Introduction to Spring 5 (3 Days)

This Introduction to Spring 5 training class introduces Spring's capabilities and provides 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.

Java developers who want to learn about RESTful services with Spring and dig deeper into Spring Boot should consider **Introduction to Spring 5, Spring Boot, and Spring REST course**.

Course Benefits:

- Understand the core principles of Spring, and of Dependency Injection (DI) / Inversion of Control.
- Learn to use the Spring Core module and DI to configure and wire application objects (beans) together.
- Understand 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.
- Learn to use Spring Boot to simplify dependency management and configuration.
- Learn to work with the ORM (Object-Relational Mapping) module to integrate Spring with technologies such as Hibernate or JPA.
- Learn to 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.
- Learn to integrate Spring with Java EE Web applications.

Prerequisites:

Working knowledge of Java programming, including use of inheritance, interfaces, and exceptions.

Course Outline:

Session 1: Introduction to Spring

- Overview of Spring Technology
  - Motivation for Spring, Spring Architecture
  - The Spring Framework
- Spring Introduction
  - Declaring and Managing Beans
  - ApplicationContext – The Spring Container
  - XML and @Component/@Named Config
- Dependencies and Dependency Injection (DI)
  - Examining Dependencies
  - Dependency Inversion
  - Dependency Injection (DI) in Spring – XML and @autowired

Session 2: Configuration in Depth

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

Session 3: Spring Boot Overview

- maven and Spring
- Spring Boot Structure
- Spring POMs with Boot Parents
- Spring Boot Starters
- Other Capabilities

Session 4: Spring Testing

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

Session 5: Spring and Spring Data with Hibernate/JPA

- Configuring a DataSource
- Using Spring with Hibernate
  - High Level Hibernate Overview
  - SessionFactory configuration, LocalSessionFactoryBean
  - Contextual Sessions and Spring Integration
- Using Spring with JPA
  - Managing the EntityManager (EM)
  - LocalContainerEntityManagerFactoryBean and Container-managed EMs
  - JEE and JNDI Lookup of the EM
  - Configuration and Vendor Adaptors
  - Creating a JPA Repository/DAO Bean - @PersistenceUnit, @PersistenceContext
- Spring Data Overview
  - Architecture, Configuring Spring Data
  - Repositories and JPA Repositories
  - Using CrudRepository
- Using Spring Data
  - Naming Conventions for Querying
  - Creating more Complex Queries
  - Query Configuration

Session 6: Spring Transaction (TX) Management

- Declarative TX Management (REQUIRED, etc.)
- TX Scope and Propagation
- Pointcut-based Configuration of Transactions

Session 7: Spring Web Integration and Intro to Spring MVC

- Java EE Web App Integration
- ContextLoaderListener and WebApplicationContext
- Web MVC Overview
- Spring MVC Basics
  - Configuration and the DispatcherServlet
  - @Controller, @RequestMapping (Handlers)
  - @RequestParam and Parameter Binding
  - View Resolvers
  - Controller Details - @RequestParam, @PathVariable
  - Model Data and @ModelAttribute