Certified Kubernetes Administrator (CKA) Prep Course

- 5 Day Course
- Lecture and Hands-on Labs

Course Overview

This class prepares students for the Certified Kubernetes Administrator (CKA) exam. Kubernetes is a Cloud Orchestration Platform providing reliability, replication, and stability while maximizing resource utilization for applications and services. By the conclusion of this hands-on, vendor agnostic training you will go back to work with the knowledge, skills, and abilities to design, implement, and maintain a production-grade Kubernetes cluster. We prioritize covering all objectives and concepts necessary for passing the Certified Kubernetes Administrator (CKA) exam. You will be provided the components necessary to assemble your own high availability Kubernetes environment and configure, nexpand, and control it to meet the demands made of cluster administrators. Your week of intensive, hands-on training will conclude with a mock CKA exam that simulates the real exam.

Review this course online at https://www.alta3.com/courses/cka

Who Should Attend

- Professionals who need to maintain or set up a Kubernetes cluster
- Container Orchestration Engineers
- DevOps Professionals

What You'll Learn

- Cluster architecture, installation, and configuration
- Rolling out and rolling back applications in production
- Scaling clusters and applications to best use
- How to create robust, self healing deployments
- Networking configuration on cluster nodes, services, and CoreDNS
- Persistent and intelligent storage for applications
- Troubleshooting cluster, application, and user errors
- Vendor-agnostic cloud provider-based Kubernetes
- AI LLM prompt engineering for generating configuration snippets and solutions

Outline

Becoming a Certified Kubernetes Administrator

- 💬 Lecture: The CKA Exam
- 💬 Lecture: Using Kubernetes Documentation Effectively on the CKA Exam

Introduction to Cluster Architecture

- 💬 Lecture: Kubernetes Architecture
- 💬 Lecture: Pods and the Control Plane

Cluster Building with Kubeadm

- 💬 Lecture: Kubeadm Prerequisites
- 💻 Lecture + Lab: Kubeadm Prerequisites
- 💬 Lecture: Configure Network Plugin Requirements
- 💻 Lecture + Lab: Configure Network Plugin Requirements
- 💻 Lecture + Lab: CKA TASK: Preparing Node for K8s Installation
- 💬 Lecture: Kubeadm Basic Cluster
- 💻 Lecture + Lab: Installing Kubeadm
- 💬 Lecture: Join Node to Cluster
- 💻 Lecture + Lab: Join Node to Cluster

Cluster Administration

- 💬 Lecture: ETCD Snapshot and Restore
- 💻 Lecture + Lab: ETCD Snapshot and Restore
- 💬 Lecture: Kubeadm Cluster Upgrade
- 💻 Lecture + Lab: Kubeadm Cluster upgrade
- 💬 Lecture: Troubleshooting Broken Clusters

Part 2: Cluster Setup

- 🔴 STOP HERE: Mandatory Cluster Re-Build

Containers

- 💬 Lecture: Container Essentials
- 💻 Lecture + Lab: Creating a Docker Image

Pod Basics

- 💬 Lecture: YAML
- 💬 Lecture: Manifests
- 💻 Lecture + Lab: Basic Pods
- 💬 Lecture: Namespaces
- 💻 Lecture + Lab: Namespaces
- 💬 Lecture: API Versioning and Deprecations

Kubectl

- 💬 Lecture: Kubectl get and sorting
- 💻 Lecture + Lab: kubectl get

Resource Management

- 💻 Lecture + Lab: Kubectl Top and Application Monitoring
- 💬 Lecture: Limits, Requests, and Namespace ResourceQuotas
- 💻 Lecture + Lab: Resource Requests and Limits
- 💻 Lecture + Lab: Pod Quality of Service (QoS)
- 💻 Lecture + Lab: Namespace Resource Quota
- 💬 Lecture: Admission Controller
- 💻 Lecture + Lab: Create a LimitRange AdmissionController

User Administration

- 💬 Lecture: Contexts
- 💻 Lecture + Lab: Contexts
- 💬 Lecture: Role Based Access Control
- 💻 Lecture + Lab: Role Based Access Control
- 💻 Lecture + Lab: RBAC Distributing Access

Advanced Pod Design

- 💬 Lecture: Readiness and Liveness Probes
- 💻 Lecture + Lab: Implement Probes and Health Checks
- 💬 Lecture: ConfigMaps and Volume Mounting
- 💻 Lecture + Lab: Persistent Configuration with ConfigMaps
- 💬 Lecture: Secrets
- 💻 Lecture + Lab: Create and Consume Secrets
- 💬 Lecture: Multi-Container Pods
- 💻 Lecture + Lab: Creating Ephemeral Storage For Fluentd Logging Sidecar
- 💬 Lecture: Init Containers
- 💻 Lecture + Lab: Understand the Init Container Multi-Container Pod Design Pattern
- 💬 Lecture: Taints, Tolerations, and Pod Affinity
- 💻 Lecture + Lab: Tainted Nodes and Tolerations

Logging

- 💬 Lecture: Logging with kubectl log
- 💻 Lecture + Lab: Utilize Container Logs
- 💬 Lecture: Advanced Logging Techniques

Labels

- 💬 Lecture: Labels
- 💻 Lecture + Lab: Labels and Selectors
- 💬 Lecture: Annotations
- 💻 Lecture + Lab: Insert an Annotation

Replica and Daemon Sets

- 💬 Lecture: ReplicaSets
- 💻 Lecture + Lab: Create and Configure a ReplicaSet
- 💬 Lecture: DaemonSets

Deployments

- 💬 Lecture: Deployments - Purpose and Advantages
- 💻 Lecture + Lab: Writing a Deployment Manifest
- 💬 Lecture: Deployments - Version Control
- 💻 Lecture + Lab: Performing Rolling Updates and Rollbacks with Deployments
- 💬 Lecture: Blue/Green and Canary Deployment Strategies
- 💻 Lecture + Lab: Advanced Deployment Strategies
- 💬 Lecture: Deployments - Horizontal Scaling
- 💻 Lecture + Lab: Horizontal Pod Autoscaling
- 💻 Lecture + Lab: PriorityClasses
- 💻 Lecture + Lab: StatefulSets

Persistent Storage

- 💬 Lecture: Persistent Volumes, Claims, and StorageClasses
- 💻 Lecture + Lab: PersistentVolumes and PersistentVolumeClaims
- 💬 Lecture: PVC, PV, and StorageClass config
- 💻 Lecture + Lab: Persistent Storage with NFS
- 💻 Lecture + Lab: CKA TASK: Default StorageClass

Extending Kubernetes

- 💬 Lecture: Custom Resource Definitions
- 💻 Lecture + Lab: Introduction to CRDs
- 💻 Lecture + Lab: CKA TASK: CRD Ownership

Helm and Kustomize

- 💬 Lecture: Helm
- 💻 Lecture + Lab: Making Charts and Templates with Helm
- 💻 Lecture + Lab: Deploy Existing Packages via Helm
- 💻 Lecture + Lab: CKA TASK: Installing Helm Template
- 💻 Lecture + Lab: Using Kustomize

Services & Networking

- 💬 Lecture: NetworkPolicy
- 💻 Lecture + Lab: Deploy a NetworkPolicy
- 💻 Lecture + Lab: Namespace Network Policy
- 💬 Lecture: Services - LoadBalancer, NodePort, and ClusterIP
- 💻 Lecture + Lab: Access to applications via services
- 💻 Lecture + Lab: Ingress
- 💬 Lecture: Networking Plugins
- 💬 Lecture: CNI Comparison: Calico vs. Flannel
- 💻 Lecture + Lab: Gateway API Routing
- 💻 Lecture + Lab: CKA TASK: Ingress to Gateway Conversion
- 💻 Lecture + Lab: Network Troubleshooting

DNS

- 💬 Lecture: Hostnames and FQDNs
- 💻 Lecture + Lab: Hostnames and FQDNs
- 💬 Lecture: CoreDNS
- 💻 Lecture + Lab: Install CoreDNS
- 💬 Lecture: Configure CoreDNS
- 💻 Lecture + Lab: Configure CoreDNS
- 💻 Lecture + Lab: Revert CoreDNS to KubeDNS

Prerequisites