

\* IBM CONFIDENTIAL \*

## IBM WEBSPHERE 6.0 SKILLS TRANSFER – LAB EXERCISE

# Building and Testing Enhanced EAR

What this exercise is about.....	1
Lab Requirements .....	1
What you should be able to do .....	1
Introduction .....	2
Exercise Instructions .....	2
Part 1: Preparing the Environment .....	3
Part 2: Create the Enhanced EAR using the Application Server Tool Kit .....	4
Part 3: Installing and Testing the application.....	11
Part 4: Restore your server .....	18
What you did in this exercise.....	19

---

**NOTE:** Education materials and other documentation as applicable including programming manuals, operating guides, physical planning manuals and installation manuals related to the IBM Products may be early versions subject to change.

---

## What this exercise is about

The objective of this lab is to demonstrate creating and testing an enhanced EAR.

## Lab Requirements

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

- WebSphere Application Server version 6 installed
- Application Server Tool Kit installed
- Lab sample code in the directory C:\LabFiles60 (Windows) or /tmp/LabFiles60 (Linux and UNIX)

## What you should be able to do

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

- Import in WebSphereBank and convert it into an Enhanced EAR using AST.
- Install the Enhanced WebSphereBank EAR and test it on WebSphere Application Server.

## Introduction

The enterprise application WebSphereBank was written to demonstrate WebSphere's use of J2EE1.4 technologies. The enterprise application consists of JSPs, Servlets, EJBs, an EJB Timer, and a Web Service.

There are two options on how you can test Cloudscape database. One option is to use the BANKDB database directory that packaged within the WebSphere.ear. This directory is a Cloudscape database containing the tables that are used by the WebSphereBank application. Some data already exists within the tables in this directory, such as Account numbers 1 and 2. This should explain why any changes you make to bank accounts are lost when the application is uninstalled and re-installed. If you choose this option, you may skip part 3 and 4 and continue with part 5.

The other option is to create your own Cloudscape BankDB database and tables using Clouscapeview utility and command scripts respectively.

We will create a data source named BankDS to access the BANKDB database. This datasource will be created in Application Server Tool Kit as a Application Scoped Resource, hence making WebSphereBank an enhancedEAR.

---

## 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	AIX/UNIX Location
<WAS_HOME>	C:\WebSphere\AppServer	/usr/WebSphere/AppServer /opt/WebSphere/AppServer
<LAB_FILES>	C:\LabFiles60	/tmp/LabFiles60

---

**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: Preparing the Environment

\_\_\_\_ 1. At the command prompt, navigate to <WAS\_HOME>\profiles\profile1\bin.

\_\_\_\_ 2. Check to see if the server is running, and if it is, stop it.

\_\_ a. Run the command:

```
serverStatus server1
```

\_\_ b. If the server status indicates STARTED, then run the command:

```
stopServer server1
```

---

**Note:** The reason for completing these steps with the server stopped is that some changes to the namespace are picked up only on server startup.

---

\_\_\_\_ 3. Create BANKDB database.

\_\_ a. Using Windows Explorer, Navigate to folder <LAB\_FILES>\Common\

\_\_ b. Update the setupVars.bat file, changing the IRAD\_INSTALL\_PATH value to your AST install directory, and verifying the WEBSPHERERUNTIME\_INSTALL\_PATH is set to WebSphere\AppServer.

\_\_ c. Navigate to folder <LAB\_FILES>\EnhancedEAR\

\_\_ d. Execute the script. Type:

```
setupBankDB.bat
```

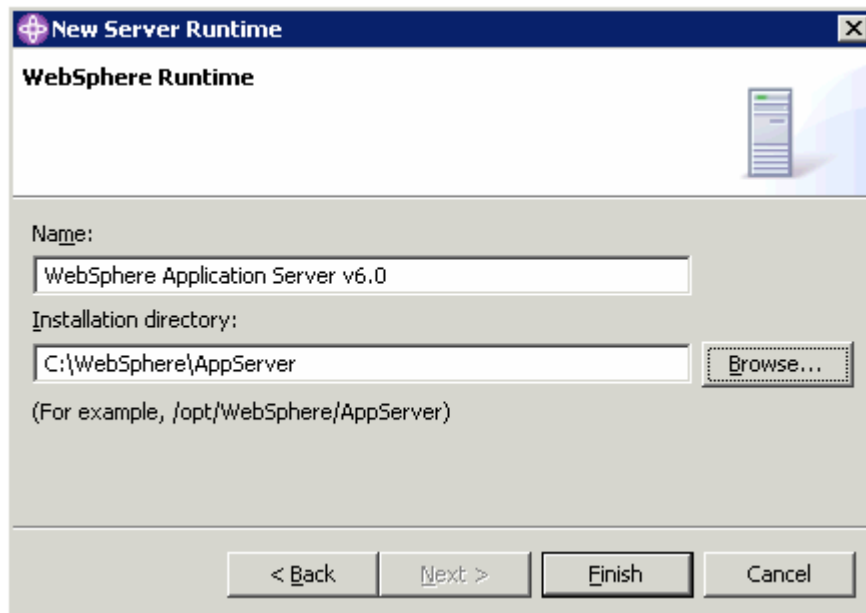
## Part 2: Create the Enhanced EAR using the Application Server Tool Kit

- \_\_\_ 1. Open Application Server Tool Kit.
  - \_\_\_ a. Using Windows Explorer, navigate to <AST\_INSTALL\_DIR>\eclipse\eclipse.exe.
  - \_\_\_ b. Right click on the eclipse.exe icon and select **Open**.
  - \_\_\_ c. Enter the workspace as **c:\labfiles60\enhancedear\workspace**.
  - \_\_\_ d. Click **OK**.
  - \_\_\_ e. Close the Welcome window.
- \_\_\_ 2. Import WebSphereBank EAR file into the workspace.
  - \_\_\_ a. Click **File > Import**.
  - \_\_\_ b. Select **EAR file**. Click **Next**.
  - \_\_\_ c. Click **Browse** to select <LAB\_FILES>\EnhancedEAR\WebSphereBank.ear. Click **Open**.
  - \_\_\_ d. Make sure that EAR project is **WebSphereBank**.
  - \_\_\_ e. For the Target Server, Click **New**.
  - \_\_\_ f. Make sure **WebSphere Application Server v6.0** is highlighted.



- \_\_\_ g. Click **Next**.

\_\_\_ h. Enter the Installation Directory as **C:\WebSphere\AppServer**.



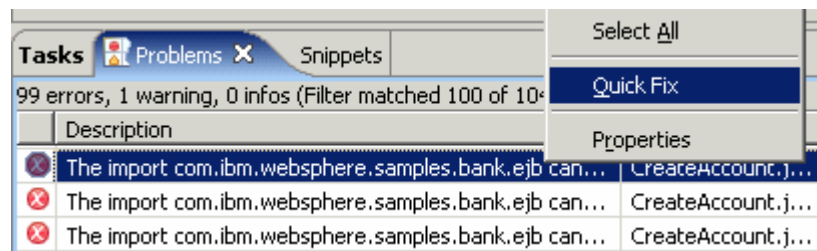
\_\_\_ i. Click **Finish**.

\_\_\_ j. Click **Finish** again.

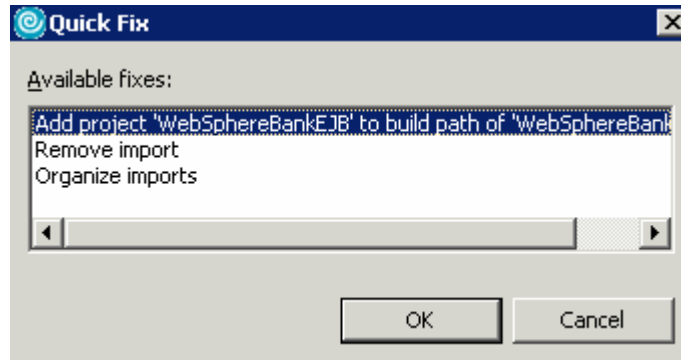
\_\_\_ k. Click **Yes** when prompted to switch to the J2EE perspective. Wait for import to complete.

\_\_\_ 3. Add Java Build Path to clean up errors. If you select the Problems tab, you will notice a list of errors and warnings.

\_\_\_ a. Right click on an error and select **Quick Fix**.



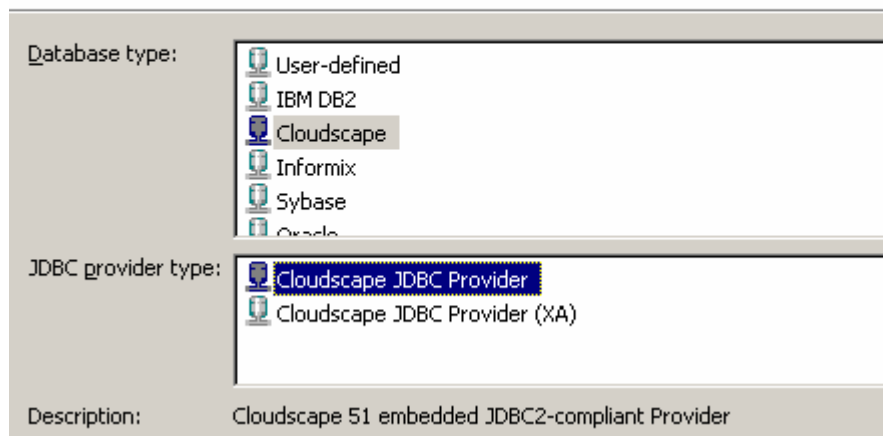
- \_\_\_ b. A list of available fixes will appear. Select “Add project ‘WebSphereBankEJB’ to build path of ‘WebSphereBankWeb’ and click **OK**. The errors should disappear.



- \_\_\_ 4. Create the JDBC provider.
  - \_\_\_ a. Navigate to Enterprise Applications > WebSphereBank > Deployment Descriptor: WebSphereBank. Right click on the Deployment Descriptor and select **Open**.
  - \_\_\_ b. Open the **Deployment** View in the Deployment Descriptor.
  - \_\_\_ c. Click on the **Add...** button by the JDBC provider list table.
  - \_\_\_ d. In the Create a JDBC Provider window, select **Cloudscape** as the Database type, and select **Cloudscape JDBC Provider** for the JDBC provider type.

#### Create a JDBC Provider

Select the type of JDBC provider to create.



- \_\_\_ e. Click **Next**.

- \_\_\_ f. In the Name field, enter **WebSphereBankJDBCProvider**.

Name:	WebSphereBankJDBCProvider
Description:	Cloudscape JDBC Provider
Implementation class name:	com.ibm.db2j.jdbc.DB2jConnectionPoolDataSource
Class path:	\${CLOUDSCAPE_JDBC_DRIVER_PATH}/db2j.jar

- \_\_\_ g. Click **Finish**.

- \_\_\_ 5. Create a Cloudscape data source.

- \_\_\_ a. Click the **WebSphereBankJDBCProvider**.

- \_\_\_ b. Click **Add** under DataSources.

- \_\_\_ c. Make sure that **Cloudscape JDBCProvider** is selected and **Version 5.0 datasource** is selected.

#### Create a Data Source

Select the type of data source to create.

Select the type of JDBC provider:	
User-defined JDBC Provider	
Cloudscape JDBC Provider	
Select the data source type:	
<input checked="" type="radio"/>	Version 5.0 data source
<input type="radio"/>	Version 4.0 data source

- \_\_\_ d. Click **Next**.

\_\_\_ e. Enter the following values as shown in screen shot below:

Name: **BANKDS**

JNDI Name: **jdbc/Bank**

Make sure that the check box – **Use this data source in Container Managed Persistence** is checked.

Name: *	BANKDS
JNDI name: *	jdbc/Bank
Description:	New JDBC Datasource
Category:	
Statement cache size:	10
Data source helper class name:	com.ibm.websphere.rsadapter.CloudscapeDataStoreHelper
Connection timeout:	1800
Maximum connections:	10
Minimum connections:	1
Reap time:	180
Unused timeout:	1800
Aged timeout:	0
Purge policy:	EntirePool
Component-managed authentication alias:	
Container-managed authentication alias:	
<input checked="" type="checkbox"/> Use this data source in container managed persistence (CMP)	

\_\_\_ f. Click **Next**.



\_\_\_ g. In the Value field enter the path to the database, for this lab the path should be

**<LAB\_FILES>/EnhancedEAR/databases/BANKDB**

### Create Resource Properties

Create the resource properties for this data source.

Resource Properties:

Name	Description
databaseName	This is a required property. This property must be set and it identifies which data
shutdownDatabase	If set to the string 'shutdown', this will cause the database to shutdown when a j
dataSourceName	Name for ConnectionPooledDataSource or XADataSource. Not used by the Data :
description	Description of the Data Source. Not used by the Data Source object. Used for inf
connectionAttributes	Connection attributes specific to Cloudscape. Please see Cloudscape documentat

Name: databaseName  
 Type: java.lang.String  
 Required: Yes  
 Value: C:/LabFiles60/EnhancedEAR/databases/BANKDB  
 Description: This is a required property. This property must be set and it identifies which database to access. For exampl

\_\_\_ h. Click **Finish**.

\_\_\_ i. Click on the **Save** button on the top of the editor to save the changes.

Application Deployment Descriptor

## WebSphere v6.0 Deployment

**Save**

▼ **Data Sources**

Allows the installed applications to access data from databases.

JDBC provider list:

Name	Implementation Class Name
Cloudscape JDBC Provider (XA)	com.ibm.db2j.jdbc.DB2jXADataSource
WebSphereBankJDBCProvider	com.ibm.db2j.jdbc.DB2jConnectionPoolDataSource

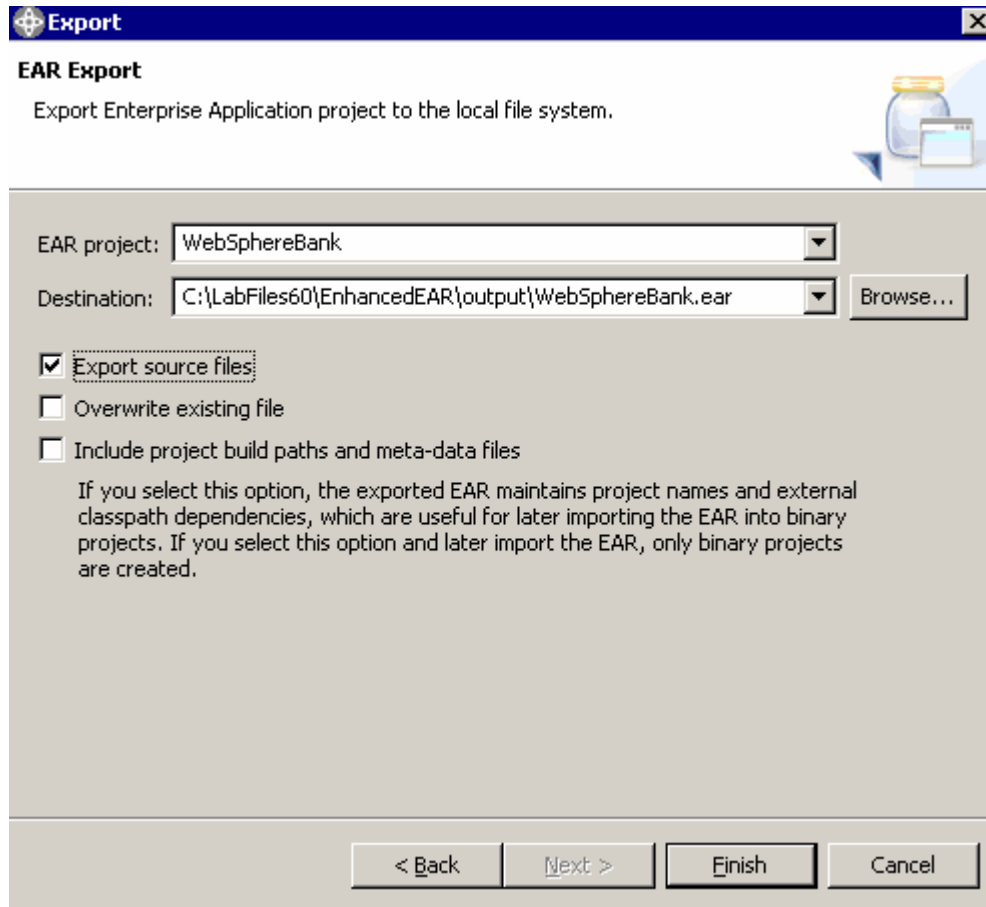
Data source defined in the JDBC provider selected above:

Name	JNDI Name
BANKDS	jdbc/Bank

\_\_\_ j. Close the editor – click **Save** again if prompted to save changed to application.xml.

\_\_\_ 6. Export the EAR file from Application Server Tool Kit.

- \_\_\_ a. Click **File > Export**.
- \_\_\_ b. Select **EAR file**. Click **Next**.
- \_\_\_ c. Select the EAR project as **WebSphereBank** and enter the destination as **<LABFILES>\EnhancedEAR\output\WebSphereBank.ear**.
- \_\_\_ d. Select the check box **Export Source Files**.



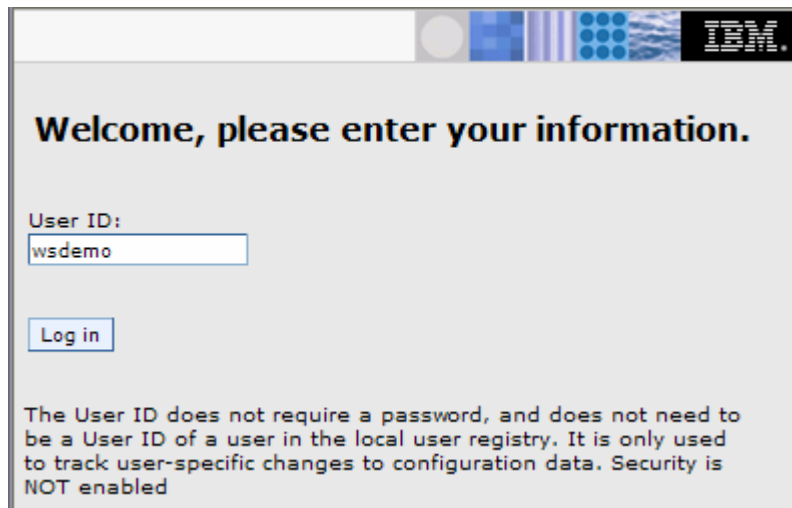
- \_\_\_ e. Click **Finish**.

---

## Part 3: Installing and Testing the application

- \_\_\_ 1. Start the application server.
  - \_\_\_ a. Navigate to <WAS\_HOME>\bin, then run the command:  

```
startServer server1
```
- \_\_\_ 2. Start the Administrative Console.
  - \_\_\_ a. Open a Web Browser and navigate to the following URL:  
**http://localhost:9060/ibm/console**
  - \_\_\_ b. When prompted for a User ID, enter **wsdemo** to log in.



---

If prompted to save configuration changes, save them.

---

- \_\_\_ 3. Expand **Applications** and click **Install New Application** under Applications on the navigation panel.
- \_\_\_ 4. Click **Browse** for the Local File system .
- \_\_\_ 5. Navigate to and select **<LAB\_FILES>/EnhancedEARlab/output/WebSphereBank.ear** and click **Open**.
- \_\_\_ 6. Click **Next**.
- \_\_\_ 7. On the next panel click **Next**. This panel would direct WebSphere to generate default bindings - for this install, all the bindings are configured in the deployment descriptors.
- \_\_\_ 8. If you see an **Application Security Warnings** page, click **Continue**.

- \_\_\_ 9. Step 1: **Select Installation Options** screen, verify information.
- \_\_\_ a. Verify that **Deploy Enterprise Beans** is selected.
- \_\_\_ b. Make sure the application name is **WebSphereBank**.

**Install New Application**

Specify options for installing enterprise applications and modules.

**Step 1: Select installation options**

Step 2 Map modules to servers

Step 3 Provide options to perform the EJB Deploy

Step 4 Provide JNDI Names for Beans

Step 5 Provide default data source mapping for modules containing 2.x entity beans

**Select installation options**

Specify the various options that are available to prepare and install your application.

☐ Pre-compile JSP

Directory to install application

☒ Distribute application

☐ Use Binary Configuration

☒ Deploy enterprise beans

Application name

☒ Create MBeans for resources

☐ Enable class reloading

Reload interval in seconds

☐ Deploy Web services

- \_\_\_ c. Click **Next**.
- \_\_\_ 10. Click **Step 3: Provide Options to perform the EJB Deploy** screen, select database type.
- \_\_\_ a. Select **Cloudscape\_V5** as the database type.

EJB Deployment Options	Enable
Deploy EJBs Option - Classpath	<input type="text"/>
Deploy EJBs Option - RMIC	<input type="text"/>
Deploy EJBs Option - Database Type	DB2UDB_V72
Deploy EJBs Option - Database Schema	<div> DB2UDB_V72  DB2UDB_V81  <b>CLOUDSCAPE_V5</b>  DB2UDBOS390_V6 </div>

This option directs the EJBDeploy process to prepare the beans to be persisted to a Cloudscape database. The Deploy process is specific to a container, and if Container Managed Persistence is used, it is necessary to specify the database as well.

\_\_\_ b. Click **Next**.

\_\_\_ 11. Click **Step 5: Provide default data source mapping for modules containing 2.x entity Beans**.

\_\_\_ a. Note that JNDI name **jdbc/Bank** is the one used while configuring your Data Source.

\_\_\_ 12. Click **Step 6: Map data sources for all 2.x CMP beans**.

\_\_\_ a. Enter **eis/jdbc/Bank\_CMP** in the **JNDI Name** field for both EJBs, as follows:

Select	EJB	EJB module	URI	JNDI name
<input type="checkbox"/>	Account	WebSphereBankEJB	WebSphereBankEJB.jar,META-INF/ejb-jar.xml	eis/jdbc/Bank_CMP
<input type="checkbox"/>	Customer	WebSphereBankEJB	WebSphereBankEJB.jar,META-INF/ejb-jar.xml	eis/jdbc/Bank_CMP

This JNDI name can be just selected rather than typing as above if you had created a datasource before the installation of the application, and if you click the checkbox *Use this data source for container managed persistence (CMP)* when you create the data source, another reference is created with the name of *eis/jndi\_name\_of\_datasource\_CMP*. For example, if a data source has a JNDI name of *jdbc/myDatasource*, the CMP JNDI name is *eis/jdbc/myDatasource\_CMP*. This name is used internally by CMP and is provided simply for informational purposes.

\_\_\_ b. Click **Next** to proceed.

\_\_\_\_ 13. Click **Step 11 Summary** and verify the values in the screen capture:

Notice the **Application Scoped Resources** option.

Summary of installation options

Options	Values
Reload interval in seconds	
Deploy Web services	No
Deploy EJB option - RMIC	
Deploy EJB option - Class path	
Cell/Node/Server	<a href="#">Click here</a>
Application Scoped Resources	Yes
Pre-compile JSP	No
Distribute application	Yes
Enable class reloading	No
Process embedded configuration	Yes
Deploy EJB option - Database type	CLOUDSCAPE_V5
Create MBeans for resources	Yes
Application name	WebSphereBank
Deploy EJB option - Database schema	
Deploy enterprise beans	Yes
Validate Input off/warn/fail	warn
Use Binary Configuration	No
Directory to install application	

\_\_\_\_ 14. Click **Finish**.

---

The installation process will take a minute or two. An instance of the workbench is started and the Ejbdeploy process runs, preparing a copy of the EAR file to be installed. Wait for the message that says the application installed successfully

---

\_\_\_\_ 15. Save your changes.

\_\_ a. Click **Save to Master Configuration**.

ADMA5011I: Cleanup of temp dir for app WebSphereBank done.

ADMA5013I: Application WebSphereBank installed successfully.

Application WebSphereBank installed successfully.

If you want to start the application, you must first save changes to the master configuration.

**Save to Master Configuration**

If you want to work with installed applications, then click Manage Applications.

**Manage Applications**

\_\_ b. Click **Save** at the bottom of the panel.

\_\_\_\_ 16. Start the WebSphereBank applications.

\_\_ a. Expand **Applications > Enterprise Applications**.

\_\_ b. Select **WebSphereBank** and click **Start**.

\_\_\_\_ 17. Test the application.

\_\_ a. Open a browser.

\_\_ b. Enter the URL **http://localhost:9080/WebSphereBankWeb/**.

\_\_ c. Click on **Create Customer**.

\_\_\_ d. Enter Customer Number, Name and Tax ID. Select **Create**.

## Create Customer

---

### Messages

---

Customer Number:

First Name:

Last Name:

TAX ID:

\_\_\_ 18. You will see details for customer created. Click **Create Account**.

## Customer Details

New Customer has been successfully created

---

Customer Number:

10

First Name:

JOHN

Last Name:

DOE

TAX ID:

012-34-5678

Create Account



- \_\_\_\_ 19. Enter **101** for the Account Number, checking for account type and **600** for the starting balance. Click **Create**.

**Create a new Account**

---

Messages

---

Customer Number:	<input type="text" value="10"/>
Account Number:	<input type="text" value="101"/>
Account Type:	<input type="radio"/> Savings <input checked="" type="radio"/> Checking
Starting Balance:	\$ <input type="text" value="600"/>
<input type="button" value="Create"/> <input type="button" value="Reset"/>	

---

If the accounts are created without generating errors, then the Data Source is working otherwise make sure the **datasenname** is correct in datasource properties and make sure to test the datasource.

---

- \_\_\_\_ 20. Uninstall the application.
- a) In the Admin console, under **Applications > Enterprise Applications**, select the **WebSphereBank** application and click on **Uninstall**.
  - b) Click **OK**.
  - c) Click **Save**.
  - d) Click **Save** again.
- \_\_\_\_ 21. You can now close your web browser and stop your server.

## Part 4: Restore your server

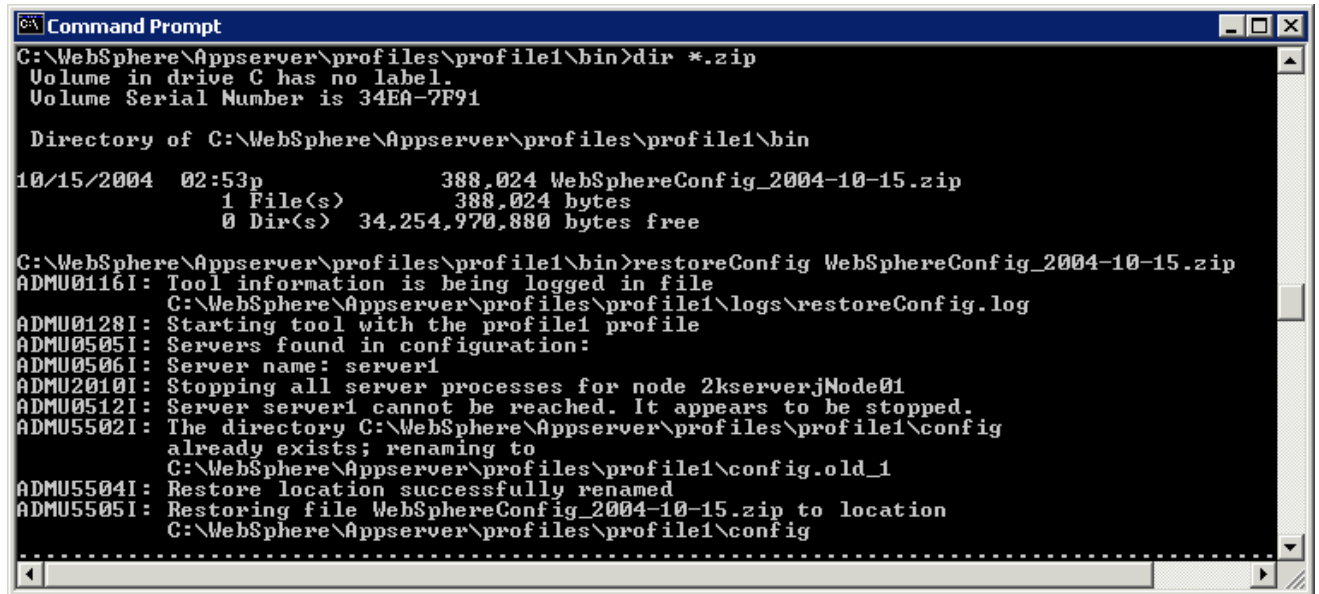
\_\_\_ 1. Restore your server configuration. This will return your server configuration to its original state.

\_\_\_ a. Open a Windows **Command Prompt** and navigate to the following directory:

**<WAS\_HOME>\profiles\profile1\bin**

\_\_\_ b. Restore the server configuration by issuing the following command:

**restoreConfig WebSphereConfig\_<date>.zip**



```
C:\WebSphere\Appserver\profiles\profile1\bin>dir *.zip
Volume in drive C has no label.
Volume Serial Number is 34EA-7F91

Directory of C:\WebSphere\Appserver\profiles\profile1\bin

10/15/2004  02:53p                388,024 WebSphereConfig_2004-10-15.zip
             1 File(s)                388,024 bytes
             0 Dir(s)  34,254,970,880 bytes free

C:\WebSphere\Appserver\profiles\profile1\bin>restoreConfig WebSphereConfig_2004-10-15.zip
ADMU0116I: Tool information is being logged in file
           C:\WebSphere\Appserver\profiles\profile1\logs\restoreConfig.log
ADMU0128I: Starting tool with the profile1 profile
ADMU0505I: Servers found in configuration:
ADMU0506I: Server name: server1
ADMU2010I: Stopping all server processes for node 2kserverjNode01
ADMU0512I: Server server1 cannot be reached. It appears to be stopped.
ADMU5502I: The directory C:\WebSphere\Appserver\profiles\profile1\config
           already exists; renaming to
           C:\WebSphere\Appserver\profiles\profile1\config.old_1
ADMU5504I: Restore location successfully renamed
ADMU5505I: Restoring file WebSphereConfig_2004-10-15.zip to location
           C:\WebSphere\Appserver\profiles\profile1\config
```

## What you did in this exercise

First, you created an enhanced EAR using the Application Server Toolkit(AST). This included defining the datasource. You then exported the application ear file.

Next, you installed the application into WebSphere Application Server using the Administration Console. You defined your database type and mapped your datasources during the installation.

Last, you tested the application.

This page is left intentionally blank.