Enterprise Programmering 1 Lesson 08: Spring

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About these slides

- These slides are just high level overviews of the topics covered in class
- The details are directly in the code comments on the Git repository

Spring Framework

- Open-source, first released in 2002
- Framework to develop enterprise/web applications
- Supported/developed by *Pivotal Software*
- Started as a lightweight alternative to Java EE
- Now quite complex, but shares/reuse many aspects of Java EE
- Probably one framework/library with the best documentation out there
  - eg, see https://spring.io

Why the name "Spring"?

Spring is what comes after the "*winter*" of Java EE…

Spring vs SpringBoot

- Spring has *many, many* modules, like for handling databases, web pages, web services, etc.

- To *wire* together a Spring application, there might be the need to set up a lot of configurations

- *SpringBoot* (2012): part of Spring

- Provides *convention over configuration*
  - ie, default, reasonable configurations
  - eg, if you have H2 embedded database as dependency in *pom.xml,* SpringBoot will automatically start it and configure Hibernate for it

- Can write up a full functional enterprise application very quickly

Popularity

- Spring is the most popular framework to develop backend enterprise applications

- However, like Java EE, it has a learning curve, as you need to have a clear understanding of *dependency injection* and *proxy classes*

- Java also has other more lightweight alternatives, like *DropWizard*
  - less "magic", but more boilerplate and less functionalities…

Deployment

- With Spring, you can still build a WAR file that can be deployed on a Java EE container like WildFly

- That because Spring still implements the "Servlet" API of Java EE (which is the one use to interact with HTTP requests)

- However, most common case is to build a fat / uber JAR file, which is self executable (and contains all needed dependencies)

  - Which will include an embedded servlet container like Tomcat or Jetty
  - These two are servers that support the "Servlet" API, but not the other specs of Java EE

From Java EE to Spring

- Spring is inspired by Java EE, and follows many of its conventions
    - and actually several aspects in Java EE came from Spring…
- Spring is huge, so we will just discuss what we have seen so far in Java EE, ie: *JPA*, *EJB* and *JSF*
- As they have many similarities, moving from one to the other is not a too complex task

JPA

- Spring can use JPA directly
- By default, Spring uses Hibernate for JPA
- No need to do any change on the *@Entity* or the *EntityManager*
- No need of *persistence.xml*, as Hibernate gets configured in main Spring configuration file (e.g., *application.yml*)
- Spring provides *more functionalities* on top of JPA, like *@Repository*, but we will not see them in this course

EJB

- Not supported in Spring
- Spring has its own equivalent bean mechanism
- Classes annotated with *@Service*, and injection done with *@Autowired*
- Spring services are by default like a *singleton*
- If you want to have transactions, not on by default, you need to use the annotation *@Transactional*
- Often, transforming a EJB into a Spring Service is just a matter of changing just the annotations...

JSF

- Not directly supported by Spring
- Spring has its own server-side HTML rendering framework called *Spring MVC*
- However, JSF (the controller beans and XHTML templates) can be used in Spring with the help of external libraries (e.g., *JoinFaces*)
  - eg, it provides the ability to use Spring beans inside JSF controller beans, and setups Spring to use the JSF Servlet to handle incoming HTTP requests
- Recall: today, if you really want to invest time in learning a front-end framework, learn *React.* We use JSF because can be in both Java EE and Spring, and do not need to go into details of JavaScript, AJAX and WebSockets yet...

Testing

- This is where Spring completely *annihilates* Java EE
- No need of special Maven plugins to download a Java EE container like WildFly
  - Spring is just yet another JAR library imported as a dependency
- A Spring application can be started directly by the tests inside the JVM of the tests
  - No need to use Arquillian to create a WAR file on the fly, and then have to control an external process running the Java EE container

Entry Point

- You need a class annotated with *@SpringBootApplication*
  - It will be the entry point of your application
- SpringBoot will automatically scan all the classes on your *classpath* (ie your own classes and all third-party dependencies) to check which *@Service* beans to start
- Be CAREFUL of package names: by default, if *@SpringBootApplication* is in package X.Y.Z, it will scan only X.Y.Z and sub-packages
  - ie, X.Y.Z.W is OK, whereas X.Y will be ignored

Configurations

- SpringBoot provides sensible default configurations based on what present on your classpath
- If you need to do modifications, those will be in a *application.properties* or *application.yml* file
  - those are the same, just in different formats
  - ".properties": pairs <property-name>=<value>
  - ".yml"/".yaml": YAML (YAML Ain't Markup Language)
- See following for list of properties:
  - https://docs.spring.io/spring-boot/docs/current/reference/html/common-application-properties.html

Git Repository Modules

- *NOTE: most of the explanations will be directly in the code as comments, and not here in the slides*
- **intro/spring/bean/service**
- **intro/spring/bean/jpa**
- **intro/spring/bean/profile**
- **intro/spring/bean/configuration**
- **intro/spring/jsf**
- Exercises for Lesson 08 (see documentation)