



## Kubernetes – Fundamentals

### Description

#### **Master Kubernetes for a Scalable and Resilient Infrastructure**

The Kubernetes training is ideal for those looking to explore the potential of microservices and enhance the scalability of their applications. This course provides essential knowledge in containerization techniques, cluster management, and the adoption of large-scale cloud-native infrastructure. By taking this Kubernetes course, you'll learn the fundamentals needed to install, configure, and deploy Kubernetes, an open-source platform that has become essential for optimizing and automating application deployment.

#### **An Up-to-Date Training for Advanced Expertise**

This program is designed to provide practical and precise knowledge of modern containerization technologies. With the latest tools and versions, including Kubernetes, you'll learn how to orchestrate and monitor containers, manage high availability, and optimize your applications using Kubernetes. With hands-on case studies and practical exercises, you'll be ready to enhance the resilience and scalability of your IT systems. Join this Kubernetes training to accelerate your career and master the essential concepts of container-based architectures.

### Course Content

#### **Module 1: Introduction to Microservices**

- Monolithic vs. microservices applications
- Cloud best practices: the "12 factors" methodology
- Transitioning an application to microservices

#### **Module 2: Container Basics**

- Overview of containers: Docker and containerd
- Installing and running Docker images
- Interacting with containers
- Creating custom images
- Differences between private and public repositories

#### **Module 3: Kubernetes Basics**

- Creating a cluster: on your workstation, in your data center, or in the cloud
- Kubernetes architecture and components (Control Plane and Node)
- kubectl request lifecycle
- Deploying an application on multiple machines
- Exploring an application
- Exposing an application on the network
- Scaling up

#### **Module 4: Key Kubernetes Concepts**

- Overview of Pods
- Interacting with Pods
- Application configuration and security (ConfigMaps and Secrets)
- Service overview (ClusterIP, NodePort, LoadBalancer, Headless)
- Creating custom services to expose applications
- Organizing Pods with Labels

#### **Module 5: Deploying Microservices**

- Cloud-native deployment strategies
- High-performance computing strategies (Jobs)
- Hands-on: deployments with kubectl and yaml
- Scaling strategies (Replicasets and Daemonsets)
- Hands-on: using replicas
- Hands-on: installing a distributed logging manager
- Software update strategy (Deployments)
- Hands-on: Rolling update
- Simplifying application updates
- Advanced techniques: blue/green and canary deployments
- Hands-on: Continuous deployment with GitOps and ArgoCD

#### **Module 6: Managing Data Persistence**

- Volatile and persistent storage (PersistentVolume / PersistentVolumeClaim)
- Deploying distributed databases (StatefulSet)
- Hands-on: installing MongoDB and/or PostgreSQL in distributed mode

#### **Module 7: Observability in Kubernetes**

- Introduction to observability with OpenTelemetry
- Types of observability data
- Cluster and infrastructure components
- Monitoring
- Logs
- Metrics
- API traces
- Cloud-native observability strategy
- Deploying a solution to collect logs: FluentD
- Deploying a solution to collect metrics: Prometheus
- Deploying a solution to correlate traces: OpenTelemetryOperator
- Unified visualization tool: Grafana

#### **Documentation**

- Digital courseware included

### **Participant profiles**

- Developers looking to master Kubernetes
- System and network administrators
- DevOps professionals
- Cloud architects

### **Prerequisites**

- Basic knowledge of containers, preferably Docker
- Familiarity with Linux systems
- Understanding of virtualization and cloud computing
- Basic system administration skills

### **Objectives**

- Master Kubernetes installation
- Deploy "cloud-native" applications at scale
- Manage application auto-scaling
- Ensure high service availability
- Optimize storage with persistent volumes
- Monitor infrastructure and applications
- Automate software updates

### **Description**

Kubernetes Training

### **Niveau**

Fondamental

### **Classroom Registration Price (CHF)**

2300

### **Virtual Classroom Registration Price (CHF)**

2150

### **Duration (in Days)**

3

### **Reference**

KUB-01