www.sheepsqueezers.com

Teiid
(and related software)
Installation Instructions

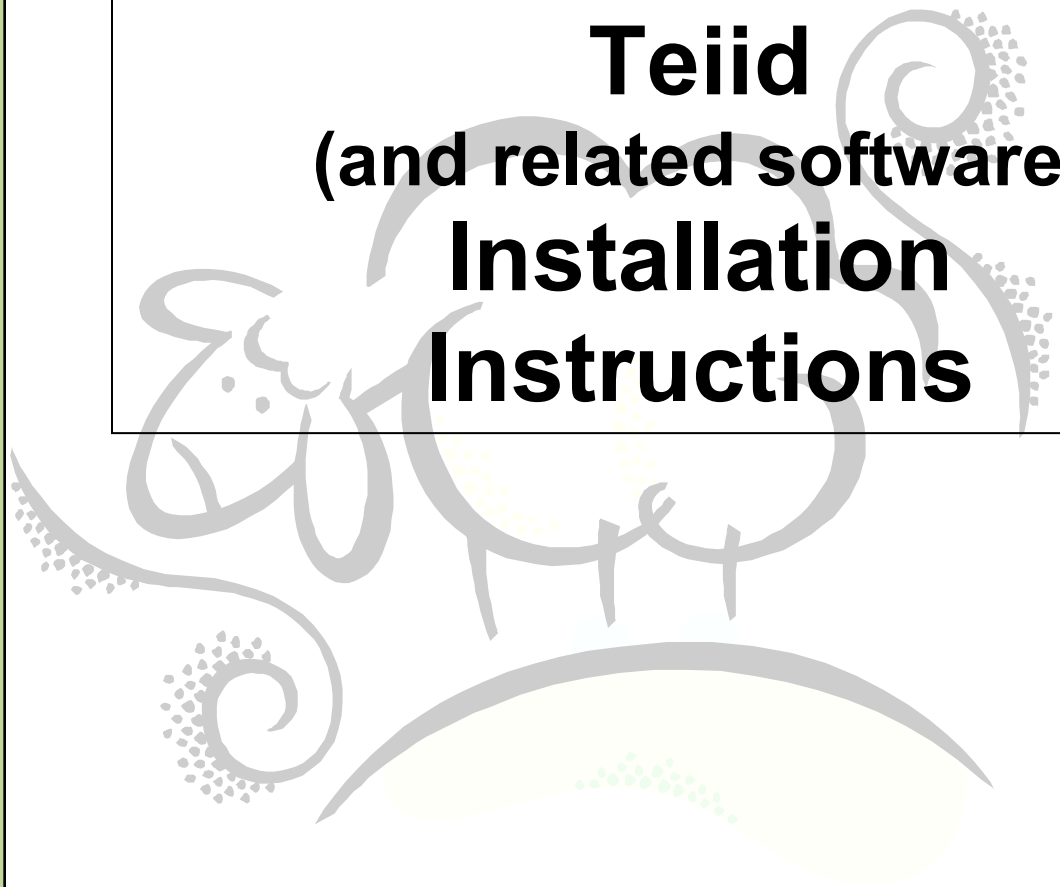


Table of Contents

Introduction

This document outlines how to install the data virtualization software Teiid and its related components on a Windows 7/8 machine.

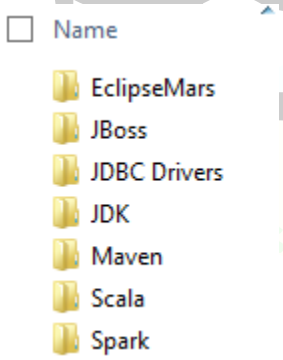
This document includes instructions detailing how to install and test the following software components:

- ☐ Java Software Development Kit (JDK)
- ☐ Java ODBC (JDBC) drivers for several databases
- ☐ Eclipse Integrated Development Environment (IDE)
- ☐ Apache Maven
- ☐ JBoss Developer Studio and related software
- ☐ Apache Spark Cluster Server software
- ☐ Scala Programming Language
- ☐ Teiid
- ☐ Teiid Designer
- ☐ SQuirreL SQL Client

Some of the instructions included in this document are taken from installation instructions from the web, but are included here as one consistent set of instructions.

All of the software will be installed on a 64-bit Windows 8.1 machine. If your machine is not 64-bit, please ensure that you download the correct files for your machine.

In order to keep everything organized, create a separate folder to be used to contain the downloaded files. For example, below is how I organized my downloads folder:



Along with these installation instructions, we go into how to test if the installs worked correctly.

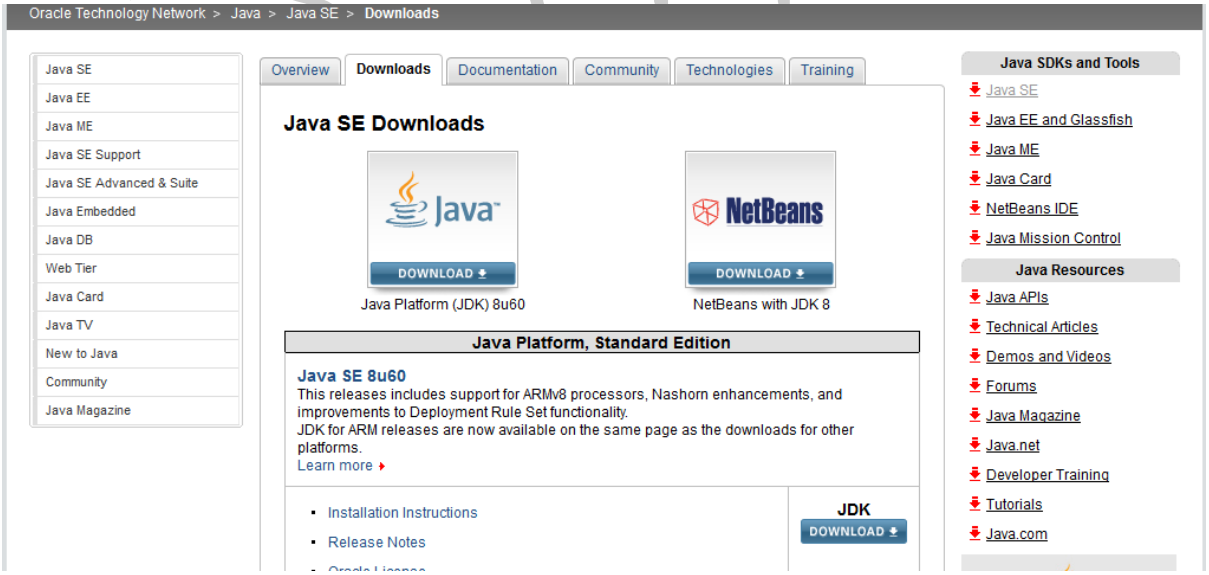
A. Java Software Development Kit (JDK 8)

This section outlines how to install the Java Software Development Kit (JDK) version 8.

Pre-Step 1 – Download JDK 8

1. Open your browser and navigate to either http://java.sun.com or, equivalently, http://www.oracle.com/technetwork/java/index.html. You will see the following web page, in part:

2. Click on the Java Downloads button to display the Java SE Downloads web page.



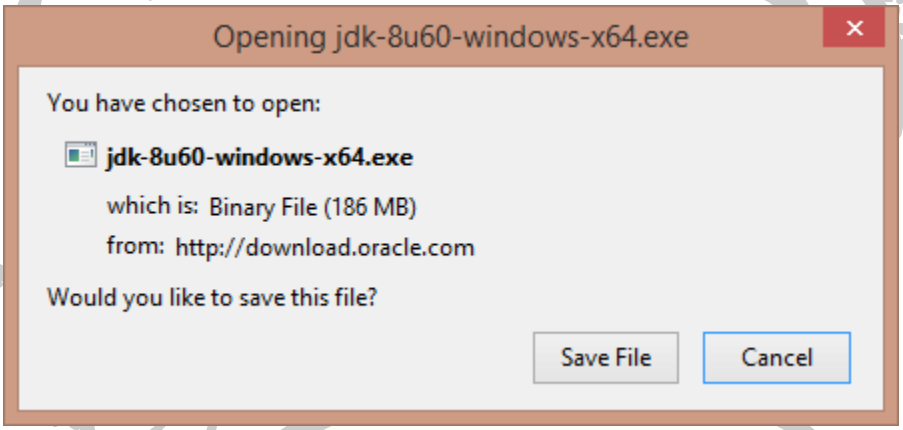
3. Click on the JDK Download button to take you to the Java SE Development Kit 8 Downloads web page. Click on the radio button to the left of "Accept License Agreement".

Java SE Development Kit 8u60

You must accept the Oracle Binary Code License Agreement for Java SE to download this software.
Thank you for accepting the Oracle Binary Code License Agreement for Java SE; you may now download this software.

Product / File Description	File Size	Download
Linux ARM v6/v7 Hard Float ABI	77.69 MB	jdk-8u60-linux-arm32-vfp-hflt.tar.gz
Linux ARM v8 Hard Float ABI	74.64 MB	jdk-8u60-linux-arm64-vfp-hflt.tar.gz
Linux x86	154.66 MB	jdk-8u60-linux-i586.rpm
Linux x86	174.83 MB	jdk-8u60-linux-i586.tar.gz
Linux x64	152.67 MB	jdk-8u60-linux-x64.rpm
Linux x64	172.84 MB	jdk-8u60-linux-x64.tar.gz
Mac OS X x64	227.07 MB	jdk-8u60-macosx-x64.dmg
Solaris SPARC 64-bit (SVR4 package)	139.67 MB	jdk-8u60-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	99.02 MB	jdk-8u60-solaris-sparcv9.tar.gz
Solaris x64 (SVR4 package)	140.18 MB	jdk-8u60-solaris-x64.tar.Z
Solaris x64	96.71 MB	jdk-8u60-solaris-x64.tar.gz
Windows x86	180.82 MB	jdk-8u60-windows-i586.exe
Windows x64	186.16 MB	jdk-8u60-windows-x64.exe

4. Click the link to the right of your operating system. For me, I clicked on `jdk-8u60-windows-x64.exe` to the right of Windows x64. The following dialog box appears:

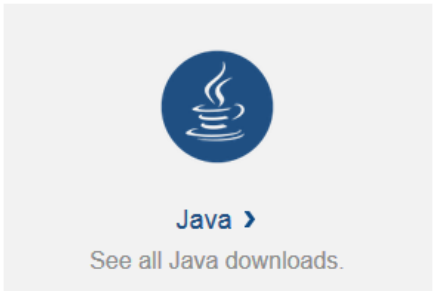


Click Save File and the file will be saved to your machine.

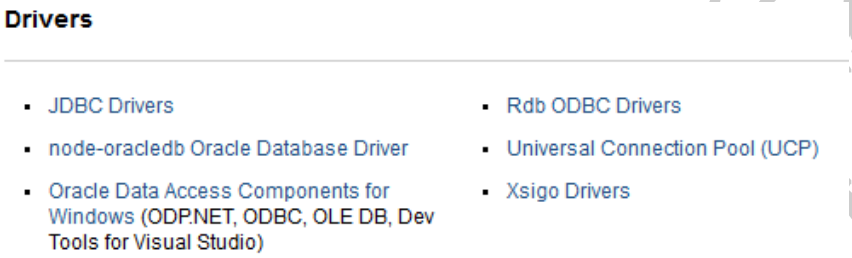
Pre-Step 1 – Download the JDBC Drivers for Oracle and SQL Server

In this section, we download the database connectivity (JDBC) drivers for Oracle and SQL Server.

1. To download the JDBC driver for Oracle, navigate your browser to http://www.oracle.com/downloads.
2. Scroll down and click on the Java > graphic to view all downloads:



3. Scroll down until you see the Drivers section. Click on the JDBC Drivers link.



4. Click on the link for your version of Oracle:

5. Ensure that the radio button to the left of the text *Accept License Agreement* is checked. Click on the `ojdbc7.jar` link.

Oracle Database 12.1.0.1 JDBC Driver & UCP Downloads

Thank you for accepting the OTN License Agreement; you may now download this software.

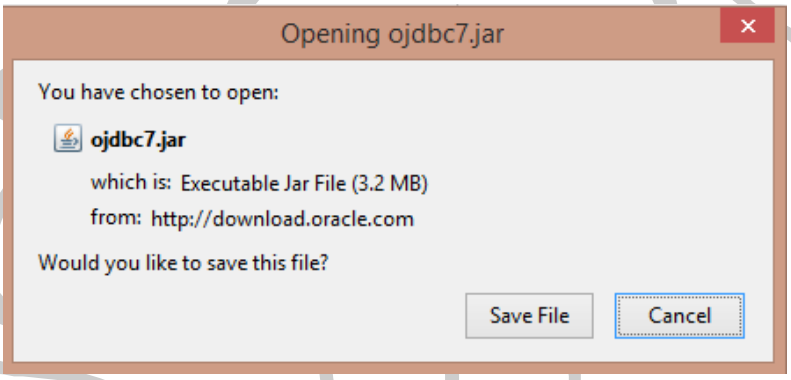
Oracle Database 12c Release 1 (12.1.0.1) JDBC Drivers & UCP

SimpleFAN
simplefan.jar (21,048 bytes) - (SHA1 Checksum: 13a3c504fb7ee9517327b1efe13dd5fa3fa125c3)
Classes for subscribing to RAC events via ONS; simplefan policy and javadoc

JDBC Thin for All Platforms
demo.tar (686,080 bytes) - JDBC Demos (TAR format)
demo.zip (614,561 bytes) -JDBC Demos (ZIP format)
JavaDoc (7,103,997 bytes)
README

ojdbc7.jar (3,397,734 bytes) - (SHA1 Checksum: a2348e4944956fac05235f7cd5d30bf872afb157)
Certified with JDK 7 and JDK 8; It contains the JDBC driver classes except classes for NLS support in Oracle Object and Collection types.

6. If you have a username and password for Oracle, sign in with it now. If not, click the Create Account button to the right and fill in the form. Once signed in, you will see a dialog box similar to that shown below. Save you JDBC driver for Oracle to your downloads folder.



7. To download the JDBC Driver to Microsoft SQL Server, navigate your browser to msdn.microsoft.com/en-us/sqlserver/aa937724.aspx.

Microsoft JDBC Driver for SQL Server

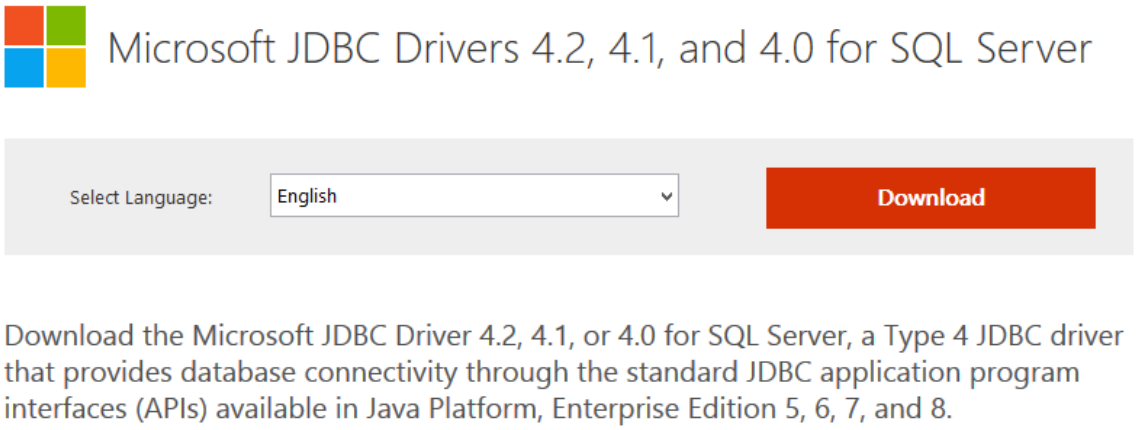
In our continued commitment to interoperability, Microsoft provides a Java Database Connectivity (JDBC) driver for use with SQL Server, SQL Azure, and Parallel Data Warehouse (PDW). The Microsoft JDBC Driver for SQL Server is available at no additional charge, and provides Java Database Connectivity from any Java application, application server, or Java-enabled applet. This driver is a Type 4 JDBC driver that provides database connectivity through the standard JDBC application program interfaces (APIs).

The Microsoft JDBC Driver for SQL Server has been tested against major application servers such as IBM WebSphere, and SAP NetWeaver.

Download the Microsoft JDBC Driver 4.2, 4.1, or 4.0 for SQL Server
The Microsoft JDBC Driver 4.2 for SQL Server supports Java Development Kit (JDK) version 8.0 in addition to JDK 7.0, 6.0, and 5.0, along with API compliance for JDBC 4.2, and Bulk Copy.

The Microsoft JDBC Drivers 4.2, 4.1, and 4.0 for SQL Server provide support for features first introduced in SQL Server 2012, including AlwaysOn, Correlated Tracing via XEvents, and UTF-16 support. Support includes Type 4 Kerberos on Windows and non-Windows platforms.

8. Click on the link (shown above) *Download the Microsoft JDBC Driver 4.2, 4.1 and 4.0 for SQL Server*.
9. Click the Download button, shown below:



10. On the Choose the download you want popup web page, select the following:

    - `license42.txt`
    - `sqljdbc_4.2.6420.100_enu.exe`
    - `sqljdbc_4.2.6420.100_enu.tar.gz`

    Click Next.

11. Save the three files to your downloads folder.

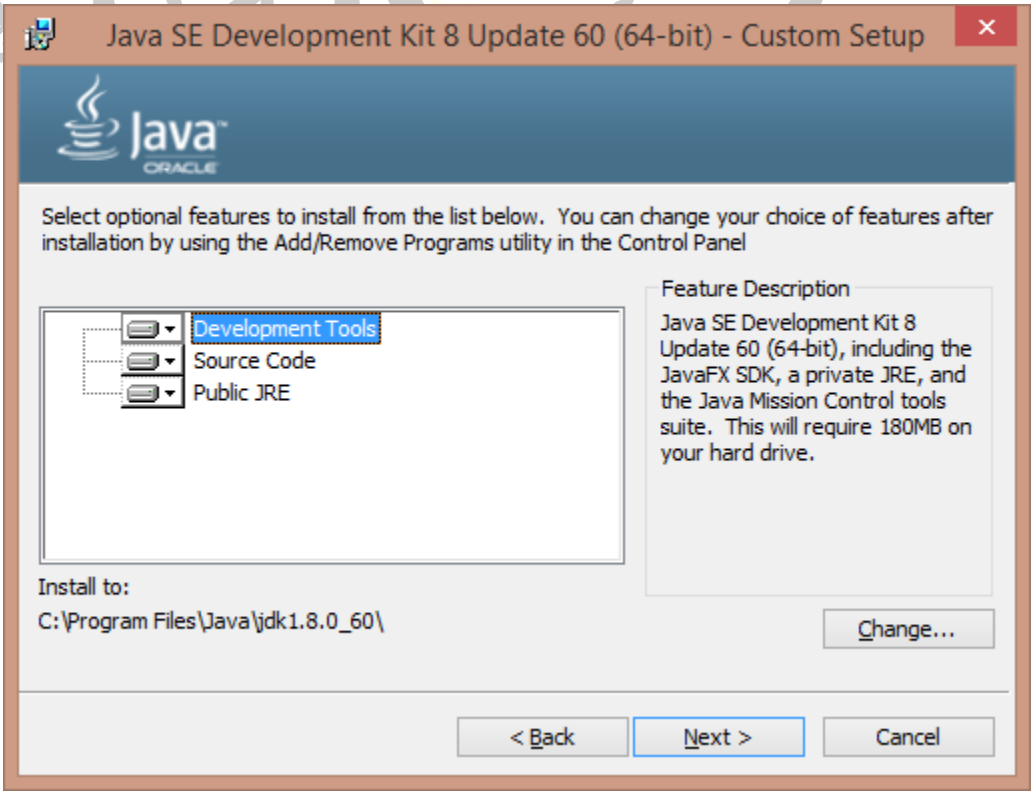
Step 1 – Install JDK 8

In this section, we outline how to install the Java Software Development Kit (JDK) 8.

1. Go to the folder containing the downloaded file `jdk-8u60-windows-x64.exe`, or similar.
2. Double-click this file to install the software.
3. If you are presented with a User Account Control dialog box, click Yes to start the install. You will be presented with the following dialog box:

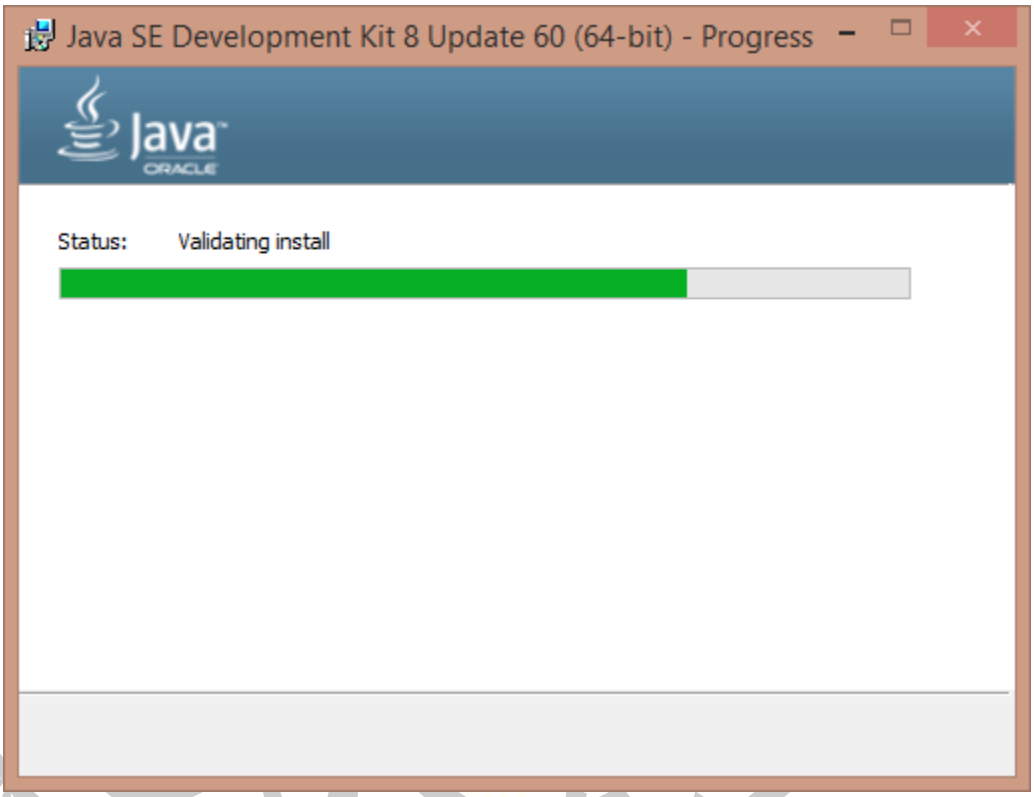
Click Next to continue the installation.

4. The Custom Setup dialog box will appear, as shown below:

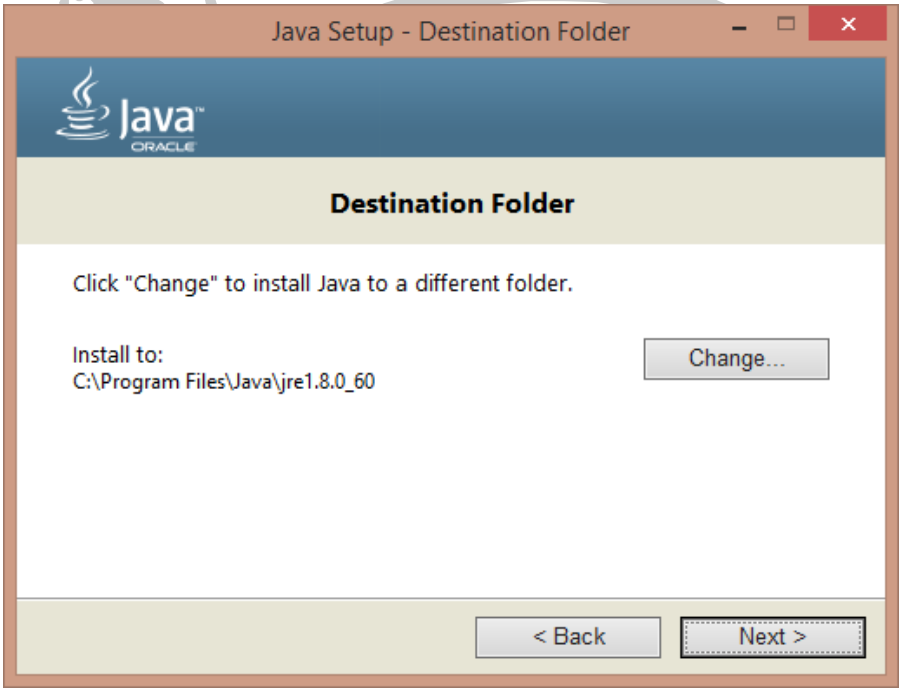


Ensure that the *Install to:* directory is where you'd like the JDK to be installed. Take note of this installation location since it will be used in the Post-Step 1 below. Click Next.

5. The Progress dialog box will appear indicating how far along the validation of the install is. Note that the JDK is not being installed yet.



6. You may be presented with the Destination Folder dialog box. If you are okay with the destination directory, click Next to continue.



7. At this point, the JDK will be installed on your system with the Progress dialog box indicating how far along the install is:

8. Once the installation has completed, the Complete dialog box will be displayed:

Click Close to dismiss the dialog box.

Step 2 – Install the JDBC Drivers for Oracle and SQL Server

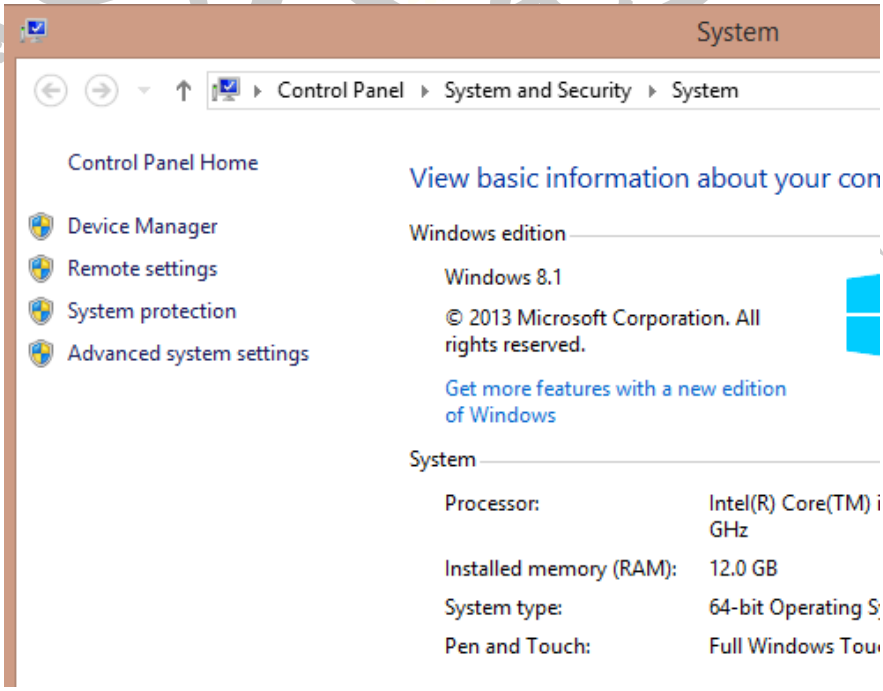
In this section, we install the JDBC drivers for Oracle and SQL Server.

1. Locate the file `ojdbc7.jar` in your downloads folder.
2. If the Oracle client software is installed on your machine, you can copy the file `ojdbc7.jar` to your `jdbc/lib` folder (mine is located in `C:\app\oracle\product\12.1.0\dbhome_1\jdbc\lib`). Note that it is very possible the file `ojdbc7.jar` already exists in that folder. If so, then do not overwrite it.
3. To install the JDBC Drivers for Microsoft SQL Server, locate the file `sqljdbc_4.2.6420.100_enu.exe` located in your downloads folder.
4. You can use either `sqljdbc_4.2.6420.100_enu.exe` or `sqljdbc_4.2.6420.100_enu.tar.gz` to start the installation. In either case, Microsoft recommends that you place these files in the folder `sqljdbc_4.2` in `C:\Program Files\Microsoft JDBC Driver 4.2 for SQL Server`.

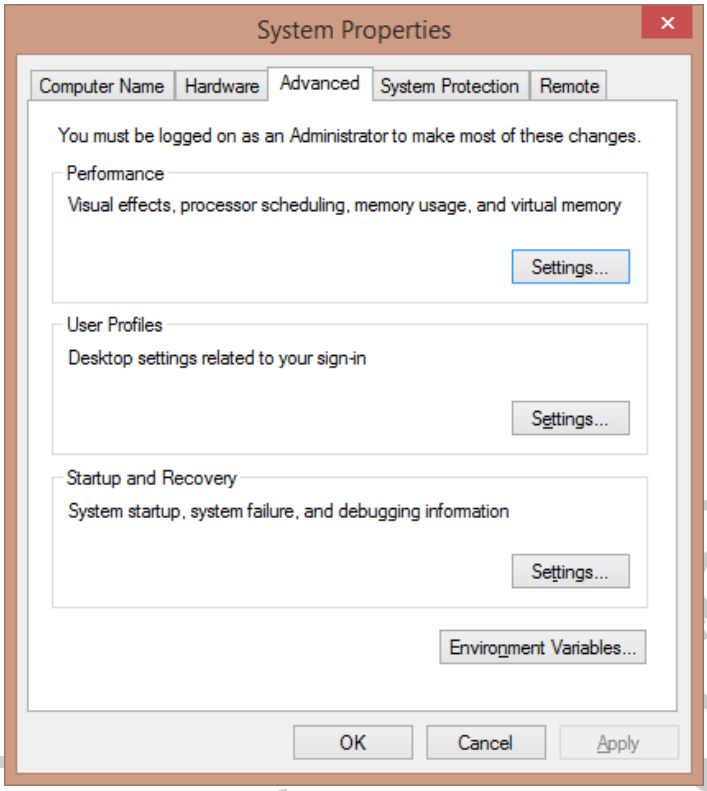
Post-Step 1 – Create/Modify Environment Variable(s)

In this step, we create or modify the JAVA_HOME environment variable. This will tell the operating system where to find the latest version of the JDK.

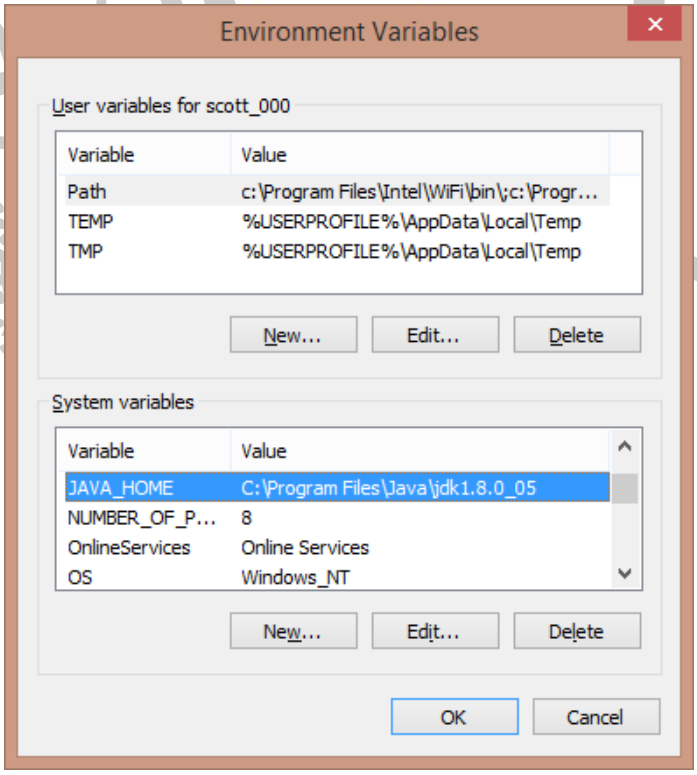
1. Right-click on This PC (or My Computer) and click on the Properties item in the popup menu. This will bring up the System dialog box, shown in part below:



2. Click on the Advanced system settings link on the left. This will display the System Properties dialog box:

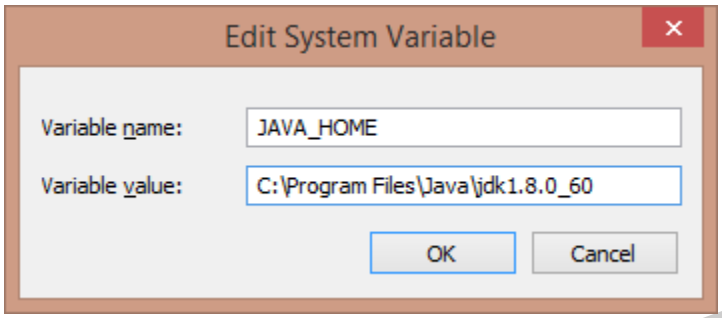


3. Click on the Environment Variables… button. This will display the Environment Variables dialog box:



4. Within the System variables section at the bottom, scroll down until you see the JAVA_HOME variable. If you do not see it, click on New… to bring up the New System Variable dialog box; otherwise, double-click the JAVA_HOME variable to bring up the Edit

System Variable dialog box. In either case, ensure that JAVA_HOME appears in the Variable name input box. In the Variable value input box, place the destination directory from Step 1 item #4. For me, that location is `C:\Program Files\Java\jdk1.8.0_60`. The dialog box will look something like this:

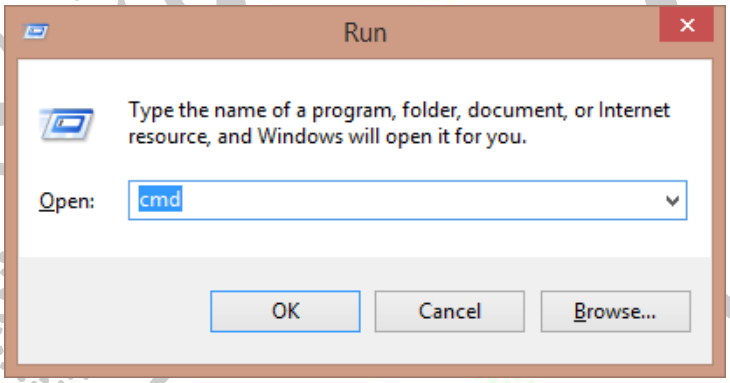


Click OK to create/modify the environment variable. Continue to click OK to close the remaining dialog boxes.

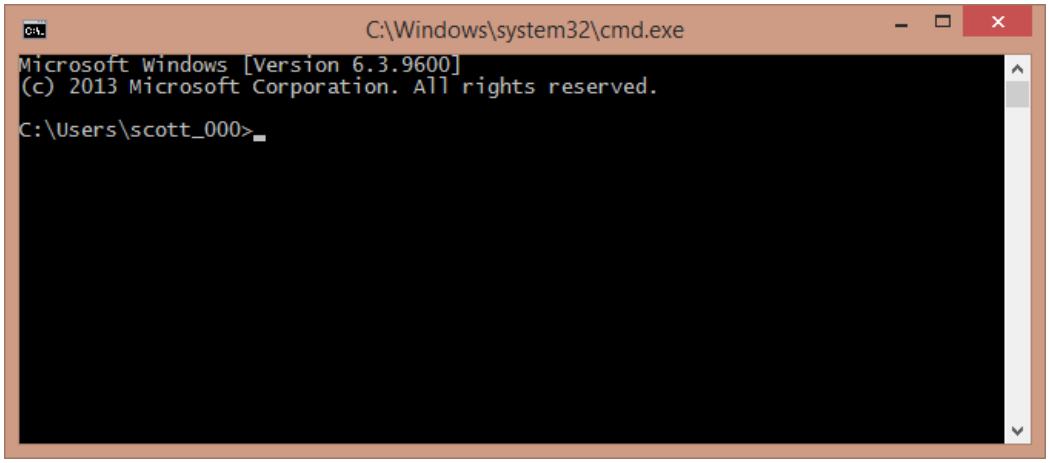
Post-Step 2 – Verifying the JDK 8 Install

In this step, we will ensure that the JDK can be found from the command line.

1. Open up a command window by clicking on the Windows Key + R. The Run dialog box appears:



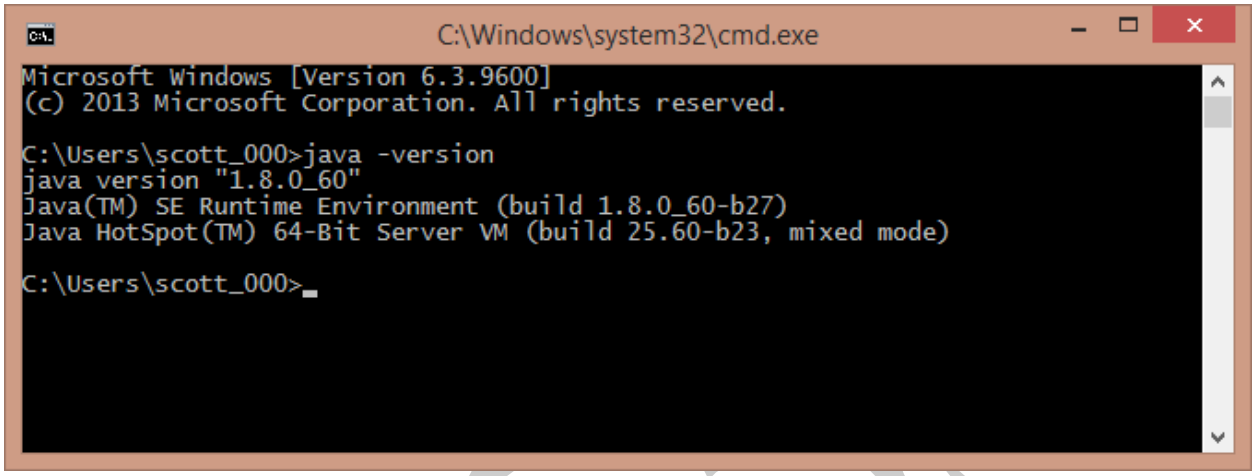
2. In the Open input box, enter the command `cmd` and click OK to bring up the command line:



3. At the command line, type in the following and hit the Enter key:

```
java -version
```

If all went well, you should see something similar to the following output:



This indicates that Windows can find the correct version of the JDK: 1.8.0_60 (i.e., JDK 8u60).

4. To close the command line window, either click on the X button, or enter the text EXIT and hit the Enter key.

Post-Step 3 – Testing Java and JDBC Connectivity to Oracle

In this step, we will create a small test program to check that the JDBC Drivers for Oracle are working properly.

Please see the appendix for the test data. This test data will be used in the Teiid examples later on in this document.

1. Within your favorite text editor, enter in the following code and save it as `OracleTest.java`. Note that you will need to modify the SQL code for the variable `rset` to point to a table of your choosing.

```
import java.sql.*;
import oracle.jdbc.*;
import oracle.jdbc.pool.OracleDataSource;

public class OracleTest {

 public static void main(String args[]) throws SQLException {

  //Create strings to hold the username, password and the name of the database.
  String username = "C##scott";
  String password = "tiger";
  String database = "orcl";

  // Open an OracleDataSource and get a connection
  OracleDataSource ods = new OracleDataSource();
  ods.setURL("jdbc:oracle:oci:@" + database);
  ods.setUser(username);
  ods.setPassword(password);
```

```
  Connection conn = ods.getConnection();

  // Create a statement
  Statement stmt = conn.createStatement();

  // Do the SQL "Hello World" thing
  ResultSet rset = stmt.executeQuery("SELECT CANDYBAR_NAME,COUNT(*) AS ROWCNT FROM
CANDYBAR_DATA GROUP BY CANDYBAR_NAME ORDER BY CANDYBAR_NAME");

  // For each row in the result set, print out the two columns.
  while (rset.next()) {
   System.out.println(rset.getString(1) + " " + rset.getInt(2));
  }

  // Close the result set, the statement and the connection
  rset.close();
  stmt.close();
  conn.close();

 }

}
```

2. At the command line, enter in the following code to compile and run the program. Note the both commands are on a single line each! Note that you may need to change the file locations if the JAR files are not in the locations shown below.

```
javac -classpath
.;C:\app\oracle\product\12.1.0\dbhome_1\jdbc\lib\ojdbc7.jar;C:\app\oracle\product\12.1
.0\dbhome_1\jlib\orai18n.jar OracleTest.java

java -classpath
.;C:\app\oracle\product\12.1.0\dbhome_1\jdbc\lib\ojdbc7.jar;C:\app\oracle\product\12.1
.0\dbhome_1\jlib\orai18n.jar OracleTest
```

3. If everything went well, you should see output from your table. Here is mine:

```
Heath Bar 3
Hershey Bar 4
Hershey Bar with Almonds 1
Hershey's Kisses 3
Hershey's Special Dark 3
Junior Mints 3
Krackel 3
Milk Duds 3
Mounds 4
Mr. Goodbar 2
```

Post-Step 4 – Testing Java and JDBC Connectivity to SQL Server

In this step, we will create a small test program to check that the JDBC Driver for SQL Server is working properly.

Please ensure that you have enabled connectivity to SQL Server via TCP/IP. See Section J/Step 3.6 for instructions on how to enable TCP/IP connectivity.

Please see the appendix for the test data. This test data will be used in the Teiid examples later on in this document.

4. Within your favorite text editor, enter in the following code and save it as `SQLServer2014Test.java`. Note that you will need to modify the SQL code for the variable `rset` to point to a table of your choosing. You will need to modify the variable `url` to point to your SQL Server server/instance.

```
import java.sql.*;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;

public class SQLServer2014Test {

 public static void main(String args[]) throws SQLException {

  //Create strings to hold the username, password and the name of the database.
  String username = "scott";
  String password = "tiger001";
  String database = "TESTDB";
  String url = "jdbc:sqlserver://SCOTT-LAPTOP\\SQLEXPRESS;user=" + username +
";password=" + password + ";databasename=" + database;

  System.out.println(url);

  // Open a SQLServerDataSource and get a connection
  //Class.forName("com.microsoft.sqlserver.jdbc.SQLServerDriver");
  Connection conn = DriverManager.getConnection(url, username, password);

  // Create a statement
  Statement stmt = conn.createStatement();

  // Do the SQL "Hello World" thing
  ResultSet rset = stmt.executeQuery("SELECT CANDYBAR_NAME,COUNT(*) AS ROWCNT FROM
CANDYBAR_DIM GROUP BY CANDYBAR_NAME ORDER BY CANDYBAR_NAME");

  // For each row in the result set, print out the two columns.
  while (rset.next()) {
   System.out.println(rset.getString(1) + " " + rset.getInt(2));
  }

  // Close the result set, the statement and the connection
  rset.close();
  stmt.close();
  conn.close();

 }

}
```

5. At the command line, enter in the following code to compile and run the program. Note the both commands are on a single line each! You may have to change to location of the JAR file if it is not in the location shown below.

```
javac -classpath .;C:\PROGRA~1\MICROS~1.2FO\sqljdbc_4.2\enu\sqljdbc42.jar
SQLServer2014Test.java

java -classpath .;C:\PROGRA~1\MICROS~1.2FO\sqljdbc_4.2\enu\sqljdbc42.jar
SQLServer2014Test
```

6. If everything went well, you should see output from your table. Here is mine:

```
Heath Bar 1
Hershey Bar 1
```

Hershey Bar with Almonds 1
Hershey's Kisses 1
Hershey's Special Dark 1
Junior Mints 1
Krackel 1
Milk Duds 1
Mounds 1
Mr. Goodbar 1

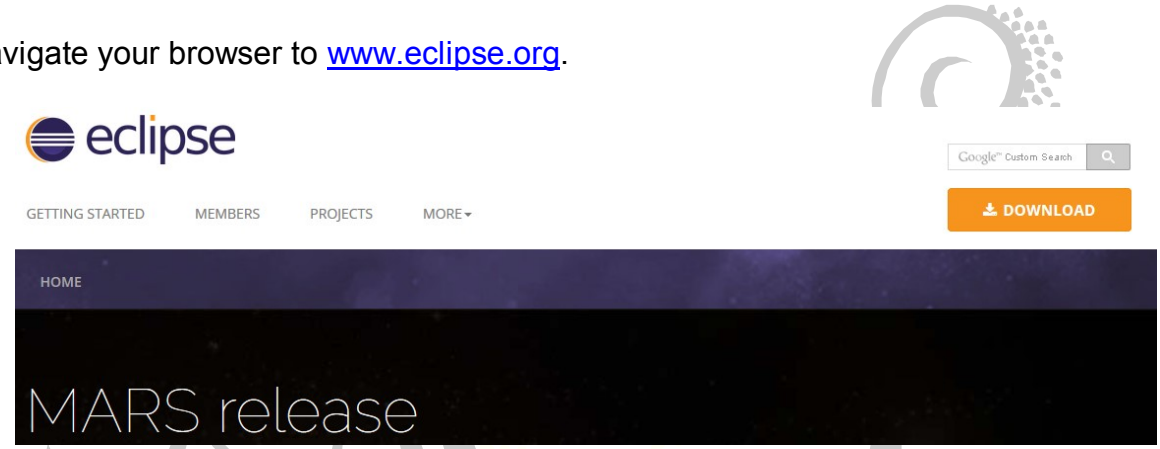
B. Eclipse "Mars" Integrated Development Environment (IDE)

WARNING: If you are planning on installing JBoss Developer Studio (JBDS) 8.1.0 GA, then this section is unnecessary since JBDS comes with Eclipse Luna (version 4.4). Follow the instructions in this section if you would like to have the latest version of Eclipse (Mars, version 4.5).

Now that the JDK is installed, one way to program with it is at the command prompt. But, this tends to be tedious. Another way is the use the Eclipse graphical user interface (GUI) integrated development environment (IDE). Note that Eclipse can also be used to program Scala as we shall see later on in these installation instructions.

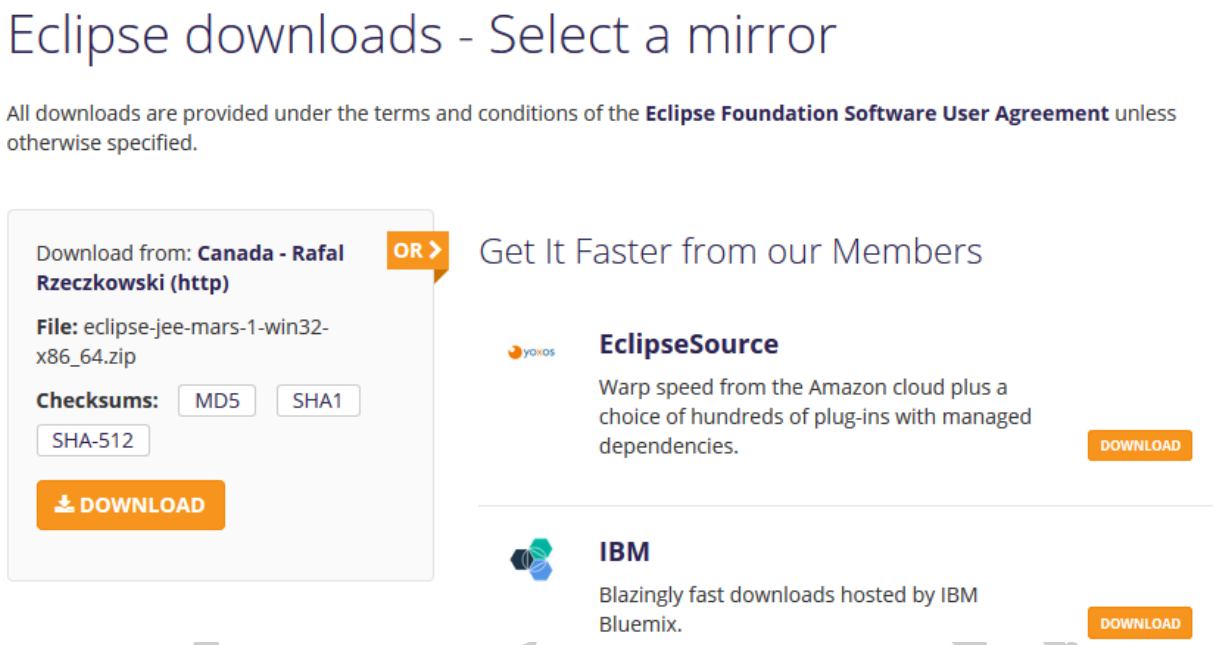
Pre-Step 1 – Download the Eclipse "Mars" IDE

1. Navigate your browser to www.eclipse.org.



2. Click on the Download button. The following web page, shown in part, will be displayed:

3. Rather than use the Eclipse Installer (described at the top of the image above), we will download the 64 bit **Eclipse IDE for Java EE Developers**, shown at the bottom of the image above. This will bring up the Select a Mirror web page:

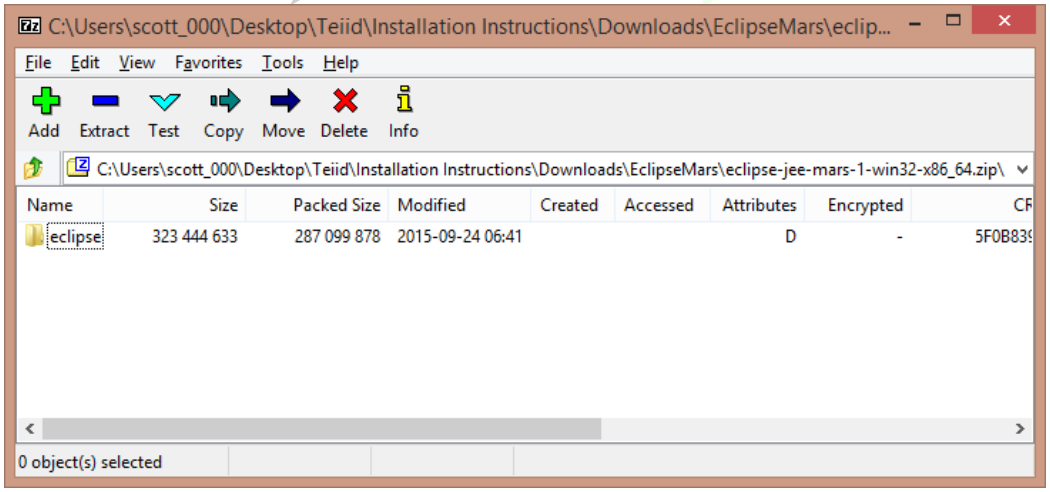


4. Click the Download button on the left side of the page to start the download. Save this file (`eclipse-jee-mars-1-win32-x64_64.zip`) to your downloads folder.

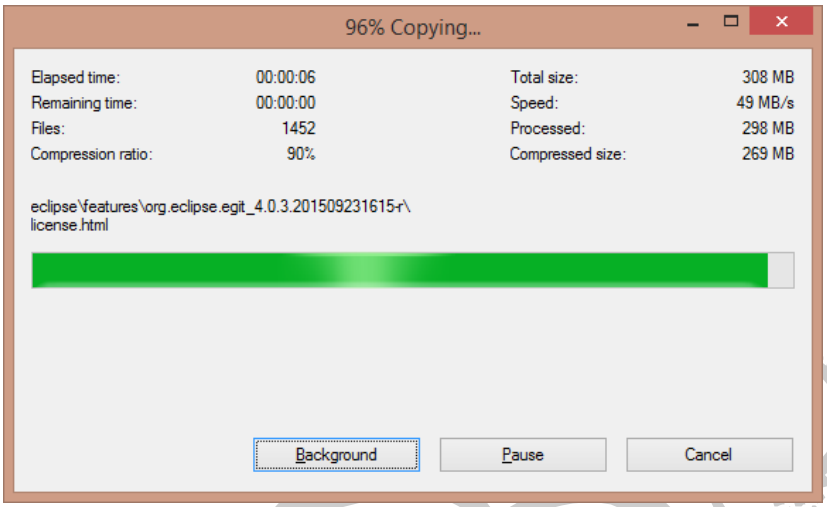
Step 1 – Install Eclipse

In this section, we describe how to install the Eclipse "Mars" IDE. Note that since the downloaded file is a zip file, you will need to have WinZip, PKZip, or other un-zipping tool installed on your machine.

1. Locate the file `eclipse-jee-mars-1-win32-x64_64.zip` in your downloads folder.
2. Double-click this file to start your zip software. You should see something similar to the following:



3. Now, the eclipse folder, shown above, can be placed anywhere. Normally, I place it on the C-Drive (under C:\). The choice is yours. Depending on your zip software, you may see a progress dialog box, similar to the one shown below:



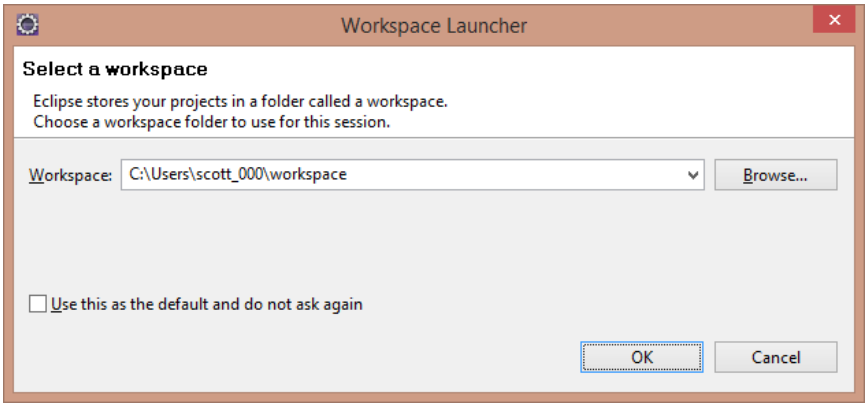
At this point, you can close your zip software.

Post-Step 1 – Starting Eclipse for the First Time

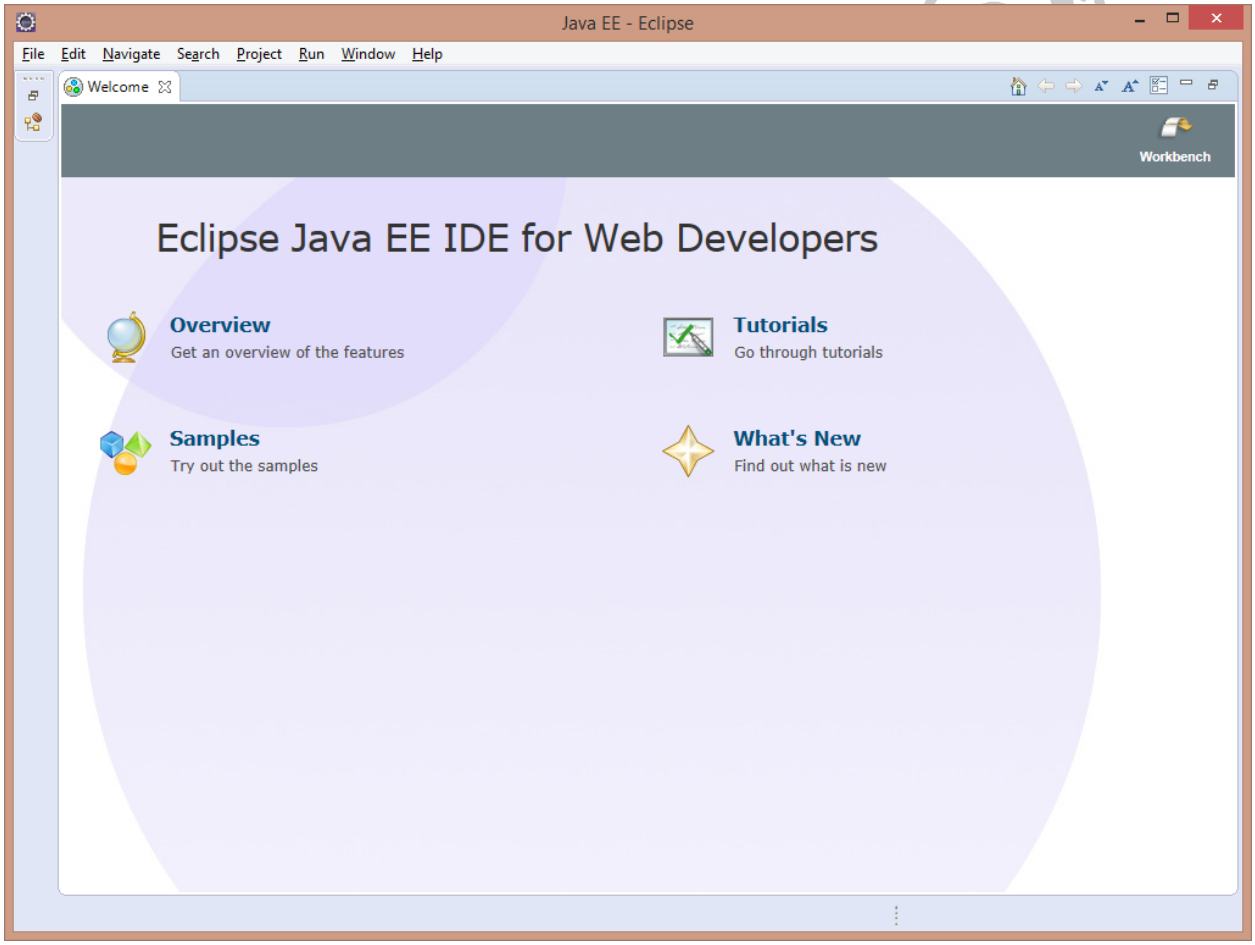
In this step, we will start the Eclipse software and ensure that it can find our JDK.

1. Locate the eclipse folder you just extracted. For me, it's located in C:\eclipse.
2. To start Eclipse, double-click on the executable file `eclipse.exe`. You will see the following start-up screen:

3. The Workspace Launcher dialog box is displayed, shown below, asking you to approve or change the location of the Eclipse workspace. You can use the default by clicking on OK.



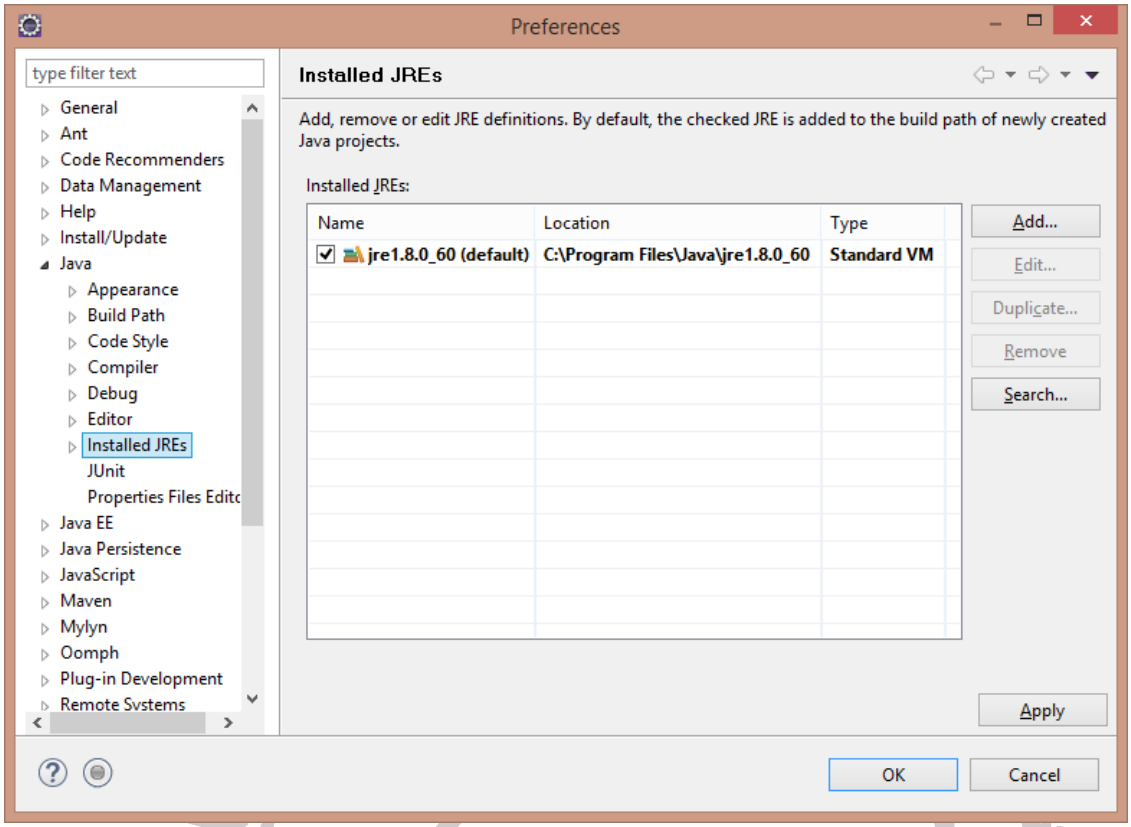
4. At this point, the IDE appears. Click the Workbench icon to display the integrated development environment itself.



Post-Step 2 – Ensuring Eclipse is Using JDK 8

In this step, we will ensure that our JDK 8 is being used by Eclipse.

1. Start the Eclipse IDE.
2. Once the IDE starts, click on the Preferences menu item under the Windows menu.
3. Within the left pane, click on the Installed JREs node under the Java tree. You should see something similar to the following:



Ensure that the JRE 1.8.0_60 is being picked up. If not, you can remove the offending line using the Remove button, and add a new line using the Add button. Click OK to dismiss the dialog box and exit out of Eclipse.

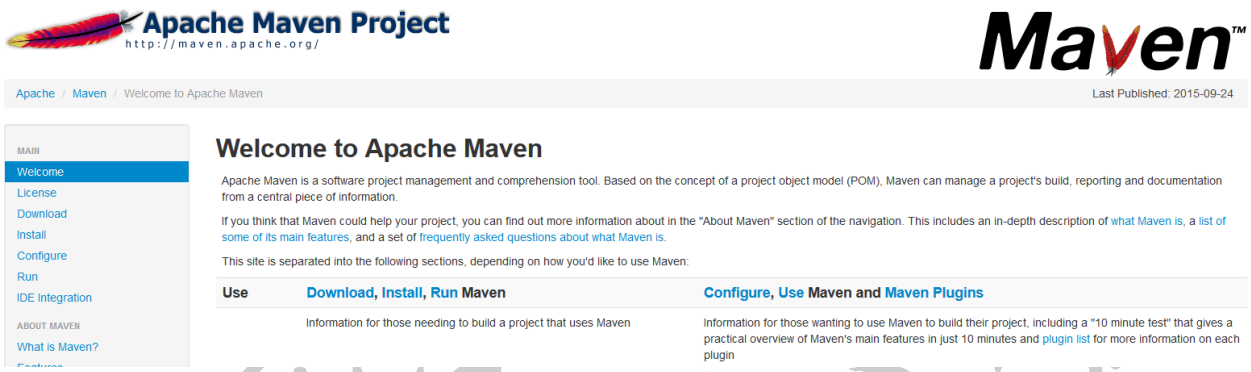
C. Apache Maven

This section details how to download and install Apache Maven. According to Wikipedia, *Maven is a build automation tool used primarily for Java projects*. If you've ever used `make` or Apache Ant, Maven is similar in concept.

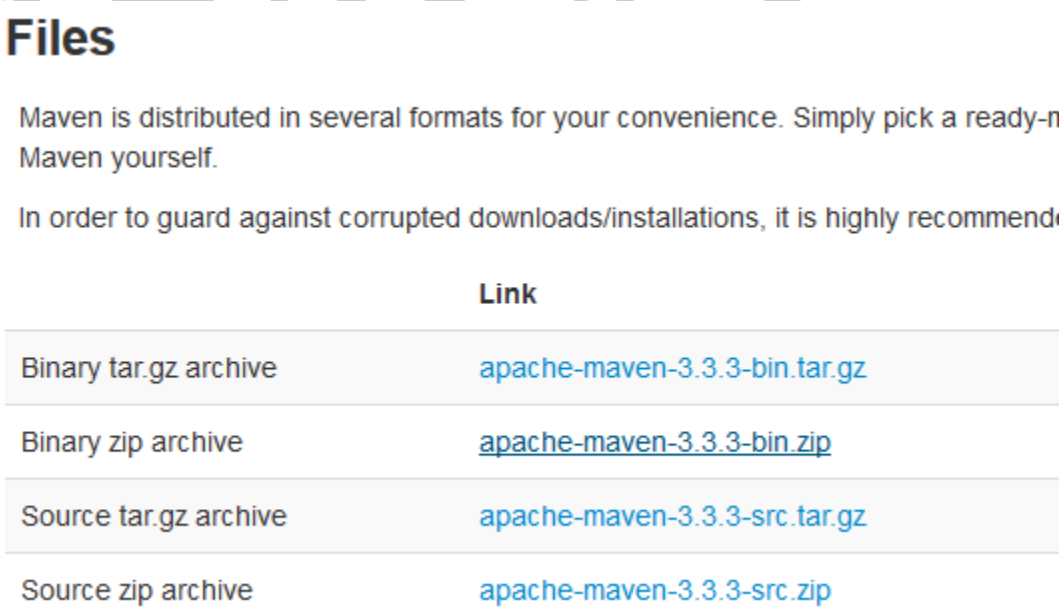
Pre-Step 1 – Downloading Apache Maven

In this step, we will download Apache Maven.

1. Navigate your browser to maven.apache.org. You will see something similar to the following:



2. Click on the Download link and you will be brought to the download web page, shown in part below:

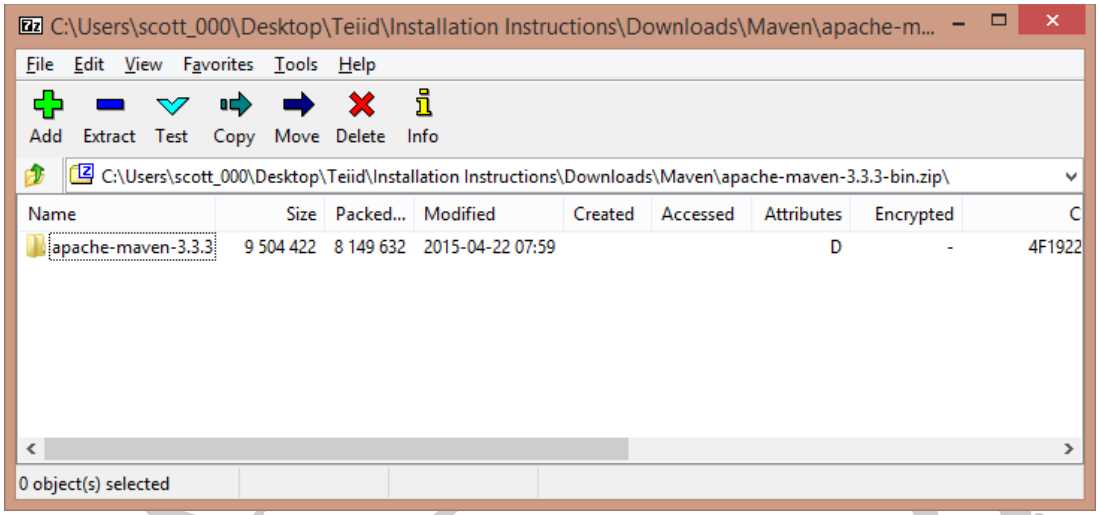


3. Click on the link to the right of the text Binary zip archive. Save this file to your downloads folder.

Step 1 – Installing Apache Maven

In this step, we will install Apache Maven. Since the downloaded file is a zip file, we can just use our favorite zip software to extract the folders/files to the hard-drive.

1. Locate the file `apache-maven-3.3.3-bin.zip` and double-click it to start up your zip software, shown below:

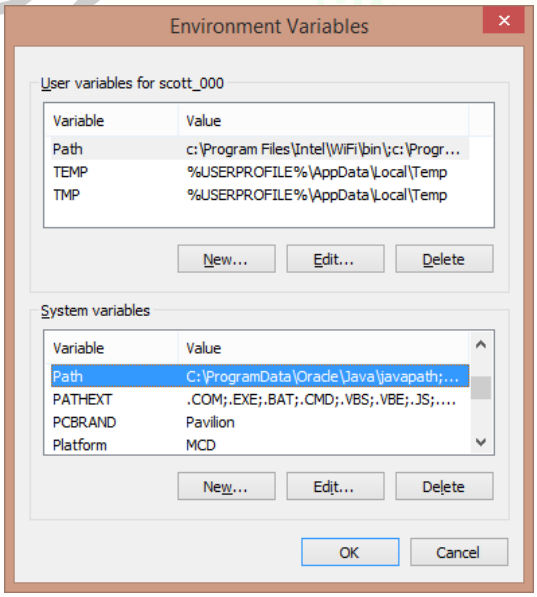


2. Extract the folder `apache-maven-3.3.3` to your C-Drive (C:\).
3. Close your zip software.

Post-Step 1 – Configuring the PATH Environment Variable

In this step, we will modify the PATH environment variable to add the folder `C:\apache-maven-3.3.3\bin` to it. This will allow Windows to find the executable software.

1. Open up the Environment Variables dialog box as explained in Section A/Post-Step 1.
2. Locate the PATH environment variable within the System variables section:



3. Click on the Edit… button to bring up the Edit System Variable dialog box.
4. Within the Variable value input box, add the following to the end of the text:

```
;C:\apache-maven-3.3.3\bin
```

5. Click OK to close the dialog box. Continue to click OK until all of the dialog boxes are closed.

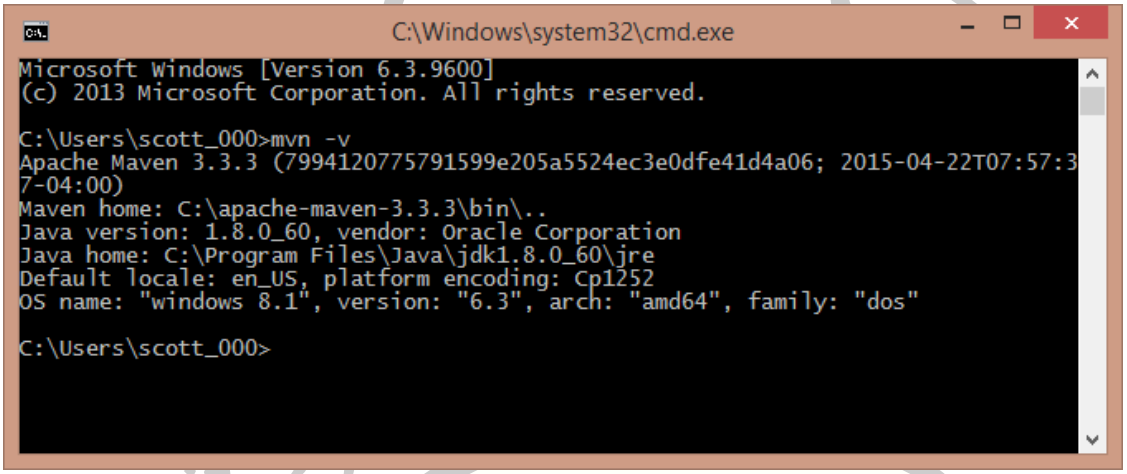
Post-Step 2 – Testing Apache Maven

In this step, we will use the command line to test if Windows can find the Apache Maven software.

1. Open up a command prompt, as described in Section A/Post-Step 2.
2. At the command prompt, type the following, and then hit the Enter key:

```
mvn -v
```

If all went well, you should see something similar to the following:



3. Close the command prompt.

D. Scala

This section details how to download and install the programming Language Scala. Note that, although we do not describe it, you can download a Scala-specific IDE at scala-ide.org.

Pre-Step 1 – Downloading the Scala Programming Language

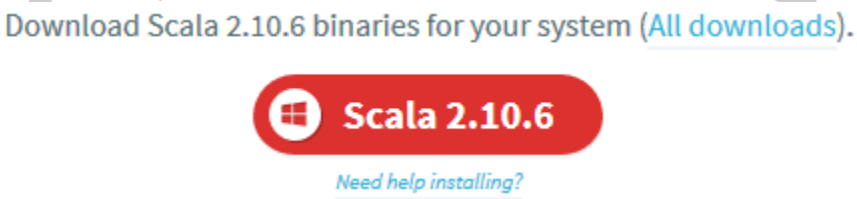
Warning: Apache Spark recommends using the Scala version 2.10 (2.10.6) rather than the latest version (2.11.7)! This section explains how to download Scala 2.10.6.

In this step, we will download the Scala Programming Language.

1. Navigate your browser to the Scala Download Previous Versions website at www.scala-lang.org/download/all.html.

2. Scroll down until you see Scala 2.10.6. Click the link and you will be taken to the Scala 2.10.6 download page.

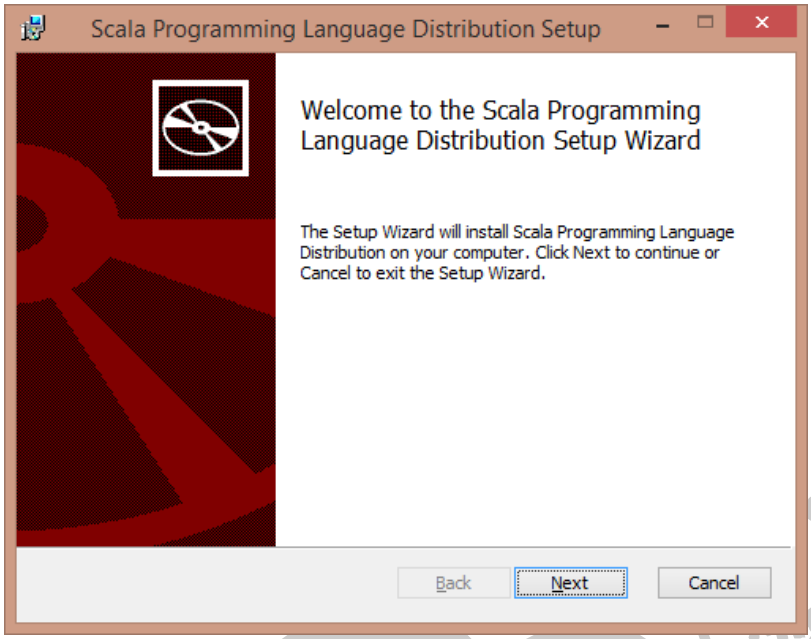
3. Click on the Scala 2.10.6 button and save the file `scala-2.10.6.msi` to your downloads folder.



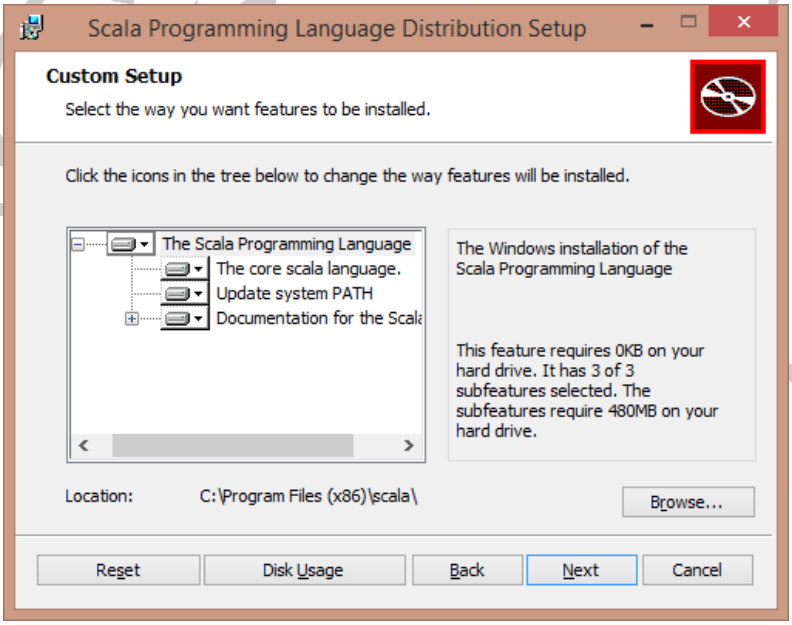
Step 1 – Installing the Scala Programming Language

In this step, we will install the Scala Programming Language.

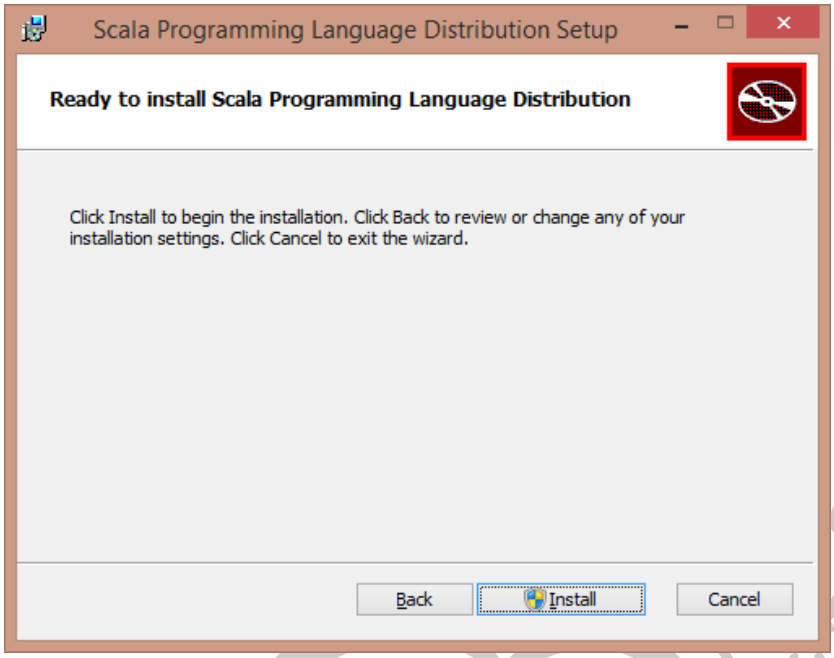
1. Locate the file `scala-2.10.6.msi` in your downloads folder and double-click it to start the installer:



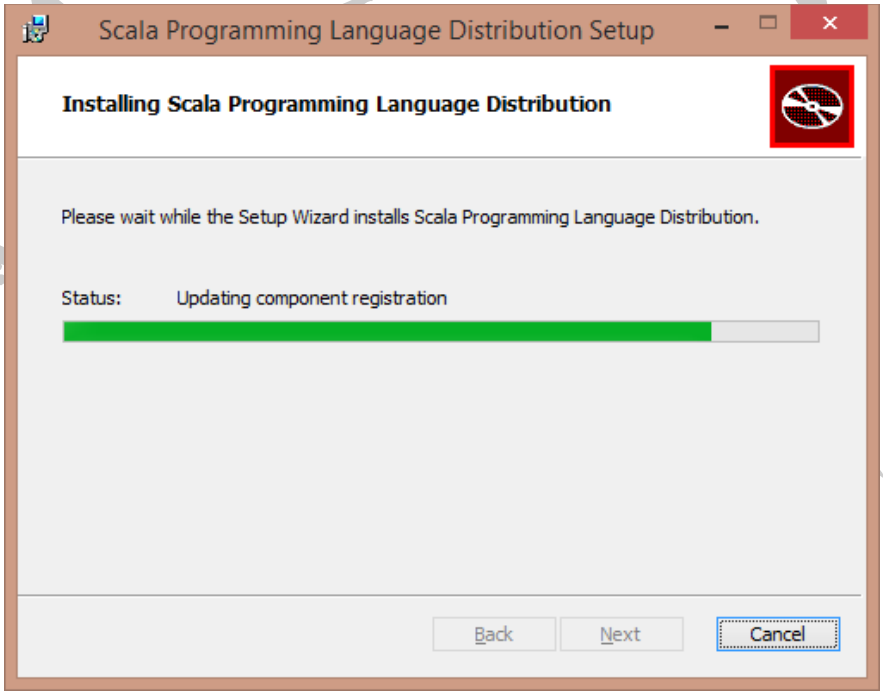
2. Click Next to bring up the End-User License Agreement dialog box. Ensure that the checkbox to the left of the text *I accept the terms in the License Agreement* is checked.
3. Click Next to display the Custom Setup dialog box, shown below. Take note of the installation location (`C:\Program Files (x86)\scala`) as it will be needed later on.



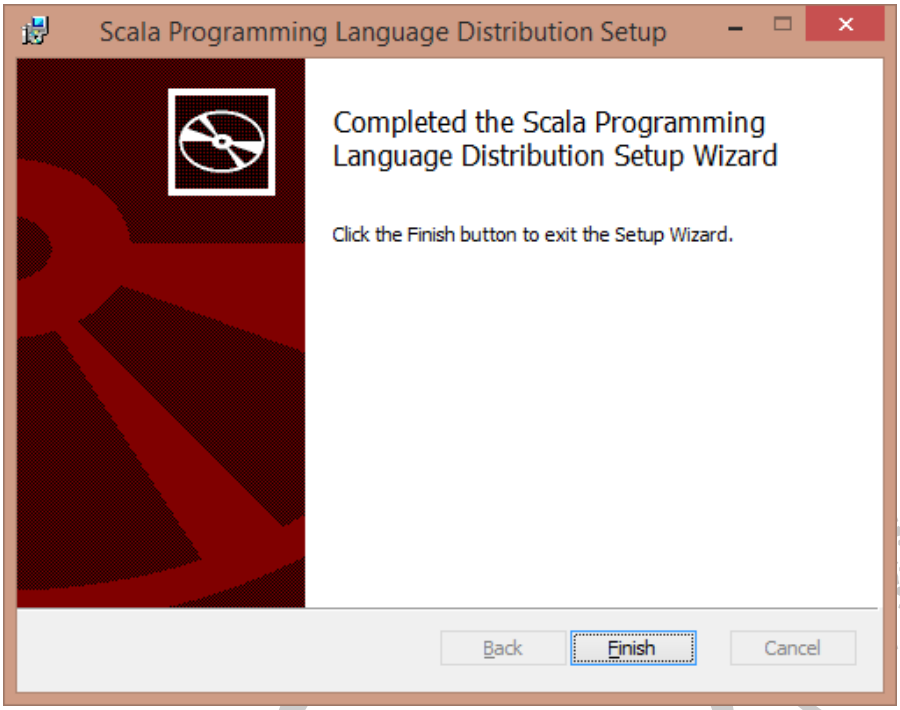
4. Click Next to display the Ready to Install Scala Programming Language Distribution dialog box. Click the Install button to start the installation of Scala.



5. A User Account Control dialog box may appear. If so, click Yes to continue the installation.
6. While the software is being installed, a progress bar will appear:



7. Once the installation has completed, the completed installation dialog box appears. Click Finish to dismiss the dialog box.



Post-Step 1 – Create/Modify Environment Variables

In this step, we will create and/or modify several environment variables related to our Scala install.

1. Open up the Environment Variables dialog box as explained in Section A/Post-Step 1.
2. Locate the PATH environment variable within the System variables section.
3. Add the following text to the end of the input box:

```
;C:\Program Files (x86)\scala\bin
```

Note that the Scala installer may have already placed this at the end of the PATH variable. If so, you do not need to add it again.

4. Click OK to save the modification to the PATH environment variable.
5. Click the New… button to bring up the New System Variable dialog box.
6. For Variable name, enter `SCALA_HOME`.
7. For Variable value, enter `C:\Program Files (x86)`
8. Click OK to save the new environment variable. Continue to click OK to close the remaining dialog boxes.

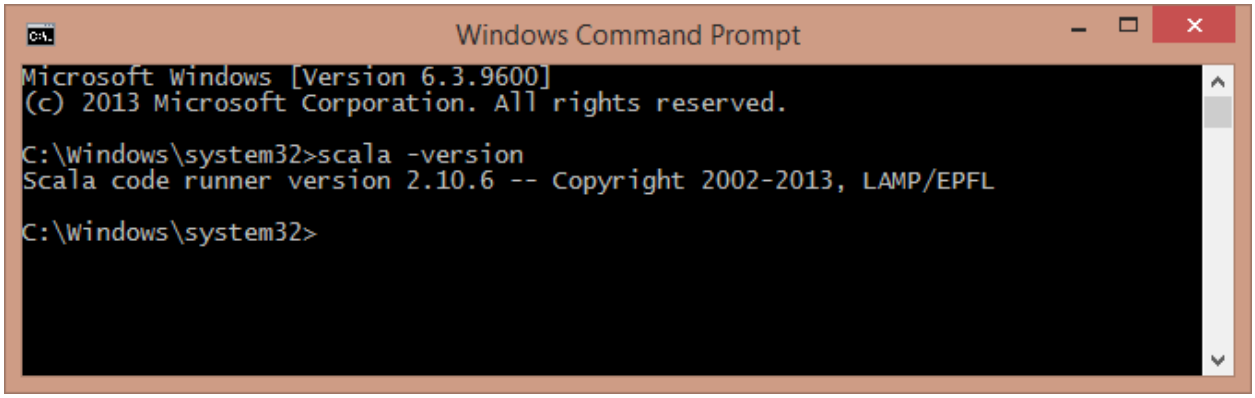
Post-Step 2 – Checking the Scala Installation

In this step, we will test if Windows can find the Scala compiler.

1. Open up a command prompt, as described in Section A/Post-Step 2.
2. At the command prompt, type the following, and then hit the Enter key:

```
scala -version
```

If all went well, you should see something similar to the following:



3. Close the command prompt.

Post-Step 3 – Compiling Our First Scala Program

In this step, we will create a small Scala program and attempt to compile and run it at the command prompt.

1. Within your favorite text editor, enter in the following Scala commands and save them to a file called `HelloWorld.scala`.

```
object HelloWorld {

 def main(args: Array[String]) {
  println("Hello, World!!!");
 }

}
```

2. At the command prompt, change directory (“`cd`”) to where you stored `HelloWorld.scala`.
3. Compile the program by entering the following at the command line followed by the Enter key:

```
scalac HelloWorld.scala
```

4. Run the program by entering the following at the command line followed by the Enter key:

```
scala HelloWorld
```

5. If all went well, you should see the following returned at the command prompt:

```
>scalac HelloWorld.scala
>scala HelloWorld
```

```
Hello, World!!!
```

6. Exit out of the command prompt.

Post-Step 4 – Configuring Eclipse Mars to Run the Scala Plugins

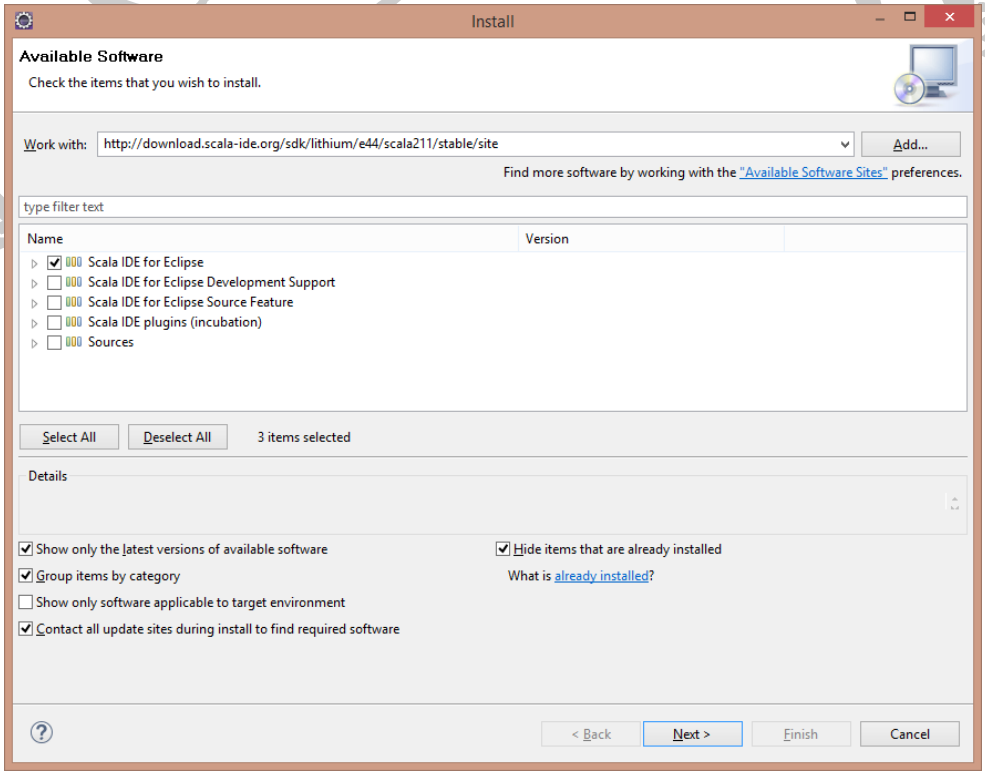
WARNING: If you installed Eclipse Mars in Section B and would like to program Scala from the IDE, then follow these instructions.

In this step, we will update Eclipse so that we can code, compile and execute Scala programs from within the Eclipse IDE.

1. Start Eclipse.
2. Click on the Install New Software… menu item under the Help menu. This will display the Install dialog box.
3. In the *Work with:* input box, enter in the following:

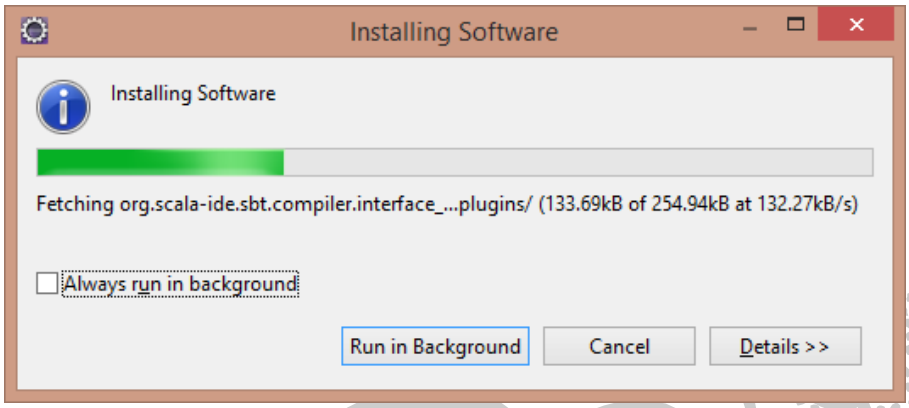
```
http://download.scala-ide.org/sdk/lithium/e44/scala211/stable/site
```

It may take a few moments, but the large text box in the center of the dialog box will be populated with choices, as shown below:

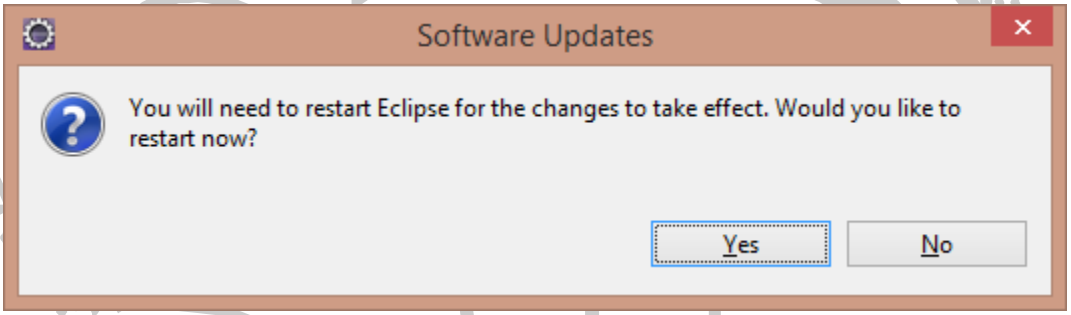


4. Ensure that the checkbox to the left of the text Scala IDE for Eclipse is checked. Click Next.
5. The Item Details dialog box appears indicating what software will be added to Eclipse. Click Next.

6. The Review Licenses dialog box will appear. Ensure that the radio button to the left of the text *I accept the terms of the license agreements* is checked *for each item* appearing in the Licenses pane on the left.
7. Click Finish.
8. The Installing Software dialog box will appear displaying the installation progress:



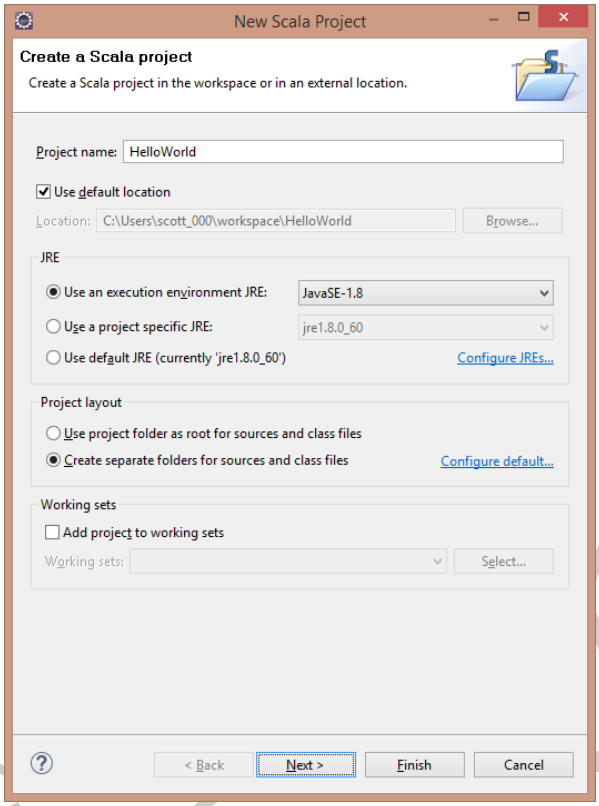
9. Once the installation is complete, you will be told to restart Eclipse. Click Yes to restart Eclipse.



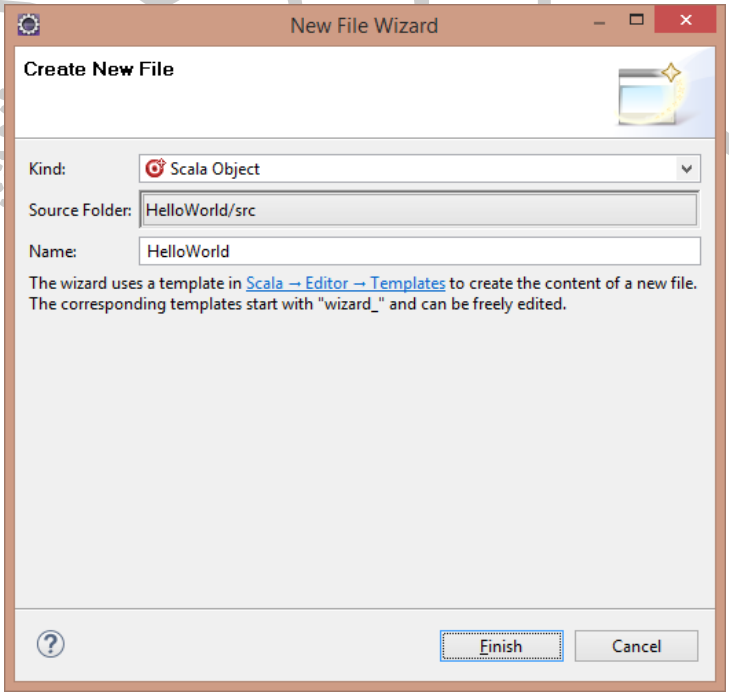
Post-Step 5 – Creating HelloWorld in Eclipse

In this step, we will code the Scala HelloWorld program in Eclipse.

1. Start Eclipse.
2. Open the Scala Perspective by clicking on Window → Perspective → Open Perspective → Other. When the dialog appears, double-click the Scala entry.
3. Next, we need to create a Scala Project. Click File → New → Scala Project. The New Scala Project dialog box will appear, as shown below. Fill in the Project Name. For our Hello World example, fill in HelloWorld. Click Finish to create the project.



4. Now that we have a project, we need to create a Scala Object in a similar way to the `HelloWorld.scala` code shown above. Expand the `HelloWorld` project under the Package Explorer (the left pane in the IDE), right-click over `src` and click New → Scala Object. When the New File Wizard dialog box appears, shown below, enter in the `HelloWorld` in the Name input box. Click Finish



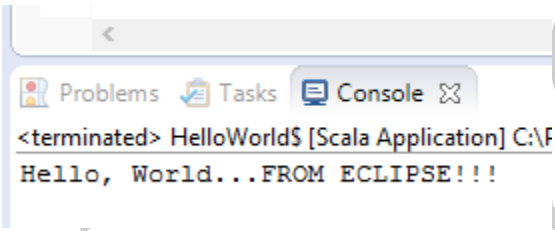
5. In the main body of the IDE, you will see the code object `HelloWorld { }` with no code within it. Fill in the like this:

```
object HelloWorld {

  def main(args: Array[String]) {
    println("Hello, World...FROM ECLIPSE!!!");
  }

}
```

6. Save the code by clicking File → Save All.
7. To run the code, click Run → Run As → Scala Application.
8. If everything went well, the text `Hello, World…FROM ECLIPSE!!!` will appear in the console tab at the bottom of the IDE:



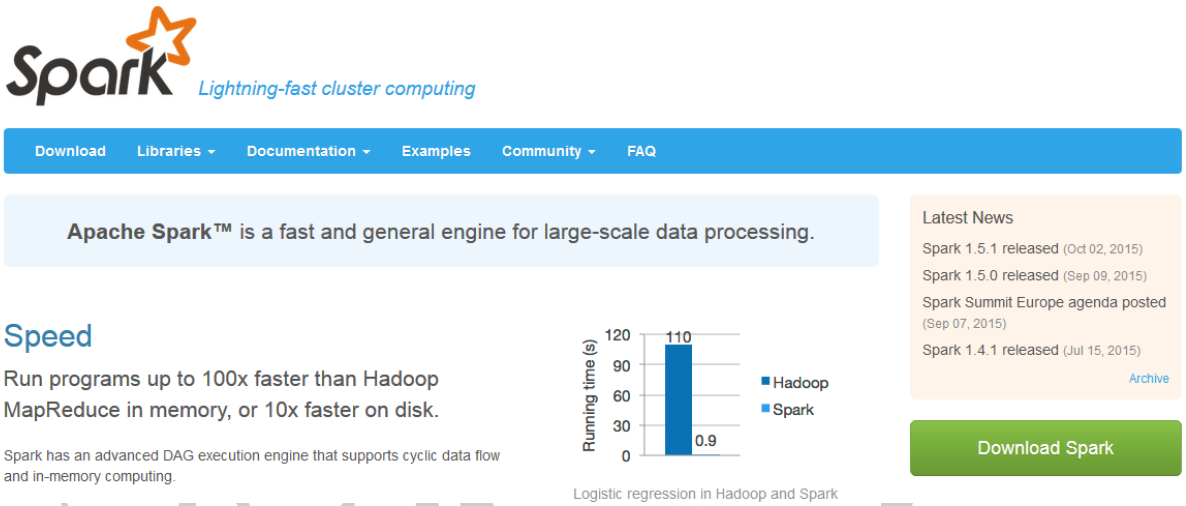
E. Apache Spark

This section details how to download and install Apache Spark, a high-performance cluster computing framework.

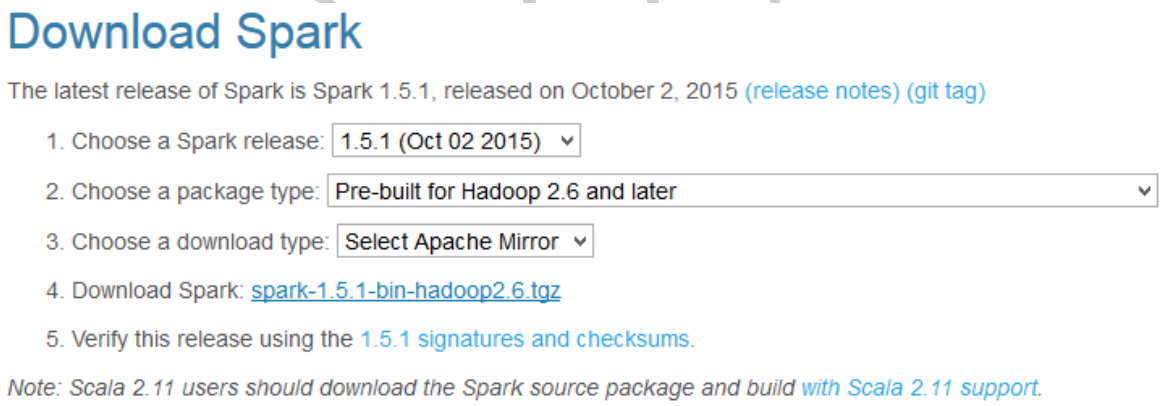
Pre-Step 1 – Downloading Apache Spark

In this step, we will download Apache Spark.

1. Navigate your browser to spark.apache.org. You will see something similar to the following:



2. Click the Download Spark button and you will be taken to the Download Spark web page, shown below:



3. Ensure that you choose the latest Spark release (*1.5.1 (Oct 02 2015)*, as shown above) and that the package type is *Pre-built for Hadoop 2.6 and later*. Next, click on the link on the Download Spark line (#4 shown above, `spark-1.5.1-bin-hadoop2.6.tgz`).

4. You are brought to the Apache Software Foundation sight and a suggested download mirror is presented to you:

5. Click on the link, shown above, and download the file to your downloads folder.

Step 1 – Installing Apache Spark

In this step, we will install Apache Spark.

1. Locate the file `spark-1.5.1-bin-hadoop2.6.tgz` in your downloads folder and double-click on it to start your zip software.
2. Initially, your zip software will un-gzip the file and display the tar file `spark-1.5.1-bin-hadoop2.6.tar`. Double-click this tar file and your zip software will un-tar it and present you with a folder named `spark-1.5.1-bin-hadoop2.6`.
3. Since Apache Spark uses Java, you can extract this folder to any location you wish. For me, I extracted it to my C-Drive.

Post-Step 1 – Testing Apache Spark

In this step, we will test the install of Apache Spark..

1. In a command window, change directory to `C:\spark-1.5.1-bin-hadoop2.6\bin` (or the `bin` folder where you placed Apache Spark).
2. Enter in the following command and hit the Enter key:

```
spark-shell
```

   At this point, you will be given the Scala interactive shell where you can enter in Spark commands. Note that you may see several warning messages.

3. Start the Windows Task Manager and ensure that you can see all of the CPUs.
4. At the command line, enter in the following command:

```
sc.parallelize(1 to 1000000000).count()
```

While this is running, take note of Task Manager and the reaction of the CPUs. You should see all of your CPUs working heavily. Once the command has completed, you will see the following results at the command line:

```
scala> sc.parallelize(1 to 1000000000).count()
[Stage 3:>                                                          (0 + 8) / 8]
[Stage 3:==============>                                            (2 + 6) / 8]
[Stage 3:====================================>                      (5 + 3) / 8]
[Stage 3:============================================>              (6 + 2) / 8]
[Stage 3:=================================================>         (7 + 1) / 8]

res3: Long = 1000000000

scala>
```

5. Close the Task Manager and exit out of the Scala interactive shell by typing exit and hitting the Enter key. Note that you may see several warning messages.

F. JBoss Developer

This section details how to download JBoss Developer Studio as well as how to install and configure it. Note that the JBoss Developer Studio version we download comes installed with JBoss Enterprise Application Platform (EAP) 6.4 (which contains JBoss Application Server 7.5) as well as Eclipse Luna (version 4.4).

Note #1: In the instructions below, we install an older version of JBoss Developer Studio: 8.1.0 GA. **If you are planning on installing Teiid Designer, you must install JBoss Developer Studio 8.1.0 GA instead of the latest version 9.0.0 GA!**

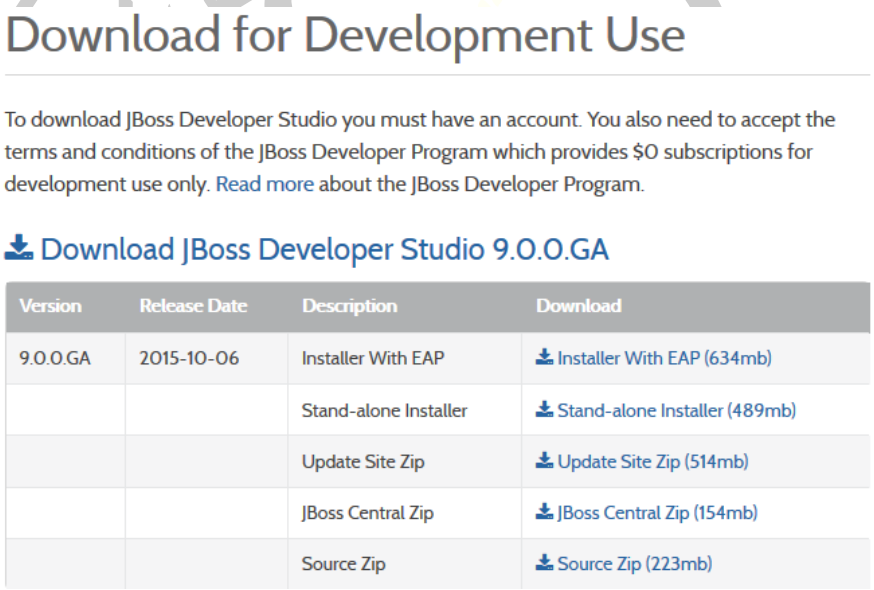
Note #2: JBDS 9.0.0 GA comes bundled with JBoss Enterprise Application Platform (EAS) 6.4 (Application Server 7.5).

Note #3: JBDS 8.1.0 GA comes bundled with JBoss Enterprise Application Platform (EAS) 6.3 (Application Server 7.4).

Pre-Step 1 – Download JBoss Developer Studio (JBDS)

In this step, we will download the JBoss Developer Studio (JBDS) software.

1. Navigate your browser to www.jboss.org/products/devstudio/download, shown in part below:



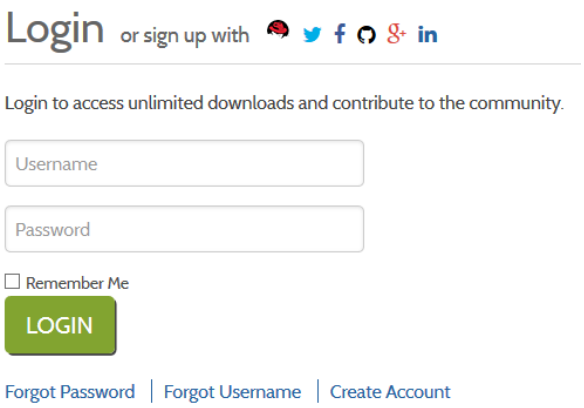
Download for Development Use

To download JBoss Developer Studio you must have an account. You also need to accept the terms and conditions of the JBoss Developer Program which provides $0 subscriptions for development use only. Read more about the JBoss Developer Program.

Download JBoss Developer Studio 9.0.0.GA

Version	Release Date	Description	Download
9.0.0.GA	2015-10-06	Installer With EAP	Installer With EAP (634mb)
		Stand-alone Installer	Stand-alone Installer (489mb)
		Update Site Zip	Update Site Zip (514mb)
		JBoss Central Zip	JBoss Central Zip (154mb)
		Source Zip	Source Zip (223mb)

2. Scroll down until you see the View Older Downloads link and click on it to expand a selection of older versions of JBoss Developer Studio.
3. Scroll down until you see 8.1.0.GA. Click on the Installer With EAP (706mb) link.
4. In order to download the software (a Java `.jar` file), you will need to either create an account or provide a username and password, as shown below:



5. Once successfully logged in, download the software (named `jboss-devstudio-8.1.0.GA-installer-eap.jar`) to your downloads folder.

Step 1 – Install JBoss Developer Studio (JBDS)

In this step, we will install the JBoss Developer Studio (JBDS) software.

1. Locate the file `jboss-devstudio-8.1.0.GA-installer-eap.jar` you downloaded in the step above.
2. Double-click the file `jboss-devstudio-8.1.0.GA-installer-eap.jar` to start the installer. After a few moments, you will be shown the following dialog box:

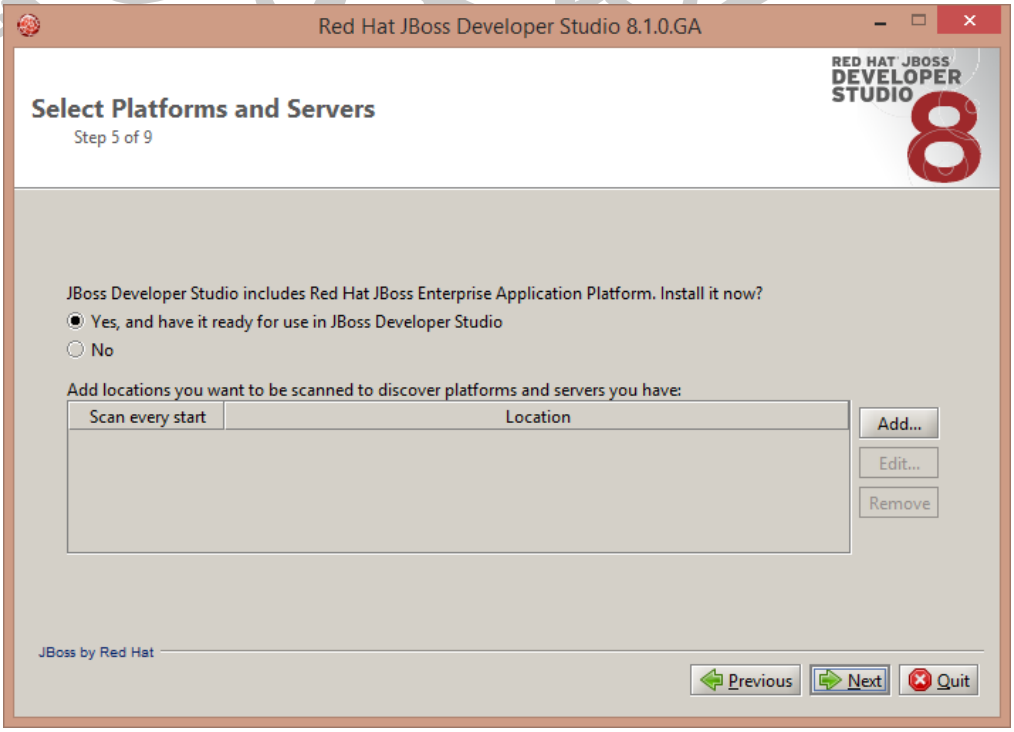
3. Click Next to continue the install. The End User License Agreement dialog is displayed. Ensure that the radio button to the left of the text *I accept the terms of this license agreement.* is checked. Click Next.

4. On the Select Target Folder dialog, you can either accept the suggested installation path (for me, `C:\Users\scott_000\jbdevstudio`), or change it to something more desirable. Click Next.

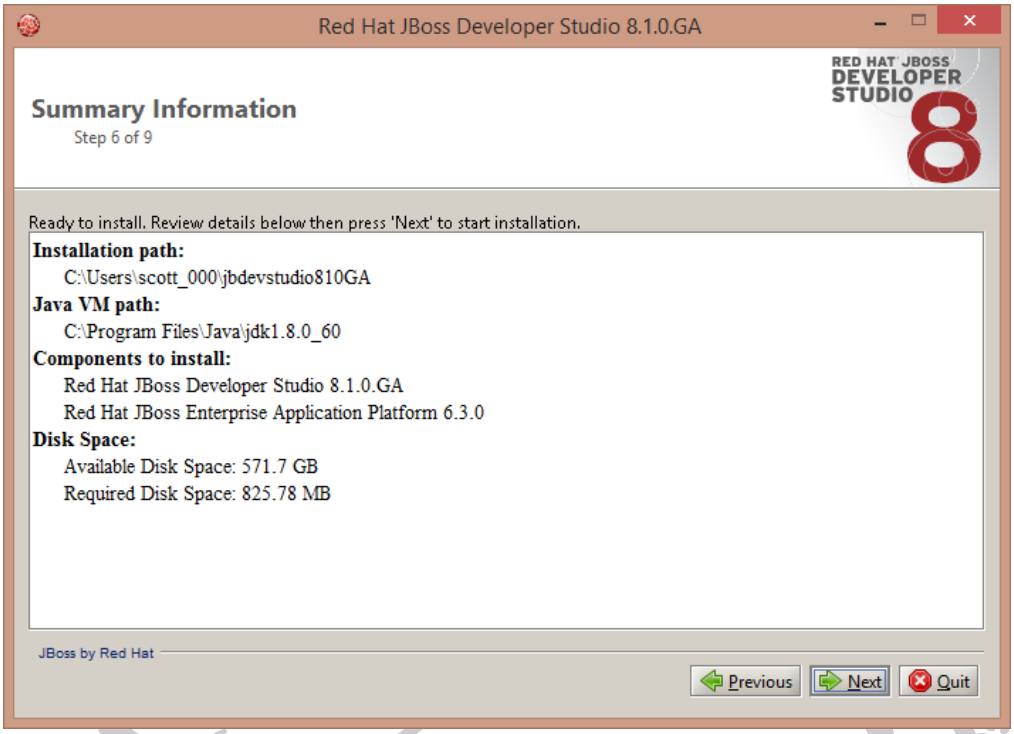
You will be asked it you would like the target directory created. Click OK when this dialog box appears.

5. On the Select Java VM dialog, ensure that the radio button to the left of the text *Specific Java VM* is checked. Then, using the Browse… button, locate JDK 8 installed in Section A. For me, it's located in `C:\Program Files\Java\jdk1.8.0_60`. Click Next.

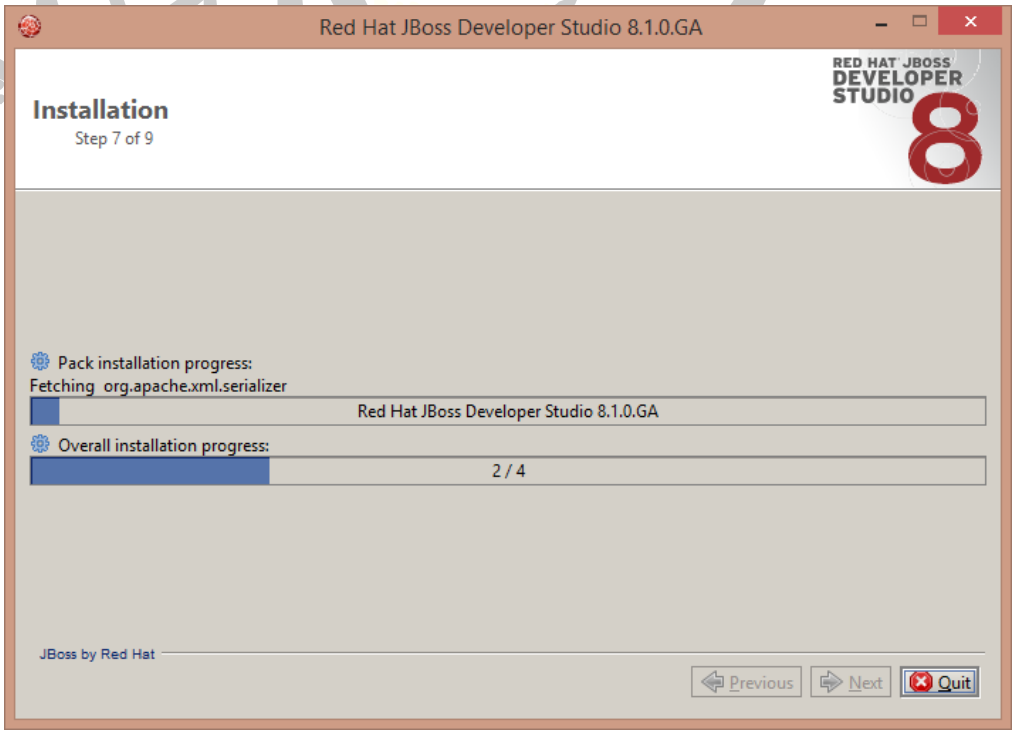
6. On the Select Platforms and Servers dialog, ensure that the radio button to the left of the text *Yes, and have it ready for use in JBoss Developer Studio* is checked. Click Next.



7. On the Summary Information dialog, ensure that the information presented is correct. Click Next.



8. On the Installation dialog, you will see the progress of your install. This may take a while…get yourself a sandwich.



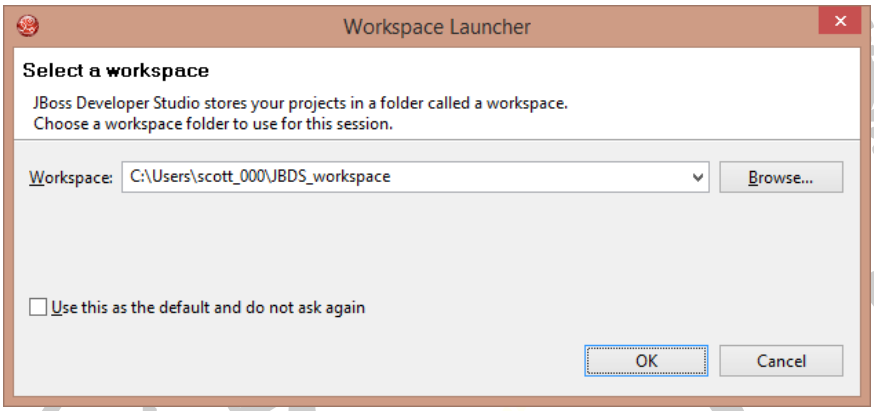
9. Once the installation is complete – you'll see the word [Finished] – click Next to continue.
10. On the Setup Shortcuts dialog, ensure the both checkboxes are checked. Click Next to continue.

11. On the Finish dialog, uncheck the checkbox and click Done to complete the install.

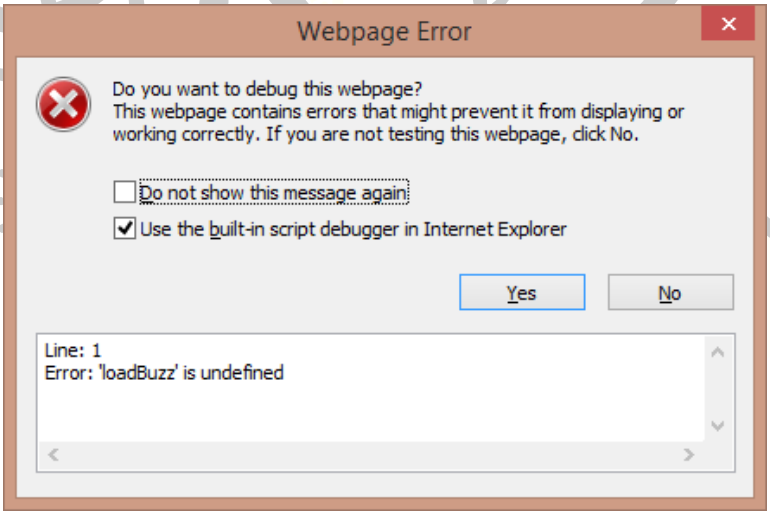
Post-Step 1 – Setting Up JBoss Developer Studio (JBDS)

In this step, we will start JBoss Developer Studio (JBDS) for the first time.

1. Locate the JBoss Developer Studio (JBDS) icon on your desktop and double-click it to start the software.
2. When the *Select a workspace* dialog box appears, choose your workspace. Note that since we set up Eclipse previously, the workspace selected in this dialog may be the same. You probably don't want that to happen, so select a different workspace. For me, I choose `JBDS_workspace` instead of the default `workspace`. Click OK to continue.



3. You may be asked to debug the current web page. Click No to continue.



4. If you click on the Servers tab at the bottom of the IDE, you will note the single line *jboss-eap [Stopped]*. To start JBoss Enterprise Application Platform (EAP), right-click and click on the Start popup menu item. After a moment, JBoss Application Server 7.4 will be started.
5. In the JMX Navigator pane on the bottom left of the IDE, expand the Server Connections node. You will note the single entry *jboss-eap [Disconnected]*. Right-click and click on the *Connect…* popup menu item.

6. At this point, the EAP 6.3 server (JBoss Application Server 7.4) has been started and the IDE is now connected to it.

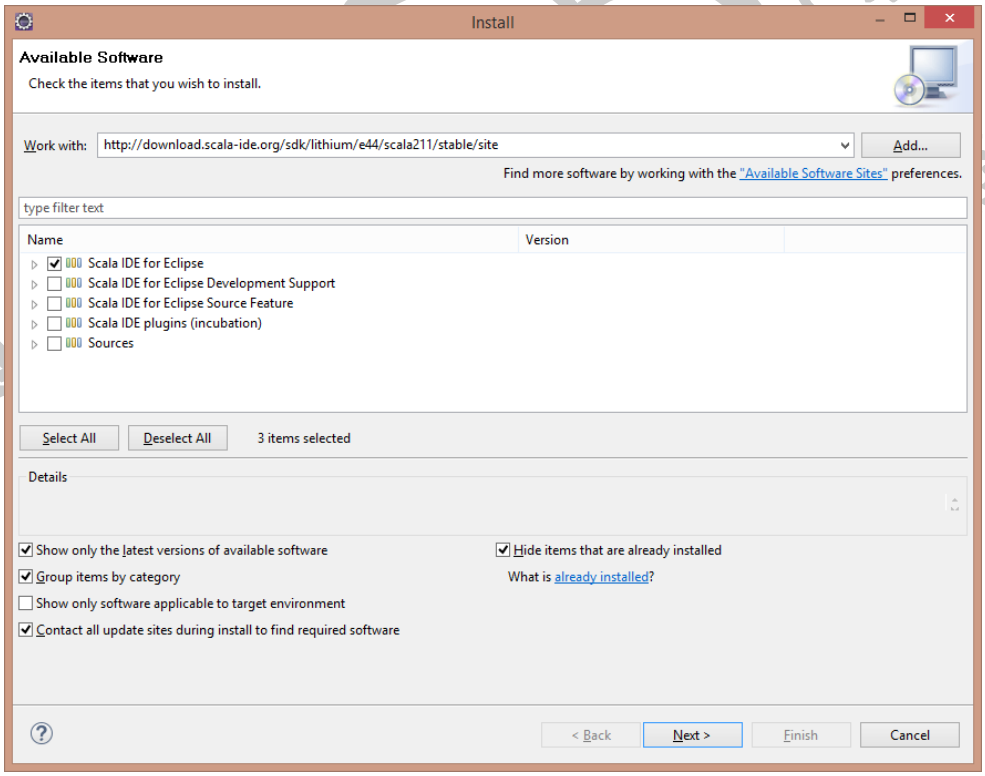
Post-Step 2 – Configuring Eclipse Luna to Run the Scala Plugins

In this step, we will update Eclipse Luna so that we can code, compile and execute Scala programs from within the Eclipse Luna IDE.

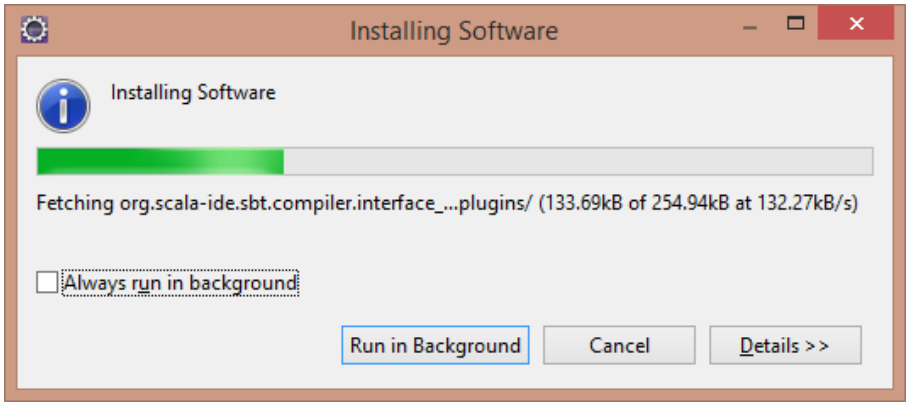
1. Start Eclipse.
2. Click on the Install New Software… menu item under the Help menu. This will display the Install dialog box.
3. In the *Work with:* input box, enter in the following:

```
http://download.scala-ide.org/sdk/lithium/e44/scala211/stable/site
```

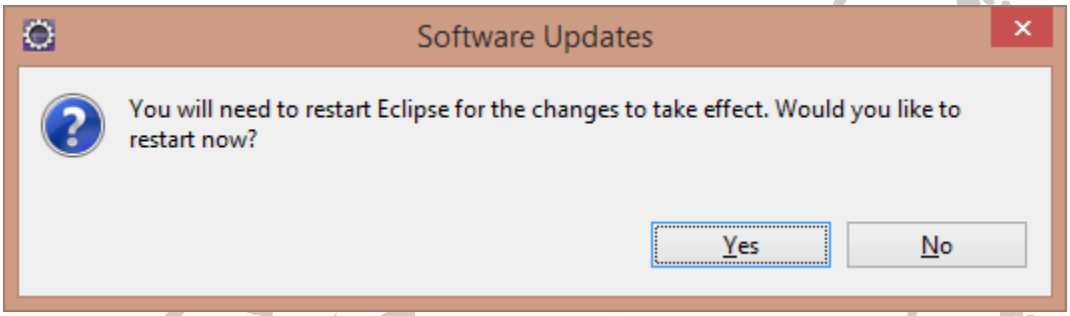
It may take a few moments, but the large text box in the center of the dialog box will be populated with choices, as shown below:



4. Ensure that the checkbox to the left of the text Scala IDE for Eclipse is checked. Click Next.
5. The Item Details dialog box appears indicating what software will be added to Eclipse. Click Next.
6. The Review Licenses dialog box will appear. Ensure that the radio button to the left of the text *I accept the terms of the license agreements* is checked *for each item* appearing in the Licenses pane on the left.
7. Click Finish.
8. The Installing Software dialog box will appear displaying the installation progress:



9. Once the installation is complete, you will be told to restart Eclipse. Click Yes to restart Eclipse.



Post-Step 3 – Forcing Scala to Compile Using Version 2.10

By default, the Eclipse Scala plug-in will compile to a target Scala version of 2.11. If you would like to change this to 2.10, then do the following:

1. Start Eclipse.
2. Choose the Scala Perspective (Window → Open Perspective → Other…).
3. Right-click your Scala project and click on the Properties menu item.
4. Ensure that the checkbox to the left of the text Use Project Settings is checked.
5. In the drop-down box to the right of the text *Scala Installation*, select *Latest 2.10 bundle (dynamic)*.
6. On the Standard tab, select `jvm-1.7` from the *target* dropdown box.
7. Click OK.
8. To test if you are actually working with the proper version, run the following Scala code:

```
object HelloWorld {
  def main(args: Array[String]) {
    println(util.Properties.versionNumberString);
  }
}
```

You should see the version number `2.10.6` appear in the Console window at the bottom of the IDE.

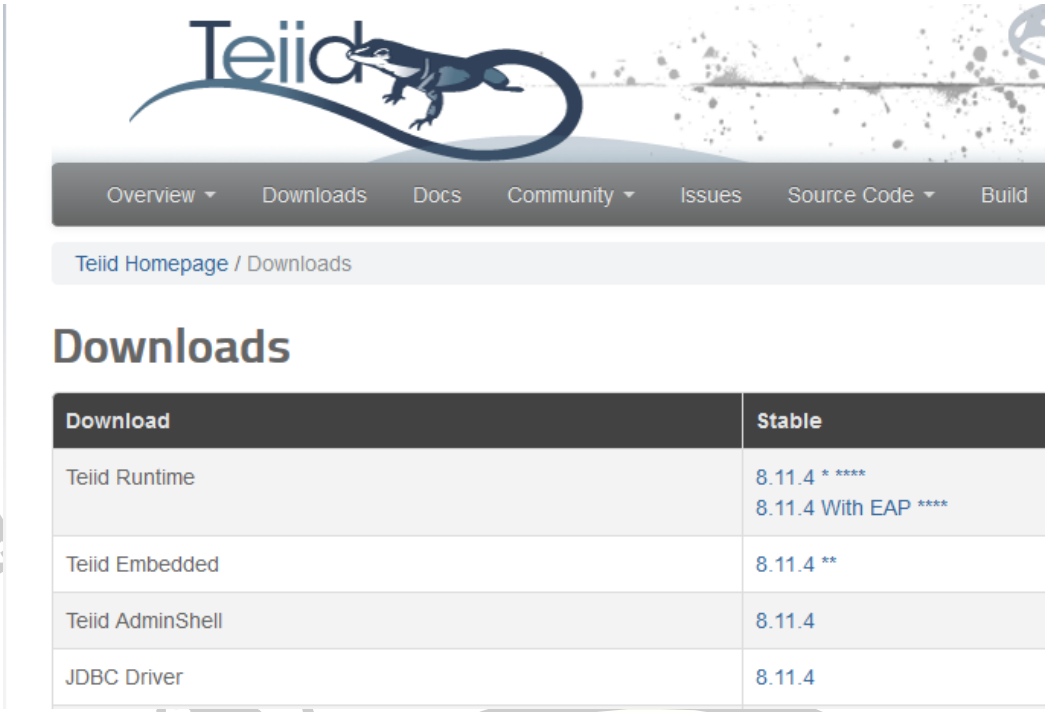
G. Teiid Data Virtualization Software

This section details how to download the Teiid Data Virtualization software as well as how to install and configure it..

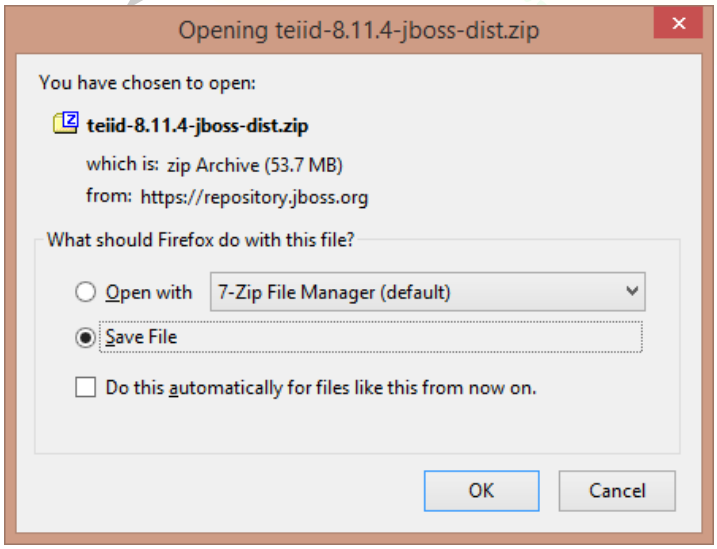
Pre-Step 1 – Download the Teiid Data Virtualization Software

In this step, we will download the Teiid Data Virtualization software.

1. Navigate your browser to teiid.jboss.org/downloads (or equivalently, www.jboss.org/teiid/downloads.html) shown in part below:



2. Click on the link labeled 8.11.4 on the Teiid Runtime line under the Stable column. Save this file (`teiid-8.11.4-jboss-dist.zip`) to your downloads folder.

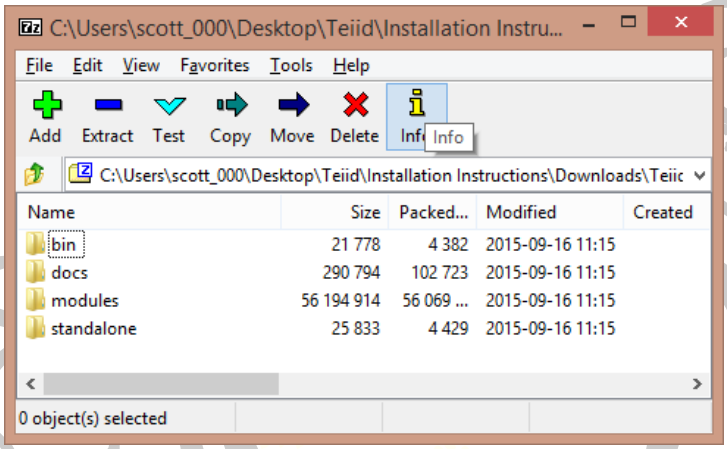


3. Do the same for the Teiid AdminShell (`teiid-8.11.4-adminshell.zip`), the JDBC Driver (`teiid-8.11.4-jdbc.jar`) and the Teiid Web Console (`teiid-console-dist-1.2.0.Final-jboss-as7.zip`).

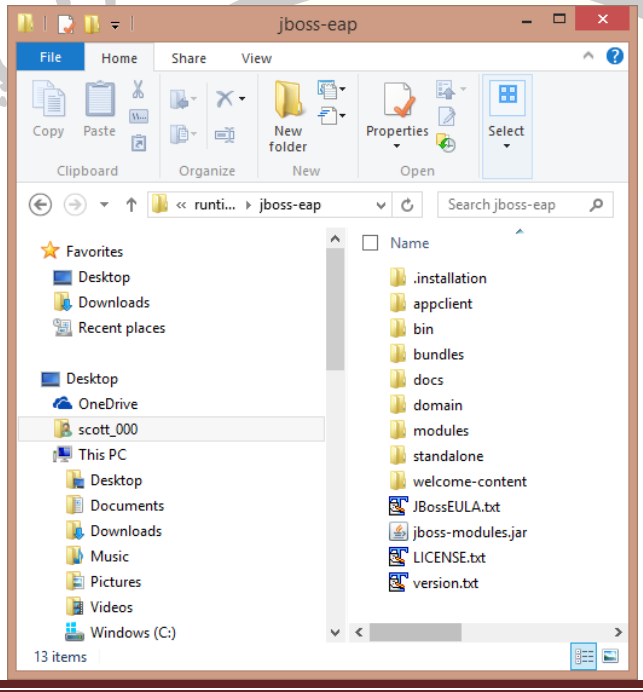
Step 1 – Install the Teiid Data Virtualization Software

In this step, we will install the Teiid Data Virtualization software into our previously installed JBoss EAP 6.3 (Application Server 7.4) software from Section F/Step 1 above.

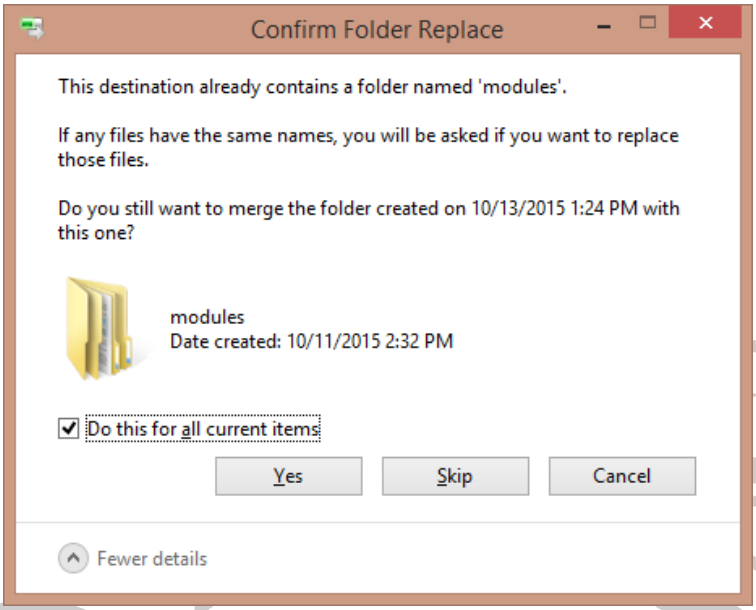
1. Locate the file `teiid-8.11.4-jboss-dist.zip` in your downloads folder. Double-click on it to start your zip software. Take note of the four folders: `bin`, `docs`, `modules`, and `standalone`.



2. In a separate window, navigate to the location where you installed JBoss Developer Studio 8.1.0 GA (for me, `C:\Users\scott_000\jbdevstudio`). Next, move down to the folder `jboss-eap` under the `runtimes` folder (for me, `C:\Users\scott_000\jbdevstudio\runtimes\jboss-eap`).



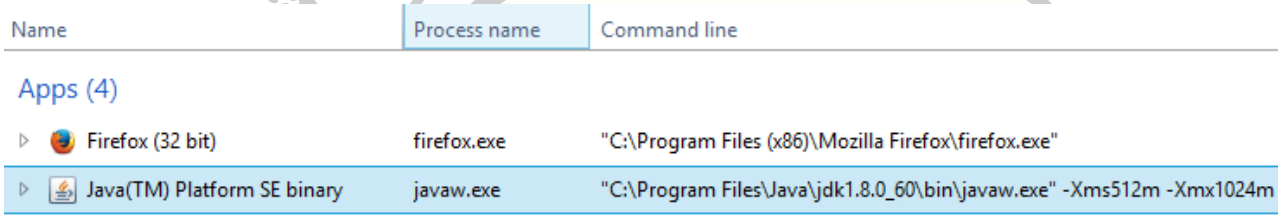
3. Next, drag the four folders from your zip software into the folder `jboss-eap`. Windows will ask if you'd like to merge the folders. Ensure that the checkbox to the left of the text *Do this for all current items* is checked. Click Yes.



Post-Step 1 – Configuring Teiid to Run in Standalone Mode

In this step, we will configure Teiid to run in standalone mode (as opposed to domain mode). This requires us to run a script at the Windows command prompt.

1. Start JBoss Developer Studio 8.1.0 GA.
2. In the Server tab at the bottom of the interface, right-click on *jboss-eap [Stopped]* and click on the Start menu item. This will start the JBoss Application Server 7.4. You will be automatically brought into the Console tab which will display the status of the application. Note that you can start Windows Task Manager to view the running server (see below). Note that the image is truncated and the command line goes on for quite a bit more!



3. Start a Windows Command Prompt.
4. Change directory to the `runtimes\jboss-eap\bin` folder where you installed JBoss Developer Studio (for me, `C:\Users\scott_000\jbdevstudio\runtimes\jboss-eap\bin`).
5. At the command line, type the following command and hit the Enter key:

```
jboss-cli.sh --file=scripts\teiid-standalone-mode-install.cli
```

You will see several informational messages such as

```
INFO  [org.jboss.as.cli.CommandContext] {
    "outcome" => "success",
    "response-headers" => {"process-state" => "reload-required"}
}
{
    "outcome" => "success",
    "response-headers" => {"process-state" => "reload-required"}
}
INFO  [org.jboss.as.cli.CommandContext] {
    "outcome" => "success",
    "response-headers" => {"process-state" => "reload-required"}
}
{
    "outcome" => "success",
    "response-headers" => {"process-state" => "reload-required"}
}
INFO  [org.jboss.as.cli.CommandContext] {
    "outcome" => "success",
    "response-headers" => {"process-state" => "reload-required"}
}
{
    "outcome" => "success",
    "response-headers" => {"process-state" => "reload-required"}
}
INFO  [org.jboss.as.cli.CommandContext] {
    "outcome" => "success",
    "result" => undefined
}
{
    "outcome" => "success",
    "result" => undefined
}
```

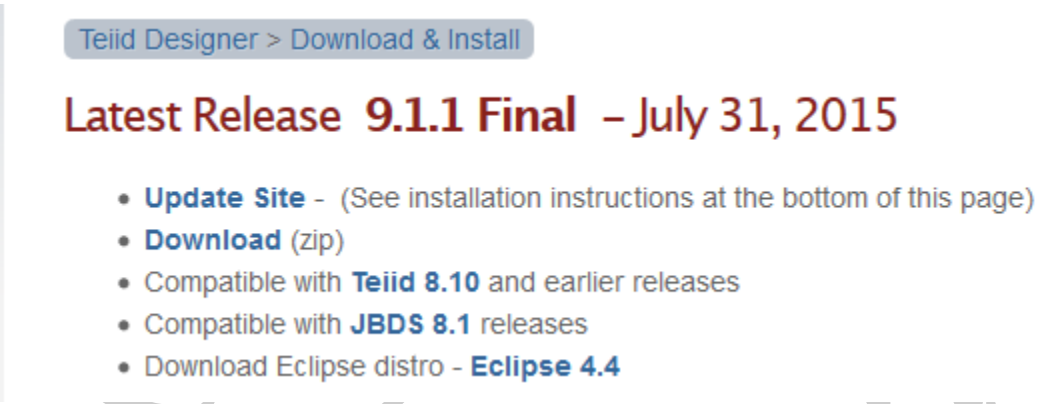
H. Teiid Designer

This section details how to download and install the Teiid Designer software.

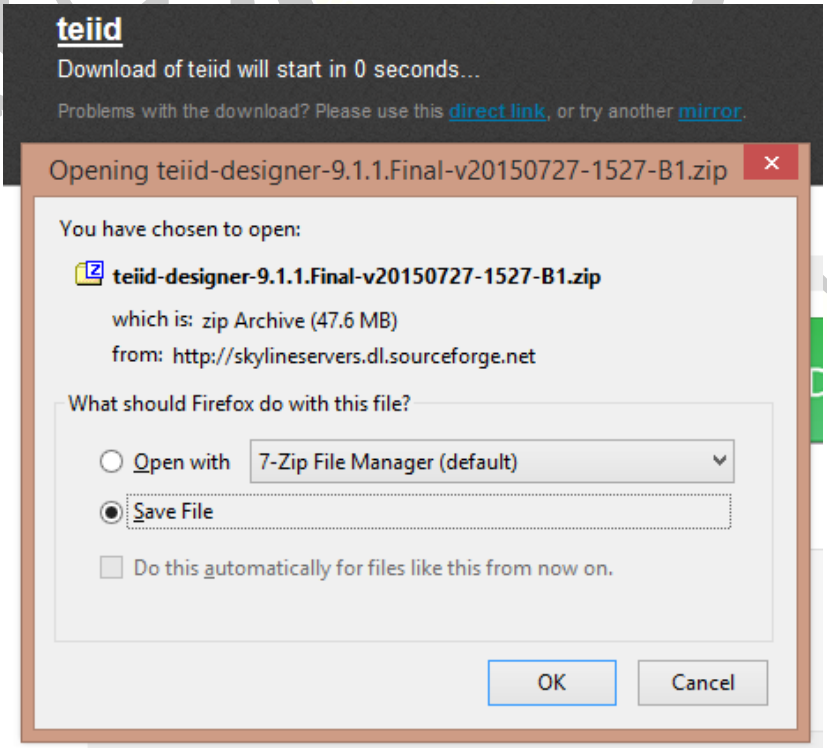
Pre-Step 1 – Download Teiid Designer

In this step, we will download the Teiid Designer software.

1. Navigate your browser to the Teiid Designer website at teiiddesigner.jboss.org/downloads.html:



2. Click on the Download link above and you will be taken to the SourceForge website and a download dialog box will appear (shown below). Save the file to your downloads folder.



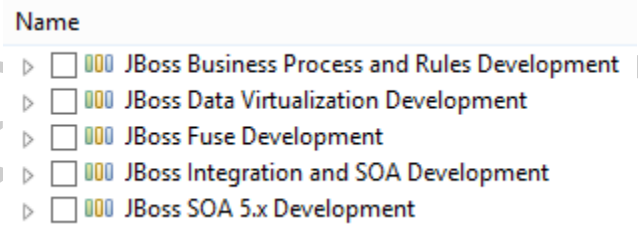
Step 1 – Installing Teiid Designer

In this step, we will install Teiid Designer.

1. Start JBoss Developer Studio 8.1.0 GA.
2. In the Server tab at the bottom of the interface, right-click on *jboss-eap [Stopped]* and click on the Start menu item.
3. Next, we will add a software repository so that the install of Teiid Designer (below) can find and install additional necessary software. Click on the Install New Software… menu item under the Help menu.
4. On the Install dialog box, click on the Add… button.
5. In the Add Repository dialog box, in the Name: input box, enter in the text *JBoss Tools Luna-Compatible Update Site* and in the Location: input box, enter in the following URL:

```
http://download.jboss.org/jbosstools/updates/development/luna/integration-stack/
```

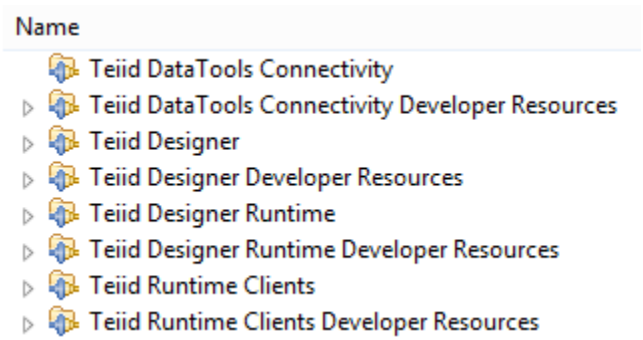
6. Click OK.
7. After a moment, the center text area will contain the following entries:



8. Ensure that the checkbox to the left of the text *Contact all update sites during install to find required software* is checked.
9. At this point, you have added an entry into the repository. You can confirm this by clicking on the *Available Software Sites* link at the top right of the dialog box.
10. Next, we will install the Teiid Designer 9.1 software into the Eclipse Luna version that JBoss Developer Studio is using. Still within the Install New Software dialog box, enter in the following URL in the *Work with:* input box at the top:

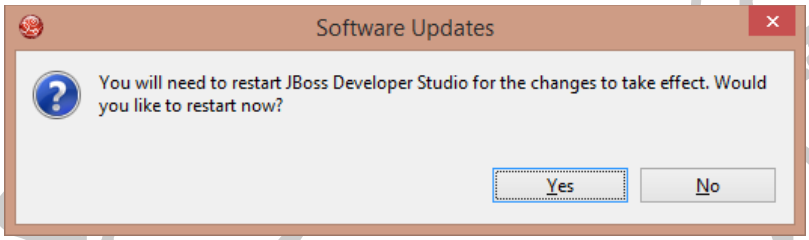
```
http://download.jboss.org/jbosstools/updates/release/luna/integration-stack/teiiddesigner/9.1.0.Final/
```

11. After a moment, the center text box will contain a single entry: Data Virtualization. Ensure that the checkbox is checked and click the Next button.
12. The Install Details dialog will appear showing the following entries:

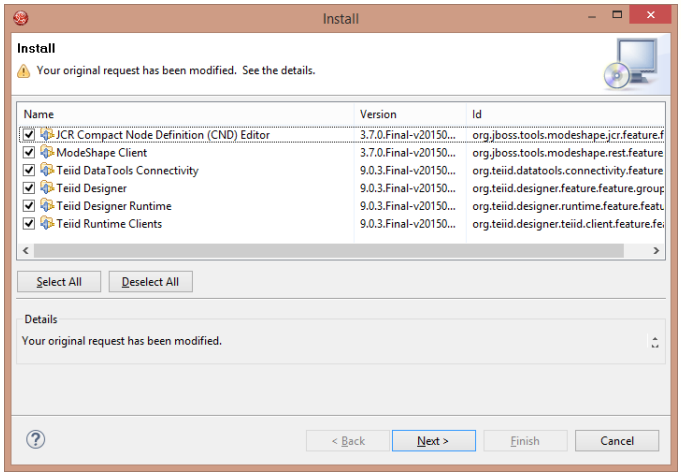


13. Click Next.
14. On the Review Licenses dialog box, ensure that the radio button to the left of the text *I accept the terms of the license agreement* is checked. Click Finish to start the install.
15. During the course of the installation, you may see the following dialog box. Click OK.

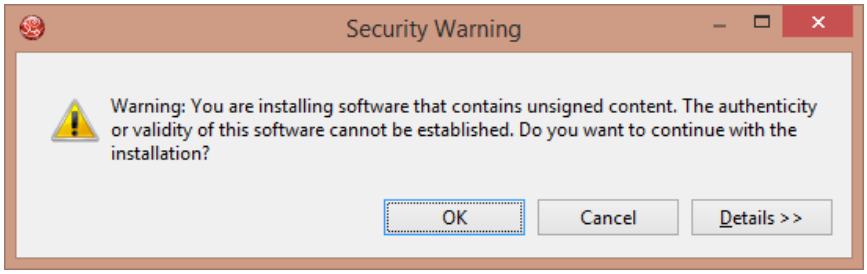
16. When the installation is done, you will be told to restart JBoss Developer Studio. Click Yes to continue.



17. Once JBoss Developer Studio has restarted, open the Teiid Designer perspective. Click on Window → Open Perspective → Other… Next, scroll down and double-click on Teiid Designer. This will bring up the Teiid Designer Perspective which displays modeling actions on the right and default server information on the bottom left.
18. Next, let's install any updates. Click on the Software/Update tab towards the bottom of the JBoss Developer Studio IDE.
19. In the screen above the Software/Update tab, scroll down until you see the JBoss Data Virtualization Development entry under the JBoss Developer Studio Integration Stack category. Ensure that the checkbox is checked and click on the Install/Update (1) tab to start the install.
20. After a moment, the Install dialog box will appear, shown below. Ensure that all checkboxes are checked. Click Next.



21. The Install Details dialog box will appear. Click Next.
22. The Review Licenses dialog box will appear. Ensure that you accept the license agreement for *all entries* in the left pane. Click Finish to start the install/update.
23. If a Security Warning dialog box appears, shown below, click OK to continue.



24. Finally, you will be asked to restart JBoss Developer Studio. Click Yes to continue.

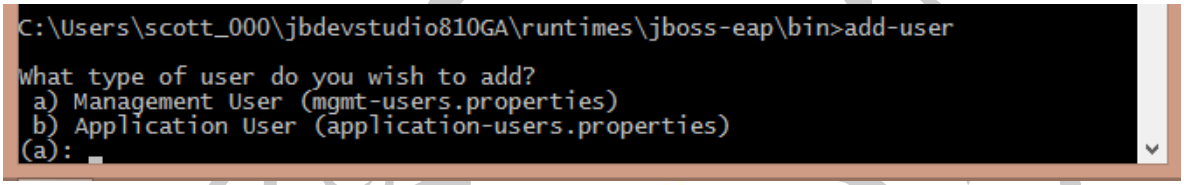
I. Teiid and Teiid Designer Post-Installation Instructions

In this section, we complete the Teiid and Teiid Designer installation instructions including adding `admin` and `user` passwords, creating properties files, and more.

Step 1 – Add `admin` and `user` password

The `admin` user is used for management login for the server and is used by all management commands as well as during server shutdown. The `user` user is used to connect to JDBC connections above and beyond the username and password you provide to connect to the database.

1. Open a Windows Command Prompt
2. Change directory to the JBoss EAP bin directory (for me, `C:\Users\scott_000\jbdevstudio810GA\runtimes\jboss-eap\bin`).
3. At the command line, type the command `add-user` and hit the Enter key. You will be prompted with this:



4. When prompted, enter the single letter `a`, which will allow you to add a management user, specifically, the `admin` user.
5. When prompted with `Username:`, enter `admin` and hit the Enter key.
6. When prompted with Password:, enter an appropriate password (must be at least 8 characters, have at least 1 alphabetic character, at least 1 digit, and at least 1 non-alphanumeric symbol). When done, hit the Enter key.
7. When asked *What groups do you want this user to belong to?*, just hit the Enter key.
8. When asked *Is this correct yes/no?*, enter in `yes` and hit the Enter key.
9. When asked *Is this new user going to be used for one AS process to connect to another AS process?*, enter in `no` and hit the Enter key.
10. At this point, you will be asked to press any key to continue. Doing so will bring you back to the command prompt.
11. Again, type the command `add-user` and hit the Enter key.
12. This time when prompted, enter the single letter `b`, which will allow you to add an application user, specifically, the `user` user.
13. When prompted with `Username:`, enter `user` and hit the Enter key.
14. When prompted with Password:, enter an appropriate password (must be at least 8 characters, have at least 1 alphabetic character, at least 1 digit, and at least 1 non-alphanumeric symbol). When done, hit the Enter key.
15. When asked *What groups do you want this user to belong to?*, just hit the Enter key.
16. When asked *Is this correct yes/no?*, enter in `yes` and hit the Enter key.
17. When asked *Is this new user going to be used for one AS process to connect to another AS process?*, enter in `no` and hit the Enter key.

18. At this point, you will be asked to press any key to continue. Doing so will bring you back to the command prompt.
19. Exit out of the command prompt.

Step 2 – Updating the `admin` and `user` passwords in JBoss Developer Studio

Next, we will update the current passwords for both the `admin` and `user` users in JBoss Developer Studio.

1. Open JBoss Developer Studio 8.1.0 GA.
2. Ensure the Teiid Designer Perspective is active by either clicking on the Teiid Designer tab at the top right of the interface (to the right of the JBoss tab). If you don't see that, click on Window → Open Perspective → Other… and double-click on the Teiid Designer entry.
3. Start the JBoss EAP server. First, click on the Servers tab located on the bottom portion of the IDE. Right-click on the sole entry, labeled `jboss-eap [Stopped]`, and click on the Start popup menu item. This will not only start EAP but the Teiid server as well. It may take longer than normal to complete the startup since Teiid has been added to the process.
4. Double-click on the Servers entry `jboss-eap [Started, Synchronized]`. This will bring up the jboss-eap Overview, Deployment and Teiid Instance tabs in the top half of the IDE.
5. On the Overview tab, within the Management Login Credentials section, update the `admin` password with the password you chose in Step 1 above.
6. On the Teiid Instance tab, change the password for the `user` user within the JDBC Connection section with the password you chose in Step 1 above.
7. Save the changes by clicking on File → Save.
8. Next, let's test both connections. Still on the Teiid Designer tab, click the link labeled *Test Administration Connection*. This should yield an OK.
9. Click the link labeled *Test JDBC Connection*. This should yield an OK as well.

Note that when testing the JDBC Connection, you may receive the following error message:

```
Unable to establish a jdbc connection to server
   "jdbc:teiid:ping@mm://localhost:31000"
```

If so, proceeding to Step 3 may solve this problem.

Step 3 – Configuring Teiid to Run in Standalone Mode

Although we performed this task earlier, we will configure Teiid to run in standalone mode again. Note that several suggestions online suggest using the `standalone-teiid.xml` file for the configuration file (we talk about this in the next step), but by performing this step, you can continue to use the `standalone.xml` file.

1. Start JBoss Developer Studio 8.1.0 GA.
2. In the Server tab at the bottom of the interface, right-click on *jboss-eap [Stopped]* and click on the Start menu item. This will start the JBoss Application Server 7.4. You will be automatically brought into the Console tab which will display the status of the application.
3. Start a Windows Command Prompt.

4. Change directory to the `runtimes\jboss-eap\bin` folder where you installed JBoss Developer Studio (for me, `C:\Users\scott_000\jbdevstudio\runtimes\jboss-eap\bin`).
5. At the command line, type the following command and hit the Enter key:

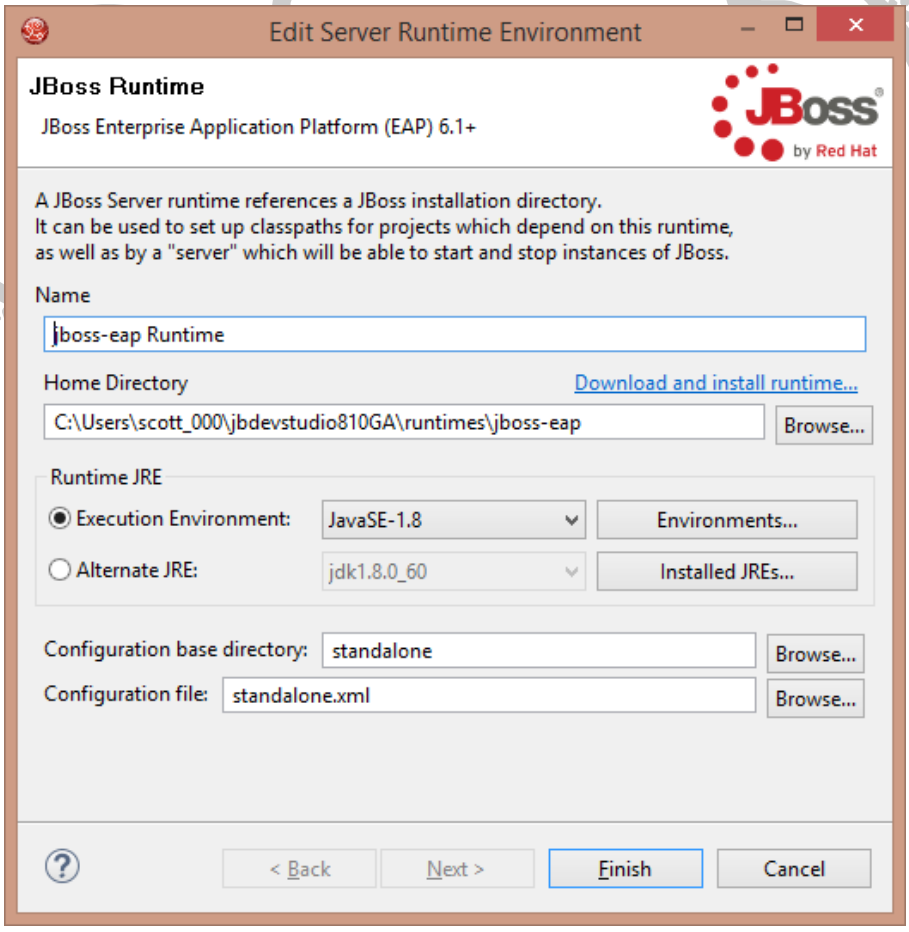
```
jboss-cli.sh --file=scripts\teiid-standalone-mode-install.cli
```

6. Restart the `jboss-eap` server and check the connections again as outlined in Step 2 above.

Step 4 – Updating the Runtime Environment

There are several runtime environment options we will change.

1. Start JBoss Developer Studio 8.1.0 GA and ensure that the `jboss-eap` server is running.
2. Double-click on the server labeled `jboss-eap` on the Servers tab to bring up the Overview tab.
3. Click on the link labeled Runtime Environment. This will bring up the Edit Server Runtime Environment dialog box, shown below:



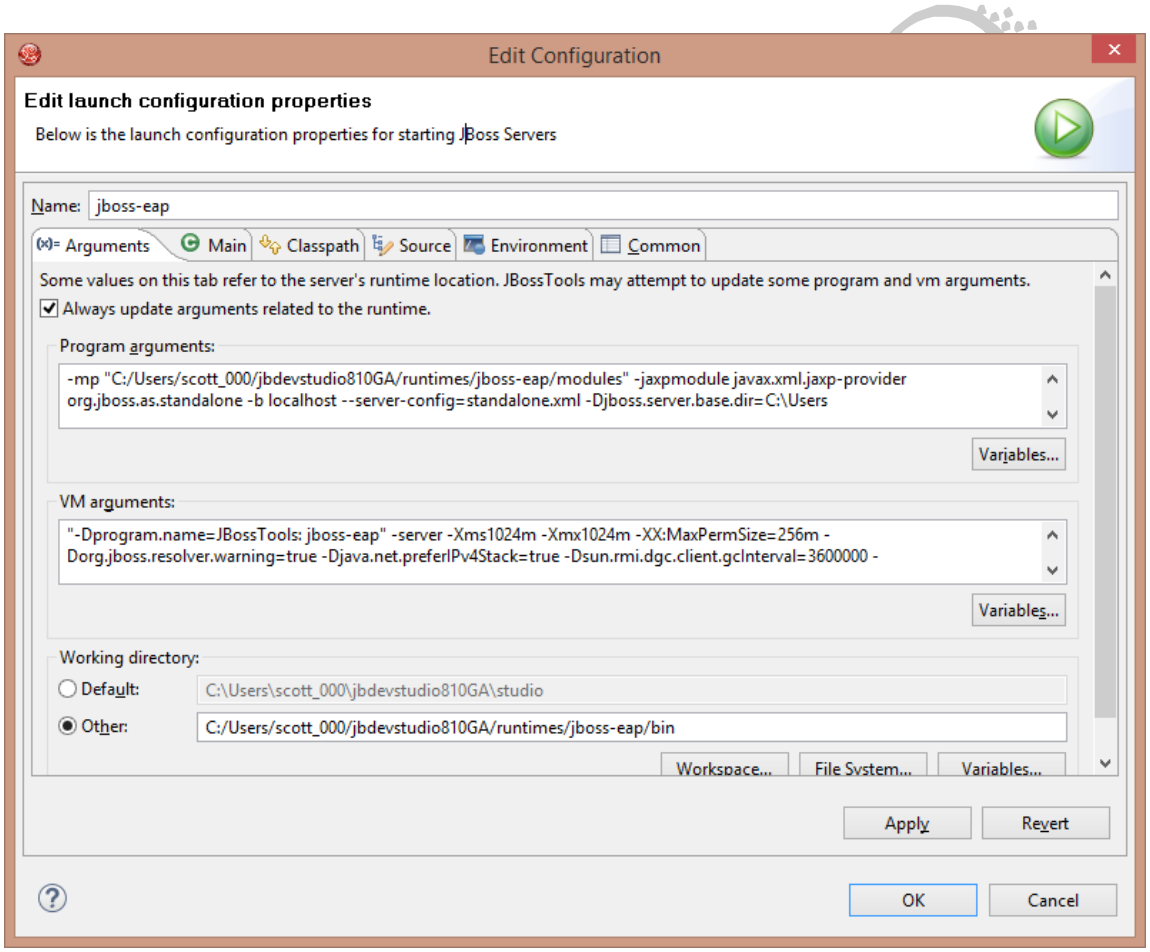
4. Ensure that JavaSE-1.8 is selected for Execution Environment.
5. Ensure that `standalone.xml` is selected for Configuration file.
6. Click Finish.

7. Click File → Save to save any changes.

Step 5 – Updating the Launch Configuration

In this step, we will add the location of the JDBC for Oracle JAR files to the classpath. If you are using JDBC to SQL Server, Teradata, etc., then add those JAR files as well to the classpath as described below.

1. Start JBoss Developer Studio 8.1.0 GA and ensure that the `jboss-eap` server is running.
2. Double-click on the server labeled `jboss-eap` on the Servers tab to bring up the Overview tab.
3. Click on the link labeled Open launch configuration. This will bring up the Edit Configuration dialog box, shown below:



4. Click on the Classpath tab.
5. Click on User Entries to active the buttons to the right.
6. Click the Add External JARs… button.
7. Locate the Oracle JAR file `ojdbc7.jar` and add it to the classpath.
8. Locate the Oracle JAR file `ora18n.jar` and add it to the classpath.
9. Continue to add JAR files as you see fit.
10. Click on Apply and then click on OK to dismiss the dialog box.

Step 6 – Creating/Updating the Teiid Properties Files

In this step, we will update several properties files.

1. Start JBoss Developer Studio 8.1.0 GA and ensure that the `jboss-eap` server is running.
2. Open up Windows Explorer and navigate to the `jboss-eap/runtimes/standalone/configuration` folder (for me, `C:\Users\scott_000\jbdevstudio810GA\runtimes\jboss-eap\standalone\configuration`).
3. At this point, the files labeled `teiid-security-users.properties` and `teiid-security-roles.properties` should NOT appear in this folder.
4. Open up your favorite text editor, and paste in the following lines:

```
# A roles.properties file for use with the UsersRolesLoginModule
# username=role1,role2
admin=admin
user=user
anon=any
```

   Save this file as `teiid-security-roles.properties`.

5. Open up your favorite text editor, and paste in the following lines:

```
# A users.properties file for use with the UsersRolesLoginModule
# username=password
user=user
admin=admin
anon=anon
```

   Save this file as `teiid-security-users.properties`.

6. In JBoss Developer Studio 8.1.0 GA, restart the `jboss-eap` server.
7. Ensure that both the *Test Administration Connection* and *Test JDBC Connection* on the Teiid Instance tab for the `jboss-eap` server return OK.

J. Teiid and Teiid Designer Example

In this section, we detail how to access data within a single text file, an Oracle database table as well as a SQL Server database table. We then create a Virtual Database (VDB) from these three tables and then query this VDB as well as attempt to access it from Microsoft Access.

Step 1 – Prepare the Data

In the Appendix to this document, I have placed all of the data used in the examples: a single text file, data for an Oracle database table, and data for a SQL Server database table. In total, there are three tables (although one is just a CSV file) which will be designated as data sources in Teiid/Teiid Designer.

Step 2 – Check JDBC Database Connectivity

Recall that in Section A/Post-Step 3, we tested the JDBC connectivity to Oracle and SQL Server. If you did not perform those steps, once you have loaded the data in the Appendix into Oracle and SQL Server, you may want to perform those tests. This will ensure that everything is working correctly from Java's perspective. Please do those tests now.

Step 3 – Preliminaries

In this step, we start the JBoss EAP server and ensure that the IDE is ready to use.

1. Start JBoss Developer Studio 8.1.0 GA.
2. Start the `jboss-eap` server in the Servers tab. As mentioned before, it may take a while for Teiid to start, so please wait until Teiid is started before moving on.
3. Ensure that you are connected to the `jboss-eap` server in the Server Connections node on the JMX Navigator tab (usually on the bottom left of the IDE).
4. Ensure the Teiid Designer perspective is active (Window → Open Perspective → Other… → Teiid Designer).
5. Ensure the Teiid Designer Guides view is active (Window → Show View → Other… → Teiid Designer → Guides). The Guides allow you to quickly define a project, create JDBC connections, create sources, preview the data, define and deploy a virtual database, and query the virtual database.
6. If you have SQL Server installed on your computer, you may not have set SQL Server to allow for TCP/IP connections. Here are the steps to enable that:
    a. Start SQL Server 20xx Configuration Manager
    b. Expand the *SQL Server Native Configuration* node
    c. Click on *Protocols for SQLEXPRESS*
    d. In the pane on the right, right-click on TCP/IP and click Enable in the popup menu.
    e. At this point, you must restart SQL Server.
        i. Start SQL Server Management Studio
        ii. Right-click the root node in Object Explorer
        iii. Click Restart.
        iv. When ask if you really want to restart the database, click Yes. Once the database restarts, TCP/IP connections to the database should be allowed.

Step 4 – Create a Teiid Model Project

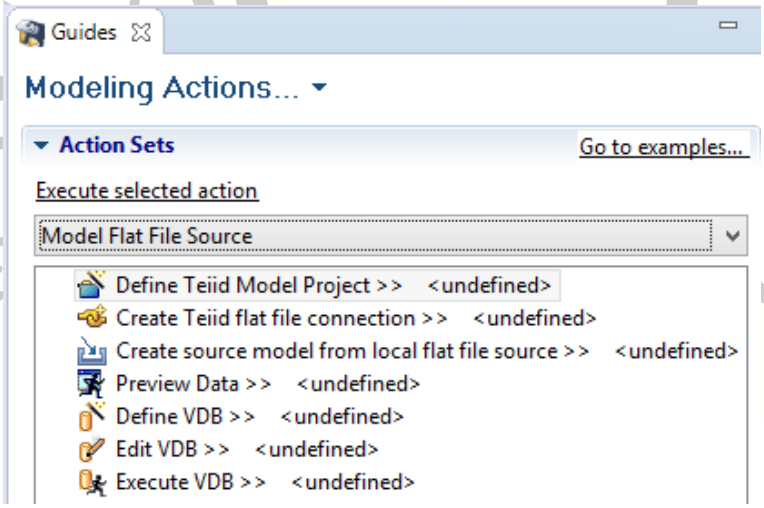
In this step, we create our first Teiid Model project.

1. On the Guides tab, click the down-arrow to the right of Modeling Actions
2. Click Manage Model Project
3. Click Create Teiid Model Project. This will bring up the New Model Project dialog box.
4. In the *Project name:* input box, fill in the name of your project. For me, I entered PRJ_TEIID_CANDYBAR.
5. Ensure *Use default location* is checked and *Add project to working sets* is unchecked.
6. Click Next.
7. On the Project References page, ensure nothing is checked and click Next.
8. On the Model Project Options page, ensure only sources and views are checked.
9. Click Finish.
10. Take note that in the Model Explorer (on the left side of the IDE), the project PRJ_TEIID_CANDYBAR appears. Expanding the root node will reveal the folders `sources` and `views`.

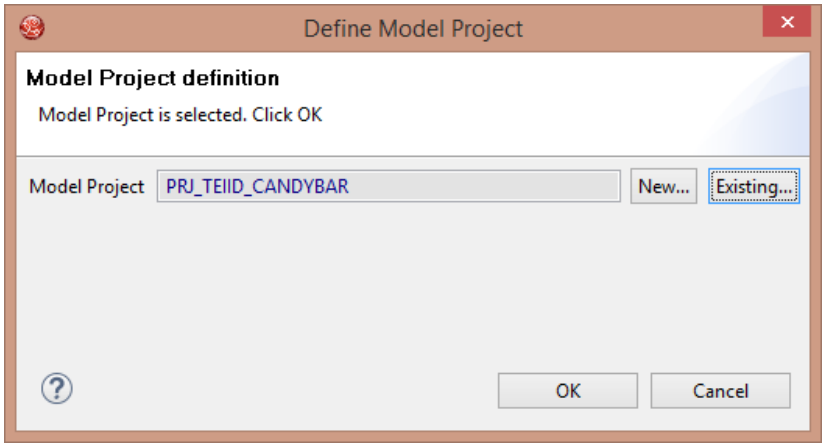
Step 5 – Create a Data Source and View for the Text File

In this step, we use Teiid Designer to specify that the text file `candybarinfo.csv` is a text file data source.

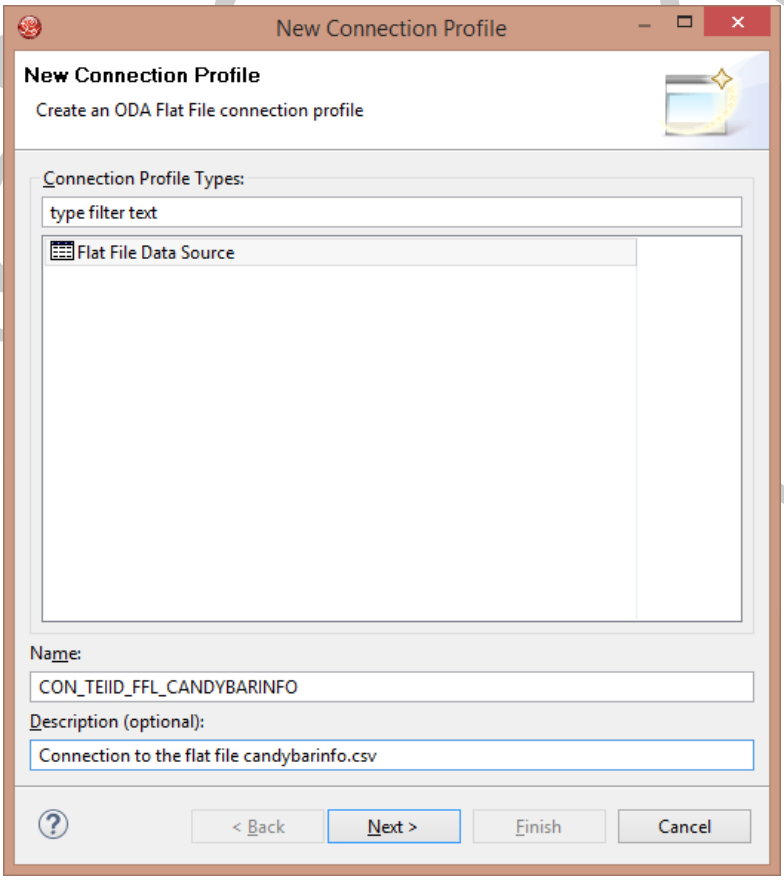
1. On the Guides tab, select Model Flat File Source from the drop-down box.



2. Double-click on Define Teiid Model Project and the Define Model Project dialog box will appear.
3. Click on Existing… to bring up a selection of existing projects.
4. Double-click on PRJ_TEIID_CANDYBAR and it will be inserted into the Model Project input box.



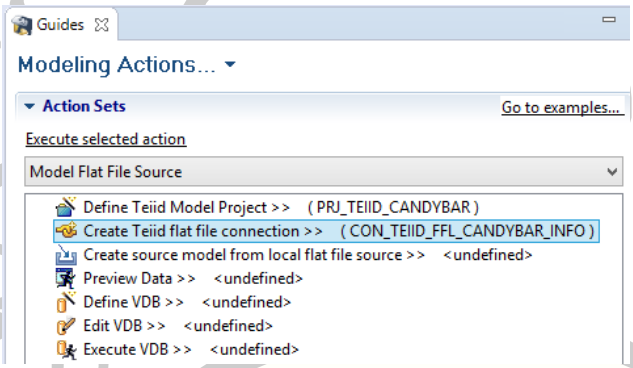
5. Click OK.
6. Double-click on Create Teiid flat file connection to bring up the New Connection Profile dialog box.
7. In the *Name:* input box, enter a name of the connection. For me, I entered CON_TEIID_FFL_CANDYBARINFO.
8. Fill in a description in the Description input box.



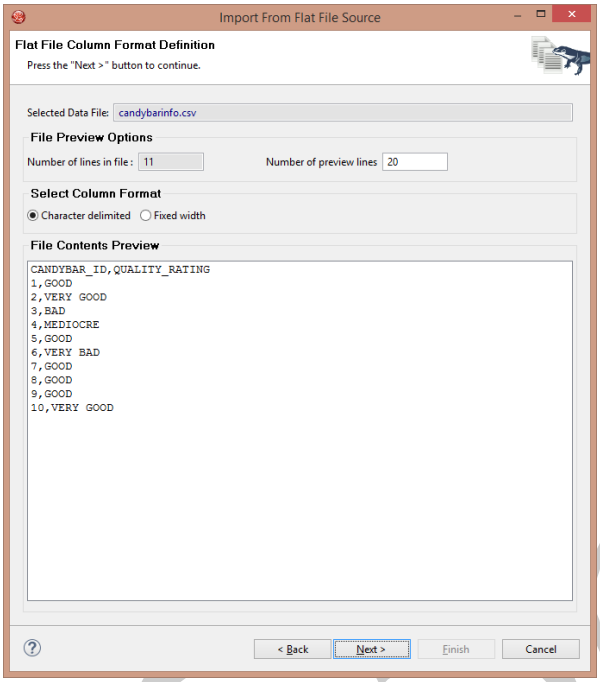
9. Click Next.
10. On the Define Folder or a File URI page, ensure that the radio button to the left of the text *Enter file URI* is checked.
11. Click the Browse… button and locate the file `candybarinfo.csv` on your hard-drive.
12. Ensure that UTF-8 is selected for the charset.

13. Ensure that CSV is selected for `flatfile` style.
14. Ensure that the checkbox to the left of the text *Use first line as column name indicator* is checked.
15. Ensure that the checkbox to the left of the text *Use second line as data type indicator* is NOT checked.
16. Ensure that the checkbox to the left of the text *Use trailing null columns* is checked.
17. Click Test Connection to make sure Teiid Designer can find your text file. If all goes well, you will see the following popup dialog box. Click OK to dismiss the dialog box.

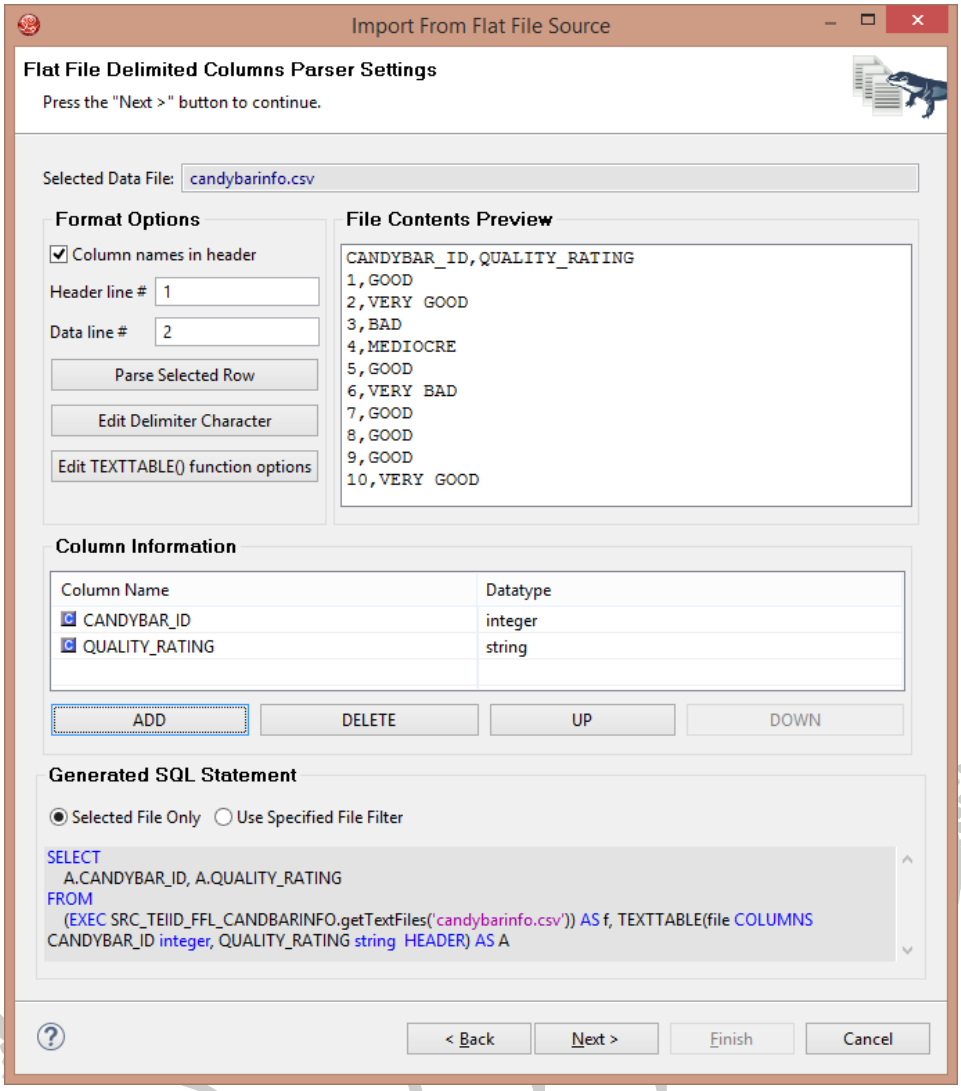
18. Click Next.
19. On the Summary page, ensure all of the information is correct. If so, click Finish.
20. Within the Model Flat File Source on the Guides tab, you will now see the connection name to the flat file:



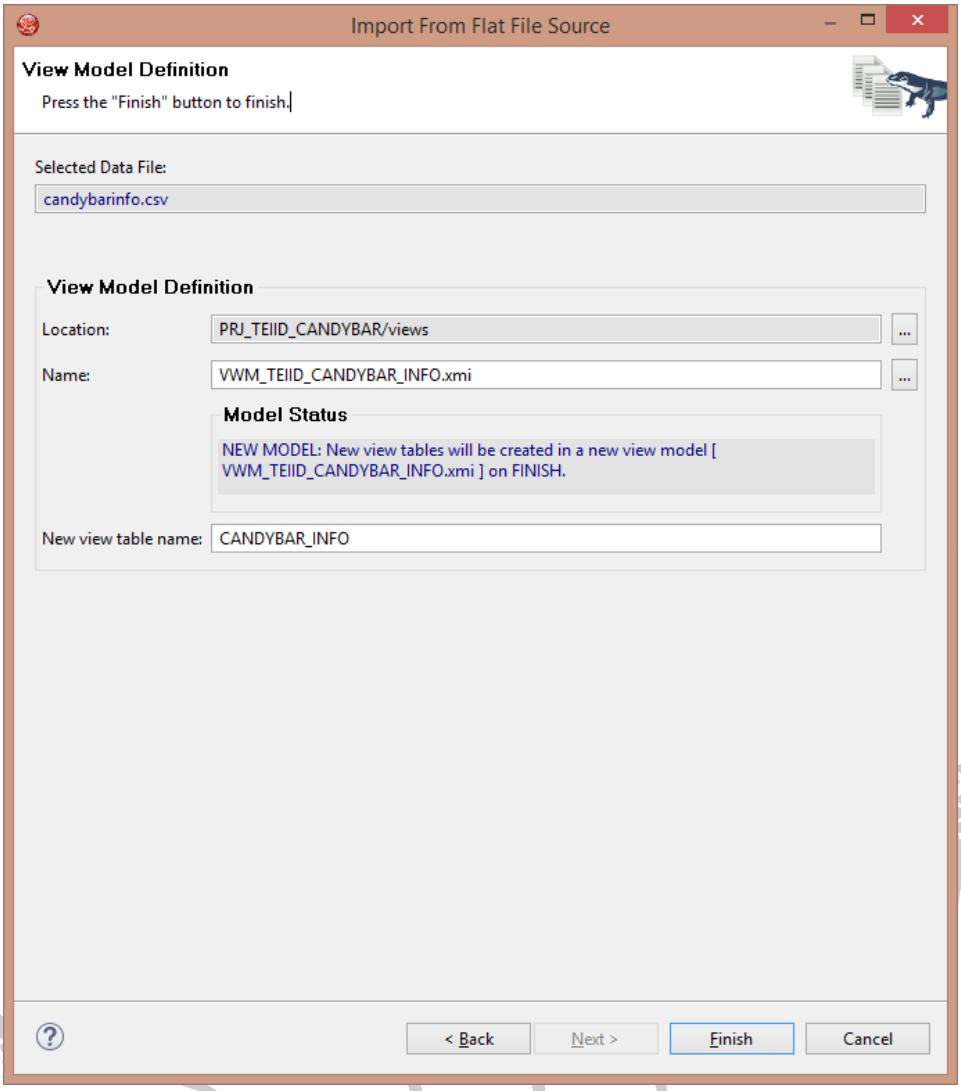
21. Next, double-click Create source model from local flat file source. This will bring up the Import Flat File Source dialog box.
22. Ensure the radio button to the left of the text Flat file on local file system is checked.
23. Click Next.
24. On the Data File Source Selection, ensure that CON_TEIID_FFL_CANDYBARINFO is selected for Data File Source.
25. Ensure that the *Selected Data File* input box contains the text `candybarinfo.csv`.
26. Ensure that the *Location:* input box contains PRJ_TEIID_CANDYBAR/sources.
27. In the *Name:* input box, create a name for the source. For me, I entered SRC_TEIID_FFL_CANDBARINFO.
28. Click Next,
29. On the Flat File Column Format Definition page, ensure that the radio button to the left of the text Character Delimited is selected.
30. In the File Contents Preview text box, ensure that what is shown matches what is in the text file itself.



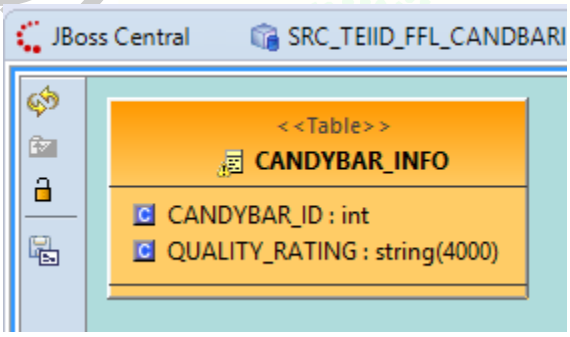
31. Click Next.
32. On the Flat File Delimited Columns Parser Settings page, ensure that the checkbox to the left of the text *Column name in header* is checked.
33. Ensure the number 1 appears in the Header line # input box. This indicates that row one contains the column names.
34. Ensure the number 2 appears in the Data line # input box. This indicates that the actual data starts in row two.
35. Click the Edit Delimiter Character button and ensure that the comma is selected. Click OK to dismiss the dialog box.
36. In the Column Information section, a list of column names will appear with initially chose data types. For me, both data types are strings, but CANDYBAR_ID is, in reality, numeric. Click on the text string for CANDYBAR_ID, and a drop-down box will appear. Replace `string` with `integer`.



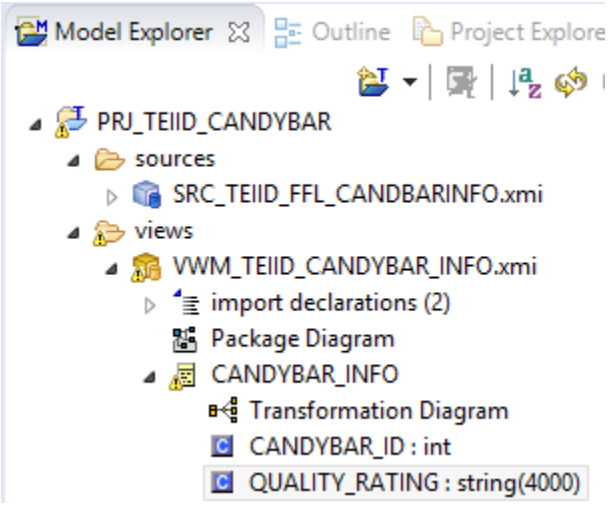
37. Click Next.
38. On the View Model Definition page, ensure that `candybarinfo.csv` appears in the *Selected Data File* input box.
39. Ensure that PRJ_TEIID_CANDYBAR/views appears in the *Location:* input box.
40. Give a name to the view in the *Name:* input box. For me, I entered VMD_TEIID_CANDYBAR_INFO.
41. Give a name to the table in the input box to the right of the text *New view table name:*. For me, I entered in CANDYBAR_INFO.



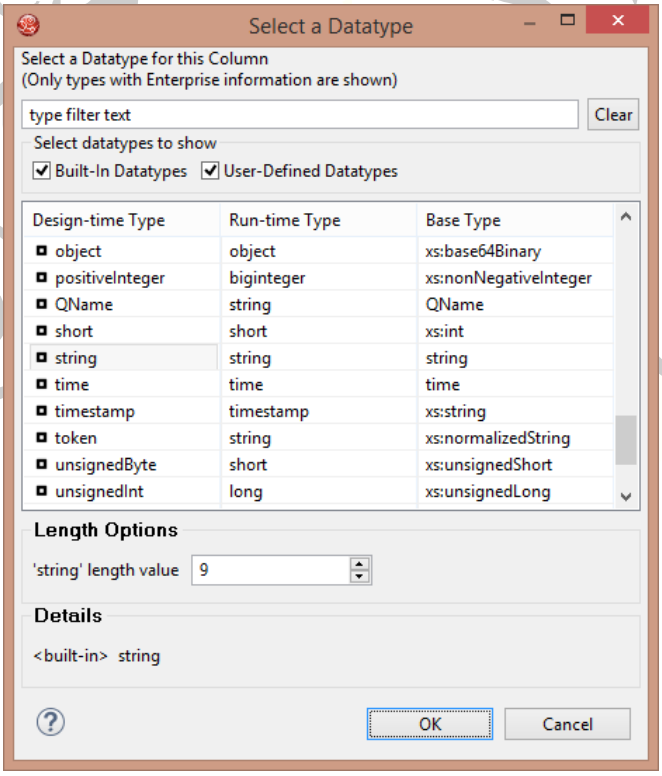
42. Click Finish.
43. A database diagram will appear for the CANDYBAR_INFO table in the upper part of the IDE.



44. Within Model Explorer, you will now have a single entry under the source folder and a single entry under the views folder. Expand the views folder until you see the columns for the CANYBAR_INFO table.

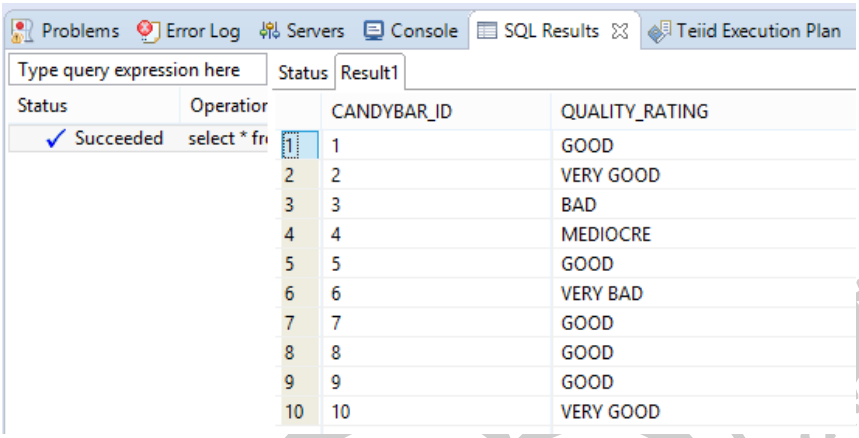


45. Take note that Teiid Designer assumes a string length of 4000 for the string column QUALITY_RATING. Let's change that.
    a. Right-click on QUALITY_RATING
    b. Click Modeling
    c. Click Set Datatype
    d. Scroll down until you see the string data type and click on it to select it.
    e. In the 'string' length value spinner, change to 4000 to 9.
    f. Click OK.



46. Note that both the column QUALITY_RATING entry will change as well as the database design.
47. Next, let's preview the data. Double-click on Preview Data in Model Flat File Source.

48. When the Preview Data dialog box appears, click on the Ellipsis button. This will bring up the Table or Procedure Selection dialog box.
49. Expand the views folder until you see the entry CANDYBAR_INFO. Double-click on it.
50. Click OK on the Preview Data dialog box.
51. Within the SQL Results tab, you will see the data within this table.



Step 6 – Create a Data Source and View for the Oracle Database

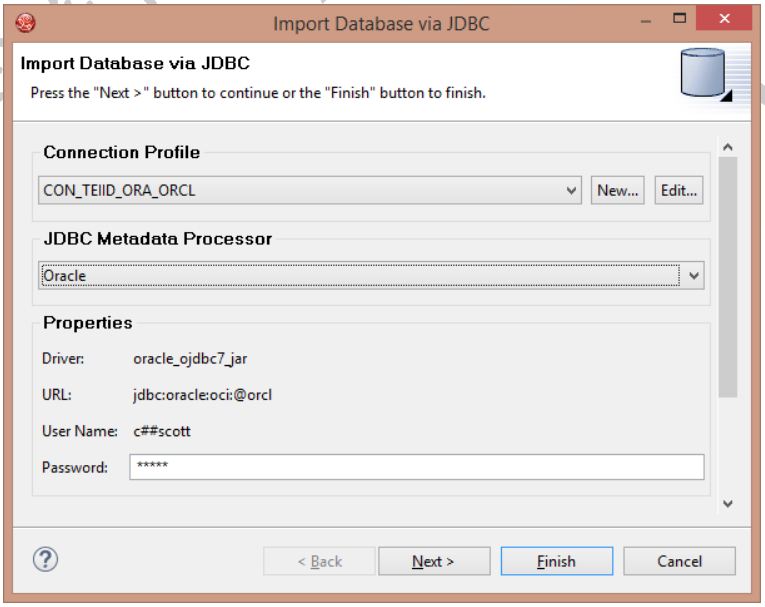
In this step, we use Teiid Designer to specify the Oracle database as a data source.

1. On the Guides tab, select Model JDBC Source from the drop-down box.
2. Double-click Define Teiid Model Project.
3. On the Define Model Project, click the Existing… button.
4. On the Select Existing Model Project, double-click PRJ_TEIID_CANDYBAR.
5. Click OK on the Define Model Project dialog box.
6. Double-click Create JDBC Connection.
7. Click on the entry for Oracle under Connection Profile Types.
8. In the Name: input box, enter in CON_TEIID_ORA_ORCL (ORA indicates Oracle whereas ORCL indicates the name of the database instance).
9. Fill in a description. For example, *Connection to the Oracle database ORCL*.
10. Click Next.
11. Initially, the Drivers drop-down box will be empty. Click on the New Driver Definition button ( ) to the right of this drop-down box.
    a. On the Name/Type tab on the Specify a Driver Template and Definition Name page on the New Driver Definition dialog box, select Other Driver, Oracle, System Version 11 in the *Available driver templates* list.
    b. In the *Driver name:* input box, fill in `oracle_ojdbc7_jar`.
    c. In the Driver type: input box, ensure that Other Driver is specified.
    d. Click the JAR List tab.
    e. Specify the location and JAR file of both `ojdbc7.jar` (for me, located in `C:\app\oracle\product\12.1.0\dbhome_1\jdbc\lib`) and `orai18n.jar` (for me, located in `C:\app\oracle\product\12.1.0\dbhome_1\jlib`).
    f. On the Properties tab, fill in the entries as follows:
        i. Catalog: USER
        ii. Connection URL: `jdbc:oracle:oci:@orcl`

iii. Database Name: `orcl`
iv. Driver Class: `oracle.jdbc.OracleDriver`
v. Password: *fill-in-your-password*
vi. User ID: *fill-in-your-userid*

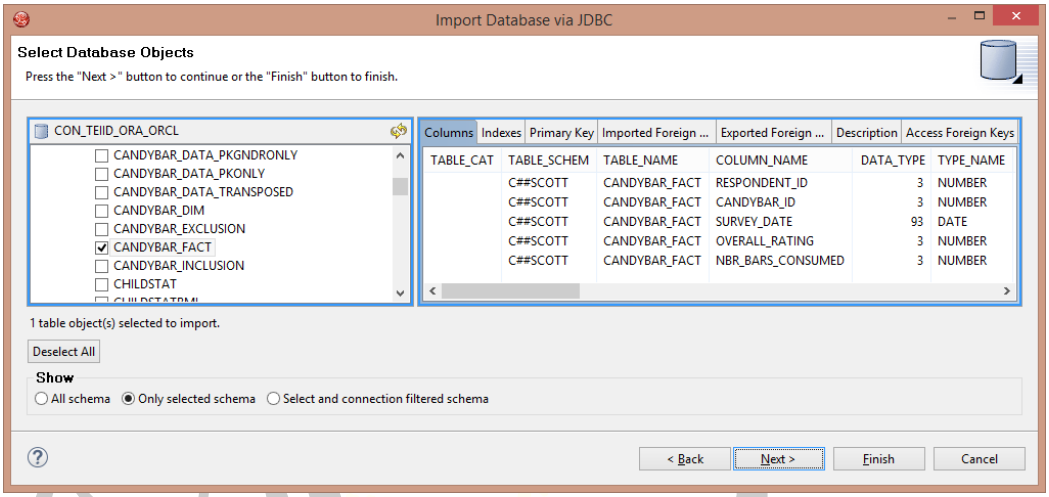
g. Click OK to dismiss the New Driver Definition dialog box.

12. Select `oracle_ojdbc7_jar` from the Drivers drop-down box.
13. On the General tab of the New Connection Profile dialog box, fill in the entries as follows:
    a. Database: `orcl`
    b. URL: `jdbc:oracle:oci:@orcl`
    c. User name: *fill-in-your-userid*
    d. Password: *fill-in-your-password*
    e. Ensure that the checkbox to the left of the text *Save password* is checked.
    f. Ensure that the checkbox to the left of the text *Connect when the wizard completes* is checked.
    g. Ensure that the checkbox to the left of the text *Connect every time the workbench is started* is unchecked.
    h. Click Test Connection to test the connection to the Oracle database. If all goes well, you will see the *Ping Succeeded!* popup dialog box.
14. Click Next to go to the Summary page. Ensure that all entries are correct. Click Finish.
15. At this point, CON_TEIID_ORA_ORCL appears next to Create JDBC connection.
16. Double-click Create source model for JDBC data source to bring up the Import Database via JDBC dialog box.
17. Ensure CON_TEIID_ORA_ORCL appears as Connection Profile.
18. Ensure Oracle appears as JDBC Metadata Processor
19. Ensure the Properties contains the following entries:
    a. Driver: `oracle_ojdbc7_jar`
    b. URL: `jdbc:oracle:oci:@orcl`
    c. User Name: *your-user-name*
    d. Password: *asterisks*

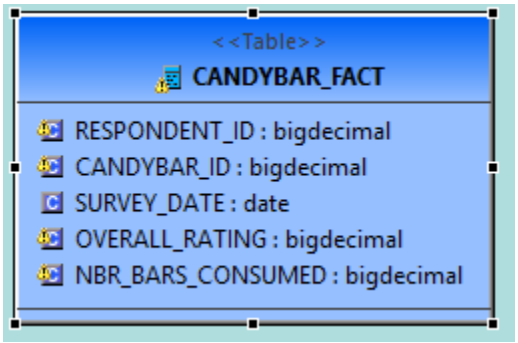


20. Click Next to bring up the Select Database Metadata page.
21. For our small example, ensure that all three checkboxes are unchecked.

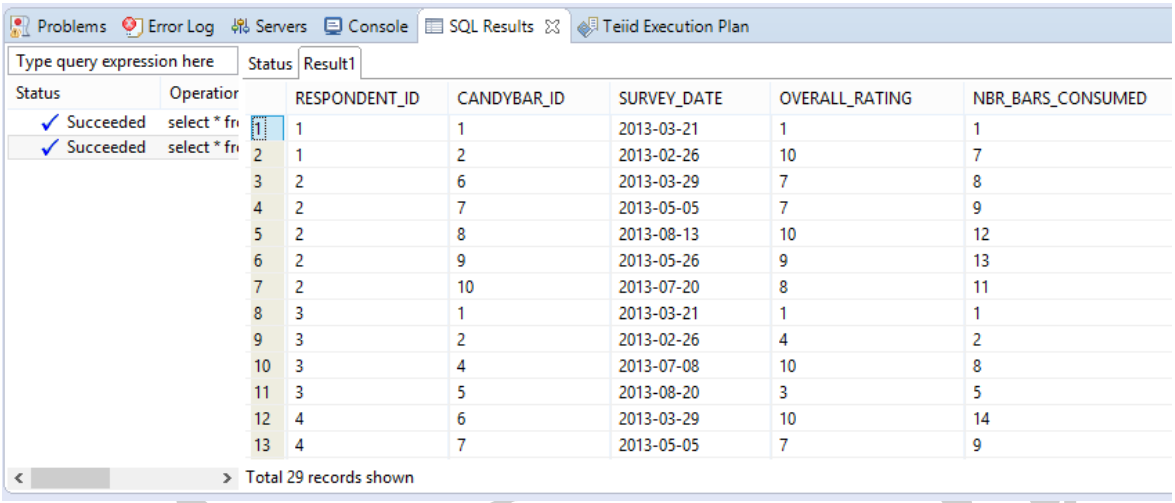
22. Ensure that TABLE is highlighted under Table Types.
23. Click Next to bring up the Select Database Objects page.
24. On this page, we will select a single database table.
    a. Click on the down arrow to the left of the username.
    b. Expand the list of tables under TABLE by clicking the down arrow. You will now see all of the tables available to that user.
    c. Click the checkbox to the left of TABLE to de-select it. All of the tables will now have their checkboxes unchecked.
    d. Ensure that a single checkbox is selected for the table CANDYBAR_FACT. At this point, the pane on the right is filled in with table metadata such as the columns, their data types, etc.



    e. Click Next.
    f. On the Specify Import Options page of the Import Database via JDBC dialog, give a name to model by filling in the *Model Name:* input box. For me, I specified SRC_TEIID_ORA_CANDYBARFACT.
    g. Ensure the *Into Folder:* input box specifies PRJ_TEIID_CANDYBAR/sources.
    h. Click Finish.
    i. At this point, you will see the following database design for the table CANDYBAR_FACT. Note that the data type for RESPONDENT_ID, CANDYBAR_ID, OVERALL_RATING and NBR_BARS_CONSUMED is bigdecimal, but should be integer. Similar to the instructions given in Step 5 #45 above, change the data types to integer.



25. Next, let's preview the data in this table. Double-click on Preview Data to bring up the Preview Data dialog box.
26. Click on the ellipsis to bring up the Table or Procedure Selection dialog box.
27. Expand the sources folder and then expand the SRC_TEIID_ORA_CANDYBARFACT.xmi entry. Click on the CANDYBAR_FACT entry. Click OK
28. Click OK again.
29. Within the SQL Results tab, you will see the data from that table CANDYBAR_FACT:



	RESPONDENT_ID	CANDYBAR_ID	SURVEY_DATE	OVERALL_RATING	NBR_BARS_CONSUMED
1	1	1	2013-03-21	1	1
2	1	2	2013-02-26	10	7
3	2	6	2013-03-29	7	8
4	2	7	2013-05-05	7	9
5	2	8	2013-08-13	10	12
6	2	9	2013-05-26	9	13
7	2	10	2013-07-20	8	11
8	3	1	2013-03-21	1	1
9	3	2	2013-02-26	4	2
10	3	4	2013-07-08	10	8
11	3	5	2013-08-20	3	5
12	4	6	2013-03-29	10	14
13	4	7	2013-05-05	7	9

Total 29 records shown

Step 7 – Create a Data Source and View for the SQL Server Database

In this step, we use Teiid Designer to specify the SQL Server database as a data source. For the steps shown below, it is assumed that you are connecting to SQL Server using SQL Server Authentication rather than Windows Authentication.

Note: The *SQL Server JDBC* connection does not seem to be working, so we will define a *Generic JDBC* connection to SQL Server instead.

1. On the Guides tab, select Model JDBC Source from the drop-down box. If you specified an Oracle database in Step 6, then the project, connection and source are already specified (at least for Oracle). We now add a JDBC connection and data source to SQL Server.
2. Double-click Create JDBC Connection.
3. For Connection Profile Types, select Generic JDBC.
4. For *Name:*, specify CON_TEIID_SQL_TESTDB (SQL stands for SQL Server whereas TESTDB is the name of the specific database).
5. Fill in an appropriate description such as *Connection to the SQL Server database TESTDB*.
6. Click Next.
7. On the Specify a Driver and Connection Details page, click on the New Driver Definition button.
    a. On the Name/Type tab, select Generic JDBC Driver.
    b. For the *Driver Name:*, specify `gen_sqlserver_sqljdbc42_jar`.
    c. Leave the *Driver Type:* input box as Generic JDBC Driver.
    d. On the JAR List tab, click on the Add JAR/Zip… button. Locate the JAR file `sqljdbc43.jar` (for me, it's located at `C:\Program Files\Microsoft JDBC Driver 4.2 for SQL Server\sqljdbc_4.2\enu`).

e. On the Properties tab, fill in the entries as follows (although you will have to modify I and ii to match your setup):
    i. Connection URL: `jdbc:sqlserver://SCOTT-LAPTOP\SQLEXPRESS`
    ii. Database Name: `TESTDB`
    iii. For Driver Class:, click on the ellipsis, click the Browse for class radio button, double-click `com.microsoft.sqlserver.jdbc.SQLServerDriver`. Click OK.
    iv. User ID: *fill-in-your-user-id*
f. Click OK.
g. On the General tab, fill in your password and ensure the checkbox to the left of *Save password* is checked.
h. Test the connection by clicking on the Test Connection button. If all went well, the *Ping Succeeded!* popup box will appear.
i. Click Next and review the summary page. Click Finish.

8. Next, let's set up a data source to the table CANDYBAR_DIM in the SQL Server database TESTDB. Double-click Create source model for JDBC data source to bring up the Import Database via JDBC dialog box.
9. Ensure the information on the Import Database via JDBC page is okay. Click Next.
10. On the Select Database Metadata page, ensure that none of the checkboxes are checked.
11. Select the entry TABLE under Table Types.
12. Click Next.
13. On the Select Database Objects, if nothing appears, you may need to click from All Schema to Select and connection filtered schema and back again. Be patient since there may be a lot of information to retrieve. Once you have a list, click on your database (for me, TESTDB).
14. Expand the TESTDB node, scroll down to dbo and expand that node as well.
15. Finally, check the table CANDYBAR_DIM.
16. Click Next.
17. On the Specify Import Options page, fill in a Model Name, such as SRV_TEIID_SQL_CANDYBARDIM.xmi.
18. Click Finish. You will be presented with the following database design for the table CANDYBAR_DIM:

19. Notice that the column CANDYBAR_ID has short as its database type. Change this to integer in the usual manner.
20. Let's preview the data. Double-click on Preview Data and select CANDYBAR_DIM from the Table or Procedure Selection dialog box. Click OK twice to preview the data, shown below.

Problems | Error Log | Servers | Console | SQL Results | Teiid Execution Plan

Type query expression here | Status | Result1

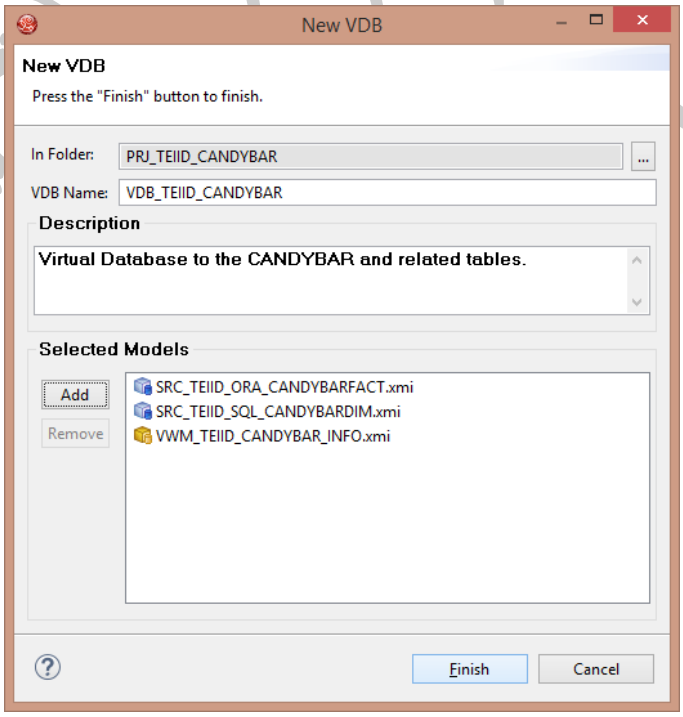
Status	Operation
Succeeded	select * fr
Succeeded	select * fr
Succeeded	select * fr

	CANDYBAR_ID	CANDYBAR_NAME	CANDYBAR_WEIGHT_OZ	CANDYBAR_PRICE_USD
1	5	Hershey's Special Dark	7.5	0.5
2	6	Junior Mints	6.0	0.75
3	3	Hershey Bar with Almonds	7.0	1.25
4	1	Heath Bar	7.0	1.34
5	2	Hershey Bar	8.0	1.0
6	7	Krackel	6.5	1.2
7	8	Milk Duds	7.0	NULL
8	9	Mounds	6.0	NULL
9	10	Mr. Goodbar	6.5	NULL
10	4	Hershey's Kisses	8.25	0.86

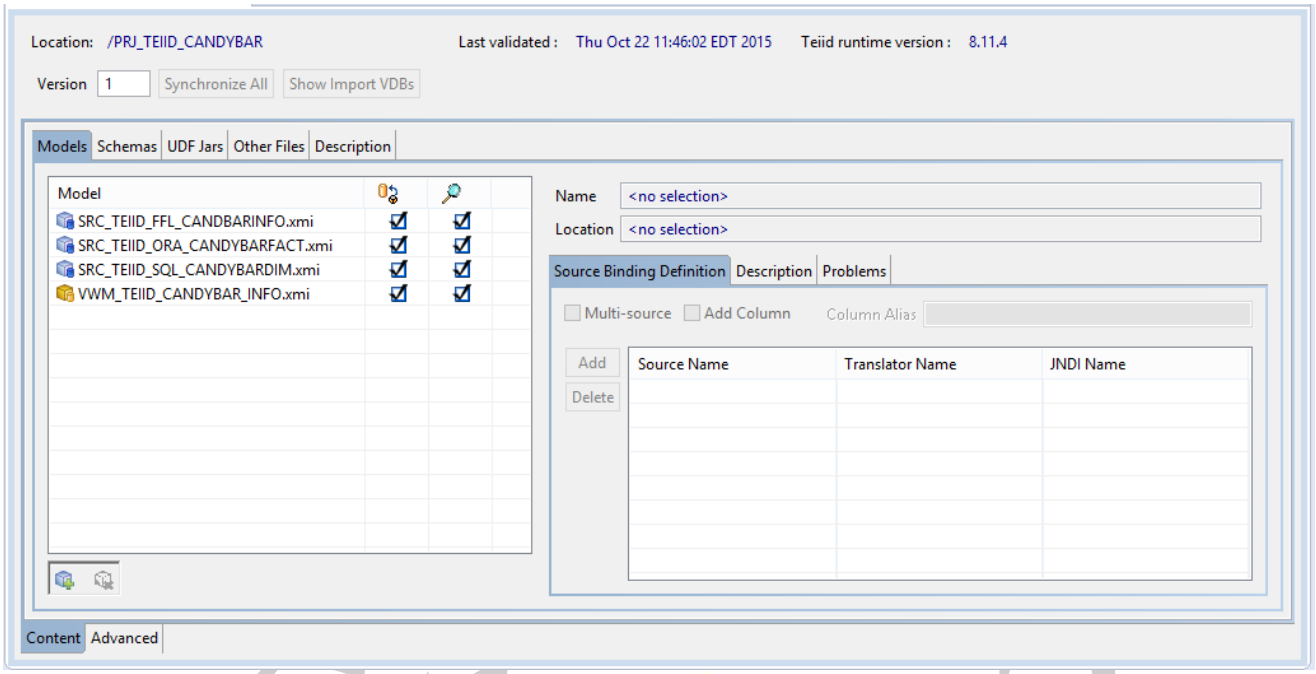
Step 8 – Create, Deploy and Execute the Virtual Database

At this point, we have connected to a text file, an Oracle database, and a SQL Server database. Next, let's create a virtual database so that we can access all of this information in one spot.

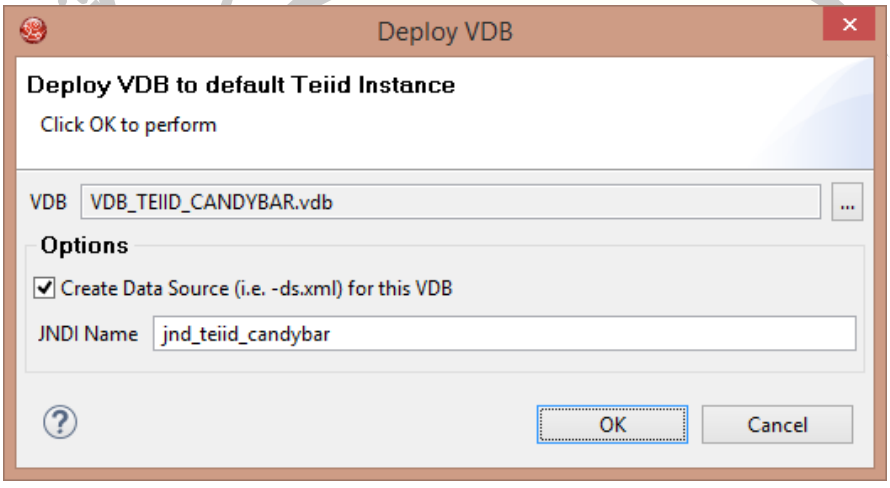
1. Ensure that the Teiid Designer perspective is active.
2. On the Guides tab, click the down-arrow to the right of Modeling Actions… Click on Manage VDBs and then click on Create VDB to bring up the New VDB dialog.
3. To fill in the *In Folder:* input box, click the ellipsis and select our project PRJ_TEIID_CANDYBAR.
4. For *VDB Name:*, fill in VDB_TEIID_CANDYBAR.
5. Fill in an appropriate description in the Description text box.
6. Under Selected Models, click the Add button and select the data sources to the databases under the sources folder as well as the VWM for the text file under the views folder of our project PRJ_TEIID_CANDYBAR.



7. Click Finish.
8. After a moment or two of processing, you should see a representation of the VDB at the top of the IDE. You will also note that the VDB shows up in Model Explorer under the project PRJ_TEIID_CANDYBAR.



9. Now that the virtual database has been defined, we have to deploy it. Click Modeling Actions… → Manage VDBs → Deploy VDB. This brings up the Deploy VDB dialog box.
10. Click on the ellipsis to the right of the VDB input box, and select our project's VDB_TEIID_CANDYBAR.vdb entry on the VDB Selection dialog box. Click OK. Note that the VDB now appears in the VDB input box.
11. Ensure that the checkbox to the left of the text *Create Data Source (i.e., -ds.xml) for this VDB* is checked.
12. In the JNDI Name input box, enter in `jnd_teiid_candybar`. Click OK.

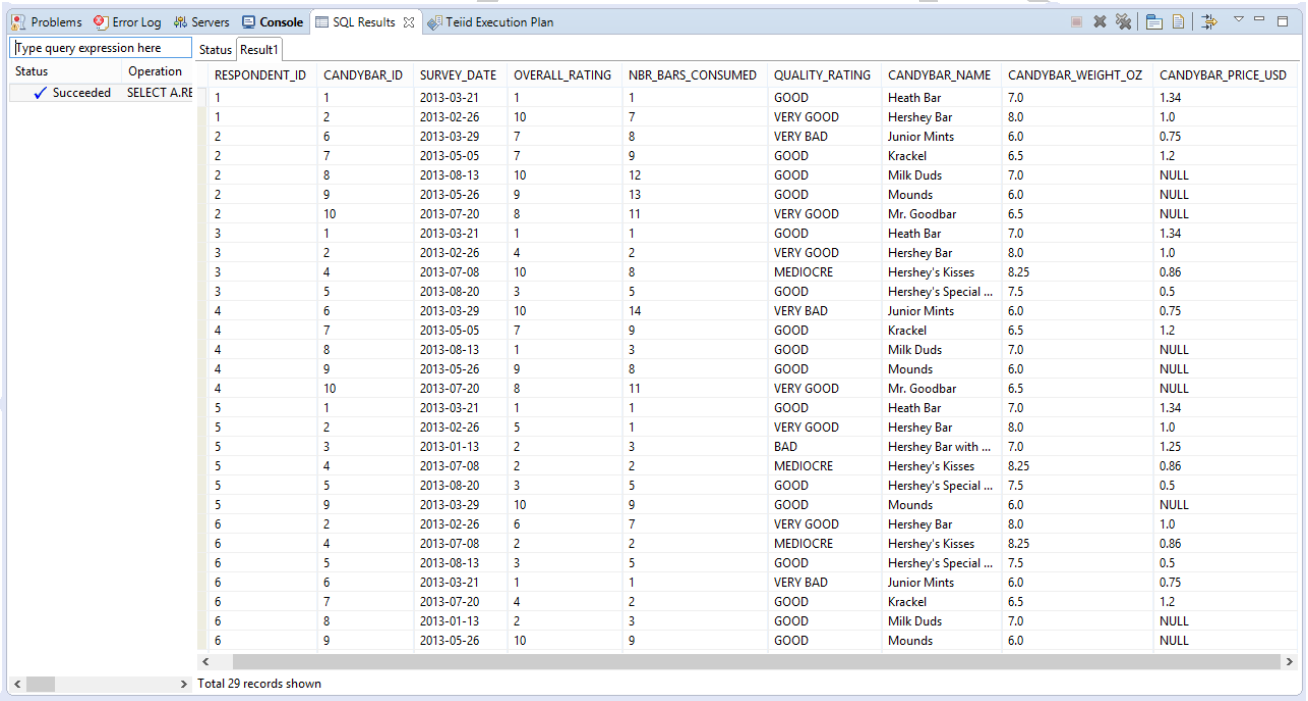


13. After a moment or two of processing, you are returned to JBoss Developer Studio.
14. Next, let's connect to our VDB. Click Modeling Actions… → Manage VDBs → Execute VDB. This will bring up the Execute VDB dialog box.

15. Click the ellipsis and select our VDB (similar to 10 above). Click OK.
16. Click OK again.
17. At this point, JBoss Developer Studio's current perspective (which was Teiid Designer) is replaced with the Database Development perspective. Note that in the upper portion of the IDE you are given a place to enter SQL code. This is where we will query the virtual database.
18. Enter the following SQL code in the SQL Scrapbook:

```
SELECT A.RESPONDENT_ID,A.CANDYBAR_ID,A.SURVEY_DATE,A.OVERALL_RATING,A.NBR_BARS_CONSUMED,
       B.QUALITY_RATING,
       C.CANDYBAR_NAME,C.CANDYBAR_WEIGHT_OZ,C.CANDYBAR_PRICE_USD
 FROM CANDYBAR_FACT A
  INNER JOIN CANDYBAR_INFO B
  ON A.CANDYBAR_ID=B.CANDYBAR_ID
   INNER JOIN CANDYBAR_DIM C
   ON A.CANDYBAR_ID=C.CANDYBAR_ID
 ORDER BY A.RESPONDENT_ID,A.CANDYBAR_ID;
```

19. Highlight the SQL code, right-click over it and click on Execute Selected Text. After a moment, the results of your SQL query will appear on the SQL Results tab under the Result 1 tab:



RESPONDENT_ID	CANDYBAR_ID	SURVEY_DATE	OVERALL_RATING	NBR_BARS_CONSUMED	QUALITY_RATING	CANDYBAR_NAME	CANDYBAR_WEIGHT_OZ	CANDYBAR_PRICE_USD
1	1	2013-03-21	1	1	GOOD	Heath Bar	7.0	1.34
1	2	2013-02-26	10	7	VERY GOOD	Hershey Bar	8.0	1.0
2	6	2013-03-29	7	8	VERY BAD	Junior Mints	6.0	0.75
2	7	2013-05-05	7	9	GOOD	Krackel	6.5	1.2
2	8	2013-08-13	10	12	GOOD	Milk Duds	7.0	NULL
2	9	2013-05-26	9	13	GOOD	Mounds	6.0	NULL
2	10	2013-07-20	8	11	VERY GOOD	Mr. Goodbar	6.5	NULL
3	1	2013-03-21	1	1	GOOD	Heath Bar	7.0	1.34
3	2	2013-02-26	4	2	VERY GOOD	Hershey Bar	8.0	1.0
3	4	2013-07-08	10	8	MEDIOCRE	Hershey's Kisses	8.25	0.86
3	5	2013-08-20	3	5	GOOD	Hershey's Special ...	7.5	0.5
4	6	2013-03-29	10	14	VERY BAD	Junior Mints	6.0	0.75
4	7	2013-05-05	7	9	GOOD	Krackel	6.5	1.2
4	8	2013-08-13	1	3	GOOD	Milk Duds	7.0	NULL
4	9	2013-05-26	9	8	GOOD	Mounds	6.0	NULL
4	10	2013-07-20	8	11	VERY GOOD	Mr. Goodbar	6.5	NULL
5	1	2013-03-21	1	1	GOOD	Heath Bar	7.0	1.34
5	2	2013-02-26	5	1	VERY GOOD	Hershey Bar	8.0	1.0
5	3	2013-01-13	2	3	BAD	Hershey Bar with ...	7.0	1.25
5	4	2013-07-08	2	2	MEDIOCRE	Hershey's Kisses	8.25	0.86
5	5	2013-08-20	3	5	GOOD	Hershey's Special ...	7.5	0.5
5	9	2013-03-29	10	9	GOOD	Mounds	6.0	NULL
6	2	2013-02-26	6	7	VERY GOOD	Hershey Bar	8.0	1.0
6	4	2013-07-08	2	2	MEDIOCRE	Hershey's Kisses	8.25	0.86
6	5	2013-08-13	3	5	GOOD	Hershey's Special ...	7.5	0.5
6	6	2013-03-21	1	1	VERY BAD	Junior Mints	6.0	0.75
6	7	2013-07-20	4	2	GOOD	Krackel	6.5	1.2
6	8	2013-01-13	2	3	GOOD	Milk Duds	7.0	NULL
6	9	2013-05-26	10	9	GOOD	Mounds	6.0	NULL

Step 9 – Accessing the Virtual Database from Microsoft Access

Now that we have our virtual database deployed, let's see if we can access it from outside of JBoss Developer Studio…I mean, that's the goal of this, right? ☺

In this example, we will attempt to access the virtual database from within Microsoft Access using External Data/ODBC Database. In order to do this we must create an ODBC DSN to the virtual database which requires an ODBC Driver. The Teiid developers suggest installing the Postgres ODBC Driver, which we'll show you how to do in a moment.

Note: When using Microsoft Access to access an ODBC data source, you must ensure that your table names do **NOT** contain underscores. Access will automatically translate the period between the schema (data source in Teiid) and the table into an underscore, and this where the problem occurs. Ensuring that your table names have no underscores is one method, but you can also alter the *outgoing* table name in Teiid Designer without affecting the underlying *incoming* data source table name. We'll show you how to do this in a moment.

Step 9A – Installing the Postgres ODBC Driver

WARNING: Microsoft Access is delivered as either a 32-bit or 64-bit application. You can determine which version you are running by looking for the `Microsoft Office` folder in either the `C:\Program Files` or `C:\Program Files (x86)` folders. If Microsoft Access (`MSACCESS.exe`) is found under `C:\Program Files (x86)` then it is 32-bit, otherwise it is 64-bit. This will determine which version of the Postgres ODBC Driver to download as well as which ODBC administration software to use to create the DSN to Teiid: `ODBC Data Sources (32-bit)` or `ODBC Data Sources (64-bit)`.

Note: Please ensure that your Virtual Database (VDB) has been deployed. If you followed the instructions from Step 8 above, you are good to go.

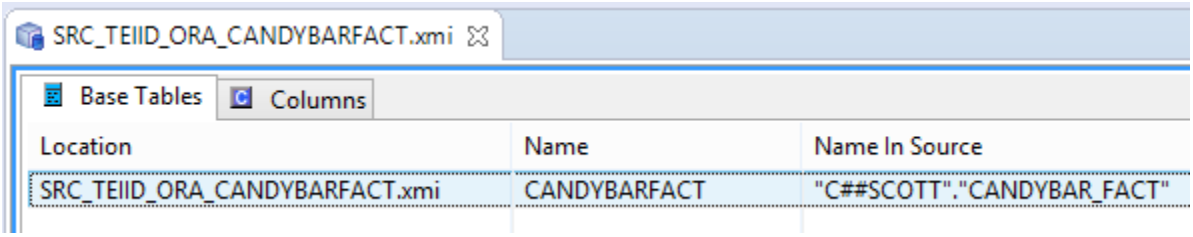
1. Open your browser and navigate to www.postgresql.org/ftp/odbc/versions/msi/.
2. Scroll down to the bottom to locate the latest drivers.
3. Download the version containing the text "x64" if your version of Microsoft Access is 64-bit. Download the version without the text "x64" if your version of Microsoft Access is 32-bit.
4. Open up the downloaded file using your favorite zip software and extract either `psqlodbc_x64.msi` or `psqlodbc-setup.exe`.
5. Double-click on the file you just extracted and follow the simple installation instructions to install the Postgres ODBC Driver.

Step 9B – Modifying Outgoing Table Names

In this step, we will modify the outgoing table names in our Virtual Database (VDB) to ensure that they do not contain underscores. Note that this does NOT affect the name of the source table!

If none of your table names contain underscores, you can safely skip this step.

1. In JBoss Developer Studio 8.1.0 GA, ensure that the Teiid Designer perspective is active.
2. Within Model Explorer (to the left of the IDE), locate a table that contains an underscore in its name.
3. Right-click over the table and click Rename…
4. Remove the underscore and hit the Enter key.
5. Double-click the table name to bring up the Package Diagram tab. You will note that the table in the database design no longer contains the underscore.
6. Click on the Table Editor tab.
7. Take note that the *Name* column contains the name of the table without underscores, but the column *Name In Source* does contain the underscores.



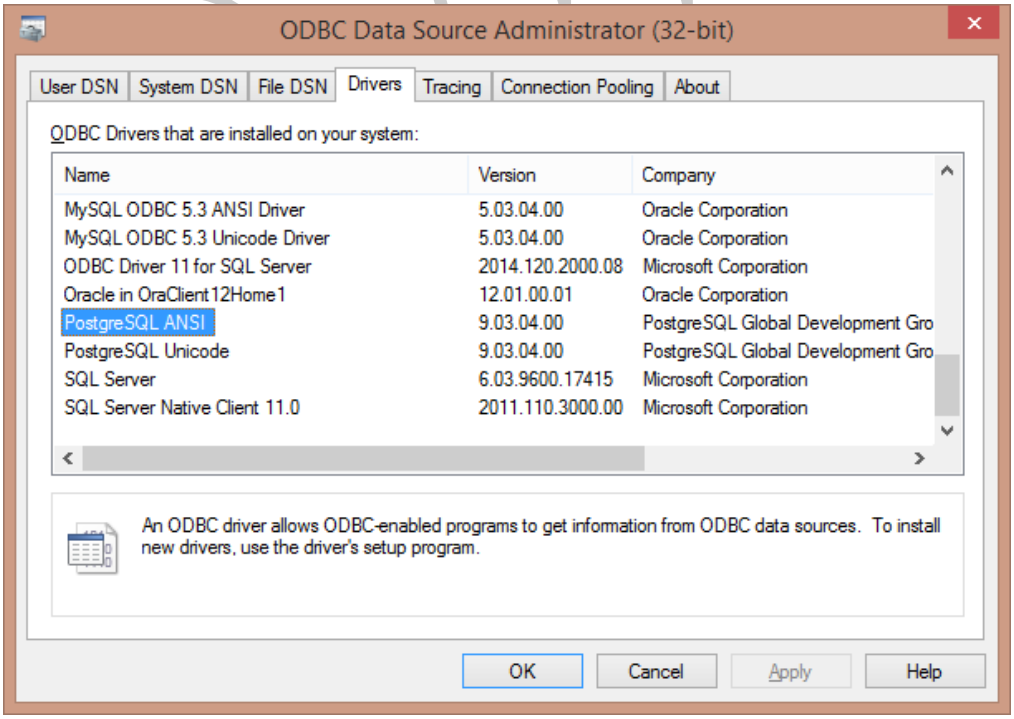
8. Save the model and re-deploy your virtual database.

Note: Occasionally, you will receive a popup dialog box indicating that one or more data sources in the deployed virtual database is not in sync with the current virtual database. When I receive this message, I find it's easier to just re-create the virtual database from scratch. There must be a better way to get around this message, so I will update this document once I found it.

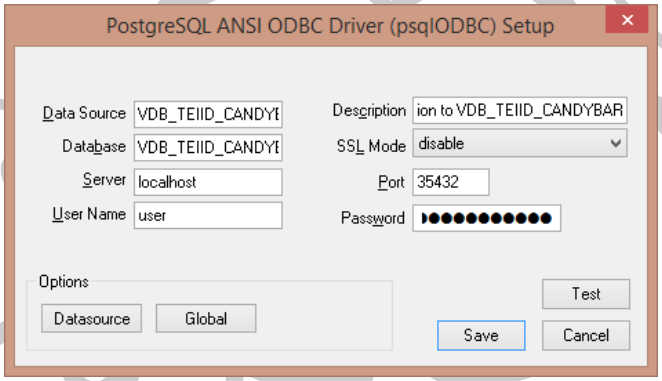
Step 9C – Creating the ODBC DSN to the Virtual Database

In this step, we will create the ODBC DSN which will access our virtual database using the Postgres ODBC driver installed in Step 9A above.

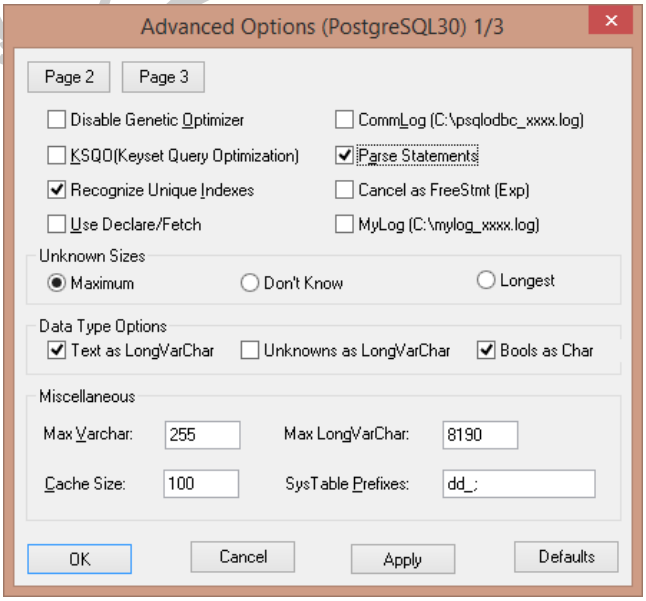
1. Start the Control Panel
2. Click on System and Security
3. Click on Administrative Tools
4. At this point, you will note the two entries `ODBC Data Sources (32-bit)` and `ODBC Data Sources (64-bit)`. Depending on the version of the Postgres ODBC Driver you downloaded, double-click on the appropriate version.
5. When the ODBC Data Source Administrator dialog box appears, click on the Drivers tab. Take note that the two entries PostgreSQL ANSI and PostgreSQL Unicode should appear.



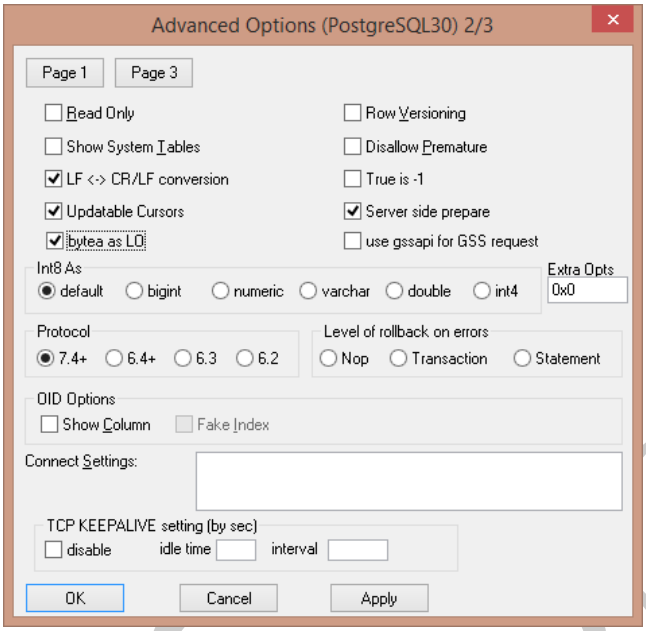
6. Click on the User DSN tab.
7. Click on the Add… button.
8. When the Create New Data Source dialog box appears, scroll down until you see PostgreSQL ANSI. Double-click on it.
9. When the PostgreSQL ANSI ODBC Driver (psqlODBC) Setup dialog box appears, fill in the entries a follows:
    a. Data Source: this can be any name you want (for me, I just used the name of the virtual database)
    b. Description: enter in an appropriate description
    c. Database: enter in the name of the virtual database
    d. SSL Mode: disable
    e. Server: localhost (if you are attempting to access a remote Teiid Server, enter in that name instead)
    f. Port: 35432 (this is the port the Teiid Server is listening on)
    g. User Name: user
    h. Password: enter in the password for the JDBC user from the Teiid Instance tab; recall that we set this up in Section I/Step 1.



10. Click the Test button. If all goes well, you will receive a success message.
11. Click on the Datasource button. You will be brought into Page 1 of 3. Ensure that your Page 1 matches what is shown below:



12. Click on the Page 2 button and fill it in as shown below:



13. Click OK.
14. Click Save to save your DSN.

Step 9D – Accessing the Virtual Database from Microsoft Access

In this step, we will pull in the tables from the virtual database into Microsoft Access using the DSN we set up in Step 9B.

1. Start Microsoft Access.
2. Open up either a blank or existing database.
3. Click the External Data menu.
4. Click on the ODBC Database icon.
5. Select whether you want to pull in the table data or just link to it.
6. On the Select Data Source dialog box, click on the Machine Data Source tab.
7. Locate the DSN created in Step 9B, click on it and click OK.
8. When Import Objects or Linked Tables dialog box appears, click on each table you want to pull into Access. Each row will be highlighted. Click on it again to de-select it.
9. Click OK.
10. When the Get External Data – ODBC Database dialog box appears, decide whether or not you want to save the import steps. Doing this will prevent you from having to go through the wizard. For me, I violently clicked Close.
11. At this point, you will see your list of tables in the pane on the left of the interface. Double-clicking each table in turn will bring it up in the pane on the right (see below).

SRC_TEIID_ORA_CANDYBARFACT_CANDYBARFACT

RESPONDENT_ID	CANDYBAR_ID	SURVEY_DATE	OVERALL_RATING	NBR_BARS_CONSUMED
1	1	3/21/2013	1	1
1	2	2/26/2013	10	7
2	6	3/29/2013	7	8
2	7	5/5/2013	7	9
2	8	8/13/2013	10	12
2	9	5/26/2013	9	13
2	10	7/20/2013	8	11
3	1	3/21/2013	1	1
3	2	2/26/2013	4	2
3	4	7/8/2013	10	8
3	5	8/20/2013	3	5
4	6	3/29/2013	10	14
4	7	5/5/2013	7	9
4	8	8/13/2013	1	3
4	9	5/26/2013	9	8
4	10	7/20/2013	8	11
5	1	3/21/2013	1	1
5	2	2/26/2013	5	1
5	3	1/13/2013	2	3
5	4	7/8/2013	2	2
5	5	8/20/2013	3	5
5	9	3/29/2013	10	9
6	6	3/21/2013	1	1
6	2	2/26/2013	6	7
6	8	1/13/2013	2	3
6	4	7/8/2013	2	2
6	5	8/13/2013	3	5
6	9	5/26/2013	10	9
6	7	7/20/2013	4	2

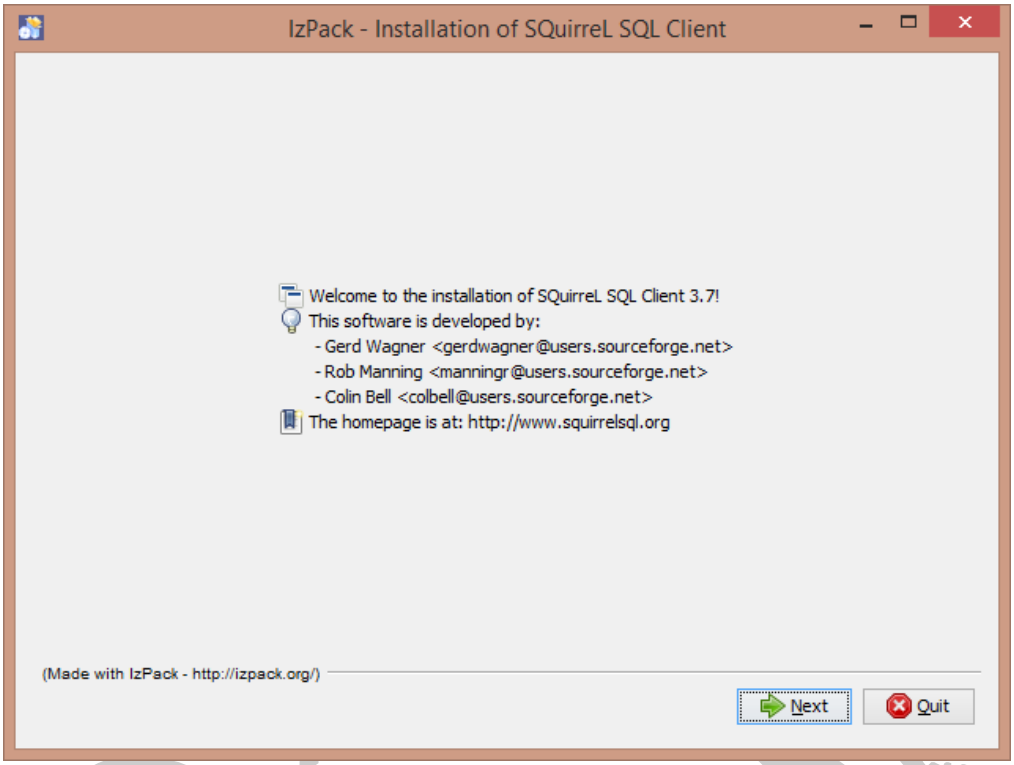
Step 9E – Accessing the Virtual Database from SQuirreL SQL Client

In this step, we will use the SQuirreL SQL Client to access the virtual database. Note that, unlike Microsoft Access, SQuirreL does not have a problem with underscores! Woo-hoo!

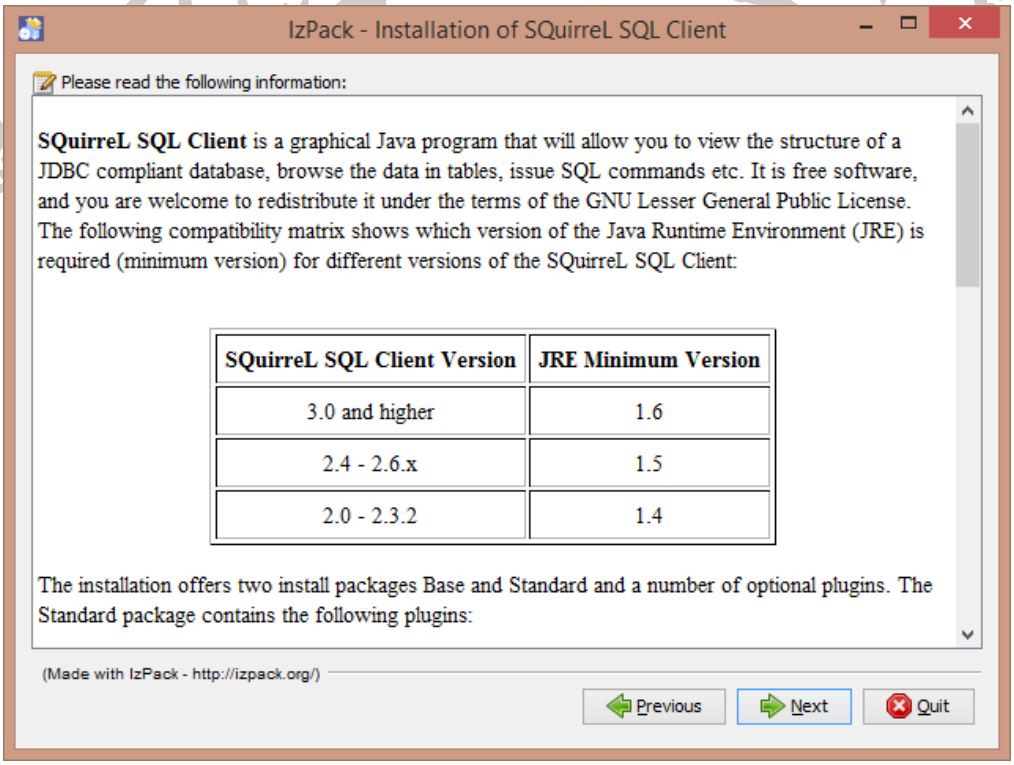
1. Download SQuirreL SQL Client from www.squirrelsql.org.
2. Click on "Install jar of SQuirreL 3.7 for Windows/Linux/others".
3. Save the file to your downloads folder.
4. Open up a Windows command prompt and type in the following:

```
java -jar squirrel-sql-3.7-standard.jar
```

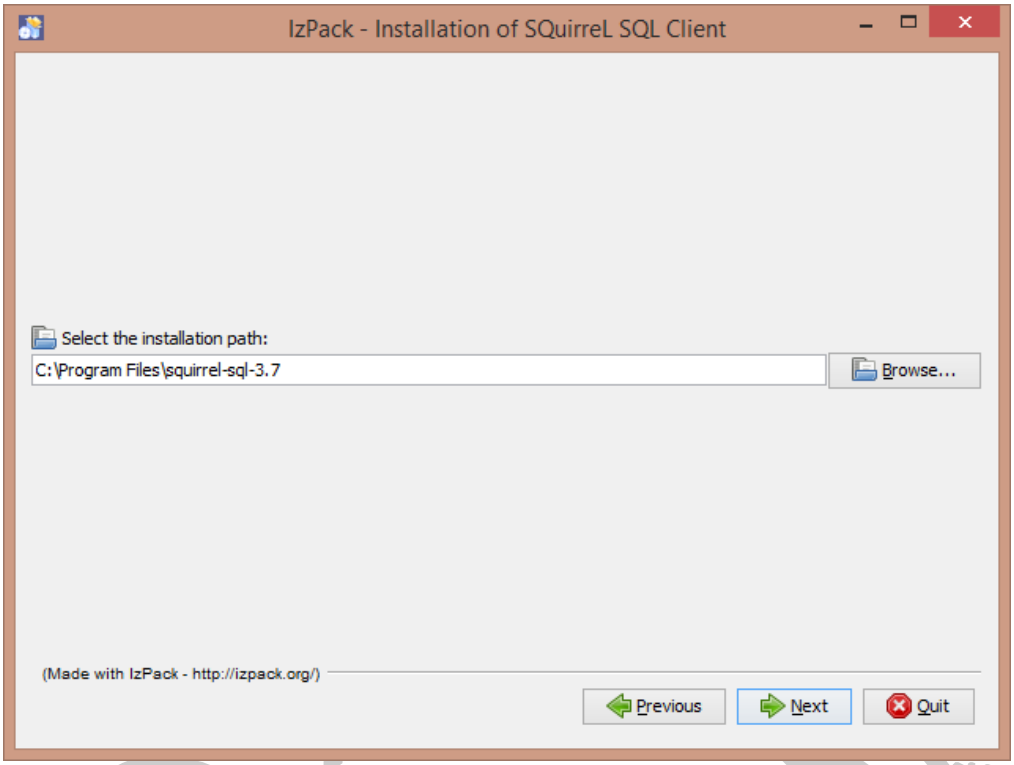
This will bring up the IzPack dialog box:



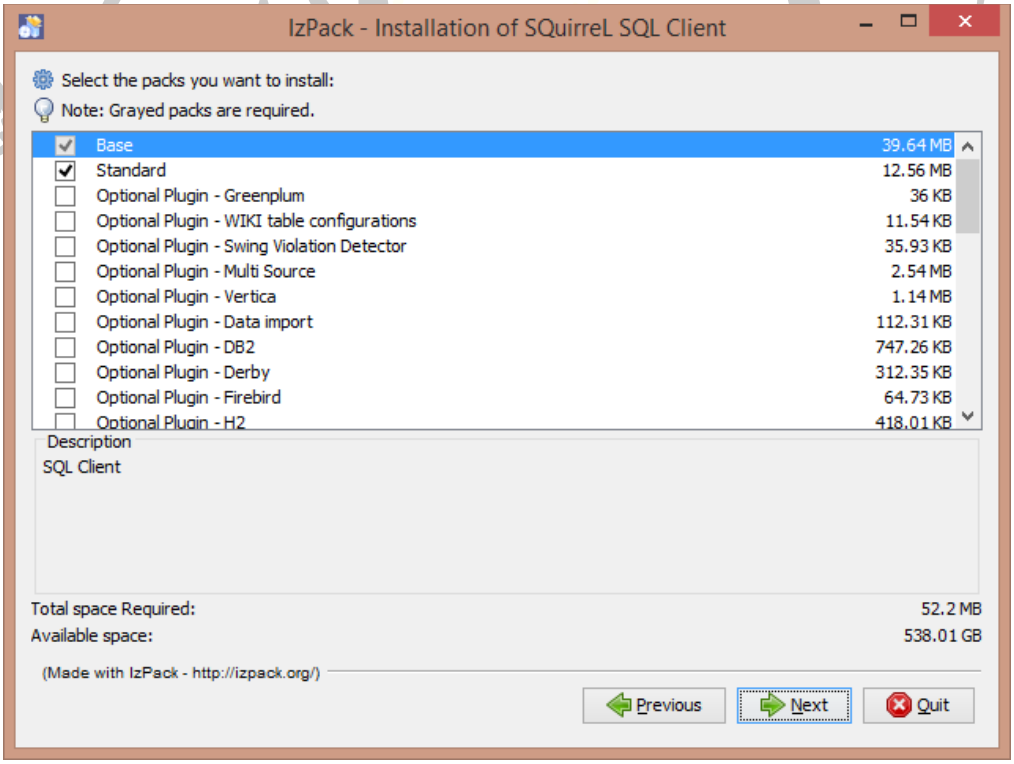
5. Click Next and the installation instructions will be displayed:



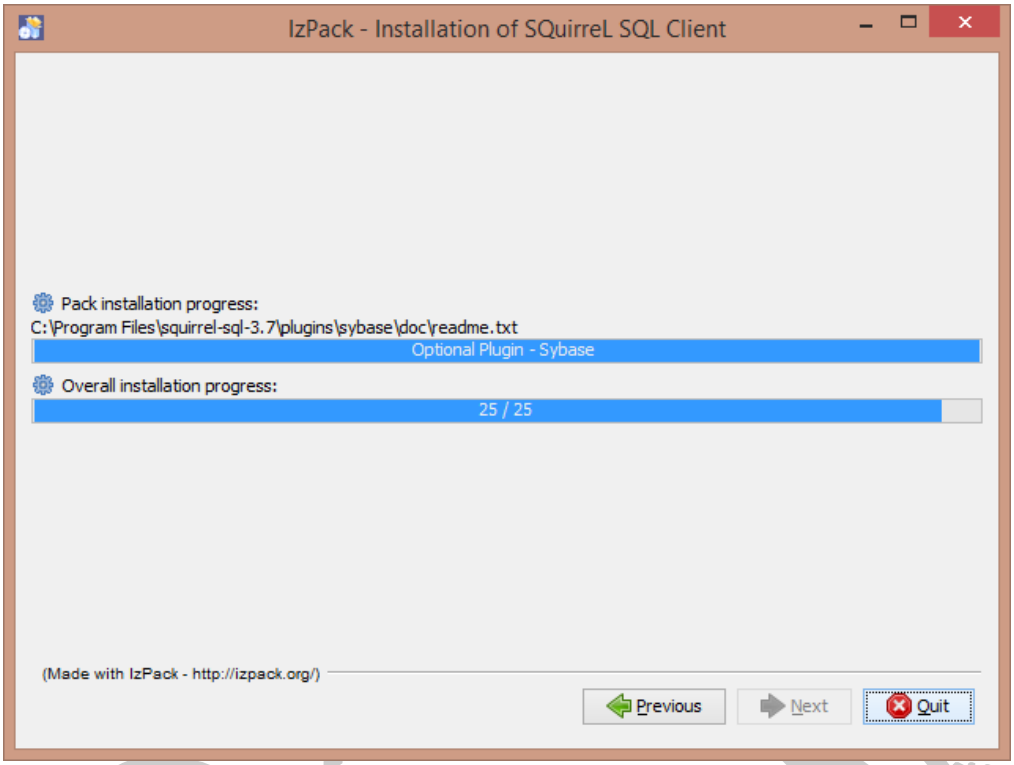
6. Click Next and you will be asked to select an installation path. Be aware that you must have write permissions on this folder.



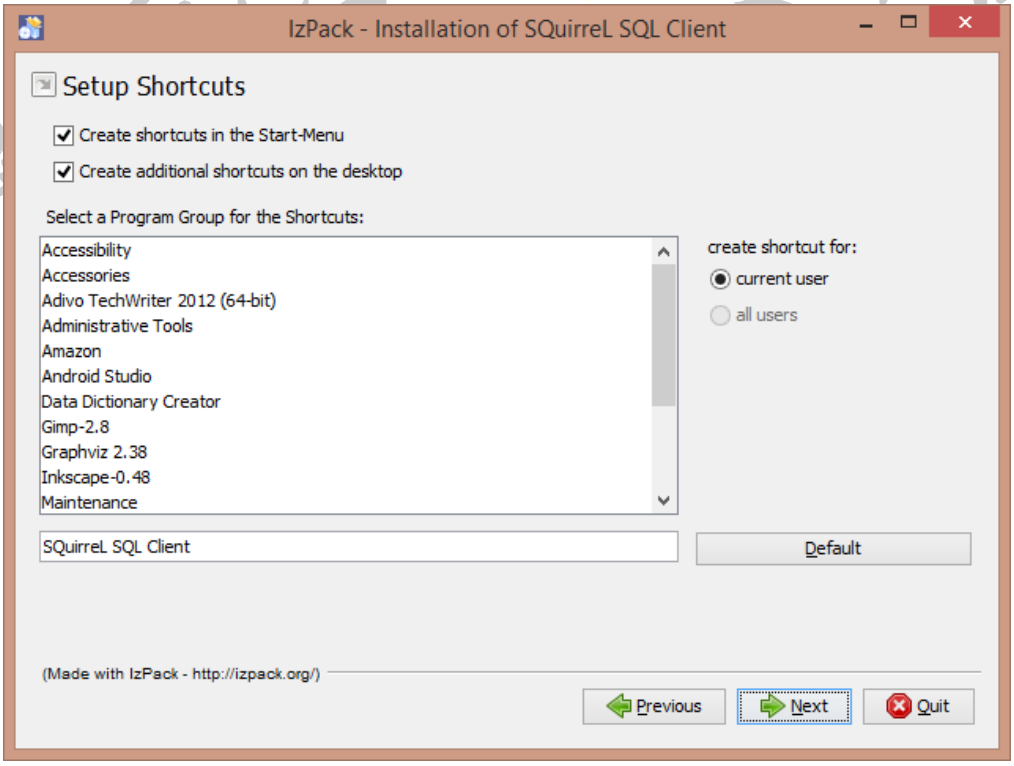
7. Click Next and you will be asked to select the packs to install. Make life easy for yourself and install everything! Woo-hoo!



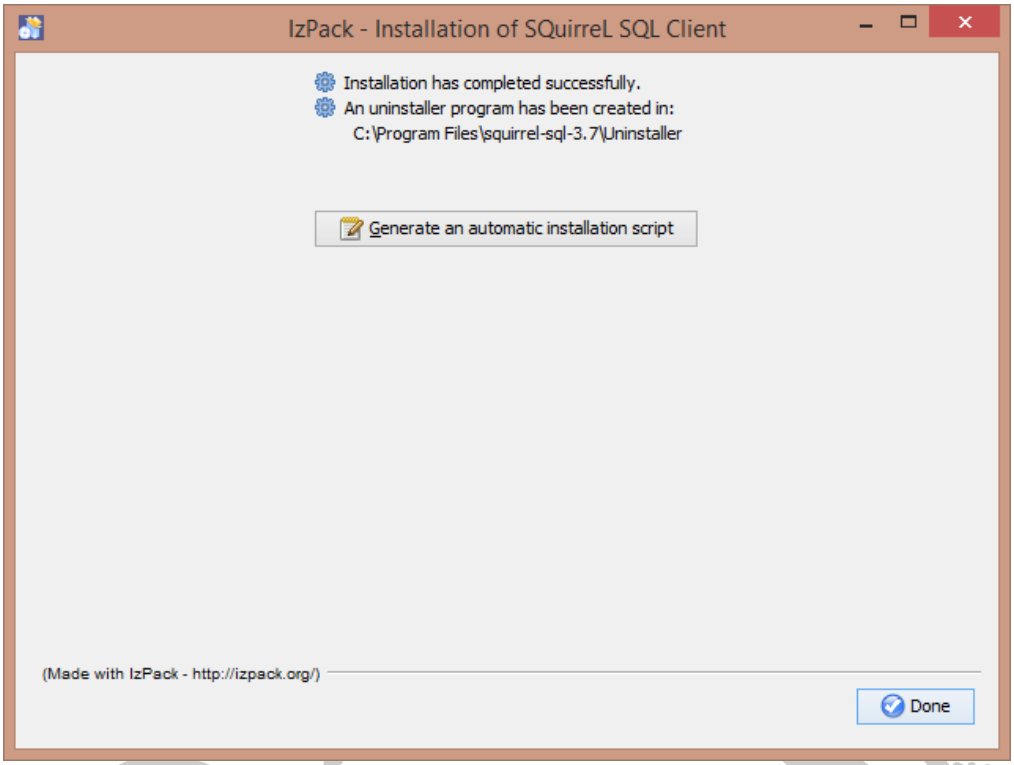
8. Click Next and the install will start and you will be shown the progress of the installation.



9. Click Next and you will be asked to setup shortcuts:



10. Click Next. Finally, you will be told that the installation has completed. Click Done.



11. Next, you must download the JDBC Driver for PostgreSQL. Navigate your browser to https://jdbc.postgresql.org/download.html.
12. Click on the link `JDBC42 Postgresql Driver, Version 9.4-1204` and download the JAR file to your download folder. Note that no installation or unzipping is necessary for this JAR file, so just place it on your hard-drive in a convenient location. Remember this location since you will need it in just a moment.
13. Ensure that JBoss Developer Studio is started and that your started the `jboss-eap` server.
14. To start the SQuirreL SQL Client, run the batch file `squirrel-sql.bat` located in the folder `C:\Program Files\squirrel-sql-3.7`.
15. Click on Windows → View Drivers. The list of drivers will appear in a pane on the left. Scroll down until you see PostgreSQL and double-click on it.
16. In the *Example URL:* input box, enter in the following:

    `jdbc:postgresql://localhost:35432/`***`your-virtual-database-name-here`***

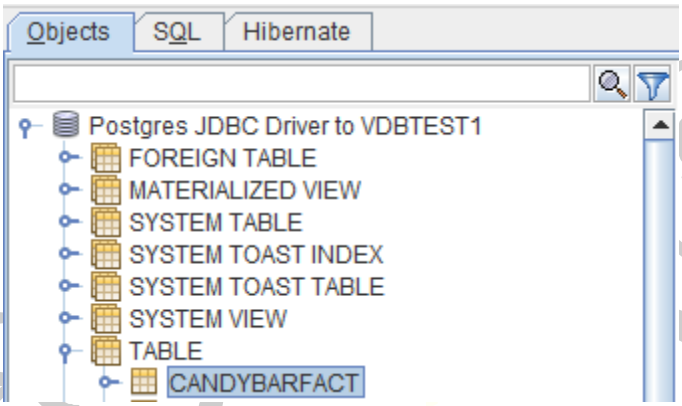
    Make sure to fill in the name of your virtual database.

17. Next, click on the Extra Class Path tab, click the Add button and add the name and location of the PostgreSQL JAR file you just downloaded.
18. Click OK.
19. Now that the driver is set up, let's create an alias to our Teiid Virtual Database. Click on Windows → View Aliases.
20. Click on the blue plus-sign to add a new alias.
21. When the Add Alias dialog box appears, ensure that you select PostgreSQL from the *Driver:* drop-down box.
22. Give a name to your alias in the *Name:* input box.
23. In the *URL:* input box, enter in the following:

`jdbc:postgresql://localhost:35432/`***`your-virtual-database-name-here`***

Make sure to enter in the name of your virtual database.

24. Enter in the Teiid Instance JDBC username (usually, `user`) and password in the *User Name:* and *Password:* input boxes.
25. Click Test to test the connection to the virtual database. If all goes well, you will get a connection successful message.
26. Click OK.
27. To connect to the virtual database, double-click the alias you just created. By clicking on the Objects tab, you can drill down to see the available tables:



APPENDIX

Test Data Used in the Examples

Below is the test data used in the Teiid and Teiid Designer examples.

```
/* TEXT FILE: candybarinfo.csv */
CANDYBAR_ID,QUALITY_RATING
1,GOOD
2,VERY GOOD
3,BAD
4,MEDIOCRE
5,GOOD
6,VERY BAD
7,GOOD
8,GOOD
9,GOOD
10,VERY GOOD

/* ORACLE 12c TABLE: CANDYBAR_FACT */
DROP TABLE CANDYBAR_FACT;
CREATE TABLE CANDYBAR_FACT(RESPONDENT_ID NUMBER,CANDYBAR_ID NUMBER,SURVEY_DATE DATE,OVERALL_RATING
NUMBER,NBR_BARS_CONSUMED NUMBER);
INSERT INTO CANDYBAR_FACT VALUES(1, 1,TO_DATE('21-MAR-2013','DD-MON-YYYY'), 1, 1);
INSERT INTO CANDYBAR_FACT VALUES(1, 2,TO_DATE('26-FEB-2013','DD-MON-YYYY'),10, 7);
INSERT INTO CANDYBAR_FACT VALUES(2, 6,TO_DATE('29-MAR-2013','DD-MON-YYYY'), 7, 8);
INSERT INTO CANDYBAR_FACT VALUES(2, 7,TO_DATE('05-MAY-2013','DD-MON-YYYY'), 7, 9);
INSERT INTO CANDYBAR_FACT VALUES(2, 8,TO_DATE('13-AUG-2013','DD-MON-YYYY'),10,12);
INSERT INTO CANDYBAR_FACT VALUES(2, 9,TO_DATE('26-MAY-2013','DD-MON-YYYY'), 9,13);
INSERT INTO CANDYBAR_FACT VALUES(2,10,TO_DATE('20-JUL-2013','DD-MON-YYYY'), 8,11);
INSERT INTO CANDYBAR_FACT VALUES(3, 1,TO_DATE('21-MAR-2013','DD-MON-YYYY'), 1, 1);
INSERT INTO CANDYBAR_FACT VALUES(3, 2,TO_DATE('26-FEB-2013','DD-MON-YYYY'), 4, 2);
INSERT INTO CANDYBAR_FACT VALUES(3, 4,TO_DATE('08-JUL-2013','DD-MON-YYYY'),10, 8);
INSERT INTO CANDYBAR_FACT VALUES(3, 5,TO_DATE('20-AUG-2013','DD-MON-YYYY'), 3, 5);
INSERT INTO CANDYBAR_FACT VALUES(4, 6,TO_DATE('29-MAR-2013','DD-MON-YYYY'),10,14);
INSERT INTO CANDYBAR_FACT VALUES(4, 7,TO_DATE('05-MAY-2013','DD-MON-YYYY'), 7, 9);
INSERT INTO CANDYBAR_FACT VALUES(4, 8,TO_DATE('13-AUG-2013','DD-MON-YYYY'), 1, 3);
INSERT INTO CANDYBAR_FACT VALUES(4, 9,TO_DATE('26-MAY-2013','DD-MON-YYYY'), 9, 8);
INSERT INTO CANDYBAR_FACT VALUES(4,10,TO_DATE('20-JUL-2013','DD-MON-YYYY'), 8,11);
INSERT INTO CANDYBAR_FACT VALUES(5, 1,TO_DATE('21-MAR-2013','DD-MON-YYYY'), 1, 1);
INSERT INTO CANDYBAR_FACT VALUES(5, 2,TO_DATE('26-FEB-2013','DD-MON-YYYY'), 5, 1);
INSERT INTO CANDYBAR_FACT VALUES(5, 3,TO_DATE('13-JAN-2013','DD-MON-YYYY'), 2, 3);
INSERT INTO CANDYBAR_FACT VALUES(5, 4,TO_DATE('08-JUL-2013','DD-MON-YYYY'), 2, 2);
INSERT INTO CANDYBAR_FACT VALUES(5, 5,TO_DATE('20-AUG-2013','DD-MON-YYYY'), 3, 5);
INSERT INTO CANDYBAR_FACT VALUES(5, 9,TO_DATE('29-MAR-2013','DD-MON-YYYY'),10, 9);
INSERT INTO CANDYBAR_FACT VALUES(6, 6,TO_DATE('21-MAR-2013','DD-MON-YYYY'), 1, 1);
INSERT INTO CANDYBAR_FACT VALUES(6, 2,TO_DATE('26-FEB-2013','DD-MON-YYYY'), 6, 7);
INSERT INTO CANDYBAR_FACT VALUES(6, 8,TO_DATE('13-JAN-2013','DD-MON-YYYY'), 2, 3);
INSERT INTO CANDYBAR_FACT VALUES(6, 4,TO_DATE('08-JUL-2013','DD-MON-YYYY'), 2, 2);
INSERT INTO CANDYBAR_FACT VALUES(6, 5,TO_DATE('13-AUG-2013','DD-MON-YYYY'), 3, 5);
INSERT INTO CANDYBAR_FACT VALUES(6, 9,TO_DATE('26-MAY-2013','DD-MON-YYYY'),10, 9);
INSERT INTO CANDYBAR_FACT VALUES(6, 7,TO_DATE('20-JUL-2013','DD-MON-YYYY'), 4, 2);
COMMIT;

/* SQL SERVER 2014 TABLE: CANDYBAR_DIM */
DROP TABLE CANDYBAR_DIM;
CREATE TABLE CANDYBAR_DIM(CANDYBAR_ID SMALLINT,CANDYBAR_NAME VARCHAR(50),CANDYBAR_WEIGHT_OZ
FLOAT,CANDYBAR_PRICE_USD FLOAT);
INSERT INTO CANDYBAR_DIM VALUES(5,'Hershey''s Special Dark',7.5,.5);
INSERT INTO CANDYBAR_DIM VALUES(6,'Junior Mints',6,.75);
INSERT INTO CANDYBAR_DIM VALUES(3,'Hershey Bar with Almonds',7,1.25);
INSERT INTO CANDYBAR_DIM VALUES(1,'Heath Bar',7,1.34);
INSERT INTO CANDYBAR_DIM VALUES(2,'Hershey Bar',8,1);
INSERT INTO CANDYBAR_DIM VALUES(7,'Krackel',6.5,1.2);
INSERT INTO CANDYBAR_DIM VALUES(8,'Milk Duds',7,NULL);
INSERT INTO CANDYBAR_DIM VALUES(9,'Mounds',6,NULL);
INSERT INTO CANDYBAR_DIM VALUES(10,'Mr. Goodbar',6.5,NULL);
INSERT INTO CANDYBAR_DIM VALUES(4,'Hershey''s Kisses',8.25,.86);
```

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