

IBM WEBSHERE PROCESS SERVER 6.0.1 – LAB EXERCISE

Configuring a Highly Available WPS Environment

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What this exercise is about

In this exercise the student will gain experience configuring a complex WebSphere Process Server clustered topology.

Using the *by-function* deployment pattern presented in the lectures, the student will define and configure 4 separate application server clusters, install and configure the Common Event Infrastructure and Business Process Choreographer components along with their respective Service Integration Buses and Messages Engines.

Lab Requirements

List of system and software required for the student to complete the lab.

- WebSphere Process Server v6.0.1 binaries installed on two systems

- DB2 UDB 8.2 installed at least on one system

What you should be able to do

At the end of this lab you should be able to:

- Configure a highly available WebSphere Process Server Environment using the by-function deployment pattern.
- Create and configure active/standby Message Engine clusters
- Create and configure Service Component Architecture Service Integration Buses using the Advanced Configuration Wizard.
- Install and configure the Common Event Infrastructure components manually to meet customized requirements, separating the Message Engine components from the application components.
- Install and configure the Business Process Choreographer components manually to meet customized requirements, separating the application components from the Message Engine components and from the infrastructural components.

Introduction

The following picture shows the logical view of the configuration using the by-function deployment pattern.

AdminCluster: ... will contain the Common Event Infrastructure (CEI) Server and Common Event Infrastructure MDB applications. It will also contain the Business Rules Manager application. This cluster will not contain any Message Engines

AdminMECluster: ... will contain the Message Engines needed by the **AdminCluster**. It will not contain any applications.

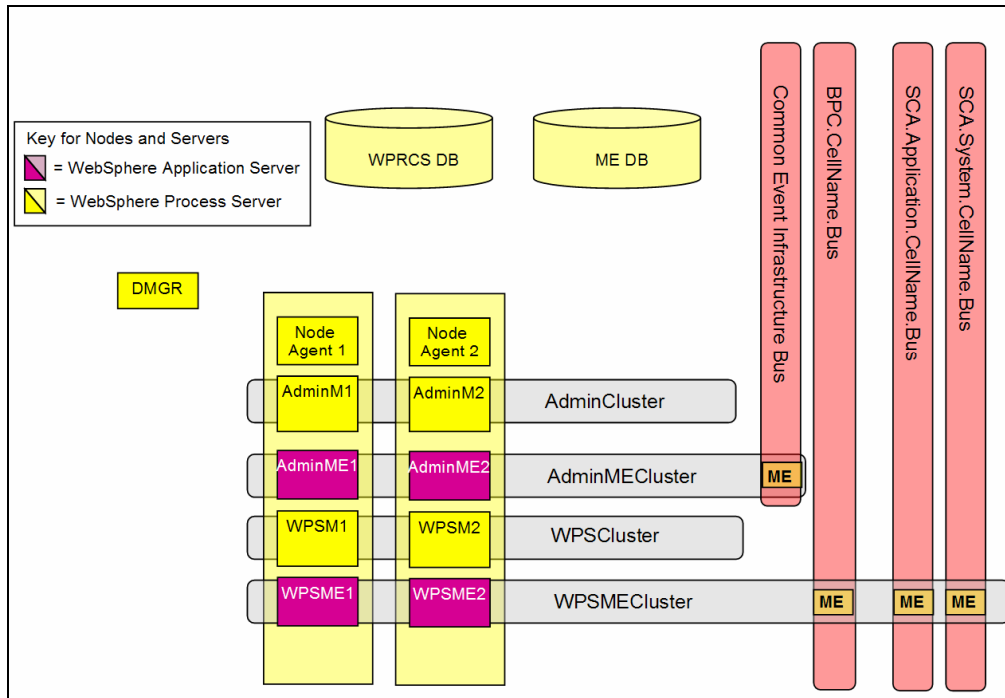
The AdminCluster and the AdminMECluster together provide the infrastructural functionality for the entire system.

WPSCluster: ... will contain the Business Process Choreographer (BPC) and Human Task Manager (HTM) containers and will host the business process applications that utilizes these features. It will not contain any Message Engines

WPSMECluster: ... will contain the Message Engines needed for the **WPSCluster**. It will not contain any applications.

With this deployment pattern the WPS clusters are the clusters that host the WebSphere Process Server applications, that is to say, business processes. For simplicity and clarity we're only using one 'application' cluster with its associated Message Engine cluster, at this time. In a real production deployment there can and will most likely be multiple 'application' clusters, with a single 'administrative' cluster to contain and manage the infrastructural components of the WebSphere Process Server Cell.

By separating the Message Engines into a separate cluster, apart from the applications, a *highly available messaging server* dedicated to a specific set of collaborating applications is created. Recall from the lecture, with the active/standby HA Policy, that there will only be one active Message Engine per cluster running in a server cluster member determined by the WebSphere High Availability and Workload Managers.



Exercise Instructions

Some instructions in this lab may be Windows operating-system specific. If you plan on running the lab on an operating-system other than Windows, you will need to execute the appropriate commands, and use appropriate files (.sh vs. .bat) for your operating system. The directory locations are specified in the lab instructions using symbolic references, as follows:

Reference Variable	Windows Location
<WPS_HOME>	C:\WPS
<PROFILE_HOME>	C:\WPS\pf
<LAB_FILES>	C:\Labfiles601\
<TEMP>	C:\temp

Windows users please note: When directory locations are passed as parameters to a Java program such as EJBdeploy or wsadmin, it is necessary to replace the backslashes with forward slashes to follow the Java convention. For example, C:\LabFiles60\ would be replaced by C:/LabFiles60/

Part 1: Creating the required Databases

DB2 Databases:

WPRCSDB : A general database for WebSphere Process Server. You will want to have created this database before you create the Deployment Manager profile. When you create the Deployment Manager profile, you will want to point it to this database.

For this lab, we are going to create all the databases and tables on the same machine where we plan to create a deployment manager profile

NOTE: We are also going to put all of our other tables into this database, instead of creating unique ones (i.e., we will put the EVENT and BPEDB information in the WPRCS database instead of creating a number of separate databases) It is not a requirement that you put all the Business Process Choreographer (BPC) and Common Event Infrastructure (CEI) tables in this database, you can put them in their separate databases if necessary.

___ 1. Creating WPRCS database

___ a. In your database provider (i.e., DB2), create a database named WPRCSDB.

1) Open a DB2 Command window and use the following command

db2Start (the database manager may already be started)

db2 create database WPRCSDB

BPEDB: This database is used to hold necessary tables for the Business Process Choreographer.

But in this lab, we are not going to create a new BPEDB database to hold the tables. We are going to use the WPRCS database to hold the tables. The scripts for generating the tables are available under **<WPS_HOME>\ProcessChoreographer** folder

___ 2. Create the BPEL database tables. Remember that for this lab, we are using the WPRCSDB to hold the tables necessary for BPEL and CEI

___ a. Browse to **<WPS_HOME>\ProcessChoreographer** in windows explorer.

___ b. Create a backup copy of **createDatabaseDB2.ddl** and name it **orgcreateDatabaseDB2.ddl**

___ c. Edit the **createDatabaseDB2.ddl** file so that the Create Database statement is commented out. Make changes to connect to the existing WPRCSDB as a valid DB2 user. An example is shown below.

```
-- create the database
```

```
-- CREATE DATABASE BPEDB USING CODESET UTF-8 TERRITORY en-us;
```

```
-- connect to the created database:
```

```
-- Use CONNECT TO BPEDB USER xxx when another user should become owner of the schema
```

```
CONNECT TO WPRCSDB USER db2admin;
```

___ d. Execute the modified **createDatabaseDB2.ddl** file to create tables

1) Use the command

db2 -tf <WPS_HOME>\ProcessChoreographer\createDatabaseDB2.ddl

- 2) You would be prompted for the password for the DB2 user that you specified in the createDatabaseDB2.ddl file. Provide a valid password

MEDB: Database utilized by the Data store for the Messaging Engines

- ___ 3. In your database provider (ie, DB2), create a database named MEDB. The tables for your Messaging Engine's data stores will be automatically created later
- ___ a. Open a DB2 Command window and use the following command

db2 create database MEDB

EsbLogMedDB: The "EsbLogMedDB" contains the MSGLOG table, which is required by the Logger Mediation Primitive.

In a standalone server environment, this database and datasource are automatically configured for you. In a Network Deployment environment, you will have to manually configure this database and datasource. In this lab, we are not going to create a new database to hold the tables. We are going to use the WPRCS database to hold the tables under a different schema. The scripts for generating the tables are available under <WPS_HOME>\util\EsbLoggerMediation\yourdatabase\ folder

- ___ 4. Create a copy of the Table.ddl file in <WPS_HOME>\util\EsbLoggerMediation\DB2UDB_V82\Table.ddl and save as orgTable.ddl
- ___ 5. Edit the Table.ddl to add the line:

CONNECT TO DBNAME USER USERID;

and to add a NOT NULL to the MEDIATIONNAME in the CREATE TABLE

For example, we want to put these tables in the existing WPRCSDB, so edit the file so it looks like this:

```
CONNECT TO WPRCSDB USER db2admin;  
  
CREATE SCHEMA ESBLOG;  
  
CREATE TABLE ESBLOG.MSGLOG  
(TIMESTAMP TIMESTAMP NOT NULL,  
MESSAGEID VARCHAR(36) NOT NULL,  
MEDIATIONNAME VARCHAR(256) NOT NULL,  
MODULENAME VARCHAR(256),  
MESSAGE CLOB(100000K),  
VERSION VARCHAR(10));  
  
ALTER TABLE ESBLOG.MSGLOG  
ADD CONSTRAINT PK_MSGLOG PRIMARY KEY (TIMESTAMP, MESSAGEID, MEDIATIONNAME);
```

- ___ 6. Save the file.

- ___ 7. Open command prompt window, type **db2cmd** and press enter. This should open a new command window.
- ___ 8. In DB2cmd window cd to <WPS_HOME>\util\EsbLoggerMediation\DB2UDB_V82\
___ 9. Type the command **db2 -tf Table.ddl** and press enter.
- ___ 10. You would be prompted for the password for the DB2 user, enter the password.

WebSphere Process Server will also need a database and tables for the **Common Event Infrastructure (CEI)** . However, the scripts to create these aren't available until you have created a profile. We will delay the creation of this database to the section after creating the profiles.

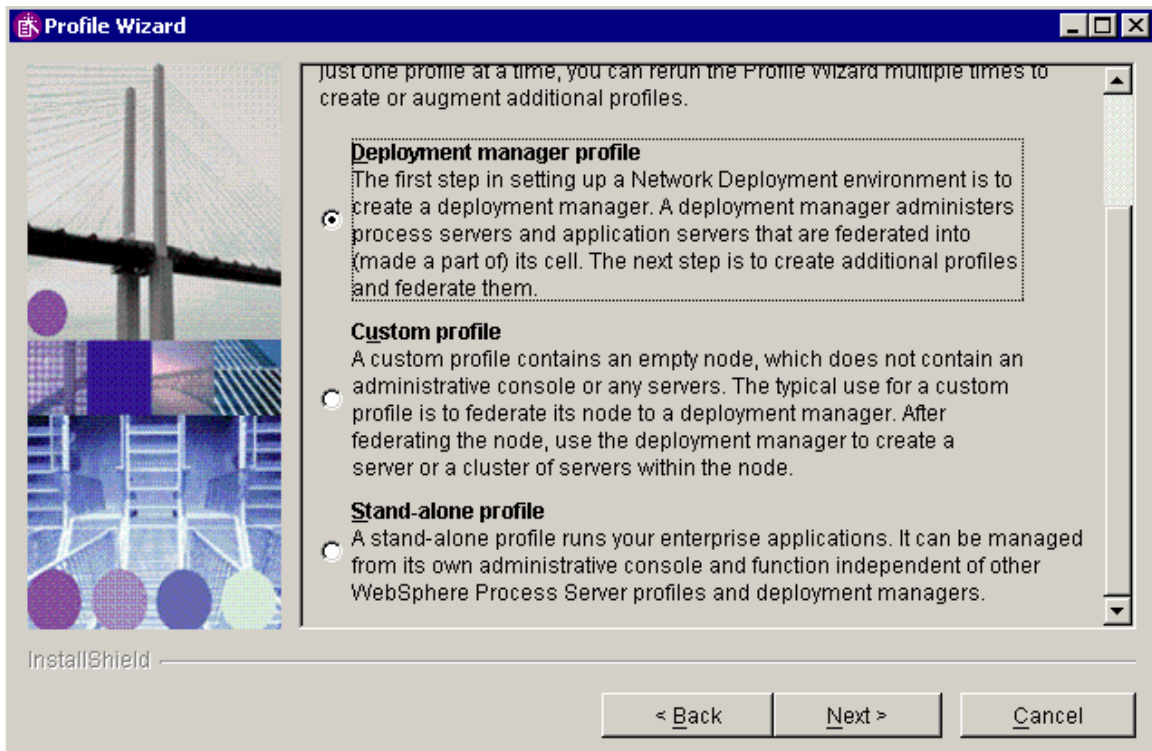
Part 2: Creating the Deployment Manager Profile

The first profile you should be creating is the WPS Deployment Manager profile. **The lab scenario uses two machines. One is considered as a local machine and the other as remote machine. The machine on which we create the deployment manager profile is referred to as local machine throughout the instructions in this lab.**

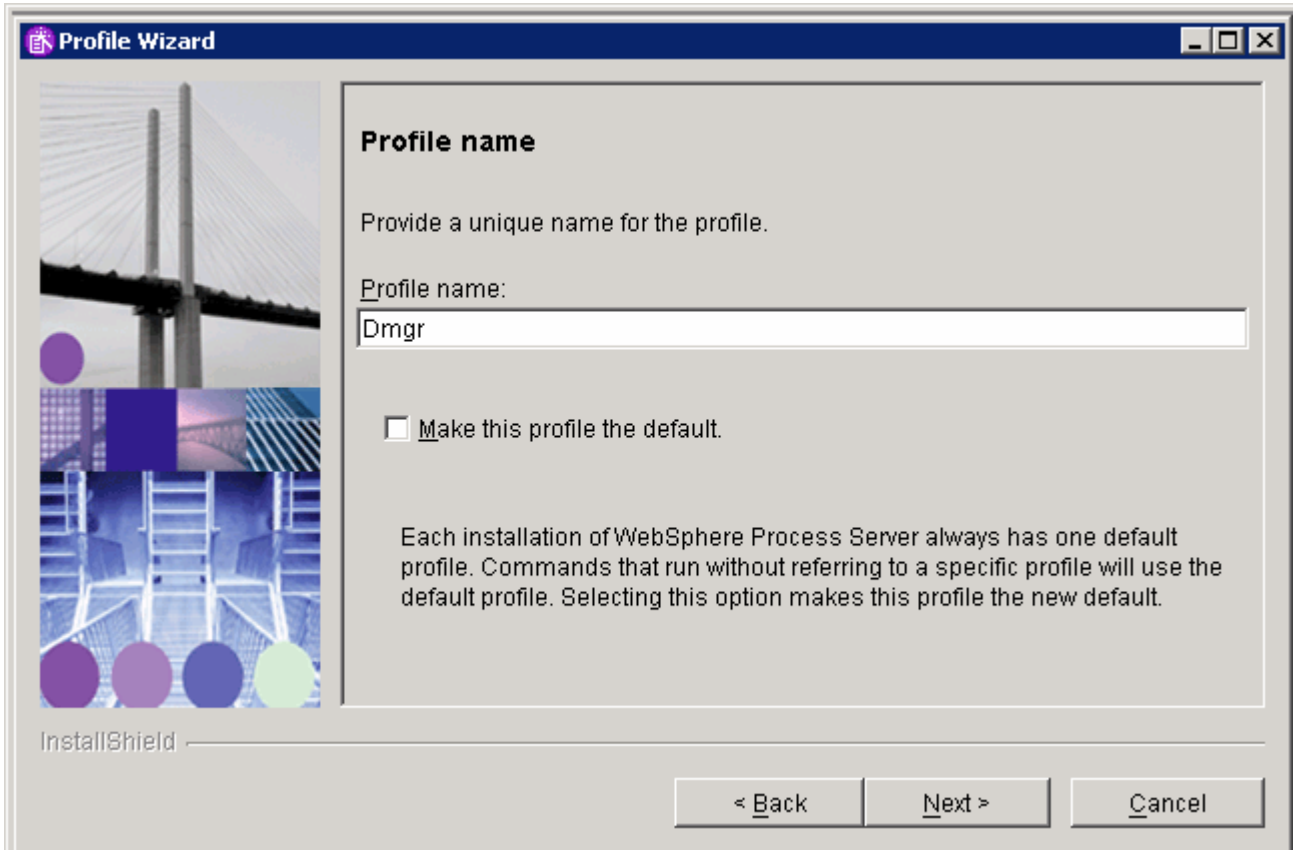
Note: You are going to create the deployment manager profile on the same machine where you created databases (in part1).

Note: The links from the Windows start menu can also be used for launching the Profile Creation Wizard, the Administration Console and for starting and stopping the nodes. Make sure that you use the menu selections for the Process Server 6.0.1, e.g. the one that uses the files in the ProfileCreator_wbi folder.

- ___ 1. Launch the profile creation wizard from the directory <WPS_HOME>\bin\ProfileCreator_wbi. Make sure that you select this directory, and not the **ProfileCreator** directory, or you'll be creating the wrong Deployment Manager. We want to create WebSphere Process Server Deployment manager profile not WebSphere Application Server Deployment manager profile.
 - ___ a. Double-click on the **pcatWindows.exe**.
- ___ 2. Click **Next** in the Profile Wizard Welcome screen.
- ___ 3. Select **Deployment manager profile** in the profile type selection.
 - ___ a. Click Next

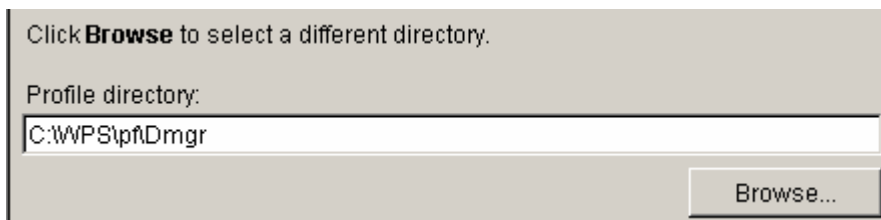


- ___ 4. Name your profile (for example, Dmgr) and click **Next**.



- ___ 5. Select the profile directory .Choose the shortest path possible to avoid the windows 259 character problem later.

Example: C:\WPS\pf\dmgr



- ___ a. Click **Next**.

- ___ 6. **Specify the hostname including the domain extension. Since we are using two machines for the lab scenario, both may not be in the same domain. Also provide node, and cell name keeping them as short as you can.**

Ex: Node name: **dNode**

Host name: **wpseduhost.austin.ibm.com**

Cell name: **dCell**

___ a. Click **Next**.

Node, host, and cell names

Specify a node name, a host name, and a cell name for this profile. Refer to the installation and migration information for detailed field descriptions and migration considerations.

Node name:
dNode

Host name:
wpseduhost.austin.ibm.com

Cell name:
dCell

___ 7. In the next port value assignment screen, note down the **SOAP Connector port** you would need it for federating the custom nodes that we are going to create in the next section.

___ a. Click **Next**.

___ 8. In the Windows service definition screen:

___ a. Uncheck the **Run the WebSphere Process Server process as a Windows service** option.

___ b. Select the radio button next to **Log on as local system account**.

Windows service definition

Choose whether to use a Windows service to run the WebSphere Process Server. Windows Services can start and stop the WebSphere Process Server, and configure startup and recovery actions.

Run the WebSphere Process Server process as a Windows service

Log on as a local system account

Log on as a specified user account

___ c. Click **Next**.

___ 9. The subsequent step is **important**. Select the check box next to **Configure the service Integration Bus in a secured mode**.

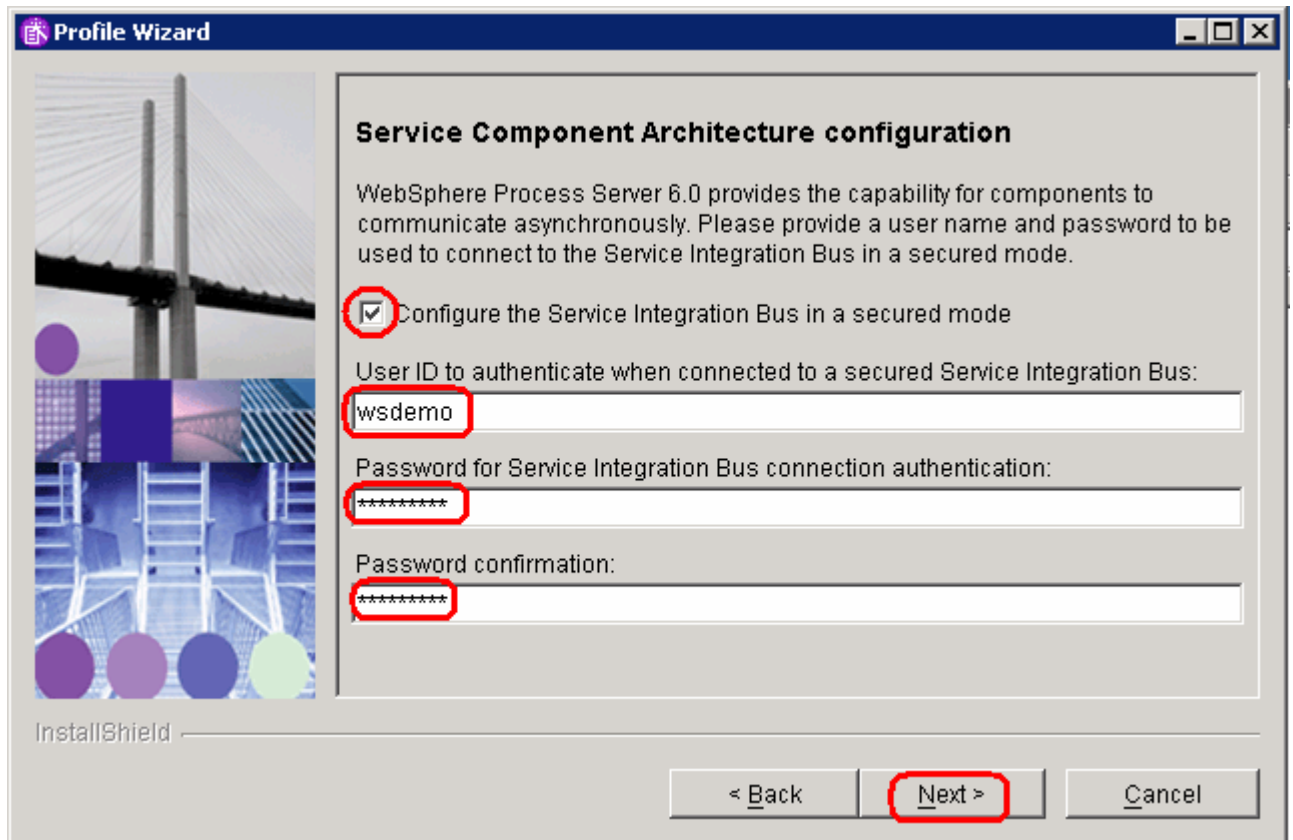
___ a. You will be asked for the user and password that the SCA infrastructure is going to use to connect to the system and application Service Integration Buses.

___ b. Provide a valid system user id and password that exists on your system.

Ex: username: wsdemo

password: *****

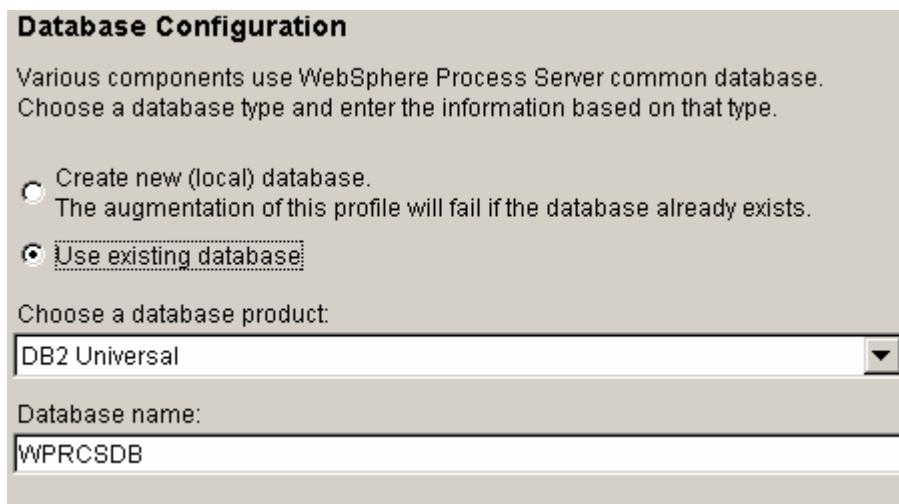
__ c. Click **Next**.



___ 10. For the Database Configuration, you are asked whether you want to create a new database, or use an existing database. We already created a database **WPRCSDB**.

__ a. Select **Use an existing database**.

__ b. Choose **DB2 Universal** for the database product and **WPRCSDB** for the database name.



__ c. Click **Next**.

- ___ 11. In the **Additional Database Configuration Information** screen,
- ___ a. Enter the DB2 username, password (ex: username: db2admin).
 - ___ b. Specify JDBC driver path required for accessing the DB2 database.
 - ___ c. Enter hostname (use fully qualified name including domain) and port.

Additional Database Configuration Information

Due to the database product that you selected, additional information is required.

User ID to authenticate with the database:
db2admin

Password (the password for database authentication):

Password confirmation:

Location (directory) of JDBC driver classpath files:
C:\wps601\universalDriver_wbi\lib

Browse...

Database server host name (for example, IP address):
table218.rchland.ibm.com

Server port:
50000

< Back Next > Cancel

- ___ d. Click **Next**.
- ___ 12. Review the summary and Click **Next**.

Note: Please be patient. This might take some time.

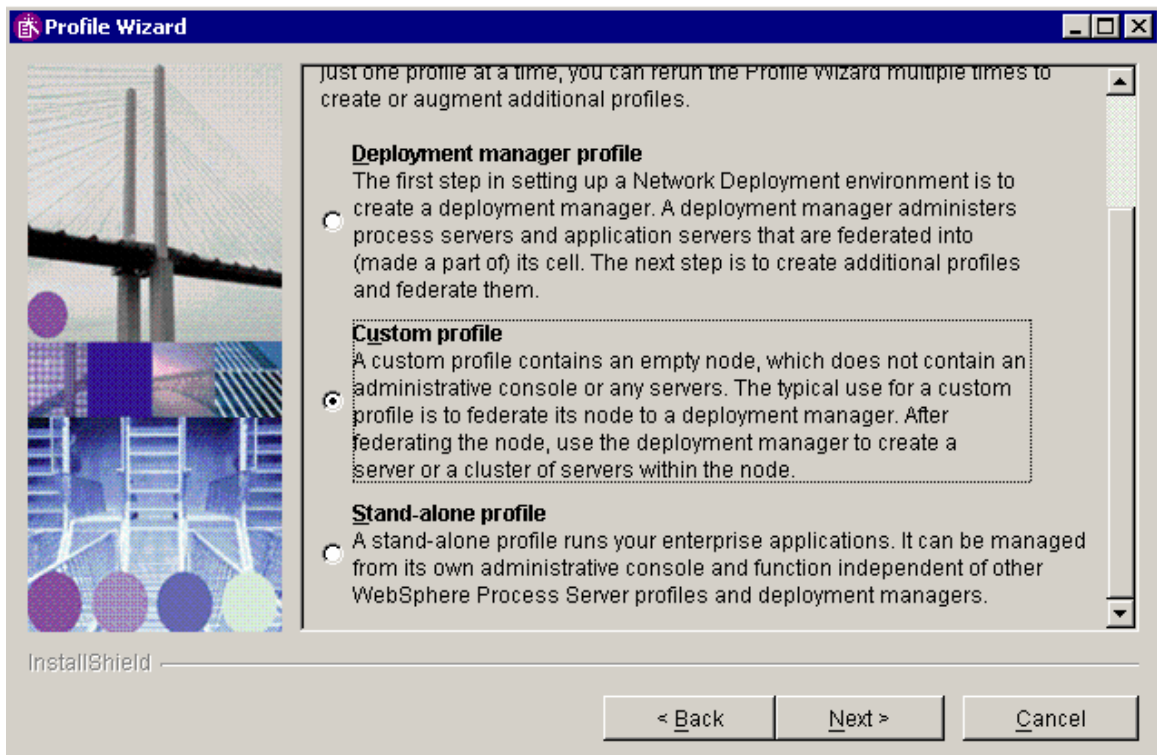
- ___ 13. When the profile creation is complete, you would be given an option to launch First Steps window.
- ___ a. Click **Finish** to launch First Steps.
 - ___ b. Click on **Start the deployment manager** link and wait for the server to start.
 - ___ c. Click on the **Administrative Console** link and wait for the Administrative Console to open.
 - ___ d. Click **Exit** on First Steps window.

- ____ 14. Verify that the two Service Integration Buses for the Service Component Architecture were created.
- __ a. Log in to the Admin Console using any userid.
 - __ b. Navigate to **Service Integration → Buses**.
 - __ c. You should see two Service Integration Buses:
 - 1) **SCA.APPLICATION.<cell name>.Bus**
 - 2) **SCA.SYSTEM.<cell name>.Bus**
- ____ 15. Verify that the J2C Authentication Aliases are in place. These are used in data sources and connection factories.
- __ a. Navigate to **Security → Global security**.
 - __ b. Under Authentication, Expand **JAAS Configuration** and select **J2C Authentication data**.
 - __ c. You should have two authentication aliases:
 - 1) **SCA_Auth_Alias** (to be used when connecting to the Message Engines)
 - 2) **WPSDBAlias** (for the WPS database)

Part 3: Creating the Custom Node Profiles

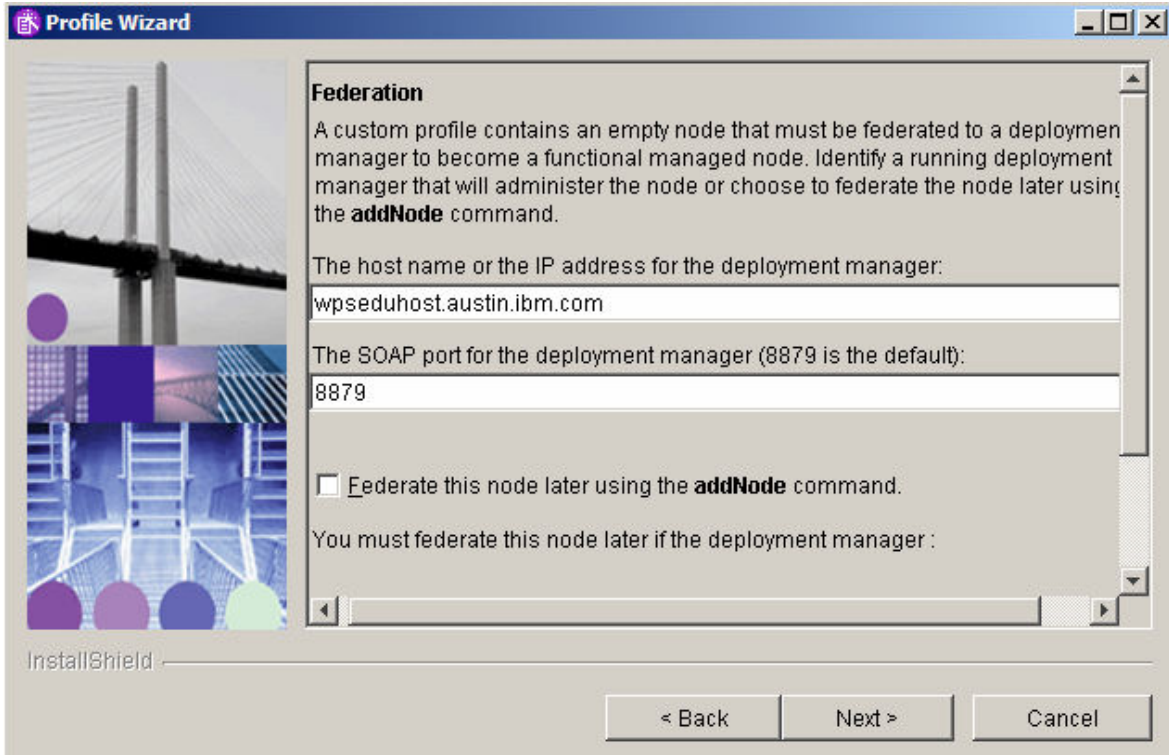
We have a deployment manager profile. We can now create the custom profiles to federate with the deployment manager. We will create one custom node on the same machine where we created deployment manager. The other custom node is created on the remote machine.

- ___ 1. Run the WPS profile creation wizard.
 - ___ a. On the same machine where deployment manager profile is created, launch the profile creation wizard from the directory <WPS_HOME>\bin\ProfileCreator_wbi.
 - ___ b. In the Welcome screen click **Next**.
 - ___ c. Select **Custom Profile**.



- ___ d. Click **Next**.

- ___ e. In the next screen, specify the deployment manager SOAP port and the hostname (**fully qualified with domain included**) where the deployment manager is created.



1) Click **Next**.

- ___ f. Provide a name to this profile. Remember to keep it short so as to not run into the windows 259 character limit problem. Select the check box next to “**Make this profile the default**”

Example: CustomN1

1) Click **Next**.

- ___ g. Choose a directory for profile installation.

Example: C:\WPS\pf\CustomN1.

Note: To keep the path shorter, C:\WPS\pf\CustomN1 is used instead of the normal C:\WPS\profiles\CustomN1 path.

1) Click **Next**.

- ___ h. Provide the Node name and Host name.

Example: cNode1 for Node name and fully qualified host name.

1) Click **Next**.

- ___ i. On “Port Value Assignment” screen accept the defaults and click **Next**.

- ___ j. For the database configuration, select the database type and driver location. For DB2, the driver is shipped with the product and no changes are normally needed.

Database Configuration

Various components use WebSphere Process Server common database.
Choose a database type and enter the information based on that type.

Choose the database product used on the Deployment Manager:

DB2 Universal

Location (directory) of JDBC driver classpath files:

C:\WPS\universalDriver_wbi\lib

Browse...

- 1) Click **Next**.

- ___ k. Review the summary and click **Next**.

Note: Please be patient. This might take some time.

- ___ l. Deselect the check box to launch first steps and click **Finish**.

- ___ m. Click **Finish** to exit the wizard without further actions.

- ___ 2. We now need to create the second custom profile on the remote machine. Run the WPS profile creation wizard on the remote machine.

Note: You need to change to the second machine (remote) now.

- ___ a. Launch the profile creation wizard from the directory <WPS_HOME>\bin\ProfileCreator_wbi.

- ___ b. On the Welcome screen, click **Next**.

- ___ c. Select Custom Profile and click **Next**.

- ___ d. In the next screen, specify the

- 1) The deployment manager SOAP port.

- 2) The hostname (fully qualified including domain name) where the deployment manager is created.

- 3) Click **Next**.

- ___ e. Provide a name to this profile. Remember to keep it short so as to not run into the windows 259 character limit problem.

example: CustomN2

- 1) Click **Next**.

- ___ f. Choose a directory for profile installation.

example: C:\WPS\pf\CustomN2 .

Note: To keep the path shorter, C:\WPS\pf\CustomN2 is used instead of the normal C:\WPS\profiles\CustomN2 path

1) Click **Next**.

___ g. Provide the nodename and hostname. The hostname is the name of the machine where you are creating this profile. Remember to provide the fully qualified hostname including the domain.

example: cNode2 for nodename

1) Click **Next**.

___ h. On “Port Value Assignment” screen

1) Accept the defaults.

2) Click **Next**.

___ i. Click **Next**.

___ j. Select the database type and driver location. For DB2, the driver is shipped with the product and no changes are normally needed.

___ k. Review the summary and complete the creation of the profile.

___ l. **Exit** the wizard without further actions.

Part 4: Configure Datasource and WebSphere Variables

Configure the datasource for EsbLogMedDB: We have created the tables for the **EsbLogMedDB** database under an **ESBLOG** schema in the **WPRCSDB** instead of creating a new database. Now we will configure a datasource that is at a cell scope to access the tables.

Note: You can use any of the two machines. But, you have to specify correct host name and port number of the Deployment manager.

- ___ 1. Open a browser and enter <http://<hostname>:<port>/admin> where hostname is the name of the machine where deployment manager is created. Port is the WC_adminhost port of deployment manager

example: <http://localhost:9062/admin>

- ___ 2. Log into the admin console using any userid

- ___ 3. Create a JDBC Provider

___ a. Navigate to, **Resources → JDBC Providers**

___ b. Select **cell scope**

___ c. Click **New**.

1) Select **DB2, DB2 Universal JDBC Driver Provider**, and **XA Data source** for steps 1 to 3. click **Next**.

2) Provider name: “**DB2 Universal JDBC Driver Provider (XA) for Message Logger**”

3) Click **OK** and save and synchronize the changes

- ___ 4. Create a datasource

___ a. Navigate to, **Resources → JDBC Providers**

___ b. Select **cell scope**

___ c. Click on “**DB2 Universal JDBC Driver Provider (XA) for Message Logger**”

___ d. Click **Data sources** under Additional properties.

___ e. Click **New**.

___ f. Provide the following values.

Name = **ESB Logger Mediation Data Source**

JNDI Name = **jdbc/mediation/messageLog**

Note: the JNDI name of the datasource is currently hard-coded. You **MUST** use **jdbc/mediation/messageLog**

Component-managed authorization alias = **WPSDBAlias**

Database name = **WPRCSDB**

Driver type = **4**

Server name = Provide fully qualified hostname of the machine with DB2 installed.

(This should be the same machine where the WPRCSDB was created.)
Port number = < your db2's port number >

* Scope

* Name

JNDI name

Use this Data Source in container managed persistence (CMP)

Description

Category

Data store helper class name

Select a data store helper class

Data store helper classes provided by WebSphere Application Server

DB2 Universal data store helper (com.ibm.websphere.rsadapter.DB2UniversalDataStoreHelper)
DB2 for iSeries data store helper (com.ibm.websphere.rsadapter.DB2AS400DataStoreHelper)
Cloudscape Network Server data store helper (com.ibm.websphere.rsadapter.CloudscapeNetworkServerDataStoreHelper)

Specify a user-defined data store helper

Enter a package-qualified data store helper class name

Component-managed authentication alias

Component-managed authentication alias

Authentication alias for XA recovery

Use component-managed authentication alias
 Specify:

Container-managed authentication

Container-managed authentication alias (deprecated in V6.0, use resource reference authentication settings instead)

Mapping-configuration alias (deprecated in V6.0, use resource reference authentication settings instead)

DB2 Universal data source properties

* Database name

* Driver type

Server name

Port number

- ___ g. Click **OK** and synchronize changes with the nodes.
- ___ h. You would need to define “**DB2UNIVERSAL_JDBC_DRIVER_PATH**” and “**UNIVERSAL_JDBC_DRIVER_PATH**” WebSphere variables at cell scope.

This is one of those steps that’s likely to be missed. One would expect the WebSphere environment variables to be in place. They are there, but not at the cell scope, which is where they’re need for this configuration.

- 1) In the Administration Console navigate to **Environment → WebSphere Variables**.
- 2) Select **cell scope**.
- 3) Click **New**.
- 4) Enter name as

Variable Name: **DB2UNIVERSAL_JDBC_DRIVER_PATH**
 Value: **<WPS_HOME>\universalDriver_wbi\lib**

Note: remember to replace the <WPS_HOME> variable with the actual value where WPS is installed.

- 5) Click **OK**.

6) In the Administration Console navigate to **Environment → WebSphere Variables**.

7) Select **cell scope**

8) Click **New**.

9) Enter name as

Variable Name:	UNIVERSAL_JDBC_DRIVER_PATH
Value:	<WPS_HOME>\universalDriver\lib

Note: remember to replace the <WPS_HOME> variable with the actual value where WPS is installed.

10) Click **OK**.

11) Save and synchronize changes.

Part 5: Identifying the necessary Clusters

Up to this point this exercise has been focused on creating the Deployment Manger Cell and the custom profiles used to define the Nodes within the cell.

The focus will now shift to defining the 4 server clusters.

AdminCluster: ... will contain the Common Event Infrastructure (CEI) Server and Common Event Infrastructure MDB applications. It will also contain the Business Rules Manager application. This cluster will not contain any Message Engines

AdminMECluster: ... will contain the Message Engines needed by the **AdminCluster**. It will not contain any applications.

The AdminCluster and the AdminMECluster together provide the infrastructural functionality for the entire system.

WPSCluster: ... will contain the Business Process Choreographer (BPC) and Human Task Manager (HTM) containers and will host the business process applications that utilizes these features. It will not contain any Message Engines

WPSMECluster: ... will contain the Message Engines needed for **WPSCluster**. It will not contain any applications.

Part 6: Creating and Configuring the AdminMECluster

- ___ 1. Create the **AdminMECluster** with one cluster member
 - ___ a. In the Administration Console navigate to, **Servers → Clusters**.
 - 1) Click **New**
 - ___ b. Provide Cluster name = **AdminMECluster**.

The screenshot shows a dialog box titled "Create a new cluster" with a progress indicator on the left. The current step is "Step 1: Enter basic cluster information." The main area contains the following fields and options:

- Cluster name:** AdminMECluster
- Prefer local
- Create a replication domain for this cluster

Buttons for "Next" and "Cancel" are visible at the bottom.

- ___ c. Click **Next**.
- ___ d. Provide

Member name = **AdminME1**,
 Node = **cNode1**,
 default application server template = **default**. (the default is a WAS server)

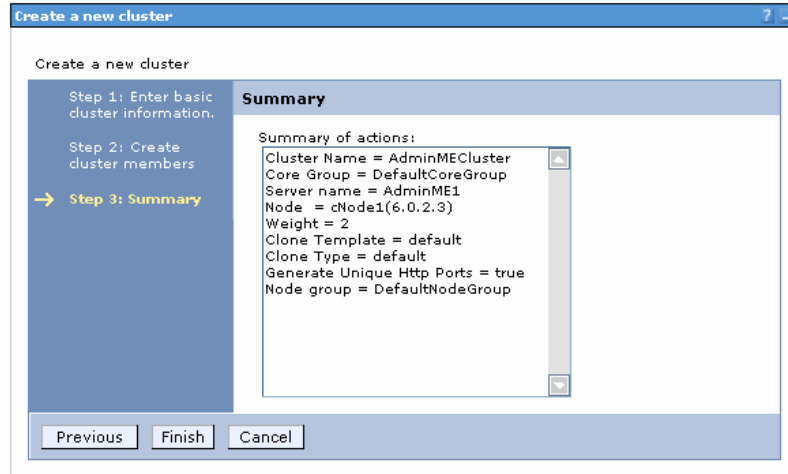
The screenshot shows the "Create a new cluster" dialog box at "Step 2: Create cluster members." The main area contains the following fields and options:

- Member name:** AdminME1
- Select node:** cNode1(6.0.2.3)
- Weight:** 2
- Generate Unique Http Ports
- Select template:**
 - Default application server template
 - Choose a server template from this list: default

Buttons for "Apply", "Edit", and "Delete" are visible. At the bottom, there are "Previous", "Next", and "Cancel" buttons.

Select	Application servers	Nodes	Version	Weight
<input type="checkbox"/>				

___ e. Click **Apply** and then click **Next**.



___ f. Click **Finish**.

___ g. Save and synchronize the changes.

___ 2. In the Admin Console, navigate to **Servers → Application Servers**.

___ a. Select the check box next to **AdminME1** and click the **Start** button.

___ b. Wait for the cluster to start before you continue.

___ 3. Create and configure resources for the Messaging Engine:

Create a cluster scoped JDBC provider and datasource that will be used by the datastore for the Message Engines in the **CommonEventInfrastructure_Bus**

___ a. Create a new JDBC Provider at the cluster scope

- 1) In the Administration Console navigate to, **Resources → JDBC Providers**.
- 2) Click on "**Browse Clusters**" button,
- 3) Select the "**AdminMECluster**"
- 4) Click **OK**
- 5) Click New on the "**JDBC Providers**" Wizard.

- 6) Select **DB2, DB2 Universal JDBC Driver Provider** and **XA data source** for Steps 1 to 3.

JDBC providers > New
Choose a type of JDBC provider to create.

Configuration

General Properties

Step 1: Select the database type
DB2

Step 2: Select the provider type
DB2 Universal JDBC Driver Provider

Step 3: Select the implementation type
XA data source

Next Cancel

- a) Click **Next**.

- 7) Provide Name = **DB2 Universal (XA) for CEI ME**

- a) Click **OK**.

- 8) Save the configuration.

__ b. Create a new Data Source in the **DB2 Universal (XA) for CEI ME** JDBC Provider.

- 1) Click on the JDBC provider **DB2 Universal (XA) for CEI ME**.

- 2) Click on **Data Sources** under the Additional Properties.

- 3) Click **New**.

- 4) Provide the following values:

- a) Name = **Datasource for CEI ME**

- b) JNDI = **jdbc/cei_bus/medb/AdminMECluster**

- c) category = **UDDI**

- d) Component managed authentication alias = **WPSDBAlias**

- e) Mapping configuration alias = **DefaultPrincipalMapping**

- f) Database name = **MEDB**

- g) Driver type = **4**

- h) Server name = Provide fully qualified hostname of the machine with DB2 installed.
This should be the same machine where the MEDB was created

- i) Port Number = Your_db2_port_number (the default is 50000)

- 5) Click **OK** and save configuration.

___ 4. Create a Service Integration Bus named “**CommonEventInfrastructure_Bus**”

___ a. In the Administration Console navigate to, Service Integration → Buses

1) Click **New**

a) Provide name as “**CommonEventInfrastructure_Bus**”

b) Select “**Secure**” option in Security panel

c) Select **SCA_Auth_Alias** as **Inter-engine authentication alias**

d) Click **OK**

e) Save and synchronize the changes.

___ 5. Add the **AdminMECluster** as a member of the **CommonEventInfrastructure_Bus**

___ a. In Administration Console navigate to, Service Integration → Buses

1) Click on the **CommonEventInfrastructure_Bus**.

___ b. Click on **Bus Members** link under **Topology**

___ c. Click **Add** button which should open a wizard

___ d. Select the Radio button next to **Cluster** and select **AdminMECluster** from the drop down menu.

___ e. Enter **jdbc/cei_bus/medb/AdminMECluster** for Data Source JNDI name.

Select server or cluster

Choose the server or cluster to add to the bus

Server

Server
cNode1:AdminME1

Data store

Default

Data source JNDI name

Cluster

Cluster
AdminMECluster

Data store

* Data source JNDI name
jdbc/cei_bus/medb/AdminME

___ f. Click **Next**

___ g. Click **Finish** and save the changes

- ___ 6. Edit the datastore attributes of the Message Engine for the Service Integration Bus member
- ___ a. In the Administration Console navigate to
Service Integration → Buses → CommonEventInfrastructure_Bus
 - ___ b. Click on **Bus members** link under **Topology**
 - ___ c. Click on the entry “**Cluster=AdminMECluster**”
 - ___ d. Click on **AdminMECluster.000-CommonEventInfrastructure_Bus**
 - ___ e. Click on **Data Store** link under Additional Properties
 - ___ f. There will be a unique schema in the MEDB for each messaging engine.
Change the default name of the SCHEMA to **AdminMECEIBus**
 - ___ g. Select **WPSDBAlias** from the drop down menu for **Authentication alias**
 - ___ h. Notice the “create tables” is checked. This will cause the tables, qualified with the schema name, to be created in the MEDB database when the AdminMECluster members are started.
 - ___ i. Click **OK** and save changes

This completes the creation and configuration of AdminMECluster. We will need to add more cluster members which is covered in later sections.

Part 7: Creating and Configuring the AdminCluster

- ___ 1. Create the **AdminCluster** with one cluster member.
 - ___ a. In the Administration Console navigate to, **Servers → Clusters**.
 - ___ b. Click **New**
 - 1) Provide Cluster name = **AdminCluster**.
 - a) Click **Next**.
 - 2) Provide:
Member name = **AdminM1**,
Node = **cNode1**,
default application server template = **defaultProcessServer**.
 - 3) Click **Apply** and then Click **Next**.
 - 4) In the next screen, click **Finish**.
 - 5) Save and synchronize the changes.
- ___ 2. In the Admin Console, navigate to **Servers → Clusters**
 - ___ a. Select the check box next to **AdminCluster** and click the Start button.
 - ___ b. Wait for the cluster to start before you continue.
 - ___ c. Make sure that the cluster member AdminM1 is also started.
 - 1) In the Admin Console, navigate to **Servers → Application Servers**
 - 2) Select the check box next to **AdminM1** and click the Start button.
 - 3) Wait for the cluster to start before you continue.

The AdminCluster will be hosting the Common Event Infrastructure (CEI) application components. To install and configure the Common Event Infrastructure entails the creation of database tables, the installation of the CEI server applications and the CEI Message Driven Bean (MDB) application.

These tasks are not specific to the WebSphere Process Server but because of the custom topology involved, the separation of the application components from the Message Engine components, there are deviations from the default installation instructions, which is why it's covered in detail here.

The remainder of this section will be dealing with the configuration of the Common Event Infrastructure components.

- ___ 3. Create the database tables required for the Common Event Infrastructure.
-

In a test or production environment, a separate database, the EVENTDB, would be created. For this exercise the tables will be created in the global **WPRCSDB** database which already exists.

- ___ a. Generate the scripts using utilities provided by the WebSphere Process Server installation.
 - 1) Navigate to, **<PROFILE_HOME>\ProfileName\event\dbconfig**

example: C:\WPS\pf\CustomN1\event\dbconfig

2) Edit the database response file (i.e., DB2ResponseFile.txt)

Note: Please make a backup copy of DB2ResponseFile.txt before editing it.

a) *CLUSTER_NAME=AdminCluster*

b) *SCOPE=cluster*

c) *DB_NAME=WPRCSDB*

d) *JDBC_CLASSPATH=<WPS_HOME>\universalDriver_wbi\lib*

e) *UNIVERSAL_JDBC_CLASSPATH= <WPS_HOME>\universalDriver\lib*

f) *JDBC_DRIVER_TYPE=4*

g) *DB_HOST_NAME=<Provide fully qualified hostname of the machine with DB2 installed. This should be the same machine where the WPRCS was created>*

h) *DB_INSTANCE_PORT=<your db2 port value> (default is 50000)*

i) *EXECUTE_SCRIPTS=NO*

3) Open a DB2cmd window and browse to the **<PROFILE_HOME>\CustomN1\event\dbconfig** directory and execute the script using the response file as input:

config_event_database.bat DB2ResponseFile.txt

a) This will cause some scripts to be generated in the following directories:

<PROFILE_HOME>\CustomN1\event\dbscripts
and
<PROFILE_HOME>\CustomN1\event\dsscripts

___ b. Edit the file named "dbConfigureCr.bat" under the **<PROFILE_HOME>\CustomN1\event\dbscripts\DB2** directory

1) Find the section of the script that occurs when you run the script on the DB machine... it starts with " :**SERVER_DB**"

2) Edit the file so that the 'create database' parts are commented out...

```
:SERVER_DB  
  
REM Check for existing database by doing a database test connection  
REM echo "Checking for existing database %DB_NAME%"  
REM db2 -z "%CURRENT_DIR%\connect.log" "connect to %DB_NAME%"  
REM FINDSTR /I /L "SQLSTATE=42705" "%CURRENT_DIR%\connect.log" > nul  
REM set RC=%ERRORLEVEL%  
REM DEL /F "%CURRENT_DIR%\connect.log"  
REM if not %RC%==0 goto DB_EXIST
```

```

REM Create the database

REM echo db2 create database %DB_NAME% using codeset UTF-8 territory US

REM db2 create database %DB_NAME% using codeset UTF-8 territory US

REM set RC=%ERRORLEVEL%

REM if %RC%==0 set DB_CREATED=1

REM if not %RC%==0 goto ERROR
    
```

__ c. Run the database script

- 1) Open a DB2cmd window and change one of the following directories, depending on the location of the database installation.

<PROFILE_HOME>\CustomN1\event\dbscripts\db2 or **<TEMP>\WPSDB2Scripts**

- 2) Run the script that will create the event tables based on the information in the *dbConfigure.bat* file that was customized in the previous step. This script will call *dbConfigure.bat*.

cr_event_db2.bat *server username*

example: cr_event_db2.bat *server wsdemo*

__ d. Run datasource script

- 1) Open a command prompt and change the directory to **<PROFILE_HOME>\CustomN1\events\dsscripts\db2** directory and run the script that will create the data source, using the name of the target cluster as a parameter.

cr_db2_jdbc_provider.bat *cluster AdminCluster*

- a) Provide the DB2 user id and password when prompted.

- 2) Next, update the datasource properties to use the **WPSDBAlias**.

- a) In the Administration Console navigate to, **Resources → JDBC Providers**

- b) Select AdminCluster Scope and click on “**Event_DB2_JDBC_Provider**”

- c) Click on **Data Sources**

- d) You should see the following two data sources

Select	Name	JNDI name	Description	Category
<input type="checkbox"/>	event	jdbc/cei	Event server data source	
<input type="checkbox"/>	event_catalog	jdbc/eventcatalog	Event catalog data source	
Total 2				

- e) Click on “**event**” and change

“Component-managed authentication alias” to “WPSDBAlias”.

(1) Click **OK**

f) Click on **“event catalog”** and change

“Container-managed authentication alias” to “WPSDBAlias”.

Make sure that you changed **“Container-managed authentication alias”**
and not **“Component-managed authentication alias”**

(1) Click **OK**

g) Save and synchronize the changes.

- ____ 4. Next, install the Common Event Infrastructure server application. The following steps will create the resources for the Common Event Infrastructure and deploy the Common Event Infrastructure Server application.

NOTE: You want to create the CEI Resources at the ‘AdminCluster’ scope.

- __ a. Open a command prompt to the **<PROFILE_HOME>\ProfileName\event\application** directory
example:

Change directory to **C:\WPS\pf\CustomN1\event\application>** and use the following command

..\..\bin\wsadmin -f event-application.jacl -profile event-profile.jacl -action install -earfile event-application.ear -backendid DB2UDBNT_V8_1 -cluster AdminCluster

- __ b. After the CEI Server application has been installed, go into the application and make note of the JNDI name of the **EventAccessEJB**. This information will be needed later when using the “CommonBaseEventBrowser” application to browse for events.

1) Navigate to, Applications → Enterprise Applications → EventServer

2) Under **Additional Properties**

a) click on **“Provide JNDI Names for Beans”**

EventAccessEjb should have a value like **ejb/com/ibm/events/access/EventAccess**

- __ c. Go to the CEI Resources and locate the JNDI name for the EmitterFactoryProfile which points to this CEI configuration.

1) Navigate to, **Resources → Common Event Infrastructure Provider**

2) Select **Cell scope**

3) Under Additional Properties,

a) click on Emitter Factory Profile

JNDI name should be like:

com/ibm/events/configuration/emitter/AdminCluster

- ____ 5. Next, install the CEI MDB application. The following steps will describe how to deploy the Common Event Infrastructure MDB application.

- __ a. Open a command prompt to the **<PROFILE_HOME>\ProfileName\event\application** directory

example:

change directories to C:\WPS\pf\CustomN1\event\application> and use the following command

```
..\bin\wsadmin -f default-event-message.jacl -profile event-profile.jacl -earfile event-message.ear -action install -cluster AdminCluster
```

- ___ b. You will be prompted for userid and password for embedded messaging authentication. Enter a valid system user id and password

Note: Please be patient. This might take some time.

Ex: Username: wsdemo

Password: *****

- ___ 6. Re-configure the **CommonEventInfrastructure_Bus** for the active/standby configuration where the Message Engine is in separate (remote) cluster.

By default the Common Event Infrastructure scripts configure the Message Engine to be local to the server or server cluster hosting the Common Event Infrastructure applications. In the *by-function* deployment pattern, the configuration of the Message Engine is in the AdminMECluster, which is remote from the AdminCluster. The next several steps involve reconfiguring the resources for the remote configuration.

- ___ a. Remove '**cluster=AdminCluster**' from the **CommonEventInfrastructure_Bus**

- 1) In the Administration Console navigate to, **Service Integration → Buses** and click on **CommonEventInfrastructure_Bus**.
- 2) Click on "**Bus Members**" under Topology.
- 3) Check box for "**Cluster=AdminCluster**" and click **Remove**.
- 4) Save the configuration

- ___ b. Create the destinations to use the remote Message Engine.

- 1) In the Administration Console navigate to, **Service Integration → Buses** and click on **CommonEventInfrastructure_Bus**
- 2) Click on "**Destinations**" under "Destination resources"
- 3) Click **New**
- 4) Select Destination type as **Queue** and click **Next**
- 5) Type in the Identifier as "**CommonEventInfrastructureQueueDestination**" and click **Next**
- 6) Select **AdminMECluster** as bus member. Click **Next**
- 7) Click **Finish**.
- 8) Save the configuration.

- ___ c. The JMS resources need to point to the new 'correct' destinations.

- 1) Go to **Resources → JMS Providers → Default Messaging**
- 2) Select **Cell Scope**
- 3) Click on “**JMS Queue Connection Factory**”
- 4) Click on “**CommonEventInfrastructure_QueueCF**”
- 5) Delete the text in the Provider endpoints text area. (defect 318807)
- 6) Change the “Component-managed authentication alias” to **SCA_Auth_Alias**
- 7) Click **OK** and save

___ 7. Re-configure the CEI EmitterFactoryProfile to emit Asynchronous Events

- ___ a. Navigate to, **Resources → Common Event Infrastructure Provider**
- ___ b. Select **Cell Scope**
- ___ c. **Additional Properties → Emitter Factory Profile**
- ___ d. Go to the EmitterFactoryProfile that was created for this CEI Server.

Click on entry with JNDI name `com/ibm/events/configuration/emitter/AdminCluster`

- 1) De-select Preferred Synchronization Mode
- 2) Click OK and then Save.

This will cause event that are emitted via this EmitterFactoryProfile to be asynchronous

___ 8. Use the Advanced Configuration Wizard to install the Business Rules Manager.

- ___ a. Navigate to, **Servers → Clusters → AdminCluster**
- ___ b. Click **Advanced Configuration** under **Additional Properties**
- ___ c. Select check box next to “**Install Business Rules Manager**”
- ___ d. Select the radio button for “**Do not configure to host SCA applications**”
- ___ e. Set the “Emitter Factory Profile JNDI Name” to be used by the Events Service (Monitoring)

- 1) select “**com/ibm/events/configuration/emitter/AdminCluster**”

The screenshot shows a 'General Properties' dialog box. At the top, there is a checked checkbox for 'Install Business Rules Manager'. Below that is a dropdown menu for 'Emitter Factory Profile JNDI Name' with the value 'com/ibm/events/configuration/emitter/AdminCluster'. Under the 'Service Component Architecture' section, there are three radio buttons: 'Do not configure to host SCA applications.' (which is selected), 'Remote Destination Location', and 'Default Destination Location'. There is also a small dropdown arrow icon next to the 'Remote Destination Location' radio button.

- ___ f. Click **OK**.
- ___ g. Save and synchronize the changes

MANUAL WORKAROUND FOR DEFECT 317434

Make sure you have a 'valid' Emitter Factory Profile:

- ___ 1. In the Administration Console navigate to, **Resources → Common Event Infrastructure Provider**
- ___ 2. Under “**Additional Properties**” go to **Emitter Factory Profile**
- ___ 3. Find the resource with the default JNDI name = “**com/ibm/events/configuration/emitter/Default**”
- ___ 4. There is a text box for you to enter a Synchronous Transmission Profile. By default, the value is “**com/ibm/events/configuration/bus-transmission/Default**”.

Change the JNDI name of this Synchronous Transmission Profile so that it references your 'valid' Synchronous Transmission Profile.

Change the value to “**com/ibm/events/configuration/bus-transmission/AdminCluster**”

- ___ 5. Click **OK**.
- ___ 6. Save and synchronize
- ___ 7. Restart the Deployment Manager
 - ___ a. Open a command prompt and change directory to
<PROFILE_HOME>\deployment manager profile name\bin. Example: C:\WPS\pf\Dmgr\bin
 - ___ b. Use the command **stopmanager.bat** to stop the deployment manager
 - ___ c. Wait for the server to stop.
 - ___ d. To start the deployment manager, use the command **startmanager.bat**.
 - ___ e. Wait for the server to start.

This completes the configuration of AdminCluster.

Part 8: Creating and Configuring the WPSMECluster

- ___ 1. Create the WPSMECluster with one cluster member
 - ___ a. In the Administration Console navigate to, **Servers → Clusters**.
 - ___ b. Click **New**.
 - 1) Provide
Cluster name = **WPSMECluster**
 - a) Click Next
 - 2) Provide Member name = **WPSME1**,
Node = **cNode1**,
default application server template = **default**. (this will be a WAS server)
 - 3) Click **Apply** and then click **Next**.
 - 4) Click **Finish**.
 - ___ c. Save and synchronize the changes
- ___ 2. In the Admin Console, navigate to **Servers → Clusters**
 - ___ a. Select the check box next to **WPSMECluster** and click the Start button.
 - ___ b. Wait for the cluster to start before you continue.
 - ___ c. Make sure that the member WPSME1 is also started:
 - 1) In the Admin Console, navigate to **Servers → Application Servers**
 - 2) Select the check box next to **WPSME1** and click the Start button.
 - 3) Wait for the cluster to start before you continue.
- ___ 3. Configure the **WPSMECluster** to host SCA Applications
 - ___ a. In the Administration Console navigate to, **Servers → Clusters → WPSMECluster**
 - ___ b. Click **Advanced Configuration** under Additional Properties
 - ___ c. Make sure that the “**Install Business Rules Manager**” is unchecked
 - ___ d. Set the JNDI name for the Emitter Factory Profile:
com/ibm/events/configuration/emitter/AdminCluster
 - ___ e. For the Service Component Architecture
 - 1) Select “**Default Destination Location**”
 - 2) Select **DB2 UDB 8.1 & 8.2 (DB2 Universal JDBC Driver Provider (XA))** for “**JDBC Provider**”
 - 3) For “**Application bus schema name**” enter **SCAAppBus**

4) For “**System bus schema name**” enter **SCASysBus**

5) For the user name and password fields, enter your database user id and password.

___ f. In “**Application Bus Database Name**” text field, make the following changes

DatabaseName = **MEDB**

DriverType = **4**

ServerName = <Provide fully qualified hostname of the machine with DB2 installed. This should be the same machine where the MEDB was created> (ex: **wpseduhost.austin.ibm.com**)

PortNumber = Enter your DB2 port number (default value is **50000**)

___ g. In “**System Bus Database Name**” text field, make the following changes

DatabaseName = **MEDB**

Drivertype = **4**

ServerName = <Provide fully qualified hostname of the machine with DB2 installed. This should be the same machine where the MEDB was created> (ex: **wpseduhost.austin.ibm.com**)

PortNumber = Enter your DB2 port number (default value is **50000**)

___ h. Click OK

___ i. Save and synchronize configuration changes

___ 4. Create the **WBI.FailedEvent.WPSCluster** queue destination for the cluster that will be used to deploy the applications so that it can channel the failed event messages to the Common Event Infrastructure.

___ a. In the **SCA.SYSTEM.<CellName>.Bus**, create a queue destination for the “**WPSMECluster**”

1) Navigate to, Service Integration → Buses

2) Click on “**SCA.SYSTEM.dCell.Bus**”

dCell is the cell name of the Deployment Manager used in this exercise.

3) Click on “**Destinations**” under “**Destination resources**”

4) Click New

5) Select the radio button next to Queue

6) Specify the identifier as **WBI.FailedEvent.WPSCluster**

7) Click Next

8) Select Bus member as “**WPSMECluster**”. Click Next

9) Click Finish and save and synchronize the configuration changes

___ 5. Create the **WBI.FailedEvent.AdminCluster** queue destination

___ a. In the **SCA.SYSTEM.<CellName>.Bus**, create a queue destination for the “**WPSMECluster**”

1) Navigate to, **Service Integration → Buses**

2) Click on “**SCA.SYSTEM.dCell.Bus**”

dCell is the cell name of the Deployment Manager used in this exercise.

- 3) Click on **"Destinations"** under "Destination resources"
- 4) Click **New**
- 5) Select the radio button next to **Queue**
- 6) Specify the identifier as **WBI.FailedEvent.AdminCluster**
- 7) Click **Next**
- 8) Select Bus member as **"WPSMECluster"**. Click **Next**
- 9) Click **Finish** and save and synchronize the configuration changes

___ 6. The next step in the configuration involves creating the SCA and JMS resources for the *Business Process Choreographer* and *Human Task Manager*.

___ 7. Create the Service Integration Bus named **"BPC.<CellName>.Bus"** (if it does not already exist)

___ a. Navigate to, Service **Integration → Buses**

___ b. Click on **New**

- 1) Enter name as **BPC.dCell.Bus**
- 2) Select **'Secure'** check box
- 3) Select the authorization alias for **"Inter-engine authentication alias"** as **SCA_Auth_Alias**.
- 4) Click **OK**
- 5) Save and synchronize the changes

Note: if you select a name other than **BPC.yourcellname.Bus** you will run into issues. The Business Process Choreographer and Human Task Manager installation wizards will create a new bus and new resources if they don't find a bus by that name. There is a defect opened on this.

___ c. Create a new JDBC Provider for the **'WPSMECluster'** for use with the Message Engine. The scope of the JDBC Provider and datasource will be the cluster.

- 1) Navigate to, **Resources → JDBC Providers**
- 2) Click on **"Browse Clusters"** button,
- 3) Select the **"WPSMECluster"**
- 4) Click **OK**
- 5) Click **New** on the "JDBC Providers" Wizard.

6) Select DB2, DB2 Universal JDBC Driver Provider and XA data source for Steps 1 to 3

JDBC providers > New
Choose a type of JDBC provider to create.
Configuration

General Properties

Step 1: Select the database type
DB2

Step 2: Select the provider type
DB2 Universal JDBC Driver Provider

Step 3: Select the implementation type
XA data source

Next Cancel

7) Click **Next**

8) Provide Name = “**DB2 Universal (XA) for BPC MEs**” and click **OK**.

9) Save the configuration.

___ d. Create a new data source in “**DB2 Universal (XA) for BPC MEs**” JDBC Provider to be use with the Message Engines in this cluster.

1) Click on the JDBC provider “**DB2 Universal (XA) for BPC MEs**”

2) Click on “**Data Sources**” under the Additional properties

3) Click **New**

4) Provide the following values

a) Name = **Datasource for BPC MEs**

b) JNDI = **jdbc/bpc_bus/medb/WPSMECluster**

c) category = **UDDI**

d) Component managed authentication alias = **WPSDBAlias**

e) Mapping configuration alias = **DefaultPrincipalMapping**

f) Database name = **MEDB**

g) Driver type = **4**

h) Server name = <Provide fully qualified hostname of the machine with DB2 installed. This should be the same machine where the MEDB was created. ex: wpseduhost.austin.ibm.com >

- i) Port Number = Your_db2_port_number (50000)
- j) Click **OK** and save configuration.

___ e. Add the 'WPSMECluster' server cluster as the member of the BPC bus

- 1) Got to **Service Integration → Buses** and click on the **BPC.dCell.Bus**,
- 2) Click on "**Bus Members**" link under **Topology**
- 3) Click **Add**
- 4) Select the radio button next to **cluster**
- 5) Select the **WPSMECluster** from the drop down menu
- 6) Specify the datasource JNDI = **jdbc/bpc_bus/medb/WPSMECluster**
- 7) Save the changes

___ f. Edit the schema name and the authentication alias for the datastore used by the Message Engine for the BPC bus member.

Each Message Engine has a unique set of tables which are uniquely qualified in the database by the schema name. The Message Engine associates a server or server cluster with a specific Service Integration Bus. In order to easily verify that the tables for a given Message Engine have been created, it's helpful to create a schema name that encodes the relationship between the server or server cluster and the Service Integration Bus.

- 1) In the Administration Console navigate to,
Service Integration → Buses → BPC.dCell.Bus
- 2) Click on **Bus members** link under **Topology**
- 3) Click on the entry "**Cluster=WPSMECluster**"
- 4) Click on "**WPSMECluster.000-BPC.dCell.Bus** "
- 5) Click on **Data Store** link under **Additional Properties**
- 6) There will be a unique schema in the MEDB for each messaging engine.
Change the default name of the SCHEMA to **WPSMEBPCBus**
- 7) Select **WPSDBAlias** from the drop down menu for **Authentication alias**
- 8) Click **OK** and save changes

___ g. Create Queue Destinations on your **BPC.YourCellName.Bus** (Queue Destinations)

- 1) BPEApiQueue_WPSCluster
 - a) Navigate to, **Service Integration → Buses** and click on **BPC.dCell.Bus**.
 - b) Click on **Destinations** link under **Destination Resources**.
 - c) Click on **New**.

- d) Select radio button next to **Queue**. Click **Next**
 - e) Enter the Identifier as **BPEApiQueue_WPSCluster**. Click **Next**.
 - f) Select **WPSMECluster** as bus member. Click **Next**
 - g) Click **Finish** and save changes.
- 2) BPEHldQueue_WPSCluster
- a) Navigate to, **Service Integration → Buses** and click on **BPC.dCell.Bus**.
 - b) Click on **Destinations** link under **Destination Resources**.
 - c) Click on **New**.
 - d) Select radio button next to **Queue**. Click **Next**.
 - e) Enter the Identifier as **BPEHldQueue_WPSCluster**. Click **Next**.
 - f) Select **WPSMECluster** as bus member. Click **Next**.
 - g) Click **Finish** and save changes.
- 3) BPEIntQueue_WPSCluster
- a) Navigate to, **Service Integration → Buses** and click on **BPC.dCell.Bus**.
 - b) Click on **Destinations** link under **Destination Resources**.
 - c) Click on **New**.
 - d) Select radio button next to **Queue**. Click **Next**.
 - e) Enter the Identifier as **BPEIntQueue_WPSCluster**. Click **Next**.
 - f) Select **WPSMECluster** as bus member. Click **Next**.
 - g) Click **Finish** and save changes.
- 4) BPERetQueue_WPSCluster
- a) Navigate to, **Service Integration → Buses** and click on **BPC.dCell.Bus**
 - b) Click on **Destinations** link under **Destination Resources**
 - c) Click on **New**.
 - d) Select radio button next to **Queue**. Click **Next**.
 - e) Enter the Identifier as **BPERetQueue_WPSCluster**. Click **Next**.
 - f) Select **WPSMECluster** as bus member. Click **Next**.
 - g) Click **Finish** and save changes.
- 5) HTMHldQueue_WPSCluster
- a) Navigate to, **Service Integration → Buses** and click on **BPC.dCell.Bus**

- b) Click on **Destinations** link under **Destination Resources**.
- c) Click on **New**.
- d) Select radio button next to Queue. Click **Next**.
- e) Enter the Identifier as **HTMHldQueue_WPSCluster**. Click **Next**.
- f) Select **WPSMECluster** as bus member. Click **Next**.
- g) Click **Finish** and save changes.

6) HTMIntQueue_WPSCluster

- a) Navigate to, **Service Integration → Buses** and click on **BPC.dCell.Bus**.
- b) Click on **Destinations** link under **Destination Resources**.
- c) Click on **New**.
- d) Select radio button next to Queue. Click **Next**.
- e) Enter the Identifier as **HTMIntQueue_WPSCluster** . Click **Next**.
- f) Select **WPSMECluster** as bus member. Click **Next**.
- g) Click **Finish** and save changes.

<input type="checkbox"/>	BPEApiQueue_WPSCluster	Queue
<input type="checkbox"/>	BPEHldQueue_WPSCluster	Queue
<input type="checkbox"/>	BPEIntQueue_WPSCluster	Queue
<input type="checkbox"/>	BPERetQueue_WPSCluster	Queue
<input type="checkbox"/>	Default.Topic.Space	Topic space
<input type="checkbox"/>	HTMHldQueue_WPSCluster	Queue
<input type="checkbox"/>	HTMIntQueue_WPSCluster	Queue
<input type="checkbox"/>	_SYSTEM.Exception.Destination.WPSMECluster.000-BPC.dCell,Bus	Queue

Part 9: Creating and Configuring the WPSCluster

- ___ 1. Create the **WPSCluster** with one cluster member.
 - ___ a. In the Admin Console go to **Servers → Clusters**. Click **New**.
 - 1) Provide Cluster name = **WPSCluster**.
 - a) Click **Next**.
 - 2) Provide Member name = **WPSM1**,
Node = **cNode1**,
default application server template = **defaultProcessServer**.
 - 3) Click **Apply** and then click **Next**.
 - 4) Click **Finish**.
 - ___ b. Save and synchronize the changes
- ___ 2. In the Admin Console, navigate to **Servers → Clusters**
 - ___ a. Select the check box next to **WPSCluster** and click the Start button.
 - ___ b. Wait for the cluster to start before you continue.
 - ___ c. Make sure that the member **WPSM1** is also started.
- ___ 3. Configure the WPSCluster for Service Component Architecture using the *Advanced Configuration Wizard*.
 - ___ a. Navigate to, **Servers → Clusters → WPSCluster**.
 - ___ b. Click **Advanced Configuration** under Additional Properties.
 - ___ c. Ensure that “**Install Business Rules Manager**” is unchecked.
 - ___ d. Set the JNDI name for the Emitter Factory Profile:

com/ibm/events/configuration/emitter/AdminCluster
 - ___ e. Configure the Service Component Architecture to the remote Message Engines in the WPSMECluster.

- 1) select "Remote Destination Location" and from the drop-down then select **cluster = WPSMECluster**

General Properties

Install Business Rules Manager

Emitter Factory Profile JNDI Name
com/ibm/events/configuration/emitter/AdminCluster

Service Component Architecture

Do not configure to host SCA applications.

Remote Destination Location
WebSphere:cluster=WPSMECluster

Default Destination Location

___ f. Click **OK** and Save and synchronize.

- ___ 4. Next, create the resources used by the Business Process Choreographer and Human Task Manager.

___ a. Create the JMS Resources for Business Process Choreographer and Human Task Manager.

The connection factories, the JMS queues, and the activation specifications must be created and configured to use the destinations configured on the BPC Bus.

- 1) Navigate to, **Resources → JMS Providers → Default messaging**

- a) Set the scope to the **WPSCluster** level.

- 2) Create the connection factories first.

- a) Click **JMS Queue Connection Factory**.

- b) Click **New**.

- c) Set the name to **BPECF** and the JNDI name to **jms/BPECF**.

- d) Set the bus name to **BPC.dCell.Bus**

- e) Set the **Component-managed Auth Alias** to **SCA_Auth_Alias**.

- f) Click **OK**.

- 3) Repeat the steps for **BPECF** (jndi: jms/BPECF) and **HTMCF** (jndi: jms/HTMCF)

- 4) You should now have three Queue Connection Factories:

Select	Name	JNDI name
<input type="checkbox"/>	BPECF	jms/BPECF
<input type="checkbox"/>	BPECFC	jms/BPECFC
<input type="checkbox"/>	HTMCF	jms/HTMCF
Total 3		

5) Save the changes.

___ b. Now create the JMS queues.

1) Navigate to, **Resources** → **JMS Providers** → **Default Messaging** (**WPSCluster** scope)

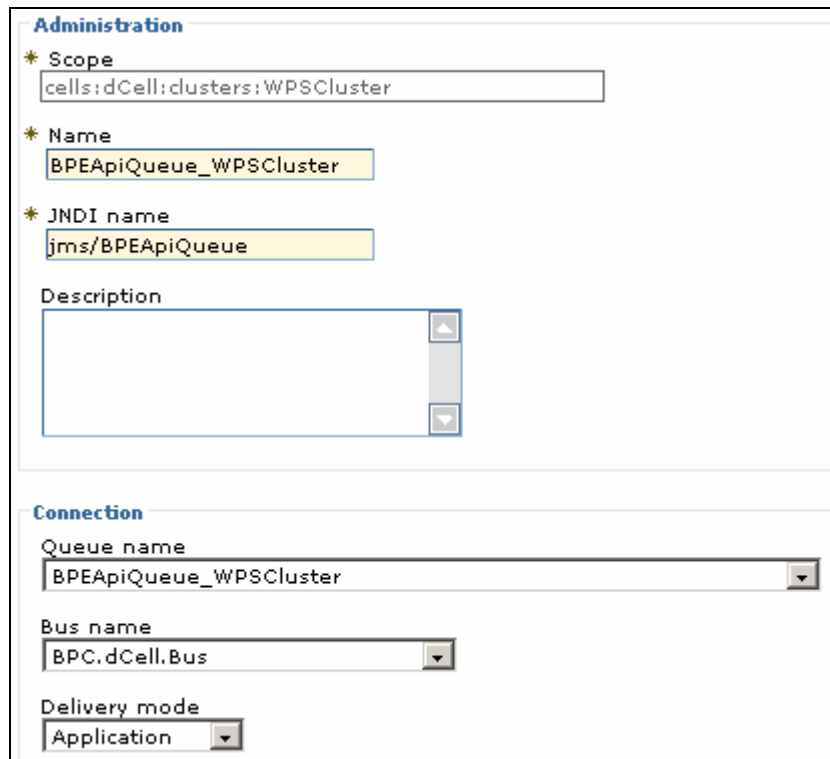
2) Click **JMS queue** under Destinations.

3) Click **New**.

a) Name: **BPEApiQueue_WPSCluster**

b) JNDI Name: **jms/BPEApiQueue**

4) Select the bus **BPC.dCell.Bus** from the pull down list, and then select the corresponding Queue “**BPEApiQueue_WPSCluster**” from the drop down for Queue name



Administration

* Scope
cells:dCell:clusters:WPSCluster

* Name
BPEApiQueue_WPSCluster

* JNDI name
jms/BPEApiQueue

Description

Connection

Queue name
BPEApiQueue_WPSCluster

Bus name
BPC.dCell.Bus

Delivery mode
Application

5) Click **OK**.

6) Click **JMS queue** under Destinations.

7) Click **New**.

- a) Name: **BPEHIdQueue_WPSCluster**
- b) JNDI Name: **jms/BPEHIdQueue**
- 8) Select the bus **BPC.dCell.Bus** from the pull down list, and then select the corresponding Queue "**BPEHIdQueue_WPSCluster**" from the drop down for Queue name
- 9) Click **OK**.
- 10) Click **JMS queue** under Destinations.
- 11) Click **New**.
 - a) Name: **BPEIntQueue_WPSCluster**
 - b) JNDI Name: **jms/BPEIntQueue**
- 12) Select the bus **BPC.dCell.Bus** from the pull down list, and then select the corresponding Queue "**BPEIntQueue_WPSCluster**" from the drop down for Queue name
- 13) Click **OK**.
- 14) Click **JMS queue** under Destinations.
- 15) Click **New**.
 - a) Name: **BPERetQueue_WPSCluster**
 - b) JNDI Name: **jms/BPERetQueue**
- 16) Select the bus **BPC.dCell.Bus** from the pull down list, and then select the corresponding Queue "**BPERetQueue_WPSCluster**" from the drop down for Queue name
- 17) Click **OK**.
- 18) Click **JMS queue** under Destinations.
- 19) Click **New**.
 - a) Name: **HTMHIdQueue_WPSCluster**
 - b) JNDI Name: **jms/HTMHIdQueue**
- 20) Select the bus **BPC.dCell.Bus** from the pull down list, and then select the corresponding Queue "**HTMHIdQueue_WPSCluster**" from the drop down for Queue name
- 21) Click **OK**.
- 22) Click **JMS queue** under Destinations.
- 23) Click **New**.
 - a) Name: **HTMIntQueue_WPSCluster**
 - b) JNDI Name: **jms/HTMIntQueue**
- 24) Select the bus **BPC.dCell.Bus** from the pull down list, and then select the corresponding Queue "**HTMIntQueue_WPSCluster**" from the drop down for Queue name





- 25) Click **OK**.
- 26) Save and synchronize the changes
- 27) At the end you should have the following queues configured

Default messaging provider > JMS queue

A JMS queue is used as a destination for point-to-point messaging. Use JMS queue destination administrative objects to manage JMS queues for the default messaging provider.

⊕ Preferences

New Delete

Select	Name	JNDI name	Description
<input type="checkbox"/>	BPEApiQueue_WPSCluster	jms/BPEApiQueue	
<input type="checkbox"/>	BPEHldQueue_WPSCluster	jms/BPEHldQueue	
<input type="checkbox"/>	BPEIntQueue_WPSCluster	jms/BPEIntQueue	
<input type="checkbox"/>	BPERetQueue_WPSCluster	jms/BPERetQueue	
<input type="checkbox"/>	HTMHldQueue_WPSCluster	jms/HTMHldQueue	
<input type="checkbox"/>	HTMIntQueue_WPSCluster	jms/HTMIntQueue	

Total 6

___ c. Now create the **Activation Specs** that are needed. There are two Activation Specs needed for the flow manager and one for the Human Tasks.

- 1) Navigate again to, **Resources → JMS Providers → Default Messaging** and make sure that the scope is set to the **WPSCluster** level.
- 2) Click **JMS Activation Specification** under Activation Specifications.
- 3) Click **New**
 - a) Name: **BPEApiActivationSpec**
 - b) JNDI Name: **eis/BPEApiActivationSpec**
- 4) Set the Destination Type to Queue and the Destination JNDI Name to **jms/BPEApiQueue**.
Select the bus where you want the Activation Spec created
(it has to be the **BPC.dCell.Bus**)
- 5) Set the Authentication Alias for the Message Engine to **SCA_Auth_Alias**.

___ d. Click **OK**.

___ e. Repeat the steps to create two more activation specs with following values

Name: **BPEInternalActivationSpec**

JNDI Name: **eis/BPEInternalActivationSpec**

Destination Type: **Queue**
 Destination JNDI Name: **jms/BPEIntQueue**
 Bus Name: **BPC.dCell.Bus**
 Authentication alias: **SCA_Auth_Alias**

Name: **HTMInternalActivationSpec**
 JNDI Name: **eis/HTMInternalActivationSpec**
 Destination Type: **Queue**
 Destination JNDI Name: **jms/HTMIntQueue**
 Bus Name: **BPC.dCell.Bus**
 Authentication alias: **SCA_Auth_Alias**

__ f. Save your configuration.

Select	Name	JNDI name
<input type="checkbox"/>	BPEApiActivationSpec	eis/BPEApiActivationSpec
<input type="checkbox"/>	BPEInternalActivationSpec	eis/BPEInternalActivationSpec
<input type="checkbox"/>	HTMInternalActivationSpec	eis/HTMInternalActivationSpec
Total 3		

___ 5. Install the Business Process Container to the WPSCluster

__ a. Navigate to, **Servers→ Clusters → WPSCluster**

__ b. Under Additional Properties, click on “**Business Process Container**”

__ c. Click on “**Business Process Container Installation Wizard** “

- 1) Select **DB2 UDB 8.1 & 8.2 (DB2 Universal JDBC Driver Provider (XA))** for “JDBC Providers”
- 2) Enter the DB2 user id and password.
- 3) Under Custom properties, change database name from BPEDB to **WPRCSDB**
- 4) Change driverType from 2 to **4**

- 5) Specify your fully qualified hostname including domain of machine that has the DB2 database server where the WPRCSDB is created .Also provide the port for DB2 server

→ Step 1 : Select the database configuration that this business process container will use

Select the desired JDBC provider. A new XA datasource will be created for this provider. [?](#)

* JDBC providers:

Implementation class name: [?](#) The Java class name of the JDBC implementation.

Classpath: [?](#) A list of paths or JAR file names from the location for the resource. Class path entries are separated by semicolons (such as ';' or ':'). Class names contain variable (symbolic) names substituted using a variable map from the driver installation notes for specifications that are required.

Data source user name: [?](#) The user name used to access the database.

Data source password: [?](#) The password used to access the database.

Custom Properties: [?](#) Consult the help documentation for information about properties that are required by the JDBC provider.

6) Click **Next**

7) On **Step 2** on the subsequent page,

- a) Leave the JMS provider to the **Default messaging provider** and
- b) Specify a valid system user/password for JMS user id and password. (ex: wsdemo/wsdemo's password)
- c) Specify a valid system user/password for Escalation (ex: wsdemo/wsdemo's password)

d) Specify a valid WebSphere group or user for the Administrator role and for the System Monitor role.

e) Click **Next**

8) On **Step 3**, check “Select Existing JMS Resources”. Make sure that the resources are selected correctly. Also check the checkboxes that relate to installing the BPC web client and enabling the Common event Infrastructure logging

9) Click **Next**.

10) On **Step 4** review the choices and click **Finish**

11) After the application is successfully installed, save your configuration

- ___ 6. Install the Human Task Container to the cluster...
 - ___ a. Navigate to, **Servers→ Clusters → WPSCluster**
 - ___ b. Under Additional Properties, click on “**Human Task Container**”
 - ___ c. Click on “**Human Task Container Installation Wizard**”

1) On **Step 1**, specify a valid system userid and password for JMS userid and password and also the escalation user id and password. (ex: wsdemo/wsdemo’s password)

a) Click **Next**.

2) On **Step 2**,

- a) Select “**Create a new JMS resources using default values**”
- b) Select checkbox for “**Enable Common Event Infrastructure logging**”.

Note: There are some bugs with the input panel for step 2 of the “Human Task Manager Container Installation Wizard”. The first has to do with the use of the existing JMS resources vs. having the wizard create them. The “Select existing JMS resources” does not work properly so use the “Existing JMS resources using default values”, option.

When the creation of the container is completed, verify that the resources are created and make note of the names. The default names do not match the names used in the lab. They don’t have the cluster name at the end. This will be Ok at this time because we’re not using the Human Task Manager at this time.

Additionally, on the panel, the prompt for the ‘Retention queue’ should be ‘Internal queue’. That is to say, the two queues required by the HTM are the **Hold** and **Internal**.

→ **Step 2 : Select JMS resources, mail session, scheduler, and logging**

Select the JMS resources, mail session, scheduler, and logging for the Human Task Manager. ?

Select the JMS resources.

Create a new JMS resources using default values. ?

Select existing JMS resources. ?

Connection Factory: ? A connection factory is used to create connection the associated JMS provider.

Hold queue: ? The hold queue for human task messages that could not be processed.

Retention queue: ? The retention queue (used internally by the container) for the Human Task Manager.

Mail session resource

Mail session for Human Task Manager ?

State observer logging

Enable Common Event Infrastructure logging ?

Enable audit logging for all human tasks ?

Previous Next Reset Cancel

c) Click **Next**

3) In Step 3, review the choices and click **Finish**.

4) Once the application is installed successfully, save and synchronize the configuration.

Part 10: Adding additional Members to the AdminCluster and the AdminMECluster

Adding Members to AdminMECluster

- ___ 1. Create additional cluster members for the AdminMECluster
 - ___ a. Go to **Servers → Clusters → AdminMECluster**
 - ___ b. Click on “**Cluster Members**” under “**Additional Properties**”
 - ___ c. Click **New**
 - ___ d. Provide the following values
 - 1) Member Name = **AdminME2**
 - 2) Node = **cNode2**
 - 3) Click **Apply**
 - ___ e. Click **Next**
 - ___ f. Click **Finish**.
 - ___ g. Save and synchronize the changes
- ___ 2. Start the AdminME2 server
 - ___ a. In the Admin console, navigate to **Servers → Application Servers**
 - ___ b. Select check box next to **AdminME2**
 - ___ c. Click **Start**.
 - ___ d. Wait for the server to start

Adding Members to AdminCluster

- ___ 1. Create additional cluster members for the AdminCluster
 - ___ a. Go to **Servers → Clusters → AdminCluster**
 - ___ b. Click on “**Cluster Members**” under “**Additional Properties**”
 - ___ c. Click **New**
 - ___ d. Provide the following values
 - 1) Member Name = **AdminM2**
 - 2) Node = **cNode2**
 - 3) Click **Apply**
 - ___ e. Click **Next**
 - ___ f. Click **Finish**.

- ___ 2. Remember to add the **WC_defaulthost** port of each of the members of the AdminCluster to the list of host aliases on the virtual host for default_host
- ___ a. In Administration Console navigate to, **Environment → Virtual hosts**
 - ___ b. Click on **default_host**
 - ___ c. Under Additional Properties, click on **Host Aliases**
 - ___ d. Click **New**
 - ___ e. Provide a fully qualified hostname including domain on which the AdminM1 is created
 - ___ f. In the port text box, enter your **WC_defaulthost** port value for server **AdminM1**

Note: To get the **WC_defaulthost** port value, go to **Servers → Application Servers** and click on the server you want the port information. In the next screen, click on the **+** sign next to **Ports**. This will list all the ports used by the server. Note down the **WC_defaulthost** port from the screen. Remember that each server has different ports. So if you want to get port information for a different server, you would need to go to **Servers → Application Servers** and click on the server you want the port information. In the next screen, click on the **+** sign next to ports

Container Settings

- Web Container Settings
- EJB Container Settings
- Container Services
- Business Process Services

Server messaging

- Messaging engines
- Messaging engine inbound transports
- WebSphere MQ link inbound transports
- SIB service

Server Infrastructure

- Java and Process Management
- Administration

Communications

- Ports

Port Name	Port	details
BOOTSTRAP_ADDRESS	9811	
SOAP_CONNECTOR_ADDRESS	8881	
SAS_SSL_SERVERAUTH_LISTENER_ADDRESS	9404	
CSIV2_SSL_SERVERAUTH_LISTENER_ADDRESS	9405	
CSIV2_SSL_MUTUALAUTH_LISTENER_ADDRESS	9406	
WC_adminhost	9061	
WC_defaulthost	9081	
DCS_UNICAST_ADDRESS	9354	
WC_adminhost_secure	9044	
WC_defaulthost_secure	9444	
SIB_ENDPOINT_ADDRESS	7276	
SIB_ENDPOINT_SECURE_ADDRESS	7286	
SIB_MQ_ENDPOINT_ADDRESS	5558	
SIB_MQ_ENDPOINT_SECURE_ADDRESS	5578	
ORB_LISTENER_ADDRESS	0	

- ___ g. Click **OK**. Save and synchronize the changes.
- ___ 3. We need to add the **WC_defaulthost** port of AdminM2 to the list of host aliases on the virtual host for default_host

- ___ a. In Administration Console navigate to, **Environment → Virtual hosts**
 - ___ b. Click on **default_host**
 - ___ c. Under Additional Properties, click on **Host Aliases**
 - ___ d. Click **New**
 - ___ e. Provide a fully qualified hostname including domain on which the AdminM2 is created
 - ___ f. In the port text box, enter your **WC_defaulthost** port value for server **AdminM2**
 - ___ g. Click **OK**. Save and synchronize the changes
- ___ 4. We need to restart the servers for the changes to take effect.
- ___ a. Log in to Admin Console
 - ___ b. Navigate to **Servers → Application Servers**
 - ___ c. Select the check box next to **AdminM1**
 - ___ d. Click **Stop**. Wait for the server to stop
 - ___ e. After the AdminM1 is stopped, select the check boxes next to **AdminM1** and **AdminM2**
 - ___ f. Click **Start** button.
 - ___ g. Wait for the servers to start.

Part 11: Adding additional Members to the WPSCluster and the WPSMECluster

Adding Members to WPSMECluster

- ___ 1. Create additional cluster members for the WPSMECluster
 - ___ a. Navigate to, **Servers → Clusters → WPSMECluster**
 - ___ b. Under Additional Properties, click on “**Cluster Members**”
 - ___ c. Click **New**
 - ___ d. Provide the following values
Member Name = **WPSME2**
Node = **cNode2**
 - ___ e. Click **Apply** and then **Next**
 - ___ f. Click **Finish**.
 - ___ g. Save and synchronize the configuration changes
- ___ 2. Start the WPSME2 server
 - ___ a. In the Admin console, navigate to **Servers → Application Servers**
 - ___ b. Select check box next to **WPSME2**
 - ___ c. Click **Start**.
 - ___ d. Wait for the server to start

Adding Members to WPSCluster

- ___ 1. Create additional cluster members for the WPSCluster
 - ___ a. Navigate to, **Servers → Clusters → WPSCluster**
 - ___ b. Under Additional Properties, click on “**Cluster Members**”
 - ___ c. Click **New**
 - ___ d. Provide the following values
Member Name = **WPSM2**
Node = **cNode2**
 - ___ e. Click **Apply** and then **Next**
 - ___ f. Click **Finish**.
- ___ 2. Add the **WC_defaulthost** port of each of the members of the WPSCluster to the list of host aliases on the virtual host for default_host
 - ___ a. In Administration Console navigate to, **Environment → Virtual hosts**

- ___ b. Click on **default_host**
 - ___ c. Under Additional Properties, click on **Host Aliases**
 - ___ d. Click **New**
 - ___ e. Provide a fully qualified host name of the machine including domain on which the **WPSM1** is created.
 - ___ f. In the port text box, enter your **WC_defaulthost** port value for server **WPSM1**
 - ___ g. Click **OK**. Save and synchronize the changes.
- ___ 3. Add the **WC_defaulthost** port of **WPSM2** the list of host aliases on the virtual host for default_host
- ___ a. In Administration Console navigate to, **Environment → Virtual hosts**
 - ___ b. Click on **default_host**
 - ___ c. Under Additional Properties, click on **Host Aliases**
 - ___ d. Click **New**
 - ___ e. Provide a fully qualified host name of the machine including domain on which the **WPSM2** is created.
 - ___ f. In the port text box, enter your **WC_defaulthost** port value for server **WPSM2**
 - ___ g. Click **OK**. Save and synchronize the changes
- ___ 4. We need to restart the servers for the changes to take effect.
- ___ a. Log in to Admin Console
 - ___ b. Navigate to **Servers → Application Servers**
 - ___ c. Select the check box next to **WPSM1**
 - ___ d. Click Stop. Wait for the server to stop
 - ___ e. After the **WPSM1** is stopped, select the check boxes next to **WPSM1** and **WPSM2**
 - ___ f. Click **Start** button.
 - ___ g. Wait for the servers to start.
- ___ 5. Restart the Deployment Manager
- ___ a. From the command window go to **<PROFILE_HOME>\deploymentmanagerprofilename\bin**
example: C:\WPS\pf\Dmgr\bin
 - ___ b. Use the command **stopmanager.bat** to stop the server. Wait for the stop to complete
 - ___ c. Use the command **startmanager.bat** to start the Deployment Manager

What you did in this exercise

In this exercise you created 4 application server clusters based on the *by-function* deployment pattern, which optimizes the Message Engine cluster for high availability using an active/standby (1 of N) HA Policy. This is the default policy when adding a server cluster as a member of a Service Integration Bus.

This entails:

1. Creating the Deployment Manager Cell with 2 Nodes one node on each machine, using the WBI Profile Creation Wizard.
2. Creating and configuring server clusters
 - a. Creating Service Integration Buses for the Business Process Choreographer and the Common Event Infrastructure
 - b. Using the Advanced Configuration Wizard to configure the Service Component Architecture specific components
 - c. Configuring remote and local Message Engines
 - d. Installing and configuring application specific components for a non-default configuration.
 - i. Common Event Infrastructure
 - ii. Business Process Choreographer

When separating the application components from the Message Engine components there are additional tasks involved in setting up the JMS resources to utilize the remote Message Engine in the message engine server cluster. This becomes evident when manually configuring the Business Process Choreographer and Human Task Manager.

When separating the Common Event Infrastructure service into an administrative cluster there are additional tasks that must be done to configure the destinations for the Failed Event Manger which the applications, in the application clusters will need to use.

Setting up a clustered WebSphere Process Server environment differs from a regular WebSphere Application Server ND V6 environment in that WebSphere Process Server requires the use of the Business Process Choreographer and Human Task Manager, which in turn require messaging. It's also important to note that asynchronous Service Component Architecture invocations also require messaging.

For this reason it's imperative to have a thorough understanding of the ramifications of clustering the Message Engine, which essentially means keeping the Message Engine cluster separate from the application cluster.

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