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Spring Boot Elevated

Master the art of scalable, real-time microservices and professional deployment techniques in 3 days

FA-0418 · 3 days

Software Development · DevOps, Cloud & Infrastructure

Introduction

Ready to level up your tech game? Welcome to a mind-expanding journey into the world of modern application architecture!

Imagine building applications that scale to the moon and back - that's the power of microservices with Spring Boot! Add the magic of Apache Kafka and Confluent Kafka Streams, and you've got a recipe for tech wizardry that'll make your applications dance.

Over three transformative days, we'll dive deep into the matrix of microservices, surfing the waves of real-time event streaming, and unlocking the secrets of professional deployment practices. This isn't just another course - it's your gateway to becoming a microservices maestro!

Your guide on this adventure? A tech sage with three decades of battle-tested wisdom, ready to share the sacred knowledge that turns good developers into great ones. Whether you're wrestling with advanced testing techniques or dreaming of perfect deployments on Ubuntu servers, we've got the map to your treasure.

Learning outcomes

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

- Design and implement scalable microservices using Spring Boot.
- Integrate Confluent Kafka and Kafka Streams into Spring Boot applications.
- Solve advanced coding challenges, including recursion in the context of Spring Boot applications.
- Test Spring Boot applications using advanced testing methodologies.
- Deploy Spring Boot microservices on an Ubuntu server with NGINX and Tomcat.

Prerequisites

- Intermediate knowledge of Spring Boot (e.g., REST API development, basic annotations).
- Familiarity with Apache Kafka basics (e.g., producers, consumers, and topics).
- Working knowledge of Linux/Ubuntu command-line tools.
- Prior experience deploying spring boot web applications.

Training outline

1. 1. Microservices Architecture with Spring Boot

Overview of microservices:

- Benefits and challenges of microservices architecture.
- Comparing monolithic vs. microservices.

Building microservices in Spring Boot:

- Designing modular services with clean separation of concerns.

  Communication between microservices:
  - Synchronous communication with REST.
  - Asynchronous communication with Kafka.

Resilience patterns for microservices:

- Circuit breakers with Resilience4j.
- Rate limiting and fallback mechanisms.

- **Practical exercise: Build a set of interconnected microservices systems.**

2. 2. Integration with Confluent Kafka and Kafka Streams

Introduction to Confluent Kafka:

- Features of Confluent Platform (Schema Registry, ksqlDB).
- Setting up Confluent Kafka locally or with Docker.

Advanced Kafka producer and consumer concepts:

- Custom serialization and deserialization.
- Schema Registry and Avro integration with Spring Boot.

Introduction to Kafka Streams:

- Stream processing concepts.
- Building stateful and stateless stream applications.
- Understanding KTables and windowed operations.

Practical exercise:

- Build a Kafka Streams application to process user transactions in real time.
- Implement a use case.

3. 3. Advanced Topics in Spring Boot

Advanced testing methodologies:

- Writing integration tests for microservices with MockMvc and TestContainers.
- Testing Kafka producers and consumers.

Recursive logic in Spring Boot:

- Understanding recursion and its use cases in backend development.
- Practical examples: Tree traversal and directory/file system structures.
- Performance implications and optimization techniques.

Security for microservices:

- Implementing OAuth2 with Spring Security.
- Token-based authentication between microservices.

4. 4. Deployment on Server

Setting up the environment:

- Preparing an Ubuntu server for deployment.
- Installing and configuring Java, Maven, and NGINX.
- Introduction to Tomcat and its role in hosting Spring Boot applications.

Deploying Spring Boot applications:

- Creating a deployable WAR file.
- Deploying on Tomcat and setting up reverse proxy with NGINX.
- Securing the deployment with HTTPS (SSL certificates).

Practical exercise

- Deploy a multi-service Spring Boot application on an Ubuntu server with NGINX and Tomcat.

5. 5. Scaling and Maintaining Microservices

- Horizontal scaling for microservices.
- Load balancing with NGINX.
- Containerizing Spring Boot applications with Docker.
- Brief introduction to Kubernetes for microservices orchestration.

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