IBM RATIONAL APPLICATION DEVELOPER 6.0 – LAB EXERCISE

Building a Web Service with IBM Rational Application Developer v6.0

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What this exercise is about

IBM Rational Application Developer v6.0 provides a complete set of tools and support for building and testing Web Service applications. This lab exercise is about creating a Web Service with IBM Rational Application Developer v6.0 for WebSphere Application Server v6.0.

Lab Requirements

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

- IBM Rational Application Developer v6.0 beta with embedded WebSphere Application Server v6.0 Test Environment installed with beta patches 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 Service provider and test it with the Web Services Explorer included in IBM Rational Application Developer v6.0.

Introduction

In this lab, you will be using the WebSphereBank application. This J2EE 1.4 application is a simple banking application composed of EJB, Web, and Application Client modules. In the EJB module there is a session bean and multiple entity beans. Before being able to create a Web Service with this simple application, you will need to generate mappings for the entity bean to a Cloudscape data source. Also, you will generate deploy code used by the EJB container of the J2EE server to handle the calls to the entity bean and persisting of the data. Cloudscape is a small, in memory, object-relational database based purely on Java. This database needs no install. Therefore it can be set up very easily and you can quickly test your application to ensure it is working properly.

After completing the Lab Setup, you will create a Web Service and then test it with the Web Services Explorer. The Web Services Explorer acts as a Web Service client to access your Web Service when there is not a Web Service client created yet for quick testing to insure the Web Service works before going through the trouble of creating a Web Service Client. When finished, you will have a valid banking Web Service ready to be accessed by a true Web Service Client.

Exercise Instructions:

Because these instructions are not operating-system specific, the directory locations will be specified in the lab instructions using symbolic references, as follows:

Reference Variable	Windows Location	AIX/UNIX Location
<lab_files></lab_files>	C:\Labfiles60	/tmp/Labfiles60
<rad_home></rad_home>	C:\Program Files\IBM\Rational\SDP\6.0	/opt/IBM/RSDP/6.0

Part 1: Lab Setup

- 1. Before you begin the lab, you will need to back up the test server. This backup will preserve the server and allow you to return to that configuration once you complete this exercise. Instructions on restoring the configuration are included at the end of this exercise.
 - ____a. Open a Windows Command Prompt and navigate to <runtimes\base_v6\bin\</pre>
 - ____b. Backup the server by issuing the following command:

backupConfig "C:\Program Files\IBM\Backup.zip"

- 2. Start IBM Rational Application Developer v6.0.
 - a. Select Start > Programs > IBM Rational > IBM Rational Application Developer v6.0 > Rational Application Developer.
 - ___b. For workspace, specify <LAB_FILES>\IRAD_WebServices\workspace.
 - ____ c. When IBM Rational Application Developer v6.0 opens, close the **Welcome page**.

NOTE: If you receive an Auto Launch Configuration Change Alert window, select **Yes** to change the auto- launch workspace to the path of the current lab.

- 3. Import the WebSphereBank application into IBM Rational Application Developer.
 - ____a. Click File > Import....
 - ____b. Click EAR file and select Next.
 - __ c. Click Browse... and navigate to <LAB_FILES>\IRAD_WebServices\WebSphereBank.ear and Click Open.
 - ____d. Click Finish.
- 4. A number of items will be displayed in the Problems view. These errors should be resolved before continuing.
 - ____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 will be resolved.

🔘 Quick Fix		×
<u>A</u> vailable fixes:		
Add project 'WebSphereB Remove import Organize imports	ankEJB' to build path of	WebSphereBank
•		
	ОК	Cancel

____ c. Close any Java files which are opened in the process.

Part 2: Initializing database components

- 1. 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.

😭 Project Explorer 🗙		🚺 CreateAcc	ount.java 🛛
	12 E 🔁 🔻	impor	t javax.servlet.Requ
🕀 🙉 Enterorise Applica	tions	impor	t javax.servlet.Serv
	Projects	impor	t javax.servlet.Serv
	c .	impor	t javax.servlet.http
E B Projects	\$	impor	t javax.servlet.http
Event Dynamic Web Prot	New	+ lor	t javax.servlet.http
	<u></u>		
webophereba	Open		com ibm webenhere
Web Diter	Onen With	+	com.ibm.websphere.
		POT	C com.ipm.websphere.
	Copy	or	t com.1bm.websphere.
H - Java Reso			
		or	t java.util.logging.
	💢 <u>D</u> elete		
±		I	
	Refactor Alt+S	hift+T 🕨 ՄԵ	ility servlet to cre
🛨 🗁 theme			-
🛨 🗁 WEB-J	import	111	c class Createlccoun
index.	🛃 Export		CIUSS CICUCEACCOUR
Cher Projects			rivate DecoursePundl
🗄 🔯 Web Services	🔗 Refresh	p	rivate Resourcebundi
👘 🛄 Databases			
🗄 🗄 👘 Database Servers	<u>R</u> un Validation		/ Strings for HTML o
	<u>R</u> un) 🛃	1 Run on Server
	Debug	• • • • • • • • • • • • • • • • • • •	

- ____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.

Server Selection		×
Add and Remove Projects Modify the projects that are configured	d on the server	
Move projects to the right to configure t	hem on the server	
<u>A</u> vailable projects:		Configured projects:
	A <u>d</u> d >	
	< <u>R</u> emove	
	Add Alj >>	
	<< Remove All	
		1
	< Back	> <u>F</u> inish Cancel

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

Server Selection				×
Select Tasks Select the tasks to perform on the serv	ver.			
■ Tasks for: WebSphere Application Server Create tables and data sources Create database tables and data sources	ver v6.0	ent backends con	figured on the ap	olication server
	< <u>B</u> ack	Next >	Einish	Cancel

___f. Click Finish.

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

🥘 Table	and Data Source Creator			×
٩	Project name: Database vendor: Backend ID used:	WebSphereBankEJB Cloudscape v5.1 CLOUDSCAPE_V51_1		4
	Data source creation status:	No new data sources were added.		
	Table creation status:	Generated from the top-down maps without errors.		
				-
Operation CREATE ALTER CREATE ALTER ALTER	ons performed for table creatic E TABLE ACCOUNT:PASS [Succe TABLE ACCOUNT:PASS [Succe E TABLE CUSTOMER:PASS [Succ TABLE CUSTOMER:PASS [Succe TABLE ACCOUNT:PASS [Succe	en: :essful] :cessful] essful] ssful]		
			ОК	

NOTE: After the code has been generated, browse to EJBProjects > WebSphereBankEJB > ejbModule. Notice the classes and the packages which were created. In the

com.ibm.websphere.samples.bank.ejb.websphere_deploy package are common classes used to support persisting entity beans running in WebSphere regardless of the data source. The

com.ibm.websphere.samples.bank.ejb.websphere_deploy.CLOUDSCAPE_V5_1 classes are specific for persisting entity beans to a Cloudscape database.

___ h. Click **OK**.

Part 3: Create a Web Service provider in WebSphere Bank

- **1.** Now that you have the workspace and test environment prepared you can create a Web Service.
 - ____a. To start creation of a Web Service select File > New > Other.... Click checkbox to Show All Wizards. Expand Web Services and select Web Service. Click Next.

© New				×
Select a wizard				
Create a new XML web service.				
<u>W</u> izards:				
🗄 🗁 Profiling and Logging				
🗄 🔁 Server				
🗄 🗁 Simple				
🗄 🗁 StatCon				
🗄 🗁 Test				
🗄 🗁 VAGen Migration to EGL				
🗄 🗁 Web				
📄 🦻 Web Services				
📃 🚽 💣 Java beans for XML Se	thema			
Unit Test UDDI				
- 🥂 Web Service				
Web Service DADX Gr	oup Configural	tion		
WSDL				•
Show All Wizarda				(3)
				212
	< Back	Next >	Einish	Cancel
_	a Emera	Tours		

- ____ b. If this is the first time running Web Services, you will get a Confirm Enablement alert window. Check the checkbox to always enable capabilities and click OK to get to continue the Web Service Wizard.
- ____ c. At the first page of the Web Services wizard, select EJB Web Service from the Web Service Type drop down menu.

____d. Uncheck the box to Start Web service in Web project. This reduces the time the wizard needs to complete. Click Next.

🥘 Web Service 🛛 🗙
Web Services Review your Web service options and make any necessary changes before proceeding to the next page.
Service Web service type: EJB Web Service Start Web service in Web project Launch the Web Services Explorer to publish this Web service to a UDDI Registry
Client proxy Client proxy Sector Sect
 Test the Web service Monitor the Web service Overwrite files without warning Create folders when necessary Check out files without warning
< <u>B</u> ack <u>N</u> ext > <u>Finish</u> Cancel

🞯 Web Service	
Object Selection Page	
Object Selection Page	Z
EAR projects WebSphereBank	
EJB bean	
Stateless EJB beans	EJB project
Transfer	WebSphereBankEJB

____e. On the Object Selection Page, select the Transfer Stateless EJB Bean. Click Next.

- ____f. On the Service Deployment Configuration page, accept the defaults and click Next.
- ____g. Under Select Router Project, instead of the router project WebSphereBankWeb type in WebSphereBankEJB_HTTPRouter. Keep all other defaults values here, especially SOAP over HTTP selected for the transport. Click Next.

WED SERVICE	×
eb Service EJB Configuration	
Web Service EJB Configuration	S.
Select Router Project	
WebSphereBankEJB_HTTPRouter	•
- Service endpoint interface:	
Service endpoint interface:	ifer_SEI
Service endpoint interface:	fer_SEI Browse classes Browse files
Service endpoint interface: com.ibm.websphere.samples.bank.ejb.Trans	fer_SEI Browse classes Browse files

h. At the Web Service Java Bean Identity page, keep all defaults. Notice where the WSDL folder and WSDL file is located in EJB Project. You will be going to this location later. Make sure getBalance and transferFunds are checked. Style should be Document / Literal. This Web Service will have No Security. Click Next.

🕑 Web Service		x
Web Service Java	a Bean Identity	
Configure the Java		,
Web convice UDT	http://localboct/0020/WebSphereBap/E18_HTTPPouter/cervices/Trapsfer	-
WSDL Folder	ntcp://iocallosc.sooo/webspire/ebankEsb_nnrrkodce/services/mais/ei	-
WODE Folder:		-
Methods:		_]
getBalance	:(int) inds(int.int.float)	
Select All Des	elect All	
Style and Use		
Document/Lib	eral	
C RPC/ Literal		
Security Configura	ition No Security	1
Use WSDL 1.1 M	Aime attachments exclusively	
Define custom n	napping for package to namespace.	
	<u> </u>	

i. At the last screen of the Web Service wizard, there are UDDI commands. Keep these unchecked and click **Finish**. After you click finish, Rational Application Developer will finalize the building of the projects and necessary files in those projects. You have just created a Web Service using the Rational Application Developer's Web Service wizard.

Part 4: Test Web Service provider with Web Services Explorer

- ____1. Create a customer.
 - ____a. Select the Create Customer link.
 - ____b. Enter Customer Number, Name and Tax ID. Example below. Select Create.

Messages				
Customer Number:	10			
First Name:	John			
Last Name:	Doe			
TAX ID:	012-34-5678			

Create Customer

- ____ c. You will see details for customer created.
- _____2. Create two accounts for the customer.
 - ____a. Select the Create Account button.

____b. Enter **101** for the Account Number, select **checking** for account type, and **600** for the starting balance. Select **Create**.

	Messages	
Customer Number:	10	
Account Number:	101	
Account Type:	O Savings 👁 Checking	
Starting Balance:	\$ 600	
Create	Reset	

Create a new Account

- _____c. Now create a **savings account** with a number of **102** and a balance of **400**. With two accounts created, you can now transfer funds between these two accounts.
- _____d. Select the **Transfer Funds** link. For the From Account enter **101**, for the To Account enter **102**, and for the amount enter **75**.

From Account:	101
To Account:	102
Amount:	\$ 75
Transfer	Reset

- ____e. Select **Transfer**. The success message will be displayed. The updated balance will also be displayed.
- 3. With the regular Web interface working for the application, you can test the Web Service you created with the Web Services Explorer. The Web Services Explorer only mimics what a Web Service client would do, and therefore, you may get different results between the Web Services Explorer and a real Web Service client.
 - ____a. In the Project Explorer view, navigate to EJB Projects > WebSphereBankEJB > ejbModule -> META-INF > wsdI.



b. Right click on **Transfer.wsdl** and select **Web Services > Test with Web Services Explorer**.

c. This will start the WS Explorer in a browser. You should see the TransferSoapBinding binding in the Navigator section and the operations transferFunds and getBalance. Get the balance of account 101 by clicking getBalance. _ d. In the Actions section of the WS Explorer enter 101 for Account ID to access your first account. Click the Go button.

Web Browser 🕺 Web Browser 🗙	
Web Services Explorer	수 수 🗊 🖡 🏂 🖈
Image: Second system Image: Second system Image: Second	Actions Endpoints http://localhost:9080/WebSphereBankEJB_HTTPRouter/services/Transfer transferFunds fromAcctId int amount float Go Reset
	i Status
Done	

- e. In the Status section, you will see the result of getBalance on the account ID you entered. Repeat the steps for the second account balance. Enter **102** for Account ID to access your second account (in the Actions section of the WS Explorer). Click **Go b**utton. You will see the balance for account 102 in the Status section of the WS Explorer.
- _____f. Now to transfer some funds. Click on transferFunds in the Navigator section of the WS Explorer. In the Actions section of the WS Explorer, enter 101 for fromAcctID, enter 102 for toAcctID, and enter 77 for amount. Click the Go button.
- _____g. You will not be shown the result like the servlet driven web application that we first used to create and enter customer information. However if you go back and click getBalance again and enter the account number in Account ID field and then click Go again, you will see the amounts have changed. At this point, you have successfully created and tested your Web Service with the Web Services Explorer. You now have a valid web service and will need to create a web service client in order to access / use it.

Part 5: Export WebSphereBank with Web Services as an EAR File

Applications destined for a production environment can be deployed directly from Rational Application Developer or can be exported out as an EAR file for a more managed installation. This part of the exercise describes the steps for exporting out the application

- 1. Click on File > Export and select EAR File from the list. Click Next.
- _____2. Select WebSphereBank from the drop down menu for the Enterprise Application project .
- 3. Browse to <LAB_FILES>\IRAD_WebServices\ and enter WebSphereBankwithWS for the name of the EAR file. Click Save.
- 4. Check the Export source files and Include project build paths and meta-data files check boxes and click Finish.

Part 6: Restore your server

Skip this Part if you plan on completing the lab exercise **Building a Web Service Client with IBM Rational Application Developer v6.0**.

5. Restore your server configuration. This will return your server configuration to its original state.

____a. Open a Windows Command Prompt and navigate to <RAD_HOME>\runtimes\base_v6\bin.

 $__$ b. Restore the server configuration by issuing the following command:

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

What you did in this exercise

This lab exercise, you created a Web Service using IBM Rational Application Developer v6.0 wizards and ran this on a WebSphere Application Server v6.0 test environment.

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 and view what was generated.

- 1. Start IBM Rational Application Developer v6.0 with a clean workspace.
- 2. Import WebSphereBank.ear with a Web Service Provider into the workspace.

____a. Select File > Import...

____ b. Select EAR file and click Next.

- ____d. Click Finish.
- ____3. When the import is complete, you will notice several errors in the Problems view. Resolve these errors.

____a. Right click on one of the errors and select Quick Edit.

- b. A list of available fixes will appear. Select Add project 'WebSphereBankEJB' to build path of 'WebSphereBankWeb' and click OK. The errors will be resolved.
- ____4. Browse the application and view the generated components or follow the instructions in Part 3 to create the database and test the web service.

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