

# Certified Kubernetes Administrator (CKA) Prep Course



**Days:** 5

**Audience:** This course is designed for Professionals who need to maintain or set up a Kubernetes cluster, Container Orchestration Engineers, DevOps Professionals.

**Description:** 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, expand, 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.

**Course Objectives:** In this course, you will:

- 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

### 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: 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 + Lab: Purge Kubeadm
- Lecture + Lab: Purge Kubeadm
- Kubernetes the Alta3 Way
- Lecture + Lab: Deploy Kubernetes using Ansible

### 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

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## 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: 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

## PERSISTENT STORAGE

- Lecture: Persistent Volumes, Claims, and StorageClasses
- Lecture: PVC, PV, and StorageClass Config
- Lecture + Lab: Persistent Storage with NFS

## EXTENDING KUBERNETES

- Lecture: Custom Resource Definitions
- Lecture + Lab: Introduction to CRDs

## HELM AND KUSTOMIZE

- Lecture: Helm
- Lecture + Lab: Making Charts and Templates with Helm
- Lecture + Lab: Deploy Existing Packages via Helm
- 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

# Certified Kubernetes Administrator (CKA) Prep Course



- Lecture: Networking Plugins
- Lecture + Lab: Gateway API Routing
- 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