IBM WEBSPHERE 6.0 – LAB EXERCISE

# Building and Testing Enhanced EAR

**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 or Rational Web Developer installed

    **NOTE:** The assembly feature of the AST and Rational Web Developer products runs on Windows and Linux Intel platforms. Users of WebSphere Application Server on other platforms must assemble their modules using an assembly tool installed on Windows or Linux Intel platforms.

- 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 or Rational Web Developer.

- 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.  You will run a script that will test for and, if present, remove the default WebSphereBank sample application and its associated Data Source.

_____ 2.  **Linux** **UNIX** : issue the following command to ensure the script has "execute" rights

   **chmod +x prepWSBank.sh**

_____ 4.  Ensure the server is stopped

   __ a. Check to see if the server is running

   **Windows** :                    `serverStatus server1`

   **Linux** **UNIX** :            `./serverStatus.sh server1`

   __ b. If the server status indicates STARTED, then stop the server:

   **Windows** :                    `stopServer server1`

   **Linux** **UNIX** :            `./stopServer.sh server1`

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**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.  Operating on a stopped server is optional; if you choose to run the commands on a running server, remove the `-conntype none` parameter from the following command. The `-conntype none` parameter indicates that wsadmin will operate directly on the files on the disk, rather than making changes to running objects.

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_____ 5.  Run the clean-up script. This script will test to see if you have installed WebSphereBank from previous lab and will remove the WebSphereBank application and the BANKDS Data Source.

   __ a. From a Command Prompt, navigate to **<WAS_HOME>/profiles/<PROFILE_NAME>/bin**

   __ b. Run the command:

   **Windows** : (Note: the forward slash is correct even for windows)
   **wsadmin –conntype none –f <LAB_FILES>/common/prepWSBank.jacl**
   **Linux** **UNIX** :

   **./wsadmin.sh –conntype none -f <LAB_FILES>/common/prepWSBank.jacl**

_____ 6.  Create BANKDB database and tables

   Note: To help you with database and table creation, a pregenerated **BANKDB** within the **<LAB_FILES>/CloudscapeDB** has been provided.  You can skip this step if you wish to use a pre-existing BANKDB.

   __ a. In a command window, navigate to **<WAS_HOME>/cloudscape/bin/embedded**

   __ b. Issue the Cloudscape **ij** command to start the Cloudscape utility

   **Windows** :                    **ij**
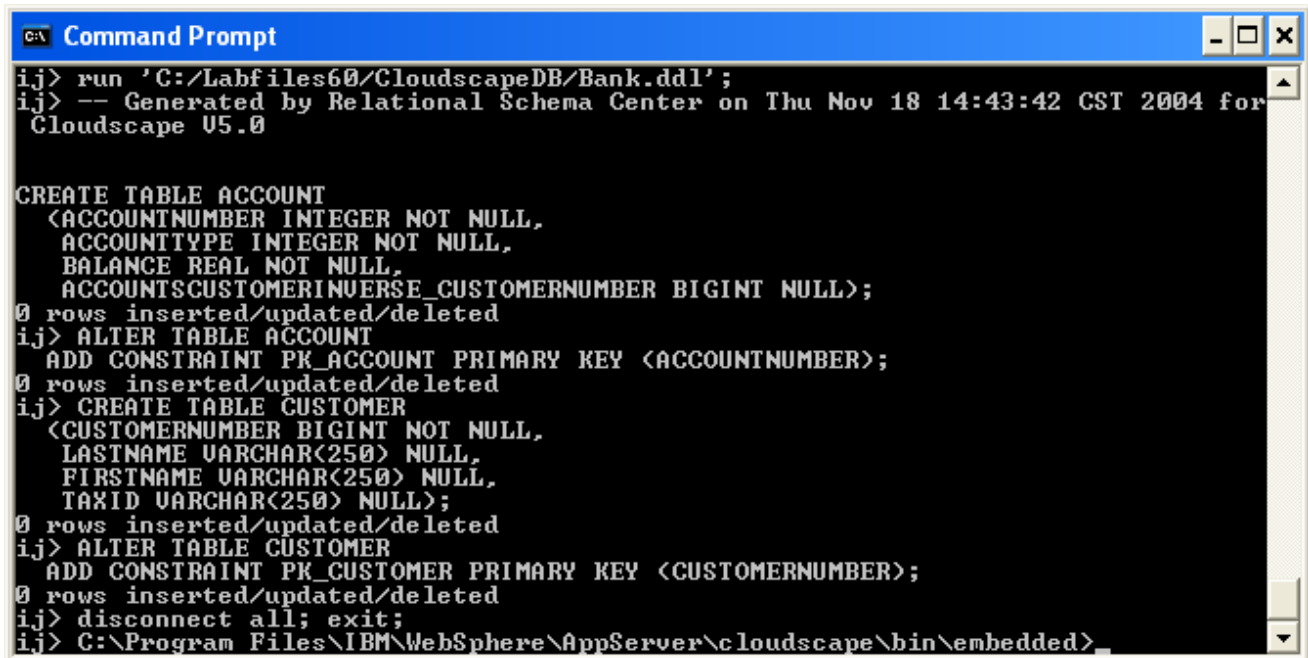
   **Linux** **UNIX** :            **./ij.sh**

__ c. Issue the following commands, replacing <LAB_FILES> with your lab file path:

> **1) connect 'jdbc:db2j:<LAB_FILES >/CloudscapeDB/BANKDB;create=true';**

> **Note:** this command may run for 10 to 30 seconds; when the command completes, you will see the "ij>" prompt with no messages; the path for DB_LOCATION_UPDATE must already exist

> **2) run '<LAB_FILES>/CloudscapeDB/Bank.ddl';**

```
ij> run 'C:/Labfiles60/CloudscapeDB/Bank.ddl';
ij> -- Generated by Relational Schema Center on Thu Nov 18 14:43:42 CST 2004 for
 Cloudscape V5.0


CREATE TABLE ACCOUNT
  (ACCOUNTNUMBER INTEGER NOT NULL,
   ACCOUNTTYPE INTEGER NOT NULL,
   BALANCE REAL NOT NULL,
   ACCOUNTSCUSTOMERINVERSE_CUSTOMERNUMBER BIGINT NULL);
0 rows inserted/updated/deleted
ij> ALTER TABLE ACCOUNT
  ADD CONSTRAINT PK_ACCOUNT PRIMARY KEY (ACCOUNTNUMBER);
0 rows inserted/updated/deleted
ij> CREATE TABLE CUSTOMER
  (CUSTOMERNUMBER BIGINT NOT NULL,
   LASTNAME VARCHAR(250) NULL,
   FIRSTNAME VARCHAR(250) NULL,
   TAXID VARCHAR(250) NULL);
0 rows inserted/updated/deleted
ij> ALTER TABLE CUSTOMER
  ADD CONSTRAINT PK_CUSTOMER PRIMARY KEY (CUSTOMERNUMBER);
0 rows inserted/updated/deleted
ij> disconnect all; exit;
ij> C:\Program Files\IBM\WebSphere\AppServer\cloudscape\bin\embedded>
```

> **3) disconnect all; exit;**

> The BANKDB database and tables have been created

____ 6. Start the server, in preparation for next part of the lab

> Navigate to **<WAS_HOME>/profiles/<PROFILE_NAME>/bin** and issue:

> **Windows**:            **startServer server1**

> **Linux**   **UNIX**:       **./startServer.sh server1**

> Note: the start is successful when you see a message, such as:

> Server server1 open for e-business; process id is XXXX.

# Part 2: Create the Enhanced EAR

____ 1.    Open Rational Web Developer or the AST

__ a. Enter the workspace as name

__ b. Click **OK**.

__ c. 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.**
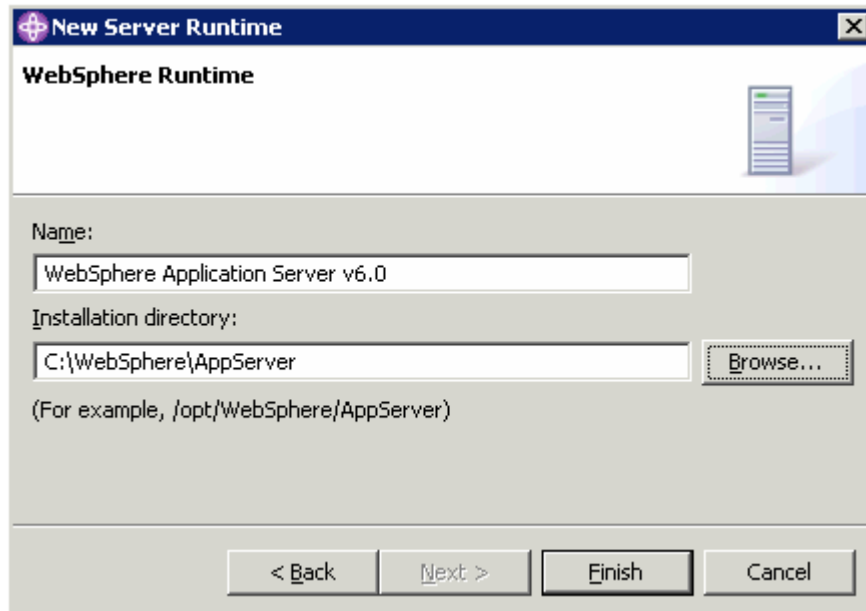
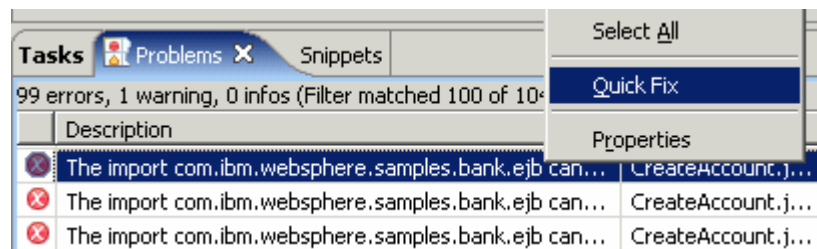__ i. Click **Finish.**

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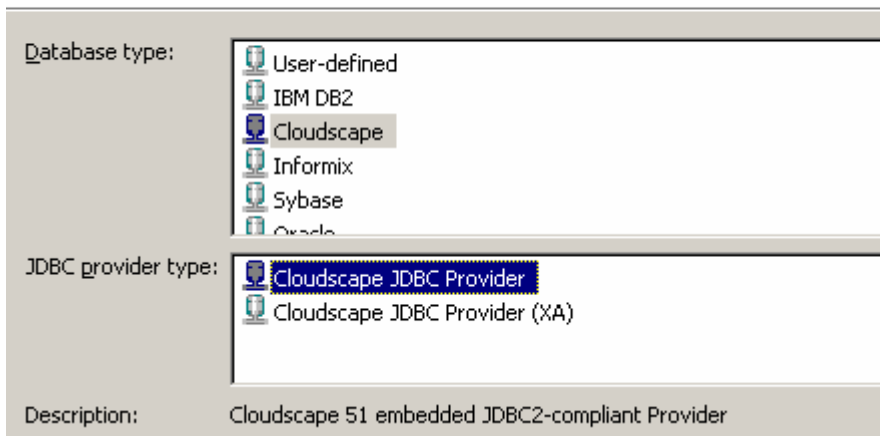
__ a. Right click on an error and select **Quick Fix.**

__ b. A list of available fixes will appear.  Select "Add project 'WebSphereBankEJB' to build path of 'WebSphereBankWeb' and click **OK.**  The errors should disappear.
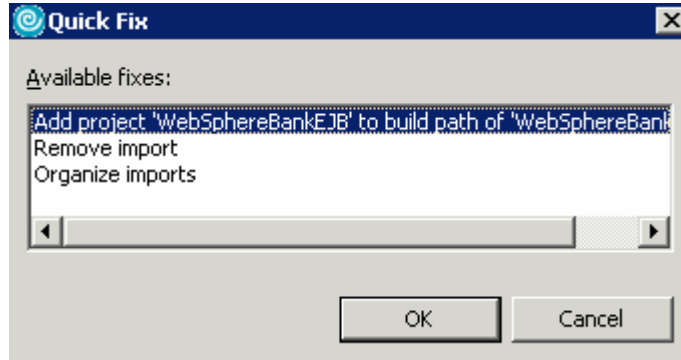


_____ 4.    Create the JDBC provider.

__ 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.



__ e. Click **Next.**

*WASv6_EnhancedEARLab.doc*

__ f. In the Name field, enter **WebSphereBankJDBCProvider**.

| | |
|---|---|
| Na_me: | WebSphereBankJDBCProvider |
| _Description: | Cloudscape JDBC Provider |
| _Implementation class name: | com.ibm.db2j.jdbc.DB2jConnectionPoolDataSource |
| Class p_ath: | ${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:

⊙ Version 5.0 data source

○ 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: | |

☑ 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

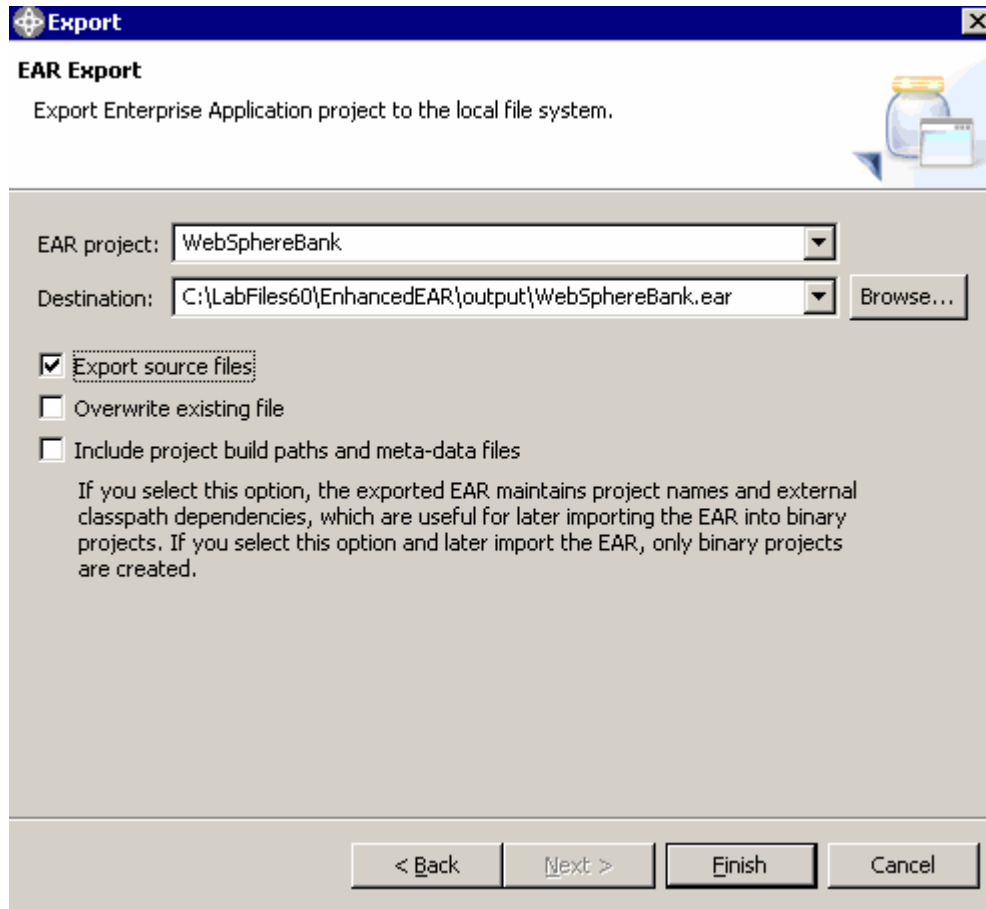**<LAB_FILES>/CloudScapeDB/BANKDB**
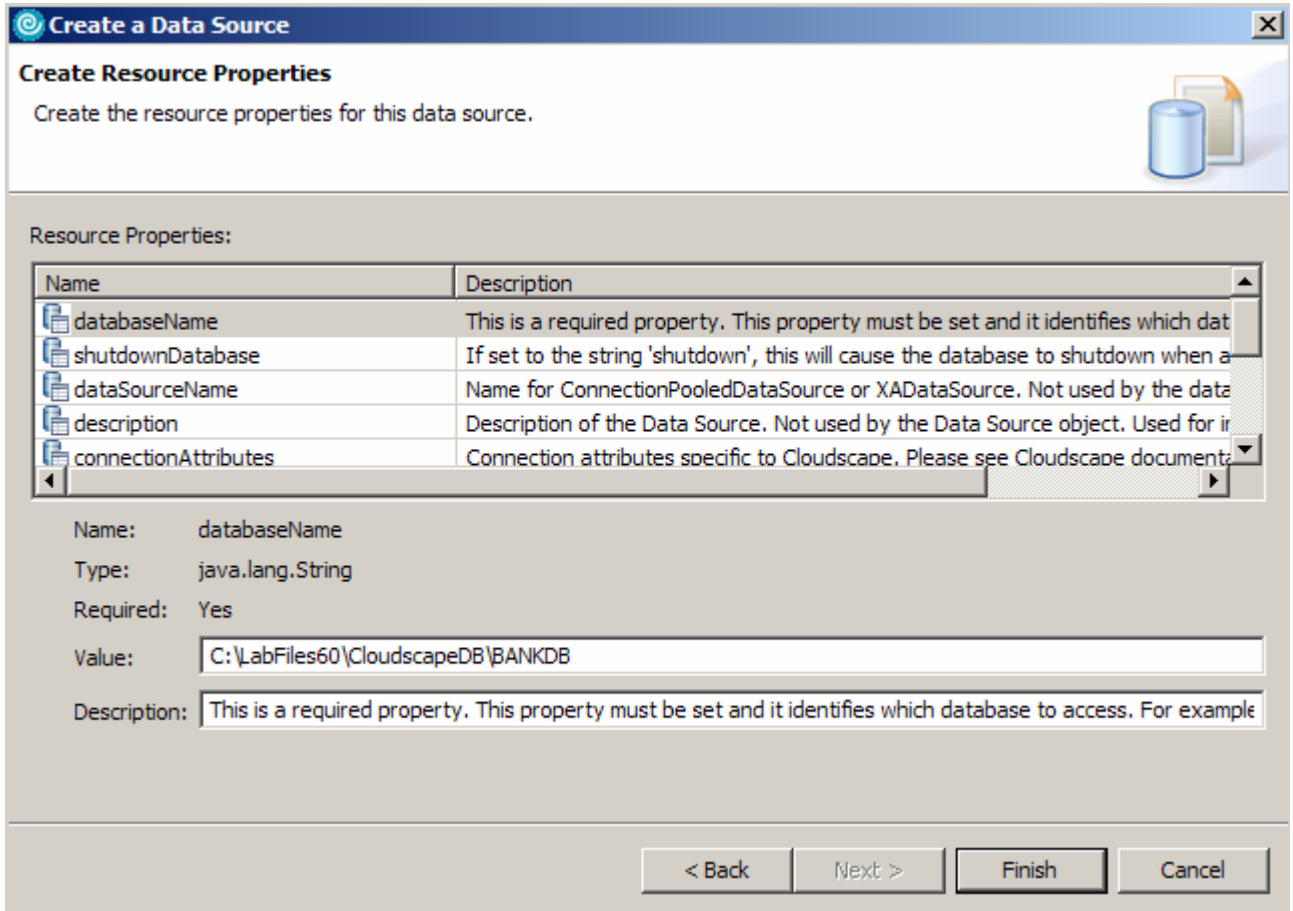


__ h. Click **Finish** and save

____ 6.　Export the EAR file.

__ 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>\profiles\<profilename>\bin**, then run the command:
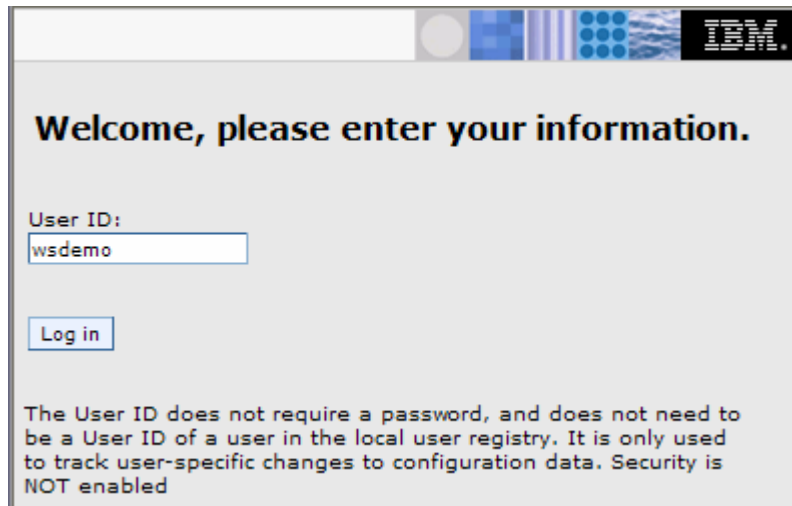
        `startServer server1`

\_\_\_\_ 2.   Start the Administrative Console.

    \_\_ a. Open a Web Browser and navigate to the following URL:

        **http://localhost:9060/ibm/console**

        The port number may change for your profile if this is not the first profile. Use the    appropriate port to open the admin 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.**
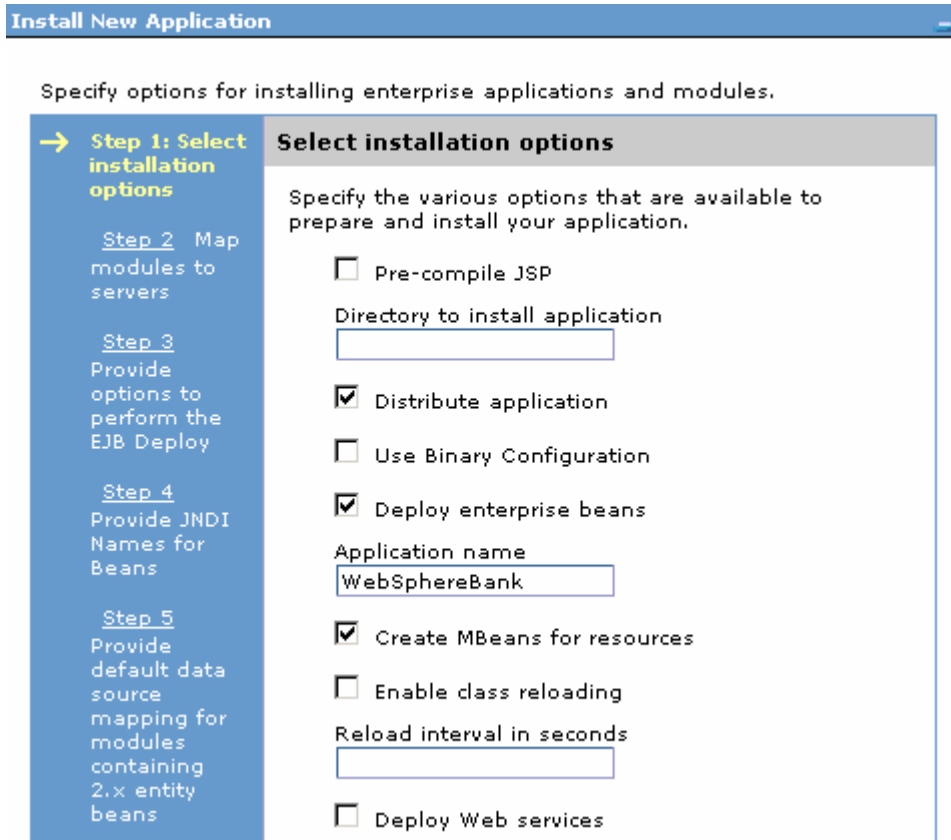


___ c. Click **Next.**

____ 10.   Click <u>Step 3:</u> **Provide Options to perform the EJB Deploy** screen, select database type.

___ a. Select **Cloudscape_V5** as the database type.



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 |
|--------|-----|------------|-----|-----------|
| ☐ | Account | WebSphereBankEJB | WebSphereBankEJB.jar,META-INF/ejb-jar.xml | eis/jdbc/Bank_CMP |
| ☐ | 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 | Click here |
| 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.**

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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

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_____ 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: | 10 |
| First Name: | John |
| Last Name: | Doe |
| TAX ID: | 012-34-5678 |

_____ 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: | 10 |
| Account Number: | 101 |
| Account Type: | ○ Savings  ◉ Checking |
| Starting Balance: | $ 600 |

Create    Reset

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

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____ 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.

# What you did in this exercise

First, you created an enhanced EAR using the Rational Web Developer/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.