Spring Boot with Kafka, Docker and Kubernetes – Course Outline

1 Duration

- 3 days

2 Objectives

At end of this workshop, participants will able to :

- Get detail understanding of Spring Boot fundamentals, architecture, features and usage
- Understand how to create Spring Boot project, build and deploy to production
- Get understanding of Kafka, Docker and Kubernetes fundamentals, architecture, features and usage
- Design and develop web applications / services using Spring Boot and deploy as Docker containers

Note: *This course is designed for beginner to intermediate level.*

3 Audience

Developers who are interested to learn and build standalone scalable web apps/APIs with Spring Boot and deploy as micro services with Docker and Kubernetes

4 Pre-requisite

- Good knowledge on Java programming
- Knowledge on Spring Framework
- Familiarity on Maven build tool and XML/JSON

5 Hardware & Network Requirements

- Desktop/Laptop with minimum 8GB RAM
- Open Internet connection

6 Software Requirements

- Windows / Linux OS
- Oracle VirtualBox

* Pre-configured image with all required softwares to be shared along with setup instructions before the training for labs.

7 Outline

Day 1

Module-1: Introduction to Spring Boot

- Spring Framework Overview
- Spring Boot Overview
- Installation and Configuration
- Spring Boot CLI
- Integration with IDE

Module-2: Create Spring Boot Application

- Create Spring Boot Project
  - Spring Maven Project
  - Spring Starter Project
  - Spring Initializr
  - Spring Boot CLI
- Spring Boot Sample Application

Module-3: Spring Boot Internals and Features

- Configuration
- Auto-Configuration
- @SpringBootApplication Annotation
- Externalized Configuration
- Profiles
- Logging
- Packaging

Module-4: Spring Boot Web Development

- Spring MVC / REST Overview
- Spring Boot support for Spring MVC
- Spring Boot support for Spring REST
- Embedded web container support
- Sample web application using Spring Boot

Day 2

Module-5: Data Access with Spring Boot

- Spring Boot support for SQL Databases
  - JdbcTemplate
  - JPA
- Spring Boot support for NoSQL Technologies
  - Spring Data
  - MongoDB
- Embedded Database Support
- Sample web application with data access using Spring Boot

Module-6: Monitoring and Management

- Actuator Overview
- Endpoints
- Remote Shell
- Metrics
- Auditing and Tracing
- Developer Tools

Module-7: Kafka Overview

- Distributed Messaging Overview
- Introduction to Kafka
- Kafka Architecture
- Kafka Components - Consumers, Producers and Brokers

Module-8: Kafka Integration using Spring Kafka

- Create Spring Boot Starter project for Spring Kafka
- Sending Messages using KafkaTemplate
- Receiving Messages using KafkaListener
- Understand Transactions, Filtering, Retry and Error Handling

Day 3

Module-9: Docker Overview

- Introduction to Docker
- Docker Architecture
- Virtual Machines vs Containers
- Docker Setup and Configuration
- Components
    - Docker Engine
    - Docker Registry
    - Docker Compose
    - Docker File
    - Images
- Managing Container Linking, Storage, Networking and Logging
- Create Docker File for Spring Boot application
- Build Docker image
- Deployment workflow
- Docker Automation with Continuous Integration
- Hands-on exercise to package spring boot applications into Docker images and deploy

Module-10: Kubernetes Overview

- Introduction to Kubernetes
- Kubernetes Architecture
- Kubernetes Setup and Configuration
- Kubernetes Components - Node, Service, Pod
- Understand Kubernetes Job, Replication, Deployments, Volumes, Secrets, Network Policies
- Creating and deploying an application in Kubernetes with Docker
- Configure Auto Scaling and High Availability
- Managing and accessing Kubernetes cluster with API and Kubectl
- Kubernetes Monitoring with Dashboard