Docker Administration and Certified Kubernetes Administrator

This document provides the curriculum outline of the Knowledge, Skills and Abilities that a Certified Kubernetes Administrator (CKA) can be expected to demonstrate.

Duration: 7 Days

Hands-On Format: This hands-on class is approximately 80/20 lab to lecture ratio, combining engaging lecture, demos, group activities and discussions with comprehensive machine-based practical programming labs and project work.

Lab: Koenig DC

Module 1 - Docker Administration

Introduction to Containers
Introduction to Docker
Downloading and Installing Docker
Docker Essential Commands
Docker Engine
Understanding Docker Images
Building Docker Images
Storing and Retrieving Docker Images from Docker Hub
Private Registry
Building Containers from Images
Understand Storage Methods
Networking Docker Containers
Data Persistence with Volumes
Linux Capabilities

Module 2 – Core Concepts

Overview of Container Orchestration
Introduction to Kubernetes
Kubernetes Architecture

Module 3 – Installation, Configuration & Validation

Design a Kubernetes Cluster
Installation of Kubernetes Master and Nodes
Choose a Network Solution
Verify Installation

Module 4 – Managing Resources

Managing Pods
Managing Labels & Selector
Managing Replication Controller & Replica Set
Managing Service
Managing DaemonSets

Module 5 – Scheduling

Manual Scheduling
Taint and Tolerations

Module 6 – Application Lifecycle Management

Overview of Deployment
Deployment Strategies
Managing Deployment

Module 7 – Environment Variable

Plain Key
Config Map
Secret
Mount Variable as Volume

Module 8 – Storage

Volumes
Persistent Volumes
Persistent Volume Claim

Module 9 – Security

Kubernetes Authentication
Managing Users in Kubernetes
Service Account
Managing Roles and Role Binding
Managing Cluster Role and Cluster Role Binding
Security Context

Module 10 – Cluster Maintenance

OS Upgrade
Upgrade Cluster Version
Static Pod
ETCD Backup
Cron Job

Module 11 – Logging and Monitoring

Understand how to Monitor all Cluster Components
Understand how to Monitor Applications
Manage Cluster Components Logs
Manage Application Logs
Prometheus Tool

Module 12 – Networking in Kubernetes

Kubernetes Networking
Understand CNI
Understand Pod Networking Concepts
Configure DNS
Configure and Manage Ingress Rule
Namespace
Metal Load Balancer

Module 13 – Troubleshooting

Troubleshoot ETCD Failure
Troubleshoot Kubelet Failure
Troubleshoot Container Runtime Failure
Troubleshoot Scheduler Failure