KOENIG
step forward

KOENIG SOLUTIONS · COURSE OUTLINE

Platform Engineering: Kubernetes, Helm & Istio

Learn to design, deploy and scale microservices on Kubernetes using Helm, observability tools, autoscaling, resilience patterns and service mesh security.

5 Days	10	26	12
DURATION	MODULES	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This is an intensive training program designed for advanced-level platform engineers and DevOps professionals. The “Advanced Platform Engineering” course focuses on the strategic application of microservices and Kubernetes to build and scale applications efficiently and reliably. This instructor-led, live training is a hands-on, immersive experience. By the end of this training, the participant will have a deep, practical understanding of designing, deploying, and managing complex, scalable systems in a modern cloud-native environment.

WHO THIS COURSE IS FOR

Audience:

Platform Engineers, DevOps Professionals, and Software Architects

PREREQUISITES

- A solid understanding of containerization and orchestration concepts.
- Practical experience with Docker and basic Kubernetes operations.
- Familiarity with cloud computing principles and microservices architecture.

LEARNING OBJECTIVES

By the end of this training, participants will be able to:

- Design and implement scalable microservices architectures
- Deploy and manage complex applications on production-grade Kubernetes clusters
- Utilize Helm charts for templating and managing service deployments efficiently
- Implement robust observability stacks to monitor and maintain the health of microservices in production
- Apply industry best practices for security and compliance within a Kubernetes environment
- Architect resilient systems that can handle failure gracefully

TRAINING APPROACH

How the Course Is Taught

> This instructor-led, live training is a hands-on, immersive experience.

COURSE SYLLABUS

10 Modules, 26 Topics

DAY 1 Foundations of Scalable Architectures

01

Advanced Concepts in Platform Engineering

TOPICS

- Review of Platform Engineering fundamentals
- The evolution of platform engineering in the context of scalability
- Design principles for a scalable and resilient platform architecture

02

Practical lab

Deep Dive into Microservices Architecture

TOPICS

- Core principles and patterns of microservices design
- Communication patterns (Synchronous vs. Asynchronous, REST, gRPC, Message Queues).
- Service discovery mechanisms and implementation

DAY 2 Containerization and Introduction to Kubernetes

03

Lab

Advanced Containerization with Docker

TOPICS

- Advanced containerization techniques and best practices
- Deep dive into container networking and storage considerations

04

Lab

The Kubernetes Ecosystem and Architecture

TOPICS

- In-depth exploration of Kubernetes components (Control Plane, Worker Nodes, etcd)
- Kubernetes networking (CNI), storage (CSI, Persistent Volumes), and security best practices

DAY 3 Deploying and Managing Applications on Kubernetes

05

Lab

Deploying Microservices on Kubernetes

TOPICS

- Understanding Kubernetes workload resources (Deployments, StatefulSets, DaemonSets)
- **Advanced deployment strategies:** Blue/Green, Canary, and Rolling updates

06

Lab

Managing Services with Helm

TOPICS

- Introduction to Helm charts for packaging and deployment
- Continuous deployment (CD) practices and integrating Helm into a CI/CD pipeline

DAY 4 Observability, Scaling, and Performance

07

Lab

Observability and Monitoring in Microservices

TOPICS

- **The three pillars of observability:** Logging, Metrics, and Tracing
- Implementing a monitoring stack (e.g., Prometheus, Grafana)
- Analyzing metrics and logs to maintain system health and troubleshoot issues

08

Lab

Scaling and Performance Tuning

TOPICS

- Horizontal (HPA) and Vertical (VPA) Pod Autoscaling
- Cluster auto-scaling strategies
- Performance tuning and resource optimization (requests, limits, quality of service)

DAY 5 Resilience, Security, and Final Project

09

Resilience and Reliability Engineering

TOPICS

- **Designing for failure:** Resilience patterns (Circuit Breakers, Retries, Timeouts)
- Implementing health checks, readiness probes, and liveness probes
- Disaster recovery and high-availability strategies for Kubernetes clusters

10

Security for Microservices and Kubernetes

TOPICS

- Securing microservice communications (mTLS)
- Kubernetes security features (RBAC, Pod Security Policies, Network Policies)
- Introduction to service meshes (e.g., Istio, Linkerd) for enhanced security and observability

Hands-On Capstone Project

5 Capstone Activities

HANDS-ON ACTIVITIES

Practise What You Learn

#	MODULE	ACTIVITY
02	**Deep Dive into Microservices Architecture**	**Practical lab:** Decomposing a monolithic application into microservices
03	**Advanced Containerization with Docker**	**Lab:** Building optimized, multi-stage Docker images for microservices
04	**The Kubernetes Ecosystem and Architecture**	**Lab:** Setting up and managing a Kubernetes cluster from scratch

#	MODULE	ACTIVITY
05	**Deploying Microservices on Kubernetes**	**Lab:** Implementing various deployment strategies for a sample microservice
06	**Managing Services with Helm**	**Lab:** Creating a Helm chart from scratch for a multi-service application
07	**Observability and Monitoring in Microservices**	**Lab:** Setting up logging, monitoring, and alerting for a microservices application
08	**Scaling and Performance Tuning**	**Lab:** Configuring auto-scaling for services based on CPU and memory load
11	**Hands-On Capstone Project**	**CAPSTONE ACTIVITY** ■ **Objective:** Design, deploy, and manage a scalable, secure, and observable microservices application on Kubernetes ■ Deploy a multi-service application using a CI/CD pipeline ■ Configure monitoring and alerting ■ Implement scaling and security policies ■ Demonstrate the application's resilience by simulating failures

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

Ready to Get Started?

Talk to a learning advisor about schedules, group training and customised delivery.

Visit koenig-solutions.com | info@koenig-solutions.com