

Advanced Kubernetes Training: Administration in Production

3 days (21 hours)

PRESENTATION

[Kubernetes](#) (commonly called "K8s") is now THE standard in terms of container orchestration. This tool will allow you to enter the "Native Cloud" era and expose your applications on a large scale in a secure, reproducible and flexible way. In this course you will learn how to monitor, administer, manage users and deploy this infrastructure in production.

You will learn how to make your applications evolve towards the micro-service, modular and scalable standard. Approved by the giants of Silicon Valley, K8s is managed by a responsible governance linked to the Cloud Native Computing Foundation (itself part of the Linux Foundation). Kubernetes provides a "platform to automate the deployment, scaling and production of application containers on server clusters". It supports multiple container execution engines including Docker and Rocket. This training is aimed at experts wishing to implement and master Kubernetes production clusters, as well as anyone wishing to understand how Kubernetes is architected, installed and maintained. The deployment of applications on Kubernetes is discussed superficially, and this training is rather aimed at people wishing to set up safe, high-performance and highly available Kubernetes clusters than at engineers having to deploy applications.

During our training sessions, you will discover how to do it with the help of an expert :

- Automated installation and rebuilding of multi-node Kubernetes clusters for development and production
- Semi-automated and hot upgrade of Kubernetes clusters
- Advanced storage management techniques, description of storage classes and dynamic volume provisioning
- Management of users and associated rights (RBAC)
- Presentation of the different network plugins and associated functionalities (Automated installation of Weave and Canal)
- Delegation to users (DevOps and developers) of network filtering functionalities (NetworkPolicies)
- Secure container development techniques running with restricted rights, or compatible with automated rights restriction on production clusters (PodSecurityPolicies)

This training will introduce you to the latest version of [Kubernetes](#)

OBJECTIVES

- Understanding how to use Kubernetes
- Discover the internal architecture of Kubernetes
- Understanding the main advanced components of Kubernetes
- Know how to install Kubernetes in production.
- Setting up authentication and user management
- Mastering the workings of Kubernetes virtual networks
- Optimize the monitoring of the Kubernetes cluster
- Extend and customize Kubernetes' gears

PUBLIC TARGETED

Developers, Architects, System Administrators, DevOps

REQUIREMENTS

- Having followed our [Formation Kubernetes](#)
- Basic knowledge of a Unix system and container operation

To go further?

- Master the deployment of containers with [Docker & Ansible](#)
- Get trained on the most powerful container orchestrator with [Kubernetes](#)
- Control your Cloud Computing deployment with [OpenStack](#)

PROGRAM OF OUR ADVANCED KUBERNETES TRAINING

GLIMPSE OF KUBERNETES

- Container Orchestration and the Kubernetes API
- Basic Objects: Pods, ReplicaSets and Services
- Organization of your cluster with namespaces, labels and annotations
- Advanced Concepts: Deployments, ingress and StatefulSets
- Batch Engine: Job and ScheduledJob
- Cluster agents and utilities: DaemonSets

KUBERNETES ARCHITECTURE

- Concepts
- Declarative configuration
- Implicit or dynamic grouping
- Unix philosophy of many components
- PLC-driven interactions
- Components of the Main Node and Work Nodes
- Management and internal functioning of the API server
- Description of the scheduler Kubernetes, predicates and priorities
- Scheduling Control with Labels and Affinity
- NodeSelector, NodeAffinity, Taints and Tolerations

PRODUCTION FACILITY

- kubeadm configuration
- Installing the Control Plane
- Installation of work nodes
- The phases
- High availability
- Upgrade automation

USER ADMINISTRATION

- Setting up the Kubeconfig file
- ServiceAccount Management
- Authorizations
- RBAC: Role and ClusterRole, RoleBinding and ClusterRoleBinding
- Intake control
- PodSecurityPolicies, ResourceQuota and LimitRange
- Intake controller management

NETWORK

- Choosing a network plug-in
- Kube-proxy: advanced operation of virtual networks
- Service discovery
- Service mesh

MONITORING

- Monitoring objectives, differences between logging and monitoring
- Building a monitoring software stack
- Get data from your cluster and applications
- Aggregation of metrics and logs from multiple sources
- Data storage for retrieval and querying
- View and interact with your data

EXPAND KUBERNETES

- Presentation of Kubernetes extension methods
- Daemons Cluster
- Cluster Assistants
- API server lifecycle extension

INTRODUCTION TO ISTIO & LINKERD (+1 DAY - ONLY ON REQUEST AS A TEAM)

- Mesh Service
- ISTIO
- LINKERD2 (Conduit)

ADDITIONAL CLOUD MODULE

Google GCP with GKE (2 jours)

AMAZON EKS (2 jours)

Companies concerned

This training is intended for companies, small or large, wishing to train their teams in a new advanced computer technology.

Teaching methods

Practical training: 60% Practical, 40% Theory. Training support distributed in digital format to each participants.

Organization

The course alternates the trainer's theoretical input supported by examples and brainstorming sessions, and group work.

Validation

At the end of the session, a multiple-choice questionnaire is used to check the correct acquisition of skills.

Sanction

A certificate will be given to each trainee who has completed the entire training.