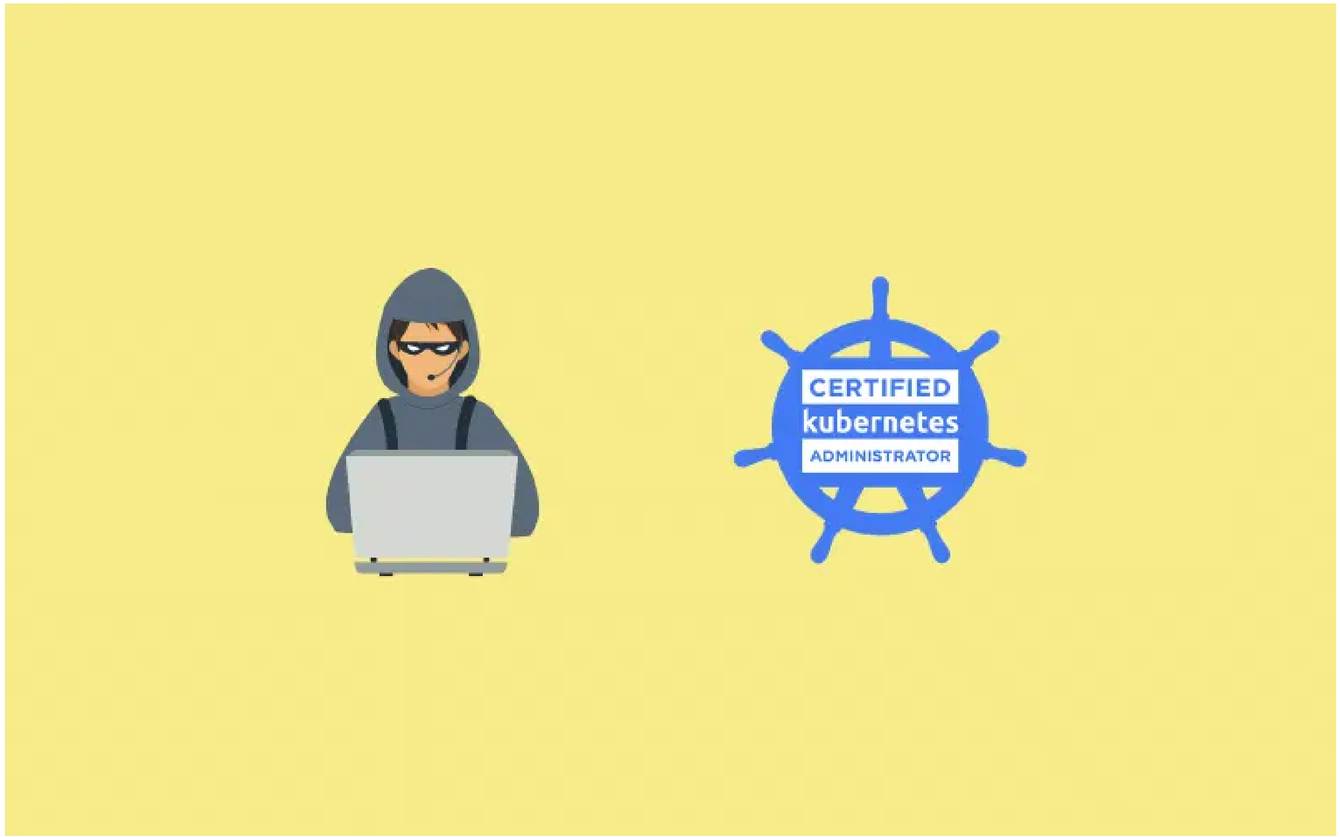
K — KUBERNETES

CKA Exam Study Guide: A Complete Resource For CKA Aspirants

by **Shishir Khandelwal** · June 25, 2021



This CKA Exam study guide will help you prepare for the Certified Kubernetes Administrator (CKA) exam with all the required resources. We will also be sharing tips that can help you pass the CKA exam with ease.

Certified Kubernetes Administrator (CKA) is one of the sought-after certifications from the Linux Foundation. Even you can say it is the top DevOps certification now. It is aimed at engineers interested in setting up and managing Kubernetes clusters.

What is the Certified Kubernetes Administrator (CKA) exam?

The official CNCF certification page says:

> The purpose of the Certified Kubernetes Administrator (CKA) program is to provide assurance that CKAs have the skills, knowledge, and competency to perform the responsibilities of Kubernetes administrators.

As one of the highest velocity open source projects, Kubernetes use is exploding. In this scenario – the demand for skilled DevOps Engineers with Kubernetes cluster administration knowledge is growing.

Therefore passing CKA certification can increase your chances for continued growth across the broad set of companies and organizations using Kubernetes.

Registering for the CKA exam [Save $57]

To begin your journey of becoming a Certified Kubernetes Administrator – start by registering for the exam on the Linux Foundation portal.

> **Note:** Save $57 Today on CKA | CKAD | CKS certification using the Voucher code given below. This offer expires soon.

REGISTER AND SAVE $75 ON CKA EXAM TODAY

CKA Exam Voucher: Use coupon **SCOFFER15** at checkout

Here are some things to keep in mind regarding the exam.

1. The CKA exam is to be taken online and it is proctored remotely.
2. A score of 66% or above must be earned to pass.
3. CKA Certification is valid for 3 years.

5 After registration, you get a maximum of 2 attempts to give the test. If you miss a scheduled exam for any reason – your second attempt gets nullified.

Note: You can always check the latest Kubernetes Certification Voucher Codes to save costs on the CKA, CKAD, and CKS certification registration

Certified Kubernetes Administrator – CKA Exam Preparation Guide

This section will go over resources and links that can help you prepare for the CKA exam better.

TABLE OF CONTENTS

CKA Exam Prerequisites

CKA does not require any candidate to have any other certification before they can appear for CKA exam. Only thing required to clear the exam is conceptual understanding of Kubernetes internal working and alot of practise.

CKA Exam details

Exam Duration	2 hours

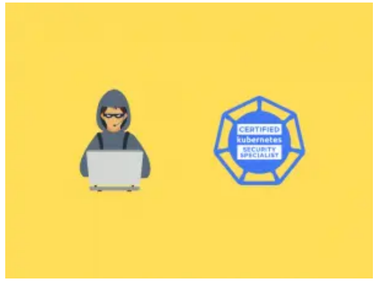
CKA Validity	3 Years
Exam Cost	300 USD

CKA Exam details

CKA exam is an open book exam i.e. you can use the following websites while you are taking the exam.

1. https://kubernetes.io/docs/
2. https://github.com/kubernetes/
3. https://kubernetes.io/blog/ and their subdomains. This includes all available language translations of these pages (e.g. https://kubernetes.io/zh/docs/)

YOU MIGHT ALSO LIKE



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CKS Exam Study Guide: Resources to Pass Certified Kubernetes Security Specialist

by Bibin Wilson · June 23, 2021

CKA Exam syllabus

The following are the domains and competencies part of syllabus along with their respective weightage.

Topic	Weightage
Cluster Architecture, Installation & Configuration	25 %
Workloads & Scheduling	15 %
Services & Networking	20 %
Storage	10 %
Troubleshooting	30 %

CKA Exam Syllabus

Investing in a course will help you understand all the concepts for the exam in an easier manner. If you are a beginner, we strongly suggest you invest some time and money in a course of your choice.

We have the following recomendtion.

1. CKA preparation course by Mumshad With Practice Tests [Udemy]: His course has a lot of quizzes and the quality is top-notch.

CKA Practice Labs

The best way to prepare is to get a clear understanding of the concepts involved and do alot of hands on practise ! The below setups will give you a Kubernetes cluster where you can do all the required practise. The exam expects you to solve problems on a live cluster.

CKA does not have any MCQ type format – so hands on practise is a must.

> **Note:** When you purchase the subscription, you will get free access to https://killer.sh/cka exam simulator. You can make use of the simulator to try the practice questions.

1. Katacoda
2. Minikube
3. Kubernetes Setup using Kubeadm [Detailed Guide]
4. Kubernetes Vagrant Setup using Kubeadm
5. GKE Cluster using free Google Cloud Credits
6. EKS Service on AWS using Free tier program
7. AKS service on Azure using free cloud credits
8. Kubernetes Cluster on Digital Ocean[Get $100 Digital Ocean Free Credits]

CKA Syllabus Wise Study resources

Here, we will be discussing about the CKA syllabus wise official and useful resources that can be used to prepare for each topic of CKA exam.

Cluster Architecture,Installation &

Manage role-based Access Control (RBAC)

Role-based access control is a method of managing access levels to applications or individual users. It's a handy tool in the hands of an administrator to give fine grained controls to others.

RBAC essentials	Check RBAC Documentation

Use Kubeadm to Install a Basic Cluster

This section focuses on setting up of a cluster using the kubeadm tool. The candidate must have clear understanding of underlying components of Kubernetes such as etcd, kube api servers, SSL certificate management etc.

> **Note:** Ensure swap is disabled on all nodes before deploying the Kubeadm cluster.

Learn About Kubeadm	Kubeadm Documenation
Tutorial	Kubeadm Cluster Setup Guide

Manage a Highly-available Kubernetes Cluster

One of the duties of a Kubernetes administrator is to ensure high availability of the cluster. This involves proper maintainence tasks on the cluster as well as managing the worker nodes.

HA Kubernetes Cluster	HA cluster setup using Kubeadm

Most clusters today are created on AWS, Azure or GCP where the respective cloud providers take responsibility of cluster availability. However, it is important to understand the logic behind the HA kubernetes cluster.

Provision Underlying Infrastructure to Deploy a Kubernetes cluster

A Kubernetes cluster needs a lot of components to work in sync. Therefore, a clear understanding of each component like etcd, kube api-service, controllers, schedulers

Kubernetes Componentes	Kubernetes components overview

Perform a Version upgrade on a Kubernetes Cluster Using Kubeadm

Kubernetes is a continously improving tool. Every now and then, a new version comes up with improvements and features. It is the duty of the administrator to take care of version upgrades.

Task	Kubernetes Version Upgrade Use Kubeadm

Implement etcd Backup and Restore

Etcd is a key value store of the cluster. All the information regarding pods, services etc are stored here in key value format

Basic etcd commands to try:

```
etcdctl cluster-health

etcdctl member-list

etcdctl set k1 v1

etcdctl get k1
```

Reference	etcd Backup & Operations

Workloads & Scheduling [15%]

Understand Deployments and How to Perform Rolling Update and rollbacks

Kubernetes Deployment ensure a minimum no of replicas of an application are running at all times. In case a replica goes down, the Kubernetes API ensures that a new one is created within minutes.

Imperative commands: These are commands which let you create Kubernetes objects via a CLI. Meaning they remove the need to write

Kubectl commands:

```
kubectl create deployment <name> --image=<name> //create deployment

kubectl create deployment <name> --image=<name> -- sleep 300 //with command
arguments

kubectl scale deployment <name> --replicas=4 //scale up or down
```

Reference	Kubernetes Deployment Concepts

Sometimes, you may want to rollback a Deployment; for example, when the Deployment is not stable, such as a crash loop back error, you can roll back the Deployment

Kubectl commands:

```
kubectl set image deployment <name of deployment> <name of container>=<new image
name> // update image

kubectl rollout status deployment <name of deployment> //see status

kubectl rollout history deployment <name of deployment> //see history
```

Reference	Kubernetes Rolling Update

Use Config Maps and Secrets to Configure applications

Kubernetes Configmaps are useful to store noncritical data in key-value pair format. They can also be used to inject env vars into pods.

Reference	Kubernetes Configmap Concepts

Kubectl Commands for Configmaps:

```
kubectl create cm <name of configmap> --from-file=hello.txt
kubectl create cm <name of configmap> --from-literal=key1=value1
```

Secrets are useful to store sensitive data in key value pair format. They can also be used to inject env vars into pods.

Kubectl commands for secrets:

```
kubectl create secrets <name of secret> --from-file=hello.txt
kubectl create secrets <name of secret> --from-literal=key1=value1
```

Know How to Scale Applications

Kubernetes provides a no. of ways to scale applications, you can use deployment objects and increase the no. of replicas of your application.

Horizontal Pod Autoscalers (HPAs) can also be used to increase the no. of replicas according to the application metrics

Task	Working With Horizontal Pod Autoscaler

Understand the Primitives Used to Create Robust, Self-healing, Application Deployments

This section is mostly conceptual, for any self healing application you should use deployments or stateful sets so that whenever pods go down, Kubernetes recreates them instantly.

Deployments also give you option to keep a track of all the changes you make. You can also rollback to a previous state very easily.

```
kubectl set image deployment <name of deployment> <name of container>=<new image name> // update image

kubectl rollout status deployment <name of deployment> //see status

kubectl rollout history deployment <name of deployment> //see history
```

Understand How Resource Limits Can Affect Pod Scheduling

Cluster management also involves management of workloads, as an admin – you should ensure that each pod is able to get resources based upon it's needs.

In kubernetes, each pod can be assigned a minimum and maximum CPU and memory usage.

Reference 01	Manage Container Resources

Awareness of manifest management and common templating tools

This section expects you to be familiar with tools like kustomization, helm etc.

Kubernetes Manifests	Managing Kubernetes Objects
Kustomization	Manage objects with Kustomize

Services & Networking [20%]

Understand host networking configuration on the cluster nodes

Kube-proxy is the component required on each worker node for the pods to communicate with each other. Networking between nodes involves kube proxy participation as well.

Kubelet is how a worker node is in network with the master node. All these concepts are required for understanding networking inside kubernetes.

Reference	Kubernetes Networking

Understand Connectivity Between Pods

Pods communicate with each other using services. Kube proxy is the component which makes this possible.

Reference	Understand Kube Proxy

Understand ClusterIP, NodePort, LoadBalancer service types and endpoints

Understanding each service type along with their use cases is very important. Special attention should be paid on understanding how pods can be added under a service.

Reference	Kubernetes Service Explained

Know how to use Ingress controllers and Ingress

Ingress resources is how external entitites are assigned access to internal cluster services. Ingress controllers are load balancers which make it possible.

Reference 01	Kubernetes Ingress
Reference 02	Kubernetes Ingress Controller
Blog	Ingress Tutorial for Beginners

Know How to Configure and Use CoreDNS

CoreDNS is a flexible, extensible DNS server that can serve as the Kubernetes cluster DNS. Like Kubernetes, the CoreDNS project is hosted by the CNCF.

Task	Using CoreDNS for Service Discovery

Choose an appropriate container network interface plugin

CNI stands for Container Networking Interface and it's goal is to create a generic plugin-based networking solution for containers.

There are a lot of solutions such as Flannel, Calico etc. This section explores some of them.

Reference	Kubernetes Network Plugins

Storage [10%]

Understand Storage Classes, Persistent Volumes, Persistent Volume Claims

StorageClasses: StorageClass provides a way to describe the "classes" of storage available.

PersistentVolume: It is a piece of storage in the cluster that has been provisioned by an administrator or dynamically provisioned using StorageClasses. They are created over StorageClasses.

PersistentVolumeClaim: It is a request for storage by a user. They are created over PersistentVolumes

Reference	Kubernetes Persistent Volumes

Understand Volume Mode, Access Modes and Reclaim Policies for volumes

Volume modes: Kubernetes supports two types of volume modes: Filesystem & Block.

Access modes: Kubernetes supports three types of access modes: ReadWriteOnce, ReadOnlyMany & ReadWriteMany.

Reclaim Policy: Kubernetes supports three policies: Retain, Recycle & Delete

Reference	Kubernetes Volume Modes Kubernetes Volume Access Modes

Know How to Configure Applications With Persistent Storage

Application pods can use persistent storage by mounting a PVC.

Task	Configure Kubernetes Volume in Pod

Troubleshooting [30%]

Evaluate Cluster and Node Logging & Managing Logs

Application logs can helps in understanding the activities and status of the application. The logs are particularly useful for debugging problems and monitoring cluster activity.

Going through logs of kubernetes control plane components like etcd, scheduler can also be very helpful.

There are certain flags in kubectl commands which can help speed up your debugging cases, they are given below.

Kubectl Command To Check Logs:

```
kubectl logs deployment/<name of deployment>
```

Reference	Kubernetes Logging

Understand How to Monitor Applications

Monitoring applications can be done by storing logs and studying the application's metrics.

Tools like Prometheus & Grafana are popular as they make management of metrics very easy.

Very often, sidecar containers are used as metrics exporter of the main application container.

Troubleshoot Application Failure

Administrators are also required to help users debug applications that are deployed into Kubernetes and not behaving correctly.

Reference	Understanding Kubernetes Logging
Task	Debug Kubernetes Objects

Troubleshoot Cluster Component Failure

Cluster components must be troubleshooted for failures when users are sure that their application have everything perfectly setup.

Task	Debug Kubernetes Cluster

Troubleshoot Networking

There can be scenarios where things are going wrong on the network end such as some incorrect configuration in ingress resources etc.

Some Unofficial Useful CKA Resources

1. Understand kubernetes SSL certificates
2. Simulator for hands-on practice
3. Vim shortcuts. This will help you save time on exams.

CKA Exam DO's

- While giving CKA practice exams, try to wrap up 15 minutes before the deadline – it will give you additional time to revise the solutions.
- Give a couple of practice exams, identify your weak topics and spend more time on those.
- On the exam day, keep an alternative internet source handy in case of Wi-Fi internet goes down. We don't want all our handwork to be wasted, do we?
- If any particular question will take more than 6-7 mins to solve, flag/mark it to solve for later and come back once you solve the rest.

CKA Exam DON'Ts

- Most people don't even use an alias. So no need to overwhelm yourself with an `alias` for everything.
- Don't give the exam on the last day. The idea is to give it in a pressure-free environment.
- At the time of the exam, you don't have anything on the table other than your workstation or laptop. Linux Foundation has strict rules on the CKA exam environment.

Conclusion

This **CKA exam study guide** will help you understand cluster components and their management in a much better way and help in your career progression.

CKA is a great certificate to have for every DevOps engineer out there who is looking to climb up the ranks! It's importance will only grow in the future. So give your best and prepare well!

This guide has given you all the resources, tips and methods to help you prepare. we will keep updating it with new tools and resources. All the best for your preparations.

SHARE TWEET

Shishir Khandelwal

Shishir is a passionate DevOps engineer with a zeal to master the field. Currently, his focus is on exploring Cloud Native tools & Databases. He is a certified AWS & Kubernetes engineer. He enjoys learning and sharing his knowledge through articles on his LinkedIn & DevOpsCube.

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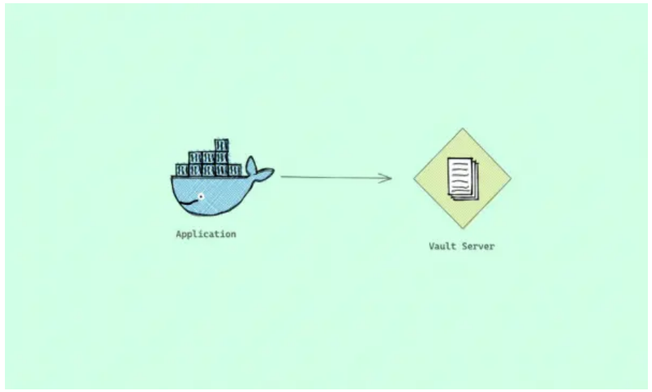

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How to Setup Vault in Kubernetes-Beginners Tutorial

by **Bibin Wilson** and **Shishir Khandelwal** · July 19, 2021

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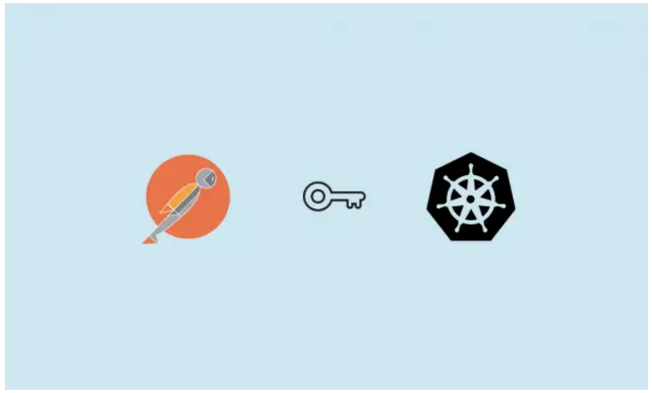

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How To Create Kubernetes Service Account For API Access

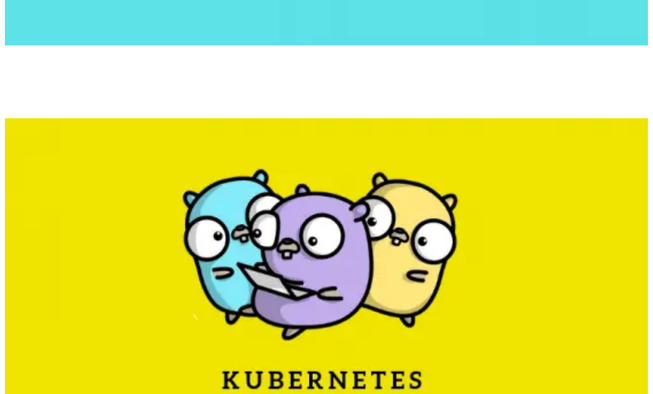
by **Bibin Wilson** · June 5, 2021

This tutorial will guide you through the process of creating the service account, role, and role binding to...

H — HOW TO

How To Setup Grafana On Kubernetes

with many data sources like Prometheus, AWS...



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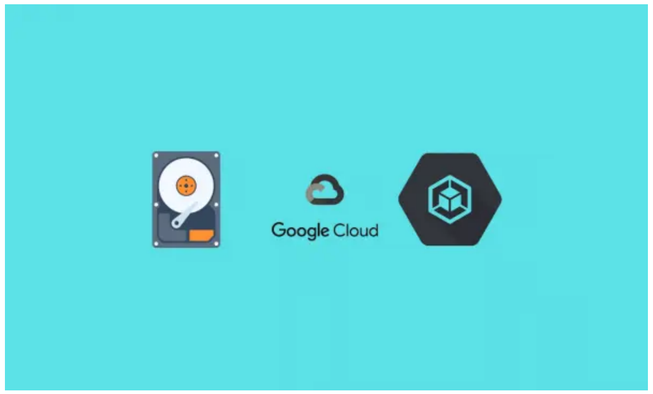
CKS Exam Study Guide: Resources to Pass Certified Kubernetes Security Specialist

by **Bibin Wilson** · June 23, 2021

In this Certified Kubernetes Security Specialist (CKS) Exam study guide, I have listed all the resources you can...



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How to Add Persistent Volume in Google Kubernetes Engine

by **Bibin Wilson** · June 17, 2021

In this blog, you will learn how to setup Persistent Volume For the GKE Kubernetes cluster. If you...

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