

IBM WEBSHERE 6.0 SKILLS TRANSFER – LAB EXERCISE

Installing WebSphereBank Application using Cloudscape

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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. Documents will be furnished solely for the purpose of and for the duration of the Beta Test.

12/17/2004 1:21 PM

What this exercise is about

The objective of this lab is to demonstrate installing and configuring the WebSphere Bank enterprise application to run on WebSphere application server V6 using Cloudscape database.

Lab Requirements

List software required for the student to complete the lab.

- Installation of WebSphere Application Server version 6
- Installation of lab sample code into directory
 - Windows: **C:\Labfiles60**
 - UNIX/Linux: **/tmp/Labfiles60**
- This Lab also contain "SHOWME" Flash demo. To view this demo you will need a flash plug-in for your browser.

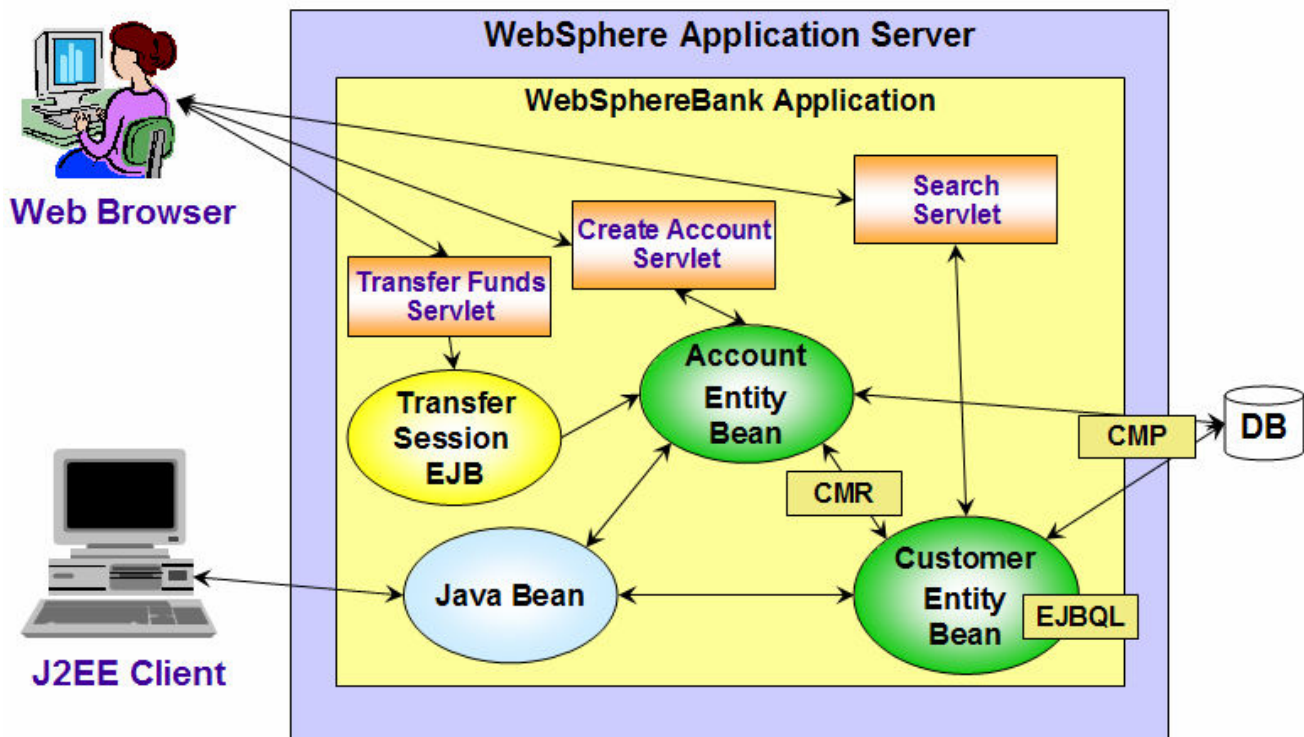
What you should be able to do

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

- Install an enterprise application
- Configure Cloudscape JDBC Driver and Data Source necessary for WebSphereBank to run.

Introduction

J2EE 1.4 Application - WebSphereBank



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.

The JSPs show the usage of JSP Expression Language and custom tags.

The EJBs illustrate the use of the EJB Query Language in the Finder and Select methods. The relationship between the Customer bean and the Account bean is a one-to-many relationship that is maintained by the container using Container Managed Relationships (CMR) and the Local interfaces of the beans.

The EJB Timer Service is used in this application to implement the scheduling of an interest calculation. It is a facility of the EJB container that allows enterprise beans to receive time-based notifications. The

service allows the bean provider to register enterprise beans for timer callbacks that occur at a specified time, after a specified elapsed time, or at specified recurring intervals. The service creates a timer to schedule callbacks. When the time specified at timer creation elapses, the container invokes the `ejbTimeout()` method of the bean.

In parts 3 and 4, you will create a Cloudscape BankDB database and associated tables using the Cloudscapeview utility and command scripts. The database contains the tables that are used by the WebSphereBank application.

Exercise Instructions

Because these instructions are not operating-system specific, the directory locations will need to be replaced in commands you type. You will also see `<MyNode>` substituted for the name of your node. Unless an exception is noted in the instructions, the term UNIX is synonymous to AIX, Solaris, and HP-UX operating systems throughout this document.

Location Reference	Windows example	UNIX/Linux example
<code><WAS_HOME></code>	<code>C:\WebSphere\AppServer\</code>	<code>/usr/WebSphere/AppServer (AIX)</code> <code>/opt/WebSphere/AppServer (Linux, Solaris, HP-UX)</code>
<code><WAS_USER_SCRIPT></code>		
<code><LAB_FILES></code>	<code>C:\Labfiles60</code>	<code>/tmp/Labfiles60</code>

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 prepare the lab setup script and run a script that will test for and, if present, remove the default WebSphereBank sample application and its associated Data Source.
- ___ 1. Within **<LAB_FILES>/common** directory, edit **labSetup.sh** or **.bat** file to ensure that the variables are correct for **WAS_HOME**, **WAS_USER_SCRIPT**, and **LAB_FILES**. Save the above changes and close the file
- ___ 2. UNIX/Linux: issue the following commands to ensure the scripts have “execute” rights
 - ___ 2. **chmod +x labSetup.sh**
- ___ 3. At the command prompt, navigate to **<WAS_HOME>/profiles/<PROFILE_NAME>/bin**
- ___ 4. Ensure the server is stopped
 - ___ a. Check to see if the server is running
 - ___ 3. Windows: **serverStatus server1**
 - ___ 4. UNIX/Linux: **./serverStatus.sh server1**
 - ___ b. If the server status indicates **STARTED**, then stop the server:
 - ___ 5. Windows: **stopServer server1**
 - ___ 6. UNIX/Linux: **./stopServer.sh 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. 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.

- ___ 7.
- ___ 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:
 - ___ 8. Windows: (Note: the forward slash is correct even for windows)
wsadmin -conntype none -f <LAB_FILES>/common/prepWSBank.jacl
 - ___ 9. UNIX/Linux:
./wsadmin.sh -conntype none -f <LAB_FILES>/common/prepWSBank.jacl
- ___ 6. Start the server, in preparation for next part of the lab
 - ___ a. Navigate to **<WAS_HOME>/profiles/<PROFILE_NAME>/bin** and issue:
 - ___ 10. Windows: **startServer server1**
 - ___ 11. UNIX/Linux: **./startServer.sh server1**

- ___ 12. Note: the start is successful when you see a message, such as:
- ___ 13. Server server1 open for e-business; process id is XXXX.
- ___ 14.

Part 2: Installing the WebSphereBank Application

___ 15. You will install the WebSphereBank ear file that is provided in the WebSphereBank lab file using the WebSphere Application Server Admin Console.

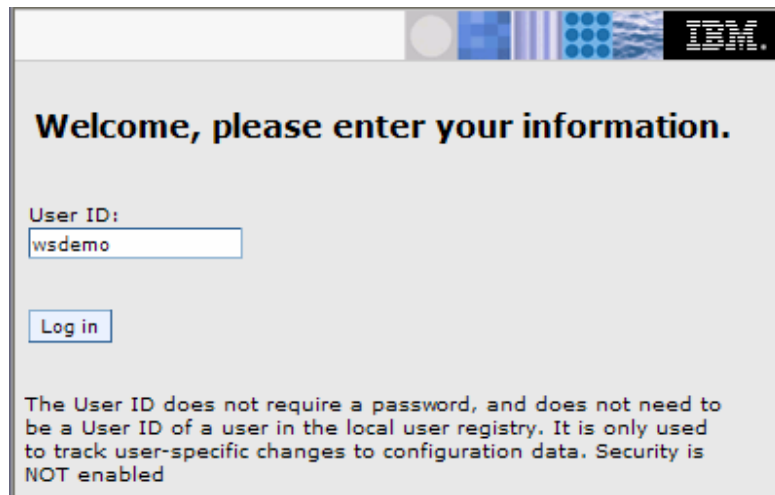
To see an animation of installing the WebSphereBank application click here: 

___ 1. Open a Browser and start the Admin Console

___ a. In the browser's Address bar, enter <http://localhost:9060/ibm/console>

___ 16.

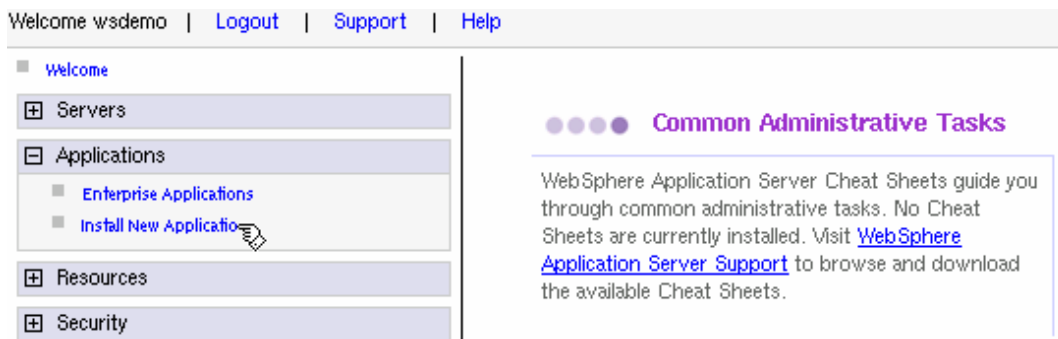
___ 17. Log in to the Admin Console with appropriate user ID



___ 18.

___ 19.

___ 20. Expand **Applications** and click **Install New Application** under Applications on the navigation panel



___ 27.

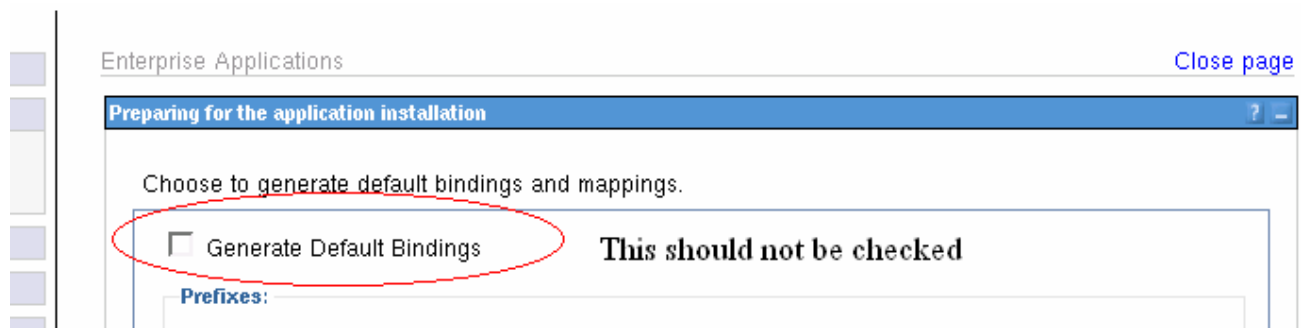
___ 28.

___ 29.

___ 30.

___ 31.

- ___ 4. Click **Browse** for the Local File system
 - ___ a. Appropriate to your operating system platform, take necessary actions within the dialogue boxes to navigate to <LAB_FILES>/WASv6_AppInstall/ directory and select/open the file **WebSphereBank.ear**.
 - ___ b. On the “**Preparing for the application installation**” screen, click **Next**
- ___ 32.
- ___ 5. In “**Preparing for the application installation**”
 - ___ a. Ensure that “Generate Default Bindings” is unchecked, since all the bindings are configured in the deployment descriptors.



- ___ b. Click **Next**
- ___ 33.
- ___ 6. If you see an **Application Security Warnings** screen, click **Continue**
- ___ 34.

___ 35.

___ 7. In “**Step 1: Select installation options**” :

___ a. Ensure that **Deploy Enterprise Beans** is checked

___ b. Ensure the application name is **WebSphereBank**

___ 36.

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

Step 6 Map data sources for all 2.x CMP beans

Step 7 Map EJB references to beans

Step 8 Map virtual hosts for Web modules

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

WebSphereBank

Create MBeans for resources

Enable class reloading

Reload interval in seconds

Deploy Web services

Validate Input off/warn/fail

warn

Process embedded configuration

___ a. Click **Next**

___ 8. In “**Step 2: Map modules to servers**”, accept the default mapping by clicking **Next**

___ 9. In “**Step 3: Provide Options to perform the EJB deploy**”:

___ 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 style="border: 1px solid black; padding: 2px;"> DB2UDB_V72 DB2UDB_V81 CLOUDSCAPE_V5 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**

___ 10. In “**Step 4: Provide JNDI Names for Beans**” click **Next** to accept the default values for JNDI Names

___ 11. In “**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**

___ 12. In “**Step6: Map datasources for all 2.0 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	BankCMRQLEJB	BankCMRQLEJB.jar,META-INF/ejb-jar.xml	eis/jdbc/Bank_CMP
<input type="checkbox"/>	Customer	BankCMRQLEJB	BankCMRQLEJB.jar,META-INF/ejb-jar.xml	eis/jdbc/Bank_CMP

___ 37.

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. Continue to click **Next** to accept all defaults until **Step 11**

- ___ 14. In “**Step 11: Summary**”:
- ___ a. verify the values in the screen capture
 - ___ b. Click **Finish**

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

Note: the step numbers are context sensitive. Which panels are displayed depends on the contents of the EAR file. Other applications may have different step numbers. The steps that were skipped over here were panels where the defaults are taken.

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

___ 38.

___ 15. Save your changes

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

ADMA50111: Cleanup of temp dir for app WebSphereBank done.

ADMA50131: Application WebSphereBank installed successfully.

Application WebSphereBank installed successfully.

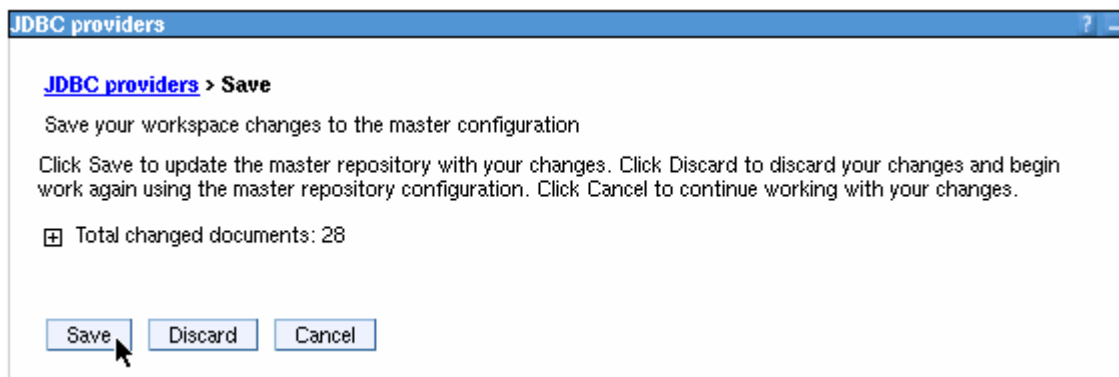
If you want to start the application, you must first save changes to the master configuration.

Save to Master Configuration

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

Manage Applications

___ b. Click **Save** on the “**Enterprise Applications > Save**” screen

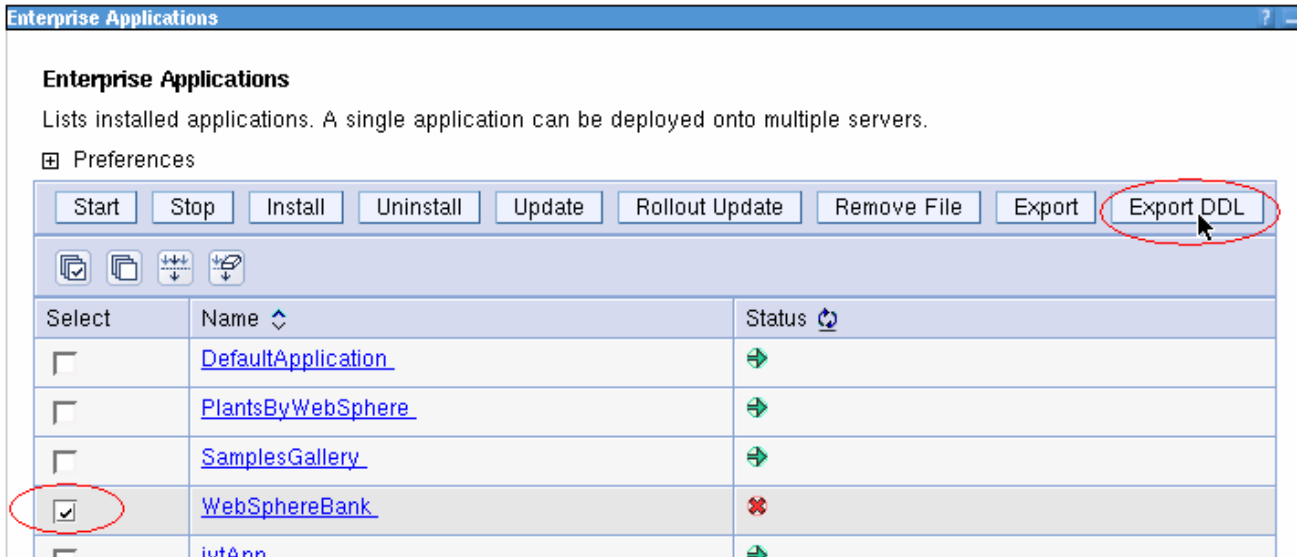


Part 3: Creating the BANKDB Cloudscape database

___ 39. This step demonstrates the creation of the Cloudscape BANKDB database, which you will need for the WebSphereBank application. You will generate the DDL and use commands to create the database and tables. The database will be created in the <LAB_FILES>/CloudscapeDB directory.

___ 1. Create the DDL

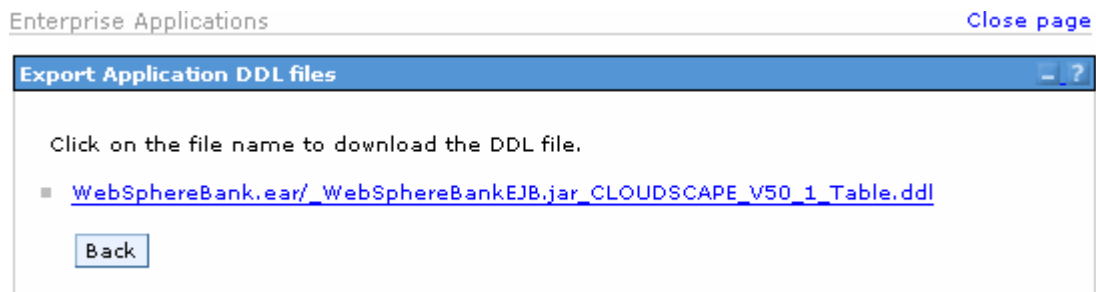
- ___ a. Logon to the WebSphere administration console
- ___ b. Expand “Applicatons” in the left pane
- ___ c. Click **Enterprise Applications**
- ___ d. Select WebSphereBank by clicking the checkbox next to the application name
- ___ e. Click on **Export DDL**



___ 40.

___ 41.

- ___ f. Click on the DDL name to download; select the item related to _WebSphereBankEJB.jar



___ 42.

___ 43.

___ 44.

___ 45.

___ g. Appropriate to your operating system platform, take necessary actions within the dialogue boxes to navigate to <LAB_FILES>/CloudscapeDB and save the file as **Bank.ddl**.

___ h. Close the dialog box

___ 2. Generate the Cloudscape BANKDB database and tables.

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

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

___ 46. Windows: **ij**

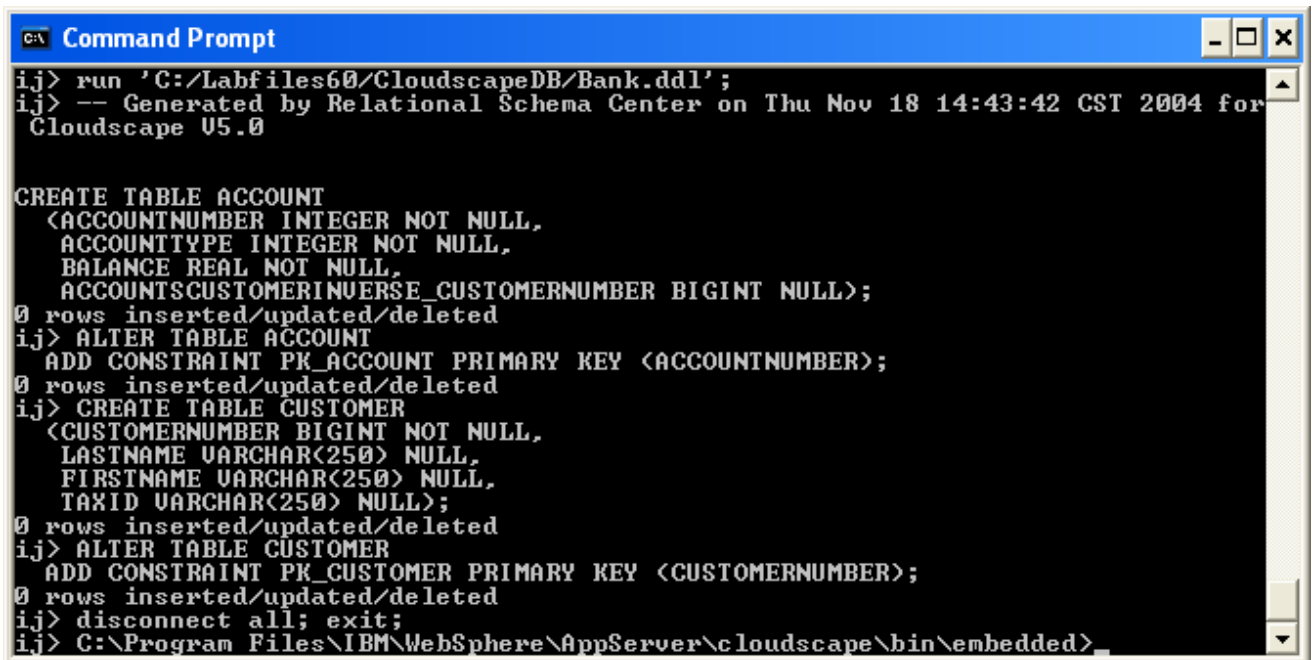
___ 47. UNIX/Linux: **./ij.sh**

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

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

___ 48. **Note:** this command may run for 10 to 30 seconds; when the command completes, you will see the "ij>" prompt with no messages

2) run '<DB_LOCATION_INSTALL>/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 for
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>

```

___ 49.

3) disconnect all; exit;

___ 50.

The BANKDB database and tables have been created.

Part 4: Configure a JDBC Driver and a Data Source

- ___ 51. You will define and configure the JDBC Driver and Data Source so the WebSphereBank application can access the Cloudscape BANKDB database you have previously created.

To see an animation of the steps in this section, click here:

Before the WebSphereBank application can be started, some resources must be in place. WebSphereBank application expects to find a JDBC connected database. While it is not necessary to configure the resources before installing an application, there is a benefit to installing after the resources are configured: the drop-down boxes in the application installation screens will be populated with the correct resource names, reducing the chance of a typographical error.

- ___ 1. Start the server

___ a. Navigate to `<WAS_HOME>/profiles/<PROFILE_NAME>/bin` and issue:

___ 52. Windows: `startServer server1`

___ 53. UNIX/Linux: `./startServer.sh server1`

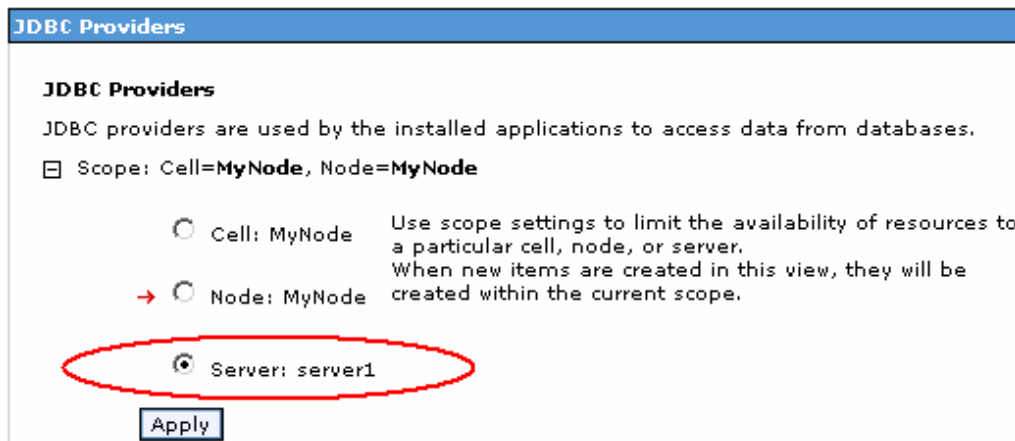
- ___ 2. Open a Browser and start the Admin Console

___ 54. In the browser's Address bar, enter <http://localhost:9060/ibm/console>

- ___ 3. Log in to the Admin Console using appropriate user ID

- ___ 4. Data sources and other resources are organized under the Resources heading. Expand **Resources** and click **JDBC Providers** to configure the data source which the WebSphereBank application will use to store data.

- ___ 5. The existing JDBC Providers that are configured at the Node level will be displayed. In order to configure a new provider scoped to the Application Server, select **Server: server1**.



- ___ 6. Click **Apply**

Note: the JDBC Providers that are configured at the Server level were not displayed immediately when you clicked Server1; they were only displayed when you clicked Apply.

Note: if the node is federated with a Deployment Manager, you will see a browse button and will need to browse to the node before selecting a server.

- ___ 7. Click **New**. In the **General properties** screen, select:
 - ___ a. Step 1: Select the database type as **Cloudscape**.
 - ___ b. Step 2: Select the provider type as **Cloudscape JDBC Provider**.
 - ___ c. Step 3: Select the implementation type as **XA data source**.

General Properties

Step 1: Select the database type
Cloudscape

Step 2: Select the provider type
Cloudscape JDBC Provider

Step 3: Select the implementation type
XA data source

Next Cancel

___ 55.

- ___ 8. Click **Next**.
- ___ 9. In this screen change the provider name to **WebSphereBank Cloudscape JDBC Provider (XA)**

General Properties

* Scope
cells:MyNode:nodes:MyNode:servers:server1

* Name
WebSphereBank Cloudscape JDBC Provider (XA)

- ___ 10. Change the description to **WebSphereBank Cloudscape JDBC Provider (XA)**

Description
WebSphereBank Cloudscape
JDBC Provider (XA)

- ___ 11. Click **OK**. The list of JDBC Providers configured at the server scope will be displayed.
- ___ 12. Click **WebSphereBank Cloudscape JDBC Provider (XA)**
- ___ 13. Click **Data Sources** under Additional Properties on the right side of the window.
- ___ 14. Click **New** to create a Data Source.

- ___ 15. The empty configuration properties for the data source will be displayed. Enter the following:
- ___ a. Name: **BANKDS**
 - ___ b. JNDI name: **jdbc/Bank**
 - ___ c. Make sure there is check next to **“Use this Data Source in container managed persistence (CMP)”**
- Note: If this box is not checked, you will have problems at runtime because the corresponding connection factory will not be created.
- ___ d. Description: **Data Source for the WebSphereBank entity beans**

* Name
BANKDS

JNDI name
jdbc/Bank

Use this Data Source in container managed persistence (CMP)

Description
Data Source for the
WebSphereBank entity beans

- ___ e. Near the bottom of the same screen under Cloudscape data source properties type the **Database name** as **<LAB_FILES>/CloudscapeDB/BANKDB** (replacing <LAB_FILES> with your lab file path):
- ___ 56.

Cloudscape data source properties

* Database name
es60\CloudscapeDB\BANKDB

Apply OK Reset Cancel

- ___ 16. Click **OK**; the data source BANKDS will appear within the list of data sources

- ___ 17. Click **BANKDS**
- ___ 18. On the right hand side click on **Custom properties**
- ___ a. Click **connectionAttributes**
- ___ b. Enter the value **upgrade=true**

Note: The value “upgrade=true” will cause Cloudscape database version to be checked. If it is at an earlier version level, the database will be converted to the current level.

- ___ c. Click **OK**

Select	Name	Value	Description	Required
<input type="checkbox"/>	shutdownDatabase	-	If set to the string 'shutdown', this will cause the database to shutdown when a java.sql.Connection object is obtained from the Data Source. E.g., If the Data Source is an XADataSource, a getConnection().getConnection() is necessary to cause the database to shutdown.	false
<input type="checkbox"/>	dataSourceName	-	Name for ConnectionPooledDataSource or XADataSource. Not used by the data source object. Used for informational purpose only.	false
<input type="checkbox"/>	description	-	Description of the Data Source. Not used by the Data Source object. Used for informational purpose only.	false
<input type="checkbox"/>	connectionAttributes	upgrade=true	Connection attributes specific to Cloudscape. Please see Cloudscape documentation for a complete list of features.	false
<input type="checkbox"/>	createDatabase	-	If set to the string 'create', this will cause a new database of DatabaseName if that database does not already exist. The database is created when a connection object is obtained from the Data Source.	false
<input type="checkbox"/>	reauthentication	false	Specifies whether to allow reauthentication of connections. This option requires	false

- ___ 19. Your Data Source is completely defined. With WebSphere Application Server v6.0, configuration changes to your server, such as defining a JDBC Provider and Data Source, must be saved with an explicit call to the Save operation in the Administrative console.
- ___ 20. Click [Save](#) in the banner at the top of the page

- ___ 21. Click the **Save** button
- ___ 22. Log out of the Admin Console
 - __ a. Click the **Logout** link in the header
- ___ 23. Stop and restart the server
 - __ a. Stop the server
 - ___ 57. Windows: **stopServer server1**
 - ___ 58. UNIX/Linux: **/stopServer.sh server1**
 - __ b. Start the server
 - ___ 59. Windows: **startServer server1**
 - ___ 60. UNIX/Linux: **./startServer.sh server1**

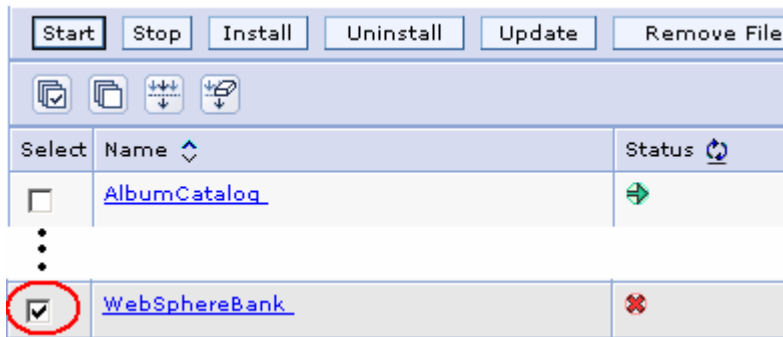
Note: There are two reasons for stopping and restarting the application server at this point. The first is that changes to Data Sources are picked up at startup. The second is that there is a naming issue in the Beta with EJBs not being removed from the namespace when the application stops. If the Samples had been installed, installing and starting WebSphereBank at this point would result in errors starting the EJBs.

Part 5: Testing the Application

___ 61. You will test the WebSphereBank application by creating accounts, transferring funds, displaying balances, and invoking the Timer bean.

To see an animation of testing the WebSphereBank application, click here:

- ___ 1. Start the WebSphereBank application
 - ___ a. Login to admin console
 - ___ b. Expand **Applications**
 - ___ c. Click **Enterprise Applications**
 - ___ d. If the WebSphereBank application is not started, select the checkbox for **WebSphereBank**



- ___ e. Click **Start**
- ___ 2. Open a new browser window
- ___ 3. Enter the URL <http://localhost:9080/WebSphereBankWeb/>
- ___ 4. You should see the following screen:



Home

Customer

Create Customer

Create Account

Transaction

Get Balance

Transfer Funds

Interest

Search By

Customer Name

Customer Number

Home Page

WebSphere Bank offers solutions for all your financial needs. The fastest, most convenient way to access your accounts, create your customer, create their accounts, check their balances, transfer accounts online. You can search for a particular customer or an account.

Savings and Checking accounts are available to you at all our branches across the country. We offer free internet banking.

WebSphere Bank offers a checking account with no monthly service fees, no check writing limit, and no minimum balance.

If you are a new customer then before creating an account you must [create customer](#).

___ 62.

___ 63.

___ 5. Test the Data Source

___ a. Create a new Customer:

1) Click on **Create Customer** link under “Customer” and fill in the following values and click **Create**.

Customer Number:	1
First Name	firstname
Last Name	lastname
Tax ID	1000

2) Click **Create**

Customer Number:

First Name:

Last Name:

TAX ID:

___ b. You will receive a successful customer creation confirmation like **New Customer has been successfully created**

___ c. Click on **Create Account**

___ d. Enter these values:

Customer Number:	1
Account Number:	256
Account Type	Checking
Starting Balance	1000

___ a. Click **Create**

Customer Number:

Account Number:

Account Type: Savings Checking

Starting Balance: \$

___ 64.

___ b. Create a second account using these values:

Customer Number: 1
Account Number: 257
Account Type Savings
Starting Balance 2000

___ c. Click **Create**

If the customer and 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.

___ e. Test the Account and Transfer entity beans

___ a. Click **Transfer Funds**

___ b. Enter these values:

1) From Account 256
2) To Account 257
3) Amount 5

___ c. Click Transfer

___ d. The balances displayed should reflect that \$5 was moved from account 256 to account 257

Transfer Funds

Successfully transferred the funds
The current balance for From Account 256 is 995.00
The current balance for To Account 257 is 2005.00

- ____ f. Test the Timer bean
- ____ 65. Note: The Interest Timer on the Interest page of the WebSphere Bank Sample creates an Enterprise JavaBeans (EJB) timer that expires every 10 seconds. Interest that is based on the interest rate and the account balance is calculated, added to the specified account, and the timer is set to expire in another 10 seconds. This is for demonstration purposes only.
- __ a. Click **Interest**
 - __ b. Enter Account **256**
 - __ c. Enter % Interest rate of **10**
 - __ d. Click **Create Timer**
 - __ e. Click **Get Balance**
 - __ f. Enter Account Number **256**
 - __ g. Click **Balance**
 - __ h. Note that the balance has gone up by ten percent (or more, depending on elapsed time).

Get Balance

The Balance for the Account Number 256 is \$
1094.50

- __ i. Re-enter Account Number **256** and click **Balance**. Continue entering the number and clicking Balance every 10 seconds or so and watch the account balance climb.

The Balance for the Account Number 256 is \$
2132.87

Entity beans set **timers** on a specific type of entity bean (in this case, the Account bean) with a specific primary key. When a timer goes off, the first thing that the container does is use the primary key associated with the timer to load the entity bean with proper data. Once the entity bean is in the ready state, the `ejbTimeout()` method is invoked. The `ejbTimeout()` method on the Account bean increments the balance by the percentage passed to it; the interval in this case is hard-coded to 10 sec.

- ____ g. Turn off the timer bean.

Note: When you are done with the testing, always stop the timer bean.

- __ a. Click **Interest**
- __ b. Enter Account **256**
- __ c. Enter Interest rate of **10**
- __ d. Click **Cancel Timer**
- __ e. **"Interest cancel succeeded"** will be displayed

What you did in this exercise

In the first part of this exercise, you prepared the lab setup script and ran a script that tested for and removed the default WebSphereBank sample application and its associated Data Source.

In Part 2, you installed the WebSphereBank ear file that was provided in the WebSphereBank lab file using the WebSphere Application Server Admin Console.

____ 66. In Part 3, you generated the DDL and used commands to create the BANKDB database and tables.

In Part 4, you defined and configured the JDBC Driver and Data Source.

Finally, in Part 5 you tested functions of the WebSphereBank application.