Hibernate Tutorial

A JBoss Developer Studio Hibernate Tutorial

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Preface

1. Document Conventions

This manual uses several conventions to highlight certain words and phrases and draw attention to specific pieces of information.

In PDF and paper editions, this manual uses typefaces drawn from the *Liberation Fonts* [https://fedorahosted.org/liberation-fonts/] set. The Liberation Fonts set is also used in HTML editions if the set is installed on your system. If not, alternative but equivalent typefaces are displayed. Note: Red Hat Enterprise Linux 5 and later includes the Liberation Fonts set by default.

1.1. Typographic Conventions

Four typographic conventions are used to call attention to specific words and phrases. These conventions, and the circumstances they apply to, are as follows.

`Mono-spaced Bold`

Used to highlight system input, including shell commands, file names and paths. Also used to highlight keycaps and key combinations. For example:

> To see the contents of the file `my_next_bestselling_novel` in your current working directory, enter the `cat my_next_bestselling_novel` command at the shell prompt and press **Enter** to execute the command.

The above includes a file name, a shell command and a keycap, all presented in mono-spaced bold and all distinguishable thanks to context.

Key combinations can be distinguished from keycaps by the hyphen connecting each part of a key combination. For example:

> Press **Enter** to execute the command.
>
> Press **Ctrl**+**Alt**+**F1** to switch to the first virtual terminal. Press **Ctrl**+**Alt**+**F7** to return to your X-Windows session.

The first paragraph highlights the particular keycap to press. The second highlights two key combinations (each a set of three keycaps with each set pressed simultaneously).

If source code is discussed, class names, methods, functions, variable names and returned values mentioned within a paragraph will be presented as above, in `mono-spaced bold`. For example:

> File-related classes include `filesystem` for file systems, `file` for files, and `dir` for directories. Each class has its own associated set of permissions.

Proportional Bold

This denotes words or phrases encountered on a system, including application names; dialog box text; labeled buttons; check-box and radio button labels; menu titles and sub-menu titles. For example:

> Choose **System** → **Preferences** → **Mouse** from the main menu bar to launch **Mouse Preferences**. In the **Buttons** tab, click the **Left-handed mouse** check box and click **Close** to switch the primary mouse button from the left to the right (making the mouse suitable for use in the left hand).
>
> To insert a special character into a **gedit** file, choose **Applications** → **Accessories** → **Character Map** from the main menu bar. Next, choose **Search** → **Find** from the **Character Map** menu bar, type the name of the character in the **Search** field and click **Next**. The character you sought will be highlighted in the **Character Table**. Double-click this highlighted character to place it in the **Text to copy** field and then click the **Copy** button. Now switch back to your document and choose **Edit** → **Paste** from the **gedit** menu bar.

The above text includes application names; system-wide menu names and items; application-specific menu names; and buttons and text found within a GUI interface, all presented in proportional bold and all distinguishable by context.

`Mono-spaced Bold Italic` or ***`Proportional Bold Italic`***

Whether mono-spaced bold or proportional bold, the addition of italics indicates replaceable or variable text. Italics denotes text you do not input literally or displayed text that changes depending on circumstance. For example:

> To connect to a remote machine using ssh, type `ssh` *`username@domain.name`* at a shell prompt. If the remote machine is `example.com` and your username on that machine is john, type `ssh john@example.com`.
>
> The `mount -o remount` *`file-system`* command remounts the named file system. For example, to remount the `/home` file system, the command is `mount -o remount /home`.
>
> To see the version of a currently installed package, use the `rpm -q` *`package`* command. It will return a result as follows: *`package-version-release`*.

Note the words in bold italics above username, domain.name, file-system, package, version and release. Each word is a placeholder, either for text you enter when issuing a command or for text displayed by the system.

Aside from standard usage for presenting the title of a work, italics denotes the first use of a new and important term. For example:

> Publican is a *DocBook* publishing system.

1.2. Pull-quote Conventions

Terminal output and source code listings are set off visually from the surrounding text.

Output sent to a terminal is set in `mono-spaced roman` and presented thus:

```
books        Desktop   documentation  drafts  mss    photos   stuff  svn
books_tests  Desktop1  downloads      images  notes  scripts  svgs
```

Source-code listings are also set in `mono-spaced roman` but add syntax highlighting as follows:

```
package org.jboss.book.jca.ex1;

import javax.naming.InitialContext;

public class ExClient
{
   public static void main(String args[])
       throws Exception
   {
      InitialContext iniCtx = new InitialContext();
      Object         ref    = iniCtx.lookup("EchoBean");
      EchoHome       home   = (EchoHome) ref;
      Echo           echo   = home.create();

      System.out.println("Created Echo");

      System.out.println("Echo.echo('Hello') = " + echo.echo("Hello"));
   }
}
```

1.3. Notes and Warnings

Finally, we use three visual styles to draw attention to information that might otherwise be overlooked.

Note

Notes are tips, shortcuts or alternative approaches to the task at hand. Ignoring a note should have no negative consequences, but you might miss out on a trick that makes your life easier.

Important

Important boxes detail things that are easily missed: configuration changes that only apply to the current session, or services that need restarting before an update will apply. Ignoring a box labeled 'Important' won't cause data loss but may cause irritation and frustration.

Warning

Warnings should not be ignored. Ignoring warnings will most likely cause data loss.

2. We Need Feedback!

You should over ride this by creating your own local Feedback.xml file.

Introduction

1.1. Tutorial Overview

This tutorial is an extension of a **Hibernate** tutorial written by Michael Gloegl. The original tutorial has been modified to serve as an introduction to application development using **JBoss Developer Studio** (JBDS), **Maven** and **Hibernate**. The topics covered include:

- JBDS/Maven integration;
- the development of command line applications;
- the development and deployment of web applications;
- database connectivity and table association mapping using hibernate;
- Integrated Development Environment (IDE) development techniques.

By the end of the tutorial the reader will have attained an awareness of the tools available for the development of web applications, be introduced to some of the features that form a part of the JBoss Enterprise Application Platform and will be in a position to confidently develop small scale applications with the aid of JBDS. The resultant application is presented as a single page to minimise the amount of code required to generate the application and to serve as a brief overview of web application development using JBDS.

1.2. Intended Audience

This tutorial has been written with the beginning developer in mind, although developers with experience in **Eclipse** and **Maven** may find it useful as a revision exercise and as a single point of access to further reference material.

It would be beneficial for the reader to have a basic knowledge of Java, Java web development, relational databases and Structured Query Language (SQL). Links to detailed information are provided throughout the text and it is recommended that these are read while progressing through the tutorial.

Maven Integration

JBoss Developer Studio is configured with the required plugins to enable the development of a variety of JBoss projects. Projects may also be built using a build tool such as **Ant** provided that the required build tool is installed on the user's system.

Given the popularity of **Maven** amongst developers as a build tool and project management tool, the following tutorial will be built using **Maven** and will use the **Maven** standard web application archetype as a basis for development.

> ### Maven Reference
>
> A detailed **Maven** guide is available which serves as both a reference and an introduction to **Maven**. *Maven: The Definitive Guide* is available for download from *http://www.sonatype.com/products/maven/documentation/book-defguide* and included as an M2Eclipse plugin option. It is recommended that readers with limited exposure to **Maven** read this guide prior to proceeding with this tutorial.

2.1. Prerequisites

This tutorial has been configured on the basis of the following installations:

- **JBoss Developer Studio 3.0.0**
- **Java Developer Kit (JDK) 1.6.0_16**
- **Maven 2.2.1**
- **Subversion 1.6.4**
- **MySQL 5.1.41**

Installation instructions for each product can be obtained from the following sources:

JBoss Developer Studio
: *http://www.redhat.com/docs/en-US/JBoss_Developer_Studio/*

JDK
: *http://java.sun.com/javase/downloads/index.jsp*

Maven
: *http://maven.apache.org/*

Subversion
http://subversion.tigris.org/

MySQL
http://dev.mysql.com/doc/

2.2. Plugin Installation

Maven support within **JBoss Developer Studio** requires the installation of additional plugins. The plugin which provides the majority of the functionality is M2Eclipse, the reference book for which recommends the installation of prerequisite plugins for use in a development environment. These include:

- Mylyn which provides M2Eclipse with the ability to interact with a task-focused interface, optimising the amount of information presented to the user and streamlining a multi-task environment;
- Subclipse which provides M2Eclipse with the ability to interact with **Subversion** repositories.

> ### M2Eclipse Reference
>
> The M2Eclipse reference used as a source for this document is *Developing with Eclipse and Maven* which can be obtained form *http://www.sonatype.com/books/m2eclipse-book/reference/*

Plugin installation in **JBoss Developer Studio** can be achieved by adding the relevant remote update site to the list of available software sites. Software sites can be added according to the following procedure:

Procedure 2.1. Adding an Update Site

1. **Access the Install dialog box**

   Select **Help** → **Install New Software**

2. **Enter the site information**

   a. Click the **Add** button.

   b. Enter a name for the plugin in the **Name** field.

   c. Enter the URL of the update site in the **Location** field.

3. **Add the site**

   Once the entered details have been verified, click the **OK** button to begin the installation. The plugin details are retrieved by **JBoss Developer Studio** and the available plugins will be displayed in the main window of the **Install** dialog box including any **Optional** plugins.

4. **Select the plugins**

   a. Choose the required plugins and any **Optional** plugins listed by clicking the relevant checkboxes. Sub-items can be selected or deselected as required.

   b. Click the **Next** button.

5. **Review the plugins**

   a. The plugins to be installed will be displayed.

   b. Choose the **Next** button to continue the installation or the **Back** button to revise the selection.

6. **Review the licenses**

   a. Read the license information presented on the screen and agree to the terms of the licence by clicking on the **I accept** radio button.

   b. Choose the **Finish** button to complete the installation or the **Back** button to revise the selection.

7. **Note any security warnings**

   a. Read the security warning. Click the **Details** button to obtain further details if required.

   b. Once satisfied that the software is safe to install, click the **OK** button to accept the installation.

8. **Restart JBoss Developer Studio**

   When prompted, it is recommended to restart **JBoss Developer Studio** by clicking the **Yes** button.

Unsigned Software

The installation of plugins often involves unsigned content for which the validity of the software cannot be established. There are risks associated with the use of unsigned software and it is recommended that users acquaint themselves with the risks prior to finalising the installation.

2.2.1. Existing Installations and the Corresponding Plugin Versions

It is important to obtain the correct plugin version corresponding to the installed version of **Eclipse**, upon which **JBoss Developer Studio** is based, and the installed versions of any supporting software such as **Subversion**.

2.2.1.1. Eclipse Version

The **Eclipse** version can be obtained by the following procedure:

Procedure 2.2. Obtaining the Eclipse version

1. **Access the Installation Details dialog**

   a. Select **Help** → **About JBoss Developer Studio**

   b. Click the **Installation Details** button.

2. **Obtain the feature details**

   a. Click the **Features** tab.

   b. Under the **Provider** column, scroll to the eclipse.org entries.

   c. Select the row corresponding to *Eclipse Platform* under the **Feature Name** column.

   The **Eclipse** version is displayed under the **Version** column of the table or in the main display area of the **Installation Details** dialog.

2.2.1.2. Supporting Software Versions

Determining the version number of the majority of applications such as **Subversion** or **Maven** can be achieved by typing `svn --version` or `mvn --version` at a command prompt. Although not required for determining plugin versions, the **Java** installation version can be obtained by typing `java -version`.

2.2.1.3. Determining the Correct Update Sites

Once the correct version numbers have been established for **Eclipse** and **Subversion**, details regarding the correct plugin version can be obtained from the relevant plugin project site. In this instance, those sites are:

Mylyn
   http://www.eclipse.org/mylyn/

Subclipse

http://subclipse.tigris.org/

M2Eclipse

http://m2eclipse.sonatype.org/

2.2.1.4. Resultant Update Site URLs

The procedure listed in *Adding an Update Site* would be completed for each required plugin. Based on plugin installations for **Subversion 1.6.4** and **JBoss Developer Studio 3.0.0** - which uses the **Eclipse 3.5.1** IDE - the correct update site URLs to be entered in *Step 2* of *Adding an Update Site* are:

Mylyn

`http://download.eclipse.org/tools/mylyn/update/e3.4`

Subclipse

`http://subclipse.tigris.org/update_1.6.x`

M2Eclipse

`http://m2eclipse.sonatype.org/update-dev` or `http://m2eclipse.sonatype.org/update`

Potential Plugin Errors

The update site used for *M2Eclipse* was the development build *http://m2eclipse.sonatype.org/update-dev* due to errors returned when creating a Maven webapp archetype project following the installation of release build plugins. The release build update site, *http://m2eclipse.sonatype.org/update/*, may be suitable once the development updates have been incorporated into the release build.

2.2.2. JBoss Developer Studio Welcome Screen

Following the initial installation of **JBoss Developer Studio** and the installation of some plugins, the user will be presented with the Overview page of the Welcome screen page set. This page provides links to information pertaining to the use of **JBoss Developer Studio** and additional web resources. Closing the Welcome page or clicking on the **Workbench** icon takes the user to the **JBoss Developer Studio** Workbench. Once closed, the Welcome screen can be accessed from within the **JBoss Developer Studio** Workbench by selecting **Help** → **Welcome**.

Once the required plugins have been installed and **JBoss Developer Studio** has been restarted, a new project can be created from the Workbench. Close the Welcome screen or click the **Workbench** icon to begin the tutorial.

Maven Archetypes and Project Creation

The Maven Archetype plugin can be used to create a default project as a foundation for a new application. We will create a project based on the Maven simple web app archetype and add the source folders required to develop the application.

3.1. Maven Project Creation

Once the Welcome screen has been closed, a new project can be created from the Workbench. The available projects types will be dependant on the installed plugins. The procedure to create a Maven project is as follows:

Procedure 3.1. Creating a Maven Project

1. **Access the New Project dialog**

   Select **File** → **New** → **Project**.

2. **Access the New Maven Project dialog**

   a. Select **Maven** from the **New Project** dialog.

   b. Select **Maven Project** from the expanded list of project types.

3. **Accept the default project name and location**

   From the **New Maven Project** dialog, click the **Next** button, accepting the defaults. Note that the **Creat a simple project** checkbox is not selected as an archetype will be selected from the next screen.

4. **Select an Archetype**

   The user will be presented with a variety of project archetypes to select from based on the **Catalog** selected. The **Catalog** defaults to **Nexus Indexer** in this instance.

   Maven Archetypes and Indexer Catalogs

   Refer to *http://www.sonatype.com/products/maven/documentation/book-defguide* and *http://www.sonatype.com/books/m2eclipse-book/reference/* for details regarding Maven archetypes, the Nexus Indexer and the use of indexer catalogs.

a. Navigate to the row corresponding to a **GroupId** of org.apache.maven.archetypes, an **ArtifactId** of **maven-archetype-webbapp** and a corresponding **Version** of `1.0`.

b. Click the **Next** button to procced.

Indexer Download

The display of the available archetypes may take some time as they are generated by the downloaded Nexus Indexer file. The *Updating indexes* progress will be displayed in the message bar at the bottom right of the display. Once the download is complete, it may be necessary to click the *Back* button followed by the *Next* button to reload the file.

5. **Define the Maven coordinates**

Maven identifies a particular project and its relation to other projects by its coordinates. Maven coordinates are defined by the set comprised of the groupId, artifactId, packaging and version.

a. Enter the **GroupId** and **ArtifactId** as org.hibernate.tutorials and hibernate-tutorial respectively.

b. Edit the **Version** number to `1.0.0-SNAPSHOT`. The **Package** field will auto-complete based on a combination of the **GroupId** and the **ArtificatId**.

c. Click the **Next** button to proceed.

Maven Coordinate Packaging

The *Packaging* which constitutes a part of the project coordinates will default to *war* in this instance as a *webapp* archetype was selected. The auto-completed *Package* refers to the *GroupId-ArtifactId* combination.

6. **Review the project**

Following a brief configuration period, a default project will be created according to the structure depicted in *Figure 3.1, “JBoss Developer Studio Maven Webapp Project ”*

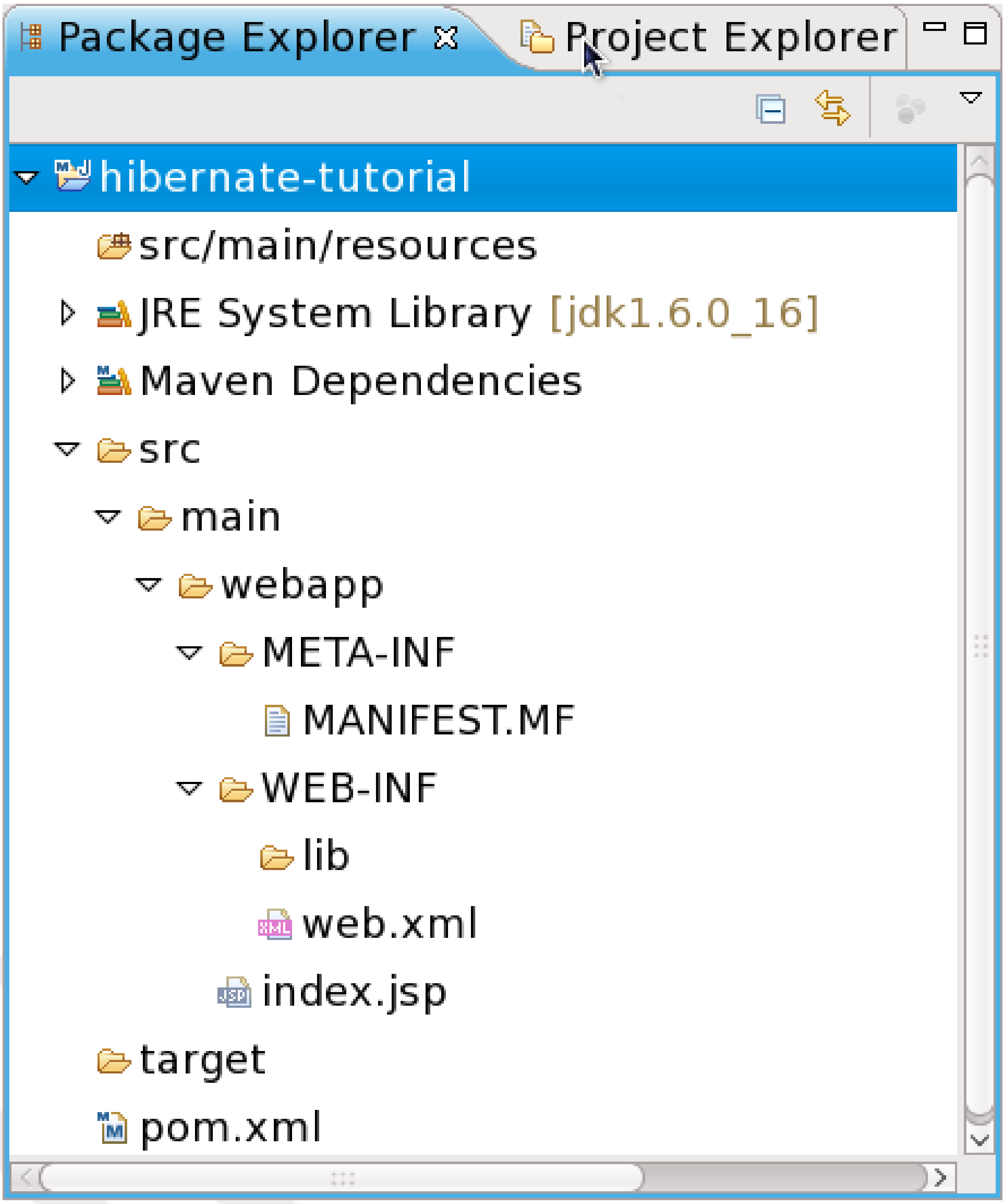


Figure 3.1. JBoss Developer Studio Maven Webapp Project

RE-READ AND CHECK THE FOLLOWING:

The points to note in regard to the project structure include:

- The src/main/resources folders collectively form a package which will house the project resources such as hibernate configuration files. Further packages will be created to accomodate java source files including the main servlet.

- The **webapp** folder or *deployment directory*, accessible by clicking the **src**+**main** folders respectively contains the **WEB-INF** and **META-INF** folders. Once the project is completed this directory will be packaged into the `war` file which can then be deployed to the server. For web applications, html and jsp files are placed in the **webbapp** folder of the application. Similarly, style sheets (css files) would be dropped in the **webbapp** folder or in a subdirectory created by the user.

  - The **WEB-INF** directory contains the `web.xml` file and **lib** directory. The `web.xml` file specifies the configuration and deployment information for the web components of the project. The **lib** directory contains the additional `jar` libraries required by the application which are not packaged with the targeted server.

  - The **META-INF** directory contains the meta information describing the contents of any packaged archives (`jar` or `war` files). The default content is the `MANIFEST.MF` file describing files contained within the web archive (`war` file).

- Information about the project is contained within the *Project Object Model* POM. The pom.xml file specifies the project coordinates, configures plugins and declares the project dependencies. Maven executes against an effective pom.xml comprising the defined POM, any parent POM, a super POM and any user-defined settings.

Later in the tutorial, the `pom.xml` file will be modified to specify further dependencies. The `web.xml` will be modified to specify the web application url. A `styles.css` file will be produced to render the styles for the application.

Command Line Project Generation

A new Maven project can be created by using the Maven Archetype plugin and specifying the *generate* goal from the command line. This is achieved by following the *plugin:goal* syntax. For example, a webapp can be created by entering *mvn archetype:generate* at the command line and selecting archetype #18 when prompted. See http://www.sonatype.com/products/maven/documentation/book-defguide for more details.

3.2. The Default POM

Example 3.1. The Default POM

```
<project xmlns="http://maven.apache.org/POM/4.0.0"
```

```
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
               http://maven.apache.org/maven-v4_0_0.xsd">
 <modelVersion>4.0.0</modelVersion>
 <groupId>org.hibernate.tutorials</groupId>
 <artifactId>hibernate-tutorial</artifactId>
 <packaging>war</packaging>
 <version>1.0.0-SNAPSHOT</version>
 <name>hibernate-tutorial Maven Webapp</name>
 <url>http://maven.apache.org</url>
 <dependencies>
  <dependency>
   <groupId>junit</groupId>
   <artifactId>junit</artifactId>
   <version>3.8.1</version>
   <scope>test</scope>
  </dependency>
 </dependencies>
 <build>
  <finalName>hibernate-tutorial</finalName>
 </build>
</project>
```

The default pom.xml file declares the following elements:

`<project>`
: this is the top-level element declared in all Maven `pom.xml` files;

`<modelVersion>`
: the object model version used by the POM;

`<groupid>`, `<artifactId>`, `<packaging>`, `<version>`
: the Maven coordinates used to identify the project;

`<name>`
: the display name used for the project;

`<url>`
: a url associating the project with a web site;

`<dependencies>`
: the list of dependencies, which currently consists of a single dependency;

`<build>`
: the build configuration, which currently declares the final name for the project. This can include declarations to target a specific JDK for the Maven Compiler plugin or to instruct Maven to continue with a build in the event of test failures.

Junit

JUnit is a testing framework which provides functionality to test the classes that comprise a project. It is used in Test Driven Development and can be used to highlight redundencies resulting from project modifications. The JUnit web site is located at *http://www.junit.org/*.

Console Application Development

The application will initially be developed as a command line application with output displayed to the Maven console to list the results of database actions and monitor errors. The main class will then be modified to produce the EventManager servlet.

4.1. The Maven Console

Maven builds projects according to a "build lifecycle". The default Maven lifecycle supports building a project from an initial project validation, through compilation, testing and ending in the deployment of the final build. The user has the option to define a particular lifecycle which will result in a build of the project up to the defined lifecycle phase. Each phase within the build lifecycle may be associated with one or more plugin goals.

When run from a command prompt, information pertaining to each phase of the build is output to the terminal. The information displayed includes downloads from the Maven repository and compilation errors.

JBoss Developer Studio enables the user to display a number of views in the **Views Panel**. The **Console** view displays output equivalent to that displayed to the terminal when executing Maven from a command prompt. The **Console** can be displayed according to the following procedure:

Procedure 4.1. Displaying the Console View

1. **Access the Show View dialog**

   Select **Window** → **ShowView** → **Other**

2. **Select the Console View**

   a. Double-click the **General** folder

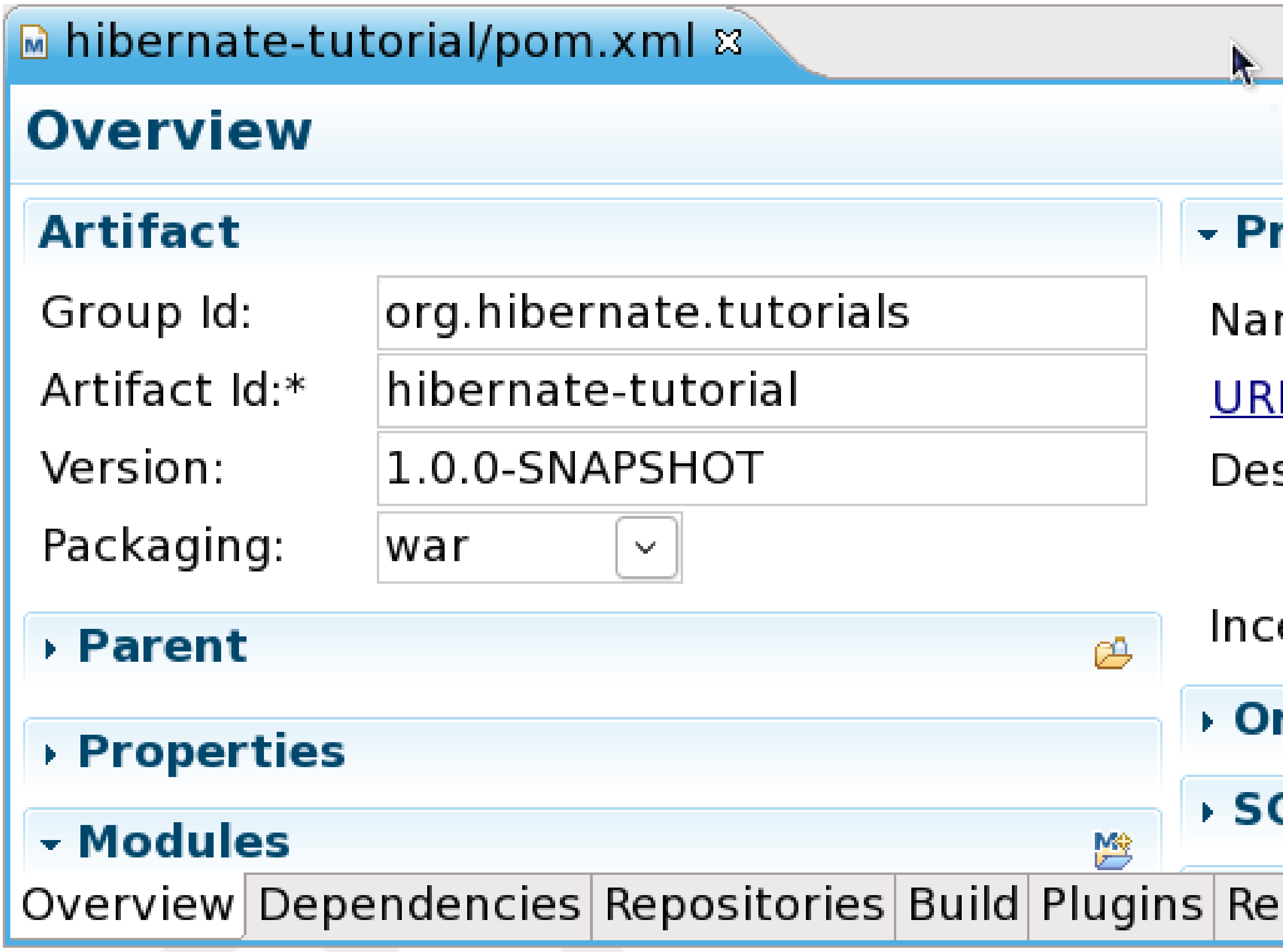
   b. Click the **Console** icon.

   c. Click the **OK** button.

   The **Console** view will be displayed in the **View Panel** situated at the bottom of screen.

4.2. Project Configuration

Following a review of the project, the `pom.xml` file can be edited to include the required dependencies. To edit, expand the project in the **PackageExplorer** panel as depicted in *Figure 3.1, “JBoss Developer Studio Maven Webapp Project ”* and double click on the `pom.xml` file. The user is presented with the interface as shown in *Figure 4.1, “POM Overview Form”*



hibernate-tutorial/pom.xml

Overview

Artifact

Group Id: org.hibernate.tutorials

Artifact Id:* hibernate-tutorial

Version: 1.0.0-SNAPSHOT

Packaging: war

Figure 4.1. POM Overview Form

The user has the option to edit the `pom.xml` file using the **Overview** and **Dependencies** forms, accessed by clicking on the appropriate **tab**, or by editing the `pom.xml` file directly. The **pom.xml** tab can be accessed by clicking the **>><num>+Show List** icon.

The procedures presented in the following sections outline the steps involved in configuring the project following the initial setup:

4.2.1. Editing the Project Name and URL

The name of the project and the web site that the project is associated with can be edited as in *Edit the Project Name and URL*:

Procedure 4.2. Edit the Project Name and URL

1. **Edit the details in the Overview form**

   a. Click on the **Overview** tab.

b. Edit the **Name** of the project to `First Hibernate Tutorial`

c. Edit the **URL** to `http://hibernate.org`

2. **Save the changes**

a. Once the values have been entered in the relevant textfield, click on the **pom.xml** tab. Note that the file been has updated with the entered values.

b. Save the changes by clicking on the **Save** toolbar icon or typing `Ctrl+S`.

4.2.2. Adding Dependencies

Procedure 4.3. Add Dependencies

The `pom.xml` can be edited directly to specify the required dependencies. We will use the **JBoss Developer Studio Dependencies** form to assist in obtaining a list of library versions.

> **M2Eclipse Dependencies Form**
>
> Depending on the M2Eclipse plugin installed, the interface presented to the user may vary. This is indicated in step 1.b in the procedure that follows **.

1. **Access the Add Dependency dialog**

a. Click the **Dependencies** tab.

b. Click the **Add** button of the **Dependencies** form (**or the **Add Dependency** icon adjacent to the **Dependencies** form header) displayed in *Figure 4.2, “POM Dependency Form”*. The **Select Dependencies** dialog will open.

Figure 4.2. POM Dependency Form

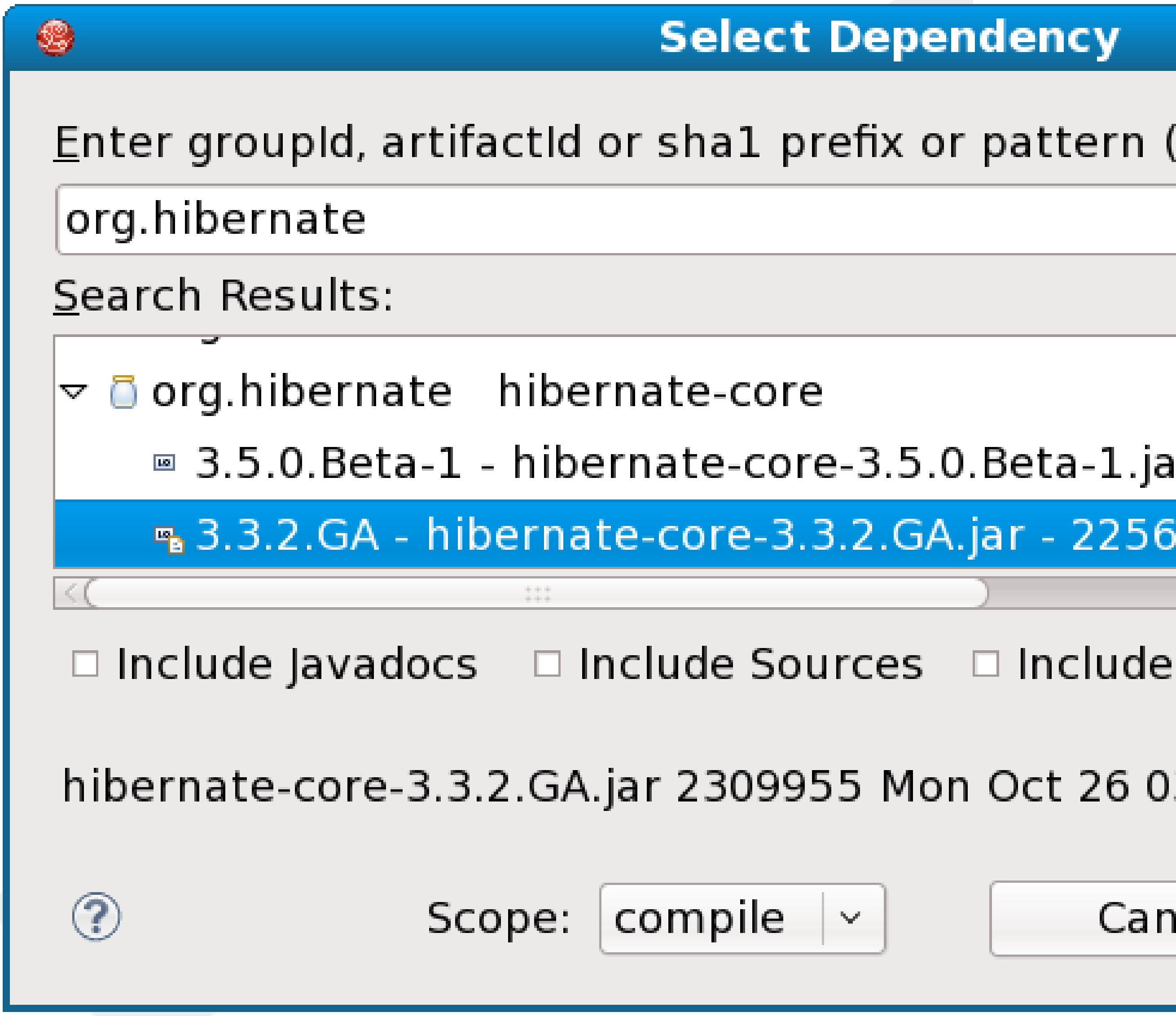
2. **Locate the required dependency**

a. Enter `org.hibernate` in the **Enter groupid, artifactid** textfield, as shown in *Figure 4.3, “Select Dependencies”*

b. The available Hibernate dependencies will be displayed. Click on the **arrow** adjacent to the `hibernate-core` entry to expand the available options .

c. Click on the **3.3.2.GA-hibernate-core-3.3.2.GA.jar** option.

d. Click the **OK** button. The **Dependency Details** form of *Figure 4.2, “POM Dependency Form”* is refreshed with the relevant dependency details.



Enter groupId, artifactId or sha1 prefix or pattern (

org.hibernate

Search Results:

▽ org.hibernate hibernate-core

3.5.0.Beta-1 - hibernate-core-3.5.0.Beta-1.ja

3.3.2.GA - hibernate-core-3.3.2.GA.jar - 2256

□ Include Javadocs □ Include Sources □ Include

hibernate-core-3.3.2.GA.jar 2309955 Mon Oct 26 0

Scope: compile

Figure 4.3. Select Dependencies

Scope

The **Scope** dropdown list of *Figure 4.3, “Select Dependencies”* specifies whether or not the dependency is available on all classpaths and packaged with the project (`compile`) or whether the dependency is provided by the server container or JDK (`provided`). We will use the maven default `compile` scope for development of the command line application. Dependency scope is defined within the dependency tag of the `pom.xml` file.

3. **Save the changes**

   Save the project as in the *Edit the Project Name and URL* procedure above and inspect the updated `pom.xml` file.

4. **View the dependency graph**

   The `hibernate-core-3.3.2.GA.jar` is dependant on further library files. Click on the **Dependency Graph** tab to display a graphic which traces the dependency hierarchy as shown in *Figure 4.4, “JBoss Developer Studio Maven Webapp Project ”*

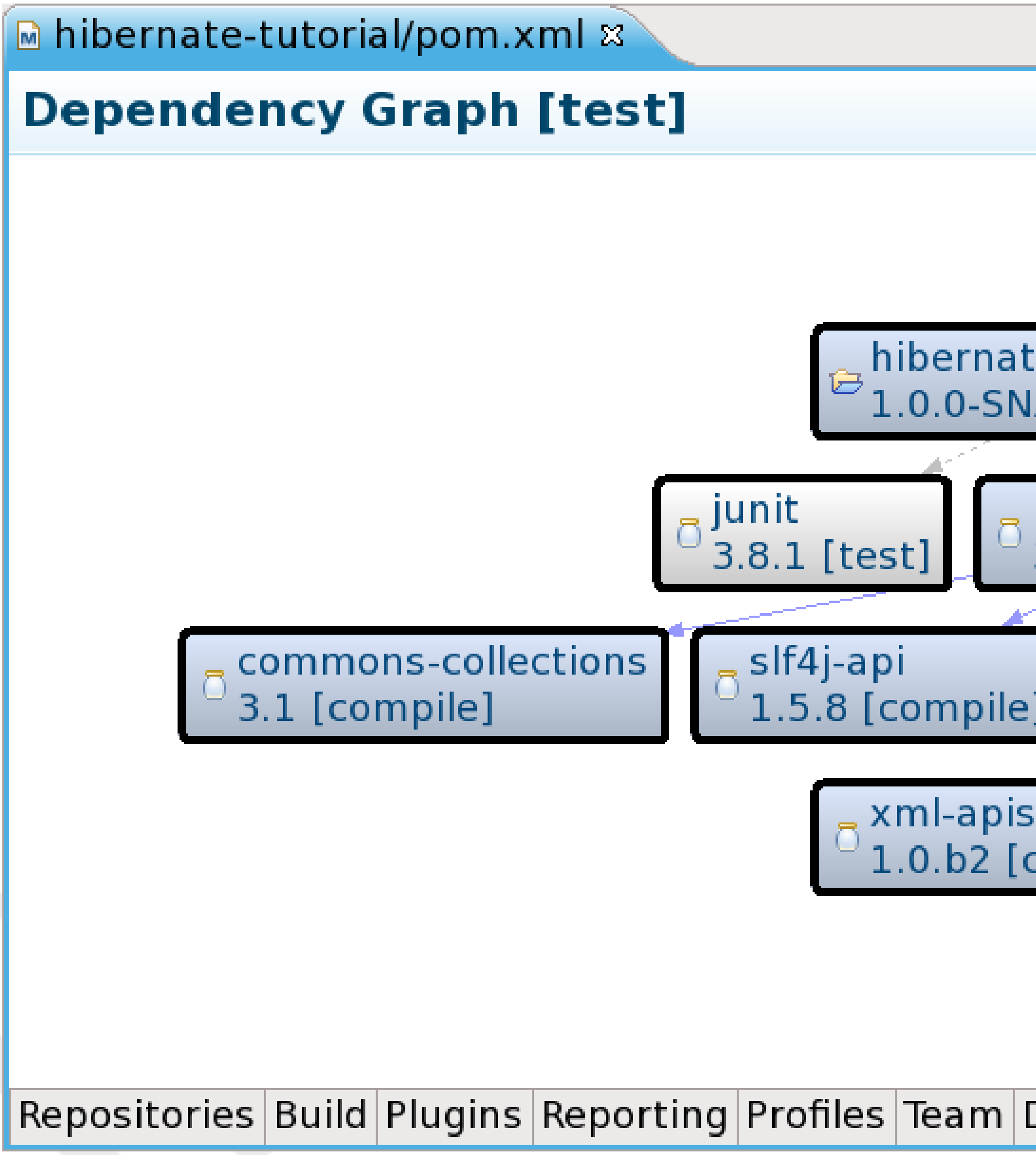


Figure 4.4. JBoss Developer Studio Maven Webapp Project

These libraries are also listed under **Maven Dependencies** in the **Package Explorer**

4.3. The Event Class

This section introduces the `Event` class. Employees will attend Events which, in the context of this tutorial, could be training courses, inductions, workshops or meetings. The class will be set up in **JBoss Developer Studio** and the available tools and forms will be used to configure the class and associated mapping files.

4.3.1. Creating the Source Folder

Maven adopts a "convention over configuration" approach to projects in that source code, resources, tests and distributable archives are located in pre-defined directories. This elimates the need to configure the project and tell the compiler where to find and store the project files.

The maven Web-app project archetype is configured with a `src/main/resources` folder which is used to store project resources such as the hibernate configuration file. Under the Maven convention, source code (`*.java`) is located in `src/main/java` by default. Prior to creating the `Event.java` class, create the source folder according to the following procedure:

Procedure 4.4. Creating a Source Folder

1. **Access the New Source Folder dialog**

   a. Right click the project from the **Package Explorer View**.

   b. Select **New** → **Source Folder**

2. **Enter the Path**

   a. Enter `src/main/java` in the **Folder** textfield of the **New Source Folder** dialog.

   b. Click the **Finish** button. The **Package Explorer** will display the **src/main/java** folder under the **hiberante-tutorial** project name.

4.3.2. Creating the Class

Once the source folder is created, create the Events class:

Procedure 4.5. Creating a Class

1. **Access the New Java Class dialog**

   a. Right click the source folder from the **Package Explorer View**.

   b. Select **New** → **Class**

2. **Enter the Package and class Name**

   Java source files begin with a `"package package_Name;"` declaration identifying the source file with a particular package. This is useful to avoid namespace clashes and to define the scope of accessibility for classes within the same or different packages.

   a. Enter `org.hibernate.tutorial.domain` in the **Package** textfield of the **New Java Class** dialog.

   b. Enter `Event` in the **Name** textfield of the **New Java Class** dialog.

3. **Create and inspect the class**

   Click the **Finish** button. The **org.hibernate.tutorial.domain** package will be displayed in the **Package Explorer**. The **Event.java** class will be displayed under this package and will be opened in the **Editor** panel ready to be modified.

4.3.3. Configuring Event as a JavaBean

The `Event.java` class will be structured according to the JavaBean convention. This type of class includes `private` member variables and `public` getters and setters which are used as an interface to the private members. This results in the ability to maintain a consistent interface while permitting changes in the underlying data structure.

Private Member Variables.

Procedure 4.6. Adding Private Member Variables

1. **Enter the id, title and date**

   Enter the following in the Event.java class"

```
private Long id;
private String title;
private Date date;
```

2. **Import Required Classes**

   Using an IDE such as **JBoss Developer Studio** provides the user with the ability to obtain contextual help. Once the `"private Date date;"` member is declared, the IDE editor will highlight this line as containing an error **(x)** and underline the affecting type declaration. In this instance, the relevant `Date` class has not been declared in a `import class_Name;` declaration.

a. Position the mouse pointer over the underlined `Date` type declaration. A number of options are presented to the user in the form of a list.

b. Click on **Import 'Date' (java.util)**. The required `import` declaration is generated by the editor. The `Date` class, which forms part of the java.util package, will be imported when the project is compiled.

Member Variable Access - Set and Get.

- **Generate the Getters and Setters**

  Right clicking on the editor panel reveals an extensive menu.

  a. Select **Source** → **Generate Getters and Setters**

  b. Expand the **date**, **id** and **title** options by clicking on the arrow next to each label.

  c. The `getMethod()` and `setMethod()` accessor methods may be selected for each `private` member variable. Select all six methods by clicking on the appropriate checkboxes.

  d. The **Access Modifier** section of the dialog will default to public. Click the **OK** button to generate the methods.

The Zero Argument Constructor.

4.3.4. The Identifier and Hibernate Persistence

Edit the setId() modifier Speel here about persistence................

4.3.5. Event Mapping File

The Event Mapping File

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Appendix A. Revision History

Revision History

Revision 0	Mon Feb 01 2010	BenClare<bclare@redhat.com>

Generation of material relating to Maven configuration and initial project set up.

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