

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.

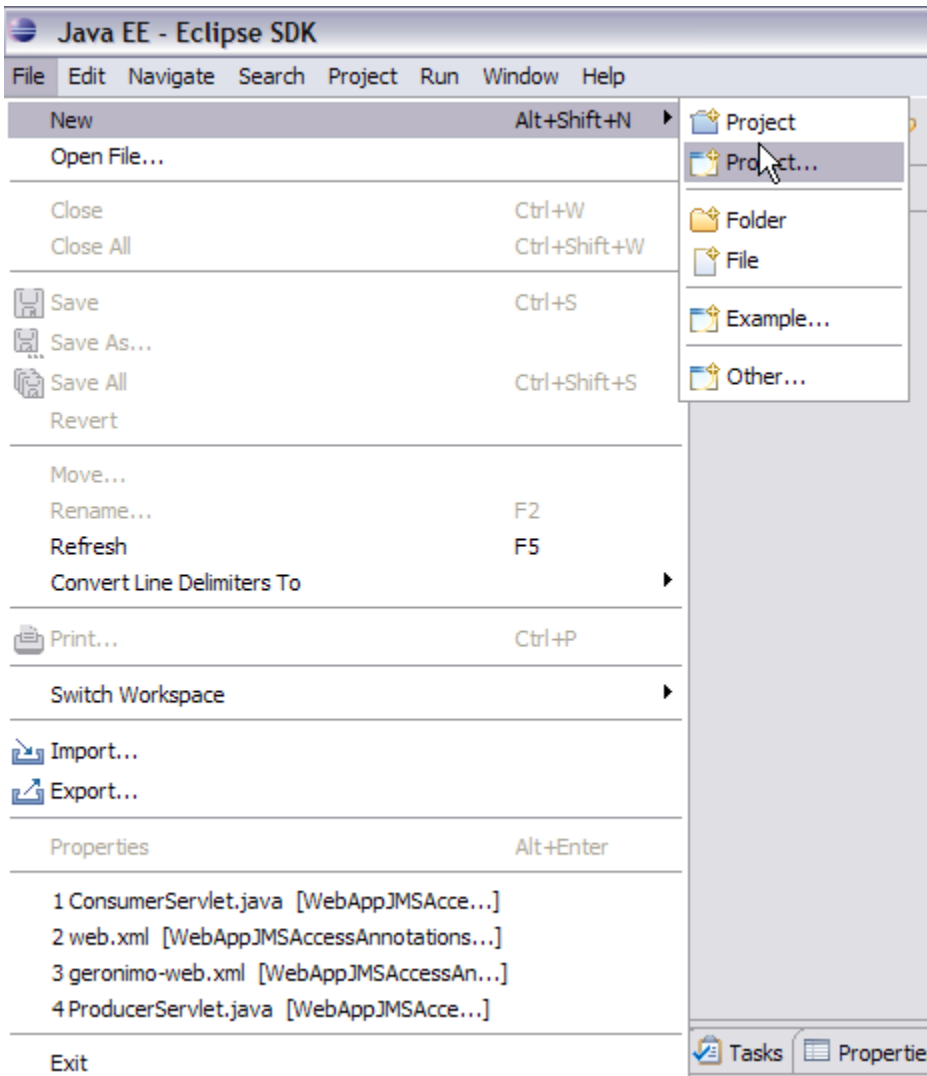
To run this tutorial, as a minimum you will be required to have installed the following prerequisite software:

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)

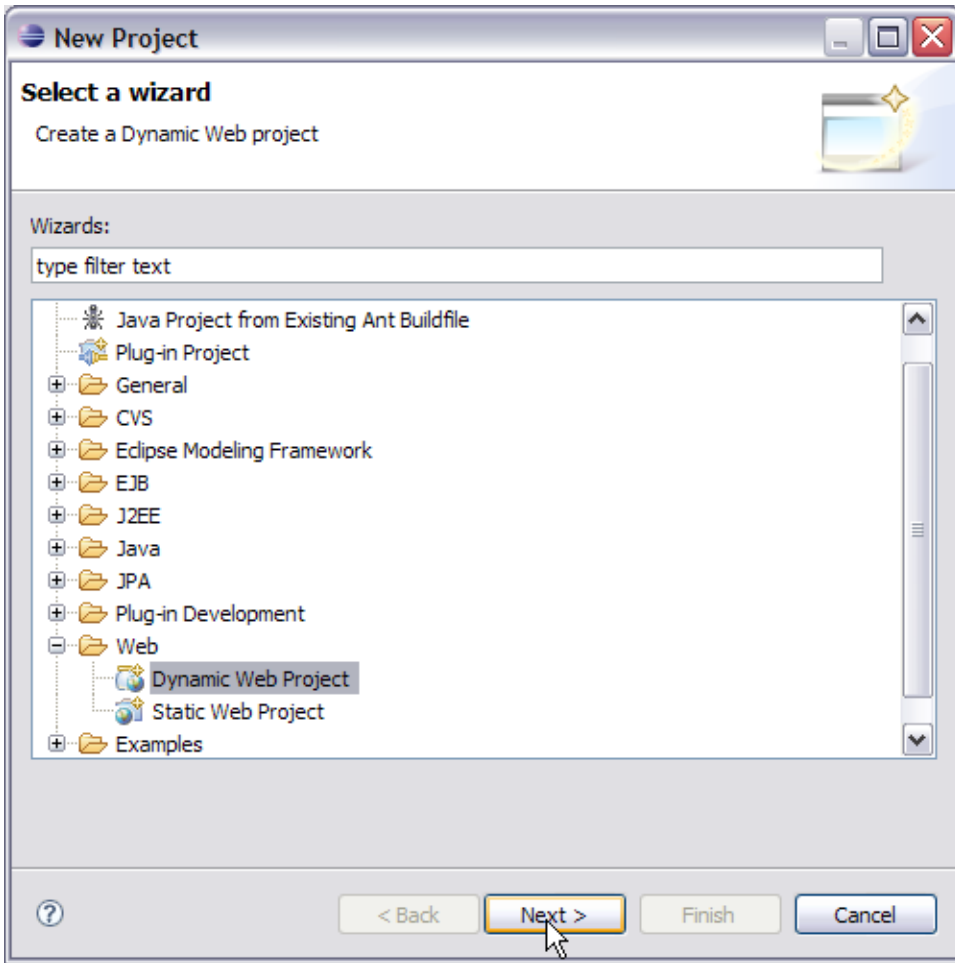
Details on installing eclipse are provided in the [Development environment](#) section. This tutorial is organized in the following sections:

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*.

New Dynamic Web Project

Dynamic Web Project
Create a standalone Dynamic Web project or add it to a new or existing Enterprise Application.

Project name: WebJMS

Project contents:
 Use default
Directory: C:\Workspace\WTP201_AG21_GEP21\WebJMS Browse...

Target Runtime
Apache Geronimo v2.1 New...

Configurations
Default Configuration for Apache Geronimo v2.1
A good starting for working with Apache Geronimo v2.1 runtime. Additional facets can later be installed to add new functionality to the project.

EAR Membership
 Add project to an EAR
EAR Project Name: EAR New...

< Back Next > Finish Cancel

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

New Dynamic Web Project

Geronimo Deployment Plan
Configure the geronimo deployment plan.

Group Id: default

Artifact Id:

Version: 1.0

Artifact Type: car

Add a runtime dependency to Geronimo's shared library

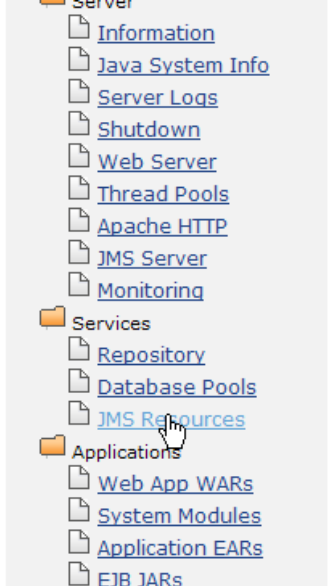
< Back Next > Finish Cancel

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*.



Administration Console!

The administration console provides a convenient, user friendly interface to administer many aspects of the Geronimo Server. It is currently in progress, and will continue to evolve over time. The navigation pane on the left-hand side of the screen provides easy access to the tasks available in the console.

This space is the main content area where the real work happens. It typically contains one or more portlets (self contained view fragments) which typically include a link for help in the header. Look at the top right for an example and try it out.

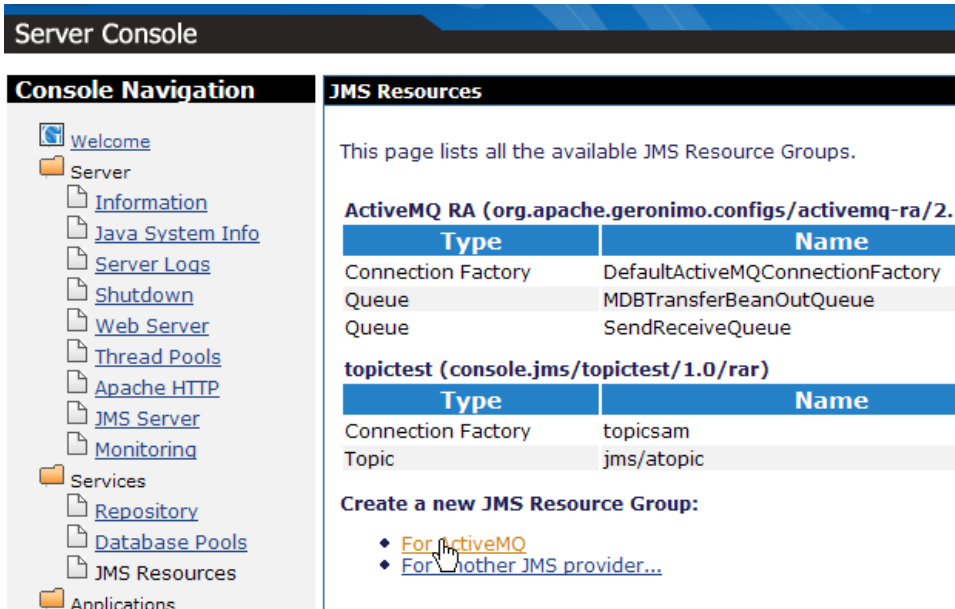
The references on the right are provided so that you can learn more about Apache Geronimo, its capabilities, and what might be coming in future releases.

Mailing lists are available to get involved in the development of Geronimo or to ask questions of the community:

- ◆ user@geronimo.apache.org (archives) for general questions related to configuring and using Geronimo
- ◆ dev@geronimo.apache.org (archives) for developers of Geronimo

So share your experiences with us and let us know how we can make Geronimo even better.

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.

JMS Resources

JMS Resource Group -- Configure Server Connection

The settings on this screen are different for each JMS provider, but they generally configure connectivity to the server. Connection factories or destinations you create in the next step typically use these settings to connect to the server.

Resource Group Name:

A unique name for the resource adapter; used to generate the name for this resource group as well as to connect Message-Driven Beans to the server using the settings on this page.

Basic Configuration Settings.

ServerUrl:

The URL to the ActiveMQ server that you want this connection to connect to. If using an embedded broker, this value should be 'vm://localhost'.

UserName:

The default user name that will be used to establish connection to the server.

Password:

The default password that will be used to log the default user in to the server.

5. Select **Next** once done.

QueuePrefetch:
The maximum number of messages sent to a consumer on a durable queue until acknowledgments are received. Default: 1000

InputStreamPrefetch:
The maximum number of messages sent to a consumer on a queue until acknowledgments are received. Default: 1000

TopicPrefetch:
The maximum number of messages sent to a consumer on a JMS stream until acknowledgments are received. Default: 100

InitialRedeliveryDelay:
The maximum number of messages sent to a consumer on a non-durable queue until acknowledgments are received. Default: 32766

MaximumRedeliveries:
The delay before redeliveries start. Default: 1000

RedeliveryBackOffMultiplier:
The maximum number of redeliveries or -1 for no maximum. Default: 5

RedeliveryUseExponentialBackOff:
The multiplier to use if exponential back off is enabled. Default: 5

To enable exponential backoff. Default: false

[Cancel](#)

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**.

JMS Resource Group -- Configure Connection Factory

Connection Factory Name:

A unique name for the connection factory; used to resource references from application components.

Transaction Support:

Which JMS interface this connection factory should implement.
Connection Pool Parameters

Pool Min Size:

The minimum number of connections in the pool. Lower values result in faster connection creation.

Pool Max Size:

The maximum number of connections in the pool. Higher values result in faster connection creation.

Blocking Timeout: (in milliseconds)

The length of time a caller will wait for a connection to become available.

Idle Timeout: (in minutes)

How long a connection can be idle before being closed.

Current Status for JMS Resource Group WebJMS

- ◆ 1 Connection Factory
 - ◊ In Process
- ◆ 0 Destinations

[Cancel](#)

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

The screenshot shows the Apache Geronimo Server Console interface. The main content area is titled "JMS Resources" and displays the "Current Progress" for the "JMS Resource Group -- Current Progress". It lists the connection factories and destinations added to the resource group. A table shows the following information:

| Type | Name | Interface |
|--------------------|---------------------------|--------------------|
| Connection Factory | jms/TestConnectionFactory | javax.jms.QueueCor |

Below the table, there are four buttons: "Add Connection Factory", "Add Destination", "Show Plan", and "Deploy Now". The "Add Destination" button is highlighted with a mouse cursor. There is also a "Cancel" link at the bottom left of the main content area.

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

Console Navigation

- Welcome
- Server
 - Information
 - Java System Info
 - Server Logs
 - Shutdown
 - Web Server
 - Thread Pools
 - Apache HTTP
 - JMS Server
 - Monitoring
- Services
 - Repository
 - Database Pools

JMS Resources

JMS Resource Group -- Select Destination Type

JMS Destination Type:

This resource adapter declares several possible types for this destination.

Current Status for JMS Resource Group WebJMS

- ◆ 1 Connection Factory
 - ◊ jms/TestConnectionFactory
- ◆ 1 Destination
 - ◊ In Process

[Cancel](#)

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

APACHE GERONIMO Server Console

Console Navigation

- Welcome
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 - Java System Info
 - Server Logs
 - Shutdown
 - Web Server
 - Thread Pools
 - Apache HTTP
 - JMS Server
 - Monitoring
- Services
 - Repository
 - Database Pools
 - JMS Resources
- Applications

JMS Resources

JMS Resource Group -- Configure Destination

Message Destination Name:

A unique name for the connection factory mapping resource references from application to physical destination.

Destination Configuration

PhysicalName:

Current Status for JMS Resource Group WebJMS

- ◆ 1 Connection Factory
 - ◊ jms/TestConnectionFactory
- ◆ 1 Destination
 - ◊ In Process

[Cancel](#)

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

APACHE Geronimo Server Console

Console Navigation

- Welcome
- Server
 - Information
 - Java System Info
 - Server Logs
 - Shutdown
 - Web Server
 - Thread Pools
 - Apache HTTP
 - JMS Server
 - Monitoring
- Services

JMS Resources

JMS Resource Group -- Current Progress

These are the connection factories and destinations you've added to the JMS resource group. After you have finished adding connection factories and destinations, you can review the Geronimo deploy plan, or go ahead and deploy it.

Resource Group WebJMS

| Type | Name | Interface |
|--------------------|---------------------------|----------------------|
| Connection Factory | jms/TestConnectionFactory | javax.jms.QueueConnr |
| Destination | jms/TestQueue | javax.jms.Queue |

[Cancel](#)

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

Console Navigation

- Welcome
- Server
 - Information
 - Java System Info
 - Server Logs
 - Shutdown
 - Web Server
 - Thread Pools
 - Apache HTTP
 - JMS Server
 - Monitoring
- Services
 - Repository
 - Database Pools
 - JMS Resources
- Applications
 - Web App WARs
 - System Modules
 - Application EARs
 - EJB JARs

JMS Resources

This page lists all the available JMS Resource Groups.

ActiveMQ RA (org.apache.geronimo.configs/activemq-ra/2.1/car)

| Type | Name | Deployed As | State |
|--------------------|----------------------------------|-------------|---------|
| Connection Factory | DefaultActiveMQConnectionFactory | Server-wide | running |
| Queue | MDBTransferBeanOutQueue | Server-wide | running |
| Queue | SendReceiveQueue | Server-wide | running |

topicstest (console.jms/topicstest/1.0/rar)

| Type | Name | Deployed As | State |
|--------------------|------------|-------------|---------|
| Connection Factory | topicsam | Server-wide | running |
| Topic | jms/atopic | Server-wide | running |

WebJMS (console.jms/WebJMS/1.0/rar)

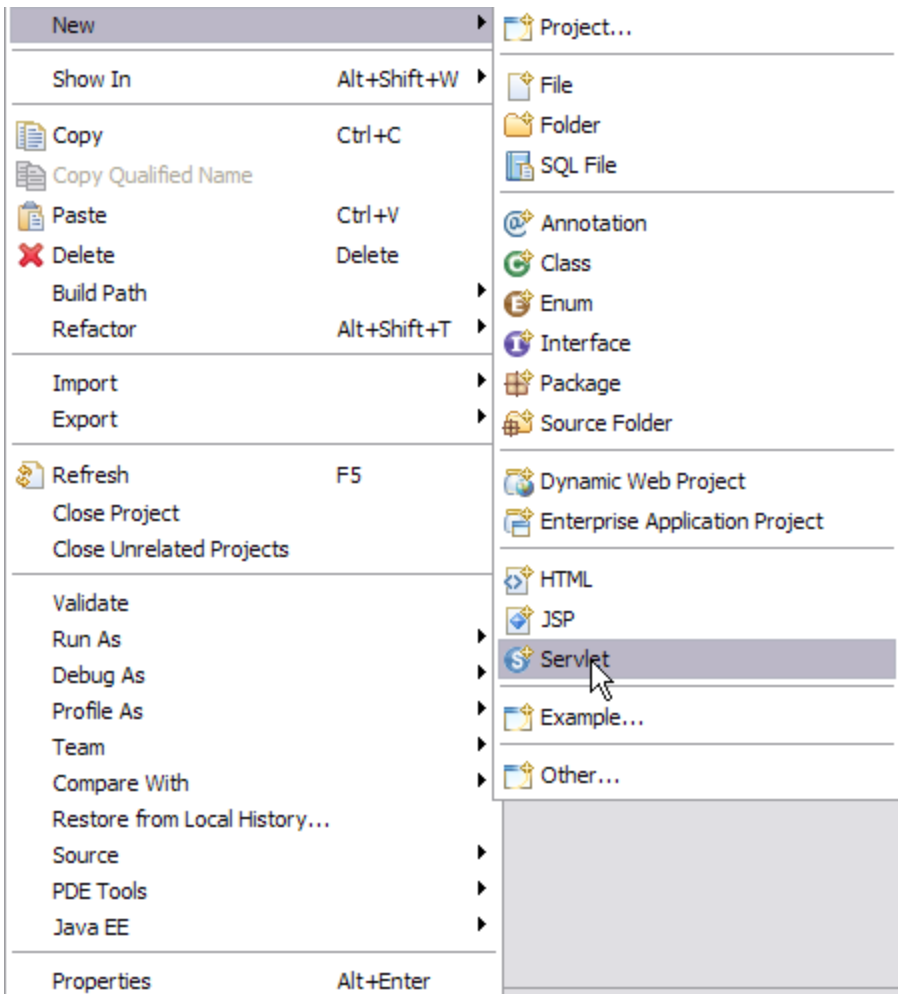
| Type | Name | Deployed As | State |
|--------------------|---------------------------|-------------|---------|
| Connection Factory | jms/TestConnectionFactory | Server-wide | running |
| Queue | jms/TestQueue | Server-wide | running |

Create a new JMS Resource Group:

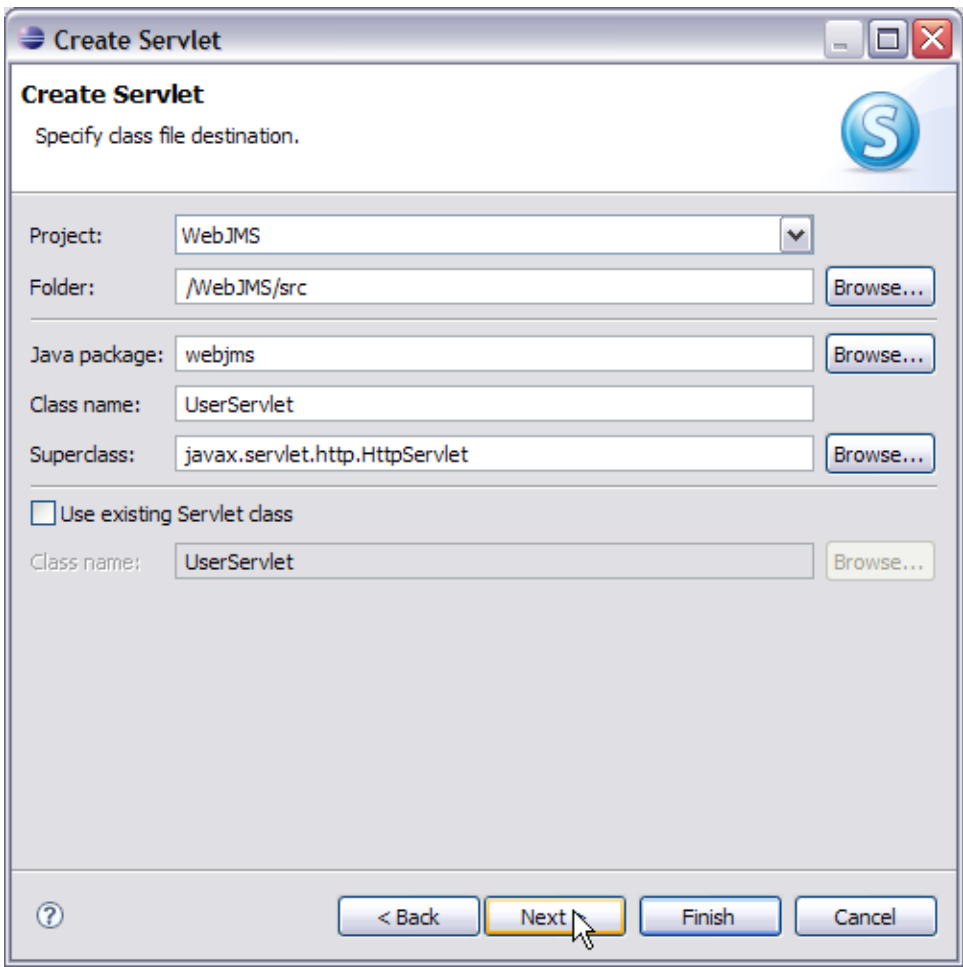
- For ActiveMQ
- For another JMS provider...

Adding producer, consumer and UI code to the application

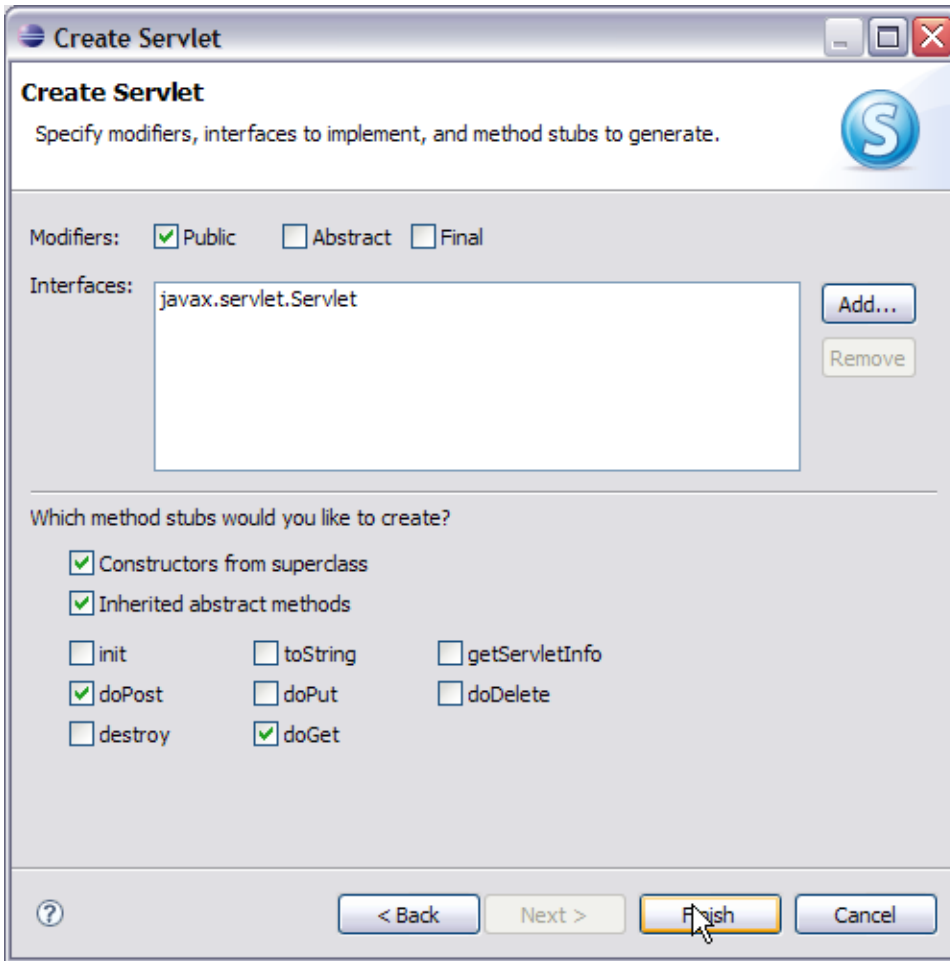
1. Right click on **WebJMS** project and create a new servlet.



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`:
- ```

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**

Specify class file destination.

Project: WebJMS

Folder: /WebJMS/src

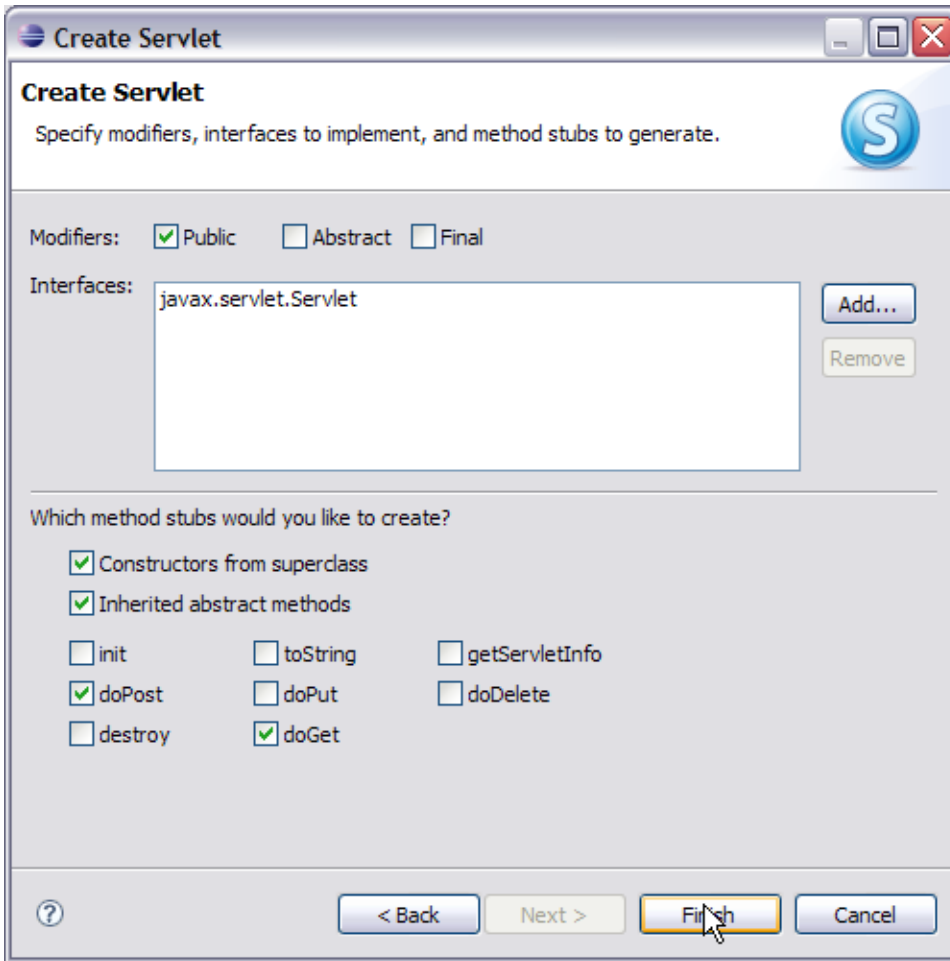
Java package: webjms

Class name: AdminServlet

Superclass: javax.servlet.http.HttpServlet

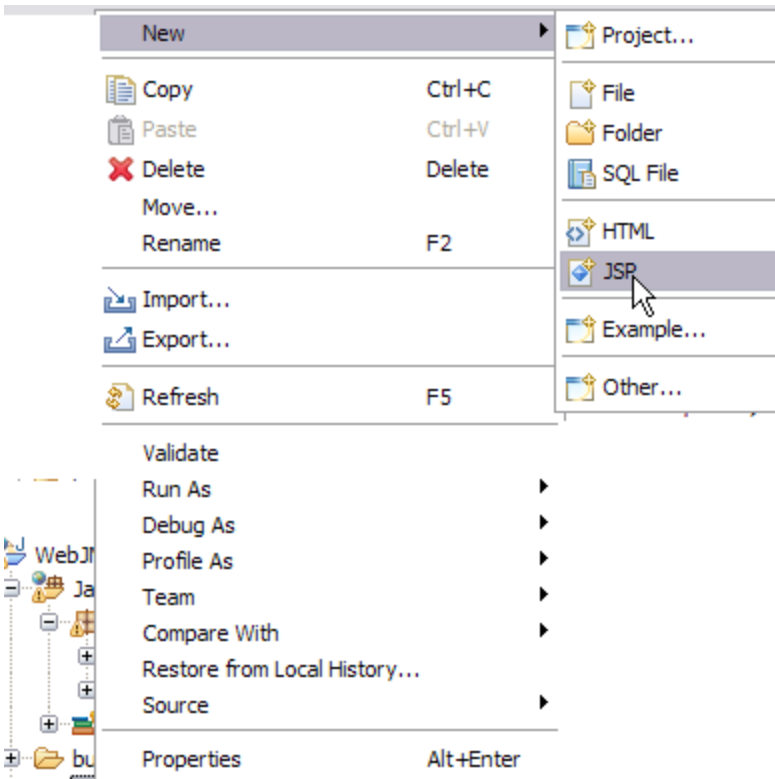
Use existing Servlet class

Class name: AdminServlet

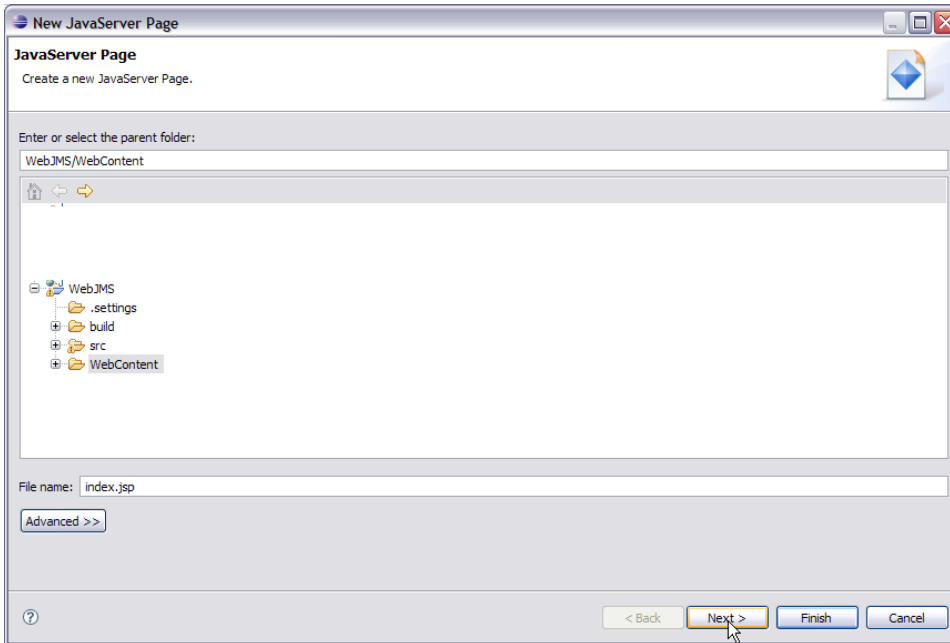


Add the following code to **AdminServlet.java**: `solidAdminServlet.java package webjms; import java.io.IOException; import java.io.PrintWriter; import javax.annotation.Resource; import javax.jms.Connection; import javax.jms.ConnectionFactory; import javax.jms.JMSEException; import javax.jms.Message; 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 (JMSEException e) { e.printStackTrace(); } finally { if (connection != null) { try { connection.close(); } catch (JMSEException e1) { } } } } /* (non-Java-doc) * @see javax.servlet.http.HttpServlet#doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException */ protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException { doGet(request, response); } }`

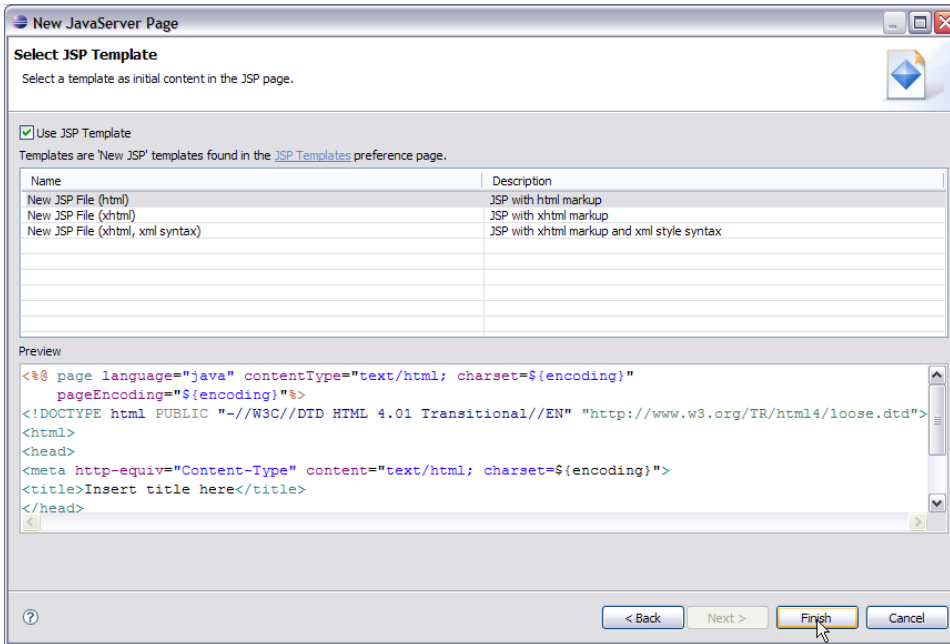
6. Right click on **WebContent** and create a JSP.



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



8. Select **Finish**.



Add the following code to `index.jsp`: `solidindex.jsp`

```
<%@ 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:

```
solidgeronimo-web.xml <?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 defined 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**.

## Please enter the updated information

|              |                                     |
|--------------|-------------------------------------|
| UserName:    | <input type="text" value="Mickey"/> |
| UserID:      | <input type="text" value="Mouse"/>  |
| Old Address: | <input type="text" value="Heaven"/> |
| New Address: | <input type="text" value="Earth"/>  |

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
```