

IBM WEBSPHERE 6.0.1 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.

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 V6.0.1 using Cloudscape database.

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.
- Installation of lab sample code into directories
 - Windows workstation: **C:\Labfiles60**
 - z/OS server system: **/etc/Labfiles60**
- This Lab also contain “SHOWME” Flash demo. To view this demo you will need a flash plug-in for your browser.

- Experience with previous versions of WebSphere Application Server and the J2EE programming model is also helpful.

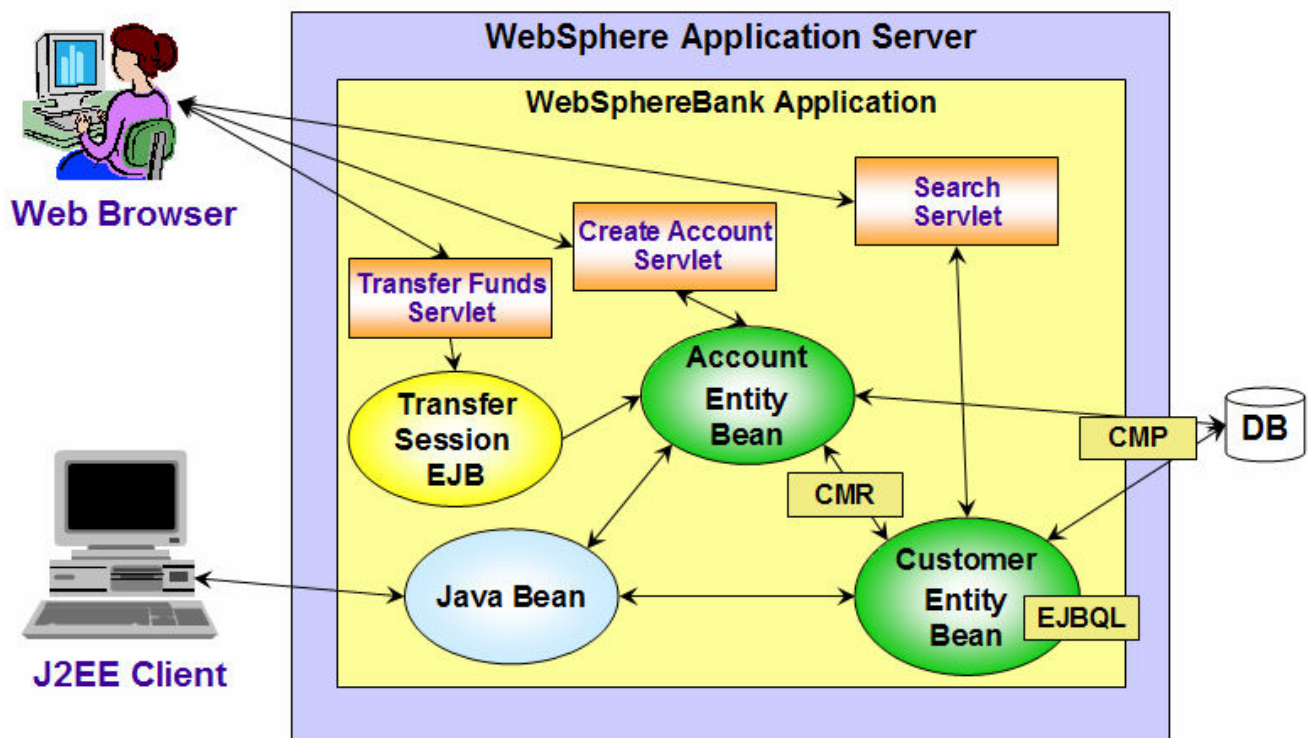
What you should be able to do

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

- Update your application in WebSphere Application Server v6.0.1.
- Initiate a partial application update within WebSphere Application Server v6.0.1.

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

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	

**** NOTE **** Solution instructions are normally provided at the end. The solution is not provided in this case because you need to do the exercises in order to understand Java tools and there is no final solution to import. To go through the lab, start at Part One assuming you have met the requirements in the section “User Requirements” stated above.

Part 1: Preparing the Environment on Host System

___ 1. You will prepare the lab setup script.

___ a. Telnet to your host system:

```
telnet MVS22x.RTP.RALEIGH.IBM.COM 1023
```

```
cd /etc/LabFiles60/common
```

___ b. Within **<HOST_LAB_FILES>/common** directory, edit **labSetup.sh** 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. If you are running this lab on the class systems, all the information should be correct. So if you don't feel comfortable using vi editor, you can skip this step.

```
vi labSetup.sh
```

“j” scrolls down.

“:q” quits and “:wq” writes and quits

___ 2. Issue the following commands to ensure the scripts have “execute” rights:

```
chmod +x labSetup.sh
```

___ 3. Ensure the server is started

___ a. At the command prompt, navigate to **<WAS_HOME>/profiles/default/bin**

```
cd /etc/c6cellB/AppServer/profiles/default/bin
```

___ b. Check to see if the server is running

```
./serverStatus.sh <SERVER_NAME>
```

___ c. If the server status does not indicate STARTED, then start the server:

```
./startServer.sh <SERVER_NAME>
```

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.

___ 1. 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
```

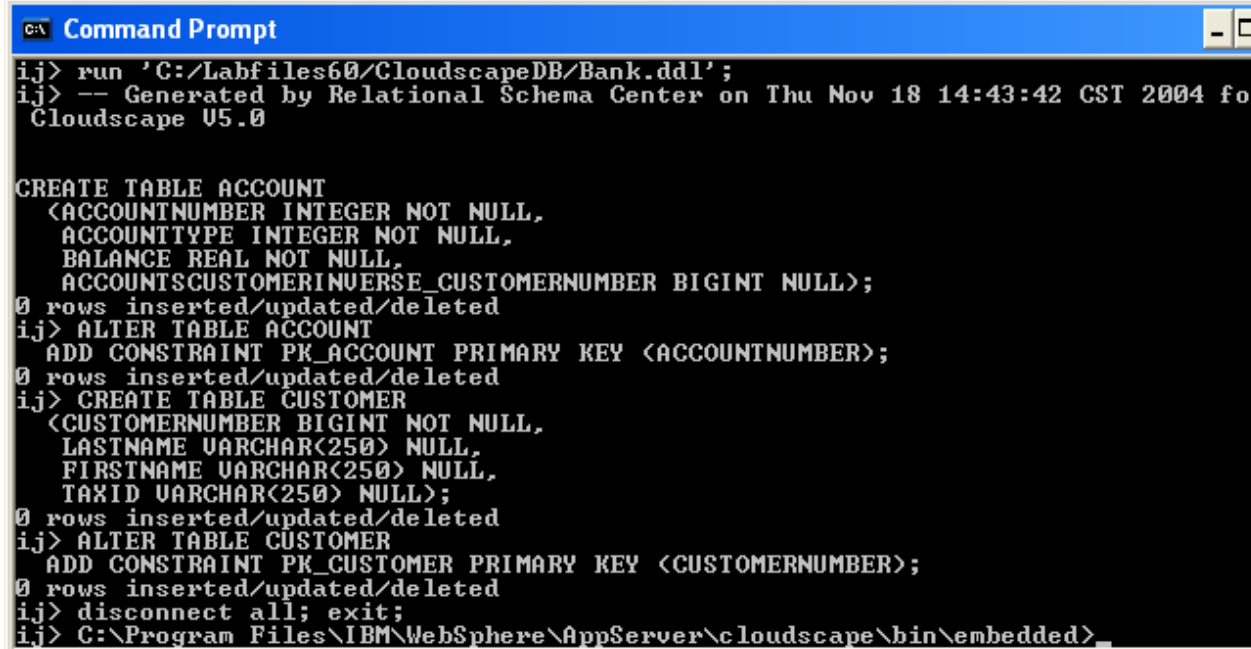
___ c. Issue the following commands, replacing <LAB_FILES> with your lab file path:

```
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;

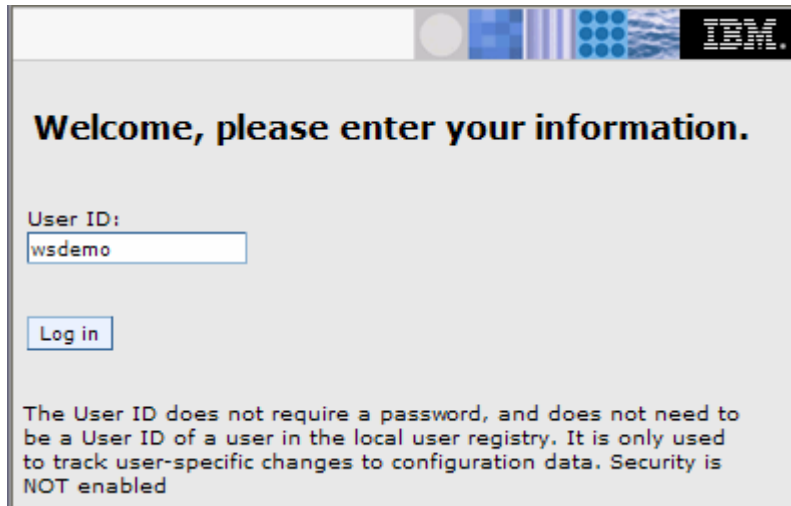
3) Go to the <LAB_FILES> directory and issue 'chmod -R 777 CloudscapeDB'

The BANKDB database and tables have been created.

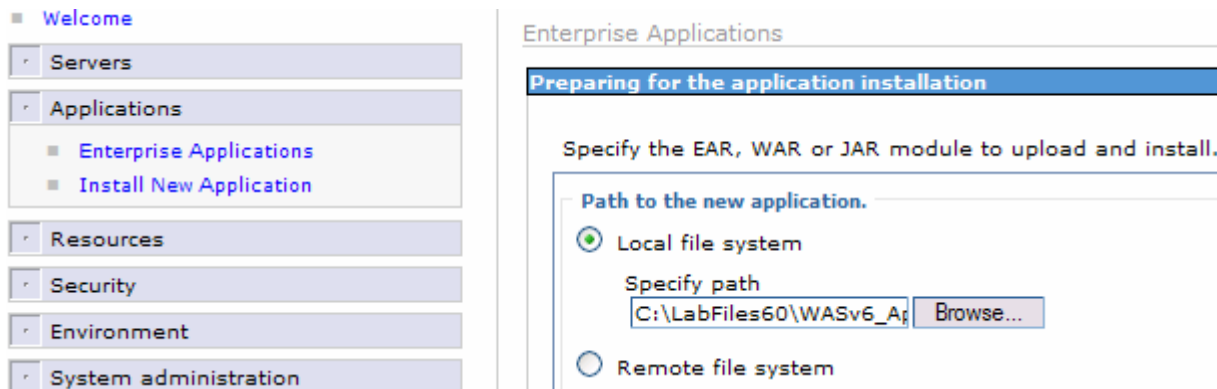
Part 3: Installing the WebSphereBank Application

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

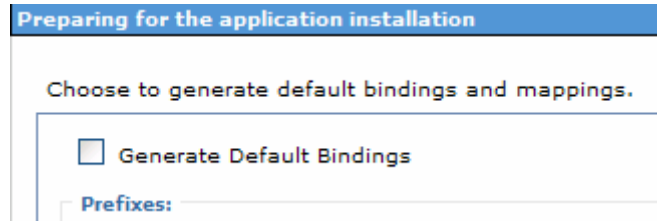
- ___ 1. Start the Administrative Console.
 - ___ a. Open a Web Browser and navigate to the following URL:
http://<HOST_NAME>:9080/ibm/console
 - ___ b. When prompted for a User ID, enter **wsdemo** to log in.



- ___ 2. Expand **Applications** and click **Install New Application** under Applications on the navigation panel.
- ___ 3. For path specify <LOCAL_LAB_FILES>\ApplInstall\WebSphereBank.ear.



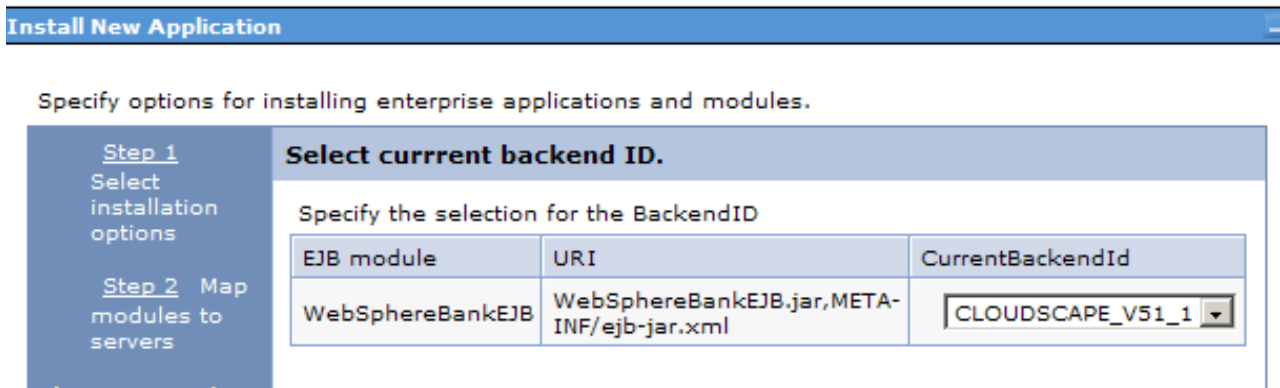
- ___ 4. Click **Next**.
- ___ 5. On the next screen, ensure that “Generate Default Bindings” is unchecked, since all the bindings are configured in the deployment descriptors.



- ___ 6. Click **Next**.
- ___ 7. If you see an Application Security Warnings screen, click **Continue**.
- ___ 8. In “**Step 1: Select installation options**” :
 - ___ a. Ensure that **Deploy Enterprise Beans** is unchecked (we deployed the Enterprise Beans in IRAD)
 - ___ b. Ensure the application name is **WebSphereBank**.

Error! Objects cannot be created from editing field codes.

 - ___ c. Click **Next**.
- ___ 9. In “**Step 2: Map modules to servers**”, accept the default mapping by clicking **Next**.
- ___ 10. In “**Step 3: Select current backend ID.**”:
 - ___ a. Verify that **Cloudscape_V51_1** is selected.



This was done in IRAD when we ran the EJBDeploy on the beans. We only have one choice here because we only deployed the beans to the Cloudscape backend. If we had deployed to a variety of backends, there would be more choices here. 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. In “**Step 4: Provide JNDI Names for Beans**” click **Next** to accept the default values for JNDI Names
- ___ 12. 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**

___ 13. If you see any Warnings, click **Continue**.

___ 14. 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

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.

___ 15. If you see any Warnings, click **Continue**.

___ 16. Click on **Step 10** to skip over the remaining steps.

___ 17. In “**Step 10: Summary**”:

__ a. Review the values in the screen capture

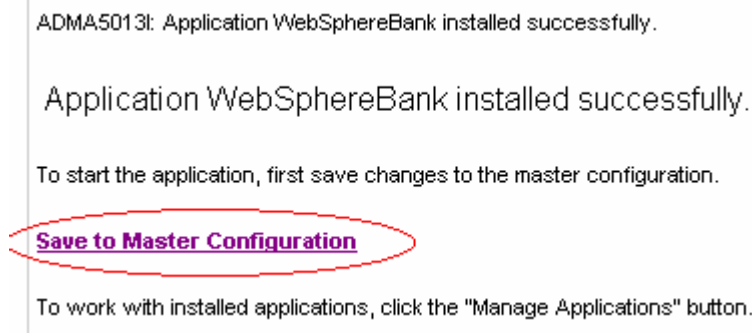
Summary	
Summary of installation options	
Options	Values
Use Binary Configuration	No
Create MBeans for resources	Yes
Cell/Node/Server	Click here
Reload interval in seconds	
Enable class reloading	No
Process embedded configuration	Yes
Application name	WebSphereBank
Validate Input off/warn/fail	warn
Directory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

__ b. Click **Finish**

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.

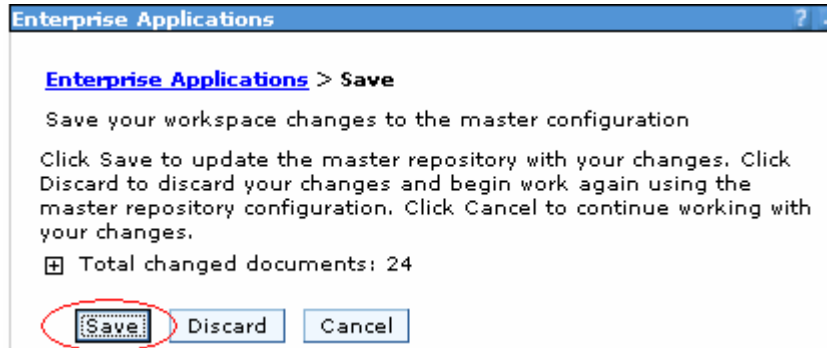
The installation process will take a minute or two. An instance of the workbench is started and the Ejbdeploy process runs, preparing a copy of the EAR file to be installed. Wait for the message that says the application installed successfully

___ 18. After messages indicate installation was successful, you need to **Save to Master Configuration**.



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

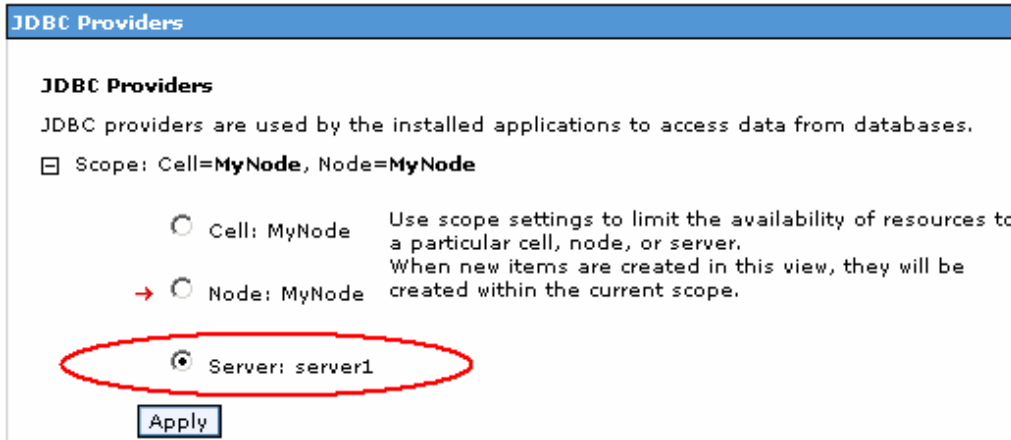
___ b. Click **Save**.



Part 4: Configure a JDBC Driver and a Data Source

You will define and configure the JDBC Driver and Data Source so the WebSphereBank application can access the Cloudscape BANKDB database.

- ___ 1. 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.
- ___ 2. 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: <SERVER_NAME>**.



- ___ 3. Click **Apply**

Note: the JDBC Providers that are configured at the Server level were not displayed immediately when you clicked <SERVER_NAME>; 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.

- ___ 4. Click **New**. In the **General properties** screen, select:
 - ___ a. Step1: 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

- ___ 5. Click **Next**.
- ___ 6. 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 Provi

- ___ 7. Change the description to WebSphereBank Cloudscape JDBC Provider (XA)

Description
WebSphereBank Cloudscape
JDBC Provider (XA)

- ___ 8. Click **OK**. The list of JDBC Providers configured at the server scope will be displayed.
- ___ 9. Click **Save** in the banner at the top of the page.
- ___ 10. Click the **Save** button.
- ___ 11. Click **WebSphereBank Cloudscape JDBC Provider (XA)**
- ___ 12. Click **Data Sources** under Additional Properties on the right side of the window.
- ___ 13. Click **New** to create a Data Source.
- ___ 14. 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 <HOST_LAB_FILES>/CloudscapeDB/BANKDB (Ex. /etc/LabFiles60/CloudscapeDB/BANKDB):

Cloudscape data source properties

* Database name
es60\CloudscapeDB\BANKDB

Apply OK Reset Cancel

___ 15. Click **OK**; the data source BANKDS will appear within the list of data sources.

___ 16. Click **Save** in the banner at the top of the page.

___ 17. Click the **Save** button.

___ 18. Click **BANKDS**.

___ 19. 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**.

___ 20. 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.

___ 21. Click **Save** in the banner at the top of the page.

___ 22. Click the **Save** button.

___ 23. Log out of the Admin Console.

___ a. Click the **Logout** link in the header.

___ 24. Stop and restart the server from you telnet session.

___ a. Stop the server

```
./stopServer.sh <SERVER_NAME>
```

___ b. Start the server

```
./startServer.sh <SERVER_NAME>
```

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

Part 5: Testing the Application

In this section you will uninstall the WebSphereBank application.

- ___ 3. Test the application.
 - ___ a. Open a browser.
 - ___ b. Enter the URL **http://<hostname>:9080/WebSphereBankWeb/**.
 - ___ c. Click on Create Customer.
 - ___ d. Enter Customer Number, Name and Tax ID. Click **Create**.

Create Customer

Messages

Customer Number:	<input type="text" value="10"/>
First Name:	<input type="text" value="John"/>
Last Name:	<input type="text" value="Doe"/>
TAX ID:	<input type="text" value="012-34-5678"/>

- ___ 4. 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

- ___ 3. 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:

Account Number:

Account Type: Savings Checking

Starting Balance: \$

- ___ 4. Create a second account.
- ___ a. Enter **102** for the Account Number, **Savings** for account type and **400** for the starting balance. Click **Create**.

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.

- ___ 5. Test transferring funds.
- ___ a. Click **Transfer Funds**.

___ b. For the From Account enter **101**, for the To Account enter **102**, and for the amount enter **10**.

From Account:	<input type="text" value="101"/>
To Account:	<input type="text" value="102"/>
Amount:	<input type="text" value="\$ 10"/>
<input type="button" value="Transfer"/>	<input type="button" value="Reset"/>

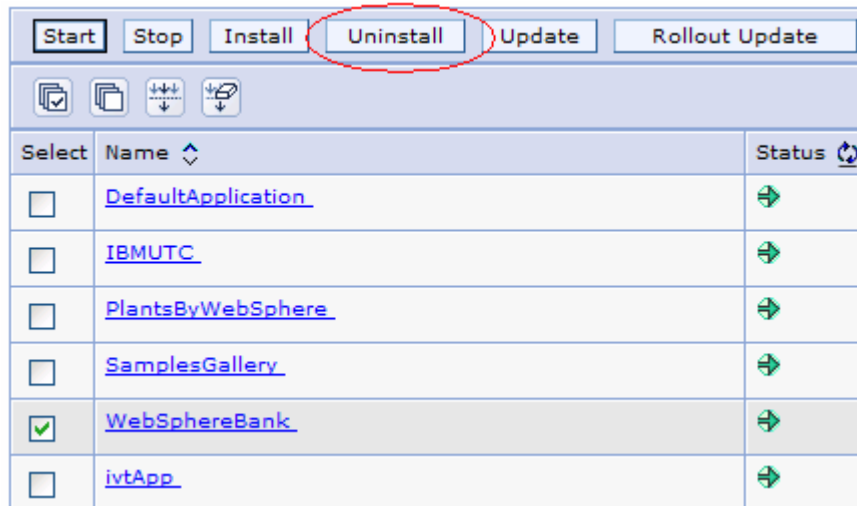
___ c. Click **Transfer**.

___ d. You will notice that the messages reflect the transfer amount.

Part 6: Cleanup

In this section you will uninstall the WebSphereBank application.

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



2. Click **OK**.
3. Click **Save** in the banner at the top of the page.
4. Click the **Save** button.
5. You can now close your browser.

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.

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.