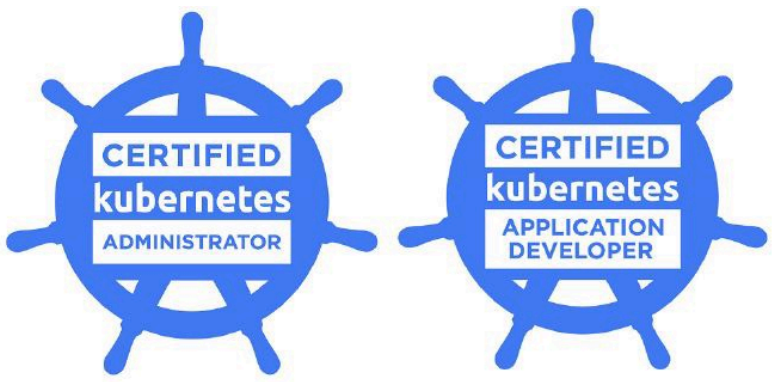

1. Docker

- Introduction to Docker:
  - Monolithic Application Overview
  - Microservices Application Overview.
  - Introduction to Containers
  - Understanding Docker Architecture , Docker Engine
  - Various types of installations available for Docker.
- Docker Containers:
  - Learning Docker Basic Commands:
  - Container LifeCycle.
  - Docker Port Binding.
  - Docker commands
  - VM vs Container
- Docker Networking:
  - Overview of Docker Networking.
  - Bridge networking
  - Implementing user-defined bridge networking.
  - Host networking.
  - Networking Commands and implementing with containers.
- Docker Storage:
  - What is Persistency ? how to achieve it in containers ??
  - Overview of Storage Drivers.
  - Understanding Bind Mount and TMPFS Mount.
  - Overview of Docker Volumes.
  - Using Volumes for Persistent Storage.
- Docker Image Management and Registry:
  - What is an Image ?
  - Inspecting and Docker image
  - How to Create and Pull/Push an Image.
  - What are Image tags ? How do we implement it in the real world?
  - Image Layering.
  - Committing Changes.
  - Deploying and Configuring Private Registry.
  - Using Multi Stage Builds.

- Building Image with Dockerfile
  - Dockerfile Introduction
  - Working with dockerfile instructions.

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2. Kubernetes Advanced(CKA and CKAD)

- **Introduction to Kubernetes**
  - History of Kubernetes.
  - Need for Orchestration and Management tool
  - Introduction to Kubernetes.

- **Kubernetes Architecture:**
  - Kubernetes Components
  - Kubernetes Master and Worker Node Architecture.
  - Working with Kubernetes:
    - Kube API Server
    - ETCD
    - Kube Controller Manager
    - Kube Scheduler
    - Kubelet
    - Kube Proxy

- **BootStrap a Kubernetes Cluster on Cloud**
  - Creating Infra ready on the cloud.
  - Bootstrapping Master and Worker nodes using KUBEADM and managed cluster

- **Working with Kubernetes POD's and Deployments :**
  - Overview on Pod , Container Vs Pod ???
  - What are Namespaces, and how would they be in real time projects ?
  - Understanding YAML.
  - Creation of Pod's through Imperative and Declarative.
  - What are Labels, Selectors , Annotations and their use in K8S.
  - Disadvantage of Pods and introduction to Deployments.
  - Difference between ReplicaSets and Replication Controllers.
  - Deep Dive into Deployments.
  - Scaling Application with RC, RS , and Deployments.
  - Deployment Strategies in Kubernetes, which are used in Production Deployments.
  - Deploying with Blue/Green and Canary strategies
  - Rolling updates and Rollbacks.
  - What are Jobs and Cronjobs
  - DaemonSets

- **Working with Services :**
  - What are Services in Kubernetes, and what's the importance of using it ???
  - Deepdive into K8S Services.
  - Creating ClusterIP, NodePort, LoadBalancer and Headless Service.
  - What's an Ingress Controller and how to create them.

- **Observability:**
  - Implementing Liveness and Readiness Probes.
  - Understanding the real use case of the probes.
  - Horizontal Pod Autoscaler.
  - Automated Scaling of Application with HPA and Metric Server.
  - Logging, Monitoring Applications and debugging.

- **Advanced Kubernetes Scheduling:**
  - How scheduling works in Kubernetes
  - Manually scheduling pods on different nodes.
  - Advanced Pod Scheduling with Node Affinity and Anti Affinity
  - Understanding Node Taints and Pod Tolerations.
  - Understanding INIT-Containers.
  - Understanding DaemonSets.
  - Static Pods
  - Working with Resource Limits in Kubernetes.

- **Kubernetes Resources, QoS, and Namespace Quota**
  - Resource Requests and Limits for CPU and Memory.
  - Quality of Service (QoS) Classes
  - Namespace Resource Quota:

- **Networking In Kubernetes:**
  - Kubernetes Networking Overview.
  - CNI in Kubernetes
  - Understanding DNS in Kubernetes
  - Ingress Networking.
  - Validating and Mutating Admission Controllers
  - Custom Resource Definitions
  - Api Deprecation

- **Storage In Kubernetes:**
  - Why Learn Kubernetes Storage
  - Introduction to Storage in Kubernetes
  - Difference between ephemeral and persistent storage.
  - Volumes: Concepts and Types
  - Persistent Volumes (PV) and Persistent Volume Claims (PVC)
  - Dynamic Volume Provisioning
  - Storage Classes and Provisioners

- Volume Access Modes
- Managing Storage Resources

- **ConfigMaps , Secrets and Environment Variables in Kubernetes:**
  - ConfigMaps in Kubernetes and UseCases in realtime
  - Creating and Using ConfigMaps
  - Mounting ConfigMaps as Volumes
  - What is a Secret?
  - Difference Between ConfigMaps and Secrets
  - Creating and Using Secrets
  - Environment Variables in Kubernetes
  - What are Environment Variables?
  - Setting Environment Variables in Pods
  - Environment Variables from ConfigMaps and Secrets

- **Role-Based Access Control (RBAC) in Kubernetes Network Policies in Kubernetes**
  - What is RBAC? Use case of RBAC ?
  - Authenticating Mechanisms ?
  - Understanding Various TLS certificates for Cluster Components.
  - What is Kubeconfig and its Structure ?
  - Managing Multiple Kubernetes Clusters and switching between clusters
  - Roles and Role Bindings
  - ClusterRoles and ClusterRole Bindings
  - Service Accounts in Kubernetes

- **Network Policies in Kubernetes Cluster Management:**
  - What is a Network Policy?
  - Components of a Network Policy
  - Creating and Applying Network Policies
  - Real Time use cases

- **Cluster Management:Managed Kubernetes Service:**
  - Introduction to High Availability in Kubernetes.
  - Working with OS upgrades.
  - Draining a node safely during maintenance.
  - Upgrading Kubernetes Cluster.
  - Backing Up and Restoring ETCD.

- **Managed Kubernetes Service:**
  - Creating a High available cluster in GKE
  - Creating various types of clusters based on requirement.
  - Dynamic volume allocation using SC
  - Zero downtime upgrades of cluster
  - Private container registry(GCR)

- **Multi Container Pods**
  - What are Multi Container pods and use cases
  - Init containers
  - Static Pod

- **Ingress Controller:**
  - What is an Ingress Controller?
  - What is an Ingress Controller?

- **Troubleshooting in Kubernetes**
  - Checking Cluster and Node logs
  - Troubleshooting a broken cluster.
  - Troubleshooting broken applications.
  - Various issue we get in deploying an application

- **Helm Fundamentals:**
  - Helm Introduction
  - Install helm
  - Create Helm Charts
- **LENS IDE**
- **Certification Preparation BootCamp**

Duration: 2.5 to 3 Months (Total 60 Hours)

Timings: Saturday and Sunday: 07 AM to 10 AM IST