

Oracle® Fusion Middleware

Administering Oracle SOA Suite and Oracle Business Process Management Suite



12c Release (12.2.1.3.0)

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Oracle Fusion Middleware Administering Oracle SOA Suite and Oracle Business Process Management Suite, 12c Release (12.2.1.3.0)

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Preface

Administering 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 JCA Adapters, and business events

Audience

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

Related Documents

Refer to the [Oracle Fusion Middleware library on the Oracle Help Center](#) for additional information.

- For Oracle SOA Suite information, see Oracle SOA Suite.
- For adapters information, see On-Premises Integration Adapters.
- For Oracle BAM information, see Oracle Business Activity Monitoring.
- For Oracle B2B information, see Oracle B2B.
- For Oracle Business Process Management information, see Oracle Business Process Management.
- For Oracle Enterprise Scheduler information, see Oracle Enterprise Scheduler.
- For Oracle Managed File Transfer information, see Oracle Managed File Transfer.
- For Oracle Service Bus information, see Oracle Service Bus.
- For Oracle SOA Suite for healthcare integration information, see Oracle SOA Suite for Healthcare Integration.
- For versions of platforms and related software for which Oracle products are certified and supported, review the [Certification Matrix on OTN](#).

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

For Oracle SOA Suite 12c (12.2.1.x), this guide has been updated to include the following new and changed administration features:

- New appendix with steps to migrate a non-container database (non-CDB) to a container database (CDB). See [Migrating from a Non-Container Database \(Non-CDB\) to a Container Database \(CDB\)](#).
- New chapter about managing permissions and roles in 12c. See [Managing Permissions and Roles for Oracle SOA Suite Users](#).
- In 12c (12.2.1.1): Enhanced support for Resiliency. REST Services are supported. Both Web Services and REST Services can now be suspended at the operation level. More adapters are supported. See [Preventing Faults from Building Up in SOA](#).
- In 12c (12.2.1.1): SOA partitions have been renamed to SOA folders. The new SOA Folders tab can be accessed from the SOA Infrastructure home page. See [Introduction to SOA Folders](#) and [Navigating Through the SOA Folder Home Page and Menu](#).

More Information

For other Oracle SOA Suite new features and known issues in this release, see *Release Notes for Oracle SOA Suite*.



Note:

Screens shown in this guide may differ slightly from your implementation. Any differences are cosmetic.

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:

- [Introduction and Concepts](#)

1

Introduction and Concepts

Understand 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. Also get an overview of Oracle Enterprise Manager 12c Cloud Control and the Oracle SOA Management Pack.

- [What Is Oracle Fusion Middleware?](#)
- [What Is Oracle SOA Suite?](#)
- [What Is Oracle Business Process Management Suite?](#)
- [Administration of Oracle SOA Suite and Oracle BPM Suite](#)
- [Administration for Application Developers](#)
- [Administration Channels for WebLogic Server](#)
- [Administration with Oracle Enterprise Manager and the Oracle SOA Management Pack](#)

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

- *Tuning Performance*
- *Administering Oracle Fusion Middleware*
- *Understanding Oracle Fusion Middleware*

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.

- [Introduction to the SOA Infrastructure Application](#)

- [Introduction to SOA Folders](#)
- [Introduction to SOA Composite Applications](#)
- [Introduction to Business Flow Instances](#)
- [Introduction to Service Components](#)
- [Introduction to Binding Components](#)
- [Introduction to Service Engines](#)
- [Introduction to the Service Infrastructure](#)
- [Introduction to the Contents of SOA Composite Applications](#)
- [Introduction to Oracle SOA Suite and Oracle Enterprise Scheduler Integration](#)

For introductory information about Oracle SOA Suite, see *Understanding Oracle SOA Suite*. For information about Oracle SOA Suite architecture and building applications, see *Developing SOA Applications with 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 SOA folder of your choice in the SOA Infrastructure. SOA folders 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 the overall status of the SOA Infrastructure, monitoring the deployed SOA composite applications in the SOA Infrastructure, updating the state of SOA composite applications, tracking business flow instances, and performing fault recovery in the Error Hospital.

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

The screenshot shows the SOA Infrastructure web console interface. At the top, there is a navigation bar with tabs for Dashboard, Deployed Composites (selected), Flow Instances, and Error Hospital. The user is logged in as 'weblogic1' and the page was refreshed on Feb 22, 2014 at 10:09:40 AM PST. Below the navigation bar, there is a message stating: '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.' There is a search bar with a dropdown menu set to 'Composite' and a 'Show only active composites' checkbox. Below the search bar, there are buttons for 'Deploy...', 'Undeploy...', and 'Redeploy...'. The main content is a table with the following columns: Composite, Partition, Status, Mode, and Deployed. The table lists 12 SOA composite applications, all with a status of 'Active' and a deployment time from Feb 19, 2014.

| Composite | Partition | Status | Mode | Deployed |
|--|--------------|--------|--------|--------------------------|
| BpelRecoveryE2ETest [1.0] | default | Active | Active | Feb 20, 2014 2:58:45 AM |
| FaultFlow [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:13 PM |
| SimpleFileout [4.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:10 PM |
| fa [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:09 PM |
| AdapterEISConnectivityTest [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:08 PM |
| ExternalComposite [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:08 PM |
| Project1 [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:05 PM |
| MultivalueProj [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:04 PM |
| DocStyleServiceScalarValuesComposite [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:03 PM |
| SecureHelloWorldComposite [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:03 PM |
| HWFPProj [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:01:01 PM |
| MediatorDHQA [1.0] | consoleTests | Active | Active | Feb 19, 2014 11:00:59 PM |

You can click a specific SOA composite application in the **Composite** table to access its home page. Figure 1-2 shows the home page for a SOA composite application. From the SOA composite application home page, you can perform administration tasks such as viewing the service components and service and reference binding components included in the SOA composite application, viewing a graphical representation of the SOA composite application, updating the state of the SOA composite application, monitoring business flow instances, automating testing of the SOA composite application, and attaching security policies. You can also perform a limited number of configuration tasks at the SOA composite application level, such as specifying the composite audit level, specifying payload validation, and enabling and disabling the collection of analytic and sensor data. These tasks are displayed as buttons at the top of the page.

Figure 1-2 SOA Composite Application Home Page

CustomerService [1.0] ⓘ

SOA Composite ▼

Logged in as **weblogic** 👤

Page Refreshed **Dec 24, 2013 8:37:02 AM PST** 🔄

Active: Retire ... Shut Down... Test Settings... 🔍 📄 🔗 Related Links

Dashboard Composite Definition Flow Instances Unit Tests Policies

Components

| Name | Component Type |
|-------------------------|----------------|
| GetCustomersBPEL | BPEL |
| DeleteCustomerBPEL | BPEL |
| GetCustomerBPEL | BPEL |
| PutCustomerBPEL | BPEL |
| CustomerMediatorService | Mediator |

Services and References

| Name | Type | Usage | Total Messages | Average Processing Time (sec) |
|----------------------------|--------------|-----------|----------------|-------------------------------|
| CustomerMediatorService_ep | Web Service | Service | 0 | 0.000 |
| CustomerRestService | REST Binding | Service | 0 | 0.000 |
| CustomerServiceAdapter | JCA Adapter | Reference | 0 | 0.000 |

For more information, see the following sections:

- [Introduction to SOA Composite Applications](#)
- [Administering the SOA Infrastructure](#)
- [Monitoring the Service Components and Binding Components of a SOA Composite Application.](#)

1.2.2 Introduction to SOA Folders

You can deploy SOA composite applications into separate sections of the SOA Infrastructure known as *SOA folders*. Deploying to SOA folders enables you to logically group SOA composites and perform bulk lifecycle management tasks on large numbers of composites. At least one folder is required for deploying SOA composite applications. A default folder named **default** is automatically included with Oracle SOA Suite.

You can perform the following tasks:

- Deploy SOA composite applications into a SOA folder using Oracle Enterprise Manager Fusion Middleware Control, Oracle JDeveloper, WebLogic Scripting Tool (WLST) commands, or `ant` commands.
- Access the folder and its deployed composites using the **SOA Folders** tab on the SOA Infrastructure page.
- Perform the following bulk lifecycle management tasks on the composites in a specific folder:
 - Start all composites
 - Shut down all composites
 - Undeploy all composites
 - Retire all composites

- Activate all composites
- List all composites
- Secure user access to folders, which provides the following benefits:
 - Administrative access control
 - Striping of instance data by folders
 - Folder level resource management

**Note:**

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

For more information about folders and folder security, see [Managing SOA Folders and Work Manager Groups](#).

1.2.3 Introduction to SOA Composite Applications

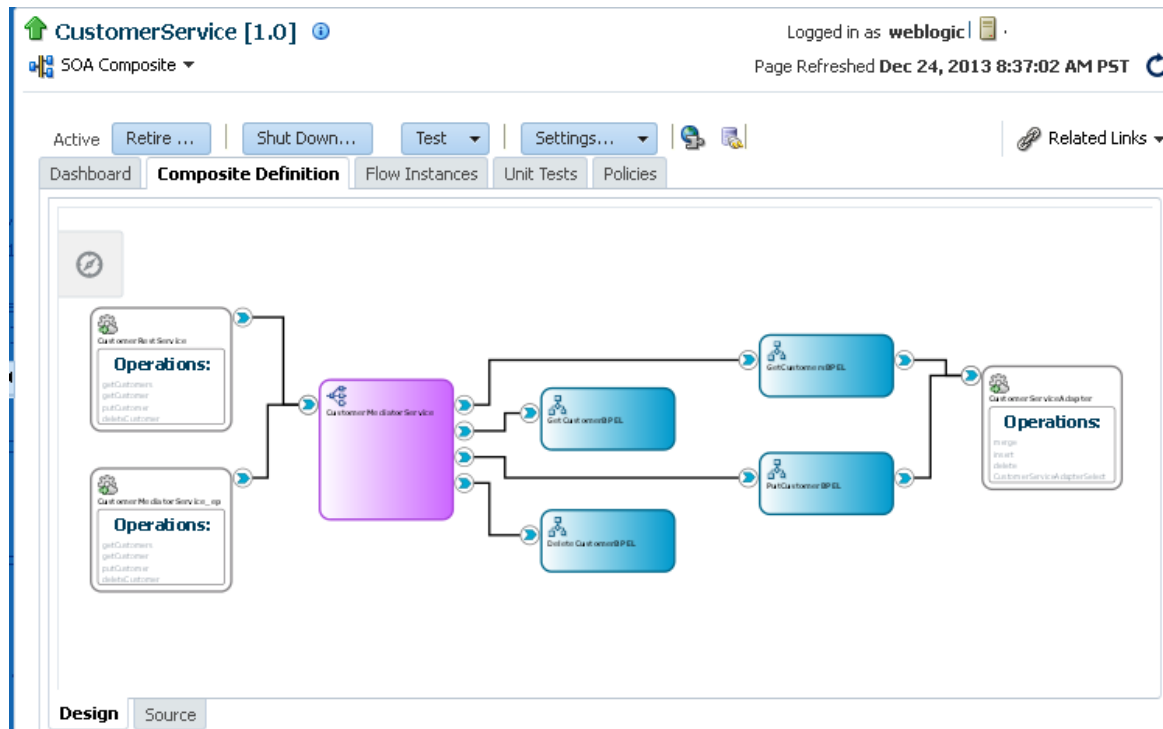
SOA composite applications such as those shown in the Deployed Composites page in [Figure 1-1](#) consist of the following:

- 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 1-3](#) shows a diagram of a SOA composite application on the Composite Definition page. Service binding components in the left swimlane (labeled as **Operations**) advertise their capabilities to external consumers. The service exposes a public interface of the SOA composite application that can consist of BPEL process, Oracle Mediator, decision service (business rule), spring, and human task service components. A wire connects the service to a specific component or reference in the composite. Reference binding components in the right swimlane (also labeled as **Operations**) 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. The Composite Definition page is similar to the diagram of the SOA composite application in the SOA Composite Editor in Oracle JDeveloper.

Figure 1-3 SOA Composite Application



The service components and binding components included in a SOA composite application are displayed in the Dashboard page of a SOA composite application. Figure 1-4 shows BPEL process and Oracle Mediator service components in the **Components** section and service and reference binding components in the **Services and References** section. You can click a specific service component or binding component to access its home page.

Figure 1-4 Service Components and Binding Components of a SOA Composite Application

| Components | |
|-------------------------|----------------|
| Name | Component Type |
| GetCustomersBPEL | BPEL |
| DeleteCustomerBPEL | BPEL |
| GetCustomerBPEL | BPEL |
| PutCustomerBPEL | BPEL |
| CustomerMediatorService | Mediator |

| Services and References | | | | | |
|----------------------------|--------------|-----------|----------------|-------------------------------|--|
| Name | Type | Usage | Total Messages | Average Processing Time (sec) | |
| CustomerMediatorService_ep | Web Service | Service | 0 | 0.000 | |
| CustomerRestService | REST Binding | Service | 0 | 0.000 | |
| CustomerServiceAdapter | JCA Adapter | Reference | 0 | 0.000 | |

For more information, see the following documentation:

- [Introduction to Service Components](#)
- [Introduction to Binding Components](#)
- [Administering SOA Composite Applications and Instances](#)
- [Viewing the SOA Composite Application Diagram](#)
- [Administering Binding Components](#)
- *Developing SOA Applications with Oracle SOA Suite*

1.2.4 Introduction to Business Flow Instances

When you create an instance of a SOA composite application, a business flow instance is created. A business flow instance is defined as follows:

- Corresponds to an end-to-end business transaction.
- Consists of a single SOA composite application or multiple SOA composite applications connected together in a business flow. The SOA composite application that initiates the business flow instance is known as the initiating composite. All other SOA composite applications in the business flow instance are known as the participating composites. A business flow can also include Oracle Service Bus components.
- Provides a complete view of the flow, rather than a subsection of the flow.
- Is identified by a single flow ID value.

You track business flow instances from the Flow Instances page at the SOA Infrastructure, individual partition, or individual SOA composite application level in Oracle Enterprise Manager Fusion Middleware Control. For example, [Figure 1-5](#) shows flow IDs displayed for SOA composite applications in the Flow Instances page of the SOA Infrastructure. When you first access this page, business flow instances do not display. You must first click **Search** to display business flow instances. You can click the flow ID to access the flow trace of the business flow instance. From the Flow Instances page, you can perform additional tasks:

- Monitor the state of business flow instances (completed, recovery required, and so on).
- Delete or terminate business flow instances.
- Recover from faults.
- View composite sensor values.
- View the initiating and participating composites.
- View any resequencing groups.

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 flow ID. For some SOA composite applications, conversation IDs are also generated. Conversation IDs provide another method for distinctly identifying a set of generated instances. 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 1-5 Flow IDs of Business Flow Instances at the SOA Infrastructure Level

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|---------------------------|------------|----------------------|--------------|
| 5 | FaultFlow [1.0] | Recovery | 08-May-2016 22:57:57 | 08-May-2016 |
| 4 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:42:47 | 08-May-2016 |
| 3 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:42:32 | 08-May-2016 |
| 2 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:41:48 | 08-May-2016 |
| 1 | BpelRecoveryE2ETest [1.0] | Completed | 08-May-2016 22:38:01 | 08-May-2016 |

For more information, see the following sections:

- [Introduction to Service Components](#)
- [Tracking Business Flow Instances](#)
- [Recovering From Faults in the Error Hospital](#)
- [Initiating a Test Instance of a Business Flow.](#)

1.2.5 Introduction to Service Components

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.

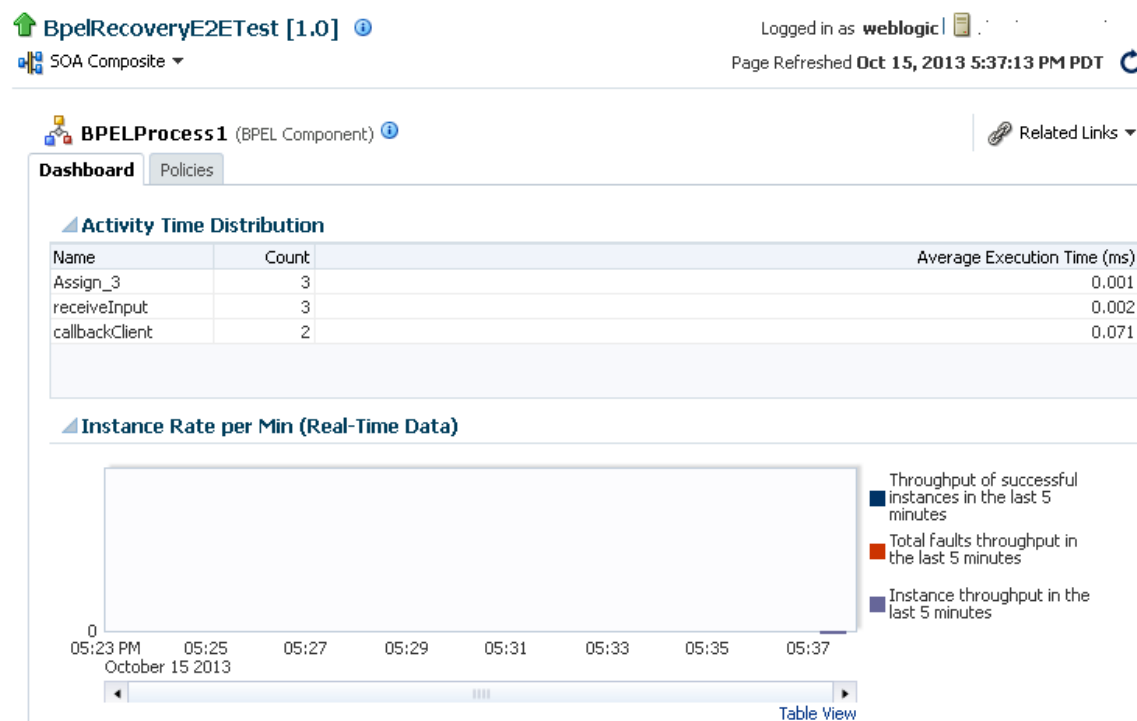
The following service components can be used in a SOA composite application:

- 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 viewing BPEL process activity time distribution details and attaching security policies. [Figure 1-6](#) provides details.

Figure 1-6 Service Component Home Page of a BPEL Process



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

- [Administering BPEL Process Service Components and Engines](#)
- [Administering Oracle Mediator Service Components and Engines](#)
- [Administering Decision Service Components and Business Rules Service Engines](#)
- [Administering Human Task Service Components and Human Workflow Service Engines](#)
- [Administering Oracle BPMN Process Service Components and Engines](#)

1.2.5.1 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.
- 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 spring instance. Therefore, you cannot abort the running instance and cannot have a terminated state for the spring service component.

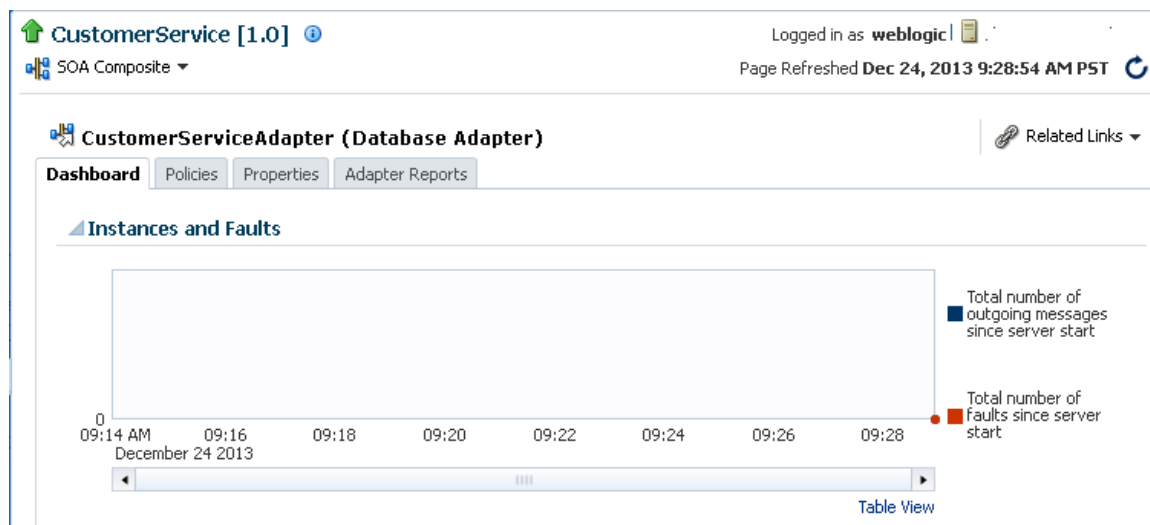
1.2.6 Introduction to Binding Components

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 viewing the total number of outgoing messages and faults since the last server startup, attaching policies, setting binding component properties, and, for JCA adapters, viewing reports. [Figure 1-7](#) shows the home page of a service binding component (for this example, a JCA database adapter).

Figure 1-7 Binding Components



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

1.2.7 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 1-8 provides an example in Oracle Enterprise Manager Fusion Middleware Control of the BPEL process service engine. 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 and the SOA composite application in which it is included.

Figure 1-8 Service Components Running in a Service Engine

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface for the BPEL Engine (Service Engine). The page is titled "BPEL Engine (Service Engine)" and includes a search bar and a table of deployed components. The table has three columns: Name, Composite, and Status. All components are shown with a green up arrow status, indicating they are running.

| Name | Composite | Status |
|----------------------|--|--------|
| BPELProcess1 | fa [1.0] | ↑ |
| BPELProcess1 | DocStyleServiceScalarValuesComposite [1.0] | ↑ |
| BPELProcess3 | ExternalComposite [1.0] | ↑ |
| BPELProcess2 | ExternalComposite [1.0] | ↑ |
| BPELProcess1 | ExternalComposite [1.0] | ↑ |
| BPELProcess5 | ExternalComposite [1.0] | ↑ |
| BPELProcess4 | ExternalComposite [1.0] | ↑ |
| WlsRulesFaultProcess | WlsRulesFaultProject [1.0] | ↑ |
| BPELProcess1 | HWFPProj [1.0] | ↑ |
| AmericanLoan | FaultFlow [1.0] | ↑ |
| UnitedLoan | FaultFlow [1.0] | ↑ |

In Oracle Enterprise Manager Fusion Middleware Control, you can perform service engine administration tasks such as monitoring service components and composites, viewing message request and thread statistics, 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.

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

- [Administering BPEL Process Service Components and Engines](#)
- [Administering Oracle Mediator Service Components and Engines](#)

- [Administering Decision Service Components and Business Rules Service Engines](#)
- [Administering Human Task Service Components and Human Workflow Service Engines](#)
- [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.

1.2.8 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:

- [Monitoring Message Delivery Processing Requests](#)
- *Developing SOA Applications with Oracle SOA Suite* for details about wiring

1.2.9 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
- REST service
- EJB service
- Direct binding service
- Oracle Application Development Framework (ADF) Business Component service
- Oracle BAM 11g (This adapter can only connect to an Oracle BAM 11g server.)
- Oracle B2B
- Oracle Healthcare

- Business events
- Oracle User Messaging Service

For conceptual information about these service components, binding components, and services, see *Understanding Oracle SOA Suite* and *Developing SOA Applications with Oracle SOA Suite*. For information about JCA adapters, see *Understanding Technology Adapters*.

1.2.10 Introduction to Oracle SOA Suite and Oracle Enterprise Scheduler Integration

Oracle Enterprise Scheduler enables you to define, schedule, and run jobs. A job is a unit of work done on an application's behalf. For example, you define a job that runs a particular PL/SQL function or command-line process.

When Oracle Enterprise Scheduler is deployed with Oracle SOA Suite, you can create jobs to perform tasks. For example, you can create error notification rules at the SOA Infrastructure or individual SOA folder level that cause an alert message to be triggered when specific fault criteria are met.

Oracle Enterprise Scheduler is currently focused on scheduling embedded product jobs. Use Oracle Enterprise Scheduler only for the following tasks:

- Schedule web services (composites, proxy services, and others).
- Schedule adapter activate and deactivate.
- Schedule fault notification and bulk fault recovery.
- Schedule scripts.
- Submit jobs and job sets from Oracle SOA Suite/Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control. You can use Oracle Enterprise Scheduler web service jobs to schedule SOA composite applications:
 - Create job definition metadata using Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control and secure the job with Oracle Web Services Manager (OWSM) policies. The job definition must be created in the namespace `/oracle/apps/ess_custom/soa`. The SOA system administrator has Oracle Enterprise Scheduler permissions to create this job. For information about creating job metadata, see *Managing Job Metadata* in *Administering Oracle Enterprise Scheduler*.
 - Submit the job using Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control and define a schedule when submitting the job. For information about submitting jobs, see *Managing Oracle Enterprise Scheduler Requests* in *Administering Oracle Enterprise Scheduler*.
- Create custom metadata from Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control.
- Manage, view job output, throttle, and control threads in Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control.
- Submit a job from a BPEL process.
- Use Enterprise Scheduler Web service (`ESSWebservice`) to access a subset of the Oracle Enterprise Scheduler runtime functionality. The `ESSWebservice` is provided primarily to support SOA integration, for example invoking Oracle Enterprise Scheduler from a BPEL process. However, any client that needs a Web service to interact with Oracle Enterprise

Scheduler can use `ESSWebservice`. `ESSWebservice` exposes job scheduling and management functionality for request submission and request management.

- Use all Oracle Enterprise Scheduler WLST commands in Oracle SOA Suite environments, as described in *WLST Command Reference for SOA Suite*.

For other uses, documentation and support may be incomplete and not supported in this release.

For more information about Oracle Enterprise Scheduler, see the following documentation:

- [Creating Error Notification Rules](#)
- *Administering Oracle Enterprise Scheduler*
- *Developing Applications for Oracle Enterprise Scheduler*

1.2.10.1 Cross-Component Wiring Between Oracle SOA Suite and Oracle Enterprise Scheduler

Oracle SOA Suite jobs (adapter activation/deactivation, fault notification, and bulk fault recovery) and Oracle Enterprise Scheduler are by default mutually wired bidirectionally using cross-component wiring. Oracle SOA Suite is automatically wired to Oracle Enterprise Scheduler, and vice versa. Each wire is implemented in two parts.

- The first part publishes where the URL is written to the service table.
- The second part consumes where the service table is read and the URL is cached in the local configuration.

If the URL changes, the republishing is typically automatic. However, on the consumption side, you must manually reread the service table and recache it in Oracle Enterprise Manager Fusion Middleware Control. You can also manually rewire when port numbers and others change in Oracle Enterprise Manager Fusion Middleware Control.

For more information about performing these tasks, see the "Wiring Components to Work Together" chapter of *Administering Oracle Fusion Middleware*.

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.
- 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

For more information, see the following documentation:

- [Administering Oracle BPMN Process Service Components and Engines](#)
- *Developing Business Processes with Oracle Business Process Composer*
- *Developing Business Processes with Oracle Business Process Management Studio*

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.

- [Configuration of Oracle SOA Suite and Oracle BPM Suite](#)
- [Monitoring of Oracle SOA Suite and Oracle BPM Suite](#)
- [Management of Oracle SOA Suite and Oracle BPM Suite](#)
- [Performance and Tuning of Oracle SOA Suite and Oracle BPM Suite](#)

The administrative tasks that you can perform are based on the SOA folder roles to which you are mapped. Each SOA folder role corresponds to a different set of privileges. You can assign the specific SOA folder roles you want a user to possess on a SOA folder. These roles determine the tasks that a user can perform in Oracle Enterprise Manager Fusion Middleware Control. For more information, see [Securing Access to SOA Folders](#).

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 *Tuning Performance*.

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:

- Individual BPEL activity
- 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 some typical examples of audit level settings.

Table 1-1 Examples of Audit Levels and Order of Precedence

| BPEL Activity | Component | Composite | Service Engine | SOA Infrastructure | Which Setting Takes Effect? |
|---------------|-------------|------------------------|----------------|--------------------|--|
| No property | No property | No property | Inherit | Production | SOA Infrastructure This is the out-of-the-box setting. The audit level is set to Production . The SOA Infrastructure settings are inherited by the child (Service Engine, composite, component, activity) levels. No property defaults to Inherit . |
| No property | No property | No property | Inherit | Off | SOA Infrastructure The audit level is set to Off . This is the recommended setting, and leads to performance enhancements. Depending on your audit requirements, you can then individually set the audit levels for composites that require auditing for debugging or compliance. |
| No property | No property | Production/Development | Inherit | Off | Composite The audit level is set to Production/Development . The composite setting overrides the setting at the SOA Infrastructure level. |

Table 1-1 (Cont.) Examples of Audit Levels and Order of Precedence

| BPEL Activity | Component | Composite | Service Engine | SOA Infrastructure | Which Setting Takes Effect? |
|------------------------|--------------------------|-------------|----------------|--------------------|---|
| No property | Production / Development | No property | Inherit | Off | Component The audit level for the component is set to Production/Development , overriding the settings at parent levels. |
| Production/Development | No property | No property | Inherit | Off | BPEL Activity. The audit level for the BPEL activity is set to Production/Development , overriding the settings at the parent levels. |

 **Note:**

The default audit level value at the BPEL activity, component, composite, and service engine levels is **Inherit**. If the audit level property is missing, it defaults to **Inherit**. The default audit level at the SOA Infrastructure level is **Production**.

To limit database growth, and for optimal performance, Oracle recommends that you turn **Off** the setting at the SOA Infrastructure level, and set the audit level at the composite level for composites that require debugging or monitoring. Your compliance requirements might also determine the granularity of your audit requirements.

The following sections describe configuring audit levels:

- See [Configuring the SOA Infrastructure](#) for more information about configuring audit level settings at the SOA Infrastructure level.
- See [Configuring BPEL Process Service Engine Properties](#) for more information about configuring audit level settings at the BPEL service engine level.
- See [Managing the State of an Application from the SOA Composite Application Home Page](#) for more information about configuring audit level settings at the composite level.
- See [Setting the Audit Level at the BPEL Process Service Component Level](#) for more information about configuring audit level settings at the BPEL component level.
- See “Auditing SOA Composite Applications at the BPEL Activity Level” in *Developing SOA Applications with Oracle SOA Suite* for more information about configuring audit level settings at the BPEL activity level.

[Reducing Audit Levels](#) includes tips on improving performance and reducing database storage for your production environment.

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:

- Business flow instances, faults, and rejected messages in the SOA Infrastructure or individual SOA folder.

- 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, Oracle Mediator, and human workflows.
- Adapter configuration, monitoring, and snapshot reports.

**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 [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:

- Creating and deleting SOA folders. Once you create SOA folders, you can deploy a composite to the appropriate SOA folder. This action enables you to logically group SOA composite applications into SOA folders.
- Creating and managing work manager groups. Each SOA folder is associated with a work manager group that consists of work managers. A work manager is an Oracle WebLogic Server entity that represents a logical thread pool. You can define priorities for the work to be processed by work managers.
- Securing user access to SOA folders. This limits users to administering only the composites within the SOA folder to which they are granted access.
- Managing the composite state (activating, retiring, starting, stopping, and setting the default composite version).
- Deleting and terminating business flow instances.
- Deploying, undeploying, and redeploying SOA composite applications.
- Exporting a deployed SOA composite application to a JAR file.
- Initiating SOA composite application test instances from the Test Web Service page.
- Recovering from faults at the SOA Infrastructure level or individual SOA folder level.
- Recovering rejected messages in BPEL processes.

- Creating error notification rules at the SOA Infrastructure or individual SOA folder level that cause an alert message to be triggered when specific fault criteria are met.
- Scheduling the activation and deactivation of JCA adapter services.
- Performing automated testing of SOA composite applications.
- Attaching policies to SOA composite applications, service components, and binding components.
- Managing incoming and outgoing notification messages in human workflow.
- Subscribing to business events and testing of event publications.
- Disabling and enabling the collection of analytic, BPEL sensor, and composite sensor data.
- Storing instance and callback message data in Oracle Coherence distributed cache on Oracle Exalogic platforms.

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

- [Introduction to Fault Recovery in the Error Hospital](#)
- [Introduction to Policies](#)
- [Introduction to the Lifecycle State of SOA Composite Applications](#)
- [Introduction to SOA Composite Application Automated Testing](#)

 **Note:**

- Backup and recovery of Oracle SOA Suite is described in *Administering Oracle Fusion Middleware*.
- 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 *High Availability Guide*.

1.4.3.1 Introduction to Fault Recovery in the Error Hospital

In 12c, fault recovery is centralized at the SOA Infrastructure level (for all SOA folders) and individual SOA folder level. This differs from 11g, where fault recovery actions were displayed at multiple levels (SOA Infrastructure, SOA composite application, service engine, and service component).

You perform fault recovery from the Flow Instances and Error Hospital pages 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

For BPEL process faults, you can define a fault recovery policy in the Fault Policy Editor in Oracle JDeveloper. The Fault Policy Editor creates the required fault policy and fault policy binding files that 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 business flow instance, it is classified as a rejected message. A system or a policy fault can be identified as a rejected message.

Table 1-2 Recoverable and Nonrecoverable 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 about performing fault recovery, see [Deleting or Terminating Business Flow Instances](#), [Recovering from Faults in a Business Flow Instance](#), and [Recovering From Faults in the Error Hospital](#).

For information about the Fault Policy Editor, see How to Design a Fault Policy for Automated Fault Recovery with the Fault Policy Wizard in *Developing SOA Applications with Oracle SOA Suite*.

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.
- **SOAP over JMS:** Enables web services and clients to communicate using JMS destinations instead of HTTP connections.
- **Configuration:** Enables web service features, such as Fast Infoset, schema validation, persistence, and so on.
- **Atomic Transactions:** Supports web service WS-AtomicTransaction (WS-AT) transaction interoperability between Oracle WebLogic Server and other vendor's transaction processing systems.

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

For more information, see the following documentation:

- [Managing SOA Composite Application Policies](#)
- [Managing BPEL Process Service Component Policies](#)
- [Managing Policies](#)
- [Managing Human Workflow Service Component Policies](#)
- [Managing Binding Component Policies](#)
- [Managing BPMN Process Service Component Policies](#)
- *Securing Web Services and Managing Policies with Oracle Web Services Manager and Understanding Oracle Web Services Manager* 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.

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

- [Initiating a Test Instance of a Business Flow](#)
- [Managing the State of Deployed SOA Composite Applications.](#)

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 business flow 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 flow ID on the Flow 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 [Automating the Testing of SOA Composite Applications](#)
- Designing test cases for SOA composite applications, see *Developing SOA Applications with Oracle SOA Suite*

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

How you set configuration properties can impact Oracle SOA Suite performance. For example, you can set properties in the BPEL process service engine for allocating the number of threads for processing system, invoke, and engine dispatcher messages. Tuning information is described in the following documents.

For the following information, see *Tuning Performance*:

- Use case tuning recommendations
- Key tuning properties per component, including the following information:
 - Default values
 - Symptoms, if not properly tuned
 - Impact of changing properties from their default values
 - Recommendations if symptoms appear
- Profile-based tuning recommendations (selecting a profile by answering questions during installation and tuning properties based on the profile selected).

For additional information about tuning Oracle SOA Suite components, see the following documentation:

- [Configuring SOA Infrastructure Properties](#)
- [Configuring BPEL Process Service Components and Engines](#)
- [Storing Instance and Message Data in Oracle Coherence Distributed Cache on Oracle Exalogic Platforms](#)
- [Configuring Service Engine Properties](#)
- [Configuring Human Workflow Service Components and Engines](#)
- [Configuring Oracle B2B](#)
- [Configuring the Healthcare Integration Audit Trail](#)
- [Configuring Service and Reference Binding Components](#)
- [Configuring BPMN Process Service Engine Properties](#)
- *Understanding Technology Adapters*
- Chapter "Managing Large Documents and Large Numbers of Instances" of *Developing SOA Applications with Oracle SOA Suite*
- *Administering Oracle Service Bus*

1.5 Administration for Application Developers

If you are an application developer, you can manage and test SOA composites using a combination of Oracle JDeveloper and Oracle Enterprise Manager Fusion Middleware Control.

See *Developing SOA Applications with 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 SOA composite application with Oracle Enterprise Manager Fusion Middleware Control:

- [Monitoring SOA Composite Applications](#)
- [Deploying and Managing SOA Composite Applications](#)
- [Initiating a Test Instance of a Business Flow.](#)

To create and design business processes with Oracle BPM Suite, see *Developing Business Processes with Oracle Business Process Management Studio*.

1.6 Administration Channels for WebLogic Server

WebLogic Server provides pre-configured channels that you do not have to explicitly define.

- Default channel — Every Managed Server has a default channel.
- Administrative channel — If you configure a domain-wide administration port, WebLogic Server configures an administrative channel for each Managed Server in the domain.

The Default Network Channel

Every WebLogic Server domain has a default channel that is generated automatically by WebLogic Server. The default channel is based on the listen address and listen port defined in the `ServerMBean` and `SSLMBean`. It provides a single listen address, one port for HTTP (non-secure) communication (7001 by default), and one port for HTTPS (secure) communication (7002 by default). You can configure the listen address and listen port using the `Configuration > General` page in the Administration Console; the values you assign are stored in attributes of the `ServerMBean` and `SSLMBean`.

The default configuration may meet your needs if:

- You are installing in a test environment that has simple network requirements.
- Your server uses a single NIC, and the default port numbers provide enough flexibility for segmenting network traffic in your domain.

Using the default configuration ensures that third-party administration tools remain compatible with the new installation, because network configuration attributes remain stored in `ServerMBean` and `SSLMBean`.

Even if you define and use custom network channels for your domain, the default channel settings remain stored in `ServerMBean` and `SSLMBean`, and are used if necessary to provide connections to a server instance.



Note:

Unless specified, WebLogic Server uses the non-secure default channel for cluster communication to send session information among cluster members. If you disable the non-secure channel, there is no other channel available by default for the non-secure communication of cluster session information. To address this, you can:

- Enable the `secureReplicationEnabled` attribute of the `ClusterMBean` so that the cluster uses a secure channel for communication.
- Create a custom channel for non-secure communication.

Administration Port and Administrative Channel

You can define an optional administration port for your domain. When configured, the administration port is used by each Managed Server in the domain exclusively for communication with the domain Administration Server.

Administration Port Capabilities

An administration port enables you to:

- Start a server in standby state. This allows you to administer a Managed Server, while its other network connections are unavailable to accept client connections.
- Separate administration traffic from application traffic in your domain. In production environments, separating traffic ensures that critical administration operations (starting and stopping servers, changing a server's configuration, and deploying applications) do not compete with high-volume application traffic on the same network connection.

- Administer a deadlocked server instance using WLST. If you do not configure an administration port, administrative commands such as `threadDump` and `shutdown` will not work on deadlocked server instances.

If a administration port is enabled, WebLogic Server automatically generates an administration channel based on the port settings upon server instance startup.

Administration Port Restrictions

The administration port accepts only secure, SSL traffic, and all connections via the port require authentication. Enabling the administration port imposes the following restrictions on your domain:

- The Administration Server and all Managed Servers in your domain must be configured with support for the SSL protocol. Managed Servers that do not support SSL cannot connect with the Administration Server during startup—you will have to disable the administration port in order to configure them.
- Because all server instances in the domain must enable or disable the administration port at the same time, you configure the administration port at the domain level. You can change an individual Managed Server administration port number, but you cannot enable or disable the administration port for an individual Managed Server. The ability to change the port number is useful if you have multiple server instances with the same listen address.
- After you enable the administration port, you must establish an SSL connection to the Administration Server in order to start any Managed Server in the domain. This applies whether you start Managed Servers manually, at the command line, or using Node Manager.
- After enabling the administration port, all Administration Console traffic must connect via the administration port.
- If multiple server instances run on the same computer in a domain that uses a domain-wide administration port, you must either:
 - Host the server instances on a multihomed machine and assign each server instance a unique listen address, or
 - Override the domain-wide port on all but one of the servers instances on the machine. Override the port using the Local Administration Port Override option in the Advanced Attributes section of the `Server > Connections > SSL Ports` page in the Administration Console.

Administration Port Requires SSL

The administration port requires SSL, which is enabled by default when you install WebLogic Server. If SSL has been disabled for any server instance in your domain, including the Administration Server and all Managed Servers, re-enable it using the `Server > Configuration > General` page in the Administration Console.

Ensure that each server instance in the domain has a configured default listen port or default SSL listen port. The default ports are those you assign on the `Server > Configuration > General` page in the Administration Console. A default port is required in the event that the server cannot bind to its configured administration port. If an additional default port is available, the server will continue to boot and you can change the administration port to an acceptable value.

By default WebLogic Server is configured to use demonstration certificate files.

Configure Administration Port

Enable the administration port as described in [Enabling the Domain-Wide Administration Port](#) in *Oracle WebLogic Server Administration Console Help*.

After configuring the administration port, you must restart the Administration Server and all Managed Servers to use the new administration port.

Booting Managed Servers to Use Administration Port

If you reboot Managed Servers at the command line or using a start script, specify the administration port in the port portion of the URL. The URL must specify the `https://` prefix, rather than `http://`, as shown below.

```
-Dweblogic.management.server=https://host:admin_port
```

Note:

If you use Node Manager for restarting the Managed Servers, it is not necessary to modify startup settings or arguments for the Managed Servers. Node Manager automatically obtains and uses the correct URL to start a Managed Server.

If the hostname in the URL is not identical to the hostname in the Administration Server's certificate, disable hostname verification in the command line or start script, as shown below:

```
-Dweblogic.security.SSL.ignoreHostnameVerification=true
```

Booting Managed Servers to Use Administrative Channels

To allow a Managed Server to bind to an administrative channel during reboot, use the following command-line option:

```
-Dweblogic.admin.ListenAddress=<addr>
```

This allows the Managed Server to startup using an administrative channel. After the initial bootstrap connection, a standard administrative channel is used.

Note:

This option is useful to ensure that the appropriate NIC semantics are used before `config.xml` is downloaded.

Custom Administrative Channels

If the standard WebLogic Server administrative channel does not satisfy your requirements, you can configure a custom channel for administrative traffic. For example, a custom administrative channel allows you to segregate administrative traffic on a separate NIC.

To configure a custom channel for administrative traffic, configure the channel as described in [Configuring a Channel](#), and select "admin" as the channel protocol. Note the configuration and usage guidelines described in:

- [Administration Port Requires SSL](#)

- [Booting Managed Servers to Use Administration Port](#)

1.7 Administration with Oracle Enterprise Manager and the Oracle SOA Management Pack

Oracle Enterprise Manager enables you to monitor runtime and historical data for multiple Oracle Fusion Middleware farms and Oracle WebLogic Server domains.

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

For more information, visit the following URL:

<http://www.oracle.com/enterprise-manager>

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:

- [Getting Started with Administering and Oracle BPM Suite](#)

2

Getting Started with Administering Oracle SOA Suite and Oracle Business Process Management Suite

Learn 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. Also learn how to access the System MBean Browser and Oracle WebLogic Server Administration Console from Oracle Enterprise Manager Fusion Middleware Control.

- [Logging In to Oracle Enterprise Manager Fusion Middleware Control](#)
- [Navigating to Oracle SOA Suite and Oracle BPM Suite Administration Tasks](#)
- [Accessing Context Sensitive Online Help](#)
- [Navigating to the System MBean Browser](#)
- [Logging Out of Oracle Enterprise Manager Fusion Middleware Control](#)
- [Setting Accessibility Options](#)

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

2.1 Logging In to Oracle Enterprise Manager Fusion Middleware Control

To log in to Oracle Enterprise Manager Fusion Middleware Control:

1. Use a browser 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.
 - *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 or create your own user name).
- *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 WebLogic Domain 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 *Installing and Configuring Oracle SOA Suite and Business Process Management* and *Installing SOA Suite and Business Process Management Suite Quick Start for Developers*.

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

Understand methods for navigating to Oracle SOA Suite and Oracle BPM Suite administration tasks in Oracle Enterprise Manager Fusion Middleware Control.

- [Navigating Through the SOA Infrastructure Home Page and Menu](#)
- [Navigating Through the SOA Composite Application Home Page and Menu](#)
- [Navigating Through the SOA Folder Home Page and Menu](#)
- [Navigating to Deployed Java EE Applications](#)
- [Navigating to the Oracle WebLogic Server Administration Console and Other Pages](#)
- [Navigating to the SOA Infrastructure or SOA Composite Application Home Page from the WebLogic Domain Home Page](#)



Note:

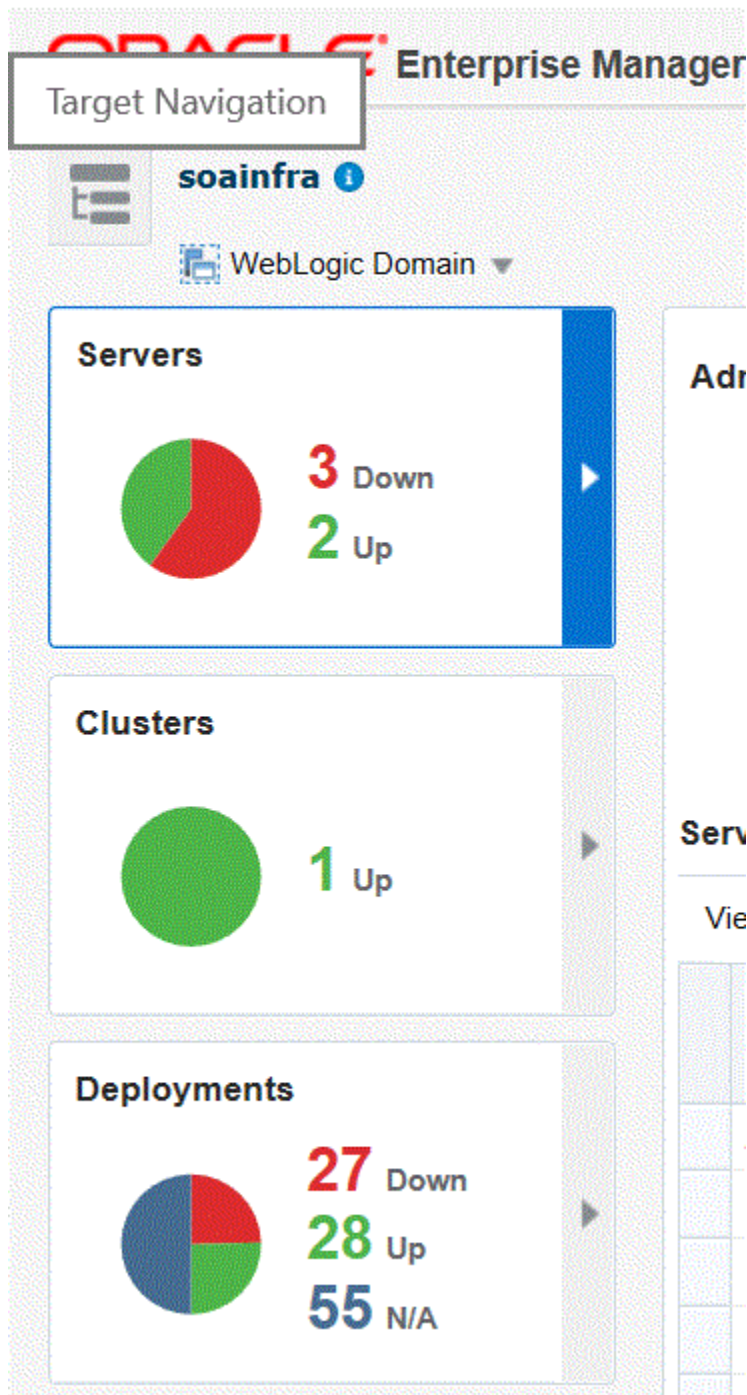
The **WebLogic Domain** menu is always displayed at the top of the navigator. As you expand the **SOA** folder in the navigator and click the links displayed beneath it, the **SOA Infrastructure** menu becomes available at the top of the page.

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.

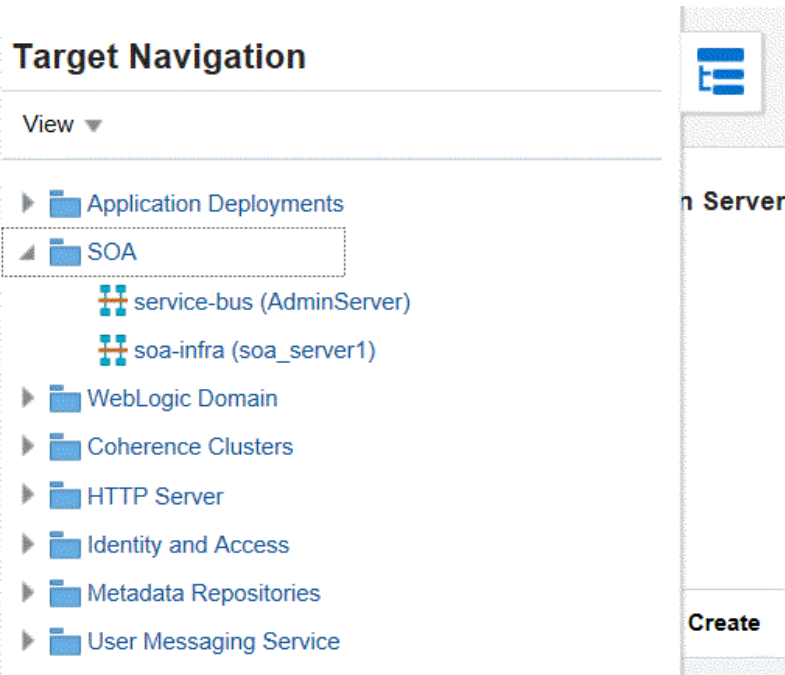
To navigate through the SOA Infrastructure home page and menu:

1. Click the **Target Navigation** icon near the top left of the screen.



The Target Navigation panel is displayed.

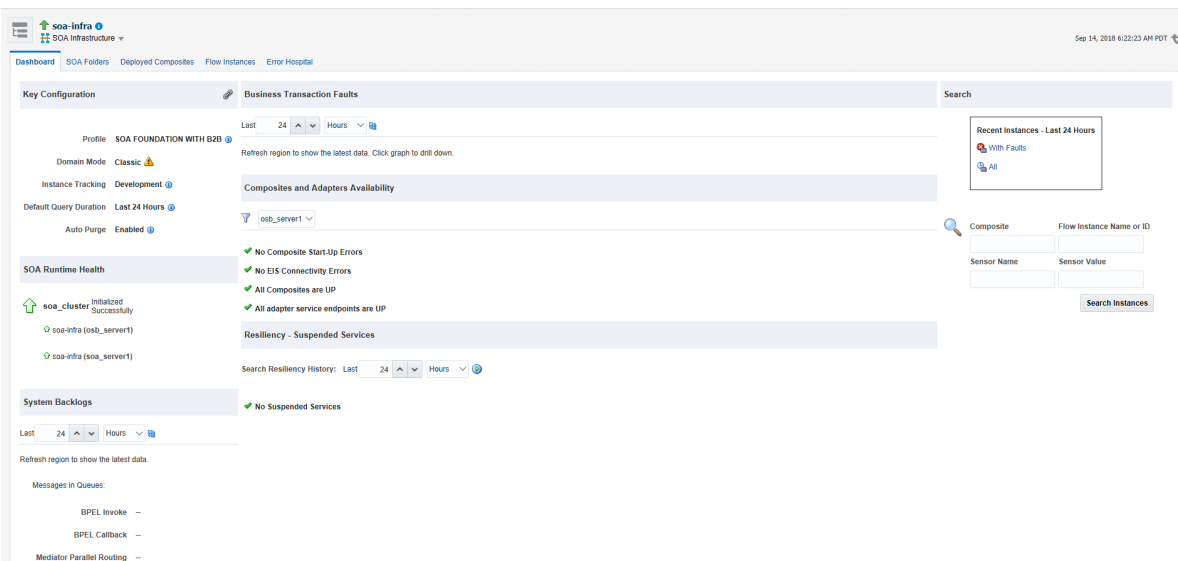
2. Expand **SOA**.



3. Click **soa-infra (server_name)**.

The Dashboard page of the SOA Infrastructure is displayed. This page includes:

- Important configuration settings
- Runtime health status
- System backlogs
- Business transaction faults
- Composite and adapter endpoint availability
- Error notification rule alerts



This page also provides search functionality to find business flow instances and bulk recovery job status. The bulk recovery job search is applicable when Oracle Enterprise Scheduler is deployed with Oracle SOA Suite.

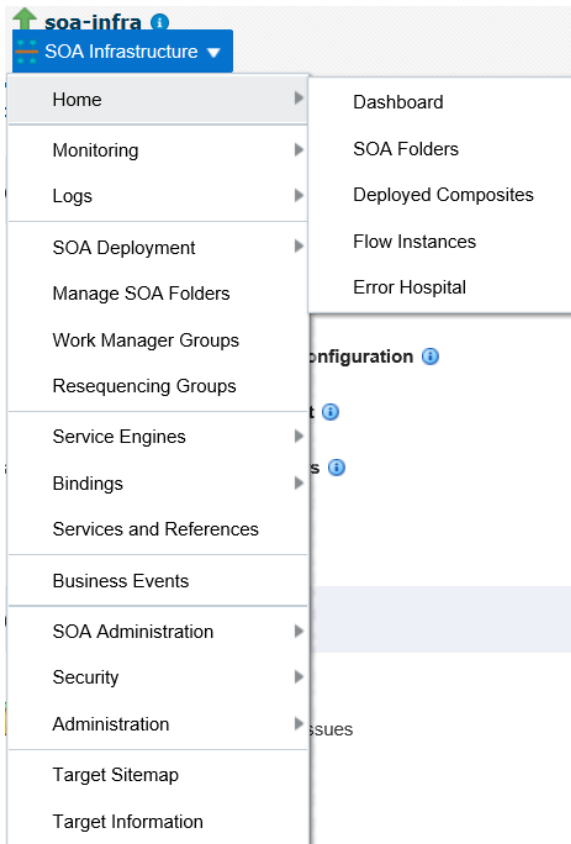
- Note that the **SOA Infrastructure** menu appears below the **soa-infra** name at the top of the page.

 **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 in the following locations:

- Within the pages of a SOA composite application, the **SOA Composite** menu is displayed.
- On the home page of a specific SOA folder, the **SOA Folder** menu is displayed.
- Within the pages of a specific SOA folder or SOA composite application, the **SOA Infrastructure** menu is still available. However, it moves to the top left corner of the page.

- Select the **SOA Infrastructure** menu.



These administrative options enable you to perform the following tasks:

| Option | Description |
|----------------------------|---|
| Home | <p>Directly navigate to the selected tab of the SOA Infrastructure:</p> <ul style="list-style-type: none"> • Dashboard: Monitor important configuration settings, runtime health status, system backlogs, business transaction faults, composite and adapter endpoint availability, and error notification rule alerts. You can also search for business flow instances and bulk recovery job search capabilities. For more information, see Monitoring the Overall Status of the SOA Infrastructure or Individual SOA Folder. • SOA Folders: View all the folders in your SOA Infrastructure and the count of composites in each folder. You can also see the number of active and retired composites for each folder. You can navigate to the Dashboard tab or Deployed Composites tab of any folder. • Deployed Composites: Manage the state of all SOA composite applications in the SOA Infrastructure. For more information, see Managing the State of All Applications at the SOA Infrastructure Level. • Flow Instances: View the list of business flow instances in the SOA Infrastructure. Business flows can consist of multiple SOA composite applications connected together in a flow. For more information, see Tracking Business Flow Instances . • Error Hospital: Manage faults occurring within Oracle SOA Suite and view aggregated statistics associated with system-wide faults data. For more information, see Recovering From Faults in the Error Hospital. |
| Monitoring | <p>Displays the following details:</p> <ul style="list-style-type: none"> • Performance Summary: 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. For more information, see Monitoring Message Delivery Processing Requests. • IWS Reports: Integration Workload Statistics (IWS) Reports provide SOA system-wide reports that can help you analyze utilizations, identify potential bottlenecks and backlogs, and perform top-down analysis of your integration system. For more information, see Monitoring and Troubleshooting SOA-Wide Issues Using IWS Reports. |
| Logs | <p>View and configure the logging levels for runtime loggers. For more information, see Configuring Log Files and Setting Logging Levels for Troubleshooting.</p> |
| SOA Deployment | <p>Deploy, undeploy, or redeploy SOA composite applications. For more information, see Deploying and Managing SOA Composite Applications .</p> |
| Manage SOA Folders | <p>Logically group your SOA Infrastructure into separate SOA folders 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 Introduction to SOA Folders and Managing SOA Folders and Work Manager Groups.</p> |
| Work Manager Groups | <p>Manage the work manager groups. A work manager group consists of work managers used by Oracle SOA Suite for each SOA folder. A work manager is an Oracle WebLogic Server entity that represents a logical thread pool. It is similar to a queue in which work items line up for processing. For more information, see Managing Work Manager Groups.</p> |
| Resequencing Groups | <p>Access the Mediator Resequencing Groups page for finding all resequencing groups processed within a specified time period. Resequencing places unsynchronized Oracle Mediator messages back in the correct order. For more information, see Monitoring Resequencing Groups.</p> |
| Service Engines | <p>Access monitoring and management tasks for the BPEL process, Oracle Mediator, Oracle BPMN (if installed), human workflow, and business rules service engines.</p> |

| Option | Description |
|---------------------------------|--|
| Bindings | Displays details about recently active document types and trading partners, and inbound and outbound endpoints for Oracle B2B. For more information, see Monitoring the Oracle B2B Infrastructure . |
| Services and References | Displays message processing metrics for service and reference binding components in all SOA composite applications. For more information, see Monitoring Service and Reference Binding Components in the SOA Infrastructure . |
| Business Events | Displays available business events and current event subscribers. For more information, see Managing Business Events . |
| Error Notification Rules | Manage error notification rules. Rules are configuration definitions created for generating alerts during runtime. Alerts are triggered when a rule condition is met (for example, you define an alert to trigger if more than 10 faults occur within a 48 hour period). Note: This option is available only if Oracle Enterprise Scheduler is deployed with Oracle Enterprise Manager Fusion Middleware Control. For more information, see Creating Error Notification Rules . |
| Define Schedules | Define a schedule for submitting jobs. You select the defined schedule when you create an error notification rule. Schedules specify how often to trigger the scheduler (for example, invoke the scheduler every two minutes). Note: This option is available only if Oracle Enterprise Scheduler is deployed with Oracle Enterprise Manager Fusion Middleware Control. For more information, see <i>Administering Oracle Enterprise Scheduler</i> . |

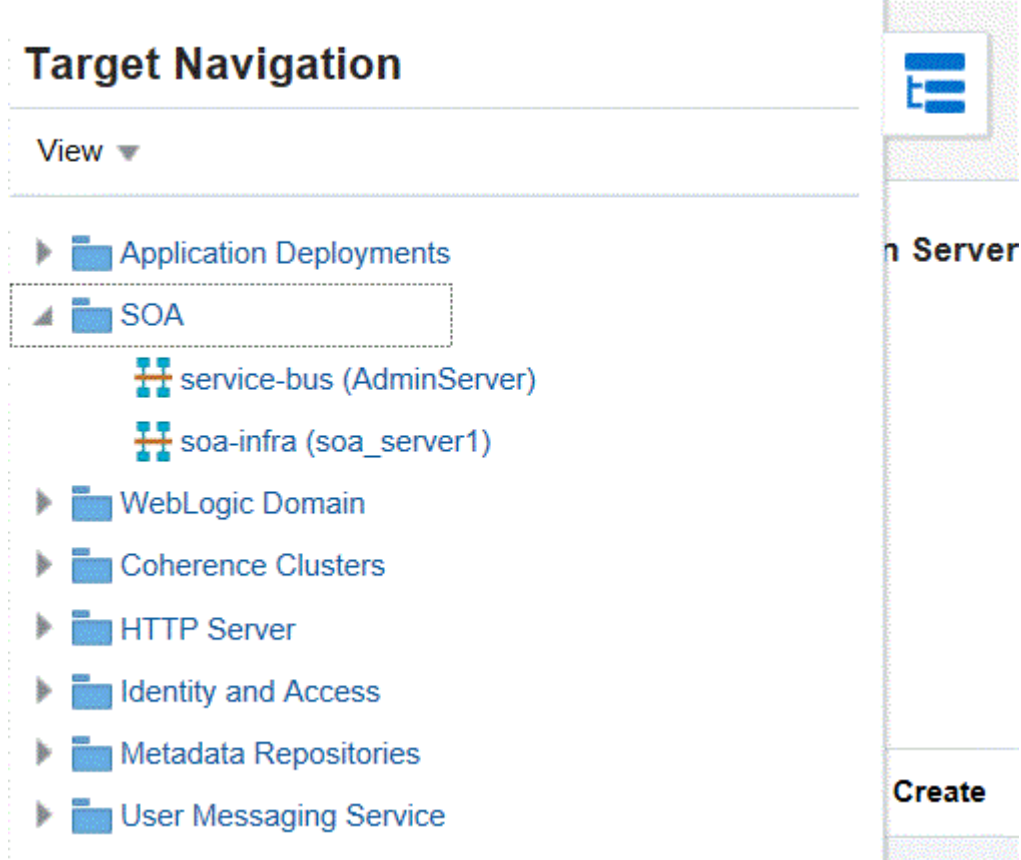
| Option | Description |
|---------------------------|---|
| SOA Administration | <p>Access the following configuration tasks for the SOA Infrastructure and each service engine:</p> <ul style="list-style-type: none"> • Common Properties: For setting properties that impact the entire SOA Infrastructure, such as viewing and updating the configuration profile, setting the SOA Infrastructure audit level, enabling the payload validation of incoming messages, updating the default query duration, specifying the callback server and server URLs, enabling and disabling analytics and sensors, setting the Universal Description, Discovery and Integration (UDDI) registry properties, viewing the data source JNDI locations, setting the nonfatal connection retry count, and setting web service binding properties. For more information, see Configuring SOA Infrastructure Properties. • BPEL Properties: For setting the audit trail size, maximum document size for a variable, payload validation for incoming and outgoing messages, audit trail level, and BPEL monitor and sensor disabling status. For more information, see Configuring BPEL Process Service Engine Properties. • 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 BPMN monitor and sensor disabling status. Note: This option is available only when Oracle BPM Suite is installed. For more information, see Configuring BPMN Process Service Engine Properties. • Mediator Properties: For setting the audit level, metrics level, maximum number of parallel rows retrieved, parallel locker thread sleep, container ID refresh time, container ID lease timeout, and resequencer locker sleep, maximum groups locked, and worker threads. For more information, see Configuring Oracle Mediator Service Engine Properties. • Workflow Properties: Displays the following tabs: <ul style="list-style-type: none"> Mailer tab: For setting the workflow service notification mode and actionable email address value. For more information, see Configuring Human Workflow Notification Properties. Task tab: For setting the actionable email account, setting the workflow service session timeout, adding the workflow custom class path URL, setting the dynamic and task escalation functions and parameters, setting the worklist application URL, setting the task assignee, setting the portal realm mapping, and adding the task auto release configuration priority. For more information, see Configuring Human Workflow Task Service Properties. • B2B Server Properties: For enabling Dynamic Monitoring Service (DMS) metrics. For more information, see Configuring Oracle B2B Server Properties. • Cross References: For selecting cross-reference values. For more information, see Deleting Cross-Reference Values. • Token Configurations: For defining and managing global token variables. 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. For more information, see Managing Global Token Variables for Multiple SOA Composite Applications. • Auto Purge: For scheduling and executing purge jobs that automatically remove older flow instances, adapter reports, and fault alerts data from the database. For more information, see Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control. <p>Note: This option is not available for selection if you are using the Java database included with the Oracle SOA Suite Quick Start installation option. For more information about this option, see <i>Installing SOA Suite and Business Process Management Suite Quick Start for Developers</i>.</p> |

| Option | Description |
|---------------------------|---|
| Security | <p>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 managing application roles, see <i>Securing Applications with Oracle Platform Security Services</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 Managing SOA Composite Application Policies.</p> |
| Administration | <p>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 Navigating to the System MBean Browser and <i>Administering Oracle Fusion Middleware</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>WLST Command Reference for SOA Suite</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> |
| Target Information | <p>Displays general details about the SOA Infrastructure, such as the Oracle Enterprise Manager Fusion Middleware Control version, Oracle home, and Oracle instance.</p> |

2.2.2 Navigating Through the SOA Composite Application Home Page and Menu

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

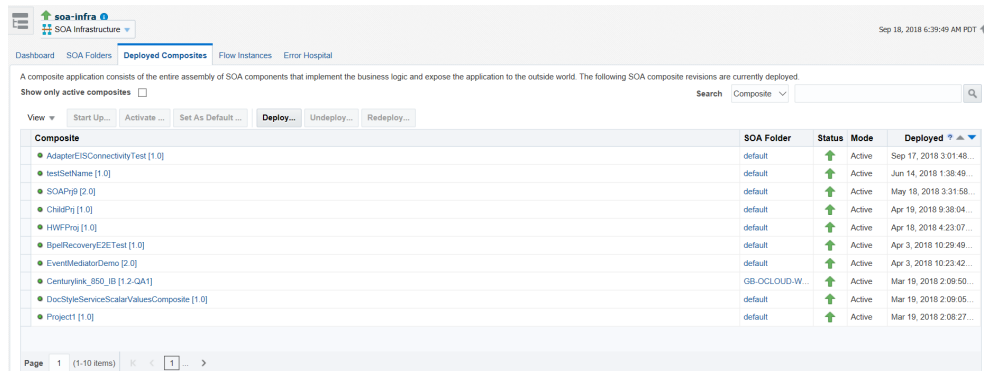
1. Expand **SOA** and click **soa-infra (server_name)** in the navigator.



The **soa-infra** page is displayed.

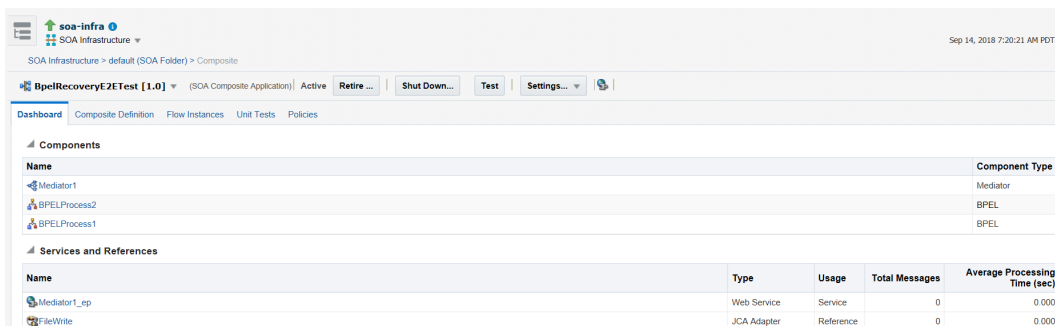
2. Click **Deployed Composites**.

You can also right click **soa-infra (server_name)**, navigate to **Home**, and select **Deployed Composites** to directly open Deployed Composite tab.



3. Select a SOA composite application.

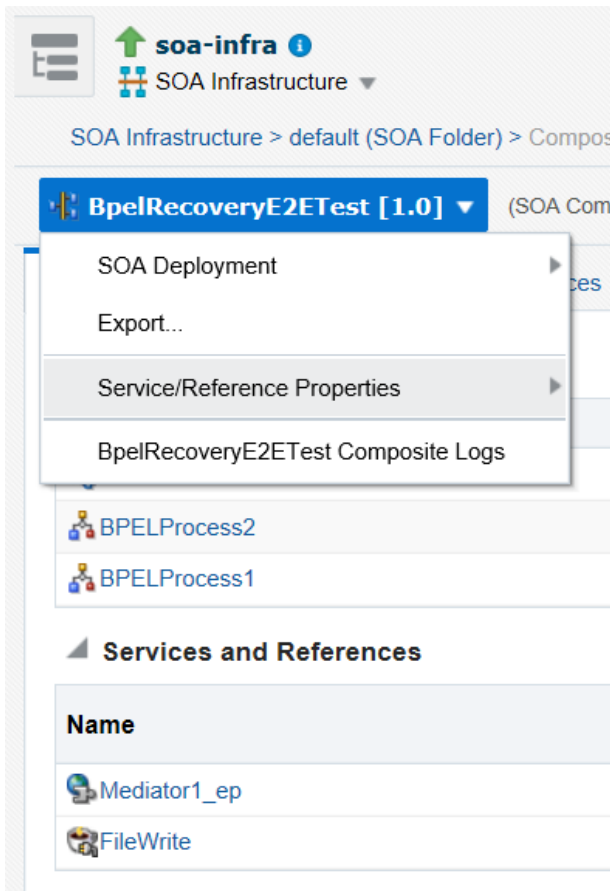
The home page for the selected SOA composite application is displayed. This page enables you to perform composite management tasks (retire, activate, shut down, start up, test, and so on) and view the service components and service and reference binding components included in the SOA composite application.



This screen enables you to navigate through the following options of the SOA composite application.

| Option | Description |
|-----------------------------|--|
| Dashboard | Manage the state of an individual SOA composite application (retire, shut down, activate, start up, test, and so on) from the application's home page. For more information, see Managing the State of an Application from the SOA Composite Application Home Page . |
| Composite Definition | View a graphical display of the SOA composite applications designed in Oracle JDeveloper 12c. This view is similar to the display of the SOA composite application in Oracle JDeveloper. SOA composite applications designed in Oracle JDeveloper 11g are not displayed. To resolve this issue, reopen the SOA composite application in Oracle JDeveloper 12c and redeploy it. |
| Flow Instances | View the list of business flow instances in this SOA composite application. Business flows can consist of multiple SOA composite applications connected together in a flow. |
| Unit Tests | 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 Introduction to SOA Composite Application Automated Testing and Automating the Testing of SOA Composite Applications . |
| Policies | View and attach or detach policies to or from the SOA composite application. For more information, see Introduction to Policies and Managing SOA Composite Application Policies . |
| Test | Manually initiate an instance of this deployed SOA composite application through the Test Web Service page. For more information, see Initiating a Test Instance of a Business Flow . |
| Settings | View and set the configuration profile, set the SOA Infrastructure audit level, enable the payload validation of incoming messages, update the default query duration, specify the callback server and server URLs, disable analytics and sensors, set the Universal Description, Discovery and Integration (UDDI) registry properties, view the data source JNDI locations, set the nonfatal connection retry count, and set web service binding properties. For more information, see Configuring SOA Infrastructure Properties . |

- Below the name of the SOA composite application, select the **SOA Composite** menu.



These administrative options enable you to perform the following tasks.

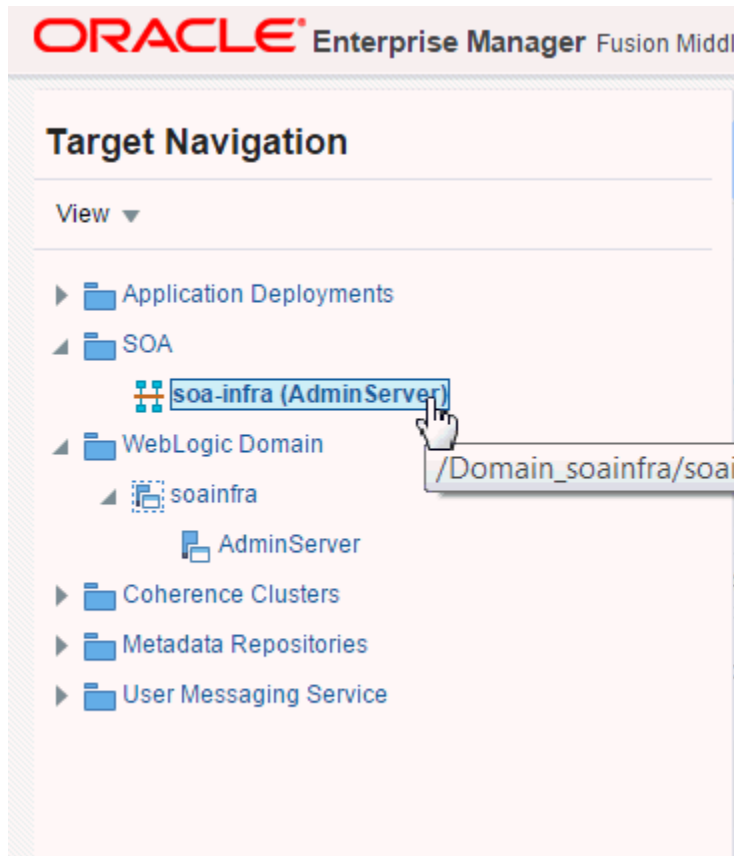
| Option | Description |
|-------------------------------------|--|
| Monitoring | View the performance summary statistics for the selected SOA composite application. |
| SOA Deployment | Undeploy or redeploy this SOA composite application, or deploy another SOA composite application. For more information, see Deploying SOA Composite Applications . |
| Export | Export a deployed SOA composite application to a JAR file. For more information, see Exporting a Deployed SOA Composite Application . |
| Service/Reference Properties | Configure WSDL file properties for the service and reference binding components included in the SOA composite application. For more information, see Configuring Service and Reference Binding Component Properties . |
| Composite Logs | View log messages. |

2.2.3 Navigating Through the SOA Folder Home Page and Menu

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

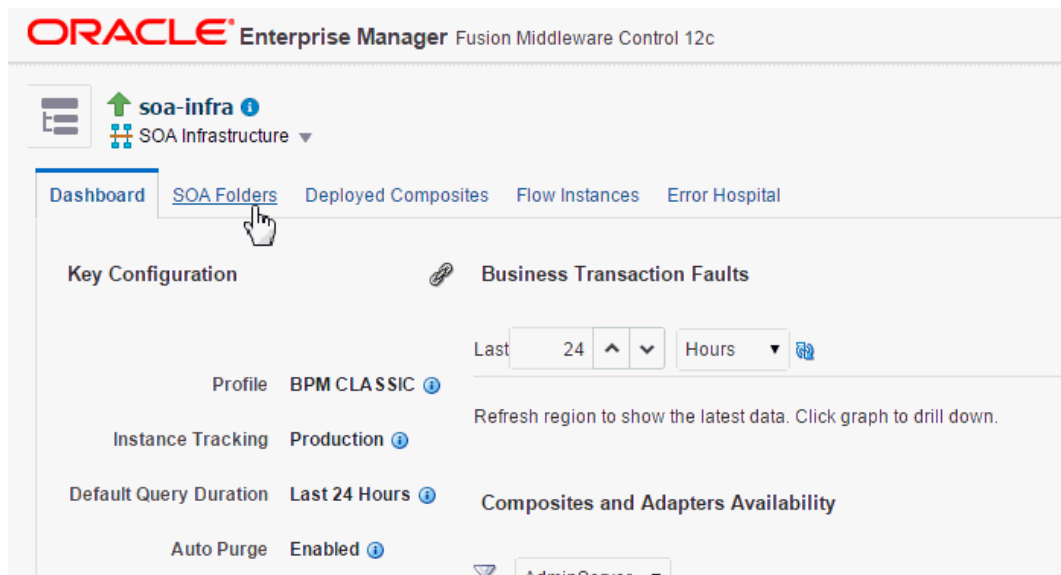
To navigate through the SOA Folder home page and menu:

1. Click **SOA > soa-infra** in the Target Navigation pane.



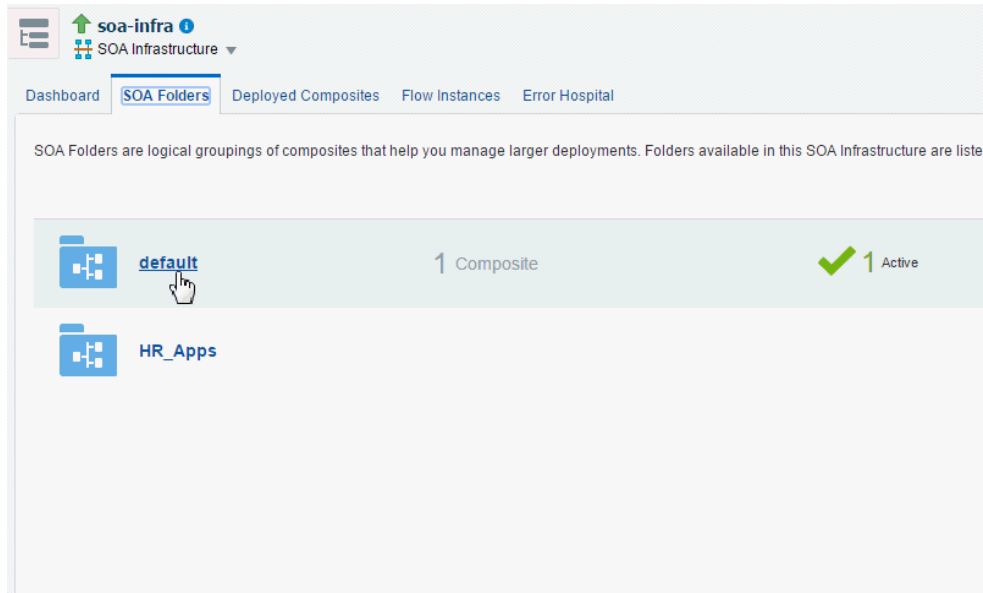
The SOA Infrastructure page appears.

2. Click the **SOA Folders** tab.



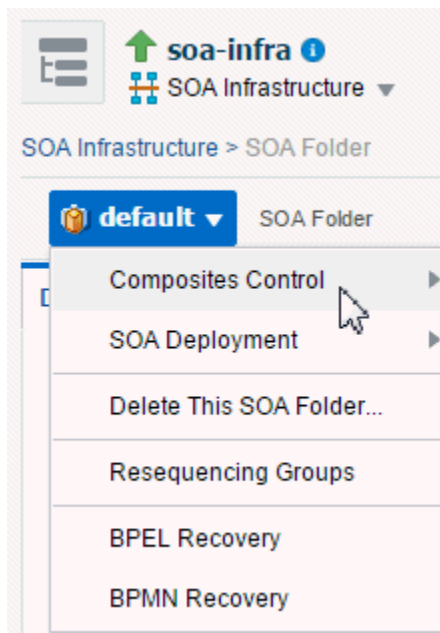
The SOA Folders page appears. Use the SOA Folders page to see all the folders in your SOA Infrastructure and the count of composites in each folder. You can also see the number of active and retired composites for each folder. You can navigate to the Dashboard tab or Deployed Composites tab of any folder.

3. Click a folder name to navigate to the home page (**Dashboard**) for the folder.



The Dashboard page enables you to monitor important configuration settings, composite and adapter endpoint availability, business transaction faults, business flow instances and bulk recovery job search capabilities, and error notification rule alerts for the folder.

4. At the top of the page, select the **SOA_Folder_Name** menu.



These administrative options enable you to perform the following tasks:

| Option | Description |
|-------------------------------|--|
| 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 folder. • Shut Down All: Invokes a dialog for shutting down all composites in this folder. • Activate All: Invokes a dialog for activating all composites in this folder. • Retire All: Invokes a dialog for retiring all composites in this folder. <p>For information about these composite states, see 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 SOA Folder: Invokes the Deploy SOA Composite wizard for selecting a composite to deploy in this SOA folder. • Undeploy All From This Folder: Invokes a dialog for undeploying all composites in this folder. • Redeploy: Invokes the Redeploy SOA Composite wizard to select composites to redeploy in this folder. <p>For more information, see Deploying and Managing SOA Composite Applications .</p> |
| Delete This SOA Folder | <p>This option invokes a dialog to delete this folder. All composites in the folder are automatically undeployed before the folder is deleted.</p> |
| Resequencing Groups | <p>This option enables you to access the Mediator Resequencing Groups page for finding all resequencing groups processed within a specified time period. Resequencing places unsynchronized Oracle Mediator messages back into the correct order.</p> <p>For more information, see Monitoring Resequencing Groups.</p> |
| BPEL Recovery | <p>A shortcut to the BPEL Recovery page where you can recover or abort messages marked as recoverable.</p> |
| BPMN Recovery | <p>A shortcut to the BPMN Recovery page where you can recover or abort messages marked as recoverable.</p> |

5. Select the **Deployed Composites** tab to navigate to the deployed composites page for the folder.

The Deployed Composites page enables you to manage the state of all SOA composite applications in the folder.
6. Select the **Flow Instances** tab to look at message flows for composites deployed in the folder.

The Flow Instances page enables you to view the list of business flow instances in the folder. Business flows can consist of multiple SOA composite applications connected together in a flow.

For more information, see [Tracking Business Flow Instances](#) .
7. Select the **Error Hospital** tab to look at aggregated faults for the folder.

The Error Hospital page enables you to manage faults occurring in the folder and view aggregated statistics associated with folder-wide faults data.

For more information, see [Recovering From Faults in the Error Hospital](#).

For information about folders, see [Introduction to SOA Folders](#) and [Managing SOA Folders and Work Manager Groups](#).

2.2.4 Navigating to Deployed Java EE Applications

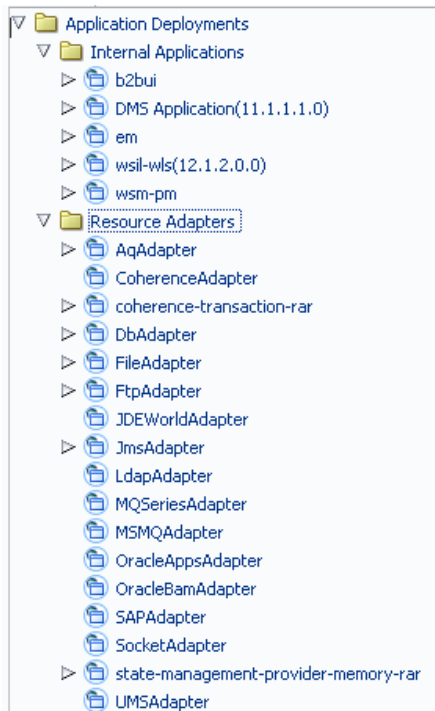
You can navigate to deployed Java EE applications related to Oracle SOA Suite and (if installed) Oracle BPM Suite components. These applications are Java EE applications that represent the SOA system components, such as the technology adapters, Oracle B2B,

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 to display 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.

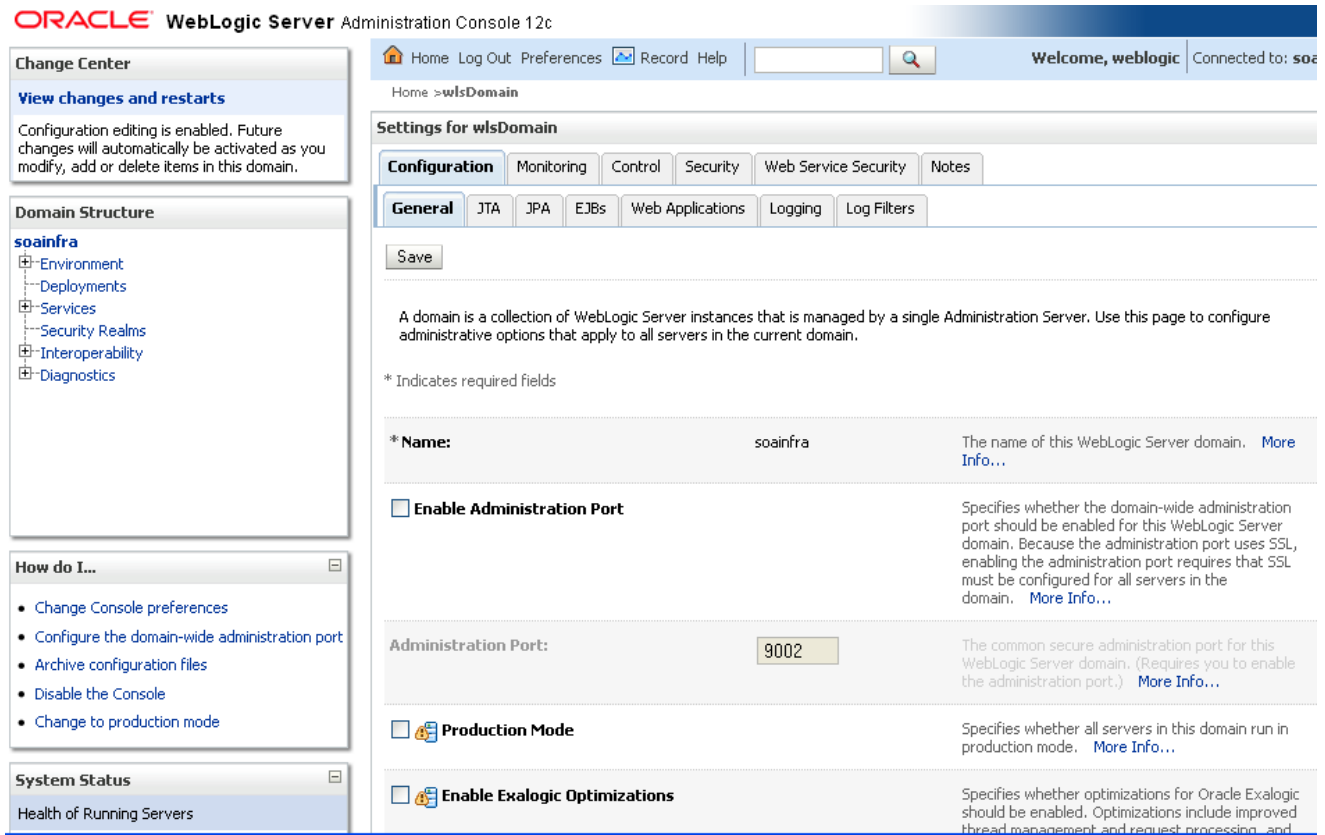
2.2.5 Navigating to the Oracle WebLogic Server Administration Console and Other Pages

To navigate to the Oracle WebLogic Server Administration Console:

1. In Oracle Enterprise Manager Fusion Middleware Control, click **WebLogic Domain** on the top right corner, then select **WebLogic Server Administration Console**.
2. At the prompt, enter your WebLogic Server Administration Control Console login credentials.

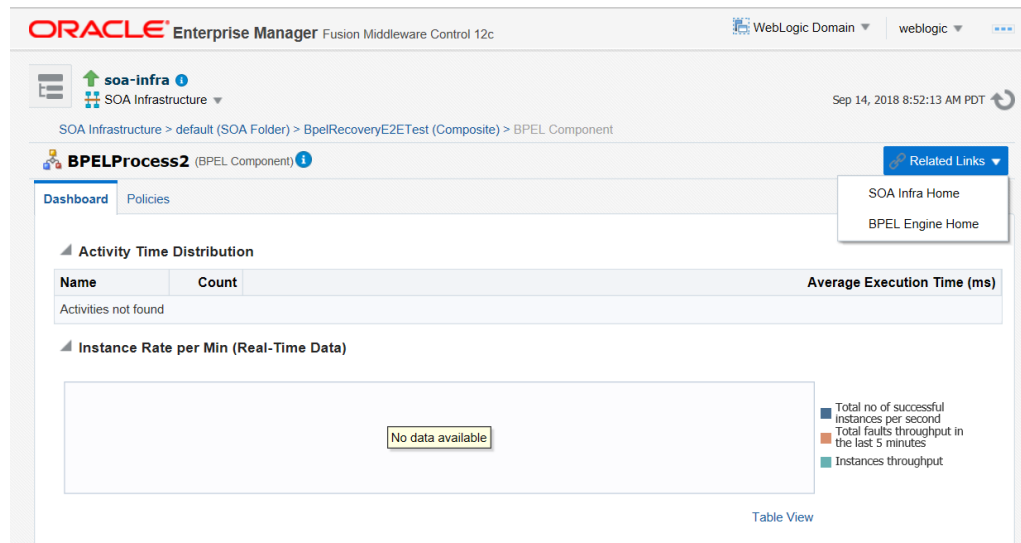
and s, and

Figure 2-1 Oracle WebLogic Server Administration Console



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. 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 2-2 Related Links Menu for a SOA Composite Application



When you are on the page of a service component of a SOA composite application (for example, a BPEL process or Oracle Mediator), 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.
- 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 **WebLogic Domain** 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.

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 Links** list. Selecting **WebLogic Server Console** opens a new browser page. Your current page in Oracle Enterprise Manager Fusion Middleware Control is not lost.

You can perform the following Oracle SOA Suite tasks from **WebLogic Server 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 WebLogic Domain Home Page

You can access the home page of the SOA Infrastructure, a specific SOA folder, or a specific SOA composite application from the WebLogic Domain home page.

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

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

The screenshot displays the Oracle WebLogic Domain Home Page for a domain named 'soainfra'. The page is logged in as 'web' and was refreshed on Feb 23, 2014 at 11:54:29 PM IST. The main content area is divided into several sections:

- Summary**: Contains general information about the domain, including the Administration Server (AdminServer), host (blr2262453.idc.oracle.com), and listen port (7001). It also shows a 'Support Workbench Problems' indicator with a red 'x' and the number '1'.
- Tools**: Provides a link to the 'WebLogic Server Administration Console' for configuring and managing the domain.
- Servers**: Shows a green circular progress indicator at 100% and a status of 'Up (1)'. Below this is a table listing the servers:

| Name | Status | Server Type | Host | Listen Port | Usage |
|-------------|--------|-------------|------------|-------------|-------|
| AdminServer | Up | Administ... | blr2262... | 7001 | 2... |
- Clusters**: Shows a green circular progress indicator at 100% and a status of 'Up (56)'. Below this is a table listing the clusters:

| Name | Servers | Cluster Address | Cluster Messaging Mode | Default Load Algorithm |
|-------------------|---------|-----------------|------------------------|------------------------|
| No Clusters found | | | | |
- Deployments**: Shows a tree view of the deployment structure. The 'SOA' folder is expanded, showing the 'soa-infra' folder with a status of 'Up' and 'AdminServer'. Below it are several composite applications, each with a status of 'Up':

| Name | Status | Deployed On |
|-------------------------|--------|-------------|
| Application Deployments | | |
| SOA | | |
| soa-infra | Up | AdminServer |
| consoleVests | | |
| AdapterEISCor | Up | |
| BpelRecoveryE | Up | |

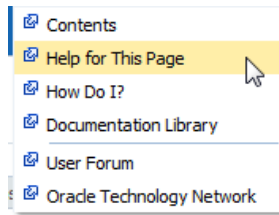
The home page for your selection is displayed.

2.3 Accessing Context Sensitive Online Help

Each page in Oracle Enterprise Manager Fusion Middleware Control provides access to context sensitive help from the **Help for This Page** option of the **Help** main menu.

To access context sensitive online help:

- In the upper right corner of a page, select **Help for This Page** from the **weblogic > Help** main menu.



Context sensitive help that describes the fields for that page is displayed.

The Help main menu list provides the following selections.

| Selection | Description |
|---------------------------|---|
| Contents | Displays a table of contents with links to relevant Oracle Enterprise Manager Fusion Middleware Control guides. |
| Help for This Page | Displays context sensitive help that describes the selectable fields of the selected page. |
| How Do I? | Displays links to conceptual and procedural documentation that is relevant to the selected page. |
| Documentation Library | Displays the main page for the Oracle Fusion Middleware documentation library. |
| User Forums | Displays the Oracle Fusion Middleware user forum. |
| Oracle Technology Network | Displays the main Oracle Fusion Middleware page of the Oracle Technology Network. |

2.4 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.

For general information about the System MBean Browser, see Getting Started Using the Fusion Middleware Control MBean Browsers in *Administering Oracle Fusion Middleware*.

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

- [Accessing the System MBean Browser from the Main Page](#)
- [Accessing the System MBean Browser from the Component Property Pages](#)

2.4.1 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:

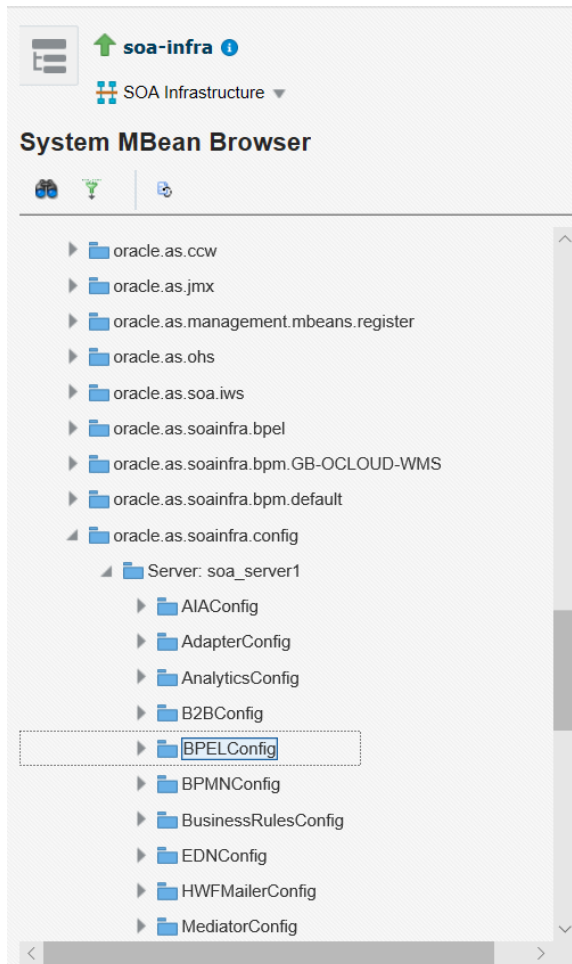
1. In the navigator, right-click **soa-infra** and select **SOA Administration**, then **System MBean Browser**.

The System MBean Browser is displayed.

The screenshot shows the System MBean Browser interface. On the left is a navigation tree with categories like Configuration MBeans, Runtime MBeans, and Application Defined MBeans. The 'Application Defined MBeans' section is expanded, showing a list of MBeans. The main area displays 'Application Defined MBeans: EMIntegration:soa-infra' with a table of attributes.

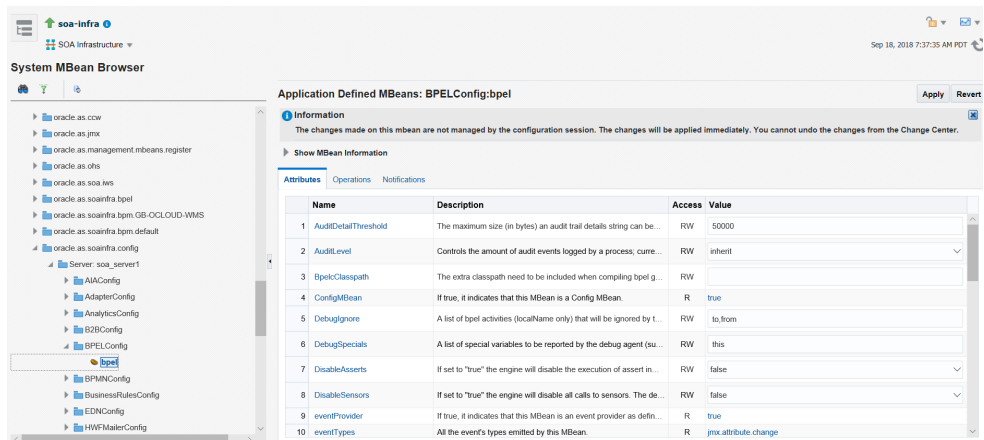
| Name | Description | Access | Value |
|------------------------|--|--------|---|
| 1 AdminMode | Attribute exposed for management | R | false |
| 2 AgentMonitored | Agent Monitored | R | false |
| 3 ConfigMBean | If true, it indicates that this MBean is a Config MBean. | R | false |
| 4 EMInstanceProperties | EM Target Properties | R | javax.management.openmbean.TabularDataSupport(tabularType=java... |
| 5 EMSwbProperties | EM SWB Properties | R | javax.management.openmbean.TabularDataSupport(tabularType=java... |
| 6 EMTargetType | Custom Target Type | R | oracle_soainfra |
| 7 eventProvider | If true, it indicates that this MBean is an event provider as defin... | R | true |
| 8 eventTypes | All the event's types emitted by this MBean. | R | jmx.attribute.change |
| 9 LocalAgentRequired | Requires Local Agent | R | false |
| 10 MemberOf | Custom Target's Group Membership | R | (No value) |
| 11 Members | Custom Target's Members | R | (No value) |
| 12 Name | Custom Target Name | R | soa-infra |
| 13 objectName | The MBean's unique JMX name | R | EMDomain:Name=soa-infra,EMTargetType=oracle_soainfra,type=EMI... |
| 14 OracleHome | Oracle Home directory | R | /scratch/vatsingha/fmwhome12213/soa |
| 15 Parent | Custom Target's Parent | R | com.bea.Name=soa_server1,Location=soa_server1,Type=Server |
| 16 ReadOnly | If true, it indicates that this MBean is a read only MBean. | R | false |

2. Scroll down to **Application Defined MBeans**.
3. Expand the **Application Defined MBeans** to access specific sections. You can also use the **Search** field at the top if you know the name (for example, **BPELConfig**).



This section contains properties for many Oracle SOA Suite components.

- Expand the component that includes the properties you want to configure. For example, expand **oracle.as.soainfra.config** > **Server: server_name** > **BPPELConfig** > **bpel**. You can also access this location by clicking the **More BPPEL Configuration Properties** short cut described in Step 2 of [Accessing the System MBean Browser from the Component Property Pages](#).



This guide provides many examples of navigating the System MBean Browser from the main page to configure properties. Here are several examples:

- For BPEL processes, see [Setting the Audit Level at the BPEL Process Service Component Level](#).
- For Oracle Mediator, see [Configuring Oracle Mediator Service Engine Properties](#).
- For human workflow, see [Globally Disabling the Automatic Release Timers for Oracle BPM Worklist Tasks](#).
- For BPMN processes, see [Task 2: Enable Oracle BPM Data Publish to Oracle BAM 11g Monitor Express](#).

2.4.2 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** and select **SOA Administration**.
2. 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 | Configuring SOA Infrastructure Properties . |
| BPEL Properties | More BPEL Configuration Properties | Configuring BPEL Process Service Engine Properties . |
| BPMN Properties Note: This option is only displayed for selection if Oracle BPM Suite is installed. | More BPMN Configuration Properties | Configuring BPMN Process Service Engine Properties . |
| Mediator Properties | More Mediator Configuration Properties | Configuring Oracle Mediator Service Engine Properties . |
| Workflow Properties > Mailer tab | More Workflow Notification Configuration Properties | Configuring Human Workflow Notification Properties . |
| Workflow Properties > Task tab | More Workflow Task Service Configuration Properties | Configuring Human Workflow Task Service Properties . |
| B2B Server Properties | More B2B Configuration Properties | Configuring Oracle B2B Server Properties . |
| Auto Purge | More Auto Purge Configuration Properties | Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control . |

For example, if you select **More BPEL Configuration Properties**, 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.

The screenshot shows the System MBean Browser interface. The left sidebar displays a tree view with the following structure:

- Application Defined MBeans
 - oracle.as.soainfra.config
 - Server: soa_server1
 - BPELConfig
 - bpel

The main content area displays the configuration for the **Application Defined MBeans: BPELConfig:bpel**. It includes an information message and a table of attributes:

| Name | Description | Access | Value |
|------------------------|--|--------|----------------------|
| 1 AuditDetailThreshold | The maximum size (in bytes) an audit trail details string can be... | RW | 50000 |
| 2 AuditLevel | Controls the amount of audit events logged by a process, cure... | RW | inherit |
| 3 BpelClasspath | The extra classpath need to be included when compiling bpel g... | RW | |
| 4 ConfigMBean | If true, it indicates that this MBean is a Config MBean. | R | true |
| 5 DebugIgnore | A list of bpel activities (localName only) that will be ignored by L... | RW | to,from |
| 6 DebugSpecials | A list of special variables to be reported by the debug agent (su... | RW | this |
| 7 DisableAsserts | If set to "true" the engine will disable the execution of assert in... | RW | false |
| 8 DisableSensors | If set to "true" the engine will disable all calls to sensors. The de... | RW | false |
| 9 eventProvider | If true, it indicates that this MBean is an event provider as defin... | R | true |
| 10 eventTypes | All the events types emitted by this MBean. | R | jmx.attribute.change |

2.5 Logging Out of Oracle Enterprise Manager Fusion Middleware Control

Overview of log out information of Oracle Enterprise Manager Fusion Middleware Control

To log out of Oracle Enterprise Manager Fusion Middleware Control:

- 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.
- In the upper right-hand corner of any page, click **weblogic** and select **Log Out** from the menu.

2.6 Setting Accessibility Options

Oracle Enterprise Manager Fusion Middleware Control provides accessibility options for the pages on which you monitor and manage applications. Oracle Enterprise Manager Fusion Middleware Control supports screen readers and provides standard shortcut keys to support keyboard navigation.

You can also view the console pages in high contrast or with large fonts for better readability. For information and instructions on configuring accessibility in Oracle Enterprise Manager Fusion Middleware Control, see "Using Oracle Fusion Middleware Accessibility Options" in *Administering Oracle Fusion Middleware*.

Part III

Administering the SOA Infrastructure

This part describes how to administer the SOA Infrastructure.

This part includes the following chapters:

- [Configuring the SOA Infrastructure](#)
- [Monitoring the SOA Infrastructure](#)
- [Tracking Business Flow Instances](#)
- [Recovering From Faults in the Error Hospital](#)
- [Managing Permissions and Roles for Oracle SOA Suite Users](#)
- [Managing SOA Folders and Work Manager Groups](#)

3

Configuring the SOA Infrastructure

You can configure the properties of the SOA Infrastructure, including Oracle SOA Suite and Oracle BPM Suite profiles, audit levels, payload validation, and default query duration. These property settings can apply to all SOA composite applications running in the SOA Infrastructure.

This chapter also describes how to configure local optimization, stop and start the managed server and SOA Infrastructure, and create global token variables.

- [Configuring SOA Infrastructure Properties](#)
- [Stopping and Starting the Managed Server and SOA Infrastructure](#)
- [Changing the SOA Infrastructure Server URL Property Port in the System MBean Browser](#)
- [Configuring Log Files](#)
- [Changing the Driver Name to Support Custom XA Drivers](#)
- [Specifying a Nondefault XA Transaction Timeout Value for XA Data Sources](#)
- [Configuring Database-bound Processing Threads](#)
- [Configuring Local Optimization](#)
- [Managing Global Token Variables for Multiple SOA Composite Applications](#)
- [Preventing Faults from Building Up in SOA](#)

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

3.1 Configuring SOA Infrastructure Properties

You can configure the following SOA Infrastructure properties in the SOA Infrastructure Common Properties page:

- Oracle SOA Suite and Oracle BPM Suite profiles
- Audit levels
- Payload validation
- Time period during which to retrieve flow instances and faults data
- Universal Description, Discovery, and Integration (UDDI) registry
- Callback server and server URLs
- Analytics, BPEL sensors, and composite sensors
- 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.

 **Note:**

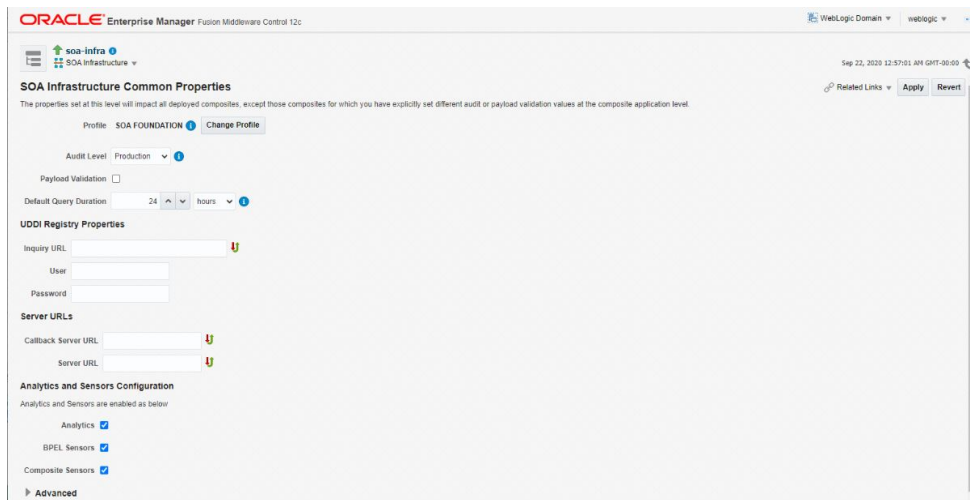
For quartz jobs that use Database for persistence, the node to node communication is done through the Database. If one node is down, there is a failover response time configuration stored in Database from where the available node detects the failure and starts processing uncompleted job requests. In SOA, this failover response time is configured for 10 minutes. This implies that there will be a delay of 10 minutes to the escalation and expiration properties if the node goes down just before the expiration time.

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... |
|---|---|--|
| <ol style="list-style-type: none"> a. Select SOA Administration > Common Properties. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select SOA Administration > Common Properties. | <ol style="list-style-type: none"> a. Select SOA Infrastructure Common Properties. |

The SOA Infrastructure Common Properties page is displayed.



 **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.
- If you exit this page without clicking **Apply**, the changes are not saved.
- If you make changes and want to reset these properties to their previous values, click **Revert**.

The properties of the SOA Infrastructure Common Properties page are described in the following sections:

- [Configuring Oracle SOA Suite and Oracle BPM Suite Profiles](#)
- [Configuring the Audit Trail, Payload Validation, and Default Query Duration](#)
- [Configuring UDDI Registry Properties](#)
- [Configuring Callback Server and Server URLs](#)
- [Configuring Analytics and Sensors](#)
- [Configuring Data Sources and Web Service Binding Properties](#)
- [Configuring SOA Infrastructure Advanced Configuration Properties](#)

3.1.1 Configuring Oracle SOA Suite and Oracle BPM Suite Profiles

Oracle SOA Suite profiles provide subsets of functionality. You select a profile and restart the SOA server to activate the selected SOA technologies. Only one SOA profile can be active in a domain at a given time. SOA profiles provide the following benefits:

- Reduce the overall memory footprint of the SOA Infrastructure.
- Make Oracle SOA Suite a more modular platform. You load only the functionality you need to use.
- Reduce overall class loading and overall startup time of the server.

A default profile is automatically set during installation. For Oracle SOA Suite installations (not using Oracle BPM Suite), the default profile is SOA Foundation. For Oracle BPM Suite installations, the default profile is BPM Basic. When you upgrade Oracle SOA Suite from Release 11g to Release 12c, the profile is set to **SOA Classic**. When you upgrade Oracle BPM Suite from Release 11g to Release 12c, the profile is set to **BPM Classic**.

Profiles are an advanced feature that must be configured with care. Ensure that you understand the following issues:

- Profile changes, if not done properly, put the system in an unstable state. Only a qualified SOA administrator must perform this operation.
- The SOA servers must be restarted after a profile change to reset the various component/application class loaders and ensure that the Oracle WebLogic Server instance does not hold onto resources for components that have been disabled by the profile change.
- Because SOA profiles define subsets of the overall SOA technology, take care when selecting the correct profile for an existing installation base of SOA composite

applications. If a smaller profile is selected that does not support a required SOA technology, composite deployment and runtime errors can occur. For example, if you change the profile from **SOA Foundation** to **BPEL Only**, and you have a business flow instance that includes a human task, the human task in the composite becomes inoperable.

- Profiles are only supported on Oracle WebLogic Server.
- When you change a profile, the domain is queried to determine the set of installed templates at runtime, and uses this information to determine which profiles are valid, given the current installation.

To change a profile:

1. Click **Change Profile**.
2. Select the desired profile, and click **OK**.

| Profile Type | Profile Description | Adapter Set Provided |
|---------------------------------------|--|--|
| BPM Classic | Contains the Oracle SOA Suite and Oracle BPM Suite functionality enabled in Release 11g (BPEL, BPMN, case management, Oracle Mediator, Oracle B2B, human workflow, and business rules). When you upgrade from Release 11g to 12c, this is the default profile. | The full set of adapters is included (file, FTP, database, JMS, MQSeries, AQ, E-Business Suite, User Messaging Service, socket, LDAP, Coherence, MSMQ, and JDE). |
| SOA Foundation | Contains SOA Foundation functionality (BPEL, human workflow, Oracle Mediator, and business rules). | The limited set of adapters is included (file, FTP, database, JMS, MQSeries, AQ, E-Business Suite, and User Messaging Service). |
| SOA Foundation With B2B | Contains SOA Foundation and the Oracle B2B functionality (BPEL, human workflow, Oracle Mediator, business rules, and Oracle B2B). | The full set of adapters. |
| SOA Foundation With Healthcare | Contains SOA Foundation and the Oracle B2B functionality (BPEL, human workflow, Oracle Mediator, business rules, and Oracle B2B). | The full set of adapters. |
| BPM Enterprise | Contains standard Oracle SOA Suite and Oracle BPM Suite functionality (BPEL, BPMN, case management, human workflow, Oracle Mediator, and business rules). | The full set of adapters. |
| Orchestration | Contains BPEL and human workflow functionality. | The limited set of adapters. |
| BPM Basic | Contains the standard Oracle SOA Suite platform, Oracle B2B, and Oracle BPM technologies (BPEL, BPMN, case management, human workflow, business rules, and Oracle B2B). | The limited set of adapters. |
| SOA Classic | Contains the Oracle SOA Suite functionality enabled in Release 11g (BPEL, BPMN, case management, Oracle Mediator, Oracle B2B, human workflow, and business rules). When you upgrade from Release 11g to 12c, this is the default profile. | The full set of adapters. |
| BPEL Only | Contains the BPEL service component. This is the minimal profile that only supports BPEL. | The limited set of adapters. |

| Profile Type | Profile Description | Adapter Set Provided |
|----------------------------------|--|---------------------------|
| SOA Foundation Enterprise | Contains the SOA Foundation functionality (BPEL, human workflow, Oracle Mediator, and business rules). | The full set of adapters. |

3. Click **Apply.**

Until you click **Apply**, you can click **Revert** to revert the profile change. In addition, no changes are made if you select different profiles (for example, to view their descriptions) and click **Cancel** in this dialog.

4. Restart Oracle WebLogic Server immediately.

Any server that includes a SOA Infrastructure deployment must be restarted:

- If the SOA Infrastructure is deployed on the administration server, then it must be restarted.
- If the SOA Infrastructure is deployed on a managed server or a cluster of managed servers, then these servers must all be restarted.

You must perform lifecycle management operations like composite undeployment, retire, activate etc. only when all managed servers in the cluster are running and accepting requests. You must not try any of these operations while a few managed servers are starting up and SOA platform is not on all the servers in the cluster.

3.1.2 Configuring the Audit Trail, Payload Validation, and Default Query Duration

You can configure the payload validation, audit trail, and default query duration for the SOA Infrastructure. Descriptions for each property are provided in the following table.

To configure the audit trail, payload validation, and default query duration:

1. Make changes appropriate to your environment.

| Element | Description |
|-------------------------------|--|
| Audit Level | <p>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.</p> <ul style="list-style-type: none"> • Off: No business flow instance tracking and payload tracking information is collected. Drilling down into a flow shows the components and their status. Using this setting limits database growth, and also helps reduce latency and improve throughput. • Production: Flow and audit event information is collected and stored in the database. Drilling down into a flow provides the flow trace. The flow trace shows the exact sequence of component interaction, and also shows component statuses. Drilling down into a BPEL instance shows the execution of BPEL activities, and their statuses. <p>As the flow-trace audit trail may not be required for all composites, you may want to set the audit level to Off at the SOA Infrastructure level, and set the audit level to Production for the required composites</p> <ul style="list-style-type: none"> • Development: This option collects payload details in addition to flow and audit events. This setting is not recommended for a production environment, as it will impact performance and result in rapid database growth. This level is useful largely for testing and debugging purposes only. <p>For more information about reducing the audit level for SOA composite applications and the data written to the Oracle SOA Suite schema, see 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. By default, this checkbox is not selected.</p> |
| Default Query Duration | <p>Specify the time period for retrieved instances and fault data, or accept the default value of 24 hours. This property controls the amount of instance and fault data fetched by default by all out-of-the-box queries. This value is also displayed as the default time range value on pages with query/search functionality (for example, the Dashboard page regions that include query functionality, the Flow Instances pages, Error Hospital pages, the Resequencer pages, and so on). You can override this value on the corresponding page, as needed.</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> |

2. Click **Apply**.
3. If you make changes and want to reset these properties to their previous values, click **Revert**.

3.1.3 Configuring UDDI Registry 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.

To configure UDDI registry properties:

1. Make changes appropriate to your environment.

| 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. | http:// master.mycompany.com:8888/ registry/uddi/inquiry |
| 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 [Changing the Endpoint Reference and Service Key for Oracle Service Registry Integration](#).

2. Click **Apply**.
3. If you make changes and want to reset these properties to their previous values, click **Revert**.

3.1.4 Configuring Callback Server and Server URLs

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.

To configure callback server and server URLs:

1. Make changes appropriate to your environment.

| 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 | Enter the server URL. This URL is published as part of the SOAP address of a service in the concrete WSDL file. Note: SOAP optimization is automatically configured. Therefore, if you upgrade to Release 12c 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. For information about local optimization, see Configuring Local Optimization . |

 **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.

2. Click **Apply**.
3. If you make changes and want to reset these properties to their previous values, click **Revert**.

3.1.5 Configuring Analytics and Sensors

The **Analytics and Sensors Configuration** section enables you to manage the collection of analytics, BPEL sensors, and composite sensors. By default, all selections are enabled.

Note the following order of precedence when disabling or enabling a selection on the SOA Infrastructure Common Properties page:

- Disabling a selection on the Common Properties page disables the collection of data for that selection for all SOA composite applications. For example, if you disable composite sensors on the Common Properties page, composite sensor details are not collected for any flow instances created after this change.
- Enabling a selection on the Common Properties page enables you to disable that setting at the individual SOA composite application level. For example, if you enable composite sensors on the Common Properties page and disable composite sensors for an individual SOA composite application (for example, named LoanFlow) on its home page under **Settings > Enable/Disable Analytics & Sensors**, composite sensor details are not collected for any instance of the LoanFlow SOA composite application after this change. However, all other flow instances continue to collect composite sensor details.

To configure analytics and sensors:

1. Make changes appropriate to your environment.

| Element | Description |
|---------------------|--|
| Analytics | Use to manage the collection of analytics in SOA composite applications. When enabled, analytics enable you to perform the following tasks: <ul style="list-style-type: none"> • Measure a business indicator at a certain point in the process or in a section of the process. • Capture BPEL process metrics that are sent to Oracle BAM Server, and then used for analysis and graphic display. |
| BPEL Sensors | Use to manage the collection of BPEL sensor details in SOA composite applications. When enabled, BPEL sensors collect data for any fault, activity, and variable sensors defined in the composite. |

| Element | Description |
|--------------------------|--|
| Composite Sensors | <p>Use to manage the collection of composite sensor details in SOA composite applications. When enabled, composite sensors perform the following tasks:</p> <ul style="list-style-type: none"> • Monitor incoming and outgoing messages. • Specify composite sensor details in the search utility of the Flow Instances page of a SOA composite application in Oracle Enterprise Manager Fusion Middleware Control. This action enables you to locate a particular instance. • Publish JMS data computed from incoming and outgoing messages. |

2. Click **Apply**.
3. If you make changes and want to reset these properties to their previous values, click **Revert**.

For information about setting analytics and sensors in an individual SOA composite application, see [Disabling and Enabling the Collection of Analytic, BPEL Sensor, and Composite Sensor Data](#).

3.1.6 Configuring Data Sources and Web Service Binding Properties

A data source enables you to retrieve a connection to a database server.

To configure data sources and web service binding properties:

1. Expand the **Advanced** section.

The **Data Sources** section displays the following properties.

The screenshot shows the configuration interface for SOA infrastructure. The 'Advanced' section is expanded, revealing two sub-sections: 'Data Sources' and 'Web Service Binding Properties'. Under 'Data Sources', there are two entries: 'Server Data Source JNDI' with the value 'jdbc/SOALocalTxDataSource' and a 'Configure' button; and 'Server Transaction Data Source JNDI' with the value 'jdbc/SOADDataSource' and a 'Configure' button. Below these is a 'Nonfatal Connection Retry Count' field with the value '0'. The 'Web Service Binding Properties' section includes 'Oracle SSL Ciphers' and 'Oracle Wallet Password' (both with empty text boxes), a checked 'Use chunking' checkbox, and a 'Chunk size' field with the value '0'. A link 'More SOA Infra Advanced Configuration Properties...' is visible at the bottom of the configuration area.

2. Make changes appropriate to your environment.

| 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 |

| Element | Description | Example |
|--|---|--------------------|
| 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 |

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

3. Make changes appropriate to your environment.

| 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 |

4. Click **Apply**.
5. If you make changes and want to reset these properties to their previous values, click **Revert**.

3.1.7 Configuring SOA Infrastructure Advanced Configuration Properties

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 key:
 - **excludeBpelMaxCreationTime** key: Enables you to set the time period for excluding messages that require recovery. For more information, see

[Monitoring the Overall Status of the SOA Infrastructure or Individual SOA Folder.](#)

- **CreateWSCallTrackingMBean:** Controls the creation of an 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 [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.
- **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.

3.2 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.

 **Note:**

- 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 [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 Domain Menu...

- a. Select **Control**.

From the WebLogic Domain Folder in the Navigator...

- a. Right-click the managed server (for example, **soa_server1**).
 - b. 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 *Administering Node Manager for Oracle WebLogic Server*.

For information on starting and stopping managed servers with WLST commands, see *Administering Oracle Fusion Middleware*.

3.2.1 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://address: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.

3.2.2 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.

3.2.3 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.createSSLSocketFactory(SSLUtil.java:50)
    at
oracle.integration.platform.common.SSLSocketFactoryManagerImpl.getSSLSocketFactory(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.fabric.composite.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 [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. 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"> a. Select SOA Administration > Common Properties. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select SOA Administration > Common Properties. | <ol style="list-style-type: none"> a. Select SOA Infrastructure Common Properties. |

- In the **Name** column, click **ServerURL**.
The Attribute: ServerURL page appears.
- In the **Value** field, change the port.

The screenshot shows the Oracle SOA Infrastructure console interface. At the top, it indicates the user is logged in as 'weblogic' and the page was refreshed on Sep 25, 2013 at 9:01:37 AM PDT. The main area is titled 'System MBean Browser' and shows a tree view on the left with 'soa-infra' selected. The right pane displays the 'Attribute: ServerURL' configuration. The MBean Name is 'oracle.as.soainfra.config:Location=soa_server1,name=soa-infra,type=SoaInfraConfig,Application=soa-infra'. The Attribute Name is 'ServerURL'. The Description states: '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.' The Type is 'java.lang.String' and it is Readable/Writable (RW). A 'Value' field is shown with the text 'myhost.us.example.com:8001/'. Below the field is a 'Use Multiple Line Editor' button. At the top right of the configuration pane are 'Apply', 'Revert', and 'Return' buttons.

- Click **Apply**.
- 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 the *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:

- Access this page through one of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|--|
| a. Select Logs > Log Configuration . | a. Right-click soa-infra . |
| | b. 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.bpel**). 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.
2. Specify search criteria (for example, `soa`), and click the **Search** icon.
Oracle SOA Suite loggers are displayed.

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 Search

| Logger Name | Oracle Diagnostic Logging Level (Java Level) | Log File |
|---|--|-------------|
| ▼ 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.bpel | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| ▶ oracle.soa.common.console | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.common.recycle | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.dvm | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.fabric.notification.service.JMSNotificationSer | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| ▶ oracle.soa.hc | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.management.config.edn.EDNConfig | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.management.config.edn.EDNJmsConfig | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.management.facade.api | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.management.internal.eih.impl.FacadeFinderR | NOTIFICATION:1 (INFO) [Inherit ▼] | ndl-handler |

Persist log level state across component restarts

3. 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 *Administering Oracle Fusion Middleware*.
4. 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.

soa-infra | Logged in as weblogic | SOA Infrastructure | Find an Instance... | Page Refreshed Sep 25, 2013 9:20:14 AM PDT

Log Configuration

Use this page to configure basic and advanced log configuration settings.

Log Levels | **Log Files**

Use this page to create and edit log file configurations. A log file configuration specifies the log file where the log messages will be logged to, the format of the log messages, the rotation policies used, as well as other parameters depending on the log file configuration class.

Create... | Create Like... | Edit Configuration... | View Configuration... | Delete Configuration...

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

For information on setting logging levels and Oracle SOA Suite logging files to view, see [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'
class='oracle.core.ojdl.logging.ODLHandlerFactory'>
      <property name='path' value='c:\soa1210.1411\user_
projects\domains\soa\servers\server_soa\logs\soa-diagnostic.log' />
      <property name='maxFileSize' value='10485760' />
      <property name='maxLogSize' value='104857600' />
      <property name='supplementalAttributes' value='J2EE_APP.name,J2EE_
MODULE.name,WEBSERVICE.name,WEBSERVICE_PORT.name,composite_instance_id,component_
instance_id,composite_name,component_name' />
    </log_handler>
  </log_handlers>
</logging_configuration>
```

```
<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 *Administering Oracle Fusion Middleware*.

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:

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

From the SOA Infrastructure Menu...

- a. Select **Logs > Log Configuration**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. Select **Logs > Log Configuration**.
-

The Log Configuration page is displayed.

2. In the **Logger Name** column, expand **oracle.soa > oracle.soa.sql.trc.fabric**.
3. Set the logging level to **FINE**.

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 | soa

| Logger Name | Oracle Diagnostic Logging Level (Java Level) | Log File |
|---|--|--------------------------|
| ▶ 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-trc-handler |
| oracle.soa.tracking.fabric.audit.AuditSerializerConfig | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.FabricAuditTransactionS | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.FlowEventAuditSerializel | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.entity.JpaAuditTrailDaoI | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.store.AsyncMultipleWrit | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.store.BaseAuditStorePo | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.store.SyncMultipleWrite | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |
| oracle.soa.tracking.fabric.audit.store.SyncSingleWriteAt | NOTIFICATION:1 (INFO) [Inherit ▼] | odl-handler |

4. 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:
6fec0e67fbf81939;-7d87fd84:138e67064fb;-8000-0000000000000dd6,1:24469]
[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. Under **Domain Structure** on the left side of the page, select **Services > Data Sources > SOADataSource > Connection Pool**.
 3. For the **Driver Class Name**, change the value to a custom data source (for example, `oracle.jdbc.xa.client.myDataSource`).
 4. 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 `.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:co0yf470</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 > 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 Database-bound Processing Threads

When client requests come in at a high rate, the requests collect in a queue and wait for the availability of database connections. To handle more concurrent incoming requests, you can change the following properties:

- The **SOADataSource** property in the Oracle WebLogic Server Administration Console

- The percentages used to calculate the maximum number of threads with the **SOAMaxThreadsConfig** property in the System MBean Browser

The **incomingRequestsPercentage** and **internalProcessingPercentage** elements of **SOAMaxThreadsConfig** are defined so that combined processing tasks are less likely to overwhelm the number of database connections. The thread limit number used for these maximum threads constraints is calculated based on the maximum capacity value of the **SOADataSource** property in the Oracle WebLogic Server Administration Console.

If you change the maximum capacity for the **SOADataSource** property, a background process is initiated to readjust the maximum threads number defined for both the **incomingRequestsPercentage** and **internalProcessingPercentage** elements. The automatic adjustment must acquire the Oracle WebLogic Server configuration editing lock before it can proceed with the operation. If you have already acquired the lock, you must release it to allow the automatic adjustment to proceed.

You can adjust the percentage allocated for internal processing versus incoming requests. The default percentage allocation enables the internal processing tasks to take up to 65% of the database connection pool size. Incoming requests take up to 15% of data source pool size, and the remaining 20% account are for adapter and Event Delivery Network processing.

3.7.1 Changing the Maximum Capacity for the SOADataSource Property

To change the maximum capacity for the `SOADataSource` property:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure**, select **Services > Data Sources**.
3. At the top of the page, click **Connection Pool**.
4. In the **Name** column, select **SOADataSource**.
5. In the **Maximum Capacity** field, update the value (for example, to 300 to accommodate loads with 200 threads). The default value is 50.

 **Note:**

For GridLink data sources, the maximum capacity of the connection pool is by default double the maximum capacity of the connection pool of the normal data source.

6. Click **Save**.

3.7.2 Configuring the SOAMaxThreadsConfig Property

To configure the `SOAMaxThreadsConfig` property:

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... |
|---|---|--|
| a. Select SOA Administration > Common Properties. | a. Right-click soa-infra. b. Select SOA Administration > Common Properties. | a. Select SOA Infrastructure Common Properties. |

2. Click **More SOA Infra Advanced Configuration Properties.**
3. Expand **SOAMaxThreadsConfig.**
4. Make changes appropriate to your environment.

The screenshot shows the SOA Infrastructure System MBean Browser interface. The left pane displays a tree view of the SOA Infrastructure configuration, with the **soa-infra** folder selected. The right pane shows the configuration details for the **SOAMaxThreadsConfig** attribute. The MBean Name is `oracle.as.soainfra.config:Location=AdminServer,name=soa-infra,type=SoaInfraConfig,Application=soa-infra`. The attribute name is **SOAMaxThreadsConfig**. The description is "SOA workmanager max threads constraint configuration." The type is `javax.management.openmbean.CompositeData`. The attribute is readable and writable. The value is a table with the following data:

| Key | Element |
|------------------------------|---------|
| SOAMaxThreadsConfig | |
| incomingRequestsPercentage | 20 |
| internalBufferPercentage | 30 |
| internalProcessingPercentage | 50 |

For example, make the following changes to accommodate these thread values:

- **incomingRequestsPercentage:** 20 (to accommodate 10 threads)
 - **internalBufferPercentage:** 50 (to accommodate 25 threads)
 - **internalProcessingPercentage:** 30 (to accommodate 15 threads)
5. Click **Apply.**
 6. If you make changes and want to reset these properties to their previous values, click **Revert.**

3.8 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.

3.8.1 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 [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 [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.
Show Instance IDs

| Instance | Type | Usage | State | Time | Composite Instance |
|--------------------------|-------------------------------|---------|-----------|-------------------|-------------------------|
| orderprocessor_client_ep | Web Service | Service | Completed | Oct 20, 2012 7:41 | OrderBookingComposite c |
| OrderProcessor | BPEL Component | | Running | Oct 20, 2012 7:4 | OrderBookingComposite c |
| StoreFrontService | Web Service(Local Invocation) | Referer | Completed | Oct 20, 2012 7:41 | OrderBookingComposite c |
| 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 c |
| StoreFrontService | Web Service(Local Invocation) | Service | Completed | Oct 20, 2012 7:41 | OrderSDOComposite of 5 |

For more information about the Flow Trace page, see [Monitoring the Flow Trace of a Business Flow Instance](#).

3.8.2 Overriding or Forcing Local Optimization

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

| Property | Description |
|--|--|
| <code>oracle.webservices.local.optimization</code> | By default, Oracle SOA Suite prefers local optimization. However, you can override this behavior with the <code>oracle.webservices.local.optimization</code> binding property in the <code>composite.xml</code> file. When this property is set to <code>false</code> , 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 Policy Attachments and Local Optimization in Composite-to-Composite Invocations . |

| Property | Description |
|-------------------------------------|---|
| oracle.soa.local.optimization.force | <p>You can override the <code>oracle.webservices.local.optimization</code> property and force optimization to be performed by setting the <code>oracle.soa.local.optimization.force</code> property to <code>true</code>. Use this property in the following scenarios:</p> <ul style="list-style-type: none"> 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 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. <p>The <code>oracle.soa.local.optimization.force</code> property has a default value of <code>false</code>. When this property is set to <code>true</code>, Oracle SOA Suite skips the condition checks described in Condition Checks for Using Local Optimization, except for policy configuration checking, which is necessary to ensure and enforce the integrity of service invocations.</p> <p>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.</p> <p>To enable the <code>oracle.soa.local.optimization.force</code> property:</p> <ul style="list-style-type: none"> Add <code>oracle.soa.local.optimization.force</code> as a binding component level property in the reference section of the composite being invoked. For example, if composite <code>comp_comp2</code> invokes <code>comp_comp1</code>, then define this property in the reference section of the <code>composite.xml</code> file of <code>comp_comp2</code>. <pre><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/</pre> |

| Property | Description |
|----------|--|
| | <pre> 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> </pre> |
| | <p>To force local optimization on the reference service callback:</p> |
| | <ul style="list-style-type: none"> • Add the <code>oracle.soa.local.optimization.force</code> property to the <code><callback></code> element in the <code><service></code> definition of the corresponding reference service. <p>For example, if <code>composite1</code> invokes <code>composite2</code>, add <code>oracle.soa.local.optimization.force</code> property in the <code><service></code> definition of <code>composite2</code> as follows. This forces the asynchronous callback from <code>composite2</code> to <code>composite1</code> to be optimized locally:</p> |
| | <pre> <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> </pre> |
| | <p>There can be other scenarios for forcing optimization that are not described in this section.</p> |

| Property | Description |
|--|--|
| <code>oracle.soa.local.force.reenable.timemillis</code> Note: This property is available in 12c (12.2.1.3) only if you have installed patch 32690550. Sign in to My Oracle Support and search for the patch number to locate and download the patch. | When this property is set to a value, local optimization will be retried after a failure for the specified amount of time (in milliseconds). The default value is 600000 (10 minutes). |



Note:

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

For information about optimization and WS-AtomicTransaction (WS-AT) transactions, see *WS-AT Transactions are Not Supported When Optimization is Enabled in Developing SOA Applications with Oracle SOA Suite*.

3.8.3 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.

3.8.4 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 3-1](#)).
- 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 3-2](#)).

Table 3-1 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. |

Table 3-1 (Cont.) Local Optimization Calls When a Composite is Unreachable

| Scenario | Description |
|---|---|
| Is it possible to retry the co-located call? | <p>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:</p> <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? | <p>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).</p> |

Table 3-2 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. |

3.9 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.

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.
- 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`.

 **Note:**

- 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 `NullPointerException` 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.

3.9.1 Managing Global Token Variables in the Token Configurations Page

You can manage global token variables on the Token Configurations 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 global 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... |
|---|---|
| a. Select SOA Administration > Token Configurations . | a. Right-click soa-infra . |
| | b. 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:

- a. Click **Bulk Append Tokens**.

- b. 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>
```

- c. 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.

- d. 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:

- a. 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. Columns can be sorted either in ascending or descending order. 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 Configurations

Bulk Append Tokens No file selected.

Modify Configuration File

Warning
Ensure that the changes are committed before switching to the Bulk Append mode or navigating out of this page. All uncommitted changes will be lost.

| Token Name | Token Value |
|------------|-------------|
| key1 | val1 |
| key2 | val2 |
| key3 | val3 |


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

Note:

After making changes, you must click **Save** 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"> i. 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 Edit icon to change the existing name. ii. Click OK to save your changes in the Add Token dialog. iii. Click Save to save your changes in the system's <code>mdm-url-resolver.xml</code> file. |
|  | <ol style="list-style-type: none"> i. Click to invoke the Edit Token dialog for editing a selected token name, value, or both. ii. Click OK to save your changes in the Edit Token dialog. iii. Click Save to save your changes in the system's <code>mdm-url-resolver.xml</code> file. |
|  | <ol style="list-style-type: none"> i. Click to remove an existing token name and value. ii. Click OK to confirm. iii. Click Save to save your changes to the system's <code>mdm-url-resolver.xml</code> file. |
|  | <ol style="list-style-type: none"> i. 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. |

| Element | Description |
|---------|-------------|
|---------|-------------|

- | | |
|--|--|
| | <ul style="list-style-type: none"> i. Click to undo all changes you have made since you last clicked Save. |
|  Revert | <ul style="list-style-type: none"> ii. Click Yes when prompted to confirm. |

- c. Restart the SOA Infrastructure after adding, modifying, or deleting token values. For information, see [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 [How Global Token Variables are Substituted at Runtime](#).

3.9.2 How Global Token Variables are Substituted at Runtime

Note:

When you deploy a SOA composite application in Oracle Enterprise Manager Fusion Middleware Control 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 [Deploying SOA Composite Applications](#).

The token names and the replacement values that you specified in the Token Configurations 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 are defined through the Token Configurations 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 Configurations 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

```

3.9.3 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

The screenshot displays the 'SOA Infrastructure Common Properties' configuration page. It includes sections for 'SOA Infrastructure Common Properties', 'UDDI Registry Properties', and 'Server URLs'. The 'Server URLs' section contains a table with two rows: 'Callback Server URL' and 'Server URL'. The 'Server URL' field is highlighted with a red border and contains the text 'my.host.com:8080'. There are also 'Change Profile', 'Audit Level', 'Payload Validation', and 'Default Query Duration' settings visible.

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

```

http://\${serverURL}/somePath/someResource.xml

```

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 [Configuring SOA Infrastructure Properties](#).

3.10 Preventing Faults from Building Up in SOA

Resiliency or **Circuit Breaker** enables you to configure the system to automatically suspend upstream endpoints when a downstream endpoint is down in a SOA composite. This prevents fault buildup in the server and relieves you from having to bulk-recover faulted instances. The upstream endpoints are automatically resumed after the downstream endpoint comes back. For Web Services and REST Services, a new message arriving after the suspension/retry interval brings the service back up.

Note:

This SOA Suite feature is part of Oracle Integration Continuous Availability. Please refer to the Oracle Fusion Middleware Licensing Information for more details on Oracle SOA Suite for Middleware Options.

Enable Resiliency (Circuit Breaker) globally by configuring it at the SOA Infrastructure level. Once enabled, all downstream endpoints are monitored in all composites. If a downstream endpoint experiences errors that exceed the threshold, specified by you in the Resiliency configuration settings, then the upstream endpoints for that downstream endpoint are automatically suspended. So, for example, if a Reference file adapter fails to write to the directory, the upstream web service can be automatically suspended. The system will periodically check if the downstream file adapter is back, and re-enable the web service when the adapter comes back.

The following types of upstream endpoints can be automatically suspended:

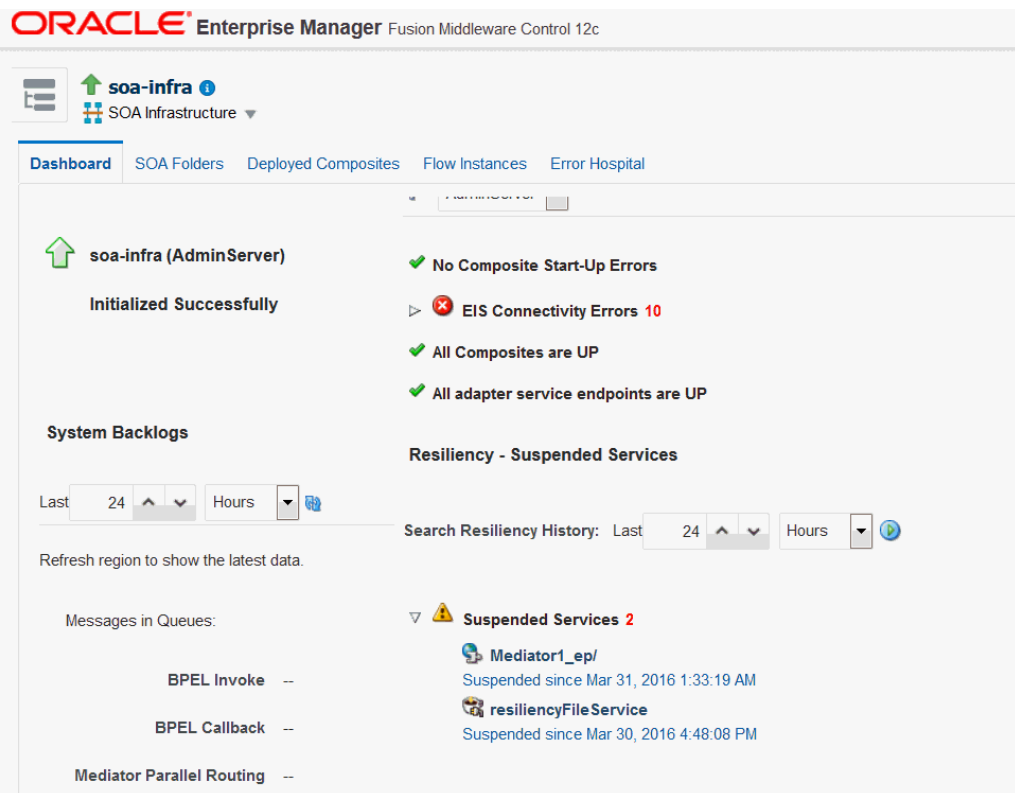
- **Web Services:** Incoming requests are rejected for the duration that the Web service is suspended.
Starting in 12.2.1.1.0, if the Web Service has multiple operations, then only the operation where the message originated from is suspended.
- **REST Services:** Starting in 12.2.1.1.0, upstream REST services can be automatically suspended. If the REST Service has multiple operations, then only the operation where the message originated from is suspended.
- **Adapters:** JMS, AQ, DB, File, Apps, SAP, MQ, UMS, and FTP adapters can be automatically suspended in this release.
- **EDN Subscribers:** The EDN subscriber closest to the downstream endpoint gets suspended. In the 12.2.1 release, all subscribers in a component (BPEL or Mediator) were suspended when the circuit breaker was triggered. In 12.2.1.1.0, only the subscriber where the message originated from is suspended.

 **Note:**

- A downstream endpoint can have many upstream endpoints. Only upstream endpoints that are actively funneling in data to the downstream endpoint are suspended.
- The circuit breaker and the adapter polling run simultaneously in separate threads. When circuit breaker is triggered, it signals to the adapter polling thread to suspend polling. However, if the adapter has already started a polling cycle when the circuit breaker sends the signal, the adapter continues to process the polled messages. This can result in more errors being generated by downstream endpoints than the number configured in resiliency **Failure Rate** before the adapter polling thread is suspended. In addition, for the Oracle Database Adapter, add JCA property `<property name="AlwaysRollbackOnFailure" value="true"/>` to the .jca file generated by Oracle JDeveloper for the adapter to trigger the circuit breaker.

Viewing and Resuming Suspended Services

Services suspended as a result of Resiliency kicking in appear on the SOA Infrastructure Dashboard page, under the Resiliency — Suspended Services section.



The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control 12c interface. The top navigation bar includes 'Dashboard', 'SOA Folders', 'Deployed Composites', 'Flow Instances', and 'Error Hospital'. The main content area displays the 'soa-infra (AdminServer)' status as 'Initialized Successfully'. Under the 'System Backlogs' section, there are filters for 'Last 24 Hours' and a 'Refresh region' button. The 'Resiliency - Suspended Services' section shows a warning icon and 'Suspended Services 2'. The list includes 'Mediator1_ep/' (Suspended since Mar 31, 2016 1:33:19 AM) and 'resiliencyFileService' (Suspended since Mar 30, 2016 4:48:08 PM). Other sections include 'No Composite Start-Up Errors', 'EIS Connectivity Errors 10', 'All Composites are UP', and 'All adapter service endpoints are UP'. A 'Messages in Queues' section lists 'BPEL Invoke', 'BPEL Callback', and 'Mediator Parallel Routing'.

The Resiliency settings take care of automatically resuming any suspended service when the downstream endpoint comes back up.

You can click on the Dashboard suspension message to see the details of the suspended service. The details of the resiliency parameters (x errors in y minutes) that

triggered the suspension are displayed. The name of the downstream endpoint and the SOA composite are also displayed. You can click **Resume** to manually resume the service.

The following example shows an upstream Web Service (`Mediator1_ep`) being suspended, as the downstream endpoint (`FileWrite`) has failed 2 times in 1 minute.

Suspended Web Service: Mediator1_ep/ ✕

The webservice has been suspended due to outbound endpoint errored 2 times in 1 minutes.

Outbound Endpoint `FileWrite` Show Faults

Composite `BpelRecoveryE2ETest`

Folder `consoleTests`

Suspended Since `Mar 31, 2016 3:04:27 AM`

The auto retry is disabled for the suspended webservice, you must resume the webservice manually.

Resume

The following example shows a suspended EDN subscriber. Both the component name and the subscriber details are shown.

Suspended Subscription: Mediator1/Event2deSu_SCA_8 (Mediator1/Event2deSu_SCA_8) ✕

The event subscription has been suspended due to outbound endpoint errored 1 times in 1 minutes.

Outbound Endpoint `fileReference2` Show Faults

Composite `SuspendSingleEventTest`

Folder `default`

Suspended Since `Mar 31, 2016 3:31:00 AM`

The suspended subscription will retry the flow in every 1 minutes or you can resume the subscription manually.

Resume

↑
Component Name/Subscriber ID

Resiliency related messages are also written to the log. You can search for strings like "CircuitBreaker" in the Log Messages page to filter out Resiliency-related messages.

| Time | Message Type | Message | ECID | Relationship ID | Log File |
|-----------------------------|--------------|--|---|-----------------|-------------------------------|
| Mar 30, 2016 9:09:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00124... | 1.22646 | AdminServer-diagnostic.log |
| Mar 30, 2016 9:08:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00124... | 1.22625 | AdminServer-diagnostic.log |
| Mar 30, 2016 9:07:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00124... | 1.22624 | AdminServer-diagnostic.log |
| Mar 30, 2016 9:06:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00124... | 1.22623 | AdminServer-diagnostic-11.log |
| Mar 30, 2016 9:05:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00124... | 1.22622 | AdminServer-diagnostic-11.log |
| Mar 30, 2016 9:04:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00124... | 1.22621 | AdminServer-diagnostic-11.log |
| Mar 30, 2016 9:03:15 PM IST | Error | CircuitBreakerHistory: Suspending Adapter -> "fileServiceRead" beca... | f868547e-7264-40ce-a88a-40637fa9d90a-00123... | 1.22600 | AdminServer-diagnostic-11.log |

3.10.1 Configuring Resiliency at the Global Level

Use the Resiliency Configuration page to enable or disable resiliency, and to specify global resiliency settings.

- Under the **SOA Infrastructure** menu, select **SOA Administration > Resiliency Configuration**.

The Resiliency Configuration page appears. [Figure 3-3](#) shows the Resiliency Configuration page.

Figure 3-3 Resiliency Configuration Page

Resiliency Configuration Apply Revert

Enable Resiliency to handle downstream endpoint failures. Resiliency prevents faults from building up in the system and error hospital by shutting down incoming requests for the flow.

Resiliency Enabled

Failure Rate errors in minutes

Retry Interval minutes Disable Auto Retry

Add Notifications

[More Resiliency Configuration Properties...](#)

- Select the **Enabled** check box to enable resiliency.

When you enable resiliency, downstream endpoints are monitored for errors, and when these errors exceed the specified threshold, upstream endpoints are automatically suspended.

The other resiliency configuration parameters, like **Failure Rate** and **Retry Interval**, are now enabled.
- Specify a **Failure Rate**: Enter the number of **errors** and the duration in **minutes**.

For example, if you specify **10 errors** in **5 minutes**, then a downstream endpoint failing 10 times in a span of 5 minutes triggers the resiliency feature.
- Specify a **Retry Interval** in **minutes**.
 - If you select **Disable Auto Retry**, then automatic retries are disabled. You would need to resume the upstream endpoint manually.

Any suspended upstream endpoint is temporarily re-enabled after every **Retry Interval** to check if the downstream endpoint is back up. So, if you specify a **Retry Interval** of 10 minutes, then a suspended upstream endpoint is re-enabled every 10 minutes to check if the downstream endpoint is back up. If the downstream endpoint is still down, then the upstream endpoint is suspended again.

5.

 **Note:**

This step is optional.

Click **Add Notification** to configure SMS, e-mail, and IM (instant messaging) notifications for the administrator.

You can notify the administrator when an upstream endpoint is suspended, or when an endpoint comes back up.

- a. Under **Send Notification To**, enter the subscriber ID for the administrator.

The subscriber ID can be an email address, phone number, or IM identifier, depending on the chosen communication channel.

- b. Under **Via**, select the communication channel.

You can click **Add Notification**, identified by the plus sign (+), to add another notification channel.

You can also click **Delete Notification**, identified by the red X, to remove an existing notification channel.

6.

 **Note:**

This step is optional.

Click **More Resiliency Configuration Properties** to configure additional resiliency properties. See [Global Resiliency Properties and Endpoint Resiliency Properties](#) for details on the properties that can be configured.

7. Click **Apply** on the Resiliency Configuration page to save your changes.
 - If you click **Revert**, then all changes made to this page are reverted.

You have now enabled resiliency at the global level.

3.10.2 Overriding Global Resiliency Settings for a Downstream Endpoint

You can tweak the resiliency settings for a downstream endpoint, and these settings will override the global Resiliency settings for that endpoint.

For example, if you do not wish to monitor a downstream file adapter for write failures, you can disable resiliency for that particular adapter. Use the following steps to configure the resiliency settings for a downstream endpoint in Oracle Enterprise Manager Fusion Middleware Control:

1. From the SOA Composite page for the composite containing the endpoint, click the endpoint name under Services and References.

For example, if you are tweaking resiliency settings for a file adapter, click the name of the file adapter under Services and References.

The dashboard for the endpoint appears.

2. Click **Properties** to switch to the **Properties** tab.

A list of properties appears for the component.

3. If you cannot see the Resiliency properties, click the **Add** button identified by the plus (+) sign.

See [Global Resiliency Properties and Endpoint Resiliency Properties](#) for the list of available Resiliency properties.

4. Modify the values for the properties that you wish to change.



Note:

You can also override the resiliency properties for a downstream endpoint in JDeveloper.

3.10.3 Global Resiliency Properties and Endpoint Resiliency Properties

You can modify the `ResiliencyConfig` MBean attribute in the System MBean Browser to globally set advanced configuration properties for Resiliency. You can also modify the properties for a Reference endpoint to override the global Resiliency settings for the endpoint.

Table 3-3 ResiliencyConfig MBean Attribute Keys and Endpoint Properties

| MBean Key | Reference Endpoint Property | Description |
|---|--|--|
| <code>circuitBreakerEnabled</code> | <code>circuitbreaker.disabled</code> | Enables or disables Resiliency. |
| <code>failureRate</code> | <code>circuitbreaker.failure.rate</code> | The threshold count of errors that trigger Resiliency. |
| <code>failureRateTime</code> | <code>circuitbreaker.failure.rate.time</code> | The time window within which the errors (<code>failureRate</code>) should occur for Resiliency to kick in. |
| <code>resiliencyNotificationConfigList</code> | | The list of email addresses, phone numbers, and IM identifiers to notify when an upstream endpoint is suspended, or when an upstream endpoint is resumed. |
| <code>resumeInitialDelay</code> | <code>circuitbreaker.resume.initial.delay</code> | The time duration, in ms (milliseconds), to wait between processing successive messages when resuming an endpoint. This guards against failure buildup in case the downstream endpoint goes down again. |

Table 3-3 (Cont.) ResiliencyConfig MBean Attribute Keys and Endpoint Properties

| MBean Key | Reference Endpoint Property | Description |
|-------------------|--|---|
| resumeRampupTime | circuitbreaker.resume.rampup.time | The time duration, in minutes, after which the initial delay is reduced to 0. This equates to the time duration after which you are reasonably confident that the downstream endpoint is up, and the system can start pumping messages without delay. The initial delay is adjusted every 5 minutes. |
| retryTimeInterval | circuitbreaker.retry.interval property for a Reference endpoint. | Periodic interval, in minutes, at which the downstream endpoint is tested by temporarily re-enabling the upstream endpoint, and letting trickle messages through. |

You can set the above properties for composite references in JDeveloper by selecting the reference in the composite and clicking the **Add** button under the Composite Bindings section.

4

Monitoring the SOA Infrastructure

You can monitor the overall status of the SOA Infrastructure or individual SOA folder, Oracle SOA Suite routing topology, SOA Infrastructure performance summary metrics, message delivery processing requests, and service and reference binding components in the SOA Infrastructure.

- [Monitoring the Overall Status of the SOA Infrastructure or Individual SOA Folder](#)
- [Monitoring SOA Infrastructure Performance Summary Metrics](#)
- [Monitoring Message Delivery Processing Requests](#)
- [Monitoring Service and Reference Binding Components in the SOA Infrastructure](#)
- [Using SOA Health Check](#)
- [Monitoring and Troubleshooting SOA-Wide Issues Using IWS Reports](#)

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

4.1 Monitoring the Overall Status of the SOA Infrastructure or Individual SOA Folder

You can monitor the overall status of your environment from the Dashboard pages of the SOA Infrastructure or an individual SOA folder. The Dashboard pages enable you to view information such as the following:

- The overall health of the SOA runtime, including any faults with which to be concerned.
- The health of deployed applications and adapter endpoints (for example, any problems when the system was restarted or when applications were deployed or upgraded).
- The health of the business transactions, including any faults with which to be concerned.
- The key events that occurred in the system in the last operating time range (for example, 24 hours).

The information that is displayed on the Dashboard page of the SOA Infrastructure or an individual SOA folder differs in some sections. [Table 4-1](#) describes the sections of the Dashboard pages and how they differ.

Table 4-1 Dashboard Page Sections at SOA Infrastructure and Individual SOA Folder Levels

| Section | Displayed on SOA Infrastructure Dashboard Page? | Displayed on Individual SOA Folder Dashboard Page? |
|---------------------------|---|--|
| Key Configuration | Yes | Yes, and also includes the work manager group of the SOA folder. |
| SOA Runtime Health | Yes | No |
| System Backlogs | Yes | No |

Table 4-1 (Cont.) Dashboard Page Sections at SOA Infrastructure and Individual SOA Folder Levels

| Section | Displayed on SOA Infrastructure Dashboard Page? | Displayed on Individual SOA Folder Dashboard Page? |
|---|--|---|
| Business Transaction Faults | Yes, shows all faults for the entire SOA Infrastructure. | Yes, shows faults for the individual SOA folder only. |
| Composites and Adapters Availability | Yes, shows composite and adapter availability for the entire SOA Infrastructure. | Yes, shows composite and adapter availability for the individual SOA folder only. |
| Search | Yes, shows all instance and bulk recovery job searches and saved searches for the entire SOA Infrastructure. | Yes, shows instance and bulk recovery job searches and saved searches for the individual SOA folder only. |
| Fault Alerts | Yes, shows error notification alerts for the entire SOA Infrastructure. | Yes, shows error notification alerts for the individual SOA folder only. |

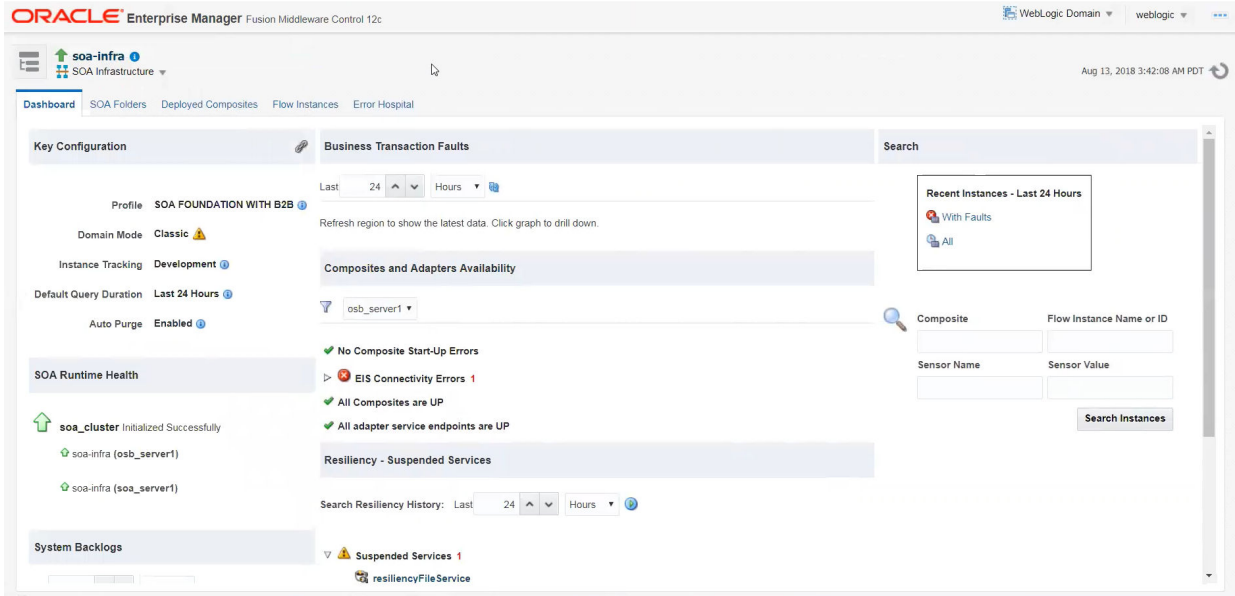
The information that you can view on the Dashboard pages is based on your permissions. For example, if you only have permissions on a specific SOA folder, you cannot access the SOA Infrastructure Dashboard page. However, you can access the Dashboard page for that specific SOA folder.

To monitor the overall status of the SOA Infrastructure or individual SOA folder:

1. Access this page through one of the following options:
 - a. To access overall status information for the SOA Infrastructure:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... | From the SOA Composite Menu... |
|---|--|--|
| <ol style="list-style-type: none"> i. Select Home > Dashboard. | <ol style="list-style-type: none"> i. Expand SOA. ii. Select soa-infra > server_name. | <ol style="list-style-type: none"> i. Select SOA Infrastructure. |

The SOA Infrastructure Dashboard page displays the following details:



- b. To access overall status information for the individual SOA folder:

From the SOA Infrastructure Menu...

From the SOA Folder in the Navigator...

- i. Select **Manage SOA Folders**.
- ii. In the **SOA Folder** column, select a specific folder.

- i. Expand **SOA**.
- ii. Expand **soa-infra > server_name**.
- iii. Select the specific SOA folder.

The Dashboard page of the selected SOA folder displays the following details:

The screenshot shows the Oracle SOA console dashboard. At the top, it says 'consoleTests' and 'SOA Partition'. The user is logged in as 'weblogic1' and the page was refreshed on Nov 22, 2013 8:03:29 AM PST. The dashboard has several tabs: 'Dashboard', 'Deployed Composites', 'Flow Instances', and 'Error Hospital'. The 'Dashboard' tab is active. It is divided into three main sections: 'Key Configuration', 'Business Transaction Faults', and 'Fault Alerts'. The 'Key Configuration' section shows settings for Profile (BPM CLASSIC), Instance Tracking (Off), Default Query Duration (Last 24 Hours), WorkManager Group (default), and Auto Purge (Not Enabled). The 'Business Transaction Faults' section shows a 'Last' filter set to 24 Hours and a 'Refresh region' button. The 'Fault Alerts' section shows 'Rules' set to 'All'. Below these sections is a 'Composites and Adapters Availability' section with a search filter set to 'soa_server1'. It shows four status items: 'No Composite Start-Up Errors' (green check), 'EIS Connectivity Errors 1' (red X), 'All Composites are UP' (green check), and 'All adapter service endpoints are UP' (green check). To the right of this section is a 'Search' area with radio buttons for 'Instances' and 'Bulk Recovery Jobs'. Below that is a 'Recent Instances - Last 24 Hours' chart showing 'With Faults' (red X) and 'All' (blue check). At the bottom right is a search form with fields for 'Composite', 'Instance Name or ID', 'Sensor Name', and 'Sensor Value', and a 'Search Instances' button.

You can perform the following overall status monitoring tasks:

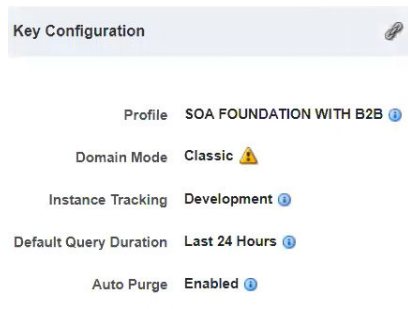
- [Viewing Key Configuration Settings](#)
- [Viewing the Overall Runtime Health of the SOA Infrastructure](#)
- [Viewing System Backlogs in the SOA Infrastructure](#)
- [Viewing Business Transaction Faults](#)
- [Viewing SOA Composite Applications and Adapters Availability](#)
- [Searching for Instances and Bulk Recovery Jobs](#)
- [Viewing Error Notification Alerts](#)

4.1.1 Viewing Key Configuration Settings

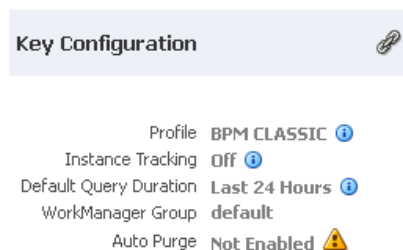
The **Key Configuration** section enables you to view important system configuration settings for the SOA profile, instance tracking, default query duration, work manager group (for a SOA folder), and automatic purging. The same configuration settings are displayed on the Dashboard pages of the SOA Infrastructure and individual SOA folder. In addition, the work manager group of the SOA folder is displayed on the Dashboard page of the individual SOA folder.

To view key configuration settings:

1. View the following details in the **Key Configuration** section.
 - On the SOA Infrastructure Dashboard page:



- On the individual SOA folder Dashboard page:



2. Perform the following monitoring and management tasks from this section.

| Element | Description |
|----------------|--|
| Profile | <p>Displays the current configuration profile selected on the SOA Infrastructure Common Properties page (for example, BPM Classic). SOA profiles provide subsets of SOA functionality and reduce the overall memory footprint of the SOA Infrastructure. A default profile is automatically set during installation.</p> <p>To change this value:</p> <ol style="list-style-type: none"> To the right of the Profile field, click the icon. Click Change Profile. The SOA Infrastructure Common Properties page is displayed. From the list, select the profile and click OK. Restart the server. <p>Note: Profile changes, if not done properly, put the system in an unstable state. Only a qualified SOA administrator must immediately restart all Oracle WebLogic Servers on which this SOA Infrastructure is deployed. Otherwise, the system is in an unstable state. For more information about profiles, see Configuring Oracle SOA Suite and Oracle BPM Suite Profiles.</p> |

| Element | Description |
|-------------------------------|---|
| Instance Tracking | <p>Displays the audit level setting (Off, Production, or Development). This setting determines 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. For details about these settings, see Configuring the Audit Trail, Payload Validation, and Default Query Duration.</p> <p>To change this value:</p> <ol style="list-style-type: none"> To the right of the Instance Tracking field, click the icon. Click Change Audit Level. The SOA Infrastructure Common Properties page is displayed. From the Audit Level list, select the appropriate value, and click Apply. |
| Default Query Duration | <p>Displays the time period during which to retrieve instances and faults data. This property controls the amount of instance and fault data fetched by default by all out-of-the-box queries. This value is also displayed as the default time range value on pages with query/search functionality (for example, the Dashboard page regions that include query functionality, the Flow Instances pages, Error Hospital pages, the Resequencer pages, and so on). You can override this value on the corresponding page, as needed.</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>Some of the more data intensive pages do not initially preload the data for performance reasons. You must explicitly request to view the data by clicking a search or refresh button. If you have not specified a different time period, the query executes using the default duration setting.</p> <p>The default value is 24 hours. The value is set in the Default Query Duration section on the SOA Infrastructure Common Properties page.</p> <p>To change this value:</p> <ol style="list-style-type: none"> To the right of the Default Query Duration field, click the icon. Click Change Default Query Duration. The SOA Infrastructure Common Properties page is displayed. From the Default Query Duration list, change the time period, and click Apply. <p>For more information about setting this property, see Configuring the Audit Trail, Payload Validation, and Default Query Duration.</p> |
| Work Manager Group | <p>Displays the work manager group for the SOA folder. This section is displayed only on the Dashboard page of the individual SOA folder.</p> <p>Work manager groups isolate SOA folder configuration and request processing. A work manager is an Oracle WebLogic Server entity that represents a logical thread pool. It is similar to a queue in which work items line up for processing.</p> <p>For more information, see Managing Work Manager Groups.</p> |

| Element | Description |
|-------------------|---|
| Auto Purge | <p>Displays whether Oracle SOA Suite is enabled to automatically remove older flow instances, adapter reports, and fault alerts data from the database. By default, this option is enabled for Oracle SOA Suite production installations. To change this value:</p> <ol style="list-style-type: none"> To the right of the Auto Purge field, click the icon. Click Set Up Auto Purge. The Auto Purge page is displayed. Based on the requirements for your environment, select or deselect the Enable checkbox. <p>Note: The Auto Purge element is not displayed if you are using the Java database included with the Oracle SOA Suite Quick Start installation option. For more information about automatically removing data from the database, see Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control.</p> |
| EDN Paused | <p>This message is only displayed when the delivery of business events has stopped. This occurs in the following scenarios:</p> <ul style="list-style-type: none"> The edn System MBean Browser property is set to <code>true</code>. When patches are applied, the EDN is automatically placed into paused mode. If the patch fails, EDN remains in paused mode. <p>For more information about setting this property, see Tuning EDN Event Bus and Delivery.</p> |

4.1.2 Viewing the Overall Runtime Health of the SOA Infrastructure

The **SOA Runtime Health** section enables you to view the overall health of the SOA Infrastructure in a cluster or a single-node environment and whether the migration of 11g to 12c data has completed. This section is only displayed on the Dashboard page of the SOA Infrastructure.

To view the overall runtime health of the SOA Infrastructure:

- View the following details in the **SOA Runtime Health** section.
 - If the SOA Infrastructure for each node is running and all composites are successfully loaded, the following message is displayed.



- If the data sources are stopped, not targeted to the SOA server, or not working (for example due to a connection timeout), the following message is displayed.



- c. If the Oracle Web Services Manager (OWSM) policy manager is not running, the following message is displayed.



2. Perform the following monitoring and management tasks from this section.

| Element | Description |
|----------------|---|
| Data Migration | <p>Displays the 11g to 12c data upgrade status. The following message links can be displayed.</p> <ul style="list-style-type: none"> Data Migration Not Completed Click this message link to invoke a message that displays the following details. The migration status of active instances (completed or not completed). The migration status of inactive instances (completed, older than <i>date</i> and not yet migrated, or not completed). Data Migration Completed Click the alert icon next to this message link to invoke a message indicating that all data available before the upgrade is now available and you can run the report migration script to view specific details. To close this message, click the close icon to the upper right of the message. This invokes a confirmation message in which to select not to display the migration completion message again. To run the report migration script, see Section "Using the Upgrade Administration Scripts" of <i>Upgrading Oracle SOA Suite and Business Process Management</i>. For information about migration status, see Section "Monitoring Upgrade Status with Fusion Middleware Control" of <i>Upgrading Oracle SOA Suite and Business Process Management</i>. |

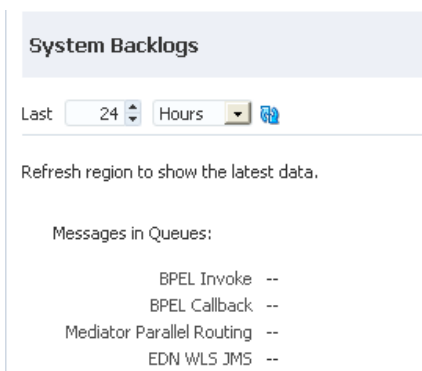
| Element | Description |
|--|---|
| soa-infra (<i>server_name</i>) | <p>Displays the overall status of all nodes in a clustered or single-node environment. Click the server name to go to the home page of the managed server. If the SOA Infrastructure for each node is running and all composites are successfully loaded, the following message is displayed.</p> <pre>Initialized Successfully</pre> <p>There are several issues that can impact the overall health of the SOA Infrastructure runtime environment:</p> <ul style="list-style-type: none"> <li>• If the data sources are stopped or not working (for example, due to a connection timeout), the following message is displayed: <pre>Data Sources unavailable: <i>number</i></pre> <p>The following data sources are monitored:</p> <ul style="list-style-type: none"> <li>- EDNDataSource <li>- EDNLocalTxDataSource <li>- SOADDataSource <li>- opss-data-source <li>- mds-SOA <p>Expand the warning message to display the impacted data source type (for example, EDNDataSource). You can click the data source to access the JDBC Data Sources (Monitoring) page.</p> <ul style="list-style-type: none"> <li>• The SOA Infrastructure Java Transaction API (JTA) application is running, but not all SOA composite applications are loaded. A warning message indicating that the SOA Infrastructure is down and currently initializing is displayed. The SOA Infrastructure 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. Do <i>not</i> 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. <li>• If the OWSM policy manager is not running, the following message is displayed: <pre>Policy Manager validation failed</pre> <ul style="list-style-type: none"> <li>- Expand the message and click Navigate to WSM Diagnostics. <li>- In the System MBean Browser, click Operations. <li>- Click checkPolicyManagerStatus. <li>- Click Invoke. |

4.1.3 Viewing System Backlogs in the SOA Infrastructure


The **System Backlogs** section enables you to view the number of messages in the queues. You must click the **Refresh Backlogs** button to retrieve the message queue backlog counts. This section is only displayed on the Dashboard page of the SOA Infrastructure.

To view system backlogs in the SOA Infrastructure:

1. View the following details in the **System Backlogs** section.



2. Perform the following monitoring and management tasks from this section.

| Element | Description |
|---|--|
| Messages in Queues | <p>Displays the number of messages in the queues for the following message types. The number of messages currently in the queue for these message types is not loaded by default.</p> <ul style="list-style-type: none"> • BPEL Invoke • BPEL Callback • Mediator Parallel Routing • EDN WLS JMS |
|  Refresh Backlogs | Click to refresh the display of the number of messages in the queues. |

4.1.4 Viewing Business Transaction Faults

The **Business Transaction Faults** section enables you to set the specified time period during which to retrieve nonrecoverable faults, faults requiring recovery, recovered faults, and automatically retried system faults at the SOA Infrastructure or individual SOA folder level. The default value is 24 hours.

To view business transaction faults:

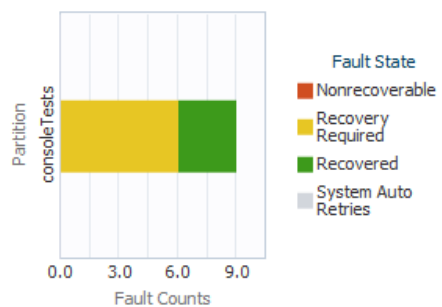
1. View the following details in the **Business Transaction Faults** section.
 - On the SOA Infrastructure Dashboard page (for all SOA folders):

Business Transaction Faults

Last* 24 Hours

1 Inactive Resequencing Groups

Refresh region to show the latest data. Click graph to drill down.



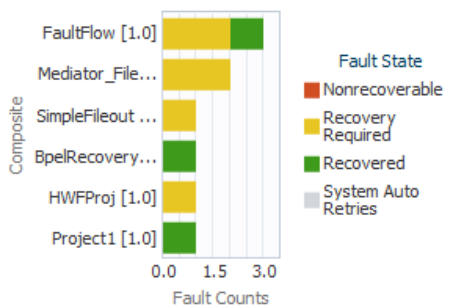
- On the individual SOA folder Dashboard page (for all composites in the SOA folder):

Business Transaction Faults

Last* 924 Hours


1 Inactive Resequencing Group

Refresh region to show the latest data. Click graph to drill down.



- Perform the following monitoring and management tasks from this section.

| Element | Description |
|-------------------------|---|
| Last <i>Time_Period</i> | Specify the time period during which to check for faults. |

| Element | Description |
|---|--|
|  Refresh icon | <p>Click to refresh the page to display the total number of nonrecoverable faults, faults requiring recovery, recovered faults, automatically retried system faults in each SOA folder of the SOA Infrastructure or individual SOA folder, and the inactive resequencer groups count.</p> <p>Click a specific graph of a SOA folder to access fault details on the Error Hospital page. When you access the Error Hospital page, the following is displayed:</p> <ul style="list-style-type: none"> At the SOA Infrastructure level, the specific SOA folder name is automatically populated in the SOA Folder Name list of the Composite filter in the Report Filters section. At the individual SOA folder level, the specific SOA composite application is automatically populated in the Composites field of the Composite filter in the Report Filters section. At the SOA Infrastructure and individual SOA folder levels, the number of inactive (faulted and timed out) resequencer groups is displayed. Click the Inactive Resequencing Group link to access the Mediator Resequencing Groups page. |

4.1.5 Viewing SOA Composite Applications and Adapters Availability

The **Composites and Adapters Availability** section enables you to view the composites that did not start, adapters with connectivity errors, and scheduled downtimes for the composite and adapter endpoints. This section is displayed in both clustered and single-node environments.

To view SOA composite applications and adapters availability:

- View the following details in the **Composites and Adapters Availability** section. On the SOA Infrastructure Dashboard page, the availability of all composites and adapters in the SOA Infrastructure are displayed. On the individual SOA folder Dashboard page, the availability of all composites and adapters within only that SOA folder are displayed.

Composites and Adapters Availability

 AdminServer ▼

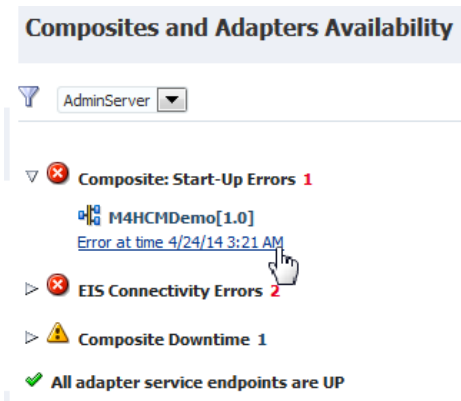
 No Composite Start-Up Errors

  EIS Connectivity Errors 2

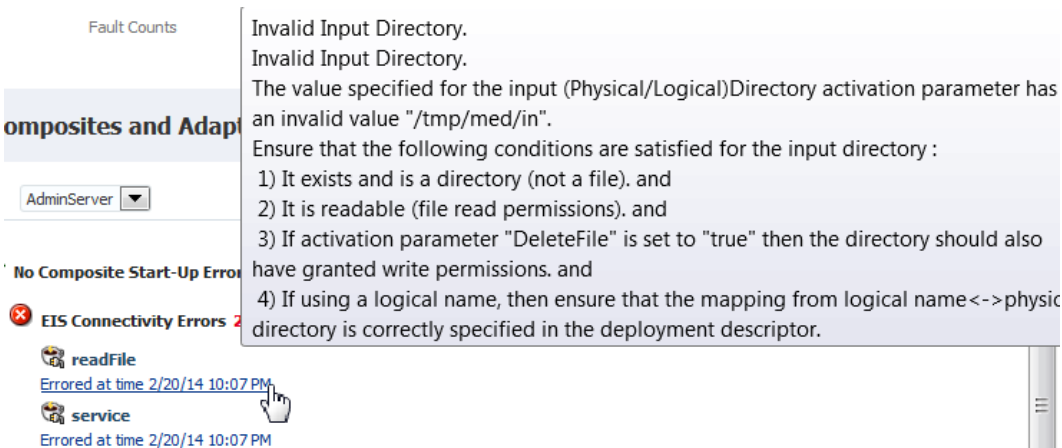
 All Composites are UP

 All adapter service endpoints are UP


- If you have composite startup errors, expand the message to display the SOA composite application name and time of the error.



3. If you have EIS connectivity errors, expand the message and place your cursor over the error timestamp to display fault details.



4. Perform the following monitoring and management tasks from this section.

| Element | Description |
|---|---|
|  | <p>Select the SOA Infrastructure in a clustered or single-node environment for which to obtain the following composite and adapter availability details. For a clustered environment, all managed servers are displayed in the list.</p> <ul style="list-style-type: none"> • Composite start-up error status. • EIS connectivity errors status: Errors are displayed when the connection between the endpoint and EIS is down (for example, for the database adapter when the database is down and for the file adapter when the file does not exist at a specified location or the file is not readable or writable). These errors are applicable for adapter service binding component endpoints, and not for reference binding component endpoints. • Composite downtime status (up or down): Downtime status typically refers to scheduled downtimes and is more planned than the first two statuses in this list. <p>When an error occurs, a warning sign and the number of errors are displayed next to the section.</p> <ol style="list-style-type: none"> a. Expand the section to display the list of composites or adapter endpoints that have problems. b. Click the error description for more specific details about the error. c. Click the name of a composite or adapter to go to its home page. |

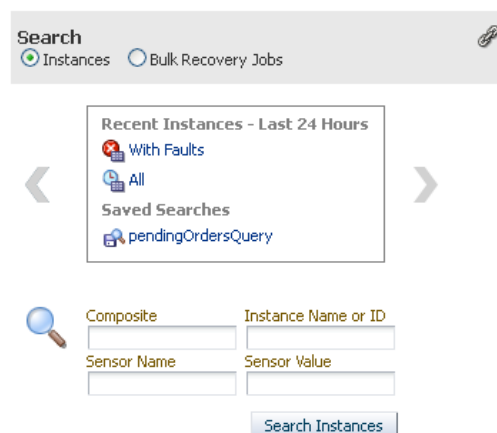
4.1.6 Searching for Instances and Bulk Recovery Jobs

The **Search** section enables you to search for recent instances and bulk recovery jobs. The **Bulk Recovery Jobs** search option is not displayed if Oracle Enterprise Scheduler is not deployed.

For the Trace Instance, Bulk Recovery, and SOA Diagnostic job to work with remote agent, you must use SSH credentials as host credentials.

To search for instances and bulk recovery jobs:




1. View the following details in the **Search** section.
 - a. Click **Instances** to view preseeded and custom instance search filters.



Search

Instances Bulk Recovery Jobs

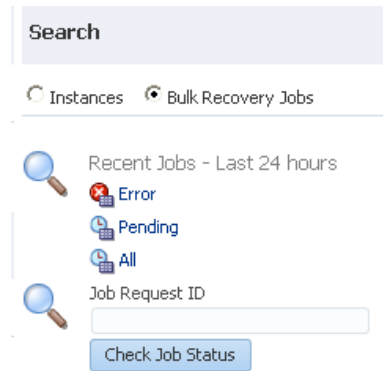
Recent Instances - Last 24 Hours

-  With Faults
-  All
- Saved Searches
 -  pendingOrdersQuery

Composite Instance Name or ID

Sensor Name Sensor Value

- b. Click **Bulk Recovery Jobs** to view preseeded job search filters.



2. Perform the following monitoring and management tasks from this section.

| Element | Description |
|------------------|---|
| Instances | <p>Select to search for recent instances. This search returns instances created within the time period specified by the Default Query Duration property in the SOA Infrastructure Common Properties page. The default time period for which to search is 24 hours.</p> <p>a. Click one of the links in the list of predefined search queries and saved search queries to initiate a search.</p> <p>With Faults: This search returns recent instances that have faults.</p> <p>All: This search returns all instances created in the default time period.</p> <p>Saved Searches: Displays the saved searches available for execution. If you create a saved search on the Flow Instances page or Error Hospital page and specify this SOA folder name, the search is displayed in this list.</p> <p>Or:</p> <p>a. Enter values for any of the following elements and click Search Instances.</p> <p>Composite Instance Name or ID Sensor Name Sensor Value</p> <p>You are redirected to the Flow Instances page with the search results.</p> |

| Element | Description |
|---------------------------|--|
| Bulk Recovery Jobs | <p>Select to search for recent bulk recovery jobs. This search displays only if Oracle Enterprise Scheduler is deployed, and returns the jobs created within the time period specified by the Default Query Duration property on the SOA Infrastructure Common Properties page. (More search options are provided in the Oracle Enterprise Scheduler page.)</p> <p>a. Click one of the links in the list of predefined search queries. You are redirected to the Oracle Enterprise Scheduler page where the search results are displayed.</p> <p>Error Pending All</p> <p>Or:</p> <p>a. In the Job Request ID, enter a value to find a specific bulk recovery job by its job ID, and click Check Job Status. This field is displayed if Oracle Enterprise Scheduler is deployed.</p> <p>You are redirected to the Oracle Enterprise Scheduler job page for viewing the status of the job.</p> <p>For more information about the job request ID, see Performing Bulk Fault Recoveries and Terminations in a Single Operation.</p> |

For more information about using Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control, see *Administering Oracle Enterprise Scheduler*.

4.1.7 Viewing Error Notification Alerts

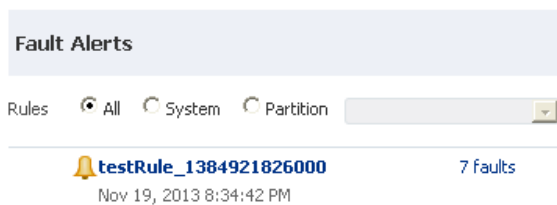
The **Fault Alerts** section enables you to view error notification alerts for the SOA Infrastructure and individual SOA folders if you have the correct permissions. If there are no errors in the system, then this section is visible with the message **No Alerts found** in place of a list of fault alerts.

Alerts are triggered when a rule condition is met (for example, you define an alert to trigger if more than 10 faults occur within a 48 hour period). Error alerts are displayed if the **Send Alert to Dashboard** option is selected on the Create Error Notification Rules page. You create error notification rules on the Create Error Notification Rules page to be sent when specific fault criteria are met.

Note: If you do not select **Send Alert to Dashboard** on the Create Error Notification Rule page, alerts are not displayed on the Dashboard page.

To view error notification alerts:

1. View the following details in the **Fault Alerts** section.
 - On the SOA Infrastructure Dashboard page:



- On the individual SOA folder Dashboard page (all fields are disabled and the SOA folder name is displayed):



2. Perform the following monitoring and management tasks from this section.

| Element | Description |
|-------------------|---|
| Rules | Select to view error notification alerts for the following: <ul style="list-style-type: none"> • All: Click to display all alerts. • System: Click to display alerts created at the SOA Infrastructure level. • SOA Folder. Click and select the SOA folder for which to view alerts. Click the fault number to access error details on the Error Hospital page. |
| Alert_Name | Displays the following details: <ul style="list-style-type: none"> • Name of the alert. Click the alert name to view the error notification rule that triggers this alert. • Number of faults associated with the alert. Click the fault number to go to the Error Hospital page to view details about the faults. The Time part of the Report Filters section on the right side is automatically selected to show you when the fault alert initially occurred and last occurred. • Time at which the alert was triggered. |

For more information, see [Creating Error Notification Rules](#).

4.2 Monitoring SOA Infrastructure Performance Summary Metrics

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

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

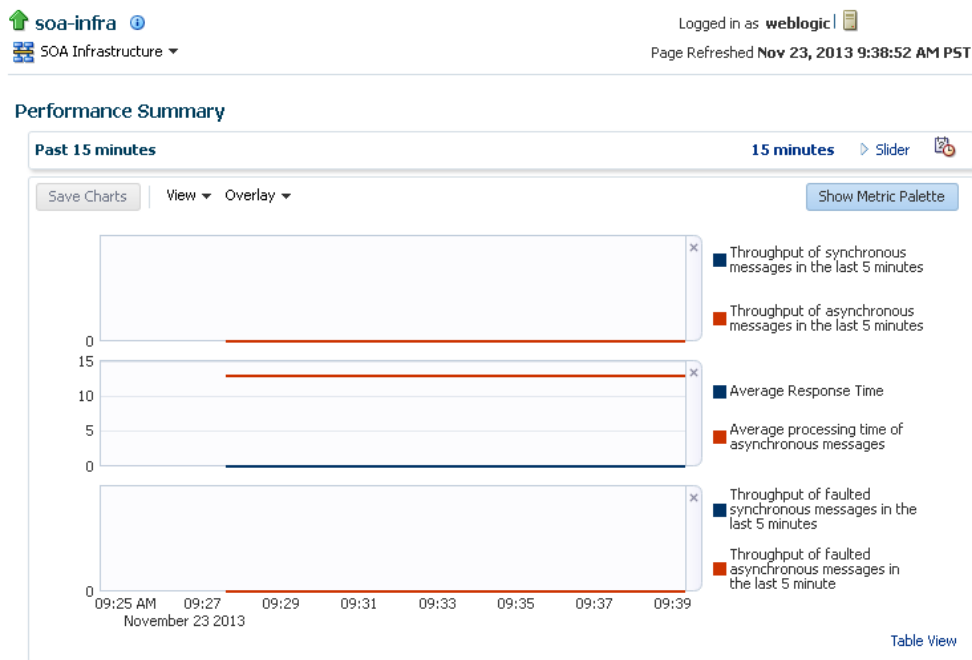
- Total number of messages in the SOA Infrastructure since the last server restart.
- Total number of service component messages (BPEL process, Oracle Mediator, human workflow, and business rule (decision service)) since the last server restart.

To monitor SOA Infrastructure performance summary metrics:

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"> a. Select Monitoring > Performance Summary | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select Monitoring > Performance Summary. |

The Performance Summary page is displayed.

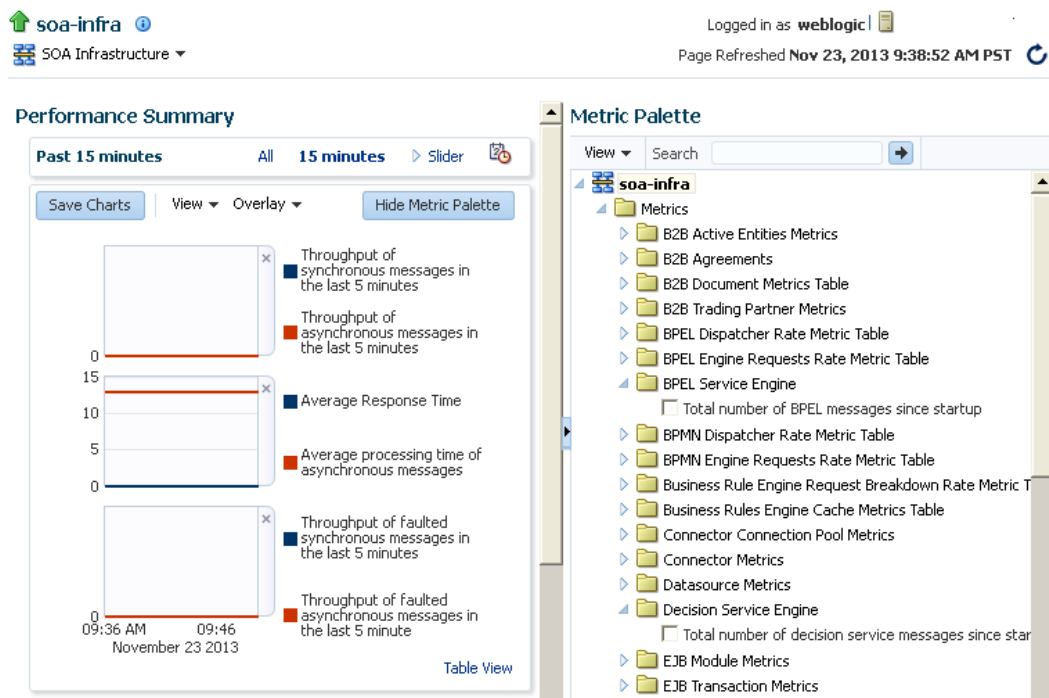


- At the bottom of the page, view additional message information.

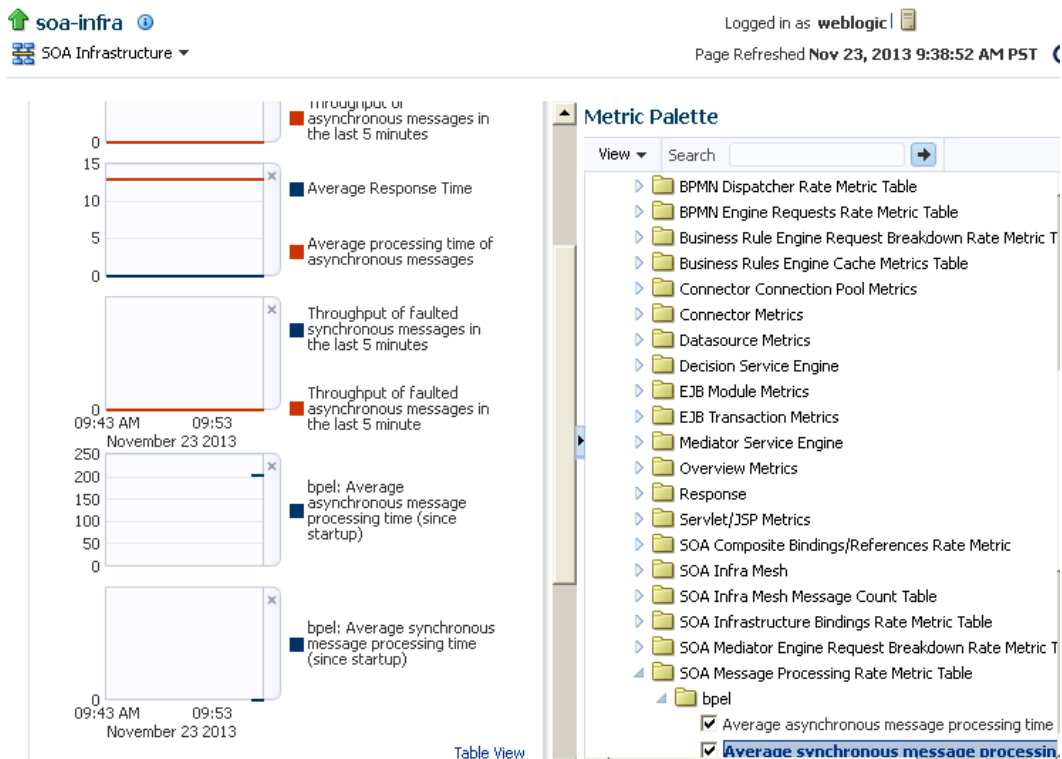
Additional Metrics

| | |
|---|----|
| Total number of messages in the mesh since server startup | 1 |
| Active Messages | 0 |
| Error Messages | 0 |
| Number of active synchronous messages | 0 |
| Number of active asynchronous messages | 0 |
| Number of completed asynchronous messages | 1 |
| Number of completed synchronous messages | 0 |
| Throughput | 0 |
| Total processing time of asynchronous messages | 13 |
| Total processing time of synchronous messages | 0 |

- 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 *Administering Oracle Fusion Middleware*.

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

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

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

- [Monitoring BPEL Process Service Engine Request and Thread Performance Statistics](#).
- [Monitoring Request Breakdown Statistics](#).
- [Monitoring Business Rules Service Engine Performance Statistics](#).
- [Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics](#).
- [Monitoring BPMN Process Service Engine Performance Statistics](#).

4.3 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... |
|--|--|
| <ol style="list-style-type: none"> a. Select Monitoring > Request Processing. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select Monitoring > Request Processing. |

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.

Service Engines

Service engines are containers that host the business logic or processing rules of service components.

| Name | Average Request Processing Time - Synchronous (ms) | Average Request Processing Time - Asynchronous (ms) | Active Requests | Requests Processed |
|---|--|---|-----------------|--------------------|
|  BPEL Engine | 0.000 | 0.000 | 0 | 0 |
|  BPMN Engine | 0.000 | 0.000 | 0 | 0 |
|  Mediator Engine | 0.000 | 0.000 | 0 | 0 |
|  Human Workflow Engine | 0.000 | 0.000 | 0 | 0 |
|  Business Rules Engine | 0.000 | 0.000 | 0 | 0 |
|  Spring Engine | 0.000 | 0.000 | 0 | 0 |

Service Infrastructure ⓘ

The Service Infrastructure internally connects components and enables data flow.

| Name | Average Request Processing Time - Synchronous (ms) | Average Request Processing Time - Asynchronous (ms) | Active Requests | Requests Processed |
|------------------------|--|---|-----------------|--------------------|
| Service Infrastructure | | | | |

Binding Components

Binding components make SOA composite applications accessible to the outside world.

| Name | Average Request Processing Time (ms) | Requests Processed |
|---|--------------------------------------|--------------------|
| Web Service (WS) Inbound | 0.000 | 0.0 |
| Web Service (WS) Outbound | 0.000 | 0.0 |
| Java EE Connector Architecture (JCA) Inbound | 0.000 | 0.0 |
| Java EE Connector Architecture (JCA) Outbound | 0.000 | 0.0 |

- 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:

- [Introduction to Binding Components.](#)
- [Introduction to Service Engines](#)
- [Introduction to the Service Infrastructure](#)

4.4 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:

- Access this page through one of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|-------------------------------------|---|
|-------------------------------------|---|

- | | |
|--|--|
| a. Select Services and References . | a. Right-click soa-infra . |
| | b. 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 SOA folders 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.

The screenshot shows the SOA Infrastructure Services page. At the top, there is a navigation bar with 'soa-infra' and 'SOA Infrastructure' menus, and a timestamp 'Sep 23, 2020 12:21:46 PM PDT'. Below the navigation bar, there are two tabs: 'Services' (selected) and 'References'. A descriptive text 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 text, there are 'Actions' and 'View' dropdown menus. The main content is a table with the following data:

| Service | Type | Composite | SOA Folder | Total Messages | Average Processing Time (sec) |
|------------------------|-------------|-----------------------------|------------|----------------|-------------------------------|
| bpelprocess1_client_ep | Web Service | POC-XSLT-DateFunction [1.0] | default | 0 | 0.000 |
| bpelprocess1_client_ep | Web Service | RulesProj [1.0] | default | 0 | 0.000 |

- In the **Service** column, click a specific service to access its home page.
- In the **Composite** column, click a specific SOA composite application to access its home page.
- In the **SOA Folder** column, click a specific SOA folder to access its home page.
- 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 SOA folders 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.

- In the **Reference** column, click a specific reference to access its home page.
- In the **Composite** column, click a specific SOA composite application to access its home page.
- In the **SOA Folder** column, click a specific SOA folder to access its home page.

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

4.5 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](#)
- [SOA Health Check Categories](#)
- [Invoking SOA Health Checks](#)

4.5.1 SOA Health Checks

SOA health checks include memory checks, data source checks, SOA-related service checks, SOA application-targeting checks, BPEL-related checks, and so on.

[Table 4-2](#) summarizes the SOA health checks that are available in this release.

Table 4-2 SOA Health Checks

| Health Check Name | Description |
|----------------------------|---|
| BPELAsyncRequestCheck | Checks if the BPEL asynchronous request count is within the configured threshold of 1000. |
| BPELComponentInstanceCheck | 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. |
| JDBCpoolsCheck | Checks if the SOA, EDN, and MDS data sources are healthy at runtime. |
| SOAppCheck | 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.

4.5.2 SOA 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 4-3](#) summarizes the SOA health check categories and their constituent health checks.

Table 4-3 SOA Health Check Categories

| Health Check Category | Description | Default Health Checks included in the Category |
|-----------------------|----------------------------|---|
| Startup | Runs at server startup | DatasourceCheck, JDBCpoolsCheck, SOAppCheck, SOALibraryCheck, ServiceCheck, MemoryCheck |
| Quick | Lightweight set of checks | JDBCpoolsCheck, ServiceCheck, MemoryCheck |
| Intermediate | Intermediate set of checks | BPELAsyncRequestCheck, BPELComponentInstanceCheck, DBStatsCheck, EDNMessageCheck |
| Extensive | Extensive set of checks | For future use |
| Config | Configuration checks | DatasourceCheck, SOAppCheck, SOALibraryCheck |

4.5.3 Invoking SOA Health Checks

The SOA health checks can be invoked in a number of ways. You can have checks that run automatically at server startup or those that run at periodic intervals. You can use the WLST command-line utility to manually run health checks.

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 WLST Command Reference for SOA Suite*.

Periodic Invocation

SOA health check is pre-configured with periodic runs that automatically run on the production SOA server. [Table 4-4](#) lists the pre-configured periodic runs.

Table 4-4 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 "createHCPersistentRun", "enableHCPersistentRun", "setHCPersistentRunInterval", "setHCPersistentRunSchedule", and "setHCPersistentRunCategory" in *Oracle Fusion Middleware WLST Command Reference for SOA Suite*.

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 WLST Command Reference for SOA Suite* 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.

4.6 Monitoring and Troubleshooting SOA-Wide Issues Using IWS Reports

Integration Workload Statistics (IWS) reports provide Oracle SOA Suite system-wide reports that can help you analyze utilizations, identify potential bottlenecks and backlogs, and perform top-down analysis of your integration system.

 **Note:**

This Oracle SOA Suite feature is part of Oracle Integration Continuous Availability. Refer to the Oracle Fusion Middleware Licensing Information for more details about Oracle SOA Suite options.

If there are stressed components or endpoints in Oracle SOA Suite that are slowing down the system, IWS reports can help you narrow down the issue. For example, a slow FTP or database adapter reference endpoint can be identified in the reports. Likewise, a BPEL process running slower than usual can also be identified. You can look at internal queue backlogs, like BPEL queues and EDN queues. Oracle SOA Suite composite summaries are also available.

IWS reports can take periodic snapshots that include metrics like system resource usage, composite statistics, statistics for internal system queues, statistics for synchronous and asynchronous business processes, and endpoint statistics. You can choose the granularity of data collected for your IWS reports. The components supported include BPEL Service Engine, EDN, Web Service Binding, File Adapter, JMS Adapter, FTP Adapter, DB Adapter, AQ Adapter, and MQ adapter. Refer to [Statistics Included in an IWS Report](#) for more information on the statistics collected.

IWS stores the snapshots in dedicated tables. These tables reside in the `soainfra` schema and are created as part of repository creation step during Oracle SOA Suite installation. Note that IWS does not query or rely on information from other SOA persistence tables of any SOA components such as MDS or BPEL engine. The tables that store IWS snapshots are:

| Metadata Tables | Runtime Tables |
|----------------------|--------------------------|
| AWR_SERVER_NODE | AWR_SNAPSHOT |
| AWR_CONFIGURATION | AWR_RESOURCE_UTIL_METRIC |
| AWR_COMPOSITE | AWR_FLOW_METRIC |
| AWR_COMPONENT | AWR_EXECUTION_METRIC |
| AWR_ENDPOINT | AWR_BACKUP_METRIC |
| AWR_ACTIVITY | |
| AWR_SYSTEM_RESOURCES | |

The following blogs provide more information about IWS reports:

- [IWS Reports - Design and Architecture](#)
- Diagnosing Oracle SOA performance issues with IWS Reports: [Part 1](#) | [Part 2](#) | [Part 3](#)

This section includes the following topics:

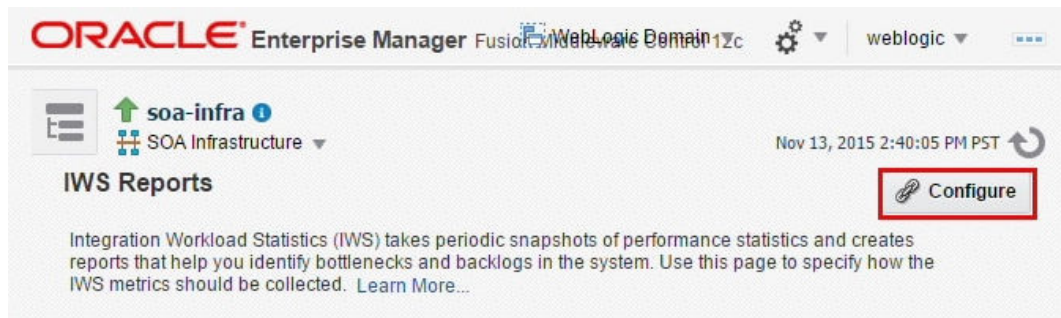
- [Enabling and Configuring IWS](#)
- [Generating an IWS Report](#)
- [Retrieving IWS Report Data Using the IWSReport MBean](#)
- [Using WLST Commands to Generate IWS Reports](#)
- [Statistics Included in an IWS Report](#)

4.6.1 Enabling and Configuring IWS

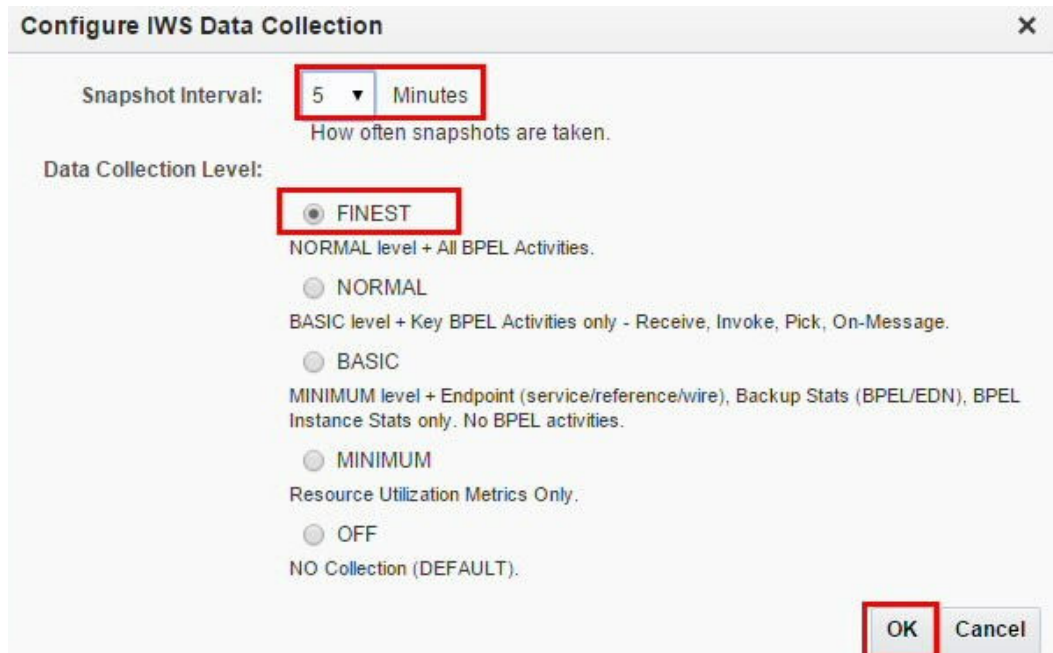
Integration Workload Statistics (IWS) snapshot data is collected at periodic intervals. You can enable snapshot data collection, configure the snapshot interval, and the select the granularity of data collected.

To enable and configure IWS:

1. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#).
2. From the **SOA Infrastructure** menu, select **Monitoring**, then **IWS Reports**.
3. In the IWS Reports page, click **Configure**.



4. In the Configure IWS Data Collection dialog, select a **Snapshot Interval** in minutes. The snapshot interval is the periodic interval at which data snapshots are collected.
5. Select a **Data Collection Level** to specify the metrics that are collected.



- **FINEST**: collects **NORMAL** data, plus all BPEL activities. For more details about the data collected, see [Statistics Included in an IWS Report](#).
- **NORMAL**: collects **BASIC** data, plus statistics on BPEL activities like `Receive`, `Invoke`, `Pick`, and `onMessage`.

- **BASIC**: collects **MINIMUM** data, plus service and reference endpoint statistics, BPEL and EDN backup queue statistics, and BPEL instance statistics
 - **MINIMUM**: collects only system-wide resource usage data
 - **OFF** (default): collects no data
6. Click **OK** to save your configuration changes.

IWS is now enabled and will start capturing snapshots at the specified interval and store them in the database tables described in [Monitoring and Troubleshooting SOA-Wide Issues Using IWS Reports](#).

4.6.2 Generating an IWS Report

Use the IWS Reports page to create SOA-wide reports that help you identify bottlenecks and backlogs in the system. Integration Workload Statistics (IWS) include metrics like system resource usage, composite statistics, statistics for internal system queues, statistics for synchronous and asynchronous business processes, and endpoint statistics.

Prerequisite: You must have already configured IWS data collection and set a snapshot interval. See [Enabling and Configuring IWS](#).

To create an IWS report:

1. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#).
2. From the **SOA Infrastructure** menu, select **Monitoring**, then **IWS Reports**.

3. On the IWS Reports page, enter timestamps for **Start Date** and **End Date** to specify the period for which you want to generate a report.

Ensure that the time period does not span server restarts, and that the **Data Collection Level** specified in the [Configure IWS Data Collection dialog](#) is not set to **OFF**.

4. Select the SOA **Server Name**.

You can either accept the default server, or choose a different node in multicluster environments. For clusters, you can also choose the cluster name to generate a consolidated report for all nodes in the cluster.

5. Optionally select a SOA **Folder** if you are using composite SOA folders and want to limit your report to a particular SOA folder.

6. Optionally use the **Select Composites** search to choose one or more composite names to restrict your report to the specified composite applications.

7. Optionally change the number of results that are displayed.

For example, the default value of 10 includes the 10 slowest endpoints, the 10 longest running business processes, and so on, in the report.

8. Click the appropriate report format near the top right of the window to generate and download the report.

You can choose between **CSV** (comma-separated values), **HTML**, and **XML** formats.

The IWS report is generated and downloaded in the selected format. For historical analysis, snapshots captured at the **Snapshot Interval** specified in the [Configure IWS Data Collection dialog](#) are also stored in the database tables described in [Monitoring and Troubleshooting SOA-Wide Issues Using IWS Reports](#).

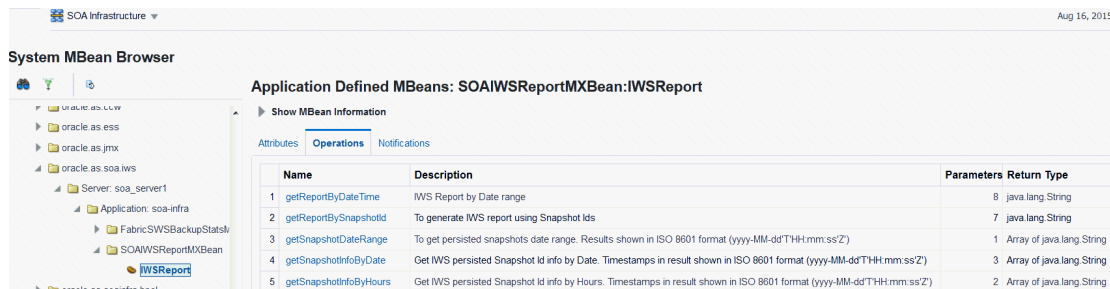
4.6.2.1 Retrieving IWS Report Data Using the IWSReport MBean

You can use the IWSReport MBean and its associated operations to retrieve information about the data collected for your IWS reports, such as snapshot IDs, date, and timestamps.

To use the IWSReport MBean:

1. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#).
2. From the **SOA Infrastructure** menu, select **SOA Administration**, then **System MBean Browser**.
For more information about the System MBean Browser, see [Navigating to the System MBean Browser](#).
3. Search for the `IWSReport` MBean, or scroll down to **Application Defined MBeans**, and expand **oracle.as.soa.iws > Server : name > Application : name > SOAIWSReportMXBean**.

The following image shows the operations, and their descriptions, available for the IWSReport MBean.



4.6.2.2 Using WLST Commands to Generate IWS Reports

You can use WLST commands to generate IWS reports or retrieve IWS metrics, such as IWS data collection level or IWS snapshot information.

IWS WLST Commands

The following table lists the WLST IWS configuration commands.

Table 4-5 IWS Configuration Commands

| WLST Command | Description |
|---|---|
| <code>getSoaIWSSnapshotInterval</code> | Retrieves the snapshot metrics collection interval. |
| <code>setSoaIWSSnapshotInterval</code> | Sets the snapshot metrics collection interval in minutes. |
| <code>getSoaIWSStatisticsLevel</code> | Retrieves the SOA IWS Statistics level (data collection level). |
| <code>setSoaIWSStatisticsLevel</code> | Sets the SOA IWS Statistics level. |
| <code>getSoaIWSStatisticsLevelList</code> | Retrieves the SOA IWS Statistics level list. |

The following table lists the WLST IWS snapshot retrieval and reporting commands.

Table 4-6 IWS Snapshot Retrieval and Reporting Commands

| WLST Command | Description |
|--|---|
| <code>getSoaIWSSnapshotInfo</code> | Retrieves snapshot information from a SOA server or all servers for the supplied number of hours. |
| <code>getSoaIWSSnapshotInfoByDate</code> | Retrieves snapshot information from a SOA server or all servers for the supplied time period. |
| <code>getSoaIWSReportBySnapshotID</code> | Generates a SOA IWS report for the supplied snapshot IDs. |
| <code>getSoaIWSReportByDateTime</code> | Generates a SOA IWS report for the supplied time period. |

4.6.3 Statistics Included in an IWS Report

An IWS report includes statistics defined by the data collection level that you have set. In addition to system-wide resource usage data, the report can include service and reference endpoint statistics, BPEL and EDN backup queue statistics, and BPEL instance statistics. Statistics on BPEL activities may also be included.

The IWS report contains the following broad sections when the data collection level is set to the most inclusive setting of **FINEST**:

- **System Resource Usage**

Statistics include Java Virtual Machine (JVM) statistics like CPU utilization and memory utilization (for JVM heap and non-heap memory), SOA Data Source

statistics that show active connections and connection pool details, and SOA Work Manager statistics that include details on threads.

- **Composite (Rollup) Statistics**

Aggregate composite-wise statistics that indicate flow rate (throughput/transactions per second) and latency (in milliseconds) for the composite endpoints and internal backup queues (EDN and BPEL queue).

- **Slowest Composite Endpoints**

Aggregate composite-wise statistics that indicate the latency (in milliseconds) and flow rate (throughput) for the slowest endpoints.

- **Backups in Internal Queues**

Aggregate statistics for the backups in internal system queues (BPEL queue and EDN queue).

- **Longest Running Business Processes**

Aggregate statistics for top asynchronous and synchronous business (BPEL) process instances based on execution time

- **Most Time-Consuming Business Process Activities**

Aggregate statistics for top business process activities (BPEL activities like Receive, Invoke, etc) based on execution time.

5

Tracking Business Flow Instances

This chapter describes how to track the status of business flow instances, including specifying and saving business flow search criteria, deleting and terminating instances, viewing the current state of an instance, recovering and aborting faults in an instance, viewing composite sensor values in an instance, viewing the initiating and participating composites in an instance, viewing resequencing groups in an instance, and viewing business flows that extend across domains.

This chapter includes the following section:

- [Tracking Business Flow Instances at the SOA Infrastructure or SOA Folder Level](#)

For more information about business flow instances and differences between instances in 12c and 11g, see [Introduction to Business Flow Instances](#).

For information about managing faults on the Error Hospital page, see [Recovering From Faults in the Error Hospital](#).

5.1 Tracking Business Flow Instances at the SOA Infrastructure or SOA Folder Level

You can track the instances of business flows from the Flow Instances page of the SOA Infrastructure, individual SOA folder, or individual SOA composite application. A business flow instance corresponds to an end-to-end business transaction. Business flows consist of a single SOA composite application or multiple SOA composite applications connected together to fulfill a specific business process.

Tracking business flow instances enables you to identify the following:

- Determine what happened to a specific request
 - Has the request been received?
 - Has request processing completed or is it still in progress?
 - If processing has finished, has it completed successfully or did errors occur?
 - If processing is still in progress, is it stuck on an external request, awaiting a scheduled recovery, or in need of any administrative action?
- Analyze and resolve a large number of failures

For example, a runtime failure of a back end service (such as a database) has occurred. In high volume systems, a very large number of faults can occur in a short duration because of a single cause. These faults may be spread across SOA composite applications. You can identify the following under these circumstances:

- Determine the root cause of the failure (typically done by analyzing one or two individual instances).
- Find the number of requests with the same root cause of failure across different SOA composite applications.

- Apply a bulk recovery/termination action to all instances with the same root cause of failure and recovery status (for example, a BPEL recovery or EDN recovery).
- Specify a batch size.
- Optionally perform a quick purge to remove the faults that have been handled or abort faults so that the next batch can be addressed.

You can manage business flow instances from the Flow Instances and Error Hospital pages at the following levels:

- SOA Infrastructure level (provides access to all SOA folders)
- Individual SOA folder level



Note:

You can also manage business flow instances from the Flow Instances page of an individual SOA composite application. Flows that are initiated by a particular composite or passing through a composite are listed at the composite level. There are separate filter criteria for each. There is no Error Hospital page at the individual SOA composite application level. For information, see [Tracking Business Flow Instances at the SOA Composite Application Level](#).

You can configure your environment to provide some administrators with access to the top level SOA Infrastructure Flow Instances and Error Hospital pages and other administrators with access to only the individual SOA folder's Flow Instances and Error Hospital pages. For more information, see [Managing SOA Folders and Work Manager Groups](#).

Access the Flow Instances page through one of the following options:

To access business flow instances in all SOA folders:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... | From the SOA Composite Menu... |
|--|---|---|
| <ol style="list-style-type: none"> 1. Select Home > Flow Instances. | <ol style="list-style-type: none"> 1. Expand the SOA folder. 2. Click soa-infra. 3. Click the Flow Instances tab. | <ol style="list-style-type: none"> 1. Select SOA Infrastructure. 2. Click the Flow Instances tab. |

To access business flow instances in an individual SOA folder:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|--|
| <ol style="list-style-type: none"> 1. Select Manage SOA Folders. 2. In the SOA Folder column, click a specific SOA folder. 3. Click the Flow Instances tab. | <ol style="list-style-type: none"> 1. Expand SOA > soa-infra. 2. Click a specific SOA folder. 3. Click the Flow Instances tab. |

To access business flow instances for an individual SOA composite application, see [Tracking Business Flow Instances at the SOA Composite Application Level](#).

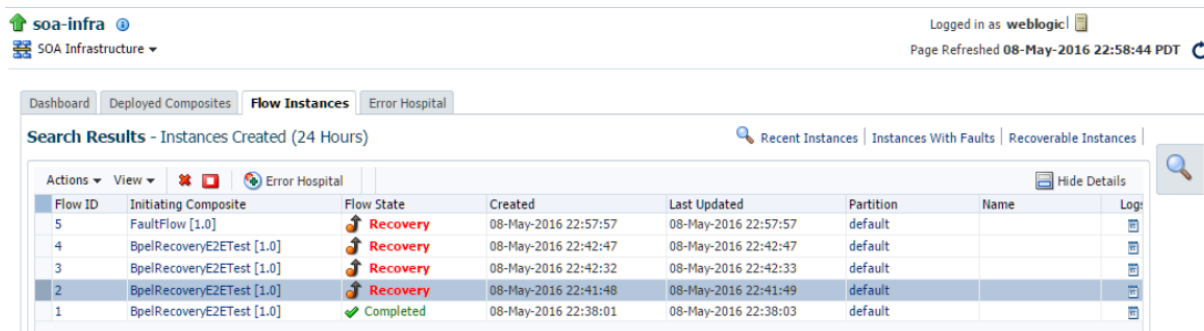
The Flow Instances page displays the following details:

- A utility for specifying and saving comprehensive instance and fault search criteria and clicking **Search**.

 **Note:**

When you initially access the Flow Instances page, the **Search Results** table is empty. You must click **Search** to populate this table with business flow instance details.











- A **Search Results** table that displays the flow ID that uniquely identifies a business flow, the composite initiating the business flow (business flows can span multiple composites), the state of the flow instance (for example, completed successfully, running, failed, recovery required, and so on), the instance start time, the last update to the instance, the SOA folder in which this flow was initiated, the flow instance name (if set during design time in a BPEL process or Oracle Mediator service component), and a link to the log files. To display additional columns in the table, select **View > Columns**.
- An **Error Hospital** button above the **Search Results** table that takes you to the Error Hospital page for a view of the results of the search criteria you executed on the Flow Instances page. This action does not require you to select any rows in the **Search Results** table. Use this option to view the error report for the flow instances currently displayed in the Flow Instances page. In the Error Hospital page, you can view aggregated fault statistics for these instances. You can also perform bulk recover and bulk abort operations on these flow instances without having to access each individual instance.



soa-infra | SOA Infrastructure | Logged in as weblogic | Page Refreshed 08-May-2016 22:58:44 PDT

Dashboard | Deployed Composites | **Flow Instances** | Error Hospital

Search Results - Instances Created (24 Hours) | Recent Instances | Instances With Faults | Recoverable Instances

| Flow ID | Initiating Composite | Flow State | Created | Last Updated | Partition | Name | Log |
|---------|---------------------------|---|----------------------|----------------------|-----------|------|---|
| 5 | FaultFlow [1.0] |  Recovery | 08-May-2016 22:57:57 | 08-May-2016 22:57:57 | default | |  |
| 4 | BpelRecoveryE2ETest [1.0] |  Recovery | 08-May-2016 22:42:47 | 08-May-2016 22:42:47 | default | |  |
| 3 | BpelRecoveryE2ETest [1.0] |  Recovery | 08-May-2016 22:42:32 | 08-May-2016 22:42:33 | default | |  |
| 2 | BpelRecoveryE2ETest [1.0] |  Recovery | 08-May-2016 22:41:48 | 08-May-2016 22:41:49 | default | |  |
| 1 | BpelRecoveryE2ETest [1.0] |  Completed | 08-May-2016 22:38:01 | 08-May-2016 22:38:03 | default | |  |

 **Note:**

- Business flow instances and faults data is delimited by the time period for which instances and faults are retrieved. The current delimiter is displayed to the right of the **Search Results** table title. The default value is 24 hours. You can change this value with the **Default Query Duration** property on the SOA Infrastructure Common Properties page. For information, see [Configuring the Audit Trail, Payload Validation, and Default Query Duration](#).
- When you undeploy and redeploy the same SOA composite application, you cannot retrieve the business flow instances created prior to composite undeployment. The business flows are still available. However, the active instances are aborted or they are untouched based on your configuration while redeploying. For more information, see [Redeploying SOA Composite Applications](#).

You can perform the following business flow instance tasks:

- [Specifying and Saving Business Flow Search Criteria](#)
- [Deleting or Terminating Business Flow Instances](#)
- [Viewing the Current State of the Business Flow Instance](#)
- [Recovering from Faults in a Business Flow Instance](#)
- [Viewing Composite Sensor Values in a Business Flow Instance](#)
- [Viewing the Initiating and Participating SOA Composite Applications in a Business Flow Instance](#)
- [Viewing Resequencing Groups in a Business Flow Instance](#)
- [Viewing Business Flows that Extend Across Domains](#)

5.1.1 Specifying and Saving Business Flow Search Criteria

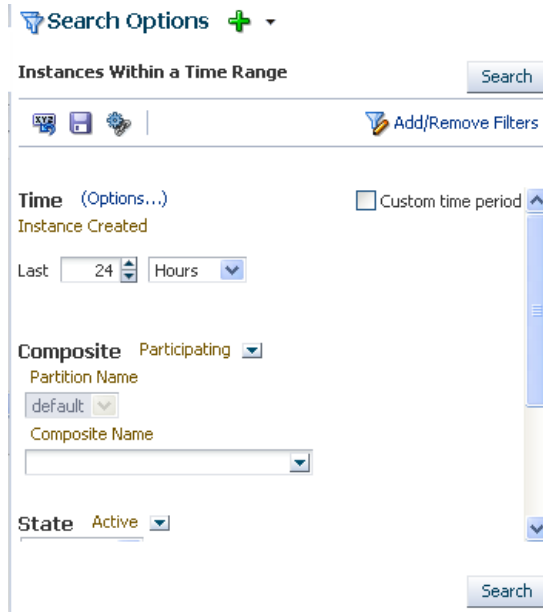
The **Search Options** section enables you to specify and save comprehensive instance and fault search criteria. Search criteria results are displayed in the **Search Results** table. Saved search criteria are user-specific, and are not common across users. Each Oracle Enterprise Manager Fusion Middleware Control user can save their own preferred searches. Upon creation, saved searches are displayed on the Dashboard page and also as links on the Error Hospital and Flow Instances pages.

To specify and save business flow search criteria:

1. Click the **Search Options** icon to display the **Search Options** section. The **Search Options** section displays in a sliding panel and may not be visible on the page at all times.



The **Search Options** section is displayed.



2. See the following sections to specify and save comprehensive instance and fault search criteria.
 - [Executing Predefined Business Flow Instance Searches](#)
 - [Using the Search Options Toolbar](#)
 - [Adding and Removing Search Filters](#)
 - [Configuring and Saving Business Flow Instance Search Filter Criteria](#)

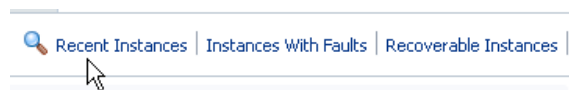
5.1.1.1 Executing Predefined Business Flow Instance Searches

You can quickly find business flows without entering any search criteria by selecting a predefined search option. Results are displayed in the **Search Results** table. The searches are constrained by a predefined time period. The default time period is 24 hours. This value can be changed by modifying the **Default Query Duration** property in the SOA Infrastructure Common Properties page, accessible under **SOA Administration** in the **SOA Infrastructure** menu.

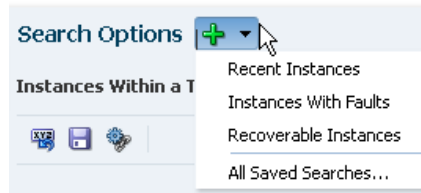
The following options are available:

- **Recent Instances:** Displays recent instances.
- **Instances With Faults:** Displays recent instances that have faults. This predefined search option is also available on the Error Hospital page, where you can select it from the **Report Filters** list.
- **Recoverable Instances:** Displays recent instances awaiting recovery.

At the top of the **Search Options** section, select the option for which to search.



or:



The search results are displayed in the **Search Results** table (for this example, the search results for the **Recoverable Instances** option are displayed).

Search Results - Instances Faulted (24 Hours) Recent Instances | Instances With Faults | Recoverable Instances

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|---------------------------------|------------|--------------------------|--------------------------|
| 10013 | Mediator_File_JavaCallOut [1.0] | Recovery | Oct 18, 2013 11:19:38 AM | Oct 18, 2013 11:19:39 AM |
| 10011 | Mediator_File_JavaCallOut [1.0] | Recovery | Oct 18, 2013 11:05:26 AM | Oct 18, 2013 11:05:29 AM |
| 10010 | FaultFlow [1.0] | Recovery | Oct 18, 2013 11:02:52 AM | Oct 18, 2013 11:02:52 AM |
| 10009 | HWFProj [1.0] | Recovery | Oct 18, 2013 10:56:42 AM | Oct 18, 2013 10:56:42 AM |
| 10005 | FaultFlow [1.0] | Recovery | Oct 18, 2013 10:50:28 AM | Oct 18, 2013 10:50:28 AM |
| 10003 | SimpleFileout [4.0] | Recovery | Oct 18, 2013 10:45:29 AM | Oct 18, 2013 10:45:41 AM |

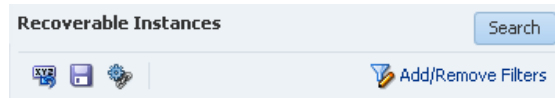
For more information about executing predefined searches, select **Help > Help for This Page** from the **weblogic** main menu on the Flow Instances page.

For information about saved searches, see [Using the Search Options Toolbar](#).




5.1.1.2 Using the Search Options Toolbar

The **Search Options** toolbar enables you to perform search-related tasks, such as executing predefined or custom searches, saving search criteria, resetting displayed search criteria, bookmarking searches, and adding and removing filters. By default, only predefined searches can be invoked. You can extend the list of available searches by saving custom searches. The **Search Options** toolbar displays in a sliding panel and may not be visible on the page at all times. If not already open, you can invoke it by clicking the large **Search Options** icon.

Go to the toolbar in the **Search Options** section.



The following options are available.

| Element | Description |
|---|---|
|  | Click to reset the search fields in the currently invoked saved search to the last saved values. This is useful when you have modified a saved search and want to restart the query building process. |
|  | Click to save your current search criteria. This saves both the selected search fields and their values, enabling you to run the identical search at a later time and view a fresh set of results. You must provide a name when saving a search. You cannot overwrite an existing saved search, but you can save it with a different name. You can delete the saved searches you created. To manage your saved searches, select All Saved Searches from the Search Options list. |
|  | Click to bookmark your current search criteria. A message is displayed with a URL containing the search parameters. Copy the URL to a browser bookmark window, email, or chat. The generated URL includes information about both the selected search fields and their values. This enables you to run the identical search at a later time and view a fresh set of results. |

For more information about the **Search Options** toolbar, select **Help > Help for This Page** from the **weblogic** main menu on the Flow Instances page.

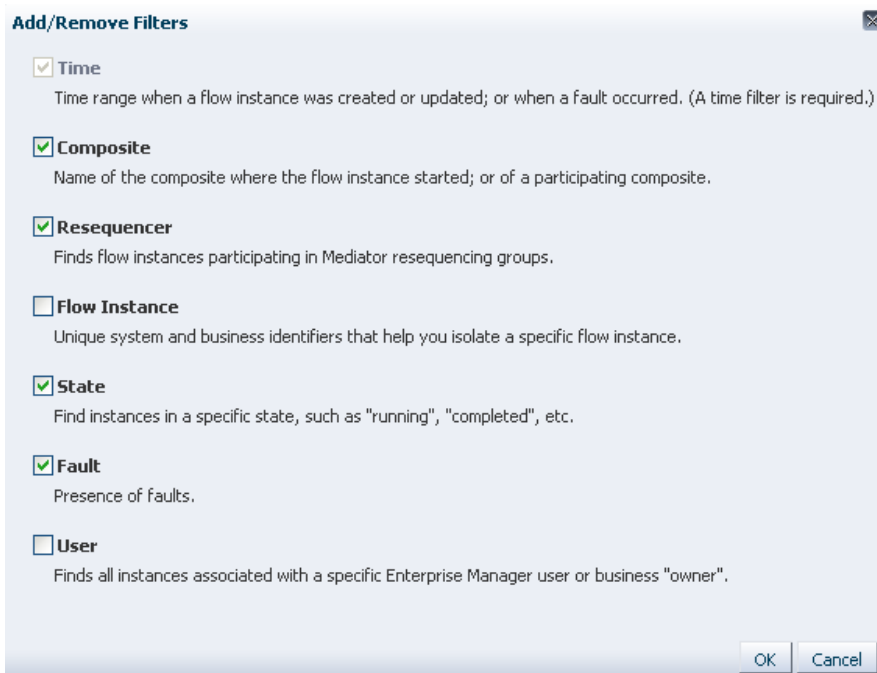
5.1.1.3 Adding and Removing Search Filters

You can add and remove the search filters that are displayed for configuration. Filters are the attributes of a business flow that you can use to create your search criteria. After selecting a filter, you can customize it in the **Search Options** section. All filters with specified search criteria are added together (treated as logical **AND** values) when the resulting query is run. Empty fields are ignored.

1. Click **Add/Remove Filters**.



The filters available for selection are displayed. Some filters are interdependent. When you remove them, your current search parameters may be reset. The time filter is required and cannot be removed.



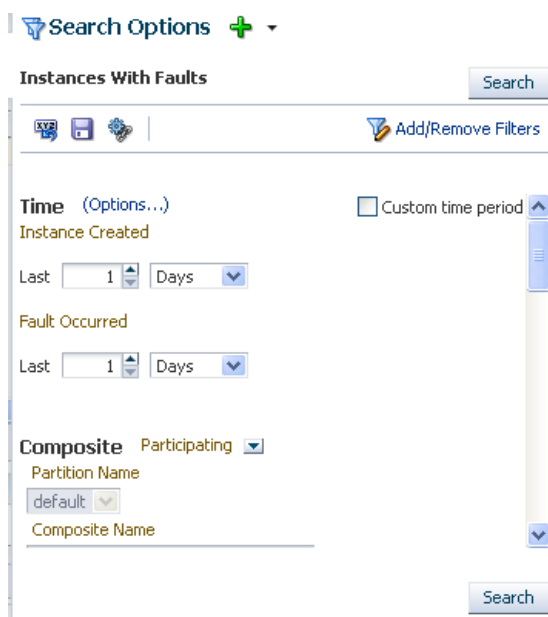
2. Select and deselect appropriate filters to use in search criteria, and click **OK**.
3. Click **Search**.

The selected criteria are displayed in the **Search Options** section. You can further customize the selected filters, as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#).

5.1.1.4 Configuring and Saving Business Flow Instance Search Filter Criteria

You can configure parameters for each search filter selected in [Adding and Removing Search Filters](#) to create a business flow instances search query. Search results are displayed in the **Search Results** table.

1. Go to the **Search Options** section.



2. Configure parameters for appropriate search filters. Filters left blank are ignored. You do not need to remove them. For more information about configuring each filter, select **Help > Help for This Page** from the **weblogic** main menu on the Flow Instances page.

| Element | Description |
|------------------|--|
| Time | <p>Restrict your search query to a specific time in the past. A time filter is required to search for business flows. At least one time filter is required. If more than one time filter list is displayed, ensure that you specify values for both. Click Options to display the filters available for selection. Once selected, you can specify the time periods to be searched.</p> <ul style="list-style-type: none"> • Instance Created (displays by default and cannot be deselected) • Instance Updated • Fault Occurred <p>You can also specify a custom time period for which to search by selecting the Custom time period checkbox. This search is for all three time periods (Instance Created, Instance Updated and Fault Occurred).</p> |
| Composite | <p>Restrict your search query for business flows to a specific composite.</p> <ul style="list-style-type: none"> • If searching at the SOA folder level, only instances that were initiated and participated in by SOA composite applications in that SOA folder are returned. • If searching at the SOA Infrastructure level, instances initiated or participated in by SOA composite application in <i>any</i> SOA folder are returned. <p>Perform the following tasks:</p> <ul style="list-style-type: none"> • Select Initiating if you want to limit your search only to the business flows that started in the selected composite. To search for all business flows in that composite, select Participating. • Select the SOA folder to search. If you access the Flow Instances page at the individual SOA folder level, that SOA folder is already selected and you cannot change it. If you do not select a SOA folder, all are searched. • Select the specific SOA composite application name from the list or click Search to specify a complete or partial name for which to search. The partial name search supports only entering the beginning part of the name and is case sensitive. If you do not specify a composite, all are searched. |

| Element | Description |
|----------------------|---|
| Resequencer | <p>Select the resequencing groups for which to search. Use this filter to limit your search only to business flows in which a resequenced component participated. If you leave this section blank, this search filter is ignored. The resequencer in Oracle Mediator rearranges a stream of related but out-of-sequence messages into a sequential order.</p> <ul style="list-style-type: none"> • Any Group: Select to search for all resequenced flows in all groups. • Specific Group: Select to find the business flow associated with a specific resequencing group. Specify the group's name and location. The location is the Oracle Mediator component and SOA composite application revision containing the group. The group name filter returns only one group instance. <p>For more information about resequencing groups, see Monitoring Resequencing Groups.</p> |
| Flow Instance | <p>To find a specific business flow instance, identify the instance in at least one of the following ways:</p> <ul style="list-style-type: none"> • Flow ID: Select to search by flow ID, initiating ECID, or correlation flow ID. • Instance Name: Specify the name or title of the flow instance that you created at design time in Oracle JDeveloper. • Composite Instance Name: Specify the name or title of the composite instance name. SOA composite applications upgraded from Release 11g can contain a composite instance name or title. • Add Sensor Value (Up to 6): Click to specify up to six composite sensor name and value pairs. <p>Note: You can populate the Sensor Name fields by either manually entering names or by using the lookup feature. If you use the lookup feature, you must specify a composite for each sensor you add in the search. All sensor-based search conditions are connected with a logical AND. However, if you specify multiple sensors from different composites, you likely end up with an empty results table. As a best practice, stick with sensors from the same composite because they are more likely to have matching values in the same flow instance.</p> <p>Note these additional sensor guidelines:</p> <ul style="list-style-type: none"> • All sensor conditions are connected with a logical AND. You cannot enter alternative sensor names. The search attempts to find an instance that matches all the names. • When manually entering names, you must provide the exact sensor name and value. • You must specify both the name and value for each sensor. • Leaving the Value field empty is not supported (no results are returned). It is not possible to use the search to find all instances in which a sensor is defined, regardless of the value. • If you want to use operators other than equals (=), use the lookup feature. • If you know the exact sensor name, but not the composite, use the main search, which attempts to find instances across all composites. However, if you want to see a list of sensors from which to select, use the lookup feature. You also must know the composite name, because the lookup feature makes you specify the composite first (it is looking for sensors one composite at a time). Also, all composites are listed: those with sensors defined for them and those without. Trying every composite is not efficient. |
| State | <p>Restrict your search to only the business flows in a given state. For descriptions of states, see Viewing the Current State of the Business Flow Instance.</p> <p>Select Active to search active instances. Active instances have not reached one of the terminal states. The list is refreshed to display the following selections for further filtering:</p> <ul style="list-style-type: none"> • All active • Recovery • Suspended • Running <p>Select Inactive to search inactive instances. Inactive instances have reached one of the terminal states. The list is refreshed to display the following selections for further filtering:</p> <ul style="list-style-type: none"> • All inactive • Completed • Failed • Aborted |

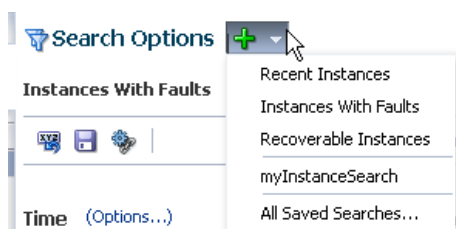
| Element | Description |
|--------------|---|
| Fault | <p>Restrict the search for business flows to only those with faults. If you leave this field blank, this filter is ignored. Select to specify the types of faults for which to search.</p> <ul style="list-style-type: none"> • All Faults: Select to search for business flows containing any type of fault. • Recovery Required: Select to search for stuck flows awaiting human recovery to proceed. To further specify a particular type of recovery, use the Fault Recovery Type filter. • Nonrecoverable: Select to search for flows containing nonrecoverable faults. • Recovered: Select to search for flows that contain at least one recovered fault. • System Auto Retries: Select to find the faulted flows in which system automatic retries occurred. <p>To further customize fault filtering, click More next to the Faults filter to display additional filtering attributes.</p> <ul style="list-style-type: none"> • Fault Recovery Type: Filter your search for faulted business flows to stuck flows awaiting a particular type of recovery action. This field is available when you select Recovery Required in the Fault filter and click More. If you leave this field blank, the Fault Recovery Type filter is ignored. The fault recovery types are as follows: <ul style="list-style-type: none"> Admin Recovery BPEL Activity Recovery BPEL Invoke Message Recovery BPEL Callback Message Recovery EDN Recovery Mediator Recovery Human Workflow Recovery Rejected Message Recovery • Fault Type: Filter your search for faulted business flows. If you leave this field blank, the Fault Type filter is ignored. Select one of the following to restrict your search to only the flows containing that fault type. <ul style="list-style-type: none"> System: Network errors or other types of errors such as a database server or a web service being unreachable. 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). OWSM: Errors on Oracle Web Service Manager (OWSM) policies attached to SOA composite applications, service components, or binding components. Policies apply security to the delivery of messages. • Fault Owner: Select the specific component, service, or reference in which the fault was handled (also known as the fault owner). Use this filter to further narrow down your search for faulted business flows. If you leave it blank, the Fault Owner filter is ignored. The fault owner is similar to the fault location, but they are not always the same. The fault owner is the component that executes the recovery or from where to attempt a recovery, in which case the flow is re-executed. The fault location is the component that created or caused the fault. • Fault Details: Filter a search for faulted business flows. If you leave all fields blank, the Fault Details filter is ignored. Specify at least one of the following fault details. To find only faults for which these values are not set, enter <code>NOT SPECIFIED</code> in the search field. <ul style="list-style-type: none"> Error Message Contains: Use to find only faulted business flows with the same error message text. You can enter any part of the message. This search is case sensitive. Fault Name: Use to find only faulted business flows with a specific descriptive fault name such as <code>NegativeCredit</code>. You must enter the exact name (the entire string). This search is case sensitive. Fault Code: Use to find only faulted business flows with the same fault code. <p>To customize fault search criteria, click More next to Fault Details to display additional configuration fields such as HTTP host, JNDI name, event name, and event namespace.</p> |

| Element | Description |
|-------------|--|
| User | Finds all instances associated with a specific Oracle Enterprise Manager user or business owner. The user is set only in SOA composite applications in which user credentials are explicitly propagated (for example, when a composite has a user authentication OWSM policy attached to the composite web service). |

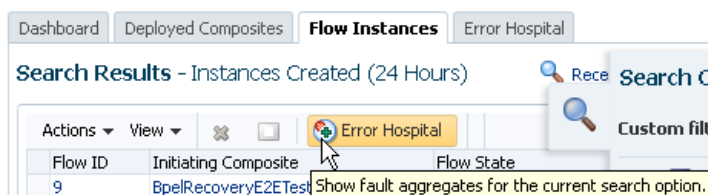
- If you want to save search criteria for future use, click the **Save Search** icon to specify a name.



Your saved search is then available for selection in the **Search Options** dropdown list and in the **Report Filters** section of the Error Hospital page.



- When search criteria creation is complete, click **Search**.
- View search results in the **Search Results** table.
- Click **Error Hospital** to display aggregated fault details in the search results, including the fault name, total number of faults, faults requiring recovery, unrecoverable faults, recovered faults, and automatic fault retries. No selections are necessary, as this aggregates the fault information for all flow instances that are already displayed in the table.



For more information about the Error Hospital, see [Managing Faults in the Error Hospital](#).

5.1.2 Deleting or Terminating Business Flow Instances

You can delete or abort business flow instances in the **Search Results** table.

- Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.

The **Search Results** table is populated with business flow instances.

2. Select a specific business flow or select multiple business flows by pressing Shift-Click.

Search Results - Instances Created (24 Hours)

| Flow ID | Initiating Composite | Flow State | Created | Last Update |
|---------|---------------------------|------------|----------------------|-------------|
| 6 | FaultFlow [1.0] | Completed | 08-May-2016 23:52:10 | 08-May-20 |
| 5 | FaultFlow [1.0] | Recovery | 08-May-2016 22:57:57 | 08-May-20 |
| 4 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:42:47 | 09-May-20 |
| 3 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:42:32 | 09-May-20 |

3. Click the **Actions** list and select to delete or abort a business flow instance. You can also click the **Deleted Selected** or **Abort Selected** icons above the table.
 - **Delete Selected:** Deletes selected business flow instances in the table. When you select to confirm the deletion of instances, the page is refreshed and the deleted instances are removed from the list. You can no longer access the flow trace details of the instance once it is deleted.
 - **Abort Selected:** Terminates selected business flow instances in the table. When you confirm to abort the selected instances, the page is refreshed and the states of the aborted instances are displayed as **Aborted**. In some cases there may be a delay in updating the instances state. You still can access the flow trace and audit trail details of the instance after it has been aborted.

To abort a large number of instances based on search criteria without selecting each one individually, do not use the **Abort Selected** action on the Flow Instances page. Instead, use the **Bulk Abort** option on the Error Hospital page.



Note:

If you selected a running instance, the **Abort** option is available for stopping a running instance.

5.1.3 Viewing the Current State of the Business Flow Instance

You can view the components that comprise the business flow instance. Business flows can consist of multiple SOA composite applications connected together in a flow.

1. Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.

The **Search Results** table is populated with business flow instances.

2. In the **Flow State** column of the **Search Results** table, view the state of a specific business flow instance.

| Flow ID | Initiating Composite | Flow State | Created | Last Updated | Partition | Name | Log |
|---------|---------------------------|------------|----------------------|----------------------|-----------|------|-----|
| 5 | FaultFlow [1.0] | Recovery | 08-May-2016 22:57:57 | 08-May-2016 22:57:57 | default | | |
| 4 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:42:47 | 08-May-2016 22:42:47 | default | | |
| 3 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:42:32 | 08-May-2016 22:42:33 | default | | |
| 2 | BpelRecoveryE2ETest [1.0] | Recovery | 08-May-2016 22:41:48 | 08-May-2016 22:41:49 | default | | |
| 1 | BpelRecoveryE2ETest [1.0] | Completed | 08-May-2016 22:38:01 | 08-May-2016 22:38:03 | default | | |

The business flow instance can exist in one of the following states:

| State | Description |
|------------------|--|
| Running | The instance is still running (for example, it may be stopped in a human workflow service component awaiting an approval). There are no recoverable faults associated with this state and the instance has not yet successfully completed. |
| Recovery | A fault in the instance is awaiting recovery. See Recovering from Faults in a Business Flow Instance . |
| Suspended | The instance is currently suspended. This is related to the migration of one version of the composite to another. This is applicable to Oracle BPM Suite components. |
| Aborted | The instance has been explicitly terminated by a user. When a composite is undeployed, running instances are marked aborted. Upon redeployment, you are given a choice to abort or keep running. |
| Completed | The instance successfully completed and there are no recoverable and nonrecoverable faults. |
| Failed | The instance completed, but there are nonrecoverable faults. |

3. In the **Flow ID** column, click a specific flow ID number to access more specific details about the state of the business flow instance.

The Flow Trace page is displayed and shows the path taken by the flow (entry points, components executed, and exit points). The flow trace is available only if the **Audit Level** property is set to **Production** or **Development**. If the audit level is set to **Off**, the trace view is replaced by a component instance listing. You can recover from faults using the **Faults** tab on the Flow Trace page.

Flow Trace
This page shows the flow of the message through various composite and component instances.

Flow ID **6**
Started **08-May-**

Faults Composite Sensor Values Composites

Recover View

| Error Message | Fault Owner | Fault Time | Recovery |
|------------------|-------------|------------|----------|
| No faults found. | | | |

Columns Hidden 8

Trace

Actions View Show Instance IDs

| Instance | Type | Usage | State | Time | Composite |
|---------------------|---------|---------|-----------|----------------------|-----------------|
| client | Service | Service | Completed | 08-May-2016 23:52:10 | FaultFlow [1.0] |
| FaultFlow | BPEL | | Completed | 08-May-2016 23:52:10 | FaultFlow [1.0] |
| CreditRatingService | BPEL | | Completed | 08-May-2016 23:52:10 | FaultFlow [1.0] |
| UnitedLoan | BPEL | | Completed | 08-May-2016 23:52:10 | FaultFlow [1.0] |

- In the **Trace** table, click a specific service component to view the audit trail and process flow. You can also view XML of the flow trace by selecting the **Actions** list.

See the following sections for specific details:

- [Monitoring the Flow Trace of a Business Flow Instance.](#)
- [Viewing the Audit Trail and Process Flow of a BPMN Process Service Component.](#)

 **Note:**

If you invoke an Oracle SOA Suite Release 12c direct binding service from Oracle Service Bus Release 11g (releases 11.1.1.4 through 11.1.1.7), no entry is displayed in the **Trace** table of the Flow Trace page in Oracle Enterprise Manager Fusion Middleware Control Release 12c that shows the direct binding service getting invoked from Oracle Service Bus. The display of this type of invocation is not supported.

In Oracle SOA Suite Release 12c, direct binding service invocation from Oracle Service Bus Release 12c is displayed in the **Trace** table of the Flow Trace page in Oracle Enterprise Manager Fusion Middleware Control.

A direct binding service is also displayed in a flow with Oracle Enterprise Scheduler or Oracle Service Bus at the start or middle of the flow.

5.1.4 Recovering from Faults in a Business Flow Instance

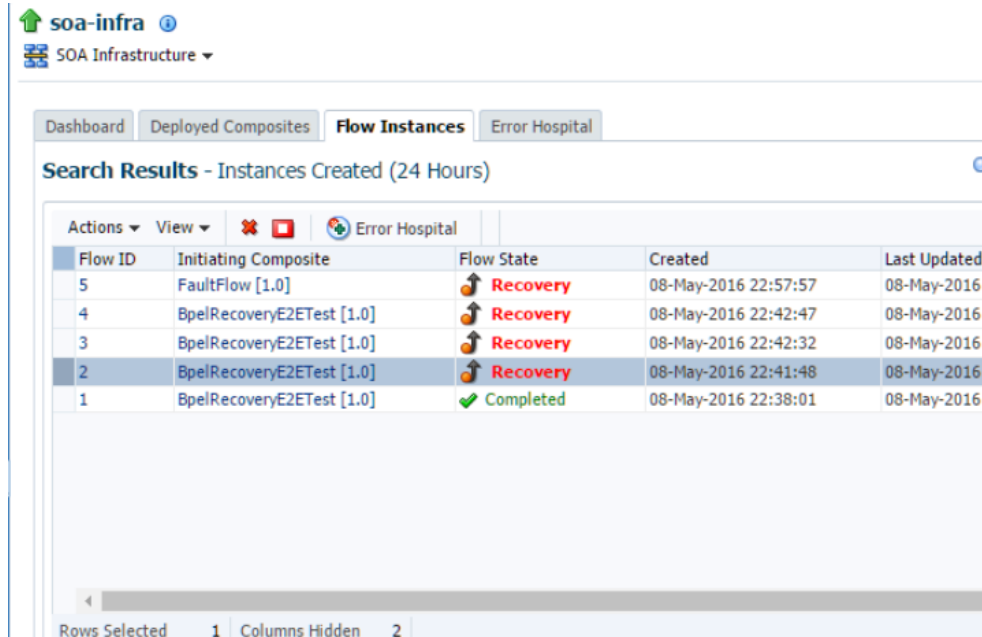
You can recover from faults identified as recoverable in the selected business flow.

- Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.

The **Search Results** table is populated with business flow instances.

- In the **Search Results** table, identify instances with faults labeled as **Recovery** in the **Flow State** column. Faults in this state are awaiting recovery.
- Select the business flow instance, and click **Show Details**.

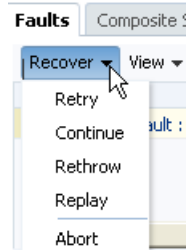
The **Faults** tab is displayed below the **Search Results** table. This tab displays the error message, the fault owner (the service component, service binding component, or reference binding component in which the fault was handled), the composite in which the fault occurred, the time of the fault, if the fault is recoverable, and links to the fault logs. To display additional columns, select **View > Columns**. Select **Reset Columns** to remove all customizations such as reordering columns and showing and hiding columns on the **Faults** table.



4. In the **Error Message** column, place your cursor over the error message to display the entire error message or click the red fault icon to display a popup dialog from which to copy the message. You can also place your cursor over the link or icon in the **Recovery** column to see what type of recovery is required.
5. Select a method for performing fault recovery. Either method enables you to automatically perform a recovery or perform a recovery through human intervention. This human intervention action is defined with the `ora-human-intervention` action in the `fault-policies.xml` file that you designed in Oracle JDeveloper.

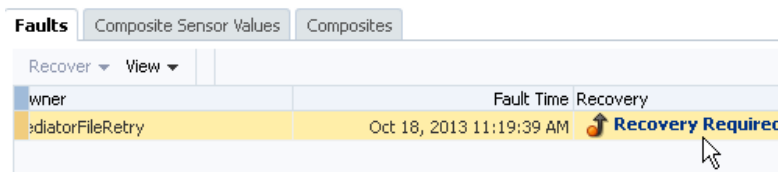
| To Perform Fault Recovery From... | Go To Step... |
|--|---------------|
| The Recover list above the table | 6 |
| The Recovery Required message in the Recovery column | 7 |

6. Select the row in the table on which to perform fault recovery.
 - a. From the **Recover** list above the table, select a fault recovery action to perform. The **Retry** and **Abort** options are available for all recoverable faults. The **Continue**, **Rethrow**, and **Replay** options depend upon the contents of the fault policy file attached to the SOA composite application.



The Fault Details and Recovery Options dialog is displayed.

- b. Go to Step 8.
7. In the **Recovery** column, click the **Recovery Required** message.



A dialog describing the fault is displayed.



- a. Click **Retry** or **Abort** to automatically retry or abort the fault or click **More Recovery Options** to perform human intervention.

If automatic recovery is successful, the flow in the **Search Results** table of the Flow Instances page is refreshed to display a different flow state (for example, recovery is changed to completed). In some cases, there may be a delay in getting the updated state and consequently the display does not show the changed state. However, in all cases, a confirmation message is displayed that indicates that the recovery request was sent. Perform an explicit page level refresh either on the button at the fault level or the **Refresh** button at the page level.

If you clicked **More Recovery Options**, the Fault Details and Recovery Options dialog is displayed.

- b. Go to Step 8.
8. In the **Recovery Options** section of the Fault Details and Recovery Options dialog, view the options for performing fault recovery. Other recovery types such as BPEL message recovery show different sets of options. Any type of fault can be recovered from this console, such as fault policy-triggered recovery and BPEL invoke, callback, and activity message recovery. As with Release 11g, you can also browse to the BPEL process service engine **Recovery** tab and perform invoke, callback, and activity recovery.

9. From the **Recovery Action** list, select an action to perform.

| Action | Description | Action is Available for... |
|--------------|---------------------------------|----------------------------------|
| Abort | Terminates the entire instance. | BPEL process and Oracle Mediator |

| Action | Description | Action is Available for... |
|-----------------|---|----------------------------------|
| Retry | 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 |
| Continue | Ignores the fault and continues processing (marks the faulted activity as a success). | BPEL process |
| Rethrow | 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 |
| Replay | Replays the entire scope again in which the fault occurred. | BPEL process |

- 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.
- Enter the correct value in the **Value** field. For this example, the social security number is edited to begin with 1.

Recovery Options

Choose a recovery action, modify the variable information as applicable and click Recover. Or click Abort to terminate the flow instance containing this fault.

Recovery Action:

Variable:

Value:

- Click **Recover**.

For information about designing a fault policy, see Section "Handling Faults with the Fault Management Framework" of *Developing SOA Applications with Oracle SOA Suite*.

5.1.5 Viewing Composite Sensor Values in a Business Flow Instance

The **Composite Sensor Values** tab displays the values of composite sensors detected in the selected business flow. Composite sensors provide a method for implementing trackable fields on messages. Composite sensors may be included in the service and reference binding components of the SOA composite application associated with the flow. This tab only has data displayed if the sensors are defined for the composite and the values captured by the selected business flow are not null.

- Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.

The Search Results table is populated with business flow instances.

- In the **Search Results** table, select a specific business flow instance, and click **Show Details**.

3. Click the **Composite Sensor Values** tab.

This tab displays composite sensor names and their values included in this flow.

The screenshot shows the SOA Infrastructure web console interface. At the top, there is a navigation bar with tabs for 'Dashboard', 'Deployed Composites', 'Flow Instances', and 'Error Hospital'. The 'Flow Instances' tab is active. Below the navigation bar, there is a search results section titled 'Search Results - Instances Created (92 Hours)'. This section contains a table with columns for 'Flow ID', 'Initiating Composite', 'Flow State', 'Created', and 'Last Updated'. Two instances are listed, both with a 'Recovery' state. Below the table, there are tabs for 'Faults', 'Composite Sensor Values', and 'Composites'. The 'Composite Sensor Values' tab is selected, showing a detailed view for 'Flow Instance 10001'. This view includes a table with columns for 'Sensor Name', 'Value', 'Location', and 'Composite'. Three sensors are listed: 'DateTimeVarSensor', 'DateVarSensor', and 'NumVarSensor'.

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|----------------------|------------|------------------------|------------------------|
| 10003 | FaultFlow [1.0] | Recovery | Mar 4, 2014 6:22:47 AM | Mar 4, 2014 6:22:47 AM |
| 10002 | FaultFlow [1.0] | Recovery | Mar 4, 2014 6:22:17 AM | Mar 4, 2014 6:22:17 AM |

| Sensor Name | Value | Location | Composite |
|-------------------|-------------------|-------------------------------|-----------|
| DateTimeVarSensor | 2013-10-10 12:... | bpelprocess1_client_ep: 10002 | DocStyle |
| DateVarSensor | 2013-10-10 00:... | bpelprocess1_client_ep: 10002 | DocStyle |
| NumVarSensor | 12345 | bpelprocess1_client_ep: 10002 | DocStyle |

For more information about composite sensors, see Chapter "Defining Composite Sensors" of *Developing SOA Applications with Oracle SOA Suite*.

5.1.6 Viewing the Initiating and Participating SOA Composite Applications in a Business Flow Instance

You can view all the SOA composite applications participating in a business flow instance. This tab displays a list of the composites that are associated with this flow, their sequence in the flow (the composite that initiated the business flow and all subsequent composites that participated in the business flow), the time at which a flow entered the specific composite, and links to logs.

To view the initiating and participating composites in a business flow instance:

1. Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.
2. In the **Search Results** table, select a specific business flow instance, and click **Show Details**.
3. Click the **Composites** tab.

The initiating and participating SOA composite applications included in this business flow instance are displayed. The **Name** column shows the value of the flow instance title (In Release 11g, you specified the title or name for each composite instance). In Release 12c, this value is displayed under the **Name** column.

Dashboard | Deployed Composites | **Flow Instances** | Error Hospital

Search Results - Instances Created (1,216 Days) Recent Instances | Instances With Faults | Recoverable Instances

| Flow ID | Initiating Composite | Flow State | Created | Last Updated | Name | Partition |
|---------|----------------------|------------|-------------------------|-------------------------|------|-----------|
| 10125 | RestClient [1.0] | Failed | Apr 25, 2014 7:39:02 AM | Apr 25, 2014 7:39:02 AM | | default |
| 10124 | RestClient [1.0] | Failed | Apr 25, 2014 5:38:34 AM | Apr 25, 2014 5:38:34 AM | | default |
| 10123 | RestClient [1.0] | Failed | Apr 25, 2014 5:36:32 AM | Apr 25, 2014 5:36:32 AM | | default |
| 10122 | RestClient [1.0] | Failed | Apr 25, 2014 5:36:02 AM | Apr 25, 2014 5:36:02 AM | | default |
| 10121 | RestClient [1.0] | Failed | Apr 25, 2014 5:35:31 AM | Apr 25, 2014 5:35:31 AM | | default |

Rows Selected: 1 | Columns Hidden: 2

Faults | Composite Sensor Values | **Composites**

Flow Instance 10116

| Composite | Sequence In Flow | Name | Flow Entered Composite | Logs |
|------------------|------------------|------|-------------------------|------|
| RestClient [1.0] | Initiating | | Apr 25, 2014 5:16:28 AM | |

5.1.7 Viewing Resequencing Groups in a Business Flow Instance

The **Resequencing Groups** tab is only displayed if a resequenced component participated in the flow. Such a flow instance is indicated by a small triple-arrow icon. The resequencer in Oracle Mediator rearranges a stream of related but out-of-sequence messages into a sequential order. The groups are ordered by the last processing time (most recent first). Alternatively, you can reorder them by the group name or state.

You cannot select the rows in the table or perform any actions under the **Resequencing Groups** tab on the Flow Instances page.

1. Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.
2. In the **Search Results** table, select a specific business flow instance that includes a resequencing group, and click **Show Details**.

| | | | | |
|-------|---------------------|-----------|--------------------------|-----------------------|
| 10003 | SimpleFileout [4.0] | Recovery | Oct 18, 2013 10:45:29 AM | Oct 18, 2013 10:45:41 |
| 10001 | Project1 [1.0] | Completed | Oct 18, 2013 10:32:01 AM | Oct 18, 2013 10:36:23 |

3. Click the **Resequencing Groups** tab.

The group name, group location, group state, and last processed time are displayed.

soa-infra SOA Infrastructure

Logged in as **weblogic**
Page Refreshed **Oct 20, 2013 11:13:18 AM**

Dashboard Deployed Composites **Flow Instances** Error Hospital

Search Results - Instances Created (24 Weeks) Recent Instances Instances With Faults Recoverable Instances

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|---------------------------------|------------|--------------------------|--------------------------|
| 10007 | wiskulesFaultProject [1.0] | Completed | Oct 18, 2013 10:53:37 AM | Oct 18, 2013 10:53:39 AM |
| 10006 | BpelRecoveryE2ETest [1.0] | Completed | Oct 18, 2013 10:51:30 AM | Oct 18, 2013 10:52:45 AM |
| 10005 | FaultFlow [1.0] | Recovery | Oct 18, 2013 10:50:28 AM | Oct 18, 2013 10:50:28 AM |
| 10004 | FaultFlow [1.0] | Completed | Oct 18, 2013 10:48:28 AM | Oct 18, 2013 10:49:54 AM |
| 10003 | SimpleFileout [4.0] | Recovery | Oct 18, 2013 10:45:29 AM | Oct 18, 2013 10:45:41 AM |
| 10001 | Project1 [1.0] | Completed | Oct 18, 2013 10:32:01 AM | Oct 18, 2013 10:36:23 AM |
| 14 | Mediator_File_JavaCallOut [1.0] | Recovery | Oct 18, 2013 12:59:01 AM | Oct 18, 2013 10:31:48 AM |
| 13 | SimpleFileout [5.0] | Recovery | Oct 18, 2013 12:53:21 AM | Oct 18, 2013 12:53:33 AM |

Rows Selected 1 Columns Hidden 1

Faults Composite Sensor Values Composites **Resequencing Groups**

| Group | Group Location | Group State | Last Processing Time |
|-----------------------|------------------------------|-------------|-------------------------|
| consoleTestGrp1382... | Mediator1 SimpleFileout[4.0] | Failed | Oct 18, 2013 5:45:41 PM |

- In the **Group** column, click the name to display group details.

If a resequencing group has faults, you can view the faults associated with a resequenced flow instance by clicking the **Faults** tab. Recoverable faults can be recovered from the **Faults** tab.

- Click **All Resequencing Groups** to access the Mediator Resequencing Groups page to view details about all defined groups, such as the group name, the Oracle Mediator and SOA composite application in which the group is included, the group state (for example, timed out or faulted), the last processing time, and the total number of backlogged messages.

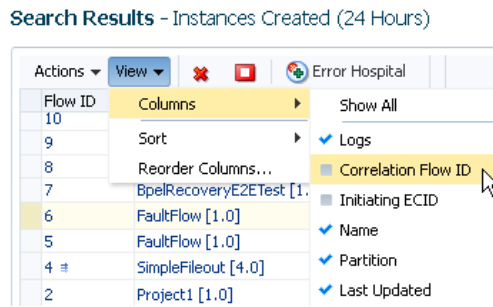
For more information, see [Monitoring Resequencing Groups](#).

5.1.8 Viewing Business Flows that Extend Across Domains

A flow correlation ID is a GUID value that uniquely identifies a business flow that extends *across* domains. The flow correlation ID differs from the flow ID, which uniquely identifies a business flow *within* an Oracle SOA Suite domain. A business flow that crosses two Oracle SOA Suite domains has a single flow correlation ID and two flow IDs. Similarly, a business flow that originates outside of Oracle SOA Suite cannot create a flow ID because it does not have access to the Oracle SOA Suite schema. However, it can create a flow correlation ID.

To view business flows that extend across domains:

- Specify search criteria in the **Search Options** section as described in [Configuring and Saving Business Flow Instance Search Filter Criteria](#), and click **Search**.
- In the **Search Results** table, select **Columns > Correlation Flow ID** from the **View** main menu.



Any flow correlation IDs are displayed in the table.

When a SOA composite application submits an Oracle Enterprise Scheduler request, the flow correlation ID, and not the flow ID, is propagated to Oracle Enterprise Scheduler and displayed in the **Submission FlowID** field of the **Execution Status** section of the Request Details page. The Oracle Enterprise Scheduler submitter flow ID associated with a request corresponds to the Dynamic Monitoring Service (DMS) flow ID. The DMS Flow ID corresponds to the SOA flow correlation ID.

5.1.9 Folder-Level and Composite-Level Search Results for Redeployed Composites with the Same Revision Number

A SOA folder-specific search shows all versions of a SOA composite application (even those that were redeployed with the same revision number), whereas a composite-specific search shows only the versions of the current deployment. Because the revision numbers do not change, it is not possible to determine which row in the **Search Results** table of the Flow Instances page belongs to which version. This can be confusing when it appears in the SOA folder-level search, but not in the composite-level search. To prevent this situation, increment the revision number between deployments. This makes multiple deployments more evident.

For example, assume you perform the following steps:

1. Deploy composite A and create several instances. Both a composite-specific search and a SOA folder-specific search show these instances.
2. Redeploy and overwrite composite A and create instances. The composite-specific search shows instances from the first revision in addition to the latest version. A SOA folder-specific search shows instances from the first revision in addition to the latest version.
3. Undeploy and redeploy composite A and create instances. The composite-specific search only shows instances from the latest version. The SOA folder-specific search shows all instances from the first and second versions in addition to the existing version.

6

Recovering From Faults in the Error Hospital

This chapter describes how to recover from faults in the error hospital, including specifying and saving fault search criteria, viewing aggregated fault statistics, performing bulk fault recoveries and bulk fault terminations in a single operation, accessing recoverable faults to perform a single fault recovery, and creating error notification rules that trigger the sending of alert messages when specific fault criteria are met.

This chapter includes the following sections:

- [Managing Faults in the Error Hospital](#)
- [Creating Error Notification Rules](#)

For information about tracking the status of business flow instances, see [Tracking Business Flow Instances](#) .

6.1 Managing Faults in the Error Hospital

You can manage all faults occurring within Oracle SOA Suite and view aggregated statistics associated with faults data on the Error Hospital page.

The Error Hospital page provides the following benefits:

- A single location for managing and recovering from all aggregated faults occurring within Oracle SOA Suite (including rejected message recovery and BPEL message recovery). Regardless of the service engine or binding component in which the fault occurred, you manage faults from the Error Hospital page at the following levels:
 - At the SOA Infrastructure level, where all system-wide faults data is aggregated for each business flow instance.
 - At the individual SOA folder level, where only faults data for the business flow instances associated with that specific SOA folder is aggregated.
- Error notification rules configuration for triggering an alert when specific fault criteria are met. For example, you define a rule to trigger an alert if more than 10 errors occur in a 48 hour period.
- Fault filtering and searching capabilities, and the ability to aggregate fault statistics by name, code, type, owner, and other grouping criteria.
- Bulk fault recovery and termination capabilities.
- Details of flow instances associated with the aggregated faults for examining fault trends.

To manage faults in the error hospital:

Access this page through one of the following options:

To access faults in all SOA folders:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... | From the SOA Composite Menu... |
|--|---|---|
| <ol style="list-style-type: none"> 1. Select Home > Error Hospital. | <ol style="list-style-type: none"> 1. Expand SOA > soa-infra. 2. Click soa-infra (server_name). 3. Click the Error Hospital tab. | <ol style="list-style-type: none"> 1. Select SOA Infrastructure. 2. Click the Error Hospital tab. |

To access faults in an individual SOA folder:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| <ol style="list-style-type: none"> 1. Select Manage SOA Folder. 2. In the SOA Folder column, select a specific SOA folder. 3. Click the Error Hospital tab. | <ol style="list-style-type: none"> 1. Expand SOA > soa-infra (server_name). 2. Select a specific SOA folder. 3. Click the Error Hospital tab. |

The Error Hospital page displays the following details:

- A utility for specifying and saving comprehensive fault search criteria and clicking **Search**.

 **Note:**

When you initially access the Error Hospital page, the **Fault Statistics** table is empty. You must click **Search** to populate this table with fault details.

- A **Fault Statistics** table that provides the fault name, total number of faults, faults requiring recovery, unrecoverable faults, recovered faults, and automatic fault retries. Click a number to search for flow instances associated with the aggregated faults (this takes you to the Flow Instances page). To display a different fault attribute in the first column of the table (such as fault name, code, type, owner, and other grouping criteria), select the **Group By** list. To display additional columns in the table, select **View > Columns**.
- **Bulk Recovery** and **Bulk Abort** buttons above the **Fault Statistics** table for performing bulk actions (recovery or abort) on a selected group of similar faults in a single operation.

soa-infra SOA Infrastructure

Logged in as weblogic Page Refreshed Oct 18, 2013 12:31:41 PM PDT

Dashboard Deployed Composites Flow Instances **Error Hospital**

Fault Statistics - For Faults occurred in (24 Hours)

Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| Group By: | Fault Name | Total Faults | Recovery Required | Nonrecoverable | Recovered | Auto Retries |
|--------------------------------|------------|--------------|-------------------|----------------|-----------|--------------|
| {http://schemas.oracle.com/m | | 10 | 9 | 1 | 0 | 0 |
| {http://services.otn.com}Neg | | 6 | 4 | 0 | 2 | 0 |
| {http://schemas.oracle.com/b | | 4 | 1 | 0 | 3 | 0 |
| oracle.bpel.services.workflow. | | 2 | 2 | 0 | 0 | 0 |
| {http://schemas.oracle.com/sc | | 1 | 0 | 1 | 0 | 0 |

Note:

- When you click a faults link or similar links elsewhere in Oracle Enterprise Manager Fusion Middleware Control, you are taken to the Error Hospital page with the fault report data already displayed. For example, when you click the **Error Hospital** button above the **Search Results** table in which business flow instances are displayed on the Flow Instances page, you see the aggregated fault statistics reported for those flow instances. In addition, when you click a specific fault state in the graph in the **Business Transaction Faults** section of the Dashboard page, you are taken to the Error Hospital page with the fault report data of the selected state already displayed.
- Report data is delimited by the time period for which instances and faults are retrieved. The current delimiter is displayed to the right of the **Fault Statistics** table title. The default value is 24 hours. You can change this value with the **Default Query Duration** property on the SOA Infrastructure Common Properties page. For information, see [Configuring the Audit Trail, Payload Validation, and Default Query Duration](#).

You can perform the following fault management tasks:

- [Specifying and Saving Fault Search Criteria](#)
- [Viewing Aggregated Fault Statistics to Examine Fault Trends](#)
- [Performing Bulk Fault Recoveries and Terminations in a Single Operation](#)
- [Accessing Faults in the Fault Statistics Table to Perform Single Fault Recovery Operations](#)

6.1.1 Specifying and Saving Fault Search Criteria

The **Report Filters** section enables you to specify and save comprehensive fault search criteria. Search results are displayed in the **Fault Statistics** table.

To specify and save fault search criteria:

1. Click the **Search** icon to display the **Report Filters** section. The **Report Filters** section displays in a sliding panel and may not be visible in the page at all times.



The **Report Filters** section is displayed.

2. See the following sections to specify and save comprehensive fault search criteria.
 - [Executing Predefined Fault Instance and Custom Searches](#)
 - [Using the Report Filters Toolbar](#)
 - [Configuring and Saving Fault Search Filter Criteria](#)

6.1.1.1 Executing Predefined Fault Instance and Custom Searches

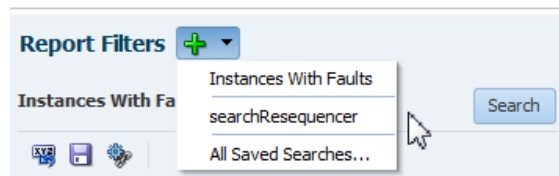
You can quickly find faults without entering any search criteria by selecting a predefined search option. Results are displayed in the **Fault Statistics** table. The searches are constrained by a predefined time period. The default time period is 24 hours. This value can be changed by modifying the **Default Query Duration** property in the SOA Infrastructure Common Properties page, accessible under **SOA Administration** in the **SOA Infrastructure** menu.

The following options are available:

- **Instances With Faults:** Displays recent instances that have faults. This predefined search option is also available on the Flow Instances page, where you can select it from the **Search Options** list or click the **Instances With Faults** link.
- **All Saved Searches:** Displays custom searches you have created and saved. Saved searches are also displayed in the **Search** region of the Dashboard page.

To execute predefined or custom fault instance searches:

At the top of the **Search Options** section, select the option for which to search.



The search results are displayed in the **Fault Statistics** table.

For more information about predefined fault instance searches, select **Help > Help for This Page** from the **weblogic** main menu on the Error Hospital page.

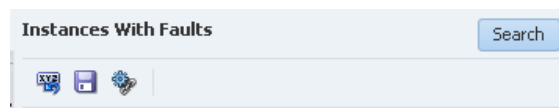
For information about saved searches, see [Using the Report Filters Toolbar](#).

6.1.1.2 Using the Report Filters Toolbar




The **Report Filters** toolbar enables you to perform search-related tasks, such as resetting displayed fault search filter criteria, saving fault search filter criteria, and bookmarking searches. By default, only predefined searches can be invoked. You can extend the list of available searches by saving custom searches. The **Report Filters** toolbar displays in a sliding panel and may not be visible in the page at all times. If not already open, you can invoke it by clicking the large **Search Options** icon.

To use the **Report Filters** toolbar.

Go the toolbar in the **Report Filters** section.



The following options are available.

| Element | Description |
|---|---|
|  | Click to reset the search fields in the currently invoked saved search to the last saved values. This is useful when you have modified a saved search and want to restart the query building process. |
|  | Click to save your current search criteria. This saves both the selected search fields and their values, enabling you to run the identical search at a later time and view a fresh set of results. Searches are saved per user, and not globally. For example, user A cannot log in to Oracle Enterprise Manager Fusion Middleware Control and access the saved search criteria of user B. You must provide a name when saving a search. You cannot overwrite an existing saved search, but you can save it with a different name. You can delete the saved searches you created. To manage your saved searches, select All Saved Searches from the Report Filters list. |
|  | Click to bookmark your current search criteria. A message is displayed with a URL containing the search parameters. Copy the URL to a browser bookmark window, email, or chat. The generated URL includes information about both the selected search fields and their values. This enables you to run the identical search at a later time and view a fresh set of results. |

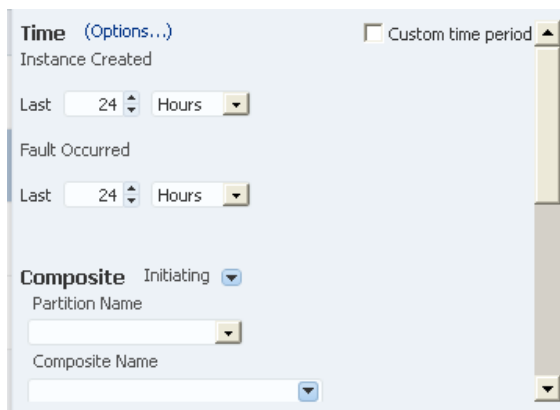
For more information about the **Report Filters** toolbar, select **Help > Help for This Page** from the **weblogic** main menu on the Error Hospital page.

6.1.1.3 Configuring and Saving Fault Search Filter Criteria

You can configure parameters for each search filter to create a fault search query. Search results are displayed in the **Fault Statistics** table.

To configure and save fault search filter criteria:

1. Go to the **Report Filters** section.
2. Specify search criteria. If you want to further customize fault search criteria, click **More** next to the **Fault** filter to display additional configuration fields such as fault owner, recovery type, fault type, and fault details (error message contents, fault name, fault code, HTTP host, and JNDI name).



3. Configure parameters for appropriate search filters. Filters left blank are ignored. You do not need to remove them. For more information about configuring each filter, select **Help > Help for This Page** from the **weblogic** main menu on the Error Hospital page.

| Element | Description |
|-------------------------|---|
| Time | <p>Use this filter to restrict your query to a specific time in the past. A time filter is required to search for faults. Ensure that you select values from both lists. For example, select 2 and Weeks to restrict your query to the last two weeks.</p> <p>Click Options to display the filters available for selection. Once selected, you can specify the time period to search.</p> <ul style="list-style-type: none"> • Instance Created (displays by default and cannot be deselected) • Instance Updated • Fault Occurred (displays by default, but you can deselect it) <p>You can also specify a custom time period for which to search by selecting the Custom time period checkbox.</p> |
| Composite | <p>Restrict your search query for faults to a specific composite.</p> <ul style="list-style-type: none"> • If searching at the SOA folder level, only faults that were initiated and participated in by SOA composite applications in that SOA folder are returned. • If searching at the SOA Infrastructure level, faults initiated or participated in by SOA composite applications in <i>any</i> SOA folder are returned. <p>Perform the following tasks:</p> <ul style="list-style-type: none"> • Select Initiating if you want to limit your search only to the faults that started in the selected composite. To search for all faults in that composite, select Participating. • Select the SOA folder to search. If you access the Error Hospital page at the individual SOA folder level, that SOA folder is already selected and you cannot change it. If you do not select a SOA folder at the SOA Infrastructure level, all are searched. • Select the specific SOA composite application name from the list or click Search to specify a complete or partial name for which to search. The partial name search supports only entering the beginning part of the name and is case sensitive. If you do not specify a composite, all are searched. |
| Resequence r | <p>Select the resequencing groups for which to search. Use this filter to limit your search only to business flows in which a resequenced component participated. If you leave this section blank, this search filter is ignored. The resequencer in Oracle Mediator rearranges a stream of related but out-of-sequence messages into a sequential order.</p> <ul style="list-style-type: none"> • Any Group: Select to search for faults in all resequenced flows in all groups. • Specific Group: Select to find faults associated with a specific resequencing group. Specify the group's name and location. The location is the Oracle Mediator service component and SOA composite application revision containing the group. The group name filter returns only one group instance. <p>For more information about resequencing, see Monitoring Resequencing Groups and Resequencing in Oracle Mediator in <i>Developing SOA Applications with Oracle SOA Suite</i>.</p> |

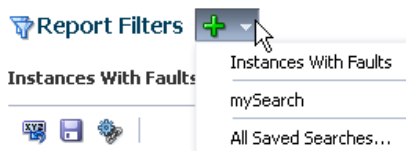
| Element | Description |
|--------------|---|
| State | <p>Select Active to search active instances. Active instances have not reached one of the terminal states. The list is refreshed to display the following selections for further filtering:</p> <ul style="list-style-type: none">• All active: Finds all business flows in nonterminal states.• Recovery: A business flow with a recoverable fault (recoverable faults, recovered faults, and system automatic retries are all included in this category). Use the Fault filter to further specify a particular type of recovery, such as selecting Recovery Required from the Fault list, clicking More, and selecting an option from the Fault Recovery Type list.• Suspended: A business flow that is typically related to migration of one version of the SOA composite application to another.• Running: A business flow is currently running. The flow may include a human task component that is currently awaiting approval. <p>Select Inactive to search inactive instances. Inactive instances have reached one of the terminal states. The list is refreshed to display the following selections for further filtering:</p> <ul style="list-style-type: none">• All inactive: Finds all terminated business flows.• Completed: A business flow has completed successfully. There are no faults awaiting recovery.• Failed: Finds completed business flows with nonrecoverable faults. Use the Fault filter to further filter based on fault type and other fault details. For example, if State is set to Failed, Nonrecoverable or All Faults can be used.• Aborted: Finds business flows explicitly terminated by the user or for which there was a system error. <p>If you leave the State field blank, the State filter is ignored.</p> |

| Element | Description |
|--------------|---|
| Fault | <p>Restrict the search for business flows to only those with faults. If you leave this field blank, this filter is ignored. Select to specify the types of faults for which to search.</p> <ul style="list-style-type: none"> • All Faults: Select to search for business flows containing any type of fault. • Recovery Required: Select to search for stuck flows awaiting a human recovery action to proceed. To further specify a particular type of recovery, use the Fault Recovery Type filter. • Nonrecoverable: Select to search for flows containing nonrecoverable faults. Nonrecoverable faults includes aborted and failed instances. • Recovered: Select to search for flows that contain at least one recovered fault. • System Auto Retries: Select to find the faulted flows in which system automatic retries occurred. This applies only to fault policy-configured automatic retries. <p>To further customize fault filtering, click More next to Faults to display additional filtering attributes.</p> <ul style="list-style-type: none"> • Fault Recovery Type: Filter your search for faulted business flows to stuck flows awaiting a particular type of recovery action. This field is available when you select Recovery Required in the Fault filter and click More. If you leave this field blank, the Fault Recovery Type filter is ignored. The fault recovery types are as follows: <ul style="list-style-type: none"> Admin Recovery BPEL Activity Recovery BPEL Invoke Message Recovery BPEL Callback Message Recovery EDN Recovery Mediator Recovery Human Workflow Recovery Rejected Message Recovery • Fault Type: Filter your search for faulted business flows. If you leave this field blank, the Fault Type filter is ignored. Select one of the following to restrict your search to only the flows containing that fault type: <ul style="list-style-type: none"> System: Network errors or errors such as a database server or web service being unreachable. 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). OWSM: Errors on Oracle Web Service Manager (OWSM) policies attached to SOA composite applications, service components, or binding components. Policies apply security to the delivery of messages. • Fault Owner: Select the specific component, service, or reference in which the fault was handled (also known as the fault owner). Use this filter to further narrow down your search for faulted business flows. If you leave it blank, the Fault Owner filter is ignored. The fault owner is similar to the fault location, but they are not always the same. For more information about this filter, see the online help for the Error Hospital page. • Fault Details: Filter a search for faulted business flows. If you leave all fields blank, the Fault Details filter is ignored. Specify at least one of the following details about the fault. To find only faults for which these values are not set, enter <code>NOT SPECIFIED</code> in the search field. <ul style="list-style-type: none"> Error Message Contains: Use to find only faulted business flows with the same error message text. You can enter any part of the message. This search is case sensitive. Fault Name: Use to find only faulted business flows with a specific descriptive fault name such as <code>NegativeCredit</code>. You must enter the exact name (the entire string). This search is case sensitive. Fault Code: Use to find only faulted business flows with the same fault code. <p>To further customize fault search criteria, click More next to Fault Details to display configuration fields such as HTTP host, JNDI name, event name, and event namespace.</p> |

4. If you want to save search criteria for future use, click the **Save Search** icon to specify a name.



Your saved search is then available for selection in the **Report Filters** dropdown list and the **Search Options** section of the Flow Instances page.



5. When search criteria creation is complete, click **Search**.

View search results in the **Fault Statistics** table.

6.1.2 Viewing Aggregated Fault Statistics to Examine Fault Trends

The **Fault Statistics** table displays a report on faults data specified and created in either of the following ways:

- Specified and created in the **Report Filters** section of the Error Hospital page.
- Specified and created in the **Search Options** section and displayed in the **Search Results** table of the Flow Instances page, and then displayed in the **Fault Statistics** table by clicking the **Error Hospital** link above the **Search Results** table.

The data is always aggregated by one of the primary fault attributes selected from the **Group By** list, such as **Fault Name**, **Fault Code**, and so on. The default aggregation is by **Fault Name**.

The Error Hospital page does not show individual faulted instances. To track individual business flows that have faults, perform one of the following tasks:

- Go to the Flow Instances page and click **Instances With Faults**.
- Click a fault count in the **Fault Statistics** table of the Error Hospital page to access details about that fault in the **Search Results** table of the Flow Instances page.

The **Fault Statistics** table enables you to examine fault trends (such as for diagnostic purposes). For example, aggregate by **Fault Code** to see which code has the most faults. You can also perform bulk actions (recovery or abort) on a selected group of similar faults in a single operation.

To view aggregated fault statistics to examine fault trends:

1. Specify search criteria in the **Report Filters** section as described in [Specifying and Saving Fault Search Criteria](#), and click **Search**.

The **Fault Statistics** table is populated with details about faults. This represents the total number of faults, faults requiring recovery, unrecoverable faults, recovered faults, and automatic fault retries.

soa-infra | SOA Infrastructure | Logged in as weblogic | Page Refreshed Oct 18, 2013 12:31:41 PM PDT

Dashboard | Deployed Composites | Flow Instances | **Error Hospital**

Fault Statistics - For Faults occurred in (24 Hours)

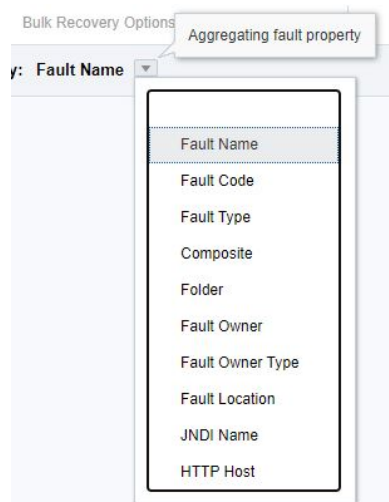
Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| Group By: | Fault Name | Total Faults | Recovery Required | Nonrecoverable | Recovered | Auto Retries |
|--------------------------------|------------|--------------|-------------------|----------------|-----------|--------------|
| {http://schemas.oracle.com/m | | 10 | 9 | 1 | 0 | 0 |
| {http://services.otn.com}Neg | | 6 | 4 | 0 | 2 | 0 |
| {http://schemas.oracle.com/b | | 4 | 1 | 0 | 3 | 0 |
| oracle.bpel.services.workflow. | | 2 | 2 | 0 | 0 | 0 |
| {http://schemas.oracle.com/sc | | 1 | 0 | 1 | 0 | 0 |

The legend above the **Fault Statistics** table displays the color symbols used in the columns of the table to identify the state of faults.

| State | Description |
|---------------------|---|
| Nonrecoverable | Displays the total count of nonrecoverable faults. This includes failed and aborted faults. Clicking the value in the column takes you to the Search Results table on the Flow Instances page and filters the list to show the flow instances associated with nonrecoverable faults. Terminal (fatal) faults cannot be recovered. |
| Recovery Required | Displays the total count of recoverable faults. Clicking the value in the column takes you to the Search Results table on the Flow Instances page and filters the list to show the flow instances associated with recoverable faults. These are faults awaiting a human recovery action so that stuck flows can proceed. |
| Recovered | Displays the total count of recovered faults. Clicking the value in the column takes you to the Search Results table on the Flow Instances page and filters the list to show flow instances associated with recovered faults. These are recoverable faults on which a recovery action was performed successfully. Processing has resumed in the business flow instance. |
| System Auto Retries | Displays the total count of faults that are automatically retried by the system. Clicking the value in the column takes you to the Search Results table on the Flow Instances page and filters the list to show the flow instances associated with these system retried faults. |

- From the **Group By** list above the **Fault Statistics** table, select the fault attribute by which to aggregate data. **Fault Name** is the default aggregation field.



The following options are available:

| Element | Description |
|-------------------------|--|
| Fault Name | Aggregates by the fault name. This aggregation option is selected by default. |
| Fault Code | Aggregates by the fault code. |
| Fault Type | Aggregates by the fault type: <ul style="list-style-type: none"> • System: Network errors or errors such as a database server or web service being unreachable. • Business: Application-specific faults generated when there is a problem with the information being processed (for example, a social security number is not found in the database). • OWSM: Errors on OWSM policies attached to SOA composite applications, service components, or binding components. Policies apply security to message delivery. |
| Composite | Aggregates by the SOA composite application name. |
| Folder | Aggregates by the SOA folder of the SOA composite application in which the fault occurred. |
| Fault Owner | Aggregates by the name of the service component, service binding component, or reference binding component that handled the fault. In some cases, this can be both the fault owner and fault location. |
| Fault Owner Type | Aggregates by the type of service component, service binding component, or reference binding component that handled the fault (for example, if a BPEL process service component owns the fault, BPEL is displayed). |
| JNDI Name | Aggregates by the JNDI name (for example, eis/FileAdapter). |
| HTTP Host | Aggregates by the HTTP host on which the fault occurred. |

3. If you select **Fault Code**, each row in the first column represents a specific code and the remaining columns show the fault statistics aggregated for each code. Regardless of your selection, the remaining rows in the table always show the total number of faults; the number of recoverable, nonrecoverable, and currently recovered faults; and the number of automatic retries performed after a fault occurred.

Fault Statistics - For Faults occurred in (24 Hours)

Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| View | Bulk Recover... | Bulk Abort... | Legend | | | | System |
|-----------------|-----------------|---------------|-------------------|-------------------|-----------|--------------|--------|
| | | | Nonrecoverable | Recovery Required | Recovered | Auto Retries | |
| Group By: | Fault Code | Total Faults | Recovery Required | Nonrecoverable | Recovered | Auto Retries | |
| [Not Specified] | | 9 | 3 | 5 | 1 | 0 | |
| 3302 | | 5 | 3 | 0 | 2 | 0 | |
| 30049 | | 3 | 3 | 0 | 0 | 0 | |
| 30004 | | 1 | 0 | 1 | 0 | 0 | |

- If you select **Fault Type**, each row in the first column represents a specific fault type and the remaining columns show the fault statistics aggregated for each type. As with all selections in the list, you can click the total, recoverable, and recovered numbers that are displayed to access the Flow Instances page for performing fault recovery actions.

Fault Statistics - For Faults occurred in (24 Hours)

Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| View | Bulk Recover... | Bulk Abort... | Legend | | | | System |
|-----------|-----------------|---------------|-------------------|-------------------|-----------|--------------|--------|
| | | | Nonrecoverable | Recovery Required | Recovered | Auto Retries | |
| Group By: | Fault Type | Total Faults | Recovery Required | Nonrecoverable | Recovered | Auto Retries | |
| System | | 10 | 7 | 1 | 2 | 0 | |
| Business | | 8 | 2 | 5 | 1 | 0 | |

- If you select **Composite**, each row in the first column represents a specific SOA composite application name and the remaining columns show the fault statistics aggregated for each composite.

Fault Statistics - For Faults occurred in (24 Hours)

Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| Group By | Composite | SOA Partition | Total Faults | Recovery Required | Nonrecoverable | Recovered | Auto Retries |
|---------------------------------|--------------|---------------|--------------|-------------------|----------------|-----------|--------------|
| SimpleApproval [1.0] | default | | 6 | 0 | 6 | 0 | |
| HWFProj [1.0] | consoleTests | | 3 | 3 | 0 | 0 | |
| FaultFlow [1.0] | consoleTests | | 3 | 2 | 0 | 1 | |
| Mediator_File_JavaCallOut [1.0] | consoleTests | | 2 | 2 | 0 | 0 | |

6.1.3 Performing Bulk Fault Recoveries and Terminations in a Single Operation

You can perform bulk fault recoveries and bulk fault terminations on any aggregated fault row in the **Fault Statistics** table that has recoverable faults. Options for performing these actions are displayed above the **Fault Statistics** table.

To perform bulk fault recoveries and terminations:

1. Specify search criteria in the **Report Filters** section as described in [Specifying and Saving Fault Search Criteria](#), and click **Search**.

The **Fault Statistics** table is populated with details about faults.

2. Select a row in the table in which the **Recovery Required** column has a value of more than one. Note that you can also recover single instances through this option.
3. Click an appropriate action above the table (for this example, **Bulk Recovery** is selected). You can also right-click a row to display the same actions.

| Element | Description |
|----------------------|---|
| Bulk Recovery | Select this option to perform a bulk recovery. Only rows with faults identified as recoverable can be recovered in bulk. |
| Bulk Abort | Select this option to perform a bulk termination. Rows with faults identified as recoverable and rows with faults in the System Auto Retried column can be terminated in bulk. |

This attempts a recovery on all recoverable faults associated with that aggregated row. For this example, the selected row includes three faults that require recovery in the **Recovery Required** column.

Fault Statistics - For Faults occurred in (24 Hours)

Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| Group By: Fault Name | Total Faults | Recovery Required |
|--|--------------|-------------------|
| {http://schemas.oracle.com/mediator/faults}mediatorFault | 3 | 3 |
| {http://services.otn.com}NegativeCredit | 2 | 2 |
| oracle.bpel.services.workflow.WorkflowException | 1 | 1 |

4. Click **Yes** when prompted to continue with the bulk recovery. You can also expand the **Schedule Properties** and **Throttling Properties** sections to display recovery details.

Recovery Request ×

You have requested for recover of 3 faults. The request will be submitted using the properties specified below.

Request Name

▲ Schedule Properties

Start Time

End Time

▲ Throttling Properties

Batch size

Do you want to continue?

Note:

Scheduling and throttling properties are not applicable for non-Oracle Enterprise Scheduler setups. You can only schedule bulk recoveries with Oracle Enterprise Scheduler. Otherwise, this dialog does not include **Schedule** and **Throttling** properties, and bulk recovery is attempted immediately. The bulk recovery job status link for non-Oracle Enterprise Scheduler setup takes you to the log viewer page where you can see the logs corresponding to bulk recovery execution.

A message is displayed indicating that recovery is in progress. If Oracle Enterprise Scheduler is deployed, you can click the link in the message to access the Request Details page of Oracle Enterprise Scheduler. If Oracle Enterprise Scheduler is not deployed, clicking the job ID invokes the Log Messages page.

Confirm ×

Request submitted. **It may take a few minutes for the request to start and get completed.** To track the status of this request, click the link below. Or later navigate to ESS Request Monitoring page and search using the following information:

Job ID [BULKRECOVERY_10001](#)

Note the following details about the Oracle Enterprise Scheduler job request number and fault alert message:

- You can search for the job request number by clicking **Bulk Recovery Jobs** in the **Search** section of the Dashboard page and specifying the number in the **Job Request ID** field. Click the ID to go to the Oracle Enterprise Scheduler Job Request page. For more information, see [Searching for Instances and Bulk Recovery Jobs](#).
 - When an alert message is triggered, the name is displayed in the **Fault Alerts** section of the Dashboard page. For more information, see [Viewing Error Notification Alerts](#).
5. Click **OK** to acknowledge that the bulk recovery job is being handled through an Oracle Enterprise Scheduler job request number.
 6. At the top of the Error Hospital page, click the **Refresh** icon.

If fault recovery was successful, the number of recovered faults that are displayed in the **Recovered** column of the **Fault Statistics** table is increased (for this example, by three).

7. In the **Recovered** column, click the number.

The Flow Instances page is displayed. The business flow instance that previously was displayed as **Recovery** in the **State** column is now displayed as **Completed** in the **Search Results** table.

8. Select the row that includes the business flow instance in the **Search Results** table, and click **Show Details**.

The **Faults** tab is displayed at the bottom of the Flow Instances page. In the **Recovery** column, the fault status is displayed as **Recovered**.

6.1.3.1 Using Additional Bulk Recovery Options for BPEL Processes

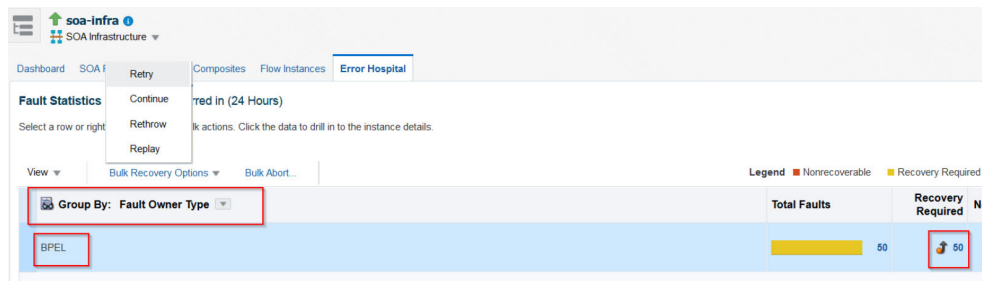
Depending on your fault policies, BPEL faults provide additional recovery options like **Replay**, **Rethrow**, and **Continue**. You can use these additional recovery options when bulk-recovering your BPEL faults.

In order to use BPEL-specific recovery options, use the following steps to filter BPEL faults in Error Hospital:

1. Under the **Group By** field, select **Fault Owner Type**.

This option groups your search results by fault owner type, such as BPEL and Mediator.

2. Select the **BPEL** row, and click **Bulk Recovery Options** for the fault recovery options.



The BPEL **Bulk Recovery Options** menu appears.

3. Select the appropriate bulk recovery action, such as **Replay**, **Continue**, or **Rethrow**, to continue with the bulk recovery.
See [Recovering from Faults in a Business Flow Instance](#) for more details on the individual BPEL recovery options.

6.1.4 Accessing Faults in the Fault Statistics Table to Perform Single Fault Recovery Operations

The Error Hospital page does not show individual faulted instances. However, you can click a fault count in the **Fault Statistics** table of the Error Hospital page to access that fault for performing single fault recovery operations in the **Search Results** table of the Flow Instances page.

To access faults in the Faults Statistics table to perform single fault recovery:

1. Specify search criteria in the **Report Filters** section as described in [Specifying and Saving Fault Search Criteria](#), and click **Search**. For example, select **Recovery Required** in the **Fault** filter.



The **Fault Statistics** table is populated with details about faults that require recovery.

2. In the **Recovery Required** column, click the number of faults requiring recovery for a specific fault name. The number can be a value of more than one. Note that you can also recover single instances through this option.

Fault Statistics - For Faults occurred in (24 Hours)

Select a row or right-click the data for bulk actions. Click the data to drill in to the instance details.

| View | Bulk Recover... | Bulk Abort... | Legend | Nonrecoverable | Recovery Required | Recovered | System Auto Retries |
|--|-----------------|---------------|--------------|-------------------|-------------------|-----------|---------------------|
| Group By: Fault Name | | | Total Faults | Recovery Required | | | |
| {http://schemas.oracle.com/mediator/faults}mediatorFault | | | 5 | 5 | | | |
| {http://services.otn.com}NegativeCredit | | | 2 | 2 | | | |
| oracle.bpel.services.workflow.WorkflowException | | | 1 | 1 | | | |

You are taken to the **Search Results** table of the Flow Instances page.

The faults requiring recovery are displayed. If you instead clicked the value in a different column (for example, the **Total Faults** or **Recovered** column in the **Fault Statistics** table), results appropriate to that selection are displayed.

3. Select a specific row in the **Search Results** table, and click **Show Details**.

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|----------------------|------------|-------------------------|-------------------------|
| 9 | HWFPProj [1.0] | Recovery | Oct 28, 2013 1:08:45 AM | Oct 28, 2013 1:08:45 AM |

The page is refreshed to display the **Faults** (selected), **Sensor Values**, **Composites**, and (if resequencing groups are included in the composite) **Resequencing Groups** tabs below the **Search Results** table. Each tab describes specific details about the flow.

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|----------------------|------------|-------------------------|-------------------------|
| 9 | HWFPProj [1.0] | Recovery | Oct 28, 2013 1:08:45 AM | Oct 28, 2013 1:08:45 AM |

| Error Message | Fault Owner | Fault |
|---|-------------|---------------------|
| exception.code:30049 exception.type: ERROR exception. | Humantask1 | Oct 28, 2013 1:08:4 |

4. To perform fault recovery actions from the **Faults** tab, see Step 4 of [Recovering from Faults in a Business Flow Instance](#).

6.1.5 Understanding Additional Message and Fault Recovery Behavior Scenarios

This section describes additional fault message behavior issues on the Error Hospital page.

6.1.5.1 Recoverable Messages are Displayed as Unrecoverable in the Error Hospital

When message delivery fails on one node (the managed server) of a cluster, undelivered messages are displayed as follows:

- Unrecoverable on the Error Hospital page
- Recoverable on the BPEL process service engine Recovery page

This occurs when BPEL process invoke activities are processing during a server shutdown. These activities may not complete, even if a graceful shutdown occurs. In these cases, the instances are shown as running and unrecoverable on the Error Hospital page because the BPEL process service engine cannot update the business flow state during a server shutdown.

You can manually recover the BPEL invoke activities on the BPEL process service engine Recovery page. Otherwise, they are recovered during automatic recovery.

For more information, see [Performing BPEL Process Service Engine Message Recovery](#).

6.1.5.2 Unrecoverable Binding Component Faults are Displayed as Recoverable

A `FabricInvocationException.RetryType.NO_RETRY` error returned by a database adapter reference binding component is treated as a binding fault. Even though the fault is nonretriable, the following is displayed:

- There is a recoverable message on the BPEL process service engine Recovery page.
- The flow state is displayed as recoverable because of the message in the BPEL process invoke activity recovery queue.

This is the expected behavior. In 12c, common faults and BPEL process messages are linked together. This means the fault and flow state both indicate that an invoke activity recovery is required.

For more information, see [Performing BPEL Process Service Engine Message Recovery](#).

6.1.5.3 BPEL Process Messages Awaiting Recovery with no Associated Instance Faults Do Not Appear on the Error Hospital Page

If messages are awaiting recovery on the BPEL process service engine Recovery page and there is no associated fault with the instance, this is not shown on the Error Hospital page. This can occur in the following scenarios:

- If a callback message arrives late and the instance has already completed.
- If a race condition occurs when using message aggregation with `reenableAggregationOnComplete=true`. When messages are sent around the same time, most of them are marked as midprocess receive messages and there are no new instances to pick them up.

For more information about message aggregation, see "Routing Messages to the Same Instance" of *Developing SOA Applications with Oracle SOA Suite*.

6.2 Creating Error Notification Rules

You can create error notification rules at the SOA Infrastructure or individual SOA folder level that cause an alert message to be triggered when specific fault criteria are met. For example, you can create a rule that sends an alert if more than 10 errors occur in a 48 hour period. You can configure the alert to be sent to the **Fault Alerts** section of the Dashboard page described in [Viewing Error Notification Alerts](#), and also to a delivery channel such as an email address.

Note:

To create error notification rules, Oracle Enterprise Scheduler must be deployed to the SOA Infrastructure. If Oracle Enterprise Scheduler is not deployed, you cannot access this page.

The error notification rules provide the following benefits:

- An aggregated notification of faults occurring in the system.
- A scheduled-based notification system with a configurable reoccurrence interval. For example, send an alert every 24 hours if rule criteria are met.
- Rule-configured faults and notification channel specifications. When a fault policy is triggered, an email is sent.

You can create fault notification rules at the following levels:

- SOA Infrastructure (for system-wide alerts)
- Individual SOA folder level (for alerts specific to that SOA folder)

The following roles are required for creating, updating, and deleting rules:

- *folder_name*ApplicationOperator: This role is folder-specific. A user in this folder-specific role has the permissions to manage alerts for that SOA folder.
- MiddlewareOperator
- MiddlewareAdministrator
- SOAAdmin
- SOAOperator

For more information, see [Securing Access to SOA Folders](#).

Note the following details about the display of rules in Oracle Enterprise Manager Fusion Middleware Control:

- Rules created at the SOA Infrastructure (system-wide) level are not displayed in the Error Notification Rules page at the individual SOA folder level.
- Rules created at the individual SOA folder level are not displayed in the Error Notification Rules page at the SOA Infrastructure (system-wide) level.

The **Fault Alerts** section of the SOA Infrastructure Dashboard page shows all system-wide alerts, including all SOA folders.

To create error notification rules:

1. To receive an alert notification when an error occurs, you must specify the address of the user and the delivery channel to use (email, IM, or SMS). Those tasks are performed on different pages in Oracle Enterprise Manager Fusion Middleware Control,

| For This Delivery Channel... | Perform These Tasks... |
|------------------------------|---|
| Email | <ol style="list-style-type: none"> a. Configure the email addresses on the Workflow Notification Properties page. See Configuring Human Workflow Notification Properties. b. When complete, click Go to the Messaging Driver page on the Workflow Notification Properties page. c. Configure the email driver on the User Messaging Service page. See <i>Configuring the Email Driver in Administering Oracle User Messaging Service</i>. |
| SMS | <ol style="list-style-type: none"> a. Configure the Short Message Peer-to-Peer (SMPP) driver on the User Messaging Service page. See <i>Configuring the SMPP Driver in Administering Oracle User Messaging Service</i>. |
| IM | <ol style="list-style-type: none"> a. Configure the Extensible Messaging and Presence Protocol (XMPP) on the User Messaging Service page. See <i>Configuring the XMPP Driver in Administering Oracle User Messaging Service</i>. |

2. Create an alert at the appropriate level:

To create error notification rules at the SOA Infrastructure level:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|---|
| <ol style="list-style-type: none"> a. Select Error Notification Rules. | <ol style="list-style-type: none"> a. Expand SOA. b. Right-click soa-infra (server_name). c. Select Error Notification Rules. |

To create error notification rules at the individual SOA folder level:

| From the SOA Folder Menu of a Specific Folder... | From the SOA Folder in the Navigator... |
|--|---|
| <ol style="list-style-type: none"> a. Select Error Notification Rules. | <ol style="list-style-type: none"> a. Right-click a specific SOA folder. b. Select Error Notification Rules. |

The Error Notification Rules page displays the following details:

- An Error Notification Rules table for viewing existing rules and details about each rule. Select one or more rules to manage.

- Links for creating a new rule, creating a new rule from an existing rule, editing a rule, deleting a rule, disabling a rule, and searching for a rule. For more information, click the **weblogic** icon and select **Help > Help for This Page** on the Error Notification Rules page.

soa-infra SOA Infrastructure

Logged in as **weblogic**
Page Refreshed Oct 29, 2013 3:41:27 PM PDT

Error Notification Rules

View **+** Create **+** Create Like **✎** Edit **✕** Delete **⏻** Disable Rule Name Contains... Search

| Rule | Description | Enabled | Send Notifications When | Send Notifications To | Dashboard Alerts | Last Modified On |
|-------|-------------|----------|-------------------------|-----------------------|------------------|------------------|
| rule1 | dafds | ⊘ | | | ✓ | 10/29/2013 |

3. Create a new rule in either of the following ways:
 - a. Click **Create** to create a new rule.
 or
 - a. Click **Create Like** to create a new rule from a selected rule.
4. Enter the following information.

| Element | Description |
|--------------------|--|
| Name | Enter a name for the rule. Once the new rule is saved, the name cannot be changed. This name is also used for alerts that display on the Dashboard page or which are sent to the notification recipients through a channel such email, SMS, or instant messaging (IM). |
| Description | Enter a description for the rule. This description is visible only to administrators. An end user receiving fault notification alerts or viewing alerts on the Dashboard page cannot see this description. |

| Element | Description |
|-----------------------|--|
| Schedule Names | <p>Select a predefined schedule. This indicates how often to trigger the scheduler (for example, invoke the scheduler every two minutes). When you select a schedule, the page is refreshed to display the Schedule Description and Frequency fields.</p> <p>You define the schedule names in the Create Schedule page of Oracle Enterprise Manager Fusion Middleware Control.</p> <ol style="list-style-type: none"> In the Navigator, expand Scheduling Services > ESSAPP or right-click soa-infra (server_name) and select Define Schedules. From the Scheduling Service menu, select Job Requests > Define Schedules. The schedules available for selection in the Schedule Names list are displayed. Click Create to create additional schedules and their execution frequency. Note: While defining a schedule name, ensure that you specify the schedule package name of /oracle/apps/ess/custom/soa. Otherwise, the schedule is created, but is not accessible on the Create or Edit Error Notification Rule page. <p>For more information about using the Oracle Enterprise Scheduler in Oracle Enterprise Manager Fusion Middleware Control, see <i>Administering Oracle Enterprise Scheduler</i>.</p> |
| Description. | Displays the schedule description configured on the Create Schedule page. |
| Frequency | Displays the schedule frequency configured on the Create Schedule page. |

- Use the IF-THEN table to define the fault notification rule, and click **Apply**.

| Element | Description |
|-------------|---|
| IF | <p>Define the IF part of the rule. At least one rule condition is mandatory, and cannot be removed.</p> <ul style="list-style-type: none"> At the SOA Infrastructure level, the mandatory parameter is: Fault Occurred in Last 48 Hours At the individual SOA folder level, the mandatory parameters are: Fault Occurred in Last 48 Hours Folder is folder_name <p>You can edit the default value of 48.</p> <p>Additional rule conditions are optional. Each condition can be added only once. Once a condition is added, it is removed from the list of available conditions.</p> <p>Click the + sign to select rule conditions and assign values. For example, define a rule to trigger an alert if more than 3 faults occur in a 48 hour period in the default SOA folder.</p> <p>IF Fault Occurred in Last 48 Hours and Folder is default and Fault Count is over 3</p> |
| THEN | <p>Define the THEN part of the rule. Any number of THEN conditions can be specified. At least one condition is required. (Send Alerts to Dashboard is a valid condition.)</p> |

| Element | Description |
|--|---|
| <ul style="list-style-type: none"> • Send Alerts to Dashboard | <p>Select whether to send an alert to the Fault Alerts section of the Dashboard pages at the SOA Infrastructure or SOA folder levels when the specified fault criteria are met. Use this selection with care to prevent the Dashboard page from overflowing with fault alerts. If you do not select this option, the alert is not displayed on the Dashboard pages.</p> |
| <ul style="list-style-type: none"> • Send Message To User Via Delivery_Channel | <p>Specify the address of the user to receive the alert notification and the delivery channel to use (email, IM, or SMS). Click the - sign to remove the users. It is your responsibility to ensure that the user contact information you enter is correct.</p> <p>Note: You must also configure the notification email properties on the Workflow Notification Properties page, as described in Configuring Human Workflow Notification Properties. The delivery channels must also be configured in the Oracle UMS Adapter, which is accessible from the Workflow Notification Properties page by clicking the Go to the Messaging Driver page link.</p> <p>The notification message the alert recipients receive provides the following details. The message content cannot be configured.</p> <ul style="list-style-type: none"> • Fault information. For example: 16 faults occurred in the last 48 hours • A link to the Error Hospital page for viewing details about the faults in this notification alert. From the Error Hospital page, you can drill down to see the individual flow instances and further details about the faults. <p>For information about configuring delivery channels in Oracle UMS Adapter, see <i>Administering Oracle User Messaging Service</i>.</p> |

When complete, alert notification rule design looks as follows.

The screenshot shows the SOA Infrastructure configuration interface. At the top left, there is a logo for 'soa-infra' and 'SOA Infrastructure'. At the top right, it shows 'Logged in as weblogic' and 'Page Refreshed Mar 7, 2014 3:56:37 PM PST'. The main content area displays the configuration for an alert notification rule:

- Rule Description:** This rule triggers an alert when an EDN Recovery error occurs within a 48 hour period.
- Schedule:** everyday (Daily)
- Schedule Description:**
 - Frequency: Daily
 - Start Date: Mar 4, 2014 5:58:33 AM
 - End Date: Mar 12, 2014 5:58:27 AM
- IF:** Fault Occurred In Last 48 Hours and Fault State is EDN Recovery and
- THEN:** Send Alerts To Dashboard
Via EMail (To) me@example.com and

By default, the alert is enabled. You can disable the alert by selecting the alert on the Edit Notification Rules page and clicking **Disable**. This button acts as a toggle for enabling or disabling one or more selected alerts.

When error notification rule criteria are met, the alert is triggered and displayed in the **Fault Alerts** section of the Dashboard page at the SOA Infrastructure or SOA folder level. The frequency with which a rule is invoked is based upon your selection from the **Schedule Names** list in Step [#unique_219/unique_219_Connect_42_BEIECEEH](#).



- a. Click the link that identifies the number of faults.
The Error Hospital page is displayed.
 - b. Click **Search**.
The **Fault Statistics** table shows details about the faults and the **Fault Occurred** field of the **Time** filter of the **Report Options** section is populated with the same time period specified on the Create Error Notification Rules page.
 - c. In the **Recoverable** column, click the values to perform fault recovery. For more information, see [Viewing Error Notification Alerts](#).
6. When you receive an error notification alert (for example, an email), click the link in the email to access the Error Hospital page.

```
16 Faults occurred in the last 48 hours
Click the link for more details http://link_to_Error_Hospital_Page
```

For information about assigning alerts in the fault management framework in Oracle JDeveloper, see [olink:SOASE88066](#) in *Developing SOA Applications with Oracle SOA Suite*.

For information about roles, see [Securing Access to SOA Folders](#).

6.2.1 Error Notification Rules Associated with an Expired Schedule

You cannot enable, disable, or delete a rule when the schedule associated with the rule has expired. The following error message appears:

```
<Error> <oracle.soa.scheduler> <BEA-000000> <ESS-01054 Cannot hold request 5.
Current state is Finished.
oracle.as.scheduler.IllegalStateException: ESS-01054 Cannot hold request 5.
Current state is Finished.
at weblogic.rmi.internal.ServerRequest.sendReceive(ServerRequest.java:258)
at
weblogic.rmi.cluster.ClusterableRemoteRef.invoke(ClusterableRemoteRef.java:472
)
at
```

These actions can be performed if the rule has an active schedule.

7

Managing Permissions and Roles for Oracle SOA Suite Users

Support for SOA permissions and roles changed between 11g and 12c as follows:

- In 11g, Oracle SOA Suite APIs and runtime were protected using Oracle SOA Suite application roles and Oracle Enterprise Manager Fusion Middleware Control protected user actions with the Oracle WebLogic Server role. Role mapping was required.
- In 12c, Oracle SOA Suite APIs and runtime and Oracle Enterprise Manager Fusion Middleware Control both protect user actions and the user interface using Oracle SOA Suite permissions. (Oracle SOA Suite application roles are defined by a set of permissions.) Therefore, mapping a user to one of the application roles gives them the required permissions.



Note:

By assigning a user to a particular role, the user gets the default permissions associated with that role. Subsequently, permissions associated with a particular role or user can be customized by managing application policies.

For more information about SOA permissions and roles, see [Understanding Additional Permission and Role Behavior Scenarios](#).

Topics:

- [Creating a WebLogic Server User](#)
- [Assigning a WebLogic Server Role to a User](#)
- [Assigning a SOA Role to a User](#)
- [Customize Role Permissions](#)
- [Assigning SOA Folder Roles to a User](#)

7.1 Creating a WebLogic Server User

To create a user login to the WebLogic Server Administration Console:

1. [Log in to WebLogic Server Administration Control Console](#), and click **Security Realms** in the left pane.
2. On the Summary of Security Realms page, select the name of the realm.
3. On the Settings for Realm Name page select **Users and Groups**, then the **Users** tab, then click **New**.
4. In the **Name** field of the Create New User page enter a unique name for the user.

5. (Optional) In the **Description** field, enter a description. The description might be the user's full name.
6. In the **Provider** drop-down list, select **DefaultAuthenticator**.
7. In the **Password** field, enter a password for the new user, then reenter the password in the **Confirm Password** field.
8. Click **OK**.

For more information about how to create roles, add users to groups, and secure resources with roles and policies in Oracle WebLogic Server, see Users, Groups, and Security Roles in *Securing Resources Using Roles and Policies for Oracle WebLogic Server*.

7.2 Assigning a WebLogic Server Role to a User

To assign a WebLogic Server role to a user, add the user to a group:

1. In the WebLogic Server Administration Control Console **Users** table, select the user you want to add to a group.
2. On the Settings for User Name page, select **Groups**.
3. Select a group from the **Available** list box.
Some of the default groups available in WebLogic Server are:

| Group Name | Membership |
|-----------------------|--|
| Administrators | By default, this group contains the user information entered as part of the installation process (that is, the Configuration Wizard), and the <code>system</code> user if the WebLogic Server instance is running Compatibility security. Any user assigned to the <code>Administrators</code> group is granted the <code>Admin</code> security role by default. |
| Deployers | By default, this group is empty. Any user assigned to the <code>Deployers</code> group is granted the <code>Deployer</code> security role by default. |
| Operators | By default, this group is empty. Any user assigned to the <code>Operators</code> group is granted the <code>Operator</code> security role by default. |
| Monitors | By default, this group is empty. Any user assigned to the <code>Monitors</code> group is granted the <code>Monitor</code> security role by default. |
| AppTesters | By default, this group is empty. Any user assigned to the <code>AppTesters</code> group is granted the <code>AppTester</code> security role by default. |
| CrossDomainConnectors | By default, this group is empty. Any user assigned to the <code>CrossDomainConnectors</code> group is granted the <code>CrossDomainConnector</code> security role by default. |

| Group Name | Membership |
|-------------------|--|
| AdminChannelUsers | By default, this group is empty. Any user assigned to the AdminChannelUsers group is granted the AdminChannelUser security role by default |

4. Click **Save**.

7.3 Assigning a SOA Role to a User

A user can be assigned an application-level role (such as `SOAMonitor`) or a folder-specific role (for example, `default_Monitor` for the `default` folder).

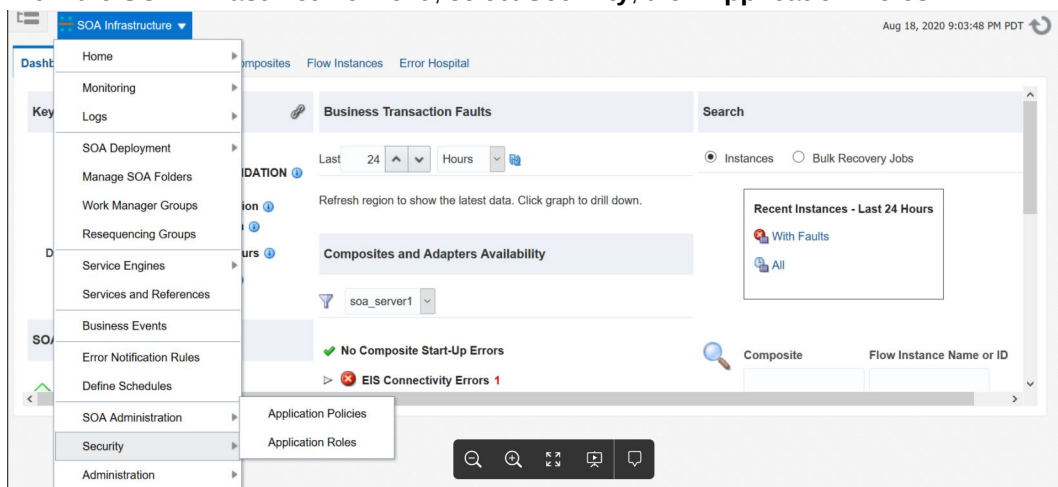


Note:

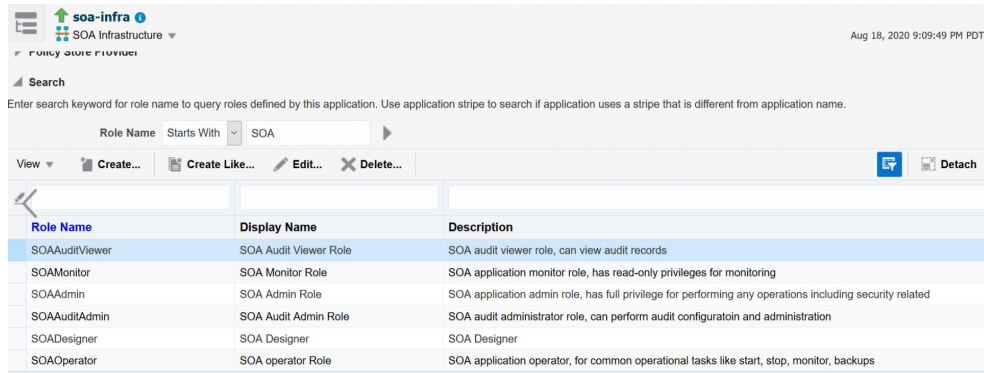
Roles can also be added to a group or another application role.

To assign a SOA role to a user, use Oracle Enterprise Manager Fusion Middleware Control:

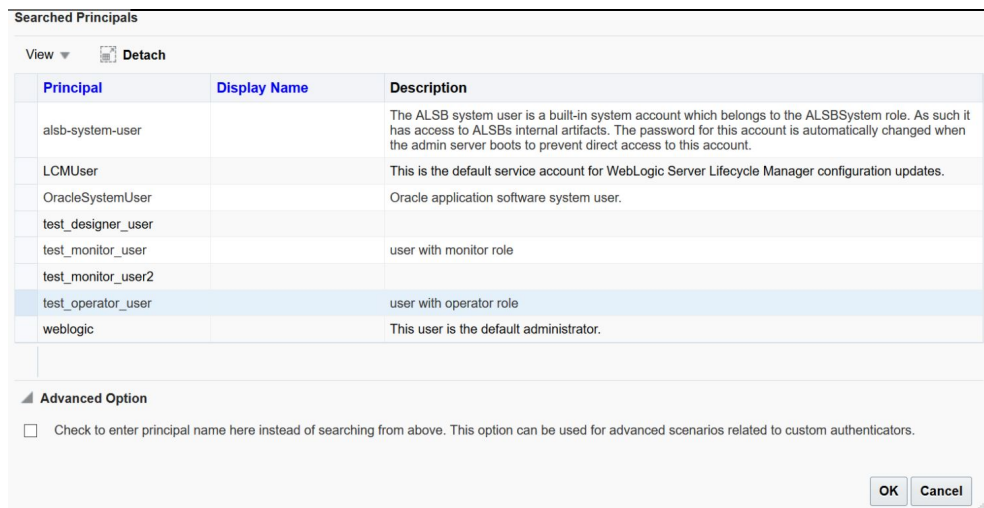
1. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#) as an Administrator.
2. From the **SOA Infrastructure** menu, select **Security**, then **Application Roles**.



3. In the list, select the role that you want to grant to the user and click **Edit**.
The following screenshot shows the available SOA roles. By assigning a user to one of these roles, the user has the associated permissions for all of the folders and partitions in the SOA application.



4. In the Edit Application Role page, click **Add**.
5. In the Add Principal dialog, from the **Type** list, and select **User**.
6. In the **Principal Name** list, select the user and click **OK**.
The selected user is given the selected role.



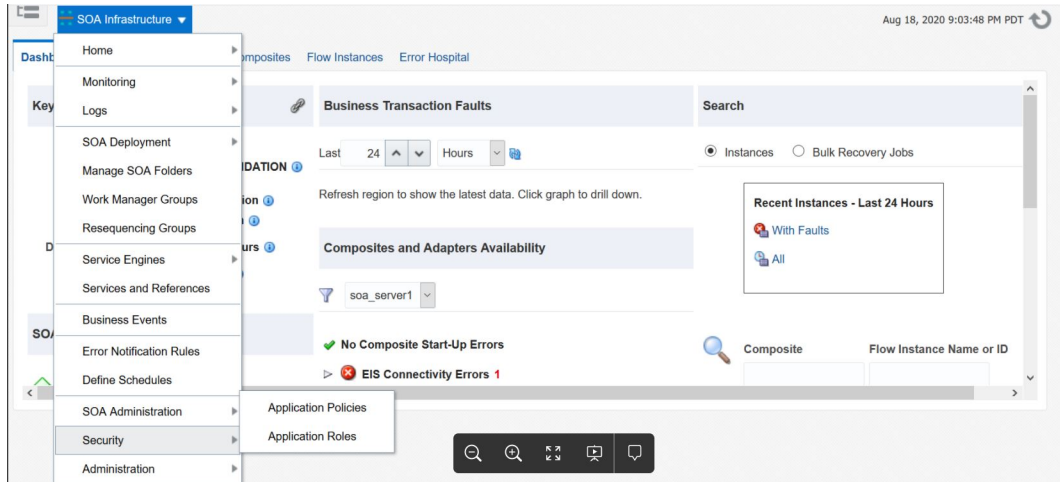
7.4 Customize Role Permissions

You can customize permissions associated with a particular role or user by managing application policies.

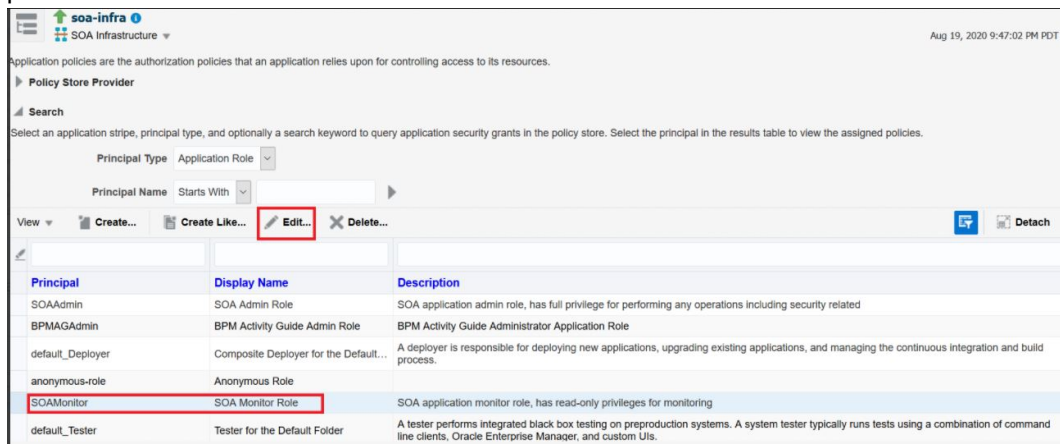
To customize role permissions:

1. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#) as an Administrator.

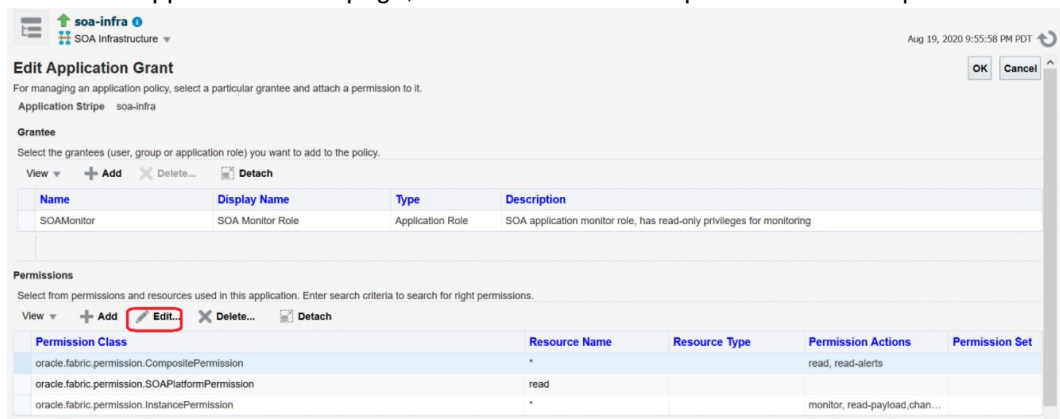
- From the **SOA Infrastructure** menu, select **Security**, then **Application Policies**.



- In the list, select the row showing the user and role for which you want to customize permissions and click **Edit**.



- In the Edit Application Grant page, click **Edit** and edit the permissions as required.



The following table lists the permissions for the default roles in Oracle Enterprise Manager. Note that these roles can be altered or new roles can be created with required permissions.

| Role | CompositePermission | SOAPPlatformPermission | InstancePermission |
|-------------|---|---|---|
| SOAMonitor | read, read-alerts on all folders/partitions | read | monitor, read-payload |
| SOAOperator | read, write, provision, lifecycle, read-alerts, manage-alerts | read, write-shared-data, read-shared-data | change-state, monitor, manage-fault, read-payload, test |
| SOADesigner | read, write, provision | read, write-shared-data, read-shared-data | N/A |
| SOAdmin | All | All | All |

where

- **CompositePermission** represents permissions to invoke an operation on composites. Permissions include:
 - **read** - read-only actions, including:
 - * view composite configuration
 - * get default version
 - * get composite metadata (export_composite, export_updates, and so on)
 - * list deployed composites for a partition
 - **write** - actions resulting in modifications of composites, including:
 - * import updates
 - **provision** - actions resulting in composite provisions, including:
 - * deploy
 - * undeploy
 - * delete a SOA partition, removing all composites for that partition as a result
 - **lifecycle** - actions resulting in composite lifecycle state changes, including:
 - * start
 - * stop
 - * activate
 - * retire
 - * assign default version
 - **read-alerts** - read all forms of alerts/notifications on configuration actions
 - **manage-alerts** - manage all forms of alerts/notifications on configuration actions
- **SOAPPlatformPermission** represents access to configuration operations on SOA server, including viewing and updating the server URL, logging, auditing, and so on. Permissions include:
 - **read** - view SOA server configuration.

- **write** - modify SOA server configuration.
- **write-shared-data** - deploy/remove shared composite resources.
- **read-shared-data** - export shared composite resources.
- **InstancePermission** represents permissions to invoke SOA runtime operations such as audit trails and fault recovery. Permissions include:
 - **monitor** - read access to composite instances, including actions such as `getNumberOfFaults`, `getNumberOfCompositeInstances`, `getNumberOfFaultInstances`, `getCompositeInstances`, `GetComponentSnapshot`, `getAuditFlow`, `getSensorData`, and so on.
 - **read-payload** - along with **monitor** permission, provides additional ability to view the payload of the runtime instances.
 - **change-state** - access to instance state change actions including:
 - * suspend a flow
 - * resume a flow
 - **manage-fault** - access to fault management actions including:
 - * recover a fault
 - * abort instances
 - **delete** - ability to delete or purge composite instances and delete rejected messages.
 - **modify-payload** - along with **change-state**, provides additional ability to modify payload.
 - **migrate** - access to composite migration actions.
 - **test** - access to composite test methods.

5. Click **OK**.

The following examples show permissions required to access certain functionality in Oracle Enterprise Manager Fusion Middleware Control.

| Functionality | Permissions Required |
|--|---|
| Access Flow Instance tab | <code>oracle.fabric.permission.InstancePermission</code> with monitor permission <code>oracle.fabric.permission.CompositePermission</code> with read permission |
| Start/stop/activate/retire a composite | <code>oracle.fabric.permission.CompositePermission</code> with read permission <code>oracle.fabric.permission.CompositePermission</code> with lifecycle permission |
| Deploy/undeploy/redeploy composite | <code>oracle.fabric.permission.SOAPPlatformPermission</code> with write permission <code>oracle.fabric.permission.CompositePermission</code> with write permission |

| Functionality | Permissions Required |
|-------------------------------|---|
| Terminate/recover an instance | oracle.fabric.permission.InstancePermission with manage-fault permission oracle.fabric.permission.InstancePermission with monitor permission |
| Delete a flow instance | oracle.fabric.permission.InstancePermission with delete and monitor permissions |

7.5 Assigning SOA Folder Roles to a User

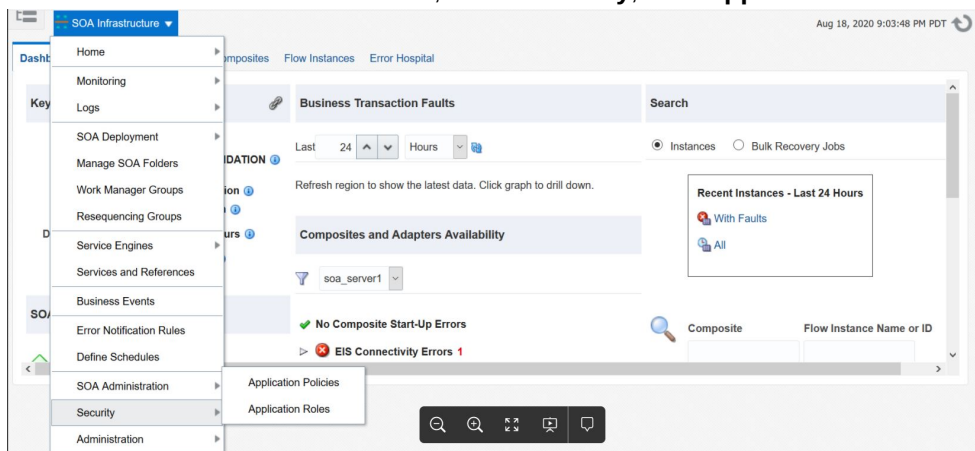
For information about managing SOA folders, see [Managing SOA Folders](#).

 **Note:**

All folders are automatically secured with application roles and folder roles.

To assign a SOA folder role to a user:

1. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#) as an Administrator.
2. From the **SOA Infrastructure** menu, select **Security**, then **Application Roles**.



3. In the list, select the required role that you want to assign to the user and click **Edit**.

Folder-based roles are named using the convention *folder-name_folder-role*. For example, some of the roles available for folder *test* may be as shown here:

| Role Name | Display Name | Description |
|--------------------------|--|--|
| test_Composer | Composer for the test folder | A composer is responsible for making changes to composite artifacts, such as business rules in a business process, security policies, f... |
| test_Tester | Tester for the test folder | A tester performs integrated black box testing on preproduction systems. A system tester typically runs tests using a combination of co... |
| test_Monitor | Monitor for the test folder | A monitor monitors applications, runtime statistics requests etc |
| test_Deployer | Composite Deployer for the test folder | A deployer is responsible for deploying new applications, upgrading existing applications, and managing the continuous integration and... |
| test_ApplicationOperator | Application Operator for the test folder | An app... |

4. In the Edit Application Role page, click **Add**.

5. In the Add Principal dialog, from the **Type** list, select **User**.
6. In the **Principal Name** list, select the user and click **OK**.
The selected user is granted the permissions associated with the selected folder role.

8

Managing SOA Folders and Work Manager Groups

This chapter describes how to manage SOA folders, manage work manager groups, and secure access to folders, including how to create, delete, and edit folders; perform bulk management lifecycle tasks on composites; view and configure work manager properties; view work manager pending and completed requests; view and create work manager groups; view SOA folder roles; and assign users to SOA folder roles.

Support for SOA permissions and roles changed between 11g and 12c as follows:

- In 11g, Oracle SOA Suite APIs and runtime were protected using Oracle SOA Suite application roles and Oracle Enterprise Manager Fusion Middleware Control protected user actions with the Oracle WebLogic Server role. Role mapping was required.
- In 12c, Oracle SOA Suite APIs and runtime and Oracle Enterprise Manager Fusion Middleware Control both protect user actions and the user interface using Oracle SOA Suite permissions. (Oracle SOA Suite application roles are defined by a set of permissions.) Therefore, mapping a user to one of the application roles gives them the required permissions.

This chapter includes the following sections:

- [Managing SOA Folders](#)
- [Managing Work Manager Groups](#)
- [Securing Access to SOA Folders](#)

For information about monitoring the overall status of a specific folder, see [Monitoring the Overall Status of the SOA Infrastructure or Individual SOA Folder](#).

For information about tracking the status of business flow instances in a specific folder, see [Tracking Business Flow Instances](#).

For information about performing error recovery in a specific folder, see [Recovering From Faults in the Error Hospital](#).

8.1 Managing SOA Folders

You can deploy SOA composite applications into separate sections of the SOA Infrastructure known as folders. Deploying composites to folders enables you to:

- Logically group SOA composites
- Perform the following bulk lifecycle management tasks on all SOA composite applications within a specific folder:
 - Start all composites
 - Shut down all composites
 - Retire all composites
 - Activate all composites

- Undeploy all composites
- Secure access to folders

At least one folder is required for deploying SOA composite applications. A default folder named `default` is automatically included with Oracle SOA Suite. You can delete the `default` folder. You cannot rename existing folders; only creation and deletion of folders is supported.

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

 **Note:**

If SOA composite applications using the same inbound resource are deployed to different folders, it cannot be guaranteed which folder 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 `Folder1` and `Folder2`, when a file is placed in `/home/Directory1`, either the composite in `Folder1` or `Folder2` 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.

To manage folders:

Access the Manage SOA Folders page through one of the following options:

| From the SOA Infrastructure Menu... | From the SOA Node in the Target Navigation Tree... |
|--|--|
| <ol style="list-style-type: none"> 1. Select Manage SOA Folders. | <ol style="list-style-type: none"> 1. Expand the SOA node. 2. Right-click soa-infra, select Manage SOA Folders. |

The Manage SOA Folders page displays the following details:

- A utility for searching for a specific folder. Enter a full or partial folder name and click the **Search** icon or press the **Return** key. The search is not case-sensitive.
- Links for creating, deleting, and editing folders.
- A **Composites Control** list for starting up, shutting down, activating, and retiring all composites in the selected folder.
- A **Deployment** list for deploying to this folder or undeploying all from this folder.
- A table that lists each folder, the work manager group, the number of active and retired SOA composite application revisions in each folder, and the name of the composites contained in each folder (under the **View** link).

| SOA Folder | Work Manager Group | Composites | | |
|------------|--------------------|------------|---------|------|
| | | Active | Retired | View |
| default | default | 1 | 0 | |
| HR_Apps | default | 0 | 0 | |

You can perform the following folder management tasks:

- [Creating SOA Folders](#)
- [Deleting Folders](#)
- [Changing the Work Manager Group of a SOA Folder](#)
- [Performing Bulk Lifecycle Management Tasks on Composites in SOA Folders](#)

For more conceptual information about folders, see [Introduction to SOA Folders](#).

8.1.1 Creating SOA Folders

You can create folders from the Manage SOA Folders page.

Note:

You *must* ensure that the Session Lock on the Change Center in the Oracle WebLogic Server Administration Console is released before creating a folder.

To create a folder:

1. Access the Manage SOA Folders page as described in [Managing SOA Folders](#).
2. Click **Create**.

The Create New SOA Folder dialog is displayed.

- a. In the **Name** field, enter a folder name.

 **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 `myfolder`, `folder2`, `dept-a`, `customer_services`, and `22`. Examples of invalid names are `-folder2`, `/folder`, and null or empty names.

- b. From the **Work Manager Group** list, select an existing work manager group or click **Add** to create a new work manager group. To create a new work manager group, see [Viewing and Creating Work Manager Groups](#).

You cannot rename an existing folder or later transfer the composite applications you deployed to it to a different folder.

3. Click **Create**.

The new folder is displayed under the **SOA Folder** column of the Manage SOA Folders page. You can now deploy composites to this SOA folder by selecting **Deploy to This Folder** from the **Deployment** dropdown list. Once deployed, a composite cannot be transferred to a different folder.

For information about performing bulk lifecycle management tasks from the **Composites Control** and **Deployment** lists, see [Performing Bulk Lifecycle Management Tasks on Composites in SOA Folders](#).

You can also create SOA folders with the Oracle WebLogic Scripting Tool (WLST) and `ant` commands. For information, see *WLST Command Reference for SOA Suite* and *Developing SOA Applications with Oracle SOA Suite*.

8.1.2 Deleting Folders

 **Note:**

You must have at least one folder. If you delete all folders, you cannot deploy a SOA composite application.

You can delete folders from the Manage SOA Folders page.

Note the following:

- If you want to re-create some of your composite deployments in another folder, you can export those composites to a JAR file *before* you delete this folder.

- Before deleting the selected folder, all SOA composite application revisions in the folder are undeployed. The states of all active instances of undeployed composites are changed to aborted.

To delete a folder:

1. Access the Manage SOA Folders page as described in [Managing SOA Folders](#).
2. Select a specific folder and click **Delete**.

The Delete SOA SOA Folder dialog is displayed.

3. Click **Delete (Undeploy All Composites)**.

All composites that were deployed in the folder are undeployed and no longer appear in the navigator. The folder is then deleted from the **SOA Folder** column of the Manage SOA Folders page.

8.1.3 Changing the Work Manager Group of a SOA Folder

You can change the work manger group associated with a folder by either selecting an existing group or creating a new group.



Note:

You *must* ensure that the Session Lock on the Change Center in the Oracle WebLogic Server Administration Console is released before changing the work manager group of a folder.

To change the work manager group of a folder:

1. Access the Manage SOA Folders page as described in [Managing SOA Folders](#).
2. Select a specific folder, and click **Edit**.
The Edit SOA Folder dialog is displayed.
3. From the **Work Manager Group** list, select an existing work manager group or click **Add** to create a new work manager group. To create a new work manager group, see [Viewing and Creating Work Manager Groups](#).
4. Click **Apply**.
5. Restart the server for the work manager group change to take effect.

8.1.4 Performing Bulk Lifecycle Management Tasks on Composites in SOA Folders

You can perform bulk lifecycle management tasks on all SOA composite applications in a specific folder on the Manage SOA Folders page or on the SOA Folder page of a specific folder.

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 business flow instances, [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 folder:

1. Access the Manage SOA Folders page as described in [Managing SOA Folders](#).

Two dropdown lists enable you to perform bulk lifecycle management actions:

- **Composites Control** list
- **Deployment** list

On the Manage SOA Folders page, these lists are displayed above the **SOA Folder** table.

2. To perform one of the following bulk lifecycle management tasks for all SOA composite applications contained in the selected folder, 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.

- b. Click **OK** to continue.

 **Note:**

Be aware that when you select **Retire All** from the **Composite Control** list, all composites in that folder 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 folder.

3. To perform one of the following management tasks, select the **Deployment** list:
 - Specify a composite to deploy to this folder. This selection invokes the Deploy SOA Composite wizard where you specify a composite revision to deploy.
 - Undeploy all composites in this folder.

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.

8.2 Managing Work Manager Groups

Each folder must be associated with a work manager group that consists of work managers. A work manager is an Oracle WebLogic Server entity that represents a logical thread pool. It is similar to a queue in which work items line up for processing. You can define priorities for the work to be processed by work managers. Work

managers manage thread pools internally and automatically, providing for optimal scheduling. Work managers provide the following capabilities:

- A single internal global pool.
- A multiple, priority-based, work request queue. The priority is computed internally based on the work manager constraints.
- New threads that are automatically added and removed based on the work load.

Oracle WebLogic Server manages the thread pool on behalf of Oracle SOA Suite. It automatically controls the number of threads required based on defined criteria. You define the priority and Oracle WebLogic Server determines if more threads are required.

There are two ways to define work priorities in the Oracle WebLogic Server Administration Console.

- Request classes:
 - Defines the necessary percentage of server resources to share
 - Defines the necessary application response times
- Constraints:
 - Maximum thread constraints: Once reached, the server does not schedule requests of this type until the number of concurrent executions falls below the limit. If you do not specify a value, the default value is unlimited.
 - Minimum thread constraints: Ensures the number of threads the server allocates to impacted requests to avoid deadlocks. The default value is zero.
 - Capacity: Causes the server to reject requests when it has reached its capacity.

 **Note:**

The minimum and maximum threads are defined using the work manager names and they can be shared by multiple work managers. Work managers are defined at the domain level.

Oracle WebLogic Server includes a number of Oracle SOA Suite work managers. You can create Oracle SOA Suite work manager groups that are automatically associated with these work managers. A work manager group consists of work managers dedicated to processing Oracle SOA Suite background work for a given folder. Work manager groups isolate folder configuration and request processing. A work manager group can be shared by multiple folders.

The mapping works as follows:

- Mapping between a service engine thread pool (for example, a BPEL invoke pool) and a work manager in a work manager group.
- Mapping between a folder and a single work manager group. A work manager group comprises all logical thread pools for background processing tasks in a given folder. Multiple folders can share a single work manager group. For example:
 - The default and HR folders can be associated with a standard work manager group.
 - The sales folder can be associated with a high priority work manager group.

However, each folder is associated with only one work manager group.

8.2.1 Viewing and Configuring Work Manager Properties

You can view and configure work manager properties through one of the following options:

- Configure the following properties:
 - The **SOADDataSource** property in the Oracle WebLogic Server Administration Console to configure the number of database connections in the data source.
 - The **SOAMaxThreadsConfig** property in the System MBean Browser to allocate percentages for the various work managers in the group.

Maximum thread constraints are automatically created based on these settings. For information, see [Configuring Database-bound Processing Threads](#).

- Configure work manager properties such as minimum thread, maximum thread, and capacity constraints from Oracle WebLogic Server Administration Console. This option is a more advanced method than the first one. For information, see [Viewing and Configuring Work Manager Constraints](#).

8.2.1.1 Viewing and Configuring Work Manager Constraints

You can view and configure Oracle SOA Suite work managers in Oracle WebLogic Server Administration Console:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure** under **domain_name** (for example, named **soainfra**), expand **Environment** > **Work Managers**.

The default work managers automatically included with each SOA folder are displayed. The work managers for the group are prefixed with the SOA folder name (for this example, **default**). This enables you to easily identify which work manager is for which SOA folder.

Global Work Managers, Request Classes and Constraints

New Clone Delete Showing 1 to 10 of 84 Previous | Next

| <input type="checkbox"/> | Name | Type | Targets |
|--------------------------|-----------------------------------|----------------------------|-------------|
| <input type="checkbox"/> | analytics_maxEventsToBuffer | Capacity Constraint | soa_server1 |
| <input type="checkbox"/> | default_Adapters | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_Analytics | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_bpmnEngine | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_bpmnEngine_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_bpmnInvoke | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_bpmnInvoke_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_bpmnNonBlock | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_bpmnNonBlock_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_bpmnSystem | Work Manager | soa_server1 |

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3. Click **Next** to display additional work managers automatically included with the SOA folder.

Global Work Managers, Request Classes and Constraints

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| <input type="checkbox"/> | Name | Type | Targets |
|--------------------------|----------------------------------|----------------------------|-------------|
| <input type="checkbox"/> | default_bpmnSystem_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_dspEngine | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_dspEngine_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_dspInvoke | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_dspInvoke_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_dspNonBlock | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_dspNonBlock_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_dspSystem | Work Manager | soa_server1 |
| <input type="checkbox"/> | default_dspSystem_minThreads_1 | Minimum Threads Constraint | soa_server1 |
| <input type="checkbox"/> | default_MediatorErrorHandling | Work Manager | soa_server1 |

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- Click a specific work manager to display details about request classes and constraint settings. You can change settings, as necessary.

Settings for default_dspSystem

Configuration Targets Notes

Save

Use this page to define the request classes and constraints for the selected global Work Manager.

Name: (No value specified) The user-specified name of this MBean instance. [More Info...](#)

Request Class: soa_fairShare_20 (Fair Share Request Class) A request class associated with this Work Manager. This may be a FairShareRequestClass, ResponseTimeRequestClass, or a ContextRequestClass. [More Info...](#)

Minimum Threads Constraint: default_dspSystem_minThreads_1 The minimum number of threads allocated to resolve deadlocks. [More Info...](#)

Maximum Threads Constraint: SOAInternalProcessing_maxThreads The maximum number of concurrent threads that can be allocated to execute requests. [More Info...](#)

Capacity Constraint: (None configured) The total number of requests that can be queued or executing before WebLogic Server begins rejecting requests. [More Info...](#)

Stuck Thread Action: Use server default behavior Specify how stuck threads should be detected, and what action to take should they occur. [More Info...](#)

Max Stuck Thread: 0 Time after which a executing thread is declared as stuck. [More Info...](#)

8.2.2 Viewing Work Manager Pending and Completed Requests

You can view the number of pending and completed requests of each work manager.

- Log in to Oracle WebLogic Server Administration Console.

2. In the Navigator under **soainfra**, click **Deployments**.
3. In the table, browse for and select **soa-infra**.
4. At the top, click **Monitoring**, then **Workload**.

Details about pending and completed requests in the work managers are displayed. The Oracle WebLogic Server **default** thread is used to process all client-initiated work.

Settings for soa-infra

Overview | Deployment Plan | Configuration | Security | Targets | Control | Testing | **Monitoring** | Notes

Health | Query Caching | **Workload** | Coherence

Use this page to view statistics for the Work Managers, constraints, and request classes that are configured for this Enterprise application.

[Customize this table](#)

Work Managers

Showing 1 to 10 of 46 Previous | Next

| Name | Server | Application | Pending Requests | Completed Requests |
|----------------------|-------------|-------------|------------------|--------------------|
| default | soa_server1 | soa-infra | 2 | 119 |
| default_Adapters | soa_server1 | soa-infra | 0 | 0 |
| default_Analytics | soa_server1 | soa-infra | 0 | 0 |
| default_bpmnEngine | soa_server1 | soa-infra | 0 | 0 |
| default_bpmnInvoke | soa_server1 | soa-infra | 0 | 0 |
| default_bpmnNonBlock | soa_server1 | soa-infra | 0 | 0 |
| default_bpmnSystem | soa_server1 | soa-infra | 0 | 0 |
| default_dspEngine | soa_server1 | soa-infra | 0 | 52 |
| default_dspInvoke | soa_server1 | soa-infra | 0 | 10 |
| default_dspNonBlock | soa_server1 | soa-infra | 0 | 0 |

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For information about exception messages caused by the unavailability of work manager threads, see [Unavailability of Work Manager Threads for Incoming Processing](#).

8.2.3 Viewing and Creating Work Manager Groups

You can create work manager groups for each SOA folder. When you create a group, the Oracle SOA Suite work managers shown in [Managing Work Manager Groups](#) are automatically added to the group. A default work manager group named **default** is automatically included with Oracle SOA Suite.

Note:

You *must* ensure that the Session Lock on the Change Center in the Oracle WebLogic Server Administration Console is released before creating or deleting work manager groups.

To create work manager groups:

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

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|--|
| a. Select Work Manager Groups . | a. Right-click soa-infra > server_name . |
| | b. Select Work Manager Groups . |

The Manage Work Groups page is displayed.

2. Expand the work manager groups to display the work managers automatically created with each group, the maximum thread constraint values and classes, the minimum thread constraint values and classes, and the fair share request classes. Constraints define the configuration values for work to be processed by work managers.

A fair share request class expresses a scheduling guideline that Oracle WebLogic Server uses to allocate threads to requests. Request classes ensure that high priority work is scheduled before less important work, even if the high priority work is submitted after the lower priority work. Oracle WebLogic Server takes into account how long it takes for requests to each module to complete.

A fair share request class specifies the average thread-use time required to process requests. The value of a fair share request class is specified as a relative value, not a percentage. Therefore, if two request classes are defined as 400 and 100, they have the same relative values as 80 and 20 or 4 and 1, respectively.

For example, `RequestClass1`, `RequestClass2`, and `RequestClass3` have the fair share values of 10, 20, and 50, respectively. There is a 12.5% (10/80) chance that the next free thread performs work for `RequestClass1`. Similarly, there is a 25% (20/80) chance it next services `RequestClass2` and a 62.5% (50/80) chance it next services `RequestClass3`.

Work Manager Groups

| Work Manager Group | Max Threads Constraint | Min Threads Constraint | Fair Share Request Class | Description |
|---------------------------------|------------------------------|--------------------------------|--------------------------|-------------|
| default | | | | The workman |
| default_Adapters | 0 | 0 | | |
| default_Analytics | 0 | 0 | soa_fairShare_20 | |
| default_MediatorErrorHandler | 32 [SOAInternalProcessing... | 1 [default_MediatorErrorH... | soa_fairShare_80 | |
| default_MediatorParallelRouting | 32 [SOAInternalProcessing... | 1 [default_MediatorParallel... | soa_fairShare_80 | |
| default_ResequencerProcessing | 32 [SOAInternalProcessing... | 1 [default_ResequencerPr... | soa_fairShare_80 | |
| default_bpnnEngine | 32 [SOAInternalProcessing... | 1 [default_bpnnEngine_mi... | soa_fairShare_80 | |
| default_bpnnInvoke | 32 [SOAInternalProcessing... | 1 [default_bpnnInvoke_mi... | soa_fairShare_20 | |
| default_bpnnNonBlock | 32 [SOAInternalProcessing... | 1 [default_bpnnNonBlock_... | soa_fairShare_20 | |
| default_bpnnSystem | 32 [SOAInternalProcessing... | 1 [default_bpnnSystem_mi... | soa_fairShare_20 | |
| default_dspEngine | 32 [SOAInternalProcessing... | 1 [default_dspEngine_minT... | soa_fairShare_80 | |
| default_dspInvoke | 32 [SOAInternalProcessing... | 1 [default_dspInvoke_minT... | soa_fairShare_20 | |
| default_dspNonBlock | 32 [SOAInternalProcessing... | 1 [default_dspNonBlock_mi... | soa_fairShare_20 | |
| default_dspSystem | 32 [SOAInternalProcessing... | 1 [default_dspSystem_min... | soa_fairShare_20 | |
| newWMG | | | | |
| newWMG_Adapters | 0 | 0 | | |
| newWMG_Analytics | 0 | 0 | soa_fairShare_20 | |
| newWMG_MediatorErrorHandler | 32 [SOAInternalProcessing... | 1 [newWMG_MediatorError... | soa_fairShare_80 | |
| newWMG_MediatorParallelRouting | 32 [SOAInternalProcessing... | 1 [newWMG_MediatorParal... | soa_fairShare_80 | |
| newWMG_ResequencerProcessing | 32 [SOAInternalProcessing... | 1 [newWMG_Resequencer... | soa_fairShare_80 | |
| newWMG_bpnnEngine | 32 [SOAInternalProcessing... | 1 [newWMG_bpnnEngine_... | soa_fairShare_80 | |

3. From the **View** list, select **Metrics** to display the number of processes:

- Completed
- Active and pending
- Active and stuck

Work Manager Groups

| View | + Create ... | ✕ Delete ... | Show | Metrics | Server | soa_server1 | Map Partitions: Go To Manage Partitions |
|---------------------------------|-------------------|----------------|--------------|-------------|--------|-------------|---|
| Work Manager Group | Process Completed | Active Pending | Active Stuck | Description | | | |
| default | | | | The workmar | | | |
| default_Adapters | 0 | 0 | 0 | | | | |
| default_Analytics | 0 | 0 | 0 | | | | |
| default_MediatorErrorHandling | 0 | 0 | 0 | | | | |
| default_MediatorParallelRouting | 4 | 0 | 0 | | | | |
| default_ResequencerProcessing | 2 | 0 | 0 | | | | |
| default_bpmnEngine | 0 | 0 | 0 | | | | |
| default_bpmnInvoke | 0 | 0 | 0 | | | | |
| default_bpmnNonBlock | 0 | 0 | 0 | | | | |
| default_bpmnSystem | 0 | 0 | 0 | | | | |
| default_dspEngine | 52 | 0 | 0 | | | | |
| default_dspInvoke | 10 | 0 | 0 | | | | |
| default_dspNonBlock | 0 | 0 | 0 | | | | |
| default_dspSystem | 110 | 0 | 0 | | | | |
| newWMG | | | | | | | |
| newWMG_Adapters | 0 | 0 | 0 | | | | |
| newWMG_Analytics | 0 | 0 | 0 | | | | |
| newWMG_MediatorErrorHandling | 0 | 0 | 0 | | | | |
| newWMG_MediatorParallelRouting | 0 | 0 | 0 | | | | |
| newWMG_ResequencerProcessing | 0 | 0 | 0 | | | | |

4. From the **Server** list, select a managed server in a cluster for which to view statistics.
5. Click **Create**.
The Create Work Manager Group dialog is displayed.
6. Enter a name and an optional description, and click **OK**.

Create Work Manager Group

A Work Group Manager comprises all logical thread pools associated with a given partition. Work Manager Groups are used to isolate partition configuration and request processing.

Work Manager Group Name Enter 1 or more characters.

Description

The work manager group is displayed in the table (for this example, **testgroup**). The Oracle SOA Suite work managers are automatically included in the work manager group, and display beneath the work manager group name.

Work Manager Groups

| Work Manager Group | Max Threads Constraint | Min Threads Constraint | Fair Share Request Class | Description |
|-----------------------------------|------------------------------|------------------------------|--------------------------|----------------|
| ▶ default | | | | The workman... |
| ▶ newWMG | | | | |
| ▲ testgroup | | | | Work manager |
| testgroup_Adapters | 0 | 0 | | |
| testgroup_Analytics | 0 | 0 | soa_fairShare_20 | |
| testgroup_MediatorErrorHandler | 32 [SOAInternalProcessing... | 1 [testgroup_MediatorErro... | soa_fairShare_80 | |
| testgroup_MediatorParallelRouting | 32 [SOAInternalProcessing... | 1 [testgroup_MediatorPara... | soa_fairShare_80 | |
| testgroup_ResequencerProcessing | 32 [SOAInternalProcessing... | 1 [testgroup_Resequencer... | soa_fairShare_80 | |
| testgroup_bpmnEngine | 32 [SOAInternalProcessing... | 1 [testgroup_bpmnEngine_... | soa_fairShare_80 | |
| testgroup_bpmnInvoke | 32 [SOAInternalProcessing... | 1 [testgroup_bpmnInvoke_... | soa_fairShare_80 | |
| testgroup_bpmnNonBlock | 32 [SOAInternalProcessing... | 1 [testgroup_bpmnNonBloc... | soa_fairShare_20 | |
| testgroup_bpmnSystem | 32 [SOAInternalProcessing... | 1 [testgroup_bpmnSystem... | soa_fairShare_20 | |
| testgroup_dspEngine | 32 [SOAInternalProcessing... | 1 [testgroup_dspEngine_mi... | soa_fairShare_80 | |
| testgroup_dspInvoke | 32 [SOAInternalProcessing... | 1 [testgroup_dspInvoke_m... | soa_fairShare_20 | |
| testgroup_dspNonBlock | 32 [SOAInternalProcessing... | 1 [testgroup_dspNonBlock... | soa_fairShare_20 | |
| testgroup_dspSystem | 32 [SOAInternalProcessing... | 1 [testgroup_dspSystem_... | soa_fairShare_20 | |

7. From the **SOA Infrastructure** menu, select **Manage SOA Folders**.
8. Assign the work manager group to a SOA folder in either of the following ways:
 - a. Click **Create** to create a new SOA folder to which you assign the work manager group, as described in [Creating SOA Folders](#).
 - b. Click **Edit** to change the work manager group of the selected SOA folder, as described in [Changing the Work Manager Group of a SOA Folder](#).

This change requires a server restart.

Note:

You cannot delete a work manager group that is currently associated with a SOA folder.

8.3 Securing Access to SOA Folders

All folders are automatically secured with application roles and folder roles. Folder-based security provides the following benefits:

- Administrative access control
 - Access control of information is provided at folder levels. You can only view the folder and composites to which you have access. For example, a user with access to only Folder1 can only see Folder1 and its deployed composites. This user cannot see any other folders.
 - Association of different users to separate roles for each folder.
- Striping of instance data by folders
 - Oracle Enterprise Manager Fusion Middleware Control pages such as Flow Instances and Error Hospital show instance data filtered by folder.

- The audit trail is displayed based on access control.
- Folder level resource management
 - Separate thread pools and work managers are configured per folder. For more information, see [Managing Work Manager Groups](#).

Application roles and folder roles consist of various combinations of Java permission classes and actions.

[Table 8-1](#) shows the Oracle SOA Suite-wide application roles. These applications roles are not limited to a specific folder.

Table 8-1 Application Roles

| Application Role | Description |
|-------------------------|---|
| MiddlewareOperator | <p>This role provides the following capabilities:</p> <ul style="list-style-type: none"> • Ensures the continued operation of Oracle SOA Suite. • Provides the main contact when a deployed SOA composite application does not operate correctly. • Customizes operational settings such as the audit level; configures error notification rules; enables, disables, and monitors composites; and manages composite sensors. |
| MiddlewareAdministrator | <p>This role provides the following capabilities:</p> <ul style="list-style-type: none"> • Ensures the continued operation of Oracle Fusion Middleware servers. • Not always responsible for deployed SOA composite applications. • Provides backup for operational roles and super user access to perform any tasks required for the continued operation of Oracle SOA Suite. |

[Table 8-2](#) describes the roles available with each folder. These folder-specific roles include various combinations of permission classes and actions.

Table 8-2 Folder Roles

| Folder Role | Description |
|-------------|---|
| Composer | For making changes to SOA composite application artifacts, such as business rules, security policies, fault policies, and so on. |
| Deployer | For deploying new SOA composite applications, upgrading existing SOA composite applications, and managing the continuous integration and build process. |
| Tester | For performing testing on preproduction systems typically using a combination of command line tools, Oracle Enterprise Manager Fusion Middleware Control, and custom user interfaces. |
| Monitor | For the successful operation of deployed SOA composite applications in the folder. |

Table 8-2 (Cont.) Folder Roles

| Folder Role | Description |
|---------------------|---|
| ApplicationOperator | For handling user complaints and making decisions on requests that result in faults in the automated process. An administrator receives notifications regarding these transactions and can take steps to recover from the fault or terminate the transaction. Note: This role does not include the <code>Deployer</code> and <code>Tester</code> roles. |

You can perform the following folder access management tasks:

- [Viewing SOA Folder Roles](#)
- [Viewing the Permissions Assigned to Each SOA Folder Role](#)
- [Assigning SOA Folder Roles to a User](#)
- [Understanding Additional Permission and Role Behavior Scenarios](#)

8.3.1 Viewing SOA Folder Roles

You can view the roles associated with each folder on the Application Roles page.

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

| From the SOA Infrastructure Menu... | From the SOA Node in the Navigator... |
|---|--|
| <ol style="list-style-type: none"> a. Select Security > Application Roles. | <ol style="list-style-type: none"> a. Expand SOA. b. Right-click soa-infra (server_name). c. Select Security > Application Roles. |

The Application Roles page is displayed.

2. Click the **Search application roles** icon.

For each folder, the roles described in [Table 8-2](#) are displayed:

- **folder_name_Monitor**
- **folder_name_Composer**
- **folder_name_Tester**
- **folder_name_Deployer**
- **folder_name_ApplicationOperator**

Application Roles

Application roles are the roles used by security aware applications that are specific to the application. These roles are seeded by applications in single global policy store when the applications are registered. 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 Security Provider](#).

Policy Store Provider

Search

Enter search keyword for role name to query roles defined by this application. Use application stripe to search if application uses a stripe that is different from application name.

Role Name Starts With

Create... Create Like... Edit... Delete...

| Role Name | Display Name | Description |
|--|--|---|
| consoleTests_Monitor | Monitor for the consoleTests Partition | A monitor monitors applications, runtime statistic... |
| consoleTests_Composer | Composer for the consoleTests Partition | A composer is responsible for making changes to... |
| consoleTests_Tester | Tester for the consoleTests Partition | A tester performs integrated black box testing o... |
| consoleTests_Deployer | Composite Deployer for the consoleTests Pa... | A deployer is responsible for deploying new appli... |
| consoleTests_ApplicationOperator | Application Operator for the consoleTests P... | An application operator is responsible for handlin... |
| consoleTests_withWMG_Monitor | Monitor for the consoleTests_withWMG Parti... | A monitor monitors applications, runtime statistic... |
| consoleTests_withWMG_Composer | Composer for the consoleTests_withWMG P... | A composer is responsible for making changes to... |
| consoleTests_withWMG_Tester | Tester for the consoleTests_withWMG Partiti... | A tester performs integrated black box testing o... |
| consoleTests_withWMG_Deployer | Composite Deployer for the consoleTests_wi... | A deployer is responsible for deploying new appli... |
| consoleTests_withWMG_ApplicationOperator | Application Operator for the consoleTests_... | An application operator is responsible for handlin... |

8.3.2 Viewing the Permissions Assigned to Each SOA Folder Role

You can view the permissions assigned to each folder role on the Application Policies page.



Note:

Oracle SOA Suite roles grant Oracle Enterprise Scheduler permissions to those roles. These permissions are permission sets. Permission sets are not currently displayed in Oracle Enterprise Manager Fusion Middleware Control.

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

From the SOA Infrastructure Menu...

- a. Select **Security > Application Policies**.

From the SOA Node in the Navigator...

- a. Expand **SOA**.
- b. Right-click **soa-infra (server_name)**.
- c. Select **Security > Application Policies**.

2. Select a folder role in the table.

The bottom of the page is refreshed to display the permission class and actions assigned to the selected folder role.

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

Select an application and enter the search keyword for principals or permissions to query application security grants. Use the application stripe to search if the application uses a stripe that is different from the application name.

Principal Type

Principal Name

| Principal | Display Name | Description |
|--|--|-------------|
| consoleTests_ApplicationOperator | Application Operator for the consoleTes... | |
| consoleTests_Composer | Composer for the consoleTests Partition | |
| consoleTests_Deployer | Composite Deployer for the consoleTest... | |
| consoleTests_Monitor | Monitor for the consoleTests Partition | |
| consoleTests_Tester | Tester for the consoleTests Partition | |
| consoleTests_withWMG_ApplicationOpe... | Application Operator for the consoleTes... | |
| consoleTests_withWMG_Composer | Composer for the consoleTests_withWM... | |
| consoleTests_withWMG_Deployer | Composite Deployer for the consoleTest... | |
| consoleTests_withWMG_Monitor | Monitor for the consoleTests_withWMG ... | |
| consoleTests_withWMG_Tester | Tester for the consoleTests_withWMG P... | |

Policies for consoleTests_Monitor

Permissions

| Resource Name | Permission Actions | Permission Class |
|---------------|--------------------|---|
| consoleTests | read, read-alerts | oracle.fabric.permission.CompositePermission |
| consoleTests | monitor | oracle.fabric.permission.InstancePermission |
| read | | oracle.fabric.permission.SOAPPlatformPermission |

8.3.3 Assigning SOA Folder Roles to a User

You can assign the specific SOA folder roles you want a user to possess on a folder. These roles determine the tasks that a user can perform in Oracle Enterprise Manager Fusion Middleware Control.

Note the following authorization checking changes for 12c:

- Authorization checking occurs against permissions, which allows for finely granular Oracle SOA Suite roles based on these permissions.
- Only the Oracle WebLogic Server monitor role and appropriate Oracle SOA Suite roles are required for Oracle Enterprise Manager Fusion Middleware Control access.
- Avoid granting WLSOperator and WLSAdmin with added privileges for Oracle SOA Suite monitoring.

To assign SOA folder roles to users:

1. Create a user in which to assign folder roles:
 - a. In the Navigator, select **WebLogic Domain** > **soainfra**.
 - b. From the **WebLogic Domain** menu, select **Security** > **Users and Groups**.
 - c. In the **Users** tab, click the **Create** icon to create a user.
 - d. Create the user name and password, and click **OK**.

 **Note:**

When you create users in Oracle WebLogic Server Administration Console, folder-specific users only require the `Monitor` role. This role enables these users to access Oracle Enterprise Manager Fusion Middleware Control. *Only* the system administrator or super user requires the `Administrator` role.

2. [Log in to Oracle Enterprise Manager Fusion Middleware Control](#) with a user account that includes the Oracle WebLogic Server Admin role. Application policies are controlled by Oracle Platform Security Services. You directly access Oracle Platform Security Services to create SOA roles. This role enables you to view and map application roles to the user you created.
3. Access the Application Roles page through one of the following options:

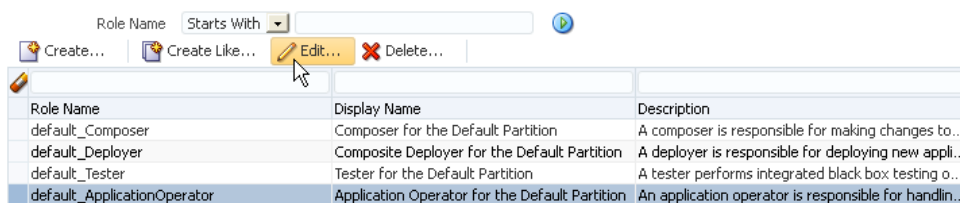
From the SOA Infrastructure Menu...

From the SOA Folder in the Navigator...

- | | |
|---|---|
| <ol style="list-style-type: none"> a. Select Security > Application Roles. | <ol style="list-style-type: none"> a. Expand SOA > soa-infra. b. Right-click soa-infra (server_name). c. Select Security > Application Roles. |
|---|---|

4. Click the **Search application roles** icon.
5. Select the folder role to which to map to the user, and click **Edit**.

For this example, the **ApplicationOperator** role in the folder **consoleTests** is selected. For all folders, the folder roles shown in [Table 8-2](#) are automatically assigned.



| Role Name | Display Name | Description |
|-----------------------------|--|--|
| default_Composer | Composer for the Default Partition | A composer is responsible for making changes to.. |
| default_Deployer | Composite Deployer for the Default Partition | A deployer is responsible for deploying new appli.. |
| default_Tester | Tester for the Default Partition | A tester performs integrated black box testing o.. |
| default_ApplicationOperator | Application Operator for the Default Partition | An application operator is responsible for handlin.. |

The Edit Application Role page is displayed.

soa-infra SOA Infrastructure

Logged in as **weblogic**
Page Refreshed Nov 17, 2013 11:50:03 AM PST

Edit Application Role : default_ApplicationO...

OK Cancel

General

Application soa-infra
Stripe
Role Name default_ApplicationOperator
Display Name Application Operator for the Default Partition
Description An application operator is responsible for handling customer complaints and making decisions on requests that result in Faults in the automated process. An administrator receives notifications

Members

An application role may need to be mapped to users or groups defined in enterprise LDAP server, or the role can be mapped to other application roles.

+ Add X Delete...

| Name | Display Name | Type |
|---------------------------------------|--------------|------|
| No groups or application roles added. | | |

- Click **Add**.
- The Add Principal dialog is displayed.
- From the **Type** list, select **User**. This becomes the user assigned to this role.
- To the right of the **Display Name** field, click the **Search** icon.
- From the list that is displayed, select the user you created and click **OK**.

Add Principal

Specify criteria to search and select the application roles that you want to grant permissions to.

Search

Type User

Principal Name Starts With

Display Name Starts With

Searched Principals

| Principal | Display Name | Description |
|------------------|--------------|-------------|
| dhaval | | |
| kirit | | |
| mark | | |
| OracleSystemUser | | |
| weblogic | | |

This adds the selected user to the folder role **ApplicationOperator** for the folder **consoleTests**.

- Select additional application roles, as necessary, and click **Edit** to add more users.
- Log out of Oracle Enterprise Manager Fusion Middleware Control.
- Log in to Oracle Enterprise Manager Fusion Middleware Control as the user you assigned to the folder role.

Because the user was given permissions on only the **consoleTests** folder, they:

- Cannot expand non-SOA folders in the Application Navigator.
- Can only see the **consoleTests** folder in the Application Navigator of which they are a member. All folders to which they do not belong are hidden from view.
- Cannot create other folders.

- Cannot change properties in the SOA Infrastructure Common Properties page.

 **Note:**

When you create an application role and assign it a user on the Application Roles page, it is not immediately visible during a search on the Application Policies page. For the role to be visible, create a policy on the Application Policies page and assign it the application role and some permissions. These actions make the role visible.

8.3.4 Understanding Additional Permission and Role Behavior Scenarios

This section describes additional permission and role behavior scenarios.

8.3.4.1 Understanding Permissions on Initiating and Participating Composites in Different SOA Folders

The administration operations that you can perform on initiating and participating SOA composite applications in different folders are based on the initiating composite in the business flow instance, and not on the participating composite.

For example, assume you perform the following steps:

1. In the **Security Realms** section of Oracle WebLogic Server Administration Console, create a user (for this example, named **soamonuser**) to which you assign the **Monitor** group.
2. Log in to Oracle Enterprise Manager Fusion Middleware Control (for example, as the **weblogic** user).
3. Create a new folder (for this example, named **test**), assuming that the **default** folder is already present.
4. From the SOA Infrastructure menu, select **Security > Application Roles**.
5. Add the **soamonuser** user to the **test_ApplicationOperator** role.
6. Deploy a SOA composite application (for this example, named **ResponseCreditRating**) to the **default** folder.
7. Deploy a SOA composite application (for this example, named **RequestCreditRating**) to the **test** folder.
8. Create an instance of **RequestCreditRating** and verify the instance details in the **Composites** tab of the Flow Instances page. The roles of the composites in this business flow instance are as follows:
 - Initiating composite: **RequestCreditRating**
 - Participating composite: **ResponseCreditRating**
9. Log in to Oracle Enterprise Manager Fusion Middleware Control with the user **soamonuser**.

The **soamonuser** user has administration permissions on the **test** folder and no permissions on the **default** folder. However, the **soamonuser** user can abort and delete instances of the initiating **RequestCreditRating** composite even though this instance flow also calls the participating **ResponseCreditRating** composite on the **default** folder on which the **soamonuser** user has no permissions.

8.3.4.2 Viewing Oracle SOA Composer Permission Actions in a SOA Folder

Oracle SOA Composer users have the following permission actions by default for any artifact (domain value maps (DVMs), business rules, composite sensors, and so on) in that folder:

- `CompositePermission` with the `read` permission action for inspecting any artifact in that folder.
- `CompositePermission` with the `write` permission action for changing any artifact in that folder.
- `SOAPPlatformPermission` with the `read-shared-data` permission action for inspecting any artifact in the shared folder. The shared folder is the location for all shared artifacts between SOA composite applications that can span multiple folders.
- `SOAPPlatformPermission` with the `write-shared-data` permission action for changing any artifact in the shared data folder.

For more information about shared data, see Chapter "Managing Shared Data with the SOA Design-Time MDS Repository" of *Developing SOA Applications with Oracle SOA Suite*.

To view Oracle SOA Composer permission actions for a folder.

1. From the **SOA Infrastructure** menu, select **Security > Application Policies**.
2. Click the **Search application security grants** icon.
3. Select **folder_name_Composer** in the table.

The permission actions are displayed at the bottom of the page.

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

Select an application and enter the search keyword for principals or permissions to query application security grants. Use the application stripe to search if the application uses a stripe that is different from the application name.

Principal Type

Principal Name

Create... Create Like... Edit... Delete...

| Principal | Display Name | Description |
|----------------------------------|---|-------------|
| default_Composer | Composer for the Default Partition | |
| SOADesigner | SOA Designer | |
| consoleTests_Monitor | Monitor for the consoleTests Partition | |
| BPMWorkflowAdmin | BPM Workflow System Admin Role | |
| test_ApplicationOperator | Application Operator for the test Partition | |
| consoleTests_withWMG_Deployer | Composite Deployer for the consoleTest... | |
| BPMAGAdmin | BPM Activity Guide Admin Role | |
| SOAOperator | SOA operator Role | |
| SOAMonitor | SOA Monitor Role | |
| consoleTests_ApplicationOperator | Application Operator for the consoleTes... | |

Policies for default_Composer

Permissions

| Resource Name | Resource Type | Permission Actions | Permission Class |
|---|---------------|------------------------|--|
| read, read-shared-data, write-shared-data | | | oracle.fabric.permission.SOAPlatformPermission |
| default | | read, write, lifecycle | oracle.fabric.permission.CompositePermission |

8.3.4.3 Understanding the MDS Configuration Page and Oracle SOA Suite Permissions

The MDS Configuration page in Oracle Enterprise Manager Fusion Middleware Control does not understand Oracle SOA Suite permissions. For example, assume you perform the following steps:

1. Create and assign a user to the **Monitor** group in Oracle WebLogic Server Administration Console.
2. Log in to Oracle Enterprise Manager Fusion Middleware Control and assign the **default_Composer** role to that user on the Application Roles page (where **default** represents the folder for this example).
3. Log back in to Oracle Enterprise Manager Fusion Middleware Control as that user, and select **Administration > MDS Configuration** from the **SOA Infrastructure** menu.
4. Note that the **Import** and **Export** options are disabled. This is the expected behavior.

As a workaround, Oracle SOA Suite users can read and write shared data using the **SOA Deployment** and **Export** operations available from the **SOA Composite** menu for a specific SOA composite application in Oracle Enterprise Manager Fusion Middleware Control.

Part IV

Administering SOA Composite Applications and Instances

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

This part includes the following chapters:

- [Securing SOA Composite Applications](#)
- [Monitoring SOA Composite Applications](#)
- [Deploying and Managing SOA Composite Applications](#)
- [Managing SOA Composite Application Business Flow Instances](#)
- [Developing a Database Growth Management Strategy](#)
- [Managing Database Growth](#)
- [Diagnosing Problems with SOA Composite Applications](#)

9

Securing SOA Composite Applications

This chapter describes security configuration procedures unique to SOA composite applications. 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:

- [Introduction to Securing SOA Composite Applications](#)
- [Configuring Oracle HTTP Server with Oracle BPM Worklist](#)
- [Setting up SAML Message-Protected Policy Configuration for the SOA Infrastructure](#)
- [Automatically Authenticating Oracle BPM Worklist and Oracle Business Process Management Users](#)
- [Setting the Authentication Provider](#)
- [Configuring SSL](#)
- [Configuring Security for Human Workflow WSDL Files](#)



Note:

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

- [Managing SOA Composite Application Policies](#)
- [Managing BPEL Process Service Component Policies](#)
- [Managing Oracle Mediator Policies](#)
- [Managing Human Workflow Service Component Policies](#)
- [Managing Binding Component Policies](#)

9.1 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 9-1](#).

Table 9-1 Security Documentation

| For Information On... | See The Following Guide... |
|---|---|
| Securing Oracle Fusion Middleware, including Oracle Single Sign-On (OSSO) configuration | <i>Securing Applications with Oracle Platform Security Services</i> |

Table 9-1 (Cont.) Security Documentation

| For Information On... | See The Following Guide... |
|---|---|
| Securing and administering web services | <i>Administering Web Services</i> |
| Understanding Oracle WebLogic Server security | <i>Understanding Security for Oracle WebLogic Server</i> |
| Securing an Oracle WebLogic Server production environment | <i>Securing a Production Environment for Oracle WebLogic Server</i> |
| Securing Oracle WebLogic Server | <i>Administering Security for Oracle WebLogic Server</i> |
| Developing new security providers for use with Oracle WebLogic Server | <i>Developing Security Providers for Oracle WebLogic Server</i> |
| Securing web services for Oracle WebLogic Server | <i>Securing WebLogic Web Services for Oracle WebLogic Server</i> |
| Programming security for Oracle WebLogic Server | <i>Developing Applications with the WebLogic Security Service</i> |
| Securing Oracle User Messaging Service | <i>Administering Oracle User Messaging Service</i> |

9.2 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>
```

9.3 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','ora
cle/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")
```

Specify the following properties when the SOA Composite is deployed on a different server and you want to use an alias to call the service:

```
oracle.soa.binding.keystore.location
oracle.soa.binding.key.alias
```

These properties in the SOA composite can be used to specify the keystore location and key alias.

8. Restart the servers.

9.4 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.

9.4.1 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 `SAML2IdentityAsserter` configuration as follows.
 - a. In the Oracle WebLogic 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 *Administering Security for 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 `SAML2IdentityAsserter` and configuring SSO with web browsers and HTTP clients, see *Administering Security for Oracle WebLogic Server*.

9.4.2 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 `SAML2IdentityAsserter` configuration as follows.
 - a. In the Oracle WebLogic 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 *Administering Security for 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 *Administering Security for Oracle WebLogic Server*.

9.4.3 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 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 *Administering Security for 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 through 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 `SAML2IdentityAsserter` and configuring SSO with web browsers and HTTP clients, see *Administering Security for Oracle WebLogic Server*.

9.4.4 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 *Administering Security for Oracle WebLogic Server*.

9.4.5 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 *Administering Security for Oracle WebLogic Server*.

9.5 Setting the Authentication Provider

The authentication provider that you want to use should appear first in the list of authentication providers. This section describes how to set the first authentication provider.

9.5.1 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 *Administering Security for Oracle WebLogic Server*.

9.5.2 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

9.5.3 Enabling Multiple Authentication Providers

The Adjudication provider determines what to do if multiple Authorization providers are configured in a security realm.

For information about the Adjudication provider and enabling multiple authentication providers, see "Configuring the WebLogic Adjudication Provider" in *Administering Security for Oracle WebLogic Server*.

9.6 Configuring SSL

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

9.6.1 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.

Not doing so can cause problems when task notifications are sent. For example, you can receive the following task notification error message in the server out log (*soa_server_name.out*).

```
<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
(TaskNotifications.java:1354)
    at
oracle.bpel.services.workflow.task.notification.
TaskNotifications.getEmailNotificationContent
(TaskNotifications.java:987)
    at
weblogic.jms.client.JMSSession$UseForRunnable.run
(JMSSession.java:5170)
    at
weblogic.work.SelfTuningWorkManagerImpl$WorkAdapterImpl.run (SelfTuningWorkManager
I
```



```
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).
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 *Administering Security for Oracle WebLogic Server*.

9.6.2 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. For more information, see *Understanding Common Policy Manager Connection Problems in Securing Web Services and Managing Policies with Oracle Web Services Manager*.

9.6.3 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 the Oracle WebLogic Console. Not doing so will result in errors when attempting to create to-do tasks.

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

1. Log in to Oracle WebLogic 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**.

9.6.4 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 two-way SSL.

9.6.4.1 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. On the client side, provide the keystore location in `DOMAIN_HOME\config\soa-infra\configuration\soa-infra-config.xml`.

```
<keystoreLocation>absolute_path_to_the_keystore_location_and_the_file_name
</keystoreLocation>
```

3. 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>
```

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

| Field | Description |
|-------------------|---|
| Select Map | Select the map created in Step 7 (for this example, SOA). |

| Field | Description |
|------------------|---|
| Key | Enter the key name (<i>KeystorePassword</i> is the default). |
| Type | Select Password . |
| User Name | Enter the keystore user name (<i>KeystorePassword</i> 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.

10. Set the keystore location in Oracle Enterprise Manager Fusion Middleware Control. See Step 1 for instructions.
11. 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""
```

9.6.5 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 `adfbcb` and the certificate has a server name of `myhost05`, the following syntax results in an SSL handshake exception.

```

<import namespace="/adfbcl/common/"

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

```

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

```

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

9.6.6 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.

9.6.6.1 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
    WLSLWallet <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 [Configuring SOA Composite Applications for Two-Way SSL Communication](#).

9.6.6.2 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 wls-certgencab -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 [Configuring SOA Composite Applications for Two-Way SSL Communication](#).

9.6.7 Configuring SSL Between Business Flow 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 business flow 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).

9.6.8 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
```

9.6.9 Configuring 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 references and bindings use plain HTTP

At runtime, the WSDL is found 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. The callback is made over HTTP instead of the default HTTPS. If the client composite is running in an SSL-managed server, then the callback defaults to SSL.

```
<binding.ws port="http://xmlns.oracle.com/Async/AsyncSecondBPELMTOM/
BPELProcess1#wSDL"
endp oint(bpelprocess1_client_ep/BPELProcess1_pt) "
location="http://localhost:8000/soa-infra/services/default/AsyncSecondBPELMTOM/
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>
```

9.7 Configuring Security for Human Workflow WSDL Files

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

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


10

Monitoring SOA Composite Applications

This chapter describes how to monitor the performance summary metrics of a SOA composite application, view a graphical representation of the SOA composite application, and monitor the total messages processed and average processing time of service and reference binding components in a SOA composite application.

This chapter includes the following topics:

- [Monitoring SOA Composite Application Performance Summary Metrics](#)
- [Viewing the SOA Composite Application Diagram](#)
- [Monitoring the Service Components and Binding Components of a SOA Composite Application](#)

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

10.1 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">a. Select Monitoring > Performance Summary. | <ol style="list-style-type: none">a. Under soa-infra, expand the folder.b. Select a specific SOA composite application.c. From the SOA Composite menu, select Monitoring > Performance Summary. |

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




- Total number of business flow 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.


Mediator_File_JavaCallOut [1.0]  Logged in as **weblogic** 

 SOA Composite Page Refreshed **Nov 24, 2013 11:42:38 AM PST** 

Performance Summary


Past 15 minutes 15 minutes ▶ Slider 

Save Charts View ▼ Overlay ▼ Hide Metric Palette



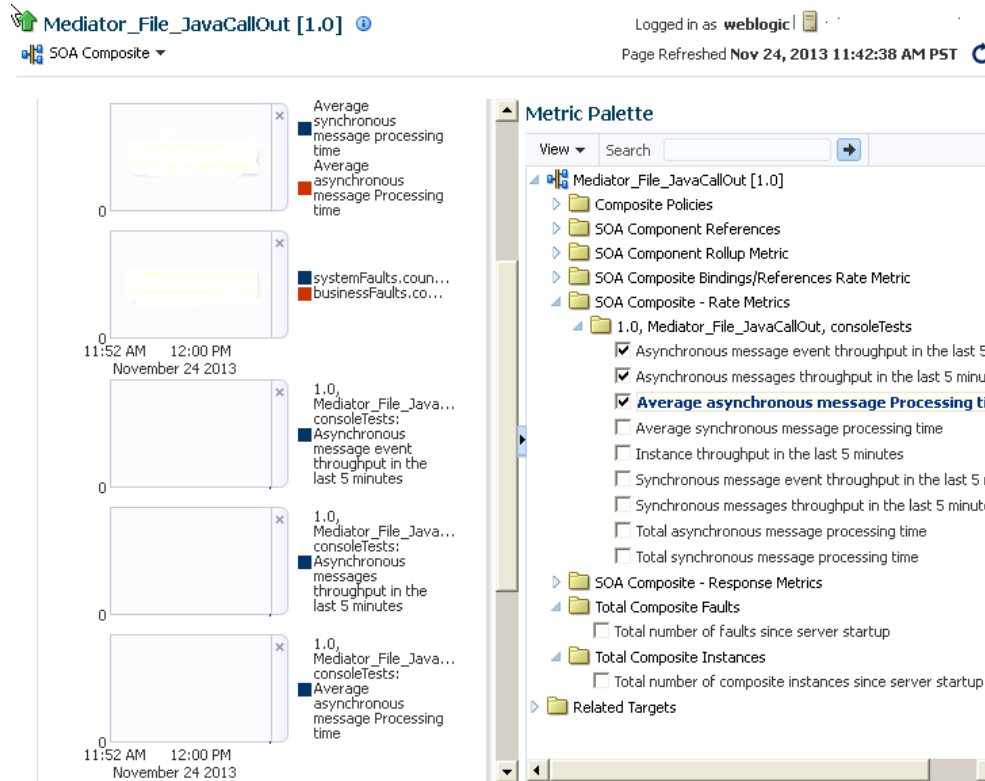
The Performance Summary section contains four line charts. The first chart shows 'Synchronous message event throughput in the last 5 minutes' and 'Asynchronous message event throughput in the last 5 minutes'. The second chart shows 'Average synchronous message processing time' and 'Average asynchronous message processing time'. The third chart shows 'systemFaults.co...' and 'businessFaults.co...'. The fourth chart shows 'Total number of Faults since server startup'. The x-axis for all charts is time, with markers for 11:45 AM and 11:55 on November 24, 2013.

Metric Palette

View ▼ Search 

- ▶ Mediator_File_JavaCallOut [1.0]
 - ▶ Composite Policies
 - ▶ SOA Component References
 - ▶ SOA Component Rollup Metric
 - ▶ SOA Composite Bindings/References Rate Metric
 - ▶ SOA Composite - Rate Metrics
 - ▶ 1.0, Mediator_File_JavaCallOut, consoleTests
 - ▶ SOA Composite - Response Metrics
 - ▶ Total Composite Faults
 - Total number of faults since server startup
 - ▶ Total Composite Instances
 - Total number of composite instances since servi
 - ▶ Related Targets

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.



4. 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 *Administering Oracle Fusion Middleware*.

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

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

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

- [Monitoring BPEL Process Service Engine Request and Thread Performance Statistics](#).
- [Monitoring Request Breakdown Statistics](#)
- [Monitoring Business Rules Service Engine Performance Statistics](#)
- [Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics](#)
- [Monitoring BPMN Process Service Engine Performance Statistics](#)

10.2 Viewing the SOA Composite Application Diagram

You can view a diagram of the SOA composite application you designed in Oracle JDeveloper in Oracle Enterprise Manager Fusion Middleware Control.

 **Note:**

If the SOA composite application was designed using a Release 11g version of Oracle JDeveloper, the diagram cannot be displayed, and you receive an error message. To resolve this issue, reopen the composite in the Release 12c version of Oracle JDeveloper and redeploy it.

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

From the SOA Infrastructure Menu...

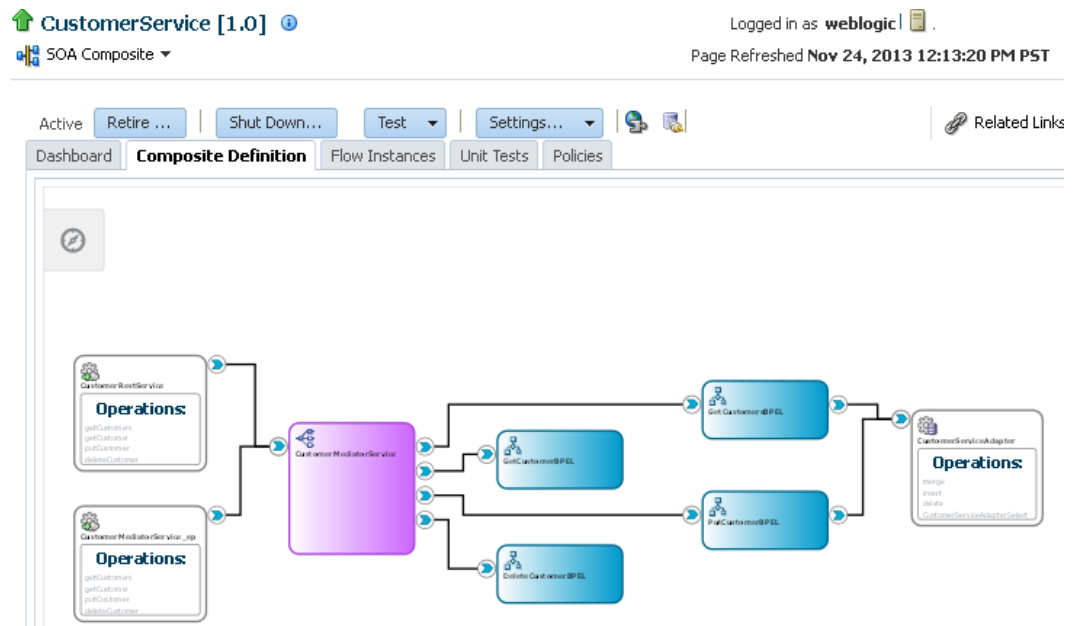
- a. Select **Home**.
- b. Select the **Deployed Composites** tab.
- c. In the **Composite** section, select a specific SOA composite application.

From the SOA Infrastructure Home Page...

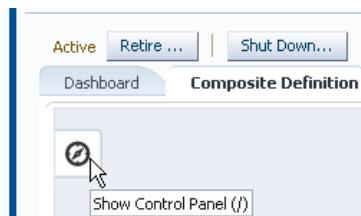
- a. Click the **SOA Folders** tab.
- b. Click **View Composites** for the SOA Folder that contains the composite.
- c. Select a specific SOA composite application.

2. Click **Composite Definition**.

The **Design** view of the SOA composite application is displayed.



3. Above the diagram, click the **Show Control Panel** icon.



4. Select an option to customize the view of the diagram:
 - **zoom to fit**
 - **zoom in**
 - **zoom out**
5. Click the **Source** tab to display the `composite.xml` source file of the SOA composite application.

10.3 Monitoring the Service Components and Binding Components of a SOA Composite Application

You can monitor the service components and binding components of a SOA composite application and the total number of messages processed and average processing time of the service and reference binding components.


To monitor the service components and binding components of a 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... |
|---|--|
| <ol style="list-style-type: none"> a. Select Home. b. Select the Deployed Composites tab. c. In the Composite section, select a specific SOA composite application. | <ol style="list-style-type: none"> a. Under soa-infra, expand the folder. b. Select a specific SOA composite application. |






The Dashboard page displays the following details:

- A summary of composite lifecycle state actions at the top of the Dashboard page (retire, activate, shut down, and start up). For information about these states, see [Managing the State of Deployed SOA Composite Applications](#).
- The name and type of service components used in this SOA composite application.
- The name and type of service (inbound) and reference (outbound) binding components used in this SOA composite application.
- Details about the total number of messages processed and average processing time of the service and reference binding components






CustomerService [1.0] 

SOA Composite  Logged in as **weblogic**  Page Refreshed Nov 24, 2013 2:04:36 PM PST 




Active  Retire ...  Shut Down...  Test  Settings...     Related Links 

Dashboard  Composite Definition  Flow Instances  Unit Tests  Policies 

Components

| Name | Component Type |
|---|----------------|
|  GetCustomersBPEL | BPEL |
|  DeleteCustomerBPEL | BPEL |
|  GetCustomerBPEL | BPEL |
|  PutCustomerBPEL | BPEL |
|  CustomerMediatorService | Mediator |

Services and References

| Name | Type | Usage | Total Messages | Average Processing Time (sec) |
|--|--------------|-----------|----------------|-------------------------------|
|  CustomerMediatorService_ep | Web Service | Service | 0 | 0.000 |
|  CustomerRestService | REST Binding | Service | 0 | 0.000 |
|  CustomerServiceAdapter | JCA Adapter | Reference | 0 | 0.000 |

- In the **Name** column of the **Components** section, click a service component to access its home page.
- In the **Name** column of the **Services and References** section, click a service or reference to access its home page.

For more information, see the following sections:

- [Introduction to Business Flow Instances](#)
- [Introduction to Service Components](#)
- [Introduction to Binding Components](#)
- Administering Oracle Fusion Middleware* for details about viewing and searching log files

Deploying and Managing SOA Composite Applications

This chapter describes how to deploy and manage SOA composite applications, including deploying, redeploying, and undeploying a SOA composite application; managing the state of deployed SOA composite applications; automating the testing of SOA composite applications; managing policies; exporting deployed composites; disabling and enabling the collection of analytic, BPEL sensor, and composite sensor data; and linking to runtime applications.

This chapter includes the following sections:

- [Deploying SOA Composite Applications](#)
- [Updating Instance, Fault, and Rejected Message States to Aborted During Undeployment or Redeployment](#)
- [Redeploying SOA Composite Applications](#)
- [Undeploying SOA Composite Applications](#)
- [Managing the State of Deployed SOA Composite Applications](#)
- [Automating the Testing of SOA Composite Applications](#)
- [Managing SOA Composite Application Policies](#)
- [Exporting a Deployed SOA Composite Application](#)
- [Disabling and Enabling the Collection of Analytic, BPEL Sensor, and Composite Sensor Data](#)
- [Linking to Runtime Applications](#)

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 *Developing SOA Applications with Oracle SOA Suite*.
- Deploying with `ant` scripts, see *Developing SOA Applications with Oracle SOA Suite*.
- Deploying with Oracle WebLogic Scripting Tool (WLST), see *WLST Command Reference for SOA Suite*.

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.

11.1 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 any shared data JAR files and 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 shared metadata JAR files are deployed first, after which the composite SAR files are deployed in random order.

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.

Note:

- 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:

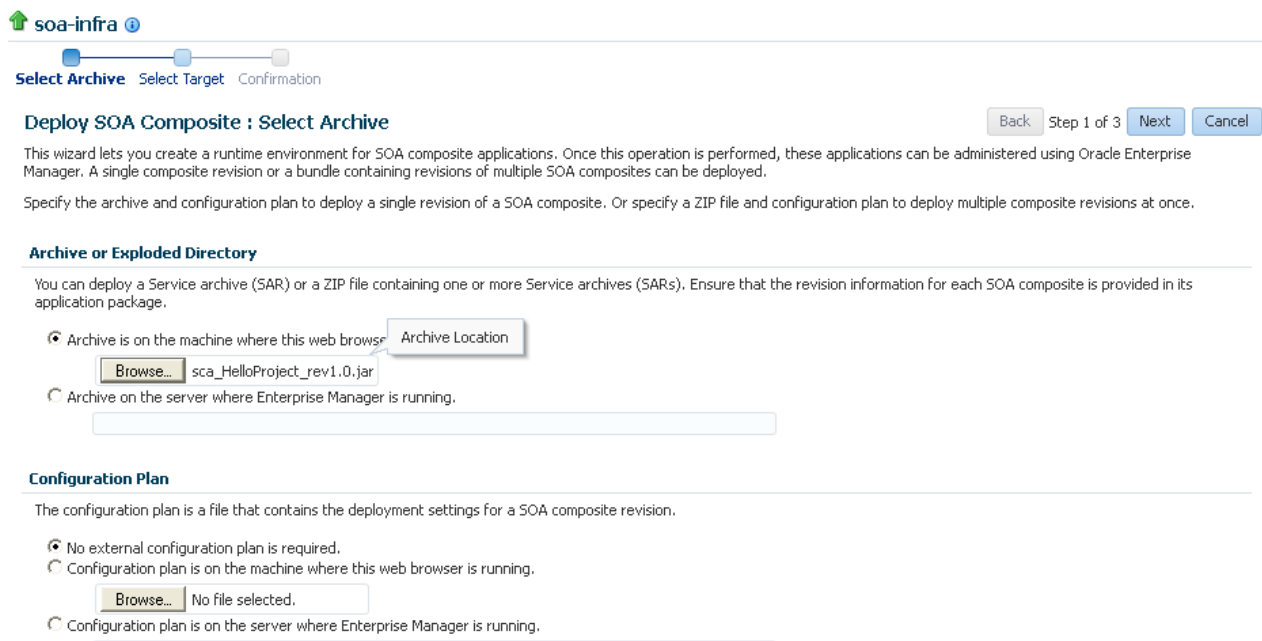
| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... | From the SOA Infrastructure Home Page... | From the SOA Composite Menu... |
|--|--|---|--|
| <ol style="list-style-type: none"> a. Select SOA Deployment > Deploy. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select SOA Deployment > Deploy. | <ol style="list-style-type: none"> a. Click the Deployed Composites tab. b. Above the Composite table, click Deploy. | <ol style="list-style-type: none"> a. Select SOA Deployment > Deploy Another Composite. |

 **Note:**

You can also access the Deploy SOA Composite wizard in the following ways:

- Selecting **Deploy To This Folder** from the **Deployment** dropdown list on the Manage SOA Folders page or home page of a specific SOA folder
- From the **SOA Folder** menu at the top of the home page of a specific SOA folder
- Right-clicking a specific SOA folder in the navigator

The Select Archive page appears.



soa-infra

Select Archive | Select Target | Confirmation

Deploy SOA Composite : Select Archive Back Step 1 of 3 Next Cancel

This wizard lets you create a runtime environment for SOA composite applications. Once this operation is performed, these applications can be administered using Oracle Enterprise Manager. A single composite revision or a bundle containing revisions of multiple SOA composites can be deployed.

Specify the archive and configuration plan to deploy a single revision of a SOA composite. Or specify a ZIP file and configuration plan to deploy multiple composite revisions at once.

Archive or Exploded Directory

You can deploy a Service archive (SAR) or a ZIP file containing one or more Service archives (SARs). Ensure that the revision information for each SOA composite is provided in its application package.

Archive is on the machine where this web browser is running. Archive Location

sca_HelloProject_rev1.0.jar

Archive on the server where Enterprise Manager is running.

Configuration Plan

The configuration plan is a file that contains the deployment settings for a SOA composite revision.

No external configuration plan is required.

Configuration plan is on the machine where this web browser is running.

No file selected.

Configuration plan is on the server where Enterprise Manager is running.

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 SOA folder into which to deploy this SOA composite application.

SOA folders enable you to logically group SOA composite applications into separate sections. Even if there is only one SOA folder available, you must explicitly select it. Once deployed, a composite cannot be transferred to a different SOA folder.

If you want to deploy a SOA composite application to a SOA folder that does not exist, exit the wizard and create the SOA folder *before* deploying the composite. You create SOA folders in the Manage SOA Folders page, accessible from the **SOA Infrastructure** menu.

If the server contains no SOA folders, 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 SOA folder named **default** is automatically included with Oracle SOA Suite. You can delete the default SOA folder.

 **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 SOA folders:

- For the same task definition type, mapped attributes defined in one SOA folder are visible in another SOA folder.
- Rules defined on a task definition in one SOA folder can apply to the same definition in another SOA folder.

If you invoke the Deploy SOA Composite wizard by selecting **Deploy To This SOA Folder** from the **Deployment** dropdown list on the Manage SOA Folders page or home page of a specific SOA folder, the folder 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 [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 *Developing SOA Applications with Oracle SOA Suite*.

11.1.1 Understanding Additional Deployment Behavior Scenarios

This section describes additional deployment behavior scenarios.

11.1.1.1 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.

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.

11.1.1.2 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`). The following example provides the details:

```
<hwTaskFlows
  xmlns="http://xmlns.oracle.com/bpel/workflow/hwTaskFlowProperties">
  <ApplicationName>worklist</ApplicationName>
  <LookupType>LOCAL</LookupType>
  <TaskFlowDeploy>>false</TaskFlowDeploy>
  <PartitionName>partition2</PartitionName>
```

If you want to deploy the task flow for the SOA composite application on all partitions, leave `PartitionName` blank. If you want to use different task flows for the composites on different partitions, then `PartitionName` must be specified.

In addition, if you want to reuse the same task flow project for another partition, you must change the web context-root.

11.1.1.3 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 *Developing SOA Applications with Oracle SOA Suite*.
- For information about deploying with WLST, see *WLST Command Reference for SOA Suite*.

11.2 Updating Instance, Fault, and Rejected Message States to Aborted 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 aborted. This section describes which states are updated to aborted for the following instances, faults, and rejected messages:

- SOA composite business flow 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
- Business flow instance faults



Note:

Note the following details about business flow instances:

- Instances no longer marked as aborted can still be purged.
- Instances that are in the completed or failed state are not changed to aborted after undeployment or redeployment. This is a change from Release 11g (11.1.1.6) and earlier.

[Table 11-1](#) shows the states that are updated to aborted during a SOA composite application redeployment or undeployment.

Table 11-1 Instance, Fault, and Rejected Message States Updated to Aborted During Undeployment or Redeployment

| Element | Instance, Fault, And Rejected Message States Updated to Aborted |
|---------------------------------------|--|
| SOA composite business flow instances | The following flow instance states are updated to aborted: <ul style="list-style-type: none"> • Running • Requires recovery • Suspended |

Table 11-1 (Cont.) Instance, Fault, and Rejected Message States Updated to Aborted During Undeployment or Redeployment

| Element | Instance, Fault, And Rejected Message States Updated to Aborted |
|---------------------------------------|---|
| Oracle Mediator instances | <p>The following instance states are updated to aborted when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> • Running • Requires recovery |
| BPEL process instances | <p>The following instance states are updated to aborted when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> • Running • Requires recovery <p>There are scenarios under which you can redeploy a SOA composite application with the same revision ID and not have the initial instance marked as aborted. For information, see Redeploying SOA Composite Applications with the Same Revision ID Without Changing the Initial Running Instance to Aborted.</p> |
| Oracle BPMN | <p>The following instance states are updated to aborted when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> • Running • Requires recovery |
| Human workflow task instances | <p>The following instance states are updated to aborted when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> • Assigned • Information requested • Outcome updated • Suspended • Alerted |
| Business rule instances | <p>The following instance states are updated to aborted when their associated composite is redeployed and undeployed:</p> <ul style="list-style-type: none"> • Running • Completed successfully • Faulted |
| Reference binding component instances | <p>Reference binding component instances are <i>not</i> updated to aborted. Instead, the original state for the reference binding component is retained:</p> <ul style="list-style-type: none"> • Completed successfully • Policy faulted • Business faulted • Faulted (neither policy or business) |
| Rejected messages | <p>The following error categories associated with the rejected message are updated to aborted:</p> <ul style="list-style-type: none"> • System • Business • Policy • Aborted • Unknown |

Table 11-1 (Cont.) Instance, Fault, and Rejected Message States Updated to Aborted During Undeployment or Redeployment

| Element | Instance, Fault, And Rejected Message States Updated to Aborted |
|-----------------|---|
| Instance faults | <p>The following error categories associated with the business flow instance fault are updated to aborted:</p> <ul style="list-style-type: none"> • System • Business • Policy • Aborted • Unknown |

For information about redeployment and undeployment, see [Redeploying SOA Composite Applications](#) and [Undeploying SOA Composite Applications](#).

11.3 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:

- When you undeploy and redeploy the same SOA composite application, you cannot retrieve the business flow instances created prior to composite undeployment. This is because if a composite is deployed, undeployed, and then deployed again, the two composites are not considered the same. Undeployment means the composite (and all related artifacts) has been removed from the system. The redeployed composite is treated as a completely new composite.
- 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 aborted. 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 aborted during redeployment, see [Updating Instance, Fault, and Rejected Message States to Aborted During Undeployment or Redeployment](#).

 **Note:**

- When you redeploy Oracle JMS Adapter after making changes, the JMS subscribers become inactive. This also results in EIS Connectivity Errors. As the inbound adapter services become inactive, consumer JMS Adapter does not receive messages. To resolve this, shut down and restart the composite. For information on EIS Connectivity Errors see, [Viewing SOA Composite Applications and Adapters Availability](#).
- 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>a. Select SOA Deployment >Redeploy. The Select Composite page appears.</p> <p>b. In the SOA Composite Deployments section, select the SOA composite application revision you want to redeploy, and click Next.</p> | <p>a. Right-click soa-infra.</p> <p>b. Select SOA Deployment > Redeploy. The Select Composite page appears.</p> <p>c. In the SOA Composite Deployments section, select the SOA composite application revision you want to redeploy, and click Next.</p> | <p>a. Click the Deployed Composites tab.</p> <p>b. In the Composite table, select a specific SOA composite application. Only one application can be redeployed at a time.</p> <p>c. Above the Composite table, click Redeploy.</p> | <p>a. Select SOA Deployment > Redeploy.</p> |

 **Note:**

You can also access the Redeploy SOA Composite wizard by right-clicking a SOA folder 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 business flow instance.
 - **Change states of running instances to aborted:**
 - Select to change the states of currently running instances to aborted after redeployment of the SOA composite application.
 - **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, or a BPEL process that includes an embedded Java snippet with a dehydration call. 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 aborted.

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 Business Process Management (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. |

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.

11.3.1 Redeploying SOA Composite Applications with the Same Revision ID Without Changing the Initial Running Instance to Aborted

You can redeploy SOA composite applications with the same revision ID without changing the initial running instance to aborted. Redeployment is permitted in the following situations:

- The composite does not include a durable BPEL process. Durable BPEL processes 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.
- None of the durable BPEL processes have changed since the last deployment.

During redeployment, a check is performed to determine if the BPEL component has changed since the last deployment. If a change is detected, redeployment is rejected.

Note the following guidelines:

- Modifying or deleting partner links is not allowed.
- Dehydration activities must exactly match. For example, if the original BPEL process had three receive activities, the modified process must also have three identical receive activities.

11.3.1.1 Examples of Redeployment Behavior for Synchronous and Asynchronous BPEL Processes

This section provides several examples of redeployment behavior.

Assume you perform the following actions to redeploy a synchronous process:

1. Deploy a SOA composite application that includes synchronous BPEL process A.
2. Initiate several instances of a composite.
3. Modify synchronous BPEL process A by adding and deleting activities.

4. Redeploy the composite in promiscuous mode.

These actions result in the following:

- Older instances of synchronous BPEL process A are not marked as aborted.
- The audit trail of older instances shows the old process execution.
- The audit trail of new instances shows the new process execution.

Assume you perform the following actions to redeploy an asynchronous process waiting on an activity.

1. Deploy a SOA composite application that includes asynchronous BPEL process B. This process is waiting on dehydration activity (wait/receive) act1.
2. Modify asynchronous BPEL process B by adding and deleting activities after act1.
3. Redeploy the composite in promiscuous mode.

These actions result in the following:

- Old instances of asynchronous BPEL process B are not marked as aborted.
- The audit trail of old instances still shows the old process execution.
- The audit trail of new instances shows the new process execution.
- The instances of asynchronous BPEL process B waiting on act1 continue from the activity using the new process definition.



Note:

For asynchronous processes waiting on a human task, the behavior for this scenario is identical to waiting on a receive activity.

Assume you perform the following actions to redeploy an asynchronous process waiting on a deleted activity.

1. Modify asynchronous BPEL process B by adding and deleting activities after act1 and also deleting activity act1.
2. Redeploy the process in promiscuous mode.

These actions result in deployment failing with an error indicating that the new process definition must include the activity act1.

11.4 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 aborted and no new messages sent to this composite are processed.

- The instance state of the undeployed composite application is set to aborted. 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 aborted during undeployment, see [Updating Instance, Fault, and Rejected Message States to Aborted 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 SOA folder. For information, see [Managing SOA Folders and Work Manager Groups](#).

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>a. Select SOA Deployment >Undeploy. The Select Composite page appears.</p> <p>b. In the SOA Composite Deployments section, select a specific SOA composite application to undeploy, and click Next.</p> | <p>a. Right-click soa-infra.</p> <p>b. Select SOA Deployment > Undeploy. The Select Composite page appears.</p> <p>c. In the SOA Composite Deployments section, select a specific SOA composite application to undeploy, and click Next.</p> | <p>a. Click the Deployed Composites tab.</p> <p>b. In the Composite table, select a specific SOA composite application. Only one application can be undeployed at a time.</p> <p>c. Above the Composite table, click Undeploy.</p> | <p>a. Select SOA Deployment > Undeploy.</p> |

 **Note:**

You can also access the Undeploy SOA Composite wizard through these additional SOA folder options:

- Right-clicking a SOA folder and selecting **SOA Deployment > Undeploy All From This Folder**
- Selecting **Deployment > Undeploy All From This Folder** on the SOA folder home page
- Selecting **Deployment > Undeploy All From This Folder** for the selected SOA folder from the Manage SOA Folders 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 SOA folder is deleted, all SOA composite applications in it are automatically undeployed. A message is displayed indicating that all the applications in that SOA folder are to be undeployed.

11.5 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 11-2](#) provides details.

Table 11-2 Application State Actions

| Action | Perform on the Deployed Composites Page of the SOA Infrastructure? | Perform on the Application Home Page (All Tabs)? |
|---|--|---|
| Shut Down and Start Up | Yes | Yes |
| Retire and Activate | Yes | Yes |
| Set as Default | Yes | <ul style="list-style-type: none"> • No: If only one version of the composite application is set as the default. • 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. |
| Deploy | Yes | Yes (through the Composite menu by selecting SOA Deployment > Deploy Another Composite) |
| Undeploy | Yes | Yes (through the Composite menu by selecting SOA Deployment > Undeploy) |
| Redeploy | Yes | Yes (through the Composite menu by selecting SOA Deployment > Redeploy) |
| Test | No | Yes |
| Settings: Composite Audit Level | No | Yes |
| Settings: Payload Validation | No | Yes |
| Settings: Enable/Disable Analytics & Sensors | No | Yes |

Table 11-2 (Cont.) Application State Actions

| Action | Perform on the Deployed Composites Page of the SOA Infrastructure? | Perform on the Application Home Page (All Tabs)? |
|--|--|--|
|  Show WSDL and endpoint URI icon | No | Yes |



Note:

To view the XML definition of the SOA composite application, click the **Source** tab at the bottom of the **Composite Definition** tab.

See the following section based on the action you want to perform:

- [Managing the State of All Applications at the SOA Infrastructure Level](#)
- [Managing the State of an Application from the SOA Composite Application Home Page](#)

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

11.5.1 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:

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... |
|-------------------------------------|---|--|
| a. Select Home . | a. Click soa-infra . | a. Select SOA Infrastructure . |

2. 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 SOA folder.
- A checkbox for searching only for activate SOA composite applications.
- A set of options for managing the lifecycle states of SOA composite applications (start up, shut down, set as default, and so on).
- A list of all SOA composite applications deployed in the SOA Infrastructure, including the SOA folder in which they are deployed, current mode (active or

retired), 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 screenshot shows the SOA Infrastructure web console interface. At the top, it displays 'soa-infra' and 'SOA Infrastructure' with a refresh icon. On the right, it shows 'Logged in as weblogic!' and 'Page Refreshed Feb 22, 2014 10:09:40 AM PST'. The main content area has tabs for 'Dashboard', 'Deployed Composites', 'Flow Instances', and 'Error Hospital'. Below the tabs, there is a message: '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.' There is a search bar with a dropdown menu set to 'Composite'. Below the search bar, there is a checkbox for 'Show only active composites' and a 'View' dropdown menu. A row of buttons includes 'Deploy...', 'Undeploy...', and 'Redeploy...'. The main part of the screenshot is a table with the following columns: 'Composite', 'Partition', 'Status', 'Mode', and 'Deployed'. The table lists several composites, all with a green dot in the 'Composite' column, indicating they are the default revision. The 'Status' column shows a green upward arrow for all entries, and the 'Mode' column shows 'Active' for all. The 'Deployed' column shows the date and time of deployment.

| Composite | Partition | Status | Mode | Deployed |
|--|--------------|--------|--------|--------------------------|
| BpelRecoveryE2ETest [1.0] | default | ↑ | Active | Feb 20, 2014 2:58:45 AM |
| FaultFlow [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:13 PM |
| SimpleFileout [4.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:10 PM |
| fa [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:09 PM |
| AdapterEISConnectivityTest [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:08 PM |
| ExternalComposite [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:08 PM |
| Project1 [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:05 PM |
| MultivalueProj [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:04 PM |
| DocStyleServiceScalarValuesComposite [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:03 PM |
| SecureHelloWorldComposite [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:03 PM |
| HWFPProj [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:01:01 PM |
| MediatorDHQA [1.0] | consoleTests | ↑ | Active | Feb 19, 2014 11:00:59 PM |

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 |
|------------------|---|
| Shut Down | <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>Note: 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> |
| Start Up | <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> |
| Retire | <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 business flow instance is delivered properly.</p> <p>Note: Only callback of HTTP/web service requests will be processed. This won't handle composites using an adapter callback service, such as the AQ Adapter.</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"> • 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 most recently the default revision (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. • 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. |
| Activate | <p>Activates the retired composite application revision. Note the following behavior with this option:</p> <ul style="list-style-type: none"> • All composite applications are automatically active when deployed. • 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. <p>This option is displayed when the application is retired.</p> |

| Action | Description |
|-----------------------|---|
| Set As Default | <p>Sets the selected composite application revision to be the default. Default revisions are indicated by a green dot in the Composite 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 Retire 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 Undeploy action in this table.</p> <p>Inbound adapters are activated only on the default revision.</p> |
| Deploy | <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"> • A new SOA composite application for the first time. • 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. <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 Deploying SOA Composite Applications and Managing SOA Folders and Work Manager Groups.</p> |

| Action | Description |
|-----------------|--|
| Undeploy | <p>Undeploys the selected composite application revision. The consequences of this action are as follows:</p> <ul style="list-style-type: none"> You can no longer configure and monitor this revision of the composite application. You can no longer process instances of this revision of the composite application. You cannot view previously completed processes. The state of currently running instances is changed to aborted and no new messages sent to this composite application are processed. 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). <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>Note: Undeploying multiple SOA composite applications at the same time is supported if they are in the same SOA folder.</p> <p>For more information, see Undeploying SOA Composite Applications and Managing SOA Folders and Work Manager Groups.</p> |
| Redeploy | <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"> 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). The older, currently deployed version of this revision is removed (overwritten). If the older, currently deployed version of this revision has running instances, you can select whether to change the state of those instances to aborted. <p>For more information, see Redeploying SOA Composite Applications.</p> |

For more information, see [Introduction to the Lifecycle State of SOA Composite Applications](#).

11.5.2 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...

- a. Select **Home**.
- b. Select the **Deployed Composites** tab.
- c. Select a specific SOA composite application.

From the SOA Folder in the Navigator...

- a. Under **soa-infra**, expand the SOA folder.
- b. Select a specific SOA composite application.

The Dashboard page of the selected SOA composite application is displayed.

CustomerService [1.0] Logged in as **weblogic** | Page Refreshed Dec 24, 2013 8:37:02 AM PST

SOA Composite ▾

Active | Retire ... | Shut Down... | Test ▾ | Settings... ▾ | Related Links ▾

Dashboard | Composite Definition | Flow Instances | Unit Tests | Policies

Components

| Name | Component Type |
|-------------------------|----------------|
| GetCustomersBPEL | BPEL |
| DeleteCustomerBPEL | BPEL |
| GetCustomerBPEL | BPEL |
| PutCustomerBPEL | BPEL |
| CustomerMediatorService | Mediator |

Services and References

| Name | Type | Usage | Total Messages | Average Processing Time (sec) |
|----------------------------|--------------|-----------|----------------|-------------------------------|
| CustomerMediatorService_ep | Web Service | Service | 0 | 0.000 |
| CustomerRestService | REST Binding | Service | 0 | 0.000 |
| CustomerServiceAdapter | JCA Adapter | Reference | 0 | 0.000 |

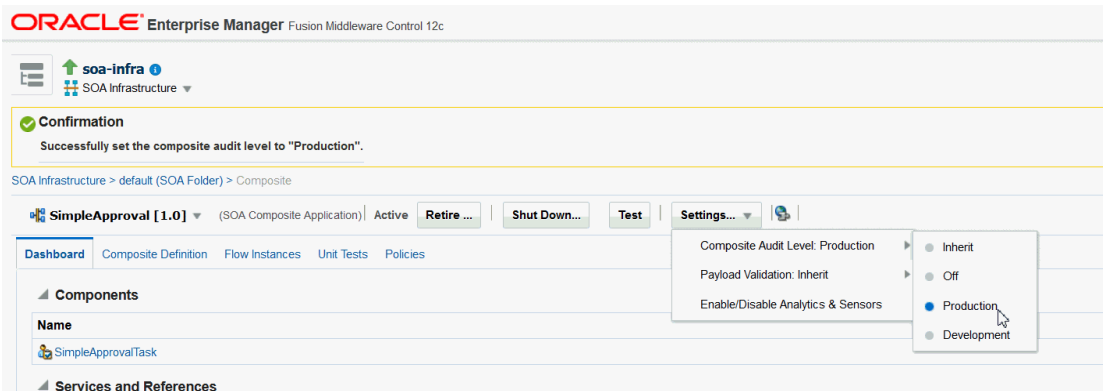
2. From the list of options at the top of the page, select a specific action to perform. These options are also displayed at the top of the Composite Definition, Flow Instances, Unit Tests, and Policies pages of the SOA composite application.

| Action | Description |
|------------------|--|
| Shut Down | See the table under Step 3 of Managing the State of All Applications at the SOA Infrastructure Level for a description of this option. |
| Start Up | See the table under Step 3 of Managing the State of All Applications at the SOA Infrastructure Level for a description of this option. |
| Retire | See the table under Step 3 of Managing the State of All Applications at the SOA Infrastructure Level for a description of this option. |
| Activate | See the table under Step 3 of Managing the State of All Applications at the SOA Infrastructure Level for a description of this option. |
| Test | Enables you to initiate a test instance from the Test Web Service page. Note: This button is disabled when the SOA composite application is stopped or retired. This is because you cannot create an instance of 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 Initiating a Test Instance of a Business Flow |

| Action | Description |
|--|---|
| Settings: Composite Audit Level | <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 Inherit, which does not override the parent level setting. depicts setting the audit level using the Composite home page.</p> <p>If you select to set the audit tracking level, the following options are available:</p> <ul style="list-style-type: none"> • Inherit: Logging level is inherited from the parent (Service Engine/SOA Infrastructure) audit level. This is the default setting. See Introduction to the Order of Precedence for Audit Level Settings for more information. • Production: Minimal information for business flow 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. • Development: Complete information for business flow instances is collected. This option allows both 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. • Off: No logging is performed. Instance tracking information and payload tracking information are not collected. <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 Off. Therefore, all composite applications have their audit tracking set to Off. Then, you explicitly set composite application XYZ to Off. Then, go to the SOA Infrastructure and change the setting to Production. The tracking levels for all composite applications are now Production; except for XYZ, which is still set to Off.</p> |
| Settings: Payload Validation | <p>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.</p> <p>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.</p> |

| Action | Description |
|---|--|
| Settings: Enable/Disable Analytics & Sensors | <p>Select to enable or disable the collection of the following data in the SOA composite application:</p> <ul style="list-style-type: none"> Analytics: Enable you to collect analytic data (BPMN measurement marks and BPEL monitors). BPEL Sensors: Enable you to collect sensor data in BPEL faults, activities, and variables. This option is only displayed if the SOA composite application includes BPEL sensors. Composite Sensors: Enable you to collect composite sensor data. <p>You can perform the following data collection actions:</p> <ul style="list-style-type: none"> Globally enable or disable the collection of analytic and sensor data for all SOA composite applications at the SOA Infrastructure level. Individually disable the collection of analytics and sensor data for a specific SOA composite application. <p>For more information, see Configuring Analytics and Sensors and Disabling and Enabling the Collection of Analytic, BPEL Sensor, and Composite Sensor Data.</p> <p>Note: The options of Enable/Disable Analytics & Sensors are only displayed for composites that include a BPEL process service component.</p> |
| Show WSDL and endpoint URI (icon) | <p>Click to display the endpoint addresses and WSDLs of all external services for this SOA composite application.</p> <p>Note: If you are using the Safari Browser to view this information, see Limitation on Using the Safari Browser to View WSDL File Content.</p> |

The following image depicts an example of setting the audit level from the composite home page:



For more information, see:

- [Introduction to the Lifecycle State of SOA Composite Applications](#)
- [Configuring SOA Infrastructure Properties](#)

11.5.3 Understanding Additional Lifecycle State Behavior Scenarios

This section describes additional lifecycle state behavior issues.

11.5.3.1 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.

11.5.3.2 Setting the Business Flow Instance Name

You can set the business flow instance name during design time for Oracle Mediator and Oracle BPEL Process Manager. For more information, see Section "How to Set the Business Flow Instance Name or Composite Instance Name at Design Time" of *Developing SOA Applications with Oracle SOA Suite*.

11.6 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 either of the following locations:

- From Oracle Enterprise Manager Fusion Middleware Control (as described in this section)
- From Oracle JDeveloper

For more information, see Section "How to Deploy and Run a Test Suite from Oracle JDeveloper" of *Developing SOA Applications with Oracle SOA Suite*.

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:

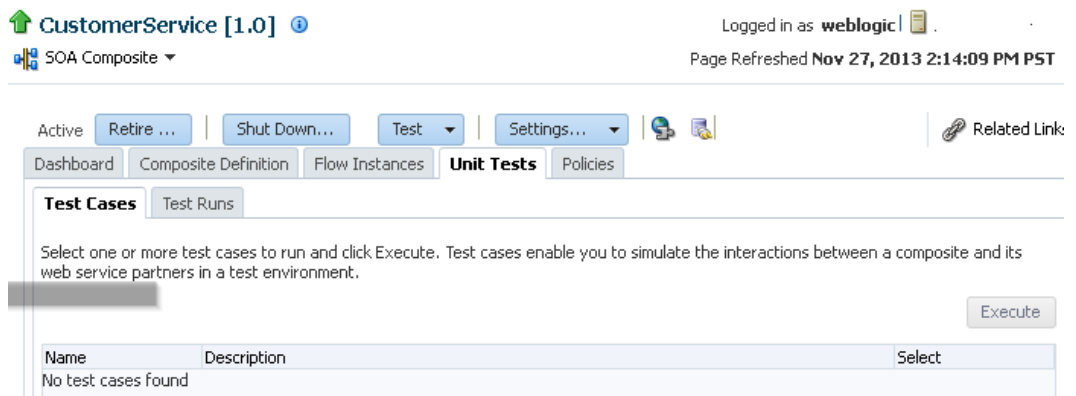
 **Note:**

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 *Developing SOA Applications with Oracle SOA Suite* for instructions on creating test cases.

1. Expand **SOA** and click **soa-infra (server_name)** in the navigator.
2. Click **Deployed Composites** in the SOA Infra page and click the **Composite**.
3. In the **Composite** section, select a specific SOA composite application.
4. Click the **Unit Tests** tab.

The test cases that are displayed were designed in Oracle JDeveloper and included in a deployed SOA composite application.

5. Select the entire test suite or individual tests of a suite to run, and click **Execute**.



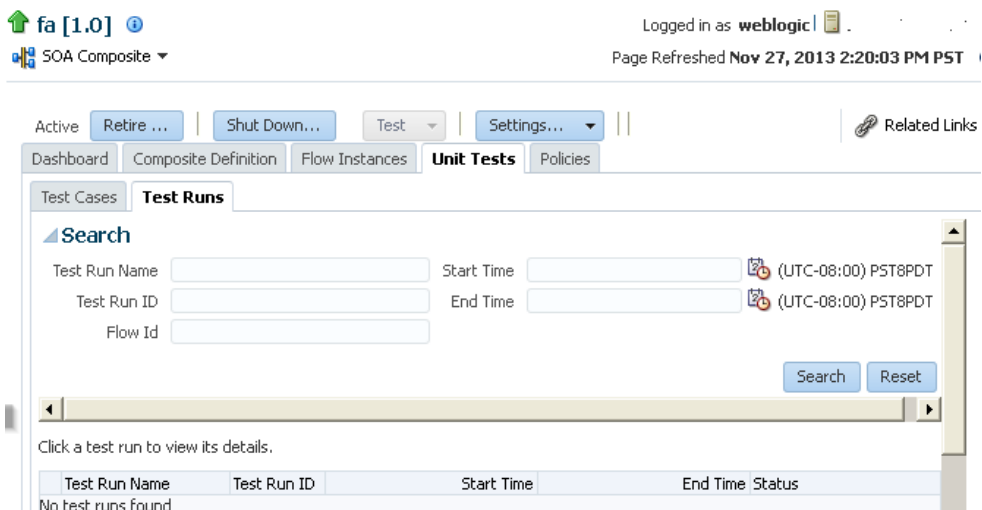
You are prompted to create a test.

6. Enter the following values, and click **OK**.

| Field | Description |
|--|--|
| Test Run Name | Enter a name for the test instance. When testing is complete, report details are captured under this name. |
| Timeout | 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. |
| Number of Concurrent Test Instances | Enter the number of test instances to create. |

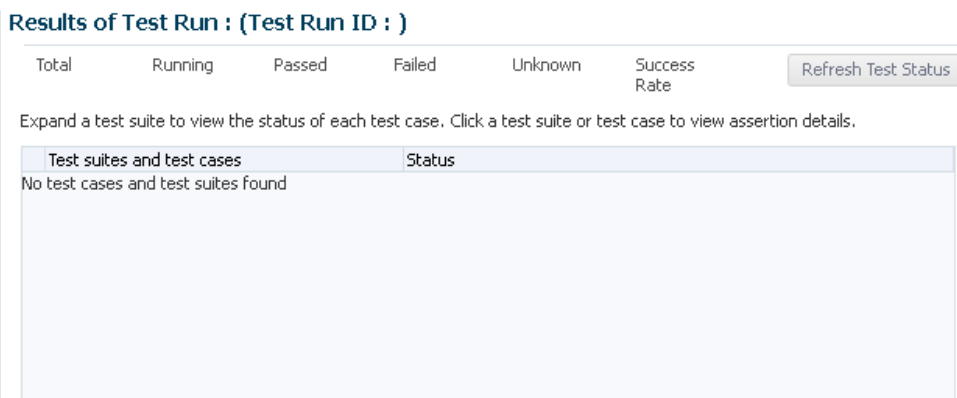
The Test Runs page is automatically displayed for tracking the running tests.

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.

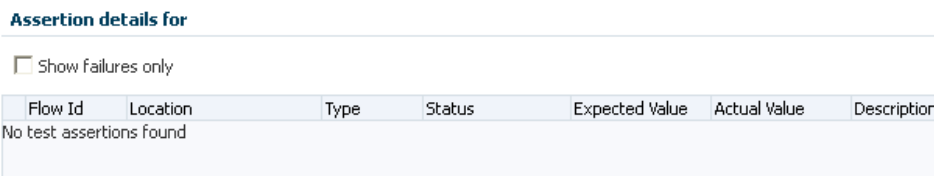


7. In the **Test Run Name** column, click a specific test run to display details in the **Results of Test Run** section. If you want to create more test runs, you can switch back to the Test Cases page at any time.

The **Results of Test Run** section displays details about the executed test run, such as a test summary and the success rate. Under the **weblogic** link, click **Help > Help for This Page** for additional details.



8. View assertion details at the bottom of the page. Assertions enable you to verify variable data or process flow.



9. Click an instance number to view specific test details.

The business flow instances created by executing unit test runs are displayed with a yellow square. 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:

- [Introduction to SOA Composite Application Automated Testing](#)
- Chapter "Automating Testing of SOA Composite Applications" of *Developing SOA Applications with Oracle SOA Suite* for instructions on creating and running test cases for SOA composite applications and BPEL process service components in Oracle JDeveloper

11.6.1 Increasing Response Message Size When Executing Test Suites in Bulk

When executing test suites with large numbers of tests in bulk (for example, with 50 tests) with the `sca-test ant` command, the **Results** tab of the Unit Tests page in Oracle Enterprise Manager Fusion Middleware Control may not display any test results. The following error message appears in the server log files:

```
<Nov 13, 2013 7:31:45 AM PST> <Error> <Socket> <BEA-000403> <IOException
occurred on socket:
Socket[addr=2606:b400:2010:4049:216:3eff:fe52:613d/2606:b400:2010:4049:216:3ef
f:fe52:613d,port=16139,localport=3872]
weblogic.socket.MaxMessageSizeExceededException: Incoming message of size:
'10000080' bytes exceeds the configured maximum of: '10000000' bytes for
protocol: 't3'.
weblogic.socket.MaxMessageSizeExceededException: Incoming message of size:
'10000080' bytes exceeds the configured maximum of: '10000000' bytes for
protocol: 't3'
    at
weblogic.socket.BaseAbstractMuxableSocket.incrementBufferOffset (BaseAbstractMu
xableSocket.java:230)
    at
weblogic.rjvm.t3.MuxableSocketT3.incrementBufferOffset (MuxableSocketT3.java:35
1)
    at weblogic.socket.SocketMuxer.readFromSocket (SocketMuxer.java:991)
    at
. . .
. . .
```

This error can occur when the test response message is too large. To resolve this error, increase the `MaxMessageSize` property.

To increase the response message size:

1. Open the `setDomainEnv.sh` file.
2. Set `MaxMessageSize` to a larger value.

```
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES}
-Dweblogic.MaxMessageSize=30000000" export EXTRA_JAVA_PROPERTIES
How to Manage SOA Composite Applications with ant Scripts
```

For information about the `sca-test ant` script, see the "Deploying and Managing SOA Composite Applications with ant Scripts" section of *Developing SOA Applications with Oracle SOA Suite*.

11.7 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. Policies can require a

credential to be entered in the CSF keystore or a certificate to be entered into the certificate store.

For more information about policies, see [Introduction to Policies](#).

 **Note:**

- Before attaching policies, see *Determining Which Predefined Policies to Use for a Web Service in [Securing Web Services and Managing Policies with Oracle Web Services Manager](#)* for definitions of available policies and details about which ones to use in your environment.
- For information about overriding policy settings, see *About Overriding Policy Configuration Properties Using Fusion Middleware Control in [Securing Web Services and Managing Policies with Oracle Web Services Manager](#)*.

To manage SOA composite application policies:

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"> a. Select Home. b. Select Deployed Composites. c. In the Composite section, select a specific SOA composite application. d. Click the Policies tab. | <ol style="list-style-type: none"> a. Under soa-infra, expand the SOA folder. b. Select a specific SOA composite application. c. Click the Policies tab. | <ol style="list-style-type: none"> a. Select Policies. |

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 (such as 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.

SecureHelloWorldComposite [1.0] Logged in as weblogic | Page Refreshed Nov 27, 2013 2:33:43 PM PST

SOA Composite

Active Retire ... Shut Down... Test Settings... Related Links

Dashboard Composite Definition Flow Instances Unit Tests **Policies**

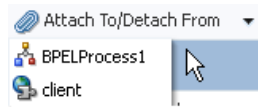
You can view and manage the list of policies attached to the web service bindings and components of this SOA composite application. Click 'Attach To/Detach From' to update the list of attached policies.

| Policy Name | Attached To | Policy Reference Status | Category | Total Violations |
|---|--------------|-------------------------|----------|------------------|
| oracle/component_authorization_denyall_p... | BPELProcess1 | Disable | Security | |
| oracle/wss_username_token_service_policy | client | Disable | Security | |

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.

| 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.

Running 0 Instances | 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 | Au |
|---|--------------|-------------------------|----------|------------------|----|
| oracle/component_permission_authorization_p | ApprovalTask | Disable | Security | 0 | |

11.7.1 Policy Subject of a Local Policy Can Become Invalid After a Server Restart

The policy subject of a local policy attached to a SOA composite application can become invalid after a server restart. You must invoke the WSLT `listWebServicePolicies` command a second time to resolve this issue. For example, perform the following steps:

1. Restart the SOA server.
2. Issue the following WLST command with data appropriate to your environment.

```
wls:/soainfra/serverConfig>
listWebServicePolicies('', 'default/LocalPolicyTest[1.0]', 'soa', '
bpelprocess1_client_ep', 'BPELProcess1_pt')

BPELProcess1_pt :
URI="oracle/wss_username_token_service_policy",
category=security, policy-status=null; source=local policy set;
reference-status=enabled; effective=true
Property name="local.policy.reference.source",
value="LOCAL_ATTACHMENT"
```

The policy subject is invalid in this context:, and the following error is displayed.

```
WSM-02557 : The documents required to configure the Oracle Web Services
Manager runtime have not been retrieved from the Policy Manager
application (wsm-pm), possibly because the application is not running
or has not been deployed in the environment. The query
"/policies/oracle/wss_username_token_service_policy" is queued for later
retrieval.
```

3. Issue the same WLST command a second time.

The command is successful this time, as indicated by the following message.

```
The policy subject is secure in this context.
```

11.7.2 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 *Securing Web Services and Managing Policies with Oracle Web Services Manager*.

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 [Configuring Local Optimization](#).

11.7.3 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.

11.8 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



Note:

- 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.

AdapterEISConnectivityTest [1.0] ⓘ SOA Composite ▾ Logged in as **weblogic1** 📄 Page Refreshed **Nov 30, 2013 2:43:53 PM PST** 🔄

Export Composite Export Cancel

This page provides different options for exporting a snapshot of a running composite. This is useful, for example, when you want to replicate the same deployment on a different deployment target. This operation will have no effect on your currently running composite.

You have chosen to export the following composite revision.

Composite Name: AdapterEISConnectivityTest
 Composite Revision: 1.0
 Current Deployment Target: /Domain_soainfra/soainfra/soa_server1/consoleTests

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_AdapterEISConnectivityTest_rev1.0.jar

Specify Custom Extension Text-EXAMPLE: sca_AdapterEISConnectivityTest_rev1.0-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, and composite properties such as audit level settings and payload validation status.
- **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 dialog is closed and you are returned to the SOA composite application home page.

11.9 Disabling and Enabling the Collection of Analytic, BPEL Sensor, and Composite Sensor Data

You can enable and disable the collection of data for the following analytics and sensors in SOA composite applications:

- Analytics (consist of BPMN measurement marks and BPEL monitors):
Enable you to collect the following types of data:
 - Business indicator measurements at a certain point in the process or in a section of the process.
 - BPEL process metrics that are sent to Oracle BAM Server, and then used for analysis and graphical display.
- BPEL sensors:
Enable you to collect sensor data in BPEL faults, activities, and variables.
- Composite sensors:
Enable you to collect composite sensor data:
 - Monitor incoming and outgoing messages.
 - Specify composite sensor details in the **Flow Instance** filter of the **Search Options** section of the Flow Instances page. This action enables you to locate a particular instance.
 - Publish JMS data computed from incoming and outgoing messages.

You can globally enable and disable the collection of analytic and sensor data at the SOA Infrastructure level or you can individually disable the collection of analytics and sensor data composite level. The following order of precedence occurs when disabling or enabling a selection on the SOA Infrastructure Common Properties page or the individual SOA composite application page:

- Disabling a selection on the Common Properties page disables the collection of data for that selection for all SOA composite applications. For example, if you disable composite sensors on the Common Properties page, composite sensor details are not collected for any flow instances created after this change.
- Enabling a selection on the Common Properties page enables you to disable that setting at the individual SOA composite application level. For example, if you enable composite sensors on the Common Properties page and disable composite sensors for an individual SOA composite application (for example, named LoanFlow) on its home page under **Settings > Enable/Disable Analytics & Sensors**, composite sensor details are not collected for any instance of the LoanFlow SOA composite application after this change. However, all other flow instances continue to collect composite sensor details.

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 on the SOA Infrastructure Common Properties page.



Note:

Disabling BPEL sensors on the BPEL Service Engine Properties page has the same effect as disabling BPEL sensors on the SOA Infrastructure Common Properties page.

For more information about BPEL sensors, see Section "Using Oracle BPEL Process Manager Sensors and Analytics" of *Developing SOA Applications with Oracle SOA Suite*.

For more information about BPMN measurements, see *Developing Business Processes with Oracle Business Process Management Studio*.

11.9.1 Disabling Analytics and Sensors for a Specific SOA Composite Application

To disable analytics and sensors for a specific SOA composite application:

1. Access the SOA Infrastructure Common Properties page by following the steps in [Configuring Analytics and Sensors](#)

All analytics, BPEL sensors, and composite sensors are enabled by default.

Analytics and Sensors Configuration

Analytics and Sensors are enabled as below

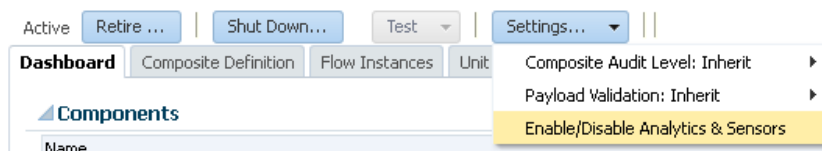
Analytics

BPEL Sensors

Composite Sensors

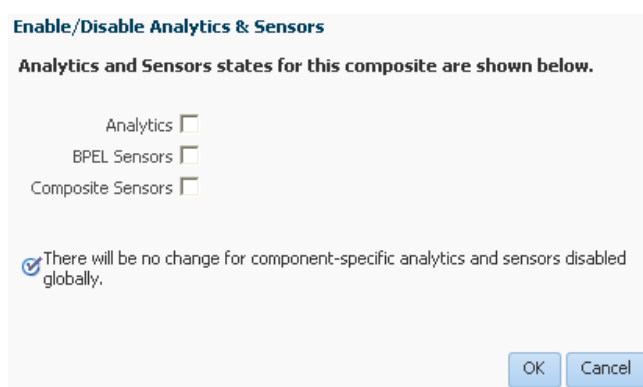
2. Go to the home page of the SOA composite application in which you want to disable analytics and sensors.

- From the **Settings** menu of the composite, select **Enable/Disable Analytics & Sensors**.



All analytics and sensors are enabled by default. Since this composite includes BPEL sensors, they are displayed in this message. If there are no BPEL sensors in a composite, the **BPEL Sensors** checkbox is not displayed.

- Disable all analytics and sensors, and click **OK**.

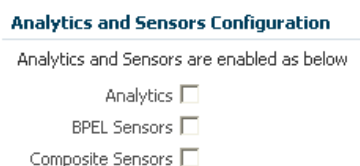


This disables the collection of analytic and sensor data for this specific SOA composite application. Because the collection of all analytic and sensor data is enabled at the SOA Infrastructure level, all other SOA composite applications in the SOA Infrastructure continue to collect data.

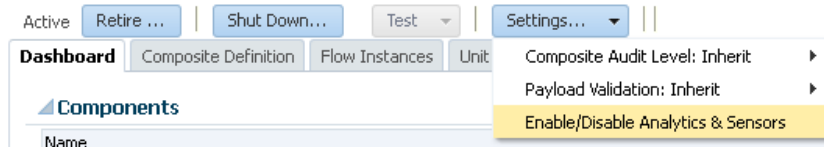
11.9.2 Disabling Analytics and Sensors for All SOA Composite Applications

To disable analytics and sensors for all SOA composite applications:

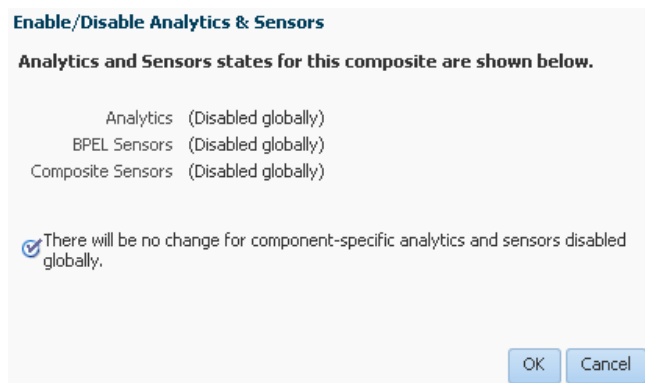
- Access the SOA Infrastructure Common Properties page by following the steps in [Configuring Analytics and Sensors](#)
- In the **Analytics and Sensors Configuration** section, disable all checkboxes.



3. Click **Apply**, then **Yes** when prompted to save your changes.
4. Go to the home page of SOA composite applications.
5. From the **Settings** menu, select **Enable/Disable Analytics & Sensors**.



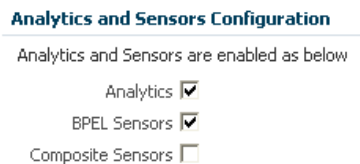
The Enable/Disable Analytics & Sensors dialog shows that all analytics and sensors are globally disabled for this composite and all other composites.



11.9.3 Selectively Disabling Specific Analytic and Sensor Settings for All SOA Composite Applications

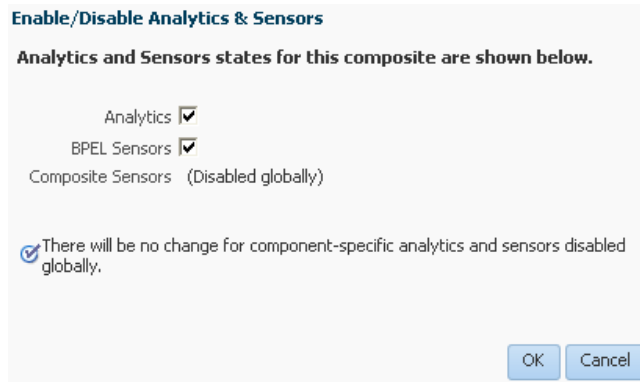
To selectively disable specific analytic and sensor settings for all SOA composite applications:

1. Return to the SOA Infrastructure Common Properties page and select all checkboxes except **Composite Sensors**.



2. Click **Apply**, then **Yes** when prompted to confirm.
3. Go to the home page of SOA composite applications.
4. From the **Settings** menu, select **Enable/Disable Analytics & Sensors**.

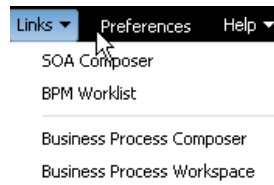
Note that composite sensors are globally disabled.



11.10 Linking to Runtime Applications

Some runtime applications such as Oracle SOA Composer include a **Links** main menu with references to other runtime applications. [Figure 11-1](#) shows the **Links** menu.

Figure 11-1 Links Main Menu in Runtime Application



A link is only shown when the application is running and accessible. The following runtime applications are supported for links:

- Oracle SOA Composer
- Oracle BPM Worklist
- Oracle Business Process Composer
- Oracle Business Process Management Workspace
- Oracle B2B Console
- Oracle SOA Suite for Healthcare
- Oracle MFT Console

You can customize the **Links** main menu to display the URLs of other applications.

To customize the **Links** main menu:

1. Create a file named `ext-app-menu.xml` that lists the runtime application and its URL and port. The content of this file looks as follows:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ns2:appMenu xmlns:ns2="http://xml.oracle.com/soa/appMenu">
  <groups>
    <group>
      <app name="Oracle OTN" url="http://otn.oracle.com"/>
      <app name="Oracle Home Page" url="http://www.oracle.com"/>
    
```

```
        </group>
        <group>
            <app name="MyApplication" url="http://www.myapplication.com"/>
        </group>
    </groups>
</ns2:appMenu>
```

2. Add `ext-app-menu.xml` to the `$ORACLE_HOME/soa/soa/modules/oracle.soa.ext_11.1.1/classes/META-INF` directory.
3. Change your current directory to `$ORACLE_HOME/soa/soa/modules/oracle.soa.ext_11.1.1`.
4. Run `ant`.

```
Buildfile: build.xml
create-manifest-jar:
  [delete] Deleting:
    /scratch/bdhenriq/fmwhome12/soa/soa/modules/oracle.soa.ext_
11.1.1/oracle.soa.ext.jar
  [jar] Building MANIFEST-only jar:
    /scratch/myhome/fmwhome12/soa/soa/modules/oracle.soa.ext_
11.1.1/oracle.soa.ext.jar
BUILD SUCCESSFUL
Total time: 0 seconds
```

5. Restart the server.

12

Managing SOA Composite Application Business Flow Instances

This chapter describes how to manage SOA composite application business flow instances, including initiating a test instance of an application and tracking business flow instances of the SOA composite application.

This chapter includes the following sections:

- [Initiating a Test Instance of a Business Flow](#)
- [Tracking Business Flow Instances at the SOA Composite Application Level](#)

12.1 Initiating a Test Instance of a Business Flow

To initiate a SOA composite application test instance:

1. Expand **SOA** and click **soa-infra (server_name)** in the navigator.
2. Click **Deployed Composites** in the SOA Infra page and click the **Composite**.
3. At the top of the composite home page, click **Test**.

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.

4. 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 at the bottom of the page. For more information about the fields on this page, select **Help > Help for This Page** from the **weblogic** menu in the upper right corner.

For additional details about using the Test Web Service page, see *Administering Web Services*.

Test Web Service

Test Web Service

Use this page to test any WSDL or WADL, including WSDLs or WADLs that are not in the farm. To test a Web service, enter the WSDL or WADL and click Parse WSDL or WADL. When the page refreshes with the WSDL or WADL details, first select the Service/Resource, then select the Port/Method, and then select the Operation/Media type that you want to test. Specify any input parameters, and click Test Web Service.

WSDL or WADL

[HTTP Basic Auth Option for WSDL or WADL Access](#)

Service
 Port
 Operation

Endpoint URL Edit Endpoint URL

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.

| Field | Description |
|---|---|
| Parse WSDL or WADL | <p>If you change the WSDL or Web Application Description Language (WADL) file, click this link to reload the file.</p> <p>WADL files are used with REST operations. For more information, see <i>Integrating REST Operations in SOA Composite Applications in Developing SOA Applications with Oracle SOA Suite</i>.</p> <p>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:</p> <ul style="list-style-type: none"> <code>http://host:port/soa-infra/services/default/HelloWorld!1.0/client</code> <code>http://host:port/soa-infra/services/default/HelloWorld!2.0/client</code> <p>However, if the WSDL specified for web service invocation does not contain the revision details (for example, <code>http://host:port/soa-infra/services/default/HelloWorld/client</code>), it is processed by the composite revision that is set as default.</p> |
| HTTP Basic Auth Option for WSDL or WADL Access | Click to insert the username and password credentials in the HTTP transport header. Both the Username and Password fields are required. |
| Operation | <p>Select the operation that you want to test from the Operation menu. The available operations are determined from the WSDL.</p> <p>To test a REST service, select the GET or POST service port operation.</p> |
| Edit Endpoint URL | Click to edit the endpoint URL. |

- Accept the default values for these fields or provide values appropriate to your test environment.

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 enables you to test web services security. This section includes the following fields for passing security properties with messages:

| Field | Description |
|-------------------------------|---|
| OWSM Security Policies | Inserts a WS-Security SOAP header. The Username field is required, and the Password field is optional. When you select this option, the page is refreshed to display security policies for selection. |
| HTTP Basic Auth | Inserts the username and password credentials in the HTTP transport header. Both the Username and Password fields are required. |
| Advanced | Uses a custom policy to authenticate the user (specifies the URI for the custom policy). The Username and Password fields are optional. |
| None | Select to not specify security credentials. This is the default selection. |

When testing REST services, the SOAP protocol is not used. The only security options are **HTTP Basic Auth** or **None**.

6. Accept the default values for these fields or provide values appropriate to your test environment.

The **Quality of Service** section enables you to test Reliable Messaging (WS-RM), Message Transmission Optimization Mechanism (MTOM), or WS-Addressing. This section is not available when testing REST services. This section includes the following fields:

| Field | Description |
|----------------------|---|
| WS-RM | <p>Select one of the following options for testing WS-Reliable Messaging protocol policies. Reliable messaging policies support this protocol, which guarantees the end-to-end delivery of messages.</p> <ul style="list-style-type: none"> • WSDL Default: 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. • None: No policy for WS-RM is tested even if the WSDL contains a reference to a policy. • Custom: Enforces a custom policy. Specify the URI of the custom policy in the Policy URI field. If a WS-RM policy is referenced in the WSDL, it is ignored, and the policy specified in the Policy URI field is used instead. |
| MTOM | <p>Select one of the following options for testing MTOM policies. MTOM policies ensure that attachments are in MTOM format, a format for efficiently sending binary data to and from web services.</p> <ul style="list-style-type: none"> • WSDL Default: 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. • None: No policy for MTOM is tested, even if the WSDL contains a reference to a policy. • Custom: Enforces a custom policy. Specify the URI of the custom policy in the Policy URI field. If an MTOM policy is referenced in the WSDL, it is ignored, and the policy specified in the Policy URI field is used instead. |
| WS-Addressing | <p>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.</p> <ul style="list-style-type: none"> • WSDL Default: 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. • None: No policy for WS-Addressing is tested even if the WSDL contains a reference to a policy. • Custom: Enforces a custom policy. Specify the URI of the custom policy in the Policy URI field. If a WS-Addressing policy is referenced in the WSDL, it is ignored, and the policy specified in the Policy URI field is used instead. |

- Accept the default values for these fields or provide values appropriate to your test environment.

The **HTTP Header** section enables you to add, modify, or delete HTTP headers to pass request information to a web service. This section is not available when testing REST services. This section includes the following fields:

| Field | Description |
|---------------|---|
| Add | Click to add a new row for an HTTP header, and then enter the appropriate information in the Name and Value fields. |
| Delete | Place this cursor in either the Name or Value field and click to remove the selected HTTP header row. |

- 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 |
|-----------------------------------|---|
| Enable Stress Test | Click Enable to create a simple stress test. With this enabled, no conversation ID is displayed. |
| Concurrent Threads | Enter the number of concurrent threads on which to send the invocations. The default is 5 threads. |
| Loops per Thread | Enter the number of times to invoke the operation. The default is 10 times. |
| Delay in Milliseconds | Specify the delay of milliseconds to wait between operation invocations. The default is 1000 milliseconds (1 second). |
| Asynchronous Test Response | When testing an asynchronous web service, this specifies whether to request an asynchronous response upon running the test. <ul style="list-style-type: none"> Resource Key: When testing an asynchronous web service, enter a value (for example, <code>testkey</code>) that correlates with the asynchronous response. Each response key must be unique. The asynchronous response can also be tracked later on the Asynchronous Test Response page by specifying the associated response key. None: Select if you do not want to specify a resource key. |

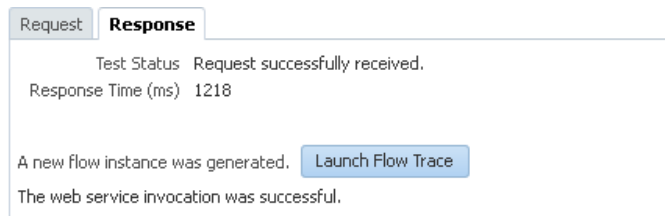
- Accept the default values for these fields or provide values appropriate to your test environment.

The **Input Arguments** section includes the following fields for entering XML payload data.

| Field | Description |
|--------------------------|---|
| Tree View | Displays a graphical interface of text fields in which to enter information. This field automatically generates the required headers and XML structure. |
| XML View | Displays the XML file format for inserting values. You can paste the raw XML payload of your message into this field. |
| Enable Validation | Select to enable validation of the input arguments. |

10. Click Test Web Service.

The test results appear in the **Response** tab upon completion.



 **Note:**

The **Response** tab does not display payload data if you are performing a stress test or are testing an asynchronous service.

- 11.** Click **Launch Flow Trace** to access the flow trace of the instance. The ID of the new flow instance is displayed in the top right corner of the Flow Trace page.
- 12.** 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. On the composite home page, click **Flow Instances** and then click **Recent Instances**. The new test instance is displayed at the top of the instances table.

For more information, see the following sections:

- [Introduction to Business Flow Instances](#) for conceptual details about instances
- [Introduction to Policies](#) for an overview of policies
- *Administering Web Services* for specific details about policies and testing web services from the Test Web Service page

12.1.1 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 like the following:

```
<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.

12.2 Tracking Business Flow Instances at the SOA Composite Application Level

In addition to tracking business flow instances in the SOA Infrastructure and in an individual SOA folder, you also can track instances on the Flow Instances page of a specific SOA composite application. A business flow instance corresponds to an end-to-end business transaction. Business flows consist of a single SOA composite application or multiple SOA composite applications connected together to fulfill a specific business process.

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"> a. Select Home. b. Select the Deployed Composites tab. c. In the Composite section, select a specific SOA composite application. | <ol style="list-style-type: none"> a. Under soa-infra, expand the SOA folder. b. Select a specific SOA composite application. |

2. Click **Flow Instances**.




The Flow Instances page displays the following details:

- A utility for specifying and saving comprehensive instance and fault search criteria and executing **Search**.


Note:

When you initially access the Flow Instances page, the **Search Results** table is empty. You must click **Search** to populate this table with business flow instance details.

- A **Search Results** table that displays the flow trace ID that uniquely identifies a business flow, the composite initiating the business flow (business flows can span multiple composites), the state of the flow instance (for example, completed successfully, running, failed, recovery required, and so on), the instance start time, the last update to the instance, the SOA folder in which this flow was initiated, the flow instance name (if set during design time in a BPEL process or Oracle Mediator service component), and a link to the log files. To display additional columns in the table, select **View > Columns**.


Logged in as **weblogic** | 
Page Refreshed Dec 1, 2013 3:56:21 PM PST 


SOA Composite ▾

Active Retire ... Shut Down... Test Settings...  Related Links ▾

Dashboard | Composite Definition | **Flow Instances** | Unit Tests | Policies

Search Results - Instances Created (624 Hours) Recent Instances | Instances With Faults | Recoverable Instances

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|---------------------------|-------------|--------------------------|-----------------|
| 18 | BpelRecoveryE2ETest [1.0] | ✔ Completed | Nov 29, 2013 12:14:18 PM | Nov 29, 2013 1: |
| 8 | BpelRecoveryE2ETest [1.0] | ✔ Completed | Nov 24, 2013 7:45:04 PM | Nov 24, 2013 7: |
| 6 | BpelRecoveryE2ETest [1.0] | ✔ Completed | Nov 24, 2013 7:42:27 PM | Nov 25, 2013 1: |

Columns Hidden 2 

Select a specific instance to see its details here.

 **Note:**

The Flow Instances page of the individual SOA composite application does not include a link to the Error Hospital page. To access that functionality, go to the Flow Instances page of the SOA Infrastructure or individual SOA folder and search with similar criteria, restricting your search to the appropriate SOA composite application.

You can perform the following business flow instance tasks:

- [Specifying and Saving Business Flow Search Criteria](#)
- [Deleting or Terminating Business Flow Instances](#)
- [Viewing the Current State of the Business Flow Instance](#)
- [Recovering from Faults in a Business Flow Instance](#)
- [Viewing Composite Sensor Values in a Business Flow Instance](#)
- [Viewing the Initiating and Participating SOA Composite Applications in a Business Flow Instance](#)
- [Viewing Resequencing Groups in a Business Flow Instance](#)

13

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:

- [Introduction to Planning for Database Growth](#)
- [Identifying the Profile or Size of the Database](#)
- [Monitoring Space Usage, Hardware Resources, and Database Performance](#)
- [Understanding Growth Management Challenges and Testing Strategies](#)
- [Understanding Space Management](#)

For information about managing database growth with the purge scripts and component table partitioning, see [Managing Database Growth](#) .

For information about troubleshooting, see [Parallel Purging and Table Partitioning Issues](#).



Note:

This chapter is intended for database administrators.

13.1 Introduction to Planning for Database Growth

An Oracle SOA Suite 12c 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.

13.2 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 [Understanding Growth Management Challenges and Testing Strategies](#).

The calculations detailed in this section approximate disk space usage and 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 [Monitoring Space Usage_Hardware Resources_ and Database Performance](#) for details about space calculation instructions.

[Table 13-1](#) 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 instance inflow may be high.

Table 13-1 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 |

13.2.1 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:

- [Identifying the Number of Instances Produced Daily](#).
- [Identifying the Disk Space Used by Each Instance](#).
- [Identifying the Composite Space Persisted Daily](#).
- [Analyzing Space Distribution of Segments](#).

13.2.1.1 Identifying the Number of Instances Produced Daily

Use the following formula to identify the number of instances produced daily:

$$\text{Daily-inflow-composite} = (\text{Instance Total} / \text{Period})$$

For example, calculate the average number of instances 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 [Determining the Growth Trend of Components](#).

13.2.1.2 Identifying the Disk Space Used by Each Instance

Use the following formula to identify the disk space used by each instance:

$$\text{Inflow-space-per-instance} = (\text{SOA Schema Size} / \text{Instance Total})$$

For example, calculate the average disk space used by each instance 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 [Determining the Growth Trend of the Schema](#).

13.2.1.3 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:

$$\text{Daily-inflow-composite-space} = (\text{SOA Schema Size} / \text{Period})$$

13.2.1.4 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 [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 [Determining the Growth Trend of the 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 [Determining the Largest Segments](#).
- Determine the growth trend of tables and indexes. For more information, see [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 [Determining the Growth Trend of Components](#).

13.2.2 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.

13.2.2.1 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 [Identifying the Composite Space Persisted Daily](#).

`Min-space-retain = Daily-inflow-composite-space * 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 GB = (40 GB * 10))`

13.2.2.2 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 [Identifying the Number of Instances Produced Daily](#).

`Min-composites-retain = Daily-inflow-composite * 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 [Quality Assurance Testing](#).

13.2.3 Identifying the Outflow of Data

The outflow of composites is a measurement of the number of instances 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 [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 [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 [Determining the Growth Trend of Components](#).
- Determine the growth trend of the Oracle SOA Suite schema. For more information, see [Determining the Growth Trend of the Schema](#).
- Determine the largest segments. For more information, see [Determining the Largest Segments](#).
- Determine the growth trend of tables and indexes. For more information, see [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.

13.2.4 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. ([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`

The space implications of long running transactions and the size of the partitioned tables are best understood through quality assurance testing, as described in [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.

13.2.4.1 Recommendations for Each Table to Partition

It is best to load the tables over a period of several days to produce reasonable averages. [Table 13-2](#) provides details.

Table 13-2 Table Partitioning Recommendations

| Action | Command |
|---|---|
| Determine the average number of rows generated daily for each table. | <code>(Total rows / period)</code> |
| Estimate the number of rows based on the longest running composite. | <code>((Total rows / period) * Longest running composite in days)</code> |
| Estimate space usage for the table and index based on row calculations. | See Estimating Table Size and Estimating Index Size . |



Note:

In Oracle SOA Suite Release 11g R1 (11.1.1.6), a set of scripts called row migration were provided. These scripts 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.

13.3 Monitoring Space Usage, Hardware Resources, and Database Performance

The following sections describe how to monitor space usage:

- [Determining the Growth Trend of Components](#)
- [Determining the Growth Trend of the Schema](#)
- [Determining the Largest Segments](#)
- [Determining the Growth Trend of Tables and Indexes](#)
- [Estimating Table Size](#)
- [Estimating Index Size](#)
- [Monitoring Unused Indexes](#)

The following sections describe how to monitor hardware resources and database performance:

- [Hardware - OSWatcher Black Box](#)
- [Database – AWR / ADDM](#)
- [Disk I/O - Oracle Orion](#)

13.3.1 Monitoring Space Usage

Monitoring space is an essential task of database and system administration 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.

13.3.1.1 Determining the Growth Trend of Components

The component master tables record the creation date of each row used to determine growth trends over a given period:

- SCA_FLOW_INSTANCE: CREATED_TIME
- CUBE_INSTANCE: CREATION_DATE

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 the following example:

```
SQL> CREATE TABLE SOA_FABRIC_HIST (SFH_DATE TIMESTAMP, SFH_COUNT NUMBER);
```

```
SQL> INSERT INTO SOA_FABRIC_HIST SELECT SYSTIMESTAMP, COUNT(*) FROM
SCA_FLOW_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.

13.3.1.2 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 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 [Understanding Space Management](#).

- Create a schema growth table based on object type, as shown in the following example:

```
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. The following example creates a history table:

```
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;
```

13.3.1.3 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 the following example:

```
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 the following example:

```
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;
```

13.3.1.4 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 `SCA_FLOW_INSTANCE` table.

```
SQL> SELECT TIMEPOINT, SPACE_USAGE, SPACE_ALLOC, QUALITY FROM TABLE (DBMS_
SPACE.OBJECT_GROWTH_TREND ('DEV_SOAINFRA','SCA_FLOW_INSTANCE','TABLE'));
```

The following example shows the complete syntax for the `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 13-3](#) describes the `object_growth_trend` function parameters.

Table 13-3 OBJECT_GROWTH_TREND Function Parameters

| Parameter | Description |
|-----------------------------|---|
| <code>object_owner</code> | The schema containing the object. |
| <code>object_name</code> | The name of the object. |
| <code>OBJECT_TYPE</code> | The type of the object. |
| <code>partition_name</code> | The name of the table or index partition, if relevant. Otherwise, specify NULL. |
| <code>start_time</code> | A time stamp value indicating the beginning of the growth trend analysis. |
| <code>end_time</code> | A time stamp value indicating the end of the growth trend analysis. The default is NOW. |

Table 13-3 (Cont.) OBJECT_GROWTH_TREND Function Parameters

| Parameter | Description |
|------------------------|--|
| 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 (<code>true</code> or <code>false</code>). |
| 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 the following example:

```
TYPE object_growth_trend_row IS RECORD(
  timepoint timestamp,
  space_usage number,
  space_alloc number,
  quality varchar(20));
```

[Table 13-4](#) describes the `object_growth_trend_row` return values.

Table 13-4 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 <code>time</code> 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. |

Table 13-4 (Cont.) OBJECT_GROWTH_TREND_ROW Return Values

| Parameter | Description |
|-----------|---|
| 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"> • good: The value whenever the value of <code>time</code> is based on recorded statistics with a recorded timestamp within 10% of the <code>interval</code> 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 <code>good</code> and <code>interpolated</code> values. The aggregate value returned is marked <code>good</code> if at least 80% of that value was derived from <code>good</code> instance values. • interpolated: The value did not meet the criteria for <code>good</code>, but was based on recorded statistics before and after the value of <code>time</code>. Current in-memory statistics can be collected across all instances in a cluster and treated as the recorded value for the present time. • projection: The value of <code>time</code> 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. |

13.3.1.5 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;
/

```

The following example estimates the space usage of a table based on its column definition:

```

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 the following examples:

- **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:**

```

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 13-5](#) and [Table 13-6](#).

Table 13-5 CREATE_TABLE_COST Procedure Parameters

| Parameter | Description |
|------------------------------|---|
| <code>tablespace_name</code> | The tablespace in which the object is created. The default is the <code>SYSTEM</code> tablespace. |
| <code>row_count</code> | The anticipated number of rows in the table. |

Table 13-5 (Cont.) CREATE_TABLE_COST Procedure Parameters

| Parameter | Description |
|-----------|---|
| 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 13-6 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. |

13.3.1.6 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.

The following example estimates the size of a new index based on the data definition language (DDL):

```
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 13-7](#).

Table 13-7 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"> • used_bytes The number of bytes representing the actual index data. • alloc_bytes The amount of space allocated for the index in the tablespace. |

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.

13.3.1.7 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.

13.3.2 Monitoring the Hardware Resources and Database

The hardware resource must support the tools selected to implement the growth strategy. It is important to monitor hardware resources during online transaction processing (OLTP) and maintenance periods and especially when these periods overlap.

13.3.2.1 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>

13.3.2.2 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*.

13.3.2.3 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 identifies 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 independent 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.

13.4 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 [Parallel Purging and Table Partitioning Issues](#).

It is advisable to read [Monitoring Space Usage, Hardware Resources, and Database Performance](#) to become familiar with the Oracle SOA Suite purging and partitioning tools described in [Managing Database Growth](#).

13.4.1 Database Growth Management Challenges

The challenges described in this section provide background by describing situations that have contributed to the recommended strategies.

13.4.1.1 Excessive Growth of Oracle SOA Suite Tables Due to an Ineffective Growth 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 [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.

13.4.1.2 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. Starting in Oracle SOA Suite Release 11g R1 (11.1.1.6), the granularity of tables that can be partitioned improved. It is possible to partition high volume tables with only their master table. This should make partitioning more attractive and feasible.

13.4.1.3 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 completed. A single flow instance can prevent a partition from being dropped and space reclaimed. This situation gave rise to the row migration scripts that were introduced with Oracle SOA Suite Release 11g R1 (11.1.1.6).

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 [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 [Partition Pruning](#).

13.4.2 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:

- [Reviewing Metalink Support Note 1384379.1](#)
- [Configuring the Production Audit Level Setting](#)
- [Creating an Schema - Test Environment](#)

- [Executing the Parallel or Single Threaded Script and Reclaiming Space](#)
- [Reviewing the Testing Results](#)
- [Partitioning the Tables Causing a Bottleneck](#)
- [Repeating Purge Testing and Review and Excluding the Partitioned Table](#)

13.4.2.1 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>

13.4.2.2 Configuring the Production Audit Level Setting

Ensure that audit settings are appropriate for a production environment. For more information, see [Reducing Audit Levels](#).

13.4.2.3 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 [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.

13.4.2.3.1 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 [Identifying the Inflow of Data](#) for calculations on inflow.

- Determine the growth trend of the components. For more information, see [Determining the Growth Trend of Components](#).
- Determine the growth trend of the Oracle SOA Suite schema. For more information, see [Determining the Growth Trend of the Schema](#).

Collect metrics with partitioning in mind:

- Determine the largest segments. For more information, see [Determining the Largest Segments](#).
- Determine the growth trend of tables and indexes. For more information, see [Determining the Growth Trend of Tables and Indexes](#).
- Estimate the table size. For more information, see [Estimating Table Size](#).
- Estimate the index size. For more information, see [Estimating Index Size](#).

13.4.2.3.2 Base Point Backup of Test Environment

Perform a backup of the test environment.

13.4.2.4 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 [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 [Executing the Parallel Purge Script](#).
- Hardware and database monitoring. For more information, see [Monitoring the Hardware Resources and Database](#).
- Space management operations. For more information, see [Introduction to the Components of a Data File](#).

13.4.2.5 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 [Developing a Retention Policy](#) and [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 [Debugging and Tracing Purging Operations](#).
- Review database and O/S reports for resource contention and waits. For more information, see [Monitoring the Hardware Resources and Database](#).

13.4.2.6 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.

Starting in Oracle SOA Suite Release 11g R1 (11.1.1.6), the granularity of tables that can be partitioned improved. You can partition high volume tables with only their master table. This should make partitioning more attractive and feasible:

- Partial partitioning.
- Long running composites. For more information, see [Identifying Long Running Composites and Table Partitioning](#).

13.4.2.6.1 Base Point Backup with Partitioned Table

Perform a backup that includes the partitioned table.

13.4.2.7 Repeating Purge Testing and Review and Excluding the Partitioned Table

Repeat the purge testing and test results review described in [Executing the Parallel or Single Threaded Script and Reclaiming Space](#) and [Reviewing the Testing Results](#). Exclude the partitioned table.

13.4.3 Recommended Growth Management Strategies

The following recommended growth management strategies are based on the Oracle SOA Suite database profile:

- [Recommendations for Large Database Profiles](#).
- [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.

13.4.3.1 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. Range interval partitioning is an extension of range partitioning in which the database automatically allocates partitions. For more information, see [Range Interval Partitioning](#).
2. Execute the parallel purge excluding the tables that are partitioned. For more information, see [Looped Purge in Parallel Script with dbms_scheduler](#).
3. Partition the tables that result in bottlenecks when running the purge script. For more information, see [Partitioning Component Tables](#).
4. Reclaim space as part of the maintenance cycle. For more information, see [Introduction to the Components of a Data File](#).
5. Drop eligible partitions as part of the maintenance cycle. For more information, see [Running the Verification Script](#).
6. Monitor the inflow and outflow. For more information, see [Developing a Retention Policy](#) and [Identifying the Outflow of Data](#).
7. Monitor database and hardware resources. For more information, see [Reclaiming Segment and Data File Space](#).

13.4.3.2 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 [Looped Purge Script](#).
2. Execute the parallel purge. For more information, see [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 [Developing a Retention Policy and Identifying the Outflow of Data](#).
4. Monitor database and hardware resources. For more information, see [Reclaiming Segment and Data File Space](#).

13.5 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.

13.5.1 Introduction to the Components of a Data File

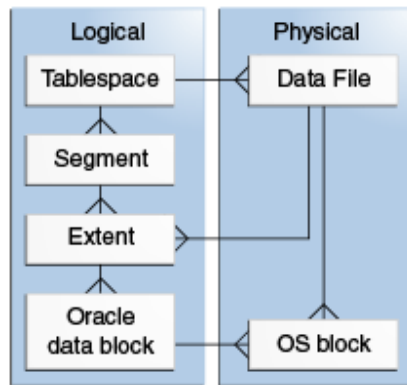
A data file scan can be divided into the following components:

- 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 13-1](#) shows the relationship between logical and physical storage.

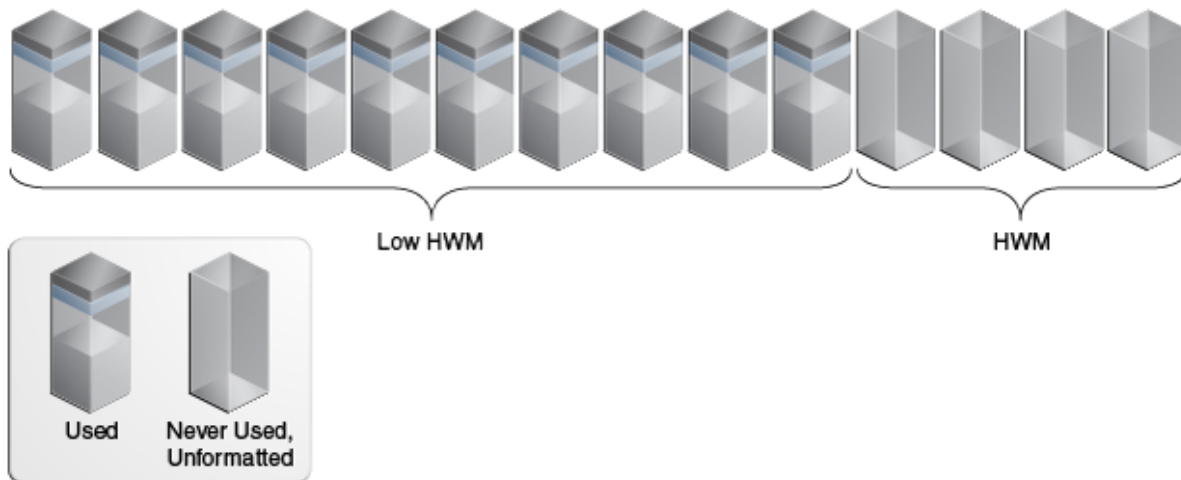
Figure 13-1 Logical and Physical Storage



13.5.1.1 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 13-2](#) 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 13-2 HWM



13.5.2 Reclaiming Segment and Data File Space

The following sections provide instructions on common techniques used to reclaim segment and data file space.

- [Performing an Online Segment Shrink](#)

- [Deallocating Unused Space](#)
- [Coalescing or Rebuilding indexes](#)
- [Dropping Table Partitions](#)
- [Configuring Secure File LOBs](#)
- [Additional Database Management Methods](#)

13.5.2.1 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 13-8 provides online segment shrinking examples.

Table 13-8 Online Segment Shrink Examples

| Scenario | Example |
|---|--|
| Shrink a large table in two phases. | <pre>SQL> ALTER TABLE TABLE_NAME ENABLE ROW MOVEMENT; SQL> ALTER TABLE TABLE_NAME SHRINK SPACE COMPACT; SQL> ALTER TABLE TABLE_NAME SHRINK SPACE;</pre> |
| Shrink a table and all its dependent segments (including BASICFILE LOB segments). | <pre>SQL> ALTER TABLE TABLE_NAME SHRINK SPACE CASCADE;</pre> |
| Shrink a BASICFILE LOB segment only. | <pre>SQL> ALTER TABLE TABLE_NAME MODIFY LOB (LOB_NAME) (SHRINK SPACE);</pre> |
| Shrink a single partition of a partitioned table. | <pre>SQL> ALTER TABLE TABLE_NAME MODIFY PARTITION P1 SHRINK SPACE;</pre> |

13.5.2.2 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.)

13.5.2.3 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 13-9](#) describes the costs and benefits of coalescing or rebuilding indexes.

Table 13-9 Costs and Benefits of Coalescing or Rebuilding Indexes

| Rebuild Index | Coalesce Index |
|--|---|
| 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 following documentation:

<http://www.oracle.com/technetwork/database/options/clustering/overview/index-086583.html>

13.5.2.4 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 [Running the Verification Script](#).

13.5.2.4.1 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 13-10](#) may be required to assist with issues.

Table 13-10 Partition Operations

| Partition Operation | Description |
|--------------------------|---|
| Shrink table partition | <code>SQL> ALTER TABLE TABLE_NAME MODIFY PARTITION P1 SHRINK SPACE;</code> |
| Truncate table partition | <code>SQL> ALTER TABLE ... TRUNCATE PARTITION</code> |
| Compress table partition | <code>SQL> ALTER TABLE TABLE_NAME MOVE PARTITION PART_NAME TABLESPACE TABLESPACE_NAME NOLOGGING COMPRESS FOR OLTP;</code> <p>Notable restrictions:</p> <ul style="list-style-type: none"> • Online segment shrinking is not supported for compressed tables. • Secure file LOBs have their own compression methods. • Compression technology increases CPU resource usage. • 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. |

13.5.2.5 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

Secure files were a feature introduced in the Oracle 11g database. It is recommended that the highest available database patch set be applied to avoid known problems.

13.5.2.5.1 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 if `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 <code>SECUREFILE</code> keyword is used. The default storage method is <code>BASICFILE</code> . |
| 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';
```

13.5.2.5.2 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 [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 [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.

13.5.2.5.3 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

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 `REDEFINITION` package, including preventing redo generation and parallel execution, see *Migrating Columns from BasicFiles LOBs to SecureFiles LOBs in Oracle Database SecureFiles and Large Objects Developer's Guide*.

13.5.2.6 Additional Database Management Methods

This section describes additional methods available for managing database growth.

13.5.2.6.1 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 [Removing Records from the Runtime Tables Without Dropping the Tables](#).

13.5.3 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.

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
```

14

Managing Database Growth

This chapter describes how to manage the growth of large numbers of flow instances, adapter reports, and fault alerts in the database with the purge scripts in Oracle Enterprise Manager Fusion Middleware Control or SQL*Plus, table partitioning for enabling schema tables to be range-partitioned on time intervals, and the truncate script for removing all records from runtime tables without dropping the tables.

This chapter includes the following sections:

- [Introduction to Managing Database Growth](#)
- [Developing a Purging and Partitioning Methodology](#)
- [Deleting Large Numbers of Flow Instances, Adapter Reports, and Fault Alerts](#)
- [Partitioning Component Tables](#)
- [Removing Records from the Runtime Tables Without Dropping the Tables](#)



Note:

Table partitioning is an advanced database task and must only be performed by an experienced database administrator (DBA).

For additional information about troubleshooting database growth issues, see [Parallel Purging and Table Partitioning Issues](#), [Extending Tablespaces to Avoid Problems at Runtime](#), and [Resolving Database Growth Issues Caused by a High Volume of Transactions](#).

For information about database growth management strategies, see [Developing a Database Growth Management Strategy](#).

14.1 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 14-1](#).

Table 14-1 Database Growth Strategies

| Environment | Use | See Section |
|--|---|---|
| Small development installations with more than 100K rows in the database | Auto Purge page of Oracle Enterprise Manager Fusion Middleware Control or the looped purge script | Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control or Deleting Large Numbers of Instances with SQL*Plus |

Table 14-1 (Cont.) Database Growth Strategies

| Environment | Use | See Section |
|---|---|--|
| Medium installations that generate less than 10 GB of data per day <i>and</i> retain less than 500 GB of data | Auto Purge page of Oracle Enterprise Manager Fusion Middleware Control or a scheduled parallel purge with optimal thread count | Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control or Deleting Large Numbers of Instances with SQL*Plus |
| 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"> Partitioning (for infrequent, long running processes). Combination of parallel purge and partitioning (for long running processes than span several months). For example, perform daily purges and monthly partition dropping. Auto Purge page of Oracle Enterprise Manager Fusion Middleware Control | Deleting Large Numbers of Flow Instances, Adapter Reports, and Fault Alerts Partitioning the Component Database Tables Partitioning Component Tables |
| <ul style="list-style-type: none"> For recreating and rerunning test scenarios 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 | Truncate scripts | Removing Records from the Runtime Tables Without Dropping the Tables |

14.2 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, which can be executed through either of the following methods:
 - Automatically from the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control
 - Manually in SQL*Plus
- Purge script + partitioning (or, more correctly, dropping table partitions)
- Partitioning all 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.



Note:

Partitioning functionality is available only if you purchase the Oracle Partitioning option in Oracle Database.

14.3 Deleting Large Numbers of Flow Instances, Adapter Reports, and Fault Alerts

You can delete flow instances, adapter reports, and fault alerts with the purge scripts (invoked either automatically from the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control or manually in SQL*Plus).

Note the following details:

- The purge scripts delete instances that have completed or are in error (have faulted). For more information, see [Purge States](#).
- 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 *Purging Data and B2B Command-Line Tools* in *Using Oracle B2B*.
- Beginning with 12c (12.1.3), Oracle Enterprise Manager Fusion Middleware Control and the purge scripts delete the `MEDIATOR_RESEQUENCER_MESSAGE` and `MEDIATOR_GROUP_STATUS` tables.
- Installers must configure the database scheduler timezone properly or the purge job may run at unexpected times.
- You can delete the following tables by running the purge scripts from SQL*Plus or from the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control:
 - `MEDIATOR_GROUP_STATUS`

- EIS_CONNECTION_DOWN_TIME and MESSAGE_STATISTICS (JCA adapter reports).
- FAULT_ALERT
- Group information for resequencing groups is not deleted. Groups contain the necessary information about the next sequence ID for that group. Purging this information is the same as starting the group from the initial sequence ID, which may not be your intent.

The following sections describe how to invoke the purge scripts from the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control or from SQL*Plus to delete flow instances, adapter reports, and fault alerts:

- [Purge States](#)
- [Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control](#)
- [Deleting Large Numbers of Instances with SQL*Plus](#)
- [Monitoring the Status of Purging](#)
- [Generating a Database SQL Trace](#)



Note:

There is no purge script support on the IBM DB2 database.

14.3.1 Purge States

Instances in the following states are purged with the Oracle Enterprise Manager Fusion Middleware Control or the purge scripts:

- Completed successfully
- Faulted
- Terminated by user
- Aborted
- 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.

14.3.2 Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control

Use the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control to schedule and execute jobs that automatically remove older flow instances, adapter reports, and fault alerts data from the database.

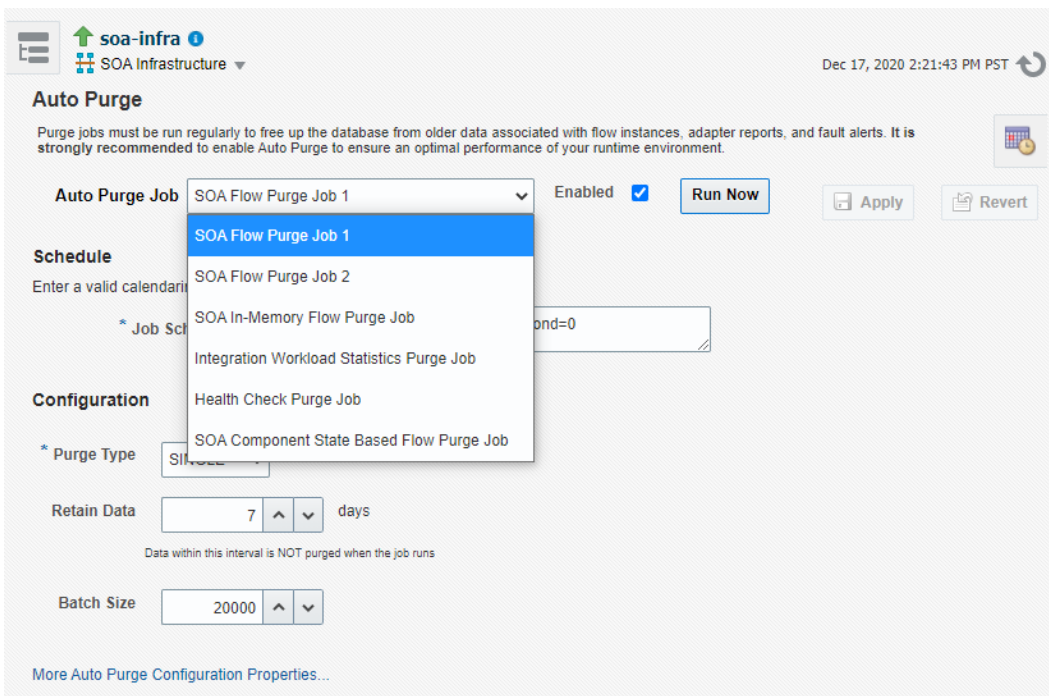
 **Note:**

- Oracle recommends that you enable automatic purging on the Auto Purge page to optimize runtime environment performance. The status of automatic purging is displayed in the **Key Configuration** section of the Dashboard page at the SOA Infrastructure and individual partition levels. Automatic purging is automatically enabled for new 12c installations, but not for upgraded environments.
- Ensure that you back up important data before enabling or changing purge configurations.
- The **Auto Purge** page is not available if you are using the Java database included with the SOA Developer Install option. Use the `truncate_soa_javadb.sql` script to purge the database.

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

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... | From the Key Configuration Section of the Dashboard Page... | From the Key Configuration Section of the Dashboard Page... |
|---|--|--|---|
| a. Select SOA Administration > Auto Purge . | a. Right-click soa-infra . b. Select SOA Administration > Auto Purge . | a. Click the Related Links icon. b. Select Auto Purge . | a. Click the icon to the right of Auto Purge Status . b. In the message that is displayed, click Set Up Auto Purge . |

The Auto Purge page is displayed.



2. Select values appropriate to your environment, and click **Apply**.

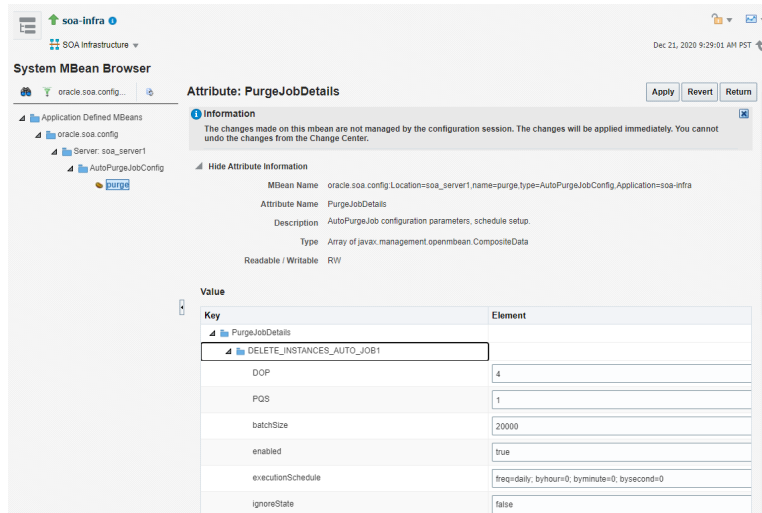
| Field | Description |
|------------------------------------|--|
| Auto Purge Job | <p>Select a predefined database purge job to run:</p> <ul style="list-style-type: none"> • SOA Flow Purge Job 1 to purge on a schedule appropriate for weekdays (Monday through Friday at midnight). This job is automatically enabled. • SOA Flow Purge Job 2 to purge on a weekend schedule (Saturday and Sunday) that may be more aggressive. • SOA In-Memory Flow Purge Job to purge in-memory flow-related records. This purges only the in-memory instances that are persisted to the database. This job is enabled when you set <code>inMemoryEnvironment</code> to <code>true</code> in the SOA common properties in Oracle Enterprise Manager Fusion Middleware Control. • Integration Workload Statistics Purge Job to purge the Integration Workload Statistics (IWS) snapshot data from the SOA database. By default, the job is scheduled to run daily at midnight. For information about IWS reports, see Monitoring and Troubleshooting SOA-Wide Issues Using IWS Reports. • Health Check Purge Job to purge SOA Health Check reports. For information about SOA Health Check, see Using SOA Health Check. • SOA Component State Based Flow Purge Job to purge flows and related tables based on the states of the components (other purge jobs are based on the flow instance state). This handles cases where the flow instance state is not in sync or turned off. This job is enabled when you set <code>CaptureFlowInstanceState</code> to <code>false</code> in the SOA common properties in Oracle Enterprise Manager Fusion Middleware Control. <p>Note: This selection is available in 12c (12.2.1.3) only if you have installed patch 31572611 or later. Sign in to My Oracle Support and search for the patch number to locate and download the patch.</p> <p>Note: You cannot add purge jobs.</p> <p>Warning: When you enable or disable an auto purge job, you must save or revert your changes before selecting a different job or navigating away from this page. Otherwise, any unsaved changes made to the currently selected job are lost.</p> |
| Enabled | <p>Select to enable automatic database purging with the database purge job selected from the Auto Purge Job list.</p> <p>The purge interval begins when it is enabled. For example, If you specify seven days in the Retain Data field, data is retained from the day you re-enabled this checkbox. Newer data is retained for seven days from when it was created.</p> |
| Calendaring Expression icon | <p>Click to view examples of job scheduling syntax. Copy and paste the syntax appropriate to your environment into the Job Schedule field and modify as necessary. Click More Info to access documentation about how to configure job frequency by setting the <code>repeat_interval</code> attribute.</p> |

| Field | Description |
|-------------------------------|---|
| Job Schedule | Specify a job execution schedule to purge instances. The default schedule is to perform a daily purge at midnight. This is a required field. To specify the schedule, use valid calendaring expressions. Click the information icon or the Calendaring Expression icon to view examples of commonly used expressions. The scheduling syntax is not case sensitive. |
| Purge Type | <p>Select the type of purge script to run. This is a required field.</p> <ul style="list-style-type: none"> • Single: Single, loop purged script that performs a batched purge. • Parallel: Functionality is the same as the single, looped purge script. However, this option enables the <code>dbms_scheduler</code> package to spawn multiple purge jobs, with each job working on subset data. <p>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.</p> <p>For more information about the single (looped) and purge parallel scripts, see Looped Purge Script and Looped Purge in Parallel Script with dbms_scheduler.</p> |
| Retain Data | Specify the time interval in days for which to retain data. Data within this interval is not purged when the job runs. The default value is seven days. For example, if you specify a data retention interval of seven days, data is protected from purging for the seven days since it was created. Older data already in the system is retained seven days from when automatic purging was enabled. You can ignore the retain data filter by setting this property to -1. |
| Maximum Flows to Purge | Select the maximum number of instance flows to purge in a single job run. |
| Batch Size | <p>Select the maximum number of business flows to delete at a time. The default value is 20000.</p> <p>This field is displayed if Parallel is selected from the Purge Type list.</p> |
| Degree of Parallel | <p>Select the number of job executions to run in parallel. The default value is 4.</p> <p>This field is displayed if Parallel is selected from the Purge Type list.</p> |

3. To view and configure advanced configuration properties in the System MBean Browser, click **More Auto Purge Configuration Properties**.
4. Click **PurgeJobDetails**.
5. Expand a job to display all properties for single and parallel purges. When either the single or parallel purge type is executed, the appropriate property values for the selected type are executed.

 **Note:**

If you need to edit the advanced purge properties, do so with extreme care. For example, do not change the job names.



The screenshot shows the 'Attribute: PurgeJobDetails' configuration in the Oracle SOA Infrastructure MBean Browser. The configuration is for the MBean 'oracle.soa.config.Location=soa_server1.name=purge.type=AutoPurgeJobConfig.Application=soa-infra'. The configuration includes the following fields and values:

| Key | Element |
|-----------------------------|--|
| DELETED_INSTANCES_AUTO_JOB1 | |
| DOP | 4 |
| PQS | 1 |
| batchSize | 20000 |
| enabled | true |
| executionSchedule | freq=daily; byhour=0; byminute=0; bysecond=0 |
| ignoreState | false |

6. View or change values, then click **Apply**.

| Field | Description |
|-------------------------------|--|
| DOP | Defines the number of job executions to run in parallel. The default value is 4. |
| PQS | Displays the number of parallel query slaves. You can add additional slaves to improve performance of expensive SQL commands. |
| batchSize | Displays the maximum number of business flows to delete at a time. The default value is 20000. |
| Enabled | Indicates if the database purge job is enabled. |
| executionSchedule | Displays the job scheduling syntax. |
| ignoreState | When set to <code>true</code> , purges all open and closed instances within the specified date range. The default value is <code>false</code> . Note: Use this parameter cautiously because purging open instances may leave your system in an inconsistent state. |
| maxCount | Displays the maximum number of flows to purge. |
| maxCreationPeriod Days | Displays the maximum creation period in days. This property is used with minCreationPeriodDays for selecting the flows created between a certain period. |
| maxRuntime | Expiration at which the purge script exits the loop. The default value is 60. This value is specified in minutes. |
| minCreationPeriod Days | Displays the minimum creation period in days. This property is used with maxCreationPeriodDays for selecting the flows created between a certain period. |

| Field | Description |
|----------------------------------|--|
| purgePartitionedComponent | Indicates if partitioned tables should be purged. If set to <code>true</code> , the same purge job is invoked to delete partitioned data. The default value is <code>false</code> . Note: If tables are partitioned, you do not want to purge them because they are maintained by a <code>DROP</code> statement. |
| purgeType | Displays either single or parallel. |
| retentionPeriodDays | Specifies the time interval in days for which to retain data. Data within this interval is not purged when the purge job runs. |
| sqlTrace | If set to <code>true</code> , indicates that SQL Trace is set. For information about SQL Trace, see the <i>Oracle Database SQL Tuning Guide</i> . |

 **Note:**

Retention period does not operate at the granularity of hours. So, if the retention period is set to 1 day, it does not mean that a job will be purged within 24 hours of its completion. Instead, it can take up to 48 hours (that is, with a retention period of 1 day, if a flow completes at 12:01am on the 20th, it will not be purged until 12:00am on the 22nd).

14.3.3 Deleting Large Numbers of Instances with SQL*Plus

 **Note:**

When upgrading Oracle SOA Suite Release 11g to 12c, do not start the Upgrade Assistant while the purge scripts are running. Wait until the purge is complete before starting the upgrade process. The upgrade fails if the purge scripts are running while using the Upgrade Assistant to upgrade your schemas. For more information about upgrading, see *Upgrading Oracle SOA Suite and Business Process Management*.

You can run the purge scripts in SQL*Plus to automatically remove older flow instances, adapter reports, and fault alerts data from the database. There are two types of purge scripts:

- Looped purge script
- Looped purge in parallel script with `dbms_scheduler`

14.3.3.1 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.

14.3.3.1.1 delete_instances Procedure

Use the `delete_instances` procedure to delete instances. The following example shows the 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
    sql_trace in boolean
    PSQ integer
);
```

Table 14-2 describes the script parameters.

Table 14-2 delete_instances Procedure Parameter Descriptions

| Parameter | Description |
|--------------------------------|--|
| <code>min_creation_date</code> | Minimum creation period in days for the business flow instances. |
| <code>max_creation_date</code> | Maximum creation period in days for the business flow instances. |
| <code>batch_size</code> | Maximum number of flows selected for deletion and committed in one execution of the single loop 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. |

Table 14-2 (Cont.) delete_instances Procedure Parameter Descriptions

| Parameter | Description |
|-----------------------------|---|
| retention_period | <p>Specify the time interval in days for which to retain data. Data within this interval is not purged when the job runs. The default value is seven days. The retention period is based on the entire flow. The period is compared to <code>SCA_FLOW_INSTANCE.UPDATED_TIME</code>.</p> <p>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 null.</p> <p>Specify a retention period if you want to retain the business flow instances based on the <code>modify_date</code> of the BPEL instances (<code>CUBE_INSTANCE</code>).</p> <p>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:</p> <pre>min_creation_date = 1st June 2011 max_creation_date = 30 June 2011 retention_period = 1st July 2011</pre> <p>This deletes all business flow 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</p> |
| purge_partitioned_component | <p>Indicates if partitioned tables should be purged. If set to <code>true</code>, the same purge job is invoked to delete the partitioned data. The default value is <code>false</code>.</p> <p>Note: If tables are partitioned, you do not want to purge them because they are maintained by a <code>DROP</code> statement.</p> |
| ignore_state | <p>When set to <code>true</code>, purges all open and closed instances within the specified date range. The default value is <code>false</code>.</p> <p>Note: Use this parameter cautiously because purging open instances may leave your system in an inconsistent state.</p> |
| composite_name | <p>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 Purging the Instances of a Specific SOA Composite Application.</p> |
| composite_revision | <p>The revision number of the SOA composite application.</p> |
| soa_partition_name | <p>The partition in which the SOA composite application is included.</p> |

Table 14-2 (Cont.) delete_instances Procedure Parameter Descriptions

| Parameter | Description |
|-----------|---|
| sql_trace | <p>When set to <code>true</code>, this parameter configures a SQL trace that generates a trace file in the destination specified with the <code>USER_DUMP_DEST</code> initialization parameter. The <code>SOA_INFRA</code> user must be granted the <code>ALTER SESSION</code> privilege, which can then be revoked by the database administrator once the trace details are collected.</p> <pre>GRANT ALTER SESSION TO SOA_INFRA</pre> <p>Note: Only use this parameter for debugging because it impacts performance.</p> |
| PQS | <p>Displays the number of parallel query slaves. You can add additional slaves to improve performance of expensive SQL commands.</p> |

 **Note:**

- 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 [Looped Purge in Parallel Script with `dbms_scheduler`](#).
- If you are *not* upgrading from Release 11g to 12c, the `max_creation_date` and `min_creation_date` parameters are optional. The purge can be run entirely by `retention_period`, which is also optional.
- 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 `SCA_FLOW_INSTANCE` table row has already been deleted.

14.3.3.2 Looped Purge in Parallel Script with `dbms_scheduler`

This script is functionally the same as the looped purge script described in [Looped Purge Script](#). However, this script uses the `dbms_scheduler` package to spawn multiple purge jobs, with each job working on subset data.

 **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.

14.3.3.2.1 delete_instances_in_parallel Procedure

Use the `delete_instances` procedure in parallel to delete instances. The following example shows the 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,
    ignore_state in boolean,
    composite_name in varchar2,
    composite_revision in varchar2,
    soa_partition_name in varchar2,
    sql_trace in boolean
);
```

[Table 14-3](#) describes the script parameters.

Table 14-3 delete_instances_in_parallel Procedure Parameter Descriptions

| Parameter | Description |
|--------------------------------|--|
| <code>min_creation_date</code> | Minimum creation period in days for the business flow instances. |
| <code>max_creation_date</code> | Maximum creation period in days for the business flow instances. |
| <code>batch_size</code> | Maximum number of flows selected for deletion. 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> | Specify the time interval in days for which to retain data. Data within this interval is not purged when the job runs. The default value is seven days. The retention period is based on the entire flow. The period is compared to <code>SCA_FLOW_INSTANCE.UPDATED_TIME</code> . The default value is null. For more information about this parameter, see Table 14-2 . |
| <code>DOP</code> | Defines the number of job executions to run in parallel. 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 temp 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. |

Table 14-3 (Cont.) delete_instances_in_parallel Procedure Parameter Descriptions

| Parameter | Description |
|-----------------------------|--|
| purge_partitioned_component | You can invoke the same purge to delete partitioned data. The default value is <code>false</code> . Note: If tables are partitioned, you do not want to purge them because they are maintained by a <code>DROP</code> statement. |
| ignore_state | When set to <code>true</code> , purges all open and closed instances within the specified date range. The default value is <code>false</code> . Note: 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 <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 Purging the Instances of a Specific SOA Composite Application . |
| composite_revision | The revision number of the SOA composite application. |
| soa_partition_name | The partition in which the SOA composite application is included. |
| sql_trace | When set to <code>true</code> , this parameter configures a SQL trace that generates a trace file in the destination specified with the <code>USER_DUMP_DEST</code> initialization parameter. The <code>SOA_INFRA</code> user must be granted the <code>ALTER SESSION</code> privilege, which can then be revoked by the database administrator once the trace details are collected. <pre>GRANT ALTER SESSION TO SOA_INFRA</pre> Note: Only use this parameter for debugging because it impacts performance. |

14.3.3.3 Running the Purge Scripts

This section describes how to execute the purge scripts. You can also execute these scripts by following the steps in [Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control](#).

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 at `MW_HOME/soa/common/sql/soainfra/sql/oracle/122130/soa_purge/soa_purge_scripts.sql`.

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 SERVEROUT 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;
    composite_name varchar2(500);
    composite_revision varchar2(50);
    soa_partition_name varchar2(200);
    PQS integer;
    ignore_state boolean;

BEGIN

    MIN_CREATION_DATE := to_timestamp('2019-10-01','YYYY-MM-DD');
    MAX_CREATION_DATE := to_timestamp('2019-10-31','YYYY-MM-DD');
    max_runtime := 60;
    retention_period := to_timestamp('2019-10-31','YYYY-MM-DD');
    batch_size := 10000;
    composite_name := 'example_composite';
    composite_revision := '1.0';
    soa_partition_name := 'default';
    ignore_state := false;
    PQS := 5;
    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,
        ignore_state => ignore_state,
        sql_trace => true);
END;
/
```

b. For parallel purge:

```

DECLARE

    max_creation_date timestamp;
    min_creation_date timestamp;
    batch_size integer;
    max_runtime integer;
    retention_period timestamp;
    composite_name varchar2(500);
    composite_revision varchar2(50);
    soa_partition_name varchar2(200);
    PQS integer;
    DOP integer;
    max_count integer;
    ignore_state boolean;

BEGIN

    min_creation_date := to_timestamp('2019-10-01','YYYY-MM-DD');
    max_creation_date := to_timestamp('2019-10-31','YYYY-MM-DD');
    batch_size integer;
    max_runtime integer;
    retention_period := to_timestamp('2019-10-31','YYYY-MM-DD');
    composite_name := 'michael_composite';
    composite_revision := '1.0';
    soa_partition_name := 'default';
    ignore_state := true;
    PQS := 5;
    DOP := 2;
    max_count := 100000;
    soa.delete_instances_in_parallel(
        min_creation_date => min_creation_date,
        max_creation_date => max_creation_date,
        batch_size => batch_size,
        max_runtime => max_runtime,
        retention_period => retention_period,
        DOP => DOP,
        max_count => max_count,
        purge_partitioned_component => false,
        ignore_state => ignore_state,
        sql_trace => true);
END;

```

14.3.3.4 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. The following example shows the error found 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;
```

14.3.3.5 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 IDs, and not `COMPOSITE_IDS`. Therefore, apart from the intended `COMPOSITE_DNS`, other composites sharing the same flow ID may get deleted. The following scenarios may occur:

- A business flow 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 business flow 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 business flow 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 [Looped Purge Script](#) and [Looped Purge in Parallel Script with `dbms_scheduler`](#).

14.3.3.6 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

14.3.4 Monitoring the Status of Purging

You can monitor purge jobs executed from Oracle Enterprise Manager Fusion Middleware Control with the SQL commands described in [Table 14-4](#).

Table 14-4 SQL*Plus Commands for Monitoring the Status of Purging

| To... | Execute This Command... |
|---------------------------------|--|
| Show the job history and status | <pre>SQL> select log_date, status from user_scheduler_job_log where job_name = 'DELETE_INSTANCES_AUTO_JOB1' order by log_date;</pre> <p>DELETE_INSTANCES_AUTO_JOB1 is enabled by default. DELETE_INSTANCES_AUTO_JOB2 can also be enabled.</p> <p>For information about selecting the job on the Auto Purge page, see Deleting Large Numbers of Instances with Oracle Enterprise Manager Fusion Middleware Control.</p> |
| Show a running job | <pre>SQL> select session_id, running_instance, elapsed_time, cpu_used from user_scheduler_running_jobs where job_name = 'DELETE_INSTANCES_AUTO_JOB1';</pre> |
| Show job details | <pre>SQL> select log_date, status, req_start_date, actual_start_date, run_duration from user_scheduler_job_run_details where job_name = 'DELETE_INSTANCES_AUTO_JOB1' order by log_date;</pre> |

Table 14-4 (Cont.) SQL*Plus Commands for Monitoring the Status of Purging

| To... | Execute This Command... |
|---|--|
| Find the job schedule | <pre>SQL> select SCHEDULE_TYPE,START_DATE,REPEAT_INTERVAL from user_scheduler_schedules where schedule_name = 'DELETE_INSTANCES_AUTO_SCH1'; DELETE_INSTANCES_AUTO_SCH1 and DELETE_INSTANCES_AUTO_SCH2 are based on the job selected.</pre> |
| Find the default job schedule | <pre>BEGIN DBMS_SCHEDULER.set_attribute (name => 'DELETE_INSTANCES_AUTO_SCH1', attribute => 'repeat_interval', value => 'freq=daily; byhour=0; byminute=0; bysecond=0'); END;</pre> |
| Change the job schedule (for this example, to hourly at the thirtieth minute) | <pre>BEGIN DBMS_SCHEDULER.set_attribute (name => 'DELETE_INSTANCES_AUTO_SCH1', attribute => 'repeat_interval', value => 'freq=hourly; byminute=30'); END;</pre> |

14.3.5 Generating a Database SQL Trace

The purge scripts include a parameter to generate a SQL trace:

- If running the purge scripts directly from SQL*Plus, the parameter is named a `sql_trace` parameter.
- If running the purge scripts from the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control, the parameter is named **sqlTrace** (located beneath the **More Auto Purge Configuration Properties** link).

Setting this parameter to `true` generates a database SQL trace that is placed in the database user `dump` directory. For the parallel purge script, the SQL trace is also generated for each subordinate parallel purge jobs (J000, J001, and so on).

If parallel query slaves have been enabled in the purge scripts, then trace files are created. The trace files are generated when `sql_trace` is set. With the parallel purge script, multiple trace files are produced named `J*`.

For information about SQL Trace, see the *Oracle Database SQL Tuning Guide*.

14.4 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
- 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.SCA_FLOW_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.

14.4.1 Partitioning the Database with the Repository Creation Utility

You can select a database profile when running the Repository Creation Utility. The profile determines the size of the SOA database and enables you to use existing performance features of the Oracle database for Oracle SOA Suite-related storage.

- Large: Provides a large partitioned schema. This selection is for databases of 200 GB or more.
- Small: Provides a small schema with no partitions.

For more information, see Section "Custom Variables" of *Creating Schemas with the Repository Creation Utility*.

14.4.2 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 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>

 **Note:**

- 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.

14.4.2.1 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 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 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.

14.4.3 Range Interval Partitioning

Range interval partitioning is a Release 12c extension of the Release 11g range partitioning feature. With range partitioning, you had to manually allocate each partition. With range interval partitioning, you do not need to manually allocate partitions. Partitions of a specified interval are automatically created when the interval value of the partition key that you assign exceeds all of the existing range partitions. The verification scripts support range interval partitioning.

For more information about range interval partitioning, see *Oracle Database VLDB and Partitioning Guide*.

14.4.4 Equipartitioning and Range Interval Partitioning

A goal of equipartitioning is to ensure that all dependent table partitions contain the complete set of associated rows for their master table partitions. This is accomplished as follows:

- A partition key value is propagated down from the master key to all dependents so that they have the same range.
- The master key contains the state of each flow (open, closed). When the master is checked and everything is closed, dependent tables with the same partition range can be dropped.

The range interval partitioning verification scripts check the following for each dependent table partition against the master partition:

- The same interval definition (each table requires the same interval definition for monthly, weekly, number of days, and so on).
 - The upper and lower bound high values are automatically maintained by the database.
- Partitions that must be dropped require the same upper bound high value.

14.4.5 Range Interval Partitioning Example

The following example describes how range interval partitioning works. For this example, the `SCA_FLOW_INSTANCE` master table is used.

```
CREATE TABLE SCA_FLOW_INSTANCE
(FLOW_ID INTEGER NOT NULL;
 . . .
 . . .
CREATED_TIME TIMESTAMP NOT NULL)
PARTITION BY RANGE (CREATED_TIME)
INTERVAL(NUMTOYMINTERVAL(1, 'MONTH'))
PARTITION p0 VALUES LESS THAN (TO_DATE('1-2-2007', 'DD-MM-YYYY'));
```

[Table 14-5](#) describes the syntax shown in the preceding example.

Table 14-5 Range Interval Partitioning Example

| Syntax | Description |
|---|---|
| <code>PARTITION BY RANGE (CREATED_TIME)</code> | The partition key (for example, a date of July 1, 2013, which is specified as 01-07-2013). |
| <code>INTERVAL(NUMTOYMINTERVAL(1, 'MONTH'))</code> | The interval (for this example, one month is specified). Therefore, if a partition key is specified for July 1 (as 01-07-2013), a partition is created for July. Partitions are then automatically allocated monthly for August 1, September 1, October 1, and so on. You do not need to manually allocate each partition. Note: All Oracle SOA Suite tables must be created with this same interval value so that the upper and lower bounds are created with respect to equipartitioning. |
| <code>PARTITION p0 VALUES LESS THAN (TO_DATE('1-2-2007', 'DD-MM-YYYY'));</code> | The first partition must be a range partition. This is the transition point after which all partitions are automatically allocated. It is recommended that the first range partition have a DATE interval that is never used (such as the completed date of 1-2-2007). The date for this partition makes it virtual metadata. This date makes it easier to drop the partition, if necessary. |

The SQL command shown in the following example identifies the first range partition created. A value of `No` in the last column indicates that this is a range partition, and not an interval partition.

```
SQL> select partition position, partition name, high value, interval
       from user_tab_partitions
       where table_name = 'SCA_FLOW_INSTANCE';
```

```
-----
1      P0          TIMESTAMP' 2007-02-01 00:00:00'      No
```

The SQL command shown in the following example identifies the system name, the upper bound high value, and whether this is an interval partition. A value of `Yes` in the last column indicates that this is an interval partition. The second row in the output is dropped. The first row is simply metadata and is not dropped. The partitions are automatically allocated as you insert the date. System names are automatically generated and partitions are allocated as necessary based on the date.

```
SQL> INSERT INTO SCA_FLOW_INSTANCE VALUES(..TO_TIMESTAMP('1-5-2013', 'DD-MM-YYYY')...);
```

```
-----
1      P0          TIMESTAMP' 2007-02-01 00:00:00'      No
2      SYS_P532    TIMESTAMP' 2013-06-01 00:00:00'      Yes
```

The SQL command shown in the following example identifies the second and third rows as the partitions to drop. Because this is performed over an earlier month (March 2013 instead of May 2013), another partition is inserted. The positions of the partitions are changed.

```
SQL> INSERT INTO SCA_FLOW_INSTANCE VALUES (...TO_TIMESTAMP('1-3-2013', 'DD-MM-YYYY')...);
```

```
-----  
1      P0          TIMESTAMP' 2007-02-01 00:00:00'   No  
2      SYS_P578    TIMESTAMP' 2013-04-01 00:00:00'   Yes  
3      SYS_P532    TIMESTAMP' 2013-06-01 00:00:00'   Yes
```

14.4.6 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

14.4.7 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.

14.4.8 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. The verification scripts support range interval partitioning.

Note:

The verification script does not drop any partitions; it just ensures that partitions are eligible to be dropped. It is important to enable partitioning for all tables for the scripts to get correct data

14.4.8.1 Component Tables

This section describes partitioning constraints and lists the component tables, the groups to which they belong, and their partition key.

14.4.8.1.1 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.

You can partition any of the tables 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 `SCA_FLOW_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 business flow instances within that partition. Therefore, if the `SCA_FLOW_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.

14.4.8.1.2 Component Tables, Range Partition Keys, and Groups

Table 14-6 through Table 14-11 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.
- 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 14-6 Component: SOA Infrastructure

| Table | Range Partition Key | Group |
|--------------------------|---------------------|-------|
| SCA_FLOW_INSTANCE | CREATED_TIME | 1 |
| SCA_FLOW_TO_CPST | PARTITION_DATE | 1 |
| SCA_COMMON_FAULT | PARTITION_DATE | 1 |
| SCA_FLOW_ASSOC | PARTITION_DATE | 1 |
| SCA_META_DATA | PARTITION_DATE | 1 |
| SCA_REJECTED_MESSAG E | PARTITION_DATE | 1 |
| SCA_ATTACHMENT_REF | PARTITION_DATE | 1 |
| SCA_SENSOR_VALUE | PARTITION_DATE | 1 |
| AUDIT_DETAILS | CI_PARTITION_DATE | 1 |
| AUDIT_TRAIL | CI_PARTITION_DATE | 1 |

Table 14-7 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 |
| WI_FAULT | CI_PARTITION_DATE | 1 |
| WORK_ITEM | CI_PARTITION_DATE | 1 |
| DLV_SUBSCRIPTION | CI_PARTITION_DATE | 1 |
| DOCUMENT_CI_REF | CI_PARTITION_DATE | 1 |
| DLV_MESSAGE | RECEIVE_DATE | 1A |
| HEADERS_PROPERTIES | DLV_PARTITION_DATE | 1A |
| DOCUMENT_DLV_MSG_RE F | DLV_PARTITION_DATE | 1A |
| XML_DOCUMENT | DOC_PARTITION_DATE | 2 |

Table 14-8 Component: Oracle Mediator

| Table Name | Range Partition Key | Group |
|-------------------------------|---------------------|-------|
| MEDIATOR_DEFERRED_M ESSAGE | CREATION_DATE | 1 |
| MEDIATOR_PAYLOAD | CREATION_TIME | 2 |

Table 14-9 Component: Human Workflow

| Table | Range Partition Key | Group |
|--------------------|----------------------|-------|
| WFASSIGNEE | COMPOSITECREATEDTIME | 1 |
| WFATTACHMENT | COMPOSITECREATEDTIME | 1 |
| WFEVIDENCE | COMPOSITECREATEDTIME | 1 |
| WFHEADERPROPS | COMPOSITECREATEDTIME | 1 |
| WFMESSAGEATTRIBUTE | COMPOSITECREATEDTIME | 1 |
| WFNOTIFICATION | COMPOSITECREATEDTIME | 1 |
| WFREVIEWER | COMPOSITECREATEDTIME | 1 |
| WFROUTINGSLIP | COMPOSITECREATEDTIME | 1 |
| WFTASK | COMPOSITECREATEDTIME | 1 |
| WFTASK_TL | COMPOSITECREATEDTIME | 1 |
| WFTASKAGGREGATION | COMPOSITECREATEDTIME | 1 |
| WFTASKERROR | COMPOSITECREATEDTIME | 1 |
| WFTASKHISTORY | COMPOSITECREATEDTIME | 1 |
| WFTASKHISTORY_TL | COMPOSITECREATEDTIME | 1 |
| WFTASKTIMER | COMPOSITECREATEDTIME | 1 |

Table 14-10 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 14-11 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_EXCEPTS | CI_PARTITION_DATE | 1 |

14.4.8.2 Equipartitioning and Interval Partitioning Verification Script Checks

The verification script uses following two tables when performing checking:

- USER_PART_TABLES
- USER_TAB_PARTITIONS

To check the interval definition that you defined for your table:

```
SQL> select INTERVAL from USER_PART_TABLES
      where table_name = 'table_name';
```

To check the upper bound high value for a partition:

```
SQL> select high_value from USER_TAB_PARTITIONS
      where table_name = 'table_name'
      and partition_name = 'partition_name';
```

14.4.9 Running the Verification Script

The verification script is located in the following directory: *MW_HOME/SOA_ORACLE_HOME/rcu/integration/soainfra/sql/verify*. There are two versions of the verification script, depending on whether your schema is Interval partitioned or Range partitioned:

- soa_exec_interval_verify.sql
- soa_exec_verify.sql

The verification script helps determine if a partition can be dropped. When you execute the verification script, a log file and a result file is generated for each partition. The log file should be examined by the database administrator to assess if a partition can be dropped by running the result file.

On examining the log file, the database administrator might find that there are too many active instances, and decide to let the partition age further. If the database administrator finds that only a small number of instances are open, say 5%, the administrator may decide to execute row movement to move these instances to another partition. Once the active instances in a partition have been moved to another partition, the partition can be dropped.

To execute the verification script:

1. Set up a database directory for the result and log files.

Before you run the script, the operating system directory, say */tmp/verify*, must exist with the appropriate access.

Log in to SQL*Plus as the *SOAINFRA* user and map the directory to store the result and log files.

```
sqlplus soainfra
Enter password:
SQL> CREATE OR REPLACE DIRECTORY PART_DIR AS '/tmp/verify';
```

2. Truncate the temporary tables for Group 1 and Group 2.

For Group 1 tables:

```
$ sqlplus soainfra
SQL> BEGIN
SQL> verify_soa.trunc_verify1_temp_tables;
SQL> END;
SQL> /
```


For Group 2 tables:

```
$ sqlplus soainfra
SQL> BEGIN
SQL> verify_soa.trunc_verify2_temp_tables;
SQL> END;
SQL> /
```

3. Edit the Group 1 verification script.

Edit the RANGE or INTERVAL script, as per the type of partition used.

Note:

The partitions assessed by the verification scripts are those belonging to the `SCA_FLOW_INSTANCE` fabric table, as all other tables are equi-partitioned on this fabric table.

- For the Range verification script `soa_exec_verify.sql`:

Update the PL/SQL table with the `SCA_FLOW_COMPOSITE` partitions that are candidates to be dropped from the schema. For example:

```
mySoa_drv_list := verify_soa.soa_drv_table();
mySoa_drv_list.extend(1); -- Ensure that you set this
correctly
mySoa_drv_list(1) := 'P01'; -- One entry per partition.
```

- For the Interval verification script `soa_exec_interval_verify.sql`:

Update the `SOA_MAX_TIMESTAMP` variable to an appropriate date. Any partitions with a high value less than this date become candidates to be dropped from the schema. For example:

```
soa_max_timestamp := to_timestamp('2013-08-15','YYYY-MM-DD');
```

4. Run the verification script for Group 1.

The verification script does not drop the partitions, but generates the log and result files in the `PART_DIR` database directory. The database administrator must examine the log file to determine if the partitions can be dropped by running the result file, or whether row movement is necessary.

The Group 1 partitions for an interval must always be dropped before the Group 2 partitions. The verification procedure assesses the Group 2 tables partitions based on whether they are still referenced by the Group 1 tables. So, if the Group 1 table partitions are dropped first, then it increases the chance that the Group 2 table partitions can be dropped.

- For range partitioning:

```
sqlplus soainfra
SQL> @soa_exec_verify.sql 1 -- 1 for Group1.
```

- For interval partitioning:

```
sqlplus soainfra
SQL> @soa_exec_interval_verify.sql 1 -- 1 for Group1.
```

5. Review the log and result files in the `PART_DIR` directory.

The `SCA_FLOW_INSTANCE` partition name is included in the log and result file each interval. For Interval partitioning, this partition name is an RDBMS system-generated name. Example log and result files for range partitioning are `SOA_P01_LOG_1` and `SOA_P01_RESULT_1.sql`. Example log and result files for interval partitioning are `SOA_SYS_P579_LOG_1` and `SOA_SYS_P579_RESULT_1.sql`.

For each partition interval, the database administrator must review the log file carefully to ensure that the partition for that interval has passed all tests. If there are open/active flows reported, then row movement is required before the partition can be dropped.

[Moving Active, Long Running Instances to a Different Partition](#) describes the process to move rows across partitions.

6. Drop Group 1 partitions that can be dropped.

The generated result file contains the command to drop the partition. The foreign keys must be disabled before you can drop table partitions with foreign keys. This is an RDBMS requirement, and the `SOAINFRA` schema presently defines many foreign keys. It is best to `DISABLE` the foreign keys, and then run all the required verification result scripts. You should re-enable the foreign keys after you have dropped the partitions.

Note:

To help with the disabling and enabling of foreign keys, a routine is provided, which generates a script with the appropriate commands. You only need to generate the script once. The database administrator can choose to customize the script. See [Alter Foreign Keys \(verify_soa.alter_FK\)](#) for more details.

To drop the partitions for an interval, run the result script. For example:

```
sqlplus soainfra
SQL> SOA_SYS_P579_RESULT_1.sql
```

7. Run row restore if rows were moved.

This procedure is required only if you used the row movement procedure to move open Group 1 instances. This procedure updates the partition key of the moved open instances back to their original flow creation date value. The mechanism for range and interval partitions is as follows:

- For range partitions, the row movement procedure moves the open flows to a safe partition, enabling the aged partition to be dropped. The row restore procedure then updates the partition key back to the original creation date, which moves the flows to the appropriate, still-available partition. This usually does not trigger any row movement, as the current partition is likely to be the only appropriate and still-available partition.
- For interval partitions, the row movement procedure moves the open flows to a safe partition, enabling the aged partition to be dropped. The row restore procedure then

updates the partition key back to the original creation date, which triggers the RDBMS to re-create the aged partition in order to accommodate the open flows. The re-created partition will be small, and will be picked up on the next run of the interval verification script. Note that the interval verification script uses a less-than date value to select candidate partitions.

Row restore is required only for Group 1 tables, and is the same procedure for range and interval partitions. Ensure that the table row movement is enabled. (See the [Step to enable table movement in the database](#) for more details.)

```
sqlplus soainfra
SQL> verify_soa.exec_row_restore_1;
SQL> END;
```

Run row restore truncate once the row restore routine has successfully completed. The row restore routine can be repeated until successful. Once you have run the row restore truncate routine, row restore cannot be repeated.

```
sqlplus soainfra
SQL> BEGIN
SQL> verify_soa.trunc_verify1_rst_temp_tables;
SQL> END;
```

8. Run the Group 2 verification script

The Group 2 verification scripts should only be executed once the Group 1 partitions for the same interval have been dropped. The steps to drop Group 2 partitions are similar to those for Group 1, as described in the preceding steps:

- a. Edit the Group 2 verification script like how we did for Group 1 ([Details as described for Group 1](#)).

- b. Run verification script for Group 2:

- For range partitioning:

```
sqlplus soainfra
SQL> @soa_exec_verify.sql 2 -- 2 for Group1.
```

- For interval partitioning:

```
sqlplus soainfra
SQL> @soa_exec_interval_verify.sql 2 -- 2 for Group1.
```

- c. Review the log and result files in the PART_DIR directory. ([Details as described for Group 1](#)).

Depending on the results, row movement might be required for Group 2 tables. See [Triggering row movement for Group 2](#) for more details.

- d. Drop Group 2 partitions ([Details as described for Group 1](#)).

Note that the row restore routine is not required for Group 2 tables.

9. Re-enable the foreign keys.

See [Alter Foreign Keys \(verify_soa.alter_FK\)](#) for more details on scripts provided to assist with enabling and disabling foreign keys.

**Note:**

A verification script is not provided for business rules.

14.4.10 Moving Active, Long Running Instances to a Different Partition

The verification script logs provide a count of total instances, open instances, and the percentage of open instances in a partition. If there are open instances, the database administrator can run the row movement procedure to move these rows to a different partition. The row movement procedure updates the partition keys of the open instances, which in turn initiates a row movement of these instances to a different partition. Moving rows is expensive, as the row movement procedure needs to move the rows in all the equi-partitioned tables. When planning a partitioning strategy, ensure that the partitions are allowed to age sufficiently, so that the percentage of open instances is less than 5% of the total number of rows in the partition.

1. Enable table row movement

The row movement procedure moves rows from one table partition to another. For the RDBMS to perform this task, row movement on the tables must also be enabled before row movement can be performed. Customize and execute the `SOA_ENABLE_MVT.SQL` script for your environment.

```
sqlplus soainfra
SQL> @SOA_ENABLE_MVT.SQL
```

2. If you are running row movement for Group 1, go to [Step 3](#). If you have already dropped the Group 1 partitions, and are running row movement for Group 2, then go to [Step 5](#).
3. Trigger row movement for Group 1.

Execute one of the following procedures to move rows for Group 1 tables, depending on whether the schema is range or interval partitioned:

- For range partitions:

```
sqlplus soainfra
SQL> PROCEDURE exec_row_movement_1( partition_name in varchar2,
new_partition_date in timestamp );
```

- For interval partitions:

```
sqlplus soainfra
SQL> PROCEDURE exec_row_movement_interval_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.

 **Note:**

Once the rows have been moved, you should [truncate the temporary Group 1 tables](#), [run the Group 1 verification script again](#), and check the generated log file to ensure that there are no more open instances.

4. You can now proceed to [dropping the Group 1 partitions](#).
5. Trigger row movement for Group 2.

Execute one of the following procedures to move rows for Group 2 tables, depending on whether the schema is range or interval partitioned:

- For range partitions:

```
sqlplus soainfra
SQL> PROCEDURE exec_row_movement_2( partition_name in varchar2,
new_partition_date in timestamp );
```

- For interval partitions:

```
sqlplus soainfra
SQL> PROCEDURE exec_row_movement_interval_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.

 **Note:**

Once the rows have been moved, you should [truncate the temporary Group 2 tables](#), [run the Group 2 verification script again](#), and check the generated log file to ensure that there are no more open instances.

6. You can now proceed to [drop the Group 2 partitions](#).

14.4.11 Routines to Assist with Partition Maintenance

Oracle SOA Suite includes several routines to assist with the database side of partition maintenance. Routines include scripts to enable and disable foreign keys, alter intervals for interval-partitioned tables, and restore rows after row movement.

The row movement and other partition maintenance routines were included in 12.1.3 through patch 21181834. The routines have been included in 12.2.1 through patch 21520523. The following routines are described below:

Row Restore (verify_soa.exec_row_restore_1)

This routine is used to restore the Group 1 table partition keys back to their original values. You can run the row restore routine once the flows have been row-migrated, and the appropriate partitions have been dropped. Once the routine completes successfully, you can execute the Row Restore Truncate routine.

```
BEGIN
  verify_soa.exec_row_restore_1;
END;
```

Row Restore Truncate (verify_soa.trunc_verify1_rst_temp_tables)

This routine truncates the table `verify_r_group1`. Run this only after the Row Restore routine has been successfully run. The Row Restore routine should be repeated until successful. Once you run Row Restore Truncate, the Row Restore routine cannot be repeated. (NOTE: Consider backing up table `verify_r_group1` prior to the truncation).



Note:

Consider backing up the table `verify_r_group1` before running the truncate routine.

```
BEGIN
verify_soa.trunc_verify1_rst_temp_tables;
END;
```

Alter Interval (verify_soa.alter_interval)

Use this routine to alter the interval for Interval partitioned tables. The routine generates a SQL script in the `PART_DIR` directory. The SQL script can then be executed by the `SOAINFRA` user.

Step 1: Generates the SQL Script

```
set echo on;
set serverout on;
/*
NUMTOYMINTERVAL(1, 'MONTH')
NUMTODSINTERVAL(1, 'DAY')
NUMTODSINTERVAL(7, 'DAY')
*/
begin
  verify_soa.alter_interval('NUMTODSINTERVAL(1, 'DAY')');
end;
```

Step 2: Runs the Generated SQL Script

```
SQL> @SOA_ALTER_INTERVAL_GROUP1.SQL
```

Alter Foreign Keys (verify_soa.alter_FK)

Use to disable the foreign keys before dropping a partition, and then to re-enable the foreign keys after the partition drop command. The routine generates two SQL scripts in the `PART_DIR` directory. The SQL scripts can be customized to suite your performance requirements. The SQL scripts must be run as the `SOAINFRA` user.

Step 1: Generates the SQL Scripts:

```
set echo on;
set serverout on;
begin
  verify_soa.alter_fk;
end;
```

Step2: Runs the enable and disable commands, as required:

```
SQL> @SOA_DISABLE_FK.SQL
SQL> @SOA_ENABLE_FK.SQL
```

Update Global Indices

The partition maintenance scripts execute the drop partition statements with the update global index clause. This clause avoids the need for the indices to be rebuilt, but causes contention. To avoid the contention, perform partition maintenance during off-peak hours or maintenance window.

14.4.12 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 [Deleting Large Numbers of Flow Instances_ Adapter Reports_ and Fault Alerts](#).

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.

14.5 Removing Records from the Runtime Tables Without Dropping the Tables

The truncate scripts (`truncate_soa_oracle.sql` and, for the Java database provided with the Oracle SOA Suite Quick Start installation, `truncate_soa_javadb.sql`) enable 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 scripts are 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 scripts provide 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
```


15

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:

- [Introduction to the Diagnostic Frameworks](#)
- [Executing Oracle SOA Suite Diagnostic Dumps](#)
- [Executing Diagnostic Framework Thread Dumps for SOA Composite Applications](#)
- [Supported DMS Metrics](#)
- [Creating Watches and Notifications](#)
- [Manually Triggering and Executing Dumps](#)
- [Viewing Incident Packages with ADR Tools](#)
- [Querying Problems and Incidents](#)

For information about troubleshooting, see [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.

15.1 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 collecting SOA-specific diagnostic information that is formatted for viewing and analysis. These data dumps can be uploaded as part of a Service Request (SR).

15.1.1 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 monitor runtime logs and metrics. This data enables you to isolate and diagnose faults when they occur.

For more information about WLDF, see *Configuring and Using the Diagnostics Framework for Oracle WebLogic Server*.

15.1.1.1 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 25%. 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 [Creating Watches and Notifications](#) and Section "Configuring the Diagnostic Framework" of *Administering Oracle Fusion Middleware*.

15.1.1.2 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 15-1](#) provides details about the supported diagnostic scenarios and the MBeans to use for monitoring.

Table 15-1 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 15-2](#) lists some of the available MBeans and DMS Metrics to select when creating watches for monitoring diagnostic data.

Table 15-2 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.JRokitRuntimeMBean | For memory statistics | Yes | -- |
| oracle.fabric.management.wldf.mbean.DeploymentWatchMXBeanImpl | For deployment elapsed time | -- | SOA MBean |
| weblogic.management.runtime.ServerRuntimeMBean | For health state information | Yes | -- |
| weblogic.management.runtime.JDBCDataSourceRuntimeMBean weblogic.management.runtime.JTARuntimeMBean | For JDBC data sources and for accessing transaction runtime characteristics | Yes | -- |

For more information about Oracle WebLogic Server MBeans, see *MBean Reference for Oracle WebLogic Server*.

15.1.2 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 15-1](#). 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 tools such as ADRCI, and analyzed.

ADRCI enables you to view the names of the dump files. 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 includes a selection of diagnostic dumps for both Oracle WebLogic Server and Oracle SOA Suite. For information about these dumps, see Investigating, Reporting, and Solving a Problem in *Administering Oracle Fusion Middleware*.

In addition to these dumps, several Oracle SOA Suite dumps are also supported. For information about Oracle SOA Suite dumps, see [Executing Oracle SOA Suite Diagnostic Dumps](#).

For more information about solving problems, incidents, and WLDF and Diagnostic Framework integration, see Diagnosing Problems in *Administering Oracle Fusion Middleware*.

For more information about ADR, see [Viewing Incident Packages with ADR Tools](#).

15.1.2.1 Controlling the Number of Incident Packages

If you have a recurring problem in Oracle SOA Suite, this can cause 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 limit the number of incident packages generated. For more information, see [Configuring the Diagnostic Framework](#) in *Administering Oracle Fusion Middleware*.

15.1.3 Predefined Incident Processing Rules

When you create a watch in the Oracle WebLogic Server Administration 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 [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 15-1](#), you must work with Oracle Support Services to obtain a copy of the customized incident processing rules file. You can place the customized rules file (for example, named `custom-rules.xml`) 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 SOA composite applications in the SOA Infrastructure.
- `application_name#name.xml`: Application scoped. Everything before the # is treated as the application name. For a rules file to be associated with an application, that application must have its own deployment in the Oracle WebLogic Server `config.xml` file. A SOA composite application does not have its own entry as an Oracle WebLogic Server deployment. Therefore, it cannot have a Diagnostic Framework rules file associated with it. For example, `myrules.xml` is scoped to Oracle WebLogic Server and can only generate root level diagnostic dumps. `soa-infra#rules.xml` is SOA scoped and can generate SOA diagnostic dumps. Both could generate incidents coming from a SOA composite application error.

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')
```

The following example 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` diagnostic dump is executed. A restart of the system to load the rules actually disturbs the accuracy of diagnostic data collected.

```

<?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>

```

15.2 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 15-3](#).

Table 15-3 Oracle SOA Suite Diagnostic Dumps

| Dump | Description |
|----------------------|---|
| soa.env | Runtime environment dumps. |
| soa.config | Runtime platform configuration dumps. |
| soa.db | Database dumps. |
| soa.composite | Deployed composite metadata dumps. |
| soa.composite.trail | Instance audit trail dumps. |
| soa.edn | Event dumps. |
| soa.wsdl | Deployed composite WSDL/schema cache dumps. |
| 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. |

Table 15-3 (Cont.) Oracle SOA Suite Diagnostic Dumps

| Dump | Description |
|----------------------|---|
| 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
```

15.2.1 Listing the Dumps

To list the dumps:

1. Connect to the managed server on which the SOA Infrastructure is installed.

```
wls:/offline>connect('user_name','password','t3://myhost.us.example.com:8001')

Connecting to t3://myhost.us.example.com: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
```

```
adf.ADFConfigPropertiesDump
bpel.apd
bpel.apt
bpel.dispatcher
mediator.resequencer
soa.adapter.connpool
soa.adapter.ra
soa.adapter.stats
soa.composite
soa.composite.trail
soa.config
soa.db
soa.edn
soa.env
soa.wsdl
webservices.servlet
```

Use the command `describeDump (name=dumpName)` for help on a specific dump.

The Oracle SOA Suite dumps are described in subsequent sections of this chapter.

For more information about Diagnostic Framework dumps, see Managing Log Files and Diagnostic Data in *Administering Oracle Fusion Middleware*.

15.2.2 Runtime Environment Diagnostic Dumps (soa.env)

Table 15-4 provides details about runtime environment diagnostic dumps.

Table 15-4 Runtime Environment Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------|--|--|
| soa.env | <ul style="list-style-type: none"> Dump parameters: None Dump Mode: ASYNC_SYNC | <ul style="list-style-type: none"> 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). 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. 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. Patch inventory Oracle Coherence messaging mode: Either unicast or multicast. |

15.2.2.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of `soa.env`.

```
wls:/soainfra/serverConfig> describeDump (name='soa.env', appName='soa-infra')
```

```
wls:/soainfra/serverConfig> executeDump (name='soa.env', appName='soa-infra')
```


15.2.3 Runtime Platform Configuration Diagnostic Dumps (soa.config)

Table 15-5 provides details about runtime platform configuration diagnostic dumps.

Table 15-5 Runtime Platform Configuration Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|------------|---|---|
| soa.config | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> zip: (Optional) Supports the following values: <ul style="list-style-type: none"> - true: (Default value) Zips the output file and artifacts into one ZIP file. - false: Writes the dump text file and artifacts to the dump path location without compressing them into one ZIP file. 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. Dump Mode: <ul style="list-style-type: none"> ASYNC_SYNC | <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"> • adapter-config.xml • b2b-config.xml • bpel-config.xml • bpmn-config.xml • businessrules-config.xml • cep-config.xml • edn-config.xml • mediator-config.xml • soa-infra-config.xml • workflow-config.xml • workflow-identity-config.xml • workflow-notification-config.xml |

15.2.3.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of soa.config:

```
wls:/soainfra/serverConfig> describeDump (name='soa.config',
appName='soa-infra')
```

```
wls:/soainfra/serverConfig> executeDump (name='soa.config', appName='soa-infra')
```

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 (for example, named `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'})
```

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

```

4. 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'})

```

15.2.4 Database Diagnostic Dumps (soa.db)

[Table 15-6](#) provides details about database diagnostic dumps. The types of database information captured includes data shape information such as counts by state and growth patterns for Oracle SOA Suite schemas and the MDS schema.

Table 15-6 Database Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------|--|--|
| soa.db | <ul style="list-style-type: none"> Dump parameters: None Dump Mode: ASYNC_SYNC | <p>BPEL database table growth data using JDBC-based access to execute the query and dump the result:</p> <pre>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')</pre> |

15.2.4.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of soa.db:

```
wls:/soainfra/serverConfig> describeDump (name='soa.db', appName='soa-infra')
```

```
wls:/soainfra/serverConfig> executeDump (name='soa.db', appName='soa-infra')
```

This dump shows the query string and records from the result set.

15.2.5 Deployed Composite Metadata Diagnostic Dumps (soa.composite)

[Table 15-7](#) provides details about deployed composite metadata diagnostic dumps. The types of information captured includes the current composite processed when an incident occurs, MDS artifact references (for example, namespace exports), and abnormal transactions.

Table 15-7 Deployed Composite Metadata Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-------------------|---|--|
| soa.compo site | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> flowid (Optional): When present, locates the flowtrace.xml file that includes the flow ID. It can be obtained from a dump context if not specified as a dump parameter. The following rules apply for actual parameter evaluation: <ol style="list-style-type: none"> 1) If the flow ID is available (as a dump parameter or obtained from a dump context), it retrieves the flow instance and gets the flow trace. It uses the ECID associated with the flow instance to retrieve the remaining dump artifacts. 2) If the flow ID is unavailable, but the ECID is (as a dump parameter or obtained from a dump context), it is used to look up the flow instance and retrieve the flow trace. It uses the ECID to retrieve other dump artifacts. 3) If both the flow ID and ECID are available, and the ECID is not equal to the flow's ECID, the ECID is ignored and a warning is displayed. Rule 1 is followed. 4) If both the flow ID and ECID are not available, an exception error is displayed. 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. 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. 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. revision: (Optional) Composite revision (for example, 1.0) that includes MDS recorded artifacts to dump. If not specified, the default composite revision as specified in deployed-composites.xml is assumed. A wild card (*) to match any revision is supported. zip: (Optional) Whether to compress the dump output into a ZIP file. The following values are supported: <ul style="list-style-type: none"> - true: (Default value) Compresses dump files into one ZIP file. - false: Writes the dump to a text file and artifacts to the dump path location without compressing them into one ZIP file. | <p>Per composite metadata from MDS:</p> <ul style="list-style-type: none"> All the MDS recorded artifacts for the specified composites. The text dump file contains logging information about which composite's MDS artifacts are dumped and to where. All dump files compressed into one ZIP file. User-specified output file location for WLST use. One or more generated scratch_entries.txt files. The scratch_entries.txt file is a per composite file containing a 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). <p>The location of the scratch area is indicated by the composite-revision element in deployed-composites/depoyed-composites.xml.</p> <ul style="list-style-type: none"> 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. |

Table 15-7 (Cont.) Deployed Composite Metadata Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------|---|----------------------|
| | <ul style="list-style-type: none"> - output: (Optional) Alternate directory location to which to write dump files. If not specified, the diagnostic dump uses the Diagnostic Framework dump path. • Dump Mode: ASYNC_SYNC | |

15.2.5.1 WLST Command Dump Description and Execution

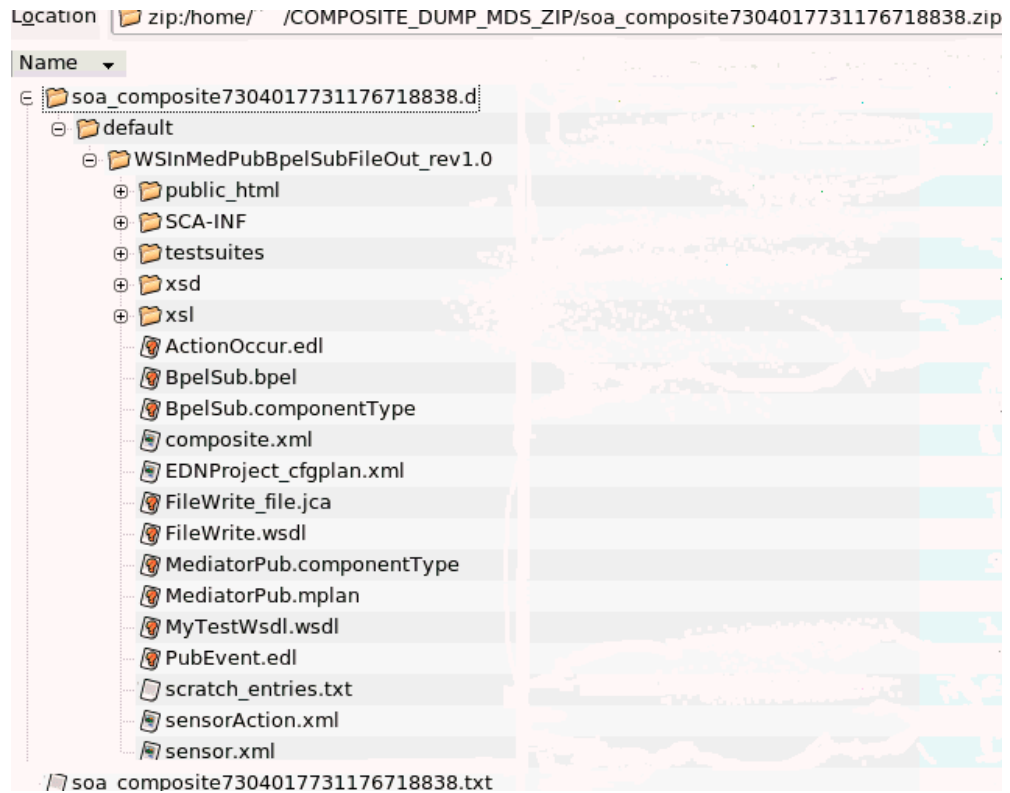
1. Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of `soa.composite`:

```
wls:/soainfra/serverConfig> describeDump (name='soa.composite'
, appName='soa-infra')
```

```
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'})
```

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',  
appName='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.



15.2.6 Instance Audit Trail Diagnostic Dumps (soa.composite.trail)

[Table 15-8](#) provides details about instance audit trail diagnostic dumps. The type of information captured includes the business flow instance audit trail, individual service component audit trails, faults, and sensors information associated with the message flow identified by the ECID.

Table 15-8 Instance Audit Trail Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|---------------------|--|--|
| soa.composite.trail | <ul style="list-style-type: none"> • Dump parameters: <ul style="list-style-type: none"> flowid (Optional): When present, locates the <code>flowtrace.xml</code> file that includes the flow ID. It can be obtained from a dump context if not specified as a dump parameter. The following rules apply for actual parameter evaluation: <ol style="list-style-type: none"> 1) If the flow ID is available (as a dump parameter or obtained from a dump context), it retrieves the flow instance and gets the flow trace. It uses the ECID associated with the flow instance to retrieve the remaining dump artifacts. 2) If the flow ID is not available, but the ECID is (as a dump parameter or obtained from a dump context), it is used to look up the flow instance and retrieve the flow trace. It uses the ECID to retrieve other dump artifacts. 3) If both the flow ID and ECID are available, and the ECID is not equal to the flow's ECID, the ECID is ignored and a warning is displayed. Rule 1 is followed. 4) If both the flow ID and ECID are not available, an exception error is displayed. ecid (Optional): The execution content ID for tracking message flow across multiple business flow instances. • zip (Optional): The following values are supported: <ul style="list-style-type: none"> - true: (Default value) Compresses dump files into one ZIP file. - false: Writes the dump to a text file and artifacts to the dump path location without compressing them into one ZIP file. • Dump Mode: <ul style="list-style-type: none"> ASYNC_SYNC | <ul style="list-style-type: none"> • The top level audit trail associated with the flow ID or ECID and the audit trails at the business flow instances level. All are written in a file per business flow instance. The main dump file logs entries for each of the individual dump artifacts (for example, for a business flow 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). <p>This dump is for the execution of message routing triggered by an inbound message.</p> • Business flow instances information. • Information for each business flow instance. • Faults related to the ECID are dumped into a dedicated faults file. • Sensor instances information for each business flow instance. |

15.2.6.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of `soa.composite.trail`:

```
wls:/soainfra/serverConfig> describeDump (name='soa.composite.trail'
, appName='soa-infra')
```

```
wls:/soainfra/serverConfig> executeDump (name='soa.composite.trail',
```



```
appName='soa-infra', args={'flowid':'3','output':'/scratch/myhome/staging_
area/SOA_TRAIL_12C_DUMP_ZIP/'})
```

For information about obtaining the ECID, see [Monitoring the Flow Trace of a Business Flow Instance](#).

15.2.7 Event Diagnostic Dumps (soa.edn)

[Table 15-9](#) provides details about event diagnostic dumps. The types of information captured include EDN business event bus status information and EDN database log records.

Table 15-9 Event Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------|---|---|
| soa.edn | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> ecid: Dumps the publisher and subscriber information associated with the ECID. flowid: Dumps the publisher and subscriber information associated with the flow ID. Dump Mode: <ul style="list-style-type: none"> ASYNC_SYNC | <ul style="list-style-type: none"> Global EDN configuration information such as retry interval, maximum retries, EDN work manager class, EDN work manager JNDI name, default JMS configuration, user-defined event type-to-JMS configuration mappings, current durable flag, current JMS type, current default event priority, EDN bus class, EDN bus status, and others. All publishers information such as composite information, component information, and publisher event information (destination, persistence flag, time to live, priority, and JCA reference information). All subscribers information such as composite information, component information, and subscriber event information (subscriber name, durable flag, event target information, per subscriber poller thread number, event filter, run as role, JCA service information, and others). <p>All information is written to the dump text file.</p> |

15.2.7.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of soa.edn.

```
wls:/soainfra/serverConfig> describeDump(name='soa.edn', appName='soa-infra')
```

```
wls:/soainfra/serverConfig> executeDump(name='soa.edn', appName='soa-infra')
```

2. Enter the following WLST command with the flowid parameter set. This parameter captures the publisher and subscriber information associated with the flow:

```
wls:/soainfra/serverConfig>
executeDump(name='soa.edn', appName='soa-infra', args={'flowid':'10002'})
```

3. Enter the following WLST command without the flowid and ecid parameters. Not specifying these parameters lists the publisher and subscriber deployed.

```
wls:/soainfra/serverConfig> executeDump(name='soa.edn', appName='soa-infra')
```

 **Note:**

- 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.

15.2.8 Deployed Composite WSDL/Schema Cache Diagnostic Dumps (soa.wSDL)

[Table 15-10](#) provides details about service definition information cached for composites that match the specified parameters: composite name, partition, and revision.

Table 15-10 Deployed Composite WSDL/Schema Cache Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|--------------|--|---|
| soa.wsd 1 | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> flowid (Optional): When present, locates the <code>flowtrace.xml</code> file that includes the flow ID. It can be obtained from a dump context if not specified as a dump parameter. The following rules apply for actual parameter evaluation: <ol style="list-style-type: none"> 1) If the flow ID is available (as a dump parameter or obtained from a dump context), it retrieves the flow instance and gets the flow trace. It uses the ECID associated with the flow instance to retrieve the remaining dump artifacts. 2) If the flow ID is not available, but the ECID is (as a dump parameter or obtained from a dump context), it is used to look up the flow instance and retrieve the flow trace. It uses the ECID to retrieve other dump artifacts. 3) If both the flow ID and ECID are available, and the ECID is not equal to the flow's ECID, the ECID is ignored and a warning is displayed. Rule 1 is followed. 4) If both the flow ID and ECID are not available, an exception error is displayed. ecid: (Optional) ECID for tracking message flow across multiple business flow instances. When present, this parameter locates any associated composites. Other composite matching parameters are ignored. The ECID is obtained from the dump context, if not specified as a dump parameter. compositeName: (Optional) Composite name that includes key service definition information (WSDLs) to dump, including WSDLs and XSDs referenced. If a value is not specified (null or blank), <code>compositeName</code> assumes a wild card (*). A wild card (*) to match any composite is supported. partition: (Optional) Partition name in which the composite is deployed. If not specified, the default composite's partition specified in the <code>deployed-composites.xml</code> file is assumed. A wild card (*) to match any partition is supported. 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 | <ul style="list-style-type: none"> Composite distinguished name (DN). For example: <code>compositeDN:partition_1/WSInMedPubBpelSubFileOut!1.0*soa_8a169ab1-395a-4b87-9986-9fa2742a8bd3</code>. Is it the default in the series. Composite name. Composite state (on or off). Composite mode (active or retired). The qualified name and the target namespace for all service definitions (including those from shared WSDLs): <code>javax.wsdl.Definition</code> objects: <ul style="list-style-type: none"> - Service name: <code>QName</code> <code>javax.wsdl.Definition.getQName()</code> - Target namespace: <code>javax.wsdl.Definition.getTargetNamespace()</code> SchemaManager state variables: <ul style="list-style-type: none"> - <code>SchemaManager.isPostDeploy()</code> - <code>SchemaManager.isShared()</code> - <code>SchemaManager.schemaAddedSinceLastBuild()</code> XML schema definitions referenced by service definitions: <ul style="list-style-type: none"> - The message type <code>QName</code> - The message type <code>SchemaTargetNamespace</code> - The message type <code>TargetNS</code> |

Table 15-10 (Cont.) Deployed Composite WSDL/Schema Cache Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------|--|----------------------|
| | <p>default composite as specified in the <code>deployed-composites.xml</code> file is assumed. A wild card (*) to match any revision is supported.</p> <ul style="list-style-type: none"> Dump Mode: ASYNC_SYNC | |

15.2.8.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to display a dump description and the available parameters and execute a dump of `soa.wSDL`:

```
wls:/soainfra/serverConfig> describeDump(name='soa.wSDL', appName='soa-infra')
```

```
wls:/soainfra/serverConfig> executeDump(name='soa.wSDL', appName='soa-infra', arg=('compositeName':'WSInMedPubBpelSubFileOut', 'revision':'1.0', 'partition':'partition_1'))
```

15.2.9 Dispatcher Static Configuration Diagnostic Dumps (bpel.dispatcher)

Table 15-11 provides details about dispatcher static configuration diagnostic dumps.

Table 15-11 Dispatcher Static Configuration Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------------|--|---|
| bpel.dispatcher | <ul style="list-style-type: none"> Dump parameters: format: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format. Dump Mode: ASYNC_SYNC <p>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 produces diagnostic information.</p> | <p>Static pool configurations (dispatcher configurations)</p> <ul style="list-style-type: none"> Audit, invoke, and nonblocking invoke thread counts Engine and system threads <p>Runtime message queue sizes:</p> <ul style="list-style-type: none"> Total scheduled (messages in the queue awaiting processing) message counts Total working (messages currently being processed) message counts <p>Runtime message queue breakdown sizes (total processed and erred messages, and average message pending and execution time):</p> <ul style="list-style-type: none"> Audit queue Engine queue Invoke queue Nonblocking invoke queue System queue |

15.2.9.1 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 [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')
```

```
wls:/soainfra/serverConfig> executeDump (name='bpel.dispatcher', appName='soa-  
infra')
```

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'})
```

15.2.9.2 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 [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.soainfra.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><scheduled count='0'></scheduled><working count='0'></working>
</invokeQueue></invokeSet><engineSet 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>
</deliveryQueue><instanceQueue><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><scheduled count='0'></scheduled><working count='0'></working>
</non-block-invokeQueue></non-block-invokeSet></dispatcher-trace>
```

15.2.10 Average Instance Processing Time Diagnostic Dumps (bpel.apt)

Table 15-12 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 15-12 Average Instance Processing Time Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------|---|--|
| bpel.apt | <ul style="list-style-type: none"> Dump parameters: format: (Optional) Specify a value of xml to display dump diagnostics output in XML format. Dump Mode: ASYNC_SYNC It is safe to mark this diagnostic dump as ASYNC_SYNC 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 produces diagnostic information. | 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. |

15.2.10.1 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')
```

- 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'})
```

15.2.11 Average Instance Processing Delay Diagnostic Dumps (bpel.apd)

[Table 15-13](#) 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 15-13 Average Instance Processing Delay Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------------------|---|--|
| <code>bpel.apd</code> | <ul style="list-style-type: none"> Dump parameters: <code>format</code>: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format. 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 produces diagnostic information. | <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>Note: The dump described in Average Instance Processing Time Diagnostic Dumps (bpel.apd) 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 Viewing Low Level Request Breakdown Table Details.</p> |

15.2.11.1 WLST Command Dump Description and Execution

 **Note:**

- 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')
```

2. Enter the following WLST command line syntax to execute a dump of `bpel.apd` in XML format:

```
wls:/soainfra/serverConfig> executeDump (name='bpel.apd', appName='soa-  
infra', args={'format':'xml'})
```

15.2.12 Synchronous Process Statistics Diagnostic Dumps (bpel.sps)

[Table 15-14](#) 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 [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 15-14 Synchronous Process Statistics Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------------------|--|---|
| <code>bpel.sps</code> | <ul style="list-style-type: none"> • Dump parameters: <ul style="list-style-type: none"> <code>buffer</code>: (Optional) Specify a value for the buffer range (100-100000). <code>duration</code>: (Optional) Specify a value for the time duration (1 - 10000). <code>format</code>: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format. • Dump Mode: <ul style="list-style-type: none"> <code>ASYNC_SYNC</code> | The minimum, maximum, and average processing time (in milliseconds) and the count of instances processed for synchronous processes. |

15.2.12.1 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.sps`:

```
wls:/soainfra/serverConfig> describeDump (name='bpel.sps', appName='soa-  
infra')
```

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')
```

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'})
```

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'})
```

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'})
```

15.2.13 Asynchronous Process Statistics Diagnostic Dumps (bpel.aps)

[Table 15-15](#) 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 [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 15-15 Asynchronous Process Statistics Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------------------|--|--|
| <code>bpel.aps</code> | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> <code>buffer</code>: (Optional) Specify a value for the buffer range (100-100000). <code>duration</code>: (Optional) Specify a value for the time duration (1 - 10000). <code>format</code>: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format. Dump Mode: <ul style="list-style-type: none"> <code>ASYNC_SYNC</code> | The minimum, maximum, and average processing time (in milliseconds) and count of instances processed for asynchronous processes. |

15.2.13.1 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.aps`:

```
wls:/soainfra/serverConfig> describeDump(name='bpel.aps', appName='soa-infra')
```

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',
appName='soa-infra')
```

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'})
```

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'})
```

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'})
```

15.2.14 Request Statistics Diagnostic Dumps (bpel.rs)

[Table 15-16](#) 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 [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 15-16 Request Statistics Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|----------------------|---|---|
| <code>bpel.rs</code> | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> <code>buffer</code>: (Optional) Specify a value for the buffer range (100 - 100000). <code>duration</code>: (Optional) Specify a value for the time duration (1 - 10000). <code>format</code>: (Optional) Specify a value of <code>xml</code> to display dump diagnostics output in XML format. Dump Mode: <ul style="list-style-type: none"> <code>ASYN_SYNC</code> | 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. |

15.2.14.1 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')
```

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'})
```

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'})
```

15.2.15 Resequencer Group Processing Delay Diagnostic Dumps (mediator.resequencer)

Table 15-17 provides details about resequencer group processing delay diagnostic dumps.

Table 15-17 Resequencer Group Processing Delay Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|----------------------|---|---|
| mediator.resequencer | <ul style="list-style-type: none"> • Dump parameter: <code>resequencerMaxUnprocessTime</code>: (Required) Specify the number of minutes a resequencer group should be inactive before being included in the diagnostic dump. • Dump Mode: <code>ASYNC_SYNC</code> | <p>Group information:</p> <ul style="list-style-type: none"> • Component DN (name) • Operation • Group ID • Group status • Component status • Last received time • Container ID • Pending message count • Last refresh time <p>Container information:</p> <ul style="list-style-type: none"> • Container ID • Resequencer type |

15.2.15.1 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=13330025266
25
,areFieldsSet=true,areAllFieldsSet=true,lenient=true,zone=sun.util.calendar.Z
on
eInfo[id="GMT-07:00",offset=-25200000,dstSavings=0,useDaylight=false,transiti
on
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
]
```

15.2.16 Adapter Diagnostic Dumps (soa.adapter.ra)

Table 15-18 provides details about connection factory configuration dumps.

Table 15-18 Adapter Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|----------------|--|--|
| soa.adapter.ra | <ul style="list-style-type: none"> Dump parameters: <ul style="list-style-type: none"> flowid (Optional): When present, locates the <code>flowtrace.xml</code> file that includes the flow ID. It can be obtained from a dump context if not specified as a dump parameter. The following rules apply for actual parameter evaluation: <ol style="list-style-type: none"> 1) If the flow ID is available (as a dump parameter or obtained from a dump context), it retrieves the flow instance and gets the flow trace. It uses the ECID associated with the flow instance to retrieve the remaining dump artifacts. 2) If the flow ID is not available, but the ECID is (as a dump parameter or obtained from a dump context), it is used to look up the flow instance and retrieve the flow trace. It uses the ECID to retrieve other dump artifacts. 3) If both the flow ID and ECID are available, and the ECID is not equal to the flow's ECID, the ECID is ignored and a warning is displayed. Rule 1 is followed. 4) If both the flow ID and ECID are not available, an exception error is displayed. ecid: (Optional) Specifies the <code>ecid jndiName</code> and <code>adapterType</code>. Dump Mode: <ul style="list-style-type: none"> ASync | <p>Dumps the connection factory information:</p> <ul style="list-style-type: none"> Managed connection factory properties Connection pool properties Transaction support property <p>Indicates if the same JNDI is being used by multiple composites.</p> |

15.2.16.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description of `soa.adapter.ra`:

```
wls:/soainfra/serverConfig> describeDump (name='soa.adapter.ra',
appName='soa-infra')
```

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 = nonworkingDirectory = default
```

15.2.17 Adapter Diagnostic Dumps (soa.adapter.connpool)

[Table 15-19](#) identifies the adapter connection pool dump.

Table 15-19 Adapter Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|----------------------|---|--|
| soa.adapter.connpool | <ul style="list-style-type: none"> Dump parameters: flowid (Optional): When present, locates the flowtrace.xml file that includes the flow ID. It can be obtained from a dump context if not specified as a dump parameter. The following rules apply for actual parameter evaluation: <ol style="list-style-type: none"> 1) If the flow ID is available (as a dump parameter or obtained from a dump context), it retrieves the flow instance and gets the flow trace. It uses the ECID associated with the flow instance to retrieve the remaining dump artifacts. 2) If the flow ID is not available, but the ECID is (as a dump parameter or obtained from a dump context), it is used to look up the flow instance and retrieve the flow trace. It uses the ECID to retrieve other dump artifacts. 3) If both the flow ID and ECID are available, and the ECID is not equal to the flow's ECID, the ECID is ignored and a warning is displayed. Rule 1 is followed. 4) If both the flow ID and ECID are not available, an exception error is displayed. ecid: (Optional) Specifies the ecid jndiName, adapterType compositeName, partition, revision adapterType, and jndiName. Dump Mode: ASYNC | Dumps the connection pool statistics for the configured connection factory JNDI. |

15.2.17.1 WLST Command Dump Description and Execution

1. Enter the following WLST command line syntax to display a dump description of soa.adapter.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 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. |
| flowid | LONG | Flow ID, when presents, will be used to locate the flowtrace.xml with it, it can be obtained from dump context if not specified as dump parameter, see rules for actual parameter evaluation for details. |
| 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',
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
```

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

```

15.2.18 Adapter Diagnostic Dumps (soa.adapter.stats)

Table 15-20 identifies the adapter diagnostic dump.

Table 15-20 Adapter Diagnostic Dumps

| Dump Name | Dump Parameters/Dump Mode | Information Captured |
|-----------------------|--|--|
| soa.adapter.stat s | <ul style="list-style-type: none"> Dump parameters: format: (Optional) Specify a value of xml to display dump diagnostics output in XML format. Dump Mode: ASync | Based on the soa.adapter.stats metrics, DMS statistics such as message size and fault count are available. |

15.2.18.1 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 msec
processIncomingMessages.completed (Elapsed time in milliseconds ) - 2 ops
processIncomingMessages.minTime (Elapsed time in milliseconds ) - 32 msec
processIncomingMessages.maxTime (Elapsed time in milliseconds ) - 4755 msec
processIncomingMessages.avg (Elapsed time in milliseconds ) - 2393.5 msec
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
```

15.3 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 business flow 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.

15.3.1 WLST Command Dump Description and Execution

- Enter the following WLST command line syntax to execute a dump of `jvm.threads`:

```
executeDump (name='jvm.threads',outputFile='path',args={'context':'true'})
```

```
===== THREAD CONTEXT INFORMATION =====
```

| id | ECID | RID | Context Values |
|---------|--|-----|--|
| id=23 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000001d3f | 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:-8000-0000000000000003c | 0 | |
| id=70 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000001e84 | 0 | |
| id=2170 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000001d3f | 0 | DSID=0000J2fPtuDSc Y5Hro2yf1G8M9Z000002 |
| id=1616 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000000004 | 0 | |
| id=2179 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-0000000000000002b | 0 | dbRID=0:10 |
| id=2195 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000001e7e | 0 | dbRID=0:2 |
| id=2196 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000001e82 | 0 | dbRID=0:2 |
| id=2197 | e6e3527fc0d0bfd2:-6c720372:139026855d8:-8000-00000000000001e80 | 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 [Diagnosing Problems in Administering Oracle Fusion Middleware](#).

15.4 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 [Monitoring BPEL Process Service Engine Request and Thread Performance Statistics](#) and [Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine](#).

Table 15-21 shows the supported service engine sensors.

Table 15-21 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. | active schedule | |
| The various request types are audit, delivery, domain, instance, invoke, maintenance, non-block-invoke, process, and system. | | | |
| /soainfra/engines/ 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 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/Task/service | soainfra_wfRequest | time count | Phase Event |
| /soainfra/engines/workflow/Task/[METHOD_NAME] | | time count | Phase Event |
| /soainfra/engines/workflow/TaskQuery/[METHOD_NAME] | | time count | Phase Event |
| /soainfra/engines/workflow/TaskMetadata/getTaskDefinition | | time count | Phase Event |
| /soainfra/engines/workflow/Verification/[METHOD_NAME] | | time count | Phase Event |
| Only methods: authenticateUser, getPermissableTaskActions, and canUserPerfromTaskAction | | | |
| /soainfra/engines/workflow/TaskNotification/notifyForTask | | time count | Phase Event |

Table 15-21 (Cont.) Service Engine Sensors

| Noun Path | Noun Type and Description | Sensor | Type |
|---|---------------------------|-------------------------------------|-------|
| /soainfra/engines/workflow/AssignmentRules/executeRules | | time | Phase |
| | | count | Event |
| /soainfra/engines/bpel/dispatcher/ | soainfra_bpel_dispatcher | maxThreads | State |
| | | avgLifeTime | State |
| | | avgRequestCountPerSecond, and so on | State |

Table 15-22 shows the supported binding sensors.

Table 15-22 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 15-23 shows the supported composite sensors.

Table 15-23 Composite Sensors

| Noun Path | Noun Type | Sensor | Type |
|---|---|---|-------|
| /soainfra/apps/[APP_NAME]/[COMPOSITE_NAME]/[REVERSION]/[COMPONENT_NAME]/decision/[INTERACTION_PATTERN]/[INTERACTION_PATTERN_NAME] | soainfra_decision_interaction | executed | Event |
| | | executionTime | Phase |
| /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 | |

Table 15-23 (Cont.) Composite Sensors

| Noun Path | Noun Type | Sensor | Type |
|--|-----------------------------------|----------------|-------|
| /soainfra/apps/ [APP_NAME]/ [COMPOSITE_NAME]/ [VERSION]/ [COMPONENT_NAME] / outcome/ | soainfra_wfOutcomeEve nt | [OUTCOME NAME] | Event |
| /soainfra/apps/ [APP_NAME]/ [COMPOSITE_NAME]/ [VERSION]/ [COMPONENT_NAME] / taskCompletion/ | soainfra_wfTaskComple tionTime | time | Phase |

Table 15-24 shows the supported reference and service sensors.

Table 15-24 Reference and Service Sensors

| Noun Path | Noun Type | Sensor | Type |
|---|------------------------|--|-------------------------|
| /soainfra/apps/[APP_NAME]/ [COMPOSITE_NAME]/[REVERSION]/ [REFERENCE_NAME] | soainfra_referenc e | processOutboundMessagesEvent s Errors processOutboundMessages | Event Event Phase |
| /soainfra/apps/[APP_NAME]/ [COMPOSITE_NAME]/[REVERSION]/ [SERVICE_NAME] | soainfra_service | processInboundMessagesEvents Errors processInboundMessages | Event Event Event |

Table 15-25 shows the supported Oracle B2B binding sensors.

Table 15-25 Oracle B2B Binding Sensors

| Noun Path | Noun Type | Sensor | Type |
|---|-------------------------------------|--|----------------------|
| /soainfra/bindings/b2b/ document_type/[inbound outbound]/ [DOCUMENT_NAME] | soainfra_b2b_docu ment | processMessagesEvents processMessagesErrors | Event Event |
| /soainfra/bindings/b2b/[inbound outbound] | soainfra_b2b_docu ment_dir | processMessages processMessageSize | Phase Event State |
| /soainfra/bindings/b2b/ trading_partner/[from to]/ [TRADING_PARTNER_NAME] | soainfra_b2b_trad ingPartner | processMessagesEvents processMessagesErrors | Event Event |
| /soainfra/bindings/b2b/[from to]/ | soainfra_b2b_trad ingPartner_dir | processMessages processMessageSize | Phase Event State |
| /soainfra/bindings/b2b/endpoint/ [inbound outbound]/[END_POINT] | soainfra_b2b_endp oint | endPointProtocol endPointStatus | State State |
| /soainfra/bindings/b2b/[inbound outbound]/ | soainfra_b2b_endp oint_dir | processMessagesEvents | Event |

Table 15-25 (Cont.) Oracle B2B Binding Sensors

| Noun Path | Noun Type | Sensor | Type |
|--|---|-----------------------|-------------|
| /soainfra/bindings/b2b/agreement/ [AGREEMENT_NAME] | soainfra_b2b_agre ement | processMessagesEvents | Event |
| /soainfra/bindings/b2b/ activeEntities | soainfra_b2b_acti ve_entities | activeTradingPartners | State |
| | | activeAgreements | State |
| | | activeDocuments | State |
| /soainfra/apps/[APP_NAME]/ [COMPOSITE_NAME]/[REVERSION]/ [SERVICE_NAME]/ [TRADING_PARTNER_NAME] | soainfra_service_ b2b_tradingPartne r | processMessagesEvents | Event |
| | | processMessagesErrors | Event |
| | | processMessages | Phase Event |
| | | processMessageSize | State |
| /soainfra/apps/[APP_NAME]/ [COMPOSITE_NAME]/[REVERSION]/ [REFERENCE_NAME]/ [TRADING_PARTNER_NAME] | soainfra_referenc e_b2b_tradingPart ner | processMessagesEvents | Event |
| | | processMessagesErrors | Event |
| | | processMessages | Phase Event |
| | | processMessageSize | State |

Table 15-26 shows the supported Oracle User Messaging Service sensors.

Table 15-26 Oracle User Messaging Service Event Bridge Metrics

| Noun Path | Noun Type | Sensor | Type |
|---|--------------------------------|---------------|-------------|
| /soainfra/eventBridge/rfidBridge | soinfra_rfidBridg e | eventsIn | Event |
| | | eventsOut | Event |
| | | eventsProcess | Phase Event |
| | | errors | Event |
| /soainfra/eventBridge/rfidBridge/ device/[SERVER_NAME]/[DEVICE_NAME] | soainfra_rfidBrid ge_device | eventsIn | Event |
| | | eventsOut | Event |
| | | eventsProcess | Phase Event |
| | | status | State |
| /soainfra/eventBridge/rfidBridge/ server/[SERVER_NAME] | soainfra_rfidBrid ge_server | status | State |

15.5 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 15-27](#) have been assigned for diagnostic purposes.

- When you manually create a watch in the Oracle WebLogic Server Administration Console, you must follow the naming conventions in [Table 15-27](#). 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 15-27 Message Prefixes

| Scenario | Message-ID | Dumps Executed | Watch Preconfigured? |
|-----------------------------------|------------|---|--|
| Memory | SOA-900000 | <ul style="list-style-type: none"> • <code>soa.env</code> • <code>soa.config</code> • <code>java.sysprops</code> | Yes, see Enabling Preconfigured Rules and Watches |
| Deployment hang | SOA-900001 | <ul style="list-style-type: none"> • <code>soa.env</code> • <code>soa.config</code> | Yes, see Enabling Preconfigured Rules and Watches |
| Data source | SOA-900002 | <ul style="list-style-type: none"> • <code>soa.env</code> • <code>soa.config</code> • <code>soa.db</code> | No, see Manually Creating Oracle SOA Suite Watches and Notifications for creation instructions |
| Elapsed time of web service calls | SOA-900003 | <ul style="list-style-type: none"> • <code>soa.env</code> • <code>soa.config</code> • <code>soa.wSDL</code> | Yes, see Enabling Preconfigured Rules and Watches |
| Resequencer groups pending | MED-900000 | <ul style="list-style-type: none"> • <code>mediator.resequencer</code> | No, see Manually Creating Oracle SOA Suite Watches and Notifications 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.

15.5.1 Enabling Preconfigured Rules and Watches

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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.
- 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 WLST Command and Variable Reference in *WLST Command Reference for WebLogic Server*.
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 *WLST Command Reference for SOA Suite*.

15.5.2 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 |
|---------------------|--|
| Watch Name | <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:</p> <pre>message-id#soa-infra#some_other_text</pre> <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 Table 15-27.</p> <p>If the watch is set up with the FMWDFW notification, the notification handler creates an incident that corresponds to the <i>message-id</i> specified in the watch name.</p> |
| Watch Type | <p>Select an option:</p> <ul style="list-style-type: none"> • Collected Metrics: 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 Table 15-1. • Server Log: Sets a watch based on data written to server logs. This type is only useful for extending an existing log watch such as <i>StuckThread</i> to include Oracle SOA Suite dumps. • Event Data: This option is not applicable because Oracle SOA Suite is not using any WLDF-based instrumentation. |
| Enable Watch | 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.JRokitRuntimeMBean** is selected).

Create Watch

Add Expression

The following expressions will be used to identify your Watch rule.

What MBean type would you like to select?

Select an MBean Type from the following list

MBean Type:

Enter a custom MBean Type

Custom MBean Type:

 **Note:**

If you want to create an automatic notification when a composite state is set to off, select **oracle.fabric.management.composite.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 |
|--------------------------|---|
| Message Attribute | <p>Select a message attribute (for this example, HeapFreePercent 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:</p> <pre>oracle.dms.name=/soainfra/engines/bpel/request/system.type=soa_infra_bpel_requests</pre> <p>You see assigned attributes such as active_count, active_maxValue, active_minValue, scheduled_count, and others.</p> |
| Operator | Select an operator (for this example, < is selected). |
| Value | Enter a value (for this example, 100 is specified). |

The Configure Watch Rule Expressions page is displayed with the watch rule expression you created.

The screenshot shows the 'Create Watch' dialog box with the 'Configure Watch Rule Expressions' step. At the top, there are buttons for 'Back', 'Next', 'Finish', and 'Cancel'. Below this, the section is titled 'Configure Watch Rule Expressions' with the instruction 'Add expressions to create the rule for your watch'. A text area labeled 'Current Watch Rule:' contains the following expression: `{ ${ServerRuntime//[weblogic.management.runtime.JRockitRuntimeMBean] //HeapFreePercent} < 100 }`. To the right of the text area is an 'Edit' button. Below the text area, there is an 'Expressions:' section with a list of buttons: 'Add Expressions', 'Combine', 'Uncombine', 'Move Up', 'Move Down', 'Remove', and 'Negate'. A single expression is listed: `{ ${ServerRuntime//[weblogic.management.runtime.JRockitRuntimeMBean] //HeapFreePercent} < 100 }`. Below this list are the same buttons as above. At the bottom of the dialog are buttons for 'Back', 'Next', 'Finish', and 'Cancel'.

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 **>**.

The screenshot shows the 'Create Watch' dialog box with the 'Configure Watch Notifications' step. At the top, there are buttons for 'Back', 'Next', 'Finish', and 'Cancel'. Below this, the section is titled 'Configure Watch Notifications' with the instruction 'Assign notifications to your watch'. The text 'Please choose notifications' is displayed. There are two columns: 'Notifications: Available:' and 'Chosen:'. The 'Chosen:' column contains a single entry: `FMWDFW-notification`. Between the two columns are four arrow buttons: a right-pointing arrow, a double right-pointing arrow, a left-pointing arrow, and a double left-pointing arrow. At the bottom of the dialog are buttons for 'Back', 'Next', 'Finish', and 'Cancel'.

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 [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.

Use this page to add watches to the current diagnostic module and to configure those watches. Click the name of an existing watch to configure that watch.

[Customize this table](#)

Watches

New Delete Showing 1 to 5 of 5 Previous | Next

| <input type="checkbox"/> | Name | Type | Enabled | Alarm Type |
|--------------------------|--------------------------------------|-------------------|---------|-----------------|
| <input type="checkbox"/> | Deadlock | Server Log | true | Automatic Reset |
| <input type="checkbox"/> | SOA-900000#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 |

New Delete Showing 1 to 5 of 5 Previous | Next

21. In the **Name** column, click the specific watch name to display configuration details about the watch.

15.5.3 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 strict 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 [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 [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.

- 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.wlwf.mbean.WSExternalBindingWatchMXBeanImpl]//
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 example:

```
WatchDomainName:      soainfra
Watch Data:
ServerRuntime//[oracle.fabric.management.wlwf.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 [Enabling Preconfigured Rules and Watches](#).

15.5.4 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 [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(invokeSet)(invoke)(scheduled)` in the **Attribute Expression** field.
- Complete the remaining fields on this page, and click **Next**.

15.5.5 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 [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.dfw.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, `custom-rule.xml`, to register the dump generation rules. For more information, see [Predefined Incident Processing Rules](#).

1. Create a watch, as described above.
2. Create a file named `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 15-1](#) provides a resequencer sample file.
4. Restart the domain or load the file dynamically. For information about dynamic loading, see [Predefined Incident Processing Rules](#).

The WLDF generates the dump.

Example 15-1 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>
```

[Example 15-1](#) shows a sample custom rules file that generates a diagnostic dump when the length of time a group stops processing messages reaches 10 minutes.

15.6 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:

1. 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',outputFile='path',
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/incid
ent/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
```

2. Specify the `executeDump` command to display dump contents to the screen.

```
executeDump(name='soa.edn', appName='soa-infra')
```

```
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
Interfacelmpt@163bd717
SharedEDN:false
OOAO Queue Name:edn_oaoo_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 *Diagnostic Framework Custom WLST Commands* in *WLST Command Reference for Infrastructure Components*.

15.7 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 ADRCI: ADR Command Interpreter in *Oracle Database Utilities*.

For information about diagnosing and resolving problems, see *Oracle Database Administrator's Guide* in .

15.8 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:

- About the Diagnostic Framework in *Administering Oracle Fusion Middleware*
- Diagnostic Framework Custom WLST Commands in *WLST Command Reference for Infrastructure Components*

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:

- [Configuring BPEL Process Service Components and Engines](#)
- [Monitoring BPEL Process Service Components and Engines](#)
- [Managing BPEL Process Service Components and Engines](#)

16

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 and audit trail threshold, 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 topics:

- [Configuring BPEL Process Service Engine Properties](#)
- [Configuring Automatic Recovery for Oracle BPEL Process Manager](#)
- [Configuring Master Node Recovery Scheduling](#)
- [Configuring Automatic Recovery Attempts for Invoke and Callback Messages](#)
- [Preserving the Order of Callback Messages](#)
- [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 *Tuning Performance*.

16.1 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... |
|---|---|
| a. Select SOA Administration > BPEL Properties . | a. Right-click soa-infra . |
| | b. Select SOA Administration > BPEL Properties . |

The BPEL Service Engine Properties page displays properties for setting the audit level, audit trail and large document thresholds, payload schema, and BPEL monitors and sensors.

The screenshot shows the SOA Infrastructure web console. At the top, it indicates the user is logged in as 'weblogic' and the page was refreshed on Feb 21, 2014 at 9:32:16 AM IST. The main heading is 'BPEL Service Engine Properties'. Below this, there are 'Related Links' and 'Apply' and 'Revert' buttons. The 'Properties' section contains several configuration options:

- * Audit Level: A dropdown menu currently set to 'Inherit'.
- * Audit Trail Threshold (Byte): A text input field containing '50000'.
- * Large Document Threshold (Byte): A text input field containing '100000'.
- * Payload Validation: A checkbox that is currently unchecked.
- * Disable BPEL Monitors and Sensors: A checkbox that is currently unchecked.

At the bottom of the configuration area, there is a link that says 'More BPEL Configuration Properties...'.

2. Make changes to the service engine properties that are appropriate to your environment.

| Property | Description |
|---------------------------------|--|
| Audit Level | <p>Select one of the following options:</p> <ul style="list-style-type: none"> • Off: Business flow instance tracking and payload tracking information is not collected. • Inherit: 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. • Minimal: 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. • Production: 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. • Development: Allows both business flow instance tracking and payload tracking. All events are logged. However, it may have an impact on performance. This level is intended for debugging and can impact system performance. |
| Audit Trail Threshold | <p>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 View XML link is shown in the audit trail instead of the payload.</p> |
| Large Document Threshold | <p>Enter the maximum size for a BPEL variable before its contents are stored in a separate location from the rest of the instance scope data.</p> |

| Property | Description |
|--|---|
| Payload Validation | Select to enable validation of inbound and outbound messages. Nonschema-compliant payload data is intercepted and displayed as a fault. Note: 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. |
| Disable BPEL Monitors and Sensors | Select this checkbox to disable all BPEL monitors and sensors defined for all BPEL components across all deployed SOA composite applications. |

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.
 - **AsyncAuditBatchSize:** Stores multiple audit trail messages (across instances) in a single transaction on Oracle Exalogic platforms. For more information, see [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 *Developing SOA Applications with 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 *Developing SOA Applications with 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 [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 [Configuring Automatic Recovery Attempts for Invoke and Callback Messages](#).
 - **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 *Developing SOA Applications with 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 [Configuring Oracle Coherence Caching](#).
- **RecoveryConfig:** Configures automatic recovery of activities and configures clustered environments to use master node recovery scheduling. For more information, see [Configuring Automatic Recovery for](#) and [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 [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 *Developing SOA Applications with Oracle SOA Suite*.

5. Make changes appropriate to your environment.

For more information about Oracle BPEL process tuning and performance parameters, see *Tuning Performance*.

16.2 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 |
|--------------------------------|--|
| maxMessageRaiseSize | <p>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.</p> <p>The default value is 50. A 0 value causes no messages to be selected from the database (effectively disabling recovery).</p> <p>Warning: 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.</p> |
| startWindowTime | <p>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).</p> <p>The default value is midnight (00:00). Any invalid parsed time value is defaulted to midnight.</p> |
| stopWindowTime | <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 (04:00), effectively setting recurring recovery to run until 04:00.</p> <p>Any invalid parsed time values default to 00:00.</p> |
| subsequentTriggerDelay | <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> |
| threshHoldTimeInMinutes | <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 threshold time.</p> <p>For automatic activities recovery, this value is used for picking activities with a modification date less than the threshold 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 threshHoldTimeInMinutes.</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.

- Set the following properties to values appropriate to your environment, and click **Apply**.

| Property | Description |
|--------------------------------|--|
| maxMessageRaiseSize | <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> |
| startupRecoveryDuration | <p>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.</p> <p>The default value is 600 (ten minutes). A negative or zero value disables startup recovery.</p> |
| subsequentTriggerDelay | <p>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.</p> <p>The default value is 300 (five minutes). A negative value causes the default to be selected.</p> |

 **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.

16.3 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 11g (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 |
|-----------------------------|--|
| clusterDbTimeRefresh | 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). |
| heartBeatInterval | 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"> • Updates the node's last updated time in the <code>cluster_node</code> table. • Attempts to claim ownership of the master role. • If the master role is claimed, the recovery manager resumes work. • Checks for all nodes that have update times not updated for the nodeReapThreshold value, deletes those nodes from the <code>cluster_node</code> table, and reschedules all expiring work items from this node. |

| Property | Description |
|----------------------------|---|
| masteAliveThreshold | <p>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.</p> <p>The default value is 15 minutes (specified as 900 seconds).</p> |
| nodeReapInterval | <p>Specifies how often the heartbeat thread is borrowed to mark old cluster nodes. Only the master node performs this job.</p> <p>The default value is 2 hours (specified as 7200 seconds).</p> |
| nodeReapThreshold | <p>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.</p> <p>The default value is 15 minutes (specified as 900 seconds).</p> |

16.4 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), two attempts are made to recover each recoverable message. 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 [Performing BPEL Process Service Engine Message Recovery](#).

16.5 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 picked up in the order in which they were received by the BPEL process service engine for a given business flow 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 [Configuring BPEL Process Service Engine Properties](#).

16.6 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:

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 [Introduction to the Order of Precedence for Audit Level Settings](#).

Monitoring BPEL Process Service Components and Engines

This chapter describes how to monitor the flow trace of a business flow instance, the time distribution of BPEL process activities and instances and faults throughput metrics, the service engine requests and thread performance statistics, the deployed BPEL process service components, and the statistics about the time a request spends in the service engine. This chapter includes the following sections:

- [Monitoring the Flow Trace of a Business Flow Instance](#)
- [Monitoring the Time Distribution of BPEL Process Activities and Instance and Fault Throughput Metrics](#)
- [Monitoring BPEL Process Service Engine Request and Thread Performance Statistics](#)
- [Monitoring Deployed BPEL Process Service Components in the Service Engine](#)
- [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:

- [Introduction to Service Components](#)
- [Introduction to Service Engines](#)
- *Tuning Performance*

Note:

You see any type of fault on the Flow Instances page (for example, fault policy faults, BPEL message recovery, rejected messages, EDN faults, and so on). All faults are part of the business flow instance details. For information, see [Tracking Business Flow Instances at the SOA Infrastructure or SOA Folder Level](#).

17.1 Monitoring the Flow Trace of a Business Flow Instance

This section describes how to monitor the flow trace of a business flow instance. The flow trace is a runtime trail of the message flow. A business flow instance corresponds to an end-to-end business transaction. Business flows consist of a single SOA composite application or multiple SOA composite applications connected together to fulfill a specific business process. The flow trace of a business flow instance is identified by a unique flow ID value that is displayed in the **Search Results** table of the Flow Instances page after you invoke a flow instance search.



Note:

This section assumes a business flow instance has been initiated. If not, see [Initiating a Test Instance of a Business Flow](#) for instructions.

To monitor the flow trace of a business flow instance:

Access the Flow Trace page through one of the following options:

1. To access business flow instances in all SOA folders:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| <ol style="list-style-type: none"> a. Select Home. b. Select the Flow Instances tab. c. Click the Search icon to populate the Search Results table with business flow IDs. d. In the Flow ID column, click a specific business flow instance number. | <ol style="list-style-type: none"> a. Expand SOA folder. b. Right-click soa-infra. c. Select Home > Flow Instances. d. Click the Search icon to populate the Search Results table with business flow IDs. e. In the Flow ID column, click a specific business flow instance number. |

2. To access business flow instances in an individual SOA folder:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| <ol style="list-style-type: none"> a. Select Manage SOA Folders. b. In the SOA Folders column, click a specific SOA folder. c. Click the Flow Instances tab. d. Click the Search icon to populate the Search Results table with business flow IDs. e. In the Flow ID column, click a specific business flow instance number. | <ol style="list-style-type: none"> a. Expand SOA > soa-infra. b. Click a specific SOA folder. c. Click the Flow Instances tab. d. Click the Search icon to populate the Search Results table with business flow IDs. e. In the Flow ID column, click a specific business flow instance number. |

The Flow Trace page consists of two sections. Depending on which tab is selected, the top section shows the **Faults**, **Composite Sensor Values**, **Composites**, or **Resequencer** (if an Oracle Mediator resequencer is included in the composite) tabs of the selected flow trace. The bottom section shows the business flow trace.

The **Faults** tab of the Flow Trace page displays the following details:




- A **Faults** table that displays the error message, component that handled the fault, time of the fault, and recovery status (for example, unrecoverable, recovery required, and so on). To display additional columns in the table, select **View > Columns**. If you change the columns in the Flow Instances page, they are also changed in the **Faults** table of the Flow Trace page.

- A **Trace** table that displays the sequence of the message flow through the services, service components, and references that comprise SOA composite applications. Regardless of the tab that you select on the Flow Trace page (**Faults**, **Composite Sensor Values**, **Composites** or **Resequencer** (if an Oracle Mediator resequencer is included in the composite), the **Trace** section is always displayed. To display additional columns in the table, select **View > Columns**. To view the flow trace in XML format, select the **Actions** list.






Flow Trace

This page shows the flow of the message through various composite and component instances.

Flow ID **13**
Started **Nov 24, 20:**

| Faults | | Composite Sensor Values | Composites |
|---|---|-------------------------|--|
| Recover | View | | Flow |
| Error Message | Fault Owner | Fault Time | Recovery |
|  ORAMED-03302:[Exception in oneway execution]Unexpec |  MediatorFileRetry | Nov 24, 2013 8:13:56 PM |  Recovery Required |
| Columns Hidden 8 | | | |































Trace

| Instance | Type | Usage | State | Time | Composite |
|--|-----------|---|--|-------------------------|---------------------------|
|  MediatorFileRetry_ep | Service |  Service |  Completed | Nov 24, 2013 8:13:51 PM | Mediator_File_JavaCallOut |
|  MediatorFileRetry | Mediator | |  Recovery Re | Nov 24, 2013 8:13:51 PM | Mediator_File_JavaCallOut |
|  FileOut | Reference |  Reference |  Completed | Nov 24, 2013 8:13:56 PM | Mediator_File_JavaCallOut |

If the **Audit Level** is set to **Off**, trace details are not captured and the trace table is not displayed. However, instance details for some components are captured. For those components, a flat list of instance details is displayed. This list only has instance details for some components and may not have all components that participated in the flow.

Midprocess receive activities that are triggered by events are displayed in the flow trace. Midprocess receive activities can co-relate multiple flow IDs. The flow trace on the correlating BPEL node can display all the flow IDs that are correlated by that node.

Trace

| Instance | Type | Usage | State | Time | Composite |
|--|-----------|---|--|------------------------|----------------|
|  bplepub_client_ep | Service |  Service |  Completed | May 6, 2014 6:09:04 PM | Project1 [1.0] |
|  BPLEPub >>  SingleEvent | BPEL | |  Completed | May 6, 2014 6:09:04 PM | Project1 [1.0] |
|  SingleEvent >>  BPELSub | BPEL | |  Failed | May 6, 2014 6:09:06 PM | Project1 [1.0] |
|  fileReference | Reference |  Reference |  Failed | May 6, 2014 6:09:06 PM | Project1 [1.0] |
|  SingleEvent >>  BPELSub | BPEL | |  Failed | May 6, 2014 6:09:36 PM | Project1 [1.0] |
|  fileReference | Reference |  Reference |  Failed | May 6, 2014 6:09:36 PM | Project1 [1.0] |
|  SingleEvent >>  BPELSub | BPEL | |  Failed | May 6, 2014 6:10:06 PM | Project1 [1.0] |
|  fileReference | Reference |  Reference |  Failed | May 6, 2014 6:10:06 PM | Project1 [1.0] |
|  SingleEvent >>  BPELSub | BPEL | |  Recovery Required | May 6, 2014 6:10:36 PM | Project1 [1.0] |
|  fileReference | Reference |  Reference |  Failed | May 6, 2014 6:10:36 PM | Project1 [1.0] |

You can perform the following flow trace management tasks:

- [Recovering from Faults in the Flow Trace](#)
- [Viewing Composite Sensor Values in the Flow Trace](#)
- [Viewing the SOA Composite Application in the Flow Trace](#)

- [Viewing the Audit Trail and Process Flow in the Flow Trace](#)
- [Monitoring Fault_Activity_ and Variable Sensors in the Flow Trace](#)
- [Understanding Additional Flow Trace Behavior Scenarios](#)

17.1.1 Recovering from Faults in the Flow Trace

You can perform fault recovery from the **Faults** tab of the Flow Trace page. The fault recovery tasks that you perform are the same as those performed from the **Faults** tab of the Flow Instances page of the SOA Infrastructure or individual SOA folder.

The **Faults** section shows the faults occurring in the services, service components, and references of the SOA composite application displayed in the **Trace** section. Selecting a fault highlights one or more rows in the **Trace** section in which the fault occurred (because multiple rows can correspond to the same fault if they are in the same fault chain). For example, a recoverable fault on a BPEL component can cause failed instances of other components and endpoints downstream. Selecting that BPEL process fault in the **Faults** table highlights all impacted **Trace** section nodes.

To recover from faults in the flow trace:

1. Access the Flow Trace page as described in [Monitoring the Flow Trace of a Business Flow Instance](#).
2. Select a fault in the **Faults** section.

Flow Trace ⓘ
This page shows the flow of the message through various composite and component instances.

Flow ID: 13
Started: Nov

| Faults | | |
|--|-------------------|--|
| Composite Sensor Values | Composites | |
| Recover ▾ | View ▾ | |
| Error Message | Fault Owner | Fault Time Recovery |
| ✖ ORAMED-03302:[Exception in oneway execution]Unexpect | MediatorFileRetry | Nov 24, 2013 8:13:56 PM Recovery Required |

This highlights the row in the **Trace** section in which the fault occurred.

3. Initiate a fault recovery through one of the following options:
 - From the **Recover** list, select a recovery option (for example, **Abort** or **Retry**).
 - In the **Error Message** column, click the error to display a detailed error message and options for performing fault recovery (for example, **Abort** or **Retry**).
 - In the **Recover** column, click **Recovery Required**.

For instructions about recovering from faults, see Step 5 of [Recovering from Faults in a Business Flow Instance](#).

If recovery is successful, the fault is cleared from the **Faults** section and **Trace** section of the Flow Trace page.

17.1.2 Viewing Composite Sensor Values in the Flow Trace

You can view details about composite sensors included in the flow trace of the business flow instance. Composite sensors provide a method for implementing trackable fields on messages. 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.

To view composite sensor values in the flow trace:

1. Access the Flow Trace page as described in [Monitoring the Flow Trace of a Business Flow Instance](#).
2. Click the **Composite Sensor Values** tab to display composite sensors in the business flow instance.

This highlights the row in the **Trace** section in which the composite sensor data was collected. Closing the sensor clears the selection in the **Trace** section.

Flow Trace ⓘ
This page shows the flow of the message through various composite and component instances.

Flow ID **7**
Started **Nov 24, 201**

Faults **Composite Sensor Values** Composites

| Sensor Name | Value | Location | Composite |
|---|-------|----------|-----------|
| No composite sensor values found for this flow. | | | |

Trace

Actions ▾ View ▾ Show Instance IDs

| Instance | Type | Usage | State | Time | Composite |
|-------------------------------|----------|---------|-----------|-------------------------|----------------------------|
| wsrulesfaultprocess_client_ep | Service | Service | Completed | Nov 24, 2013 7:43:40 PM | WlsRulesFaultProject [1.0] |
| WlsRulesFaultProcess | BPEL | | Completed | Nov 24, 2013 7:43:40 PM | WlsRulesFaultProject [1.0] |
| RatingRules | Decision | | Completed | Nov 24, 2013 7:43:40 PM | WlsRulesFaultProject [1.0] |

17.1.3 Viewing the SOA Composite Application in the Flow Trace

You can view the initiating and participating SOA composite applications included in the flow trace of the business flow instance.

To view the SOA composite application in the flow trace:

1. Access the Flow Trace page as described in [Monitoring the Flow Trace of a Business Flow Instance](#).
2. Click the **Composites** tab.

The initiating and participating composites in the flow trace of the business flow instance are displayed. If you set a value for the business flow instance title during design time in Oracle JDeveloper, it is displayed in the **Name** column.

Flow Trace Flow ID 13

This page shows the flow of the message through various composite and component instances.

Started **Nov 24, 2013 8:1**

| Composite | Sequence In Flow | Name | Flow Entered Composite |
|---------------------------------|------------------|------|-------------------------|
| Mediator_File_JavaCallOut [1.0] | Initiating | | Nov 24, 2013 8:13:51 PM |

Trace

| Instance | Type | Usage | State | Time | Composite |
|----------------------|-----------|-----------|-------------|-------------------------|---------------------------------|
| MediatorFileRetry_ep | Service | Service | Completed | Nov 24, 2013 8:13:51 PM | Mediator_File_JavaCallOut [1.0] |
| MediatorFileRetry | Mediator | | Recovery Re | Nov 24, 2013 8:13:51 PM | Mediator_File_JavaCallOut [1.0] |
| FileOut | Reference | Reference | Completed | Nov 24, 2013 8:13:56 PM | Mediator_File_JavaCallOut [1.0] |

For information about setting the business flow instance name, see Section "How to Set the Flow Instance Name or Composite Instance Name at Design Time" of *Developing SOA Applications with Oracle SOA Suite*.

17.1.4 Viewing the Audit Trail and Process Flow in the Flow Trace

You can view the audit trail and process flow in the flow trace of the business flow instance. The audit trail and flow trace provide a graphical representation of the audit trail data. The audit trail displays execution details about the activities in the BPEL process. The process flow displays the flow of the payload through the process.

To view the audit trail and process flow in the flow trace:

1. Access the Flow Trace page as described in [Monitoring the Flow Trace of a Business Flow Instance](#).

The **Trace** section displays the sequence of the message flow through the services, service components, and references that comprise the SOA composite application. For this example, the service binding component, service components, and reference binding component involved in the flow have successfully received and processed messages.

2. In the **Instance** column of the **Trace** section, click a specific BPEL process component. Service components can be accessed from the Flow Trace page; services and references cannot be accessed.

Trace

| Instance | Type | Usage | State |
|--------------|-----------|-----------|-----------|
| Mediator1_ep | Service | Service | Completed |
| Mediator1 | Mediator | | Completed |
| BPELProcess1 | BPEL | | Completed |
| FileWrite | Reference | Reference | Completed |

The audit trail for the selected service component is displayed.

Flow Trace > Instance of BPELProcess1

Data Refreshed Tue Oct 15 17:14:37 PDT 20

Instance of BPELProcess1

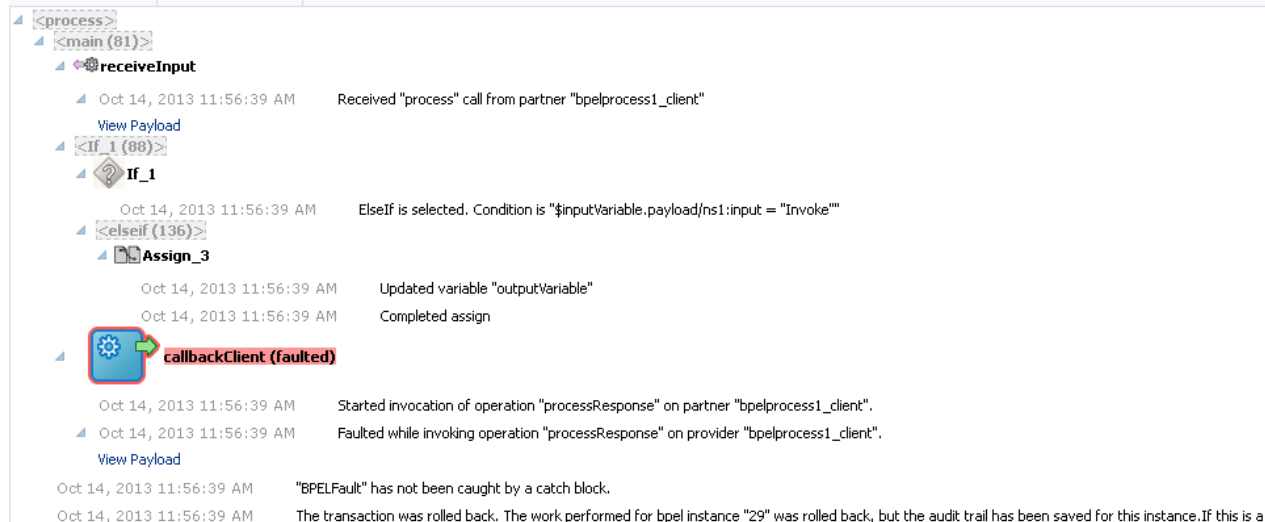
This page shows BPEL process instance details.

Instance ID 29

Started Oct 14, 2013 11:56:

Audit Trail | Flow | Sensors

Actions View Highlight Faults



3. Select the **Highlight Faults** checkbox to highlight any faults in the audit trail.
4. From the **View** list, select **Audit trail XML** to view the XML output of the audit trail. You can save the XML output as a file.
5. Scroll through the audit trail to check for errors and click the **View Payload** links to view their contents at a given point in the flow.

Note:

- 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.

6. Click the **Flow** tab.

A flow diagram of the activities in the BPEL process is displayed. Any faults in the flow diagram are highlighted.

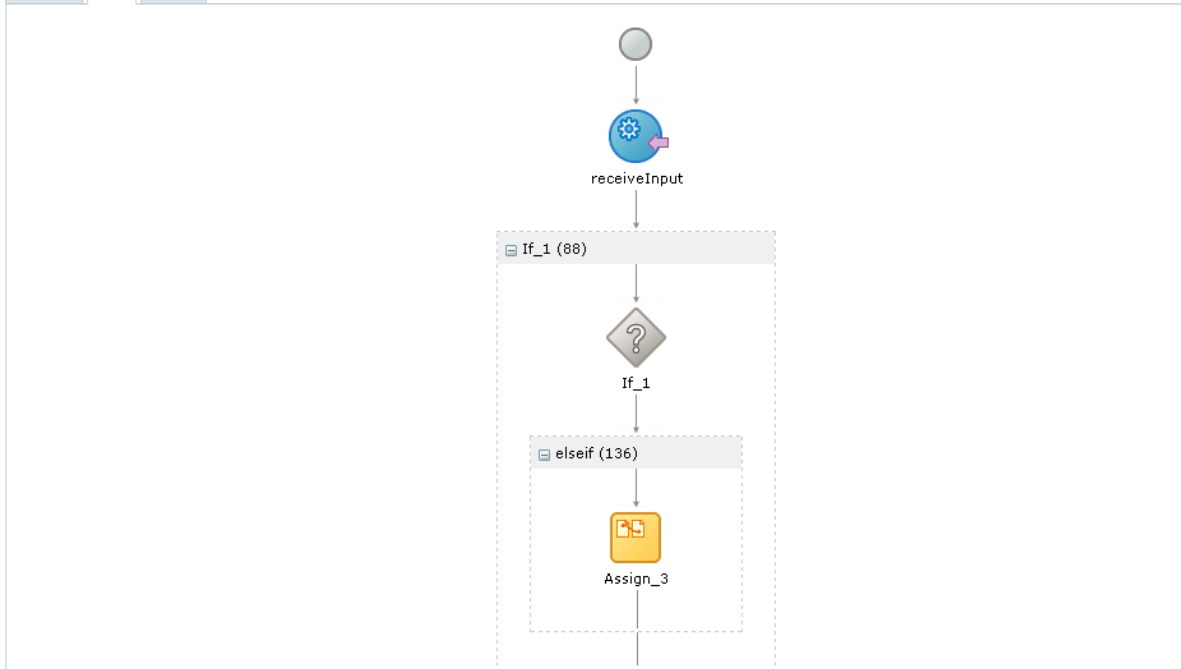
Flow Trace > Instance of BPELProcess1

Data Refreshed Tue Oct 15 17:14:3

 Instance of BPELProcess1 ⓘ
This page shows BPEL process instance details.

Instance ID **29**
Started **Oct 14, 2013**

Audit Trail **Flow** Sensors

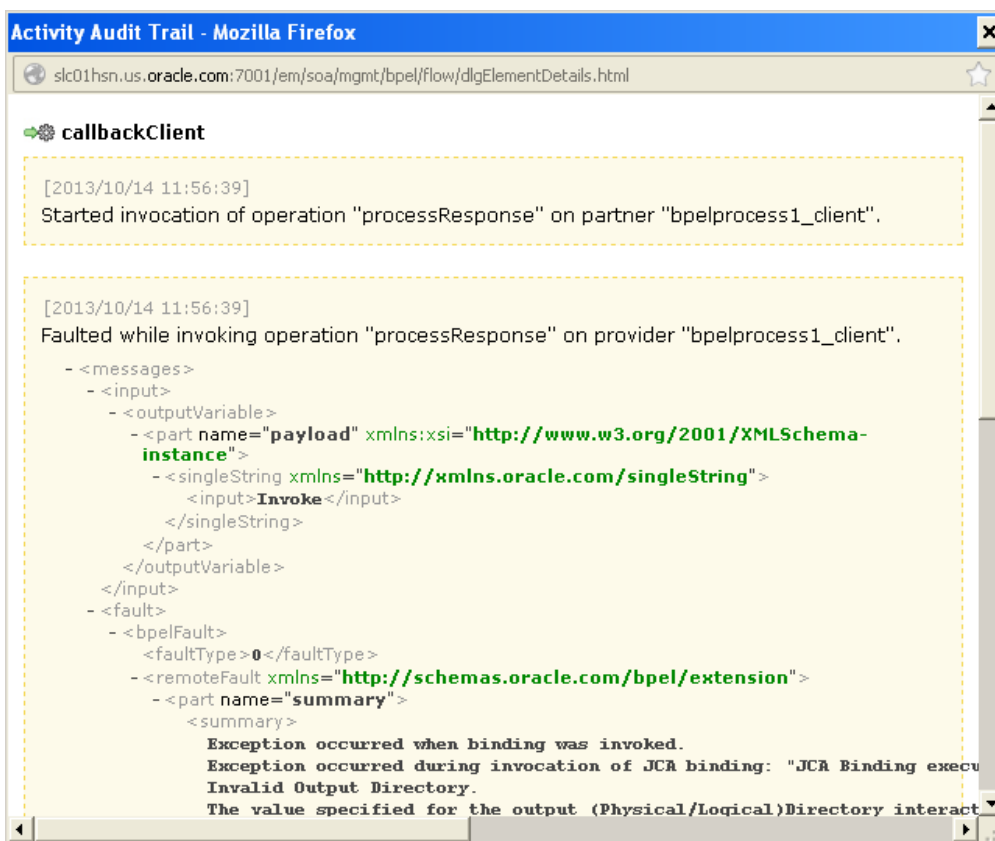


7. Click an activity to view the flow of the payload through the process.

 **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.

8. Scroll through the flow diagram to check for errors.
9. Click a highlighted activity to view error messages.



10. Close the message.

17.1.5 Monitoring Fault, Activity, and Variable Sensors in the Flow Trace

You can view the fault, activity, and variable sensor data in a BPEL process service component. You design sensors in BPEL processes in Oracle JDeveloper. Sensors enable you to monitor BPEL process activities, variables, and faults during runtime.

To monitor fault, activity, and variable sensor data in BPEL processes:

1. Access the Flow Trace page as described in [Monitoring the Flow Trace of a Business Flow Instance](#).
2. Click a specific BPEL process service component in the **Instance** column of the **Trace** section.
3. Click the **Sensor** tab.
4. Expand a sensor type 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 stores the values in the database are displayed (for example, database sensor values).

Flow Trace > Instance of FaultFlow

Data Refreshed Mon Nov 25 1:

Instance of FaultFlow

This page shows BPEL process instance details.

Instance ID 45

Started Nov 24

Audit Trail Flow **Sensors**

Select a sensor to view its values.

Activity Sensors

| Sensor | Activity |
|---------------------------|----------|
| No sensor data available. | |

Variable Sensors

| Sensor | Variable |
|----------------|-----------|
| VariableSensor | \$counter |

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 and Analytics" of *Developing SOA Applications with Oracle SOA Suite*.

For more information about fault recovery, see [Recovering from Faults in a Business Flow Instance](#) and [Performing BPEL Process Service Engine Message Recovery](#).

17.1.6 Understanding Additional Flow Trace Behavior Scenarios

This section describes additional flow trace behavior scenarios.

17.1.6.1 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.

17.2 Monitoring the Time Distribution of BPEL Process Activities and Instance and Fault Throughput Metrics

You can monitor the time distribution of BPEL process activities and a graphical view of instance and fault throughput metrics for the BPEL process service component.

To monitor the time distribution of BPEL process activities and instance and fault throughput metrics:

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"> a. Select Home. b. Select the Deployed Composites tab. c. In the Composite section, select a specific SOA composite application. | <ol style="list-style-type: none"> a. Under soa-infra, expand the SOA folder. b. Select a specific SOA composite application. |

The Dashboard page is displayed.

2. In the **Components** section, select the BPEL process service component.

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.
- A graphical representation of the number of successful, faulted, and incoming (pending) instances of the BPEL process service component over a specific time range.

BpelRecoveryE2ETest [1.0] SOA Composite Logged in as weblogic Page Refreshed Oct 15, 2013 5:37:13 PM PDT

BPELProcess1 (BPEL Component) Related Links

Dashboard Policies

Activity Time Distribution

| Name | Count | Average Execution Time (ms) |
|----------------|-------|-----------------------------|
| Assign_3 | 3 | 0.001 |
| receiveInput | 3 | 0.002 |
| callbackClient | 2 | 0.071 |

Instance Rate per Min (Real-Time Data)

Throughput of successful instances in the last 5 minutes
Total faults throughput in the last 5 minutes
Instance throughput in the last 5 minutes

05:23 PM 05:25 05:27 05:29 05:31 05:33 05:35 05:37
October 15 2013

Table View

- Click **Table View** to display throughput details for the last five minutes in tabular form, including the throughput for successful instances, the total faults throughput, and the instance throughput.

| Time | Throughput of successful instances in the last 5 minutes | Total faults throughput in the last 5 minutes | Instance throughput in the last 5 minutes |
|-------------------------|--|---|---|
| Oct 17, 2013 2:32:44 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:32:59 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:33:14 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:33:29 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:33:44 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:33:59 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:34:14 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:34:29 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:34:44 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:34:59 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:35:14 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:35:29 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:35:44 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:35:59 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:36:14 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:36:29 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:36:44 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:36:59 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:37:14 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:37:29 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:37:44 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:37:59 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:38:14 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:38:29 PM | 0 | 0 | 0 |
| Oct 17, 2013 2:38:44 PM | 0 | 0 | 0 |

Throughput of successful instances in the last 5 minutes
Total faults throughput in the last 5 minutes
Instance throughput in the last 5 minutes

Close

BPEL Process Throughput Metrics

For more information, see [Introduction to Business Flow Instances](#) and [Administering Oracle Fusion Middleware](#) for details about viewing and searching log files.

17.3 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...

- a. Select **Service Engines > BPEL**.

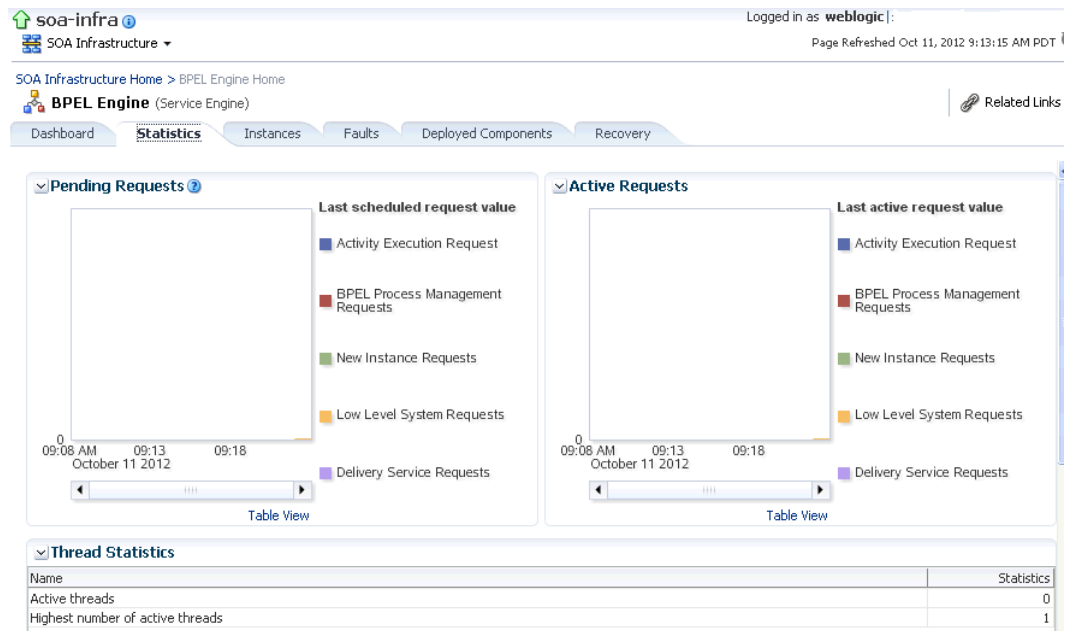
From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
- b. Select **Service Engines > BPEL**.

2. Click **Statistics**.

The **Pending Requests** and **Active Requests** sections of the Statistics page display the following details. Click the **Help** icon for additional information.

- Pending requests in the service engine
- Active requests in the service engine



The **Thread Statistics** and **Request Breakdown** parts of the Statistics page display details about the number of active threads and the count and minimum, maximum, and average request processing times in the service engine.

The screenshot shows the SOA Infrastructure web console. At the top, it says 'soa-infra' and 'SOA Infrastructure'. On the right, it says 'Logged in as weblogic' and 'Page Refreshed Nov 24, 2013 3:54:28 PM PST'. The main content area is titled 'BPEL Engine (Service Engine)' and has tabs for 'Deployed Components', 'Statistics', and 'Recovery'. Under the 'Statistics' tab, there are two sections: 'Thread Statistics' and 'Request Breakdown'. The 'Thread Statistics' section has a table with columns 'Name' and 'Statistics'. It lists 'Active threads' and 'Highest number of active threads', both with a value of 0. The 'Request Breakdown' section has a table with columns 'Name', 'Count', 'Min Request Processing Time (ms)', 'Max Request Processing Time (ms)', and 'Avg Request Processing Time (ms)'. It shows 'No request breakdown metrics found'.

For more information about BPEL process tuning and performance, see *Tuning Performance*.

17.3.1 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. You may need to scroll down the Statistics page to view this part.

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 [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 [Viewing Statistics About the Time a Request Spends in the BPEL Process Service Engine](#).

17.4 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...

- a. Select **Service Engines > BPEL**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. Select **Service Engines > BPEL**.
-

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**. This search is case sensitive. You must enter the exact name of the component and the exact name of the composite, without the revision portion. To view an unfiltered list of all components after searching, click **Reset**.
- 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, and the current status (up or down).

The screenshot shows the SOA Infrastructure web console. At the top, it indicates the user is logged in as 'weblogic' and the page was refreshed on Nov 24, 2013 at 4:10:51 PM PST. The main content area is titled 'BPEL Engine (Service Engine)' and has tabs for 'Deployed Components', 'Statistics', and 'Recovery'. Below the tabs is a search utility with input fields for 'Name' and 'Composite Name', and 'Search' and 'Reset' buttons. A table below the search utility lists the deployed components. The table has columns for 'Name', 'Composite', and 'Status'. All components shown have a status of 'Up' (indicated by a green arrow).

| Name | Composite | Status |
|----------------------|----------------------------|--------|
| GetCustomerBPEL | CustomerService [1.0] | Up |
| PutCustomerBPEL | CustomerService [1.0] | Up |
| DeleteCustomerBPEL | CustomerService [1.0] | Up |
| GetCustomersBPEL | CustomerService [1.0] | Up |
| BPELProcess3 | ExternalComposite [1.0] | Up |
| BPELProcess2 | ExternalComposite [1.0] | Up |
| BPELProcess1 | ExternalComposite [1.0] | Up |
| BPELProcess5 | ExternalComposite [1.0] | Up |
| BPELProcess4 | ExternalComposite [1.0] | Up |
| BPEPub | Project1 [1.0] | Up |
| BPESub | Project1 [1.0] | Up |
| WlsRulesFaultProcess | WlsRulesFaultProject [1.0] | Up |
| BPELProcess1 | fa [1.0] | Up |

2. In the **Name** column, click a specific service component to access its home page.
3. In the **Composite** column, click a specific SOA composite application to access its home page.

17.5 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 > EMDomain > Server: server_name > Application: soa-infra > EMIntegration > soa-infra**.

The following properties can be configured.

- **AsyncProcessStats**: Asynchronous process statistics
 - **RequestStats**: Request breakdown statistics
 - **SyncProcessStats**: Synchronous process statistics
4. View the content of the **AsyncProcessStats** property.

Attribute: AsyncProcessStats Ret

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 Return

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>
</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>
<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">
```

- View the content of the **SyncProcessStats** property.

Attribute: SyncProcessStats[Return](#)

MBean Name orade.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 [Configuring BPEL Process Service Engine Properties](#).

18

Managing BPEL Process Service Components and Engines

This chapter describes how to manage BPEL process service components and service engines, including managing service component policies, performing BPEL process message recovery of undelivered invoke and callback messages, and storing instance and message data in Oracle Coherence distributed cache on Oracle Exalogic Platforms.

This chapter includes the following topics:

- [Managing BPEL Process Service Component Policies](#)
- [Performing BPEL Process Service Engine Message Recovery](#)
- [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:

- [Introduction to Service Components](#)
- [Introduction to Service Engines](#)

18.1 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.



Note:

Before attaching policies, see *Securing Web Services and Managing Policies with Oracle Web Services Manager* 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...

- a. Select **Home**.
- b. Select the **Deployed Composites** tab.
- c. In the **Composite** section, select a specific SOA composite application.

From the SOA Folder in the Navigator...

- a. Under **soa-infra**, expand the SOA folder.
- b. Select a specific SOA composite application.

-
2. Select the BPEL process service component in the **Components** 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 (such as 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.

The screenshot shows the Oracle SOA Composite console interface. At the top, it displays 'WlsRulesFaultProject [1.0]' and 'SOA Composite'. The user is logged in as 'weblogic'. The page title is 'WlsRulesFaultProcess (BPEL Component)'. The 'Policies' tab is selected, and the page content indicates that no policies are currently attached to this component.

| Policy Name | Policy Reference Status | Category | Total Violations | Security | |
|-----------------------|-------------------------|----------|------------------|----------------|---------------|
| | | | | Authentication | Authorization |
| No policies attached. | | | | | |

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:

- [Introduction to Policies](#)
- [Managing SOA Composite Application Policies](#) for the dialogs that are displayed during policy attachment
- *Securing Web Services and Managing Policies with Oracle Web Services Manager* for definitions of available policies and details about which ones to use for your environment

18.2 Performing BPEL Process Service Engine Message Recovery

In Release 12.1.3, issues with business flow instances, including BPEL process message recovery, are reported as faults. Therefore, you can perform message recovery from the Recovery page of the BPEL process service engine or from the Error Hospital page.

You can perform a manual recovery of undelivered invoke or callback messages due to a transaction rollback in the business flow 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 business flow 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... |
|--|--|
| a. Select Service Engines > BPEL . | a. Right-click soa-infra . |
| | b. Select Service Engines > BPEL . |

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 business flow 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.

- 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.

The screenshot displays the 'BPEL Engine (Service Engine)' interface, specifically the 'Recovery' tab. At the top, it shows 'soa-infra' and 'SOA Infrastructure' on the left, and 'Logged in as weblogic' and 'Page Refreshed May 3, 2014 12:41:14 AM IST' on the right. The main content area includes a 'Refresh Alarm Table' button and a search section with the following filters: Type (Invoke), Duration (Last 24 Hours), Exclude Last 5 Minutes (checked), and Message State (Undelivered). There are also input fields for Composite Name, Component Name, and Flow ID. Below the search filters are 'Search' and 'Reset' buttons. At the bottom, there are 'Select', 'View', 'Recover', 'Abort...', and 'Reset' buttons. A table with columns 'Conversation ID', 'Flow ID', 'Recovery', 'Component', 'Composite', and 'Partition' is shown, with the text 'No search conducted' below it.

Note:

- 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 business flow 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.
- The **Message States** list is applicable to the callback and invoke message type recovery, and the activity message type recovery for the undelivered, cancelled, and exhausted states. The delivered and resolved message states are not applicable to activity messages in Release 12c.

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 Reset 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 Recover 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> |
| 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 instance state. Message cancellation is executed in the context of the flow ID. If instances are linked using this flow ID, all instances are terminated. A flow ID enables you to track a message flow that crosses 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 Undelivered from the Message State list and click Search, these messages are displayed. Callback messages in the exhausted state can also be reset to the resolved state and still remain recoverable.</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 fault recovery in the Error Hospital, see [Recovering From Faults in the Error Hospital](#).

For information about configuring the maximum number of times to attempt an invoke and callback message recovery, see [Configuring Automatic Recovery Attempts for Invoke and Callback Messages](#).

For information about designing a fault policy, see Section "Handling Faults with the Fault Management Framework" of *Developing SOA Applications with Oracle SOA Suite*.

18.3 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 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.

Note:

If your environment is not using Oracle Exalogic, Oracle Coherence distributed cache is not available.

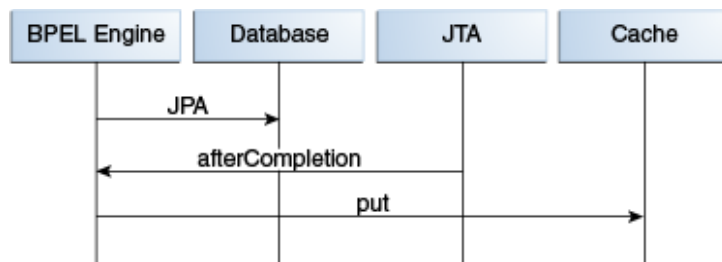
The potential performance gains of using a distributed cache for BPEL processes are as follows:

- 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

18.3.1 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 18-1](#) provides details about the dehydration process.

Figure 18-1 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:

(database read time + relational to object mapping) minus (Object serialization + reading from serialized form + Coherence network overhead + 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.

18.3.2 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 [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.

18.3.3 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... |
|--|---|
| a. Select SOA Administration > BPEL Properties . | a. Right-click soa-infra . b. 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 **QualityOfService**.
4. In the **Value** field, enter a value appropriate to your environment. This change does not require a SOA Infrastructure restart.

Table 18-1 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 aborted, data is read from the database. |

5. Click **Apply**.

18.3.4 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`. This property is now set from the `AuditConfig` attribute at the SOA Infrastructure level.
- **QualityOfServiceOneWayDeliveryPolicyUseDistributedCache** is set to `true`.
This property is set under BPEL Service Engine Properties.
- **QualityOfService** is set to `CacheEnabled`. This property is set under BPEL Service Engine Properties. For instructions, see [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... |
|---|---|
| <ol style="list-style-type: none"> a. Select SOA Administration > BPEL Properties. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. 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**.

18.3.5 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 [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... |
|---|---|
| <ol style="list-style-type: none"> a. Select SOA Administration > BPEL Properties. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. 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 **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**.

18.3.6 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 *Enterprise Deployment Guide for Oracle SOA Suite*.

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 [Configuring Oracle Coherence Caching](#).
5. Run the following script:

```
start-bpel-cache.sh
```

Part VI

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:

- [Configuring Service Components and Engines](#)
- [Monitoring and Managing Service Components and Engines](#)
- [Managing Cross-References](#)

19

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:

- [Configuring Oracle Mediator Service Engine Properties](#)
- [Configuring Resequenced Messages](#)

For more information about Oracle Mediator tuning and performance properties, see *Tuning Performance*.

19.1 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... |
|---|---|
| a. Select SOA Administration > Mediator Properties . | a. Right-click soa-infra . |
| | b. Select SOA Administration > Mediator Properties . |

The Mediator Service Engine Properties page displays a list of Mediator properties, as shown in the following figure.

soa-infra ⓘ
SOA Infrastructure ▼

Mediator Service Engine Properties

Properties

Edit property values and click Apply to save the changes.

| | |
|--------------------------------------|--------------------------------------|
| Audit Level | <input type="text" value="Inherit"/> |
| Metrics Level | <input type="text" value="Enabled"/> |
| Parallel Maximum Rows Retrieved | <input type="text" value="200"/> |
| Parallel Locker Thread Sleep(sec) | <input type="text" value="2"/> |
| Parameters | <input type="text"/> |
| Container ID Refresh Time(sec) | <input type="text" value="60"/> |
| Container ID Lease Timeout(sec) | <input type="text" value="300"/> |
| Resequencer Locker Thread Sleep(sec) | <input type="text" value="10"/> |
| Resequencer Maximum Groups Locked | <input type="text" value="4"/> |
| Resequencer Worker Threads | <input type="text" value="4"/> |

[More Mediator Configuration Properties...](#)

2. Make changes to the service engine properties that are appropriate to your environment.

The properties are described in [Table 19-1](#) below.

Table 19-1 Mediator Service Engine Properties

| Property | Description |
|---|---|
| Audit Level | <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"> • Off: Switches off auditing for Mediator. Business flow instance tracking and payload tracking information are not collected. • Inherit: 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. • Production: 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. • Development: 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. <p>The default value of this flag is Inherit.</p> <p>Notes:</p> <ul style="list-style-type: none"> • You do not need to restart the server after changing these properties. • Audit levels were known as instance tracking levels in the Oracle Application Server 10g releases. |
| 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"> • Enabled: Enables DMS metrics tracking • Disabled: Disables DMS metrics tracking |
| Parallel Maximum Rows Retrieved | <p>The number of rows retrieved per iteration for parallel processing.</p> <p>Note: 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> |
| Parameters | <p>Custom configuration properties. For an example, see Configuring Resequenced Messages.</p> |

Table 19-1 (Cont.) Mediator Service Engine Properties

| Property | Description |
|---|--|
| Container ID Refresh Time (sec) Container ID Lease Timeout (sec) | <p>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:</p> <ul style="list-style-type: none"> • Container ID Refresh Time (sec): The time interval at which the heartbeat thread periodically updates the time stamp associated with each Mediator service engine's unique identifier. Notes: 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. You can set this parameter to a smaller value, like 30 seconds, if you need to ensure more frequent refreshes. • Container ID Lease Timeout (sec): 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. Notes: 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>By configuring these parameters, you can specify the period used by the heartbeat thread to detect the failure of a Mediator service engine.</p> |
| Resequencer Locker Thread Sleep (sec) | <p>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.</p> |
| Resequencer Maximum Groups Locked | <p>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.</p> |
| Resequencer Worker Threads | <p>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.</p> |

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.

19.1.1 To Unit Test Mediator in JDeveloper:

A simple UI driven testing framework for the Mediator component takes a sample input in HL7 format and shows the HL7 payload generated downstream.

The testing framework also shows the input/output payloads at the various intermediate stages. If you have destinations configured in the routing rules, the framework also shows the HL7 payloads sent to the various pre-configured destinations. The testing framework runs within JDeveloper.

1. In JDeveloper, create a **SOA Project**.
2. In the composite file, define **External Services and References**.
3. Add the Mediator sub component to the design and define flows.
 - a. Call out to a Java process.
 - b. Define XPath expressions for routing to References.
 - c. Use XSLT before routing; applicable to one or many or all the routes.
4. In the navigation pane, right-click the `Mediator` file and select **Test**.

A window pops up that allows you to specify a sample HL7 payload.

5. Click **Run** to execute the test and publish the test result in a new tabbed window.

The result shows inputs at all the sub components of designed Mediator and outputs from these sub components at every step. If there are calls to references, the test shows only appropriate messages like `call to the reference with <input data>`.

19.1.2 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 19-1](#), with some additional read-only properties for the MBean. An additional property, **ContainerInitRetries**, is not listed in [Table 19-1](#). This property indicates the number of attempts that are made to create an Oracle Mediator service engine instance ID.

19.2 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 [Configuring 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 19-1](#).

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 and Managing Oracle Mediator Service Components and Engines

This chapter describes how to monitor and manage Oracle Mediator service components and engines using Oracle Enterprise Manager Fusion Middleware Control. This chapter includes the following topics:

- [Introduction to the Oracle Mediator Component Dashboard Page](#)
- [Monitoring and Managing an Oracle Mediator Service Component](#)
- [Monitoring an Oracle Mediator Service Engine](#)
- [Monitoring Resequencing Groups](#)

For more information, see the following sections:

- [Introduction to Service Components](#)
- [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 [Diagnosing Problems with SOA Composite Applications](#).

20.1 Introduction to the Oracle Mediator Component Dashboard Page

The Mediator Component Dashboard lets you view information about the current state of the selected Mediator service component. This information includes routing statistics and statistics on successful, failed, and pending instances.

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.

20.1.1 Routing Statistics Section

The Routing Statistics section includes 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 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.

20.1.2 Instance Rate Per Min Section

The Instance Rate Per Min 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**.

20.2 Monitoring and Managing an Oracle Mediator Service Component

You can perform any of the following component-level monitoring and management tasks from the Mediator Component home page in Oracle Enterprise Manager Fusion Middleware Control:

- [Monitoring Oracle Mediator Service Component Routing Statistics and Instances](#)
- [Managing Oracle Mediator Policies](#)

20.2.1 Monitoring Oracle Mediator Service Component Routing Statistics and Instances

The Mediator Component Dashboard displays routing statistics and instance-related information.

To monitor Mediator service component routing statistics and instances:

1. Access the SOA Composite home Page through one of the following options:

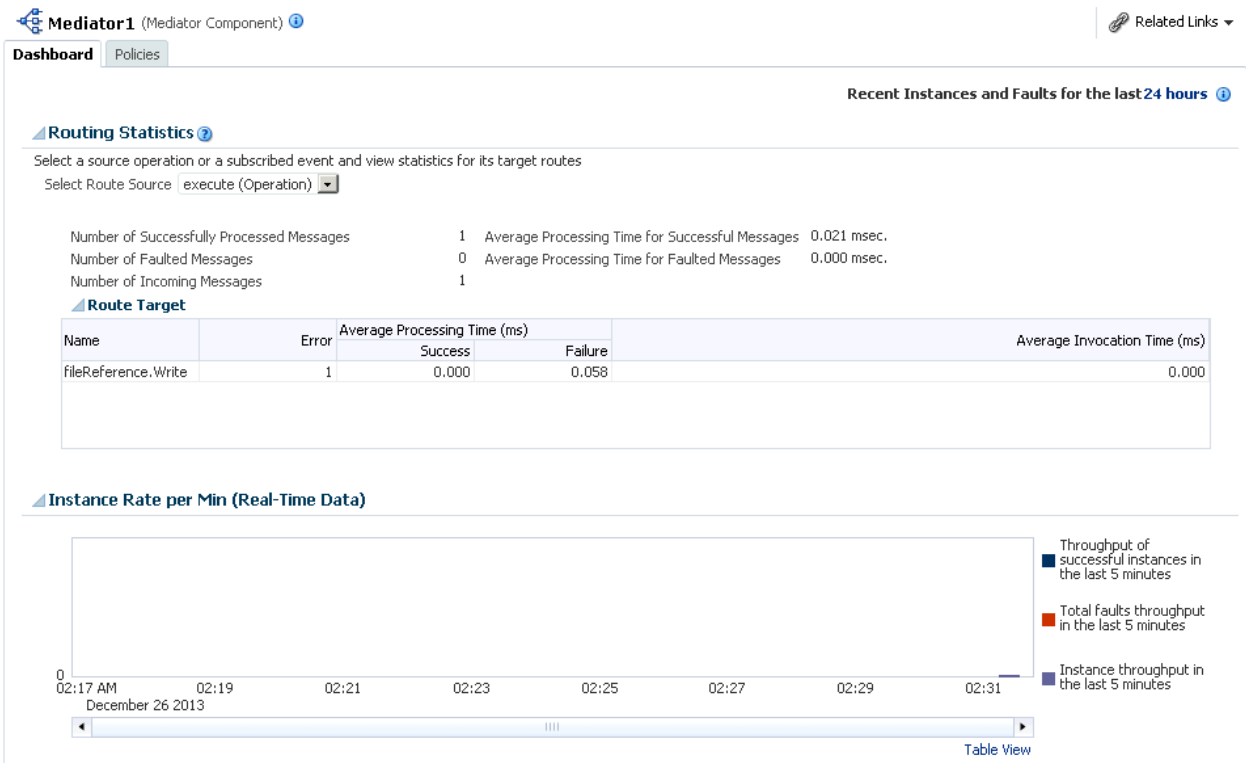
From the SOA Infrastructure Menu...

- a. Select **Home**.
- b. Select the **Deployed Composites** tab.
- c. In the **Composite** section, select a specific SOA composite application.

From the SOA Folder in the Navigator...

- a. Expand **soa-infra**, and then select a specific SOA composite application.

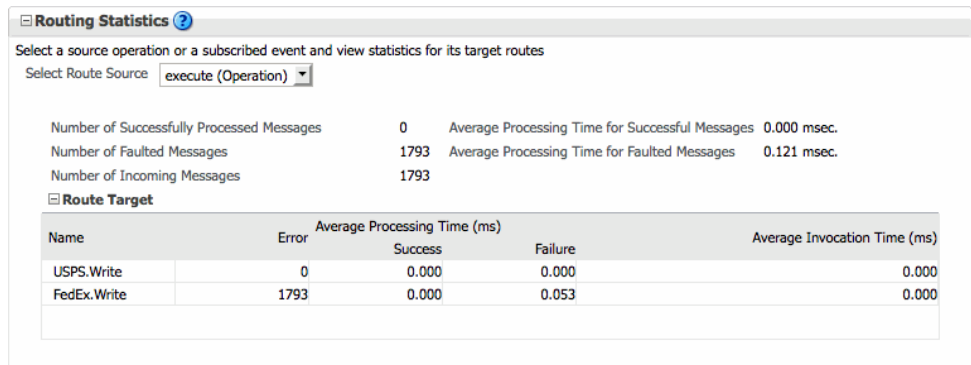
2. In the **Components** section, select the Mediator service component.
3. Click the **Dashboard** tab.



The Dashboard page displays the information described in [Introduction to the Component Dashboard Page](#).

4. 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.

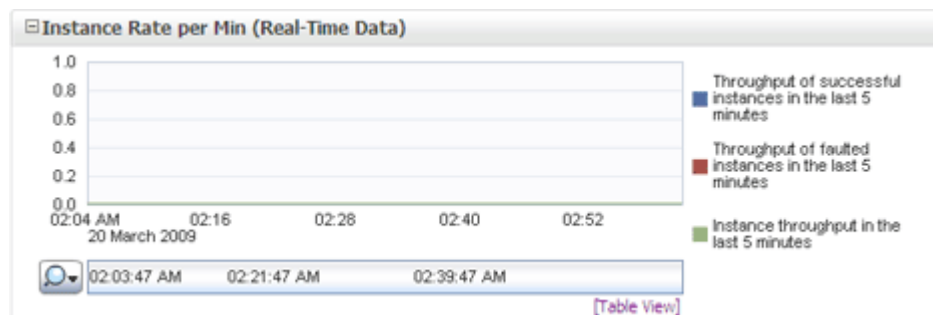


- View the routing statistics for all targets in the **Route Target** table.

For information about the fields displayed in the **Routing Statistics** section, see [Routing Statistics Section](#).

- 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 [Introduction to Business Flow Instances](#). For information about viewing and searching log files, see *Administering Oracle Fusion Middleware*.

20.2.2 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:

- 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.

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"> a. Select Home. b. Select the Deployed Composites tab. c. In the Composite section, select a specific SOA composite application. | <ol style="list-style-type: none"> a. Under soa-infra, select a specific SOA composite application. |

2. Select the Mediator service component in the **Components** 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.

Attached Policies

| Name | Category | Enabled | Description | View Full Description |
|------------------|------------|---------|-------------------------------|-----------------------|
| orade/log_policy | Management | ✓ | This policy causes the req... | |

Available Policies

Search: Category:

| Name | Category | Enabled | Description | View Full Description |
|---|----------|---------|-------------------------------|-----------------------|
| orade/component_authorization_denyall_policy | Security | ✓ | This policy is a special c... | |
| orade/component_authorization_permitall_policy | Security | ✓ | This policy is a special c... | |
| orade/component_permission_authorization_policy | Security | ✓ | This policy is a special c... | |

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:

- [Introduction to Policies](#)
- [Managing SOA Composite Application Policies](#) for the dialogs that are displayed during policy attachment

20.3 Monitoring an Oracle Mediator Service Engine

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 Request Breakdown Statistics](#)
- [Monitoring Deployed Oracle Mediator Service Components in the Service Engine](#)

20.3.1 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...

- a. Select **Service Engines > Mediator**.

- a. Right-click **soa-infra**.

- b. 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 Oracle Mediator Engine interface. At the top, there is a header with the Mediator Engine logo and the text "(Service Engine)". Below the header, there are two tabs: "Deployed Components" and "Statistics", with "Statistics" being the active tab. On the right side, there is a "Related Links" icon. The main content area is titled "Request Breakdown" and contains a table with the following data:

| Request | Count | Execution Time (ms) |
|----------------------|-------|---------------------|
| Invoke One Way | 9 | 26.778 |
| Transformation | 9 | 10.667 |
| Enqueue | 2 | 2.000 |
| 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.

- **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.

20.3.2 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...

- a. Select **Service Engines > Mediator**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. 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 |
|------------------------------|---------------------------------|--------|
| testSetName | testSetName [1.0] | ↑ |
| LookupMultipleValuesMediator | MultivalueProj [1.0] | ↑ |
| Mediator1 | SimpleFileout [5.0] | ↑ |
| Mediator1 | ExternalComposite [1.0] | ↑ |
| Mediator_par_rout_rules | ExternalComposite [1.0] | ↑ |
| Mediator2 | ExternalComposite [1.0] | ↑ |
| Mediator1 | MediatorDHQA [1.0] | ↑ |
| Mediator1 | BpelRecoveryE2ETest [1.0] | ↑ |
| Mediator1 | SimpleFileout [4.0] | ↑ |
| CustomerMediatorService | CustomerService [1.0] | ↑ |
| MediatorFileRetry | Mediator_File_JavaCallOut [1.0] | ↑ |

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.

20.4 Monitoring Resequencing Groups

You can use the Mediator Resequencing Groups page to view and manage resequencing groups for the Mediator.

Note:

The Mediator Component page or Mediator Engine (service engine) page cannot be used to access, or configure, resequencer related information.

Use the Mediator Resequencing Groups page and the Flow Instances page to manage and monitor all Mediator resequencer groups, and to perform actions like fault recovery.

Resequencing enables the Mediator to have the out-of-sync messages put back into order. See Resequencing in Oracle Mediator in *Developing SOA Applications with Oracle SOA Suite* for details on resequencing.

To monitor resequencing groups:

1. Access the Mediator Resequencing Groups page through one of the following options:
 - To monitor resequencing groups at the SOA Infrastructure level:

From the SOA Infrastructure Menu...

- a. Select **Resequencing Groups**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra (server_name)**.
 - b. Select **Resequencing Groups**.
-

The Mediator Resequencing Groups page appears. shows the Mediator Resequencing Groups page.

- To monitor resequencing groups at the individual SOA folder level:

From the SOA Folder Menu of a Specific SOA Folder...

From the SOA Folder in the Navigator...

a. Select **Resequencing Groups**.

a. Expand **SOA > soa-infra (server_name)**.

b. Right-click a specific SOA folder.

c. Select **Resequencing Groups**.

The Mediator Resequencing Groups page appears.

Mediator Resequencing Groups

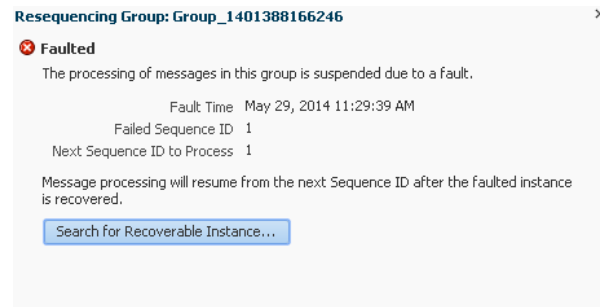
Resequencing enables the Mediator to have the out-of-synch messages put back into order. Click the go button to find all resequencing groups last processed within the specified time.

Last: Hours

Search For:

| Group | Group Location | Group State | Last Processing Time | Backlog Messages |
|----------------------|-------------------------------------|-------------|--------------------------|------------------|
| Group_1387804983... | Mediator1 SimpleFileout[5.0] (cons) | Faulted | Dec 23, 2013 1:23:18 PM | 1 |
| consoleTestGrp138... | Mediator1 SimpleFileout[4.0] (cons) | Faulted | Dec 23, 2013 12:54:03 PM | 1 |

- Select the time period to find all resequencing groups processed within the specified period.
- Click **Find Resequencing Groups**. Details for all resequencing groups processed within the specified period are displayed. The details include the following:
 - Group:** Displays the resequencing group name. Click on any group name to see details like the last processed sequence ID, next sequence ID, and so on.
 - Group Location:** Displays the location for the resequencing group. The location comprises of the component name, composite name, and the name of the SOA folder where the composite is deployed.
 - Group State:** Displays the state of the resequencing group. This can be one of Faulted, TimedOut, or Running.
 - Last Processing Time:** Displays the timestamp when a message in the group was last processed.
 - Backlog Messages:** Displays the number of pending messages for the resequencing group.
- Click a group name to show the group details:
 - If you click a Group with a Faulted Group State, the following group details are shown:
 - Fault Time
 - Failed Sequence ID
 - Next Sequence ID to Process



You can click **Search for Recoverable Instance** to navigate to the Flow Instances tab where you can recover the faulted instance.

- If you click a Timed Out Group, the following group details are shown:
 - Last Message Processing Time
 - Last Processed Sequence ID
 - Next Sequence ID to Process

You can click **Skip** to unlock the group and start processing the next available sequence ID.
- If you click a Running Group, the following details are shown:
 - If the mediator's resequencer type is not Standard, then the following message is displayed:

Now processing the messages
 - If the mediator's resequencer type is Standard, then the following details are shown:
 - * Last Message Process Time
 - * Last Processed Sequence ID
 - * Next Sequence ID to Process

You can click **Skip** to skip to the next available instance.

5. Click **Flow Instances** on the Mediator Resequencing Groups page to show the business flow instances corresponding to the group. See [Tracking Business Flow Instances](#) for details on working with the flow instances page.
6. Click **Recoverable Instance** to show the recoverable flow instances corresponding to the group. See [Recovering from Faults in a Business Flow Instance](#) for details on recovering from faults.

21

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 topic:

- [Deleting Cross-Reference Values](#)

21.1 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...

- a. Select **SOA Administration > Cross References**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. Select **SOA Administration > Cross References**.
-

The Cross References page appears.

The screenshot shows the 'Cross References' page in the SOA Infrastructure console. The page title is 'Cross References' and it includes a 'Delete' button. The 'Select Tables and Columns' section has two radio buttons: 'All tables' and 'Select a table and columns'. Under 'Select a table and columns', there are two lists: 'Tables' with 'XREF_ORDER' and 'XREF_CUSTOMER', and 'Columns' with 'COL1' (checked) and 'COL2'. The 'Select Values' section has three radio buttons: 'All', 'Marked for delete', and 'Updated between'. Below 'Updated between' are 'From' and 'To' input fields.

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 selected the **Updated between** option in the preceding step, 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:

- [Monitoring Decision Service Service Components and Engine](#)

Monitoring Decision Service Service Components and Engine

This chapter describes how to monitor Decision Service service components, including service engine performance statistics and deployed composites; business rule tracing; and log files. Decision Service service components are also called business rules service components in the Oracle Fusion Middleware documentation.

This chapter includes the following topics:

- [Monitoring Business Rules Service Engine Performance Statistics](#)
- [Monitoring Business Rules Service Engine Deployed Components](#)
- [Monitoring Business Rule Tracing](#)
- [Monitoring Decision Service Service Component Logs](#)

For information about business rules tuning and performance parameters, see *Tuning Performance*.



Note:

The business rules service engine does not support any user level configuration.

22.1 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 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...

Select **Service Engines > Business Rules**.

From the SOA Folder in the Navigator...

a. Select **soa-infra**.

b. Right-click and select **Service Engines > Business Rules**.

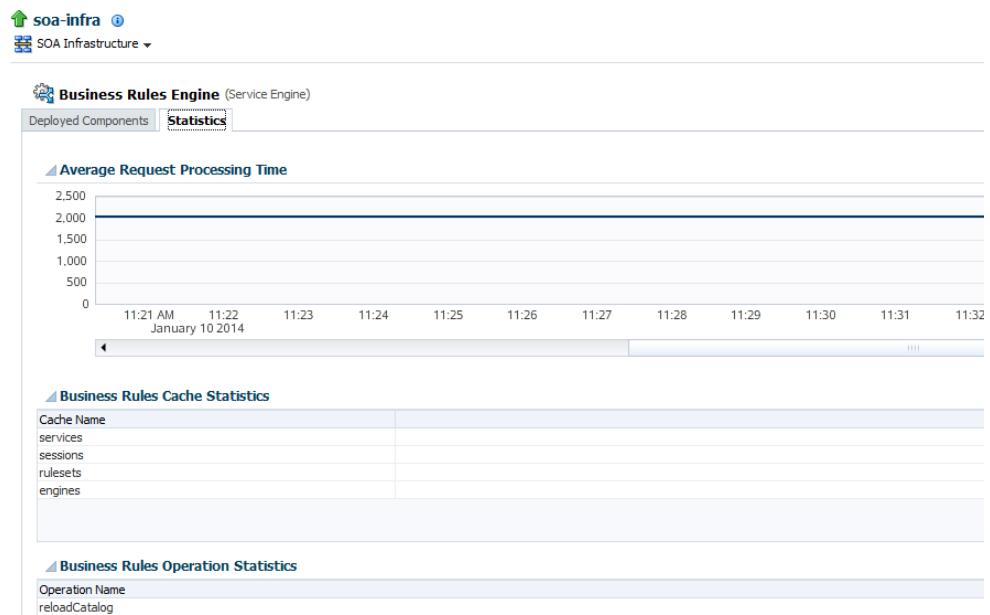
2. Click **Statistics**.

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 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 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 *Tuning Performance*.

22.2 Monitoring Business Rules Service Engine Deployed Components

Using the Deployed Components page, you can monitor all Decision Service service components deployed across SOA composite applications. Decision Service 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...

Select **Service Engines > Business Rules**.

From the SOA Folder in the Navigator...

a. Right-click **soa-infra**.

b. 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, and the status (up or down).

soa-infra
SOA Infrastructure

Business Rules Engine (Service Engine)

Deployed Components

Search

Name

Composite Name

View

| Name | Composite |
|-------------|---------------------------|
| RatingRules | WsRulesFaultProject [1.0] |

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 [Introduction to Service Components](#).

22.3 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 [Getting Started with Administering 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 [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 [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 [Configuring SOA Infrastructure Properties](#) for SOA Infrastructure audit level configuration information. See [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.

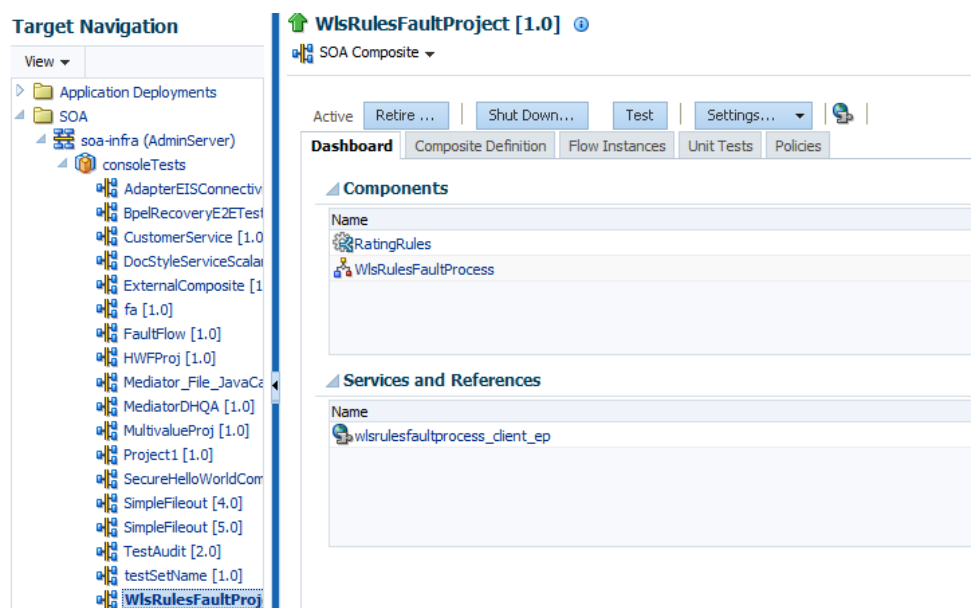
The following sections discuss setting audit levels at the composite level for the purposes of rule execution tracing.

22.3.1 Tracing Rule Execution at the Development Audit Level

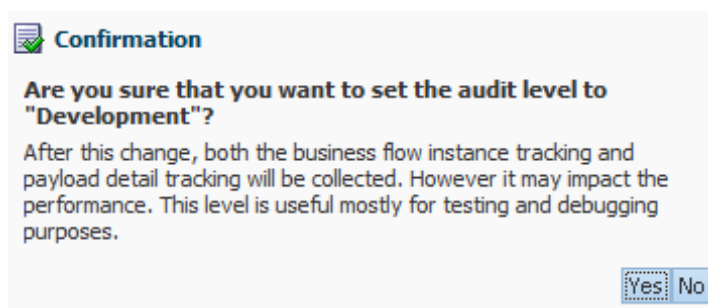
By setting the audit level to Development you can view all the details pertaining to a rule that has been executed.

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 business flow 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.



3. Click **Yes** in the Confirmation dialog.



4. Click **Test** and then click the name of the service to invoke a test instance of the business flow to view the decision traces corresponding to different input parameters.
5. Enter a value in the **Value** field in the **Input Arguments** section on the Test Web Service page and click the **Test Web Service** button.

Use the **Load Payload** field to add a payload file. Click **Browse** to locate the file and then click **Save Payload** to save the file.

WlsRulesFaultProject [1.0]

SOA Composite

Quality of Service

WS-RM WSDL Default None Custom
 Policy URI

MTCM WSDL Default None Custom
 Policy URI

WS-Addressing WSDL Default None Custom
 Policy URI

HTTP Header

Additional Test Options

Enable Stress Test

Concurrent Threads

Loops per Thread

Delay in Milliseconds

None

Input Arguments

Tree View Enable Validation Load Payload

SOAP Body

View

| Name | Type | Value |
|-----------|---------|----------------------|
| * payload | payload | |
| * date | date | <input type="text"/> |
| * SSN | string | <input type="text"/> |
| * name | string | <input type="text"/> |
| * age | int | <input type="text"/> |
| * amount | double | <input type="text"/> |

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.

- Click **Launch Flow Trace** under the **Response** tab to open the Flow Trace page.

WlsRulesFaultProject [1.0]

SOA Composite

Logged in as **weblogic** slc01ghk.us.oracle
 Page Refreshed Jan 22, 2014 3:06:34 PM PST

Operation

Endpoint

Request **Response**

Test Status Request successfully received.

Response Time (ms) 1169

Tree View

A new flow instance was generated.

| Name | Type | Value |
|-----------|---------|-------|
| payload | payload | |
| date | date | |
| SSN | string | |
| rating | int | |
| risk | string | |
| maxAmount | double | |

- Click the Decision Service service component instance called **RatingRules** in the **Trace** section to view the actual rule execution trace.

Data Refreshed Wed Jan 22 15:00:19 PST 2014

Flow Trace

This page shows the flow of the message through various composite and component instances.

Flow ID 8
Started Jan 22, 2014 2:15:55 AM

Faults Composite Sensor Values Composites

Recover View

| Error Message | Fault Owner | Fault Time | Recovery |
|------------------|-------------|------------|----------|
| No faults found. | | | |

Columns Hidden 8

Trace

Actions View Show Instance IDs

| Instance | Type | Usage | State | Time | Composite |
|--------------------------------|----------|---------|-----------|-------------------------|----------------------------|
| WisRulesFaultProcess_client_ep | Service | Service | Completed | Jan 22, 2014 2:15:55 AM | WisRulesFaultProject [1.0] |
| WisRulesFaultProcess | BPEL | | Completed | Jan 22, 2014 2:15:55 AM | WisRulesFaultProject [1.0] |
| RatingRules | Decision | | Completed | Jan 22, 2014 2:15:55 AM | WisRulesFaultProject [1.0] |

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 WisRulesFaultProcess.

The execution trace for the Decision Service service component called **RatingRules** is shown.

Flow Trace > Instance of RatingRules

Data Refreshed Wed Jan 22 15:01:32 PST 2014

Instance of RatingRules

This page shows the Decision component instance details.

Instance ID 40

Audit Trail

Expand the nodes to view the details of the instance audit trail.
Click a node to view the state of the service engine at the time that step occurred.

Audit Level DEVELOPMENT View Raw XML
Show rule set stack states in audit trail

- onMessage
 - Invoked Decision Service "RatingRules" [Jan 22, 2014 2:15:56 AM]
 - Asserted fact: "com.otn.samples.bpel.demo.Ratingrequest [1]"
 - Activated rule: "Ruleset_1.Rule_1"
 - Facts: "com.otn.samples.bpel.demo.Ratingrequest [1]"
 - Fired rules in Ruleset "Ruleset_1"
 - Fired rule: "Ruleset_1.Rule_1"
 - Facts: "com.otn.samples.bpel.demo.Ratingrequest [1]"
 - Asserted fact: "com.otn.samples.bpel.demo.Rating [2]"

Business Rules Engine State

- Facts in Working Memory
[no facts found]
- Rule Set Stack
[empty]
- Rule Activation
[no rules found]

8. Select the **Show rule set stack states in audit trail** check box to view further details of the rule execution.

Selecting this check box affects just the trace (the **Rule Set Stack** panel on the right hand side is not impacted). This check box hides or shows the pushed or popped steps. The default option is *Hidden*, which displays a more compact rendition of the audit trail.

Flow Trace > Instance of RatingRules Data Refreshed Wed Jan 22 15:01:32 PST 2014

Instance of RatingRules
This page shows the Decision component instance details. Instance ID 40

Audit Trail

Expand the nodes to view the details of the instance audit trail.
Click a node to view the state of the service engine at the time that step occurred.

Audit Level DEVELOPMENT [View Raw XML](#)
Show rule set stack states in audit trail

onMessage

- Invoked Decision Service "RatingRules"** [Jan 22, 2014 2:15:56 AM]
 - Pushed ruleset: "Ruleset_1"
 - Asserted fact: "com.otn.samples.bpel.demo.Ratingrequest [1]"
 - Activated rule: "Ruleset_1.Rule_1"
 - Facts: "com.otn.samples.bpel.demo.Ratingrequest [1]"
 - Pushed ruleset: "main"
 - Fired rules in Ruleset "Ruleset_1"**
 - Fired rule: "Ruleset_1.Rule_1"
 - Facts: "com.otn.samples.bpel.demo.Ratingrequest [1]"
 - Asserted fact: "com.otn.samples.bpel.demo.Rating [2]"
 - Popped ruleset: "Ruleset_1"
 - Popped ruleset: "main"

Business Rules Engine State

- Facts in Working Memory**
[no facts found]
- Rule Set Stack**
[empty]
- Rule Activation**
[no rules found]

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 |
|--------------------------------------|---|
| Invoked Decision Service Name | Displays the name of the Decision Service service component that is invoked. |
| Asserted Fact | There can be three types of asserted facts: <ul style="list-style-type: none"> • Input fact • Facts that get asserted as part of <i>initial actions</i> of a decision function • Facts that get asserted during rule execution |
| Activated Rule | Displays the name of the rule that is activated, along with the name of the fact that activated the rule. |
| Pushed ruleset | Displays the name of the ruleset that has been invoked when the fact is asserted. |
| Fired rules in Ruleset | Displays the name of the ruleset whose rule is executed. |
| Fired rule | Displays the name of the rule that is executed. |
| Modified fact | 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 service component to the BPEL service. |
| Popped ruleset | Displays the name of the ruleset for which execution is complete and so, the ruleset is taken out of the execution queue. |

 **Note:**

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`.

Click the nodes of the execution trace to see the corresponding engine state in the **Business Rules: Engine State** section of the page. This section contains the following panels:

Facts in Working Memory: This panel displays the tree of objects that have been asserted and are currently being reasoned on by the service engine. These objects can lead to subsequent rule activations or firings and are the ones that can be modified or retracted as part of rules.

Rule Set Stack: This panel displays which rulesets are currently in the stack and which one of those is at the top of the stack. Once all activated rules within that ruleset are fired, the next ruleset goes to top of stack and the first ready-to-fire rule in that ruleset is fired next.

Rule Activation: This panel displays the list of rules that have fired as well as those that have been activated but not yet fired.

A rule can be activated but not fired if the ruleset that contains the rule is not at the top of the stack or if there is a rule in the same ruleset that is deemed to have a higher priority according to the service engine's conflict resolution semantics.

22.3.2 Tracing Rule Execution at the Production Audit Level

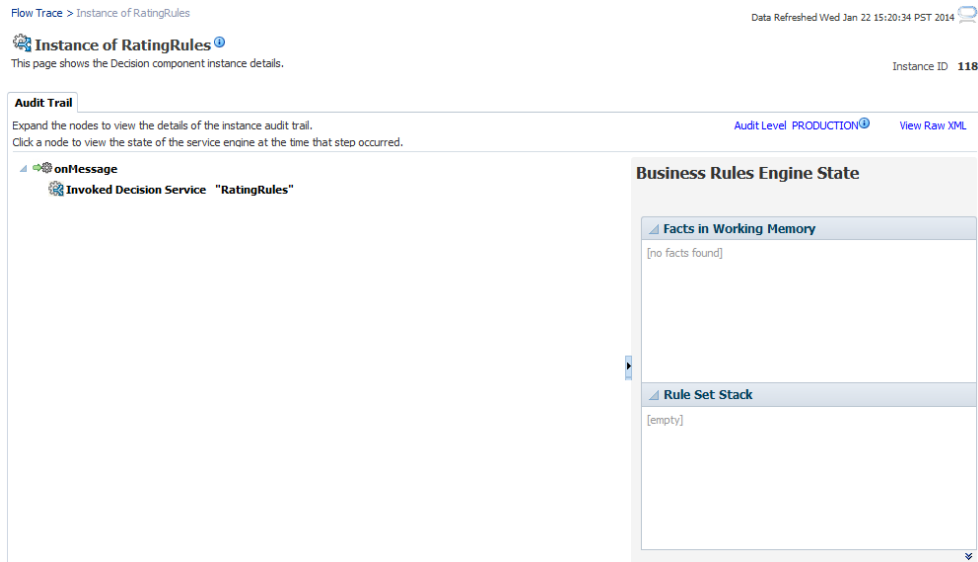
Setting the audit level to **Production** provides a truncated report on the rule execution trace. It only displays the ruleset and the rules that have been fired and does not display details about facts, rule activation, and so on.

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.

Figure 22-1 shows the Flow Trace page that displays the trace report.

Figure 22-1 Flow Trace Audit Trail - Production



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** check box that provides a drill-down detailed trace report is unavailable in the Production-level trace report.

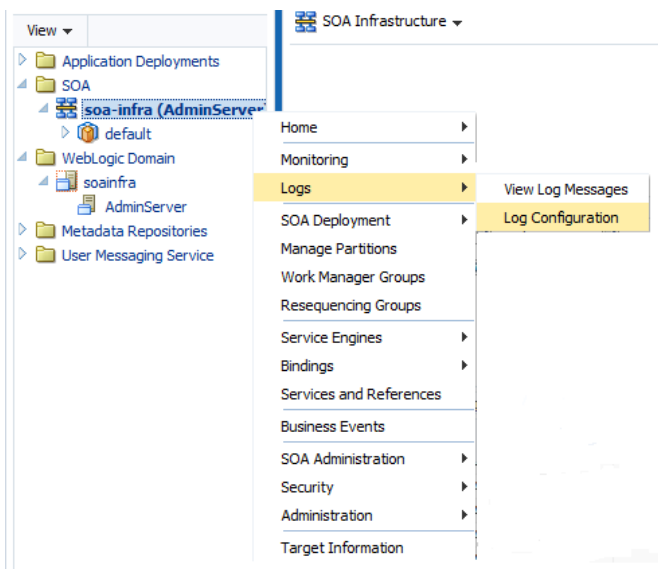
22.4 Monitoring Decision Service Service Component Logs

You can monitor Decision Service service component logs. Decision Service service components are also called business rules service components in the Oracle Fusion Middleware documentation.

22.4.1 Viewing Decision Service Service Component Logs

To view Decision Service 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.

Log Messages

Search

Selected Targets (1)

Date Range: Most Recent, 10 Minutes

* Message Types: Incident Error, Error, Warning, Notification, Trace, Unknown

* Search: Selected Fields, All Fields

* Match: All, Any

Search

Tip: Enter one or more keywords separated by a comma. If keyword contains comma then prepend the comma with \,

| Time | Message Type | Message ID | Message |
|------------------------------|--------------|------------|---|
| Jan 15, 2014 12:05:19 AM IST | Error | | JCABinding=> CustomerService:CustomerServiceAdapter [CustomerServiceAdapter, |
| Jan 15, 2014 12:05:19 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |
| Jan 15, 2014 12:05:20 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |
| Jan 15, 2014 12:05:21 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |
| Jan 15, 2014 12:05:22 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |
| Jan 15, 2014 12:05:23 AM IST | Error | | JCABinding=> CustomerService:CustomerServiceAdapter [CustomerServiceAdapter, |
| Jan 15, 2014 12:05:23 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |
| Jan 15, 2014 12:05:24 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |
| Jan 15, 2014 12:05:25 AM IST | Error | | [composite_name: MultivalueProj] [composite_version: 1.0] [service_name: readFile]. |

22.4.2 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 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 persisted across component restarts. Runtime loggers are automatically created during runtime and become active when a particular feature EJB module is deployed. Log levels for runtime loggers are not persisted across component restarts.

View: ▼

Search: ▼

| Logger Name | Oracle Diagnostic Logging Level (Java Level) | Log File |
|---|--|--------------------------|
| 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.rules.performance | NOTIFICATION:1 (INFO) [Inherit] ▼ | 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.tracking.fabric.audit.AuditSerializer... | NOTIFICATION:1 (INFO) [Inherit] ▼ | odl-handler |

Part VIII

Administering Human Task Service Components and Human Workflow Service Engines

Learn how to administer human task service components and human workflow service engines

- [Configuring Human Workflow Service Components and Engines](#)
- [Monitoring Human Workflow Service Components and Engines](#)
- [Managing Human Workflow Service Components and Engines](#)

Configuring Human Workflow Service Components and Engines

Learn how to configure human workflow service components and the human workflow service engine, including how to configure the notification mode for messages and actionable addresses. Also learn how to configure workflow 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.

- [Configuring Human Workflow Notification Properties](#)
- [Configuring the Notification Service to Send Notifications to a Test Address](#)
- [Configuring Human Workflow Task Service Properties](#)
- [Configuring Oracle HTTP Server for Task Form Attachments](#)
- [Configuring Oracle Advanced Queuing for Oracle Human Workflow Notifications](#)
- [Configuring the Pluggable Notification Service](#)
- [Globally Disabling the Automatic Release Timers for Oracle BPM Worklist Tasks](#)
- [Configuring the Number of Email Notification Messages](#)
- [Configuring Multiple Send Addresses](#)
- [Configuring Notification Retries](#)
- [Configuring the Identity Service](#)
- [Seeding Users, Groups, and Application Roles using LDAP Tools](#)
- [Enabling Case Agnostic Group Names in Human Tasks](#)
- [Configuring Security Policies for Human Workflow Web Services](#)
- [Enabling Lookup of Tasks Assigned to Groups not Part of the Configured Provider](#)

For information about installing and using the organizational hierarchy of users and groups known as the demo user community, see [Installing the Demo User Community in the Database](#).

For more information about human workflow tuning and performance properties, see *Tuning Performance*.

23.1 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.

To configure human workflow notification properties:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Access the Workflow Notification Properties page in one of the following ways:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| a. Select SOA Administration > Workflow Properties > Mailer tab. | a. Right-click soa-infra . |
| | b. Select SOA Administration > Workflow Properties > Mailer tab. |

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface. At the top, there is a navigation menu with a hamburger icon, a green arrow pointing up next to 'soa-infra', and a dropdown menu for 'SOA Infrastructure'. Below this, there are two tabs: 'Mailer' (selected) and 'Task'. An information icon (i) is followed by the text 'Information' and a message: 'All changes made in this page require a server restart to take effect.' Below this is the main heading 'Workflow Notification Properties'. Underneath, there is a field for '* Notification Mode' with a dropdown menu currently set to 'None'. Below that is the section 'Notification Service' which contains three input fields: '* Email : From Address' with the value 'accountId@yourdomain.com', '* Email : Actionable Address' with the value 'respondToaccountId@yourdomain.com', and '* Email : Reply To Address' with the value 'no.reply@yourdomain.com'. At the bottom of the form, there is a link that says 'More Workflow Notification Configuration Properties...'.

3. Select the **Notification Mode**:
 - **All**: The email, short message service (SMS), and instant message (IM) channels are configured and notification is sent through any channel that you use.
 - **None**: No channel is configured for sending notification messages. This is the default setting.
 - **Email**: Only the email channel is configured for sending notification messages.
4. Specify notification channel values:

| Field | Description | Example |
|----------------------------------|---|--------------------------------------|
| Email: From Address | <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>Note: 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 Email: Reply To Address field, error messages do not appear in the server logs.</p> <p>It is best practice to have From Address pointing to outgoing email address in the Email Driver Properties page.</p> | workflow.notifications@mycompany.com |
| Email: Actionable Address | <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 receiver addresses that you specify on the Email Driver Properties page of the Oracle User Messaging Service.</p> | workflow.actions@mycompany.com |
| Email: Reply To Address | <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 email address, human workflow sends an automated email indicating the correct usage. This is another incoming email account.</p> <p>It is best practice to have this email account set to something other than Actionable email address on the Email Driver Properties page. (If it is set same as Actionable email address then auto reply or any reply to email notifications will be processed by workflow engine and at times will be responded back to as unsolicited email).</p> | workflow.no.reply@mycompany.com |

5. Click **Apply**.
6. 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:

- **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 [Configuring the Number of Email Notification Messages](#).
7. 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 wfaulk Task Help desk request for wfaulk
requires your attention. NOTE: You can act on the task by
copy-pasting one of following lines as your response.
```

```
RESOLVED : [[NID]] :
Pt12uRUu9H+Xem4NYS2o7dKDtqNLs42d4YIs8yS08Gn0ZVYFsb1SQVenRukRE+
IcE7c4XDb+tPazvP v9T2iA0qylDg0bTaVxX13HhsrCYAg= : [[NID]]
UNRESOLVED : [[NID]] :
xT9l06rbaGRAey+BtgQyJIXk62mkFtCe7ocKxwNLIsPzyE5/7AnGwX1BodEgQxr6
jorvsw2F54k/Cl r5mvyAJpAp4I4IekOHi4qhQ3eSbBHdzET1IL4F3qV/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 [Managing Outgoing Notifications and Incoming Email Notifications](#).

23.2 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.

Use the System MBean Browser in Oracle Enterprise Manager to configure the Notification Service.

To configure the Notification Service to send notifications to a test address:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Navigate to the System MBean Browser in one of the following ways:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|--|
| <ol style="list-style-type: none"> a. Select Administration > System MBean Browser. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select Administration > System MBean Browser. |

3. Search for the **HWFMailerConfig** Mbean by clicking 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.

4. Select the Operations page. To set a test address:
 - a. In the Operations page, select **addTestNotificationAddress**. The Operation: `addTestNotificationAddress` page appears.
 - 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, IM.
 - 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**.
 - e. Shut down and restart the SOA server in order for the change to take effect.

Note that in the Enterprise Manager notification management screen, the original email address is still displayed as the To address.

The test user can respond to any actionable emails. Ensure that the test email address belongs to a user in the Identity store so that it is verified as part of response email processing.

When the notification service is initialized with a test address and the recipient address is switched with the test address, a Warning is written to the log. This can be useful to identify an incorrect configuration of the test notification address.

23.2.1 Removing a Test Address

To remove a test address:

1. In the Operations page, select **removeTestNotificationAddress**. The Operation: `removeTestNotificationAddress` page appears in the right pane.
2. 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, IM.
3. Click **Invoke**.

23.3 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, group, or application role from a group or application role, or a list of users, groups, or application roles. The selection is made according to criteria specific to the particular dynamic assignment function.

To configure human workflow task service properties:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Access the Workflow Task Service Properties in one of the following ways:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| <ol style="list-style-type: none"> a. Select SOA Administration > Workflow Properties > Task tab. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. 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 pre-defined dynamic assignment functions.

The screenshot displays the 'Workflow Task Service Properties' configuration page. At the top, there are navigation tabs for 'Mailer' and 'Task'. Below the title, there are two input fields: '* Actionable Email Account' with the value 'Default' and 'Workflow Custom Classpath URL'. A third field, '* Workflow Service Session Timeout (in minutes)', has the value '60'. Under the heading 'Dynamic Assignment and Task Escalation Functions', there are controls for 'View', 'Add Function', and 'Remove Function'. A table lists four functions with their respective classpaths. Below the table is a 'Parameters' section with a table that currently shows 'No parameters found'. At the bottom, there is an 'Advanced' section indicator.

| Function Name | Classpath |
|------------------|---|
| ROUND_ROBIN | oracle.bpel.services.workflow.assignment.dynamic.patterns.RoundRobin |
| LEAST_BUSY | oracle.bpel.services.workflow.assignment.dynamic.patterns.LeastBusy |
| MOST_PRODUCTIVE | oracle.bpel.services.workflow.assignment.dynamic.patterns.MostProductive |
| MANAGERS_MANAGER | oracle.bpel.services.workflow.assignment.dynamic.patterns.TaskEscalationManagersManager |

3. Enter the following details.

| Function | Description |
|--|--|
| Actionable Email Account | Enter the incoming, actionable email account to use. The default account name is Default , which is the account configured in Configuring Human Workflow Notification Properties . If a different account name is specified in this field, then create and configure the account as described in Configuring Multiple Send Addresses . |
| Workflow Service Session Timeout (in minutes) | 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 <code>TaskQueryService</code> authentication methods. |

| Function | Description |
|--------------------------------------|--|
| 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>.</p> <p>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. The URL must include the protocol; for a class path on the local filesystem, the <code>file</code> protocol must be specified, such as <code>'file:///example/directory/'</code>. If the URL specifies a directory, it must include a trailing slash ('/') character.</p> <p>The classpath can consist of more than one URL; each URL in the classpath can be delimited with a comma character (',').</p> |

4. 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 |
|-------------------------|--------------------|---|
| MANAGERS_MANAGER | Task escalation | This function picks the manager's manager for the task. |
| ROUND_ROBIN | Dynamic assignment | This function picks each user, group, or application role in turn. This function uses the initialization parameter <code>MAX_MAP_SIZE</code> . This parameter specifies the maximum number of sets of users, groups, or roles for which the function can maintain <code>ROUND_ROBIN</code> counts. The dynamic assignment function holds a list of participants in memory for each group, role (or list of users, groups or roles) on which it is asked to execute the <code>ROUND_ROBIN</code> function. |
| LEAST_BUSY | Dynamic assignment | This function picks the user, group or role with the least number of tasks currently assigned to it. |
| MOST_PRODUCTIVE | Dynamic assignment | This function picks the user, group, or role that has completed the most tasks over a certain time period (by default, the last seven days). This function uses the initialization parameter <code>DEFAULT_TIME_PERIOD</code> . This parameter specifies the length of time (in days) over which to calculate the productivity. This value can be overridden when calling the <code>MOST_PRODUCTIVE</code> dynamic assignment function. |

5. Click a function to display its parameters and values in the **Parameters** section.

6. Click **Add** to add a function. You are prompted to specify the following:

- Function name
- Class path
- Function parameter name
- Function parameter value

7. Click **OK**.
8. 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.

9. Update the value.
10. Expand the **Advanced** section.

The **Advanced** section displays the following properties:

Advanced

* Worklist Application URL

* Pushback Assignee

* Portal Realm Mapping

Task Auto Release Configuration

| Priority | Default Duration |
|----------|------------------|
| 5 | P5D |
| 4 | P4D |
| 3 | P3D |
| 1 | P1D |
| 2 | P2D |

[More Workflow Task Service Configuration Properties...](#)

These properties are defined in the following table.

| Properties | Description |
|---------------------------------|---|
| Worklist Application URL | 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. |
| Pushback Assignee | A task can be pushed back to the previous approver or previous initial assignees. The original assignees may not be the approver because they may have reassigned the task, escalated the task, and so on. The possible values for this element are INITIAL_ASSIGNEES and APPROVER . |
| Portal Realm Mapping | 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. Note: This property is no longer used and therefore, must not be altered. |

| Properties | Description |
|--|---|
| Task Auto Release Configuration | <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. After 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> |

11. Make changes appropriate to your environment.
12. Click **Apply**.
13. To configure advanced task service properties in the System MBean Browser, click **More Workflow Taskservice Configuration Properties**. See [Configuring Human Workflow Notification Properties](#) for a list of some advanced properties that are displayed.
14. Make changes appropriate to your environment.

For more information about the task service and assignment service, see *Developing SOA Applications with Oracle SOA Suite*.

23.4 Configuring Oracle HTTP Server for Task Form Attachments

When adding an attachment to the task form through Oracle HTTP Server (OHS), include the location, `/ADFAttachmentHelper`, 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>
```

23.5 Configuring Oracle Advanced Queuing for Oracle Human Workflow Notifications

Understand how to configure Oracle Advanced Queuing for Oracle Human Workflow Notifications.

To configure Oracle Advanced Queuing for Oracle Human Workflow notifications, set the managed bean property `UseAQ` under the `HWFMailer` configuration in Oracle Enterprise Manager Fusion Middleware Control to `TRUE`. Restart the SOA server.

After the server restarts, new notification messages are enqueued onto Oracle Advanced Queuing. Pending messages in the JMS queue are enqueued onto Oracle Advanced Queuing by the notification retry thread.

23.6 Configuring the Pluggable Notification Service

You can plug in and use custom notification service implementations 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.

- [Pluggable Notification Service Implementation](#)
- [Pluggable Notification Service Registration](#)

23.6.1 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
- SMS
- 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.

23.6.2 Pluggable Notification Service Registration

After 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**, **Email**, **Fax**, **Pager**, **SMS**, and **IM** properties.
7. Click **Return**.
8. Click the **Operations** tab.
9. Click **setCustomNSDriverPropertyValue**.

The screenshot shows the Oracle Enterprise Manager System MBean Browser interface. On the left, a tree view shows the navigation path: **soa-infra** > **SOA Infrastructure** > **System MBean Browser** > **Application Defined MBeans** > **oracle.as.soainfra.config** > **Server: AdminServer** > **HWFMailerConfig** > **human-workflow**. The right pane displays the details for the **Operation: setCustomNSDriverPropertyValue**. It includes the following information:

- MBean Name:** oracle.as.soainfra.config:Location=AdminServer,name=human-workflow
- Operation Name:** setCustomNSDriverPropertyValue
- Description:** Set custom notification services property value
- Return Type:** java.lang.String

Below this information is a table for **Parameters**:

| Name | Description | Type |
|---------------|--|------------------|
| propertyName | A Key for identifying and setting properties | java.lang.String |
| propertyValue | A Configuration Property Value | java.lang.String |

At the bottom of the right pane, there is a section for **Return Value**, which is currently empty.

10. In the **Value** field for **propertyName**, enter one of the values you noted down for the **All**, **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.

23.7 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. 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*** > **WorkflowConfig** > **human-workflow** > **WorkflowConfig.TaskAutoReleaseConfiguration**.
5. Select the task priority to modify. Each task instance has a priority.
 - **Priority[1]**
 - **Priority[2]**
 - **Priority[3]**
 - **Priority[4]**
 - **Priority[5]**
6. In the **Attributes** tab, click **DefaultDuration**.
7. In the **Value** field, enter **P0D** to indicate zero days. The default value is **P1D** (one day).
8. Click **Apply**.
9. Perform Steps 5 through 8 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.

23.8 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. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Access the Workflow Notification Properties page in one of the following ways:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| a. Select SOA Administration > Workflow Properties > Mailer tab. | a. Right-click soa-infra . |
| | b. Select SOA Administration > Workflow Properties > Mailer tab. |

The screenshot shows the Oracle Enterprise Manager Fusion Middleware Control interface. At the top, there is a navigation menu with 'Mailer' and 'Task' tabs. Below the menu, there is an 'Information' section with a warning icon and the text: 'All changes made in this page require a server restart to take effect.' The main section is titled 'Workflow Notification Properties'. It contains a 'Notification Mode' dropdown menu set to 'None'. Below this is the 'Notification Service' section, which includes three email address fields: 'Email : From Address' (accountId@yourdomain.com), 'Email : Actionable Address' (respondToaccountId@yourdomain.com), and 'Email : Reply To Address' (no.reply@yourdomain.com). At the bottom of the page, there is a link for 'More Workflow Notification Configuration Properties...'.

3. Click **More Workflow Notification Configuration Properties**.
4. Click **RetryNotificationMessageThrottle**.
5. In the **Value** field, enter a value. The default is 200000 messages.

6. Click **Apply**.

23.9 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 Section "Configuring Oracle User Messaging Service" of *Administering 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.

23.10 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.

23.11 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.

Learn 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 *Configuring the Identity Store Service* in *Securing Applications with Oracle Platform Security Services*.

- [Adding an Authentication Provider](#)
- [Creating Users and Groups in the Authentication Provider](#)
- [Configuring the Directory Service](#)
- [Configuring the Directory Service](#)

For information about installing and using the organizational hierarchy of users and groups known as the demo user community, see [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.

23.11.1 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

Configuration Users and Groups Roles and Policies Credential Mappings **Providers** Migration

Authentication Password Validation Authorization Adjudication Role Mapping Auditing Credential Mapping Certification Path Keystores

An Authentication provider allows WebLogic Server to establish trust by validating a user. You must have one Authentication provider in a security realm, and you can configure multiple providers. Providers are designed to access different data stores, such as LDAP servers or DBMS. You can also configure a Realm Adapter Authentication provider that allows you to

Customize this table

Authentication Providers

New Delete Reorder

| Name | Description |
|---------------------------------|---|
| Trust Service Identity Asserter | Trust Service Identity Assertion Provider |
| DefaultAuthenticator | WebLogic Authentication Provider |
| DefaultIdentityAsserter | WebLogic Identity Assertion provider |

New Delete Reorder

4. Click **New** to add a new authentication provider.

The Create a New Authentication Provider page appears.

Create a New Authentication Provider

OK Cancel

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:

OK Cancel

5. In the **Name** field, type a name for the provider, choose the authenticator type using the **Type** drop-down list, and click **OK**.

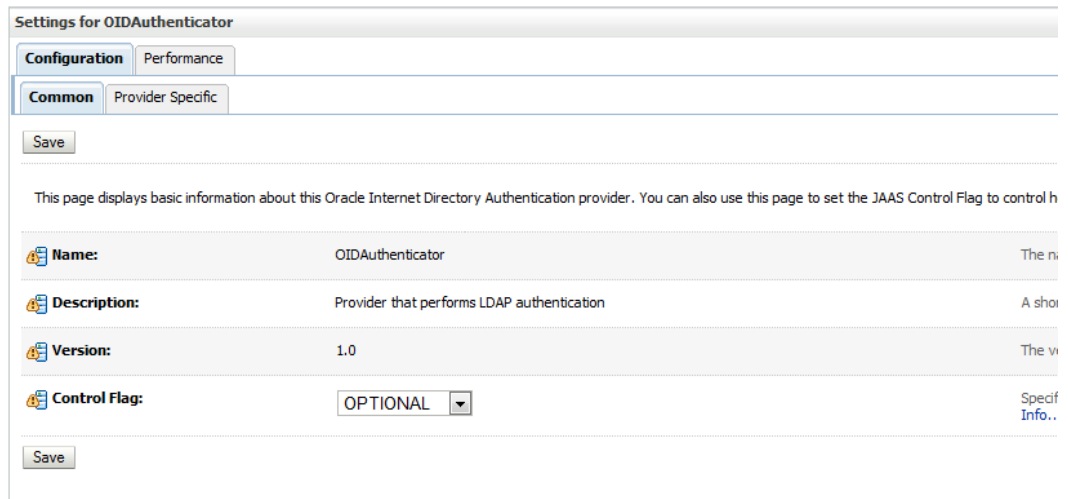
For example, you can type `OIDAuthenticator` as the name and choose **OracleInternetDirectoryAuthenticator** as the type for a provider that authenticates users using the Oracle Internet Directory.

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 [Configuring the Directory Service](#) for more information.

- On the **Providers > Authentication** page, click the authenticator that you just created. The settings for the authentication provider appears.



Settings for OIDAuthenticator

Configuration Performance

Common Provider Specific

Save

This page displays basic information about this Oracle Internet Directory Authentication provider. You can also use this page to set the JAAS Control Flag to control h

Name: OIDAuthenticator The n

Description: Provider that performs LDAP authentication A sho

Version: 1.0 The vi

Control Flag: OPTIONAL Specif Info..

Save

- 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.

- Click **Provider Specific** to enter the details for the authenticator server.
- Enter the provider-specific information about the authentication provider, check the **Use Retrieved User Name as Principal** check box, 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. |
| Principal | The Distinguished Name (DN) of the authenticator server user that Oracle WebLogic Server should use when connecting to the server. |

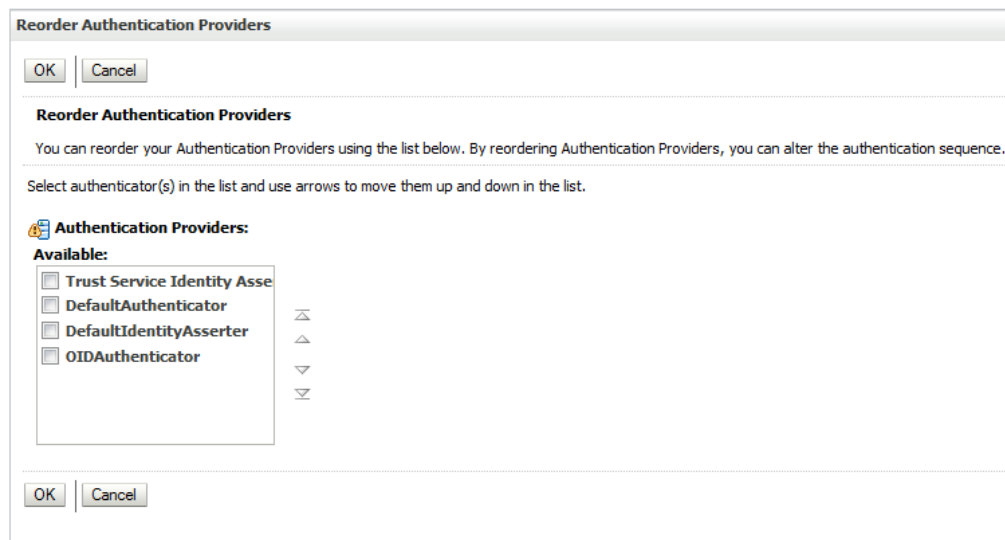
| Field | Description |
|---|--|
| Credential | The credential (usually a password) used to connect to the authenticator server. |
| User Base DN | The base Distinguished Name (DN) of the tree in the LDAP directory that contains users. |
| Group Base DN | The base Distinguished Name (DN) of the tree in the LDAP directory that contains groups. |
| Use Retrieved User Name as Principal | Specifies whether to use the user name retrieved from the LDAP server as the principal in the subject. |
| User Name Attribute | 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**.

10. Click **Security Realms > Providers > Authentication** to return to the list of authentication providers.
11. Click **Reorder**.

The Reorder Authentication Providers page appears.



12. 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.

23.11.1.1 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**.

23.11.1.2 Configuring Multiple Authentication Providers

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:

```
<serviceInstance name="idstore.ldap"
  provider="idstore.ldap.provider">
  .....
  <property name="virtualize" value="true"/>
  .....
</serviceInstance>
```

23.11.2 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.

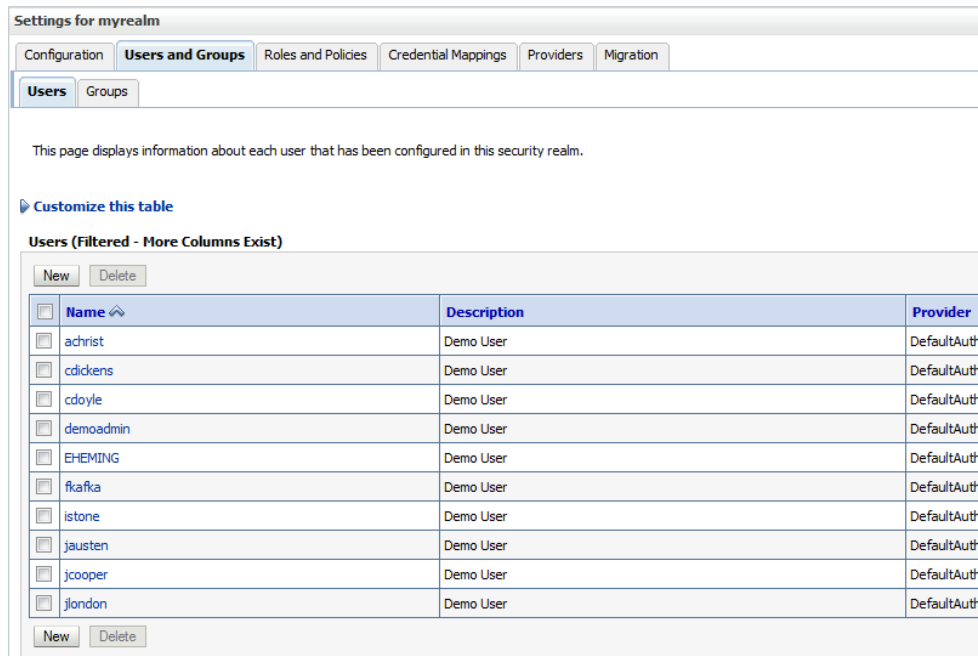
23.11.2.1 Creating Users Using WebLogic Console

You can create users for a specific provider, and define user 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.



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 |
|-------------------------|---|
| Name | (Required) The name of the new user. |
| Description | A description of the new user. |
| Provider | The provider for the user. |
| Password | The password associated with the login name for the new user. |
| Confirm Password | 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**.

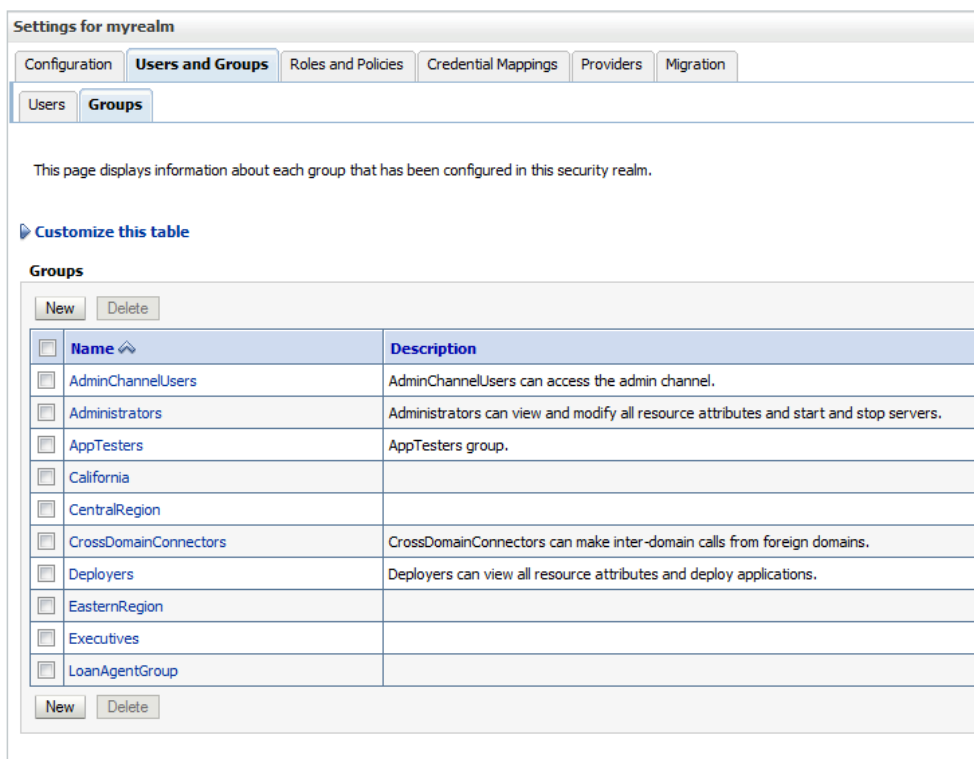
23.11.2.2 Creating Groups Using WebLogic Console

You can create groups for a specific provider, and define group membership, using the Oracle WebLogic Server Administration Console.

To create a group using WebLogic Console:

1. Click **Users and Groups > Groups**.

The Groups page appears.



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 |
|--------------------|---------------------------------------|
| Name | (Required) The name of the new group. |
| Description | A description of the new group. |
| Provider | 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 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**.

23.11.2.3 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 |
|--------------------|--|
| Name | The name of the connection. |
| Server | (Required) The hostname or IP address of the system on which Oracle Internet Directory is running. |
| Port | (Required) The port number on the system on which Oracle Internet Directory is running. |
| SSL Enabled | Select to enable Secure Sockets Layer (SSL) communication. |
| User Name | (Required) The user name used to log in to Oracle Internet Directory. |
| Password | (Required) The password associated with the user name. |
| Start Page | 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.

23.11.2.3.1 How to Create a Domain

To create a domain:

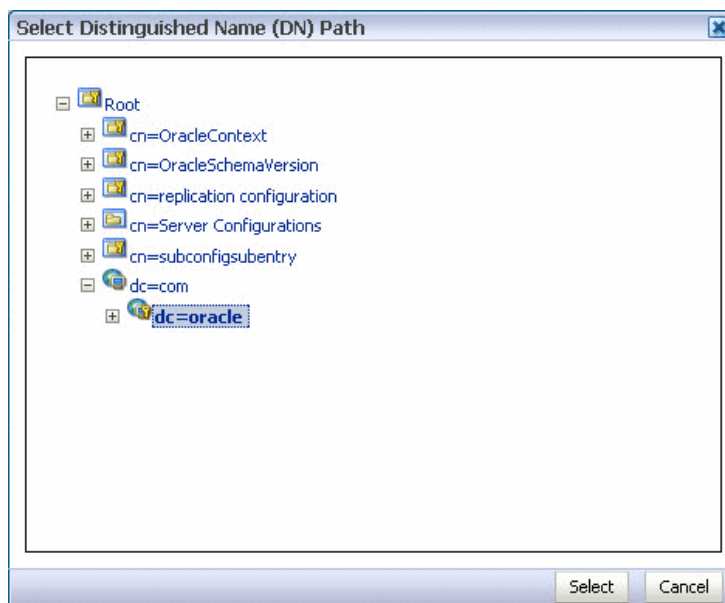
1. Click the **Create a new entry** button in the **Data Tree** pane. The Entry Properties page of the Create New Entry wizard appears.
2. Click the **Add** button to add the required object class for the domain. The Add Object Class dialog appears.

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 |
|------------------------------------|---|
| dc | (Required) The domain component. |
| Relative Distinguished Name | (Required) The relative distinguished name of the user. |

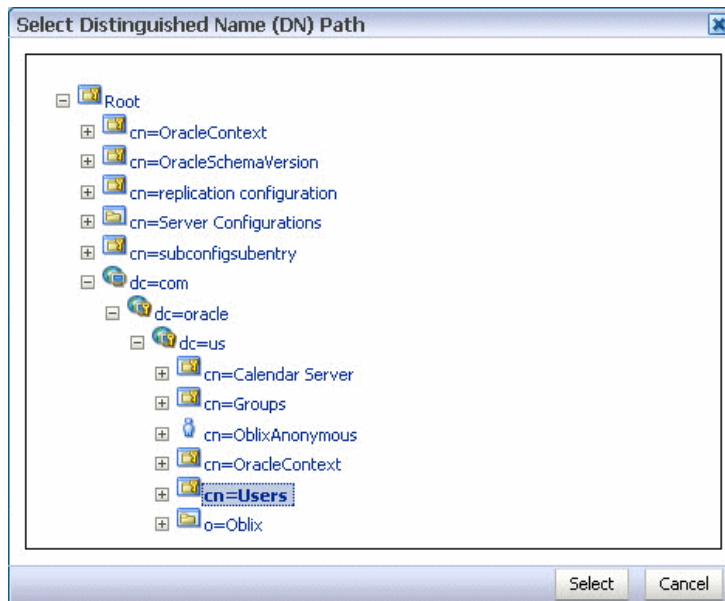
The Status page of the Create New Entry wizard appears.

9. Verify the status of the new domain, and click **Finish** to create the new domain.

23.11.2.3.2 How to Create a User

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.



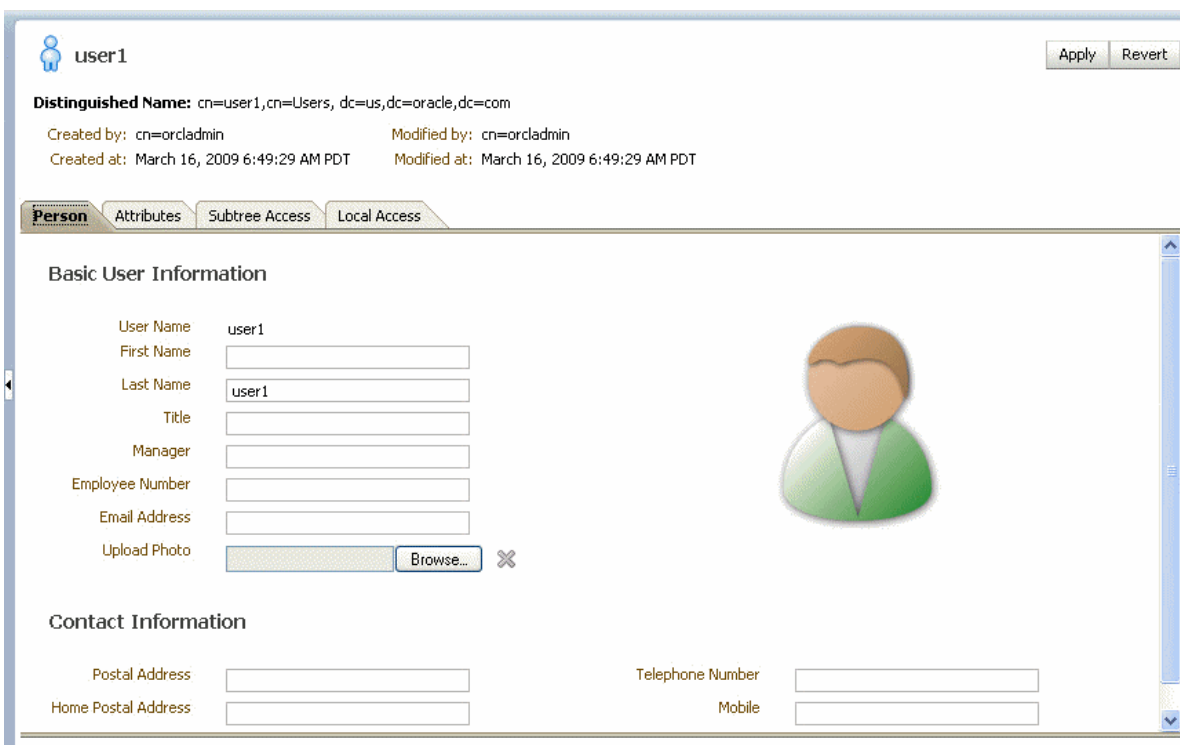
6. Select the parent of the user and click **Select**.
7. Click **Next** in the Create New Entry dialog. The Mandatory Properties page of the Create New Entry wizard appears.
8. Enter and select values for the required fields, and click **Next**.

Specify the following information.

| Field | Description |
|------------------------------------|---|
| cn | (Required) The common name. |
| sn | (Required) The surname (last name). |
| Relative Distinguished Name | (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.



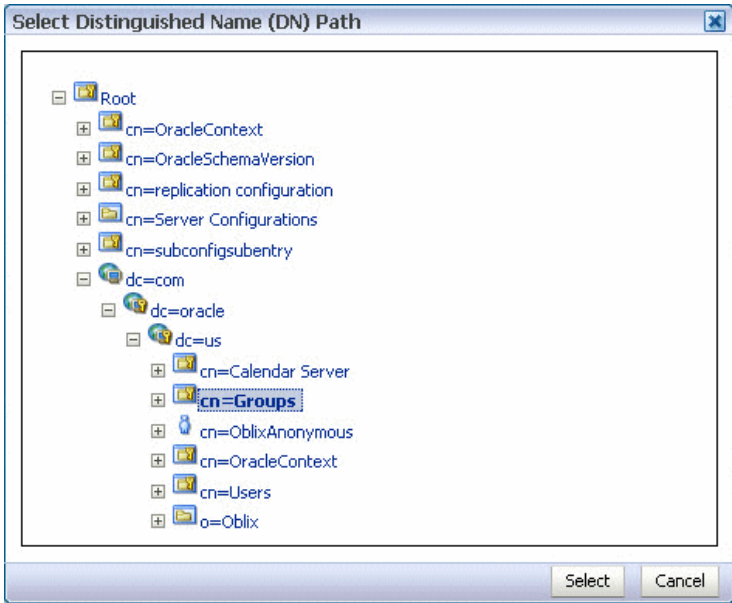
The screenshot shows the Oracle Identity Management console interface for editing a user. At the top, the user is identified as 'user1' with a small person icon. To the right are 'Apply' and 'Revert' buttons. Below this, the distinguished name is shown as 'cn=user1,cn=Users,dc=us,dc=oracle,dc=com'. Creation and modification details are listed: 'Created by: cn=orcladmin', 'Modified by: cn=orcladmin', 'Created at: March 16, 2009 6:49:29 AM PDT', and 'Modified at: March 16, 2009 6:49:29 AM PDT'. A tabbed interface shows 'Person' as the active tab, with other tabs for 'Attributes', 'Subtree Access', and 'Local Access'. The main content area is divided into two sections: 'Basic User Information' and 'Contact Information'. The 'Basic User Information' section contains fields for 'User Name' (filled with 'user1'), 'First Name', 'Last Name' (filled with 'user1'), 'Title', 'Manager', 'Employee Number', 'Email Address', and 'Upload Photo' (with a 'Browse...' button and a close icon). A placeholder image of a person is shown to the right. The 'Contact Information' section contains fields for 'Postal Address', 'Home Postal Address', 'Telephone Number', and 'Mobile'. A vertical scrollbar is visible on the right side of the form area.

11. Enter details about the user, and click **Apply**.

23.11.2.3.3 How to Create a Group

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**.
Specify the following information.

| Field | Description |
|------------------------------------|--|
| cn | (Required) The common name. |
| Relative Distinguished Name | (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.

The screenshot shows the Oracle Identity Management console for a group named 'grp1'. At the top left is the group icon and name. To the right are 'Apply' and 'Revert' buttons. Below the name is the 'Distinguished Name' field with the value 'cn=grp1,cn=Groups, dc=us,dc=oracle,dc=com'. Underneath are 'Created by' and 'Modified by' fields, both with the value 'cn=orcladmin', and 'Created at' and 'Modified at' fields, both with the value 'March 16, 2009 11:04:12 PM PDT'. A navigation bar contains tabs for 'Group', 'Attributes', 'Subtree Access', and 'Local Access'. The 'Group' tab is selected. Below the tabs are three sections: 'Owner', 'Description', and 'Members'. Each section has a '+' and 'x' icon and a text area. The 'Owner' and 'Members' text areas contain the text 'No information currently available'. The 'Description' text area is empty.

11. Specify details about the group, and click **Apply**.

23.11.2.3.4 How to Delete an Entry

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.

23.11.3 Configuring the Directory Service

When using Oracle Internet Directory as the authentication provider, you must set the **orclsslinteropmode** 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.

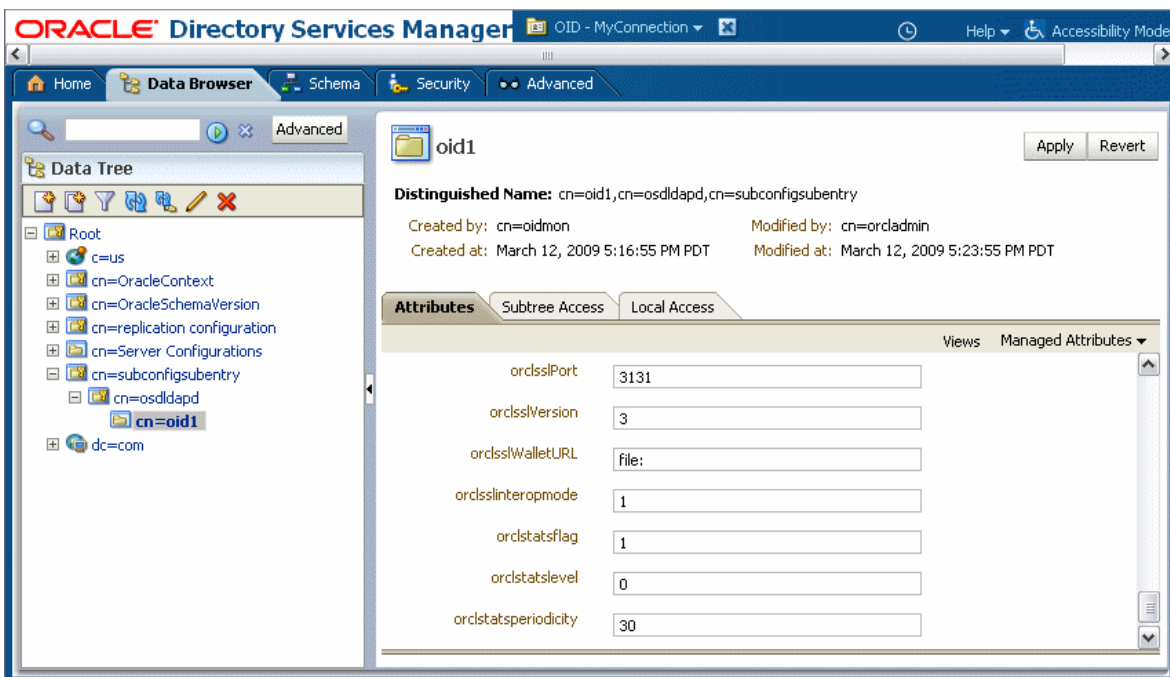
You map `GUID` to `cn` in the `jps-config.xml` file:

```
<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 *Securing Applications with Oracle Platform Security Services*.

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=osldapd > cn=oid1` nodes.



4. In the Attributes page, set the `orclsslinteropmode` attribute to 0.
5. Click the **Apply** button.

23.11.4 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>

23.12 Seeding Users, Groups, and Application Roles using LDAP Tools

Get 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 *Developing SOA Applications with Oracle SOA Suite*.

23.12.1 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 *Administering Security for Oracle WebLogic Server*.

23.12.2 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 [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.

23.12.3 Seeding Application Roles Using WLST Scripts

For instructions on using the WebLogic Scripting Tool (WLST) to seed application roles, see OPSS Security Store WLST Commands in *WLST Command Reference for Infrastructure Security*.

23.12.4 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.

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. In the **Application** list, select the application name (*server_name/soa-infra*) under which to create a role.
 - b. Select the **Create** option in the Application Roles page.
The Create Application Role page appears.
 - 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.

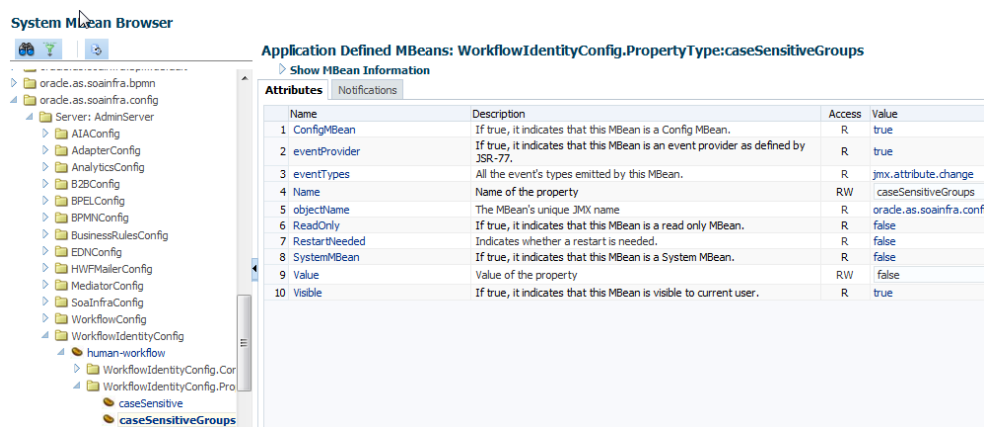
23.13 Enabling Case Agnostic Group Names in Human Tasks

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 **Value**.
4. In the **Value** field, enter `false`.
5. Click **Apply**.



23.14 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 *About Attaching Policies Globally Using WLST in Securing Web Services and Managing Policies with Oracle Web Services Manager*.

23.15 Enabling Lookup of Tasks Assigned to Groups not Part of the Configured Provider

Tasks that are assigned to the groups which are part of non configured provider do not appear in Human Workflow.

To enable the lookup of such tasks where the groups are not part of the configured provider, set the Mbean attribute `GroupsFromNonConfiguredProvider` in `WorkflowConfig` Mbean to `true`.

Monitoring Human Workflow Service Components and Engines

Learn how to monitor human workflow service engine active requests and operation performance statistics, and how to monitor deployed human workflows in the service engine.

- [Monitoring Human Workflow Service Engine Active Requests and Operation Performance Statistics](#)
- [Monitoring Deployed Human Workflows in the Service Engine](#)

For more information, see the following sections:

- [Introduction to Service Components](#)
- [Introduction to Service Engines](#)

24.1 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:

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

From the SOA Infrastructure Menu...

- a. Select **Service Engines > Human Workflow**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. Select **Service Engines > Human Workflow**.
-

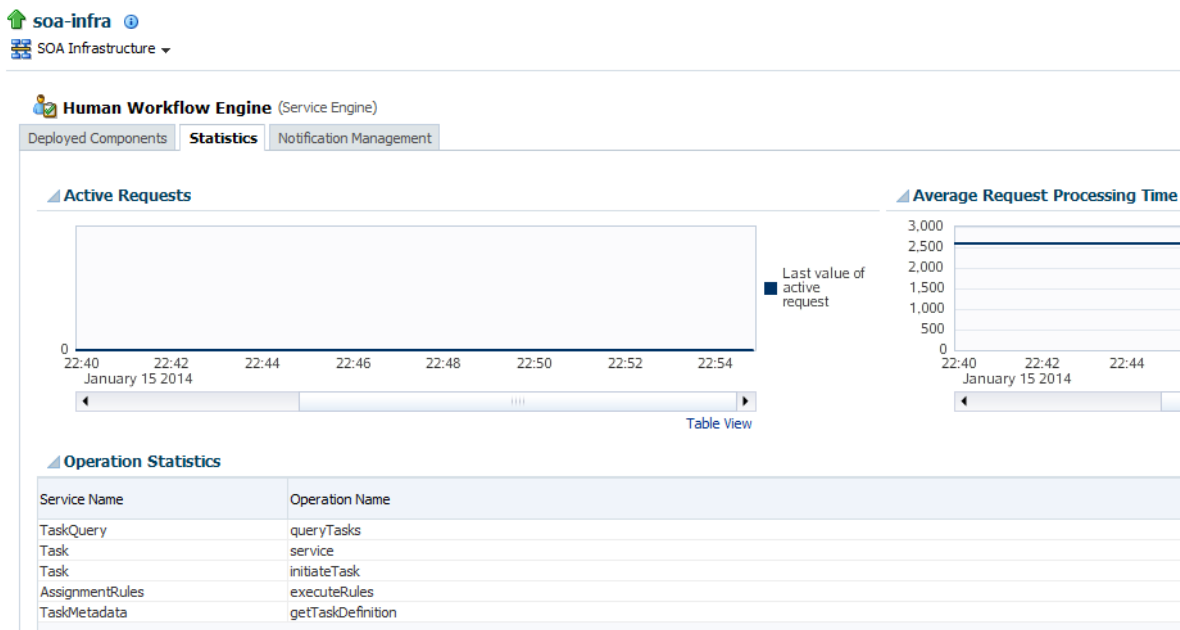
2. Click **Statistics**.

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. After 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.
- Users with the highest backlog provides a snapshot of the workload assigned to various users, groups, or roles. Using this table you can identify assignees with a large number of pending human workflow service tasks as well as the average time it takes for each assignee to complete their tasks.



For more information, see the following documentation:

- [Introduction to Service Components](#)
- *Developing SOA Applications with Oracle SOA Suite* for details about human workflow services and operations
- *Tuning Performance* for more details about human workflow tuning and performance properties

24.2 Monitoring Deployed Human Workflows in the Service Engine

You can monitor all deployed SOA composite applications with human workflow 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... |
|---|---|
| <ol style="list-style-type: none"> a. Select Service Engines > Human Workflow. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select Service Engines > Human Workflow. |

2. The Deployed Components tab is displayed.

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 workflow 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.



Human Workflow Engine (Service Engine)

Deployed Components | Statistics | Notification Management

Search

Name

Composite Name

View ▾

| Name | Composite |
|--------------------|----------------------|
| Humantask1 | HWFProj [1.0] |
| SimpleApprovalTask | SimpleApproval [1.0] |

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

Learn how to manage human workflow 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.

- [Managing Human Workflow Service Component Policies](#)
- [Managing the URI of the Human Workflow Service Component Task Details Application](#)
- [Managing Outgoing Notifications and Incoming Email Notifications](#)
- [Moving Human Workflow Data from a Test to a Production Environment](#)



Note:

Human workflow service components are also known as human task service components in Oracle Enterprise Manager Fusion Middleware Control.

For more information, see the following sections:

- [Introduction to Service Components](#)
- [Introduction to Service Engines](#)

25.1 Managing Human Workflow Service Component Policies

You can attach and detach security policies to and from human workflow 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.



Note:

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.

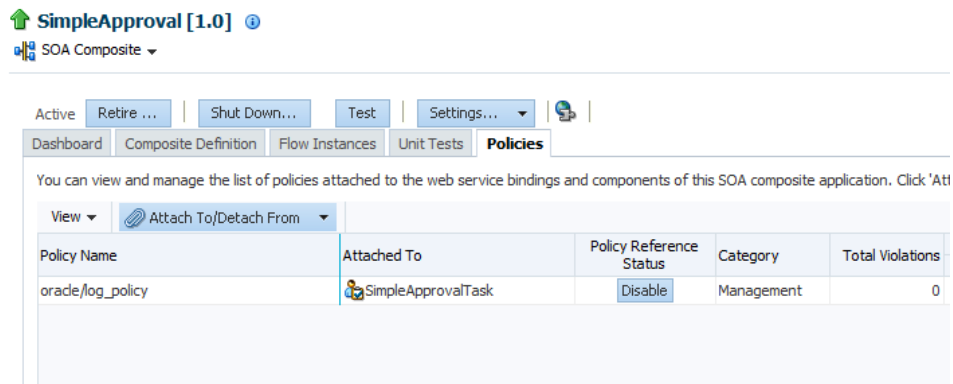
To manage human workflow service component policies:

1. Access the human workflow service component's home page through one of the following options:

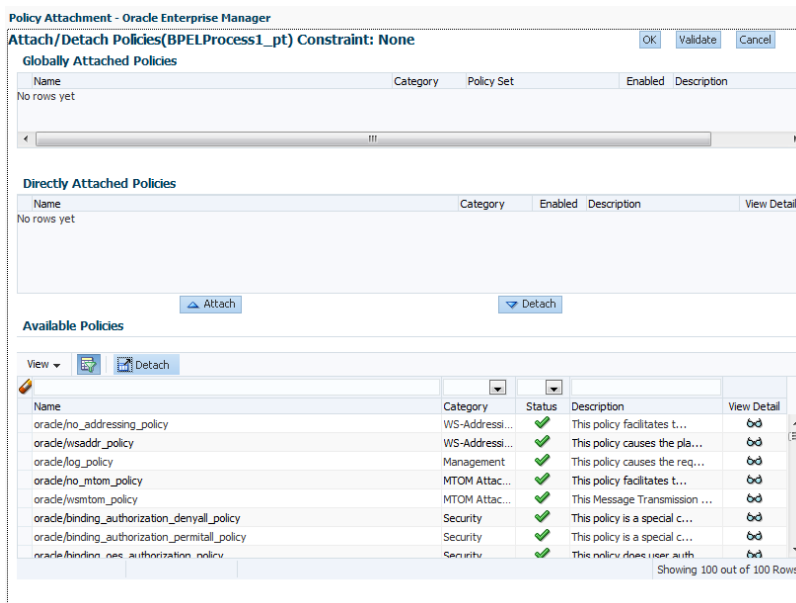
| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|--|
| Select Service Engines > Human Workflow . | <ol style="list-style-type: none"> Select soa-infra. Right-click and select Service Engines > Human Workflow. |

- Go to the **Composites** column of the View table and select a specific SOA composite application to access its home page.
- Click **Policies**.

The Policies page enables you to attach and detach security policies to and from a human workflow 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.



- Click **Attach/Detach From**.
If multiple components are available, you are prompted to select the service or component for which to perform the attachment or detachment.
- 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 **Globally Attached Policies** or **Directly 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:

- [Introduction to Policies](#)
- [Managing SOA Composite Application Policies](#) for the dialogs that are displayed during policy attachment

25.2 Managing the URI of the Human Workflow Service Component Task Details Application

You can add or remove the URIs of the task details application used in human workflow.

To manage the URIs of the human workflow service component task details application:

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

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|--|
| Select Service Engines > Human Workflow . | <ol style="list-style-type: none"> Select soa-infra. Right-click and select Service Engines > Human Workflow. |

- Go to the **Composites** column of the View table and select a specific SOA composite application to access its home page.
- Select a component from the list of components.
- Click **Administration**.

The Administration page shows the URI for the task details application.

SimpleApproval [1.0] ⓘ

SOA Composite ▾

SimpleApprovalTask (Human Workflow Component) ⓘ

Dashboard Policies Administration

Add or remove the URI for the user defined task details application.

View ▾ + Add URI ✖ Remove URI

| Application Name | Host Name | HTTP Port | HTTPS Port | URI |
|------------------|---------------------------|-----------|------------|--------------------------------|
| worklist | blr2262453.idc.oracle.com | 7001 | | /SimpleApprovalTaskFlow/faces/ |

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.

- Click the **Add** icon to specify the following details for the URI:
 - Application name
 - Hostname
 - HTTP port
 - HTTPS port (optional)
 - URI
- Click **OK** and then click **Apply**.

25.3 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:

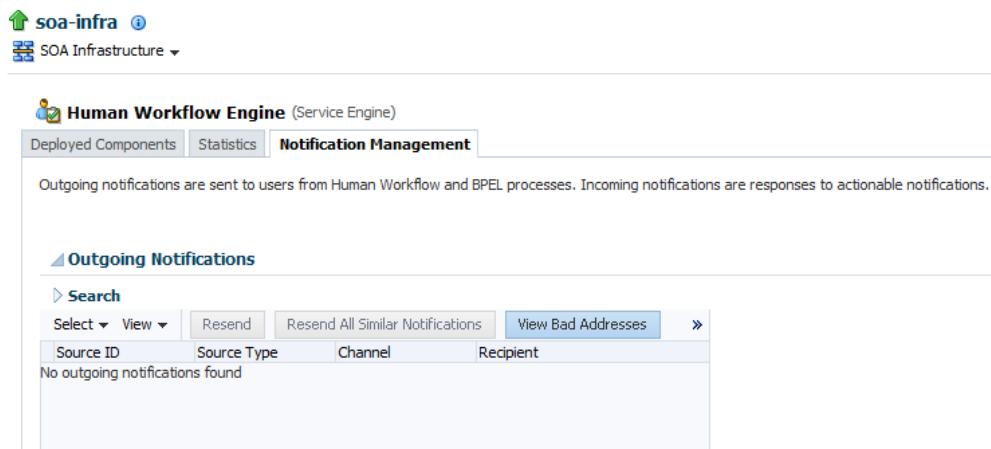
1. Access the Human Workflow Engine page using one of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|---|---|
| <ol style="list-style-type: none"> a. Select Service Engines > Human Workflow. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select Service Engines > Human Workflow. |

2. In the the Human Workflow Engine, click the **Notification Management** tab.

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, or instant message), the address of the message recipient, the message status (for example, error, send, retry, sent), and the time at which the message was sent.



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.

3. Perform the following actions on outgoing notifications:

| Action | Description |
|---|--|
| Send Test Notification | <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"> • Destination address • Delivery channel (for example, email) • Message subject and content <p>Note: You cannot send test notification messages with the messaging extension driver because it requires the following:</p> <ul style="list-style-type: none"> • Specific data to be manually entered into the test page (such as the URI of the task details) • URI-specific headers (such as time, user, and so on) |
| Resend | <p>Select specific outgoing notification messages in the table and click Resend 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 Resend to test the delivery.</p> |
| Resend All Similar Notifications | <p>Resend all error notification messages having the same recipient address as the selected one.</p> |
| View Bad Addresses | <p>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.</p> |
| Delete icon | <p>Click to delete a selected message.</p> |

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 |
|---------------------|--|
| Mark as Spam | 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. |
| No Spam | Mark incoming messages as not being spam. This action enables new messages from the sender's address to be delivered again. |
| Delete icon | Click to delete a selected message. |

For more information about notifications, see *Developing SOA Applications with Oracle SOA Suite*.

25.4 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.

25.4.1 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 [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 [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 [Configuring Human Workflow Notification Properties](#).

25.4.2 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 |
|------------------------------------|--|
| <code>operationType</code> | Specify to perform one of the following actions: <ul style="list-style-type: none"> EXPORT: Data is migrated from a SOA server instance into an XML file. IMPORT: Data is migrated from the XML file into the SOA server instance. |
| <code>objectType</code> | Specify the type of object to migrate: <ul style="list-style-type: none"> VIEW: Migrates views. RULE: Migrates vacation rules. TASK_PAYLOAD_FLEX_FIELD_MAPPING: Migrates mapped attribute mappings. |
| <code>name</code> | Specify the object name if you specified VIEW or TASK_PAYLOAD_FLEX_FIELD_MAPPING values for the <code>objectType</code> . This property refers to the following: <ul style="list-style-type: none"> viewName for VIEW taskDefinitionId for TASK_PAYLOAD_FLEX_FIELD_MAPPING Specify ALL to identify all objects of this type. |
| <code>user</code> | Specify the user name only if you specified the VIEW or RULE value for the <code>objectType</code> property. If a user is not specified for VIEW, it implies STANDARD_VIEW. |
| <code>group</code> | Specify this property only if you specified the RULE value of the <code>objectType</code> property. It identifies the group name (for example, LoanAgentGroup). |
| <code>grantPermission</code> | Specify this property only if you specified the VIEW value of the <code>objectType</code> property. <ul style="list-style-type: none"> true: Migrates view definitions and grants. false: Migrates only view definitions. |
| <code>migrateAttributeLabel</code> | Specify one of the following values: <ul style="list-style-type: none"> true: Migrates only attribute labels. Payload mappings are <i>not</i> migrated. false: Does not migrate attribute labels. Migrates only payload mappings. |

| Argument | Definition |
|------------------------|--|
| override | Specify whether to override the data on the target SOA server: <ul style="list-style-type: none"> • true: Overrides the existing workflow user-configurable data on the target SOA server. • false: Does not override the target SOA server instance that has the workflow user-configurable data. |
| skip | Specify error handling details. <ul style="list-style-type: none"> • true: Errors are skipped and the migration utility continues processing. • false: Any encountered error halts the migration. |
| migrateToActiveVersion | Specify a value for mapping task definition IDs. <ul style="list-style-type: none"> • true: Maps task definition IDs to the active version in the target SOA server instance. • false: Does not map task definitions. |

25.4.2.1 Migration Property File Examples

This section provides examples how to configure the `migration.properties` file.

25.4.2.1.1 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
```

25.4.2.1.2 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
```

25.4.2.1.3 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
```

25.4.2.1.4 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
```

25.4.2.1.5 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
```

25.4.2.1.6 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
```

25.4.2.1.7 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
```

25.4.2.1.8 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
```

25.4.2.1.9 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
```

25.4.2.1.10 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
```

25.4.2.1.11 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
```

25.4.2.1.12 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
```

25.4.2.1.13 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
```

25.4.2.1.14 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
```

25.4.2.1.15 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
```

25.4.2.1.16 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
```

25.4.2.1.17 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
```

25.4.2.1.18 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
```

25.4.2.1.19 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
```

25.4.2.1.20 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
```

25.4.3 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
-Dhwf.t2p.config.file=
```

| Argument | Definition |
|--|---|
| <code>bea.home</code> | The absolute path of the installation directory for Oracle WebLogic Server. |
| <code>soa.home</code> | The absolute path of the Oracle SOA Suite home directory. |
| <code>migration.properties.file</code> | The absolute path to the <code>migration.properties</code> file. |
| <code>soa.hostname</code> | The hostname of the SOA server instance. Note: You must specify the complete domain name, such as <code>myhost.us.example.com</code> , instead of <code>myhost</code> . |
| <code>soa.rmi.port</code> | The remote method invocation (RMI) port of the SOA server instance. |
| <code>soa.admin.user</code> | The Admin user name to connect to the SOA server instance. |
| <code>soa.admin.password</code> | The Admin user password to connect to the SOA server instance. |
| <code>realm</code> | The realm of the SOA server instance. |
| <code>migration.file</code> | The complete path location of the migration file in which all user-configurable data from the SOA server is exported to or imported from. |
| <code>map.file</code> | The full path location of the map file in which all the <code>TaskDefinitionId</code> mappings in the target SOA server are provided. This file enables you to customize the mapping. |
| <code>hwf.t2p.config.file</code> | The location of the configuration file. |

 **Note:**

The configuration file specified must be of type `.properties` (for example, `config.properties`) and include an entry for `soa.admin.password` (for example, `soa.admin.password=****`).

When calling `ant-t2p-worklist.xml`, set the argument `soa.admin.password` to the correct password, or to an empty value. For example:

```
-Dsoa.admin.password=*** or -Dsoa.admin.password=
```

If `soa.admin.password` is set to an empty value, provide the password configuration file location by setting the `hwf.t2p.config.file` argument to the file location. If both `hwf.t2p.config.file` and `soa.admin.password` are set, the `soa.admin.password` value is read from the configuration file.

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
-Dhwf.t2p.config.file=
```

Part IX

Administering Oracle JCA Adapters

Learn how to administer Oracle JCA Adapters.

- [Configuring Oracle JCA Adapters](#)
- [Monitoring Oracle JCA Adapters](#)

26

Configuring Oracle JCA Adapters

Learn how to configure inbound and outbound endpoint properties during runtime for Oracle JCA adapters.

- [Configuring the Endpoint Properties for an Inbound Adapter](#)
- [Configuring the Endpoint Properties for an Outbound Adapter](#)

For more information about adapter tuning and performance properties, see *Understanding Technology Adapters*.

Note:

All adapter properties visible in Oracle Enterprise Manager Fusion Middleware Control can be updated on a live basis. Some properties may cause the endpoint to recycle (for example, `QueueName`), others do not (for example, `jca.retry.count`). Generally, properties originating from an activation or interaction spec cause the endpoint to recycle. All other (binding / endpoint) properties do not cause it to recycle.

Also, you can add any properties that you want to use and that are specified in *Understanding Technology Adapters*. However, because there is no validation when you add properties within Oracle Enterprise Manager Fusion Middleware Control, this practice is not recommended.

26.1 Configuring the Endpoint Properties for an Inbound Adapter

Learn how to configure the endpoint properties for an inbound adapter.

- [Editing a Predefined Property for an Inbound Adapter](#)
- [Adding Predefined Properties for an Inbound Adapter](#)
- [Creating a New Property for an Inbound Adapter](#)
- [Deleting a Property for an Inbound Adapter](#)
- [Reverting a Property Value for an Inbound Adapter](#)

26.1.1 Editing a Predefined Property for an Inbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, you can edit the predefined properties at a later stage using Oracle Enterprise Manager Fusion Middleware Control.

To edit a predefined property for an inbound adapter, navigate to the adapter by using either of the following options:

| 1. From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|---|
| <p>a. Right-click soa-infra in the target menu.</p> <p>b. Click Services and References. The SOA-Infra page is displayed with Services and References.</p> <p>c. Click either Services or References. The Home page for the Adapter is displayed.</p> | <p>a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>b. From the Composite Target menu, select Service/Reference Properties. Select the Service or Reference. The Home Page for the adapter is displayed.</p> |

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and [Understanding Technology Adapters](#).

26.1.1.1 Edit a Predefined Property:

1. Click **Properties** to see a list of the currently defined binding properties.
2. Select the property you want to edit.
3. Edit the value in the **Value** text box, and then click **Apply**.

You have edited a predefined property for an inbound adapter.

26.1.2 Adding Predefined Properties for an Inbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, you can 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 the adapter by using either of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|---|
| <p>a. Right-click soa-infra in the target menu.</p> <p>b. Click Services and References. The SOA-Infra page is displayed with Services and References.</p> <p>c. Click either Services or References. The Home page for the Adapter is displayed.</p> | <p>a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>b. From the Composite Target menu, select Service/Reference Properties. Select the Service or Reference. The Home Page for the Adapter is displayed.</p> |

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 **Apply**.
You have added a predefined property for an inbound adapter.

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and [Understanding Technology Adapters](#).

26.1.3 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 the adapter 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"> a. Right-click soa-infra in the target menu. b. Click Services and References. The SOA-Infra page is displayed with Services and References. c. Click Services. The Home page for the Adapter is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. From the Composite Target menu, select Service/Reference Properties. Select the Service. The Home Page for the Adapter is displayed. |

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 [Configuring Service and Reference Binding Component Properties](#) and [Understanding Technology Adapters](#).

26.1.4 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 the adapter 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"> a. Right-click soa-infra in the target menu. b. Click Services and References. The SOA-Infra page is displayed with Services and References. c. Click Services. The Home page for the Adapter is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. From the Composite Target menu, select Service/Reference Properties. Select the Service. The Home Page for the Adapter is displayed. |

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 **Yes** to confirm.
- d. Click **Apply**.

You have deleted a property for an inbound adapter.

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and *Understanding Technology Adapters*.

26.1.5 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 the Adapter 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"> a. Right-click soa-infra in the target menu. b. Click Services and References. The SOA-Infra page is displayed with Services and References. c. Click Services. The Home page for the Adapter is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. From the Composite Target menu, select Service/Reference Properties. Select the Service. The Home Page for the Adapter is displayed. |

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 **Yes** to confirm.
 - d. Click **Save**.

You have reverted a property value for an inbound adapter.

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and *Understanding Technology Adapters*.

26.2 Configuring the Endpoint Properties for an Outbound Adapter

Learn how to configure the endpoint properties for an outbound adapter.

- [Editing a Predefined Property for an Outbound Adapter](#)
- [Adding a Predefined Property for an Outbound Adapter](#)
- [Creating a New Property for an Outbound Adapter](#)
- [Deleting a Property for an Outbound Adapter](#)
- [Reverting a Property Value for an Outbound Adapter](#)

26.2.1 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>a. Right-click soa-infra in the target menu.</p> <p>b. Click Services and References. The SOA-Infra page is displayed with Services and References.</p> <p>c. Click References. The Home page for the Adapter is displayed.</p> | <p>a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>b. From the Composite Target menu, select Service/Reference Properties. Select the Reference. The Home Page for the Adapter is displayed.</p> |

2. Edit a predefined property:
 - a.** Click the **Properties** tab to see a list of the currently defined binding properties.
 - b.** Select the property you want to edit.
 - c.** Edit the value in the **Value** text box. You can click **Apply** to apply the change.
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 [Configuring Service and Reference Binding Component Properties](#) and [Understanding Technology Adapters](#).

26.2.2 Adding a Predefined Property for an Outbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, you can 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 the Adapter by using either of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|---|
| <p>a. Right-click soa-infra in the target menu.</p> <p>b. Click Services and References. The SOA-Infra page is displayed with Services and References.</p> <p>c. Click References. The Home page for the Adapter is displayed.</p> | <p>a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>b. From the Composite Target menu, select Service/Reference Properties. Select the Reference. The Home Page for the Adapter is displayed.</p> |

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 [Configuring Service and Reference Binding Component Properties](#) and *Understanding Technology Adapters*.

26.2.3 Creating a New Property for an Outbound Adapter

The properties of an adapter are usually defined in Oracle JDeveloper during design time. However, you can 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 the Adapter by using either of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|---|
| <p>a. Right-click soa-infra in the target menu.</p> <p>b. Click Services and References. The SOA-Infra page is displayed with Services and References.</p> <p>c. Click References. The Home page for the Adapter is displayed.</p> | <p>a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed.</p> <p>b. From the Composite Target menu, select Service/Reference Properties. Select the Reference. The Home Page for the Adapter is displayed.</p> |

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 **Apply** to apply the changes.

You have created a new property for an outbound adapter.

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and *Understanding Technology Adapters*.

26.2.4 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 the Adapter by using either of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|--|
| <ul style="list-style-type: none"> a. Right-click soa-infra in the target menu. b. Click Services and References. The SOA-Infra page is displayed with Services and References. c. Click References. The Home page for the Adapter is displayed. | <ul style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. From the Composite Target menu, select Service/Reference Properties. Select the Reference. The Home Page for the Adapter is displayed. |

2. Delete a property 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 delete, and then click **Delete**.
A message asking you to confirm your action is displayed.
 - c. Click **OK** to confirm.
 - d. Click **Apply** to apply the changes.

You have deleted a property for an outbound adapter.

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and *Understanding Technology Adapters*.

26.2.5 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 the Adapter by using either of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|--|
| <ul style="list-style-type: none"> a. Right-click soa-infra in the target menu. b. Click Services and References. The SOA-Infra page is displayed with Services and References. c. Click References. The Home page for the Adapter is displayed. | <ul style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. From the Composite Target menu, select Service/Reference Properties. Select the Reference. The Home Page for the Adapter is displayed. |

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, and click **Apply**.
You have reverted a property value for an outbound adapter.

For more information about configuring adapters, see [Configuring Service and Reference Binding Component Properties](#) and [Understanding Technology Adapters](#).

Monitoring Oracle JCA Adapters

Learn how to monitor inbound and outbound Oracle JCA adapters, including monitoring instances and faults, recent faults and rejected messages, adapter properties, and adapter logs.

- [Monitoring Instances and Faults for an Inbound Adapter](#)
- [Monitoring Recent Faults and Rejected Messages for an Inbound Adapter](#)
- [Monitoring Faults for an Inbound Adapter](#)
- [Monitoring Properties for an Inbound Adapter](#)
- [Monitoring Instances and Faults for an Outbound Adapter](#)
- [Monitoring Faults for an Outbound Adapter](#)
- [Monitoring Properties for an Outbound Adapter](#)
- [Monitoring Adapter Logs](#)
- [Adapter Configuration Reports](#)
- [Scheduling JCA Adapter Endpoint Activation and Deactivation using Oracle Enterprise Scheduler](#)

27.1 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composites is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite home page is displayed. d. Click the inbound adapter (service) from the Services and References section in the right panel. The Service Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite Home page is displayed. b. Click the inbound adapter (Service) from the Services and References section in the right panel. |

2. Monitor the instances and faults for an inbound adapter:
 - a. The **Dashboard** page is, by default, selected once you select the composite under soa-infra.
 - b. Select the **Flow instance** tab. Under that the **Instances with Faults Section** is displayed. You can view the instances and faults within the **Instances and Faults** section.

The details of the fault is displayed in a line chart in the **Instances and Faults** section, which you can search within to find recent faults. 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 *Understanding Technology Adapters*.

27.2 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 under the **Flow Instances** tab 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... |
|---|---|
| <ol style="list-style-type: none"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composites is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite home page is displayed. d. Click the inbound adapter (Service) from the Services and References section in the right panel. The Service Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. Click the inbound adapter (service) from the Services and References section in the right panel. The Service Home page is displayed. |

2. Monitor the recent faults and rejected messages for an inbound adapter:
 - a. Click **Dashboard**.
The Dashboard page is displayed.
 - b. View the recent faults and rejected messages listed in **Instances and Faults** section within the **Flow Instances** tab.

A list of recently rejected faults and messages with details such as error message, fault time, and the business flow instance ID is displayed.

For more information about monitoring adapters, see *Understanding Technology Adapters*.

27.3 Monitoring Faults for an Inbound Adapter

You can view the details of the faults and rejected messages of an inbound adapter in the **Flow Instances** 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composites is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite Home page is displayed. |

2. To monitor the faults and rejected messages for an inbound adapter:

- a. View the recent faults and rejected messages listed in **Instances and Faults** section within the **Flow Instances** tab.

A list of faults and rejected messages with details such as error message, fault time, and business flow instance ID is displayed.

For more information about monitoring adapters, see *Understanding Technology Adapters*.

27.3.1 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composite applications is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite Home page is displayed. |

2. Select the **Flow instance** tab to obtain the **Instances with Faults** section.
3. Enter any or all of the following search options:
 - **Instances within a Time Range**
Enter any part of the error message text.
 - **Time**
Enter the ID of the fault.
 - **Composite**
Select Initiating or Participating from the toggle.
 - **State**
Select Active, which can be one of All Active, Recovery, Running, Suspended, or Inactive, which can be one of All Inactive, Completed, Failed or Aborted
 - **Fault**
Select a type from the list of faults available. These include: **All Faults, Recovery Required, Nonrecoverable, Recovered, System Auto Retries**
 - You can also choose to search for only **Recent Instances, Instances with Faults, Recoverable Instances**.
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 *Understanding Technology Adapters*.

27.3.2 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composite applications is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. |

2. Select the **Flow instance** tab to obtain the **Instances with Faults** section.

3. Click the **Delete Selected Flow Instances icon**

The Delete Selected Flow Instances dialog is displayed.

4. Click **Delete**.

To delete a fault, you must delete the associated business flow instance from the **Instances** page.

For more information about configuring adapters, see *Understanding Technology Adapters*.

27.4 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... |
|--|--|
| <p>a. Click Home. The SOA Infrastructure page is displayed.</p> | <p>a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed.</p> |
| <p>b. Click the Deployed Composites tab. The list of deployed composites is displayed.</p> | <p>b. Click the inbound adapter (service) from the Services and References section in the right panel. The Service Home page is displayed.</p> |
| <p>c. In the Composite section, click a specific SOA composite application. The SOA Composite home page is displayed.</p> | |
| <p>d. Click the inbound adapter (service) from the Services and References section in the right panel. The Service Home page is displayed.</p> | |

2. Monitor the properties for an inbound adapter:

a. Click **Properties**.

The Properties page is displayed for that adapter.

A list of properties with details such as name and value is displayed.

 **Note:**

For 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; details about the interaction specification are not displayed.

For more information about monitoring adapters, see *Understanding Technology Adapters*.

27.5 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composites is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite home page is displayed. d. Click the outbound adapter (reference) from the Services and References section in the right panel. The Service Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. Click the outbound adapter (reference) from the Services and References section in the right panel. The Service Home page is displayed. |

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, after clicking on the **Flow Instances** tab.

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.
- c. Select **Table View** to see an expanded table view listing to see total number of messages since server start or total number of faults since server start, which you can sort by ascending, or descending order, or you can sort by more advanced criteria by choosing advanced.

For more information about monitoring adapters, see *Understanding Technology Adapters*.

27.6 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composites is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite Home page is displayed. |

2. To monitor the faults for an outbound adapter:
 - a. Select the **Flow instance** tab to obtain the **Instances with Faults** section.
 - b. Select **Table View** to see a listing of faults, total number of incoming messages since server start and total number of faults., and to sort the displayed data according to your preference.

For more information about monitoring adapters, see *Understanding Technology Adapters*.

27.6.1 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"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composite applications is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite Home page is displayed. | <ol style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite Home page is displayed. |

2. Select the **Flow instance** tab to obtain the **Instances with Faults** section.

3. Click the **Search** icon at the right to execute any saved Searches.
4. In the **Search** Options section, enter any or all of the following search criteria:
 - Select the **Reset** icon to reset the search criteria.
 - Select the **Disk** icon to save the custom search.
 - Select the **Bookmark** icon to generate a bookmarkable link.
 - Select the **Funnel** icon on the right to customize (that is, add or remove) filters.
 - On the **Add/Remove Filters** link t you can set Filters by you can add or remove Filters by Time, Composite, Resequencer, Flow Instance, State, Fault, or User.
 - Using Search Options, you can set **Recent Instances**, **Instances with Faults**, **Recoverable Instances**, **All Saved Searches**.
 - You can either select **Customize Time Period**, or Last number of hours, minutes, days or weeks.
 - Choose **Participating** or a **Composite**.
 - Choose **State**, which can be **All Active**, **Recovery**, **Suspended**, **Running**.
 - Chose Fault, which can be any one of **All Faults**, **Recovery Required**, **Nonrecoverable**, **Recovered**, **System Auto Retries**.
5. Click **Search** to start the search operation.

The fault matching the criteria you specified is displayed.

For more information about configuring adapters, see *Understanding Technology Adapters*.

27.7 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... |
|--|--|
| <ul style="list-style-type: none"> a. Click Home. The SOA Infrastructure page is displayed. b. Click the Deployed Composites tab. The list of deployed composites is displayed. c. In the Composite section, click a specific SOA composite application. The SOA Composite home page is displayed. d. Click the outbound adapter (reference) from the Services and References section in the right panel. The Service Home page is displayed. | <ul style="list-style-type: none"> a. Under soa-infra, click a specific SOA composite application. The SOA Composite home page is displayed. b. Click the outbound adapter (reference) from the Services and References section in the right panel. The Service Home page is displayed. |

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:

Where an adapter 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 *Understanding Technology Adapters*.

27.8 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 logger for all Oracle JCA Adapters, and the logger is called `oracle.soa.adapter`.

To monitor the File adapter logs:

1. Navigate to your SOA composite dashboard for the selected composite application.
2. Select the logs for your composite application from the **Selected Links** link to the right of the SOA composite dashboard.
3. Supply a date and time range for the logs you want to examine.
4. In addition to date and time range, you can also provide other criteria to delimit the list of logs you will find. These include the following:

- **Message contains | is | is not | does not contain | starts with | does not start with | ends with | does not end with | matches | does not match**
 - **Composite name is | is not | contains | does not contain | starts with | does not start with | ends with | does not end with | matches | does not match**
 - **Fault id is | is not | contains | does not contain | starts with | does not start with | ends with | does not end with | matches | does not match**
 - **Flow correlation is | is not | contains | does not contain | starts with | does not start with | ends with | does not end with | matches | does not match**
 - **Flow id is | is not | contains | does not contain | starts with | does not start with | ends with | does not end with | matches | does not match**
5. Oracle Enterprise Manager Fusion Middleware Control displays a list of logs meeting the criteria you have supplied. Select a server log from the list of logs and download to view it in an editor.
 6. You could have alternatively navigated from **Target-Navigation-Domain** and right-clicked on the domain where the composite resides to select **View Log Messages**. This brings up a list of log messages directly.
 7. Information about SOA adapter logs can be found in the logger.

For information about configuring logs, see [Configuring Log Files](#). For information about diagnostics related to logs, see [Diagnosing Problems with SOA Composite Applications](#).

27.9 Adapter Configuration Reports

Oracle Adapter Configuration reports provide information on how you have configured Adapters. They provide diagnostics information in addition to Snapshot reports and Monitoring reports. Without this the support, one has to go through multiple consoles and logs for diagnosis. There are many more Adapter properties than those reported on in the diagnostic reports; however, the reports provide information from the most relevant properties.

The configuration report provides information on the service endpoints; each of these reports correlate and provide you with information that would otherwise require you to do a large amount of moving between different reports to find information related to Adapter configuration.

Adapter Configuration reports capture:

- Connection Factory properties
- Service Definition Properties (Activation Properties and other specs related to a service endpoint).
- Service Tuning Properties - Service endpoint properties used to tune the service to alter performance items such as throughput and throttling.
- Reference Definition Properties (Interaction Properties and other types of specs involved in Reference endpoint).
- Reference Tuning Properties - Reference endpoint properties used to tune the service to alter performance factor such as throughput and throttling.

The Reports do not provide information on Adapter-specific properties that are not part of Connection Factory properties. For example, the reports do not provide information on LDAP RootDSE properties.

27.9.1 Enabling Display of Adapter Reports

You can enable the following Adapter reports to display in Oracle Enterprise Manager Fusion Middleware Control:

- [Monitoring Report](#)
- [Configuration Reports](#)
- [Snapshot Reports](#)

You can enable reports by checking the box at the top of the **Monitoring Reports** page. Another way to enable reports to add corresponding property on the **Properties** tab.

27.9.1.1 Monitoring Report

Within a Monitoring report, showing real-time monitoring statistics, the activation spec provides configuration-related information, including:

- EIS connection configurations, displayed as connection factory properties.
- Resources that are being accessed. These include Managed Connections and the Most Recent Timestamp for such connections.
- Additional tuning information, such as Currently Free Connections and Maximum Pool Size for Connections.

[Figure 27-1](#) shows the appearance of the Monitoring report in the context of the Diagnosability and Snapshot reports. This report shows a information related to a service endpoint.

Figure 27-1 Monitoring Report Showing Statistics for a Service Endpoint

| Node | EIS Connection Status | Managed Connections | | | | Most Recent Time Stamp | |
|-------------|-----------------------|---------------------|---------------------|----------------|-------------------|--------------------------|--------------------------|
| | | Currently Open | Average Number Used | Currently Free | Maximum Pool Size | Last Message Publication | Last Service Activation |
| AdminServer | Connected | 10.0 | 0.0 | 10.0 | 2,147,483,647 | | Nov 26, 2013 11:34:14 AM |

See [Figure 27-1](#) for a description of the elements in the Monitoring Report.

Table 27-1 Adapter Monitoring Report Elements

| Element | Description |
|-----------------------------------|--|
| Server Name | The name of the server where the endpoint is deployed. |
| EIS Connection Status | Indicates if the EIS is connected to the Endpoint. You can click status icon to obtain stack trace if status is Not connected. |
| Managed Connections | Connection pool statistics for the managed connections for this Adapter to Enterprise Information System (EIS) systems. |
| Currently Free | The pool size of this Connector connection pool. |
| Average Number Used | The running average usage of created connections that are active in the Connector Pool since the pool was last shrunk. |
| Currently Free | The current total free connections. |
| Maximum Pool Size | The maximum capacity configured for this Connector connection pool. |
| Most Recent Time Stamp | The most recent time stamp for last message publication and last service activation. |
| Last Message Publication | Last message published to the fabric for a service endpoint; last message published to the EIS for a reference endpoint. |
| Last Service Activation | Last time the service endpoint was activated. Only for a service endpoint. |
| Last Reference Interaction | Last time the reference endpoint was activated. Only for a reference endpoint. |

27.9.1.2 Configuration Reports

The Configuration report within the Diagnosability Report from the Oracle Enterprise Manager Fusion Middleware Control dashboard shows a summary of connection factory, binding and activation properties for a specific service endpoint.

[Figure 27-2](#) shows an Adapter Configuration Report for a Service Endpoint, showing Deployment Configuration Type, and information about EIS Connectivity and Service Properties, including definition properties and Tuning Properties, in this case properties that are specific to a File Adapter.

Figure 27-2 Adapter Configuration Reports

The screenshot displays the Oracle WebLogic Server Console interface for configuring a service. At the top, there are navigation tabs: Dashboard, Policies, Properties, and Adapter Reports. A 'Deactivate ...' button is visible in the top right. Below the tabs, there are sections for 'Diagnosis Reports' (with an 'Enable reports' checkbox) and 'Configuration Reports'. The 'Configuration Reports' section is expanded to show 'Deployment Configuration Type' (AdminServer, Active) and two main report areas: 'EIS Connectivity' and 'Service Properties'.

EIS Connectivity

| | |
|--------------------------|-----------------|
| JndiName | eis/FileAdapter |
| ControlDir | \${user.dir} |
| IsTransacted | false |
| OutboundLockTypeForWrite | none |
| InboundDataSource | none |

Service Properties

| Definition Properties | | Tuning Properties | |
|-----------------------|--------------|-------------------|-------|
| DeleteFile | true | MaxRaiseSize | 10000 |
| PollingFrequency | 60 second(s) | SingleThreadModel | false |
| MinimumAge | 0 minute(s) | ThreadCount | -1 |
| PhysicalDirectory | /tmp/write | | |
| Recursive | true | | |

See [Table 27-2](#) for a description of the elements in the Adapter Configuration Report.

Note that you need to select **Related Links** (at the top right of the page) to initiate the process of configuring a connection factory within the WebLogic Server Console.

Table 27-2 Adapter Configuration Reports Elements

| Element | Description |
|--------------------------------------|---|
| Deployment Configuration Type | Indicates if the endpoint is part of an active-active or active-passive configuration. This is only displayed for a service endpoint. |
| EIS Connectivity | Provides information about connection factory properties related to this endpoint and its connection to the Enterprise Information System. |
| Service Properties | Lists Definition Properties, used to define services specific to this endpoint, and Tuning Properties, used to tune services specific to this endpoint. For Reference Endpoints, there are Reference Properties which include Definition Properties and Tuning Properties. See the User's Guide to Technology Adapters appendix for the complete list and definitions of the properties. |

27.9.1.3 Snapshot Reports

The Snapshot Reports section of the **Service** or **Reference Adapter Reports** Page provides connection downtime and message statistics over a specified period.

Snapshot reports aggregate historical data over a selected period of time.

The default for snapshot data persistence is 15 minutes, which is the period of time collection over which the captured data persists when Write to database is checked. You can configure the snapshot interval from the `snapshotInterval` property in the Properties tab. Because the default value of some properties on the Properties tab is not shown explicitly, you might need to add `snapshotInterval` property from the properties page and then modify it as you require. You can select **Write to Database** on a Report Screen to have the data persisted.

Similarly, you can add or modify `enableSnapshots` (enables **Write to Database**) and select the `Enables Reports` checkbox (enables Reports).

Note that you must understand each Snapshot report in the context of the functioning of the specific adapter; for example, for the Database Adapter, the payload size that is reported and displayed is the size of XML produced by the Adapter, never the size of XML consumed by the Adapter.

Where an adapter has no output, the size is reported as 0.

For the same service endpoint, you can correlate information from the Snapshot report and the Monitoring Report.

Figure 27-3 shows an example Snapshot Report, with the Message Statistics tab selected. The Report shows:

- Data will be retrieved over the last 24 hours
- The name of the server for which information is being collected
- **Average Message Size**, in bytes
- **Maximum Message Size**, in bytes
- **Minimum Message Size**, in bytes
- **Total Message Size**, in bytes
- **Number of Messages**
- **Data Location**, specifying Persisted or In-Memory, as indicated by an icon and tooltip
- **Write to Database**-enables data persistence. By default, the data is not persisted. Note that when enabled, persistence is enabled concurrently for both EIS Connection statistics and Message statistics at once. Once you enable persistence, the value for writes to the database is displayed (for example, "every 15 minutes".)

Figure 27-3 Snapshot Report, with Message Statistics Tab Selected

| Server Name | Average Message Size (bytes) | Maximum Message Size (bytes) | Minimum Message Size (bytes) | Total Message Size (bytes) | Number Of Messages | Data Location |
|-------------|------------------------------|------------------------------|------------------------------|----------------------------|--------------------|---------------|
| AdminServer | 21 | 23 | 19 | 42 | 2 | |
| AdminServer | 41 | 41 | 41 | 41 | 1 | |

Figure 27-4 shows an example Snapshot Report, with EIS Connection Downtime, or the down shown. The Report shows:

- **Server Name**
- The **Start EIS Downtime**-when the connection downtime began
- The **End EIS Downtime**-when the connection downtime ended
- **Error Summary**-A summary of the errors that might be related to the downtime.
- **Total EIS Connection Downtime**.
- **Data Location**, specifying Persisted or In-Memory, as indicated by an icon and tooltip

- **Show XML button**, which when clicked on provides XML data for the information that is displayed.

Figure 27-4 Snapshot Report with EIS Connection Downtime Tab Selected

| Server Name | Start EIS Downtime | End EIS Downtime | Error Summary | Total EIS Connection Downtime (Seconds) | Data Location |
|-------------|-------------------------|-------------------------|--------------------------|---|---------------|
| AdminServer | Dec 3, 2013 10:02:34 AM | Dec 3, 2013 10:03:04 AM | File/Directory is not wr | 29 | |
| AdminServer | Dec 3, 2013 10:05:08 AM | Dec 3, 2013 10:05:16 AM | File/Directory is not wr | 8 | |
| AdminServer | Dec 3, 2013 10:07:22 AM | Dec 3, 2013 10:07:31 AM | File/Directory is not wr | 9 | |

27.9.1.3.1 Snapshot Reporting Persistence and Intervals

The snapshot persistence period can provide historical data over the period the data is persisted; this period is different than the global refresh period for the Oracle Enterprise Manager Fusion Middleware Control.

You must also distinguish the Snapshot Interval (default is 15 minutes) versus the Retrieve Data period, which is defaulted to one day.

Persisted and In-memory data is shown per query criteria (that is, EIS connection downtime falls within the time range used for searching or message publication time is within the time range used for searching).

The persistence setting provides a way to guard saved data from crashes and downtime. However, there is a performance cost to retaining saved data.

A **Data Location** column in the reports contains either or both of two icons which signify the place of origin of the data in the reports in the appropriate row: either from persistent data or from in-memory data.

Also note that data is not persisted in the following circumstances.

For non-persisted (in-memory) data, when the following occur:

- Write to database is unchecked
- The adapter's composite application is shutdown or retired
- Composite is un-deployed
- The Adapter endpoint is de-activated (for service endpoints)
- The SOA server is bounced
- Auto purge occurred

For persisted data, data is not persisted when the following occur:

- Auto purge occurred

You can search and retrieve past data. Therefore, the Retrieve Data search control is always available for data that persists. The search feature is specific to Enterprise Information System (EIS) Connection statistics and is distinct from Message statistics.

Table 27-3 provides information about the different elements found in the Snapshot Adapter Reports and their meaning.

Table 27-3 Snapshot Adapter Report Elements

| Element | Description |
|------------------------------------|--|
| EIS Connection Downtime | (Only shown for the service downtime.) |
| Select a Time Range | The time range filter delimits the statistics displayed in the snapshot reports to a specified number of minutes, hours, days, or weeks. |
| Show XML | Shows the EIS connection downtime in an XML format. |
| Server Name | The name of the server connected to this Adapter for which messages are being displayed. |
| End EIS Connection Downtime | Time at which the EIS connection is restored. |
| Start EIS Downtime | The time at which the EIS connection is lost. |
| Error Summary | Select Error Summary to provide stack trace. |
| Message statistics | |
| Server Name | The name of the server where this endpoint is displayed. |
| Average Message Size | Average message size processed for the filtered snapshot interval. |
| Maximum Message Size | Maximum message size processed for the filtered snapshot interval. |
| Minimum Message Size | Minimum message size processed for the filtered snapshot interval. |
| Total Message Size (Bytes) | Sum total of all the messages processed for the filtered snapshot interval. |
| Number of Messages | Number of messages processed for the filtered snapshot interval. |
| Data Location | Specifies Persisted or In-Memory, as indicated by an icon and tooltip. |
| Write to Database | Select this checkbox to enable persistence. The value (for example, every 15 minutes) shows how often that write to the database happens, when enabled. By default the check box is not selected. Persistence is enabled for both EIS Connection starts and Message statistics at the same time. The screen indicates the following: "Select to persist the data. Persisted data remains available in case of downtimes or crashes, or if you disable the reports; but it impacts performance. Persistence operations involve a snapshot scheduler and repetitive I/O (disk read and write) operations. Persistent operations are different from in-memory operations because I/O operations from memory are faster than Database operations. |

27.9.2 Configuration Report Categories and Adapter Properties Reported

The following tables show, for each Adapter type, the configuration report category, the available property name, and a description of each property. Although adapter configuration properties can be set at service/reference Mbean and Adapter binding

Mbean, the Adapter configuration report shows only properties from the Adapter binding Mbean.

Table 27-4 MSMQ Adapter Connection Factory Properties

| Property Name | Description |
|------------------|---|
| QueueManagerName | MQ Series Queue Manager Name. |
| PortNumber | Port on which the Queue Manager is listening. |
| HostName | Host on which the Queue Manager is running. |
| ChannelName | MQ Series Server Connection Channel name. |
| CCDTurl | The URL to the MQ Series CCDT file. |
| XATransaction | Flag that enables participation in JTA transaction. |
| SSLEnable | Flag that enables SSL. |

Table 27-5 MSMQ Adapter Service Definition Properties

| Property Name | Description |
|------------------|---|
| QueueName | Queue on which the MQSeries Adapter is polling. |
| BackoutQueueName | The configured Backout Queue Name (if any). |
| MessageSelector | Message selector to filter inbound messages. |

Table 27-6 MSMQ Adapter Service Tuning Properties

| Property Name | Description |
|----------------------|---|
| jca.retry.count | JCA retry count before the message is rejected. |
| jca.retry.interval | Time interval between the JCA retries. |
| payloadSizeThreshold | Specifies the size of the payload that the adapter can process. |
| InboundThreadCount | Number of inbound polling threads to dequeue messages. |

Table 27-7 MSMQ Adapter Reference Definition Properties

| Property Name | Description |
|---------------------|---|
| QueueName (Enqueue) | Queue to which messages are published. |
| QueueName (Dequeue) | Queue from which messages are dequeued. |
| SegmentIfRequired | Specifies whether large messages should be segmented. |

Table 27-8 MSMQ Adapter Reference Tuning Properties

| Property Name | Description |
|-----------------|---|
| jca.retry.count | JCA retry count before the message is rejected. |

Table 27-8 (Cont.) MSMQ Adapter Reference Tuning Properties

| Property Name | Description |
|-----------------------------------|---|
| <code>jca.retry.interval</code> | Time interval between the JCA retries. |
| <code>payloadSizeThreshold</code> | Specifies the size of the payload that the adapter can process. |

Table 27-9 File Adapter Connection Factory Properties

| Property Name | Description |
|---------------------------------------|---|
| <code>ControlDir</code> | The directory used by the adapter for storing bookkeeping information. |
| <code>InboundDataSource</code> | Specifies to the data source name to enable high availability on the inbound adapter. |
| <code>OutboundLockTypeForWrite</code> | Set to <code>oracle</code> , <code>database</code> , or <code>coherence</code> to enable high availability on the outbound adapter. |
| <code>IsTransacted</code> | Set to <code>true</code> for LRC (Last Resource Commit). This applies only if you choose <code>LocalTransaction</code> for the <code>transaction-supports</code> attribute. |

Table 27-10 File Adapter Service Definition Properties

| Property Name | Description |
|--------------------------------|---|
| <code>PhysicalDirectory</code> | Directory to be polled by the File Adapter. |
| <code>Recursive</code> | If set to <code>true</code> , the File/FTP Adapter processes files recursively in subdirectories. |
| <code>DeleteFile</code> | If set to <code>true</code> , the File/FTP Adapter deletes the file after it has been processed. |
| <code>PollingFrequency</code> | Specifies (in seconds) how often the File/FTP Adapter wakes up in order to look for files in the inbound directory. |
| <code>MinimumAge</code> | Specifies the time interval after which a file should be picked up 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. 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. |

Table 27-10 (Cont.) File Adapter Service Definition Properties

| Property Name | Description |
|----------------------|--|
| PublishSize | Indicates that a file contains multiple messages and specifies how many messages should be processed at one time. For example, if a file has 11 records and this parameter is set to 2, then the file will be processed 2 records at a time and the final record will be processed in the 6th iteration. |
| jca.message.encoding | This parameter is used to override the encoding specified in the NXSD schema for the inbound File/FTP Adapter. |

Table 27-11 File Adapter Service Tuning Properties

| Property Name | Description |
|-------------------|--|
| ThreadCount | If this parameter 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 parameter partitions the in-memory queue and each composite app gets its own in-memory queue. If the ThreadCount is set to 0, it behaves in the same manner as the SingleThreadModel. If the ThreadCount is set to -1, it begins using the global thread pool. The maximum value for this property is 40. |
| SingleThreadModel | If the value is true, the File/FTP Adapter poller processes files in the same thread. That is, it does not use the global in-memory queue for processing. |
| MaxRaiseSize | Specifies the maximum number of files that the File/FTP Adapter will submit for processing in each polling cycle. For example, if the inbound directory has 1000 files and this parameter is set to 100 and the polling frequency is one minute, then the File/FTP Adapter will submit 100 files every minute. |

Table 27-12 File Adapter Reference Definition Properties

| Property Name | Description |
|----------------------|--|
| PhysicalDirectory | Directory path for outbound file write. |
| NumberMessages | Used for outbound batching. The outgoing file is created when the number of messages condition is met. The parameter is of type String and is not mandatory. The default value is 1. |
| FileNamingConvention | Specifies the naming convention for the outbound write operation file. |

Table 27-12 (Cont.) File Adapter Reference Definition Properties

| Property Name | Description |
|---------------|---|
| Append | If set to <code>true</code> , the File/FTP Adapter to appends to a file on the outbound. If the file does not exist, a new file is created. |
| ChunkSize | Specifies the chunk size for the chunked interaction operation. |

Table 27-13 File Adapter Reference Tuning Properties

| Property Name | Description |
|----------------------|---|
| ConcurrentThreshold | Specifies 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 hence needs to be guarded as it might cause other applications/ threads to starve. The maximum is 100 (same value as the maximum for <code>dspMaxThreads</code> in BPEL.) |
| UseStaging | If set to <code>true</code> , then the outbound File/FTP Adapter writes translated data to a staging file and then it streams the staging file to the target file. If <code>false</code> , the outbound File/FTP Adapter does not use an intermediate staging file. |
| inMemoryTranslation | Applicable only if <code>UseStaging</code> is <code>false</code> . If set to <code>true</code> , the translation step occurs in-memory (that is, an in-memory byte array is created). If set to <code>false</code> , then the adapter creates an output stream to the target file and allows the translator to translate and write directly to the stream. |
| serializeTranslation | If set to <code>true</code> , the translation step is serialized using a semaphore. The number of permits for semaphore (guarding the translation step) comes from the <code>ConcurrentThreshold</code> parameter. If <code>false</code> , then the translation step occurs outside the semaphore. |

Table 27-14 FTP Adapter Specific Connection Factory Properties (Properties in addition to those for file adapter)

| Property Name | Description |
|---------------|----------------------|
| Host | FTP server host name |
| Port | FTP server port |
| Username | FTP server user name |
| Password | FTP server password |

Table 27-14 (Cont.) FTP Adapter Specific Connection Factory Properties (Properties in addition to those for file adapter)

| Property Name | Description |
|-------------------|---|
| DefaultDateFormat | Specifies the default date format value. On the FTP server, this is the value for files that are older. The default value for this parameter is <code>MMM dd yyyy</code> as most UNIX-type FTP servers return the last modified time stamp for older files in the <code>MMM dd yyyy</code> format. For example, Jan 31 2020. |
| RecentDateFormat | Specifies the recent date format value. On the FTP server, this is the value for files that were recently created. |
| ListParserKey | Directs the FTP Adapter how it should parse the response from the <code>LIST</code> command. The default value is <code>UNIX</code> , in which case the Oracle FTP Adapter uses a generic parser for UNIX-like FTP servers. The other supported values are <code>WIN /WINDOWS</code> for Microsoft Windows NT, <code>FTP server</code> and <code>MVS</code> for FTP servers running on MVS systems. |
| ConnectionMode | Indicates if the FTP Adapter uses the active/passive mode to connect to FTP server. |
| UseFtps | Set to <code>true</code> for FTP over SSL. |
| UseSFTP | Set to <code>true</code> for SFTP. |

Table 27-15 FTP Adapter Specific Service Definition Properties (Properties in addition to those for file adapter)

| Property Name | Description |
|-----------------|---|
| timestampOffset | Used by the FTP Adapter to address timezone issues, typically to convert the time difference between the FTP server and the system on which the FTP Adapter is running to milliseconds. |
| UseNlst | Set to <code>true</code> if you need the FTP Adapter to use the <code>NLST</code> FTP command rather than the <code>LIST</code> command that the Adapter uses by default. |

Table 27-16 FTP Adapter Specific Service Tuning Properties (Properties in addition to those for file adapter)

| Property Name | Description |
|----------------------|--|
| control.read.timeout | Timeout on the control socket in milliseconds. |

Table 27-17 Socket Adapter Connection Factory Properties

| Property Name | Description |
|---------------|---|
| Host | Host on which ServerSocket is running. |
| Port | Port on which ServerSocket is listening. |
| BacklogQueue | Queue length for incoming connection. |
| SSLEnable | Flag that enables SSL. |
| KeepAlive | Flag that enables pooling of connections. |

Table 27-18 Socket Adapter Service Definition Properties

| Property Name | Description |
|---------------|--|
| Host | Host on which ServerSocket is running. |
| Port | Port on which ServerSocket is listening. |
| TransMode | Translation mode of Adapter. |
| Encoding | Encoding of data. |
| ByteOrder | Byte order of the data. |

Table 27-19 Socket Adapter Service Tuning Properties

| Property Name | Description |
|-------------------------|--|
| NIOProcessorThreadCount | Number of threads processing messages in inbound (only in NIO mode). |

Table 27-20 Socket Adapter Reference Definition Properties

| Property Name | Description |
|---------------|--|
| Host | Host on which ServerSocket is running. |
| Port | Port on which ServerSocket is listening. |
| TransMode | Translation mode of adapter. |
| Encoding | Encoding of data. |
| ByteOrder | Byte order of the data. |

Table 27-21 UMS Adapter Connection Factory Properties

| Property Name | Description |
|---------------|--|
| XATransaction | Set to <code>false</code> to disable XA Transaction support on inbound. Default value is <code>true</code> . |

Table 27-22 UMS AdapterService Definition Properties

| Property Name | Description |
|-----------------|--|
| DeliveryType | Specifies the message channel to receive/send messages. Email, SMS, IM in case of receiving. |
| To | Address from which to receive incoming messages. One or more comma-separated device addresses, such as email addresses or mobile phone numbers. |
| ConsumeMode | Specifies how the adapter will receive messages from UMS. Set to <code>poller</code> for polling mode; set to <code>listener</code> for listener mode. |
| JavaCalloutImpl | Name of the Java class that defines custom logic for a message filtering or any other check, after message is accepted from UMS. It is a concrete implementation of <code>ICustomCallout</code> interface. |
| MessageFilters | Specifies one or more message filters. A single filter would comprise of a Java Pattern String to match against incoming message's content/metadata, along with the metadata field type and the action (<code>accept</code> or <code>reject</code>) to be taken. |

Table 27-23 UMS Adapter Service Tuning Properties

| Property Name | Description |
|--------------------|--|
| InboundThreadCount | The number of inbound poller or listener threads. |
| PollingInterval | Polling interval in seconds for poller consume mode. |

Table 27-24 UMS Adapter Reference Definition Properties

| Property Name | Description |
|---------------|---|
| DeliveryType | The message channel through which to send messages. Email, SMS, IM for sending. |

Table 27-25 UMS Adapter Outgoing Message Properties

| Property Name | Description |
|-----------------------|--|
| SendEmailAsAttachment | Set to <code>true</code> to send email as an attachment. |

Table 27-26 LDAP Adapter Connection Factory Properties

| Property Name | Description |
|-------------------|--|
| inboundDataSource | JNDI string location pointing to a valid XA data source. |
| hostName | Host name of the directory server. |

Table 27-26 (Cont.) LDAP Adapter Connection Factory Properties

| Property Name | Description |
|------------------|--|
| port | Port where the LDAP service is running. |
| bindDN | DN of the entry that will be used to bind to the LDAP service. |
| operationTimeout | Client-side timeout defined at the connection level. If the response is not received by the DS in the timeout period, the operation will be abandoned and an exception will be raised. |
| useStartTLS | Use start TLS extended operation to secure communication with a directory server over a non-encrypted channel. Port in this case is listening for clear-text LDAP connections. |
| useSSL | Indicates that the LDAP adapter should use SSL to secure communication with the directory server. The server must be configured to listen in SSL mode and the value for the port argument must be one where the server is listening for SSL based connections. |

Table 27-27 LDAP Adapter Service Definition Properties

| Property Name | Description |
|---------------------------|--|
| NotificationStrategy | Specifies how notifications are polled and published. Based on the Timestamp of the changeLog and if changelog, which changeLog mechanism. |
| EventType | If set to <code>all</code> , all the events will be published. Otherwise, a comma-separated list of events type to publish will be sent. |
| BaseDN | Valid DN under which events should be reported. |
| EventScope | Scope of event source under the configured base DN. |
| SearchFilter | Advanced filter condition. Only events that satisfy the given filter condition will be published by the Adapter. Value should be a valid string representation of LDAP filter. |
| TypesOnly | When set to <code>true</code> , only the attribute names will be returned. Otherwise, both attribute names and values will be returned. |
| ReturnAttributes | A list of all the attributes to return as part of the event. |
| ReturnAttributesDelimiter | String <code>regex</code> . A delimiting regular expression. |

Table 27-28 LDAP Adapter Service Tuning Properties

| Property Name | Description |
|----------------------|---|
| PollingInterval | Polling interval before conducting a subsequent search for new events. |
| payloadSizeThreshold | Integer value representing the byte count threshold limit of the message to be published. |
| SizeLimit | Maximum number of entries returned as part of a search operation. This can be configured on the DS side as well. The lower of the two values will take effect. <code>SizeLimit</code> is enforced within a single page. |
| TimeLimit | Maximum time the server should wait before returning the results. |
| PageSize | Maximum number of events that should be published in a page. |

Table 27-29 LDAP Adapter Reference Definition Properties

| Property Name | Description |
|-----------------|--|
| RequestControls | The Adapter constructs the appropriate control objects from this interaction spec property and passes them along with the request message. |

Table 27-30 LDAP Adapter Reference Tuning Properties

| Property Name | Description |
|--------------------|--|
| SizeLimit | Maximum number of entries returned as part of a search operation. This value can be configured on the Directory Server side as well. If so, the lower of the two values takes effect. |
| TimeLimit | Maximum time in seconds the server should wait before returning the results. |
| FollowReferrals | Referral chase strategy. |
| HopLimit | Maximum number of permissible hops while chasing referrals. |
| AliasDereferencing | Behavior for handling alias entries while processing the search. |
| MaxDSMLRequestSize | DSML contains a batch request. This batch request can potentially contain millions of LDAP operation requests. This property is used to control the maximum number of permissible operation requests that can be passed to the LDAP adapter through a single DSML batch request. |

Table 27-31 DB Adapter Service Definition Properties

| Property Name | Description |
|-----------------|---|
| PollingStrategy | Indicates how to poll for records and what to do with them after they have been read so they are only processed once. |
| DescriptorName | A name generated from the root table name. |

Table 27-32 DB Adapter Service Tuning Properties

| Property Name | Description |
|--------------------|--|
| PollingInterval | Specifies how often to poll for new records. |
| MaxTransactionSize | Specifies how many records to fetch at a time and process in a single transaction (not per polling interval). |
| MaxRaiseSize | Specifies how many top-level records to bundle into a single XML document and hence a single process instance. |
| NumberOfThreads | Specifies how many threads concurrently poll for and process records. |

Table 27-33 DB Adapter Reference Definition Properties

| Property Name | Description |
|------------------|--|
| SchemaName | The schema to which the stored procedure belongs. |
| PackageName | The package to which the stored procedure belongs. |
| ProcedureName | The name of the stored procedure being executed. |
| SqlString | The SQL to execute |
| DescriptorName | A name generated from the root table name. |
| QueryName | The name of the EclipseLink query being executed |
| IsQueryByExample | If <code>QueryName</code> not set, SQL is built from an input XML example record |
| DmlType | Indicates merge, insert, update, or delete. |

Table 27-34 JMS Adapter Connection Factory Properties

| Property Name | Description |
|---------------------------|--|
| ConnectionFactoryLocation | JMS provider connection factory. |
| FactoryProperties | Enables parameters that establish context for remote lookup. |

Table 27-34 (Cont.) JMS Adapter Connection Factory Properties

| Property Name | Description |
|---------------|--|
| IsTopic | Flag that enables you to select the connection factory based on the JMS destination (topic/queue). |
| IsTransacted | Flag that enables you to specify if the Adapter participates in local or XA transaction. |

Table 27-35 JMS Adapter Service Definition Properties

| Property Name | Description |
|-------------------|---|
| DestinationName | The name of the queue or topic. |
| MessageSelector | A string expression (based on a subset of the SQL92 conditional expression) specifying the messages the Adapter is interested in. |
| DurableSubscriber | Name used to identify a durable subscription. |
| PayloadType | Specifies the type of JMS message. |

Table 27-36 JMS Adapter Service Tuning Properties

| Property Name | Description |
|--|--|
| <code>adapter.jms.receive.threads</code> | Poller threads created when an endpoint is activated. |
| <code>adapter.jms.receive.timeout</code> | Timeout value used for the synchronous receive call. |
| <code>adapter.jms.retry.interval</code> | The time that the Oracle JMS Adapter waits before trying to re-create a connection after a connection is lost. |

Table 27-37 JMS Adapter Reference Definition Properties

| Property Name | Description |
|-----------------|---|
| DestinationName | The name of the queue or topic. |
| TimeToLive | The message's lifetime (in milliseconds). |
| Priority | The priority for the message. |
| PayloadType | The type of JMS message. |
| DeliveryMode | The delivery mode to use. |

Table 27-38 JMS Adapter Reference Tuning Properties

| Property Name | Description |
|--|--|
| <code>adapter.jms.receive.timeout</code> | Timeout value used for the synchronous receive call. |

Table 27-38 (Cont.) JMS Adapter Reference Tuning Properties

| Property Name | Description |
|---|--|
| <code>adapter.jms.retry.interval</code> | The time that the Oracle JMS Adapter waits before trying to re-create a connection after a connection is lost. |

Table 27-39 AQ Adapter Connection Factory Properties

| Property Name | Description |
|-------------------------------|---|
| <code>XADataSourceName</code> | Datasource name for xa transactions. |
| <code>DataSourceName</code> | Datasource name for local transactions. |

Table 27-40 AQ Adapter Service Definition Properties

| Property Name | Description |
|------------------------------------|--|
| <code>QueueName</code> | The name of the AQ queue. |
| <code>DatabaseSchema</code> | The schema where the queue resides. |
| <code>Consumer</code> | Dequeue message for a given consumer. |
| <code>ObjectFieldName</code> | The field containing the business payload if the queue is an ADT queue. |
| <code>PayloadHeaderRequired</code> | Ensures all non- payload attributes of ADT are available for processing. |
| <code>Correlation</code> | Dequeues messages that match the value specified. |
| <code>DequeueCondition</code> | Expression to allow dequeue of message based on a specific condition. |

Table 27-41 AQ Adapter Service Tuning Properties

| Property Name | Description |
|---|---|
| <code>DequeueTimeOut</code> | The interval after which the <code>dequeue()</code> API times out if no message is received on the inbound queue. |
| <code>adapter.aq.dequeue.threads</code> | The number of poller threads that are created when an endpoint is activated. |

Table 27-42 AQ Adapter Reference Definition Properties

| Property Name | Description |
|------------------------------|---|
| <code>QueueName</code> | The name of the AQ queue. |
| <code>DatabaseSchema</code> | The schema where the queue resides. |
| <code>ObjectFieldName</code> | The field containing the business payload if the queue is an ADT queue. |

Table 27-42 (Cont.) AQ Adapter Reference Definition Properties

| Property Name | Description |
|-----------------------|---|
| PayloadHeaderRequired | Ensures all non-payload attributes of ADT are available for processing. |
| RecipientList | The consumer name or names that are the intended recipients for the messages enqueued by the Adapter. |

Table 27-43 Coherence Adapter Connection Factory Properties

| Property Name | Description |
|---------------------|---|
| CacheConfigLocation | Location of cache configuration file that defines the cache and extend client settings. |
| ServiceName | Name of the cache service to be associated with the connection. |

Table 27-44 Coherence Adapter Reference Definition Properties

| Property Name | Description |
|---------------------|---|
| CacheName | Identifies a particular Coherence cache. |
| CacheOperation | The operation to be carried out on the cache identified by <code>CacheName</code> . |
| Filter | Specifies the subset of cache to which the operation should be applied. |
| ValueType | Fully qualified class name that identifies the object stored to/retrieved from cache. |
| ReturnCacheKeysOnly | Boolean that allows for only cache identifiers (keys) to be returned. |
| Key | Identifier for a cache entry. |
| KeyType | Identifies the Java type of the value to be used as the key. |

Table 27-45 Coherence Adapter Reference Tuning Properties

| Property Name | Description |
|----------------------|---|
| payloadSizeThreshold | The size of the payload that Adapter can process. |

Table 27-46 MSMQ Adapter Connection Factory Properties

| Property Name | Description |
|---------------|--|
| Host | The name of the MSMQ host. |
| Domain | Windows domain name of the MSMQ host. |
| AccessMode | Indicates if the connection factory will allow for native access or not. |

Table 27-46 (Cont.) MSMQ Adapter Connection Factory Properties

| Property Name | Description |
|-----------------|---|
| TransactionMode | Indicates if the connection will participate in a transaction when sending and receiving a message. |

Table 27-47 MSMQ Adapter Service Definition Properties

| Property Name | Description |
|------------------------|--|
| DestinationType | The type of queue. |
| DestinationName | The name of the MSMQ queue. |
| DestinationPath | The actual string that identifies a DistributionList or Public queue as represented in ActiveDirectory. |
| UseActiveDirectoryPath | Boolean that allows for Active Directory Path to be used to identify a public queue instead of queue name. |
| UseDirectFormatName | Boolean that allows for Direct Format name to be used for public and private queues. |
| Correlation | Correlation identifier. |

Table 27-48 MSMQ Adapter Service Tuning Properties

| Property Name | Description |
|-------------------------------|--|
| adapter.msmsg.receive.timeout | The time (in milliseconds) that Message Queuing will wait for a message to arrive before starting. |

Table 27-49 MSMQ Adapter Another Poll-Cycle

| Property Name | Description |
|-------------------------------|--|
| adapter.msmsg.dequeue.threads | Number of poller threads that will be initialized when endpoint activation occurs. |

Table 27-50 MSMQ Adapter Reference Definition Properties

| Property Name | Description |
|------------------------|---|
| DestinationType | Type of queue. |
| DestinationName | Name of the MSMQ queue. |
| DestinationPath | The actual string that identifies a DistributionList or Public queue as represented in ActiveDirectory. |
| UseActiveDirectoryPath | Boolean that enables the Active Directory Path to be used to identify a public queue instead of queue name. |

Table 27-50 (Cont.) MSMQ Adapter Reference Definition Properties

| Property Name | Description |
|---------------------|---|
| UseDirectFormatName | Boolean that enables the Direct Format name to be used for public and private queues. |
| Priority | Message priority. |
| TimeToLive | Time limit (in seconds) for the message to be retrieved from the target queue. |
| Delivery | Specifies <i>express</i> (non-persistent) or <i>recoverable</i> (persistent) messaging. |

Table 27-51 SAP Adapter Connection Factory Properties

| Property Name | Description |
|--|--|
| ServerDataProvider_JCO_gwhost | Gateway host. |
| ServerDataProvider_JCO_gwserv | Gateway service. |
| ServerDataProvider_JCO_progid | Program ID of the server. |
| ServerDataProvider_JCO_trace | Enable/disable RFC trace. |
| ServerDataProvider_JCO_params | Arbitrary parameters for RFC library. |
| ServerDataProvider_JCO_snc_myname | SNC name. |
| ServerDataProvider_JCO_snc_qop | SNC level of security. |
| ServerDataProvider_JCO_snc_lib | Path to the SNC library. |
| ServerDataProvider_JCO_unicode | Flags whether to connect in unicode mode. |
| ServerDataProvider_JCO_max_startup_delay | Maximum server startup delay time in seconds. |
| ServerDataProvider_JCO_connection_count | Maximum server connection threads allowed. |
| ServerDataProvider_JCO_dsr | Enable/Disable DSR support. |
| DestinationDataProvider_JCO_client | SAP client. |
| DestinationDataProvider_JCO_user | Logon user. |
| DestinationDataProvider_JCO_alias_user | Logon user alias. |
| DestinationDataProvider_JCO_passwd | Logon password. |
| DestinationDataProvider_JCO_lang | Logon language. |
| DestinationDataProvider_JCO_saprouter | SAP router string to use for a system protected by a firewall. |
| DestinationDataProvider_JCO_sysnr | SAP system number. |
| DestinationDataProvider_JCO_ashost | SAP application server. |
| DestinationDataProvider_JCO_mshost | SAP message server. |
| DestinationDataProvider_JCO_msserv | Optional: SAP message server port to use instead of the default SAPMS SID. |
| DestinationDataProvider_JCO_gwhost | Gateway host. |
| DestinationDataProvider_JCO_gwserv | Gateway service. |
| DestinationDataProvider_JCO_r3name | System ID of the SAP system. |

Table 27-51 (Cont.) SAP Adapter Connection Factory Properties

| Property Name | Description |
|---|--|
| DestinationDataProvider_JCO_group | Group of SAP application servers. |
| DestinationDataProvider_JCO_tpname | Program ID of external server program. |
| DestinationDataProvider_JCO_tphost | Host of external server program. |
| DestinationDataProvider_JCO_type | Type of remote host. |
| DestinationDataProvider_JCO_trace | Enable/disable RFC trace. |
| DestinationDataProvider_JCO_cpic_trace | Enable/disable CPIC trace. |
| DestinationDataProvider_JCO_use_sapgui | Start a SAP GUI and associate with the connection. |
| DestinationDataProvider_JCO_codepage | Initial codepage in SAP notation. |
| DestinationDataProvider_JCO_getsso2 | Get/Do not get a SSO ticket after logon. |
| DestinationDataProvider_JCO_mysapsso2 | Use the specified SAP Cookie Version 2 as logon ticket. |
| DestinationDataProvider_JCO_x509cert | Use the specified X509 certificate as logon ticket. |
| DestinationDataProvider_JCO_lcheck | Enable/Disable logon check at open time. |
| DestinationDataProvider_JCO_snc_mode | Secure network connection mode. |
| DestinationDataProvider_JCO_snc_partner name | SNC partner. |
| DestinationDataProvider_JCO_snc_gop | SNC level of security. |
| DestinationDataProvider_JCO_snc_myname | SNC name. Overrides default SNC partner. |
| DestinationDataProvider_JCO_snc_lib | Path to library which provides SNC service |
| DestinationDataProvider_JCO_dsr | Enable/disable DSR support. |
| DestinationDataProvider_JCO_peak_limit | Maximum number of active connections that can be created for a destination simultaneously. |
| DestinationDataProvider_JCO_pool_capacity | Maximum number of idle connections kept open by the destination. A value of 0 has the effect that there is no connection pooling. |
| DestinationDataProvider_JCO_expiration_time | Time in ms after that the connections hold by the destination can be closed. |
| DestinationDataProvider_JCO_expiration_check_period | Period in ms after that the destination checks the released connections for expiration. |
| DestinationDataProvider_JCO_max_get_client_time | Maximum time in ms to wait for a connection, if the max allowed number of connections is allocated by the application. |
| DestinationDataProvider_JCO_repository_destination | Specifies which destination should be used as repository, |
| DestinationDataProvider_JCO_repository.user | If repository destination is not set, and this property is set, it will be used as user for repository calls. This allows using a different user for repository lookups. |
| DestinationDataProvider_JCO_repository.passwd | The password for a repository user. Mandatory, if a repository user should be used. |

Table 27-51 (Cont.) SAP Adapter Connection Factory Properties

| Property Name | Description |
|---|---|
| DestinationDataProvider_JCO_repository. snc_mode | If SNC is used for this destination, it is possible to turn it off for repository connections, if this property is set to 0. Defaults to the value of DestinationDataProvider_JCO_snc_mode. |

Table 27-52 SAP Adapter Service Definition Properties

| Property Name | Description |
|---------------|--|
| Type | SAP object type. |
| BAPIName | Name of BAPI object. |
| RFCName | Name of RFC object. |
| IDOCName | Name of IDOC object. |
| ProgramID | Program ID registered at SAP. |
| AutoSYSTAT01 | Auto SYSTAT01 acknowledgment IDOC. |
| EncodeIDOC | Encode IDOC in flat file format. |
| Migration | Migration support for older SAP Adapter. |

Table 27-53 SAP Adapter Reference Definition Properties

| Property Name | Description |
|---------------|--|
| Type | SAP object type. |
| BAPIName | Name of BAPI object. |
| RFCName | Name of RFC object. |
| IDOCName | Name of IDOC object. |
| QueueName | Name of SAP inbound queue to send. |
| Interaction | Stateful or stateless interaction. |
| Migration | Migration support for older SAP Adapter. |

Table 27-54 Oracle E-Business Suite Adapter Connection Factory Properties

| Property Name | Description |
|------------------|---|
| XADatasourceName | Datasource name for XA transaction. |
| DatasourceName | Datasource name for local transactions. |

Table 27-55 Oracle E-Business Suite Adapter Service Definition Properties

| Property Name | Description |
|------------------|---|
| IRepInternalName | Internal name of the EBS interface from Integration Repository. |

Table 27-55 (Cont.) Oracle E-Business Suite Adapter Service Definition Properties

| Property Name | Description |
|------------------|---|
| PollingStrategy | How to poll for records and what to do with them after they have been read so they are only processed once. |
| DescriptorName | A name generated from the root table name. |
| QueueName | The name of the AQ queue. |
| DatabaseSchema | The schema where the queue resides. |
| Consumer | Dequeue message for a given consumer. |
| Correlation | Dequeue messages that match the value specified. |
| DequeueCondition | Expression to allow dequeue of message based on a specific condition. |
| AppsEventSchema | Custom schema for business events payload. |

Table 27-56 Oracle E-Business Suite Adapter Service Tuning Properties

| Property Name | Description |
|---|---|
| PollingInterval | How often to poll for new records. |
| MaxTransactionSize | How many records to fetch at a time and process in a single transaction (not per polling interval). |
| MaxRaiseSize | How many top-level records to bundle into a single XML document and hence a single process instance. |
| NumberOfThreads | How many threads concurrently poll for and process records. |
| DequeueTimeOut | Interval after which the <code>dequeue()</code> API times out if no message is received on the inbound queue. |
| <code>adapter.aq.dequeue.threads</code> | The number of poller threads that are created when an endpoint is activated. |

Table 27-57 Oracle E-Business Suite Adapter Reference Definition Properties

| Property Name | Description |
|------------------|---|
| IRepInternalName | Internal name of the EBS interface from Integration Repository. |
| SchemaName | The schema to which the stored procedure belongs. |
| PackageName | The package to which the stored procedure belongs. |
| ProcedureName | The name of the stored procedure being executed. |
| SqlString | The SQL to execute. |

Table 27-57 (Cont.) Oracle E-Business Suite Adapter Reference Definition Properties

| Property Name | Description |
|----------------------|--|
| DescriptorName | A name generated from the root table name. |
| QueryName | The name of the EclipseLink query being executed. |
| IsQueryByExample | If <code>queryName</code> is not set, SQL is built from an input XML example record. |
| DmlType | Indicates merge, insert, update or delete. |
| DataSecurityCheck | Enables EBS function security check. |
| APIErrorHandler | To retrieve error messages from FND_MSG_PUB message stack. |
| QueueName | The name of the EBS queue. |
| DatabaseSchema | The schema where the queue resides. |
| IRepOverloadSequence | Overload sequence from Integration Repository. |
| AppsFlexConfigFile | Flexfield mapping configuration file name. |

27.10 Scheduling JCA Adapter Endpoint Activation and Deactivation using Oracle Enterprise Scheduler

You can schedule activation and deactivation of the SOA composite JCA Adapter Services from Oracle Enterprise Manager Fusion Middleware Control.

Using Oracle Enterprise Scheduler schedule metadata you provide, you can:

- Schedule a request for composite JCA Adapter service activation.
- Schedule a request for composite JCA Adapter service deactivation.

Oracle Enterprise Manager Fusion Middleware Control also displays the current state of an Adapter endpoint (composite service), which can be either active or inactive.

You can also edit existing metadata to alter your schedule, and you can remove schedules for Adapters.



Note:

Because the Oracle Enterprise Scheduler installation is optional, this feature is not be available if the Oracle Enterprise Scheduler is not installed.

Follow these steps to schedule activation and deactivation of the SOA composite JCA Adapter Services:

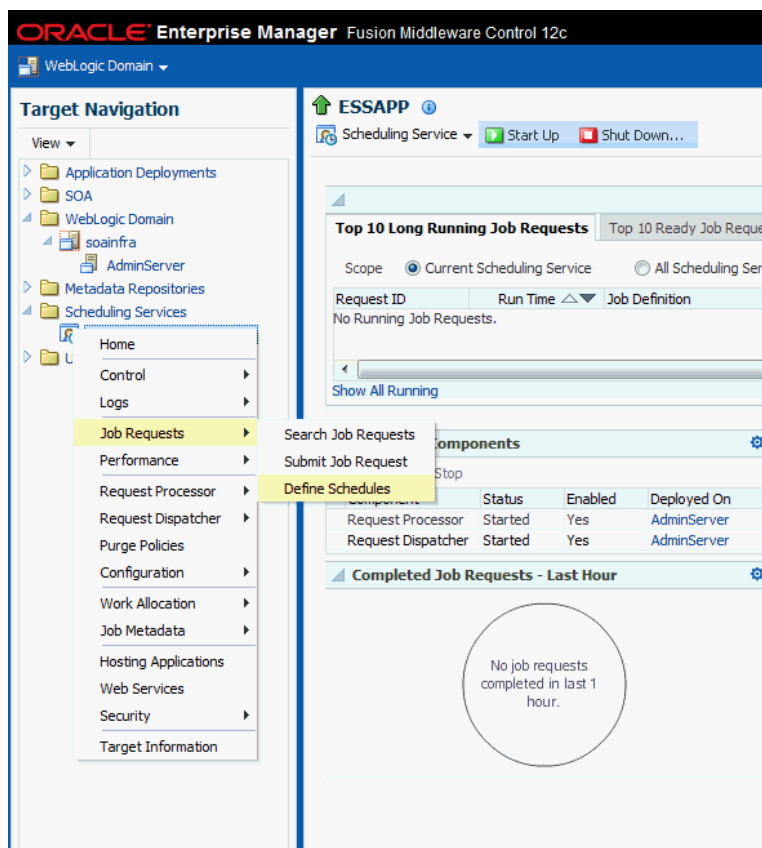
- [Create the Schedule Metadata](#)

- Use the Created Schedule Metadata to Schedule the Deactivation and Activation of a SOA Composite JCA Adapter
- Editing Oracle Enterprise Scheduler Schedule Metadata
- Removing Schedules from an Adapter Endpoint

27.10.1 Create the Schedule Metadata

To create the schedule metadata, you fill in a form by selecting **Define Schedules**. The form populates the metadata.

1. In Oracle Enterprise Manager Fusion Middleware Control, login to the Scheduling Services page, and navigate to the **SOA Infrastructure** menu -> **Define Schedules** page by using the Scheduling Services menu.



2. The next Oracle Enterprise Scheduler page lists schedules for submitting jobs.

ESSAPP
Scheduling Service Start Up Shut Down...
Logged in as weblogic
Page Refreshed Feb 4, 2014 6:27:29 PM PST

Scheduling Service Home > Schedules

Schedules

Schedules listed here will be used for submitting jobs.

Filter Criteria

Application: EssNativeHostingApp(V1.0)
Name:
Package:
Go

Results

| Create... | Edit... | Delete... | | | | | |
|------------------|--------------|---------------------------|----------------|-------------------------|----------|-----------|-------------------------|
| Name | Display Name | Package | Description | Starts On | Repeat | Frequency | Ends On |
| Evry2mins | Evry2mins | /oracle/apps/ess/custo... | Evry2mins | Jan 31, 2014 4:21:48 AM | Minutely | 2 | Jan 31, 2014 5:00:00 AM |
| schedule2 | schedule2 | /oracle/apps/ess/custo... | schedule2 desc | Feb 1, 2014 10:25:30 PM | Minutely | 1 | Feb 1, 2014 11:00:00 PM |
| schedule4 | schedule4 | /oracle/apps/ess/custo... | schedule4 desc | Feb 1, 2014 10:26:42 PM | Minutely | 5 | Feb 1, 2014 11:00:00 PM |

- 3. On this page, select the **Create** button to launch the page that helps create the schedule metadata.

ESSAPP
Scheduling Service Start Up Shut Down...
Logged in as weblogic
Page Refreshed Feb 4, 2014 6:27:29 PM PST

Scheduling Service Home > Schedules

Schedules

Schedules listed here will be used for submitting jobs.

Filter Criteria

Application: EssNativeHostingApp(V1.0)
Name:
Package:
Go

Results

| Create... | Edit... | Delete... | | | | | |
|------------------|--------------|---------------------------|----------------|-------------------------|----------|-----------|-------------------------|
| Name | Display Name | Package | Description | Starts On | Repeat | Frequency | Ends On |
| Evry2mins | Evry2mins | /oracle/apps/ess/custo... | Evry2mins | Jan 31, 2014 4:21:48 AM | Minutely | 2 | Jan 31, 2014 5:00:00 AM |
| schedule2 | schedule2 | /oracle/apps/ess/custo... | schedule2 desc | Feb 1, 2014 10:25:30 PM | Minutely | 1 | Feb 1, 2014 11:00:00 PM |
| schedule4 | schedule4 | /oracle/apps/ess/custo... | schedule4 desc | Feb 1, 2014 10:26:42 PM | Minutely | 5 | Feb 1, 2014 11:00:00 PM |

- 4. Define the schedule metadata on this page. Provide a name for the schedule, a display name, a description, frequency of activation and deactivation and start date of the schedule. Ensure you create the schedule metadata in the /oracle/apps/ess/custom/soa package.

ESSAPP
Scheduling Service Start Up Shut Down...
Scheduling Service Home > Schedules > Create Schedule

Create Schedule

* Name
* Display Name
Package /oracle/apps/ess/custom
Description
Frequency Once
* Start Date 11/26/2013 14:51:41 (UTC-08:00) PST8PDT

27.10.2 Use the Created Schedule Metadata to Schedule the Deactivation and Activation of a SOA Composite JCA Adapter

You next use the metadata you have created to schedule the deactivation and activation of an Adapter.

1. Once the schedule is created, navigate back to the **SOA Composite** home page, and then to the **Services and References** page of the Composite Application or the **SOA Infra** page (to see **Services and References across Composites**).
2. In the **Service** home page, select a JCA Adapter. Select the icon provided in the top-right of the page to launch the popup to schedule the deactivation. The icon is shown in on the right side. This button activates or deactivates the endpoint when selected. It provides a manual way to activate or deactivate the schedule.

The screenshot shows the Oracle Enterprise Scheduler interface for a service named 'fa [1.0]'. The user is logged in as 'weblogic'. The page is refreshed on May 6, 2014. The service page for 'service (File Adapter)' is displayed, with tabs for 'Dashboard', 'Policies', 'Properties', and 'Adapter Reports'. A 'Deactivate ...' button is visible in the top right corner, circled in red. Below the tabs is a graph titled 'Instances and Faults' showing the total number of incoming messages and faults since server start over time.

3. The popup has two sections: **Deactivate** and **Activate**. Each section has a drop-down that displays the saved schedule. Select an activation and a deactivation schedule, and select the **Apply Schedules** button to enable automated activation for this adapter or to refresh already applied schedules. (Both sections are mandatory.)

The Adapter endpoint status is shown with an icon on the service home page.

Select **Remove Schedules** to stop automated activation/deactivation for this adapter

If the Adapter already has activate/deactivate schedules set, you have the option to cancel them and to add a new schedule, or simply to cancel the schedule.

When a drop-down list appears blank, this indicates that the endpoint is no longer associated with a schedule.

Adapter Schedules

Select an activation and a deactivation schedule. Click Apply Schedules to enable automated activation for this adapter or to refresh the already applied schedules. Click Remove Schedules to stop automated activation for this adapter.

Only schedules in package `/oracle/apps/ess/custom/soa` of application `EssNativeHostingApp` can be used for activation and deactivation.

Deactivation Schedule

Activation Schedule

Schedule modifications will go into effect the next time the nearest schedule fires. An older schedule that already has fired, will be allowed to complete.

27.10.3 Editing Oracle Enterprise Scheduler Schedule Metadata

You can edit existing metadata you have created using the Oracle Enterprise Scheduler/ Oracle Enterprise Manager Fusion Middleware Control page. To do so:

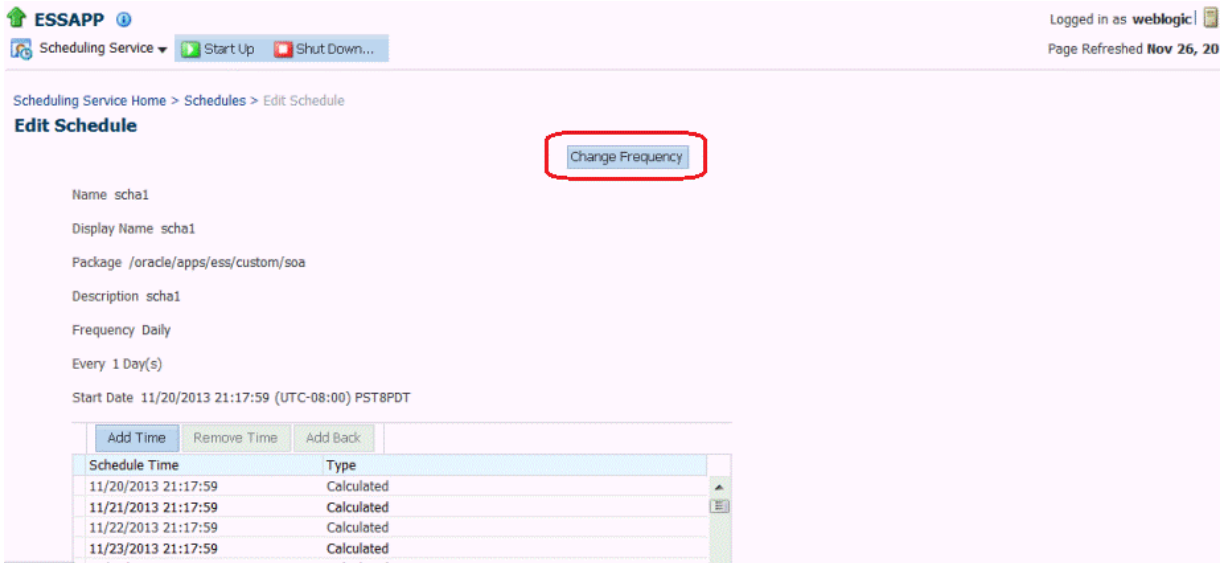
1. Navigate to the **Scheduling Services -> Job Requests -> Define Schedules** page by using the **Scheduling Services** menu.
2. The existing schedules will be listed in the table. Select the one you want to modify and to select the **Edit** button on the table's toolbar.

Results

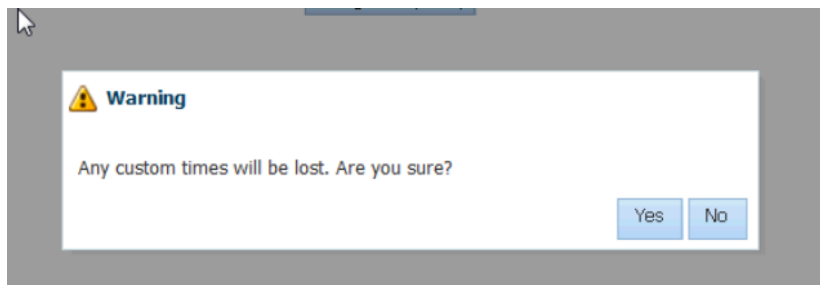
Create...
 Edit...
 Delete...

| Name | Display Name | Package | Description | Starts On | Repeat |
|-------|--------------|----------------------------|-------------|-------------------------|--------|
| scha1 | scha1 | /oracle/apps/ess/custom... | scha1 | Nov 20, 2013 9:17:59 PM | Daily |
| schb1 | schb1 | /oracle/apps/ess/custom... | schb1 | Nov 20, 2013 9:18:26 PM | Daily |

3. The Edit Schedule metadata screen opens and displays the current state of the Schedule. Click the **Change Frequency** button.



4. Click **Yes** on the warning popup that is displayed.



5. The Schedule opens up in a editable mode, and you can make necessary modifications. If you change the schedule, it does not automatically apply to adapter activate/deactivate requests that have already been issued with that schedule. You have to reissue the activate/deactivate requests.

27.10.4 Removing Schedules from an Adapter Endpoint

You can remove schedules from an Adapter Endpoint. To do so:

1. After deactivation and activation schedules have been attached to the Adapter endpoint, the icon reflects the state accordingly. Select this icon to display the popup with schedules associated with this Adapter pre-selected.
2. Select the **Remove Schedules** button to remove the schedules from this Adapter endpoint.

Adapter Schedules ? ✕

Select an activation and a deactivation schedule. Click Apply Schedules to enable automated activation for this adapter or to refresh the already applied schedules. Click Remove Schedules to stop automated activation for this adapter.

Only schedules in **package / oracle / apps / ess / custom / soa** of application **EssNativeHostingApp** can be used for activation and deactivation. New schedules can be created in the Enterprise Manager Scheduler page.

Deactivation Schedule

MyDeactSchedule ▾

Description Deactivation Schedule

Start Date May 8, 2014 9:15:52 AM

End Date May 8, 2015 9:15:03 AM

Frequency Daily

Activation Schedule

MyActSchedule ▾

Description Activation Schedule

Start Date May 8, 2014 9:16:38 AM

End Date May 8, 2015 9:16:00 AM

Frequency Daily

Schedule modifications will go into effect the next time the nearest schedule fires. An older schedule that already has fired, will be allowed to complete.

3. A confirmation dialog appears. Click **OK** to remove the schedules.

Adapter Schedules ? ✕

Select an activation and a deactivation schedule. Click Apply Schedules to enable automated activation for this adapter or to refresh the already applied schedules. Click Remove Schedules to stop automated activation for this adapter.

Only schedules in **package / oracle / apps / ess / custom / soa** of application **EssNativeHostingApp** can be used for activation and deactivation. New schedules can be created in the Enterprise Manager Scheduler page.

Deactivation Schedule

MyDeactSchedule ▾

Description Deactivation Schedule

Start Date May 8, 2014 9:15:52 AM

End Date May 8, 2015 9:15:03 AM

Frequency Daily

Activation Schedule

MyActSchedule ▾

Description Activation Schedule

Start Date May 8, 2014 9:16:38 AM

End Date May 8, 2015 9:16:00 AM

Frequency Daily

Confirmation ✕

Are you sure you want to remove schedules?

Schedule modifications will go into effect the next time the nearest schedule fires. An older schedule that already has fired, will be allowed to complete.

27.11 Monitoring Adapter Resiliency

Resiliency deals with downstream service outages or connectivity issues that cause failures to build up within SOA. Within the context of JCA Technology Adapters, this means dealing with downstream service outages related to Adapters.

If a downstream endpoint is down or behaving sporadically, a large number of instances are forwarded to the error hospital and have to be recovered. If the endpoint is down, machine resources are wasted, as they partially process instances which are not going to complete

anyway. The solution is to suspend upstream inbound adapters. With failure resiliency in place, messages wait in a queue or a topic until the endpoint is resumed.

To use resiliency, the first step is to enable it. You can enable it globally: each downstream endpoint inherits the failure resiliency configuration but you can override this resiliency for that one endpoint.

Once the upstream endpoint is suspended, periodically, one or a few messages are let into the flow. If the downstream endpoint is detected as clear, the upstream endpoint automatically resumes.

The Resiliency feature determines when a downstream endpoint is down based on system errors based on error rate heuristics (that is, M failures in N minutes.)

It then disables/suspends upstream endpoints where messages originated and leaves incoming messages in the natives system rather than erring out in SOA (Adapters, WebServices)

EDN events are still queued up in the system but not read by the subscriber.

The Resiliency feature supports JMS, AQ, DB, File and FTP Adapters.

WebService requests will be rejected.

The Resiliency feature monitors downstream endpoints and determine when the endpoints come back up by periodically processing inbound requests and re-enabling upstream endpoints if there is success in enabling a message to go through.

Resiliency provides Fusion Middleware Control dashboard notification and history for disabled endpoints; re-enabled status of upstream endpoints and enables upstream endpoints to be resumed from Fusion Middleware Control.

For complete information, see the section on resiliency in this guide.

27.11.1 Adapter Properties for Resiliency

You can define adapter properties in Fusion Middleware Control (in Adapter properties screen) and by using JDeveloper, the WebService properties are set using MBeans in Fusion Middleware Control and the same way as Adapters in JDev (composite bindings). Note that EDN subscribers cannot override resiliency properties.

Part X

Administering Oracle B2B and Oracle Healthcare

This part describes how to administer Oracle B2B and Oracle Healthcare.

This part includes the following chapters:

- [Configuring Oracle B2B](#)
- [Monitoring Oracle B2B](#)
- [Monitoring Oracle Healthcare](#)

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 topics:

- [Configuring Oracle B2B Server Properties](#)
- [Configuring Oracle B2B Operations](#)
- [Configuring Oracle B2B Attributes](#)
- [Configuring Oracle B2B Logging Mode](#)

28.1 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 *Using Oracle B2B*.

28.2 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:**

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.

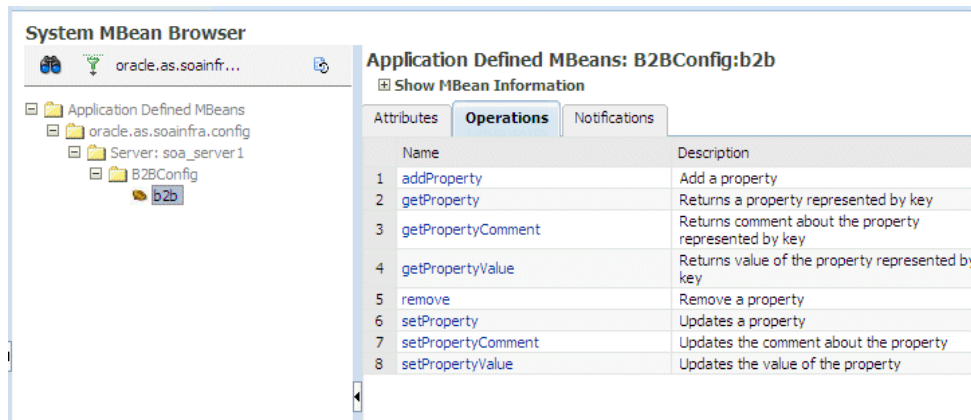
 **Note:**

You can also use `Search` and search for `B2BConfig`.

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 **manage server name** 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.



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 *Using 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.

28.3 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. Expand the **SOA** node and select the **soa-infra** node.
2. From the **SOA Infrastructure** menu, choose **AdministrationSystem MBean Browser**.
3. Click the **Attributes** tab.
4. Click **Properties**.
5. Expand **Property_0**, **Element_1**, and so on to find the property you want to change.
6. 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**.

7. Click the **Operations** tab.
8. Click **setProperty**.
9. Enter values for the key, value, and optional comments.

Operation: setProperty Invoke Revert Return

MBean Name oracle.as.soainfra.config:Location=soa_server1,name=b2b,type=B2BConfig,Application=soa-infra,ApplicationVersion=11.1.1

Operation Name setProperty

Description Updates a property

Return Type void

Parameters

| 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**.

10. Click **Invoke**.
11. Click **Return**.

28.4 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 |

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*.

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 topics:

- [Monitoring the Oracle B2B Infrastructure](#)
- [Accessing Oracle B2B from the B2B Infrastructure Page](#)
- [Viewing the Message Flow of an Oracle B2B Binding Component](#)
- [Viewing Services and References](#)
- [Accessing Oracle B2B Reports from the Oracle B2B Composite Flow Trace Page](#)

29.1 Monitoring the Oracle B2B Infrastructure

To monitor the Oracle B2B infrastructure, metrics must be enabled (the default) on the B2B Server Properties page. To change the setting, click **Related Links** then select **B2B Server Properties** on the B2B Infrastructure (SOA Binding) page.

For more information on enabling metrics, see [Configuring Oracle B2B Server Properties](#).

[Table 29-1](#) describes the information displayed on the B2B Infrastructure (SOA Binding) page.

Table 29-1 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. Outbound indicates messages sent from the host to the trading partner and Inbound 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. |
| Average Message Size (kb) | Shows the average document size, in kilobytes, for both outbound and inbound messages. |
| Errors | Shows the document error count. |

Table 29-1 (Cont.) B2B Infrastructure (SOA Binding)

| Section/Column | Description |
|---|---|
| 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. From indicates messages sent from this partner to its trading partner. To 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)**.



- From the **SOA Infrastructure** menu, select **Bindings > B2B**.

See [Table 29-1](#) 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.

29.2 Accessing Oracle B2B from the B2B Infrastructure Page

To log in to Oracle B2B, click **Related Links** and select **B2B Console**.

Figure 29-1 Accessing Oracle B2B from Oracle Enterprise Manager Fusion Middleware Control

| Name | Number of Messages Processed | | Average Message Processing Time (sec) | | Average Message Size | | Inbound | Outbound |
|----------------------------|------------------------------|---------|---------------------------------------|---------|----------------------|---------|---------|----------|
| | Outbound | Inbound | Outbound | Inbound | Outbound | Inbound | | |
| EDI_X12 4010 850 | 15 | 0 | 4.463 | 0.000 | 1,098 | 0.000 | 2 | 0 |
| 1Sync 6.4 catalogueRequest | 7 | 0 | 0.377 | 0.000 | 46.731 | 0.000 | 6 | 0 |
| EDI_EDIFACT D3 CONTRL | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0 |

See *Using Oracle B2B* for information on using the Oracle B2B interface.

29.3 Viewing the Message Flow of an Oracle B2B Binding Component

Use these instructions to view the message flow of an Oracle B2B binding component in a business flow instance.

- 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 | Conclusion ID | Status | Start Time |
|-------------|------|-------------------|--------|------------------------|
| 20060 | | JygzKlc4xapUdG... | --- | Sep 9, 2009 1:11:28 PM |
| 20058 | | 58IT9XvzF2JA0h... | --- | Sep 9, 2009 1:04:28 PM |
| 20059 | | yqxOAGPFH63GN... | --- | Sep 9, 2009 1:04:28 PM |
| 20057 | | p4kT9jqCE8VajW... | --- | 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 |

- To see all instances of this SOA composite application, click the **Instances** tab.

B2B_FDI_X12 [1.0] (Oracle SOA Composite) Page Refreshed Dec 11, 2008 11:28:35 AM PST

Running Instances 0 | Total 30 | Active Retire ... Shut Down... Enable Payload Validation ... Test Related Links

Dashboard **Instances** Faults and Rejected Messages Unit Tests Policies

Search

Instance ID Start Time From (UTC-08:00) US Pacific Time
 Conversation ID Start Time To (UTC-08:00) US Pacific Time

Show Any Search Rese

View ✗ Delete Selected ... ✗ Delete With Options ... Abort...

| Instance ID | Conversation ID | State | Faults | Start Time | Logs |
|-------------|---------------------------|-------|--------|--------------------------|------|
| 60015 | 8C54845611E27685A4C000... | --- | 0 | Dec 11, 2008 10:56:37 AM | |
| 60014 | 8C54845611E27684CF9000... | --- | 0 | Dec 11, 2008 10:56:33 AM | |
| 60013 | 8C54845611E27684A4F000... | --- | 0 | Dec 11, 2008 10:56:32 AM | |
| 60012 | 8C54845611E27684718000... | --- | 0 | Dec 11, 2008 10:56:32 AM | |
| 60011 | 8C54845611E276833E5000... | --- | 0 | Dec 11, 2008 10:56:27 AM | |
| 60010 | 8C54845611E24F3B3BA000... | --- | 0 | Dec 10, 2008 11:29:57 PM | |
| 60009 | 8C54845611E24F3AFEF000... | --- | 0 | Dec 10, 2008 11:29:56 PM | |
| 60008 | 8C54845611E24F3AC82000... | --- | 0 | Dec 10, 2008 11:29:55 PM | |
| 60007 | 8C54845611E24F04F20000... | --- | 0 | Dec 10, 2008 11:26:15 PM | |
| 60006 | 8C54845611E24F0425E000... | --- | 0 | Dec 10, 2008 11:26:12 PM | |
| 60005 | 8C54845611E24F031B2000... | --- | 0 | Dec 10, 2008 11:26:07 PM | |
| 60004 | 8C54845611E24F02C3F000... | --- | 0 | Dec 10, 2008 11:26:06 PM | |
| 60003 | 8C54845611E24F0254F000... | --- | 0 | Dec 10, 2008 11:26:04 PM | |
| 60002 | 8C54845611E24EF7702000... | --- | 0 | Dec 10, 2008 11:25:20 PM | |
| 60001 | 8C54845611E24DCF194000... | --- | 0 | Dec 10, 2008 11:05:06 PM | |
| 50001 | 8C54845611E23B2ABB7000... | --- | 0 | Dec 10, 2008 5:39:18 PM | |
| 40005 | 8C54845611E22AAB88B000... | --- | 0 | Dec 10, 2008 12:51:00 PM | |
| 40004 | 8C54845611E22AAA873000... | --- | 0 | Dec 10, 2008 12:50:56 PM | |
| 40003 | 8C54845611E22AAA4E3000... | --- | 0 | Dec 10, 2008 12:50:55 PM | |
| 40002 | 8C54845611E22AAA2B6000... | --- | 0 | Dec 10, 2008 12:50:54 PM | |
| 40001 | 8C54845611E22919151000... | --- | 0 | Dec 10, 2008 12:23:32 PM | |
| 30001 | 8C54845611E1E4CA6E5000... | --- | 0 | Dec 9, 2008 4:29:46 PM | |
| 20004 | 8C54845611E1E2E6E86000... | --- | 0 | Dec 9, 2008 3:56:46 PM | |
| 20003 | 8C54845611E1E2E68CB000... | --- | 0 | Dec 9, 2008 3:56:45 PM | |
| 20002 | 8C54845611E1E2E67DA000... | --- | 0 | Dec 9, 2008 3:56:40 PM | |

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.

Flow Trace ?

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 |
|-----------------------------|------------------------|---------|
| B2BShiporderInboundService | B2B Binding | Service |
| B2BShiporderInboundMediator | Mediator Component | |
| FileShiporderInboundSer | Open using B2B Console | Referen |

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.

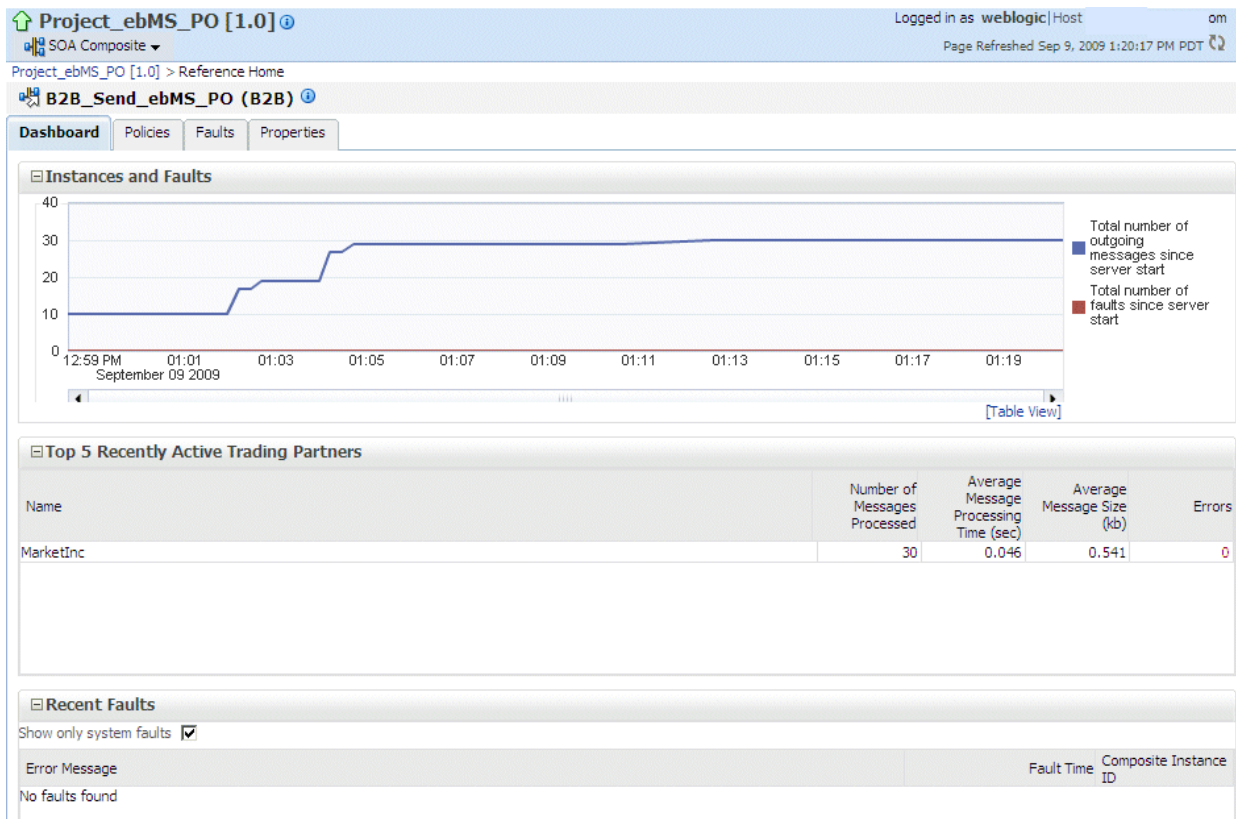
29.4 Viewing Services and References

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.

The Dashboard page for a composite application lists the services and references used in the composite.

Details of the Oracle B2B reference shown in [Figure 29-2](#), **B2B_Send_ebMS_PO**, are displayed on the Reference home page.

Figure 29-2 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 29-1](#) for a description of the **Top 5 Recently Active Trading Partners** section.

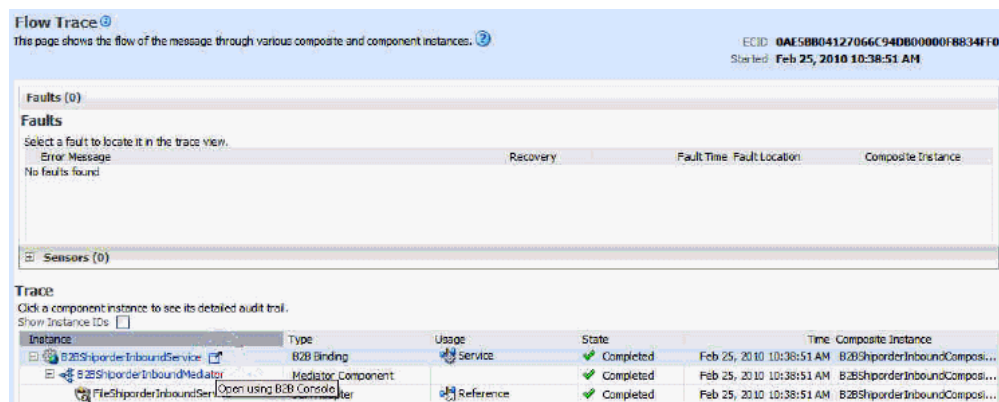
The **Recent Faults** section lists the faults, including details such as the error message, time of the fault, and the associated business flow instance ID. Faults can be on the incoming messages processed by a service binding component or on the outgoing messages processed by a reference binding component.

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 [Monitoring the SOA Infrastructure](#), and [Monitoring Service and Reference Binding Components](#) for more information.

29.5 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.



Flow Trace
This page shows the flow of the message through various composite and component instances.

ECID: 0AE58B04127066C94DB0000F8834FF0
Started: Feb 25, 2010 10:38:51 AM

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 (0)

Trace
Click a component instance to see its detailed audit trail.
Show Instance IDs:

| 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... |
| FileShiporderInboundSer... | | Reference | Completed | Feb 25, 2010 10:38:51 AM | B2BShiporderInboundCompos... |

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:

- [Introduction to the Audit Trail](#)
- [Configuring the Healthcare Integration Audit Trail](#)
- [Viewing User Audit Logs](#)

30.1 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 Securing Applications with Oracle Platform Security Services* 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:

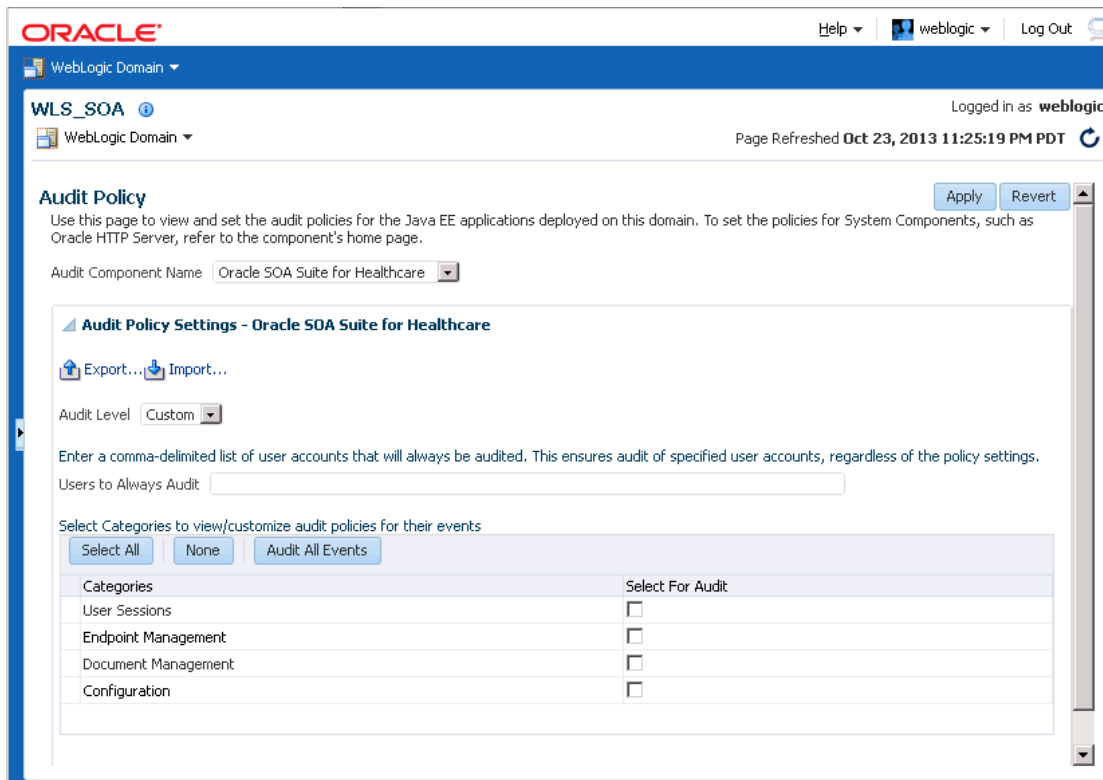
- **Low:** This option selects a subset of events from all auditable components in the audit policy list, including a subset of Oracle SOA Suite for healthcare integration events. It does not allow custom filters to be created.
- **Medium:** This option selects a larger subset of events from all auditable 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 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.

30.1.1 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 configure these options, select **Oracle SOA Suite for Healthcare** from the **Audit Component Name** list, **Custom** from the **Audit Level** list, and click the check boxes adjacent to the events as displayed in [Figure 30-1](#).

Figure 30-1 Healthcare Integration Components on the Audit Policy Page



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
 - Create Endpoint
 - Enable Endpoint
 - Disable Endpoint
 - Delete Endpoint
- Document Management
 - Create Document Definition
 - Update Document Definition
 - Delete Document Definition
 - Resubmit Message
 - Purge Message
 - Resubmit Message
 - Purge Message
 - Read Payload
- Configuration
 - Import
 - Export
 - Create Internal Delivery Channel
 - Delete Internal Delivery Channel
 - Create Mapset
 - Delete Mapset

30.1.2 Oracle B2B Auditing Options

The Oracle B2B components and events available for auditing are listed on the Audit Policy page of Oracle Enterprise Manager. To view or configure the Oracle B2B options, expand the nodes under SOA_B2B.

The available components and events for audit in Oracle B2B include the following:

- User Session
 - User Login
 - User Logout
- Document Management
 - Create Document Definition
 - Update Document Definition
 - Delete Document Definition
 - Resubmit Message
 - Purge Message
 - Read Payload

- Configuration
 - Import
 - Export
 - Create Batch
 - Delete Batch
 - Update Batch
 - Create Schedule Downtime
 - Delete Schedule Downtime
 - Create Mapset
 - Delete Mapset
- Partner Management
 - Create Trading Partner
 - Delete Trading Partner
- Agreement Management
 - Create Agreement
 - Delete Agreement
 - Edit Agreement
 - Deploy Agreement
 - Activate Agreement
 - Inactivate Agreement
 - Retire Agreement
 - Purge Agreement
- Channel Management
 - Create Delivery Channel
 - Delete Delivery Channel
 - Create Internal Delivery Channel
 - Delete Internal delivery Channel
 - Create Listening Channel
 - Edit Listening Channel
 - Delete Listening Channel
- User Management
 - Add user Roles
 - Remove User Roles
 - Add Supported Document Definition
 - Remove Supported Document Definition

30.1.3 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.

30.2 Configuring the Healthcare Integration Audit Trail

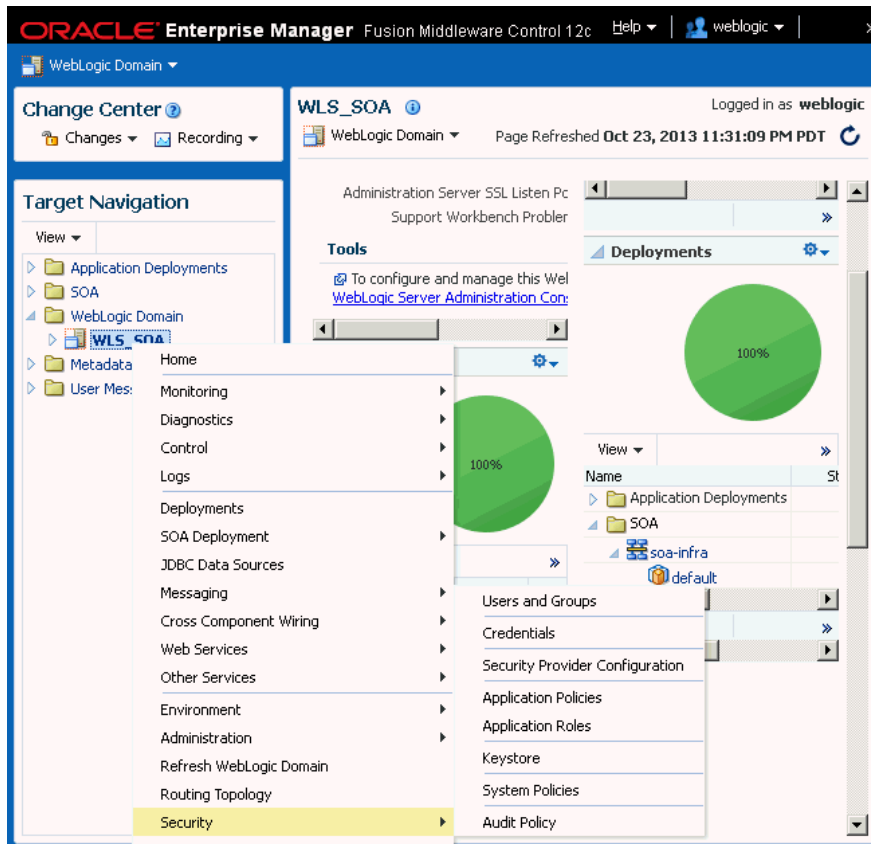
You configure audit policies in Oracle Enterprise Manager by selecting the events or components to include in the audit log. Currently, Oracle B2B components and events are not included in the audit trail.

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**.

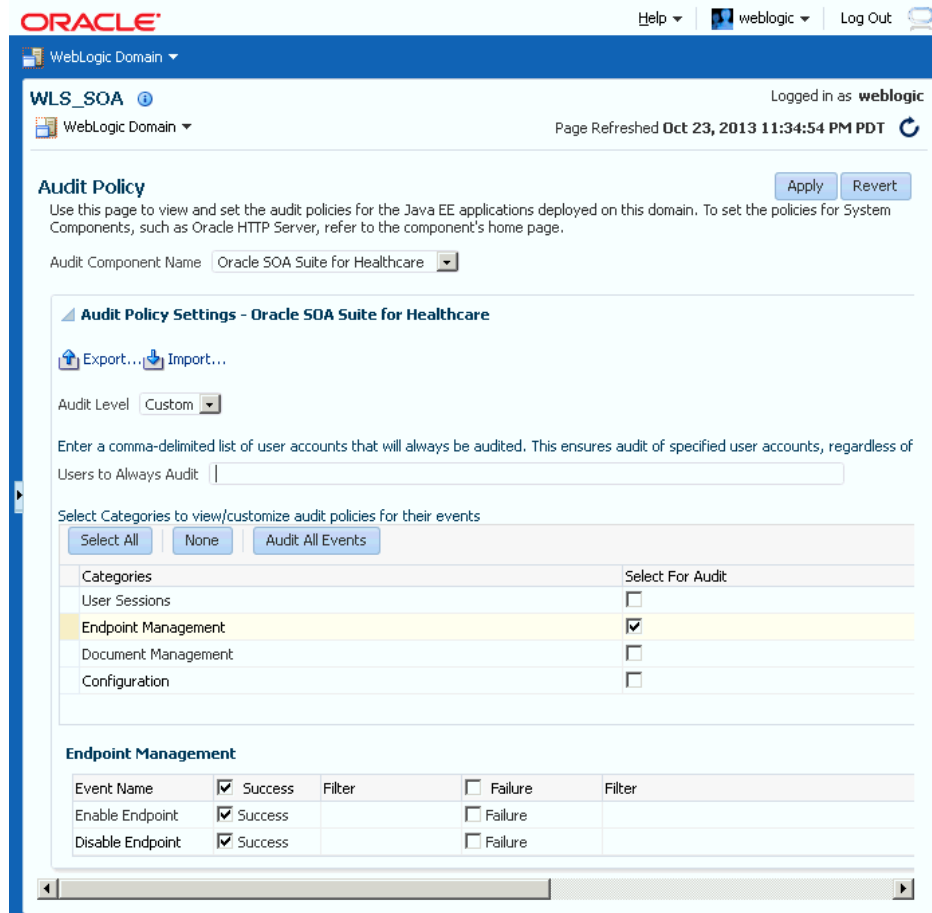


4. In the **Audit Level** field, select **Custom**.

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**.



- 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 [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.

30.3 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 information listed here.

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/healthcare/audit_1_0.log
```

Part XI

Administering Binding Components

This part describes how to administer binding components.

This part includes the following chapters:

- [Configuring Service and Reference Binding Components](#)
- [Monitoring Service and Reference Binding Components](#)
- [Managing Service and Reference Binding Components](#)

31

Configuring Service and Reference Binding Components

This chapter describes how to configure runtime properties for web service, REST, and JCA adapter binding components in SOA composite applications. Binding components are network protocols and services that connect the SOA platform with the outside world. This chapter includes the following topic:

- [Configuring Service and Reference Binding Component Properties](#)

For more information about binding components, see the following documentation:

- [Introduction to Binding Components](#)
- *Developing SOA Applications with Oracle SOA Suite*



Note:

- 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 *Developing SOA Applications with Oracle SOA Suite*.

31.1 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... |
|--|--|--|
| <ol style="list-style-type: none"> a. Select Services and References. b. Select a specific service or reference. c. Click the Properties tab. | <ol style="list-style-type: none"> a. Right-click soa-infra. b. Select Services and References. c. Select a specific service or reference. d. Click the Properties tab. | <ol style="list-style-type: none"> a. Select Services/Reference Properties. b. Select a specific service or reference. c. Click the Properties tab. |

The following binding component properties appear for a web service.

The screenshot shows the Oracle SOA Suite interface for configuring the properties of a web service named 'CustomerMediatorService_ep'. The page is titled 'CustomerService [1.0]' and shows the user is logged in as 'weblogic'. The 'Properties' tab is selected, and the 'General' section is visible. The properties are as follows:

| Property Name | Value |
|--------------------------------|---------|
| RESTful Enabled | False |
| WSDL Enabled | True |
| Metadata Exchange Enabled | True |
| Endpoint Test Enabled | True |
| Schema validation | False |
| Atomic Transaction Flow Option | Never |
| Atomic Transaction Version | Default |

The following binding component properties appear for a file adapter. Depending upon your selection of JCA adapter, different properties display for configuring.

The screenshot shows the Oracle SOA Suite interface for configuring the properties of a file adapter named 'readFile'. The page is titled 'MultivalueProj [1.0]' and shows the user is logged in as 'weblogic'. The 'Properties' tab is selected, and the 'Adapter Reports' section is visible. The properties are as follows:

| Name (Operation) | Value |
|--------------------------|-------------|
| PollingFrequency (Read) | 1 |
| MinimumAge (Read) | 0 |
| UseHeaders (Read) | false |
| Recursive (Read) | true |
| DeleteFile (Read) | true |
| PhysicalDirectory (Read) | /tmp/med/in |

The following binding component properties appear for a REST reference binding component.

2. Change properties based on your selection of binding component:

- [Configuring Properties for Web Services](#)
- [Configuring Properties for REST Adapters](#)
- [Configuring Properties for Oracle JCA Adapters](#)

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 [Configuring SOA Infrastructure Properties](#).

31.1.1 Configuring Properties for Web Services

[Table 31-1](#) describes the properties available for a web service binding component.

Table 31-1 Web Service Properties

| Service, Reference, or Endpoint | Property Name | Description |
|---------------------------------|----------------------------------|--|
| Service | REST Enabled | Enable or disable the web services port to accept messages in REST format. |
| Service | WSDL Enabled | Enable or disable the WSDL of the web service. |
| Service | Metadata Exchange Enabled | Enable or disable a metadata exchange of the web service. |
| Service | Endpoint Test Enabled | Enable or disable an endpoint test of the web service. |

Table 31-1 (Cont.) Web Service Properties

| Service, Reference, or Endpoint | Property Name | Description |
|---------------------------------|---------------------------------------|--|
| Service | Schema Validation | Enable or disable schema validation. |
| Service | Atomic Transaction Flow Option | <p>Select the transaction participation value:</p> <ul style="list-style-type: none"> • Never No transaction context is imported (for services) or exported (for references). • Supports If a transaction exists, a transaction context is imported (for services) or exported (for references). This information is added to the <code>composite.xml</code> file. • Mandatory 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. <p>For more information, see Section "WS-AtomicTransaction Support" of <i>Developing SOA Applications with Oracle SOA Suite</i>.</p> |
| Service | Atomic Transaction Version | Select the WS-AtomicTransaction (WS-AT) supported version (1.0, 1.1, 1.2, or default). |

31.1.2 Configuring Properties for REST Adapters

[Table 31-2](#) describes the properties available for a REST binding component.

Table 31-2 REST Adapter Properties

| Property Type | Binding Component Type | Description |
|-------------------------------------|------------------------|--|
| Endpoint Address | Reference | Endpoint URL to which the client sends the request. |
| Stop Chunking | Reference | Flag that specifies whether chunking is enabled for client requests. |
| Chunking Size (bytes) | Reference | Size of the request chunk in bytes. |
| HTTP Read Timeout (ms) | Reference | Length of the request read timeout in milliseconds. |
| HTTP Connection Timeout (ms) | Reference | Length of the request connection timeout in milliseconds. |

31.1.3 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 31-3](#) describes the JCA adapter property types.

Table 31-3 Types of JCA Adapters

| Property Type | Description | Restrictions |
|--|---|--|
| 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. |

For information on available JCA adapter configuration properties, see Appendix "Oracle JCA Adapter Properties" of *Understanding Technology Adapters*.

32

Monitoring Service and Reference Binding Components

This chapter describes how to monitor service and reference binding component messages and faults in SOA composite applications. If Oracle Enterprise Scheduler is deployed with Oracle SOA Suite, you can also access a page for scheduling the activation and deactivation of JCA adapter services.

This chapter includes the following topic:

- [Monitoring Binding Component Messages and Faults](#)

For more information, see the following documentation:

- [Introduction to Binding Components](#) for conceptual details about binding components
- [Administering Oracle B2B and Oracle Healthcare](#)
- *Developing SOA Applications with Oracle SOA Suite*

32.1 Monitoring Binding Component Messages and Faults

You can monitor messages and faults for all binding components included in SOA composite applications.

To monitor binding component messages and faults:

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

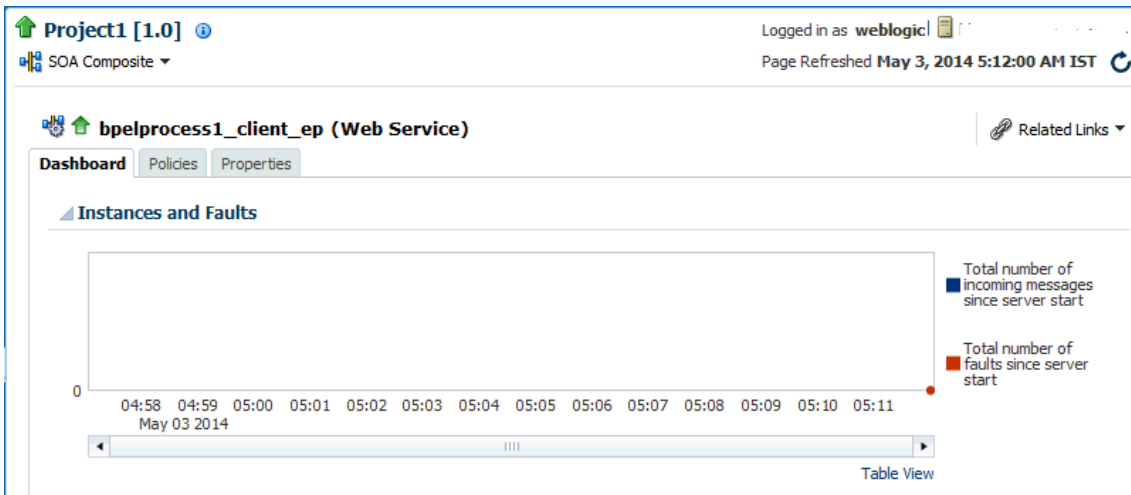
From the SOA Infrastructure Menu...

- a. Select **Home**. > **Deployed Composites**.
- b. In the **Composite** section, select a specific SOA composite application.

From the SOA Folder in the Navigator...

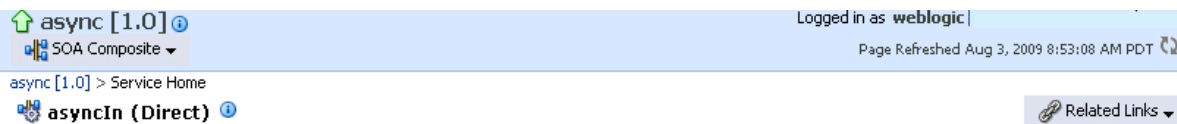
- a. Under **soa-infra**, expand the SOA folder.
 - b. Select a specific SOA composite application.
-

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 binding component that is a JCA adapter, web service, or REST service, the Dashboard page displays a graphic representation of the total number of incoming messages and faults since server startup:

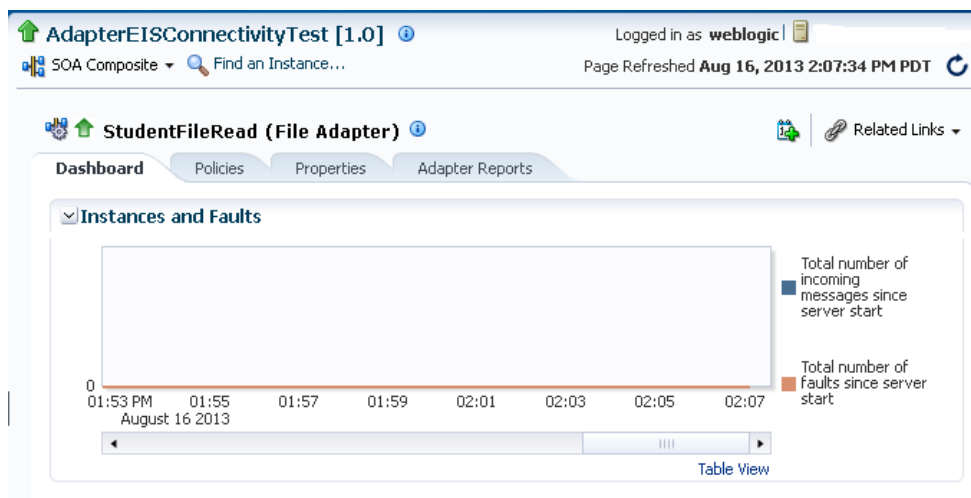


- If you select a service that invokes a SOA composite application through a remote method invocation (RMI) call (known as direct binding), the Dashboard page displays similar details as described in Step 4. Direct binding enables SOA composite applications to be invoked through an API that supports 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.



- If you select a reference binding component, the Dashboard page displays a graphic representation of the total number of outgoing messages and faults since server startup. Reference binding components are only available for JCA adapters, web services, and REST services.



If Oracle Enterprise Scheduler is deployed with Oracle SOA Suite, the **Adapter Schedules** icon is displayed to the left of the **Related Links** list. This enables you to schedule the activation and deactivation of JCA adapter services.

7. Click the **Adapter Schedules** icon to invoke the Adapter Schedules dialog for selecting an activation and deactivation schedule to enable automated activation of this adapter.

Page Refreshed Aug 16, 2013 2:00:29 PM PDT



For more information, see [Scheduling JCA Adapter Endpoint Activation and Deactivation using Oracle Enterprise Scheduler](#).

33

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, publish service binding components to the Universal Description, Discovery, and Integration (UDDI) registry from a registered UDDI source, and perform additional Oracle Service Registry tasks.

This chapter includes the following topics:

- [Managing Binding Component Policies](#)
- [Publishing Web Services to the UDDI Registry](#)
- [Changing the Endpoint Reference and Service Key for Oracle Service Registry Integration](#)
- [Publishing and Browsing the Oracle Service Registry](#)

Note:

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.

For more information, see the following documentation:

- [Introduction to Binding Components](#) for conceptual details about binding components
- *Developing SOA Applications with Oracle SOA Suite*

33.1 Managing Binding Component Policies

You can attach and detach security policies to and from binding components included in a currently deployed SOA composite application (for example, web services and JCA adapters). 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 *Securing Web Services and Managing Policies with Oracle Web Services Manager* 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... |
|---|--|
| <ol style="list-style-type: none"> a. Select Home. b. Select the Deployed Composites tab. c. In the Composite section, select a specific SOA composite application. | <ol style="list-style-type: none"> a. Under soa-infra, expand the SOA folder. b. 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 (such as 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 *Securing Web Services and Managing Policies with Oracle Web Services Manager*.

- 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.

SimpleFileout [5.0] | Logged in as weblogic | Page Refreshed Aug 2, 2013 1:58:40 PM PDT

SOA Composite | Find an Instance...

Mediator1_ep (Web Service) | Related Links

Dashboard | Policies | Properties

Select an expression from the Constraint dropdown to view the corresponding effective policy references. For policy set flagged as "Not Valid", click the link to view the validation error details. For security policy references, click the violations count link to view violation details. When policies are attached/detached, effective policy references are recalculated.

Constraint: None | Status: Secure

Globally Attached Policies

| Category/Policy Name | Policy Set | Enabled | Total Violations |
|----------------------|------------|---------|------------------|
| no rows yet | | | |

Directly Attached Policies

View | Attach/Detach | Enable | Disable | Override Policy Configuration | Effective Only | All

| Category/Policy Name | Effective | Enabled | Total Violations |
|---|-----------|---------|------------------|
| security | | | |
| oracle/http_saml20_token_bearer_over_ssl_service_policy | ✓ | ✓ | 0 |

- 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 business flow 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 business flow instance was initiated externally or internally through the Test Web Service page.

- 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.

- Select policies to attach that are appropriate to your environment.

- Click **Attach**.

- When you are finished attaching policies, click **Validate**.

- 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.

11. Click **OK**.

For more information, see the following documentation:

- [Introduction to Policies](#)
- [Managing SOA Composite Application Policies](#) for the dialogs that are displayed during policy attachment
- *Securing Web Services and Managing Policies with Oracle Web Services Manager* for definitions of available policies and details about which ones to use for your environment

33.1.1 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 [Managing Binding Component Policies](#) to attach a policy to a service or reference binding component.
2. Select the attached policy in the table.
3. Click **Override Policy Configuration**.

The **Security Configuration Details** dialog is displayed.

| Name | Value | Original Value |
|-----------------------------------|----------------------|----------------|
| reference.priority | <input type="text"/> | |
| saml.trusted.issuers | <input type="text"/> | |
| saml.enveloped.signature.required | <input type="text"/> | |
| propagate.identity.context | <input type="text"/> | |

4. In the **Value** field, enter a value to override the default value in the **Original Value** column.
5. Click **Apply**.

For more information on overriding policy values, see *Securing Web Services and Managing Policies with Oracle Web Services Manager*.

33.2 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.
- 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>

For more information about publishing web services to the UDDI registry, see *Administering Web Services*.

To publish a web service to the UDDI registry:

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

From the SOA Infrastructure Menu...

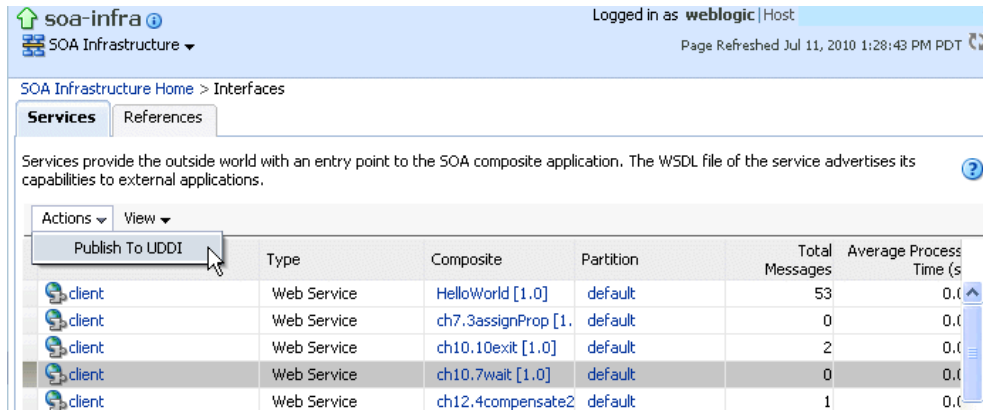
- a. Select **Services and References**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. 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 SOA folder 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.

2. In the **Service** table, select a service to publish to the UDDI registry.
3. From the **Actions** list, select **Publish To UDDI**.



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. |
| System Definition Location | Displays the WSDL URL to publish to the UDDI registry. For example: <code>http://myhost.mycompany.com:7001/soa-infra/services/default/HelloWorld/client?WSDL</code> |
| UDDI Source | Select the UDDI publishing source from which to register the service. |
| Business Name | 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:

Publish Service to UDDI

Choose a UDDI publication source, then select a Business to publish the service.

* Service Name

Service Description

Service Definition Location

* UDDI Source

* Business Name

- Click **OK**.

33.3 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:

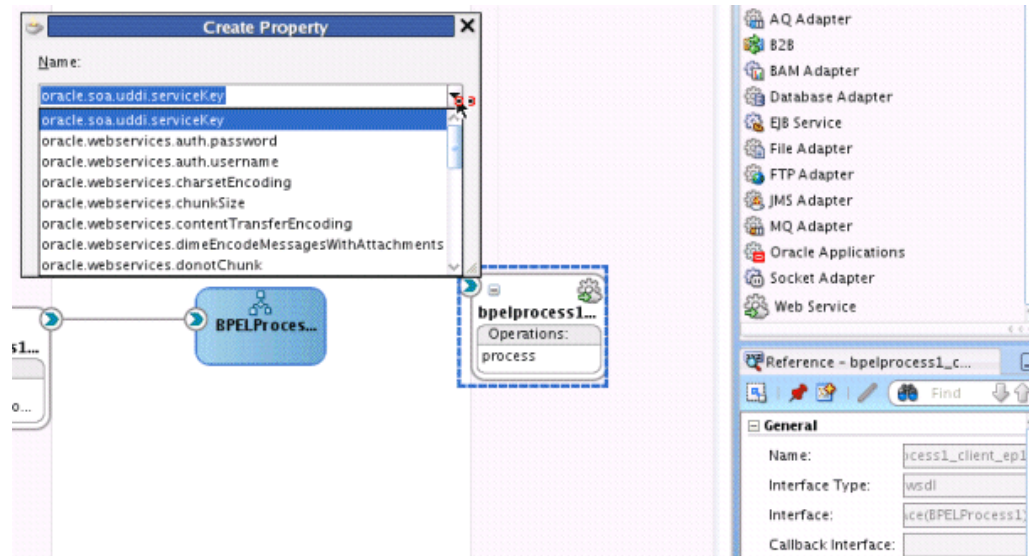
- Change the value as needed.
- Add it to a composite that did not use UDDI for runtime endpoint resolution.

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 33-1 shows both fields.

Figure 33-1 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 *Developing SOA Applications with Oracle SOA Suite*.

For information about how to set the inquiry URL during runtime, see [Configuring SOA Infrastructure Properties](#).

33.3.1 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**.

33.4 Publishing and Browsing the Oracle Service Registry

The Oracle Service Registry (OSR) provides a common standard for publishing and discovering information about web services. This section describes how to configure OSR against a separately installed Oracle SOA Suite environment.

You can use Oracle SOA Suite with the following versions of OSR:

- OSR 11g
- OSR 10.3 (with Oracle WebLogic Server 10.3)
- OSR 10.1.3

For more information about OSR, visit the following URL:

<http://www.oracle.com/technetwork/middleware/registry/overview/index.html>

Note:

- This section does *not* describe how to configure OSR against the embedded Oracle WebLogic Server in Oracle JDeveloper.
- OSR 10.3 deploys to the 10.3.0.0 version of Oracle WebLogic Server.
- OSR 10.3 does not support the 10.3.1.0 version of Oracle WebLogic Server.

33.4.1 Publishing a Business Service

This section provides an overview of how to publish a business service. For specific instructions, see the documentation at the following URL:

<http://www.oracle.com/technetwork/middleware/registry/overview/index.html>

You can also access the documentation by clicking the **Registry Documentation** link.

To publish a business service:

1. Go to the Registry Control:
`http://hostname:port/registry/uddi/web`
2. Click **Publish > WSDL**.
3. Log in when prompted.
4. Complete the fields on this page to specify the access point URL and publish the WSDL for the business service.

 **Note:**

If you later change your endpoint location, you must also update the WSDL location in the Registry Control. Otherwise, UDDI invocation fails during runtime. See section [Changing Endpoint Locations in the Registry Control](#).

33.4.2 Creating a Connection to the Registry

To create a connection to the registry:

1. Go to Oracle JDeveloper.
2. Select **File > New > Connections > UDDI Registry Connection** to create a UDDI connection.
3. Enter a connection name.
4. Enter an inquiry endpoint URL. For example:
`http://myhost.us.example.com:7001/registry/uddi/inquiry`
5. Ensure that the **Business View** option is selected.
6. Click **Next**.
7. Click **Test Connection**.
8. If successful, click **Finish**. Otherwise, click the **Back** button and correct your errors.

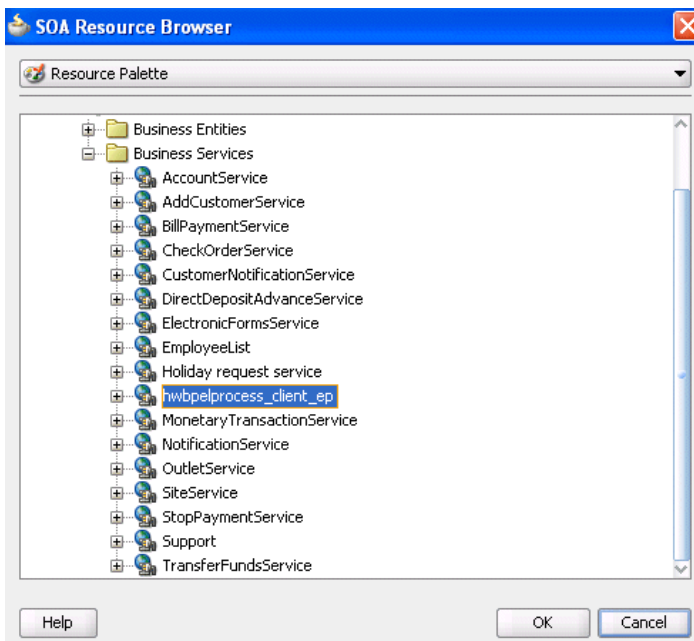
 **Note:**

When you right-click a web service of a SOA composite application under **IDE Connections > Application Server** in the Resources window in Oracle JDeveloper, the **Publish WSDL To UDDI** option is disabled.

33.4.3 Configuring a SOA Project to Invoke a Service from the Registry

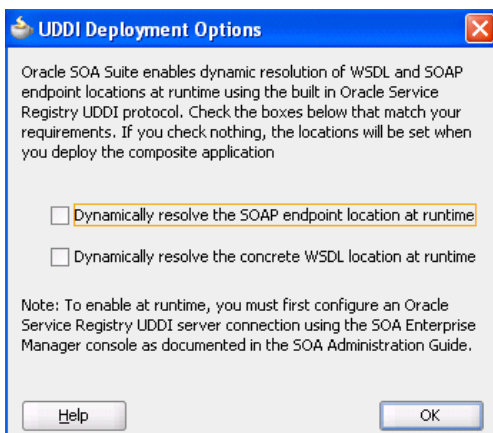
To configure a SOA project to invoke a service from the registry:

1. Open the SOA project in which to create a reference to the business service.
2. Drag a **Web Service** icon into the **External References** swimlane.
The Create Web Service dialog appears.
3. To the right of the **WSDL URL** field, click the icon to select a WSDL.
4. From the list at the top, select **Resource Palette**.
5. Expand the navigational tree.
6. Expand **UDDI Registry > Business Services**.
7. Select the published business service, and click **OK**.



The UDDI Deployment Options dialog appears.

8. Select one of the following deployment options:
 - **Dynamically resolve the SOAP endpoint location at runtime**
 - **Dynamically resolve the concrete WSDL location at runtime**

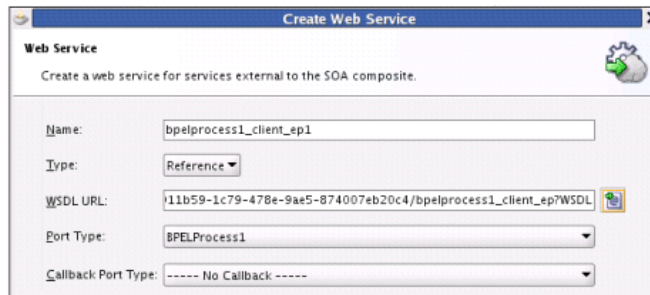


9. Click **OK**.
You are returned to the Create Web Service dialog.
10. See the following section based on your selection in the UDDI Deployment Options dialog.
 - [Dynamically Resolving the SOAP Endpoint Location](#)
 - [Dynamically Resolving the WSDL Endpoint Location](#)

33.4.3.1 Dynamically Resolving the SOAP Endpoint Location

To dynamically resolve the SOAP endpoint location:

1. Complete the remaining fields in the Create Web Service dialog, and click **OK**.
The Create Web Service dialog looks as follows.

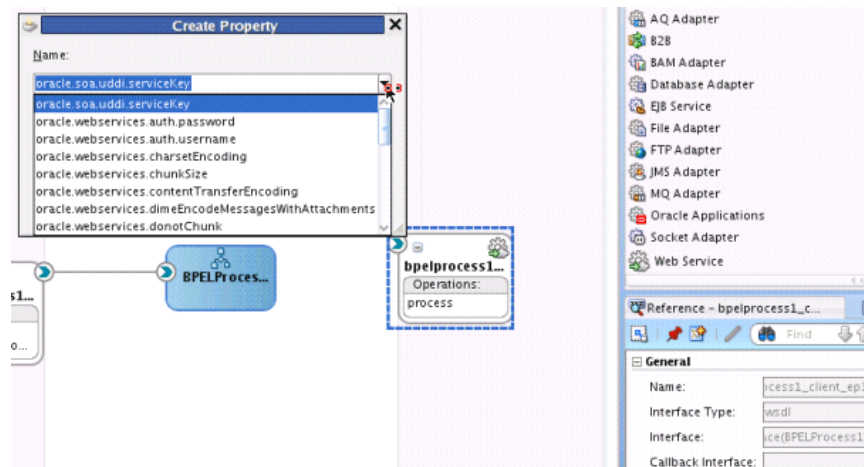


2. Wire the reference with the appropriate service component.
3. In the SOA Composite Editor, click **Source**.

The `composite.xml` file shows the `serviceKey`. The property dynamically resolves the endpoint binding location at runtime.

```
<property name="oracle.soa.uddi.servicekey" type="xs:string"
many="false">uddi:
d3611b59-1c79-478e-9ae5-874007eb20c4">
```

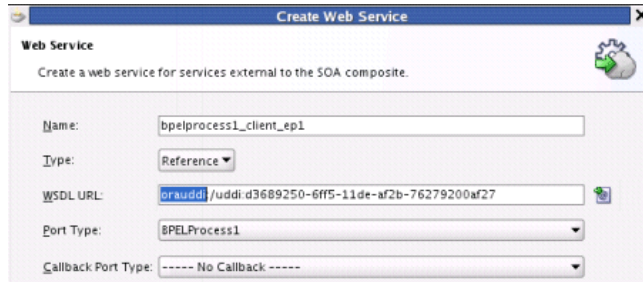
4. If you want, you can also resolve the SOAP endpoint location by explicitly adding the `oracle.soa.uddi.servicekey` property in the Property Inspector. This action dynamically resolves the SOAP endpoint location at runtime for any external reference to a web service.
 - a. Highlight the reference binding component in the **External References** swimlane.
 - b. In the **Property Inspector**, expand the **Properties** section.
 - c. Click the **Add** icon.
 - d. In the **Name** list, select `oracle.soa.uddi.servicekey`.
 - e. In the **Value** field, specify the value for `oracle.soa.uddi.servicekey` from the `composite.xml` file.



33.4.3.2 Dynamically Resolving the WSDL Endpoint Location

To dynamically resolve the WSDL endpoint location:

1. Complete the remaining fields in the Create Web Service dialog, and click **OK**.



2. Wire the reference with the appropriate service component.
3. In the SOA Composite Editor, click **Source**.

The `composite.xml` file shows that the WSDL location is an abstract URL of `orauddi:/uddi_service_key` instead of a concrete URL (such as a HTTP URL). The `orauddi` protocol dynamically resolves the WSDL location at runtime.

```
<location="orauddi:/uddi:d3689250-6ff5-11de-af2b-76279200af27">
```

33.4.3.3 Resolving Endpoints

Oracle SOA Suite invokes a service for resolving an endpoint. Examples and descriptions are shown in [Table 33-1](#).

Table 33-1 Resolving Endpoints

| Endpoint Resolutions | Description | Example |
|------------------------------------|---|--|
| Normalized message UDDI serviceKey | The OSR UDDI serviceKey is specified in the normalized message property within an Oracle Mediator or an Oracle BPEL Process Manager assign activity (serviceKey). | For example, with Oracle Mediator: <pre><copy target="\$out.property.oracle.soa.uddi.serviceKey" value="uddi:10a55fa0-99e8-11df-9edf-7d5e3ef09eda"/></pre> |
| Normalized message endpointURI | The normalized message endpointURI property is specified within an Oracle Mediator or an Oracle BPEL Process Manager assign activity (endpointURI). | For example, with Oracle Mediator: <pre><copy target="\$out.property.endpointURI" value="http://hostname:8001/soa-infra/services/partition/Project/endpoint_ep"/></pre> |

Table 33-1 (Cont.) Resolving Endpoints

| Endpoint Resolutions | Description | Example |
|---|---|--|
| composite.xml UDDI serviceKey | The OSR UDDI serviceKey property (oracle.soa.uddi.serviceKey) is specified in the binding component section of composite.xml. Note: This can be overwritten in Oracle Enterprise Manager Fusion Middleware Control. | <pre><binding.ws port="http://xmlns.oracle.com/ UDDIPublishApplication /Proj/ BPELProcess1#wsdl.endpoint(bpelprocess1_client _ep/BPELProcess1_pt) " . . . > <property name="oracle.soa.uddi.serviceKey" type="xs:string" many="false">uddi:31040650-9ce7-11df-9ee1-7d5e3e f09eda</property> </binding.ws></pre> |
| composite.xml endpointURI | The endpointURI property is specified within the binding component section of composite.xml. Note: This can be overwritten in Oracle Enterprise Manager Fusion Middleware Control. | <pre><binding.ws port="http://xmlns.oracle.com/UDDIPublishApplica tion/Project/BPELProcess1#wsdl.endpoint(bpelproc ess1_client_ep/BPELProcess1_pt) " . . . > <property name="oracle.soa.uddi.endpointURI" value="http://hostname:8001/soa-infra/services/ Partition/Project/bpelprocess1_client_ep"</ property> </binding.ws></pre> |
| composite.xml concrete WSDL endpoint location | The endpoint location is specified in the concrete WSDL in the binding component section of composite.xml. | <pre><binding.ws port="http://xmlns.oracle.com/ UDDIPublishApplication /Project/BPELProcess1#wsdl.endpoint(bpelprocess1_ client_ep/BPELProcess1_pt) " location="http://hostname:8001/soa-infra/services /Partition/Project/bpelprocess1_client_ep?wsdl" soapVersion="1.1"></pre> |

The failover scenario for resolving endpoints is as follows.

- Normalized message UDDI serviceKey
 - Any error on the endpoint access
 - * Log a severe error
 - * Return an error to the user
- Normalized message endpointURI
 - Any error on the endpoint access
 - * Log a severe error
 - * Return an error to the user
- composite.xml UDDI serviceKey
 - Error on an OSR connection

- * Log a severe error
- * Use the `composite.xml endpointURI` if it is coded
- * Else, return an error to the user
- Error for an invalid `serviceKey` in the connection
 - * Log a severe error
 - * Use the `composite.xml endpointURI` if it is coded
 - * Else, return an error to the user
- Error on the endpoint access
 - * Log a warning error
 - * Use a second (or third) binding template if it exists.
 - * Else, fail over to the `composite.xml endpointURI`
- `composite.xml endpointURI`
 - Error on the endpoint access
 - * Log a warning error
 - * Fail over to the `composite.xml concrete WSDL endpoint location`
- `composite.xml concrete WSDL endpoint location`
 - Error on the endpoint access
 - * Log a severe error
 - * Return an error to the user

33.4.4 Configuring the Inquiry URL, UDDI Service Key, and Endpoint Address for Runtime

You can set the inquiry URL, UDDI service key, and endpoint address during runtime in Oracle Enterprise Manager Fusion Middleware Control.

To configure the inquiry URL, UDDI service key, and endpoint reference for runtime:

1. Log in to Oracle Enterprise Manager Fusion Middleware Control.
2. Specify values for the following properties:
 - In the SOA Infrastructure Common Properties page, specify the same UDDI inquiry URL that you specified in the Create UDDI Registry Connection wizard. For information, see [Configuring UDDI Registry Properties](#).
 - In the Properties page of the reference binding component, you can change the endpoint reference and service key values created during design time. For information, see [Configuring Service and Reference Binding Component Properties](#).
3. Restart the SOA Infrastructure.
4. Exit Oracle Enterprise Manager Fusion Middleware Control.
5. To see endpoint statistics, return to the Registry Control.
6. Go to the Manage page and check statistics to see the increase in the number of invocations when not cached (the first time).

Caching of WSDL URLs occurs by default during runtime. If a WSDL URL is resolved using the orauddi protocol, subsequent invocations retrieve the WSDL URLs from cache, and not from OSR. When an endpoint WSDL obtained from cache is no longer reachable, the cache is refreshed and OSR is contacted to retrieve the new endpoint WSDL location. As a best practice, Oracle recommends that you undeploy services that are no longer required in Oracle Enterprise Manager Fusion Middleware Control and used by the SOA Infrastructure. Endpoint services that are shut down or retired (but not undeployed) are still reachable. Therefore, the cache is not refreshed.

If you move the business service WSDL from one host to another, ensure that you change the location in the Registry Control. No change is required in Oracle JDeveloper or Oracle Enterprise Manager Fusion Middleware Control.

You can optionally increase the amount of time that the WSDL URL is available in cache for inquiry by the service key. For more information, see [Configuring Service and Reference Binding Component Properties](#).

 **Note:**

In 11g, caching occurs automatically. If you are using Oracle SOA Suite 10.1.3, caching is supported by setting the `CacheRegistryWSDL` property to `true` in `bpel.xml`. Setting this property to `false` disables caching.

33.4.4.1 Changing Endpoint Locations in the Registry Control

The Registry Control provides an option for changing the endpoint location. This is a two-step process. The following steps provide an overview. For more specific details, see the Oracle Service Registry documentation:

<http://www.oracle.com/technetwork/middleware/registry/overview/index.html>

To update WSDL bindings:

1. Log in to Registry Control.
2. Click **Search > Business**.
3. Click **Add Name**.
4. In the **Name** field, enter a search criteria.
5. Click **Find**.
6. In the search results, click the business name that is displayed.
7. On the right side, click the **Services** tab.
8. From the list of services, click the service name.
9. At the bottom, click the **Edit** button.
10. On the right side, click the **Bindings** tab.
11. In the list of bindings, select the **notepad** icon next to the description column.
Oracle Service Registry is now in edit mode for bindings.
12. In the **Access Point** field, change the required URL, and save your changes.

Edit binding 'http://adc2180517.us.oracle.com:8013/soa-infra/services/P...'

Details

| | |
|--------------------|---|
| Binding Key | uddi:3126f7a0-9ce7-11df-9ee1-7d5e3ef09eda |
| Service Key | uddi:31040650-9ce7-11df-9ee1-7d5e3ef09eda |

Type Setup

Access point: http://myhost.us.oracle.com:8013/soa-infra/services/Part1/

Use type: other
http

Hosting redirector: _____

Description Language

wsdl:type representing port

33.4.4.1.1 To Update WSDL Binding Overview Documentation:

1. Within the Registry Control, click **Search**.
2. In the **tModel name** field, enter the name and click **Find tModel**.
3. In the **name** column, click the name with the description **wsdl:type representing portType**.
4. Ensure that WSDL details are shown correctly.
5. Click the **Edit** button.
6. On the right side, click the **Overview doc** tab.
7. Under the **Add description** button, click the **Edit** icon.
8. Enter the new URL.
9. Click **Update** and save the changes.

Edit tModel 'BPELProcess1'

Overview document

Overview URL: http://myhost.us.oracle.com:8001/soa-infra/services/de

Use type: wsdlInterface

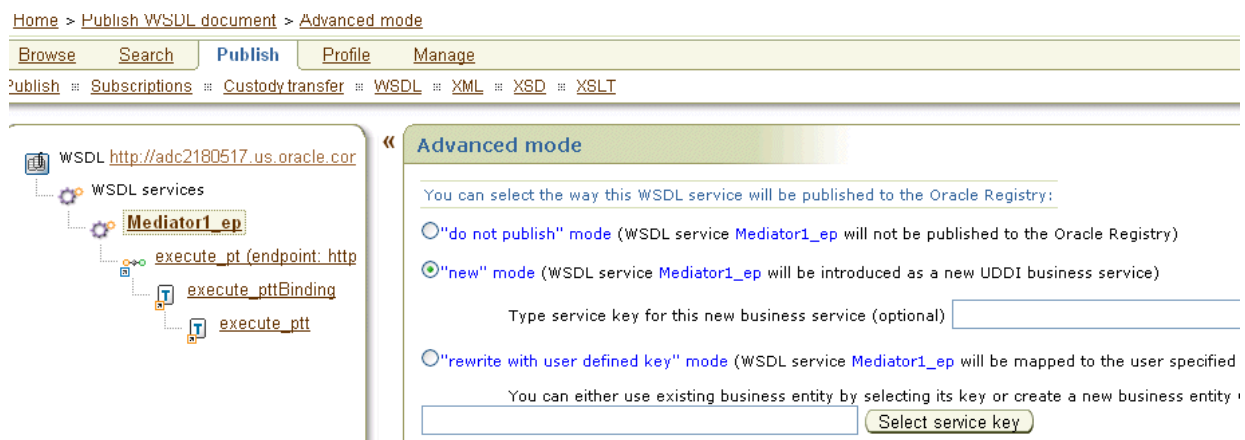
10. To verify, navigate to the service and ensure that the WSDL URL is pointing to a new location.

33.4.4.2 Publishing WSDLs from Multiple SOA Partitions

Follow these steps to publish WSDLs from multiple SOA partitions using the Registry Control, and access them using a separate `serviceKey` and bindings.

To publish WSDLs from multiple SOA partitions:

1. Log in to Registry Control.
 - `http://host:port/registry/uddi/web`
2. Publish the WSDL from the first partition.
3. Publish the WSDL from the second partition.
 - a. Click **Publish > WSDL**.
 - b. Enter values in the **Business key** and **WSDL location (URI)** fields.
 - c. Select the **Advanced Mode** checkbox.
 - d. Click **Publish**.
 - e. In the navigation tree in the left pane, select the endpoint, bindings, and port type, and ensure that the **"new" mode** option is selected.



- f. Click **Publish**.

33.4.5 How to Publish WSDLs to UDDI for Multiple Partitions

The following limitations exist for publishing WSDL services from Oracle Enterprise Manager Fusion Middleware Control.

- You cannot publish the same service with the same target namespace from different SOA partitions or from different hosts.
- There is no option for entering your own service key.

Instead, use the Registry Console to publish the same WSDL service deployed to different partitions to OSR.

To publish WSDLs to UDDI for multiple partitions:

1. Log in to the Registry Console.

2. Publish the WSDL of the first partition.
3. Rename the above-mentioned service name to a unique name.
4. Publish the WSDL of the second partition.

This creates two separate services in OSR.

Part XII

Administering Business Events

This part describes how to administer business events.

This part includes the following chapter:

- [Managing Business Events](#)

Managing Business Events

This chapter describes how to manage business events and the Event Delivery Network (EDN), including mapping the flow of different business events through different JMS destinations, testing the publishing of business events, viewing the event definition language (EDL) file of the business event, viewing service components subscribed to business events, changing the JMS type, and configuring the inbound poller thread number. 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 can subscribe to it. This chapter includes the following topics:

- [Introduction to the Event Delivery Network and JMS Provider Types](#)
- [Mapping Business Events to JMS Topic Destinations](#)
- [Testing the Publishing of Business Events and Viewing the EDL File](#)
- [Viewing Business Event Subscribers](#)
- [Resolving Duplicate Messages for Subscribers in Clustered Environments](#)
- [Changing the JMS Type](#)
- [Configuring the Inbound Poller Thread Number](#)

For information about troubleshooting business event issues, see [Business Events and Event Delivery Network Troubleshooting](#).

For information about creating business events in Oracle JDeveloper, see Using Business Events and the Event Delivery Network in *Developing SOA Applications with Oracle SOA Suite*.

34.1 Introduction to the Event Delivery Network and JMS Provider Types

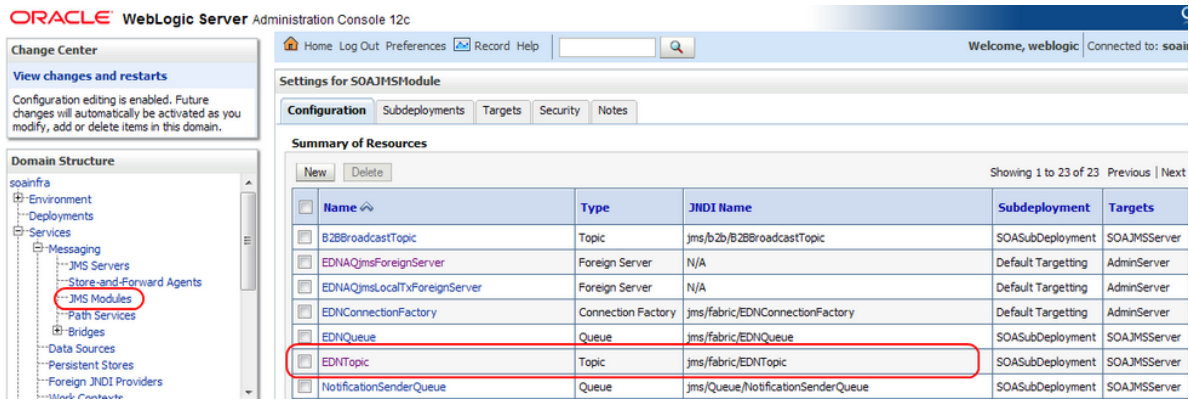
You create business events in Oracle JDeveloper and include them in SOA composite applications that you deploy to Oracle Enterprise Manager Fusion Middleware Control. Service components can subscribe to business events. When a business event is published, the entity subscribed to that event receives it.

EDN is the subsystem of Oracle SOA Suite that accepts published business events and delivers them to the subscribers. EDN uses a JMS topic as a back-end store. EDN provides two JMS-based types:

- Oracle WebLogic Server JMS

EDN uses a default Oracle WebLogic Server JMS topic as the underlying JMS store for all event types. [Figure 34-1](#) provides details.

Figure 34-1 JMS Topic of Oracle WebLogic Server JMS



The following JMS adapter connection factories are supported:

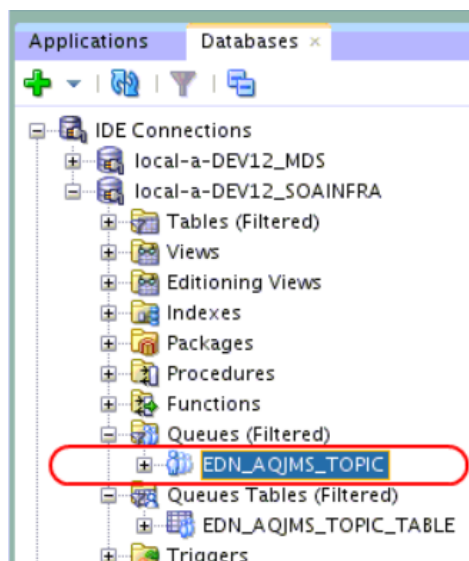
- **eis/wls/EDNxaDurableTopic** (supports XA, durable topic with **ClientID=edn_wljms_xa_client**)
- **eis/wls/EDNxaTopic** (supports XA)
- **eis/wls/EDNLocalTxDurableTopic** (supports local transaction, durable topic with **ClientID=edn_wljms_localtx_client**)
- **eis/wls/EDNLocalTxTopic** (supports a local transaction)

You can change the default JMS type. For information, see [Changing the JMS Type](#). You can also create custom JMS topics and specify certain event types of interest to map to the custom topics.

- Oracle Advanced Queueing (AQ) JMS

AQ JMS topics can also be created and used. EDN provides a preprovisioned AQ JMS topic out of the box. [Figure 34-2](#) provides details.

Figure 34-2 JMS Topic of Oracle AQ JMS



AQ JMS is exposed through a foreign server.

The following JMS adapter connection factories are supported:

- **eis/aqjms/EDNxaDurableTopic** (supports XA, durable topic with **ClientID=edn_aqjms_xa_client**)
- **eis/aqjms/EDNxaTopic** (supports XA)
- **eis/aqjms/EDNLocalTxDurableTopic** (supports local transaction, durable topic with **ClientID=edn_aqjms_localtx_client**)
- **eis/aqjms/EDNLocalTxTopic** (supports a local transaction)

The following JDBC data sources are supported:

- **jdbc/EDNDataSource** (supports XA)
- **jdbc/EDNLocalTxDataSource** (supports local transaction)

The following foreign servers are supported:

- **EDNAQjmsForeignServer** (supports XA)
- **EDNAQjmsLocalTxForeignServer** (supports local transaction)

Table 34-1 describes the benefits of both JMS provider types.

Table 34-1 Comparison Between JMS Provider Types

| Oracle WebLogic Server JMS | AQ JMS |
|---|---|
| <ul style="list-style-type: none"> • A file-based (file store) and file cached database backed (JDBC store) implementation. • When you have an application that runs in the same process space as the JMS server, it is always faster than AQ JMS. This is because AQ JMS always requires database round trips. • Does not provide SQL visibility of messages, so there is no language conversion cost. • In most low to medium scale and some high end (concurrency, throughput) JMS use cases, Oracle WebLogic Server JMS outperforms AQ JMS. This is because you usually compare different qualities of services when looking beyond what is expected from standard JMS (for example, crash recoverability, SQL visibility, full ordering, and disaster recovery). • Usually wins on a price and performance basis for most cases if you evaluate total cost. | <ul style="list-style-type: none"> • Oracle database access is inherently multithreaded through the use of multiple database connections (whereas Oracle WebLogic Server JMS storage is single threaded). If you have enough database connections to spare, AQ JMS does well at high concurrencies when compared to Oracle WebLogic Server JMS arriving at the same destination both in clustered (RAC in the AQ JMS' case) and nonclustered cases. • AQ JMS can short-circuit 2-PCs when Oracle database operations are involved in the XA transaction. Therefore, in cases in which the messaging cost is much lower when compared to the 2-PC cost required for using XA, AQ JMS does well. • AQ JMS does better than Oracle WebLogic Server JMS when large message sizes are involved, when there are large message backlogs, or when there are complex selectors. This is because the database offers indexing, LOB streaming, embedded rules engines, and lock management that are much better than what Oracle WebLogic Server JMS offers. • AQ JMS does well in an Exadata-Exalogic pairing because it makes better use of Exadata capabilities. Oracle WebLogic Server JMS becomes bottle necked because of the lower end storage nodes in Exalogic. |

Durable subscriptions are supported. This means that events are retained even if the subscriber is not up and running. Durable subscriptions continue to accumulate events. [Table 34-2](#) describes how nondurable and durable subscriptions are handled in the various life cycle states of the SOA composite application.

Table 34-2 Business Events and Composite Life Cycle States

| The Composite Is... | Effect on Nondurable Subscribers | Effect on Durable Subscribers |
|---------------------|--|--|
| Deployed | The subscriber is created and starts receiving events. | The subscriber is created, a durable subscription is registered, and the subscriber starts receiving events. |
| Undeployed | The subscriber is removed and stops receiving events. | The subscriber is removed, a durable subscription is unregistered, and the subscriber stops receiving events. |
| Redeployed | The durable subscription and subscriber are recreated. | The durable subscription and its subscriber are recreated. |
| Shut down | The subscriber stops receiving events. | The subscriber stops receiving events, but events continue to be queued (are not dropped) through durable subscriptions. |
| Started up | The subscriber starts receiving events. | The subscriber receives events, including those queued up prior to startup. |
| Retired | The subscriber stops receiving events. | The subscriber stops receiving events and events are not queued (are dropped). |
| Activated | The subscriber starts receiving events. | The subscriber start receiving events. |

34.2 Mapping Business Events to JMS Topic Destinations

You can map the flow of different business events through different JMS destinations in Oracle Enterprise Manager Fusion Middleware Control. This mapping can reduce business event bottlenecks caused by mapping all business events through a single destination. After installation, all business events are mapped by default to a single, local Oracle WebLogic Server JMS topic. You can manually create additional JMS topics and map business events to the topics appropriate to your performance needs.

Note the following best practices when mapping business events to JMS topics other than the default.

- Perform the mapping before messages flow into JMS topic destinations. This prevents existing events from flowing into old JMS topic destinations for which there are no subscribers.
- Restart the subscribing SOA composite applications or the SOA server after completing the mapping. This enables subscribers to be associated with the new JMS topic destination.
- Ensure that the JMS topic is configured in the Oracle WebLogic Server Administration Console. See [Creating an Oracle WebLogic Server JMS Topic](#) .

- Ensure that all JMS adapter connection factories are configured in the Oracle WebLogic Server Administration Console. See [Optionally Creating JMS Adapter Connection Factories for JMS](#).

34.2.1 Creating an Oracle WebLogic Server JMS Topic

To create an Oracle WebLogic Server JMS topic:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure**, go to **Services > Messaging > JMS Modules**.
3. In the **Name** column, click **SOAJMSModule**.
4. Click **New**.
5. Create a new topic.

ORACLE WebLogic Server Administration Console 12c

Home > Summary of Deployments > Summary of JMS Modules > **SOAJMSModule**

Create a New JMS System Module Resource

Back Next Finish Cancel

JMS Destination Properties

The following properties will be used to identify your new Topic. The current module is SOAJMSModule.

* Indicates required fields

* **Name:** MyCustomTopic

JNDI Name: jms/fabric/MyCustomTopic

Template: None

Back Next Finish Cancel

6. Target it to **SOAJMSServer**.

Home > Summary of Deployments > Summary of JMS Modules > SOAJMSModule

Create a New JMS System Module Resource

Back Next Finish Cancel

Select the subdeployment you want to use. If you select (none), no targeting will occur.

Subdeployments: SOASubDeployment Create a New Subdeployment

What targets do you want to assign to this subdeployment?

Targets :

| JMS Servers | |
|----------------------------------|---------------------|
| <input type="radio"/> | BPMJMSServer |
| <input checked="" type="radio"/> | SOAJMSServer |
| <input type="radio"/> | UMSJMServer |

34.2.2 Optionally Creating JMS Adapter Connection Factories for Oracle WebLogic Server JMS

It is typically unnecessary to create JMS Adapter connection factories because you can reuse the ones included with EDN installation. If you need to create connection factories (for example, for a separate management purpose), follow these steps.

To create JMS adapter connection factories for Oracle WebLogic Server JMS:

1. Log in to Oracle WebLogic Server Administration Console.
2. From the **Domain Structure**, select **soainfra > Environment > Deployments > JMS Adapter > Configuration > Outbound Connection Pools**.
3. Click **New**.
4. Provide the JNDI name (for example, `eis/wls/MyEdnWLjmsTopic`).
5. Save the new deployment plan.
6. Return to **JMS Adapter > Configuration > Outbound Connection Pools**, and click the newly created connection factory.
7. Provide values appropriate to your connection factory:

| Property Name | Property Value |
|--|---|
| AcknowledgeMode | Leave as AUTO_ACKNOWLEDGE . |
| ConnectionFactoryLocation | For XA, use weblogic.jms.XAConnectionFactory . For a local transaction, use weblogic.jms.ConnectionFactory . |
| FactoryProperties | For a durable topic, specify ClientID=your_client_ID . For a nondurable topic, leave this field blank. |
| IsTopic | Always true . |
| IsTransacted | For XA, use false . For a local transaction, use true . However, if the Oracle WebLogic Server JMS server is running in a local JVM (same JVM as the EDN/JMS adapter), set IsTransacted to false . |
| Password | Leave blank. |
| Username | Leave blank. |
| Transaction Support (in the Transaction tab) | Leave as XA Transaction . |

34.2.3 Creating an AQ JMS Topic

Open the Database Navigator (in Oracle JDeveloper) or SQL Developer as the `soainfra` user, and run the following script to create an AQ JMS topic:

```
define edn_user=soainfra_schema_user_here
define topic=your_custom_aqjms_topic_name_here (for example, EDN_AQJMS_TOPIC_2)
define topic_table=your_custom_aqjms_topic_table_here (EDN_AQJMS_TOPIC_
TABLE_2)

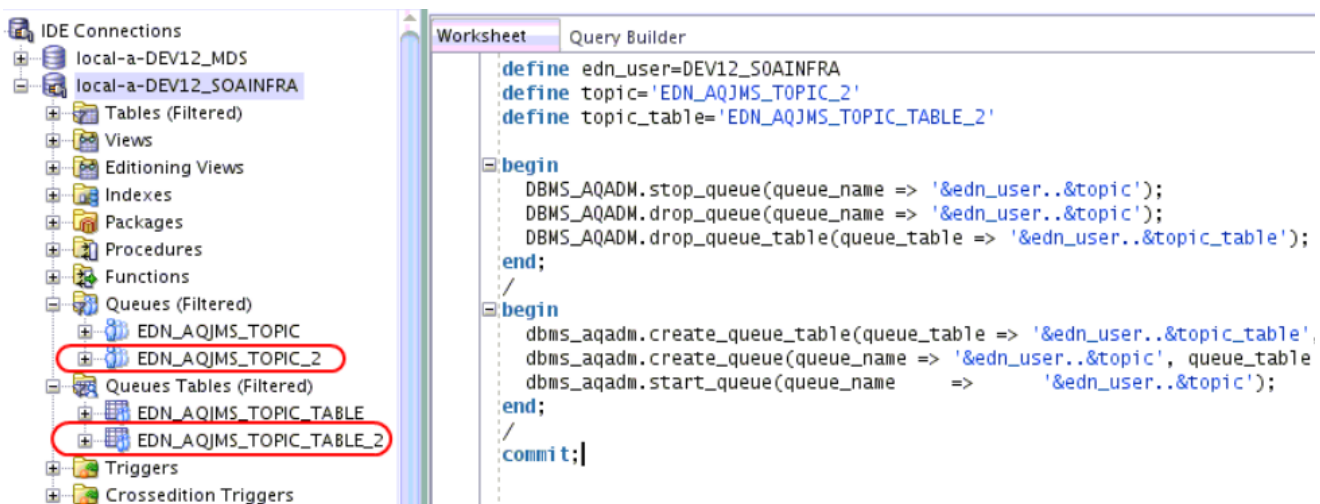
begin
  DBMS_AQADM.stop_queue(queue_name => '&edn_user..&topic');
  DBMS_AQADM.drop_queue(queue_name => '&edn_user..&topic');
```

```

DBMS_AQADM.drop_queue_table(queue_table => '&edn_user..&topic_table');
end;
/
begin
  dbms_aqadm.create_queue_table(queue_table => '&edn_user..&topic_table',
                                queue_payload_type => 'SYS.AQ$_JMS_MESSAGE',
                                multiple_consumers => true);
  dbms_aqadm.create_queue(queue_name => '&edn_user..&topic',
                           queue_table => '&edn_user..&topic_table',
                           max_retries => 256);
  dbms_aqadm.start_queue(queue_name => '&edn_user..&topic');
end;
/
commit;

```

The queue and queue table are created.



34.2.4 Exposing an AQ JMS Topic

If you created an AQ JMS topic in [Creating an AQ JMS Topic](#), you must expose the topic to Oracle WebLogic Server applications, including Oracle SOA Suite applications. Use Oracle WebLogic Server Administration Console to either create a new foreign server or update the existing foreign server **EDNAQjmsForeignServer** to add AQ JMS topic mapping:

To expose an AQ JMS topic:

1. Optionally create a new foreign service:
 - a. Log in to Oracle WebLogic Server Administration Console.
 - b. In the **Domain Structure**, go to **Services > Messaging > JMS Modules > SOAJMSModule**.
 - c. Click **New**, and select **Foreign Server**.
 - d. Name the foreign server, target it to the SOA server, and click **Finish**.
 - e. Open the new foreign server, and go to **Configuration > General**.
 - f. Set the following properties.

| Property | Value |
|-------------------------------------|---|
| JNDI Initial Context Factory | oracle.jms.AQjmsInitialContextFactory |
| JNDI Properties | For an EDN XA JDBC data source (for example, datasource=jdbc/EDNDataSource). For an EDN non-XA JDBC data source (for example, datasource=jdbc/EDNLocalTxDataSource). |

2. If you also create your custom JMS adapter connection factories for AQ JMS, then you must create a connection factory mapping:
 - a. Go to the **Configuration > Connection Factories** tab of this foreign server, and click **New**.
 - b. Provide the local JNDI name (which matches the value configured in the adapter's **ConnectionFactoryLocation**) and remote JNDI name, which is **XATopicConnectionFactory** for XA support.
 - c. If you must create another foreign server that uses a non-XA JDBC data source, set the remote JNDI name to **TopicConnectionFactory** for non-XA support.
3. Add mapping to the AQ JMS topic
 - a. Click **New** to create a new destination mapping in one of the newly created foreign servers or the existing foreign server **EDNAQjmsForeignServer**.
 - b. Map a local JNDI name to a remote JNDI name convention of **Topics/custom_aqjms_topic_name**.

34.2.5 Optionally Creating JMS Adapter Connection Factories for AQ JMS

It is typically unnecessary to create JMS adapter connection factories because you can reuse the ones included with EDN installation. If you must create connection factories (for example, for a separate management purpose), follow these steps.

To create JMS adapter connection factories for AQ JMS:

1. Log in to Oracle WebLogic Server Administration Console.
2. From the **Domain Structure**, select **soainfra > Environment > Deployments > JMS Adapter > Configuration > Outbound Connection Pools**.
3. Click **New**.
4. Provide the JNDI name (for example, `eis/wls/MyEdnAQjmsTopic`).
5. Save this new deployment plan.
6. Return to **JMS Adapter > Configuration > Outbound Connection Pools**, and click the newly created connection factory.
7. Provide values appropriate to your connection factory:

| Property Name | Property Value |
|------------------------|------------------------------------|
| AcknowledgeMode | Leave as AUTO_ACKNOWLEDGE . |

| Property Name | Property Value |
|--|---|
| ConnectionFactoryLocation | For XA, the value must match the local JNDI name of the connection factory that is mapped to XATopicConnectionFactory in the foreign server of EDNAQjmsForeignServer or your custom foreign server supporting XA. For a local transaction, the value must match the local JNDI name of the connection factory that is mapped to TopicConnectionFactory in the foreign server of EDNAQjmsLocalTxForeignServer or your custom foreign server supporting a local transaction. |
| FactoryProperties | For a durable topic, specify ClientID=your_client_ID . For a nondurable topic, leave this field blank. |
| IsTopic | Always true . |
| IsTransacted | For XA, use false . For a local transaction, use true . |
| Password | Leave blank. |
| Username | Leave blank. |
| Transaction Support (in the Transaction tab) | Leave as XA Transaction . |

34.2.6 Enabling a Remote Client to Interact with an AQ JMS-Based Topic

If an event type is mapped to the default EDN AQ JMS topic or a custom AQ JMS topic, EDN enables Oracle SOA Suite publishers and subscribers to interact with this event type through the AQ JMS topic. However, EDN does not enable remote publishers or subscribers to interact by default.

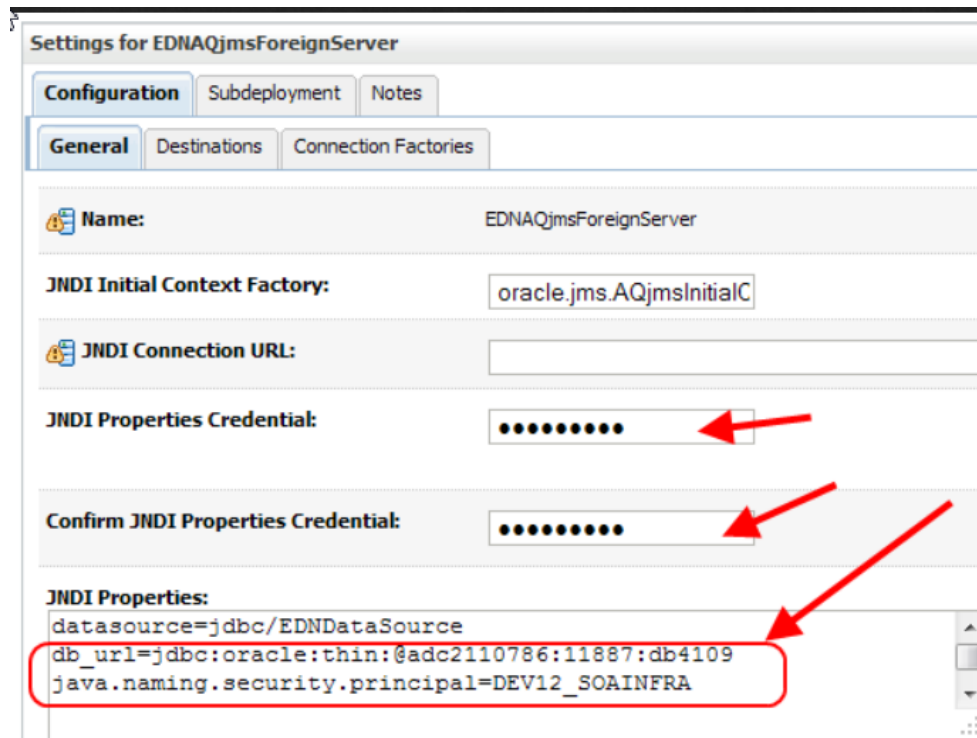
To enable remote publishers, subscribers, or both, the EDN foreign servers (either the one installed by EDN or the custom foreign servers) must have their JNDI properties and credential updated, as shown in [Table 34-3](#).

Table 34-3 JNDI Properties and Credentials

| Property Name | Property Value |
|-----------------------------------|--|
| JNDI Properties | Add: db_url=jdbc:oracle:thin:@host:port:service . java.naming.security.principal=soainfra_schema_user . |
| JNDI Properties Credential | Enter the password for oainfra_schema_user . |

[Figure 34-3](#) provides details.

Figure 34-3 Enable a Remote Client to Interact with an AQ- MS-Based Topic



34.2.7 Mapping Business Events to JMS Topic Destinations on the Business Events Page

You can map business events to JMS topic destinations on the Business Events page in Oracle Enterprise Manager Fusion Middleware Control.

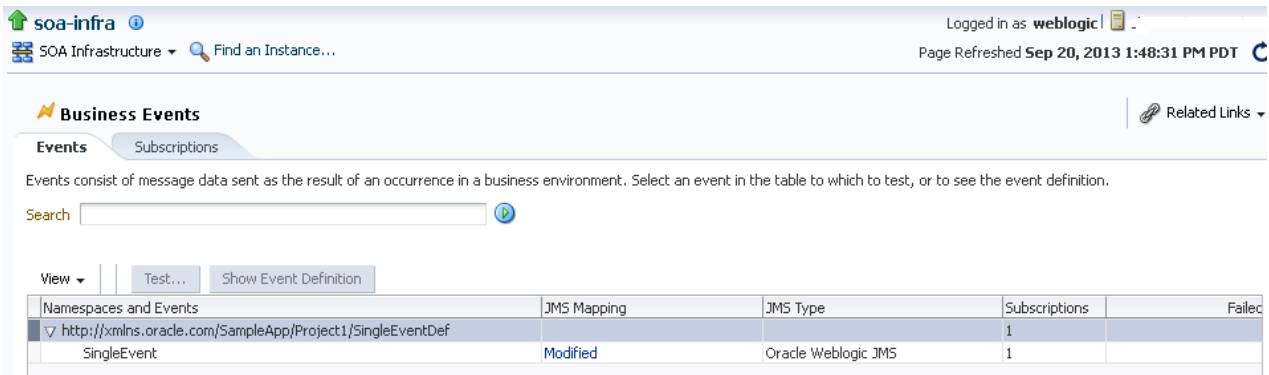
To map business events to JMS topic destinations on the Business Events page:

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

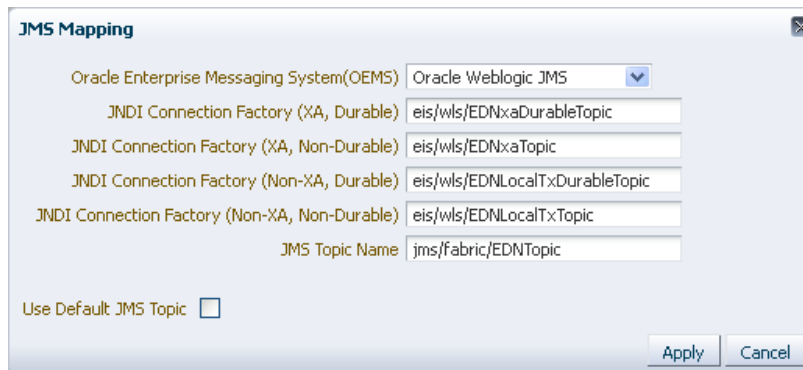
| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|-------------------------------------|--|
| Select Business Events . | Right-click soa-infra and select Business Events . |

The Business 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 **Help > Help For This Page** under the **weblogic** menu for details.
- Business events, including the namespace, event name, JMS type and mapping, number of subscriptions to each event, and number of failed event deliveries. Business events are contained within their namespace.



2. In the **JMS Mapping** column, view the supported JMS topic mapping for the event:
 - **Default:** Indicates that the business event is using the default JMS topic destination mapping. The default configuration consists of a single, local JMS topic destination that uses Oracle WebLogic Server JMS as the underlying provider.
 - **Modified:** Indicates that the business event is not using the default JMS topic destination mapping.
3. Click the JMS topic mapping type in the column. For example, if **Default** is selected, the following details are displayed. The connection factory settings that are initially displayed are automatically set during installation.



4. Enter values appropriate to your environment:

| Element | Description |
|--|--|
| Oracle Enterprise Messaging System (OEMS) | Select the underlying JMS provider: <ul style="list-style-type: none"> • Oracle WebLogic Server JMS (default provider) • Oracle Advanced Queuing JMS |

| Element | Description |
|--------------------------------|--|
| JNDI Connection Factory | <p>Specify connection factory details for the JMS adapter. EDN uses the JMS adapter to interact with JMS.</p> <p>For Oracle WebLogic Server JMS:</p> <ul style="list-style-type: none"> • <code>eis/wls/EDNxaDurableTopic</code> (supports XA, durable topic with <code>ClientID=edn_wljms_xa_client</code>) • <code>eis/wls/EDNxaTopic</code> (supports XA) • <code>eis/wls/EDNLocalTxDurableTopic</code> (supports local transaction, durable topic with <code>ClientID=edn_wljms_localtx_client</code>) • <code>eis/wls/EDNLocalTxTopic</code> (supports local transaction) <p>For Oracle AQ JMS:</p> <ul style="list-style-type: none"> • <code>eis/aqjms/EDNxaDurableTopic</code> (supports XA, durable topic with <code>ClientID=edn_aqjms_xa_client</code>) • <code>eis/aqjms/EDNxaTopic</code> (supports XA) • <code>eis/aqjms/EDNLocalTxDurableTopic</code> (supports local transaction, durable topic with <code>ClientID=edn_aqjms_localtx_client</code>) • <code>eis/aqjms/EDNLocalTxTopic</code> (supports local transaction) |
| JMS Topic Name | Specify the JNDI name of the JMS topic. |
| Use Default JMS Topic | <p>Select to reset all configuration fields to values to use the default JMS topic destinations provided during installation. The default configuration consists of a single, local JMS topic destination that uses Oracle WebLogic Server JMS as the underlying provider.</p> <p>However, if the default JMS type is changed to AQ JMS instead of Oracle WebLogic Server JMS, then the default configuration consists of a single, local JMS topic that uses Oracle AQ as the underlying provider.</p> |

5. Click **Apply** to close the dialog and display your selection in the **JMS Mapping** column.
6. Shut down and start up either of the following:
 - The impacted SOA composite applications on the Deployed Composites page of the SOA Infrastructure
 - The Oracle SOA Suite managed server

For more information, see the following documentation:

- [Introduction to the Contents of SOA Composite Applications](#)
- Chapter "Using Business Events and the Event Delivery Network" of *Developing SOA Applications with Oracle SOA Suite* for details about business events

34.3 Testing the Publishing of Business Events and Viewing the EDL File

You can test the publishing of business events and view the EDL file contents. The business event is defined using EDL. EDL is a schema used to build business event definitions.

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

From the SOA Infrastructure Menu...Select **Business Events**.**From the SOA Folder in the Navigator...**Right-click **soa-infra** and select **Business Events**.

The Business 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 **Help > Help for This Page** under the **weblogic** menu for details.
- Business events, including the namespace, the event name, the JMS type, the mapping between the business event and the JMS topic destination, the number of subscriptions to each event, and the number of failed event deliveries. Business events are contained within their namespace.

soa-infra | Logged in as weblogic | Page Refreshed Sep 20, 2013 1:48:31 PM PDT

Business Events | Events | Subscriptions

Events consist of message data sent as the result of an occurrence in a business environment. Select an event in the table to which to test, or to see the event definition.

Search

View

| Namespaces and Events | JMS Mapping | JMS Type | Subscriptions | Failed |
|--|-------------|---------------------|---------------|--------|
| <ul style="list-style-type: none"> http://xmlns.oracle.com/SampleApp/Project1/SingleEventDef <ul style="list-style-type: none"> SingleEvent | Modified | Oracle Weblogic JMS | 1 | |

2. In the **Namespaces and Events** column, select a specific event to test.
 - a. Click **Test** to test the selected event. This action enables you to publish a test event that subscribers can act upon.

The Test Event dialog appears.
 - b. Specify the XML payload to use in the test.

Test Event: Earthquake

Name Earthquake Namespace http://earthquake-event.oracle.com

XML Payload

```
<?xml version="1.0" encoding="UTF-8" ?><Earthquake
xmlns:ns1="http://earthquake.oracle.com" xmlns="http://earthquake.oracle.com">
<ns1:Magnitude>6.5</ns1:Magnitude>
<ns1:Longitude>231</ns1:Longitude>
<ns1:Latitude>712</ns1:Latitude>
<ns1:Depth>17</ns1:Depth>
<ns1:Timestamp>2013-10-08T17:05:58.971-07:00</ns1:Timestamp>
</Earthquake>
```

- c. Click **Publish**.

If publishing is successful, the following message is displayed.

The Event published successfully

3. In the **Namespaces and Events** column, select a specific event for which to display the EDL file.
 - a. Click **Show Event Definition** to display the EDL file for the selected event.



```

XML Definition: SingleEvent
Name SingleEvent Namespace http://xmlns.oracle.com/SampleApp/Project1/SingleEventDef

Event Definition(EDL)
<ns0:definitions targetNamespace="http://xmlns.oracle.com/SampleApp/Project1/SingleEventDef">
  <ns0:schema-import location=" ../Schemas/singleString.xsd"
    namespace="http://xmlns.oracle.com/singleString"/>
  <ns0:event-definition name="SingleEvent">
    <ns0:content element="ns1:singleString"/>
  </ns0:event-definition>
</ns0:definitions>

```

- b. Click **OK** to close the message.

34.4 Viewing Business Event Subscribers

When business events are published, service components can subscribe to them. You can view the service components that have subscribed to business events. Service component subscriptions are created in Oracle JDeveloper during design time and cannot be modified in Oracle Enterprise Manager Fusion Middleware Control.

All business events are applicable to the entire Oracle SOA Suite domain instead of the individual partitions of the publishers and subscribers. Business events are also displayed as separate entries in the flow trace of the business flow instance.

Note:

- 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 view business event subscribers:

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

From the SOA Infrastructure Menu...

- a. Select **Business Events**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
- b. Select **Business Events**.

2. Click **Subscriptions**.

The Subscriptions page displays the following details:

- A utility for searching for a specific subscription by specifying criteria and clicking **Search**. You can search based on the namespace or event name. Click **Help > Help for This Page** under the **weblogic** menu for details.
- The component subscriptions, including the event name, the namespace, the service component subscribing to the event, the SOA composite application, any optionally defined XPath filters, the consistency level (**Guaranteed** or **OneAndOnlyOne**), and the number of business events that failed to be delivered.

soa-infra | SOA Infrastructure | Find an Instance... | Logged in as weblogic | Page Refreshed Sep 20, 2013 1:48:31 PM PDT

Business Events | Related Links

Events | **Subscriptions**

The following list shows the components that have subscribed to an event.

Search

Event Namespace: All | Consistency Level: All

Event Name: All | XPath Filter:

Subscriber:

Search | Reset

View

| Event | | Subscription | | | | Failed Deliveries |
|-------------|---|--------------|----------------|--------------|-------------------|-------------------|
| Event Name | Namespace | Component | Composite | XPath Filter | Consistency Level | |
| SingleEvent | http://xmlns.oracle.com/SampleApp/Project1/SingleEventDef | BPESub | Project1 [1.0] | | OneAndOnlyOne | 0 |

3. In the **Subscription Component** column, click a service component to access its home page.
4. In the **Composite** column, click a SOA composite application to access its home page.

For more information about creating business events in Oracle JDeveloper, see Chapter "Using Business Events and the Event Delivery Network" of *Developing SOA Applications with Oracle SOA Suite*.

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.

34.5 Resolving Duplicate Messages for Subscribers in Clustered Environments

SOA composite subscribers can receive duplicate events in a multiple-node cluster. This occurs when EDN uses the default JMS type and topic (that is, Oracle WebLogic Server JMS). This occurs because the template used by Oracle SOA Suite installation defaults to a Uniform Distributed WebLogic JMS topic with a replicated (instead of partitioned) forwarding policy and does not support configuration of the forwarding policy.

To automatically configure an EDN JMS topic to be a partition-distributed topic in a clustered environment, change the EDN JMS topic from replicated to partitioned.

To change to the partitioned policy:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure**, select **soainfra > Services > Messaging > JMS Modules > SOAJMSModule**.
3. Click the distributed EDN topic (**dist_EDNTopic_auto**).
4. Go to **Configuration > General** tab.
5. In the dropdown list, change **Forwarding Policy** from **Replicated** to **Partitioned**.

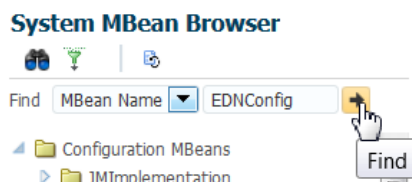
When set to `Partitioned`, the physical member receiving the message is the only member of the uniform distributed topic that is aware of the message. When a message is published to the logical name of a partitioned uniform-distributed topic, it only arrives at one specific, physical topic member. Once a message arrives at a physical topic member, the following occurs:

- The message is not forwarded to the rest of the members of the uniform distributed destination.
- Subscribers at other physical topic members do not receive a copy of the message.

34.6 Changing the JMS Type

You can change the default JMS provider type from Oracle WebLogic Server JMS to AQ JMS. or vice versa.

1. From the **SOA Infrastructure** menu, select **Administration > System MBean Browser**.
2. Click the **Search** icon, enter **EDNConfig**, and click **Find**.



3. Click **JmsType**.
4. Specify a value.
 - `WLJMS` (Oracle WebLogic Server JMS)
 - `AQJMS` (Oracle Advanced Queuing JMS)
5. Click **Apply**.
6. Restart the SOA server.

Note that you can only change the default JMS type mapped from an event type that does not have mapping to a custom JMS topic. Custom mapping (where an event type is mapped to a user-defined JMS topic) is not altered by this change.

34.7 Configuring the Inbound Poller Thread Number

For each subscriber, EDN spawns poller threads (defaults to one worker thread) for the underlying JMS consumer. You can change the number of inbound poller threads in either of two ways:

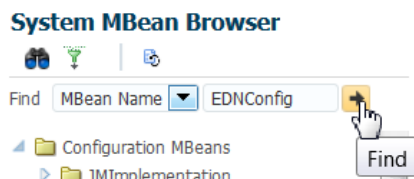
- [Updating the Global Inbound Poller Thread Number in the System MBean Browser](#)
- [Updating the Local Inbound Poller Thread Number Value at the Service Component Level](#)

34.7.1 Updating the Global Inbound Poller Thread Number in the System MBean Browser

You can update the inbound poller thread number at the SOA Infrastructure level with the (global) attribute **ThreadsPerSubscriber**.

To update the inbound poller thread number in the System MBean Browser:

1. From the **SOA Infrastructure** menu, select **Administration > System MBean Browser**.
2. Click the **Search** icon, enter **EDNConfig**, and click **Find**.



3. Click the **ThreadsPerSubscriber** attribute. Change the value from the default of 1 to an appropriate integer, and click **Apply**.

Attribute: ThreadsPerSubscriber Apply Revert Return

Information
The changes made on this mbean are not managed by the configuration session. The changes will be applied immediately. You cannot undo the changes from the Change Center.

MBean Name oracle.as.soainfra.config:Location=AdminServer,name=edn,type=EDNConfig,Application=soa-infra
Attribute Name ThreadsPerSubscriber
Description Number of inbound poller thread that SOA subscriber should use for processing events. Default value is 1.
Type int
Readable / Writable RW

Value

A confirmation message indicating that the **ThreadsPerSubscriber** attribute has been updated successfully is displayed. No restart of the SOA server or redeployment of SOA composite applications is necessary.

34.7.2 Updating the Local Inbound Poller Thread Number Value at the Service Component Level

You can update the local inbound poller thread number at the service component level with a System MBean property corresponding to the composite containing the event subscribing component (Oracle Mediator or BPEL process).

1. From the **SOA Infrastructure** menu, select **Administration > System MBean Browser**.
2. Select **Application Defined MBeans > oracle.soa.config > Server: Server_name > SCAComposite > composite_name > SCAComposite.SCAComponent > component_name**.
3. Expand the **Events** attribute.
4. Update the **numberOfPollerThreads** value. The default value is -1, which means that the global SOA Infrastructure level **EDNConfig** MBean's **ThreadsPerSubscriber** value takes effect for initializing EDN inbound poller threads for the subscriber. The updated **numberOfPollerThreads** value that you specify takes precedence over the global value.
5. Click **Apply**.
6. When the Confirmation message appears, click **Return**.
7. Switch to the **Operations** tab, and click **save**.
8. On the operation: save page, click **Invoke**.
A Confirmation message is displayed.
9. Restart the SOA composite application of interest, or restart the SOA server for the **numberOfPollerThreads** to take effect.

Part XIII

Administering Oracle BPMN Process Service Components and Engines

Learn how to administer Oracle BPMN Process Service Components and Engines.

- [Configuring Oracle BPMN Process Service Components and Engines](#)
- [Monitoring BPMN Process Service Components and Engines](#)
- [Managing Oracle BPMN Service Components and Engines](#)

Configuring Oracle BPMN Process Service Components and Engines

Learn how to configure the BPMN process service engine, including configuring properties used by the engine during processing of BPMN service components.

- [Configuring BPMN Process Service Engine Properties](#)
- [Integrating Oracle BPM with Oracle BAM 12c](#)
- [Integrating Oracle BPM with Oracle BAM 11g](#)

For more information about BPMN process tuning and performance properties, see *Tuning Performance*.

35.1 Configuring BPMN Process Service Engine Properties

Learn how to configure 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...

- a. Select **SOA Administration > BPMN Properties**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
 - b. Select **SOA Administration > BPMN Properties**.
-

The BPMN Service Engine Properties page displays properties for setting audit trail and large document thresholds, validating payload schema, and setting the audit trail level.

soa-infra

SOA Infrastructure

BPMN Service Engine Properties

Properties

Edit property values and click Apply.

* Audit Level

* Audit Trail Threshold (Byte) *

* Large Document Threshold (Byte) *

* Payload Validation

* Disable BPMN Monitors and Sensors

[More BPMN Configuration Properties...](#)

2. Make changes to the service engine properties that are appropriate to your environment.

| Property | Description |
|--|--|
| Audit Level | <p>Select one of the following options:</p> <ul style="list-style-type: none"> • Off: No logging is performed. Business flow instance tracking and payload tracking information are not collected. If measurement is enabled, then this level is overridden to Minimal. • Inherit (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. • Minimal: Instance tracking information is collected, but not payload details; no payload details are available in the flow audit trails. • Production: 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. • Development: Allows both the business flow instance tracking and payload tracking. However it may impact the performance. This level is useful mostly for debugging purposes. <p>Note: 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> |
| Audit Trail Threshold | <p>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 View XML link is shown in the audit trail instead of the payload.</p> |
| Large Document Threshold | <p>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.</p> |
| Payload Validation | <p>Select to enable validation of inbound and outbound messages. Nonschema-compliant payload data is intercepted and displayed as a fault.</p> <p>Note: 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> |
| Disable BPMN Monitors and Sensors | <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.
 - **AuditKeyExtents:** The extent size for the BPMN Audit Query ID generation. This value specifies the amount by which the BPMN Audit Query sequence will increase each time a new set of IDs are requested.

- **AuditUpdateBatchSize:** The batch size used when marking BPMN process audit information as aborted during undeployment.
- **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.
- **cleanupCompletedTask:** If set to false, **Me and my group** assignment filter and **Completed** status, get completed tasks. Default is `cleanupCompletedTask=true`, which cleans up table to show the completed tasks with **Me (previous)** assignment filter and **Completed** status at improved performance.
- **DebugIgnore:** Lists BPMN activities (localName only) that are ignored by the debugger agent. The BPMN activity names are separated by comma (,), semi-colon (;), or white space.
- **DisableProcessBroker:** If set to `false` the process broker service is enabled. The default value is `true`.
- **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.
- **MaxOptimizationDataToFetch:** Maximum depth of data to fetch from database for optimization features.

- **objectName:** The MBean's unique JMX name.
- **OERCredentialMapName:** Set the OER Credential map name here.
- **OERPublisherCsfKeyName:** Set the OER Credential map name to use when publishing the Business Architecture Project to OER.
- **OERServerURL:** The URL of the OER server including the port name. This server name is used for publishing assets to the OER.
- **OneWayDeliveryPolicy:** Changes whether the one-way invocation messages are delivered.
- **OptimizationDataUpdateInterval:** Attribute exposed for management.
- **OptimizationDisabledProcesses:** List of processes for which optimization features are disabled.
- **OptimizationEnabled:** Globally enable or disable the process optimization features. This must be set to true to enable the Process Monitor dashboard in Oracle Business Process Management Workspace.
- **PeopleQueryTimeout:** Specify quartz cron expression People Query. People Query in Logical People Group is reevaluated based on this cron expression.
- **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.
- **RecoveryConfig:** Set recovery configuration values.
- **RepositoryType:** Set the repository type to use for Business Architecture Reports. Possible values are `RDFRepository` or `OERRepository`. OER specific parameters are used only when `OERRepository` type is specified.
- **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.
- **TimeEstimationToBamUpdateInterval:** The time interval in seconds in which the process instances estimated completion times are populated in BAM.
- **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.
- **Visible:** If set to `true`, this MBean is visible to the current user.

35.1.1 Configuring the BPMN Service Engine for Process Monitoring

Process monitor dashboards in Oracle Business Process Management Workspace allow you to monitor and optimize process execution by identifying bottlenecks and other performance problems.

To configure support for process monitor dashboards:

1. Access BPMN Service Engine Properties as described above, click **More BPMN Configuration Properties...** and set the **OptimizationEnabled** property to `true`.
2. Locate the **AnalyticsConfig:analytics** mbean. In the System MBean Browser click **Filter** (View and configure the filters applied to the mbean browser).
3. In the **Filtering Settings** dialog, specify the **MBean Pattern Filter** as `oracle.as.soainfra.config:name=analytics,*`.
4. Set **DisableAnalytics** to `false`.
5. Set **DisableProcessMetrics** to `false`.
6. Click **Apply**.

35.2 Integrating Oracle BPM with Oracle BAM 12c

When a BPM composite with enabled measurements (either standard or user-defined) is created, composite specific derived physical and logical data objects are created in Oracle Business Activity Monitoring (Oracle BAM) 12c.

These data objects have the columns for standard metrics and user-defined metrics.

35.2.1 Physical Data Objects

Composite specific process physical derived data object

Name: `ORACLE_PROCESSANALYTICS_<COMPOSITE>_PROCESS`

Display Name: `oracle/processanalytics/<COMPOSITE>/Process (physical)`

Composite specific activity physical derived data object

Name: `ORACLE_PROCESSANALYTICS_<COMPOSITE>_ACTIVITY`

Display Name: `oracle/processanalytics/<COMPOSITE>/Activity (physical)`

35.2.2 Logical Data Objects

Composite specific process logical data object

Name: ORACLE_PROCESSANALYTICS_<COMPOSITE>_BPM_PROCESS

Display Name: oracle/processanalytics/<COMPOSITE>/Process

Composite specific activity logical data object

Name: ORACLE_PROCESSANALYTICS_<COMPOSITE>_BPM_ACTIVITY

Display Name: oracle/processanalytics/<COMPOSITE>/Activity

35.2.3 Process Star Schema Database Views

In a BPM composite, if the user has defined *Analytics View Identifier* for the composite, then synonyms to composite specific physical data object views are generated. These views are used to get SQL access to process analytics data. The naming convention of the view synonyms are:

BPM_FV_PRCS_<IDENTIFIER>_V - composite specific process fact

BPM_FV_ACTV_<IDENTIFIER>_V - composite specific activity fact

where <IDENTIFIER> is the *Analytics View Identifier* defined in the composite.

In addition to the creation of composite specific fact data objects in Oracle BAM 12c, the standard dimension data objects, such as COMPOSITE_DEFINITION, ACTIVITY_DEFINITION, PROCESS_DEFINITION, TASK_DEFINITION, ROLE_DEFINITION, and so on, are also populated with appropriate metadata information from the composite.

35.2.4 Task 1: Enable Oracle BPM Data Publish to Oracle BAM 12c

To do this task, you use the Oracle Enterprise Manager Fusion Middleware Control.

To enable Oracle BPM Data Publish to Oracle BAM 12c:

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. Click **Analytics**.

To the right, set **disableProcessMetrics** to *false*. (Default is *true*.)

 **Note:**

The `ProcessMetrics` target can be enabled only if an Oracle BAM 12c server is detected.

5. Click **Save** and **Submit**.

 **Note:**

If a new BPM composite configured with measurement is deployed before enabling `ProcessMetrics`, or when the Oracle BAM 12c server is down; then all data publishing to Oracle BAM 12c Process Star Schema from such composites is permanently disabled (even if Oracle BAM 12c comes up later). This is because some mandatory artifacts, required for allowing runtime analytics population, could not be created in Oracle BAM 12c during composite deployment time. In order to allow such composites to publish data to Oracle BAM 12c Process star schema, they must be redeployed when Oracle BAM 12c is up.

35.3 Integrating Oracle BPM with Oracle BAM 11g

Learn how to integrate Oracle BPM with Oracle BAM 11g.

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 BAM 11g, you perform these tasks:

- [Task 1: Configure the Oracle BAM Adapter on Server](#)
- [Task 2: Enable Oracle BPM Data Publish to Oracle BAM 11g Monitor Express](#)

35.3.1 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 BAM with Oracle SOA Suite composite applications, see *Developing SOA Applications with Oracle SOA Suite*.

35.3.2 Task 2: Enable Oracle BPM Data Publish to Oracle BAM 11g Monitor Express

To do this task, you use the Oracle Enterprise Manager Fusion Middleware Control.

To enable Oracle BPM data publish to Oracle BAM 11g Monitor Express:

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. Click **Analytics**.
To the right, set **disableMonitorExpress** to *false*. (Default is *true*.)
5. Click **Save** and **Submit**.

36

Monitoring BPMN Process Service Components and Engines

Learn how to monitor BPMN process service components and service engines, including viewing the audit trail and process flow, monitoring request and thread performance statistics, and monitoring deployed BPMN processes.

- [Viewing the Audit Trail and Process Flow of a BPMN Process Service Component](#)
- [Monitoring BPMN Process Service Engine Performance Statistics](#)
- [Monitoring Deployed BPMN Processes in the Service Engine](#)

For more information, see the following sections:

- [Introduction to Service Components](#)
- [Introduction to Service Engines](#)

36.1 Viewing the Audit Trail and Process Flow of a BPMN Process Service Component

Learn how to view the audit trail and process flow of a BPMN process service component in a business flow instance.



Note:

- This section assumes a business flow instance has been initiated. If not, see [Initiating a Test Instance of a Business Flow](#) 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:

From the SOA Infrastructure Menu...

- a. Select **Home > Deployed Composites**
- b. In the **Composite** section, select a specific SOA composite application.

From the SOA Folder in the Navigator...

- a. Under **soa-infra**, select a specific SOA composite application.

The Dashboard page for the selected composite application appears.

2. Click the **Flow Instances** tab.

Use one of the following methods to select an instance of the application:

- For recent instances of this application, click the **Recent Instances** link.
- For instances with faults, click the **Instances With Faults** link.
- For recoverable instances, click the **Recoverable Instances** link.

A Search page appears.

Search Options + ▾

Instances Within a Time Range Search

Add/Remove Filters

Time (Options...) Custom time period

Instance Created

Last* Hours ▾

Composite

Participating ▾

State Active ▾

Fault

Enter your search criteria and click **Search** to display a list of instances.

MsgRecovery3 [1.0] ⓘ

SOA Composite ▾

Active | Retire ... | Shut Down... | Test ▾ | Settings... ▾ |

Dashboard | Composite Definition | **Flow Instances** | Unit Tests | Policies

Search Results - Instances Created (24 Weeks)

Actions ▾ | View ▾ |

| Flow ID | Initiating Composite | Flow State | Created | Last Updated |
|---------|----------------------|------------------|-------------------------|-------------------------|
| 10161 | MsgRecovery3 [1.0] | → Running | Jan 29, 2014 4:40:32 AM | Jan 29, 2014 4:40:32 AM |

3. Highlight the required instance and click **Show Details** to display additional information about the instance in a table containing the following tabs:
 - The **Faults** tab shows the faults occurring in the services, service components, and references that comprise the SOA composite application. Information includes, *Error Name*, *Fault Name*, *Fault Owner*, *Fault Time*, *Recovery*, and so on. Use the **View** option to select the columns to display.
 - The **Composite Sensor Values** tab displays details about composite sensors included in the service and reference binding components of the SOA composite application. 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.

- The **Composites** tab shows the sequence of the composites through the flow.
4. Click the Flow ID of the selected instance to display the Flow Trace page.

Flow Trace

This page shows the flow of the message through various composite and component instances.

Flow ID **10145**

Started **Feb 21, 2014 12:1**

Faults
Composite Sensor Values
Composites

Recover ▾ View ▾
Flow Instance

| Error Message | Fault Owner | Fault Time | Recovery |
|---|-------------|--------------------------|------------------|
| exception.code:36335 exception.type: ERROR exception. | BRProcess | Feb 21, 2014 12:11:09 AM | Recovered |

Columns Hidden 8

Trace
Show Instance IDs

Actions ▾ View ▾

| Instance | Type | Usage | State | Time | Composite |
|-------------------|-----------|-----------|------------------|--------------------------|--------------------------|
| BRProcess.service | Service | Service | Completed | Feb 21, 2014 12:11:09 AM | BusinessRulesFault [1.0] |
| BRProcess | BPMN | BPMN | Recovered | Feb 21, 2014 12:11:09 AM | BusinessRulesFault [1.0] |
| WriteToFile | Reference | Reference | Completed | Feb 21, 2014 12:11:09 AM | BusinessRulesFault [1.0] |
| OradeRules2 | Decision | Decision | Failed | Feb 21, 2014 12:11:09 AM | BusinessRulesFault [1.0] |
| WriteToFile | Reference | Reference | Completed | Feb 21, 2014 12:11:09 AM | BusinessRulesFault [1.0] |

The flow trace is a runtime trail of a message flow identified by a Flow ID that is displayed in the upper right corner of the page. The Flow ID 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.

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.

5. Select a fault in the **Faults** section.
This highlights the row in the **Trace** section in which the fault occurred.
6. Close the fault to clear the selection in the **Trace** section.
7. Expand the **Composite Sensor Values** tab to display composite sensors.
8. Select a sensor in the **Composite Sensor Values** tab.

This highlights the row in the **Trace** section in which the composite sensor data was collected.

9. 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.

Flow Trace > Instance of BRProcess

Data Refreshed Fri Feb 21 0

Instance of BRProcess

This page shows BPMN process instance details.

Instance ID **11248**Started **Feb 21,****Audit Trail**

| Activity | Status | Start | End | Location |
|--|--------------------|--------------------------|--------------------------|------------|
| Start Start | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| WriteFaultTypeToFile WriteFaultType | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| Is Replay Is Replay | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| BusinessRuleTask BusinessRuleTask | Activity fault | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| BusinessRuleTask BusinessRuleTask | Instance fault | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | |
| BoundaryEvent BoundaryEvent | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| WriteFaultToFile WriteFaultToFile | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| IS Replay End IS Replay End | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |
| End End | Activity completed | Feb 21, 2014 12:11:09 AM | Feb 21, 2014 12:11:09 AM | /BRProcess |

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 business flow 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, 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.

When you first open the Instance page, the **Audit Trail** process instance details are displayed in a table by default. It provides execution details about the activities in the BPMN process. You can use the drop down to view the details as a list, tree, or graphical view. If you choose to view by list, you can also choose the types of processes to view. You can select All, Human Activities, Service Activities, Business Rules Activities, Sub-processes, Events, Gateways, Script Activities and Other Activities.

The List table includes the following information:

| Column | Description |
|-----------------|---|
| Activity | Lists all the BPM constructs available in a process in the order they are executed. These include: <ul style="list-style-type: none"> • Events: start, end, signal, throw, catch message. • Activities: user task, business rules task, service task, call activity, subprocess. • Gateways: inclusive, exclusive, parallel, event based, and complex. |
| Status | Displays the status of the activity, such as <i>Instance Suspended</i> , <i>Instance Fault</i> , <i>Activity Fault</i> , <i>Activity Completed</i> , and so on. |
| Start | Time stamp showing when the activity started. |
| End | Time stamp showing when the activity ended. |

| Column | Description |
|----------|-------------------------------------|
| Location | Shows the location of the activity. |

You can also view **Audit Trail** in **Tree View**. When you view Audit Trail in a tree view, both interrupting and non-interrupting timers appear in the tree structure. If it is an interrupting timer, the due date appears on the node that is going to be interrupted at expiration.

| Timer Scheduling Type | Non-Interrupting | Interrupting |
|---------------------------|---|--|
| Event Sub-process | Timer scheduling node appears at the process or sub process level that this timer could be trigger. | Due Date is set to the node that can be closed if that timer is fired. |
| Boundary Timer | Timer scheduling node appears at the activity or sub process level that this timer is bounded to. | Due Date is propagated to the node that can be closed, cancelled if this timer is fired. |
| Intermediate Timer | FLOW_NODE_IN event represents scheduling and FLOW_NODE_OUT finishing. | No due date is propagated. |

36.2 Monitoring BPMN Process Service Engine Performance Statistics

You can monitor pending and active requests as well as thread performance statistics for all BPMN process service components running in the service engine.

To monitor BPMN process service engine requests and thread statistics:

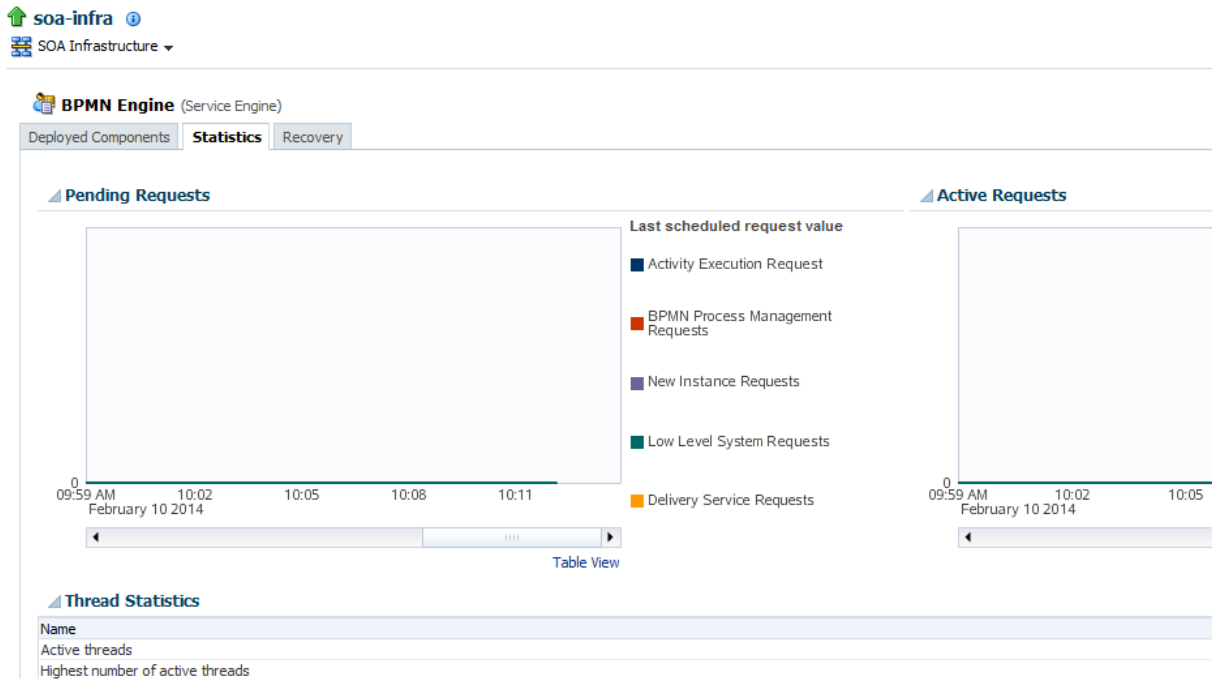
1. Access this page through one of the following options:

| From the SOA Infrastructure Menu... | From the SOA Folder in the Navigator... |
|--|--|
| a. Select Service Engines > BPMN . | a. Right-click soa-infra . |
| | b. Select Service Engines > BPMN . |

2. Click the **Statistics** tab.

The Statistics page displays the following details.

- Pending requests in the service engine. Use this graph to view backlogged requests waiting to be fulfilled.
- Active requests in the service engine. Use this graph to get an idea of the current service engine load. Most requests are processed instantaneously so only under extreme load conditions should there be data shown in the graph.
- Thread statistics for the service engine. Use this table to view details about thread performance in the BPMN process service engine. Details include the number of threads used for the performance category (for example, number of active threads, highest number of active threads, and so on).



For more information about BPMN process tuning and performance properties, see *Tuning Performance*.

36.3 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.



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...

- a. Select **Service Engines > BPMN**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
- b. Select **Service Engines > BPMN**.

2. Click the **Deployed Components** tab.

soa-infra  SOA Infrastructure ▾

BPMN Engine (Service Engine)













Deployed Components Statistics Recovery

Search

Name

Composite Name

View ▾

| Name | Composite |
|--|---|
|  ComplexGWProcess | CmplxGatewayActivationCon [1.0] |
|  Process | FCScriptTask [1.0] |
|  CallingProcess | CmplxGatewayActivationConCallable [1.0] |
|  CallingProcess | IntMsgOnBoundary [1.0] |
|  MainProcess | IntMsgOnBoundary [1.0] |
|  MainProcWithEvSP | UpdateTaskInEvSP [1.0] |
|  ProcessWithEvSPUT | EventSubprocUserTask [1.0] |
|  SuspendAtCallActivityWithMsgProc | SuspendAtCallActivityWithMsg [1.0] |
|  SignalThrower | CatchSignalIncallable [1.0] |
|  MainProc | CatchSignalIncallable [1.0] |
|  SignalThrowe | IntSignalOnBoundary [1.0] |
|  IntSignalBoundaryProcess | IntSignalOnBoundary [1.0] |

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, and the current status.

To access the home page of a specific service component, click the specific service component in the **Name** column.

To access the home page of a specific SOA composite application, click the specific SOA composite application in the **Composite** column.

Managing Oracle BPMN Service Components and Engines

Learn how to manage BPMN process service components and service engines.

- [Managing BPMN Process Service Component Policies](#)
- [Performing BPMN Process Service Engine Message Recovery](#)
- [Migrating Instances Between Different Composite Application Revisions](#)

37.1 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.



Note:

Before attaching policies, see *Administering 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...

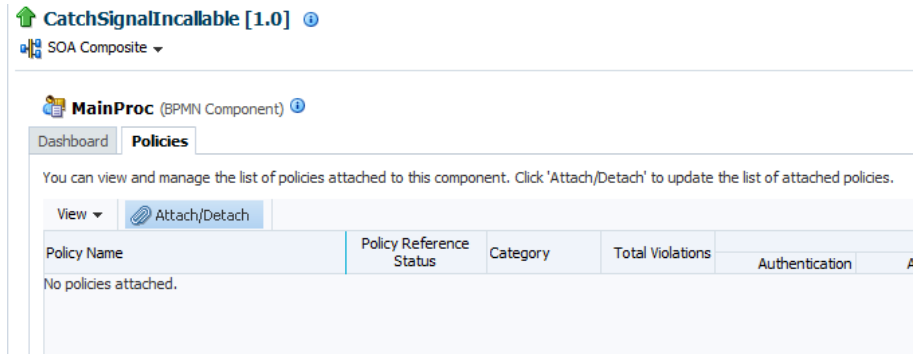
Select **Service Engines > BPMN**.

From the SOA Folder in the Navigator...

- a. Select **soa-infra**.
 - b. Right-click and select **Service Engines > BPMN**.
-

2. Go to the **Composites** column of the View table and select a specific SOA composite application to access its Dashboard page.
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:

- [Introduction to Policies](#)
- [Managing SOA Composite Application Policies](#) for the dialogs that display during policy attachment.
- *Administering Web Services* for definitions of available policies and details about which ones to use for your environment.

37.2 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...

- a. Select **Service Engines > BPMN**.

From the SOA Folder in the Navigator...

- a. Right-click **soa-infra**.
- b. Select **Service Engines > BPMN**.

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.

soa-infra SOA Infrastructure

BPMN Engine (Service Engine)

Deployed Components | Statistics | **Recovery**

If a message is marked as Recoverable, you can recover or cancel it. You can recover or cancel multiple messages in a batch. Select the messages:

Search

Type: Composite Name:

Duration: Component Name:

Message State:

Select View

| Conversation ID | Recovery | Component | Composite |
|---|----------|-------------------------|------------------------|
| urn:uuid:50f8a1e9-297c-4b31-aa4d-a1... | | ServiceTaskFaultProcess | serviceTaskFault [1.0] |
| urn:uuid:d77eef5d-b599-4956-b968-6c... | | ServiceTaskFaultProcess | serviceTaskFault [1.0] |
| urn:uuid:5111ea93-2331-4e9b-8a8c-0f... | | Async | MsgRecovery [1.0] |
| urn:uuid:9a0a90b2-0977-4690-bf7b-10... | | Async | MsgRecovery [1.0] |
| urn:uuid:60607f15-82fa-4df3-8c00-09c... | | Async | MsgRecovery [1.0] |
| urn:uuid:f8f1b622-5e0d-446c-ad8a-a6... | | Process | ActivityRecovery [1.0] |

3. Select a fault in the table.
4. Select one of the following options:

| Action | Description |
|-----------------------|---|
| Recover | 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 Recover 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. |
| Mark Cancelled | 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.

37.3 Migrating Instances Between Different Composite Application Revisions

Instance migration between revisions is based on flow instances instead of composite instances. For a set of flow instances and a composite type, all instances of the composite in each flow are migrated. A flow migration first obtains the component instances for the flow instance and composite type from each of the composite's associated service engines. The service engine is then requested to migrate each of those component instances, one at a time.



Note:

This feature is only applicable to Oracle BPMN projects that do not include asynchronous BPEL processes.

The reasons for migrating flow 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 flow instances that run for months or years. Because of this:
 - Changes may need to be applied while the flow 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 flow instance migration:

- Both composite revisions must be deployed.
- Only running flow instances can be migrated. You cannot migrate completed, suspended, or faulted flow instances, except for Oracle Mediator, which can be in a faulted state and still successfully migrated.
- Only compatible flow 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 flow instance. You typically operate on batches of flow instances related to a specific composite. Each flow instance is bound to a single transaction. Migration of one or more flow instances can fail without failing the entire batch.

Two migration methods are supported:

- Automatic migration: For trivial changes between revisions. Each flow instance is bound to a single transaction. You can migrate a batch of flow 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.

37.3.1 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 flow instance is not eligible for migration. The SOA composite application flow instance is only migrated if the associated service component flow 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 flow instances. Flow instance tracking data is migrated to the new revision.

The flow instance must have at least one active component instance of the following states:

- Running
- Recovery required
- Suspended

[Table 37-1](#) describes how the following service component flow instances are migrated to a new flow instance. If not compatible, the overall flow instance migration is reported as incompatible, and you cannot migrate it.

Table 37-1 Service Component Flow Instance Migration Details

| Service Component | Supported Migration Types | Migration Restrictions |
|-------------------|--|--|
| BPEL process | Automatic migration of BPEL process flow instances to a new revision | <ul style="list-style-type: none"> 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. Only completed component flow instances are migrated. |
| Oracle Mediator | Automatic migration of Oracle Mediator flow instances to a new revision | <p>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.</p> <p>Instances must be in one of the following states: completed successfully, faulted, or terminated by user.</p> |
| Human workflow | Automatic migration of human workflow flow instances to a new revision | None (all running and completed instances are migrated). |
| Business rules | Automatic migration of business rules to a new revision (there is no concept of rules flow instances) | None. |
| Oracle BPM | Both manual (through use of a migration plan) and automatic migration of Oracle BPM flow instances to a new revision | <p>You cannot migrate flow instances between incompatible models. Examples of incompatible flow instances include:</p> <ul style="list-style-type: none"> Removing or changing the behavior of a subprocess Changing the levels of any activities Removing gateways (except exclusive gateways) Changing the interface Adding or removing a boundary event on any activity <p>Adding or removing activities means you must manually migrate them with a migration plan.</p> |



Note:

Flow instance migration fails for an instance that includes an Oracle Mediator service component with parallel routing rules and an Oracle BPMN service component.

37.3.2 Migrating Instances with the ant Script

You must create an ant script to perform a migration. The script must import the `Middleware_Home/soa/bin/ant-flow-instance-migration.xml` script.

You can get help to create your ant script with the following command:

```
ant -f Middleware_Home/soa/bin/ant-flow-instance-migration.xml help
```

The following elements are supported:

- `locatorConfig`: defines locator configuration
- `locatorSession`: represents locator session
- `flowInstanceFilterDef`: filter that selects the flow instances to migrate. This element supports the following attributes:
 - `id` (required)
 - `compositeDN` (required)
 - `flowId`
 - `pageStart`
 - `pageSize`
 - `tenantId`
 - `maxCreationDate`
 - `minCreationDate`
 - `maxModifyDate`
 - `minModifyDate`
 - `like`
 - `ecid`
 - `conversationId`
 - `compositeName`
 - `domainName`
 - `label`
 - `revision`
 - `title`
- `generateFlowMigrationReport`: synchronously generates flow migration report
- `migrateFlowInstances`: synchronously migrates flow instances

The code sample below shows an example of the `ant-flow-instance-migration.xml` script.

```
<?xml version="1.0" encoding="iso-8859-1"?>
<project name="migration-test1" basedir="." default="test">
  <property name="env" environment="env" value="env"/>
  <property name="mw.ora.home" value="${env.MW_ORA_HOME}"/>
  <import file="${mw.ora.home}/bin/ant-flow-instance-migration.xml"/>
  <property name="reports.dir" value="${baseDir}/reports"/>
</project>
```

```

<locatorConfig id="c1" host="localhost" port="7001" user="weblogic"
password="weblogic1"/>

<target name="test">
  <flowInstanceFilterDef
    id="f3"
    compositeDN="default/SubProcess!1.0"/>
  <locatorSession configId="c1">
    <generateFlowMigrationReport filterId="f3"
      revision="2.0"
      outputFile="{reports.dir}/
      migrationReport.html"/>

    <migrateFlowInstances filterId="f3"
      revision="2.0"
      migrationPlan="{basedir}/
      TaskRemovedInSubprocess-plan.xml"
      outputFile="{reports.dir}/
      migrationResult.html"/>

  </locatorSession>
</target>
</project>

```

37.3.3 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 37-1 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 37-1 Oracle BPM Instance Flow for Revision 1.0

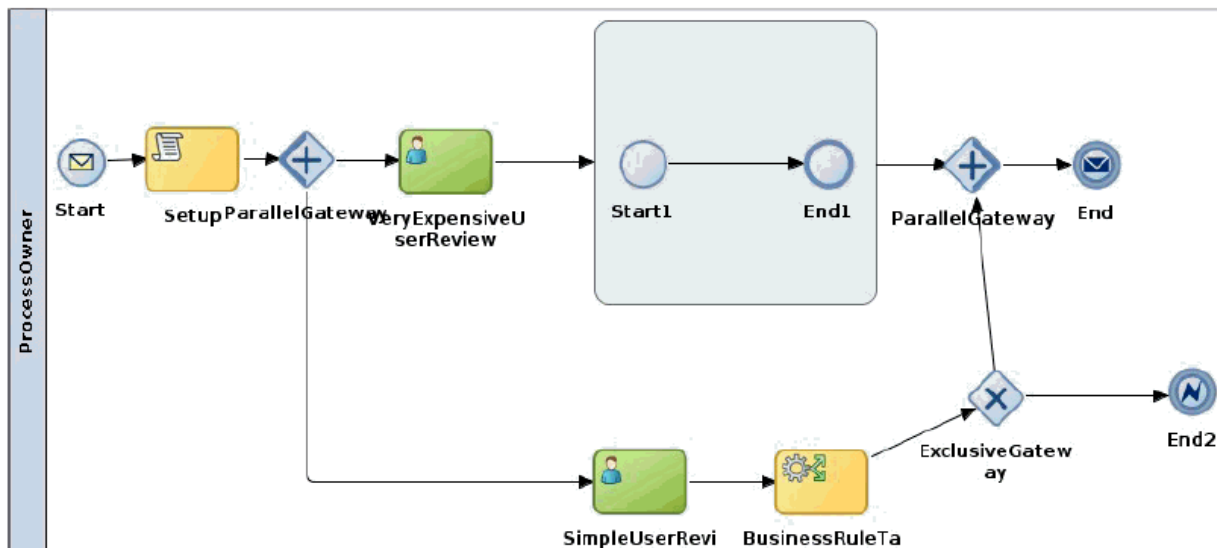


Figure 37-2 shows revision 1.0 of the composite in the SOA Composite Editor.

Figure 37-2 Composite Application for Revision 1.0

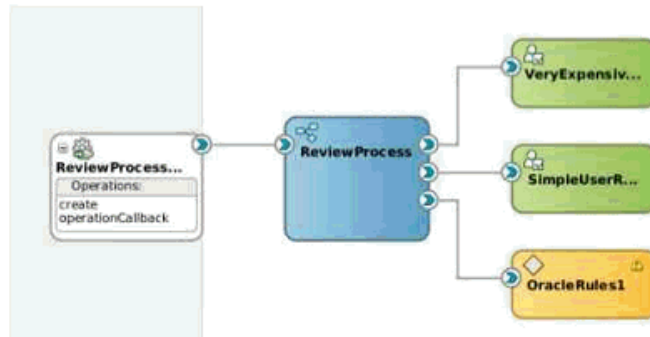


Figure 37-3 shows the improved instance flow for revision 2.0 of the composite application.

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 37-3 Oracle BPM Instance Flow for Revision 2.0

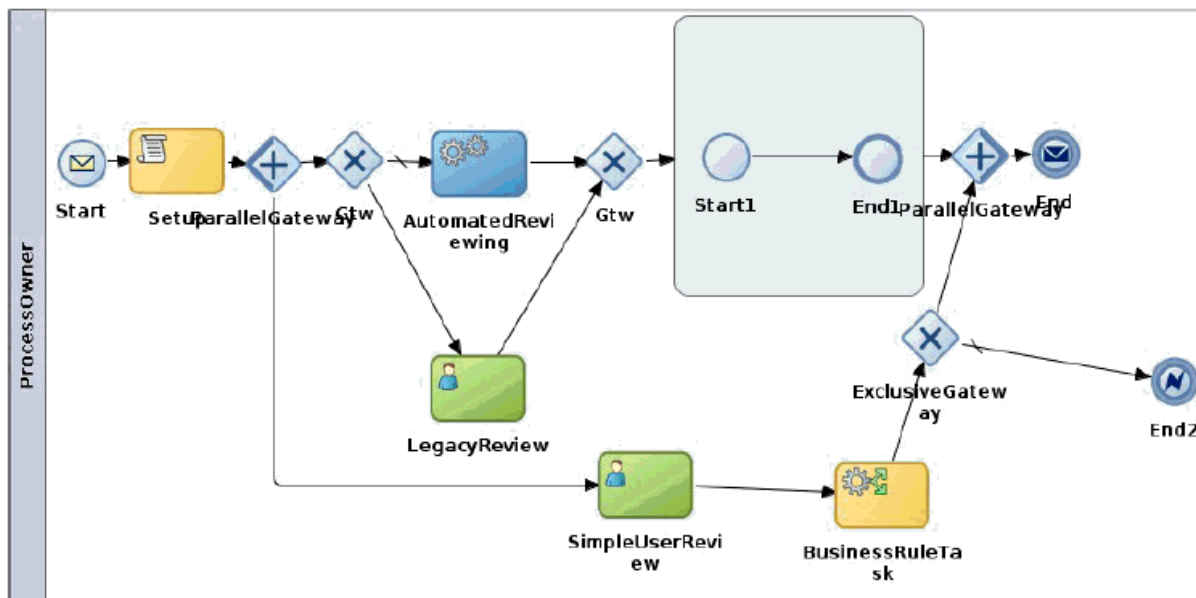
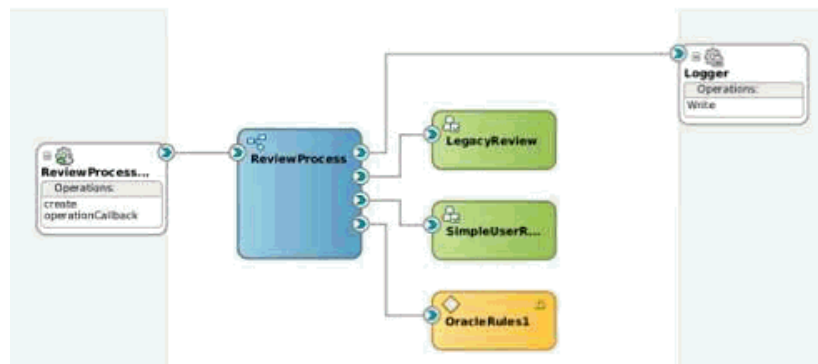


Figure 37-4 shows revision 2.0 of the composite application in the SOA Composite Editor.

Figure 37-4 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.

37.3.3.1 Migrating a Revision Instance

To migrate a revision instance for Oracle BPM:

1. Generate a migration feasibility report that decides:
 - Whether the selected 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.

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:ty
          xmlns:ns0="http://www.w3.org/2001/XMLSchema-instance">ok</dataO
        </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. 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"/>

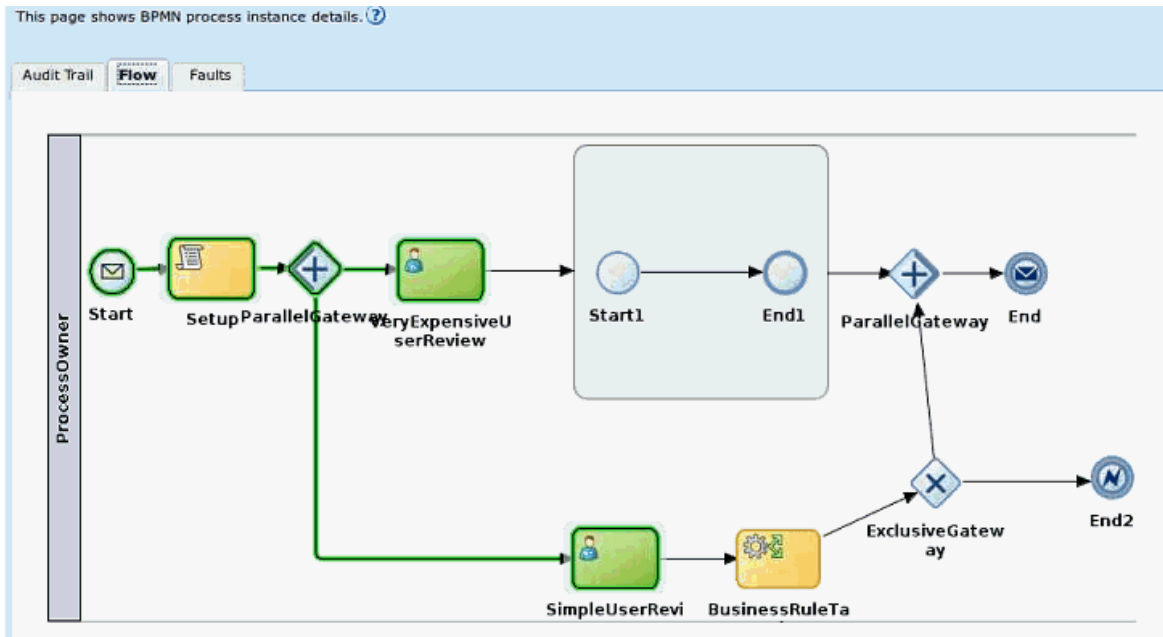
locatorConfig id="c1" host="${wls.host}" port=${wls.port}"
  user="{wls.user}" password="{wls.password}"/>
compositeInstanceFilterDef id="f1" domainName="default"
  compositeName="Project3" compositeInstanceId="40001"/>

<target name="test">
  <locatorSession configId="c1">
    <generateFlowMigrationReport filterId="f1" revision="2.0">
      <migrateReportedCompositeInstances migrationPlanPath=
        "${migrationPlanPath}"/>
    </generateFlowMigrationReport>
  </locatorSession>
</target>

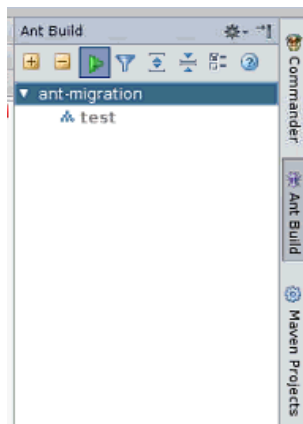
```

4. Create a business flow 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 [Initiating a Test Instance of a Business Flow](#).
5. On the Flow Instances page, click the flow ID of revision 1.0 (for this example, **40007**).
6. In the **Trace** table, click the **ReviewProcess** instance.
7. Click the **Flow** tab.

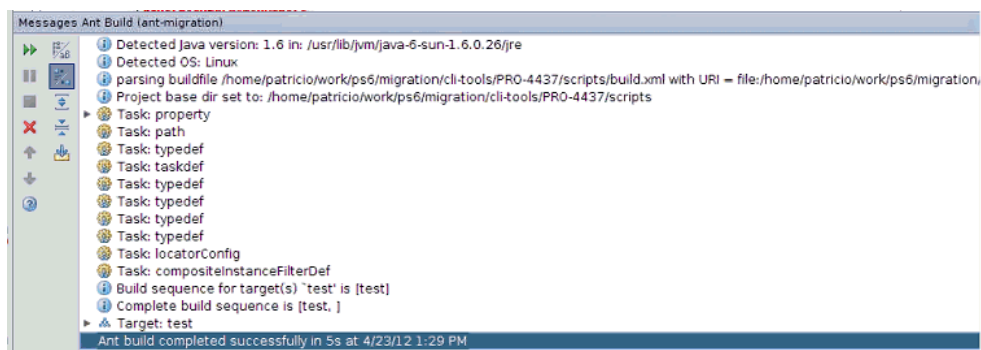
Revision 1.0 of the flow is shown. The instance is waiting on the parallel approval of the two instance tasks.



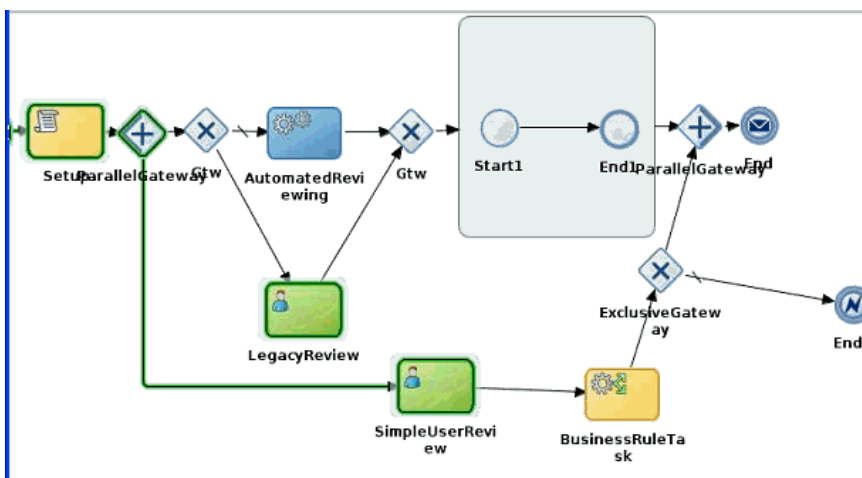
8. Go to the location for the `build.xml` file.
9. Change the `flowId` value to migrate to 40007.
10. In the upper right corner, run the `ant` script.



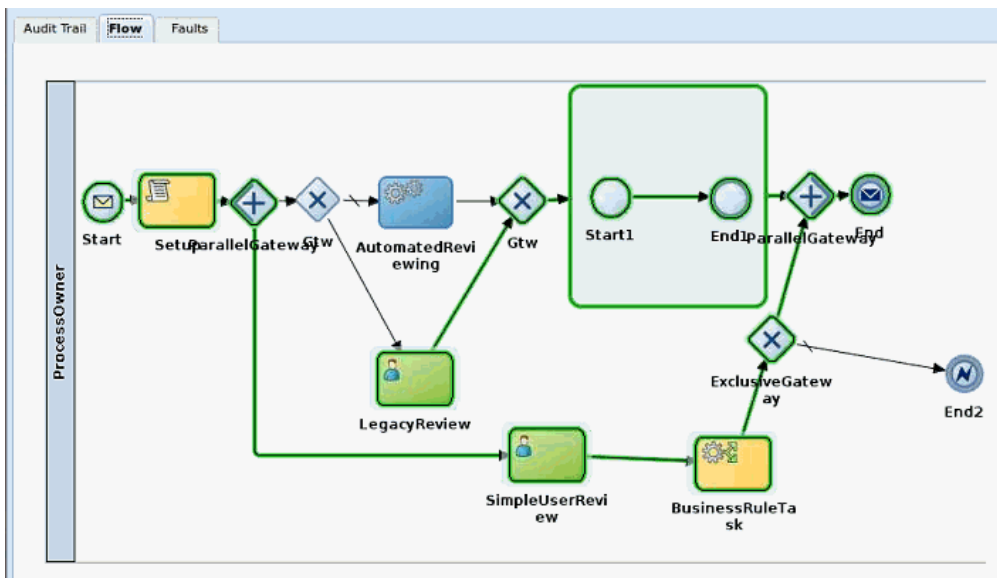
11. View the ant build report to see that migration was successful.



12. Return to the Flow 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.
14. In the navigator, click revision **2.0**.
15. Note that the migrated instance is displayed for the revision.
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.
21. Click **Process Tracking** to refresh the page.
22. Note that version ReviewProcess 2.0 is running.
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.



Part XIV

Appendixes

This part includes the following appendixes:

- [Migrating from a Non-Container Database \(Non-CDB\) to a Container Database \(CDB\)](#)
- [Installing the Demo User Community in the Database](#)
- [Troubleshooting Oracle SOA Suite and Oracle BPM Suite](#)

A

Migrating from a Non-Container Database (Non-CDB) to a Container Database (CDB)

This appendix describes the steps to migrate a non-container database (non-CDB) to a container database (CDB), allowing for changes to the host name, service name, or port name.

For information about multitenancy, CDBs, and pluggable databases (PDBs), review the following resources:

- On oracle-base.com: [Multitenant: Overview of Container Databases \(CDB\) and Pluggable Databases \(PDB\)](#)
- 12c Release 1 (12.1): [Multitenant Architecture](#)

This appendix includes the following sections:

- [About the Migration Scenario](#)
- [Starting the Oracle Fusion Middleware and Oracle SOA Suite Domains on the Source Database](#)
- [Exporting from the Source Database](#)
- [Importing to the Target Database](#)
- [Updating JDBC Connections for the Oracle Fusion Middleware and Oracle SOA Suite Domains](#)
- [Starting the Oracle Fusion Middleware and Oracle SOA Suite Domains on the Target Database](#)



Note:

The steps in this appendix assume that you already have the source (non-CDB) and target (CDB) environments set up, similar to the example use case described in [About the Migration Scenario](#).

A.1 About the Migration Scenario

The scenario presented here is a source environment with multiple Oracle Fusion Middleware and Oracle SOA Suite 12c (12.2.1.3) domains connecting to the same non-container database (CDB) 12.1.0.2 using different schemas prefixes (for example, `DEV_WLS`, `DEV2_SOAINFRA`, and so on) but using the same database service name (for example, `orclsoa.example.com`).

To migrate to a CDB that contains multiple PDBs, the approach is:

- Migrate data (using `expdp` and `impdp`, or by cloning PDBs) from the non-CDB 12.1.0.2 to a CDB 12.1.0.2 with multiple PDBs.

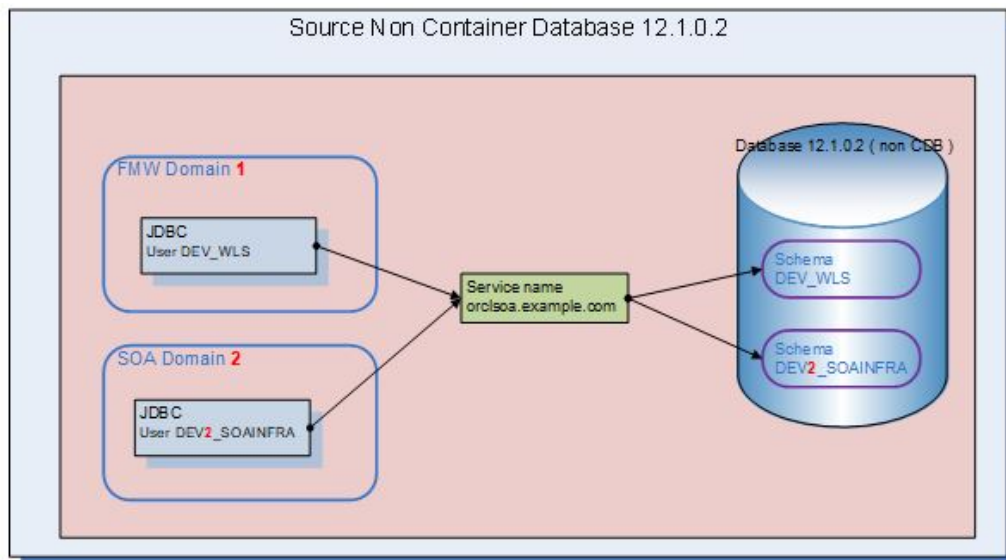
- Each PDB must contain a consistent set of schemas (per application), differentiated by prefixes.
- PDBs must be available under different PDB service names.

To simplify the example provided here, the setup is as follows:

- The non-CDB 12.1.0.2 (*source environment*) has one Oracle Fusion Middleware 12.2.1.3 domain and one Oracle SOA Suite 12.2.1.3 domain, so there are two prefix schemas:
 - DEV_WLS for the Oracle Fusion Middleware domain.
 - DEV2_SOAINFRA for the Oracle SOA Suite domain.
- In the new target CDB 12.1.0.2 (*target environment*), there will be two PDBs (PDB1 and PDB2), and the target system will be installed in `new-target-db12c.example.com` (192.168.56.93).
 - PDB1 will have DEV_WLS as prefix but will have the new service name `pdb1_orclsoa`.
 - PDB2 will have DEV2_SOAINFRA as prefix but will have the new service name `pdb2_orclsoa`.
- The Oracle Fusion Middleware and Oracle SOA Suite 12.2.1.3 domains will stay as they are (installed in `soa-host01.example.com`), and the JDBC connections will be reconfigured to point to the new target Oracle Database 12.1.0.2 container instance (installed in `new-target-db12c.example.com`).

Source Environment: Non-Container Database

The following diagram and values depict this scenario in the source environment.

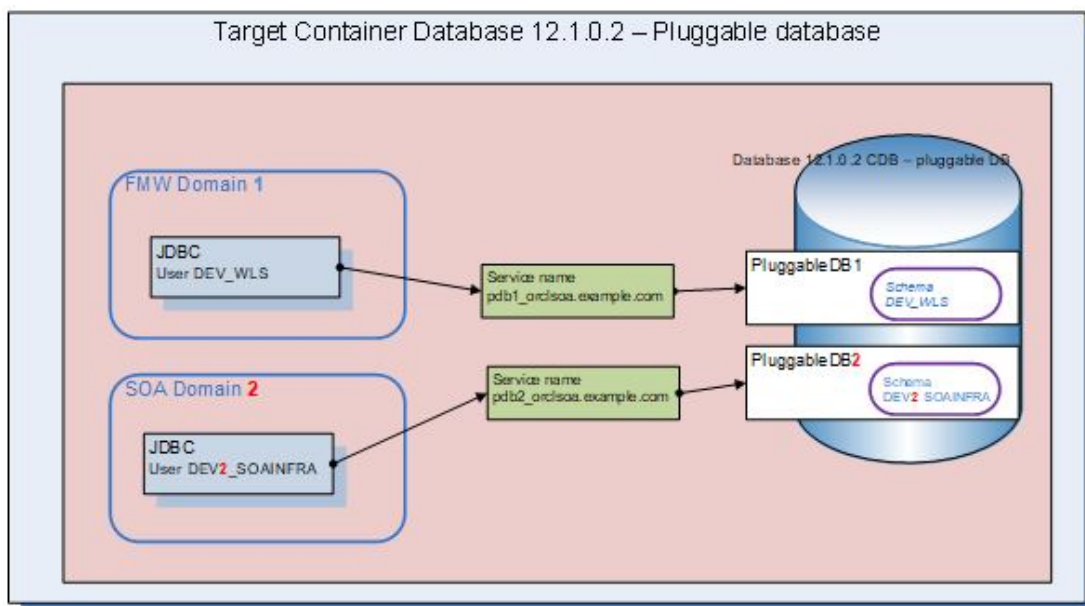


| Source Non-CDB | Fusion Middleware Domain | SOA Suite Domain |
|----------------|--------------------------|------------------------|
| Host Name | soa-host01.example.com | soa-host01.example.com |
| IP Address | 192.168.56.192 | 192.168.56.192 |
| Service Name | orclsoa.example.com | orclsoa.example.com |

| Source Non-CDB | Fusion Middleware Domain | SOA Suite Domain |
|----------------|-----------------------------------|-----------------------------------|
| Port | 1521 | 1521 |
| WLS Console | http://192.168.56.92:7001/console | http://192.168.56.92:7010/console |
| EM Console | http://192.168.56.92:7001/em | http://192.168.56.92:7010/em |
| Server URL | http://192.168.56.92:7003 | http://192.168.56.92:7013 |

Target Environment: Container Database

The following diagram and values depict this scenario in the target environment.



| Target CDB | Fusion Middleware Domain | SOA Suite Domain |
|-------------------------|-----------------------------------|-----------------------------------|
| Host Name | new-target-db12c.example.com | new-target-db12c.example.com |
| IP Address | 192.168.56.193 | 192.168.56.193 |
| Service Name | pdb1 _orclsoa.example.com | pdb2 _orclsoa.example.com |
| Port | 1521 | 1521 |
| Container Name | PDB1_ORCLSOA | PDB2_ORCLSOA |
| Alias | PDB1 | PDB2 |
| WLS Console (no change) | http://192.168.56.92:7001/console | http://192.168.56.92:7010/console |
| EM Console (no change) | http://192.168.56.92:7001/em | http://192.168.56.92:7010/em |
| Server URL (no change) | http://192.168.56.92:7003 | http://192.168.56.92:7013 |

A.2 Starting the Oracle Fusion Middleware and Oracle SOA Suite Domains on the Source Database

To start the domains on the source database:

1. Enter the following commands to start the Oracle Fusion Middleware domain:

```
cd /u01/oracle/middleware/domains/fmw_domain
./startWebLogic.sh
cd /u01/oracle/middleware/domains/fmw_domain/bin
./startManagedWebLogic.sh infra_server1 http://192.168.56.92:7001
```

2. Enter the following commands to start the Oracle SOA Suite domain:

```
cd /u01/oracle/middleware/domains/soa_domain
./startWebLogic.sh
cd /u01/oracle/middleware/domains/soa_domain/bin
./startManagedWebLogic.sh soa_server1 http://192.168.56.92:7010
```

 **Note:**

The JDBC connections are still pointing to the source database (soa-host01.example.com).

A.3 Exporting from the Source Database

To export from the source non-container database (non-CDB), complete the following steps:

- [Export INFRA Schemas](#)
- [Export SOA Schemas](#)

Export INFRA Schemas

To export INFRA schemas from the source database:

1. Sign in to the source environment. For example, soa-host01.example.com.
2. Change to the `oracle` user:

```
sudo su - oracle
```

3. Create a directory to store the exported files. For example:

```
mkdir -p /u01/db_exp/INFRA_EXPORTS
cd /u01/db_exp/INFRA_EXPORTS
```

4. Set the `ORACLE_HOME`, `ORACLE`, and `PATH` environment variables. For example:

```
export ORACLE_HOME=/opt/oracle/product/12.1.0.2/db_1
export ORACLE_SID=orclsoa
export PATH=$PATH:$ORACLE_HOME/bin
```

5. Change to the `sys` user, or any user with `sysdba` privileges, and connect to the source database:

```
sqlplus "/ as sysdba"
```

6. Create the export directory. For example:

```
CREATE DIRECTORY DUMP_INFRA AS '/u01/db_exp/INFRA_EXPORTS';
```

7. Check if the export directory was properly created:

```
SELECT directory_name, directory_path FROM dba_directories WHERE
directory_name='DUMP_INFRA';
```

8. Grant `READ` and `WRITE` permissions to the respective schemas:

```
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_IUA;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_IUA_APPEND;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_IUA_VIEWER;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_MDS;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_OPSS;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_STB;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_WLS;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_WLS_RUNTIME;
```

9. Verify that there are no connections from the `INFRA` users above in the database:

```
SELECT username FROM v$session WHERE username IS NOT NULL ORDER BY
username ASC;
quit
```

10. Change to the `oracle` user.

11. In the `INFRA_EXPORTS` directory, use a text editor to create a bash script to run the Data Pump Export utility (`expdp`) on all schemas. For example, create a script named `export_infra_schema.sh` with the following contents:

```
expdp DEV_IUA/password schemas=DEV_IUA directory=DUMP_INFRA
dumpfile=DEV_IUA_export.dmp logfile=DEV_IUA_export.log PARALLEL=4
expdp DEV_IUA_APPEND/password schemas=DEV_IUA_APPEND directory=DUMP_INFRA
dumpfile=DEV_IUA_APPEND_export.dmp logfile=DEV_IUA_APPEND_export.log
PARALLEL=4
expdp DEV_IUA_VIEWER/password schemas=DEV_IUA_VIEWER directory=DUMP_INFRA
dumpfile=DEV_IUA_VIEWER_export.dmp logfile=DEV_IUA_VIEWER_export.log
PARALLEL=4
expdp DEV_MDS/password schemas=DEV_MDS directory=DUMP_INFRA
dumpfile=DEV_MDS_export.dmp logfile=DEV_MDS_export.log PARALLEL=4
expdp DEV_OPSS/password schemas=DEV_OPSS directory=DUMP_INFRA
dumpfile=DEV_OPSS_export.dmp logfile=DEV_OPSS_export.log PARALLEL=4
expdp DEV_STB/password schemas=DEV_STB directory=DUMP_INFRA
dumpfile=DEV_STB_export.dmp logfile=DEV_STB_export.log PARALLEL=4
expdp DEV_WLS/password schemas=DEV_WLS directory=DUMP_INFRA
dumpfile=DEV_WLS_export.dmp logfile=DEV_WLS_export.log PARALLEL=4
expdp DEV_WLS_RUNTIME/password schemas=DEV_WLS_RUNTIME
```

```
directory=DUMP_INFRA dumpfile=DEV_WLS_RUNTIME_export.dmp  
logfile=DEV_WLS_RUNTIME_export.log PARALLEL=4
```

12. As the `sys` user, run the script in the source environment:

```
@export_infra_schema.sh  
quit
```

13. Export the `SCHEMA_VERSION_REGISTRY` view and its underlying tables from the `SYSTEM` schema:

```
expdp \"/ as sysdba\" SCHEMAS=system  
INCLUDE=VIEW:"IN('SCHEMA_VERSION_REGISTRY) "  
TABLE:"IN('SCHEMA_VERSION_REGISTRY$) " directory=DUMP_INFRA  
dumpfile=SYSTEM_SCHEMA_VERSION_REGISTRY.dmp  
logfile=SYSTEM_SCHEMA_VERSION_REGISTRY.log
```

 **Note:**

If you encounter an error, make sure you are using a Bash shell to run this command

14. In the `INFRA_EXPORTS` directory, use a text editor to create a script to export users. For example, create a script named `export_users.sql` with the following contents:

```
set long 10000;  
set lines 200;  
set pages 400;  
set longchunksize 10000;  
spool create_users.sql  
  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_IAU') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_IAU_APPEND') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_IAU_VIEWER') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_MDS') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_OPSS') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_STB') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_WLS') FROM dual;  
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV_WLS_RUNTIME') FROM dual;  
  
spool off
```

15. As the `sys` user, run the script in the source environment:

```
sqlplus sys/password as sysdba  
@export_users.sql  
quit
```

16. Edit the output file (in this example, `create_users.sql`), and verify that it contains only lines with `CREATE USER` statements, then add a semicolon at the end of the `CREATE` statement. For example:

```
CREATE USER "DEV_IAU" IDENTIFIED BY VALUES
'S:7C9B0ECE4641D7409A0CBF67505591DD4E437FDDF7524FDBE61051FC3663;H:4A0E99B6
CA492BF37AA2177A0D0043F3;T:093C0D3F6BA909A2B2A9077F4AC1B92B6CF59A5C6C6404B
7E07CDAA652947C0593FB2EB3D7AC886D9F3164A5F98D25004E6C7A1F7277E2491F1AB7AC2
6AF4FEAA58561E489AB3CD17BACE090E17A2A52;38D2C7CEB79AC568'
  DEFAULT TABLESPACE "DEV_IAU"
  TEMPORARY TABLESPACE "DEV_IAS_TEMP";
```

17. Enter the following commands to identify the tablespaces in the INFRA schemas:

```
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
select DISTINCT tablespace_name,owner from dba_segments WHERE OWNER like
'DEV\_%' ESCAPE '\';
```

The command output should look similar to the following:

| TABLESPACE_NAME | OWNER |
|-----------------|----------|
| DEV_IAU | DEV_IAU |
| DEV_STB | DEV_STB |
| DEV_MDS | DEV_MDS |
| DEV_IAS_OPSS | DEV_OPSS |
| DEV_WLS | DEV_WLS |

18. Enter the following command to identify the temporary tablespaces in the INFRA schemas:

```
select DISTINCT temporary_tablespace from dba_users WHERE username like
'DEV\_%' ESCAPE '\';
```

The command output should look similar to the following:

```
TEMPORARY_TABLESPACE
-----
DEV_IAS_TEMP
```

19. In the `INFRA_EXPORTS` directory, use a text editor to create a script to export the tablespaces identified in the prior steps. For example, create a script named `export_tablespaces.sql` with the following contents:

```
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
spool create_tablespaces.sql
```



```

SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV_IAU') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV_STB') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV_MDS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV_IAS_OPSS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV_WLS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV_IAS_TEMP') FROM DUAL;

```

```
spool off
```

- 20.** As the `sys` user, run the script in the source environment:

```

sqlplus sys/password as sysdba
@export_tablespaces.sql
quit

```

- 21.** Edit the output file (in this example, `create_tablespaces.sql`), and verify that it contains only lines with `CREATE TABLESPACE` statements, then add a semicolon at the end of the `CREATE` statement. For example:

```

CREATE USER "DEV_IAU" IDENTIFIED BY VALUES CREATE TABLESPACE
"DEV_IAU" DATAFILE
'/u01/app/oracle/oradata/CDB1/datafile/DEV_iau.dbf' SIZE 62914560
AUTOEXTEND ON NEXT 8192 MAXSIZE 32767M
LOGGING ONLINE PERMANENT BLOCKSIZE 8192
EXTENT MANAGEMENT LOCAL AUTOALLOCATE DEFAULT
NOCOMPRESS SEGMENT SPACE MANAGEMENT AUTO;

```

- 22.** In the `INFRA_EXPORTS` directory, use a text editor to create a script to export roles and grants. For example, create a script named `export_role_grant.sql` with the following contents:

```

set long 6000;
set longchunksize 6000;
set linesize 120;
spool create_role_grant.sql

BEGIN
    DBMS_METADATA.set_transform_param
(DBMS_METADATA.session_transform, 'SQLTERMINATOR', true);
    DBMS_METADATA.set_transform_param
(DBMS_METADATA.session_transform, 'PRETTY', true);
END;
/

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_IAU') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV_IAU') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_IAU')
FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT',
'DEV_IAU_APPEND') FROM dual;
SELECT

```

```

DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_IAU_APPEND') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_IAU_APPEND')
FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_IAU_VIEWER') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_IAU_VIEWER')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_IAU_VIEWER')
FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_MDS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_MDS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_MDS') FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_OPSS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_OPSS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_OPSS') FROM
dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_STB') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_STB') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_STB') FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_WLS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_WLS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_WLS') FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV_WLS_RUNTIME')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT','DEV_WLS_RUNTIME')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV_WLS_RUNTIME')
FROM dual;

spool off

```

- 23.** As the `sys` user, run the script in the source environment:

```

sqlplus sys/password as sysdba
@export_role_grant.sql
quit

```

- 24.** Edit the output file (in this example, `create_role_grant.sql`), and verify that it contains only lines with `GRANT` statements. For example:

```

GRANT "CONNECT" TO "DEV_IAU";
GRANT "RESOURCE" TO "DEV_IAU";
GRANT "SELECT_CATALOG_ROLE" TO "DEV_IAU";
...

```

25. In the `INFRA_EXPORTS` directory, use a text editor to create a script to grant `SELECT` privileges to the `SCHEMA_VERSION_REGISTRY` table to all users. For example, create a script named `create_select_grant_system.sql` with the following contents:

```
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV_IAU";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV_IAU_APPEND";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV_IAU_VIEWER";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV_MDS";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV_OPSS";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV_STB";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV_WLS";
```

You will use this script later in [Importing to the Target Database](#) to validate the data.

Export SOA Schemas

To export SOA schemas from the source database:

1. Sign in to the source environment. For example, `soa-host01.example.com`.
2. Change to the `oracle` user:

```
sudo su - oracle
```

3. Create a directory to store the exported files. For example:

```
mkdir -p /u01/db_exp/SOA_EXPORTS
cd /u01/db_exp/SOA_EXPORTS
```

4. Set the `ORACLE_HOME`, `ORACLE`, and `PATH` environment variables. For example:

```
export ORACLE_HOME=/opt/oracle/product/12.1.0.2/db_1
export ORACLE_SID=orclsoa
export PATH=$PATH:$ORACLE_HOME/bin
```

5. Change to the `sys` user, or any user with `sysdba` privileges, and connect to the source database:

```
sqlplus "/" as sysdba"
```

6. Create the export directory. For example:

```
CREATE DIRECTORY DUMP_SOA AS '/u01/db_exp/SOA_EXPORTS';
```

7. Check if the export directory was successfully created:

```
SELECT directory_name, directory_path FROM dba_directories WHERE
directory_name='DUMP_SOA;
```

8. Grant READ and WRITE permissions to the respective schemas:

```
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_IAU;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_IAU_APPEND;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_IAU_VIEWER;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_MDS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_OPSS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_SOAINFRA;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_STB;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_UMS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_WLS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_WLS_RUNTIME;
```

9. Enter the following commands to verify if any SOA queues are stopped:

```
sqlplus / as sysdba
connect DEV2_SOAINFRA;

set lines 200;
set pages 400;
COLUMN name format A25;
COLUMN enqueue_enabled format A15;
COLUMN dequeue_enabled format A15;

SELECT name,enqueue_enabled,dequeue_enabled FROM USER_QUEUES where
queue_type = 'NORMAL_QUEUE';
```

| NAME | ENQUEUE_ENABLED | DEQUEUE_ENABLED |
|------------------------|-----------------|-----------------|
| B2B_BAM_QUEUE | YES | YES |
| OSB_REPORTING_PURGE | YES | YES |
| OSB_REPORTING_ERROR | YES | YES |
| OSB_REPORTING_PROVIDER | YES | YES |
| OSB_FILE_TRANSPORT | YES | YES |
| OSB_EMAIL_TRANSPORT | YES | YES |
| OSB_SFTP_TRANSPORT | YES | YES |
| OSB_FTP_TRANSPORT | YES | YES |
| TASK_NOTIFICATION_Q | YES | YES |
| EDN_AQJMS_TOPIC | YES | YES |
| EDN_OAOO_QUEUE | YES | YES |
| EDN_EVENT_QUEUE | YES | YES |
| IP_OUT_QUEUE | YES | YES |
| IP_IN_QUEUE | YES | YES |
| AIA_CAVSCALLBACKJMSQ | YES | YES |

10. Enter the following commands to stop the SOA database queues and confirm they are stopped:

```
sqlplus / as sysdba
connect DEV2_SOAINFRA;

set lines 200;
set pages 400;
COLUMN name format A25;
```

```
COLUMN enqueue_enabled format A15;
COLUMN dequeue_enabled format A15;
```

```
--Stop the SOA database queues :
BEGIN
DBMS_AQADM.STOP_QUEUE ('AIA_CAVSCALLBACKJMSQ');
DBMS_AQADM.STOP_QUEUE ('B2B_BAM_QUEUE');
DBMS_AQADM.STOP_QUEUE ('EDN_AQJMS_TOPIC');
DBMS_AQADM.STOP_QUEUE ('EDN_EVENT_QUEUE');
DBMS_AQADM.STOP_QUEUE ('EDN_OAOO_QUEUE');
DBMS_AQADM.STOP_QUEUE ('IP_IN_QUEUE');
DBMS_AQADM.STOP_QUEUE ('IP_OUT_QUEUE');
DBMS_AQADM.STOP_QUEUE ('OSB_EMAIL_TRANSPORT');
DBMS_AQADM.STOP_QUEUE ('OSB_FILE_TRANSPORT');
DBMS_AQADM.STOP_QUEUE ('OSB_FTP_TRANSPORT');
DBMS_AQADM.STOP_QUEUE ('OSB_REPORTING_ERROR');
DBMS_AQADM.STOP_QUEUE ('OSB_REPORTING_PROVIDER');
DBMS_AQADM.STOP_QUEUE ('OSB_REPORTING_PURGE');
DBMS_AQADM.STOP_QUEUE ('OSB_SFTP_TRANSPORT');
DBMS_AQADM.STOP_QUEUE ('TASK_NOTIFICATION_Q');
END;
/
```

```
SELECT name,enqueue_enabled,dequeue_enabled FROM USER_QUEUES where
queue_type = 'NORMAL_QUEUE' order by name asc;
```

| NAME | ENQUEUE_ENABLED | DEQUEUE_ENABLED |
|------------------------|-----------------|-----------------|
| AIA_CAVSCALLBACKJMSQ | NO | NO |
| B2B_BAM_QUEUE | NO | NO |
| EDN_AQJMS_TOPIC | NO | NO |
| EDN_EVENT_QUEUE | NO | NO |
| EDN_OAOO_QUEUE | NO | NO |
| IP_IN_QUEUE | NO | NO |
| IP_OUT_QUEUE | NO | NO |
| OSB_EMAIL_TRANSPORT | NO | NO |
| OSB_FILE_TRANSPORT | NO | NO |
| OSB_FTP_TRANSPORT | NO | NO |
| OSB_REPORTING_ERROR | NO | NO |
| OSB_REPORTING_PROVIDER | NO | NO |
| OSB_REPORTING_PURGE | NO | NO |
| OSB_SFTP_TRANSPORT | NO | NO |
| TASK_NOTIFICATION_Q | NO | NO |

11. Verify that there are no connections from the SOA users above in the database:

```
SELECT username FROM v$session WHERE username IS NOT NULL ORDER BY
username ASC;
quit
```

If there are any connections, stop the SOA domain.

12. Change to the oracle user.

13. In the `SOA_EXPORTS` directory, use a text editor to create a bash script to run the Data Pump Export utility (`expdp`) on all schemas. For example, create a script named `export_soa_schema.sh` with the following contents:

```
expdp DEV2_IUA/password schemas=DEV2_IUA directory=DUMP_SOA
dumpfile=DEV2_IUA_export.dmp logfile=DEV2_IUA_export.log PARALLEL=4
expdp DEV2_IUA_APPEND/password schemas=DEV2_IUA_APPEND directory=DUMP_SOA
dumpfile=DEV2_IUA_APPEND_export.dmp logfile=DEV2_IUA_APPEND_export.log
PARALLEL=4
expdp DEV2_IUA_VIEWER/password schemas=DEV2_IUA_VIEWER directory=DUMP_SOA
dumpfile=DEV2_IUA_VIEWER_export.dmp logfile=DEV2_IUA_VIEWER_export.log
PARALLEL=4
expdp DEV2_MDS/password schemas=DEV2_MDS directory=DUMP_SOA
dumpfile=DEV2_MDS_export.dmp logfile=DEV2_MDS_export.log PARALLEL=4
expdp DEV2_OPSS/password schemas=DEV2_OPSS directory=DUMP_SOA
dumpfile=DEV2_OPSS_export.dmp logfile=DEV2_OPSS_export.log PARALLEL=4
expdp DEV2_SOAINFRA/password schemas=DEV2_SOAINFRA directory=DUMP_SOA
dumpfile=DEV2_SOAINFRA_export.dmp logfile=DEV2_SOAINFRA_export.log
PARALLEL=4
expdp DEV2_STB/password schemas=DEV2_STB directory=DUMP_SOA
dumpfile=DEV2_STB_export.dmp logfile=DEV2_STB_export.log PARALLEL=4
expdp DEV2_UMS/password schemas=DEV2_UMS directory=DUMP_SOA
dumpfile=DEV2_UMS_export.dmp logfile=DEV2_UMS_export.log PARALLEL=4
expdp DEV2_WLS/password schemas=DEV2_WLS directory=DUMP_SOA
dumpfile=DEV2_WLS_export.dmp logfile=DEV2_WLS_export.log PARALLEL=4
expdp DEV2_WLS_RUNTIME/password schemas=DEV2_WLS_RUNTIME
directory=DUMP_SOA dumpfile=DEV2_WLS_RUNTIME_export.dmp
logfile=DEV2_WLS_RUNTIME_export.log PARALLEL=4
```

14. As the `sys` user, run the script in the source environment:

```
@export_soa_schema.sh
quit
```

15. Export the `SCHEMA_VERSION_REGISTRY` view and its underlying tables from the `SYSTEM` schema:

```
expdp \"/ as sysdba\" SCHEMAS=system
INCLUDE=VIEW:"IN('SCHEMA_VERSION_REGISTRY')\"
TABLE:"IN('SCHEMA_VERSION_REGISTRY$')\" directory=DUMP_SOA
dumpfile=SYSTEM_SCHEMA_VERSION_REGISTRY.dmp
logfile=SYSTEM_SCHEMA_VERSION_REGISTRY.log
```

 **Note:**

If you encounter an error, make sure you are using a Bash shell to run this command

- 16.** In the SOA_EXPORTS directory, use a text editor to create a script to export users. For example, create a script named `export_users.sql` with the following contents:

```
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
spool create_users.sql

SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_IAU') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_IAU_APPEND') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_IAU_VIEWER') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_MDS') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_OPSS') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_SOAINFRA') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_STB') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_UMS') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_WLS') FROM dual;
SELECT DBMS_METADATA.GET_DDL('USER', 'DEV2_WLS_RUNTIME') FROM dual;

spool off
```

- 17.** Change to the `sys` user, and run the script in the source environment:

```
sqlplus sys/password as sysdba
@export_users.sql
quit
```

- 18.** Edit the output file (in this example, `create_users.sql`), and verify that it contains only lines with `CREATE USER` statements, then add a semicolon at the end of the `CREATE` statement. For example:

```
CREATE USER "DEV_IAU" IDENTIFIED BY VALUES
'S:7C9B0ECE4641D7409A0CBF67505591DD4E437FDDF7524FDBE61051FC3663;H:4A
0E99B6CA492BF37AA2177A0D0043F3;T:093C0D3F6BA909A2B2A9077F4AC1B92B6CF
59A5C6C6404B7E07CDAA652947C0593FB2EB3D7AC886D9F3164A5F98D25004E6C7A1
F7277E2491F1AB7AC26AF4FEAA58561E489AB3CD17BACE090E17A2A52;38D2C7CEB7
9AC568'
  DEFAULT TABLESPACE "DEV2_IAU"
  TEMPORARY TABLESPACE "DEV2_IAS_TEMP";
```

- 19.** Enter the following commands to identify the tablespaces in the SOA schema:

```
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
SELECT DISTINCT tablespace_name,owner from dba_segments WHERE OWNER
like 'DEV2\_%' ESCAPE '\';
```

The command output should look similar to the following:

| TABLESPACE_NAME | OWNER |
|-----------------|---------------|
| DEV2_STB | DEV2_STB |
| DEV2_IAS_UMS | DEV2_UMS |
| DEV2_SOAINFRA | DEV2_SOAINFRA |
| DEV2_MDS | DEV2_MDS |
| DEV2_IAU | DEV2_IAU |
| DEV2_WLS | DEV2_WLS |
| DEV2_IAS_OPSS | DEV2_OPSS |

20. Enter the following command to identify the temporary tablespaces in the SOA schemas:

```
SELECT DISTINCT temporary_tablespace from dba_users WHERE username like
'DEV2\_%' ESCAPE '\';
```

The command output should look similar to the following:

| TEMPORARY_TABLESPACE |
|----------------------|
| DEV2_IAS_TEMP |

21. In the SOA_EXPORTS directory, use a text editor to create to export the tablespaces identified in the prior steps. For example, create a script named export_tablespaces.sql with the following contents:

```
set long 10000;
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
spool create_tablespaces.sql

BEGIN
    DBMS_METADATA.set_transform_param (DBMS_METADATA.session_transform,
'SQLTERMINATOR', true);
    DBMS_METADATA.set_transform_param (DBMS_METADATA.session_transform,
'PRETTY', true);
END;
/

SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_IAU') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_STB') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_IAS_UMS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_SOAINFRA') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_MDS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_IAS_OPSS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_WLS') FROM DUAL;
SELECT DBMS_METADATA.GET_DDL('TABLESPACE','DEV2_IAS_TEMP') FROM DUAL;

spool off
```


22. As the `sys` user, run the script in the source environment:

```
sqlplus sys/password as sysdba
@export_tablespaces.sql
quit
```

23. Edit the output file (in this example, `create_tablespaces.sql`), and verify that it contains only lines with `CREATE TABLESPACE` statements, then add a semicolon at the end of the `CREATE` statement. For example:

```
CREATE TABLESPACE "DEV2_IAU" DATAFILE
'/opt/oracle/oradata/DEV2_iau.dbf' SIZE 62914560
AUTOEXTEND ON NEXT 8192 MAXSIZE 32767M
LOGGING ONLINE PERMANENT BLOCKSIZE 8192
EXTENT MANAGEMENT LOCAL AUTOALLOCATE DEFAULT
NOCOMPRESS SEGMENT SPACE MANAGEMENT AUTO;
```

24. In the `SOA_EXPORTS` directory, use a text editor to create a script to export roles and grants. For example, create a script named `export_role_grant.sql` with the following contents:

```
set long 6000;
set longchunksize 6000;
set linesize 120;
spool create_role_grant.sql

BEGIN
    DBMS_METADATA.set_transform_param
(DBMS_METADATA.session_transform, 'SQLTERMINATOR', true);
    DBMS_METADATA.set_transform_param
(DBMS_METADATA.session_transform, 'PRETTY', true);
END;
/

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_IAU') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_IAU')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_IAU')
FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT',
'DEV2_IAU_APPEND') FROM dual;
SELECT
DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_IAU_APPEND')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT',
'DEV2_IAU_APPEND') FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT',
'DEV2_IAU_VIEWER') FROM dual;
SELECT
DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_IAU_VIEWER')
```

```
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_IAU_VIEWER')
FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_MDS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_MDS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_MDS') FROM
dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_OPSS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_OPSS') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_OPSS') FROM
dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_SOAINFRA') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_SOAINFRA') FROM
dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_SOAINFRA')
FROM dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_STB') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_STB') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_STB') FROM
dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_UMS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_UMS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_UMS') FROM
dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_WLS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_WLS') FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_WLS') FROM
dual;

SELECT DBMS_METADATA.GET_GRANTED_DDL('ROLE_GRANT', 'DEV2_WLS_RUNTIME')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('SYSTEM_GRANT', 'DEV2_WLS_RUNTIME')
FROM dual;
SELECT DBMS_METADATA.GET_GRANTED_DDL('OBJECT_GRANT', 'DEV2_WLS_RUNTIME')
FROM dual;

spool off
```

25. As the sys user, run the script in the source environment:

```
sqlplus sys/password as sysdba
@export_role_grant.sql
quit
```

26. Edit the output file (in this example, `create_role_grant.sql`), and verify that it contains only lines with `GRANT` statements. For example:

```
GRANT "CONNECT" TO "DEV2_IAU";
GRANT "RESOURCE" TO "DEV2_IAU";
GRANT "SELECT_CATALOG_ROLE" TO "DEV2_IAU";
...
```

27. In the `SOA_EXPORTS` directory, use a text editor to create a script to grant `SELECT` privileges to the `SCHEMA_VERSION_REGISTRY` table to all users. For example, create a script named `create_select_grant_system.sql` with the following contents:

```
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV2_IAU";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_IAU_APPEND";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_IAU_VIEWER";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_MDS";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_OPSS";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_SOAINFRA";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_STB";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO
"DEV2_UMS";
GRANT SELECT ON "SYSTEM"."SCHEMA_VERSION_REGISTRY" TO "DEV2_WLS";
```

You will use this script later in [Importing to the Target Database](#) to validate the data.

28. Enter the following commands to restart the SOA queues and confirm they are started:

```
sqlplus / as sysdba
connect DEV2_SOAINFRA;

set lines 200;
set pages 400;
COLUMN name format A25;
COLUMN enqueue_enabled format A15;
COLUMN dequeue_enabled format A15;

BEGIN
DBMS_AQADM.START_QUEUE ('AIA_CAVSCALLBACKJMSQ');
DBMS_AQADM.START_QUEUE ('B2B_BAM_QUEUE');
DBMS_AQADM.START_QUEUE ('EDN_AQJMS_TOPIC');
DBMS_AQADM.START_QUEUE ('EDN_EVENT_QUEUE');
DBMS_AQADM.START_QUEUE ('EDN_OAEO_QUEUE');
DBMS_AQADM.START_QUEUE ('IP_IN_QUEUE');
DBMS_AQADM.START_QUEUE ('IP_OUT_QUEUE');
DBMS_AQADM.START_QUEUE ('OSB_EMAIL_TRANSPORT');
DBMS_AQADM.START_QUEUE ('OSB_FILE_TRANSPORT');
```

```
DBMS_AQADM.START_QUEUE ('OSB_FTP_TRANSPORT');
DBMS_AQADM.START_QUEUE ('OSB_REPORTING_ERROR');
DBMS_AQADM.START_QUEUE ('OSB_REPORTING_PROVIDER');
DBMS_AQADM.START_QUEUE ('OSB_REPORTING_PURGE');
DBMS_AQADM.START_QUEUE ('OSB_SFTP_TRANSPORT');
DBMS_AQADM.START_QUEUE ('TASK_NOTIFICATION_Q');
END;
/
```

```
SELECT name,enqueue_enabled,dequeue_enabled FROM USER_QUEUES where
queue_type = 'NORMAL_QUEUE' order by name asc;
```

| NAME | ENQUEUE_ENABLED | DEQUEUE_ENABLED |
|------------------------|-----------------|-----------------|
| AIA_CAVSCALLBACKJMSQ | YES | YES |
| B2B_BAM_QUEUE | YES | YES |
| EDN_AQJMS_TOPIC | YES | YES |
| EDN_EVENT_QUEUE | YES | YES |
| EDN_OAOO_QUEUE | YES | YES |
| IP_IN_QUEUE | YES | YES |
| IP_OUT_QUEUE | YES | YES |
| OSB_EMAIL_TRANSPORT | YES | YES |
| OSB_FILE_TRANSPORT | YES | YES |
| OSB_FTP_TRANSPORT | YES | YES |
| OSB_REPORTING_ERROR | YES | YES |
| OSB_REPORTING_PROVIDER | YES | YES |
| OSB_REPORTING_PURGE | YES | YES |
| OSB_SFTP_TRANSPORT | YES | YES |
| TASK_NOTIFICATION_Q | YES | YES |

A.4 Importing to the Target Database

To import to the target container database (CDB), complete the following steps:

- [Import INFRA Schemas](#)
- [Import SOA Schemas](#)

Import INFRA Schemas

To import INFRA schemas to the target CDB:

1. Sign in to the target environment. For example, `new-target-db12c.example.com`.
2. Change to the `oracle` user:

```
sudo su - oracle
```

3. Make sure the source environment (`soa-host01.example.com` in this example) is in the `/etc/hosts` file.

4. Copy all the scripts you created and dump files from the source environment (soa-host01.example.com in this example) to the target environment (new-target-db12c.example.com:/u01/db_exp/INFRA_EXPORTS in this example):

```
mkdir -p /u01/db_exp/INFRA_EXPORTS
cd /u01/db_exp/INFRA_EXPORTS
scp -r oracle@soa-host01.example.com:/u01/db_exp/INFRA_EXPORTS/* .
```

5. Set the ORACLE_HOME, ORACLE, and PATH environment variables. For example:

```
export ORACLE_HOME=/u01/app/oracle/product/12.1.0.2/dbhome_1
export ORACLE_SID=CDB1
export PATH=$PATH:$ORACLE_HOME/bin
```

6. Change to the sys user, or any user with sysdba privileges, and connect to the target database, then determine the existing data file location using the following commands:

```
sqlplus sys/password as sysdba
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
set wrap off;
COLUMN FILE_NAME FORMAT A90;
COLUMN name FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A20;
SELECT name, pdb FROM v$services ORDER BY name;
```

| NAME | PDB |
|--------------------------|--------------|
| CDB1.example.com | CDB\$ROOT |
| SYS\$BACKGROUND | CDB\$ROOT |
| SYS\$USERS | CDB\$ROOT |
| pdb1_orclsoa.example.com | PDB1_ORCLSOA |
| pdb2_orclsoa.example.com | PDB2_ORCLSOA |

```
ALTER SESSION SET CONTAINER=PDB1_ORCLSOA;
SELECT TABLESPACE_NAME, FILE_NAME FROM dba_data_files;
```

| TABLESPACE_NAME | FILE_NAME |
|-----------------------------|--|
| SYSTEM | /u01/app/oracle/oradata/CDB1/datafile/ |
| o1_mf_system_hkj1b8h3_.dbf | |
| SYSAUX | /u01/app/oracle/oradata/CDB1/datafile/ |
| o1_mf_sysaux_hkj1b8gy_.dbf | |
| USERS | /u01/app/oracle/oradata/CDB1/datafile/ |
| o1_mf_users_hkj1b8h7_.dbf | |
| EXAMPLE | /u01/app/oracle/oradata/CDB1/datafile/ |
| o1_mf_example_hkj1b8dt_.dbf | |

In this example, the data location of PDB1_ORCLSOA is in /u01/app/oracle/oradata/CDB1/datafile.

7. Edit the script `create_tablespaces.sql` and update the value of the `DATAFILE` variable to `/u01/app/oracle/oradata/CDB1/datafile`
8. In order for the import to succeed, edit the script `create_role_grant.sql` and add the following commands:

```
GRANT UNLIMITED TABLESPACE TO "DEV_MDS";
GRANT UNLIMITED TABLESPACE TO "DEV_OPSS";
GRANT UNLIMITED TABLESPACE TO "DEV_STB";
GRANT UNLIMITED TABLESPACE TO "DEV_WLS";
```

9. As the `sys` user, connect to the target database and run the scripts `create_tablespaces.sql`, `create_users.sql`, and `create_role_grant.sql`:

```
sqlplus sys/password as sysdba
ALTER SESSION SET CONTAINER=PDB1_ORCLSOA;
show con_name;
```

```
CON_NAME
-----
PDB1_ORCLSOA
```

```
@create_tablespaces.sql
@create_users.sql
@create_role_grant.sql
```

 **Note:**

Some statements in `create_role_grant.sql` will fail as some objects are not yet created. You will run this script again later to succeed.

10. As the `sys` user, connect to the target database and create the export directory:

```
sqlplus "/" as sysdba"
ALTER SESSION SET CONTAINER=PDB1_ORCLSOA;
CREATE DIRECTORY DUMP_INFRA AS '/u01/db_exp/INFRA_EXPORTS';
```

11. Check if the export directory was successfully created:

```
SELECT directory_name, directory_path FROM dba_directories WHERE
directory_name='DUMP_INFRA';
```

12. Grant `READ` and `WRITE` permissions to the respective schemas:

```
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_IAU;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_IAU_APPEND;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_IAU_VIEWER;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_MDS;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_OPSS;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_STB;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_WLS;
GRANT READ,WRITE ON DIRECTORY DUMP_INFRA TO DEV_WLS_RUNTIME;
```

- 13.** Enter the following commands to avoid an error that STBROLE does not exist during the import of DEV_STB:

```
sqlplus sys/password@PDB1 as sysdba
BEGIN      EXECUTE IMMEDIATE 'CREATE ROLE STBROLE'; END;
/
```

- 14.** Change to the oracle user.

- 15.** In the INFRA_EXPORTS directory, use a text editor to create a bash script to run the Data Pump Import utility (impdp) on all schemas. For example, create a script named import_infra_schema.sh with the following contents:

```
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_IAU
directory=DUMP_INFRA dumpfile=DEV_IAU_export.dmp
logfile=DEV_IAU_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_IAU_APPEND
directory=DUMP_INFRA dumpfile=DEV_IAU_APPEND_export.dmp
logfile=DEV_IAU_APPEND_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_IAU_VIEWER
directory=DUMP_INFRA dumpfile=DEV_IAU_VIEWER_export.dmp
logfile=DEV_IAU_VIEWER_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_MDS
directory=DUMP_INFRA dumpfile=DEV_MDS_export.dmp
logfile=DEV_MDS_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_OPSS
directory=DUMP_INFRA dumpfile=DEV_OPSS_export.dmp
logfile=DEV_OPSS_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_STB
directory=DUMP_INFRA dumpfile=DEV_STB_export.dmp
logfile=DEV_STB_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_WLS
directory=DUMP_INFRA dumpfile=DEV_WLS_export.dmp
logfile=DEV_WLS_import.log parallel=4
impdp \"sys/password@PDB1 as sysdba\" schemas=DEV_WLS_RUNTIME
directory=DUMP_INFRA dumpfile=DEV_WLS_RUNTIME_export.dmp
logfile=DEV_WLS_RUNTIME_import.log parallel=4
```

- 16.** As the sys user, run the script in the target environment:

```
@import_infra_schema.sh
quit
```

- 17.** Connect to the target database and run the script create_role_grant.sql again to succeed without errors:

```
sqlplus sys/password@PDB1 as sysdba
@create_role_grant.sql
```

18. Before importing the `SCHEMA_VERSION_REGISTRY`, enter the following commands as the database administrator to create a role to allow registry access:

```
sqlplus sys/password@PDB1 as sysdba
BEGIN EXECUTE IMMEDIATE 'CREATE ROLE REGISTRYACCESS'; END;
/
```

19. As the `oracle` user, enter the following commands to run the Data Pump Import utility (`impdp`):

```
impdp \"sys/password@PDB1 as sysdba\" SCHEMAS=SYSTEM directory=DUMP_INFRA
DUMPFILE=SYSTEM_SCHEMA_VERSION_REGISTRY.dmp
LOGFILE=SYSTEM_SCHEMA_VERSION_REGISTRY_import2.log parallel=4
TABLE_EXISTS_ACTION=APPEND
```

```
impdp \"sys/password@PDB1 as sysdba\"
SCHEMAS=DEV_IUA,DEV_IUA_APPEND,DEV_IUA_VIEWER,DEV_MDS,DEV_OPSS,DEV_STB,DEV
_WLS,DEV_WLS_RUNTIME directory=DUMP_INFRA
DUMPFILE=SYSTEM_SCHEMA_VERSION_REGISTRY.dmp
LOGFILE=SYSTEM_SCHEMA_VERSION_REGISTRY_import.log parallel=4
TABLE_EXISTS_ACTION=APPEND
```

 **Note:**

The first `impdp` command will return some errors on `DEV2*` schemas, which is a normal error as there are no `DEV2` schemas in `PDB1`. The second `impdp` returns some errors on `DEV_*` schemas, which can also be ignored.

20. Enter the following commands and review the `SELECT` statement output to ensure the data is valid:

```
sqlplus sys/password@PDB1 as sysdba
@create_select_grant_system.sql
CREATE PUBLIC SYNONYM schema_version_registry FOR
system.schema_version_registry;

set lines 210;
set pages 40;
COLUMN MRC_NAME FORMAT A10;
COLUMN COMP_ID FORMAT A12;
COLUMN COMP_NAME FORMAT A35;
COLUMN OWNER FORMAT A17;
COLUMN VERSION FORMAT A12;
COLUMN STATUS FORMAT A8;
COLUMN UPGRADED FORMAT A8;
COLUMN OBJECT_NAME FORMAT A25;
COLUMN TABLE_NAME FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A15;

SELECT MRC_NAME, COMP_ID, COMP_NAME, OWNER, VERSION, STATUS, UPGRADED
FROM SCHEMA_VERSION_REGISTRY ORDER BY MRC_NAME, COMP_ID;
```


| MRC_NAME | COMP_ID | COMP_NAME | OWNER | VERSION | STATUS | UPGRADED |
|-----------------|------------|-----------------------------------|-------|---------|--------|----------|
| DEV | IAU | Audit Service | | | | |
| DEV_IAU | | 12.2.1.2.0 | VALID | N | | |
| DEV | IAU_APPEND | Audit Service Append | | | | |
| DEV_IAU_APPEND | | 12.2.1.2.0 | VALID | N | | |
| DEV | IAU_VIEWER | Audit Service Viewer | | | | |
| DEV_IAU_VIEWER | | 12.2.1.2.0 | VALID | N | | |
| DEV | MDS | Metadata Services | | | | |
| DEV_MDS | | 12.2.1.3.0 | VALID | N | | |
| DEV | OPSS | Oracle Platform Security Services | | | | |
| DEV_OPSS | | 12.2.1.0.0 | VALID | N | | |
| DEV | STB | Service Table | | | | |
| DEV_STB | | 12.2.1.3.0 | VALID | N | | |
| DEV | WLS | WebLogic Services | | | | |
| DEV_WLS | | 12.2.1.0.0 | VALID | N | | |
| DEV2 | IAU | Audit Service | | | | |
| DEV2_IAU | | 12.2.1.2.0 | VALID | N | | |
| DEV2 | IAU_APPEND | Audit Service Append | | | | |
| DEV2_IAU_APPEND | | 12.2.1.2.0 | VALID | N | | |
| DEV2 | IAU_VIEWER | Audit Service Viewer | | | | |
| DEV2_IAU_VIEWER | | 12.2.1.2.0 | VALID | N | | |
| DEV2 | MDS | Metadata Services | | | | |
| DEV2_MDS | | 12.2.1.3.0 | VALID | N | | |
| DEV2 | OPSS | Oracle Platform Security Services | | | | |
| DEV2_OPSS | | 12.2.1.0.0 | VALID | N | | |
| DEV2 | SOAINFRA | SOA Infrastructure Services | | | | |
| DEV2_SOAINFRA | | 12.2.1.3.0 | VALID | N | | |
| DEV2 | STB | Service Table | | | | |
| DEV2_STB | | 12.2.1.3.0 | VALID | N | | |
| DEV2 | UCSUMS | User Messaging Service | | | | |
| DEV2_UMS | | 12.2.1.0.0 | VALID | N | | |
| DEV2 | WLS | WebLogic Services | | | | |
| DEV2_WLS | | 12.2.1.0.0 | VALID | N | | |

select rowid, mrc_name, owner from system.schema_version_registry\$;

| ROWID | MRC_NAME | OWNER |
|--------------------|----------|-----------------|
| AAAXDtAABAAAIWxAAA | DEV | DEV_STB |
| AAAXDtAABAAAIWxAAB | DEV | DEV_IAU_APPEND |
| AAAXDtAABAAAIWxAAC | DEV | DEV_IAU_VIEWER |
| AAAXDtAABAAAIWxAAD | DEV | DEV_MDS |
| AAAXDtAABAAAIWxAAE | DEV | DEV_WLS |
| AAAXDtAABAAAIWxAAF | DEV | DEV_IAU |
| AAAXDtAABAAAIWxAAG | DEV | DEV_OPSS |
| AAAXDtAABAAAIWxAAH | DEV2 | DEV2_STB |
| AAAXDtAABAAAIWxAAI | DEV2 | DEV2_IAU_APPEND |
| AAAXDtAABAAAIWxAAJ | DEV2 | DEV2_IAU_VIEWER |
| AAAXDtAABAAAIWxAAK | DEV2 | DEV2_MDS |
| AAAXDtAABAAAIWxAAL | DEV2 | DEV2_WLS |
| AAAXDtAABAAAIWxAAM | DEV2 | DEV2_UMS |
| AAAXDtAABAAAIWxAAN | DEV2 | DEV2_IAU |

```
AAAXDtAABAAAIWxAO DEV2      DEV2_OPSS
AAAXDtAABAAAIWxAAP DEV2      DEV2_SOAINFRA
```

```
SELECT OWNER, TABLE_NAME, TABLESPACE_NAME, STATUS from all_tables where
table_name = 'SCHEMA_VERSION_REGISTRY$' and owner in ('SYSTEM',
'FMWREGISTRY');
```

```
OWNER          TABLE_NAME          TABLESPACE_NAME  STATUS
-----
SYSTEM         SCHEMA_VERSION_REGISTRY$  SYSTEM            VALID
```

```
select owner, object_name, object_type from all_objects where object_name
like '%SCHEMA_VERSION_REGISTRY%';
```

```
OWNER          OBJECT_NAME          OBJECT_TYPE
-----
PUBLIC         SCHEMA_VERSION_REGISTRY  SYNONYM
SYSTEM        SCHEMA_VERSION_REGISTRY$  TABLE
SYSTEM        SCHEMA_VERSION_REGISTRY  VIEW
```

21. Delete lines that do not belong to DEV, and review the SELECT statement output to ensure the data is valid:

```
sqlplus sys/password@PDB1 as sysdba
DELETE FROM SCHEMA_VERSION_REGISTRY WHERE MRC_NAME != 'DEV';
```

```
set lines 210;
set pages 40;
COLUMN MRC_NAME FORMAT A10;
COLUMN COMP_ID FORMAT A12;
COLUMN COMP_NAME FORMAT A35;
COLUMN OWNER FORMAT A17;
COLUMN VERSION FORMAT A12;
COLUMN STATUS FORMAT A8;
COLUMN UPGRADED FORMAT A8;
COLUMN OBJECT_NAME FORMAT A25;
COLUMN TABLE_NAME FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A15;
```

```
SELECT MRC_NAME, COMP_ID, COMP_NAME, OWNER, VERSION, STATUS, UPGRADED
FROM SCHEMA_VERSION_REGISTRY ORDER BY MRC_NAME, COMP_ID;
```

```
MRC_NAME  COMP_ID  COMP_NAME
OWNER          VERSION  STATUS  UPGRADED
-----
DEV          IAU      Audit Service
DEV_IAU      12.2.1.2.0  VALID  N
DEV          IAU_APPEND  Audit Service Append
DEV_IAU_APPEND  12.2.1.2.0  VALID  N
DEV          IAU_VIEWER  Audit Service Viewer
DEV_IAU_VIEWER  12.2.1.2.0  VALID  N
DEV          MDS      Metadata Services
DEV_MDS      12.2.1.3.0  VALID  N
DEV          OPSS     Oracle Platform Security Services
```

```
DEV_OPSS          12.2.1.0.0  VALID    N
DEV              STB          Service Table
DEV_STB          12.2.1.3.0  VALID    N
DEV              WLS          WebLogic Services
DEV_WLS          12.2.1.0.0  VALID    N
```

```
select rowid, mrc_name, owner from system.schema_version_registry$;
```

```
ROWID              MRC_NAME  OWNER
-----
AAAXDtAABAAAIWxAAA DEV        DEV_STB
AAAXDtAABAAAIWxAAB DEV        DEV_IAU_APPEND
AAAXDtAABAAAIWxAAC DEV        DEV_IAU_VIEWER
AAAXDtAABAAAIWxAAD DEV        DEV_MDS
AAAXDtAABAAAIWxAAE DEV        DEV_WLS
AAAXDtAABAAAIWxAAF DEV        DEV_IAU
AAAXDtAABAAAIWxAAG DEV        DEV_OPSS
```

22. Identify and recompile schema objects with status INVALID, and review the SELECT statement output:

```
sqlplus sys/password@PDB1 as sysdba
set wrap off;
column owner format a20;
column object_type format a13;
column object_name format a10;
```

```
SELECT owner, object_type, object_name FROM dba_objects WHERE
status = 'INVALID' AND owner in
('DEV_IAU','DEV_IAU_APPEND','DEV_IAU_VIEWER','DEV_MDS','DEV_OPSS','D
EV_STB','DEV_WLS','DEV_WLS_RUNTIME') ORDER BY owner, object_type,
object_name;
```

```
OWNER              OBJECT_TYPE  OBJECT_NAM
-----
DEV_IAU            SYNONYM     OHS
DEV_IAU            SYNONYM     OID
DEV_IAU            SYNONYM     OVD
DEV_IAU            SYNONYM     REPORTSSER
DEV_IAU            SYNONYM     WEBCACHE
```

```
BEGIN UTL_RECOMP.recomp_serial('DEV_IAU'); END;
/
PL/SQL procedure successfully completed.
```

```
SELECT owner, object_type, object_name FROM dba_objects WHERE
status = 'INVALID' AND owner in
('DEV_IAU','DEV_IAU_APPEND','DEV_IAU_VIEWER','DEV_MDS','DEV_OPSS','D
EV_STB','DEV_WLS','DEV_WLS_RUNTIME') ORDER BY owner, object_type,
object_name;
```

```
no rows selected
```

Import SOA Schemas

To import SOA schemas to the target CDB:

1. Sign in to the target environment. For example, `new-target-db12c.example.com`.
2. Change to the `oracle` user:

```
sudo su - oracle
```

3. Make sure the source environment (`soa-host01.example.com` in this example) is in the `/etc/hosts` file.
4. Copy all the scripts you created and dump files from the source environment (`soa-host01.example.com` in this example) to the target environment (`new-target-db12c.example.com:/u01/db_exp/SOA_EXPORTS` in this example):

```
mkdir -p /u01/db_exp/SOA_EXPORTS
cd /u01/db_exp/SOA_EXPORTS
scp -r oracle@soa-host01.example.com:/u01/db_exp/SOA_EXPORTS/* .
```

5. Set the `ORACLE_HOME`, `ORACLE`, and `PATH` environment variables. For example:

```
export ORACLE_HOME=/u01/app/oracle/product/12.1.0.2/dbhome_1
export ORACLE_SID=CDB1
export PATH=$PATH:$ORACLE_HOME/bin
```

6. Change to the `sys` user, or any user with `sysdba` privileges, and connect to the target database, then determine the existing data file location using the following commands:

```
sqlplus sys/password as sysdba
set long 10000;
set lines 200;
set pages 400;
set longchunksize 10000;
set wrap off;
COLUMN FILE_NAME FORMAT A90;
COLUMN name FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A20;
SELECT name, pdb FROM v$services ORDER BY name;
```

| NAME | PDB |
|--------------------------|--------------|
| CDB1.example.com | CDB\$ROOT |
| SYSS\$BACKGROUND | CDB\$ROOT |
| SYSS\$USERS | CDB\$ROOT |
| pdb1_orclsoa.example.com | PDB1_ORCLSOA |
| pdb2_orclsoa.example.com | PDB2_ORCLSOA |

```
ALTER SESSION SET CONTAINER=PDB2_ORCLSOA;
SELECT TABLESPACE_NAME, FILE_NAME FROM dba_data_files;
```

```
TABLESPACE_NAME  FILE_NAME
-----
```

```

-----
SYSTEM      /u01/app/oracle/oradata/CDB1/datafile/pdb2_orclsoa/
pdb2_orclsoa_o1_mf_system_hkj0jm6k_.dbf
SYSAUX      /u01/app/oracle/oradata/CDB1/datafile/pdb2_orclsoa/
pdb2_orclsoa_o1_mf_sysaux_hkj0jm47_.dbf
USERS       /u01/app/oracle/oradata/CDB1/datafile/pdb2_orclsoa/
pdb2_orclsoa_users01.dbf

```

In this example, the data location of PDB2_ORCLSOA is in /u01/app/oracle/oradata/CDB1/datafile/pdb2_orclsoa.

7. Edit the script `create_tablespaces.sql` and update the value of the `DATAFILE` variable to `/u01/app/oracle/oradata/CDB1/datafile/pdb2_orclsoa`
8. In order for the import to succeed, edit the script `create_role_grant.sql` and add the following commands:

```

GRANT UNLIMITED TABLESPACE TO "DEV2_MDS";
GRANT UNLIMITED TABLESPACE TO "DEV2_OPSS";
GRANT UNLIMITED TABLESPACE TO "DEV2_SOAINFRA";
GRANT UNLIMITED TABLESPACE TO "DEV2_STB";
GRANT UNLIMITED TABLESPACE TO "DEV2_UMS";
GRANT UNLIMITED TABLESPACE TO "DEV2_WLS";

```

9. As the `sys` user, connect to the target database and run the scripts `create_tablespaces.sql`, `create_users.sql`, and `create_role_grant.sql`:

```

sqlplus sys/password as sysdba
ALTER SESSION SET CONTAINER=PDB2_ORCLSOA;
show con_name;

CON_NAME
-----
PDB2_ORCLSOA

@create_tablespaces.sql
@create_users.sql
@create_role_grant.sql

```

 **Note:**

Some statements in `create_role_grant.sql` will fail as some objects are not yet created. You will run this script again later to succeed.

10. As the `sys` user, connect to the target database and create the export directory:

```

sqlplus "/ as sysdba"
ALTER SESSION SET CONTAINER=PDB2_ORCLSOA;
CREATE DIRECTORY DUMP_SOA AS '/u01/db_exp/SOA_EXPORTS';

```

11. Check if the export directory was successfully created:

```
SELECT directory_name, directory_path FROM dba_directories WHERE
directory_name='DUMP_SOA';
```

12. Grant READ and WRITE permissions to the respective schemas:

```
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_IAU;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_IAU_APPEND;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_IAU_VIEWER;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_MDS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_OPSS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_SOAINFRA;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_STB;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_UMS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_WLS;
GRANT READ,WRITE ON DIRECTORY DUMP_SOA TO DEV2_WLS_RUNTIME;
```

13. Enter the following commands to avoid an error that STBROLE does not exist during the import of DEV_STB:

```
sqlplus sys/password@PDB2 as sysdba
BEGIN      EXECUTE IMMEDIATE 'CREATE ROLE STBROLE'; END;
/
```

14. Change to the oracle user.**15. In the SOA_EXPORTS directory, use a text editor to create a bash script to run the Data Pump Import utility (impdp) on all schemas. For example, create a script named import_soa_schema.sh with the following contents:**

```
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_IAU directory=DUMP_SOA
dumpfile=DEV2_IAU_export.dmp logfile=DEV2_IAU_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_IAU_APPEND
directory=DUMP_SOA dumpfile=DEV2_IAU_APPEND_export.dmp
logfile=DEV2_IAU_APPEND_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_IAU_VIEWER
directory=DUMP_SOA dumpfile=DEV2_IAU_VIEWER_export.dmp
logfile=DEV2_IAU_VIEWER_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_MDS directory=DUMP_SOA
dumpfile=DEV2_MDS_export.dmp logfile=DEV2_MDS_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_OPSS
directory=DUMP_SOA dumpfile=DEV2_OPSS_export.dmp
logfile=DEV2_OPSS_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_SOAINFRA
directory=DUMP_SOA dumpfile=DEV2_SOAINFRA_export.dmp
logfile=DEV2_SOAINFRA_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_STB directory=DUMP_SOA
dumpfile=DEV2_STB_export.dmp logfile=DEV2_STB_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_UMS directory=DUMP_SOA
dumpfile=DEV2_UMS_export.dmp logfile=DEV2_UMS_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_WLS directory=DUMP_SOA
dumpfile=DEV2_WLS_export.dmp logfile=DEV2_WLS_import.log parallel=4
impdp \"sys/password@PDB2 as sysdba\" schemas=DEV2_WLS_RUNTIME
```

```
directory=DUMP_SOA dumpfile=DEV2_WLS_RUNTIME_export.dmp
logfile=DEV2_WLS_RUNTIME_import.log parallel=4
```

16. As the `sys` user, run the script in the target environment:

```
@import_soa_schema.sh
quit
```

17. Connect to the target database and run the script `create_role_grant.sql` again to succeed without errors:

```
sqlplus sys/password@PDB1 as sysdba
@create_role_grant.sql
```

18. Before importing the `SCHEMA_VERSION_REGISTRY`, enter the following commands as the database administrator to create a role to allow registry access:

```
sqlplus sys/password@PDB2 as sysdba
BEGIN EXECUTE IMMEDIATE 'CREATE ROLE REGISTRYACCESS'; END;
/
```

19. As the `oracle` user, enter the following commands to run the Data Pump Import utility (`impdp`):

```
impdp \"sys/password@PDB2 as sysdba\" SCHEMAS=SYSTEM
directory=DUMP_SOA DUMPFILE=SYSTEM_SCHEMA_VERSION_REGISTRY.dmp
LOGFILE=SYSTEM_SCHEMA_VERSION_REGISTRY_import.log parallel=4
TABLE_EXISTS_ACTION=APPEND

impdp \"sys/password@PDB2 as sysdba\"
SCHEMAS=DEV2_IAU,DEV2_IAU_APPEND,DEV2_IAU_VIEWER,DEV2_MDS,DEV2_OPSS,
DEV2_SOAINFRA,DEV2_STB,DEV2_UMS,DEV2_WLS,DEV2_WLS_RUNTIME
directory=DUMP_SOA DUMPFILE=SYSTEM_SCHEMA_VERSION_REGISTRY.dmp
LOGFILE=SYSTEM_SCHEMA_VERSION_REGISTRY_import2.log parallel=4
TABLE_EXISTS_ACTION=APPEND
```

 **Note:**

The first `impdp` command will return some errors on `DEV_*` schemas, which is a normal error as we don't have `DEV` schemas in `PDB2`. The second `impdp` returns some errors on `DEV2_*` schemas, which can also be ignored.

20. Enter the following commands and review the `SELECT` statement output to ensure the data is valid:

```
sqlplus sys/password@PDB2 as sysdba
@create_select_grant_system.sql
CREATE PUBLIC SYNONYM schema_version_registry FOR
system.schema_version_registry;

set lines 210;
```

```

set pages 40;
COLUMN MRC_NAME FORMAT A10;
COLUMN COMP_ID FORMAT A12;
COLUMN COMP_NAME FORMAT A35;
COLUMN OWNER FORMAT A17;
COLUMN VERSION FORMAT A12;
COLUMN STATUS FORMAT A8;
COLUMN UPGRADED FORMAT A8;
COLUMN OBJECT_NAME FORMAT A25;
COLUMN TABLE_NAME FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A15;

SELECT MRC_NAME, COMP_ID, COMP_NAME, OWNER, VERSION, STATUS, UPGRADED
FROM SCHEMA_VERSION_REGISTRY ORDER BY MRC_NAME, COMP_ID;

```

| MRC_NAME | COMP_ID | COMP_NAME | OWNER | VERSION | STATUS | UPGRADED |
|----------|------------|-----------------------------------|-------|---------|--------|----------|
| DEV | IAU | Audit Service | | | | |
| DEV | IAU | 12.2.1.2.0 | | VALID | | N |
| DEV | IAU_APPEND | Audit Service Append | | | | |
| DEV | IAU_APPEND | 12.2.1.2.0 | | VALID | | N |
| DEV | IAU_VIEWER | Audit Service Viewer | | | | |
| DEV | IAU_VIEWER | 12.2.1.2.0 | | VALID | | N |
| DEV | MDS | Metadata Services | | | | |
| DEV | MDS | 12.2.1.3.0 | | VALID | | N |
| DEV | OPSS | Oracle Platform Security Services | | | | |
| DEV | OPSS | 12.2.1.0.0 | | VALID | | N |
| DEV | STB | Service Table | | | | |
| DEV | STB | 12.2.1.3.0 | | VALID | | N |
| DEV | WLS | WebLogic Services | | | | |
| DEV | WLS | 12.2.1.0.0 | | VALID | | N |
| DEV2 | IAU | Audit Service | | | | |
| DEV2 | IAU | 12.2.1.2.0 | | VALID | | N |
| DEV2 | IAU_APPEND | Audit Service Append | | | | |
| DEV2 | IAU_APPEND | 12.2.1.2.0 | | VALID | | N |
| DEV2 | IAU_VIEWER | Audit Service Viewer | | | | |
| DEV2 | IAU_VIEWER | 12.2.1.2.0 | | VALID | | N |
| DEV2 | MDS | Metadata Services | | | | |
| DEV2 | MDS | 12.2.1.3.0 | | VALID | | N |
| DEV2 | OPSS | Oracle Platform Security Services | | | | |
| DEV2 | OPSS | 12.2.1.0.0 | | VALID | | N |
| DEV2 | SOAINFRA | SOA Infrastructure Services | | | | |
| DEV2 | SOAINFRA | 12.2.1.3.0 | | VALID | | N |
| DEV2 | STB | Service Table | | | | |
| DEV2 | STB | 12.2.1.3.0 | | VALID | | N |
| DEV2 | UCSUMS | User Messaging Service | | | | |
| DEV2 | UCSUMS | 12.2.1.0.0 | | VALID | | N |
| DEV2 | WLS | WebLogic Services | | | | |
| DEV2 | WLS | 12.2.1.0.0 | | VALID | | N |

```

select rowid, mrc_name, owner from system.schema_version_registry$;

```

| ROWID | MRC_NAME | OWNER |
|-------|----------|-------|
|-------|----------|-------|


```

-----
AAAX10AABAAAIBAAA DEV          DEV_STB
AAAX10AABAAAIBBAAB DEV        DEV_IAU_APPEND
AAAX10AABAAAIBBAAC DEV        DEV_IAU_VIEWER
AAAX10AABAAAIBBAAD DEV        DEV_MDS
AAAX10AABAAAIBBAAE DEV        DEV_WLS
AAAX10AABAAAIBBAAF DEV        DEV_IAU
AAAX10AABAAAIBBAAG DEV        DEV_OPSS
AAAX10AABAAAIBBAAH DEV2       DEV2_STB
AAAX10AABAAAIBBAAI DEV2       DEV2_IAU_APPEND
AAAX10AABAAAIBBAAJ DEV2       DEV2_IAU_VIEWER
AAAX10AABAAAIBBAAK DEV2       DEV2_MDS
AAAX10AABAAAIBBAAL DEV2       DEV2_WLS
AAAX10AABAAAIBBAAM DEV2       DEV2_UMS
AAAX10AABAAAIBBAAN DEV2       DEV2_IAU
AAAX10AABAAAIBBAAO DEV2       DEV2_OPSS
AAAX10AABAAAIBBAAP DEV2       DEV2_SOAINFRA

```

```

SELECT OWNER, TABLE_NAME, TABLESPACE_NAME, STATUS from all_tables
where table_name = 'SCHEMA_VERSION_REGISTRY$' and owner in
('SYSTEM', 'FMWREGISTRY');

```

| OWNER | TABLE_NAME | TABLESPACE_NAME | STATUS |
|--------|---------------------------|-----------------|--------|
| SYSTEM | SCHEMA_VERSION_REGISTRY\$ | SYSTEM | VALID |

```

select owner, object_name, object_type from all_objects where
object_name like '%SCHEMA_VERSION_REGISTRY%';

```

| OWNER | OBJECT_NAME | OBJECT_TYPE |
|--------|---------------------------|-------------|
| PUBLIC | SCHEMA_VERSION_REGISTRY | SYNONYM |
| SYSTEM | SCHEMA_VERSION_REGISTRY\$ | TABLE |
| SYSTEM | SCHEMA_VERSION_REGISTRY | VIEW |

- 21. Delete lines that do not belong to DEV2, and review the SELECT statement output to ensure the data is valid:**

```

sqlplus sys/password@PDB2 as sysdba
DELETE FROM SCHEMA_VERSION_REGISTRY WHERE MRC_NAME != 'DEV2';

```

```

set lines 210;
set pages 40;
COLUMN MRC_NAME FORMAT A10;
COLUMN COMP_ID FORMAT A12;
COLUMN COMP_NAME FORMAT A35;
COLUMN OWNER FORMAT A17;
COLUMN VERSION FORMAT A12;
COLUMN STATUS FORMAT A8;
COLUMN UPGRADED FORMAT A8;
COLUMN OBJECT_NAME FORMAT A25;
COLUMN TABLE_NAME FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A15;

```

```

SELECT MRC_NAME, COMP_ID, COMP_NAME, OWNER, VERSION, STATUS,

```

```
UPGRADED FROM SCHEMA_VERSION_REGISTRY ORDER BY MRC_NAME, COMP_ID;
```

| MRC_NAME | COMP_ID | COMP_NAME | OWNER | VERSION | STATUS | UPGRADED |
|-----------------|------------|-----------------------------------|-------|---------|--------|----------|
| DEV2 | IAU | Audit Service | | | | |
| DEV2_IAU | | 12.2.1.2.0 | | VALID | | N |
| DEV2 | IAU_APPEND | Audit Service Append | | | | |
| DEV2_IAU_APPEND | | 12.2.1.2.0 | | VALID | | N |
| DEV2 | IAU_VIEWER | Audit Service Viewer | | | | |
| DEV2_IAU_VIEWER | | 12.2.1.2.0 | | VALID | | N |
| DEV2 | MDS | Metadata Services | | | | |
| DEV2_MDS | | 12.2.1.3.0 | | VALID | | N |
| DEV2 | OPSS | Oracle Platform Security Services | | | | |
| DEV2_OPSS | | 12.2.1.0.0 | | VALID | | N |
| DEV2 | SOAINFRA | SOA Infrastructure Services | | | | |
| DEV2_SOAINFRA | | 12.2.1.3.0 | | VALID | | N |
| DEV2 | STB | Service Table | | | | |
| DEV2_STB | | 12.2.1.3.0 | | VALID | | N |
| DEV2 | UCSUMS | User Messaging Service | | | | |
| DEV2_UMS | | 12.2.1.0.0 | | VALID | | N |
| DEV2 | WLS | WebLogic Services | | | | |
| DEV2_WLS | | 12.2.1.0.0 | | VALID | | N |

```
select rowid, mrc_name, owner from system.schema_version_registry$;
```

| ROWID | MRC_NAME | OWNER |
|-------------------|----------|-----------------|
| AAAX10AABAAAIBAAH | DEV2 | DEV2_STB |
| AAAX10AABAAAIBAAI | DEV2 | DEV2_IAU_APPEND |

```
set lines 210;
set pages 40;
COLUMN MRC_NAME FORMAT A10;
COLUMN COMP_ID FORMAT A12;
COLUMN COMP_NAME FORMAT A35;
COLUMN OWNER FORMAT A17;
COLUMN VERSION FORMAT A12;
COLUMN STATUS FORMAT A8;
COLUMN UPGRADED FORMAT A8;
COLUMN OBJECT_NAME FORMAT A25;
COLUMN TABLE_NAME FORMAT A25;
COLUMN TABLESPACE_NAME FORMAT A15;
```

```
SELECT MRC_NAME, COMP_ID, COMP_NAME, OWNER, VERSION, STATUS, UPGRADED
FROM SCHEMA_VERSION_REGISTRY ORDER BY MRC_NAME, COMP_ID;
```

| MRC_NAME | COMP_ID | COMP_NAME | OWNER | VERSION | STATUS | UPGRADED |
|----------|------------|----------------------|-------|---------|--------|----------|
| DEV2 | IAU | Audit Service | | | | |
| DEV2_IAU | | 12.2.1.2.0 | | VALID | | N |
| DEV2 | IAU_APPEND | Audit Service Append | | | | |

```


DEV2_IAU_APPEND 12.2.1.2.0 VALID N
DEV2_IAU_VIEWER Audit Service Viewer
DEV2_IAU_VIEWER 12.2.1.2.0 VALID N
DEV2_MDS MDS Metadata Services
DEV2_MDS 12.2.1.3.0 VALID N
DEV2_OPSS OPSS Oracle Platform Security Services
DEV2_OPSS 12.2.1.0.0 VALID N
DEV2_SOAINFRA SOAINFRA SOA Infrastructure Services
DEV2_SOAINFRA 12.2.1.3.0 VALID N
DEV2_STB STB Service Table
DEV2_STB 12.2.1.3.0 VALID N
DEV2_UCSUMS UCSUMS User Messaging Service
DEV2_UCSUMS 12.2.1.0.0 VALID N
DEV2_WLS WLS WebLogic Services
DEV2_WLS 12.2.1.0.0 VALID N

```

```
select rowid, mrc_name, owner from system.schema_version_registry$;
```

| ROWID | MRC_NAME | OWNER |
|--------------------|----------|----------|
| AAAX10AABAAAIIBAAB | DEV2 | DEV2_IUA |
| AAAX10AABAAAIIBAAC | DEV2 | DEV2_IUB |
| AAAX10AABAAAIIBAAD | DEV2 | DEV2_IUC |
| AAAX10AABAAAIIBAAE | DEV2 | DEV2_IUD |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUE |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUF |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUG |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUH |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUI |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUJ |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUK |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUL |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUM |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUN |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUO |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUP |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUQ |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUR |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUS |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUT |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUV |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUW |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUX |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUY |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUZ |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUA |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUB |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUC |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUD |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUE |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUF |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUG |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUH |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUI |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUJ |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUK |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUL |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUM |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUN |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUO |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUP |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUQ |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUR |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUS |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUT |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUV |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUW |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUX |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUY |
| AAAX10AABAAAIIBAAG | DEV2 | DEV2_IUZ |

22. Identify and recompile schema objects with status INVALID, and review the SELECT statement output.

 **Note:**
In this example, the 6 rows of DEV2_SOAINFRA are already INVALID in the source database.

```

sqlplus sys/password@PDB2 as sysdba
set wrap off;
column owner format a20;
column object_type format a13;

```

```
column object_name format a20;

SELECT owner, object_type, object_name FROM dba_objects WHERE status =
'INVALID' AND owner in
('DEV2_IAU','DEV2_IAU_APPEND','DEV2_IAU_VIEWER','DEV2_MDS','DEV2_OPSS',
'DEV2_SOAINFRA','DEV2_STB','DEV2_UMS','DEV2_WLS','DEV2_WLS_RUNTIME')
ORDER BY owner, object_type, object_name;
```

| OWNER | OBJECT_TYPE | OBJECT_NAM |
|---------------|--------------|------------|
| DEV2_IAU | SYNONYM | OHS |
| DEV2_IAU | SYNONYM | OID |
| DEV2_IAU | SYNONYM | OVD |
| DEV2_IAU | SYNONYM | REPORTSSER |
| DEV2_IAU | SYNONYM | WEBCACHE |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_BPEL |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_DEC |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_FAB |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_HWF |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_MED |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_SOA |

```
BEGIN UTL_RECOMP.recomp_serial('DEV2_IAU'); END;
/
PL/SQL procedure successfully completed.
BEGIN UTL_RECOMP.recomp_serial('DEV2_SOAINFRA'); END;
/
PL/SQL procedure successfully completed.
```

```
SELECT owner, object_type, object_name FROM dba_objects WHERE status =
'INVALID' AND owner in
('DEV2_IAU','DEV2_IAU_APPEND','DEV2_IAU_VIEWER','DEV2_MDS','DEV2_OPSS',
'DEV2_SOAINFRA','DEV2_STB','DEV2_UMS','DEV2_WLS','DEV2_WLS_RUNTIME')
ORDER BY owner, object_type, object_name;
```

| OWNER | OBJECT_TYPE | OBJECT_NAME |
|---------------|--------------|-------------|
| DEV2_SOAINFRA | PACKAGE BODY | TRS_BPEL |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_DEC |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_FAB |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_HWF |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_MED |
| DEV2_SOAINFRA | PACKAGE BODY | TRS_SOA |

23. Start the SOA queues, and review the SELECT statement output:

```
sqlplus DEV2_SOAINFRA/password@PDB2

set lines 200;
set pages 400;
COLUMN name format A25;
COLUMN enqueue_enabled format A15;
COLUMN dequeue_enabled format A15;

SELECT name,enqueue_enabled,dequeue_enabled FROM USER_QUEUES where
```

```
queue_type = 'NORMAL_QUEUE';
```

| NAME | ENQUEUE_ENABLED | DEQUEUE_ENABLED |
|------------------------|-----------------|-----------------|
| B2B_BAM_QUEUE | NO | NO |
| OSB_REPORTING_PURGE | NO | NO |
| OSB_REPORTING_ERROR | NO | NO |
| OSB_REPORTING_PROVIDER | NO | NO |
| OSB_FILE_TRANSPORT | NO | NO |
| OSB_EMAIL_TRANSPORT | NO | NO |
| OSB_SFTP_TRANSPORT | NO | NO |
| OSB_FTP_TRANSPORT | NO | NO |
| TASK_NOTIFICATION_Q | NO | NO |
| EDN_AQJMS_TOPIC | NO | NO |
| EDN_OAOO_QUEUE | NO | NO |
| EDN_EVENT_QUEUE | NO | NO |
| IP_IN_QUEUE | NO | NO |
| IP_OUT_QUEUE | NO | NO |
| AIA_CAVSCALLBACKJMSQ | NO | NO |

```
BEGIN
DBMS_AQADM.START_QUEUE ('AIA_CAVSCALLBACKJMSQ');
DBMS_AQADM.START_QUEUE ('B2B_BAM_QUEUE');
DBMS_AQADM.START_QUEUE ('EDN_AQJMS_TOPIC');
DBMS_AQADM.START_QUEUE ('EDN_EVENT_QUEUE');
DBMS_AQADM.START_QUEUE ('EDN_OAOO_QUEUE');
DBMS_AQADM.START_QUEUE ('IP_IN_QUEUE');
DBMS_AQADM.START_QUEUE ('IP_OUT_QUEUE');
DBMS_AQADM.START_QUEUE ('OSB_EMAIL_TRANSPORT');
DBMS_AQADM.START_QUEUE ('OSB_FILE_TRANSPORT');
DBMS_AQADM.START_QUEUE ('OSB_FTP_TRANSPORT');
DBMS_AQADM.START_QUEUE ('OSB_REPORTING_ERROR');
DBMS_AQADM.START_QUEUE ('OSB_REPORTING_PROVIDER');
DBMS_AQADM.START_QUEUE ('OSB_REPORTING_PURGE');
DBMS_AQADM.START_QUEUE ('OSB_SFTP_TRANSPORT');
DBMS_AQADM.START_QUEUE ('TASK_NOTIFICATION_Q');
END;
/
```

```
SELECT name,enqueue_enabled,dequeue_enabled FROM USER_QUEUES where
queue_type = 'NORMAL_QUEUE' order by name asc;
```

| NAME | ENQUEUE_ENABLED | DEQUEUE_ENABLED |
|----------------------|-----------------|-----------------|
| AIA_CAVSCALLBACKJMSQ | YES | YES |
| B2B_BAM_QUEUE | YES | YES |
| EDN_AQJMS_TOPIC | YES | YES |
| EDN_EVENT_QUEUE | YES | YES |
| EDN_OAOO_QUEUE | YES | YES |
| IP_IN_QUEUE | YES | YES |
| IP_OUT_QUEUE | YES | YES |
| OSB_EMAIL_TRANSPORT | YES | YES |
| OSB_FILE_TRANSPORT | YES | YES |
| OSB_FTP_TRANSPORT | YES | YES |
| OSB_REPORTING_ERROR | YES | YES |

| | | |
|------------------------|-----|-----|
| OSB_REPORTING_PROVIDER | YES | YES |
| OSB_REPORTING_PURGE | YES | YES |
| OSB_SFTP_TRANSPORT | YES | YES |
| TASK_NOTIFICATION_Q | YES | YES |

A.5 Updating JDBC Connections for the Oracle Fusion Middleware and Oracle SOA Suite Domains

To update JDBC connections for Oracle Fusion Middleware and Oracle SOA Suite domains, complete the following steps:

- [Update Oracle Fusion Middleware Domain Configuration Files](#)
- [Update Oracle SOA Suite Domain Configuration Files](#)

Update Oracle Fusion Middleware Domain Configuration Files

In this example:

- The new host is `new-target-db12c.example.com`.
- The new service name is `PDB1_ORCLSOA.EXAMPLE.COM`.

To update Oracle Fusion Middleware domain configuration files to point to the new target database:

1. **Update** `/u01/oracle/middleware/domains/fmw_domain/config/fmwconfig/jps-config.xml`:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" jps-config.xml
```

2. **Update** `/u01/oracle/middleware/domains/fmw_domain/config/fmwconfig/jps-config-jse.xml`:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" jps-config-jse.xml
```

3. **Update** `/u01/oracle/middleware/domains/fmw_domain/config/jdbc/LocalSvcTblDataSource-jdbc.xml`:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" LocalSvcTblDataSource-jdbc.xml
```

4. **Update** `/u01/oracle/middleware/domains/fmw_domain/config/jdbc/mds-owsm-jdbc.xml`:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" mds-owsm-jdbc.xml
```

5. **Update** /u01/oracle/middleware/domains/fmw_domain/config/jdbc/opss-audit-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" opss-audit-jdbc.xml
```

6. **Update** /u01/oracle/middleware/domains/fmw_domain/config/jdbc/opss-auditview-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" opss-auditview-jdbc.xml
```

7. **Update** /u01/oracle/middleware/domains/fmw_domain/config/jdbc/opss-datasource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" opss-datasource-jdbc.xml
```

8. **Update** /u01/oracle/middleware/domains/fmw_domain/config/jdbc/WLSSchemaDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB1_ORCLSOA.EXAMPLE.COM|Ig" WLSSchemaDataSource-jdbc.xml
```

Update Oracle SOA Suite Domain Configuration Files

In this example:

- The new host is `new-target-db12c.example.com`.
- The new service name is `PDB2_ORCLSOA.EXAMPLE.COM`.

To update Oracle SOA Suite domain configuration files to point to the new target database:

1. **Update** /u01/oracle/middleware/domains/soa_domain/config/fmwconfig/jps-config.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" jps-config.xml
```

2. **Update** /u01/oracle/middleware/domains/soa_domain/config/fmwconfig/jps-config-jse.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" jps-config-jse.xml
```

3. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/LocalSvcTblDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" LocalSvcTblDataSource-jdbc.xml
```

4. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/mds-owsm-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" mds-owsm-jdbc.xml
```

5. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/SOADataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" SOADataSource-jdbc.xml
```

6. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/SOALocalTxDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" SOALocalTxDataSource-jdbc.xml
```

7. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/mds-soa-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" mds-soa-jdbc.xml
```

8. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/opss-audit-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" opss-audit-jdbc.xml
```

9. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/opss-auditview-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" opss-auditview-jdbc.xml
```

10. **Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/opss-datasource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig" opss-datasource-jdbc.xml
```


- 11. Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/OraSDPMDDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-
target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig"
OraSDPMDDataSource-jdbc.xml
```

- 12. Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/EDNDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-
target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig"
EDNDataSource-jdbc.xml
```

- 13. Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/EDNLocalTxDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-
target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig"
EDNLocalTxDataSource-jdbc.xml
```

- 14. Update** /u01/oracle/middleware/domains/soa_domain/config/jdbc/WLSSchemaDataSource-jdbc.xml:

```
sed -i "s|soa-host01.example.com:1521/ORCLSOA.EXAMPLE.COM|new-
target-db12c.example.com:1521/PDB2_ORCLSOA.EXAMPLE.COM|Ig"
WLSSchemaDataSource-jdbc.xml
```

A.6 Starting the Oracle Fusion Middleware and Oracle SOA Suite Domains on the Target Database

To start the domains on the target container database (CDB), complete the following steps:

- [Start the Oracle Fusion Middleware Domain](#)
- [Start the Oracle SOA Suite Domain](#)

Start the Oracle Fusion Middleware Domain

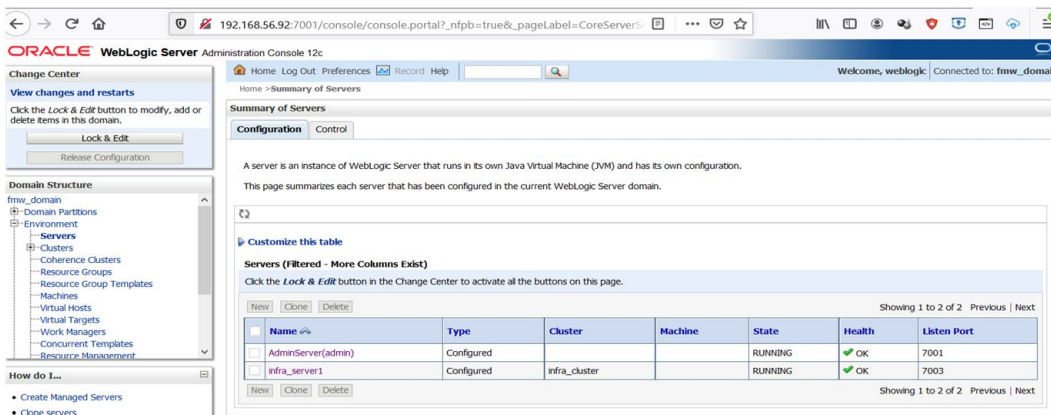
After updating the Oracle Fusion Middleware domain configuration files to point to the new target database, you can shut down the source database, then start the Oracle Fusion Middleware domain on the target database and check the JDBC connections:

1. To start the Oracle Fusion Middleware domain, start the Administration Server and the Managed Servers. For example:

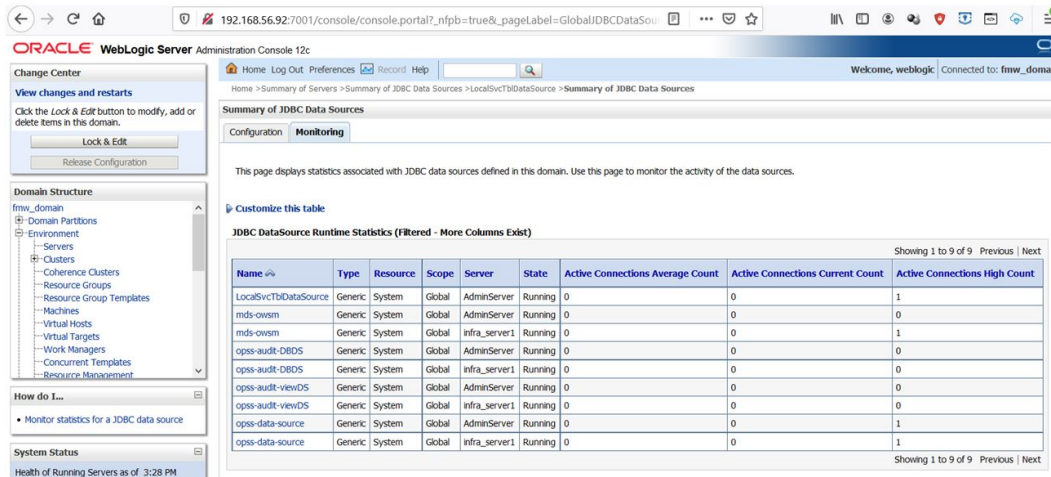
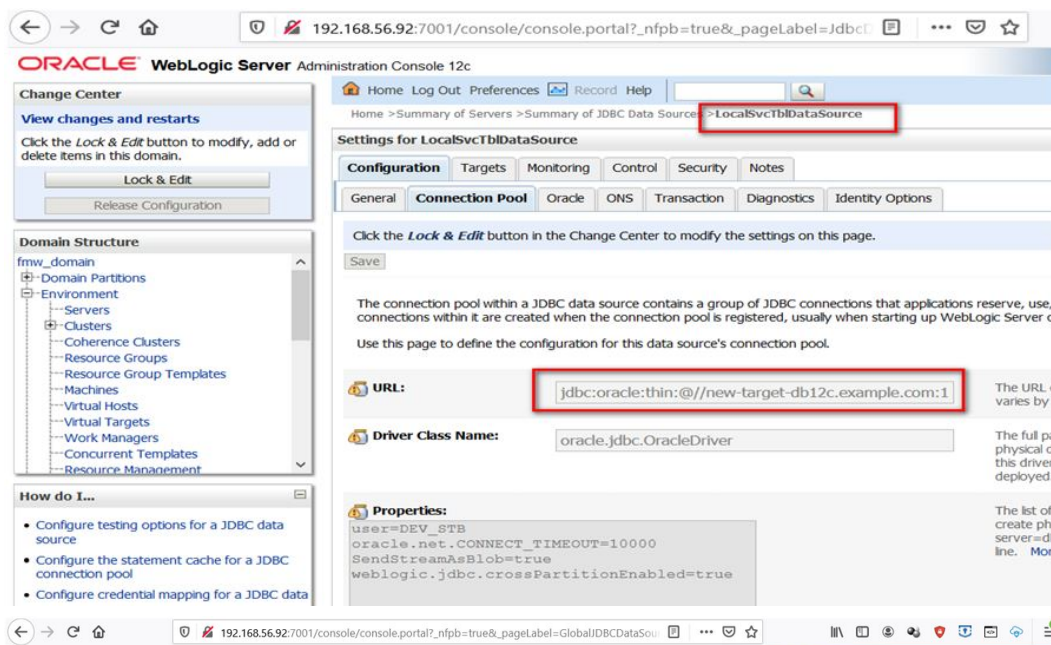
```
cd /u01/oracle/middleware/domains/fmw_domain
./startWebLogic.sh
cd /u01/oracle/middleware/domains/fmw_domain/bin
./startManagedWebLogic.sh infra_server1 http://192.168.56.92:7001
```

2. In the WebLogic Server Administration Console, check the server status:

Starting the Oracle Fusion Middleware and Oracle SOA Suite Domains on the Target Database



3. Check the connection status:



Start the Oracle SOA Suite Domain

After updating the Oracle SOA Suite domain configuration files to point to the new target database, you can shut down the source database, then start the Oracle SOA Suite domain on the target database and check the JDBC connections:

1. To start the Oracle SOA Suite domain, start the Administration Server and the Managed Servers. For example:

```
cd /u01/oracle/middleware/domains/soa_domain
./startWebLogic.sh
cd /u01/oracle/middleware/domains/soa_domain/bin
./startManagedWebLogic.sh soa_server1 http://192.168.56.92:7010
```

2. In the WebLogic Server Administration Console, check the server status:

ORACLE WebLogic Server Administration Console 12c

Home > Summary of Servers

Summary of Servers

Configuration Control

A server is an instance of WebLogic Server that runs in its own Java Virtual Machine (JVM) and has its own configuration. This page summarizes each server that has been configured in the current WebLogic Server domain.

Customize this table

Servers (Filtered - More Columns Exist)

Click the Lock & Edit button in the Change Center to activate all the buttons on this page.

| Name | Type | Cluster | Machine | State | Health | Listen Port |
|--------------------|------------|-------------|---------|---------|--------|-------------|
| AdminServer(admin) | Configured | | | RUNNING | OK | 7010 |
| soa_server1 | Configured | soa_cluster | | RUNNING | OK | 7013 |

3. Check the connection status:

ORACLE WebLogic Server Administration Console 12c

Home > Summary of Servers > Summary of JDBC Data Sources > SOADataSource

Settings for SOADataSource

Configuration Targets Monitoring Control Security Notes

General Connection Pool Oracle ONS Transaction Diagnostics Identity Options

Click the Lock & Edit button in the Change Center to modify the settings on this page.

Save

The connection pool within a JDBC data source contains a group of JDBC connections that applications reserve, use, and then return to the pool. The connection pool and the connections within it are created when the connection pool is registered, usually when starting up WebLogic Server or when deploying the data source to a new target.

Use this page to define the configuration for this data source's connection pool.

URL: jdbc:oracle:thin:@/new-target-d012c.example.com:1

Driver Class Name: oracle.jdbc.xa.client.OracleXADataSource

Properties: dev2_BOAINFRA

Server Administration Console 12c

Home > Summary of Servers > Summary of JDBC Data Sources > SOADataSource > Summary of JDBC Data Sources

Summary of JDBC Data Sources

Configuration Monitoring

This page displays statistics associated with JDBC data sources defined in this domain. Use this page to monitor the activity of the data sources.

Customize this table

JDBC DataSource Runtime Statistics (Filtered - More Columns Exist)

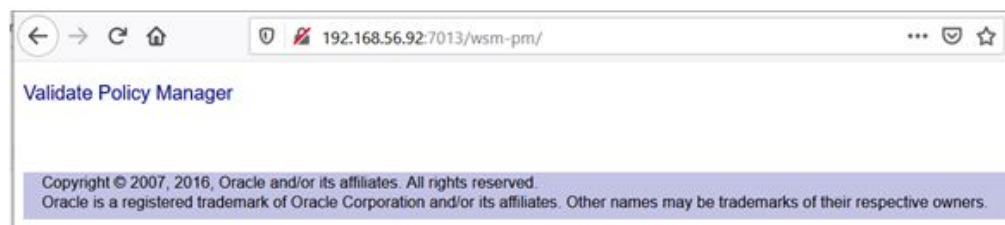
| Name | Type | Resource | Scope | Server | State | Active Connections | Average Count | Active Connections Current Count | Active Connections High Count |
|----------------------|---------|----------|--------|-------------|---------|--------------------|---------------|----------------------------------|-------------------------------|
| EDNDataSource | Generic | System | Global | soa_server1 | Running | 0 | 0 | 0 | 0 |
| EDNLocalTxDataSource | Generic | System | Global | soa_server1 | Running | 0 | 0 | 0 | 0 |
| LocalSvcTbDataSource | Generic | System | Global | AdminServer | Running | 0 | 0 | 1 | 1 |
| mds-owsm | Generic | System | Global | soa_server1 | Running | 0 | 0 | 2 | 2 |
| mds-owsm | Generic | System | Global | AdminServer | Running | 0 | 0 | 2 | 2 |
| mds-soa | Generic | System | Global | soa_server1 | Running | 0 | 0 | 2 | 2 |
| mds-soa | Generic | System | Global | AdminServer | Running | 0 | 0 | 0 | 0 |
| opss-audit-DBDS | Generic | System | Global | soa_server1 | Running | 0 | 0 | 0 | 0 |
| opss-audit-DBDS | Generic | System | Global | AdminServer | Running | 0 | 0 | 0 | 0 |
| opss-audit-viewDS | Generic | System | Global | soa_server1 | Running | 0 | 0 | 0 | 0 |

4. Check the Oracle SOA Suite Managed Server log file. For example:

```
...
<Aug 20, 2020 3:23:43,616 PM CEST> <Warning> <oracle.soa.scheduler>
<BEA-000000> <No row exists in table soaqtz_JOB_DETAILS for lock named:
VerificationSessionPurgeJob-QLCKSEP-DEFAULT>
[EL Info]: 2020-08-20 15:23:44.079--ServerSession(1948318745)--
EclipseLink, version: Eclipse Persistence Services - 2.6.5.v20170607-
b3d05bd
[EL Info]: 2020-08-20 15:23:44.08--ServerSession(1948318745)--Server:
12.2.1.3.0
[EL Info]: 2020-08-20 15:23:44.157--ServerSession(1948318745)--/file:/u01/
oracle/middleware/soa12213/soa/soa/modules/oracle.soa.fabric_11.1.1/
tracking-fabric.jar_soa_local_resiliency_persistence_unit login successful
SOA Platform is running and accepting requests. Start up took 17561 ms,
partition=DOMAIN
<Aug 20, 2020 3:23:47,156 PM CEST> <Warning> <oracle.soa.healthcheck>
<BEA-000000> <On startup, health check id 293 failed for category
'Startup'. Ran 6 checks. Number of failures=1, errors=1, warnings=0.>
```

5. Check Oracle SOA Suite URLs. For example:

- <http://192.168.56.92:7013/wsm-pm/>



- <http://192.168.56.92:7013/soa-infra/>

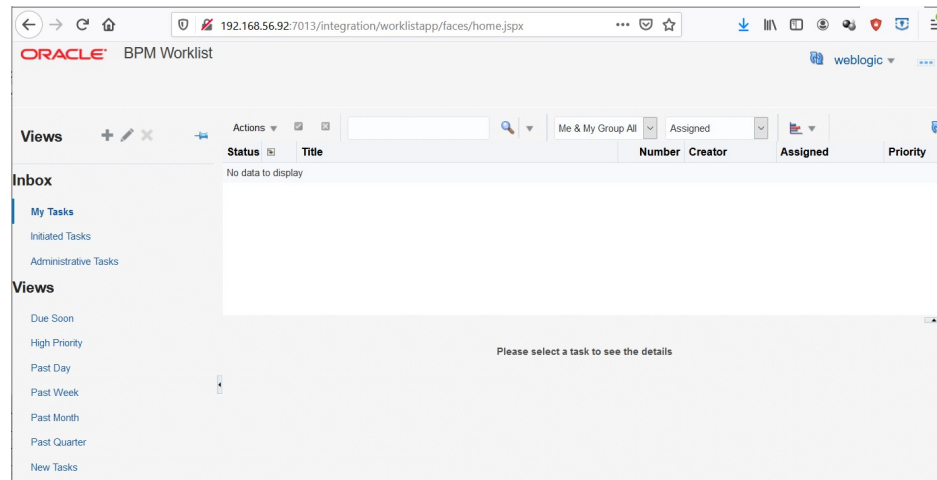


Welcome to the Oracle SOA Platform on WebLogic

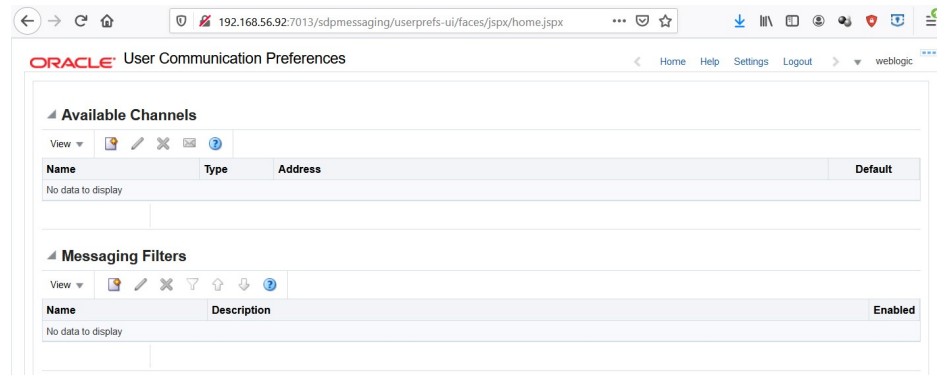
SOA Version: v12.2.1.3.0 - MAIN_170820.1700.2557
 WebLogic Server 12.2.1.3.0 (12.2.1.3.0)
 Running on: soa_server1

There are no composites deployed to the platform

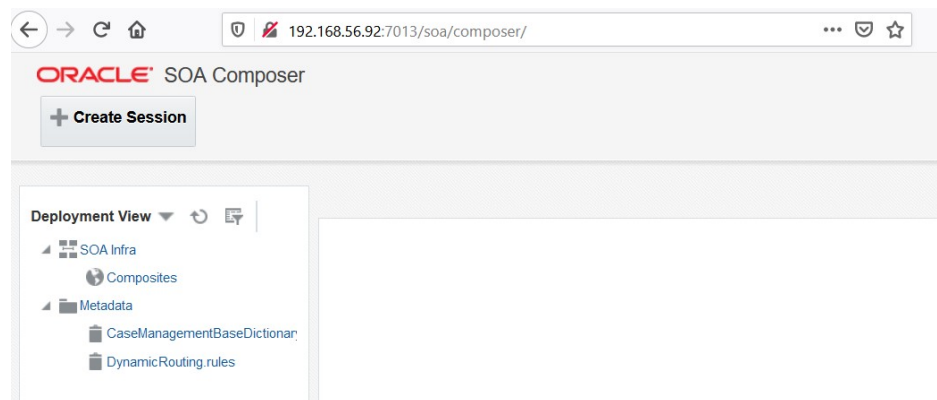
- <http://192.168.56.92:7013/integration/worklistapp>



- <http://192.168.56.92:7013/sdpMessaging/userprefs-ui>



- <http://192.168.56.92:7013/soa/composer>



- <http://192.168.56.92:7013/integration/services/IdentityService/identity?WSDL>

```

<definitions name="IdentityService" targetNamespace="http://xmlns.oracle.com/bpel/services/IdentityService">
  <documentation>Service used to interact with the task service</documentation>
  <import namespace="http://xmlns.oracle.com/bpel/services/IdentityService" location="http://192.168.56.92:7013/integration/services/IdentityService/identity?WSDL=IdentityServiceInterface.wsdl"/>
  <binding name="IdentityServiceSOAPBinding" type="tns:IdentityServicePortType">
    <soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>
    <operation name="getUserAttribute">
      <soap:operation style="document" soapAction=""/>
      <input name="getUserAttributeInput">
        <soap:body use="literal" parts="payload"/>
      </input>
      <output name="getUserAttributeOutput">
        <soap:body use="literal" parts="payload"/>
      </output>
      <fault name="identityServiceFault">
        <soap:fault name="lookupUserFault" use="literal"/>
      </fault>
      <fault name="identityNotFoundFault">
        <soap:fault name="lookupUserFault" use="literal"/>
      </fault>
    </operation>
    <operation name="getGroupAttribute">
      <soap:operation style="document" soapAction=""/>
      <input name="getGroupAttributeInput">
        <soap:body use="literal" parts="payload"/>
      </input>
      <output name="getGroupAttributeOutput">
        <soap:body use="literal" parts="payload"/>
      </output>
      <fault name="identityServiceFault">
        <soap:fault name="lookupUserFault" use="literal"/>
      </fault>
    </operation>
  </binding>
</definitions>

```

6. Perform an Oracle SOA Suite health check:

- a. Sign in to the source environment. For example, soa-host01.example.com.
- b. Change to the oracle user:

```
sudo su - oracle
```

- c. Create a directory to store the healthcheck files. For example:

```
mkdir -p /u01/db_exp/soa_healthcheck
```

- d. Start WLST and connect to the SOA Server. For example:

```
/u01/oracle/middleware/soa12213/oracle_common/common/bin/wlst.sh
connect('weblogic','manager1','t3://192.168.56.92:7013') //
soa_server1
```

7. Enter the following commands and review the output in the generated SOA Health Checks Reports:

```
executeHealthCheckAndGenerateReport('DatasourceCheck','/u01/oracle/
soa_healthcheck/DatasourceCheck.html')
executeHealthCheckAndGenerateReport('ServiceCheck','/u01/oracle/
soa_healthcheck/ServiceCheck.html')
executeHealthCheckAndGenerateReport('SOAppCheck','/u01/oracle/
soa_healthcheck/SOAppCheck.html')
executeHealthCheckAndGenerateReport('JDBCpoolsCheck','/u01/oracle/
soa_healthcheck/JDBCpoolsCheck.html')
executeHealthCheckAndGenerateReport('SOALibraryCheck','/u01/oracle/
soa_healthcheck/SOALibraryCheck.html')
executeHealthCheckAndGenerateReport('MemoryCheck','/u01/oracle/
soa_healthcheck/MemoryCheck.html')
```

B

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:

- [Installing the Demo User Community](#)
- [Demo Community Users](#)
- [Demo Community Groups](#)
- [soa-infra Application Roles](#)
- [SOATestDemoApp Application Roles](#)
- [Roles Granted to and Owned by Users](#)
- [WorkflowPermission Class](#)

B.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.



Note:

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...

- a. Edit the `build.properties` file included in the downloaded sample to match your environment:

```
# 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
```

- b. Run the following ant command:

```
$FMW_HOME\modules\org.apache.ant
_1.7.0\bin\ant seedDemoUsers
```

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).

To Run the ant Script with Specified Parameters...

- a. Run the ant script with specified parameters. Note that `bea.home` and `FMW_HOME` are the same

```
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
```

Where `FMW_HOME` is the absolute path of the installation home directory and `ORACLE_HOME` is the absolute path of the Oracle home provided during installation.

For example:

```
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
```

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.

B.2 Demo Community Users

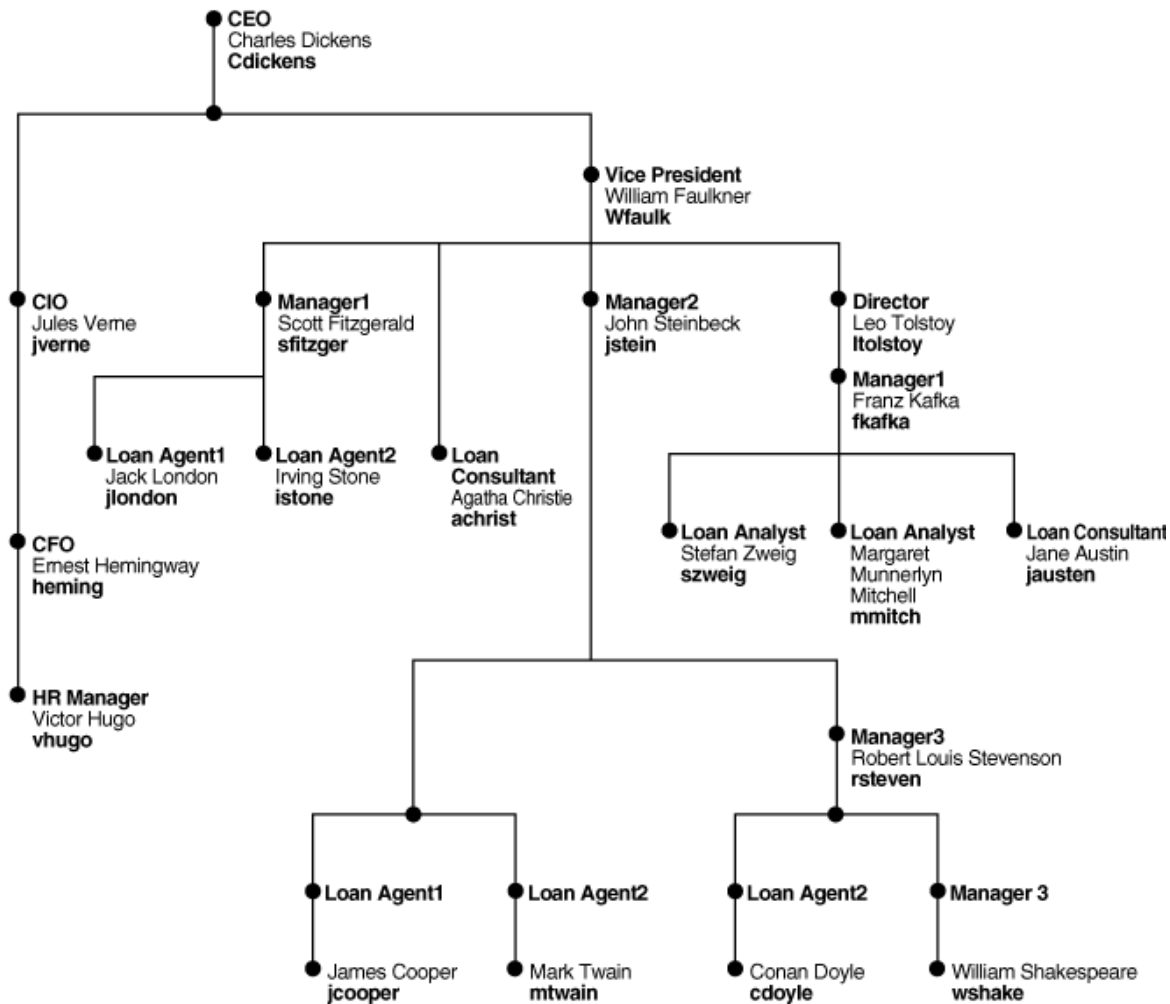
Table B-1 lists the users in the demo community.

Table B-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 | cdoyale | Conan | Doyle | Loan Agent 2 | rsteven | cdoyale@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 | ltolstoy@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 B-1 shows the organizational hierarchy of the demo community.

Figure B-1 Demo Community Organizational Hierarchy



B.3 Demo Community Groups

Table B-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 B-6 for the roles granted to users sorted by user.

Table B-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 B-3 shows information for several groups listed in Table B-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 B-6 for the roles owned by users sorted by user.

Table B-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 | - | - |

B.4 soa-infra Application Roles

Table B-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 B-6 for the application roles granted to users sorted by user.

Table B-4 Application Roles in soa-infra

| Application Role | Direct Grantees | All Grantees | Direct-Granted Roles | All Granted Roles |
|----------------------|-------------------------------------|---|----------------------|--|
| SOAdmin | Administrators | Administrators | BPMWorkflowAdmin | BPMWorkflowCustomize BPMWorkflowAdmin |
| BPMWorkflowAdmin | SOAdmin, demoadmin | SOAdmin, demoadmin, Administrators | BPMWorkflowCustomize | BPMWorkflowCustomize |
| BPMWorkflowCustomize | LoanAnalyticGroup, BPMWorkflowAdmin | szweig, LoanAnalyticGroup, SOAdmin, BPMWorkflowAdmin, mmitch, fkafka, Administrators, demoadmin | - | - |

For more information about application roles, see *Developing SOA Applications with Oracle SOA Suite*.

B.5 SOATestDemoApp Application Roles

Table B-5 lists the roles in the SOATestDemoApp application.

Table B-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 |

B.6 Roles Granted to and Owned by Users

Table B-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 B-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 | | |
| 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 | | |
| Itolstoy | - | - | - | - |
| mmitch | LoanAnalyticGroup, EasternRegion, ProductionTeam | BPMWorkflowCustomize RegionalOffices, LoanAnalyticGroup, LoanAgentGroup, EasternRegion, DevTeam, QATeam, ProductionTeam | - | - |

Table B-6 (Cont.) Roles for Each User

| User Name | Direct-Granted Roles | All Granted Roles | Direct-Owned Roles | All Owned Roles |
|-----------|---|--|--------------------|-----------------|
| 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 | - | - |

B.7 WorkflowPermission Class

Table B-7 lists the permissions defined in the WorkflowPermission class and the application roles associated with each permission.

Table B-7 WorkflowPermission Class

| Permission | Application Role with Permission |
|-------------------------------------|--|
| workflow.mapping.publicFlexField | BPMWorkflowAdmin, BPMWorkflowCustomize |
| workflow.mapping.protectedFlexField | BPMWorkflowAdmin |
| workflow.admin | BPMWorkflowAdmin |
| workflow.admin.evidenceStore | BPMWorkflowAdmin |

C

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:

- [Setting Logging Levels for Troubleshooting](#)
- [Parallel Purging and Table Partitioning Issues](#)
- [Connection and Transaction Timeout Troubleshooting](#)
- [Runtime Diagnostics Troubleshooting](#)
- [Human Workflow Troubleshooting](#)
- [Business Events and Event Delivery Network Troubleshooting](#)
- [Performance Troubleshooting](#)
- [Server Troubleshooting](#)
- [Browser Troubleshooting](#)
- [Additional Troubleshooting Documentation](#)

C.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 [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 | Runtime Loggers |
|---|---|
| Human workflow/ approval management extensions (AMX)/ rules | <ul style="list-style-type: none"> • oracle.soa.services.common • oracle.soa.services.identity • oracle.soa.services.notification • oracle.soa.services.rules • oracle.soa.services.rules.obrtrace • oracle.soa.services.workflow • oracle.soa.services.workflow.common • oracle.soa.services.workflow.evidence • oracle.soa.services.workflow.metadata • oracle.soa.services.workflow.persistency • oracle.soa.services.workflow.query • oracle.soa.services.workflow.report • oracle.soa.services.workflow.runtimeconfig • oracle.soa.services.workflow.soa • oracle.soa.services.workflow.task • oracle.soa.services.workflow.task.dispatch • oracle.soa.services.workflow.task.routing • oracle.soa.services.workflow.user • oracle.soa.services.workflow.verification • oracle.soa.services.workflow.performance • oracle.soa.services.workflow.worklist |
| SOA Infrastructure | <ul style="list-style-type: none"> • oracle.fabric.common.wsdl • oracle.integration.platform.blocks.deploy • oracle.integration.platform.blocks.soap • oracle.integration.platform.blocks.local • oracle.integration.platform.kernel • oracle.integration.plaform.blocks.mesh • oracle.integration.platform.common • oracle.integration.platform.instance • oracle.integration.platform.instance.activity • oracle.integration.platform.instance.store |
| EDN | <ul style="list-style-type: none"> • oracle.integration.platform.blocks.event • oracle.integration.platform.blocks.event.saq • oracle.integration.platform.blocks.event.jms |
| Deployment | oracle.integration |

| Component | Runtime Loggers |
|--|---|
| Oracle Mediator | <ul style="list-style-type: none"> • <code>oracle.soa.mediator.common</code> • <code>oracle.soa.mediator.common.cache</code> • <code>oracle.soa.mediator.common.error</code> • <code>oracle.soa.mediator.common.error.recovery</code> • <code>oracle.soa.mediator.common.listener</code> • <code>oracle.soa.mediator.common.message</code> • <code>oracle.soa.mediator.common.persistence</code> • <code>oracle.soa.mediator.dispatch</code> • <code>oracle.soa.mediator.dispatch.db</code> • <code>oracle.soa.mediator.dispatch.resequencer.toplink</code> • <code>oracle.soa.mediator.monitor</code> • <code>oracle.soa.mediator.resequencer</code> • <code>oracle.soa.mediator.resequencer.besteffort</code> • <code>oracle.soa.mediator.resequencer.fifo</code> • <code>oracle.soa.mediator.resequencer.standard</code> • <code>oracle.soa.mediator.service</code> • <code>oracle.soa.mediator.service.common.functions</code> • <code>oracle.soa.mediator.service.filter</code> • <code>oracle.soa.mediator.service.transformation</code> • <code>oracle.soa.mediator.serviceEngine</code> |
| Oracle BPEL Process Manager | <ul style="list-style-type: none"> • <code>oracle.soa.bpel</code> • <code>oracle.soa.bpel.console</code> • <code>oracle.soa.bpel.engine</code> • <code>oracle.soa.bpel.engine.activation</code> • <code>oracle.soa.bpel.engine.agents</code> • <code>oracle.soa.bpel.engine.bpel</code> • <code>oracle.soa.bpel.engine.compiler</code> • <code>oracle.soa.bpel.engine.data</code> • <code>oracle.soa.bpel.engine.delivery</code> • <code>oracle.soa.bpel.engine.deployment</code> • <code>oracle.soa.bpel.engine.dispatch</code> • <code>oracle.soa.bpel.engine.sensor</code> • <code>oracle.soa.bpel.engine.translation</code> • <code>oracle.soa.bpel.engine.ws</code> • <code>oracle.soa.bpel.engine.xml</code> • <code>oracle.soa.bpel.entity</code> • <code>oracle.soa.bpel.jpaa</code> • <code>oracle.soa.bpel.system</code> |
| Oracle BPM Suite | <code>oracle.bpm.bpmn.engine</code> |
| Oracle B2B | <ul style="list-style-type: none"> • <code>oracle.soa.b2b.apptransport</code> • <code>oracle.soa.b2b.engine</code> • <code>oracle.soa.b2b.transport</code> • <code>oracle.soa.b2b.ui</code> • <code>oracle.soa.b2b.repository</code> |
| Oracle adapters | <code>oracle.soa.adapter</code> |
| Oracle Web Services Manager (OWSM) | <code>oracle.wsm</code> |

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.

C.1.1 Log Files and Thread Dumps from All Managed Servers

Table C-1 describes the log files to view and thread dumps to obtain.

Table C-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 | <p><code>server_name.log</code> (for example, <code>soa_server1.log</code>, if <code>server_name</code> is <code>soa_server1</code>)</p> |
| Server console output | <p><stdout> 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"> 1. In the navigation tree of Oracle WebLogic Server Administration Console, select Environment > Servers. 2. In the table, select the server. 3. Select the Monitoring tab. 4. Select the Threads tab. 5. Click Dump Thread Stacks. <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"> 1. Go to Fusion Middleware Control > Weblogic Domain > Web Services > Policies. 2. Select the security level for which to enable logging. 3. Edit the policy to enable the log assertion. |

C.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.

You can delete instances and rejected messages with the PL/SQL purge script or from the Auto Purge page in Oracle Enterprise Manager Fusion Middleware Control. For more information, see [Managing Database Growth](#).

C.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](#)

C.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.

C.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.

C.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.

C.2.1.4 Debugging and Tracing Purging Operations

This section describes debugging and tracing issues.

C.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 SEVEROUT 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.

C.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
```

C.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 [Partitioning Component Tables](#).

C.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 business flow 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 `SCA_FLOW_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_PARTITON_DATE`.
- Oracle Mediator master table `MEDIATOR_INSTANCE` column `COMPOSITE_CREATION_DATE`, which is then pushed down into dependent tables.

 **Note:**

- Dependent tables must be partitioned with their master and, in all cases, the top level SOA Infrastructure `SCA_FLOW_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.

C.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 [Partition Pruning](#).) Therefore, to avoid a full table scan when the cost-based optimizer identifies uniqueness, indexes are searched that bypass the hash subpartition.

C.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.

C.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 B-tree 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.

C.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`

C.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 [Understanding Space Management](#).

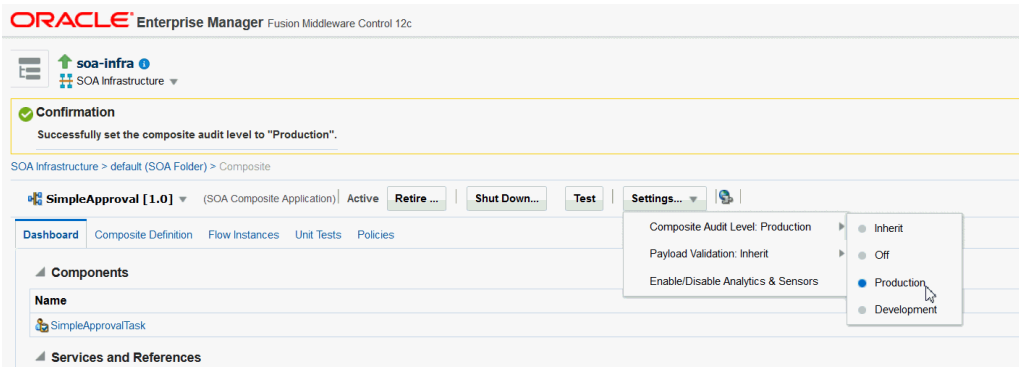
C.2.3 Reducing Audit Levels

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.

C.2.3.1 Setting the Audit Level for Production Environments

The default **Audit Level** is set to **Production** at the SOA Infrastructure level. To limit database growth, and for optimal performance, Oracle recommends that you turn **Off** the setting at the SOA Infrastructure level, and instead turn on auditing at the composite level for composites that require debugging or monitoring. Your compliance requirements might also determine the granularity of your audit requirements.

The following image depicts setting the audit level for a composite from the composite home page:



 **Note:**

You can change the audit level setting at the SOA Infrastructure level using the SOA Infrastructure Common Properties page in Oracle Enterprise Manager Fusion Middleware Control. See [Configuring SOA Infrastructure Properties](#) for information about turning off audit at the SOA Infrastructure level.

See [Managing the State of an Application from the SOA Composite Application Home Page](#) for more information about setting the audit levels at the composite level.

If you can disable auditing (provided the business requirements allow 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 for 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 "Deployment Descriptor Properties" in *Developing SOA Applications with Oracle SOA Suite*.

 **Note:**

Use these settings for synchronous BPEL processes and *not* for asynchronous BPEL processes.

C.3 Connection and Transaction Timeout Troubleshooting

This section describes how to troubleshoot connection and transaction timeout issues.

C.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.

To avoid these 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.

C.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:

1. Increase the **JTA Timeout Seconds** value to 1200.
2. Change the EJB timeout to 1800 for **NotificationSender**, **NotificationServiceBean**, and **TaskNotificationSender** EJBs. See [Long Running_ Synchronous Calls To Remote Web Services Error Out or Asynchronous Transactions Return with an Error after a Long Time](#).
3. Increase the **DataSource XA Transaction Timeout** value to 1330.
4. In the database, change the **Distributed_lock_timeout** parameter value to 1400.

 **Note:**

Important point to note here is that the **DataSource XA Transaction Timeout** has to be greater than the **JTA transaction time out** and the **Distributed_lock_timeout** has to be greater than the **DataSource XA Transaction timeout** value.

5. Restart Oracle WebLogic Server after making these changes.

 **Note:**

You can also increase the timeout values in deployment descriptor file and redploy the deployment descriptor file. For more information, Deployment Descriptor Schema and Document Type Definitions Reference and other deployment related sections in the **Developing Enterprise JavaBeans, Version 2.1, for Oracle WebLogic Server** guide.

C.3.3 Increasing Database Connection Values

You can receive the error message shown below because of slow connections to the database:

```
090304)): oracle.toplink.exceptions.DatabaseException
Internal Exception: java.sql.SQLException: Internal error: Cannot obtain
XAConnection weblogic.common.resourcepool.ResourceDeadException: Pool
SOADDataSource 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.sh` file on Linux or the `DOMAIN_HOME\bin\setSOADomainEnv.cmd` file on Windows.
2. Open the `DOMAIN_HOME\bin\setSOADomainEnv.cmd` file.
3. Uncomment the lines shown in bold.

```
# 8331492: Value of weblogic.resourcepool.max_test_wait_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_wait_secs=30"
export EXTRA_JAVA_PROPERTIES
```

4. Save your changes and restart the managed Oracle WebLogic Server.

C.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 below after restarting the SOA Infrastructure:

```
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 [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.

C.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 [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 [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.

C.3.6 Increasing the HTTP POST Timeout Value to Resolve Broken Pipe Errors

If you receive the broken pipe error as shown below, increase the HTTP POST timeout value in Oracle WebLogic Server Administration Console.

```
<BEA-000000> <got FabricInvocationException, Cikey=73410002, FlowId=10001,
Current
  Activity Key=73460002-BpInv0-BpSeq0.3-3, Current Activity Label=Invoke_1,
  ComponentDN=default/TestClientWSMEDWSBPELFAProj!2.0*soa_
b2e412f3-1167-4a9a-bbe0-73795f0743d4/BPELProcess1
java.net.SocketException: Broken pipe
  at java.net.SocketOutputStream.socketWrite0(Native Method)
  at java.net.SocketOutputStream.socketWrite(SocketOutputStream.java:113)
```

To increase the HTTP POST timeout value:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure**, expand **Environment > Servers**.
3. In the **Name** column, click the SOA server.
4. At the top of the page, click the **Protocols** tab.
5. In the **Post Timeout** field, increase the value to a maximum of 120.

C.3.7 Resolving Exception Errors When Processing Large Documents

If you receive the error shown below when processing large attachments, increase EJB property timeout values.

```
java.sql.SQLException: Unexpected exception while enlisting XAConnection
java.sql.SQLException: Transaction rolled back: Transaction timed out after 501
seconds
```

To increase EJB property timeout values:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure**, click **Deployments**.
3. Expand **soa-infra > EJBs**.
4. At the bottom of the page, expand the **EJBs** section.
5. Increase the time out value:
 - **BpelEngineBean**
 - **BpelDeliveryBean**
 - **CompositeMetaDataServiceBean**

C.4 Runtime Diagnostics Troubleshooting

This section describes how to troubleshoot runtime issues.

C.4.1 Unavailability of Work Manager Threads for Incoming Processing

The exception message shown below occurs because there are a fixed number of work manager threads allocated for incoming processing, and Oracle SOA Suite has reached the thread limit. Oracle SOA Suite gracefully backs out of processing to prevent a resource bottleneck that may eventually lead to a stuck thread scenario. If you receive this error, you must resubmit your request.

```
<Mar 11, 2014 2:10:16 PM PDT> <Error> <HTTP> <BEA-101017>
<[ServletContext@207971169[app:soa-infra module:/soa-infra path:null
spec-version:3.0]] Root cause of ServletException.
java.lang.Exception: Unable to acquire the workmanager thread resource in
order to process requests directed at compsoite
default/POProcessing!1.0*soa_7a9c6320-c26e-4df2-b29f-7b80782d3693
    at
oracle.integration.platform.blocks.deploy.CompositeLazyLoader.load(CompositeLa
zyLoader.java:112)
    at
. . .
. . .
```

C.4.2 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 of 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 Section "Customizing Your Application for the Target Environment Before Deployment" of *Developing SOA Applications with Oracle SOA Suite*.

C.4.3 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 and 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 is 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 [Configuring Automatic Recovery for Oracle BPEL Process Manager](#).

C.4.4 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 retrievable. For example, after several web service invocations, if dehydration fails due to a data source error, then this is identified as a retrievable 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 `idempotent` 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 "Managing Idempotence at the Partner Link Operation Level" section of *Developing SOA Applications with Oracle SOA Suite*.

C.4.5 Application Transaction Does Not Complete and the Underlying Composite is Stuck in a Running State

Assume an application transaction is not completing. For example, a purchase order status may remain processing. Checking the business flow 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 **Flow Instances** tab.
5. Search for the business flow instance, and click the flow 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** tab, 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 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 Flow Instances page of the SOA Infrastructure.

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 17.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 *Administering Oracle Fusion Middleware*.

See the following chapters for the various ways to recover transactions and messages:

- [Managing SOA Composite Application Business Flow Instances](#) to recover from the SOA composite application page in Oracle Enterprise Manager Fusion Middleware Control.
- [Managing BPEL Process Service Components and Engines](#) to recover from the BPEL process service component and BPEL process service engine message recovery pages.

C.4.6 Errors During Analytics Measurement Event Processing

When errors occur during processing of BPMN, Human Workflow, CASE analytics measurement events for any reason like target BAM is down or the database is not available and so on, (i) analytics message processing related errors are seen in the logs and (ii) BPM_MEASUREMENT_ACTION_EXCEPS table also has one or more records of these errors. You can republish these events by using any of the two methods.

Using Measurement Action Service client

Use **republishErroredEvents** operation to republish errored measurement events of the past 24 hours. This operation is available as part of AnalyticsConfig mbean To republish the error events, perform the following activities. Enter password when prompted..

```
java [CLASSPATH] [PROPERTIES]
oracle.bpm.metrics.action.MeasurementActionRecoveryClient
```

```
CLASSPATH:
-classpath $MW_HOME/soa/soa/modules/oracle.bpm.runtime_<version number
of instance>/oracle.bpm.analytics.metrics.interface.jar:
          $MW_HOME/soa/wlserver/server/lib/weblogic.jar
```

Enter the following required properties.

```
-Dhost=<host> (soa server host name)
-Dport=<port> (soa server port)
-Duser=<admin user> (soa server admin user name)
-DcompositeName=<soa composite name> (soa server host name)
```

Enter the following optional properties depending on your need.

```
-Drealm = <hostrealm Name> (default is jazn.com)
-Dprotocol=<protocol> (jndi protocol. Default is t3)
-DinitialContextFactory = <jndi initial context factory> (Default is
weblogic.jndi.WLInitialContextFactory)
-DmeasurementAction=<action name> (measurement action name. Default is
ProcessMetrics (BAM 12c))
-DrangeStartDate=mm/dd/yyyy (Range start date . Default is 24 hours before
rangeEndDate )
-DrangeEndDate=mm/dd/yyyy (Range end date. Default is current time)
-Ddebug=true/false (if true, prints the exception stacktraces in case of any
error. default is false)
```

Using Oracle Enterprise Manager AnalyticsConfig MBean - republishErroredEvents operation

republishErroredEvents operation is also available as part of AnalyticsConfig mbean (mbean object name = `oracle.as.soainfra.config:name=analytics,type=AnalyticsConfig,Application=soa-infra`). Oracle Enterprise Manager administrator can access and republish errored messages of the last 24 hours.

1. Log into Oracle Enterprise Manager
2. Expand **oracle.as.soainfra.config, Server:AdminServer, AnalyticsConfig** and select **analytics**.
3. Open **Operations** tab in the right pane.
4. Click on **republishErroredEvents**.
5. Provide the necessary details as described above.
6. Click **Invoke**.

C.5 Human Workflow Troubleshooting

This section describes how to troubleshoot human workflow issues.

C.5.1 Unavailability of Human Workflow Service Engine

During SOA server startup, you can receive the exception shown below. This exception occurs because the SOA server is still initializing. Wait for SOA server initialization to complete.

```
ORABPEL-30132
```

```
exception.code:30132
```

```
exception.type: ERROR
exception.severity: 2
exception.name: Workflow Service Engine not ready. SOA server is still
starting.
exception.description: Could not obtain instance of Workflow Service Engine
as the SOA server is still initializing.
exception.fix: Wait for SOA server to finish starting up, and retry.
```

For information about monitoring SOA server initialization status in Oracle Enterprise Manager Fusion Middleware Control, see [Viewing the Overall Runtime Health of the SOA Infrastructure](#).

C.5.2 Task Assignment/Routing/Escalation Issues

[Table C-2](#) describes symptoms, possible causes, and possible solutions for task assignment/routing/escalation issues.

Table C-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"> 1. Correct any issues with the XPath expressions. 2. Ensure that you get some results for the XPath expression for the given data. 3. Check the skip conditions specified with the Specify skip rule checkbox for task participants in the Human Task Editor. |
| 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 human workflow task chooses the incorrect user if many rules are defined or it errors with the following message: " in this table. | <ol style="list-style-type: none"> 1. Use the <code>ignoreParticipant(...)</code> function to model your rules. 2. Ensure the rules are modeled correctly so that at least one rule is fired. |
| 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. |

Table C-2 (Cont.) Troubleshooting Task Assignment/Routing/Escalation Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|---|
| <p>A human workflow task chooses the incorrect user if many rules are defined or it errors with the following message:</p> <p>Ruleset returned lists with different list builder</p> | <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 Task Detail comments 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>Developing Business Processes with Oracle Business Process Management Studio</i>.</p> |
| <p>Parallel assignees have to approve or reject the task even though the parallel completion criteria is met.</p> | <p>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.</p> | <p>Make the correct selection for completion in the Add Participant Type dialog.</p> |
| <p>The task is assigned to the group/role when the expectation is that it goes to every user in the group/role individually.</p> | <p>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.</p> | <p>To assign separately to the members of the group or role, use the XPath functions <code>ids:getUsersInGroup</code> and <code>ids:getUsersInAppRole</code>.</p> |
| <p>A task errors out when invoking the decision service for the evaluation of routing rules or rule-based participants.</p> | <p>Payload validation is enabled on the SOA Infrastructure instance.</p> | <p>Deselect the Payload Validation checkbox for the instance. For more information, see Configuring SOA Infrastructure Properties.</p> |

C.5.3 Task Action Issues

[Table C-3](#) describes symptoms, possible causes, and possible solutions for task action issues.

Table C-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 <code>ORA-30279</code> error is displayed (with an underlying <code>ORA SQL</code> exception of <code>ORA-20001</code> also displayed). | Two users are trying to update the same task concurrently. | Wait for the other user to finish. |

C.5.4 Notification Issues

[Table C-4](#) describes symptoms, possible causes, and possible solutions for notification issues.

Table C-4 Troubleshooting Notifications Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|--|
| <p>You may receive the following error message:</p> <pre>[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)</pre> | <p>Check if you have apostrophes in the body of an email notification message.</p> <pre><%string('À titre de responsable fonctionnel, une demande d'approbation . . .</pre> | <p>Escape each apostrophe by adding double apostrophes in your string. For example, if you have 'd in your message, escape it as follows:</p> <pre><%string('d'd')%> to: <%string('d''d')%></pre> |
| <p>The email notification is not being sent out.</p> | <p>Incorrect outgoing (SMTP) server settings are used in the email driver configuration.</p> | <p>Check the Simple Mail Transfer Protocol (SMTP) port/SMTP host/user name/password/email values.</p> <p>Tip: 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"> 1. In the navigator, right-click User Messaging Service. 2. Select usermessagingdriver-email > Email Driver Properties. 3. Check the settings, in particular the settings for these properties: <ul style="list-style-type: none"> - OutgoingMailServer - OutgoingMailServerPort |
| <p>The task email notification is not being sent out.</p> | <p>Notification Mode is set to NONE on the Workflow Notification Properties page in Oracle Enterprise Manager Fusion Middleware Control.</p> | <p>Change this setting to Email or All. For information, see Configuring Human Workflow Notification Properties.</p> |

Table C-4 (Cont.) Troubleshooting Notifications Issues

| Symptom | Possible Cause | Possible Solution |
|---|---|--|
| <p>Notifications are not being sent because of the following error message:</p> <pre>No matching drivers found for sender address = <address></pre> | <p>The User Messaging Service driver for the appropriate channel is configured with a specific list of sender addresses, and the message sent by the application has set a nonmatching sender address.</p> <p>Note: The User Messaging Service server matches the outbound message's sender address, if set, against the available drivers' sender addresses to find a matching driver to use for delivering the message. If a driver has set one or more sender addresses, then the User Messaging Service server only sends messages with the matching sender address to it.</p> | <p>Perform the following tasks:</p> <ul style="list-style-type: none"> Check the following settings for the appropriate driver in Oracle Enterprise Manager Fusion Middleware Control: <p>SenderAddresses</p> <p>SenderAddresses format is a comma-delimited list of DeliveryType:Address. For example: EMAIL:sender@example.com, EMAIL:sender@example2.com</p> Leave this property blank if you want this driver to service outbound messages for all sender addresses for this channel (delivery type). If there are multiple driver instances deployed for the same channel (delivery type) with different configurations, use SenderAddresses to differentiate the driver instances. For example, set one instance with a value in SenderAddresses to only service outbound messages with that matching sender address. The other instance can keep the SenderAddresses blank to service all outbound messages that do not specify any sender address or one that does not match the first driver instance. SenderAddresses that are configured with incorrect syntax (such as missing DeliveryType;) are ignored by the User Messaging Service server for driver selection. |
| <p>The notifications are sent, but are not actionable.</p> | <p>The Actionable Address field is not configured on the Workflow Notification Properties page in Oracle Enterprise Manager Fusion Middleware Control.</p> | <p>In Oracle Enterprise Manager Fusion Middleware Control, configure the Actionable Address field with a valid email address. For information, see Configuring Human Workflow Notification Properties.</p> <p>Ensure that the same email address is used when configuring the incoming server setting in the User Messaging Service email driver. For information, see Configuring Human Workflow Notification Properties.</p> |
| <p>Notifications are sent, but are not actionable.</p> | <p>The human workflow task is not set to send actionable notifications.</p> | <p>In the Human Task Editor (you can double click the <code>.task</code> file in Oracle JDeveloper to start the editor), expand the Notification section, click the Advanced tab, and select the Make notification actionable checkbox.</p> |

Table C-4 (Cont.) Troubleshooting Notifications Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| Actionable notifications are sent, but no action is taken after responding. | The Actionable Address field is incorrect. | <p>Check the IMAP/POP3 server/port values. Ensure the Actionable Address field is used in the email driver configuration.</p> <p>Tip: Validate the values by using them in any email client for connecting to the IMAP/POP3 server.</p> |
| 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 Actionable Email Account field of the Workflow Task Service Properties page as the incoming, actionable email account to use. The default account name is Default.</p> <p>For information, see Configuring Human Workflow Task Service Properties.</p> |
| Human workflow actionable notifications are sent, but no action is taken after responding. | Incoming mail server settings for the email driver are incorrect. | <p>Check the following email driver settings in Oracle Enterprise Manager Fusion Middleware Control:</p> <ul style="list-style-type: none"> • MailAccessProtocol (IMAP or POP3 in uppercase) • ReceiveFolder • IncomingMailServer • IncomingMailServerPort • IncomingMailServerSSL • IncomingUserIDs • IncomingUserPasswords • ImapAuthPlainDisable |
| 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. | 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. |

Table C-4 (Cont.) Troubleshooting Notifications Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|---|
| User notifications or human workflow notifications are sent through the correct delivery type (email, SMS, and so on), but to the wrong address. | <p>A self-provisioned messaging channel was created by the user in User Messaging Preferences for use in a BPEL process user notification or human workflow notification.</p> <p>Note: The User Messaging Preferences user interface enables you to create your own messaging channel for various use cases. However, do not use these channels for BPEL process user notification and human workflow.</p> | <p>Do not use a self-provisioned messaging channel for BPEL process user notification and 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 process user notification and human workflow use User Messaging Preferences only for the delivery type preference. The the actual address is retrieved from the user profile in the identity management system.</p> <p>Note: Addresses from the user profile in the identity management system are available through User Messaging Preferences using predefined channel names, such as business email, business mobile, business phone, and instant messaging. Use these predefined messaging channels instead for bpel process user notification and human workflow use cases.</p> |
| 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"> 1. In the Notification section of the Human Task Editor, click the Advanced tab. 2. Deselect the Show worklist URL in notifications checkbox. |

Table C-4 (Cont.) Troubleshooting Notifications Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| 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"> 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. 2. In the Notification section of the Human Task Editor, click the Advanced tab. 3. If you want to send one email to all group members, select Send one email containing all user addresses from the Group notification configuration 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). 4. If you want to send individual emails, but reuse content between members, select Send individual emails (the default selection) from the Group notification configuration list and unselect Use separate task forms based on locale. 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. |

C.5.5 Task View Issues

[Table C-5](#) describes symptoms, possible causes, and possible solutions for task view issues.

Table C-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. | <p>In Oracle BPM Worklist (view/create/edit UI), specify a task type for the view in the Definition 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 Display tab.</p> <p>It is possible to associate a view with multiple task types. Multiple task types can be selected from the Task Type browser. If multiple task types are selected, then the attribute labels for all those task types are available for use in the view.</p> |

Table C-5 (Cont.) Troubleshooting Task View Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|--|
| 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 Definition tab of Oracle BPM Worklist (view/edit UI), ensure that Share View is set to Definition only , which enables grantees to use the view against their own tasks. Setting Share View to Data 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"> 1. Ensure the logged-in user has administration privileges. 2. Define the view as usual, using Oracle BPM Worklist (create/edit UI). 3. Check the add to standard views checkbox. The view is created as a standard view. |
| 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 <code>WorkflowLabels</code> resource bundle. | Add a new resource key to the <code>WorkflowLabels</code> resource bundle. The key is the name you used for the view, prefixed by <code>STD_VIEW</code> . (Note the required trailing period.) |
| 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 Moving Human Workflow Data from a Test to a Production Environment . |

C.5.6 Task Attribute Mapping Issues

[Table C-6](#) describes symptoms, possible causes, and possible solutions for task attribute mapping issues.

Table C-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"> • Add simple attributes to the payload. • 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. • Use the <code>RuntimeConfigService</code> API to create public mappings using XPath expressions. |

Table C-6 (Cont.) Troubleshooting Task Attribute Mapping Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| 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 <code>RuntimeConfigService</code> API. | <ul style="list-style-type: none"> Use a public attribute label for the mapping. Create the mapping to the protected attribute label in the task definition at design time. |
| 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"> Log in to Oracle BPM Worklist as an administrator. Go to Administration > Protected Flexfields. Check that protected attribute labels exist. Create any protected attribute labels as required. |
| 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 <code>WorkflowLabels</code> resource bundle. | Add a new resource key to the <code>WorkflowLabels</code> resource bundle. The key is the name you used for the label, prefixed by <code>FLEX_LABEL</code> . (note the trailing period). |
| 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 Moving Human Workflow Data from a Test to a Production Environment.</p> |

C.5.7 Task Report Issues

[Table C-7](#) describes symptoms, possible causes, and possible solutions for task report issues.

Table C-7 Troubleshooting Task Report Issues

| Symptom | Possible Cause | Possible Solution |
|---|--|---|
| You receive the following error: <code>Null Pointer Exception</code> 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. |

C.5.8 Task History Issues

Table C-8 describes symptoms, possible causes, and possible solutions for task history issues.

Table C-8 Troubleshooting Task History Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|---|
| The Add Participant 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 Future Approvers checkbox may not be selected. | Select the Future Approvers 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"> In the Assignment tab of the Human Task Editor, click the Task will go from starting to final participant icon in the upper right corner. The Configure Assignment dialog is displayed. Select the Allow participants to edit new participants and Allow initiator to add participants checkboxes. |

Table C-8 (Cont.) Troubleshooting Task History Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| <p>You receive the following error:</p> <pre><Warning> <oracle.adf.controller.inter n al.metadata.MetadataService> <BEA-000000><ADFC: /META-INF/adfc-config.xml: > <Warning> <oracle.adf.controller.inter n al.metadata.MetadataService> < ADFC-52024> <ADFC: Duplicate managed bean definition for 'aleCompBindings' detected.></pre> | <p>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.</p> | <p>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.</p> |
| <p>You receive the following error:</p> <pre><Error> <Deployer> <BEA-149265> <Failure occurred in the execution of deployment request with ID '1297964056778' for task '3'. Error is: 'weblogic.management.Deployem e 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.Deployem n 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> | <p>Shared library oracle.soa.workflow.wc is referenced in weblogic.xml, but not available on the server.</p> | <p>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.</p> |

Table C-8 (Cont.) Troubleshooting Task History Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| <p>You receive the following error:</p> <pre>java.lang.IllegalStateException: Attempt to validate an already invalid RegionSite:</pre> | <p>This is a generic exception that sometimes is displayed in the server logs (for example, AdminServer.log).</p> | <p>See the real exception in the diagnostic logs (for example, AdminServer-diagnostic.log) and provide that exception with the bug you file.</p> |
| <p>You receive the following error:</p> <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:12e3444eb1b:-8000-0000000000002f0a,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)</pre> | <p>This is a common mistake and is not related to any components you are using. You forget to put faces in the URL. For example:</p> <pre>http://server:port/FederatedApp/test.jspx</pre> | <p>Put faces in the URL as follows:</p> <pre>http://server:port/FederatedApp/faces/test.jspx</pre> |

C.5.9 Task Form/Action Issues

Table C-9 describes symptoms, possible causes, and possible solutions for task form/action issues.

Table C-9 Troubleshooting Task Form/ Action Issues

| Symptom | Possible Cause | Possible Solution |
|--|----------------|---|
| <p>The task form application does not have an empty JSPX page.</p> | <p>N/A</p> | <p>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.</p> |

Table C-9 (Cont.) Troubleshooting Task Form/ Action Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|--|
| 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. |
| Deployment fails with a <code>class not found exception</code> . | The shared library entry is missing from <code>weblogic.xml</code> . | <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 <code>weblogic.xml</code>. Add the following element in <code>weblogic.xml</code>:</p> <pre><library-ref> <library-name>oracle.soa.worklist.w ebapp</library-name> <specification-version>11.1.1</spec ification-version> </library-ref></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"> • On Windows operating systems, this is typically in <code>%windir%\drivers\etc\lmhosts</code>. • On Linux/UNIX, this is typically in <code>/etc/hosts</code>. |

Table C-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"> 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. 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. |



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 [PermGen Memory Requirements for Multiple ADF Task Form Deployments](#).

C.5.10 Task Comments/Attachment Issues

[Table C-10](#) describes symptoms, possible causes, and possible solutions for task comments/attachment issues.

Table C-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 <code>web.xml</code> to adjust the file size and temporary storage for uploaded files:</p> <pre> <context-param> <!-- Maximum memory per request (in bytes) --> <param-name>oracle.adf.view.faces.U PLOAD_MAX_MEMORY</param-name> <!-- Use 500K --> <param-value>512000</param-value> </context-param> <context-param> <!-- Maximum disk space per request (in bytes) --> <param-name>oracle.adf.view.faces.U PLOAD_MAX_DISK_SPACE</param-name> <!-- Use 5,000K --> <param-value>5120000</param-value> </context-param> <context-param> <!-- directory to store temporary files --> <param-name>oracle.adf.view.faces.U PLOAD_TEMP_DIR</param-name> <!-- Use an ADFUploads subdirectory of /tmp --> <param-value>/tmp/ADFUploads</para m-value> </context-param> </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. |

C.5.11 Design Time at Runtime Issues

[Table C-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 C-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 Save button just saves the changes made in a design time at runtime tool to the sandbox. To see these changes in action, click Commit to send them to the MDS repository. |

C.5.12 Human Workflow API (Including SOAP/EJB) Usage Issues

[Table C-12](#) describes symptoms, possible causes, and possible solutions for human workflow API (including SOAP/EJB) usage issues.

Table C-12 Troubleshooting Human Workflow API Usage Issues

| Symptom | Possible Cause | Possible Solution |
|---|---|---|
| Location of the JavaDoc for human workflow APIs. | N/A | See <i>Workflow Services Java API Reference for Oracle SOA Suite</i> , which is available in the documentation library. |
| Understanding the API usage. | N/A | 1. Refer to the API documentation. |
| Using .net to access the APIs. | N/A | It is possible to write a .net client that accesses the SOAP web service APIs. |
| You receive <code>Class not found</code> errors when attempting to use the Java API clients. | Not all required JAR files are in the client class path. | - |
| 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> . |
| Newly created task does not appear in Task UI | <code>createTask</code> activity requires <code>SimpleWorkflowApp</code> . This did not get deployed during SOA server setup. | Deploy Simple Approval composite before you create a task using <code>Create Task</code> global activity. |

C.5.13 Oracle JDeveloper Data Control / Form Generation Issues

[Table C-13](#) describes symptoms, possible causes, and possible solutions for Oracle JDeveloper data control/form generation issues.

Table C-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><?xml version='1.0' encoding='UTF-8'?><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/a df/faces/rich"> <jsp:directive.page contentType="text/html;charset=UTF-8"/> <f:view> <af:document id="d1"> <af:form id="f1"></af:form> </af:document> </f:view> </jsp:root></pre> |

C.5.14 Human Workflow Service/ System MBean Browser Issues

Table C-14 describes symptoms, possible causes, and possible solutions for human workflow service/System MBean Browser issues.

Table C-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"> 1. In the navigator, right-click soa-infra. 2. Select SOA Administration > Workflow Config > Mailer tab to access notification properties. 3. Select SOA Administration > Workflow Config > Task tab to access task service properties. <p>For more information, see Configuring Human Workflow Notification Properties and Configuring Human Workflow Task Service Properties.</p> |

Table C-14 (Cont.) Troubleshooting Human Workflow Service/ System MBean Browser Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| 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"> 1. In the navigator, right-click soa-infra. 2. Select SOA Infrastructure > Administration > System MBean Browser. 3. Select Application Defined MBeans > oracle.as.soainfra.config > server > WorkflowConfig > human-workflow. 4. Set simple parameters by editing the appropriate field in the Attributes tab, and clicking Apply. 5. Make more complex parameter changes (for example, adding a new locale) by switching to the Operations tab, selecting the appropriate operation, entering required fields, and clicking Invoke. |
| 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 refresh cached tree data 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 (/). | <p>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:</p> <pre>file:///home/wstallar/ wfcustomizati ons/</pre> |
| 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 Managing the URI of the Human Workflow Service Component Task Details Application 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 worklist.</p> |

C.5.15 AMX Extension Issues

Table C-15 describes symptoms, possible causes, and possible solutions for AMX extension issues.

Table C-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: <pre>\$FMW_HOME/SOA_HOME/soa/modules/oracle.soa.ext_11.1.1/classes</pre> <p>This directory is part of the SOA class path. The Oracle WebLogic Server must be restarted.</p> |
| 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. |

C.5.16 Oracle BPM Worklist/Task Region Issues

Table C-16 describes symptoms, possible causes, and possible solutions for Oracle BPM Worklist/task region issues.

Table C-16 Troubleshooting Oracle BPM Worklist/Task Region Issues

| Symptom | Possible Cause | Possible Solution |
|---|--|--|
| <p>You receive the following exception message in the logs:</p> <pre><Warning> <oracle.adf.controller.internal.metadata.MetadataService> <BEA-000000><ADFC: /META-INF/adc-config.xml: > <Warning> <oracle.adf.controller.internal.metadata.MetadataService><ADFC-52024> <ADFC: Duplicate managed bean definition for 'aleCompBindings' detected.></pre> | <p>The shared library <code>oracle.soa.worklist.webapp</code> is referenced in the <code>weblogic.xml</code> file and also the JAR files <code>adflibWorklistComponent.s.jar</code> and <code>adflibTasklistTaskflow.jar</code> are packaged in the web application.</p> | <p>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.</p> |
| <p>You receive the following exception message in the logs:</p> <pre>Duplicate default server in client configuration. Configuration needs to have only one default server in client configuration. Specify one default server in client configuration.</pre> | <p>Two default servers are specified in the client configuration file or in the JAXB object passed to the task flow.</p> | <p>Mark only one server as the default in the client configuration file or in the JAXB object passed.</p> |
| <p>You receive the following exception message in the logs:</p> <pre>The default server is not specified</pre> | <p>The default server is not specified in the client configuration file or in the JAXB object passed to the task flow.</p> | <p>Ensure that the default server is marked in the client configuration file or the JAXB object.</p> |
| <p>You receive the following exception message in the logs:</p> <pre>Invalid display column. The display column COLUMN NAME is not a valid Task column. Specify a valid column name.</pre> | <p>The column name passed to the task flow parameter <code>displayColumnsList</code> is not correct.</p> | <p>Ensure that you pass the correct column name to the task flow parameter.</p> |
| <p>You receive the following exception message in the logs:</p> <pre>java.lang.IllegalStateException: Attempt to validate an already invalid RegionSite:</pre> | <p>This is a generic exception that sometimes appears in server logs (for example, <code>AdminServer.log</code>).</p> | <p>See the real exception in the diagnostic logs (for example, <code>AdminServer-diagnostic.log</code>) and provide that exception with the bug you can file.</p> |
| <p>You receive the following exception message in the logs:</p> <pre>Caused by: oracle.adf.controller.ControllerException: ADFC-02001: The ADF Controller cannot find '/WEB-INF/taskList-task-flow-definition.xml'</pre> | <p>The Oracle BPM Worklist JARs are not provided in the class path, either by referring to the shared library <code>oracle.soa.worklist.webapp</code> or by packaging those in the web application.</p> | <p>Ensure either the JARs are referred through the shared library or packaged inside the application.</p> |

Table C-16 (Cont.) Troubleshooting Oracle BPM Worklist/Task Region Issues

| Symptom | Possible Cause | Possible Solution |
|---|---|---|
| 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 <code>viewId</code> of that view as the value of parameter <code>ViewFilter</code> . This makes that view the default view of the task list. |
| You have set the <code>taskTypesFilterList</code> parameter, but instead of seeing assigned tasks, you are seeing all tasks. | If you specified the <code>taskTypesFilterList</code> parameter, then you forgot to specify the <code>attributesFilterList</code> parameter. | You have to use both parameters with the AND operator. For example: <pre><parameter id="taskTypesFilterList" value="http://xmlns.oracle.com/HelpDeskRequestSOApp/HelpDeskRequestComposite/HelpDeskRequestHumanTask, [http://xmlns.oracle.com/VacationRequestApp/VacationRequest/VacationRequestTask]"/></pre> <pre><parameter id="attributesFilterOperator" value="and"/> <parameter id="attributesFilterList" value="state=ASSIGNED"/></pre> |
| You receive the following exception message in the logs: | 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: | Put faces in the URL as follows: |
| <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:12e344 4eb1b:-8000-0000000000002f0a,0] [APP: FederatedApp_ application1] unable to dispatch JSP page: The following exception occurred:.[[java.lang.RuntimeException: Cannot find FacesContext at javax.faces.webapp.UIComponentCl assicTagBase.getFacesContext (UIC omponentClassicTagBase.java:2122)</pre> | <pre>http://server:port/ FederatedApp/test.jspx</pre> | <pre>http://server:port/FederatedApp/ faces/test.jspx</pre> |

Table C-16 (Cont.) Troubleshooting Oracle BPM Worklist/Task Region Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|--|
| <p>You receive the following exception message in the logs:</p> <pre>[AdminServer] [TRACE] [] [] [tid: [ACTIVE].ExecuteThread: '5' for queue: 'weblogic.kernel.Default (self-tuning)'] [userId: weblogic] [ecid: 17011f2a001d6b0e:7e22d6ce:12e344 4eb1b:-8000-0000000000001d39,0] [SRC_CLASS: oracle.bpel.services.workflow.cl ient.config.ClientConfigurationU til] [APP: FederatedApp_ application1] [SRC_METHOD: getClientConfiguration] WorkflowServiceClientContext: Cannot find client configuration file: wf_client_ config.xml</pre> | <p>There are three possible causes for this issue:</p> <ol style="list-style-type: none"> 1. The client configuration file is not provided in the class path. 2. The JAXB object is not passed to the task flow. 3. If one of the above is provided, the port number for the remote/SOAP client is incorrect. | <p>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.</p> |
| <p>You receive the following exception message in the logs:</p> <pre><Error> <Deployer> <BEA-149265> <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> | <p>Shared library <code>oracle.soa.workflow.wc</code> is referenced in <code>weblogic.xml</code>, but is not available on the server.</p> | <p>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.</p> |

Table C-16 (Cont.) Troubleshooting Oracle BPM Worklist/Task Region Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|--|
| <p>You cannot see the mapped attributes mapped columns.</p> <p>Note: Starting with Release 11g R1 (11.1.1.4), Oracle BPM Worklist flex fields are now known as mapped attributes.</p> | <p>The right set of parameters is not being passed to the task list task flow.</p> | <p>The correct set of parameters to be passed is as follows:</p> <pre><parameter id= "displayColumnsList" value="assignees, creator, assignedDate, state, textAttribute1, textAttribute2"/></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><parameter id="taskTypesFilterList" value="http://xmlns.oracle.com/HelpDeskRequestSOAApp/HelpDeskRequestComposite/HelpDeskRequestHumanTask"/></pre> |

C.5.17 Test-to-Production Issues

Table C-17 through Table C-20 describe symptoms, possible causes, and possible solutions for test-to-production issues.

Table C-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"> From a browser, go to the following URL: <pre>http:host:port/integration/ servic es/IdentityService/configuration</pre> Select getDefaultRealmName from the Operation drop-down menu. Click the Invoke button. <p>This retrieves the default realm name. Here is a sample answer from an invocation:</p> <pre><env:Envelope xmlns:env="http:// schemas.xmlsoap.org/soap /envelope/"> <env:Header/> <env:Body> <realmName xmlns="http://xmlns.oracle.com/bpel/ servi ces/IdentityService">jazn.com</ realmName> </env:Body> </env:Envelope></pre> |

Table C-18 Troubleshooting Test-to-Production Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| <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. [java] Error in authenticating and creating a workflow context for user jazn.com/FMW_USERID. [java] Verify that the user credentials and identity service configurations are correct.</pre> | <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> |

Table C-18 (Cont.) Troubleshooting Test-to-Production Issues

| Symptom | Possible Cause | Possible Solution |
|--|---|--|
| <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"> 1. Import attribute labels into the target SOA server. 2. Import payload mappings into the target SOA server. <p>See Moving Human Workflow Data from a Test to a Production Environment for more details.</p> |

Table C-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. implhwmigrator.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"> • user • group <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> |

Table C-19 (Cont.) 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 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.UserConfigDataMigrationException</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 C-20 Troubleshooting Test-to-Production Issues

| Symptom | Possible Cause | Possible Solution |
|--|----------------|--|
| <p>Testing the health of the installed server.</p> | <p>N/A</p> | <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> <pre>http://host:port/integration/worklistapp/</pre> <pre>http://host:port/integration/services/TaskQueryService/TaskQueryService</pre> <pre>http://host:port/integration/services/IdentityService/configuration</pre> <pre>http://host:port/integration/services/IdentityService/identity</pre> <pre>http://host:port/integration/services/RuntimeConfigService/RuntimeConfigService</pre> <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 [Moving Human Workflow Data from a Test to a Production Environment](#).

C.5.18 Identity Service Issues

Table C-21 and Table C-22 describe symptoms, possible causes, and possible solutions for identity service issues.

Table C-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 the <i>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. | <p>Mention the user base under which all the groups are seeded. This can be performed in two ways:</p> <p>Add the base DN under which all the required groups are seeded. For instance, if users are seeded under:</p> <pre>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</pre> <p>Then mention the group base DN as follows:</p> <pre>dc=us,dc=oracle,dc=com</pre> <p>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 <code>serviceInstance</code> with the name <code>idstore.ldap</code> in the <code>\$DOMAIN_HOME/config/fmwconfig/jps-config.xml</code> file:</p> <pre><serviceInstance name="idstore.ldap" provider="idstore.ldap.provider"> <property name="idstore.config.provider" value="oracle.security.jps.wls.internal.idstore.WlsLdapIdStoreConfigProvider"/> <property name="CONNECTION_POOL_CLASS" value="oracle.security.idm.providers.stdldap.JNDIPool"/> <extendedProperty> <name>user.search.bases</name> <values> <value>cn=users1,dc=us,dc=oracle,dc=com</value> <value>cn=users2,dc=us,dc=oracle,dc=com</value> </values> </extendedProperty> </serviceInstance></pre> |

Table C-21 (Cont.) Troubleshooting Identity Service Issues

| Symptoms | Possible Cause | Possible Solution |
|---|---|--|
| 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 Release 11.1.1.4, you can authorize users and groups from multiple authenticators. For more information, see Configuring Multiple Authentication Providers . |

Table C-22 Troubleshooting Identity Service Issues

| Symptom | Possible Cause | Possible Solution |
|--|--|---|
| <p>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.</p> <pre>Exception seen : Service" Unknown macro: {0} "in configuration" Unknown macro: {1} " could not be initialized. Error in initializing service "Authentication" in configuration "myrealm".</pre> | <p>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.</p> | <p>To change the realm name, the WorkflowIdentityConfig file can be edited in the System MBean Browser of Oracle Enterprise Manager Fusion Middleware Control.</p> <ol style="list-style-type: none"> 1. In the navigator, right-click soa-infra. 2. Select SOA Infrastructure > Administration > System Mbean Browser. 3. Select Application Defined Mbeans > oracle.as.soainfra.config > Server > WorkflowIdentityConfig > human-workflow > WorkflowIdentityConfig.ConfigurationType. 4. Select the configuration and rename it by invoking the operation setRealmName. This change requires a server restart. |

Table C-22 (Cont.) Troubleshooting Identity Service Issues

| Symptom | Possible Cause | Possible Solution |
|---|---|--|
| 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. | <p>Mention the group base under which all the groups are seeded. This can be performed in two ways.</p> <p>Add the base DN under which all the required groups are seeded. For instance, if groups are seeded under:</p> <pre>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</pre> <p>Then mention the group base DN as follows:</p> <pre>dc=us,dc=oracle,dc=com</pre> <p>This is the common DN. If only some group DN's are required (for example, GroupDN1 and GroupDN2), then the following property must be added to serviceInstance with the name <code>idstore.ldap</code> in the <code>\$DOMAIN_HOME/config/fmwconfig/jps-config.xml</code> file.</p> <pre><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.stdldap.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></pre> |

C.6 Business Events and Event Delivery Network Troubleshooting

This section describes how to troubleshoot business event and event delivery network (EDN) issues.

C.6.1 Increasing the JMS Adapter Connection Pool Size

EDN uses the connection factories shown in [Table C-23](#) for the JMS adapter to communicate with the underlying JMS topic for event publishing and subscription.

Table C-23 Connection Factories for the JMS Adapter

| JMS Type | JMS Connection Factories for the JMS Type |
|----------------------------|--|
| Oracle WebLogic Server JMS | <ul style="list-style-type: none"> eis/wls/EDNxaDurableTopic eis/wls/EDNxaTopic eis/wls/EDNLocalTxDurableTopic eis/wls/EDNLocalTxTopic |
| AQ JMS | <ul style="list-style-type: none"> eis/aqjms/EDNxaDurableTopic eis/aqjms/EDNxaTopic eis/aqjms/EDNLocalTxDurableTopic eis/aqjms/EDNLocalTxTopic |

In environments in which there are a large number of concurrent event publishers, a large number of event subscribers, or both, the default connection pool size (200) for the JMS Adapter can be exceeded. This can cause `ResourceLimitException` errors similar to that shown below:

The JCA Binding Component was unable to establish an outbound JCA CCI connection due to the following issue:

```
javax.resource.spi.ApplicationServerInternalException:
  Unable to get a connection for pool = "eis/wls/EDNxaDurableTopic",
weblogic.common.resourcepool.ResourceLimitException:
  Configured maximum limit of (0) on number of threads allowed to wait for a
resource reached for pool eis/wls/EDNxaDurableTopic
```

Please make sure that the JCA connection factory and any dependent connection factories have been configured with a sufficient limit for max connections. Please also make sure that the physical connection to the backend EIS is available and the backend itself is accepting connections.

When this occurs, you must increase the connection pool **Max Capacity** value of the corresponding JMS connection factory for the JMS adapter in Oracle WebLogic Server Administration Console. [Table C-24](#) identifies the use of each JMS connection factory for the JMS adapter.

Table C-24 Uses of Each JMS Connection Factory for the JMS Adapter

| JMS Connection Factory | Used for Outbound Event Publishing? | Used for Inbound Event Subscription? |
|--------------------------------|--|--|
| eis/wls/EDNxaDurableTopic | Yes, for event publishing with a global transaction. | Yes, for durable subscriptions with One And Only One (OAOO) consistency. |
| eis/wls/EDNxaTopic | No. | Yes, for nondurable subscriptions with OAOO consistency. |
| eis/wls/EDNLocalTxDurableTopic | Yes, for event publishing with a local transaction. | Yes, for durable subscriptions with guaranteed consistency. |
| eis/wls/EDNLocalTxTopic | No. | Yes, for nondurable subscriptions with guaranteed consistency. |
| eis/aqjms/EDNxaDurableTopic | Yes, for event publishing with global transaction. | Yes, for durable subscriptions with OAOO consistency. |

Table C-24 (Cont.) Uses of Each JMS Connection Factory for the JMS Adapter

| JMS Connection Factory | Used for Outbound Event Publishing? | Used for Inbound Event Subscription? |
|--------------------------------------|---|--|
| eis/aqjms/EDNxaTopic | No. | Yes, for nondurable subscriptions with OAOO consistency. |
| eis/aqjms/ EDNLocalTxDurableTopic | Yes, for event publishing with local transaction. | Yes, for durable subscriptions with guaranteed consistency. |
| eis/aqjms/EDNLocalTxTopic | No. | Yes, for nondurable subscriptions with guaranteed consistency. |

When calculating connections used, you must combine the number of events publishing with the event subscriptions if the corresponding JMS connection factory is used for both event publishing and event subscription.

For example, if there are 200 concurrent BPEL process event publishers that publish events in a global transaction, and the default `SOAInternalProcessing_maxThreads` is set to 150, then these publishers use all 150 threads, which takes 150 connections from `eis/wls/EDNxaDurableTopic`. There are also a total of 12 SOA event subscribers with `ThreadsPerSubscriber` set to 5. These subscribers use $12 \times 5 = 60$ threads, which takes 60 connections from `eis/wls/EDNxaDurableTopic`.

Because $150 + 60 = 210 > 200$ (the default setting), you receive a `ResourceLimitException` error.

In this case, you may need to increase the size of the **Max Capacity** field of the connection pool of `eis/wls/EDNxaDurableTopic` to a larger value (for example, 300).

To increase the connection pool size:

1. Log in to Oracle WebLogic Server Administration Console.
2. In the **Domain Structure** window, click **Environment > Deployments > JmsAdapter > Configuration > Outbound Connection Pools**.
3. In the **Outbound Connection Pool Configuration Table**, expand **oracle.tip.adapter.jms.IJmsConnectionFactory**.
4. Click the appropriate connection factory, as described in [Table C-24](#).
5. Click **Connection Pool**.
6. In the **Max Capacity** field, increase the value (for example, to 300), and click **Save**.

The screenshot shows the 'Connection Pool' configuration page in the Oracle WebLogic Server Administration Console. The page has tabs for 'General', 'Properties', 'Transaction', 'Authentication', 'Connection Pool', and 'Logging'. The 'Connection Pool' tab is selected. Below the tabs is a 'Save' button. A message states: 'This page allows you to view and modify the pool parameters of this outbound connection.' There are two input fields: 'Initial Capacity' with a value of 0, and 'Max Capacity' with a value of 300.

C.6.2 Tuning Recommendations For Publishing Many BPEL Process Events with Oracle WebLogic Server JMS

When publishing many BPEL process events (for example, one million) with Oracle WebLogic Server JMS, you can receive numerous recoverable errors (for example, 20% of the one million events) if the EDN is not properly tuned. For example, assume you have the following use case scenario:

- 200 threads
- 5000 iterations

After running for some time (for example, 40 minutes), you can receive the error shown below:

```
<Jan 8, 2014 10:08:33 AM PST> <Error> <oracle.soa.adapter.jms.outbound>
<BEA-000000> <JMSMessageProducer_produce: [default destination =
jms/fabric/EDNTopic]:weblogic.messaging.kernel.QuotaException: Quota blocking
time exceeded and no quota available>
<Jan 8, 2014 10:08:33 AM PST> <Error> <oracle.soa.adapter.jms.outbound>
<BEA-000000> <JMSMessageProducer_produce: [default destination =
jms/fabric/EDNTopic]:weblogic.messaging.kernel.QuotaException: Quota blocking
time exceeded and no quota available>
```

In addition, subscriptions are slow (there are many database, Coherence cache, and transaction-related operations for the EDN threads) and the accumulated messages slow down publishing.

If this occurs, tune the following areas:

- The EDN quota is automatically defined on the default EDN topic on Oracle WebLogic Server JMS. This EDN quota has a maximum message limit of 50,000. You may need to define a quota with a different maximum message limit based on your use case scenario. For more information, see *Tuning WebLogic JMS in Tuning Performance of Oracle WebLogic Server*.
- Tune the send timeout value on the EDN connection factories based on your use case scenario. The following EDN JMS connection factories have a default value of 10,000 (ms) as the send timeout value:
 - **EDNConnectionFactory**
 - **xaEDNConnectionFactory**

For more information, see *Blocking Senders During Quota Conditions in /*.

- When there are heavy loads, messages accumulate in the JMS topic. The EDN client receives a `QuoteException` when the number of messages exceeds the quota limit. If the EDN client is a composite with a BPEL process service component, the BPEL process persists the messages into the Error Hospital. There may be a big delay in delivery to the subscribers. The messages in the Error Hospital can be recovered manually from the Error Hospital or automatically from the **Recovery** tab of the BPEL process service engine. For more information, see [Recovering From Faults in the Error Hospital](#) and [Performing BPEL Process Service Engine Message Recovery](#).

C.6.3 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. Enter `EDNConfig` in the **Search** field and click the **Search** icon or expand **Application Defined MBeans > oracle.as.soainfra.config > Server: soa_server > EDNConfig > edn**.
4. Double-click an attribute.

| Properties | Type | Details |
|-----------------------|---------------|--|
| JmsType | WLJMS | <p>The default JMS type for a topic. By default, EDN events published in a given SOA domain are (temporarily) stored in a default JMS topic for consumption by event subscribers. Valid values are:</p> <ul style="list-style-type: none"> • WLJMS (Oracle WebLogic Server JMS) • AQJMS (Oracle Advanced Queuing JMS) |
| NumberOfRetrys | integer value | <p>The number of delivery retries that EDN automatically attempts in case of a retrieable exception during event delivery. This applies to subscribers of either the guaranteed or one and only one consistency level. Once the retry reaches the NumberOfRetrys value, the event is moved to the Error Hospital and subject to manual recovery.</p> <p>If the EDN delivers an event and fails with a nonretrieable exception, there is no retry, and the event is moved to the Error Hospital immediately.</p> <p>If GlobalTxMaxRetry = 0, the retry is disabled.</p> |
| Paused | boolean value | <p>Temporarily stops delivering events.</p> <p>Values are <code>true</code> or <code>false</code>. If <code>true</code>, the JMS consumer threads for each Oracle SOA Suite subscriber are removed. As a result, published events are lost for nondurable subscribers and retained in a JMS server for durable subscribers.</p> |
| QueueWaitTime | 30,000 | <p>The amount of time in milliseconds to wait between retries. This value must be at least 1000. The default value is 30,000 (30 seconds).</p> |

 **Note:**

Manually tune the following to avoid `ResourceLimitExceptions` and performance issue:

- Max Capacity for JMSAdapter Connection Pool from 200 to 300
- SOAIncoming_maxThreads from 60 to 300
- SOA_EDN_WM's min-thread-constraint from current 1 to 100

| Properties | Type | Details |
|-----------------------------|------|---|
| ThreadsPerSubscriber | 1 | The number of inbound poller threads that each SOA subscriber should use for processing events. When an event-subscribing composite is deployed, EDN initializes inbound JMS consumer threads whose number is based on this value. You can customize the thread number by configuring the local thread number as described in Updating the Local Inbound Poller Thread Number Value at the Service Component Level . Once locally customized, the thread number is not subject to changes in this global ThreadsPerSubscriber value. |

 **Note:**

- Although the **EventTypeToJmsConfigMappings** attribute is listed in the **EDNConfig > edn** section of the System MBean Browser, do not modify it. Instead, modify JMS mappings as described in [Mapping Business Events to JMS Topic Destinations on the Business Events Page](#).
- The **NumberOfThreads** attribute is used in Release 12c to control event backlog upgrades.

5. Enter a value, and click **Apply**.

C.6.4 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.

C.6.5 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.

C.6.6 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 Web Services Manager 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 business flow 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 business flow 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 *Developing SOA Applications with Oracle SOA Suite*.

For information about setting the **oneWayDeliveryPolicy** property in the System MBean Browser, see [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 business flow instance 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).

C.7 Performance Troubleshooting

This section describes how to troubleshoot performance issues.

C.7.1 Resolving Issue Where BPEL Compiler Does Not Terminate or Report Exceptions

If a large SOA composite application containing many BPEL process service components is compiled, the BPEL compiler may not terminate and report any exceptions. If this occurs, increase the JVM heap size in the `ant-sca-compile.xml` file as follows:

- Change `<jvmarg value="-Xmx1024m"/>`
- To `<jvmarg value="-Xmx4g"/>`

The code sample below provides details:

```
<scac input="${scac.input}" outXml="${scac.output}"
  error="${scac.error}" appHome="${scac.application.home}"
  failonerror="true" displayLevel="${scac.displayLevel}"
  reportErrors="${scac.reportSchemaValidationErrors}">
  <jvmarg
value="-Djavax.xml.xpath.XPathFactory:http://java.sun.com/jaxp/xpath/dom=oracle.
xml.xpath.JXPathFactory"/>
  <jvmarg value="-Xms128m"/>
  <jvmarg value="-Xmx4g"/>
  <jvmarg value="-XX:PermSize=32m"/>
  <jvmarg value="-XX:MaxPermSize=256m"/>
  <jvmarg value="-Doracle.xdkjava.compatibility.version=11.1.1"/>
  <jvmarg value="-Doracle.soa.compatibility.version=11.1.1"/>
  <!-- jvmarg
value="-Xrunjdpw:transport=dt_socket,server=y,suspend=y,address=5005"/ -->
  </scac>
</target>
```

C.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
vmemoryuse  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      4096
*               hard   nofile      4096
```

4. Close your terminal and reopen for the change to take effect. A system restart is not required.

C.7.3 Resolving MaxMessageSizeExceededException Errors Caused By Large Payloads

`MaxMessageSizeExceededException` error occurs when you provide a large payload (for example, `200vu*500iter` which is 100,000 requests) to your deployed SOA composite application. `MaxMessageSize` configuration must be configured based on the load. Click **View XML Document** in the audit trail to view the payload, and check for `MaxMessageSizeExceededException` errors. To resolve the error either increase the `MaxMessageSize` to 80000000, or decrease the `session-flush-threshold` to 50.



Note:

This values depend on the load. The default value of `MaxMessageSize` is 10000000. Change the values according to you load.

Increasing MaxMessageSize

To increase the `MaxMessageSize`:

1. Login to admin console.
2. Navigate to **servers, protocols, general, max message size**.
3. Changed the value to 80000000. (both the admin and the soa).
4. Navigate to **servers, configuration, server start, arguments**, and set-
`Dweblogic.MaxMessageSize = 80000000`.

You can also change the `-Dweblogic.MaxMessageSize` value by adding `weblogic.MaxMessageSize` property. To change the value by adding the property:

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=80000000"
export EXTRA_JAVA_PROPERTIES
```

3. Restart the server.

Decreasing session-flush-threshold

Navigate to **console cluster, soa_cluster, Configuration, Replication, Advanced**, and change the **Session Flush Threshold** value to 50 (smaller value).

C.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 1 and Example 2 below 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 1

```
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
. . .
. . .
```

Example 2

```
<bpelFault><faultType>0</faultType><subLanguageExecutionFault
xmlns="http://schemas.oracle.com/bpel/extension"><part
name="summary"><summary>XPath expression failed to execute.
An error occurs while processing the XPath expression; the expression is
ora:readBinaryFromFile('/scratch/vbasaval/dropbox/LFile/PO_5Gig.zip').
The XPath expression failed to execute; the reason was:
```

```
java.sql.SQLException: ORA-01652: unable to extend temp segment by 128 in
tablespace DEV12_IAS_TEMP
```

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.

To manually add data files in SQL*Plus:

```
SQL> alter tablespace SOA12_SOAINFRA add datafile
'/scratch/db12101/Oracle/oradata/SOA12_soainfra2.dbf' size 1000M autoextend on
next 30M maxsize unlimited;

ALTER DATABASE TEMPFILE '/scratch/db12101/Oracle/oradata/SOA12_iastemp.dbf'
RESIZE
 100M;
ALTER DATABASE TEMPFILE '/scratch/db12101/Oracle/oradata/SOA12_iastemp.dbf'
  AUTOEXTEND ON NEXT 30M MAXSIZE UNLIMITED;
ALTER DATABASE DATAFILE '/scratch/db12101/Oracle/oradata/SOA12_mds.dbf' RESIZE
 100M;
ALTER DATABASE DATAFILE '/scratch/db12101/Oracle/oradata/SOA12_mds.dbf'
  AUTOEXTEND
  ON NEXT 50M MAXSIZE UNLIMITED;
ALTER DATABASE DATAFILE '/scratch/db12101/Oracle/oradata/SOA12_soainfra.dbf'
  RESIZE 2048M;
ALTER DATABASE DATAFILE '/scratch/db12101/Oracle/oradata/SOA12_soainfra.dbf'
  AUTOEXTEND ON NEXT 50M MAXSIZE UNLIMITED;
ALTER DATABASE DATAFILE '/scratch/db12101/Oracle/oradata/SOA12_svctbl.dbf' RESIZE
 100M;
ALTER DATABASE DATAFILE '/scratch/db12101/Oracle/oradata/SOA12_svctbl.dbf'
  AUTOEXTEND ON NEXT 50M MAXSIZE UNLIMITED;

ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA1.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA2.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA3.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA4.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA5.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA6.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA7.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA8.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
  '/scratch/db12101/Oracle/oradata/SOA12_SOAINFRA9.dbf' SIZE 100M AUTOEXTEND ON
  NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
```

```
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAA.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAB.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAC.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAD.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAE.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAF.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAG.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAH.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAI.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAJ.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
ALTER TABLESPACE "C0123_SOAINFRA" ADD DATAFILE
'/scratch/db12101/Oracle/oradata/SOA12_SOAINFRAK.dbf' SIZE 100M AUTOEXTEND ON
NEXT 30M MAXSIZE UNLIMITED;
```

C.7.5 Resolving Database Growth Issues Caused by a High Volume of Transactions

If Oracle SOA Suite transactions fail and the 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.

1. 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 [Developing a Database Growth Management Strategy](#) and [Managing Database Growth](#).

2. 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.

3. Tune database parameters for memory, tablespace, and partitions to get maximum performance. For more information, see Section "Tuning Database Parameters" of *Tuning Performance*.
4. 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
=
'<TABLESPACE_NAME>'
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 [Resolving Message Failure Caused by Too Many Open Files](#).

C.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 trashing. 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 *Tuning Performance*.

For information about using the purge scripts, see [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 [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 of *Tuning Performance*.

- 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 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.
13. 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 *Tuning Performance*.

For information about setting properties on the BPEL Service Engine Properties page, see [Configuring BPEL Process Service Components and Engines](#).

C.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 below:

```
[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: 0000JSnNKVTBh4Z5ln1FiZ1Fdnmd001gWL,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 [Deployment Descriptor Properties in /](#).
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, [Step 3](#)) 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.

C.8 Server Troubleshooting

This section describes how to troubleshoot server issues.

For more information about server startup issues, see [Stopping and Starting the Managed Server and SOA Infrastructure](#).

C.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 [Installing and Configuring Oracle SOA Suite and Business Process Management](#).

C.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.

C.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. The code sample below provides details:

```
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.

C.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.

C.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 C-25](#) for IPv4 clients to access IPv6 URLs in Oracle Enterprise Manager Fusion Middleware Control.

Table C-25 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. |

Table C-25 (Cont.) IPv4 and IPv6 Settings in etc/hosts File

| On The... | Edit the etc/hosts File as Follows.... |
|--------------------|---|
| On the IPv6 client | 2001:0db8:db0a::0:1 myhost10-ipv6 myhost10-ipv6.us.example.com |
| | Note: Replace 2001:0db8:db0a::0:1 with a value appropriate to your host environment. |

C.9 Browser Troubleshooting

This section describes how to troubleshoot browser issues.

C.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.

C.10 Additional Troubleshooting Documentation

[Table C-26](#) describes documentation to see for additional troubleshooting issues.

Table C-26 Additional Troubleshooting Documentation

| For Information About... | See... |
|---|---|
| SOA Infrastructure startup and shutdown issues | Stopping and Starting the Managed Server and SOA Infrastructure |
| Using WebLogic Diagnostic Framework (WLDF) and Diagnostics Framework (DFW) to diagnosis Oracle SOA Suite problems | Diagnosing Problems with SOA Composite Applications |

Table C-26 (Cont.) Additional Troubleshooting Documentation

| For Information About... | See... |
|---|---|
| Managing large documents and metadata and for managing environments with large numbers of instances | Managing Large Documents and Large Numbers of Instances in <i>Developing SOA Applications with Oracle SOA Suite</i> |
| Deployment and compilation errors | Testing and Troubleshooting in <i>Developing SOA Applications with Oracle SOA Suite</i> |
| Oracle Web Services Manager Policy Manager errors | Diagnosing Problems with Oracle Web Services Manager in <i>Securing Web Services and Managing Policies with Oracle Web Services Manager</i> |
| Oracle Business Rules | Oracle Business Rules Troubleshooting in <i>Designing Business Rules with Oracle Business Process Management</i> |

C.10.1 Unable to Get Pool Connection

In scenarios where there are a large number of concurrent event publishers and a large number of event subscribers, (for example, PSR stress tests), ResourceLimitException with following messages or similar can occur.

The JCA Binding Component was unable to establish an outbound JCA CCI connection due to the following issue:

```

javax.resource.spi.ApplicationServerInternalException:
  Unable to get a connection for pool = "eis/wls/EDNDurableTopic",
weblogic.common.resourcepool.ResourceLimitException:
  Configured maximum limit of (0) on number of threads allowed to wait for
a resource reached for pool eis/wls/EDNDurableTopic
Please make sure that the JCA connection factory and any dependent
connection factories have been configured with a sufficient limit for max
connections.

```

Please also make sure that the physical connection to the backend EIS is available and the backend itself is accepting connections.

Causes

EDN 12c uses following JMS adapter connection factories to communicate with underlying JMS topic for both event publish and/or event subscription.

| JMS Type | JMS Connection Factories for JMS Adapter |
|----------|--|
| WLJMS | <ul style="list-style-type: none"> • eis/wls/EDNxaDurableTopic • eis/wls/EDNxaTopic • eis/wls/EDNLocalTxDurableTopic • eis/wls/EDNLocalTxTopic |
| AQJMS | <ul style="list-style-type: none"> • eis/aqjms/EDNxaDurableTopic • eis/aqjms/EDNxaTopic • eis/aqjms/EDNLocalTxDurableTopic • eis/aqjms/EDNLocalTxTopic |

When there are many publishers and subscribers, the default **Connection Pool Size** of JmsAdapter, which is 200, may be all used up.

Solutions

Increase the "Max Capacity" of Connection Pool of corresponding JMS connection factory for JMS adapter. The following table indicates the uses of each of the JMS connection factories for JMS adapter:

| JMS Connection Factory | Used for Outbound Event Publish? | Used for Inbound Event Subscription? |
|----------------------------------|--|---|
| eis/wls/EDNxaDurableTopic | No | Yes, for durable subscription with 'OAOO' consistency |
| eis/wls/EDNxaTopic | Yes, for event publish with global transaction | Yes, for non-durable subscription with 'OAOO' consistency |
| eis/wls/EDNLocalTxDurableTopic | No | Yes, for durable subscription with 'Guaranteed' consistency |
| eis/wls/EDNLocalTxTopic | Yes, for event publish with local transaction | Yes, for non-durable subscription with 'Guaranteed' consistency |
| eis/aqjms/EDNxaDurableTopic | No | Yes, for durable subscription with 'OAOO' consistency |
| eis/aqjms/EDNxaTopic | Yes, for event publish with global transaction | Yes, for non-durable subscription with 'OAOO' consistency |
| eis/aqjms/EDNLocalTxDurableTopic | No | Yes, for durable subscription with 'Guaranteed' consistency |
| eis/aqjms/EDNLocalTxTopic | Yes, for event publish with local transaction | Yes, for non-durable subscription with 'Guaranteed' consistency |

When calculating JMS connections used, you need to add the number of event publishing to that of event subscription if the corresponding JMS connection factory is used for **both** event publishing and event subscription.

For example, if there are 200 concurrent BPEL event publishers that publish events in global transaction, and the default SOAInternalProcessing_maxThreads is 150 (SOAMaxThreadsConfig = 300 and InternalProcessingPercentage = 50%), then these publishers would use all 150 threads, which takes up 150 JMS connections from "eis/wls/EDNDurableTopic".

Suppose there are also a total of 8 SOA event subscribers with "durable" option and subscription consistency being "Guaranteed". The ThreadsPerSubscriber is also set to 10. Then these subscribers could use up to $8 * 10 = 80$ consumer threads. Since the actual consumer threads is limited by the EDN WorkManager's max-threads-constraint, which is SOAIncoming_maxThreads which is 60 by default, the consumer threads would take away 60 connections from "eis/wls/EDNDurableTopic". Since $150 + 60 = 210 > 200$ (200 is the default adapter connection pool size of "eis/wls/EDNDurableTopic"), user would get ResourceLimitException. In this case, user needs to increase the "Max Capacity" of Connection Pool of "eis/wls/EDNDurableTopic" to a larger value, for example, 300.

 **Note:**

When a resource is accessed by multiple requests in a cluster environment, resource busy message logs like

```
org.eclipse.persistence.exceptions.DatabaseException Internal  
Exception: java.sql.SQLException: ORA-00054: resource busy and acquire  
with NOWAIT specified or timeout expired may be logged. These logs are  
warning messages and require no action if they do not affect the functionality.
```

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