

Docker & Kubernetes Administration

Introduction to Docker

Theory

Docker overview

Images, containers, volumes, networks

Installing Docker

Running a container

Building an image

Using docker

Best practices

Image management, Docker Hub and Docker Registry

Docker volumes

Docker networks

Container orchestration

Introduction to Docker swarm

Install and configure docker swarm

Container orchestration

Introduction to container orchestration

Introduction to Kubernetes

Kubernetes installation and configuration

Kubernetes concepts

Pods, volumes, labels, annotations

Deployments, services

Using Kubernetes

Application Lifecycle Management

Understand deployments and how to perform rolling update and rollbacks

Know various ways to configure applications

Know how to scale applications

Understand the primitives necessary to create a self-healing application

Installation, Configuration & Validation

Design a Kubernetes Cluster

Install Kubernetes Masters and Nodes

Configure secure cluster communications

Configure a highly-available Kubernetes cluster

Know where to get the Kubernetes release binaries

Provision underlying infrastructure to deploy a Kubernetes cluster

Choose a network solution

Choose your Kubernetes infrastructure configuration

Run end-to-end tests on your cluster

Analyze end-to-end test results

Run Node end-to-end Tests

Install and use kubeadm to install, configure, and manage Kubernetes clusters

Core Concepts

Understand the Kubernetes API primitives

Understand the Kubernetes cluster architecture

Understand Services and other network primitives

Networking

Understand the networking configuration on the cluster nodes

Understand Pod networking concepts

Understand Service Networking

Deploy and configure network load balancer

Know how to use Ingress rules

Know how to configure and use the cluster DNS

Understand CNI

Scheduling

Use label selectors to schedule Pods

Understand the role of DaemonSets

Understand how resource limits can affect Pod scheduling

Understand how to run multiple schedulers and how to configure Pods to use them

Manually schedule a pod without a scheduler

Display scheduler events

Security

- Know how to configure authentication and authorization
- Understand Kubernetes security primitives
- Know how to configure network policies
- Create and manage TLS certificates for cluster components
- Work with images securely
- Define security contexts
- Secure persistent key value store

Cluster Maintenance

- Understand Kubernetes cluster upgrade process
- Facilitate operating system upgrades
- Implement backup and restore methodologies
- Logging / Monitoring
- Understand how to monitor all cluster components
- Understand how to monitor applications
- Manage cluster component logs
- Manage application logs

Storage

- Understand persistent volumes and know how to create them
- Understand access modes for volumes
- Understand persistent volume claims primitive
- Understand Kubernetes storage objects
- Know how to configure applications with persistent storage

Troubleshooting

- Troubleshoot application failure
- Troubleshoot control plane failure
- Troubleshoot worker node failure
- Troubleshoot networking