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## Kubernetes

	Level	Duration
	Introduction/Advanced	3 days

## Course Description

### Audience and prerequisites

- This course is for DevOps developers who intend or are currently working with K8S

### Main Goals

- The main objective of this course is to get familiar with Kubernetes in a depth level
- Learn Containers and Kubernetes Fundamentals its architecture of (Control plane, components, worker nodes and more)
- Practice K8S Cluster Operations.
- HandsOn: deploying multiple resources & applications into Kubernetes.
- Become familiar with K8S YAML files & Kubernetes objects
- Understand Kubernetes core concepts & Objects.
- Use kubectl, the Kubernetes CLI, and become familiar with its commands and options
- Learn how to troubleshoot Kubernetes

# Content

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Session	Content
Introduction	
	◆ What is K8s?
	◆ Kubernetes Overview
	◆ Introduction to Container Orchestration
	◆ Kubernetes Architecture
	◆ Kubernetes Core Concepts
Getting Started with Kubernetes	
	◆ Labels & Selectors
	◆ Kubernetes Clusters (tools for our HandsOn Labs)
	◆ minikube
	◆ limactl
	◆ Rancher
	◆ k3d / microk8s / kind
Kubernetes CLI	
	◆ kubectl
	◆ Commands
	◆ JSONPath
Common Kubernetes Objects	
	◆ Config files
	◆ DaemonSet
	◆ Deployments
	◆ Jobs
	◆ Pods
	◆ ReplicaSets (+ Rolling update)
	◆ StatefulSets
	◆ Services
	◆ CRD
Scaling Kubernetes / Auto-Scaling	
Manage Cluster content	
	◆ Deploy multiple revisions

	◆ Replica (sets, controller, etc)
	◆ Update / Upgrade existing container
	◆ Rollout
	◆ init Containers
<b>Health Checking</b>	
	◆ Liveness
	◆ Readiness
	◆ Resources
<b>Kubernetes Networking</b>	
	◆ Services
	◆ Ingress / Egress
	◆ Network Policy
	◆ ClusterIP, NodePort, and LoadBalancer
	◆ Networking within a pod
	◆ Pod-to-Pod Networking
	◆ Ingress controllers
	◆ DNS & Service Discovery
<b>Stateful Applications in Kubernetes</b>	
	◆ Stateless versus Stateful
	◆ Volumes
	◆ Persistent volumes claims
	◆ StorageClasses
	◆ StatefulSets
<b>Configuration</b>	
	◆ etcd
	◆ Secrets
	◆ ConfigMap
	◆ Dynamic configuration
	◆ Jobs, CronJobs
<b>Security</b>	
	◆ RBAC
	◆ SecurityContext

<b>Auditing</b>	
	◆ logs
	◆ events
	◆ debugging
<b>High Availability</b>	
	◆ Custom HPA
	◆ Keda
	◆ Backup cluster
<b>Kubernetes API</b>	
	◆ Admission Controls
	◆ hooks
	◆ api/metrics
<b>Additional Content</b>	
	◆ Kustomization
	◆ CRD
	◆ HELM
	◆ What is Helm
	◆ Working with Helm
	◆ Build Helm package
	◆ Tools: (Most of this section is hands on)
	◆ Service Mesh
	◆ Istio / Linkerd
	◆ Keda
	◆ Lens
	◆ Prometheus
	◆ Grafana
	◆ ArgoCD

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