DevOps Phase-2

Kubernetes Certified Admin (CKA/CKAD)

## Introduction to Docker & Kubernetes

* Understanding Container Runtime Environments.
* Working with YAML files for creating manifests.
* Deploying Docker and understanding Docker components like Engine, Networks, Images & Registries.
* Creating custom container images with Dockerfile
* Why Kubernetes & Understanding Kubernetes architecture and Components.
* Understanding the Kubernetes Component Connectivity.
* Studying significance of API-Server, ETCD, Kube-Scheduler, Controllers, Kubelet & Kube-Proxy.
* Understanding Kubernetes High Availability.

**Deploying & Managing Kubernetes using KOPS**

* What is Kubernetes Operations (KOPS)?
* Deploying Kubernetes Production Grade Kubernetes Cluster with on AWS with KOPS.
* Understanding components of KOPS.
* Scaling the Kubernetes Cluster using KOPS.
* Manipulating KOPS configuration for reducing the bill.
* Accessing Kubernetes cluster with Kubeconfig
* Running Kubernetes basic cluster commands.

**Working with Kubernetes POD’s & Deployments**

* Running Kubectl Commands vs. Deploying Manifests
* Overview about POD, Deployment, ReplicaSet, Service & Namespaces.
* Deploying, Managing & Troubleshooting PODs.
* Deep dive through POD, POD Components, POD-Sidecar, kube-scheduler life cycle.
* Managing PODs with EXEC, port-forwarding, POD Metadata & POD Environment variables.
* Disadvantages of running PODS and Intro to Deployments.
* Deep dive with Deployments, Replica Set & Replication Controller.
* Differences and use cases of Replica Set & Daemonset.

**Creating and Integrating Kubernetes Services**

* Understating Kubernetes Service and its importance.
* Deep dive on Kubernetes Services and understanding Traffic Flow.
* Creating ClusterIP, NodePort, LoadBalancer & Headless Service.
* Understanding & Creating Liveness & Readiness Probes.
* Understanding and Creating Ingress Controllers and Ingress Services.
* Configure AWS LoadBalancer with Ingress controllers.

**Kubernetes Advance Scheduling**

* Understanding Labels & Annotations
* Configuring Labels & Annotations at Node & PODs.
* Understanding how Taints and Tolerations work.
* Configuring Node Taints and POD Tolerations.
* Understanding and Configuring Node Affinity.
* Understanding and Configuring POD Affinity.

**Storage with Kubernetes**

* Understanding Kubernetes Persistence and Non-Persistent Storage.
* Creating non-persistent volumes - emptydir, gitrepo & host-path.
* Deep dive in to Kubernetes Persistence Volumes (PV).
* Creating Persistent Volume Claims (PVC) with Persistence Volumes.
* Understanding Kubernetes Storage Classes and Dynamic Volume Provisioning.

**Kubernetes ConfigMaps & Secrets**

* Passing command-line variables containers.
* Setting environment variables for containers.
* Intro to ConfigMaps.
* Decoupling configuration with ConfigMap
* Working with sensitive data in Kubernetes.
* Creating and using Secrets in Kubernetes.

**Securing Kubernetes Cluster**

* How authentication works in Kubernetes.
* Deepdive into Kubernetes Namespaces.
* Configuring user access to the cluster.
* Creating and working with service accounts.
* Understanding RBAC in Kubernetes.
* Creating Role and Role Bindings.
* Creating ClusterRoles and ClusterRoleBindings.
* Understanding Blue-Green Deployments & Rolling Updates.

**Troubleshooting & Updating Kubernetes Cluster**

* Working with logs in Kubernetes.
* Working with Master and Worker Node Failure.
* Find and retrieve information about the cluster components.
* Performing Rolling Update with KUBECTL with no downtime & challenges with KUBECTL rolling updates.
* Running KUBECTL cheat sheet commands.

**Kubernetes Jobs & Cronjobs**

* Understanding differences between Job & Cronjobs
* Creating a Job and understanding the attributes.
* Use cases for Jobs.
* Scheduling with Cron Jobs.
* Use cases for Cron Jobs.

**Kubernetes with Rancher & K3S**

* Understanding Rancher & Components
* Deploying Racher and access dashboards.
* Deploy On-Prem Kubernetes Cluster with Rancher
* What is K3S?
* Deploying Kubernetes Cluster with K3S application.
* Advantages of K3S.

**POD Level Security with Network Policies**

* Understanding Kubernetes Network Policies.
* Restricting and Allow Traffic between Pods.
* Allow & Restrict traffic between Namespaces.
* Restricting & Allow traffic based on Application Ports.

**Service Mesh with Istio**

* What is Istio & What is the purpose?
* Understanding Istio Architecture.
* Deploy Istio on Kubernetes Cluster.
* Enable Istio on namespace and deploy application
* Checking Sidecars, Kiali, Jaeger
* Deploying VirtualService & Gateways

**Monitoring & Logging & Cluster Maintenance**

* Monitoring Cluster Components.
* Working with Logs and application logs.
* Performing cluster upgrade.
* Backup and Restore of Cluster.
* Overview about Prometheus monitoring.
* Deploying Prometheus and Grafana on Kubernetes.
* Creating dashboards for monitoring.
* Understanding Alert Manager.

**Working with Azure Kubernetes Services(AKS)**

* Understanding Azure AKS Architecture
* Deploying Azure AKS Cluster
* Understanding Node Pools, Scaling and Upgrading.
* AKS Cluster Access and Azure RBAC
* CI & CD Deployment with Azure DevOps.
* Kubenet vs Azure CNI
* Integrating with Application Gateway & Azure Firewall

**Working with AWS Elastic Kubernetes Services(EKS)**

* Understanding AWS EKS Architecture
* Deploying workloads on EKS Cluster.
* Adding & Removing resources to the cluster.
* RBAC on AWS EKS.

**Helm Package Manager**

* Understanding & Installing Helm 3
* Creating Helm Chart and understanding folder structure.
* Working with Values.yaml file.
* Creating custom charts for Nginx & EFS Provisioner.
* Creating & linting Helm Packages.
* Understanding Helm Chart Repositories.
* Downloading & Installing applications for Helm Repositories.

**CI/CD Tools & GitOps Kubernetes Applications**

* Jenkins & Azure DevOps Overview
* Installing Jenkins and installing necessary plugins.
* Integrating Jenkins with Kubernetes Cluster.
* CI/CD with Jenkins Pipelines.
* Overview on GitOps.
* Understanding and Deploying ArgoCD application.
* Deploying & Updating application using ArgoCD GitOps way.

**Kubernetes Certifications & Interviews**

* Understanding CKA vs CKAD vs CKS.
* CKA/CKAD Exam overview and registration.
* Understanding the exam lab environment.
* CKA/CKAD sample example questions.
* Resume & Profile Creation.
* Attending interviews tips & tricks.

**My Other Courses**

AWS Curriculum:

<https://docs.google.com/document/d/1ujIRC6sSulxagSw7LbA1mSUiDs2BoZ6v85Ypmg68JEI/edit?usp=sharing>

Azure Curriculum:

<https://drive.google.com/file/d/1gCNbDbEGTLCQwlSH4PvXQPaf5FL8Ycj3/view?usp=sharing>

DevOps Curriculum:

<https://drive.google.com/file/d/1H92BoC4nVKrv3crN1J2yy0zE8ZlEorEj/view?usp=sharing>

My YouTube Channel:

<https://www.youtube.com/user/sreeharshav/>