Certified Kubernetes Administrator (CKA)

Course Duration: 40 Hours (5 Days)

Overview

The Certified Kubernetes Administrator (CKA) course is a comprehensive program designed to provide learners with a deep understanding and hands-on experience in managing Kubernetes, the leading container orchestration platform. Container Orchestration is a pivotal skill in the modern cloud-native landscape, and this course starts with the basics before delving into Kubernetes' architecture and components. Participants will learn to design, install, and configure a Kubernetes cluster, ensuring that they can handle real-world Kubernetes environments. The course covers key aspects such as Resource management, Pod scheduling, Application lifecycle management, and understanding Environment variables, which are crucial for deploying scalable and highly available applications. With a focus on practical skills, the CKA course emphasizes Storage options, Security best practices, Cluster maintenance, and Logging and monitoring strategies, ensuring that administrators can efficiently manage cluster health and troubleshoot issues. Networking is another critical topic covered, where learners will understand Kubernetes networking concepts and configure Network policies. The training culminates with advanced topics like building High availability clusters and troubleshooting complex cluster issues, preparing participants for the challenges of running Kubernetes in production. By completing the CKA course, learners will acquire the skills necessary to become proficient Kubernetes administrators, aligning with industry best practices and enhancing their job prospects in the cloud technology domain.

Audience Profile

The Certified Kubernetes Administrator (CKA) course caters to professionals seeking expertise in Kubernetes deployment, management, and scaling.

- DevOps Engineers
- Systems Administrators
- Cloud Engineers
- Site Reliability Engineers (SRE)
- Technical Leads
- Infrastructure Architects
- Software Developers with an interest in deployment and network operations
- IT Project Managers involved in software development lifecycle management
- Security Professionals responsible for containerized application security
- Application Developers looking to understand the deployment environment
- Technical Support Professionals specializing in container technologies
- IT Professionals aiming to specialize in orchestration and cloud-native deployments

Course Syllabus

Module 1: – Core Concepts

- Overview of Container Orchestra9on
- Introduc9on to Kubernetes
- Understanding Kubernetes Architecture

Module 2: Installation, Configuration & Validation

- Design a Kubernetes Cluster

Labs

- Installation of Kubernetes 1-Master and 2-Nodes Cluster
- Choose a Network Solution and Configure
- Verify Installa9on with Kubectl command

Module 3: Creating Kubernetes Resources

- Understanding Pods, Labels & Selectors
- Understanding Replication Controller & Replica Set
- Understanding Services – ClusterIP, NodePort & LoadBalancer
- Understanding Daemon Sets

Labs

- Deploying Applications as a Pod
- Managing Labels & Selector
- Deploying Replication Controller & Replica Set
- Creating & Managing Service

Module 4: Scheduling

- Manual Scheduling of Pods
- Taint and Tolerations

Labs

- Using Manual Scheduling or Taints and Tolerations

Module 5: Application Lifecycle Management

- Overview of Deployment

- Deployment Strategies – Blue/Green & Canary

Labs

- Deploying Applications as Deployment
- Implementing Deployment Strategies on Deployments

Module 6: - **Environment Variable**

- Plain Key
- Config Map
- Secret

Labs

- Using Plain Keys, Config Map & Generic Secret as Environment Variables
- Mount Environment Variable as Volumes

Module 7: - **Storage**

- Understanding Volume Management in K8s
- Types of Volumes Provisioning
- Persistent Volumes
- Persistent Volume Claim

Labs

- Using PV & PVC to aWach Persistent Volume to a Pod as HostPath
- Understanding Storage Class

Module 8: - **Security**

- Understanding Kubernetes Authentication
- Understanding Role, ClusterRole, RoleBinding & ClusterRoleBinding
- Understanding Security Context

Labs

- Creating and Managing Users in Kubernetes
- Creating Service Accounts
- Managing Roles and Role Binding
- Managing Cluster Role and Cluster Role Binding
- Adding Security Context to Pod to enable ping

Module 9: - **Cluster Maintenance**

- Understanding OS Upgrade
- Static Pod
- Cron Job

Labs

- Upgrade a Kubernetes Cluster Version
- Deploying Pods as Sta1c Pod
- ETCD Backup
- Deploying Pod as Cron Job

Module 10: - **Logging and Monitoring**

- Understand how to Monitor Applica1on and Cluster Components

Labs

- Understand how to Read Application & Cluster Component Logs
- 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
- Understanding Namespace & Use-Cases
- Metal Load Balancer

Labs

- Configure and Manage Ingress Rule
- Crea1ng Namespace & Deploying K8s resources in Different Namespaces
- Deploying Metal Load Balancer

Module 12: - **Troubleshooting**

- Ways to Troubleshoot ETCD Failure
- Ways to Troubleshoot Kubelet Failure
- Ways to Troubleshoot Container Run1me Failure

- Ways to Troubleshoot Scheduler Failure