Oracle® BPEL Process Manager

Installation Guide

10*g* Release 3 (10.1.3.1.0) for UNIX and Microsoft Windows

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Oracle BPEL Process Manager Installation Guide, 10*g* Release 3 (10.1.3.1.0) for UNIX and Microsoft Windows

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Preface

This guide is the primary source of installation information for Oracle BPEL Process Manager.

This preface contains these topics:

- Audience
- Documentation Accessibility
- Related Documentation
- Conventions

Audience

Oracle BPEL Process Manager Installation Guide is intended for customers who want to install Oracle BPEL Process Manager.

Documentation Accessibility

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- *Oracle Application Server Installation Guide* for your platform

- *Oracle Database Administrator's Guide*

In North America, printed documentation is available for sale in the Oracle Store at

```
http://oraclestore.oracle.com/
```

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```
http://www.oracle.com/technology/membership
```

If you already have a username and password for OTN, then you can go directly to the documentation section of the OTN Web site at

```
http://www.oracle.com/technology/documentation
```

Conventions

The following text conventions are used in this document:

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

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Overview of Oracle BPEL Process Manager

This chapter provides an overview of Oracle BPEL Process Manager components and installation scenarios.

This chapter contains the following topics:

- Oracle BPEL Process Manager Components Overview
- Installation Scenarios for Oracle BPEL Process Manager
- System Requirements for Oracle BPEL Process Manager
- Oracle Application Server Portal and Oracle BPEL Portlets
- Oracle BPEL Process Manager and Oracle Application Server Integration B2B

Oracle BPEL Process Manager Components Overview

Oracle BPEL Process Manager provides a user-friendly and reliable solution for designing, deploying, and managing BPEL processes. There are two options for installing Oracle BPEL Process Manager, as shown in Table 1–1.

Table 1–1   Oracle BPEL Process Manager Installation Types

Installation Type	Description
Oracle BPEL Process Manager for Oracle SOA Suite	Provides a single environment for designing and running BPEL processes. This installation type is available only on Microsoft Windows, is configured with an embedded Oracle Containers for J2EE (OC4J) and uses an Oracle Database Lite as its database.
Oracle BPEL Process Manager for OracleAS Middle Tier	Provides a standards-based environment for running processes designed using BPEL. This runtime environment includes Oracle BPEL Server, Oracle BPEL Control, runtime services, and adapters. This installation type requires that an Oracle Application Server 10*g* J2EE middle tier already be installed in the chosen Oracle home.

Oracle BPEL Process Manager consists of the key components shown in Figure 1–1. Oracle BPEL Process Manager runs standard BPEL processes that you deploy to Oracle BPEL Server.

Figure 1–1   Oracle BPEL Process Manager Components
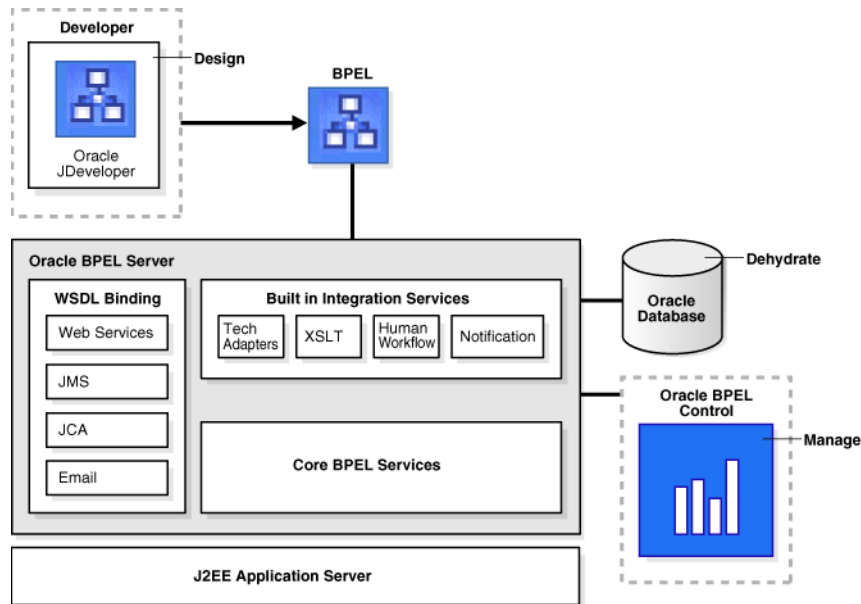
> **Note:**   Although it is shown in Figure 1–1 for completeness, Oracle JDeveloper, a graphical and user-friendly way to model, edit, design, and deploy BPEL processes, is not part of the Oracle BPEL Process Manager installation and must be downloaded and installed separately.

The following components are included with Oracle BPEL Process Manager:

- Oracle BPEL Server: the server to which you deploy the BPEL process that you design and that contains human workflow, technology adapters, and notification services components.

- Oracle BPEL Control: the console from which you run, manage, and test your deployed BPEL process. Oracle BPEL Control provides a Web-based interface for management, administration, and debugging of processes deployed to Oracle BPEL Server.

- Oracle Database Lite, on Windows: This component gets installed as part of the SOA Suite basic installation only, and it is the database that holds your BPEL schema. For UNIX/Linux platforms, you must configure an Oracle Database to test your deployed BPEL processes.

  This version of Oracle Database Lite supports Unicode. By default, the `DB_CHAR_ENCODING` is set to `UTF8`.

See Also:

- *Oracle BPEL Process Manager Developer's Guide*

- *Oracle BPEL Process Manager Quick Start Guide*

- *Oracle BPEL Process Manager Order Booking Tutorial*

- *Oracle Application Server Adapter for Files, FTP, Databases, and Enterprise Messaging User's Guide*

- *Oracle BPEL Process Manager Administrator's Guide*

- `http://www.oracle.com/technology/bpel`

- *Oracle Application Server 10g Release 3 (10.1.3.1.0) Installation Guide* for your platform

Installation Scenarios for Oracle BPEL Process Manager

Installation scenarios are described in the following sections:

- Scenario 1: Oracle BPEL Process Manager with Oracle SOA Suite

- Scenario 2: Oracle BPEL Process Manager for OracleAS Middle Tier

This document describes Scenario 2, installation of Oracle BPEL Process Manager for OracleAS Middle Tier. For information about installing Oracle BPEL Process Manager with the Oracle SOA Suite with Scenario 1, see the *Oracle Application Server 10g Release 3 (10.1.3.1.0) Installation Guide* for your platform.

> **Note:** For information about other installation configurations, see:
>
> - "Oracle Application Server Portal and Oracle BPEL Portlets" on page 1-7 to use Oracle Application Server Portal with Oracle BPEL Process Manager
>
> - "Oracle BPEL Process Manager and Oracle Application Server Integration B2B" on page 1-7 to use Oracle Application Server Integration B2B with Oracle BPEL Process Manager
>
> - "Step 4: If Installing on a Cold Failover Cluster (CFC) Middle Tier" on page 2-4
>
> - Chapter 4, "Oracle BPEL Process Manager Migration" for details on migrating an existing release of Oracle BPEL Process Manager to release 10.1.3.1.0
>
> - Oracle BPEL Process Manager high availability details in the *Oracle Application Server High Availability Guide*,
>
> - The instructions on creating an Oracle BPEL Process Manager clustering environment in Chapter 5, "Oracle BPEL Process Manager Clustering"

Scenario 1: Oracle BPEL Process Manager with Oracle SOA Suite

Oracle BPEL Process Manager is automatically installed as part of the 10*g* Release 3 (10.1.3.1.0) Oracle SOA Suite basic installation, providing a design and standalone test environment. Using this installation type, you design your process and then perform preproduction deployment and testing. Once you are ready for production, you use

Oracle BPEL Process Manager on the OracleAS Middle Tier to deploy the BPEL process.

When you install Oracle BPEL Process Manager with the Oracle SOA Suite basic installation, you get these components:

- Oracle BPEL Server
- Oracle BPEL Control
- Oracle Database Lite

> **Note:** As of 10*g* Release 3 (10.1.3.1.0), Oracle JDeveloper is no longer bundled with Oracle BPEL Process Manager. You must install Oracle JDeveloper separately for use with Oracle BPEL Process Manager projects.

For details about the SOA Suite installation, see the *Oracle Application Server 10g Release 3 (10.1.3.1.0) Installation Guide* for your platform.

Scenario 2: Oracle BPEL Process Manager for OracleAS Middle Tier

Oracle BPEL Process Manager for OracleAS Middle Tier provides robust production components for running BPEL processes.

When you select Oracle BPEL Process Manager for OracleAS Middle Tier, you get these components:

- Oracle BPEL Server
- Oracle BPEL Control

Installing on an Upgraded OracleAS Middle Tier

If you are currently using an Oracle Application Server 10*g* Release 3 (10.1.3) Middle Tier, you must upgrade to 10*g* Release 3 (10.1.3.1.0) using the suitable patch set before installing Oracle BPEL Process Manager.

> **See Also:** For more information, visit the Oracle Technology Network at http://www.oracle.com/technology/index.html

About the Dehydration Store Database

Oracle BPEL Process Manager uses a dehydration store database to enable the states of long-running processes to be automatically persisted. This can be:

- Oracle Database Lite, if you use the SOA Suite Basic installation option

  Oracle Database Lite is configured to support Unicode. `DB_CHAR_ENCODING` is defaulted to `UTF8` in the `polite.ini` file.

- Oracle9*i* Database Server
- Oracle Database 10*g*

If using an Oracle Database, before installation, you must configure your Oracle Database for use with Oracle BPEL Process Manager by running the Integration Repository Creation Assistant.

See Also:

- Table 1–3, " Available Databases" on page 1-6
- Appendix A, "Integration Repository Creation Assistant"

System Requirements for Oracle BPEL Process Manager

This section describes operating system and database requirements for Oracle BPEL Process Manager for OracleAS Middle Tier.

System requirements for Oracle BPEL Process Manager with Oracle SOA Suite basic installation are specified in the *Oracle Application Server 10g* Release 3 (10.1.3.1.0) *Installation Guide* for your platform.

> **Note:** The information provided here reflects the platforms that were supported at the time this document was released. For the most recent list of supported platforms, see the **Certify** tab in Oracle Metalink, available at http://metalink.oracle.com/ for Oracle customers.

Platform Requirements for Oracle BPEL Process Manager

Table 1–2 describes the hardware and memory requirements for Oracle BPEL Process Manager OracleAS Middle Tier.

Table 1–2   Oracle BPEL Process Manager System Requirements

Element	Requirement
Operating system	- Red Hat Enterprise Linux AS/ES 3.0 and 4.0 - SUSE Linux Enterprise Server 9 **See Also:** *Oracle Application Server Installation Guide 10g Release 3 (10.1.3.1.0) for Linux x86* for information on any required operating system patches, packages, swap space requirements, and kernel parameter settings - Microsoft Windows 2000 with Service Pack 3 or higher - Microsoft Windows Server 2003 (32-bit) with Service Pack 1 or higher - Microsoft Windows Server 2003 Release 2 - Microsoft Windows XP Professional with Service Pack 2 or higher *Note*: If you are running Windows XP with Service Pack 2, see Document ID 280874.1 on Oracle *MetaLink* at: http://metalink.oracle.com/ **See Also:** *Oracle Application Server Installation Guide 10g Release 3 (10.1.3.1.0) for Microsoft Windows* for information on processor, TEMP directory, virtual memory, and swap space requirements - Other Platforms For support on operating systems not listed in this table, check the Certify section of Oracle MetaLink (http://metalink.oracle.com). For UNIX-based operating systems not listed in this table, but listed as supported in Certify, use the instructions in this guide labeled for UNIX and the corresponding *Oracle Application Server Installation Guide 10g Release 3 (10.1.3.1.0)* for that operating system (for information on any required operating system patches, packages, swap space requirements, and kernel parameter settings). Oracle BPEL Process Manager for OracleAS Middle Tier is supported on all operating systems listed in Certify.

Table 1–2 (Cont.) Oracle BPEL Process Manager System Requirements

Element	Requirement
Memory	512 MB RAM minimum (1 GB preferred)
Disk space	Oracle BPEL Process Manager for OracleAS Middle Tier: ■ 160 MB *Note*: Requires an additional 400 MB temporary space.
Swap space	512 MB minimum
Monitor	Configured to display at least 256 colors
Oracle JDeveloper	Oracle JDeveloper 10.1.3.1 Studio

Databases for Oracle BPEL Process Manager

Table 1–3 lists information about databases you can utilize for your Oracle BPEL Process Manager installation.

You can use your existing Oracle Database, if it meets the requirements shown in Table 1–3.

> **Note:** This table shows the databases on which you can install Oracle BPEL Process Manager. Check the *Oracle Application Server Installation Guide* for your operating system for the latest information about supported databases for Oracle Application Server.

Table 1–3 Available Databases

Database	Oracle BPEL Process Manager for SOA Suite	Oracle BPEL Process Manager for OracleAS Middle Tier
Oracle Database Lite	Included with SOA Suite basic installations only. No database installation steps are necessary.	Not applicable
Oracle Database 10*g* release 10.1.0.5 or higher, release 10.2.0.2 or higher, or 10.2.0.1 XE	Requires SOA Suite advanced installation	Recommended
Oracle9*i* Database release 9.2.0.7.0 or higher	Requires SOA Suite advanced installation	Supported

> **See Also:**
>
> ■ **Patches & Updates** tab of Oracle*MetaLink* (`http://metalink.oracle.com`) for information about any required patches for your version of the Oracle Database
>
> ■ *Oracle Application Server Installation Guide* for your operating system for information about the supported Oracle Application Server databases

Supported Web Browsers for Oracle BPEL Control

Oracle BPEL Control supports these browsers:

- Microsoft Internet Explorer 6.0 Service Pack SP2 (supported on Microsoft Windows only)

- Netscape 7.2

- Mozilla 1.7

    You can download the Mozilla browser from `http://www.mozilla.org`.

- Firefox 1.0.4

    You can download the Firefox browser from `http://www.mozilla.org`.

- Safari 1.2, 2.0 (on Apple Macintosh computers)

Note: Ensure that cookies are enabled in your Web browser. The Oracle BPEL Control caching mechanism uses cookies to identify user sessions.

Oracle Application Server Portal and Oracle BPEL Portlets

Oracle BPEL Portlets consist of Oracle BPEL Control report portlets and Oracle BPEL Worklist Application portlets. To use Oracle BPEL Portlets, you must install the following installation types:

- Install the Identity Management and Metadata Repository installation type of Oracle Application Server Infrastructure 10*g* Release 2 (10.1.2.0.2)

- Install the Portal and Wireless Middle Tier (same release)

- Oracle BPEL Process Manager for OracleAS Middle Tier 10.1.3.1.0

See Also: "Oracle BPEL Portlets" in the *Oracle BPEL Process Manager Developer's Guide* for additional information about deploying portlets.

Oracle BPEL Process Manager and Oracle Application Server Integration B2B

The B2B WSIL Browser enables interoperability between Oracle BPEL Process Manager and Oracle Application Server Integration B2B and is available through patch 5105622.

See Also:

- The `README.txt` file for patch 5105622. This patch is available from

    `http://metalink.oracle.com/`

- *Oracle Application Server Integration B2B User's Guide*

2

Oracle BPEL Process Manager Installation

This chapter provides the requirements and procedures for installing Oracle BPEL Process Manager.

This chapter contains the following topics:

- Installation Overview for Oracle BPEL Process Manager
- Preinstallation Tasks for Oracle BPEL Process Manager
- Installation Tasks for Oracle BPEL Process Manager
- Silent Installation of Oracle BPEL Process Manager
- Postinstallation Tasks for Oracle BPEL Process Manager
- Postinstallation Verification Tasks for Oracle BPEL Process Manager
- Globalization for Oracle BPEL Process Manager
- Determining the Version of Oracle BPEL Process Manager
- Directory Structure of Oracle BPEL Process Manager
- Deinstallation Tasks for Oracle BPEL Process Manager
- Troubleshooting Oracle BPEL Process Manager Installation and Configuration

Installation Overview for Oracle BPEL Process Manager

This section provides an overview of installation tasks to perform based on the type of installation used for Oracle BPEL Process Manager, and provides references to procedures for performing these tasks.

> **Note:** A silent installation option is available. See "Silent Installation of Oracle BPEL Process Manager" on page 2-8.

Exploring the Product CD-ROM

The Oracle BPEL Process Manager product CD-ROM contains the following files and directories at the top level:

- `README_BPEL_OC4J.txt`: The readme file for this release, which contains important information
- `bpel_oc4j`: The directory that contains software to install
- `doc`: The directory that contains this installation guide

Installation Tasks Summary and Where to Find Procedures

The remainder of this section provides an overview of installation tasks for Oracle BPEL Process Manager for OracleAS Middle Tier.

> **Note:** The Integration Repository Creation Assistant referenced in Table 2-1 is a utility that creates the Oracle BPEL Process Manager user and schema in the Oracle Database. For more information, see Appendix A, "Integration Repository Creation Assistant".

Table 2–1 provides an overview of installation tasks to perform for Oracle BPEL Process Manager for OracleAS Middle Tier.

Table 2–1   Oracle BPEL Process Manager for OracleAS Middle Tier

For	Follow These Steps...	See Also...
Oracle Database 10*g* or Oracle9*i* Database release 9.2.0.7.0	**1.** Install Oracle Database 10*g* or Oracle9*i* Database release 9.2.0.7.0 or higher if not already installed **See Also:** Table 1–3 on page 1-6 for supported Oracle Database releases	*Oracle Database Installation Guide 10g* or *Oracle Database Installation Guide 9i* for your operating system
	2. Create the Oracle BPEL Process Manager schema and user in the Oracle Database using the Integration Repository Creation Assistant (IRCA). The `.bat/.sh` scripts to run IRCA are located in the installation CD under the `install/soa_schemas` directory.	"Step 2: Run the Integration Repository Creation Assistant on the Database" on page 2-3
	3. Install Oracle Application Server 10*g* Release 3 (10.1.3.1.0) and select either the J2EE Server installation type or the J2EE and Web Server installation type.	*Oracle Application Server Installation Guide* for your operating system
	4. Install the current release of Oracle BPEL Process Manager for OracleAS Middle Tier. **Important:** You must install on the Oracle Application Server middle tier in the same Oracle home as the J2EE Server and Web Server or J2EE Server installed in Step 3.	"Installation Tasks for Oracle BPEL Process Manager" on page 2-4

Preinstallation Tasks for Oracle BPEL Process Manager

This section describes the preinstallation steps for Oracle BPEL Process Manager for OracleAS Middle Tier, which are as follows:

- Step 1: Install the Oracle Database - If Not Already Installed

- Step 2: Run the Integration Repository Creation Assistant on the Database

- Step 3: Install or Upgrade Oracle Application Server

- Step 4: If Installing on a Cold Failover Cluster (CFC) Middle Tier

- Step 5: Disable IPv6 if it Is Enabled

> **Note:** This document provides installation details only for Oracle
> BPEL Process Manager for OracleAS Middle Tier. For information
> about installing Oracle BPEL Process Manager with Oracle SOA Suite,
> see the *Oracle Application Server 10g Release 3 (10.1.3.1.0) Installation
> Guide* for your platform.

Details of Preinstallation Steps

This section provides details of the preinstallation steps to follow when installing
Oracle BPEL Process Manager for OracleAS Middle Tier.

Step 1: Install the Oracle Database - If Not Already Installed

One of the following databases is required as a dehydration store for Oracle BPEL
Process Manager for OracleAS Middle Tier:

- Oracle9*i* Database Server

- Oracle Database 10*g*

> **See Also:** "Dehydration Store Maintenance" on page 2-17

If you already have an Oracle Database that meets the requirements listed in
" Available Databases" on page 1-6, then you do not need to reinstall the database.
Otherwise, install or upgrade before you proceed.

> **See Also:**
>
> - *Oracle Database Installation Guide for Microsoft Windows (32-Bit)*
>
> - *Oracle Database Installation Guide for Linux x86*
>
> - *Oracle Database Installation Guide for Solaris Operating System
>   (SPARC 64-Bit)*

Step 2: Run the Integration Repository Creation Assistant on the Database

Run the Integration Repository Creation Assistant (IRCA) to create the database user
and schema. IRCA creates the default user `orabpel`, the default password `orabpel`,
and the tablespace `orabpel` in the Oracle Database.

For details about how to run the IRCA utility, see Appendix A, "Integration Repository
Creation Assistant".

Note that:

- If you previously installed Oracle BPEL Process Manager and you already ran
  Integration Repository Creation Assistant on this Oracle Database, then you do
  not need to run it again.

- If you already have an Oracle BPEL Process Manager user (`orabpel`) in the target
  database, then stop all sessions, activities, and transactions for the user before
  running Integration Repository Creation Assistant. This involves shutting down
  Oracle BPEL Server, Oracle BPEL Control, and Oracle JDeveloper.

- Oracle recommends that you enable automatic segment space management when
  creating the `orabpel` tablespace. This enables you to conveniently reclaim free
  space in the dehydration store.

> **See Also:** "Dehydration Store Maintenance" on page 2-17

Step 3: Install or Upgrade Oracle Application Server

Oracle BPEL Process Manager must be installed on Oracle Application Server 10*g* Release 3 (10.1.3.1.0). Options include:

- Install Oracle Application Server 10*g* Release 3 (10.1.3.1.0) and select the J2EE Server installation type or the J2EE and Web Server installation type.

  > **See Also:** *Oracle Application Server Installation Guide* for your operating system

  or

- Upgrade an existing Oracle Application Server 10*g* Release 3 (10.1.3) Middle Tier

  > **See Also:** "Installing on an Upgraded OracleAS Middle Tier" on page 1-4

Step 4: If Installing on a Cold Failover Cluster (CFC) Middle Tier

If you are installing on a Cold Failover Cluster (CFC) middle tier, the following steps are required after installation of the middle tier and before you install Oracle BPEL Process Manager.

1. Configure the middle tier for a CFC environment.

   See *Oracle Application Server Installation Guide for Microsoft Windows* for your operating system for this step.

2. Check the *Midtier_Home*/config/ias.properties file and make sure that the value of the property VirtualHostName is correct for the VirtualHostName of the CFC middle tier.

Step 5: Disable IPv6 if it Is Enabled

The Oracle BPEL Process Manager installation does not support IPv6 addressing. If IPv6 is enabled on the target machine, disable it prior to installing BPEL Process Manager. You can enable IPv6 after installation.

After you complete the preinstallation steps, you are ready to continue with the installation.

Installation Tasks for Oracle BPEL Process Manager

Before installing Oracle BPEL Process Manager on an OracleAS Middle Tier, recall from "Preinstallation Tasks for Oracle BPEL Process Manager" on page 2-2 that you must already have a database installed for use as a dehydration store for Oracle BPEL Process Manager for OracleAS Middle Tier. This must be an Oracle Database on which the Integration Repository Creation Assistant has been executed to create the necessary database user and schema (see "Step 2: Run the Integration Repository Creation Assistant on the Database" on page 2-3).

> **Note:** If you are configuring Oracle BPEL Process Manager in a
> disaster recovery environment that uses host aliases, see "Configuring
> Oracle BPEL Process Manager for OracleAS Middle Tier in Disaster
> Recovery Environments" on page 2-8 for configuration information
> you will need to provide during installation.

To install Oracle BPEL Process Manager for OracleAS Middle Tier:

1. Ensure that all preinstallation tasks and requirements described in "Preinstallation
   Tasks for Oracle BPEL Process Manager" on page 2-2 have been completed.

2. Log on to the host on which you want to install Oracle BPEL Process Manager
   components.

3. Insert the Oracle BPEL Process Manager CD-ROM.

4. Start Oracle Universal Installer from the `bpel_oc4j` directory of the CD-ROM as
   follows:

On...	Do This...
UNIX/Linux	Enter the following command at the operating system prompt: `./runInstaller`
Windows	Double-click `setup.exe`.

   The Welcome screen appears.

5. Click **Next**.

   If your host is detected to be part of a cluster, the Specify Hardware Cluster
   Installation Mode screen appears. Select **Noncluster Installation**. This installs
   Oracle BPEL Process Manager on this node only, and not as part of a cluster node.
   Do not select **Cluster Installation**.

   The Specify File Locations screen appears.

6. Select the Oracle home name and directory path where the Oracle Application
   Server 10.1.3.1.0 J2EE and Web Server or J2EE Server instance is located.

   - Do not accept the default name and path. Instead, ensure that it points to the
     Oracle home where the Oracle Application Server 10.1.3.1.0 J2EE and Web
     Server or J2EE Server instance is installed. If you specify an incorrect path, the
     Dependencies alert appears. Enter the name and path as shown in these
     examples.

     UNIX/Linux example:

     ```
     Name: OraBPEL
     Path: /home/oracle/OraBPEL
     ```

     Windows example:

     ```
     Name: OraBPEL
     Path: C:\OraBPEL
     ```

   - Do not change the directory path in the **Source** field. This is the location of
     installation files.

7. Click **Next**.

The Select Installation Type screen appears.

8. Select **BPEL Process Manager for OracleAS Middle Tier** and click **Next**.

> **Note:** **BPEL Process Manager for Developers** is not a supported option. To install Oracle BPEL Process Manager as part of the Oracle SOA basic installation for preproduction testing purposes, see the *Oracle Application Server Installation Guide 10g Release 3 (10.1.3.1.0)* for your platform.

The Specify Outgoing HTTP Proxy Information screen appears.

9. If you have a direct connection to the Internet and do not use a proxy server, or if you accept the default information, then click **Next**. Otherwise, enter the information as shown in Table 2–2.

> **Note:** This information is automatically filled in if your browser has been configured for Proxy Server information under **LAN Settings** on the **Connections** tab.
>
> If your browser is using Automatic Configuration of proxies, then you must fill in this information.
>
> On platforms other than Windows, proxy information can be manually set in the `opmn.xml` file.

Table 2–2   Outgoing HTTP Proxy Information

Field	Description	Example
HTTP Proxy Host	Enter the name of the proxy server host.	`www-proxy.us.acme.com`
HTTP Proxy Port	Enter the port number of the proxy server host.	`80`
Bypass proxy for addresses	Enter an address that bypasses the proxy. You may enter more than one address, separating each with a semi-colon (;). If you are configuring Oracle BPEL Process Manager in a disaster recovery environment that uses host aliases, specify those aliases in this field.	`*.us.acme.com;*.us.acme.com;<local>` **Note:** The `<local>` tag ensures that your hostname is automatically included in the bypass proxy list.

The Specify Database screen appears.

10. Provide the details as described in the following table:

Information	Description	Example
Database Type	This must be an Oracle Database.	

Hostname and Port	The full name or IP address of your database host and the listener port. The default listener port is `1521`.	`my-pc.acme.com:1521`
		 or
		 `137.1.18.228:1521`

Information	Description	Example

Service Name	The service name that you specified when you installed the database. The default service name is `orcl`, which may be prepended to the fully qualified domain name (FQDN) for your database.
	
	Note that this is not the SID.
	
	If you are not sure, then run the SQL*Plus command `show parameter service_names`.
		`orcl`
		
		or
		
		`orcl.us.acme.com`

ORABPEL Schema Password	The password assigned to the user `orabpel`. You may have changed this password during preinstallation tasks. For information about the `orabpel` user account, refer to the section "Step 2: Run the Integration Repository Creation Assistant on the Database" on page 2-3.	

11. Click **Next**.

> **Note:** It takes a few minutes for the database connection to be established.

The Administration Settings screen appears.

12. Specify the administrator password. This must match the password of the Oracle Application Server administrator (username `oc4jadmin`).

The Summary screen appears.

13. Click **Install**.

The Installation Progress screen appears for a few seconds, and then the Configuration Assistants screen appears, listing the following:

- The Oracle BPEL Process Manager Configuration Assistant
- The Oracle Process Manager and Notification Server Configuration Assistant

The installer automatically executes each configuration assistant in sequence, displaying the progress in the **Status** column. No action is required on this screen.

When installation completes, the End of Installation screen appears with information for your review.

14. Click **Exit** and confirm when prompted.

The Getting Started page appears.

This completes the installation procedures. Verify the installation, as described in "Postinstallation Verification Tasks for Oracle BPEL Process Manager" on page 2-11.

Configuring Oracle BPEL Process Manager for OracleAS Middle Tier in Disaster Recovery Environments

If you are configuring Oracle BPEL Process Manager in a disaster recovery environment that uses host aliases, specify those aliases in the **Bypass proxy for addresses** field of the Specify Outgoing HTTP Proxy Information window during Oracle BPEL Process Manager for OracleAS Middle Tier installation.

Silent Installation of Oracle BPEL Process Manager

Silent installation eliminates the need to monitor the Oracle BPEL Process Manager installation because there is no graphical output and no input by the user.

To perform a silent installation, you must provide information specific to your installation in a response file. Response files are text files that you can create or edit in a text editor.

A sample response file is shown here:

```
RESPONSEFILE_VERSION=2.2.1.0.0
UNIX_GROUP_NAME="svrtech"
FROM_LOCATION=/mount_point/Disk1/stage/products.xml
ORACLE_HOME=/scratch/aime2/work/soa173
ORACLE_HOME_NAME=soa173
SHOW_SPLASH_SCREEN=false
SHOW_WELCOME_PAGE=false
SHOW_INSTALL_PROGRESS_PAGE=false
SHOW_COMPONENT_LOCATIONS_PAGE=false
SHOW_CUSTOM_TREE_PAGE=false
SHOW_SUMMARY_PAGE=false
SHOW_REQUIRED_CONFIG_TOOL_PAGE=false
SHOW_OPTIONAL_CONFIG_TOOL_PAGE=false
SHOW_RELEASE_NOTES=false
SHOW_ROOTSH_CONFIRMATION=false
SHOW_END_SESSION_PAGE=false
SHOW_EXIT_CONFIRMATION=false
NEXT_SESSION=false
NEXT_SESSION_ON_FAIL=false
SHOW_DEINSTALL_CONFIRMATION=false
SHOW_DEINSTALL_PROGRESS=false
SHOW_IAS_COMPONENT_CONFIG_PAGE=false
ACCEPT_LICENSE_AGREEMENT=true
RESTART_SYSTEM=<Value Unspecified>
CLUSTER_NODES=<Value Unspecified>
OUI_HOSTNAME=isunnat04.us.oracle.com
PreReqConfigSelections=""
n_ValidationPreReqConfigSelections=0
TOPLEVEL_COMPONENT={"oracle.tip.pcbpel","10.1.3.0.0"}
DEINSTALL_LIST={"oracle.tip.pcbpel","10.1.3.0.0"}
COMPONENT_LANGUAGES={"en"}
INSTALL_TYPE=installtype_Server
sl_
HTTPProxyInfoConfig={"www-proxy.us.oracle.com","80","*.oracle.com;*.us.oracle.com"
}
s_configProxyOptions="-http-proxy-required true -http-proxy-host
www-proxy.us.oracle.com -http-proxy-port 80 -http-no-proxy-for
*.oracle.com;*.us.oracle.com"
nValidationHTTPProxyInfoConfig=0
oracle.tip.pcbpel.midtier:sl_MdConnect={"Oracle Database",
"myhost.us.oracle.com:1521", "", "", "db1234.us.oracle.com", "", "orabpel", ""}
```

```
oracle.tip.pcbpel.midtier:s_DBHost="myhost.us.oracle.com"
oracle.tip.pcbpel.midtier:s_DBPort="1521"
oracle.tip.pcbpel.midtier:s_DBPasswd="orabpel"
oracle.tip.pcbpel.midtier:s_DBSid="db1234.us.oracle.com"
oracle.tip.pcbpel.midtier:iASinstancePW="welcome1"
oracle.tip.pcbpel.midtier:bMaskValidationMD=false
oracle.tip.pcbpel.midtier:nValidationMD=0
oracle.tip.pcbpel.midtier:n_choosedb=0
oracle.tip.pcbpel.midtier:s_dbVendor="oracle"
oracle.tip.pcbpel.midtier:bMaskValidationAdminInfo=false
oracle.tip.pcbpel.midtier:n_validateAdminDialogInfo=0
oracle.tip.pcbpel.midtier:sl_adminDialogReturn={"welcome1", "", "default_
group^oc4j_soa", "", ":", ""}
```

You can copy and paste this example file into a text editor, replacing the parameters with their correct values. Use a file type `.rsp` when creating the file.

After the file is ready, run the installer using the `-silent` parameter to perform a silent installation. The syntax is as follows:

Windows

```
setup.exe -silent -responseFile absolute_path_and_filename_to_
responsefile
```

Unix/Linux

```
runInstaller -silent -responseFile absolute_path_and_filename_
to_responsefile
```

> **See Also:**   Silent and Non-Interactive Installation in the *Oracle Application Server Installation Guide* for details about silent installations.

Postinstallation Tasks for Oracle BPEL Process Manager

After installing Oracle BPEL Process Manager, complete the postinstallation steps described in these sections:

- Step 1: Recommended - Change Default Passwords

- Step 2: Recommended - Configure Notification and Workflow for Oracle BPEL Process Manager

- Step 3: Recommended - Update the Path on UNIX/Linux

- Step 4: May Be Needed - Re-enable IPv6

- Step 5: May Be Needed - Install Oracle JDeveloper

- Step 6: Recommended - Add Oracle BPEL Process Manager for OracleAS Middle Tier Memory Settings

> **Note:**
>
> - Important information about Oracle BPEL Process Manager configuration is provided in `Oracle_Home`/install/bpelsetupinfo.txt.
>
> - For the full log of installation details, see the installActions`date_time`.log file, where the date and time are specified as `yyyy-mm-dd_hr-mm-ss`. This file is located under `c:\Program Files\Oracle\Inventory\logs\` on Windows and `Oracle_user_home`/oraInventory/logs/ on UNIX/Linux.

Step 1: Recommended - Change Default Passwords

It is important to change all default passwords before you start using the product.

Two user accounts, named `default` and `bpeladmin`, are automatically created with your Oracle BPEL Process Manager installation. The initial password for both accounts is `welcome1`. Change the password on both accounts immediately after installation is complete.

The `bpeladmin` user provides access to all domains.

> **See Also:** *Oracle Application Server Administrator's Guide* for procedures on changing the domain and Oracle BPEL Control passwords

Step 2: Recommended - Configure Notification and Workflow for Oracle BPEL Process Manager

To use the notification service and workflow applications, you must complete the following steps:

1. Configure the e-mail server settings as described in the Service Configuration section of the *Oracle BPEL Process Manager Administrator's Guide*. The e-mail server settings send and receive e-mails by the Notification and Workflow services.

2. Acting on workflow tasks through e-mail requires that you configure the actionable e-mail account as described in the Services Configuration section of the *Oracle BPEL Process Manager Administrator's Guide*.

3. If the notification service is to be used to send notifications using voice, pager, fax, and short message service (SMS) channels, then the wireless service settings must be configured as described in the section on configuring the wireless service provider for voice in the Services Configuration section of the *Oracle BPEL Process Manager Administrator's Guide*.

Step 3: Recommended - Update the Path on UNIX/Linux

After installing on a UNIX or Linux platform, add `Oracle_Home/bpel/bin` to the path. This enables you to run useful commands such as `ant.sh` and `obversion.sh`, and also facilitates the deployment and running of samples.

See Table 2–3 on page 2-12 for information on how to enable access to the developer prompt.

Step 4: May Be Needed - Re-enable IPv6

If you disabled IPv6 on the target host prior to installation, you can now enable it.

Step 5: May Be Needed - Install Oracle JDeveloper

Oracle JDeveloper, a graphical and user-friendly way to model, edit, design, and deploy BPEL processes, is not included with Oracle BPEL Process Manager. You must download and install Oracle JDeveloper 10.1.3.1 Studio, available on the companion CD, to work with Oracle BPEL Process Manager projects.

> **Note:** Do not install Oracle JDeveloper into a directory path that includes a space (for example, in `C:\Program Files\JDev`). If you do, you receive an error when you compile BPEL processes.

Step 6: Recommended - Add Oracle BPEL Process Manager for OracleAS Middle Tier Memory Settings

After installing Oracle BPEL Process Manager for OracleAS Middle Tier, ensure that you increase the `MaxPermSize` value from 128 to 256 in the Oracle SOA Suite `Oracle_Home\opmn\conf\opmn.xml` file:

```
 <ias-component id="default_group">
   <process-type id="home" module-id="OC4J" status="enabled">
      <module-data>
         <category id="start-parameters">
            <data id="java-options" value="-Xrs -server
            -XX:MaxPermSize=256M -ms512M -mx1024M -XX:AppendRatio=3 ..>
```

For related information, see "OutOfMemory Error" on page 2-18.

Postinstallation Verification Tasks for Oracle BPEL Process Manager

This section helps you verify your installation of Oracle BPEL Process Manager. Completing these steps help confirm a fully functional installation of the various installed components.

Table 2–3 provides instructions for accessing the various components.

Table 2–3   Accessing Oracle BPEL Process Manager Components

To Access The...	On Windows...	On UNIX/Linux...
Oracle BPEL Server	To start Oracle BPEL Server: Select **Start** > **All Programs** > **Oracle -** *Oracle_Home* > **Oracle BPEL Process Manager** > **Start BPEL PM Server** To stop Oracle BPEL Server: Select **Start** > **All Programs** > **Oracle -** *Oracle_Home* > **Oracle BPEL Process Manager** > **Stop BPEL PM Server**	To start Oracle BPEL Server: Use either the `opmnctl` command-line tool or the Application Server Control Console. See "Starting and Stopping Components" in the *Oracle Application Server Administrator's Guide* for details. To stop Oracle BPEL Server: Use either the `opmnctl` command-line tool or the Application Server Control Console. See "Starting and Stopping Components" in the *Oracle Application Server Administrator's Guide* for details.
Oracle BPEL Control	First start Oracle BPEL Server. To start Oracle BPEL Control: 1. Select **Start** > **All Programs** > **Oracle -** *Oracle_Home* > **Oracle BPEL Process Manager** > **BPEL Control** You can also start Oracle BPEL Control from your Web browser using the URL for your installation, which can be found in `bpelsetupinfo.txt`.	First start Oracle BPEL Server. To start Oracle BPEL Control: ■ From your Web browser, log on to the URL for your installation, which can be found in `bpelsetupinfo.txt`.

Developer Prompt for easy access to samples	Select **Start** > **All Programs** > **Oracle -** *Oracle_Home* > **Oracle BPEL Process Manager** > **Developer Prompt** to open up a command prompt at the `c:\`*Oracle_Home*`\bpel\samples` directory.	Set the Developer Prompt in the Bourne shell:
		
		`$ ORACLE_HOME=/home/oracle/installs/midtier`
		
		`$ export ORACLE_HOME`
		
		`$ PATH=$ORACLE_HOME/bpel/bin:$PATH`
		
		`$ export PATH`

Oracle BPEL Process Manager Samples and Tutorials	For details about BPEL samples and additional tutorials available for use: Select **Start** > **All Programs** > **Oracle -** *Oracle_Home* > **Oracle BPEL Process Manager** > **Getting Started with Samples**	Log into the following URL using your Web browser: `$ORACLE_HOME/bpel/samples/sampleshome.html`
Oracle BPEL Worklist Application	To access the login window for Oracle BPEL Worklist Application: Select **Start** > **All Programs** > **Oracle -** *Oracle_Home* > **Oracle BPEL Process Manager** > **Worklist Application** You may also start Oracle BPEL Worklist Application from your Web browser using the URL for your installation, which is found in `bpelsetupinfo.txt`.	First start Oracle BPEL Server. To start Oracle BPEL Worklist Application: ■ From your Web browser, log on to the URL for your installation, which is found in `bpelsetupinfo.txt`.

See Also:

- *Oracle BPEL Process Manager Quick Start Guide*

- *Oracle BPEL Process Manager Order Booking Tutorial*

- *Oracle BPEL Process Manager Developer's Guide*

- *Oracle Application Server Adapter for Files, FTP, Databases, and Enterprise Messaging User's Guide*

Globalization for Oracle BPEL Process Manager

This section provides information about globalization and optional considerations. It includes these sections:

- Oracle BPEL Control and BPEL Server Locales

- XSLT Mapper Parsing

Oracle BPEL Control and BPEL Server Locales

Oracle BPEL Control is available in the following languages: French, German, Italian, Spanish, Portuguese, Japanese, Korean, Simplified Chinese, and Traditional Chinese. Oracle JDeveloper is only available in English and Japanese. Oracle BPEL Control and Oracle JDeveloper retrieve and display text messages from Oracle BPEL Server in the server locale on certain pages. To avoid mixed languages being displayed, ensure Oracle BPEL Control and Oracle BPEL Server are using the same locale.

XSLT Mapper Parsing

The XSLT mapper uses UTF-8 encoding for your operating system to read XSL content from files. Therefore, parsing errors can occur if encoding of XSL content is different from UTF-8.

Determining the Version of Oracle BPEL Process Manager

You can determine the version number of Oracle BPEL Process Manager and Oracle JDeveloper for support purposes.

To check the Oracle BPEL Server version on Windows:

1. Select **Start** > **All Programs** > **Oracle - *Oracle_Home*** > **Oracle BPEL Process Manager** and select **Developer Prompt**.

2. Enter `obversion` at the command prompt.

To check the Oracle BPEL Server version on UNIX/Linux:

- Go to *Oracle_Home*`/bpel/bin` and run `obversion.sh`.

To check the Oracle JDeveloper version:

- Start Oracle JDeveloper and select **About** from the **Help** menu. Click the **Version** tab, and look for the line **BPEL Designer**.

> **Note:** Oracle JDeveloper 10.1.3.1 Studio is not installed with Oracle BPEL Process Manager and must be downloaded and installed separately. Oracle JDeveloper 10.1.3.1 Studio is also available on the companion CD for Oracle BPEL Process Manager.

Directory Structure of Oracle BPEL Process Manager

Table 2–4 shows the directory structure that is created under the `bpel` directory after completing installation.

Table 2–4   Directory Structure for Oracle BPEL Process Manager Installed Components

This Directory	Contains...
`bpel`	The top-level directory for the Oracle BPEL Process Manager installation. It contains these subdirectories:
■ `bin`	■ BPEL server binary and script files
■ `docs`	■ Javadocs and API documentation
■ `domains`	■ The default domain, plus new domains you create
■ `install`	■ BPEL installer-related files
■ `lib`	■ Oracle BPEL Process Manager JAR files
■ `registry`	■ Oracle BPEL Process Manager runtime files for Systinet registry, and for dynamic binding and lookup.
■ `samples`	■ All samples and associated files
■ `system`	■ Oracle Application Server files, classes, and logs.
■ `utilities`	■ Property files to 1) define commonly-used application server-specific properties, and 2) override default properties when running `ant` from the developer prompt or against `build.xml`. Also contains `ant` files for tasks such as migrating projects and testing a BPEL process.

Deinstallation Tasks for Oracle BPEL Process Manager

This section contains the following topics:

- Preparing for Deinstallation
- Deinstallation Tasks

Preparing for Deinstallation

To ensure that BPEL references are removed from the OracleAS Middle Tier, you must run some deinstall-related scripts prior to performing the deinstallation steps. Refer to the *Oracle_Home*/bpel/install/README.deinstall.txt file for instructions.

Deinstallation Tasks

Follow these instructions to deinstall Oracle BPEL Process Manager:

1. Start Oracle Universal Installer.

On...	Do This...
UNIX	Enter the following command at the operating system prompt: `./runInstaller`
Windows	Select **Start** > **All Programs** > **Oracle - *Oracle_Home*** > **Oracle Installation Products** > **Universal Installer**

2. Select **Deinstall Products**.

3. Expand the Oracle home that contains the products to deinstall.

4. Select **Oracle BPEL Process Manager**.

5. Click **Yes** when prompted.

   The deinstallation does not remove files created after installation. You must manually remove these files and directories. Review the `obsetenv.bat` and `devprompt.bat` files located in *Oracle_Home*`/bpel/bin` for more information about how to do this. Oracle recommends that you delete the `bpel` directory under your Oracle home after backing up any required files.

6. After running the pre-deinstall scripts and deinstalling Oracle BPEL Process Manager, restart Oracle Process Manager and Notification Server using the `opmnctl stopall` and `opmnctl startall` commands. This ensures that other OC4J applications, like Oracle Enterprise Manager 10*g*, are in a usable state after you deinstall Oracle BPEL Process Manager.

> **Note:**
>
> - If you want to deinstall and reinstall Oracle BPEL Process Manager in the *same* Oracle home, ensure that you first remove files and subdirectories under *Oracle_Home*`/bpel` before performing the Oracle BPEL Process Manager reinstallation.
>
> - You cannot deinstall and then reinstall within the same Oracle home during the same OUI install session. You must exit the OUI after deinstallation, clean out the directory structure, and then restart a fresh installation.

Troubleshooting Oracle BPEL Process Manager Installation and Configuration

This section contains troubleshooting tips and information for issues that you can encounter. It includes these topics:

- Optimizing Transaction Timeout for Oracle BPEL Server
- Finding Metrics in Application Server Control Console
- Oracle BPEL Server Processes Not Starting
- Dehydration Store Maintenance
- Developer Prompt on Windows 2000
- Multiple Basic Installations on the Same Host
- Multiple Oracle BPEL Process Manager Versions on the Same Database
- Notes about Mozilla and Firefox Security
- OutOfMemory Error

Optimizing Transaction Timeout for Oracle BPEL Server

The server timeout value is specified by the `transaction-timeout` parameter, which is located in *Oracle_Home*`\bpel\system\appserver\oc4j\j2ee\home\config\transaction-manager.xml`.

The default value of the `transaction-timeout` parameter is 30 seconds, which may not be optimal for your server load.

A related parameter, `syncMaxWaitTime`, resides in the domain configuration file `domain.xml`, which is located in *Oracle_Home*\bpel\domains*DOMAIN_NAME*\config.

In general, `syncMaxWaitTime` should always be less than `transaction-timeout` in the `transaction-manager.xml` file.

To change the `transaction-config timeout` parameter value:

1. Open the `server.xml` file in a text editor.

2. Find the line for the `transaction-config timeout` parameter. For example:

   ```
   <transaction-config timeout="60000" />
   ```

3. Change the value to a greater duration. An example that sets the duration to five minutes is as follows:

   ```
   <transaction-config timeout="300000" />
   ```

You can change the `syncMaxWaitTime` parameter value by using Oracle BPEL Control. Alternatively, you can change the `syncMaxWaitTime` setting manually, as follows:

1. Open the file `domain.xml` in a text editor.

2. Find the line for the `syncMaxWaitTime` parameter. For example:

   ```
   <property id="syncMaxWaitTime">
   ```

3. Change the value to a greater duration, making sure that this is less than the duration you set for `transaction-config timeout`. For example:

   ```
   <property id="syncMaxWaitTime">
       <name>Delivery result receiver maximum wait time</name>
       <value>120</value>
   ```

   The default is `45` seconds, and in this example the duration is changed to `120` seconds, or two minutes.

Alternatively, you can reduce the database activity to the BPEL dehydration store database. For example, you can change the `AuditLevel` value to `production` to reduce the database activity. However, doing so takes away some of the useful information from the Console Audit instances details in the Oracle Enterprise Manager 10*g* Application Server Control Console.

Finding Metrics in Application Server Control Console

The metrics for Start Time, CPU Usage, and Memory Usage for Oracle BPEL Process Manager are displayed as "`Not Yet Available`" in Oracle Enterprise Manager 10*g* Application Server Control Console. To see these metrics for Oracle BPEL Process Manager, go to the page for Oracle Containers for J2EE.

Oracle BPEL Server Processes Not Starting

Oracle HTTP Server must be running for BPEL server processes to be available. You can start this server process from Oracle Enterprise Manager 10*g* Application Server Control Console by selecting the process and then clicking **Start**.

Alternatively, you can start the Oracle HTTP Server process from the developer prompt as follows:

```
opmnctl startproc process-type=HTTP_server
```

Dehydration Store Maintenance

This section explains how you can periodically reclaim free space in the dehydration store and manage the future growth of the store.

Oracle recommends that you create the `orabpel` tablespace with auto segment space management turned on. This enables you to conveniently reclaim free space in the dehydration store.

With auto segment space management turned on, use the following commands to regain free space (in this example, for the `cube_scope` table):

```
alter table cube_scope enable row movement;
alter table cube_scope shrink space compact;
alter table cube_scope shrink space;
alter table cube_scope disable row movement;
```

Developer Prompt on Windows 2000

On Windows 2000, the developer prompt can fail to display when selecting **Start > All Programs > Oracle** - *Oracle_Home* **> Oracle BPEL Process Manager > Developer Prompt**. This is a known classpath length issue with Windows 2000. For the developer prompt to successfully display, you must shorten your classpath. For example, when you install Oracle BPEL Process Manager, limit the length of the directory path of your *Oracle Home*.

Multiple Basic Installations on the Same Host

On Windows platforms, do not attempt to apply multiple installations of the SOA Basic installation type on the same host. This is because multiple installations would require multiple versions of Oracle Database Lite on the same host, which is not supported.

If you need a newer version, first uninstall the original installation, then reinstall.

Multiple Oracle BPEL Process Manager Versions on the Same Database

You cannot use the same dehydration store for multiple Oracle BPEL Process Manager installations for different releases. For example, Oracle BPEL Process Manager 10.1.3.1.0 and 10.1.2.0.2 cannot share the same Oracle Database.

Notes about Mozilla and Firefox Security

This section provides information specific to Mozilla/Firefox security settings.

1. Due to some security restrictions in Firefox and Mozilla browsers, some tasks require explicit permission. To enable users to ask for that permission, the following Mozilla/Firefox preference must be set to true:

   ```
   signed.applets.codebase_principal_support = true
   ```

   The effect of this setting is that code which executes and asks for a certain privilege, and is given that privilege, will run with it in the context of the currently

executing stack frame and all called frames. Access is not granted to the lower stack frames from the point of privilege grant.

To set this property:

a. Open a new tab, and type `about:config` in the location/address field.

b. Find the preference `signed.applets.codebase_principal_support`.

c. Right-click over it to get the context menu and choose **Toggle** so that the preference has the value `true`.

2. Modal dialogs cannot exist in Mozilla/Firefox unless a `UniversalBrowserWrite` permission is granted to the calling script. This is encountered in some places in Oracle BPEL Control. Unless you grant this privilege, the code will not run; instead, the browser will ask you for that privilege when such code is to be executed.

3. A copy-to-clipboard feature exists in some places in Oracle BPEL Control to help in moving XML document data to and from other editors. Mozilla and Firefox do not grant access (either read or write) to the system clipboard unless the `UniversalXPConnect` privilege is granted.

OutOfMemory Error

Out-of-memory errors can have many different causes, including hardware configuration, software configuration, JDK versions, and so on. For example, when too many Java classes must be loaded, you may receive the following error:

`Java.lang.OutOfMemoryError: PermGen space`

After installing Oracle BPEL Process Manager for OracleAS Middle Tier, ensure that you increase the MaxPermSize value from 128 to 256 in the Oracle SOA Suite *Oracle_Home*\opmn\conf\opmn.xml file:

```
<ias-component id="default_group">
  <process-type id="home" module-id="OC4J" status="enabled">
    <module-data>
      <category id="start-parameters">
        <data id="java-options" value="-Xrs -server
        -XX:MaxPermSize=256M -ms512M -mx1024M -XX:AppendRatio=3 ..>
```

3

Installing Oracle BPEL Process Manager with the IBM WebSphere Application Server

This chapter provides the requirements and procedures for installing Oracle BPEL Process Manager with IBM WebSphere Application Server.

This chapter contains these topics:

- Overview
- System and Database Requirements
- Installation and Configuration
- Design-time Deployment Support for BPELPM 10.1.3.1 on WebSphere 6.1.0.3
- Postinstallation Configuration of the IBM WebSphere Application Server
- Postinstallation Verification Tasks
- Limitations, Known Issues, Troubleshooting Tips

> **See Also:** The following documentation after completing installation:
>
> - *Oracle BPEL Process Manager Quick Start Guide*
> - *Oracle BPEL Process Manager Order Booking Tutorial*
> - *Oracle BPEL Process Manager Developer's Guide*
> - *Oracle Application Server Adapter for Files, FTP, Databases, and Enterprise Messaging User's Guide*
> - *Oracle Application Server Adapter Concepts*

Overview

You can install and use Oracle BPEL Process Manager with the IBM WebSphere Application Server.

The IBM WebSphere Application Server enables you to set up, operate, and integrate e-business applications across multiple computing platforms using Web technologies. The IBM WebSphere Application Server includes both the run-time components and the tools to develop and design applications.

Oracle BPEL Process Manager provides the infrastructure for creating standards-based business processes, which can span heterogenous environments, include human intervention, and exhibit efficient asynchronous and synchronous behavior. A key

enabler of Service-Oriented Architecture it also provides services that can be used for integration and notifications.

Oracle BPEL Console is the monitoring environment for Oracle BPEL Process Manager. You can run, manage, and test your deployed BPEL process using the Oracle BPEL Console. Oracle BPEL Console provides a Web-based interface for management, administration, and debugging of processes deployed to Oracle BPEL Server.

System and Database Requirements

Table 3–1 describes the system requirements for using Oracle BPEL Process Manager with the IBM WebSphere Application Server.

Table 3–1   Oracle BPEL Process Manager System Requirements

Element	Requirement
IBM WebSphere Application Server	Version 6.1.0.3 Network Deployment with fix packs PK33090
	Note: The Interim Fix pack - IFPK33090 is used to resolve a WebSphere Bug related to ServletFilters. A Web Container custom property needs to be set for this bug fix to take effect. This step has been detailed in Step 14 of Section 3 of the Installation guide.
	Fix Pack 3: *http://www-1.ibm.com/support/docview.wss?rs=180&uid=swg27004980#ver61*
	Interim Fix Pack IFPK33090: *http://www-1.ibm.com/support/docview.wss?uid=swg24014758*
Oracle BPEL Process Manager for OC4J	Version 10.1.3.1
	Note: Refer to Step 3: Install Oracle BPEL Process Manager 10.1.3.1.0 for OC4J for installing Oracle BPEL Process Manager for OC4J.
Web browsers	Internet Explorer 6.0 or Mozilla Firefox 5.0
Operation systems	Microsoft Windows XP, Microsoft Windows 2003, Red Hat Enterprise Linux release 3, and Red Hat Enterprise Linux release 4
	Note: See the IBM Web site for additional details about using these operating systems with the IBM WebSphere Application Server.
Dehydration store database	Oracle Database 10.1.0.5 and Oracle Database 10.1.2.2

Installation and Configuration

This section describes the steps involved in installing and configuring the Oracle Database, creating a schema in the Database, and installing and configuring IBM WebSphere Application Server.

This section contains the following topics:

- Step 1: Configure the Oracle Database

- Step 2: Create the Oracle BPEL Process Manager Schema in the Oracle Database

- Step 3: Install Oracle BPEL Process Manager 10.1.3.1.0 for OC4J

- Step 4: Install and Configure IBM WebSphere Application Server Version 6.1.0

> **Note:** Oracle Database Lite is automatically installed with the Oracle BPEL Process Manager for Developers install type described in this chapter. However, you *cannot* use Oracle Database Lite as the dehydration store.

Step 1: Configure the Oracle Database

Follow these instructions to install Oracle Database 10*g*.

> **Note:** These instructions assume that you have obtained Oracle Database 10*g* version 10.1.0.2 and Oracle Database 10*g* Patch version 10.1.0.5.

1. Install Oracle Database 10*g* 10.1.0.2.

2. Open SQL*Plus and log in as a user with the SYSDBA privilege.

3. Shut down the database:

   ```
   SQL> SHUTDOWN IMMEDIATE
   ```

4. Install the Oracle Database 10*g* 10.1.0.5 patch in the same Oracle home in which you installed Oracle Database 10*g*.

5. If using Linux only, then log in as the root user and run the following command from the operating system command prompt:

   ```
   /etc/init.d/init.cssd stop
   ```

6. Start the database in upgrade mode in SQL*Plus:

   ```
   SQL> STARTUP UPGRADE
   ```

7. Run the following script:

   ```
   SQL> @ORACLE_HOME/rdbms/admin/catpatch.sql;
   ```

8. Shut down the database:

   ```
   SQL> SHUTDOWN IMMEDIATE
   ```

9. Restart the database:

   ```
   SQL> STARTUP
   ```

10. Run the following script:

    ```
    SQL> @ORACLE_HOME/rdbms/admin/utlrp.sql;
    ```

Step 2: Create the Oracle BPEL Process Manager Schema in the Oracle Database

> **Note:** The scripts to configure Oracle BPEL Process Manager on the IBM WebSphere Application Server require that the JAVA_HOME environment parameter be set prior to running the script.

1. Navigate to the Disk1\install\soa_schemas\irca folder in the BPEL Installation Setup files directory.

2. Set `ORACLE_HOME` to point to the Oracle Database Installation location. For example,

   ```
   set ORACLE_HOME=c:\Oracle10g
   ```

3. Enter `irca bpel`.

   This runs the irca script packaged with the Oracle BPEL Process Manager installation.

4. Enter `sys` as the user name and the sys password when prompted.

   The `orabpel` schema is loaded on the Oracle Database.

Step 3: Install Oracle BPEL Process Manager 10.1.3.1.0 for OC4J

This is the standalone version of BPEL. Please note the basic SOA Suite installation cannot be used for this setup. You can download this standalone version of Oracle BPEL Process Manager 10.1.3.1.0 from:

http://www.oracle.com/technology/software/products/ias/bpel/index.html

Install Oracle BPEL Process Manager for Developers version 10.1.3.1 into any directory on the same host on which the IBM WebSphere Application Server ND is installed.

Oracle BPEL installation on Websphere 6.1 requires to reference the binaries, property files, and path from this. This is an important prerequisite prior to the WAS install.

> **Note:** Refer to Chapter 2, "Oracle BPEL Process Manager Installation" for Oracle BPEL Process Manager installation.

> **WARNING:** Do not start Oracle BPEL Server from the Windows Start Menu or by running the Oracle_Home\bpel\bin\startorabpel script. These actions are not supported.

Step 4: Install and Configure IBM WebSphere Application Server Version 6.1.0

> **Note:** These instructions assume that you have obtained IBM WebSphere Application Server version 6.1.0 and version 6.1.0.3 upgrade software.

1. Install IBM WebSphere Application Server Network Deployment (ND) version 6.1.0. If installing on Windows, then ensure that you have administrative privileges.

   > **Note:** If installing on Linux, then the WebSphere Application Server should be installed from the root user.

2. Upgrade IBM WebSphere Application Server ND to version 6.1.0.3 by downloading and applying the following fix pack from WebSphere Supplements:

   - Fixpack3 PK33090 (IFIX330906023) on 6.1.0 ND using the UpdateInstaller

3. Download Oracle BPEL Process Manager 10.1.3.1 for IBM Websphere Application Server (6.1.0.3) at

http://www.oracle.com/technology/software/products/ias/bpel/index.html and unzip to the `Installables` folder.

> **Note:**
>
> - The directory to which you download the Oracle BPEL Process Manager should be the same host on which the IBM WebSphere Application Server ND is installed.
>
> - Unzip the `Installables` folder as a non-root user (same user as was used to install Oracle BPEL Process Manager 10.1.3.1.0 for OC4J). For example, `Oracle`.

4. Start `Nodeagent` as follows:

For...	Run...
Windows XP	`WAS_HOME\profiles\<ProfileName>\bin\startNode.bat`
Linux	`WAS_HOME/profiles/<ProfileName>/bin/startNode.sh`

5. Modify the following mandatory installation properties in the `Installables`\cfg\constants.properties file:

> **Note:** Mandatory properties cannot have a comment tag or contain blank values. Failure to follow this requirement results in errors during installation. Also, ensure that you enter the appropriate information for each of the fields. Any typo will cause errors during installation.

Property	Description
WAS_HOME	The directory path in which IBM WebSphere Application Server is installed.
CELL_NAME	Name of the IBM WebSphere Application Server Cell (<host>Node01Cell).
NODE_NAME	Name of the IBM WebSphere Application Server Node (<host>Node01).
PROFILE_NAME	Name of the Profile (AppSrv01 by default).
BPEL_HOME	The directory path in which Oracle BPEL Process Manager is installed.
BPEL_INSTALL_ ROOT	The directory containing the JDK of Oracle BPEL Process Manager. For example, if the Oracle BPEL Process Manager home directory is `C:\product\10.1.3.1\OraBPEL_1\bpel`, then `BPEL_INSTALL_ ROOT` is typically `C:\product`.
SERVER_NAME	The name of the IBM WebSphere Application Server instance that runs Oracle BPEL Process Manager. The default value is `oracleBPELServer`, but this can be any valid name.
ORACLE_JDBC_ DRIVER_PATH	The JDBC driver path (`ojdbc14.jar`).
DRIVERTYPE	The JDBC driver type (thick or thin).

Property	Description
HOSTNAME	The name or IP address of the host on which Oracle Database 10*g* is installed.
PORTNUMBER	The port number of the host on which Oracle Database 10*g* is installed.
SID	The service name of Oracle Database 10*g*.
JAASAUTHUSERID	The user name for accessing the Oracle BPEL Process Manager schema.
JASAUTHPASSWD	The password of the user name for accessing the Oracle BPEL Process Manager schema.
VHPORTS1	The virtual host or HTTP port number.
VHPORTS2	The virtual host or HTTP port number.
ISEMBEDDED	The Boolean value to specify for the messaging type.
	True - WebSphere Default Messaging
	False - WebSphere MQ Messaging

6. If you want to use the following optional properties, remove the comment tag from the properties, and then specify values.

> **Note:** Optional properties have the comment tag, by default. If you remove the comment tag for these properties, then they cannot contain blank values. Change the default values for the four properties. Failure to follow this requirement results in errors during installation.

Property	Description
PROXYSET	Indicates whether a proxy server is being used (`true` or `false`).
PROXYHOST	The name or IP address of the host on which the proxy server is installed.
PROXYPORT	The port your host uses to access the proxy server.
NONPROXYHOSTS	The addresses for which the proxy server must be bypassed.
CLUSTER_NAME	Name of the WebSphere cluster for hosting BPEL Server.

7. If you are using MQ as the messaging middleware, then remove the comment tag and then specify values for the following properties:

> **Note:** MQ properties have a comment tag by default. If you remove the comment tag for these properties, then they cannot contain blank values. Failure to follow this requirement results in errors during installation.

Property	Description
QUEUEMANAGER	The name of the queue manager that provides access to the queues.
HOST	The name of the host on which the WebSphere MQ queue manager runs.

Property	Description
PORT	The TCP/IP port number used for connections to the WebSphere MQ queue manager.
CHANNEL	The name of the channel used for connections to the WebSphere MQ queue manager.
TRANSPORTTYPE	The communication channel to connect to the queue manager.
CCSID	The coded character set identifier for use with the WebSphere MQ queue manager.
INVOKERBASEQUEUENAME	The name of the invoker base queue to which messages are sent.
WORKERBASEQUEUENAME	The name of the worker base queue to which messages are sent
TESTBASEQUEUENAME	The name of the test base queue to which messages are sent.
NOTIFICATIONBASEQUEUENAME	The name of the notification base queue to which messages are sent.
ALIAS	The name of the component-managed authentication alias.
USERNAME	The user name for accessing the queue.
PASSWORD	The password for the user name.

8. Navigate to **Start**, **Programs**, **IBM WebSphere**, **Application Server Network Deployment V6.1**, **Profiles**, **Dmgr01**, and **Start the Deployment Manager** to start Deployment Manager.

Deployment Manager is the default IBM WebSphere Application Server instance that runs the WebSphere Administrative Console. This server has to be started before the user can access the WebSphere Administrative Console at the following URL:

```
http://hostname:9060/ibm/console
```

Remain in the Installables\bin directory.

9. Run the following script at the operating system command prompt:

For...	Run...
Windows XP	setup.bat
Linux	setup.sh

This creates Oracle BPEL Server on the IBM WebSphere Application Server and configures the required applications, database connections, and adapters.

Installation progress is logged to the *Installables*\bin\logs\output.log file.

> **Note:** If using Linux, run the setup.sh as a non-root user (same user as was used to install Oracle BPEL Process Manager 10.1.3.1.0 for OC4J). For example, Oracle. Enter the sudo password when prompted. (Sudo access required for IBM WebSphere Application Server commands) Script execution completes.

10. Restart Deployment Manager after the script run is completed.

11. From IBM Admin console, add Webcontainer custom property
`"com.ibm.ws.webcontainer.invokefilterscompatibility=true"` for
oracleBPELServerApplication Servers > oracleBPELServer > Web Container >
Custom Properties.

> **Note:** This is required for the domain filter bug fix in IBM
> WebSphere Application Server.

12. Start **Oracle BPEL Server** (represented by the name **oracleBPELServer**) by
following the startup instructions in the IBM WebSphere Application Server
administration documentation.

> **Note:** Do *not* start Oracle BPEL Server from the Windows Start Menu
> or by running the `Oracle_Home`\bpel\bin\startorabpel script.
> These actions are not supported.

Design-time Deployment Support for BPELPM 10.1.3.1 on WebSphere 6.1.0.3

This section describes the various design-time support functions available on
WebSphere 6.1.0.3, for the deployment of J2EE applications in JDeveloper. You can
deploy BPELPM components on WebSphere 6.1.0.3 by using the following two
methods:

- From the BPELPM Developer Prompt Using Ant
- From JDeveloper

From the BPELPM Developer Prompt Using Ant

You can use `ant` in the BPELPM developer prompt to deploy J2EE applications. This
section contains the following topics:

- Prerequisite Checks
- Steps to Deploy Using the BPELPM Prompt

Prerequisite Checks

1. Ensure that `bpelPlatform` is set to **WebSphere_5** in the
`bpel\system\config\collaxa-config.xml` file.

2. Ensure that `platform` is set to **WebSphere_5** in the
`bpel\utilities\ant-orabpel.properties` file.

3. The `admin.user` property and `admin.password` property should point to a
valid LDAP user if security is ON in the
`bpel\utilities\ant-orabpel.properties` file.

> **Note:** If the `admin.user` property is not set correctly, then the
> deployment may throw authentication errors.

Steps to Deploy Using the BPELPM Prompt

Follow these instructions to deploy BPELPM from the developer prompt using ant:

1. Open a BPELPM Developer prompt.

2. Run `ant.sh/bat` from the `Oracle_Home\bpel\system\appserver\oc4j\ant\bin` directory of the BPEL application. This runs the `build.xml` of the BPEL application and performs the following steps:

   a. Compiles and deploys the BPEL process to BPELPM.

   b. Compiles and generates Workflow form WAR files in `public_html` within the BPEL application directory, but does not deploy on WebSphere.

   c. Compiles and generates UI application EAR files (if any) in the `bpel\system\appserver\oc4j\j2ee\home\applications` directory, but does not deploy on WebSphere.

   d. Compiles and generates Decision Service (Business Rules) application EAR files in the `decisionservices` folder within the BPEL application directory, but does not deploy on WebSphere.

3. At the BPELPM Developer prompt, enter the following command:

   `cd bpel\bin\wsant`

4. Follow Steps 5 - 6 for all the applications generated in Steps 2.b, 2.c and 2.d.

5. Edit and update the `App.properties` file in `bpel\bin\wsant` directory.

   > **Note:** The `app.wsopt` attribute should be set to **deployws**, if the EAR contains any Webservices that need deployment, for example, Decision Service applications. Otherwise, this value should be set to **nodeployws**.
   >
   > The `SERVER_NAME` property should be set to **DecisionServer** for deploying Decision Service applications (Business Rules applications) and **oracleBPELServer** for UI or Workflow form Application.

6. Run `ant.sh/bat` from the `bpel\bin\wsant` directory. This would deploy the application mentioned in the `App.properties` file on WebSphere.

7. Restart **oracleBPELServer** and **DecisionServer** from the IBM console (available at http://hostname:9060/ibm/console).

From JDeveloper

You can also deploy J2EE applications from JDeveloper. This section contains the following topics:

- Prerequisite Checks
- Steps to Deploy Using JDeveloper

Prerequisite Checks

1. Download JDeveloper Studio 10.1.3.1 (`jdevstudio10131.zip`) from

For Windows -
http://www.oracle.com/technology/software/products/jdev/htdocs/soft10131.html.

2. Ensure that `bpelPlatform` is set to **WebSphere_5** in the `bpel\system\config\collaxa-config.xml` file.

3. Ensure that `platform` is set to **WebSphere_5** in the `bpel\utilities\ant-orabpel.properties` file.

4. Copy `bpm-services.jar` from `Installables/lib` to `<jdev_ home>/integration/lib`.

> **Note:** The `bpm-services.jar` contains changes to `java-wsdl-mapping` and `DecisionServiceInfoTemplate`, which are required for `DecisionServices` to run on WebSphere.

5. The `admin.user` property and `admin.password` property should point to a valid LDAP user if security is ON in the `bpel\utilities\ant-orabpel.properties` file.

6. Create an application server connection of the Standalone OC4J 10.1.3 type.

7. Create an Integration Server connection to **hostname:9700**.

Steps to Deploy Using JDeveloper

Follow these instructions to deploy BPELPM from the developer prompt using ant:

1. From JDeveloper, right-click and deploy the BPEL application into the required domain. This runs the build.xml file of the BPEL application and performs the following steps:

   a. Compiles and deploys the BPEL process to BPELPM.

   b. Compiles and generates Workflow form WAR files in `public_html` within the BPEL application directory but does not deploy on WebSphere.

   c. Compiles and generates UI application EAR files (if any) in the `bpel\system\appserver\oc4j\j2ee\home\applications` directory but does not deploy on WebSphere.

   d. Compiles and generates Decision Service (Business Rules) application EAR files in the `decisionservices` folder within the BPEL application directory but does not deploy on WebSphere.

   > **Note:** This EAR file contains an `application.xml` file, with a `<description>` tag. This tag is not supported by WebSphere, which may lead to deployment errors. As a workaround for this issue, ensure to remove the `<description>` tag from the `application.xml` file manually before deploying it into WebSphere.
   >
   > Oracle is working to provide a fix in a future patch, which will be available from MetaLink.

2. Import the following files from `bpel\bin\wsant` into the **Resources** section of the JDeveloper project .

3. Follow Steps 4 - 5 for all the applications generated in Steps 1.b, 1.c and 1.d.

4. Edit and update the `App.properties` file in the `bpel\bin\wsant` directory.

> **Note:** The `app.wsopt` attribute should be set to **deployws**, if the EAR contains any Web services that need deployment, for example, Decision Service applications. Otherwise, this value should be set to **nodeployws**.
>
> The `SERVER_NAME` should be set to **DecisionServer** for deploying Decision Service Applications (Business Rules Applications) and **oracleBPELServer** for UI or Workflow form Application.

5. Right-click and run the `bpel\bin\wsant\build.xml` file. This would deploy the application mentioned in the `App.properties` file on WebSphere.

6. Restart **oracleBPELServer** and **DecisionServer** from the IBM console (available at http://hostname:9060/ibm/console).

Postinstallation Configuration of the IBM WebSphere Application Server

You can perform the following postinstallation steps for configuring IBM WebSphere Application Server:

- Using Messaging Feature
- Using Application Security
- Using Clustering

Using Messaging Feature

While configuring Oracle BPEL Process Manager on the IBM WebSphere Application Server, you can use either the default messaging feature of WebSphere or the external MQ for JMS feature:

- To use default messaging, set the `ISEMBEDDED` property to `true` in the `constants.properties` configuration file. The queue connection factories and queues required for Oracle BPEL Process Manager are created under Queue Connection Factories in the WebSphere Administrative Console.

- To use external MQ for JMS, set the `ISEMBEDDED` property to `false` in the `constants.properties` configuration file. The queue connection factories and queues required for Oracle BPEL Process Manager are created under Queue Connection Factories in the WebSphere Administrative Console.

If you change the `ISEMBEDDED` setting *after* running the `setup` script, then you must manually delete several configuration properties.

1. If the message middleware type changes as described below, then perform the following changes:

If the Messaging Middleware is Changed From...	Go to the WebSphere Console and Perform the Following Tasks...
External MQ for JMS *to* Default	Delete the following: 1. **BPELInvokerQueueFactory**, **BPELWorkerQueueFactory**, **BPELTestQueueFactory**, and **BPELNotificationSenderQueueFactory** under **WebSphere MQ Queue Connection Factories**. 2. **BPELInvokerQueue**, **BPELWorkerQueue**, **BPELTestQueue**, and **BPELNotificationSenderQueue** under **WebSphere MQ Queue Destinations**. 3. **InvokerAS**, **WorkerBeanAS**, **TestAS**, and **NotificationSenderAS** from the **Activation Specifications**.
Default *to* External MQ for JMS	Delete the following: 1. **BPELInvokerQueueFactory**, **BPELWorkerQueueFactory**, **BPELTestQueueFactory**, and **BPELNotificationSenderQueueFactory** under **WebSphere Queue Connection Factories**. 2. **BPELInvokerQueue**, **BPELWorkerQueue**, **BPELTestQueue**, and **BPELNotificationSenderQueue** under **WebSphere MQ Queue Destinations**. 3. **InvokerBeanPort**, **WorkerBeanPort**, **TestPort**, and **NotificationSenderPort** from the **listener ports**.

2. If you manually install any new adapters, add the directory path of the adapter JAR file to the shared libraries classpath in the WebSphere Administrative Console under **Environment**, **Shared Libraries**, and **orabpel_sl**.

   You must perform this action only for adapters you intend to use with Oracle BPEL Process Manager.

3. Change the default values configured by the setup script for the adapter J2C connection factories to values suitable to your environment in the WebSphere Administrative Console under **Resources**, **Resource Adapters**, *adapter_type*, and **J2C Connection Factories**.

   The J2C connection factories are created for the resource adapters. These adapters are created and configured as follows:

   - Resource adapters (file, FTP, and so on) are created using the JACL script.

   - J2C connection factories are created for each resource adapter.

   To connect to the suitable resource, the server uses the J2C connection factories. For example, you create a J2C connection factory with the following attributes for the database adapter:

   - Name of BPELSamples

   - JNDI name of eis\DB\BPELSamples

   - Connection string of jdbc:oracle:thin:@localhost:1521:orcl

   This connection string is automatically configured to use the default values as mentioned earlier. You must change the string to point to a proper database (if it is

different from the default value) under **Resources**, **Resource Adapters**, *adapter_ type*, **J2C Connection Factories** before using the database adapter.

4. Change the default value of `none` for the adapter J2C connection factories authentication alias to a value suitable to your environment.

Using Application Security

This section describes different methods to set up Application Security using External LDAP Store for WebSphere Application Server ND. The various methods used to set up Application Security are:

- Using Script

  Edit `SecConfig.properties` and the values of the following mandatory fields:

  LDAPServerId

  LDAPPassword

  LDAPServerType

  LDAPHostName

  LDAPPort

  LDAPBaseDN

  LDAPBindDN

  LDAPBindPassword

  LDAPPrimaryAdminId

  Run the setupSecurity.bat/sh from `<INSTALL_HOME>`.

  This script enables the application and administrative security for WebSphere and configures the provided LDAP store as the User Registry for authentication.

  This script logs its errors at `<INSTALL_HOME>`\logs\security.log

- Manually using WebSphere Security Configuration Wizard

  – Navigate to **WebSphere Admin console**, **Security**, **Secure administration, applications, and infrastructure**, **Security Configuration Wizard**.

  – Select **Enable Security**, and then Click **Next**.

  – Select **Standalone LDAP Registry**, and then click **Next**.

  – Provide all required LDAP server and bootstrap user information, and then click **Next**.

  – Review summary information, and then click **Finish**.

  – Restart Deployment Manager and OracleBPELServer.

  – After restart the IBM Admin console would require a valid LDAP user name/password for login.

Using Clustering

This section describes the cluster support available for BPELPM 10.1.3.1 on WebSphere 6.1.0.3 Network Deployment. This section contains the following topics:

- Prerequisite Checks
- Steps to Create a Cluster for BPELPM

Prerequisite Checks

Ensure that `setup.bat(sh)` has been run successfully and the installation is verified.

Steps to Create a Cluster for BPELPM

Follow these instructions to create a cluster for BPELPM:

1. Edit the `Installables\cfg\constants.properties` file. Remove the comment tag for the `CLUSTER_NAME` property and provide a valid name.

2. Run `setup.sh/bat createCluster` from the Installables\bin directory. This creates a cluster (`CLUSTER_NAME`) and adds the server (`SERVER_NAME`) to it.

   > **Note:** You can find the log details at the Installables\bin\logs\cluster.log file.

3. You can also add additional cluster members from the IBM admin console (available at http://<hostname>:9060/ibm/console).

   > **Note:** The new cluster that is created is based on the configuration setting on **oracleBPELServer**. You *cannot* deploy any Decision Service application on this cluster. They should be deployed on the Decision Server, which has been created with a specific configuration to host Decision Service applications.

Postinstallation Verification Tasks

This section describes the postinstallation verification tasks to be performed, and it contains the following topics:

- Verifying Installation from the WebSphere Console
- Verifying Oracle BPEL Process Manager Console
- Verifying the SelectAllByTitle Sample for the Database Adapter
- Verifying the OrderBooking Tutorial Sample
- Running Adapter Samples
- Deploying Samples Using Ant

Verifying Installation from the WebSphere Console

1. Log in to the WebSphere Console and verify that **oracleBPELServer** is installed under **Servers**, **Application Servers**.

2. Verify that the **orabpel_sl** shared library has been created under **Environment**, **Shared Libraries**.
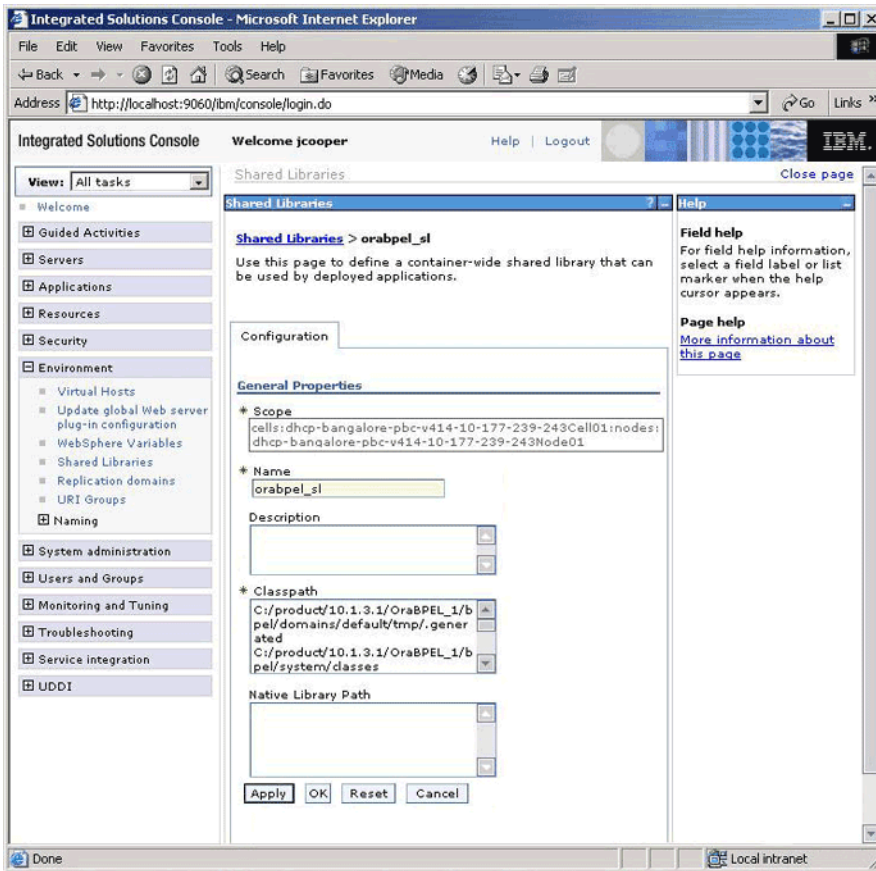
3. Verify that **BPELDataSourceProvider** and **BPELXADataSourceProvider** are created for oracleBPELServer under **Resources**, **JDBC**, **JDBC Providers**.
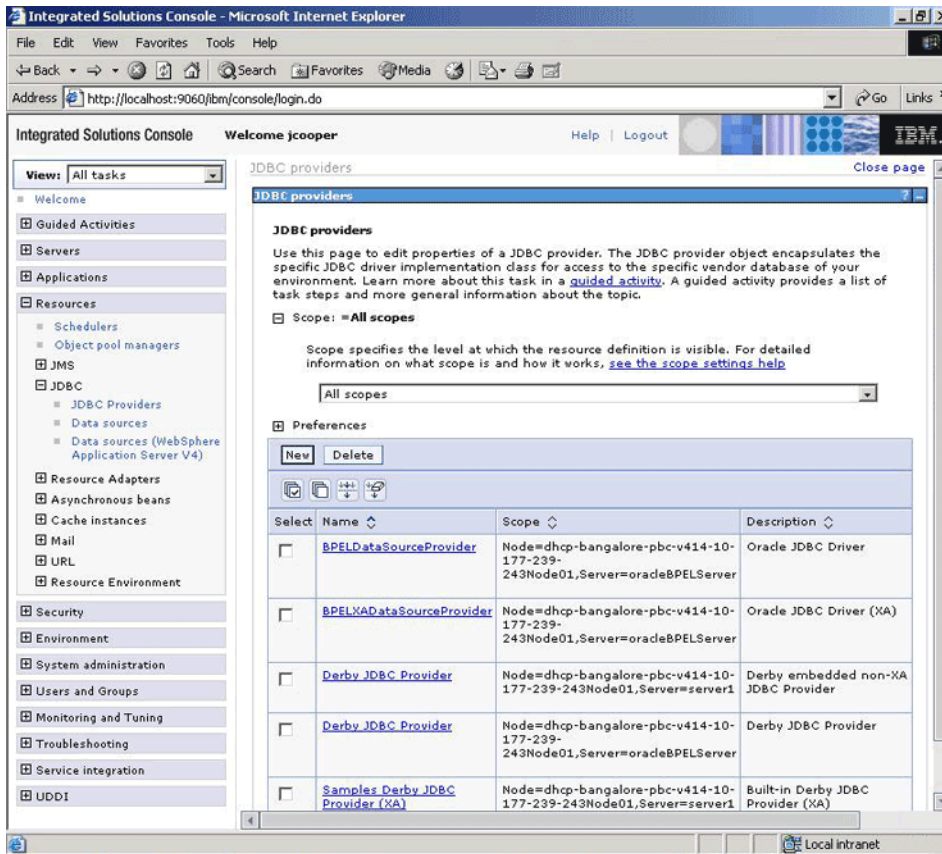
4. Test the database connectivity of the created data sources under **Resources**, **JDBC, Data Sources**, **BPELDataSourceProvider** and **Resources**, **JDBC Providers**, **BPELXADataSourceProvider**.
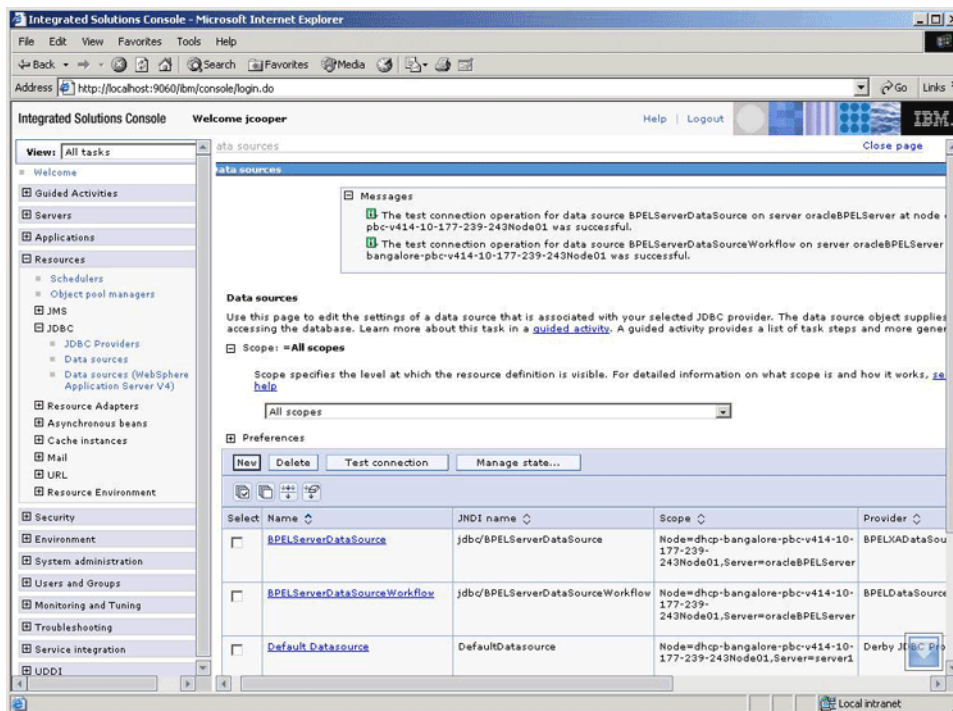
5. Verify that the **CollaxaWebApplications** and **BPELServices** application enterprise archives (EARs) are installed under **Applications**, **Enterprise Applications**.
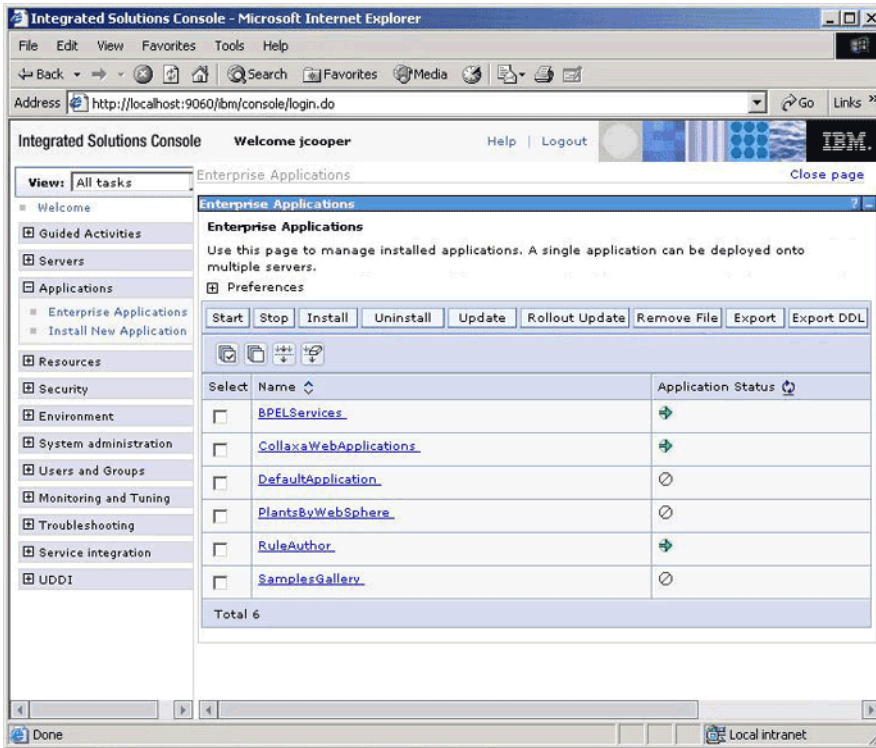
Verifying Oracle BPEL Process Manager Console

Perform the following steps to check if the Oracle BPEL Process Manager Console has started:

1. Navigate to http://localhost:9700/BPELConsole/ (Or to the location where the software is installed, for example, http://<machine-name>:9700/BPELConsole/. The Oracle BPEL Process Manager Console window is displayed.

2. Log in using the user-id as configured in the security settings step in "Using Application Security".
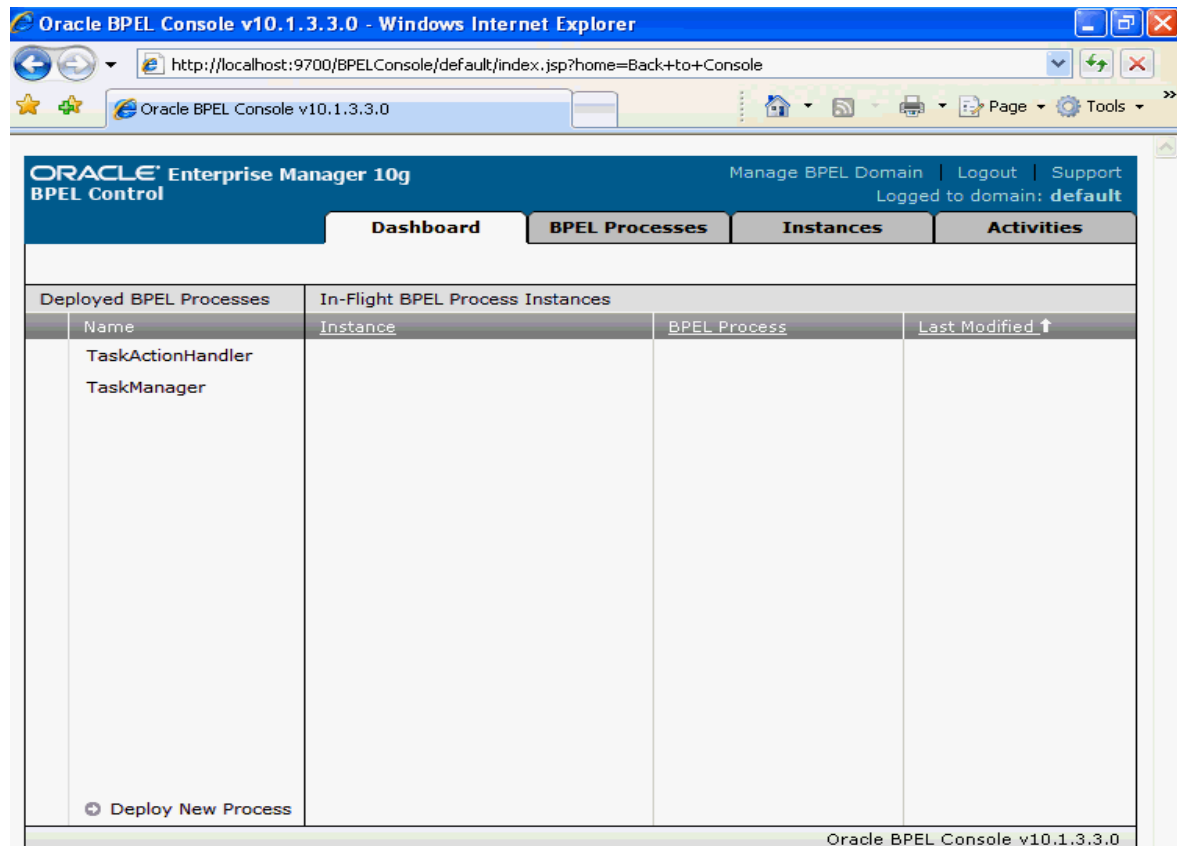
Verifying the SelectAllByTitle Sample for the Database Adapter

1. Log in to the database and start SQL*Plus.

2. Run the `setup.sql` script:

```
SQL> @Oracle_Home/samples/tutorials/122.DBAdapter/sql/setup.sql;
```

This script creates and populates the `movies` table in the database.

3. Point the database adapter to your database in the WebSphere Console under **Resources**, **Resource Adapters**, **DB Adapter**, **J2C Connection Factories**, **BPEL Samples**, **Custom Properties**, **Connection String**.

4. Select **Start**, **All Programs**, **Oracle - *Oracle_Home***, **Oracle BPEL Process Manager**, **Developer Prompt**.

5. Change to the following directory:

```
tutorials\122.DBAdapter\SelectAllByTitle
```

6. Run the following command:

```
ant
```

This compiles and deploys all projects dependent on this tutorial. Projects are deployed into *Oracle_Home*\bpel\domains*domain_name*\deploy.

7. Select **Start**, **All Programs**, **Oracle - *Oracle_Home***, **Oracle BPEL Process Manager**, **BPEL Console**.

8. Click **SelectAllByTitle** in the **Deployed BPEL Processes** list.

9. Enter the movie title on the Initiate page.

10. Click **Post XML Message**.

11. View the results and inspect the instance.

Verifying the OrderBooking Tutorial Sample

The Web application DTD link in the `web.xml` files included with Oracle BPEL Process Manager must be modified before deployment to the IBM WebSphere Application Server.

1. Search for the `web.xml` files in the *Oracle_Home*\bpel\samples directory.

2. Make the following change in each `web.xml` file related to the sample to run:

Change:

```
http://java.sun.com/j2ee/dtds/web-app_2_3.dtd
```

To:

```
http://java.sun.com/dtd/web-app_2_3.dtd
```

3. Select **Start**, **All Programs**, **Oracle - *Oracle_Home***, **Oracle BPEL Process Manager**, **Developer Prompt**.

4. Change directories to the following:

```
tutorials\127.OrderBookingTutorial
```

5. Start SQL*Plus and run the following script:

```
SQL> @PracticeFiles/insertTable.sql;
```

This creates the required sample tables in the database.

6. Run the following command:

   `ant`

   This compiles and deploys all projects dependent upon this tutorial. Projects are deployed into `Oracle_Home\bpel\domains\domain_name\deploy`. However, EAR files for CreateOrderBookingUI and SelectManufacturingUI must be manually deployed into the IBM WebSphere Application Server.

7. Change to the `PriceQuote\CreateOrderBookingUI` directory.

8. Note the `CreateOrderBookingUI.ear` file that was created when you ran `ant` in Step 6.

9. Select **Install Application** in the WebSphere Administrative Console to deploy the `CreateOrderBookingUI.ear` file to the IBM WebSphere Application Server.

   Access the WebSphere Administrative Console at the following URL:

   `http://hostname:9060/ibm/console`

10. Select **oracleBPELServer** as the deployment target.

11. Repeat Steps 8 through 10 for the `war` or `ear` file.

12. Run the following OrderBooking Tutorial steps:

    a. You can use the BatchOrderProcessing process to trigger the process using the File Read adapter. Copy the practicefiles\OrderBookingPO_*.xml to \temp and observe the File Read adapter trigger the process.

    b. Open the console in audit or flow mode. Follow the steps that appear on the console and click task links to complete the task.

       > **Note:** The process halts in the parallel flow, awaiting input from a manual pricequote from one of the vendors. To access the vendor UI page, open the following URL in a browser:
       >
       > *http://localhost:9700/SelectManufacturingUI.*

    c. After the process moves beyond supplier selection, the human workflow is added, for manual user approval (or rejection). This process has a timeout of 5 minutes and defaults to order status is rejected. Follow this step by opening the worklist URL at

       http://localhost:9700/integration/worklistapp/Login

    d. Log in as jcooper/welcome, and you will be presented with a list of tasks. Acquire the task first, then view it, and approve or reject the task. Then, logout of the jcooper page.

       Log in as jstein/welcome and you will be presented with a list of Approved tasks only. View it, and approve or reject it. Then, logout of the jstein page. This completes the human workflow part of the process. You can return to main process to audit the process.

    e. To run the process in batch mode with file read, copy the provided practice files\OrderBookingPO_*.xml in the \temp directory, and observe the batch process read the file and process it.

13. Restart **oracleBPELServer** from the IBM console.

Running Adapter Samples

Ensure that the J2C connection factory properties shown in Table 3–2 are modified.

Table 3–2   J2C Connection Factory Properties

Adapter Type	Properties
Database	▪ `driverClassName` ▪ `connectionString`
FTP	▪ `host` ▪ `port` **Note:** A new authentication alias must be created for connecting to the FTP server.
Applications	▪ `connectionString` ▪ `userName` ▪ `password`
AQ	▪ `connectionString` ▪ `userName` ▪ `password`
JMS	▪ `connectionFactoryLocation` ▪ `isTopic` ▪ `isTransacted` **Note:** The `istopic` property must be set to `false` for queues. The `isTransacted` property must be set to `false` for the JMS samples to run.
MQ	▪ `channelName` ▪ `portNumber` ▪ `queueManagerName` ▪ `hostName`

Deploying Samples Using Ant

Ensure that admin.user and admin.password in *BPEL_ HOME\bpel\utilities\ant-orabpel.properties* are updated with the credentials of a valid user from the authentication store setup for authentication.

Samples can be deployed from the developer prompt using the `ant` script following the above step.

The samples containing only BPEL processes can be fully deployed using the `ant` script.

Samples containing additional components such as Decision Service applications, workflow forms, and UI applications need to be deployed in the following manner.

1. Use the `ant` script to deploy the BPEL process of the sample.

2. For each Decision Service application, manually edit the jsps and the decisionservice.xml file to replace the variables for domain, host the port as required. Generate the `war` or `ear` file, and deploy into `DecisionServer`. Start the application.

3. For each workflow form application, generate the `war` or `ear` file, and deploy into **oracleBPELServer**. Start the Application.

4. For each UI Application, manually edit the `doApply.jsp` to replace the variables for domain, host the port as required. Generate the `war` or `ear` file, and deploy into **oracleBPELServer**. Start the application.

Limitations, Known Issues, Troubleshooting Tips

This section describes the limitations, known issues, and troubleshooting tips for Oracle BPEL Process Manager 10.1.3.1 on IBM WebSphere Application Server version 6.1.0.3.

Limitations

Note the following limitations:

- Decision Service applications should be deployed on the DecisionServer application server that has been created by the setup scripts.

  Alternatively, to deploy Decision Service applications on any other application server, ensure that the server references the shared library `decsvr_sl` that has been created for DecisionServer.

  > **Note:** Decision Service applications cannot be deployed on **oracleBPELServer** due to JWSDL incompatibilities between BPELPM and WebSphere.

- The BPEL Test page, which runs the JUnit test cases for the BPEL process, cannot run multiple concurrent instances. This is due to the fact that threads that are spawned from JSP pages are unable to access JNDI resources in WebSphere.

Known Issues

Note the following known issues:

- The following exception occurs in the SystemOut.log file when starting BPEL processes:

  ```
  "javax.ejb.RemoveException: com.ibm.ejs.container.BeanNotReentrantException:
  METHOD_READY: Tx != null"
  ```

  This can be ignored because it does not affect any functionality.

Troubleshooting Tips

The following list explains the errors encountered while installing Oracle BPEL Process Manager with the IBM WebSphere Application Server, and their resolutions:

Proxy Settings

When you initiate a BPEL process, you could encounter the WSDL not found error. To resolve this error, ensure that the proxy settings have been configured correctly, as follows:

1. Log in to the IBM Admin console window.

2. Navigate to **Servers**, **Application Servers**. The Application Servers page is displayed.

3. Click **Java and Process Management**, **Process Definition**, **Java Virtual Machine**, and **Custom Properties**.

4. Verfiy the values for the following custom properties

    ■ `http.proxySet`: Set to true if using a proxy server, else false

    ■ `http.proxyHost`: URL of the proxy server

    ■ `http.proxyPort`: Port of the proxy server

    ■ `http.nonProxyHosts`: Pipe(|) separated list of addresses for which proxy will be bypassed.

5. Restart the **oracleBPELServer**, if you change any of these properties.

Sudo Access (Linux only)

IBM WebSphere Application Server 6.1.0.3 should be installed as root (using sudo access).

Also, the sudo password should be provided, when prompted, while you run the `Installables\bin\setup.sh` file.

J_security Servlet Not Found

When you log in to BPELConsole, you may encounter the J_security servlet not found error. This indicates that the application security has not been enabled for form-based authentication.

To enable security, follow these steps:

1. Log in to the IBM Admin console window.

2. Navigate to **Servers**, and **Secure administration, applications, and infrastructure**. The Secure, administration, applications, and infrastructure page is displayed.

3. Click the **Security Configuration Wizard** button, and then follow the steps in the wizard.

If security is not required, then directly access the BPEL Console dashboard using: *http://hostname:9700/BPELConsole/default/index.jsp*.

Business Rules Applications (Decision Service Applications)

Some Decision Service applications with the Deploy Web services option may fail to install on IBM WebSphere Application Server. This is mainly due to the differences in the JAX-RPC java-wsdl mapping file expected by IBM WebSphere Application Server.

The `java-wsdl` mapping file may need to be regenerated using the `java2wsdl` emitter in IBM WebSphere Application Server.

> **Note:** Refer to
> `http://publib.boulder.ibm.com/infocenter/wasinfo/v6r`
> `1/index.jsp?topic=/com.ibm.websphere.express.doc/inf`
> `o/exp/ae/rwbs_java2wsdl.html` for **wsdl2java** and **java-wsdl**
> mapping file details.

Deployment of BPEL Processes Using Ant/Obant Scripts

If the deployment of BPEL processes fail, then verify the following attributes set in the `bpel\utilities\ant-orabpel.properties` file:

- `Platform`: This should be set to **websphere_5**.

- `admin.user`, `admin.password`: These should be the credentials of a valid user from the User Account Repository(this applies only if Application security is enabled in IBM WebSphere Application Server).

> **Note:** The `ant-orabepl.properties` file is the `BPEL_HOME\OraBPEL_1\bpel\utilities` directory.

Handling Null Pointer Exceptions in JMS Adapter When Using MCF Attributes

When running any adapter process ensure to remove the ManagedConnectionFactory (MCF) and other associated MCF attributes (within jca:address) from the inbound and outbound service wsdls. These attributes are generated by JDeveloper and are to be used only on OC4J.

If you retain the MCF attributes, it can cause null pointer exception in JMS adapter on MQ. You will encounter similar errors with other adapters too. Hence, it is best practice to remove these MCF attributes when running on Websphere.

4

Oracle BPEL Process Manager Migration

This chapter describes how to migrate from an Oracle BPEL Process Manager release 10.1.2.0.2 installation to release 10.1.3.1.0.

This chapter contains the following sections:

- Understanding What is Meant By Oracle BPEL Process Manager Migration
- Migration Information for Oracle BPEL Process Manager for OracleAS Middle Tier
- Opening Oracle JDeveloper 10.1.2.0.2 Projects in 10.1.3.1.0
- Component Migration
- Additional Migration Topics

Understanding What is Meant By Oracle BPEL Process Manager Migration

An Oracle BPEL Process Manager migration potentially includes the following main tasks:

- Migrating BPEL data from the previous release to the current release (for example, from release 10.1.2.0.2 to 10.1.3.1.0) in the same dehydration store database
- Migrating BPEL processes and completed process instances
- Installing new releases of Oracle Application Server middle tier and Oracle BPEL Process Manager on the same host as was used in the previous release
- Loading project files from a previous Oracle JDeveloper release

10*g* Release 3 (10.1.3.1.0) supports *only* project migration. No data or process migration is supported.

Oracle BPEL Process Manager and Oracle JDeveloper

As of 10*g* Release 3 (10.1.3.1.0), Oracle JDeveloper is no longer bundled with Oracle BPEL Process Manager. You must install Oracle JDeveloper separately for use with Oracle BPEL Process Manager projects.

Use the companion CD to install Oracle JDeveloper 10.1.3.1 Studio.

Migration Information for Oracle BPEL Process Manager for OracleAS Middle Tier

You cannot migrate Oracle BPEL Process Manager for OracleAS Middle Tier release 10.1.2.0.2 to 10.1.3.1.0.

Instead, install Oracle BPEL Process Manager for Middle Tier release 10.1.3.1.0 and also install Oracle JDeveloper 10.1.3.1.0. You can then open Oracle JDeveloper 10.1.3.1.0 and point it to the source files of your 10.1.2.0.2 projects. You can redeploy your projects with Oracle JDeveloper or `ant` and proceed.

> **See Also:** "Opening Oracle JDeveloper 10.1.2.0.2 Projects in 10.1.3.1.0"

Opening Oracle JDeveloper 10.1.2.0.2 Projects in 10.1.3.1.0

Oracle JDeveloper 10.1.2.0.2 projects can be deployed in Oracle JDeveloper 10.1.3.1.0.

> **Note:** Only 10.1.2.0.2 projects can be migrated.

Follow these procedures to use Oracle JDeveloper 10.1.2.0.2 projects in 10.1.3.1.0:

1. Install Oracle BPEL Process Manager for Developers 10.1.3.1.0 into a *new* Oracle home directory on the same host as Oracle BPEL Process Manager for Developers 10.1.2.0.2.

2. Start Oracle BPEL Server 10.1.3.1.0 if it is not currently running.

3. Start Oracle JDeveloper 10.1.3.1.0 for the first time.

   A message appears asking if you want to migrate from a previous release of Oracle JDeveloper.

4. Click **Yes**.

   The Migrate User Settings window appears.

5. Click **Browse**.

6. Select the *Oracle_Home***integration****jdev****jdev****system10.1.2.0.2.***nn* directory of Oracle BPEL Process Manager for Developers 10.1.2.0.2.

7. Click **Select**.

   Applicable settings on the Migrate User Settings window are automatically selected.

8. Click **OK**.

   A message appears that describes details about migrating user settings.

9. Click **OK**.

   Your 10.1.2.0.2 project files (for example, WSDL, BPEL, `bpel.xml`, and so on) are loaded into the **Applications Navigator** of Oracle JDeveloper 10.1.3.1.0.

> **Note:** If you do not select to migrate your projects from a previous
> Oracle JDeveloper release, you can still load them into 10.1.3.1.0 by
> following these procedures:
>
> 1. Create a new workspace in Oracle JDeveloper 10.1.3.1.0.
> 2. Select **Open** from the **File** main menu.
> 3. Navigate to the *process_name*.**jpr** file of the process you want to open.
> 4. Double-click the *process_name*.**jpr** file.
>
>   Your 10.1.2.0.2 project files are loaded into the **Applications Navigator** of
>   Oracle JDeveloper 10.1.3.1.0.

Component Migration

This section provides additional information about migrating projects. It contains
these topics:

- Migrating Projects That Use BPEL Services
- Migrating Adapters

Migrating Projects That Use BPEL Services

You can continue to use your existing release 10.1.2.0.2 projects that use services
(workflow, notification, and sensors) in release 10.1.3.1.0 without modifications to the
process. However, you will need to redesign the human workflow portion of the
process if you wish to use new 10.1.3.1.0 functionality.

There are two options for deploying 10.1.2.0.2 projects in release 10.1.3.1.0:

- Open the project in Oracle JDeveloper 10.1.3.1.0 and redeploy.

    See Also:

    "Opening Oracle JDeveloper 10.1.2.0.2 Projects in 10.1.3.1.0" on page 4-2

    Oracle BPEL Process Manager Developer's Guide for additional details

    about migrating workflow definitions from 10.1.2 to 10.1.3.1

- Manually change the build.xml file in the project to conform to the new
  10.1.3.1.0 format, and redeploy.

Migrating Adapters

The JCA adapter WSDLs can be reused in 10.1.3 without any changes. Although there
are a number of enhancements in this area, they do not factor into project migration.

However, you will need to pay attention to JCA connection factories, particularly the
Database adapter and the AQ adapter, which have significant changes in this release.
Both adapters refer exclusively to data source definitions instead of inline connection
strings.

In order to migrate, say, a database connection factory, you will need to create a new
data source, reflecting the 10.1.2 connection settings, and then create a new connection
factory entry referring to this data source.

Similar considerations apply to the AQ adapter.

Additional Migration Topics

This section describes miscellaneous migration-related issues. It contains these topics:

- Best Practices for Project Migration
- language Attribute in bpel:exec Element

Best Practices for Project Migration

To avoid issues that may arise when migrating older projects, adopt the following best practices when migrating 10.1.2.0.2 projects to 10.1.3.1.0:

1. Create a new project with the same name as the BPEL process.

2. Copy the project files from the old project and replace them in the right target directories.

3. Change the port references in `WSDL` files and `bpel.xml` (that is, references to WSDL locations) as needed.

4. Open `ear` files also in Oracle JDeveloper and redeploy them post-compilation.

language Attribute in bpel:exec Element

If a BPEL process (defined in a file with the .bpel extension) contains the `"bpel:exec"` extension element containing a `language="Java"` attribute (note the capitalized "J" in Java), you need to manually change this to lowercase so that it reads `language="java"`.

5

Oracle BPEL Process Manager Clustering

Oracle BPEL Process Manager performs tasks such as sending requests to and receiving responses from Web services, storing processes for future use (dehydration), retrieving stored processes, and performing logic on incoming data. If a single Oracle BPEL Server fails while BPEL processes are running, service is interrupted. This interruption is preventable by setting up a cluster to improve reliability, throughput, and performance.

This chapter provides information on how to create and configure a cluster of 10.1.3.1.0 Oracle BPEL Process Manager for OracleAS Middle Tier installation types to provide faster and more reliable performance.

This chapter contains the following topics:

- Clustering Scenario and Architecture
- Creating an Oracle BPEL Process Manager Cluster
- Summary

Clustering Scenario and Architecture

J2EE instances on which Oracle BPEL Process Manager is installed and clustered must be part of an OPMN cluster. In this environment, J2EE applications that are part of BPEL applications are automatically deployed to all nodes (if they are up and running) when a BPEL application is deployed.

Oracle BPEL Process Manager 10.1.3.1 supports a clustering environment that consists of the following components:

- Install either of the following Oracle Application Server SOA advanced installation types:

  - J2EE Server and Web Server

  - J2EE Server

  During installation, you are prompted to configure this instance to be part of an Oracle Application Server cluster.

- Install Oracle BPEL Process Manager for OracleAS Middle Tier installation type.

  The tasks in subsequent sections of this chapter describe how to create an Oracle BPEL Process Manager cluster.

The following components are sufficient for Oracle BPEL Process Manager clustering:

- Multiple Oracle BPEL Servers (installed as part of the Oracle BPEL Process Manager for OracleAS Middle Tier installation type) on different nodes.

- A load balancer to proxy all communication between clients and Oracle BPEL Server. The load balancer can be a software load balancer or hardware load balancer such as F5 BigIP Switch.

- A dehydration store database shared by all Oracle BPEL Server installations.

In case of server failure, the next available Oracle BPEL Server running on another server resumes the process from the last dehydration point. All Oracle BPEL Servers share the same database resource and SOAP URLs. As long as a front end load balancer and dispatcher are available, the BPEL processes are shared among the Oracle BPEL Servers in the cluster. If any Oracle BPEL Servers are down, the remaining Oracle BPEL Servers in the cluster pick up and continue processing the uncompleted BPEL processes of the failed Oracle BPEL Server.

Figure 5–1 provides an overview of this Oracle BPEL Process Manager clustering environment.

Figure 5–1 Oracle BPEL Process Manager in a Cluster Environment
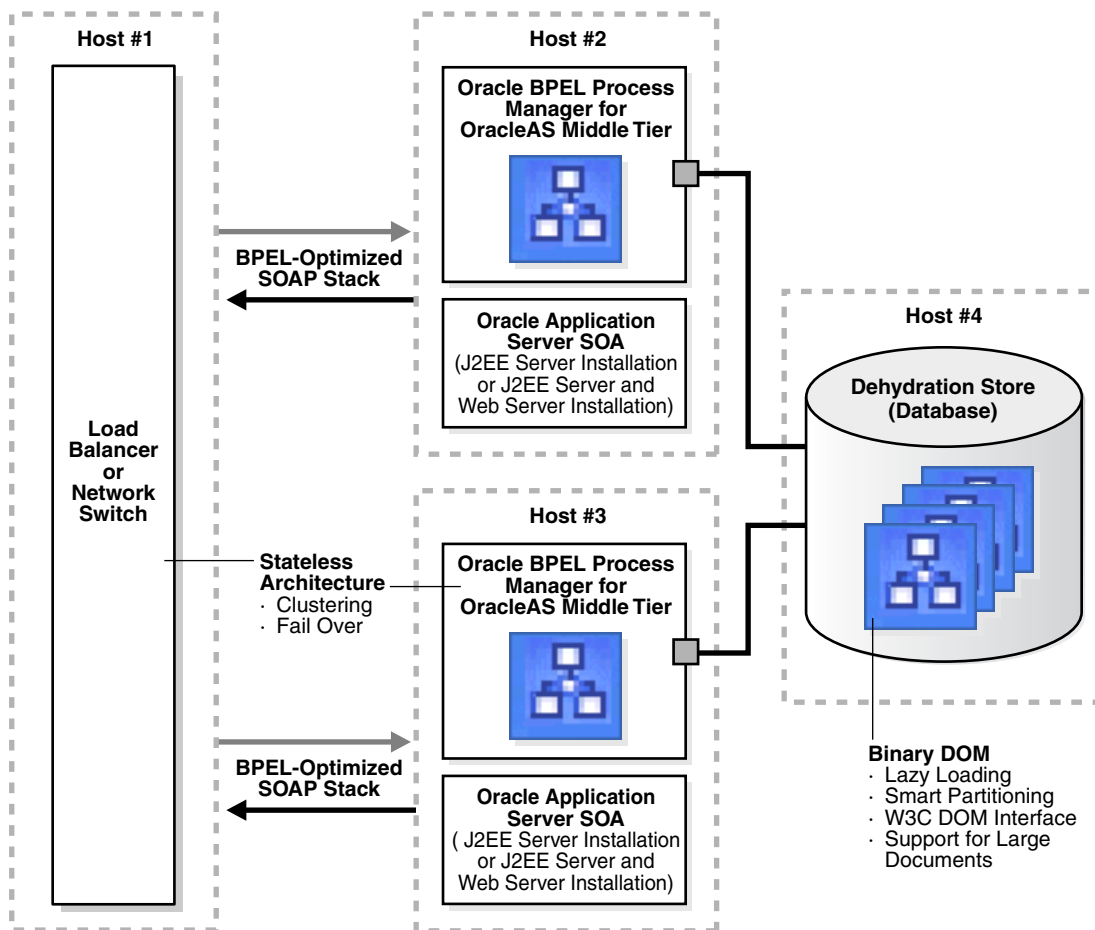
See Also:

- *Oracle Application Server Installation Guide 10g Release 3 (10.1.3.1.0)* for your operating system for instructions on installing and clustering the Oracle Application Server SOA advanced installation types

- Chapter 2, "Oracle BPEL Process Manager Installation" for instructions on installing Oracle BPEL Process Manager for OracleAS Middle Tier

Creating an Oracle BPEL Process Manager Cluster

This section describes how to create an Oracle BPEL Process Manager cluster.

This section contains the following topics:

- Task 1: Installing the Required Components
- Task 2: Editing Configuration Files
- Task 3: Restarting the Hosts
- Task 4: Compiling and Deploying the BPEL Process

Task 1: Installing the Required Components

> **Notes:** Ensure that you have accurate time synchronization on all nodes in a cluster. For example, if there are wait activities in your process and all nodes in the cluster are not operating with identical times, an activity may finish ahead of the actual wait time when a node fails, as they happen to be in different time zones.
>
> For example, on UNIX systems, synchronize the system time through the network time protocol (NTP) (`/usr/sbin/ntpdate`).

1. Follow the instructions in *Oracle Application Server Installation Guide 10g Release 3 (10.1.3.1.0)* for your operating system to install either of the following Oracle Application Server SOA advanced installation types:

   – J2EE Server and Web Server

   – J2EE Server

   For example, on host 1:

   ```
   C:\OraBPELMT
   ```

   > **Note:** The Oracle HTTP Server is installed with the J2EE Server and Web Server installation type and can be used as a load balancer. The J2EE Server installation type does not include a load balancer. You can also install and configure a third-party load balancer.

2. Install Oracle BPEL Process Manager for OracleAS Middle Tier into the *same* Oracle home as the Oracle Application Server SOA advanced installation type in Step 1.

For example, on host 1:

```
C:\OraBPELMT
```

3. Repeat Steps 1 and 2 to install an Oracle Application Server SOA advanced installation type and Oracle BPEL Process Manager for OracleAS Middle Tier into the same Oracle home directory on a different node (for example, on host 2, host 3, and so on).

4. Ensure that you point to the same dehydration store during each Oracle BPEL Process Manager for OracleAS Middle Tier installation.

Installation is now complete. The remaining tasks in this section describe how to configure the Oracle BPEL Process Manager cluster.

Task 2: Editing Configuration Files

You now configure the cluster by setting values for the following properties on each node on which you installed the Oracle BPEL Process Manager for OracleAS Middle Tier:

- Cluster ID, host, and port
- Multicast address
- Multicast port

1. Use a text editor to open the *SOA_Oracle_ Home*\bpel\system\config\collaxa-config.xml file.

2. Set enableCluster to true to enable clustering.

```
<property id="enableCluster">
<name>Cluster enable flag</name>
<value>true</value>
```

3. Specify the clusterName cluster ID, host name, and port values for the node on which the load balancer to use is installed. The cluster ID must be a unique string that is used as a filter for internode communication. If you installed the J2EE Server and Web Server installation type, the cluster ID, host name, and port for the Oracle HTTP Server load balancer appear by default.

```
<property id="clusterName">
<name>Cluster Id</name>
<value>myhost-pc.us.oracle.com:8888</value>
```

The values for the enableCluster and clusterName properties must be the same for *all* Oracle BPEL Process Manager nodes in the cluster.

4. Save your changes and exit the file.

5. Use a text editor to open the *SOA_Oracle_ Home*\bpel\system\config\jgroups-protocol.xml file.

6. See the following step based on whether each node in the cluster is in the same subnet or a different subnet:

Are All Nodes in the Same Subnet?	See Step...
Yes	7
No	10

7. Specify the User Datagram Protocol (UDP) `mcast_port` and `mcast_addr` values.

```
<config>
    <UDP mcast_send_buf_size="32000"
        mcast_port="45788"
        ucast_recv_buf_size="64000"
        mcast_addr="228.8.15.24"
        bind_to_all_interfaces="true"
        loopback="true"
        mcast_recv_buf_size="64000"
        max_bundle_size="48000"
        max_bundle_timeout="30"
        use_incoming_packet_handler="false"
        use_outgoing_packet_handler="false"
        ucast_send_buf_size="32000"
        ip_ttl="32"
        enable_bundling="false"/>
    <PING timeout="2000"
        num_initial_members="3"/>
    <MERGE2 max_interval="10000"
        min_interval="5000"/>
    <FD timeout="2000"
        max_tries="3"
        shun="true"/>
    <VERIFY_SUSPECT timeout="1500"/>
    <pbcast.NAKACK max_xmit_size="8192"
        use_mcast_xmit="false"
        gc_lag="50"
        retransmit_timeout="600,1200,2400,4800"/>
    <UNICAST timeout="1200,2400,3600"/>
. . .
. . .
```

The values for the `mcast_port` and `mcast_addr` properties must be the same for *all* Oracle BPEL Process Manager nodes in the cluster.

8. Save your changes and exit the file.

9. Go to Step 13.

10. Edit `jgroups-protocol.xml` as follows:

```
<!-- For cluster across subnet, please use the following tcp config and
    - change the initial_hosts instead of the above, the initial_hosts that
    - are going to be participating in the cluster.
-->
<config>
    <TCP start_port="7900" loopback="true" send_buf_size="32000"
        recv_buf_size="64000"/>
    <TCPPING timeout="3000" initial_hosts="node1[7900],node2[7900]"
        port_range="3" num_initial_members="3"/>
    <FD timeout="2000" max_tries="4"/>
    <VERIFY_SUSPECT timeout="1500" down_thread="false" up_thread="false"/>
    <pbcast.NAKACK gc_lag="100" retransmit_timeout="600,1200,2400,4800"/>
    <pbcast.STABLE stability_delay="1000" desired_avg_gossip="20000"
        down_thread="false" max_bytes="0" up_thread="false"/>
    <VIEW_SYNC avg_send_interval="60000" down_thread="false"
        up_thread="false" />
    <pbcast.GMS print_local_addr="true" join_timeout="5000"
        join_retry_timeout="2000" shun="true"/>
</config>
```

where you replace *node1* and *node2* with the actual host names.

11. Save your changes and exit the file.

12. Go to Step 13.

13. If you did *not* specify the URL of the load balancer when prompted during Oracle Application Server SOA advanced installation in "Task 1: Installing the Required Components" on page 5-3, you must manually specify this information.

    a. Log in to Oracle BPEL Admin Console.

```
http://localhost:port/BPELAdmin
```

    b. Enter the `oc4jadmin` username and password.

    c. Set the following two parameters under the **Configuration** tab to point to the host name and port of the load balancer URL:

Parameter	Description	Example
soapServerUrl	The BPEL SOAP server endpoint URL of a process	`http://hostname:port`
soapCallbackUrl	The BPEL SOAP callback URL of a process	`http://hostname:port`

14. Repeat these configuration steps on *all* remaining nodes on which an Oracle Application Server SOA advanced installation type and Oracle BPEL Process Manager for OracleAS Middle Tier are installed (for example, on host 2).

Task 3: Restarting the Hosts

You must manually restart *each* of the nodes in the cluster.

1. Change directories to the following location:

```
cd SOA_Oracle_Home\opmn\bin
```

2. Stop and restart Oracle Application Server:

```
opmnctl stopall
opmnctl startall
```

3. Wait for Oracle Application Server to *completely* restart before starting Oracle Application Server on the next node in the cluster.

4. Repeat Steps 1 through 3 for each of the remaining nodes in the cluster.

Task 4: Compiling and Deploying the BPEL Process

As a best practice, Oracle recommends using `ant`, instead of Oracle JDeveloper, to deploy to a production cluster environment.

1. Go to the host *from* which to deploy BPEL processes.

2. Ensure your BPEL process is *cluster-ready*. For example, if your project uses EJB binding (such as the sample in *SOA_Oracle_Home*\bpel\samples\702.Bindings\EJBBinding), review the following:

- Use system variables such as `${jndi_provider_url}` in the WSDL file instead of hard-coding the URL. (See the `CreditRatingService.wsdl` file for the sample in the `EJBBinding` directory mentioned above.)

- If you use EJB bindings, copy or FTP the EJB stub classes to the *SOA_Oracle_Home*`\bpel\system\classes` directory on each node in the BPEL cluster. As a current limitation in 10.1.3.1 class loading, the EJB client side classes can *not* be packaged and deployed together with the BPEL suitcase. These classes must reside in the `system\classes` directory of each node. You can automate copying or using FTP by using `ant` property tasks in your `build.xml` file. See your Apache `ant` documentation for more details.

- Upload any third party libraries by importing shared libraries for each node in the BPEL cluster. See *Oracle Containers for J2EE Deployment Guide* for details.

3. Use a text editor to open the *SOA_Oracle_Home*`\bpel\utilites\ant-orabpel.properties` file.

4. Define the properties that share common values across multiple nodes. For example:

```
http.hostname=load_balancer_url
http.port=load_balancer_port
cluster = true
oc4jinstancename = default_group
j2ee.hostname = node1.mycompany.com
opmn.requestport=6005
```

where:

- `http.hostname` and `http.port` are the URL and port for the load balancer. The URL must match the value of **soapServerUrl** set either during Oracle Application Server SOA advanced installation or manually as a postinstallation task in Step 13 of "Task 2: Editing Configuration Files" on page 5-6. The value for soapServerUrl must be the same for all nodes.

- `cluster` indicates that applications are to be deployed in an OC4J cluster. This property is required for J2EE artifacts.

- `oc4jinstancename` is the OPMN cluster group in which the OC4J container for Oracle Application Server is clustered. A group is a collection of OC4J instances that belong to the same cluster topology.

- `j2ee.hostname` defines the URL to the OC4J container that includes Oracle Enterprise Manager 10*g* Application Server Control Console.

- `opmn.requestport` defines the OPMN request port for the above OC4J container.

5. Deploy the BPEL suitcase by running `ant`.

> **Note:**
>
> - For property descriptions, see the comments in *SOA_Oracle_Home*\bpel\utilites\ant-orabpel.properties.
>
> - In some situations, deployment of BPEL processes may also be automatically attempted to *all* nodes in your cluster, including nodes on which Oracle BPEL Process Manager is *not* installed. If you receive a deployment operation failure message on a node on which Oracle BPEL Process Manager in not installed, it can be ignored.
>
> - The host from which to deploy BPEL processes does *not* need to be part of the Oracle BPEL Process Manager cluster.

See Also: *Oracle Application Server Administrator's Guide* for details about OC4J containers and groups

Summary

This chapter describes how to configure an Oracle BPEL Process Manager cluster. This cluster consists of an Oracle Application Server SOA advanced J2EE Server and Web Server installation type or J2EE Server installation type and an Oracle BPEL Process Manager for OracleAS Middle Tier installation type.

A

Integration Repository Creation Assistant

This appendix describes how to use the Integration Repository Creation Assistant. It contains these sections:

- About the Integration Repository Creation Assistant
- System Requirements
- Running the Integration Repository Creation Assistant

About the Integration Repository Creation Assistant

Integration Repository Creation Assistant (IRCA) is a command-line utility used to create and load the Oracle BPEL Process Manager `orabpel` schema into an Oracle Database. It is necessary to run IRCA if you plan to install Oracle BPEL Process Manager on an Oracle Application Server 10.1.3.1.0 middle tier.

System Requirements

Requirements for using the Integration Repository Creation Assistant include:

- An Oracle Database

  See Also: Table 1–3 on page 1-6 for the list of supported database versions

- JDK 1.4 or 1.5
- 120 MB disk space for tablespaces

If you will be running Oracle BPEL Process Manager in a multilingual environment, it is recommended that you use the Unicode (`AL32UTF8`) database character set encoding. Using a character set encoding other than Unicode may result in possible loss or misinterpretation of data.

Running the Integration Repository Creation Assistant

You must run the Integration Repository Creation Assistant on the machine where your Oracle Database is installed, or from a remote Oracle client with `sqlplus` installed.

Follow these steps to run the IRCA utility:

1. Set `ORACLE_HOME` in your environment so that you can use `sqlplus` to connect to the local or remote Oracle Database.

2. Make sure you can connect to your Oracle Database as the `sys` database user with a command structured as follows:

   ```
   $ORACLE_HOME/bin/sqlplus "sys/sysPassword@serviceName as
   sysdba"
   ```

3. If your `ORACLE_HOME` does not contain a JDK with a valid version as listed in "System Requirements" on page A-1, set `JAVA_HOME` to the correct JDK version.

4. If there are Oracle BPEL Process Manager users in the target database, ensure that these users are logged out. IRCA will prompt you before overwriting existing data.

5. Obtain the `irca.sh/irca.bat` file located in the `soa_schemas\irca` folder of the distribution. A `README.txt` file in this folder provides additional useful information and examples of running the utility.

6. Execute the `irca.sh` (UNIX/Linux)/`irca.bat`(Windows) command to load the schema into the target database. IRCA provides two execution modes: silent and interactive.

   In the silent mode, you provide all the execution parameters in a single string, using the syntax:

   ```
   irca[.sh] orabpel "db_host db_port db_service_name" sys_
   password [-overwrite] ORABPEL orabpel_password
   ```

   In the interactive mode, you invoke the command by specifying only the schema to be loaded:

   ```
   irca[.sh] orabpel
   ```

   The utility prompts you for the database details and the passwords.

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