Java on OCI: Develop a REST-based Microservice

Course Duration: 40 Hours **Course Code: SPMVC-101**

1. Course Overview

OCI-JAVA-REST-201 is a hands-on course that guides Java developers through designing, building, containerizing, and deploying a RESTful microservice on Oracle Cloud Infrastructure (OCI). You'll use a modern Java framework (Spring Boot or Micronaut), package to containers, and ship to OCI Container Registry (OCIR), front with OCI API Gateway, run on OCI Container Engine for Kubernetes (OKE) or Oracle Functions, and wire up observability, security, and CI/CD with OCI services.

2. What You'll Learn

- Design a REST API and implement it with Spring Boot or Micronaut
- Build, test, and containerize with Maven/Gradle + Docker
- Push/pull images with OCI Container Registry (OCIR)
- Deploy to OKE (Kubernetes) using manifests/Helm, or to Oracle Functions for serverless
- Expose endpoints via OCI API Gateway with routes, auth, and throttling
- Store config and secrets with OCI Vault; control access via OCI IAM policies
- Persist data using Oracle Autonomous Database (JDBC/JPA) or OCI Object Storage

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- Implement logging, metrics, and tracing with OCI Logging, Monitoring, and APM
- Automate pipelines using OCI DevOps (Code Repo, Build, Deploy) or GitHub Actions
- Apply blue/green or canary releases and basic SRE practices (SLOs, alerts)

3. Target Audience

- **Java developers and backend engineers building cloud-native services**
- **Solution architects standardizing on OCI**
- **DevOps engineers implementing Java microservice delivery on Kubernetes/serverless**

4. Pre-Requisites

- **Proficiency in Java 11+ and Spring Boot or Micronaut**
- **Basic Docker and Git knowledge**
- **Familiarity with REST/HTTP, JSON, and SQL**
- **An OCI tenancy with permissions to use IAM, OCIR, OKE/API Gateway (lab tenancy provided in class)**

5. Course Content

Module 1: Cloud-Native on OCI Fundamentals

- OCI regions, compartments, IAM basics, networking (VCN/Subnets/LB)
- Microservices vs. monolith, 12-factor, configuration strategy

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Module 2: Designing the REST API

- Resource modeling, versioning, OpenAPI/Swagger, error contracts

Module 3: Implementing with Spring Boot/Micronaut

- Controllers, DTOs, validation, exception handling, tests (JUnit/MockMvc)

Module 4: Data Access & Persistence

- JPA/Hibernate with Autonomous Database; Flyway migrations
- Alternatives: Object Storage, NoSQL (concepts)

Module 5: Containerization & Image Security

- Dockerfiles, multi-stage builds, SBOM basics, scanning images

Module 6: OCI Container Registry (OCIR)

- Repos, auth tokens, pushing/pulling images, lifecycle policies

Module 7: Deploying to Kubernetes with OKE

- Cluster setup, kubeconfig, manifests/Helm, ConfigMaps/Secrets, **HPA**

Module 8: Serverless Option: Oracle Functions *(alternative path)*

- Function packaging, Fn Project basics, event triggers

Module 9: API Exposure with OCI API Gateway

- Route configs, CORS, request/response transformations, JWT/OAuth integration

Module 10: Security & Secrets

- OCI Vault KMS/Secrets, IAM policies, private endpoints, mTLS patterns

Module 11: Observability & Reliability

- OCI Logging, Monitoring, Alarms, and APM for tracing
- Health checks, readiness/liveness probes, SLOs and alerts

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Module 12: CI/CD with OCI DevOps

- Code Repo, Build pipelines, container builds, Deploy to OKE/Functions
- Blue/green & canary strategies, rollbacks

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