Deploying Jakarta EE 9 applications to Apache TomEE

NOTE: Apache TomEE is Web Profile compatible, not an implementation of Full Profile.

Get the [source codes](https://github.com/hantsy/jakartaee9-starter-boilerplate) from Github.

Prerequisites

Make sure you have installed the following software.

* Java 11 ([OpenJDK](https://openjdk.java.net/install/) or [AdoptOpenJDK](https://adoptopenjdk.net/installation.html))
* [Apache Maven 3.6.3](http://maven.apache.org/download.cgi)
* [Apache TomEE (Plume) 9.0.0-M3](http://tomee.apache.org/download-ng.html)

Manual Deployment

As an example, we select the *plume* version, which includes a super feature collection of Web Profile .

Extract the files from the downloaded archive into your local disk. The TomEE file structure is similar to Apache Tomcat.

To start a TomEE server, open a terminal window, enter the TomEE root folder and switch to *bin* folder, execute the following command to start a TomEE server in a separate window.

*# Windows*

startup.bat

*# or*

catalina.bat start

*# Linux like system.*

sh ./startup.sh

Or run the TomEE server in the same window by executing the following command.

*# Windows*

catalina.bat run

*# Linux like system.*

sh ./catalina.sh run

You will see the start up progress in the TomEE server console.

Using CATALINA\_BASE: "D:\appsvr\apache-tomee-plume-9.0.0-M3"

Using CATALINA\_HOME: "D:\appsvr\apache-tomee-plume-9.0.0-M3"

Using CATALINA\_TMPDIR: "D:\appsvr\apache-tomee-plume-9.0.0-M3\temp"

Using JRE\_HOME: "D:\jdk11"

Using CLASSPATH: "D:\appsvr\apache-tomee-plume-9.0.0-M3\bin\bootstrap.jar;D:\appsvr\apache-tomee-plume-9.0.0-M3\bin\tomcat-juli.jar"

Using CATALINA\_OPTS: ""

...

Execute the following command in the project root folder to build the project into a *war* package in the *target* folder.

mvn clean package

To deploy the application, just copy the *target/jakartaee9-starter-boilerplate.war* to the *[tomee install dir]/webapps* folder.

In the console window, you will see the deployment progress is started automatically.

29-Nov-2020 15:40:33.673 INFO **[**Catalina-utility-1] jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke Deploying web application archive **[**D:\appsvr\apache-tomee-plume-9.0.0-M3\webapps\jakartaee9-starter-boilerplate.war]

29-Nov-2020 15:40:33.673 INFO **[**Catalina-utility-1] org.apache.tomee.catalina.TomcatWebAppBuilder.init ------------------------- localhost -> /jakartaee9-starter-boilerplate

...

29-Nov-2020 15:40:37.955 INFO **[**Catalina-utility-1] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints REST Application: http://localhost:8080/jakartaee9-starter-boilerplate/api -> com.example.JaxrsActivator@69c1f1fe

29-Nov-2020 15:40:37.955 INFO **[**Catalina-utility-1] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints Service URI: http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting -> Pojo com.example.GreetingResource

29-Nov-2020 15:40:37.955 INFO **[**Catalina-utility-1] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints GET http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting/**{**name**}** -> Response greeting**(**String**)**

29-Nov-2020 15:40:38.003 INFO **[**Catalina-utility-1] jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke Deployment of web application archive **[**D:\appsvr\apache-tomee-plume-9.0.0-M3\webapps\jakartaee9-starter-boilerplate.war] has finished **in** **[**4,330] ms

Once it is deployed successfully, use curl command to verify the deployment result.

curl http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting/Hantsy

**{**"message":"Say Hello to Hantsy at 2020-11-29T15:44:29.252675900"**}**

To undeploy the application, just remove the **war** file from the *[tomee install dir]/webapps* folder. Wait a second, you will see the undeployment progress in the TomEE console.

To stop the running TomEE server, just send a CTRL+C signal in the TomEE console, or execute the shutdown command in another terminal window.

*# Linux like system.*

**[**tomee install dir**]**/bin/shutdown

*# Windows*

**[**tomee install dir**]**\b**in**\shutdown.bat

Using TomEE Maven Plugin

Apache TomEE provides a official maven plugin for developers to deploy and undeploy applications to TomEE server in application development stage.

Declare the tomee-maven-plugin under plugins in the *pom.xml* file.

<plugin>

<groupId>org.apache.tomee.maven</groupId>

<artifactId>tomee-maven-plugin</artifactId>

<version>${tomee-maven-plugin.version}</version>

</plugin>

Define a tomee-maven-plugin.version property to specify the version of tomee-maven-plugin to use.

<tomee-maven-plugin.version>8.0.5</tomee-maven-plugin.version>

NOTE: Currently tomee-maven-plugin does not provide a preview version for Jakarta EE 9/TomEE 9, but the stable version(8.0.5) works great with the latest TomEE 9 preview version.

By default, tomee-maven-plugin will retrieve the latest stable version to serve your application. Add the following properties in the configuration of tomee-maven-plugin to force it to use the latest TomEE 9.0.0-M3 instead.

*<!-- download and run on a managed Apache TomEE server -->*

<tomeeVersion>${tomee.version}</tomeeVersion>

<tomeeArtifactId>apache-tomee</tomeeArtifactId>

<tomeeGroupId>org.apache.tomee.jakarta</tomeeGroupId>

<tomeeClassifier>plume</tomeeClassifier>

Define a tomeeVersion to specify the TomEE version.

<tomee.version>9.0.0-M3</tomee.version>

NOTE: The tomeeGroupId is **org.apache.tomee.jakarta**, which is different from the stable version, TomEE 8.0 uses groupId **org.apache.tomee**.

OK, now run the following command to start a TomEE 9 server and deploy the applications.

mvn clean package tomee:run -Ptomee

You will see the following info in the TomEE console.

**[**INFO] --- tomee-maven-plugin:8.0.5:run **(**default-cli**)** @ jakartaee9-starter-boilerplate ---

**[**INFO] TomEE was unzipped **in** 'D:\hantsylabs\jakartaee9-starter-boilerplate\target\apache-tomee'

**[**INFO] Removed not mandatory default webapps

**[**INFO] Installed 'D:\hantsylabs\jakartaee9-starter-boilerplate\target\jakartaee9-starter-boilerplate.war' **in** D:\hantsylabs\jakartaee9-starter-boilerplate\target\apache-tomee\webapps\ja

kartaee9-starter-boilerplate.war

**[**INFO] TomEE will run **in** development mode

**[**INFO] Running 'org.apache.openejb.maven.plugin.run'. Configured TomEE **in** plugin is localhost:8080 **(**plugin shutdown port is 8005 and https port is null**)**

// ...

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke Server version name: Apache Tomcat **(**TomEE**)**/9.0.39 **(**8.0.5**)**

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke Server built: Oct 6 2020 14:11:46 UTC

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke Server version number: 9.0.39.0

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke OS Name: Windows 10

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke OS Version: 10.0

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke Architecture: amd64

29-Nov-2020 14:50:20.179 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke Java Home: D:\jdk11

29-Nov-2020 14:50:20.194 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke JVM Version: 11.0.9.1+1

29-Nov-2020 14:50:20.194 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke JVM Vendor: AdoptOpenJDK

29-Nov-2020 14:50:20.194 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke CATALINA\_BASE: D:\hantsylabs\jakartaee9-starter-boilerplate\target\apache-tomee

29-Nov-2020 14:50:20.194 INFO **[**main] jdk.internal.reflect.NativeMethodAccessorImpl.invoke CATALINA\_HOME: D:\hantsylabs\jakartaee9-starter-boilerplate\target\apache-tomee

//...

29-Nov-2020 14:50:28.371 INFO **[**main] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints REST Application: http://localhost:8080/jakartaee9-starter-boilerplate/api

-> com.example.JaxrsActivator@2ab8589a

29-Nov-2020 14:50:28.386 INFO **[**main] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints Service URI: http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting

-> Pojo com.example.GreetingResource

29-Nov-2020 14:50:28.386 INFO **[**main] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints GET http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting

/**{**name**}** -> Response greeting**(**String**)**

...

29-Nov-2020 14:50:29.325 WARNING **[**main] org.apache.catalina.util.SessionIdGeneratorBase.createSecureRandom Creation of SecureRandom instance **for** session ID generation using **[**SHA1PRNG]

took **[**829] milliseconds.

29-Nov-2020 14:50:29.341 INFO **[**main] jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke Starting ProtocolHandler **[**"http-nio-8080"**]**

29-Nov-2020 14:50:29.348 INFO **[**main] jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke Server startup **in** **[**6177] milliseconds

You can also use tomee-maven-plugin to deploy the application to a running TomEE server, esp. running on a remote server.

Open the *[tomee install dir]/conf/tomcat-users.xml* file, uncomment the following the configuration.

*<!-- Activate those lines to get access to TomEE GUI if added (tomee-webaccess) -->*

<role rolename="tomee-admin" />

<user username="tomee" password="tomee" roles="tomee-admin,manager-gui" />

Open the *[tomee install dir]/conf/system.properties* file, uncomment and modify the following items.

tomee.remote.support = true

tomee.serialization.class.blacklist = -

tomee.serialization.class.whitelist = com.example.

openejb.system.apps = true

openejb.servicemanager.enabled = true

Let’s return to the project *pom.xml* file, replace the former tomee-maven-plugin configuration with the following.

<configuration>

<tomeeHost>localhost</tomeeHost>

<user>tomee</user>

<password>tomee</password>

<path>${project.build.directory}/${project.build.finalName}.war</path>

</configuration>

Make sure the TomEE server is running, run the following command in the project root folder.

mvn clean package tomee:deploy -Ptomee

You can view the deployment progress info in the TomEE console.

...

29-Nov-2020 16:56:23.550 INFO **[**http-nio-8080-exec-8] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints REST Application: http://localhost:8080/jakartaee9-starter-boilerplate/api -> com.example.JaxrsActivator@affb16f

29-Nov-2020 16:56:23.550 INFO **[**http-nio-8080-exec-8] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints Service URI: http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting -> Pojo com.example.GreetingResource

29-Nov-2020 16:56:23.550 INFO **[**http-nio-8080-exec-8] org.apache.openejb.server.cxf.rs.CxfRsHttpListener.logEndpoints GET http://localhost:8080/jakartaee9-starter-boilerplate/api/greeting/**{**name**}** -> Response greeting**(**String**)**

To undeploy the application, execute the following command.

mvn tomee:undeploy -Ptomee