

Component-based Software Development

**Introduction to Computing Platform
Java, Tomcat, Eclipse, JPA
configurations**

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SWE 645
George Mason University**

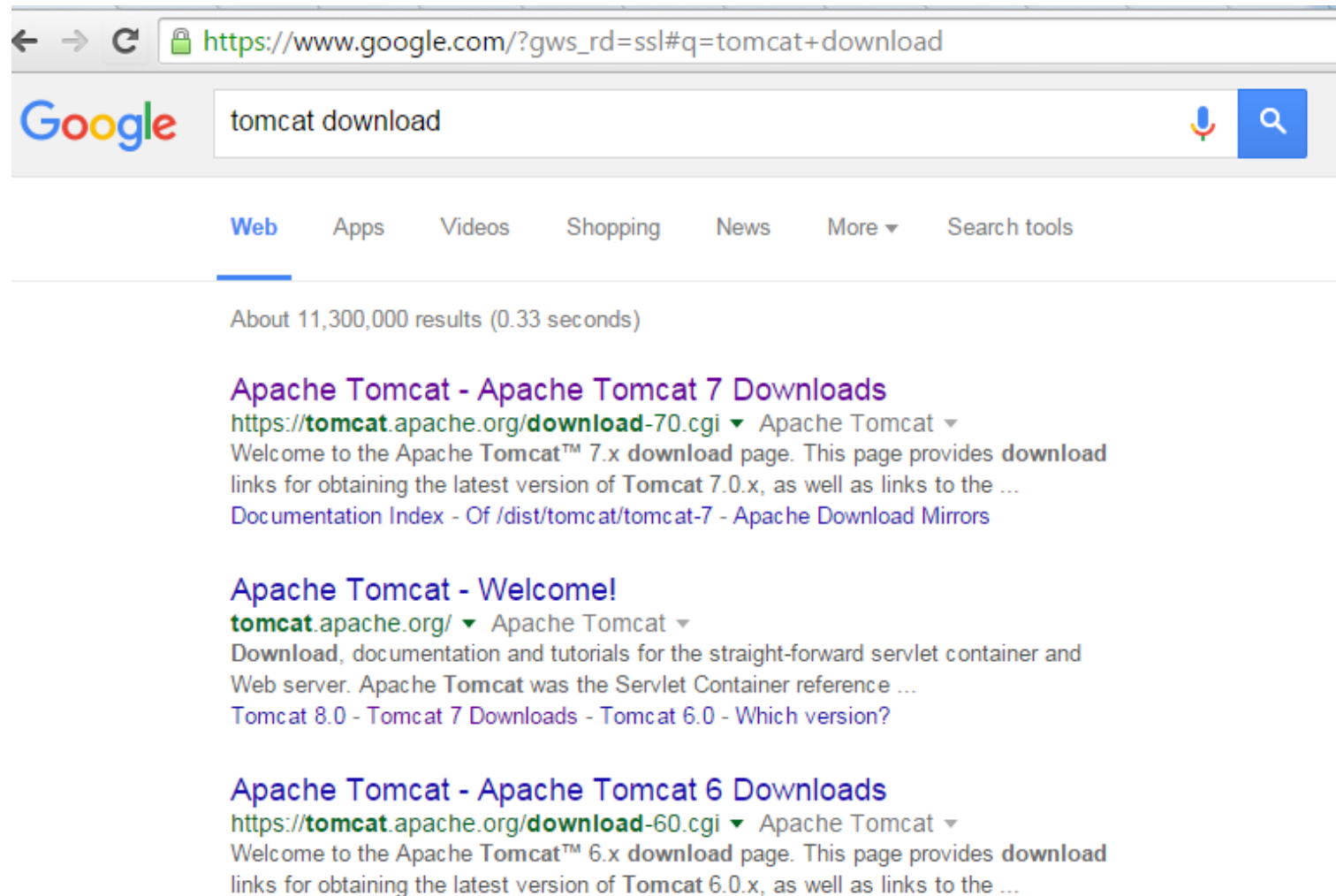
JDK: Installation and Setup

Download and Install JDK1.7


- **Tomcat or JBoss requires JVM environment**
 - The first mandatory requirement is to install a JDK 1.7 environment where Tomcat or JBoss will run
 - **The Java SE download site can be found at**
<http://www.oracle.com/technetwork/java/javase/downloads/index.html>
- **Set up the JAVA_HOME environment variable that points to path of your JDK installation**
 - For example: `JAVA_HOME=c:\Java\jdk1.7`

Tomcat: Installation and Setup

Tomcat 7 Download and Installation



Tomcat 7 Download and Installation



Apache Tomcat

Home
Taglibs
Maven Plugin

Download


Which version?
Tomcat 8.0
Tomcat 7.0
Tomcat 6.0
Tomcat Connectors
Tomcat Native
Taglibs
Archives

Documentation

Tomcat 8.0
Tomcat 7.0
Tomcat 6.0
Tomcat Connectors
Tomcat Native
Wiki
Migration Guide

Problems?

Security Reports
Find help
FAQ



Tomcat 7 Downloads

Welcome to the Apache Tomcat™ 7.x download page. This page provides download links for obtaining the latest version of Tomcat 7.0.x, as well as links to the archives of older releases.

Quick Navigation

[KEYS](#) | [7.0.64](#) | [Browse](#) | [Archives](#)

Release Integrity

You **must** [verify](#) the integrity of the downloaded files. We provide OpenPGP signatures for every release file. This signature should be matched against the [KEYS](#) file which contains the OpenPGP keys of Tomcat's Release Managers. We also provide [MD5](#) and [SHA-1](#) checksums for every release file. After you download the file, you should calculate a checksum for your download, and make sure it is the same as ours.

Mirrors

You are currently using <http://www.eu.apache.org/dist/>. If you encounter a problem with this mirror, please select another mirror. If all mirrors are failing, there are *backup* mirrors (at the end of the mirrors list) that should be available.

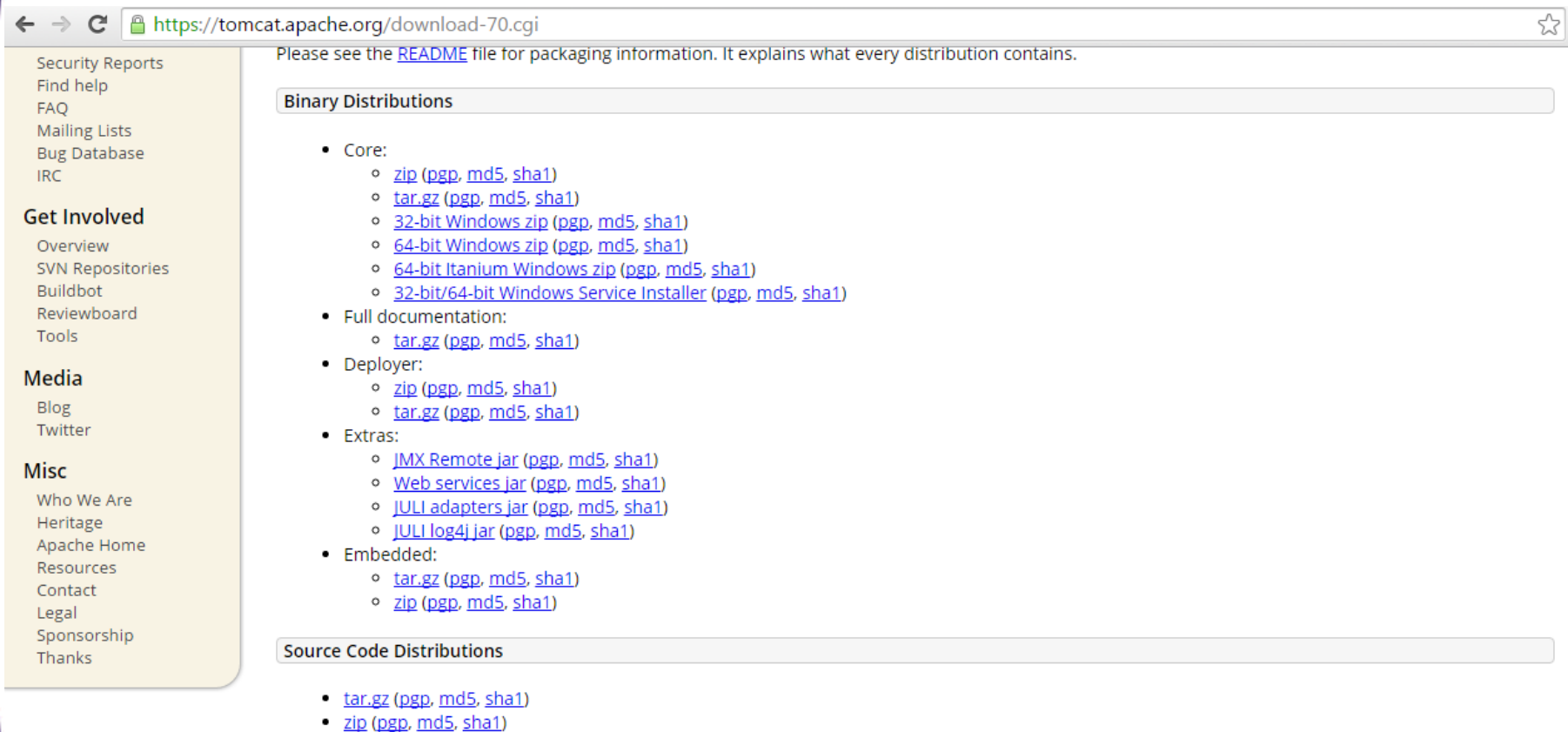
Other mirrors:

7.0.64

Please see the [README](#) file for packaging information. It explains what every distribution contains.

Binary Distributions

Tomcat 7 Download and Installation

A screenshot of the Apache Tomcat 7.0 download page. The browser address bar shows 'https://tomcat.apache.org/download-70.cgi'. The page has a left sidebar with navigation links and a main content area with download instructions and links.

← → ↻ <https://tomcat.apache.org/download-70.cgi> ☆

Please see the [README](#) file for packaging information. It explains what every distribution contains.

Binary Distributions

- Core:
 - [zip \(pgp, md5, sha1\)](#)
 - [tar.gz \(pgp, md5, sha1\)](#)
 - [32-bit Windows zip \(pgp, md5, sha1\)](#)
 - [64-bit Windows zip \(pgp, md5, sha1\)](#)
 - [64-bit Itanium Windows zip \(pgp, md5, sha1\)](#)
 - [32-bit/64-bit Windows Service Installer \(pgp, md5, sha1\)](#)
- Full documentation:
 - [tar.gz \(pgp, md5, sha1\)](#)
- Deployer:
 - [zip \(pgp, md5, sha1\)](#)
 - [tar.gz \(pgp, md5, sha1\)](#)
- Extras:
 - [JMX Remote jar \(pgp, md5, sha1\)](#)
 - [Web services jar \(pgp, md5, sha1\)](#)
 - [JULI adapters jar \(pgp, md5, sha1\)](#)
 - [JULI log4j jar \(pgp, md5, sha1\)](#)
- Embedded:
 - [tar.gz \(pgp, md5, sha1\)](#)
 - [zip \(pgp, md5, sha1\)](#)

Source Code Distributions

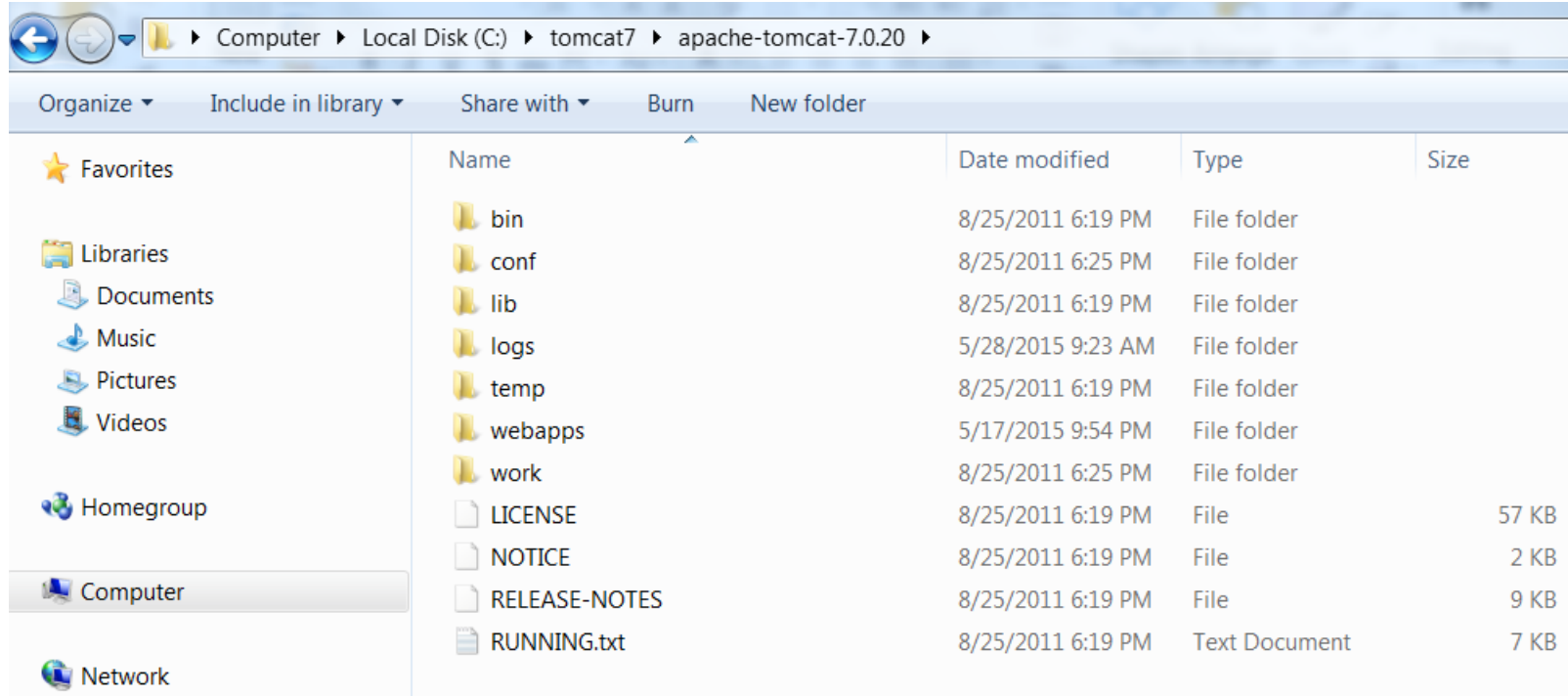
- [tar.gz \(pgp, md5, sha1\)](#)
- [zip \(pgp, md5, sha1\)](#)

Left Sidebar:

- Security Reports
- Find help
- FAQ
- Mailing Lists
- Bug Database
- IRC
- Get Involved**
- Overview
- SVN Repositories
- Buildbot
- Reviewboard
- Tools
- Media**
- Blog
- Twitter
- Misc**
- Who We Are
- Heritage
- Apache Home
- Resources
- Contact
- Legal
- Sponsorship
- Thanks

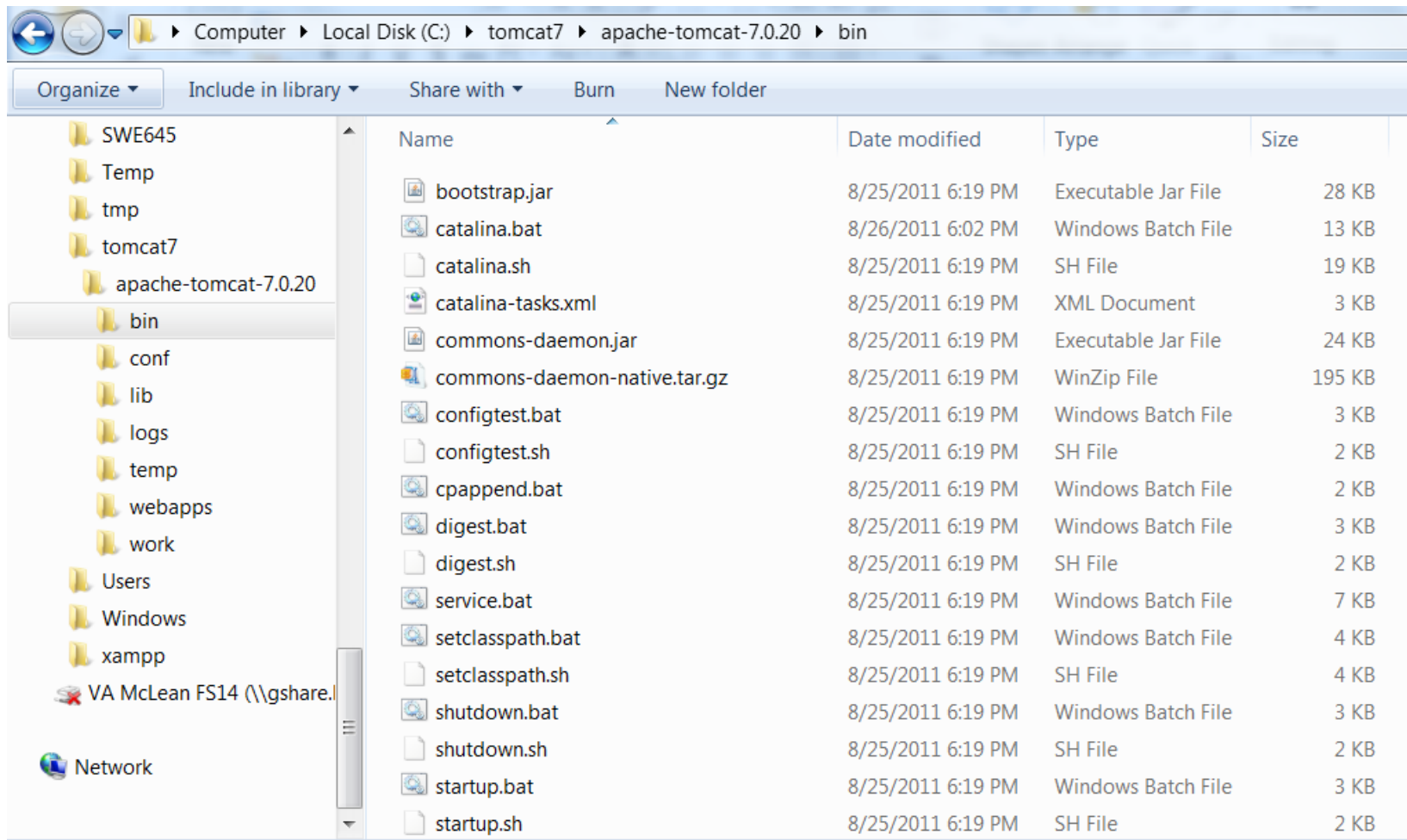
Download and save the zip file (32 bit or 64 bit version depending on your O/S)

Tomcat 7 Download and Installation



Unzip/extract the downloaded zip file

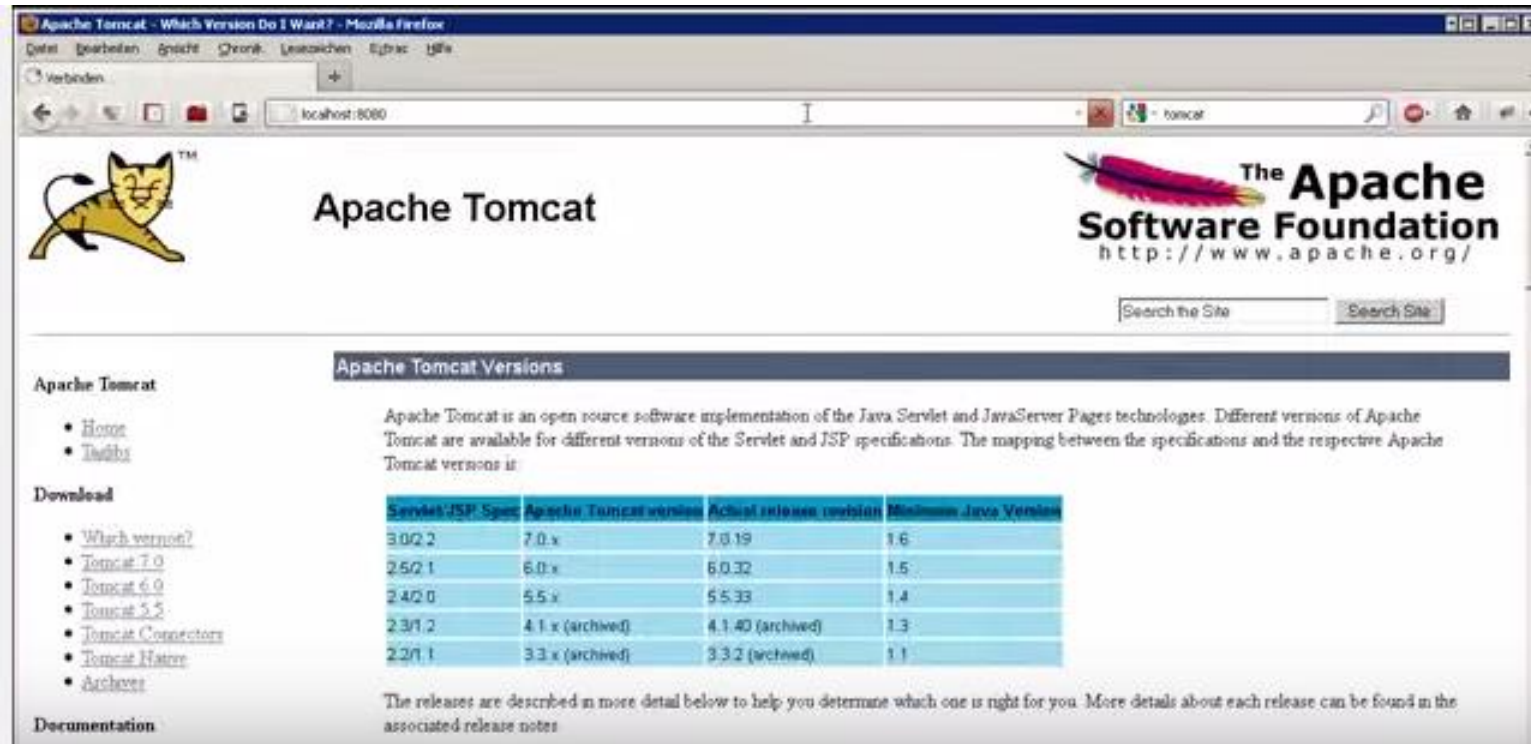
Tomcat 7 Download and Installation



Name	Date modified	Type	Size
bootstrap.jar	8/25/2011 6:19 PM	Executable Jar File	28 KB
catalina.bat	8/26/2011 6:02 PM	Windows Batch File	13 KB
catalina.sh	8/25/2011 6:19 PM	SH File	19 KB
catalina-tasks.xml	8/25/2011 6:19 PM	XML Document	3 KB
commons-daemon.jar	8/25/2011 6:19 PM	Executable Jar File	24 KB
commons-daemon-native.tar.gz	8/25/2011 6:19 PM	WinZip File	195 KB
configtest.bat	8/25/2011 6:19 PM	Windows Batch File	3 KB
configtest.sh	8/25/2011 6:19 PM	SH File	2 KB
cpappend.bat	8/25/2011 6:19 PM	Windows Batch File	2 KB
digest.bat	8/25/2011 6:19 PM	Windows Batch File	3 KB
digest.sh	8/25/2011 6:19 PM	SH File	2 KB
service.bat	8/25/2011 6:19 PM	Windows Batch File	7 KB
setclasspath.bat	8/25/2011 6:19 PM	Windows Batch File	4 KB
setclasspath.sh	8/25/2011 6:19 PM	SH File	4 KB
shutdown.bat	8/25/2011 6:19 PM	Windows Batch File	3 KB
shutdown.sh	8/25/2011 6:19 PM	SH File	2 KB
startup.bat	8/25/2011 6:19 PM	Windows Batch File	3 KB
startup.sh	8/25/2011 6:19 PM	SH File	2 KB

**Bin directory contains
startup/shutdown scripts**

Download and Install Tomcat



Apache Tomcat

The Apache Software Foundation
<http://www.apache.org/>

Search the Site

Apache Tomcat Versions

Apache Tomcat is an open source software implementation of the Java Servlet and JavaServer Pages technologies. Different versions of Apache Tomcat are available for different versions of the Servlet and JSP specifications. The mapping between the specifications and the respective Apache Tomcat versions is:

Servlet/JSP Spec	Apache Tomcat version	Actual release version	Minimum Java Version
3.0/2.2	7.0.x	7.0.19	1.6
2.5/2.1	6.0.x	6.0.32	1.5
2.4/2.0	5.5.x	5.5.33	1.4
2.3/1.2	4.1.x (archived)	4.1.40 (archived)	1.3
2.2/1.1	3.3.x (archived)	3.3.2 (archived)	1.1

The releases are described in more detail below to help you determine which one is right for you. More details about each release can be found in the associated release notes.

Apache Tomcat

- [Home](#)
- [Downloads](#)

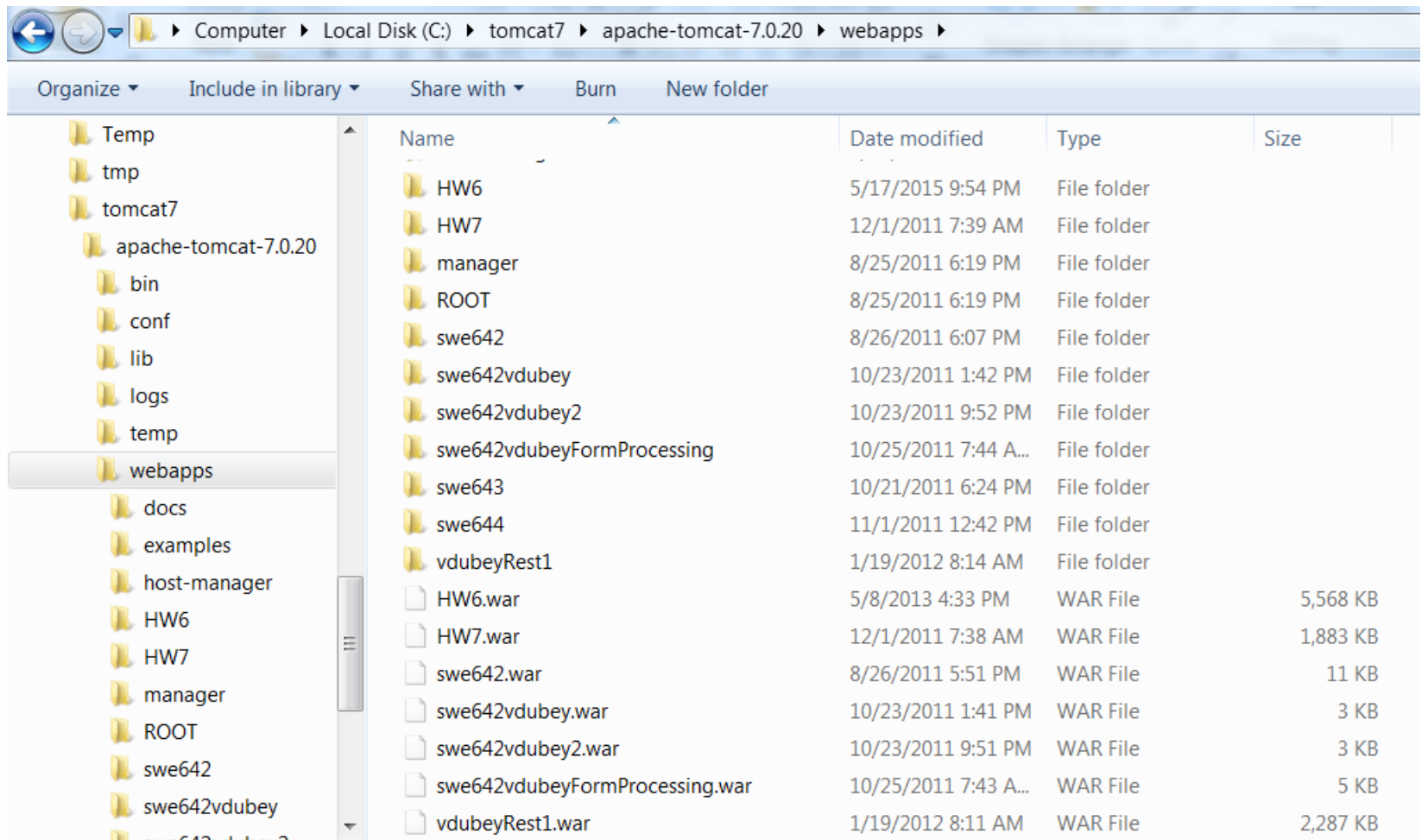
Download

- [Which version?](#)
- [Tomcat 7.0](#)
- [Tomcat 6.0](#)
- [Tomcat 5.5](#)
- [Tomcat Connectors](#)
- [Tomcat Native](#)
- [Archives](#)

Documentation

Once started, tomcat will be up and running at <http://localhost:8080>

Tomcat 7 Download and Installation



webapps folder is used for deploying war files

Eclipse: Installation and Setup

Installing and configuring Eclipse environment

- Download the latest **Enterprise Edition** of **Eclipse IDE** from <http://www.eclipse.org>



Eclipse IDE for Java EE Developers, 221 MB

Downloaded 1,811,337 Times

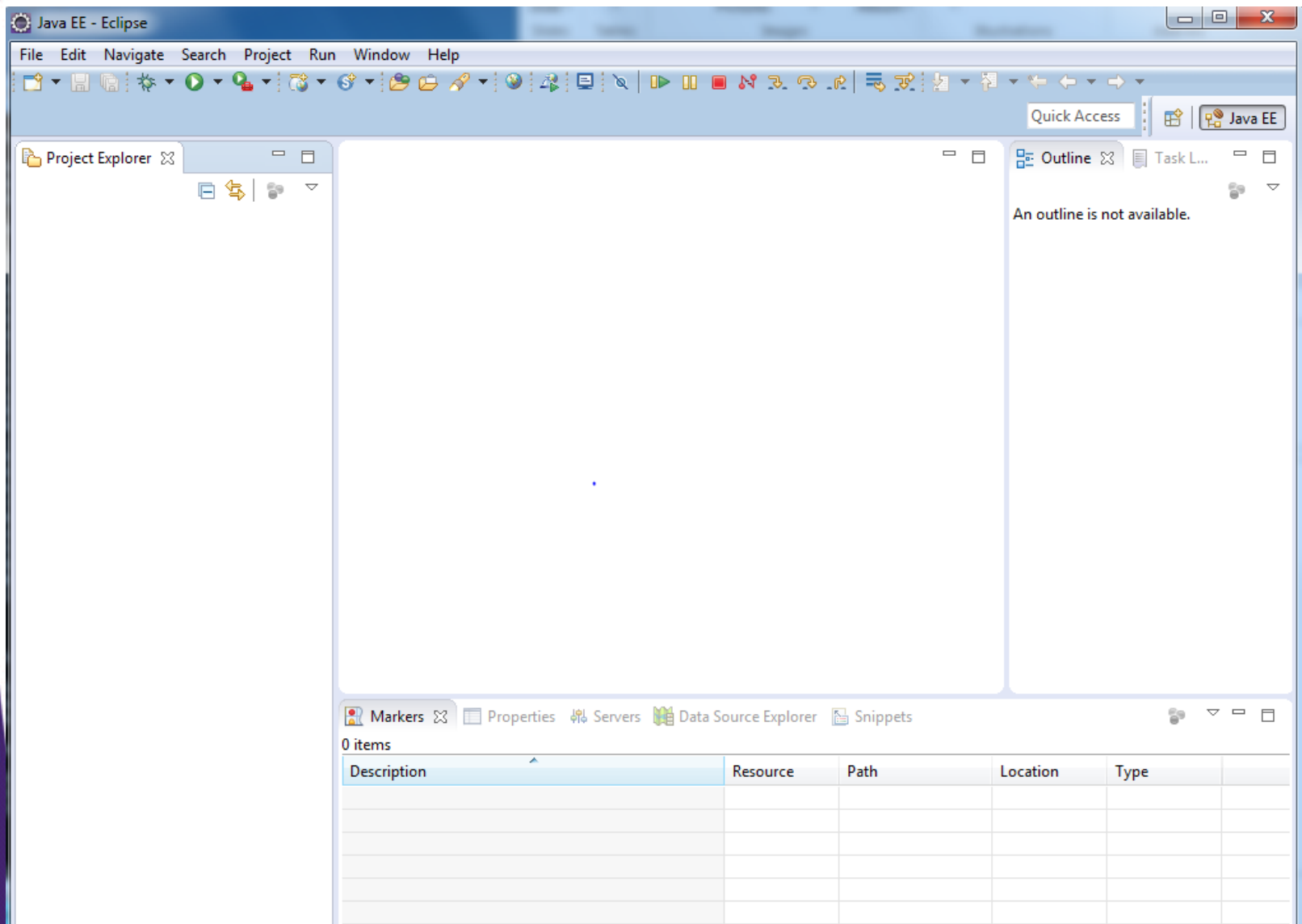
[Details](#)



Windows 32 Bit

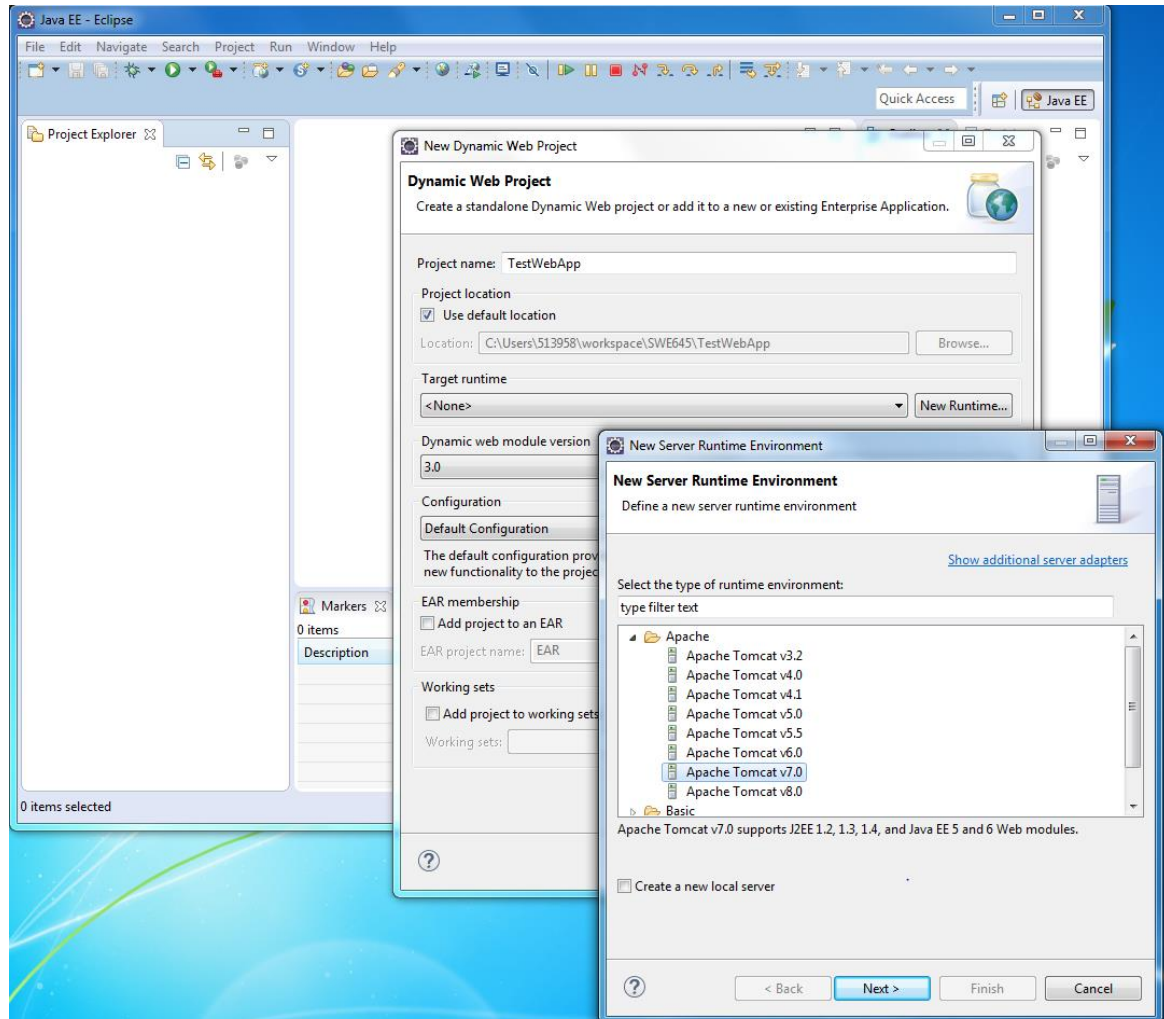
Windows 64 Bit

Open the Eclipse IDE



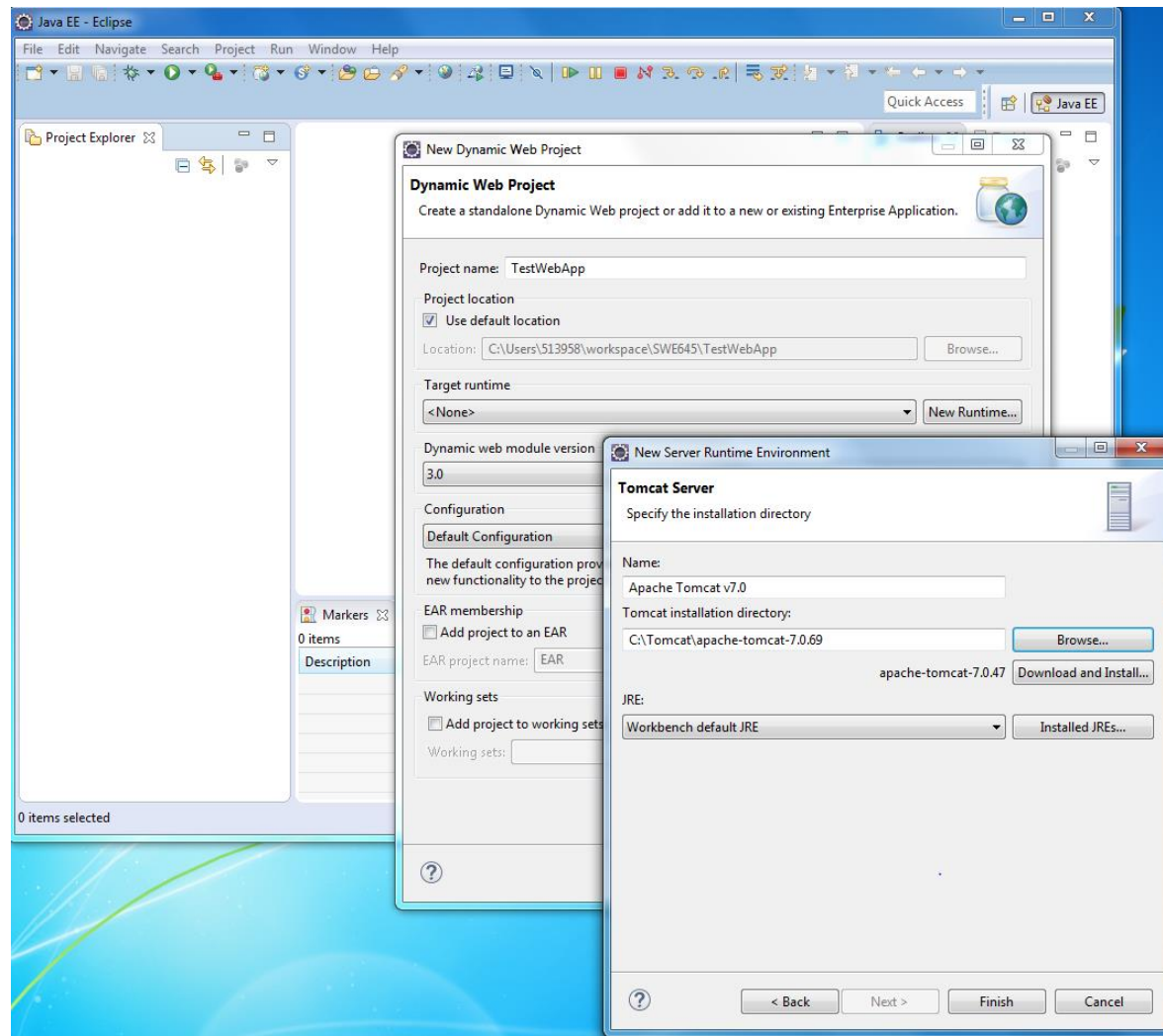
Created a Dynamic Web Project

- **File -> New -> Dynamic Web Project**



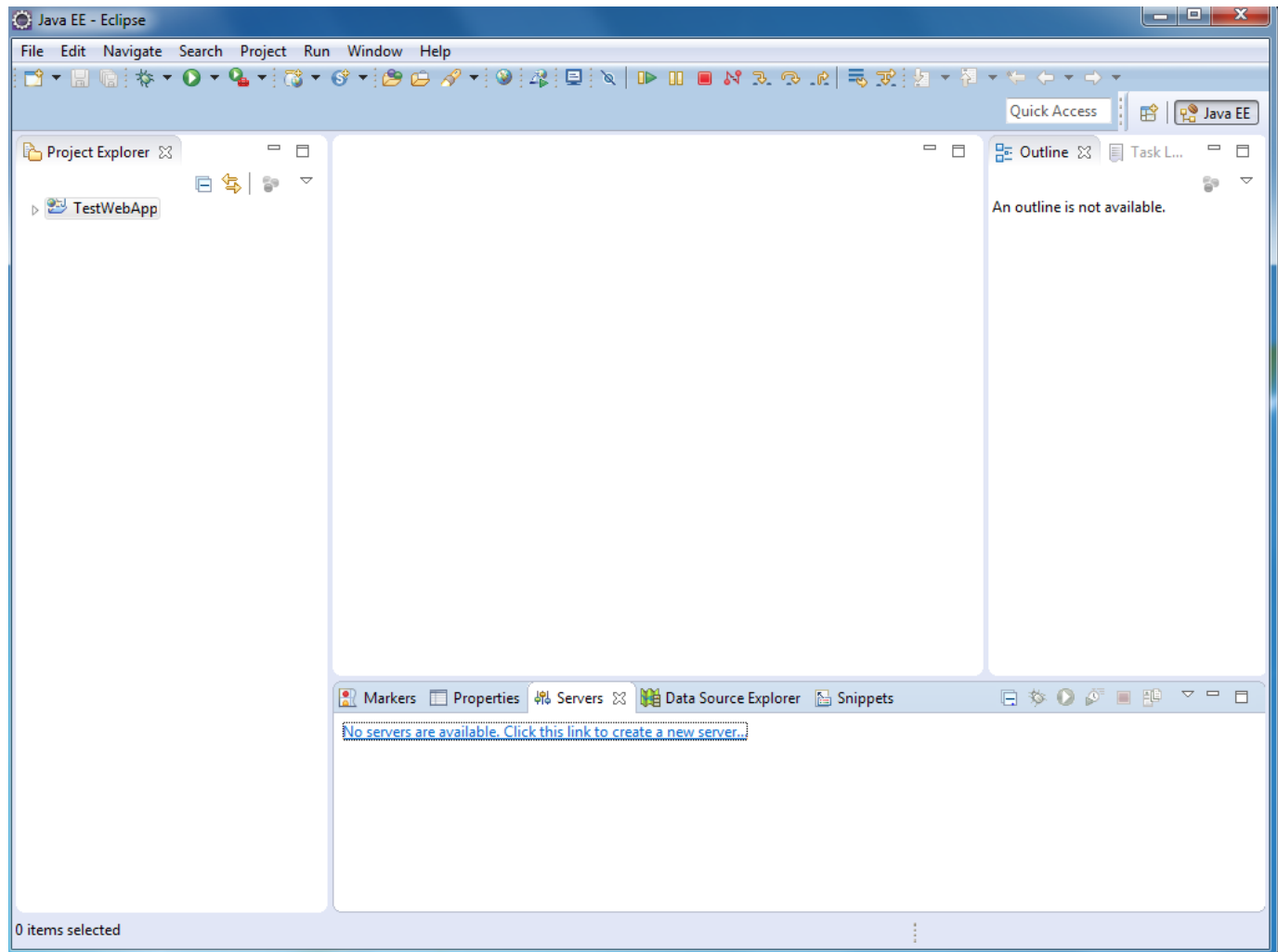
For the Target runtime, select Tomcat

- Browse to point to the Tomcat installation directory



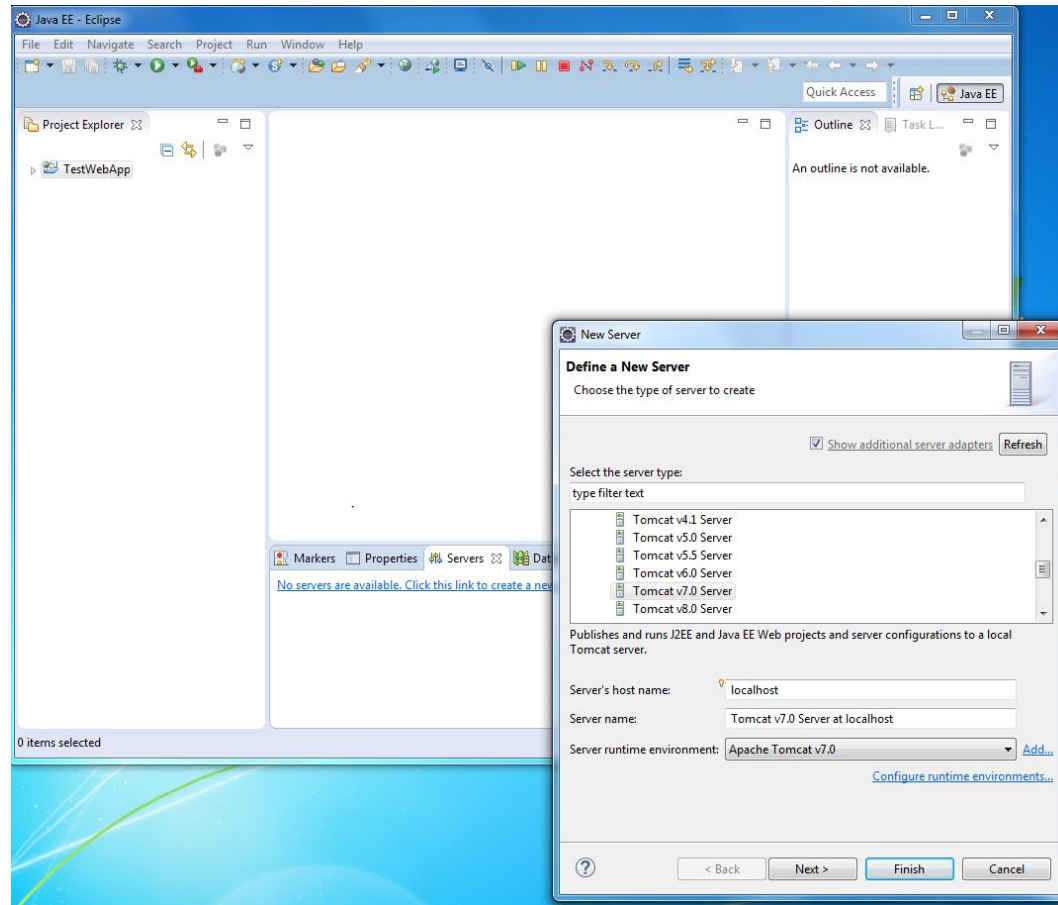
Configure Tomcat in Eclipse

- Initially there is nothing under the Servers tab

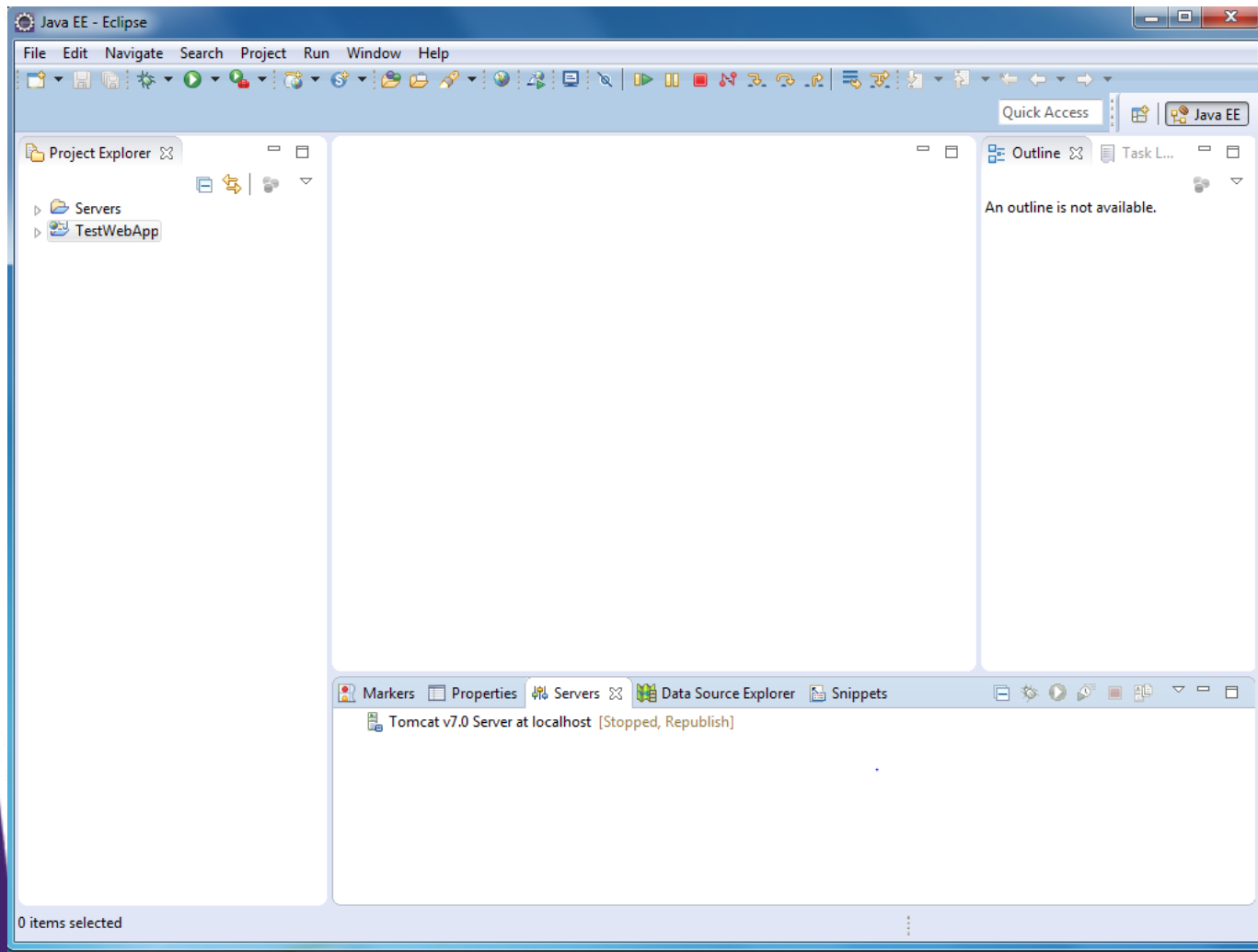


Configure Tomcat in Eclipse

- R-click in the space under Servers tab and select New to define new server – select Tomcat

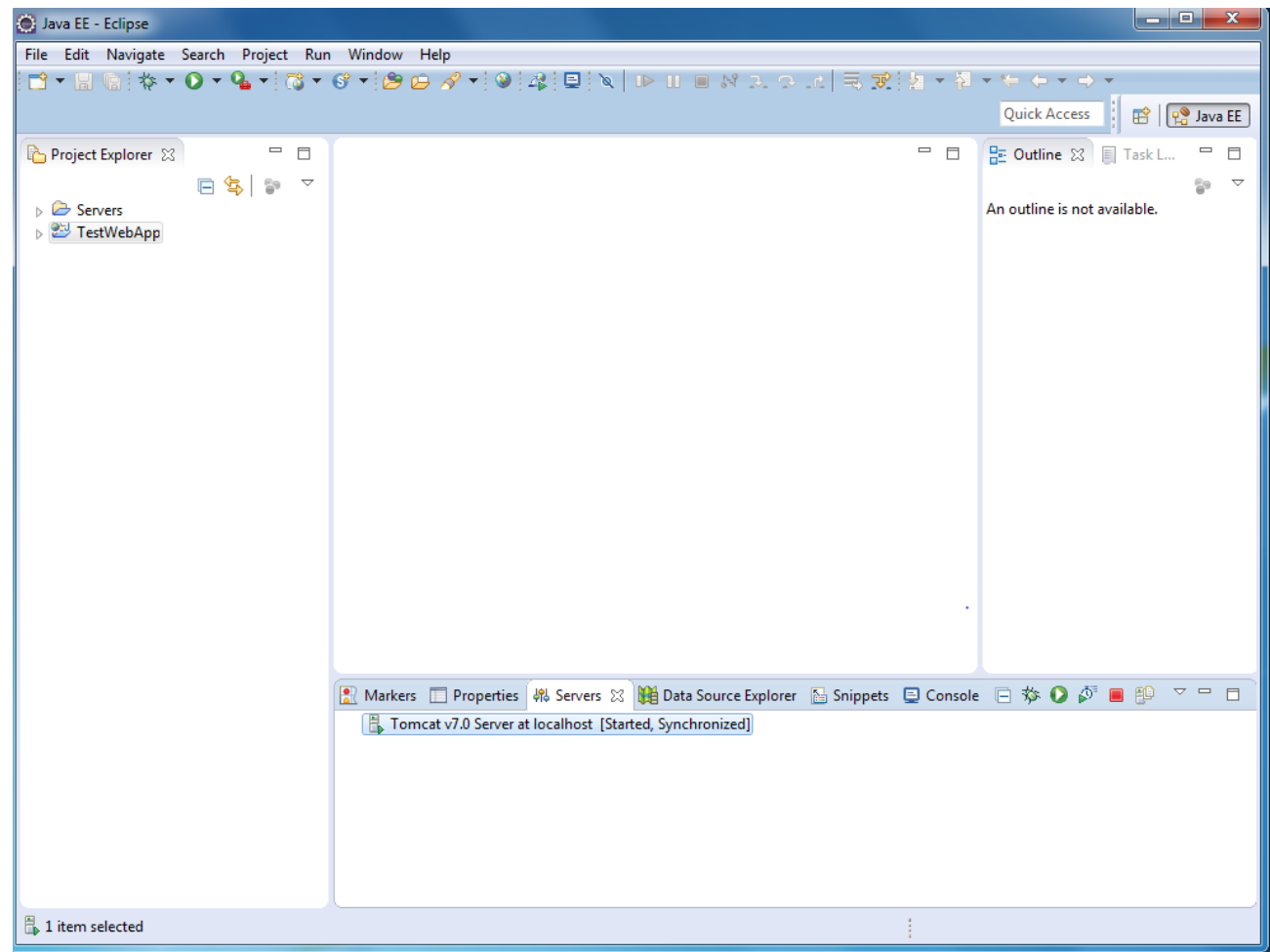


Configure Tomcat in Eclipse



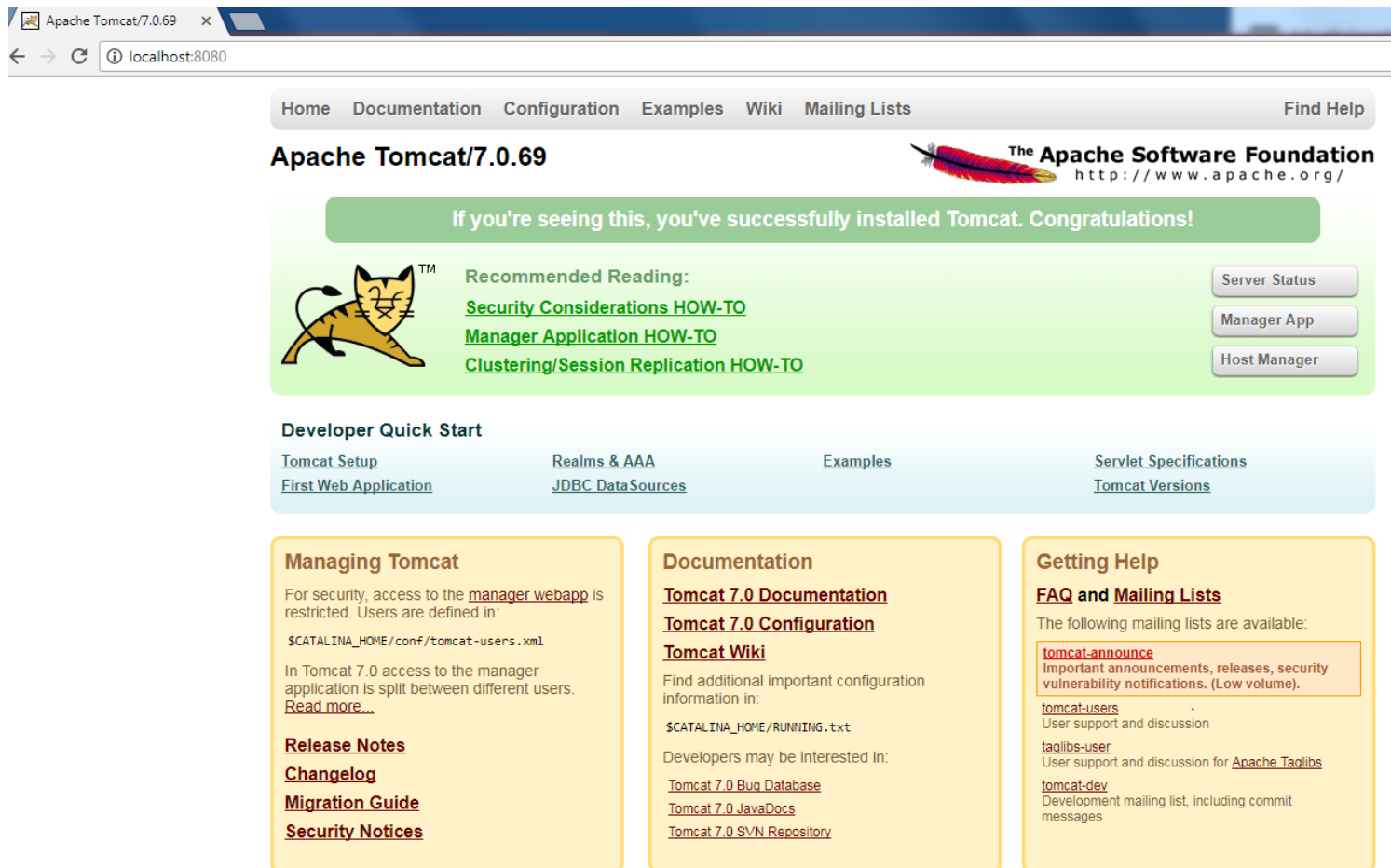
Start the Tomcat

- R-click on the Tomcat server and select Start



Access Tomcat homepage

- Once the server is running, you can access the homepage at localhost:8080




The screenshot shows a web browser window with the title "Apache Tomcat/7.0.69". The address bar shows "localhost:8080". The page has a navigation bar with links: Home, Documentation, Configuration, Examples, Wiki, Mailing Lists, and Find Help. The main heading is "Apache Tomcat/7.0.69" next to the Apache Software Foundation logo and URL "http://www.apache.org/". A green banner says "If you're seeing this, you've successfully installed Tomcat. Congratulations!". Below this is a section for "Recommended Reading" with links to "Security Considerations HOW-TO", "Manager Application HOW-TO", and "Clustering/Session Replication HOW-TO". To the right of these links are buttons for "Server Status", "Manager App", and "Host Manager". A "Developer Quick Start" section contains links for "Tomcat Setup", "First Web Application", "Realms & AAA", "JDBC DataSources", "Examples", "Servlet Specifications", and "Tomcat Versions". At the bottom, there are three yellow boxes: "Managing Tomcat" (with links for Release Notes, Changelog, Migration Guide, Security Notices), "Documentation" (with links for Tomcat 7.0 Documentation, Tomcat 7.0 Configuration, Tomcat Wiki, and various repositories), and "Getting Help" (with links for FAQ and Mailing Lists, and a list of mailing lists including tomcat-announce, tomcat-users, taglibs-user, tomcat-dev).

Apache Tomcat/7.0.69

Home Documentation Configuration Examples Wiki Mailing Lists Find Help

Apache Tomcat/7.0.69 The Apache Software Foundation <http://www.apache.org/>

If you're seeing this, you've successfully installed Tomcat. Congratulations!

 Recommended Reading:

- [Security Considerations HOW-TO](#)
- [Manager Application HOW-TO](#)
- [Clustering/Session Replication HOW-TO](#)

Server Status
Manager App
Host Manager

Developer Quick Start

- [Tomcat Setup](#)
- [First Web Application](#)
- [Realms & AAA](#)
- [JDBC DataSources](#)
- [Examples](#)
- [Servlet Specifications](#)
- [Tomcat Versions](#)

Managing Tomcat

For security, access to the [manager webapp](#) is restricted. Users are defined in:

```
$CATALINA_HOME/conf/tomcat-users.xml
```

In Tomcat 7.0 access to the manager application is split between different users.
[Read more...](#)

[Release Notes](#)
[Changelog](#)
[Migration Guide](#)
[Security Notices](#)

Documentation

[Tomcat 7.0 Documentation](#)
[Tomcat 7.0 Configuration](#)
[Tomcat Wiki](#)

Find additional important configuration information in:

```
$CATALINA_HOME/RUNNING.txt
```

Developers may be interested in:

- [Tomcat 7.0 Bug Database](#)
- [Tomcat 7.0 JavaDocs](#)
- [Tomcat 7.0 SVN Repository](#)

Getting Help

[FAQ and Mailing Lists](#)

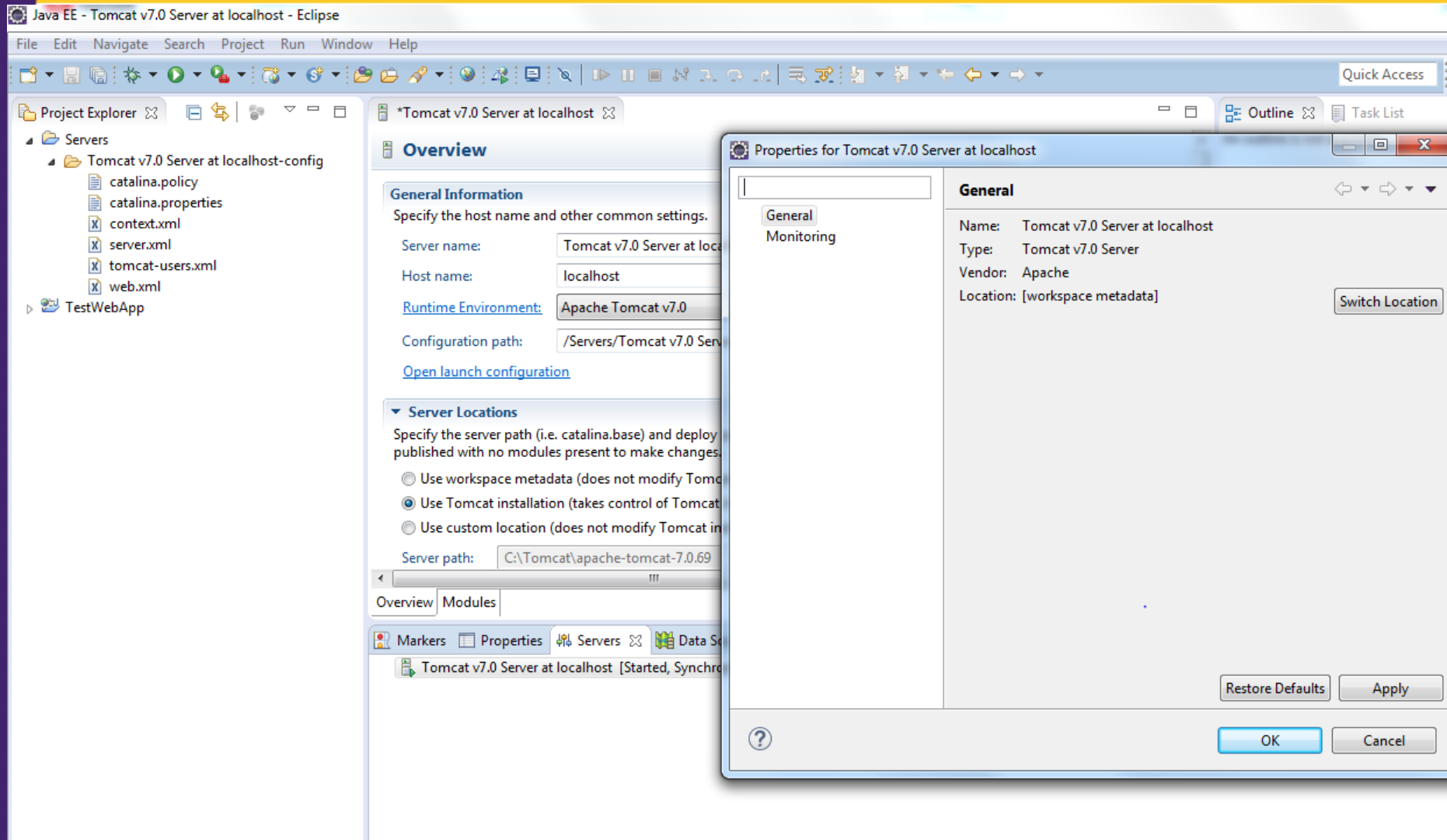
The following mailing lists are available:

- [tomcat-announce](#)
Important announcements, releases, security vulnerability notifications. (Low volume).
- [tomcat-users](#)
User support and discussion
- [taglibs-user](#)
User support and discussion for [Apache Taglibs](#)
- [tomcat-dev](#)
Development mailing list, including commit messages

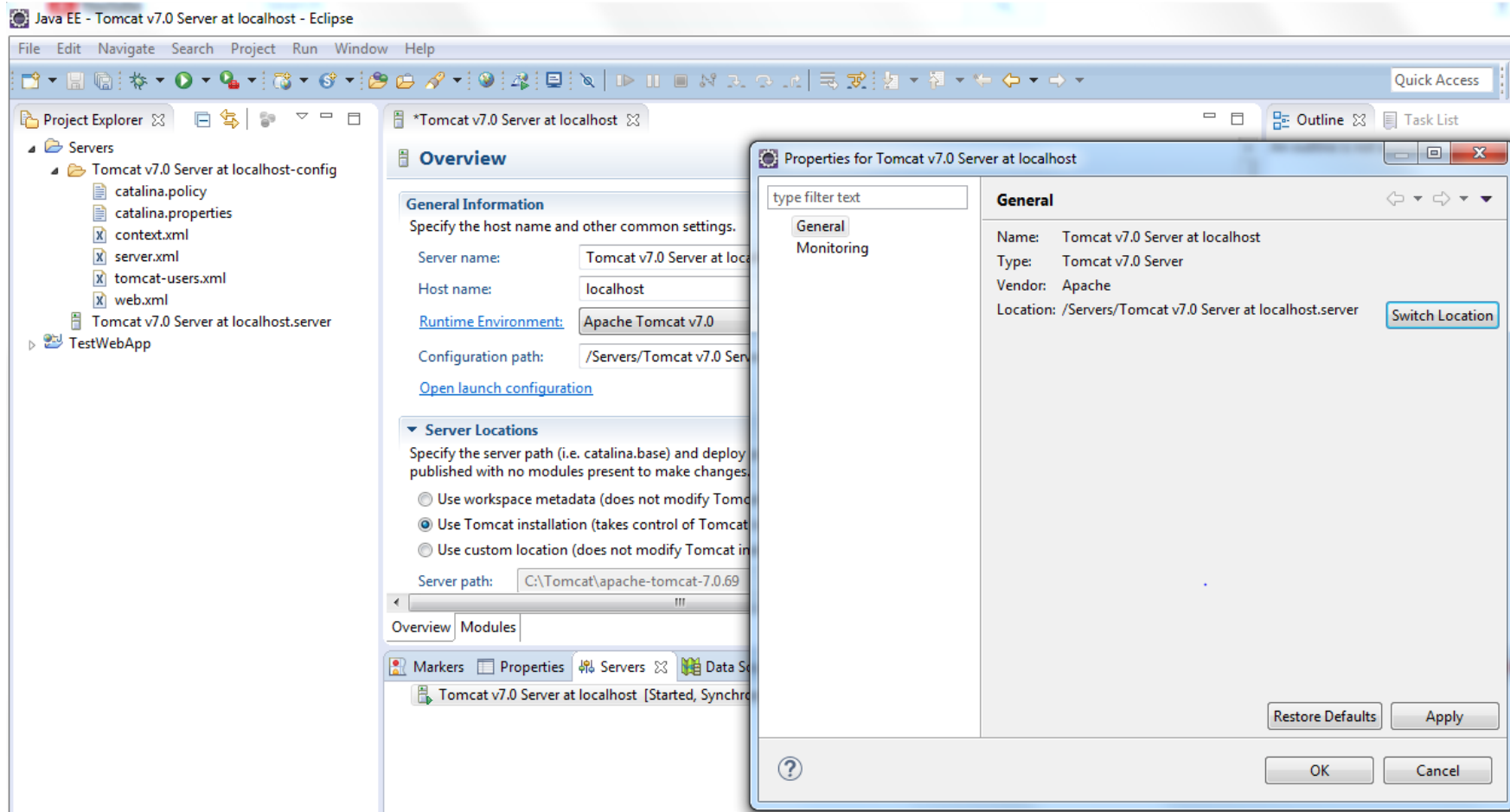
Trouble shooting steps

- **If you don't see the Server tab in the bottom portion of the Eclipse IDE, do the following:**
 - Window-> Show View -> Other -> Servers
- **Once the server is started, you can test by going to localhost:8080**
- **If you get HTTP Status 404 – page not found error, do the following two things:**
 - R-click on the Tomcat v7.0 Server and select Properties, and press the button “Switch Location” so that the Location is changed from “Workspace Metadata” to “/Servers/Tomcat Server v7.0 at localhost server [STEP 1]
 - Double click on the Tomcat v7.0 Server and for the server location make sure use select radio button for “Use Tomcat Installation” and NOT the “Use workspace metadata” [STEP 2]
 - Now Save the changes or try deleting the page with newly selected radio button option, it will ask you to save the settings, if so, select Yes
 - Restart the server and now you should be able to see the tomcat startup page at localhost:8080
- **Now create a Dynamic Web Project (make sure checkbox for the deployment descriptor file is checked), and create a default welcome page index.html (in Web Content folder) as listed in web.xml**
- **To deploy this project on tomcat server, R-click on the project name -> Run As -> Run on server; select the Tomcat server (already configured/selected), go to Next, make sure your Dynamic Web Project is in the Configured box on the right hand side, select Finish, then select OK to Restart Server.**
 - Now, in your browser, you can go to your localhost:8080/TestWebApp where the TestWebApp is your project name. This should render the content of the index.html

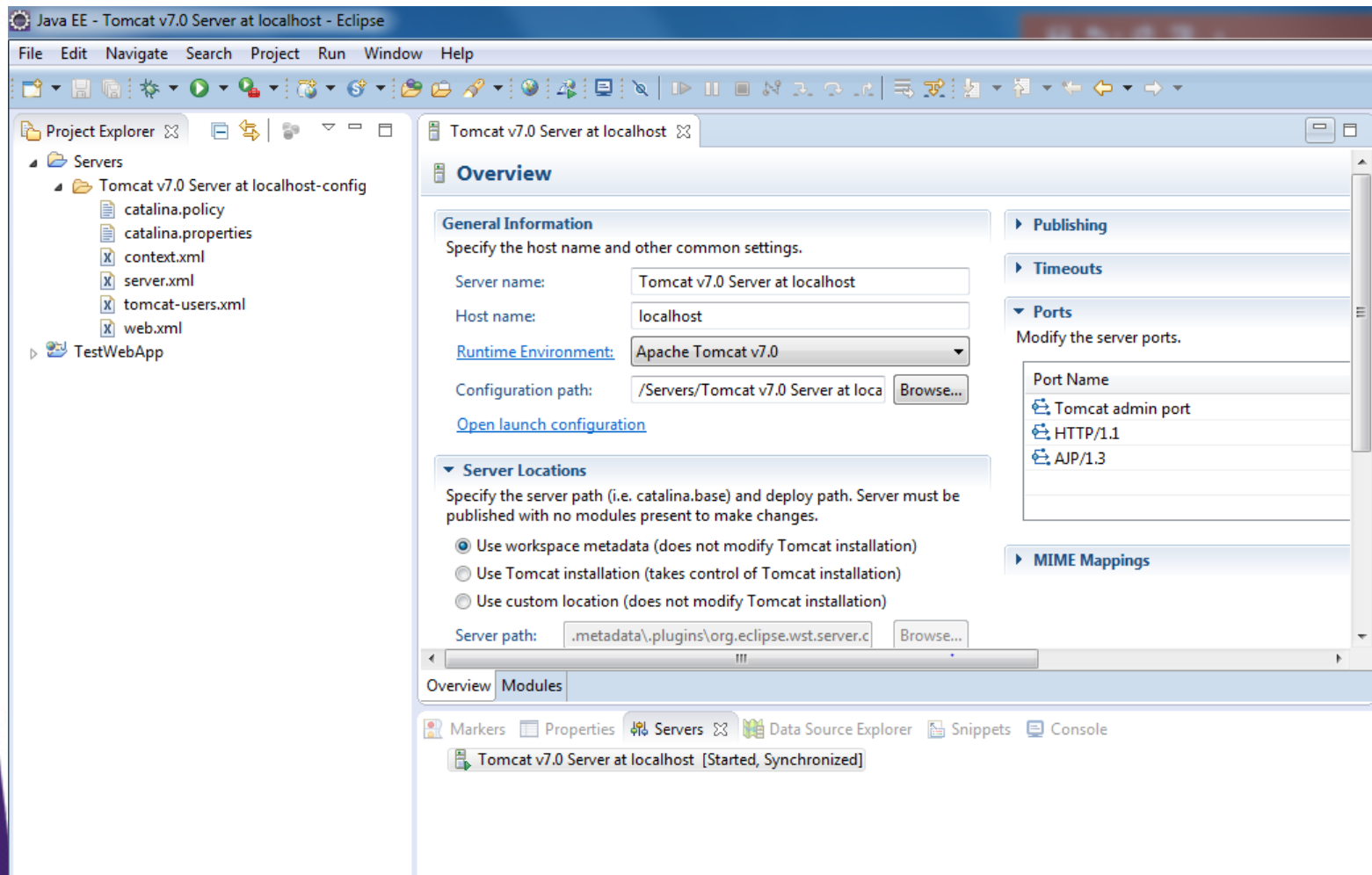
STEP 1



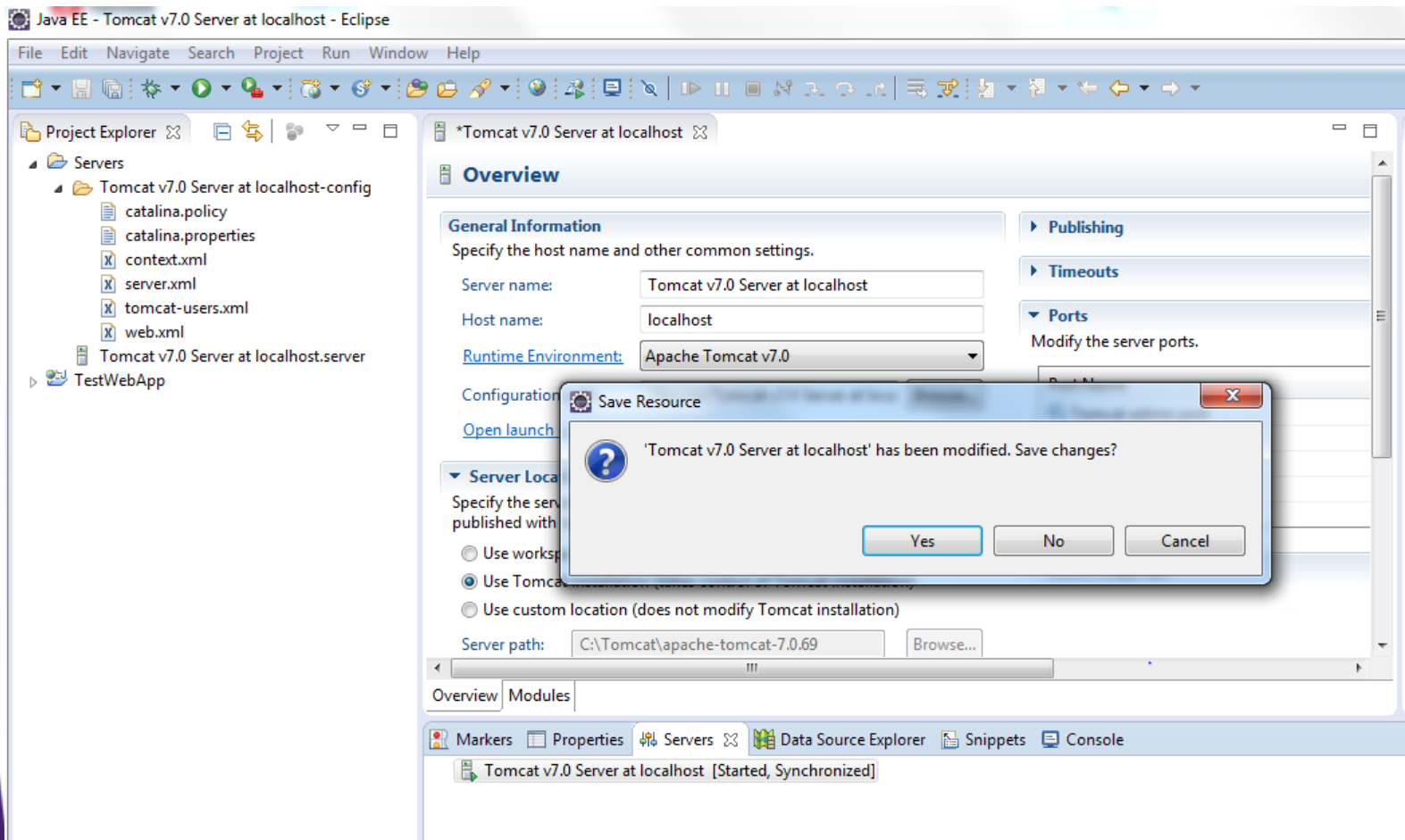
STEP 1



STEP 2



STEP 2

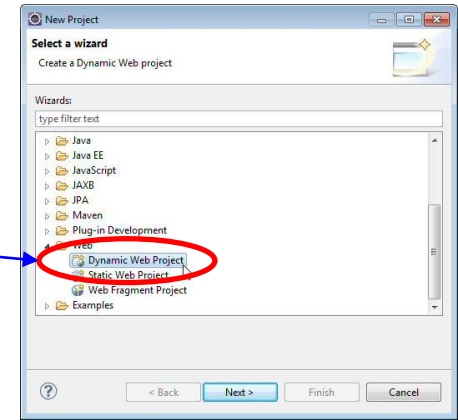


Dynamic Web Projects

- **Dynamic Web Projects**
 - Purpose
 - Servlets, JSP, JSF, Struts, and other Web apps.
 - Creating
 - File, New, Dynamic Web Project

Making Dynamic Web Project in Eclipse

- **Create project**
 - File → New → Project → Web → Dynamic Web Project
 - Next time, you can do File → New → Dynamic Web Project



JPA Configuration With Hibernate

JPA Providers

- **Hibernate**

- To use hibernate, please Download hibernate (zip file) www.hibernate.org/downloads and jar files to project build path/classpath and add them to lib folder of your application
- On download page, click on release bundle, e.g., 3.6.4.....zip and, which has
 - has lib folder which has jars needed by hibernate
 - You will need all jars in [lib/jpa](#) and [lib/required](#) folders
- Also, download JDBC driver (of database choice) and add it to your project's java build path
 - This configures hibernate to use JDBC driver (jar) to connect to database

JPA Providers

hibernate.org/orm/downloads/



ORM Search Validator OGM Tools Others

Blog Community Follow Us



Hibernate ORM Downloads

About

Downloads

Docs (5.1)

Docs (5.0)

Docs (4.3)

Docs (4.2)

Tooling

Envers

Paid support

Get Certified

FAQ

Roadmap

Contribute

Wiki

Issues

Security issue

Forum

Source code

CI

stable 5.1.0.Final

Interested in commercial support? Check out Red Hat's offering.

Releases

5.1.0.Final



2016-02-10

stable

Maven gav: org.hibernate:hibernate-core:5.1.0.Final

Entity joins, load-by-multiple-ids, association traversal in AuditQuery

[More on this release](#)

5.0.9.Final



2016-03-14

stable

Maven gav: org.hibernate:hibernate-core:5.0.9.Final

Improved bootstrapping, hibernate-java8, hibernate-spatial, Karaf support

[More on this release](#)

4.3.11.Final



2015-08-05

stable

Maven gav: org.hibernate:hibernate-core:4.3.11.Final

JPA 2.1 support

[More on this release](#)

Adding Hibernate/JPA jars to your classpath in eclipse

- Unzip the downloaded file. Your jars are inside lib folder, specifically inside **lib/required** and **lib/jpa**

Documents library
hibernate-release-5.1.0.Final

Name

Documents library
lib

Name

optional
envers
java8
jpa
jpa-metamodel-generator
osgi
required

Documents library
required

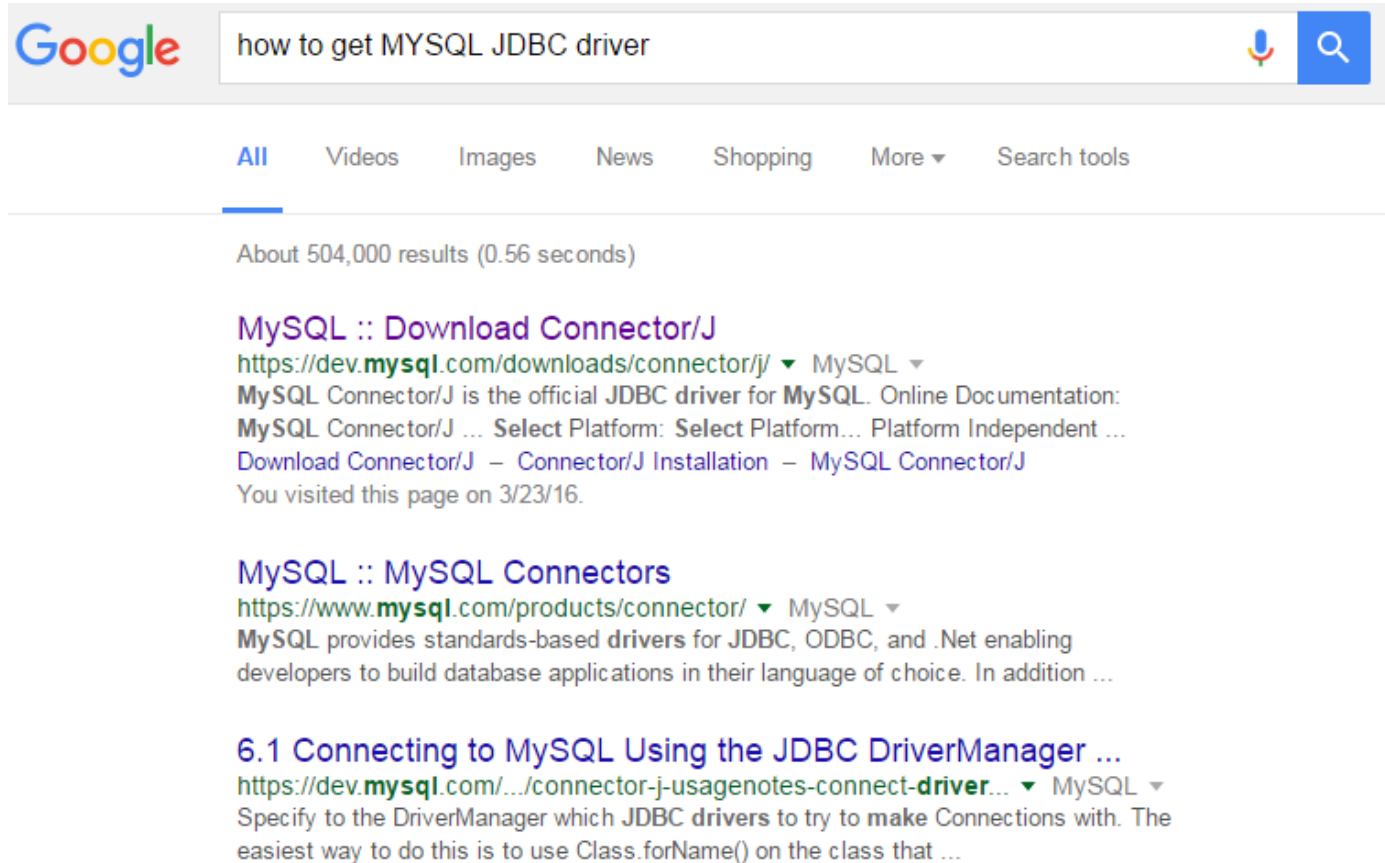
Name	Date modified
hibernate-core-5.1.0.Final.jar	2/10/2016 10:21 AM
hibernate-commons-annotations-5.0.1.Final.jar	11/30/2015 9:22 AM
jandex-2.0.0.Final.jar	11/30/2015 9:22 AM
javassist-3.20.0-GA.jar	10/6/2015 7:29 PM
classmate-1.3.0.jar	10/6/2015 10:12 AM
jboss-logging-3.3.0.Final.jar	5/28/2015 12:35 PM
geronimo-jta_1.1_spec-1.1.1.jar	5/5/2015 11:26 AM
hibernate-jpa-2.1-api-1.0.0.Final.jar	4/28/2014 8:30 PM
antlr-2.7.7.jar	4/28/2014 8:30 PM
dom4j-1.6.1.jar	4/28/2014 8:28 PM

Documents library
jpa

Name	Date modified
hibernate-entitymanager-5.1.0.Final.jar	2/10/2016 10:21 AM

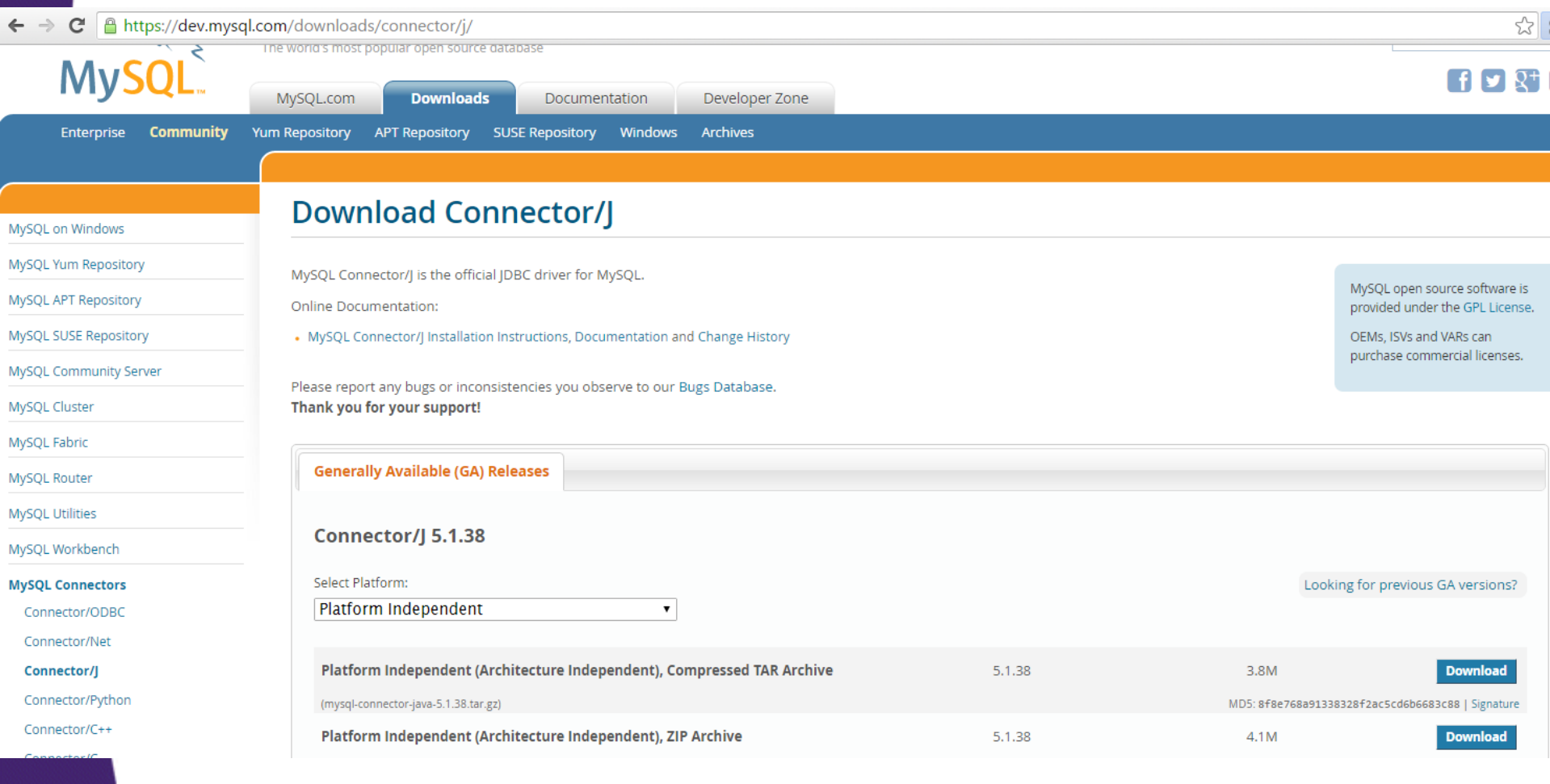
Download MySQL JDBC driver and add it to Java Build Path of your project in Eclipse

- Here is what I got in Google search – click the first link
“MySQL::Download Connector/J”



Download MySQL JDBC driver and add it to Java Build Path of your project in Eclipse

- Download the zip file (the 2nd Download link)



The screenshot shows the MySQL Connector/J download page. The browser address bar displays the URL <https://dev.mysql.com/downloads/connector/j/>. The page features a navigation bar with links to MySQL.com, Downloads, Documentation, and Developer Zone. A sidebar on the left lists various MySQL products, with 'MySQL Connectors' expanded to show 'Connector/J'. The main content area is titled 'Download Connector/J' and describes the driver as the official JDBC driver for MySQL. It includes links to online documentation and installation instructions. A section titled 'Generally Available (GA) Releases' shows the 'Connector/J 5.1.38' release. Below this, a table lists two download options: a 'Compressed TAR Archive' and a 'ZIP Archive', both for 'Platform Independent (Architecture Independent)' systems. Each option includes the version number (5.1.38), the file size (3.8M and 4.1M respectively), and a 'Download' button. A text box on the right side of the page states that MySQL open source software is provided under the GPL License and that OEMs, ISVs, and VARs can purchase commercial licenses.

MySQL Connector/J is the official JDBC driver for MySQL.

Online Documentation:

- [MySQL Connector/J Installation Instructions, Documentation and Change History](#)

Please report any bugs or inconsistencies you observe to our [Bugs Database](#).
Thank you for your support!

Generally Available (GA) Releases

Connector/J 5.1.38

Select Platform:
Platform Independent

Looking for previous GA versions?

Platform Independent (Architecture Independent), Compressed TAR Archive (mysql-connector-java-5.1.38.tar.gz)	5.1.38	3.8M	Download
Platform Independent (Architecture Independent), ZIP Archive	5.1.38	4.1M	Download

MD5: 8f8e768a91338328f2ac5cd6b6683c88 | [Signature](#)

MySQL open source software is provided under the [GPL License](#).
OEMs, ISVs and VARs can purchase commercial licenses.

Download MySQL JDBC driver and add it to Java Build Path of your project in Eclipse

- On the page that follows, click on “**No thanks, just start my download**”

MySQL.com Downloads Documentation Developer Zone

Yum Repository APT Repository SUSE Repository Windows Archives

Begin Your Download - mysql-connector-java-5.1.38.zip

Login Now or Sign Up for a free account.

An Oracle Web Account provides you with the following advantages:

- Fast access to MySQL software downloads
- Download technical White Papers and Presentations
- Post messages in the MySQL Discussion Forums
- Report and track bugs in the MySQL bug system
- Comment in the MySQL Documentation

Login »
using my Oracle Web account

Sign Up »
for an Oracle Web account

MySQL.com is using Oracle SSO for authentication. If you already have an Oracle Web account, click the Login link. Otherwise, you can signup for a free account by clicking the Sign Up link and following the instructions.

No thanks, just start my download.

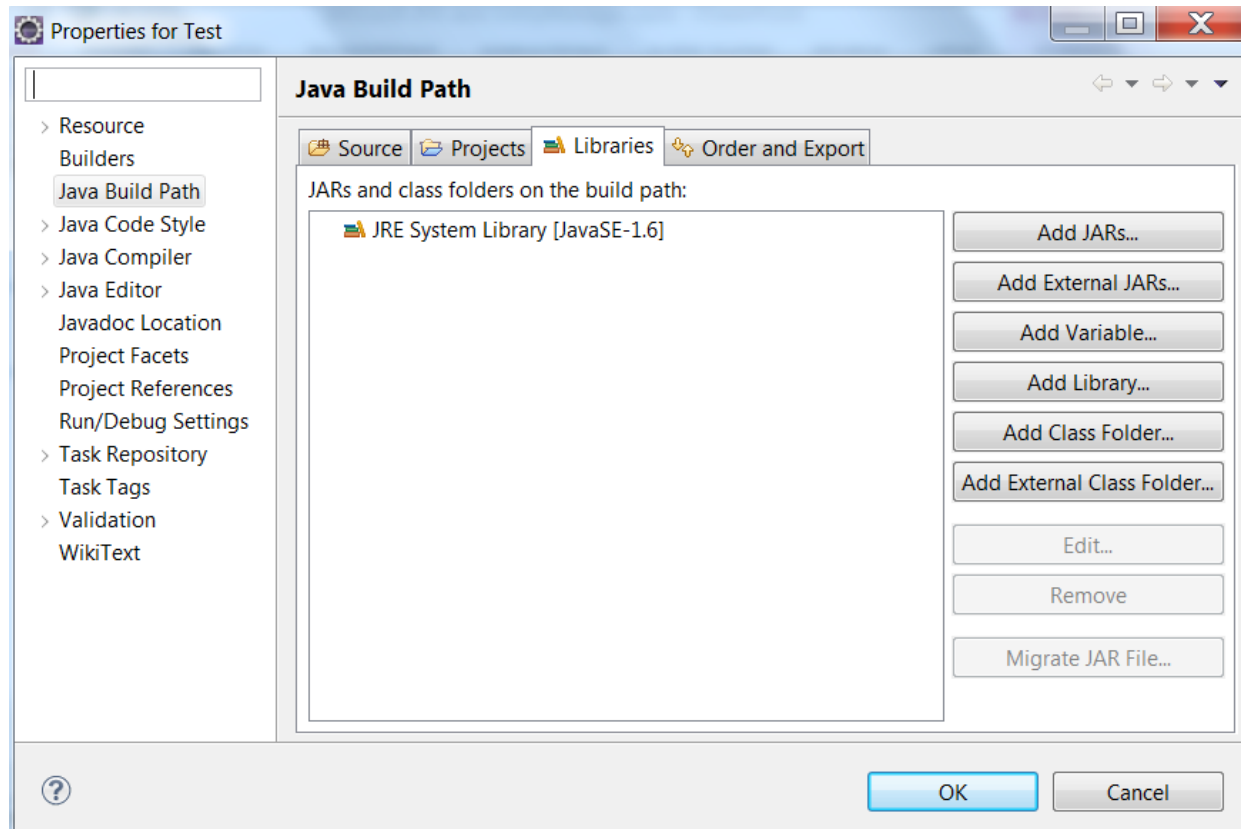
Download MySQL JDBC driver and add it to Java Build Path of your project in Eclipse

- Unzipped downloaded zip file contains one jar file, which is your jdbc driver
- You must add this jar file to Java Build Path of your project in Eclipse

Name	Date modified	Type	Size
docs	3/23/2016 5:06 PM	File folder	
src	3/23/2016 5:06 PM	File folder	
build.xml	12/2/2015 8:02 AM	XML Document	94 KB
CHANGES	12/2/2015 8:02 AM	File	233 KB
COPYING	12/2/2015 8:02 AM	File	18 KB
mysql-connector-java-5.1.38-bin.jar	12/2/2015 8:02 AM	Executable Jar File	961 KB
README	12/2/2015 8:02 AM	File	60 KB
README.txt	12/2/2015 8:02 AM	Text Document	63 KB

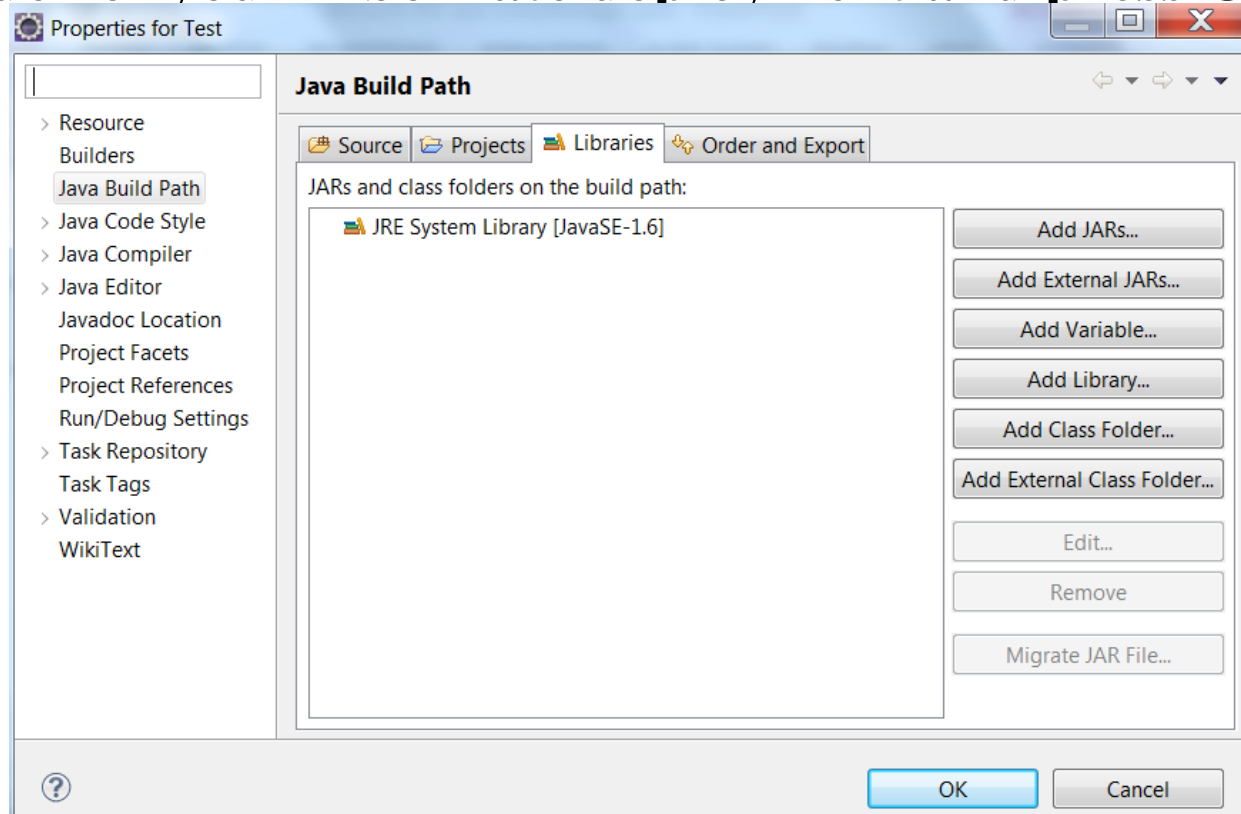
Adding Hibernate/JPA jars to your classpath in eclipse

- Select or Click on your **Java Project** or **Dynamic Web Project** name in Eclipse, and then select **Project->Properties** for your project
 - You will see something like this



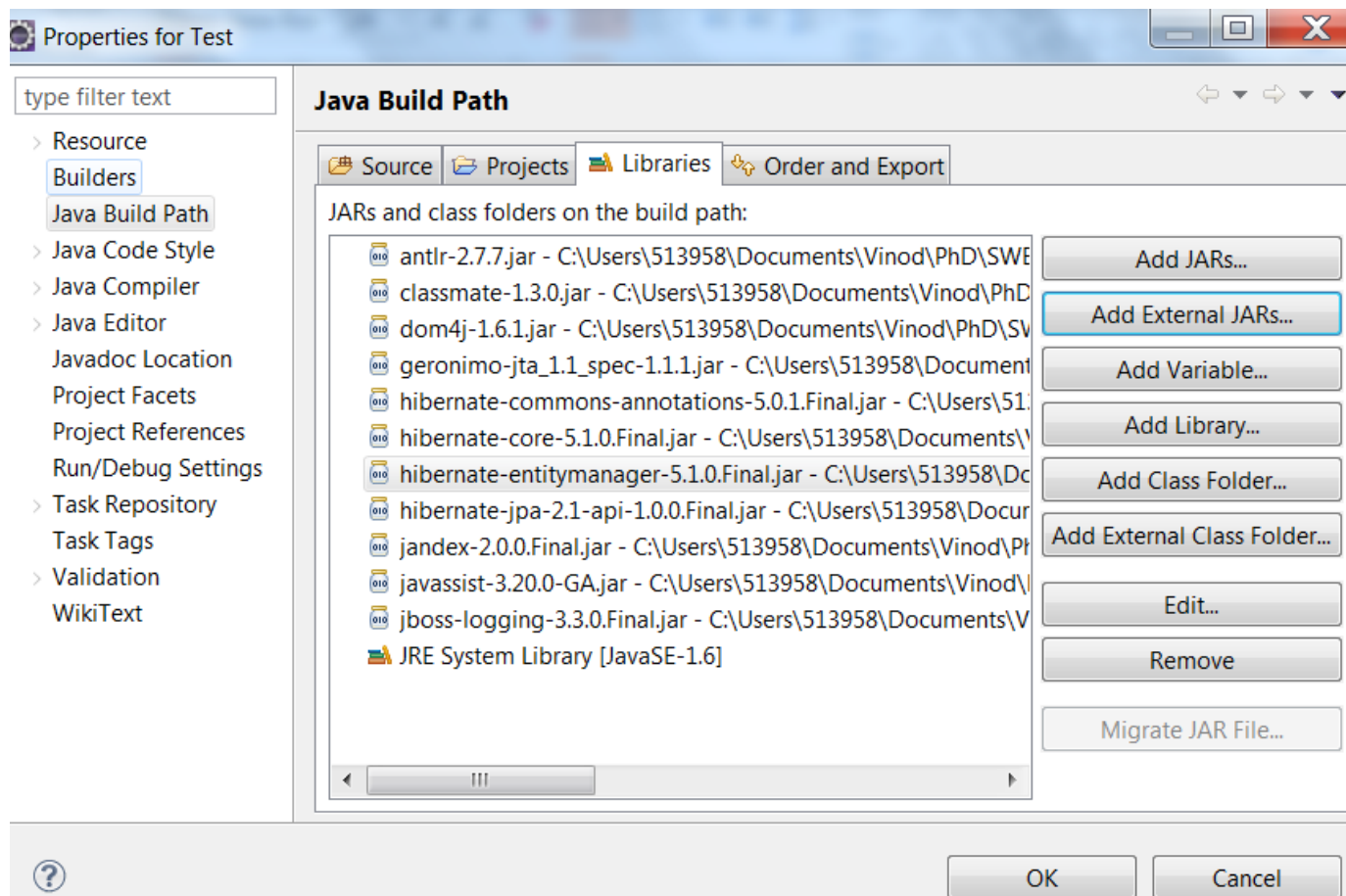
Adding Hibernate/JPA jars to your classpath in eclipse

- Now select **Java Build Path** (in the left panel) and the **Library** tab (as shown below)
- Then use **Add External Jars** link to add all jars in **lib/required** and **lib/jpa** folder of your hibernate deployment and press OK



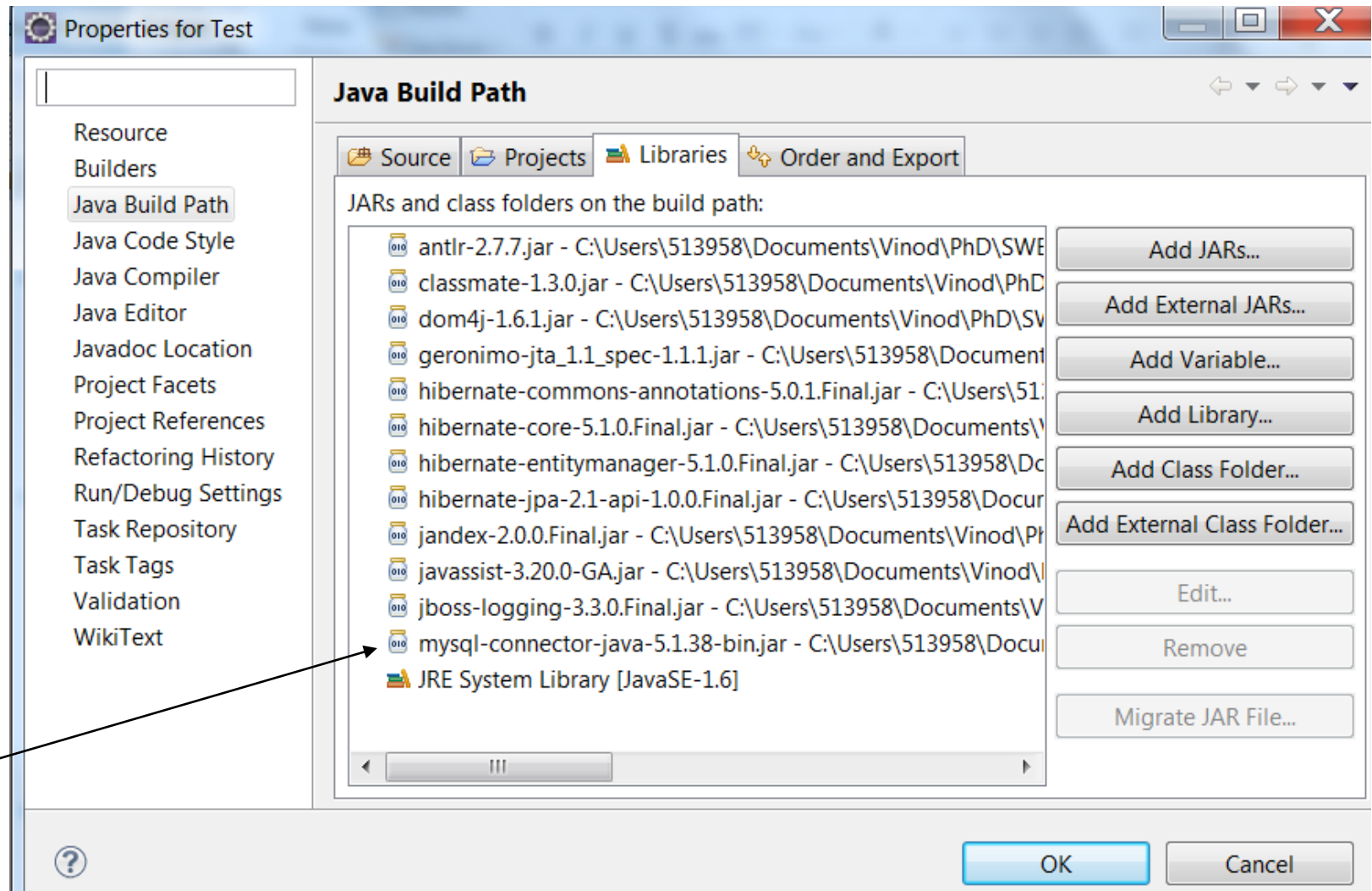
Adding Hibernate/JPA jars to your classpath in eclipse

- After adding the jar files, you should see something like as shown below – now your project's class path has **hibernate-core** jar and all its dependencies jars as well as jpa jars!



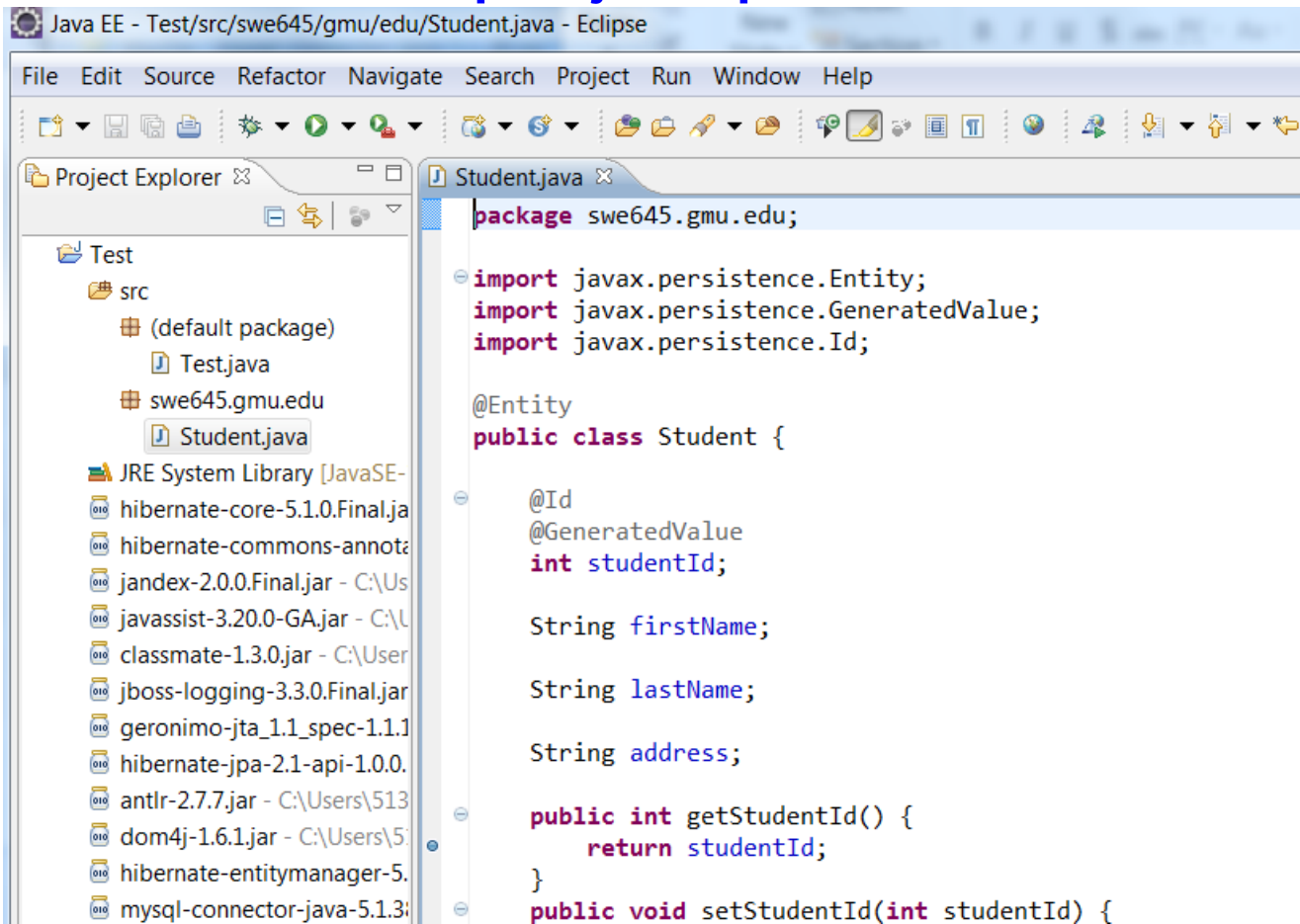
Adding Hibernate/JPA jars to your classpath in eclipse

- Repeat the same steps to add MySQL JDBC Driver jar



Your project is now ready to create JPA/Hibernate entity

- You can now create POJO and use JPA/hibernate annotations to create your JPA or hibernate entity
 - Make sure to use **import javax.persistence.***



```
Java EE - Test/src/swe645/gmu/edu/Student.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Project Explorer
Test
src
  (default package)
  Test.java
  swe645.gmu.edu
    Student.java
JRE System Library [JavaSE-
hibernate-core-5.1.0.Final.jar
hibernate-commons-annota
jandex-2.0.0.Final.jar - C:\Us
javassist-3.20.0-GA.jar - C:\U
classmate-1.3.0.jar - C:\User
jboss-logging-3.3.0.Final.jar
geronimo-jta_1.1_spec-1.1.1
hibernate-jpa-2.1-api-1.0.0.
antlr-2.7.7.jar - C:\Users\513
dom4j-1.6.1.jar - C:\Users\5
hibernate-entitymanager-5.
mysql-connector-java-5.1.3

Student.java
package swe645.gmu.edu;

import javax.persistence.Entity;
import javax.persistence.GeneratedValue;
import javax.persistence.Id;

@Entity
public class Student {

    @Id
    @GeneratedValue
    int studentId;

    String firstName;

    String lastName;

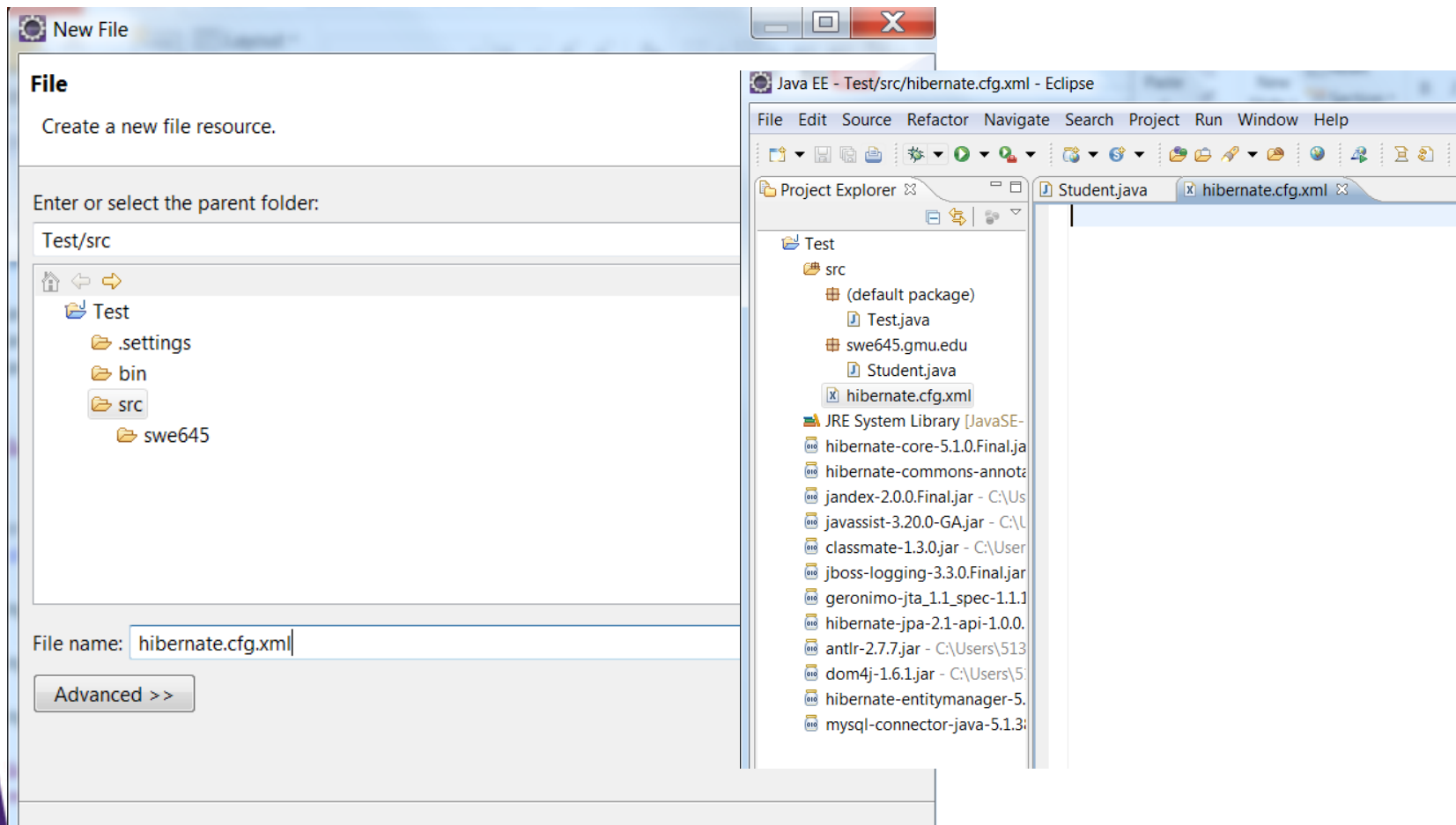
    String address;

    public int getStudentId() {
        return studentId;
    }

    public void setStudentId(int studentId) {
```

Create Hibernate JPA Configuration file: persistence.xml

- **R-Click** on your **Java Project** in Eclipse, select **New-File** and give it a name, **persistence.xml**, save it in **src/META** folder



Create Hibernate JPA Configuration file: persistence.xml

- Below is a template example of **persistence.xml**, which resides in the META-INF folder.

```
<persistence xmlns="http://java.sun.com/xml/ns/persistence"
             xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
             xsi:schemaLocation="http://java.sun.com/xml/ns/persistence http://java.sun.com/xml/ns/persistence/persistence_2_0.xsd"
             version="2.0">
  <persistence-unit name="sample">
    <provider>org.hibernate.ejb.HibernatePersistence</provider>
    <jta-data-source>java:/DefaultDS</jta-data-source>
    <mapping-file>ormap.xml</mapping-file>
    <jar-file>MyApp.jar</jar-file>
    <class>org.acme.Employee</class>
    <class>org.acme.Person</class>
    <class>org.acme.Address</class>
    <properties>
      <property name="hibernate.connection.driver_class">com.mysql.jdbc.Driver</property>
      <property name="hibernate.connection.password">XXXXXX</property>
      <property name="hibernate.connection.url">jdbc:mysql://<hostname>/<database></property>
      <property name="hibernate.connection.username">XXXXXX</property>
      <property name="hibernate.default_schema">XXXXXX</property>
      <property name="hibernate.dialect">org.hibernate.dialect.MySQLDialect</property>
    </properties>
  </persistence-unit>
</persistence>
```

Create Hibernate JPA Configuration file: persistence.xml

- Below is an example of **persistence.xml**, which resides in the **src/META-INF** folder. Here **swe645** is the MySQL database name created via Amazon RDS.

```
<?xml version="1.0" encoding="UTF-8"?>
- <persistence xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/persistence
http://xmlns.jcp.org/xml/ns/persistence/persistence_2_1.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://xmlns.jcp.org/xml/ns/persistence" version="2.1">
  - <persistence-unit transaction-type="RESOURCE_LOCAL" name="assign3">
    <provider>org.hibernate.ejb.HibernatePersistence</provider>
    <class>assignment.Student</class>
    - <properties>
      <property name="hibernate.dialect" value="org.hibernate.dialect.MySQLDialect"/>
      <property name="hibernate.hbm2ddl.auto" value="update"/>
      <property name="hibernate.show_sql" value="true"/>
      <property name="hibernate.connection.driver_class" value="com.mysql.jdbc.Driver"/>
      <property name="hibernate.connection.url" value="jdbc:mysql://127.0.0.1:3306/swe645"/>
      <property name="hibernate.connection.username" value="nsimon2"/>
      <property name="hibernate.connection.password" value="nopassword"/>
    </properties>
  </persistence-unit>
</persistence>
```

Create Hibernate JPA Configuration file: persistence.xml

- Below is an example of **persistence.xml** using GMU's Oracle database.

```
<?xml version="1.0" encoding="UTF-8"?>
- <persistence xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/persistence
http://xmlns.jcp.org/xml/ns/persistence/persistence_2_1.xsd"
xsi:schemaLocation="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://xmlns.jcp.org/xml/ns/persistence" version="2.1">
  - <persistence-unit transaction-type="RESOURCE_LOCAL" name="SWE645HW4">
    <class>Student</class>
    - <properties>
      <property name="hibernate.connection.url"
        value="jdbc:oracle:thin:@apollo.ite.gmu.edu:1521:ite10g"/>
      <property name="hibernate.connection.driver_class" value="oracle.jdbc.driver.OracleDriver"/>
      <property name="hibernate.connection.username" value="sshres18"/>
      <property name="hibernate.connection.password" value="esoals"/>
      <property name="hibernate.archive.autodetection" value="class"/>
      <property name="hibernate.show_sql" value="true"/>
      <property name="hibernate.format_sql" value="true"/>
      <property name="hbm2ddl.auto" value="update"/>
    </properties>
  </persistence-unit>
</persistence>
```