Lab 3: Migrating Applications from WebSphere Application Server ND V6.1 to WebSphere Application Server ND V8.5

What this Lab Exercise is about

This lab exercise describes how to migrate two different applications from WebSphere Application Server ND V6.1 to WebSphere Application Server ND V8.5

Assumptions

It is assumed that you are using the WebSphere Version to Version Migration Workshop VMWare image that has been pre-installed with a WebSphere Application Server ND V6.1 standalone server profile containing the PlantsByWebSphere and StockQuote applications. It is also assumed that you have completed Lab1: Installing WebSphere Application Server ND V8.5

Introduction

This exercise will illustrate how to use the Application Migration Tool to help with Application Migration from one version of WebSphere Application Server to another. You will migrate two applications (Plants by WebSphere and Stock Quote) from WebSphere Application Server V6.1 to WebSphere Application Server V8.5.

Plants by WebSphere

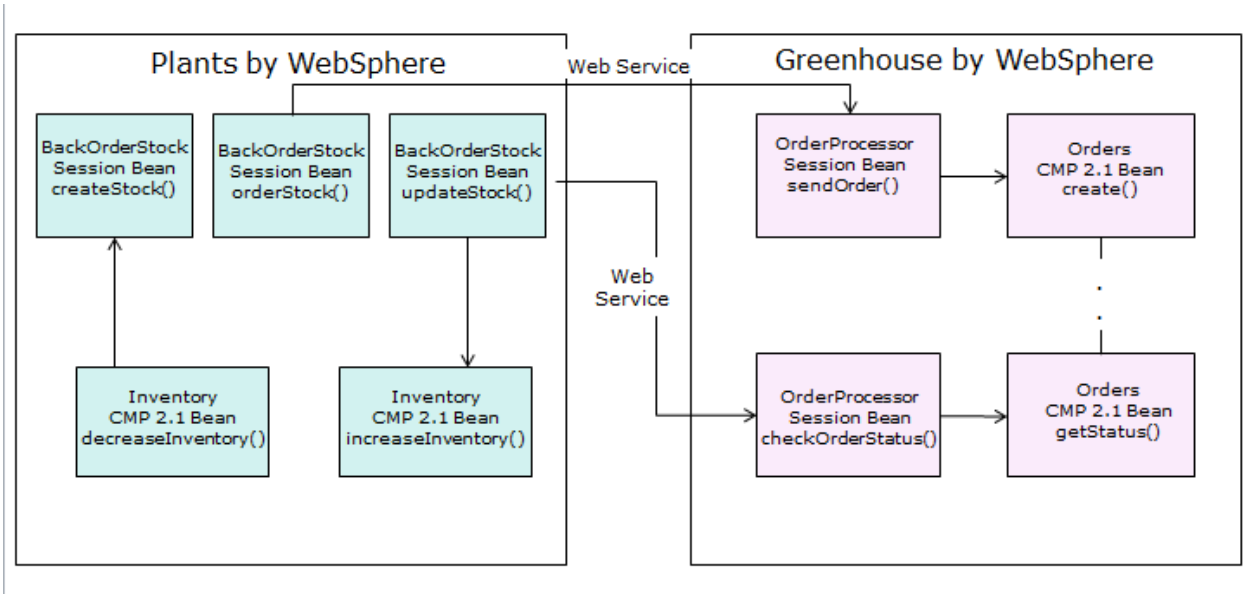
The Plants by WebSphere application is an application that is available with the WebSphere Application Server samples gallery. As the name suggests, the application demonstrates several JEE functions using an online store that specializes in selling plants, trees, and accessories. Using the Plants by WebSphere storefront, customers can open accounts, browse for items to purchase, view product details, and place orders. The Plants by WebSphere application uses container-managed persistence (CMP), container-managed relationships (CMR), stateless session beans, a stateful session bean, JSP pages, and servlets. This application is only intended to showcase the capabilities of WebSphere Application Server itself. Nevertheless, it is useful in many testing and development scenarios. The source code of Plants by WebSphere is distributed with WebSphere Application Server, and, as such, you can modify it freely as you wish. “Plants by WebSphere” is included with WebSphere Application Server in all versions greater than 5.0.

The Plants by WebSphere Sample incorporates the following technologies:

- Container-managed persistence (CMP) entity beans
- Bean-managed persistence (BMP) entity beans
- Stateless session beans
- Stateful session beans
- Servlets
- JavaServer Pages (JSP) files and HTML
- Container-managed relationships (CMR)
- Java 2 platform, enterprise edition (J2EE) security

- Java API for XML-based remote procedure call (JAX-RPC)

The Plants by WebSphere application is supported through a series of JSP pages and HTML pages. These pages communicate with the following servlets: AccountServlet, ShoppingServlet, ImageServlet, and AdminServlet. The servlets use the various enterprise bean business methods, which in turn, access data from the database as needed. In general, stateless session beans are used to interface with the entity beans, in order to reduce the number of transactions. The high level architecture of the application is shown below.



Stock Quote

The Stock Quote application is a Web Services application based on the Axis 2 Web Services engine. Web services are a technology that allows applications to be invoked using internet standards and protocols. The applications are divided into multiple tiers, typically at least two: client and server. These two pieces communicate using XML messages defined by the SOAP 1.1 or 1.2 protocols.

WebSphere Application Server version 6.1 provides support for using the JAX-RPC and JAX-WS protocols and provides additional features such as a UDDI registry and extensions to the SOAP protocol known as WSIF.

The WebSphere Application Server also supports several additional protocols that build on top of the basic web services protocol such as WS-Notification and WS-ReliableMessaging. All of these functions are provided by the web services engine provided by the application server. However in some circumstances you need to use a third party web services engine, such as Axis 2. For example if you wish to deploy applications that use a single runtime across various application servers such as WebSphere Application Server, JBoss, and WebLogic you would use such a third party engine.

Note, however, that even though IBM supports the enablement of third party JAX-WS runtimes to run on WebSphere Application Server, and ensures the successful deployment of applications that use such runtimes, IBM does not provide support for resolving JAR file conflict problems, or any problem that a stack trace indicates is in the third party code. In addition using a third party web services engine will prevent the application server from recognizing that web services

provided by the third party engine are, in fact, web services and hence prevents the use of application level policy sets such as WS-Security, WS-RM, and WS-Transactions policy sets and also prevents the use of WSDM or the use of JNDI lookups to retrieve JAX-WS Services or Port Instances

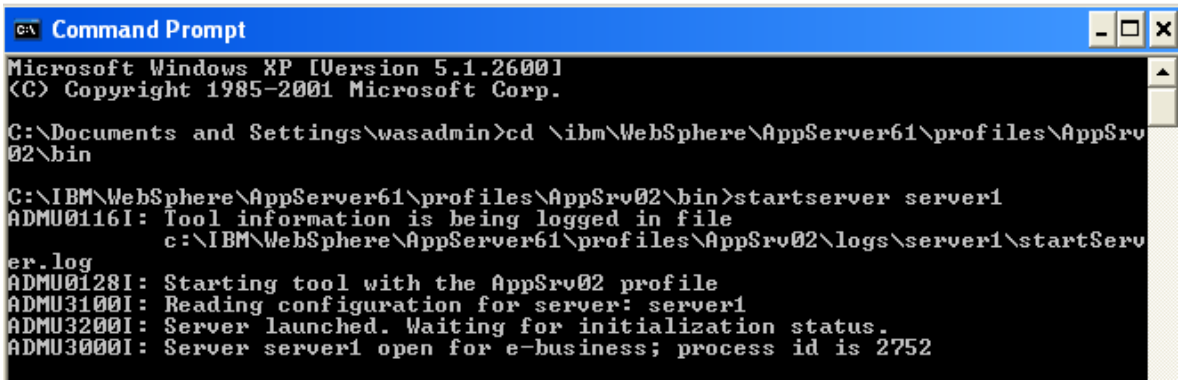
The Stock Quote application is an example of an application that uses a third party web services engine, specifically the Axis2 web services engine. The application is extremely simple (in fact, it provides just two web services), but demonstrates the potential problems of migrating such an application.

The application provides a stock quote service that a client can use to discover stock prices by providing the symbol of the required stock price as input. The Axis Object Model (AXIOM) is used to allow arbitrary pieces of XML to be passed and returned in the body of the web services messages. In this example, of course, a simple Plain Old Java Object (POJO) could have been used as the implementation of the web service together with a suitable definition of the web service. The developer of this particular application chose to use the AXIOM style for the web service.

Exercise Instructions

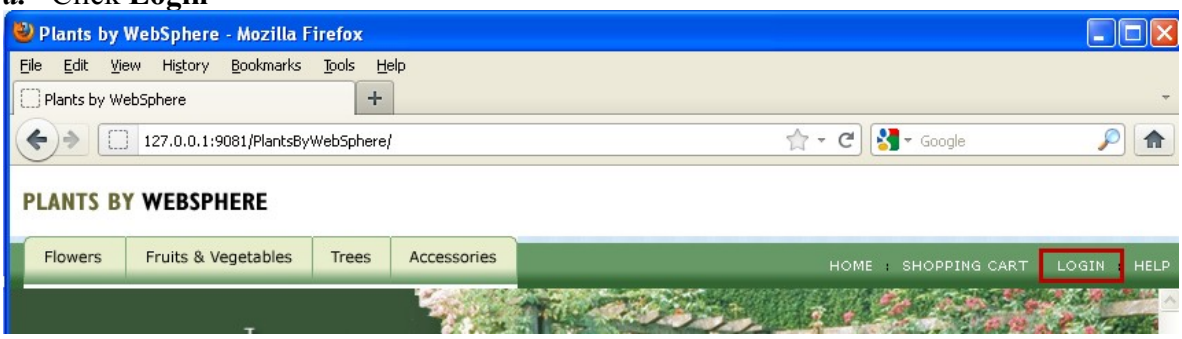
Part 1 – Execute PlantsByWebSphere on WAS ND 6.1

1. Start the WAS ND 6.1 standalone server:
   a. Open a Command Prompt
   b. Navigate to
   `C:\IBM\WebSphere\AppServer61\profiles\AppSrv02\bin`
   c. Issue the command `startServer.bat server1`



2. Open a Browser and navigate to http://127.0.0.1:9081/PlantsByWebSphere

3. Register a new Account:
   a. Click **Login**



   b. Click the link to **register for your own account here**
   c. Enter the required information (you will need the E-mail address and password later on) and click **Register**

Login Information

E-mail address * migration@ibm.com
Password * ••••••••
Verify Password * ••••••••

Contact Information

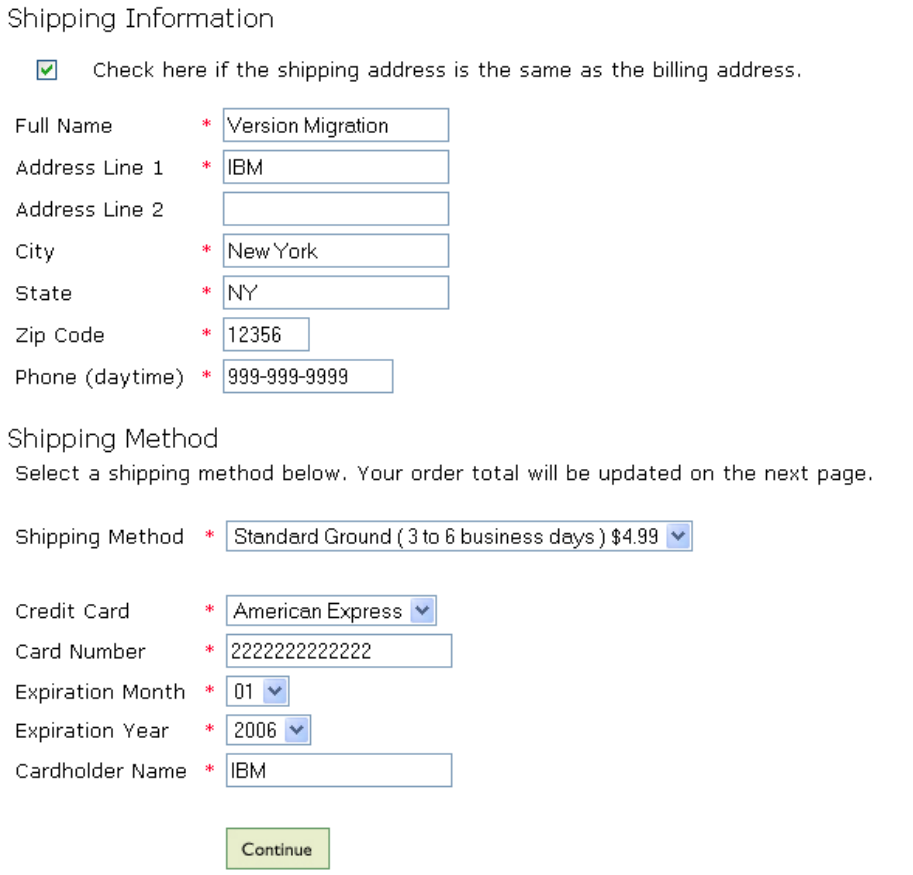
First Name * Version
Last Name * Migration
Address Line 1 * IBM
Address Line 2
City * New York
State * NY
Zip Code * 12356
Phone (daytime) * 999-999-9999

Register

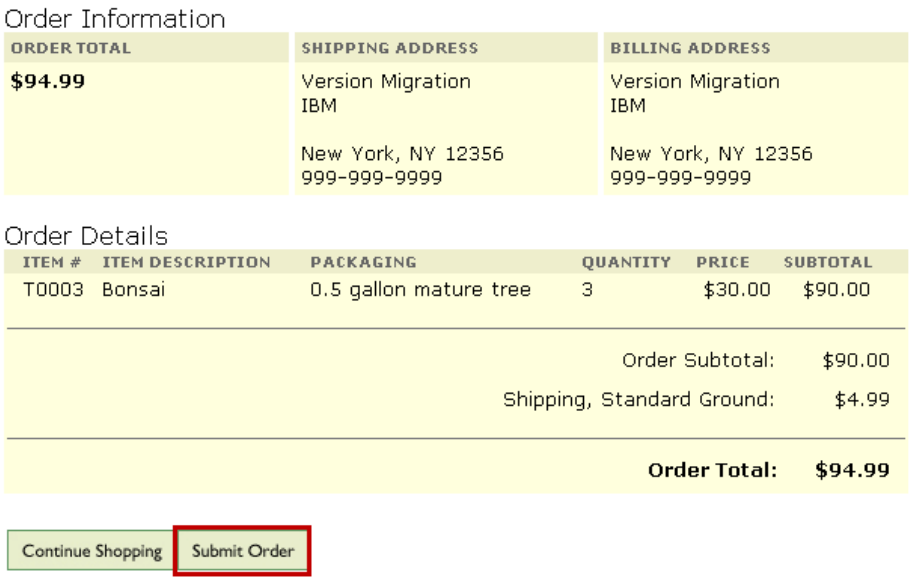
4. Login and make a purchase:
   a. Click **Login** again, enter your E-mail address and Password and click **sign-in**
   b. Click the **Bonsai Tree** special

   c. Change the **Quantity** to 3 and click **Add to cart**

   d. Click **Checkout now**
   e. Complete the Shipping Information and Payment Information and then click **Continue**



f. On the "Review your order" page, click **Submit Order**



g. After a short while your order will complete and the page shown below will appear

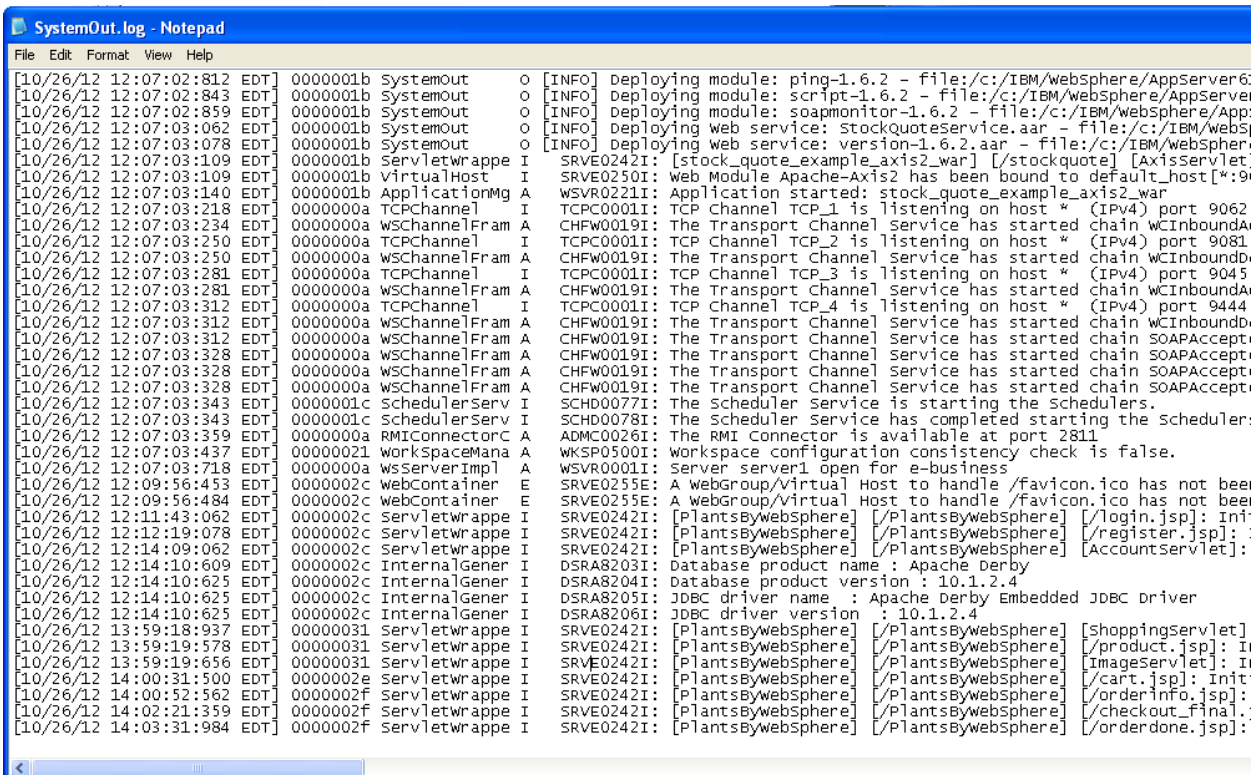
Order Completion

Thank you for making your Plants By WebSphere purchase!

Order number 2

Expected arrival in 5-7 business days.

5. Review the SystemOut.log for any errors
   a. Open the `C:\IBM\WebSphere\AppServer61\profiles\AppSrv02\logs\server1\SystemOut.log` file
   b. Scroll to the end of the file and check that no errors have been thrown

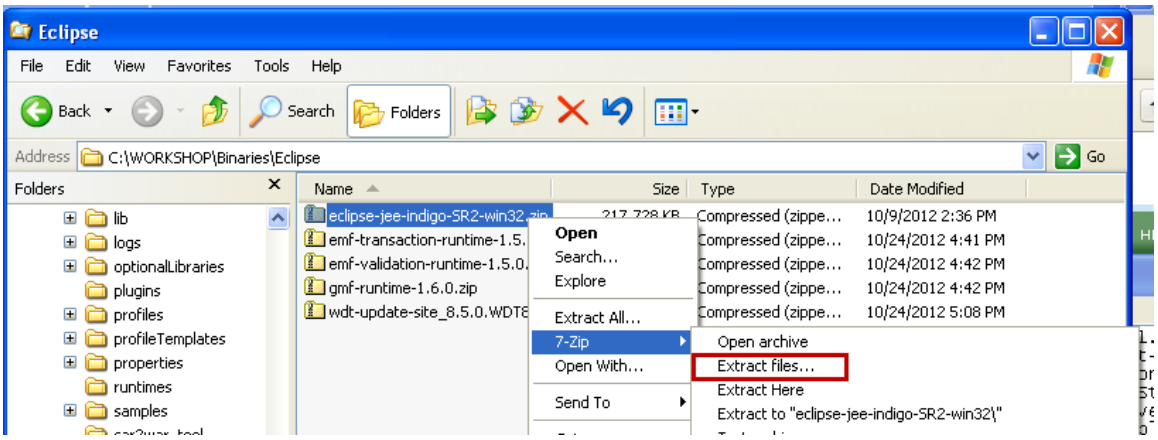


6. Close the Browser and SystemOut.log file

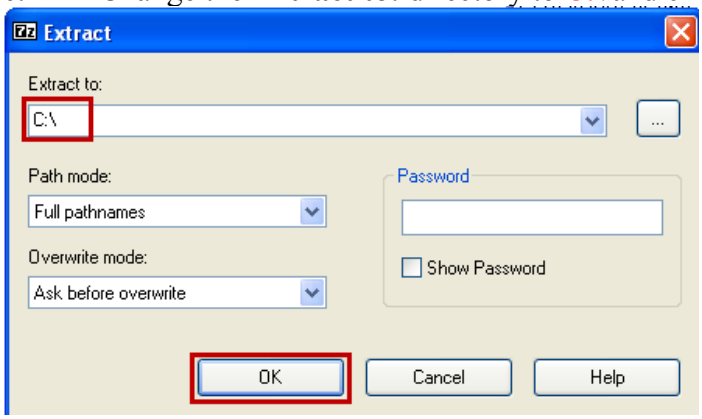
Part 2 – Install Eclipse

The Migration Toolkit can be installed in to either Rational Application Developer or Eclipse. For this exercise we are going to use Eclipse (Indigo) which has been downloaded for you.

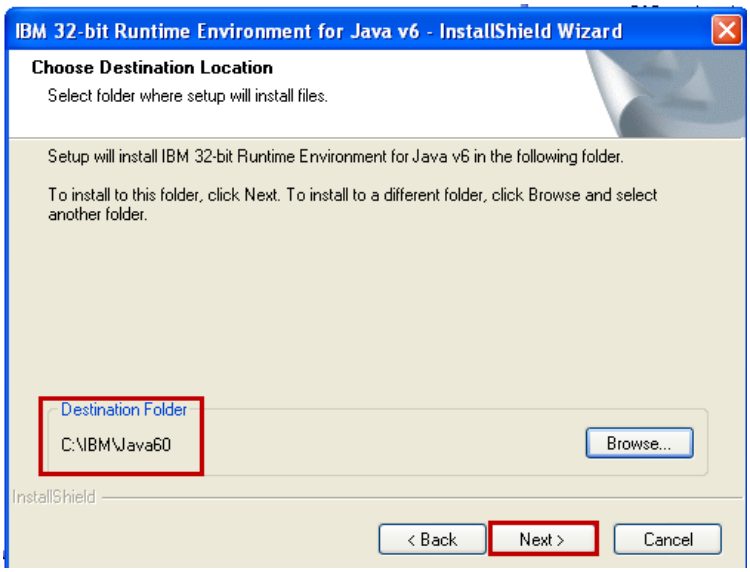
1. Unzip Indigo
   a. Open a Windows Explorer and navigate to `C:\Workshop\Binaries\Eclipse`
   b. Right-click on `eclipse-jee-indigo-SR2-win32.zip` and select **7-Zip → Extract Files…**



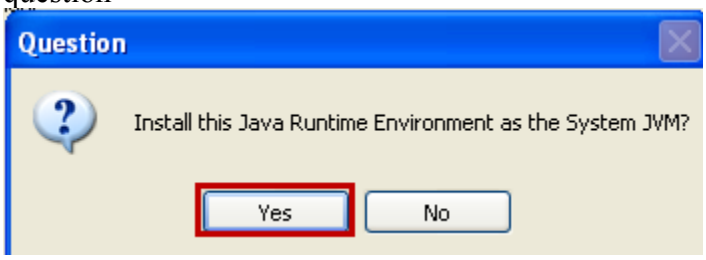
c. Change the **Extract to:** directory to C:\ and click **OK**



2. Install the IBM Java 6.0 JRE
   a. Open a Windows Explorer and navigate to `C:\WORKSHOP\Binaries\Java`
   b. Double-click on `ibm-java-jre-60-win-i386.exe`
   c. Click **OK** on the Language Dialog to accept United States (English)
   d. When the "Welcome" screen appears, click **Next**
   e. When the "License Agreement" screen appears, click **Yes**
   f. When the "Choose Destination" screen appears, change the Destination Folder to C:\IBM\Java60 and click **Next**

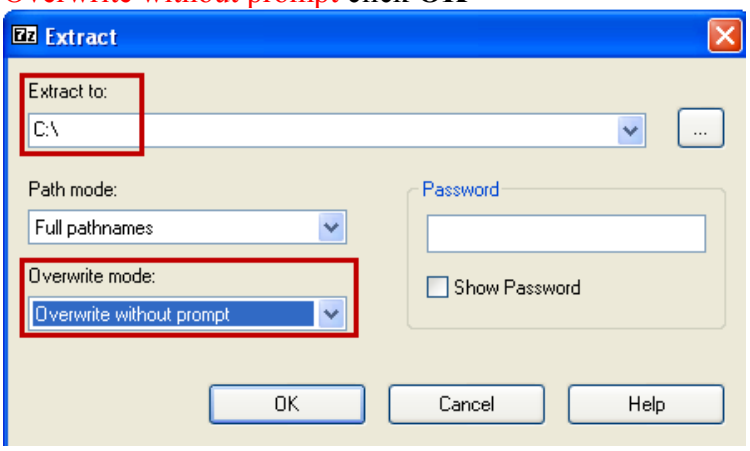


g. Answer **Yes** to the "Install this Java Runtime Environment as the System JVM?" question



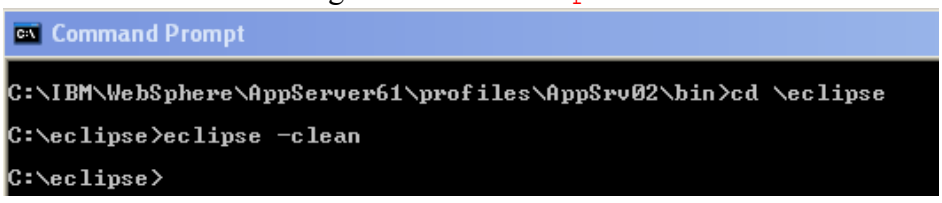
h. When the "Start Copying Files" dialog is displayed, click **Next**
i. When the "Browser Registration" dialog is displayed, click **Next**
j. When the "Installation Wizard complete" dialog is displayed, click **Finish**

3. Install the WebSphere Developer Tools prerequisites
   a. Open a Windows Explorer and navigate to `C:\Workshop\Binaries\Eclipse`
   b. Right-click on `emf-transaction-runtime-1.5.0.zip` and select **7-Zip → Extract Files…**
   c. Change the **Extract to:** directory to C:\ and change the **Overwrite mode:** to Overwrite without prompt click **OK**

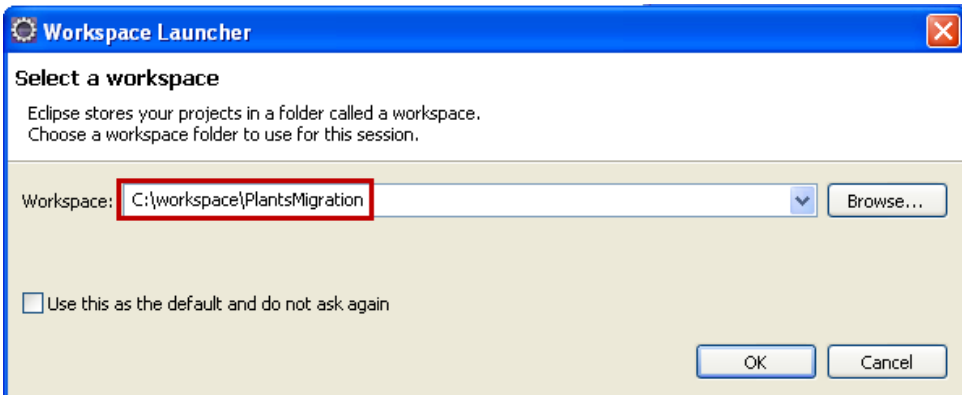


   d. Repeat steps a-c for `emf-validation-runtime-1.5.0.zip`
   e. Repeat steps a-c for `gmf-runtime-1.6.0.zip`

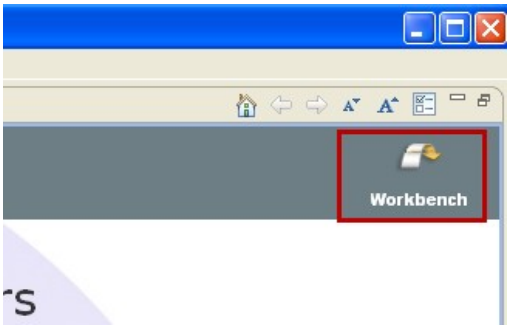
4. Install the WebSphere Developer Tools
   a. Open a Command Prompt and navigate to `C:\Eclipse`
   b. Issue the following command: `eclipse -clean`



   c. When the Workspace Launcher is displayed, change the Workspace to `C:\workspace\PlantsMigration` and click **OK**

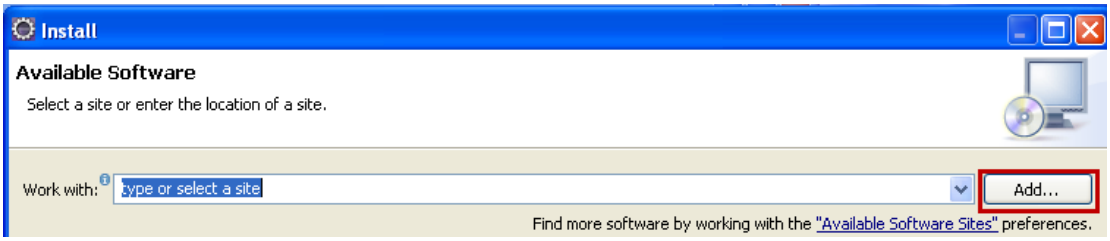


d. Click the **Workbench** icon to close the Welcome Screen.

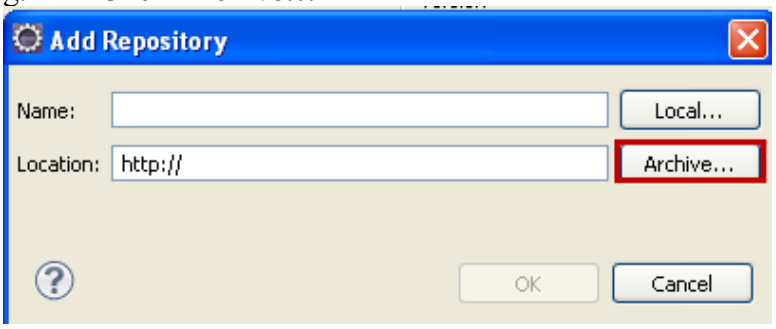


e. Click ***Help → Install New Software***

f. Click **Add…**



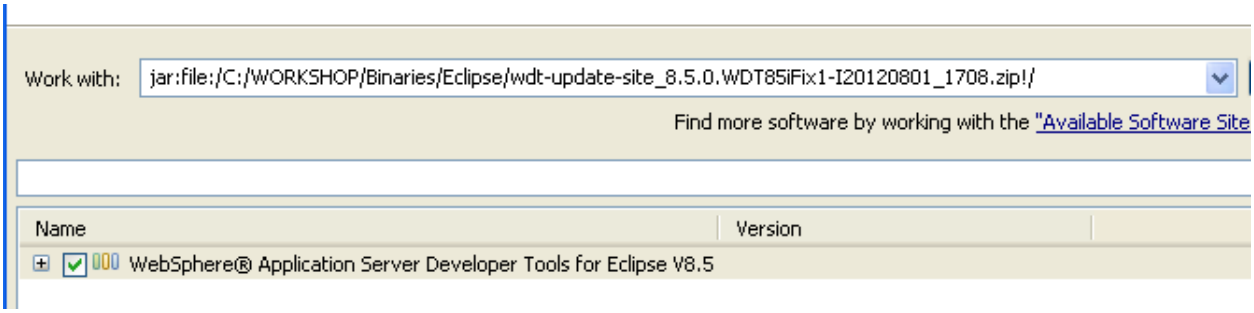
g. Click **Archive…**



h. Navigate to `C:\WORKSHOP\Binaries\Eclipse\wdt-update-site_8.5.0.WDT85iFix1-I20120801_1708.zip` and click **Open**

i. When you are returned to the Add Repository dialog, click **OK**

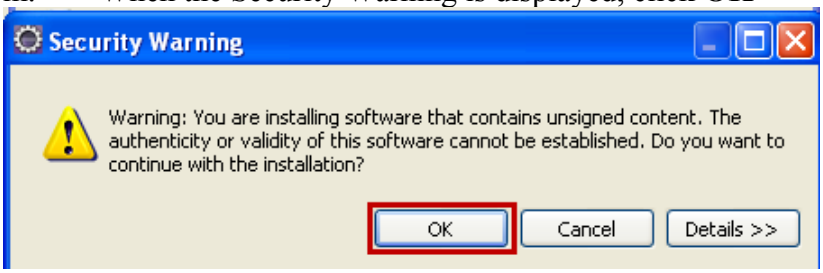
j. Select the **WebSphere Application Server Developer Tools for Eclipse V8.5** and click **Next**



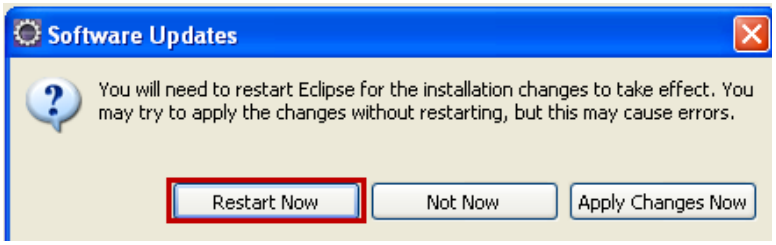
k. When the Install Details screen is displayed, click **Next**

l. When the Review Licenses screen is displayed, accept the Licenses and click **Finish**

m. When the Security Warning is displayed, click **OK**

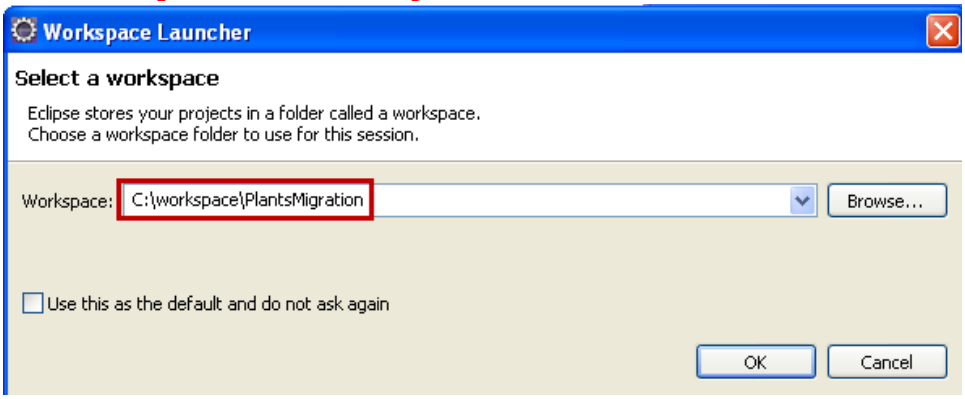


n. When the installation completes the Software Updates screen will be displayed. Click **Restart Now**

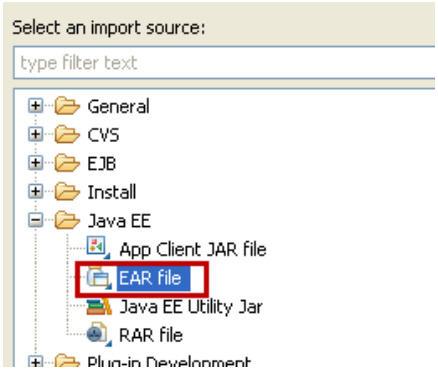


Part 3 – Import the PlantsByWebSphere Application

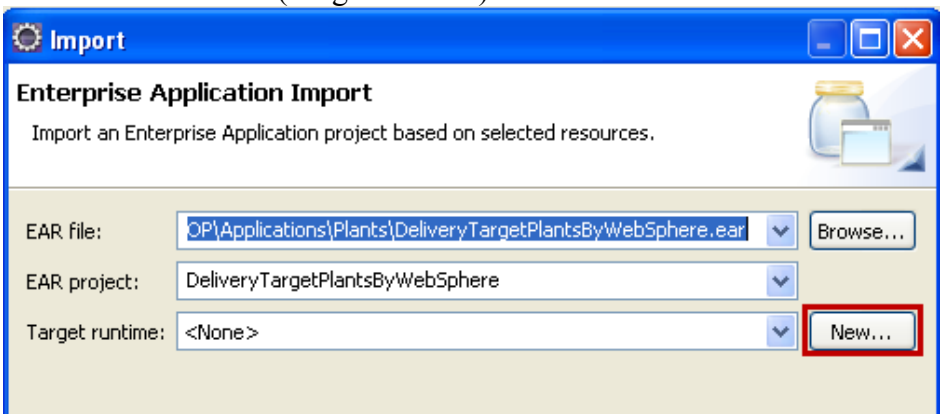
1. Start Eclipse (if it isn't already running from the previous step)
   a. Open a Windows Explorer and navigate to `C:\eclipse`
   b. Double-click on `eclipse.exe`
   c. When the Workspace Launcher is displayed, change the Workspace to `C:\workspace\PlantsMigration` and click **OK**



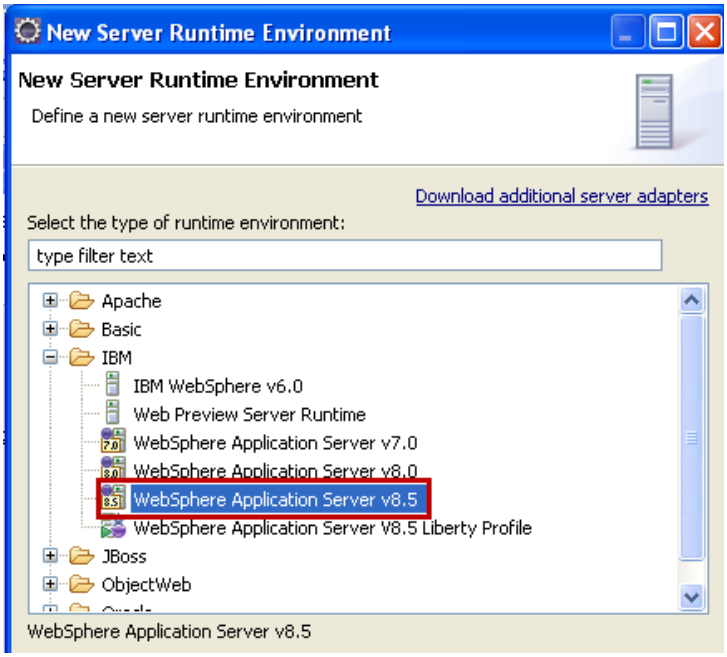
2. Import the PlantsByWebSphere Application Code
   a. Click ***File → Import***
   b. When the "Select" dialog is displayed, select **Java EE → EAR file** and click **Next**



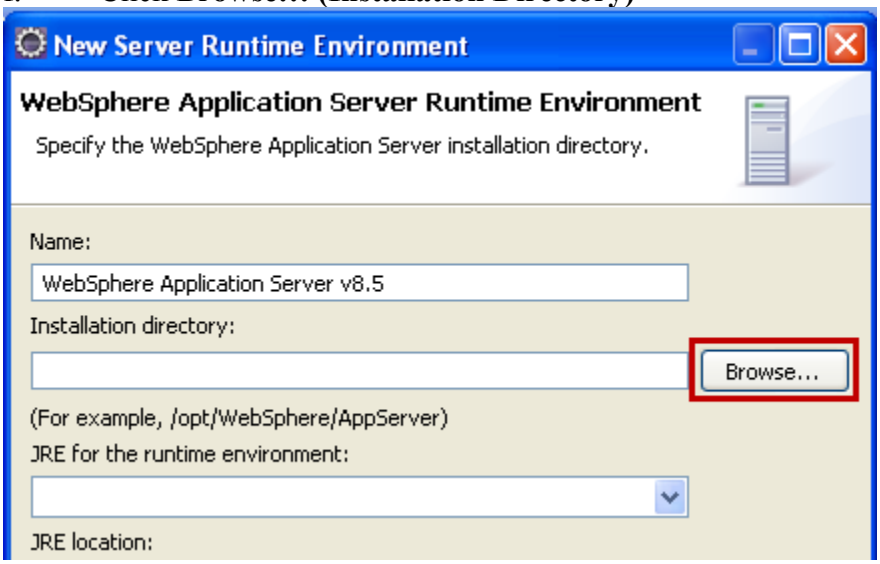
   c. Click **Browse…** (EAR file) and navigate to `C:\WORKSHOP\Applications\Plants\DeliveryTargetPlantsByWebSphere.ear`
   d. Click **New…** (Target runtime)



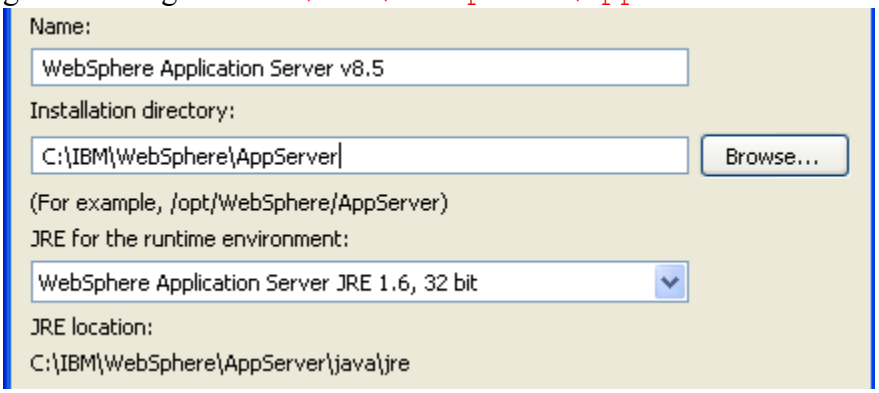
   e. Select **WebSphere Application Server v8.5** from the list and click **Next**



f. Click **Browse… (Installation Directory)**

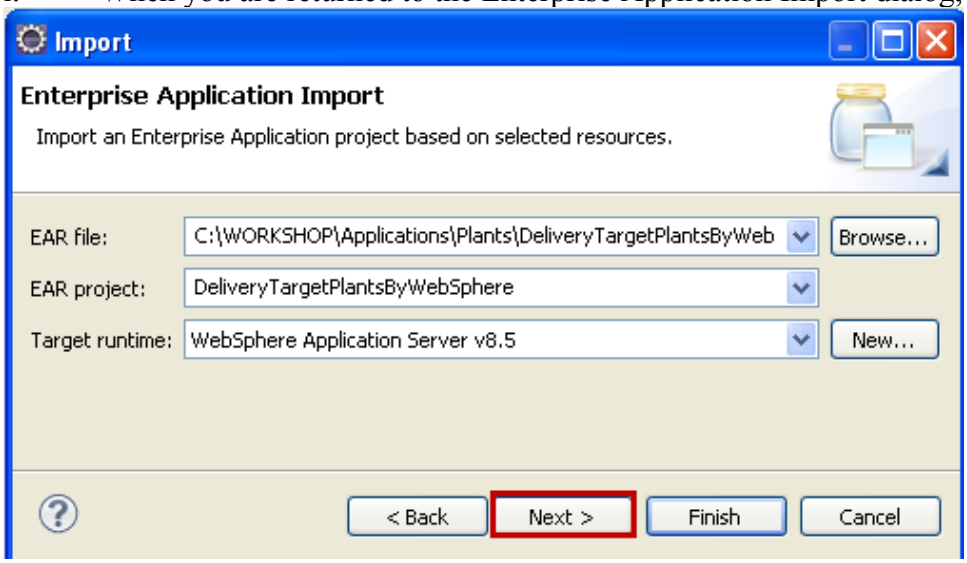


g. Navigate to `C:\IBM\WebSphere\AppServer85` and click **OK**



h. Click **Finish**

i. When you are returned to the Enterprise Application Import dialog, click **Next**



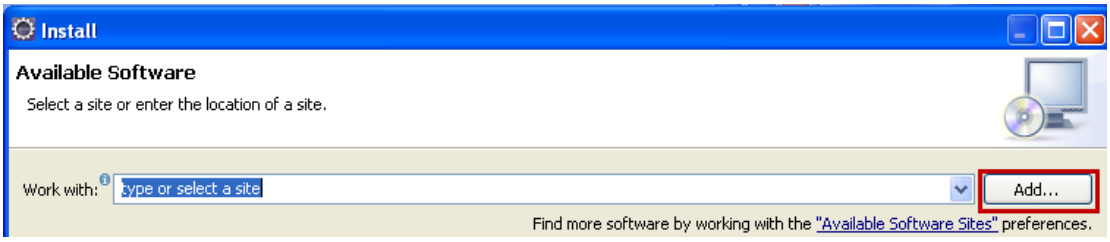
j. On the Utility JARs and web libraries dialog, click **Next**

k. On the EAR modules and Utility JAR projects dialog, click **Finish**

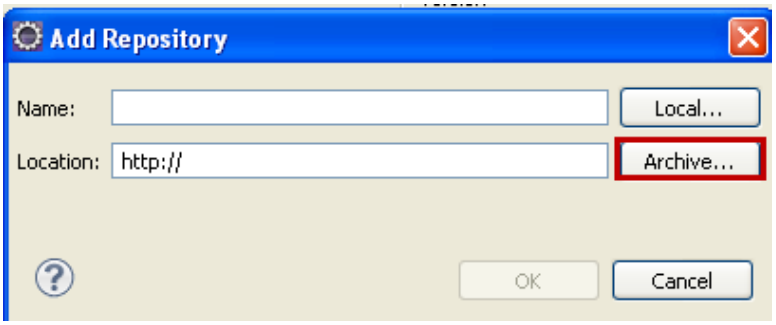
Part 4 – Install and Configure the Application Migration Toolkit

The Application Migration Toolkit is a downloadable plugin to Eclipse. It has already been downloaded for you and can be installed in to Eclipse using the following steps.

1. Install the ApplicationMigration Toolkit
   a. Eclipse should already be running and open in the PlantsMigration workspace from the previous step. If it is not already open, use the steps from Part 3 to open it.
   b. Click ***Help → Install New Software***
   c. Click **Add…**



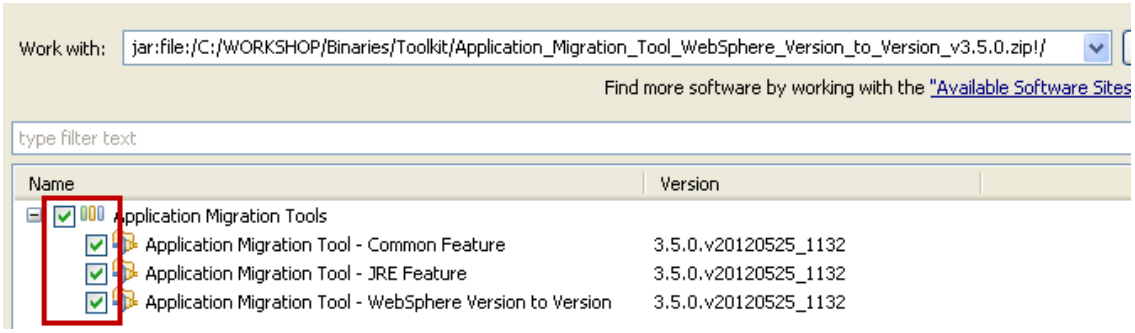
   d. Click **Archive…**



e. Navigate to `C:\WORKSHOP\Binaries\Toolkit\Application_Migration_Tool_WebSphere_Version_to_Version_v3.5.0.zip` and click **Open**

f. When you are returned to the Add Repository dialog, click **OK**

g. Select **Application Migration Tools** from the Available Software list and click **Next**



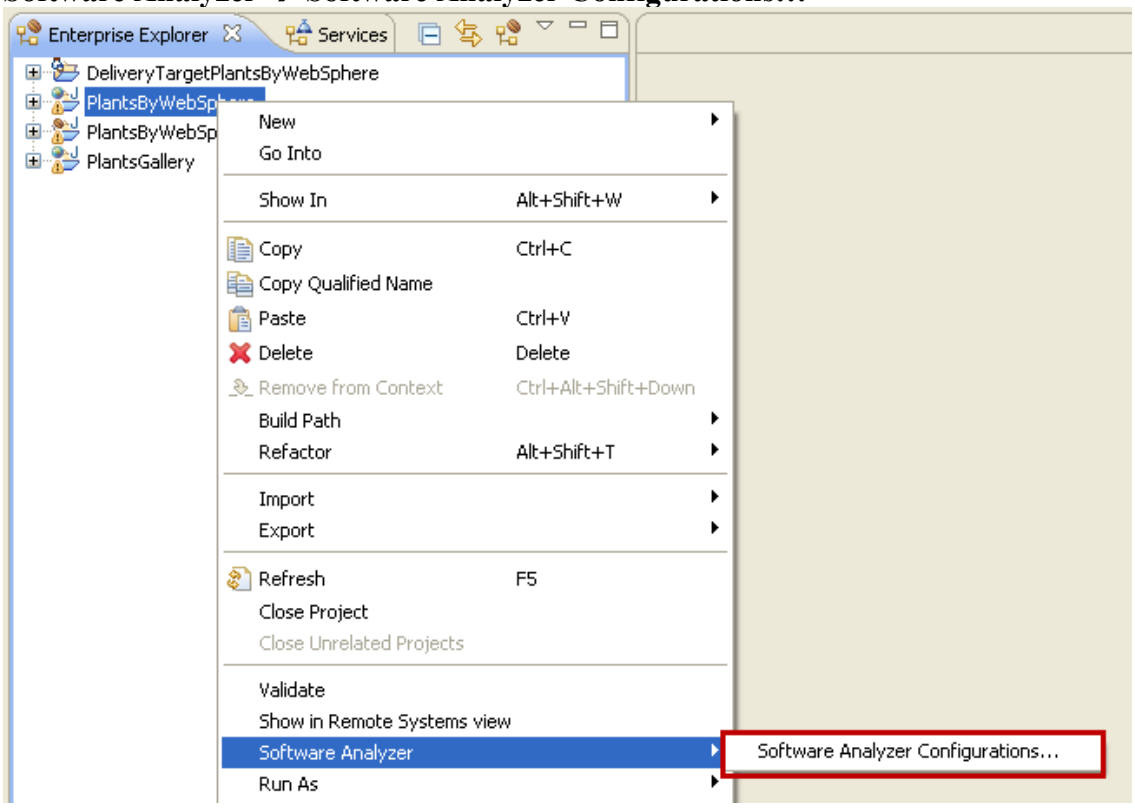
h. When the Install Details screen is displayed, click **Next**

i. When the Review Licenses screen is displayed, accept the Licenses and click **Finish**

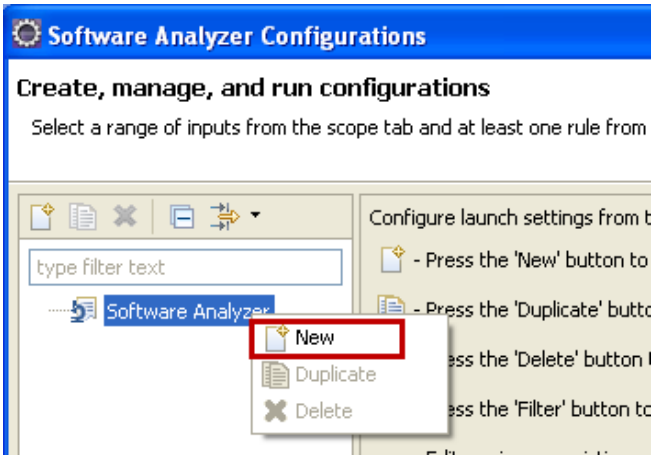
j. When the installation completes the Software Updates screen will be displayed. Click **Restart Now**

2. Configure the Application Migration Toolkit

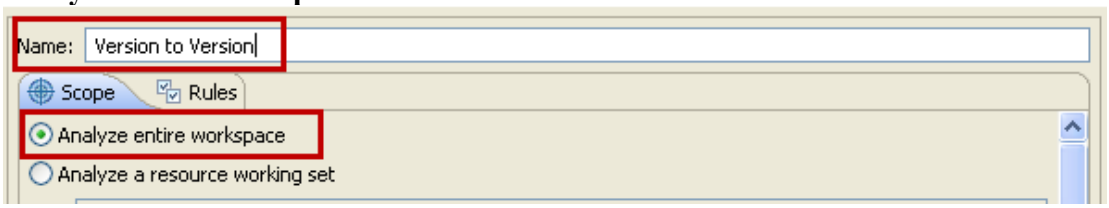
a. Right-click on **PlantsByWebSphere** in the Enterprise Explorer and select **Software Analyzer → Software Analyzer Configurations…**



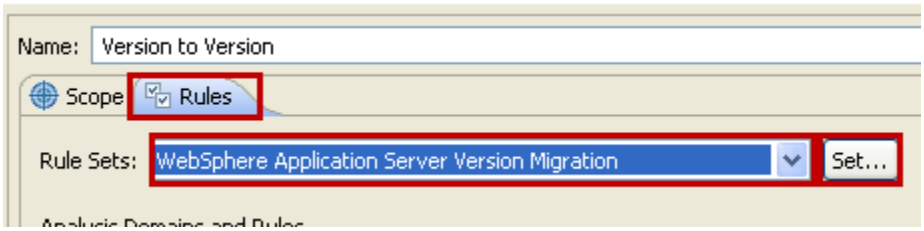
b. Right-click on **Software Analyzer** and select **New**



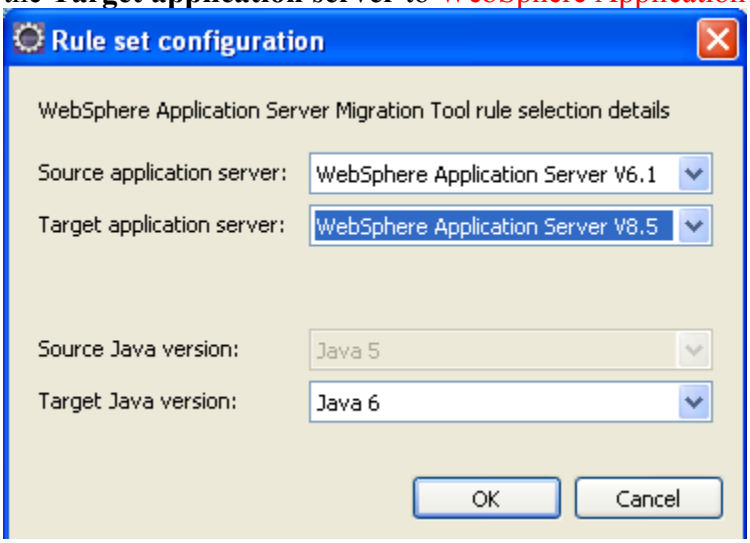
c. Set the **Name** to `Version to Version` and ensure that the Scope is set to **Analyze entire workspace**



d. Switch to the **Rules** tab, select WebSphere Application Server Version Migration from the **Rule Sets** list and click **Set…**



e. Change the **Source application server** to WebSphere Application Server V6.1, the **Target application server** to WebSphere Application Server V8.5 and click **OK**



f. On the Software Analyzer Configurations dialog, click **Apply** and then click **Close**

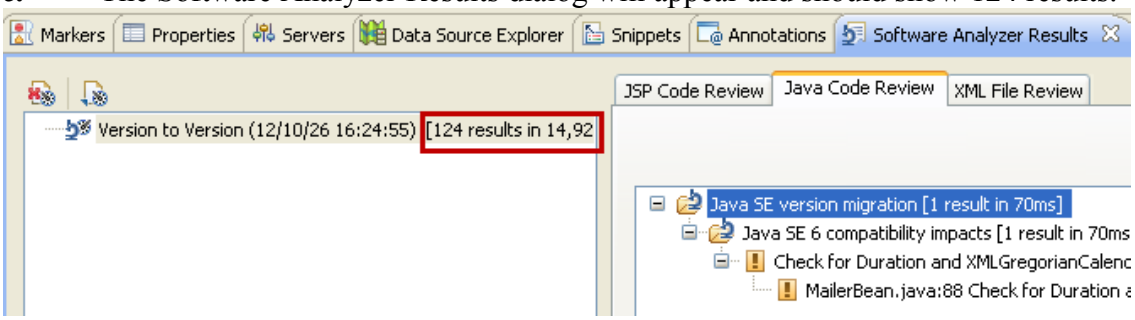
Part 4 – Analyze and Migrate the PlantsByWebSphere Application

1. Run the Application Migration Toolkit

a. Right-click on **PlantsByWebSphere** in the Enterprise Explorer and select **Software Analyzer → Software Analyzer Configurations…**

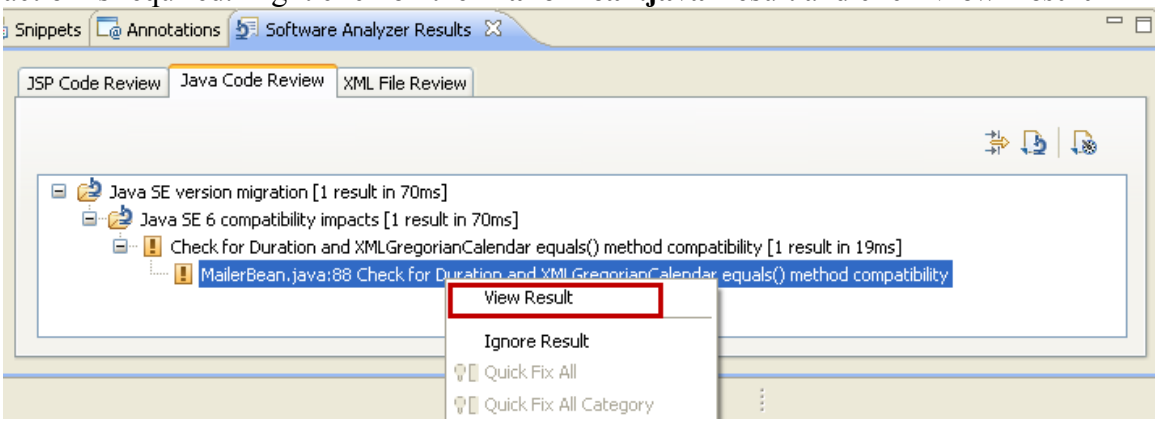
b. Click **Version to Version** and then click **Analyze**

c. The Software Analyzer Results dialog will appear and should show 124 results.



2. Analyze the Java Code Review items

a. In the **Software Analyzer Results** dialog, change to the **Java Code Review** tab and open the tree. Note that the results have **Yellow** Warning icons to highlight that action is required. Right click on the **MailerBean.java** Result and click **View Result**



b. The Java Code for MailerBean.java is displayed and line 88 is highlighted.

```
Duration d = df.newDuration(duration);
Duration zero = df.newDuration(0);
if (!d.equals(zero)) { // If the duration isn't zero build a new date
    XMLGregorianCalendar cal = df.newXMLGregorianCalendar(new GregorianCalendar());
    cal.add(d);
    return ((DateFormat)DateFormat.getDateInstance().clone()).format(cal.toGregorianCalendar().getTime());
}
else {
    return "";
}
```

NOTE: This rule flags the use of the *equals(Object param)* method on *javax.xml.datatype.Duration or javax.xml.datatype.XMLGregorianCalendar*. Java 6 now returns false if the parameter passed is null. It used to throw a *NullPointerException* in earlier versions of Java. In this case, the code handles the true/false Boolean return correctly, so no code changes are required.

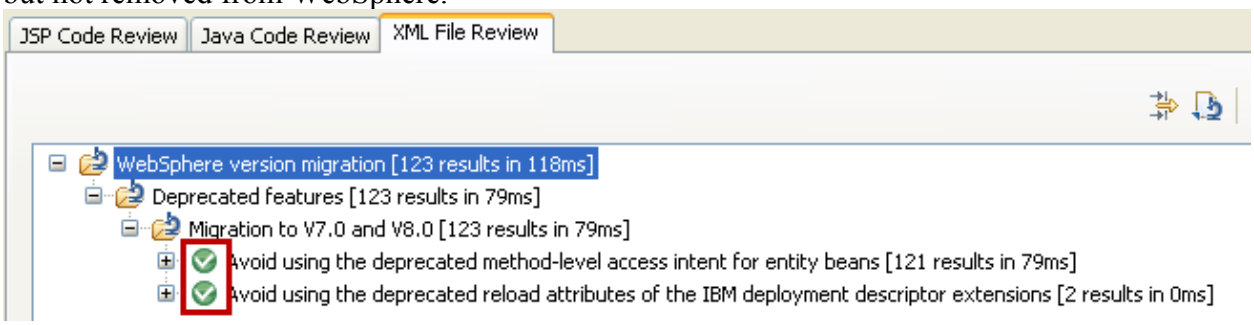
c. In the **Software Analyzer Results** dialog, change to the **Java Code Review** tab and open the tree. Right click on the **MailerBean.java** Result and click **Ignore Result**

d. Note the changes that were made when you chose to ignore the result.

```
Duration d = df.newDuration(duration);
Duration zero = df.newDuration(0);
//$ANALYSIS-IGNORE
if (!d.equals(zero)) { // If the duration isn't zero build a new date
            XMLGregorianCalendar cal = df.newXMLGregorianCalendar(new GregorianCalendar());
            cal.add(d);
```

3. Analyze the XML File Review items

a. In the **Software Analyzer Results** dialog, change to the **XML File Review** tab and open the tree. Note that the results have **Green** icons next to them to highlight that action is not required. Both of these results refer to functions that have been deprecated but not removed from WebSphere.

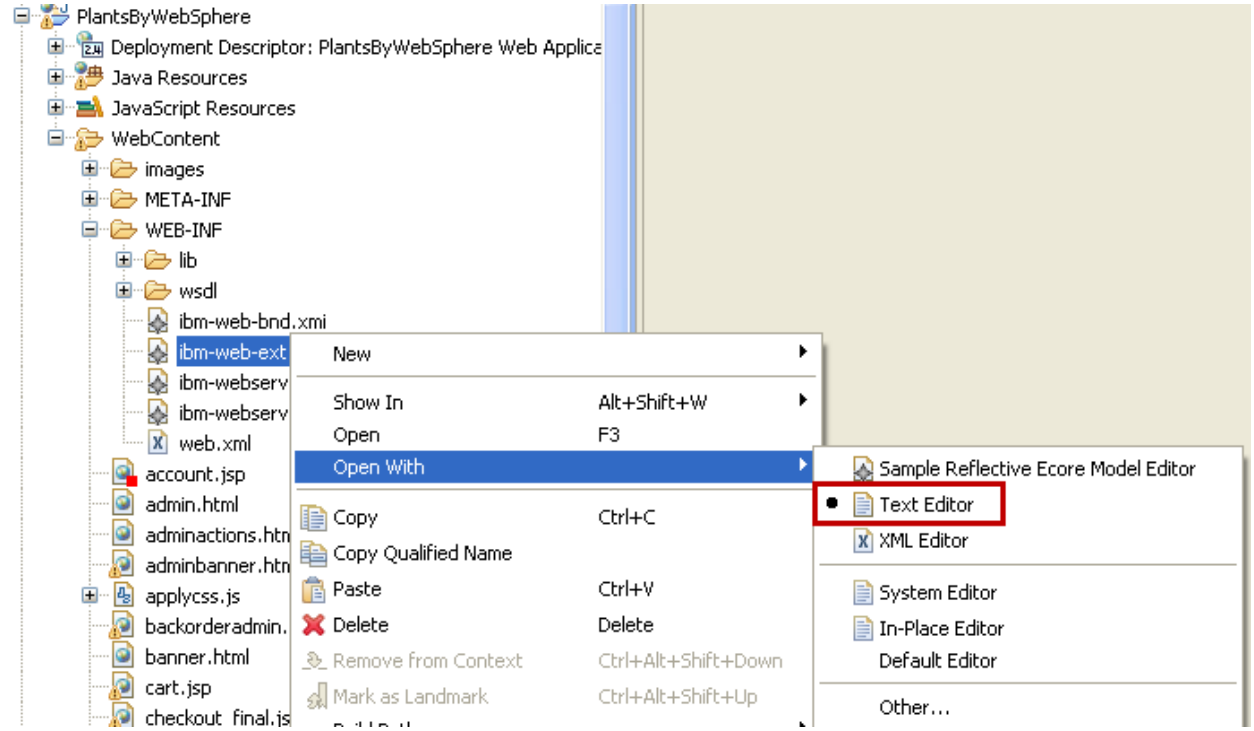


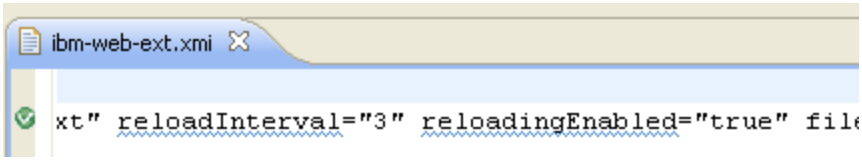
NOTE: In this instance the first of the results refers to the use of *method-level access intent for entity beans.* Method level access intent was deprecated because it might run into data access problems, like deadlock. While it is possible to modify the deployment descriptor for each of the entity beans to use a *bean-level access intent*, it is more likely that code changes will be required to achieve the same functionality without using deprecated features.

NOTE: The second of the results refers to the use of *reloadInterval* and *reloadingEnabled* attributes of the IBM deployment descriptor extensions which has been deprecated, including both the WAR file extension (WEB-INF/ibm-web-ext.xmi) and the application extension (META-INF/ibm-application-ext.xmi). Instead of using deployment descriptor extensions, you should use the reload enable and interval options provided during application deployment.

b. As the results returned by the Application Migration Tool do not require any code changes as the functions that are noted are only deprecated, we are going to proceed without making any changes.

c. If you choose, you can open ***PlantsByWebSphere/WebContent/WEB-INF/ibm-web-ext.xmi*** in a Text Editor and review the reloadInterval and reloadingEnabled parameters.



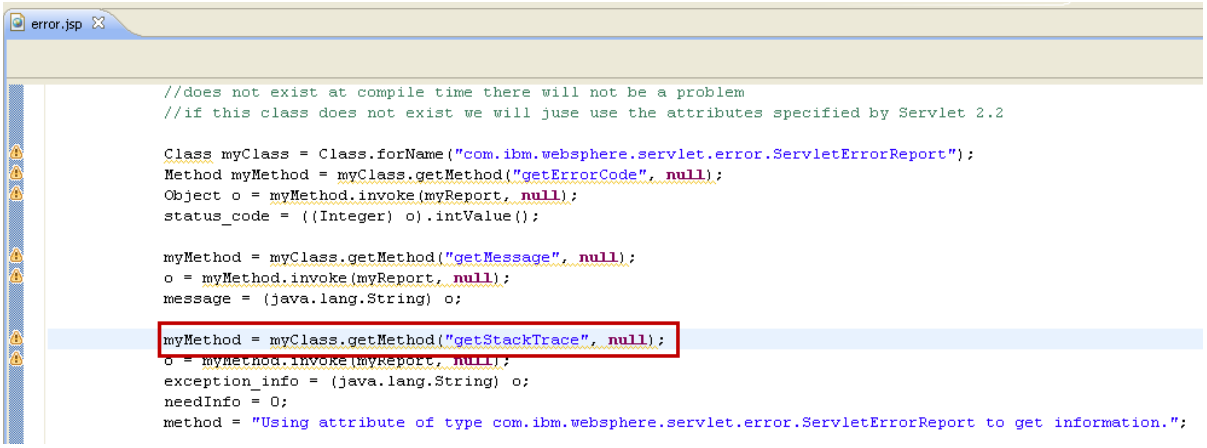


4. Analyze the problems that were not discovered by the Application Migration Toolkit.
While the Application Migration Tool detects many migration problems, there are a few classes of migration problems that are currently not detected by the tools:

- Migration problems in applications originally written for versions of WebSphere Application Server prior to version 5.1
- Migration problems in Java code included as snippets inside of JSPs.
- Migration problems in Java code where the migration problem is hidden by the use of java reflection.

If you suspect that an application being migrated has code that falls into any of these categories, you will need to put in place a plan to manage the risks of undetected migration problems, for example, by putting in place a manual code review plan for the affected application or application parts.
As it happens the PlantsByWebSphere application actually has such a problem in one of its JSP files. The error.jsp file has a section of Java code, as shown below, that uses java reflection to invoke the getStackTrace method on the ServletErrorReport class provided by the WebSphere Application Server. This method was modified in WebSphere 5.1 to avoid a conflict caused by a change in Java 1.4 to the Throwable class. This particular change thus falls into all three of the categories of potential application migration problems that are not detected by the application migration tools.

a. Open ***PlantsByWebSphere/WebContent/error.jsp*** in a Text Editor and navigate to line 68 to view the use of getStackTrace

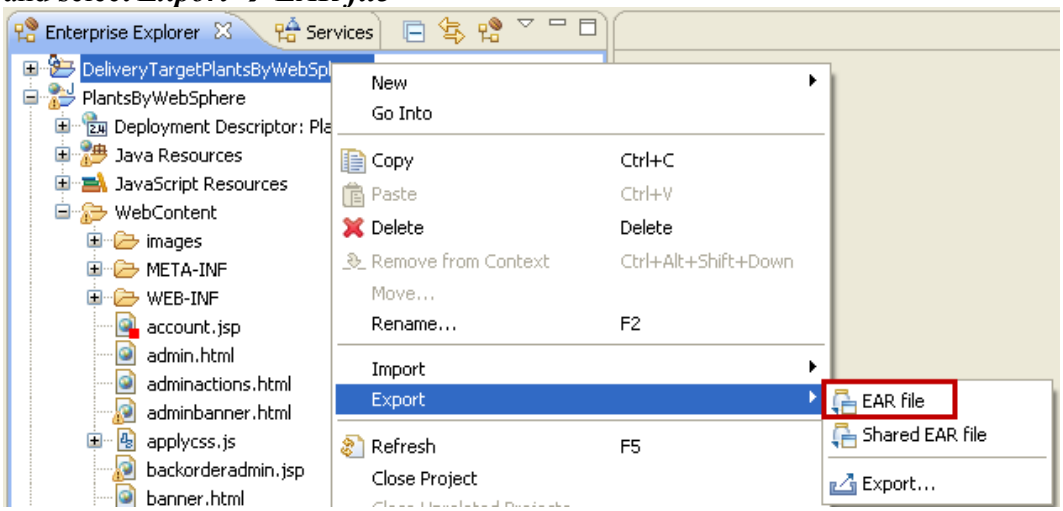


NOTE: We are not going to fix this problem at this time; we will demonstrate that the problem occurs at runtime and then return to fix it.

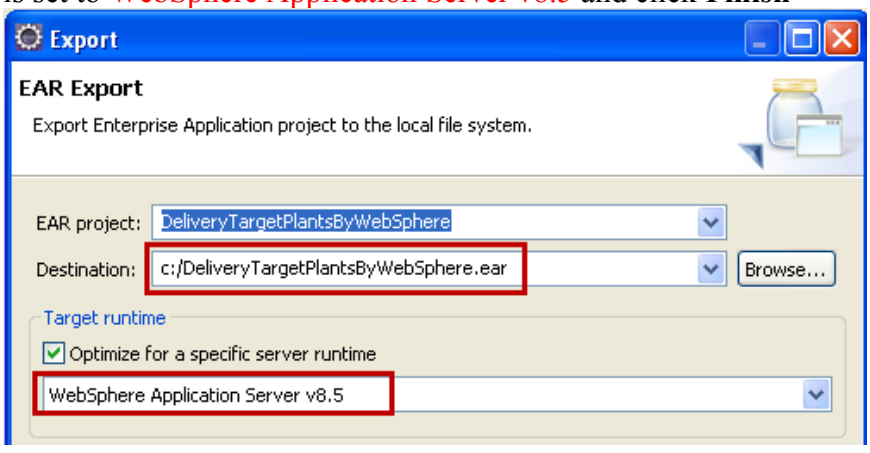
Part 5 – Execute PlantsByWebSphere on WAS ND 8.5

1. Export the EAR file from Eclipse

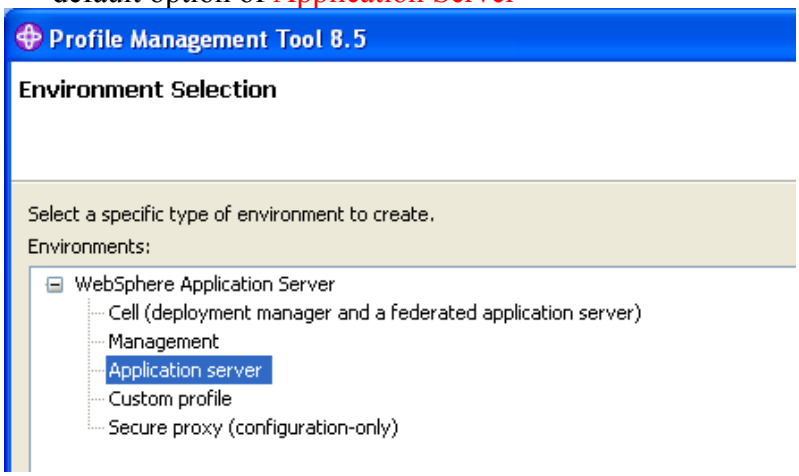
   a. Right-click on **DeliveryTargetPlantsByWebSphere** in the Enterprise Explorer and select ***Export → EAR file***



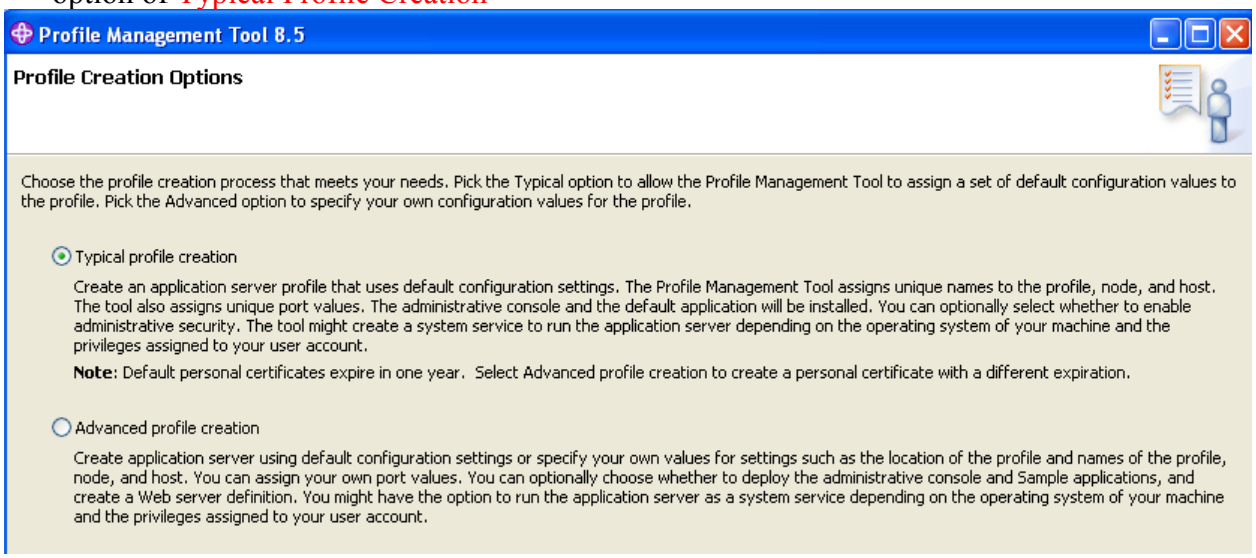
   b. Set the **Destination** to be `c:/DeliveryTargetPlantsByWebSphere.ear`, ensure that the **Target runtime** is set to WebSphere Application Server v8.5 and click **Finish**



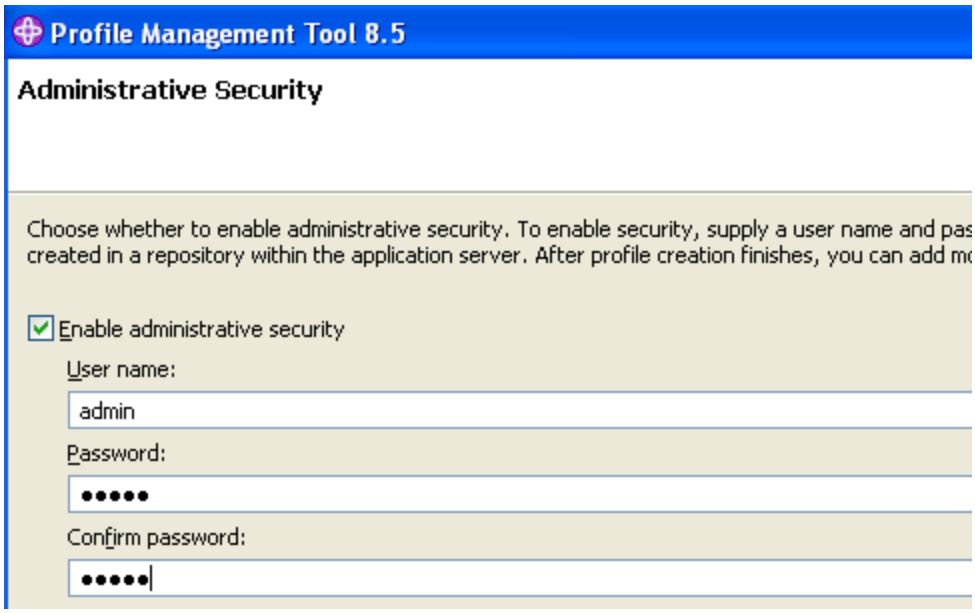
2. Create a new WebSphere Application Server V8.5 standalone profile
   a. Click ***Start → Programs → IBM WebSphere → IBM WebSphere Application Server V8.5 → Tools → Profile Management Tool***
   b. Click **Create…**
   c. When the Environment Selection dialog is displayed, click **Next** to select the default option of Application Server



   d. When the Profile Creation dialog is displayed click **Next** to accept the default option of Typical Profile Creation



   e. Enter **User name** = admin and **Password** = admin for the Administrative User and click **Next**

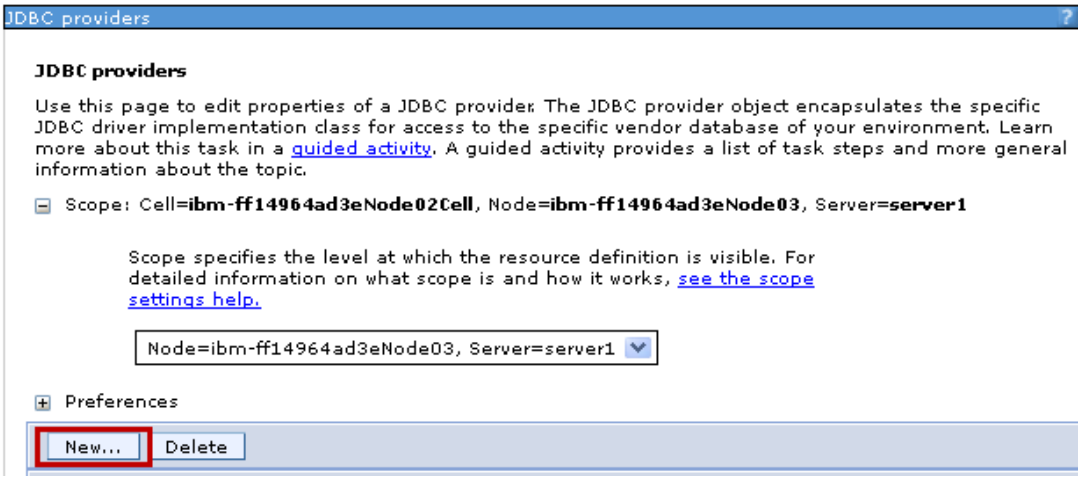


f. When the Review dialog is displayed, click **Create**

g. When the Profile Creation Complete dialog is displayed, **uncheck** the Launch the First Steps Console and click **Finish**

3. Start the WebSphere Application Server V8.5 standalone server
   a. Open a Command Prompt
   b. Navigate to `C:\IBM\WebSphere\AppServer85\profiles\AppSrv02\bin`
   c. Issue the command `startServer.bat server1`

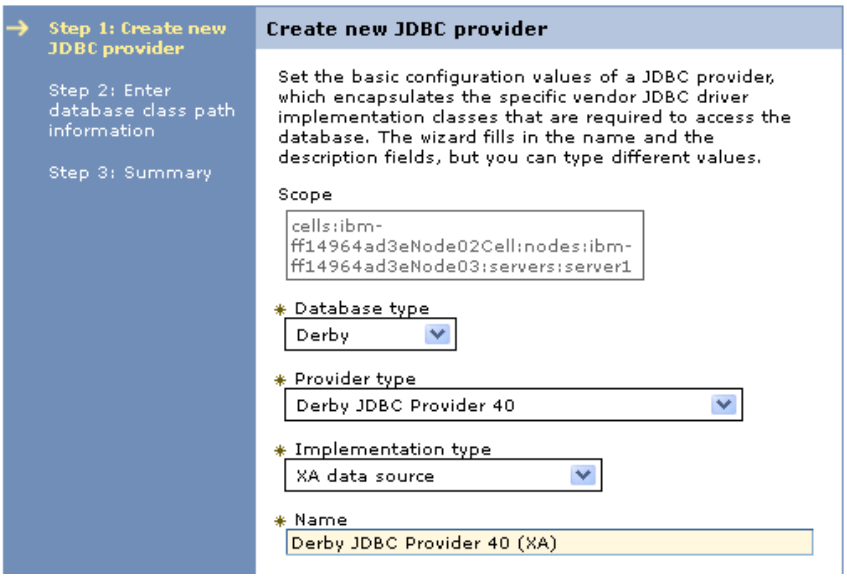
4. Create the JDBC Provider
   a. Click ***Start → Programs → IBM WebSphere → IBM WebSphere Application Server V8.5 → Profiles → AppSrv02 → Administrative Console***
   b. Log in as **User name** = admin **Password** = admin
   c. Navigate to **Resources → JDBC → JDBC Providers**
   d. Set the **Scope** to Node=ibm-ff14964ad3eNode03, Server=server1 and click **New**



e. Select Derby from the Database list

f. Select Derby JDBC Provider 40 from the Provider Type list

g. Select XA data source from the Implementation Type list



h. Click **Next**

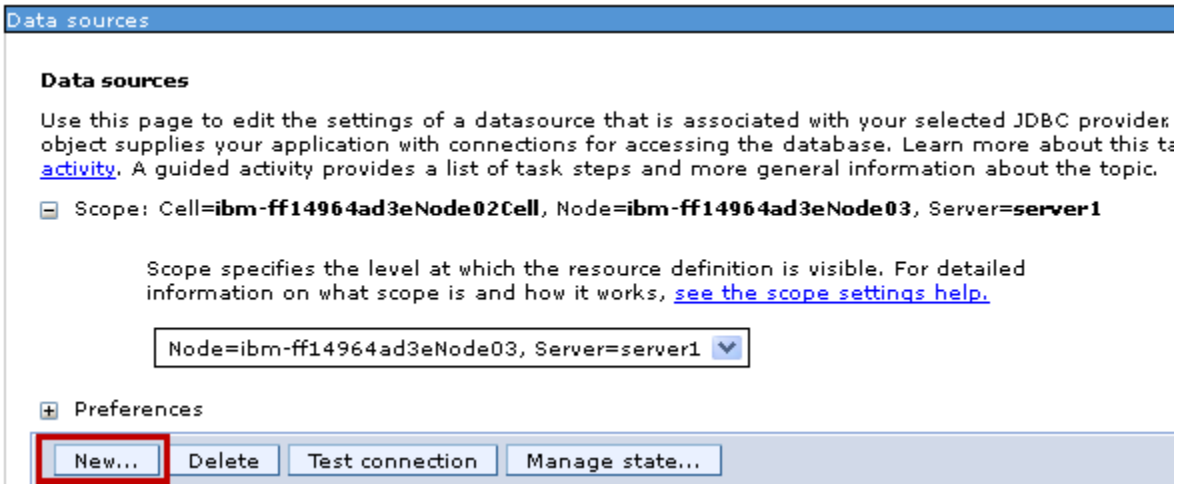
i. On the Summary Dialog, click **Finish**

j. **Save** the changes to the Master Configuration

5. Create the JDBC DataSource

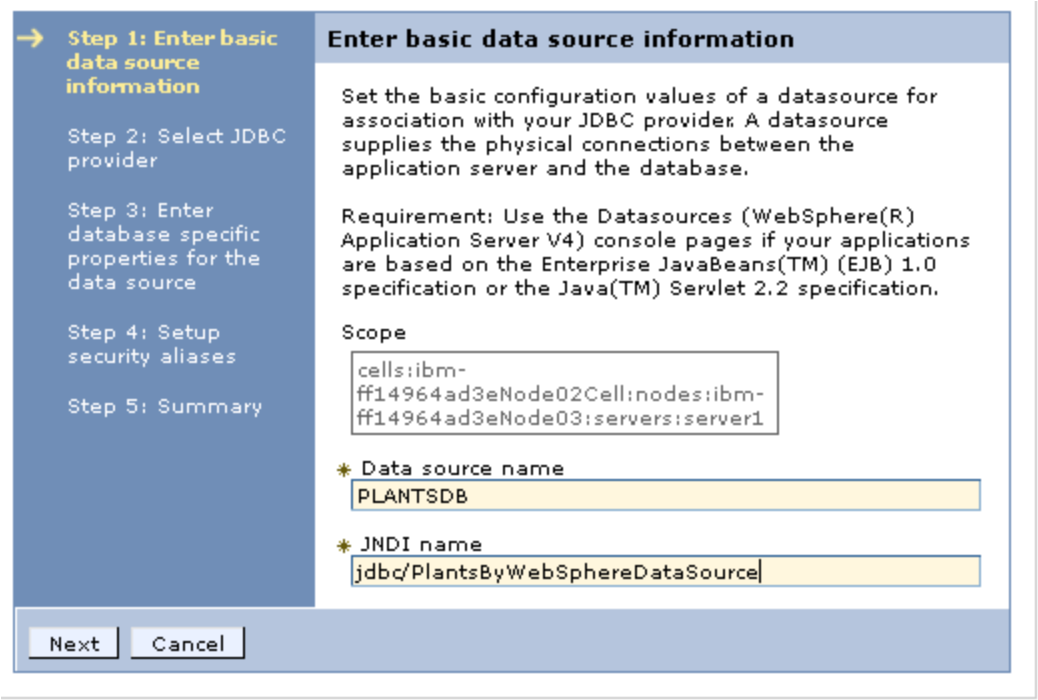
a. Navigate to **Resources → JDBC → JDBC Providers**

b. Set the **Scope** to Node=ibm-ff14964ad3eNode03, Server=server1 and click **New**



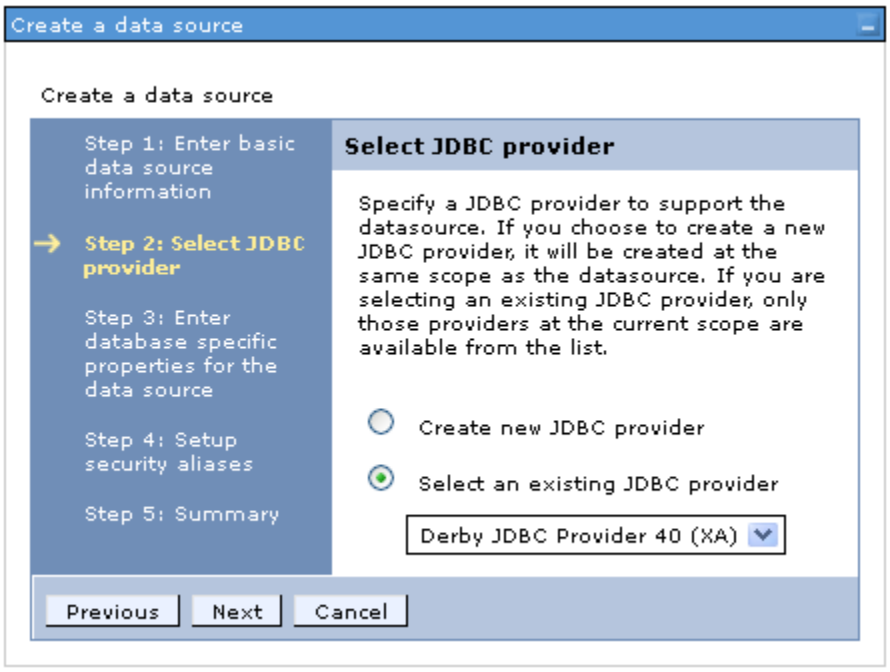
c. Set the **Data source name** = PLANTSDB

d. Set the **JNDI name** = jdbc/PlantsByWebSphereDataSource



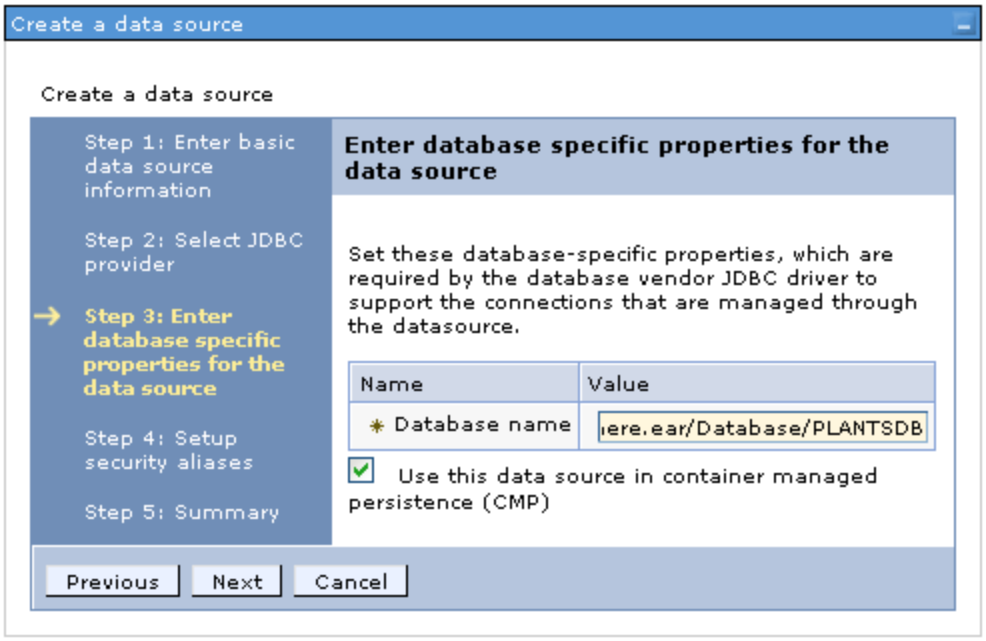
e. Click **Next**

f. Select Derby JDBC Provider 40 (XA) from the **Existing JDBC Provider** list



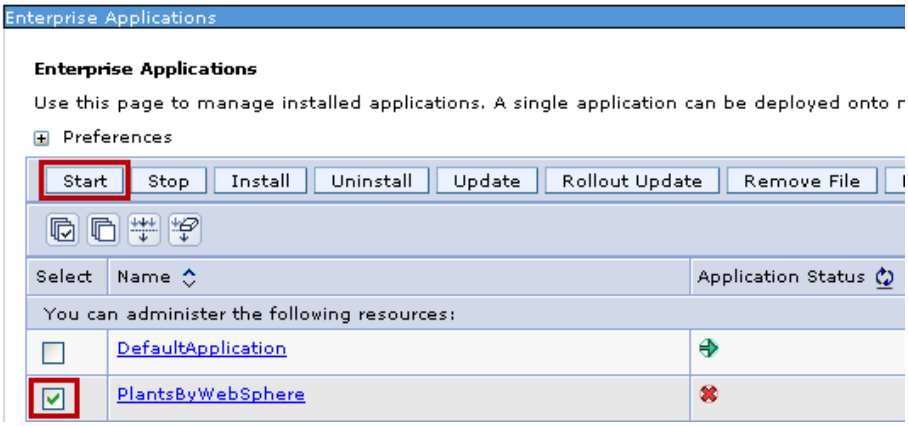
g. Click **Next**

h. Set **Database Name** = ${APP_INSTALL_ROOT}/${CELL}/PlantsByWebSphere.ear/Database/PLANTSDB



i. Click **Next**
j. On the Security Aliases dialog, click **Next**
k. On the Summary dialog, click **Finish**
l. **Save** the changes to the Master Configuration

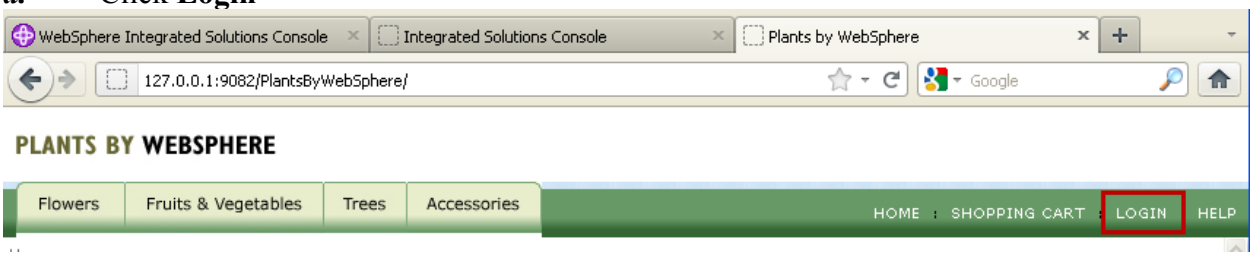
6. Deploy the PlantsByWebSphere application
   a. Navigate to **Applications → Application Types → WebSphere enterprise applications**
   b. Click **Install**
   c. Click **Browse…**
   d. Navigate to `C:\DeliveryTargetPlantsByWebSphere.ear`
   e. Click **Next**
   f. On the "How do you want to install the application?" dialog, click **Next**
   g. On the "Select installation options" dialog, click **Next**
   h. On the "Map modules to servers" dialog, click **Next**
   i. On the "Map virtual hosts for Web modules" dialog, click **Next**
   j. On the "Summary" dialog, click **Finish**
   k. **Save** the changes to the Master Configuration
   l. Navigate to **Applications → Application Types → Enterprise Applications**
   m. Select PlantsByWebSphere and click **Start**



7. Open a Browser and navigate to http://127.0.0.1:9082/PlantsByWebSphere

8. Register a new Account:

a. Click **Login**



b. Click the link to **register for your own account here**

c. Enter the required information (you will need the E-mail address and password later on) and click **Register**

9. Login and make a purchase:

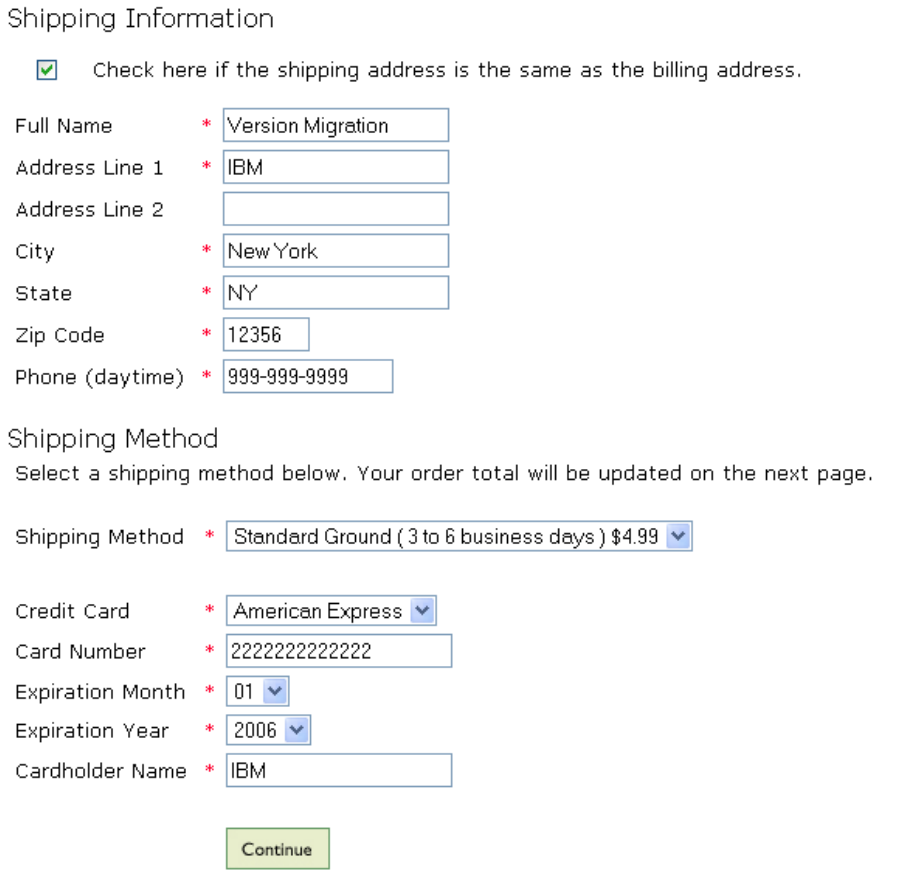
a. Click **Login** again, enter your E-mail address and Password and click **sign-in**

b. Click the **Bonsai Tree** special

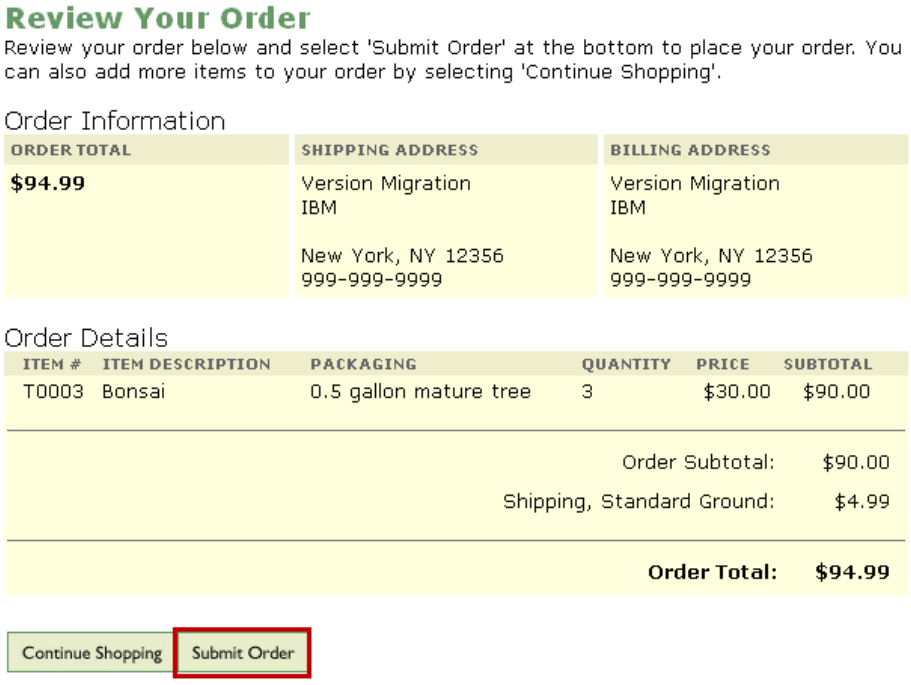
c. Change the **Quantity** to 3 and click **Add to cart**

d. Click **Checkout now**

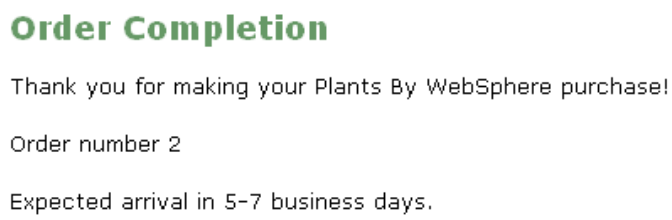
e. Complete the Shipping Information and Payment Information and then click **Continue**



f. On the "Review your order" page, click **Submit Order**



g. After a short while your order will complete and the page shown below will appear



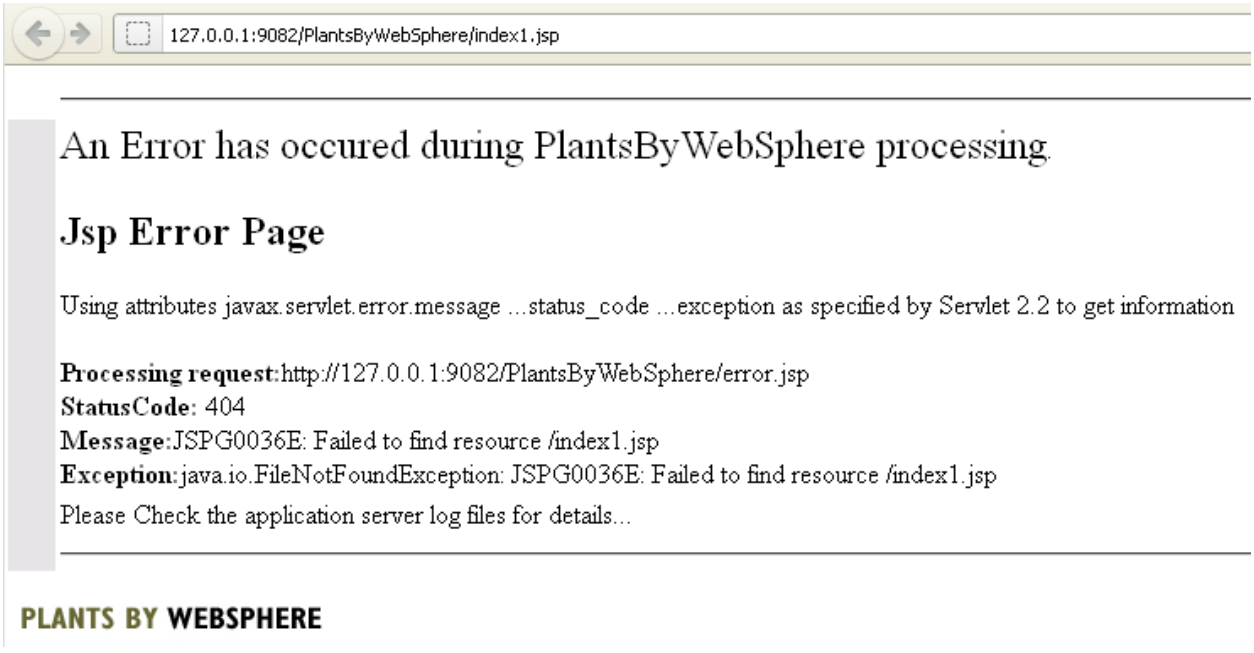
10. Review the SystemOut.log for any errors
    a. Open the `C:\IBM\WebSphere\AppServer85\profiles\AppSrv02\logs\server1\SystemOut.log` file
    b. Scroll to the end of the file and check that no errors have been thrown

11. You have now migrated and tested the PlantsByWebSphere application. Close the Browser and SystemOut.log file

Part 6 – Analyze and Fix error.jsp

In Part 4 we decided to leave fixing the error.jsp file until later. In this Part we will trigger an error which will load the JSP file, analyze and fix the problem with the Java Snippet and then deploy and test the change.

1. Open a Browser and navigate to http://127.0.0.1:9082/PlantsByWebSphere/index1.jsp note that the message shown is a generic one based on the status_code and that no stack trace is displayed.



2. Analyze and fix the JSP file
    a. Eclipse should already be running and open in the PlantsMigration workspace from the previous step. If it is not already open, use the steps from Part 3 to open it.
    b. Open ***PlantsByWebSphere/WebContent/error.jsp*** in a Text Editor and navigate to line 68 to view the use of getStackTrace

```
error.jsp

            //does not exist at compile time there will not be a problem
            //if this class does not exist we will juse use the attributes specified by Servlet 2.2

            Class myClass = Class.forName("com.ibm.websphere.servlet.error.ServletErrorReport");
            Method myMethod = myClass.getMethod("getErrorCode", null);
            Object o = myMethod.invoke(myReport, null);
            status_code = ((Integer) o).intValue();

            myMethod = myClass.getMethod("getMessage", null);
            o = myMethod.invoke(myReport, null);
            message = (java.lang.String) o;

            myMethod = myClass.getMethod("getStackTrace", null);
            o = myMethod.invoke(myReport, null);
            exception_info = (java.lang.String) o;
            needInfo = 0;
            method = "Using attribute of type com.ibm.websphere.servlet.error.ServletErrorReport to get information.";
```

c. As mentioned in Part 4, *getStackTrace* was used in WebSphere 5.1 to work around a problem with Java 1.4 and the Throwable class. It isn't detected by the Application Migration Toolkit because it is a reflection (not a direct use of the class) and is in a Java Snippet in a JSP file. The fix is to use the *getStackTraceAsString* method instead.

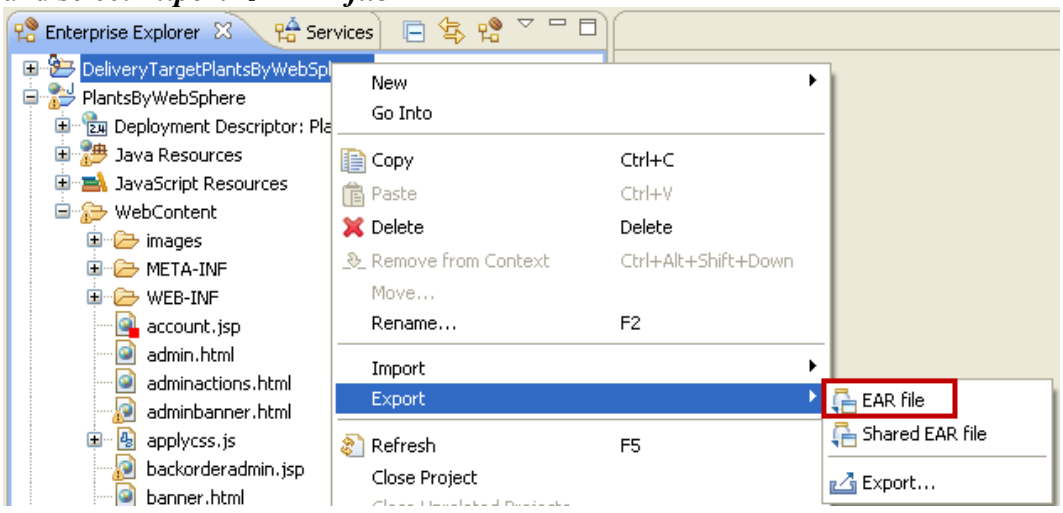
d. Modify the JSP file, replacing *getStackTrace* with *getStackTraceAsString* as shown below

```
myMethod = myClass.getMethod("getStackTraceAsString", null);
o = myMethod.invoke(myReport, null);
exception_info = (java.lang.String) o;
needInfo = 0;
method = "Using attribute of type com.ibm.websphere.servlet.error.ServletErrorReport to get information.";
```

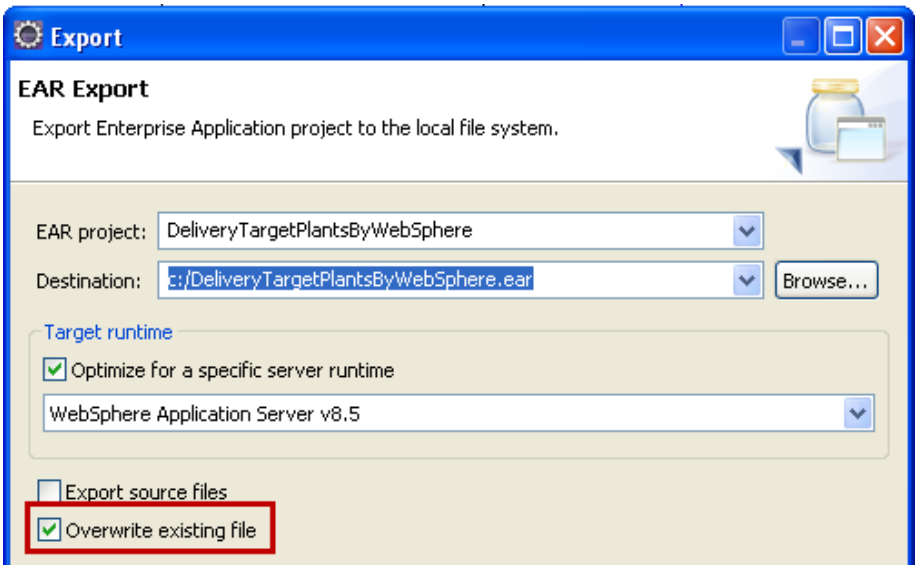
e. Save the change.

3. Export the new EAR file

a. Right-click on **DeliveryTargetPlantsByWebSphere** in the Enterprise Explorer and select ***Export → EAR file***

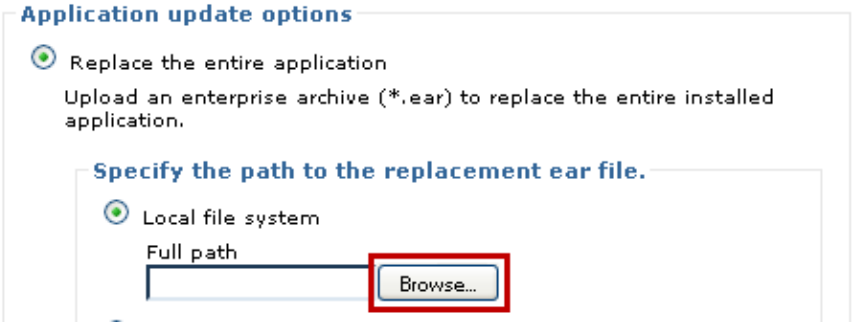


b. Set the **Destination** to be `c:/DeliveryTargetPlantsByWebSphere.ear`, ensure that the **Target runtime** is set to WebSphere Application Server v8.5 and that **Overwrite existing file** is selected, then click **Finish**



4. Update the running PlantsByWebSphere EAR file
   - ***a.*** Click ***Start → Programs → IBM WebSphere → IBM WebSphere Application Server V8.5 → Profiles → AppSrv01 → Administrative Console***
   - ***b.*** Log in as **User name** = admin **Password** = admin
   - ***c.*** Navigate to **Applications → Application Types → WebSphere enterprise applications**
   - ***d.*** Select **PlantsByWebSphere** and click **Update**

   - ***e.*** Click **Browse…**



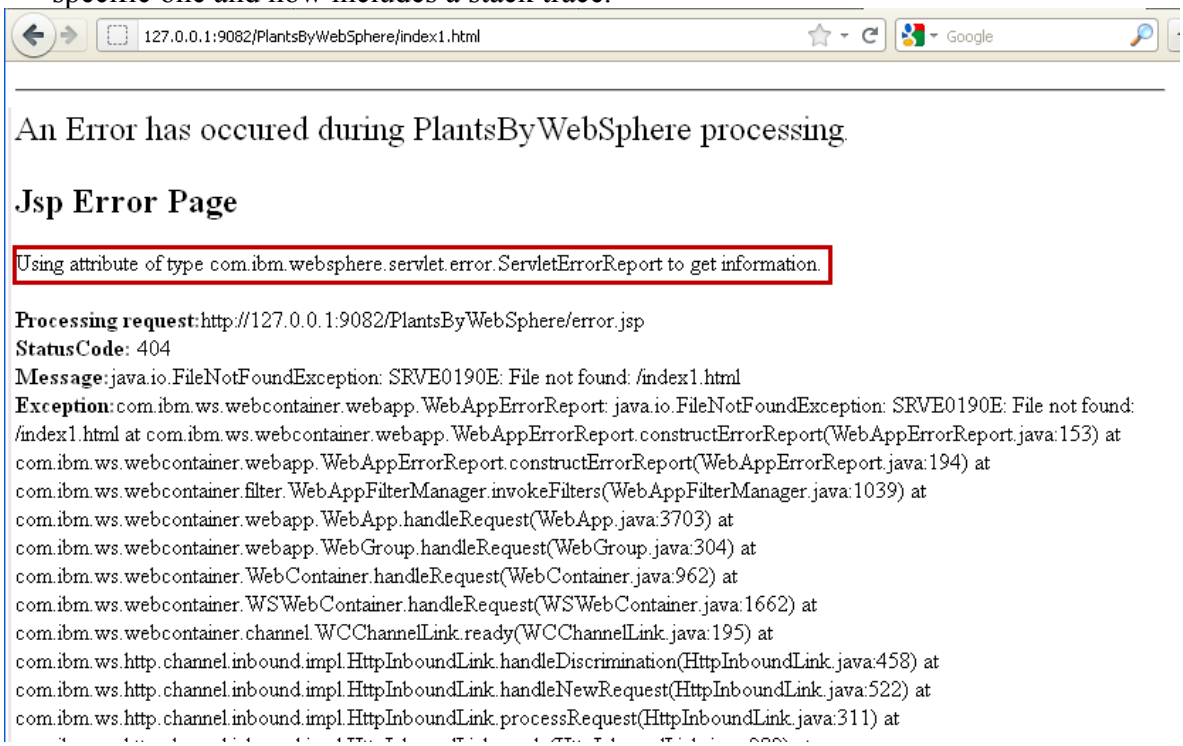
   - ***f.*** Navigate to `C:\DeliveryTargetPlantsByWebSphere.ear`
   - ***g.*** Click **Next**
   - ***h.*** On the "How do you want to install the application?" dialog, click **Next**
   - ***i.*** On the "Select installation options" dialog, click **Next**
   - ***j.*** On the "Map modules to servers" dialog, click **Next**

k. On the "Summary" dialog, click **Finish**

l. **Save** the changes to the Master Configuration

5. Test the change to error.jsp

a. Open a Browser and navigate to http://127.0.0.1:9082/PlantsByWebSphere/index1.jsp not that message shown is a now a specific one and now includes a stack trace.



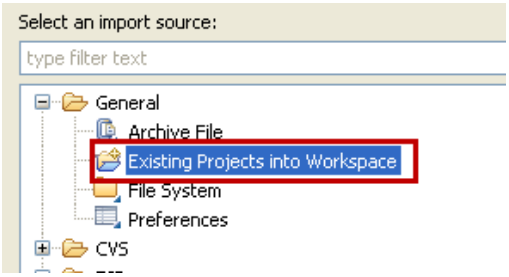
You have now fixed Error.jsp to run correctly on WebSphere Application Server V8.5

Part 7 – Execute StockQuote on WAS ND 6.1

The StockQuote application is already installed on WAS ND 6.1 but it is necessary to import the Client application in to Indigo in order to test it.

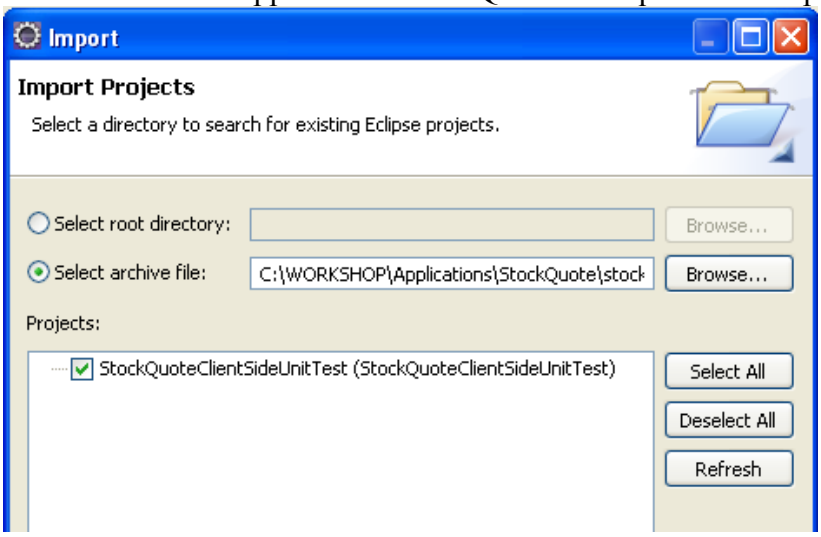
1. Open Eclipse with a new Workspace
   a. Open a Windows Explorer and navigate to `C:\eclipse`
   b. Double-click on `eclipse.exe`
   c. When the Workspace Launcher is displayed, change the Workspace to `C:\workspace\StockQuoteMigration` and click **OK**

2. Import the `stockquoteclient.zip` project into the Workspace
   a. Click ***File → Import***
   b. When the "Select" dialog is displayed, select **General → Existing Projects into Workspace** and click **Next**



c. Click **Select archive file**

d. Click **Browse…** and navigate to C:\WORKSHOP\Applications\StockQuote\stockquoteclient.zip



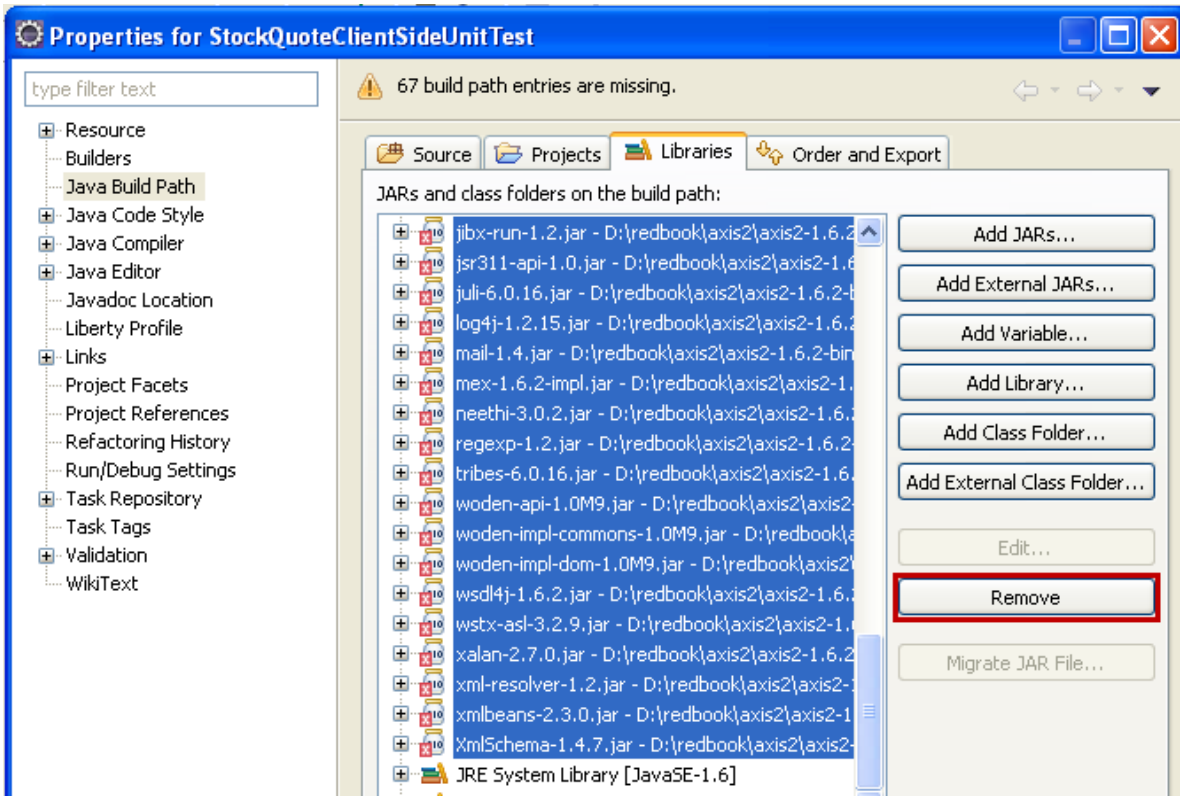
e. Click **Finish**

3. Fix the Java Build Problems.

a. Right-click on **StockQuoteClientSideUnitTest** in the Enterprise Explorer and select **Build Path → Configure Build Path**

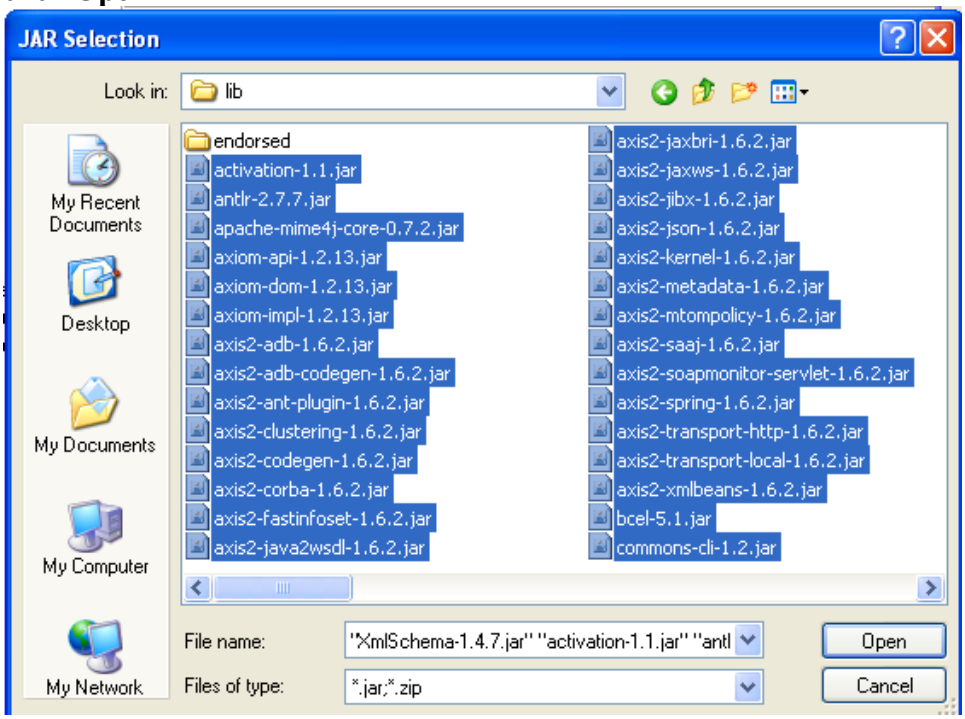
b. Change to the **Libraries** tab

c. Select **all** of the **jar files** that have a **red x** icon next to them and click **Remove**



d. Click **Add External JARs…**

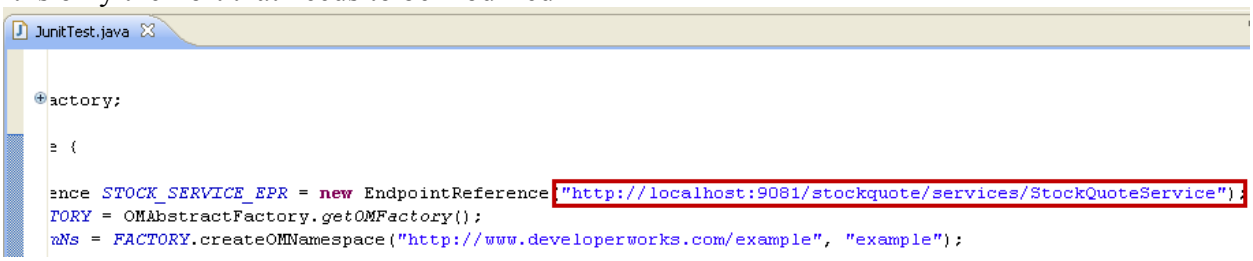
e. Navigate to `c:\axis2-1.6.2\lib`, select **all of the JARs** in the folder and click **Open**



f. In the Java Build Path dialog, click **OK**

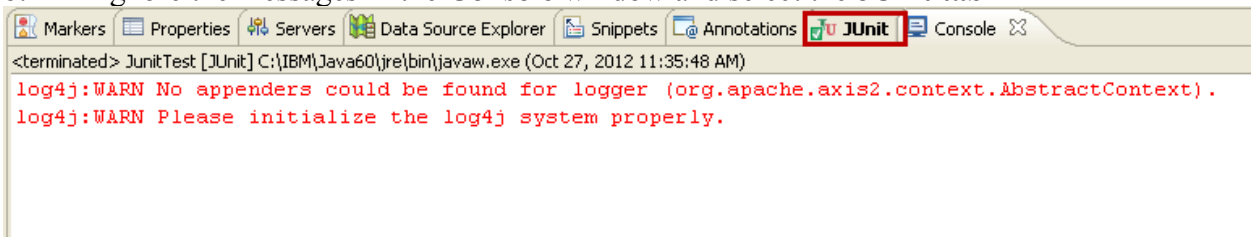
g. The project should now rebuild without issues.

4. Update the StockQuote Service URL
    a. Open the **StockQuoteClientSideUnitTest/src/Stock/JUnitTest.java** file
    b. Locate **Line 17**
    c. Modify the URL to use Port 9081 as shown below. The rest of the URL is correct, it is only the Port that needs to be modified

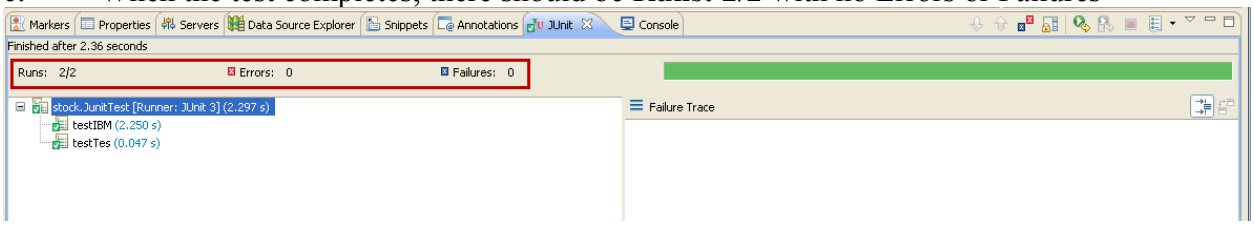


    d. Save your changes

5. Execute the JUnit Test
    a. Right-click on **StockQuoteClientSideUnitTest/src/Stock/JUnitTest.java** in the Enterprise Explorer and select **Run As → JUnit Test**
    b. Ignore the messages in the **Console** window and select the **JUnit tab**



    c. When the test completes, there should be **Runs: 2/2** with no Errors or Failures



    You have tested that the StockQuote application runs correctly on WebSphere Application Server V6.1

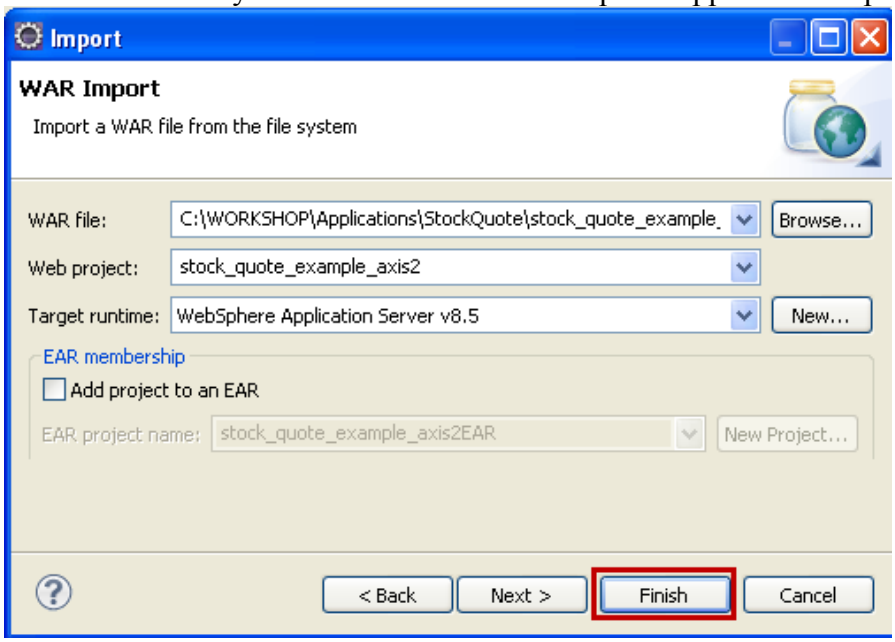
Part 8 – Analyze and Migrate the StockQuote Application

1. Import the StockQuote Application using a WAR file
    a. Click ***File → Import***
    b. When the "Select" dialog is displayed, select **Web → WAR file** and click **Next**
    c. Click **Browse…** (WAR file) and navigate to `C:\WORKSHOP\Applications\StockQuote\stock_quote_example_axis2.war`
    d. Click **New…** (Target runtime)
    e. Select **IBM → WebSphere Application Server v8.5** from the list and click **Next**
    f. Click **Browse… (Installation Directory)**

g. Navigate to `C:\IBM\WebSphere\AppServer85` and click **OK**

h. Click **Finish**

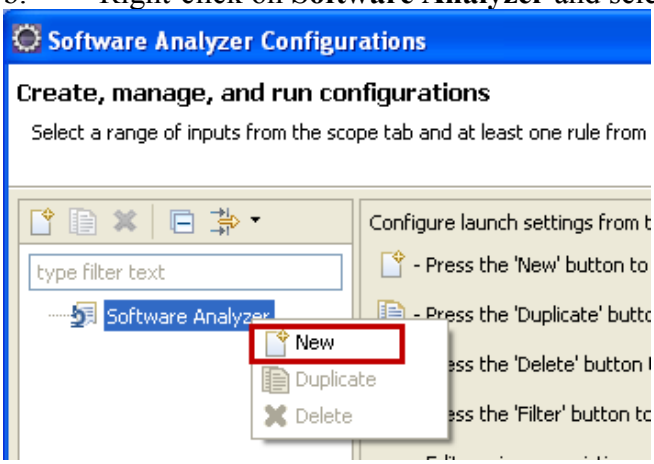
i. When you are returned to the Enterprise Application Import dialog, click **Finish**



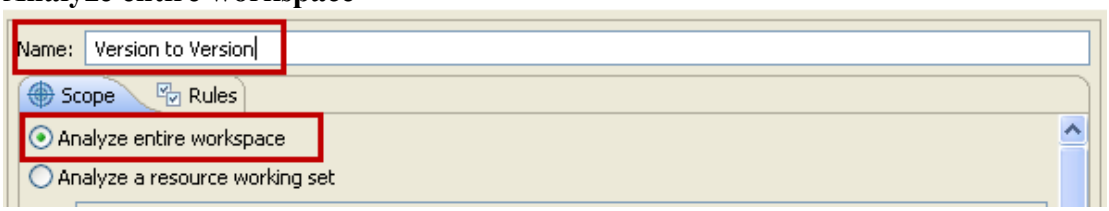
2. Configure the Application Migration Toolkit

a. Right-click on **stock_quote_example_axis2** in the Enterprise Explorer and select **Software Analyzer → Software Analyzer Configurations…**

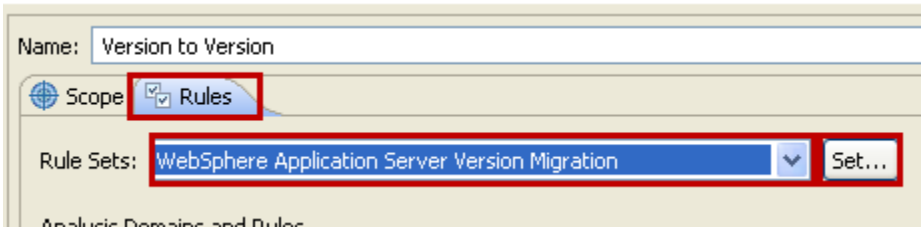
b. Right-click on **Software Analyzer** and select **New**



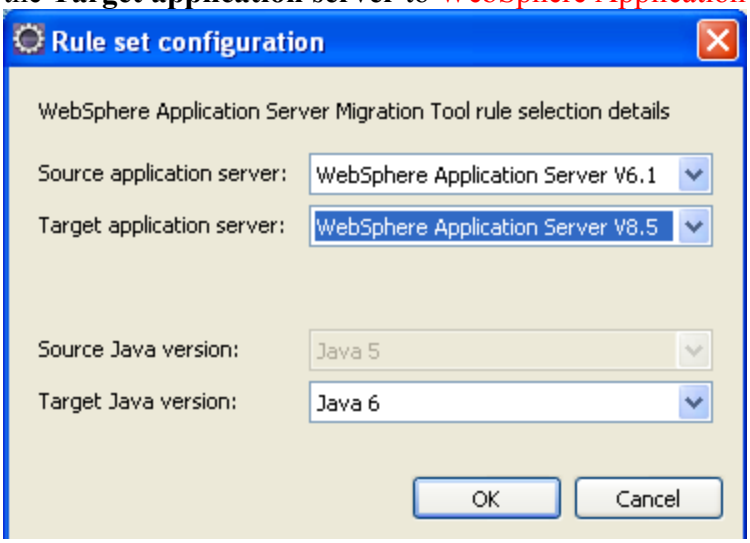
c. Set the **Name** to `Version to Version` and ensure that the Scope is set to **Analyze entire workspace**



d. Switch to the **Rules** tab, select WebSphere Application Server Version Migration from the **Rule Sets** list and click **Set…**



e. Change the **Source application server** to WebSphere Application Server V6.1, the **Target application server** to WebSphere Application Server V8.5 and click **OK**



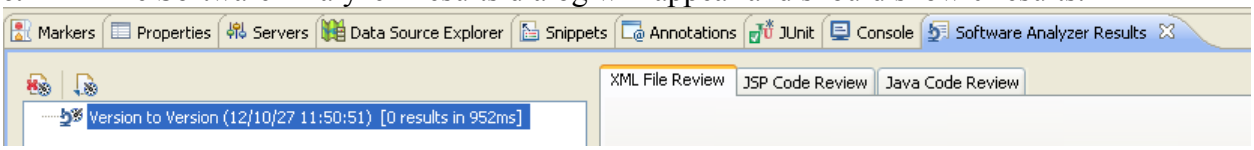
f. On the Software Analyzer Configurations dialog, click **Apply** and then click **Close**

3. Run the Application Migration Toolkit

a. Right-click on **stock_quote_example_axis2** in the Enterprise Explorer and select **Software Analyzer → Software Analyzer Configurations…**

b. Click **Version to Version** and then click **Analyze**

c. The Software Analyzer Results dialog will appear and should show 0 results.



NOTE: The analysis reports no problems were detected. However version 3.5 of the Migration Toolkit does not check for the use of third party web services engines such as axis2 and hence does not report that some small changes are needed to the configuration of that engine in order to successfully run the application in WebSphere Application Server v8.5.

4. Update the axis2.xml file to specify EnableChildFirstClassLoading

Starting with version 1.5.5 of the axis2 web services engine, a new parameter was added to the axis2 configuration. This parameter controls how class loaders created by the axis2 web service

engine behave. In order to operate correctly in WebSphere Application Server v8.5, this parameter needs to be changed from the default of false to true.

a. Open the **stock_quote_exercise_axis2/WebContent/WEB-INF/conf/axis2.xml** file in a text editor
b. Locate **Line 34**
c. Modify the value of the EnableChildFirstClassLoading parameter to be **true**

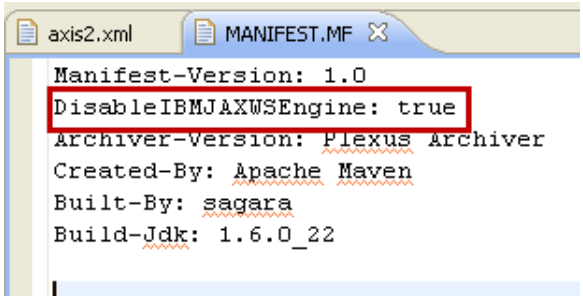
```
<parameter name="EnableChildFirstClassLoading">true</parameter>
```

d. Save your changes and close axis2.xml

5. Disable web services annotation scanning for the application

By default the WebSphere application server will perform annotation scanning for all installed applications to determine what web services are provided by those applications. When using a third party web services engine this is unnecessary and can cause problems. To disable the annotation scanning for this application we update the MANIFEST.MF file for the application's war file to add DisableIBMJAXWSEngine

a. Open the **stock_quote_exercise_axis2/WebContent/META-INF/MAINFEST.MF** file in a text editor
b. Add **`DisableIBMJAXWSEngine: true`** to the file as shown below



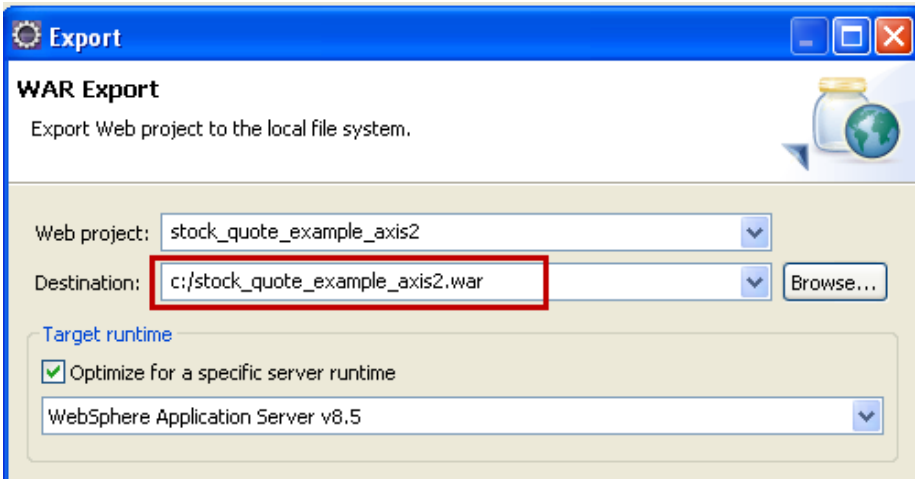
c. Save your changes and close MAINFEST.MF

Part 9 – Execute StockQuote on WAS ND 8.5

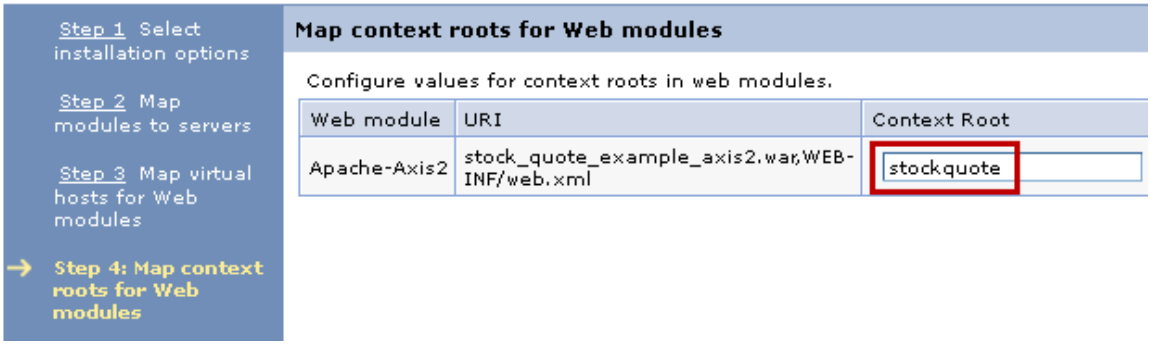
1. Export the WAR file from Eclipse

a. Right-click on **stock_quote_exercise_axis2** in the Enterprise Explorer and select ***Export → WAR file***

b. Set the **Destination** to be C`:/stock_quote_example_axis2.war`, ensure that the **Target runtime** is set to WebSphere Application Server v8.5 and click **Finish**

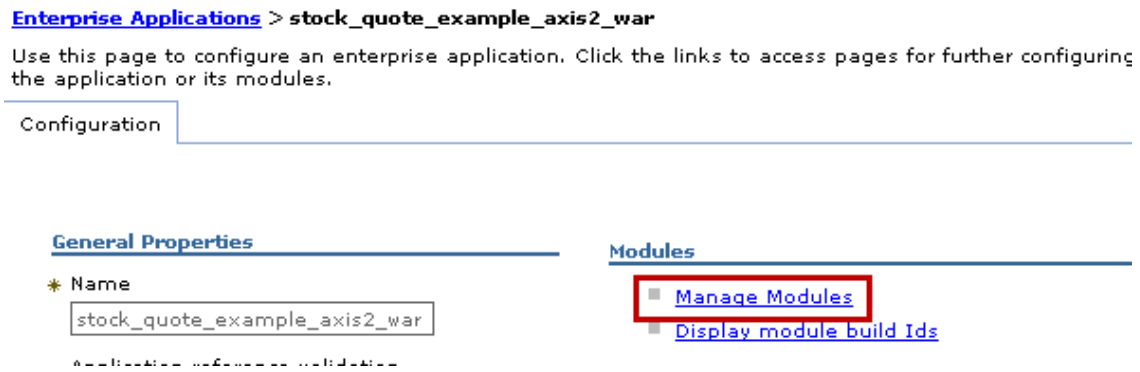


2. Import the WAR into WebSphere Application Server V8.5
   - ***a.*** Click ***Start → Programs → IBM WebSphere → IBM WebSphere Application Server V8.5 → Profiles → AppSrv02 → Administrative Console***
   - ***b.*** Log in as **User name** = admin **Password** = admin
   - ***c.*** Navigate to **Applications → Application Types → WebSphere enterprise applications**
   - ***d.*** Click **Install**
   - ***e.*** Click **Browse…**
   - ***f.*** Navigate to `C:\stock_quote_exercise_axis2.war`
   - ***g.*** Click **Next**
   - ***h.*** On the "How do you want to install the application?" dialog, click **Next**
   - ***i.*** On the "Select installation options" dialog, click **Next**
   - ***j.*** On the "Map modules to servers" dialog, click **Next**
   - ***k.*** On the "Map virtual hosts for Web modules" dialog, click **Next**
   - ***l.*** On the "Map context roots for Web modules" enter stockquote for the **Apache-Axis2 Context Root** and then click **Next**

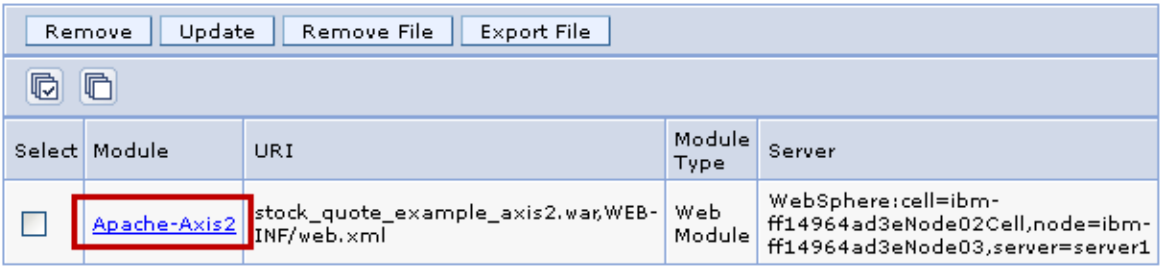


   - ***m.*** On the "Summary" dialog, click **Finish**
   - ***n.*** **Save** the changes to the Master Configuration

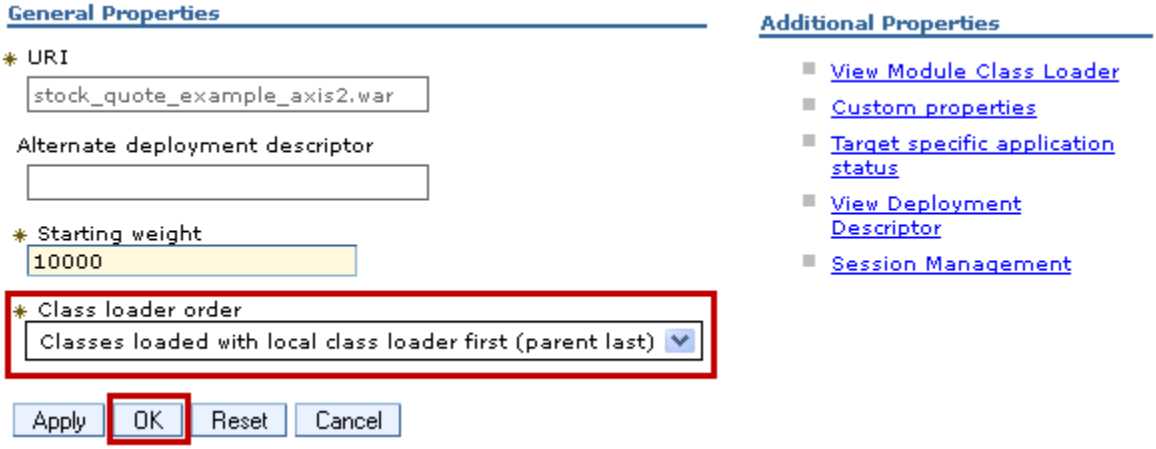
3. Update the Class Loader for the Stock Quote application
   - ***a.*** Navigate to **Applications → Application Types → WebSphere enterprise applications**
   - ***b.*** Click stock_quote_example_axis2_war
   - ***c.*** Click **Manage Modules**



d. Click **Apache-Axis2**



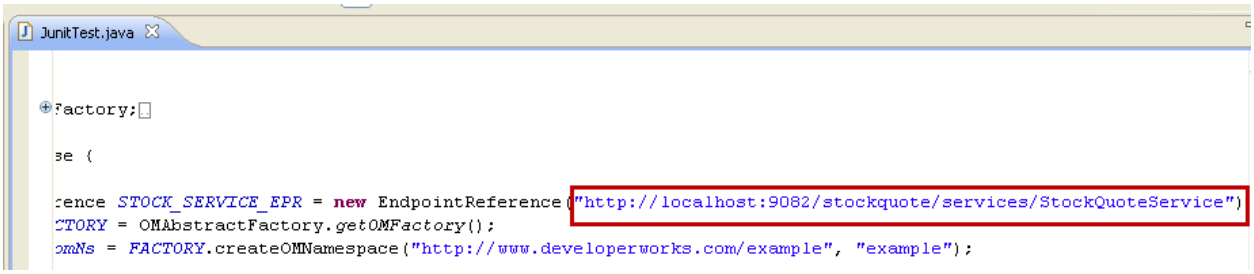
e. Change the **Class loader order** to Classes loaded with local class loader first (parent last) and click **OK**



f. **Save** your changes to the Master Configuration

4. Start the Stock Quote Application
   a. Navigate to **Applications → Application Types → WebSphere enterprise applications**
   b. Select stock_quote_example_axis2_war and click **Start**

6. Update the StockQuote Service URL
   a. In Eclipse, open the **StockQuoteClientSideUnitTest/src/Stock/JUnitTest.java** file
   b. Locate **Line 17**
   c. Modify the URL to use Port 9082 as shown below. The rest of the URL is correct, it is only the Port that needs to be modified

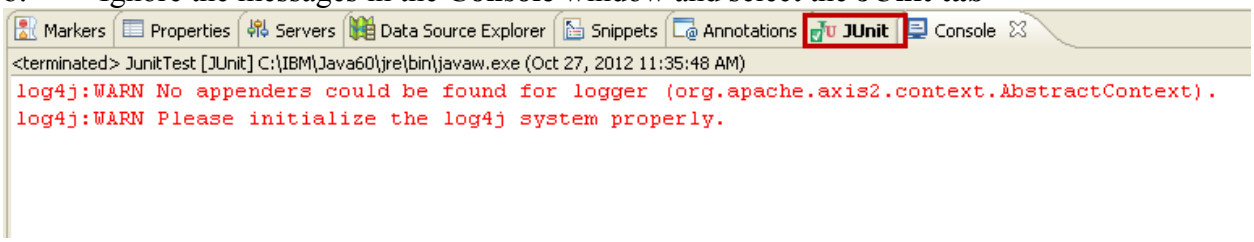


d. Save your changes

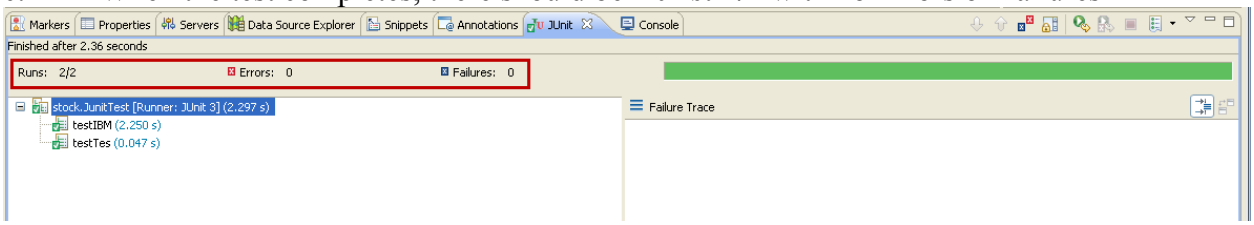
7. Execute the JUnit Test

a. Right-click on **StockQuoteClientSideUnitTest/src/Stock/JUnitTest.java** in the Enterprise Explorer and select **Run As → JUnit Test**

b. Ignore the messages in the **Console** window and select the **JUnit tab**



c. When the test completes, there should be **Runs: 2/2** with no Errors or Failures



You have tested that the StockQuote application runs correctly on WebSphere Application Server V8.5