

## Hatigen Consulting Services Pvt Ltd

### Certified Kubernetes Administrator

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#### Program Overview:

Kubernetes is one of the most popular container orchestration tools available. The Container Orchestration with Kubernetes Certification course will help you grasp the key skills, technology, and concepts that a Kubernetes administrator needs to know. Plan to oversee containerized workloads and administrations with industrial Organizations utilizing the Kubernetes Preparing course. It covers all of the aspects, including application lifecycle management, installation, configuration and validation, networking, scheduling, security, cluster maintenance, core concepts, Azure Kubernetes, storage, and more.

#### Program Features:

- Trusted content
- Re-learn for free anytime in a year
- Rigorous assignments and assessments
- Learn at your own pace
- Mandatory feedback sessions
- Mock-interview
- Hands-on real-time experience

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- Free Mentorship
- Live chat for instant solutions
- Job-ready employees post-training
- End-to-end training
- Download the certificate after the course

### **Delivery Mode:**

- Online Training

### **Prerequisites:**

You should have a solid understanding of containers, and Docker in particular. Our DevOps Certification course will help you learn about Docker. Working experience with Linux shells is beneficial but not mandatory.

### **Target Audience:**

- Software developers
- Software engineers
- System administrators
- Linux administrators
- Cloud administrators

### **Key Learning Outcomes:**

- By the end of this online Container Orchestration with Kubernetes course, you will be able to:
- Understand the application lifecycle management
- Install and configure Kubernetes
- Maintain clusters, security, storage, and volumes
- Comprehend microservices architecture

### **Certification Details and Criteria:**

- Gain the course certificate by finishing any one of the given criteria

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- Pass at least one Course end Project out of two
- Pass at least one Assessment test out of two with 75% passing marks

### Course Curriculum:

#### Self Paced Curriculum

##### Lesson 01 - Introduction

- Introduction

##### Lesson 02 - Kubernetes Overview

- Containers Overview
- Demo - Setup Lab – VirtualBox
- Demo – Docker
- Container Orchestration
- Kubernetes Architecture

##### Lesson 03 - Setup Kubernetes

- Kubernetes Setup - Introduction and Minikube
- Demo – Minikube
- Kubernetes Setup – Kubectl
- Demo - Kubectl - Part 1 - Setup Virtual Machines and Prerequisites
- Demo - Kubectl - Part 2 - Configure Cluster with kubectl
- Demo - Kubernetes on Google Cloud Platform
- Demo - play-with-k8s.com

##### Lesson 04 - Kubernetes Concepts

- PODs
- Demo – PODs

##### Lesson 05 - YAML Introduction

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- Introduction to YAML

### **Lesson 06 - Kubernetes Concepts - PODs, ReplicaSets, Deployments**

- PODs with YAML
- Tips & Tricks – YAML
- Replication Controllers and ReplicaSets
- Demo – ReplicaSets
- Deployments
- Demo – Deployments
- Deployments - Update and Rollback
- Demo - Deployments - Update and
- Rollback

### **Lesson 07 - Networking in Kubernetes**

- Basics of Networking in Kubernetes
- Demo - Networking in Kubernetes

### **Lesson 08 - Services**

- Services – NodePort
- Demo – Services
- Services – ClusterIP

### **Lesson 09 - Microservices Architecture**

- Microservices Application
- Demo - Deploying Microservices
- Application on GCP Kubernetes Cluster
- Demo - Example Voting Application
- Improved - v2

### **Lesson 10 - Conclusion**

- Conclusion

### **Course Curriculum:**

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### Live Virtual Curriculum

#### Lesson 01 - Course Introduction

- Introduction to Kubernetes
- CKA and its importance
- Learning Path
- Program Outline
- Course Outline
- Course Components
- Course Completion Criteria

#### Lesson 02 - Core Concepts

- Overview
- Etcd
- Controller
- Scheduler
- Kubelet
- Kube Proxy
- Pods
- ReplicaSets
- Deployments
- Services, Load Balancing & Networking
- Containers
- Policies

#### Lesson 03 - Kubernetes Cluster

- Cluster Architecture overview
- Configuring a Cluster
- Managing and Administering Clusters
- Node
- Control Plane–Node Communication
- Understanding Controllers
- Importance of Cloud Controller Manager
- Working with kubeadm

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- Managing a Cluster Using kubelet
- Role-Based Access Controller
- API Server
- Achieving High Availability
- Backup, Restoration of etcd Cluster Data
- Version Upgrade on Kubernetes Cluster
- Managing Kubernetes Objects

### Lesson 4: Workloads

- Overview of Workloads
- Deployment
- Understanding Pods
- Pod Lifecycle
- Working on Pod Allocation
- Init Containers
- Managing Container Resources
- Health Monitoring
- Multi Pod Containers
- Pod Topology Spread Constraints
- ReplicaSet
- Static Pods
- Application Configuration
- ConfigMap and Secrets
- Achieving Scalability
- Building Self-Healing Pods with Restart
- Policies
- Manifest Management and Common
- Templating Tools

### Lesson 5: Scheduling

- Scheduler Overview
- Scheduling Frameworks
- Kube-Scheduler
- Node Selection in Kube-Scheduler

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- Perform Rolling Updates on a DaemonSet
- Rollbacks
- Scheduler Performance Tuning
- Scheduling Policies
- Scheduling Profiles
- Topology Management Policies
- DaemonSet
- Pod Overhead
- Performance Tuning
- Managing Resources

### Lesson 6: Services, Load Balancing, and Networking

- Overview
- Services
- Topology
- Service Catalog
- DNS for Services and Pods
- Connecting Applications with Services
- EndpointSlices
- Ingress
- Ingress Controllers
- Network Policies
- Adding Entries to Pod /etc/hosts With
- HostAliases
- IPv4/IPv6 Dual-Stack
- Cluster Networking

### Lesson 7: Storage

- Overview of Storage in Kubernetes
- Volumes
- Persistent Volumes
- Volume Snapshots
- CSI Volume Cloning

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- Storage Classes
- Volume Snapshot Classes
- Dynamic Volume Provisioning
- Storage Capacity
- Ephemeral Volumes
- Node-Specific Volume Limits

### Lesson 8: Azure Kubernetes Service

- Kubernetes in Cloud Environment
- AKS Service Components

### Lesson 9 :Troubleshooting and Kubernetes Case Studies

- Overview of Troubleshooting in Kubernetes
- Kubernetes Cluster Logging Architecture
- Cluster and Node Logs
- Container Logs
- Application Troubleshooting
- Monitoring Tools
- Commands to Debug Networking Issues
- AKS Monitoring and Logging
- Case Studies

### Course End Projects:

#### Project 1: IT Software Containerization

As a Kubernetes developer demonstrate the packaging of your web application in a Docker container image. Use the container image on Google Kubernetes Engine cluster as a load-balanced set of replicas that can scale to the needs of your users. Scale a deployed application in Google Kubernetes Engine then deploy a new version of your app without having zero down time and finally deploy it to the cluster.

#### Project 2: Social Media underlying infra challenges

As a Kubernetes Developer, complete the features of the application Scalability by





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demonstrating how to create Cluster with auto scale feature, How to resize the existing cluster size in order to meet infra requirements of already running application in production, & Finally how to auto scale the application in terms of Replica set and deployments.

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