CERTIFIED KUBERNETES ADMINISTRATOR TRAINING

Course Outline

Program Overview:

Kubernetes is one of the most popular container orchestration tools available. The Kubernetes Administrator certification course, founded by the Cloud Native Computing Foundation (CNCF), will enhance your Kubernetes skills and give you credibility in the field while preparing you for the CKA exam. Get prepared for the CKA exam with our Certified Kubernetes Administrator course. It covers all of the domains, including application lifecycle management, installation, configuration and validation, networking, scheduling, security, cluster maintenance, core concepts, storage, and troubleshooting, with projects to help you get exam-ready.

Program Features:

- 52 hours of Blended Learning
- 40 hours of instructor-led training
- 12 hours of online self-paced learning
- 11 real-life projects
- Flexibility to choose classes
- Industry-recognized course completion certificate

Delivery Mode:

Blended - Online self-paced learning and live virtual classroom

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
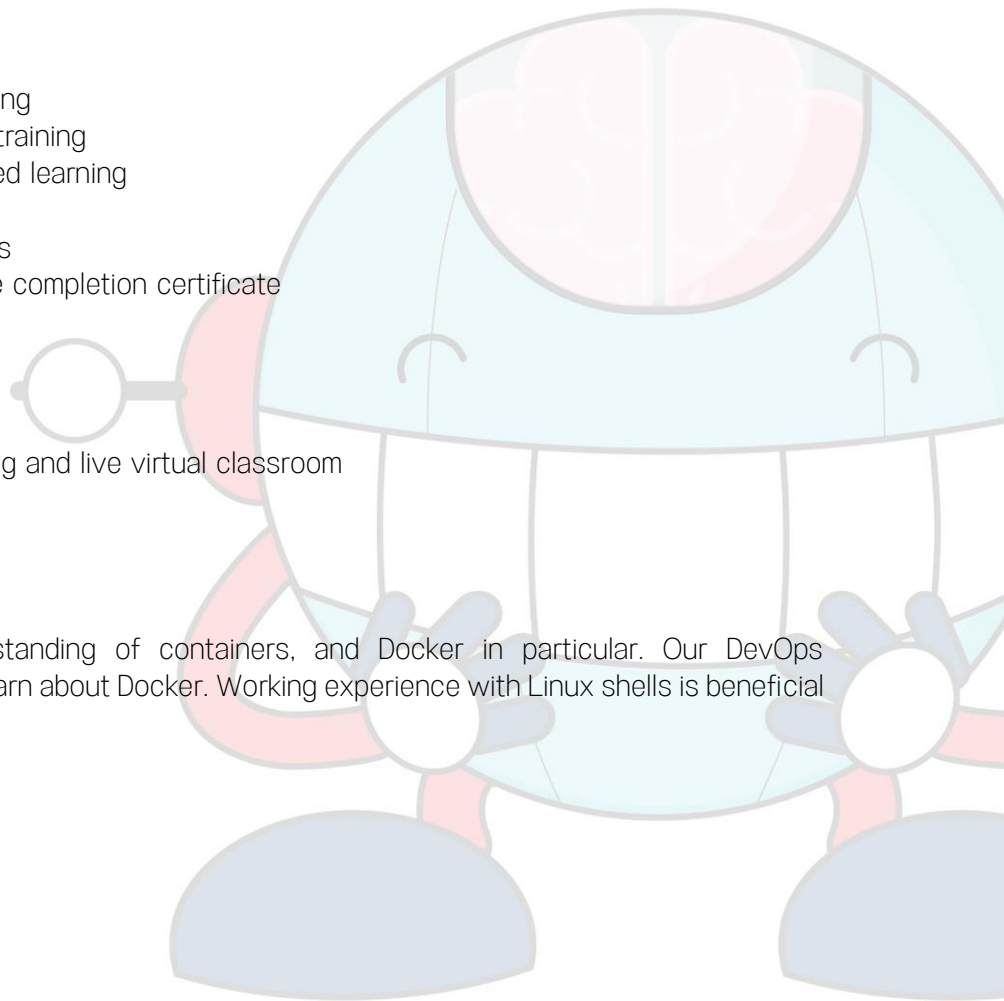
- Linux administrators
- Cloud administrators

Key Learning Outcomes:

By the end of this online CKA training course, you will be able to:

- Understand the application lifecycle management
- Install and configure Kuberenetes
- Maintain clusters, security, storage, and volumes
- Comprehend microservices architecture

Certification Details and Criteria:

- Complete at least 85 percent of the course or attend one complete batch
- Successful completion and evaluation in the project

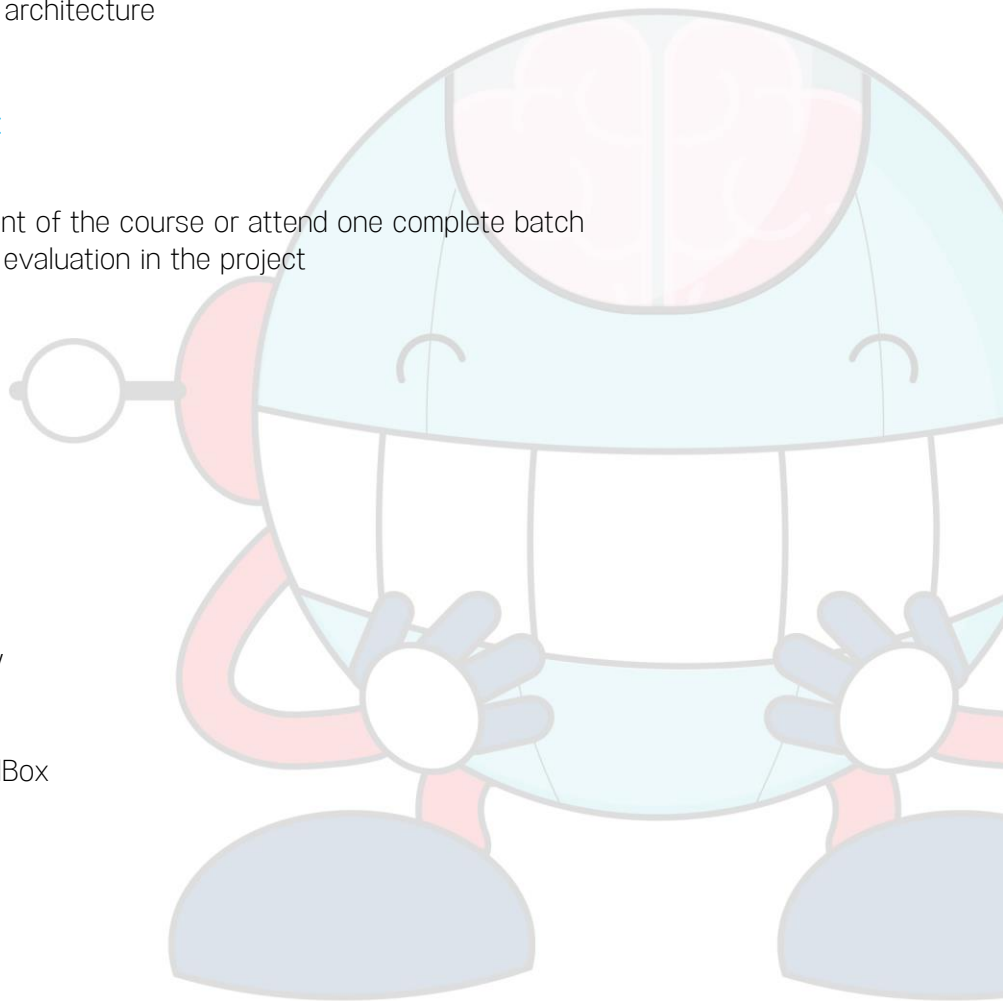## Course Curriculum:

Self Paced Curriculum

Lesson 1: Introduction

- Introduction

Lesson 2: 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 – Kubeadm
- Demo - Kubeadm - Part 1 - Setup Virtual Machines and Prerequisites
- Demo - Kubeadm - Part 2 - Configure Cluster with kubeadm
- Demo - Kubernetes on Google Cloud Platform
- Demo - play-with-k8s.com

Lesson 04: Kubernetes Concepts

- PODs
- Demo – PODs

Lesson 05: YAML Introduction

- 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
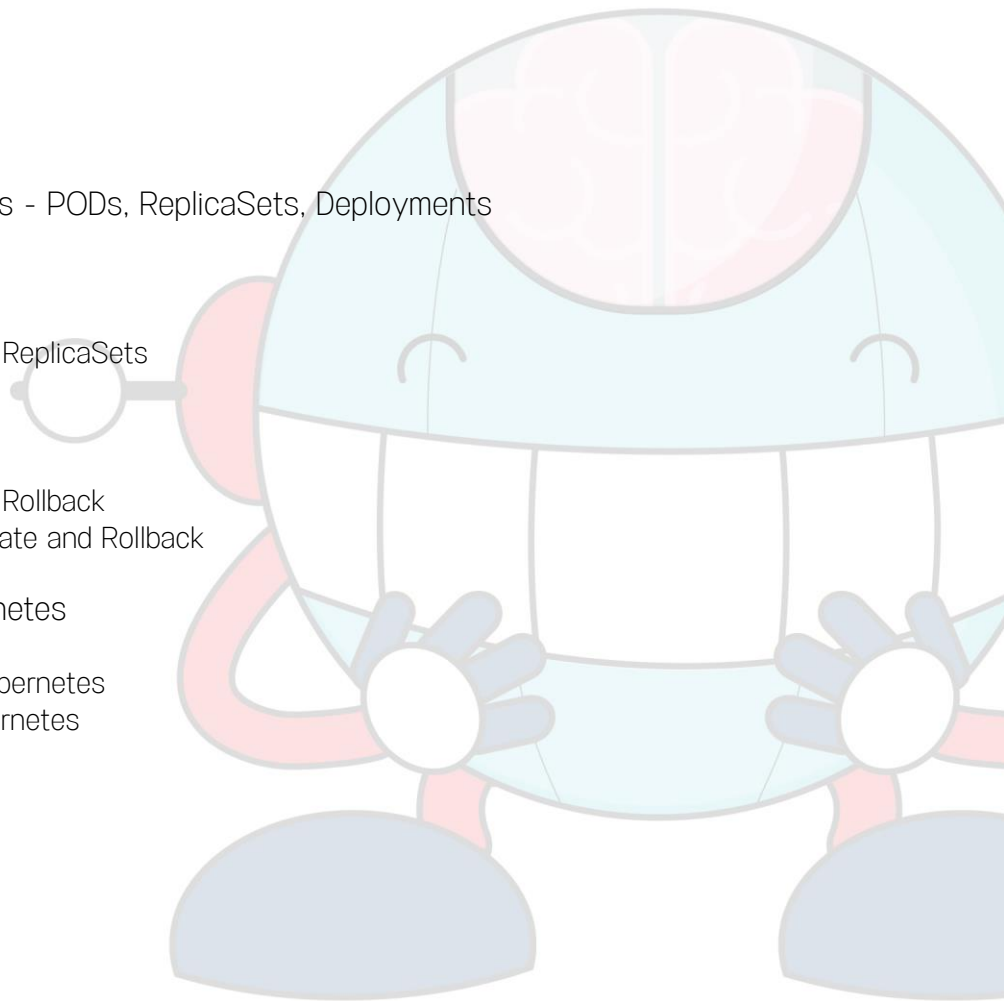
Lesson 09: Microservices Architecture

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

Lesson 10: Conclusion

- Conclusion

Live Virtual Class Curriculum

Lesson 01: Core Concepts

- ETCD
- Assisted Practice: ETCD Installation
- Kube-API Server
- Controller Manager
- Scheduler
- kubelet
- Assisted Practice: Installation of kubelet in worker nodes in kubeadm method
- kube proxy
- PODs
- Assisted Practice: Pods creation using yaml file
- ReplicaSets
- Assisted Practice: ReplicaSet creation using yaml file
- Deployments
- Assisted Practice: Deployment creation using yaml file
- Services, Service Cluser IP
- Assisted Practice: Service creation using yaml file
- Job Scheduling
- Using Kubernetes Scheduler

Lesson 02: - Scheduling Pods

- Manual Scheduling
- Assisted Practice: Scheduling Pod using Binding
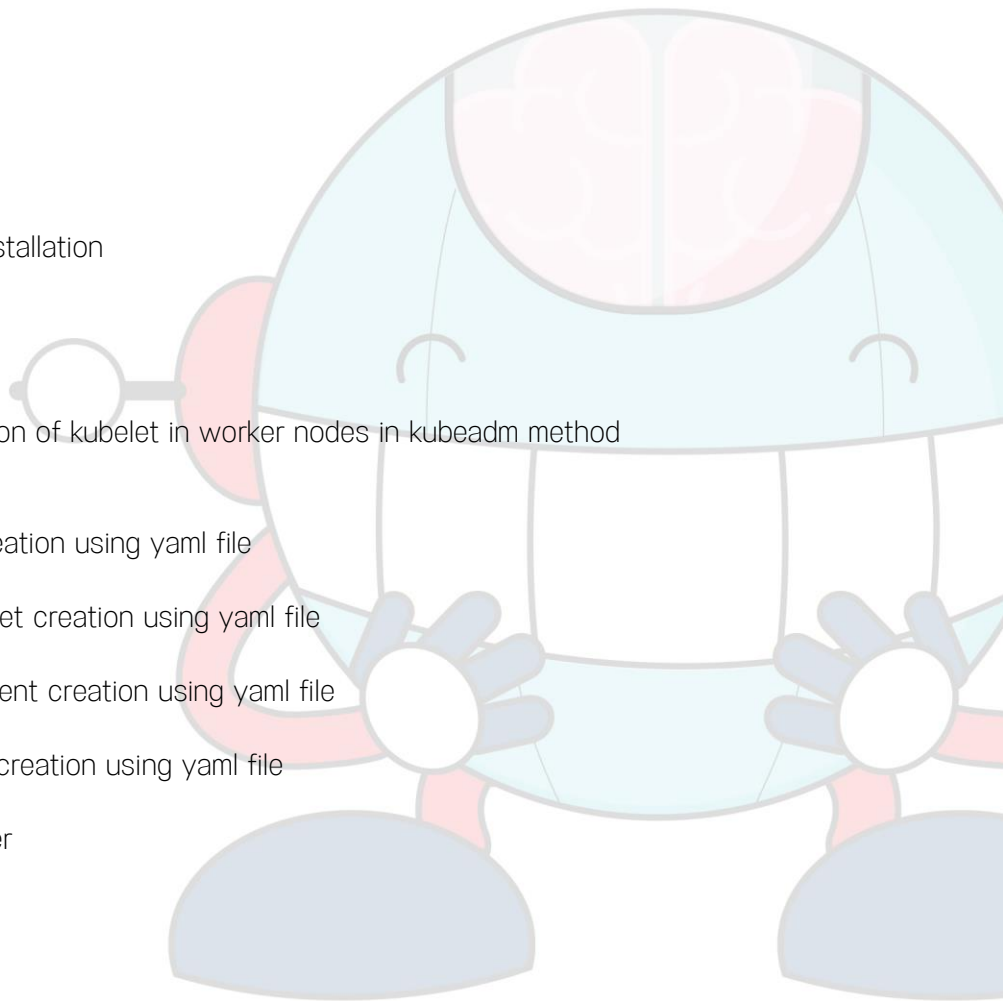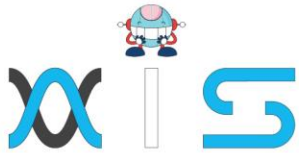
- Labels and Selectors
- Assisted Practice: Labels and Selectors in ReplicaSet
- Resource Requiments and Limits
- Assisted Practice: Create a POD with resource requirement & Limit
- DeamonSets
- Assisted Practice: Create DaemonSets
- Static Pods
- Multiple Scheduler
- Assisted Practice: Docker commands instead of kubectl commands in static POD
- Assisted Practice: Multiple Scheduler - Introduction
- Assisted Practice: Configure the POD with custom scheduler
- Assisted Practice: Create custom scheduler in Kubeadm
- Task Allocation Using Kubernetes Scheduler

Lesson 03: Logging and Monitoring

- Monitor Cluster Components
- Assisted Practice: Install and configure Metric Server
- Managing Application Logs
- Assisted Practice: kubectl top commands
- Assisted Practice: Viewing logs in multicontainer POD
- Health Monitoring Using Kubernetes

Lesson 04 - Application Lifecycle Managemen

- Rolling Updates and Rollbacks
- Assisted Practice: Deployment rolling update with kubectl rollout (command)
- Assisted Practice: Deployment rolling update with editing the Deployment file
- Assisted Practice: Rollout status check
- Assisted Practice: Rollout pause and resume
- Assisted Practice: Rollbacks with command and deployment file
- Assisted Practice: Updating the rollback deployment method
- Configure Applications Commands and Arguments
- Assisted Practice: Create a Pod with 'echo host name' commands
- Assisted Practice: Create a Pod with 'sleep 3600' arguments
- Configure Environmental variables n applications
- Assisted Practice: Create a Pod with environment of 'sample environment'
- Configuring ConfigMaps in Applications
- Assisted Practice: Create a configmap from the values with variable
- Assisted Practice: Create a configmap from file
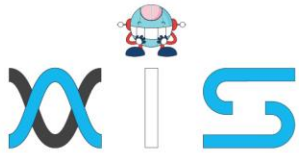
- Assisted Practice: Create a configmap from env file
- Assisted Practice: Configure a configmap as a file in the POD
- Assisted Practice: Configure a configmap as a variable in the POD
- Assisted Practice: Configure a configmap as a volume in the POD
- Scale Applications
- Assisted Practice: Scale up application with more replicas
- Assisted Practice: Scale down application with less replicas
- Assisted Practice: Scale up and Down with kubectl command Multi-container PODs
- Assisted Practice: Create a multi container pod which access same volume
- Multi-container PODs Design Patterns InitContainers
- Assisted Practice: InitContainers Demonstration Self Healing Applications
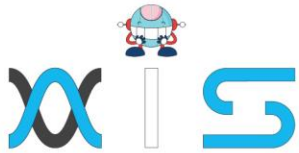- Autoscaling and Cluster Resource Management

Lesson 05 - Cluster Maintenance

- OS Upgrades
- Assisted Practice: Drain node
- Assisted Practice: Cordon node
- Assisted Practice: Uncordon node
- Kubernetes Software versions
- Cluster Upgrade Process
- Assisted Practice: kube-apiserver
- Assisted Practice: kubelet and kube-proxy
- Backup and Restore Methods
- Assisted Practice: Backup Resource configs
- Assisted Practice: Backup etcd
- Assisted Practice: Restore etcd CICD (Continues Integration and Continues Deployment)

Lesson 06 - Security and Authentication

- Kubernetes Security Primitives
- Authentication
- TLS
- Certificates API Kubeconfig
- Persistent key/value store
- API Groups
- Role Based Access Controls
- Assisted Practice: RBAC role creation
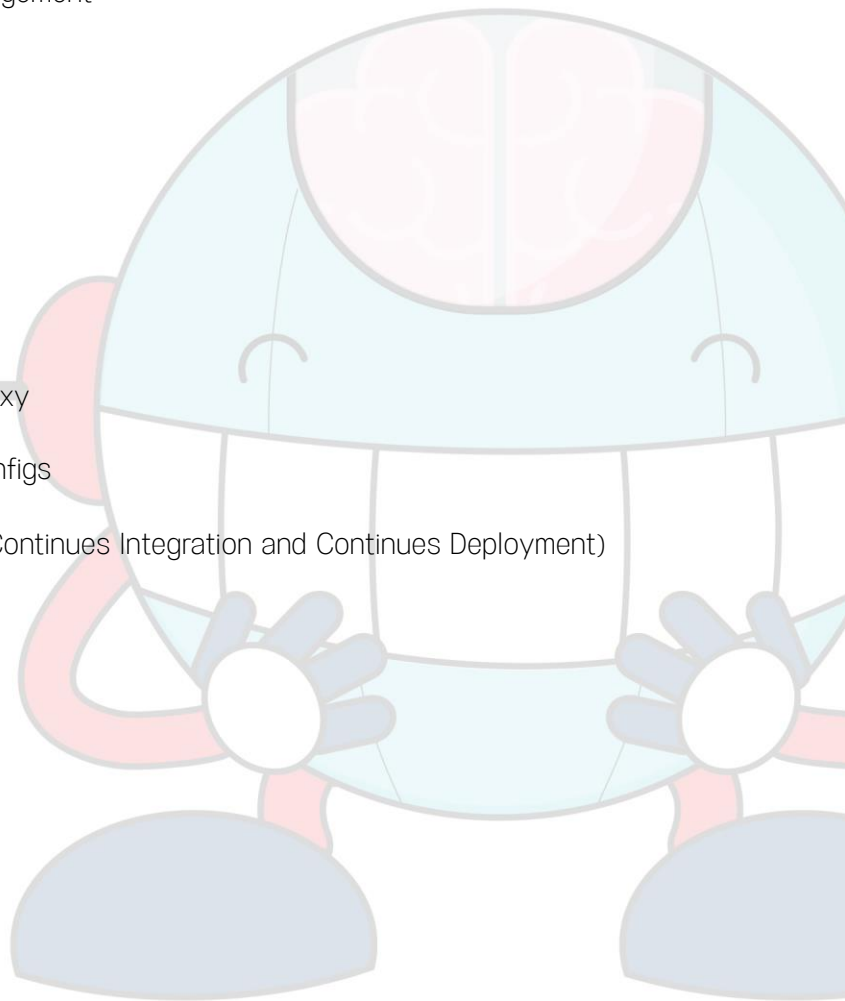
- Assisted Practice: Cluster Role Creation
- Cluster Roles and Role Bindings
- Assisted Practice: Associate the user with the role
- Assisted Practice: Associate the user with Cluster Role Image Security
- Assisted Practice: Secrets with private registry info stored Network Policy
- Assisted Practice: Create network policy
- Assisted Practice: Modify the pod settings to associate with Network policy
- Authentication and Authorization

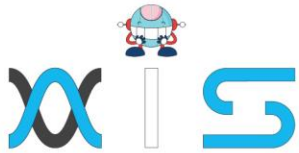## Lesson 07 - Code Quality Improvement Using Jenkins

- Volumes
- Assisted Practice: Create a volume with Declarative (Yaml)
- Assisted Practice: Create a volume with Host path (Host Drive)
- Assisted Practice: Create a volume with Empty Dir (Auto deletion)
- Assisted Practice: Create a volume with nfs share
- Persistent Volumes Assisted Practice: Introduction to Persistent volume
- Assisted Practice: Create a persistent volume with declarative (yaml)
- Persistent Volume Claims
- Assisted Practice: Introduction to Persistent volume claims
- Assisted Practice: Create a persistent volume claims with declarative (yaml)
- Application Configuration Assisted Practice: Pod Creation with volumes
- Assisted Practice: Pod Creation with Persistent volume
- Claims Deploy Large scale Applications

Lesson 08 - DNS Networking, CoreDNS, and CNI

- Introduction to Automated Deployment and Continuous Delivery
- Building the Continuous Delivery Process
- Implementing Automated and Continuous Deployment
- Assisted Practice: Deploying a Python Application Assisted Practice: Tomcat and Jenkins
- Assisted Practice: PHP and Jenkins
- Deploying Maven App To Tomcat Server

Lesson 09 - Troubleshooting: Application Failures, Control Panel Failures, and Network Failures

- Application failure
- Assisted Practice: Application Failure - Check POD, Logs and Events

- Control Panel Failure
- Assisted Practice: Check controlplane failure status in POD and service
- Worker Node Failure
- Assisted Practice: Check Node status, describe node to know cause
- Assisted Practice: Top command to check node performance
- Assisted Practice: Connectivity with master and cert status
- Assisted Practice: Worker node failure checks Networking Failure
- Assisted Practice: Service connectivity check
- Assisted Practice: Nslookup check
- Assisted Practice: kube-proxy check and CNI plugin check
- Assisted Practice: Network failure check in above stuffs
- Debugging

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 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.
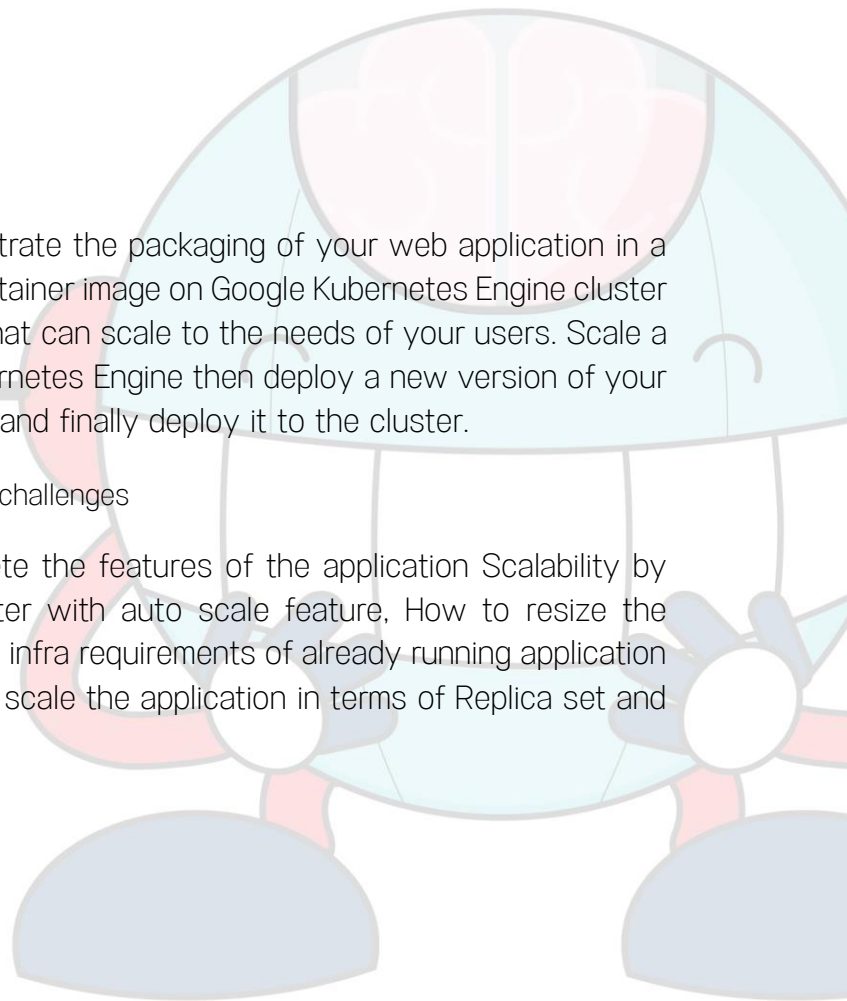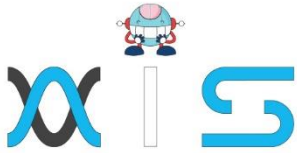
AIS

With the rising demand in scalable technology, AIS provides tailored goal-setting based on your organization's needs and expectations. With products geared towards the growing needs of your organization's customers and employees, AIS has innovative and value-driven solutions.

Learning Partners

SAS Management, Inc.

SAS Management, Inc. has been a leader in the training, certification and consulting services industry in the Philippines. With offices in Makati, Ortigas and Cebu, Philippines, the company has been the top training and consulting company for over 9 years. In its years of existence, it has provided certificates to over 100,000 professionals including 10,000 participants in the 160+ courses that have been conducted just during the 2020-2021 pandemic alone. The most sought-after courses being offered are ITIL, Project Management Professional (PMP)®, COBIT 5, Six Sigma Yellow Belt, Six Sigma Green Belt, PRINCE2, and organizational skills, among others.

Simplilearn

Simplilearn, based in California and India, is the world's #1 online bootcamp and one of the world's the leading certification and training providers. Simplilearn trained over 2,000,000 professionals with 2,000+ trainers and provides over 400 different courses.

Technology Partner

Freshworks

With over 40,000 customers, Freshworks is a business solutions software provider with products ranging from IT helpdesk and service desk, customer relationship management, live chat, marketing automation, phone system, and HR.
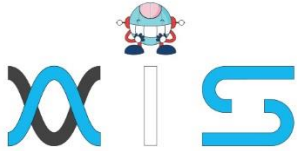
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