

Introduction to Spring 5

Course Summary

Description

Spring 5 provides an evolutionary advance of Spring's powerful capabilities. This course introduces these capabilities, as well as providing guidelines on when and how to use them. It includes coverage of the three main configuration styles: Java-based (@Configuration), annotation-based (@Component), and the traditional XML-based configuration that may still play an important role in existing and new projects.

The course starts with in-depth coverage of Spring's Core module to reduce coupling and increase the flexibility, ease of maintenance, and testing of your applications. It goes on to cover many of the most important capabilities of Spring, including easing configuration with Spring Boot, integrating Hibernate and JPA persistence layers with Spring and Spring Data, and using Spring's declarative transaction capabilities.

This course is hands on with labs to reinforce all the important concepts. It will enable you to build working Spring applications and give you an understanding of the important concepts and technology in a very short time.

Objectives

By the end of this course, students will be able to:

- Understand the core principles of Spring, and of Dependency Injection (DI) / Inversion of Control
- Use the Spring Core module and DI to configure and wire application objects (beans) together
- Know the different types of metadata (XML, annotations/@Component, and Java Configuration/@Configuration), and how and when to use them
- Understand and use the complete capabilities of the Core module, such as lifecycle events, bean scopes, and the Spring API
- Use Spring Boot to simplify dependency management and configuration
- Work with the ORM (Object-Relational Mapping) module to integrate Spring with technologies such as Hibernate or JPA.
- Use Spring Data to automatically generate JPA-based repository classes
- Understand and use Spring's transaction support, including the easy-to-use Java annotation support, as well as the tx/aop XML configuration elements
- Integrate Spring with Java EE Web applications

Topics

- Introduction to Spring
- Configuration in Depth
- Spring Boot Overview
- Spring Testing
- Spring and Spring Data with Hibernate/JPA
- Spring Transaction (TX) Management
- Java EE Web Applications with Spring
- Additional New Features in Spring 5 (Optional)
- XML Specific Configuration (Optional)

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Course Summary (cont.)

Prerequisite

Working knowledge of Java programming, including use of inheritance, interfaces, and exceptions is a prerequisite for this course.

Duration

Three Days

Introduction to Spring 5

Course Outline

I. Introduction to Spring

- A. Overview of Spring Technology
 1. Motivation for Spring, Spring Architecture
 2. The Spring Framework
- B. Spring Introduction
 1. Declaring and Managing Beans
 2. ApplicationContexts - The Spring Container
 3. XML and @Component/@Named Config
- C. Dependencies and Dependency Injection (DI)
 1. Examining Dependencies
 2. Dependency Inversion / Dependency Injection (DI)
 3. DI in Spring - XML and @Autowired

II. Configuration in Depth

- A. Java Based Configuration (@Configuration)
 1. Overview, @Configuration, @Bean
 2. Dependency Injection
 3. Resolving Dependencies
- B. Integrating Configuration Types
 1. XML and @Component Pros/Cons
 2. @Configuration Pros/Cons
 3. Choosing a Configuration Style
 4. Integrating with @Import and <import>
- C. Bean Scope and Lifecycle
 1. Singleton, Prototype, and Other Scopes
 2. Configuring Scope
 3. Bean Lifecycle / Callbacks
- D. Externalizing Properties
 1. Properties Files
 2. @PropertySource, property-placeholder
 3. Using @Value
 4. SpEL
- E. Profiles
 1. Overview and Configuration
 2. Activating Profiles

III. Spring Boot Overview

- A. maven and Spring
- B. Spring Boot Structure
- C. Spring POMs with Boot Parents
- D. Spring Boot Starters
- E. Other Capabilities

IV. Spring Testing

- A. Testing and JUnit Overview
 1. Writing Tests - Test Classes, asserts, Naming Conventions
 2. Running Tests - IDE, maven, ...
 3. Test Fixtures - setup and teardown
- B. Spring TestContext Framework
 1. Overview
 2. Configuration
 3. Running Tests

V. Spring and Spring Data with Hibernate/JPA

- A. Overview of Spring database support
- B. Configuring a DataSource
- C. Using Spring with Hibernate
 1. High Level Hibernate Overview
 2. SessionFactory configuration, LocalSessionFactoryBean
 3. Contextual Sessions and Spring Integration
- D. Using Spring with JPA
 1. Managing the EntityManager (EM)
 2. LocalContainerEntityManagerFactoryBean and Container-managed EMs
 3. JEE and JNDI Lookup of the EM
 4. Configuration and Vendor Adaptors
 5. Creating a JPA Repository/DAO Bean - @PersistenceUnit, @PersistenceContext
- E. Spring Data Overview
 1. Overview and Architecture
 2. Configuring Spring Data
 3. Repositories and JPA Repositories
 4. Using CrudRepository

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Course Outline (cont.)

- F. Using Spring Data
 - 1. Naming Conventions for Querying
 - 2. Creating more Complex Queries
 - 3. Query Configuration

- VI. *Spring Transaction (TX) Management***
 - A. Overview
 - B. Declarative TX Management (REQUIRED, etc.)
 - C. TX Scope and Propagation
 - D. Pointcut-based Configuration of Transactions

- VII. *Java EE Web Applications with Spring***
 - A. Java EE Web App Overview
 - B. ContextLoaderListener and WebApplicationContext
 - C. Using Spring Beans

- VIII. *Additional New Features in Spring 5 (Optional)***
 - A. Updates to Spring Core
 - B. WebFlux / Reactive Web Framework

- IX. *XML Specific Configuration (Optional)***
 - A. Collections - lists, sets, etc.
 - B. Additional Capabilities
 - 1. Factory Classes and Factory Methods
 - 2. Definition Inheritance (Parent Beans)
 - 3. AutoWiring with XML
 - 4. Inner Beans, Compound Names