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# ABOUT THEODORA FRAGKOULI



Theodora has graduated from Computer Engineering and Informatics Department in the University of Patras. She also holds a Master degree in Economics from the National and Technical University of Athens. During her studies she has been involved with a large number of projects ranging from programming and software engineering to telecommunications, hardware design and analysis. She works as a junior Software Engineer in the telecommunications sector where she is mainly involved with projects based on Java and Big Data technologies.

# Spring Hibernate Integration Example – Mysql and Maven Showcase

⚠ Posted by: Theodora Fragkouli in JPA/ORM O October 10th, 2013 2 Comments 4097 Views



In this tutorial we shall show you how to create a simple Spring Hibernate MySql example. The Spring Framework supports integration with Hibernate for resource management, data access object (DAO) implementations and transaction strategies. Here we are using a simple Entity class that is mapped to a database table and we implement the basic CRUD (create- retrieve- update- delete) functionality to the database.

Our preferred development environment is Eclipse. We are using Eclipse Juno (4.2) version, along with Maven Integration plugin version 3.1.0. You can download Eclipse from here and Maven Plugin for Eclipse from here. The installation of Maven plugin for Eclipse is out of the scope of this tutorial and will not be discussed. We are also using Spring version 3.2.3 and the JDK  $7\_u\_21$ . The Hibernate version is 4.1.9, and the database used in the example is MySQL Database Server 5.6.

Let's begin.

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# 1. Create a new Maven project

Go to File -> Project -> Maven -> Maven Project.

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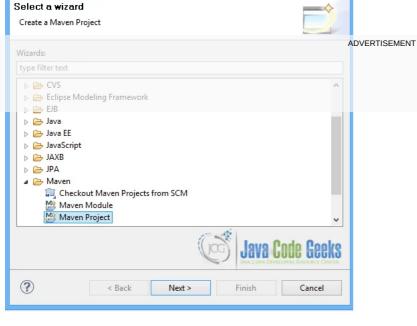
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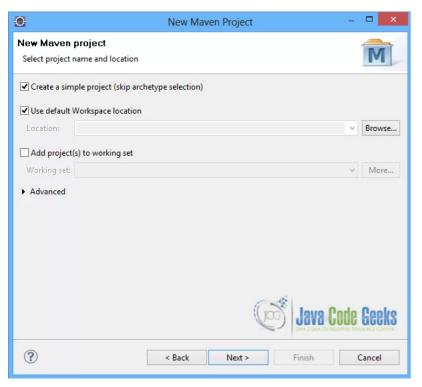
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**New Project** 

In the "Select project name and location" page of the wizard, make sure that "Create a simple project (skip archetype selection)" option is **checked**, hit "Next" to continue with default values.



In the "Enter an artifact id" page of the wizard, you can define the name and main package of your project. We will set the "Group Id" variable to

"com.javacodegeeks.snippets.enterprise"

# and the "Artifact Id" variable to

"springexample"

0

. The aforementioned selections compose the main project package as

"com.javacodegeeks.snippets.enterprise.springexample"

and the project name as

"springexample"

. Hit "Finish" to exit the wizard and to create your project.

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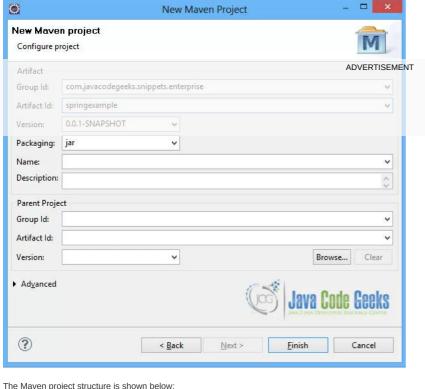
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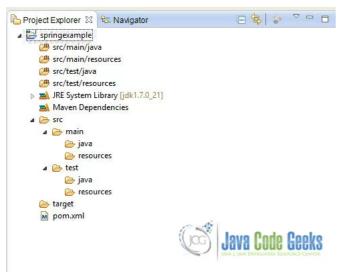
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It consists of the following folders:

- · /src/main/java folder, that contains source files for the dynamic content of the application,
- · /src/test/java folder contains all source files for unit tests,
- /src/main/resources folder contains configurations files.
- · /target folder contains the compiled and packaged deliverables,
- the pom.xml is the project object model (POM) file. The single file that contains all project related configuration.

# 2. Add Spring 3.2.3 dependency

- Locate the "Properties" section at the "Overview" page of the POM editor and perform the following changes: Create a new property with name org.springframework.version and value 3.2.3.RELEASE.
- Navigate to the "Dependencies" page of the POM editor and create the following dependencies (you should fill the "GroupId", "Artifact Id" and "Version" fields of the "Dependency Details" section at that page): Group Id: org.springframework Artifact Id: spring-web Version: \${org.springframework.version}

Alternatively, you can add the Spring dependencies in Maven's

file, by directly editing it at the "Pom.xml" page of the POM editor, as shown below:

# pom.xml:

```
01
02
03
         <groupId>com.javacodegeeks.snippets.enterprise</groupId>
05
06
07
08
        <artifactId>springexample</artifactId>
<version>0.0.1-SNAPSHOT</version>
         <dependencies>
09
10
11
             <dependency:
                <groupId>org.springframework</groupId>
<artifactId>spring-core</artifactId>
12
                <version>${spring.version}</version>
```

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```
//dependency>
<dependency>
<dependency>
<dependency>
<groupId>org.springframework</groupId>
<artifactId>spring-context</artifactId>
<artifactId>version>{spring.version}</artifactId>
<dependency>
</dependency>

//dependencies>

ADVERTISEMENT

//properties>
<spring.version>3.2.3.RELEASE</spring.version>

//properties>

//properties>
```

As you can see maven manages ilorary dependencies declaratively. A local repositories created (by default under {user\_nome}r.mz folder) and all required libraries are downloaded and placed there from public repositories. Furthermore intra – library dependencies are automatically resolved and manipulated.

# 3. Add Hibernate and MySql dependencies

The Hibernate and MySql-connector dependencies are added, along with the org.apache.commons.dbcp package, that provides database Connection Pool API. We also need the spring-orm package and the javax.persistence api.

#### pom.xml

```
02
         <modelVersion>4.0.0</modelVersion>
04
         <groupId>com.javacodegeeks.snippets.enterprise/groupId>
05
         <artifactId>springexample</artifactId>
06
07
         <version>0.0.1-SNAPSHOT</version>
09
10
              <dependency:
                  <groupId>org.springframework</groupId>
                  <artifactId>spring-core</artifactId>
<version>${spring.version}</version>
13
14
             15
16
17
18
19
                  <version>${spring.version}</version>
             </dependency>
             <dependency>
    <groupId>org.springframework</groupId>
    <artifactId>spring-orm</artifactId>
    <version>${spring.version}</version>
             </dependency>
              <denendency>
                  <groupId>commons-dbcp
                  <artifactId>commons-dbcp</artifactId>
<version>1.2.2</version>
             </dependency>
              <artifactId>persistence-api</artifactId>
<version>1.0</version>
              </dependency>
38
              <dependency:
                  <groupId>org.hibernate<artifactId>hibernate-core</artifactId>
                  <version>4.1.9.Final
             </dependency>
              <dependency:
45
46
47
48
49
50
51
52
                  <groupId>mysql</groupId>
<artifactId>mysql-connector-java</artifactId>
<version>5.1.6</version>
              </dependency>
         </dependencies>
         </properties>
```

# 4. The entity class

```
class is a class with three properties. It uses the

javax.persistence

annotations to be mapped to a table,

EMPLOYEE

in the database. In particular, the

@Entity

annotation specifies that the class is an entity. The

@Table

annotation specifies the primary table for the annotated entity. The
```

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annotation is used to specify a mapped column for the persistent field, whereas the

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```
package com.javacodegeeks.snippets.enterprise.model;
      import javax.persistence.Column;
      import javax.persistence.Id;
05
06
07
      import javax.persistence.Table;
08
09
      @Entity
@Table(name = "EMPLOYEE")
     public class Employee {
11
12
          @Id
13
14
15
16
17
18
19
20
21
22
24
25
26
27
28
29
31
33
33
34
44
44
45
46
47
           @Column(name = "ID", nullable = false)
          private String id;
          @Column(name = "NAME", nullable = false)
          private String name;
          @Column(name = "AGE", nullable = false)
          private long age;
          public Employee() {
          public String getId() {
    return id;
          }
          public void setId(String id) {
               this.id = id;
          public String getName() {
    return name;
          }
          public void setName(String name) {
               this.name = name;
          public long getAge() {
               return age;
          public void setAge(long age) {
               this.age = age;
48
49
```

annotation specifies the primary key field of the entity.

Employee.java

# 5. The DAO class

The Data Access Object implemented to interact with the database uses Hibernate data access technology. It is the

EmployeeDA0Impl.java

class. It uses the

@Repository

annotation, to guarantee that the Data Access Object (DAO) provides exception translation. When using Hibernate, we must decide how to handle the native exception classes. The DAO throws a subclass of a

HibernateException

, that is a run-time exception and does not have to be declared or caught. We may also deal with

IllegalArgumentException

and

IllegalStateException

. This means that callers can only treat exceptions as generally fatal, unless they want to depend on Hibernate's own exception structure. Spring enables exception translation to be applied transparently through the

@Repository

annotation.

The DAO uses the Hibernate

SessionFactory

that provides Sessions to access the Database. It gets it as bean reference from the Spring IoC container. All the methods implemented in the DAO get

Session

instances by using the

getCurrentSession()

method of

SessionFactory

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. The SessionFactory

is injected using the

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annotation.

The basic CRUD methods implemented here use the

persist(Object object

get(Class clazz, Serializable id)

update(Object object)

and

delete(Object object)

API methods of

Session

to create, retrieve, update and delete an object from the database.

package com.javacodegeeks.snippets.enterprise.dao;

EmployeeDAOImpl.java

```
import org.hibernate.SessionFactory;
import org.springframework.beans.factory.annotation.Autowired;
04
05
      import org.springframework.stereotype.Repository;
06
07
      import com.javacodegeeks.snippets.enterprise.model.Employee;
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
30
31
      @Repository("employeeDAO")
      public class EmployeeDA0Impl implements EmployeeDA0 {
           private SessionFactory sessionFactory;
           @Override
public void persistEmployee(Employee employee) {
                sessionFactory.getCurrentSession().persist(employee);
           public Employee findEmployeeById(String id) {
                return (Employee) sessionFactory.getCurrentSession().get(Employee.class, id);
           public void updateEmployee(Employee employee) {
    sessionFactory.getCurrentSession().update(employee);
           @Override
public void deleteEmployee(Employee employee) {
                sessionFactory.getCurrentSession().delete(employee);
33
34
           }
35
36
      }
```

The inteface of

EmployeeDA0Impl.java

is shown below:

EmployeeDAO.java

# 6. The Service class

The

EmployeeDA0Impl.java

class is injected in the

EmployeeServiceImpl.java

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```
class. Thus, in the methods implemented here, the DAO methods are invoked to perform the basic interaction with the database. The EmployeeServiceImpl.java
```

class is annotated with the

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annotation, dictating that it is a Spring Bean and thus allowing Spring to auto-detect it.

rne

@Transactional

annotation is placed before the methods, to denote that a transaction is created when each method is invoked. The transaction will be configured in Spring configuration file.

EmployeeServiceImpl.java

```
package com.javacodegeeks.snippets.enterprise.service;
03
                      import org.springframework.beans.factory.annotation.Autowired:
                      import org.springframework.stereotype.Service;
import org.springframework.transaction.annotation.Transactional;
04
05
06
07
                      \label{lem:com.javacodegeeks.snippets.enterprise.dao.} \\ \textbf{EmployeeDAO;} \\ \textbf{import} \quad \text{com.javacodegeeks.snippets.enterprise.model.Employee;} \\ \\ \textbf{Com.javacodegeeks.snippets.enterprise.model.Employee;} \\ \textbf{Com.javacodegeeks.snippets.enterprise.model.Employee} \\ \textbf{Com.javacodegeeks.enterprise.model.Employee} \\ \textbf{Com.javacodegeeks.enterprise.enterprise.model.Employee} \\ \textbf{Com.javacodegeeks.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterprise.enterpri
08
09
10
11
12
                                              /ice("employeeService")
                      public class EmployeeServiceImpl implements EmployeeService{
13
14
15
16
17
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19
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21
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24
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26
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31
32
33
34
35
36
                                         EmployeeDAO employeeDAO;
                                         @Override
                                        public void persistEmployee(Employee employee) {
   employeeDAO.persistEmployee(employee);
                                         @Override
                                        dTransactional
public void updateEmployee(Employee employee) {
                                                            employeeDAO.updateEmployee(employee);
                                          @Override
                                         public Employee findEmployeeById(String id) {
    return employeeDAO.findEmployeeById(id);
                                        @Override
@Transactional
                                        public void deleteEmployee(Employee employee) {
   employeeDAO.deleteEmployee(employee);
37
38
40
                                         }
41
42
                    3
```

### The interface of

EmployeeServiceImpl.java

class is shown below:

# EmployeeService.java

```
package com.javacodegeeks.snippets.enterprise.service;
import com.javacodegeeks.snippets.enterprise.model.Employee;

import com.javacodegeeks.snippets.enterprise.model.Employee;

public interface EmployeeService {
    void persistEmployee(Employee employee);

Employee findEmployeeById(String id);
    void updateEmployee(Employee employee);

void deleteEmployee(Employee employee);
}

void deleteEmployee(Employee employee);
}
```

# 7. Configure Spring Beans

The

applicationContext.xml

file shown below defines and configures all the beans needed for the interaction with the database.

First of all, since we are using Spring beans, we must use the

<context:component-scan

> element to define where the beans are, so that the IOC container will detect them.

We also use the

<tx:annotation-driven/>

element, so that Spring is @Transactional-aware and can detect the

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annotations to configure the appropriate beans with transactional behavior.

In the

asource

DataSource

is defined. Spring obtains a connection to the database through a

DataSource

. The properties to be configured here are the

driverClassName

, the

Ala a

to the database and the

username

and

password

for the connection to the database.

In the

sessionFactory

bean we must define the

SessionFactory

class. The

SessionFactory

class is a thread-safe object that is instantiated once to serve the entire application. The

SessionFactory

is used to create Sessions. A Session is used to get a physical connection with a database. The Session object is instantiated each time an interaction is needed with the database. Persistent objects are saved and retrieved through a Session object.

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The class that implements the

sessionFactory

is the

org.springframework.orm.hibernate4.LocalSessionFactoryBean

class. We can configure the properties this class provides in the bean definition. In the

datasource

property, that is a reference to the

DataSource

we set the DataSource to be used by the SessionFactory. In the

annotatedClasses

property we must specify annotated entity classes to register with this Hibernate SessionFactory. The

Employee

class is the value of this property. The

 $\verb|org.springframework.orm.hibernate4.LocalSessionFactoryBean|\\$ 

class also provides a

hibernateProperties

property to configure. Here we can configure all properties provided by Hibernate. For example, JDBC Properties, Hibernate Configuration Properties, Cache and Transaction Properties and SQL dialects. Here we have set two properties. The

hibernate.dialect

property is set to MySql, and the

hibernate.show\_sql

is set to true so that the queries implemented are printed.

Last but not least, the

transactionManager

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bean is defined. The class to implement the transaction is the

org.springframework.orm.hibernate4.HibernateTransactionManager

. The bean has a property named

bean.

applicationContext.xml

```
<beans xmlns="http://www.springframework.org/schema/beans"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:p="http://www.springframework.org/sche
    xmlns:aop="http://www.springframework.org/schema/aop" xmlns:context="http://www.springframework.org/schema/ipe" xmlns:tx="http://www.springframework.org/schema/ipe" xmlns:tx="http
02
03
04
06
                         xsi:schemaLocation="http://www.springframework.org/schema/aop http://www.springframework.org/schem
07
08
                   <context:component-scan base-package="com.javacodegeeks.snippets.enterprise.*" />
10
11
12
                  <tx:annotation-driven/>
                13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
                  roperty name="dataSource"
                           <list>
                                                      name="annotatedClasses">
                                                         <value>com.javacodegeeks.snippets.enterprise.model.Employee</value>
                                              </list>
                        </property>
roperty name="hibernateProperties">
                              cprops>
                                  30
31
32
33
34
                                    <prop key="hibernate.show_sql">true</prop>
                               </bean>
                  37
                   </hean>
38
             </beans>
```

# 8. Run the Application

```
App.java
class we load the
```

applicationContext.xml

file. We create an

Employee

object and use the CRUD methods to interact with the database

# App.java

```
package com.javacodegeeks.snippets.enterprise;
       import org.springframework.context.ConfigurableApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
03
04
       import com.javacodegeeks.snippets.enterprise.model.Employee;
07
08
       import com.javacodegeeks.snippets.enterprise.service.EmployeeService;
09
10
       public class App {
11
12
13
14
15
16
17
18
19
20
21
22
23
24
              public static void main(String[] args) {
    System.out.println("load context");
    ConfigurableApplicationContext context = new ClassPathXmlApplicationContext("applicationContex");
                    Employee em = new Employee();
em.setId("123");
em.setName("John");
                    em.setAge(35):
                    EmployeeService emService = (EmployeeService) context.getBean("employeeService");
emService.persistEmployee(em);
System.out.println("Updated age :" + emService.findEmployeeById("123").getAge());
                    em.setAge(32);
                    emService.updateEmployee(em);
                    System.out.println("Updated age :" + emService.findEmployeeById("123").getAge()); emService.deleteEmployee(em);
25
26
                    context.close();
27
28
       }
```

When you run the application, you will see the sql gueries in the output. You will also see the the age of the first emloyee and the age of the updated employee

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Hibernate: insert into EMPLOYEE (AGE, NAME, ID) values (?, ?, ?)

Hibernate: select employee0\_.ID as ID0\_0\_, employee0\_.AGE as AGE0\_0\_, employee0\_.NAME as NAME0\_0\_ from EMPLOYEE employee0\_
Persisted age :35

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Hibernate: update EMPLOYEE set AGE=?, NAME=? where ID=?

Hibernate: select employee0\_.ID as ID0\_0\_, employee0\_.AGE as AGE0\_0\_, employee0\_.NAME as NAME0\_0\_ from EMPLOYEE employee0\_
Updated age :32

Hibernate: select employee\_.ID, employee\_.AGE as AGE0\_, employee\_.NAME as NAME0\_ from EMPLOYEE employee\_.I

Hibernate: delete from EMPLOYEE where ID=?

This was an example of Spring Hibernate and Mysql integration.

Download the Eclipse project of this tutorial : SpringHibernateMysqlMavenExample.zip

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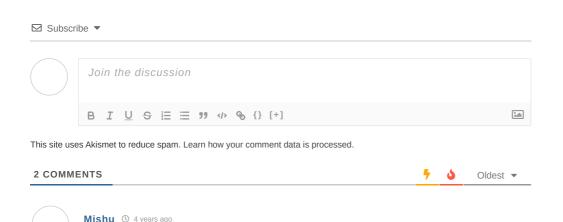
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## Sid () 3 years ago

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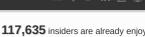
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