

**Kubernetes Administration**

**Course Number:** CLD-108  
**Duration:** 3 days

**Overview**

[Kubernetes](https://kubernetes.io/) is an open-source system for automating deployment, scaling, and management of containerized applications. This Kubernetes Administration training course introduces participants to the architecture of Kubernetes, installation and setup, application lifecycle management, networking, storage, security, scheduling, logging, maintenance, and troubleshooting.

**Prerequisites**

* Proficiency with the Linux command-line interface
* A broad understanding of Linux system administration
* Basic knowledge of Linux containers such as Docker is recommended; we will back fill whatever knowledge the group needs

**Materials**

All Kubernetes training attendees receive comprehensive courseware.

**Software Needed on Each Student PC**

A complete remote environment is included for each student with the class. You will need Internet access, a modern web browser, and an SSH client to access the environment.

**Objectives**

* Install Kubernetes
* Manage the Kubernetes application lifecycle
* Configure networking and related network services for nodes and clusters
* Manage storage
* Set up authentication, authorization, and encryption
* Schedule tasks
* Configure and understand logs
* Perform node and cluster maintenance
* Set up jobs and cron jobs
* Manage Linux containers

**Outline**

* Introduction
* Core Concepts
  + Kubernetes Architecture
  + Cluster Communication
  + Objects
  + Object Properties
  + Labels & Selectors
  + Annotations
  + Object Management
  + Image Fundamentals
  + Container Fundamentals
  + Pod Fundamentals
  + Working with Pods
* Installation
  + Installing HA Control Plane (demo)
* Application Lifecycle Management
  + Pod Lifecycle
  + Container Lifecycle
  + Init Containers
  + Container: command and args
  + Container: Defining Environment
  + ReplicaSet
  + Deployments
  + Working with Deployments
  + Deployment Rollouts
* Networking
  + Network Overview
  + Service Discovery & CoreDNS
  + Container Network Interface (CNI)
  + Services
  + Ingress Objects
* Storage
  + Storage
  + Volume Types
  + Dynamic Volume Provisioning (demo)
  + Static Volumes (demo)
  + ConfigMaps
  + Secrets
* Security
  + Controlling Access to k8s API
  + kubeconfig Management
  + RBAC: Roles & ClusterRoles
  + RBAC: RoleBinding & ClusterRoleBinding
  + Pod Security Policies
  + etcd Encryption
  + Network Policies
  + TLS Certificate Rotation
  + DEMO: Certificate Management
* Scheduling
  + Controlling and Tracking Resources
  + Scheduler Operation
  + DaemonSet
  + Node Affinity & Anti-affinity
  + Pod Affinity & Anti-affinity
  + Taints & Tolerations
* Logging & Maintenance
  + Cluster Events
  + Control Plane Logs
  + Kubelet Logs
  + kubectl Verbosity
  + Consolidated Cluster Logging
  + Node Maintenance
  + Upgrading Cluster Components
  + Backup and Restore of etcd
* Metrics & Troubleshooting
  + Cluster Metrics
  + Metric Visualization
  + Node Health Monitoring
  + Horizontal Pod Autoscaling
* Jobs & CronJob
  + Jobs
  + CronJobs
* StatefulSets
  + Challenges of Deploying Stateful Applications
  + StatefulSet
* Linux Containers
  + Application Management Landscape
  + Application Isolation
  + Resource Measurement and Control
  + Container Security
  + OverlayFS Overview
  + Container Security
  + Open Container Initiative
* Conclusion