

Certified Kubernetes Administrator (CKA) 2024 Curriculum

This repository hosts notes, diagrams, assignments, and resources for the CKA course.

✦ If you find this content helpful, please consider giving the repository a star! ★

Course Outline

Here's a breakdown of the CKA curriculum:

Day 0: Introduction to the Series 🌟

- Course Introduction
- Overview of the #40daysofkubernetes challenge

Day 1: Docker Fundamentals 🐳

- What is Docker?
- Docker vs. Virtual Machines
- Docker Architecture
- Docker Flow
- Essential Docker commands
- [Notes & Useful Links](#) ☒

Day 2: Dockerize an Application 🛠️

- Understanding Dockerfile and how to write it
- `docker pull`, `push`, `tag` commands, and more
- [Notes & Useful Links](#) ☒

Day 3: Docker Multi-Stage Builds 🏗️

- How to write a Dockerfile for multi-stage builds
- Benefits of multi-stage builds
- Other Docker best practices
- [Notes & Useful Links](#) ☒

Day 4: Why do We need Kubernetes? 🧠

- [Notes & Useful Links](#) ☒

Day 5: Kubernetes Architecture 🏠

- Control Plane vs. Worker Nodes
- Overview of Control Plane components
- [Notes & Useful Links](#) ☒

Day 6: Install Kubernetes Cluster Locally

- Installing a Kind cluster locally
- How to access the cluster
- [Notes & Useful Links](#) ☒

Day 7: Pods in Kubernetes

- What are pods in Kubernetes?
- Containers vs. Pods
- Imperative vs. Declarative way for creating Kubernetes resources
- Creating a sample pod using imperative and declarative methods
- Inspecting pods
- [Notes & Useful Links](#) ☒

Day 8: Replicasets and Deployments in Kubernetes

- Replication Controller
- ReplicaSet
- Deployments
- Performing Rolling updates/rollbacks
- Scaling deployments
- [Notes & Useful Links](#) ☒

Day 9: Services in Kubernetes

- What are services in Kubernetes, and why are they needed?
- NodePort, ClusterIP, and LoadBalancer service types
- [Notes & Useful Links](#) ☒

Day 10: Namespaces

- Understanding Namespaces
- Services and namespaces interaction
- [Notes & Useful Links](#) ☒

Day 11: Multi-container Pods

- What are multi-container pods?
- Multi-container pod patterns - sidecar/init, etc.
- Environment variables in Kubernetes
- [Notes & Useful Links](#) ☒

Day 12: Daemonset, CronJob, and Job

- What are Daemonset, CronJobs, and Jobs?
- Cron fundamentals with examples
- [Notes & Useful Links](#) ☒

Day 13: Static Pods

- What are static pods?
- Labels and selectors
- Manual Scheduling
- [Notes & Useful Links](#) ☒

Day 14: Taints and Tolerations

- [Notes & Useful Links](#) ☒

Day 15: Node Affinity

- [Notes & Useful Links](#) ☒

Day 16: Resource Requests and Limits

- [Notes & Useful Links](#) ☒

Day 17: Autoscaling in Kubernetes

- Horizontal vs. Vertical Autoscaling
- HPA, VPA, Cluster Autoscaling, NAP
- Metrics server
- [Notes & Useful Links](#) ☒

Day 18: Probes in Kubernetes

- Liveness vs. Readiness Probes
- HTTP/TCP/Command-based health checks
- [Notes & Useful Links](#) ☒

Day 19: Config Maps and Secrets

- Concept and demo of ConfigMaps and Secrets
- [Notes & Useful Links](#) ☒

Day 20: How SSL/TLS Works

- Symmetric vs. Asymmetric encryption
- SSL certificates and Certificate Authority
- [Notes & Useful Links](#) ☒

Day 21: TLS in Kubernetes

- How TLS works in Kubernetes
- Why TLS is needed in Kubernetes
- Private key and public certificates
- [Notes & Useful Links](#) ☒

Day 22: Authorization in Kubernetes

- Authorization vs. Authentication

- Authorization types: ABAC, RBAC, Node, Webhook
- Kubeconfig
- [Notes & Useful Links](#) ☒

Day 23: Role-Based Access Control (RBAC)

- Role and RoleBinding
- Generating and approving certificates
- Granting access to users
- [Notes & Useful Links](#) ☒

Day 24: Cluster Role and Cluster Role Binding

- Concept and demo
- [Notes & Useful Links](#) ☒

Day 25: Service Account

- What are Service Accounts, and why are they used?
- Creating a Service Account and granting access
- [Notes & Useful Links](#) ☒

Day 26: Network Policies

- Network Policy concept
- CNI installation
- Enforcing network policy by creating the object
- [Notes & Useful Links](#) ☒

Day 27: Use Kubeadm to Install a Kubernetes Cluster

- Provisioning underlying infrastructure for Kubernetes cluster deployment
- Setting up Master Node for Kubernetes components
- Setting up multiple worker nodes and joining them to the master
- [Notes & Useful Links](#) ☒

Day 28: Docker Storage Fundamentals

- Why storage is needed in Docker containers
- Persistent Docker storage
- [Notes & Useful Links](#) ☒

Day 29: Storage in Kubernetes

- How storage works in Kubernetes
- HostPath volumes in Kubernetes
- Persistent Volumes and Persistent Volume Claims
- Volume modes, Access modes, and reclaim policies for volumes
- Storage classes and provisions

Day 30: How DNS Works? 🌐

- What happens when you type a website address in your browser
- Different components involved in DNS
- End-to-end flow
- Important files and resources

Day 31: DNS in Kubernetes 🔍

- How DNS works in Kubernetes
- CoreDNS

Day 32: Kubernetes Networking 🌐

- CNI, Network Add-on
- Containerd vs. runc, container runtime

Day 33: Ingress Controller and Ingress Resources 📄

Day 34: Perform a Version Upgrade on a Kubernetes Cluster using Kubeadm 📄

Day 35: Implement etcd Backup and Restore 📄

Day 36: Monitoring, Logging, and Alerting 📊

- Monitoring cluster components
- Evaluating cluster and node logging
- Understanding how to monitor applications, Metric Server
- Managing container stdout & stderr logs

Day 37: Troubleshoot Application Failure ☠️

Day 38: Troubleshoot Cluster Component Failure ✨

Day 39: Network Troubleshooting 📡

- Worker node failure
- Cordon, uncordon, and drain (maintenance)

Day 40: JSONPath, Advanced Kubectl Commands 📝

- JSON for beginners
- JSON vs. YAML
- JSONPath basics
- Multiple JSONPath queries to fetch details

Day 41: Mission CKA 🎯

- Exam Pattern
- Pre-requisites
- Last-minute preparation

- Tips and Tricks
- Sample questions

Day 42: Realtime Project: Host your own container registry on Kubernetes 🌟

- This project will include multiple Kubernetes topics with real-time implementation.

Day 43: Helm 📦

Day 44: Kustomize 🧑🔧

Day 45: StatefulSets 📁

Day 46: Priority Class and Preemption 🚀