Accessing JMS in Web applications

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This application is a simple JMS application wherein a user sends information to the administrator for upgrade. As we go through the tutorial we will try to understand the basics of Servlets and JMS.

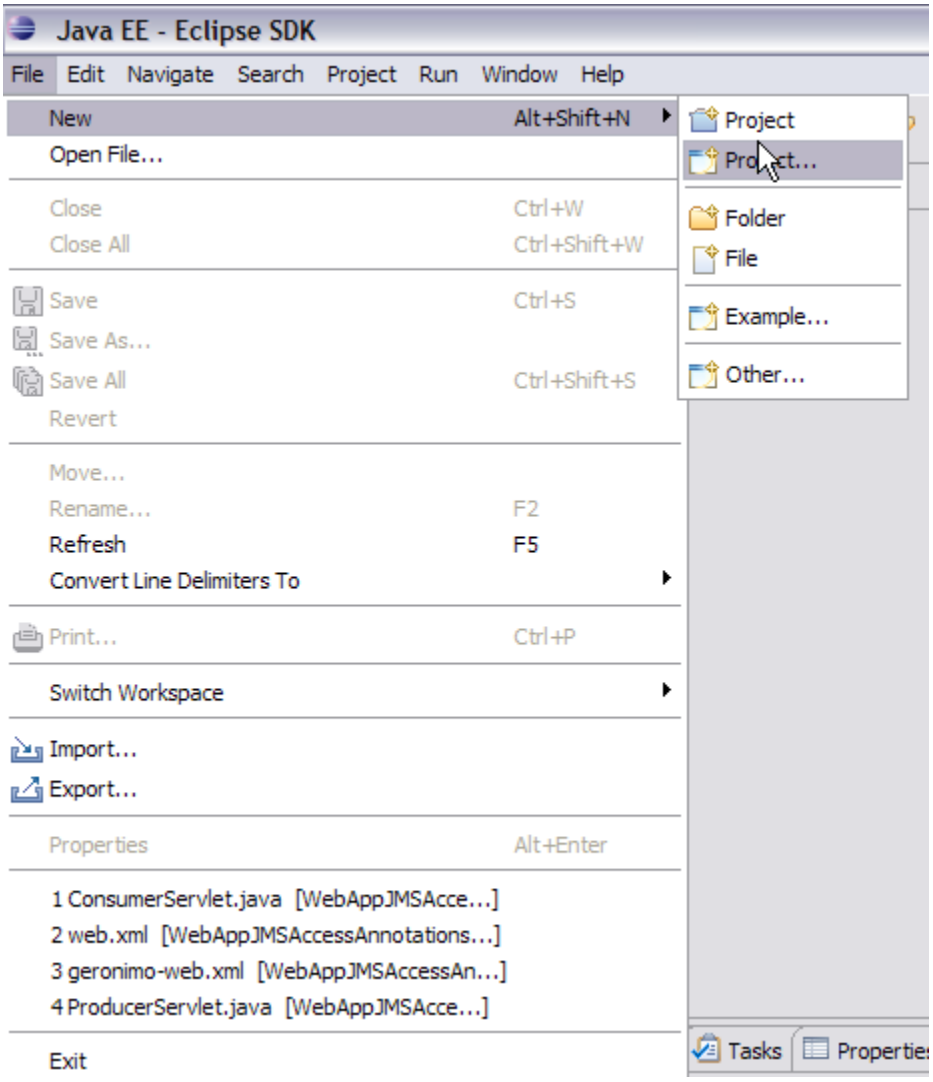
To run this tutorial, as a minimum you will be required to have installed the following prerequisite software:

1. Sun JDK 5.0+ (J2SE 1.5)
2. Eclipse IDE for Java EE Developers, which is platform specific
3. Apache Geronimo Eclipse Plugin 2.1.x
4. Apache Geronimo Server 2.1.x
   Geronimo version 2.1.x, Java 1.5 runtime, and Eclipse Ganymede are used in this tutorial but other versions can be used instead (e.g., Geronimo version 2.2, Java 1.6, Eclipse Europa)

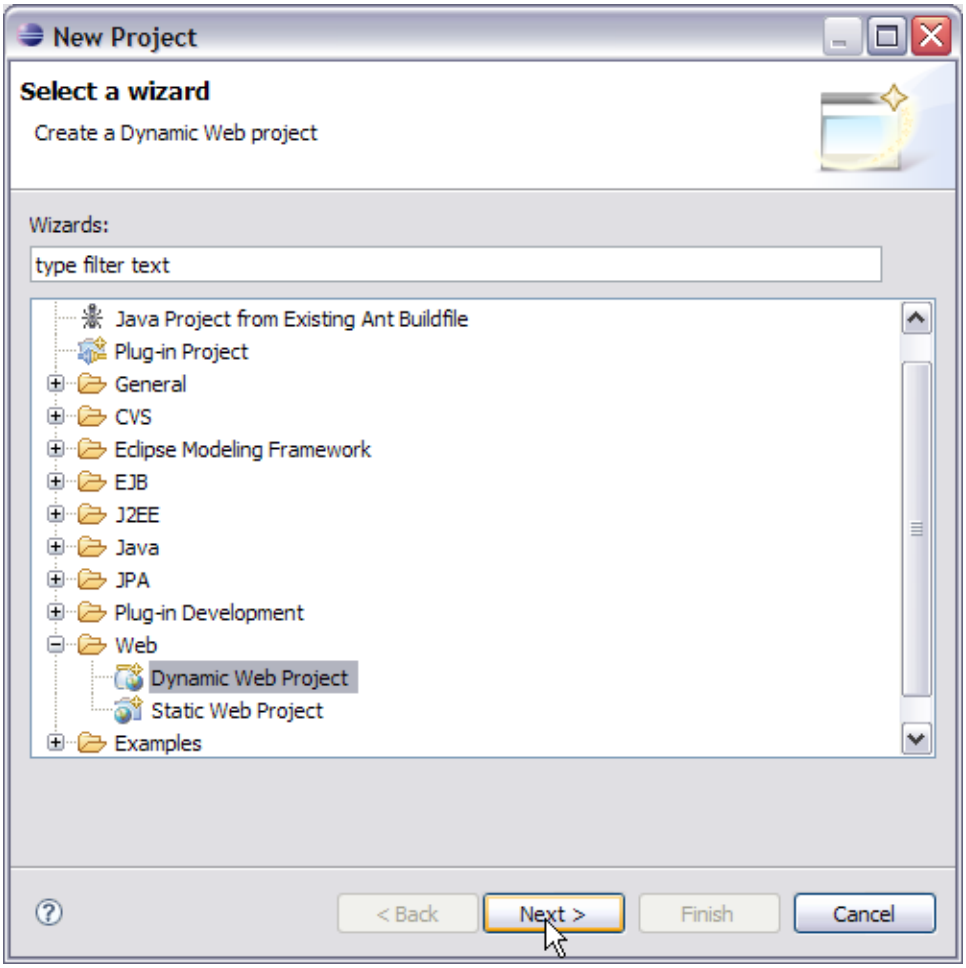
Details on installing eclipse are provided in the Development environment section. This tutorial is organized in the following sections:

Creating a dynamic Web Project

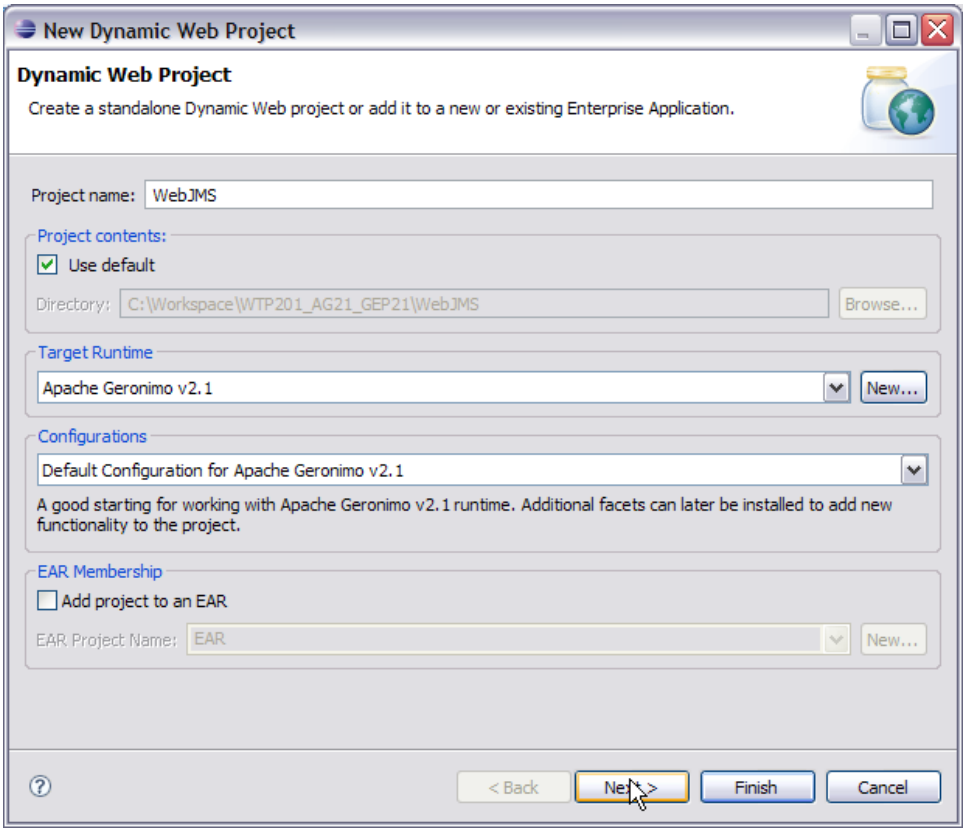
1. Launch Eclipse. Select **File -> New -> Project**.



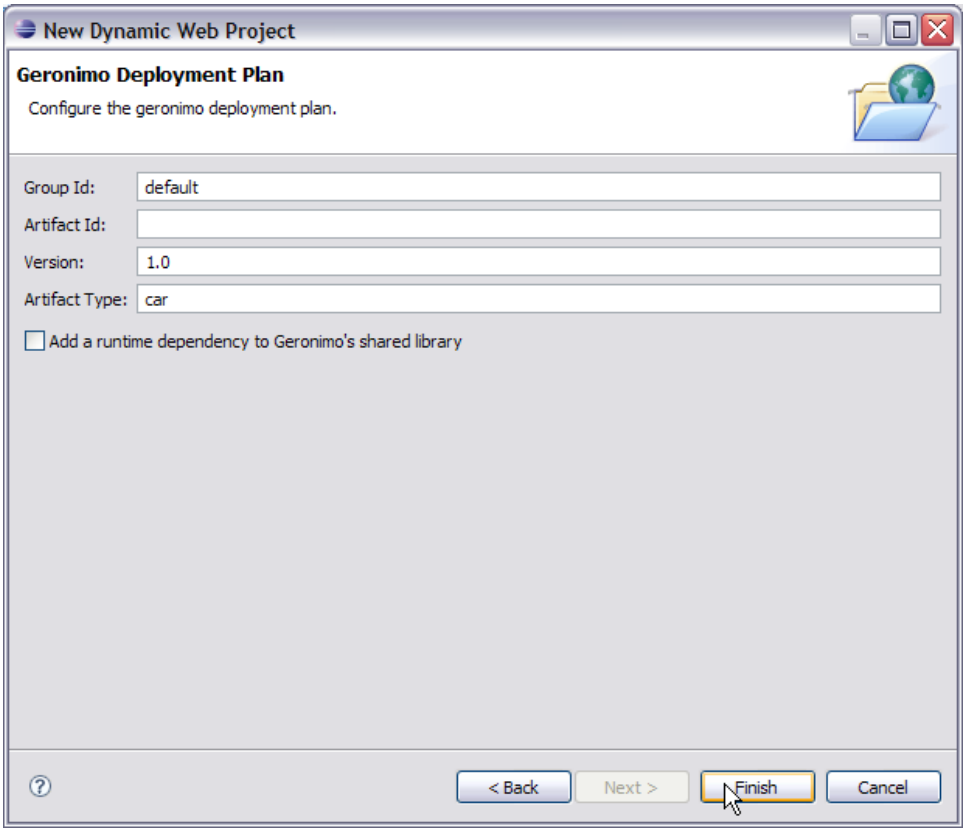
2. Select **Web -> Dynamic Web Project**. Select **Next**.



3. On the next screen give the name of the project as *WebJMS*.



4. Select default values for all other fields. Finally select **Finish**.

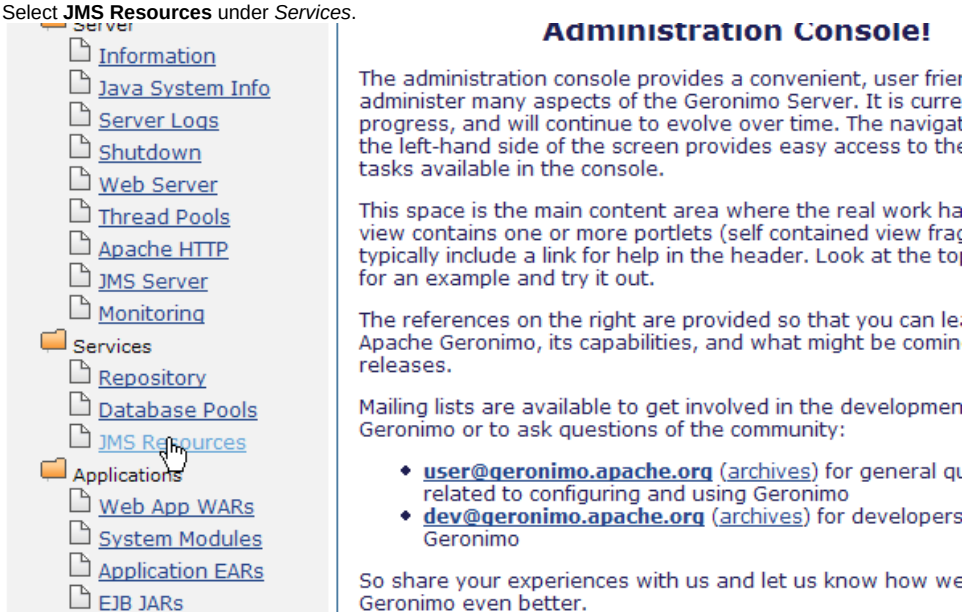


Creating Connection Factory and Destination

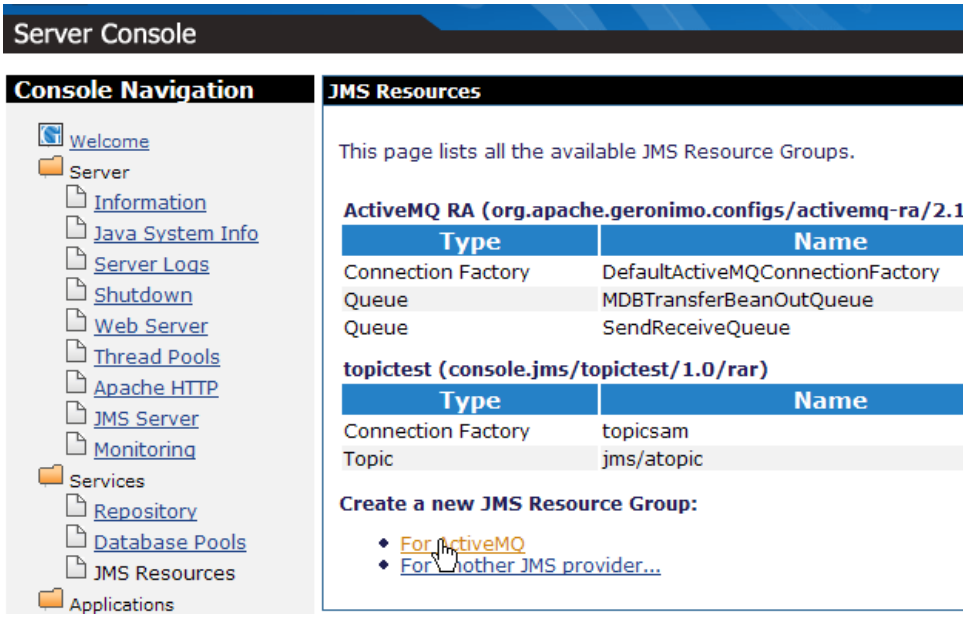
In simple terms a *Connection Factory* is an object which is used by a client to connect to a Service provider. In our case we will be using **Active MQ** as the provider. A *Destination* is an object which is used by client to provide the target to messages produced and source of the messages to be consumed. In our case the target is going to be a queue.

Let us see how we can use the administrative console to create a Connection Factory and Message Destination.

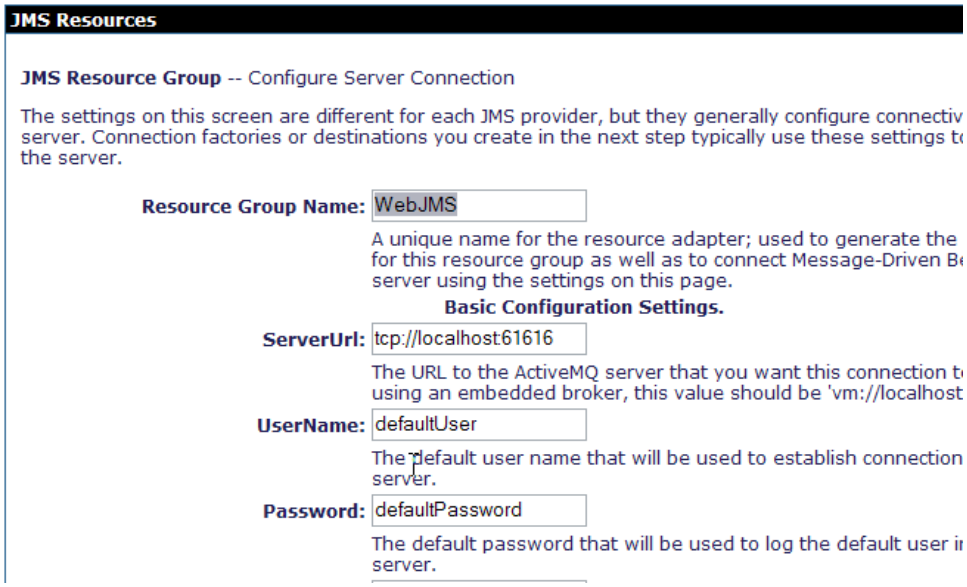
1. Start the server and Launch the administrative console.
   For this tutorial you should start the server and launch the administrative console outside of Eclipse (due to limitations with the Eclipse web browser)
2. Select **JMS Resources** under *Services*.



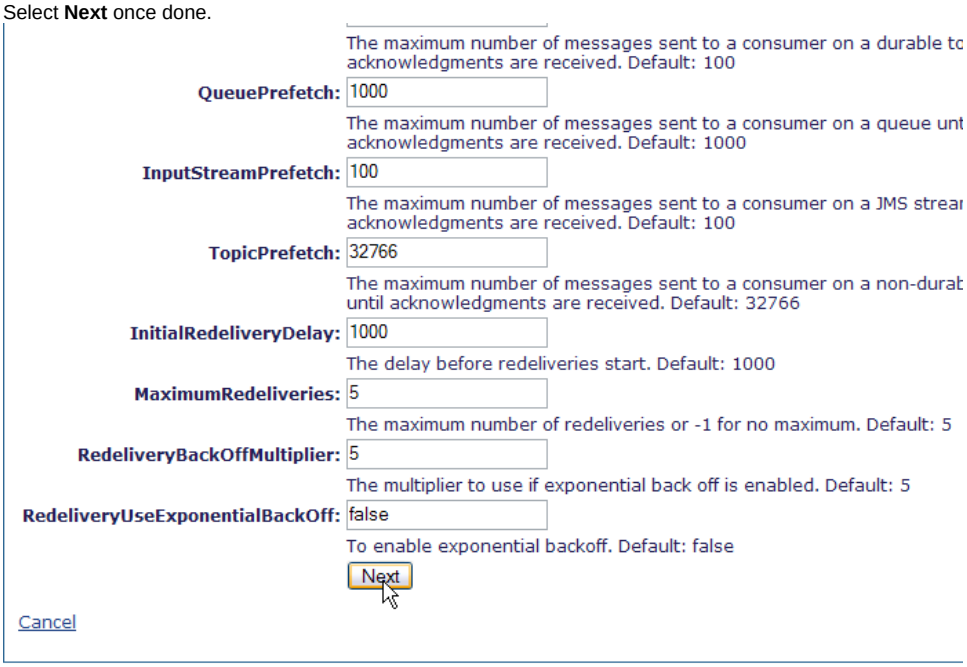
3. Under *Create a new JMS Resource Group:* select **For ActiveMQ**.



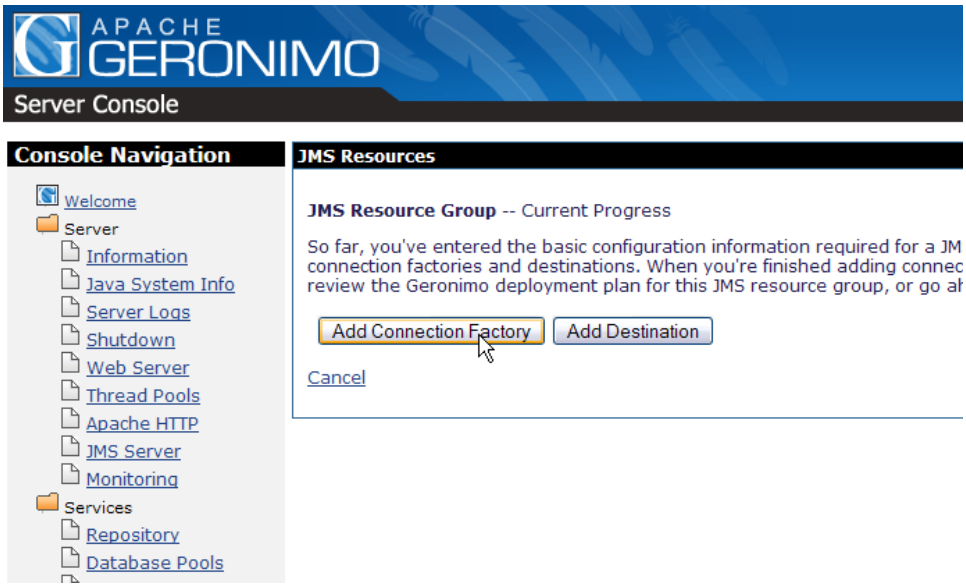
4. On the next screen enter a *Resource Group Name*. In our case we are using **WebJMS**. All other values can be taken as default.



5. Select **Next** once done.

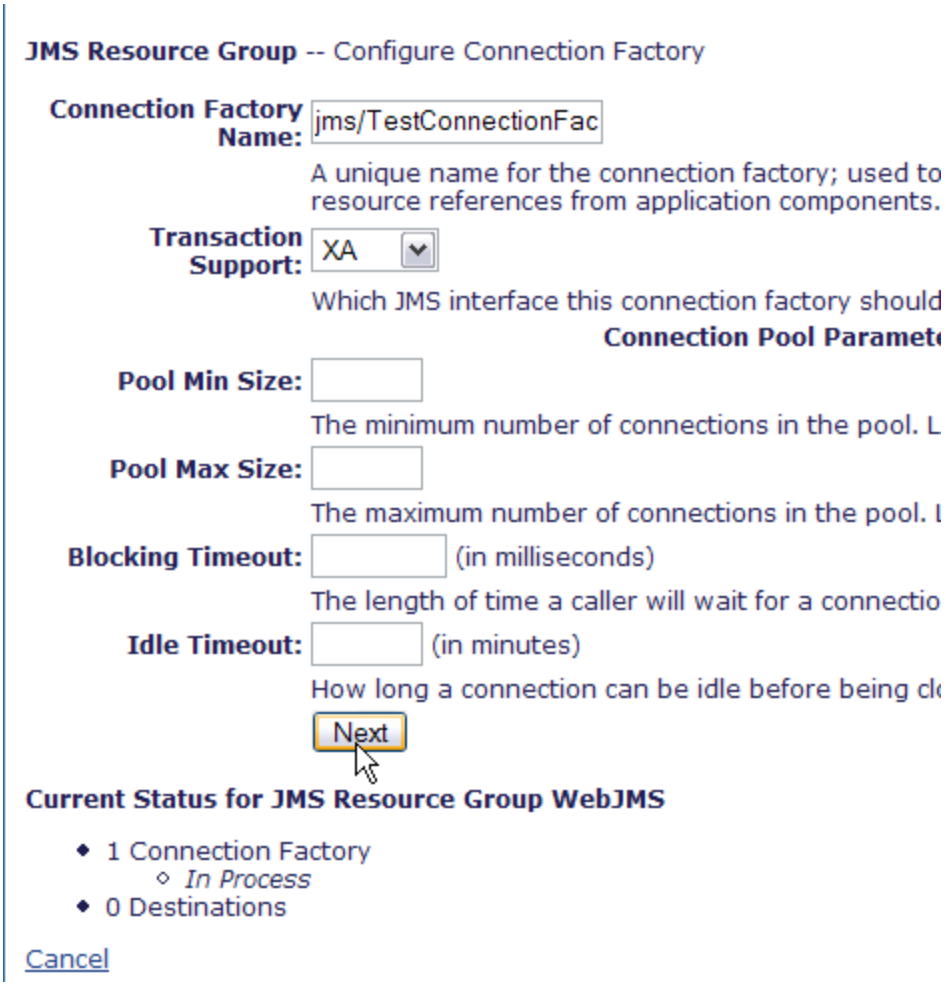


6. Select **Add Connection Factory** on the next page.

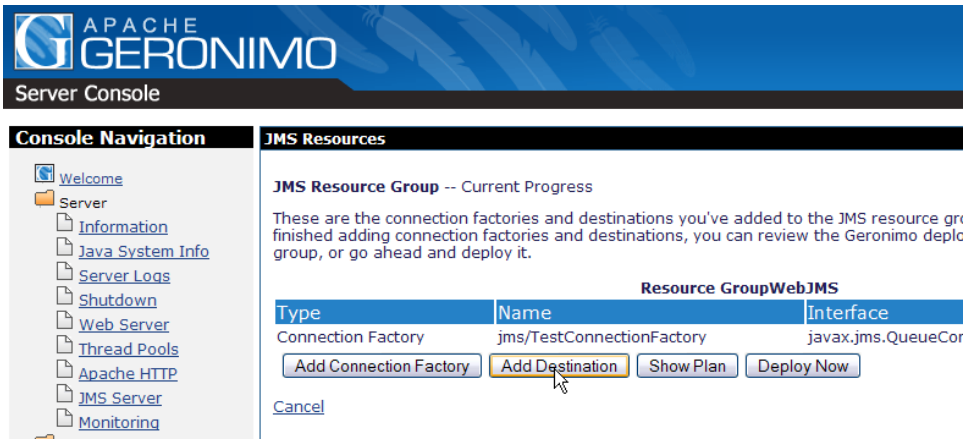


7. In the drop down box select **javax.jms.QueueConnectionFactory**. Select **Next**.

8. Next give the *Connection Factory Name* as **jms/TestConnectionFactory**. Keep default for all other fields. Select **Next**.

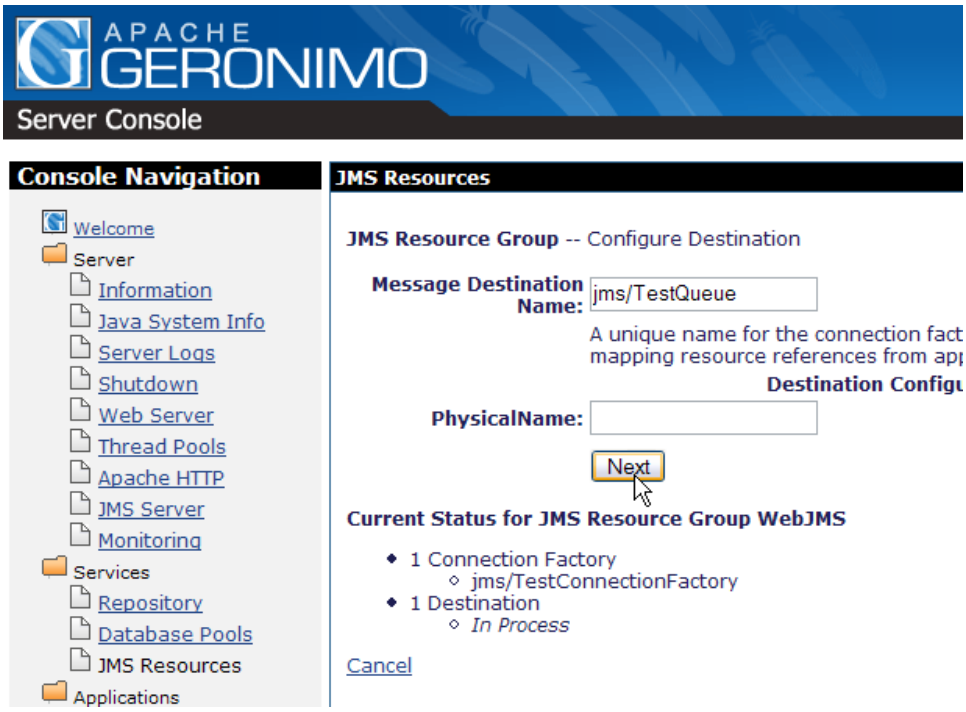


9. Select **Add Destination** on the next screen.

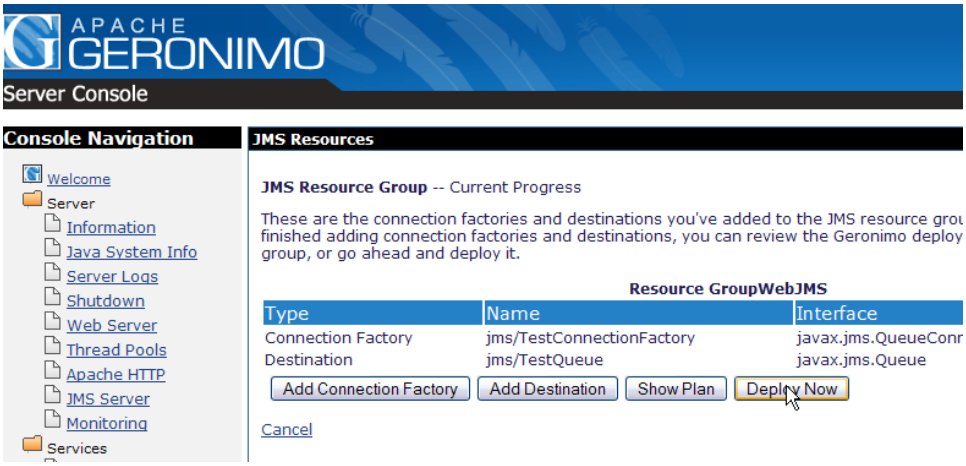


10. Select *JMS Destination Type* as **javax.jms.Queue**. Select **Next**.

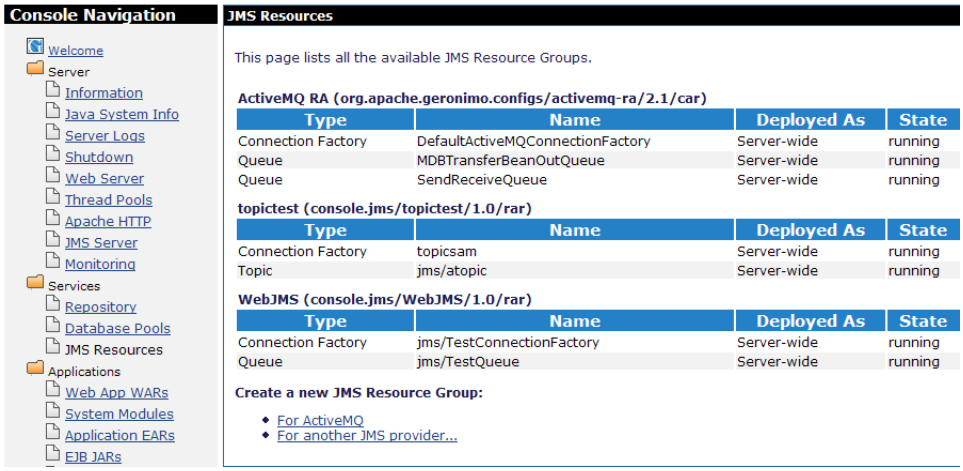
11. Name the *Message Destination Name* as **jms/TestQueue**. Select **Next**.



12. On the next screen Select **Deploy Now**. This will deploy the created plan.

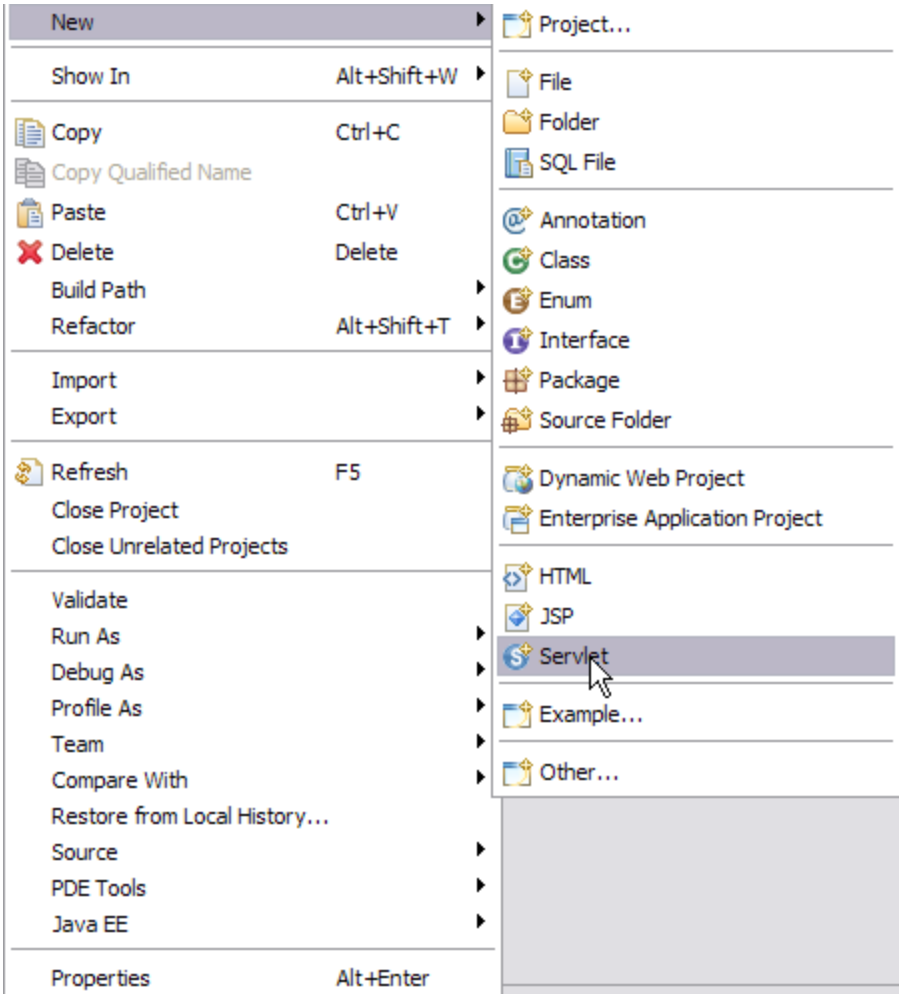


13. Under *JMS resources* you can see the newly created connection factory and queue.

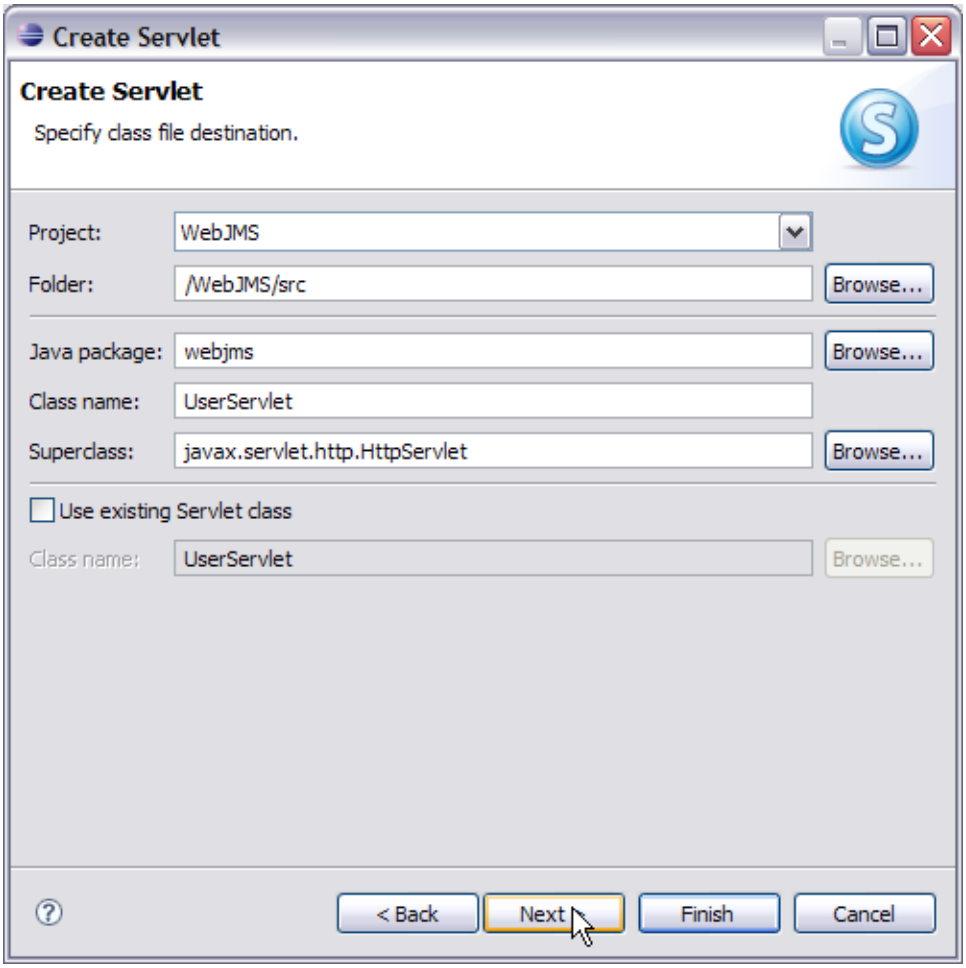


Adding producer, consumer and UI code to the application

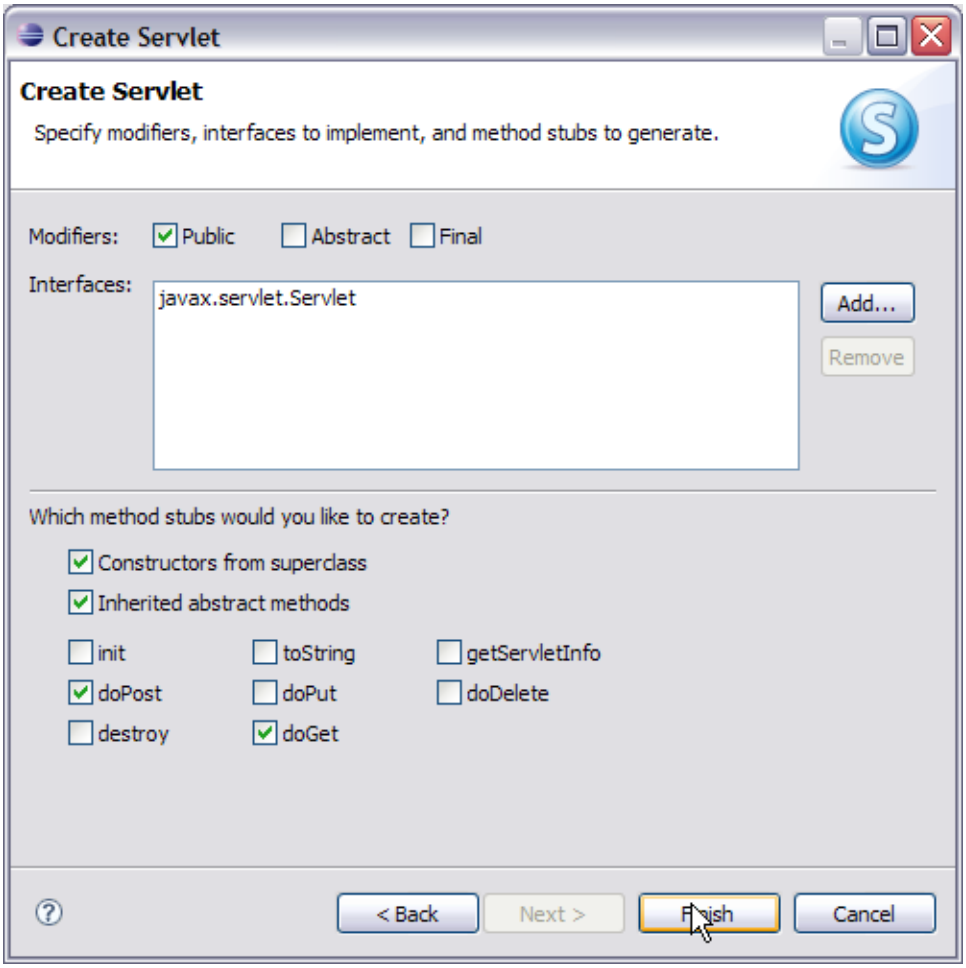
1. Right click on **WebJMS** project and create a new servlet.



2. Name the servlet as *UserServlet* and package as *webjms*. This is the producer in the application.

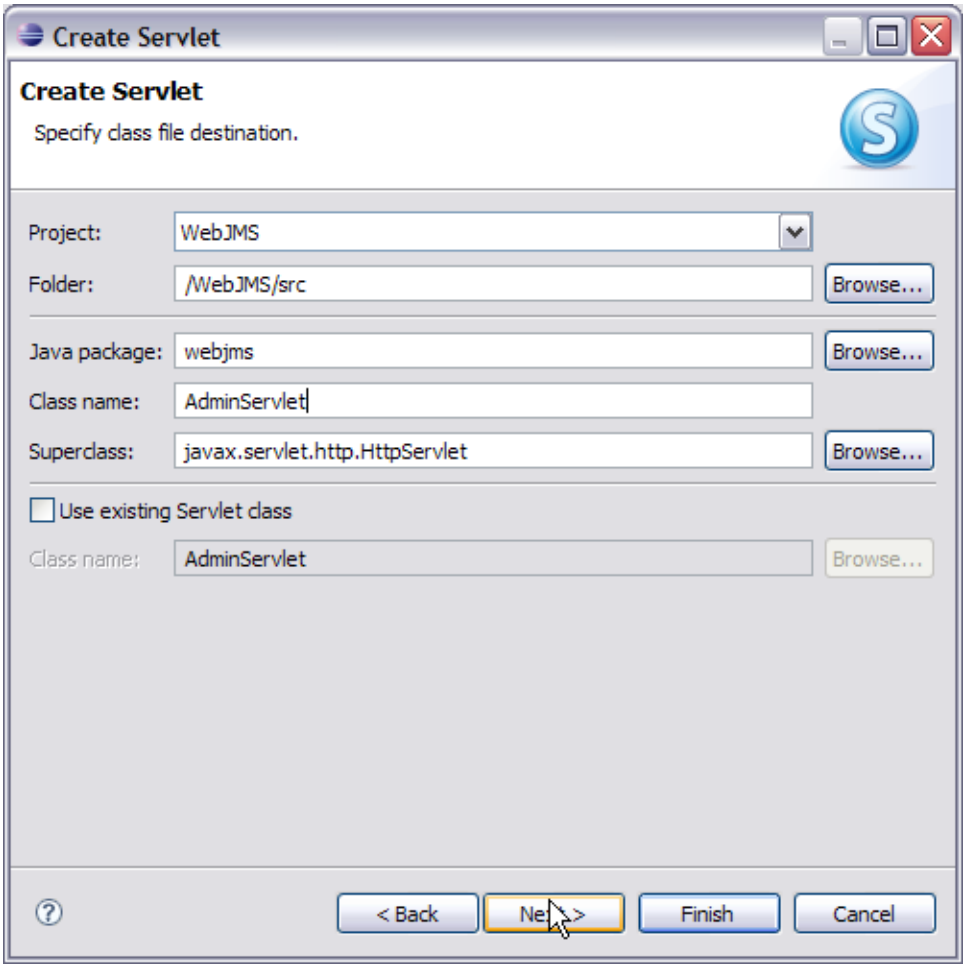


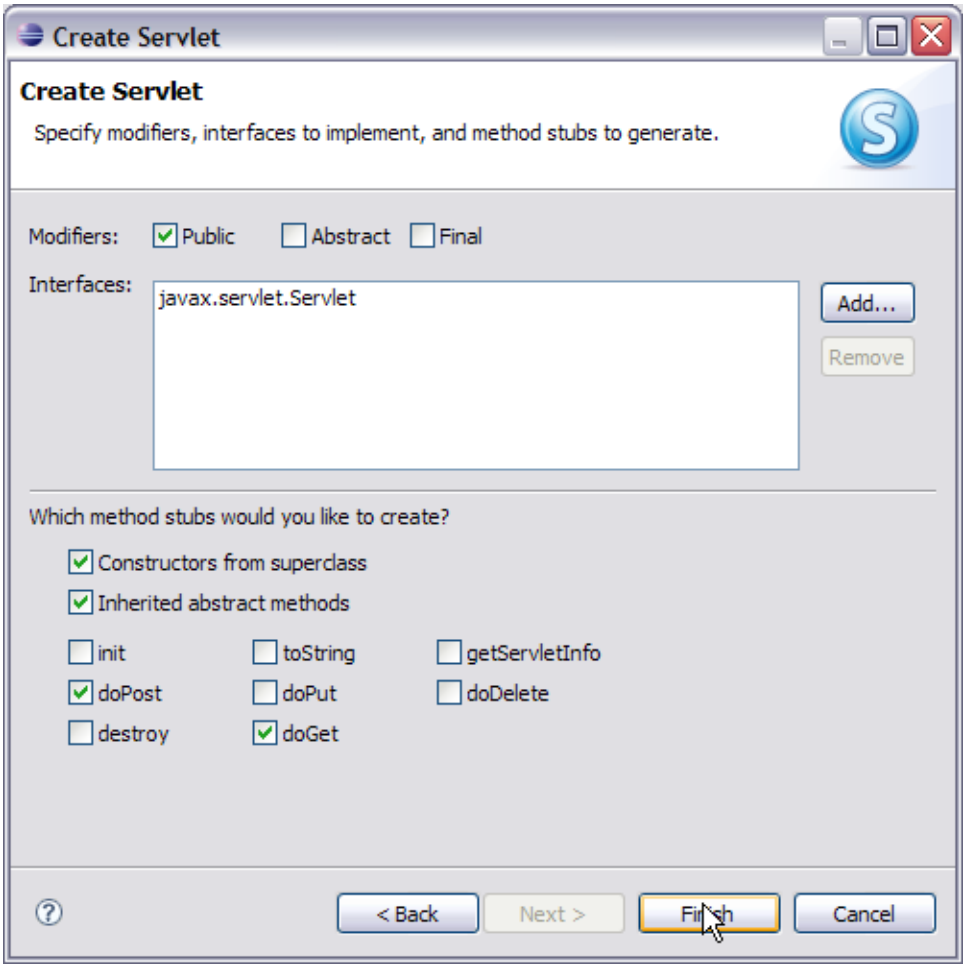
3. Select **Next** and later **Finish**.



4. Add the following code to `UserServlet.java`: UserServlet.javasolid package webjms; import java.io.IOException; import java.io.PrintWriter; import java.util.Enumeration; import javax.annotation.Resource; import javax.jms.Connection; import javax.jms.ConnectionFactory; import javax.jms.JMSException; import javax.jms.MessageProducer; import javax.jms.Queue; import javax.jms.Session; import javax.jms.TextMessage; import javax.servlet.ServletException; import javax.servlet.http.HttpServletRequest; import javax.servlet.http.HttpServletResponse; /** * Servlet implementation class for Servlet: UserServlet * */ public class UserServlet extends javax.servlet.http.HttpServlet implements javax.servlet.Servlet { @Resource(name="jms/TestConnectionFactory") private ConnectionFactory connectionFactory; @Resource(name="jms/TestQueue") private Queue queue; static final long serialVersionUID = 1L; /* (non-Java-doc) * @see javax.servlet.http.HttpServlet#HttpServlet() */ public UserServlet() { super(); } /* (non-Java-doc) * @see javax.servlet.http.HttpServlet#doGet(HttpServletRequest request, HttpServletResponse response) */ protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException { PrintWriter out = response.getWriter(); if(connectionFactory == null) { out.println("Connection Factory lookup has failed"); return; } if(queue == null) { out.println ("Queue lookup has failed"); return; } Connection connection = null; try { connection = connectionFactory.createConnection(); connection.start(); Session session = connection.createSession(false, Session.AUTO_ACKNOWLEDGE); MessageProducer producer = session.createProducer (queue); TextMessage message = session.createTextMessage(); Enumeration arr=request.getParameterNames(); while(arr.hasMoreElements()) { String fields= (String)arr.nextElement(); String paramname[]=request.getParameterValues(fields); for (int i=0; i<paramname.length;i++) { String s=null; s=fields+":" + paramname[i]; message.setText(s); producer.send(message); } } out.println("Your request has been sent to the administrator."); //Send a non-text control message indicating end of messages. producer.send(session.createMessage()); } catch (JMSException e) { e.printStackTrace(); } finally { if(connection != null) { try { connection.close(); } catch (JMSException e1) { } } } } /* (non-Java-doc) * @see javax. servlet.http.HttpServlet#doPost(HttpServletRequest request, HttpServletResponse response) */ protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException { doGet(request, response); } }
   Lets try to understand the code:
   - **@Resource(name="jms/TestConnectionFactory")**- This is a resource injection wherein connection factory has been injected.
   - **@Resource(name="jms/TestQueue")**- a queue previously created has been injected. Resource injection is useful in the sense that we need not include the entries in a deployment descriptor.
   - Servlets follow a request response model wherein a request is send to servlet and a response is generated. The function **protected void doGet(....,....)** follows a request response model.
   - **PrintWriter out = response.getWriter()**- This statement returns a PrintWriter object which is used to send HTML content to client page.
   - **connection = connectionFactory.createConnection()**- Creates a connection to **jms/TestConnectionFactory**
   - **Session session = connection.createSession(..,..)**- A session is a context for producing and consuming messages. Use this statement we create a new session.
   - **MessageProducer producer = session.createProducer(queue)**- A client uses message producer to send messages to a destination. Queue name is passed to createProducer method provided by session object.
   - **TextMessage message = session.createTextMessage()**- A TextMessage is used to send a message of java.lang.String type.

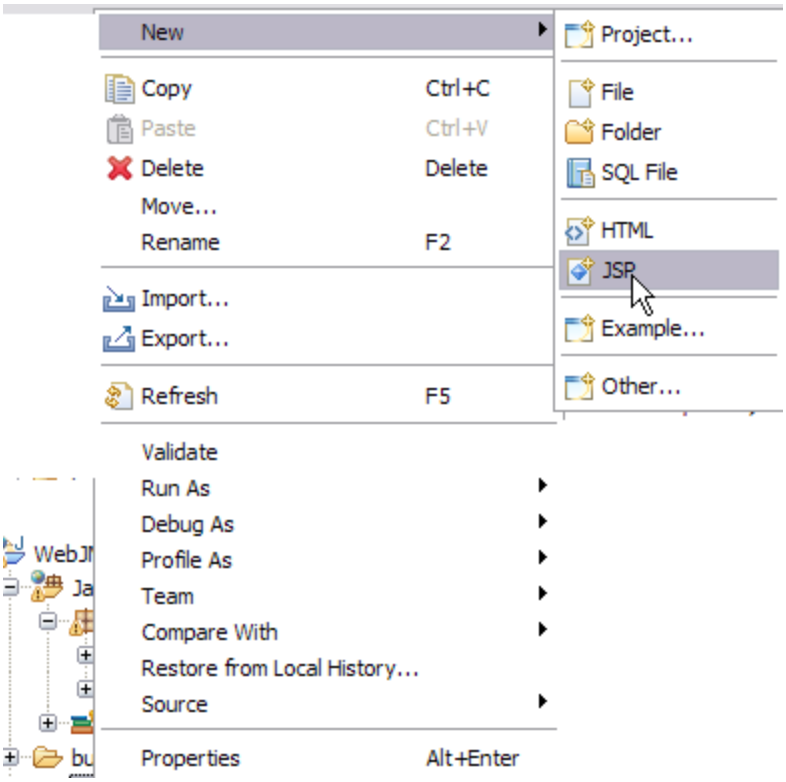
5. Similarly create a second servlet *AdminServlet*. This is the consumer in the application.


Create Servlet
Create Servlet
Specify class file destination.
Project:
WebJMS
Folder:
/WebJMS/src
Browse...
Java package:
webjms
Browse...
Class name:
AdminServlet
Superclass:
javax.servlet.http.HttpServlet
Browse...
Use existing Servlet class
Class name:
AdminServlet
Browse...
< Back
Next >
Finish
Cancel

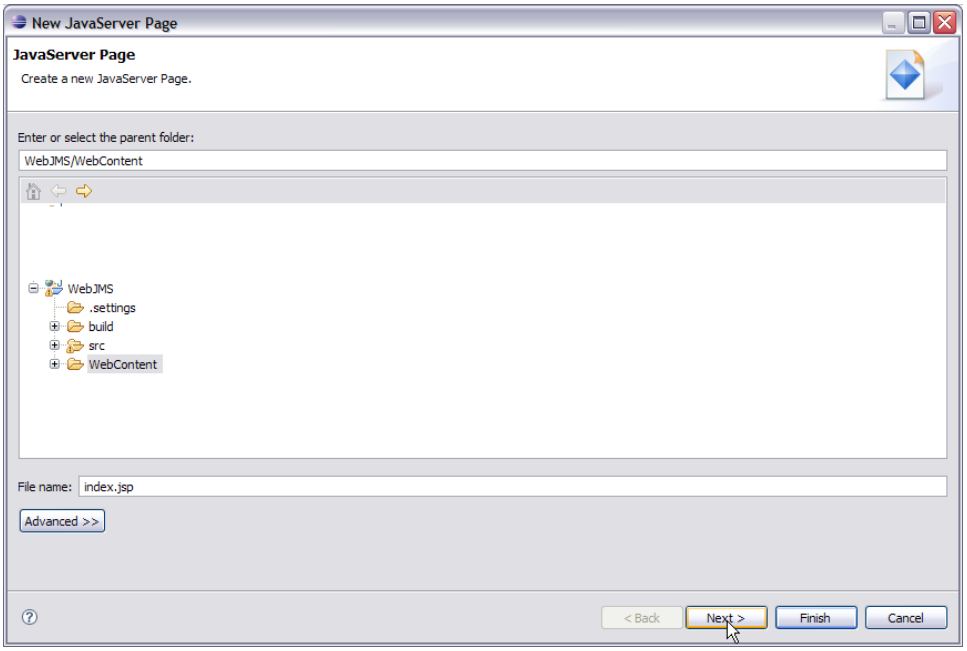


Add the following code to **AdminServlet.java**: AdminServlet.javasolid package webjms; import java.io.IOException; import java.io.PrintWriter; import javax.annotation.Resource; import javax.jms.Connection; import javax.jms.ConnectionFactory; import javax.jms.JMSException; import javax.jms.Message; import javax.jms.MessageConsumer; import javax.jms.Queue; import javax.jms.Session; import javax.jms.TextMessage; import javax.servlet.ServletException; import javax.servlet.http.HttpServletRequest; import javax.servlet.http.HttpServletResponse; /** * Servlet implementation class for Servlet: AdminServlet * */ public class AdminServlet extends javax.servlet.http.HttpServlet implements javax.servlet. Servlet { @Resource(name="jms/TestConnectionFactory") private ConnectionFactory connectionFactory; @Resource(name="jms/TestQueue") private Queue queue; /* (non-Java-doc) * @see javax.servlet.http.HttpServlet#HttpServlet() */ public AdminServlet() { super(); } /* (non-Java-doc) * @see javax.servlet.http.HttpServlet#doGet(HttpServletRequest request, HttpServletResponse response) */ protected void doGet (HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException { PrintWriter out = response.getWriter(); if (connectionFactory == null) { out.println("Connection Factory lookup has failed"); return; } if(queue == null) { out.println("Queue lookup has failed"); return; } Connection connection = null; try { connection = connectionFactory.createConnection(); Session session = connection. createSession(false, Session.AUTO_ACKNOWLEDGE); MessageConsumer consumer = session.createConsumer(queue); connection.start(); out.println("The following information has been received:"); while(true) { Message m = consumer.receive(); if (m instanceof TextMessage) { TextMessage message = (TextMessage) m; out.println(message.getText()); } else { break; } } } catch (JMSException e) { e.printStackTrace(); } finally { if(connection != null) { try { connection.close(); } catch (JMSException e1) { } } } } /* (non-Java-doc) * @see javax.servlet.http. HttpServlet#doPost(HttpServletRequest request, HttpServletResponse response) */ protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException { doGet(request, response); } }

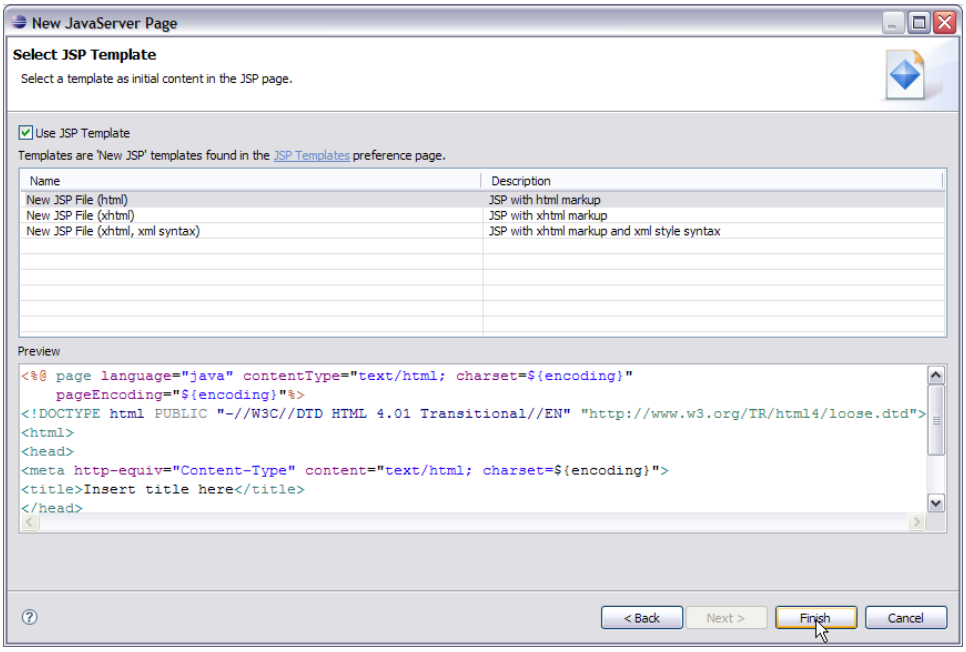
6. Right click on **WebContent** and create a JSP.



7. Name the JSP as `index.jsp`. Select **Next**.



8. Select **Finish**.



Add the following code to `index.jsp`: index.jspsolid <%@ page language="java" contentType="text/html; charset=ISO-8859-1" pageEncoding="ISO-8859-1"%> <!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd"> <html> <head> <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1"> <title>Sample Web Application accessing JMS Resources</title> </head> <body> <form action="/WebJMS/UserServlet"> <h1>Please enter the updated information</h1> <table> <tr> <td>UserName:</td> <td><input type="text" name="username" size="30"></td> </tr> <tr> <td>UserID:</td> <td><input type="text" name="userid" size="30"></td> </tr> <tr> <td>Old Address:</td> <td><input type="text" name="oldaddress" size="30"></td> </tr> <tr> <td>New Address:</td> <td><input type="text" name="newaddress" size="30"></td> <tr> </table> <input type="submit" value="Submit"> </form> </body> </html> This will create the producer, consumer and user interface required by the application.

Modifying the deployment plan:

Modify the **geronimo-web.xml** deployment plan as shown below:

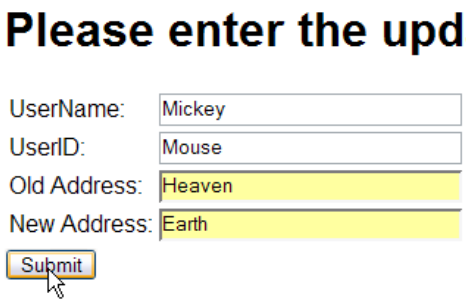
geronimo-web.xmlsolid <?xml version="1.0" encoding="UTF-8"?> <web-app xmlns="http://geronimo.apache.org/xml/ns/j2ee/web-1.2" xmlns:nam="http://geronimo.apache.org/xml/ns/naming-1.2" xmlns:sec="http://geronimo.apache.org/xml/ns/security-1.1" xmlns:sys="http://geronimo.apache.org/xml/ns/deployment-1.2"> <sys:environment> <sys:moduleId> <sys:groupId>default</sys:groupId> <sys:artifactId>WebJMS</sys:artifactId> <sys:version>1.0</sys:version> <sys:type>car</sys:type> </sys:moduleId> <sys:dependencies> <sys:dependency> <sys:groupId>org.apache.geronimo.configs</sys:groupId> <sys:artifactId>activemq-ra</sys:artifactId> <sys:version>2.1.3</sys:version> <sys:type>car</sys:type> </sys:dependency> </sys:dependencies> </sys:environment> <context-root>/WebJMS</context-root> <nam:resource-ref> <nam:ref-name>jms/TestConnectionFactory</nam:ref-name> <nam:pattern> <nam:groupId>org.apache.geronimo.configs</nam:groupId> <nam:artifactId>activemq-ra</nam:artifactId> <nam:version>2.1.3</nam:version> <nam:name>DefaultActiveMQConnectionFactory</nam:name> </nam:pattern> </nam:resource-ref> <nam:resource-env-ref> <nam:ref-name>jms/TestQueue</nam:ref-name> <nam:pattern> <nam:groupId>org.apache.geronimo.configs</nam:groupId> <nam:artifactId>activemq-ra</nam:artifactId> <nam:version>2.1.3</nam:version> <nam:name>SendReceiveQueue</nam:name> </nam:pattern> </nam:resource-env-ref> </web-app>

The deployment plan has been modified to include active-mq dependencies and resource references for queue **TestQueue** and Connection Factory **Test Connection Factory**. You may have to update version number of each dependency to comply with the Geronimo version you are using.
<sys:dependency> – Defines the dependency of the application on **ActiveMQ**.
<nam:resource-ref> – This tag is basically used to define connections that can be JDBC Connection, Java Mail connection or JMS Connection Factory. In our case we are using it for **JMS Connection Factory**.
<nam:resource-env-ref> – This tag is basically used to define a resource. In our case we have defind the message destination that is the **TestQueue**.

Deploy and Run

1. Right click on **WebJMS** project and select **Run as - > Run on server**.

2. Launch the application using http://localhost:8080/WebJMS. Fill in the required information and select **Submit**.



3. Once your request is successfully sent to the administrator you will get the following message.

```
Your request has been sent to administrator.
```

4. Once the administrator logs in they will receive the request sent by the user. Launch the AdminServlet using the following http://localhost:8080/WebJMS/AdminServlet.

```
The following information has been received for updation

oldaddress:Heaven
userid:Mouse
newaddress:Earth
username:Mickey
```