



MAVEN DOCUMENTATION

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Maven Build Tool

Document History

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Introduction

Apache Maven is a software project management and comprehension tool. Based on the concept of a project object model (POM), Maven can manage a project's build, reporting and documentation.

The most powerful feature is able to download the project dependency libraries automatically from maven central repo, maven remote repo or local repo.

Pre requisites

- Java
- XML

Maven Details	
Type	JAVA based Open source Build Technology
Vendor	Apache
Is Open Source?	Yes
Version	3.x
Operating system	Cross Platform
Software Download URL	
Is executable software?	No, download as zip, extract and use it.
Reference Websites	1)

Installation of Maven software

1) Download Maven software as a ZIP file using below url

<http://maven.apache.org/download.cgi>

2) Copy apache-maven-3.6.3-bin.zip it into C:\Maven drive and extract into this(C:\Maven) directory, we will see four folders namely

C:\Maven\apache-maven-3.6.3

- 1) \bin ----> It contains the batch files.
- 2) \conf ----> It contains the configuration files like settings.xml.
- 3) \lib ----> It contains the jar files.

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Contents in pom.xml

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.bt</groupId>
  <artifactId>maven-java-project</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <packaging>jar</packaging>
  <dependencies>

  <dependency>
    <groupId>junit</groupId>
    <artifactId>junit</artifactId>
    <version>3.8.1</version>
    <scope>test</scope>
  </dependency>
</dependencies>

</project>
```

All POM files require the **project** element and three mandatory fields: **groupId**, **artifactId**, **version**.

Root element of POM.xml is **project** and it has three major sub-nodes .

groupId : This is an Id of project's group. This is generally unique amongst an organization or a project. For example, a banking group com.company.bank has all bank related projects.

artifactId : This is an Id of the project. This is generally name of the project. For example, consumer-banking. Along with the groupId, the artifactId defines the artifact's location within the repository.

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version: This is the version of the project. Along with the groupId, It is used within an artifact's repository to separate versions from each other. For example:
com.company.bank:consumer-banking:1.0 com.company.bank:consumer-banking:1.1.

Maven Repositories

A Maven repository can be one of the following types:

- Maven Local Repository
- Maven Central Repository
- Remote Repository

Maven Local Repository

The **maven** local repository is a local folder that is used to store all your project's dependencies (plugin jars and other files which are downloaded by Maven). In simple, when you build a Maven project, all dependency files will be stored in your Maven local repository.

By default, Maven local repository is default to **.m2** folder:

1. Unix/Mac OS X – **~/ .m2/repository**
(/Users/MithunReddy/.m2/repository)
2. Windows – **C:\Documents and Settings\{your-username}\.m2/repository**

Normally, We will change the default local repository folder from default **.m2** to another more meaningful name as follows.

Find {M2_HOME}\conf\setting.xml, update localRepository to something else.

```
<!-- localRepository
```

The path to the local repository maven will use to store artifacts.

Default: \${user.home}/.m2/repository

```
<localRepository>/path/to/local/repo</localRepository>
```

```
-->
```

```
<localRepository>D:/maven_custom_repo</localRepository>
```

Maven Central Repository

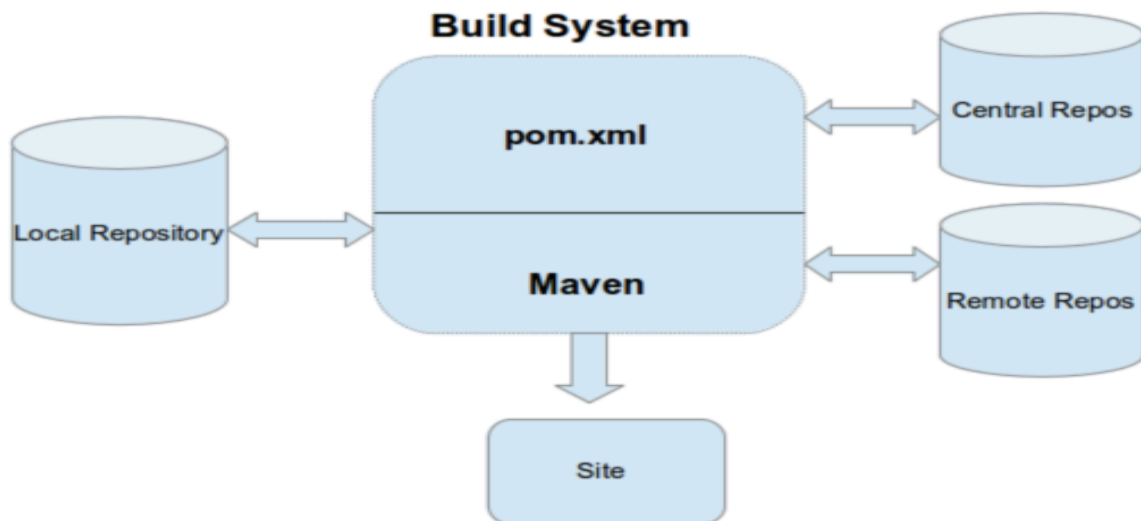
The central repository is the repository provided by the Maven community. It contains a large repository of commonly used libraries. This repository comes into play when Maven does not find libraries in the local repository.

The central repository can be found at: <http://search.maven.org/>.

Remote Repository

Enterprises usually maintain their own repositories for the libraries that are being used for the project. These differ from the local repository; a repository is maintained on a separate server, different from the developer's machine and is accessible within the organization.

Maven Architecture



Maven Life cycles

There are 3 life cycles in maven.

- a) clean
- b) site
- c) default

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Default Lifecycle

validate validate the project is correct and all necessary information is available.

compile compile the source code of the project.

test run tests using a suitable unit testing framework. These tests should not require the code be packaged or deployed.

package take the compiled code and package it in its distributable format, such as a JAR, WAR, EAR....

install : install the package into the local repository, for use as a dependency in other projects locally.

deploy copies the final package to the remote repository for sharing with other developers and projects.

Clean Lifecycle:

clean : remove all files generated by the previous build

Site Lifecycle

site generate the project's site documentation

Maven Goals

To invoke a maven build you set a life cycle goal.

mvn install : Invokes validate, compile, test, package, install.

mvn clean: Invokes just clean.

mvn clean compile : Clean old builds and execute validate, compile.

mvn compile install : Invokes validate, compile, test, package, install.

mvn test clean : Invokes validate, compile, test then clean.

Maven with SonarQube

To generate SonarQube scanner report for maven projects need to add below lines in pom.xml.

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```

<properties>
  <sonar.host.url>http://IPaddr:9000/</sonar.host.url>
  <sonar.login>SonarQubeServerUserName</sonar.login>
  <sonar.password>SonarQubeServerPassword/Token</sonar.password>
</properties>

```

Once you add you need to trigger the below command from the project directory to which you are generating report.

```
mvn sonar:sonar
```

(OR)

```
mvn clean install sonar:sonar
```

In SonarQube dashboard you will find the project with the name which you mentioned in **<name>Maven-Java-Project</name>** tag and the key it will take from **<groupId>com.mt</groupId>** and **<artifactId>maven-java-project</artifactId>** as follows.

com.mt: maven-java-project , and version it will take from **<version>1.0</version>** tag.

Note: If we want to generate sonarqube report for all Maven projects, we have to add above lines in each project, pom.xml. Instead of copying in each pom.xml, just copy into **settings.xml** which is available in **conf** directory.

In two locations settings.xml file may be existed.

The Maven install: \${maven.home}/conf/settings.xml

A user's install: \${user.home}/.m2/settings.xml

The former settings.xml are also called global settings, the latter settings.xml are referred to as user settings. If both files exists, their contents gets merged, with the user-specific settings.xml being dominant.

Maven with Remote Repositories

If we want to configure nexus remote repo with Maven, need to follow the below steps.

Remote Repository add

```
<repositories>
  <repository>
    <id>comt.mt</id>
    <url>https://maven.java.net/content/repositories/public/</url>
  </repository>
</repositories>
```

To install the Oracle jdbc drivers :

2.1 ojdbc6.jar

```
$ mvn install:install-file -Dfile={Path/to/your/ojdbc6.jar}
-DgroupId=com.oracle -DartifactId=ojdbc6 -Dversion=11.2.0 -Dpackaging=jar
```

2.2 ojdbc7.jar

```
$ mvn install:install-file -Dfile={Path/to/your/ojdbc7.jar}
-DgroupId=com.oracle -DartifactId=ojdbc7 -Dversion=12.1.0 -Dpackaging=jar
```

Full example to install a ojdbc7.jar

Terminal

```
> mvn install:install-file -Dfile=C:\\OracleJDBC\\ojdbc7.jar
-DgroupId=com.oracle -DartifactId=ojdbc7 -Dversion=12.1.0 -Dpackaging=jar
```

After installation, you must add below dependency in pom.xml as follows.

```
<!-- ojdbc6.jar example -->
<dependency>
  <groupId>com.oracle</groupId>
  <artifactId>ojdbc6</artifactId>
  <version>11.2.0</version>
</dependency>
```

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```
<!-- ojdbc7.jar example -->
<dependency>
  <groupId>com.oracle</groupId>
  <artifactId>ojdbc7</artifactId>
  <version>12.1.0</version>
</dependency>
```

```
mvn install:install-file -DlocalRepositoryPath=repo -DcreateChecksum=true -
Dpackaging=jar -Dfile=/Users/BhaskarReddyL/Jars/BluePagesJavaToolKit-3.jar -
DgroupId=com.mt -DartifactId=BluePagesJavaToolKit-3.jar -Dversion=1.0
```

pom.xml

```
<repositories>
  <repository>
    <id>com.mt</id>
    <url>file://${project.basedir}/repo</url>
  </repository>
</repositories>
```

Skip Unit Tests in Maven

Using mvn package -Dmaven.test.skip=true or mvn package -DskipTests we can skip running the unit test cases.

Alternatively, to using -Dmaven.test.skip=true in a terminal window when running a specific Maven command, you can disable Unit tests for all Maven commands. To disable Unit tests using POM.XML add **maven.test.skip** to properties XML element.

```
<properties>
```

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```
<maven.test.skip>true</maven.test.skip>
```

```
</properties>
```

What is the difference between -DskipTests and -Dmaven.test.skip=true ?

Ans)

maven.install.skip=true

```
mvn archetype:generate -DarchetypeGroupId=org.apache.maven.archetypes -
DarchetypeArtifactId=maven-archetype-quickstart -DgroupId=com.mt -DartifactId=Maven-
standalone-Project -DinteractiveMode=yes
```

```
mvn archetype:generate -DarchetypeGroupId=org.apache.maven.archetypes -
DarchetypeArtifactId=maven-archetype-webapp -DgroupId=com.mt -DartifactId=Maven-Web-
Project -DinteractiveMode=yes
```

```
mvn eclipse:eclipse
```

```
mvn jetty:run
```

Generate the Java standalone project

```
=====
mvn -B archetype:generate \
  -DarchetypeGroupId=org.apache.maven.archetypes \
  -DgroupId=com.mt.devops.maven \
  -DartifactId=helloworld
```

FileName: createfile.sh

```
-----
#!/bin/bash
# create an example application
mvn -B archetype:generate \
  -DarchetypeGroupId=org.apache.maven.archetypes \
```

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```
-DgroupId=com.mt.devops.maven \
-DartifactId=helloworld
```

```
# create a resource directory for the log4j properties
mkdir -p helloworld/src/main/resources
```

```
# create the log4j properties file
echo "
# Root logger option
log4j.rootLogger=DEBUG, stdout, file
# Redirect log messages to console
log4j.appender.stdout=org.apache.log4j.ConsoleAppender
log4j.appender.stdout.Target=System.out
log4j.appender.stdout.layout=org.apache.log4j.PatternLayout
log4j.appender.stdout.layout.ConversionPattern=%d{yyyy-MM-dd HH:mm:ss} %-5p
%c{1}:%L - %m%n
">> helloworld/src/main/resources/log4j.properties
```

Compile the Program

```
-----
mvn compile
```

Run the program

```
-----
#!/bin/bash
cd helloworld
```

```
# run application using maven exec plugin
mvn exec:java -Dexec.mainClass="com.mt.devops.maven.App"
```

Maven Installation in MAC Book

Step 1: Download the software from below url.
<https://maven.apache.org/download.cgi> (apache-maven-3.5.0-bin.tar.gz)

Step 2: Unzip the file.
#tar -xvf apache-maven-3.3.9-bin.tar.gz

Step 3: Set the classpath as follows.

```
# vim ~/.bash_profile
~/.bash_profile
export M2_HOME=/opt/apache-maven-3.3.9
export PATH=${PATH}:${M2_HOME}/bin
```

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Restart the terminal, and execute the below command to verify the installation.

#mvn -version

Maven Installation in Windows OS

Step 1: Download the software from below url.

<https://maven.apache.org/download.cgi> (apache-maven-3.5.0-bin.tar.gz)

Step 2: Create one directory with the name Maven and copy the maven software in to that folder and extract it.

Step 3: Set the classpath as follows.

Right click on Computer —> Properties —> Advanced System settings —> Environment Variables —> in System Variables section click on New and provide the Variable names as M2_HOME

and Variable value as (Give the path where maven software extracted) and click on OK.

select the Path variable from System Variables section —> Click on Edit —> add below lines
;%M2_HOME%/bin —> Click on Ok.

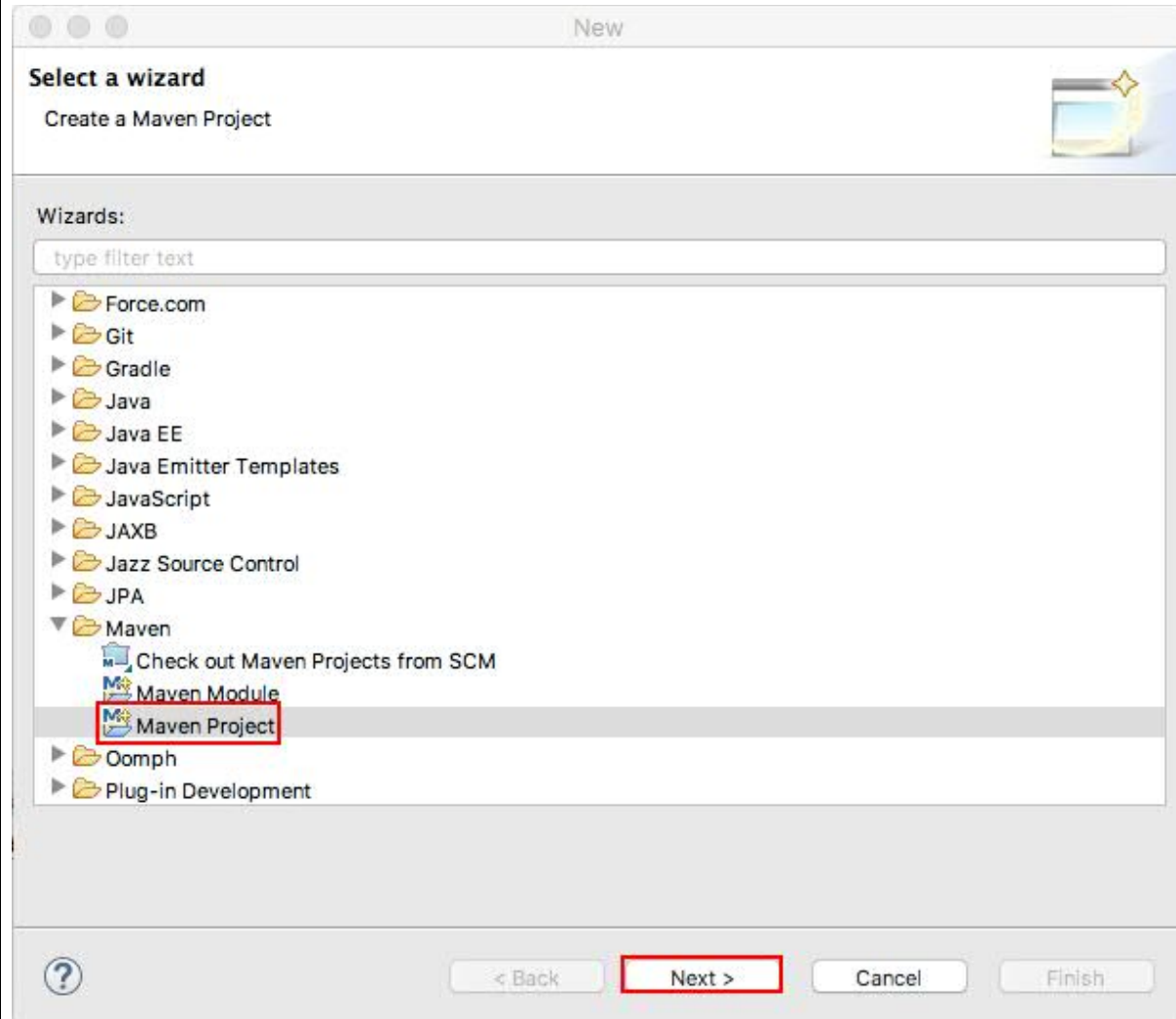
Step 4: Restart the terminal, and execute the below command to verify the installation.

#mvn -version

Developer Tasks

Create the maven java (jar) project in Eclipse

File ---> New ---> Other ---> Maven ---> Maven Project --->



Next --->

New Maven Project

New Maven project

Select project name and location

☐ Create a simple project (skip archetype selection)

☒ Use default Workspace location

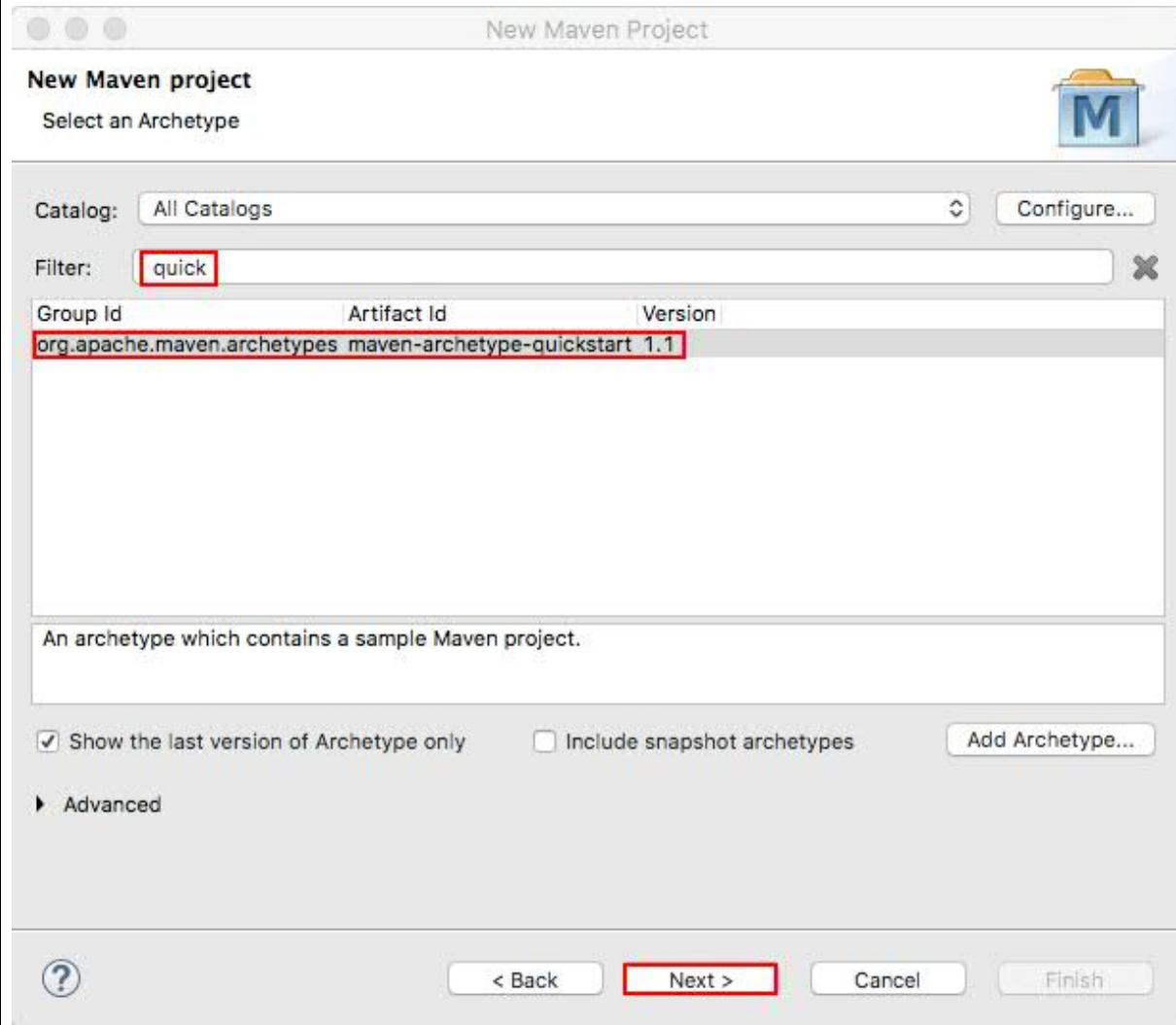
Location:

☐ Add project(s) to working set

Working set:

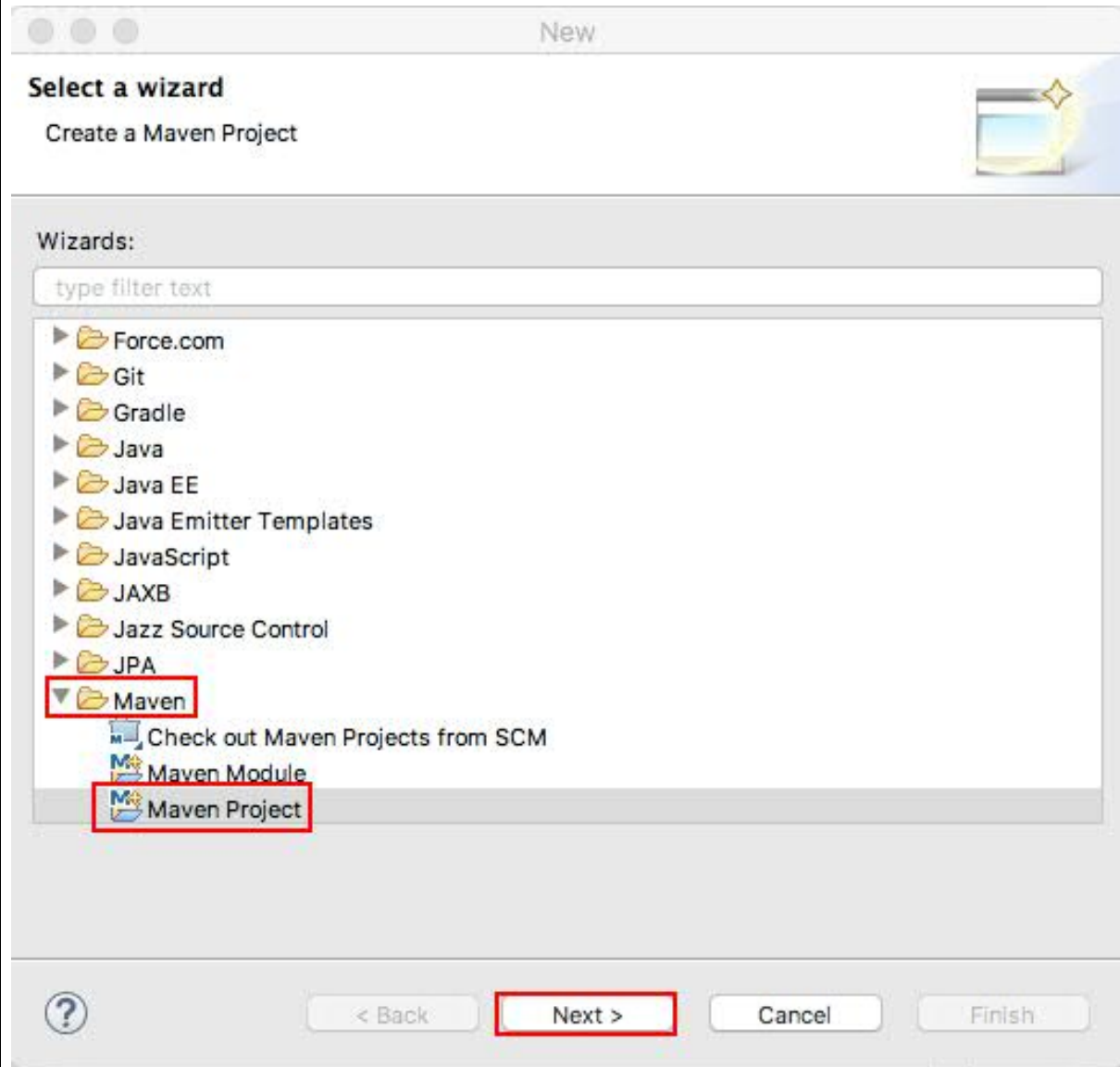
► Advanced

Next ---> filter for the "quickstart" archetype and select the maven-archetype-quickstartentry. This is the classical Maven example archetype for project creation.



Create the maven web(war) project in Eclipse

File ---> New ---> Other ---> Maven ---> Maven Project ---> Next --->



Next --->

New Maven Project

Select project name and location

☐ Create a simple project (skip archetype selection)

☒ Use default Workspace location

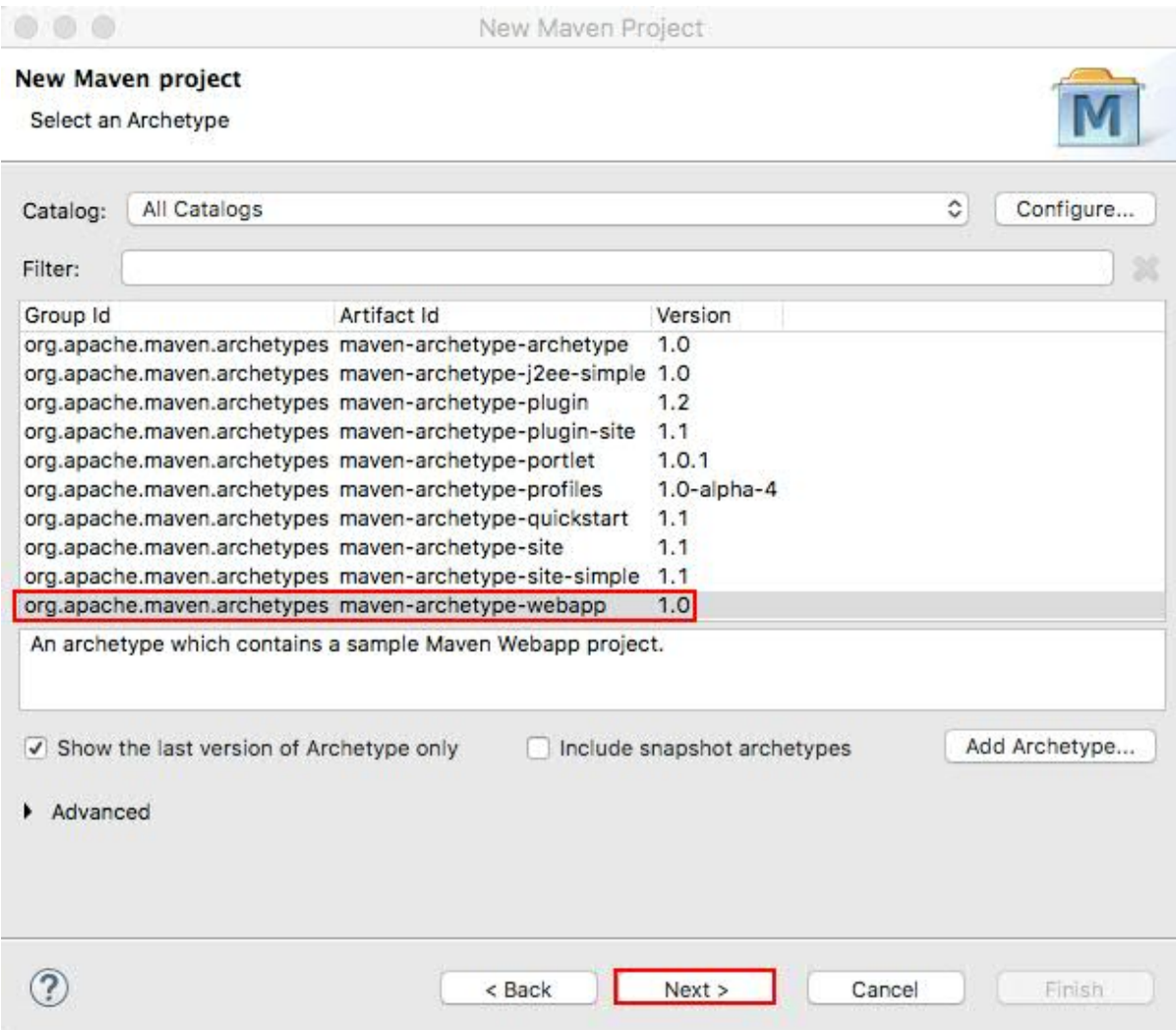
Location:

☐ Add project(s) to working set

Working set:

▶ Advanced

org.apache.maven.archetypes maven-archetype-webapp 1.0 ---> Next



New Maven Project

Select an Archetype

Catalog: All Catalogs Configure...

Filter: ✕

Group Id	Artifact Id	Version
org.apache.maven.archetypes	maven-archetype-archetype	1.0
org.apache.maven.archetypes	maven-archetype-j2ee-simple	1.0
org.apache.maven.archetypes	maven-archetype-plugin	1.2
org.apache.maven.archetypes	maven-archetype-plugin-site	1.1
org.apache.maven.archetypes	maven-archetype-portlet	1.0.1
org.apache.maven.archetypes	maven-archetype-profiles	1.0-alpha-4
org.apache.maven.archetypes	maven-archetype-quickstart	1.1
org.apache.maven.archetypes	maven-archetype-site	1.1
org.apache.maven.archetypes	maven-archetype-site-simple	1.1
org.apache.maven.archetypes	maven-archetype-webapp	1.0

An archetype which contains a sample Maven Webapp project.

☒ Show the last version of Archetype only ☐ Include snapshot archetypes Add Archetype...

► Advanced

? < Back Next > Cancel Finish

Provide the below details

GroupId:

Artifact Id:

Version:

New Maven Project

Specify Archetype parameters

Group Id:

Artifact Id:

Version:

Package:

Properties available from archetype:

Name	Value

Advanced

< Back Next > Cancel **Finish**

Expand the project (maven-sample-project) ---> Expand src folder ---> Right click on the main ---> New ---> Other ---> General ---> Folder ---> Next ---> Provide the Folder name as java and click on Finish button.

Create the maven Enterprise Project (ear) project [Multi Modules] in Eclipse

First create the maven project as follows.

File ---> New ---> Other ---> Maven ---> Maven Project --->

New Maven Project

Configure project

Artifact

Group Id:

Artifact Id:

Version:

Packaging:

Name:

Description:

Parent Project

Group Id:

Artifact Id:

Version:

Browse... Clear

Advanced

< Back Next > Cancel Finish

Create the one web module as follows.

New Maven Module

Select the module name and parent

☐ Create a simple project (skip archetype selection)

Module Name:

Parent Project:



☐ Add project(s) to working set


Working set:

▶ Advanced

New Maven Module


Select an Archetype

Catalog: All Catalogs   Configure...


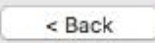
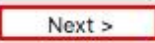
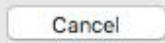

Filter: 

Group Id	Artifact Id	Version
org.apache.maven.archetypes	maven-archetype-archetype	1.0
org.apache.maven.archetypes	maven-archetype-j2ee-simple	1.0
org.apache.maven.archetypes	maven-archetype-plugin	1.2
org.apache.maven.archetypes	maven-archetype-plugin-site	1.1
org.apache.maven.archetypes	maven-archetype-portlet	1.0.1
org.apache.maven.archetypes	maven-archetype-profiles	1.0-alpha-4
org.apache.maven.archetypes	maven-archetype-quickstart	1.1
org.apache.maven.archetypes	maven-archetype-site	1.1
org.apache.maven.archetypes	maven-archetype-site-simple	1.1
org.apache.maven.archetypes	maven-archetype-webapp	1.0

An archetype which contains a sample Maven Webapp project.

☒ Show the last version of Archetype only ☐ Include snapshot archetypes 

Advanced

New Maven Module

Specify Archetype parameters

Group Id:

Artifact Id:

Version:

Package:

Properties available from archetype:

Name	Value

Advanced

< Back Next > Cancel Finish

create another ear module.

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References

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<http://maven.apache.org/settings.html>

<http://maven.apache.org/general.html#available-plugins>