Certified Kubernetes Administrator

Duration: 5 days (8hrs/day)

Prerequisites:

- Basic knowledge of Linux Server Administration.
- Basic knowledge of Containers

Course Objective: This comprehensive Kubernetes course, covering container orchestration, cluster design, installation, resource and application management, security, networking, maintenance, logging, and monitoring, as well as troubleshooting, is designed to equip learners with the skills needed to successfully clear the Certified Kubernetes Administrator exam.

Kubernetes Version: Latest

Lab Requirement: Koenig-DC

Module 1 – Core Concepts

Overview of Container Orchestration

Introduction to Kubernetes

Understanding Kubernetes Architecture

Module 2 – Installation, Configuration & Validation

Design a Kubernetes Cluster

Lab: Installation of Kubernetes 1-Master and 2-Nodes Cluster

Lab: Choose a Network Solution and Configure

Lab: Verify Installation with Kubectl command

Module 3 – Creating Kubernetes Resources

Understanding Pods, Labels & Selectors

Lab: Deploying Applications as a Pod

Lab: Managing Labels & Selector

Understanding Replication Controller & Replica Set

Lab: Deploying Replication Controller & Replica Set

Understanding Services – ClusterIP, NodePort & LoadBalancer

Lab: Creating & Managing Service

Understanding Daemon Sets

Lab: Deploying Applications as Daemon Sets

Module 4 - Scheduling

Manual Scheduling of Pods

Taint and Tolerations

Lab: Using Manual Scheduling or Taints and Tolerations

Module 5 - Application Lifecycle Management

Overview of Deployment

Deployment Strategies – Blue/Green & Canary

Lab: Deploying Applications as Deployment

Lab: Implementing Deployment Strategies on Deployments

Module 6 - Environment Variable

Plain Key

Config Map

Secret

Lab: Using Plain Keys, Config Map & Generic Secret as Environment Variables

Lab: Mount Environment Variable as Volumes

Module 7 – Storage

Understanding Volume Management in K8s

Types of Volumes Provisioning

Persistent Volumes

Persistent Volume Claim

Lab: Using PV & PVC to attach Persistent Volume to a Pod as HostPath

Understanding Storage Class

Module 8 – Security

Understanding Kubernetes Authentication

Lab: Creating and Managing Users in Kubernetes

Lab: Creating Service Accounts

Understanding Role, ClusterRole, RoleBinding& ClusterRoleBinding

Lab: Managing Roles and Role Binding

Lab: Managing Cluster Role and Cluster Role Binding

Understanding Security Context

Lab: Adding Security Context to Pod to enable ping

Module 9 – Cluster Maintenance

Understanding OS Upgrade

Lab: Upgrade a Kubernetes Cluster Version

Static Pod

Lab: Deploying Pods as Static Pod

Lab: ETCD Backup

Cron Job

Lab: Deploying Pod as Cron Job

Module 10 – Logging and Monitoring

Understand how to Monitor Application and Cluster Components

Lab: Understand how to Read Application & Cluster Component Logs

Lab: Deploying Prometheus & Grafana to Monitor K8s Cluster

Module 11 – Networking in Kubernetes

Understand Basics of Kubernetes Networking

Understand CNI overview

Understand Pod Networking Concepts

CoreDNS overview of K8s

Understanding Ingress

Lab: Configure and Manage Ingress Rule

Understanding Namespace & Use-Cases

Lab: Creating Namespace & Deploying K8s resources in Different Namespaces

Metal Load Balancer

Lab: Deploying Metal Load Balancer

Module 12 – Troubleshooting

Ways to Troubleshoot ETCD Failure

Ways to Troubleshoot Kubelet Failure

Ways to Troubleshoot Container Runtime Failure

Ways to Troubleshoot Scheduler Failure