

Certified Kubernetes Administrator Exam Training

Course Curriculum: Your 7 module Learning Plan

https://www.edureka.co/kubernetes-certification

About Edureka

Edureka is a leading e-learning platform providing live instructor-led interactive online training. We cater to professionals and students across the globe in categories like Big Data & Hadoop, Business Analytics, NoSQL Databases, Java & Mobile Technologies, System Engineering, Project Management and Programming. We have an easy and affordable learning solution that is accessible to millions of learners. With our students spread across countries like the US, India, UK, Canada, Singapore, Australia, Middle East, Brazil and many others, we have built a community of over 1 million learners across the globe.

Kubernetes Course Description

About Kubernetes Course

Edureka's CKA Training course is designed in reference with CNCF's Certified Kubernetes Administrator Exam. This course will give you an in-depth understanding of various aspects of the Exam such as Kubernetes Core Concepts, Kubernetes Networking, Pod Scheduling, Logging, Monitoring, Cluster Security, and Troubleshooting.

The course also provides you with a set of MCQs, demos, and an Exam-level Industry-grade project, which will help you prepare for the CKA Exam.

Why learn Kubernetes?

Docker revolutionized the IT industry with the introduction of their Portable Lightweight Container Engine. More than 30% of the organizations in the IT industry have already adopted Docker, and the adoption rate is increasing by 40% every year. Over 50% of these environments are orchestrated.

Kubernetes is the biggest player in the Container Orchestration world. Tools such as Docker Swarm and Mesos, which have been competitors of Kubernetes in the Container Orchestration market, have added support for Kubernetes within their ecosystems.

What are the objectives of our Course?

After the completion of the Certified Kubernetes Administrator Training at Edureka, you will be able to:

- Understand Kubernetes Core Concepts
- Deploy a Kubernetes cluster
- Secure cluster objects using TLS Certificates
- Leverage Kubernetes Networking Concepts
- Deploy Services and Load Balancers to route traffic
- Implement different Pod Scheduling techniques

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- Use various Controllers to manage your applications
- Create and use Persistent Storage for your applications
- Secure your cluster against unauthorized access
- Monitor and log your cluster events
- Troubleshoot application and cluster failures

Who should go for this training?

This course is specifically designed for:

- Professionals aspiring to clear the Certified Kubernetes Administrator (CKA) program by CNCF
- Professionals keen on advancing their career as DevOps Engineers
- Individuals looking to establish their credibility and value in the market as Kubernetes
 Administrators
- Principal Software Engineers
- Cloud Professionals
- Technical Leads

What are the pre-requisites for this course?

Required Pre-requisites:

- Knowledge on Docker
- Basic Kubernetes concepts and commands

To help you brush up these skills, you will get self-paced module on these concepts as pre-requisites in your LMS.

Kubernetes Curriculum

Kubernetes Core Concepts and Networking

Learning Objective: Learn the basic concepts of Kubernetes and configure your Kubernetes network using calico. **Topics:**

- Kubernetes Core Concepts
- Kubectl common commands
- Understanding Pods
- Configure network on cluster nodes
- Pod Networking Concepts
- Setting up a cluster Kubernetes Certificates

Hands-On:

- Perform basic kubectl commands
- Deploy pods and use init containers to pre-set an environment
- Configure Kubernetes network using Calico
- Use certificates to authenticate resources

Kubernetes Services and Scheduling

Learning Objective: Learn to expose your application using different kinds of Services and understand the ins and outs of Pod Scheduling in your cluster. **Topics:**

- Services and Controllers
- Service Networking
- Deploy and configure network Load Balancer
- Primitives necessary for self-healing apps
- Effects of resource limiting on pod scheduling

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- Configure Kubernetes Scheduler
- Running multiple Schedulers

Hands-On:

- Deploy different kinds of services
- Deploy and configure a network load balancer
- Configure the Kubernetes scheduler
- Run multiple schedulers

Kubernetes Controllers

Learning Objective: Learn the use of different Kubernetes controllers and set up traffic routing rules using Ingress. **Topics:**

- ReplicaSet and ReplicationController
- DaemonSets
- Deployments
- Rolling updates and Rollbacks
- Scaling applications
- Ingress

Hands-On:

- Deploy different ReplicationControllers
- Use DaemonSets on nodes
- Manage pod updates using Deployments
- Use HPA for dynamic work-load management
- Use Ingress controller and rules to manage network traffic

Persistent Storage in Kubernetes

Learning Objective: Learn to use persistent storage methods for stateful applications and hide sensitive information using ConfigMaps and Secrets. **Topics:**

- PersistentVolume and PersistentVolumeClaim
- Access modes for volumes
- Primitives for PersistentVolumeClaim
- Secrets and ConfigMaps in your pods
- Storage classes
- Headless services
- StatefulSets

Hands-On:

- Deploy PersistentVolume and PersistentVolumeClaim
- Use Secrets and ConfigMaps in your applications
- Use StorageClass for dynamic storage allocation
- Use stateful applications for sticky identities for pods
- Deploy a highly available replicated MariaDB cluster

Securing the Cluster

Learning Objective: Learn how to secure the cluster using role-based access control (RBAC) and configure custom network policies for your pods. **Topics:**

- Authentication
- Authorization
- Kubernetes security primitives
- Configure Network Policies
- Security Contexts

Hands-On:

- Create and use Roles and RoleBindings
- Define custom Egress and Ingress policies
- Use probes and configure a restart policy for pods
- Define privilege and access control using security contexts

Logging and Monitoring the Cluster

Learning Objective: Monitor cluster and visualize cluster logs using Prometheus and EFK stack. Deploy jobs, manage the etcd cluster, and use Helm Charts to deploy applications. **Topics:**

- Monitoring the cluster using Prometheus
- Visualizing cluster logs using EFK stack
- Jobs
- ETCD operations
- Helm Charts

Hands-On:

- Monitor cluster using Prometheus
- Visualize logs using EFK stack
- Deploy jobs to run tasks to completion
- Manage etcd cluster
- Use Helm Charts

Troubleshooting the Cluster

Learning Objective: Learn how to handle and troubleshoot common cluster failures. **Topics:**

Troubleshooting application failures



• Troubleshooting cluster failures

Kubernetes Training Project

What are the system requirements for this Training?

Any system with 4GB of RAM and a decent HDD with the latest version of Windows, Linux, or MacOS is compatible. Free Tier GCP account will be used to perform all the demos. Edureka will help you set up the required software. The Installation Guides to set up the environment is available on the LMS.

How will I execute the Practicals?

All the practicals will run on Google Compute Engine (GCE) virtual machines. In case of any doubts, you can reach out to our 24x7 support team.

Which project will be part of this Course?

Edureka's Certification Project for CKA Training course, has been designed to help you with the CKA Examination. The project is divided into eight units, each representing a domain in the CKA Exam. The weightage of units is aligned to the official CKA Exam pattern. The following units are included in the project:

- **Installation, Configuration, and Validation:** Deploy a new cluster with a master node on a bare-metal machine leveraging the provided Container Network Interface (CNI) option and then add use kubeadm to attach new worker nodes to it.
- **Application Lifecycle Management:** Manage applications deployed on the cluster using different controllers and operations such as rolling updates, rollbacks, and scaling.
- **Networking:** Demonstrate different application/service discovery mechanisms in your cluster and deploy an ingress controller and ingress resource using specified rules for traffic routing.
- **Scheduling:** Configure and manage pod scheduling on your cluster by using multiple schedulers, applying resource limiting filters, and deploying pods without using a scheduler.
- **Security:** Secure the cluster in different ways using Role-Based Access Control (RBAC), network policies, and security contexts.
- **Cluster Maintenance:** Perform cluster-level maintenance tasks such as upgrading the kubeadm library, backing up etcd, and adding and removing nodes.
- **Logging and Monitoring:** Log and monitor various cluster events and resources using the various commands at your disposal.

• Storage: Create and use persistent storage mounts for your stateful application.