



Interstage Business Process Manager V11.3

Server and Console Installation Guide (WebLogic Server)

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About this Manual

This manual describes how to configure the system environment and setup the Interstage Business Process Manager (Interstage BPM) Server and Console.

Note that the Interstage BPM Tenant Management Console setup is automatically performed when you setup Interstage BPM Console.

Intended Audience

This manual is intended for Interstage BPM Super Users, who are administrators managing Interstage BPM Server. It assumes that the reader has a working knowledge of

- Operating system administration
- Application server administration
- Database administration
- Directory Service administration

This Manual Contains

Here is a list of what is in this manual:

Chapter	Title	Description
1	System Configurations for Interstage BPM Server	Description of the typical system configurations for the setup of Interstage BPM Server.
2	System Configurations for Interstage BPM Console	Description of the typical system configurations for the setup of Interstage BPM Console.
3	System Requirements for Interstage BPM Server and Console	Description of the minimum system requirements by platform.
4	Preparing for setup of Interstage BPM Server and Console	Instructions for preparing external systems like the database or the application server.
5	Setting up Interstage BPM Server and Console	Instructions for performing setup of Interstage BPM Server and Console.
6	Configuring Interstage BPM Console to work with Interstage Analytics	Instructions to run the Wizard for integrating Interstage Analytics with Console.
7	Setting Up a Directory Service	Instructions for setting up your Directory Service.
8	Un-setting up the Interstage BPM Server and Console	Instructions for removing an instance of Interstage BPM Server and Console from the application server

Chapter	Title	Description
9	Upgrading Interstage BPM from Previous Versions	Instructions for performing an upgrade.
Appendix A	Security	Instructions for security implementation on Interstage BPM.
Appendix B	Running Interstage Business Process Manager in Solaris Containers	Instructions for setting up Interstage BPM Server in Solaris containers that run on the same physical computer.
Appendix C	Clustering, Load Balancing, and Failover	Instructions for setting up a cluster of Interstage BPM Servers.
Appendix D	Enabling NTLM Authentication Protocol for Interstage BPM Console	Instructions to enable NTLM Authentication Protocol for Interstage BPM Console
Appendix E	Troubleshooting	Information to help you troubleshoot problems associated with using Interstage BPM.

Screenshots of the products that appear in this manual are approximations only. What you see when using the product may differ in appearance due to platform or product version differences.

Typographical Conventions

The following conventions are used throughout this manual:

Example	Meaning
<code>command</code>	Text, which you are required to type at a command line, is identified by <code>Courier</code> font.
screen text	Text, which is visible in the user interface, is bold .
<i>Reference</i>	Reference material is in <i>italics</i> .
<code>Parameter</code>	A command parameter is identified by <code>Courier</code> font.

Other References

The following references for Interstage Business Process Manager are also available:

- *Release Notes*
Contains an overview of Interstage Business Process Manager, setup tips, and late-breaking information that could not make it into the manuals.
- *Interstage Business Process Manager Server and Console Installation Guide*
Describes software and hardware requirements, setup procedure for Interstage Business Process Manager Server and Console

- *Interstage Business Process Manager Server Administration Guide*
Explains how to configure and administrate Interstage Business Process Manager Server. This guide also describes the configuration parameters of the Interstage BPM Server.
- *Interstage Business Process Manager Developer's Guide*
Describes how to use the Interstage Business Process Manager API to customize and extend Interstage BPM to fit the unique needs of your organization.
- *Interstage Business Process Manager Studio User's Guide*
Explains how to model processes using the Interstage Business Process Manager Studio.
- *Interstage Business Process Manager Tenant Management Console Online Help*
Explains how to use the Interstage Business Process Manager Tenant Management Console user interface.
- *Interstage Business Process Manager Console Online Help*
Explains how to use the Interstage Business Process Manager Console user interface.
- *API Javadoc Documentation*
This HTML documentation provides the API and syntax of the packages, interfaces and classes for developing custom applications or embedding Interstage Business Process Manager into other products.

Abbreviations

The products described in this manual are abbreviated as follows:

- "Oracle WebLogic Server" is referred to as "WebLogic Application Server" and abbreviated as "WebLogic".
- "Interstage Business Process Manager" is abbreviated as "Interstage BPM".
- "Microsoft® Windows Server® 2008" and "Microsoft® Windows Server® 2012" are abbreviated as "Windows Server".
- "Oracle Solaris" might be described as "Solaris", "Solaris Operating System", and "Solaris OS" in this document.
- "Microsoft® SQL Server 2008 Standard Edition", "Microsoft® SQL Server 2008 Enterprise Edition", "Microsoft® SQL Server 2012 Standard Edition", "Microsoft® SQL Server 2012 Business Intelligence Edition" and "Microsoft® SQL Server 2012 Enterprise Edition" are abbreviated as "Microsoft® SQL Server", "Microsoft SQL Server", or "SQL Server".
- "Oracle 10g R2 Standard Edition", "Oracle 10g R2 Standard Edition One", "Oracle 10g R2 Enterprise Edition", "Oracle 11g Standard Edition", "Oracle 11g Standard Edition One", "Oracle 11g Enterprise Edition" are abbreviated as "Oracle".

1 System Configurations for Interstage BPM Server

Interstage Business Process Manager (Interstage BPM) is a server-based workflow engine with APIs (Application Programming Interfaces) for workflow application development.

The Interstage BPM Server runs on an application server providing load balancing and failover capabilities, and it operates with a database, which persistently stores and maintains all process information.

A user and group store is required to manage Interstage BPM user accounts and to expand a group into a list of users. Depending on your choices when setting up the server, users are managed either in Interstage BPM's local user store or in a Directory Service. Groups can be managed in Interstage BPM's local group store, in a Directory Service or in both systems.

The Interstage BPM Server is shipped with setup script, which is used to

- Configure the database and the application server
- Setup the Interstage BPM Server and Console to the application server

The system configurations described in the next sections are typically used. The decision of the configuration to be used depends on the desired performance of the employed systems.

1.1 Minimum Configuration: All Systems on the same Computer

You can copy the Interstage BPM software from the product media to your machine and use the Interstage BPM setup script to setup the Interstage BPM Server and Console into the application server. The Interstage BPM Server is setup as EJB application and the Interstage BPM Console is setup as WebApplication. The setup script also creates database on the machine, and if you plan to use a remote user store, the Directory Service on the same computer.

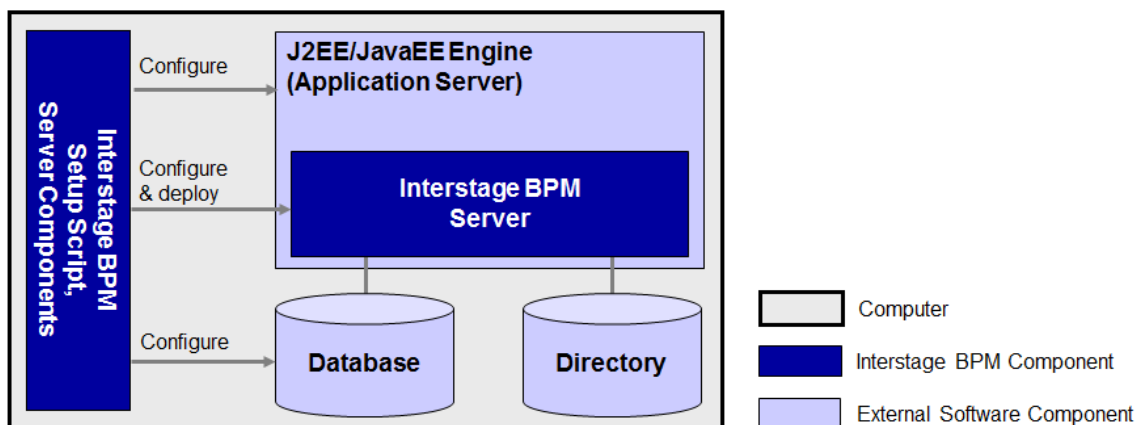


Figure 1: All systems on the same computer

For details about the architecture of Interstage BPM, refer to the *Interstage Business Process Manager Server Administration Guide*.

1.2 Database on Remote Computer

The following figure shows a configuration where the Interstage BPM Server and the database are setup on separate computers.

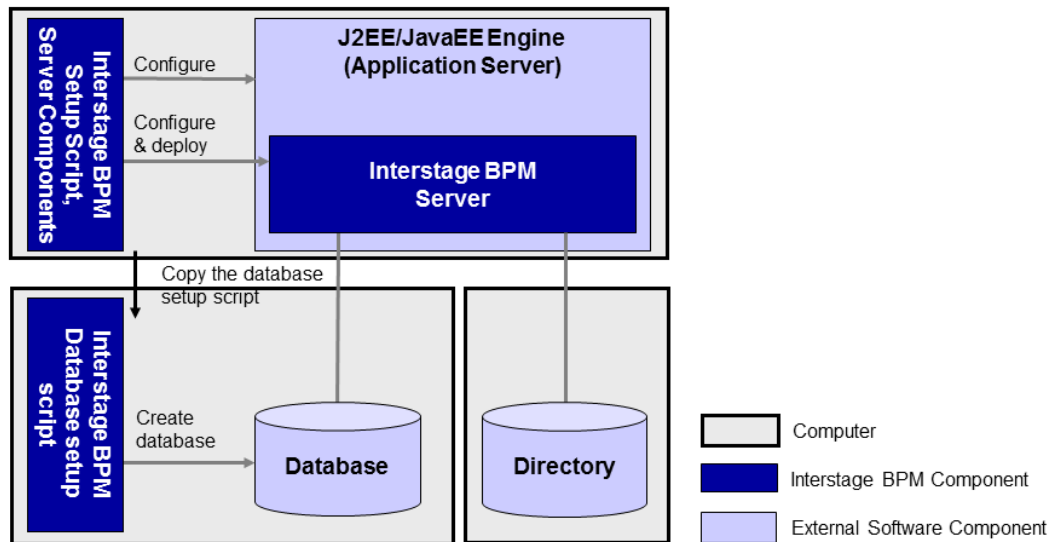


Figure 2: Database on Remote Computer

To set up this configuration, you copy the database setup script from the Interstage BPM Server-computer to the database server computer. And, you can use the database setup script to create the database.

The Interstage BPM setup script can then be run from that Interstage BPM Server-computer to configure the application server and setting up the Interstage BPM Server to the application server.

In the configuration shown above, the Directory Service is also installed on a remote computer. However, this has no impact on the Interstage BPM installation procedure.

2 System Configurations for Interstage BPM Console

The Interstage BPM Console is the Client that connects to the Interstage BPM Server.

The Interstage BPM Console must run on the same application server on the same machine as the Interstage BPM Server to which it connects.

2.1 Minimum Configuration: All Systems on the same Computer

Interstage BPM Server and Console is always setup together on the same computer.

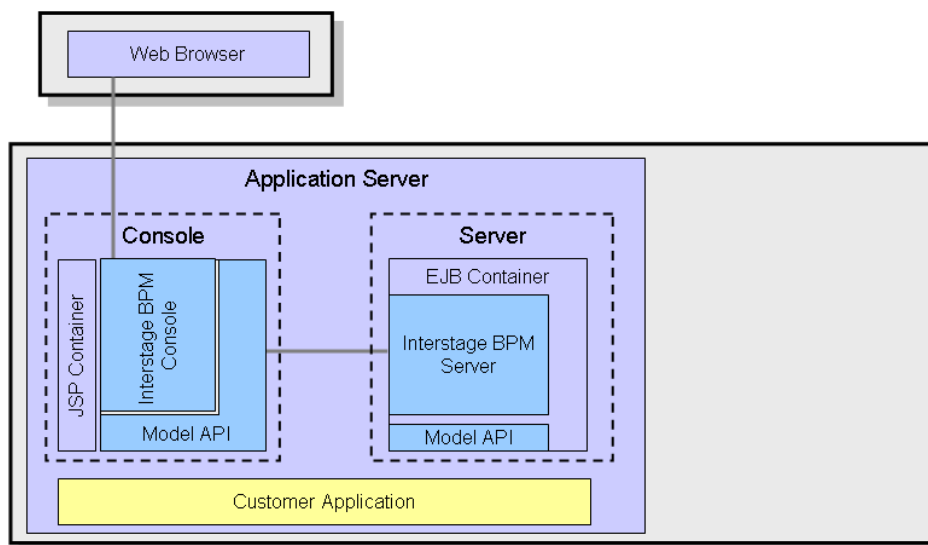


Figure 3: All systems on the same computer

For details about the architecture of the Interstage BPM Server, refer to the *Interstage Business Process Manager Server Administration Guide*.

3 System Requirements for Interstage BPM Server and Console

3.1 Hardware Requirements for Interstage BPM Server and Console

Machine and Processor

Operating System	Machine	Processor
Windows	Fujitsu PRIMERGY or other Intel Architecture servers	Minimum: Intel® Pentium III processor, 1 GHz, 1 CPU or greater Recommended: Intel® Pentium III processor, 2 GHz, 2 CPU or greater
Solaris	Fujitsu PRIMEPOWER or other Solaris servers	Minimum: Ultra SPARC or SPARC64 V (kernel arch: sun4u/sun4us/sun4d) 1 GHz, 1 CPU or greater Recommended: SPARC 1.2GHz, 2CPU or greater
Linux	Fujitsu PRIMERGY or other Intel Architecture server	Minimum: Intel® Pentium III processor, 1 GHz, 1 CPU or greater Recommended: Intel® Pentium III processor, 2 GHz, 2 CPU or greater

Memory

Minimum: 1 GB

Recommended for Server: 2 GB or more

Recommended for Console: 4 GB or more

Hard Drive

Interstage BPM setup: 300 MB

Database server installation: Please refer to the product documentation.

Database space: The amount of database space required depends upon your business situation. Please contact your Local Fujitsu Support Organization for more information about the estimation.

3.2 Minimum Software Requirements for Server and Console

For software requirements for the server, refer to the *Interstage BPM Server Release Notes*.

For software requirements for the Console, refer to the *Interstage BPM Console Release Notes*.

3.3 Hardware Requirements for Browser

Machine

Fujitsu DESKPOWER, ESPRIMO, SCENIC, SCALEO, CELCIUS, Lifebook, AMILO, PRIMERGY or other Windows PC / Intel Architecture servers

Processor

Pentium III 500 MHz or greater

Memory

Minimum: 512 MB, Recommended: 2 GB or more

3.4 Minimum Software Requirements for Web Browser Clients

For software requirements for the client machines connecting to the Console remotely, refer to the Release Notes.

4 Preparing for Setup of Interstage BPM Server and Console

This chapter explains how to set up your environment before executing setup of Interstage BPM.

4.1 Database Server Preparation

This section provides instructions in configuring your database software for use by Interstage BPM. You must create a new database instance for Interstage BPM. When setting up the Interstage BPM Server and Console, you will specify this instance. These instructions use the default database instance for the purpose of providing an example.

4.1.1 Configuring Microsoft® SQL Server

Prerequisites: Microsoft SQL Server is installed.

To configure Microsoft SQL Server:

1. Change SQL Server Authentication
 - a) Interstage BPM only supports SQL Server Authentication. To enable this, install Microsoft® SQL Server by Mixed Mode in Authentication Mode.

Note: If Microsoft® SQL Server is already installed, you may have to run a configuration program such as **SQL Server Configuration Manager** if the default selection from the prior installation enabled Named Pipes. Run the **SQL Server Configuration Manager** and add TCP/IP. However, do not disable Named Pipes. Both must be selected.

2. Configure the network for SQL Server
 - a) Confirm that **TCP/IP** is selected under Network Operations.
 - b) Determine the port number of the Microsoft® SQL Server instance that Interstage BPM will connect to. To do so:
 1. Select **Start > Programs > Microsoft SQL Server <version> > Configuration Tools > SQL Server Configuration Manager**.
 2. Navigate to **SQL Server Network Configuration > Protocols for <MSSQLInstance>**. For the default instance, the value of <MSSQLInstance> is MSSQLSERVER.
 3. Confirm that TCP/IP is enabled. Then, go to the TCP/IP properties and click the **IP Addresses** tab. The **IPAll** section displays the **TCP port** and **TCP Dynamic Ports** parameters.
 4. If you are using the default Microsoft® SQL Server instance, note down the value of **TCP Port**. If you are using a named instance, note down the value of the **TCP Dynamic Ports**. You will need to specify the port number later when setting up the Interstage BPM Server.

3. Confirm Collation settings.

The default Collation settings at the time of installing Microsoft SQL are usually correct.

- a) Use the following query to confirm the collation of your database case-insensitive:

```
SELECT convert(varchar(100), SERVERPROPERTY ('COLLATION')) as Collation
```

Please change the collation of the server if it is not case insensitive (collation including 'CI').

Note: If you have changed the CaseSensitivity parameter to `cs` for the server level collation, you cannot create database via the setup script. In such a case, you need to first create Interstage BPM database using the database creation script, and change the database collation to CaseSensitive.

```
ALTER DATABASE teamflowdb COLLATE <collationName>
```

where `<collationName>` is the name of the collation, example, `Latin1_General_CI_AS`.

Ensure this is case-insensitive, that is, it contains the 'CI' characters.

Then you need to select the **Use existing database** option in the `setup.config` file.

4. Install the SQL Server Driver for JDBC.

You need to copy the required Microsoft SQL Server JDBC driver files from Microsoft SQL Server WebSite to the application server computer. You will need to specify the driver location later when setting up the Interstage BPM Server. For the exact version of the JDBC driver supported, refer the Release Notes. If you are running your **database on a remote computer**, you need to copy the required jdbc driver files to the application server computer.

In case of UNIX environments you need to confirm whether the 'read' permissions are provided for the JDBC driver jar files.

4.1.2 Configuring Oracle

Prerequisite: Oracle is installed.

To configure Oracle for Interstage BPM:

1. Set the `ORACLE_HOME` environment variable to the installation directory of the database server you are setting up on.

- Example on Oracle 10g:

```
ORACLE_HOME=/opt/oracle/app/oracle/product/10.2.0/db_1; export ORACLE_HOME
```

- Example on Oracle 11g:

```
ORACLE_HOME=/opt/Oracle/Oracle11gR2/product/11.2.0/dbhome_1; export ORACLE_HOME
```

2. Create a new database instance for Interstage BPM.

When setting up the Interstage BPM Server, you will specify this instance. The default database instance for Oracle is `ORCL`.

Make sure that the database instance is created with the following character sets:

- AL32UTF8 as the database character set
- AL16UTF16 as the national character set

These settings are required to support Unicode UTF-16 characters.

3. Make sure that a TCP/IP version of Oracle's SQL*Net is installed.

The Oracle JDBC driver requires a TCP/IP version of Oracle's SQL*Net. This is the default for a standard installation.

Note: If you need to uninstall Oracle or require recovery from a failed installation, contact Oracle Technical Support for instructions before reinstalling.

4. Install the Oracle Driver for JDBC.
 - a) You need to copy the required Oracle JDBC driver files from Oracle WebSite to the application server computer. You will need to specify the driver location later when setting up the Interstage BPM Server. For the exact version of the JDBC driver supported, refer the Release Notes. If you are running your **database on a remote computer**, you need to copy the required jdbc driver files to the application server computer.
 - b) In case of UNIX environments you need to confirm whether the 'read' permissions are provided for the JDBC driver jar files.

4.1.3 Starting the Database Server

Since configuration information must be written to the database during setup, ensure that the database server is running prior to setting up Interstage BPM Server. Start the database server according to the documentation provided with your database server.

4.2 Application Server Preparation

4.2.1 How to configure a WebLogic Domain for the Interstage BPM Server

Prerequisite: You have installed the WebLogic Application Server.

Configuring a WebLogic Domain for the Interstage BPM Server

To create a WebLogic domain for Interstage BPM:

1. Start the WebLogic Domain Configuration Wizard as follows:
 - On Windows:
 - For Weblogic 10.3.2, do either of the following:
 - Select **Start > All Programs > Oracle WebLogic > Weblogic Server 11g R1 > Tools > Configuration Wizard**.
 - Run the `config.cmd` script located in the `<MW_HOME>/wlserver_10.3/common/bin` directory.
 - For Weblogic 12c, do either of the following:
 - Select **Start > All Programs > Oracle WebLogic > Weblogic Server 12 c > Tools > Configuration Wizard**.
 - Run the `config.cmd` script located in the `<MW_HOME>/wlserver_12.1/common/bin` directory.
 - On UNIX, run the `config.sh` script located in the `<MW_HOME>/common/bin` directory.
The **Welcome** page appears.
2. Make sure that the **Create a new WebLogic domain** checkbox is selected. Then, click **Next**.
The **Select Domain Source** page appears.
3. Make sure that the **Generate a domain configured automatically to support the following products** option is selected. Also make sure that following check box is selected and then, click **Next**.
 - For WebLogic 10.3.2: **Basic Weblogic Server Domain - 10.3.2.0[wlserver_10.3]**
 - For WebLogic 12c: **Basic Weblogic Server Domain - 12.1.1.0[wlserver_12.1]**

The **Specify Domain Name and Location** page appears.

4. In the **Domain location** field, specify a configuration location. By default, `<MW_HOME>/user_projects/domains` is used. In the **Domain name** field, specify a name for your name. By default, `base_domain` is used. Then, click **Next**.

Note: You do not have to accept the default domain name or domain location. You can choose any name or location for your new domain. You will be asked for this user name and password when setting up the Interstage BPM Server. This user is also known as your WebLogic AdminUser.

The **Configure Administrator Username and Password** page appears.

5. Enter a user name and password. This user becomes the initial administrative user for the domain. Then, click **Next**.

The **Configure Server Start Mode and JDK** page appears.

6. Select the appropriate Java SDK and click **Next**:
 - On Windows, select the SUN SDK.
 - On Solaris, select the SUN SDK.

The **Select Optional Configuration** page appears.

7. Do not select any of the checkboxes, and click **Next**.

The **Configuration Summary** page appears, showing the summary of the domain to be created.

8. Click **Create**.

The **Creating Domain** page appears and will indicate the progress of your domain creation.

9. When your domain creation is completed, check the **Start Admin Server** checkbox and click **Done**.

When your Admin Server appears, you are ready to setup the Interstage BPM.

4.2.2 Configuring WebLogic Domain Security for Interstage BPM Server

Special WebLogic Server Configurations to Enable Web Service Operations

The instructions in this topic are needed if you want to perform the following operations:

- Download or upload process definitions from remote Interstage BPM Servers. This operation is used by Interstage BPM Studio also.
- Run remote subprocesses using SWAP (Simple Workflow Access Protocol) or ASAP (Asynchronous Service Access Protocol).
- Call Web Services from process definitions without specifying an endpoint URL.

Note: The following steps are not automatically executed by the setup script. These steps are necessary to do manually if you want to use above functionality.

To enable the listed Web Services Operations :

1. Stop the WebLogic Administration Server and Interstage BPM Server in which the Console is running.

2. Add the following tag block as the last block in the

`<MW_HOME>/user_projects/domains/base_domain/config/config.xml` file on WebLogic, for the WebLogic Server Domain in which the Interstage BPM Console is setup:

```
<enforce-valid-basic-auth-credentials>>false</enforce-valid-basic-auth-credentials>
```

For example:

```
...
<enforce-valid-basic-auth-credentials>>false</enforce-valid-basic-auth-credentials>
</security-configuration>
```

3. Save the changes you have made to this file.
4. Start the WebLogic Administration Server and Interstage BPM Server in which the Console is configured.

The WebLogic configuration change described in these instructions effectively "turns off" WebLogic authentication. For Interstage BPM purposes, WebLogic authentication is unnecessary because the Console authenticates its users.

Configuring WebLogic's Embedded LDAP Server

WebLogic Application Server comes with an embedded LDAP Server. You need to configure WebLogic's embedded LDAP Server if any of the following applies:

- You are using Interstage BPM Studio.
- You want to run remote subprocesses using SWAP (Simple Workflow Access Protocol) or ASAP (Asynchronous Service Access Protocol).
- You want to call Web Services from process definitions without specifying an endpoint URL.

To configure the embedded LDAP Server, do one of the following:

- Configure the Directory Service that you are using as an authentication provider for the embedded LDAP Server.
- Add the required users manually to the embedded LDAP Server.

If you want to run remote subprocesses, you need to add the owner of the parent process definition.

If you want to call Interstage BPM Web Services from process definitions without specifying an endpoint URL, you need to add the Interstage BPM Administrator account. This is the account that you defined during the setup of Interstage BPM Server.

For detailed instructions on how to configure the embedded LDAP Server, refer to the WebLogic Application Server documentation.

4.2.3 Starting WebLogic Administration Server

Before setting up Interstage BPM Server or Console, make sure that the WebLogic Administration Server is running.

To start the WebLogic Administration Server:

1. If using Microsoft® SQL Server as database, modify the `setDomainEnv` scripts located at following location to include Microsoft® SQL Server jar in front of classpath:

```
<MW_HOME>/user_projects/domains/<Domain Name>/bin
```

For example on Windows:

```
@REM ADD EXTENSIONS TO CLASSPATHS
set DB_CLASSPATH=D:\ sqljdbc4.jar
set EXT_PRE_CLASSPATH=%DB_CLASSPATH%;%CLASSPATH%
```

For example on UNIX:

```
#ADD EXTENSIONS TO CLASSPATHS
DB_CLASSPATH="user/ sqljdbc4.jar"
EXPORT DB_CLASSPATH
EXT_PRE_CLASSPATH="${DB_CLASSPATH}${CLASSPATH}"
EXPÖRT EXT_PRE_CLASSPATH
```

2. Run the startup script located in:

```
<MW_HOME>/user_projects/domains/<Domain Name>/bin
```

Operating System	Script
Windows	startWebLogic.cmd
UNIX	startWebLogic.sh

3. On Windows, for WebLogic, you can start the server by selecting **Start > Programs > Oracle WebLogic > User Projects > <Domain Name> > Start Admin Server for WebLogic Server Domain**.

Upon successful initialization of the WebLogic Administration Server, the following message appears near the end of the WebLogic Console Window:

```
<Server started in RUNNING mode>
```

Note: If you run the WebLogic Administration Server as a Windows service, wait awhile after the Windows service says that the service is running, because it takes longer for WebLogic Administration Server to start.

4.3 Directory Server Preparation

If you use local user management system, you do not need to do this step. Local user management system is user management function for Interstage BPM that is provided by Interstage BPM. In the Local user management system, all of the users for Interstage BPM are created in the database.

If you want to use external directory service to manage Interstage BPM users, you need to register LDAP Access for users before setting up Interstage BPM Server and Console. How to setup external directory service is described in *Setting Up a Directory Service* on page 37.

5 Setting-up Interstage BPM Server and Console

Interstage BPM can be used by copying the engine directory from the product media to the application server computer, and executing the setup script.

This chapter explains how to perform server and console setup using the setup script.

For Interstage BPM Server and Console, refer to *System Requirements for Interstage BPM Server and Console* on page 13. Refer to the Release Notes for details on the required components mentioned in the procedures described in this chapter.

Note: When you setup Interstage BPM Server and Console, Interstage BPM Tenant Management Console setup is also automatically performed.

Note: If you setup Interstage BPM Server on a computer that is periodically disconnected from the network, your computer's DHCP lease may expire while you are off line. If this happens, TCP/IP (and therefore Interstage BPM Server) will cease functioning. Therefore, you should use a static IP address for the computer.

If you want to change the Interstage BPM configuration after setup, you can do so by following the instructions in the *Interstage BPM Server Administration Guide*.

5.1 Permissions Required for Setup

Permissions Required for Installation

You must have read, write and execute permissions on the installation directory of the Interstage BPM Server and Console.

Note: On Solaris, if you are installing as a non-root user, Interstage BPM Server will not be installed as a package.

5.2 Overview of the Setup Procedure

This section summarizes the steps required to setup the Interstage BPM Server and Console. The setup procedure depends on whether the database and the application server are installed on the same or on different computers.

To connect to a Directory Service and log into Interstage BPM, you must configure and start the Directory Service before starting the Interstage BPM Server.

Note: If you are upgrading from a previous version of Interstage BPM, refer *Upgrading Interstage BPM from Previous Versions* on page 59.

Running the Database and Interstage BPM Server, Console on the Same Computer

1. Prepare the database and make sure that the database server is running.
Refer to section *Database Server Preparation* on page 15.
2. Prepare the application server and make sure it is running.
Refer to section *Application Server Preparation* on page 17.

3. If you want to connect to a Directory Service, you must configure it before starting the Interstage BPM Server.
Refer to chapter *Setting Up a Directory Service* on page 37.
4. Setup Interstage BPM.
For setting Interstage BPM on the same computer, refer to section *Setup Database and Interstage BPM on the Same Computer* on page 23.
5. Switch on Java security.
Refer to section *Switching on Java Security* on page 30.
6. Start the Interstage BPM Server.
Refer to section *Starting Interstage BPM Server* on page 32.

Note: Even if you intend to setup database and Application server on the same machine, you can use the steps below in case you want to create database and setup Interstage BPM Server at different times on the same machine.

Running the Database and Interstage BPM Server, Console on Different Computers

1. Prepare the database and make sure that the database server is running.
Refer to section *Database Server Preparation* on page 15.
2. Prepare the application server and make sure it is running.
Refer to section *Application Server Preparation* on page 17.
3. Copy `engine` directory from product media to the application server computer.
4. Setup Interstage BPM on the **application server computer**.
Refer to section *Setup Database and Interstage BPM on the Different Computer* on page 27.
5. On the **database server computer**, execute the database creation script. To execute the database creation script you need to copy it from Interstage BPM installed computer.
Refer to section *Updating the database setup script on the database machine* on page 27.
6. If you want to connect to a Directory Service, you must configure it before starting the Interstage BPM Server.
Refer to chapter *Setting Up a Directory Service* on page 37.
7. On the **application server computer**, run the setup script to setup the Interstage BPM Server and Console.
Refer to section *Running the Interstage BPM Setup Script* on page 25.
8. Switch on Java security.
Refer to section *Switching on Java Security* on page 30.
9. Start the Interstage BPM Server.
Refer to section *Starting Interstage BPM Server* on page 32.

5.3 Setup Database and Interstage BPM on the Same Computer

To setup Interstage BPM, follow these steps:

1. Copy the `engine` directory from product media. Refer to the *Copy Interstage BPM engine directory from Product Media* on page 23.
2. Update the configuration file according to the instructions in section *Updating the Interstage BPM Configuration File* on page 23.
3. Run setup script according to the instructions in section *Running the Interstage BPM Setup Script* on page 25.

If any error occurs in the script execution, check the configuration file updated in step 2 and then re-execute the setup script. However, if an error caused due to pre-existing components of Interstage BPM, then you need to uninstall the Interstage BPM and again execute this setup script. Refer to the *Un-setup Interstage BPM Server and Console* on page 56

5.3.1 Copy Interstage BPM engine directory from Product Media

To copy Interstage BPM engine directory, follow these steps:

1. Create a directory on your machine where you want to setup Interstage BPM and copy the `engine` directory from Interstage BPM product media to the directory created on your machine.

In case of UNIX environment, you must grant execute permissions to the script `setup.sh` file.

Note: Make sure that there are no space character or special characters (such as '~', '\$', '@') in the path of directory where you are copying the `engine` directory.

5.3.2 Updating the Interstage BPM Configuration File

Before execution of setup script, you need to update the configuration file for the values of parameters required to setup the Interstage BPM.

To update the configuration file, follow these steps:

1. Open the following configuration file located in the `<engine directory>/server/deployment/configFile` directory in a text editor.

For Windows: `setup-Win.config`

For UNIX: `setup-Unix.config`

Note: You can change the file name and location of these configuration files. The updated file name and location will need to be specified in the setup script in next step. For example, here we use `setup.config` as the configuration file name.

2. Update the configuration parameters as described in the `setup.config` file. The parameters are classified under following categories:

Note: Any backslashes "\", colons ":" or equal signs "=" used in parameter values inside the configuration file must be escaped by backslashes.

For example:

```
C:\\Program Files
```

- **Interstage BPM Environment Parameters:** Specify the environment you have selected for setting up the Interstage BPM. For example, specify the selected application server, database.

execution_mode_selection

This parameter specifies the mode of setup execution. Specify the value of this parameter as 0 to setup the Interstage BPM Server and Console.

database_creation_selection

This parameter specifies whether the existing database is to be used or create a new database. Specify the value of this parameter as 0 when the new database is to be created during the setup of Interstage BPM Server and Console. Specify the value of this parameter as 1 when you use an existing database.

- **Application Server Parameters:** Specify the parameters only for the application server that you have selected for setting up the Interstage BPM.
- **Database Parameters:** Specify the parameters only for database that you have selected for setting up the Interstage BPM.
- **Interstage BPM System Administrator:** Specify the parameters for system administrator (Super User).
- **Interstage BPM Tenant:** Specify the parameters for Tenant Administrator.

Note: If you want to use directory server to manage Interstage BPM users, refer to the section *Setting Up a Directory Service* on page 37 for more information on how to setup a directory service.

- **Interstage BPM Analytics Parameter:** Specify the parameters for Interstage BPM Analytics only at the time of setting up Analytics. This parameter is not used at the time of setting up Interstage BPM Server and Console.

Notes about Parameters of Configuration File

Read the following instructions before updating the parameters values in configuration file.

- **db_ibpm_password:**
 - For SQL Server: By default, Microsoft SQL Server enforces a password policy that prevents users from using simple passwords. Make sure that you enter a password that meets the password policy requirements. Otherwise, the setup will fail. For details on the password policy, refer to the *Microsoft SQL Server* documentation.
- **db_port:**
 - For SQL Server: Ensure that TCP/IP is selected under Network Operations while configuring Microsoft SQL Server. Please refer to the section *Configuring Microsoft® SQL Server* on page 15.
 - For Oracle: The port number is typically 1521. You can check the actual port number in the `targets.xml` file located in the `<ORACLE_HOME>/<hostname>_<SID>/sysman/emd` directory.
- **db_instance_name**
 - For Oracle: The connection identifier usually corresponds to the database name unless the database name is longer than eight characters. In this case, a truncated version of the database name is used. You can verify the actual connection identifier in the `tnsnames.ora` file located in the `<ORACLE_HOME>/network/admin` directory.
- **LDAPAccessUserID:** If you have selected a Directory Service, by default, the user account defined on this screen is also used to log into the Directory Service. If you want to use a different user, you must change the `LDAPAccessUserID` and `LDAPAccessUserPassword` configuration

parameters of the Interstage BPM Server. Refer to the *Server Administration Guide* for more information.

5.3.3 Running the Interstage BPM Setup Script

Before executing the setup script, do the following:

- Set the value of `JAVA_HOME` environment variable on your machine. Specify the JDK shipped with your application server. If this parameter is left blank or set to an incorrect value, it will cause the error.

For detail instructions on how to set the value of `JAVA_HOME` environment variable, refer to the specific application server documentation.

Example on Windows:

```
set JAVA_HOME=C:\Java\jdk6
```

Example on UNIX:

```
# JAVA_HOME=/usr/local/jdk1.6; export JAVA_HOME
```

Note: The JDBC connection through Microsoft JDBC Driver to a Microsoft SQL server database can not be created using JDK 1.6.0_29. Therefore, use the JDK version that is supported by the Interstage BPM and your Application Server. For the version information, refer to the *Interstage BPM Server Release Notes*.

- Make sure that the configuration file is updated properly.

Note: Make sure that there are no space character or special characters (such as '~', '\$', '@') in the path of JDK.

Note: JRE is not supported.

To execute Interstage BPM setup script, follow these steps:

1. Copy the updated `setup.config` file to the `<engine directory>/server` directory.
2. Run the following setup script located in the `<engine directory>/server` directory as mentioned below.

For Windows: `setup.bat`

For UNIX: `setup.sh`

Execute the setup script using the following command:

- On Windows:

```
setup.bat -<options> <parameter name>=<value> <parameter name>=<value>...
```

- On UNIX:

```
setup.sh -<option> <parameter name>=<value> <parameter name>=<value>...
```

Options:

- `-configFilePath <Path of configuration file>`: If you do not specify this option, the `setup.config` that exist in the same directory (as of `setup.bat`) will be used.

- `-onlyValidation`: This option is used to execute the setup script in validation mode. If you specify this option, only the content of the configuration file is verified but the actual setup of Interstage BPM will not be performed.

Command Line Parameters:

All the parameters specified in the `setup.config` file can be specified as the command line parameters. The error occurs if you specify any parameter that is not supported. The format of specification is `<parameter name>=<value>`. You can specify multiple parameters delimited by space character.

If you want to use space character in the value of a parameter then you need to enclose entire `<parameter name>=<value>` in double quotes. For example: `"DATAFILE_PATH=C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Data"`.

If you want to use special characters on your shell, you need to escape such a character at the command line option. If you want to use un-escape character, you need to write in the `setup.config` file.

In the following example, path of `setup.config` file is specified, and `password` is set to the parameter of `appserver_admin_password` and `db_admin_password`. Also the setup script is executed in Validation mode.

On Windows:

```
setup.bat -configFilePath C:\engine\server\setup-Win.config
-onlyValidation
appserver_admin_password=password db_admin_password=password
```

On UNIX:

```
setup.sh -configFilePath /opt/FJSVibpm/engine/server/setup-Unix.config
-onlyValidation
appserver_admin_password=password db_admin_password=password
```

How to Confirm Successful Setup

After executing the setup, if you receive the `Setup Successful` message, then the setup of Interstage BPM server and console is completed successfully and you can now proceed to the next step.

However, if you receive the `Setup Failed: <error message>` message, then it indicates that the setup is failed due to some reason. You can check the cause of any errors that occur during setup by viewing the `deployment.log` file, located at the following location:

- On Windows: `<engine directory>\server\deployment\logs`
- On UNIX: `<engine directory>/server/deployment/logs`

Note: Each time you execute the setup script, the contents of `deployment.log` file will be overwritten. In some cases like specifying inappropriate options, the log file might not be generated.

Note: When setup execution fails, depending on the cause of failure you might require to execute un-setup script. For further information, refer to *Un-setup Interstage BPM Server and Console* on page 56.

5.4 Setup Database and Interstage BPM on the Different Computer

To setup Interstage BPM, follow these steps:

1. Copy the `engine` directory from Interstage BPM product media. Refer to the *Copy Interstage BPM engine directory from Product Media* on page 23.
2. Copy the database directory specific to database you are using. Refer to the *Copy database setup directory to database machine* on page 27
3. Update and run the database setup script on the machine where database is installed according to the instructions in section *Updating the database setup script on the database machine* on page 27
4. Update the configuration parameters as described in the `setup.config` file. Refer to the section *Update the configuration file on Interstage BPM Server machine* on page 29.
5. Run setup script according to the instructions in section *Running the Interstage BPM Setup Script* on page 25.

If any error occurs in the script execution, check the configuration file updated in step 4 and then re-execute the setup script. However, if an error caused due to pre-existing components of Interstage BPM, then you need to uninstall the Interstage BPM and again execute this setup script. Refer to the

5.4.1 Copy database setup directory to database machine

To copy database setup directory, follow these steps:

1. Copy the directory specific to database you are using from the `<engine directory>/server/deployment/dbsetup` directory to the machine where database is installed.

For Example:

- For Oracle: `oracle`
- For Microsoft SQL Server: `sqlserver`

In this directory, only shell scripts and sql scripts are included. To use these scripts, you do not need to install Java on the database machine.

Note: In UNIX, you must grant following permissions for the directory you just copied (for example `<engine directory>/server/deployment/dbsetup/oracle`) to the user who executes the scripts.

- Directory: 'Read', 'Write' and 'Execute' permissions.
- All files: 'Read' permission.
- All script (.sh) files: 'Execute' permission.

5.4.2 Updating the database setup script on the database machine

Prerequisite: You have prepared the database server as instructed in section *Database Server Preparation* on page 15.

This section describes how to execute the database creation script and how to run the setup script on the database server computer to configure the database.

How to use the database creation script:

1. Login to the machine where the database is installed.
2. On the database machine, navigate to the directory where you copied the script files, and edit the following parameters in the configuration file. The name of the configuration file depends on Operating System of the database machine as mentioned below:
 - For Windows: `config.bat`
 - For UNIX: `config.sh`

Note: When editing parameters, **do not** include values in double-quotes. An example of the **correct way** to specify a value:

```
DATAFILE_PATH=C:\Program Files\Microsoft SQL
Server\MSSQL11.MSSQLSERVER\MSSQL\DATA.
```

- **Parameters common to all databases:**
 - **USER**
Database User Name
Sample value: `ibpmuser`
 - **PASSWORD**
Database User Password
- **For Oracle:**
 - **SID**
Oracle System ID
Sample value: `orcl`
 - **SYSTEM_PASSWORD**
System User Password
 - **ORACLE_HOME**
ORACLE home directory
Sample value on Windows: `C:\app\oracle\product\11.2.0\dbhome_1`
Sample value on UNIX: `/opt/app/oracle/product/11.2.0/dbhome_1`
 - **DATAFILE_PATH**
Path to store data files
Sample value on Windows: `C:\app\oracle\oradata\orcl`
Sample value on UNIX: `/opt/app/oracle/oradata/orcl`
- **For SQL Server:**
 - **ADMIN_USER**
Database Administrator User
Sample value: `sa`
 - **ADMIN_PASSWORD**
Database Administrator Password
 - **PORT**
Database Port Number

Sample value: 1433

- **SQLSERVER_HOME**

SQLSERVER home directory

Sample value on Windows: C:\Program Files\Microsoft SQL Server

- **DATAFILE_PATH**

Path to store data files

Sample value on SQL Server 2008: C:\Program Files\Microsoft SQL Server\MSSQL10.MSSQLSERVER\MSSQL\DATA.

Sample value on SQL Server 2012: C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA.

3. Run the setup script. The name of the setup script depends on Operating System of the database machine as mentioned below:

- For Windows: dbsetup.bat
- For UNIX: dbsetup.sh

Note: Running these scripts causes the older database to be deleted. So, when you run these scripts for the first time, you will receive an error message saying database deletion failed. This is correct behavior.

Note: If you create database using the database creation script, validation is not performed by the Setup Script. Therefore you need to confirm all of the preparation requirements described in section *Database Server Preparation* on page 15.

5.4.3 Update the configuration file on Interstage BPM Server machine

Before executing the setup script, do the following:

To update the configuration file on Interstage BPM Server machine:

1. Update the configuration parameters as described in the `setup.config` file. The parameters are classified under following categories:
 - **Interstage BPM Environment Parameters:** Specify the environment you have selected for setting up the Interstage BPM. For example specify the selected application server, database.
 - **execution_mode_selection**
This parameter specify the mode of setup execution. Specify the value of this parameter as 0 to setup the Interstage BPM Server and Console.
 - **Database_creation_selection**
This parameter specify whether the existing database is to be used or create a new database. Specify the value of this parameter as 1 as the existing database is to be used.
 - **Application Server Parameters:** Specify the parameters only for the application server that you have selected for setting up the Interstage BPM.
 - **Database Parameters:** Specify the parameters only for database that you have selected for setting up the Interstage BPM.
 - **Interstage BPM System Administrator:** Specify the parameters for system administrator (Super User).

- **Interstage BPM Tenant:** Specify the parameters for Tenant Administrator.

Note: If you want to use directory server to manage Interstage BPM users, refer to the section *Setting Up a Directory Service* on page 37 for more information on how to setup a directory service.

- **Interstage BPM Analytics Parameter:** Specify the parameters for Interstage BPM Analytics only at the time of setting up Analytics. This parameter is not used at the time of setting up Interstage BPM Server and Console.

5.5 User Accounts and Groups

Every user that is to work with Interstage BPM needs a user account and must be assigned to one or more groups.

Note: To create user accounts and groups that are valid for Interstage BPM, use only alphanumeric characters, hyphens, and underscore characters ("_"). User names and group names must not begin with an at character ("@"), as this is used to identify Agents in Interstage BPM.

Interstage BPM administrator accounts must be members of a special group named by default `AdminRole`.

If you have configured the Interstage BPM Server to use a Directory Service, you need to configure the Directory Service before starting the Interstage BPM Server. For details, refer to chapter *Setting Up a Directory Service* on page 37.

If you have configured the Interstage BPM Server to use its local user store, the Interstage BPM Super User account has already been created in the user store. There is no need to perform further configuration steps before starting the Interstage BPM Server. For details on creating additional user accounts and groups, refer to the *Interstage Business Process Manager User's Guide*.

5.6 Switching on Java Security

Setup script setup the Interstage BPM in SaaS mode. In SaaS mode, it is critical to ensure that each tenant has access to only their own resources, and no other tenant's resources. To achieve this security, you need to manually switch on Java security as follows:

For WebLogic:

1. When you setup Interstage BPM, a `policy.txt` file is created at `<engine directory>/server/instance/default/resources`. Confirm that the content of this `policy.txt` file is as given below:

```
grant {
    permission java.security.AllPermission;
};
```

2. To the `startWebLogic.cmd / startWebLogic.sh` file located in `<BEA Home>/user_projects/domains/<Domain Name>/bin/`, for the `JAVA_OPTIONS` variable, add the following command level arguments:

```
-Djava.security.manager -Djava.security.policy=<Location of policy.txt>
```

For example:

```
...
%JAVA_HOME%\bin\java %JAVA_VM% %MEM_ARGS% %JAVA_OPTIONS%
-DwebLogic.Name=%SERVER_NAME%
-Djava.security.manager -Djava.security.policy=C:\policy.txt
%PROXY_SETTINGS% %SERVER_CLASS%
...
```

3. If you intend to invoke any custom JavaActions, JavaScripts, or Agents, the following permission needs to be added to the `policy.xml` file. Refer the *Interstage BPM Administration Guide* for details about its location and how to edit this file.

```
...
<permission
  className="java.io.FilePermission"
  target="<WebLogic Domain
dir>\\<server>\\<ServerName>\\cache\\EJBCompilerCache\\"-
  action="read,write,execute,delete"/>
<permission
  className="java.io.FilePermission"
  target="<WebLogic Domain dir>\\<server>\\<ServerName>\\tmp\\"-
  action="read,write,execute,delete"/>
<permission
  className="java.io.FilePermission"
  target="<WebLogic Domain dir>\\<server>\\<ServerName>\\"-
  action="read,write,execute,delete"/>
...
```

For example:

```
...
<permission
  className="java.io.FilePermission"
  target="D:\\bea\\user_projects\\domains\\base_domain\\servers\\AdminServer\\cache\\EJBCompilerCache\\"-
  action="read,write,execute,delete"/>
<permission
  className="java.io.FilePermission"
  target="D:\\bea\\user_projects\\domains\\base_domain\\servers\\AdminServer\\tmp\\"-
  action="read,write,execute,delete"/>
<permission
  className="java.io.FilePermission"
  target="D:\\bea\\user_projects\\domains\\base_domain\\servers\\AdminServer\\"-
  action="read,write,execute,delete"/>
...
```

4. Re-start Interstage BPM Server. For details, refer *Starting Interstage BPM Server* on page 32.

Additional Settings for Custom Adaptors

In case you intend to use Custom Directory Adaptors to connect to remote server, you need to add the following permission in the `policy.xml` file. Refer the *Interstage BPM Administration Guide* for details about its location and how to edit this file.

```
...
<permission
  className="java.net.SocketPermission"
  target="*"
  action="connect, resolve"/>
...
```

To reflect these changes, restart the Interstage BPM Server and Console application working on the WebLogic server. For details, refer *Starting Interstage BPM Server* on page 32.

5.7 Starting Interstage BPM Server

Prerequisites:

- If you are using a Directory Service, you must have configured that Directory Service for Interstage BPM. For details, refer to chapter *Setting Up a Directory Service* on page 37.
- The WebLogic Administration Server is running.
- You have switched on Java security. For details, refer *Switching on Java Security* on page 30.

Stop and re-start Interstage BPM Server:

1. Stop the Interstage BPM Server by running the shutdown script located in

```
<MW_Home>/user_projects/domains/<Domain Name>/bin:
```

Operating System	Script
Windows	stopManagedWebLogic.cmd <Server Name> Example: stopManagedWebLogic.cmd IBPMServer
UNIX	stopManagedWebLogic.sh <Server Name> Example: stopManagedWebLogic.sh IBPMServer

For <Server Name>, specify the name that you defined when setting up the Interstage BPM Server.

2. Run the startup script located in <MW_HOME>/user_projects/domains/<Domain Name>/bin

Operating System	Script
Windows	startManagedWebLogic.cmd <Server Name> Example: startManagedWebLogic.cmd IBPMServer
UNIX	startManagedWebLogic.sh <Server Name> Example: startManagedWebLogic.sh IBPMServer

For <Server Name>, specify the name that you defined when setting up the Interstage BPM Server.

- When asked by the startup script, enter the name and password of the administrator for the WebLogic Administration Server.

Upon successful initialization of the Interstage BPM Server, the following message appears near the end of the Console Window:

```
<Server started in RUNNING mode>
```

Interstage BPM Server for WebLogic is now ready to use.

5.8 Starting Interstage BPM Console and Tenant Management Console

Prerequisites:

The WebLogic Administration Server where you have setup the Console is running.

When Interstage BPM Console setup is done on WebLogic, starting the Interstage BPM Server also starts Interstage BPM Console and Tenant Management Console. For details of starting Interstage BPM Server, refer section *Starting Interstage BPM Server* on page 32

When Interstage BPM Console setup is done on a different WebLogic domain than the Interstage BPM Server, starting the WebLogic managed server on which Console is setup starts Interstage BPM Console. For details, refer *Interstage BPM Server Release Notes*.

To access Interstage BPM Console or Tenant Management Console:

- In a Web browser

- To access the Interstage BPM Tenant Management Console, enter the URL
`http://<hostname>:<port>/console/TenantManager.page`
- To access the Interstage BPM Console, enter the URL
`http://<hostname>:<port>/console/<tenant_name>/`

Here:

- <hostname> is the machine name of the computer upon which you have setup the Interstage BPM Console.
- The default port is 49950.
- <tenant_name> is the name of the tenant; if you configure non-SaaS mode, this is default.
- It is recommended to use the tenant name in the URL with the same case as it has been created with during setup. However, tenant name in the URL is not case sensitive.

The Login page appears.

- Log on to Interstage BPM Console or Tenant Management Console.

You can now begin using Interstage BPM Console and Tenant Management Console. Refer the *Interstage BPM Console Online Help* and *Interstage BPM Tenant Management Console Online Help* for details.

5.8.1 Starting Interstage BPM Mobile Application

To start Interstage BPM Mobile Application:

- In your mobile device's Browser, open the Interstage BPM Mobile application at the following URL: `http://<hostname>:<port>/console/<tenant_name>/`

The Login page appears.

2. Log on to Interstage BPM Mobile application.

You can now begin using Interstage BPM Mobile application. Refer the *Interstage BPM Console Online Help* for details.

6 Configuring Interstage BPM Console to work with Interstage Analytics

This section provides information about configuring Interstage BPM Console to work with Interstage Analytics.

To set up Interstage BPM for Interstage Analytics:

1. Update the configuration file according to the instructions in the *Update the Configuration File* on page 35.
2. Run setup script according to the instructions in section *Running the Interstage BPM Setup Script* on page 25. If any error occurs in the script execution, check the configuration file updated in step 1 and then re-execute the setup script. However, if an error caused due to pre-existing components of Interstage BPM, then you need to uninstall the Interstage BPM and again execute this setup script. Refer to the *Un-setup Interstage BPM Server and Console* on page 56
3. Execute the remaining steps as described in the *Interstage Analytics Installation Guide*.
4. Configure the SSL for Interstage Analytics according to the instructions in the *Configuration for SSL* on page 36.

6.1 Prerequisites

To set up Interstage BPM for Interstage Analytics, use the setup script.

Using the Interstage Analytics Setup Script:

- Complete the setup of Interstage BPM Server and Console.
- Prepare JAR files of Interstage Analytics.

The JAR file of Interstage BPM Analytics exists in the setup directory of Interstage BPM Analytics.

The following example shows the directory of JAR files of Interstage BPM Analytics:

- On WebLogic

Windows: <Interstage Analytics Installation directory>\bpmm\ibpmm\WEB-INF\lib
(This is the default deployment directory written in the *Interstage Analytics Installation Guide*.)

On UNIX: /var/opt/FJSVibpma/ibpmm/WEB-INF/lib (This is the default deployment directory written in the *Interstage Analytics Installation Guide*.)

If you setup Interstage Analytics on a different machine than Interstage BPM, then copy these directories to the Interstage BPM machine.

Note: Only the user registered in Interstage Analytics can access analytics information from Console. Ensure that your Interstage BPM Console username is also a registered Interstage Analytics username.

6.2 Update the Configuration File

To update the configuration file for Interstage Analytics Setup:

1. Open the following configuration file located in the <engine directory>/server/deployment/configFile directory in a text editor.

For Windows: setup-Win.config

For UNIX: setup-Unix.config

Note: You can change the file name and location of these configuration files. The updated file name and location will need to be specified in the setup script in next step. For example, here we use `setup.config` as the configuration file name.

Update the configuration parameters as described in the `setup.config` file. The parameters are classified under following categories:

- **Interstage BPM Environment Parameters:** Specify the environment you have selected for setting up the Interstage BPM. For example specify the selected application server, database, execution mode.

execution_mode_selection

This parameter specify the mode of setup execution. Specify the value of this parameter as 3 to setup the Interstage BPM Analytics.

- **Application Server Parameters:** Specify the parameters only for the application server that you have selected for setting up the Interstage BPM. This parameter is not used for Analytics.
- **Database Parameters:** Specify the parameters only for database that you have selected for setting up the Interstage BPM. It is mandatory to set the value for `db_ibpm_user_name` and `db_ibpm_password` parameters.
- **Interstage BPM System Administrator:** Specify the parameters for system administrator (Super User). This parameter is not used for Analytics.
- **Interstage BPM Tenant Owner:** Specify the parameters for Tenant Administrator. This parameter is not used for Analytics.
- **Interstage BPM Analytics Parameter:** Specify the parameters for Interstage BPM Analytics.

6.3 Configuration for SSL

Interstage Analytics configuration in secure mode:

- If you have implemented SSL for Interstage BPM Console, set the `InterstageAnalyticsProtocol` Console configuration parameter (in the `console.conf` file) to `https`.

Note: If both Interstage BPM Console and Interstage BPM Analytics are using different domains (for example, Interstage BPM Console using local domain and Interstage BPM Analytics using a remote domain), then Interstage BPM Console does not operate properly. To avoid this either of the following settings is required for Internet Explorer:

- Add Interstage BPM Console and Interstage BPM Analytics address to local Intranet or to **Trusted sites** in **Tools >Internet Options > Security**.
- Add Interstage BPM Console and Interstage BPM Analytics domain to **Per Site Privacy Actions** as **Allow** in **Tools >Internet Options > Privacy > Sites**.

7 Setting Up a Directory Service

This chapter provides instructions for setting up your Directory Service.

7.1 Setting Up Microsoft® Active Directory

This section provides instructions for setting up Microsoft® Active Directory. Active Directory uses a form of the Lightweight Directory Access Protocol (LDAP). Like all LDAP-type Directory Services, Active Directory organizes people into Groups, and maintains a user profile with the appropriate permissions for each user.

The Active Directory setup procedure must be performed on the domain controller for your network by an Administrator.

7.1.1 Configuring Users and Groups for Interstage BPM with GUI of Microsoft® Active Directory

This section explains how to configure users and groups for Interstage BPM with the GUI of Microsoft Active Directory.

1. Create an Organizational Unit (ou) named as `Groups`.

This ou should also be specified in the `setup.config` file during Interstage BPM setup. (You can change this value to another value.)

- a) Open the Active Directory Management Console (Active Directory Users and Computers).
- b) In the Console tree, right-click the required domain, select **New**, and click **Organizational Unit**.
- c) Type the name of the organizational unit (`Groups`).

The following are common rules for configuring users and groups for Interstage BPM:

- To create Groups that are valid for Interstage BPM, use only alphanumeric characters, hyphens, and underscore characters ("_"). Group names must not begin with an 'at' character ("@"), as this is used to identify Agents in Interstage BPM.

2. Create an Organizational Unit (ou) named as `People`.

(You cannot change this value to another value.)

- a) Open the Active Directory Management Console (Active Directory Users and Computers).
- b) In the Console tree, right-click the required domain, select **New**, and click **Organizational Unit**.
- c) Type the name of the organizational unit (`People`).

At this point, the directory tree of LDAP root looks as follows:

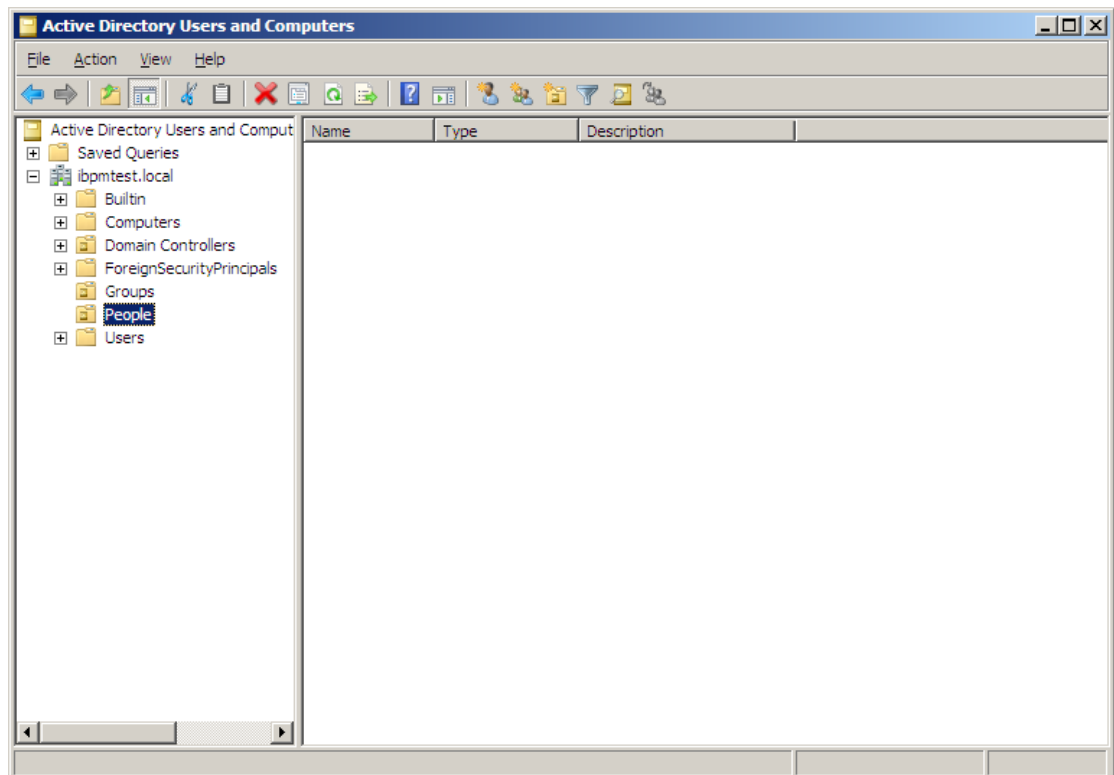


Figure 4: Creating Groups and People

3. Create LDAP-access user.

This user is specified as SuperUser during the setup of Interstage BPM. For example, here we use `ibpm_server1` as LDAP-access user.

- a) Open the Active Directory Management Console (Active Directory Users and Computers).
- b) Right-click the **People** object, click **New**, and select **User**.
- c) Enter the new user's information for `ibpm_server1` and click **Next**.

For the user, Active Directory requires you to provide a **First name**, **Last name**, **Full name**, and **User logon name**. Interstage BPM requires both a user login name and password to log in.

- d) Enter the user's password, and click **Next**.
- e) Confirm the adding of the new user by clicking **Finish** in the confirmation dialog box.

Note: Although entering a password and confirming it are optional for Active Directory, Interstage BPM requires a password to log in. The other fields such as E-Mail, Phone, and Fax are not used by Interstage BPM.

At this point, the directory tree of **People** looks like the following:

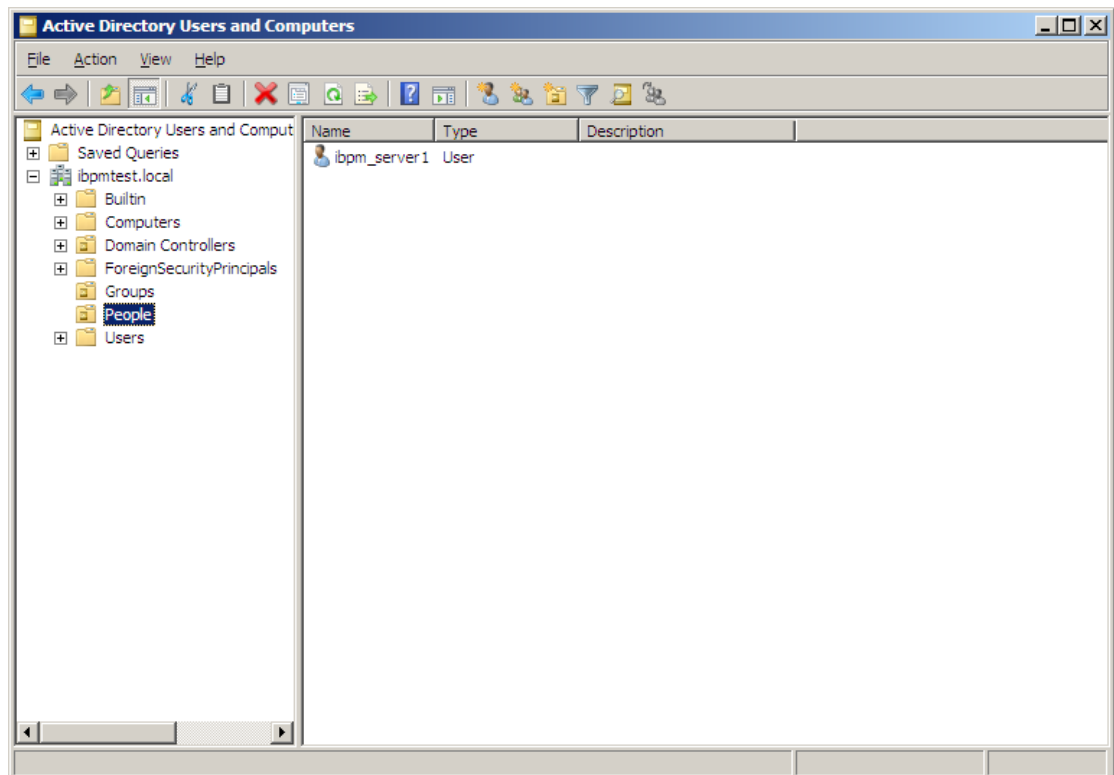


Figure 5: Directory Tree of People

4. Create the default Interstage BPM roles `Role` and `AdminRole` belonging to the Organizational Unit `Groups`.
 - a) Open the Active Directory Management Console (Active Directory Users and Computers).
 - b) Right-click the **Groups** object, click **New** and then select **Groups**.
 - c) Create the group's information for **AdminRole**.
 - d) Double-click the **AdminRole** object, and navigate to the **Member** tab.
 - e) Click **Add**, and enter `ibpm_server1`. Now `ibpm_server1` is linked to `AdminRole` group.
 - f) Repeat these steps to create the `Role` group, and add `ibpm_server1` to the `Role` group.

Note: After normal setup using Active Directory, the default Administrator Role is assigned to a Group called `AdminRole`. You can change this default name by modifying the `AdminRole` parameter of the Interstage BPM Server.

5. Create the `IflowUsers` group belonging to the Organizational Unit `Groups`.
 - a) Open the Active Directory Management Console (Active Directory Users and Computers).
 - b) Right-click the **Groups** object, click **New** and then select **Groups**.
 - c) Create the group's information for **IflowUsers**. Also, create this object as **Distribute**.
 - d) Double-click the **IflowUsers** object, and navigate to the **Member** tab.
 - e) Click **Add**, and enter `ibpm_server1`.

6. Create the `IflowGroups` group belonging to the Organizational Unit `Groups`.
 - a) Open the Active Directory Management Console (Active Directory Users and Computers).
 - b) Right-click the **Groups** object, click **New** and then select **Groups**.
 - c) Create the group's information for **IflowGroups**. Also, create this object as **Distribute**.
 - d) Double-click the **IflowGroups** object, and navigate to the **Member** tab.
 - e) Click **Add**, and enter `AdminRole`.
 - f) Similarly, add `Role` to `IflowGroups`.

At this point, the directory tree of `Groups` looks like the following:

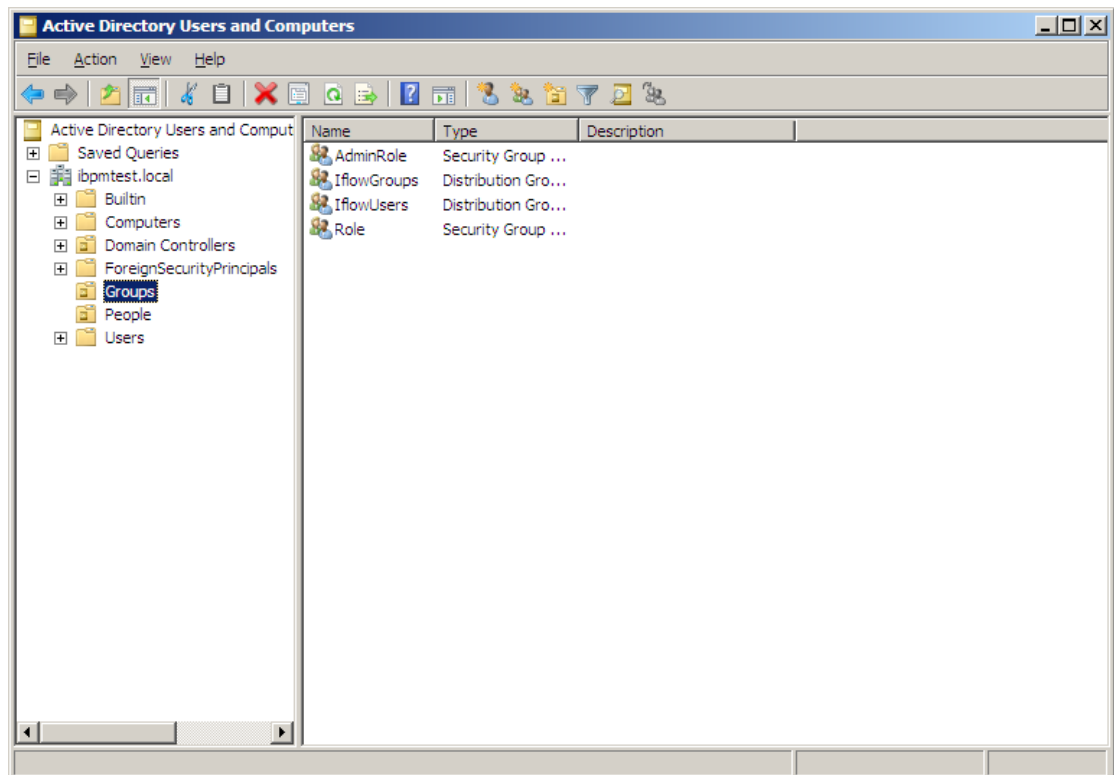


Figure 6: Directory Tree of Groups

You have now completed the configuration for Active Directory. You can now setup Interstage BPM with Microsoft Active Directory.

7.1.2 Using Existing Active Directory Users and Groups

If you are new to Interstage BPM and are already using Active Directory as the Directory Service to maintain your organization's Users and Groups, you can use your existing directory structure with Interstage BPM. You can do this by designating which of your LDAP Users and Groups you will be able to use in Interstage BPM. This involves the modification of two special LDAP Groups, `IflowUsers` and `IflowGroups`.

To give your LDAP Users access to Interstage BPM as Interstage BPM users, add them as members of the `IflowUsers` group. You can add each user individually or add a group that contains the users.

Users in the group sub-levels will also have access permission. To use your LDAP Groups directly in Interstage BPM add them as members of the `IflowGroups` group.

7.1.3 Adding New Users Using the GUI

Note: To create users that are valid for Interstage BPM, use only alphanumeric characters, hyphens, and underscore characters ("_"). User names must not begin with an at character ("@"), as this is used to identify Agents in Interstage BPM.

To add new users using the ActiveDirectory GUI:

1. Launch the Active Directory Console if you haven't already done so by selecting **Start > Settings > Control Panel > Administrative Tools > Active Directory Users and Computers**. Expand the host name and the domain name to find the **people** Organizational Unit.
2. Right click **people**.
3. From the popup menu, select **New**, and then select **User** to open the **New Object - User** dialog.

The screenshot shows the 'New Object - User' dialog box. At the top, it says 'Create in: example.com/people'. Below this, there are several input fields:

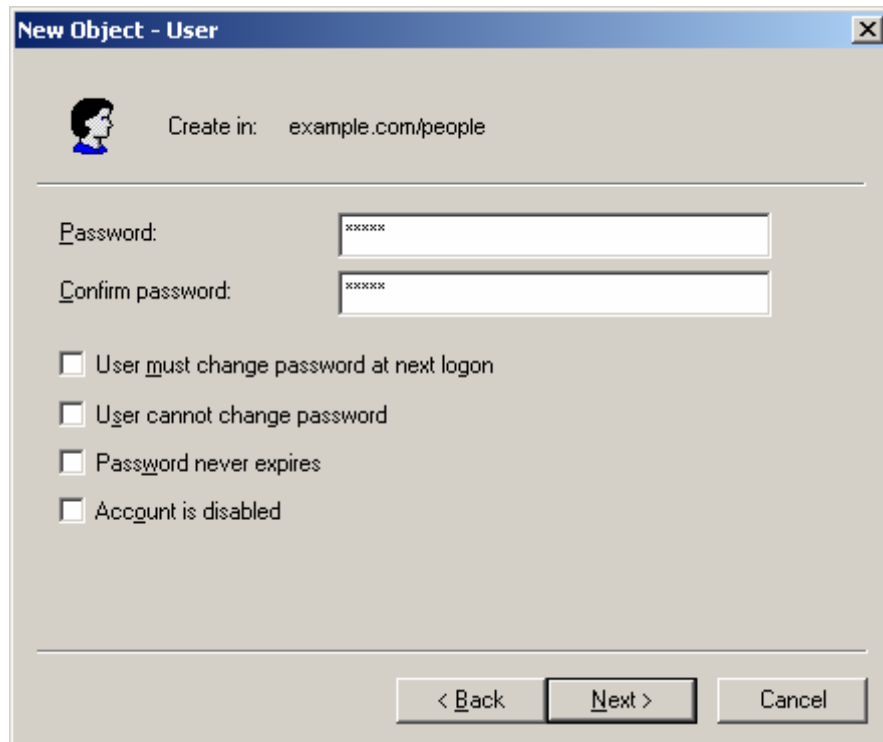
- First name:** user1
- Initials:** (empty)
- Last name:** user1
- Full name:** user1 user1
- User logon name:** user1
- Domain:** @example.com (selected from a dropdown)
- User logon name (pre-Windows 2000):** EXAMPLE\user1

 At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

Figure 7: Adding a New User

4. Enter the new user's information and click **Next**.
For each user, Active Directory requires you to provide a first name, last name, full name, and user login name.
Interstage BPM requires both a user login name and password to log in.

5. Enter the user's password, and then click **Next**.



New Object - User

Create in: example.com/people

Password: [password field]

Confirm password: [password field]

User must change password at next logon

User cannot change password

Password never expires

Account is disabled

< Back Next > Cancel

Figure 8: Adding a New User

6. Confirm the adding of the new user by clicking **Finish** in the confirmation dialog.

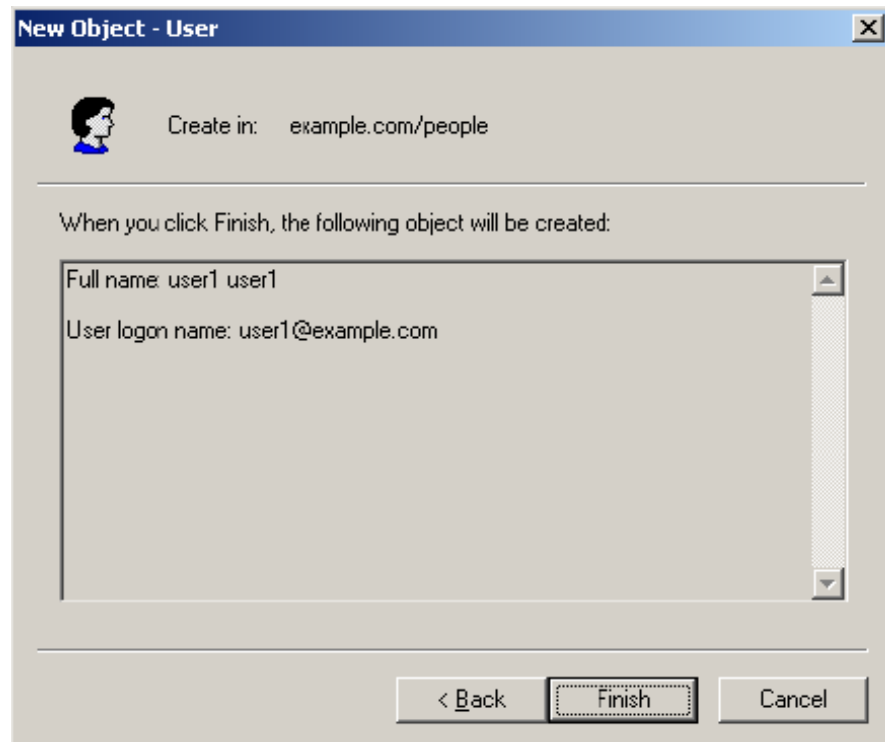


Figure 9: Adding a New User

Use the **New Object - User** dialog to create as many new user profiles as you want.

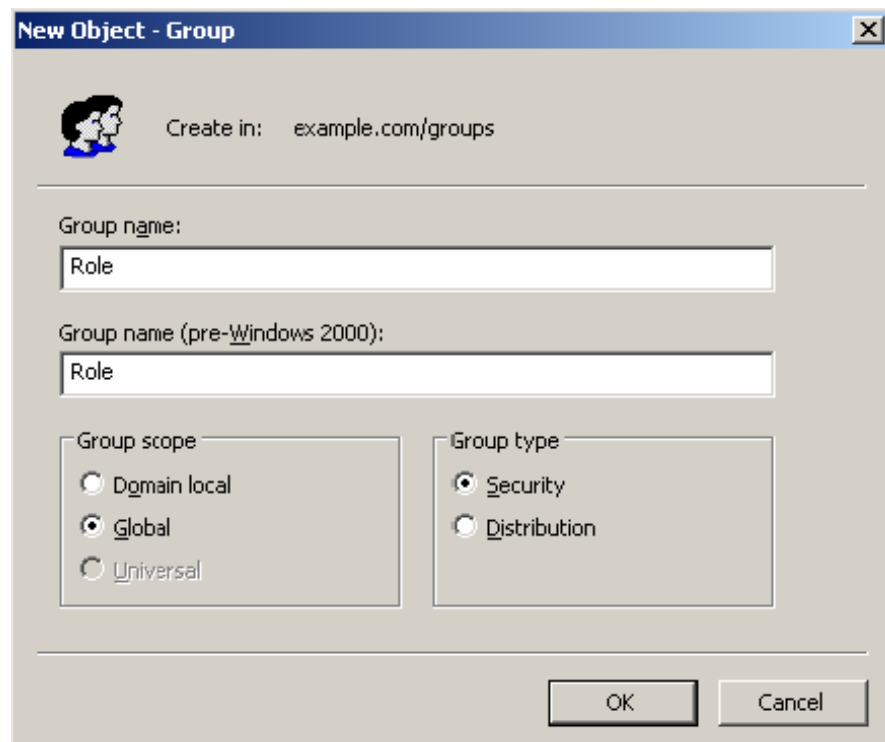
7. Add the new user to `IflowUsers` so that the new user is recognized by Interstage BPM. To do so:
- In the **Active Directory Users and Computers** window, expand the host name and the domain name to find the main Organizational Unit that you specified during Interstage BPM installation.
 - Right click the `IflowUsers` Group and select **Properties** from the popup menu.
 - Select the **Members** tab and click **Add**.
The **Select Users, Contacts, Computers, or Groups** dialog appears.
 - Enter the name of the new user that is to be added to `IflowUsers`. Click **Check Names** to verify the user name.
 - Click **OK**.

7.1.4 Adding New Groups Using the GUI

Note: To create Groups that are valid for Interstage BPM, use only alphanumeric characters, hyphens, and underscore characters ("_"). Group names must not begin with an at character ("@"), as this is used to identify Agents in Interstage BPM.

To add a new Group using the GUI:

1. Launch the Active Directory Console if you haven't already done so by selecting **Start > Settings > Control Panel > Administrative Tools > Active Directory Users and Computers**. Expand the host name and the domain name to find the **groups** Organizational Unit.
2. Right click **groups**.
3. From the popup menu, select **New**, and then select **Groups** to open the **New Object - Groups** dialog.
4. Add the new Group's information, and then click **OK** to add your new Group.
In the example below, the Group `Role` is added.

**Figure 10: Adding New Groups**

5. Confirm the adding of the new Group by clicking **Finish** in the confirmation dialog box.
Use the **New Object - Groups** dialog to create as many new user profiles as you want.
For each Group, Active Directory requires you to provide a unique name for your Group.
6. Add the new Group to `IflowGroups` so that the new Group is recognized by Interstage BPM. To do so:
 - a) In the **Active Directory Users and Computers** window, expand the host name and the domain name to find the main Organizational Unit that you specified during Interstage BPM installation.
 - b) Right click the `IflowGroups` Group and select **Properties** from the popup menu.
 - c) Select the **Members** tab and click **Add**.
The **Select Users, Contacts, Computers, or Groups** dialog appears.

- d) Enter the name of the new Group that is to be added to `IflowGroups`. Click **Check Names** to verify the Group name.
- e) Click **OK**.

7.1.5 Adding Members to a Group Using the GUI

To add members to a Group using the GUI:

1. Launch the Active Directory Console if you haven't already done so by selecting **Start > Settings > Control Panel > Administrative Tools > Active Directory Users and Computers**. Expand the hostname and the domain name to find the **groups** Organizational Unit.
2. Right click the group to which you want to add members.
3. From the popup menu that appears select **Properties**, and then select the **Members** tab to display the Group's properties dialog.

The **Properties** dialog for the group named "Role" is used in the following example. `ibpm_example` is already a member of the group named "Role". It is highly recommended that you use a group with a more meaningful name than "Role" in your own programming practice, since this name tends to be very confusing to talk about.

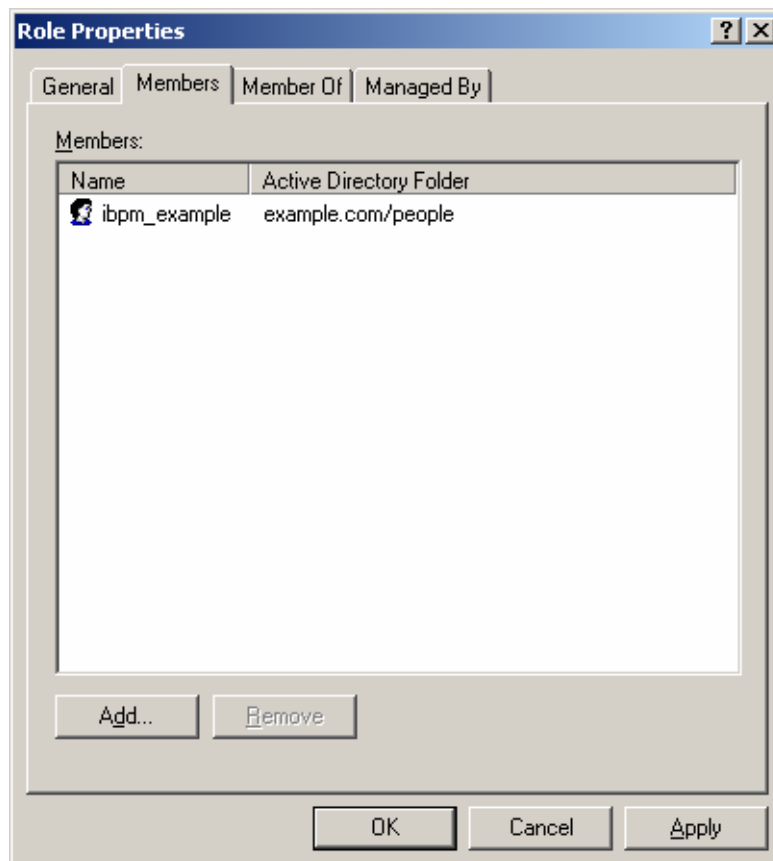


Figure 11: Adding Members

4. In the **Role Properties** dialog, click **Add**.

The **Select Users, Contacts, Computers, or Groups** dialog appears.

5. In Windows Server, search a user or Group that you want to add as a member of the Group.
The user or Group appears in the bottom text area of the dialog.

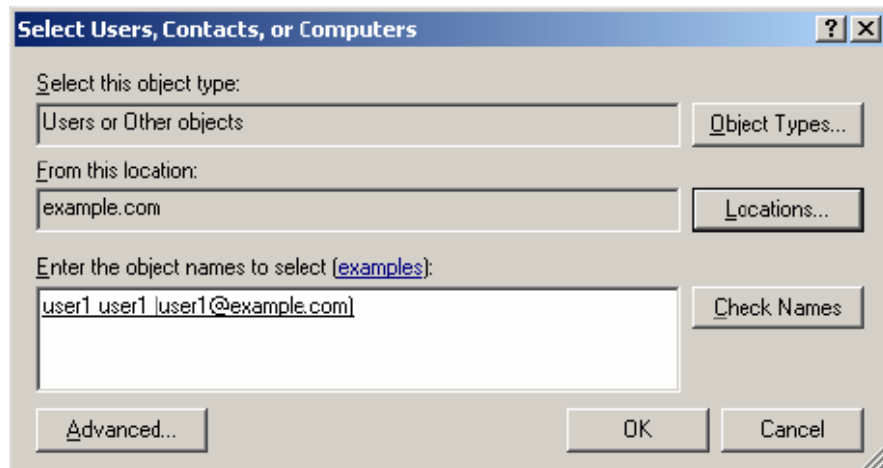


Figure 12: Selecting a User

6. Click **OK**.

The user appears with the existing users in the **Properties** dialog.

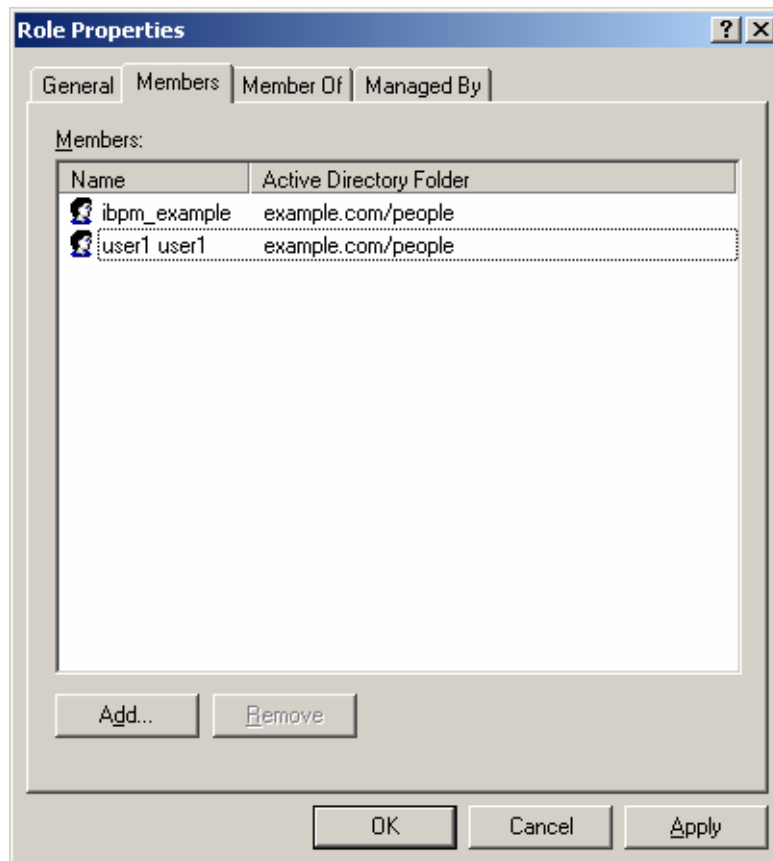


Figure 13: New Member Added

- To the **AdminRole** Group, add the IDs of all Interstage BPM users who will create `WFAdminSession` objects through Java. This Group should at least include the Interstage BPM Administrator account that you defined during setup.

7.2 Setting Up Oracle Directory Server Enterprise Edition

Oracle Directory Server Enterprise Edition uses a form of the Lightweight Directory Access Protocol (LDAP). Like all LDAP-type Directory Services, it organizes people into Groups, and maintains a user profile with the appropriate permissions for each user.

Prerequisite:

- Install the Oracle Directory Server Enterprise Edition and start it.
- Create suffixes on Oracle Directory Server Enterprise Edition for Interstage BPM.
- Create a Directory Server Instance.

To use Interstage BPM with Oracle Directory Server Enterprise Edition:

You must customize your Oracle Directory Server Enterprise Edition installation as follows:

- Configure users and Groups to use Interstage BPM.
- Add general users and general Groups to the Directory Service.

7.2.1 Configuring Users and Groups for Interstage BPM with GUI of Oracle Directory Server Enterprise Edition

This section explains how to configure users and groups for Interstage BPM with the GUI of Oracle Directory Server Enterprise Edition.

1. Create an Organizational Unit (ou) named as `Groups`.

This ou should also be specified in the `setup.config` file during Interstage BPM setup. (You can change this value to another value.)

- a) Open the Oracle Directory Service Control Center, and select the **Browse** tab of **Entry Management**.
- b) Specify the DN that you want to use in the **View DN** drop-down list.
- c) Click **New Entry** to start the **New Entry** wizard.
- d) In the **Choose Object Class** screen, for **Entry Type**, select **Organizational Unit-(organizationalUnit)**.
- e) In the **Configure Attribute** screen, enter `Groups` for the Organization Unit (ou).

The following are common rules for configuring users and groups for Interstage BPM:

- To create users that are valid for Interstage BPM, use only alphanumeric characters, hyphens, and underscore characters ("_"). User IDs must not begin with an 'at' character ("@") as this is used to identify Agents in Interstage BPM.

2. Create an Organizational Unit (ou) named as `People`.

(You cannot change this value to another value.)

- a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.
- b) Specify the DN that you want to use in the **View DN** drop-down list.
- c) Click **New Entry** to start the **New Entry** wizard.
- d) In the **Choose Object Class** screen, for **Entry Type**, select **Organizational Unit-(organizationalUnit)**.
- e) In the **Configure Attribute** screen, enter `People` for the Organization Unit (ou).

<p>Note: Although entering a password and confirming it are optional for Oracle Directory Server Enterprise Edition, Interstage BPM requires a password to log in. The other fields such as E-Mail, Phone, and Fax are not used by Interstage BPM.</p>

At this point, the directory tree of LDAP root looks as follows:

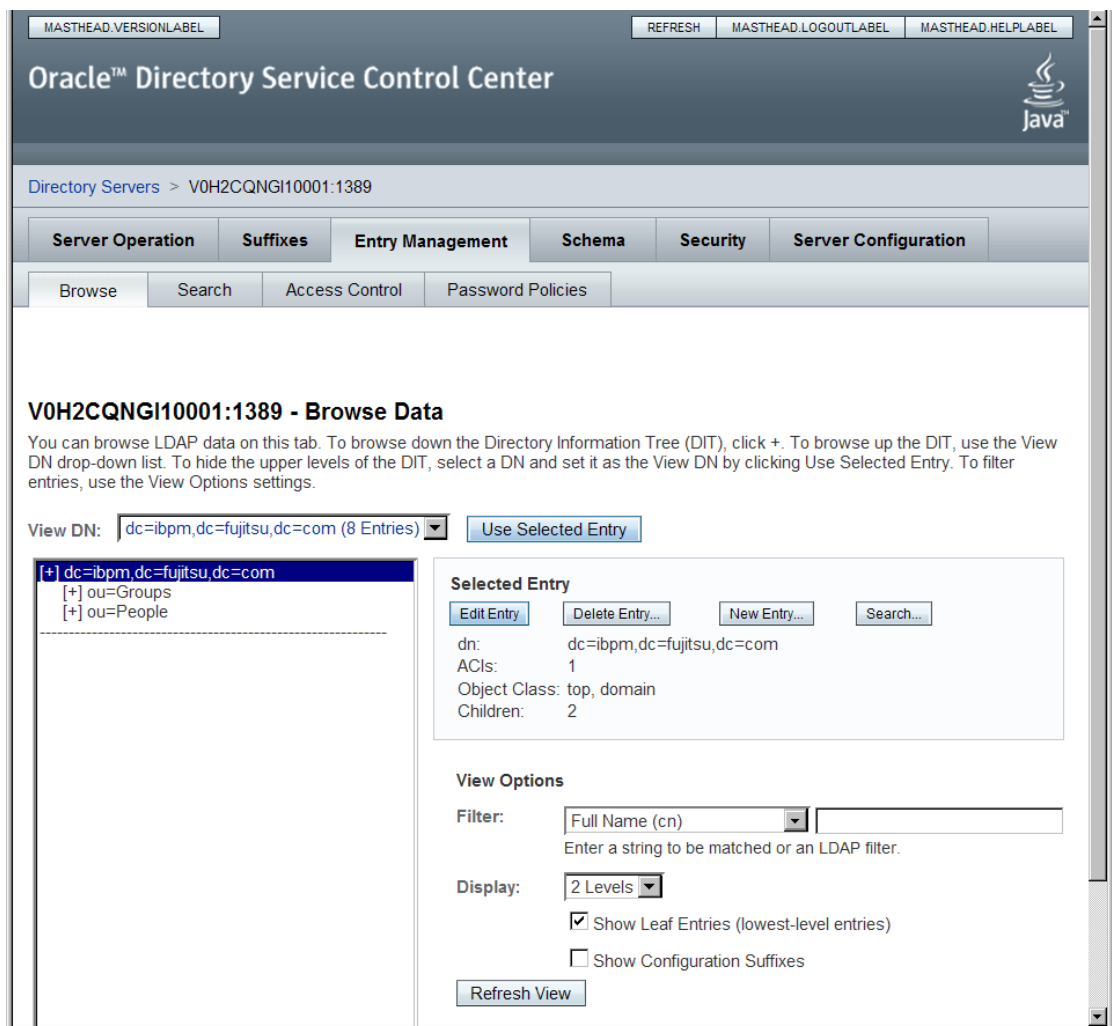


Figure 14: Creating Groups and People

3. Create LDAP-access user.

This user is specified as SuperUser during the setup of Interstage BPM. For example, here we use `ibpm_server1` as LDAP-access user.

- In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.
- Under the `People` group you created earlier, click **New Entry** and start the **New Entry** wizard.
- In the **Choose Object Class** screen, for **Entry Type**, select **User - (inetOrgPerson)**.
- In the **Configure Attribute** screen, enter `ibpm_server1` for **cn** and **sn** fields of **Required Attributes**.
- In the **Configure Attribute** screen, enter `ibpm_server1` for **User ID(uid)** field of **Allowed Attributes**. Also enter information for **Password** and **Confirm Password** fields.

At this point, the directory tree of **People** looks like the following:

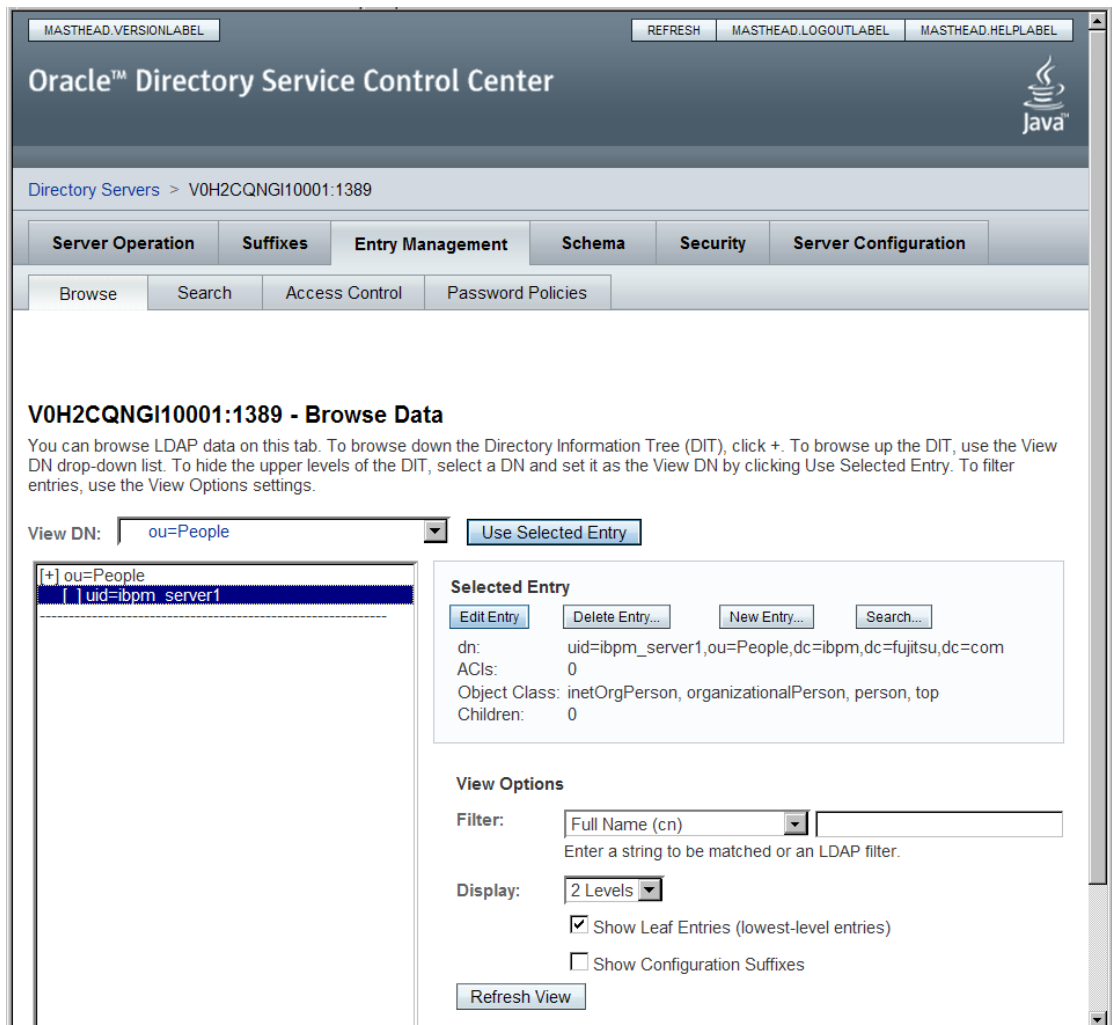


Figure 15: Directory Tree of People

4. Create the default Interstage BPM roles `Role` and `AdminRole` belonging to the Organizational Unit `Groups`.
 - a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.
 - b) Under the `Groups` group you created earlier, click **New Entry** and start the **New Entry** wizard.
 - c) In the **Choose Object Class** screen, for **Entry Type**, select **Static Group - (groupOfUniqueNames)**.
 - d) In the **Configure Attribute** screen, enter `AdminRole` for **Full Name (cn)** field of **Required Attributes**.
 - e) In the **Configure Attribute** screen, in **Allowed Attributes**, for both `Groups` select the default user you created in the previous step.
 - f) Similar to the steps just performed for `AdminRole`, repeat these steps for `Role`.

Note: After a normal installation using the Oracle Directory Server Enterprise Edition, the default Administrator Group is called `AdminRole`. You can change this default name by modifying the `AdminRole` parameter of the Interstage BPM Server. For the parameter description, refer the *Interstage BPM Server Administration Guide*. To this Group, add the IDs of all Interstage BPM users who will access administration functions in the Interstage BPM Console or create `WFAdminSession` objects through Java. This Group should at least include the Interstage BPM Administrator account that you defined during setup (typically `ibpm_server1`).

5. Create the `IflowUsers` group belonging to the Organizational Unit `Groups`.
 - a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.
 - b) Under the `Groups` group you created earlier, click **New Entry** and start the **New Entry** wizard.
 - c) In the **Choose Object Class** screen, for **Entry Type**, select **'Static Group - (groupOfUniqueNames)**.
 - d) In the **Configure Attribute** screen, enter `IflowUsers` for **Full Name (cn)** field of **Required Attributes**.
 - e) In the **Configure Attribute** screen, in **Allowed Attributes**, add `ibpm_server1` for **Group Member (uniqueMember)** field. By using the **Add** button, for both `Groups` select the default user you created in step 3.
6. Create the `IflowGroups` group belonging to the Organizational Unit `Groups`.
 - a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.
 - b) Under the `Groups` group you created earlier, click **New Entry** and start the **New Entry** wizard.
 - c) In the **Choose Object Class** screen, for **Entry Type**, select **'Static Group - (groupOfUniqueNames)**.
 - d) In the **Configure Attribute** screen, enter `IflowGroups` for **Full Name (cn)** field of **Required Attributes**.
 - e) In the **Configure Attribute** screen, in **Allowed Attributes**, add `AdminRole` and `Role` for **Group Member (uniqueMember)** field. By using the **Add** button, you can select `AdminRole` and `Role` you created in step 4.

At this point, the directory tree of `Groups` looks like the following:

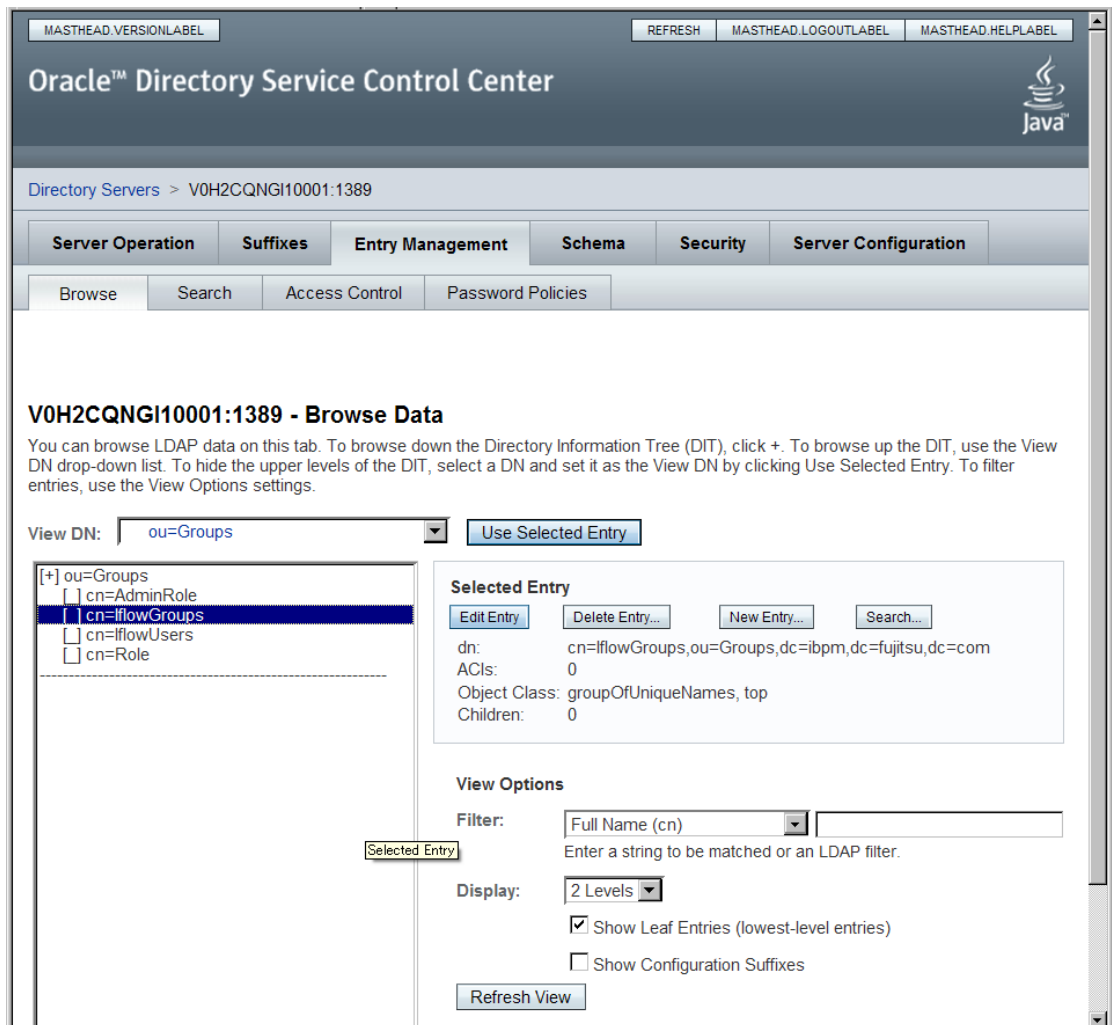


Figure 16: Directory Tree of Groups

7. Configure ACI.

- a) In the Oracle Directory Service Control Center, select the **Access Control** tab of **Entry Management**.
- b) Click **New ACI from Syntax** and start the **New ACI** wizard.
- c) Enter information for the **ACI Syntax** and **Entry where the ACI is located**.

ACI Syntax: `(target = ldap:///Suffix) (targetattr="*") (version 3.0; acl "ACIName"; allow (all) (userdn = "ldap:///uid='UserId',ou=People,'Suffix'");)`

Example:

```
(target = ldap:///dc=xxxx,dc=fujitsu,dc=com) (targetattr="*")
(version 3.0; acl "Enable Full access for IBPM admin user"; allow
(all)
```

```
(userdn =
"ldap:///uid=ibpm_server1,ou=People,dc=xxxx,dc=fujitsu,dc=com") ;)
```

Entry where the ACI is located: `Suffix`

Example:

```
dc=xxxx,dc=fujitsu,dc=jp
```

You have now completed the configuration for Oracle Directory Server. You can now setup Interstage BPM with Oracle Directory Server Enterprise Edition.

7.2.2 Using Existing Oracle Directory Server Enterprise Edition Users and Groups

If you are new to Interstage BPM and are already using Oracle Directory Server Enterprise Edition as the Directory Service to maintain your organization's users and Groups, you can use your existing directory structure with Interstage BPM. You can do this by designating which LDAP Users and Groups can be used directly within Interstage BPM. This involves the modification of two special LDAP Groups, `IflowUsers` and `IflowGroups`.

To give your LDAP Users access to Interstage BPM add them as members of the `IflowUsers` Group. You can add each user individually or add a Group that contains the users. Users in the Group sub-levels are also given access. To use your LDAP Groups within Interstage BPM add them as members of the `IflowGroups` Group.

7.2.3 Adding New Oracle Directory Server Enterprise Edition Users

When you want to add a new user as a general Interstage BPM user, you need to create a user that belongs to `ou=People`.

To add a new user:

1. Open the Oracle Directory Service Control Center, and select the **Browse** tab of **Entry Management**.
2. Under the `People` group, click **New Entry** and start the **New Entry** wizard.
3. In the **Choose Object Class** screen, for **Entry Type**, select **User - (inetOrgPerson)**.
4. In the **Configure Attribute** screen, enter the username of the new user in the **cn** and **sn** fields of **Required Attributes**.
5. In the **Configure Attribute** screen, enter the LDAP User ID for **User ID(uid)** field of **Allowed Attributes**. Also enter information for **Password** and **Confirm Password** fields.

7.2.4 Adding New Groups

When you want to add new groups as general Interstage BPM group, you need to create a group and add it to `Role` group.

1. Open the Oracle Directory Service Control Center, and select the **Browse** tab of **Entry Management**.
2. Under the `Groups` group, click **Edit Entry** to start the **Edit Entry** wizard for the group named "Role".
3. In the **Allowed Attributes** screen, add the group you want by using the **Add** button.

7.3 Group Caching

When the Interstage BPM Server starts up, Interstage BPM connects to the Directory Service and copies all of the user and Group information defined in `LDAPUsersDN` and `LDAPGroupsDN` to a cache on the Interstage BPM Server. This increases Interstage BPM performance because user and Group information no longer has to be retrieved from the Directory Service, which might be running on a separate network computer. It retrieves it from the LDAP Cache that is on the local computer in memory.

If the cache is not updated, users added since the start of the Interstage BPM Server would not be able to login to or use Interstage BPM. To avoid this, the cache has to be updated periodically.

The `LDAPGroupCacheAgeSec` parameter of the Interstage BPM Server specifies how often the LDAP Cache is updated. Groups that have been in service for longer than the period of time specified in the `LDAPGroupCacheAgeSec` parameter are checked, and new user and Group information is retrieved from the Directory Service. The default value for this parameter is 3600 seconds; that is, the LDAP Cache will be checked every hour. If this parameter is set to -1, new user and Group information is retrieved from the Directory Service every time it is needed. Refer to the *Interstage Business Process Manger Server Administration Guide* for more information about the configuration parameters of the Interstage BPM Server.

Each entry in the cache has a timestamp that is set to the last time that group was read from the Directory Service. Whenever someone calls the Directory Adapter to fetch a Group, the Directory Adapter checks if that Group is in the cache:

- If the Group requested is not in the cache, it is read in and timestamped with the current time.
- If the Group requested is already in the cache, the timestamp is checked. If the Group was timestamped before the previous cache check (it is at a time before `LDAPGroupCacheAgeSec` seconds ago), then just that Group is deleted from the LDAP Cache and read back in from the Directory Service. All other Groups in the cache are unaffected.

7.4 User Attribute Caching

The generic structure of an Interstage BPM user's profile is stored using multiple user attributes. These attribute values include the user's ID, email, manager or subordinate's ID, and so on. Inclusion of manager or subordinate information in the Interstage BPM user profile allows mapping of your company's organization and people structure so that Interstage BPM can further use this information. The `RequiredUserAttribute` property of Interstage BPM stores names of user attributes that are necessary to be defined for a user profile.

All attributes specified for `RequiredUserAttribute` are not cached. Only attributes for which the `cache` option is specified are cached. Storing attributes in the local database cache allows Interstage BPM to quickly search and retrieve these attribute values for any user, from the cache. Retrieved attribute values can further be used for different purposes (for example, directly allocating a task to a particular user's manager or subordinate, or viewing what tasks a user's subordinates are allocated to).

Interstage BPM server refreshes the user attribute values in the cache in the following scenarios:

- When you modify the value of the `RequiredUserAttribute` Interstage BPM property
- When you call the Model API `WFAdminSession.refreshAllUserProfileCache()` method

7.5 Changing Username and Password of Tenant Owner

When a tenant is created, the Tenant Owner name and password specified while creation of the tenant are stored in Interstage BPM Server tenant properties of `ServerUserName`, `ServerPassword` and in `LDAPAccessUserID`, `LDAPAccessUserPassword` for LDAP-related directory services.

If you change Tenant Owner name or password then please do not forget to change these Interstage BPM Server tenant properties as well and also re-activate the tenant.

But, if you use Local User Management (LUM) as a directory service and change the Tenant Owner password then `ServerPassword` will be changed automatically at the same time. In this scenario, you need not re-activate the tenant.

8 Un-setup Interstage BPM Server and Console

This chapter explains how to un-setup Interstage BPM Server and Console from an application server.

8.1 Un-setup Interstage BPM Server and Console from the Application Server

Prerequisite: The WebLogic Administration Server is running.

You can un-setup the Interstage BPM Server and Console from the application server using the setup script.

Note: When you un-setup the Interstage BPM Server and Console, the Interstage BPM database will not be removed.

To un-setup an Interstage BPM Server and Console instance:

Log out of all Interstage BPM Clients and close all Browser windows.

Stop the Interstage BPM Server by running the shutdown script located in

`<MW_Home>/user_projects/domains/<Domain Name>/bin:`

For `<Server Name>`, specify the name that you defined when setting up the Interstage BPM Server.

Operating System	Script
Windows	<pre>stopManagedWebLogic.cmd <Server Name></pre> <p>Example:</p> <pre>stopManagedWebLogic.cmd IBPMServer</pre>
UNIX	<pre>stopManagedWebLogic.sh <Server Name></pre> <p>Example:</p> <pre>stopManagedWebLogic.sh IBPMServer</pre>

Follow the steps described below:

1. Confirm the configuration parameters according to the section *Confirm the Un-setup Configuration File* on page 56.
2. Run the unsetup script according to the instructions in section *Running the Un-setup Script* on page 57
3. Backup your data according to the instructions in section *Backup Resources* on page 58
4. Remove the `engine` directory according to the section *Remove engine Directory* on page 58.

8.1.1 Confirm the Un-setup Configuration File

Make sure the configuration parameters are properly set in the `unsetup.config` file located at `<engine directory>/server` directory. You can specify the value of parameters which are not set, either in the `unsetup.config` file or using the command line parameters while executing the unsetup script, as the value is not specified for parameter of password.

Note: Basically, when `unsetup.config` file does not exist, executing un-setup is not necessary. However, under certain conditions (for example - when directory from previous setup is deleted without executing un-setup), the `unsetup.config` file needs to be created manually using the following steps:

1. Use the following template located in the `<engine directory>/server/deployment/configFile/directory` to create the un-setup configuration file.
 - For Windows: `unsetup-template-Win.config`
 - For UNIX: `unsetup-template-Unix.config`
2. Rename the template file you used in step 1 to `unsetup.config`.
3. Copy `unsetup.config` to `<engine directory>/server directory`.

8.1.2 Running the Un-setup Script

To un-setup an Interstage BPM Server and Console instance:

1. Run the following unsetup script located in the `<engine directory>/server directory` as mentioned below.

For Windows: `unsetup.bat`

For UNIX: `unsetup.sh`

Execute the setup script using the following command:

- On Windows:

```
unsetup.bat <parameter name>=<value> <parameter name>=<value>...
```

- On UNIX:

```
unsetup.sh <parameter name>=<value> <parameter name>=<value>...
```

All the parameters specified in the `unsetup.config` file can be specified as the command line parameters. The error occurs if you specify any parameter that is not supported. The format of specification is `<parameter name>=<value>`. You can specify multiple parameters delimited by space character.

If you want to use space character in the value of a parameter then you need to enclose entire `<parameter name>=<value>` in double quotes. For example: `"DATAFILE_PATH=C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Data"`.

If you want to use special characters on your shell, you need to escape such a character at the command line option. If you want to use un-escape character, you need to write in the `unsetup.config` file.

In the following example, `password` is set to the parameter of `appserver_admin_password` and `as_message_broker_password`:

On Windows:

```
unsetup.bat appserver_admin_password=password db_admin_password=password
```

On UNIX:

```
unsetup.sh appserver_admin_password=password db_admin_password=password
```

How to Confirm Successful Un-setup

After executing the un-setup, if you receive the `Un-setup Successful` message, then the un-setup of Interstage BPM server and console is completed successfully and you can now proceed to the next step.

However, if you receive the `Un-setup Failed: <error message>` message, then it indicates that un-setup is failed due to some reason. You can check the cause of any errors that occur during un-setup by viewing the `deployment.log` file, located at the following location:

- On Windows: `<engine directory>\server\deployment\logs`
- On UNIX: `<engine directory>/server/deployment/logs`

Note: Each time you execute the un-setup script, the contents of `deployment.log` file will be overwritten. In some cases like specifying inappropriate options, the log file might not be generated.

Note: If the un-setup also fails, you need to manually delete the resources. Refer to the section *Errors during Setup of the Interstage BPM Server* on page 108

8.1.3 Backup Resources

Before you go to next step, you need to back up your resources. For detail information, refer *Server Administration Guide* .

8.1.4 Remove engine Directory

You can remove the `engine` directory that you have copied during the setup of Interstage BPM.

9 Upgrading Interstage BPM from Previous Versions

9.1 Outline

The basic steps for upgrading from previous version of Interstage BPM are described below:

To upgrade from previous versions of Interstage BPM:

1. Backup the complete Interstage BPM materials.
2. Uninstall the previous version of Interstage BPM.
3. Create a directory on your machine where you want to setup Interstage BPM and copy the `engine` directory from Interstage BPM engine directory on product media to the directory created on your machine
4. Upgrade your database according to the instructions in section *Upgrade Database* on page 59.
5. Upgrade the Interstage BPM Server and migrate application resources as described in *Migrating Application Resources from Previous Versions to this Version of Interstage BPM* on page 66.

Following sections explain the instructions for each of these steps.

9.1.1 Back up the Interstage BPM materials

To upgrade from previous versions of Interstage BPM:

1. Before uninstalling the previous version of Interstage BPM:
 - Back up the Interstage BPM database - This is the only way to ensure the retention of your current Interstage BPM data. The upgrade process automatically migrates (and therefore overwrites) process definitions to the current release's formats. Use the default functionalities of your database software for backing up your database.
 - Export out the Interstage BPM Server properties using the Interstage BPM export script. (For details, refer *Using the Configuration Export and Import Scripts* on page 77.) This preserves your previous server configurations. (If upgrading from Interstage BPM v7.x or v8.x, the uninstallation program automatically saves your configuration files with the suffix `previous` appended to their file names. For example, the `ibpm.properties` file is saved as `ibpmprevious.properties`.) After setting up the new version of Interstage BPM, you can use the saved properties file to manually configure your new server setup. For information on how to change the server configuration, refer to the *Interstage Business Process Manager Server Administration Guide*.
 - Back up all files from the previous `agents/` folder
 - Back up all files from the previous `calendar/` folder
 - Back up the `resources/DataSourceDefinition.xml` file
 - Back up the `resources/fileListenerConf.xml` file
 - Back up the `DmsCollections.xml` file and the directories specified in it - these directories contain data that users have previously uploaded.

9.1.2 Upgrade Database

The database upgrade procedure consists of the following 3 main steps:

1. **Schema migration:** This upgrade script does not require Java execution environment. This script must be executed with admin credentials on the machine where database is installed. In case of upgrading remote database, you need to copy the database upgrade script to remote database

machine and then configure the database parameters and execute the script, which will perform the database migration.

2. **Data migration:** This step executes data conversion and initialization for new schema. This step requires Java execution environment and can be executed from a remote machine that has Interstage BPM setup. Hence you do not need to execute this step on the remote database machine. This step fails if schema migration is not completed successfully.

Note: If the Java execution environment is available on the database machine, you can execute this step on the database machine also.

3. **Post upgrade operations:** This is the final step to complete the database upgrade. This script does not require Java execution environments and must be executed on the database machine. In case of upgrading remote database, you need to copy the database upgrade script to the remote database machine and then configure the database parameters and execute the script, which will perform the post upgrade operations. This step fails if data migration is not completed successfully.

Before starting the execution of database upgrade script, you need to configure the parameters in the configuration file. These parameters indicates which step to execute. You can either execute all the scripts at one go or you can manually inspect and sequentially execute these three steps of database upgrade procedure if your database resides on a machine other than the Interstage BPM Server setup. For information regarding the configuration parameters, refer to the *Parameters for the database upgrade configuration file* on page 60

Parameters for the database upgrade configuration file

Before you execute database upgrade script, you need to configure parameters in the database upgrade configuration file `config.bat / config.sh` located at `<engine directory>/server/deployment/dbupgrade/bin` directory.

You can edit `config.bat / config.sh` file using the text editor.

Note: If special characters are included in the parameter value, you need to escape the character followed by your shell.

Configuration Parameters for Database Upgrade:

Configuration Parameter	Description
MIGRATE_SCHEMA	<p>This parameter specifies whether the schema migration has to be performed or not. The valid values are <code>y</code> or <code>n</code>.</p> <ul style="list-style-type: none"> • If set to <code>y</code>, this parameter enables the schema migration. • If set to <code>n</code>, this parameter disables the schema migration. <p>Please refer to <i>Upgrading Database</i> on page 63 for the usage example.</p>

Configuration Parameter	Description
MIGRATE_DATA	<p>This parameter specifies whether the data migration has to be performed or not. The valid values are <code>y</code> or <code>n</code>.</p> <ul style="list-style-type: none"> • If set to <code>y</code>, this parameter enables the data migration. • If set to <code>n</code>, this parameter disables the data migration. <p>Please refer to <i>Upgrading Database</i> on page 63 for the usage example.</p>
POST_UPGRADE	<p>This parameter specifies whether the post upgrade operations has to be performed or not. The valid values are <code>y</code> or <code>n</code>.</p> <ul style="list-style-type: none"> • If set to <code>y</code>, this parameter enables the post upgrade operations. • If set to <code>n</code>, this parameter disables the post upgrade operations. <p>Please refer to <i>Upgrading Database</i> on page 63 for the usage example.</p>
AE_TO_EE	<p>This parameter specifies the edition you are upgrading from. The valid values are <code>y</code> or <code>n</code>.</p> <ul style="list-style-type: none"> • If set to <code>y</code>, this parameter indicates that you are upgrading from AE(Advanced Edition) to EE(Enterprise Edition) • If set to <code>n</code>, this parameter indicates that you are upgrading from EE to EE
DB_HOME	<p>This parameter specifies the absolute path to the top-level directory of your database installation.</p> <p>Sample Value For Oracle:</p> <p>On Windows: C:\app\oracle\product\11.2.0\dbhome_1</p> <p>On UNIX: /opt/app/oracle/product/11.2.0/dbhome_1</p> <p>Sample Value For Microsoft SQL Server:</p> <p>On Windows: C:\Program Files\Microsoft SQL Server</p>
DATAFILE_PATH	<p>This parameter specifies the absolute path to the directory where your data files resides.</p> <p>Sample Value for Oracle:</p> <p>On Windows: C:\app\oracle\oradata\orcl</p> <p>On Linux: /opt/app/oracle/oradata/orcl</p> <p>For Microsoft SQL Server: C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA</p>

Configuration Parameter	Description
JDBC_DRIVER_PATH	<p>This parameter specifies the absolute path of the JDBC driver.</p> <p>This parameter is mandatory to specify:</p> <ul style="list-style-type: none"> If you are upgrading from pre-10.1 version of Interstage BPM. If you are upgrading from V10.1 or above version of Interstage BPM and if you have specified <code>MIGRATE_DATA=y</code>.
JAVA_HOME	<p>This parameter specifies the absolute path to the top-level directory of the JDK installation.</p> <p>Sample Value: <code>D:\java\jdk1.6.0_22</code></p> <p>This parameter is mandatory to specify:</p> <ul style="list-style-type: none"> If you are upgrading Interstage BPM from 10.1 older version. If you are upgrading Interstage BPM from 10.1 later version, and if you have specified <code>MIGRATE_DATA=y</code>.
DB_TYPE	This parameter specifies the type of database used. The valid values are <code>oracle</code> or <code>mssql</code>
DB_HOST	This parameter specifies the IP address or host name of the machine where database is installed. If you do not specify the value of this parameter <code>localhost</code> will be used.
DB_PORT	<p>This parameter specifies the port on which your database is running. It is used for creating database connection.</p> <p>Sample Value:</p> <p>For Oracle: <code>1521</code></p> <p>For Microsoft SQL Server: <code>1433</code></p>
ORCL_SID	This parameter is specific to oracle database and indicates the connection identifier used for creating database connection and executing Oracle SQL scripts.
DBUSER	<p>This parameter specifies the name of the database user.</p> <p>Sample Value: <code>ibpmuser</code></p>
DBPWD	<p>This parameter specifies the database user password.</p> <p>Sample Value: <code>ibpmuserpassword</code></p>
DBADMINUSER	<p>This parameter specifies the name of database admin user.</p> <p>Sample Value: <code>ibpadminuser</code></p>

Configuration Parameter	Description
DBADMINPWD	This parameter specifies the database admin password. Sample Value: <code>ibpadminuserpassword</code>

Copy the upgrade scripts

You need to copy the database upgrade scripts only if the Interstage BPM Server and the database are setup on different machines. This is for remote database configuration. When the Interstage BPM Server and database exist on the same machine, you do not need to copy the script.

1. Create a directory with a name (for example `dbupgrade_local`) on the machine where database is installed.
2. From following directory, copy the directories in the `dbupgrade_local` directory that you have just created:

- On Windows: `<engine directory>\server\deployment\dbupgrade`
- On UNIX: `<engine directory>/server/deployment/dbupgrade`

Directories to be copied to the database machine:

- If you are upgrading from pre-10.1 versions of Interstage BPM, copy the following folders:
 1. `bin`
 2. `lib`
 3. For Oracle: `oracle`
 4. For Microsoft SQL Server database: `sqlserver`

Note: The `lib` directory includes Java code. Hence in this case, you need to make sure that the Java execution environment is available on the database machine.

- If you are upgrading from V10.1 or above versions of Interstage BPM, copy the following folders:
 1. `bin`
 2. For Oracle: `oracle`
 3. For Microsoft SQL Server database: `sqlserver`

Note: In this case, Java execution environment is not required on the database machine.

Note: In UNIX, you must grant following permissions for the `dbupgrade_local` directory to the user who executes the scripts.

- The `dbupgrade_local` directory and sub-directories: 'Read', 'Write' and 'Execute' permissions.
- All files: 'Read' permission.
- All script (.sh) files: 'Execute' permission.

Upgrading Database

Pre-requisites: You have uninstalled the previous version of Interstage BPM.

Note: In case of UNIX environment, make sure that you have set the following environment variables as mentioned below:

- ORACLE_HOME=<Database Installation directory>

For example:

```
ORACLE_HOME=/opt/app/oracle/product/11.2.0/dbhome_1; export ORACLE_HOME
```

- ORACLE_SID=<Database identifier>

For example:

```
ORACLE_SID=orcl; export ORACLE_SID
```

If you want to execute the database upgrade script in the Java execution environment and the Interstage BPM Server and database are exist on the same machine, follow these steps:

1. Configure the parameters in the `config.bat` / `config.sh` file located at:

- On Windows: `dbupgrade\bin`
- On UNIX: `dbupgrade/bin`

Configure the parameters as below:

```
MIGRATE_SCHEMA=y
MIGRATE_DATA=y
POST_UPGRADE=y
```

For more information, refer to the *Parameters for the database upgrade configuration file* on page 60

2. Run the upgrade script `dbupgrade.bat` / `dbupgrade.sh` as shown below. The script file located at the:

- On Windows: `dbupgrade\bin`
- On UNIX: `dbupgrade/bin`

If you want to overwrite values of any of the database configuration parameters that you have specified in the configuration file `config.bat` / `config.sh`, at runtime you can provide the parameters and its value from the command line while executing the upgrade script.

Use the following command to execute this script:

```
dbupgrde.bat dbuser=<dbuser> dbpwd=<db password> dbadminuser=<db
administrator> dbadminpwd=<db administrator password> JDBC_DRIVER_PATH
="C:\Microsoft SQL Server\sqljdbc_2.0\enu\sqljdbc4.jar"
JAVA_HOME=C:\Java\jdk6
```


Note:

- If any space used in parameter values then values must be enclosed in double quotes.
For example: `DATAFILE_PATH="C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA"`
- On the command line, you can specify only the parameters supported in the configuration file. If you specify any unsupported parameters, it may cause an error. Refer to the *Configuration Parameters* table described above.

If the Java execution environment is not available on database machine. In this case, the Interstage BPM Server usually exists on different machine then you need to execute the scripts for each step of database upgrade, as described below:

1. **Migrating Database Schema:** This procedure must be executed on the machine where database is installed.

- Copy the directories on the database machine according to the instructions in the *Copy the upgrade scripts* on page 63
- Configure the following parameters in the `config.bat / config.sh` file located in the `dbupgrade_local\bin` folder that you have copied in previous step.

For more information, refer to the *Parameters for the database upgrade configuration file* on page 60.

```
MIGRATE_SCHEMA=y
MIGRATE_DATA=n
POST_UPGRADE=n
```

- Run the upgrade script `dbupgrade.bat / dbupgrade.sh` file located in the `dbupgrade_local\bin` folder that you have copied, as described above.

2. **Migrating Data:** This procedure can be executed from a non-database (remote) machine.

Note: This procedure can be executed only if the database schema migration is completed successfully.

- Configure the migration parameters in the `config.bat / config.sh` file located at `<engine directory>\server\deployment\dbupgrade\bin` as shown below.
For more information, refer to the *Parameters for the database upgrade configuration file* on page 60.

```
MIGRATE_SCHEMA=n
MIGRATE_DATA=y
POST_UPGRADE=n
```

- Run the upgrade script `dbupgrade.bat / dbupgrade.sh` located at `<engine directory>\server\deployment\dbupgrade\bin` folder, as described above.

3. **Executing Post Migration operations**

Note: This procedure can be executed only if the data migration is completed successfully.

- On the machine where database is installed, navigate to the `dbupgrade_local\bin` directory and configure the migration parameters in the `config.bat / config.sh` file as shown below.

For more information, refer to the *Parameters for the database upgrade configuration file* on page 60.

```
MIGRATE_SCHEMA=n
MIGRATE_DATA=n
POST_UPGRADE=y
```

- b) Run the upgrade script `dbupgrade.bat / dbupgrade.sh` located in the `dbupgrade_local\bin` directory, as described above.

9.1.3 Upgrade Interstage BPM and Migrate Application Resources

To upgrade Interstage BPM and migrate application resources:

1. Setup the Interstage BPM Server and/or Console according to the instructions in section *Setting-up Interstage BPM Server and Console* on page 21.

Note: Specify `1` to `database_creation_selection` in `setup.config`. Otherwise, the old database will be overwritten and you will lose all of the previous work that is stored in the database.

Note: Once upgrade is completed, the `ApplicationSecurityMode` server configuration parameter is set to `Secure` (SaaS mode) by default as the setup is always in SaaS mode. Therefore if you want to keep using Interstage BPM with non-SaaS mode, you should change the property value from `Secure` to `Relax`. How to change server parameters is described in the *Interstage BPM Server Administration Guide*.

2. Migrate application resources as described in *Migrating Application Resources from Previous Versions to this Version of Interstage BPM* on page 66.
3. Start the Interstage BPM Server and Console. Refer the following sections:
 - *Starting Interstage BPM Server*
 - *Starting Interstage BPM Console and Tenant Management Console*
4. If needed, migrate the application owners as described in *Migrating Application Owners from Previous Versions to this Version of Interstage BPM* on page 68
5. For security reasons, delete the configuration file after using it.

Interstage BPM is now upgraded to the latest version.

9.2 Migrating Application Resources from Previous Versions to this Version of Interstage BPM

Pre-requisites: You have completed the previous steps as described in *Outline* on page 59.

- If you are upgrading from a version of Interstage BPM that do not support SaaS mode or if you were using Interstage BPM with non SaaS mode, you have to setup an instance of Interstage BPM Server, and after setup, you have to change the `ApplicationSecurityMode` server configuration parameter to `relax`.

To migrate application resources from previous versions to this version of Interstage BPM:

1. Copy the `DmsCollections.xml` file of the previous version to the `<engine directory>/server/instance/default/tenants/Default/resources/` folder. (Replace the `DmsCollections.xml` present at this location.)

Essentially, to be able to use attachments from the previous Interstage BPM version, you need to continue to use the same DMSRoot you used in the previous version.

2. Copy the `apps` folder from `<engine directory>/server/instance/default/tenants/Default/attachments/` to the DMSRoot `<Path>` specified in `DmsCollections.xml`.

Note: For UNIX environments, while specifying the DMSRoot, ensure you use the correct case in the file path.

3. Create a new directory named `engine_classes` in the `<DMSRoot>/apps/<app_ID>/` and copy all the class files for generic Java Actions in this `engine_classes` directory.
4. For each application, do one of the following:
 - a) If an application already contains the `agentsConfig.xml` file (located in `<DMSRoot>/apps/<application id>/`), add the following code to that file:

```
<ActionAgent>
  <Name>@FTP</Name>
  <Description>FTP Agent</Description>
  <RetryInterval>20</RetryInterval>
  <EscalationInterval>1</EscalationInterval>
  <ClassName>com.fujitsu.iflow.serveree.impl.actionagent.ServiceAgent
</ClassName>
  <ConfigFile>ftp.xml</ConfigFile>
</ActionAgent>
<ActionAgent>
  <Name>@HTTPAgent</Name>
  <Description>HTTP Agent</Description>
  <RetryInterval>20</RetryInterval>
  <EscalationInterval>1</EscalationInterval>
  <ClassName>com.fujitsu.iflow.serveree.impl.actionagent.httpservice.
HTTPServiceAgent</ClassName>
  <ConfigFile>HTTPAgent.xml</ConfigFile>
</ActionAgent>
```

- b) If an application does not contain the `agentsConfig.xml` file (located in `<DMSRoot>/apps/<application id>/`)
 - Copy the `agentsConfig.xml` file of the previous version to the `<DMSRoot>/apps/System` folder.
 - Edit the copied `agentsConfig.xml` to remove 'agents/' from the text within the `<ConfigFile>` tag.
5. Copy the `fileListenerConf.xml` file of the previous version to the `<DMSRoot>/apps/System` directory.
6. Copy the previous versions of each of the following to each application folder in the `<DMSRoot>/apps/<application id>/` directory.
 - `HTTPAgent.xml` file
 - `ftp.xml` file
 - **Business Calendar (.cal) files**
 - `DataSourceDefinition.xml` file

Note: Do not migrate Decision Table Management (DTM) configuration files from previous versions of Interstage BPM; this version of Interstage BPM does not support DTM configuration files of pre-v11.0 versions.

7. Synchronize the Interstage BPM Console with your DMSRoot using the following steps:
 - a) Login to Interstage BPM Console as an administrator.
 - b) After choosing an application, in the **System Administration tab**, click **Application Settings**.
 - c) In the **Application Settings** page, click **Synchronize with DMS**, and then click **Synchronize** in the pop-up that appears.

Note: Repeat the above steps for all the tenants.

Note: From this version of Interstage BPM:

- Parent process definitions can only call sub process definitions if they exist in the same application. To continue using parent process definition from previous versions in Interstage BPM V11.0, ensure their sub process definitions exist in the same application as the parent process definition.
- You cannot migrate process instances from one application to another.
- You cannot copy process definitions from one application to another.

9.3 Migrating Application Owners from Previous Versions to this Version of Interstage BPM

When you migrate applications prior to this version to this version of Interstage BPM, the user group having the role of AdminRole is automatically set as the owner of the application. After application migration, if you want to assign application ownership to a group other than the AdminRole, you can do so by using Interstage BPM Console. For information about changing application owners in Interstage BPM Console, refer the *Managing Applications* section of the *Interstage BPM Console Online Help*.

9.4 Migrating WebDAV Repository and UDDI Registry from Previous Versions to this Version of Interstage BPM

If you had configured Interstage BPM of the version prior to this version to use WebDAV repository and UDDI registry (such as Centrasite), you need to configure for WebDAV and UDDI repositories. This configuration is possible by using Interstage BPM Tenant Management Console or the ImportProperties command.

After this configuration is complete, you need to synchronize the Interstage BPM Server with your WebDAV and UDDI repositories before you can use already published information or publish new process definitions. Use the following steps to achieve this:

1. After upgrade and configuration of Interstage BPM Server and Console, start the Interstage BPM Server and Console.
 - *Starting Interstage BPM Server* on page 32
 - *Starting Interstage BPM Console and Tenant Management Console* on page 33
2. Login to Interstage BPM Console as an administrator.
3. After choosing an application, in the **System Administration tab**, click **Application Settings**.

4. In the **Application Settings** page, click **Synchronize with Repository**, and then click **Synchronize** in the pop-up that appears.

Once synchronization is successful, an appropriate message is displayed.

Now this version of Interstage BPM is ready to be used with WebDAV and UDDI repositories

9.5 Additional Steps for Handling Pre-11.0 Console URLs

From version 11.0 of Interstage BPM Console, the Interstage BPM Console URL has been changed, making older versions of URLs such as those of Remote SubProcesses, Service Registry, and so on incompatible when called from previous versions of Interstage BPM.

To overcome this problem, deploy the Compatibility Proxy WAR provided in this release using the steps listed in this section.

Note:

1. For a remote subprocess, perform the steps listed here only in the following cases:
 - When both the Parent and child process instances are running, and you upgrade Interstage BPM on the parent server to v11.0
 - When the parent process is running but the child process instance has not yet started, and you upgrade Interstage BPM on the child server to v11.0
2. Support for HTTPS is not available in this release.

In order to use the Compatibility Proxy for supporting pre-V11.0 URLs, the following requirements must be met:

- You should setup an instance of Interstage BPM Server, and after setup, you should change the `ApplicationSecurityMode` server configuration parameter to `relax`.
- The Compatibility Proxy should be deployed at the original pre-V11 context root, and the V11 Console should be deployed at a different context root. For example, if the pre-v11.0 Console was deployed at the context root `ibpmconsole`, then you should install the compatibility proxy at `ibpmconsole` and the V11 Console at any other context root, for example, `console`. The default context root for V11 Console is `console`, which is different from the default context root for any previous version. So if you have followed the defaults, this requirement rule will be automatically satisfied.
- V10.x had the restriction that two applications cannot have process definitions with the same name. This restriction has been removed in V11.0. But to use the Compatibility Proxy, the same restriction needs to be followed, that is, two applications should not have process definitions with the same name.

9.5.1 Steps to Overcome the URL-incompatibility Problem

Pre-requisites: You have completed the previous steps as described in *Outline* on page 59:

- You have setup an instance of Interstage BPM Server and Console, and after setup, you have changed the `ApplicationSecurityMode` server configuration parameter to `relax`.
- Make sure that the WebLogic Server is running.

To overcome the URL-incompatibility problem caused by pre-11.0 URLs:

1. Create a folder whose name corresponds to your pre-v11.0 context root (for example `ibpmconsole`) on your machine. For example purposes, the following directory will be used:

On UNIX or Linux:

```
/opt/FJSVibpm/ibpmconsole
```

On Windows:

```
c:\fujitsu\InterstageBPM\ibpmconsole
```

2. Copy `webserviceproxy.war` from the console directory of your Interstage BPM Console Installation CD or CD Image to the directory that you just created on your machine.
3. Extract the files from `webserviceproxy.war` into the `ibpmconsole` directory. Use the following Java command:

```
jar -xvf webserviceproxy.war
```

4. After extracting the jar, edit the `proxy.conf` file under `<Extraction Directory>\WEB-INF\config` and update the `ServerBaseURL` to the **V11 port number and context root**.
5. Start the WebLogic Server Default Server. For details, refer *Starting WebLogic Administration Server* on page 19.

The WebLogic Administration Server will start in a Console Window.

6. Start the Interstage BPM Server to which you want to connect in WebLogic. For details, refer *Starting Interstage BPM Server* on page 32.
7. Open the WebLogic Admin Console by entering the following URL in your Web Browser:

```
http://<hostname>:7001/console
```

The WebLogic Administration Console will open in your Web Browser.

8. Login to the WebLogic Administration Console.
9. Deploy the `webserviceproxy.war` on the WebLogic Application Server. See the Deploy Web Application topic in the WebLogic Server Administration Console Help for instructions specific to the particular version of WebLogic that you are using.
10. Deploying the `webserviceproxy` using the WebLogic Administration Console:

Note: Two different scenarios are presented in these instructions. In Case 1, the `webserviceproxy` is deployed in the same WebLogic Server Domain as the Interstage BPM Server. In Case 2, the `webserviceproxy` is deployed in a WebLogic Server Domain other than the one used by the Interstage BPM Server.

- a) In the left pane of the Administration Console, click **Lock & Edit**, so you can deploy the `webserviceproxy.war`. This action greys out the **Lock & Edit** button and makes the **Release Configuration** button available. The WebLogic Administration Console is now in edit mode. The WebLogic configuration cannot be changed unless you are in edit mode.

Note: In WebLogic, this step is not required if the **Automatically acquire lock and activate changes** option is enabled in your admin console **Preferences**.

- b) In the left pane of the Administration Console, click **Deployments** in the **Domain Structure** list. The **Summary of Deployments** page appears.
- c) In the right pane, click **Install**. The **Install Application Assistant** page appears.
- d) Click the link for **Location** and navigate to the `ibpmconsole` (where we have extracted the `webserviceproxy.war` in Step 3) directory.
- e) Check the **ibpmconsole** checkbox. Then, click **Next**. The Choose Targeting Style step of the Install Application Assistant is displayed.
- f) Make sure that the **Install this deployment as an application** checkbox is checked. Then, click **Next**.

- g) For Case 1, check the **InterstageBPM Server** checkbox in the Servers list. For Case 2, you only have the option of using the Admin Server, so no action is needed on this screen.
- h) For Case 1, click **Next**. For Case 2, click **Finish**. In Case 1, the Optional Settings step of the Install Application Assistant is displayed. In Case 2, you can skip the next step.
- i) You do not need to make any optional settings, so click **Next**.
- j) Activate your deployment by clicking **Activate Changes**. A message appears informing you that your changes have been activated.

Note: In WebLogic, this step is not required if the **Automatically acquire lock and activate changes** option is enabled in your admin console **Preferences**.

- k) Click **Deployments** in the **Domain Structure** list. Your newly deployed Web Application appears in the **Deployments** list.
 - l) For Case 1, make sure that your Interstage BPM Server is running because you will not be able to start `ibpmconsole (webserviceproxy)` if it is not running.
 - m) Check the Selection box of `ibpmconsole (webserviceproxy)`, then select **Servicing all requests** from the **Start** drop-down list to the Web application.
 - n) Click **Yes** to confirm that you want to start the selected Web applications. A page indicating that the deployment has started will appear.
11. Start the Interstage BPM Server and Console. Refer the following topics:
- *Starting Interstage BPM Server* on page 32
 - *Starting Interstage BPM Console and Tenant Management Console* on page 33

9.6 Additional Steps for Form Styles while Migrating from Interstage BPM Console 11.1

Versions of Interstage BPM Console **later than v11.1** allow changing the look and feel of Interstage BPM Console forms using Interstage BPM Console itself. If you are migrating from Interstage BPM Console 11.1, and you were using custom stylesheets for either:

- `tenants` (stylesheet placed under `//<console WAR>/tenant/<tenantName>/web/styles/custom.css` OR `//<console WAR>/web/styles/custom.css`), OR
- `applications` (stylesheet placed under `//<console WAR>/tenant/<tenantName>/apps/<appName>/web/styles/customTheme.css`)

after migration, ensure you define form-specific style classes in the custom CSS files.

9.7 Additional Steps for Interstage BPM Console

9.7.1 Deleting Interstage BPM Console

In version 11.2.1 of Interstage BPM, Interstage BPM Console is always setup with Interstage BPM Server. Therefore if you do not want to work with Interstage BPM Console you can un-setup it from your application server.

On WebLogic:

1. Access the Administration Console of WebLogic Server, and in the Domain Structure tree, select **Deployments**.

2. In **Summary of Deployments**, in the **Control** tab, select the **InterstageBPMConsole** checkbox.
3. Click **Delete**.

9.7.2 Updating System Properties for Web Server Port

If you changed your WebServer port from default value, you need to change the following System properties.

- ServerBaseURL
- ServerEmailBaseURL

You can update these values via the Interstage BPM Tenant Management Console or Import/Export property commands. How to change properties using Tenant Management Console is explained in the *Interstage BPM Tenant Management Console Online Help*. Details of using import/export commands are described in the *Interstage BPM Server Administration Guide*.

Appendix A: Security

Interstage BPM can be set to two security levels: Demo Mode and Security Mode. Demo Mode is useful while key members of your work team learn the features of the software. Later, Security Mode provides a stable and controlled environment for implementing Interstage BPM across your company.

A.1 Interstage BPM Operation Model

It is assumed that Interstage BPM is used in an organizational Intranet. VPN is used when connecting from Internet to Intranet. In most situations, end-users will work with Interstage BPM applications via a firewall, administrators, however, will be using the server segment.

End-users do not need to run applets or other clients requiring the Interstage BPM model. This means that the only port that needs to be opened in the firewall is the standard HTTPS port (443) and the Web Server in the server segment.

The following diagram depicts a setup situation where Interstage BPM applications are used via a firewall. It also shows possible security threats – these are described in more detail in the subsequent table.

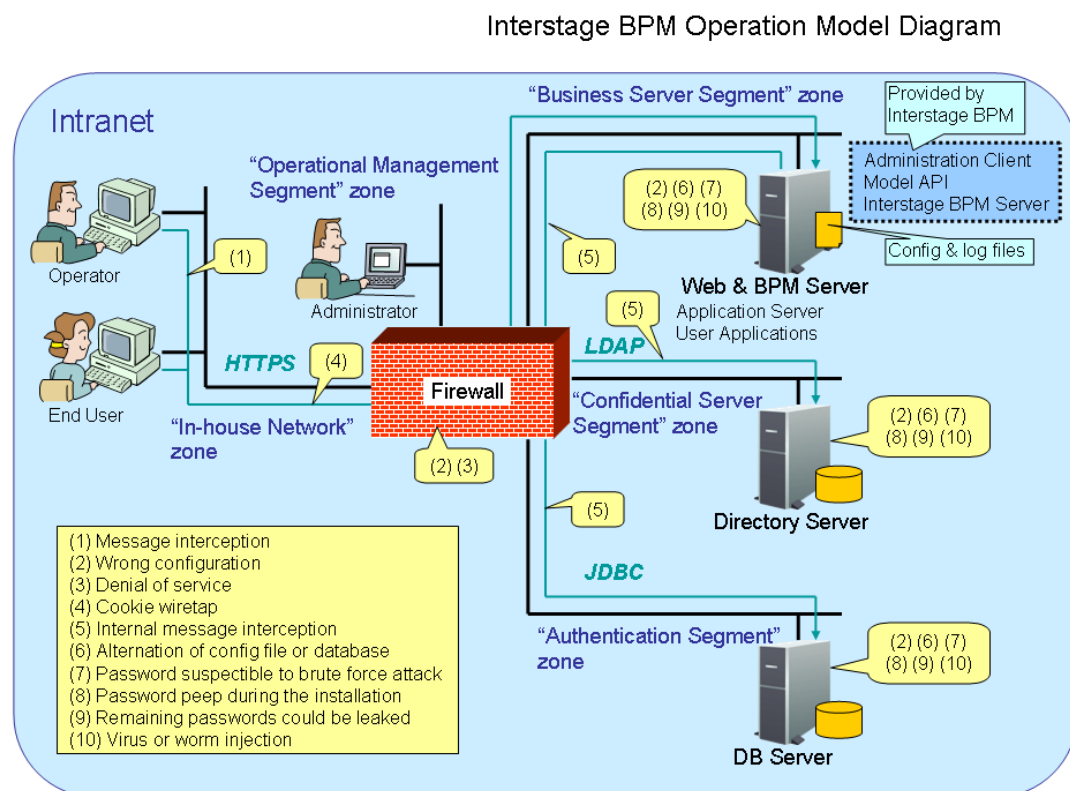


Figure 17: Interstage BPM Operation Model

The following table lists the possible security threats as well as possible solutions:

#	Threat	Solution
(1)	Message interception	Use SSL.
(2)	Wrong configuration	Make sure that your administrators are properly trained and certified, and that the firewall, the Web Server, the Interstage BPM Server, the Database Server and the Directory Server are configured correctly.
(3)	Denial of service	Use firewall configuration to block illegitimate requests.
(4)	Cookie wiretap	Use secure cookies if you are using cookies for session management.
(5)	Internal message interception	Keep the Web Server, Interstage BPM Server, the Directory Server and the Database Server machines in a secure location.
(6)	Alternation of config file or database	Keep the Web Server, Interstage BPM Server, Directory Server and Database Server machines in a secure location. Set the operating system/database permissions such that file/database access is possible only by authorized people. Take special care for the directories/database of Interstage BPM, Interstage Application Server, Active Directory and Oracle.
(7)	Password susceptible to brute force attack	All guessed passwords should be changed to something that is less vulnerable. Passwords should not be proper nouns (e.g., a person's name), a word found in a dictionary or the same string as the user name. Ideally, a password should contain a minimum of 6 characters in a mixture of upper case, lower case, numeric digits and other characters. In addition, it should not contain more than two identical consecutive characters and more than two ascending or descending consecutive characters.
(8)	Password peep during the installation	Install under the condition that no one is around you.
(9)	Remaining passwords could be leaked	Secure the configuration files after setup.
(10)	Virus or worm injection	As a rule, always use anti-virus software.

A.2 Password Encryption

The Interstage BPM setup script encrypts the passwords entered during setup and writes the encrypted passwords into the database.

The Interstage BPM Server decrypts all passwords at startup. If decryption fails, a warning message is printed in the `Trace.log` file.

If you need to change the user/passwords after completion of setup, an Encryption Utility is provided so that you can encrypt the passwords and overwrite them in the server's configuration. The Encryption Utility does not provide for decryption of passwords. It can only be used for encryption.

Initially, a default key is used to encrypt and decrypt the passwords. If you want to use a different key for security reasons, you must add this key to the server's configuration. The default key is not published; it is hardcoded in the server code.

The Encryption Utility provided is:

```
com.fujitsu.iflow.utilities.TextEncrypter.class
```

To call the Encryption Utility, use the encryption script located in `<engine directory>/client/samples/configuration`:

- On Windows: `EncryptPassword.bat`
- On UNIX: `EncryptPassword.sh`

Encrypting a Password With the Default Key

To encrypt a password with the default key, run the script with the following option:

On Windows: `EncryptPassword.bat -e "<TextPassword>"`

On UNIX: `EncryptPassword.sh -e "<TextPassword>"`

Note: Make sure to enclose the password and the encryption key in double quotes. Otherwise, the encryption process might fail. As double quotes are delimiters, do not use double quotes in the encryption key.

Encrypting Passwords With a New Key

You are recommended to encrypt your passwords with your own key.

To encrypt a single password with a new key, run the script with the following options:

On Windows: `EncryptPassword.bat -e "<TextPassword>" "<Key>"`

On UNIX: `EncryptPassword.sh -e "<TextPassword>" "<Key>"`

Note: If a key other than the default key is used, it should contain more than 24 characters. Make sure to enclose the password and the encryption key in double quotes. Otherwise, the encryption process might fail. As double quotes are delimiters, do not use double quotes in the encryption key.

During startup of the Interstage BPM Server, the key needs to be present in the server's configuration. Therefore, before starting the server, use the configuration export and import scripts to add the following parameter to the server's configuration:

```
EncryptionKey=<Key>
```

For details on the procedure, refer to section *Using the Configuration Export and Import Scripts* on page 77. For security reasons, the key can be removed again from the configuration file that you imported into the database.

Alternatively, you can encrypt all passwords in the configuration file at the same time before importing it into the database. To do this, substitute all passwords in the configuration file with actual text passwords and encrypt the configuration file by running the script with the following options:

On Windows: `EncryptPassword.bat -f "<Path of Configuration File>" "<Key>"`

On UNIX: `EncryptPassword.sh -f "<Path of Configuration File>" "<Key>"`

Note: Make sure to enclose the file path and the encryption key in double quotes. Otherwise, the encryption process might fail. As double quotes are delimiters, do not use double quotes in the encryption key.

The following parameters in the configuration file are encrypted using this method:

- DBALoginpassword
- LDAPAccessUserPassword
- MetadataRepositoryPassword
- ServerPassword
- SMTPPassword
- SWAPLinkagePassword
- UDDIPublisherPassword

Example

Use the following command to encrypt all passwords in the configuration file at the same time.

On Windows: `EncryptPassword.bat -f`

`"C:\SomeDirectory\MyServerConfiguration.properties" "EWAERJQ23FIQ0J22"`

On UNIX: `EncryptPassword.sh -f "/SomeDirectory/MyServerConfiguration.properties"`

`"EWAERJQ23FIQ0J22"`

A.3 Using Demo Mode and Security Mode

Interstage BPM can be set to two security levels: Demo Mode and Security Mode. Demo Mode is useful while key members of your work team learn the features of the software. Later, Security Mode provides a stable and controlled environment for implementing Interstage BPM across your company.

Demo Mode restricts access to Interstage BPM in two ways:

- Only the person who is assigned a work item may make choices about it, thus advancing the process to the next work item - or completing it.
- Only members of the `AdminRole` can access administration functions in the Interstage BPM Console.

All Interstage BPM users can experiment with all of Interstage BPM functions, including creating and editing process definitions and process instances.

In **Security Mode**, access to process definitions, process instances, and work items are restricted to the specific people who need to use them. The following are examples of people who need to use them:

- Only members of the Role specified in the `TemplatePublishers` parameter of the Interstage BPM Server can create new process definitions.
- Only the process instance owners, current assignees, and Interstage BPM Administrators can view any specific process instances. (Current assignees are those who have active task assignments. This does not include people who will have task assignments later in the process.)
- Only the process instance owners, current assignees, and Interstage BPM Administrative Users can edit their specific process instances. This means they can change User Defined Attributes and add or delete attachments. However, they are not allowed to edit the process structure.

To set up Security Mode:

- Add the following parameters to the server configuration:

```
SecuritySwitch=true
```

This setting enables Security Mode.

```
TemplatePublishers =<Registered Role>
```

This Role must be registered in Interstage BPM's local group store or in your Directory Service. For example, if you have defined a Role of `pubRole`, you would type `TemplatePublishers=pubRole`. Be aware that this key takes effect only if the Security Mode is switched on.

For information on how to add parameters, refer to section *Using the Configuration Export and Import Scripts* on page 77.

A.4 Configuring SMTP Authentication for Use with Interstage BPM

Note: Only a System Administrator should perform these instructions.

If you required SMTP Authentication for logging in to Interstage BPM, use the following instructions:

1. Set up an email server and enable SMTP Authentication.
2. Add the following parameters to the server configuration:

```
SMTPServerHost=<Email Server Host Name>
SMTPUserName=<User Name for SMTP Authentication>
SMTPPassword=<Password for SMTP authentication>
```

For details on the procedure, refer to section *Using the Configuration Export and Import Scripts* on page 77.

3. Design a process definition to test the email feature.

Refer to the *Interstage Business Process Manager Studio User's Guide* for information on how to design process definitions.

If the `SMTPUserName` or `SMTPPassword` are set correctly, the email will be accepted by the email server. If neither the `SMTPUserName` nor `SMTPPassword` values are blank, Interstage BPM will use the SMTP authentication feature.

A.5 Using the Configuration Export and Import Scripts

Prerequisite: The database server is running.

Interstage BPM comes with configuration export and import scripts that allow you to change the server configuration. You can use these scripts to add parameters that are not present in the configuration or remove parameters from the configuration. If the server fails to start or denies login due to configuration errors, you can use the scripts to import a working configuration into the database.

You can add or edit both System as well as Tenant properties using the export and import scripts. For more information about System and Tenant properties, refer the *Interstage BPM Server Administration Guide*.

The Interstage BPM Server is not required to be running for the configuration export and import scripts to be used.

To use the configuration export and import scripts:

1. Export the server configuration by running the export script located in `<engine directory>/server/deployment/bin`:

Operating System	Configuration Export Script
Windows	<ul style="list-style-type: none"> • For System Properties: <code>exportProperties.bat <File Name> <Database User Name> <Password></code> Example: <code>exportProperties.bat MyServerConfiguration.properties SomeUserName SomePassword</code> • For Tenant Properties: <code>exportProperties.bat <File Name> <Database User Name> <Password> <TenantName></code> Note that <TenantName> is case-sensitive. Example: <code>exportProperties.bat MyServerConfiguration.properties SomeUserName SomePassword Default</code>
UNIX	<ul style="list-style-type: none"> • For System Properties: <code>exportProperties.sh <File Name> <Database User Name> <Password></code> Example: <code>exportProperties.sh MyServerConfiguration.properties SomeUserName SomePassword</code> • For Tenant Properties: <code>exportProperties.sh <File Name> <Database User Name> <Password> <TenantName></code> Note that <TenantName> is case-sensitive. Example: <code>exportProperties.sh MyServerConfiguration.properties SomeUserName SomePassword Default</code>

For `<File Name>`, specify the file name and, optionally, the path of the configuration file to be generated. If you do not specify a path, the configuration file is written to the current directory.

For `<Database User Name>` and `<Password>`, specify the database user account that you defined during setup of the Interstage BPM Server.

Note: Before you make any changes to the configuration file, create a copy of the configuration file you exported as a back-up. In case you make errors while editing parameters and import the file, Interstage BPM Server may not be able to start or errors may occur at runtime. In such a case you can use the back-up file which contains a working configuration.

2. Make the required changes in the generated configuration file.

If you want to add parameters, use the following syntax:

```
<Parameter Name>=<Parameter Value>
```

- Note:**
- Parameter names and values are case sensitive.
 - Any backslashes "\" or colons ":" used in parameter values must be escaped by backslashes. For example, a server address is specified like this:
`ibpmhost\:49950`
 - Some configuration parameters have a `<Hostname>` or `<Hostname>.<Servername>` suffix appended to their names. These suffixes are automatically removed during the export and are automatically appended during the import. Do not add these suffixes to the parameter names.

Passwords in the generated configuration file are encrypted for security reasons. If you change a password, you are recommended to encrypt it before importing the configuration file. Passwords are not automatically encrypted during the import. For details on how to encrypt passwords, refer to section *Password Encryption* on page 74.

3. Import the updated configuration file into the database by running the import script located in `<engine directory>/server/deployment/bin:`

Operating System	Configuration Import Script
Windows	<ul style="list-style-type: none"> • For System Properties: <pre>importProperties.bat <File Name> <Database User Name> <Password></pre> <p>Example:</p> <pre>importProperties.bat MyServerConfiguration.properties SomeUserName SomePassword</pre> • For Tenant Properties: <pre>importProperties.bat <File Name> <Database User Name> <Password> <TenantName></pre> <p>Note that <TenantName> is case-sensitive.</p> <p>Example:</p> <pre>importProperties.bat MyServerConfiguration.properties SomeUserName SomePassword Default</pre>
UNIX	<ul style="list-style-type: none"> • For System Properties: <pre>importProperties.sh <File Name> <Database User Name> <Password></pre> <p>Example:</p> <pre>importProperties.sh MyServerConfiguration.properties SomeUserName SomePassword</pre> • For Tenant Properties: <pre>importProperties.sh <File Name> <Database User Name> <Password> <TenantName></pre> <p>Note that <TenantName> is case-sensitive.</p> <p>Example:</p> <pre>importProperties.sh MyServerConfiguration.properties SomeUserName SomePassword Default</pre>

For <File Name>, specify the file name and, if required, the path of the updated configuration file. You need to specify the path if the configuration file is not located in the current directory.

For <Database User Name> and <Password>, specify the database user account that you defined during setup of the Interstage BPM Server.

4. In a cluster installation, each server node must be configured individually. Therefore, repeat steps 1-3 for the other server nodes.
5. Restart the Interstage BPM Server for the changes to take effect.

Appendix B: Running Interstage Business Process Manager in Solaris Containers

The Solaris "container" feature enables you to run several Solaris servers with the same version of the Solaris operating system on the same physical machine. Each of the Solaris servers configured in this way is called a "container" with the following properties:

- individual, separate IP address
- individual server name
- individual file system
- individual or shared resource pool

For instructions on setting up Solaris containers, refer to the Solaris product documentation. Below, you find a sample setup.

Sample

This section lists all commands that need to be called on a Solaris machine in order to set up a container with the following settings:

- Container name (host name): `IBPM_Test`
- IP address: `11.1.111.111`
- File system: `default`
- Additional devices: `none`
- Project: `myIBPMProject`
- Resource pool: minimum 2 and maximum 4 CPUs

The basic Solaris installation consists of exactly one container (or zone): the global zone. Every additionally installed zone is called local zone or container. Proceed as follows:

Step 1: Configuring the container

1. Create a root directory for the `IBPM_Test` container:

```
mkdir -p /export/zones/IBPM_Test
```

2. Set the user permissions:

```
chmod 700 /export/zones/IBPM_Test
```

3. Create and configure the container:

```
zonecfg -z IBPM_Test
create
set zonepath=/export/zones/IBPM_Test
set autoboot=true
add net
    set address=11.1.111.111
    set physical=hme0
end
verify
commit
exit
```

4. Install the container:

```
zoneadm -z IBPM_Test install
```

5. Boot the container:

```
zoneadm -z IBPM_Test boot
```

6. Login to the container:

```
zlogin -C IBPM_Test
```

7. Proceed with answering the default questions for the container settings when you log in for the first time.

Step 2: Setting up ssh connectivity for the container

1. Edit the `/etc/ssh/sshd_config` file:

```
vi /etc/ssh/sshd_config
```

and set the `PermitRootLogin` to `yes`.

2. Restart the container:

```
init 1  
init 3
```

After having finished the initial setup, leave the current prompt by typing `~`. (currently you are logged in as the root of the global container). All subsequent actions can be performed if you log in as root user via ssh.

Step 3: Setting up a resource pool and binding it to the container

1. Create a processor set:

```
poolcfg -c 'create pset ibpm (uint pset.min=2; uint pset.max=4)'
```

2. Create the resource pool:

```
poolcfg -c 'create pset ibmpool (string pool.scheduler="FSS)'
```

3. Associate the processor set to the pool:

```
poolcfg -c 'associate pool ibmpool (pset ibpm)'
```

4. Enable the settings:

```
pooladm -c
```

5. Verify the settings:

```
poolcfg -dc info
```

Step 4: Binding the pool to the container

1. Set the pool for the container:

```
zonecfg -z IBPM_Test set pool=ibmpool
```

2. Bind the pool to the container:

```
poolbind -p ibmpool -i zoneid IBPM_Test
```

3. Exit the prompt.

Step 5: Setting up the project for the container

1. Log on to the local container `IBPM_Test` as user `root`.
2. Create a project `myIBPMProject` for user `root`:

```
projadd -c "IBPM default project" -U root myIBPMProject
```

3. Set the maximum shared memory for the project:

```
projmod -sK "project.max-shm-memory=(privileged,521M,deny)" myIBPMProject
```

4. Set the CPU shares for the project:

```
projmod -sK "project.cpu-shares=(privileged,100,none)" myIBPMProject
```

Step 7: Starting Interstage Business Project Manager

1. To start Interstage Business Process Manager and apply the restrictions set in the previous steps:

```
newtask -p myIBPMProject
```

All activities that will be started subsequent to the above command will be subject to the set resource restrictions and be started for / in the `myIBPMProject` of the `IBPM_Test` container.

Appendix C: Clustering, Load Balancing, and Failover

This appendix provides you with an effective means of increasing the scalability and reliability of your Interstage Business Process Manager system. Configuring your system for load balancing can increase scalability. Configuring your system for failover can increase reliability.

This appendix provides guidelines for setting up a cluster of Interstage BPM Servers. It also provides guidelines for configuring that cluster for load balancing and failover.

In an Interstage BPM Cluster, multiple Interstage BPM Servers are setup to work in concert with each other. In other words, they work together as a unit. The default Interstage BPM Cluster is configured for load balancing in a round-robin configuration and for failover. For Interstage BPM Clusters in a round-robin configuration, requests sent to the cluster are distributed evenly among the servers in the cluster. If the cluster is configured for failover, a working server in the cluster automatically "takes over for" a server in the cluster that has just failed for some reason.

Note: Ensure that all machines that you plan to include in a cluster are in the same Time Zone, and the difference between their system times is not more than 5 minutes.
--

C.1 Setting Up an Interstage BPM Cluster on WebLogic Application Server

To set up an Interstage BPM Cluster, you must first configure a cluster of Interstage BPM Servers, and then connect that cluster to all of the Interstage BPM components in the same manner that they were connected to a single Interstage BPM Server. Setting up the cluster consists of the following major steps:

1. Preparing the cluster setup. This involves preparing the database, the application server and Interstage BPM Server.
2. Configuring environment variables
3. Configuring Interstage BPM for the cluster by running a script
4. Configuring the Shared Resource Root
5. Updating the Interstage BPM Server configuration files
6. Updating the Interstage BPM Client configuration
7. Updating environment variables and server startup scripts
8. Importing the Interstage BPM Server configuration files
9. Starting the cluster
10. Implementing failover if you require this feature

The sample cluster used to illustrate the instructions in this section is setup on two computers. The computer with hostname `svmd2` is the computer on which the WebLogic Administration Server is running. `svmdapp5` is the other computer in the sample cluster. The cluster is configured to run a standard load-balancing algorithm known as round-robin. A file server is used for storing documents

that need to be accessed by all cluster nodes, for example attachments to process instances. The following figure shows the sample system.

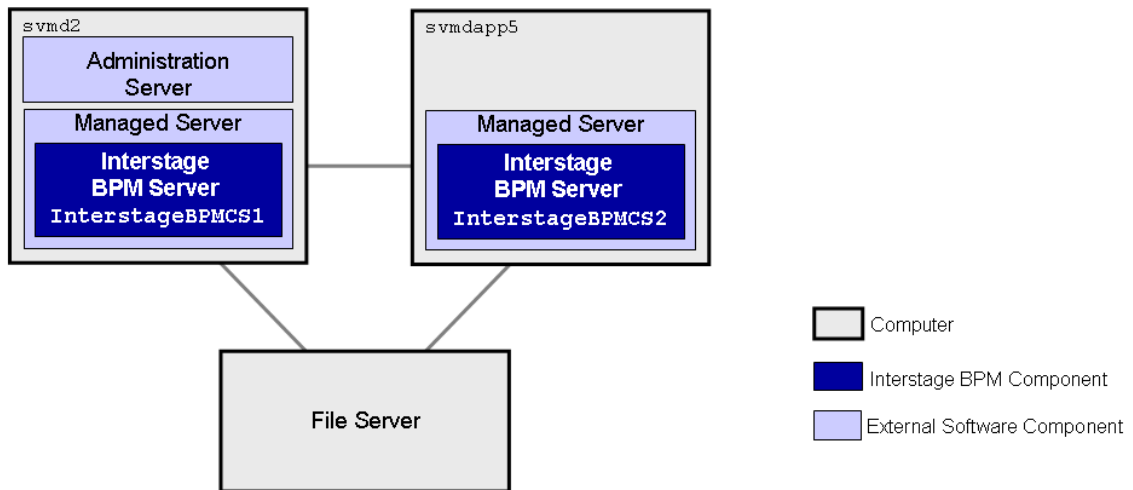


Figure 18: Sample Cluster

The next sections provide step-by-step instructions on how to set up the cluster.

C.1.1 Preparing the Cluster

To prepare the cluster:

1. Prepare the database system as explained in section *Database Server Preparation* on page 15
2. Install WebLogic Application Server on all computers that you want to include in your cluster. Use the WebLogic installation instructions and the special instructions for configuring WebLogic in section *How to configure a WebLogic Domain for the Interstage BPM Server* on page 17.
3. On the computer you have selected for your WebLogic Administration Server, perform the following substeps:
 - a) Start the WebLogic Administration Server as instructed in section *Starting WebLogic Administration Server* on page 19.
 - b) Configure the database, as explained in *Configuring the Remote Database*.
 - c) Setup Interstage BPM Server. Use the instructions in chapter *Setting-up Interstage BPM Server and Console* on page 21.

Note: Ensure you select to create the default tenant during setup.

Note: Ensure you do not use 'localhost' but the machine name or IP address in all screens during setup.

Note: This setup is only a dummy setup that is done for generating all the necessary files to be used for the cluster set-up.

During setup, a properties file is generated that contains the server configuration parameters. You will need to update and import the generated file in a later configuration step.

- d) Make sure that Interstage BPM is operating correctly in a simple configuration i.e. running a single Interstage BPM Server.
- e) Stop the Interstage BPM Server.
- f) Un-setup the dummy Interstage BPM Server setup. Refer *Un-setup Interstage BPM Server and Console* on page 56.

You are now ready to configure a WebLogic cluster.

C.1.2 Configuring Environment Variables

To configure the required environment variables:

1. Edit the environment variable script located in `<engine directory>/server/deployment/WLS-Cluster:`

Operating System	Environment Variable Script
Windows	<code>setIBPMenv.cmd</code>
UNIX	<code>setIBPMenv.sh</code>

2. Provide the appropriate values for the following variables:

- **BEA_HOME=<WebLogic Installation Directory>**
Location of your WebLogic installation directory.
Example on Windows: `C:\Oracle\Middleware`
Example on UNIX: `/opt/oracle/middleware`
- **WEBLOGIC_SERVER_HOME=<WebLogic Installation Directory upto 'server' folder>**
Path of the WebLogic installation directory upto the `server` folder.
Example on Windows:
 - On WebLogic 10.3.2: `C:\Oracle\Middleware\wlserver_10.3\server`
 - On WebLogic 12c: `C:\Oracle\Middleware\wlserver_12.1\server`
 Example on UNIX:
 - On WebLogic 10.3.2: `/opt/oracle/middleware/wlserver_10.3/server`
 - On WebLogic 12c: `/opt/oracle/middleware/wlserver_12.1/server`
- **weblogic_domain=<Domain Name>**
Name of the WebLogic domain that you created for Interstage BPM.
Example: `InterstageBPM_domain`
- **DOMAIN_DIR=<Domain Directory>**
Location of the domain directory.
Example on Windows: `C:\Oracle\Middleware\user_projects\domains\InterstageBPM_domain`
Example on UNIX: `/opt/oracle/middleware/user_projects/domains/InterstageBPM_domain`

Note: While editing the `setIBPMenv` script, ensure you use only forward slashes (/) with any paths in the script.

C.1.3 Configuring the Cluster

All of the WebLogic configurations performed to configure a cluster are performed on the computer you have selected for your WebLogic Administration Server. This is the computer upon which you setup Interstage BPM for WebLogic as a single server and got it running. You must continue to connect to this computer to make any configuration changes.

You configure the cluster by running a script. The script setups the following components on the cluster:

- JDBC
- Data Source
- JMS
- Interstage BPM Enterprise JavaBeans (EJBs)
- Startup Class

To configure an Interstage BPM Cluster on the WebLogic Administration Server computer:

1. Locate the following files in `<engine directory>/server/deployment/WLS-Cluster:`

- `ibpmWLInstallScripts.properties`
- `ibpmWLInstallScripts.py`
- On Windows: `runWLScript.bat`
- On UNIX: `runWLScript.sh`

2. If you want more than two servers in your Interstage BPM Cluster or want to change the names of your servers or port numbers:

- Change the `clusterServers` parameter in the `ibpmWLInstallScripts.py` script.
- Change the `NoOfServerInCluster` parameter in the `ibpmWLInstallScripts.properties` properties file as appropriate.

Make sure that the server names and port numbers are unique.

Example:

To add a server called `InterstageBPMCS3` with port 49959 to the cluster configuration, change the `clusterServers` parameter in the `ibpmWLInstallScripts.py` properties file to the following:

```
clusterServers={'InterstageBPMCS1':49952, 'InterstageBPMCS2':49956, 'InterstageBPMCS3':49959}
```

Also, change the `NoOfServerInCluster` parameter in the `ibpmWLInstallScripts.properties` properties file to the following:

```
NoOfServerInCluster=3
```

3. Run the cluster configuration script:

Operating System	Cluster Configuration Script
Windows	<code>runWLScript.bat <WebLogic Administrator Name> <WebLogic Administrator Password> <Database User Name> <Database User Password></code>

Operating System	Cluster Configuration Script
UNIX	runWLScript.sh <WebLogic Administrator Name> <WebLogic Administrator Password> <Database User Name> <Database User Password>

For <WebLogic Administrator Name> <WebLogic Administrator Password>, specify the user account of the administrator for the WebLogic Administration Server.

For <Database User Name> <Database User Password>, specify the database user account that you defined during setup of the Interstage BPM Server.

Running this script configures the cluster. It modifies the EJBs, JMS, database connections, etc. to a cluster configuration.

If you did not modify the cluster setup files according to step 2 of this procedure, you now have a cluster called `InterstageBPMCluster` and two WebLogic Managed Servers. The primary server is named `InterstageBPMCS1`. Its port is 49952. The secondary server is named `InterstageBPMCS2`. Its port is 49956.

4. Verify that the application server has been configured correctly. To do so:
 - a) Log in to the WebLogic Administration Console using the following URL:
`http://<hostname>:7001/console`
 - b) Go to **<Domain> > Environment > Servers** and verify that the servers have been created. If you did not modify the cluster setup files, the primary server is named `InterstageBPMCS1` and uses port 49952. The secondary server is named `InterstageBPMCS2`. Its port is 49956.
 - c) Go to **<Domain> > Deployments** and verify that an application called `InterstageBPMCServerApplication` has been installed.

C.1.4 Configuring the Shared Resource Root

The ResourceRoot is a directory on a central server containing resources (such as workflow applications, file listeners, shared classes, and so on).

In a load-balancing system, the ResourceRoot directory must be located on a central server that can be accessed by all server nodes; all server nodes must use the same ResourceRoot directory.

Each server node must be configured to access the ResourceRoot directory on that central server. The server nodes are allowed to map those directories to different physical paths as long as they use the same symbolic name for the directory.

Note: If anonymous user access is not available to shared resource root, then make sure that user who is starting the Server (each cluster server) have the full permissions to access the configured shared resource root.

To configure your ResourceRoot:

1. On a central server, create a ResourceRoot directory. Make sure that all server nodes have read and write access to this directory.

Example: In the sample system, a file server is used to host the ResourceRoot directory. You could create a directory named `InterstageBPMShared`.
2. Create the `tenants/Default/` folders under the ResourceRoot directory.

For example, `//MyFileServer/InterstageBPMShared/tenants/Default/`

3. Do the following:

- a) From the Weblogic Administration Server computer's `<engine directory>/server/instance/default/tenants/Default/` directory, **move** the following folders to the `tenants/Default/` folder under the ResourceRoot directory.

- apps
- attachments
- classes
- dmsroot
- lib

- b) Copy the entire Interstage BPM structure from the Weblogic Administration Server computer to the other computers in your cluster.

Example on Windows: If you accepted the default Interstage BPM location

`C:\Fujitsu\InterstageBPM` during setup, you would copy the `Fujitsu` directory and all of its subdirectories from the WebLogic Administration Server computer `svmd2` to the `C:` drive of `svmdapp5`.

Example on Solaris: If you accepted the default Interstage BPM location `/opt/FJSVibpm` during installation, you would copy the `FJSVibpm` directory and all of its subdirectories from the WebLogic Administration Server computer `svmd2` to the `/opt` directory of `svmdapp5`.

Example on Linux: If you accepted the default Interstage BPM location `/opt/FJSVibpm` during installation, you would copy the `FJSVibpm` directory and all of its subdirectories from the WebLogic Administration Server computer `svmd2` to the `/opt` directory of `svmdapp5`.

Note: The path of the Interstage BPM Server setup directory must be the same on all computers in your cluster.

4. On Windows, on each server node, update the `<Path>` tag of `DmsCollections.xml` file located in `<engine directory>/server/instance/default/tenants/Default/resources` to specify the `attachments` directory on the file server.

Specify the path for the DMS root directory to be a folder different from the default IBPM copy directory and add share permissions to that folder.

Use one of the following formats to specify the directory's path:

```
//<Remote Computer Name>/<Absolute Path of DMS Folder>/
```

```
\\<Remote Computer Name>\<Absolute Path of DMS Folder>\
```

Example:

```
<DmsCollections>
<Dms>

<Path>//MyFileServer/InterstageBPMSHared/tenants/Default/attachments</Path>

<ImplementationClass>com.fujitsu.iflow.dmsadapter.impl.FileSystemDmsSessionImpl
  </ImplementationClass>
  <Name>Attachments</Name>
</Dms>
</DmsCollections>
```

Note:

- Do not use a network drive in the path specification. (For example, like in `<Path>P:/InterstageBPMSHared/tenants/Default/attachments</Path>`). Network drives cannot be accessed by the Interstage BPM Server.
- In the path specification, if using the machine name does not work use the machine IP.

Note: To use WebDAV directory as DMS, ensure that at least one File DMS directory (local path folder) is present as the first DMS path in `DmsCollections.xml`.

5. Perform the subsequent steps if you are copying on the following operating system:

- UNIX
 - a) On each server node, mount the `attachments` directory that you copied on the file server.
 - b) On each server node, update the `DmsCollections.xml` file located in `<engine directory>/server/instance/default/tenants/Default/resources` to specify the `attachments` directory on the file server.

Example: If you mount the shared directory at `mp1`, you would update the `DmsCollections.xml` file to look like the following:

```
<DmsCollections>
<Dms>
  <Path>/mp1/attachments</Path>

<ImplementationClass>com.fujitsu.iflow.dmsadapter.impl.FileSystemDmsSessionImpl
  </ImplementationClass>
  <Name>Attachments</Name>
</Dms>
</DmsCollections>
```

Note: To use WebDAV directory as DMS, ensure that at least one File DMS directory (local path folder) is present as the first DMS path in `DmsCollections.xml`.

The DMS root directory's mount point may be different on the individual server nodes. However, the directory's symbolic name, which is specified in the <Name> element, must be the same on all server nodes. The following figure shows this configuration:

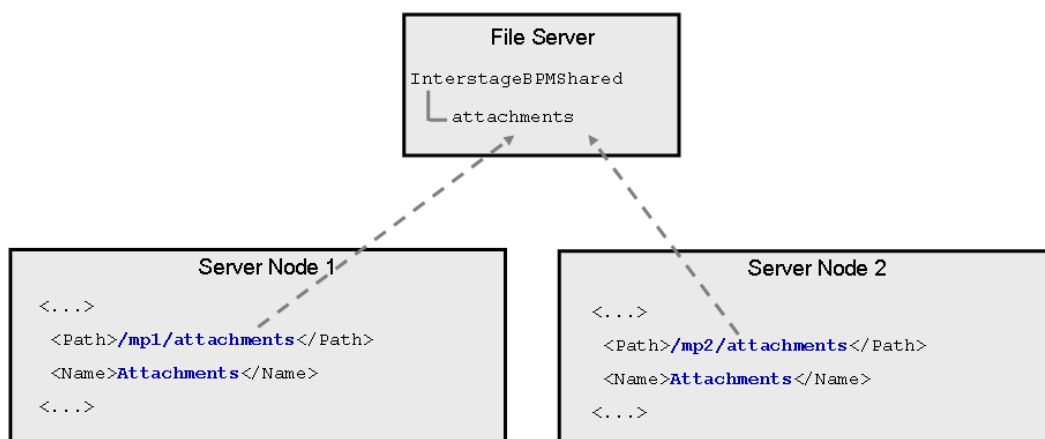


Figure 19: Sample DMS Configuration

C.1.5 Updating the Interstage BPM Server Configuration Files

When you are running Interstage BPM Servers in a cluster, you must change some server configuration settings to complete the cluster's server configuration.

To update the Interstage BPM Server configuration files:

1. **On each of the cluster nodes**, from the database, export system level server configuration parameters into a configuration file (<filename>.properties).

Operating System	Configuration Import Script
Windows	<pre>exportProperties.bat <filePath> <Database User Name> <Password></pre> <p>The script is located at <engine directory>\server\deployment\bin\ directory.</p>
UNIX	<pre>exportProperties.sh <filePath> <Database User Name> <Password></pre> <p>The script is located at <engine directory>/server/deployment/bin/ directory.</p>

Note: Before you make any changes to the configuration file, create a copy of the configuration file you exported as a back-up. In case you make errors while editing parameters and import the file, Interstage BPM Server may not be able to start or errors may occur at runtime. In such a case you can use the back-up file which contains a working configuration.

2. Add the following entries to the configuration file:

```
ServerName=<Name of the Cluster Server>
ServerSharedRoot=<Path of shared ResourceRoot in file server>
```

Example:

These are the entries on `svmd2`:

```
ServerName=InterstageBPMCS1
ServerSharedRoot=//MyFileServer/InterstageBPMShared
```

Note: Make sure that you specify the server names defined in the `WLInstallScripts.py` script located in `<engine directory>/server/deployment/WLS-Cluster`.

3. On any one of the cluster nodes, add the following to the configuration file:

```
ServerInCluster=true
```

4. Check the default settings for the multicast group.

A multicast group is used to distribute information among the Interstage BPM Servers in a cluster. These are the default settings used by the Interstage BPM Servers:

- Multicast port number: 5000
- Multicast group address: 225.4.5.6

A multicast group address is an IP address in the range 224.0.0.0 to 239.255.255.255, inclusive. It is used to identify the members of a multicast group. Each member of the group uses the same multicast group address. The address 224.0.0.0 is reserved and must not be used.

1. On each node, check and if require update the value for `JAVA_HOME` parameter in the `setIBPMJava` script located at `<engine directory>/server/deployment/bin/`.
2. Run the `startMulticastReceiver` script on each server node as follows.

```
<startMulticastReceiver script> <address> <port>
```

For example:

On Windows:

```
startMulticastReceiver.bat 225.4.5.6 5000
```

On UNIX:

```
startMulticastReceiver.sh 225.4.5.6 5000
```

3. Run the `startMulticastSender` script on one of the server nodes and check whether all server nodes are receiving the multicasts. Use the following format:

```
<startMulticastSender script> <address> <port>
```

Note: With the `startMulticastSender` script, use the same address-port pair as used with the `startMulticastReceiver` script in step 3.

For example:

On Windows:

```
startMulticastSender.bat 225.4.5.6 5000
```

On UNIX:

```
startMulticastSender.sh 225.4.5.6 5000
```

4. Stop the execution of the multicast sender script. If there are any remaining nodes that were not tested, repeat step 4 for them.
5. If you find that nodes are not receiving multicasts, repeat the multicast tests (step 3, 4, 5) with other ports and/or addresses. In case of any problems, contact your network administrator to make sure that the network is IP multicast enabled.
6. Once you know for which port and address (default or otherwise) the nodes are able to reach each other via IP multicast, update the following parameters in the configuration file on one of the cluster nodes:

```
ClusterMulticastPort=<Multicast Port Number>
ClusterMulticastTopic=<Multicast Group Address>
```

Note: As the multicast parameters are identical for all cluster servers, you only need to add them to the configuration file on one of the cluster nodes.

5. **On each cluster node**, ensure the values of the following node-specific properties are correct:

- JMSNamingProviderURL
- KPIListenerConfigFile
- ServerBaseURL
- ServerEmailBaseURL
- ServerHost
- ServerName
- ServerRoot

6. Before importing the configuration file to the database, delete the older system properties from the database (from the `IBPMProperties` table) using the following SQL command:

```
DELETE FROM IBPMProperties WHERE tenantId = -1 AND modifier = 0
```

In order for your changes to take effect, you will later import the updated configuration files into the database.

C.1.6 Steps for Deploying Interstage BPM Console

Admin Server for Weblogic Server Domain is running.

To deploy the Interstage BPM Console:

1. Create a directory (for example `ibpmconsole`) on your machine.
2. Copy `console.war` from the `<engine directory>/client` directory of your Interstage BPM product media to the directory that you just created on your machine
3. Extract the files from `console.war` into the `ibpmconsole` directory. Use the following Java command:

```
jar -xvf console.war
```

4. Copy `iflow.jar` from `<engine directory>/client/lib` to `WEB-INF/lib` directory.
5. Login to the WebLogic Administration Console.
6. In the left pane of the Administration Console, click **Deployments**.
7. In the right pane, click **Install**. The **Install Application Assistant** page appears.
8. Click the link for **Location** and navigate to the `ibpmconsole` (where we have extracted the `console.war` in Step 3) directory.
9. Check the `ibpmconsole` checkbox. Then, click **Next**.
10. Make sure that the **Install this deployment as an application** checkbox is checked. Then, click **Next**.
11. Check the **InterstageBPMCluster** checkbox in the Servers list.
12. Select the **I will make the deployment accessible from the following location** option and click **Next**.
13. Click **Next** on all following screens and then click **Finish**.

The console application will be deployed on the extracted location (`ibpmconsole`).

14. Copy following properties from `iFlowClient.properties` located at `<engine directory>/client` to `console.conf` located at `<Interstage BPM Console Installation directory>/WEB-INF/conf` directory.

- `NamingProvider = weblogic.jndi.WLInitialContextFactory`
- `UserAgentServiceName = iflow.UserAgentService`
- `HostName=<hostname>`
- `JMSFactory=iflow.TopicConnectionFactory`
- `JMSCommandTopic=iflow.CommandTopic`

15. Add the following property to `console.conf` located at `<Interstage BPM Console Installation directory>/WEB-INF/conf` directory.

```
MAXJAVAACTION = 4
```

C.1.7 Updating the Interstage BPM Client Configuration

Interstage BPM Server comes with a client configuration file, which is used by Interstage BPM Clients to connect to the server. You need to update the client configuration file so that the client connects to one of the cluster servers.

To update the client configuration:

- On all computers in your cluster, update the following properties in the configuration file `iFlowClient.properties` located in `<engine directory>/client` and in file `console.conf` located in `<Interstage BPM Console Installation directory>/WEB-INF/conf`:
 - `JmsNamingProviderUrl`
 - `NamingProviderUrl`

Example:

These are the entries on `svmd2`:

```
JmsNamingProviderUrl=t3://svmd2:49952,svmdapp5:49956
NamingProviderUrl=t3://svmd2:49952,svmdapp5:49956
```

These are the entries on `svmdapp5`:

```
JmsNamingProviderUrl=t3://svmd2:49952,svmdapp5:49956
NamingProviderUrl=t3://svmd2:49952,svmdapp5:49956
```

C.1.8 Updating Environment Variables and Server Startup Scripts

Scripts that start Interstage BPM Servers in single-server mode are currently on all of your cluster computers. You must modify some environment variables to start the cluster servers instead of the default Interstage BPM Server. Also, you must check whether the server startup scripts match the host's environment.

To update environment variables and server startup scripts:

1. On the WebLogic Administration Server, change the `SERVERNAME` parameter to the name of the primary server in the environment variable script.

Operating System	Environment Variable Script
Windows	<code>setIBPMenv.cmd</code>
Solaris Linux	<code>setIBPMenv.sh</code>

The script is located in `<engine directory>/server/deployment/WLS-Cluster`.

Example:

This is the entry before the change: `SERVERNAME=<Server Name Provided During Deployment>`

This is the entry after the change: `SERVERNAME=InterstageBPMCS1`

Note: The server names to be used in a cluster are defined in the `ibpmWLInstallScripts.py` script located in `<engine directory>/server/deployment/WLS-Cluster`.

2. On all other computers in the cluster, perform these steps:
 - a) Update the `SERVERNAME` and `SERVER_HOST_NAME` entries in the environment variable script.

Operating System	Environment Variable Script
Windows	<code>setIBPMenv.cmd</code>
UNIX	<code>setIBPMenv.sh</code>

Example:

These are the entries on `svmdapp5` before the change:

```
SERVERNAME=InterstageBPMServer
```

```
SERVER_HOST_NAME= svmd2
```

These are the entries after the change:

```
SERVERNAME=InterstageBPMCS2
```

```
SERVER_HOST_NAME=svmdapp5
```

- b) Make sure that the `JDBC_PATH` entry in the environment variable script is correct.

JDBC_PATH specifies the path to the JDBC driver of the database you are using. The JDBC driver must be copied from your database installation to a local directory on your computer.

For more information on the names of the JDBC driver files, refer to section *Database Server Preparation* on page 15.

Note: While editing the `setIBPMenv` script, ensure you use only forward slashes (/) with any paths in the script.

- On the WebLogic Administration Server and on all other computers in the cluster, make sure that the paths specified in the server startup script and in the server shutdown scripts are correct.

Operating System	Server Startup/Shutdown Scripts
Windows	iFlowServer_Managed.bat StopiFlowServer_Managed.bat
UNIX	iFlowServer_Managed.sh StopiFlowServer_Managed.sh

The scripts are located in `<engine directory>/server/deployment/WLS-Cluster`.

Especially, verify the path to `weblogic.jar` and `weblogic_sp.jar` and the path to WebLogic's `server/bin` directory.

C.1.9 Importing the Interstage BPM Server Configuration Files

Prerequisites:

- On one of the cluster nodes, you have updated the server configuration file as instructed in section *Updating the Interstage BPM Server Configuration Files* on page 91.
- On each cluster node, you have updated the environment variables as explained in section *Updating Environment Variables and Server Startup Scripts* on page 95.
- The database server is running.

To import the system configuration files into the database:

- On the node on which you updated the configuration file in section *Updating the Interstage BPM Server Configuration Files* on page 91, run the configuration import script located in `<engine directory>/server/deployment/WLS-Cluster`:

Operating System	Configuration Import Script
Windows	importProperties.bat <filePath> <Database User Name> <Password>
UNIX	importProperties.sh <filePath> <Database User Name> <Password>

For `<Database User Name>` and `<Password>`, specify the database user account that you defined during setup of the Interstage BPM Server. `<filePath>` is the fully qualified file path of the configuration file you updated.

The script imports the configuration file you updated in section *Updating the Interstage BPM Server Configuration Files* on page 91 into the database.

After import is complete, for security reasons, delete the configuration file on each node.

C.1.10 Starting the Cluster

Prerequisite: The Interstage BPM Cluster must be completely configured by following the clustering appendix instructions through section *Updating the Interstage BPM Client Configuration* on page 94.

Note: In case of WebLogic 12c, if Oracle JDK is being used in `iFlowServer_Managed.bat` for starting Interstage BPM server, then you need to copy `<Weblogic Installation Directory>/Middleware/<JDK Home>/jre/lib/endorsed` directory to `<Oracle JDK Home>/jre/lib/endorsed` directory.

To start the Interstage BPM cluster:

1. Make sure that the WebLogic Administration Server is started by checking to see that its Console Window is open and that the output `<Server started in RUNNING mode>` is displayed.

If it is not started, you can start it in either of the following ways:

- Run the startup script provided by Interstage BPM in the `<engine directory>/server/deployment/WLS-Cluster` directory:

Operating System	Startup Script
Windows	<code>startWebLogic.bat</code>
UNIX	<code>startWebLogic.sh</code>

- Run the startup script provided by Weblogic. For details, refer to section *Starting WebLogic Administration Server* on page 19.
2. On all cluster computers, start the Interstage BPM Server using the startup script provided by Interstage BPM.

This ensures that required environment variables are set before actually starting the server.

The startup script is located in `<engine directory>/server/deployment/WLS-Cluster`.

Operating System	Server Startup Script
Windows	<code>iFlowServer_Managed.bat <WebLogic Administrator Name> <WebLogic Administrator Password></code>
UNIX	<code>iFlowServer_Managed.sh <WebLogic Administrator Name> <WebLogic Administrator Password></code>

You can start the cluster servers in any order.

If you are following the example, run the server startup script on `svmd2` and `svmdapp5`.

Upon successful initialization of the server, the following output is displayed:

```
...
<Joining cluster InterstageBPMCluster on ...>
```

```
...
<Server started in RUNNING mode>
```

To confirm that each server has been started, on each server open `Trace.log` located at `<engine directory>/server/instance/default/logs` and check that it contains the start up message.

```
... Interstage BPM Server Enterprise Edition Version <number> Build
<number> ... is ready ...
```

C.1.11 Automated Failover Settings

During operation, events are created and written to the database by each server node. Events are tied to the server node that created them and will be processed by this server node. If a server node goes down, and no failover is used, remaining events tied to this node will not be processed, and the processing of such events will resume only when the server node is available again.

Automated failover (which is enabled by default) ensures that events that cannot be processed are automatically transferred to other server nodes in the load-balancing system. Automated failover settings are controlled using the following server properties:

- The `ClusterAutomateFailoverEnabled` server property. By default, this is true, which enables automated failover.
- The `ClusterHeartbeatInterval` property (which specifies how often the status of all nodes will be checked) and the `ClusterInterceptEvents` property (which specifies, in case a node fails, how many of unhandled events will be handled by the active nodes at a time).

For details about these properties and how to change them, refer the *Interstage BPM Server Administration Guide*.

Note: If the `ClusterAutomateFailoverEnabled` server property is set to 'true' before you start all nodes in a cluster, the following behavior may occur (depending on the value of the `ClusterHeartbeatInterval` property, and how long start-up of each node takes):

As you start nodes, each started node may begin handling any unhandled events of the remaining, to-be-started nodes; this 'failover' will continue until all nodes have been started. This is normal and expected behavior.

Note: During failover, the order of transfer of unhandled events is as follows: first history events, then timer events, and then events of process scheduler.

Example

This example demonstrates the processing of events in case one of two server nodes fails.

A sample load-balancing system with two server nodes has been set up. While all of the server nodes are up and running, events are created and written to the database by each server node.

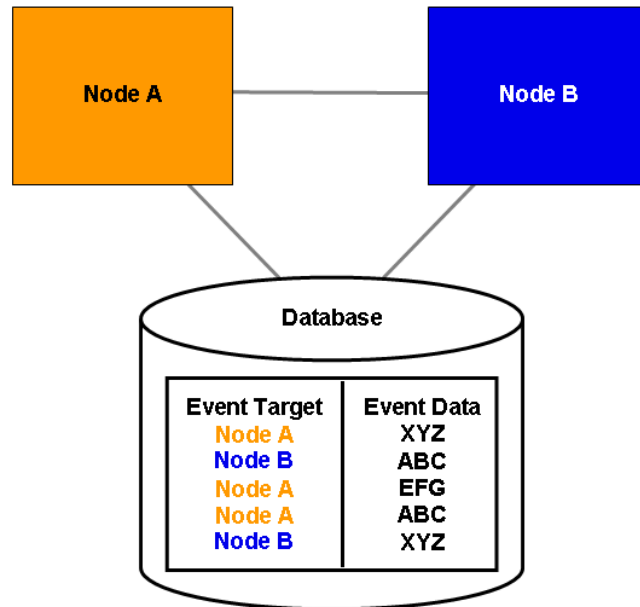


Figure 20: All Server Nodes are Up and Running

If Node A goes down, events remain assigned to that node and are waiting to be processed.

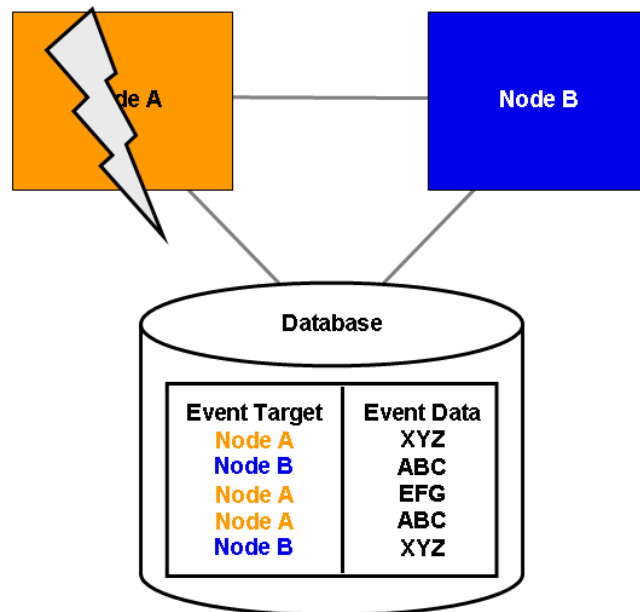


Figure 21: Server Node Goes Down

If Node A goes down when automated failover is enabled:

- A pre-defined number (defined by the `ClusterInterceptEvents` server property) of node A's unhandled events are transferred to Node B, and then processed by Node B.
- Then, depending on the value of `ClusterHeartbeatInterval` property, the next node status check will be carried out.
- If node A is still found to be down, the next set from Node A's remaining events are transferred to and processed by Node B.

If node A continues to be down, the process described above continues until all of Node A's unhandled events (one set at a time) have been transferred to and processed by Node B.

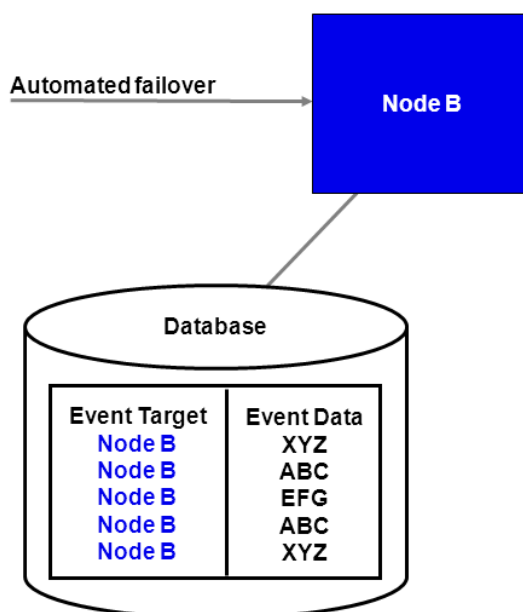


Figure 22: Events are Transferred to Another Node

C.1.12 Running Two Cluster Servers on the Same Computer (Optional)

Prerequisite: The database server is running.

To configure two cluster servers running on the same computer:

1. Prepare the cluster, configure environment variables, and configure the cluster as instructed in sections *Preparing the Cluster* on page 85, *Configuring Environment Variables* on page 86, and *Configuring the Cluster* on page 87.
2. Make a copy of the directory `<Interstage BPM Server Installation Directory>/server/deployment/WLS-Cluster` and place the copy under `<Interstage BPM Server Installation Directory>/server/deployment`.

For the directory name, you are recommended to append the name of the cluster server that you want to run from this computer, for example `WLS-ClusterInterstageBPMCS1`.

However, you can choose any other name.

3. From the database, export out the server configuration settings into a configuration file. Name the configuration file `ibpm.properties`, and place the configuration file for that node at `<Interstage BPM Server Installation Directory>/server/instance/default`.
Refer to section *Using the Configuration Export and Import Scripts* on page 77 for details on how to use the export script.
4. Copy `ibpm.properties` from `<Interstage BPM Server Installation Directory>/server/instance/default` to the subdirectory that you just created, for example to `<Interstage BPM Server Installation Directory>/server/deployment/WLS-ClusterInterstageBPMCS1`.
5. In the subdirectory that you created, update `ibpm.properties` according to the instructions in section *Updating the Interstage BPM Server Configuration Files* on page 91.
6. In the environment variable script, change the `SERVERNAME` parameter to the server's name in the cluster.

The script is located in the subdirectory that you created, for example in `<Interstage BPM Server Installation Directory>/server/deployment/WLS-ClusterInterstageBPMCS1`:

Operating System	Environment Variable Script
Windows	<code>setIBPMenv.cmd</code>
UNIX	<code>setIBPMenv.sh</code>

Example:

This is the entry before the change: `set SERVERNAME=<Server Name Provided During Deployment>`

This is the entry after the change: `set SERVERNAME=InterstageBPMCS1`

Note: The server names to be used in a cluster are defined in the `ibpmWLInstallScripts.py` script located in `<Interstage BPM Server Installation Directory>/server/deployment/WLS-Cluster`.

Note: While editing the `setIBPMenv` script, ensure you use only forward slashes (/) with any paths in the script.

7. Update the configuration import script. To do so:
 - a) Open the script from the subdirectory that you created, for example from `<Interstage BPM Server Installation Directory>/server/deployment/WLS-ClusterInterstageBPMCS1`:

Operating System	Configuration Import Script
Windows	<code>importProperties.bat <FileName> <UserName> <Password></code>
UNIX	<code>importProperties.sh <FileName> <UserName> <Password></code>

- b) Replace `../../instance/default/ibpm.properties` with `./ibpm.properties`.
The script now references the `ibpm.properties` file that you copied to the subdirectory.

8. Run the configuration import script.

For security reasons, after importing the configuration file (`ibpm.properties`), ensure you delete it.

- Start the Interstage BPM Server by running the startup script from the subdirectory that you created, for example from `<Interstage BPM Server Installation Directory>/server/deployment/WLS-ClusterInterstageBPMCS1:`

Operating System	Server Startup Script
Windows	<code>iFlowServer_Managed.bat <WebLogic Administrator Name> <WebLogic Administrator Password></code>
UNIX	<code>iFlowServer_Managed.sh <WebLogic Administrator Name> <WebLogic Administrator Password></code>

- Repeat steps 2 through 9 for each cluster server that you want to add.
If you are following the example, repeat these steps to configure a second cluster server called `InterstageBPMCS2`.
- Update client configuration as described in section *Updating the Interstage BPM Client Configuration* on page 94.

C.1.13 Removing an Interstage BPM Cluster

To remove an Interstage BPM Cluster:

- Log out of all Interstage BPM Clients and close all Browser windows.
- In the `ibpmWLInstallScripts.properties` file located in `<Interstage BPM Server Installation Directory>/server/deployment/WLS-Cluster`, change the `opType` setting to the following:
`opType=uninstall_cluster_ibpm`
- Run the cluster configuration script:

Operating System	Cluster Configuration Script
Windows	<code>runWLScript.bat <WebLogic Administrator Name> <WebLogic Administrator Password> <Database User Name> <Database User Password></code>
UNIX	<code>runWLScript.sh <WebLogic Administrator Name> <WebLogic Administrator Password> <Database User Name> <Database User Password></code>

Running this script removes the Interstage BPM cluster from the application server.

The single-server installation of Interstage BPM is not modified by this procedure. If you want to remove the single-server installation from the application server and uninstall the server software, follow the steps explained in chapter *Un-setup Interstage BPM Server and Console* on page 56.

Appendix D: Enabling NTLM Authentication Protocol for Interstage BPM Console

If accessing Interstage BPM Console on Windows, you can enable NTLMV1 (NT LAN Manager V1) authentication protocol for Interstage BPM Console. Doing so allows Integrated Windows Authentication for Interstage BPM Console users in a Microsoft AD network (Windows Server 2003 EE SP2 (32 bit), Windows Server 2008 R2). For instance, if NTLM has been enabled for a tenant of Interstage BPM Console, if any user under that tenant successfully logs on to Windows desktop, on accessing any Interstage BPM Console URL, user will be automatically logged in to Interstage BPM Console without having to login to it explicitly; the Interstage BPM Console login screen will not appear.

Prerequisites:

- Interstage BPM Server and Console have been setup.
- Set Local Security Policy on Interstage BPM client machine and on Server(AD Server), as described below:

Note: You must log on to Windows desktop using the Administrator's user ID.

1. Navigate to **Start > Run**, type `gpedit.msc`, click **OK**.
 2. In the **Local Group Policy Editor** screen, go to **Local Computer Policy > Computer Configuration > Windows Settings > Security Settings > Local Policies > Security Options > Network Security: LAN Manager authentication Level**
 3. Select **Send NTLM Response Only** from the drop-down list and click **OK**.
 4. To apply these settings, navigate to **Start > Run**, type `gpupdate`, click **OK**.
- Enable Anonymous logon in the Browser on Interstage BPM client machine, as described below:
 1. In the Web browser, navigate to **Tools > Internet Options > Security > Custom Level > User Authentication**
 2. Select the **Automatic Logon with current user name and password** radio button to enable this option.
 3. Click **OK**.

<p>Note: If this option is not enabled, user will be prompt to enter the username and password. To avoid this issue, in the browser, add the Interstage BPM Console address to local intranet zone in Tools -> Internet Option -> Security -> Local Intranet Zone -> Sites.</p>

Note:

- NTLM cannot be enabled for super users accessing the Interstage BPM Tenant Management Console.
- NTLM authentication will only work if the machine on which Interstage BPM is being accessed is on Microsoft AD network.
- Only NTLMV1 is supported. NTLMV2 is not supported.
- While providing credentials in the NTLM enabled Interstage BPM Console, if the user has clicked the **Remember my password** option, the user name and password is stored in the **Stored Username and Password** utility of the Windows. If any new user logs into the system and access the same URL, it will automatically login with the previously stored user. To solve this problem, you need to remove the entry from the Windows utility as follows:
 - For Windows XP, remove the entry from **Control Panel > User Accounts > Users > Advanced > Manage Passwords > Stored User Names and Passwords**.
 - For Windows 2003, remove the entry from **Control Panel > Stored User Names and Passwords**.
 - For Windows 2008 and Windows Vista, remove the entry from **Control Panel > User Accounts > Manage your network passwords > Stored User Names and Passwords**.
 - For Windows 7, remove the entry from **Control Panel > User Accounts > Manage Windows Credentials > Add a Windows Credentials**.
 - For Windows 2008 R2, remove the entry from **Control Panel > All Control Panel Items > Credential Manager > Windows Vault**.

Note: You must be login as the Administrator user to complete this procedure.

To enable NTLM for Interstage BPM Console:

1. Navigate to <Interstage BPM Console Setup Directory>/WEB_INF/conf/ and add the following parameters (and their values) to `console.conf`:
 - `SSONTLMTenants=<value1,value2>`- this is a comma separated list of tenants for which you want to enable NTLM.

Note: If you are specifying value in the `SSONTLMTenants` parameter, following parameters (except `SSOUserPassKey`) are mandatory and should not be left blank. If you leave any of these parameters blank, Interstage BPM Console will not start and an error will be logged in the Application Server log file.
 - `SSOToken=<value>` - the value is used to authenticate the logged in user. This is a mandatory parameter and should not be left blank.
 - `SSOIP=<value>` -the value is IP address of the domain controller (AD Server). This is a mandatory parameter and should not be left blank.
 - `SSOPreAuthDomain=<value>` -the value is the Domain Name (NETBIOS Name). This is a mandatory parameter and should not be left blank.
 - `SSOPreAuthUser=<value>` -the value is the Username of the Domain defined in `SSOPreAuthDomain` parameter. This is a mandatory parameter and should not be left blank.
 - `SSOPreAuthPass=<value>` -the value is the encrypted Password of the Domain user. This is a mandatory parameter and should not be left blank.

Note:

- To encrypt/decrypt the password, use the `Encrypt-DecryptPassword.bat` located in `<BPM Installation DIR>/client/tool` with the encryption key defined in the `SSOUserPassKey` parameter. If no key is defined, then this script will use a default key to encrypt the password and the same will be used for decryption.
- Due to security reasons, this `Encrypt-DecryptPassword.bat` utility must be used only by Administrators and must not be shared with other users.

- `SSOUserPassKey=<value>` -the value is the key to encrypt the password of the Domain user. This is an optional parameter. If you do not specify, a default key will be used to encrypt the password. This key should be 24 characters long.

For details about the Interstage BPM Console configuration file (`console.conf`) refer the *Interstage BPM Console Online Help*.

2. Update the following Interstage BPM Server configuration parameters:

- For system-level, update `SSOToken=<value>`. Its value will be used to the verify connection between Console and Server using SSO. Ensure that the value is the same as that updated in `console.conf` in the step above.
- For each tenant for which you want to enable NTLM, update `IASSSOLoginConfFileEntryName=com.fujitsu.iflow.sso`. Its value specifies that Interstage BPM will use Windows authentication for that tenant.

For details of how to update Interstage BPM Server system and tenant parameters, refer the *Interstage BPM Server Administration Guide*.

3. Re-start Interstage BPM Server and Console.

Appendix E: Troubleshooting

E.1 Log File Information

For details about Log Files, refer the **Configuring Log Files** topic in the *Interstage BPM Server Administration Guide*.

E.2 Resolving Specific Error Situations

E.2.1 Interstage BPM Server Fails to Start

Check the `Error.log` file in the `<Interstage BPM Server Installation Directory>/server/instance/default/logs` directory.

Look for	What to do
<pre>DbService : setConnection: Connection to database server failed. Is the database server running and reachable through the network? {ORA-01089: immediate shutdown in progress - no operations are permitted.</pre>	<p>Check if the database is running. Also check that you can access the database from the machine where the Interstage BPM Server is installed in case the database is running on a different machine. You can use <code>telnet <Database Server Hostname> <Port></code> from the server host machine to check that the connection to the database host/port can be established.</p>
<pre>LdapBroker : getContext: Could not create the directory services. {[LDAP: error code 49 - Invalid Credentials]} LdapBroker : getGroupMembersByDN: Could not retrieve the user groups. {Could not create the directory services. {[LDAP: error code 49 - Invalid Credentials]}}</pre> <pre>LdapBroker : Could not retrieve the user groups. {Could not create the directory services. {[LDAP: error code 49 - Invalid Credentials]}}</pre>	<p>Ensure that the user name/password as specified in the <code>LDAPAccessUserID</code> / <code>LDAPAccessUserPassword</code> parameters of the Interstage BPM Server are correct and you can login to your Directory Server using the above user name/password.</p>
<pre>getContext: Could not create the directory services. LdapBroker : getGroupMembersByDN: Could not retrieve the user groups. {Could not create the directory services. LdapBroker : Could not retrieve the user groups. {Could not create the directory services.</pre>	<p>Ensure that the LDAP Server is running on the port as specified in the <code>LDAPServer</code> parameter of the Interstage BPM Server. You can use <code>telnet ldapServerHostName port</code> from the server host machine to check that the connection to the host/port can be established.</p>

Look for	What to do
<pre>IflowStartup : @(Failed to execute the IBPM startup routine task)Unable to deliver the message for the requested eventClass. {javax.naming.ServiceUnavailableException: A communication failure occurred while attempting to obtain an initial context with the provider URL: "iiop://<hostname>:<port>". Make sure that any bootstrap address information in the URL is correct and that the target name server is running. A bootstrap address with no port specification defaults to port 2809. Possible causes other than an incorrect bootstrap address or unavailable name server include the network environment and workstation network configuration.}</pre>	<p>This is because you installed WebSphere Application Server in a Cell (deployment manager and a managed node) environment, causing the <code>BOOTSTRAP_ADDRESS</code> port to be incorrect in some configuration files.</p> <ol style="list-style-type: none"> 1. Get the correct value of the <code>BOOTSTRAP_ADDRESS</code> port from the WebSphere Application Server Console (from Servers > Server Types > WebSphere application servers > <ServerName> > Ports). 2. Update the value of the <code>BOOTSTRAP_ADDRESS</code> port for the following entries in the <code>iflowClient.properties</code> file, as well as Interstage BPM properties in the database. (For steps to change the server properties, refer the <i>Interstage BPM Server Administration Guide</i>.) <ul style="list-style-type: none"> • JMSNamingProviderURL (in the format <code>iiop://<hostname>:<BOOTSTRAP_ADDRESS></code>) • NamingProviderURL (in the format <code>iiop://<hostname>:<BOOTSTRAP_ADDRESS></code>)

E.2.2 Error in Trace.log

Check the `Trace.log` in the `<Interstage BPM Server Installation Directory>/server/instance/default/logs` directory.

Look for	What to do
<pre>getGroupMembersByDN: Could not retrieve the user groups. {[LDAP: error code 32 - No Such Object]}</pre>	<p>Possible cause of this error: A user has been deleted from the Directory Server (LDAP Server) but the reference of it is still there in one of the groups.</p>

E.2.3 Timeout During JavaScript Execution

When executing large JavaScripts, the current transaction timeout (120 seconds) is insufficient for the following application servers:

- WebLogic Application Server

Due to this setting, script execution may fail with a "transaction timeout".

Your application server administrator can increase the transaction timeout depending on your usage requirements, for example, to 200 seconds. This setting can be changed in the following location:

- WebLogic Application Server: `<jta>/<timeout-seconds>tag`
in `<MW_HOME>/user_projects/domains/<Domain Name>/config/config.xml` file.

For Example: `<jta><timeout-seconds>200</timeout-seconds></jta>`

E.2.4 Failure in Writing to an Oracle Database

When the updating of an Oracle database table fails, for example, when you try to archive a process instance, check the Oracle alert log file located in the `<Oracle Installation Dir>/admin/<DB instance name>/bdump` directory, for example:

```
C:\ProgramFiles\Oracle\admin\orcl\bdump>alert_orcl.log
```

The following error may be observed:

```
{Database add/create request failed. {ORA-08103: object no longer exists}}
```

This failure may be due to the fact that the Datafile size reached the file size limit on the hard disk of the database server.

The system administrator of the database server needs to increase the file size on the database server hard disk.

E.3 Errors during Setup of the Interstage BPM Server

If you have trouble executing the setup script, you can check the cause of error by viewing `deployment.log`. The deployment log is created at the following location:

On Windows: `<engine directory>\server\deployment\logs\deployment.log`

On Unix: `<engine directory>/server/deployment/logs/deployment.log`

The following tables explain the possible causes of errors during server startup and the appropriate action(s) to take:

Installation of IBPM fails when trying to install a new build

I	Cause	The build directory of the existing installed build was deleted, without un-installing the build or un-installation failed.

	Action	<p>For Windows</p> <p>Manually delete the earlier build's registry-entry, as follows:</p> <ol style="list-style-type: none"> 1. Go to Start > Run, type <code>regedit</code>, click OK. 2. In the Registry Editor screen, go to HKEY_LOCAL_MACHINE > SOFTWARE > Fujitsu > Install > Interstage BPM Server . 3. Delete the Interstage BPM Server registry entry under Install key. 4. Go to HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Fujitsu > Interstage BPM Server. 5. Delete the Interstage BPM Server registry entry under Fujitsu key. This will ensure complete deletion of the registry entry for Windows platform. 6. Go to HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Uninstall > DFC70E37-68E7-469C-A253-9ED7BB3BCD23. 7. Delete the Interstage Business Process Manager xx.x registry entry under Uninstall key. This will ensure complete deletion of the registry entry for Windows platform. <p>For Solaris</p> <p>Manually delete the Solaris package information, as follows:</p> <ol style="list-style-type: none"> 1. Open the Command Prompt window and run the command <code>pkginfo -l FJSVibpm</code> from any location of the Solaris machine, to check if the Solaris package information still exists. 2. If the Solaris package information is displayed, then delete the package information using the following steps: <ol style="list-style-type: none"> a. Create a file named ibpm.uninst under the /tmp location. b. Run the command <code>pkgrm FJSVibpm</code> to delete the Solaris package. c. Run the command <code>pkginfo -l FJSVibpm</code> once more, to ensure that the Solaris package has been deleted successfully. If no information is displayed, then it confirms that the Solaris package has been completely deleted from the Solaris platform. <p>For Linux</p> <p>Manually delete the RPM package information, as follows:</p> <ol style="list-style-type: none"> 1. Open the Command Prompt window and run the command <code>rpm -qi FJSVibpm</code> from any location of the Linux machine, to check if the RPM package still exists. 2. If the RPM package information is displayed, then delete the package information using the command <code>rpm -e FJSVibpm</code>. 3. Run the command <code>rpm -qi FJSVibpm</code> once more to ensure that the RPM package has been deleted successfully. If no information is displayed, then it confirms that the RPM package has been completely deleted from the Linux platform.
II	Cause	It is possible that some essential packages may not be installed on the Linux machine.
	Action	For details about mandatory packages for Linux, refer to section <i>Preparation for Installing Interstage BPM on Linux Environments</i> of the <i>Interstage BPM Server and Console Installation Guide</i> . After installing mandatory packages, retry launching the Interstage BPM installation program for Linux.

An error occurred during Interstage BPM database creation/update

I	Cause	One of the following values provided during setup were wrong: <ul style="list-style-type: none"> Database Administrator user name Database Administrator password
	Action	Restore the database from the backup of the database made before setting up Interstage BPM. Update the <code>setup.config</code> file and run the setup script again.
II	Cause	One of the following values provided during setup were wrong: <ul style="list-style-type: none"> Host name of the database server Database SID (database instance name) Database port
	Action	Restore the database from the backup of the database made before setting up Interstage BPM. Update the <code>setup.config</code> file and run the setup script again.
III	Cause	Database server is not running.
	Action	Start the database server. Update the <code>setup.config</code> file and run the setup script again.

Errors caused by JDK Version

I	Cause	The version of JDK specified during setup does not match the version required for this application server.
	Action	You need to update <code>JAVA_HOME</code> variable of system environment and run the setup script again. Please update <code>JAVA_HOME</code> with <code>setIBPMJava.bat/setIBPMJava.sh</code> that exists in <code><engine directory>/server/deployment/bin</code> when the error happens when the script of Interstage BPM is executed after completing the setup.

Problems related to LDAP Server Access

I	Cause	Even if LDAP server is up, the error message <code>Unable to connect to specified directory server</code> appears. This happens when Super user or Tenant Administrator is not registered in LDAP server.
	Action	Please register the Super user and Tenant Administrator in the LDAP server before executing the setup script.

Errors Pertaining to Active Directory

I	Cause	The Active Directory Server is remote and Active Directory is not running.
	Action	Start the Active Directory Server, and then run the setup script again.

II	Cause	Interstage BPM cannot connect to the Active Directory Server because one of the following values provided during setup was wrong: <ul style="list-style-type: none"> Active Directory Key Active Directory Organizational Unit
	Action	Update the <code>setup.config</code> file and run the setup script again.

Errors Pertaining to Oracle Directory Server Enterprise Edition

I	Cause	Interstage BPM cannot connect to the LDAP Server because one of the following values provided during setup was wrong: <ul style="list-style-type: none"> LDAP Key LDAP Organizational Unit
	Action	Update the <code>setup.config</code> file and run the setup script again.

Errors Pertaining to Un-setup

I	Cause	Interstage BPM Un-setup failed.
	Action	<p>If un-setup fails, follow these steps to remove the resources:</p> <ol style="list-style-type: none"> Login to WebLogic Admin Console and navigate to Domain Structure > <Domain Name>. Check if the following resources exists and if exists then delete them. <ul style="list-style-type: none"> Navigate to Deployments and delete <code>InterstageBPMServer</code> and <code>InterstageBPMConsole</code> applications, if exists. Navigate to Environment> Servers and delete <code>IBPMServer</code>, if exists. Navigate to Services > Messaging> JMS Modules and delete <code>InterstageBPM-JMSSystemResource.IBPMServer</code>, if exists. Navigate to Services > Messaging> JMS Servers and delete <code>InterstageBPMJMServer.IBPMServer</code>, if exists. Navigate to Services > Data Sources and delete <code>iflow.iFlowDS.IBPMServer</code>, if exists. Navigate to Services > XML Registries and delete <code>ibpm_crimson_registry</code>, <code>ibpm_sun_xerces_registry</code>, and <code>ibpm_xerces_registry</code> if exists. Delete the following directories manually from the file system: <ul style="list-style-type: none"> <code>InterstageBPMServer</code> directory located at <code><Weblogic Home>/Middleware/user_projects/domains/base_domain/servers/AdminServer/upload/</code> directory. <code>IBPMServer</code> directory at <code><Weblogic Home>/Middleware/user_projects/domains/base_domain/servers/</code> directory.

E.4 Errors Related to Interstage BPM Database Creation/Update

Errors Pertaining to the Database

I	Cause	The Database Server is not running.
	Action	Start the Database Server, and then start the Interstage BPM Server.

Errors Pertaining to a Hostname Change

I	Cause	You changed the hostname of the computer where Interstage BPM Server has been installed. As the hostname occurs in the names and values of various configuration parameters of the Interstage BPM Server, the server cannot access its configuration settings.
	Action	<p>In the <code>IBPMProperties</code> table of the Interstage BPM database, make the following changes:</p> <ul style="list-style-type: none"> In the <code>PROPERTYKEY</code> column, update any parameter names that have the hostname in the suffix. These parameters have the format <code><PARAMETER_NAME>.<HOSTNAME></code> or <code><PARAMETER_NAME>.<HOSTNAME>.<SERVERNAME></code>. In the <code>PROPERTYVALUE</code> column, update any parameter values containing the hostname. <p>To update the <code>IBPMProperties</code> table, use the appropriate database commands or a database client software.</p>

E.5 Contacting Your Local Fujitsu Support Organization

If you are unable to troubleshoot your problem:

1. Replicate the actions that caused the error.
2. Contact your local Fujitsu Support organization and provide the following information:

General Information

- Operating System
- Directory Service (type and version)
- Database server (type and version)
- JDK version
- Application server (type and version)
- Interstage BPM edition, version and build number
- Major problem area
- Priority of the issue
- Environment in which the problem occurs

Configuration Information

- The configuration file that you exported from the Interstage BPM Server

Log Files

- All log files from `<engine directory>/server/instance/default/logs`

- Setup log file from `<engine directory>/server/deployment/logs/deployment.log`
- When using WebLogic: All log files from `<MW_HOME>/user_projects/domain/<Your Domain>/servers/AdminServer/logs`

OS System Logs

- The Windows event log that you obtain using the Windows Event Viewer
- Linux system logs stored in `/var/log/messages`
- Solaris system logs stored in `/var/adm/messages`

Problem Description

- Description of the steps you performed before the problem occurred
- Frequency with which the problem occurs

Problem Details

- The application program and its source code that caused the error
- The XPDL file of the process definition that caused the error
- Information about Java Actions, Timers and Agents defined in the process definition
- Screenshot of the process instance history if the process instance goes into error state
- Stack trace if any exception is displayed
You can obtain the stack trace by clicking **Details** on the error page displayed in the Interstage BPM Console.
- Screenshot of the exception wherever it is displayed
- Screenshot of the process instance (graphical view) if the process instance goes into error state or into an unexpected state
- Calendar files (`*.cal`) if timers are used
- The `agentsConfig.xml` file if agents are used

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