Certified Kubernetes Administrator (CKA), 4th Edition

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This comprehensive guide equips you with the knowledge and skills to run containerized applications seamlessly in a Kubernetes cluster and effectively manage Kubernetes clusters. It is designed to simulate the real exam experience by including a sample exam that encompasses all the necessary skills required for success. Additionally, it offers an exam-grade script, allowing you to evaluate your performance on the sample exam and receive a PASS/FAIL score.

Module 1: Cluster Architecture, Installation, and Configuration

Lesson 1: Understanding Kubernetes Architecture

- 1.1 Vanilla Kubernetes and the Ecosystem
- 1.2 Running Kubernetes in Cloud or on Premises
- 1.3 Kubernetes Distributions
- 1.4 Kubernetes Node Roles

Lesson 2: Creating a Kubernetes Cluster with kubeadm

- 2.1 Understanding Cluster Node Requirements
- 2.2 Provisioning an Infrastructure for Hosting Kubernetes
- 2.3 Installation Procedure Overview
- 2.4 Configuring Linux Kernel Settings for Kubernetes Networking
- 2.5 Installing CRI and Tools
- 2.6 Using kubeadm init
- 2.7 Configuring the Kubernetes Client
- 2.8 Setting up Node Networking
- 2.9 Adding Nodes to the Cluster
- 2.10 Using kubeadm init with a Configuration File

Lesson 3: Managing Kubernetes Clusters

- 3.1 Analyzing Cluster Nodes
- 3.2 Using crictl to Manage Node Containers
- 3.3 Running Static Pods
- 3.4 Managing Node State
- 3.5 Managing Node Service

Lesson 4: Performing Node Maintenance Tasks

- 4.1 Using Metrics Server to Monitor Node and Pod Performance
- 4.2 Backing up the Etcd
- 4.3 Restoring the Etcd
- 4.4 Performing Cluster Node Upgrades
- 4.5 Performing Cluster Worker Upgrades
- 4.6 Understanding Cluster High Availability Options
- 4.7 Setting up a Highly Available Kubernetes Cluster

Lesson 5: Managing Security Settings

- 5.1 Understanding API Access
- 5.2 Managing Security Context
- 5.3 Users, ServiceAccounts, and API Access
- 5.4 Understanding Role Based Access Control (RBAC)
- 5.5 Setting up RBAC for ServiceAccounts
- 5.6 ClusterRoles and ClusterRoleBindings
- 5.7 Setting up RBAC for Users

Module 2: Workloads and Scheduling

Lesson 6: Deploying Kubernetes Applications

- 6.1 Using Deployments
- 6.2 Running Agents with DaemonSets
- 6.3 Using StatefulSets
- 6.4 The Case for Running Individual Pods
- 6.5 Managing Pod Initialization
- 6.6 Scaling Applications
- 6.7 Configuring Autoscaling
- 6.8 Using Sidecar Containers for Application Logging

Lesson 7: Using Templating Tools

- 7.1 Running Applications from YAML Files
- 7.2 The Helm Package Manager
- 7.3 Creating a Template from a Helm Chart
- 7.4 Managing Applications with Helm
- 7.5 Using Kustomize

Lesson 8: Managing Scheduling

- 8.1 Exploring the Scheduling Process
- 8.2 Setting Node Preferences
- 8.3 Managing Affinity and anti-Affinity Rules
- 8.4 Managing Taints and Tolerations
- 8.5 Configuring Resource Limits and Requests
- 8.6 Setting Namespace Quota
- 8.7 Configuring LimitRange
- 8.8 Configuring Pod Priorities

Module 3: Services and Networking

Lesson 9: Managing Application Access

- 9.1 Exploring Kubernetes Networking
- 9.2 Understanding Network Plugins
- 9.3 Using Services to Access Applications
- 9.4 Running an Ingress Controller
- 9.5 Configuring Ingress
- 9.6 Using Port Forwarding for Direct Application Access
- 9.7 Understanding Gateway API
- 9.8 Configuring Gateway API
- 9.9 Using Gateway API to Provide Access to Applications
- 9.10 Configuring Gateway API for TLS Access

Lesson 10: Networking

- 10.1 Managing the CNI and Network Plugins
- 10.2 Understanding Service Auto Registration and Kubernetes DNS
- 10.3 Using NetworkPolicies to Manage Traffic Between Pods
- 10.4 Configuring NetworkPolicies to Manage Traffic Between Namespaces
- 10.5 Managing CoreDNS

Module 4: Storage

Lesson 11: Managing Storage

- 11.1 Understanding Kubernetes Storage Options
- 11.2 Accessing Storage Through Pod Volumes
- 11.3 Configuring PersistentVolume (PV) Storage
- 11.4 Configuring PersistentVolumeClaim (PVC)
- 11.5 Configuring Pod Storage with PVs and PVCs
- 11.6 Using Volume Reclaim Policies
- 11.7 Using ConfigMaps and Secrets as Volumes

Lesson 12: Auto-provisioning Storage

- 12.1 Using StorageClass
- 12.2 Understanding Storage Provisioners
- 12.3 Setting up an NFS Storage Provisioner

Module 5: Troubleshooting

Lesson 13: Logging, Monitoring, and Troubleshooting

- 13.1 Monitoring Kubernetes Resources
- 13.2 Understanding the Troubleshooting Flow
- 13.3 Troubleshooting Kubernetes Applications
- 13.4 Troubleshooting Cluster Nodes

- 13.5 Fixing Application Access Problems

Module 6: Sample Exams

Lesson 14: Sample Exam Instructions

- 14.1 Preparing an Environment for the Sample Exams
- 14.2 Working Through the Sample Exams
- 14.3 Using the exam-grade Script

Lesson 15: CKA Sample Exam 1

- 15.1 Questions Overview
- 15.2 Configuring a HA Cluster
- 15.3 Scheduling a Pod
- 15.4 Managing Application Initialization
- 15.5 Setting up Persistent Storage
- 15.6 Configuring Application Access
- 15.7 Securing Network Traffic
- 15.8 Setting up Quota
- 15.9 Creating a Static Pod
- 15.10 Troubleshooting Node Services
- 15.11 Configuring Cluster Access
- 15.12 Configuring Taints and Tolerations

Lesson 16: CKA Sample Exam 2

- 16.1 Questions Overview
- 16.2 Creating a Cluster
- 16.3 Performing a Control Node Upgrade
- 16.4 Configuring Application Logging
- 16.5 Managing PersistentVolumeClaims
- 16.6 Investigating Pod Logs
- 16.7 Analyzing Performance
- 16.8 Managing Application Scheduling
- 16.9 Configuring Ingress
- 16.10 Preparing for Node Maintenance
- 16.11 Scaling Applications
- 16.12 Etcd Backup and Restore