

# Docker Course Content

## **1. Introduction**

- What is Application Stack
- Challenges with Deployments
- What is Virtualization
- Problems with Virtualization
- Containerization Introduction
- What is Docker
- Docker features
- Applying the Solution with Docker

## **2. Docker Installation**

- Install Docker
- Start docker Service
- Stop docker
- Uninstall docker
- ECS introduction

## **3. Docker Architecture**

- Docker Client
- Docker Engine
- Dockerfile
- Docker Images
- Docker Hub
- Docker Containers
- Docker Hub Acc Creation

## **4. Docker Commands**

- docker version
- docker info
- docker help
- docker images
- docker pull
- docker rmi
- docker ps
- docker login
- docker push
- docker rm

## **5. Writing Docker File**

- Creating Docker File
- Visual Source Code IDE
- Understanding the Instructions used in Docker file
  - FROM
  - MAINTAINER
  - COPY
  - ADD
  - RUN
  - CMD
  - ENTRYPOINT
  - VOLUME



# Docker Course Content

## **6. Docker Images**

- Understanding the Base Image
- Image Layered Structure
- Internals of docker Image
- Build Process of docker Images
- Tagging the images
- Image Generation with Docker Commit.
- Run , inspect, remove and prune images

## **7. Docker Containers**

- Running Docker Containers from Images
- Listing Running Containers
- Container Lifecycle
- Start,Stop and Restart Containers
- Removing the Containers
- Container With Dependencies-Multi Containers
- Starting Containers in shell
- Running Containers in Bash Mode using IT flag
- Container Isolation

## **8. Docker Volume**

- Advantages
- Bind Mounts
- Volumes over Bind Mounts
- Creating Volumes
- List all Volumes
- Run Container on Volumes
- Remove Volumes

## **9. Docker Compose**

- Installation
- Docker Compose file
- Check the validity of the file
- Run docker compose
- Stop docker
- Scale the containers

## **10. Docker Swarm**

- Container orchestration
  - Features of docker swarm
  - Docker swarm node manager
  - Create worker nodes
  - Run containers on swarm
  - Scaling the services
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# **Kubernetes (K8S) Course Content**

## **1. Introduction**

- What is Containerization
- What is Orchestration
- Orchestration Tools
- Docker Swarm vs K8S
- K8S Introduction
- Kubernetes Features
- K8S terminology

## **2. K8S Architecture**

- Master Node
- Worker Nodes
- Control Plane
- API Server
- Scheduler
- Controller Manager
- Etcd
- Kubelet
- Kube-proxy
- Runtime Engine
- PODs
- Containers
- Kubectl
- Workflow

## **3. Environment Setup**

- How to setup Cluster
- Self-Managed Cluster
- Provider Managed Cluster
- Mini Kube (Single Node Cluster)
- Kubeadm (Multi Node Cluster)
- Mini Kube Vs Kubeadm
- K8S HA Setup
- AWS EKS

## **4. PODS Life Cycle**

- PODS Introduction
  - POD creation types
  - Interactive POD creation
  - Declarative POD creation
  - POD Manifest file
  - Kubectl Commands
  - Playing PODS
  - Manifest Syntax
  - Best Practices
  - Static PODS
  - POD re-creation
  - POD deletion
  - POD Labels
  - POD Template
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## 5. K8S Namespaces

- What is Namespace
- Default Namespaces
- Custom Namespaces
- Playing with k8s namespaces

## 6. K8S Services

- What is k8s service
- Why we need K8S service
- How to create k8s service
- Types of services
  - ClusterIP
  - NodePort
  - LoadBalancer
- Service Manifest
- Service commands
- Labels & Selectors
- POD expose outside cluster

## 7. K8S Objects

- ReplicationController
- ReplicaSet
- RC Vs RS
- Mutli Selectors
- DaemonSets
- When to use DaemeontSet
- StatefulSets
- Deployment
- Rollout & Rollback

- Deployment Strategies

- Recreate
- Rolling Update
- Blue / Green

## 8. K8S Auto Scaling

- What is Auto Scaling
- Horizontal Scaling
- Vertical Scaling
- HPA (Horizontal POD Autoscaling)
- VPA (Vertical POD Autoscaling)
- Node Auto Scaling
- Metric Server
- Load Simulation
- Busy Box
- Watch PODS with HPA

## 9. K8S Volumes

- Volumes Introduction
  - Why we need volumes
  - Types of K8s volumes
    - Host Path
    - emptyDir
    - Persistent Volumes
    - NFS
    - Cloud Volumes
    - ConfigMap
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## **10. Essentials**

- ConfigMaps
- Secrets
- Rbac
- Taints
- Tolerations

## **11. EKS Cluster**

- AWS intro
- EKS Setup
- Playing with EKS cluster
- Ingress
- Destroying Cluster

## **12. HELM Charts**

- What is Helm
- Helm Architecture
- Helm Setup
- Helm Implementation
- Helm Limitation

## **13. Prometheus**

- What is Prometheus
- Integration with Workloads
- Prometheus Setup
- Explore Metrics
- Prometheus Usecases

## **14. Project Setup**

- Spring Boot App Deployment
  - Python Flask App Deployment
  - Interview Questions
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