

IBM RATIONAL APPLICATION DEVELOPER 6.0 – LAB EXERCISE

EJB Mediator

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What this exercise is about

The objective of this lab is to provide you with an understanding of the tooling support for the EJB Mediator. This lab also demonstrates how to use this technology in association with the JavaServer Faces (JSF) support.

Lab Requirements

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

- IBM Rational Application Developer v6.0 with embedded WebSphere Application Server v6.0 Test Environment installed.
- Lab source files (Labfiles60.zip) must be extracted to the local system (preferably C:\).

What you should be able to do

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

- Create a web a new EJB Session Bean Façade
- Add an EJB Session Bean to the page data of a JSF resource

- Add and configure a selection column on a JSF data table
- Use generated Session Façade methods to query and delete back end data

Introduction

The EJB Mediator provides an Service Data Object (SDO) data mediator service for applications developed using CMP Entity EJBs. This technology is available to application developers by the create session bean façade feature. This feature allows developers to automatically develop a session bean façade to access Entity EJBs. The methods that are exposed on the session bean façade return SDO DataObjects. This technology can easily be incorporated with JSF technology by adding the Session Bean Façade to the page data of a JSF page by an EJB Session Bean data item.

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
<LAB_FILES>	C:\Labfiles60	/tmp/Labfiles60
<LAB_NAME>	IRAD_EJBMediator	

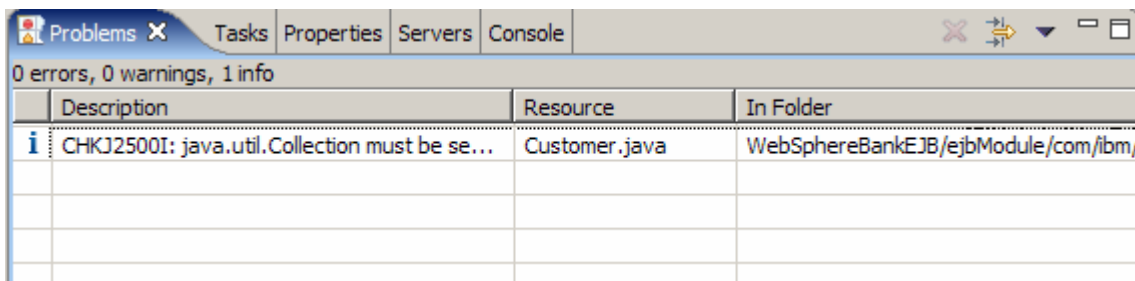
Windows users please note: When directory locations are passed as parameters to a Java program such as EJBdeploy or wsadmin, it is necessary to replace the backslashes with forward slashes to follow the Java convention. For example, C:\LabFiles60\ would be replaced by C:/LabFiles60/

Part 1: Import the WebSphereBank EAR file

- ___ 1. Start IBM Rational Application Developer v6.0 with a new workspace.
 - ___ a. Select **Start > Programs > IBM Rational > IBM Rational Application Developer V6.0 > Rational Application Developer**.
 - ___ b. When prompted enter **<LAB_FILES>\IRAD_EJBMediator\workspace** for your workspace.
 - ___ c. Click **OK**.
 - ___ d. When IBM Rational Application Developer v6.0 opens, close the **Welcome page**

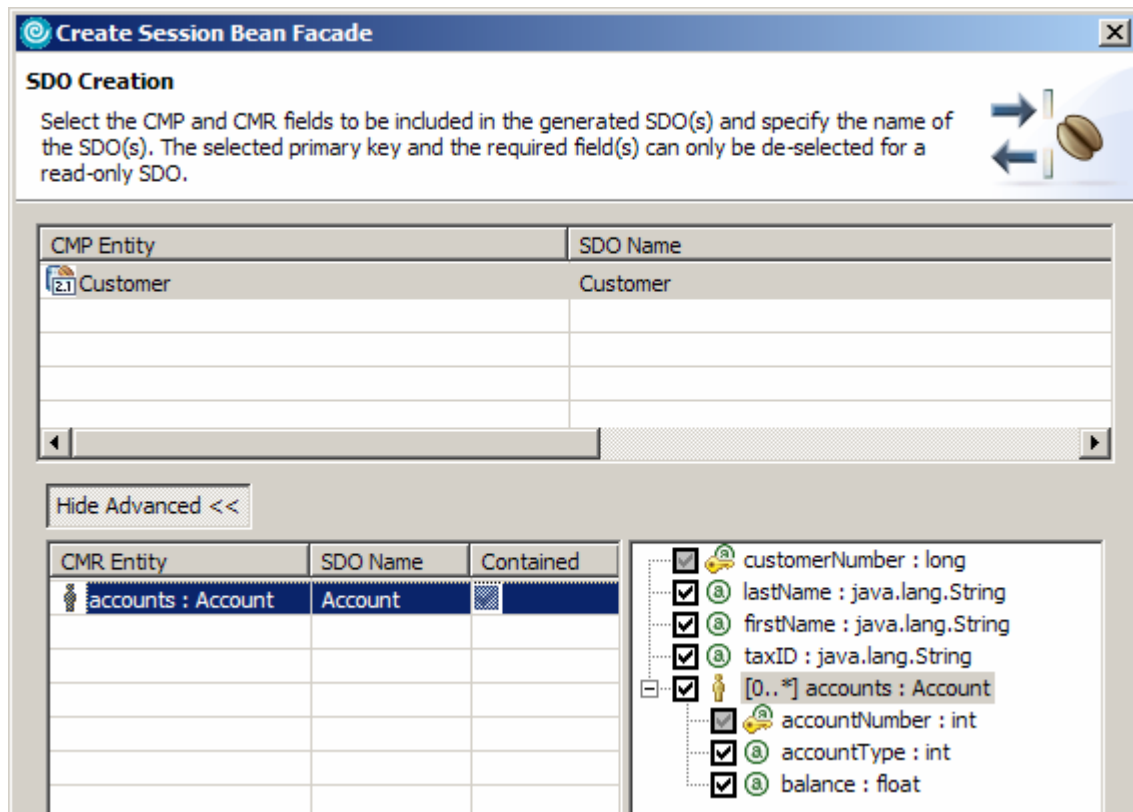
NOTE: If the Auto Launch Configuration Change Alert window appears click the **Yes** button to change the auto launch eclipse instance to use when opening IBM Rational Software Development Platform in the future.

- ___ 2. Import the WebSphereBank application into Rational Application Developer for testing.
 - ___ a. Select **File > Import...**
 - ___ b. Select **EAR file** and click **Next**.
 - ___ c. Select **Browse...** and navigate to **<LAB_FILES>\IRAD_EJBMediator\WebSphereBankInitial.ear** and click **Open**.
 - ___ d. Change the EAR project to **WebSphereBank**.
 - ___ e. Click **Finish**.
- ___ 3. When the import is complete, you will notice several errors in the Problems view. These errors arise because the WebSphereBankWeb Dynamic Web Project does not include the WebSphereBankEJB EJB project in the build path. Resolve these errors before you start working with the EJB Mediator support.
 - ___ a. In the Project Explorer view, expand Dynamic Web Projects and right click on **WebSphereBankWeb**. From the context menu select **Properties**.
 - ___ b. Select **Java Build Path** on the left, and click the **Projects** tab. Select the checkbox next to **WebSphereBankEJB**.
 - ___ c. Click **OK**.
 - ___ d. Verify that there are no errors in the Problems view. The Problems view should look like the following screen capture:



Part 2: Create a Customer Session Bean Façade

- ___ 1. Create a new Session Bean Façade for the Customer Entity Bean.
 - ___ a. From the Project Explorer view, expand **EJB Projects > WebSphereBankEJB > Deployment Descriptor: WebSphereBankEJB > Entity Beans**.
 - ___ b. Right-click on **Customer** and select **Create Session Bean Facade** from the context menu.
 - ___ c. From the Create Session Bean Facade wizard select **Customer** from the list of available CMP Beans and click **Next**.
 - ___ d. From the SDO Creation page click the **Show Advanced...** button.
 - ___ e. From the list of customer attributes in the right area, check the box next to **[0..*] accounts : Account** and then check the box next to **contained** for the **accounts : Account** CMR Entity.

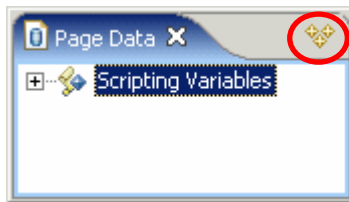


- ___ f. Click **Next** and uncheck the option to add this session bean to a class diagram.
 - ___ g. Click **Finish**.
- ___ 4. Explore generated code.
 - ___ a. From the Project Explorer view expand **EJB Projects > WebSphereBankEJB > gen/src > com.ibm.websphere.samples.ejb**. Explore the **CustomerFacadeBean** java class and become familiar with the methods in this class.

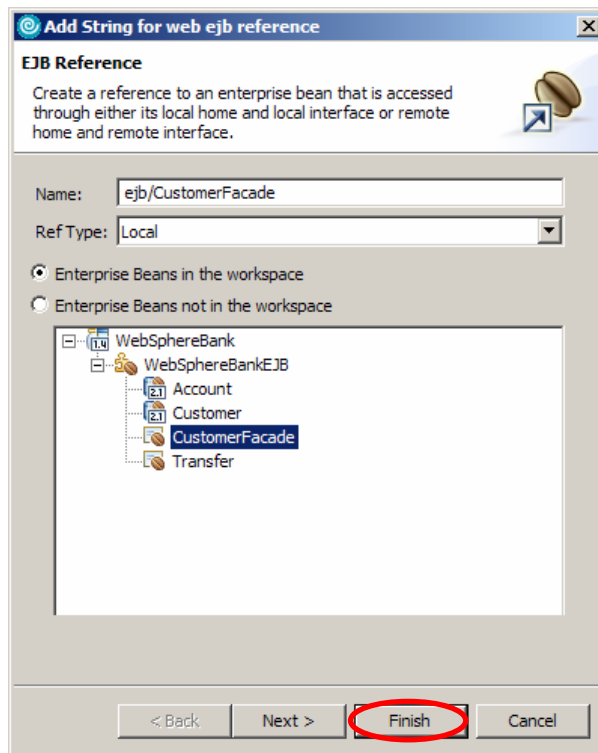
- ___ b. From the Project Explorer view expand **EJB Projects > WebSphereBankEJB > gen/src > com.ibm.websphere.samples.ejb.sdo**. Explore the static SDO classes included in this package.

Part 3: Create an Administration Page

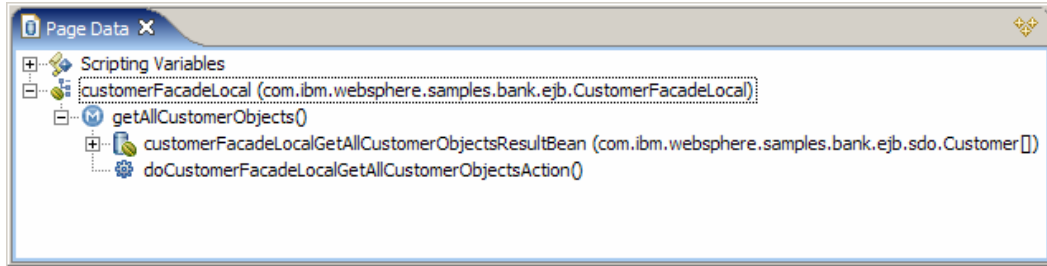
- ___ 1. Open the Web perspective if it is not already open.
 - ___ a. From the menu bar select **Window > Open Perspective > Web**.
- ___ 5. Open the admin.jsp file.
 - ___ a. From the Project Explorer view, expand **Dynamic Web Project > WebSphereBankWeb > WebContent**.
 - ___ b. Double click on the file admin.jsp.
- ___ 6. Add a new EJB Session Bean to the admin.jsp page.
 - ___ a. From the Page Data view click on the **Create new data component...** button.



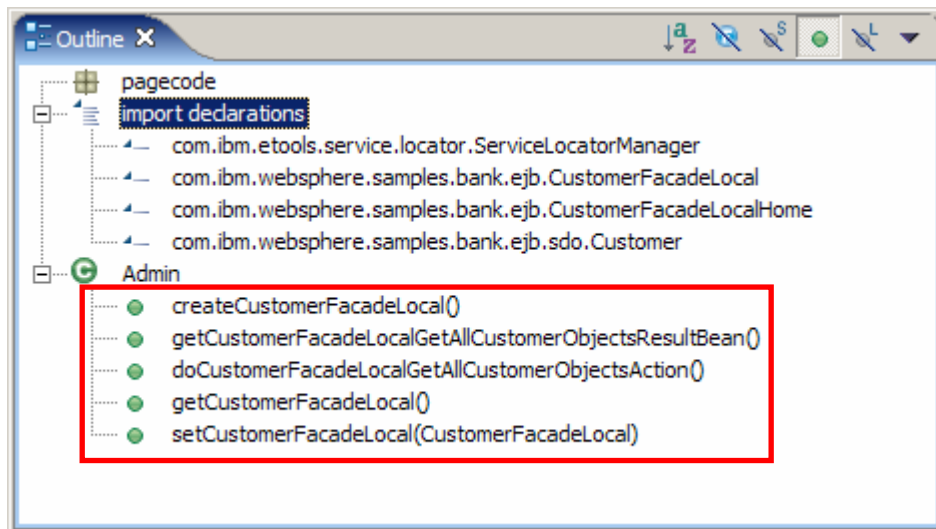
- ___ b. Select **EJB Session Bean** from the New Data Component dialog and click **OK**.
- ___ c. On the Select Reference page, click the **New EJB Reference...** button.
- ___ d. Expand **WebSphereBank > WebSphereBankEJB** and select **CustomerFacade** and click **Finish**.



- ___ e. From the Select Reference page, select **ejb/CustomerFacade** and click **Next**.
- ___ f. On the Select Method page, select the **getAllCustomerObjects()** method and click **Finish**.
- ___ g. Verify that the following item has been added to the Page Data view for the admin.jsp page.



- ___ 7. Open the Admin.java page code file and review the code that has been generated for this data item.
 - ___ a. Expand **Dynamic Web Project > WebSphereBankWeb > Java Resources > JavaSource > pagecode**.
 - ___ b. Double click on **Admin.java**.
 - ___ c. Become familiar with the methods and code generated in the Admin.java page code file. The following screen capture lists the methods you should be aware of.



- ___ d. Enter the following code into the `getCustomerFacadeLocalGetAllCustomerObjectsResultBean ()` method. For your convenience, this code can be found in **<LAB_FILES>\IRADv6_EJBMediator\snippets\snippet0.txt**.

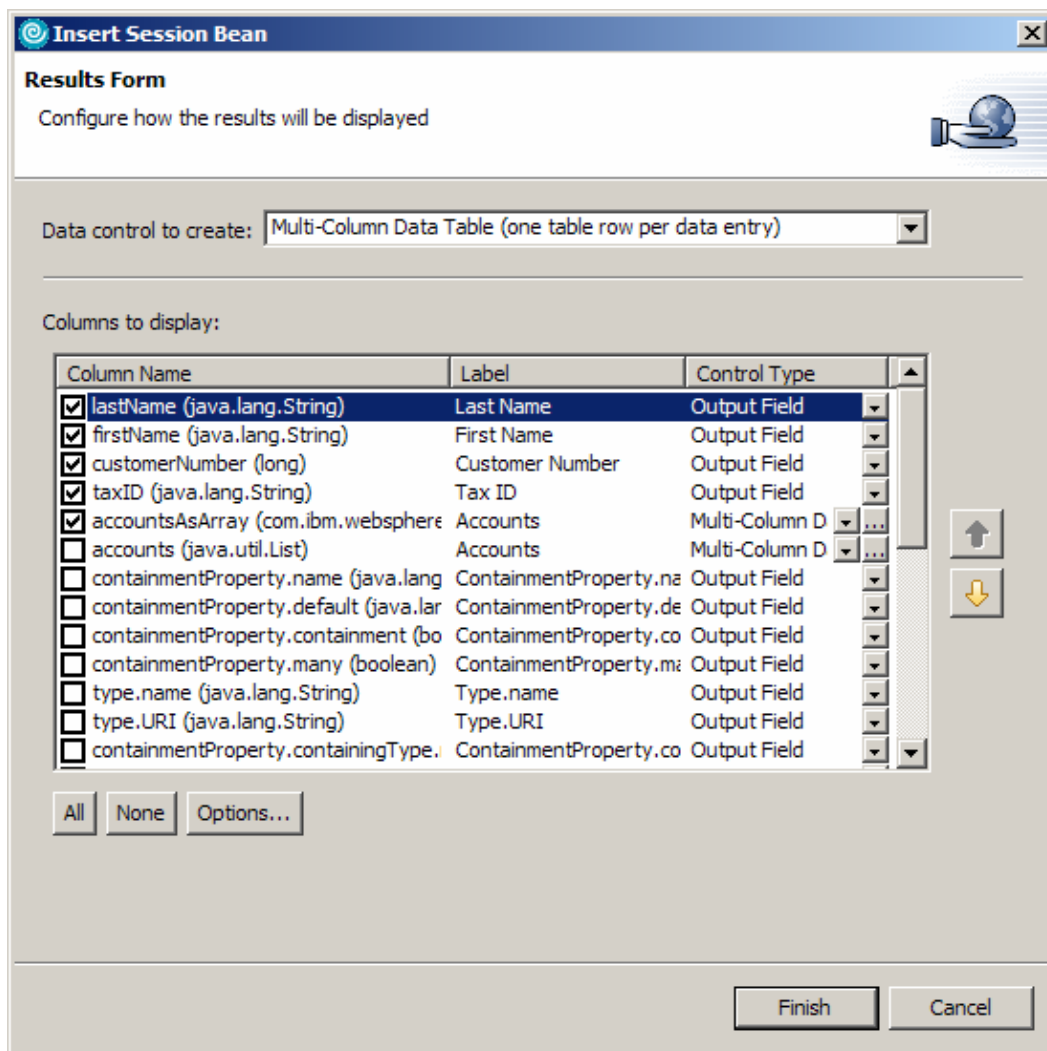
```

if (customerFacadeLocalGetAllCustomerObjectsResultBean == null) {
    try {
        customerFacadeLocalGetAllCustomerObjectsResultBean =
getCustomerFacadeLocal ().getAllCustomerObjects ();
    } catch (Exception e) {
        logException(e);
    }
}
return customerFacadeLocalGetAllCustomerObjectsResultBean;

```

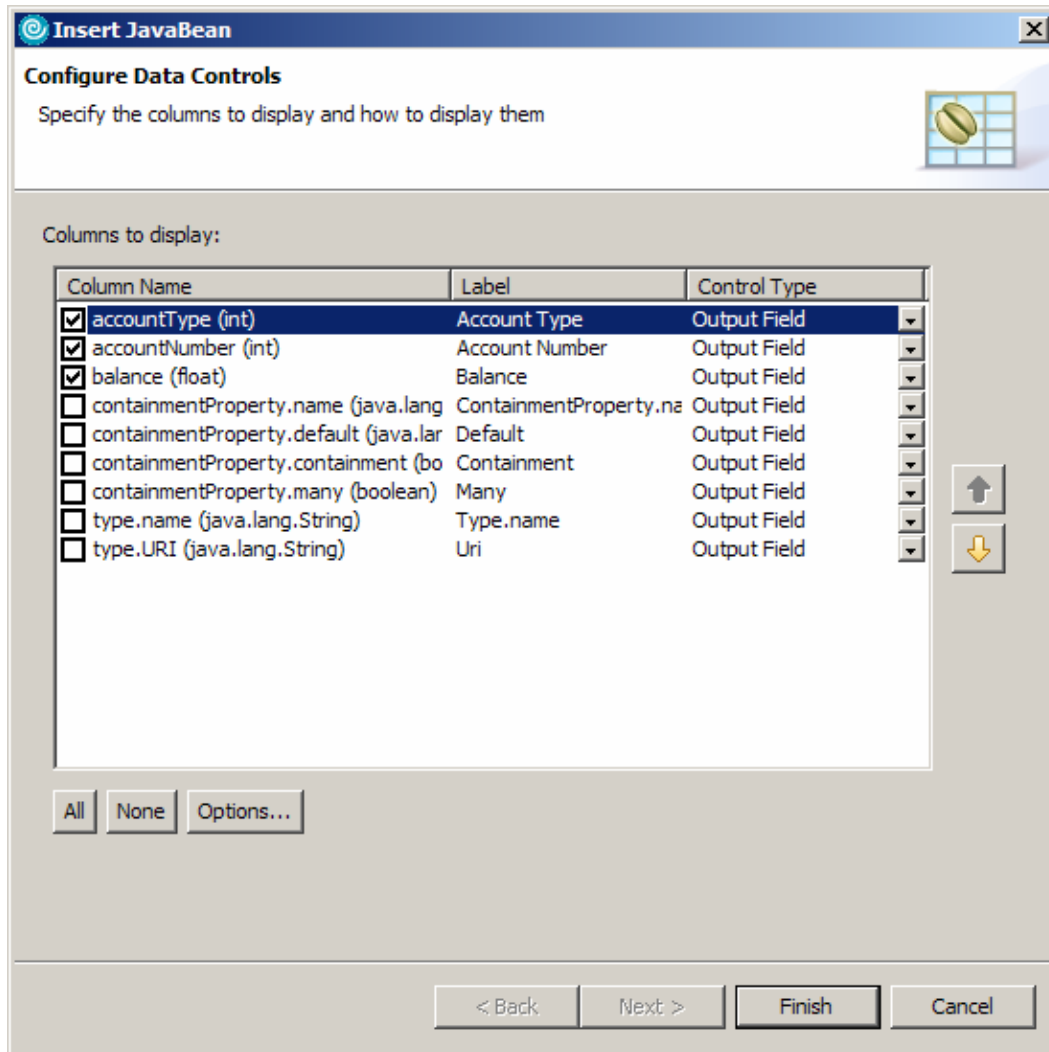
- ___ e. Save and close the file.

- ___ 8. Insert controls for the customerFacadeLocalGetAllCustomerObjectsResultBean data item.
- ___ a. From the Page Data view for the admin.jsp page, expand **customerFacadeLocal > getAllCustomerObjects()**.
 - ___ b. Right click on **customerFacadeLocalGetAllCustomerObjectsResultBean** and select **Insert New Controls for...** from the context menu.
 - ___ c. When the Object Type dialog comes up for the accounts collection, accept **java.lang.Object** as the default type by clicking **OK**.
 - ___ d. On the Results Form page click the **None** button to deselect all attributes.
 - ___ e. Select the check boxes next to the items indicated below. Use the arrow buttons to the right of the list box to arrange the order of items as indicated below.



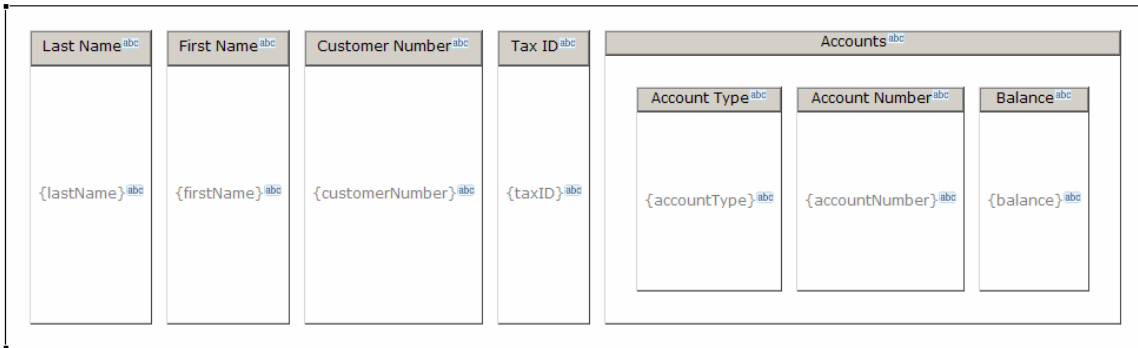
- ___ f. Change the Labels for the selected items as indicated above in the screen capture.
- ___ g. Click the ... button to the right of the accountsAsArray item.
- ___ h. On the Configure Data Controls page click the **None** button to deselect all attributes.

- ___ i. Select the check boxes next to items indicated below. Use the arrow buttons to the right of the list box to arrange the order of items as indicated below.



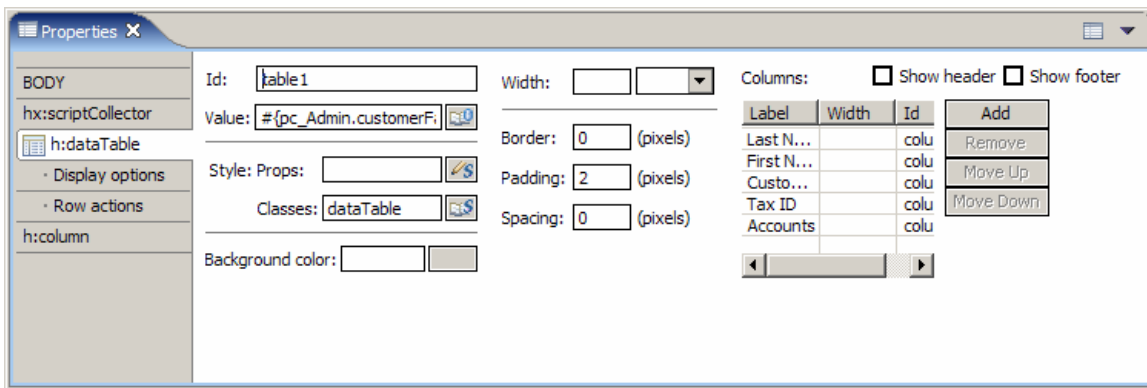
- ___ j. Change the Labels for the selected items as indicated above in the screen capture
- ___ k. Click **Finish** on the Configure Data Controls page for the accountsAsArray item
- ___ l. Click **Finish** again to complete the Insert New Controls for customerFacadeLocalGetAllCustomerObjectsResultBean process

9. Verify that your admin.jsp page looks like the following screen capture.



10. Configure the Customer data table to include: paging support, a selection column to the Customer table, and a delete button on the table header to delete selected items

- a. Go to the Properties view for the data table component on the admin.jsp page. To do this, select the data table component and go the Properties view. If you are having trouble selecting the data table component, select a column from the table and then go to the Properties view and click on the h:dataTable tab.

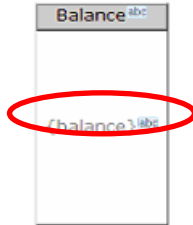


- b. Click the Display Options tab underneath h:dataTable.
- c. Click the button next to **Add a simple pager** and enter 5 in the Rows per page field.
- d. Click the **Row actions** tab underneath h:dataTable.
- e. Click the Add button next to **Add selection column to the table**.
- f. Remain on the **Row actions** tab under h:dataTable and click on the Add button next to **Add action that manipulates selection to header**.

Note: After adding the selection column to the table in the previous steps you may be taken to the hx:inputRowSelect tab. To complete the previous step you will need to return to the Row actions tab under h:dataTable.

11. Format the balance output text so that it will display a currency type data field.

__ a. Click on the balance output component in the table that is highlighted below.



__ b. In the properties view for the h:outputText component select **Number** for the format and **Currency** for the type.

___ 12. Create and bind boolean [] data to table selection component.

__ a. Open the Admin.java file

__ b. Add the following code right before the closing bracket of the class definition. For your convenience, this code can be found in

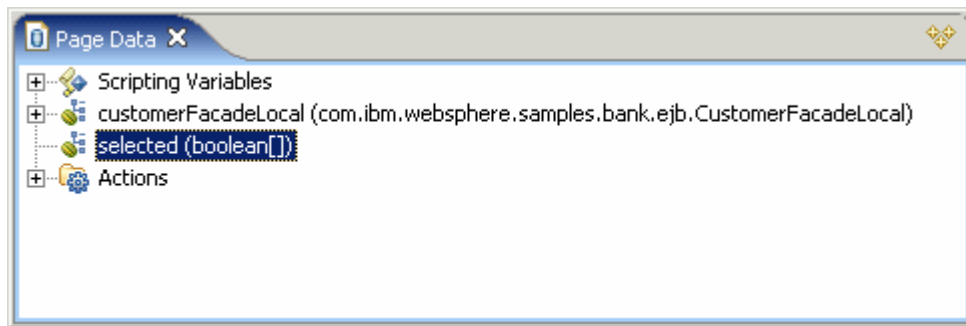
<LAB_FILES>IRADv6_EJBMediator\snippets\snippet1.txt

```
private boolean [] selected;
public boolean [] getSelected() {
    if (selected == null) {
        selected = new
boolean[customerFacadeLocal.getAllCustomerObjectsResultBean.length];
    }
    return selected;
}

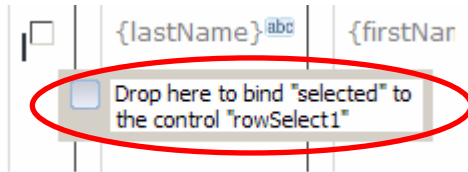
public void setSelected(boolean [] selected) {
    this.selected = selected;
}
```

__ c. Save and close the Admin.java file.

__ d. From the Page Data view for the admin.jsp page, verify that the following item shows up as available data.



- ___ e. Drag the selected(boolean[]) data item onto the selection box in the admin.jsp page. You will know this positioned correctly when you see a fly over message as indicated below.



- ___ f. Verify that the selection component has been bound correctly in the Properties view. From the hx:inputRowSelect tab find the value field and verify that the selection component is **#{pc_Admin.selected}**.

- ___ 13. Rename the submit button, and add the action method that will handle deleting the Customer records selected from the selection component

- ___ a. Select the **Submit** button that was added to the top of the admin.jsp page in an earlier step.
- ___ b. In the Properties view select the **Display options** tab under hx:commandExButton, then change the value of the field Button label to **Delete**.
- ___ c. Switch to the **Quick Edit** view.
- ___ d. Select the **Command** item in the left frame and click in the editor frame of the Quick Edit view.
- ___ e. Add the following code right above the return statement. For your convenience, this code can be found in <LAB_FILES>\IRADv6_EJBMediator\snippets\snippet2.txt.

```
String result = "success";
for (int i = 0; i < selected.length; i++) {
    if (selected[i]) {
        System.out
            .print("WebSphereBank >> Deleting customer: "
                +
                customerFacadeLocalGetAllCustomerObjectsResultBean[i]);
        try {
            customerFacadeLocal
                .deleteCustomer(customerFacadeLocalGetAllCustomerObjectsResultBean[i]
                    );
        } catch (Exception e) {
            result = "failure";
            e.printStackTrace();
        }
    }
}
customerFacadeLocalGetAllCustomerObjectsResultBean = null;
selected = null;
return result;
```

- ___ f. Delete the original **return "";** statement.

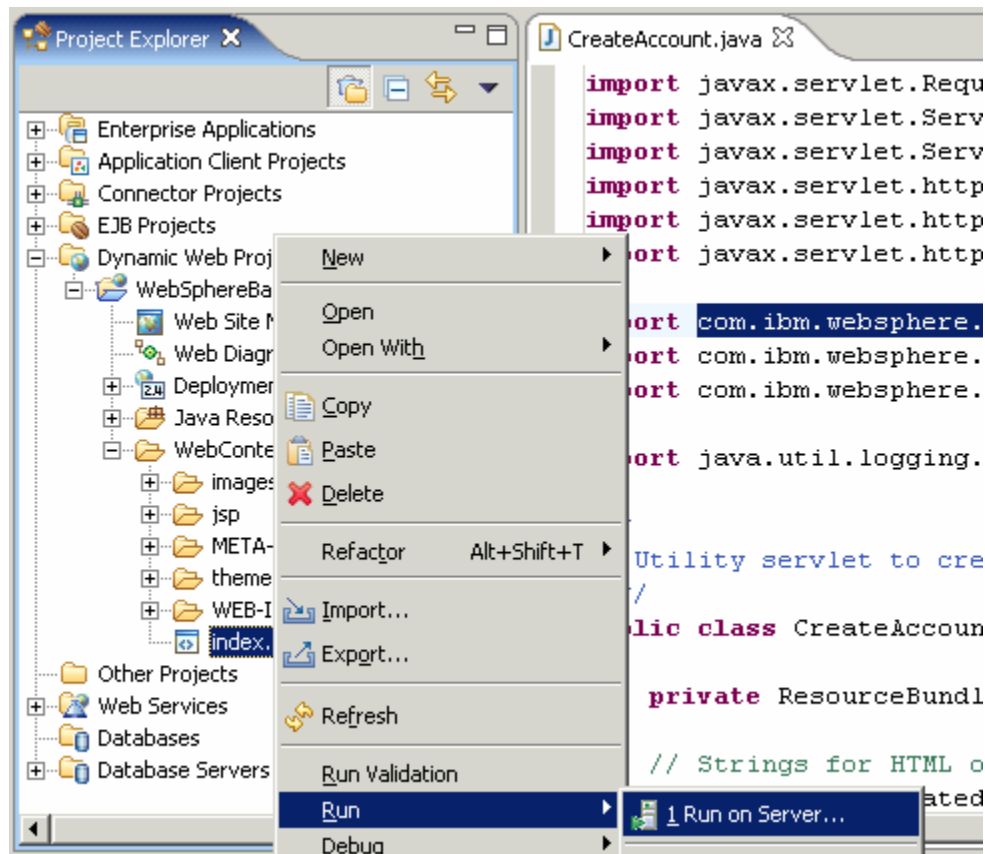
- ___ 14. Align the Delete button to the left of the data table.

- ___ a. Select the Delete button and locate the hx:panelBox tab in the Properties view.
- ___ b. For the **Size** specify the Width as 100%.
- ___ c. For the **Alignment** select **Left** for Horizontal and **Middle** for Vertical.

____ 15. Save the admin.jsp file.

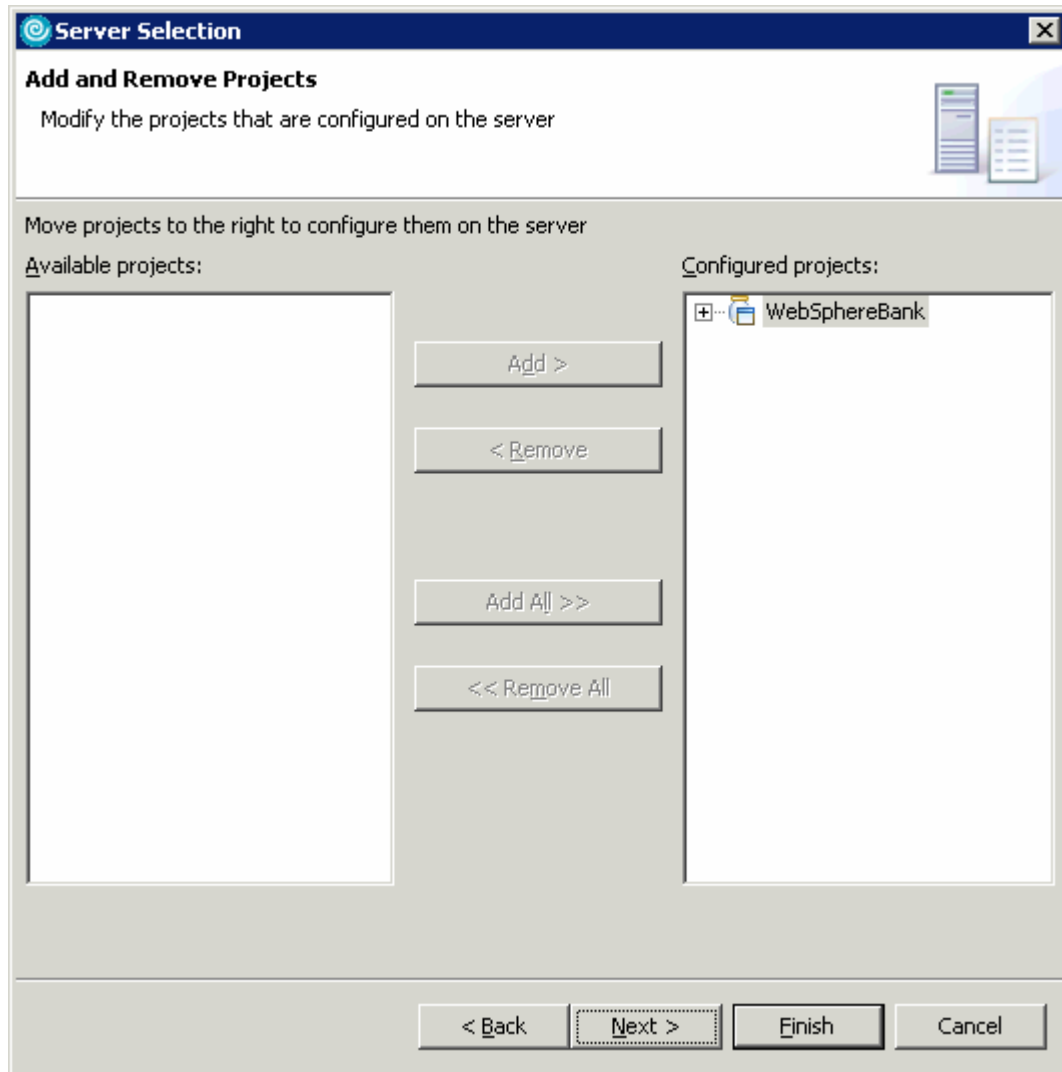
Part 4: Application and Cloudscape Setup

- ___ 1. Backup your server configuration. This will preserve your current server configuration. You will restore your server configuration at the end of the lab exercise.
 - ___ a. Open a Windows **Command Prompt** and navigate to the following directory:
`<RAD_HOME>\runtimes\base_v6\bin`
 - ___ b. Backup the server configuration by issuing the following command:
`backupConfig "C:\Program Files\IBM\Backup.zip"`
- ___ 2. Start the server with the WebSphereBank project while initializing the database and datasource.
 - ___ a. In the Project Explorer view, navigate to **Dynamic Web Projects > WebSphereBankWeb > WebContent** and right click on `index.html`.

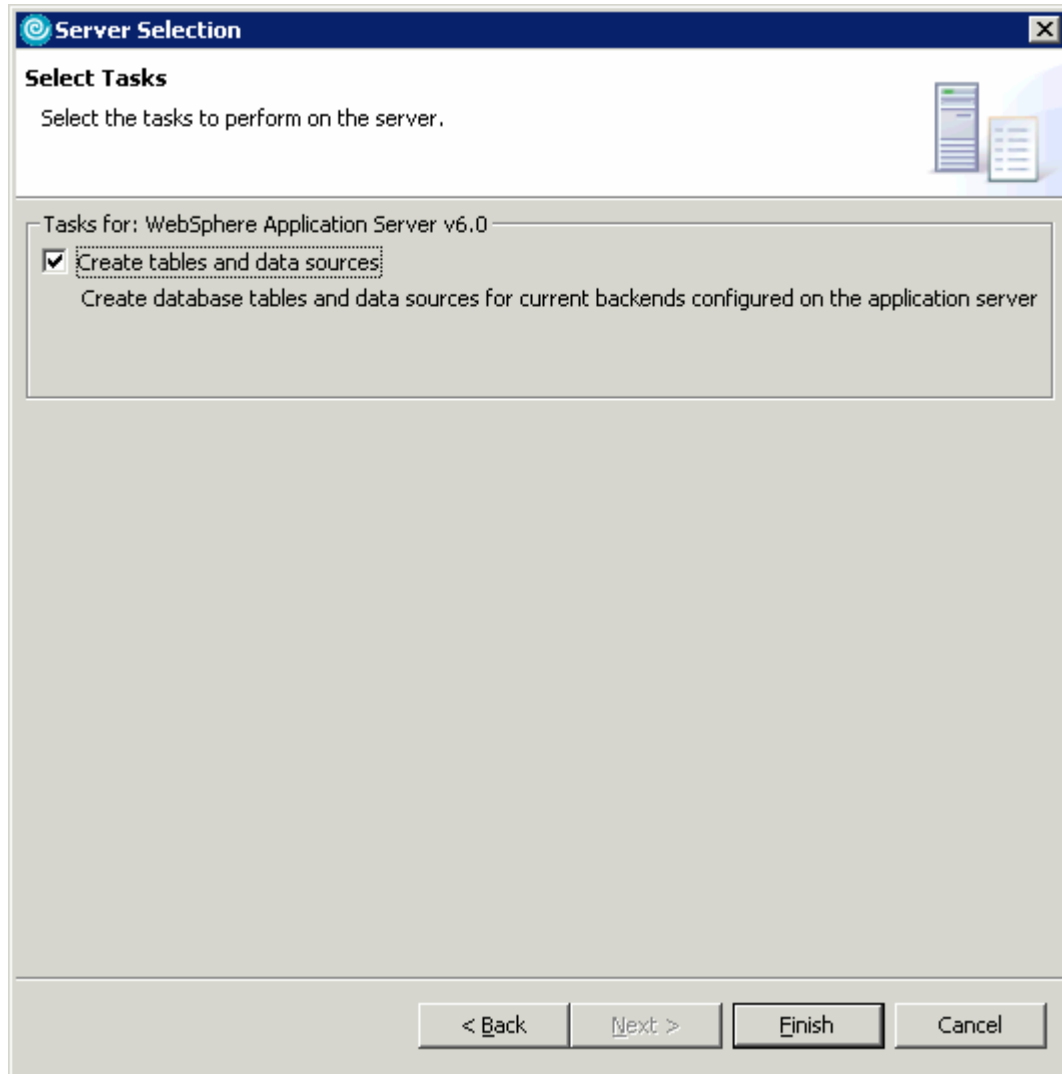


- ___ b. Select the **Run > Run on Server** option to open the Server Selection window.
- ___ c. On the Define a New Server page of the Server Selection window make sure the **Choose an existing server** option is selected as well as the server WebSphere Application Server v6.0. Then click on the **Next** button.

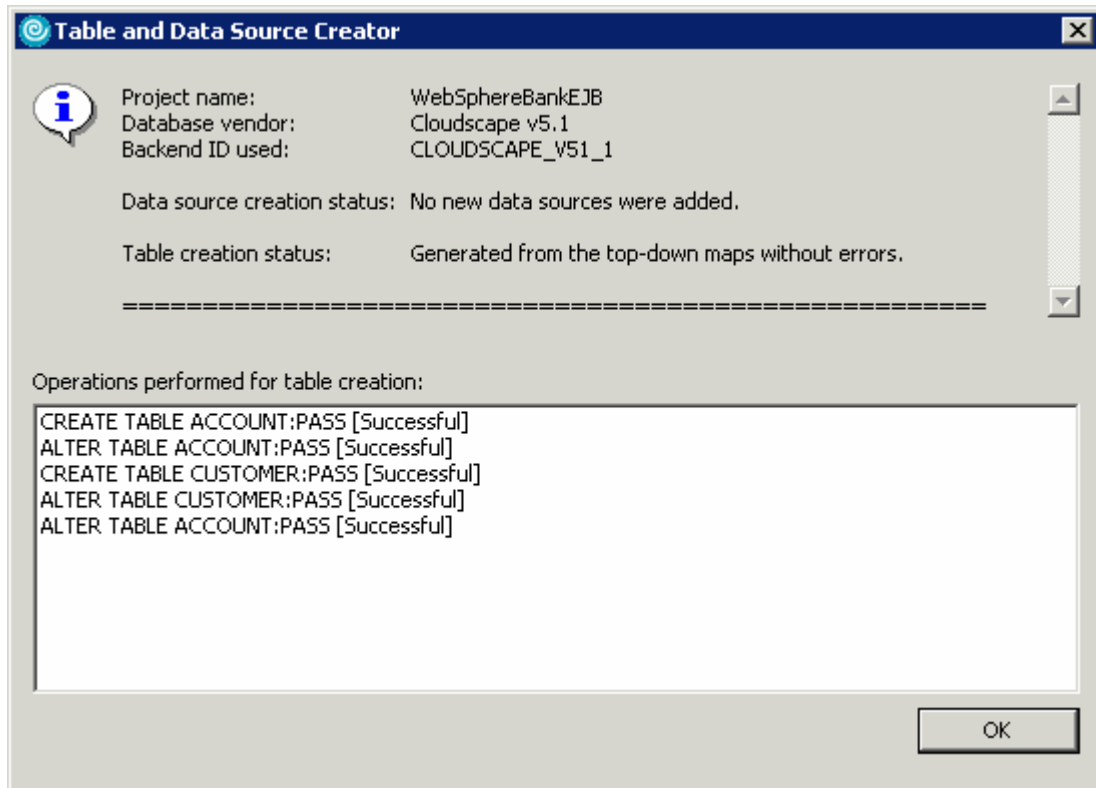
- ___ d. On the **Add and Remove Projects** page, make sure that WebSphereBank is added to the Configured projects list on the right side of the window. Then click on the **Next** button.



- ___ e. On the **Select Tasks** page, click on the Create tables and data sources checkbox. Then click the **Finish** button.



__ f. You should see a window like the one below if the database has been setup successfully.



__ g. Click **OK**.

___ 3. Go to the administrative console and wait for WebSphereBank application to show up.

__ 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.

__ c. Select Applications -> Enterprise Applications. Watch for WebSphereBank to appear in the list of applications.





- ⊕ Servers
- ⊖ Applications
 - Enterprise Applications
 - Install New Application
- ⊕ Resources
- ⊕ Security
- ⊕ Environment
- ⊕ System administration
- ⊕ Monitoring and Tuning
- ⊕ Troubleshooting
- ⊕ Service integration
- ⊕ UDDI

Enterprise Applications

Enterprise Applications
Lists installed applications. A single application can be deployed onto multiple servers.

⊕ Preferences

Start Stop Install Uninstall Update Rollout Update

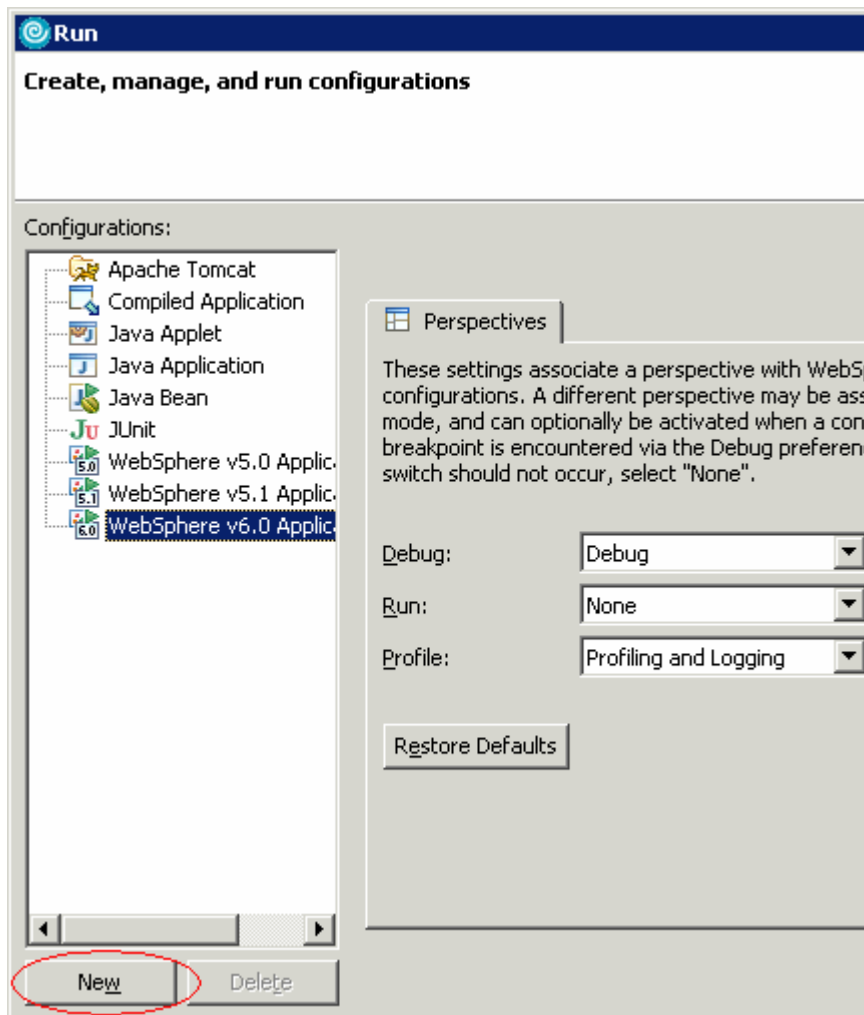
   

Select	Name	Status
<input type="checkbox"/>	DefaultApplication	➔
<input type="checkbox"/>	IBMUTC	➔
<input type="checkbox"/>	WebSphereBank	➔
<input type="checkbox"/>	ivtApp	➔
<input type="checkbox"/>	query	➔

Total 5

Part 5: Test Application

- ___ 1. Populate the WebSphereBank database with Customer and Account data. For your convenience, and Application Client Project called CreateAccounts has been included with the WebSphereBank EAR file you imported at the beginning of this lab exercise.
 - ___ a. From the Project Explorer view, expand **Application Client Projects > CreateAccounts > appClientModule > com.ibm.websphere.samples.bank.clients**.
 - ___ b. Right click on **CreateAccounts.java**, and select **Run > Run...** from the context menu.
 - ___ c. In the Configurations list, select WebSphere v6.0 Application Client and click the New button at the bottom of the list.



- ___ d. Enter **CreateAccounts** for the Name and click **Run**.

___ e. When the process has completed you should see the following message in the Console view.


```
WebSphereBank CreateAccounts >> ----- Begin -----
WebSphereBank CreateAccounts >> Create customer Mills, Mary 1 1111
WebSphereBank CreateAccounts >> Create savings account 101, $1300.0
WebSphereBank CreateAccounts >> Create checking account 100, $700.0
WebSphereBank CreateAccounts >> Create customer Klein, Paul 2 2222
WebSphereBank CreateAccounts >> Create savings account 201, $1000.0
WebSphereBank CreateAccounts >> Create checking account 200, $650.0
WebSphereBank CreateAccounts >> Create customer Klein, Steve 3 3333
WebSphereBank CreateAccounts >> Create savings account 301, $1100.0
WebSphereBank CreateAccounts >> Create checking account 300, $100.0
WebSphereBank CreateAccounts >> Create customer Smith, Catherine 4 4444
WebSphereBank CreateAccounts >> Create savings account 401, $100.0
WebSphereBank CreateAccounts >> Create checking account 400, $850.0
WebSphereBank CreateAccounts >> Create customer Anderson, Mary 5 5555
WebSphereBank CreateAccounts >> Create savings account 501, $1100.0
WebSphereBank CreateAccounts >> Create checking account 500, $550.0
WebSphereBank CreateAccounts >> Create customer Jones, Linda 6 6666
WebSphereBank CreateAccounts >> Create savings account 601, $500.0
WebSphereBank CreateAccounts >> Create checking account 600, $600.0
WebSphereBank CreateAccounts >> ----- Done -----
```

___ 4. Access the admin.jsp page.

___ a. Open a web browser and navigate to the following URL.

<http://localhost:9080/WebSphereBankWeb/index.html>

- ___ b. Click on Customer Administration at the bottom of the menu bar and make sure that you Verify that you see the following page in your browser



Home

Customer Administration

Customer		Delete						
Create Customer								
Create Account								
Transaction		Last Name	First Name	Customer Number	Tax ID	Accounts		
						Account Type	Account Number	Balance
<input type="checkbox"/>	Mills	Mary	1	11111	1	101	\$1,300.00	
					2	100	\$700.00	
Get Balance								
Transfer Funds								
Interest								
Search By								
Customer Name								
Customer Number								
Administration								
Customer Administration								
<input type="checkbox"/>	Klein	Paul	2	22222	1	201	\$1,000.00	
					2	200	\$650.00	
<input type="checkbox"/>	Klein	Steve	3	33333	1	301	\$1,100.00	
					2	300	\$100.00	
<input type="checkbox"/>	Smith	Catherine	4	44444	1	401	\$100.00	
					2	400	\$850.00	
<input type="checkbox"/>	Anderson	Mary	5	55555	1	501	\$1,100.00	
					2	500	\$550.00	

Next Page Go

- ___ 5. Select the check box next to Mills and Smith and click the Delete button at the top of the table.
- ___ 6. Verify that the customers have been deleted.
- ___ 7. Remove the WebSphereBank bank application from the application server
 - ___ a. From the Server view right click on the server and select Add and Remove projects
 - ___ b. In the Configured projects list select WebSphereBank and click the Remove button
 - ___ c. Click **Finish**
- ___ 8. Stop the server
 - ___ a. From the Server view, right click on the server and select Stop from the context menu

Part 6: Restore the Server Configuration

___ 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:

```
<RAD_HOME>\runtimes\base_v6\bin
```

Restore the server configuration by issuing the following command:

```
restoreConfig "C:\Program Files\IBM\Backup.zip"
```

___ b. Using explorer navigate to the following directory

```
<RAD_HOME>\runtimes\base_v6\cloudscape
```

___ c. Delete the topDownDB folder. This will remove the database files generated during the lab.

What you did in this exercise

In this lab exercise you built and tested an administrative customer interface for the WebSphereBank application. The application you built in this lab demonstrates how to configure and use the Create Session Bean Façade capabilities (SDO and EJB Mediator technology). Additionally, this lab demonstrates how to add an EJB Session Bean as a data source to a JSF page.

Solution Instructions

If you are unable to get this lab to work, and would like to see the results, you can follow these steps to import the solution to this lab. You will then be able to browse the solution for examples of how the data components look and function in the final application.

- ___ 1. Start IBM Rational Application Developer.
 - ___ d. Select **Start > Programs > IBM Rational Software Development Platform > Rational Software Development Platform**.
 - ___ e. For the workspace, specify **<LAB_FILES\IRAD_EJBMediator\workspace**.
- ___ 9. When IBM Rational Application Developer v6 opens, close the welcome page.
- ___ 10. Import the **WebSphereBank Application** into Rational Application Developer for testing.
 - ___ f. Select **File > Import...**
 - ___ g. Select **Project Interchange** and select **Next**.
 - ___ h. Select **Browse...** and navigate to **<LAB_FILES>\IRAD_EJBMediator\solution\EJBMediator.zip** and select **Open**.
 - ___ i. Click **Select All**.
 - ___ j. Click **Finish**.
- ___ 11. Now you can test the solution following the steps outlined in Part 5.

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