Certified Kubernetes Application Developer (CKAD)

- 5 days
- Lecture & Labs

Course Overview

This class prepares students for the Certified Kubernetes Application Developer (CKAD) 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 training you will go back to work with all necessary commands and practical skills to empower your team to succeed, as well as gain knowledge of important concepts like Kubernetes architecture and container orchestration. We prioritize covering all objectives and concepts necessary for passing the Certified Kubernetes Application Developer (CKAD) exam. You will command and configure a high availability Kubernetes environment (and later, build your own!) capable of demonstrating all “K8s’ ’ features discussed and demonstrated in this course. Your week of intensive, hands-on training will conclude with a mock CKAD exam that matches the real thing.

Who Should Attend

- Anyone who plans to work with Kubernetes at any level or tier of involvement
- Any company or individual who wants to advance their knowledge of the cloud environment
- Application Developers
- Operations Developers
- IT Directors/Managers

What You’ll Learn

All topics required by the CKAD exam, including:

- Deploy applications to a Kubernetes cluster
- Use Kubernetes primitives to implement common deployment strategies (e.g. blue/green or canary)
- Define, build and modify container images
- Implement probes and health checks
- Understand multi-container Pod design patterns (e.g. sidecar, init and others)
- Understand ConfigMaps
- Create & consume Secrets
- Troubleshooting and debugging tools
- Provide and troubleshoot access to applications via services
- Use Ingress rules to expose applications

Outline

AI LLM Toolkit

- 💻 Lecture + Lab: Large Language Model toolkit for AI Solution Assistance

From Containers to Kubernetes

- 💬 Lecture: Kubernetes Architecture
- 💻 Lecture + Lab: Define, build and modify container images
- 💬 Lecture: Pods and the Control Plane
- 💬 Lecture: Kubernetes the Alta3 Way
- 💻 Lecture + Lab: Deploy Kubernetes using Ansible

Pod Basics

- 💬 Lecture: YAML
- 💬 Lecture: Manifests for Pods
- 💻 Lecture + Lab: Create and Configure Basic Pods
- 💬 Lecture: API Versioning and Deprecations

Cluster Basics

- 💬 Lecture: Namespaces and Fundamental Kubectl Commands
- 💻 Lecture + Lab: Creating and Configuring Namespaces
- 💬 Lecture: Kubectl get and sorting
- 💻 Lecture + Lab: Listing Resources with kubectl get

Container Health, Security, and Observability

- 💬 Lecture: Kubectl port-forward
- 💻 Lecture + Lab: Kubectl port-forward
- 💬 Lecture: Kubectl exec and cp
- 💻 Lecture + Lab: Performing Commands inside a Pod
- 💬 Lecture: Readiness and Liveness Probes
- 💻 Lecture + Lab: Implement Probes and Health Checks
- 💬 Lecture: Pod Security Contexts
- 💻 Lecture + Lab: Applying Security Contexts

Resource Management

- 💬 Lecture: Limits, Requests, and Namespace ResourceQuotas
- 💻 Lecture + Lab: Defining Resource Requirements, Limits and Quotas
- 💻 Lecture + Lab: Kubectl Top and Application Monitoring
- 💬 Lecture: Admission Controller
- 💻 Lecture + Lab: Create a LimitRange AdmissionController

RBAC

- 💬 Lecture: Role Based Access Control
- 💻 Lecture + Lab: Service Accounts
- 💬 Lecture: Contexts
- 💻 Lecture + Lab: Cluster Access with Kubernetes Context

Logging

- 💬 Lecture: Utilize Container Logs
- 💻 Lecture + Lab: Kubectl Log Command
- 💬 Lecture: FluentD and RsysLog

Ephemeral Storage

- 💬 Lecture: ConfigMaps and Volume Mounting
- 💻 Lecture + Lab: Persistent Configuration with ConfigMaps
- 💬 Lecture: Secrets
- 💻 Lecture + Lab: Create and Consume Secrets

Persistent Storage

- 💬 Lecture: Persistent Volumes, Claims, and StorageClasses
- 💻 Lecture + Lab: Using PersistentVolumeClaims for Storage
- 💬 Lecture: Persistent Volumes with CSI
- 💻 Lecture + Lab: CSI Storage Solution: NFS

Multi-Container Pod Design

- 💬 Lecture: Multi-Container Pods
- 💻 Lecture + Lab: Configuring a Fluentd Logging Sidecar
- 💬 Lecture: Init Containers
- 💻 Lecture + Lab: Using Init Container for Pod Initialization

Deployments

- 💬 Lecture: Labels
- 💻 Lecture + Lab: Labels and Selectors
- 💬 Lecture: Annotations
- 💻 Lecture + Lab: Insert an Annotation
- 💬 Lecture: ReplicaSets
- 💻 Lecture + Lab: Create and Configure a ReplicaSet
- 💬 Lecture: DaemonSets
- 💬 Lecture: Deployments - Purpose and Advantages
- 💻 Lecture + Lab: Create and Configure a Deployment
- 💬 Lecture: Deployments Rollout
- 💻 Lecture + Lab: Performing Rolling Updates and Rollbacks
- 💬 Lecture: Blue/Green and Canary Deployment Strategies
- 💻 Lecture + Lab: Advanced Deployment Strategies
- 💬 Lecture: Deployments - Horizontal Scaling
- 🏆 Challenge: Horizontal Pod Autoscaler

Jobs and CronJobs

- 💬 Lecture: Jobs and CronJobs
- 💻 Lecture + Lab: Running and Executing a Job
- 💻 Lecture + Lab: Scheduling a CronJob

Affinity and Anti-Affinity

- 💬 Lecture: Taints, Tolerations
- 💻 Lecture + Lab: Tainted Nodes and Tolerations

NetworkPolicy

- 💬 Lecture: NetworkPolicy
- 💻 Lecture + Lab: Network Policy Basics
- 💻 Lecture + Lab: Namespace Network Policy

Services and Ingress

- 💬 Lecture: Networking with Services
- 💻 Lecture + Lab: Expose Applications via Services
- 💬 Lecture: Networking Plugins
- 💬 Lecture: Ingress Controllers
- 💻 Lecture + Lab: Expose Applications via Ingress Controllers

DNS

- 💬 Lecture: Hostnames and FQDNs
- 💻 Lecture + Lab: Utilizing FQDNs

The Helm Package Manager

- 💬 Lecture: Helm
- 💻 Lecture + Lab: Deploy Existing Packages via Helm

Extending Kubernetes

- 💬 Lecture: Custom Resource Definitions
- 💻 Lecture + Lab: Introduction to CRDs

Troubleshooting

- 💻 Lecture + Lab: Troubleshooting

CKAD

- 💬 Lecture: Tips to Pass your CKAD Exam!

Prerequisites

Next Courses

- CKA
- Developing Microservices