



Interstage Business Process Manager V11.2.1

Server and Console Installation Guide (JBoss Application Server)

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About this Manual

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

Note that the Interstage BPM Tenant Management Console is automatically deployed when you deploy 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 installation of Interstage BPM Server.
2	System Configurations for Interstage BPM Console	Description of the typical system configurations for the installation of Interstage BPM Console.
3	System Requirements for Interstage BPM Server and Console	Description of the minimum system requirements by platform.
4	Overview of Integrated Deployment of Interstage BPM Server and Console	An overview of using the new integrated Deployment Tool
5	Preparing for Installation and Deployment of Interstage BPM Server and Console	Instructions for preparing external systems like the database or the application server.
6	Installing and Deploying Interstage BPM Server and Console	Instructions for performing installation of Interstage BPM Server and Console.
7	Configuring Interstage BPM Console to work with Interstage Analytics	Instructions to run the Wizard for integrating Interstage Analytics with Console.
8	Setting Up a Directory Service	Instructions for setting up your Directory Service.

Chapter	Title	Description
9	Undeploying and Uninstalling Interstage BPM Server and Console	Instructions for removing an instance of Interstage BPM Server and Console from the application server and for uninstalling Interstage BPM
10	Upgrading Interstage BPM from Previous Versions	Instructions for performing an upgrade.
Appendix A	Security	Instructions for security implementation on Interstage BPM.
Appendix B	Silent Mode Installation	Instructions for using the Silent Mode installation feature of Interstage BPM.
Appendix C	Silent Mode Deployment and Undeployment	Instructions for running the Interstage BPM Deployment Tool in Silent Mode.
Appendix D	Silent Mode Uninstallation	Instructions for uninstalling Interstage BPM in Silent Mode.
Appendix E	Clustering, Load Balancing, and Failover	Instructions for setting up a cluster of Interstage BPM Servers.
Appendix F	Enabling NTLM Authentication Protocol for Interstage BPM Console	Instructions to enable NTLM Authentication Protocol for Interstage BPM Console
Appendix G	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, installation 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, installation 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:

- "Interstage Business Process Manager" is abbreviated as "Interstage BPM".
- "Microsoft® Windows Server® 2003" is abbreviated as "Windows Server® 2003".
- "Oracle Solaris" might be described as "Solaris", "Solaris Operating System", and "Solaris OS" in this document.
- "Microsoft® SQL Server 2005 Standard Edition", and "Microsoft® SQL Server 2005 Enterprise Edition", "Microsoft® SQL Server 2008 Standard Edition", and "Microsoft® SQL Server 2008 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".
- "JBoss Enterprise Application Platform" is abbreviated as "JBoss EAP".

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 deploying 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 a Deployment Tool, which is used to

- Configure the database, the application server and the Interstage BPM Server
- Deploy 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 install the Interstage BPM Deployment Tool, the Interstage BPM Server, the database, and, if you plan to use a remote user store, the Directory Service on the same computer.

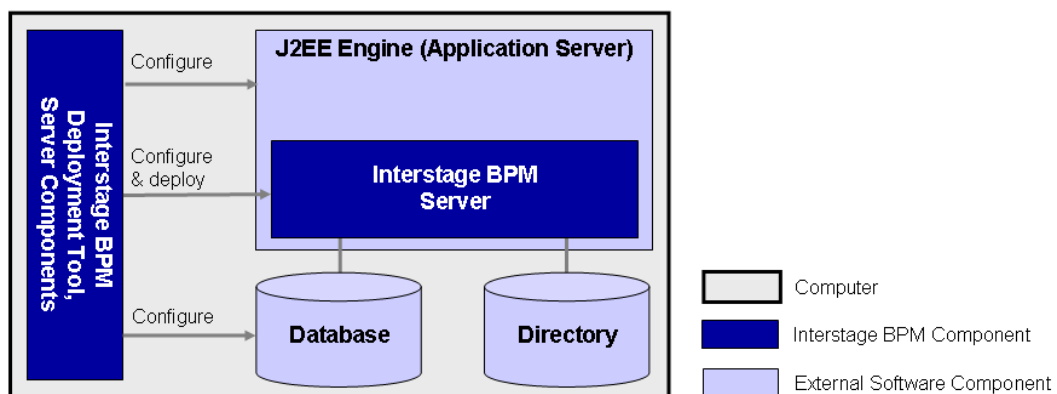


Figure 1: All systems on the same computer

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 installed on separate computers.

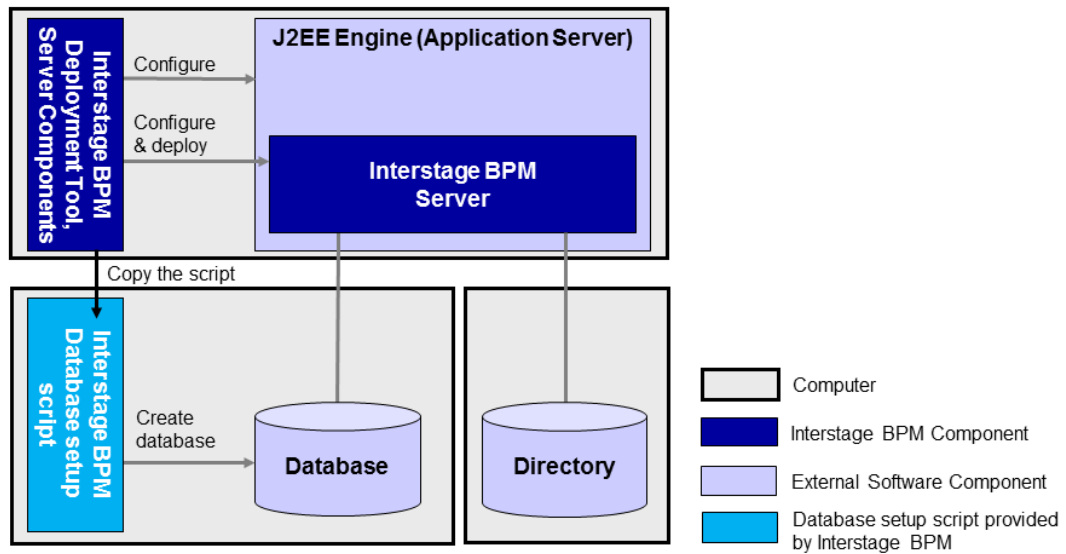


Figure 2: Database on Remote Computer

To set up this configuration, you install the Interstage BPM Server software on the computer hosting the database and use the Deployment Tool to configure the database.

Next, you copy the database setup script from the Interstage BPM Server-computer to the database server computer. The Interstage BPM Deployment Tool can then be run from that computer to configure the application server and deploying 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.

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.

2.1 Minimum Configuration: All Systems on the same Computer

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

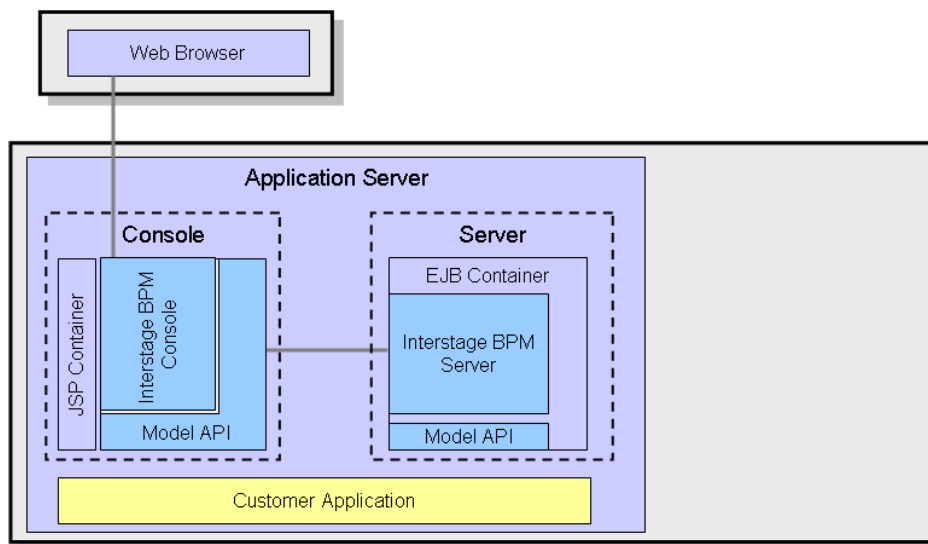


Figure 3: All systems on the same computer

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

Recommended for Server: 8 GB of free space during runtime (at least 1 GB must be available in the /tmp directory)

(Please refer the calculation method below)

Interstage BPM installation: 300 MB

Log file space: Depends on the number of active users. As a rule of thumb, with the default log level, calculate 5 KB for each user logging in. For example, if 1000 users log in per day, the log file increases by 5 MB per day.

Database server installation: Please refer to the product documentation.

Database space:

As a rule of thumb, 1000 instances of a process definition with 10 nodes require about 5 MB. During Interstage BPM runtime, the processing of work items, history entries in the database, etc., require additional space besides the initial database size. This additional space depends on 1) the number

of process instances 2) the number of active nodes 3) the number of users who are assigned to work items.

For example, if you have 1000 instances of a process with 10 nodes, 50% of the nodes require parallel processing (e.g. OR nodes), 10 users are accessing the process instances, you need the following disk space at runtime:

1500 active nodes multiplied with 10 users: 15,000 KB or 15 MB

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*.

3.2.1 Preparation for Installing Interstage BPM on Linux Environments

If using Linux, before installation ensure the following packages of Red Hat Enterprise Linux are available.

To check whether a particular package is installed, use the following command:

```
rpm -q <package-name>
```

(Note that `i686` and `x86_64` below denote the respective package's architecture.)

Packages for Red Hat Enterprise Linux 5 (32 bit and 64 bit):

- `libXp (i686)`

Packages for Red Hat Enterprise Linux 6 (32 bit):

- `glibc-devel (i686)`
- `glibc-headers (i686)`
- `kernel-headers (i686)`
- `libXp (i686)`

Packages for Red Hat Enterprise Linux 6 (64 bit):

- `glibc (i686)`
- `glibc-devel (i686)`
- `glibc-headers (x86_64)`
- `kernel-headers (x86_64)`
- `libICE (i686)`
- `libSM (i686)`
- `libX11 (i686)`
- `libXau (i686)`
- `libXext (i686)`
- `libXi (i686)`
- `libXp (i686)`
- `libXt (i686)`
- `libXtst (i686)`
- `libuuid(i686)`
- `libxcb (i686)`

- `nss-softokn-freebl (i686)`

In case any package is not installed, download it from your Red Hat Enterprise Linux CD or the Red Hat Network website, and install it using the following command:

```
rpm -i <package-name>
```

Note: If you plan to perform GUI-based installation and deployment of Interstage BPM on Linux, you need to install **X Window System** on your Linux machine. **X Window System** is not installed by default on Red Hat Enterprise Linux 6. For this, ensure that the following packages are installed:

- X Window System
- Desktop
- Legacy X Window System compatibility
- General Purpose Desktop

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 Overview of Integrated Deployment of Interstage BPM Server and Console

You can deploy Interstage BPM Server and Console together using the integrated Deployment Tool.

Note: When you deploy Interstage BPM Console, Interstage BPM Tenant Management Console is automatically deployed as well.

Note: If you are upgrading from a previous version of Interstage BPM, refer *Upgrading Interstage BPM from Previous Versions* on page 67.

5 Preparing for Installation and Deployment of Interstage BPM Server and Console

This chapter explains how to set up your environment before installation and deployment of Interstage BPM.

5.1 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 deploying 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.

5.1.1 Configuring Microsoft® SQL Server

Microsoft® SQL Server 2005 or Microsoft® SQL Server 2008 can be used as the database with Interstage BPM.

Prerequisites: Microsoft SQL Server is installed. If you want to use Microsoft SQL Server as database for deploying Interstage BPM Server and Console in non-windows environments, ensure that Microsoft SQL Server is used as remote database.

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 in Mixed 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 2005/2008 > 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 deploying the Interstage BPM Server.
 3. Confirm Collation settings.

The default Collation settings at the time of installing Microsoft SQL are usually correct. However, if you receive a collation error when deploying, you need to configure these settings.

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

```
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.

Note: If you have changed the CaseSensitivity parameter to `cs` for the server level collation, you cannot create database via the Deployment Tool. In such a case, you need to first create Interstage BPM database using the database creation script, and change the database collation to CaseSensitive. Then you need to select the **Use existing database** option in the **Database Settings** screen of the Deployment Tool.

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 deploying 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 the JDBC driver jar's permission. The permission must be '666'(ugo=rw).

5.1.2 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 deploying on.

- Example on Oracle 10g:

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

- Example on Oracle 11g:

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

You can either set the environment variable in your `~/.profile` file or in the shell before starting the Deployment Tool.

Note: If you set the environment variable in the shell, run the `set -a` command so that the environment variable is set for all subshells created from the parent shell.

2. Create a new database instance for Interstage BPM.

When deploying 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 deploying 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 UNIX environments, confirm the JDBC driver jar's permission. The permission must be '666'(ugo=rw).
5. Change permissions in case of UNIX environments.
 - a) You must have execute permissions for the sqlplus file located in the <ORACLE_HOME>/bin directory.
 - b) You must have write permissions for the directory in which the Interstage BPM database will reside.

5.1.3 Starting the Database Server

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

5.2 Application Server Preparation

5.2.1 Installing and Configuring JBoss EAP for Interstage BPM Server and Console

The JBoss Application Server can be installed in different ways using different server configurations. To make sure that your JBoss installation is configured properly for Interstage BPM, you are recommended to perform the steps described below.

To install JBoss for Interstage BPM:

1. Prepare the JBoss Application Server:

Download the `jboss-eap-5.0.0.GA.zip` from the Red Hat website. The zip file contains a ready-to-use JBoss Application Server installation.
2. Unzip the downloaded file to a directory of your choice.

Note: The JBoss installation path must not contain blanks or special characters such as ~ \$ @.

3. Verify that your JBoss installation directory contains at least the following subdirectories. 'JBoss installation directory' is assumed to be JBoss here.

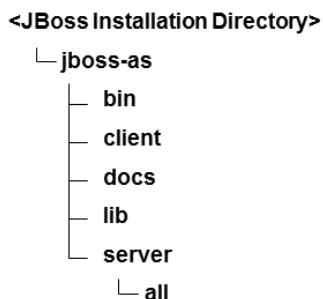


Figure 4: JBoss EAP 5 Installation Directory with Required Subdirectories

Note: You are recommended not to use the JBoss Application Server installer. Ensure that the `all` directory is not changed after you have unzipped the downloaded file. If you have configured the `all` directory, deployment might fail and Interstage BPM Server and Console may not start.

5.3 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 deploying Interstage BPM Server and Console. How to setup external directory service is described in *Setting Up a Directory Service* on page 45.

6 Installing and Deploying Interstage BPM Server and Console

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

Interstage BPM comes with an installation program and a Deployment Tool. The installation program installs the product documentation, the Deployment Tool and all files required for subsequent deployment of the Interstage BPM Server and Console to an application server of your choice. The Deployment Tool walks you through the required configuration steps and performs the actual deployment to an application server.

This chapter explains how to perform server and console installation using the installation program and the Deployment Tool in graphical mode.

Installation and deployment is a short, smooth process if you know the overall procedure and all of the values for the parameters that you need to supply. It is recommended that read the overview of the installation and deployment procedure before starting the installation.

Refer to *System Requirements for Interstage BPM Server and Console* on page 14 and to the Release Notes for details on the required components mentioned in the procedures described in this chapter.

Note: If you install 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 deployment, you can do so by following the instructions in the *Interstage BPM Server Administration Guide*.

6.1 Permissions Required for Installation and Deployment

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.

6.2 Overview of the Installation and Deployment Procedure

This section summarizes the steps required to install and deploy the Interstage BPM Server and Console. The installation and deployment 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 (except for the default Interstage BPM user created during deployment), 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 67.

Running the Database and Interstage BPM Server 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 18.
2. Prepare the application server and make sure it is running.
Refer to section *Application Server Preparation* on page 20.
3. Install Interstage BPM.
Refer to section *Installing Interstage BPM* on page 24.
4. 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 45.
5. Configure the Interstage BPM Server and Console and deploy it to the application server.
Refer to section *Deploying Server Instances with Console* on page 35.
6. Switch on Java security.
Refer to section *Switching on Java Security* on page 39.
7. Start the Interstage BPM Server.
Refer to section *Starting Interstage BPM Server* on page 40.

Running the Database and Interstage BPM Server on Different Computers

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 deploy Interstage BPM Server at different times on the same machine.

1. Prepare the database and make sure that the database server is running.
Refer to section *Database Server Preparation* on page 18.
 2. Prepare the application server and make sure it is running.
Refer to section *Application Server Preparation* on page 20.
 3. Install Interstage BPM on the **application server computer**.
Refer to section *Installing Interstage BPM* on page 24.
 4. 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 *Configuring the Remote Database* on page 33.
 5. 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 45.
 6. On the **application server computer**, run the Deployment Tool to deploy the Interstage BPM Server and Console.
Refer to section *Deploying Server Instances with Console* on page 35.
 7. Switch on Java security.
Refer to section *Switching on Java Security* on page 39.
 8. Start the Interstage BPM Server.
-

Refer to section *Starting Interstage BPM Server* on page 40.

6.3 Installing Interstage BPM

Use the instructions in this section to perform a new installation of Interstage BPM.

Note: If you have a previous version of Interstage BPM Server on your computer, refer to chapter *Upgrading Interstage BPM from Previous Versions* on page 67.

To install Interstage BPM:

1. Read the Release Notes located in the top-level directory of the CD-ROM.
2. Start the installation program located in the `engine` directory on the CD-ROM.

Operating System	Installation Program
Windows	<code>setupwin32.exe</code>
Solaris	<code>setupSolaris.bin</code>
Linux	<code>setupLinux.bin</code>

3. Read the **Welcome** screen and click **Next**.
4. On the **Interstage Business Process Manager Installation Directory** screen, specify an installation directory. Accept the default or click **Browse** and navigate to a directory of your choice.

Default on Windows: `C:\Fujitsu\InterstageBPM`

Default on UNIX: `/opt/FJSVibpm`

Note: The installation directory path must not contain blanks or special characters such as ~ \$ @. Do not specify an installation directory path that is longer than 255 characters.

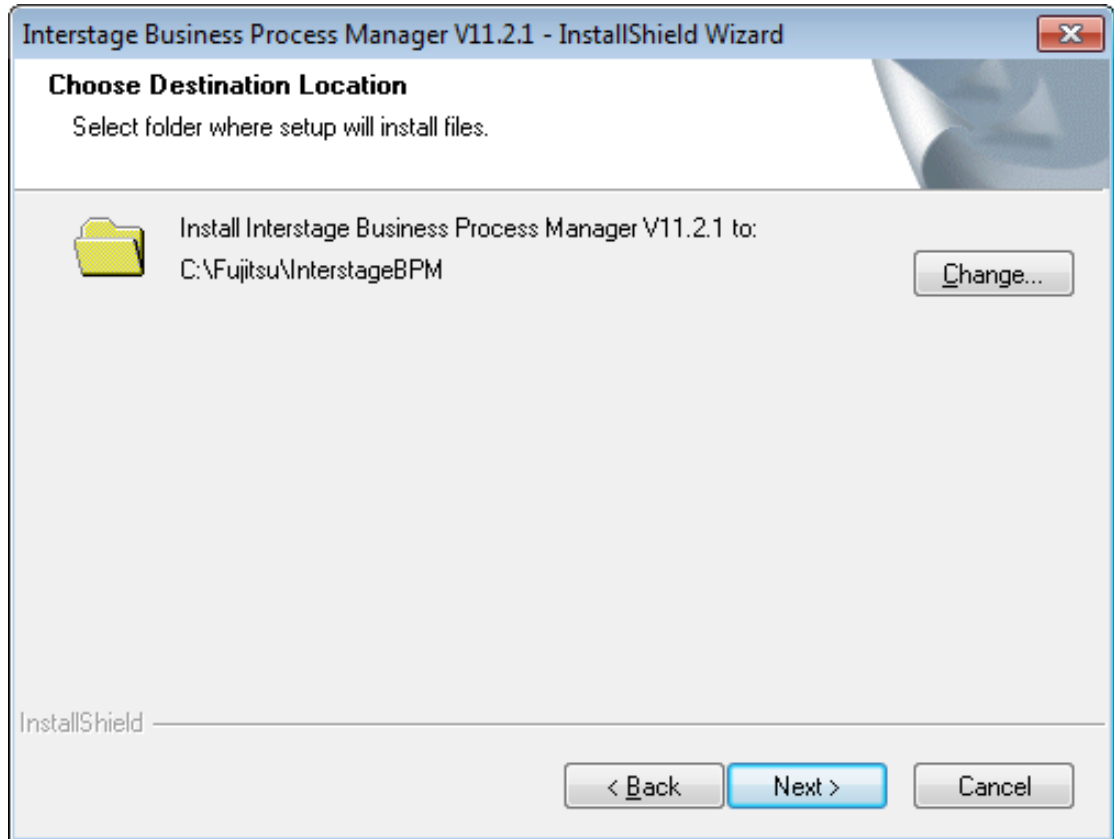


Figure 5: Server Installation Directory (for Windows)

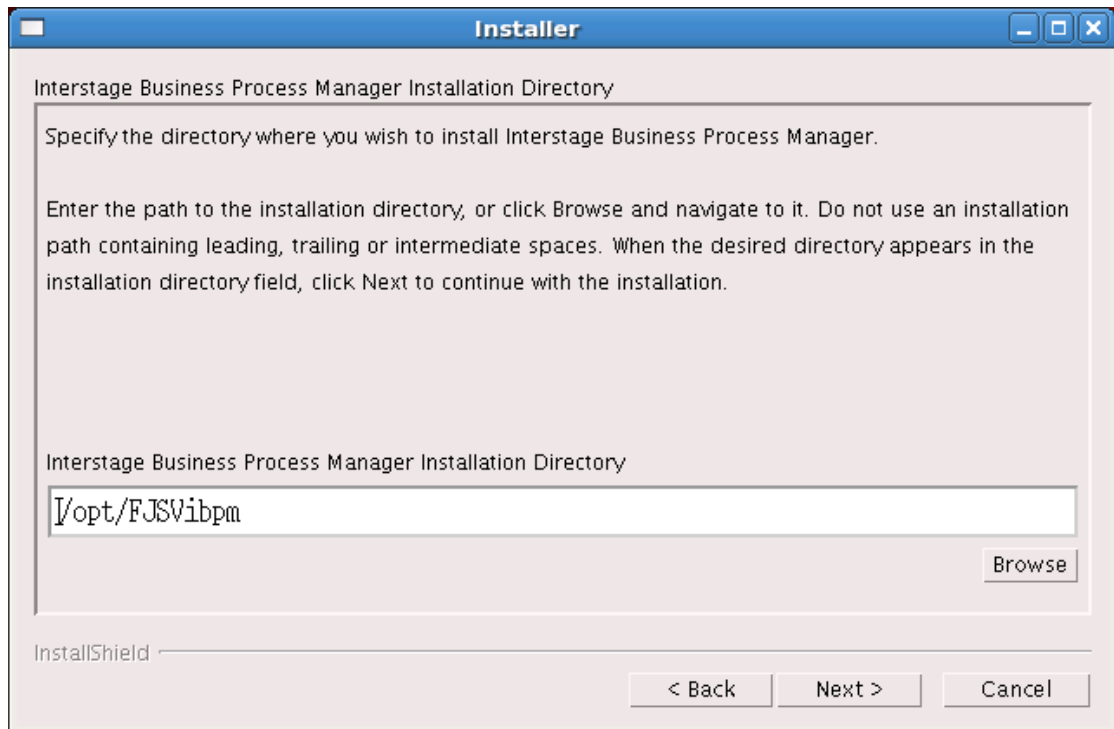


Figure 6: Server Installation Directory (for UNIX)

5. Click **Next**.
6. On the JDK selection screen, specify the top-level directory of your J2SE Development Kit (JDK) installation. If the default directory is not the top-level directory of your JDK installation, click **Browse** and navigate to it.

Note: JRE is not supported.

The JDK you specify here is also used during deployment of Interstage BPM. A different version of JDK is supported for each application server, as described in the *Interstage BPM Server Release Notes*.

Example on Windows: D:\java\jdk1.6.0_22

Example on UNIX: /usr/jdk/jdk1.6.0_22

Note: The JDK installation path must not contain blanks or special characters such as ~ \$ @.

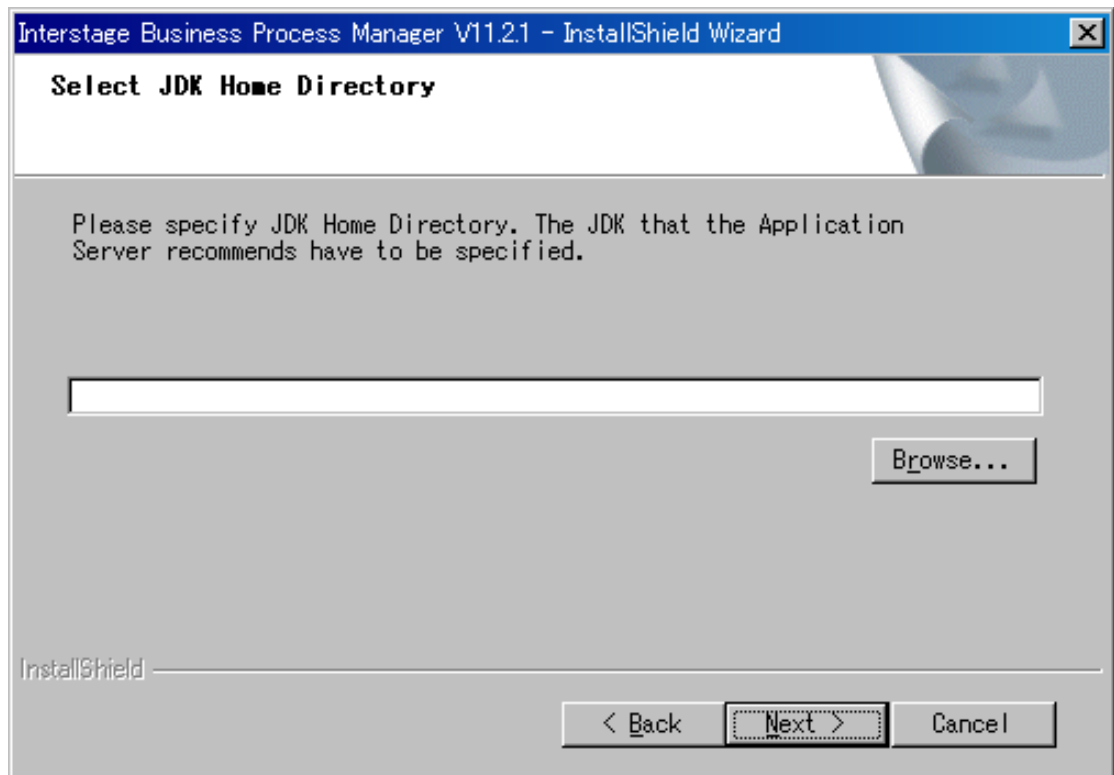


Figure 7: JDK Directory (for Windows)



Figure 8: JDK Directory (for UNIX)

7. Click **Next**, and on the screen that appears, click **Install** to start the installation.
The installation program starts copying files to your computer. Once the files have been copied, the **Start Deployment Tool** screen is displayed.
8. To launch the Deployment Tool, do one of the following:
 - **For Windows:** A 64 bit-JVM-specific Deployment Tool and a 32 bit-JVM-specific Deployment Tool are provided for Windows Server 2003 and Windows Server 2008.
 1. Select the appropriate radio button to launch the 32 bit-specific or 64bit-specific Deployment Tool.

2. Click **Next**.

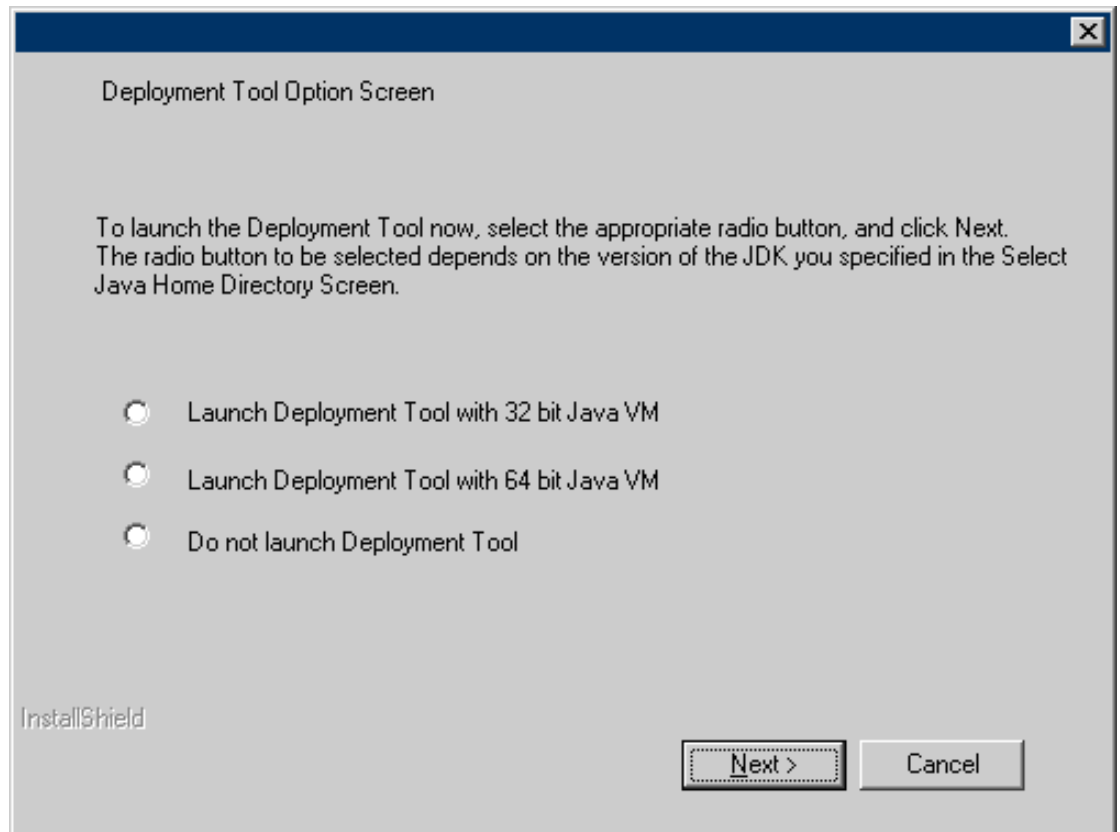


Figure 9: Start Deployment Tool - For Windows

- **For Solaris:** On the **Start Deployment Tool** screen, select the **Launch Deployment Tool** check box and click **Next**.

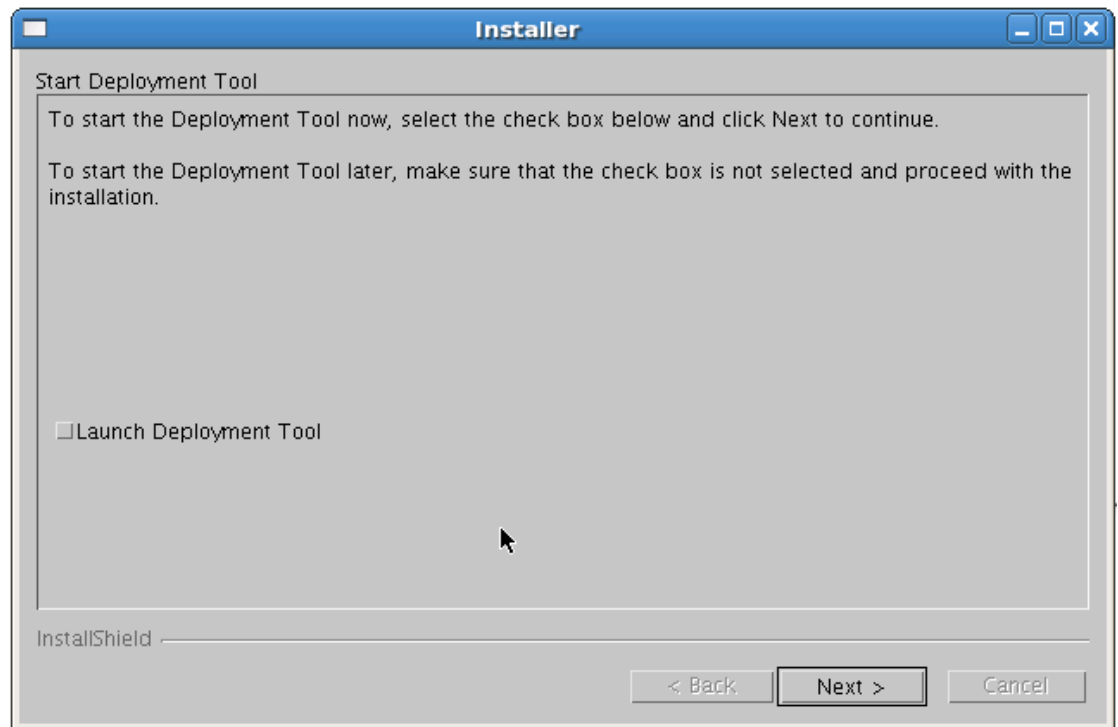


Figure 10: Start Deployment Tool - For Solaris

- **For Linux:** A 64 bit-JVM-specific Deployment Tool and a 32 bit-JVM-specific Deployment Tool are provided for Linux.
 1. Select the appropriate radio button to launch the 32 bit-specific or 64bit-specific Deployment Tool.

2. Click **Next**.

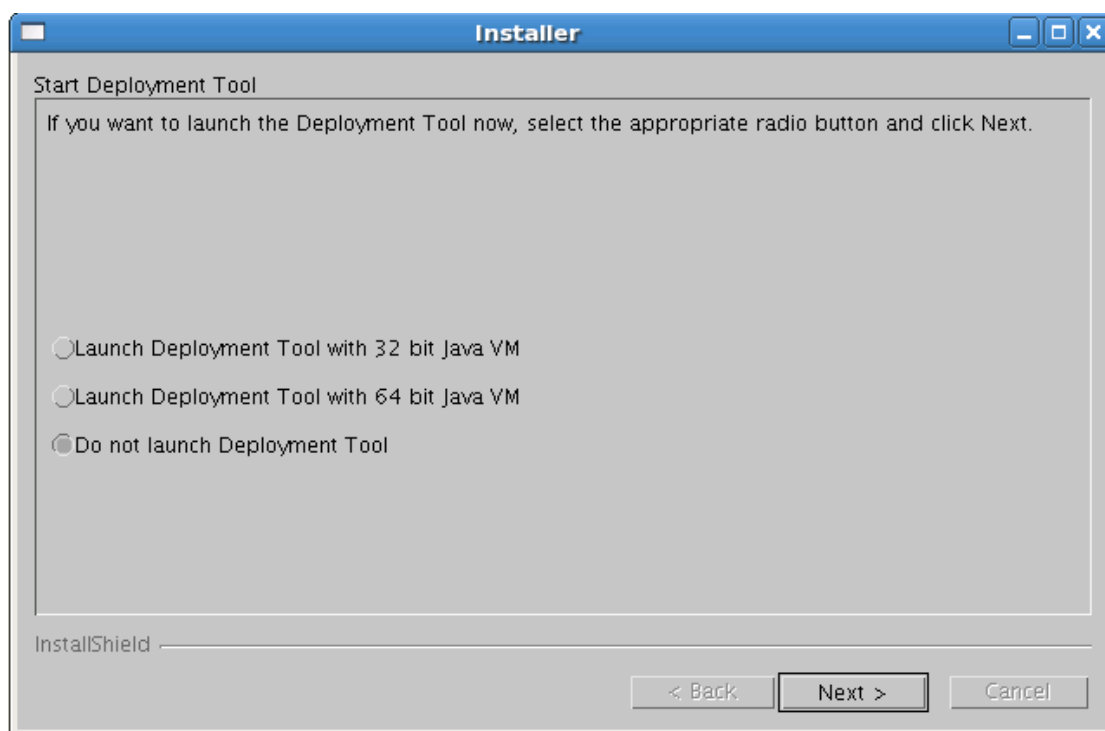


Figure 11: Start Deployment Tool - for Linux

Note: If you want to configure and deploy Interstage BPM Server and Console at a later time, or you want to create a silent deployment script, make sure that you do not launch the Deployment Tool from this screen. Click **Next** and then **Finish**.

Refer *Starting the Deployment Tool* on page 31 for more information about launching the Deployment Tool at a later time.

Refer *Silent Mode Deployment and Undeployment* on page 92 for more information about creating a silent deployment script.

The installation program exits. If you selected to launch the Deployment Tool, the Deployment Tool is started.

6.4 Starting the Deployment Tool

6.4.1 Using the Deployment Tool Start-up Script

Prerequisites:

- You have prepared the database server and the application server as explained in chapter *Preparing for Installation and Deployment of Interstage BPM Server and Console* on page 18.
- You have installed Interstage BPM.
- You have set the resolution of your screen and the font size as follows:
On UNIX: 1024x768, Sans 9 pt font or 1280x1024, Sans 10 pt font

On Windows: 1024x768, system default font

- You have the required permissions for deployment. For details, refer to section *Permissions Required for Installation and Deployment* on page 22.

If you chose not to launch the Deployment Tool at the end of the installation process as described at the end of the previous section, you can start the Deployment Tool manually.

To start the Deployment Tool:

- Run the startup script located in `<Interstage BPM Installation Directory>/server/deployment/tool:`

Operating System	Startup Script
Windows	run_windows.bat (for 32bit Java VM) run_windows_x64.bat (for 64bit Java VM)
Solaris	run_solaris.sh
Linux	run_linux.sh (for 32bit Java VM) run_linux_x64.sh (for 64bit Java VM)

On Windows (32 bit), you can also start the Deployment Tool using **Start > Programs > Interstage Business Process Manager > Launch Deployment Tool**.

On Windows (64 bit), you can also start the Deployment Tool using **Start > Programs > Interstage Business Process Manager > Launch Deployment Tool (64-Bit)**.

`run_windows_x64.bat`

This is a 64bit-JVM-specific Deployment Tool provided for Windows Server 2003, Windows Server 2008.

- Use the 64bit Deployment Tool only if both your Operating System as well as Java Environment (JVM) is 64bit. If used otherwise, the Deployment Tool will fail to start.
- Irrespective of your Operating System, if your JVM is 32bit, use the 32bit Deployment Tool.

Note: 32bit Operating Systems and 64bit JVM are incompatible and using this combination will cause launch of Deployment Tool to fail irrespective of the version of Deployment Tool.

`run_linux_x64.sh`

This is a 64bit-JVM-specific Deployment Tool provided for Linux.

- Use the 64bit Deployment Tool only if both your Operating System as well as Java Environment (JVM) is 64bit. If used otherwise, the Deployment Tool will fail to start.
- Irrespective of your Operating System, if your JVM is 32bit, use the 32bit Deployment Tool.

Note: 32bit Operating Systems and 64bit JVM are incompatible and using this combination will cause launch of Deployment Tool to fail irrespective of the version of Deployment Tool.

6.4.2 Configuring the Deployment Tool Startup JVM

If you want to change the Deployment Tool startup Java VM, it is necessary to modify the startup script explained in the previous section.

For example, open the script file in a text editor and correct `JAVA_HOME`

Edit `run_windows.bat`, `run_windows_x64.bat` as follows:

```
SET JAVA_HOME=C:\java\jdk1.6.0_22\bin\java
```

Edit the following files as follows:

- `run_linux.sh`
- `run_linux_x64.sh`
- `run_solaris.sh`

```
SET JAVA_HOME=/usr/java/jdk1.6.0_22/bin/java
```

6.5 Configuring the Remote Database

Prerequisite: You have prepared the database server as instructed in section *Database Server Preparation* on page 18.

This section describes how to execute the database creation script and how to run the Deployment Tool on the database server computer to configure the database. **If you are using a local database, you do not need to perform the instructions in this section.** You will typically perform the instructions in this section only if your database is installed on a remote computer.

How to use the database creation script:

1. From following directory on the Interstage BPM installed-machine, copy the database-related scripts to the database machine:

Windows:

- Oracle: `<install_directory>\server\deployment\dbsetup\oracle`
- Microsoft SQL Server: `<install_directory>\server\deployment\dbsetup\sqlserver`

UNIX:

- Oracle: `<install_directory>/server/deployment/dbsetup/oracle`
- Microsoft SQL Server: `<install_directory>/server/deployment/dbsetup/sqlserver`

Note: Database creation script for Microsoft SQL Server is provided only for Windows. This is because Microsoft SQL Server cannot be installed on UNIX environments.

Script files to be copied (into a common directory on database machine):

- `dbsetup.bat` (Setup script for Windows)
- `dbsetup.sh` (Setup script for UNIX)
- `config.bat` (Configuration file for Windows)
- `config.sh` (Configuration file for UNIX)
- SQL script files for Oracle:
 - `OracleDbCreate.sql`
 - `OracleTableCreate.sql`
- SQL script files for Microsoft SQL Server:
 - `mssqlDbCreate.sql`
 - `mssqlUserCreate.sql`
 - `mssqlTableCreate.sql`
 - `mssqlGrantPermissions.sql`

- `mssqlModifyIsolationLevel.sql`

2. Login to the machine where the database is installed.
3. On the database machine, navigate to the directory where you copied the script files, and edit the following parameters in the `config.bat` / `config.sh` file:

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\MSSQL.1\MSSQL\Data.
```

Common to all databases:

Parameter	Sample Value	Description
USER	ibpmuser	Database User Name
PASSWORD	ibpmuserpassword	Database User Password

For Oracle:

Parameter	Sample Value	Description
SID	orcl	Oracle System ID
SYSTEM_PASSWORD	systempassword	System User Password
ORACLE_HOME	On Windows: C:\app\oracle\product\11.2.0\ohome_1 On UNIX: /opt/app/oracle/product/11.2.0/ohome_1	ORACLE home directory
DATAFILE_PATH	On Windows: C:\app\oracle\oradata\orc On UNIX: /opt/app/oracle/oradata/orcl	Path to store data files

For SQL Server:

Parameter	Sample Value	Description
ADMIN_USER	sa	Database Administrator User
ADMIN_PASSWORD	adminpassword	Database Administrator Password
PORT	1433	Database Port Number
SQLSERVER_HOME	Example (On Windows): C:\Program Files\Microsoft SQL Server	SQLSERVER home directory

Parameter	Sample Value	Description
DATAFILE_PATH	On SQL Server 2005: C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Data. On SQL Server 2008: C:\Program Files\Microsoft SQL Server\MSSQL10.MSSQLSERVER\MSSQL\DATA.	Path to store data files

4. Run the setup script:

- dbsetup.bat (for Windows)
- dbsetup.sh (for UNIX)

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.

To configure the database:

1. On the machine where Interstage BPM is installed, if the Deployment Tool is not running, start it.
For details, refer to section *Starting the Deployment Tool* on page 31.
2. On the **Welcome** screen of the Deployment Tool, select **Server instance setup**, and click **Next**.
For details about using the Deployment Tool, refer *How to use Deployment Tool* on page 36.
3. Proceed through the Deployment Tool using the Description messages on each screen, till you reach the **Database Selection** screen.
4. On the **Database Selection** screen, select **Use existing database**. Complete other details required for your database as instructed on the screen.
5. Proceed through the rest of Deployment Tool and complete deployment.

Note: If you create the database using database creation script, validation is not executed by the Deployment Tool. Therefore you need to confirm all of the preparation requirements described in section *Database Server Preparation* on page 18 are met.

6.6 Deploying Server Instances with Console

There are two methods to deploy Server instance with Console. One is by using the Deployment Tool and the other is by using silent deployment. This section provides information about using the Deployment Tool.

To start the Deployment Tool, execute the appropriate startup script as described in *Using the Deployment Tool Start-up Script* on page 31.

6.6.1 How to Deploy Interstage BPM Server Instance with Console

Prerequisites: You have already started the Deployment Tool

To deploy Server Instances with Console, in the **Welcome** screen of the Deployment Tool, select the **Server instance setup** option. After selecting this, click **Next** and start the Deployment wizard. How to use Deployment Tool is described in the next section.

6.6.2 How to use Deployment Tool

The following figure shows the generic layout of the Deployment Tool.

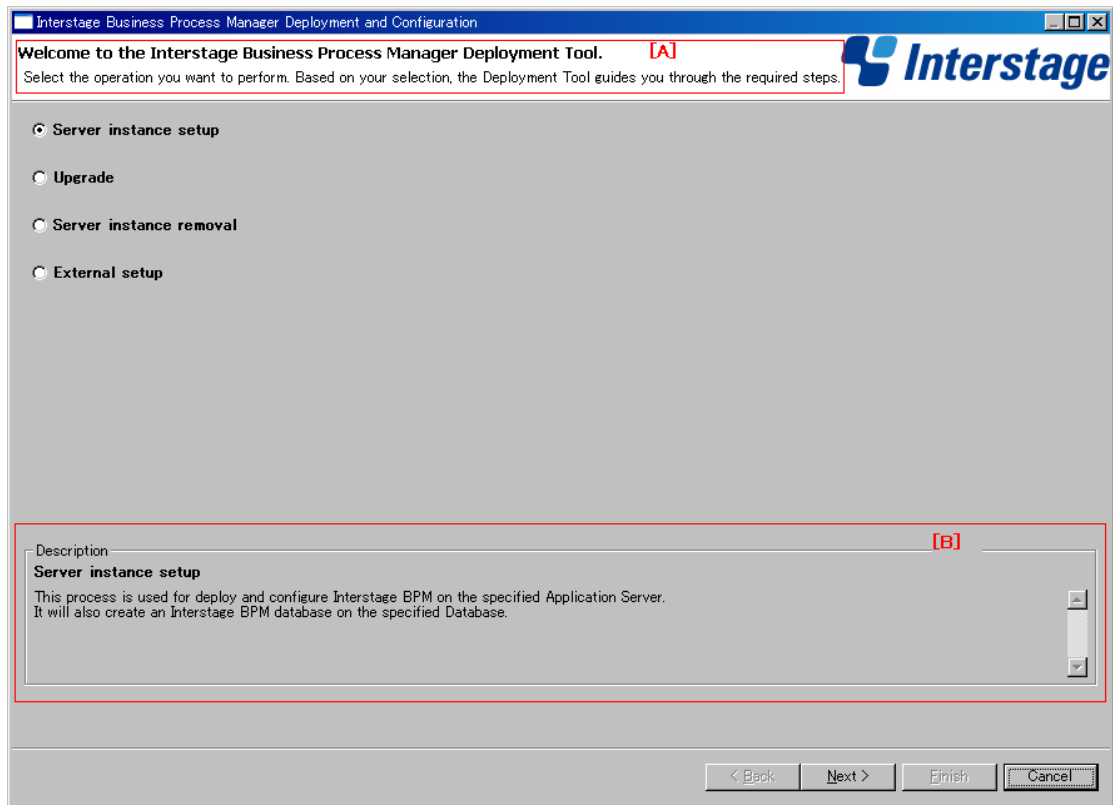


Figure 12: Deployment Tool - General Layout

Note the following:

- You can progress through this wizard by following the displayed messages.
- To move forward in the wizard, click the **Next** button.
- At the setup confirmation screen, clicking **Next** starts deployment.

Legend:

- [A]: The title of the screen and a brief summary of the screen's contents are displayed here. In case any of your inputs generate validation errors, these errors are also displayed here. You need to solve these errors to be able to proceed to the next screen. Help to solve errors is displayed in the area [B], described below.

- [B]: This area displays the description of the currently selected option or input-field in the screen.
- In any screen, if on clicking **Next** any errors occur, these are displayed in a pop-up message window. To move to the next screen you need to solve the detected issue. Sometimes the messages are

shown as warning message, at which time you are allowed to progress to the next screen without solving the issue.

To find more details about any errors that occur during deployment, you can view the `deployment.log` file, available at the following location:

- On Windows: <Interstage BPM Installation directory>\server\deployment\logs
- On UNIX: <Interstage BPM Installation directory>/server/deployment/logs

Note: Contents of `deployment.log` are overwritten each time the Deployment Tool is executed.

6.6.3 How to Confirm Successful Deployment

If deployment was completed successfully, you will view the following screen.

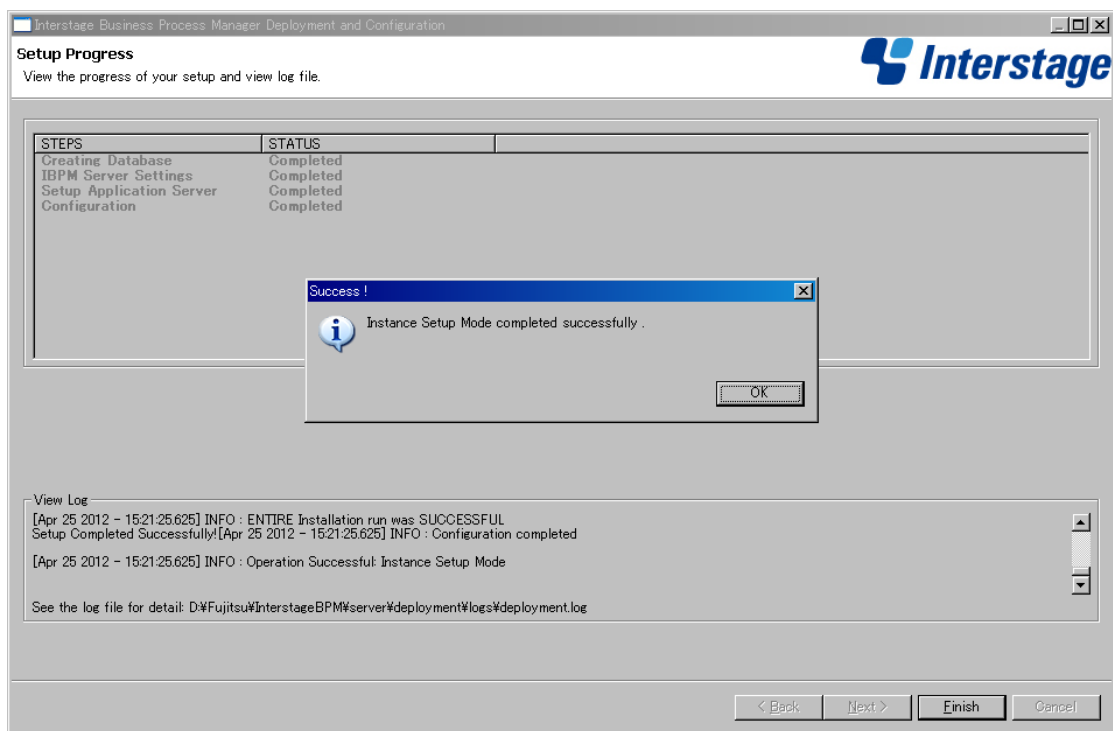


Figure 13: Deployment Succeeded

If you receive the **Success!** pop-up message, deployment was completed successfully and you can now proceed to the next step.

However, if you receive the **Failed!** pop-up message as shown below, it means deployment failed due to some reason.

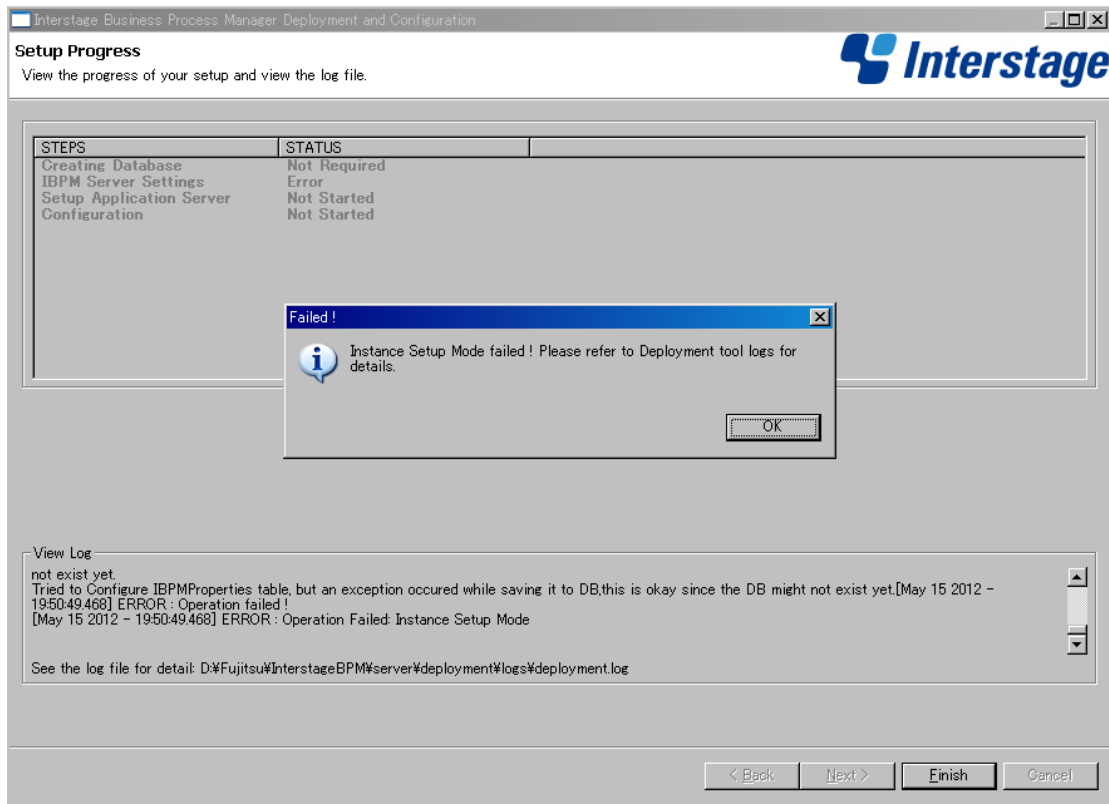


Figure 14: Deployment Failed

To find the cause of failure, check the deployment.log, displayed at the bottom of **View Log** area. Often, the cause of failure is mis-configuration of database, application server or operating system. Based on the detected error, confirm if the database, application server or operating system was configured correctly by referring to that element's 'Preparation' section in this guide.

6.7 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.

A group is a collection of users who share a function within an organization. For example, a `Manager` group might contain the first-line managers in an organization. Any Interstage BPM user may be made a member of any group.

In Interstage BPM, groups are used to determine who is responsible for carrying out a task in a process. Activities in process definitions are assigned to so-called Roles, which are equivalent to groups. The advantage of assigning activities to Roles (rather than individuals) is that if personnel changes occur, only the Role definition needs to be updated, and not all the processes that use the Role.

To set up an Interstage BPM user account, you create an account with appropriate user rights. You must make sure that the user names for the Interstage BPM users and the group members are identical.

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.

The default group used by Interstage BPM is `Role`. 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 45.

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*.

6.8 Switching on Java Security

Deployment Tool deploys 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 JBoss:

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

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

2. Append the following new Java VM option for the `JAVA_OPTS` variable in `run.conf` for a UNIX machine or `run.conf.bat` for Windows environment. These files are located in `<JBoss HOME>/jboss-as/bin` directory.

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

If you configure the `JAVA_OPTS` variable at any other place, it might prevent the setting of certain Java VM options which are necessary for server startup.

3. To the `policy.xml` file, add the following permissions. Refer the *Interstage BPM Administration Guide* for details about its location and how to edit this file.

```
...
<permission
  className="java.lang.RuntimePermission"
  target="accessDeclaredMembers"/>
<permission
  className="java.lang.reflect.ReflectPermission"
```

```
target="suppressAccessChecks"/>
...
```

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"/>
...
```

6.9 Starting Interstage BPM Server

Prerequisites: You have switched on Java security. For details, refer *Switching on Java Security* on page 39.

You start the Interstage BPM Server by starting the JBoss Application Server.

To start the server for JBoss run `runIBPM.bat` or `runIBPM.sh`:

Note: This file is located in the `<JBoss Installation Directory>/jboss-as/bin` directory.

Example:

- On Windows, run `runIBPM.bat -b 0.0.0.0`.
- On UNIX, run `runIBPM.sh -b 0.0.0.0`.

Note: The JBoss Enterprise Application Platform now binds its services to localhost (127.0.0.1) by default, instead of binding to all available interfaces (0.0.0.0). This was primarily done for security reasons because of concerns of users going to production without having secured their servers correctly. To enable remote access by binding JBoss services to a particular interface, simply run `jboss` with the `-b` option. To bind to all available interfaces and re-enable the legacy behaviour, use `./run.sh -b 0.0.0.0` on UNIX run `run.bat -b 0.0.0.0` on Windows. In any case, be aware you still need to secure your server properly.

You will see the following message near the end of the Command Prompt window upon successful initialization of the server:

```
... Interstage BPM Server ... is ready.
```

Note: If Interstage BPM Server does not start and you receive an error message notifying a conflict about the http port number (49950) already being in use, then for JBoss EAP 5.0, you can change the http port in the `server.xml` file located in the `<JBoss installation directory>\jboss-as\server\ibpm\deploy\jbossweb.sar\` directory.

If you change the port number, you also need to change the `ServerBaseURL` property using the Tenant Management Console. For details, refer the *Interstage BPM Server Administration Guide*.

To stop the server:

You can stop the Interstage BPM Server by stopping the JBoss Application Server. To stop the server, do one of the following:

- Run the shutdown script. To do this:
 1. First ensure the `JAVA_HOME` system environment is set. Also ensure that JMX authentication is configured - for details on how to do this refer *Configuring JBoss Application Server Secure Access* on page 86.
 2. Run the shutdown script located in the `<JBoss Installation Directory>/jboss-as/bin` directory as follows:

Operating System	Script
Windows	<pre>shutdown.bat -S -s <Server Name>:<port> -u <user id> -p <password></pre> <p>Example: <code>shutdown.bat -S -s localhost:1099 -u admin -p admin</code></p>
UNIX	<pre>shutdown.sh -S -s <Server Name>:<port> -u <user id> -p <password></pre> <p>Example: <code>shutdown.sh -S -s localhost:1099 -u admin -p admin</code></p>

Note: Here, the `-u` and `-p` options are required if you have set up JMX Console Authentication.

- Display the Command Prompt window in which the JBoss Application Server is running. Press `<Ctrl>-C` and wait for the server to stop.

Note: Do not stop the JBoss Application Server by closing the Command Prompt window in which the server is running. Some components may not stop properly and you may not be able to start the JBoss Application Server again.

6.10 Starting Interstage BPM Console and Tenant Management Console

Prerequisites:

The application server where you have deployed Console is running.

When you deploy Interstage BPM Console on JBoss, you start Console and Tenant Management Console by starting Interstage BPM Server. To start Interstage BPM Server, refer *Starting Interstage BPM Server* on page 40.

To access Interstage BPM Console and Tenant Management Console:

1. 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/<TenantName>/`

Here:

- `<hostname>` is the machine name of the computer upon which you have deployed the Interstage BPM Console.
- The default port is `49950`.
- `<TenantName>` 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 deployment. However, tenant name in the URL is not case sensitive.

The Login page appears.

2. Log on to 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.

7 Configuring Interstage BPM Console to work with Interstage Analytics

The following section provides information about configuring Interstage BPM Console to work with Interstage Analytics v12.0 and v11.1.

To set up Interstage BPM for Interstage Analytics, use the Analytics Setup Wizard provided by the Deployment Tool.

Using the Analytics Setup Wizard

Prerequisites:

- Complete the deployment of Interstage BPM Server and Console.
- If using Interstage Analytics v11.1, ensure you have installed Interstage Analytics and Interstage BPM (Server and Console) on the same machine.
- Prepare JAR files of Interstage Analytics.

If you install and deploy Interstage Analytics on the same machine with Interstage BPM, Interstage Analytics files are stored in the Interstage Analytics deployment directory. The following are examples of Interstage Analytics JARS directories. If you install and deploy Interstage Analytics on a different machine than Interstage BPM, then copy the following directories to the local machine.

- On JBoss
 - **Windows:** <JBoss installation directory>\jboss-as\server<Profile>\deploy\ibpmm.war\WEB-INF\lib
 - **UNIX:** <JBoss installation directory>/jboss-as/server/<Profile>/deploy/ibpmm.war/WEB-INF/lib

Here, <Profile> is the Interstage Analytics deployment directory. If you deployed Interstage Analytics on <JBoss Installation Directory>/jboss-as/server/default, then <Profile> is default.

To run the Interstage Analytics Setup Wizard:

1. Start the Deployment Tool. For details, refer *Starting the Deployment Tool* on page 31.
2. On the **Welcome** screen, select **External setup**, and click **Next**.
3. Confirm that **Interstage Analytics feature** is selected on the **Feature Selection** screen, and click **Next**.
4. On the **Analytics Setup** screen, input values for all fields. For description of each field, view the Description area at the bottom of the Deployment Tool screen.
5. Progress through, and complete the Analytics Setup wizard.

Execute the remaining steps as described in the *Interstage Analytics Installation Guide*.

Notes for Interstage Analytics 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`.
- If Interstage Analytics is deployed on a remote machine, and both Interstage Analytics as well as Interstage BPM are in secure mode, import the CA-issued certificate of Interstage Analytics to the keystore of Interstage BPM. For details of how to import a certificate into Interstage BPM's keystore, refer the last step in *Configuring a Keystore and Obtaining a Signed Certificate* on page 82.

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**.

8 Setting Up a Directory Service

This chapter provides instructions for setting up your Directory Service.

8.1 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.

8.1.1 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 on the **LDAP Configuration for Default Tenant** screen during Interstage BPM deployment. (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:

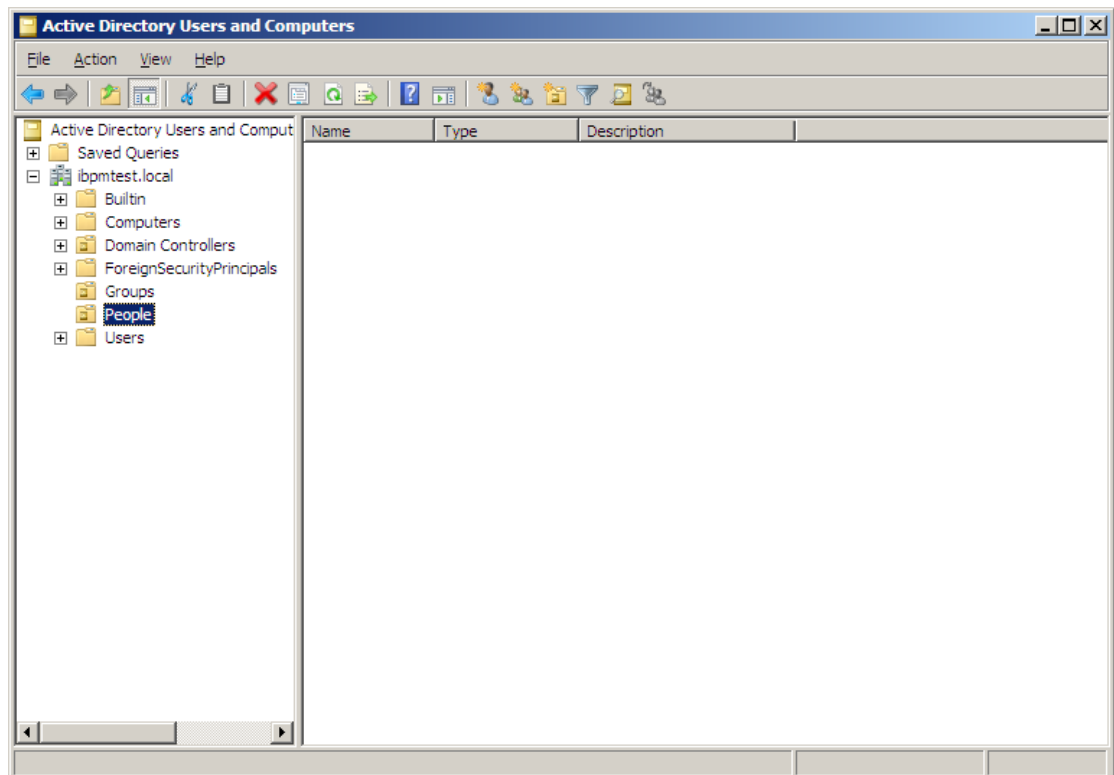


Figure 15: Creating Groups and People

3. Create LDAP-access user.

This user is specified as SuperUser during the deployment 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:

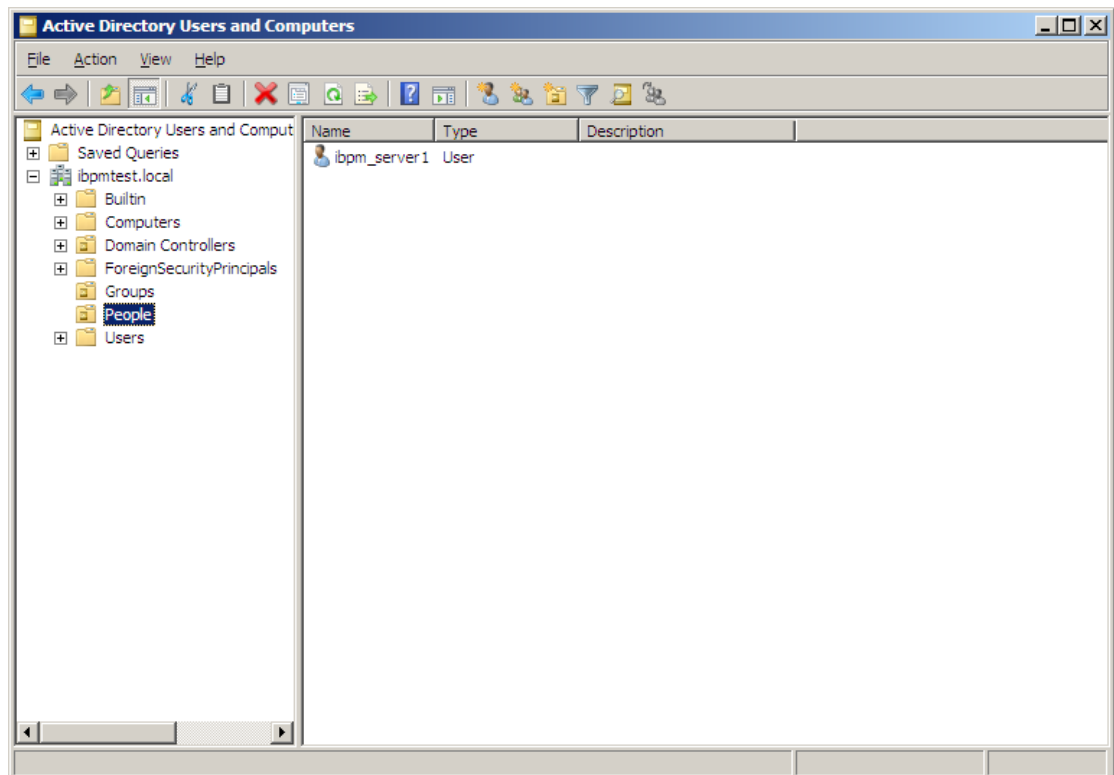


Figure 16: Directory Tree of People

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.
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:

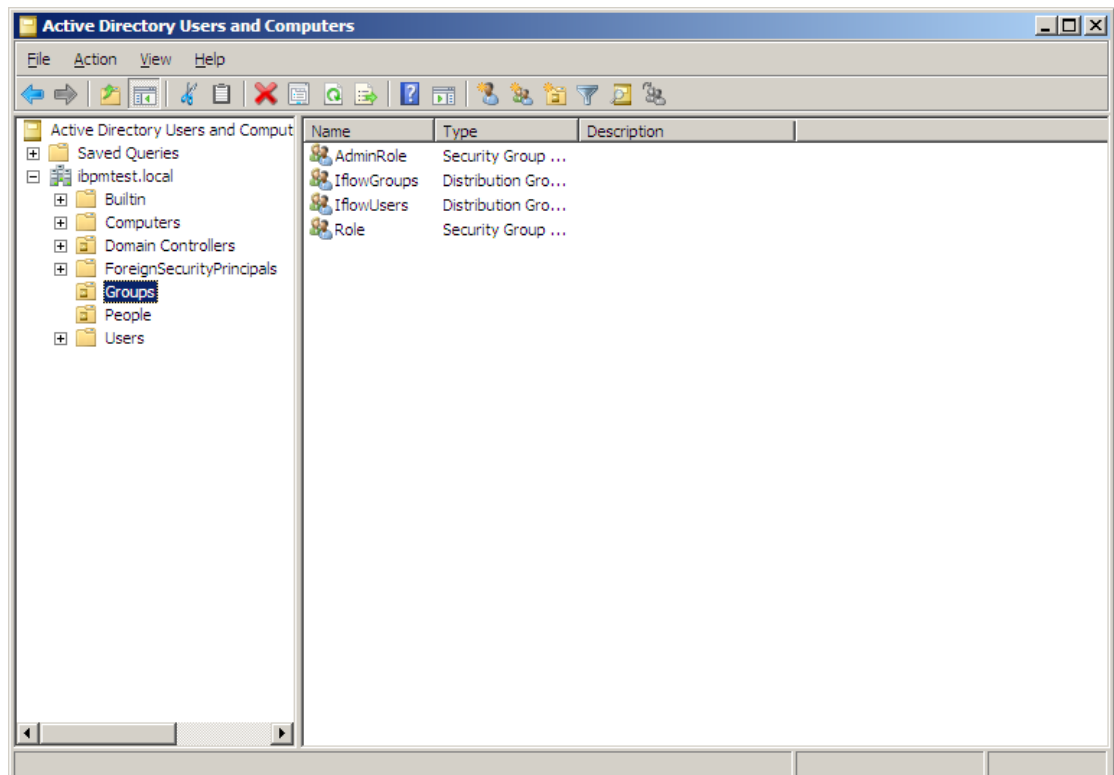


Figure 17: Directory Tree of Groups

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

8.1.2 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 your LDAP Users as Interstage BPM users and your LDAP Groups as Interstage BPM Roles. 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 are also given access. To give your LDAP Groups access to Interstage BPM as Interstage BPM Roles, add them as members of the `IflowGroups` group.

8.1.3 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:

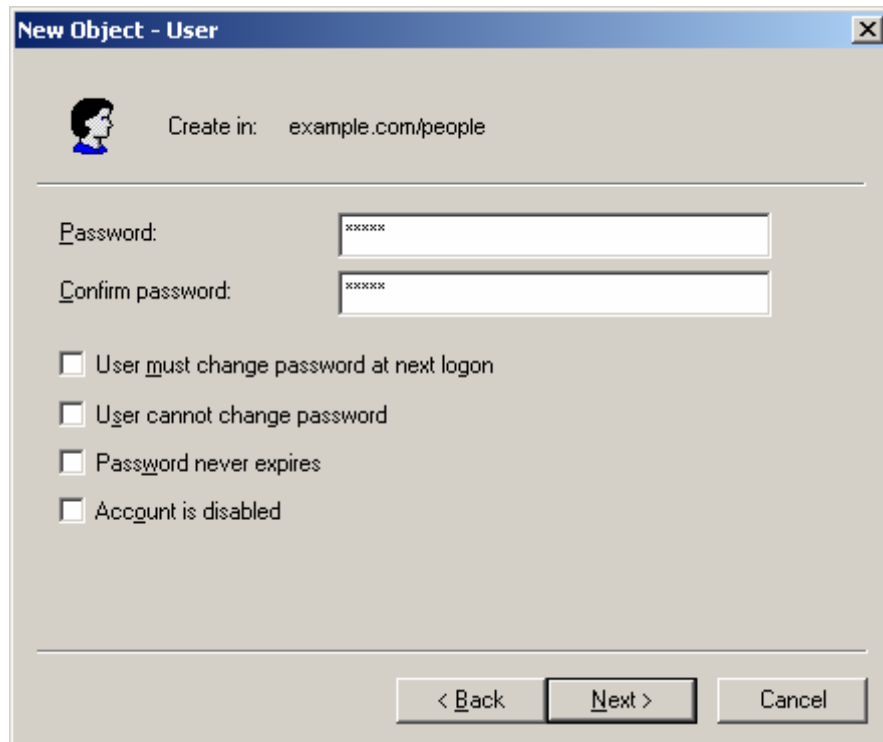
- First name:** user1
- Last name:** user1
- Full name:** user1 user1
- User logon name:** user1
- User logon name (pre-Windows 2000):** EXAMPLE\user1

 The domain dropdown menu is set to @example.com. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

Figure 18: 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 19: Adding a New User

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

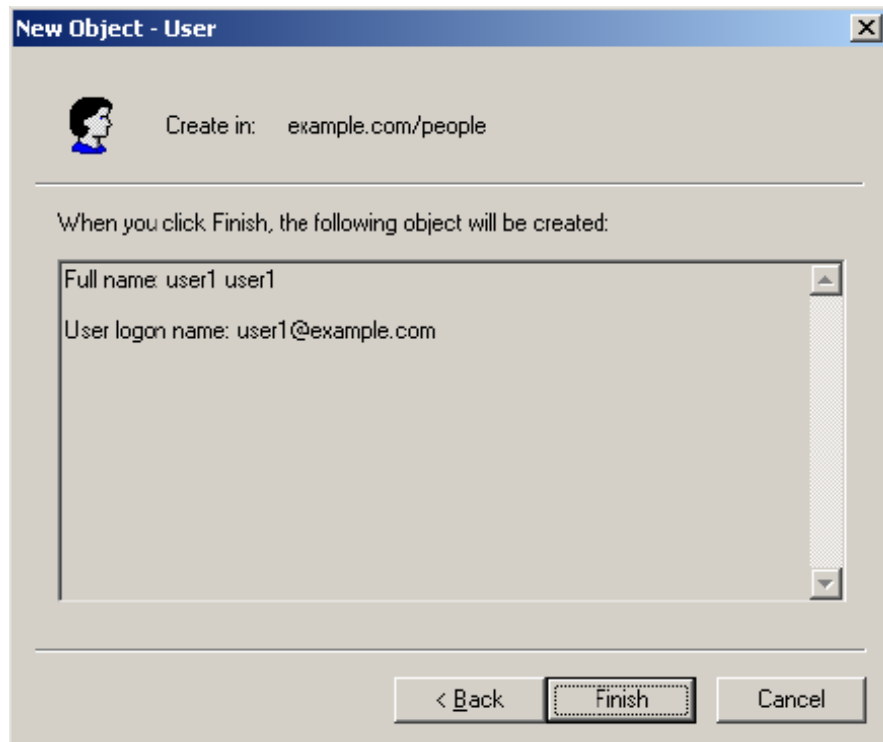


Figure 20: Adding a New User

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

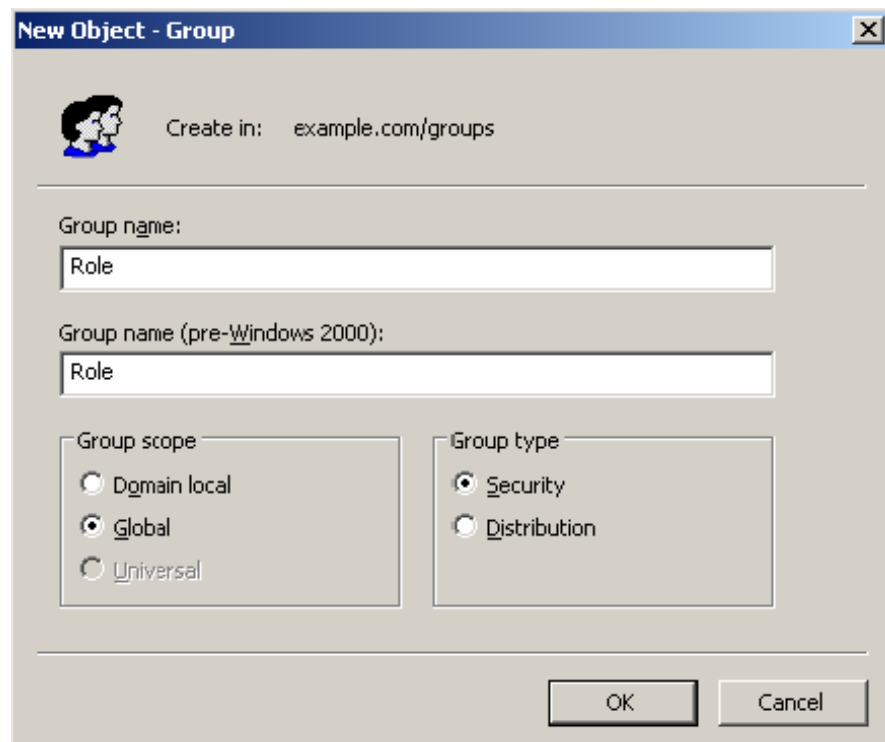
7. Add the new user to `IflowUsers` so that the new user is recognized by Interstage BPM. To do so:
- In the **Active Directory Users and Computers** window, expand the host name and the domain name to find the main Organizational Unit that you specified during Interstage BPM installation.
 - Right click 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**.

8.1.4 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 21: 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**.

8.1.5 Adding Members to a Group Using the GUI

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

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 `Role` Group is used in the following example. `ibpm_example` is already a member of the `Role` Group.

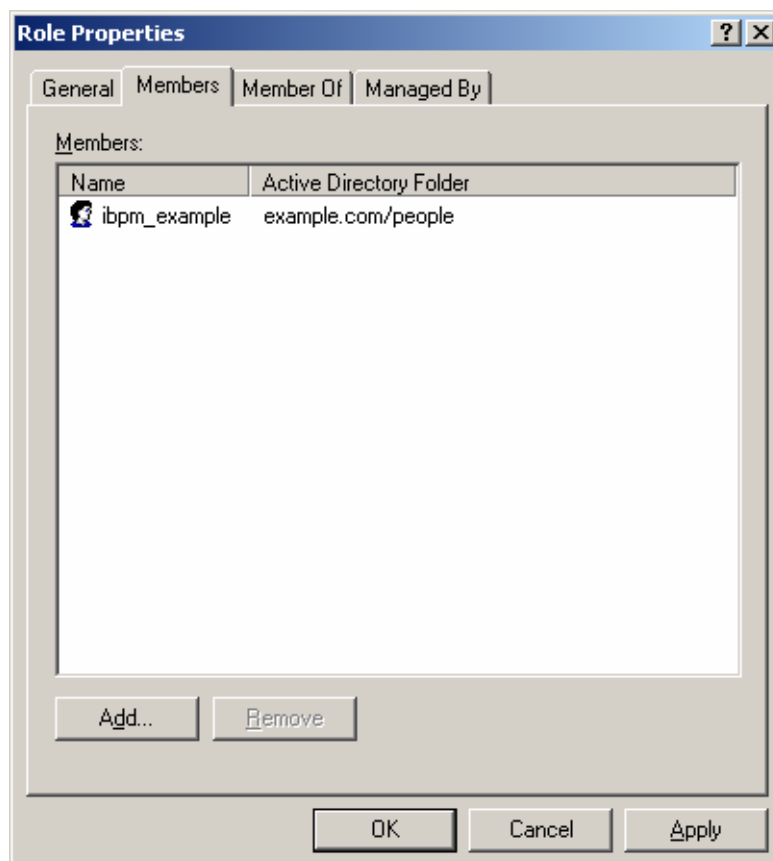


Figure 22: Adding Members

4. In the **Role Properties** dialog, click **Add**.
The **Select Users, Contacts, Computers, or Groups** dialog appears.
5. In Windows® 2003 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.

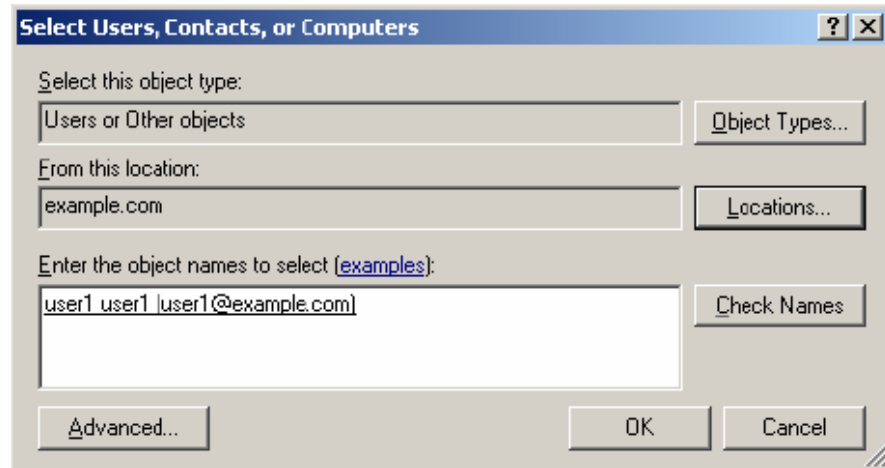


Figure 23: Selecting a User

6. Click **OK**.

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

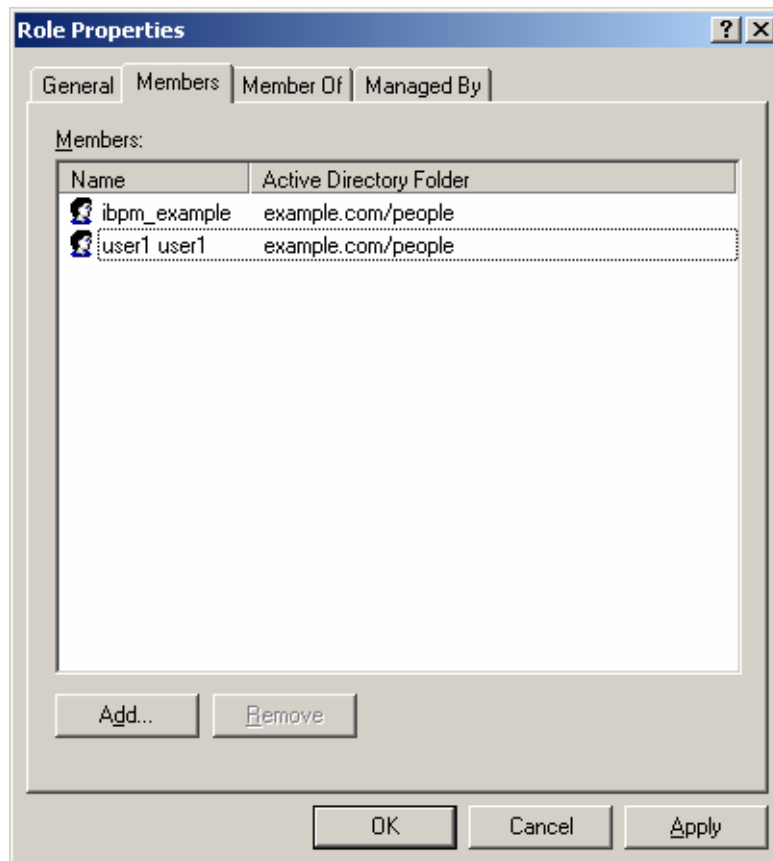


Figure 24: New Member Added

- 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 deployment.

8.2 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.

To use Interstage BPM with Oracle Directory Server Enterprise Edition, you must customize your Oracle Directory Server Enterprise Edition installation as follows:

- Start the Oracle Directory Server Enterprise Edition.
- Create suffixes on Oracle Directory Server Enterprise Edition for Interstage BPM.
- Configure users and Groups to use Interstage BPM.
- Add general users and general Groups to the Directory Service.

8.2.1 Starting the Oracle Directory Server Enterprise Edition

Prerequisite:

- Install the Oracle Directory Server Enterprise Edition.
- Create a Directory Server Instance.

You can start the Directory Server using the `dsadm` command or Directory Service Control Center. For details, refer *Oracle Directory Server Enterprise Edition Installation Guide 11g Release 1*.

8.2.2 Create suffixes on Oracle Directory Server Enterprise Edition for Interstage BPM

Do the following:

1. In Oracle Directory Service Control Center, navigate to the **Suffixes** tab.
2. Click **New Suffix** and configure the suffix using the wizard. Ensure the following:
 - a) In the **Choose Replication Option** screen, select **Do Not Replicate Suffix**.
 - b) In the **Choose Server(s)** screen, select **Choose by Server**.
 - c) In the **Choose Settings** screen, select **Use Default Settings**.
 - d) Check the **Use Default Database Location** and **Leave Suffix not Initialized** options.

8.2.3 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 on the **LDAP Configuration for Default Tenant** screen during Interstage BPM deployment. (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).

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.

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

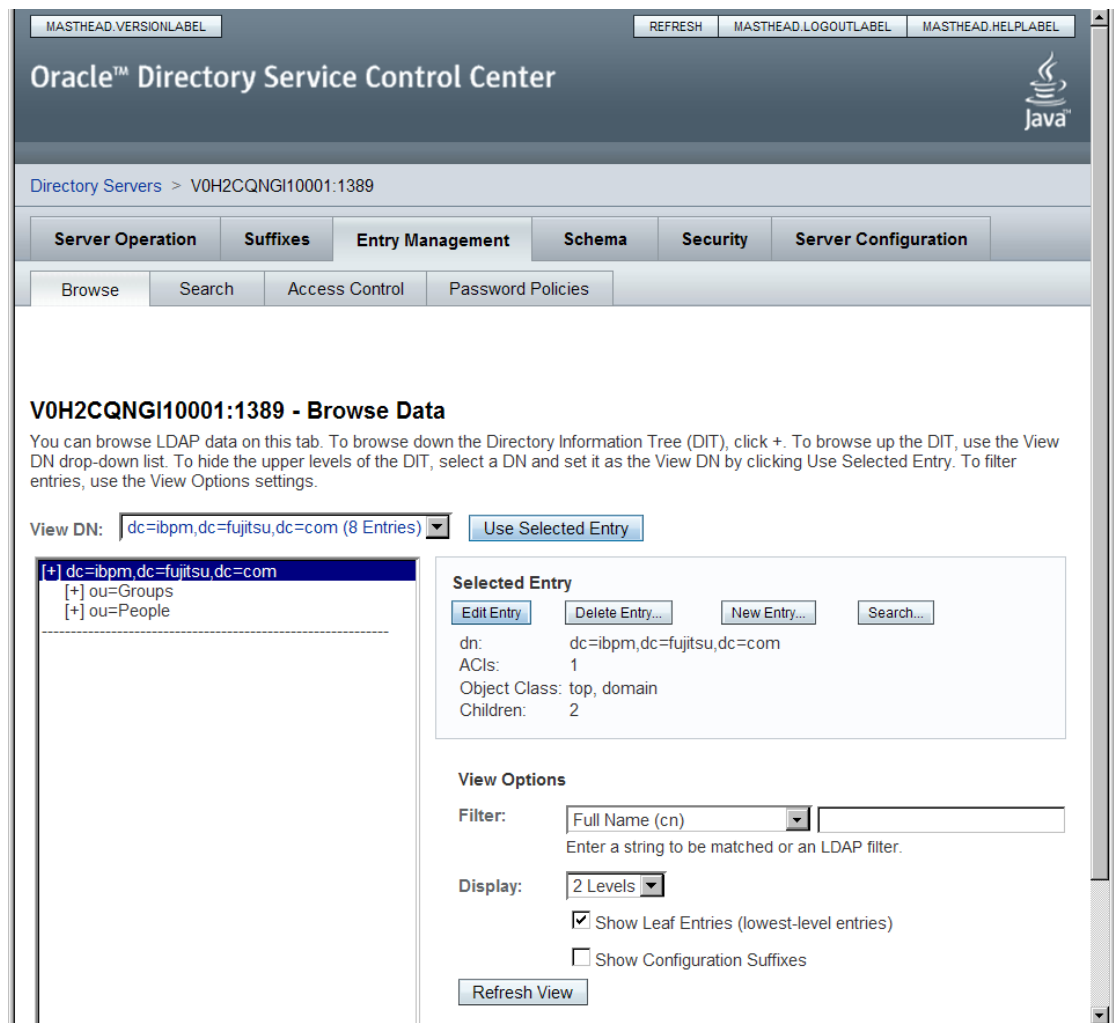


Figure 25: Creating Groups and People

3. Create LDAP-access user.

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

- a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.
- b) Under the `People` group you created earlier, click **New Entry** and start the **New Entry** wizard.

- c) In the **Choose Object Class** screen, for **Entry Type**, select **User - (inetOrgPerson)**.
- d) In the **Configure Attribute** screen, enter `ibpm_server1` for **cn** and **sn** fields of **Required Attributes**.
- e) 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:

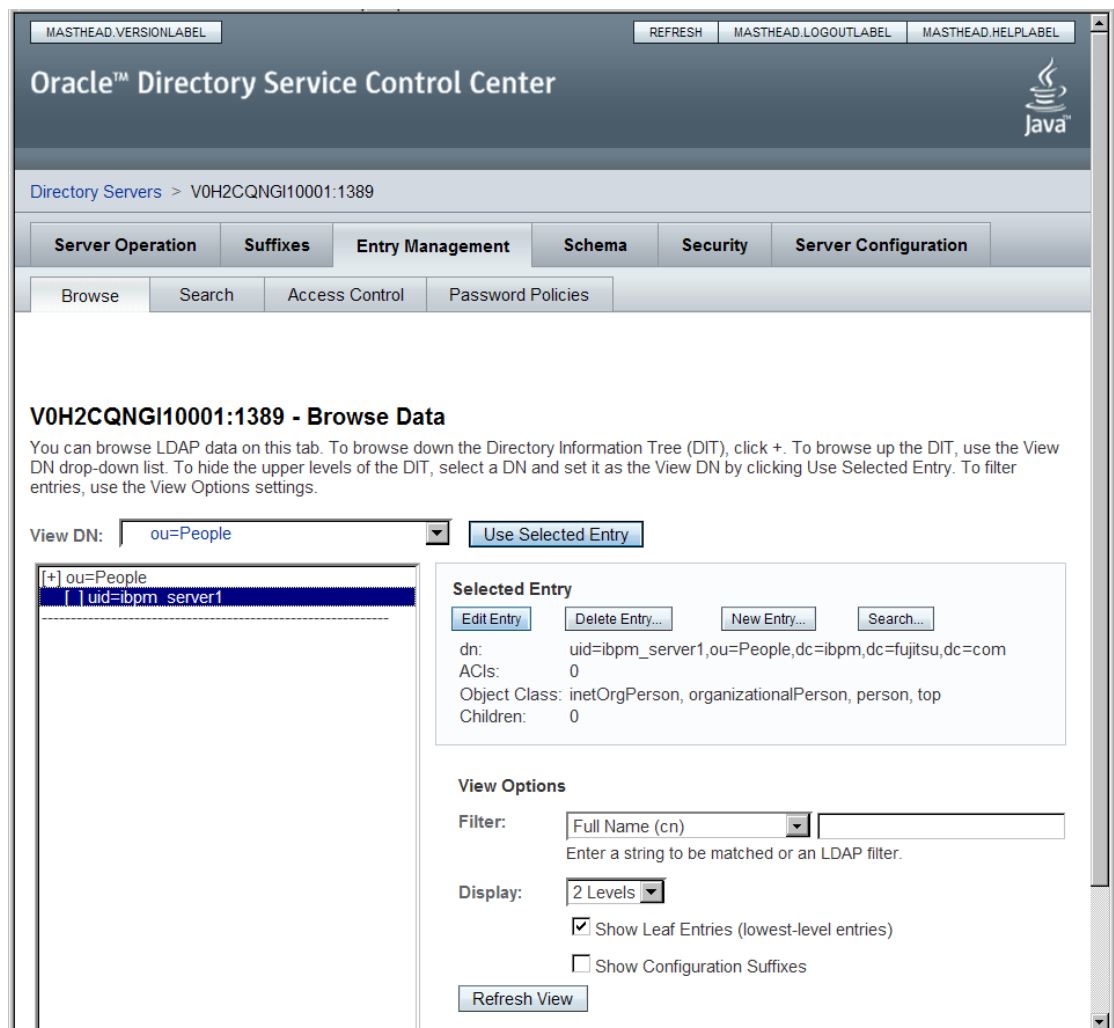


Figure 26: Directory Tree of People

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`.
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:

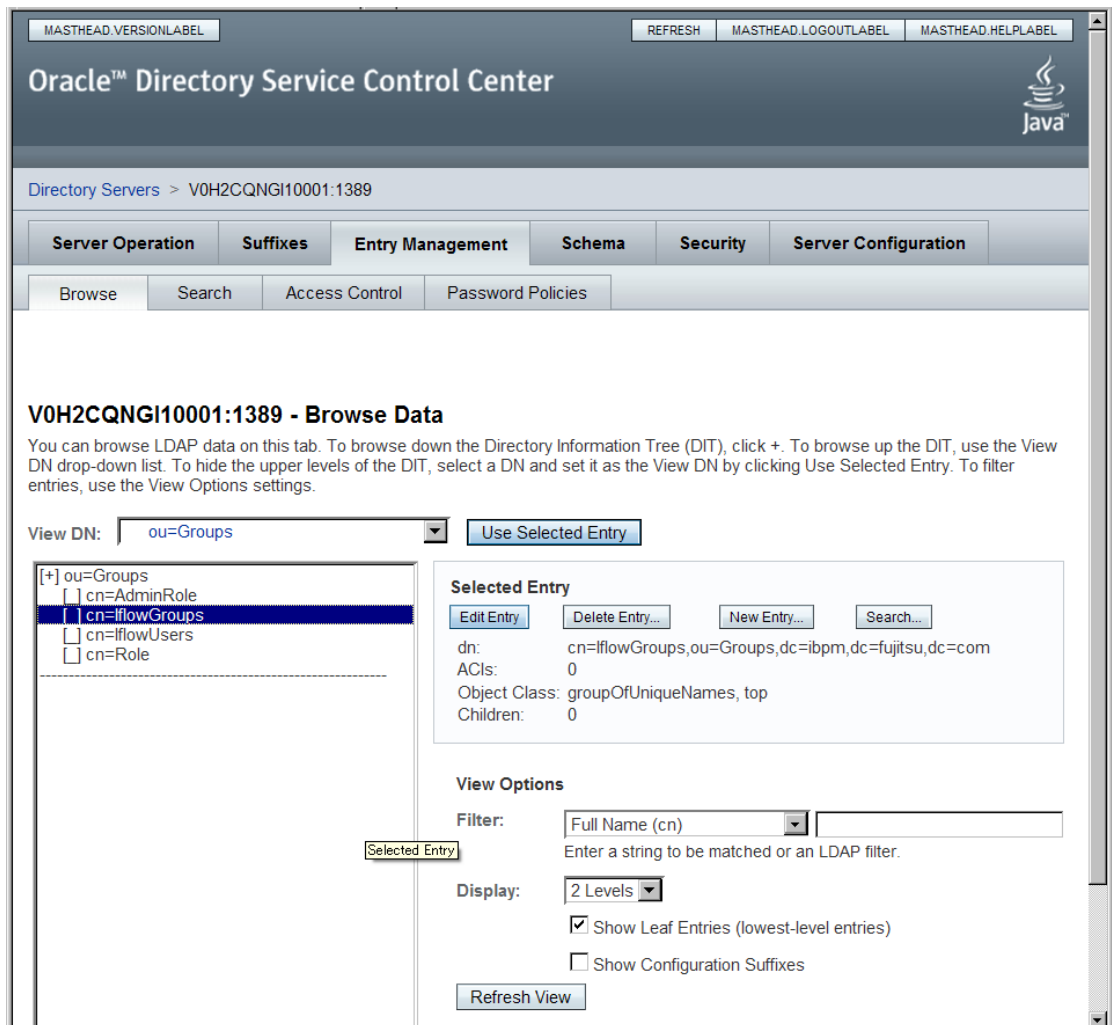


Figure 27: Directory Tree of Groups

7. Configure ACI.

- In the Oracle Directory Service Control Center, select the **Access Control** tab of **Entry Management**.
- Click **New ACI from Syntax** and start the **New ACI** wizard.
- 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='username',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 ACL is located: `Suffix`

Example:

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

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

8.2.4 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 your LDAP Users as Interstage BPM users and your LDAP Groups as Interstage BPM Roles. This involves the modification of two special LDAP Groups, `IflowUsers` and `IflowGroups`.

These two special LDAP Groups can be used to allow your LDAP Users and Groups access to Interstage BPM.

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 are also given access. To give your LDAP Groups access to Interstage BPM as Interstage BPM Roles, add them as members of the `IflowGroups` Group.

8.2.5 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.

8.2.6 Adding New Groups

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 deployment (typically `ibpm_server1`).

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 `Role` group.
3. In the **Allowed Attributes** screen, add the group you want by using the **Add** button.

8.3 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.

8.4 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

8.5 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.

9 Undeploying and Uninstalling Interstage BPM Server and Console

This chapter explains how to undeploy Interstage BPM Server and Console from an application server and how to uninstall Interstage BPM.

9.1 Undeploying Interstage BPM Server and Console from the Application Server

You can undeploy an instance of the Interstage BPM Server and Console from the application server using the Interstage BPM Deployment Tool.

Note: When you remove a server or console instance, the Interstage BPM database will not be removed.

To undeploy an Interstage BPM Server and Console instance:

1. Log out of all Interstage BPM Clients and close all Browser windows.
2. Start the Interstage BPM Deployment Tool.
For details, refer to section *Starting the Deployment Tool* on page 31.
3. On the **Welcome** screen, click **Server Instance Removal**.
4. Progress through the wizard using the explanations provided in the Description area for each field.

Note: During undeployment, in the Deployment screen, almost all field values are present, and are the same as those entered during deployment. You only need to specify the password.

9.2 Uninstalling Interstage BPM

When you uninstall Interstage BPM using its uninstallation program, everything **except** the following is removed:

- The Interstage BPM database
- Log files and configuration files located in `<Interstage BPM Server Installation Directory>` or in one of the subdirectories

During uninstallation, the Deployment Tool is started so that you can remove Interstage BPM Server from the application server if you have not done so yet.

To uninstall Interstage BPM:

1. If you have not yet removed the Interstage BPM Server/Console from the application server:
 - a) Log out of all Interstage BPM Clients and close all Browser windows.
2. Start the Interstage BPM uninstallation program:
 - On Windows, select **Start > Programs > Interstage Business Process Manager > Uninstall**. Alternatively, you can use the Windows Control Panel (**Start > Settings > Control Panel > Add or Remove Programs > Interstage Business Process Manager**)
 - On UNIX, run `<Interstage BPM Server Installation Directory>/_uninst/uninstall.sh`.
3. On the **Welcome** screen, click **Next**.

4. Depending on your platform, do any of the following:

- **On Windows:** Select the appropriate radio button on the **Deployment Tool Option Screen** and click **Next**.

Note: If you have already removed the Interstage BPM Server and Console from the application server, make sure that you select the **Do not launch Deployment Tool** radio button.

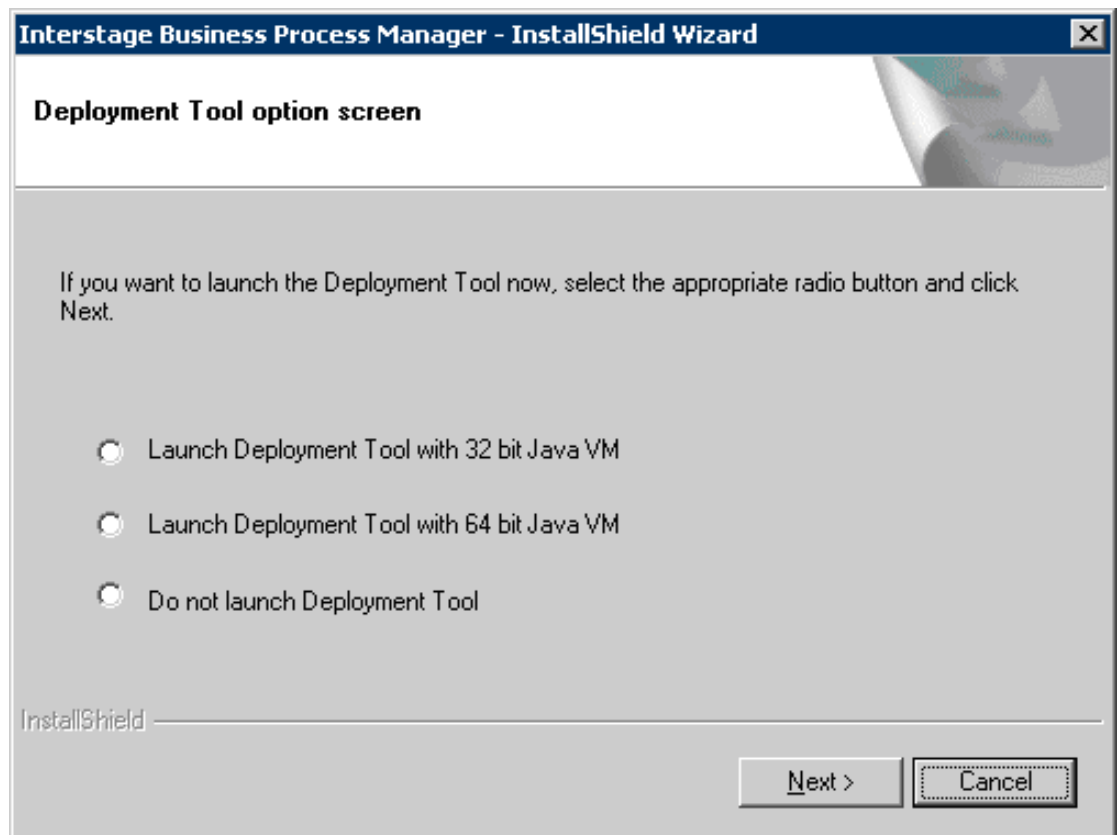


Figure 28: Start Deployment Tool - For Windows

- **On Linux:** Select the appropriate radio button on the **Deployment Tool Option Screen** and click **Next**.

Note: If you have already removed the Interstage BPM Server and Console from the application server, make sure that you select the **Do not launch Deployment Tool** radio button.

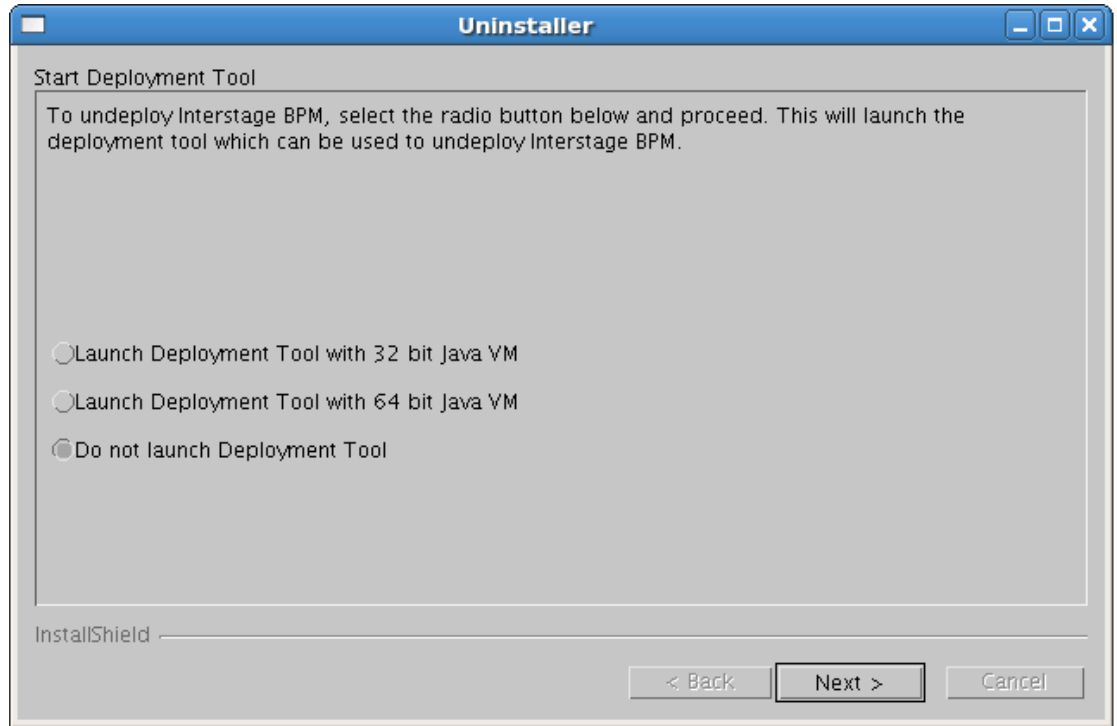


Figure 29: Start Deployment Tool - For Linux

- **On platforms other than Windows or Linux:** On the **Uninstaller** screen, check/uncheck the **Start Deployment Tool** checkbox depending on whether or not you want to undeploy before uninstallation. Then click **Next**.
5. If you decided to launch the Deployment Tool, do one of the following:
 - If you have already removed the Interstage BPM Server and Console from the application server, click **Cancel** to exit the Deployment Tool.
 - If you have not yet removed the Interstage BPM Server and Console from the application server, click **Server/Console instance removal** to start the removal process.
For further instructions, refer to section *Undeploying Interstage BPM Server and Console from the Application Server* on page 64.

In either case, after exiting the Deployment Tool, you will return to the uninstallation program.
 6. On Windows, when asked if you want to completely remove the selected application and all of its features, click **Yes /Next**.
 7. During uninstallation, the uninstallation program may ask you to confirm the deletion of some files. Decide whether you want to keep or remove the files.
 8. When the uninstallation is complete, click **Finish**.

10 Upgrading Interstage BPM from Previous Versions

10.1 Upgrading from Previous Versions of Interstage BPM

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 78.) 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 installing the new version of Interstage BPM, you can use the saved properties file to manually configure your new server installation. 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.
2. Uninstall the previous version of Interstage BPM according to the instructions for that version.
3. Install Interstage BPM Server according to the instructions in section *Installing Interstage BPM* on page 24.
4. Upgrade your database as follows:
 - a) If the Deployment Tool is not running, start it using the instructions in section *Starting the Deployment Tool* on page 31.
 - b) On the **Welcome** screen of the Deployment Tool, select **Upgrade**.
 - c) Click **Next**.
 - d) On the **Database Selection** screen, select the database system you are using.
 - e) Click **Next**.
 - f) On the **Database Configuration** screen, specify the settings for your database.
If you are migrating from an Interstage BPM **Advanced Edition**, select the **Upgrade from AE to EE Version** check box.

<p>Note: If you are upgrading from an Interstage BPM Enterprise Edition, do not select the Upgrade from AE to EE Version check box. Otherwise, your database may get incorrectly updated.</p>
--

- g) Click **Next**.
- h) Make sure that all the information displayed on the **Setup Confirmation** screen is correct.
- i) Click **Next** to start upgrading the database.

At the end of the process, a message is displayed notifying you that the database has been upgraded.

j) Click **OK** to exit the Deployment Tool.

5. Deploy the Interstage BPM Server and/or Console according to the instructions in section *Deploying Server Instances with Console* on page 35.

Note: On the **<Database> Setting** screen, **do not select** the **Create New Database** option. 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). 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*.

6. Migrate application resources as described in *Migrating Application Resources from Previous Versions to this Version of Interstage BPM* on page 68.
7. Start the Interstage BPM Server and Console. Refer the following topics:
 - *Starting Interstage BPM Server* on page 40
 - *Starting Interstage BPM Console and Tenant Management Console* on page 41
8. If needed, migrate application owners as described in *Migrating Application Owners from Previous Versions to this Version of Interstage BPM* on page 70.
9. For security reasons, delete the configuration file (of step 1) after using it.

Interstage BPM is now upgraded to the latest version.

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

Pre-requisites: You have completed the following steps as described in *Upgrading from Previous Versions of Interstage BPM* on page 67:

- You have uninstalled the previous version of Interstage BPM
- You have installed the new version of Interstage BPM
- You have upgraded the database
- You have deployed an instance of Interstage BPM Server, and after deployment, you have changed 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 `<Interstage BPM Installation 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 `<Interstage BPM Installation 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. 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.

4. Copy the `fileListenerConf.xml` file of the previous version to the `<DMSRoot>/apps/System` directory.

5. 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.

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.

10.3 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*.

10.4 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 40
 - *Starting Interstage BPM Console and Tenant Management Console* on page 41
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

10.5 Additional Steps for Handling Pre-11.0 Console URLs

In 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

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

- You should deploy an instance of Interstage BPM Server, and after deployment, 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.

10.5.1 Steps to Overcome the URL-incompatibility Problem

Pre-requisites: You have completed the following steps as described in *Upgrading from Previous Versions of Interstage BPM* on page 67:

- You have uninstalled the previous version of Interstage BPM
- You have installed the new version of Interstage BPM
- You have upgraded the database
- You have deployed an instance of Interstage BPM Server and Console, and after deployment, you have changed the `ApplicationSecurityMode` server configuration parameter to `relax`.

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`) at any location on your machine.
2. Copy the `webserviceproxy.war` file from the `console` directory on the Interstage BPM CD to the folder created in step 1.
3. Extract `webserviceproxy.war` to the `ibpmconsole` directory using the following java command:


```
jar -xvf webserviceproxy.war
```
4. After extracting the jar, edit the `proxy.conf` file located under `<Extraction Directory>\WEB-INF\config` and update the `ServerBaseURL` parameter in this file to the **v11 port number and context root**.
5. Copy the `jbossall-client.jar` file available in the `<JBossHOME>/client/` folder to the `WEB-INF/lib/` folder of the extracted WAR.

6. Start the JBoss Application server.
7. Start the Interstage BPM Server and Console. Refer the following topics:
 - *Starting Interstage BPM Server* on page 40
 - *Starting Interstage BPM Console and Tenant Management Console* on page 41

10.6 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.

10.7 Additional Steps for Interstage BPM Console

10.7 Additional Steps for Interstage BPM Console

10.8.1 Deleting Interstage BPM Console

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

On JBoss: Delete `console.war` from the following directory:

- On Windows: `<JBoss Installation Directory>\jboss-as\server\ibpm\deploy\console.war`
- On UNIX: `<JBoss Installation Directory>/jboss-as/server/ibpm/deploy/console.war`

10.8.2 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*.

10.9 Additional Steps for JBoss Application Server Configuration

In the former version of Interstage BPM (v11.2), Partition Name and Multicast IP were configurable during deployment. In Interstage BPM v11.2.1, these parameters are not configurable during deployment. Therefore, after completing deployment of Interstage BPM on JBoss application server, you need to configure these parameters.

Configure the `IBPM_CLUSTER_PARTITION_NAME` and `IBPM_MULTICAST_IP` parameters in the following files (using a text editor):

- On Windows: `<JBoss Installation Directory>\jboss-as\bin\setEnv.cmd`
- On UNIX: `<JBoss Installation Directory>/jboss-as/bin/setEnv.cmd`

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. 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 deployment 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.

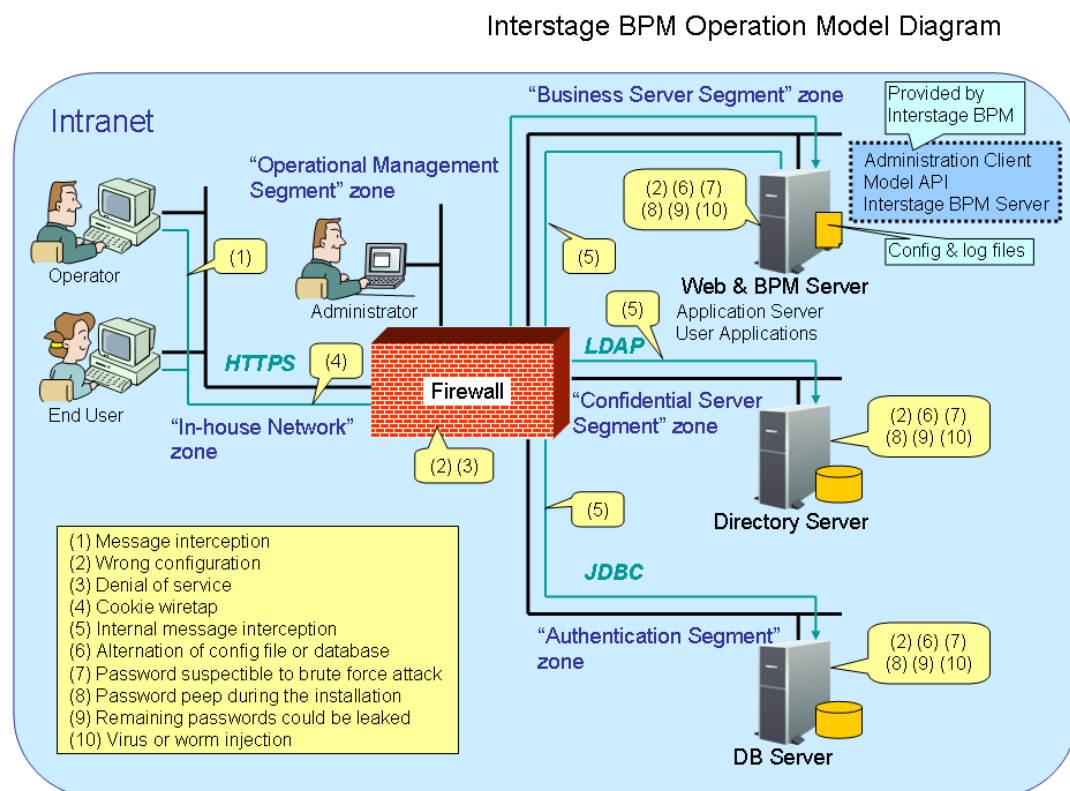


Figure 30: Interstage BPM Operation Model

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)	Virus or worm injection	As a rule, always use anti-virus software.

A.2 Password Encryption

The Interstage BPM Deployment Tool encrypts the passwords entered during deployment 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 deployment, 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 <Interstage BPM Server Installation 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 78. 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 78.

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 78.

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 `<Interstage BPM Server Installation 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 deployment 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 75.

3. Import the updated configuration file into the database by running the import script located in `<Interstage BPM Server Installation Directory>/server/deployment/bin:`

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

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 deployment 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.

A.6 Configuring JBoss Application Server for Secure Access of Interstage BPM Console

The Interstage BPM Console deployed on Interstage Application Server can be configured for secure access using HTTPS protocol. To enable this, Interstage BPM Console deployed on JBoss application server should be configured to run on Secure Socket Layer (SSL) port.

Broadly, configuring JBoss for secure access of Interstage BPM Console consists of the following steps:

1. Configuring a keystore and obtaining a signed certificate - refer *Configuring a Keystore and Obtaining a Signed Certificate* on page 82
2. Configuring Interstage BPM Console for HTTPS connection - refer *Configuring Interstage BPM Console on JBoss Application Server for HTTPS connection* on page 84
3. Updating Interstage BPM Server parameters - refer *Updating Interstage BPM Server Parameters* on page 84

Additionally, if Interstage BPM Server and Console need to access secure URLs, further steps are needed. For details, refer *Configuring Truststore for Interstage BPM Server and Console to access Secure URLs* on page 84

Note: Please refer JDK documentation for usage of various commands described in this section.

A.6.1 Configuring a Keystore and Obtaining a Signed Certificate

Overview

Broadly, the following steps are used to create a keystore and obtain a signed certificate from a Certifying Authority (CA):

1. Create a private/public key pair, self-signed certificate
2. Generate a Certificate Signing Request (CSR) for a CA
3. If the CA's own certificate is not already present in your list of trusted certificates in the keystore, import the CA's certificate
4. Import the CA-signed certificate reply to the keystore

Details

1. To create a private/public key pair, self-signed certificate, use `keytool.exe`, which is a Key and Certificate Management Tool supplied with any version of the Java SDK.

- a) Find the keytool located in `<JAVA_HOME>\bin\keytool.exe`.
- b) The keystore can be created in a directory of your choice. This directory is also referenced as `<KEYSTORE_HOME>`.

Create a self-signed certificate (a public/private key) using the following command at a Command Prompt: `keytool -genkey -v -alias <keyname> -keypass <keypassword> -keyalg RSA -keystore <keyStoreFile> -storepass <KeystorePassword> -dname <dname>`.

Here, `<keyStoreFile>` is the full path including the name of the keystore file to be created, `<dname>` is the 'X.500 Distinguished Name' to be associated with this key. While specifying `<dname>`, it is mandatory to keep the 'first and last name' (denoted by 'CN') as the hostname of the machine on which the secure Interstage BPM Console is to be deployed. This is to avoid SSL certificate name mismatch error.

For example, `keytool -genkey -alias jbosskey -keypass changeit -keyalg RSA -keystore C:\server.keystore -storepass changeit -dname "CN=MyMachine, OU=MyOrg, O=MyCompany, L=MyCity, ST=MyState, C=US"`.

The generated keystore contains a certificate (containing the public key) and its associated private key.

2. Create a new certificate signing request (CSR) with the following command:

```
keytool -certreq -v -alias <keyname> -keystore <KEYSTORE_HOME> -keypass
<keypassword> -storepass <KeystorePassword>
```

A request of the following format is generated:

```
-----BEGIN NEW CERTIFICATE REQUEST-----
...
...
-----END NEW CERTIFICATE REQUEST-----
```

3. Send the signing request (generated in the step above) to a trusted Certificate Authority (CA) for issuing a signed certificate. The Certifying Authority will return a signed certificate reply.
4. The signed certificate reply issued by the CA authenticates the self-signed public key certificate generated in step 1. A typical signed certificate reply issued by the CA will have the following format:

```
-----BEGIN CERTIFICATE-----
...
...
-----END CERTIFICATE-----
```

Save this certificate into a file.

Note: Make sure that the format in which the certificate reply is provided by the CA is supported for import using the keytool. Typically, keytool can import X.509 certificates and PKCS#7 formatted certificate chains. And the certificate must be either in binary encoding format or in printable encoding format.

5. Verify the certificate reply by executing the following command to view its fingerprints:

```
keytool -printcert -file <certificate-reply-file>
```

<certificate-reply-file> is the complete path of the file containing the certificate reply that you received from the CA. Compare the displayed fingerprints with the ones received from CA. Only when the fingerprints match is it guaranteed that the certificate has not been tampered in transit by someone.

6. If the CA's own certificate is not already present in your list of trusted certificates in the keystore, import the CA's certificate.
7. Import the certificate reply file to the keystore file so that it can be used for configuring HTTPS on JBoss application server. Use the following command to import/store the certificate reply as a trusted certificate:

```
keytool -v -import -trustcacerts -keystore <keystore-location> -file
<certificate-reply-file> -alias <keyname> -keypass <keypassword> -storepass
<KeystorePassword>
```

Here, <keyname> is the name of the key, <keystore-location> is the complete path of the keystore file which contains the generated key, <keypassword> is the password of the key, <KeystorePassword> is the password of the keystore and <certificate-reply-file> is the complete path of the file containing the certificate reply that you received from the CA.

Once the certificate is imported to a keystore, it can be used for configuring secure connections in Interstage BPM on JBoss application server.

A.6.2 Configuring Interstage BPM Console on JBoss Application Server for HTTPS connection

Prerequisite: Ensure that Interstage BPM Console is already deployed on JBoss application server.

Steps

1. For JBoss EAP 5.0, open the `server.xml` file located in the `<JBoss Installation directory>\jboss-as\server\ibpm\deploy\jbossweb.sar` folder.
2. Disable the existing HTTP support by commenting out the contents inside the `<Connector>` tag for HTTP connection. This tag can be identified by the comment above the tag as `'A HTTP/1.1 Connector on port 49950'`.
3. Enable HTTPS support by removing comments for the `<Connector>` tag for HTTPS connection. This tag can be identified by the comment above the tag as `'SSL/TLS Connector configuration using the admin devl guide keystore'`.
4. Inside the `<Connector>` tag for HTTPS, add/update the following attributes:
 - `keystoreFile`: specify location of keystore file containing the signed certificates. For example, `keystoreFile="C:/server.keystore"`
 - `keystorePass`: specify password for keystore file. For example, `keystorePass="changeit"`
 - `keystoreType`: If the keystore type is different from the default keystore type, namely `JKS`, add this attribute specifying the keystore type as its value.
 - `useBodyEncodingForURI="true"`
 - `port`: change to a desired value if required

A sample configuration in the `<Connector>` tag for HTTPS connection should look like the following:

```

<!--SSL/TLS Connector configuration using the admin devl guide
keystore-->
<Connector port="49950" address="{jboss.bind.address}"
maxThreads="100" strategy="ms" maxHttpHeaderSize="8192"
emptySessionPath="true" useBodyEncodingForURI="true"
scheme="https" secure="true" clientAuth="false"
keystoreFile="C:/server.keystore"
keystorePass="changeit" sslProtocol = "TLS" />
```

Now Interstage BPM Console is configured to use the CA certificate as its site certificate.

A.6.3 Updating Interstage BPM Server Parameters

Change `http` to `https` in the values of the following Interstage BPM Server parameters:

- `ServerBaseURL`
- `ServerEmailBaseURL`

Refer the *Interstage BPM Server Administration Guide* for details on how to update server parameters.

A.6.4 Configuring Truststore for Interstage BPM Server and Console to access Secure URLs

The Interstage BPM Server and Console would need to access 'secure URLs' in following scenarios:

- When accessing remote subprocess using ASAP/SWAP URLs which is deployed either on a local or a remote Interstage BPM Console

- For Web services – for example, both Interstage BPM web services and other external web services can be accessed from a web service javaaction
- When XSD is used for trigger validation

Note: For information about how Interstage BPM Server can be configured to access secure WebDAV, refer *Configuring Interstage BPM Server for secure WebDAV DMS access* on page 85.

For accessing a particular secure URL from Interstage BPM, it is essential that:

- This URL is hosted on a website which has a CA certified certificate.
- The Java Runtime Environment (JRE) used for starting Interstage BPM should be able to identify the self-signed certificate of the root CA of this website as a trusted certificate. The trusted certificates for a JRE are those which are included as trusted entries either in the `cacerts` file (the `cacerts` file represents a system-wide keystore with CA certificates, located at `<jrehome>/lib/security`) or in the truststore file (this file needs to be explicitly specified using the `-Djavax.net.ssl.trustStore` JVM option).

To configure truststore for Interstage BPM Server and Console to access secure URLs:

1. Configure the truststore for Interstage BPM by adding the truststore's path to the `run.conf` file on a UNIX machine or the `run.conf.bat` file in Windows environment, as follows. These files are located at `<JBoss Installation Directory>/jboss-as/bin/ directory`.

```
set JAVA_OPTS= -Djavax.net.ssl.trustStore="<path to truststore file>" %JAVA_OPTS%
```

Example: `set JAVA_OPTS= -Djavax.net.ssl.trustStore="C:\libpmtruststore" %JAVA_OPTS%`

If you configure the `JAVA_OPTS` variable at any other place, it might prevent the setting of certain Java VM options which are necessary for server startup.

A.7 Configuring Interstage BPM Server for secure WebDAV DMS access

WebDAV compliant directory can be configured as DMS root for the IBPM Server. This WebDAV directory may be configured for secure access using HTTPS url. In such a case additional configuration should be done on IBPM.

To configure Interstage BPM server for secure WebDAV DMS access:

1. Export the IBPM configuration from the database into a configuration file.

For information on exporting the configuration file, refer *Using the Configuration Export and Import Scripts* on page 78.

2. Copy the root CA certificate used by WebDAV directory to the machine where IBPM is installed. This is further referenced as `<CERTIFICATE_PATH>`

3. Import the root CA certificate copied in the step above to a keystore (which gets created) using the following command: `keytool -import -trustcacerts -alias <key name> -file <CERTIFICATE_PATH>\<certificate name> -keystore <keyStoreFile>`.

Here, `<keyStoreFile>` is the full path including the name of the keystore file to be created.

Example on Windows: `keytool -import -trustcacerts -alias mykey -file C:\example.cer -keystore C:\java\jdk1.6.0_22\jre\lib\security\mystore.keystore`

Example on UNIX: `keytool -import -trustcacerts -alias mykey -file /tmp/example.cer -keystore /usr/java/jdk1.6.0_22/jre/lib/security/mystore.keystore`

Note: Ensure that all security certificates related to IBPM are added to the same keystore file.

4. Add the following property in the configuration file exported in step 1: `WebDAVKeyStore=<keystore path>`.

Example on Windows:

```
WebDAVKeyStore=C:\java\jdk1.6.0_22\jre\lib\security\mystore.keystore
```

Example on UNIX:

```
WebDAVKeyStore=/usr/java/jdk1.6.0_22/jre/lib/security/mystore.keystore
```

5. In order for your changes to take effect, import the updated configuration file into the database. For information on importing the configuration file, refer *Using the Configuration Export and Import Scripts* on page 78. After import is complete, for security reasons, delete the configuration file.
6. Restart the Interstage BPM Server.
7. Configure the truststore for Interstage BPM by adding the truststore's path to the `run.conf` file on a UNIX machine or the `run.conf.bat` file in Windows environment, as follows. These files are located at `<JBoss Installation Directory>/jboss-as/bin/ directory`.

```
set JAVA_OPTS= -Djavax.net.ssl.trustStore="<path to truststore file>" %JAVA_OPTS%
```

Example on Windows: `set JAVA_OPTS=`

```
-Djavax.net.ssl.trustStore="C:\java\jdk1.6.0_22\jre\lib\security\mystore.keystore"
%JAVA_OPTS%
```

Example on UNIX: `set JAVA_OPTS=`

```
-Djavax.net.ssl.trustStore="/usr/java/jdk1.6.0_22/jre/lib/security/mystore.keystore"
%JAVA_OPTS%
```

If you configure the `JAVA_OPTS` variable at any other place, it might prevent the setting of certain Java VM options which are necessary for server startup.

A.8 Configuring JBoss Application Server Secure Access

If Jboss services need to listen on external IPs that may be visible to unauthorized users, it is recommended that authentication is enabled on services like `rmi-http`, `jmx-console`, and `web-console`. Failure to do so could result in exposing administrative services on the JBoss installation to malicious users and this could result in Denial of Service (DoS) attacks.

JBoss Console can be accessed by using the following:

- `http://<hostname>:<port>/`
- Default configuration by Interstage BPM Deployment tool (using `-b 0.0.0.0` option)
- `http://<hostname>:49950/`

To enable authentication for JMX and web console:

1. Edit the following `web.xml` files to comment out the security-constraint sections:

- `server/ibpm/deploy/jmx-console.war/WEB-INF/web.xml`
- `server/ibpm/deploy/management/console-mgr.sar/web-console.war/WEB-INF/web.xml`

Commented out the following fragments:

```
<security-constraint>
    .
    .
    .
</security-constraint>
```

2. Ensure the following `jboss-web.xml` files use a security domain:

- `server/ibpm/deploy/jmx-console.war/WEB-INF/jboss-web.xml`
- `server/ibpm/deploy/management/console-mgr.sar/web-console.war/WEB-INF/jboss-web.xml`

The above file should have something like the following XML fragment:

```
<jboss-web>
    .....
    <security-domain>java:/jaas/jmx-console</security-domain>
</jboss-web>
```

3. Set up users and roles.

- Set up users. The default username/password combination of `admin/admin` is now active.
- Change or update the usernames and/or passwords for the configured security domain by editing the corresponding credential files.

- `server/ibpm/conf/props/jmx-console-users.properties`
Default : `admin=admin`

- Confirm the following settings to make this property effective. The following examples are the settings that use the same password as `jms-console`.

```
-server/ibpm/conf/login-config.xml
<application-policy name="jmx-console">
...
<module-option
name="usersProperties">props/jmx-console-users.properties</module-option>
<module-option
name="rolesProperties">props/jmx-console-roles.properties</module-option>
...
</application-policy>
...
<application-policy name="web-console">
...
<module-option
name="usersProperties">props/jmx-console-users.properties</module-option>
<module-option
name="rolesProperties">props/jmx-console-roles.properties</module-option>
...
</application-policy>
...
<application-policy name="JBossWS">
...
<module-option
name="usersProperties">props/jmx-console-users.properties</module-option>
<module-option
name="rolesProperties">props/jmx-console-roles.properties</module-option>
...
</application-policy>
```

If you need more details, refer to the JBoss Application Server documents.

Note: After finishing to use JBoss consoles, all web browsers must be closed.

Appendix B: Silent Mode Installation

A Silent Mode installation is a non-interactive type of installation, i.e. you start the installation program and Interstage BPM is installed. If you have to perform multiple installations of Interstage BPM, and the installations are essentially the same, you might want to consider installing Interstage BPM in Silent Mode as you can save a significant amount of time.

How It Works

Silent Mode installations involve the use of an installation script. You perform the first installation interactively using a special installation option that records the installation into an installation script in ASCII (text) format. You then run subsequent installations in silent mode using this script. Minor installation variations can be handled by editing the script.

B.1 Setting Up a Silent Mode Installation of Interstage BPM

To set up a Silent Mode Installation:

1. Create a new directory on your computer.
2. Copy the following files from the `engine` directory on your CD-ROM to the directory that you created on your computer:
 - `setup.jar`
 - `setupwin32.exe` on Windows
 - `setupSolaris.bin` on Solaris
 - `setupLinux.bin` on Linux
3. Open a Command Prompt window and navigate to the directory on your computer containing the copied files.
4. Start the installation program for Interstage BPM by entering the following command:

On Windows:

```
setupwin32.exe /r /f1"<Absolute Installation Script Path>\<Installation Script Name>"
```

In the following example, `RMI` is the directory containing the copied files and `record-install.iss` is the name of the installation script to be recorded:

```
C:\RMI> setupwin32.exe /r /f1"C:\RMI\record-install.iss"
```

Note: The installation script for Windows is created in a `.iss` (and not `.txt`) file.

On Solaris:

```
./setupSolaris.bin -options-record <Installation Script>
```

In the following example, `RMI` is the directory containing the copied files and `record-install.txt` is the name of the installation script to be recorded:

```
/RMI> ./setupSolaris.bin -options-record record-install.txt
```

On Linux:

```
/RMI> ./setupLinux.bin -options-record record-install.txt
```


Note: If you receive an error while launching the installation program on Linux, it is possible that some essential packages are missing from the Linux machine. For details about mandatory packages for Linux, refer *Preparation for Installing Interstage BPM on Linux Environments* on page 15. After installing mandatory packages, retry launching the Interstage BPM installation program for Linux.

This command starts a normal mode installation of Interstage BPM and records the installation choices that you make. As the installation program runs, use the instructions in chapter *Installing and Deploying Interstage BPM Server and Console* on page 22.

At the end of installation, the installation choices are written to the installation script. In the example, the installation script `record-install.txt` (`record-install.iss` for Windows) is created in the `RMI` directory. You can now use the installation script to install Interstage BPM on other computers in Silent Mode.

B.2 Installing Interstage BPM in Silent Mode

Prerequisite: You have set up your Silent Mode installation as instructed in section *Setting Up a Silent Mode Installation of Interstage BPM* on page 88.

To install Interstage BPM using Silent Mode:

1. Create a directory on the computer where you want to install Interstage BPM in Silent Mode. In the example below, `RMI` is used as the directory's name.
2. Copy the following files from the computer where you recorded the installation script to the directory that you created in the previous step:
 - the installation script that you recorded, e.g. `record-install.txt`
 - `setup.jar`
 - `setupwin32.exe` on Windows
 - `setupSolaris.bin` on Solaris
 - `setupLinux.bin` on Linux
3. Make a note of the drive and directory to which you copied the files.
4. Open the installation script in a text editor and make any changes necessary to make it run properly in the different environment. Refer to section *Silent Mode Installation Options* on page 90 for allowed changes.

For example, you might have your J2SE Development Kit (JDK) installed on a different drive and in a different directory than on the computer where you recorded the installation script. You must search for that path and change it to the path used by the computer on which you are running the silent mode installation.

5. Save the changes made to your installation script.
6. Open a Command Prompt window and navigate to the directory that contains the installation script.
7. Install Interstage BPM in Silent Mode with the following command:

On Windows:

```
C:\RMI> <Absolute Path>\setupwin32.exe /s /f1"<Absolute Installation Script
Path>\<Installation Script Name>" /f2"<Absolute Installation Log File
Path>\<Installation Log File Name>"
```

On Solaris:

```
/RMI> ./setupSolaris.bin -options "<Absolute Path>/record-install.txt" -silent
```

On Linux:

```
/RMI> ./setupLinux.bin -options "<Absolute Path>/record-install.txt" -silent
```

This procedure can be repeated for all of your Interstage BPM installations.

B.3 Silent Mode Installation Options

The Silent Mode installation script is a text file that you record while performing the first installation.

Note: Only use the installation script for the type of installation that you recorded. Do not add or delete parameters. Otherwise, your installation script might not work properly.

You can customize the installation script to make it run properly in a different environment. For example, you might have your J2SE Development Kit (JDK) installed on a different drive and in a different directory than on the computer where you recorded the installation script.

Parameter Description

The following table lists the parameters that occur in the installation script. All parameter values have to be enclosed in double quotes. A short description of the parameters is also provided. For detailed information about the parameters, refer to section *Installing Interstage BPM* on page 24.

Parameter Name	Sample Value	Description
On Windows: <code>szDir</code> (located below <code>SdAskDestPath2</code>) On UNIX: <code>-w bean1.destinationPath</code>	On Windows: <code>"C:\Fujitsu\InterstageBPM"</code> On UNIX: <code>"/opt/FJSVibpm"</code>	Absolute path to the installation directory of the Interstage BPM.
On Windows: <code>szDir</code> (located below <code>SelectDir</code>) On UNIX: <code>-w bean11.jdkHome</code>	On Windows: <code>"C:\j2sdk"</code> On UNIX: <code>"/usr/java"</code>	Absolute path to the top-level directory of the J2SE Development Kit (JDK) installation.

Parameter Name	Sample Value	Description
On Solaris: <code>-w</code> <code>bean2223.deploymenttool</code> On Linux: <code>-w</code> <code>bean22233.deploymenttool</code> (This parameter does not exist for Windows)	""	Specifies whether the installation program launches the Deployment Tool in graphical mode at the end of installation. "A": The installation program launches the Deployment Tool in graphical mode. This option does not make sense when running a silent mode installation because it requires some user interaction after installation. "": The installation program does not launch the Deployment Tool. Like the installation program, the Deployment Tool can be run in Silent Mode. For details, refer to appendix <i>Silent Mode Deployment and Undeployment</i> on page 92.

Example

On Windows, since no parameter exists to control launch of Deployment Tool in graphical mode, even if you perform a silent install, the Deployment Tool is not launched in graphical mode at the end of silent installation. For example, the following script performs a new installation of the Interstage BPM, but the Deployment Tool is not launched at the end of silent installation.

```

...
[ { ID } -SdAskDestPath2-0 ]
szDir=C:\Fujitsu\InterstageBPM
[ { ID } -SelectDir-0 ]
...
szDir=C:\j2sdk
...

```

On UNIX-based systems, the following sample script performs a new installation of the Interstage BPM without launching the Deployment Tool at the end of installation.

Sample script for Solaris:

```

-w bean1.destinationPath="opt/FJSVibpm"
-w bean11.jdkHome="/usr/java"
-w bean2223.deploymenttool=""

```

Sample script for Linux

```

-w bean1.destinationPath="opt/FJSVibpm"
-w bean11.jdkHome="/usr/java"
-w bean22233.deploymenttool=""

```

Appendix C: Silent Mode Deployment and Undeployment

Like the installation program, the Deployment Tool can be run in Silent Mode. Running the Deployment Tool in silent mode allows you to **deploy or undeploy** Interstage BPM Server without user interaction. This is an efficient way to perform multiple deployments or undeployments if the operations are essentially the same.

Silent Mode deployments and undeployments require the use of a Silent Mode script. You perform an interactive deployment or undeployment using a special option that records your choices into a Silent Mode script. You then run subsequent deployments/undeployments in Silent Mode using this script. Minor operation variations can be handled by editing the script.

C.1 Setting Up Silent Mode Operation

To set up a Silent Mode operation:

1. Start the Deployment Tool with the `-generateSilent` option.

From `<Interstage BPM Installation Directory>/server/deployment/tool` execute the following command:

Operating System	Startup Script
Windows	run_windows.bat -generateSilent (for 32bit Deployment Tool) run_windows_x64.bat -generateSilent (for 64bit Deployment Tool)
Solaris	run_solaris.sh -generateSilent
Linux	run_linux.sh -generateSilent (for 32bit Deployment Tool) run_linux_x64.sh -generateSilent (for 64bit Deployment Tool)

2. Choose the operation you want to perform (Server Instance Setup / Server Instance Removal).

Note: The **Upgrade** and **External setup** options are not supported in silent mode.

3. Walk through the configuration steps for the operation you selected until you reach the **Setup Confirmation** screen .
4. Click **Next** to start the selected operation.
Your configuration choices are written to a Silent Mode script named `silent_<Date>`. The script is located in `<Interstage BPM Server Installation Directory>/server/deployment/resources`.

Note: It is recommended you rename the Silent Mode script because it will be overwritten if you regenerate it.

You can now use the script to perform the recorded operations on other computers in Silent Mode.

C.2 Running Silent Mode Operations

Prerequisite: You have created a Silent Mode script as instructed in section *Setting Up Silent Mode Operation* on page 92. Also, Interstage BPM is already installed on your computer.

To run the Deployment Tool in Silent Mode:

1. Copy the Silent Mode script that you recorded to the computer where you want to run the Deployment Tool in Silent Mode.

You can copy the script to a directory of your choice.

2. Open the Silent Mode script in a text editor and make any changes necessary to make it run properly in the different environment. Refer to section *Silent Mode Deployment Tool Options* on page 93 for allowed changes.

For example, you might have your database installed on a different drive and in a different directory than on the computer where you recorded the script. You must search for that path and change it to the path used by the computer on which you are running the silent mode deployment.

3. Open a Command Prompt window and navigate to the directory `<Interstage BPM Server Installation Directory>/server/deployment/tool`.
4. Execute the following command:

Operating System	Startup Script
Windows	<pre>run_windows.bat -silentmode <Silent Mode Script> (for 32bit Deployment Tool) run_windows_x64.bat -silentmode <Silent Mode Script> (for 64bit Deployment Tool)</pre>
Solaris	<pre>run_solaris.sh -silentmode <Silent Mode Script></pre>
Linux	<pre>run_linux.sh -silentmode <Silent Mode Script> (for 32bit Deployment Tool) run_linux_x64.sh -silentmode <Silent Mode Script> (for 64bit Deployment Tool)</pre>

For `<Silent Mode Script>`, specify the absolute path of your script.

The Deployment Tool will run in silent mode and execute the options you chose while recording the script.

C.3 Silent Mode Deployment Tool Options

The Silent Mode script is a text file that you record while running the Deployment Tool in interactive mode. The contents of the Silent Mode script depends on the type of operation that you record. There are different types of operations; each type has its own set of parameters:

- Server/Console instance setup without configuring the database (deployment)
- Server/Console instance setup including database configuration (deployment)
- Server/Console instance removal (undeployment)

For each type of operation, there are additional variations depending on the application server, database and Directory Service you are using.

Note: Only use the Silent Mode script for the type of operation that you recorded.

You can customize the script to make it run properly in a different environment. For example, you might have your database installed on a different drive and in a different directory than on the computer where you recorded the script.

The following tables list the parameters that you may change in the script. A short description of the parameters is also provided. **Parameters listed below for the application server are applicable for both deployment as well undeployment, unless specifically mentioned otherwise.**

Note:

- Only change parameters that are described below. Do not change any other parameters. Do not add or delete parameters. Otherwise, your script might not work properly.
- Any backslashes "\", colons ":" or equal signs "=" used in parameter values must be escaped by backslashes. For example, a server address is specified like this:
`ibpmhost\ :49950`

JBoss Application Server Parameters (for Deployment and Undeployment)

Parameter	Sample Value	Description
appserver_version	JBoss EAP 5	Version of JBoss Application Server. Current valid value is JBoss EAP 5.
appserver_home	<ul style="list-style-type: none"> • On Windows: C:\jboss-eap-5.0\jboss-as • On UNIX: /opt/jboss-eap-5.0/jboss-as 	Absolute path to the installation directory of the JBoss Application Server. Use the appropriate values depending on the JBoss version that you are using. Note: Available only during deployment

Database Parameters – Microsoft SQL Server

Parameter	Sample Value (without spaces)	Description
db_ibpm_user_name	ibpmuser	User name for a non-administrative database user account.
db_ibpm_password	ibpmuserpassword	Password for the non-administrative database user account.
db_host	<database server name>	Database server name or IP address. This parameter is necessary only for remote database.

Parameter	Sample Value (without spaces)	Description
db_port	1433	Port on which Microsoft SQL Server is running.
db_adminpassword	adminpassword	Password for the administrative database user account.
db_jdbc_library_path	C:\MicrosoftSQLServer2005JDBCdriver\sqljdbc_2.0\enu\sqljdbc4.jar	Absolute path of the JDBC driver. For the exact version of the JDBC driver supported, refer the <i>Release Notes</i> .
db_database_home	C:\Program Files\Microsoft SQL Server	Absolute path to the top-level directory of your Microsoft SQL Server installation.
sql_db_admin_username	sa	Username for the administrative database user account. Usually sa for Microsoft SQL Server.
sql_db_data_files_dir	C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Data	Absolute path to the directory where the Interstage BPM database resides.

Database Parameters – Oracle

Parameter	Sample Value (without spaces)	Description
db_ibpm_user_name	ibpmuser	User name for a non-administrative database user account.
db_ibpm_password	ibpmuserpassword	Password for the non-administrative database user account.
db_host	<database server name>	Database server name or IP address. This parameter is necessary only for remote database.
db_port	1521	Port number of the database
db_jdbc_library_path	On Windows: C:\ojdbc\Driver11.1.0.7\ojdbc6.jar On UNIX: /opt/ojdbc/driver11.1.0.7/ojdbc6.jar	Absolute path of the Oracle JDBC driver. For the exact version of the JDBC driver supported, refer the <i>Release Notes</i> .

Parameter	Sample Value (without spaces)	Description
db_database_home	On Windows: C:\app\Administrator\product\11.2.0\db_1 On UNIX: /opt/oracle/product/11.2.0/db_1	Absolute path to the top-level directory of your Oracle installation.
db_admin_password	oracleadminpassword	Password of the SYSTEM user
db_instance_name	ORCL	Connection identifier for the Oracle database
db_data_file_location	On Windows: C:\app\Administrator\product\11.2.0\oradata\orcl On UNIX: /opt/oracle/product/11.2.0/oradata/orcl	Absolute path to the directory where the Interstage BPM database resides.

Interstage BPM System Administrator (Super User)

Parameter	Sample Value (without spaces)	Description
super_user	ibpm_server1	User name of the Interstage BPM System Administrator (Super User)
super_user_password	ibpm_server1	Password of the Interstage BPM System Administrator (Super User)

Directory Service Parameters

Parameter	Sample Value	Description
LDAPServer	myhost	Host name or IP address of the computer hosting the Directory Service.
LDAPDBSuffix	dc=fujitsu,dc=com	Directory Service Key.
LDAPGroups	ou=Groups	Directory Service Organizational Unit.
LDAPPort	389	Directory Service port.

Interstage BPM Tenant Owner

Parameter	Sample Value (without spaces)	Description
LDAPAccessUserID	ibpm_server1	User name of Tenant Owner of the default tenant.
LDAPAccessUserPassword	ibpm_server1password	Password of Tenant Owner of the default tenant.

Interstage BPM Environment

Parameter	Options	Description
appserver_selected	JBoss EAP 5 for JBoss	Application server type for Interstage BPM deployment.
DirectoryService	0: Local user management 1: Oracle Directory Service 3: Active Directory	Directory server type
database_selected	Oracle for Oracle11g/10g SQLServer for Microsoft SQL Server	Database server type for Interstage BPM deployment
database_creation_selection	0: create new database 1: use existing database	Configuration for Interstage BPM database

Appendix D: Silent Mode Uninstallation

Similar to silent undeployment, you can also uninstall Interstage BPM in silent mode, without user interaction. This is helpful for multiple, similar uninstallations.

Note: Unlike in the Interstage BPM interactive uninstall functionality (using the Graphical User Interface), in Silent Mode you cannot undeploy and uninstall together in one go. In Silent Mode, you need to do these actions separately with two different scripts.

D.1 Setting Up a Silent Uninstall

Note: This setup is required only for Windows. For other platforms, no setup is required; you can directly uninstall Interstage BPM silently using the information in section *Uninstalling Interstage BPM in Silent Mode* on page 98.

Pre-requisites: You have already undeployed Interstage BPM.

On Windows, set up a silent uninstallation as follows:

1. Record your choices from the interactive uninstallation into an uninstallation script.
 - a) From the Command Prompt, run the following command:


```
"C:\Program Files\InstallShield Installation Information\{DFC70E37-68E7-469C-A253-9ED7BB3BCD23}\setup.exe"
-runfromtemp -l0x0009 -removeonly -r -f1"Absolute Uninstallation
ScriptPath"<Uninstallation Script Name>"
```

For example:

 - Run the following command:


```
"C:\Program Files\InstallShield Installation
Information\{DFC70E37-68E7-469C-A253-9ED7BB3BCD23}\setup.exe" -runfromtemp
-l0x0009 -removeonly -r -f1"C:/Temp/record-uninstall.iss"
```

Note that the recorded script should be a *.iss file.
 - b) On the first uninstall screen that comes up (Deployment Tool Options Screen), ensure you select the **Do not launch Deployment Tool** option.
 - c) Click through the remaining uninstall screens to finish recording the script.

D.2 Uninstalling Interstage BPM in Silent Mode

Pre-requisite: On Windows, ensure you have completed setting up silent mode uninstallation.

To uninstall Interstage BPM using Silent Mode:

1. **On Windows:**
 - a) Copy the uninstall script you recorded earlier, on to the machine where you intend to uninstall Interstage BPM silently.
 - b) From the Command Prompt, run the following command:


```
"C:\Program Files\InstallShield Installation Information\{DFC70E37-68E7-469C-A253-9ED7BB3BCD23}\setup.exe"
-runfromtemp -l0x0009 -removeonly -s -f1"Absolute Uninstallation Script
Path"<Uninstallation Script Name>"
```
2. **On UNIX:** From the Command Prompt, navigate to <Interstage BPM Server Installation Directory>/_uninst and run the following command: `uninstall.sh -silent`.

Appendix E: 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 deployed 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.

This appendix also provides the procedure for setting up a cluster of Interstage BPM Consoles on JBoss.

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.
--

E.1 Setting Up an Interstage BPM Cluster on JBoss

This section provides instructions for setting up a cluster of Interstage BPM Servers on JBoss. Setting up the cluster consists of the following steps:

1. Prepare the cluster. This involves preparing the database, installing the application server and installing and deploying Interstage BPM Server on all cluster nodes.
2. Updating the Interstage BPM Server configuration files
3. Configuring environment variables
4. Importing the Interstage BPM Server configuration files
5. Configuring additional settings for JBoss
6. Configuring the Shared Resource Root
7. Configuring JMS messaging
8. Starting the cluster
9. Implementing failover if you require this feature

The sample cluster used to illustrate the clustering instructions is deployed on two computers referred to as "cluster nodes". A file server is used for storing files that need to be accessed by all cluster

nodes, for example Workflow Applications and attachments to process instances. The following figure shows the sample system.

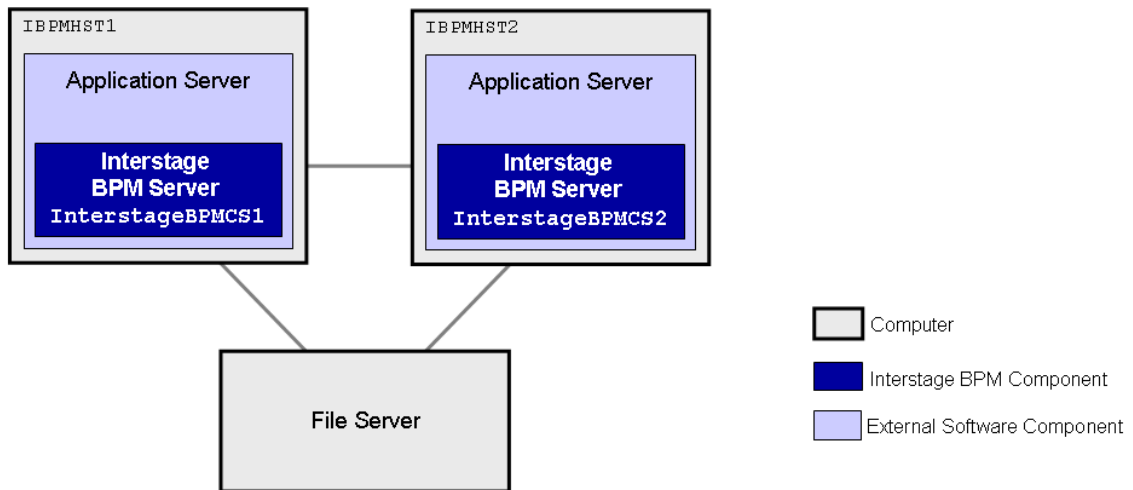


Figure 31: Sample Cluster

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

E.1.1 Preparing the Cluster

Prerequisite: All cluster nodes can reach each other via IP multicast. For you to check whether multicasts are available in the target environment, perform the following steps:

1. Edit the `startMulticastReceiver.bat` and `startMulticastReceiver.sh` scripts to replace the value of `INSTALL_DIR` by `<Interstage BPM Server Installation Directory>`.
2. Run the following script on each node of the cluster:

Operating System	Multicast Receiver Script
Windows	<code>startMulticastReceiver.bat</code>
UNIX	<code>startMulticastReceiver.sh</code>

This script file is located in `<Interstage BPM Server Installation Directory>/server/deployment/bin`.

3. Edit the `startMulticastSender.bat` and `startMulticastSender.sh` scripts to replace the value of `INSTALL_DIR` by `<Interstage BPM Server Installation Directory>`.
4. Run the following script on one node of the cluster and check whether all nodes in the cluster are receiving the multicasts:

Operating System	Multicast Sender Script
Windows	<code>startMulticastSender.bat</code>

Operating System	Multicast Sender Script
UNIX	startMulticastSender.sh

This script file is also located in <Interstage BPM Server Installation Directory>/server/deployment/bin.

5. Stop the execution of the multicast sender script. If there are any remaining nodes that were not tested, repeat step 2 for them.

In case of any problems, contact your network administrator to make sure that the network is IP multicast enabled.

The JBoss Application Server can be installed in different ways using different server configurations. To make sure that your JBoss installation is configured properly for Interstage BPM, you are recommended to perform the following steps:

1. Prepare the database system as explained in section *Database Server Preparation* on page 18
2. Install the JBoss Application Server on all computers that you want to include in your cluster. Refer *Installing and Configuring JBoss EAP for Interstage BPM Server and Console* on page 20 for steps to install the JBoss Application Server.
3. Install and deploy Interstage BPM for JBoss on all computers in the cluster. Use the instructions in chapter *Installing and Deploying Interstage BPM Server and Console* on page 22.
After deployment, you need to configure multicast IP address. It is necessary to change the partition name of the machine of which you want to compose the cluster to the same name.
4. Start the Interstage BPM Server on **one** of the cluster nodes. Use the instructions in section *Starting Interstage BPM Server* on page 40. Make sure that Interstage BPM is operating correctly.
5. Stop the Interstage BPM Server. For instructions, refer to section *Starting Interstage BPM Server* on page 40.

E.1.2 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 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	exportProperties.bat <filePath> <Database User Name> <Password>
UNIX	exportProperties.sh <filePath> <Database User Name> <Password>

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. On **each cluster node**, add the following entries to the configuration file:

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

For the server name, specify a name of your choice. You can set the server name to the hostname, but you can also use any other name. Make sure that each server name is unique in the cluster. Note down the server names because you will need to specify them in other configuration files later.

Example:

On IBPMHST1, you could specify:

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

On IBPMHST2, you could specify:

```
ServerName=InterstageBPMCS2
ServerSharedRoot=//MyFileServer/InterstageBPMShared/
```

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

```
ServerInCluster=true
```

4. In the configuration file of **any one node** add (default or custom) values for the following multicast group properties.

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

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 IP address 224.0.0.0 is reserved and must not be used.

Note: The IP address must be different from the JBoss start up environment. Please confirm the `IBPM_MULTICAST_IP` parameter's value in the following file.

- **Windows:** <JBoss Installation directory>/jboss-as/bin/setEnv.cmd
- **UNIX:** <JBoss Installation Directory>/jboss-as/bin/setEnv.sh

Note: Ensure these parameters are not empty. Also, since 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.

E.1.3 Configuring Environment Variables

To configure the required environment variables:

1. On each cluster node, configure the `SERVERNAME` entry in the following environment variable script:

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

This script file is located in `<JBoss Installation Directory>/bin`.

Set the `SERVERNAME` entry to the same value that you set for the `ServerName` parameter as explained in section *Updating the Interstage BPM Server Configuration Files* on page 101.

Example: If you are following the example, set the `SERVERNAME` entry to `InterstageBPMCS1` on `IBPMHST1`. On `IBPMHST2`, set the `SERVERNAME` entry to `InterstageBPMCS2`.

2. On each cluster node, make the same change in the following script:

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

This script file is located in `<Interstage BPM Server Installation Directory>/server/deployment/bin`.

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

E.1.4 Importing the Interstage BPM Server Configuration Files

Prerequisites:

- On each cluster node, you have updated the server configuration file as instructed in section *Updating the Interstage BPM Server Configuration Files* on page 101.

- On each cluster node, you have updated the required environment variables as explained in section *Configuring Environment Variables* on page 103.
- The database server is running.

To import the configuration files into the database:

- On each cluster node, run the configuration import script located in <Interstage BPM Server Installation Directory>/server/deployment/bin:

Operating System	Configuration Import Script
Windows	importProperties.bat <ConfigurationFilePath>/<ConfigurationFileName>.properties <Database User Name> <Password>
UNIX	importProperties.sh <ConfigurationFilePath>/<ConfigurationFileName>.properties <Database User Name> <Password>

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

The script imports the specified configuration file into the database. During import, the string <Hostname>.<Server Name> is appended to some of the parameter names in order to make those names unique in a cluster environment.

For example, when importing the configuration file on IBPMHST1, the entry
ServerName=InterstageBPMCS1 is transformed into

ServerName.IBPMHST1.InterstageBPMCS1=InterstageBPMCS1. Likewise, when importing the configuration file on IBPMHST2, the entry ServerName=InterstageBPMCS2 is transformed into ServerName.IBPMHST2.InterstageBPMCS2=InterstageBPMCS2.

After importing the configuration files, for security reasons, delete the configuration file on each node.

E.1.5 Additional Configuration for JBoss

The following additional configuration is needed if deploying the cluster on **any version** of JBoss.

1. Add the following attribute to the `iiop-service.xml` file located in the <JBoss HOME>\server\<Interstage BPM deployment folder>\deploy\ directory.

```
<attribute name="SunJDK14IsLocalBugFix">false</attribute>
```

For example

```
..
<mbean code="org.jboss.iiop.CorbaORBService"
name="jboss:service=CorbaORB">
  <attribute name="ORBPropertiesFileName">jacorb.properties</attribute>
  <attribute name="SunJDK14IsLocalBugFix">false</attribute>
..
</mbean>
```

2. If using Oracle as database, from the Oracle website (http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc_111060.html) download and use the latest Oracle 11g JDBC drivers. For the exact version of drivers, refer the *Interstage BPM Server Release Notes*.

The following additional configuration is also needed:

1. **On each node**, in `iFlowClient.properties` (located at `<Interstage BPM Installation Directory>/client`) update the `NamingProviderURL` and `JMSNamingProviderURL` properties with values of **all nodes**. For example, on node 1, update as follows:

```
NamingProviderURL=jnp://<Host1>:<BOOTSTRAP_ADDRESS>,jnp://<Host2>:<BOOTSTRAP_ADDRESS>
JMSNamingProviderURL=jnp://<Host1>:<BOOTSTRAP_ADDRESS>,jnp://<Host2>:<BOOTSTRAP_ADDRESS>
```

For node 2, also update as follows:

```
NamingProviderURL=jnp://<Host1>:<BOOTSTRAP_ADDRESS>,jnp://<Host2>:<BOOTSTRAP_ADDRESS>
JMSNamingProviderURL=jnp://<Host1>:<BOOTSTRAP_ADDRESS>,jnp://<Host2>:<BOOTSTRAP_ADDRESS>
```

2. **On each node**, update the following in `<database>-persistence-service.xml` (located in `<JBoss Installation Directory>/jboss-as/server/ibpm/deploy/messaging`)
 - Set the `Clustered` attribute to `true`.
 - Add the following attribute:

```
<attribute
name="ChannelFactoryName">jboss.jgroups:service=ChannelFactory</attribute>
```

3. **On each node**, in `messaging-service.xml` (located in `<JBoss Installation Directory>/jboss-as/server/ibpm/deploy/messaging`), comment out the `ClusterPullConnectionFactoryName` attribute.
4. **On each node**, in `iflow-destinations-service.xml` (located in `<JBoss Installation Directory>/jboss-as/server/ibpm/deploy/messaging`), for `iflow.TriggerTopic`, set the `Clustered` attribute to `false`.

E.1.6 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.

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 **any one** of the server nodes, from `<Interstage BPM Installation Directory>/server/instance/default/tenants/Default/` **move** the following folders to the `tenants/Default/` folder under the ResourceRoot directory.

- apps
- attachments
- classes
- dmsroot
- lib

- b) Also delete the folders listed above from the other server nodes.

4. On Windows, on each server node, update the `<Path>` tag of `DmsCollections.xml` file located in `<Interstage BPM Server Installation 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 installation 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 installing 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 `<Interstage BPM Server Installation`

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:

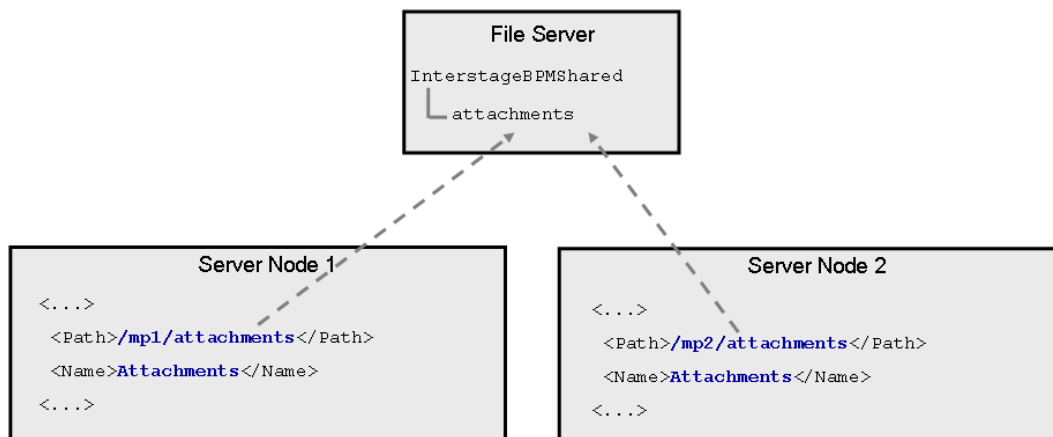


Figure 32: Sample DMS Configuration

E.1.7 Configuring JMS Messaging

As a default, the JBoss Application Server sends all JMS messages to all cluster nodes. However, some JMS messages are relevant to the local Interstage BPM Server only. You need to change the default configuration to make sure that these messages are sent to the local Interstage BPM Server only. Make the configuration changes on each cluster node.

To configure JMS messaging:

1. On one of the cluster nodes, back up the original <JBoss Installation Directory>/server/ibpm/deploy/fujitsu-ibpm-engine.ear Enterprise Archive as follows:
 - On Windows: copy fujitsu-ibpm-engine.ear fujitsu-ibpm-engine.ear.org
 - On UNIX: cp fujitsu-ibpm-engine.ear fujitsu-ibpm-engine.ear.org
2. From the <JBoss Installation Directory>/server/ibpm/deploy/fujitsu-ibpm-engine.ear Enterprise Archive, extract the fujitsu-ibpm-engine-ejb.jar Java Archive using the following command:


```
jar -xf fujitsu-ibpm-engine.ear fujitsu-ibpm-engine-ejb.jar
```
3. Extract the ejb-jar.xml file from the fujitsu-ibpm-engine-ejb.jar archive using the following command:


```
jar -xf fujitsu-ibpm-engine-ejb.jar META-INF/ejb-jar.xml
```
4. Open ejb-jar.xml in a text editor or in an XML editor.
5. Add the following entry to all Message Driven Bean sections:

```
<message-selector>SERVER_ID='SERVERNAME'</message-selector>
```

For SERVERNAME, specify the value of the `ServerName` parameter that you configured for the Interstage BPM Server as instructed in section *Updating the Interstage BPM Server Configuration Files* on page 101.

Note: In the `ejb-jar.xml` file, specify the server name in uppercase letters regardless of the spelling that is used in the Interstage BPM Server's configuration.

This is an example of a Message Driven Bean section before the change:

```
<message-driven>
  <display-name>EmailDispatcher</display-name>
  <ejb-name>EmailDispatcher</ejb-name>
  <ejb-class>com.fujitsu.iflow.serveree.impl.globalnotification.
    EmailDispatcherMB</ejb-class>
  <transaction-type>Bean</transaction-type>
  <message-driven-destination>
    <destination-type>javax.jms.Topic</destination-type>
  </message-driven-destination>
</message-driven>
```

You can add the `<message-selector>` entry as shown in the example below within the `<message-driven>` tags.

Example: If you are following the example, you configured `InterstageBPMCS1` as the server name on `IBPMHST1`. Specify this value as `INTERSTAGEBPMCS1` in the `ejb-jar.xml` file. The following extract shows all the Message Driven Bean sections where you need to add the `<message-selector>` entry:

```
<message-driven>
  <display-name>EmailDispatcher</display-name>
  <ejb-name>EmailDispatcher</ejb-name>
  <ejb-class>com.fujitsu.iflow.serveree.impl.globalnotification.
    EmailDispatcherMB</ejb-class>
  <transaction-type>Bean</transaction-type>
  <message-selector>SERVER_ID='INTERSTAGEBPMCS1'</message-selector>
  <message-driven-destination>
```

```

    <destination-type>javax.jms.Topic</destination-type>
  </message-driven-destination>
</message-driven>

<message-driven>
  <display-name>Enactment</display-name>
  ...
  <message-selector>SERVER_ID=' INTERSTAGEBPMCS1 '</message-selector>
</message-driven>

<message-driven>
  <display-name>JmsEnactor</display-name>
  ...
  <message-selector>SERVER_ID=' INTERSTAGEBPMCS1 '</message-selector>
</message-driven>

<message-driven>
  <display-name>ActionAgent</display-name>
  ...
  <message-selector>SERVER_ID=' INTERSTAGEBPMCS1 '</message-selector>
</message-driven>

<message-driven>
  <display-name>TimerTaskMB</display-name>
  ...
  <message-selector>SERVER_ID=' INTERSTAGEBPMCS1 '</message-selector>
</message-driven>

```

6. Add the modified `ejb-jar.xml` file to the `fujitsu-ibpm-engine-ejb.jar` archive using the following command:

```
jar -uf fujitsu-ibpm-engine-ejb.jar META-INF/ejb-jar.xml
```

7. Add the modified `fujitsu-ibpm-engine-ejb.jar` archive to the `<JBoss Installation Directory>/server/ibpm/deploy/fujitsu-ibpm-engine.ear` archive using the following command:

```
jar -uf fujitsu-ibpm-engine.ear fujitsu-ibpm-engine-ejb.jar
```

8. If you extracted the `ejb-jar.xml` file to the `<JBoss Installation Directory>/server/ibpm/deploy` directory, remove `ejb-jar.xml` from there. Otherwise, the Interstage BPM Server will not be able to start.

9. Delete the temporary files using the following commands:

- On Windows:

```
del fujitsu-ibpm-engine-ejb.jar
rmdir /S /Q META-INF
```

- On UNIX:

```
rm fujitsu-ibpm-engine-ejb.jar
rm -r META-INF
```

10. Repeat steps 1-9 for the other cluster nodes.

If you are following the example, repeat the steps for `IBPMHST2` configuring `InterstageBPMCS2` as the server name.

E.1.8 Starting the Cluster

Start the JBoss Application Server on each cluster node. You can start the server instances in any order.

For JBoss Enterprise Application Platform 5.0: For starting each server instance in a cluster, use the following command:

```
runIBPM.bat -b 0.0.0.0 -u <MulticastGroupAddress>
-Djboss.messaging.ServerPeerID=<n>
```

Here, <n> is node number, and should be 1 for the master node, and 2, 3, etc. for the other nodes. For example:

```
runIBPM.bat -b 0.0.0.0 -u 225.4.5.6 -Djboss.messaging.ServerPeerID=1
```

Note: The first server instance that you start becomes the master node. If your cluster is composed of computers that differ in terms of CPU power and main memory capacity, you are recommended to start the most powerful computer first.

E.1.9 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 its 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.

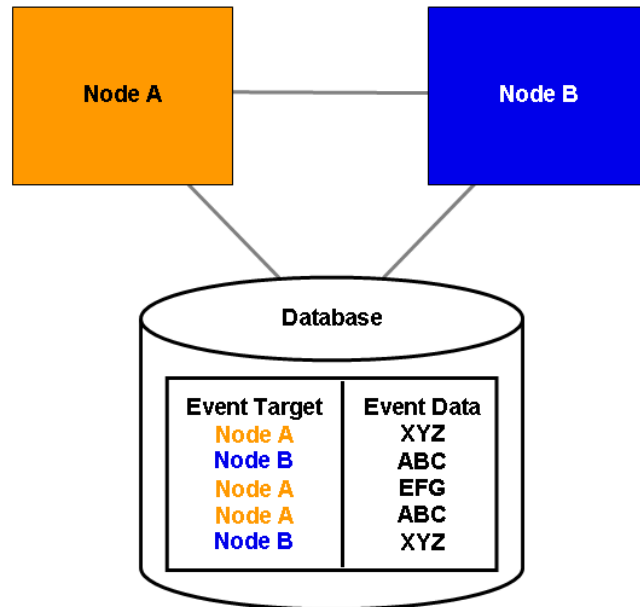


Figure 33: All Server Nodes are Up and Running

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

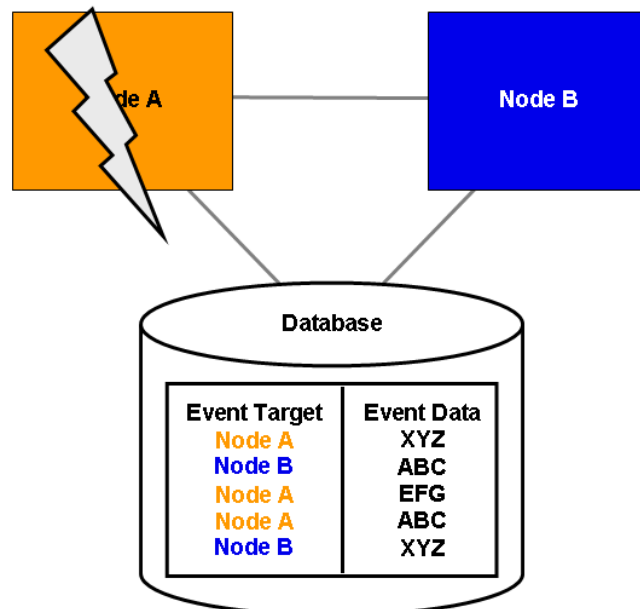


Figure 34: Server Node Goes Down

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.

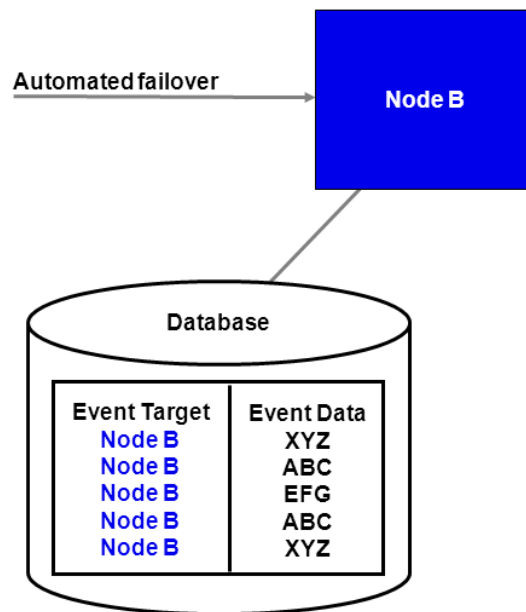


Figure 35: Events are Transferred to Another Node

Appendix F: Enabling NTLM Authentication Protocol for Interstage BPM Console

Prerequisites: Interstage BPM Server and Console have been installed and deployed.

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. For instance, if NTLM has been enabled for a tenant of Interstage BPM Console, if any user under that tenant successfully logs on to her Windows desktop, on accessing any Interstage BPM Console URL, she 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.

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.
- If NTLM is enabled:
 - Access to Interstage BPM Console from a browser in remote desktop is not supported.
 - Access to Interstage BPM Console from a browser in other remote-access clients is not supported.

To enable NTLM for Interstage BPM Console:

1. Navigate to `<Interstage BPM Console Deployment Directory>/WEB_INF/conf/` and add the following parameters (and their values) to `console.conf`:

- `SSOToken=<value>` -this will be a single entry for all tenants. The value will be used to authenticate the logged in user.
- `SSOADIP.<Tenant-Name>=<value>` -the value will be a tenant-specific IP address of the domain controller (AD Server). Repeat this parameter for each tenant for which you want to enable NTLM.
- `SSODomain.<Tenant-Name>=<value>` -the value will be the tenant-specific Domain Name (NETBIOS Name). Repeat this parameter for each tenant for which you want to enable NTLM.

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 `IASSOLoginConfFileEntryName=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 G: Troubleshooting

G.1 Log File Information

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

G.2 Resolving Specific Error Situations

G.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://<ServerName>:<Ports>". 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 > Application Servers > <ServerName> > Ports). (For WebSphere 7.0, this path is 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"> • <code>JMSNamingProviderURL</code> (in the format <code>iiop://<Host Name>:<BOOTSTRAP_ADDRESS></code>) • <code>NamingProviderURL</code> (in the format <code>iiop://<Host Name>:<BOOTSTRAP_ADDRESS></code>)

G.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>

G.2.3 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.

G.3 Errors During Installation

This section lists several errors that could occur during the installation of Interstage BPM and describes the required action(s) to take:

Installation of IBPM fails when trying to install a new build

	Cause	
I		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 > Uninstall > Interstage Business Process Manager xx.x. 5. 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.
--------	---

The Interstage BPM installation program was unable to launch on Linux

I	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.

G.4 Errors during Deployment of the Interstage BPM Server

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

On Windows: <Interstage BPM Installation Directory>\server\deployment\logs\deployment.log

On Unix: <Interstage BPM Installation 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:

An error occurred during Interstage BPM database creation/update

I	Cause	One of the following values provided during deployment 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 deploying Interstage BPM. Run the Deployment Tool again and select Use existing database in the Database Settings screen. In this way, the database is configured without data deletion from the database.
II	Cause	One of the following values provided during deployment 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 deploying Interstage BPM. Remove Interstage BPM from the application server and deploy it again using the Deployment Tool.
III	Cause	Database server is not running.
	Action	Start the database server. Run the Deployment Tool again and select Use existing database in the Database Settings screen. In this way, the database is configured without data deletion from the database.

Errors caused by JDK Version

I	Cause	The version of JDK specified during installation does not match the version required for this application server.
---	-------	---

	Action	<p>You need to re-install Interstage BPM. During re-installation, specify the JDK specific to your Application Server.</p> <p>Alternately, you can change the <code>JAVA_HOME</code> variable present in the deployment tool startup script. For details, refer section Configuring the Deployment Tool Startup JVM of the <i>Interstage BPM Server and Console Installation Guide</i>.</p> <p>Supported JDK versions are listed in the <i>Interstage BPM Server Release Notes</i>.</p>
--	--------	--

Undeployment Problems

I	Cause	<p>If Server instance removal process can not advance beyond the Application Server Configuration page, contents of the <code>setupconfig.properties</code> file are corrupted.</p>
	Action	<p>Remove the <code>setupconfig.properties</code> file from the following directory:</p> <ul style="list-style-type: none"> • Windows: <Interstage BPM Installation Directory>\server\deployment\Resources • UNIX: <Interstage BPM Installation Directory>/server/deployment/resources <p>Then re-start the deployment tool. Note that after you remove this file, your undeployment information is erased. Therefore you need to select the Application Server from which you want to remove Interstage BPM again.</p>

Problems related to LDAP Server Access

I	Cause	<p>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.</p>
	Action	<p>Please register the Super user and Tenant Administrator in the LDAP server before executing the Deployment Tool.</p>

Errors Pertaining to Active Directory

I	Cause	<p>The Active Directory Server is remote and Active Directory is not running.</p>
	Action	<p>Start the Active Directory Server, and then start the Interstage BPM Server.</p>
II	Cause	<p>Interstage BPM cannot connect to the Active Directory Server because one of the following values provided during deployment was wrong:</p> <ul style="list-style-type: none"> • Active Directory Key • Active Directory Organizational Unit
	Action	<p>Remove Interstage BPM from the application server and deploy it again using the Deployment Tool.</p>

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 deployment was wrong: <ul style="list-style-type: none"> • LDAP Key • LDAP Organizational Unit
	Action	Remove Interstage BPM from the application server and deploy it again using the Deployment Tool.

G.5 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	In the <code>IBPMProperties</code> table of the Interstage BPM database, make the following changes: <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. To update the <code>IBPMProperties</code> table, use the appropriate database commands or a database client software.

G.6 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 `<Interstage BPM Server Installation Directory>/server/instance/default/logs`
- Deployment log file from `<Interstage BPM Server Installation Directory>/server/deployment/logs/deployment.log`

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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