FUJITSU Software
Interstage Business Process Manager
V11.4.1

Server and Console Installation Guide
(JBoss Application Server)

Table of Contents

About this Manual

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

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

Intended Audience

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

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

This Manual Contains

Here is a list of what is in this manual:

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

Chapter	Title	Description
Appendix A	Security	Instructions for security implementation on Interstage BPM.
Appendix B	Clustering, Load Balancing, and Failover	Instructions for setting up a cluster of Interstage BPM Servers.
Appendix C	Overview of NTLM Authentication Protocol	Instructions to enable NTLM Authentication Protocol for Interstage BPM Console
Appendix D	Overview of SSO Authentication	Instructions to enable SSO Authentication Protocol for Interstage BPM Console
Appendix E	Troubleshooting	Information to help you troubleshoot problems associated with using Interstage BPM.

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

Typographical Conventions

The following conventions are used throughout this manual:

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

Other References

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

- *Release Notes*

  Contains an overview of Interstage Business Process Manager, setup tips, and late-breaking information that could not make it into the manuals.

- *Interstage Business Process Manager Server and Console Installation Guide*

  Describes software and hardware requirements, setup procedure for Interstage Business Process Manager Server and Console

- *Interstage Business Process Manager Server Administration Guide*

  Explains how to configure and administrate Interstage Business Process Manager Server. This guide also describes the configuration parameters of the Interstage BPM Server.

- *Interstage Business Process Manager Developer's Guide*

  Describes how to use the Interstage Business Process Manager API to customize and extend Interstage BPM to fit the unique needs of your organization.

- *Interstage Business Process Manager Studio User's Guide*

  Explains how to model processes using the Interstage Business Process Manager Studio.

- *Interstage Business Process Manager Tenant Management Console Online Help*

  Explains how to use the Interstage Business Process Manager Tenant Management Console user interface.

- *Interstage Business Process Manager Console Online Help*

  Explains how to use the Interstage Business Process Manager Console user interface.

- *API Javadoc Documentation*

  This HTML documentation provides the API and syntax of the packages, interfaces and classes for developing custom applications or embedding Interstage Business Process Manager into other products.

Abbreviations

The products described in this manual are abbreviated as follows:

- "Interstage Business Process Manager" is abbreviated as "Interstage BPM".
- "Microsoft® Windows Server® 2008" and "Microsoft® Windows Server® 2012" are abbreviated as "Windows Server".
- "Oracle Solaris" might be described as "Solaris", "Solaris Operating System", and "Solaris OS" in this document.
- "Microsoft® SQL Server 2008 Standard Edition", "Microsoft® SQL Server 2008 Enterprise Edition", "Microsoft® SQL Server 2012 Standard Edition", "Microsoft® SQL Server 2012 Business Intelligence Edition" and "Microsoft® SQL Server 2012 Enterprise Edition" are abbreviated as "Microsoft® SQL Server", "Microsoft SQL Server", or "SQL Server".
- "Oracle Database 11g R1 Standard Edition", "Oracle Database 11g R1 Standard Edition One", "Oracle Database 11g R1 Enterprise Edition", "Oracle Database 11g R2 Standard Edition", "Oracle Database 11g R2 Standard Edition One", "Oracle Database 11g R2 Enterprise Edition", "Oracle Database 12c R1 Standard Edition", "Oracle Database 12c R1 Enterprise Edition" are abbreviated as "Oracle".
- "JBoss Enterprise Application Platform" is abbreviated as "JBoss EAP".
- "Java Development Kit" and "Java SE Development Kit" is abbreviated as "JDK".
- "Java Runtime Environment" and "Java SE Runtime Environment" is abbreviated as "JRE".

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1 System Configurations for Interstage BPM Server

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

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

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

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

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

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

1.1 Minimum Configuration: All Systems on the same Computer

You can copy the Interstage BPM software from the product media to your machine and use the Interstage BPM setup script to setup the Interstage BPM Server and Console into the application server. The Interstage BPM Server is setup as EJB application and the Interstage BPM Console is setup as WebApplication. The setup script also creates database on the machine, and if you plan to use a remote user store, the Directory Service on the same computer.
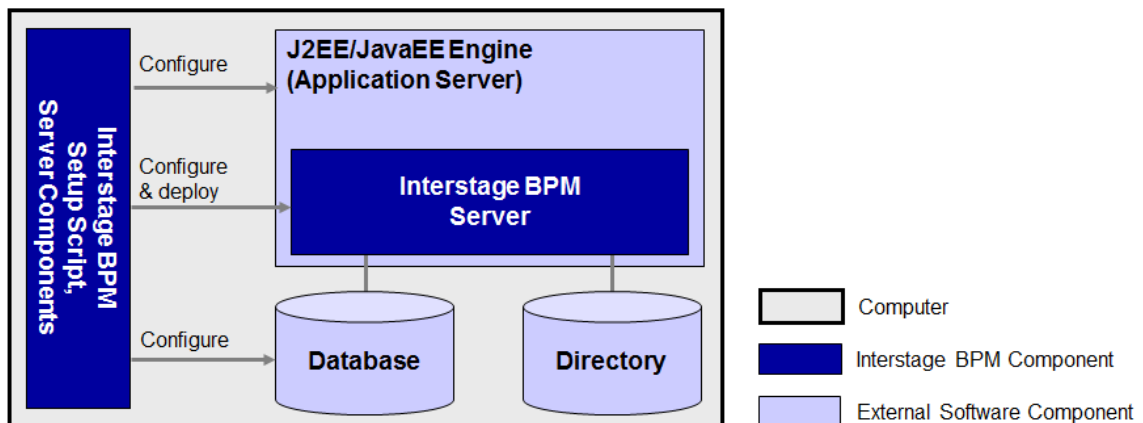
Figure 1: All systems on the same computer

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

1.2　Database on Remote Computer

The following figure shows a configuration where the Interstage BPM Server and the database are setup on separate computers.
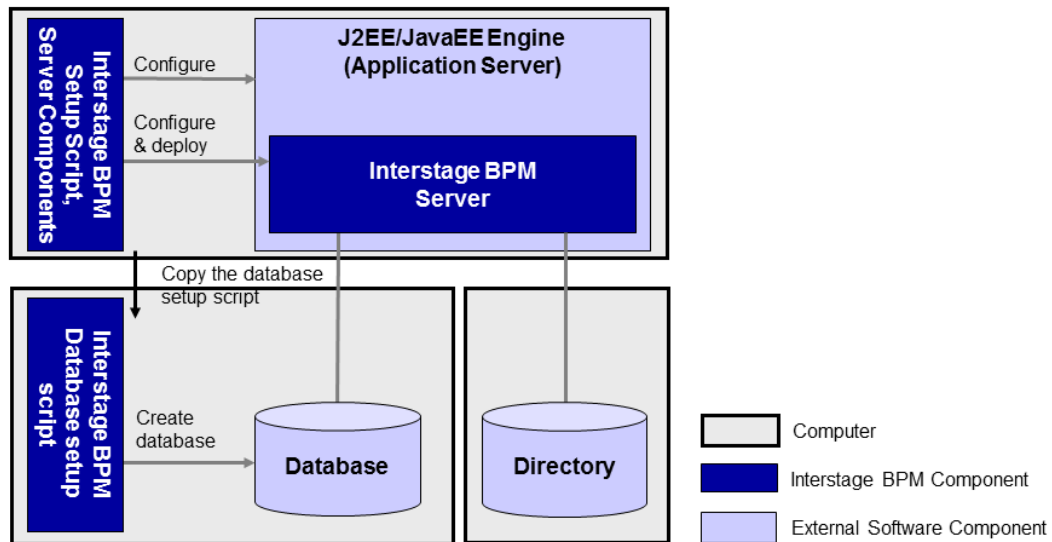
Figure 2: Database on Remote Computer

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

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

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

2 System Configurations for Interstage BPM Console

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

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

2.1 Minimum Configuration: All Systems on the same Computer

Interstage BPM Server and Console is always setup together on the same computer.
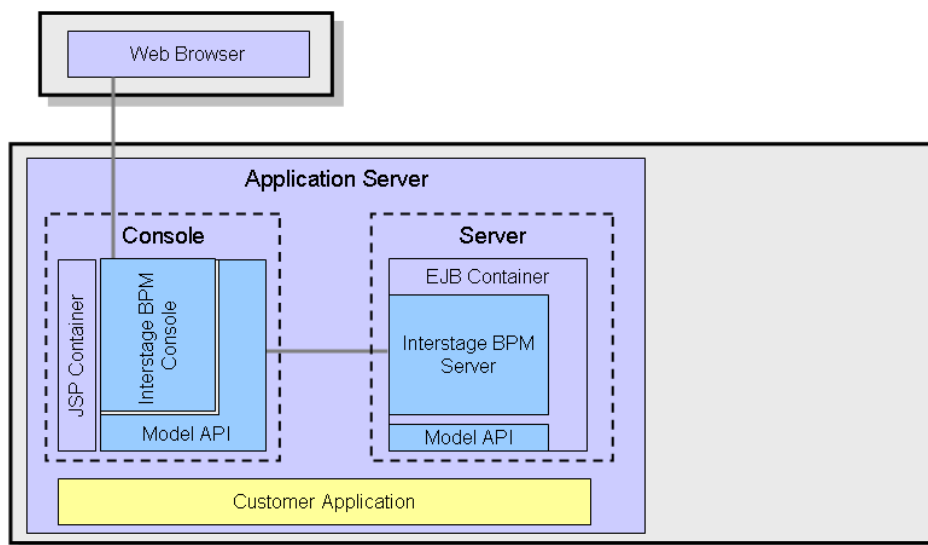
Figure 3: All systems on the same computer

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

3 System Requirements for Interstage BPM Server and Console

3.1 Hardware Requirements for Interstage BPM Server and Console

Machine and Processor

Operating System	Machine	Processor
Windows	Fujitsu PRIMERGY or other Intel Architecture servers	Minimum: Intel® Xeon® processor, 2GHz, 2 Core or greater
Solaris	Fujitsu PRIMEPOWER or other Solaris servers	Minimum: SPARC64 V (kernel arch: sun4u/sun4us/sun4d) processor, 1.1 GHz, 2 Core or greater
Linux	Fujitsu PRIMERGY or other Intel Architecture server	Minimum: Intel® Xeon® processor, 2GHz, 2 Core or greater

Memory

Minimum: 2 GB

Hard Drive

Interstage BPM setup: 300 MB

Database server installation: Please refer to the product documentation.

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

3.2 Minimum Software Requirements for Server and Console

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

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

3.3 Minimum Software Requirements for Web Browser Clients

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

4 Preparing for Setup of Interstage BPM Server and Console

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

4.1 Database Server Preparation

This section provides instructions in configuring your database software for use by Interstage BPM.

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

4.1.1 Configuring Microsoft® SQL Server

Prerequisites: Microsoft SQL Server is installed.

To configure Microsoft SQL Server:

1. Change SQL Server Authentication

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

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

2. Configure the network for SQL Server

   a) Confirm that **TCP/IP** is selected under Network Operations.

   b) Determine the port number of the Microsoft® SQL Server instance that Interstage BPM will connect to. To do so:

      1. Select **Start** > **Programs** > **Microsoft SQL Server <version>** > **Configuration Tools** > **SQL Server Configuration Manager**.

      2. Navigate to **SQL Server Network Configuration** > **Protocols for <MSSQLInstance>**. For the default instance, the value of <MSSQLInstance> is MSSQLSERVER.

      3. Confirm that TCP/IP is enabled. Then, go to the TCP/IP properties and click the **IP Addresses** tab. The **IPAll** section displays the **TCP port** and **TCP Dynamic Ports** parameters.

      4. If you are using the default Microsoft® SQL Server instance, note down the value of **TCP Port**. If you are using a named instance, note down the value of the **TCP Dynamic Ports**. You will need to specify the port number later when setting up the Interstage BPM Server.

3. Confirm Collation settings.

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

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

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

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

> **Note:** If you have changed the CaseSensitivity parameter to `cs` for the server level collation, you cannot create database via the setup script. In such a case, you need to first create Interstage BPM database using the database creation script, and change the database collation to CaseSensitive.
>
> `ALTER DATABASE teamflowdb COLLATE <collationName>`
>
> where `<collationName>` is the name of the collation, example, `Latin1_General_CI_AS`.
>
> **Ensure this is case-insensitive, that is, it contains the 'CI' characters.**
>
> Then you need to select the **Use existing database** option in the `setup.config` file.

4. Install the SQL Server Driver for JDBC.

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

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

4.1.2 Configuring Oracle

Prerequisite: Oracle is installed.

To configure Oracle for Interstage BPM:

1. Set the `ORACLE_HOME` environment variable to the installation directory of the database server you are setting up on.
   - Example on Oracle 11g:

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

   - Example on Oracle 12c:

     `ORACLE_HOME=/home/oracle/app/oracle/product/12.1.0/dbhome_1; export ORACLE_HOME`

2. Create a new database instance for Interstage BPM.

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

   Make sure that the database instance is created with the following character sets:
   - AL32UTF8 as the database character set
   - AL16UTF16 as the national character set

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

> **Note:** If you use Oracle 12c, don't create the database instance as Container Database.

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

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

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

4. Install the Oracle Driver for JDBC.

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

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

4.1.3 Starting the Database Server

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

4.2 Application Server Preparation

4.2.1 Installing and Configuring JBoss EAP 6 for Interstage BPM Server and Console

The JBoss EAP 6 features two modes for running application server - **Standalone** and **Domain**. The Interstage BPM will be configured in domain mode that allows you to run and manage multiple servers from a single location (domain-controller). Note the following information:

- The Interstage BPM server uses **"full-ha"** profile for setup.

To install JBoss for Interstage BPM:

1. For JBoss EAP 6, download the `jboss-eap-6.[version].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.

```
<JBoss Installation Directory>
    ├─ appclient
    ├─ bin
    ├─ bundles
    ├─ docs
    ├─ domain
    ├─ modules
    ├─ standalone
    └─ welcome-content
```

Figure 4: JBoss 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, setup might fail and Interstage BPM Server and Console may not start.

4. If using JBoss 6.4, download the `jboss-eap-6.4.9-patch.zip` from the Red Hat website. The zip file contains updates for JBoss 6.4.

5. Apply the patch downloaded in step 4. For details on how to apply patch, please refer to the Red Hat website.

4.2.2 Update the domain server configuration

To configure JBoss EAP 6 application server in domain mode, you need to perform following setting:

To be able to use the default ports (for example remoting default port i.e. `4447`) for Interstage BPM you need to do one of the following:

- Specify the `port-offset` value to some non-zero value for server configurations other than Interstage BPM Server. Do not use `0` (if not specified then the `port-offset` is `0` (zero)) as the `port-offset` value for any other server, because Interstage BPM Server uses `0` as the value of its `port-offset`.

- Remove the default server configurations, as described below.

Open the `host.xml` present at `<JBoss Installation Directory>/domain/configuration/` on server machine and remove all the default servers present in `<servers>` section, as shown below:

Existing settings:

```
<servers>
   <server name="server-one" group="main-server-group">
       <!-- Remote JPDA debugging for a specific server
         <jvm name="default">
            <jvm-options>
               <option
value="-agentlib:jdwp=transport=dt_socket,address=8787,server=y,suspend=n"/>

            </jvm-options>
         </jvm>-->
   </server>
   <server name="server-two" group="main-server-group" auto-start="true">

       <!-- server-two avoids port conflicts by incrementing the ports in

          the default socket-group declared in the server-group -->
         <socket-bindings port-offset="150"/>
   </server>
   <server name="server-three" group="other-server-group"
auto-start="false">
       <!-- server-three avoids port conflicts by incrementing the ports
in the default socket-group declared in the server-group -->
       <socket-bindings port-offset="250"/>
```

```
    </server>
</servers>
```

Changed to:

```
<servers>
</servers>
```

4.2.3 Disabling the Remoting Security

To disable the remoting security in JBoss EAP 6 application server:

Update the `domain.xml` file located in: `<JBoss Installation Directory>/domain/configuration/`

Search for the profile `<profile name="full-ha">` in the file and then modify remoting sub-system to remove the `security-realm` as shown below:

Existing setting:

```
<subsystem xmlns="urn:jboss:domain:remoting:[version]">
   <connector name="remoting-connector" socket-binding="remoting"
security-realm="ApplicationRealm"/>
</subsystem>
```

Change to:

```
<subsystem xmlns="urn:jboss:domain:remoting:[version]">
   <connector name="remoting-connector" socket-binding="remoting"/>
</subsystem>
```

4.2.4 Configuring JBoss EAP 6 Domain

You have installed the JBoss EAP 6 application server.

Follow these steps:

1. In the `domain.xml` file located in `<JBoss Installation Directory>/domain/configuration/`, search for the `full-ha-sockets` and then update the values of `multicast-address` and `multicast-port` with a unique combination of multicast IP address and port which is not being used in the network, as shown below:

    Existing default setting:

```
<socket-binding name="jgroups-mping" port="0"
multicast-address="${jboss.default.multicast.address:230.0.0.4}"
multicast-port="45700"/>
...
<socket-binding name="jgroups-udp" port="55200"
multicast-address="${jboss.default.multicast.address:230.0.0.4}"
multicast-port="45688"/>
...
<socket-binding name="messaging-group" port="0"
multicast-address="${jboss.messaging.group.address:231.7.7.7}"
multicast-port="${jboss.messaging.group.port:9876}"/>
```

    Update `multicast-address` and `multicast-port` like below:

```
<socket-binding name="jgroups-mping" port="0"
multicast-address="${jboss.default.multicast.address:<Multicast IP 1>}"
 multicast-port="<Port Number 1>"/>
```

```
...
<socket-binding name="jgroups-udp" port="55200"
multicast-address="${jboss.default.multicast.address:<Multicast IP 2>}"
 multicast-port="<Port Number 2>"/>
...
<socket-binding name="messaging-group" port="0"
multicast-address="${jboss.messaging.group.address:<Multicast IP 3>}"
multicast-port="${jboss.messaging.group.port:<Port Number 3>}"/>
```

> **Note:**
> - A multicast group address is an IP address in the range `224.0.0.0` to `239.255.255.255`, inclusive. It is used to identify the members of a multicast group. Each member of the group uses the same multicast group address. The address `224.0.0.0` is reserved and must not be used.
> - During the Interstage BPM setup, you will need to specify the multicast IP address in the configuration file (`setup.config`). So, make sure that the value of `multicast-address` you used here must be different from the configuration file.
> - In case of cluster environment, on all slave machines specify the multicast IP address that you have specified on master machine.

Example:

```
<socket-binding name="jgroups-mping" port="0"
multicast-address="${jboss.default.multicast.address:230.0.0.1}"
multicast-port="5000"/>
...
<socket-binding name="jgroups-udp" port="55200"
multicast-address="${jboss.default.multicast.address:230.0.0.1}"
multicast-port="5001"/>
...
<socket-binding name="messaging-group" port="0"
multicast-address="${jboss.messaging.group.address:231.7.7.1}"
multicast-port="${jboss.messaging.group.port:5002}"/>
```

2. Edit the `host.xml` located at `<JBoss Installation Directory>/domain/configuration` directory for IP address of the machine as shown below:

```
<interfaces>
    <interface name="management">
        <inet-address value="${jboss.bind.address.management:<IP Address
 of machine>}"/>
    </interface>
    <interface name="public">
        <inet-address value="${jboss.bind.address:<IP Address of
machine>}"/>
    </interface>
    <interface name="unsecure">
        <!-- Used for IIOP sockets in the standard configuration.
                To secure JacORB you need to setup SSL -->
        <inet-address value="${jboss.bind.address.unsecure:<IP Address
of machine>}"/>
```

```
        </interface>
</interfaces>
```

> **Note:** Make sure that you specify the IP address that must resolve to localhost. In case of multiple IP addresses on the machine, specify the IP address that must be able to connect to the application server successfully.

Example: If the IP address of machine is `10.1.1.1`, then you can update this as below:

```
<interfaces>
    <interface name="management">
       <inet-address value="${jboss.bind.address.management:10.1.1.1}"/>

    </interface>
    <interface name="public">
       <inet-address value="${jboss.bind.address:10.1.1.1}"/>
    </interface>
    <interface name="unsecure">
        <!-- Used for IIOP sockets in the standard configuration.
                To secure JacORB you need to setup SSL -->
       <inet-address value="${jboss.bind.address.unsecure:10.1.1.1}"/>
     </interface>
</interfaces>
```

> **Note:** Make sure that you do not change the host-controller name (`master`) that exists in the `host.xml` an shown below:
>
> `<host name="master" xmlns="urn:jboss:domain:[version]">`

3. Verify that you have specified correct IP address. Follow these steps:

   a) Set the value of `JAVA_HOME` environment variable on your machine. If this parameter is left blank or set to an incorrect value, it will cause the error.

   b) Start the JBoss EAP 6 application server by executing the `domain.bat` / `domain.sh` script located in: `<JBoss Installation Directory>/bin`.

      The application server must be started successfully.

   c) Update the successfully verified IP address (specified in the step 2), in the `jboss-cli.xml` file located at `<JBoss Installation Directory>/bin`.

```
<default-controller>
        <host>localhost</host>
        <port>9999</port>
</default-controller>
```

   For example:

```
<default-controller>
        <host>10.1.1.1</host>
        <port>9999</port>
</default-controller>
```

   d) Execute the `jboss-cli.bat` / `jboss-cli.sh` script located at `<JBoss Installation Directory>/bin`.

e) Execute the below command to connect to JBoss application server:

```
connect
```

The connection should be established successfully.

4. Stop the JBoss application server according to the instructions in the section *Starting Interstage BPM Server* on page 35.

4.2.5 Setting-up the JDBC Module

To configure the JDBC module in Domain Mode:

Follow these steps:

1. Execute the `jboss-cli.bat` / `jboss-cli.sh` script located at `<JBoss Installation Directory>/bin/`.

2. Make sure that status of CLI is `[disconnected]` and then execute the below command:

```
[disconnected/]module add --name=<jdbc module name>
--resources=<jdbc_jar_path>
--dependencies=javax.api,javax.transaction.api
```

- `<jdbc module name>` is the name of the JDBC module that will be created. Please note down this name because you will need to specify the same name in the configuration file later.

Note: In case of cluster environment, the JDBC module name must be same on all cluster nodes.

- `<jdbc_jar_path>` is the location of the jdbc jar file of the database you have selected.

Example for Oracle:

```
[disconnected/]module add --name=com.oracle.jdbc
--resources=C:\PRG\jdbcjars\ojdbc7.jar
--dependencies=javax.api,javax.transaction.api
```

Note: For JBoss EAP 6.1.0, make sure that the jar file and JBoss6 both are present in the same drive. Also, make sure that you do not include the drive name in the path. For example, in case of Oracle database, if the path of jar file is `C:\PRG\jdbcjars\ojdbc7.jar` then you must specify `\PRG\jdbcjars\ojdbc7.jar`.

3. Execute the following command to exit from the CLI prompt:

```
[disconnected/]quit
```

Note: If you need to remove this JDBC module, follow these steps:

1. Execute the `jboss-cli.bat` / `jboss-cli.sh` script located at `<JBoss Installation Directory>/bin`

2. Execute the following commands:

```
module remove --name=<jdbc module name>
```

Example for Oracle:

```
module remove --name=com.oracle.jdbc
```

4.3 Directory Server Preparation

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

If you want to use external directory service to manage Interstage BPM users, you need to register LDAP Access for users before setting up Interstage BPM Server and Console. How to setup external directory service is described in *Setting Up a Directory Service* on page 38.

5 Setting-up Interstage BPM Server and Console

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

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

5.1 Permissions Required for Setup

Permissions Required for Setup

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

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

5.2 Overview of the Setup Procedure

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

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

Note: If you are upgrading from a previous version of Interstage BPM, refer *Upgrading Interstage BPM from Previous Versions* on page 61.

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

1. Prepare the database and make sure that the database server is running.

   Refer to section *Database Server Preparation* on page 14.

2. Prepare the application server and make sure it is running.

   Refer to section *Application Server Preparation* on page 16.

3. If you want to connect to a Directory Service, you must configure it before starting the Interstage BPM Server.

   Refer to chapter *Setting Up a Directory Service* on page 38.

4. Setup Interstage BPM.

   For setting Interstage BPM on the same computer, refer to section *Setup Database and Interstage BPM on the Same Computer* on page 24.

5. Switch on Java security.

   Refer to section *Switching on Java Security* on page 32.

6. Encrypt the password for datasource.

   Refer to section *Encrypting the Password for Datasource* on page 33.

7. Start the Interstage BPM Server.

   Refer to section *Starting Interstage BPM Server* on page 35.

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

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

1. Prepare the database and make sure that the database server is running.

   Refer to section *Database Server Preparation* on page 14.

2. Prepare the application server and make sure it is running.

   Refer to section *Application Server Preparation* on page 16.

3. Copy `engine` directory from product media to the application server computer.

4. Setup Interstage BPM on the **application server computer**.

   Refer to section *Setup Database and Interstage BPM on the Different Computer* on page 28.

5. On the **database server computer**, execute the database creation script. To execute the database creation script you need to copy it from application server computer.

   Refer to section *Updating the database setup script on the database machine* on page 29.

6. If you want to connect to a Directory Service, you must configure it before starting the Interstage BPM Server.

   Refer to chapter *Setting Up a Directory Service* on page 38.

7. On the **application server computer**, run the setup script to setup the Interstage BPM Server and Console.

   Refer to section *Running the Interstage BPM Setup Script* on page 26.

8. Switch on Java security.

   Refer to section *Switching on Java Security* on page 32.

9. Encrypt the password for datasource.

   Refer to section *Encrypting the Password for Datasource* on page 33.

10. Start the Interstage BPM Server.

   Refer to section *Starting Interstage BPM Server* on page 35.

5.3 Setup Database and Interstage BPM on the Same Computer

To setup Interstage BPM, follow these steps:

1. Copy the `engine` directory from product media. Refer to the *Copy Interstage BPM engine directory from Product Media* on page 25.

2. Update the configuration file according to the instructions in section *Updating the Interstage BPM Configuration File* on page 25.

3. Run setup script according to the instructions in section *Running the Interstage BPM Setup Script* on page 26.

If any error occurs in the script execution, check the configuration file updated in step 2 and then re-execute the setup script. However, if an error caused due to pre-exisitng components of Interstage BPM, then you need to un-setup the Interstage BPM and again execute this setup script. Refer to the *Un-setup Interstage BPM Server and Console* on page 58

5.3.1 Copy Interstage BPM engine directory from Product Media

To copy Interstage BPM engine directory, follow these steps:

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

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

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

5.3.2 Updating the Interstage BPM Configuration File

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

Follow these steps:

1. Open the `setup.config` file located in the `<engine directory>/server` directory in a text editor.

> **Note:** To edit `setup.config` file, use the text editor that can edit LF characters.

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

> **Note:** For security reasons, it is recommended that passwords should be specified from command prompt as Command Line Parameters. For details, refer *Running the Interstage BPM Setup Script* on page 26. If passwords are specified in the configuration file, the file should be secured.

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

  execution_mode_selection

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

  database_creation_selection

  This parameter specifies whether the existing database is to be used or create a new database.

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

> **Note:** If you want to use directory server to manage Interstage BPM users, refer to the section *Setting Up a Directory Service* on page 38 for more information on how to setup a directory service.

- **Interstage BPM Console**: Specify the parameters for Interstage BPM Console.

Notes about Parameters of Configuration File

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

- **db_ibpm_password**:
  - For SQL Server: By default, Microsoft SQL Server enforces a password policy that prevents users from using simple passwords. Make sure that you enter a password that meets the password policy requirements. Otherwise, the setup will fail. For details on the password policy, refer to the *Microsoft SQL Server* documentation.

- **db_port**:
  - For SQL Server: Ensure that TCP/IP is selected under Network Operations while configuring Microsoft SQL Server. Please refer to the section *Configuring Microsoft® SQL Server* on page 14.
  - For Oracle: The port number is typically `1521`. You can check the actual port number in the `targets.xml` file located in the `<ORACLE_HOME>/<hostname>_<SID>/sysman/emd` directory.

- **db_instance_name**
  - For Oracle: The connection identifier usually corresponds to the database name unless the database name is longer than eight characters. In this case, a truncated version of the database name is used. You can verify the actual connection identifier in the `tnsnames.ora` file located in the `<ORACLE_HOME>/network/admin` directory.

- **LDAPAccessUserID**: If you have selected a Directory Service, by default, the user account defined on this screen is also used to log into the Directory Service. If you want to use a different user, you must change the `LDAPAccessUserID` and `LDAPAccessUserPassword` configuration parameters of the Interstage BPM Server. Refer to the *Server Administration Guide* for more information.

5.3.3 Running the Interstage BPM Setup Script

Before executing the setup script, do the following:

- Set the value of `JAVA_HOME` environment variable on your machine. Specify the JDK version that is mentioned in the *Interstage BPM Server Release Notes* . If this parameter is left blank or set to an incorrect value, it will cause the error.
- Make sure that the configuration file is updated properly.
- Make sure JBoss EAP 6 application server is up and running by executing the `domain.bat` / `domain.sh` script located in: `<JBoss Installation Directory>/bin`. *Interstage BPM Server Release Notes*.

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

> **Note:** JRE is not supported.

Execute Interstage BPM setup script:

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

- For Windows: `setup.bat`
- For UNIX: `setup.sh`

Execute the setup script using the following command:

- On Windows:

```
setup.bat [-<option>] [<parameter name>=<value>] [<parameter
name>=<value>]...
```

- On UNIX:

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

Options:

- `-configFilePath <Path of configuration file>`: This option is used to specify the path of configuration file located in a directory other than that of `setup.bat` / `setup.sh`.
- `-onlyValidation`: This option is used to execute the setup script in validation mode. If you specify this option, only the content of the configuration file is verified but the actual setup of Interstage BPM will not be performed.

Command Line Parameters:

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

If you want to use space character in the value of a parameter then you need to enclose entire <parameter name>=<value> in double quotes. For example: `"DATAFILE_PATH=C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA"`.

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

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

On Windows:

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

On UNIX:

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

How to Confirm Successful Setup

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

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

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

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

> **Note:** When setup execution fails, depending on the cause of failure you might require to execute un-setup script. For further information, refer to *Un-setup Interstage BPM Server and Console* on page 58.

5.4 Setup Database and Interstage BPM on the Different Computer

To setup Interstage BPM, follow these steps:

1. Copy the `engine` directory from Interstage BPM product media. Refer to the *Copy Interstage BPM engine directory from Product Media* on page 25.

2. Copy the database directory specific to database you are using. Refer to the *Copy database setup directory to database machine* on page 28

3. Update and run the database setup script on the machine where database is installed according to the instructions in section *Updating the database setup script on the database machine* on page 29

4. Update the configuration parameters as described in the `setup.config` file. Refer to the section *Update the configuration file on Interstage BPM Server machine* on page 30.

5. Run setup script according to the instructions in section *Running the Interstage BPM Setup Script* on page 26.

   If any error occurs in the script execution, check the configuration file updated in step 4 and then re-execute the setup script. However, if an error caused due to pre-existing components of Interstage BPM, then you need to un-setup the Interstage BPM and again execute this setup script. Refer to the *Un-setup Interstage BPM Server and Console* on page 58.

5.4.1 Copy database setup directory to database machine

To copy database setup directory, follow these steps:

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

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

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

> **Note:** In UNIX, you must grant following permissions for the directory you just copied (for example `<engine directory>/server/deployment/dbsetup/oracle`) to the user who executes the scripts.
> - Directory: 'Read', 'Write' and 'Execute' permissions.
> - All files: 'Read' permission.
> - All script (.sh) files: 'Execute' permission.

5.4.2 Updating the database setup script on the database machine

Prerequisite: You have prepared the database server as instructed in section *Database Server Preparation* on page 14.

To use the database creation script:

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

> **Note:**
> - When editing parameters, **do not** include values in double-quotes. An example of the **correct way** to specify a value:
>
>   `DATAFILE_PATH=C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA.`
> - For security reasons, the password specified in the configuration file should be secured.

- **Parameters common to all databases:**
  - **USER**
    Database User Name
    Sample value: `ibpmuser`
  - **PASSWORD**
    Database User Password

- **For Oracle:**
  - **SID**
    Oracle System ID
    Sample value: `orcl`
  - **SYSTEM_PASSWORD**
    System User Password
  - **ORACLE_HOME**
    ORACLE home directory
    Sample value on Windows: `C:\app\oracle\product\11.2.0\dbhome_1`

Sample value on UNIX: `/opt/app/oracle/product/11.2.0/dbhome_1`

- **DATAFILE_PATH**
  Path to store data files
  Sample value on Windows: `C:\app\oracle\oradata\orc1`
  Sample value on UNIX: `/opt/app/oracle/oradata/orcl`

- **For SQL Server:**
  - **ADMIN_USER**
    Database Administrator User
    Sample value: `sa`

  - **ADMIN_PASSWORD**
    Database Administrator Password

  - **PORT**
    Database Port Number
    Sample value: `1433`

  - **SQLSERVER_HOME**
    SQLSERVER home directory
    Sample value on Windows: `C:\Program Files\Microsoft SQL Server`

  - **DATAFILE_PATH**
    Path to store data files
    Sample value on SQL Server 2012: `C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA.`

3. Run the setup script. The name of the setup script depends on Operating System of the database machine as mentioned below:
   - For Windows: `dbsetup.bat`
   - For UNIX: `dbsetup.sh`

Note:	Running these scripts causes the older database to be deleted. So, when you run these scripts for the first time and if database does not exist on the machine, you will receive an error message saying database deletion failed. This is correct behavior.

Note:	If you create database using the database creation script, validation is not performed by the Setup Script. Therefore you need to confirm all of the preparation requirements described in section *Database Server Preparation* on page 14.

5.4.3 Update the configuration file on Interstage BPM Server machine

Before executing the setup script, do the following:

To update the configuration file on Interstage BPM Server machine:

1. Open the `setup.config` file located in the `<engine directory>/server` directory in a text editor.

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

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

> **Note:** For security reasons, it is recommended that passwords should be specified from command prompt as Command Line Parameters. For details, refer *Running the Interstage BPM Setup Script* on page 26. If passwords are specified in the configuration file, the file should be secured.

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

  execution_mode_selection

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

  Database_creation_selection

  This parameter specify whether the existing database is to be used or create a new database. Specify the value of this parameter as `1` as the existing database is to be used.

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

> **Note:** If you want to use directory server to manage Interstage BPM users, refer to the section *Setting Up a Directory Service* on page 38 for more information on how to setup a directory service.

- **Interstage BPM Console**: Specify the parameters for Interstage BPM Console.

5.5 User Accounts and Groups

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

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

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

If you have configured the Interstage BPM Server to use a Directory Service, you need to configure the Directory Service before starting the Interstage BPM Server. For details, refer to chapter *Setting Up a Directory Service* on page 38.

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

5.6   Switching on Java Security

Setup script setup the Interstage BPM in SaaS mode. In SaaS mode, it is critical to ensure that each tenant has access to only their own resources, and no other tenant's resources. To achieve this security, you need to manually switch on Java security. If you use only the default tenant or you don't need to achieve the security, you don't have to switch on Java security.

The tenant resources to be uploaded to server are stored to the directory corresponding to tenant name in `<engine directory>`. Without switching on Java security, there is no limitation to access to external resources from a custom JavaAction or a Java class of agent. In this case, you can access to any resource and execute it.

With switching on Java security, the permissions enable access restrictions by using the custom class loader of Interstage BPM. If lacking for execution permissions by default to perform a workflow application, you can add the lacking permissions by editing the `policy.xml` file to grant them.

> **Note:**   The `policy.xml` file is provided by Interstage BPM itself. For details, refer to *Changing Tenant Resource Permissions* in *Administration Guide*.

For JBoss:

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

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

2. Uncomment the `SECMGR="true"` line in the below configuration file for JBoss.

   • For Windows: `<JBoss Installation Directory>\bin\domain.conf.bat`

   • For UNIX: `<JBoss Installation Directory>/bin/domain.conf`

> **Note:**   This step is not required for JBoss EAP 6.1.0/6.2.0.

3. Append the following new Java VM options for the `<jvm-options>` element in `host.xml` located in the `<JBoss Installation Directory>/domain/configuration/` directory.

```
<servers>
<server name="ibpm-server" group="iflow-server-group" auto-start="true">

 <jvm name="default">
  <jvm-options>
   <option value="-Djava.security.policy=<engine
directory>/server/instance/default/resources/policy.txt"/>
  </jvm-options>
 </jvm>
...
```

```
</server>
</servers>
```

> **Note:** When using JBoss EAP 6.1.0/6.2.0, add the following `<option>` element inside the
> `<jvm-options>` element:
>
> `<option value="-Djava.security.manager"/>`

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.

4. 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 Adapters 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"/>
 ...
```

5.7   Encrypting the Password for Datasource

Follow the below procedure to encrypt database user password from the JBoss resource.

1. Encrypt the database password by running the following command:
   • On Windows:

```
set CLASSPATH=<JBoss installation
directory>/modules/system/layers/base/.overlays/layer-base-jboss-eap-6.4.9.CP
 /org/picketbox/main/picketbox-4.1.2.Final-redhat-1.jar;%CLASSPATH%
java org.picketbox.datasource.security.SecureIdentityLoginModule <Your
 Database Password>
```

   • On UNIX:

```
CLASSPATH=<JBoss installation
directory>/modules/system/layers/base/.overlays/layer-base-jboss-eap-6.4.9.CP
 /org/picketbox/main/picketbox-4.1.2.Final-redhat-1.jar:$CLASSPATH:.:
export CLASSPATH
```

```
java org.picketbox.datasource.security.SecureIdentityLoginModule <Your
 Database Password>
```

> **Note:** If you are setting up Interstage BPM on JBoss EAP 6.1.0/6.2.0,
> `picketbox-<version>.Final-redhat-1.jar` will be placed in a different directory. Use
> the following path when setting the CLASSPATH.
>
> For JBoss EAP 6.1.0: `<JBoss installation`
> `directory>/modules/system/layers/base/org/picketbox/main/picketbox-4.0.17.Final-redhat-1.jar`
>
> For JBoss EAP 6.2.0: `<JBoss installation`
> `directory>/modules/system/layers/base/org/picketbox/main/picketbox-4.0.19.Final-redhat-1.jar`

Record the encrypted password that is displayed by running the above command. It will be used in the next step.

2. Search for the profile `<profile name="full-ha">` in `domain.xml`, and inside the `security-domains` tag, add the following `security-domain` with the encrypted database password

```
<security-domain name="encryptedSecurityDomain" cache-type="default">
  <authentication>
    <login-module
code="org.picketbox.datasource.security.SecureIdentityLoginModule"
flag="required">
      <module-option name="username" value="<database user name>"/>
      <module-option name="password" value="<encrypted database
password>"/>
    </login-module>
  </authentication>
</security-domain>
```

3. Replace the authentication information for datasource to the `security-domain` created in step 2 inside `domain.xml`.

Example:

Before change

```
<datasource jndi-name="java:jboss/datasources/iFlowDS"
pool-name="iFlowDS" enabled="true" use-java-context="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:ORCL</connection-url>

  <driver-class>oracle.jdbc.driver.OracleDriver</driver-class>
  <driver>iFlowDSDriver</driver>

<transaction-isolation>TRANSACTION_READ_COMMITTED</transaction-isolation>

  <pool>
    <min-pool-size>15</min-pool-size>
    <max-pool-size>64</max-pool-size>
  </pool>
  <security>
    <user-name>database user name</user-name>
    <password>plain text password</password>
  </security>
  <validation>
    <exception-sorter
class-name="org.jboss.jca.adapters.jdbc.extensions.oracle.OracleExceptionSorter"/>

  </validation>
```

```
   <timeout>
     <blocking-timeout-millis>10000</blocking-timeout-millis>
     <idle-timeout-minutes>0</idle-timeout-minutes>
   </timeout>
</datasource>
```

After change

```
<datasource jndi-name="java:jboss/datasources/iFlowDS"
pool-name="iFlowDS" enabled="true" use-java-context="false">
  <connection-url>jdbc:oracle:thin:@localhost:1521:ORCL</connection-url>

  <driver-class>oracle.jdbc.driver.OracleDriver</driver-class>
  <driver>iFlowDSDriver</driver>

<transaction-isolation>TRANSACTION_READ_COMMITTED</transaction-isolation>

  <pool>
    <min-pool-size>15</min-pool-size>
    <max-pool-size>64</max-pool-size>
  </pool>
  <security>
    <security-domain>encryptedSecurityDomain</security-domain>
  </security>
  <validation>
    <exception-sorter
class-name="org.jboss.jca.adapters.jdbc.extensions.oracle.OracleExceptionSorter"/>

  </validation>
  <timeout>
    <blocking-timeout-millis>10000</blocking-timeout-millis>
    <idle-timeout-minutes>0</idle-timeout-minutes>
  </timeout>
</datasource>
```

4. Remove the passwords from backup files of `domain.xml`. Datasource passwords are also recorded in `domain.v<number>`.xml under `<JBoss Installation directory>/domain/configuration/domain_xml_history/<serial number>`. The file is kept as a backup of `domain.xml` files and not used during operation. Please remove the passwords from the files for security reasons.

5.8 Starting Interstage BPM Server

Prerequisites:

• You have finished the setup script successfully. For details, refer *Running the Interstage BPM Setup Script* on page 26.

> **Note:** If you are setting up Interstage BPM on JBoss EAP 6.2.0 or later, add system parameter `ByPassJBoss6EjbLoadAfterEjbCreate` with the value `false` before starting the Interstage BPM. For information on how to add new system property, please refer to section *Using the Configuration Export and Import Scripts* on page 78.

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

To start the server:

Run `domain.bat` / `domain.sh` located in the `<JBoss Installation Directory>/bin` directory.

To confirm successful setup see the Interstage BPM server logs at location: `<engine directory>/server/instance/default/logs`

- In `Trace.log` a message is displayed when the server is started. For example,

```
Interstage BPM Server Enterprise Edition Version <Version number> Build
 <Build number> (using JBoss) is ready
```

- In `Audit.log` a message is displayed for successful user login

```
INFO : User <admin user Id> successfully logged into Default
tenant(session id= <ID>).
INFO : User <admin user Id> successfully logged out from Default
tenant(session id=<ID>).
```

To stop the server:

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

1. Display the Command Prompt window in which the JBoss Application Server is running.

2. 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.

5.9   Starting Interstage BPM Console and Tenant Management Console

Prerequisites:

The application server where you have setup Console is running.

When you setup 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 35.

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/<tenant_name>/`

   Here:

   - `<hostname>` is the machine name of the computer upon which you have setup the Interstage BPM Console.

   - The default port is `49950`.

   - `<tenant_name>` is the name of the tenant; if you configure non-SaaS mode, this is `default`.

   - It is recommended to use the tenant name in the URL with the same case as it has been created with during setup. However, tenant name in the URL is not case sensitive.

The Login page appears.

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.

5.9.1 Starting Interstage BPM Mobile Application

To start Interstage BPM Mobile Application:

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

   The Login page appears.

2. Log on to Interstage BPM Mobile application.

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

5.10 Starting Interstage BPM OpenID Provider

Prerequisites: The application server where you have setup OpenID Provider is running.

When you setup Interstage BPM OpenID Provider on JBoss, you start OpenID Provider by starting Interstage BPM Server. To start Interstage BPM Server, refer *Starting Interstage BPM Server* on page 35.

6 Setting Up a Directory Service

This chapter provides instructions for setting up your Directory Service.

6.1 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.

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

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

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

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

   a) Open the Active Directory Management Console (Active Directory Users and Computers).

   b) In the Console tree, right-click the required domain, select **New**, and click **Organizational Unit**.

   c) Type the name of the organizational unit (`Groups`).

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

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

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

   (You cannot change this value to another value.)

   a) Open the Active Directory Management Console (Active Directory Users and Computers).

   b) In the Console tree, right-click the required domain, select **New**, and click **Organizational Unit**.

   c) Type the name of the organizational unit (`People`).

At this point, the directory tree of LDAP root looks as follows:
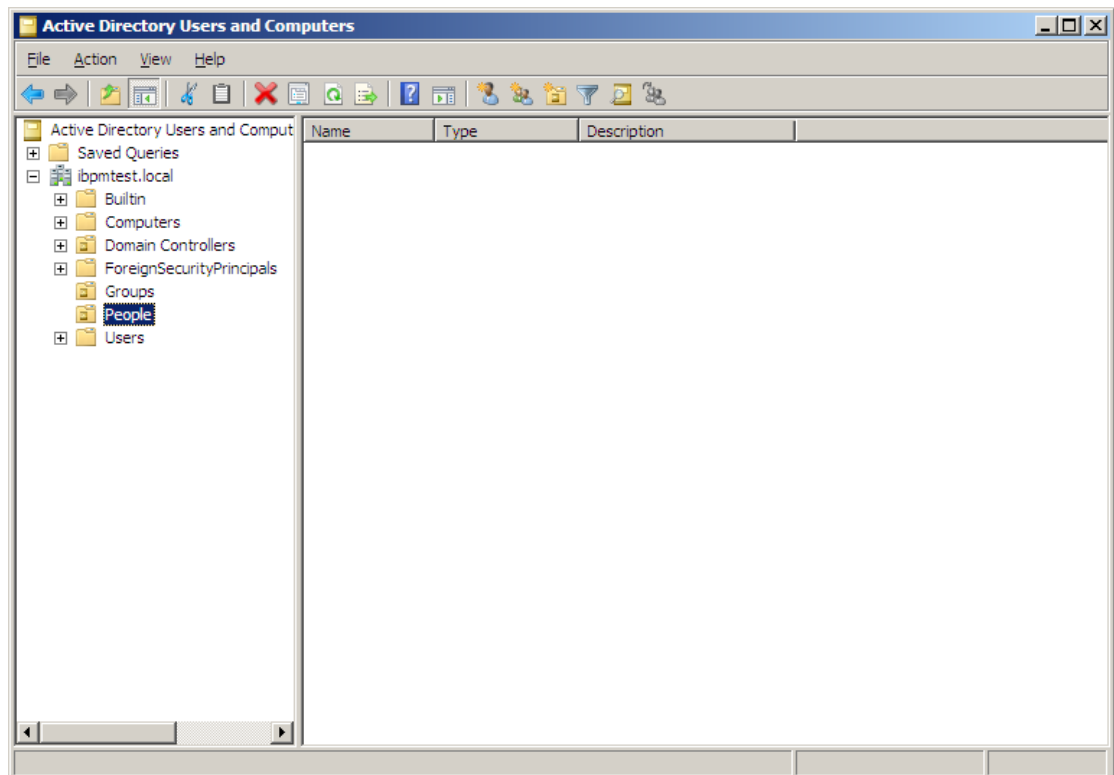
Figure 5: Creating Groups and People

3. Create LDAP-access user.

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

   a) Open the Active Directory Management Console (Active Directory Users and Computers).

   b) Right-click the **People** object, click **New**, and select **User**.

   c) Enter the new user's information for `ibpm_server1` and click **Next**.

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

   Note: If you use Built-in SSO authentication, do not include any forwardslash "/" or backslash '\' characters in the user ID that you create.

   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:
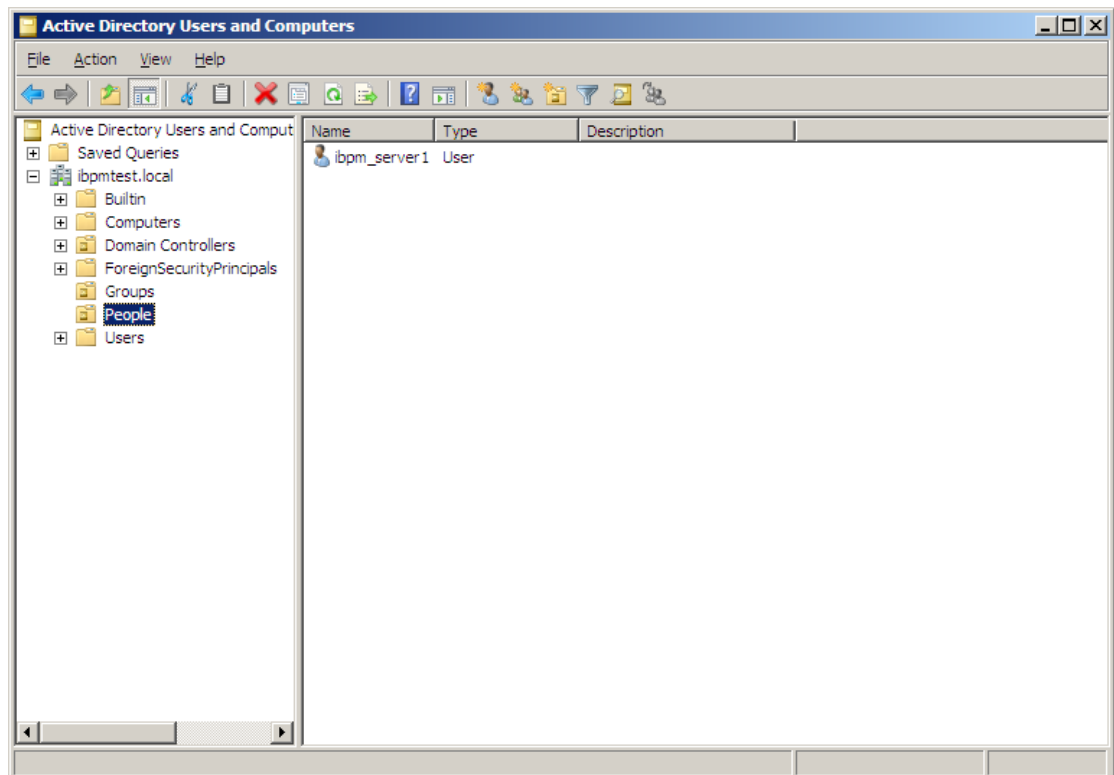
Figure 6: Directory Tree of People

4. Add the LDAP-access user (`ibpm_server1`) in the Administrators group.

   a) Select **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.

   b) Right click the user (`ibpm_server1`) that you want to include in the Administrators group.

   c) From the popup menu that appears, select **Properties**, and then select the **Members Of** tab.

   d) In the user properties (for example, **ibpm_server1 Properties**) dialog, check if the `Administrators` group already exists in the list. If not, then follow these steps:

      1. Click **Add**.

         The **Select Groups** dialog appears.

      2. Type group name (`Administrators`), and then click **Check Names** to verify the group name.

      3. Click **OK**.

   e) Click **OK**.

5. Create the default Interstage BPM roles `Role` and `AdminRole` belonging to the Organizational Unit `Groups`.

   a) Open the Active Directory Management Console (Active Directory Users and Computers).

   b) Right-click the **Groups** object, click **New** and then select **Groups**.

    c) Create the group's information for **AdminRole**.

    d) Double-click the **AdminRole** object, and navigate to the **Member** tab.

    e) Click **Add**, and enter `ibpm_server1`. Now `ibpm_server1` is linked to `AdminRole` group.

    f) Repeat these steps to create the `Role` group, and add `ibpm_server1` to the `Role` group.

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

6. 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`.

7. 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:
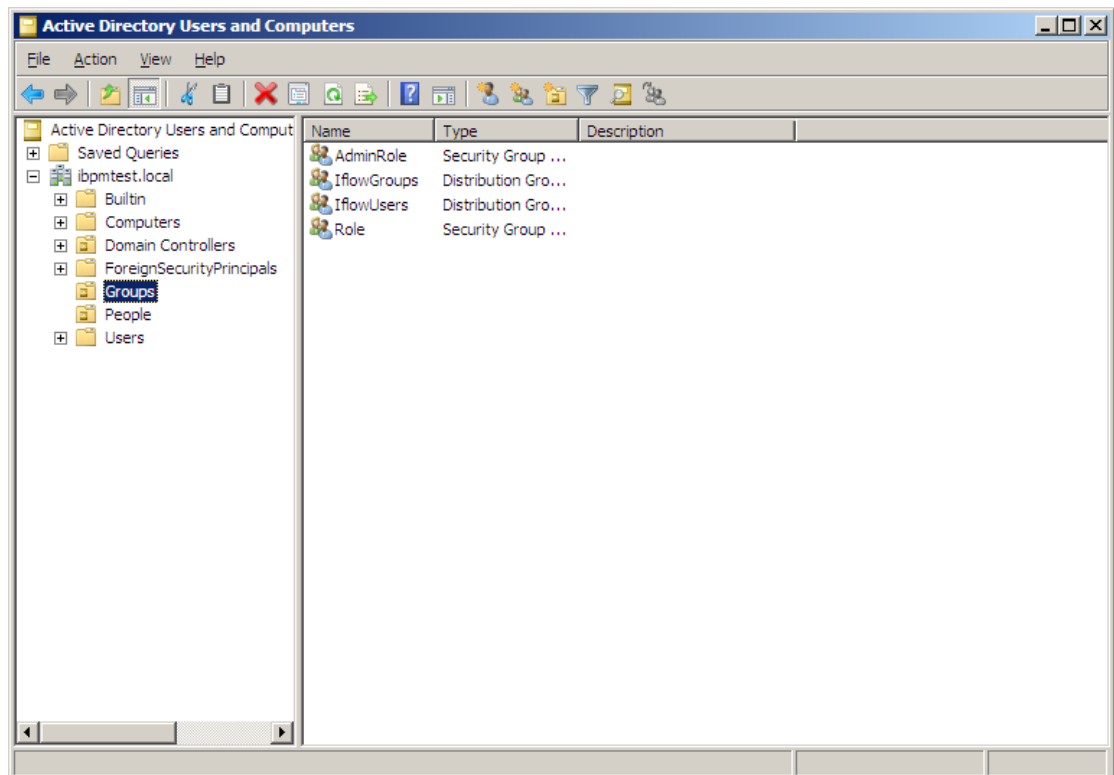
Figure 7: Directory Tree of Groups

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

6.1.2 Using Existing Active Directory Users and Groups

If you are new to Interstage BPM and are already using Active Directory as the Directory Service to maintain your organization's Users and Groups, you can use your existing directory structure with Interstage BPM. You can do this by designating which of your LDAP Users and Groups you will be able to use in Interstage BPM. This involves the modification of two special LDAP Groups, `IflowUsers` and `IflowGroups`.
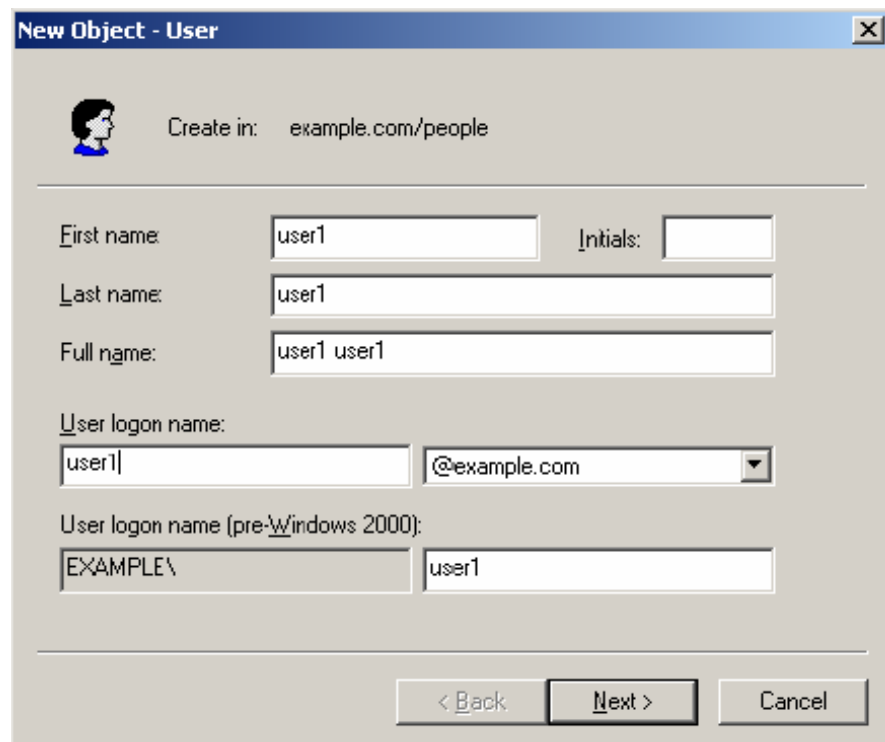
To give your LDAP Users access to Interstage BPM as Interstage BPM users, add them as members of the `IflowUsers` group. You can add each user individually or add a group that contains the users. Users in the group sub-levels will also have access permission. To use your LDAP Groups directly in Interstage BPM add them as members of the `IflowGroups` group.

6.1.3 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.
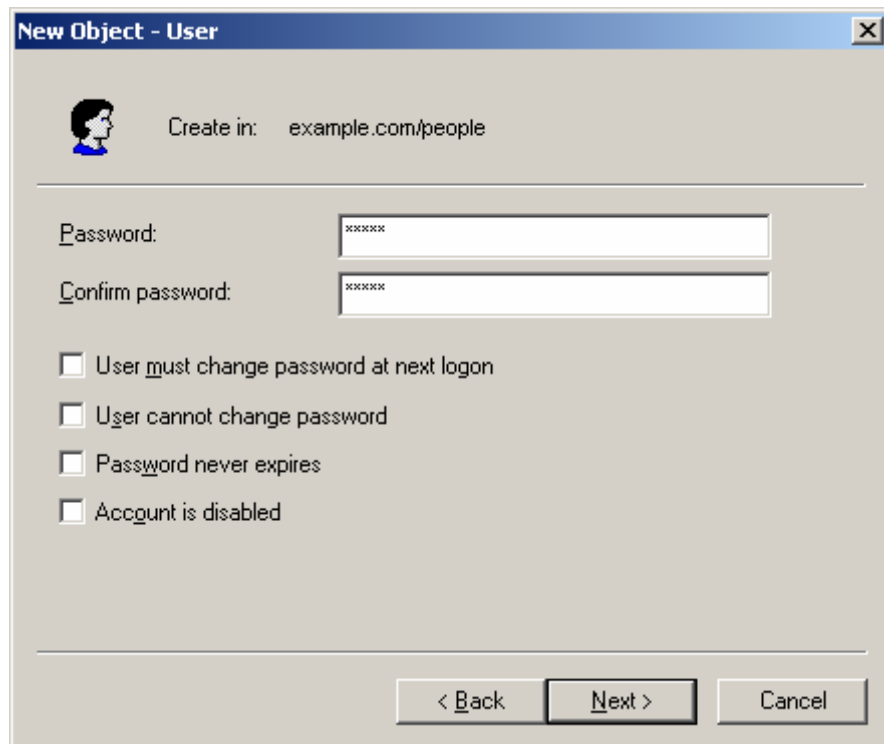
Figure 8: Adding a New User

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 make sure that **User must change password at next logon** check box is not selected. Click **Next**.

Figure 9: Adding a New User

6. Confirm the adding of the new user by clicking **Finish** in the confirmation dialog.
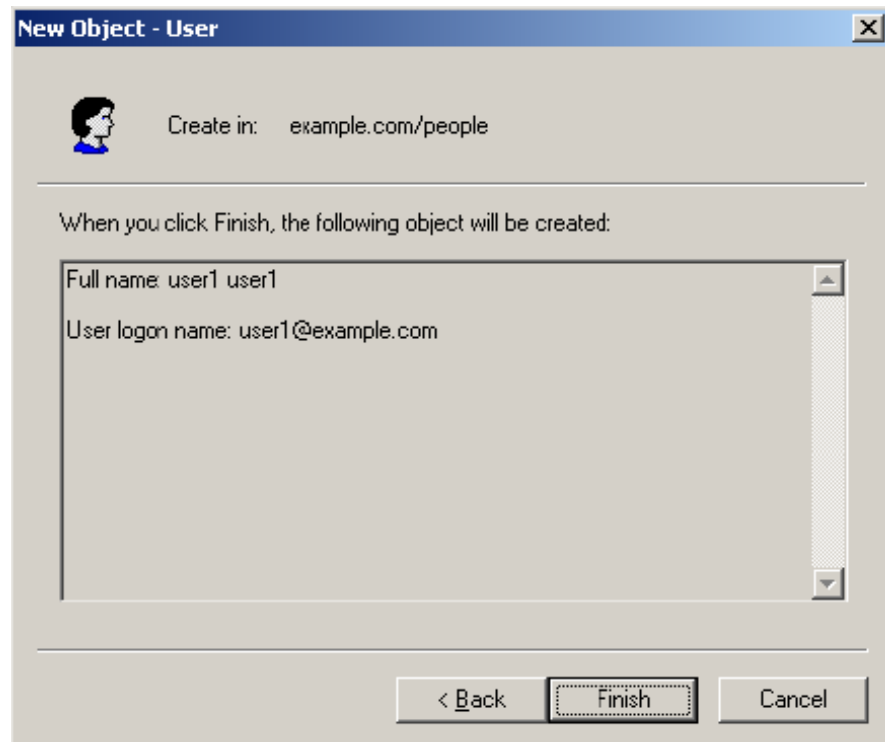
Figure 10: Adding a New User

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:

    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 setup.

    b) Right click the `IflowUsers` 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 user that is to be added to `IflowUsers`. Click **Check Names** to verify the user name.

    e) Click **OK**.

6.1.4 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.
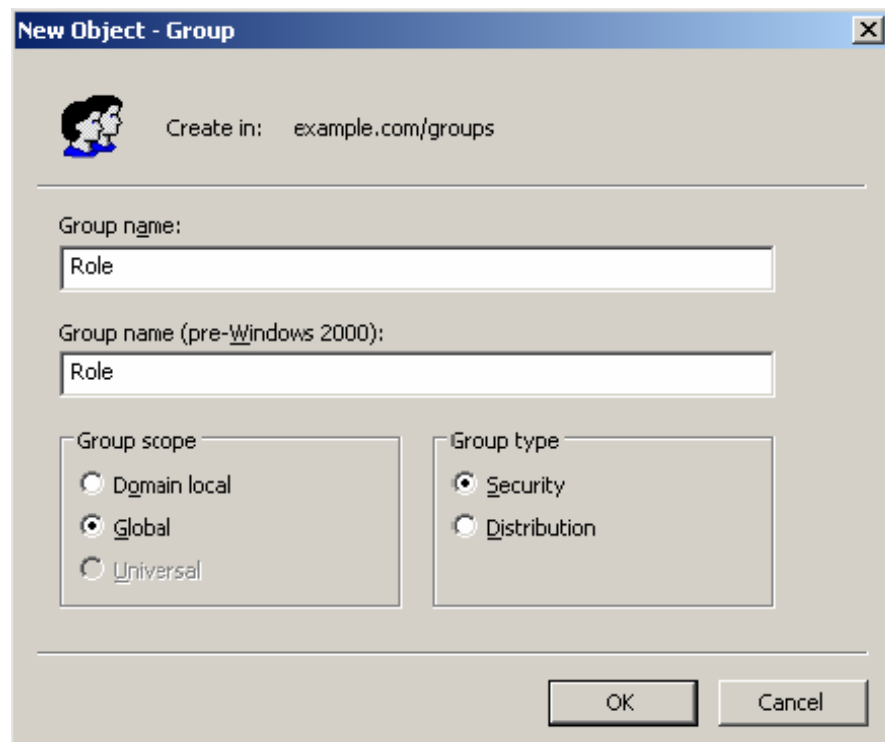
Figure 11: Adding New Groups

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 setup.

   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**.

6.1.5 Adding Members to a Group Using the GUI

To add members to a Group using the GUI:

1. Launch the Active Directory Console if you haven't already done so by selecting **Start** > **Settings** > **Control Panel** > **Administrative Tools** > **Active Directory Users and Computers**. Expand the hostname and the domain name to find the **groups** Organizational Unit.

2. Right click the group to which you want to add members.

3. From the popup menu that appears select **Properties**, and then select the **Members** tab to display the Group's properties dialog.

   The **Properties** dialog for the group named "`Role`" is used in the following example. `ibpm_example` is already a member of the group named "`Role`". It is highly recommended that you use a group with a more meaningful name than "Role" in your own programming practice, since this name tends to be very confusing to talk about.
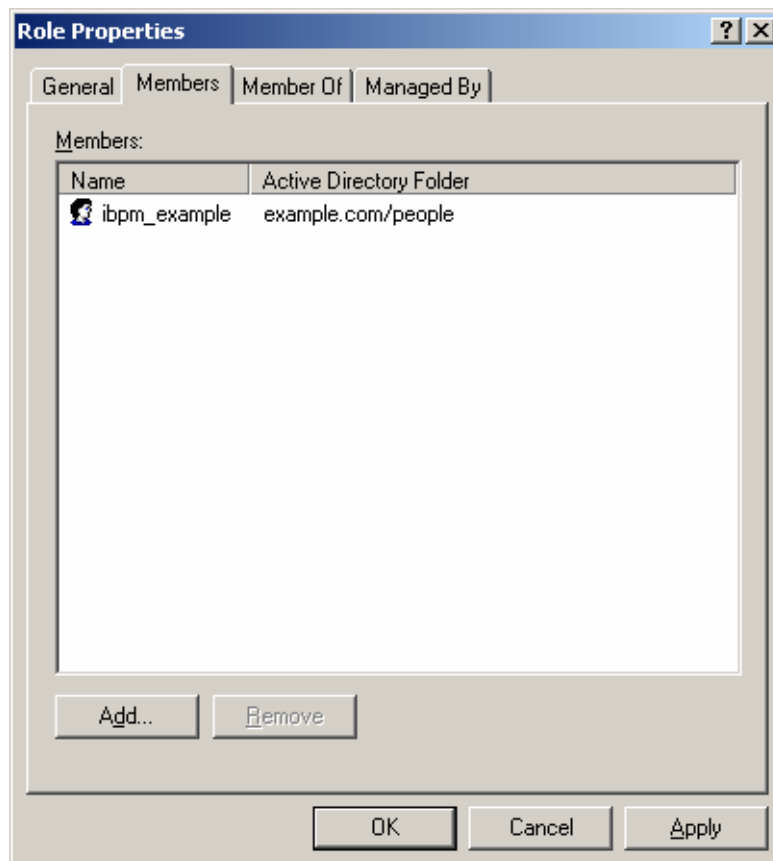
Figure 12: Adding Members

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

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

5. In Windows Server, search a user or Group that you want to add as a member of the Group. The user or Group appears in the bottom text area of the dialog.
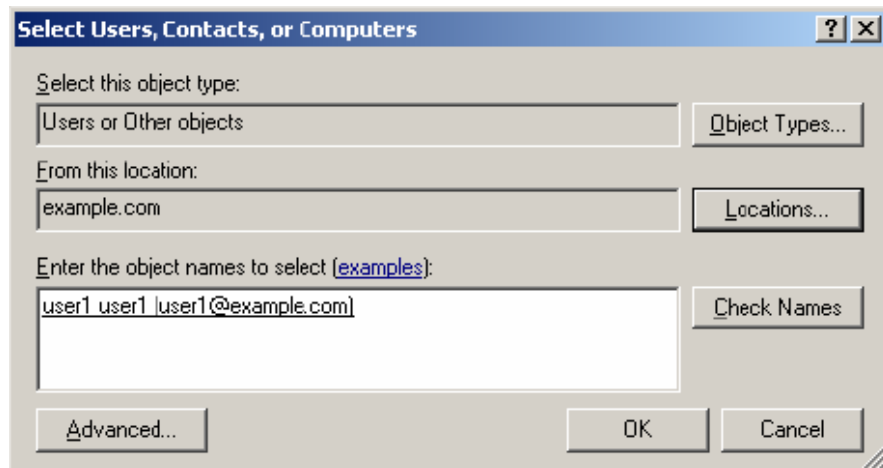
Figure 13: Selecting a User

6. Click **OK**.

The user appears with the existing users in the **Properties** dialog.
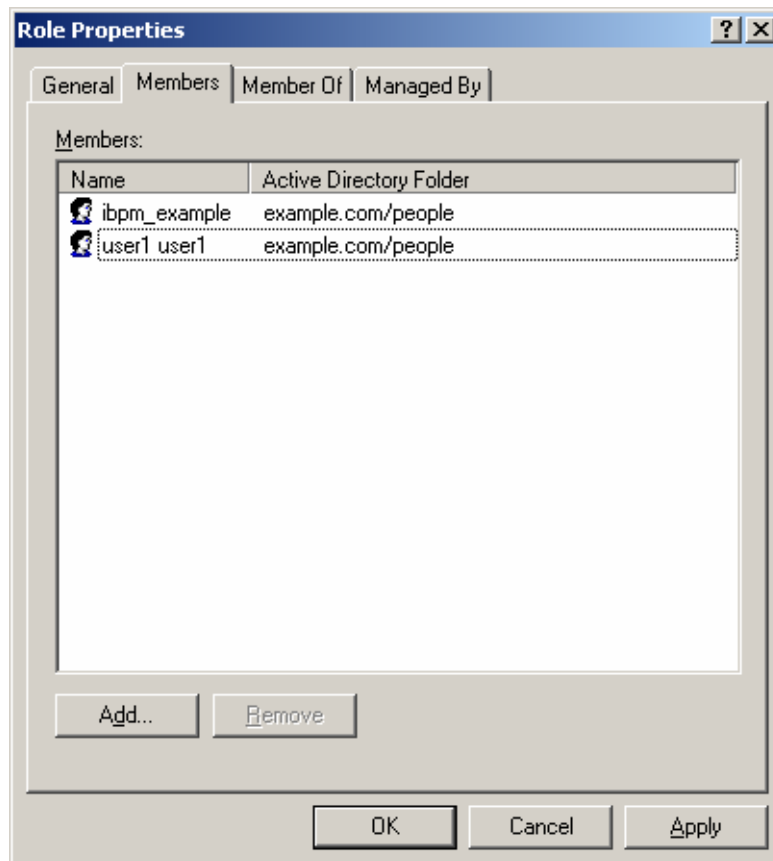
Figure 14: New Member Added

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

6.2 Setting Up Oracle Directory Server Enterprise Edition

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

Prerequisite:

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

To use Interstage BPM with Oracle Directory Server Enterprise Edition:

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

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

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

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

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

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

   a) Open the Oracle Directory Service Control Center, and select the **Browse** tab of **Entry Management**.

   b) Specify the DN that you want to use in the **View DN** drop-down list.

   c) Click **New Entry** to start the **New Entry** wizard.

   d) In the **Choose Object Class** screen, for **Entry Type**, select **Organizational Unit-(organizationalUnit)**.

   e) In the **Configure Attribute** screen, enter `Groups` for the Organization Unit (ou).

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

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

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

   (You cannot change this value to another value.)

   a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.

   b) Specify the DN that you want to use in the **View DN** drop-down list.

   c) Click **New Entry** to start the **New Entry** wizard.

   d) In the **Choose Object Class** screen, for **Entry Type**, select **Organizational Unit-(organizationalUnit)**.

   e) In the **Configure Attribute** screen, enter `People` for the Organization Unit (ou).

> **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:
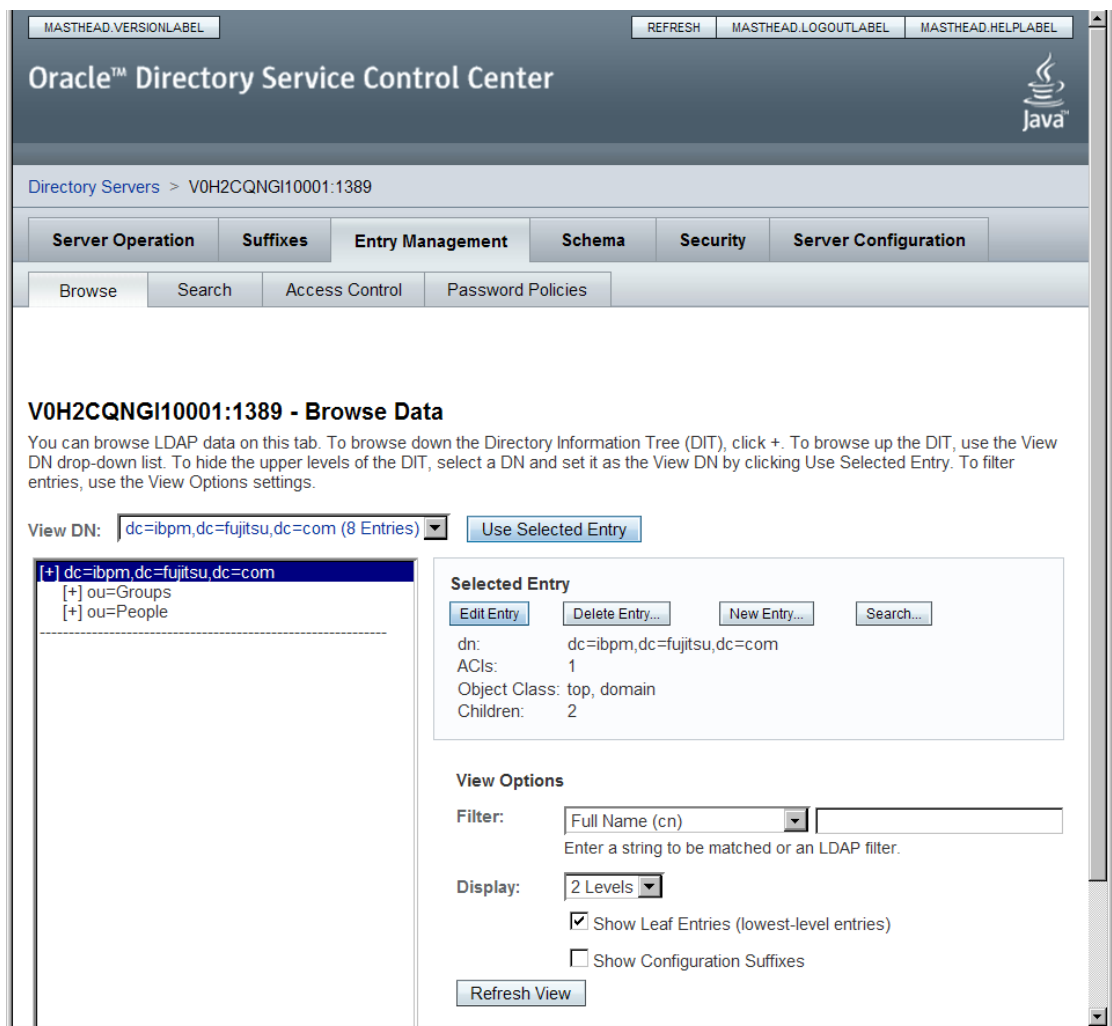
Figure 15: Creating Groups and People

3. Create LDAP-access user.

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

   a) 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.

Note: If you use Built-in SSO authentication, do not include any forwardslash "/" or backslash '\' characters in the user ID that you create.

At this point, the directory tree of **People** looks like the following:
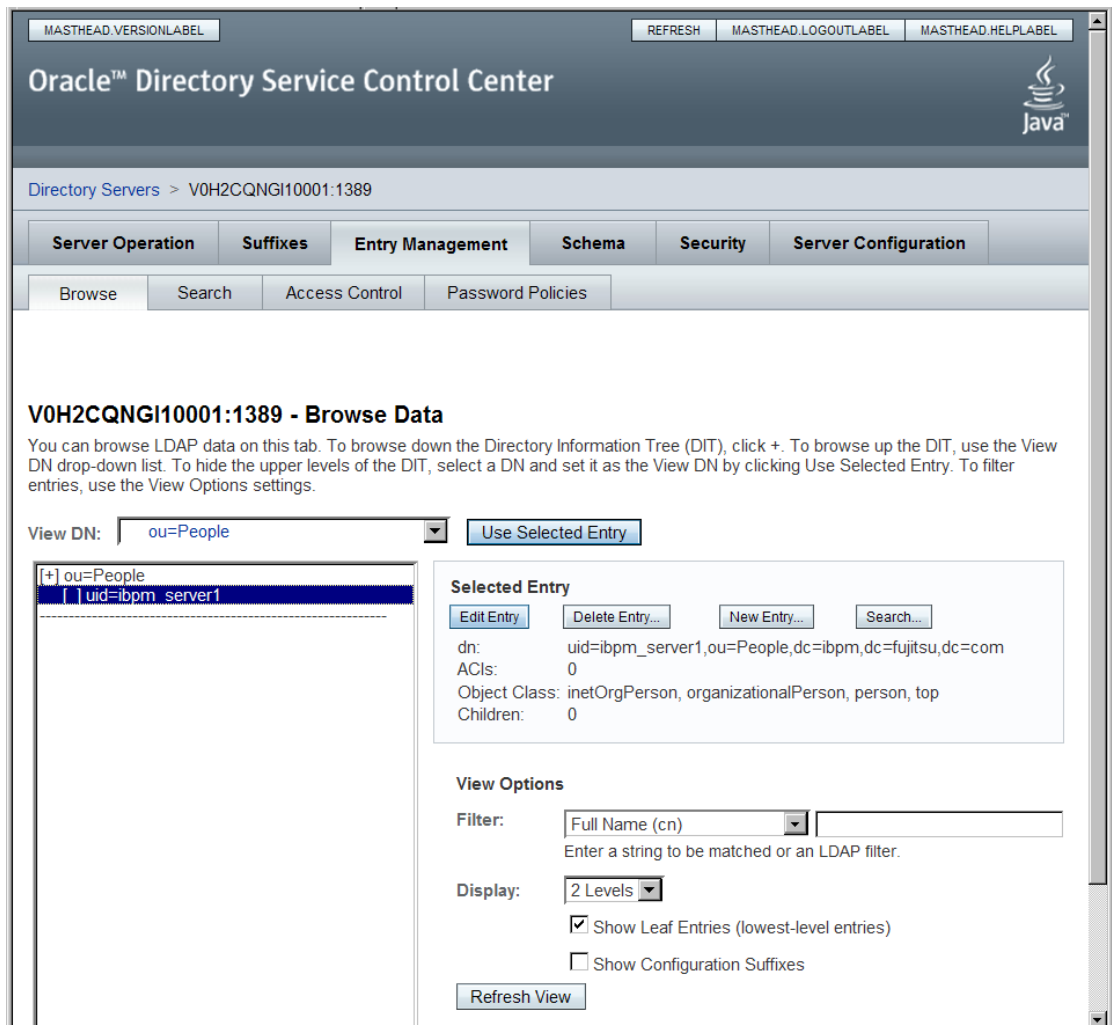
Figure 16: Directory Tree of People

4. Create the default Interstage BPM roles `Role` and `AdminRole` belonging to the Organizational Unit `Groups`.

   a) In the Oracle Directory Service Control Center, select the **Browse** tab of **Entry Management**.

   b) Under the `Groups` group you created earlier, click **New Entry** and start the **New Entry** wizard.

   c) In the **Choose Object Class** screen, for **Entry Type**, select **Static Group - (groupOfUniqueNames)**.

   d) In the **Configure Attribute** screen, enter `AdminRole` for **Full Name (cn)** field of **Required Attributes**.

   e) In the **Configure Attribute** screen, in **Allowed Attributes**, for both Groups select the default user you created in the previous step.

   f) Similar to the steps just performed for `AdminRole`, repeat these steps for `Role`.

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

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

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

At this point, the directory tree of `Groups` looks like the following:
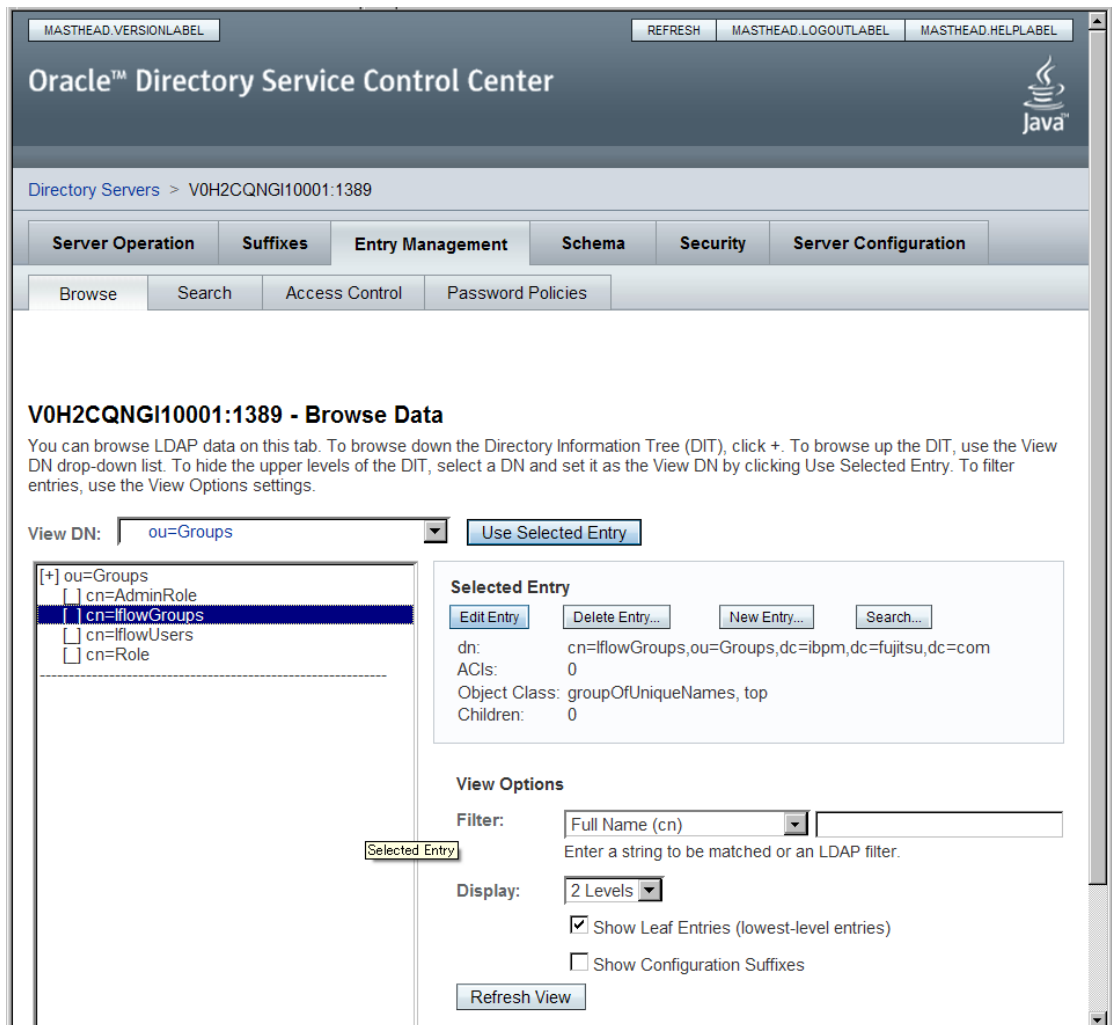
Figure 17: Directory Tree of Groups

7. Configure ACI.

a) In the Oracle Directory Service Control Center, select the **Access Control** tab of **Entry Management**.

b) Click **New ACI from Syntax** and start the **New ACI** wizard.

c) Enter information for the **ACI Syntax** and **Entry where the ACI is located**.

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

Example:

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

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

Entry where the ACI is located: `Suffix`

Example:

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

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

6.2.2 Using Existing Oracle Directory Server Enterprise Edition Users and Groups

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

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

6.2.3 Adding New Oracle Directory Server Enterprise Edition Users

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

To add a new user:

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

6.2.4 Adding New Groups

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

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

6.3 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.

6.4 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

6.5 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.

7 Un-setup Interstage BPM Server and Console

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

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

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

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

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

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

Follow the steps described below:

1. Confirm the configuration parameters according to the section *Confirm the Un-setup Configuration File* on page 58.
2. Run the unsetup script according to the instructions in section *Running the Un-setup Script* on page 59
3. Backup your data according to the instructions in section *Backup Resources* on page 60
4. Remove the `engine` directory according to the section *Remove engine Directory* on page 60.

7.1.1 Confirm the Un-setup Configuration File

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

> **Note:** If you have set the password parameters in the configuration file, secure the file for security reasons.

> **Note:** Basically, when `unsetup.config` file does not exist, executing un-setup is not neccessary. However, under certain conditions (for example - when directory from previous setup is deleted without executing un-setup), the `unsetup.config` file needs to be created manually using the following steps:
>
> 1. Use the following template located in the `<engine directory>/server/deployment/configFile/`directory to create the un-setup configuration file.
>   - For Windows: `unsetup-template-Win.config`
>   - For UNIX: `unsetup-template-Unix.config`
>
> 2. Rename the template file you used in step 1 to `unsetup.config`.
> 3. Copy `unsetup.config` to `<engine directory>/server` directory.

7.1.2 Running the Un-setup Script

Stop the Interstage BPM Server by stopping the JBoss Application Server before executing the unsetup script. For further information refer to *To stop the server* section of *Starting Interstage BPM Server* on page 35.

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

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

For Windows: `unsetup.bat`

For UNIX: `unsetup.sh`

Execute the setup script using the following command:

- On Windows:

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

- On UNIX:

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

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

If you want to use space character in the value of a parameter then you need to enclose entire <parameter name>=<value> in double quotes. For example: `"DATAFILE_PATH=C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA"`.

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

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

On Windows:

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

On UNIX:

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

Note: If the administrative security mode is enabled and you run the unsetup script, a dialog box appears with prompts for username and password. Specify the username and password that you have configured for global security.

How to Confirm Successful Un-setup

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

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

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

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

Note: If the un-setup also fails, you need to manually delete the resources. Refer to the section *Errors during Setup of the Interstage BPM Server* on page 109

7.1.3 Backup Resources

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

7.1.4 Remove engine Directory

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

8 Upgrading Interstage BPM from Previous Versions

8.1 Outline

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

To upgrade from previous versions of Interstage BPM:

1. Backup the complete Interstage BPM materials.
2. Uninstall the previous version of Interstage BPM.
3. Create a directory on your machine where you want to setup Interstage BPM and copy the `engine` directory from Interstage BPM engine directory on product media to the directory created on your machine
4. Upgrade your database according to the instructions in section *Upgrade Database* on page 61.
5. Upgrade the Interstage BPM Server and migrate application resources as described in *Migrating Application Resources from Previous Versions to this Version of Interstage BPM* on page 69.

Following sections explain the instructions for each of these steps.

8.1.1 Back up the Interstage BPM materials

To upgrade from previous versions of Interstage BPM:

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

8.1.2 Upgrade Database

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

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

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

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

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

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

Before starting the execution of database upgrade script, you need to configure the parameters in the configuration file. These parameters indicates which step to execute. You can either execute all the scripts at one go or you can manually inspect and sequentially execute these three steps of database upgrade procedure if your database resides on a machine other than the Interstage BPM Server setup. For information regarding the configuration parameters, refer to the *Parameters for the database upgrade configuration file* on page 62

Parameters for the database upgrade configuration file

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

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

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

Configuration Parameters for Database Upgrade:

Configuration Parameter	Description
MIGRATE_SCHEMA	This parameter specifies whether the schema migration has to be performed or not. The valid values are y or n. • If set to y, this parameter enables the schema migration. • If set to n, this parameter disables the schema migration. Please refer to *Upgrading Database* on page 66 for the usage example.
MIGRATE_DATA	This parameter specifies whether the data migration has to be performed or not. The valid values are y or n. • If set to y, this parameter enables the data migration. • If set to n, this parameter disables the data migration. Please refer to *Upgrading Database* on page 66 for the usage example.

Configuration Parameter	Description
POST_UPGRADE	This parameter specifies whether the post upgrade operations has to be performed or not. The valid values are y or n. • If set to y, this parameter enables the post upgrade operations. • If set to n, this parameter disables the post upgrade operations. Please refer to *Upgrading Database* on page 66 for the usage example.
AE_TO_EE	This parameter specifies the edition you are upgrading from. The valid values are y or n. • If set to y, this parameter indicates that you are upgrading from AE(Advanced Edition) to EE(Enterprise Edition) • If set to n, this parameter indicates that you are upgrading from EE to EE

DB_HOME	This parameter specifies the absolute path to the top-level directory of your database installation.
	Sample Value
	• For Oracle:
	  • On Windows: `C:\app\oracle\product\12.1.0\dbhome_1`
	  • On UNIX: `/home/oracle/app/oracle/product/12.1.0/dbhome_1`
	• For Microsoft SQL Server: `C:\Program Files\Microsoft SQL Server`

DATAFILE_PATH	This parameter specifies the absolute path to the directory where your data files resides.
	Sample Value
	• For Oracle:
	  • On Windows: `C:\app\oracle\oradata\orcl`
	  • On UNIX: `/home/oracle/app/oracle/oradata/orcl`
	• For Microsoft SQL Server: `C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\DATA`

Configuration Parameter	Description

JDBC_DRIVER_PATH	This parameter specifies the absolute path of the JDBC driver.
	
	This parameter is mandatory to specify if you have set MIGRATE_SCHEMA=y while upgrading from pre-10.1 version of Interstage BPM or if you have set MIGRATE_DATA=y.
	
	Sample Value
	• For Oracle:
	  • On Windows:
	    C:\app\oracle\product\12.1.0\dbhome_1\jdbc\lib\ojdbc7.jar
	  • On UNIX:
	    /home/oracle/app/oracle/product/12.1.0/dbhome_1/jdbc/lib/ojdbc7.jar
	• For Microsoft SQL Server:
	  On Windows: C:\MicrosoftSQLServer2012JDBCDriver\sqljdbc_4.0\enu\sqljdbc41.jar

JAVA_HOME	This parameter specifies the absolute path to the top-level directory of the JDK installation. Sample Value: D:\java\jdk1.7.0_80 This parameter is mandatory to specify if you have set MIGRATE_SCHEMA=y while upgrading from pre-10.1 version of Interstage BPM or if you have set MIGRATE_DATA=y.
DB_TYPE	This parameter specifies the type of database used. The valid values are: • oracle • mssql
DB_HOST	This parameter specifies the IP address or host name of the machine where database is installed. If you do not specify the value of this parameter localhost will be used.
DB_PORT	This parameter specifies the port on which your database is running. It is used for creating database connection. Sample Value: • For Oracle: 1521 • For Microsoft SQL Server: 1433
ORCL_SID	This parameter is specific to oracle database and indicates the connection identifier used for creating database connection and executing Oracle SQL scripts.
DBUSER	This parameter specifies the name of the database user. Sample Value: ibpmuser

Configuration Parameter	Description
DBPWD	This parameter specifies the database user password. Sample Value: `ibpmuserpassword`
DBADMINUSER	This parameter specifies the name of database admin user. Sample Value: `ibpmadminuser`
DBADMINPWD	This parameter specifies the database admin password. Sample Value: `ibpmadminuserpassword`

Copy the upgrade scripts

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

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

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

   Directories to be copied to the database machine:

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

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

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

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

> **Note:** In UNIX, you must grant following permissions for the `dbupgrade_local` directory to the user who executes the scripts.
> - The `dbupgrade_local` directory and sub-directories: 'Read', 'Write' and 'Execute' permissions.
> - All files: 'Read' permission.
> - All script (.sh) files: 'Execute' permission.

Upgrading Database

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

> **Note:** In case of Oracle database in UNIX environment, make sure that you have set the following environment variables as mentioned below:
> - `ORACLE_HOME=<Database Installation directory>`
>   For example:
>   `ORACLE_HOME=/home/oracle/app/oracle/product/12.1.0/dbhome_1; export ORACLE_HOME`
>
> - `ORACLE_SID=<Database identifier>`
>   For example:
>   `ORACLE_SID=orcl; export ORACLE_SID`

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

1. Configure the parameters in the `config.bat / config.sh` file located at:
   - On Windows: `dbupgrade\bin`
   - On UNIX: `dbupgrade/bin`

   Configure the parameters as below:

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

   For more information, refer to the *Parameters for the database upgrade configuration file* on page 62

2. Run the upgrade script `dbupgrade.bat / dbupgrade.sh` as shown below. The script file located at the:
   - On Windows: `dbupgrade\bin`
   - On UNIX: `dbupgrade/bin`

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

   Use the following command to execute this script:

   ```
   dbupgrde.bat dbuser=<dbuser> dbpwd=<db password> dbadminuser=<db
   administrator> dbadminpwd=<db administrator password> JDBC_DRIVER_PATH
   ```

```
="C:\Microsoft SQL Server\sqljdbc_2.0\enu\sqljdbc41.jar"
JAVA_HOME=C:\Java\jdk7
```

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

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

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

   a) Copy the directories on the database machine according to the instructions in the *Copy the upgrade scripts* on page 65

   b) Configure the following parameters in the `config.bat / config.sh` file located in the `dbupgrade_local\bin` folder that you have copied in previous step.

   For more information, refer to the *Parameters for the database upgrade configuration file* on page 62.

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

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

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

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

   a) Configure the migration parameters in the `config.bat / config.sh` file located at `<engine directory>\server\deployment\dbupgrade\bin` as shown below.

   For more information, refer to the *Parameters for the database upgrade configuration file* on page 62.

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

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

3. **Executing Post Migration operations**

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

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

For more information, refer to the *Parameters for the database upgrade configuration file* on page 62.

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

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

> **Note:** If you are using JBoss EAP 6.2.0 or later after upgrade and was using an older version of JBoss EAP before upgrade, add system parameter `ByPassJBoss6EjbLoadAfterEjbCreate` with the value `false`. For information on how to add new system property, please refer to section *Using the Configuration Export and Import Scripts* on page 78.

8.1.3 Upgrade Interstage BPM and Migrate Application Resources

To upgrade Interstage BPM and migrate application resources:

1. Setup the Interstage BPM Server and/or Console according to the instructions in section *Setting-up Interstage BPM Server and Console* on page 23.

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

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

2. Migrate application resources as described in *Migrating Application Resources from Previous Versions to this Version of Interstage BPM* on page 69.

3. Start the Interstage BPM Server and Console. Refer the following sections:
   - *Starting Interstage BPM Server* on page 35
   - *Starting Interstage BPM Console and Tenant Management Console* on page 36

4. If needed, migrate the application owners as described in *Migrating Application Owners from Previous Versions to this Version of Interstage BPM* on page 70

Interstage BPM is now upgraded to the latest version.

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

Pre-requisites: You have completed the previous steps as described in *Outline* on page 61.

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

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

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

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

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

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

3. Create a new directory named `engine_classes` in the `<DMSRoot>/apps/<app_ID>/` and copy all the class files for generic Java Actions in this `engine_classes` directory.

4. For each application, do one of the following:

   a) If an application already contains the `agentsConfig.xml` file (located in `<DMSRoot>/apps/<application id>/`), add the following code to that file:

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

   b) If an application does not contain the `agentsConfig.xml` file (located in `<DMSRoot>/apps/<application id>/`)

   - Copy the `agentsConfig.xml` file of the previous version to the `<DMSRoot>/apps/System` folder.

- • Edit the copied `agentsConfig.xml` to remove 'agents/' from the text within the `<ConfigFile>` tag.

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

6. Copy the previous versions of each of the following to each application folder in the `<DMSRoot>/apps/<application id>/` directory.
   - • `HTTPAgent.xml` file
   - • `ftp.xml` file
   - • Business Calendar (`.cal`) files
   - • `DataSourceDefinition.xml` file

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

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

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

8.3 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*.

8.4 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 35
   • *Starting Interstage BPM Console and Tenant Management Console* on page 36

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

8.5 Additional Steps for Handling Pre-11.0 Console URLs

From version 11.0 of Interstage BPM Console, the Interstage BPM Console URL has been changed, making older versions of URLs such as those of Remote Sub-Processes, 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 setup an instance of Interstage BPM Server, and after setup, you should change the `ApplicationSecurityMode` server configuration parameter to `relax`.

• The Compatibility Proxy should be deployed at the original pre-V11 context root, and the V11 Console should be deployed at a different context root. For example, if the pre-v11.0 Console was deployed at the context root `ibpmconsole`, then you should install the compatibility proxy at `ibpmconsole` and the V11 Console at any other context root, for example, `console`. The default context root for V11 Console is `console`, which is different from the default context root for any previous version. So if you have followed the defaults, this requirement rule will be automatically satisfied.

• V10.x had the restriction that two applications cannot have process definitions with the same name. This restriction has been removed in V11.0. But to use the Compatibility Proxy, the same restriction needs to be followed, that is, two applications should not have process definitions with the same name.

8.5.1 Steps to Overcome the URL-incompatibility Problem

Pre-requisites: You have completed the previous steps as described in *Outline* on page 61:

- You have setup an instance of Interstage BPM Server and Console, and after setup 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 product media 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 `<JBoss Installation Directory>/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 35
   - *Starting Interstage BPM Console and Tenant Management Console*

8.6 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.

8.7 Additional Steps for Interstage BPM Console

8.7.1 Deleting Interstage BPM Console

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

On 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`

8.7.2 Updating System Properties for Web Server Port

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

- ServerBaseURL
- ServerEmailBaseURL

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

Appendix A: Security

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

A.1 Interstage BPM Operation Model

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

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

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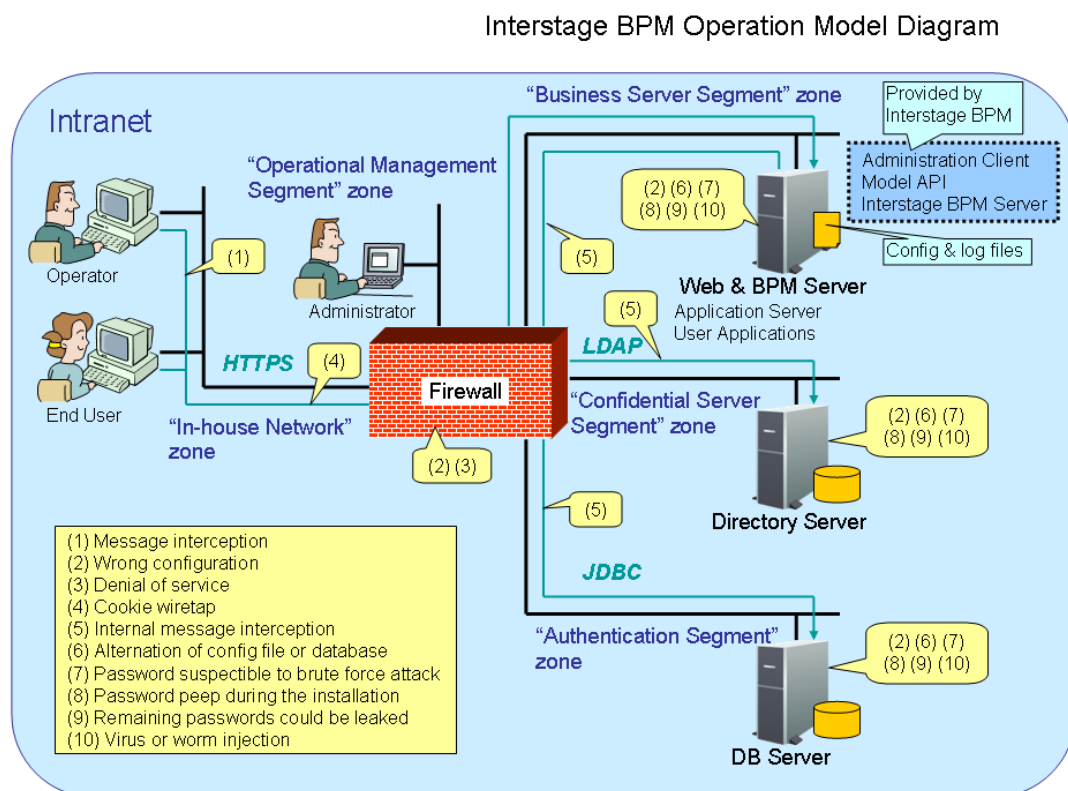
Interstage BPM Operation Model Diagram

Figure 18: 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.
(7)	Password susceptible to brute force attack	All guessed passwords should be changed to something that is less vulnerable. Passwords should not be proper nouns (e.g., a person's name), a word found in a dictionary or the same string as the user name. Ideally, a password should contain a minimum of 6 characters in a mixture of upper case, lower case, numeric digits and other characters. In addition, it should not contain more than two identical consecutive characters and more than two ascending or descending consecutive characters.
(8)	Password peep during the installation	Install under the condition that no one is around you.
(9)	Remaining passwords could be leaked	Secure the configuration files after setup.
(10)	Virus or worm injection	As a rule, always use anti-virus software.

A.2 Password Encryption

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

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

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

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

The Encryption Utility provided is:

```
com.fujitsu.iflow.utilities.TextEncrypter.class
```
To call the Encryption Utility, use the encryption script located in `<engine directory>/client/samples/configuration`:

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

Encrypting a Password With the Default Key

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

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

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

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

Encrypting Passwords With a New Key

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

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

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

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

> **Note:** If a key other than the default key is used, it should contain more than 23 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 system or tenant configuration file that you imported into the database.

Alternatively, you can encrypt all passwords in a system or tenant 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:

- `LDAPAccessUserPassword`
- `MetadataRepositoryPassword`

- `ServerPassword`
- `SMTPPassword`
- `SWAPLinkagePassword`
- `UDDIPublisherPassword`

Example

Use the following command to encrypt all passwords in the system or tenant 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"`

> **Note:** If including all leading and trailing white space characters in a password, use `-t` option instead of `-f` option not to trim the leading and trailing white space characters.

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 `<engine directory>/server/deployment/bin`:

Operating System	Configuration Export Script

Windows	• For System Properties:
	
	`exportProperties.bat <File Name> <Database User Name> <Password>`
	
	Example:
	
	`exportProperties.bat MyServerConfiguration.properties SomeUserName SomePassword`
	
	• For Tenant Properties:
	
	`exportProperties.bat <File Name> <Database User Name> <Password> <TenantName>`
	
	Note that `<TenantName>` is case-sensitive.
	
	Example:
	
	`exportProperties.bat MyServerConfiguration.properties SomeUserName SomePassword Default`

UNIX	• For System Properties:
	
	`exportProperties.sh <File Name> <Database User Name> <Password>`
	
	Example:
	
	`exportProperties.sh MyServerConfiguration.properties SomeUserName SomePassword`
	
	• For Tenant Properties:
	
	`exportProperties.sh <File Name> <Database User Name> <Password> <TenantName>`
	
	Note that `<TenantName>` is case-sensitive.
	
	Example:
	
	`exportProperties.sh MyServerConfiguration.properties SomeUserName SomePassword Default`

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

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

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

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

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

   `<Parameter Name>=<Parameter Value>`

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

Passwords in the generated configuration file are encrypted for security reasons. If you change a password, you are recommended to encrypt it before importing the configuration file. Passwords are not automatically encrypted during the import. For details on how to encrypt passwords, refer to section *Password Encryption* on page 75.

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

Operating System	Configuration Import Script

Windows	• For System Properties:
	
	`importProperties.bat <File Name> <Database User Name> <Password>`
	
	Example:
	
	`importProperties.bat MyServerConfiguration.properties SomeUserName SomePassword`
	
	• For Tenant Properties:
	
	`importProperties.bat <File Name> <Database User Name> <Password> <TenantName>`
	
	Note that `<TenantName>` is case-sensitive.
	
	Example:
	
	`importProperties.bat MyServerConfiguration.properties SomeUserName SomePassword Default`

UNIX	• For System Properties:
	
	`importProperties.sh <File Name> <Database User Name> <Password>`
	
	Example:
	
	`importProperties.sh MyServerConfiguration.properties SomeUserName SomePassword`
	
	• For Tenant Properties:
	
	`importProperties.sh <File Name> <Database User Name> <Password> <TenantName>`
	
	Note that `<TenantName>` is case-sensitive.
	
	Example:
	
	`importProperties.sh MyServerConfiguration.properties SomeUserName SomePassword Default`

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

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

4. In a cluster setup, 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 setup on JBoss Application Server can be configured for secure access using HTTPS protocol. To enable this, Interstage BPM Console setup 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 EAP 6 Application Server for HTTPS connection* on page 84
3. Updating Interstage BPM Server parameters - refer *Updating Interstage BPM Server Parameters* on page 85

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*

> **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 setup. 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 EAP 6 Application Server for HTTPS connection

Prerequisite:

- Ensure that Interstage BPM Console is already setup on JBoss application server and running successfully.
- You have created a keystore and obtained a signed certificate as per the instructions in the section *Configuring a Keystore and Obtaining a Signed Certificate* on page 82.

Steps

- Start the Interstage BPM Server according to the instructions in section *Starting Interstage BPM Server* on page 35.
- Open the command prompt and execute the `jboss-cli.bat` / `jboss-cli.sh` script located at `<JBoss Installation Directory>/bin/`.
- Execute the below command to connect to JBoss application server:

```
connect
```

- Execute the below command to add HTTPS connector:

```
/profile=full-ha/subsystem=web/connector=HTTPS/:
add(socket-binding=https,scheme=https,protocol=HTTP/1.1,secure=true)
```

- Execute the below command:

```
/profile=full-ha/subsystem=web/connector=HTTPS/ssl=configuration:
add(name=https,certificate-key-file="<keystore-path>",password=<keystore-password>)
```

Here,

- `<keystore-path>` is the complete path of the keystore file, which contains the generated key. Use Forward Slash "/" for all backward slash "\" characters in truststore path.

  For example, `C:/HTTPS_KEYSTORE/server.keystore`

- `<keystore-password>` is the password of the keystore.

- Restart Interstage BPM server.

  The Interstage BPM Console will be accessible via HTTPS protocol on port `8443`.

> **Note:**
> - If you want you can change the https port number, you can change it using JBoss CLI command:
>
>   `/socket-binding-group=full-ha-sockets/socket-binding=https: write-attribute(name=port,value=<PORT_VALUE>)`
>
>   Example:
>
>   `/socket-binding-group=full-ha-sockets/socket-binding=https: write-attribute(name=port,value=49953)`
>
> - If there is an error occurs while adding the HTTPS Connector, you can remove it using JBoss CLI command:
>
>   `/profile=full-ha/subsystem=web/connector=HTTPS/ssl=configuration:remove`
>
>   Now re-try above steps for adding HTTPS Connector again.

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 setup 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 86.

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 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.

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

Configure the truststore for Interstage BPM by adding the truststore's path to the Interstage BPM Server's JVM Configuration using below steps:

1. Open the command prompt and execute the `jboss-cli.bat` / `jboss-cli.sh` script located at `<JBoss installation directory>/bin/`

2. Execute the below command to connect to JBoss application server:

```
connect
```

3. Execute the below command to add truststore path (Use Forward Slash "`/`" for all Backward Slash "`\`" characters in truststore path).

```
/system-property=javax.net.ssl.trustStore:add(value="<keystore-path>")
```

4. Re-start Application Server.

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 setup. 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\jdk1.7.0_80\jre\lib\security\mystore.keystore`

   Example on UNIX: `keytool -import -trustcacerts -alias mykey -file /tmp/example.cer -keystore /usr/java/jdk1.7.0_80/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\jdk1.7.0_80\jre\lib\security\mystore.keystore`
   Example on UNIX:
   `WebDAVKeyStore=/usr/java/jdk1.7.0_80/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\jdk1.7.0_80\jre\lib\security\mystore.keystore"`
`%JAVA_OPTS%`

Example on UNIX: `set JAVA_OPTS=`
`-Djavax.net.ssl.trustStore="/usr/java/jdk1.7.0_80/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.

Appendix B: Clustering, Load Balancing, and Failover

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

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

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

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.

B.1 Setting up an Interstage BPM Cluster on JBoss EAP 6

This section provides instructions for setting up a cluster of Interstage BPM Servers on JBoss EAP 6 application server.

The sample cluster used to illustrate the clustering instructions is setup on three computers; The `master` computer will run as domain controller to manage the slave computers (`slave1` and `slave2`).

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.
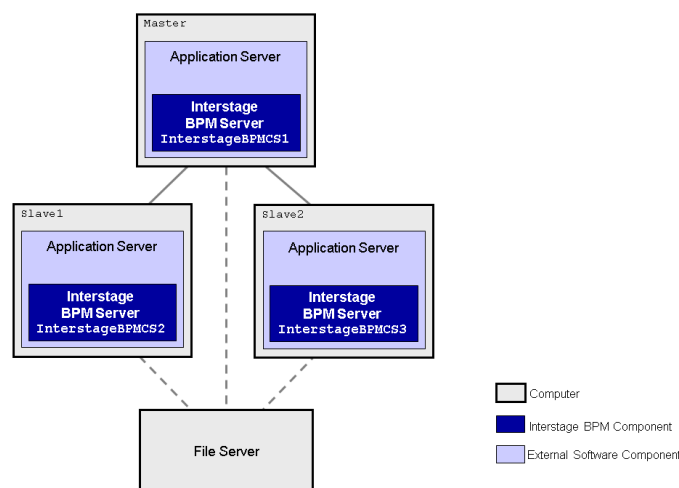

Figure 19: Sample Cluster

Setting up the cluster consists of the following steps:

1. Pre-Setup operations:

   a) Prepare the cluster as follows:

      1. Verifying the multicast connectivity according to the instructions in *Verifying the Multicast Connectivity* on page 89.

      2. Prepare the database system as explained in *Database Server Preparation* on page 14.

      3. On all cluster nodes, prepare the application server according to the instructions in *Application Server Preparation* on page 16.

      4. Configure the Shared Resource Root according to instructions in *Configuring the Shared Resource Root*.

   b) Additional configurations for JBoss EAP 6

      1. Configure domain as explained in *Configuring JBoss EAP 6 Domain for Cluster Environment* on page 91.

      2. Configure domain security as explained in *Configuring JBoss Domain Security for Cluster Environment* on page 93.

2. Setup operations:

   a) Setup Interstage BPM for JBoss on master machine. Use the instructions in *Cluster Setup Operations* on page 95.

3. Post-Setup operations:

   a) Copy all the contents of `<engine directory>` from the master machine to `<engine directory>` on all the slave machines. Note that the path of engine directory should be same on all the machines.

   b) On all machines, configure the environment variables according to the instructions in *Configuring Environment Variables* on page 95.

   c) Make sure that JBoss EAP 6 application server is stopped on all the machines. Refer to *Starting Interstage BPM Server* on page 35.

   d) On all machines, switch on Java Security according to the instructions in *Switching on Java Security* on page 32.

   e) Encrypt the password for datasource on master machine. Refer to section *Encrypting the Password for Datasource* on page 33.

   f) Start the Interstage BPM Server Cluster. Refer to *Starting and Stopping the Cluster* on page 96.

B.2   Pre-Setup Operations for Cluster Setup

B.2.1 Verifying the Multicast Connectivity

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

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

A multicast group address is an IP address in the range `224.0.0.0` to `239.255.255.255`, inclusive.

It is used to identify the members of a multicast group. Each member of the group uses the same multicast group address. The address `224.0.0.0` is reserved and must not be used.

1. Create a directory on your machines that you want to include as nodes in your cluster setup and copy the engine directory from Interstage BPM product media to the directory created on your machines.

> **Note:** that the path of engine directory should be same on all the machines

2. On each node, check and if require update the value for `JAVA_HOME` parameter in the `setIBPMJava.bat` / `setIBPMJava.sh` script located at `<engine directory>/server/deployment/bin/`.

3. On each server node, run the `startMulticastReceiver` script located at `<engine directory>/server/deployment/bin/` directory, as follows:

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

> **Note:** The address that you use here must be different from the value of `multicast-address` that you have specified in `domain.xml` file located in `<JBoss Installation Directory>/domain/configuration/`. Refer to the section *Configuring JBoss EAP 6 Domain* on page 18.

   For example:

   On Windows: `startMulticastReceiver.bat 225.4.5.6 5000`

   On UNIX: `startMulticastReceiver.sh 225.4.5.6 5000`

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

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

   This script is located at `<engine directory>/server/deployment/bin/` directory.

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

   For example:

   On Windows: `startMulticastSender.bat 225.4.5.6 5000`

   On UNIX: `startMulticastSender.sh 225.4.5.6 5000`

5. Stop the execution of the multicast sender script. If there are any remaining nodes that were not tested, repeat step 4 for them.

6. If you find that nodes are not receiving multicasts, repeat the multicast tests (step 3, 4, 5) with other ports and/or addresses. In case of any problems, contact your network administrator to make sure that the network is IP multicast enabled.

7. Once you know for which port and address (default or otherwise) the nodes are able to reach each other via IP multicast, note these values to update the parameters in the configuration file later.

B.2.2 Configuring the Shared Resource Root

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

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

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

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

- For Windows:
  - Directory, Sub-directories, and All files: Full control.
- For UNIX:
  - Directory and Sub-directories: 'Read', 'Write' and 'Execute' permissions.
  - All files: 'Read' and 'Write' permissions.

To configure your ResourceRoot:

On a central server, create a ResourceRoot directory.

Example: In the sample system, a file server is used to host the ResourceRoot directory. You could create a directory named `InterstageBPMShared`.

B.2.3 Configuring JBoss EAP 6 Domain for Cluster Environment

Pre-requisites: You have installed the JBoss EAP 6 application server on all computers that you want to include in your cluster.

On each slave machine, update the following in the `host.xml` located at: `<JBoss Installation Directory>/domain/configuration`

1. Specify any unique host-controller name for slave as shown below:
   Existing setting:

   ```
   <host name="master" xmlns="urn:jboss:domain:[version]">
   ```

   Change to:

   ```
   <host name="<Unique name for Slave>" xmlns="urn:jboss:domain:[version]">
   ```

   Example:

   ```
   <host name="slave1" xmlns="urn:jboss:domain:[version]">
   ```

> **Note:** Make sure that you specify unique host-controller name on each slave machine. Also, note down these unique host controller names and the corresponding machine names because you will need to specify these as the value of `appserver_nodes_address` parameter in the configuration files later.

2. In the `<domain-controller>` section, delete or comment out the `<local/>` tag and remove the comments for the `<remote>` tag. Also specify the IP address of the master machine, as shown below:

Existing setting:

```
<domain-controller>
        <local/>
        <!-- Alternative remote domain controller configuration with a
host and port -->
        <!-- <remote host="${jboss.domain.master.address}"
port="${jboss.domain.master.port:9999}"
security-realm="ManagementRealm"/> -->
</domain-controller>
```

Change to:

```
<domain-controller>
     <!-- <local/> -->
     <remote host="${jboss.domain.master.address:<IP Address of Master
machine>}" port="${jboss.domain.master.port:9999}"
security-realm="ManagementRealm"/>
</domain-controller>
```

Example:

```
<domain-controller>
     <!-- <local/> -->
     <remote host="${jboss.domain.master.address:10.1.1.1}"
port="${jboss.domain.master.port:9999}"
security-realm="ManagementRealm"/>
</domain-controller>
```

3. Make sure that in the Interface section, you have modified the IP address of slave machine, as shown below:

```
<interfaces>
  <interface name="management">
     <inet-address value="${jboss.bind.address.management:<IP Address
of Slave machine>}"/>
 </interface>
 <interface name="public">
     <inet-address value="${jboss.bind.address:<IP Address of Slave
machine>}"/>
 </interface>
 <interface name="unsecure">
     <inet-address value="${jboss.bind.address.unsecure:<IP Address of
 Slave machine>}"/>
 </interface>
</interfaces>
```

Example: If IP address of `slave1` machine is `10.1.1.2`, then update as follows:

```
<interfaces>
  <interface name="management">
     <inet-address value="${jboss.bind.address.management:10.1.1.2}"/>
 </interface>
 <interface name="public">
     <inet-address value="${jboss.bind.address:10.1.1.2}"/>
 </interface>
 <interface name="unsecure">
     <inet-address value="${jboss.bind.address.unsecure:10.1.1.2}"/>
```

```
  </interface>
</interfaces>
```

B.2.4 Configuring JBoss Domain Security for Cluster Environment

To configure User Authentication:

1. On master machine, execute the `add-user.bat` / `add-user.sh` located at `<JBoss Installation Directory>/bin/`. This will prompt you to enter user details, as shown in the following example:

   For more information, refer to the JBoss documentation.

> **Note:** Password should contain alphabets, number and special character. You need to note down the `<secret value>` for each machine that is displayed on the screen. It will be used later for security configurations.

```
D:\jboss-eap-6.4\bin>add-user.bat

What type of user do you wish to add?
 a) Management User (mgmt-users.properties)
 b) Application User (application-users.properties)
(a): a

Enter the details of the new user to add.
Using realm 'ManagementRealm' as discovered from the existing property
 files.
Username : @dm1n1strator
Password requirements are listed below. To modify these restrictions
edit the add-user.properties configuration file.
 - The password must not be one of the following restricted values {root,
 admin, administrator}
 - The password must contain at least 8 characters, 1 alphabetic
character(s), 1 digit(s), 1 non-alphanumeric symbol(s)
 - The password must be different from the username
Password :
Re-enter Password :
What groups do you want this user to belong to? (Please enter a comma
separated list, or leave blank for none)[  ]:
About to add user '@dm1n1strator' for realm 'ManagementRealm'
Is this correct yes/no? yes
Added user '@dm1n1strator' to file
'D:\jboss-eap-6.4\standalone\configuration\mgmt-users.properties'
Added user '@dm1n1strator' to file
'D:\jboss-eap-6.4\domain\configuration\mgmt-users.properties'
Is this new user going to be used for one AS process to connect to
another AS process?
e.g. for a slave host controller connecting to the master or for a
Remoting connection for server to server EJB calls.
yes/no? yes
To represent the user add the following to the server-identities
definition <secret value="SW5mb3N5c0AxMjM=" />
Press any key to continue . . .
```

2. Repeat the above step on each of the slave machines to add users. For example, add user slave1 on slave host1, slave2 on slave host2.

   Note down the secret values for each machine that is displayed on the screen.

> **Note:**
> - The username here must be the same as specified in the host name attribute in the `host.xml` of slave machine. Refer to *Configuring JBoss EAP 6 Domain for Cluster Environment* on page 91. For example, `slave1` is specified in the `host.xml` of first slave machine.
> - Use the same password as used on the master machine, so that the secret value generated for each host will be the same for all the slave machines.

3. On each slave machines, edit the `host.xml` to modify the `security-realm` section for the secret value respective to that machine. Add the `<server-identities>` section, as shown below:

```
<security-realms>
    <security-realm name="ManagementRealm">
        <server-identities>
            <secret value="SW5mb3N5c0AxMjM="/>
        </server-identities>
        <authentication>
            <local default-user="$local" skip-group-loading="true"/>
            <properties path="mgmt-users.properties"
relative-to="jboss.domain.config.dir"/>
        </authentication>
        ...
    </security-realm>
</security-realms>
```

4. On master machine, edit the `mgmt-users.properties` file located at `<JBoss Installation Directory>/domain/configuration/` to add details of all the new users that are created on each of the slave machines. For example:

```
slave1=bb45a4493871903f3e8c783a94dff052
slave2=91f2cdc68959bd1d83e7c00f7e334dd5
```

You can confirm these values in the `mgmt-users.properties` file on all the slave machines.

5. Start the Master host first and then slave machines by executing `domain.bat` / `domain.sh` located in: `<JBoss Installation Directory>/bin`. If started successfully, you will receive a message, as shown below:

```
[Host Controller] 12:03:00,552 INFO  [org.jboss.as.domain]
(slave-request-threads - 1) JBAS010918: Registered remote slave host
"slave1", JBoss EAP 6.4.9.GA (AS 7.5.9.Final-redhat-2)
[Host Controller] 12:03:45,075 INFO  [org.jboss.as.domain]
(slave-request-threads - 1) JBAS010918: Registered remote slave host
"slave2", JBoss EAP 6.4.9.GA (AS 7.5.9.Final-redhat-2)
```

6. Stop JBoss application server on all the machines by displaying 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.

B.3 Cluster Setup Operations

Follow these steps:

1. Copy the database directory specific to the database that you are using. Refer to *Copy database setup directory to database machine* on page 28.

2. Update and run the database setup script on the machine where database is installed according to the instructions in *Updating the database setup script on the database machine* on page 29.

> **Note:** Even if you intend to setup database and Interstage BPM on the same machine, first you need to setup database separately as mentioned in Step-2 and then execute setup of Interstage BPM Server with parameter set as -
>
> `database_creation_selection=1`

3. Update the configuration parameters as described in the setup.config file. Refer to *Update the configuration file on Interstage BPM Server machine* on page 30.

4. On all cluster nodes, start the application server according to the instructions in *Starting Interstage BPM Server* on page 35.

5. Run setup script according to the instructions in *Running the Interstage BPM Setup Script* on page 26.

   If any error occurs in the script execution, you need to check the configuration file updated in step 4 and then re-execute the setup script. However, if an error caused due to pre-existing components of Interstage BPM, then you need to un-setup the Interstage BPM and again execute this setup script. Refer to *Un-setup Interstage BPM Server and Console* on page 58.

> **Note:** Before running the setup script, make sure the following:
> - Specify the value for `console_shared_root` parameter in configuration file during setup. Please ensure that the path specified in the value for this parameter is accessible from all cluster member nodes.

6. Stop the JBoss EAP 6 application server on all machines as explained in *Starting Interstage BPM Server* on page 35.

B.4 Post Setup configurations in cluster environment

B.4.1 Configuring Environment Variables

To configure the required environment variables:

1. On each cluster node, confirm the following in the `setIBPMEnv.cmd` / `setIBPMEnv.sh` script located at `<engine directory>/server/deployment/bin`.

   Make sure that you have set the value of `JDBCPATH` parameter to the path of the JDBC jar file that you have copied in the drive where you have extracted JBoss6 application server.

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

2. On each cluster node, update the value for `JAVA_HOME` parameter in the `setIBPMJava.bat` / `setIBPMJava.sh` script located at `<engine directory>/server/deployment/bin/`.

B.4.2 Starting and Stopping the Cluster

Start the JBoss Application Server on each cluster node. You must start the master server instances first and then start other slave machines.

To Start the JBoss EAP 6 application server:

1. Start the master server first by executing `domain.bat` / `domain.sh` located in: `<JBoss Installation Directory>/bin`.

2. Repeat the above step on all slave machines.

If master and all slave machines started successfully, you will receive a message, as shown below:

```
[Host Controller] 12:03:00,552 INFO  [org.jboss.as.domain]
(slave-request-threads - 1) JBAS010918: Registered remote slave host
"slave1", JBoss EAP 6.4.9.GA (AS 7.5.9.Final-redhat-2)
[Host Controller] 12:03:45,075 INFO  [org.jboss.as.domain]
(slave-request-threads - 1) JBAS010918: Registered remote slave host
"slave2", JBoss EAP 6.4.9.GA (AS 7.5.9.Final-redhat-2)
```

To Stop the JBoss EAP 6 application server:

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.

B.5 Automated Failover Settings

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

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

• The `ClusterAutomateFailoverEnabled` server property. By default, this is true, which enables automated failover.

• The `ClusterHeartbeatInterval` property (which specifies how often the status of all nodes will be checked) and the `ClusterInterceptEvents` property (which specifies, in case a node fails, how many of unhandled events will be handled by the active nodes at a time).

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

> **Note:** If the `ClusterAutomateFailoverEnabled` server property is set to 'true' before you start all nodes in a cluster, the following behavior may occur (depending on the value of the `ClusterHeartbeatInterval` property, and how long start-up of each node takes):
>
> As you start nodes, each started node may begin handling any unhandled events of the remaining, to-be-started nodes; this 'failover' will continue until all nodes have been started. This is normal and expected behavior.

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

Example

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

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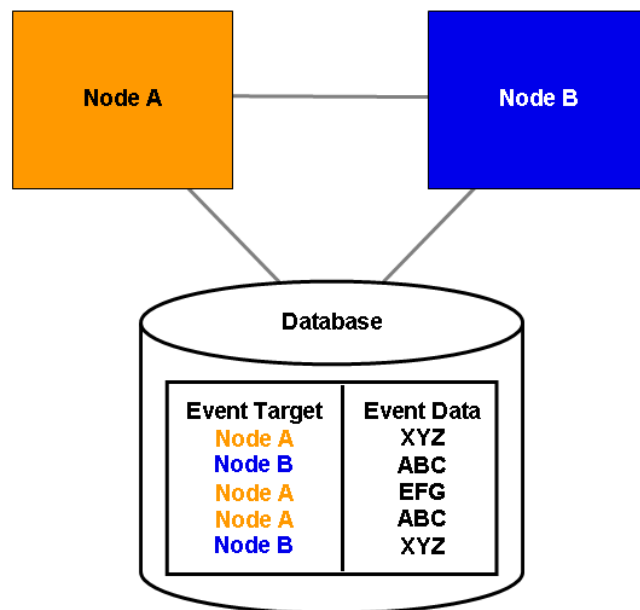

Figure 20: All Server Nodes are Up and Running

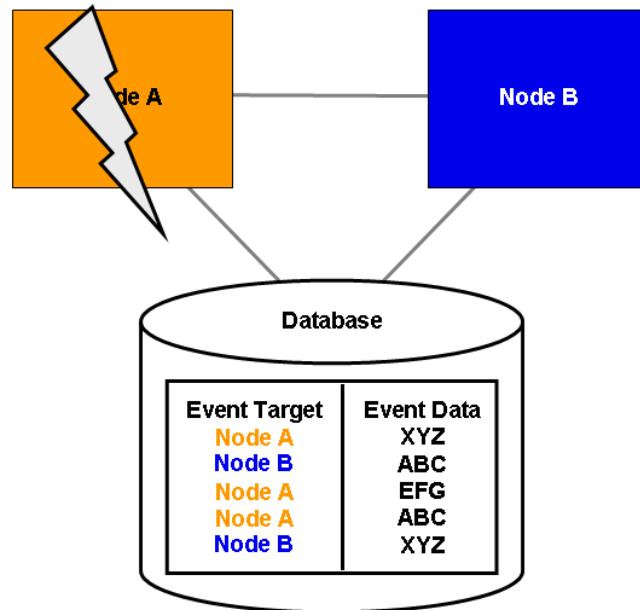If Node A goes down, events remain assigned to that node and are waiting to be processed.

Figure 21: Server Node Goes Down

If Node A goes down when automated failover is enabled:

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

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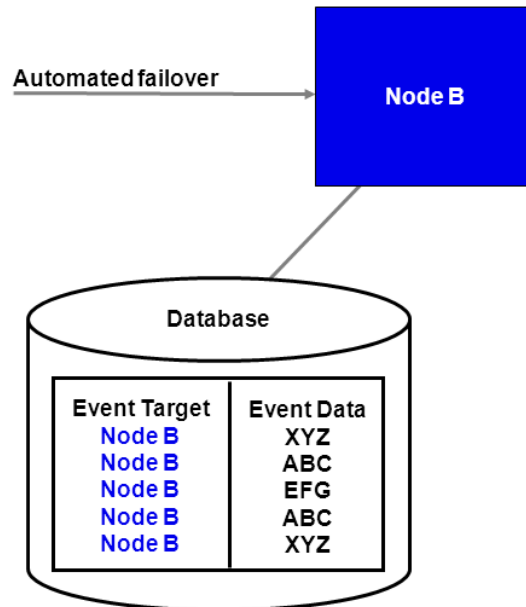

Figure 22: Events are Transferred to Another Node

Appendix C: Overview of NTLM Authentication Protocol

What is NTLM Authentication Protocol?

It is one of the security protocols used to authenticate users present in Windows AD network. The users can login into the AD network via local or remote Windows workstations present within the AD network. For more details regarding this protocol refer to Microsoft® documentation on NTLM.

Enabling NTLM Authentication Protocol for Interstage BPM Console

If you are accessing Interstage BPM Console on Windows, you can enable NTLM (NT LAN Manager) Version1 authentication protocol for Interstage BPM Console.

Enabling this protocol 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 and any user within that tenant successfully logs on to Windows desktop, then on accessing any Interstage BPM Console URL of that tenant, user will be automatically logged in to Interstage BPM Console without having to login to it explicitly; the Interstage BPM Console login screen will not appear. However, login screen will always be displayed for Interstage BPM tenants who are not configured for NTLM Authentication.

You can also enable NTLM based SSO Authentication by configuring IBPM tenant with OpenID Provider module. For more details regarding this please refer the section *Overview of SSO Authentication* on page 103.

Limitations:

- 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 NTLM Version1 is supported. NTLM Version 2 is not supported. (For NTLM authentication via OpenID Provider NTLM Version 2 is also supported).

Prerequisites:

- **Network**: Machines being used for Interstage BPM Server and Console setup, and machines being used to access the Interstage Console URL are present within the AD network.
- **For all machines (Domain Controller, AD Clients, and Interstage BPM Server and Console machine)**: Set Local Security Policy as described below:

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

  1. Navigate to **Start > Run**, type `gpedit.msc`, click **OK**.

  2. In the **Local Group Policy Editor** screen, go to **Local Computer Policy > Computer Configuration > Windows Settings > Security Settings > Local Policies > Security Options**

  3. Update policies as mentioned below and click **OK**.

     - Set policy **Network security: LAN Manager authentication Level** to **Send NTLM Response Only** (for NTLM Version 1) or to **Send NTLMv2 Response Only** (for NTLM Version 2, in case of NTLM via OpenID Provider).

     Also, it is recommended to update following policies (if present) as mentioned below:

     - Set policy **Network security: Restrict NTLM: Incoming NTLM traffic** to **Allow all**.
     - Set policy **Network security: Restrict NTLM: NTLM authentication in this domain** to **Disable**.
     - Set policy **Network security: Restrict NTLM: Outgoing NTLM traffic to remote servers** to **Allow all**.

4. To apply these settings, navigate to **Start > Run**, type `gpupdate`, click **OK**.

- **Setup**: Interstage BPM Server and Console have been setup.

- **AD Client Browser Setting**: Enable Automatic logon in the Browser on Interstage BPM client machine, as described below:

  1. In the Web browser, navigate to **Tools > Internet Options > Security > Internet > Custom Level > User Authentication**.

  2. Select the **Automatic Logon with current user name and password** radio button to enable this option.

  3. Click **OK**.

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

C.1 Setup NTLM Authentication Protocol for Interstage BPM Console

You have prepared the system environment as instructed in section *Overview of NTLM Authentication Protocol* on page 100.

To setup NTLM Authentication Protocol, follow these steps:

For the steps to setup OpenID Provider for NTLM Authentication, refer the section *Overview of SSO Authentication* on page 103.

Navigate to `<Console Shared Root>/console/conf` and add the following parameters (and their values) to `console.conf`:

Here, `<Console Shared Root>` is the value of `console_shared_root` parameter set in the configuration file during setup.

- `SSONTLMTenants=<value1,value2>`- this is a comma separated list of tenants for which you want to enable NTLM.

  Note: If you are specifying value in the `SSONTLMTenants` parameter, following parameters (except `SSOUserPassKey`) are mandatory and should not be left blank. If you leave any of these parameters blank, Interstage BPM Console will not start and an error will be logged in the Application Server log file.

- `SSOIP=<value>` -the value is IP address of the domain controller (AD Server). This is a mandatory parameter and should not be left blank.

- `SSOPreAuthDomain=<value>` -the value is the Domain Name (NETBIOS Name). This is a mandatory parameter and should not be left blank.

- `SSOPreAuthUser=<value>` -the value is the Username of the Domain defined in `SSOPreAuthDomain` parameter. This is a mandatory parameter and should not be left blank.

- `SSOPreAuthPass=<value>` -the value is the encrypted Password of the Domain user. This is a mandatory parameter and should not be left blank.

> **Note:** To encrypt the password, use the `EncryptPassword.bat` located in `<engine directory>/client/samples/configuration` with the encryption key defined in the `SSOUserPassKey` parameter. If no key is defined, then this script will use a default key to encrypt the password.
>
> For detailed information about encrypting passwords, please refer the section *Password Encryption* on page 75.

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

> **Note:** The `SSONTLMTenants` parameter is dynamically reloadable, so if you add/modify/remove this parameter, then you must log out and again login to the Interstage BPM Console for the change to take effect. You do not need to restart the Interstage BPM Console.
>
> However, if you add/modify/remove other parameters (i.e. `SSOIP`, `SSOPreAuthDomain`, `SSOPreAuthUser`, `SSOPreAuthPass`, and `SSOUserPassKey`), then you must restart the Interstage BPM Console.

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

> **Note:** When a machine's local user has logged-in into the AD Client machine and is trying to access an NTLM Authentication enabled tenant, then the login screen will be displayed. While providing credentials, if this user has clicked the **Remember my password** option, the user name and password are stored in the **Stored Username and Password** utility of the Windows. If any new user logs into the system and access the same URL, it will automatically login with the previously stored user credentials. To solve this problem, you need to remove the entry from the Windows utility as follows:
>
> - For **Windows Server 2008 and Windows Vista**, remove the entry from:
>
>   Control Panel > User Accounts > Manage your network passwords > Stored User Names and Passwords
>
> - For **Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Windows 7, Windows 8, Windows 8.1**, remove the entry from:
>
>   Control Panel > All Control Panel Items > Credential Manager > Windows Vault/Windows Credentials
>
> **Note**: You must login as the Administrator user to complete this procedure.

Appendix D: Overview of SSO Authentication

The SSO authentication process allows the user to log in once and gain access to multiple (SSO enabled) applications without having to login again in each application during that session.

In this SSO authentication process, the authentication is performed by a single module referred to as **OpenID Provider** application. Any application can leverage this SSO authentication process by integrating with OpenID Provider. As a result, usage of a single authentication module removes the overhead of authentication from each application & provides a centralized authentication mechanism into which any number of applications can be integrated.

The **OpenID Provider application** makes use of the OpenID Authentication 2.0 protocol to authenticate the users present in Microsoft Active Directory servers and Oracle Directory Server Enterprise Edition. It is the central system where user authentication will be done for all web based applications. You can configure this application for authentication of users in a particular directory server.

The setup of OpenID Provider application is done automatically along with the setup of Interstage BPM Server and Console for `default` tenant, if this tenant uses any directory server. If this tenant uses `Local User Management` then OpenID Provider application will only be deployed but not configured with any directory server, because OpenID Provider application does not support `Local User Management`.

OpenID Provider Authentication Modes:

There are two types of authentication mechanisms supported by OpenID Provider. The type is decided by OpenID Provider configuration property **AuthType**. Following are the authentication modes:

- **Authentication using Directory Server (LDAP):** If **AuthType** configuration property value is not NTLM (i.e. any value other than NTLM) then OpenID Provider will authenticate user using LDAP protocol with help of other LDAP Configuration properties defined in OpenID Provider configuration.
- **Authentication using NTLM Protocol:** If AuthType configuration property value is NTLM (case-insensitive) then OpenID Provider will authenticate user using NTLM protocol. In this case NTLM V1 or NTLM V2 is supported as an authentication protocol. For more details regarding NTLM Protocol refer to the section *Overview of NTLM Authentication Protocol* on page 100.

Enabling SSO Authentication for Interstage BPM Console

If SSO authentication is enabled and you access the Console URL:

- If OpenID Provider is configured to use **LDAP Protocol** for authentication and you are accessing the URL in a new session, the SSO login screen appears.
- If OpenID Provider is configured to use **NTLM** Protocol for authentication and you are accessing the URL in a new session, then SSO login screen will not appear and you will be automatically logged in to the Interstage BPM Console application.
- If you are already logged into an application that is pre-authenticated by SSO authentication process, you will be automatically logged in to the Interstage BPM Console application in the same session. The SSO Login screen will not appear. The **Log Out** link displayed in the header of the Interstage BPM Console web page will also not appear. To log out, please close all the browser windows.

For more information about enabling SSO authentication, refer to the section *Setup SSO Authentication for Interstage BPM Console* on page 104.

D.1 Setup SSO Authentication for Interstage BPM Console

Pre-requisites:

- Interstage BPM OpenID Provider application is started.
- The tenant uses Microsoft Active Directory servers or Oracle Directory Server Enterprise Edition. (The `DirectoryService` property of Interstage BPM Server Tenant must be set to `1` or `3`).
- The OpenID Provider application and tenant both have the same LDAP configuration.

To use SSO authentication, follow these steps:

> **Note:** If you meet any of the following conditions, then before updating the SSO authentication it is mandatory to update the OpenID Provider Configuration according to the instructions given in the section *Updating the OpenID Provider Configuration* on page 104:
> - If you specify the Local User Management during the setup of Interstage BPM.
> - If the OpenID Provider application and tenant both have different LDAP configuration.
> - If OpenID Provider needs to be configured to use **NTLM** authentication.

You can update the SSO authentication in following ways:

- **Using the Interstage BPM Tenant Management Console**: Select the tenant for which you want to enable\disable the SSO authentication and update the `SSOAuthentication` property. For detail instructions, refer to the *SSOAuthentication* section of *Interstage BPM Server Administration Guide*.

D.2 Updating the OpenID Provider Configuration

To update OpenID Provider configuration, follow these steps:

> **Note:** If you use Built-in SSO authentication, do not include any forwardslash "/" or backslash '\' characters in the user ID that you create.

1. Open the `config.properties` file located in the `<Console Shared Root>/ssofi /provider/<context-root-name>/` directory.

   Here,
   - `<Console Shared Root>`- is the value of `console_shared_root` parameter set in the configuration file during setup.
   - `<context-root-name>` - is the context-root name of the OpenID Provider application. Its value is `openid` if you are using the OpenID provider application that is setup by the Interstage BPM setup script.

2. Update the following parameters in this configuration file.

> **Note:** Any backslashes "\", colons ":" or equal signs "=" used in parameter values inside the configuration file must be escaped by backslashes.
>
> For example: `C\:\\Program Files`

Parameter	Mandatory?	Description
AuthType	Yes	The property decides which authentication mechanism will be used by OpenID Provider (either LDAP protocol or NTLM protocol). • For LDAP Protocol `AuthType=LDAP` • For NTLM Protocol `AuthType=NTLM` This property is case-insensitive i.e. NTLM or ntlm or nTLm is valid for NTLM Protocol. If there is any other value then by default LDAP protocol will be used for authentication. In case of NTLM protocol, configuration properties related to Directory Server are ignored (i.e. not required).
LDAPuid	Yes	This parameter specifies the name of the attribute that identifies the user ID within an LDAP login string. The value of this parameter can be any of the following: • For Oracle Directory Server Enterprise Edition: `LDAPuid=uid` • For Microsoft Active Directory: `LDAPuid=CN`
LDAPPeople	Yes	This parameter specifies the LDAP organization unit to be used for searching users. Its value will be: For users stored in the Directory Service: `LDAPPeople=ou\=People`
LDAPDBSuffix	Yes	This parameter specifies the directory sub-tree in the Directory Service where groups and users to be used are stored. For example: `LDAPDBSuffix=dc\=xxx,dc\=fujitsu,dc\=com` The users will be searched under the organization unit specified as the value of `LDAPPeople` parameter.

Parameter	Mandatory?	Description

LDAPServer	Yes	This parameter identifies the server (machine name) on which the LDAP server is installed. Its value will be in the following format:
		
		`LDAPServer=<PROTOCOL NAME>://<LDAP SERVER HOST NAME/IP>:<PORT>`
		
		For example: `LDAPServer=ldap\://<LDAP Server FQDN>\:<port>`
		
		If LDAP is used in secured mode (i.e. LDAP using SSL), then `<PROTOCOL NAME>` will be `ldaps` and `<PORT>` value will be `<ldap-ssl-port>`.
		
		For example:
		`LDAPServer=ldaps\://<FQDN>\:<port>`

DirectoryService	Yes	This parameter indicates the directory server to be used for user authentication. Its value can be: • For Oracle Directory Server Enterprise Edition:`DirectoryService=1` • For Microsoft Active Directory: `DirectoryService=3` If you specify any other value, it will cause an error.
LDAPContextFactory	Yes	This parameter specifies the name of the LDAP Context Factory class used to authenticate users against a Directory Service. The initial value is as mentioned below: `LDAPContextFactory= com.sun.jndi.ldap.LdapCtxFactory`
LDAPConnectionTimeout	No	This parameter specifies the time duration after which the connection to LDAP will be lost. The value of this parameter is the time in milliseconds. If this property is not specified, a default value `30000` milliseconds will be used. If it is left blank or an incorrect value (less than Zero) is specified, it will cause an error. `LDAPConnectionTimeout=30000`
SessionTimeout	No	This parameter specifies the time duration (in minutes) after which the session timeout will occur. If the value is not specified or an incorrect value is specified, a default value `1440` will be used. For example: `SessionTimeout=1440`

3. Restart the Interstage BPM OpenID Provider for the configuration property changes to take effect.

D.3 Configuration for SSL

SSO Authentication configuration in secured mode:

1. Open the `config.properties` file located in the `<Console Shared Root>/ssofi/provider/<context-root-name>/` directory.

   Here,

   - `<Console Shared Root>` - is the value of `console_shared_root` parameter set in the configuration file during setup.
   - `<context-root-name>` - is the context-root name of the OpenID Provider application. Its value is `openid` if you are using the OpenID provider application that is setup by the Interstage BPM setup script.

2. Update the following parameters in this configuration file:

Parameter	Mandatory?	Description
OpenIDPattern	Yes	For implementing SSL, use the `https` protocol. For example: `OpenIDPattern=https\://{FQDN}/{provider-root-context}/id/{id}`

Note: Restart the Interstage BPM OpenID Provider for the configuration property changes to take effect. For details, refer the section *Starting Interstage BPM OpenID Provider*.

3. Login to the Interstage BPM Tenant Management Console and update the value of `OpenID Provider URL` in the `SSOAuthentication` property.

   Use the `https` protocol instead of `http`.

   For example: `https://<FQDN>:<port>/openid/id/`

Note: After updating the configuration parameters you must log out and again login to the Interstage BPM Console for these changes to take effect.

Appendix E: Troubleshooting

E.1 Log File Information

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

E.2 Resolving Specific Error Situations

E.2.1 Interstage BPM Server Fails to Start

Check the `Error.log` file in the `<engine directory>/server/instance/default/logs` directory.

Look for	What to do
`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.`	Check if the database is running. Also check that you can access the database from the machine where the Interstage BPM Server is setup in case the database is running on a different machine. You can use `telnet <Database Server Hostname> <Port>` from the server host machine to check that the connection to the database host/port can be established.

`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]}}`
 	
`LdapBroker : Could not retrieve the user groups. {Could not create the directory services. {[LDAP: error code 49 - Invalid Credentials]}}`
	Ensure that the user name/password as specified in the `LDAPAccessUserID` / `LDAPAccessUserPassword` parameters of the Interstage BPM Server are correct and you can login to your Directory Server using the above user name/password.

`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.`
	Ensure that the LDAP Server is running on the port as specified in the `LDAPServer` parameter of the Interstage BPM Server. You can use `telnet ldapServerHostName port` from the server host machine to check that the connection to the host/port can be established.

Look for	What to do

`JDBC module:`
 	
`ERROR: Failed to load module for driver`
`[<jdbc_module_name>]"`
 	
`WARN : Error looking up`
`datasources/iFlowDS, service service`
`jboss.naming.context.java.jboss.datasources.iFlowDS`
`is not started`
	You need to manually add the JDBC module with the same name as specified in the `setup.config` file.
	
	Refer to *Setting-up the JDBC Module* on page 21 for more information about how to manually configure the JDBC module.
	
	Restart the JBoss EAP 6 application server for the changes to take effect.

E.2.2 Error in Trace.log

Check the `Trace.log` in the `<engine directory>/server/instance/default/logs` directory.

Look for	What to do

`getGroupMembersByDN: Could not retrieve`
`the user groups. {[LDAP: error code 32`
`- No Such Object]}`
	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.

E.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.

E.3 Errors during Setup of the Interstage BPM Server

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

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

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

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

Setup of IBPM fails when trying to setup a new build

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

	Action (For Windows)	Manually delete the earlier build's registry-entry, as follows:
		1. Go to **Start > Run**, type `regedit`, click **OK**.
		2. In the **Registry Editor** screen, go to below path. • 32bit OS: **HKEY_LOCAL_MACHINE > SOFTWARE > Fujitsu > Install > Interstage BPM Server** • 64bit OS: **HKEY_LOCAL_MACHINE > Wow6432Node > SOFTWARE > Fujitsu > Install > Interstage BPM Server**
		3. Delete the **Interstage BPM Server** registry entry under **Install** key.
		4. Go to below path. • 32bit OS: **HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Fujitsu > Interstage BPM Server** • 64bit OS: **HKEY_LOCAL_MACHINE > Wow6432Node > SOFTWARE > Microsoft > Windows > CurrentVersion > Fujitsu > Interstage BPM Server**
		5. Delete the **Interstage BPM Server** registry entry under **Fujitsu** key. This will ensure complete deletion of the registry entry for Windows platform.
		6. Go to below path. • 32bit OS: **HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Uninstall > DFC70E37-68E7-469C-A253-9ED7BB3BCD23** • 64bit OS: **HKEY_LOCAL_MACHINE > Wow6432Node > SOFTWARE > Microsoft > Windows > CurrentVersion > Uninstall > DFC70E37-68E7-469C-A253-9ED7BB3BCD23**
		7. Delete the **Interstage Business Process Manager xx.x** registry entry under **Uninstall** key. This will ensure complete deletion of the registry entry for Windows platform.
	Action (For Solaris)	Manually delete the Solaris package information, as follows:
		1. Open the Command Prompt window and run the command `pkginfo -l FJSVibpm` 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: a. Create a file named **ibpm.uninst** under the **/tmp** location. b. Run the command `pkgrm FJSVibpm` to delete the Solaris package. c. Run the command `pkginfo -l FJSVibpm` 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.

Action (For Linux)	Manually delete the RPM package information, as follows: 1. Open the Command Prompt window and run the command `rpm -qi FJSVibpm` 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 `rpm -e FJSVibpm`. 3. Run the command `rpm -qi FJSVibpm` 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.	

An error occurred during Interstage BPM database creation/update

I	Cause	One of the following values provided during setup were wrong: • Database Administrator user name • Database Administrator password
	Action	Restore the database from the backup of the database made before setting up Interstage BPM. Update the `setup.config` file and run the setup script again.
II	Cause	One of the following values provided during setup were wrong: • Host name of the database server • Database SID (database instance name) • Database port
	Action	Restore the database from the backup of the database made before setting up Interstage BPM. Update the `setup.config` file and run the setup script again.
III	Cause	Database server is not running.
	Action	Start the database server. Update the `setup.config` file and run the setup script again.

Errors caused by JDBC Connection

I	Cause	The SQLRecoverableException occurs. This is caused by Oacle Bug 6485149.
	Action	Please contact Oracle Technical Support team for further instructions.

Errors caused by JDK Version

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

	Action	You need to update `JAVA_HOME` variable of system environment and run the setup script again. Please update `JAVA_HOME` with `setIBPMJava.bat/setIBPMJava.sh` that exists in `<engine directory>/server/deployment/bin` when the error happens when the script of Interstage BPM is executed after completing the setup.

Problems related to LDAP Server Access

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

Errors Pertaining to Active Directory

I	Cause	The Active Directory Server is remote and Active Directory is not running.
	Action	Start the Active Directory Server, and then run the setup script again.
II	Cause	Interstage BPM cannot connect to the Active Directory Server because one of the following values provided during setup was wrong: • Active Directory Key • Active Directory Organizational Unit
	Action	Update the `setup.config` file and run the setup script again.

Errors Pertaining to Oracle Directory Server Enterprise Edition

I	Cause	Interstage BPM cannot connect to the LDAP Server because one of the following values provided during setup was wrong: • LDAP Key • LDAP Organizational Unit
	Action	Update the `setup.config` file and run the setup script again.

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

Errors Pertaining to the Database

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

Errors Pertaining to a Hostname Change

I	Cause	You changed the hostname of the computer where Interstage BPM Server has been setup. 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 `IBPMProperties` table of the Interstage BPM database, make the following changes: • In the `PROPERTYKEY` column, update any parameter names that have the hostname in the suffix. These parameters have the format `<PARAMETER_NAME>.<HOSTNAME>` or `<PARAMETER_NAME>.<HOSTNAME>.<SERVERNAME>`. • In the `PROPERTYVALUE` column, update any parameter values containing the hostname. To update the `IBPMProperties` table, use the appropriate database commands or a database client software.

E.5 Manual Procedure for Un-setup of Interstage BPM Server and Console

This chapter describes the manual procedure for un-setup of Interstage BPM Server and Console from JBoss EAP 6 application server. If you failed to execute `unsetup.bat` / `unsetup.sh`, refer this chapter to un-setup manually.

Follow these steps:

1. Make sure that JBoss EAP 6 application server is running. You can start this by executing `domain.bat` / `domain.sh` located in the `<JBoss Installation Directory>/bin` directory.

2. Open command prompt and execute the `jboss-cli.bat` / `jboss-cli.sh` script located at `<JBoss Installation Directory>/bin`.

3. Execute the following commands in the same order as mentioned below:

> **Note:** If you have already executed un-setup script and it was failed then some of the resource might have been removed. Now if you will execute the following commands to remove the resources manually, some error messages might appear. Ignore these messages and continue executing the commands in the order given below.
>
> However, make sure that the `connect` command is executed successfully before executing next commands.

```
a) connect
b) /server-group=iflow-server-group:stop-servers
c) /host=master/server-config=ibpm-server:read-resource(
include-runtime=true)

 After running the above command, make sure that the status should be
changed to 'STOPPED'.

d) undeploy fujitsu-ibpm-engine.ear --server-groups=iflow-server-group
e) /profile=full-ha/subsystem=datasources/data-source=iFlowDS:remove
f) /profile=full-ha/subsystem=datasources/jdbc-driver=iFlowDSDriver:
```

```
remove
g) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=NotificationTopic/:remove
h) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=SQNotificationTopic/:remove
i) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=EnactmentTopic/:remove
j) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=EmailNotificationTopic/:remove
k) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=ActionAgentTopic/:remove
l) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=TimerTaskTopic/:remove
m) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=CommandTopic/:remove
n) /profile=full-ha/subsystem=messaging/hornetq-server=default/
jms-topic=ResponseTopic/:remove
o) /profile=full-ha/subsystem=messaging/hornetq-server=default/
connection-factory=iFlowConnectionFactory/:remove
p) /profile=full-ha/subsystem=messaging/hornetq-server=default/
connection-factory=iFlowServerConnectionFactory/:remove
q) /profile=full-ha/subsystem=messaging/hornetq-server=default/:
undefine-attribute(name=security-enabled)
r) /profile=full-ha/subsystem=ejb3/:undefine-attribute(
name=default-entity-bean-instance-pool)
s) /profile=full-ha/subsystem=ejb3/strict-max-bean-instance-pool=
entity-strict-max-pool/:remove
t) /profile=full-ha/subsystem=ejb3/:undefine-attribute(
name=default-entity-bean-optimistic-locking)
u) /system-property=org.apache.catalina.connector.
USE_BODY_ENCODING_FOR_QUERY_STRING/:remove
v) /system-property=ConsoleSharedRoot/:remove
w) undeploy console.war --server-groups=iflow-server-group
x) undeploy openid.war --server-groups=iflow-server-group
y) /host=master/server-config=ibpm-server:remove
z) /server-group=iflow-server-group:remove
aa) quit
```

4. **In case of cluster environment**, remove the server configuration as mentioned below:

   On each slave machine, update the host.xml present at `<JBoss Installation Directory>/domain/configuration/` to remove the server configuration in the `<servers>` section:

   Existing:

```
<servers>
 <server name="<server_name>" group="iflow-server-group"
auto-start="true">
  <system-properties>
   <property name="message.selector" value="<ServerName>"
boot-time="true"/>
        <property name="ibpm.nodename" value="<ServerName>"
boot-time="true"/>
     </system-properties>
 </server>
</servers>
```

Changed to:

```
<servers>
</servers>
```

5. **Delete Interstage BPM Console and OpenID Provider:**

   a) Delete `<engine directory>/client/console` directory

   b) Delete `<engine directory>/client/openid` directory

The un-setup of Interstage BPM Server and Console is completed successfully

> **Note:** You need to manually delete the registry-entry/RPM package/package information as described in *Errors during Setup of the Interstage BPM Server* on page 109, topic (*Setup of IBPM fails when trying to setup a new build* on page 109).

E.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 `<engine directory>/server/instance/default/logs`
   - Setup log file from `<engine 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

Index