

Spring Boot based Microservices Application Development and Deployment

Course Duration: 24 Hours

Course code: SBMSADD

1. Course Overview

During this 3-day course, you focus on designing, developing, and deploying microservices-based applications using Spring Boot. Learn how to build RESTful APIs, integrate services using Spring Cloud, and manage inter-service communication. Explore service discovery, API gateway implementation, and centralized configuration. Gain hands-on experience with containerizing microservices using Docker, orchestrating them with Kubernetes, and deploying to cloud environments. Understand monitoring, logging, and scaling strategies for production-ready microservices.

2. What you'll learn?

By the end of the course, you should be able to:

- Describe microservices architecture principles
- Develop REST APIs with Spring Boot
- Implement inter-service communication (synchronous and asynchronous)
- Use Spring Cloud for service discovery, configuration, and resilience
- Secure microservices with Spring Security and OAuth2
- Implement centralized logging and monitoring
- Containerize applications using Docker and deploy with Kubernetes
- Integrate CI/CD pipelines for microservices deployment
- Optimize, troubleshoot, and scale microservices in production

3. Target Audience

Java developers, backend engineers, and architects responsible for building and deploying microservices-based applications.

4. Pre-Requisites

Familiarity with:

- Java programming
- Basics of Spring Framework
- REST APIs and HTTP protocol
- Containerization concepts (helpful but not mandatory)

5. Course content

Module 1: Course Introduction

- Introduction
- Course Contents

Module 2: Introduction to Microservices with Spring Boot

- Overview of microservices architecture
- Advantages and challenges of microservices
- Role of Spring Boot in microservices development
- Summary

Module 3: Building REST APIs with Spring Boot

- Creating Spring Boot projects
- Defining controllers, services, and repositories
- Handling request/response payloads
- Exception handling and validation

Module 4: Service Discovery and API Gateway

- Introduction to Spring Cloud

- Implementing service discovery with Eureka
- API gateway with Spring Cloud Gateway or Zuul
- Routing and load balancing

Module 5: Centralized Configuration and Resilience

- Spring Cloud Config Server
- Distributed configuration management
- Circuit breakers with Resilience4j/Hystrix
- Retry patterns and fallback methods

Module 6: Inter-Service Communication

- Synchronous communication with REST/Feign Clients
- Asynchronous communication with RabbitMQ/Kafka
- Event-driven architecture

Module 7: Security in Microservices

- Securing APIs with Spring Security
- Implementing OAuth2 and JWT
- Role-based access control

Module 8: Containerization with Docker

- Creating Dockerfiles for Spring Boot services
- Building and running Docker containers
- Managing containerized services

Module 9: Deploying with Kubernetes

- Kubernetes architecture basics
- Creating deployments, services, and ingress
- Scaling microservices in Kubernetes

Module 10: Monitoring and Logging

- Centralized logging with ELK/EFK stack

- Monitoring microservices with Prometheus and Grafana
- Health checks and metrics with Spring Boot Actuator

Module 11: CI/CD for Microservices Deployment

- Integrating Jenkins/GitHub Actions
- Automated builds and testing
- Continuous deployment strategies

Module 12: Best Practices and Production Readiness

- Versioning APIs
- Database considerations in microservices
- Performance optimization and troubleshooting

