Faysal Aziz

Spring Boot Fundamentals

Simplify Web Development with Java in 4 days

FA-0420 · 4 days

Software Development · DevOps, Cloud & Infrastructure · Data & Analytics

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Introduction

Your gateway to modern Java application development with ease and confidence!

Spring Boot has revolutionized the way developers build and deploy Java applications. By simplifying configurations and integrating seamlessly with modern tools, it empowers developers to focus on writing robust and scalable code.

This course is designed for complete beginners with basic Java knowledge, enabling them to understand, develop, and deploy production-ready applications using Spring Boot. With real-world insights and hands-on exercises, you'll gain practical skills to kickstart your journey in Spring Boot development.

Learning outcomes

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

- Understand the foundational concepts of Spring Boot and its role in Java application development.
- Set up and configure a Spring Boot project using industry-standard tools.
- Build RESTful web services with Spring Boot.
- Implement data access layers using Spring Data JPA and connect to relational databases.
- Secure applications using Spring Security.
- Test Spring Boot applications effectively.
- Deploy Spring Boot applications to production environments.

Prerequisites

- Basic knowledge of Java programming (understanding of classes, objects, methods, and basic syntax).
- Familiarity with IDEs like IntelliJ IDEA or Eclipse (optional but recommended).
- A basic understanding of web concepts (e.g., HTTP, APIs) is helpful but not mandatory.

Training outline

1. 1. Introduction to Spring Framework and Spring Boot

- The evolution of Java application development.

  What is the Spring Framework?

  - Core concepts: Dependency Injection (DI) and Aspect-Oriented Programming (AOP).

  Introduction to Spring Boot:

  - Features and benefits.
  - Comparing Spring Boot with traditional Spring applications.

  Setting up the environment:

  - Installing JDK, Maven, and IntelliJ IDEA/Eclipse.
  - Creating your first Spring Boot project using Spring Initializr.

2. 2. Spring Boot Fundamentals

- Understanding the structure of a Spring Boot application.
- Dependency management using Maven.

  Configuration basics:

  - application.properties vs application.yml.
  - Profiles and environment-specific configurations.
- Running and debugging Spring Boot applications.

3. 3. Building RESTful Web Services

Introduction to REST architecture:

- Key principles and HTTP methods.

Creating RESTful APIs using Spring Boot.

- @RestController and @RequestMapping annotations.
- Handling HTTP GET, POST, PUT, DELETE requests.

- Data validation with @Valid and Bean Validation.

  Exception handling in Spring Boot:
  - @ControllerAdvice and @ExceptionHandler.
- Practical exercise: Build a simple "To-Do List" REST API.

4. 4. Working with Data in Spring Boot

Introduction to Spring Data JPA:
- Benefits of JPA and Hibernate.
- Setting up a database connection (H2, MySQL).

Defining entities and repositories:
- @Entity, @Id, @GeneratedValue annotations.
- Repository interfaces and query methods.

- CRUD operations with Spring Data JPA.
- Pagination and sorting.
- Practical exercise: Extend the "To-Do List" app with database persistence.

5. 5. Working with Spring Boot and Apache Kafka

Introduction to Apache Kafka

What is Apache Kafka?

- **Overview of Kafka as a distributed event-streaming platform.**
- **Key use cases: real-time analytics, event-driven architecture, log aggregation, and more.**

Core Kafka concepts:

- **Topics, producers, and consumers.**
- **Partitions and offsets.**
- **Brokers and Kafka clusters.**
- **Consumer groups and message delivery semantics (at-least-once, at-most-once, exactly-once).**

Benefits of using Kafka in modern applications:

- **Scalability, durability, and high-throughput.**

- ## Integrating Spring Boot with Kafka

  Setting up Kafka in a development environment:

  - **Installing and running Kafka locally.**
  - **Exploring tools like Confluent Platform or Docker for Kafka setup.**

- **Adding Kafka dependencies to a Spring Boot project using Maven/Gradle.**

  Configuring Kafka in Spring Boot:

  - **Defining properties in application.yml or application.properties.**
  - **Understanding producer and consumer configuration.**

6. 7. Deploying Spring Boot Applications

Overview of deployment options:

- Running Spring Boot as a standalone JAR.
- Deploying to application servers (e.g., Tomcat).
- Cloud deployments with AWS Elastic Beanstalk or Azure App Services.

Configuring Spring Boot for production:

- Logging with Spring Boot.
- Monitoring and metrics using Actuator.

- Practical exercise: Deploy app locally and explore deployment options for the cloud.

This comprehensive course combines step-by-step guidance, hands-on exercises, and real-world insights from an instructor with over 30 years of industry experience. Whether you're a budding developer or looking to expand your skills, this course equips you with the tools to succeed in the dynamic world of Java development.

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