DOCKER WITH KUBERNETES

INTRODUCTION TO CONTAINERIZATION AND DOCKER

- Understanding VM's and Containers.
- Benefits of Containerization.
- What is Docker?
- Comparing VM and Docker.
- Advantages of Docker.
- Docker Architecture and Taxonomy.

WORKING WITH IMAGES AND CONTAINER

- Installing Docker for Windows / Mac Desktop
- Installing Docker on Linux VM
- Pulling Images
- Starting and Stopping Containers
- Running a Container in interactive mode
- Creating Image from current state of Container
- Important Docker Commands

DEVELOPING CUSTOM IMAGES

- Understanding Base Images.
- Managing and Removing Base Image
- Saving and Loading Docker Images
- Docker file and Building Docker Images
- Breaking down and understanding Docker file
- Executing custom applications as Containers.
- Inspecting the Image Architecture
- Multiple stages in Docker file
- Benefits of Multi-Stage builds
- Creating efficient, small images o Alpine Linux, Ubuntu 18.04, Debian slim, and other distributions.

DOCKER VOLUME

- Purpose of using Volumes
- Access Data in Docker Containers
- Use Cases for Volumes
- Docker volume commands

- Creating Container with Volumes
- Sharing Volumes
- Managing state inside containers

DOCKER COMPOSE
- Overview
- Docker compose features
- Building docker-compose.yml file
- Docker-compose command
- Working with multiple images in a single application
- Environment Variables and Configuration File

NETWORKING & PORT FORWARDING
- Introduction to Container Networking
- Exposing Containers with Port Redirect

DOCKER REGISTRY
- Creating a Docker Hub Account
- Pushing an Image to Docker Hub
- Pulling the Image from Docker Hub
- Create Local / Private Registry
- Pushing and Pulling Image from Registry
- Docker Content Trust

KUBERNETES SYLLABUS
Introduction to Kubernetes and its Architecture
- What is Kubernetes
- Why Kubernetes
- Kubernetes features
- Kubernetes Architecture
- Kubernetes Cluster
- Kubernetes Master
    - o API Server
    - o Etcd
    - o Scheduler
    - o Controller Manager
- Worker nodes
- Container Runtime
    - o Kubelet
    - o Kube-proxy
    - o cAdvisor
- Kubernetes Objects Overview

o Kubernetes Pods
o Replication Controllers and Replication sets
o Deployments
o Services
o Volumes and Persistent Volumes
o Stateful Sets
o Daemon Sets
o Jobs and Cron Jobs

INSTALLING KUBERNETES INSTALLATION
- Docker for Desktop
- Minikube
- AKS/EKS Working with Pods and Kubectl Commands
- Create out first pod with kubectl
- Basic Kubectl Commands
- Inspecting Kubernetes Objects using kubectl
- About Kubernetes Generators
- Imperative vs Declarative Commands
- Exploring YAML Syntax
  - o Name and Metadata
  - o Labels and Label Selectors
- Kubernetes Namespace
- Kubernetes Generators
- Working with Dashboard

WORKING WITH KUBERNETES OBJECTS
- Pods
- Replication Controller
- Replica Sets
- Creating Deployment
- Self Healing Applications.
- Handling Rolling Updates and Rollbacks
- Best practices in rolling upgrades, canary deploys, blue-green deploys etc

SERVICES AND INGRESS
- Service Types
  - o Creating a ClusterIP Service
  - o Creating a Node Port
  - o Load Balancer Service
- Working with Ingress
- Ingress Controllers
- Ingress Annotations and rewrite target

- Kubernetes Services DNS
- Network Policies
- Working with Probes

ADVANCED KUBERNETES OBJECTs

- ConfigMap and Environment Variables
- Working with Secrets and sensitive information
- Kubernetes Volumes
- Persistent Volumes and Persitent Volume Claims
- Stateful Set
- Daemon Sets
- Jobs
- Scheduling using Cron Jobs
- Monitoring and Probes

AZURE KUBERNETES SERVICE

- About AKS
- Creating AKS Cluster using Portal
- Creating AKS Cluster using CLI
- Connecting to AKS Cluster using Kubectl
- Deploying Kubernetes Objects to AKS
- Pulling Images from ACR and DockerHub
- System Nodes vs User Nodes
- AKS Networking: Azure CNI vs Kubenet
- AKS Logging and Monitoring

CLUSTER ADMINISTRATION

- Kubernetes Dashboard
- Manage Memory, CPU and API resources.
- Authentication and Authorization
- Using RBAC Authorization

HELM INTRODUCTION

- Benefits of Helm
- What is Helm and how to install it
- What is Helm and how to install it
- Helm charts, Templates, Release, Revisions and Repositories
- How to Deploy,Upgrade and Roll Back Helm charts
- How to Create and host your helm charts

SAAG
Technologies