Micro services with Kubernetes

Prerequisites:

1. Java – 11
2. AWS account / Cloud Lab setup

Lab Setup:

1. Java 11
2. Docker
3. Postman client
4. Kubectl
5. IntelliJ/Spring Tool Suite

Duration: 3 days

Training level: Intermediate to Advance

Course Outline:

1. **Microservices – Introduction**
   - Why and When to use
   - SOA versus Microservices
   - Benefits of using Microservices
   - Challenges in using Microservice Architecture
   - Breaking down a monolithic app to microservice app
   - Case study of organizations who have moved to Microservice Architecture
   - Frameworks used to build Microservices
   - Design Patterns to be used when using a Microservice architecture

2. **Microservices and Cloud**
   - The Twelve-Factor App
   - CAP Theorem, Murphy's law

- Cloud - IAAS, PAAS, SAAS, Cloud Computing Design Patterns - : Sharing, Scaling Elasticity, Reliability, Resiliency and Recovery, Monitoring, Provisioning and Administration Patterns

3. **Building Microservices**
    - Hexagonal architecture
    - Polygot microservices
    - Applying DDD techniques

4. **Transactions in Microservices**
    - Sagas
    - CQRS
    - Event sourcing with Kafka

5. **Securing Microservices**
    - Security practices
    - Application Security using Spring Security
    - Spring security Architecture
    - Authentication
    - Authorization
    - OpenID
    - Integration with Okta
    - JWT tokens
    - OAUTH 2
        - Authorization Server
    - Scopes and claims
    - Method level security

6. **Introducing Pods**
    - Pods overview
    - Encapsulating Docker images with Pods
    - Pod lifecycle
    - Labelling Pods
    - Annotating Pods

7. **Managing Pods with Replica Sets**
    - Attaching and detaching pods from RC
    - Replica Sets to manage Pods
    - Advance commands to manage ReplicaSets

8. **Service Discovery**
    - Managing Service Resource
    - Deep dive into K8s Service resource
    - Communicating with K8s services
    - Working with Ingress
    - Setting up NLB, ALB and ELB
    - Configuring TLS

9. **ConfigMaps and Secrets**

    - Passing environmental variables using Config Maps
    - Creating Secrets

10. **Deployments**
    - Understanding K8s Deployment resource
    - Canary deployment
    - Blue green deployment
    - Pausing Deployment
    - Rolling back a deployment

Mode of delivery:

The training will be based on a real-world use case and will be built from ground up in a iterative manner. All the sessions will be workshop based, where participants will be coding along with the instructor for the entire session. The artifacts will be deployed to AWS Cloud environment.