

Kubernetes Basic to Advanced & Kubernetes Operations

Course 35652 – 40 Hours

Overview

Microservices are the emerging basis for the new application platform. It is the architecture that will serve as the basis for many applications over the next 10 years. There's a good reason for this: the advantages associated with microservices, such as their allowance for agile development and artifacts and an architecture that enables businesses to develop and roll out new digital offerings faster, make it the obvious choice.

Containers are the most common way of developing and delivering applications and IT infrastructure for microservices applications.

Now comes the question how will we run our containers' workload in production ?

Kubernetes is arguably the most important container management technology in the world. This Seminar will take you from the basics of K8S objects to the depths of utilizing K8S as your multi-tier microservices application backbone, from theory to best practices, planning a microservices architecture, migrating from Monolith to microservices design, utilizing API Gateways, such as Ambassador and ingress controllers, along with deploying and packaging with Helm and ARGOCD along RBAC, Operators , ECK (Elastic Cloud K8S), ISTIO and Calico CNI

We're updating our Deep Dive K8S course constantly, in order to keep providing the most relevant and updated information based on new releases from K8S and main cloud vendor providers.

On Completion, Delegates will be able to

- Setup Kubernetes on a High Scale
- Develop & create Service in Containers Orchestration Framework
- Design microservices architecture with K8S
- Utilize API Gateway with istio
- Understand and utilize calico CNI
- Work with Ingress controllers for L7 traffic management
- HELM packaging and deployment using ARGOCD

Who Should Attend

- Developers & architectes
- Production Operation teams (devops)
- SRE
- IT Operators

Prerequisites

- Microservices Basic Seminar

- Docker basic to advanced Seminar

Course Contents

Basics (24 hours)

Introducing K8S

- Kubernetes Foundations
- K8S Architecture and design
- K8S Objects
- K8S Volumes
- K8S StateLess and Stateful applications
- Daemonsets
- microservices Design and best practices in the world of K8S
- DevOps / Developer7 who is responsible for what?

Core Concepts of Kubernetes

- Cluster Orchestration
- Benefits
- Design Principles

Navigating Kubernetes Architecture

- Deployment design + best practices + HA
- Automation for CI/CD - Overview
- Monitoring in the world of microservices and K8S - Overview
- Master/Node
- Kubectl
- Replication Controller
- Kubelet
- Kube-Proxy
- Persistent Volumes
- Etcd
- High Availability
- Auto Scaling
- Base on metrics

Using Kubernetes Features

- Adv. using Pods
- Adv. using Labels
- Adv. using Services
- Adv. using Namespaces
- Adv. using Resource Quota

Networking and advance Kubernetes

- Docker Networking
- Kubernetes Networking
- Pod to Pod
- Exposing Services
- IP Per Pod
- Inter Pod Communication
- Intra Pod Communication

Ingress Controllers

- Traefik

Continuously Developing into K8S

- Using K8S Kind (K8s Cluster per Developer)
- Using scaffold to delivery code from IDE directly to K8S Kind with zero touch

Intro Managing secrets with K8S

- VAULT
- CONSUL

Workshop - Building Custom deployments and Ingress by the developers

Advance for operation (16 hours)

- **Intro** - managing k8s with Rancher
- CI/CD Into K8S Using Argo and containers Pipelines
- The 12 Factor application design patterns K8S
- Discovery and Dynamic variables using Consul
- Secrets management using Vault

Security

- Pods Policy
- Pods Security

ECK For log aggregation ,

Dashboarding and monitoring

POD Scheduling

- Affinities / Anti-affinities
- Node selectors
- Taints & tolerations

Accessing Services

- K8S Services & Services types
 - Keycloak
 - Auth and Authz
 - Load Balancing and Traffic shaping
 - Ingress & Ingress controllers (IC)
 - NetworkPolicy
 - CNI Deep dive architecture and configuration
 - TOP 3 + AWS CNI
- Service discovery in Kubernetes

HPA

- Resource Management
 - Setting resources requests and limits
 - Resource quotas
 - NIC Accelerators / CPU management AND Quota
 - Monitoring with Prometheus

K8s basic to advanced

Service mesh

- What is a service mesh

- ISTIO deep dive
 - API Gateway
 - Service Mesh
 - Security
- NGINX deep dive

Deployment & Upgrades using ISTIO

- Canary
- Rolling updates and revisions
- A/B Testing, BlueGreen & Canary deployments

HELM

- Overview
- Best practices

K8S Operations

- Centralized logging and monitoring using ECK
 - ELASTIC CLOUD K8S Operators
 - Monitoring with Prometheus Exporters + Alertmanager and Grafana
 - Build a centralized full fledged monitoring solution for your K8S infrastructure.
- Authentication - Review
 - Basic auth in K8S
 - Auth using a proxy
 - OpenID Auth
- Authorization - Review
 - Intro
 - RBAC
- K8S Operators - Review
- Job Resources and management -
- Scheduling - Review
 - Scheduling with CronJobs
- Container Bare Metal for 2nd Generation Intel - BMRA

