Installation and Configuration

Introduction

Our project makes use of different libraries and tools as components of the recommendation system. This document is intended for new users who wish to make use of the system. We try to explain the steps required to be performed in order to setup the different components of our recommendation system.

To setup the project, we have submitted the following:

SongReco.zip – This is a zip file that contains an Eclipse java web project that contains all the relevant source code for the web components of our project like eg. Servlets etc.

SongRecoSystem.zip – This is a zip that contains Eclipse java project that has all the java classes for DROOLS and other MongoDb and Hibernate related files .

SongRecoSystem_SQLDump.rar – This is the MySQL database dump that needs to be imported into MySQL for use in the project

MongoDBDump.rar – This archive contains all the collection data that needs to be imported into MongoDB

dependent_jars.zip – This archive contains all the JAR files required by the system. Please make sure that the contents are extracted and all the jars are placed in the build path of our project.

To aid the reader, we have logically divided the installation and configuration steps into the following parts:

1. Installation and configuration of the data models of the system
2. Installation and configuration of the rule-engine of the system
3. Installation and configuration of the user interface of the system

Installation and configuration of the data models of the system

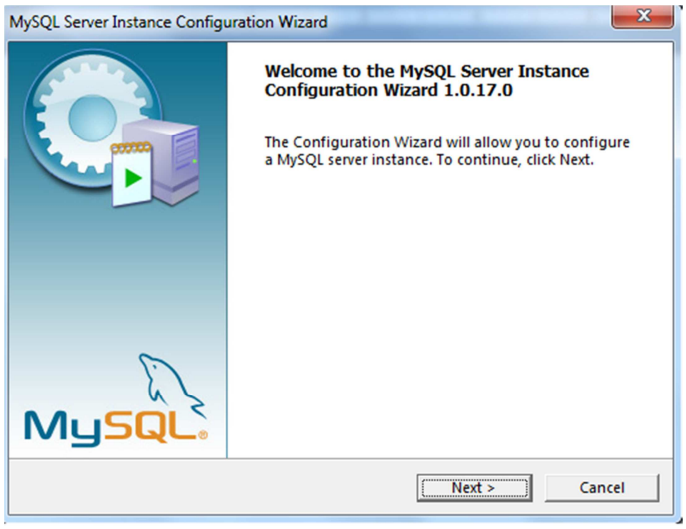
1) Relational Database

MySQL

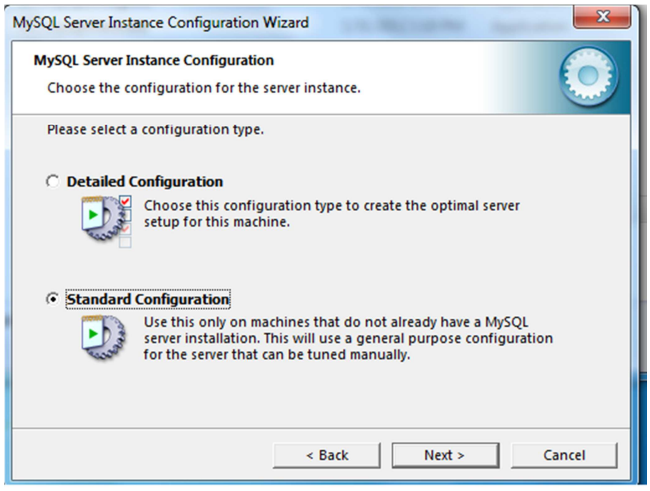
MySQL is one of the world's most famous open-source free database. We have used this database to store all the data as specified by in the Software Design Specification.

To setup MySQL, please follow the following steps:

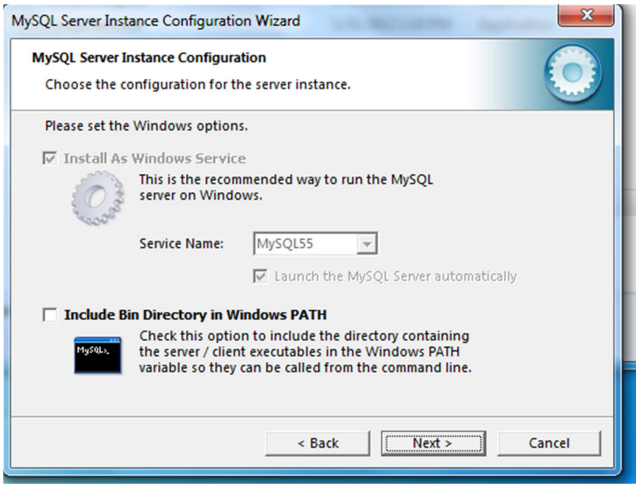
1. Download MySQL server from: http://dev.mysql.com/downloads/installer/#downloads. Install MySQL using the installer downloaded
2. After installation, the MySQL Server Instance Configuration wizard is started to configure MySQL server



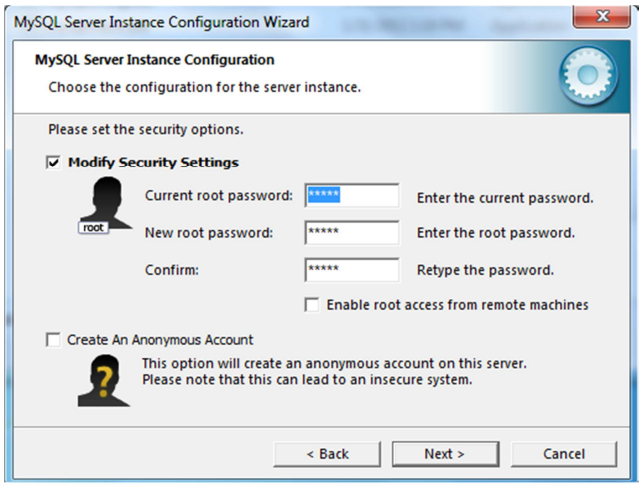
3. After clicking Next, select Standard Configuration



4. Select Include Bin Directory in Windows Path



5. Enter the password which you wish to set



6. Click on Next
7. Click on Execute in the last step which appears

To import the database dump 'SongRecoSystem_SQLDump.rar' into MySQL, please follow the following steps

1. Extract the database dump into a directory of your choice. The directory now contains a SQL script.
2. Press 'Ctrl+R' to open the Run window and type 'cmd'. This yields the command prompt.
3. Navigate to the folder containing the SQL script.
4. Type 'mysql –u root -p' and press enter. You are prompted for the database password. Please enter the same password you entered during MySQL configuration.
5. If you do not have a schema created within MySQL, please type 'CREATE DATABASE <name>;'. Switch to the newly created or existing database using the command 'use <name>;'. For our project we have used the database name 'songrecosystem'.
6. Import the database dump by typing 'source <filename.sql>;'. This will import all the project data into MySQL.

2) Hibernate

Hibernate is a library implemented in Java that allows Object-Relational mappings, also called O/R mappings. Essentially, it allows the user to map a relational database to an object-oriented model. In other words, it allows users to map database tables to classes implemented in the code. The advantage of such a library is that it provides an abstraction over the database. It provides functionalities such as implicit SQL query generation and data persistence using the object oriented model.

Hibernate Setup

A precursor to installing Hibernate is to ensure that you have installed Eclipse Enterprise Edition IDE on your system, if your aim is to perform development work using Hibernate. Once installed, go to the Eclipse Marketplace in the Eclipse IDE, found at Help -> Eclipse Marketplace, and download and install JBOSS Tools. Installing this plugin helps in development using Hibernate.

To setup Hibernate, please follow the steps in order

1. Download the latest release bundle of Hibernate from http://www.hibernate.org/downloads. Extract it to a local directory on the system.
2. Add all the JAR files from the /<Hibernate-Release>/lib/ directory into the extension directory of Java JRE.
3. Add all the JAR files from the /<Hibernate-Release>/jpa/ directory into the extension directory of Java JRE.
4. Download the latest release bundle of SLF4j or Simple Logging Façade for Java from http://www.slf4j.org/download.html. Extract the JAR file from /<slf4j-release>/slf-api/ into the extension directory of Java JRE.
5. Download the Java connector for MySQL from http://www.mysql.com/downloads/connector/j/ and place the JAR file in extension directory of Java JRE.

This completes the setup required for Java Hibernate. Alternatively, you can reference these jar files in your Eclipse project by adding these jar files to the project. Right-click on your project in the Package Explorer window (on the left of the IDE) and select 'Build Path' -> 'Configure Build Path'. A new pop-up window opens. Please select the 'Libraries' tab and select the 'Add External JARs' button to add all the required JAR files to the project. Press 'OK' when done.

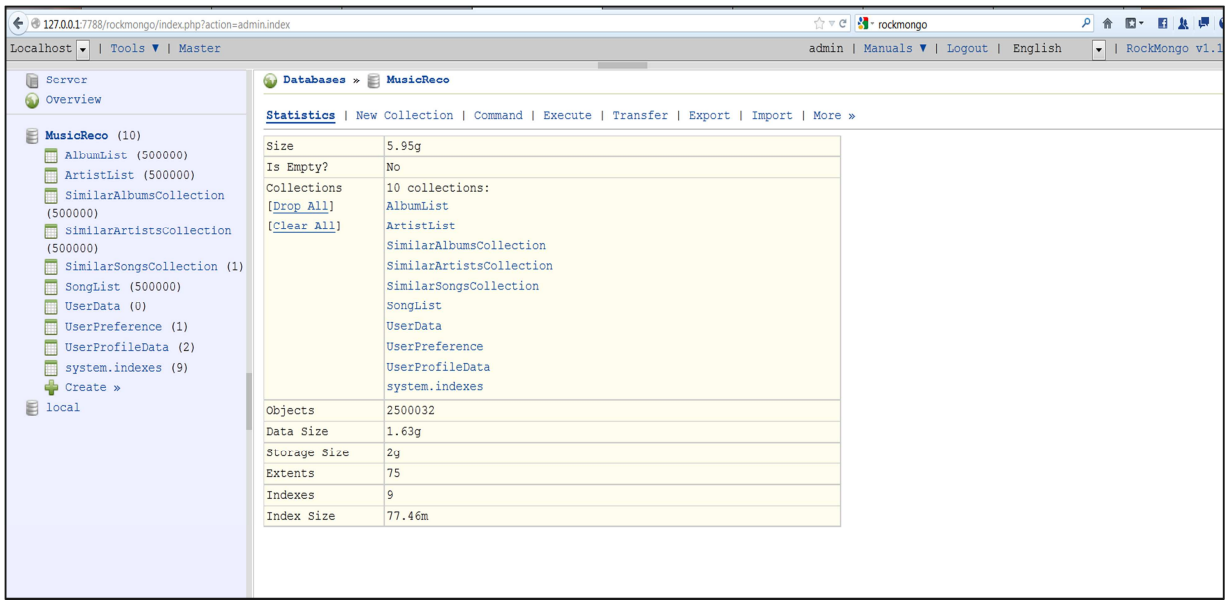
Hibernate requires an XML file to interface with a relational database, called 'hibernate.cfg.xml'. Please edit the XML document to modify the database password. Hibernate also requires Mapping XML files that are used to perform the Object-Relational mapping. We have provided these files in the 'newEntities' package in our source code. No change should be made to these files.

3) NoSQL Database

These are non – relational databases addressing some of the key points such as: being non-relational, distributed, open-source and horizontally scalable. NoSQL databases are characterized as being schema free, easily replicated, simple API for interfacing, eventually consistent without ACID compliance and the ability to manage huge amount of data.

We have used MongoDB as the NoSQL database of choice in our project. To setup MongoDB, please follow the following steps

1. Download the latest stable release of the MongoDB server in .zip of .tgz format for the appropriate 32 bit or 64 bit operating system from http://www.mongodb.org/downloads/ to your local drive and extract the contents of the package to a destination on your local drive having sufficient space. MongoDB is self-contained and does not have any other system dependencies. You can run MongoDB from any folder you choose. You may extract MongoDB to any directory
2. To set up the environment for MongoDB, you require a data folder to store its files (collections). The default location for the MongoDB data directory is C:\data\db. If you wish to change this directory to some other location, you can create a new directory called as “data” in the location where you want your MongoDb database collections to be stored. The data folder is usually the default folder where the databse dumps created using mongodump is stored. So it’s a good practice to reserve some space in the drive where MongoDB instance is installed along with the ‘data’ folder for normal operation.
3. To start MongoDb server, execute the executable file mongod.exe, use the command prompt to travel to the directory where you have extracted MongoDB. You will find the following executable file at the path <MongoDB directory>\mongodb\bin\mongod.exe. For e.g. if your MongoDb instance is stored in D:\ drive under a folder named MongoDb, you would execute the following command at command prompt: D:\MongoDb\mongodb\bin\mongod.exe
4. You need not specify the --dbpath option if you have your “data” folder in the default directory, mentioned above, else the path of this ‘data’ folder needs to be given as a value to the --dbpath argument. For e.g. if the data folder is stored under D:\MongoDb\ then execute the command: D:\MongoDb\mongodb\bin\mongod.exe --dbpath D:\MongoDb\data
5. You can also make MongoDb as a Windows service, the instructions of which can be found on the official link: http://docs.mongodb.org/manual/tutorial/install-mongodb-on-windows/. The installation guide for MongoDB on other operating systems can be found at the link http://www.mongodb.org/display/DOCS/Quickstart
6. For accessing and updating the data stored in the MongoDb directly, we have used a PHP based MongoDb client called RockMongo. This web based client allows us to manage instances of MongoDb server, change administrator rights and create more users for a database. Also it allows efficient querying and updating documents using Javascript or JSON. The .zip extractable can be freely downloaded from http://rockmongo.com/. Just extract the contents of the zip file into a local directory and run the executable rockstart.bat after your MongoDb instance is up and running. The default login name and password for the default instance of MongoDb is admin/admin.



7. ‘mongodump’ is a utility for creating a binary export of the contents of a database. Consider using this utility as part of an effective backup strategy. Used in conjunction with ‘mongorestore’ to provide restore functionality.

   Usage: mongodump --db <database name> --collection <collection name>

   This command should be executed from the command prompt by reaching till /mongodb/bin location. If the --collection argument is not provided then all the collections which are stored in the “db” will be exported. The default path where this binary dump file will be created is mongodb/data/dump/. For more usage options, please refer to the following link:- http://docs.mongodb.org/manual/reference/mongodump/

8. The ‘mongorestore’ tool imports content from binary database dump, created by mongodump into a specific database. ‘mongorestore’ can import content to an existing database or create a new one. ‘mongorestore’ only performs inserts into the existing database, and does not perform updates or upserts. If existing data with the same _id already exists on the target database, mongorestore will not replace it. mongorestore will recreate indexes from the dump.

   Usage: mongorestore --collection <collection name> --db <database name> <path>

   For our project, we have submitted all the MongoDB collections in an archive called MongoDBDump.rar. To import this data into MongoDB

   a. Extract the dump into a folder. This yields all the collections in BSON format.
   b. Use the mongorestore command to import all the collections into MongoDB. We have used ‘MusicReco’ as the database name. The collections will have to be imported one by one.

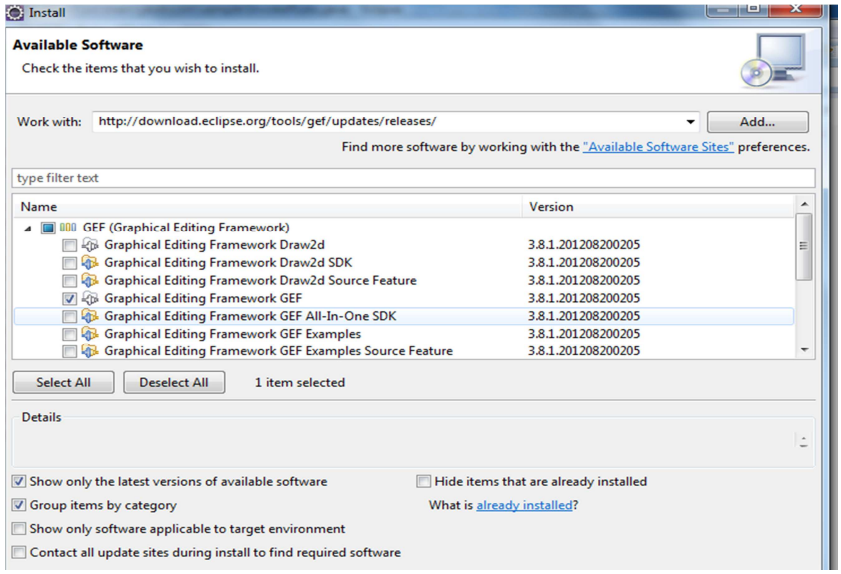
4) Installation and configuration of the rule-engine of the system

DROOLS Engine

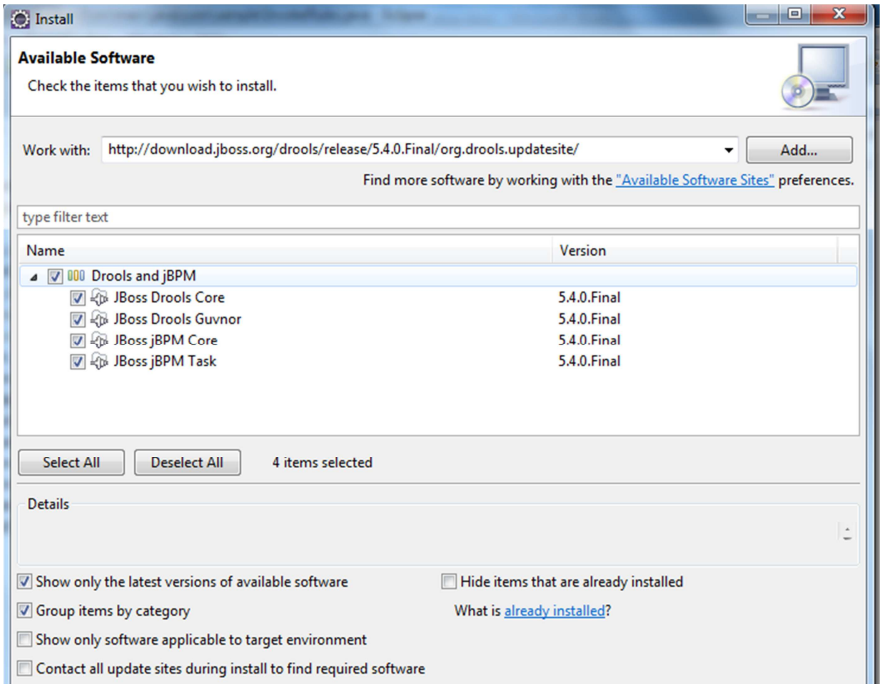
Drools is a rule engine that is part of the JBOSS application server that is used to implement business logic and process workflow by defining business rules that are invoked in response to an event.

Drools Setup

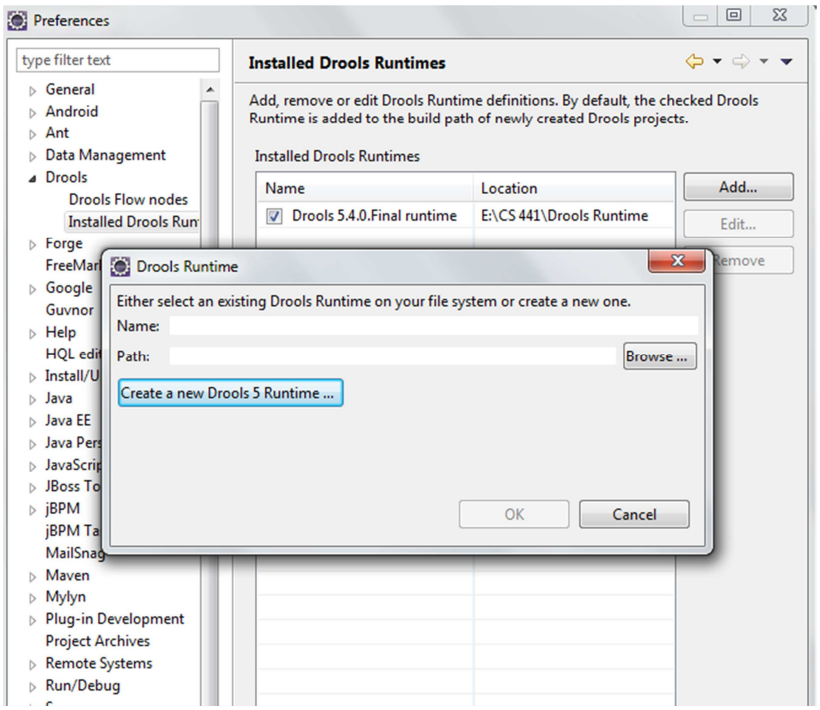
1. Download the latest version of Drools release bundle from http://www.jboss.org/drools/downloads. Extract the release bundle to a directory and traverse to the 'Binaries' folder. We need two JAR files: drools-core.jar and mvel.jar. These JAR files should be placed in the extension directory of the JRE or can also be added to the project's BUILDPATH in Eclipse.
2. In your Eclipse IDE, click on windows drop down and then clip on Install New Software
3. In the 'Works with' text box, copy and paste the following link: http://download.eclipse.org/tools/gef/updates/releases/



4. From the list of available software, maximize GEF SDK 3.4.2 and select Graphical Editing Framework GEF
5. In the textbox of Available Software, paste the following link
6. http://download.jboss.org/drools/release/5.4.0.Final/org.drools.updatesite/



7. Select all the options and press next.
8. Press Finish
9. Select Window Dropdown and select Preferences
10. Select Drools and then select Installed Drools Runtime.



11. Click on Add and then select Create new Drools Runtime.

5) Installation and configuration of the user interface of the system

JBOSS Application Server

To access the recommendation system, we have developed a web interface. However, to make this web interface available, we needed to host our webpages on an application server. We have decided to use JBOSS for this purpose.

Installation of JBOSS Application Server

1. Install the JAR file for the JBoss Application from the following website: http://www.jboss.org/jbossas/downloads/
2. To install the server on eclipse:
    a. First, go to File->New->Other->Server
    b. Choose the type of server as JBoss AS 7.0->Next
    c. Now browse to the JAR file that was just downloaded by clicking on Browse
    d. Now go to Window->Show View->Other->Servers->Right-Click on the Servers and then select JBoss Server
    e. Right-click on the JBoss server->Add or Remove->Add the project from the left column to the right column
    f. Right-click on the project and then select "Run on server"

Source Code:

We have submitted two source code archives for our project

1) SongReco.zip

2) SongRecoSystem.zip

To use the code, please import the code into Eclipse Enterprise Edition. Additional configurations are also required to make the source code execute

We have submitted all the JAR files required by our project in the archive file. Please extract them and add it to the BUILDPATH of the SongRecoSystem project.