Building Resilient Microservices with Istio and Red Hat OpenShift Service Mesh

Course Duration: 32 Hours   **Course Code: DO328**

1. Course Overview

The **Building Resilient Microservices with Istio and Red Hat OpenShift Service Mesh** course is designed to help developers and system administrators build, secure, and manage microservices-based applications using Red Hat OpenShift Service Mesh. Based on **Istio**, this course provides hands-on experience in deploying and managing service-to-service communication, implementing traffic control, securing microservices, and monitoring applications for high availability and resiliency in cloud-native environments.

2. What You'll Learn?

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

- Understand the concepts of **service mesh** and **Istio architecture**.

- Deploy and configure **Red Hat OpenShift Service Mesh**.

- Build and manage **resilient microservices** using Istio.

- Secure service-to-service communication with **mTLS and RBAC**.

- Implement **traffic management**, including routing, load balancing, and failover.

- Apply **observability tools** (Jaeger, Kiali, Prometheus) for monitoring and tracing.

- Troubleshoot microservices in a service mesh environment.

- Adopt best practices for cloud-native **microservices architecture**.

3. Target Audience

This course is ideal for:

- **Application developers** building microservices on OpenShift.

- **DevOps engineers** managing microservices deployments.

- **System administrators** integrating Istio with OpenShift clusters.

- **Cloud architects** designing resilient, distributed applications.

- **SRE teams** focusing on monitoring, resilience, and fault tolerance.

4. Pre-Requisites

Participants should have:

- Completed **Red Hat OpenShift Development I/II** or **OpenShift Administration I**.

- Experience with **Kubernetes/OpenShift basics**.

- Knowledge of **containerized applications** and microservices.

- Familiarity with **networking, security, and DevOps tools** is recommended.

5. Course Content

Module 1: Introduction to Service Mesh and Istio

- Overview of microservices challenges

- Introduction to Istio and service mesh concepts

- Benefits of OpenShift Service Mesh

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Module 2: Deploying Red Hat OpenShift Service Mesh

- Installing Istio-based Service Mesh on OpenShift
- Configuring namespaces, sidecars, and control plane

Module 3: Traffic Management in Service Mesh

- Routing, load balancing, and canary deployments
- Fault injection and circuit breaking
- Service discovery and failover

Module 4: Securing Microservices

- Mutual TLS (mTLS) between services
- Role-based access control (RBAC)
- Managing policies and authentication

Module 5: Observability and Monitoring

- Using **Kiali** for service visualization
- Distributed tracing with **Jaeger**
- Metrics collection with **Prometheus and Grafana**

Module 6: Building Resilient Microservices

- Designing fault-tolerant microservices
- Error handling and retry strategies
- Real-world deployment scenarios

Module 7: Troubleshooting and Best Practices

- Debugging Istio and Service Mesh issues
- Performance tuning and scaling
- Best practices for production environments