IBM RATIONAL APPLICATION DEVELOPER 6.0 - LAB EXERCISE

Testing MDB Application in IBM Rational Application Developer

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What this exercise is about

This exercise will test an MDB(Message Driven Bean). The application with the MDB will be deployed to the server. The JMS(Java Message Service) will be used to send a message from the client running in IBM Rational Application Developer to the server, where the MDB will be invoked to process the message request.

Lab Requirements

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

- Windows 2000 Professional Service Pack 4 is required for this lab exercise.
- IBM Rational Application Developer v6.0, with the WebSphere Application Server v6.0 Integrated Test Environment is also required.
- The lab source files (LabFiles60.zip) must be extracted to the root directory (i.e., C:\).
- Experience with previous versions of Rational Application Developer and the J2EE programming model are also required.

What you should be able to do

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

- Prepare a MDB application for testing on the Integrated Test Environment Application Server.
- Set up Cloudscape as a data source for your application before testing the application.
- Set up JMS.
- Test you application on the Integrated Test Environment Application Server.

Introduction

The J2EE 1.4 application which you will be testing is a simple banking application named WebSphereBank. It is composed of MDB, EJB, Web, and Application Client modules. In the EJB module there is a session bean and an entity bean. Before being able to fully test the application, you will need to generate mappings for the entity bean to a data source as well as generate deploy and RMIC 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 footprint, object-relational database based purely on Java. It can be set up very easily and you can quickly test your application to ensure it is working properly. You will also need to

You will also need to perform some setup of the JMS resources.

In this lab, you will be deploying the WebSphereBank application on the Integrated Test Environment application server. Finally, you will test the application by initiating a message from the client to the Integrated Test Environment application server.

Exercise Instructions

** 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.

Reference Variable	Windows Location	AIX/UNIX Location
<lab_files></lab_files>	C:\Labfiles60	/tmp/Labfiles60Beta2
<lab name=""></lab>	IRAD_TestingMDBLocal	TestingMDBLocal
<rad_home></rad_home>	C:\Program Files\IBM\RSDP\6.0	

Part 1: Server 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 Rational Application Developer.
 - ____a. Start > Programs > IBM Rational > IBM Rational Application Developer V6.0 > Rational Application Developer.
 - ___b. For workspace, specify <LAB_FILES>\IRAD_TestMDBLocal\workspace.
- 3. Open the J2EE Perspective if it is not already open
 - ____a. Close the welcome screen.
 - ____b. From the menu select **Window > Open Perspective > Other.**
 - ____ c. Select J2EE and click OK.

Part 2: Application and Cloudscape Setup

- 1. Back in IBM Rational Application Developer, import the WebSphereBank application for testing.
 - ____a. Select File > Import...
 - ____b. Select EAR file and select Next.
 - ____ c. Select Browse... and navigate to <LAB_FILES>\IRAD_TestMDBLocal\WebSphereBank.ear and select Open.
 - ____d. For the Project name, enter WebSphereBank.
 - ___e. Click Finish.
- 4. Add Java Build Path to clean up errors. If you select the Problems tab, you will notice a list of errors and warnings.
 - ____a. Right click on an error and select Quick Fix.

	Select <u>A</u> ll	F
99 errors, 1 warning, 0 infos (Filter matched 100 of 104	Quick Fix	
Description	Properties	
The import com.ibm.websphere.samples.bank.ejb	can CreateAccount.j	
🔇 The import com.ibm.websphere.samples.bank.ejb	can CreateAccount.j	
8 The import com.ibm.websphere.samples.bank.ejb	can CreateAccount.j	

__5. A list of available fixes will appear. Select "Add project 'WebSphereBankEJB' to build path of 'WebSphereBankWeb'" and select **OK.** The errors should disappear.



- 6. Start WebSphere Application Server.
 - _____a. Select the server to be started, on the Servers tab, then click on the Start the server icon.

Problems Tasks Properties 👫 Server	5 ×		🛛 🗱 🖸 🖉 🚺 🕅 🕅
Server	Host name	Status	State
B WebSphere Application Server v6.0	localhost	E Stopped	Synchronized

____b. When the server start has completed, you should see the following information:

ADMU3000I: Server server1 open for e-business; process id is XXXX

NOTE: The server may also be started from the command line by navigating to the **C:\Program Files\IBM\RADBeta6.0\runtimes\base_v6\bin** directory and issuing the **startserver server1** command.

Part 3: Preparing the JMS Resources

- _____1. Log on to the Administrative Console
 - ____a. In a browser, enter the URL: http://localhost:9060/ibm/console
 - ____b. Any string can be entered as the user ID (e.g.: Enter **wsdemo** and click Log In)
- _____ 7. Create a SIBus. To see an animation , click here: _____ShowMe
 - ____c. In the Administrative Console, expand Service Integration. Click Buses
 - ____d. Click New to create a new bus
 - ____e. Enter the name as **mybus**

	* Name
	mybus
	UUID
	C465AAD6A37E0E02
	Description
	Secure
	Inter-engine authentication alias
	(none)
	Mediations authentication alias
	(none)
	Protocol
	Discard messages after queue deletion
	Configuration Reload Enabled
	Apply OK Reset Cancel
-	f. Click OK .
8.	Save changes
-	g. In the Messages area, click Save
-	h. Click Save again to save changes to master configuration
9.	Make server1 a member of mybus
-	i. Under Service Integration, click Buses
_	j. Click mybus

- ___ k. Under Additional Properties, select Bus Members
- ___I. Click **Add** to add a new bus member
- ____m. Make sure that the Server radio button is selected
- ____n. From the server selection box, select <mynodename>:server1

Add an application server or server cluster as a new member of the bus.

→ Step 1: Select	Select Server or Cluster		
Step 2: Confirm Bus Member Creation	Choose the server or cluster to add to the bus Server inst1Node:server1 Culuster (none)		
Next Cancel			

- ___o. Click Next
- ___ p. Click Finish
- _ 10. Let's now create the SIB destination. In this exercise, we are using point-to-point messaging, ie, our MDB needs to listen to a queue. So, let's create a SIB queue
 - ____a. In the Administrative Console under Service Integration, click Buses.
 - ____b. Click on mybus.
 - ____ c. In the Additional Properties, click Destinations.
 - ____ d. Click New to create a new destination.
 - ____e. Select Queue as the Destination Type and click Next.
 - ____f. In the Set Queue Attributes panel, enter the Identifier as **BankJSQueue**.

Create a new queue for point-to-point messaging

→ Step 1: Set	Set queue attributes
Step 2: Assign the queue to a bus member Step 3: Confirm queue creation	Configure the attributes of your new queue Identifier BankJSQueue Description
Next Cancel	

___g. Click Next.

- ___h. In the Assign Bus member panel, server1 is selected by default. Click Next.
- ____i. Click **Finish** on the Confirmation Panel.
- _____11. Save changes
 - ____a. In the Messages area, click Save
 - ____b. Click **Save** again to save changes to master configuration.
- 12. Let's now create the JMS resources that will point at the SIB Destination. Create a JMS Connection factory.
 - ____a. Expand Resources > JMS Providers. Click Default messaging.
 - ____b. Under Connection Factories, click JMS Connection Factory.
 - ___ c. Click New.

___ d. Enter the following: Name: JNDI Name: Bus Name:

BankJMSConnFactory jms/BankJMSConnFactory mybus

Leave all the other values to the default.

General Properties			
* Scope			
cells:inst1NodeCell:nodes:inst1Node			
* Name			
BankJMSConnFactory			
* JNDI name			
s/BankJMSConnFactory			
Description			
Category			
Bus name			
mybus			
Client identifier			
* <u>Non-persistent message reliab</u> ility			
Express non-persistent			
* Enable message streaming			
Default 💌			
Temporary queue name prefix			
Temporary topic name prefix			
Durable subscription home			
* Share durable subscriptions			
As cluster			
Remote target group			

____e. Select Apply, then OK.

____ 13. Create a JMS Queue.

- ____a. Under Resources > JMS Providers. Click Default messaging.
- ____b. Under Destinations, click JMS Queue. Click New.

c. Enter the following: Name: BankJMSQueue JNDI Name: jms/BankJMSQueue Queue Name: BankJSQueue Bus Name: mybus

Leave all the other values to default.

General Properties
* Scope
cells:inst1NodeCell:nodes:inst1Node
* Name
BankJMSQueue
* JNDI name
jms/BankJMSQueue
Description
* Queue name
BankJSQueue
Samoodada
Delivery mode
Application 💌
Time to keep messages
Priority
Enable message streaming
Always on 💌
Bus name
mybus

____d. Select **Apply**, then **OK**.

____ 14. Create an activation spec for the Message Driven Bean.

____a. Under Resources > JMS Providers. Click Default Messaging Provider.

____b. Under Activation Specs, click JMS activation specification. Click New.

____c. Enter the following:

BankActivationSpec
eis/BankActivationSpec
jms/BankJMSQueue
mybus

Leave all the other values to default.

____d. Select **Apply**, then **OK**.

____ 15. Save changes.

- ____a. In the Messages area, click Save.
- ____b. Click **Save** again to save changes to master configuration.
- _____16. Restart the server.
 - ____a. From server window in Rational Application Developer, click on the server and then click on the recycle server icon

Part 4: 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 🗙	- 8	CreateAcco	ount.java 🛛
	宿 🖻 😫 🔻	import	javax.servlet.Requ
🕀 🧟 Enterprise Applicat	tions	import	javax.servlet.Serv
	Projects	import	javax.servlet.Serv
	<	import	javax.servlet.http
E IB Projects	-	import	javax.servlet.http
Event Dynamic Web Proj	New	+ lort	javax.servlet.http
📄 🥵 WebSphereBa	<u></u>		2
web Site N	<u>O</u> pen	unt	com.ibm.websnbere.
Web Diagr	Open With	+ ort	com ibm websphere
			com ibm websphere.
🖽 📴 Deployment	Copy	IOLO	com.ipm.wepsphere.
E Conte	🛱 Paste		
		ort	java.util.logging.
E isp	💢 <u>D</u> elete		
I I I I I I I I I I I I I I I I I I I	Defector Alter	L:CL . T	
	Rerac <u>t</u> or Alt+5	Uti	lity servlet to cre
	- Import	1/	
		lic	class CreateAccoun
Other Projects	🛃 Exp <u>o</u> rt		
Web Services		p1	ivate ResourceBundl
	💞 Refresh	-	
Databases	Due Helideties		Strings for HTML o
	<u>R</u> un Validation		bted
4	Run	i 🛃 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 server Create database tables and data server	ver v6.0	rent backends c	onfigured on the a	application 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			×
•	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 creation E TABLE ACCOUNT:PASS [Succe TABLE ACCOUNT:PASS [Succe E TABLE CUSTOMER:PASS [Succe TABLE CUSTOMER:PASS [Succe TABLE ACCOUNT:PASS [Succe	in: tessful] ssful] tcessful] 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 5: Test Application

1. After the application has made it to the server, open your browser to the WebSphereBank homepage. Open a Web Browser and navigate to the following URL:

http://localhost:9080/WebSphereBankWeb

It may take some time, but eventually the homepage of the WebSphereBank Application will come up. The WebSphereBank Application is composed of several processes (Create Customer, Create Account, Transfer funds, etc). First you will test the application by creating a customer, then creating two accounts before transferring funds between the two accounts.

- _____2. Select the **Create Customer** link.
- _____ 3. Enter Customer Number, Name and Tax ID. Select Create.

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

Create Customer

4. You will see details for customer created. Select **Create Account**.

Customer Details

New Customer has been successfully created

Customer Number:	10
First Name:	JOHN
Last Name:	DOE
TAX ID:	012-34-5678
Create Account	

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

	Messages
Customer Number:	10
Castomer Namber.	
Account Number:	101
Account Type:	C Savings ⊙ Checking
Starting Balance:	\$ 600
Create	Reset

Create a new Account

- 6. Create a savings account with a number of **102** and a balance of **400**.
- _____7. Run Application Client Code.
 - ____a. In IBM Rational Application Developer, project explorer view, expand **Application Client Projects.**

____b. Right click on TransferClient and select **Run > Run** from the context menu.

🕀 🔁 FindAccounts	Refactor	psphere.samples.b
🗄 🔁 GetAccounts		bsphere.samples.b;
🕀 🖽 TransferClient	<u>R</u> un	🕨 📑 <u>1</u> Run on Server
🗄 🦕 Connector Modules	<u>D</u> ebug	•
EJB Modules	Profile	🕨 🔅 Ru <u>n</u>

____c. In the configurations list select WebSphere Application Server v6 Application client and select **New**.

WebSphere v5.0 Application Clie
WebSphere v5.1 Application Clie
WebSphere v6.0 Application Clie
WebSphere v6.0 Server
🚮 WebSphere v6.0 Server @ I
WebSphere v6.0 Server Proces:
🚮 WebSphere v6.0 Server Prc

- ____d. Make sure the **Application client module** is **TransferClient**.
- ____a. In the Classpath tab, add ibmorb.jar to the list of External Jars
 - 1) Click on Bootstrap entries and select Add External Jars.
 - 2) Navigate to <RAD_HOME>\runtimes\base_v6\java\jre\lib\ibmorb.jar. Select Open.
- ____b. On the Arguments tab you should enter the following in the Program Arguments text area:

-CCverbose=true 101 102 50

- ____ c. Click **Run.** This will transfer \$50 from account 101 to account 102.
- ____ 12. Go to the WebSphereBank web interface and verify the transfer.
 - ____a. Select Get Balance function.
 - ____b. Enter **101** for account and select **Balance**.
 - ____c. Message will indicate account balance of 550.

Get	Balance

	Messages	
The Balance for the Account Number 101 is \$550.00		
Account Number		
	1	
	Balance	

- ___ d. Repeat for account **102**.
- _____ 13. The application works properly. Close the Web **Browser**.
- _____14. Select the **Servers** view from the Server Perspective and stop the server. Select **server1** and rightclick selecting **Stop**.

Part 6: Restore your server configuration

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

 - ____b. Restore the server configuration by issuing the following command: restoreConfig "c:\Program Files\IBM\Backup.zip"

What you did in this exercise

In this exercise, you tested an application containing a Message Driven Bean.

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