Step 2 of 4", and "Next".

8. Select the SOA target.
9. Enter an application name in the Application Attributes page. The application name must exactly match the string used for DriverDeploymentName (in Step 3 above) which is provided in the deployment plan. If it does not, the deployment and activation fails. The Deployment Setting page appears.

**Deployment Settings**

Name	Go To Task	Description
Configure Web Modules		Configure the web modules in your application.
Configure EJBs		Configure the Enterprise Java Beans in your application.
Configure Application Contexts		Configure application context entries, endpoint injection and other configuration.

**Deployment Plan**

10. Click Deploy. The Deployment Completed page appears.

**Deployment Completed**

**Deployment of Application "usermessagingdriver-email2" is completed. However an error occurred while starting the application on one or more targets.**

To configure and manage the application "usermessagingdriver-email2", use the [Oracle WebLogic Server Administration Console](#).

**Summary**

Version	Not versioned
Deployed Archive Location	/scratch/oracle/middleware/as11gr1soa/communications/applications/sdpmessagingdriver-email.ear
Archive Type	Java EE Application (EAR file)
Deployment Mode	Distribute and start application (servicing all requests)
Deployment Target	soa_server1
Application States	New (soa_server1)
Context Root	sdpmessagingdriver/email-mbeanlifecycle

**Hide Progress Messages**

```
[Thu Feb 19 14:40:22 PST 2009] Initiating deploy operation ...
[Thu Feb 19 14:40:22 PST 2009] Archive: /scratch/oracle/middleware/as11gr1soa/communications/applications/sdpmessagingdriver-email.ear
[Thu Feb 19 14:40:22 PST 2009] Deployment plan: /scratch/oracle/middleware/as11gr1soa/communications/plans/usermessagingdriver-email2_Plan.xml
[Thu Feb 19 14:40:25 PST 2009] [Deployer:149195]Deployment of application 'usermessagingdriver-email2' has been deferred since 'soa_server1' is unavailable
[Thu Feb 19 14:40:25 PST 2009] [Deployer:149034]An exception occurred for task [Deployer:149026]deploy application usermessagingdriver-email2 on soa_server1...
[Thu Feb 19 14:40:26 PST 2009] Deploy operation completed.
```

**Close**

11. To see the result (driver deployed), start the SOA Server.

### 29.1.3 Deploying Drivers Using the Oracle Fusion Middleware Configuration Wizard

To install the SMPP, XMPP, and VoiceXML drivers, extend the domain using the extension template available at \$ORACLE\_HOME/common/templates/applications/oracle.ums.drivers\_template\_11.1.1.jar.

To extend a domain using Oracle Fusion Middleware Configuration Wizard:

1. Launch Oracle Fusion Middleware Configuration Wizard (`$ORACLE_HOME/common/bin/config.sh` or `%ORACLE_HOME%\common\bin\config.cmd`).
2. Select the **Extend an existing WebLogic domain** option.
3. Select the desired domain directory containing UMS.
4. Select the **Extend my domain using an existing extension template** option.
5. Click **Browse**, and navigate to `$ORACLE_HOME/common/templates/applications`
6. Select `oracle.ums.drivers_template_11.1.1.jar`.
7. Complete the remaining steps of the Oracle Fusion Middleware Configuration Wizard, and remember to target the required drivers to the desired Oracle WebLogic Servers, clusters, or both.
8. Restart the appropriate Oracle WebLogic Servers.

## 29.1.4 Deploying Drivers Using the wsadmin Tool

You can deploy additional instances of UMS drivers by using the Oracle Fusion Middleware-specific wsadmin command `OracleUMS.deployUserMessagingDriver`.

### 29.1.4.1 About the wsadmin OracleUMS.deployUserMessagingDriver Command

This section describes the syntax and arguments for the wsadmin `OracleUMS.deployUserMessagingDriver` command.

#### 29.1.4.1.1 Description

`OracleUMS.deployUserMessagingDriver` is used to deploy additional instances of user messaging drivers.

Specify a base driver type (email, xmpp, smpp, voicexml, proxy, or worklist) and a short name for the new driver deployment. The string "usermessagingdriver-" is prepended to the specified application name.

#### 29.1.4.1.2 Syntax

```
OracleUMS.deployUserMessagingDriver(baseDriver, appName, required_options)
```

Argument	Definition
baseDriver	Specifies the base messaging driver type. Must be a known driver type, such as email, proxy, smpp, voicexml, 'proxy', or 'worklist'.
appName	A short descriptive name for the new deployment. The specified value is prepended with the string <code>usermessagingdriver-</code> .
required_options	Additional arguments that are valid for the "AdminApp.install" command.  These options are mandatory for this command: <code>-node</code> , <code>-cell</code> , <code>-server</code> , <code>-usedefaultbindings</code> , and <code>-defaultbinding.virtual.host</code>

Example:

```
OracleUMS.deployUserMessagingDriver('email', 'myEmail', '-node myNode -cell myCell
-server myServer -usedefaultbindings -defaultbinding.virtual.host default_host')
```

where:

`email` and `myEmail` represent values for the `baseDriver` and `appName` arguments respectively.

`-node, -cell, -server, -usedefaultbindings, -defaultbinding.virtual.host` are the required options. `myNode`, `myCell`, `myServer` and `default_host` represent the values of respective options.

#### 29.1.4.1.3 Examples

To deploy a second instance of an email driver with name "smpp2" on a SOA Server named "soa\_server1":

```
wsadmin> OracleUMS.deployUserMessagingDriver('smpp','smpp2','-node DefaultNode01
-cell DefaultCell01 -server soa_server1 -usedefaultbindings
-defaultbinding.virtual.host default_host')
```

To deploy a second instance of an email driver with name "email2" on a BAM Server named "bam\_server1":

```
wsadmin> OracleUMS.deployUserMessagingDriver('email','email2','-node DefaultNode01
-cell DefaultCell01 -server bam_server1 -usedefaultbindings
-defaultbinding.virtual.host default_host')
```

#### 29.1.4.2 Deploying an Additional Driver

To deploy the UMS drivers by using the `wsadmin` tool, do the following:

1. Open a browser and enter the following URL to access the IBM WebSphere Administrative Console (also known as IBM WebSphere Integrated Solutions Console):

`https://hostname:SSL_Port/ibm/console`

2. Log in to the administration console by using the administrator name and password.
3. Navigate to **System administration > Deployment manager > Configuration > Ports > BOOTSTRAP\_ADDRESS** and identify the corresponding port number.

The screenshot shows the Integrated Solutions Console interface. On the left, a sidebar lists various administrative tasks under categories such as Welcome, Guided Activities, Servers, Applications, Services, Resources, Security, Environment, and System administration. The main panel is titled 'Deployment manager' and contains tabs for 'Runtime' and 'Configuration'. Under 'Configuration', there are several sections: 'General Properties' (with a 'Name' field set to 'dmgr' and a checked checkbox for 'Start components as needed'), 'Server Infrastructure' (listing Java and Process Management and Administration), 'Additional Properties' (listing Core group service and Job managers), and 'Ports' (a table showing port mappings for various services like CELL\_DISCOVERY\_ADDRESS, BOOTSTRAP\_ADDRESS, and DCS\_UNICAST\_ADDRESS). A yellow highlight is placed over the 'BOOTSTRAP\_ADDRESS' row in the Ports table.

4. On the system where Oracle SOA server is running, set the `ORACLE_HOME` environment variable to the location where Oracle Fusion Middleware SOA component is installed. You should set this variable before running the `wsadmin` command.

For example,

On UNIX platform, run the following command in the UNIX shell:

```
$ export ORACLE_HOME=/fmwwas-nd/middleware/Oracle_SOA1
```

On Windows platform, run the following command in the DOS shell:

```
C:\> set ORACLE_HOME=C:\fmwwas-nd\middleware\Oracle_SOA1
```

5. From the `ORACLE_HOME\common\bin` folder, run the `wsadmin` command. Specify the RMI port number (see Step 2) as the value for the `-port` option.

On UNIX:

```
ORACLE_HOME/common/bin/wsadmin.sh
 -profileName profilename
 -connType RMI
 -host hostname
 -port RMI_port
 -user admin_user
 -password admin_password
```

On Windows:

```
ORACLE_HOME\common\bin\wsadmin.cmd
 -profileName profilename
```

```
-connType RMI
-host hostname
-port RMI_port
-user admin_user
-password admin_password
```

6. To view the list of enterprise applications and drivers that are already deployed, run the wsadmin command as follows:

```
wsadmin>print AdminApp.list()
DMS Application_11.1.1.1.0
DefaultToDoTaskFlow
Dmgr DMS Application_11.1.1.1.0
FMW Welcome Page Application_11.1.0.0.0
User Messaging Parlay X Sample App
composer
em
oracle-bam
soa-infra
usermessagingdriver-email
usermessagingdriver-smp
usermessagingdriver-voicexml
usermessagingdriver-xmpp
usermessagingserver
worklistapp
wsil-nonwls
wsm-pm
```

7. Run the OracleUMS.deployUserMessagingDriver command to deploy the UMS driver(s) as follows:

```
wsadmin> OracleUMS.deployUserMessagingDriver('email','email01','-node
DefaultNode01 -cell DefaultCell01 -server soa_server1 -usedefaultbindings
-defaultbinding.virtual.host default_host')
```

8. To verify that the newly deployed UMS driver(s) is listed along with the rest of enterprise applications and drivers, run the following command:

```
wsadmin>print AdminApp.list()
DMS Application_11.1.1.1.0
DefaultToDoTaskFlow
Dmgr DMS Application_11.1.1.1.0
FMW Welcome Page Application_11.1.0.0.0
User Messaging Parlay X Sample App
composer
em
oracle-bam
soa-infra
usermessagingdriver-email
usermessagingdriver-email-email01
usermessagingdriver-smp
usermessagingdriver-voicexml
usermessagingdriver-xmpp
usermessagingserver
worklistapp
wsil-nonwls
wsm-pm
```

Make sure that the newly deployed UMS drivers(s) is listed. In the above example, usermessagingdriver-email-email01 is the new driver.

For more information about using the wsadmin utility to configure Oracle Fusion Middleware products, see *Oracle Fusion Middleware Configuration Guide for IBM WebSphere Application Server*. For more information about managing Oracle SOA Suite on IBM WebSphere, see *Oracle Fusion Middleware Third-Party Application Server Guide*.

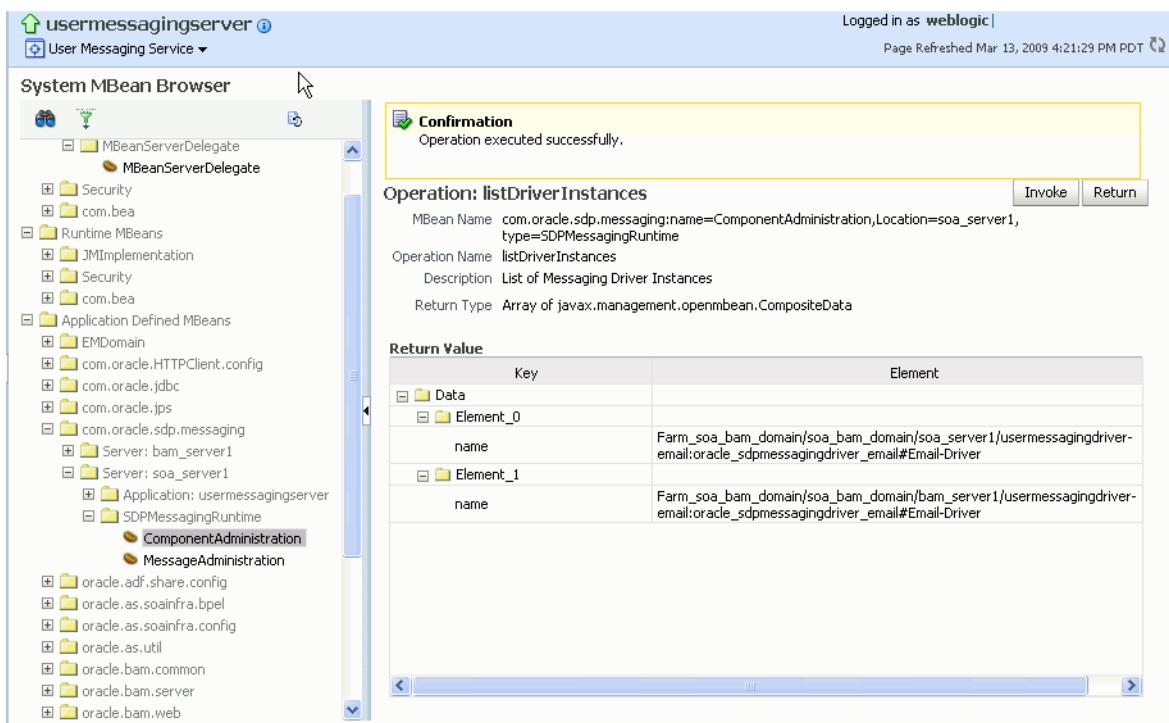
## 29.2 Undeploying and Unregistering Drivers

Since Messaging Drivers are standard JEE applications, they can be undeployed from the Oracle WebLogic Server using standard Oracle WebLogic tools such as the Administration Console or WLST.

However, since the UMS server keeps track of the messaging drivers that have been registered with it in a persistent store (database), this registration must be cleaned in a separate step using a runtime MBean exposed by the UMS server. The procedure to do this from Oracle Enterprise Manager Fusion Middleware Control is as follows.

To undeploy and unregister drivers:

1. Ensure the UMS server is available.
2. In Oracle Enterprise Manager Fusion Middleware Control, select any usermessagingserver target in the domain.
3. From the target's menu, select **System MBean Browser**.
4. In System MBean Browser, locate the *ComponentAdministration* MBean of usermessagingserver:  
Expand the folder **com.oracle.sdp.messaging > Server** (such as **Server: soa\_server1 > SDPMessagingrun time > ComponentAdministration**).
5. Invoke the operation **listDriverInstances**.
  - a. Click the **Operations** tab.
  - b. Click the operation **listDriverInstances**.
  - c. Click **Invoke**.
  - d. Identify and copy the name of the driver you want to unregister. (for example: /Farm\_soa\_bam\_domain/soa\_bam\_domain/soa\_server1/usermessagingdriver-email:oracle\_sdpmessagingdriver\_email#Email-Driver)



6. Click **Return**.
7. Invoke the operation **unregisterDriverInstance** with the desired driver name.
  - a. Click the operation **unregisterDriverInstance**.
  - b. Paste the driver name in the **Value** field (for example: /Farm\_soa\_bam\_domain/soa\_bam\_domain/soa\_server1/usermessagingdriver-email:oracle\_sdpmessagingdriver\_email#Email-Driver).
  - c. Click **Invoke**.

The screenshot shows the Oracle WebLogic Server System MBean Browser. The left pane displays a tree view of MBeans under 'usermessagingserver'. The right pane shows the details for the 'unregisterDriverInstance' operation of the 'SDPMessagingRuntime' MBean.

**Operation: unregisterDriverInstance**

- MBean Name: com.oracle.sdp.messaging:name=ComponentAdministration,Location=soa\_server1, type=SDPMessagingRuntime
- Operation Name: unregisterDriverInstance
- Description: Unregister Messaging Driver
- Return Type: boolean

**Parameters**

Name	Description	Type	Value
driverInstanceName	Messaging Driver Instance Name	java.lang.String	_sdpmessagingdriver_email#Email-Driver

**Return Value**

**8. Check the confirmation dialog for success.**

This completes the unregistration of the specified driver from the UMS server and it is no longer used in future message delivery.



# **Part XI**

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## **Administering Oracle JCA Adapters**

This part describes how to administer Oracle JCA Adapters.

This part includes the following chapters:

- [Chapter 30, "Configuring Oracle JCA Adapters"](#)
- [Chapter 31, "Monitoring Oracle JCA Adapters"](#)



# 30

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## Configuring Oracle JCA Adapters

This chapter describes how to configure inbound and outbound endpoint properties during runtime for Oracle JCA adapters.

This chapter includes the following sections:

- [Section 30.1, "Configuring the Endpoint Properties for an Inbound Adapter"](#)
- [Section 30.2, "Configuring the Endpoint Properties for an Outbound Adapter"](#)

For more information about adapter tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

### 30.1 Configuring the Endpoint Properties for an Inbound Adapter

This section describes how to configure the endpoint properties for an inbound adapter. It includes the following topics:

- [Section 30.1.1, "Editing a Predefined Property for an Inbound Adapter"](#)
- [Section 30.1.2, "Adding Predefined Properties for an Inbound Adapter"](#)
- [Section 30.1.3, "Creating a New Property for an Inbound Adapter"](#)
- [Section 30.1.4, "Deleting a Property for an Inbound Adapter"](#)
- [Section 30.1.5, "Reverting a Property Value for an Inbound Adapter"](#)

#### 30.1.1 Editing a Predefined Property for an Inbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, it is possible edit the predefined properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

To edit a predefined property for an inbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>
<ol style="list-style-type: none"> <li>2. Edit a predefined property:           <ol style="list-style-type: none"> <li>a. Click <b>Properties</b> to see a list of the currently defined binding properties.</li> <li>b. Select the property you want to edit.</li> <li>c. Edit the value in the <b>Value</b> text box, and then click <b>Save</b>.</li> </ol> </li> </ol>	<p>You have edited a predefined property for an inbound adapter.</p>

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.1.2 Adding Predefined Properties for an Inbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, it is possible to add properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

---

**Note:** Though the Properties page list both endpoint and the binding properties, you can *only* add endpoint properties.

---

To add a predefined property for an inbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Add a predefined property:
  - a. Click the **Properties** tab to see a list of the currently defined binding properties.
  - b. Click the **Add** button.  
A new empty row is appended to the existing list of properties.
  - c. Click the **Select Values** icon in the **Name** field of the new row.  
The Properties dialog is displayed.
  - d. Select a property that is valid for the particular adapter from the list of properties, and then click **OK**.
  - e. Click **Save**.

You have added a predefined property for an inbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.1.3 Creating a New Property for an Inbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, it is possible to add new properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

To create a new property for an inbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Create a new property:
  - a. Click the **Properties** tab to see the list of the currently defined binding properties.
  - b. Click the **Add** button.  
A new empty row is appended to the existing list of properties.
  - c. Specify the property name and value in the **Name** and the **Value** fields of the new row.
  - d. Click **Save**.

You have created a new property for an inbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.1.4 Deleting a Property for an Inbound Adapter

You can delete only properties that you added from the predefined list of properties or the ones that you newly created.

To delete a property for an inbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Delete a property:
  - a. Click the **Properties** tab to see a list of the currently defined binding properties.
  - b. Select the property you want to delete, and then click **Delete**.  
A message asking you to confirm your action is displayed.
  - c. Click **OK** to confirm.
  - d. Click **Save**.

You have deleted a property for an inbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.1.5 Reverting a Property Value for an Inbound Adapter

You can only revert the properties that you have changed. Also note that you can perform the revert operation only on the existing property values and not on those that you added from the predefined list of properties or the ones that you created.

To revert a property value for an inbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Revert a property value for an inbound adapter:
  - a. Click the **Properties** tab to see a list of the currently defined binding properties.
  - b. Select the property you want to revert, and then click **Revert**.  
A message asking you to confirm your action is displayed.
  - c. Click **OK** to confirm.
  - d. Click **Save**.

You have reverted a property value for an inbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

## 30.2 Configuring the Endpoint Properties for an Outbound Adapter

This section describes how to configure the endpoint properties for an outbound adapter. It includes the following topics:

- [Section 30.2.1, "Editing a Predefined Property for an Outbound Adapter"](#)
- [Section 30.2.2, "Adding a Predefined Property for an Outbound Adapter"](#)
- [Section 30.2.3, "Creating a New Property for an Outbound Adapter"](#)
- [Section 30.2.4, "Deleting a Property for an Outbound Adapter"](#)
- [Section 30.2.5, "Reverting a Property Value for an Outbound Adapter"](#)

### 30.2.1 Editing a Predefined Property for an Outbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, it is possible to edit the predefined properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

To edit a predefined property for an outbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<p>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</p> <p>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</p> <p>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</p>	<p>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</p>

2. Edit a predefined property:
- Click the **Properties** tab to see a list of the currently defined binding properties.
  - Select the property you want to edit.
  - Edit the value in the **Value** text box, and then click **Save**.

You have edited a predefined property for an outbound adapter.

---

**Note:** For Oracle MQ Series Adapter in an asynchronous outbound request/reply scenario, properties are differentiated by an (Enqueue) or (Dequeue) label. For example, QueueName(Enqueue) is used for putting a message and QueueName(Dequeue) is used for dequeuing the reply.

When editing Oracle MQ Series Adapter properties in this scenario, note the following:

- If you change the ReplyToQueueName(Enqueue) property, you must also change the QueueName(Dequeue) property to the same value.
  - If you change the MessageId(Dequeue) property, you must also change the MessageId(Enqueue) property to the same value.
  - If you change the CorrelationId(Dequeue) property, you must also change the CorrelationId(Enqueue) property to the same value.
- 

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.2.2 Adding a Predefined Property for an Outbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, it is possible to add predefined properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

To add a predefined property for an outbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>

2. Add a predefined property:

- a. Click the **Properties** tab to see a list of the currently defined binding properties.
- b. Click the **Add** button.  
A new empty row is appended to the existing list of properties.
- c. Click the **Select Value** icon in the **Name** field of the new row.  
The Properties dialog is displayed.
- d. Select a property that is valid for the particular adapter from the list of properties, and then click **OK**.
- e. Click **Save**.

You have added a predefined property for an outbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.2.3 Creating a New Property for an Outbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, it is possible to add new properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

To create a new property for an outbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>

2. Create a new property:
  - a. Click the **Properties** tab to see a list of the currently defined binding properties.
  - b. Click the **Add** button.  
A new empty row is appended to the existing list of properties.
  - c. Specify the property name and value in the **Name** and the **Value** fields of the new row.
  - d. Click **Save**.

You have created a new property for an outbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.2.4 Deleting a Property for an Outbound Adapter

You can delete only properties that you added from the predefined list of properties or the ones that you newly created.

To delete a property for an outbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<p>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</p>	<p>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</p>
<p>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</p>	<p>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</p>
<p>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</p>	
<p>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</p>	
<p>2. Delete a property for an outbound adapter:</p> <ul style="list-style-type: none"> <li>a. Click the <b>Properties</b> tab to see a list of the currently defined binding properties.</li> <li>b. Select the property you want to delete, and then click <b>Delete</b>. A message asking you to confirm your action is displayed.</li> <li>c. Click <b>OK</b> to confirm.</li> <li>d. Click <b>Save</b>.</li> </ul> <p>You have deleted a property for an outbound adapter.</p>	

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 30.2.5 Reverting a Property Value for an Outbound Adapter

You can revert changes made, if any, only for the already existing property values and not those that you added from the predefined list of properties or the ones that you newly created.

To revert a property value for an inbound adapter:

1. Navigate to a SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>

2. Revert a property value for an outbound adapter:
  - a. Click the **Properties** tab to see a list of the currently defined binding properties.
  - b. Select the property you want to revert, and then click **Revert**.  
A message asking you to confirm your action is displayed.
  - c. Click **OK** to confirm.
  - d. Click **Save**.

You have reverted a property value for an outbound adapter.

For more information about configuring adapters, see [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#) and *Oracle Fusion Middleware User's Guide for Technology Adapters*.



# 31

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## Monitoring Oracle JCA Adapters

This chapter describes how to monitor inbound and outbound Oracle JCA adapters, including monitoring instances and faults, recent faults and rejected messages, adapter properties, and adapter logs.

This chapter includes the following sections:

- [Section 31.1, "Monitoring Instances and Faults for an Inbound Adapter"](#)
- [Section 31.2, "Monitoring Recent Faults and Rejected Messages for an Inbound Adapter"](#)
- [Section 31.3, "Monitoring Faults and Rejected Messages for an Inbound Adapter"](#)
- [Section 31.4, "Monitoring Properties for an Inbound Adapter"](#)
- [Section 31.5, "Monitoring Instances and Faults for an Outbound Adapter"](#)
- [Section 31.6, "Monitoring Recent Faults for an Outbound Adapter"](#)
- [Section 31.7, "Monitoring Faults for an Outbound Adapter"](#)
- [Section 31.8, "Monitoring Properties for an Outbound Adapter"](#)
- [Section 31.9, "Monitoring Adapter Logs"](#)

### 31.1 Monitoring Instances and Faults for an Inbound Adapter

An invocation to a service from a composite may result in an error. This error is captured as a fault in the service. You can view the details of the instances and faults of the inbound adapter in the **Instances and Faults** section of the Dashboard page.

To monitor instances and faults for an inbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>
<ol style="list-style-type: none"> <li>2. Monitor the instances and faults for an inbound adapter:           <ol style="list-style-type: none"> <li>a. Click <b>Dashboard</b>. The <b>Dashboard</b> page is displayed.</li> <li>b. View the instances and faults listed in the <b>Instances and Faults</b> section. The details of the fault is displayed in a line chart in the <b>Instances and Faults</b> section. This line chart shows the total number of outgoing messages since the start of the server, and the total number of faults since the start of the server.</li> </ol> </li> </ol>	
	<p>For more information about monitoring adapters, see <i>Oracle Fusion Middleware User's Guide for Technology Adapters</i>.</p>

## 31.2 Monitoring Recent Faults and Rejected Messages for an Inbound Adapter

You can view the details of the recent faults and rejected messages of the inbound adapter in the **Recent Faults and Rejected Messages** section of the Dashboard page.

To monitor the recent rejected messages for an inbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<p>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</p> <p>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</p> <p>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</p>	<p>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</p>
<p>2. Monitor the recent faults and rejected messages for an inbound adapter:</p> <p>a. Click <b>Dashboard</b>. The Dashboard page is displayed.</p> <p>b. View the recent faults and rejected messages listed in the <b>Recent Faults and Rejected Messages</b> section. A list of recently rejected faults and messages with details such as error message, fault time, and the composite instance ID is displayed.</p> <p>For more information about monitoring adapters, see <i>Oracle Fusion Middleware User's Guide for Technology Adapters</i>.</p>	

### 31.3 Monitoring Faults and Rejected Messages for an Inbound Adapter

You can view the details of the faults and rejected messages of an inbound adapter in the Faults and Rejected Messages page.

To monitor the rejected messages for an inbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Monitor the faults and rejected messages for an inbound adapter:
  - a. Click **Faults and Rejected Messages**.  
The Faults and Rejected Messages page is displayed.  
A list of faults and rejected messages with details such as error message, fault time, and composite instance ID is displayed.

For more information about monitoring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 31.3.1 Searching for Rejected Messages for an Inbound Adapter

Use the *Search* feature to search for faults and rejected messages for an inbound adapter.

To search for faults and rejected messages for an inbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Click the **Faults and Rejected Messages** tab.
3. Enter any or all of the following search criteria:
  - **Error Message Contains**  
Enter any part of the error message text.
  - **Fault ID**  
Enter the ID of the fault.
  - **Fault Time From**  
Enter the lower limit of the time when the fault could have occurred.
  - **Fault Time To**  
Enter the upper limit of the time when the fault could have occurred.
  - **Composite Instance ID**  
Enter the ID of the composite.
  - **Fault Type**  
Select a type from the list of faults available.
4. Click **Search** to start the search operation.  
The fault or rejected message matching the criteria you specified is displayed.
5. Click **Reset** to reset the search criteria.

For more information about configuring adapters, see Oracle Fusion Middleware User's Guide for Technology Adapters.

### 31.3.2 Deleting Rejected Messages for an Inbound Adapter

You can directly delete rejected messages from the database by specifying a search criteria.

To delete rejected messages for an inbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Click the **Faults and Rejected Messages** tab.
  3. Click **Delete Rejected Messages....**  
The Delete: Rejected Messages dialog is displayed.
  4. Specify a selection criterion for deleting rejected messages directly from the database, and then click **Delete**.
- To delete a fault, you must delete the associated composite instance from the Instances page.
- For more information about configuring adapters, see Oracle Fusion Middleware User's Guide for Technology Adapters.

## 31.4 Monitoring Properties for an Inbound Adapter

You can view the details of the properties of an inbound adapter in the Properties page.

To monitor the properties for an inbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the inbound adapter (service) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Monitor the properties for an inbound adapter:

- a. Click **Properties**.

The Properties page is displayed.

A list of properties with details such as name and value is displayed.

---

**Note:** In any adapter that has an inbound asynchronous request-reply scenario (the Get Message operation preceding the Send Reply operation) only details about the activation specification are displayed, and details about the interaction specification are not displayed.

---

For more information about monitoring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

## 31.5 Monitoring Instances and Faults for an Outbound Adapter

An invocation to a reference from a composite may result in an error. This error is captured as a fault in the reference. The details of the instances and faults of the outbound adapter can be viewed in the **Instances and Faults** section of the Dashboard page.

To monitor instances and faults for an outbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Monitor the instances and faults for an outbound adapter:

- a. Click **Dashboard**.

The Dashboard page is displayed.

- b. View the instances and faults listed in the **Instances and Faults** section.

The details of the fault is displayed in a line chart in the **Instances and Faults** section. This line chart shows the total number of outgoing messages since the start of the server, and the total number of faults since the start of the server.

For more information about monitoring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

## 31.6 Monitoring Recent Faults for an Outbound Adapter

The details of the recent faults of the outbound adapter can be viewed in the **Recent Faults** section of the Dashboard page.

To monitor recent faults for an outbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Monitor the recent faults for an outbound adapter:
  - a. Click **Dashboard**.  
The Dashboard page is displayed.
  - b. View the recent faults listed in the **Recent Faults** section.  
A list of recent faults with details such as name, time, and type is displayed.

For more information about monitoring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

## 31.7 Monitoring Faults for an Outbound Adapter

The details of the instances and faults of the outbound adapter can be viewed in the Faults page.

To monitor faults for an outbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Monitor the faults for an outbound adapter:
  - a. Click the **Faults** tab.  
The Faults page is displayed.
  - b. Click **View**.  
A list of faults with details such as name, time, and type is displayed.

For more information about monitoring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

### 31.7.1 Searching for Faults for an Outbound Adapter

Use the *Search* feature to search for faults for an outbound adapter.

To search for faults for an outbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composite applications is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Reference Home page is displayed.</li> </ol>

2. Click the **Faults** tab.
3. In the **Search** section, enter any or all of the following search criteria:
  - **Error Message Contains**  
Enter any part of the error message text.
  - **Fault ID**  
Enter the ID of the fault.
  - **Fault Time From**  
Enter the lower limit of the time when the fault could have occurred.
  - **Fault Time To**  
Enter the upper limit of the time when the fault could have occurred.
  - **Composite Instance ID**  
Enter the ID of the composite.
  - **Fault Type**

Select the type of the fault from the list of types available.

4. Click **Search** to start the search operation.

The fault matching the criteria you specified is displayed.

5. Click **Reset** to reset the search criteria.

For more information about configuring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

## 31.8 Monitoring Properties for an Outbound Adapter

The details of the properties of the outbound adapter can be viewed on the Properties page.

To monitor properties for an outbound adapter:

1. Navigate to the SOA composite application by using either of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Click <b>Home</b>. The SOA Infrastructure page is displayed.</li> <li>2. Click the <b>Deployed Composites</b> tab. The list of deployed composites is displayed.</li> <li>3. In the <b>Composite</b> section, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>4. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, click a specific SOA composite application. The SOA Composite home page is displayed.</li> <li>2. Click the outbound adapter (reference) from the <b>Services and References</b> section in the right panel. The Service Home page is displayed.</li> </ol>

2. Monitor the properties for an outbound adapter:

- a. Click the **Properties** tab.

The Properties page is displayed.

- b. Click **View**.

A list of properties with details such as name and value is displayed.

---

**Note:** In the case of an adapter that has an outbound asynchronous request-reply scenario (the Send Message operation preceding the Get Response operation), only details about the interaction specification are displayed, and details about the activation specification are not displayed.

---

For more information about monitoring adapters, see *Oracle Fusion Middleware User's Guide for Technology Adapters*.

## 31.9 Monitoring Adapter Logs

Oracle Fusion Middleware components generate log files containing messages that record all types of events, including startup and shutdown information, errors, warning messages, access information on HTTP requests, and additional information. There is only one log for all Oracle JCA Adapters, and the log is called `oracle.soa.adapter`.

To monitor the File adapter logs:

1. Navigate to **Composite Home > J2EE Application** (menu) > **Monitoring > Logs**.
2. Find the `oracle.soa.adapter` logger for adapters and increase verbosity.
3. Find resulting log files.
4. Cause an adapter to fail. For example, delete a directory that the file adapter writes to, or delete a table that the Database adapter reads from.
5. Ensure that the resulting log files give a good indication of the cause of failure.

For information about configuring logs, see [Section 3.4, "Configuring Log Files."](#)



# **Part XII**

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## **Administering Oracle B2B and Oracle Healthcare**

This part describes how to administer Oracle B2B and Oracle Healthcare.

This part includes the following chapters:

- [Chapter 32, "Configuring Oracle B2B"](#)
- [Chapter 33, "Monitoring Oracle B2B"](#)
- [Chapter 34, "Monitoring Oracle Healthcare"](#)



# 32

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## Configuring Oracle B2B

This chapter describes how to configure Oracle B2B to view data on B2B Bindings and configure Oracle B2B operations and attributes.

This chapter includes the following sections:

- [Section 32.1, "Configuring Oracle B2B Server Properties"](#)
- [Section 32.2, "Configuring Oracle B2B Operations"](#)
- [Section 32.3, "Configuring Oracle B2B Attributes"](#)
- [Section 32.4, "Configuring Oracle B2B Logging Mode"](#)

For more information about Oracle B2B tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

### 32.1 Configuring Oracle B2B Server Properties

You can configure the **Enable Metrics** property on the B2B Server Properties page of Oracle Enterprise Manager Fusion Middleware Control.

The metrics are enabled by default, and include data on the top five recently active document types, top five recently active trading partners, and inbound and outbound endpoints.

---

**Note:** You do not need to restart the server after changing this property.

---

To configure Oracle B2B server properties:

1. From the **SOA Infrastructure** menu, select **SOA Administration > B2B Server Properties**.
2. Select **Enable Metrics** to view data on the B2B Bindings and SOA composite pages.

For information about using Oracle B2B, which enables the secure and reliable exchange of business documents between an enterprise and its trading partners, see *Oracle Fusion Middleware User's Guide for Oracle B2B*.

### 32.2 Configuring Oracle B2B Operations

You can configure the properties of Oracle B2B operations by setting values using the System MBean Browser.

---

**Note:** Restarting the SOA server is required after updating the following MBean properties:

- **b2b.inboundThreadCount**
  - **b2b.outboundThreadCount**
- 

To specify Oracle B2B operation properties:

---

**Note (a shortcut):** To access the Application Defined MBeans for Oracle B2B, you can also click the **More B2B Configuration Properties** link on the B2B Server Properties page.

---

1. Expand the **SOA** node and select the **soa-infra** node.
  2. From the **SOA Infrastructure** menu, choose **Administration > System MBean Browser**.
- The System MBean Browser page is displayed.
3. Under **Application Defined MBeans**, expand the **oracle.as.soainfra.config** node.
  4. Expand the **Server:soa\_server1** node.
  5. Expand the **B2BConfig** node.
  6. Click the **b2b** MBean.
- The properties of the MBean are displayed in the right pane.
7. Click the **Operations** tab.
  8. Click an operation in the list.

Name	Description
1 addProperty	Add a property
2 getProperty	Returns a property represented by key
3 getPropertyComment	Returns comment about the property represented by key
4 getPropertyValue	Returns value of the property represented by key
5 remove	Remove a property
6 setProperty	Updates a property
7 setPropertyComment	Updates the comment about the property
8 setPropertyValue	Updates the value of the property

9. Provide the needed information (key, value, and an optional comment) and click **Invoke**.

See Appendix "Setting Oracle B2B Configuration Properties in Fusion Middleware Control" in *Oracle Fusion Middleware User's Guide for Oracle B2B* for a list of property names and valid values, including properties for turning off validation during deployment, setting the MDS cache size, setting thread count and thread sleep time, specifying how functional acknowledgments are handled, setting payload obfuscation, and more.

## 32.3 Configuring Oracle B2B Attributes

You can configure Oracle B2B attributes by setting values using the System MBean Browser.

To specify Oracle B2B attribute properties:

1. Perform Steps 1 through 6 in [Section 32.2, "Configuring Oracle B2B Operations."](#)
2. Click the **Attributes** tab.
3. Click **Properties**.
4. Expand **Element\_0**, **Element\_1**, and so on to find the property you want to change.
5. Note the property name and value, and click **Return**.

For example, under **Element\_3**, you see the **b2b.payloadObfuscation** property with the default value **false**.

6. Click the **Operations** tab.
7. Click **setProperty**.
8. Enter values for the key, value, and optional comments.

The screenshot shows the 'Operation: setProperty' dialog. At the top, there are three buttons: 'Invoke', 'Revert', and 'Return'. Below the buttons, the MBean Name is listed as 'oracle.as.soaconfig:Location=soa\_server1,name=b2b,type=B2BConfig,Application=soa-infra, ApplicationVersion=11.1.1'. The Operation Name is 'setProperty', the Description is 'Updates a property', and the Return Type is 'void'. In the 'Parameters' section, there is a table with three rows:

Name	Description	Type	Value
key	Name of the property	java.lang.String	b2b.payloadObfuscation
value	Value of the property	java.lang.String	true
comment	Comment about the property	java.lang.String	

For example, to enable payload obfuscation, set **b2b.payloadObfuscation** to **true**.

9. Click **Invoke**.
10. Click **Return**.

## 32.4 Configuring Oracle B2B Logging Mode

You can configure the logging mode for Oracle B2B by using Oracle Enterprise Manager Fusion Middleware Control.

For example, to set the log mode to TRACE mode (DEBUG):

1. Expand the **SOA** node and select the **soa-infra** node.
2. From the SOA Infrastructure menu, select **Logs**, and then **Log Configuration**.
3. In the Log Configuration page, expand **oracle.soa**.
4. Use the Oracle Diagnostic Logging Level (Java Level) list to select **TRACE:32 (FINEST)** for **oracle.soa.b2b**.

**Log Configuration**  
Use this page to configure basic and advanced log configuration settings.

**Log Levels** Log Files

This page allows you to configure the log level for both persistent loggers and active runtime loggers. Persistent loggers are loggers that are saved in a configuration file and become active when the component is started. The log levels for these loggers are persisted across component restarts. Runtime loggers are automatically created during runtime and become active when a particular feature area is exercised. For example, oracle.j2ee.ejb.deployment.Logger is a runtime logger that becomes active when an EJB module is deployed. Log levels for runtime loggers are not persisted across component restarts.

View Runtime Loggers

Search All Categories

Logger Name	Oracle Diagnostic Logging Level (Java Level)	Log File
oracle.bpm	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.fabric.common.wsdl	WARNING:1 (WARNING) [Inherit]	odl-handler
oracle.integration	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.sdp	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.sdpinternal	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.adapter	NOTIFICATION:1 (INFO) [Inherit]	odl-handler
oracle.soa.b2b	TRACE:32 (FINEST)	odl-handler

Apply Revert

5. Click **Apply**.

---

**Note:** For more information about log files and the level and type of logging information to write to a log file, see *Oracle Fusion Middleware Administrator's Guide*.

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# 33

## Monitoring Oracle B2B

This chapter describes how to monitor Oracle B2B, including monitoring the Oracle B2B infrastructure, viewing Oracle B2B binding component message flow, viewing services and references, and accessing Oracle B2B reports from the Oracle B2B composite flow trace page.

This chapter includes the following sections:

- [Section 33.1, "Monitoring the Oracle B2B Infrastructure"](#)
- [Section 33.2, "Accessing Oracle B2B from the B2B Infrastructure Page"](#)
- [Section 33.3, "Viewing the Message Flow of an Oracle B2B Binding Component"](#)
- [Section 33.4, "Viewing Services and References"](#)
- [Section 33.5, "Accessing Oracle B2B Reports from the Oracle B2B Composite Flow Trace Page"](#)

### 33.1 Monitoring the Oracle B2B Infrastructure

To monitor the Oracle B2B infrastructure, metrics must be enabled (the default) on the B2B Server Properties page.

Use the **B2B Server Properties** link under **Related Links** on the B2B Infrastructure (SOA Binding) page to change the setting. See [Section 32.1, "Configuring Oracle B2B Server Properties,"](#) for more information on enabling metrics.

[Table 33-1](#) describes the information displayed on the B2B Infrastructure (SOA Binding) page.

**Table 33-1 B2B Infrastructure (SOA Binding)**

Section/Column	Description
Top 5 Recently Active Document Types	Shows the active document types with the maximum number of messages exchanged (inbound and outbound combined) during the current session of the server. The document types listed in this section are from Oracle DMS metrics, triggered by runtime sensors. This data is not persisted. Therefore, if Oracle B2B is restarted, then new data based on Oracle B2B activity appears here.
Number of Messages Processed	Shows the number of document messages exchanged between the host and trading partners. <b>Outbound</b> indicates messages sent from the host to the trading partner and <b>Inbound</b> indicates messages sent from the trading partner to the host.
Average Message Processing Time (sec)	Shows the average document processing time, in seconds, for both outbound and inbound messages.

**Table 33–1 (Cont.) B2B Infrastructure (SOA Binding)**

Section/Column	Description
Average Message Size (kb)	Shows the average document size, in kilobytes, for both outbound and inbound messages.
Errors	Shows the document error count.
Top 5 Recently Active Trading Partners	Shows the active trading partners with the maximum number of messages exchanged (from and to combined) during the current session of the server.  The trading partners listed here are from Oracle DMS metrics, triggered by runtime sensors. This data is not persisted. Therefore, if Oracle B2B is restarted, then new data based on Oracle B2B activity appears here.
Number of Messages Processed	Shows the number of messages sent and received between the host and trading partners. <b>From</b> indicates messages sent from this partner to its trading partner. <b>To</b> indicates messages received by this partner from the trading partner.
Average Message Processing Time (sec)	Shows the average document processing time, in seconds, for exchanged messages.
Average Message Size (kb)	Shows the average document size, in kilobytes, for exchanged messages.
Errors	Shows the document error count.
Inbound Endpoints	Shows the status of the listening endpoints at the time the connection was attempted (not for a later point in time). For example, in an EDI transaction using Generic File transport, when Oracle B2B reads from a directory, that directory is the inbound endpoint.
Protocol	Shows the type of transport protocol used in the exchange, for example, File, AQ, and FTP, among others.
Endpoint	Shows the location from which messages are received. The endpoint can be a URL, folders, or path, among others.
Status	Shows the status (up or down) of the endpoint (protocol) the last time a connection was attempted.
Outbound Endpoints	Shows the status of the delivery endpoints at the time the delivery was attempted (not for a later point in time). For example, in an EDI transaction using Generic File transport, when Oracle B2B writes to a directory, that directory is the outbound endpoint.
Protocol	Shows the type of transport protocol used in the exchange, for example, File, AQ, and FTP, among others.
Endpoint	Shows the location to which messages are sent. The endpoint can be a URL, folders, or path, among others.
Status	Shows the status (up or down) of the endpoint (protocol) the last time a delivery was attempted.

To monitor the Oracle B2B infrastructure using Oracle Enterprise Manager Fusion Middleware Control:

1. Expand the **SOA** node.
2. Select the SOA Infrastructure, for example, **soa-infra (soa\_server1)**.



3. From the **SOA Infrastructure** menu, select **Bindings > B2B**.

See [Table 33–1](#) for a description of the information displayed.

Information displayed in Fusion Middleware Control is based on DMS metrics, including inbound and outbound endpoints. Therefore, changes to Oracle B2B runtime data are not necessarily or immediately reflected in Fusion Middleware Control.

For example, if you purge runtime data or make Oracle B2B configuration changes in the Oracle B2B interface, the changes do not affect DMS metrics. To view current runtime data, use the Oracle B2B interface. Fusion Middleware Control data shows Oracle B2B message traffic from the time that the Oracle B2B (SOA) server starts.

## 33.2 Accessing Oracle B2B from the B2B Infrastructure Page

Use the **B2B Console** link under **Related Links**, as shown in [Figure 33–1](#), to log in to Oracle B2B.

**Figure 33–1 Accessing Oracle B2B from Oracle Enterprise Manager Fusion Middleware Control**

The screenshot shows the 'B2B Infrastructure (SOA Binding)' page. At the top, it says 'Logged in as weblogic|Host' and 'Page Refreshed Oct 9, 2009 1:40:09 PM PDT'. Below that is a 'Top 5 Recently Active Document Types' table. The table has columns for Name, Number of Messages Processed (Outbound, Inbound), Average Message Processing Time (sec), and Average Message Size. The data is as follows:

Name	Number of Messages Processed	Average Message Processing Time (sec)	Average Message Size		
	Outbound	Inbound	Outbound	Inbound	Outbound
EDI_X12 4010 850	15	0	4.463	0.000	1.098
1Sync 6.4 catalogueRequest	7	0	0.377	0.000	46.731
EDI_EDIFACT D3 CONTRL	0	0	0.000	0.000	0.000

A 'Related Links' dropdown menu is open on the right side of the table, listing: SOA Infra Home, B2B Server Properties, B2B Console, and WebLogic Server Console.

See *Oracle Fusion Middleware User's Guide for Oracle B2B* for information on using the Oracle B2B interface.

## 33.3 Viewing the Message Flow of an Oracle B2B Binding Component

To view the message flow of an Oracle B2B binding component in a SOA composite application instance:

1. Select a SOA composite application with an Oracle B2B binding component.

A list of the recent instances is displayed in the Dashboard page.

**Project\_ebMS\_PO [1.0] ⓘ**

Logged in as weblogic|Host  
Page Refreshed Sep 9, 2009 1:19:34 PM PDT

Running Instances 0 | Total 36 | Active Retire ... | Shut Down... | Test | Settings... | ☰ |

**Dashboard** Instances Faults and Rejected Messages Unit Tests Policies

Instance ID	Name	Conversation ID	State	Start Time
20060		JygzkC4xapUdG...	---	Sep 9, 2009 1:11:28 PM
20058		58IT9XvzF2JAOh...	---	Sep 9, 2009 1:04:28 PM
20059		yqx0AGPFH63GN...	---	Sep 9, 2009 1:04:28 PM
20057		p4ikT9jqCE8VajW...	---	Sep 9, 2009 1:03:58 PM
20056		V78qCW4Wr_xkF...	---	Sep 9, 2009 1:03:58 PM

>Show All

**Recent Faults and Rejected Messages**

Show only system faults

Error Message	Recovery	Fault Time	Fault Location	Composite Instance ID	Logs
No faults found					

>Show All

**Component Metrics**

Name	Component Type	Total Instances	Running Instances	Faulted Instances	
				Recoverable	Non Recoverable
Mediator_ebMS_PO	Mediator	36	0	0	0

**Services and References**

Name	Type	Faults	Total Messages	Average Processing Time (sec)
File_Read_PO	Service	0	30	0.211
B2B_Send_ebMS_PO	Reference	0	30	0.039

2. To see all instances of this SOA composite application, click the **Instances** tab.

The screenshot shows the Oracle SOA Composite Instances page for the B2B\_EDI\_X12 [1.0] composite. The page has a header with 'Logged in as PLUSH' and a timestamp 'Page Refreshed Dec 11, 2008 11:28:35 AM PST'. Below the header are tabs for 'Dashboard', 'Instances' (which is selected), 'Faults and Rejected Messages', 'Unit Tests', and 'Policies'. A search bar at the top allows filtering by 'Instance ID' or 'Conversation ID' and specifies time ranges from 'Start Time From' and 'Start Time To' both set to '(UTC-08:00) US Pacific Time'. Below the search bar is a dropdown menu 'Show' with 'Any' selected. There are also buttons for 'Delete Selected ...', 'Delete With Options ...', and 'Abort...'. The main content is a table with columns: Instance ID, Conversation ID, State, Faults, Start Time, and Logs. The table lists numerous instances, each with a unique ID and conversation ID, all in a '---' state with 0 faults, and various start times between Dec 9 and Dec 11, 2008.

**Note:** You can see details of a specific message by searching on the instance ID on the **Reports** page of the Oracle B2B interface.

- Click a specific instance in the **Instance ID** list to see faults and the flow trace.

The screenshot shows the Flow Trace page. At the top, it says 'Flow Trace' and 'The page shows the flow of the message through various composite and component instances.' Below this is a section titled 'Faults (0)' which contains a message 'Select a fault to locate it in the trace view.' and 'No faults found.' Further down is a section titled 'Sensors (0)'. At the bottom, there is a 'Trace' section with a message 'Click a component instance to see its detailed audit trail.' and a checkbox 'Show Instance IDs'. A table below shows component instances with their types and usages:

Instance	Type	Usage
B2BShiporderInboundService	B2B Binding	Service
B2BShiporderInboundMediator	Mediator Component	
FileShiporderInboundSer	Open using B2B Console	Referer

The Flow Trace page displays the following details:

- The **Faults** section shows the faults occurring and sensor information collected in the services, service components, and references that comprise the SOA composite application.

- The **Trace** section shows the sequence of the message flow through the services, service components, and references that comprise the SOA composite application.

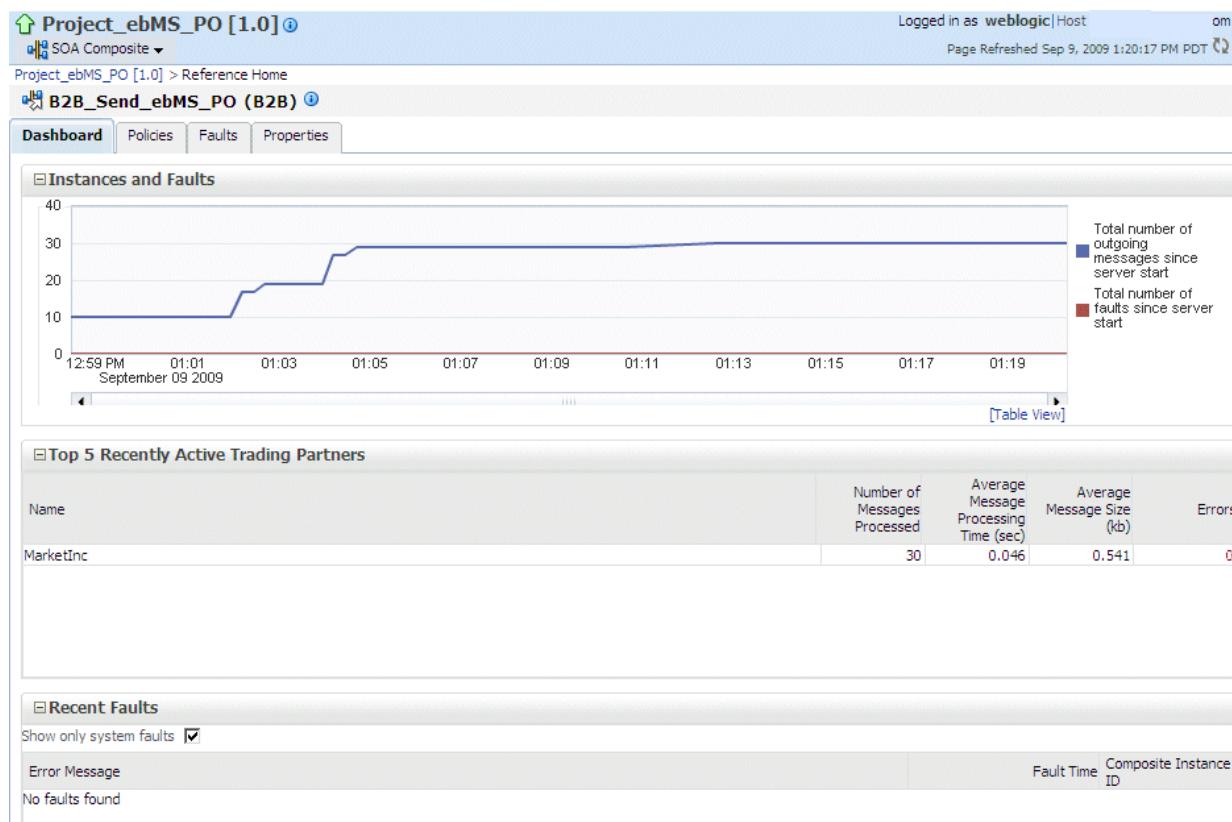
## 33.4 Viewing Services and References

The Dashboard page for a composite application, lists the services and references used in the composite.

When Oracle B2B is used as a *service* (inbound), it receives messages from trading partners and delivers them to SOA composite applications. When Oracle B2B is used as a *reference* (outbound), it sends messages from the SOA composite application to partners.

Details of the Oracle B2B reference shown in Figure 33–2, **B2B\_Send\_ebMS\_PO**, are displayed on the Reference home page.

**Figure 33–2 The Oracle B2B Reference, B2B\_Send\_ebMS\_PO**



The **Instances and Faults** section shows the number of outgoing messages and the number of faults since the server was started. See Table 33–1 for a description of the **Top 5 Recently Active Trading Partners** section.

The **Recent Faults** section lists the faults, including details such as the error message, time of the fault, and the associated composite instance ID. Faults can be on the incoming messages processed by a service binding component or on the outgoing messages processed by a reference binding component.

While all errors appear in the Oracle B2B console, only a subset of faults appears in Oracle Enterprise Manager Fusion Middleware Control. This subset includes all

inbound messages containing an error after trading partner identification in Oracle B2B.

See [Chapter 4, "Monitoring the SOA Infrastructure,"](#) and [Chapter 37, "Monitoring Service and Reference Binding Components,"](#) for more information.

## 33.5 Accessing Oracle B2B Reports from the Oracle B2B Composite Flow Trace Page

The Oracle B2B composite Flow Trace page displays Oracle B2B faults and traces. Click an instance to open the Oracle B2B console and view a report.

The screenshot shows the Oracle B2B Composite Flow Trace page. At the top, it displays the ECID (OAESBB04127066C94DB00000F8834FF0) and the start time (Feb 25, 2010 10:38:51 AM). The page is divided into two main sections: 'Faults (0)' and 'Trace'.

**Faults:** This section is empty, showing a message: "Select a fault to locate it in the trace view." It includes a link to "Error Message" and a note: "No faults found".

**Trace:** This section contains a table titled "Component Instances". The table has columns: Instance, Type, Usage, State, and Time: Composite Instance. The data in the table is as follows:

Instance	Type	Usage	State	Time: Composite Instance
B2BShiporderInboundService	B2B Binding	Service	Completed	Feb 25, 2010 10:38:51 AM B2BShiporderInboundCompos...
B2BShiporderInboundMediator	Mediator Component		Completed	Feb 25, 2010 10:38:51 AM B2BShiporderInboundCompos...
FileShiporderInboundService	Open using B2B Console	Reference	Completed	Feb 25, 2010 10:38:51 AM B2BShiporderInboundCompos...



# 34

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## Monitoring Oracle Healthcare

This chapter describes how to enable and configure an audit trail of user activity for healthcare integration components and applications. Oracle SOA Suite for healthcare integration uses Oracle's Common Audit Framework to log user activity against healthcare integration components.

This chapter includes the following sections:

- [Section 34.1, "Introduction to the Audit Trail"](#)
- [Section 34.2, "Configuring the Healthcare Integration Audit Trail"](#)
- [Section 34.3, "Viewing User Audit Logs"](#)

### 34.1 Introduction to the Audit Trail

The Oracle auditing framework collects and stores information about events affecting configured components, providing an audit log of activity for those components to help support your compliance requirements. Auditing for each SOA Suite component is defined by an *audit policy* that defines which components and which activities are captured in the audit log. You can configure the audit policy to only capture the information you need and ignore the rest. This is done on the Audit Policy page of Oracle Enterprise Manager. See "Managing Audit Policies" in the *Oracle Fusion Middleware Application Security Guide* for more information.

The set of auditable events for each application and component is defined by the audit policy and differs between each application. When you expand the list of events for a component, only those events that can be audited for that component appear in the list. For each event, you can further specify whether to only log successful attempts or failed attempts (currently Oracle SOA Suite for healthcare integration only logs successful attempts).

When you configure auditing, you can select from the following audit levels:

- **Low:** This option selects a subset of events from all auditable components in the audit policy list, including a subset of Oracle SOA Suite for healthcare integration events. It does not allow custom filters to be created.
- **Medium:** This option selects a larger subset of events from all auditable components in the audit policy list, including all Oracle SOA Suite for healthcare integration events. It does not allow custom filters to be created.
- **Custom:** This options lets you select only those components, events, and conditions that you want to audit. This is the recommended level for Oracle SOA Suite for healthcare integration. You need to select this level in the Oracle Enterprise Manager console to enable Oracle Healthcare auditing.

You can also specify a list of users whose activity is audited regardless of the actions performed or the component used. Auditing occurs for these users no matter what audit level or filters are defined.

For more information about audit policies, see [Configuring and Managing Auditing](#) in the *Oracle Fusion Middleware Application Security Guide*.

### 34.1.1 Oracle SOA Suite for Healthcare Integration Auditing Options

The components and events available for auditing are listed on the Audit Policy page of Oracle Enterprise Manager (Weblogic domain > Security > Audit Policy). To view or configure the these options, select **Oracle SOA Suite for healthcare integration** from the **Audit Component Name** list, **Custom** from the **Audit Level** list, and click the check boxes adjacent to the events.

**Figure 34–1 Healthcare Integration Components on the Audit Policy Page**

The screenshot shows the 'Audit Policy' settings for the 'soainfra' WebLogic Domain. The 'Audit Component Name' is set to 'Oracle SOA Suite for healthcare integration' and the 'Audit Level' is set to 'Custom'. Under the 'Audit Policy Settings' section, there is a table for 'User Session' events. The table has columns for 'Event Name', 'Success Filter', 'Failure Filter', and 'Filter'. Two rows are shown: 'User Login' with both success and failure filters checked, and 'User Logout' with both success and failure filters checked. A note at the bottom of the table states: 'Note: Currently only the SUCCESS events are audited. You should not select FAILURE events.'

Event Name	Success Filter	Failure Filter	Filter
User Login	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
User Logout	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

**Note:** Currently only the SUCCESS events are audited. You should not select FAILURE events.

Currently, the following components and events are supported for audit in Oracle SOA Suite for healthcare integration (note that additional events appear in the list, but they are not currently logged):

- User Session
  - User Login
  - User Logout

- Endpoint Management
  - Enable Endpoint
  - Disable Endpoint
- Document Management
  - Resubmit Message
  - Purge Message
  - Read Payload

### 34.1.2 Using Filter Conditions for Auditing

For each event, you can define filters for the success condition. Filters use rule-based expressions that are based on the attributes of the event. For most Oracle SOA Suite for healthcare integration user access auditing, you can use the following attributes in your filter expressions:

- Host ID
- Host Network Address
- Initiator
- Client IP Address
- Resource
- Domain Name

Expressions can include AND and OR operators, as well as a variety of comparison functions, such as equals, starts with, contains, does not equal, and so on.

## 34.2 Configuring the Healthcare Integration Audit Trail

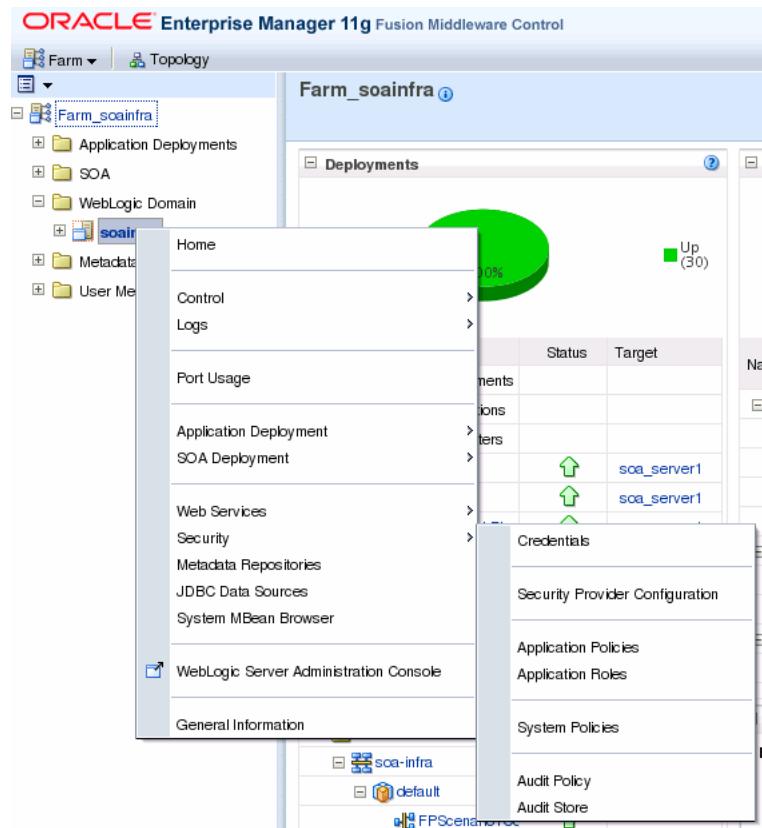
You configure audit policies in Oracle Enterprise Manager by selecting the events or components to include in the audit log. Currently, Oracle B2B components and events are not included in the audit trail.

There are two default configurations, Low and Medium audit levels, that select a predefined subset of components or events. These are not recommended for Oracle SOA Suite for healthcare integration because they affect all auditable components, not just the components of Oracle SOA Suite for healthcare integration. Selecting either of these options can result in extraneous audit entries and unnecessarily large audit logs. Additionally, these two options do not allow you to define any filters.

The following instructions apply to custom-level audit policy configuration.

### To configure auditing for healthcare integration

1. Login to Oracle Enterprise Manager.
2. In the navigation panel on the left, expand **WebLogic Domain** and then right-click the name of the domain for which you want to enable user auditing.
3. In the context menu that appears, point to **Security** and then select **Audit Policy**.

**Figure 34–2 Security Context Menu for a WebLogic Domain**

4. In the **Audit Level** field, select **Custom**.

Check boxes appear in the **Select for Audit** column so you can select which healthcare integration components and events to audit.

5. Click event categories such as User Session to display the list of events pertaining to that category below.
  6. Do any of the following:
    - To enable auditing for all Oracle SOA Suite for healthcare integration components and events, click the **Audit All Events** button.
    - To enable auditing for all events for a specific component, click the check box in the **Select for Audit** column next to the component name.
- For example, to audit all actions taken against endpoints, select the check box for **Endpoint Management**.

**Figure 34–3 Endpoint Management Component With All Events Selected**

Audit Policy Settings - Oracle SOA Suite for healthcare integration

Export...  Import...

Audit Level  Custom

Enter a comma-delimited list of user accounts that will always be audited. This ensures audit of specified user accounts, regardless of the policy settings.

Users to Always Audit:

Select Categories to view/customize audit policies for their events

<input type="button"/> Select All	<input type="button"/> Deselect All	<input type="button"/> Audit All Events
Categories	Select For Audit	
User Session	<input checked="" type="checkbox"/>	
Endpoint Management	<input type="checkbox"/>	
Document Management	<input type="checkbox"/>	
Configuration	<input type="checkbox"/>	

**User Session**

Event Name	Success	Filter	Failure	Filter
User Login	<input type="checkbox"/> Success		<input type="checkbox"/> Failure	
User Logout	<input type="checkbox"/> Success		<input type="checkbox"/> Failure	

- To enable auditing of a specific event for a component, expand the component and select the check box in the **Enable Audit** column next to the event name under that component.
7. To define a filter for a success condition, select **Enable Audit** for the success condition, and then click its **Edit Filter** icon. Define the filter on the dialog that appears, and then click **OK**.  
For more information about filters, see [Section 34.1.2, "Using Filter Conditions for Auditing"](#) and the online help available from the Edit Filter dialog. Note that filters can only be defined for success conditions at this time.
  8. To specify a list of users whose activity is always audited regardless of the component configuration, enter a list of user accounts in the **Users to Always Audit** section. Separate the account names with commas.
  9. When you are done configuring auditing, click **Apply**.
  10. Restart the server in order for the changes to take effect.

### 34.3 Viewing User Audit Logs

When an event triggers an audit log entry, the event information is written to the audit log file. The audit log captures the following information. Depending on the type of event that triggered the entry, several of these fields might be empty.

- Date and time
- Initiator of the event
- Event type
- Event status
- Message text (indicating what occurred)
- ECID

- RID
- Context fields
- Session ID
- Target component type
- Application name
- Event category
- Thread ID
- Failure code
- Remote IP address
- Target
- Resource
- Roles
- Authentication method
- Reason

You can view the audit log file directly. It is written to the following location:

*fmw\_home/user\_projects/domains/domain\_name/servers/managed\_server\_name/logs/auditlogs/SOA-HCFP/audit.log*

# **Part XIII**

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## **Administering Business Events**

This part describes how to administer business events.

This part includes the following chapter:

- [Chapter 35, "Managing Business Events"](#)



# 35

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## Managing Business Events

This chapter describes how to manage business events and the Event Delivery Network (EDN), including subscribing to business events, managing subscribers, and recovering from business event faults. Business events consist of message data sent as the result of an occurrence in a business environment. When a business event is published, other service components or database agents can subscribe to it.

This chapter includes the following sections:

- [Section 35.1, "Introduction to the Event Delivery Network"](#)
- [Section 35.2, "Subscribing to Business Events"](#)
- [Section 35.3, "Managing Business Event Subscribers"](#)
- [Section 35.4, "Recovering from Business Event Faults"](#)

For information about troubleshooting business event issues, see [Section B.6, "EDN Troubleshooting."](#)

For more information about business events, see Chapter "Using Business Events and the Event Delivery Network" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

### 35.1 Introduction to the Event Delivery Network

The subsystem of Oracle SOA Suite that accepts published business events and delivers them to the subscribers is called the EDN. EDN has two different implementations:

- EDN-DB
  - EDN-DB uses an Oracle database as a back-end store and depends on Oracle-specific features.
- EDN-JMS
  - EDN-JMS uses a JMS queue as a back-end store.

The correct implementation is configured during installation by Oracle Universal Installer. You can also make postinstallation changes. From an application development point of view, the two implementations are identical and the behavior is the same.

### 35.2 Subscribing to Business Events

You can subscribe to business events in Oracle Enterprise Manager Fusion Middleware Control. Business events consist of message data sent as the result of an occurrence in a

business environment. You create business events in Oracle JDeveloper and include them in SOA composite applications that you deploy to Oracle Enterprise Manager Fusion Middleware Control. Service components and database agents can subscribe to business events. Only database agents can be subscribed to from Oracle Enterprise Manager Fusion Middleware Control. Service components are only subscribed to from Oracle JDeveloper. When a business event is published, the entity subscribed to that event receives it.

To subscribe to business events:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
Select <b>Business Events</b> .	Right-click <b>soa-infra</b> and select <b>Business Events</b> .

The Events page displays the following details:

- A utility for searching for a specific business event by specifying a full or partial name and clicking the **Search** icon. Click the **Help** icon for details.
- Business events, including the namespace used, event name, number of subscriptions to each event, and number of failed event deliveries. Business events are contained within their namespace.

The screenshot shows the Oracle SOA Infrastructure Home > Business Events page. At the top, there are navigation links for SOA Infrastructure Home, Business Events, and Related Links. Below the header, there is a search bar and buttons for View, Subscribe..., Test..., and Show Event Definition. The main content area displays a table titled "Namespaces and Events" with the following data:

Namespaces and Events	Subscriptions	Failed Deliveries
http://schemas.oracle.com/events/edl/OrderEventsDefinition	1	0
ContinueOrderProcessingEvent	0	0
OrderInformationCheckEvent	0	0
StopOrderProcessingEvent	0	0
OrderUpdateEvent	1	0
http://oracle/fodemo/storefront/entities/events/edl/OrderEO	2	0
NewOrderSubmitted	1	0
OrderFaulted	0	0
OrderCompleted	1	0
http://xmlns.oracle.com/bpel/workflow/taskEvent	1	0
OnStageCompleted	0	0
OnTaskAssigned	1	0

2. Select a specific event in the **Namespaces and Events** section.
3. Click **Show Event Definition**.

The event definition language (EDL) file for the selected event appears. The business event is defined using EDL. EDL is a schema used to build business event definitions.

In this example, business events named **OrderUpdateEvent**, **OrderInformationCheckEvent**, **ContinueOrderProcessingEvent**, and **StopOrderProcessingEvent** appear in the event definition.

Name ContinueOrderProcessingEvent Namespace http://schemas.oracle.com/events/edl/OrderEventsDefinition

**Event Definition(EDL)**

```
<definitions targetNamespace="http://schemas.oracle.com/events/edl/OrderEventsDefinition"> <schema-import namespace="http://www.globalcompany.example.com/ns/OrderBookingService" location="oramds:/apps/FusionOrderDemoShared/services/orderbooking/OrderProcessor.xsd"/> <event-definition name="OrderUpdateEvent"> <content element="ns0:updateOrderStatus"/> </event-definition> <event-definition name="OrderInformationCheckEvent"> <content element="ns0:orderInformationEvent"/> </event-definition> <event-definition name="ContinueOrderProcessingEvent"> <content element="ns0:continueOrderProcessingEvent"/> </event-definition> <event-definition name="StopOrderProcessingEvent"> <content element="ns0:stopOrderProcessingEvent"/> </event-definition> </definitions>
```

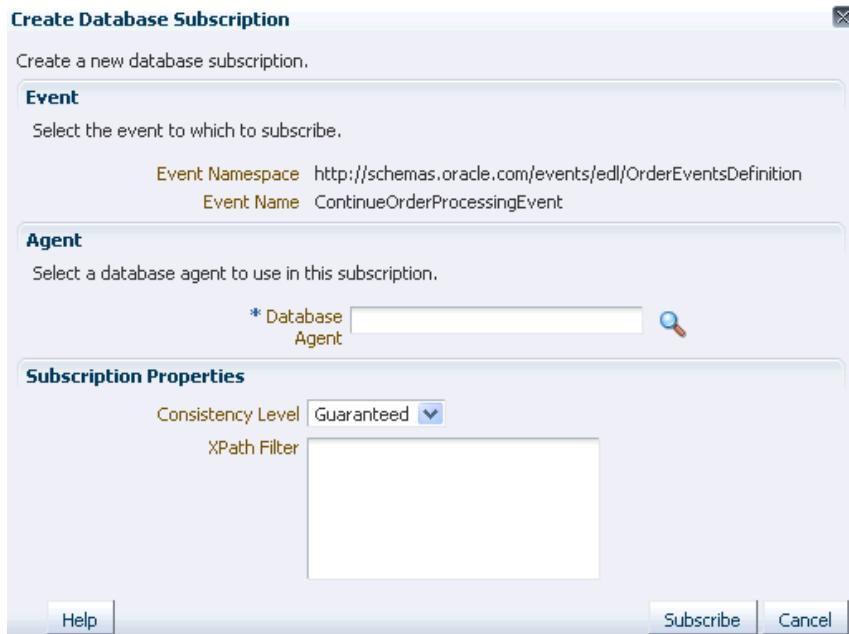
4. Click **OK** to close the dialog.
5. Click **Subscribe** to subscribe a database agent to the event selected in the **Namespaces and Events** table.

---

**Note:** The Events page for EDN-JMS implementations does not display the **Subscribe** button for subscribing a database agent to the selected event.

---

The Create Database Subscription dialog appears. You create an agent to listen for and subscribe to appropriate events when they are published.



6. Enter the following values. An asterisk indicates a required field.

Field	Description
Event Namespace	Displays the event namespace.
Event Name	Displays the event name.

Field	Description
<b>Database Agent</b>	Specify a database agent name or click <b>Create Agent</b> to create an agent. The agent listens for and subscribes to appropriate events when they are published.
<b>Consistency Level</b>	Select one of the following options: <ul style="list-style-type: none"> <li>▪ <b>Guaranteed:</b> Delivers events to the subscriber asynchronously without a global transaction. The subscriber can choose to create its own local transaction for processing, but it is committed independently of the rest of the event processing. By default, guaranteed delivery attempts to deliver the event three times to the subscriber. If it cannot deliver the event in these three attempts, then the delivery fails. Also, there is a possibility that a system failure can cause an event to be delivered multiple times because there is no global transaction. If the subscriber throws an exception (or fails in any way), the exception is logged, but the event is not resent.</li> <li>▪ <b>Immediate:</b> Delivers events to the subscriber in the same transaction and same thread as the publisher. The publish call does not return until all immediate subscribers have completed processing. If any subscribers throw an exception, no additional subscribers are invoked and an exception is thrown to the publisher.</li> </ul>
<b>XPath Filter</b>	If you want to filter the event, specify an XPath expression. When the subscription is delivered and the expression logic is satisfied, the event is accepted for delivery. If the logic is not satisfied, the event is not delivered.

7. Click **Subscribe**.
8. Click **Test** to test a selected event. This action enables you to publish a test event that subscribers can act upon.  
The Test Event dialog appears.
9. Specify the XML payload to use in the test.
10. Click **Publish**.

---

**Note:** Enforcement of policies for event subscriptions is not supported in this release. You can attach or detach a policy to or from a service component that subscribes to a business event (such as Oracle Mediator) without being warned. This action does not result in any errors; policy enforcement simply does not occur.

---

For more information, see the following documentation:

- [Section 1.2.8, "Introduction to the Contents of SOA Composite Applications"](#)
- Chapter "Using Business Events and the Event Delivery Network" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite* for details about business events

## 35.3 Managing Business Event Subscribers

You can also create, edit, and delete existing database subscriptions. When a business event is published, service components and database agents can subscribe to it. Use this page to view all subscriptions to business events. This page also enables you to manage event subscriptions by database agents. Service component subscriptions are created in Oracle JDeveloper during design time and cannot be modified in Oracle Enterprise Manager Fusion Middleware Control.

---

**Notes:**

- If your SOA composite application includes a business event subscription, and you deploy different revisions of the composite, all event subscriptions from all revisions of the composite are active and receive messages. To receive the event with the latest revision of the composite only, it is recommended that you retire all previous revisions of the composite.
  - A BPEL component in a retired SOA composite application cannot receive a business event, even if the event is associated with a noninitiating receive activity of the BPEL process.
- 

To manage business event subscribers:

1. Access this page through one of the following options:

<b>From the SOA Infrastructure Menu...</b>	<b>From the SOA Folder in the Navigator...</b>
1. Select <b>Business Events</b> .	1. Right-click <b>soa-infra</b> . 2. Select <b>Business Events</b> .

2. Click **Subscriptions**.

The Subscriptions page displays the following details:

- A utility for searching for a specific subscription by specifying criteria and clicking **Search**. Click the **Help** icon for details.
- The database subscriptions, including the event name, namespace used, subscription agent name, optionally defined XPath filters, consistency level, and number of failed deliveries. You create database subscriptions to business events on this page during runtime.
- The component subscriptions, including the event name, namespace used, the service component subscribing to the event, the SOA composite application, any optionally defined XPath filters, and the consistency level.

The following list shows the components and database agents that have subscribed to an event. [?](#)

**Search**

Subscription Type: Database and Component Subscriptions | Event Namespace: All | Event Name: All | Subscriber: | Consistency Level: All | XPath Filter: | [Search](#) | [Reset](#)

Database Subscriptions					
Event	Subscription	Failed Deliveries			
Event Name	Namespace	Database Agent	XPath Filter	Consistency Level	Deliveries
No data found					

Component Subscriptions					
Event	Subscription	Failed Deliveries			
Event Name	Namespace	Component	Composite	XPath Filter	Consistency Level
NewOrderSubmitted	/oracle/fodemo/storefront/entities/ev	OrderPendingEvent	OrderBookingCompos		One And Only One 0
OnTaskAssigned	http://xmlns.oracle.com/bpel/workflow	OrderApprovalTaskA	OrderBookingCompos		One And Only One 0

**Note:** For business events implementing EDN - JMS, the **Create Database Agent** icon, **Edit Database Agent** icon, **Delete Database Agent** icon, and **Manage Database Agents** button are not displayed.

- Click the appropriate icon below the **Database Subscriptions** title to create, edit, or delete a database subscription.



- Click **Manage Database Agents** to edit the PL/SQL procedure or delete agents not currently subscribing to events.
- In the **Subscription Component** column, click a service component to access its home page.
- In the **Composite** column, click a SOA composite application to access its home page.

For more information about business events, see Chapter "Using Business Events and the Event Delivery Network" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## 35.4 Recovering from Business Event Faults

You can recover from business event faults that are identified as recoverable.

To recover from business event faults:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Business Events.	1. Right-click <b>soa-infra</b> . 2. Select <b>Business Events</b> .

- Click **Faults**.

The Faults page displays the following details:

- A utility for searching for a specific business event fault by specifying criteria and clicking **Search**.
- Faults occurring in a business event, including the error message, whether you can recover from the fault, the time at which the fault occurred, the event namespace, event name, the subscriber, and the subscription type (database or component). The **Recoverable?** column identifies faults for which recovery actions can be performed.

- From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message.
- Click a specific fault that has been identified as recoverable and select one of the following options:

Action	Description
<b>Retry</b>	Retries the instance in which the fault occurred. <b>Note:</b> When a business event fault is awaiting recovery, the overall SOA composite application instance is displayed as completed with faults.
<b>Abort</b>	Terminates the entire instance in which the fault occurred.

5. In the **Logs** column, click a specific log to access the Log Messages page with filtered messages specific to that instance.

For more information about business events, see Chapter "Using Business Events and the Event Delivery Network" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

# **Part XIV**

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## **Administering Binding Components**

This part describes how to administer binding components.

This part includes the following chapters:

- [Chapter 36, "Configuring Service and Reference Binding Components"](#)
- [Chapter 37, "Monitoring Service and Reference Binding Components"](#)
- [Chapter 38, "Managing Service and Reference Binding Components"](#)



# 36

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## Configuring Service and Reference Binding Components

This chapter describes how to configure runtime properties for web service and JCA adapter service and reference binding components in SOA composite applications and change the endpoint reference and service key for Oracle Service Registry integration. Binding components are network protocols and services that connect the SOA platform with the outside world.

This chapter includes the following sections:

- [Section 36.1, "Configuring Service and Reference Binding Component Properties"](#)

For more information about binding components, see the following documentation:

- [Section 1.2.5, "Introduction to Binding Components"](#)
- [\*Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite\*](#)

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### Notes:

- You cannot configure message header properties for direct binding components that invoke a SOA composite application through a remote RMI call. For this reason, the **Properties** tab does not display for direct binding components.
  - You cannot change the **httpBinding** property for the HTTP binding component.
  - Support is provided for adding MTOM attachments to web services. For more information, see [\*Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite\*](#).
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### 36.1 Configuring Service and Reference Binding Component Properties

You can configure message header properties for the service and reference binding components included in a deployed SOA composite application.

To configure service and reference binding component properties:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...	From the SOA Composite Menu...
1. Select Services and References.	1. Right-click <b>soa-infra</b> .	1. Select Services/Reference Properties.
2. Select a specific service or reference.	2. Select Services and References.	2. Select a specific service or reference.
3. Click the <b>Properties</b> tab.	3. Select a specific service or reference.	3. Click the <b>Properties</b> tab.
	4. Click the <b>Properties</b> tab.	

The following binding component properties appear for a web service.

This screenshot shows the Oracle SOA Suite interface for configuring a web service. The top navigation bar includes 'HelloWorldProj [1.0]', 'SOA Composite', and 'Properties' (which is the active tab). Below the navigation, there are tabs for 'Dashboard', 'Policies', 'Faults and Rejected Messages', and 'Properties'. The main content area displays various configuration options under the 'General' tab, such as REST Enabled (False), WSDL Enabled (True), and Maximum Request Size (-1 bytes). A 'Maximum Request Size' section is also visible on the right side of the screen.

The following binding component properties appear for a file adapter. Depending upon your selection of JCA adapter, different properties display for configuring.

This screenshot shows the Oracle SOA Suite interface for configuring a file adapter. The top navigation bar includes 'HelloWorldProj [1.0]', 'SOA Composite', and 'Properties' (active tab). Below the navigation, there are tabs for 'Dashboard', 'Policies', 'Faults', and 'Properties'. A message at the top states 'You can edit or delete the following binding properties. Click Add to add additional properties.' The 'Properties' tab is selected, showing a table with four rows: 'Append (Write)' (Value: false), 'PhysicalDirectory (Write)' (Value: /tmp), 'FileNamingConvention (Write)' (Value: rakesh\_%SEQ%.xml), and 'NumberMessages (Write)' (Value: 1).

- Change properties based on your selection of binding component. See sections [Section 36.1.1, "Configuring Properties for Web Services"](#) and [Section 36.1.2, "Configuring Properties for Oracle JCA Adapters"](#) for available properties.

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**Note:** To see adapter header properties and their values on this page, ensure that you change the value of the **Audit Level** property from **Production** (the default) to **Development** on the SOA Infrastructure Common Properties page. If this property is set to **Production**, the properties and their values do not display. For more information, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

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### 36.1.1 Configuring Properties for Web Services

[Table 36–1](#) describes the properties available for a web service binding component.

**Table 36–1 Web Service Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	<b>REST Enabled</b>	Enable or disable the web services port to accept messages in Representational State Transfer (REST) format.
Service	<b>WSDL Enabled</b>	Enable or disable the WSDL of the web service.
Service	<b>Metadata Exchange Enabled</b>	Enable or disable a metadata exchange of the web service.
Service	<b>Endpoint Test Enabled</b>	Enable or disable an endpoint test of the web service.
Service	<b>Logging Level</b>	Select the level of logging to perform on the web service.
Service	<b>Schema Validation</b>	Enable or disable schema validation.
Service	<b>Atomic Transaction Version</b>	Select the WS-AtomicTransaction (WS-AT) supported version (1.0, 1.1, 1.2, or default).

**Table 36–1 (Cont.) Web Service Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	<b>Atomic Transaction Flow Option</b>	Select the transaction participation value: <ul style="list-style-type: none"> <li>▪ <b>Never</b> No transaction context is imported (for services) or exported (for references).</li> <li>▪ <b>Supports</b> If a transaction exists, a transaction context is imported (for services) or exported (for references). This information is added to the composite.xml file.</li> <li>▪ <b>Mandatory</b> A transaction context is imported (for services) or exported (for references). For exports, a web service exception message is thrown if there is no active transaction. For imports, a fault is returned to the client if there is no transaction context in the request.</li> </ul> <p>For more information, see Section "WS-AtomicTransaction Support" of <i>Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite</i>.</p>
Service	<b>Maximum Request Size</b>	Enter the maximum request size of the web service. A value of -1 indicates the size is unlimited.
Service	<b>Unit of Maximum Request Size</b>	Select the request unit of the web service (either bytes, kilobytes, megabytes, or gigabytes).

### 36.1.2 Configuring Properties for Oracle JCA Adapters

If you manually add a nonregistered JCA binding level property in the composite.xml file, then you cannot subsequently edit that property or any other registered properties for that service or reference through Oracle Enterprise Manager Fusion Middleware Control. [Table 36–2](#) describes the JCA adapter property types.

**Table 36–2 Types of JCA Adapters**

<b>Property Type</b>	<b>Description</b>	<b>Restrictions</b>
Activation specification and interaction specification	Activation specification properties operate as services and interaction specification properties operate as references in a SOA composite application.	Do <i>not</i> add or remove these properties. You can only change their values. These properties require the adapter endpoint to be recycled. These types of properties are also dependent upon other properties. If you attempt to add one of these properties, you have no way of knowing which dependent properties must also be added.
Endpoint	These are tuning-related properties that are not exposed through the activation or interaction specification properties, such as specifying timeouts, thresholds, maximum intervals, and so on.	There are no restrictions on adding, removing, or changing endpoint properties. The adapter is notified when these properties are added, removed, or changed, but it does not require redeployment. You cannot add or remove <code>jca.retry.*</code> endpoint properties without redeploying the composite. However, you can change these properties by using Oracle Enterprise Manager Fusion Middleware Control without redeploying the composite.

This section includes the following topics:

- [Section 36.1.2.1, "Oracle AQ Adapter"](#)
- [Section 36.1.2.2, "Oracle Database Adapter"](#)
- [Section 36.1.2.3, "Oracle File Adapter"](#)
- [Section 36.1.2.4, "Oracle FTP Adapter"](#)
- [Section 36.1.2.5, "Oracle JMS Adapter"](#)
- [Section 36.1.2.6, "Oracle MQ Series Adapter"](#)
- [Section 36.1.2.7, "Oracle Socket Adapter"](#)
- [Section 36.1.2.8, "Oracle JCA Adapters Endpoint Properties"](#)

### 36.1.2.1 Oracle AQ Adapter

[Table 36–3](#) describes the properties available for the Oracle AQ Adapter.

**Table 36–3 Oracle AQ Adapter Properties**

<b>Service, Reference, or Endpoint</b>	<b>Property Name</b>	<b>Description</b>
Service	DequeueTimeOut	Specifies the dequeue timeout interval.
Service	ConnectionRetryDelay	Specifies the connection retry interval.
Service	adapter.aq.dequeue.threads	Specifies the number of dequeue threads.
Service	jca.retry.count	Specifies the number of retries to post the message.
Service	jca.retry.interval	Specifies the time interval between message retries.
Service	QueueName	Specifies the AQ queue name.
Service	DatabaseSchema	Specifies the database schema name that hosts the queue.

**Table 36–3 (Cont.) Oracle AQ Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	SchemaValidation	Validates the message payload.
Service	ObjectFieldName	Specifies the ADT entry used as a payload.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	PayloadHeaderRequired	Specifies if the abstract data type (ADT) entries, except for the payload, are accessible.
Service	DequeueCondition	Specifies the expression to dequeue messages.
Service	Consumer	Specifies the consumer of a queue.
Service	MessageSelectorRule	Specifies the message selector to dequeue messages.
Service	StreamPayload	Specifies if the payload is streamed or not.
Service	Correlation	Specifies a correlation criterion or search criterion for the dequeue operation. For the enqueue operation, the value becomes the correlation of the message sent to AQ.
Reference	Username	Identifies a user name requesting access to a secure environment or program, such as an Oracle database or Oracle applications system.
Reference	Responsibility	Specifies a collection of functions within Oracle E-Business Suite. Each user is assigned one or more responsibilities to allow access to the appropriate functions and data.
Reference	QueueName	Indicates an AQ queue name.
Reference	DatabaseSchema	Indicates the database schema name that hosts the queue.
Reference	ObjectFieldName	Specifies the ADT entry to use as a payload.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	PayloadHeaderRequired	Specifies if ADT entries, except for the payload, are accessible.
Reference	RecipientList	Specifies the recipient of the messages.
Reference	Correlation	Specifies a correlation criterion or search criterion for the dequeue operation. For the enqueue operation, the value becomes the correlation of the message sent to AQ.

### 36.1.2.2 Oracle Database Adapter

Table 36–4 describes the properties available for the Oracle database adapter.

**Table 36–4 Oracle Database Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	DescriptorName	The key into the TopLink metadata indicating the root relational table.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	QueryName	The key into the TopLink metadata indicating the named query to execute, with a predefined where clause and properties.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	MappingsMetaDataURL	In conjunction with MappingsMetaDataURL, the path to the TopLink metadata file that describes how a database schema has been mapped to a particular predefined XML schema.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	OXMappingsMetaDataURL	In conjunction with MappingsMetaDataURL, the path to the TopLink metadata file that describes how a database schema has been mapped to a particular predefined XML schema.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	PollingInterval	Indicates the number of seconds between queries to the database for new events.
Service	MaxRaiseSize	Indicates the maximum number of XML records that can be raised at a time to Oracle BPEL Process Manager or the activation listener.
Service	PollingStrategy	Indicates the method in which events are raised from the database. This is also known as AfterReadStrategy.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	MarkReadColumn	Indicates the status column used by LogicalDeletePollingStrategy for indicating which rows have been processed.
Service	MarkUnreadValue	The status of unprocessed rows.
Service	MarkReservedValue	The status of rows reserved by this polling instance.
Service	MarkReadValue	The status of processed rows.
Service	SequencingTableName	For example, DB_ADAPTER_SEQUENCING.
Service	SequencingTableKeyColumn	For example, TABLE_NAME. This column holds the primary keys of the various sequences stored.
Service	SequencingTableValueColumn	For example, LAST_READ_ID. This is the column that holds the value of the last processed sequence value.
Service	SequencingColumn	This is the monotonically increasing column on the polled table. For example, SCOTT.EMP.EMP_ID.

**Table 36–4 (Cont.) Oracle Database Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	SequencingColumnType	This is the type of sequence counter used. For example, the <code>java.math.BigDecimal</code> , <code>java.sql.Timestamp</code> .
Service	SequencingTableKey	For example, the SCOTT.EMP. This is the key into the sequencing helper table, usually the name of the table being polled.
Service	ShouldCacheSequenceValue	For SequencingPollingStrategy, the lastReadId can be kept in-memory so it does not have to be read at the start of each polling interval.
Service	ShouldWriteSequenceValue	For SequencingPollingStrategy, the lastReadId can be kept in-memory and only written out to disk or a database when the process, application server, or both are shut down.
Service	DeleteDetailRows	For the delete polling strategy, this indicates whether to delete detail rows and master rows after XML records have been read.
Service	SequencingDataSourceName	For ExternalSequencingPollingStrategy.
Service	SequencingIsXADataSource	For ExternalSequencingPollingStrategy.
Service	UseBatchDestroy	Deletes or updates multiple processed rows with a single Data Manipulation Language (DML) statement.
Service	DelayCommit	Indicates whether to delay the commit/destroy action until all rows picked up (across multiple maxTransactionSize units) have been processed.
Service	PollForChildUpdates	Indicates whether an update to a detail row must result in the master row and all its details being picked up for processing.
Service	ShouldOrderRows	For SequencingPollingStrategy, there may be cases in which you do not want to order the rows by the sequence value.
Service	NumberOfThreads	Indicates the number of transactional threads to be used by the database adapter.
Service	FetchSize	Indicates the JDBC level cursor fetch size.
Service	MaxBatchWritingSize	Indicates the JDBC level statements per batch statement.
Service	DeleteFromCursor	Indicates the JDBC delete level while iterating over the result set.
Service	UseDirectSQL	Enables performance optimization in certain cases.
Service	ReturnSingleResultSet	Reads from multiple joined tables in a single SQL select statement rather than many, and returns a single giant result set.
Service	MaxTransactionSize	The maximum number of rows to raise as part of one database transaction.
Service	SequencingFileName	For FileSequencingPollingStrategy only. The file contains a single value: the last read sequence value/updated time. Timestamps appear in ISO format.

**Table 36–4 (Cont.) Oracle Database Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	SchemaValidation	Validates the XML against the XML schema before raising it. This can only happen if the automatically generated file has been hand-edited (that is, to add restrictions). Invalid records are rejected.
Service	EnableStreaming	Allows LOBs and multirecord XML files to be streamed through Simple API for XML (SAX) events, allowing only a small part of the payload to be kept in memory at a time.
Reference	DescriptorName	The key into the TopLink metadata indicating the root relational table.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	OutputCompletedXml	Indicates if this interaction execution has an output message that is the input message with primary keys set.
Reference	MappingsMetaDataURL	The path to the <code>toplink.xml</code> file that describes how a database schema has been mapped to an XML schema.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	OXMappingsMetaDataURL	In conjunction with <code>MappingsMetaDataURL</code> , the path to the TopLink metadata file that describes how a database schema has been mapped to a particular predefined XML schema.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	GetActiveUnitOfWork	Operations within the same JTA transaction use the same TopLink session and connection, and write operations occur together on a JTA commit.
Reference	DmlType	Indicates the type of DML operation (merge, insert, update, delete, or write).
Reference	OutputCompletedXml	Does this interaction execution have an output message that is the input message with primary keys set? This is useful when assigning primary keys on an insert.
Reference	OptimizeMerge	Sets some properties to improve performance of the merge. For one, if multiple objects are merged, the read queries to check for the existence and loads database versions into memory. Comparisons are performed as a single query, using an <code>in()</code> clause on the primary key.
Reference	DetectOmissions	Indicates whether to differentiate between null and "not there" in the input XML. The difference between <code>&lt;director /&gt;</code> (omission) and <code>&lt;director xsi:nil="true"/&gt;</code> (null).
Reference	MaxBatchWritingSize	The JDBC level statements per batch statement.
Reference	UseDirectSQL	Enables performance optimization in certain cases.
Reference	QueryName	The key into the TopLink metadata indicating the named query to execute, with predefined where clause and properties.

**Table 36–4 (Cont.) Oracle Database Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	IsQueryByExample	The query is generated dynamically on each invoke, based on matching the example input XML record.
Reference	ReturnSingleResultSet	An advanced feature that influences how many total select statements TopLink uses when querying against multiple related tables (that is, master-detail). The safest setting is the default (one per table); setting it to true than attempts one total statement, by outer joining all related selects into a single result set.
Reference	CursorWindowSize	The number of records to return at a time when selecting a very large number of rows in a single query.
Reference	EnableStreaming	Allows LOBs and multirecord XMLs to be streamed through SAX events, allowing only a small part of the payload to be kept in memory at a time.
Reference	SqlString	The SQL to execute in the pure SQL interaction. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	IsTransactional	Indicates whether the pure SQL being executed is a write statement that must occur within transaction boundaries.
Reference	QueryTimeout	Indicates the JDBC level queryTimeout setting. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	MaxRows	Indicates the JDBC level maxRows setting. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	SchemaName	The schema of the stored procedure to execute.
Reference	PackageName	The package of the stored procedure to execute.
Reference	ProcedureName	The procedure of the stored procedure to execute.
Reference	Overload	Further identifies the stored procedure to execute (in case of overloading) by the expected number of properties.
Reference	QueryTimeout	Indicates the JDBC level queryTimeout setting.

### 36.1.2.3 Oracle File Adapter

Table 36–5 describes the properties available for the Oracle file adapter.

**Table 36–5 Oracle File Adapter Properties**

<b>Service, Reference, or Endpoint</b>	<b>Property Name</b>	<b>Description</b>
Service	PhysicalDirectory	Specifies the physical directory for the file/FTP adapter.
Service	UseHeaders	Set to true if the file/FTP adapter must publish metadata (for example, the file name, directory name, last modified data, file size, and whether to exclude the payload). This is typically used in large payload scenarios where you want to use the inbound adapter as a notifier.
Service	Recursive	If set to true, the file/FTP adapter processes files recursively in subdirectories.
Service	PhysicalArchiveDirectory	Directory in which the inbound file/FTP adapter archives files after they have been processed successfully.
Service	PhysicalErrorArchiveDirectory	Indicates the directory where the inbound file/FTP adapter archives files in case of failures, such as translation errors and publishing errors.
Service	DeleteFile	If set to true, the file/FTP adapter deletes the file after it has been processed.
Service	IncludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is processed by the file/FTP adapter.
Service	ExcludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is excluded and not processed by the file/FTP adapter.
Service	PollingFrequency	This property specifies how often the file/FTP adapter looks for files in the inbound directory. It is specified in seconds.
Service	MinimumAge	This property specifies the time interval after which to pick up a file for processing. For example, this enables a large file to be completely copied into the directory before it is retrieved for processing. The age is determined by the last modified time stamp. For example, if you know that it takes three to four minutes for a file to be written, set the minimum age of pollable files to five minutes. If a file is detected in the input directory and its modification time is less than 5 minutes older than the current time, the file is not retrieved because it is still potentially being written to.
Service	PublishSize	This property indicates that a file contains multiple messages and specifies how many messages to process simultaneously. For example, if a certain file has 11 records and this property is set to 2, then the file is processed 2 records at a time and the final record is processed in the sixth iteration.
Service	Lenient	If set to true, then the file adapter does not complain if it does not have enough permission to read/write to the inbound directory. By default, this is set to false.

**Table 36–5 (Cont.) Oracle File Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	TriggerFilePhysicalDirectory	The directory path where the file/FTP adapter looks for the trigger files.
Service	TriggerFile	The name of the trigger file that causes the inbound file/FTP adapter to be activated.
Service	TriggerFileStrategy	This property defines the strategy that the file/FTP adapter uses to look for the specified trigger file in the trigger file directory. The acceptable values are EndpointActivation, EveryTime, or OnceOnly.
Service	MaxRaiseSize	This property specifies the maximum number of files that the file/FTP adapter submits for processing in each polling cycle. For example, if the inbound directory has 1000 files and this property is set to 100 and the polling frequency is one minute, then the file/FTP adapter submits 100 files every minute.
Service	DirectorySeparator	When you choose multiple directories, the generated JCA files use \" ; \" as the separator for these directories. If you want, you can change the separator. If you do change it, manually add DirectorySeparator=\"<>chosen separator>>\\" in the generated JCA file. For example, to use a comma (,) as the separator, you must first change the separator to \" , \" in the physical directory and then add DirectorySeparator=\" , \" in the JCA file.
Service	AsAttachment	If set to true, it causes the inbound file to be published as an attachment.
Service	CharacterSet	Set it to the character set for the attachment. This property is not used internally by the file/FTP adapter and is meant for third party applications that process the attachments published by the file/FTP adapter.
Service	Encoding	Set it to the encoding for the attachment. This property is not used internally by the file/FTP adapter and is meant for third party applications that process the attachments published by the file/FTP adapter.
Service	ContentType	Set it to the Mime-Type for the attachment. This property is not used internally by the file/FTP adapter and is meant for third party applications that process the attachments published by the file/FTP adapter.
Service	ListSorter	Specifies the sorter that the file/FTP adapter uses to sort files in the inbound direction. You can set this property to one of the following: <ul style="list-style-type: none"> <li>▪ \"oracle.tip.adapter.file.inbound.listing.TimestampSorterAscending\"</li> <li>▪ \"oracle.tip.adapter.file.inbound.listing.TimestampSorterDescending\"</li> </ul> <p>You can also plug in your own sorter by writing a class that implements \"java.util.Comparator\".</p>

**Table 36–5 (Cont.) Oracle File Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	SingleThreadModel	If the value is <code>true</code> , the file/FTP adapter poller processes files in the same thread; it does not use the global in-memory queue for processing.
Service	ThreadCount	If this property is available, the adapter creates its own processor threads rather than depending on the global thread pool processor threads (by default, four of them). This property partitions the in-memory queue and each composite application gets its own in-memory queue. If the <code>ThreadCount</code> is set to <code>\\"0\\"</code> , then it behaves in the same manner as the single thread model. If <code>ThreadCount</code> is set to <code>\\"-1\\"</code> , then it starts using the global thread pool. The maximum value for this property is 40.
Service	recoveryInterval	Used by the inbound adapter to configure the recovery interval in case of errors. For example, if the physical directory is nonexistent, then the adapter uses this value to perform periodic sleep/wake up actions to check if the physical directory has been created and is accessible.
Reference	PhysicalDirectory	Specifies the physical directory for the file/FTP adapter.
Reference	NumberMessages	Specifies the outbound file naming convention used.
Reference	ElapsedTime	This property is used for outbound batching. When the time specified elapses, the outgoing file is created. The property is of type <code>String</code> and is not mandatory. The default value is 1.
Reference	FileSize	Indicates if an opaque schema is being used.
Reference	FileNamingConvention	This property is for the naming convention for the outbound write operation file.
Reference	FileName	Use this property to specify a static single file name during the write operation.
Reference	Append	Setting this property to <code>\\"true\\"</code> causes the file/FTP adapter to append to a file in the outbound direction. If the file does not exist, a new file is created.
Reference	UseStaging	If <code>\\"true\\"</code> , then the outbound file/FTP adapter writes translated data to a staging file and afterward streams the staging file to the target file. If <code>\\"false\\"</code> , then the outbound file/FTP adapter does not use an intermediate staging file.
Reference	ConcurrentThreshold	The maximum number of translation activities that can be allowed to execute in parallel for a particular outbound scenario. The translation step during the outbound operation is CPU intensive and therefore must be guarded as it may cause starvation in other applications/threads. The maximum is 100 (same as the maximum for <code>dspMaxThreads</code> in BPEL processes).
Reference	SequenceName	Specifies the Oracle database sequence name to be used if you have already configured the outbound file/FTP adapter for high availability.

**Table 36–5 (Cont.) Oracle File Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	oracle.tip.adapter.file.mutex	Set it to the class name that specifies the mutex you want to use for the outbound write operation. This class must extend the "oracle.tip.adapter.file.Mutex" abstraction.
Reference	serializeTranslation	If set to \"true\", then the translation step is serialized using a semaphore. The number of permits for semaphore (guarding the translation step) comes from the ConcurrentThreshold property. If \"false\", then the translation step occurs outside the semaphore.
Reference	inMemoryTranslation	This property is applicable only if UseStaging is \"false\". If set to \"true\", then the translation step occurs in-memory (that is, an in-memory byte array is created). If set to \"false\", then the adapter creates an output stream to the target file (FTP, FTPS, and SFTP included) and allows the translator to translate and write directly to the stream.
Reference	DeleteFile	If set to \"true\", the file/FTP adapter deletes the file after it has been processed.
Reference	IgnoreZeroByteFile	Set it to true if you do not want the file/FTP adapter to throw an exception during the outbound read operation if the file was not found. This property is ignored if the schema for the inbound file is anything other than opaque.
Reference	IncludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is processed by the file/FTP adapter.
Reference	ExcludeFiles	Includes the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is excluded and not processed by the file/FTP adapter.
Reference	Recursive	If set to true, the file/FTP adapter processes files recursively in subdirectories.
Reference	MaxRaiseSize	This property specifies the maximum number of files that the file/FTP adapter submits for processing in each polling cycle. For example, if the inbound directory has 1000 files and this property is set to 100 and the polling frequency is one minute, then the file/FTP adapter submits 100 files every minute.
Reference	DirectorySeparator	When you choose multiple directories, the generated JCA files use \";\" as the separator for these directories. If you want, you can change the separator. If you do so, manually add DirectorySeparator=\"<<chosen separator>>\" in the generated JCA file. For example, to use a comma (,) as the separator, you must first change the separator to \";\" in the physical directory and then add DirectorySeparator=\"\", \" in the JCA file.
Reference	SourceFileName	The source file for the file I/O operation.
Reference	SourcePhysicalDirectory	The source directory for the file I/O operation.

**Table 36–5 (Cont.) Oracle File Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	SourceType	Set this to \ "native\ " if the source file is native and to \ "xml\ " if the source file is XML.
Reference	SourceSchema	Set it to the schema for the source file.
Reference	SourceSchemaRoot	Set it to the root element name for the source file.
Reference	TargetFileName	Indicates the target file for the file I/O operation.
Reference	TargetPhysicalDirectory	Indicates the target directory for the file I/O operation.
Reference	TargetType	Set this to \ "native\ " if the target file is native and to \ "xml\ " if the source file is XML.
Reference	TargetSchema	Set it to the schema for the target file.
Reference	TargetSchemaRoot	Set it to the root element name for the target file.
Reference	Xsl	Set it to the XSL transformer between the source and target.
Reference	Type	Set it to \ "COPY\ ", \ "MOVE\ ", or \ "DELETE\ ".
Reference	BatchSize	Set it to the batch size for the batching transformation.
Reference	ChunkSize	Specifies the number of outbound messages.

### 36.1.2.4 Oracle FTP Adapter

[Table 36–6](#) describes the properties available for the Oracle FTP adapter.

**Table 36–6 Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	timestampOffset	This property is used by the FTP adapter to tackle time zone issues (typically, to convert the time difference between the FTP server and the system on which the FTP adapter is running to milliseconds).
Service	PhysicalDirectory	This property specifies the physical directory for the file/FTP adapter.
Service	UseHeaders	Set to \ "true\ " if the file/FTP adapter must publish metadata (for example, the file name, directory name, last modified date, file size, and whether to exclude the payload). This is typically used in large payload scenarios where you want to use the inbound adapter as a notifier.
Service	FileType	Set it to either \ "ascii\ " or \ "binary\ ", depending on the requirement.
Service	Recursive	If set to \ "true\ ", the file/FTP adapter processes files recursively in subdirectories.
Service	PhysicalArchiveDirectory	Directory in which the inbound file/FTP adapter archives files after they have been processed successfully.

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	PhysicalErrorArchiveDirectory	Indicates the directory where the inbound file/FTP adapter archives files in case of failures, such as translation errors, and errors during publishing.
Service	UseRemoteArchive	Set this property to <code>\"true\"</code> to notify the FTP adapter that the archival directory is on the same FTP server. If set to <code>\"false\"</code> , the FTP adapter uses a local file system folder for archiving.
Service	UseNlst	Set this property to <code>\"true\"</code> if you need the FTP adapter to use the <code>\\"NLST\\"</code> FTP command instead of the <code>\\"LIST\\"</code> command that the adapter uses by default.
Service	DeleteFile	If set to <code>\"true\"</code> , the file/FTP adapter deletes the file after it has been processed.
Service	IncludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is processed by the file/FTP adapter.
Service	ExcludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is excluded and not processed by the file/FTP adapter.
Service	PollingFrequency	This property specifies how often the file/FTP adapter checks for files in the inbound directory. It is specified in seconds.
Service	MinimumAge	This property specifies the time interval after which to pick up a file for processing. For example, this enables a large file to be completely copied into the directory before it is retrieved for processing. The age is determined by the last modified time stamp. For example, if you know that it takes three to four minutes for a file to be written, set the minimum age of pollable files to five minutes. If a file is detected in the input directory and its modification time is less than 5 minutes older than the current time, the file is not retrieved because it is still potentially being written to.
Service	PublishSize	This property indicates that a file contains multiple messages and specifies how many messages should be processed simultaneously. For example, if a certain file has 11 records and this property is set to 2, then the file is processed 2 records at a time and the final record is processed in the sixth iteration.
Service	TriggerFilePhysicalDirectory	The directory path in which the file/FTP adapter looks for the trigger files.
Service	TriggerFile	The name of the trigger file that causes the inbound file/FTP adapter to activate.
Service	TriggerFileStrategy	This property defines the strategy that the file/FTP adapter uses to look for the specified trigger file in the trigger file directory. The acceptable values are <code>EndpointActivation</code> , <code>EveryTime</code> , or <code>OnceOnly</code> .

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	MaxRaiseSize	This property specifies the maximum number of files that the file/FTP adapter submits for processing in each polling cycle. For example, if the inbound directory has 1000 files and this property is set to 100 and the polling frequency is one minute, then the file/FTP adapter submits 100 files every minute.
Service	DirectorySeparator	When you choose multiple directories, the generated JCA files use \" ; \" as the separator for these directories. If you want, you can change the separator. If you do, manually add DirectorySeparator=\"<>chosen separator><\" in the generated JCA file. For example, to use a comma ( , ) as the separator, you must first change the separator to \" , \" in the physical directory and then add DirectorySeparator=\" , \" in the JCA file.
Service	AsAttachment	If set to \"true\", it causes the inbound file to be published as an attachment.
Service	CharacterSet	Set it to the character set for the attachment. This property is not used internally by the file/FTP adapter and is meant for third party applications that process the attachments published by the file/FTP adapter.
Service	Encoding	Set it to the encoding for the attachment. This property is not used internally by the file/FTP adapter and is meant for third party applications that process the attachments published by the file/FTP adapter.
Service	ContentType	Set it to the Mime-Type for the attachment. This property is not used internally by the file/FTP adapter and is meant for third party applications that process the attachments published by the file/FTP adapter.
Service	ListSorter	Specifies the sorter that the file/FTP adapter uses to sort files in the inbound direction. You can set this property to one of the following: <ul style="list-style-type: none"> <li>■ \"oracle.tip.adapter.file.inbound.listing.TimestampSorterAscending\"</li> <li>■ \"oracle.tip.adapter.file.inbound.listing.TimestampSorterDescending\"</li> </ul> <p>You can also plug in your own sorter by writing a class that implements \"java.util.Comparator\".</p>
Service	SingleThreadModel	If the value is true, the file/FTP adapter poller processes files in the same thread; it does not use the global in-memory queue for processing.

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	ThreadCount	If this property is available, the adapter creates its own processor threads rather than depending on the global thread pool processor threads (by default, 4 of them). In other words, this property partitions the in-memory queue and each composite application gets its own in-memory queue. If the ThreadCount is set to \"0\", then it behaves in the same manner as the SingleThreadModel. If the ThreadCount is set to \"-1\", then it starts using the global thread pool. The maximum value for this property is 40.
Service	recoveryInterval	Used by the inbound adapter to configure the recoveryInterval in case of errors. For example, if the PhysicalDirectory is nonexistent, then the adapter uses this value to perform periodic sleep/wake up actions to check if the PhysicalDirectory has been created and is accessible.
Service	jca.message.encoding	This property is used to override the encoding specified in the NXSD schema for the inbound file/FTP adapter.
Service	oracle.tip.adapter.file.debatching.rejection.quantum	This property lets you control the size of a rejected message for the inbound file/FTP adapter partner link. For example, if you set it to "100", it causes the file/FTP adapter to reject 100 lines from the file since the actual file is too large.
Service	useFileSystem	This property is used by the inbound file/FTP adapter during read-only polling in a clustered environment. Setting it to "true" causes the adapter to use the file system to store metadata about files that have been already processed. Setting it to "false" causes the adapter to use a database table.
Service	oracle.tip.adapter.file.timeout.recover.picked.minutes	Used by the inbound high-availability adapter when using "FILEADAPTER_IN" as the coordinator. When a file is first claimed (enqueued) by a node for processing, the FILE_PROCESSED column in FILEADAPTER_IN is set to "0". At a later point in time, when one of the decoupled processor threads picks up the file for processing, the value of FILE_PROCESSED column is updated from "0" to "1". When the file is processed completely, the FILE_PROCESSED column is updated from "1" to "2". However, if the processor thread picks up a file, but the node crashes before it can process the file, then the file is never processed. This property is used to "undo" the pick operation. The adapter does this by deleting the entries in the FILEADAPTER_IN table that have been picked up, but not processed within the value specified here.

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	oracle.tip.adapter.file.timeout.recoverunpicked.minutes	Used by the inbound high-availability adapter when using \"FILEADAPTER_IN\" as the coordinator. When a file is first claimed by a node for processing, the FILE_PROCESSED column in FILEADAPTER_IN is set to \"0\". At a later point in time, when the decoupled-processor thread picks up the file for processing, the value of the FILE_PROCESSED column is updated from \"0\" to \"1\". When the file is processed completely, the FILE_PROCESSED column is updated from \"1\" to \"2\". If the node crashes when the FILE_PROCESSED is still \"0\", the file is enqueued by a node (this means no other nodes can pick this one up). However, it also means that the decoupled processor threads have still not picked this one for processing. This property is used to \"undo\" the claim(enqueue) operation. The adapter does this by deleting the entries in the FILEADAPTER_IN table that have been claimed (for example, FILE_PROCESSED == \"0\"), but not picked up until now.
Service	purgeIntervalMillis	Defines how often the poller thread purges control files for read-only polling scenarios. This defaults to 5 days.
Service	oracle.tip.adapter.file.highavailability.maxRetryInterval	The number of milliseconds after which the inbound file/FTP adapter retries to establish a database connection in distributed polling scenarios.
Service	oracle.tip.adapter.file.highavailability.maxRetry	The number of times that the inbound file/FTP adapter retries to establish a database connection in distributed polling scenarios.
Service	oracle.tip.adapter.file.rejectOriginalContent	Setting to \"true\" causes the file/FTP adapter to reject the original actual content. If set to \"false\", the adapter rejects the XML data created because of the translation step.
Service	notifyEachBatchFailure	Setting to \"true\" causes the file/FTP adapter to call the notification agent's onBatchFailure every time an error occurs in a debatching scenario. If set to \"false\", the file/FTP adapter calls onBatchFailure only once after all messages in the debatching scenario.
Reference	PhysicalDirectory	The directory path for the file/FTP adapter.
Reference	FileType	Set it to either \"ascii\" or \"binary\", depending on the requirement.
Reference	NumberMessages	This property is used for outbound batching. The outgoing file is created when the number of messages condition is met. The property is of type String and is not mandatory. The default value is 1.
Reference	ElapsedTime	This property is used for outbound batching. When the time specified elapses, the outgoing file is created. The property is of type String and is not mandatory. The default value is 1.

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	FileSize	This property is used for outbound batching. The outgoing file is created when the file size condition is met. The property is of type String and is not mandatory. The default value is 1000 KB.
Reference	FileNamingConvention	This property is for the naming convention of the outbound write operation file.
Reference	FileName	Use this property to specify a static single file name during the write operation.
Reference	Append	Setting this property to \"true\" causes the file/FTP adapter to append to a file in the outbound direction. If the file does not exist, a new file is created.
Reference	UseStaging	If \"true\", then the outbound file/FTP adapter writes translated data to a staging file and afterward streams the staging file to the target file. If \"false\", then the outbound file/FTP adapter does not use an intermediate staging file.
Reference	ConcurrentThreshold	The maximum number of translation activities allowed to execute in parallel for a particular outbound scenario. The translation step during the outbound operation is CPU intensive and must be guarded as it may cause starvation in other applications/threads. The maximum value is 100 (same as the maximum value for dspMaxThreads in BPEL processes).
Reference	SequenceName	Specifies the Oracle database sequence name to use if you have already configured the outbound file/FTP adapter for high availability.
Reference	oracle.tip.adapter. file.mutex	Set it to the class name that specifies the mutex you want to use for the outbound write operation. This class must extend the \"oracle.tip.adapter.file.Mutex\" abstraction.
Reference	serializeTranslation	If set to \"true\", then the translation step is serialized using a semaphore. The number of permits for semaphore (guarding the translation step) comes from the ConcurrentThreshold property. If \"false\", then the translation step occurs outside the semaphore.
Reference	inMemoryTranslation	This property is applicable only if UseStaging is \"false\". If set to \"true\", then the translation step occurs in-memory (that is, an in-memory byte array is created). If set to \"false\", then the adapter creates an output stream to the target file (FTP, FTPS, and SFTP included) and allows the translator to translate and write directly to the stream.
Reference	FileType	Set it to either \"ascii\" or \"binary\", depending on the requirement.
Reference	UseRemoteArchive	Set this property to \"true\" to notify the FTP adapter that the archival directory is on the same FTP server. If set to \"false\", the FTP adapter uses a local file system folder for archiving.

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	DeleteFile	If set to <code>\"true\"</code> , the file/FTP adapter deletes the file after it has been processed.
Reference	IgnoreZeroByteFile	Set it to <code>\"true\"</code> if you do not want the file/FTP adapter to throw an exception during the outbound read operation if the file was not found. This property is ignored if the schema for the inbound file is anything other than <code>\\"Opaque\\"</code> .
Reference	IncludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is processed by the file/FTP adapter.
Reference	ExcludeFiles	Indicates the regex pattern against which the file names are matched. If the name of a certain file matches this pattern, it is excluded and not processed by the file/FTP adapter.
Reference	Recursive	If set to <code>\"true\"</code> , the file/FTP adapter processes files recursively in subdirectories.
Reference	MaxRaiseSize	This property specifies the maximum number of files that the file/FTP adapter submits for processing in each polling cycle. For example, if the inbound directory has 1000 files and this property is set to 100 and the polling frequency is one minute, the file/FTP adapter submits 100 files every minute.
Reference	DirectorySeparator	When you choose multiple directories, the generated JCA files use <code>\";\\"</code> as the separator for these directories. If you want, you can change the separator. If you do, manually add <code>DirectorySeparator=\\"&lt;&gt;chosen separator&gt;\\"</code> in the generated JCA file. For example, to use a comma (,) as the separator, you must first change the separator to <code>\",\\"</code> in the physical directory and then add <code>DirectorySeparator=\",\\"</code> in the JCA file.
Reference	UseNlst	Set this property to <code>\"true\"</code> if you need the FTP adapter to use the <code>\\"NLST\\"</code> FTP command instead of the <code>\\"LIST\\"</code> command that the adapter uses by default.
Reference	timestampOffset	This property is used by the FTP adapter to tackle time zone issues (typically, to convert the time difference between the FTP server and the system on which the FTP adapter is running to milliseconds).
Reference	SourceFileName	Indicates the source file for the file I/O operation.
Reference	SourcePhysicalDirectory	Indicates the source directory for the file I/O operation.
Reference	SourceType	Set this to <code>\\"native\\"</code> if the source file is native and to <code>\\"xml\\"</code> if the source file is XML.
Reference	SourceSchema	Set it to the schema for the source file.
Reference	SourceSchemaRoot	Set it to the root element name for the source file.
Reference	TargetFileName	Indicates the target file for the file I/O operation.

**Table 36–6 (Cont.) Oracle FTP Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	TargetPhysicalDirectory	The target directory for the file I/O operation.
Reference	TargetType	Set this to \"native\" if the target file is native and to \"xml\" if the source file is XML.
Reference	TargetSchema	Set it to the schema for the target file.
Reference	TargetSchemaRoot	Set it to the root element name for the target file.
Reference	Xsl	Set it to the XSL transformer between the source and target.
Reference	Type	Set it to either \"ascii\" or \"binary\", depending on the requirement.
Reference	BatchSize	Set it to the batch size for the batching transformation.
Reference	SourceIsRemote	Set it to \"false\" to notify the FTP adapter that the source for the I/O operation is a local file system as opposed to a remote FTP server.
Reference	TargetIsRemote	Set it to \"false\" to I/O notify the FTP adapter that the target for the I/O operation is a local file system as opposed to a remote FTP server.
Reference	ChunkSize	Set it to the ChunkSize for the chunked interaction operation.

### 36.1.2.5 Oracle JMS Adapter

Table 36–7 describes the properties available for the Oracle JMS adapter.

**Table 36–7 Oracle JMS Adapter**

Service, Reference, or Endpoint	Property Name	Description
Service	adapter.jms.encoding	Set the encoding to be used by the JMS inbound adapter.
Service	adapter.jms.receive.timeout	Set the receive timeout interval.
Service	adapter.jms.retry.interval	Set the interval that the JMS adapter uses to retry.
Service	adapter.jms.registration.interval	Set the registration interval.
Service	adapter.jms.receive.threads	Set the number of receive threads.
Service	JMSReplyTo DestinationProperties	Set the reply-to destination.
Service	JMSReplyUse MessageIdForCorrelation	Specifies whether the message ID is necessary for correlation. Valid values are true or false.
Service	JMSReplyUseCorrelation IdForCorrelation	Specifies whether the correlation ID is necessary for correlation. Valid values are true or false.
Service	suppressHeaders	Specifies whether to bypass headers. Valid values are true or false.
Service	JMSReplyPropagateJMSExpiration	Specifies whether a reply message is created with a time-to-live (TTL) value of other than 0, which is the default value in a request-reply scenario. Valid values are true or false.

**Table 36–7 (Cont.) Oracle JMS Adapter**

Service, Reference, or Endpoint	Property Name	Description
Service	minimumDelayBetweenMessages	This is a throttling property (in milliseconds) that adds a brief sleep period between each inbound posted message, thus slowing down the message inflow.
Reference	requestReply.useCorrelation	Specifies whether correlation is necessary in a request-reply scenario. Valid values are true or false.
Reference	requestReply.cacheReceivers	Specifies whether correlation is necessary in a request-reply scenario. Valid values are true or false.
Reference	DestinationName	The name of the JMS physical destination.
Reference	PayloadType	Indicates the JMS message type.
Reference	DeliveryMode	Sets the JMS delivery mode. Delivery modes supported by the JMS API are PERSISTENT and NON_PERSISTENT.
Reference	TimeToLive	Indicates the message lifetime in milliseconds.
Reference	Priority	Indicates the JMS message priority.
Reference	PayloadEntry	Specifies the MapMessage entry to use as the payload.
Reference	AttachmentList	Specifies the MapMessage entry to use as the payload and publish as an attachment.
Reference	RequestDestinationName	Indicates the name of the JMS physical destination.
Reference	ReplyDestinationName	Indicates the name of the JMS physical destination.
Reference	AllowTemporaryReplyDestination	Allows creation of a temporary destination for receiving messages.
Reference	DurableSubscriber	Indicates the unique name of the durable subscription within a client identifier.
Reference	MessageSelector	The message selector expression used for message selection when delivering a message to the destination.
Reference	ReplyTimeout	Indicates the Timeout to receive a reply message.

### 36.1.2.6 Oracle MQ Series Adapter

Table 36–8 describes the properties available for the Oracle MQ Series adapter.

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**Note:** The MQ Series adapter does not support browsing messages in the queue for service binding components. The MQ Series adapter polls for messages in the queue and always destructively gets (reads and removes) the message from the queue. This means that you *cannot* set the QueueOpenOptions property to MQOO\_BROWSE in the JCA adapter file for service binding components:

```
<property name="QueueOpenOptions" value="MQOO_BROWSE" />
```

The QueueOpenOptions property is supported for reference binding components.

---

**Table 36–8 Oracle MQ Series Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	MessageType	Indicates the message type of the outbound/dequeue message.
Service	QueueName	Indicates the name of the inbound/outbound queue.
Service	UseMessageEncodingForTranslation	Set to true if the character set from header is used during translation.
Service	InboundThreadCount	Indicates the number of threads used in the inbound direction.
Service	BackoutQueueName	Indicates the name of a backout queue in which the rejected message goes.
Service	BackoutQueueManagerName	Indicates the name of the backout queue manager in which the rejected message goes.
Service	MaximumBackoutCount	Indicates the number of times the adapter retries before sending the message to a backout queue.
Service	BackoutInterval	Indicates the interval between a retry for a backout message.
Service	jca.message.encoding	This encoding value overwrites any encoding specified in either the message queuing message descriptor (MQMD) or a schema file.
Service	UseMessageEncodingForTranslation	Set to \"true\" if the characterSet field of MQMD is used for translation in the inbound direction. If set to \"false\", the translator uses the encoding from the schema file. You can use the jca.message.encoding property to overwrite any encoding specified, either in MQMD or in the schema file.
Service	FallbackReplyToQueueName	Indicates the Fallback Reply To queue name.
Service	FallbackReplyToQueueManagerName	Indicates the Fallback Reply To queue manager name.
Service	Priority	Indicates the priority of the reply/outbound message.
Service	Expiry	Indicates the expiration time for the reply/outbound message.
Service	Persistence	Indicates the persistence of the reply/outbound message.

**Table 36–8 (Cont.) Oracle MQ Series Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	Feedback	Indicates the feedback code of the reply/outbound message. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	MessageFormat	Indicates the format of the reply/outbound message.
Service	OnDeliveryFailure	Indicates the behavior of the adapter if reply/outbound message delivery fails.
Service	SegmentIfRequired	Indicates the segmentation property for the message.
Service	CopyPersistenceFromInbound	Indicates the copy persistence from inbound message to reply message in a synchronous request-response (inbound) scenario.
Service	PropagateExpiryInterval	Indicates the propagate expiration interval from the inbound message to the reply message in a synchronous request-response (inbound) scenario.
Service	QueueName	Indicates the name of the inbound/outbound queue.
Service	GetMessageOptions	Indicates the Get message options for an outbound dequeue scenario.
Service	FilterByMsgId	Indicates the message ID to use for filtering.
Service	FilterByCorrelId	Indicates the correlation ID to use for filtering.
Service	FilterByGroupId	Indicates the group ID to use for filtering.
Service	FilterByMsgSeqNumber	Indicates the message sequence number to use for filtering.
Service	FilterByMsgSeqNumber	Indicates the message sequence number to use for filtering.
Reference	QueueName	Indicates the name of the inbound/outbound queue.
Reference	DistributionList	Indicates the distribution list in which the message goes.
Reference	PartialDeliveryForDL	Set to <code>false</code> if the message must go to all queues in the DL. Otherwise, it is set to <code>true</code> .
Reference	SecondaryQueueManagerName	Indicates the name of the secondary queue manager.
Reference	MessageFormat	Indicates the format of the reply/outbound message.
Reference	ReplyMessageId	Indicates the correlation scheme for the message ID to be set.
Reference	ReplyCorrelationId	Indicates the correlation scheme for the correlation ID to be set.
Reference	MessageId	Indicates the correlation scheme for the outbound message.
Reference	CorrelationId	Indicates the correlation scheme for the outbound message.

**Table 36–8 (Cont.) Oracle MQ Series Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	ReportCOA	Indicates the confirmation of arrival (COA) report to be set on the message.
Reference	ReportCOD	Indicates the confirmation of delivery (COD) report to be set on the message.
Reference	ReportException	Indicates the exception report to be set on the message.
Reference	ReportExpiry	Indicates the expiration report to be set on the message.
Reference	ReportPAN	Indicates if PAN is required.
Reference	ReportNAN	Indicates if NAN is required.
Reference	FallbackReplyToQueueName	Indicates the Fallback Reply To queue name.
Reference	FallbackReplyToQueueManagerName	Indicates the Fallback Reply To queue manager name.
Reference	Priority	Indicates the priority of the reply/outbound message.
Reference	Expiry	Indicates the expiration time for the reply/outbound message.
Reference	Persistence	Indicates the persistence of the reply/outbound message.
Reference	Feedback	Indicates the feedback code of the reply/outbound message.
Reference	ReplyToQueueName	Indicates the ReplyToQueue to set on the message.  <i>You cannot edit this property in Oracle Enterprise Manager Fusion Middleware Control.</i>
Reference	ReplyToQueueManagerName	Indicates the ReplyToQueueManager to be set on the message.  <i>You cannot edit this property in Oracle Enterprise Manager Fusion Middleware Control.</i>
Reference	OnDeliveryFailure	Indicates the behavior of the adapter if reply/outbound message delivery fails.
Reference	SegmentIfRequired	Indicates the segmentation property for the message.
Reference	PartialDeliveryForDL	Set to true if partial delivery to the distribution list is allowed. Otherwise, it is set to false.
Reference	SyncSolicitReqRes	Set to true if it is a synchronous request-response (outbound) scenario. Otherwise, it is set to false.  <i>You cannot edit this property in Oracle Enterprise Manager Fusion Middleware Control.</i>
Reference	ResponseOpaqueSchema	Set to true if a reply/report message in a asynchronous request-response scenario has an opaque schema.
Reference	ResponseWaitInterval	Indicates the wait time for the reply/report to arrive.

**Table 36–8 (Cont.) Oracle MQ Series Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Reference	ResponseNoMessageAllowed	Set to true if no message is allowed as a reply/report after the specified wait interval.
Reference	ResponseGetMessageOptions	Indicates the Get message options for a reply/report.
Reference	ResponseQueueOpenOptions	Indicates the open options for a reply/report queue.
Reference	PutMessageOptions	Indicates the Put message options.
Reference	QueueOpenOptions	Indicates the open options for the queue.  You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	UseMessageEncodingForTranslation	Set to true if the character set from the header is used during translation.
Reference	DynamicQueueName	Indicates the dynamic queue name.
Reference	AlternateUserID	Indicates the alternate user ID.
Reference	WaitInterval	Indicates the wait interval for the outbound dequeue.
Reference	NoMessageAllowed	Set to true if no message is allowed in the outbound dequeue scenario after a specified wait interval.
Reference	UseMessageEncodingForTranslation	Set to \"true\" if the characterSet field of MQMD is to be used for translation in the inbound direction. If set to \"false\", the translator uses the encoding from the schema file. You can use the jca.message.encoding property to overwrite any encoding specified, either in MQMD or in the schema file.

### 36.1.2.7 Oracle Socket Adapter

Table 36–9 describes the properties available for the Oracle socket adapter.

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**Note:** Properties such as TransMode and XSLT, which are not listed in Table 36–9, are displayed in the **Properties** tab. However, you cannot edit properties that are not listed in Table 36–9. Making changes to noneditable properties makes the composite invalid and requires remodeling of the composite.

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**Table 36–9 Oracle Socket Adapter Properties**

Service, Reference, or Endpoint	Property Name	Description
Service	Port	The port on which the inbound socket adapter listens for incoming socket connections.
Service	Encoding	Indicates the character encoding of the native data. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Service	ByteOrder	Indicates the byte order of the native data as bigEndian or littleEndian. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	Host	Indicates the host to which the outbound socket adapter opens a socket connection.
Reference	Port	Indicates the port to which the outbound socket adapter tries to connect.
Reference	Encoding	Indicates the character encoding of the native data. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.
Reference	ByteOrder	Indicates the byte order of the native data as bigEndian or littleEndian. You <i>cannot</i> edit this property in Oracle Enterprise Manager Fusion Middleware Control.

### 36.1.2.8 Oracle JCA Adapters Endpoint Properties

Table 36–10 describes the endpoint properties available for the Oracle JCA Adapters.

You cannot add or remove the endpoint properties without redeploying the composite. However, you can change the endpoint properties by using Oracle Enterprise Manager Fusion Middleware Control without redeploying the composite.

**Table 36–10 Oracle JCA Adapters Endpoint Properties**

<b>Direction (Inbound/Outbound)</b>	<b>Property Name</b>	<b>Description</b>
Inbound	activationInstances	This property increases the number of polling (worker) threads for any inbound JCA resource adapter. It is only meant to help increase concurrency (scalability) for adapters that do not natively support multithreading. Since most of the adapters included with Oracle Fusion Middleware natively support multithreading, this setting is mostly useful to third party (custom) JCA adapters, which do not natively support multithreading. Set this property to the number of threads required for a particular JCA service (endpoint).
Inbound	useWorkManager	By default, JCA adapters use the standard Oracle Fusion Middleware Oracle WebLogic Server work manager for starting polling (worker) threads. However, if you want a particular JCA service (endpoint) to use a custom (user-defined) work manager, then this property enables you to specify the name of a custom work manager. The work manager is only used to start the JCA service (endpoint) for which this property has been defined.
Inbound	rejectUncorrelatedMessages	When native correlation is used to correlate an inbound asynchronous message with a previous outbound message (by way of defining a callback interface (for a reference) or by a midprocess receive (in BPEL processes)), the JCA framework normally tries to post the message to the composite, whether the inbound message can be correlated or not. By setting this property to true, the JCA framework rejects a message, which cannot be correlated (when native correlation is active).
Inbound	jca.retry.count	Indicates the maximum number of retries before rejection.
Inbound	jca.retry.interval	Indicates the time interval between retries (measured in seconds).
Inbound	jca.retry.backoff	Indicates the retry interval growth factor (positive integer).
Inbound	jca.retry.maxInterval	Indicates the maximum value of retry interval; that is, a cap if backoff is greater than 1.
Outbound	jca.retry.count	Indicates the maximum number of retries before throwing a retryable error condition back to the invoking service engine.
Outbound	jca.retry.interval	Indicates the time interval between retries (measured in seconds).
Outbound	jca.retry.backoff	Indicates the retry interval growth factor (positive integer).
Outbound	jca.retry.maxInterval	Indicates the maximum value of retry intervals; that is, a cap if the backoff is greater than 1.
Outbound	jca.retry.maxPeriod	Indicates the maximum total retry period. Retries do not occur longer than the value specified in this property.

The following examples show how to specify the endpoint properties in the composite.xml file in Oracle JDeveloper:

- [Example 36–1, "Specifying Endpoint Properties - Inbound"](#)
- [Example 36–2, "Specifying Endpoint Properties - Outbound"](#)

**Example 36–1 Specifying Endpoint Properties - Inbound**

```
<service name="Inbound">
 <interface.wsdl interface="http://xmlns...#wsdl.interface(Inbound_PortType)"/>
 <binding.jca config="Inbound_db.jca">
 <property name="jca.retry.interval">5</property>
 <property name="jca.retry.interval">1</property>
 <property name="jca.retry.backoff">2</property>
 <property name="jca.retry.maxInterval">6</property>
 </binding.jca>
</service>
```

The inbound property `jca.retry.maxPeriod` in [Example 36–2](#) is not supported in the inbound direction (as it is in the outbound direction).

**Example 36–2 Specifying Endpoint Properties - Outbound**

```
<reference name="Outbound">
 <interface.wsdl interface="http://xmlns...#wsdl.interface(Outbound_PortType)"/>
 <binding.jca config="Outbound_jms.jca">
 <property name="jca.retry.count">5</property>
 <property name="jca.retry.interval">1</property>
 <property name="jca.retry.backoff">2</property>
 <property name="jca.retry.maxInterval">6</property>
 <property name="jca.retry.maxPeriod">30</property>
 </binding.jca>
</reference>
```

### 36.1.3 Changing the Endpoint Reference and Service Key for Oracle Service Registry Integration

If a reference binding component of the SOA composite application is integrated with Oracle Service Registry (OSR), you can change the endpoint reference and service key in the **General** section of this page.

The **UDDI ServiceKey** field automatically displays the value of `binding.ws property="oracle.soa.uddi.serviceKey"` from the `composite.xml` file if you selected to use UDDI for runtime resolution of the endpoint.

You can edit the **UDDI ServiceKey** field after the SOA composite application has been deployed to either:

- Change the value as needed.
- Add it to a composite that did not use UDDI for runtime endpoint resolution.

The **Endpoint Address** field represents the endpoint location as defined with the `ws.binding.endpointURI` property in the `composite.xml` file. The **Endpoint Address** field is not filled in after the SOA composite application has been deployed, but can override the endpoint location in the concrete WSDL.

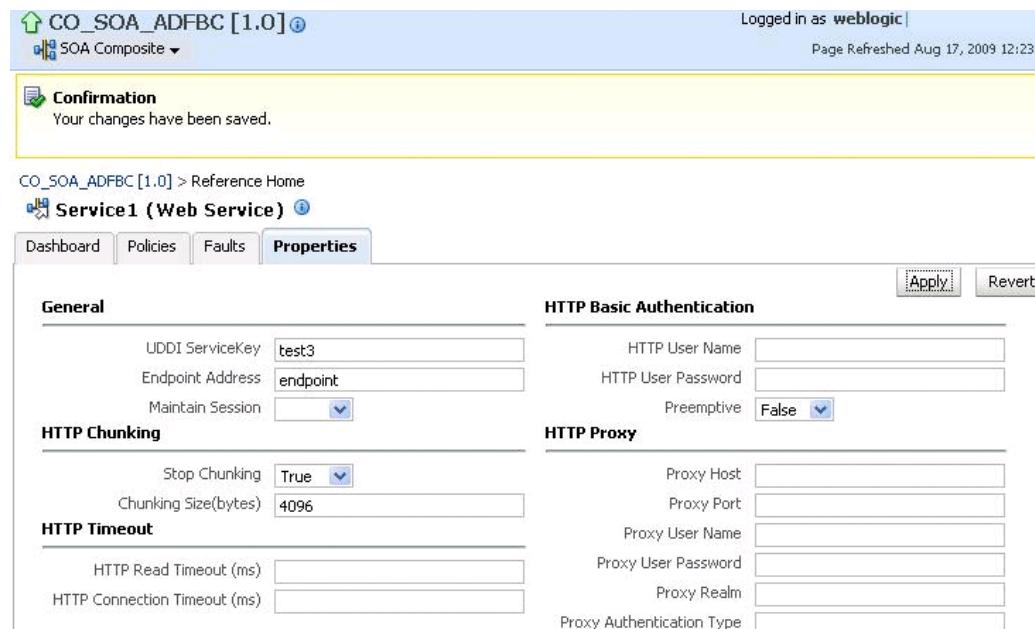
The endpoint location order of precedence is as follows:

- Dynamically set the binding `oracle.soa.uddi.serviceKey` at runtime in the **UDDI ServiceKey** field.
- Dynamically set the binding property `endpointURI` at runtime in the **Endpoint Address** field.

- Use the binding property value for oracle.soa.uddi.serviceKey in the composite.xml file (viewable and editable in Oracle Enterprise Manager Fusion Middleware Control).
- Use the binding property value for endpointURI in the composite.xml file (viewable and editable in Oracle Enterprise Manager Fusion Middleware Control).
- Use the location specified in the concrete WSDL.

[Figure 36-1](#) shows both fields.

**Figure 36-1 Endpoint Reference and Service Key Properties**



To change the endpoint reference and service key for OSR integration:

1. In the **UDDI ServiceKey** field, change the service key to use during runtime.
2. In the **Endpoint Address** field, enter the endpoint address to use during runtime.

You can edit both fields. The value for one field is selected and used based on what you selected in the UDDI Deployment Options dialog during design time. The changes to these fields are persisted in the composite.xml file during runtime.

For information about design-time tasks such as how to publish a business service, create a connection to the UDDI registry, and configure a SOA project to invoke a service from the registry, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

For information about how to set the inquiry URL during runtime, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

### 36.1.3.1 Configuring Caching of WSDL URLs

Caching of endpoint WSDL URLs occurs by default during runtime. If an endpoint WSDL URL is resolved using the orauddi protocol, subsequent invocations retrieve the WSDL URLs from cache, and not from OSR. You can increase the amount of time that the endpoint WSDL URL is available in cache for inquiry by the service key with the **UddiCacheLifetime** property. This property invalidates the cache at specified time intervals. The default value is 86400 seconds. The minimum value is 300 seconds.

To configure endpoint caching of WSDL URLs:

1. From the **SOA Infrastructure** menu, select **Administration > System MBean Browser**.
2. Select **Application Defined MBeans > oracle.as.soainfra.config > Server: soa\_server1 > SoaInfraConfig > soa-infra > Attributes**.
3. Click the **UddiCacheLifetime** property on the right side of the page.
4. Enter a value.
5. Click **Apply**.

---

# Monitoring Service and Reference Binding Components

This chapter describes how to monitor service and reference binding components in SOA composite applications, including monitoring instances, faults, and rejected messages.

This chapter includes the following sections:

- [Section 37.1, "Monitoring Binding Component Instances and Faults"](#)
- [Section 37.2, "Monitoring Binding Component Rejected Messages"](#)

For more information, see the following documentation:

- [Section 1.2.5, "Introduction to Binding Components"](#) for conceptual details about binding components
- [Part XII, "Administering Oracle B2B and Oracle Healthcare"](#) for details about Oracle B2B
- *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*

## 37.1 Monitoring Binding Component Instances and Faults

You can monitor instances and faults for all binding components included in SOA composite applications.

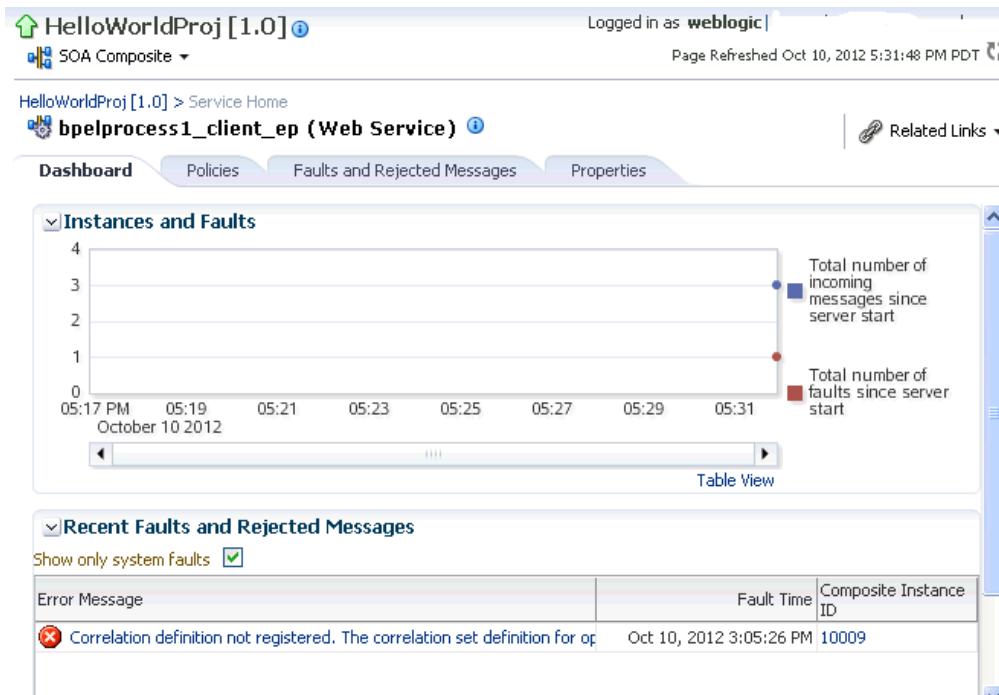
To monitor binding component instances and faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"><li>1. Select Home.</li><li>2. Select the <b>Deployed Composites</b> tab.</li><li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li></ol>	<ol style="list-style-type: none"><li>1. Under <b>soa-infra</b>, expand the partition.</li><li>2. Select a specific SOA composite application.</li></ol>

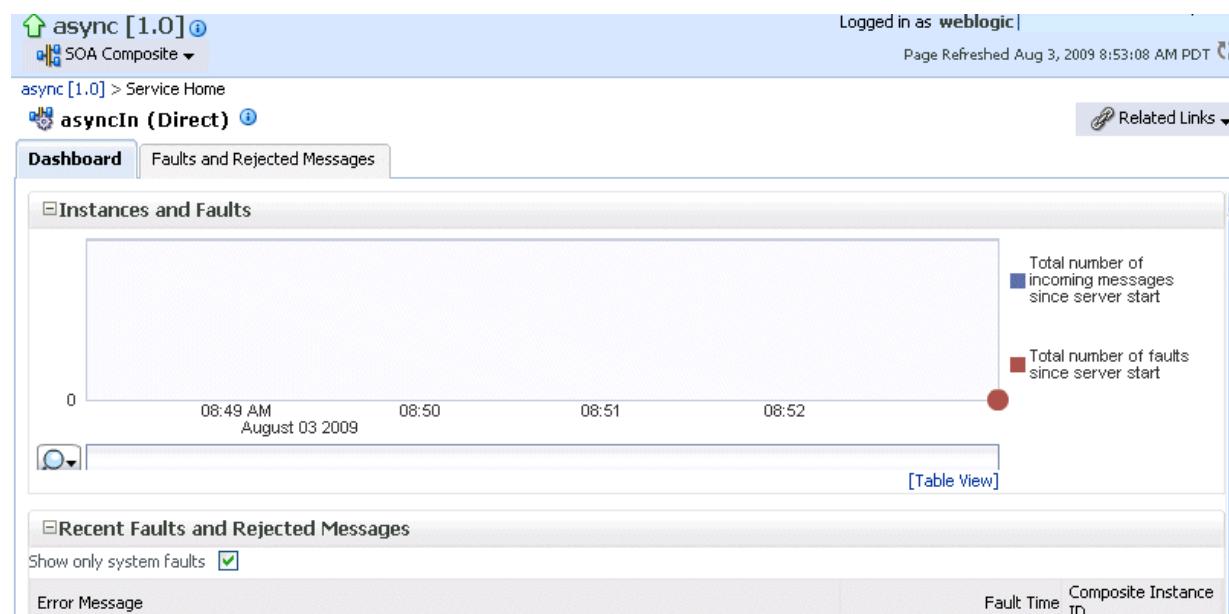
2. Click **Dashboard** (if it is not selected).
3. In the **Services and References** section, select a specific service or reference.
4. If you select a service that is a JCA adapter or web service, the Dashboard page displays the following details:
  - A graphic representation of the total incoming messages and faults since server startup.

- Recently rejected messages, including the message name, time of fault, and type of fault (business or system).



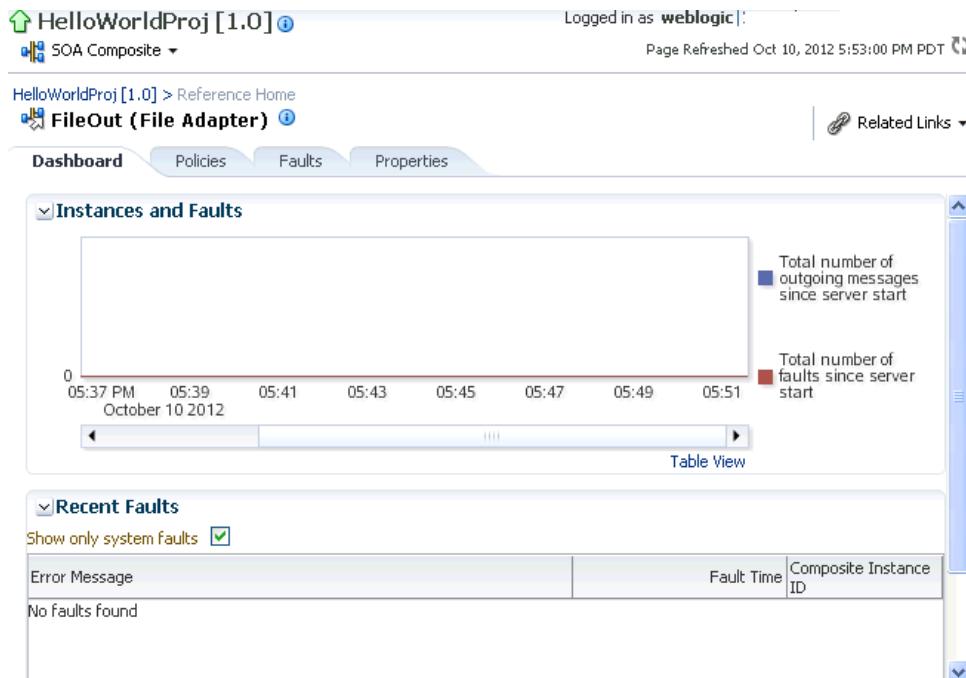
- If you select a service that invokes a SOA composite application through a remote method invocation (RMI) call (known as direct binding), the Dashboard page displays similar details as described in Step 4. Direct binding enables SOA composite applications to be invoked through an API that supports transaction and security propagation across JVMs.

The word **Direct** is displayed in the header to indicate that this is a direct binding component. However, no **Policies** and **Properties** tabs are available for direct binding components.



6. If you select a reference, the Dashboard page displays the following details:
  - A graphic representation of the total outgoing messages and faults since server startup.
  - Recent faults, including the time of the fault and the type of fault (business or system).

Reference binding components are only available for JCA adapters and web services.



## 37.2 Monitoring Binding Component Rejected Messages

You can monitor rejected messages for all binding components included in a SOA composite application.

To monitor binding component rejected messages:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Home.	1. Under <b>soa-infra</b> , expand the partition.
2. Select the Deployed Composites tab.	2. Select a specific SOA composite application.
3. In the Composite section, select a specific SOA composite application.	

2. In the **Services and References** section, select a specific service or reference.
3. Click **Faults and Rejected Messages**.

The Faults and Rejected Messages page shows the list of faults and rejected messages, including details such as the error message, time of fault, and the associated composite instance ID. Depending upon the type of the binding component selected, the faults can be in the incoming messages processed by a

service binding component or outgoing messages processed by a reference binding component.

You can perform fault recovery from this page.

Error Message	Fault Time	Rejected Message	Composite Instance ID
Correlation definition not registered. The correlation set defini	Oct 10, 2012 3:05:26 PM		10009

4. Click a specific message in the **Error Messages** column to display complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. A **Recover Now** option is displayed for recoverable faults.
5. Click **Recover Now** to perform fault recovery.
6. If you want to delete rejected messages, click **Delete Rejected Messages**.

This displays a dialog for specifying criteria for deleting rejected messages.

7. Specify criteria, and click **Delete**.



# 38

---

## Managing Service and Reference Binding Components

This chapter describes how to manage policies for web service and JCA adapter service and reference binding components in SOA composite applications and publish service binding components to the Universal Description, Discovery, and Integration (UDDI) registry from a registered UDDI source.

This chapter includes the following sections:

- [Section 38.1, "Managing Binding Component Policies"](#)
- [Section 38.2, "Publishing Web Services to the UDDI Registry"](#)

---

### Notes:

- Oracle SOA Suite does not support multiple bindings for service or reference binding components (for example, specifying both SOAP 1.1 and SOAP 1.2 in the `composite.xml` file). Support is only provided for a single web service binding per service or reference. If you specify multiple bindings, remove all but one and redeploy your SOA composite application.
- The only type of binding component to which you can attach a policy is a web service. If you click the **Policies** tab for another type of binding component, such as a JCA adapter, ADF-BC service, or EJB service, the following message is displayed:

Policies can be attached to web service bindings and SOA components.

---

For more information, see the following documentation:

- [Section 1.2.5, "Introduction to Binding Components"](#) for conceptual details about binding components
- [\*Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite\*](#)

### 38.1 Managing Binding Component Policies

You can attach and detach security policies to and from binding components included in a currently deployed SOA composite application. Policies apply security to the delivery of messages. Oracle Fusion Middleware uses a policy-based model to manage web services.

---

**Note:** Before attaching policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use in your environment.

---

To manage binding component policies:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Home</b> .	1. Under <b>soa-infra</b> , expand the partition.
2. Select the <b>Deployed Composites</b> tab.	2. Select a specific SOA composite application.
3. In the <b>Composite</b> section, select a specific SOA composite application.	

The Dashboard page for the selected SOA composite application appears. The **Services and References** section of this page displays the binding components being used in the application.

2. In the **Services and References** section, select a service or reference.
3. Click **Policies**.

The Policies page enables you to view the globally-attached and directly-attached policies, and to attach or detach security policies to and from a service or reference binding component:

- The **Globally Attached Policies** table displays the globally-attached policy name, the policy set, the category (Management, Reliable Messaging, MTOM Attachment, Security, or WS Addressing), the violations since the SOA Infrastructure was last restarted, and the authentication, authorization, confidentiality, and integrity failures since the SOA Infrastructure was last restarted.

Policy sets provide a means to attach policies globally to a range of endpoints of the same type. Attaching policies globally using policy sets enables an administrator to ensure that all subjects are secured in situations in which the developer, assembler, or deployer did not explicitly specify the policies to attach. Policies that are attached using a policy set are considered externally attached. For information about creating and managing policy sets, see Chapter "Creating and Managing Policy Sets" of *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

- The **Directly Attached Policies** table displays the directly-attached policy name, the policy reference status (enabled or disabled), the category, the violations since the SOA Infrastructure was last restarted, and the authentication, authorization, confidentiality, and integrity failures since the SOA Infrastructure was last restarted.

**Globally Attached Policies**

Policy Name	Category	Policy Set	Status	Total Violations
No rows yet				

**Directly Attached Policies**

Policy Name	Category	Effective	Status	Total Violations
No rows yet				

**4. In the Directly Attached Policies section, click Attach/Detach.**

If multiple components are available, you are prompted to select the service or component for which to perform the attachment or detachment.

---

**Note:** If you attach a policy to a service binding component (client) and initiate an instance of the SOA composite application in the Test Web Service page, and the policy attachment fails, an Oracle Web Services Manager (OSWM) policy error is not generated and viewable in Oracle Enterprise Manager Fusion Middleware Control.

If the same SOA composite application instance is initiated externally, a policy error is generated and viewable in Oracle Enterprise Manager Fusion Middleware Control.

For service components (such as a BPEL process) or reference binding components, the policy error is always generated and viewable, regardless of whether the application instance was initiated externally or internally through the Test Web Service page.

---

**5. Select the service or component to which to attach or detach a policy.**

This invokes a dialog for attaching or detaching policies.

Policies currently attached appear in the **Attached Policies** section. Additional policies available for attachment appear in the **Available Policies** section.

**6. Select policies to attach that are appropriate to your environment.**

**7. Click Attach.**

**8. When you are finished attaching policies, click Validate.**

**9. If an error message appears, make the necessary corrections until you no longer have any validation errors.**

The attached policy is displayed in the policies table.

**10. Click OK.**

For more information, see the following documentation:

- [Section 1.4.3.2, "Introduction to Policies"](#)
- [Section 7.7, "Managing SOA Composite Application Policies"](#) for the dialogs that are displayed during policy attachment
- *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use for your environment

### 38.1.1 Override Policy Configuration Property Values

Your environment may include multiple servers with the same policies. However, each server may have their own specific policy requirements. To satisfy your runtime requirements, you can override the property values for some management and security policies attached to service and reference binding components.

1. Follow the instructions in [Section 38.1, "Managing Binding Component Policies"](#) to attach a policy to a service or reference binding component.
2. Select the attached policy in the table.

The **Security Configuration Details** table is displayed at the bottom of the page.

Policy Name	Category	Policy Reference Status	Total Violations	Authentication	Authorization	Confidentiality
oracle/log_policy	Management	Enabled	0	n/a	n/a	n/a
oracle/binding_authorization_permitall_policy	Security	Enabled	0	0	0	0
oracle/vss10_saml_token_with_message_prol	Security	Enabled	0	0	0	0

3. In the **Value** field, enter a value to override the default value in the **Original Value** column.
4. Click **Apply**.

For more information on overriding policy values, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

## 38.2 Publishing Web Services to the UDDI Registry

You can publish service binding components to the UDDI registry from a registered UDDI source.

---

**Notes:**

- You *cannot* publish a reference binding component to the UDDI registry.
  - You can *only* publish web services to the UDDI registry. For example, you cannot publish a JCA adapter.
- 

For information about the Oracle Service Registry:

1. Visit the following URL:

<http://www.oracle.com/technetwork/middleware/registry/overview/index.html>

2. Click the **Products** tab.
3. Click **Governance**.

For information about Oracle Enterprise Repository, see *Oracle Fusion Middleware Configuration Guide for Oracle Enterprise Repository* and *Oracle Fusion Middleware Integration Guide for Oracle Enterprise Repository*.

For more information about publishing web services to the UDDI registry, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services*.

### 38.2.1 Configuring the Environment for Publishing Web Services to UDDI

Before you can publish a web service to the UDDI registry, you must configure your environment.

If your SOA Infrastructure installation is behind a firewall, the Oracle Enterprise Manager Fusion Middleware Control managed server must have a proxy server configured for outbound URL connections.

To configure the environment for publishing web services to UDDI:

1. Configure the proxy server setting in either of the following ways:

In the following file:

- a. Open the `FMW_Home/user_projects/domains/soainfra/bin/setDomainEnv.sh` file for Linux (or `setDomainEnv.bat` for Windows operating systems).
- b. Enter the following syntax and provide host, port, and proxy host details appropriate to your environment:

```
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES} -DproxySet=true
-Dhttp.proxyHost=www-myproxy.us.mycompany.com -Dhttp.proxyPort=80
-Dhttp.nonProxyHosts=localhost|${HOST_IP}_ADDRESS|${HOSTNAME}|*.us.mycompany.com"
export EXTRA_JAVA_PROPERTIES
```

- c. Run `setDomainEnv.sh` or `setDomainEnv.bat`.

With an environment variable:

- a. Set the `PROXY_SETTINGS` environment variable before starting Oracle WebLogic Server.

```
setenv PROXY_SETTINGS "-DproxySet=true
-Dhttp.proxyHost=www-myproxy.us.mycompany.com -Dhttp.proxyPort=80
-Dhttp.nonProxyHosts=localhost|*.us.mycompany.com
|0:0:0:0:0:0:1|fe80:0:0:0:250:56ff:fe31"
```

You must set up a UDDI source to use for publication.

1. In the navigator, expand **Weblogic Domain**.

2. Right-click **soainfra** and select **Web Services > Registered Services**.

The Registered Sources and Services page appears.

3. In the **Sources** section, click **Register Web Services**.

The Register New Source dialog appears.

4. Enter the following information:

Field	Description
Name	Enter a descriptive name for the service.
Description	Enter a descriptive name for the UDDI source to which to publish the WSDL.
Type	Select <b>UDDI v3 registry import</b> .
Source Location	Enter the source location. For example: <code>http://myhost.us.mycompany.com:7001/registry/uddi/inquiry</code>
Publication	Select the <b>Enable</b> checkbox.
Publication URL	Enter the publication URL. For example: <code>http://myhost.us.mycompany.com:7001/registry/uddi/publishing</code>
Security URL	Enter the security URL. For example: <code>http://myhost.us.mycompany.com:7001/registry/uddi/security</code>
User ID	Enter admin.
Password	Enter the user ID password.

5. Click **OK**.

## 38.2.2 Publishing a Web Service to the UDDI Registry

**Note:** You can publish web services to default Oracle Service Registry businesses from Oracle Enterprise Manager Fusion Middleware Control. To publish to nondefault businesses, use the publish option in Oracle Service Registry.

For more information about Oracle Service Registry, including documentation, visit the following URL:

<http://www.oracle.com/technetwork/middleware/registry/overview/index.html>

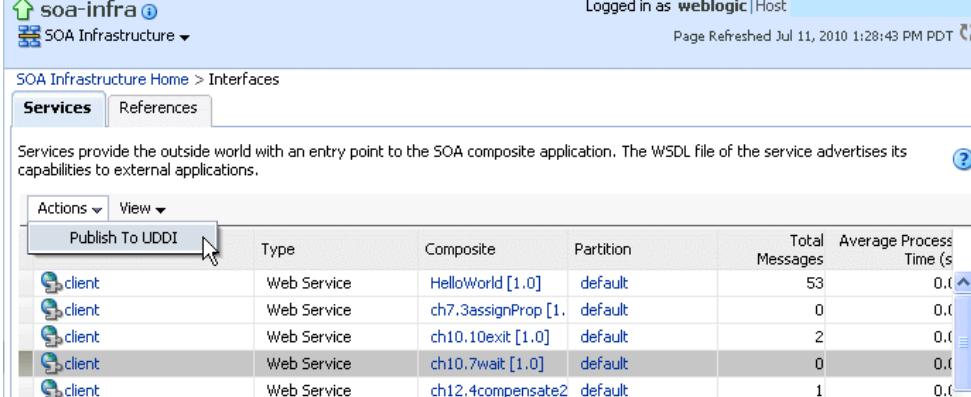
To publish a web service to the UDDI registry:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Services and References.	1. Right-click <b>soa-infra</b> . 2. Select Services and References.

The Services page displays details about the names and types of the services, the SOA composite applications in which the services are used, the partition in which the composite is deployed, the total number of messages processed, the average processing time, and the number of faults occurring in the services.

- In the **Service** table, select a service to publish to the UDDI registry.
- From the **Actions** list, select **Publish To UDDI**.



The screenshot shows the Oracle SOA Infrastructure Home interface. The top navigation bar includes 'soa-infra' and 'SOA Infrastructure'. The main content area is titled 'SOA Infrastructure Home > Interfaces'. Below this, there are two tabs: 'Services' (which is selected) and 'References'. A message states: 'Services provide the outside world with an entry point to the SOA composite application. The WSDL file of the service advertises its capabilities to external applications.' Below this message is a table with the following data:

	Type	Composite	Partition	Total Messages	Average Process Time (s)
client	Web Service	HelloWorld [1.0]	default	53	0.0
client	Web Service	ch7.3assignProp [1]	default	0	0.0
client	Web Service	ch10.10exit [1.0]	default	2	0.0
client	Web Service	ch10.7wait [1.0]	default	0	0.0
client	Web Service	ch12.4compensate2	default	1	0.0

The Publish Service to UDDI dialog appears.

- Enter the following information:

Field	Description
Service Name	Displays the name of the selected service.
Service Description	Enter an optional description of the selected service.

Field	Description
<b>System Definition Location</b>	Displays the WSDL URL to publish to the UDDI registry. For example:  http://myhost.mycompany.com:7001/soa-infra/services/default/HelloWorld/client?WSDL
<b>UDDI Source</b>	Select the UDDI publishing source from which to register the service.
<b>Business Name</b>	Select a business to publish the service. This is the name of the data structure in the UDDI registry. It is assumed that the business has already been registered in the UDDI registry.

When complete, the Publish Service to UDDI dialog looks similar to the following:



5. Click OK.

# **Part XV**

---

## **Administering Oracle BPMN Process Service Components and Engines**

This part describes how to administer Oracle BPMN Process Service Components and Engines.

This part includes the following chapters:

- [Chapter 39, "Configuring Oracle BPMN Process Service Components and Engines"](#)
- [Chapter 40, "Monitoring BPMN Process Service Components and Engines"](#)
- [Chapter 41, "Managing Oracle BPMN Service Components and Engines"](#)



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# Configuring Oracle BPMN Process Service Components and Engines

This chapter describes for administrators how to configure the BPMN process service engine, including configuring properties used by the engine during processing of BPMN service components.

This chapter includes the following sections:

- [Section 39.1, "Configuring BPMN Process Service Engine Properties"](#)
- [Section 39.2, "Integrating Oracle BPM with Oracle Business Activity Monitoring"](#)

For more information about BPMN process tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

## 39.1 Configuring BPMN Process Service Engine Properties

To configure BPMN process service engine properties:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select SOA Administration > BPMN Properties.	1. Right-click <code>soa-infra</code> . 2. Select SOA Administration > BPMN Properties.

The BPMN Service Engine Properties page displays properties for setting audit trail and large document thresholds, setting dispatcher thread properties, validating payload schema, and setting the audit trail level.

soa-infra

SOA Infrastructure

Logged in as **weblogic** | Page Refreshed Dec 24, 2012 12:00:36 PM PST

**BPMN Service Engine Properties**

**Properties**

Edit property values and click **Apply**.

* Audit Level	Inherit
* Audit Trail Threshold (Byte)	* <input type="text"/> 50000
* Large Document Threshold (Byte)	* <input type="text"/> 100000
* Dispatcher System Threads	* <input type="text"/> 2
* Dispatcher Invoke Threads	* <input type="text"/> 20
* Dispatcher Engine Threads	* <input type="text"/> 30
* Payload Validation	<input checked="" type="checkbox"/>
* Disable BPMN Monitors and Sensors	<input checked="" type="checkbox"/>

More BPMN Configuration Properties...

2. Make changes to the service engine properties that are appropriate to your environment.

Property	Description
<b>Audit Level</b>	Select one of the following options: <ul style="list-style-type: none"> <li>■ <b>Off:</b> No logging is performed. Composite instance tracking and payload tracking information are not collected. If measurement is enabled, then this level is overridden to Minimal.</li> <li>■ <b>Inherit</b> (default): Logging equals the SOA Infrastructure audit level. This allows the BPMN audit level to automatically change when the global setting is changed. Setting a different audit level tracking in this page overrides the tracking set at the SOA Infrastructure level.</li> <li>■ <b>Minimal:</b> Instance tracking information is collected, but not payload details; no payload details are available in the flow audit trails.</li> <li>■ <b>Production:</b> Instance tracking information is collected, payload details are collected only for out data associations for asynchronous activities. This level is optimal for most normal operations and testing.</li> <li>■ <b>Development:</b> Allows both the composite instance tracking and payload tracking. However it may impact the performance. This level is useful mostly for debugging purposes.</li> </ul> <p><b>Note:</b> If you do not want audit entries to be displayed, then you must turn off both the audit level and the metrics. If metrics are enabled, then audit entries are displayed even if the audit level is set to Off.</p>
<b>Audit Trail Threshold</b>	Enter the maximum size in bytes of an instance audit trail before it is chunked and saved in a dehydration store table separate from the audit trail. If the threshold is exceeded, the <b>View XML</b> link is shown in the audit trail instead of the payload.
<b>Large Document Threshold</b>	Enter the maximum size of a generated document within a BPMN process component instance before it is stored in a separate table in the dehydration store.

Property	Description
<b>Dispatcher System Threads</b>	<p>Specify the total number of threads allocated to process system dispatcher messages. System dispatcher messages are general clean-up tasks that are typically processed quickly by the server (for example, releasing stateful message beans back to the pool). Typically, only a small number of threads are required to handle the number of system dispatch messages generated during runtime.</p>
	<p>The default value is 2 threads. Any value less than 1 thread is changed to the default.</p>
<b>Dispatcher Invoke Threads</b>	<p>Specify the total number of threads allocated to process invocation dispatcher messages. Invocation dispatcher messages are generated for each payload received and are meant to instantiate a new instance. If the majority of requests processed by the service engine are instance invocations (as opposed to instance callbacks), greater performance may be achieved by increasing the number of invocation threads. Higher thread counts may cause greater CPU utilization due to higher context switching costs.</p>
	<p>The default value is 20 threads. Any value less than 1 thread is changed to the default.</p>
<b>Dispatcher Engine Threads</b>	<p>Specify the total number of threads allocated to process service engine dispatcher messages. Service engine dispatcher messages are generated whenever an activity must be processed asynchronously. If the majority of processes deployed are durable with a large number of dehydration points (midprocess receive, onMessage, onAlarm, and wait activities), greater performance may be achieved by increasing the number of service engine threads. Higher thread counts can cause greater CPU utilization due to higher context switching costs.</p>
	<p>The default value is 30 threads. Any value less than 1 thread is changed to the default.</p>
<b>Payload Validation</b>	<p>Select to enable validation of inbound and outbound messages. Nonschema-compliant payload data is intercepted and displayed as a fault.</p> <p><b>Note:</b> This setting is independent of the SOA composite application and SOA Infrastructure payload validation level settings. If payload validation is enabled at both the service engine and SOA Infrastructure levels, data is checked twice: once when it enters the SOA Infrastructure, and again when it enters the service engine.</p>
<b>Disable BPMN Monitors and Sensors</b>	<p>Select this checkbox to disable all BPMN monitors and sensors defined for all BPMN components across all deployed SOA composite applications.</p>

3. Click **Apply**.
4. If you want to configure advanced BPMN properties in the System MBean Browser, click **More BPMN Configuration Properties**. Properties that display include the following. Descriptions are provided for each property.
  - **AuditDetailThreshold**: The maximum size (in bytes) an audit trail details string can be before it is stored separately from the audit trail.
  - **AuditLevel**: Controls the amount of audit events logged by a process; currently supported logging levels are: off: absolutely no logging performed whatsoever; may result in a slight performance boost for processing instances.
  - **BpelcClasspath**: The extra class path must be included when compiling BPMN generated java sources.
  - **ConfigMBean**: If true, it indicates that this MBean is a Config MBean.

- **CubeInstanceExpiration:** The expiration time in hours of performance data. This parameter is disabled by default. You can enable it.
- **CubeTimerMaxErrorCount:** Maximum allowed number of consecutive errors during cube timer processing. Once number of errors reaches *CubeTimerMaxErrorCount*, the cube timer skips processing.
- **CubeTimerMaxSkipOnErrorCount:** Specifies the number of times the timer skips processing once the number of errors reaches *CubeTimerMaxErrorCount*.

---

**Note:** Once the cube timer errors out consecutively for *CubeTimerMaxErrorCout* times, the cube timer skips the timeout processing for *CubeTimerMaxSkipOnErrorCount* times. It then resumes the normal timeout processing. The time for which the cube timer skips processing can be calculated as *CubeTimerMaxErrorCount* \* *CubeUpdateFrequency*.

If the lockout time must be less, you must either reduce the time to a lesser value or change the number of times to skip timeout processing.

---

- **CubeUpdateFrequency:** Frequency in seconds at which cube action calculates the workload.
- **CubeWorkloadExpiration:** The expiration time for workload records. It is set to 48 hours by default, which means that if a workload record's age is more than 48 hours, it is purged.
- **DisableActions:** Comma-delimited list of disabled measurement actions (such as CubeCommand, BAMCommand). Also see **PublishMaxTrackBackCount**.
- **DisableProcessTracking:** If set to true, the audit disables process tracking. The default value is false.
- **DisableSensors:** If set to true, the service engine disables all calls to sensors. The default value is false.
- **DispatcherEngineThreads:** The total number of threads that are allocated to process engine dispatcher messages.
- **DispatcherInvokeThreads:** The total number of threads that are allocated to process invocation dispatcher messages.
- **DispatcherMaxRequestDepth:** Maximum number of internal messages the service engine processes. If this number is exceeded, new messages are not dispatched. The default value is 600.
- **DispatcherSystemThreads:** The total number of threads that are allocated to process system dispatcher messages.
- **eventProvider:** If set to true, indicates that this MBean is an event provider as defined by JSR-77.
- **eventTypes:** All the event's types emitted by this MBean.
- **ExpirationMaxRetry:** The maximum number of times a failed expiration call (wait/onAlarm) is retried before failing.
- **ExpirationRetryDelay:** The delay between the expiration retries. The default value is 120 seconds.
- **InstanceKeyBlockSize:** The size of the block of instance IDs to allocate from the dehydration store during each fetch.

- **LargeDocumentThreshold:** The maximum size (in bytes) a BPMN variable can be before it is stored in a separate location from the rest of the instance scope data.
- **MaximumNumberOfInvokeMessagesInCache:** Specify the number of invoke messages that can be kept in the in-memory cache, once the service engine reaches this limit, it pushes the message to dispatcher in-memory cache, instead it saves the message in the database, and these saved messages can be recovered using recovery job. Use value -1 to disable this property.
- **objectName:** The MBean's unique JMX name.
- **OneWayDeliveryPolicy:** Changes whether the one-way invocation messages are delivered.
- **PeopleQueryTimeout:** Specify quartz cron expression People Query. People Query in Logical People Group is reevaluated based on this cron expression.
- **PublishMaxTrackBackCount:** Maximum number of records traversed from last audit record, checked for measurement and action enabled and published if so.
- **QualityOfService:** Flag to enable or disable Oracle Coherence cache for BPMN service engine. Use **CacheEnabled** for enabling Oracle Coherence.
- **ReadOnly:** If set to true, indicates that this MBean is a read only MBean.
- **RestartNeeded:** Indicates whether a restart is needed.
- **StatsLastN:** The size of the most recently processed request list.
- **SystemMBean:** If set to true, indicates that this MBean is a System MBean.
- **UserInitiateProcessCleanupAction:** The action to be performed for the cleanup procedure: OFF (default), ABORT or DELETE. OFF will disable the cleanup process on the next scheduled activation of the process.
- **UserInitiateProcessCleanupCronExpression:** The cron type expression indicates when and how often the cleanup procedure should take place. Any changes to the schedule will take effect on the next scheduled activation of the cleanup process.
- **UserInitiateProcessCleanupRetentionDays:** Only the user-initiated processes older than number of days old will be processed. Zero is not allowed. Fractions of a day can be specified as a decimal.
- **UserInitiateProcessCleanupTaskStates:** The task states to be considered during the cleanup procedure.

---

**Note:** The UserInitiateProcessCleanup properties support the cleanup of properties created using the initiator task.

---

- **ValidateXML:** If set to true, the service engine applies schema validation for incoming and outgoing XML documents. The default value false.
- **Version:** Version of the configuration file.
- **WFOracleUcmUrl:** Specify a URL for Oracle WebCenter Content repository administration server.

## 39.2 Integrating Oracle BPM with Oracle Business Activity Monitoring

When a BPMN composite application is deployed, the following Oracle BAM data objects are generated automatically:

- Data object for the following business indicator:

`TEMPLATE_BI_Partition_Composite_Process`

Once this is imported, you should rename it to:

`BI_DEFAULT_Compositename_ProcessName`

This is created in the target folder. If the data object already exists, new columns are added to it, assuming the old columns match data types. Otherwise, an error is thrown.

- COMPONENT, INTERVAL, COUNTER data objects if they are not present in the target folder.

The target Oracle BAM Server is specified by JNDI name parameter.

---

**Note:** Data objects can be created only automatically at deployment.  
You cannot create them manually.

---

To configure Oracle BPM for use with Oracle Business Activity Monitoring, you perform these tasks:

- [Task 1: Configure the Oracle BAM Adapter on Oracle BPM Server](#)
- [Task 2: Enable Oracle BAM on the Oracle BPM Server](#)

### 39.2.1 Task 1: Configure the Oracle BAM Adapter on Oracle BPM Server

You must configure the Oracle BAM Adapter to use either SOAP or RMI for communicating with Oracle BAM.

To configure the Oracle BAM adapter on Oracle BPM server:

1. In the Oracle WebLogic Server Administration Console, under **Domain Structure**, click **Deployments**.
2. Click **OracleBAMAdapter** > **Configuration** > **Outbound Connection Pools**.
3. Expand **oracle.bam.adapter.adc.soap.SOAPConnectionFactory**.
4. Click either **eis/bam/soap** or **eis/bam/rmi**.

The JNDI name used to configure the Oracle BAM adapter is used. For example, if you configured the Oracle BAM adapter to use SOAP, then the default JNDI name is `eis/bam/soap`. Similarly, if you configure the Oracle BAM adapter to use RMI, then the default JNDI name is `eis/bam/rmi`.

5. Modify properties to match Oracle BAM Server. (Remember to press **Enter** after text entry).
6. Click **Save**.
7. Select the location for the deployment plan—for example, `bam/Plan.xml`, then complete the dialogs.
8. Return to **Deployments**.
9. Select **OracleBAMAdapter**.

- 
10. Click **Update** and complete the dialogs.

For more information about integrating Oracle Business Activity Monitoring with Oracle SOA Suite composite applications, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

### 39.2.2 Task 2: Enable Oracle BAM on the Oracle BPM Server

To do this task, you use the Oracle Enterprise Manager Fusion Middleware Control.

To enable Oracle BAM on the Oracle BPM server:

1. In Oracle Fusion Middleware Control, under **WebLogic Domain**, select your domain and server.
2. Go to **System MBean Browser**.
3. Select **oracle.as.soainfra.config > Server > BPMNConfig > bpmn**.
4. Go to **Disable Actions**. If you find **BAMAction** there, then clear the field.
5. Click **Apply**.



## Monitoring BPMN Process Service Components and Engines

This chapter describes how to monitor BPMN process service components and service engines, including viewing the audit trail and process flow, monitoring instances and faults, monitoring request and thread performance statistics, and monitoring deployed BPMN processes.

This chapter includes the following sections:

- [Section 40.1, "Viewing the Audit Trail and Process Flow of a BPMN Process Service Component"](#)
- [Section 40.2, "Monitoring BPMN Process Service Component Instances and Faults"](#)
- [Section 40.3, "Monitoring BPMN Process Service Component Instances"](#)
- [Section 40.4, "Monitoring BPMN Process Service Engine Instances and Faults"](#)
- [Section 40.5, "Monitoring BPMN Process Service Engine Request and Thread Performance Statistics"](#)
- [Section 40.6, "Monitoring BPMN Process Service Engine Instances"](#)
- [Section 40.7, "Monitoring Deployed BPMN Processes in the Service Engine"](#)

For more information, see the following sections:

- [Section 1.2.4, "Introduction to Service Components and Service Component Instances"](#)
- [Section 1.2.6, "Introduction to Service Engines"](#)

### 40.1 Viewing the Audit Trail and Process Flow of a BPMN Process Service Component

This section describes how to view the audit trail and process flow of a BPMN process service component in a SOA composite application instance.

---

**Note:**

- This section assumes a SOA composite application instance has been initiated. If not, see [Section 8.1, "Initiating a SOA Composite Application Test Instance"](#) for instructions.
  - When several messages are thrown in a short interval, they are not processed in the same order as they were sent. This can be apparent when you are examining the audit trail of a process instance.
- 

To view the audit trail and process flow of a BPMN process service component:

1. Access this page through one of the following options:

<b>From the SOA Infrastructure Menu...</b>	<b>From the SOA Folder in the Navigator...</b>
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

The Dashboard page for the selected composite application appears.

2. Use one of the following methods to select an instance of the application:
  - For recent instances of this application, click the instance number of an instance in the **Instance ID** column of the **Recent Instances** section.
  - For all instances of this application, click the **Instances** tab, then click a specific instance in the **Instance ID** list.

The Flow Trace page displays the following details:

- The **Faults** section shows the faults occurring in the services, service components, and references that comprise the SOA composite application. Sensors enable you to monitor BPMN process activities, variables, and faults during runtime. Selecting a fault highlights the row in the **Trace** section in which the fault occurred. Closing the fault clears the selection in the **Trace** section.
- The **Sensors** section displays details about composite sensors included in the service and reference binding components of the SOA composite application. The total number of sensors is shown in the section header. Composite sensors can be added to service and reference binding components during design time in Oracle JDeveloper. You cannot add composite sensors to service components. Selecting a composite sensor in this section highlights the service or reference in the **Trace** section in which composite sensor data was collected. Closing the sensor clears the selection in the **Trace** section.

---

**Note:** Expand the **Faults** or **Sensors** sections one at a time. The fault or sensor information is displayed only for viewing in this way.

---

- The **Trace** section shows the sequence of the message flow through the services, service components, and references that comprise the SOA composite application.

The flow trace is a runtime trail of a message flow identified by an execution context ID (ECID) that is displayed in the upper right corner of the page. An ECID enables you to track a message flow that crosses instances of different composites. The flow trace lists all services, references, components across composites participating in the flow.

**Flow Trace** Data Refreshed Aug 27, 2010  
This page shows the flow of the message through various composite and component instances. ECID 484ae83ec35e9489:1bab839d:12a9e920b8b-8000-00 Started Aug 23, 2010 7:28:36 AM

Instance	Type	Usage	State	Time	Composite Instance
Caller.service	Web Service	Service	Completed	Aug 23, 2010 7:28:36 AM	MessageEventOnUserTask of 20
Caller	BPMN Component		Completed	Aug 23, 2010 7:28:54 AM	MessageEventOnUserTask of 20
Process	BPMN Component		Completed	Aug 23, 2010 7:28:52 AM	MessageEventOnUserTask of 20
NonIntTimer	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:38 AM	MessageEventOnUserTask of 20
nonIntMessageRecd	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:40 AM	MessageEventOnUserTask of 20
IntMessageRecd	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:50 AM	MessageEventOnUserTask of 20
IntTimer	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:52 AM	MessageEventOnUserTask of 20
correctPathTakenBeforeProcResponse	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:52 AM	MessageEventOnUserTask of 20
ParallelGatewayWithCatchEvents	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:54 AM	MessageEventOnUserTask of 20
nonIntMsgResponse	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:54 AM	MessageEventOnUserTask of 20
ProcessResponse	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:54 AM	MessageEventOnUserTask of 20
IntMsgResponse	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:54 AM	MessageEventOnUserTask of 20
InclusiveGatewayWithServiceTask	JCA Adapter	Reference	Completed	Aug 23, 2010 7:28:54 AM	MessageEventOnUserTask of 20

For the flow example in the **Trace** section, the service binding component and reference binding component involved in the flow have successfully received and processed messages.

Note the following restrictions with ECIDs:

- A separate ECID is displayed for each instance of a composite application and not for the composite level ECID that can track the complete flow of any instances for the composite application.
- To get complete flow information, you must find the composite level ECID in the log files. Use that value to get all information for a particular composite and therefore all its executed instances.
- ECIDs are not propagated through business events. This can limit the amount of logging information that is collected. For example, if you publish an event that is subscribed to in the same composite application, limited logging information is available.

### 3. Select a fault in the **Faults** section.

This highlights the row in the **Trace** section in which the fault occurred.

### 4. Close the fault to clear the selection in the **Trace** section.

5. Expand the **Sensors** section to display composite sensors.
6. Select a sensor in the **Sensors** section.

This highlights the row in the **Trace** section in which the composite sensor data was collected.

7. In the **Instance** column of the **Trace** section, click a specific BPMN process service component instance. Service component instances can be accessed from this section; services and references cannot be accessed.

The Instance page appears, as shown in [Figure 40–1](#).

**Figure 40–1 Instance Page**

The screenshot shows the 'Instance of Process' page with the 'Audit Trail' tab selected. The top navigation bar includes 'Flow Trace > Instance of Process', a refresh icon, and the date 'Data Refreshed Aug 27, 2010 10:19:28 AM PDT'. Below the bar, the title 'Instance of Process' with a help icon is displayed, followed by a sub-instruction: 'This page shows BPMN process instance details.' A status bar indicates 'Instance ID bpmn:48' and 'Started Aug 23, 2010 7:28:36 AM'.

The main content area features a tree view of BPMN components on the left and a detailed audit log table on the right. The tree view includes nodes for Start, UserTask, BoundaryEvent, ServiceTask3, UserTask1, ServiceTask2, BoundaryResponse, ServiceTask4, and End. The audit log table has columns for Activity, Loop Count, Event, Date, and Copy. Key entries include:

Activity	Loop Count	Event	Date	Copy
Start	0	Instance created	Aug 23, 2010 7:28:36 AM	0
		Activity completed	Aug 23, 2010 7:28:36 AM	0
		Activity cancelled	Aug 23, 2010 7:28:36 AM	0
UserTask	NONE	Instance entered the activity	Aug 23, 2010 7:28:36 AM	0
BoundaryEvent		Activity completed	Aug 23, 2010 7:28:50 AM	0
BoundaryEvent		Activity cancelled	Aug 23, 2010 7:28:50 AM	0
ServiceTask3	0	Activity completed	Aug 23, 2010 7:28:50 AM	0
UserTask1		Activity cancelled	Aug 23, 2010 7:28:50 AM	0
ServiceTask2		Activity completed	Aug 23, 2010 7:28:52 AM	0
BoundaryResponse	0	Activity completed	Aug 23, 2010 7:28:52 AM	0
ServiceTask4		Activity completed	Aug 23, 2010 7:28:52 AM	0
End		Activity completed	Aug 23, 2010 7:28:52 AM	0
		Instance terminated	Aug 23, 2010 7:28:52 AM	0

Use these pages to view the audit trail, flow and faults of a BPMN process service component instance. The following links provide additional details about the instance:

- **Flow Trace link:** Click the breadcrumbs in the upper left corner of the page to access the flow trace for the ECID (composite instance) that contains this BPMN component instance.
- **Information icon:** Click the information icon to the right of the name of the BPMN component (in the page title) to see biographical information about this BPMN instance. This information includes a summary of the instance, including instance ID, ECID, instance startup time or last modification time, instance state (for example, running), and number of faults.

This icon is displayed only on the Audit Trail pages of BPMN processes and Oracle Mediators, and not on the pages of human tasks and business rules.

- **Current Audit Level:** Click to display information details, such as the audit level used by this instance.

When you first open the Instance page, the **Audit Trail** page is displayed by default. It provides execution details about the activities in the BPMN process.

Column	Description
<b>Activity</b>	Lists all the BPM constructs available in a process in the order they are executed. These include: <ul style="list-style-type: none"> <li>▪ Events: start, end, signal, throw, catch message.</li> <li>▪ Activities: user task, business rules task, service task, call activity, subprocess.</li> <li>▪ Gateways: inclusive, exclusive, parallel, event based, and complex.</li> </ul>
<b>Loop Count Event</b>	If the activity referred to in a row of the audit trail table is a subprocess with the loop characteristic set to either Loop or Multi-instance, this column shows the value of the <code>loopCounter</code> variable.
<b>Event</b>	When any BPMN construct executes, audit is logged twice: once when it enters that activity, and once when it leaves that activity to move to next activity. If the node is collapsed, it shows you whether the activity is completed, processing, or canceled.
<b>Date</b>	Time stamp showing when the item was posted.
<b>Copy</b>	If some activities are executed simultaneously—for example, on different paths in a parallel gateway—the copy keeps the number of threads used for this purpose.

8. Scroll through the audit trail to check for errors and expand the payload links to view their contents at a given point in the flow.

When you click a payload link, the Payload XML page appears. This page shows the value of data objects which had out data association at that particular point in the process.

Flow Trace > Instance of Process

**Instance of Process** i  
This page shows BPMN process instance details. ?

Data Refreshed Aug 27, 2010 10:19:28 AM PDT ↻

Instance ID: **bpmn:48**  
Started Aug 23, 2010 7:28:36 AM

Audit Trail Flow Faults Current Audit Level: production i

Activity	Loop Count Event	Date	Copy
Start	Instance created	Aug 23, 2010 7:28:36 AM	0
UserTask	0 Activity completed	Aug 23, 2010 7:28:36 AM	0
	0 Activity cancelled	Aug 23, 2010 7:28:36 AM	0
BoundaryEvent	Instance entered the activity	Aug 23, 2010 7:28:36 AM	0
	NONE	Aug 23, 2010 7:28:50 AM	0
ServiceTask3			0
UserTask1			0
ServiceTask2			0
BoundaryResponse			0
ServiceTask4			0
End			0

**Payload XML**

```

<auditQueryPayload ciKey="20">
 <dataObject name="dataObject1" isBusinessIndicator="true">
 <value>
 <dataObject1 xsi:type="def:string">init</dataObject1>
 </value>
 </dataObject>
 <dataObject name="oc" isBusinessIndicator="false">
 <value>
 <oc xsi:type="def:string"/>
 </value>
 </dataObject>
</auditQueryPayload>

```

9. Click the **Flow** tab.

A flow diagram of the BPMN process activities appears. This flow diagram shows a fault highlighted in a BPMN process activity.

10. Click an activity to view the flow of the payload through the process.

---

**Note:** If using Microsoft Internet Explorer, you can click **Copy details to clipboard** to copy the activity details to the clipboard. If using Mozilla Firefox, this link does not appear. Instead, you must manually select the text and copy and paste it to a file.

---

11. Scroll through the flow diagram to check for errors and click the highlighted activity to view error messages.

12. Close the window.

13. Click the **Faults** tab.

This page shows the error message, whether you can recover from the fault, the time at which the fault occurred, and the activity in which the fault occurred. This page displays the faults in the BPMN component instance (but not the faults that occurred in a service or reference binding component).

You can recover from instance faults identified as recoverable. This page lists all instance faults, recoverable or not. The component instance faults that occurred in a service or reference are not listed here.

This page enables you to target individual faults from which to recover, and provides a degree of fault recovery granularity not available on other pages.

However, you cannot perform bulk fault recoveries on this page. To perform bulk fault recovery, use one of the following pages:

- Faults and Rejected Messages page of a specific SOA composite application or of the SOA Infrastructure.
- Faults page of the BPMN process service engine or of a specific BPMN process service component.

14. Select a fault for recovery that has been identified as recoverable through one of the following methods. The page refreshes to display a fault recovery section at the bottom of the page.

- If you click a fault in the **Error Message** column, a popup message displays details about the fault, including the fault ID, fault time, fault location, fault type, and complete error message text. If the fault is identified as recoverable, a **Recover Now** button is displayed that you can click.
- You click a fault identified as recoverable in the **Recovery** column.

15. Select an action from the **Recovery Action** list.

---

Action	Description
Retry	Retries the instance with an option to provide a retry success action. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
Abort	Terminates the entire instance.
Replay	Replays the entire scope again in which the fault occurred.

---

Action	Description
<b>Rethrow</b>	Rethrows the current fault. BPMN fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulting activity as a success).

Your selection causes additional fields to appear. For example, the following fields display if you select **Rethrow**.

16. Use the **After Successful Retry** list to select defined actions to invoke after a successful retry. If you select a variable in the **Variable** list, you can edit the value in the **Value** text box.
17. Click the **Back** button of your browser to exit the flow diagram.

## 40.2 Monitoring BPMN Process Service Component Instances and Faults

You can monitor BPMN process service component recent instances and faults. Each service component in a SOA composite application has its own instance ID. These IDs are different from the overall instance ID of the SOA composite application of which each service component is a part.

To monitor BPMN process service component instances and faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>
<ol style="list-style-type: none"> <li>2. In the <b>Component Metrics</b> section, select the BPMN process service component.</li> <li>3. Click <b>Dashboard</b>.</li> </ol>	

The screenshot shows the Oracle SOA Composite interface for a component named 'FailsTruly [5.6]'. The top navigation bar includes 'SOA Composite', 'Page Refreshed Oct 23, 2009 8:52:38 AM PDT', and 'Related Links'. Below the header are buttons for 'Running Instances 0 | Total 1 | Active | Retire ... | Shut Down... | Test | Settings...' and tabs for 'Dashboard' (selected), 'Instances', 'Faults and Rejected Messages', 'Unit Tests', and 'Policies'.

**Recent Instances:** Shows one instance (ID 1) with a Conversation ID of 1254509558379, State '...', and Start Time 'Oct 2, 2009 11:52:39 AM'.

**Recent Faults and Rejected Messages:** Displays two entries:

Error Message	Recovery	Fault Time	Fault Location	Composite Instance ID	Logs
<bpelFault><faultType> <message>0</message></faultType><bindingFault :>	Recover...	Oct 2, 2009 11:52:47 AM	BPMNThatFails	1	<a href="#">Logs</a>
Exception occurred when binding was invoked. Exception occurred during invocation.		Oct 2, 2009 11:52:46 AM	NonExistentFile	1	<a href="#">Logs</a>

The upper part of the Dashboard page displays the following details:

- Recent instances of the BPMN process service component, including the instance ID, the state of the instance (for example, completed successfully or faulted), the start time, the last modification time, and logs describing the instance.
- Recent faults in the BPMN process service component, including the error message, whether you can recover from the fault, the time at which the fault occurred, the instance ID of the BPMN service component, the BPMN activity in which the fault occurred, and logs describing the fault.
- The average processing time for each activity in the BPMN process service component.

4. In the **Recent Instances** section, you can perform the following tasks:

- View the audit trail, process flow and faults of a service component. To do this task, in the **Instance ID** column, click the instance ID of that service component.
- Access the Log Messages page with filtered messages specific to that instance. To do this task, in the **Logs** column, click a specific log.
- Access the Instances page of the service component. To do this: Click **Show More** below the section.

5. In the **Recent Instances and Faults** section, you can perform the following tasks:

- Display complete information about a fault. To do this task, in the **Error Message** column, click an error message. If the fault is identified as recoverable, you can perform fault recovery by clicking the **Recover Now** link.
- Perform fault recovery at the component instance level. To do this task, in the **Recovery** column, click a fault identified as **Recoverable**.

- Access the Log Messages page with filtered messages specific to that instance. To do this task, in the **Logs** column, click a specific log.
- Access the Faults page of the service component. To do this task, click **Show More** below the section.

The lower part of the Dashboard page displays the following details:

- A graphical representation of the number of successful, faulted, and incoming (pending) instances of the BPMN process service component over a specific time range.
- The number of faults and message processed by any reference binding component with which this BPMN process service component communicated.

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances."](#)

## 40.3 Monitoring BPMN Process Service Component Instances

You can monitor BPMN process service component instances. Each service component has its own unique instance ID. This ID is in addition to the instance ID of the overall SOA composite application of which this service component is a part.

To monitor BPMN process service component instances:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select Home.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. In the **Component Metrics** section, select the BPMN process service component.
3. Click the **Instances** tab.

The screenshot shows the Oracle SOA Composite application interface. At the top, it displays the application name "FailsTruly [5.6]" and the component "BPMNthatFails (BPMN Component)". Below this, there are tabs for "Dashboard", "Instances" (which is selected), "Faults", and "Policies". A search bar allows filtering by Instance ID, Start Time From, Start Time To, Modified Date From, and State. The results table lists two instances: "bpmin:6" and "bpmin:2", both in a "Running" state. Each instance row includes columns for Instance ID, State, Start Date, Last Modified Date, and Logs.

Instance ID	State	Start Date	Last Modified Date	Logs
bpmin:6	Running	Sep 10, 2009 2:07:43 PM	Sep 10, 2009 4:52:04 PM	<a href="#">Logs</a>
bpmin:2	Running	Sep 10, 2009 2:04:17 PM	Sep 10, 2009 2:04:22 PM	<a href="#">Logs</a>

The Instances page displays the following details:

- A utility for searching for a specific BPMN service component instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
- BPMN process service component instances, including the instance ID, instance state (for example, completed or faulted), instance start time, last instance modification time, and log files describing the instance.

In this page, you can perform the following tasks:

- View the audit trail, process flow, and faults of a service component. To do this task, in the **Instance ID** column, click the instance ID for a service component.
- Access the Log Messages page with filtered messages specific to that instance. To do this task, in the **Logs** column, click a specific log.

For more information, see [Section 1.2.3, "Introduction to SOA Composite Application Instances."](#)

## 40.4 Monitoring BPMN Process Service Engine Instances and Faults

You can monitor instances and faults of all BPMN process service components running in the BPMN process service engine. These BPMN process service components can be part of separate SOA composite applications.

To monitor BPMN process service engine instances and faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Service Engines &gt; BPMN</b>.</li> </ol>	<ol style="list-style-type: none"> <li>1. Right-click <b>soa-infra</b>.</li> <li>2. Select <b>Service Engines &gt; BPMN</b>.</li> </ol>

## 2. Click Dashboard.

The screenshot shows the 'Recent Instances' section of the BPMN Engine Home dashboard. It displays two running instances of the 'BPMNThatFails' component, both associated with the 'FailsTruly [5.6]' composite application. The table includes columns for Instance ID, Component, Composite, State, Start Date, Last Modified Date, and Logs.

Instance ID	Component	Composite	State	Start Date	Last Modified Date	Logs
bpmn:6	BPMNThatFails	FailsTruly [5.6]	Running	Sep 10, 2009 2:07:4	Sep 10, 2009 4:52:04 PM	<a href="#">View Logs</a>
bpmn:2	BPMNThatFails	FailsTruly [5.6]	Running	Sep 10, 2009 2:04:1	Sep 10, 2009 2:04:22 PM	<a href="#">View Logs</a>

The upper part of the Dashboard page displays recent instances of all BPMN process service components running in the BPMN process service engine, including the instance ID of the service component, the service component name, the SOA composite application of which the service component is a part, the state of the instance (for example, completed successfully or faulted), the instance start time, the last modification time, and logs describing the instance.

The screenshot shows the lower part of the BPMN Engine Home dashboard. It includes sections for 'Components' and 'Recent Faults'.

**Components:**

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances
BusinessRuleInclusiveGateway	BusinessRuleInclusiveGateway [1.1]	<span style="color: green;">▲</span>	0	0	0 0 0
End2EndUserFileAdapter	EndToEndUserFileAdapter [1.2]	<span style="color: green;">▲</span>	0	0	0 0 0
BPMNThatFails	FailsTruly [5.6]	<span style="color: green;">▲</span>	2	2	0 0 0
BPMNProcessThatFails	MessageRecovery [1.4]	<span style="color: green;">▲</span>	4	0	0 0 2

**Recent Faults:**

Error Message	Recovery	Fault Time	Composite	Component	Component Instance ID	Activity	Logs
✖ <faultType>0</faultType><bindingFault>	<span style="color: blue;">Recover...</span>	Sep 10, 2009 2:07:43 PM	FailsTruly [5.6]	BPMNThatFails	bpmn:6	a6	<a href="#">View Logs</a>
✖ <faultType>0</faultType><bindingFault>	<span style="color: blue;">Recover...</span>	Sep 10, 2009 2:04:22 PM	FailsTruly [5.6]	BPMNThatFails	bpmn:2	a6	<a href="#">View Logs</a>

The lower part of the Dashboard page displays the following details:

- The service components running in the service engine, the SOA composite applications of the service components, the state of the applications (for example, running), and the total, running, and faulted instances in the service engine.
- The recent faults in the service engine, including the error message, whether you can recover from the fault, the time at which the fault occurred, the SOA composite application in which the fault occurred, the service component, the

instance ID of the service component, the activity in which the fault occurred, and log files describing the fault.

3. In the **Recent Instances** section, you can perform the following monitoring tasks:
  - View the audit trail, process flow and faults of a service component. To do this task, in the **Instance ID** column, click an instance ID for the service component.
  - Access the home page of a service component. To do this task, in the **Component** column, click a specific service component.
  - Access its home page of a SOA composite application. To do this task, in the **Composite** column, click the specific SOA composite application.
  - Access the Log Messages page with filtered messages specific to an instance. To do this task, in the **Logs** column, click the specific log.
  - Access the Instances page of the service engine. To do this task, click **Show More** below the section.
4. In the **Components** section, you can perform the following tasks:
  - Access the home page of a specific service component. To do this task, in the **Name** column, click the specific service component.
  - Access the home page of a specific SOA composite application. To do this task, in the **Composite** column, click the specific SOA composite application.
  - Access the Deployed Components page of the service engine. To do this task, click **Show More** below the section.
5. In the **Recent Faults** section, you can perform the following tasks:
  - Display complete information about a fault. To do this task, in the **Error Message** column, click an error message. If the fault is identified as recoverable, click the **Recover Now** link to perform fault recovery.
  - Perform fault recovery at the component instance level. To do this task, in the **Recovery** column, click a fault identified as **Recoverable**.
  - Access the home page of a specific SOA composite application. To do this task, in the **Composite** column, click the specific SOA composite application.
  - Access the home page of a specific service component. To do this task, in the **Component** column, click a specific service component.
  - View the audit trail, process flow and faults of a service component. To do this task, in the **Component Instance ID** column, click an instance ID for a service component.
  - Access the Log Messages page with filtered messages specific to a fault. To do this task, in the **Logs** column, click the specific log.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 40.5 Monitoring BPMN Process Service Engine Request and Thread Performance Statistics

You can monitor request and thread performance statistics for all BPMN process service components running in the service engine.

To monitor BPMN process service engine request and thread statistics:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPMN.	1. Right-click <code>soa-infra</code> . 2. Select Service Engines > BPMN.

- Click **Statistics**.

The upper part of the Statistics page displays the following details. Click the **Help** icon for additional details.

- Pending requests in the service engine
- Active requests in the service engine
- Thread statistics for the service engine

The lower part of the Statistics page displays details about the count and minimum, maximum, and average request processing times.

For more information about BPMN process tuning and performance properties, see *Oracle Fusion Middleware Performance and Tuning Guide*.

## 40.6 Monitoring BPMN Process Service Engine Instances

You can monitor all BPMN process service component instances running in the service engine. These BPMN process service components can be part of separate SOA composite applications.

To monitor BPMN process service engine instances:

- Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPMN.	1. Right-click <code>soa-infra</code> . 2. Select Service Engines > BPMN.

- Click **Instances**.

The screenshot shows the SOA Infrastructure Home > BPMN Engine Home page. The Instances tab is selected. On the left, there is a search form with fields for Instance ID, Start Time From, Start Time To, Modified Date From, Modified Date To, State, and Component. Below the search form is a table titled 'View' showing six rows of instance details:

Instance ID	Component	Composite	State	Start Date	Last Modified Date	Logs
bpmn:6	BPMNThatFails	FailsTruly [5.6]	Running	Sep 10, 2009 2:07:43 PM	Sep 10, 2009 4:52:04 PM	
bpmn:5	BPMNProcessThatFails	MessageRecovery [1..4]	✗ Faulted	Sep 10, 2009 2:07:32 PM	Sep 10, 2009 2:07:32 PM	
bpmn:4	BPMNProcessThatFails	MessageRecovery [1..4]	✓ Completed	Sep 10, 2009 2:07:21 PM	Sep 10, 2009 2:07:21 PM	
bpmn:3	BPMNProcessThatFails	MessageRecovery [1..4]	✗ Faulted	Sep 10, 2009 2:05:50 PM	Sep 10, 2009 2:05:50 PM	
bpmn:2	BPMNThatFails	FailsTruly [5.6]	Running	Sep 10, 2009 2:04:17 PM	Sep 10, 2009 2:04:22 PM	
bpmn:1	BPMNProcessThatFails	MessageRecovery [1..4]	✓ Completed	Sep 10, 2009 2:02:59 PM	Sep 10, 2009 2:03:06 PM	

The Instances page displays the following details:

- A utility for searching for a specific instance by specifying criteria and clicking **Search**. By default, instances are not displayed the first time you access this page. You must click **Search** to display any instances.
  - Instances, including the instance ID of the service component, the service component name, the SOA composite application name, the state of the instance (for example, completed successfully, running, or faulted), the instance start time, the last modification time, and log files describing the instance.
3. In the **Instances** section, you can perform the following monitoring tasks:
- View the audit trail, process flow, sensor values, and faults of a service component. To do this task, in the **Instance ID** column, click an instance ID for a service component.
  - Access the home page of a specific service component. To do this task, in the **Component** column, click the specific service component.
  - Access the home page of a specific SOA composite application. To do this task, in the **Composite** column, click the specific SOA composite application.
  - Access the Log Messages page with filtered messages specific to an instance. To do this task, in the **Logs** column, click the specific log.

For more information, see [Section 1.2.4, "Introduction to Service Components and Service Component Instances."](#)

## 40.7 Monitoring Deployed BPMN Processes in the Service Engine

You can monitor all deployed SOA composite applications with BPMN process service components running in the service engine.

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**Note:** Subtasks are not listed in the Oracle Enterprise Manager Fusion Middleware Control.

---

To monitor deployed BPMN processes in service engines:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select Service Engines > BPMN.	1. Right-click <b>soa-infra</b> . 2. Select Service Engines > BPMN.

2. Click **Deployed Components**.

Name	Composite	Status	Total Instances	Running Instances	Faulted Instances	
					Recoverable	Non Recoverable
BusinessRuleInclusiveGateway	BusinessRuleInclusiveGateway [1.1]	Up	0	0	0	0
End2EndUserFileAdapter	EndToEndUserFileAdapter [1.2]	Up	0	0	0	0
BPMNthatFails	FailsTruly [5.6]	Up	2	2	0	0
BPMNProcessThatFails	MessageRecovery [1.4]	Up	4	0	0	2

The Deployed Components page displays the following details:

- A utility for searching for a specific deployed SOA composite application by specifying criteria and clicking **Search**.
- Details about deployed SOA composite applications with BPMN process service components running in this service engine, including the service component name, the SOA composite application, the current status, and the total, running, and faulted instances in the service engine.

To access the home page of a specific service component, in the **Name** column, click the specific service component.

To access the home page of a specific SOA composite application, in the **Composite** column, click the specific SOA composite application.



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# Managing Oracle BPMN Service Components and Engines

This chapter describes how to manage BPMN process service components and service engines.

This chapter includes the following topics:

- [Section 41.1, "Recovering from BPMN Process Service Component Faults"](#)
- [Section 41.2, "Managing BPMN Process Service Component Policies"](#)
- [Section 41.3, "Recovering from BPMN Process Service Engine Faults"](#)
- [Section 41.4, "Performing BPMN Process Service Engine Message Recovery"](#)

## 41.1 Recovering from BPMN Process Service Component Faults

You can monitor and perform individual and bulk fault recoveries for BPMN process service components that are identified as recoverable. For BPMN process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the `fault-bindings.xml` file) and which triggers the action `ora-human-intervention`. However, without defining any fault policies, the fault takes its normal course as either a recoverable or nonrecoverable fault.

To recover from BPMN process service component faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"><li>1. Select <b>Home</b>.</li><li>2. Select the <b>Deployed Composites</b> tab.</li><li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li></ol>	<ol style="list-style-type: none"><li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li></ol>

2. In the **Component Metrics** section, select the BPMN process service component.
3. Click **Faults**.

The screenshot shows the 'Faults' tab selected in the navigation bar. The search section contains fields for 'Error Message Contains', 'Fault ID', 'Fault Time From', 'Fault Time To', 'Composite Instance ID', and 'Component Instance ID'. Below the search are buttons for 'Search' and 'Reset'. A dropdown menu allows filtering by 'Show only recoverable faults' or 'All Faults'. The main table lists two recoverable faults:

Error Message	Recovery	Fault Time	Component Instance ID	Activity	Logs
<faultType>0</faultType><bindingFault xmlns='http://schemas.oracle.com/bpe'	<a href="#">Recover...</a>	Sep 10, 2009 2:07:43 PM	bpmn:6	a6	<a href="#">Logs</a>
<faultType>0</faultType><bindingFault xmlns='http://schemas.oracle.com/bpe'	<a href="#">Recover...</a>	Sep 10, 2009 2:04:22 PM	bpmn:2	a6	<a href="#">Logs</a>

The Faults page displays the following details:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the service component, including the fault ID, error message, whether you can recover from the fault, time at which the fault occurred, service component instance ID, activity in which the fault occurred, and a link to a log file describing the fault.

BPMN process service component faults identified as recoverable can be recovered.

4. Select faults for recovery using one of the following methods. Fault recovery selection at the BPMN process service component level equals the SOA Infrastructure level, SOA composite application level, and Oracle Mediator service component level.

For...	Then...
Single fault recovery	<p>There are three options from which to choose for single fault recovery:</p> <ol style="list-style-type: none"> <li>1. Click the row of the fault that has been identified as recoverable. With the row highlighted, select a specific action from the <b>Recovery Action</b> list, as described in Step 5.</li> <li>2. In the <b>Recovery</b> column, click the <b>Recover</b> link to access the Faults page of the instance audit trail to perform fault recovery.</li> <li>3. In the <b>Error Message</b> column, click the message of a fault that has been identified as recoverable. This displays complete fault details, including the fault ID, fault time, fault location, fault type, and error message text. A <b>Recover Now</b> option is displayed for recoverable faults. Click <b>Recover Now</b> to access the Faults page of the instance audit trail to perform fault recovery.</li> </ol>

For...	Then...
Bulk fault recovery	<p>There are two options from which to choose for bulk fault recovery:</p> <ol style="list-style-type: none"> <li>1. Use Shift+Click or Control+Click to select specific faults in the rows.</li> <li>or</li> <li>2. From the <b>Select</b> menu, choose <b>Select All Recoverable</b>. Then use Shift+Click or Control+Click to deselect the faults to <i>not</i> include in the recovery operation.</li> </ol> <p>Then:</p> <ol style="list-style-type: none"> <li>3. Select an action from the <b>Recovery Action</b> list, as described in Step 5.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>
Recovery of all faults	<ol style="list-style-type: none"> <li>1. From the <b>Select</b> menu, choose <b>Select All Recoverable</b>.</li> <li>2. Select an action from the <b>Recovery Action</b> list, as described in Step 5.</li> </ol> <p><b>Note:</b> Only the actions applicable to all selected faults are available.</p>

---

**Note:** In most cases, fault policy actions are automatically executed. The only exception is if you defined a fault policy that uses the action ora-human-intervention. This action creates a recoverable fault that can be recovered from Oracle Enterprise Manager Fusion Middleware Control.

---

**5.** Select an action from the **Recovery Action** list.

Action	Description
<b>Retry</b>	Retries the instance directly. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault. BPMN fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulting activity as a success).

**6.** Perform the following additional monitoring tasks from within the faults table:

- a. Click the **Show only recoverable faults** checkbox to display only faults from which you can recover.
- b. From the **Fault Type** list, select to display all faults, system faults, business faults, or Oracle Web Service Manager (OWSM) faults in the faults table. Click the **Help** icon for a description of these fault types.
- c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.

- d. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.
- e. In the **Logs** column, click a link to access the Log Messages page with filtered messages specific to that instance.

For more information, see the following documentation:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#)
- [Section 8.4.2, "Examples of Fault Recovery for BPMN Processes"](#)
- [Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite](#)

## 41.2 Managing BPMN Process Service Component Policies

You can attach and detach policies to and from BPMN process service components in currently deployed SOA composite applications. Policies apply security to the delivery of messages. Oracle Fusion Middleware uses a policy-based model to manage web services.

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**Note:** Before attaching policies, see *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use in your environment.

---

To manage BPMN process service component policies:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select <b>Home</b>.</li> <li>2. Select the <b>Deployed Composites</b> tab.</li> <li>3. In the <b>Composite</b> section, select a specific SOA composite application.</li> </ol>	<ol style="list-style-type: none"> <li>1. Under <b>soa-infra</b>, select a specific SOA composite application.</li> </ol>

2. Select the BPMN process service component in the **Component Metrics** section.
3. Click **Policies**.

The Policies page enables you to attach and detach policies to and from BPMN process service components. The policies table displays the attached policy name, the policy reference status (enabled or disabled) that you can toggle, the category (Management, Reliable Messaging, MTOM Attachment, Security, or WS Addressing), the violations, and the authentication, authorization, confidentiality, and integrity failures since the SOA Infrastructure was last restarted.

4. Click **Attach/Detach**.

If multiple components are available, you are prompted to select the service or component for which to perform the attachment or detachment.

5. Select the service or component to which to attach or detach a policy.

This invokes a dialog for attaching or detaching policies.

Policies currently attached appear in the **Attached Policies** section. Additional policies available for attachment appear in the **Available Policies** section.

6. Select to attach policies appropriate to your environment.
7. Click **Attach**.
8. When you are finished attaching policies, click **Validate**.
9. If an error message appears, make the necessary corrections until you no longer have any validation errors.
10. Click **OK**.

The attached policy is displayed in the policies table.

For more information, see the following documentation:

- [Section 1.4.3.2, "Introduction to Policies"](#)
- [Section 7.7, "Managing SOA Composite Application Policies"](#) for the dialogs that display during policy attachment.
- *Oracle Fusion Middleware Security and Administrator's Guide for Web Services* for definitions of available policies and details about which ones to use for your environment.

## 41.3 Recovering from BPMN Process Service Engine Faults

You can monitor and perform individual and bulk recoveries of faults occurring in BPMN process service engines that are identified as recoverable. All BPMN process service component faults, regardless of the SOA composite application instance of which they are a part, can be viewed in the BPMN process service engine. For BPMN process faults to be identified as recoverable, there must be a fault policy defined that is bound to the fault (through the `fault-bindings.xml` file) and which triggers the action `ora-human-intervention`. However, without defining any fault policies, the fault takes its normal course as either a recoverable or nonrecoverable fault.

To recover from BPMN process service engine faults:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
<ol style="list-style-type: none"> <li>1. Select Service Engines &gt; BPMN.</li> </ol>	<ol style="list-style-type: none"> <li>1. Right-click <code>soa-infra</code>.</li> <li>2. Select Service Engines &gt; <b>BPMN</b>.</li> </ol>

2. Select the **Faults** tab.

If a fault is marked as Recoverable, you can select it and choose a recovery action from the list. This action reruns the instance in which the fault occurred and attempts to recover from it. You can also perform a batch recovery by selecting multiple faults and choosing a recovery action. For additional recovery options, click the Recoverable link for an individual fault. To recover from a Human Workflow fault, select it and click Recover and then click the link to the Worklist application.

**Search**

Error Message Contains  Composite Instance ID   
 Fault ID  Component Instance ID   
 Fault Time From  (UTC-08:00) US Pacific Time  
 Fault Time To  (UTC-08:00) US Pacific Time

Show only recoverable faults  Fault Type All Faults

Error Message	Recovery	Fault Time ▲▼	Composite	Component	Component Instance ID	Activity	Logs
☒ <faultType>0</faultType><bindingF	<a href="#">Recover...</a>	Sep 10, 2009 2:07:43 PM FailsTruly [5.6]	BPMNThatFails	bpmn:6	a6	<a href="#">View</a>	
☒ <faultType>0</faultType><bindingF	<a href="#">Recover...</a>	Sep 10, 2009 2:04:22 PM FailsTruly [5.6]	BPMNThatFails	bpmn:2	a6	<a href="#">View</a>	

The Faults page displays the following details:

- A utility for searching for a specific fault by specifying criteria and clicking **Search**. Click the **Help** icon for details. By default, faults are not displayed the first time you access this page. You must click **Search** to display any faults.
- Faults that occurred in the service engine, including the fault ID, error message, whether you can recover from the fault, the time at which the fault occurred, the SOA composite application and service component in which the fault occurred, and the service component instance ID.

BPMN process service engine faults identified as recoverable can be recovered.

3. As with fault recovery at the SOA Infrastructure level, SOA composite application level, and Oracle Mediator service component level, you can perform single fault recovery, bulk fault recovery, and recovery of all faults. See Step 4 of [Section 41.1, "Recovering from BPMN Process Service Component Faults"](#) for instructions on selecting faults to perform these types of recovery.

---

**Note:** In most cases, fault policy actions are automatically executed. The only exception is if you defined a fault policy that uses the action ora-human-intervention. This action creates a recoverable fault that can be recovered from Oracle Enterprise Manager Fusion Middleware Control.

---

4. Select an action from the **Recovery Action** list.

Action	Description
Retry	Retries the instance with an option to provide a retry success action. An example of a scenario in which to use this recovery action is when the fault occurred because the service provider was not reachable due to a network error. The network error is now resolved.

Action	Description
<b>Abort</b>	Terminates the entire instance.
<b>Replay</b>	Replays the entire scope again in which the fault occurred.
<b>Rethrow</b>	Rethrows the current fault. BPMN fault handlers (catch branches) are used to handle the fault. By default, all exceptions are caught by the fault management framework unless an explicit rethrow fault policy is provided.
<b>Continue</b>	Ignores the fault and continues processing (marks the faulting activity as a success).

5. Perform the following additional monitoring tasks from within the faults table:
  - a. Click the **Show only recoverable faults** checkbox to only display faults from which you can recover.
  - b. From the **Fault Type** list, select to display all faults, system faults, business faults, or OWSM faults in the faults table. Click the **Help** icon for a description of these fault types.
  - c. From the **View** list, select **Columns > Fault ID** to display the fault IDs for each error message. The fault ID is automatically generated and uniquely identifies a fault. The fault ID is also displayed when you click an error message.
  - d. In the **Composite** column, click a specific SOA composite application to access its home page.
  - e. In the **Component** column, click a specific service component to access its home page.
  - f. In the **Component Instance ID** column, click a specific service component ID to access task details about the instance (for example, the current state of a task). Rejected messages do not have a component instance ID.

For more information, see the following sections:

- [Section 1.4.3.1, "Introduction to Fault Recovery"](#) for conceptual details about faults.
- [Section 8.4.2, "Examples of Fault Recovery for BPMN Processes"](#)

## 41.4 Performing BPMN Process Service Engine Message Recovery

You can perform a manual recovery of undelivered invoke or callback messages due to a transaction rollback in the process instance. Recovery of invoke messages applies to asynchronous BPMN processes only. Synchronous BPMN processes return an error to the calling client and are not recoverable from this page. Recoverable activities are activities that failed and can be recovered. For example, if you are using the file adapter to initiate an asynchronous BPMN process and your system crashes while the instance is processing, you can manually perform recovery when the server restarts to ensure that all message records are recovered.

---

**Note:** If you encounter the error message ORA-01000: maximum open cursors exceeded, then do the following:

1. Shut down the Oracle database.
  2. Increase the value of OPEN\_CURSORS to 1500.
  3. Restart the Oracle database.
-

To perform BPMN process service engine message recovery:

1. Access this page through one of the following options:

From the SOA Infrastructure Menu...	From the SOA Folder in the Navigator...
1. Select <b>Service Engines &gt; BPMN</b> .	1. Right-click <b>soa-infra</b> . 2. Select <b>Service Engines &gt; BPMN</b> .

2. Click **Recovery**.

The Recovery page displays the following details:

- A utility for searching for a specific message failure by specifying criteria and clicking **Search**. Click the **Help** icon for details.
- Message failure in the service engine, including the conversation ID, whether you can recover from the message failure, the service component and composite application in which the failure occurred, and the time at which the fault occurred.

3. Select a fault in the table.

4. Select one of the following options:

<b>Action</b>	<b>Description</b>
<b>Recover</b>	Retries the message in which the fault occurred. If an asynchronous BPMN process encounters a transaction rollback scenario because of any underlying exception error, it rolls back to the last dehydration activity. If this is a new instance, and a receive activity was the first dehydration activity, the BPMN process service engine creates a recoverable invoke. When you click <b>Recover</b> to recover the invoke, the service engine creates a new instance. This instance may run to completion with no exception error. However, you continue to see the older instance identified as faulted.
<b>Mark Cancelled</b>	Marks the message so it is never delivered.

Once a message is submitted for recovery, the BPMN process service engine may take time to complete the action. This typically takes less than several seconds. During this time, the message remains visible in the Recovery page. Duplicate attempts to recover the same message in that period are ignored. Refresh the page every few seconds to receive the latest recovery status.

# **Part XVI**

---

## **Appendices**

This part includes the following appendixes:

- [Appendix A, "Installing the Demo User Community in the Database"](#)
- [Appendix B, "Troubleshooting Oracle SOA Suite and Oracle BPM Suite"](#)
- [Appendix C, "Roles and Privileges for Oracle SOA Suite Users in Oracle Enterprise Manager"](#)



# A

---

## Installing the Demo User Community in the Database

This appendix describes how to install and use the organizational hierarchy of users and groups known as the demo user community in the database. You can assign users and groups in this community to tasks that require approvals or other types of human interactions that advance the task workflow.

This appendix includes the following sections:

- [Section A.1, "Installing the Demo User Community"](#)
- [Section A.2, "Demo Community Users"](#)
- [Section A.3, "Demo Community Groups"](#)
- [Section A.4, "soa-infra Application Roles"](#)
- [Section A.5, "SOATestDemoApp Application Roles"](#)
- [Section A.6, "Roles Granted to and Owned by Users"](#)
- [Section A.7, "WorkflowPermission Class"](#)

### A.1 Installing the Demo User Community

The demo user community is an organizational hierarchy of users and groups. After installing Oracle SOA Suite, you must install the demo user community in the database. The demo user community is part of the workflow-001-DemoCommunitySeedApp sample available under the **HW** link on the Oracle SOA Suite samples site. The `README.txt` file included with the sample describes both basic and advanced methods for installing the demo user community. The basic method for installing the demo user community is also described in this section.

---

**Notes:** You must run the script for seeding the user demo community locally from within a domain, and not remotely.

---

To install the demo user community:

1. Ensure that you have a local installation of one of the following:
  - Oracle JDeveloper
  - Oracle BPM server
  - ant 1.7

2. Download the workflow-001-DemoCommunitySeedApp sample from the Oracle SOA Suite samples site.
3. Enter the following command to determine the version of Java on the host.

```
java -version
```

The host on which to install the demo user community into the database must include Java 1.6 update 17 or higher.

4. Ensure that your environment PATH contains the version of Java that is shipped with Oracle SOA Suite.
5. Select a method for installing the demo user community in the database.

To Use the build.properties File...	To Run the ant Script with Specified Parameters...
<p>1. Edit the build.properties file included in the downloaded sample to match your environment:</p> <pre># Set the admin server location admin.url=t3://localhost:7001 server.url=http://localhost:8001  # Set the Fusion Middleware home, also # called the bea home # Linux style /scratch/oracle/middleware # Windows style C:\\Oracle\\Middleware bea.home=/scratch/oracle/middleware/ home_betaupdate  # Set the authentication admin.name=weblogic admin.pwd=password  # Use the managed server for the target or # if single server configuration use the # admin server # e.g. target=soa_server1 or # target=AdminServer target=AdminServer</pre> <p>2. Run the following ant command:</p> <pre>\$FMW_HOME\modules\org.apache.ant_1.7.0\bin\ant seedDemoUsers</pre> <p>Where \$FMW_HOME is the Oracle Fusion Middleware home directory for Oracle JDeveloper or SOA Server (or, specify the path to the ant 1.7 location).</p>	<p>1. Run the ant script with specified parameters. Note that bea.home and <i>FMW_HOME</i> are the same</p> <pre>ant seedDemoUsers -Dbea.home=FMW_HOME -Doracle.home=ORACLE_HOME -Ddomain.home=FMW_HOME/user_projects/ domains/Domain_Name -Dtarget=Managed_Server_Name -Dadmin.url=t3://HOST:Admin_Server_Port -Dserver.url=http://HOST:Managed_Server_Port -Dadmin.name=Admin_Name -Dadmin.pwd=Admin_Password</pre> <p>Where <i>FMW_HOME</i> is the absolute path of the installation home directory and <i>ORACLE_HOME</i> is the absolute path of the Oracle home provided during installation.</p> <p>For example:</p> <pre>ant seedDemoUsers -Dbea.home=/scratch/wls/as11wls/lt20 -Doracle.home=/scratch/wls/as11wls/lt20/ AS11gr1SOA -Ddomain.home=/scratch/wls/as11wls/lt20/ user_projects/domains/domain1 -Dtarget=soa_server1 -Dadmin.url=t3://wlserver.example.com:7001 -Dserver.url=http://wlserver.example.com: 8001 -Dadmin.name=weblogic -Dadmin.pwd=password</pre>

This installs the demo user community and grants permissions to the demo appRoles.

If installation is successful, the following message is displayed:

```
Build Successful
```

---

**Note:** You can receive a Build Successful message even though there were connection problems. Watch for those messages.

---

After the successful seeding of demo users, you can log in with jcooper, jstein, or other users with the password specified in the build.properties file.

If installation is unsuccessful, the following message is displayed:

Build Failed

Installation failure is caused by a configuration or server availability issue. Correct those problems and retry again.

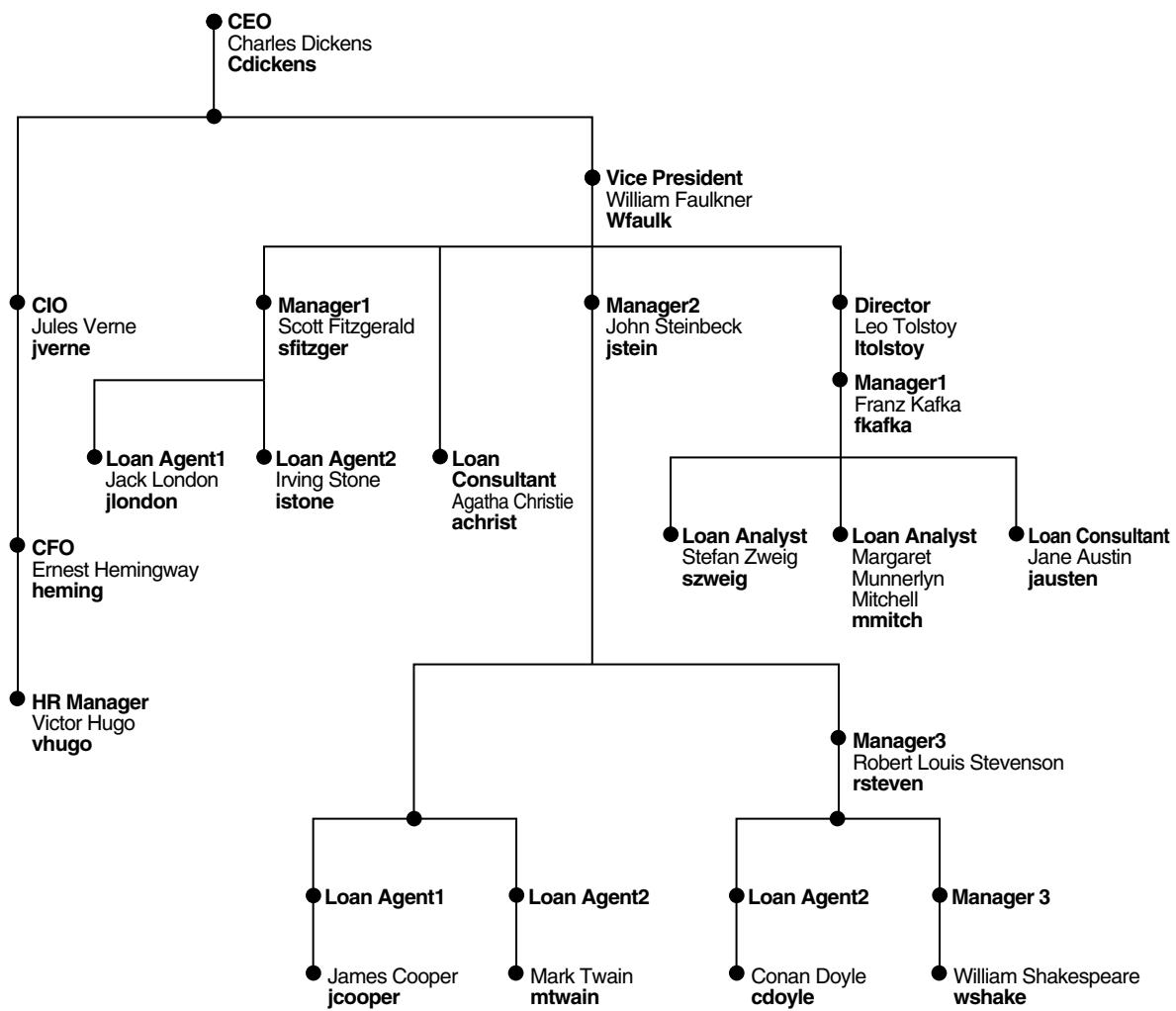
## A.2 Demo Community Users

[Table A-1](#) lists the users in the demo community.

**Table A-1 Users in the Demo Community**

User	User Name	First Name	Last Name	Title	Manager	Email
1	achrist	Agatha	Christie	Loan Consultant	wfaulk	achrist@emailExample.com
5	cdickens	Charles	Dickens	CEO	--	cdickens@emailExample.com
6	cdoyle	Conan	Doyle	Loan Agent 2	rsteven	cdoyle@emailExample.com
3	EHEMING	Ernest	Hemingway	CFO	JVerne	EHEMING@emailExample.com
7	fkafka	Franz	Kafka	Manager 1	ltolstoy	fkafka@emailExample.com
8	istone	Irving	Stone	Loan Agent 2	sfitzger	istone@emailExample.com
9	jausten	Jane	Austen	Loan Consultant	fkafka	jausten@emailExample.com
10	jcooper	James	Cooper	Loan Agent 1	jstein	jcooper@emailExample.com
11	jlondon	Jack	London	Loan Agent 1	sfitzger	jlondon@emailExample.com
12	jstein	John	Steinbeck	Manager 2	wfaulk	jstein@emailExample.com
2	JVerne	Jules	Verne	CIO	cdickens	JVerne@emailExample.com
13	ltolstoy	Leo	Tolstoy	Director	wfaulk	ltolsoy@emailExample.com
14	mmitch	Margaret	Mitchell	Loan Analyst	fkafka	mmitch@emailExample.com
15	mtwain	Mark	Twain	Loan Agent 2	jstein	mtwain@emailExample.com
16	rsteven	Robert	Stevenson	Manager 3	jstein	rsteven@emailExample.com
17	sfitzger	Scott	Fitzgerald	Manager 1	wfaulk	sfitzger@emailExample.com
18	szweig	Stefan	Zweig	Loan Analyst	fkafka	szweig@emailExample.com
4	VHUGO	Victor	Hugo	HR Manager	EHEMING	VHUGO@emailExample.com
19	wfaulk	William	Faulkner	Vice President	cdickens	wfaulk@emailExample.com
20	wshake	William	Shakespeare	Manager 3	rsteven	wshake@emailExample.com

[Figure A-1](#) shows the organizational hierarchy of the demo community.

**Figure A–1 Demo Community Organizational Hierarchy**

## A.3 Demo Community Groups

Table A–2 lists the following:

- Groups in the demo community
- Users and groups that are granted each group role (direct grantees and all grantees)
- Group roles and application roles granted to each group (direct-granted roles and all granted roles)

See [Table A–6](#) for the roles granted to users sorted by user.

**Table A-2 Groups in the Demo Community: Grant Relationships**

Group	Direct Grantees	All Grantees	Direct-Granted Roles	All Granted Roles
RegionalOffices	CentralRegion, WesternRegion, EasternRegion	szweig, wshake, jcooper, WesternRegion, mmitch, EasternRegion, jlondon, CentralRegion, istone, cdoyle, mtwain, California, fkafka	-	-
EasternRegion	szweig, wshake, mmitch, fkafka	szweig, wshake, mmitch, fkafka	RegionalOffices	RegionalOffices
CentralRegion	jlondon, mtwain	jlondon, mtwain	RegionalOffices	RegionalOffices
WesternRegion	cdoyle, California	jcooper, istone, cdoyle, California	RegionalOffices	RegionalOffices
California	jcooper, istone	jcooper, istone	WesternRegion	RegionalOffices, WesternRegion
LoanAgentGroup	jlondon, wshake, LoanAnalyticGroup, jcooper, istone, cdoyle, mtwain	szweig, jlondon, wshake, LoanAnalyticGroup, jcooper, istone, cdoyle, mtwain, mmitch, fkafka	-	-
LoanAnalyticGroup	szweig, mmitch, fkafka	szweig, mmitch, fkafka	BPMWorkflowCustomize, LoanAgentGroup	BPMWorkflowCustomize, LoanAgentGroup
Supervisor	jcooper, mtwain, rsteven	jcooper, mtwain, rsteven	-	-
Executives	cdickens, JVerne, EHeming, VHUGO	cdickens, JVerne, EHeming, VHUGO	-	-

[Table A-3](#) shows information for several groups listed in [Table A-2](#). It lists the following:

- Users and groups (direct owners and all owners) that own each group
- Group roles (direct-owned roles and all owned roles) that each group owns

See [Table A-6](#) for the roles owned by users sorted by user.

**Table A-3 Groups in the Demo Community: Ownership Relationships**

Group	Direct Owners	All Owners	Direct Owned Roles	All Owned Roles
EasternRegion	jstein	jstein	-	-
WesternRegion	jstein	jstein	-	-
California	fkafka	fkafka	-	-
LoanAgentGroup	jcooper, fkafka	jcooper, fkafka	-	-
LoanAnalyticGroup	jstein	jstein	-	-
Supervisor	jstein	jstein	-	-

## A.4 soa-infra Application Roles

[Table A-4](#) lists the following:

- soa-infra application roles
- Users, groups, and roles that are granted each application role (direct grantees and all grantees)

- Roles granted to each application role (direct-granted roles and all granted roles)
- See [Table A–6](#) for the application roles granted to users sorted by user.

**Table A–4 Application Roles in soa-infra**

Application Role	Direct Grantees	All Grantees	Direct-Granted Roles	All Granted Roles
SOAAdmin	Administrators	Administrators	BPMWorkflowAdmin	BPMWorkflowCustomize BPMWorkflowAdmin
BPMWorkflowAdmin	SOAAdmin, demoadmin	SOAAdmin, demoadmin, Administrators	BPMWorkflowCustomize	BPMWorkflowCustomize
BPMWorkflowCustomize	LoanAnalyticGroup, BPMWorkflowAdmin	szweig, LoanAnalyticGroup, SOAAdmin, BPMWorkflowAdmin, mmitch, fkafka, Administrators, demoadmin	-	-

For more information about application roles, see *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## A.5 SOATestDemoApp Application Roles

[Table A–5](#) lists the roles in the SOATestDemoApp application.

**Table A–5 SOATestDemoApp Roles**

Application Role	Direct Grantees	All Grantees	Direct-Granted Roles	All Granted Roles
DevTeam	rsteven	rsteven, mmitch, fkafka, jcooper, istone		
QATeam	jlondon, Supervisor	jlondon, jcooper, mtwain, rsteven, mmitch, fkafka, istone		
ProductionTeam	mmitch, fkafka, California	mmitch, fkafka, jcooper, istone	DevTeam, QATeam	DevTeam, QATeam

## A.6 Roles Granted to and Owned by Users

[Table A–6](#) lists the following:

- Roles granted to each user (direct-granted roles and all granted roles)
- Roles owned by each user (direct-owned roles and all owned roles)

**Table A–6 Roles for Each User**

User Name	Direct-Granted Roles	All Granted Roles	Direct-Owned Roles	All Owned Roles
achrist	Executives	-	-	-
cdickens	-	-	Executives	-
cdoyle	WesternRegion, LoanAgentGroup	RegionalOffices, WesternRegion, LoanAgentGroup	-	-
EHEMING		Executives		

**Table A-6 (Cont.) Roles for Each User**

User Name	Direct-Granted Roles	All Granted Roles	Direct-Owned Roles	All Owned Roles
fkafka	LoanAnalyticGroup, EasternRegion, ProductionTeam	BPMWorkflowCustomize, RegionalOffices, LoanAnalyticGroup, LoanAgentGroup, EasternRegion, ProductionTeam, DevTeam, QATeam	LoanAgentGroup, California	LoanAgentGroup, California
istone	LoanAgentGroup, California	RegionalOffices, WesternRegion, LoanAgentGroup, California, DevTeam, QATeam, ProductionTeam	-	-
jausten	-	-	-	-
jcooper	Supervisor, LoanAgentGroup, California	RegionalOffices, WesternRegion, Supervisor, LoanAgentGroup, California, DevTeam, QATeam, ProductionTeam	LoanAgentGroup	LoanAgentGroup
jlondon	CentralRegion, LoanAgentGroup, QATeam	CentralRegion, RegionalOffices, LoanAgentGroup, QATeam	-	-
jstein	-	-	LoanAnalyticGroup WesternRegion, Supervisor, EasternRegion	LoanAnalyticGroup WesternRegion, Supervisor, EasternRegion
JVerne		Executives		
ltolstoy	-	-	-	-
mmitch	LoanAnalyticGroup, EasternRegion, ProductionTeam	BPMWorkflowCustomize RegionalOffices, LoanAnalyticGroup, LoanAgentGroup, EasternRegion, DevTeam, QATeam, ProductionTeam	-	-
mtwain	CentralRegion, Supervisor, LoanAgentGroup	CentralRegion, RegionalOffices, Supervisor, LoanAgentGroup, QATeam	-	-
rsteven	Supervisor, DevTeam	Supervisor, DevTeam	-	-
sfitzger	-	-	-	-
szweig	LoanAnalyticGroup, EasternRegion	BPMWorkflowCustomizeDemoApp/FlexFieldRole, RegionalOffices, LoanAnalyticGroup, LoanAgentGroup, EasternRegion		
vhugo		Executives		
wfaulk	-	-	-	-
wshake	LoanAgentGroup, EasternRegion	RegionalOffices, LoanAgentGroup, EasternRegion	-	-

## A.7 WorkflowPermission Class

Table A-7 lists the permissions defined in the WorkflowPermission class and the application roles associated with each permission.

**Table A-7 WorkflowPermission Class**

Permission	Application Role with Permission
workflow.mapping.publicFlexField	BPMWorkflowAdmin, BPMWorkflowCustomize
workflow.mapping.protectedFlexField	BPMWorkflowAdmin
workflow.admin	BPMWorkflowAdmin
workflow.admin.evidenceStore	BPMWorkflowAdmin

# B

---

## Troubleshooting Oracle SOA Suite and Oracle BPM Suite

This appendix describes how to troubleshoot issues you can encounter when using Oracle SOA Suite and Oracle BPM Suite, including logging level setup, parallel purge and table partitioning issues, connection and transaction timeout issues, runtime diagnostic issues, human workflow issues, Event Delivery Network (EDN) issues, performance issues, server startup best practices, and browser issues. References to additional troubleshooting information are also provided.

This appendix includes the following sections:

- [Section B.1, "Setting Logging Levels for Troubleshooting"](#)
- [Section B.2, "Parallel Purging and Table Partitioning Issues"](#)
- [Section B.3, "Connection and Transaction Timeout Troubleshooting"](#)
- [Section B.4, "Runtime Diagnostics Troubleshooting"](#)
- [Section B.5, "Human Workflow Troubleshooting"](#)
- [Section B.6, "EDN Troubleshooting"](#)
- [Section B.7, "Performance Troubleshooting"](#)
- [Section B.8, "Server Troubleshooting"](#)
- [Section B.9, "Browser Troubleshooting"](#)
- [Section B.10, "Additional Troubleshooting Documentation"](#)

### B.1 Setting Logging Levels for Troubleshooting

To simplify troubleshooting, it is recommended that you set logging levels to the **TRACE:32 FINEST** level in Oracle Enterprise Manager Fusion Middleware Control. This section describes loggers to which to set to this level.

To set logging levels for troubleshooting:

1. See [Section 3.4, "Configuring Log Files"](#) for instructions on accessing the Log Configuration page.
2. From the **Oracle Diagnostic Logging Level (Java Level)** list, set the following parent loggers to the **TRACE:32 FINEST** level:
  - **oracle.soa**
  - **oracle.fabric**
  - **oracle.integration**

- **oracle.wsm** (Setting this logger to the `ERROR` level may also be sufficient because this setting logs the required error messages.)
3. If you want finer-grained control over logging, expand the parent loggers and set any of the following loggers:

Component	Logger
Human workflow/approval management extensions (AMX)/rules	<ul style="list-style-type: none"> <li>▪ <code>oracle.soa.services.common</code></li> <li>▪ <code>oracle.soa.services.identity</code></li> <li>▪ <code>oracle.soa.services.notification</code></li> <li>▪ <code>oracle.soa.services.rules</code></li> <li>▪ <code>oracle.soa.services.rules.obrtrace</code></li> <li>▪ <code>oracle.soa.services.workflow</code></li> <li>▪ <code>oracle.soa.services.workflow.common</code></li> <li>▪ <code>oracle.soa.services.workflow.evidence</code></li> <li>▪ <code>oracle.soa.services.workflow.metadata</code></li> <li>▪ <code>oracle.soa.services.workflow.persistence</code></li> <li>▪ <code>oracle.soa.services.workflow.query</code></li> <li>▪ <code>oracle.soa.services.workflow.report</code></li> <li>▪ <code>oracle.soa.services.workflow.runtimeconfig</code></li> <li>▪ <code>oracle.soa.services.workflow.soa</code></li> <li>▪ <code>oracle.soa.services.workflow.task</code></li> <li>▪ <code>oracle.soa.services.workflow.task.dispatch</code></li> <li>▪ <code>oracle.soa.services.workflow.task.routing</code></li> <li>▪ <code>oracle.soa.services.workflow.user</code></li> <li>▪ <code>oracle.soa.services.workflow.verification</code></li> <li>▪ <code>oracle.soa.services.workflow.performance</code> - Workflow Performance API</li> <li>▪ <code>oracle.soa.services.workflow.worklist</code> - Oracle BPM Worklist</li> </ul>
SOA Infrastructure	<ul style="list-style-type: none"> <li>▪ <code>oracle.fabric.common.wsdl</code> - WSDL/schema management</li> <li>▪ <code>oracle.integration.platform.blocks.deploy</code> - Deployment</li> <li>▪ <code>oracle.integration.platform.blocks.soap</code> - WS binding - Calling web services</li> <li>▪ <code>oracle.integration.platform.blocks.local</code> - Local binding</li> <li>▪ <code>oracle.integration.platform.kernel</code> - Startup issues</li> <li>▪ <code>oracle.integration.platform.blocks.mesh</code> - Message routing</li> <li>▪ <code>oracle.integration.platform.common</code> - Metadata/MDS</li> <li>▪ <code>oracle.integration.platform.instance</code> - Instance</li> <li>▪ <code>oracle.integration.platform.instance.activity</code> - Instance</li> <li>▪ <code>oracle.integration.platform.instance.store</code> - Instance</li> </ul>
EDN	<ul style="list-style-type: none"> <li>▪ <code>oracle.integration.platform.blocks.event</code></li> <li>▪ <code>oracle.integration.platform.blocks.event.saq</code></li> <li>▪ <code>oracle.integration.platform.blocks.event.jms</code></li> </ul>
Deployment	<code>oracle.integration</code>

Component	Logger
Oracle Mediator	<ul style="list-style-type: none"> <li>■ <b>oracle.soa.mediator.common</b> - Logs the processing events related to Oracle Mediator audit message persistence.</li> <li>■ <b>oracle.soa.mediator.common.cache</b> - Metadata cache (RuntimeMetadataCache) and runtime related cache (RuntimeCache).</li> <li>■ <b>oracle.soa.mediator.common.error</b> - Logs information related to error enqueueing and handling.</li> <li>■ <b>oracle.soa.mediator.common.error.recovery</b> - Logs only the error recovery processing. All fault policy handlers are part of this logger.</li> <li>■ <b>oracle.soa.mediator.common.listener</b> - Processing related to common infrastructure for Oracle Mediator parallel routing rules and resequencer.</li> <li>■ <b>oracle.soa.mediator.common.message</b> - Logs information related to creation and modification of the Oracle Mediator message. (Oracle Mediator wraps a normalized message into the Oracle Mediator message.)</li> <li>■ <b>oracle.soa.mediator.common.persistence</b> - Logs information related to the persistence of Oracle Mediator deferred messages to the database.</li> <li>■ <b>oracle.soa.mediator.dispatch</b> - Logs everything related to message routing inside Oracle Mediator. This includes sequential, parallel, and dynamic routing.</li> <li>■ <b>oracle.soa.mediator.dispatch.db</b> - Logs information related to the deferred message and container ID infrastructure.</li> <li>■ <b>oracle.soa.mediator.dispatch.resequencer.toplink</b> - Logs information related to database interactions of the resequencer. This includes execution of all three resequencer strategies.</li> <li>■ <b>oracle.soa.mediator.monitor</b> - Logs all events related to instance tracking in Oracle Mediator.</li> <li>■ <b>oracle.soa.mediator.resequencer</b> - Logs everything related to Oracle Mediator resequencer processing such as locker-worker infrastructure, group, and sequencer ID expression evaluation.</li> <li>■ <b>oracle.soa.mediator.resequencer.besteffort</b> - For best effort strategy of the resequencer; in particular, the locking stage processing.</li> <li>■ <b>oracle.soa.mediator.resequencer.fifo</b> - For the FIFO strategy of the resequencer.</li> <li>■ <b>oracle.soa.mediator.resequencer.standard</b> - For standard strategy of the resequencer.</li> <li>■ <b>oracle.soa.mediator.service</b> - Logs events related to the processing of various message exchange patterns (one way, two way, synchronous, asynchronous, and so on) in Oracle Mediator.</li> <li>■ <b>oracle.soa.mediator.service.common.functions</b> - Oracle Mediator XPath extension function-related logs.</li> <li>■ <b>oracle.soa.mediator.service.filter</b> - Evaluation of filter criteria for routing rules.</li> <li>■ <b>oracle.soa.mediator.service.transformation</b> - Logs transformation-related events such as the payload before and after the transformation.</li> <li>■ <b>oracle.soa.mediator.serviceEngine</b> - Logs lifecycle events of the Oracle Mediator service engine. Also logs the entry and exit of messages for Oracle Mediator.</li> </ul>

Component	Logger
Oracle BPEL Process Manager	<ul style="list-style-type: none"> <li>■ oracle.soa.bpel</li> <li>■ oracle.soa.bpel.console</li> <li>■ oracle.soa.bpel.engine</li> <li>■ oracle.soa.bpel.engine.activation</li> <li>■ oracle.soa.bpel.engine.agents</li> <li>■ oracle.soa.bpel.engine.bpel</li> <li>■ oracle.soa.bpel.engine.compiler</li> <li>■ oracle.soa.bpel.engine.data</li> <li>■ oracle.soa.bpel.engine.delivery</li> <li>■ oracle.soa.bpel.engine.deployment</li> <li>■ oracle.soa.bpel.engine.dispatch</li> <li>■ oracle.soa.bpel.engine.sensor</li> <li>■ oracle.soa.bpel.engine.translation</li> <li>■ oracle.soa.bpel.engine.ws</li> <li>■ oracle.soa.bpel.engine.xml</li> <li>■ oracle.soa.bpel.entity</li> <li>■ oracle.soa.bpel.jpa</li> <li>■ oracle.soa.bpel.system</li> </ul>
Oracle BPM Suite	oracle.bpm.bpmn.engine
Oracle B2B	<ul style="list-style-type: none"> <li>■ oracle.soa.b2b.appproxy - Runtime logger</li> <li>■ oracle.soa.b2b.engine - Runtime logger</li> <li>■ oracle.soa.b2b.transport - Runtime logger</li> <li>■ oracle.soa.b2b.ui - User interface logger</li> <li>■ oracle.soa.b2b.repository - Repository access detailed logger</li> </ul>
Oracle adapters	oracle.soa.adapter
Oracle Web Services Manager (OWSM)	oracle.wsm - Defaulted to the <b>ERROR</b> level; logs all WSM-0xxxx errors. TRACE:32 results in significant details.

4. From the **Oracle Diagnostic Logging Level (Java Level)** list, change the logger level to one of the following settings:
- **TRACE:1 (FINE)**
  - **TRACE:16 (FINER)**
  - **TRACE:32 (FINEST)** - Most verbose level (recommended for troubleshooting)
- The change takes effect within several minutes.

For information about monitoring Oracle Business Activity Monitoring (BAM) logs, see [Section 25.6, "Monitoring Oracle BAM Logs."](#) For information about monitoring Oracle User Messaging Service (UMS) logs, see [Section 28.2, "Viewing Log Files."](#)

### B.1.1 Log Files and Thread Dumps from All Managed Servers

[Table B-1](#) describes the log files to view and thread dumps to obtain.

**Table B-1 Log Files and Thread Dumps**

Output	Description
Server diagnostic log	<p>View the following file:</p> <pre>\$DOMAIN_HOME/servers/server_name/logs/server_name-diagnostic.log</pre> <p>For example, <code>soa_server1-diagnostic.log</code>, if <code>server_name</code> is <code>soa_server1</code>.</p> <p>This is where the log output is available. By default, only the last 100 MB of the diagnostic logs are retained.</p>
Server log	<pre>server_name.log</pre> <p>(for example, <code>soa_server1.log</code>, if <code>server_name</code> is <code>soa_server1</code>)</p>
Server console output	<p><code>&lt;stdout&gt;</code> is also useful, especially for deployment and patching issues.</p>
Server thread dump	<p>Enter the following at the operating system command prompt:</p> <pre>kill -3 managed_server_process_ID</pre> <p>You can also use Oracle WebLogic Server Administration Console.</p> <ol style="list-style-type: none"> <li>1. In the navigation tree of Oracle WebLogic Server Administration Console, select <b>Environment &gt; Servers</b>.</li> <li>2. In the table, select the server.</li> <li>3. Select the <b>Monitoring</b> tab.</li> <li>4. Select the <b>Threads</b> tab.</li> <li>5. Click <b>Dump Thread Stacks</b>.</li> </ol> <p>The output is in the console logs.</p>
OWSM message log	<p>The following log captures all SOAP messages on the wire.</p> <pre>\$DOMAIN_HOME/servers/server_name/logs/owsm/msglogging/diagnostic.log</pre> <p>This log is not enabled by default. To enable this log:</p> <ol style="list-style-type: none"> <li>1. Go to <b>Fusion Middleware Control &gt; Weblogic Domain &gt; Web Services &gt; Policies</b>.</li> <li>2. Select the security level for which to enable logging.</li> <li>3. Edit the policy to enable the log assertion.</li> </ol>

## B.2 Parallel Purging and Table Partitioning Issues

This section describes how to troubleshoot parallel purge and table partitioning issues. Audit level recommendations are also provided.

For more information, see [Chapter 10, "Managing Database Growth."](#)

### B.2.1 Executing the Parallel Purge Script

This section addresses situations in which the Oracle SOA Suite database has not been managed and space must be reclaimed. This section also describes how to identify the appropriate parameter settings for normal, daily execution.

When trying to reclaim space, the purge scripts must be executed frequently to delete substantially more SOA composite applications than are being created. This has implications for host and database resources that must be monitored to avoid lengthy wait queues.

There must be a clear goal on the number of SOA composite applications to delete. Otherwise, the purge script can be configured too aggressively. The following aspects are described:

- [Specifying the Degree of Parallel Value](#)
- [Parsing SOA Composite Applications to Delete](#)
- [Using Parallel Query Slaves](#)
- [Debugging and Tracing Purging Operations](#)

#### **B.2.1.1 Specifying the Degree of Parallel Value**

When specifying the appropriate degree of parallel (DOP) value, hardware resources must be considered. The DOP identifies the number of jobs scheduled by the database and the number of processes concurrently executed on the host.

The parallel purge jobs are I/O intensive, which means that they are not entirely CPU-bound. However, the following formula is a starting point after which testing and monitoring are required to identify any increases:

```
DOP <= PARALLEL_THREADS_PER_CPU x CPU_COUNT
```

While purge jobs are run concurrently, they are actually executed with a 30-second incremental delay to avoid resource contention. The delay is not meant to avoid row contention because the purge jobs must not contend for the same SOA composite applications. This delay has implications for the elapsed time of the purge jobs. As an example, a DOP of 10 means that the tenth purge job sleeps for 270 seconds before starting (that is,  $(DOP - 1) * 30 \text{ sec}$ ).

If a high DOP number is specified, then the `max_runtime` parameter must be set appropriately.

#### **B.2.1.2 Parsing SOA Composite Applications to Delete**

The temptation to delete as many SOA composite applications as possible in each execution of the purge script is understandable when trying to reclaim space. However, the script must parse the data for the appropriate SOA composite application, which can monopolize the elapsed time of the purge.

The strategy must be to reduce the data by running the purge script often with modest date and `max_count` parameter settings. This reduction requires the parallel purge to be scheduled frequently, perhaps twice an hour.

The set of SOA composite applications to parse is identified by the following parameters:

- `min_creation_date`
- `max_creation_date`
- `retention_date`
- `max_count`

A modest `max_count` parameter setting is the most effective method for reducing parse elapsed times. Set the `max_count` parameter low, perhaps to 50K, to begin until an optimal value can be identified. As the tables start to reduce in size, the `max_count` parameter and date ranges can be increased.

---

**Note:** This method of reduction is not always effective. On occasions, you may need to introduce parallel query to parse larger amounts of data.

---

### B.2.1.3 Using Parallel Query Slaves

The parsing for candidate SOA composite applications to delete is primarily performed by several `INSERT ... SELECT` statements. The larger the set of SOA composite applications to parse, the more the database cost-based optimizer favors a full table scan. When large portions of a table must be traversed, a full table scan can be faster than index access because it performs multiblock I/O calls.

A parallel query can significantly improve full table scan performance by coordinating and distributing the work over multiple slave processes. Additionally, the `PARALLEL` hint on the `INSERT` portion executes in APPEND mode. This further improves performance through direct path inserts.

As with the scheduled purge jobs, the parallel query slaves are I/O intensive and not entirely CPU bound. However, the following formula is a good starting point when selecting a DOP for the `PARALLEL` hint:

```
DOP <= PARALLEL_THREADS_PER_CPU x CPU_COUNT
```

---

**Note:** There is a DOP setting to identify the number of parallel purge jobs and a DOP setting to identify the number of parallel query slaves. These DOP settings both impact the amount of processes executed on the host, but not simultaneously. The `INSERT ... SELECT` statement executes first to parse the data followed by the scheduling of the parallel purge jobs.

---

For the `INSERT... SELECT` statement, the `PARALLEL` hint can be specified after the `INSERT` keyword, after the `SELECT` keyword, or both. Therefore, parallelism of the `INSERT` and `SELECT` operations are independent of each other. The appropriate DOP for the entire statement is identified by the following precedence rule:

- `PARALLEL` hint on `INSERT` portion of the statement.
- Set at session.
- DOP on `INSERT` table.
- Maximum DOP set on any table in the statement.

To execute parallel DML, the following statement must be executed within the script:

```
ALTER SESSION FORCE PARALLEL DML STATEMENT
```

For example, this statement has a DOP of 2 for the `INSERT` and 4 for the `SELECT`. However, given the precedence rules, the DOP for the entire statement is 2:

```
INSERT /*+ PARALLEL(TBL_INS,2) */ INTO TBL_INS
SELECT /*+ PARALLEL(TBL_SEL,4) */ * FROM TBL_SEL;
```

---

**Note:** A parallel query can also be applied to the `DELETE` and `SUBSELECT` commands in the purge script, if required.

---

### B.2.1.4 Debugging and Tracing Purging Operations

This section describes debugging and tracing issues.

**B.2.1.4.1 Debugging Purging Operations** The purge scripts are instrumented with a DEBUG flag that provides detailed, timestamped information on each operation. This information can be evaluated to identify which tables are difficult to delete and may be better managed outside of the purge scripts through table partitioning.

To set the DEBUG flag:

1. Create an operating system directory in which to write the debug logs.

```
mkdir -p ../../debuglogs
```

2. Connect to the database with the SYSDBA account to create the database directory.

```
SQL> CREATE OR REPLACE DIRECTORY SOA_PURGE_DIR AS '/../../DEBUGLOGS';
```

3. Grant privileges to the Oracle SOA Suite schema owner:

```
SQL> GRANT READ, WRITE ON DIRECTORY SOA_PURGE_DIR TO DEV_SOAINFRA;
```

4. Connect as the Oracle SOA Suite schema owner and set the DEBUG flag.

```
cd MW_HOME/SOA_ORACLE_HOME/rcu/integration/soainfra/sql/soa_purge/
SQL> @DEBUG_ON.SQL;
```

5. Execute the purge script:

```
SQL> SET SERVEROUT ON
SQL> EXECUTE_PURGE
```

---

**Note:** As an alternative, use the SQL\*Plus SPOOL command to capture debug information.

---

The Automatic Workload Repository (AWR) reports for the period of the purge can also help to identify the SQL with the longest elapse and execution times.

**B.2.1.4.2 Tracing Purging Operations** If SQL tracing is required to diagnose the performance of the parallel purge scripts, then the following is required:

1. Edit procedures soa.delete\_instances\_in\_parallel and soa.delete\_insts\_in\_parallel\_job to add the SQL trace (10046):

```
SQL> EXECUTE IMMEDIATE 'ALTER SESSION SET EVENTS ''10046 TRACE NAME CONTEXT FOREVER, LEVEL 12''';
```

---

**Note:** All quotes are single quotes.

---

This creates a SQL trace for the purge session and the scheduled purge jobs (J000) in the database user dump destination.

```
SQL> SHOW PARAMETER DUMP
```

2. Identify the trace for the main database session by searching the trace files for string dbms\_scheduler.create\_job or delete\_instances\_in\_parallel.

```
grep -i dbms_scheduler.create_job *
```

For example:

TESTORA2\_ora\_3893.trc

The number of scheduled jobs depends on the DOP. For example, a DOP of 4:

- TESTORA2\_j000\_9585.trc
- TESTORA2\_j001\_9587.trc
- TESTORA2\_j002\_9604.trc
- TESTORA2\_j003\_9606.trc

If parallel query slaves have been customized into the purge script, then there are trace files (P000) for each. The parallel query trace files are less important because the query plans in the other trace file account for their execution. For example:

PSOAORA2\_p000\_4284.trc

3. Execute TKPROF on the trace files and sort by the elapsed time to identify the most costly SQL:

```
TKPROF TESTORA2_ORA_3893.TRC ..//OUT/ TESTORA2_ORA_3893.OUT WAITS=YES
SYS=YES AGGREGATE=YES SORT=EXEELA
```

For more information about TKPROF, see *Oracle Database Performance Tuning Guide*.

## B.2.2 Oracle SOA Suite Table Partitioning

Oracle table partitioning addresses many concerns about the maintenance of large tables by decomposing them into smaller, more manageable segments called partitions. The SOA schema has been instrumented with partition keys to take advantage of the Oracle database range partitioning.

For more information about partitioning, see [Section 10.4, "Partitioning Component Tables."](#)

### B.2.2.1 Referential Integrity and Equipartitioning

For performance reasons, the Oracle SOA Suite service components (excluding Oracle B2B) have no foreign key constraints to police referential integrity. Without these constraints, the relationship between master and detail tables must be protected to avoid dangling references in the detail tables.

Equipartitioning is a database partitioning feature that partitions master and detailed tables based on their foreign key constraint. This feature creates table partitions that group related master and detail rows in the same date range. This grouping ensures that no dangling references are created when partitions are dropped.

To mimic this feature, Oracle SOA Suite is instrumented to push the creation date of the SOA composite application instances down into the component master tables (Oracle BPEL Process Manager, Oracle Mediator, and human workflow). Because the SOA Infrastructure is the top level component on which all other components depend, this method groups all dependent rows by date range.

For example, the timestamp in the CREATED\_TIME column of the COMPOSITE\_INSTANCE table is pushed down into the following tables:

- Oracle BPEL Process Manager master table CUBE\_INSTANCE column CPST\_INST\_CREATED\_TIME, which is then pushed down into dependent tables such as CUBE\_SCOPE.CI\_PARTITION\_DATE.

- Oracle Mediator master table MEDIATOR\_INSTANCE column COMPOSITE\_CREATION\_DATE, which is then pushed down into dependent tables such as MEDIATOR\_CASE\_INSTANCE.MI\_PARTITION\_DATE.

---

**Notes:**

---

- Dependent tables must be partitioned with their master and, in all cases, the top level SOA Infrastructure COMPOSITE\_INSTANCE table must be partitioned.
  - To complete equipartitioning, the table partitions must all share the same name and date range.
- 

In summary, equipartitioning means that the associated dependent table rows are in a partition with the same partition key range as their master table rows. Therefore, the state of each detail row in the equipartition can be inferred from its associated master table row.

### B.2.2.2 SOA Composite Application Range-Hash Partitions

Range partitions can have their rows hashed into a subpartition to implement SOA composite application range-hash partitioning. Hash subpartitions can benefit in distributing I/O, but it is not currently recommended when partitioning Oracle SOA Suite tables.

Hashing of keys is a method that works well with equality predicates (=, IN), and there are several tables with keys that are good candidates such as the Oracle BPEL Process Manager CIKEY table. However, range-hash partitions alone do not convey the uniqueness of the hash key. For the cost-based optimizer to identify uniqueness, the query must search all partitions of a table (a full table scan). Partition pruning helps by narrowing the range of partitions to search, but Oracle SOA Suite does not use this feature. (See [Section B.2.2.5, "Partition Pruning."](#)) Therefore, to avoid a full table scan when the cost-based optimizer identifies uniqueness, indexes are searched that bypass the hash subpartition.

### B.2.2.3 Interval Partitioning

Interval partitioning is an extension of range partitioning that instructs the database to automatically create partitions as required.

The verification scripts currently require the partition name to be the same across all tables in a group. The interval partitioning system generates partition names that differ for each partition. Therefore, this is not supported.

### B.2.2.4 Global Hash Indexes

The use of global hash indexes is independent of Oracle SOA Suite table partitioning.

Oracle SOA Suite is constantly inserting rows, and many of the index keys are monotonically increasing. Indexes of a BTREE structure insert these keys and target only a few database blocks that can become very hot across an Oracle Real Application Clusters (Oracle RAC) setup. This is typically seen in the AWR reports as excessive buffer busy waits. To distribute the index keys randomly across many database blocks, use global hash indexes.

### B.2.2.5 Partition Pruning

When the range partition keys are used as predicates, the optimizer can prune the number of partitions to search. Oracle SOA Suite and especially Oracle Enterprise Manager Fusion Middleware Control do not presently use partition keys in SQL queries and therefore do not take advantage of this performance feature.

With the requirements of equipartitioning, the partition keys are populated with the SOA composite application creation date that is not the creation date of the components. The components (Oracle BPEL Process Manager, Oracle Mediator, and human workflow) have their own creation dates that are used in the console queries:

Example for Oracle BPEL Process Manager:

- Partition key: Table CUBE\_INSTANCE column CPST\_INST\_CREATED\_TIME
- Creation date: Table CUBE\_INSTANCE column CREATION\_DATE

### B.2.2.6 Purging Partitions

Circumstances may arise that require the partitioned tables to be purged, especially if the row migration scripts are used. This defeats the purpose of partitioning the table for maintenance, which can remove data in bulk through the ALTER TABLE ... DROP PARTITION command.

Attempting to purge the partitioned tables most likely causes the parsing performance problem. If partitions must be purged, then also shrink the partitions. For more information, see [Section 9.5, "Understanding Space Management."](#)

## B.2.3 Reducing Audit Levels

This section provides tuning information about how to reduce the audit level for SOA composite applications and the data written to the Oracle SOA Suite schema.

### B.2.3.1 Setting the Audit Level for Production Environments

Set the **Audit Level to Production** for all production environments on the SOA Infrastructure Common Properties page in Oracle Enterprise Manager Fusion Middleware Control. This should be the standard setting for all Oracle SOA Suite domains in production. Each component can be set independently of the SOA composite application level. However, **Production** should be the minimal setting. Changing the **Audit Level** from **Development** to **Production** can result in performance improvements (without tuning the individual component audit settings).

If you can disable auditing (provided the business environment allows for it), there are substantial performance improvements. Changing **Production** to **Off** can result in improvements (without tuning the individual component audit settings). However, if you cannot disable auditing, Oracle recommends that you consider the following steps to reduce audit levels.

For synchronous BPEL components in which the audit trail is not required, use the following settings:

- inMemoryOptimization = true
- completionPersistPolicy = faulted

With these settings, the synchronous process only appears in the audit trail if the instance faults.

For information about setting `inMemoryOptimization` and `completionPersistPolicy`, see Chapter "Deployment Descriptor Properties" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

For more information about setting the **Audit Level**, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

---

**Note:** Use these settings for synchronous BPEL processes and *not* for any type of asynchronous BPEL processes.

---

### B.2.3.2 Disabling Instance State Tracking

You can reduce the audit level by disabling instance state tracking. Deselect the **Capture Composite Instance State** checkbox on the SOA Infrastructure Common Properties page. This provides the following benefits:

- A performance improvement because the state is not captured in the database.
- Less data in the database for purging.

The implication is that although you may still see SOA composite application instances in Oracle Enterprise Manager Fusion Middleware Control, the state of instances is displayed as a question mark (?). Therefore, you cannot identify from Oracle Enterprise Manager Fusion Middleware Control whether the SOA composite application has completed. The state column does not reflect the states of the individual components (Oracle Business Process Management, Oracle BPEL Process Manager, human workflow user task, Oracle Mediator, and so on) within the SOA composite application. The state of individual components can be tracked by going to the respective component pages (for example, going to **soa-infra > Service Engines > BPEL** in Oracle Enterprise Manager Fusion Middleware Control).

Each component also has its own audit level that can be set because the initial setting is **Inherit**, which inherits the global audit setting. These settings can be set in Oracle Enterprise Manager Fusion Middleware Control by selecting **soa-infra > SOA Administration > BPMN Properties, BPEL Properties, or Mediator Properties**.

You can further tune auditing by setting the SOA composite application audit level. It is set to **Inherit** by default and inherits the respective component auditing level. For example, setting the following properties as follows:

- Set the **Audit Level** on the SOA Infrastructure Common properties page to **Production**.
- Deselect the **Capture Composite Instance State** checkbox.
- Set the **Audit Level** on the BPEL Service Engine Properties page to **Minimal**.
- Set the **Audit Level** for the SOA composite application to **Inherit**.
- Set `inMemoryOptimization` and `completionPersistPolicy` to `true` and `faulted`, respectively (for synchronous processes only).

These settings reduce the SOA composite application data traffic and improve purging times.

For more information about setting the **Audit Level** and deselecting the **Capture Composite Instance State** checkbox on the SOA Infrastructure Common Properties page, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

For information about setting `inMemoryOptimization` and `completionPersistPolicy`, see Chapter "Deployment Descriptor Properties" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

## B.3 Connection and Transaction Timeout Troubleshooting

This section describes how to troubleshoot connection and transaction timeout issues.

### B.3.1 Resolving Connection Timeouts

You can receive a connection timeout error under circumstances such as the following:

- You run a SOA composite application with a large payload that takes more than 30 seconds to process.
- You are invoking a stress test using a large payload from the Test Web Service page of Oracle Enterprise Manager Fusion Middleware Control.
- You are passing a large number of message files (one million) into a composite with a file adapter service.
- You are retrieving instance and fault count metrics in Oracle Enterprise Manager Fusion Middleware Control.

To avoid receiving timeout errors, increase the transaction timeout property as follows:

1. Log into Oracle WebLogic Administration Console.
2. Click **JTA**.
3. Change the value of **Timeout Seconds** (the default is 30).
4. Click **Save**.
5. Restart Oracle WebLogic Server.

### B.3.2 Resolving Email Notification Timeouts

You can receive a connection timeout errors when a large number (for example, 200,000) of notification emails are sent.

To avoid these timeout errors:

- Increase the **JTA Timeout Seconds** value to 1200. See [Chapter B.3.1, "Resolving Connection Timeouts"](#) for the method.
- Increase the transaction timeout settings value to 1800 for the **NotificationSender**, **NotificationServiceBean**, and **TaskNotificationSender** EJBs. See [Chapter B.3.5, "Long Running, Synchronous Calls To Remote Web Services Error Out or Asynchronous Transactions Return with an Error after a Long Time"](#)

Restart Oracle WebLogic Server after making these changes.

### B.3.3 Increasing Database Connection Values

You can receive the error message shown in [Example B-1](#) because of slow connections to the database.

#### **Example B-1 Slow Database Connections Error**

```
Exception [TOPLINK-4002] (Oracle TopLink - 11g Release 1 (11.1.1.1.0) (Build 090304)): oracle.toplink.exceptions.DatabaseException
Internal Exception: java.sql.SQLException: Internal error: Cannot obtain XAConnection
weblogic.common.resourcepool.ResourceDeadException: Pool SOADatasource has been disabled because of hanging connection tests, cannot allocate resources to applications.
```

If this occurs, perform the following steps:

1. Open the `DOMAIN_HOME\bin\setSOADomainEnv.cmd` file.
2. Uncomment the lines shown in bold.

```
8331492: Value of weblogic.resourcepool.max_test_secs is 10
seconds. It can be increased by uncommenting line below if your database
connections are slow. See SOA documentation for more details.
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES}"
-Dweblogic.resourcepool.max_test_secs=30"
export EXTRA_JAVA_PROPERTIES
```

3. Save your changes and restart the managed Oracle WebLogic Server.

### B.3.4 Updating the EJB Transaction Timeout Value in the Deployment Archive After SOA Infrastructure Failure

Updating the transaction timeout value for the **FacadeFinderBean** property in Oracle WebLogic Server Administration Console under **Deployments > expanded SOA Infrastructure Application > FacadeFinderBean > Configuration tab** can result in the error shown in [Example B-2](#) after restarting the SOA Infrastructure:

#### **Example B-2 EJB Transaction Timeout Error**

```
java.lang.IllegalArgumentException: Cannot convert value of type [$Proxy223
implementing
oracle.bpel.services.workflow.verification.IVerificationService,org.springframework
work.aop.SpringProxy,org.springframework.aop.framework.Advised]
to required type
[oracle.bpel.services.workflow.verification.IVerificationService] for
property 'verificationService': no matching editors or conversion strategy found
Message icon - Warning Errors were encountered while performing this operation.
```

The SOA Infrastructure status is also displayed as failed.

This error is not specific to **FacadeFinderBean**; it also applies to any EJB that is part of the SOA Infrastructure application.

To resolve this error, you must manually modify the transaction timeout setting in your deployment archive.

To update the transaction timeout setting:

1. Open the `fabric-ejb.jar` file in your deployment archive.
2. Increase the transaction timeout value in the `META-INF/weblogic-ejb-jar.xml` file to a larger value.
3. Rejar the file.
4. Restart the managed server that includes the SOA Infrastructure by following the instructions in [Section 3.2, "Stopping and Starting the Managed Server and SOA Infrastructure."](#)

---

**Note:** This issue may also occur while updating any EJBs deployed as part of the SOA Infrastructure application. If this issue occurs, you must update the corresponding contained JAR file for those EJBs in a similar fashion.

---

### B.3.5 Long Running, Synchronous Calls To Remote Web Services Error Out or Asynchronous Transactions Return with an Error after a Long Time

You may have long running, synchronous calls to remote web services that end with JTA transaction rolled-back errors. When executing a transaction making an asynchronous call (for example, to the SOA server), the application may return with an error. The server logs show JTA transaction timeouts, which can cause this behavior.

To check the JTA transaction timeout in the Oracle WebLogic Server Administration Console.

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure**, select **Services > JTA** to check the timeout value.

If the transaction is always timing out beyond 30 seconds and is a custom composite synchronous client invocation, then you may need to revisit the design approach. It may be best for the external web service to be invoked as an asynchronous transaction.

Increasing the JTA for supporting long running, synchronous transactions is simply an interim mechanism. For information on changing the JTA transaction timeout setting, see [Section B.3.1, "Resolving Connection Timeouts."](#)

3. If synchronous client invocations take a long time, check for any performance issues with the system and try to resolve them.
4. Check for appropriate values for the **syncMaxWaitTime** property and BPEL's EJB transaction timeout settings in relation to the JTA timeout settings and only then increase the value of the JTA timeout, if needed.

For information on viewing and changing the **syncMaxWaitTime** property, see [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)

5. To view and change the BPEL EJB transaction timeout settings, perform the following steps:
  - a. Log in to Oracle WebLogic Server Administration Console.
  - b. In the **Domain Structure**, click **Deployments**.
  - c. Expand **soa-infra > EJBs**.
  - d. Update the following EJBs:
    - **BPELActivityManagerBean**
    - **BPELDeliveryBean**
    - **BPELDispatcherBean**
    - **BPELEngineBean**
    - **BPELFinderBean**
    - **BPELInstanceManagerBean**
    - **BPELProcessManagerBean**
    - **BPELSensorValuesBean**
    - **BPELServerManagerBean**
  - e. Click **Save**.
  - f. Restart Oracle WebLogic Server.

6. For asynchronous transactions, check the values for both the BPEL EJB transaction timeout and the JTA transaction timeout and adjust as needed.

## B.4 Runtime Diagnostics Troubleshooting

This section describes how to troubleshoot runtime issues.

### B.4.1 Oracle SOA Suite Runtime Failure with a "Cannot read WSDL" Error

The following error is displayed if either the endpoint is not available for a reference or a composite is deployed with an incorrect deployment plan file.

```
oracle.fabric.common.FabricException: Cannot read WSDL
```

To diagnose this issue:

1. Ensure that the endpoint for the reference is up and running.

The WSDL or endpoint is stated in the error. The service can then be looked up from Oracle Enterprise Manager Fusion Middleware Control to check if it is active. Once the service is active and the endpoint is reachable, search for the SOA instance and retry it through the **Recovery** tab for the BPEL process service engine in Oracle Enterprise Manager Fusion Middleware Control.

2. For extensions/customizations, ensure that the correct URL is updated in the deployment configuration plan.

For information about deployment plans, including examples of using `sca_extractPlan` to extract plans, see the "Customizing Your Application for the Target Environment Before Deployment" section of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

### B.4.2 Automatic Recovery of BPEL Instances is Not Recovering A Specific Instance

BPEL processes have an automatic recovery feature that attempts to automatically recover activities that are recoverable such as unresolved invoke/callback messages, activities not completed over a provided threshold time, and so on. However, the automatic recovery feature only tries to recover a few instances and only retries a fixed number of times. If some instances are not being automatically recovered, they are likely not being picked up because of the configuration of the automatic recovery parameters.

To resolve this issue:

- Set the maximum number of messages to automatically recover.

By default, the automatic recovery feature of Oracle BPEL Process Manager processes 50 messages to submit for each recovery attempt. This is controlled by the `maxMessageRaiseSize` property.

1. In the navigation pane, right-click **soa-infra (SOA\_cluster\_name)**.
2. Select **SOA Administration > BPEL Properties > More BPEL Configuration Properties > RecoveryConfig**.
3. Expand both **RecurringScheduleConfig > maxMessageRaiseSize** and **StartupScheduleConfig > maxMessageRaiseSize**.

The default value is 50 for each. A negative value causes all messages selected from the database to be submitted for recovery. A value of 0 causes no messages to be selected from the database (effectively disabling recovery). To

recover more than 50 messages, set the property value to that value. Use this property to limit the impact of recovery on the server.

- Set the maximum number of automatic recovery attempts on a given message.

You can also configure the number of automatic recovery attempts to submit in the same recoverable instance. The value you provide specifies the maximum number of times that invoke and callback messages are recovered. If the value is 0 (the default value), it recovers all messages. Once the number of recovery attempts on a message exceeds the specified value, a message is marked as nonrecoverable.

To configure automatic recovery attempts for invoke and callback messages in Oracle Enterprise Manager Fusion Middleware Control:

1. In the navigation pane, right-click **soa-infra (SOA\_cluster\_name)**.
2. Select **SOA Administration > BPEL Properties > More BPEL Configuration Properties**.
3. Select **MaxRecoverAttempt**, and enter a value in the **Value** field.
4. Click **Apply**.

It may not be desirable in all cases to use automatic recovery. If services are not idempotent, then corruption can occur. Moreover, the automatic recovery restores the composite to the last save point that can be immediately after an asynchronous invoke, wait, and so on. Therefore, it is important to understand the process behavior and what it does next before performing mass recoveries. Attempt mass automatic recovery only after the root cause of the composite failures has been fixed (for example, a service that was unavailable is now available, a database running out of space was fixed, and so on). Automatic recovery can also trigger an unexpected load during failure scenarios. This causes more threads to block on a remote server that can induce hangs in the SOA server in a cascading fashion.

For more information, see [Section 13.2, "Configuring Automatic Recovery for Oracle BPEL Process Manager."](#)

### B.4.3 Some Composites Are Retried Multiple Times on Failure

When a BPEL process flow errors out, it is retried with all its invocations. This is undesirable in some cases.

The property **GlobalTxMaxRetry** (default value is 3) specifies how many retries are performed if an error is identified as a retriable one. For example, after several web service invocations, if dehydration fails due to a data source error, then this is identified as a retriable error and all activities from the prior dehydration state are retried. If the activities being retried are not idempotent (that is, their state can change with each retry and is not guaranteed to give the same behavior), then multiple retries can be problematic.

To rectify this situation, customize the composite by specifically marking the nonidempotent activities with **idempotentSet** set to **false** in the partner link settings section of the **composite.xml** file to prevent retries.

```
<property name="bpel.partnerLink.partner_link_name.idempotent">false</property>
```

You cannot set the **idempotent** property in Oracle Enterprise Manager Fusion Middleware Control.

You can also set **GlobalTxMaxRetry** to 0 in the Systems MBean Browser.

To set **GlobalTxMaxRetry**:

1. Right-click **soa-infra (SOA\_cluster\_name)**.
2. Select **SOA Administration > Common Properties**.
3. Click **More SOA Infra Advanced Configuration Properties**.
4. Click **GlobalTxMaxRetry**.
5. In the **Value** field, enter an appropriate value.
6. Click **Apply**.

For more information about the `idempotent` property, see the "BPEL Properties Set Inside a Composite" section of *Oracle Fusion Middleware Performance and Tuning Guide* and the "Managing Idempotence at the Partner Link Operation Level" section of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

#### B.4.4 Application Transaction Does Not Complete and the Underlying Composite Is Stuck in a Running State

An application transaction is not completing. For example, a purchase order status may remain processing. Checking the composite instance shows that the composite is stuck in the running state. In this case, the component is probably not running. Instead, it has likely faulted and may need recovery.

Faults may occur for various reasons:

- A BPEL activity faulted with an error (for example, a business error, security authorization error, or some other error).
- A BPEL activity invoked an external web service that was unavailable.
- A BPEL activity has already been terminated by the administrator using Oracle Enterprise Manager Fusion Middleware Control.
- A BPEL activity invoked an asynchronous ADF service and the message is stuck in the AQ/JMS queue.
- A BPEL activity invoked an asynchronous ADF service, but because Oracle SOA Suite was unavailable, the callback message did not arrive.
- A BPEL activity invoked a synchronous ADF service, which is taking a long time (or is hanging).
- A network error occurred.

To diagnose this issue:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. In the navigator pane, go to **domain\_name > SOA**.
3. Click **soa-infra (SOA\_cluster\_name)**.
4. Click the **Instances** tab.
5. Search for the composite instance, and click the instance ID.

The Flow Trace page appears.

If the instance is not visible (and the **Audit Level** is not set to **Off** on the SOA Infrastructure Common Properties page), this implies that the message is stuck outside of Oracle SOA Suite.

If the message has reached Oracle Mediator, but not instantiated the BPEL flow, the BPEL instance may have been rolled back from the start due to an error.

If the BPEL flow exists, the **Faults** section of the Flow Trace page typically shows the faulted service that can trace the root cause.

6. In the **Trace** section, click the BPEL process.
7. Expand the BPEL audit trail to see the exact point at which the service faulted. This information is also available in the **Faults** tab of the BPEL flow trace. It also indicates whether the fault can be recovered.
8. Click the **View Raw XML** link.

The same information is also available through this link, where you can see the error. For example:

```
...
<message>Faulted while invoking operation "modifyUserRoles" on provider
 "UserService". </message><details>
...
<tns:message>JBO-27023: Failed to validate all rows in a
 transaction.</tns:message>
<tns:severity>SEVERITY_ERROR</tns:severity>
...
<message>The transaction was rolled back. The work performed for bpel instance
 "451042" was rolled back to the previous dehydration point, but the audit
 trail has been saved.
You can recover the instance from the recovery console by resubmitting the
 callback message or activity for execution.</message>
```

Since the instance was rolled back to its previous dehydration point, the status remains as **Running**.

9. In the **Audit Trail** and **Faults** tabs, make a note of the following:
  - Composite name (for example, **POComposite**)
  - Component (for example, **UpdateGuid** BPEL process)
  - BPEL instance ID (for example, **bpel:451042**)
 This is all used in the recovery of the instance, if it is recoverable. The Audit Trail window may mark the error as a nonrecoverable business fault, but the recoverability of the message can be found in the **Recovery** tab of the BPEL process service engine.
10. To attempt to recover the instance, right-click **soa-infra (SOA\_cluster\_name)**, and select **Service Engines > BPEL**.
11. Click the **Recovery** tab.
12. From the **Type** list, select **Activity**.
13. Specify the composite and component names captured in step 9, and click **Search**.
14. Find the specific BPEL instance ID. You can recover faults marked as **Recoverable**.
15. Check the other recovery options in the **Type** list (for example, **Invoke** and **Callback**), if they exist.

---

**Note:** You can also search for recoverable messages from the **Faults and Rejected Messages** tab of the SOA Infrastructure by clicking the message and selecting the appropriate action from the **Recovery Actions** list.

---

16. If the instance is not marked as recoverable, then reinvoking the service is not allowed (most probably because it is not idempotent). In some cases, you may need to provide diagnostic information to Oracle Support Services to resolve issues with nonrecoverable, nonidempotent transactions.
17. If the BPEL activity has invoked an asynchronous ADF service and the message is stuck in the AQ JMS queue, you can view the *server.log* and *server-diagnostic.log* files to see the logging of the message metadata logged by the JRF web services infrastructure.

In addition, the ADF diagnostic logs are also available to debug, if needed.

- a. Use the **ECID** field to correlate and track ADF service logging corresponding with the SOA composite application that invoked it.
- b. When viewing the log in Oracle Enterprise Manager Fusion Middleware Control, click the **Broaden Target Scope** dropdown list and select the *farm\_name/domain\_name* (Oracle WebLogic domain) to view messages across the domain.
- c. In the **Selected Targets** section of the Log Messages page for the Oracle WebLogic Server domain, ensure that the search includes the **ECID** field with the value noted in step a.
- d. Search and view log records for the execution content ID (ECID) and note any issues.

For a specific ECID, you find several root instances (top level clients). You must drill down to the appropriate instance to find a specific fault.

- e. Observe if the components completed successfully or completed with an error. See the "Viewing and Searching Log Files" section in the *Oracle Fusion Middleware Administrator's Guide*.

See the following chapters for the various ways to recover transactions and messages:

- [Chapter 8, "Managing SOA Composite Application Instances"](#) to recover from the SOA composite application page in Oracle Enterprise Manager Fusion Middleware Control.
- [Chapter 15, "Managing BPEL Process Service Components and Engines"](#) to recover from the BPEL process service component and BPEL process service engine message recovery pages.

## B.5 Human Workflow Troubleshooting

This section describes how to troubleshoot human workflow issues.

### B.5.1 Task Assignment/Routing/Escalation Issues

[Table B-2](#) describes symptoms, possible causes, and possible solutions for task assignment/routing/escalation issues.

**Table B–2 Troubleshooting Task Assignment/Routing/Escalation Issues**

Symptom	Possible Cause	Possible Solution
The task completes without any assignment occurring.	The most common problem is that task assignees are specified using XPath expressions, and the expression does not evaluate to any nodes. Other problems can include incorrect skip conditions for participants.	<ol style="list-style-type: none"> <li>1. Correct any issues with the XPath expressions.</li> <li>2. Ensure that you get some results for the XPath expression for the given data.</li> <li>3. Check the skip conditions specified with the <b>Specify skip rule</b> checkbox for task participants in the Human Task Editor.</li> </ol>
The business rules do not return any list builders.	When participants of a task are specified using business rules, it is expected that business rules return at least one list builder. If business rules determine that no participants are needed, the function <code>ignoreParticipant(...)</code> must be used. If modeled correctly and you still see this error, it is likely that none of the rules fired. See the symptom entitled " <a href="#">A human workflow task chooses the incorrect user if many rules are defined or it errors with the following message:</a> " in this table.	<ol style="list-style-type: none"> <li>1. Use the <code>ignoreParticipant(...)</code> function to model your rules.</li> <li>2. Ensure the rules are modeled correctly so that at least one rule is fired.</li> </ol>
The business rules return list builders of different types.	When participants in a task are specified using business rules, it is expected that business rules return list builders of the same type.	Correct your rules.
A human workflow task chooses the incorrect user if many rules are defined or it errors with the following message:  Ruleset returned lists with different list builder	<p>At runtime, when a human workflow task tries to fetch the list of users, it may error out with the following error:</p> <p>Ruleset returned lists with different list builder</p> <p>This error is displayed in the <b>Task Detail comments</b> field. Alternately, the task may select a user or approver, which may not appear to be the correct or expected one. This is primarily caused by having overlapping rules. When the participants of a task are specified using business rules, it is expected that business rules return list builders of the same type.</p> <p>Moreover, only one rule from a ruleset must be applicable for a transaction. In case many rules are true, the actions associated with the applicable rule with the highest priority get executed. In case multiple applicable rules have the same priority, then the first rule in the list is picked and its actions executed.</p>	<p>Avoid writing overlapping rules. Constraints from different list builders are different and cannot be mixed. If multiple rules get triggered with a different list builder, this error occurs. In addition, only one set of constraints is honored.</p> <p>Check that all rules in the ruleset have priorities defined so that multiple rules with the same priority are not applicable for the same transaction.</p> <p>For more details., see <i>Oracle Fusion Middleware Modeling and Implementation Guide for Oracle Business Process Management</i>.</p>

**Table B–2 (Cont.) Troubleshooting Task Assignment/Routing/Escalation Issues**

Symptom	Possible Cause	Possible Solution
Parallel assignees have to approve or reject the task even though the parallel completion criteria is met.	In the Add Participant Type dialog for a parallel participant, you can configure the human task during runtime to wait for all parallel participants to complete or to complete when criteria are met.	Make the correct selection for completion in the Add Participant Type dialog.
The task is assigned to the group/role when the expectation is that it goes to every user in the group/role individually.	When a group or a role is used as a task assignee, the task is assigned to the group or role directly. Task runtime does not assign it separately. One of the users in the group/role has to claim the task and work on it. When used with a parallel or serial participant, often times it is expected that this resolution to users is automatic, which it is not.	To assign separately to the members of the group or role, use the XPath functions <code>ids:getUsersInGroup</code> and <code>ids:getUsersInAppRole</code> .
A task errors out when invoking the decision service for the evaluation of routing rules or rule-based participants.	Payload validation is enabled on the SOA Infrastructure instance.	Deselect the <b>Payload Validation</b> checkbox for the instance. For more information, see <a href="#">Section 3.1, "Configuring SOA Infrastructure Properties."</a>

## B.5.2 Task Action Issues

[Table B–3](#) describes symptoms, possible causes, and possible solutions for task action issues.

**Table B–3 Troubleshooting Task Action Issues**

Symptom	Possible Cause	Possible Solution
A user is not allowed to perform an action on a task.	The most common problem is that the user does not have permissions to perform that action on that task at that point in time.	Find out if the user can be an assignee, owner, or creator of the task, or if they are an administrator. If the user should have been allowed to perform the action, check the server log file for a detailed log message, which includes information such as the task state, task assignees, user who acquired it, permitted actions, roles played by this user for the given task, and so on.
A task is locked and cannot be updated in Oracle BPM Worklist. An ORA-30279 error is displayed (with an underlying ORA SQL exception of ORA-20001 also displayed).	Two users are trying to update the same task concurrently.	Wait for the other user to finish.

## B.5.3 Notification Issues

[Table B–4](#) describes symptoms, possible causes, and possible solutions for notification issues.

**Table B-4 Troubleshooting Notifications Issues**

Symptom	Possible Cause	Possible Solution
The task email notification is not being sent out.	<b>Notification Mode</b> is set to <b>NONE</b> on the Workflow Notification Properties page in Oracle Enterprise Manager Fusion Middleware Control.	Change this setting to <b>Email</b> or <b>All</b> . For information, see <a href="#">Section 21.1, "Configuring Human Workflow Notification Properties."</a>
The email notification is not being sent out.	Incorrect outgoing server settings are used in the email driver configuration.	<p>Check the Simple Mail Transfer Protocol (SMTP) port/SMTP host/user name/password/email values.</p> <p><b>Tip:</b> Validate the values by using them in any email client for connecting to the SMTP server.</p> <p>Perform the following steps to verify the settings in Oracle Enterprise Manager Fusion Middleware Control:</p> <ol style="list-style-type: none"> <li>1. In the navigator, right-click <b>User Messaging Service</b>.</li> <li>2. Select <b>usermessagingdriver-email &gt; Email Driver Properties</b>.</li> <li>3. Check the settings.</li> </ol>
The notifications are sent, but are not actionable.	The <b>Actionable Address</b> field is not configured.	In Oracle Enterprise Manager Fusion Middleware Control, configure the <b>Actionable Address</b> field with a valid email address. For information, see <a href="#">Section 21.1, "Configuring Human Workflow Notification Properties."</a>
Notifications are sent, but are not actionable.	The human workflow task is not set to send actionable notifications.	Ensure that the same email address is used when configuring the incoming server setting in the Oracle User Messaging Server email driver. For information, see <a href="#">Section 21.1, "Configuring Human Workflow Notification Properties."</a>
Actionable notifications are sent, but no action is taken after responding.	The <b>Actionable Address</b> field is incorrect.	<p>In the Human Task Editor (you can double click the .task file in Oracle JDeveloper to start the editor), expand the <b>Notification</b> section, click the <b>Advanced</b> tab, and select the <b>Make notification actionable</b> checkbox.</p> <p>Check the IMAP/POP3 server/port values. Ensure the <b>Actionable Address</b> field is used in the email driver configuration.</p> <p><b>Tip:</b> Validate the values by using them in any email client for connecting to the IMAP/POP3 server.</p>

**Table B–4 (Cont.) Troubleshooting Notifications Issues**

Symptom	Possible Cause	Possible Solution
Actionable notifications are sent, but no action is taken after responding.	The nondefault email client is configured for receiving notifications.	<p>When the user clicks the approval link, the default mail client page opens, which may send emails to a different email server. Configure the default email client to receive actionable notifications.</p> <p>Enter the correct value in the <b>Actionable Email Account</b> field of the Workflow Task Service Properties page as the incoming, actionable email account to use. The default account name is <b>Default</b>.</p> <p>For information, see <a href="#">Section 21.3, "Configuring Human Workflow Task Service Properties."</a></p>
Actionable notifications are sent but no action is taken after responding.	An email client is configured with the same account used in the email driver.	<p>The mail may be downloaded and marked as <i>read</i> or deleted by the email client before the human workflow notification service can download and process the mail. Remove that account from the email client.</p>

**Table B-4 (Cont.) Troubleshooting Notifications Issues**

Symptom	Possible Cause	Possible Solution
The Oracle BPM Worklist link appears in email notifications.	This is the default behavior. By default, email notifications point to Oracle BPM Worklist.	<p>Perform the following steps:</p> <ol style="list-style-type: none"> <li>1. In the <b>Notification</b> section of the Human Task Editor, click the <b>Advanced</b> tab.</li> <li>2. Deselect the <b>Show worklist URL in notifications</b> checkbox.</li> </ol>
Performance is slow for group notifications.	The group notification performance depends on the number of members in the group (size of group).	<ol style="list-style-type: none"> <li>1. Provide an email ID for the group in LDAP. In this case, human workflow sends one email to the group email ID, instead of individual emails to each group member.</li> <li>2. In the <b>Notification</b> section of the Human Task Editor, click the <b>Advanced</b> tab.</li> <li>3. If you want to send one email to all group members, select <b>Send one email containing all user addresses</b> from the <b>Group notification configuration</b> list. This action enables all members to see the <i>to</i> list and common content is sent to all members (without considering locale, and so on).</li> <li>4. If you want to send individual emails, but reuse content between members, select <b>Send individual emails</b> (the default selection) from the <b>Group notification configuration</b> list and unselect <b>Use separate task forms based on locale</b>. This action enables group members to receive individual mails in their locale. Task forms generated for creating notification content are reused between members in the same locale.</li> </ol>
You may receive the following error message:  [2012-07-05T09:13:05.246-04:00] [soa_server1] [ERROR] [] [oracle.soa.services.workflow.common] [tid: [ACTIVE].ExecuteThread: '6' for queue: 'weblogic.kernel.Default (self-tuning)' ] [userId: <anonymous>] [ecid: dc2ff0568380b04f:23824bc7:138570a4e67:-8000-0000000000001716,0] [APP: soa-infra] <.> [[ORABPEL-0 at oracle.bpel.services.workflow.task.notification.TaskNotifications.notifyForTask(TaskNotifications.java:481) ... ...]	Check if you have apostrophes in the body of an email notification message.  <pre>&lt;%string('À titre de responsable fonctionnel, une demande d'approbation . . .')%</pre>	Escape each apostrophe by adding double apostrophes in your string. For example, if you have 'd in your message, escape it as follows:  <pre>&lt;%string('d'd')%&gt;</pre> to:  <pre>&lt;%string('d''d')%&gt;</pre>

## B.5.4 Task View Issues

[Table B-5](#) describes symptoms, possible causes, and possible solutions for task view issues.

**Table B-5 Troubleshooting Task View Issues**

Symptom	Possible Cause	Possible Solution
Showing custom (mapped attribute) columns in a view.	Attribute mappings are created for specific task types. The view must be associated with one or more task types to use mapped attributes.	In Oracle BPM Worklist (view/create/edit UI), specify a task type for the view in the <b>Definition</b> tab. The attribute labels used in the mappings for that task type are now available as columns that can be used in the view in the <b>Display</b> tab.  It is possible to associate a view with multiple task types. Multiple task types can be selected from the <b>Task Type</b> browser. If multiple task types are selected, then the attribute labels for all those task types are available for use in the view.
View grantees can view and edit tasks belonging to the view owner.	The view is shared as data. This type of sharing allows grantees to use the view as if they are the view owner, and can see and act on the view owner's task.	In the <b>Definition</b> tab of Oracle BPM Worklist (view/edit UI), ensure that <b>Share View</b> is set to <b>Definition only</b> , which enables grantees to use the view against their own tasks. Setting <b>Share View</b> to <b>Data</b> enables grantees to use the view against the view owner's data.
Creating a new standard view.	Only users with administration privileges can create standard views.	<ol style="list-style-type: none"> <li>1. Ensure the logged-in user has administration privileges.</li> <li>2. Define the view as usual, using Oracle BPM Worklist (create/edit UI).</li> <li>3. Check the <b>add to standard views</b> checkbox.  The view is created as a standard view.</li> </ol>
Internationalizing a standard view name.	The value specified in the name field for standard views can be used as a resource key to look up a display name from the WorkflowLabels resource bundle.	Add a new resource key to the WorkflowLabels resource bundle. The key is the name you used for the view, prefixed by STD_VIEW. (Note the required trailing period.)  For more information about resource bundles, see workflow sample workflow-110-workflowCustomizations, available with the Oracle SOA Suite Samples.
Migrating views and standard views you have created on one instance to another SOA server.	You must use the test-to-production utility.	The test-to-production utility enables you to export user views and standard views as an XML file, and to import the views from the XML file into another instance. For information about this utility, see <a href="#">Section 23.6, "Moving Human Workflow Data from a Test to a Production Environment."</a>

## B.5.5 Task Attribute Mapping Issues

[Table B-6](#) describes symptoms, possible causes, and possible solutions for task attribute mapping issues.

**Table B-6 Troubleshooting Task Attribute Mapping Issues**

Symptom	Possible Cause	Possible Solution
No payload attributes are available for mapping to a public attribute in Oracle BPM Worklist.	Oracle BPM Worklist only supports creation of mappings to simple payload attributes. Only simple attributes from the task payload are displayed for creating mappings in Oracle BPM Worklist.	<ul style="list-style-type: none"> <li>▪ Add simple attributes to the payload.</li> <li>▪ Create protected mappings at design time. Mappings can be made to be complex payload attributes using XPath expressions for protected attribute mappings at design time in Oracle JDeveloper.</li> <li>▪ Use the RuntimeConfigService API to create public mappings using XPath expressions.</li> </ul>
You cannot create mappings for the protected attribute label in Oracle BPM Worklist.	Protected mappings can only be created as part of the task definition at design time. Protected mappings cannot be created or updated at runtime using Oracle BPM Worklist, or the RuntimeConfigService API.	<ul style="list-style-type: none"> <li>▪ Use a public attribute label for the mapping.</li> <li>▪ Create the mapping to the protected attribute label in the task definition at design time.</li> </ul>
You cannot see any attribute labels for which to create mappings in Oracle JDeveloper.	Design-time mappings can only be created for protected attribute labels. Ensure that protected attribute labels have been created in the SOA instance to which you are connected.	<ol style="list-style-type: none"> <li>1. Log in to Oracle BPM Worklist as an administrator.</li> <li>2. Go to <b>Administration &gt; Protected Flexfields</b>.</li> <li>3. Check that protected attribute labels exist.</li> <li>4. Create any protected attribute labels as required.</li> </ol>
Internationalizing the name of an attribute label.	You can use the attribute label name as a resource key to look up a display name from the WorkflowLabels resource bundle.	<p>Add a new resource key to the WorkflowLabels resource bundle. The key is the name you used for the label, prefixed by FLEX_LABEL. (note the trailing period).</p> <p>For more information on the resource bundle, see the workflow sample workflow-110-workflowCustomizations, available with the Oracle SOA Suite Samples.</p>
Migrating attribute labels and mappings from one server to another.	Use the test-to-production utility.	<p>The test-to-production utility enables you to export public attribute labels, public attribute mappings, and protected attribute labels as an XML file, and to import the labels and mappings from the XML file into another instance.</p> <p>For more information, see <a href="#">Section 23.6, "Moving Human Workflow Data from a Test to a Production Environment."</a></p>

## B.5.6 Task Report Issues

[Table B-7](#) describes symptoms, possible causes, and possible solutions for task report issues.

**Table B-7 Troubleshooting Task Report Issues**

Symptom	Possible Cause	Possible Solution
You receive the following error: Null Pointer Exception when running Task Productivity Report	This is caused by an issue with the handling of dates when the worklist client locale and server default locale are different.	The workaround is to change the locale for the worklist client to be the same as the server, or to run a report without specifying dates.

## B.5.7 Task History Issues

[Table B-8](#) describes symptoms, possible causes, and possible solutions for task history issues.

**Table B-8 Troubleshooting Task History Issues**

Symptom	Possible Cause	Possible Solution
The <b>Add Participant</b> button is disabled.	A current or past participant is selected in the history table.	This is designed behavior. Adding adhoc participants is not allowed with the current or past participant. The current participant means the task is with that participant at that point in time.
All the added adhoc participants disappeared after a page refresh.	You may not have saved your modifications to the history table.	Ensure that you save your changes. Otherwise, all changes disappear. If you think you have saved your changes and the changes still disappear, file a bug.
Do not see future approvers in the history table.	The <b>Future Approvers</b> checkbox may not be selected.	Select the <b>Future Approvers</b> checkbox in Oracle BPM Worklist (configuration in the task sequence table).
You see the message in the history table about the correlation ID not being passed or any exception related to the correlation ID.	If the task is uninitiated, the correlation ID may not have been passed.	Ensure that you pass the correlation ID to the uninitiated task.
The edit toolbar is disabled or is not displayed.	The user may not have privileges to edit the participants.	<ol style="list-style-type: none"> <li>1. In the <b>Assignment</b> tab of the Human Task Editor, click the <b>Task will go from starting to final participant</b> icon in the upper right corner. The Configure Assignment dialog is displayed.</li> <li>2. Select the <b>Allow participants to edit new participants</b> and <b>Allow initiator to add participants</b> checkboxes.</li> </ol>
You receive the following error: <pre>&lt;Warning&gt; &lt;oracle.adf.controller.internal.metadata.MetadataService&gt;   &lt;BEA-000000&gt;&lt;ADFc: /META-INF/adfc-config.xml: &gt;   &lt;Warning&gt; &lt;oracle.adf.controller.internal.metadata.MetadataService&gt;&lt; ADFC-52024&gt; &lt;ADFc: Duplicate managed bean definition for 'aleCompBindings' detected.&gt;</pre>	Shared library oracle.soa.worklist.webapp is referenced in weblogic.xml and the JAR files adflibWorklistComponents.jar and adflibTasklistTaskflow.jar are packaged in the web application.	These JARs ideally should not be packaged inside the web application. They should only be referenced as a shared library. Do not package these JARs in the web application.

**Table B-8 (Cont.) Troubleshooting Task History Issues**

Symptom	Possible Cause	Possible Solution
You receive the following error:  <pre>&lt;Error&gt; &lt;Deployer&gt; &lt;BEA-149265&gt; &lt;Failure occurred in the execution of deployment request with ID '1297964056778' for task '3'. Error is:  'weblogic.management.Deployme ntException: [J2EE:160149]Error while processing library references. Unresolved application library references, defined in weblogic-application.xml: [Extension-Name: oracle.soa.workflow.wc, exact-match: false].' weblogic.management.Deploymen tException: [J2EE:160149]Error while processing library references. Unresolved application library references, defined in weblogic-application.xml: [Extension-Name: oracle.soa.workflow.wc, exact-match: false].'</pre>	Shared library oracle.soa.workflow.wc is referenced in weblogic.xml, but not available on the server.	Ensure that this shared library is deployed on the server to which you are deploying your application. It may happen that the shared library is deployed, but <i>not</i> targeted, for that server.
You receive the following error:  <pre>java.lang.IllegalStateException: on: Attempt to validate an already invalid RegionSite:</pre>	This is a generic exception that sometimes is displayed in the server logs (for example, AdminServer.log).	See the real exception in the diagnostic logs (for example, AdminServer-diagnostic.log) and provide that exception with the bug you file.

**Table B-8 (Cont.) Troubleshooting Task History Issues**

Symptom	Possible Cause	Possible Solution
You receive the following error: <pre>[AdminServer] [NOTIFICATION] [J2EE JSP-00008] [oracle.j2ee.jsp] [tid: [ACTIVE].ExecuteThread: '15' for queue: 'weblogic.kernel.Default (self-tuning)'] [userId: weblogic] [ecid: 17011f2a001d6b0e:7e22d6ce:12e 3444eb1b:-8000-0000000000002f 0a,0] [APP: FederatedApp_ application1] unable to dispatch JSP page: The following exception occurred:..[]  java.lang.RuntimeException: Cannot find FacesContext at javax.faces.webapp.UIComponen tClassicTagBase.getFacesConte xt(UIComponentClassicTagBase. java:2122)</pre>	This is a common mistake and is not related to any components you are using. You forgot to put faces in the URL. For example:	Put faces in the URL as follows: <a href="http://server:port/FederatedApp/faces/test.jspx">http://server:port/FederatedApp/faces/test.jspx</a>

## B.5.8 Task Form/Action Issues

Table B-9 describes symptoms, possible causes, and possible solutions for task form/ action issues.

**Table B-9 Troubleshooting Task Form/ Action Issues**

Symptom	Possible Cause	Possible Solution
The task form application does not have an empty JSPX page.	N/A	The task forms are now invoked using an ADF task flow and control is returned to the module that initiated the task form task flow when the task flow completes. Therefore, no empty JSPX is needed.
The task form does not load in Microsoft Internet Explorer.	Microsoft Internet Explorer has a URL length limit.	Your task form URL length is too long.

**Table B-9 (Cont.) Troubleshooting Task Form/ Action Issues**

Symptom	Possible Cause	Possible Solution
Deployment fails with a class not found exception.	The shared library entry is missing from weblogic.xml.	<p>If you see the following error:</p> <p>Caused By:  <code>java.lang.ClassNotFoundException:  oracle.bpel.services.datacontrol.ty  pes.Number</code></p> <p>during deployment of a task form, then it is likely due to the missing shared library in weblogic.xml. Add the following element in weblogic.xml:</p> <pre>&lt;library-ref&gt; &lt;library-name&gt;oracle.soa.worklist.w  ebapp&lt;/library-name&gt; &lt;specification-version&gt;11.1.1&lt;/spec  ification-version&gt; &lt;/library-ref&gt;</pre>
Deployment/access of task form fails when the hostname is used.	The DNS entry is missing.	<p>If you are using a server with DHCP, the DNS entry may be missing for the host. Therefore, deployment/access using the IP address may succeed, but deployment/access using a hostname may fail. Update your client computer by manually adding the host/IP address:</p> <ul style="list-style-type: none"> <li>▪ On Windows operating systems, this is typically in %windir%\drivers\etc\lmhosts.</li> <li>▪ On Linux/UNIX, this is typically in /etc/hosts.</li> </ul>

**Table B–9 (Cont.) Troubleshooting Task Form/ Action Issues**

Symptom	Possible Cause	Possible Solution
Task form URL protocol (HTTP or HTTPS).	You are unable to access the task form through HTTPS or HTTP.	<ul style="list-style-type: none"> <li>▪ DefaultToDoTaskForm: The worklist accesses the default to-do task form using the port/protocol returned by the <code>getServerInfo</code> API from the runtime config service. This API uses the frontend host setup for the cluster or managed server. It gives preference to the HTTPS protocol if it is enabled. It is dynamic and can be changed using Oracle Enterprise Manager Fusion Middleware Control for default to-do tasks as the other custom task form.</li> <li>▪ CustomTaskForm: The custom task form gets the HTTP and HTTPS information from the setup. It uses the JRF API to get the information. This gets the frontend host information from the cluster and then the managed server if the cluster frontend host is not set up. In case the managed server frontend host is not set up, it uses a regular port. If the user enables the HTTPS port during deployment, the task form stores this information in the database. After this occurs, if the user disables the HTTPS port using Oracle WebLogic Server Administration Console, then the user must remove the HTTPS port for the task form using Oracle Enterprise Manager Fusion Middleware Control.</li> </ul>

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**Note:** If you receive a `java.lang.OutOfMemoryError: PermGen space` error when deploying multiple task forms, you may need to increase PermGen memory. For more information, see [Section 7.1.1, "PermGen Memory Requirements for Multiple ADF Task Form Deployments."](#)

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## B.5.9 Task Comments/Attachment Issues

Table B–10 describes symptoms, possible causes, and possible solutions for task comments/attachment issues.

**Table B-10 Troubleshooting Task Comments/Attachment Issues**

Symptom	Possible Cause	Possible Solution
The file is not getting uploaded.	The file is too big	<p>By default, ADF has a size limit of 2000 KB for each request. Add the following parameters in web.xml to adjust the file size and temporary storage for uploaded files:</p> <pre>&lt;context-param&gt;     &lt;!-- Maximum memory per request     (in bytes) --&gt;     &lt;param-name&gt;oracle.adf.view.faces.U     PLOAD_MAX_MEMORY&lt;/param-name&gt;     &lt;!-- Use 500K --&gt;     &lt;param-value&gt;512000&lt;/param-value&gt; &lt;/context-param&gt; &lt;context-param&gt;     &lt;!-- Maximum disk space per     request (in bytes) --&gt;     &lt;param-name&gt;oracle.adf.view.faces.U     PLOAD_MAX_DISK_SPACE&lt;/param-name&gt;     &lt;!-- Use 5,000K --&gt;     &lt;param-value&gt;5120000&lt;/param-value&gt; &lt;/context-param&gt; &lt;context-param&gt;     &lt;!-- directory to store temporary     files --&gt;     &lt;param-name&gt;oracle.adf.view.faces.U     PLOAD_TEMP_DIR&lt;/param-name&gt;     &lt;!-- Use an ADFUploads     subdirectory of /tmp --&gt;     &lt;param-value&gt;/tmp/ADFUploads/&lt;para     m-value&gt; &lt;/context-param&gt;</pre>
The file uploaded in the task details application is not visible in the same task flow.	After uploading a file, the attachment link generated in the task form is invalid. Clicking this link returns an empty stream.	When you upload a file, you see the attachment link in the table. However, this link does not work. You must reload the task details to view the file.
Adding file attachments creates a new task version, but adding a URL attachment does not create a new version.	Inconsistent behavior of the URL attachment and file attachment.	When a file is uploaded, the task is saved because the file is uploaded to persistency storage. This creates a new task version. The URL attachments only update the local task object in the user interface application. Therefore, no task version is created.

### B.5.10 Design Time at Runtime Issues

Table B-11 describes symptoms, possible causes, and possible solutions for design time at runtime issues. Two design time at runtime tools are available for use:

- Oracle SOA Composer
- Task Configuration tab of Oracle BPM Worklist

**Table B-11 Troubleshooting Design Time at Runtime UI Issues**

Symptom	Possible Cause	Possible Solution
Modifications made to a task in a design time at runtime tool do not appear for the task.	The task was instantiated before you actually edited it using a design time at runtime tool.	Design time at runtime updates go into effect only for instances created after the changes, and not for those that were created before the change.  Therefore, if you edit a task using a design time at runtime tool, and then instantiate a new task, the new instance of the task has the changes you made.
Modifications made to a task in a design time at runtime tool do not appear for the task.	The changes made were probably not committed to the MDS repository.	The <b>Save</b> button just saves the changes made in a design time at runtime tool to the sandbox. To see these changes in action, click <b>Commit</b> to send them to the MDS repository.
When a user tries to commit design time at run time changes to Rules, it fails with the error: <code>oracle.mds.sandbox.SandboxNotFoundException: MDS-01805: Sandbox error</code>	More than one user is trying to update the same rules dictionary file. This is not supported. Only one user can update the rules in a rule dictionary file at a given time.	Have one designated user to update all the rules for a given rule dictionary file. Sometimes it might map to more than one task based rules, based on the composite design. If there is only one rule dictionary for a given composite application, have a dedicated user to modify all the rules for that composite application.

### B.5.11 Human Workflow API (Including SOAP/EJB) Usage Issues

Table B-12 describes symptoms, possible causes, and possible solutions for human workflow API (including SOAP/EJB) usage issues.

**Table B-12 Troubleshooting Human Workflow API Usage Issues**

Symptom	Possible Cause	Possible Solution
Location of the JavaDoc for human workflow APIs.	N/A	See <i>Oracle Fusion Middleware Workflow Services Java API Reference for Oracle BPEL Process Manager</i> , which is available in the documentation library.
Understanding the API usage.	N/A	<ol style="list-style-type: none"> <li>Refer to the API documentation.</li> <li>See sample <code>workflow-118-JavaSamples</code>, available with the Oracle SOA Suite Samples.</li> </ol>
Using .net to access the APIs.	N/A	It is possible to write a .net client that accesses the SOAP web service APIs. See sample <code>workflow-119-DotNetSample</code> , available with the Oracle SOA Suite Samples.
You receive Class not found errors when attempting to use the Java API clients.	Not all required JAR files are in the client class path.	See the <code>workflow-118-JavaSamples</code> definition of <code>client.classpath</code> in the <code>build.xml</code> ant file, available with the Oracle SOA Suite Samples. The sample includes all required JAR files.
Creating a routing slip for simple patterns to use with a simple approval task or to dynamically route a task during task initiation.	N/A	See <code>oracle.bpel.services.workflow.task.impl.SimpleApprovalTaskUtil</code> .

## B.5.12 Oracle JDeveloper Data Control / Form Generation Issues

[Table B-13](#) describes symptoms, possible causes, and possible solutions for Oracle JDeveloper data control/form generation issues.

**Table B-13 Troubleshooting Oracle JDeveloper Data Control / Form Generation Issues**

Symptom	Possible Cause	Possible Solution
Empty1.jspx is not generated when creating the task form.	Created an initiator task based on an XSD element and tried to autogenerate the task form.	<p>This file is not required except for the BPM initiator task. If you encounter it, create an Empty1.jspx file in the same directory as referenced by adfc-config.xml and put the following content in it:</p> <pre>&lt;?xml version='1.0' encoding='UTF-8'?&gt; &lt;jsp:root xmlns:jsp="http://java.sun.com/JSP/Page" version="2.1" xmlns:f="http://java.sun.com/jsf/core" xmlns:h="http://java.sun.com/jsf/html" xmlns:af="http://xmlns.oracle.com/adf/faces/rich"&gt;   &lt;jsp:directive.page contentType="text/html;charset=UTF-8"/&gt;   &lt;f:view&gt;     &lt;af:document id="d1"&gt;       &lt;af:form id="f1"&gt;&lt;/af:form&gt;     &lt;/af:document&gt;   &lt;/f:view&gt; &lt;/jsp:root&gt;</pre>

## B.5.13 Human Workflow Service/ System MBean Browser Issues

[Table B-14](#) describes symptoms, possible causes, and possible solutions for human workflow service/System MBean Browser issues.

**Table B-14 Troubleshooting Human Workflow Service/ System MBean Browser Issues**

Symptom	Possible Cause	Possible Solution
Setting commonly used human workflow configuration parameters.	N/A	<p>Use the Workflow Task Service and Workflow Notification pages of Oracle Enterprise Manager Fusion Middleware Control:</p> <ol style="list-style-type: none"> <li>1. In the navigator, right-click <b>soa-infra</b>.</li> <li>2. Select <b>SOA Administration &gt; Workflow Config &gt; Mailer</b> tab to access notification properties.</li> <li>3. Select <b>SOA Administration &gt; Workflow Config &gt; Task</b> tab to access task service properties.</li> </ol> <p>For more information, see <a href="#">Section 21.1, "Configuring Human Workflow Notification Properties"</a> and <a href="#">Section 21.3, "Configuring Human Workflow Task Service Properties."</a></p>
Setting human workflow configuration parameters not available in the Oracle Enterprise Manager Fusion Middleware Control properties pages.	N/A	<p>Use the System MBean Browser in Oracle Enterprise Manager Fusion Middleware Control:</p> <ol style="list-style-type: none"> <li>1. In the navigator, right-click <b>soa-infra</b>.</li> <li>2. Select <b>SOA Infrastructure &gt; Administration &gt; System MBean Browser</b>.</li> <li>3. Select <b>Application Defined MBeans &gt; oracle.as.soainfra.config &gt; server &gt; WorkflowConfig &gt; human-workflow</b>.</li> <li>4. Set simple parameters by editing the appropriate field in the <b>Attributes</b> tab, and clicking <b>Apply</b>.</li> <li>5. Make more complex parameter changes (for example, adding a new locale) by switching to the <b>Operations</b> tab, selecting the appropriate operation, entering required fields, and clicking <b>Invoke</b>.</li> </ol>

**Table B-14 (Cont.) Troubleshooting Human Workflow Service/ System MBean Browser Issues**

Symptom	Possible Cause	Possible Solution
The System MBean Browser does not reflect my changes after editing the human workflow configuration MBeans.	The System MBean Browser is showing a previously cached version of beans.	Click the <b>refresh cached tree data</b> button in the System MBean Browser.
Human workflow services are not locating resource bundles or classes located at the workflow customizations class path URL.	The protocol is not specified in the URL, or the URL is missing a trailing forward slash (/).	Ensure that the configured URL is formatted correctly, and specifies a protocol. If the class path points to a directory (rather than a JAR file), it is important that the URL has a trailing forward slash character. For example: <code>file:///home/wstallar/wfcustomizations/</code>
Manually setting the URL used for displaying task details for a particular task component.	N/A	<p>Use the Administration page in Oracle Enterprise Manager Fusion Middleware Control for the human task service component.</p> <p>See <a href="#">Section 23.3, "Managing the URI of the Human Task Service Component Task Details Application"</a> for instructions.</p> <p>You can edit or delete existing task display URL entries, and add new entries. For task display URLs used from Oracle BPM Worklist, the application name must be set to <b>worklist</b>.</p>

### B.5.14 AMX Extension Issues

[Table B-15](#) describes symptoms, possible causes, and possible solutions for AMX extension issues.

**Table B-15 Troubleshooting AMX Extension Issues**

Symptom	Possible Cause	Possible Solution
The dynamic approval group class is not found.	The class file is not accessible in the Oracle SOA Suite class path.	To make the dynamic approval group class accessible, the class file must be placed in the following directory:  \$FMW_HOME/SOA_HOME/soa/modules/oracle.soa.ext_11.1.1/classes  This directory is part of the SOA class path.  The Oracle WebLogic Server must be restarted.
During design time at runtime, while defining a rule based on the Approval Group list builder, a message keeps appearing indicating that the group does not exist.	The Approval Group name is not enclosed in quotes ("").	Enclose the name in quotes (for example, "Sample Approval Group Name").
In a ruleset, many rules defined are applicable for a transaction. It appears that the correct constraints are not getting applied; therefore, the generated approver list is not correct.	Only one rule from a ruleset must be applicable for a transaction.  In case many rules are true, the actions associated with the applicable rule with the highest priority are executed.  In case multiple applicable rules have the same priority, the first rule in the list is picked and its actions are executed.	Check that all rules in the ruleset have priorities defined so that multiple rules with the same priority are not applicable for the same transaction.

### B.5.15 Oracle BPM Worklist/Task Region Issues

Table B-16 describes symptoms, possible causes, and possible solutions for Oracle BPM Worklist/task region issues.

**Table B-16 Troubleshooting Oracle BPM Worklist/Task Region Issues**

Symptom	Possible Cause	Possible Solution
You receive the following exception message in the logs:  <Warning> <oracle.adf.controller.internal.metadata.MetadataService> <BEA-000000><ADFc:> /META-INF/adfc-config.xml: > <Warning> <oracle.adf.controller.internal.metadata.MetadataService><ADFC-5 2024> <ADFc: Duplicate managed bean definition for 'aleCompBindings' detected.>	The shared library oracle.soa.worklist.webapp is referenced in the weblogic.xml file and also the JAR files adflibWorklistComponents.jar and adflibTasklistTaskflow.jar are packaged in the web application.	These JARs should not be packaged inside the web application. They should only be referenced as a shared library. Do not package these JARs in the web application.
You receive the following exception message in the logs:  Duplicate default server in client configuration. Configuration needs to have only one default server in client configuration. Specify one default server in client configuration.	Two default servers are specified in the client configuration file or in the JAXB object passed to the task flow.	Mark only one server as the default in the client configuration file or in the JAXB object passed.
You receive the following exception message in the logs:  The default server is not specified	The default server is not specified in the client configuration file or in the JAXB object passed to the task flow.	Ensure that the default server is marked in the client configuration file or the JAXB object.
You receive the following exception message in the logs:  Invalid display column. The display column COLUMN NAME is not a valid Task column. Specify a valid column name.	The column name passed to the task flow parameter displayColumnsList is not correct.	Ensure that you pass the correct column name to the task flow parameter.
You receive the following exception message in the logs:  java.lang.IllegalStateException: Attempt to validate an already invalid RegionSite:	This is a generic exception that sometimes appears in server logs (for example, AdminServer.log).	See the real exception in the diagnostic logs (for example, AdminServer-diagnostic.log) and provide that exception with the bug you can file.
You receive the following exception message in the logs:  Caused by: oracle.adf.controller.ControllerException: ADFC-02001: The ADF Controller cannot find '/WEB-INF/taskList-task-flow-definition.xml'	The Oracle BPM Worklist JARs are not provided in the class path, either by referring to the shared library oracle.soa.worklist.webapp or by packaging those in the web application.	Ensure either the JARs are referred through the shared library or packaged inside the application.
Filters for the task list are removed when the task list is refreshed.	Because an inbox is not a persisted view, filters set on it are removed when rendering the page again or refreshing the task list.	Instead of setting filters on the task list, create a user view with the required set of filters and pass the viewId of that view as the value of parameter ViewFilter. This makes that view the default view of the task list.

**Table B–16 (Cont.) Troubleshooting Oracle BPM Worklist/Task Region Issues**

Symptom	Possible Cause	Possible Solution
You have set the taskTypesFilterList parameter, but instead of seeing assigned tasks, you are seeing all tasks.	If you specified the taskTypesFilterList parameter, then you forgot to specify the attributesFilterList parameter.	<p>You have to use both parameters with the AND operator. For example:</p> <pre>&lt;parameter id="taskTypesFilterList" value="http://xmlns.oracle.com/HelpDeskRequestSOAApp/HelpDeskRequestComposite/HelpDeskRequestHumanTask,[http://xmlns.oracle.com/VacationRequestApp/VacationRequest/VacationRequestTask]"/&gt;</pre> <pre>&lt;parameter id="attributesFilterOperator" value="and"/&gt; &lt;parameter id="attributesFilterList" value="state=ASSIGNED"/&gt;</pre>
You receive the following exception message in the logs:	<p>[AdminServer] [NOTIFICATION]  [J2EE JSP-00008]  [oracle.j2ee.jsp] [tid:  [ACTIVE].ExecuteThread: '15'  for queue:  'weblogic.kernel.Default  (self-tuning)'] [userId:  weblogic] [ecid:  17011f2a001d6b0e:7e22d6ce:12e344  4eb1b:-8000-000000000002f0a,0]  [APP: FederatedApp_  application1] unable to dispatch  JSP page: The following  exception occurred:..[[  java.lang.RuntimeException:  Cannot find FacesContext  at  javax.faces.webapp.UIComponentClassicTagBase.getFacesContext(UIComponentClassicTagBase.java:2122)</p>	<p>This is a common mistake that is generic in nature and is not related to any components you are using. You forgot to put faces in the URL. For example:</p> <p>Put faces in the URL as follows:</p> <p><a href="http://server:port/FederatedApp/faces/test.jspx">http://server:port/FederatedApp/faces/test.jspx</a></p>

**Table B-16 (Cont.) Troubleshooting Oracle BPM Worklist/Task Region Issues**

Symptom	Possible Cause	Possible Solution
You receive the following exception message in the logs:  <pre>[AdminServer] [TRACE] [] [] [tid: [ACTIVE].ExecuteThread: '5' for queue: 'weblogic.kernel.Default (self-tuning)'] [userId: weblogic] [ecid: 17011f2a001d6b0e:7e22d6ce:12e344 4eb1b:-8000-000000000001d39,0] [SRC_CLASS: oracle.bpm.services.workflow.cl ient.config.ClientConfigurationU til] [APP: FederatedApp_ application1] [SRC_METHOD: getClientConfiguration] WorkflowServiceClientContext: Cannot find client configuration file: wf_client_ config.xml</pre>	There are three possible causes for this issue:  <ol style="list-style-type: none"> <li>1. The client configuration file is not provided in the class path.</li> <li>2. The JAXB object is not passed to the task flow.</li> <li>3. If one of the above is provided, the port number for the remote/SOAP client is incorrect.</li> </ol>	Ensure either the client configuration file <code>wf_client_config.xml</code> is provided in the class path or the JAXB object is passed to the task flow. If it is already done, ensure that the port number refers to the SOA server.
You receive the following exception message in the logs:  <pre>&lt;Error&gt; &lt;Deployer&gt; &lt;BEA-149265&gt; &lt;Failure occurred in the execution of deployment request with ID '1297964056778' for task '3'. Error is: 'weblogic.management.DeploymentE xception: [J2EE:160149]Error while processing library references. Unresolved application library references, defined in weblogic-application.xml: [Extension-Name: oracle.soa.workflow.wc, exact-match: false].' weblogic.management.DeploymentEx ception: [J2EE:160149]Error while processing library references. Unresolved application library references, defined in weblogic-application.xml: [Extension-Name: oracle.soa.workflow.wc, exact-match: false].'</pre>	Shared library <code>oracle.soa.workflow.wc</code> is referenced in <code>weblogic.xml</code> , but is not available on the server.	Ensure that this shared library is deployed on the server on which you are deploying your application. The shared library may be deployed, but not targeted, for that server.

**Table B–16 (Cont.) Troubleshooting Oracle BPM Worklist/Task Region Issues**

Symptom	Possible Cause	Possible Solution
You cannot see the mapped attributes mapped columns.  Note: Starting with Release 11g R1 (11.1.1.4), Oracle BPM Worklist flex fields are now known as mapped attributes.	The right set of parameters is not being passed to the task list task flow.	<p>The correct set of parameters to be passed is as follows:</p> <pre>&lt;parameter id= "displayColumnsList" value="assignees,creator, assignedDate,state, textAttribute1,textAttribute2"/&gt;</pre> <p>textAttribute1, textAttribute2 is the correct way to provide a value for the column name. Providing 'label name' (Name of the mapping) associated with these values does not work.</p> <p>You must specifically pass the fully qualified value to parameter taskTypesFilterList. Otherwise, the column creation does not work.</p> <p>For example:</p> <pre>&lt;parameter id="taskTypesFilterList" value="http://xmlns.oracle.com/HelpDeskRequestSOAApp/HelpDeskRequestComposite/HelpDeskRequestHumanTask " /&gt;</pre>

### B.5.16 Test-to-Production Issues

Table B–17 through Table B–20 describe symptoms, possible causes, and possible solutions for test-to-production issues.

**Table B-17 Troubleshooting Test-to-Production Issues**

Symptom	Possible Cause	Possible Solution
Finding the default realm name for a SOA server.	N/A	<p>The defaultRealmName can be obtained from the identity configuration service. You can get this from the SOAP service test page.</p> <ol style="list-style-type: none"> <li>From a browser, go to the following URL: <code>http:host:port/integration/services/IdentityService/configuration</code></li> <li>Select getDefaultRealmName from the <b>Operation</b> drop-down menu.</li> <li>Click the <b>Invoke</b> button.</li> </ol> <p>This retrieves the default realm name. Here is a sample answer from an invocation:</p> <pre>&lt;env:Envelope   xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"&gt;   &lt;env:Header/&gt;   &lt;env:Body&gt;     &lt;realmName       xmlns="http://xmlns.oracle.com/bpel/services/IdentityService"&gt;jazn.com&lt;/realmName&gt;   &lt;/env:Body&gt; &lt;/env:Envelope&gt;</pre>

**Table B-18 Troubleshooting Test-to-Production Issues**

<b>Symptom</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
<p>The following user authentication error (in this example, the user is FMW_USERID and the identity context is jazn.com) is displayed:</p> <pre>[java] Error in workflow service Web service operation invocation. The error is ORA-30501:Error in authenticating user.</pre> <p>[java] Error in authenticating and creating a workflow context for user jazn.com/VMW_USERID. [java]</p> <p>Verify that the user credentials and identity service configurations are correct.</p>	<p>This occurs if the given user is not seeded and available in the LDAP provider.</p> <p>To identify if the user is seeded properly, try to log in to Oracle BPM Worklist from a browser as this user. If the user can log in to Oracle BPM Worklist, that means the user is seeded.</p>	<p>If Oracle Internet Directory or another LDAP provider is used, ensure the configuration of the LDAP provider is completed correctly. Otherwise, you cannot get past this error.</p>
<p>While importing task payload mapped attribute mappings (previously known as flex fields) into the target SOA server, you may encounter the following error in the console logs:</p> <pre>[java] Caused by: java.sql.SQLIntegrityConstraintViolationException: ORA-02291: integrity constraint (UAT_ SOAINFRA.SYS_C0018364) violated - parent key not found* *</pre>	<p>The importing of task payload mapped attribute mappings into the target SOA server is a two-step process.</p> <p>Even before the import of task payload mapped attribute mappings into the target SOA server operation is attempted, there is a prerequisite step that must be performed. This is the import of attribute labels into the target SOA server operation.</p>	<p>To be successful, perform the following operations (in the correct order) with the human workflow test-to-production migration tool:</p> <ol style="list-style-type: none"> <li>1. Import attribute labels into the target SOA server.</li> <li>2. Import payload mappings into the target SOA server.</li> </ol> <p>See <a href="#">Section 23.6, "Moving Human Workflow Data from a Test to a Production Environment"</a> for more details.</p>

**Table B-19 Troubleshooting Test-to-Production Issues**

Symptom	Possible Cause	Possible Solution
<p>Assume you encounter the following error during rule migration:</p> <pre>[java] Error encountered during migration. [java] Exception in thread "main" [java] UserConfigDataMigrationException: [java] faultString:Invalid parameters for RULE. [java] Invalid user and group: both parameters can not have null values.[java] To migrate User Rules, provide the 'user' parameter only. [java] To migrate Group Rules, provide the 'group' parameter only.[java] oracle.bpel.services.workflow.util. tools.wfUserConfigDataMigrator. UserConfigDataMigrationException [java] at oracle.bpel.services.workflow. util.tools.wfUserConfigDataMigrator. implhwfMigrator.parseParametersNode</pre>	<p>There are two properties in the migration.properties file that are of interest for this error.</p> <ul style="list-style-type: none"> <li>■ user</li> <li>■ group</li> </ul> <p>During any rule migration (whether export or import) operation, at most one of them (user or group) should have a value. That is, both user and group cannot have null or empty values.</p>	<p>Set values for at most one of them. To perform user rule migration, set the user parameter alone. To perform group rule migration, set the group parameter alone.</p>
<p>Assume you encounter the following error during rule migration:</p> <pre>[java] Error encountered during migration.[java] Exception in thread "main" [java] UserConfigDataMigrationException: [java] faultString: Invalid parameters for RULE. [java] Invalid user and group: both parameters can not have values. [java] To migrate User Rules, provide the 'user' parameter only. [java] To migrate Group Rules, provide the 'group' parameter only. [java] oracle.bpel.services. workflow.util.tools.wfUserConfigData Migrator.UserConfigDataMigrationE xception</pre>	<p>This is similar to the previous explanation in this table.</p> <p>During any rule migration (whether export or import) operation, both user and group parameters cannot have a value.</p>	<p>Provide values for at most one of them.</p>

**Table B–20 Troubleshooting Test-to-Production Issues**

Symptom	Possible Cause	Possible Solution
Testing the health of the installed server.	N/A	<p>Before performing a test-to-production migration, it is useful to test the health of the server.</p> <p>From a browser, you can test some SOAP services. The following list provides a subset of human workflow services and Oracle BPM Worklist:</p> <p><code>http://host:port/integration/worklistapp/</code></p> <p><code>http://host:port/integration/services/TaskQueryService/TaskQueryService</code></p> <p><code>http://host:port/integration/services/IdentityService/configuration</code></p> <p><code>http://host:port/integration/services/IdentityService/identity</code></p> <p><code>http://host:port/integration/services/RuntimeConfigService/RuntimeConfigService</code></p> <p>You can randomly test some operations in these services, and verify that the operation yields results. Similarly, you can log in as a user to Oracle BPM Worklist and see if everything is fine.</p>

For more information about test-to-production issues, see [Section 23.6, "Moving Human Workflow Data from a Test to a Production Environment."](#)

### B.5.17 Identity Service Issues

[Table B–21](#) and [Table B–22](#) describe symptoms, possible causes, and possible solutions for identity service issues.

**Table B-21 Troubleshooting Identity Service Issues**

Symptoms	Possible Cause	Possible Solution
In a clustered environment, you can receive the following error when you attempt to act on an approval task in Oracle BPM Worklist:  Token Decryption Failed	You are using a file-based repository, instead of an LDAP-based repository. This causes the application roles to not be synchronized across the nodes.	For repository configuration information in a clustered environment, you must follow the instructions in Chapter "Integrating an Enterprise Deployment with Oracle Identity Management" of <i>Oracle Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite</i> .
Only a subset of users in LDAP can log in to Oracle BPM Worklist.	The user base DN is not configured properly.	Mention the user base under which all the groups are seeded. This can be performed in two ways:  Add the base DN under which all the required groups are seeded. For instance, if users are seeded under:  UserDN 1 : cn=users1,dc=us,dc=oracle,dc=com UserDN 2 : cn=users2,dc=us,dc=oracle,dc=com UserDN 3 : cn=users3,dc=us,dc=oracle,dc=com  Then mention the group base DN as follows:  dc=us,dc=oracle,dc=com  This is the common DN. If only some user DNs are required (for example, UserDN1 and UserDN2), then the following property must be added to serviceInstance with the name idstore.ldap in the \$DOMAIN_HOME/config/fmwconfig/jps-config.xml file:  <pre>&lt;serviceInstance name="idstore.ldap"   provider="idstore.ldap.provider"&gt;   &lt;property name="idstore.config.provider"     value="oracle.security.jps.wls.internal.idstore.WlsLd     apIdStoreConfigProvider"/&gt;   &lt;property name="CONNECTION_POOL_CLASS"     value="oracle.security.idm.providers.stldap.JNDIPool"   /&gt;   &lt;extendedProperty&gt;     &lt;name&gt;user.search.bases&lt;/name&gt;     &lt;values&gt;       &lt;value&gt;cn=users1,dc=us,dc=oracle,dc=com&lt;/value&gt;       &lt;value&gt;cn=users2,dc=us,dc=oracle,dc=com&lt;/value&gt;     &lt;/values&gt;   &lt;/extendedProperty&gt; &lt;/serviceInstance&gt;</pre>
Users and groups seeded only in the first authenticator are visible, but not from the other authenticators.	By default, users and groups from the first authenticator are authorized.	Starting with 11.1.1.4, you can authorize users and groups from multiple authenticators. Add the following property to the idstore instance in the \$DOMAIN_HOME/config/fmwconfig/jps-config.xml file.  <pre>&lt;serviceInstance name="idstore.ldap"   provider="idstore.ldap.provider"&gt;   .....   &lt;property name="virtualize" value="true"/&gt;   ..... &lt;/serviceInstance&gt;</pre>

**Table B-22 Troubleshooting Identity Service Issues**

Symptom	Possible Cause	Possible Solution
The following exception appears when myrealm (the default realm in the Oracle WebLogic Server Administration Console configuration) is passed as a parameter to the identity context to the Identity Service APIs.  Exception seen : Service" Unknown macro: {0} "in configuration" Unknown macro: {1} " could not be initialized. Error in initializing service "Authentication" in configuration "myrealm".	The human workflow identity service uses the identity context that is set in the WorkflowIdentityConfig file (by default, it is jazn.com) and not from the Oracle WebLogic Server configuration. Therefore, in the customer code, if jazn.com is passed as the identity context, the authenticate API should work fine.	To change the realm name, the WorkflowIdentityConfig file can be edited in the System MBean Browser of Oracle Enterprise Manager Fusion Middleware Control. <ol style="list-style-type: none"> <li>In the navigator, right-click <b>soa-infra</b>.</li> <li>Select <b>SOA Infrastructure &gt; Administration &gt; System Mbean Browser</b>.</li> <li>Select <b>Application Defined Mbeans &gt; oracle.as.soainfra.config &gt; Server &gt; WorkflowIdentityConfig &gt; human-workflow &gt; WorkflowIdentityConfig.ConfigurationType</b>.</li> <li>Select the configuration and rename it by invoking the operation <b>setRealmName</b>. This change requires a server restart.</li> </ol>
After configuring LDAP with Oracle WebLogic Server, the users are visible in the Oracle WebLogic Server Administration Console, but the following error is thrown:  No Role found matching the criteria	The group's base DN is not configured properly. Either the group that is being looked up is not present in LDAP or it may be seeded outside the group base DN that is mentioned while configuring LDAP.	Mention the group base under which all the groups are seeded. This can be performed in two ways.  Add the base DN under which all the required groups are seeded. For instance, if groups are seeded under:  GroupDN 1 : cn=groups1,dc=us,dc=oracle,dc=com GroupDN 2 : cn=groups2,dc=us,dc=oracle,dc=com GroupDN 3 : cn=groups3,dc=us,dc=oracle,dc=com  Then mention the group base DN as follows:  dc=us,dc=oracle,dc=com  This is the common DN. If only some group DNs are required (for example, GroupDN1 and GroupDN2), then the following property must be added to serviceInstance with the name idstore.ldap in the \$DOMAIN_HOME/config/fmwconfig/jps-config.xml file.  <serviceInstance name="idstore.ldap" provider="idstore.ldap.provider"> <property name="idstore.config.provider" value="oracle.security.jps.wls.internal.idstore.WlsL dapIdStoreConfigProvider"/> <property name="CONNECTION_POOL_CLASS" value="oracle.security.idm.providers.stddap.JNDIPool"/> <extendedProperty> <name>group.search.bases</name> <values> <value>cn=groups1,dc=us,dc=oracle,dc=com</value> <value>cn=groups2,dc=us,dc=oracle,dc=com</value> </values> </extendedProperty> </serviceInstance>

## B.6 EDN Troubleshooting

This section describes how to troubleshoot EDN issues.

## B.6.1 Tuning EDN Event Bus and Delivery

You can customize the following EDN properties in the System MBean Browser:

1. Right-click **soa-infra**.
2. Select **SOA Infrastructure > Administration > System MBean Browser**.
3. Expand **Application Defined MBeans > oracle.as.soainfra.config > Server: soa-server-x > EDNConfig > edn**.
4. Double-click an attribute.

Properties	Type	Details
<b>NumberOfThreads</b>	int	Defaults to 3 for the EDN-DB implementation or 2 for the EDN-JMS implementation. Setting this property to 0 is effectively the same as 2 for EDN-DB or 1 for EDN-JMS.  For more information about EDN-DB and EDN-JMS, see <a href="#">Section 35.1, "Introduction to the Event Delivery Network."</a>
<b>Paused</b>	boolean	Values are true or false. If true, the EDN listener threads are decreased to 0, which effectively stops the delivery of events. This works for EDN-DB and EDN-JMS.
<b>NumberOfRetrys</b>	int	The maximum number of EDN deliveries and redeliveries before moving the event to the error hospital. This parameter works only for one-and-only-one delivery, and not for guaranteed delivery. The maximum allowed value is 5. If set to less than 5, then it is effectively the same as 5.  If <b>NumberOfRetrys</b> is set to the following values: <ul style="list-style-type: none"> <li>■ <math>\geq 2</math>, then EDN delivers the event once, and may try redeliveries up to (<b>NumberOfRetrys</b> - 1) times in case of XA failures.</li> <li>■ <math>= 1</math>, then EDN delivers the event only once. There is no retry with XA failures.</li> <li>■ <math>= 0</math>, then this is the same as <math>= 1</math> (that is, EDN delivers an event only once). There is no retry with XA failures.</li> <li>■ <math>&gt; 5</math>, then it is effectively the same as <b>NumberOfRetrys</b> = 5.</li> </ul>

5. Enter a value, and click **Apply**.

## B.6.2 Rolled Back One-and-Only-One Event Delivery Messages are Displayed in the Log Files

If the Java debug level is set to **TRACE:16 (FINER)** or a lower value, you may see log messages such as the following:

```
Began XA for OA00
Rolled back XA for OA00
```

These are normal messages of one-and-only-one (OA00) event delivery when there are no events waiting to be delivered. These are *not* error conditions. You can turn off these messages by setting the Java logging level to **TRACE:1 (FINE)** or a higher value.

## B.6.3 Events Are Consumed by Multiple Revisions of the Same Composites

By design, different composites can subscribe to the same event. However, it is an error if multiple revisions of the same composite subscribe to the same event. This

occurs when you have multiple active versions of the composite that may be a result of a patch failure.

Perform the following steps to determine whether there are multiple, active revisions of the same composite and to retire the composite revision that should not be active:

1. Go to Oracle Enterprise Manager Fusion Middleware Control.
  2. Click **SOA > soa-infra**.
- In the **Deployed Composites** section of the **Dashboard** tab, you see a list of deployed composite names, revisions, and modes (for example, active).
3. Identify composites with the same name and with an active mode, but with different revisions.
  4. Click the composite revision that should not be active.
  5. Click the **Retire** button.

#### B.6.4 Business Event Is Picked Up Twice (Or More) By SOA Server

Business events may be raised from J2EE applications and picked up more than once. Expected behavior is that they must be picked up only once.

If a patch fails, it may be possible for two versions of a given composite to be active (that is, the older version has not been retired). When multiple versions of a composite are active, they all become subscribers and the event is picked up more than once. This should not happen under normal scenarios. Reapply the patch and ensure that the deployed composite only has one active version.

#### B.6.5 Some Messages Are Lost Between EDN and Composites or Composites Across Clusters

Messages primarily may get lost for the following reasons:

1. The EDN message was not delivered.
2. The target asynchronous service did not respond.
3. The message was roll backed (though it was not lost; you still see it in Oracle Enterprise Manager Fusion Middleware Control).

This issue typically requires you to identify where the messages are supposed to be and to diagnose the path.

- Check if the Oracle WSM Policy Manager security configurations allow the client to invoke the SOA composite.
- Verify that the transaction is not transient (nonpersistent).

Oracle BPEL Process Manager uses the dehydration store database to maintain long-running, asynchronous processes and their current state information in a database while they wait for asynchronous callbacks. Storing the process in a database preserves the process and prevents any loss of state or reliability if a system shuts down or a network problem occurs. There are two types of processes in Oracle BPEL Process Manager. These processes impact the dehydration store database in different ways.

- Transient processes: This process type does not incur any intermediate dehydration points during process execution. If there are unhandled faults or there is system downtime during process execution, the instances of a transient process do not leave a trace in the system. Instances of transient

processes cannot be saved in-flight (whether they complete normally or abnormally). Transient processes are typically short-lived, request-response style processes. The synchronous process you design in Oracle JDeveloper is an example of a transient process.

- Durable processes: This process type incurs one or more dehydration points in the database during execution because of the following activities:
  - \* Receive activity
  - \* OnMessage branch of a pick activity
  - \* OnAlarm branch of a pick activity
  - \* Wait activity

Instances of durable processes can be saved in-flight (whether they complete normally or abnormally). These processes are typically long-living and initiated through a one-way invocation. Because of out-of-memory and system downtime issues, durable processes cannot be memory-optimized.

- If a composite instance is not visible in Oracle Enterprise Manager Fusion Middleware Control and the SOA Infrastructure is running, check that the **Audit Level** is not set to **Off** on the SOA Infrastructure Common Properties page. This can be checked in Oracle Enterprise Manager Fusion Middleware Control:
  1. Right-click **soa-infra (SOA\_cluster\_name)**.
  2. Select **SOA Administration > Common Properties**.
- If the composite instance is available, check the **oneWayDeliveryPolicy** BPEL property value. You can check the value in Oracle Enterprise Manager Fusion Middleware Control:
  1. In the navigation pane, expand **soa-infra (SOA\_cluster\_name)**.
  2. Expand the partition, and select the composite.

The Dashboard page for the composite is displayed.

  3. In the upper right corner, click the **Show XML Definition** icon.

The contents of `composite.xml` for that composite are displayed.

If this is set to **async.cache**, you may lose messages. Set it to **async.persist** for reliable messages. This is typically specified in the BPEL process service component section of the `composite.xml` file. Therefore, this can be set for custom composites. If the value is not set in `composite.xml`, the value for **oneWayDeliveryPolicy** in the System MBean Browser in Oracle Enterprise Manager Fusion Middleware Control is used. The following values are possible:

- **async.persist**: Messages are persisted in the database hash map.
- **async.cache**: Messages are stored in memory.
- **sync**: Direct invocation occurs on the same thread.

For more information about these settings, see the "Deployment Descriptor Properties" appendix and the "Transaction and Fault Propagation Semantics in BPEL Processes" chapter of the *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.

For information about setting the **oneWayDeliveryPolicy** property in the System MBean Browser, see [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)

It is also possible that the transaction has invoked a target asynchronous service that has not responded back. In this case, the composite instance flow shows the call to the target asynchronous service.

- Check if the instance has rolled back and the message is in recovery.
  1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
  2. Right-click **soa-infra** (*SOA\_cluster\_name*), and select **Service Engines > BPEL**.
  3. Click the **Recovery** tab.

This may occur if any external references receiving the message are not reachable (for example, an external web service, enterprise applications such as Siebel, and so on).

## B.6.6 Checking Whether Bad Composites Exist in the SOA Domain that Slow Down Overall EDN Event Delivery

EDN internally uses two advanced queuing (AQ) queues in a serial processing fashion for all business events. One or more bad SOA composite applications that fail to consume certain types of events can slow down EDN delivery of all other event types and cause an event backlog in the AQ queues.

1. Check if there are repeated errors from bad SOA composite applications in the SOA server log with EDN logging enabled. Even if the errors are in completely separate SOA composite applications that are unrelated to the event types of interest, it can delay the overall delivery of events of interest to the target SOA composite applications.
2. Check the event backlog count as detailed in Step 4 (events are stuck in advanced queue). Obtain the counts by running the following SQL queries (substitute *SOAINFRA-SCHEMA-USER* with the schema owner).

```
SELECT COUNT(*) FROM SOAINFRA-SCHEMA-USER.EDN_OA00_DELIVERY_TABLE;
SELECT COUNT(*) FROM SOAINFRA-SCHEMA-USER.EDN_EVENT_QUEUE_TABLE;
```

If bad composites are found in Step 1 and large numbers of backlogged events occur in Step 2, then proceed to 3.

3. Stop bad composites identified in Step 1. This can be achieved from Oracle Enterprise Manager Fusion Middleware Control or the WLST command line utility.
4. Temporarily increase the number of EDN threads to a larger number, (for example, from 3 to 5 or 7) to clear up the backlogged events faster.

To change the number of EDN threads through the configuration of the **EDNConfig** MBean in Oracle Enterprise Manager Fusion Middleware Control:

- a. Go to the navigation pane.
- b. Right-click **soa-infra**.
- c. Select **SOA Infrastructure > Administration > System MBean Browser**.
- d. Expand **Application Defined MBeans > oracle.as.soainfra.config > Server: soa\_server-x > EDNConfig > edn**.
- e. Change the value for the **NumberOfThreads** attribute, and click **Apply**.

If you do not care about backlog event processing, you can purge the backed up events directly in AQ. The purge script is as follows:

```

DECLARE
 purge_options dbms_aqadm.aq$_purge_options_t;
BEGIN
 purge_options.block := FALSE;
 DBMS_AQADM.PURGE_QUEUE_TABLE(
 queue_table => '&edn_user..edn_event_queue_table',
 purge_condition => NULL,
 purge_options => purge_options);
 DBMS_AQADM.PURGE_QUEUE_TABLE(
 queue_table => '&edn_user..edn_oao_delivery_table',
 purge_condition => NULL,
 purge_options => purge_options);
END;
/
commit;

```

5. Periodically monitor the EDN backlog count (see Step 2) to confirm that it is being reduced. If the clear-up rate is very slow, you can further increase the EDN thread number (see Step 4).
6. Continue to monitor the EDN backlog count over a period. Also monitor the recent instances and faults in Oracle Enterprise Manager Fusion Middleware Control to see if composite instances are being created or new faults are showing up both across the board (that is, at SOA Infrastructure level) and for the composite of interest.
7. Once the backlog is cleared up, revert the number of EDN threads to the previous setting or an appropriate number.
8. Publish a business event of interest and verify that the target composite is triggered with expected instance creations.

## B.7 Performance Troubleshooting

This section describes how to troubleshoot performance issues.

### B.7.1 Optimizing the Loading of Pages with Instance and Fault Metrics

Since production systems can include numerous composite instances and faults, there is a possibility of timeouts in the Oracle Enterprise Manager Fusion Middleware Control pages as information retrieval becomes relatively slow. To optimize the loading performance of Dashboard pages for the SOA Infrastructure, SOA composite applications, service components, and service engines; Deployed Composites page of the SOA Infrastructure and service engines; and partition home page, you can enable two property settings on the SOA Infrastructure Common Properties page that perform the following:

- Disable the loading of all metrics information upon page load. The instances and faults metrics can be obtained on demand from the server.

---

**Note:** This setting disables fault, instance, and count metrics, and not DMS metrics.

---

- Restrict the retrieval of instances, faults, and counts to a specified time period (default selection).

To optimize the loading of pages with instance and fault metrics:

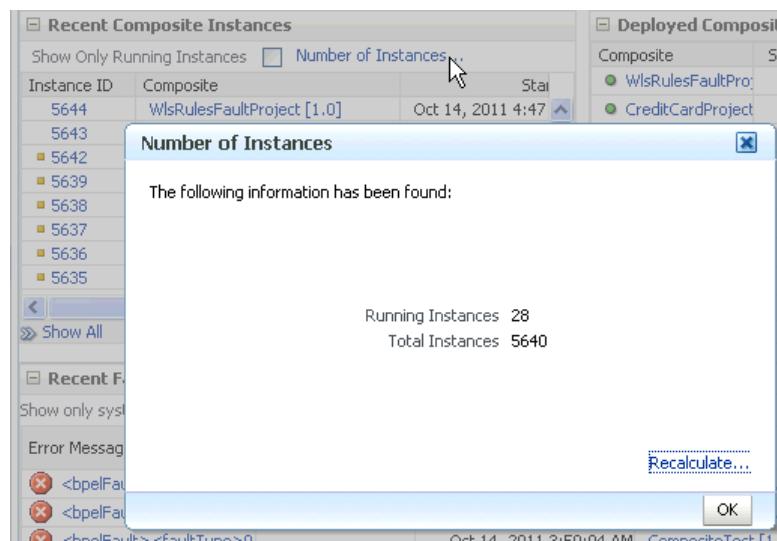
1. In the navigator, click **soa-infra**.
2. Note that values appear in the **Running** and **Total** fields in the **Recent Composite Instances** section and the **Instances** and **Faulted Instances** columns of the **Deployed Composites** section. When these values are large, it can take time to load this page and other pages with similar information.

The screenshot shows the SOA Infrastructure dashboard. The top navigation bar includes links for 'soa-infra' and 'SOA Infrastructure'. The main content area has tabs for 'Dashboard', 'Deployed Composites', 'Instances', and 'Faults and Rejected Messages'. The 'Instances' tab is selected. On the left, under 'Recent Composite Instances', there is a table showing 28 running instances and a total of 5640 instances. On the right, under 'Deployed Composites', there is a table listing various composite applications with their status, mode, instances, and faulted instances. A message at the top right indicates the page was refreshed on October 15, 2011, at 5:49:48 PM PDT.

3. From the SOA Infrastructure menu, select **SOA Administration > Common Properties**.
4. In the **Data Display Options** section, select the **Disable fetching of instance and fault count metrics** checkbox.
5. Click **Apply**.
6. Return to the Dashboard page of the SOA Infrastructure.
7. Note that the values that previously displayed have been replaced with links.
8. In the **Deployed Composites** section, click a link for a specific SOA composite application to display details about the number of instances. The values are calculated for the link you select.

The screenshot shows a modal dialog titled 'Number of Instances'. It displays a message stating 'The following information has been found:' followed by 'Composite Name: WlsRulesFaultProject [1.0]' and 'Number of Instances: 1'. To the right of the dialog, the 'Deployed Composites' table from the previous screenshot is visible, showing the same data but with small blue info icons next to the 'Instances' and 'Faulted Instances' columns instead of numerical values. A cursor is hovering over one of these info icons.

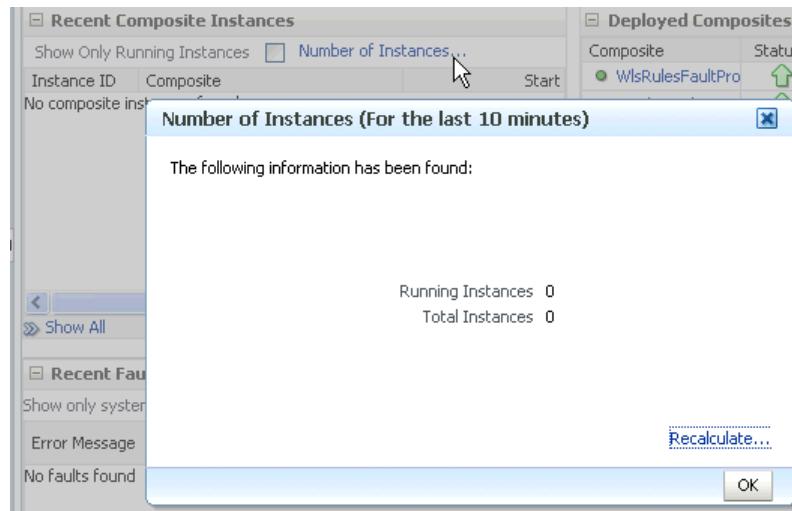
9. Click **OK**.
10. Click **Number of Instances**.



A message displays the number of running and total instances in the SOA Infrastructure.

11. Click **OK**.
12. Return to the SOA Infrastructure Common Properties page.
13. In the **Data Display Options** section, select the **Restrict display of instances and faults to the last *time\_period*** checkbox if it is not already selected. By default, this checkbox is selected and the time period duration is set to **24 hours** (one day).
14. Specify a time period during which to retrieve recent instances, faults, and count metrics for display (for example, **10 minutes**).
15. Click **Apply**.
16. Return to the Dashboard page of the SOA Infrastructure.
17. Note that the following message is displayed in the upper right section of the page:  
Recent Instances and Faults for the last 10 minutes
18. Click **Number of Instances**.

The value that you specified for the time period is displayed in the message title. The number of running and total messages for that time period is also displayed.

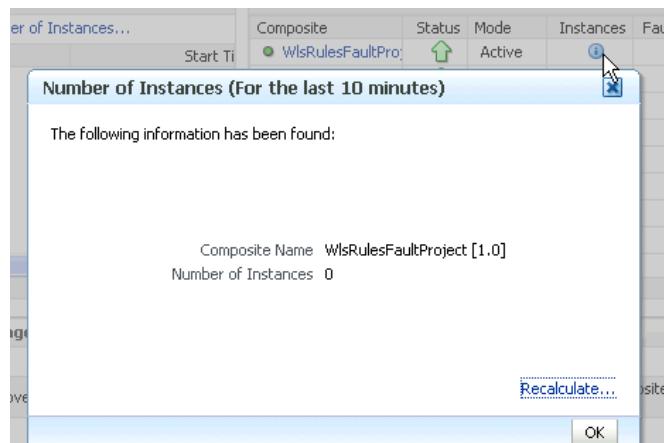


19. Click OK.

20. In the Deployed Composites section, click a link.

Composite	Status	Mode	Instances	Faulted Instances
WlsRulesFaultPro		Active		
CreditCardProject		Active		
EventMediatorDef		Active		
FaultFlow [1.0]		Active		
DocStyleServiceS		Active		
BPELSyncWaitAss		Active		
SimpleApproval [1]		Active		

The value that you specified for the time period is displayed in the message title. The number of running and total messages for the selected SOA composite application for that time period is also displayed.



For more information about setting these properties, see [Section 3.1, "Configuring SOA Infrastructure Properties."](#)

---

**Notes:**

- If you click a link to retrieve instance and fault count metrics, and Oracle Enterprise Manager Fusion Middleware Control times out, increase the transaction timeout property. For more information, see [Section B.3.1, "Resolving Connection Timeouts."](#)
  - If you click **Recalculate**, and the recalculation occurs quickly, the progress indicator does not have a chance to render. However, any updates to the data are reflected on-screen.
- 

## B.7.2 Resolving Message Failure Caused by Too Many Open Files

You can receive the following error at runtime or compilation time, depending on the number of JAR files being used, the use of file descriptors by JDK 6/JRE, or both.

Message send failed: Too many open files

To resolve this error, increase the number of file descriptors to at least 4096.

1. Use the `limit` command (for the C shell) or the `ulimit` command (for the Bash shell) to identify the value for descriptors. A value of 1024 is typically too low, especially for JDK 6.

```
% limit

cputime unlimited
filesize unlimited
datasize unlimited
stacksize 10240 kbytes
coredumpsize unlimited
memoryuse unlimited
vmmemoryuse unlimited
descriptors 1024
memorylocked 500000 kbytes
maxproc 46720
```

2. Log in as the root user on your operating system.
3. Edit the `/etc/security/limits.conf` file to increase the value for descriptors.

For this example, the `limits.conf` file appears as follows after increasing the limit for all users to 4096:

```
#<domain> <type> <item> <value>
#
#*
#* soft core 0
#* hard rss 10000
#@student hard nproc 20
#@faculty soft nproc 20
#@faculty hard nproc 50
#ftp hard nproc 0
#@student - maxlogins 4

End of file
@svrgroup soft memlock 500000
@svrgroup hard memlock 500000
```

*	soft	nofile	<b>4096</b>
*	hard	nofile	<b>4096</b>

4. Close your terminal and reopen for the change to take effect. A system restart is not required.

### B.7.3 Resolving MaxMessageSizeExceededException Errors Caused By Large Payloads

If you provide a large payload (for example, 12 MB) to your deployed SOA composite application, then click **View XML Document** in the audit trail to view the payload, you can encounter `MaxMessageSizeExceededException` errors. This error can be resolved by setting the following JVM parameter.

1. Open the following file:
  - On UNIX operating systems, open `$MIDDLEWARE_HOME/user_projects/domains/domain_name/bin/setDomainEnv.sh`.
  - On Window operating systems, open `MIDDLEWARE_HOME\user_projects\domains\domain_name\bin\setDomainEnv.bat`.
2. Add the `weblogic.MaxMessageSize` property with the following value:

```
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES}
-Dweblogic.MaxMessageSize=20000000"
export EXTRA_JAVA_PROPERTIES
```
3. Restart the server.

### B.7.4 Extending Tablespaces to Avoid Problems at Runtime

If the database tablespace is not extended, runtime processing can be impacted. Messages are not processed or persisted, and exception errors similar to that shown in [Example B-3](#) can appear in the log files. This is because Oracle BPEL Process Manager relies on the database to store instance data. If the database is not available, runtime processing is impacted.

#### **Example B-3 Exception Error**

```
INFO: MediatorServiceEngine returning after processing the request for
operation = processResponse

[EL Warning]: 2009.01.14 11:46:16.783--UnitOfWork(32372128)--Exception
[EclipseLink-4002] (Eclipse Persistence Services - 1.1 (Build
SNAPSHOT-20081007)): org.eclipse.persistence.exceptions.DatabaseException
Internal Exception: java.sql.BatchUpdateException: ORA-01691: unable to
extend lob segment SH_SOAINFRA.SYS_LOB0000145067C00007$$ by 1024 in
tablespace SH_SOAINFRA

Error Code: 1691
Query: InsertObjectQuery(com.collaxa.cube.persistence.dto.AuditTrail@199b33d)
[EL Warning]: 2009.01.14 11:46:16.782--UnitOfWork(32372128)--Exception
[EclipseLink-4002] (Eclipse Persistence Services - 1.1 (Build
SNAPSHOT-20081007)): org.eclipse.persistence.exceptions.DatabaseException
Internal Exception: java.sql.BatchUpdateException: ORA-01691: unable to
extend lob segment SH_SOAINFRA.SYS_LOB0000145067C00007$$ by 1024 in
tablespace SH_SOAINFRA
.
.
```

Ensure that you set a tablespace to automatically extend itself by a specified amount when it reaches its size limit. If you do not enable autoextend, ensure that you respond when alerted that the tablespace is reaching its critical or warning threshold size. You can respond to size alerts by manually increasing the tablespace size.

### B.7.5 Resolving Database Growth Issues Caused by a High Volume of Transactions

If Oracle SOA Suite transactions fail and logs indicate that the database is running out of space, the dehydration store or MDS store may be running out of space due to a high volume of transactions. In the latter example, you see errors such as the following:

```
java.sql.SQLException: ORA-01653: unable to extend table SH_MDS.CUBE_INSTANCE by 16 in tablespace FUSION_TS_TOOLS
```

This indicates that the tablespace is full and the database cannot extend it.

Perform the following tasks.

- Purge the dehydration store tables periodically, taking into account the appropriate record retention policies and ensuring that the applications have no dependencies on runtime data.

The purge should be followed by commands to coalesce the space. For the purging strategy to work, it is important to understand how long to retain the data in the database. Factors that drive the retention policy include the following:

- Legal requirements
- Line of business requirements
- Overall company policy on retention of data

The longer the retention policy, the greater the volume of data that must be stored and, correspondingly, the higher the disk capacity requirements.

For details on creating a purging strategy, see [Chapter 9, "Developing a Database Growth Management Strategy"](#) and [Chapter 10, "Managing Database Growth."](#)

- Ensure that the database hardware has sufficient resources to handle the demands of Oracle database partitioning before configuring your tables for partitioning.

For the dehydration store, database partitioning using range partitioning and hash partitioning is an optimal solution. Partitioning by definition means storing data in multiple tables to reduce bigger data sets into smaller, more manageable data sets. Partitioning strategies play a large role in easing maintenance overheads (dropping and pruning the partition) and improving performance. Partitioning should at least be done for tables having high activity. This plays a large role in balancing disk I/O and preventing hot disks. One important requirement that you must meet before configuring your tables for partitioning is to ensure that the database hardware has sufficient resources to handle the demands of Oracle database partitioning. If preproduction testing has indicated that the installation is large, Oracle expects that you have sized your environment (CPU, memory, and disk space) correctly to take advantage of the partitioning features.

- Tune database parameters for memory, tablespace, and partitions to get maximum performance. For more information, see Section "Tuning Database Parameters" of the *Oracle Fusion Middleware Performance and Tuning Guide*.
- For other tablespaces running out of space, use the following query to check for free tablespace:

```
SELECT TOTAL.TABLESPACE_NAME "TABLESPACE NAME", FREE_SPACE, (TOTAL_SPACE-FREE_SPACE) USED_SPACE, TOTAL_SPACE, ROUND((FREE_SPACE*100/TOTAL_SPACE),2) "FREE %"
FROM (SELECT TABLESPACE_NAME, SUM(BYTES/1024/1024) FREE_SPACE FROM SYS.DBA_FREE_SPACE GROUP BY TABLESPACE_NAME) FREE,
(SELECT TABLESPACE_NAME, SUM(BYTES/1024/1024) TOTAL_SPACE FROM SYS.DBA_DATA_FILES GROUP BY TABLESPACE_NAME) TOTAL
WHERE FREE.TABLESPACE_NAME = TOTAL.TABLESPACE_NAME AND TOTAL.TABLESPACE_NAME =
'<TABLESPACENAME>'
ORDER BY 5;
```

5. To increase tablespace settings, use the administrator account. For example:

```
ALTER TABLESPACE TABLESPACE_NAME ADD DATAFILE 'DATAFILE_NAME' SIZE 500M
AUTOEXTEND ON;
```

For more details, see [Section B.7.2, "Resolving Message Failure Caused by Too Many Open Files."](#)

## B.7.6 Observing Slow Application Performance Such as Longer Time to Serve Pages or Finish Transactions

You can observe slow application performance and/or memory thrashing. For example, it may take longer to load and serve pages or to complete composite transactions. Response time may seem slower compared to normal behavior.

There are various reasons for slow performance. It may be due to a large number of servers running on the same host, or there may be a large number of records/sessions/locking in the database. Thread contention can also be a reason for poor performance.

---

**Note:** All configuration changes in Oracle Enterprise Manager Fusion Middleware Control may be unavailable due to this problem.

---

To diagnosis this issue:

1. Check the CPU utilization to see if it is saturated due to a heavy load or too many processes in relation to CPU capacity.  
If CPU utilization is at 100% during normal load hours (the target should be 70-80%), you have no capacity to handle a peak load and the hardware resources are insufficient. Add scale-out servers to handle the additional load.
2. Check applications using Oracle Enterprise Manager Fusion Middleware Control to report on performance. Check the performance of services and the invoke/response times in the BPEL process audit trail.
3. To maximize performance, it is recommended that you not set the logging level higher than the default **INFO** level.

For debugging purposes, you must set the logging level to the **FINEST** level. However, once issues are resolved, reset the logging level to the default level for best performance. It is also recommended that you set **Audit Level to Production** on the SOA Infrastructure Common Properties page. This can be set in Oracle Enterprise Manager Fusion Middleware Control as follows:

- a. Right-click **soa-infra (SOA\_cluster\_name)**.
- b. Select **SOA Administration > Common Properties**.
- c. Set **Audit Level to Production**.

4. Purge periodically based on retention requirements to maintain any service level agreements (SLAs).

To identify the tables where data growth may lead to performance issues, see Section "Identifying Tables Impacted By Instance Data Growth" of the *Oracle Fusion Middleware Performance and Tuning Guide*.

For information about using the purge scripts, see [Chapter 10, "Managing Database Growth."](#)

5. Check the memory/IO/paging/swapping/CPU usage load statistics using Top or Glance or another monitoring tool.

6. Optimize the JVM to avoid full garbage collection or out-of-memory errors.

Frequent garbage collection can be either due to higher memory usage or memory leaks.

- a. Ensure that the sum of the maximum heap size of all the JVMs running on your system does not exceed the amount of available physical RAM to avoid operating system level paging activity.

- b. Use the JRockit mission control memory profiling tools to get thread dumps and memory snapshots, which helps Oracle Support Services debug any code issues. For more information about thread dumps, see [Chapter 12, "Diagnosing Problems with SOA Composite Applications."](#)

7. Optimize threads to avoid contention. Get a thread dump to investigate and submit it to Oracle Support Services.

8. Check the JVM and thread dumps for methods invoking the database to identify if database performance is a bottleneck.

9. Run database AWR snapshots to identify causes of database performance issues.

10. Ensure that database statistics are updated at regular intervals and other tunable parameters for memory, tablespace, and partitions are used effectively to obtain maximum performance.

Here are some common tuning recommendations. For more information, see the "Tuning Database Parameters" section in the *Oracle Fusion Middleware Performance and Tuning Guide*.

- Put indexes and tables in as physically separate disk areas, if possible.
- Never put rollback segments with data or index segments.
- Separate highly active tables and indexes into their own tablespaces.
- Partition high activity tables and indexes to help balance disk I/O and prevent hot disks.
- Have processes in place to generate database table statistics at regular intervals.

11. Tune database tables to control the high watermark (HWM) contention of large objects. Tune database advanced queues (AQ) to control HWM contention and ensure consistent performance of producing and consuming messages from AQ.

The EDN AQ names to be aware of are EDN\_EVENT\_QUEUE\_TABLE and EDN\_OA00\_DELIVERY\_TABLE.

12. Tune the BPEL process and EDN thread counts to ensure optimal settings (for example, the **Dispatcher Invoke Threads** and **Dispatcher Engine Threads** properties on the BPEL Service Engine Properties page in Oracle Enterprise

Manager Fusion Middleware Control). If the thread configuration is too high, the servers run out of memory. If they are too low, the messages start backing up.

13. Tune the BPEL process properties to reduce overhead (for example, disable the **ValidateXML** and **StatsLastN** (statistics gathering batch size) properties on the BPEL Service Engine Properties page in Oracle Enterprise Manager Fusion Middleware Control), if they are not needed.
14. In case of integration with packaged applications (for example, Siebel), check if the issue lies with the legacy applications.

For more information about performance tuning the various components, see the "Top Performance Areas" chapter and the "SOA Suite Components" part in the *Oracle Fusion Middleware Performance and Tuning Guide*.

For information about setting properties on the BPEL Service Engine Properties page, see [Chapter 13, "Configuring BPEL Process Service Components and Engines."](#)

## B.7.7 Observing Incoming Message Rates Exceeding Outgoing Message Rates

When the incoming rate of messages exceeds the processing rate of messages (that is, the outgoing rate), you can receive the warning message shown in [Example B-4](#).

### **Example B-4 Warning Message When Incoming Message Rates Exceed the Processing Message Rate**

```
[2012-04-09T16:49:40.342-04:00] [Soa_server1] [WARNING] []
[oracle.soa.bpel.engine.dispatch] [tid:
weblogic.work.j2ee.J2EEWorkManager$WorkWithListener@e3d0e3d
] [userId: <anonymous>] [ecid: 0000JSnNKVTBh4Z5ln1Fiz1Fdndmd001gWL,0] [APP:
soa-infra] BPEL service engine is overloaded, the inflow is higher than the
outflow, there are "100000" invoke messages pending in the dispatcher in-memory
cache, the configured threshold is "102", the new incoming invoke messages will not
be dispatched or processed immediately, they are going to be persisted in the
dehydration store and can be recovered later using recovery.
```

To resolve this issue, either increase the processing rate or lower (that is, throttle down) the incoming rate. The relatively low processing rate may be due to any or all of the following issues:

- Not enough invoke threads
- Not enough JVM capacity
- The external partners that the BPEL process is calling cannot scale, which causes the messages to back up in the BPEL process.

To identify the exact causes and resolve them, perform the following steps:

1. Check the `oneWayDeliveryPolicy` property value in the `composite.xml` file. Is it set to `async.persist`, `async.cache`, or `sync`? For information about this property, see Appendix "Deployment Descriptor Properties" of *Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite*.
2. Ensure that the outgoing invocations from the BPEL process to external services are not backed up due to low scalability of the external services. If the bottleneck is in an external service, any tuning you perform in Oracle SOA Suite (that is, Steps 3 and 4) does not help. You must first resolve the bottleneck.
3. Monitor your JVM garbage collection (GC). If the GC frequency appears higher than normal and the JVM appears to be near capacity, increase the JVM heap size. If the JVM does not have enough capacity, any tuning you perform in Step 4

makes matters worse.

4. Increase the values for the dispatcher invoke threads and dispatcher engine threads on the BPEL Service Engine Properties page so that the server has more threads to process the incoming messages. For more information, see [Section 13.1, "Configuring BPEL Process Service Engine Properties."](#)

## B.8 Server Troubleshooting

This section describes how to troubleshoot server issues.

For more information about server startup issues, see [Section 3.2, "Stopping and Starting the Managed Server and SOA Infrastructure."](#)

### B.8.1 Best Practices for Starting and Stopping a Managed Server

As a best practice, it is always recommended that you start and stop a managed server through one, but not both, of the following methods. Do *not* mix these methods, such as starting the managed server from the command line and stopping it from Oracle Enterprise Manager Fusion Middleware Control, or vice versa.

- Oracle Enterprise Manager Fusion Middleware Control

With this method, the node manager must be up and running. The node manager tracks all managed server startups and shutdowns performed from Oracle Enterprise Manager Fusion Middleware Control. With this method, the server state is not an issue.

- Command line

With this method, the node manager does not track the server state. Therefore, if you start the server from the command line and shut it down from Oracle Enterprise Manager Fusion Middleware Control, the Oracle WebLogic Administration Server accesses the node manager to determine its status, which returns a state of unknown.

Perform the following steps to stop and start the server from Oracle Enterprise Manager Fusion Middleware Control.

1. Expand the WebLogic domain.
2. Select the managed server (for example, named soa\_server1).
3. Select **Control > Shut Down**.
4. Select **Control > Start Up**.

For information on starting and stopping managed servers from the command line, see *Oracle Fusion Middleware Installation Guide for Oracle SOA Suite and Oracle Business Process Management Suite*.

### B.8.2 Diagnosing SOA Server Startup Problems

If the SOA server (soa\_infra) does not start, there can be various reasons for server startup issues. A discovery-based approach to finding the root cause is required. Check the server and diagnostic logs as a first attempt to diagnose the issue. In addition, check the following.

To diagnose server startup issues:

1. Check if the database is not available or there are not enough connections available. Some failures with Oracle SOA Suite runtime can result from database outage/connectivity issues. Perform the following steps:
  - a. Log in to Oracle WebLogic Server Administration Console.
  - b. In the **Domain Structure**, view the status by selecting **Services > Data Sources > SOADatasource > Monitoring > Testing** to test the data source. You can also check this from a SQL prompt.
2. Check the list of ports used for port conflicts.
3. Check if the MDS repository cannot load shared documents (incorrect MDS configuration or the database that holds the MDS schema is not reachable).
4. Check the Oracle Coherence configuration if using an Oracle SOA Suite cluster (use of unicast versus multicast).

This issue only applies after provisioning is complete. Clustering of SOA servers may fail if there are port conflicts (used by Oracle Coherence). For example, one SOA server may be picking up the deployment, but the other server is not. In some cases, this may only present the following error:

```
[soa_server1] [ERROR] [] [Coherence] [tid: Logger@352821903 3.6.0.4]
[ecid: 46f620208907e045:63f295ec:12dd091ec2e:-8000-0000000000000003,1:27187]
[APP: soa-infra] 2011-01-28 23:06:19.463/414.816 Oracle Coherence GE 3.6.0.4
<Error> (thread=[ACTIVE] ExecuteThread: '0' for queue: 'weblogic.kernel.Default
(self-tuning)', member=n/a):
Error while starting cluster: com.tangosol.net.RequestTimeoutException: Timeout
during service start: ServiceInfo(Id=0, Name=Cluster, Type=Cluster[[...]
```

In this example, Oracle Coherence timeouts are prominently available. However, sometimes it presents itself with an unrelated error, such as the following:

```
Error creating bean with name 'SensorManager' defined in ServletContext
resource
```

The root cause of this is still primarily related to Oracle Coherence configuration.

5. Check if both the administration server and managed server ports are open and accessible.
6. Check if managed server startup failed because the administration server is not reachable.
7. Check network issues (for example, IP routing filtering/rules that may be causing issues).
8. Check Oracle WebLogic Server LDAP security corruption.

The managed server may report that policies for the application System MBeans Browser already exist or do not exist.

For more information, see the "Setting the Frontend URL for the Administration Console and Setting Redirection Preferences" section and the "Setting the Frontend HTTP Host and Port" section in the *Oracle Fusion Middleware Enterprise Deployment Guide for Oracle SOA Suite*.

### B.8.3 Specifying the Proxy Server

To use system properties to specify the proxy server, write your client application in the standard way, and then specify Java system properties when you execute the client application. [Example B-5](#) provides details.

**Example B–5 Proxy Server Specification**

```
setenv PROXY_SETTINGS "-DproxySet=true
-Dhttp.proxyHost=www-myproxy.us.mycompany.com -Dhttp.proxyPort=80
-Dhttp.nonProxyHosts=localhost|*.us.mycompany.com
|0:0:0:0:0:0:1|fe80:0:0:0:250:56ff:fe31"
```

---

**Note:** When you specify values for proxy properties such as `http.proxyHost` and `http.proxyPort`, also specify the `http.nonProxyHosts` property.

---

**B.8.4 Flow Diagram Does Not Display The First Time on Some Lower End Hosts**

The flow diagram for an instance ID of a deployed SOA composite application in Oracle Enterprise Manager Fusion Middleware Control may not display the first time on some lower end hosts. Instead, you receive a failed to load resource message.

As a workaround, close the flow trace page and click the instance ID to return to the flow trace page.

**B.8.5 Accessing Oracle Enterprise Manager Fusion Middleware Control on Dual Stack Hosts that Support IPv4 and IPv6**

If you run Oracle SOA Suite on a dual stack host that supports both IPv4 and IPv6, you must update the `etc/hosts` file as shown in [Table B–23](#) for IPv4 clients to access IPv6 URLs in Oracle Enterprise Manager Fusion Middleware Control.

**Table B–23 IPv4 and IPv6 Settings in etc/hosts File**

On The...	Edit the <code>etc/hosts</code> File as Follows....
On the IPv4 client:	<code>xx.xxx.xxx.xxx myhost10-ipv6</code> where <code>xx.xxx.xxx.xxx</code> is the IP address of IPv6.
On the IPv6 client	<code>2001:0db8:db0a::0:1 myhost10-ipv6 myhost10-ipv6.us.example.com</code> <b>Note:</b> Replace <code>2001:0db8:db0a::0:1</code> with a value appropriate to your host environment.

**B.9 Browser Troubleshooting**

This section describes how to troubleshoot browser issues.

**B.9.1 Limitation on Using the Safari Browser to View WSDL File Content**

If you are using the Safari browser, note the following limitation and workaround for viewing WSDL file contents in Oracle Enterprise Manager Fusion Middleware Control. Note also that Mozilla Firefox works correctly and does not require this workaround.

1. Go to the home page for a SOA composite application.
2. Click the **Show WSDL and endpoint URI** link at the top of the page.
3. Click the WSDL link that is displayed.

This opens a blank page that does *not* display the contents of the selected WSDL.

As a workaround, perform the following additional steps.

4. In the upper right corner of this page, click the **Display a menu for the current page** icon.
5. Select **View Source** from the menu that is displayed.

This displays the contents of the selected WSDL in another page.

## B.10 Additional Troubleshooting Documentation

[Table B-24](#) describes documentation to see for additional troubleshooting issues.

**Table B-24 Additional Troubleshooting Documentation**

For Information About...	See...
SOA Infrastructure startup and shutdown issues	<a href="#">Section 3.2, "Stopping and Starting the Managed Server and SOA Infrastructure."</a>
Using WebLogic Diagnostic Framework (WLDF) and Diagnostics Framework (DFW) to diagnosis Oracle SOA Suite problems	<a href="#">Chapter 12, "Diagnosing Problems with SOA Composite Applications."</a>
Managing large documents and metadata and for managing environments with large numbers of instances	Chapter "Managing Large Documents and Large Numbers of Instances" of <i>Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite</i> .
Deployment and compilation errors	Section "Testing and Troubleshooting" in <i>Oracle Fusion Middleware Developer's Guide for Oracle SOA Suite</i> .
Oracle WSM Policy Manager errors	Section "Diagnosing Problems" chapter in the <i>Oracle Fusion Middleware Security and Administrator's Guide for Web Services</i> .
Oracle Business Activity Monitoring (BAM)	Appendix "Troubleshooting" of <i>Oracle Fusion Middleware User's Guide for Oracle Business Activity Monitoring</i> .
Oracle Business Rules	Appendix "Oracle Business Rules Troubleshooting" of <i>Oracle Fusion Middleware User's Guide for Oracle Business Rules</i> .
Oracle User Messaging Service	<a href="#">Section 27.7, "Troubleshooting Oracle User Messaging Service."</a>

# C

---

## Roles and Privileges for Oracle SOA Suite Users in Oracle Enterprise Manager

This appendix describes role-based access and the privileges that users with the administrator, operator, and monitor roles are authorized with when accessing Oracle SOA Suite pages in Oracle Enterprise Manager Fusion Middleware Control.

This appendix includes the following section:

- [Section C.1, "Roles and Privileges"](#)

For information about how to create roles, add users to groups, and secure resources with roles and policies, see *Oracle Fusion Middleware Securing Resources Using Roles and Policies for Oracle WebLogic Server* and the *Oracle Fusion Middleware Oracle WebLogic Server Administration Console Online Help*. Click the **Contents** link in the Console Help to access procedures for performing the above-mentioned tasks.

### C.1 Roles and Privileges

Oracle Enterprise Manager Fusion Middleware Control supports the notion of role-based access. Users are mapped to different roles; each role corresponds to a different set of privileges. Using this mechanism, you can provision certain users with simple monitoring privileges (for instance view-only access), while administrators can be granted full access, including the ability to update configurations, restart servers, and so on.

The following roles have been defined for Oracle WebLogic Server in Oracle Enterprise Manager Fusion Middleware Control:

- Administrator  
This role provides complete management and monitoring capabilities.
- Operator  
This role provides restricted management capabilities.
- Monitor  
This role provides read-only capabilities.

The actions that you can perform in Oracle Enterprise Manager Fusion Middleware Control are protected using Oracle WebLogic Server enterprise roles (Monitor, Operator, and Administrator). To obtain the appropriate behavior in Oracle Enterprise Manager Fusion Middleware Control, you must correctly map either the user or enterprise role to the Oracle SOA Suite application role.

The following mappings are typically valid:

- Oracle WebLogic Server Monitor enterprise role to SOAMonitor application role
- Oracle WebLogic Server Operator enterprise role to SOAOperator application role
- Oracle WebLogic Server Administrator enterprise role to SOAAdmin application role

Mapping the Oracle WebLogic Server enterprise role to the Oracle SOA Suite application role provides users with the same access to all the users in the Oracle WebLogic Server enterprise role, while mapping a user to the SOA application role restricts access to a given user only.

---

**Notes:**

- There is *no* default mapping of the SOAMonitor and SOAOperator roles to Oracle WebLogic Server groups or users. These roles must be manually mapped in Oracle Enterprise Manager Fusion Middleware Control. For instructions, see [Section 5.2, "Mapping the SOAOperator and SOAMonitor Roles to Oracle WebLogic Server Groups or Users"](#)
  - You need both the Oracle WebLogic Server enterprise role (for example, Oracle WebLogic Server Monitor) and the Oracle SOA Suite application role (for example, SOAMonitor) to use Oracle Enterprise Manager Fusion Middleware Control. If you have only one of these roles, Oracle Enterprise Manager Fusion Middleware Control does not work properly.
  - Exercise care when mapping Oracle SOA Suite application roles to Oracle WebLogic Server groups or users. For example, if a user with the Oracle WebLogic Server Monitor role is mapped to the SOAOperator role, they have deployment permissions on the back end of Oracle SOA Suite, but cannot deploy composites in Oracle Enterprise Manager Fusion Middleware Control. This is because Oracle Enterprise Manager Fusion Middleware Control identifies the user as having the Oracle WebLogic Server Monitor role, meaning that the deployment option is disabled.
- 

### C.1.1 Overall Role Functionality Matrix

[Table C-1](#) lists the actions that users with the correct role mapping can perform.

**Table C-1 Role Functionality Matrix**

<b>Actions</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View monitoring metrics	Yes	Yes	Yes
View configurations	Yes	Yes	Yes
Update configurations	No	No	Yes
Handle fault actions	No	Yes	Yes

**Table C–1 (Cont.) Role Functionality Matrix**

<b>Actions</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
Create instances using the Test Web Service page	Yes  <b>Note:</b> You can restrict the creation of composite test instances with OWSM policies.	Yes	Yes
Start, stop, retire, and activate a composite	No	Yes	Yes
Execute unit tests	No	Yes	Yes
Attach and detach policies	No	No	Yes
View instances, the flow trace, and the audit trail	Yes	Yes	Yes
View audit trail payloads	Yes	Yes	Yes
Delete instances	No	No	Yes
Start and stop the SOA Infrastructure	No	Yes	Yes
Perform deployment options (deploy, undeploy, and redeploy)	No	Yes	Yes
Modify composite properties (enable payload and audit level)	No	Yes	Yes
Create partitions	No	No	Yes
Delete partitions	No	No	Yes
Bulk composite lifecycle management (start all, stop all, retire all, and activate all)	No	Yes	Yes

---

**Note:** When you select the **WebLogic Domain** folder in the navigator, the **WebLogic Domain** menu is displayed at the top of the page. The **Application Deployment** option in this menu enables you to deploy Java EE applications if you have the administrator role. A user with the operator role *cannot* deploy Java EE applications.

---

## C.1.2 SOA Infrastructure Page Access

Table C–2 lists the lowest role that a user must have to access this page and the privileges that a user with the correct role mapping has on this page.

**Table C-2 SOA Infrastructure Page**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View Dashboard tab	Monitor	Yes	Yes	Yes
View Deployed Composites tab	Monitor	Yes	Yes	Yes
▪ Start/stop (SOA Infrastructure)	Operator	No	Yes	Yes
▪ Activate/retire	Operator	No	Yes	Yes
▪ Deployment options	Operator	No	Yes	Yes
▪ Set as default	Operator	No	Yes	Yes
View Instances tab	Monitor	Yes	Yes	Yes
▪ Delete options (all)	Administrator	No	No	Yes
▪ Abort	Administrator	No	No	Yes
View Faults and Rejected Messages tab	Monitor	Yes	Yes	Yes
▪ Recovery actions	Operator	No	Yes	Yes
▪ Delete rejected messages	Administrator	No	No	Yes

### C.1.3 SOA Infrastructure Menu Access

Table C-3 lists the lowest role that a user must have to access the options on this menu and the privileges that each role mapping has on the menu options.

**Table C-3 SOA Infrastructure Menu**

Menu Items	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
Control	Operator	No	Yes	Yes
SOA Deployment	Operator	No	Yes	Yes
Logs > Log Configuration	Administrator	No	No	Yes
Other menu items	Monitor	Yes	Yes	Yes

### C.1.4 SOA Composite Menu Access

Table C-4 lists the lowest role that a user must have to access the options on this menu and the privileges that each role mapping has on the menu options.

**Table C-4 SOA Composite Menu**

Menu Items	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
SOA Deployment	Operator	No	Yes	Yes
Test Service	Monitor	Yes	Yes	Yes
Other menu items	Monitor	Yes	Yes	Yes

### C.1.5 Composite Home Page Access

Table C-5 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C–5 Composite Home Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes
▪ Test composite service action	Operator	Yes	Yes	Yes
▪ Activate/retire action	Operator	No	Yes	Yes
▪ Start/stop action	Operator	No	Yes	Yes
▪ Property changes (settings)	Operator	No	Yes	Yes
View <b>Instances</b> tab	Monitor	Yes	Yes	Yes
▪ Delete/abort actions	Administrator	No	No	Yes
View <b>Faults</b> tab	Monitor	Yes	Yes	Yes
▪ Fault recovery actions	Operator	No	Yes	Yes
▪ Delete rejected messages	Administrator	No	No	Yes
View <b>Unit Test</b> tab	Monitor	Yes	Yes	Yes
▪ Execute test action	Operator	No	Yes	Yes
View <b>Policies</b> tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes

## C.1.6 BPEL Process Service Engine Access

Table C–6 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C–6 BPEL Process Service Engine**

<b>Menu Items</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes
View <b>Statistics</b> tab	Monitor	Yes	Yes	Yes
View <b>Instances</b> tab	Monitor	Yes	Yes	Yes
View <b>Faults</b> tab	Monitor	Yes	Yes	Yes
▪ Fault recovery actions (abort, retry, and so on)	Operator	No	Yes	Yes
View <b>Deployed Components</b> tab	Monitor	Yes	Yes	Yes
<b>Message Recovery</b> tab	Monitor	Yes	Yes	Yes
▪ BPEL message recovery action	Operator	No	Yes	Yes
View Configuration (Properties page)	Monitor	Yes	Yes	Yes
▪ <b>Apply</b> button	Administrator	No	No	Yes
▪ <b>Add</b> button	Administrator	No	No	Yes

## C.1.7 Oracle Mediator Service Engine Access

[Table C-7](#) lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-7 Mediator Service Engine**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View Dashboard tab	Monitor	Yes	Yes	Yes
View Statistics tab	Monitor	Yes	Yes	Yes
View Instances tab	Monitor	Yes	Yes	Yes
View Faults tab	Monitor	Yes	Yes	Yes
▪ Fault recovery action (abort, retry, and so on)	Operator	No	Yes	Yes
View Deployed Components tab	Monitor	Yes	Yes	Yes
View Configuration (Properties page)	Monitor	Yes	Yes	Yes
Apply button	Administrator	No	No	Yes

## C.1.8 Human Workflow Service Engine Access

[Table C-8](#) lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-8 Human Workflow Service Engine**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View Dashboard tab	Monitor	Yes	Yes	Yes
View Statistics tab	Monitor	Yes	Yes	Yes
View Instances tab	Monitor	Yes	Yes	Yes
View Faults tab	Monitor	Yes	Yes	Yes
▪ Fault recovery action	Operator	No	Yes	Yes
View Deployed Components tab	Monitor	Yes	Yes	Yes
View Notification Management tab	Monitor	Yes	Yes	Yes
▪ Send notifications	Administrator	No	No	Yes
Configuration (Properties page)	Monitor	Yes	Yes	Yes
▪ Apply button	Administrator	No	No	Yes

## C.1.9 Business Rules Service Engine Access

[Table C-9](#) lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-9 Business Rules Service Engine**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes
View <b>Instances</b> tab	Monitor	Yes	Yes	Yes
View <b>Faults</b> tab	Monitor	Yes	Yes	Yes
View <b>Deployed Components</b> tab	Monitor	Yes	Yes	Yes

### C.1.10 BPEL Process Service Component Home Page Access

Table C-10 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-10 BPEL Process Service Component Home Page**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes
View <b>Instances</b> tab	Monitor	Yes	Yes	Yes
View <b>Faults</b> tab	Monitor	Yes	Yes	Yes
▪ Fault recovery action	Operator	No	Yes	Yes
View <b>Policies</b> tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes

### C.1.11 Oracle Mediator Service Component Home Page Access

Table C-11 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-11 Mediator Service Component Home Page**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes
View <b>Instances</b> tab	Monitor	Yes	Yes	Yes
View <b>Faults</b> tab	Monitor	Yes	Yes	Yes
▪ Fault recovery action	Operator	No	Yes	Yes
View <b>Policies</b> tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes

### C.1.12 Human Task Service Component Home Page Access

Table C-12 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-12 Human Task Service Component Home Page**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View Dashboard tab	Monitor	Yes	Yes	Yes
View Instances tab	Monitor	Yes	Yes	Yes
View Faults tab	Monitor	Yes	Yes	Yes
▪ Fault recovery action	Operator	No	Yes	Yes
View Policies tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes
View Administration tab	Monitor	Yes	Yes	Yes
▪ Apply changes	Administrator	No	No	Yes

### C.1.13 Decision Service Component Home Page Access

[Table C-13](#) lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-13 Decision Service Component Home Page**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View Dashboard tab	Monitor	Yes	Yes	Yes
View Instances tab	Monitor	Yes	Yes	Yes
View Faults tab	Monitor	Yes	Yes	Yes
▪ Fault recovery action	Operator	No	Yes	Yes
View Policies tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes

### C.1.14 Flow Trace Page Access

[Table C-14](#) lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-14 Flow Trace Page**

Page Elements	Lowest Role for Accessing	With Monitor to SOAMonitor Mapping Set	With Operator to SOAOperator Mapping Set	With Administrator to SOAAdmin Mapping Set
View Flow trace	Monitor	Yes	Yes	Yes

### C.1.15 Audit Trail Access

[Table C-15](#) lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-15 Audit Trail Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View <b>Audit Trail</b> tab	Monitor	Yes	Yes	Yes
▪ Audit trail payloads	Monitor	Yes	Yes	Yes
View <b>Flow Debug</b> tab	Monitor	Yes	Yes	Yes
View <b>Sensors</b> tab	Monitor	Yes	Yes	Yes
View <b>Fault Recovery</b> tab	Monitor	Yes	Yes	Yes
▪ Recovery action	Operator	No	Yes	Yes

### C.1.16 Services Home Page Access

Table C-16 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-16 Services Home Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes
View <b>Policies</b> tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes
View <b>Faults</b> tab	Monitor	Yes	Yes	No
▪ Delete rejected messages	Administrator	No	No	Yes
View Properties	Monitor	Yes	Yes	Yes
▪ Apply changes	Administrator	No	No	Yes
▪ Add properties	Administrator	No	No	Yes

### C.1.17 References Home Page Access

Table C-17 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-17 References Home Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View <b>Dashboard</b> tab	Monitor	Yes	Yes	Yes

**Table C-17 (Cont.) References Home Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View Policies tab	Monitor	Yes	Yes	Yes
▪ Attach/detach action	Administrator	No	No	Yes
View Faults tab	Monitor	Yes	Yes	Yes
▪ Delete rejected messages	Administrator	No	No	Yes
View Properties	Monitor	Yes	Yes	Yes
▪ Apply changes	Administrator	No	No	Yes
▪ Add properties	Administrator	No	No	Yes

### C.1.18 Oracle B2B Pages Access

Table C-18 lists the lowest role that a user must have to access these pages and the privileges that each role mapping has on these pages.

**Table C-18 B2B Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View B2B Configuration page	Monitor	Yes	Yes	Yes
▪ Apply changes	Administrator	No	No	Yes
View B2B Bindings page	Monitor	Yes	Yes	Yes

### C.1.19 Business Events Page Access

Table C-19 lists the lowest role that a user must have to access this page and the privileges that each role mapping has on this page.

**Table C-19 Business Events Page**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View Events tab	Monitor	Yes	Yes	Yes
▪ Subscribe/test	Administrator	No	No	Yes
▪ Show event definition	Monitor	Yes	Yes	Yes
View Subscriptions tab	Monitor	Yes	Yes	Yes
▪ Add/edit/delete subscriptions	Administrator	No	No	Yes
▪ Manage database agents	Administrator	No	No	Yes
View Faults tab	Monitor	Yes	Yes	Yes
▪ Retry/abort	Operator	No	Yes	Yes

### C.1.20 System MBean Browser Access

Table C-20 lists the lowest role that a user must have to access this browser and the privileges that each role mapping has on this page.

**Table C–20 System MBean Browser**

<b>Page Elements</b>	<b>Lowest Role for Accessing</b>	<b>With Monitor to SOAMonitor Mapping Set</b>	<b>With Operator to SOAOperator Mapping Set</b>	<b>With Administrator to SOAAdmin Mapping Set</b>
View Configuration	Monitor	Yes	Yes	Yes
■ Add/apply changes	Administrator	No	No	Yes



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