

IBM WEBSHERE 6.0 SKILLS TRANSFER – LAB EXERCISE

Building and Testing Enhanced EAR

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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 v6.0.1 should be installed. Read the SystemSetup_ReadMe file included with the lab sample code for system setup information.
- Application Server Tool Kit or Rational Web Developer installed (with the v6.0 runtime).
- Installation of lab sample code into directory
 - Windows: **C:\Labfiles60**
 - UNIX/Linux/zOS: **/etc/Labfiles60**
- Experience with previous versions of WebSphere Application Server and the J2EE programming model is also helpful.
- Completion of lab: **Installing WebSphereBank Application using Cloudscape.**

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 IRAD).
- 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 WebSphereBank.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. 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.

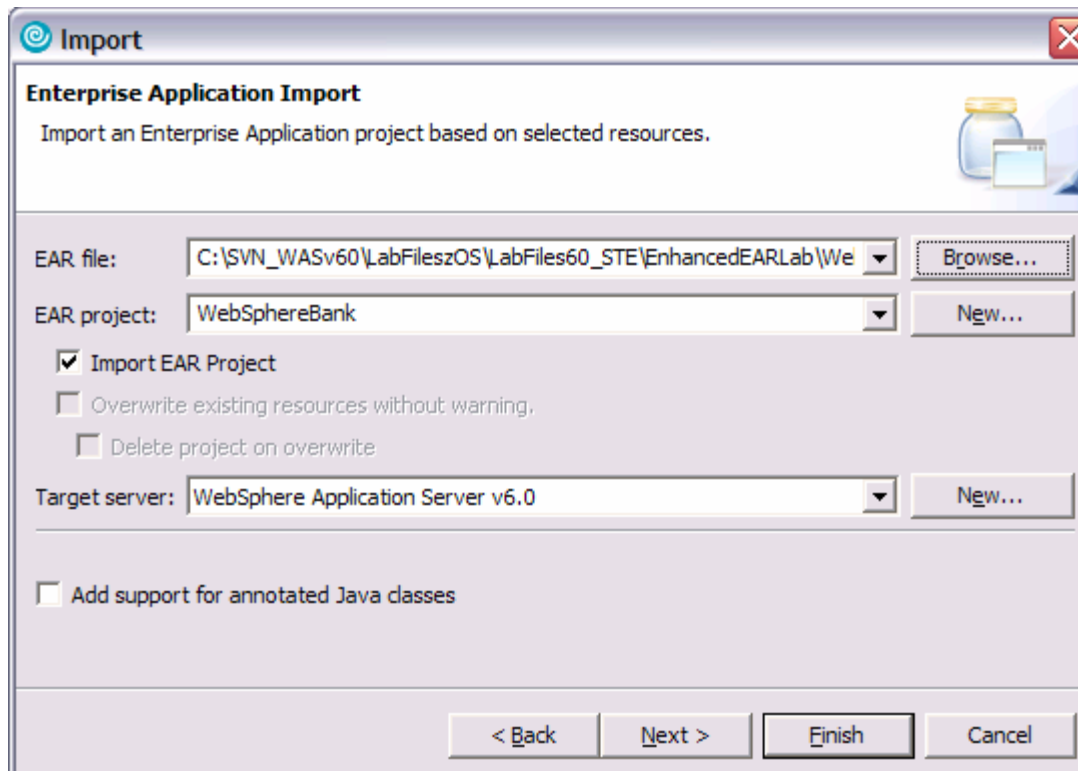
Exercise Instructions

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:

Location Reference	Windows example	z/OS example
<WAS_HOME>	C:\WebSphere\AppServer\	/etc/c6cellB/AppServer
<HOST_NAME>	localhost	mvs22x.rtp.raleigh.ibm.com
<SERVER_NAME>	Server1	C6Server01
<HOST_LAB_FILES>		/etc/LabFiles60
<LOCAL_LAB_FILES>	C:\LabFiles60	

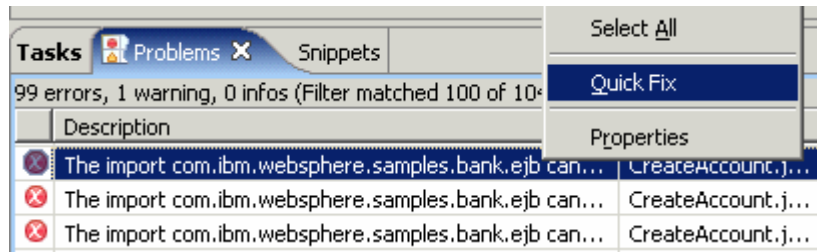
Part 1: Create Enhanced EAR using Application Server Tool Kit (or IRAD)

- ___ 1. Open Application Server Tool Kit (or IRAD).
 - ___ a. Using Windows Explorer, navigate to c:\AST or c:\IRAD.
 - ___ b. Double-click on the **ast.exe** to open it, or launch IRAD.
 - ___ c. Enter the workspace as **c:\LabFiles60\EnhancedEAR\workspace**
 - ___ d. Click **OK**.
 - ___ e. Close the Welcome tab.
- ___ 1. Import WebSphereBank EAR file into the workspace.
 - ___ a. Click **File > Import**.
 - ___ b. Select **EAR file**. Click **Next**.
 - ___ c. Click **Browse** to select <LOCAL_LAB_FILES>\EnhancedEAR\WebSphereBank.ear. Click **Open**.
 - ___ d. Make sure that EAR project is **WebSphereBank**.

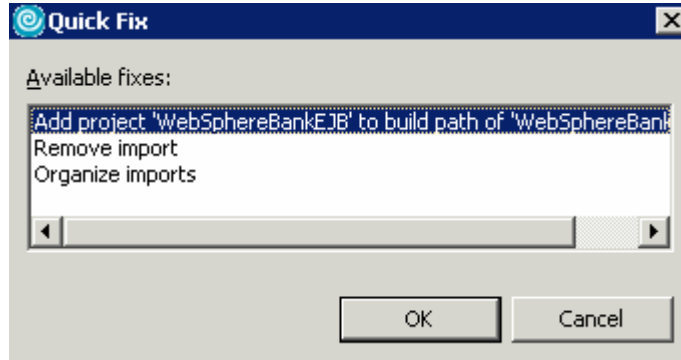


- ___ e. Click **Finish**.
 - ___ f. Click **Yes** when prompted to switch to the J2EE perspective. Wait for import to complete.
- ___ 2. Add Java Build Path to clean up errors. If you select the Problems tab, you will notice a list of errors and warnings.

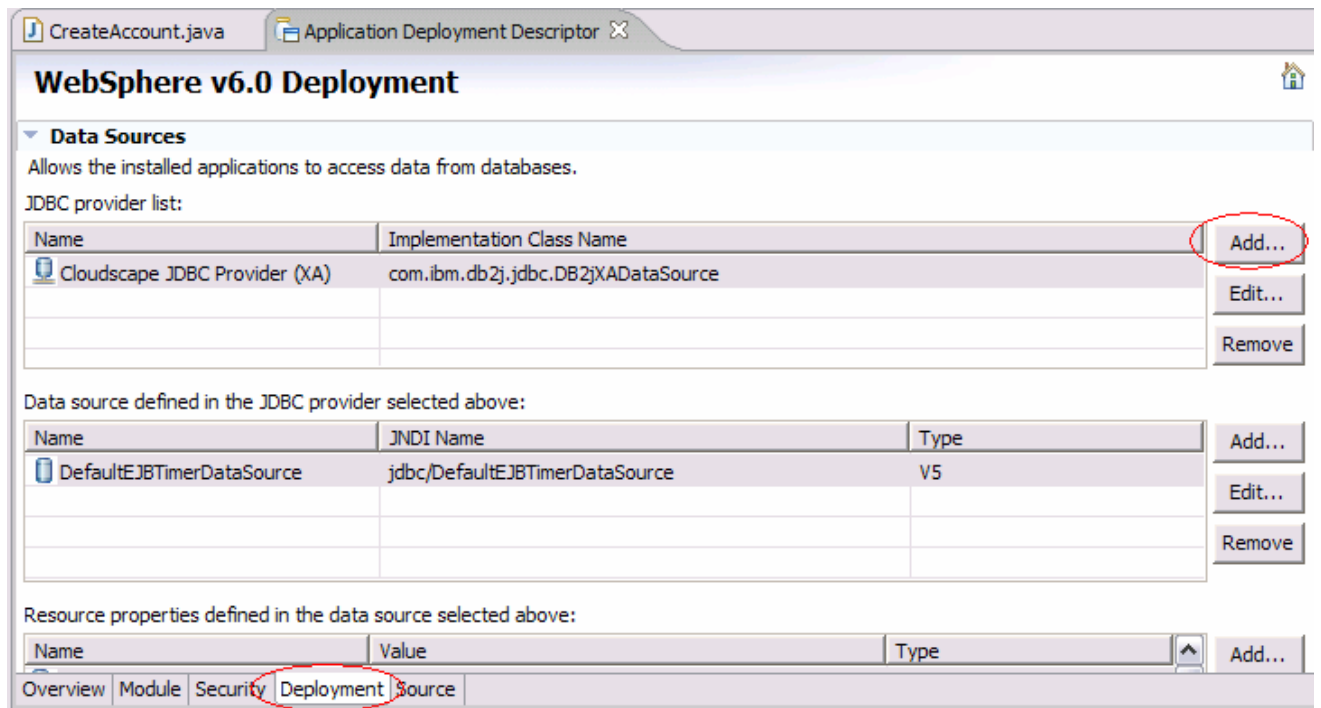
___ a. Right click on an error and select **Quick Fix**.



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



- ___ 3. 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.

Database type:	<ul style="list-style-type: none"><input type="radio"/> User-defined<input type="radio"/> IBM DB2<input checked="" type="radio"/> Cloudscape<input type="radio"/> Informix<input type="radio"/> Sybase<input type="radio"/> Oracle
JDBC provider type:	<ul style="list-style-type: none"><input checked="" type="radio"/> Cloudscape JDBC Provider<input type="radio"/> Cloudscape JDBC Provider (XA)
Description:	Cloudscape 51 embedded JDBC2-compliant Provider

___ 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**.

____ 4. 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**

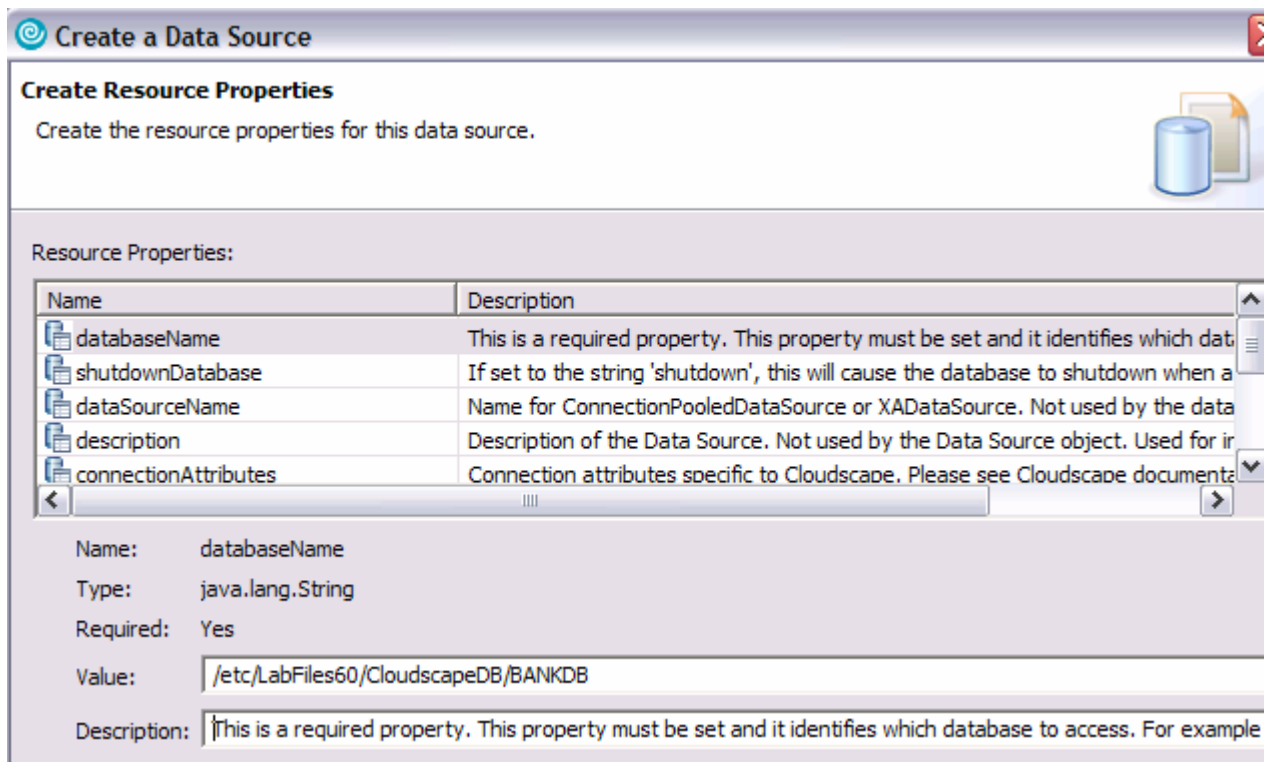
Make sure that the check box – **Use this data source in Container Managed Persistence** is checked.

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**.

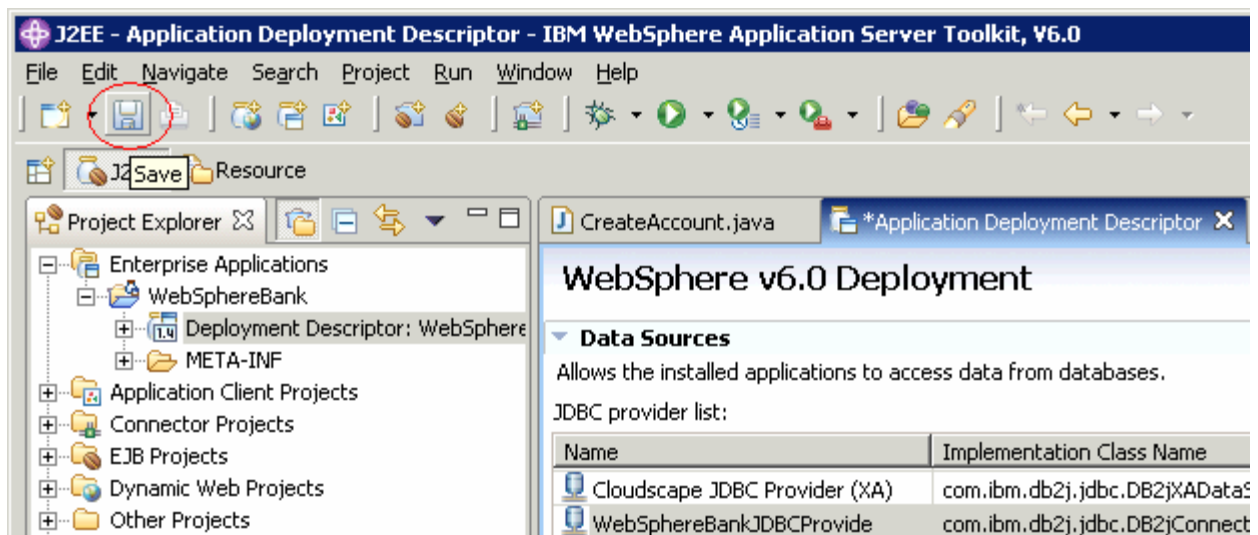
___ g. In the Value field enter the path to the database, for this lab the path should be

<HOST_LAB_FILES>/CloudscapeDB/BANKDB



___ h. Click **Finish**.

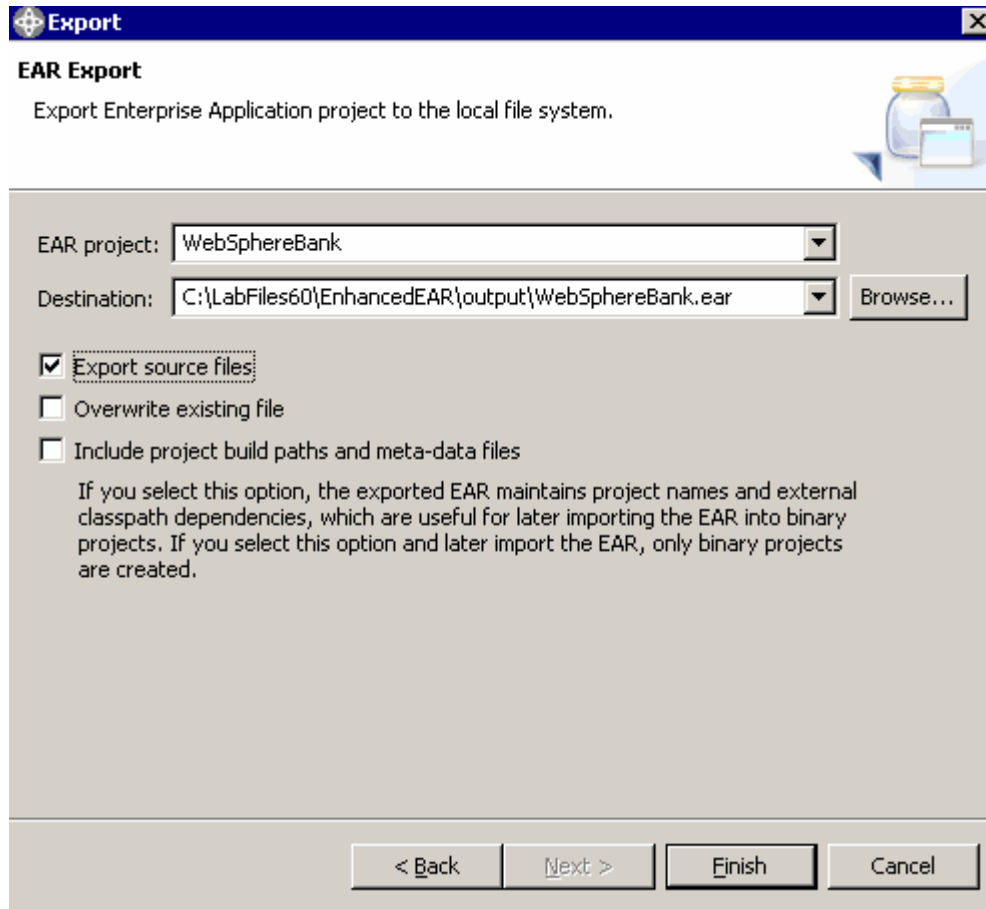
___ i. Click on the **Save** button on the top of the window to save the changes.



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

___ 5. Export the EAR file from Application Server Tool Kit (or IRAD).

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



- ___ e. Click **Finish**.

Part 2: Creating the BANKDB Cloudscape database

This step demonstrates the creation of the Cloudscape BANKDB database, which you will need for the WebSphereBank application. You will use commands to create the database and tables. The database will be created in the <LAB_FILES>/CloudscapeDB directory.

___ 6. Generate the Cloudscape BANKDB database and tables.

___ a. In a command window, navigate to

```
/etc/c6cellB/AppServer/cloudscape/bin/embedded
```

___ b. Issue the Cloudscape ij command to start the Cloudscape utility

```
./ij.sh
```

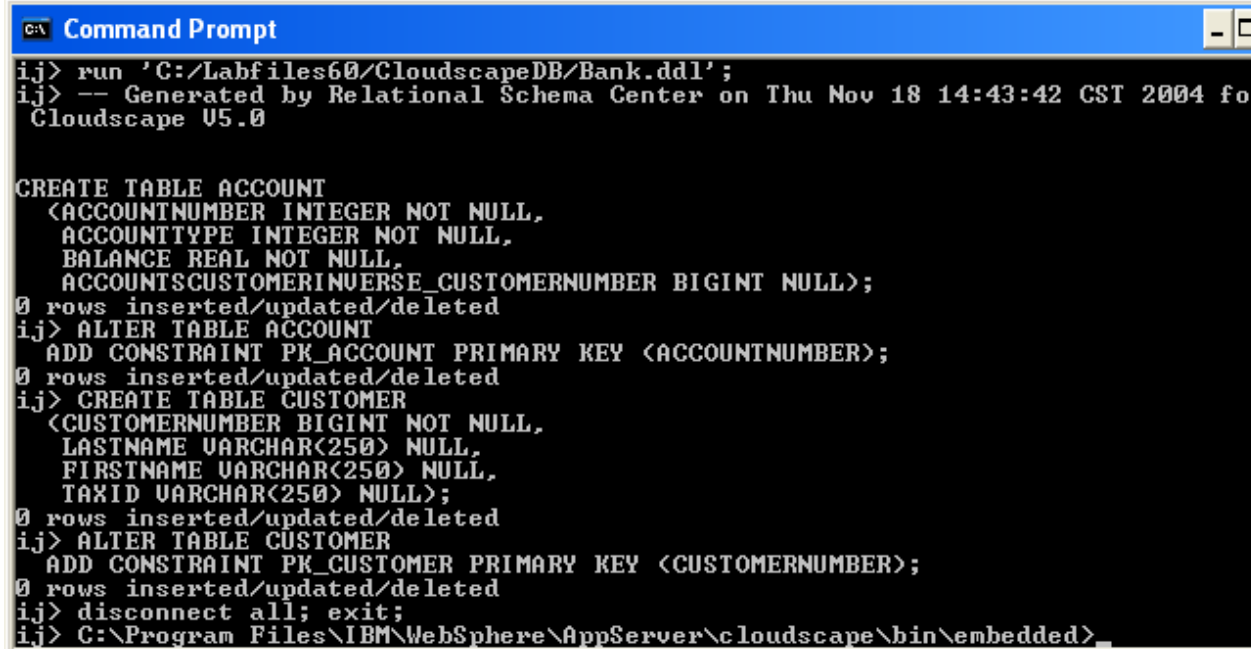
___ c. Issue the following commands, replacing <LAB_FILES> with your lab file path:

```
mkdir /tmp/LabFiles60/CloudscapeDB
```

```
connect 'jdbc:db2j:/tmp/LabFiles60/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

1) run 'tmp/LabFiles60/common/Bank.ddl';



```

C:\ Command Prompt
ij> run 'C:/Labfiles60/CloudscapeDB/Bank.ddl';
ij> -- Generated by Relational Schema Center on Thu Nov 18 14:43:42 CST 2004 fo
Cloudscape U5.0

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>

```

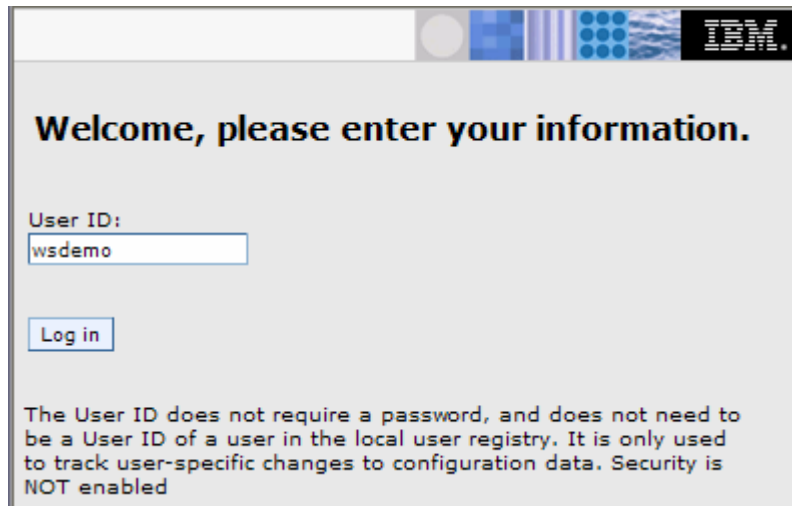
2) disconnect all; exit;

3) Go to the <LAB_FILES> directory and issue 'chmod -R 777 CloudscapeDB'

The BANKDB database and tables have been created.

Part 3: Installing and Testing the application

- ___ 1. Start the Administrative Console.
 - ___ a. Open a Web Browser and navigate to the following URL:
http://<HOST_NAME>:9080/ibm/console
 - ___ b. When prompted for a User ID, enter **wsdemo** to log in.



If prompted to save configuration changes, save them.

- ___ 2. Expand **Applications** and click **Install New Application** under Applications on the navigation panel.
- ___ 3. Click **Browse** for the Local File system .
- ___ 4. Navigate to and select **<LOCAL_LAB_FILES>\EnhancedEAR\output\WebSphereBank.ear** and click **Open**.
- ___ 5. Click **Next**.
- ___ 6. 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.
- ___ 7. If you see an **Application Security Warnings** page, click **Continue**.

___ 8. Step 1: **Select Installation Options** screen, verify information.

___ a. Verify that **Deploy Enterprise Beans** is not selected.

___ b. Make sure the application name is **WebSphereBank**.

Specify options for installing enterprise applications and modules.

→ **Step 1: Select installation options**

[Step 2](#) Map modules to servers

[Step 3](#) Select current backend ID.

[Step 4](#) Provide JNDI Names for Beans

[Step 5](#) Provide default data source mapping for modules containing 2.x entity beans

[Step 6](#) Map data sources for all 2.x CMP beans

Select installation options

Specify the various options that are available 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**.

___ 9. Step 2: Click **Next**.

___ 10. Step 3: **Provide Options to perform the EJB Deploy** screen, select database type.

___ a. Select **Cloudscape_V51_1** as the database type.

Specify options for installing enterprise applications and modules.

[Step 1](#) Select installation options

[Step 2](#) Map modules to servers

→ **Step 3: Select current backend ID.**

Select current backend ID.

Specify the selection for the BackendID

EJB module	URI	CurrentBackendId
WebSphereBankEJB	WebSphereBankEJB.jar,META-INF/ejb-jar.xml	<input type="text" value="CLOUDSCAPE_V51_1"/>

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. Step 4: Click **Next**.

___ 12. 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.

__ b. Click **Next**.

__ c. If you see a warning panel, click **Continue**.

___ 13. 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.

__ c. If you see a warning panel, click **Continue**.

____ 14. Click **Step 10 Summary** and review the values in the screen capture:

Notice the **Application Scoped Resources** option.

Summary of installation options

Options	Values
Use Binary Configuration	No
Create MBeans for resources	Yes
Cell/Node/Server	Click here
Reload interval in seconds	
Enable class reloading	No
Process embedded configuration	Yes
Application name	WebSphereBank
Validate Input off/warn/fail	warn
Application Scoped Resources	Yes
Directory to install application	
Distribute application	Yes
Deploy Web services	No
Pre-compile JSP	No
Deploy enterprise beans	No

____ 15. 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

___ 16. Save your changes.

___ a. Click **Save to Master Configuration**.

ADMA5011: Cleanup of temp dir for app WebSphereBank done.

ADMA5013: 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.

___ 17. Start the WebSphereBank applications.

___ a. Expand **Applications > Enterprise Applications**.

___ b. Select **WebSphereBank** and click **Start**.

___ 18. Test the application.

___ a. Open a browser.

___ b. Enter the URL **http://<HOST_NAME:9080/WebSphereBankWeb/**.

___ c. Click on **Create Customer**.

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

Create Customer

Messages

Customer Number:	<input type="text" value="20"/>
First Name:	<input type="text" value="Jane"/>
Last Name:	<input type="text" value="Smith"/>
TAX ID:	<input type="text" value="222-22-2222"/>

___ 19. You will see details for customer created. Click **Create Account**.

Customer Details

New Customer has been successfully created

Customer Number:	20
First Name:	JANE
Last Name:	SMITH
TAX ID:	222-22-2222

- ____ 20. Enter **201** 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="20"/>
Account Number:	<input type="text" value="201"/>
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"/>

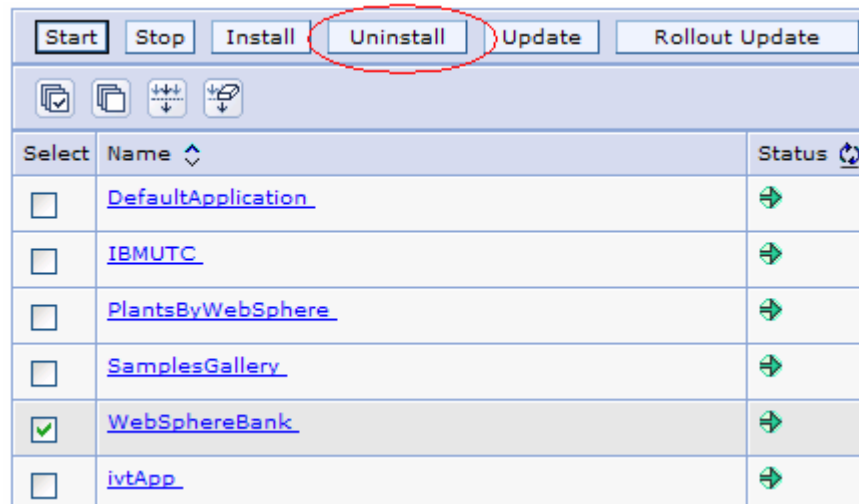
If the accounts are created without generating errors, then the Data Source is working otherwise make sure the **dbname** is correct in datasource properties and make sure to test the datasource.

- ____ 21. You are finished testing the application.

Part 4: Cleanup

In this section you will uninstall the WebSphereBank application.

- ____ 22. In the Administrative console, under **Applications > Enterprise Applications**, select the **WebSphereBank** application and click on **Uninstall**.



- ____ 23. Click **OK**.
- ____ 24. Click **Save** in the banner at the top of the page.
- ____ 25. Click the **Save** button.

What you did in this exercise

First, you created an enhanced EAR using the AST or IRAD. 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.

Solution Instructions

For solution, you can use the enhanced ear located in the solutions folder.

- ____ 1. Navigate to folder <LOCAL_LAB_FILES>\EnhancedEAR\solutions.
- ____ 2. Copy <LOCAL_LAB_FILES>/EnhancedEAR\solutions\WebSphereBank.ear into folder <LOCAL_LAB_FILES>\EnhancedEAR\output.
- ____ 3. Proceed with the above lab starting at **Part 2**.