Introduction to Spring 5 and JPA2

This course includes coverage of all the core Spring 5 and JPA 2 capabilities, as well as the integration capabilities provided by Spring. It provides extensive coverage of using Spring and JPA together, as well as using Spring Boot for dependency management and creating JPA-based repositories using Spring Data. All capabilities are practiced via an extensive set of hands-on labs.

Spring 5 provides an evolutionary advance of Spring's powerful capabilities. The 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. It uses Spring Boot capabilities for dependency management in many of the labs.

The JPA material covers all basic JPA concepts, including mapping persistent classes, and using EntityManager and EntityManagerFactory to access and manipulate persistent entities. Querying with the Java Persistence Query Language (JPQL) is covered in depth, from basic queries to more advanced queries like eager queries using left joins. It also includes coverage of advanced concepts such as collections of value objects, relationships, and inheritance and polymorphic queries.

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

The standard platform does all labs with the **Eclipse IDE**, and the lab instructions include detailed directions for setting up and using it. The course can be made available for all major development environments, including IBM RAD and IntelliJ.

Audience: Java developers who need to work with Spring based applications

Prerequisites: A strong working knowledge of Java, JDBC, and Servlets/JSP.

Number of Days: 5 days

Session 1: Introduction to Spring

- Overview of Spring Technology
- Spring Introduction
- Dependencies and Dependency Injection (DI)

Session 2: Configuration in Depth

- Java Based Configuration (@Configuration)
- Integrating Configuration Types
- Bean Scope and Lifecycle
- Externalizing Properties
- 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
- Spring TestContext Framework

Session 5: Introduction to Java Persistence API (JPA2)

- Overview
- Mapping with JPA
- Persistence Unit and EntityManager
- More About Mappings
- equals() and hashCode()
- Logging Options (Provider based)

Session 6: Spring/JPA Integration

- Spring's DataSource Support
- 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

Session 7: JPA Updates and Queries

- Inserting Updating, and Deleting Entities
- Querying and JPQL
- Additional Query Capabilities - Projection and Aggregate Query, Embedded Objects

Session 8 Transactions

- TX Overview and JPA Transactions
- Spring's Declarative TX Management (REQUIRED, etc.)
- @Transactional
- TX Scope and Propagation
- Pointcut-based Configuration of Transactions

Session 9: The JPA Persistence Lifecycle

- The Persistence Lifecycle
- Versioning and Optimistic Locking
- Lifecycle Callbacks

Session 10: Relationships

- Relationships Overview: Object Relationships, Participants, Roles, Directionality, Cardinality
- Relationship Mapping
- Entity Inheritance Mapping

Session 11: Spring Web Integration

- Integrating Spring with Java EE Web Apps
- Open EntityManager in View

Session 12: Spring Data Introduction

- Spring Data Overview
- Using Spring Data

Session 13: Additional Topics

- Spring 5: Core Updates
- JPA: Embedded Objects
- JPA: Compound Primary Keys
- JPA: Element Collections