

IBM WEBSHERE APPLICATION SERVER V6.1 FEATURE PACK FOR EJB 3.0– LAB EXERCISE

Configuring the Application Server Toolkit for EJB 3.0 development

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What this exercise is about

The objective of this lab is to demonstrate the process of configuring the Application Server Toolkit (AST) V6.1 as a development environment for applications that use the Enterprise Java Beans (EJB) 3.0 specification. You will step through the process of setting up the AST for use with the WebSphere Application Server Feature Pack for EJB 3.0, then create and deploy a simple enterprise application that includes an EJB 3.0 module.

This will enable you to use the Application Server Toolkit to work with, modify, and add to the sample application if you want.

Lab requirements

- This exercise assumes that WebSphere Application Server V6.1 with the Feature Pack for EJB 3.0 is already installed and an application server profile is already created with administrative security enabled.
- Lab source files (the Labfiles61EJB3 directory) must be downloaded and extracted. This directory is included in the archive file that contained this document (WASv61_EJB3_Labs.zip). The exercise uses <LAB_FILES> to refer to the directory in which you have extracted the archive file.

What you should be able to do

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

- Configure the Application Server Toolkit to develop EJB 3.0 artifacts
 - Package an enterprise application with EJB 3.0 modules for deployment to a local WebSphere Application Server installation
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Exercise instructions

Security note: For the purposes of this exercise, it is assumed that administrative security has been enabled, and that a user with the name **wsdemo** and password **password** has full administrative rights. If a different administrator exists on your system, replace the sample user credentials with the actual user credentials when necessary.

For the purposes of this exercise, it is assumed that a profile was created using the default port values. If different port numbers are used on your system, substitute port numbers as necessary.

For the purposes of this exercise, the following directory locations are assumed. If different locations are in use in your environment, replace the sample paths with the actual path on your system

Location	Windows®	UNIX®/Linux®
WebSphere Application Server installation	C:\WebSphere\AppServer\	/opt/WebSphere/AppServer
Lab files location	C:\Labfiles61EJB3	var/tmp/Labfiles61EJB3

Part 1: Prepare the Environment

___ 1. Verify that server1 is stopped

___ a. Navigate to the profile's **bin** directory in a command prompt.

Windows

```
cd c:\WebSphere\AppServer\profiles\AppSrv01\bin
```

Linux

```
cd /opt/WebSphere/AppServer/profiles/AppSrv01/bin
```

___ b. Use the **serverStatus** command to verify that the application server is stopped.

Windows

```
serverStatus.bat server1 -username wdemo  
-password password
```

Linux

```
./serverStatus.sh server1 -username wdemo  
-password password
```

___ c. If the server status indicates STARTED, then stop the server:

Windows

```
stopServer.bat server1 -username wdemo  
-password password
```

Linux


```
./stopServer.sh server1 -username wdemo  
-password password
```


Part 2: Prepare the Application Server Toolkit

___ 1. Launch the Application Server Toolkit


___ a. Open a command prompt.


___ b. Navigate to the directory where you have installed the Application Server Toolkit

 `cd c:\IBM\AST`

 `cd /opt/IBM/AST`

___ c. Start the AST and specify a workspace to use for this exercise, using the paths shown below, or another path of your choice.

 `ast.exe -data c:\LabFiles61EJB3\workspace`

 `./ast -data var/tmp/LabFiles61EJB3/workspace`

___ d. Close the “Welcome” tab.

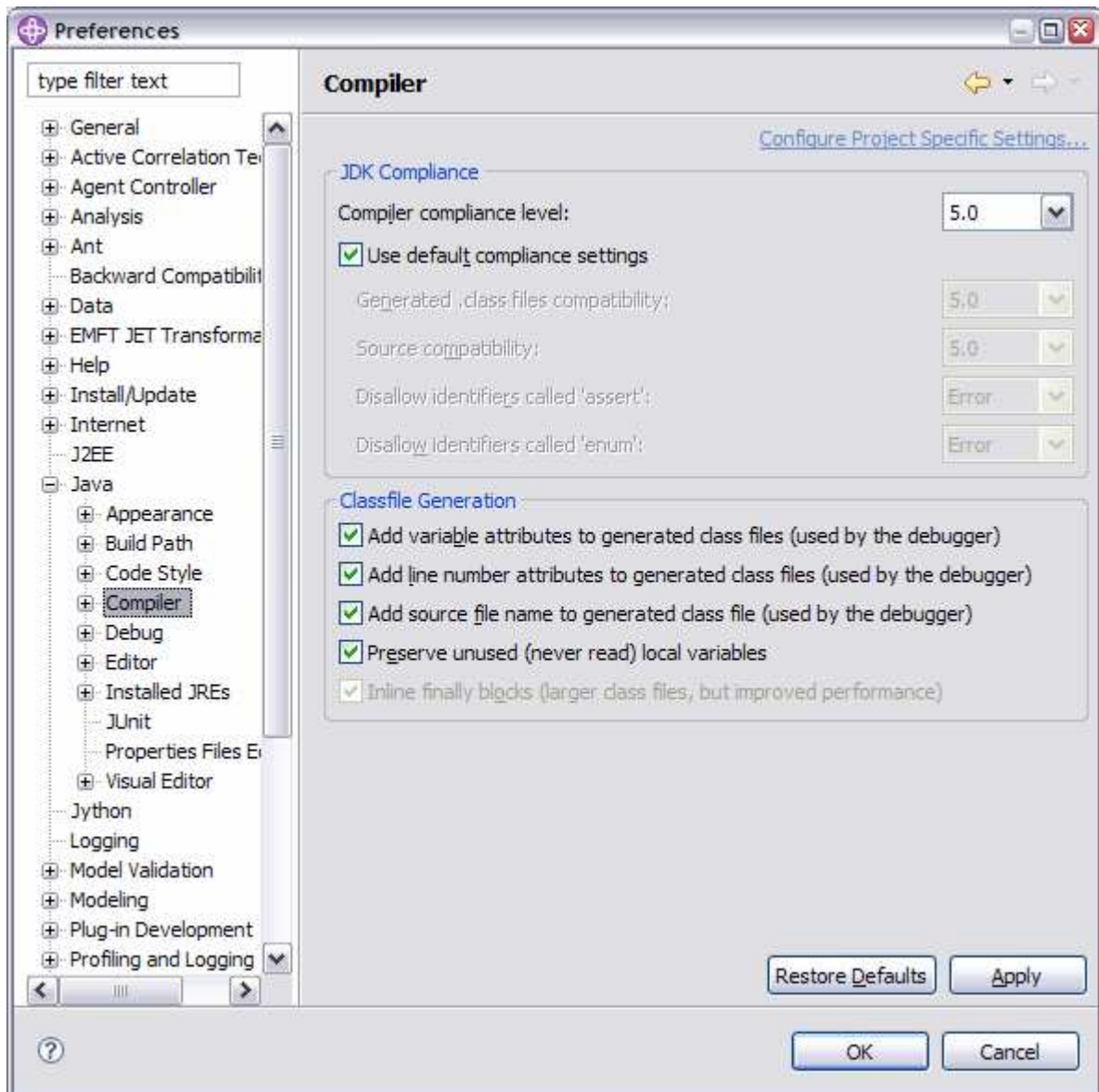
___ 2. Ensure that the AST is configured to compile Java 5.0 code.

___ a. Select **Window > Preferences....**

___ b. Expand **Java** in the left menu.

___ c. Click **Compiler**.

- ___ d. Ensure that the **Compiler compliance level** is set to **5.0** as shown below.



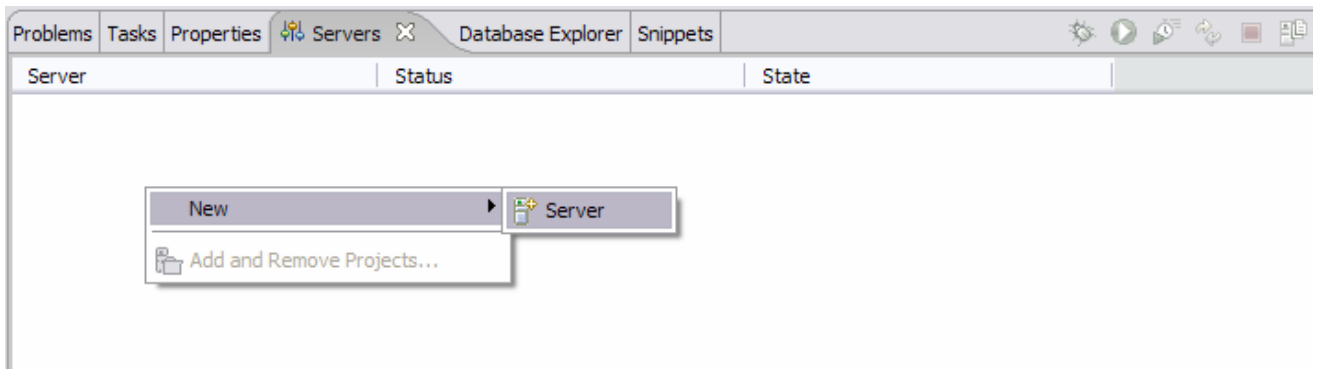
- ___ e. Click **OK**.

- ___ f. You may be prompted to perform a “full build”. There is no code in this workspace yet, so it will have no effect. Click **Yes**.

- ___ 3. Define a local test server instance that uses WebSphere Application Server V6.1 with the Feature Pack for 3.0 installed. By defining a local test server before creating any projects, you will ensure that **j2ee.jar** from the server’s installation will be included on the build path of any project that you create. This is important because the AST must have visibility to this file, or it will not be aware of EJB 3.0.

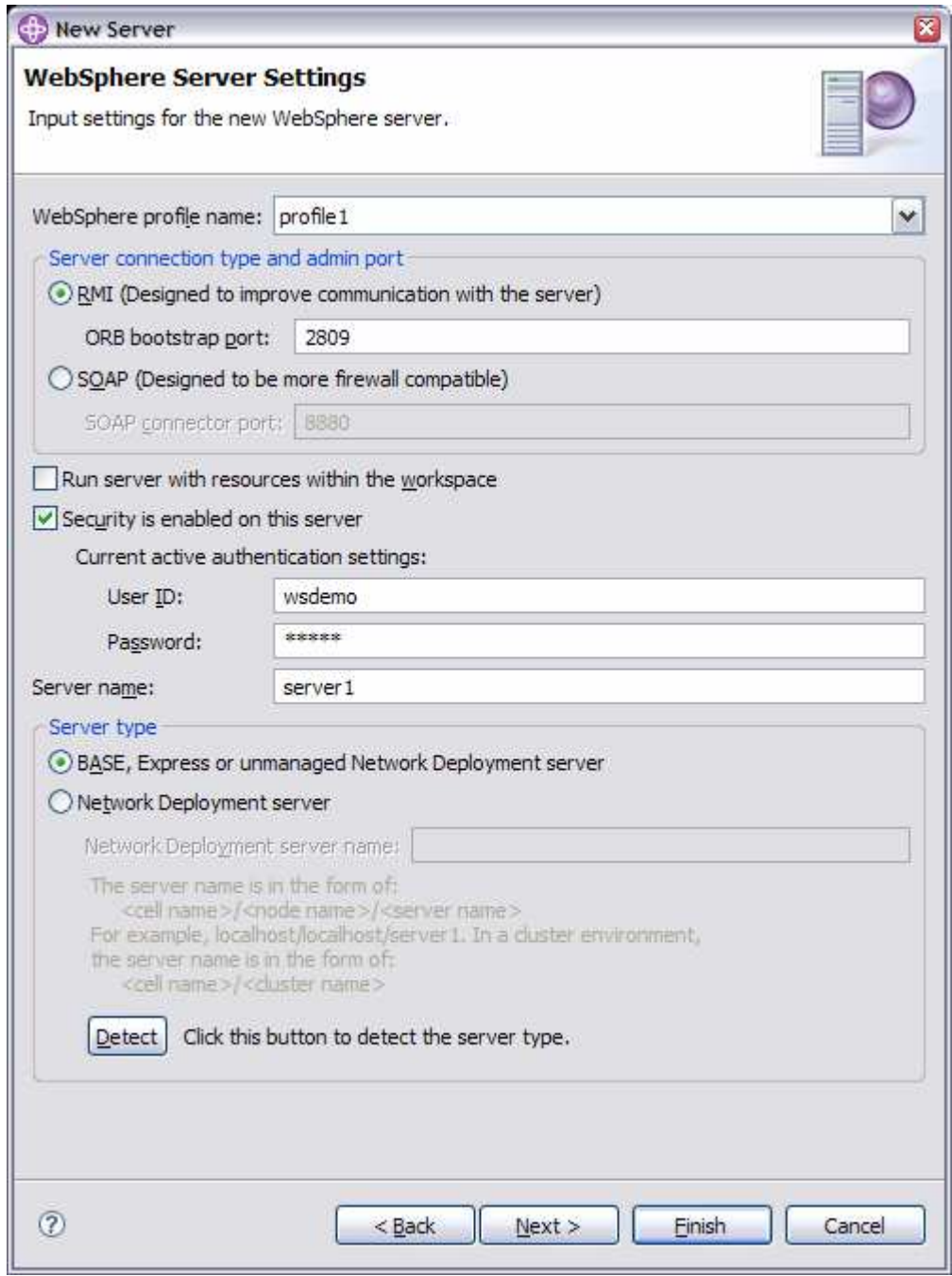
- ___ a. Switch to the J2EE Perspective by selecting **Window > Open Perspective > J2EE**. If J2EE is not shown in this menu, select **Other...** and then **J2EE**.

- ___ b. In the lower panel, click the **Servers** tab.
- ___ c. Right-click in the lower panel and select **New > Server** from the contextual menu as shown below.



- ___ d. In the resulting window, click **Installed runtimes....**
- ___ e. Click **Add...** in the “Installed Server Runtimes” window.
- ___ f. Select **IBM > WebSphere Application Server V6.1** in the “New Server Runtime” window
- ___ g. Click **Next**.
- ___ h. In the “Name” field, enter **WebSphere Application Server V6.1 with EJB 3.0**.
- ___ i. In the “Installation directory” field, enter the location of the WebSphere Application Server installation that has had the Feature Pack for EJB 3.0 installed. (For example, **c:\WebSphere\AppServer**). You can also use the **Browse...** button to locate this directory.
- ___ j. Click **OK**.
- ___ k. You will be returned to the “Installed Server Runtime Environments” window. Select **WebSphere Application Server V6.1 with EJB 3.0**.
- ___ l. Click **OK**.
- ___ m. Ensure that the “Server runtime:” field now reads **WebSphere Application Server V6.1 with EJB 3.0** and click **Next**.
- ___ n. In the “WebSphere Server Settings” window, select the profile that you want to use for the server runtime. If you have created only one profile, it will already be selected.
- ___ o. Clear the **Run Server with resources within the workspace** check box. This will run the server using resources that are on the server, not within the workspace.

- __ p. Ensure that **Security is enabled on this server** is checked (if security is in fact enabled on that server) and provide your administrative username and password. The window should now look like the window shown below (allowing for differences in profile name and user ID information).



- __ q. Click **Finish**.

- ___ 4. Create an enterprise application project named **EJB3CounterSample**.
 - ___ a. Select **File > New > Project....**
 - ___ b. Expand **J2EE** and select **Enterprise Application Project**.
 - ___ c. Click **Next**.
 - ___ d. Enter a project name of **EJB3CounterSample**.
 - ___ e. In the “Target runtime” field, select **WebSphere Application Server V6.1 with EJB 3.0**.
 - ___ f. Click **Finish**.
 - ___ g. **EJB3CounterSample** should now appear in the Project Explorer panel.

- ___ 5. Add a Web module.
 - ___ a. Right-click on **EJB3CounterSample** in the Project Explorer and select **New > Dynamic Web Project**.
 - ___ b. Type **counter** in the “Project name:” field.
 - ___ c. Ensure that **Add project to an EAR** is selected and that the EAR project name is **EJB3CounterSample**.
 - ___ d. Click **Next**.
 - ___ e. Click **Next** again.
 - ___ f. Set the context root to **ejb3sample/**
 - ___ g. Click **Finish**.

- ___ 6. Import EJBCount.jsp and web.xml from the sample application provided in the Lab files download. This is the same sample application that is installed into the “samples” directory by the feature pack installer.
 - ___ a. Expand **counter** in the Project Explorer.
 - ___ b. Right-click WebContent, and select **Import....**
 - ___ c. Expand **General** and click **File system**.
 - ___ d. Click **Next**.
 - ___ e. Set the “From directory” to **c:\Labfiles61EJB3\EJB3Counter\WebApplication** (or its equivalent if you expanded the download to a different location)
 - ___ f. Expand **WebApplication** and **WEB-INF**, then check the box next to **web.xml**.
 - ___ g. Check the box next to **EJB3Count.jsp** in the right-side panel.
 - ___ h. Click **Finish**.
 - ___ i. When asked if you want to overwrite existing files, click **Yes to all**.

___ 7. Create a utility JAR project. This will become the EJB module for your enterprise application.

Note: The AST has not been enhanced to understand EJB 3.0, and assumes that all EJB projects are EJB 1 or 2 projects. To develop EJB 3.0 modules in the Application Server Toolkit, you must create them as Java projects or utility projects, not as EJB projects. This prevents the AST from adding a J2EE 1.4 EJB deployment descriptor to the project. After creating the project, you will also need to hand-edit the application deployment descriptor to include the module.

- ___ a. Right-click on **EJB3CounterSample** in the Project Explorer and select **New > Project....**
- ___ b. Expand **J2EE** and select **Utility Project**.
- ___ c. Click **Next**.
- ___ d. Enter **EJB3Beans** as the project name.
- ___ e. Ensure that **Add project to an EAR** is selected and that the EAR project name is **EJB3CounterSample**.
- ___ f. Click **Finish**.

___ 8. Import the sample code into the EJB3Beans project.

- ___ a. Expand **EJB3Beans** in the Project Explorer.
- ___ b. Right-click **src** and select **Import....**
- ___ c. Expand **General** and select **File system**.
- ___ d. Click **Next**.
- ___ e. Set the "From directory" to **c:\Labfiles61EJB3\EJB3Counter** (or its equivalent if you expanded the download to a different location)
- ___ f. Expand **EJB3Counter** and check the box next to **com**.
- ___ g. Click **Finish**. You should now see a package named **com.ibm.websphere.ejb3sample.counter** in the "src" folder

___ 9. Import persistence.xml from the sample application into the EJB3Beans project. persistence.xml defines the data source that will be used for JPA persistence, and the entity classes for which it will be used.

- ___ a. Expand **EJB3Beans** in the Project Explorer.
- ___ b. Expand **src**.
- ___ c. Right-click **META-INF** and select **Import....**
- ___ d. Expand **General** and select **File system**.
- ___ e. Click **Next**.
- ___ f. Set the "From directory" to **c:\Labfiles61EJB3\EJB3Counter\EJB3Beans\META-INF** (or its equivalent if you expanded the download to a different location)
- ___ g. Check the box next to **persistence.xml**.

- ___ h. Click **Finish**. You should now see persistence.xml in the META-INF folder in the Project Explorer
- ___ 10. Manually edit the application deployment descriptor to include a reference to the EJB 3.0 project.
 - ___ a. Expand **EJB3CounterSample** in the Project Explorer.
 - ___ b. Expand **META-INF**.
 - ___ c. Double-click **application.xml** to open it in the deployment descriptor editor.
 - ___ d. Click the **Source** tab in the deployment descriptor editor.
 - ___ e. Locate the closing tag **</application>**, and add the following line immediately above it, to identify EJB3Beans.jar as an EJB module:

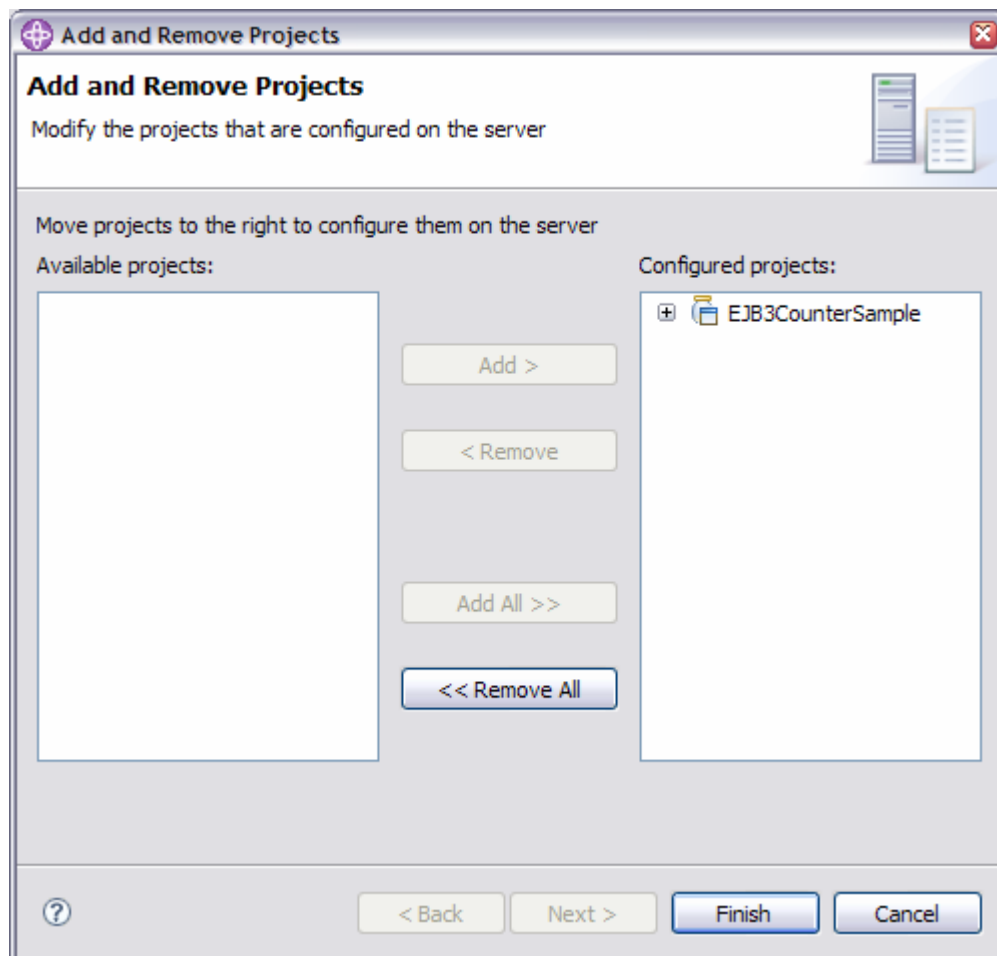
```
<module id="EJB3Module"><ejb>EJB3Beans.jar</ejb></module>
```
 - ___ f. Select **File > Save** to save the edited deployment descriptor.
 - ___ g. Close the deployment descriptor.
- ___ 11. Import the Derby database from the sample application
 - ___ a. Right-click **EJB3CounterSample** in the Project Explorer and select **Import...**
 - ___ b. Expand **General** and select **File system**.
 - ___ c. Click **Next**.
 - ___ d. Set the "From directory" to **c:\Labfiles61EJB3\EJB3Counter\Database** (or its equivalent if you expanded the download to a different location)
 - ___ e. Expand **Database** and check the box next to **database** (note the case differences).
 - ___ f. Click **Finish**. You should now see a folder named **database** in the EJB3CounterSample project. This is the embedded Derby database that is used by the JPA entity.
- ___ 12. Import the WebSphere Application Server configuration files from the sample application.

Note: These configuration files get applied to the application server when the application is deployed to the server. They will create JDBC resources for accessing the database, and a Host Alias for the Web application. These resources will not be available until the server is restarted.

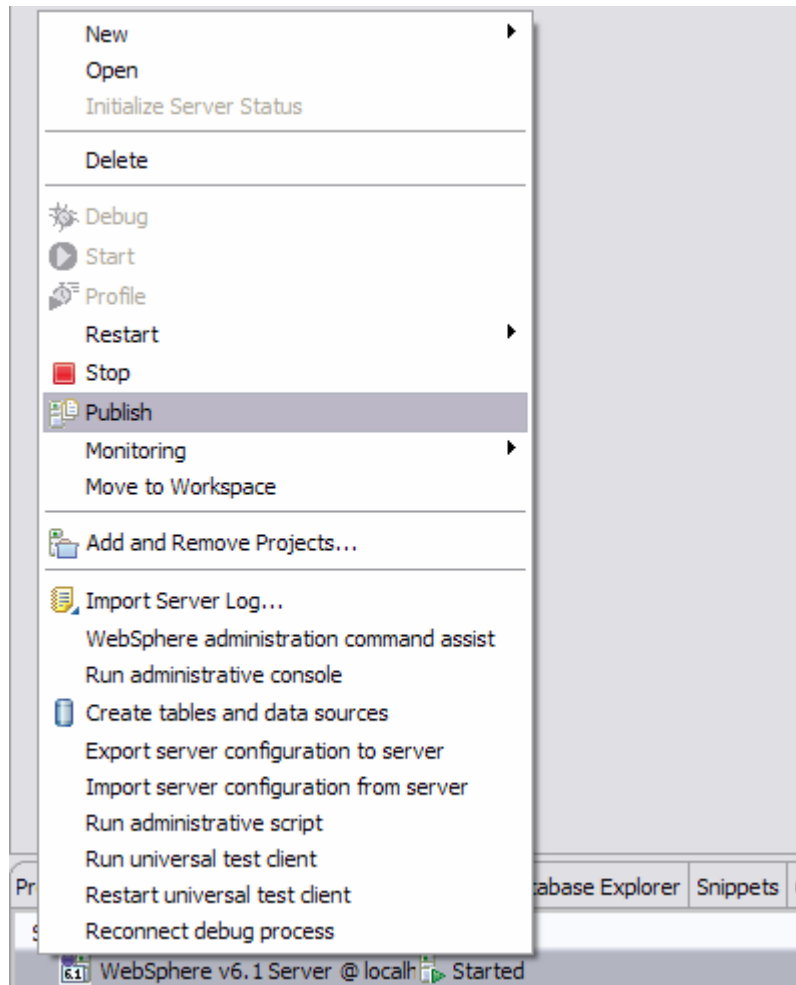
- ___ a. Expand **EJB3CounterSample** in the Project Explorer.
- ___ b. Right-click **META-INF** and select **Import...**
- ___ c. Expand **General** and select **File system**.
- ___ d. Click **Next**.
- ___ e. Set the "From directory" to **c:\Labfiles61EJB3\EJB3Counter\META-INF** (or its equivalent if you expanded the download to a different location)
- ___ f. Expand **META-INF** and check the box next to **ibmconfig**.
- ___ g. Click **Finish**. You should now see a folder named **ibmconfig** in the EJB3CounterSample project.

Part 3: Deploy the application to WebSphere Application Server

- ___ 1. Add your enterprise application project to the server.
 - ___ a. Click on the **Servers** tab in the lower panel.
 - ___ b. Right-click on the server you created earlier and select **Add and Remove Projects....**
 - ___ c. Click on **EJB3CounterSample**.
 - ___ d. Click **Add**. The project should move to the column on the right, as shown below.



- ___ e. Click **Finish**.
- ___ 2. Publish the application to your server.
 - ___ a. Right-click on the server and select **Start**, and wait for the server's status to change to "Started".
 - ___ b. Right-click on the server again and select **Publish** from the contextual menu as shown below.



___ c. Verify that the server's state is now "Synchronized".

Part 4: Test the application

In this section you will test the sample application that you built and deployed.

- ___ 1. Launch a Web browser and navigate to <http://localhost:9080/ejb3sample/counter>.
- ___ 2. Verify that you see a page titled “EJB 3.0 and JPA 1.0 Counter Sample”.
- ___ 3. Click the **Increment** button to increment the counter using a JPA entity, and verify that the counter is incremented. This establishes that all parts of the application have been packaged and installed correctly.
- ___ 4. Note in the console log displayed in the AST that you see, in addition to messages written by the Entity and by the session bean, you also see messages that are written by the AuditInterceptor class. This Interceptor was written to log the name of each method that is called. Inspect AuditInterceptor.java for details.

What you did in this exercise

In this exercise you configured the Application Server Toolkit to support development of EJB 3.0 modules. To do so, you created a server configuration to use a WebSphere Application Server with the Feature Pack for EJB 3.0 installed, and configured the AST to use the resources provided by the Feature Pack for EJB 3.0.

You also created a new enterprise application, and modified it to run under WebSphere Application Server V6.1 with the Feature Pack for EJB 3.0. You created the EJB module as a Utility JAR project to prevent the addition of a J2EE 1.4 EJB deployment descriptor, and then modified the application deployment descriptor to include this module as an EJB module.

You then deployed this application to WebSphere Application Server using the publishing function of the AST, and verified that the configuration and packaging were correct by running the sample application.

You are now ready to use the AST to modify and add to the sample application to further your EJB 3.0 learning experience.