

**Certified Kubernetes Administrator (CKA)**

**Course Number:** CLD-112
**Duration:** 5 days

**Overview**

This Certified Kubernetes Administrator (CKA) training course teaches attendees how to configure, deploy, administer, and monitor Kubernetes clusters. This class also prepares them to pass the Certified Kubernetes Administrator CKA exam.

**Note:** This CKA course includes access to on-demand labs, exam vouchers, and a K8s sandbox for each attendee.

**Prerequisites**

All attendees must:

* Have Linux administration skills and be comfortable using the command line
* Be able to edit files using a command-line text editor
* Have experience with containers and networking

**Materials**

All attendees receive comprehensive courseware.

**Software Needed on Each Student PC**

* A computer with access to a Kubernetes cluster, local or remote, version 1.20 or higher (The recommended setup is to install Minikube and kubectl)
* A machine with Vagrant and VirtualBox installed

**Objectives**

* Create a Kubernetes cluster, including installing the necessary components, configuring the cluster, and adding nodes
* Deploy applications to Kubernetes by creating pods, services, and storage
* Manage Kubernetes resources with scaling, autoscaling, and updating applications
* Secure Kubernetes by configuring authentication, authorization, and admission control.
* Troubleshoot Kubernetes by monitoring logs, diagnosing application failures, and troubleshooting network access

**Outline**

* Introduction
* Kubernetes Concepts
	+ Kubernetes Basics
	+ Container Orchestration
	+ Kubernetes Architecture
	+ Kubernetes Concepts
	+ Cluster and Namespace
	+ Control Plane
	+ Nodes
	+ Pods
	+ Storage
	+ Services
	+ Objects
	+ Object Specifications
	+ Labels & Selectors
	+ Tools (kubeadm, kubectl)
	+ Essential K8S commands
	+ Essential Linux commands
* Installation and Configuration
	+ Installing kubeadm
	+ Obtaining Nodes
	+ Installing Kubelet
	+ Installing kubectl
	+ Initializing the control plane
	+ Setup kubeconfig file
	+ Joining nodes to the cluster
	+ Verifying the cluster
* Cluster Administration
	+ Cluster Components
	+ Installation and Setup
	+ Security
	+ Resource management
	+ Scheduling
	+ Monitoring
	+ Logging
	+ Scaling
	+ Autoscaling
	+ High Availability
	+ Upgrading the cluster version
	+ Backup and restore the etcd store
* Workloads
	+ Application Images
	+ Deploying Pods
	+ Deploying Workloads
	+ Self-healing applications
	+ Deployments
	+ Deployment States
	+ Replica Sets
	+ Daemon Sets
	+ Scaling a workload
	+ Autoscaling a workload
	+ Deleting workloads
	+ Updating a workload image
	+ Update strategies
	+ Rolling updates
	+ Rolling back an update
* Scheduling
	+ Pod Scheduling
	+ Resource usage basics
	+ Setting Resource Limits
	+ Resource Requests
	+ Resource Quotas
	+ Optimizing Resource Usage
	+ Node Affinity
	+ Pod Affinity
	+ Taints
	+ Tolerations
* Services
	+ Available Service Types
	+ ClusterIP Service
	+ NodePort Service
	+ LoadBalancer Service
	+ Creating services
	+ Accessing workloads through services
* Networking
	+ K8s Networking Overview
	+ Ingress Controller
	+ Ingress Resources
	+ Resource Discovery
	+ CoreDNS
	+ Configuring CoreDNS
	+ Port forwarding
* Storage
	+ Storage Classes
	+ EmptyDir
	+ HostPath
	+ Persistent volumes
	+ Persistent volume claims
	+ NFS share volumes
	+ Cloud storage volumes
	+ Access Modes
	+ Reclaim Policies
	+ Configuring persistent storage for workloads
	+ Secrets
	+ Config Maps
* Security
	+ Securing the API
	+ Securing ETCD
	+ Securing Worker nodes
	+ Securing images
	+ Authentication
	+ Authorization
	+ Admission Controller
	+ Securing cluster access
	+ Kubectl config
	+ RBAC Role-Based Access Control
	+ Pod policies
	+ Network Policies
* Troubleshooting
	+ Logs and log access
	+ Standard output and error logs
	+ Workload monitoring
	+ Application failure
	+ Network access troubleshooting
	+ Troubleshooting cluster components
* Conclusion