Course Outline

Certified Kubernetes Administrator Course
Course CKA: 5 days Instructor Led

About this course
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.

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

At course completion
After completing this course, students will be able to:
- 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

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Cluster Architecture
- Kubernetes Architecture
- Pods and the Control Plane

Installation
- Kubeadm Prerequisites
  - Lab-Kubeadm Prerequisites
- Configure Network Plugin Requirements
  - Lab-Configure Network Plugin Requirements
- Kubeadm Basic Cluster
  - Lab-Installing Kubeadm
- Join Node to Cluster
  - Lab-Join Node to Cluster

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Cluster Administration

- ETCD Snapshot and Restore
  - Lab-ETCD Snapshot and Restore
- Kubeadm Cluster Upgrade
  - Lab-Kubeadm cluster upgrade
- Purge Kubeadm
  - Lab-Purge Kubeadm
- k8s with Ansible
  - Lab-Deploy Kubernetes using Ansible

Containers

- Container Essentials
  - Lab-Creating a Docker Image

Kubectl

- Kubectl get and sorting
  - Lab-kubectl get
  - Lab-kubectl describe

Pod Basics

- Namespaces
  - Lab-Namespaces
- YAML
- Manifests
  - Lab-Basic Pods
- API Versioning and Deprecations

Resource Management

  - Lab-Kubectl Top and Application Monitoring
- Limits, Requests, and Namespace ResourceQuotas
  - Lab-Resource Requests and Limits
  - Lab-Namespace Resource Quota

User Administration

- Contexts
  - Lab-Contexts
- Authentication and Authorization
- Role Based Access Control
  - Lab-Role Based Access Control
  - Lab-RBAC Distributing Access

Advanced Pod Design

- Multi-Container Pods
  - Lab-Multi-Container Pod Design Patterns

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- Init Containers
  - Lab-Understand the Init Container Multi-Container Pod Design Pattern
- Readiness and Liveness Probes
  - Lab-Implement Probes and Health Checks
- ConfigMaps and Volume Mounting
  - Lab-Persistent Configuration with ConfigMaps
- Secrets
  - Lab-Create and Consume Secrets
- Taints, Tolerations, and Pod Affinity
  - Lab-Tainted Nodes and Tolerations

Logging and Troubleshooting

- Logging with kubectl log
- Advanced Logging Techniques
  - Lab-Cluster, Node, and Container Logging
  - Lab-Ephemeral Storage for Fluentd Logging Sidecar

Deployments

- Deployments - Purpose and Advantages
  - Lab-Writing a Deployment Manifest
- Deployments - Version Control
  - Lab-Performing Rolling Updates and Rollbacks with Deployments
- Deployments - Horizontal Scaling
  - Lab-Horizontal Scaling with kubectl scale
  - Lab-Horizontal Pod Autoscaling

Persistent Storage

- Persistent Volumes, Claims, and StorageClasses
- PVC, PV, and StorageClass config
  - Lab-Persistent Storage with NFS

Services & Networking

- Services - LoadBalancer, NodePort, and ClusterIP
  - Lab-Host Networking
  - Lab-Access to applications via services
- Networking Plugins
- Ingress Controllers
  - Lab-Ingress Controllers Expose a Service

DNS

- Hostnames and FQDNs
  - Lab-Hostnames and FQDNs
- CoreDNS
  - Lab-Install CoreDNS
- Configure CoreDNS
  - Lab-Configure CoreDNS

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- Lab-Revert CoreDNS to KubeDNS