Kubernetes Administrator (CKA) Fast Track

Days: 3

Prerequisites: Kubernetes Fundamentals, Linux for Absolute Beginners, or any other Formal Linux Training.

Audience: Systems Administrators (SA), Site Reliability Engineers (SRE) and Team Leaders who plan to work with Kubernetes at any level or tier of involvement. Any company or individual who wants to achieve CKA Certification. Any SA/SRE/Leader expanding their Kubernetes Learning. Any company or individual who wants to advance their knowledge of administrating and maintaining microservice architectures.

Description: This accelerated course is designed for students preparing for the Certified Kubernetes Administrator (CKA) exam. Building on a foundational understanding of Kubernetes, the CKA Fast Track course focuses on real-world cluster administration, troubleshooting, and lifecycle management skills required to confidently operate Kubernetes in production environments.

Through concise lectures and intensive hands-on labs, students will gain direct experience with cluster provisioning, configuration, upgrades, and recovery. You will practice performing essential administrative tasks such as ETCD snapshot and restore, managing node access, configuring network plugins, setting resource quotas, implementing security controls, and troubleshooting networking and DNS issues.

Every module reinforces critical CKA exam domains through guided exercises and practical challenges, simulating the time-constrained, scenario-driven nature of the certification exam. By the end of this course, you will possess the applied knowledge and operational expertise to deploy, manage, and secure Kubernetes clusters with confidence — and to succeed on the Certified Kubernetes Administrator (CKA) exam.

Course Objectives: Students will learn to:

- Create working Python scripts following best practices
- Prepare for and successfully pass the Certified Kubernetes Administrator (CKA) exam
- Build and manage production-grade Kubernetes clusters using kubeadm and automation tools such as Ansible
- Configure and manage control plane and worker nodes, including network plugin setup and node joins
- Perform essential cluster administration tasks such as ETCD backup and restore, cluster upgrades, and version management
- Monitor and optimize cluster performance using resource metrics, quotas, and AdmissionControllers
- Manage Kubernetes users, contexts, and Role-Based Access Control (RBAC) to enforce secure access control
- Configure application environment data using ConfigMaps, Secrets, and ephemeral storage
- Design advanced Pod configurations including init containers, sidecars, and node scheduling with taints and tolerations
- Implement logging, labeling, and annotation strategies for improved observability and metadata management
- Deploy and maintain workloads using ReplicaSets, DaemonSets, and Deployments with rollout, rollback, and scaling operations
- Configure and manage persistent storage using PersistentVolumes, PersistentVolumeClaims, and StorageClasses with CSI drivers
- Extend Kubernetes functionality through Custom Resource Definitions (CRDs)
- Package and manage complex deployments using Helm and Kustomize
- Configure Services, NetworkPolicies, and Gateway APIs to control and route network traffic securely
- Manage and troubleshoot CoreDNS and cluster-level DNS functionality

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- Diagnose and resolve networking, scheduling, and resource issues using kubectl and cluster-level troubleshooting tools

OUTLINE:

BECOMING A CERTIFIED KUBERNETES ADMINISTRATOR
• Lecture: The CKA Exam

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: Manifests for Pods
• Lecture + Lab: Create and Configure Basic Pods
• CKA Practice - Pod Basics

RESOURCE MANAGEMENT
• Lecture + Lab: kubectl Top and Application Monitoring
• Lecture: Limits, Requests, and Namespace ResourceQuotas
• Lecture + Lab: Resource Requests and Limits
• CKA Practice - Resource Requirements
• 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

EPHEMERAL STORAGE
• Lecture: ConfigMaps and Volume Mounting
• Lecture + Lab: Persistent Configuration with ConfigMaps
• CKA Practice - ConfigMaps
• Lecture: Secrets
• Lecture + Lab: Create and Consume Secrets
• CKA Practice - Secrets

ADVANCED POD DESIGN
• 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

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DEPLOYMENTS
• Lecture: ReplicaSets
• Lecture: DaemonSets
• Lecture: Deployments - Purpose and Advantages
• Lecture + Lab: Create and Configure a Deployment
• CKA Practice - Deployments
• Lecture: Deployments Rollout
• Lecture + Lab: Performing Rolling Updates and Rollbacks
• CKA Practice - Rollbacks
• Lecture: Blue/Green and Canary Deployment Strategies
• Lecture + Lab: Advanced Deployment Strategies
• Lecture: Deployments - Horizontal Scaling
• Mastery Challenge - Horizontal Pod Autoscaler

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
• 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