

Docker and Kubernetes Administrator (DKA)

Course Outline - 20 Classes

1: Introduction to Containers and Docker

- Topics:
 - Infrastructure Stack & Technological Transform
 - Virtualization Technologies & Architectural Overview
 - Overview Microservices: Container & Docker
 - Basic Docker Commands

2: Docker Images

- Topics:
 - Docker Images vs. Containers
 - Building Docker Images
 - Dockerfile basics
 - Best practices for writing Dockerfiles
 - Docker Public & Private Repo

3: Docker Networking, Volumes and Storage

- Topics:
 - Docker Networking Overview
 - Default Bridge Networks
 - Host and Overlay Networks
 - Managing Data in Docker
 - Docker Volumes
 - Host Path Mounts

4: Docker Compose

- Topics:
 - Introduction to Docker Compose

- Defining services in a docker-compose.yml file
- Multi-container applications
- Docker Registry (Docker Hub)
- Docker Security Best Practices

5: Introduction to Kubernetes

- Topics:
 - What is Kubernetes?
 - Docker Swarm vs. Kubernetes
 - Kubernetes architecture and components
 - Kubernetes installation and configuration
 - Adding Kubernetes Masters and Worker Nodes
 - Managing a Highly-available Kubernetes Cluster

6: Cluster Architecture, Installation & Configuration

- Topics:
 - Role-based access control (RBAC)
 - Installation with Kubeadm
 - Version upgrades and cluster management
 - Scaling and rolling updates
 - Managing ConfigMaps and Secrets
 - Networking configurations

7: Workloads & Scheduling

- Topics:
 - Pod, containers, and deployments
 - Label selectors and scheduling
 - Taints, tolerations, and affinity

8: Services & Networking

- Topics:
 - ClusterIP, NodePort, LoadBalancer service types
 - Ingress controllers and DNS configuration
 - Connectivity between Pods

9: Storage

- Topics:
 - Storage classes and persistent volumes
 - Volume access modes and reclaim policies
 - Persistent volume claims
 - Application configuration with persistent storage

10:RBAC Authorization & ServiceAccounts

- Topics:
 - API Groups
 - Role and RoleBinding
 - ServiceAccounts
 - ConfigMaps and Secrets in Pods

11: Networking and Security

- Topics:
 - Cluster node network configuration
 - Service networking
 - CNI and Pod networking
 - Securing hosts and Kubernetes
 - Authentication & authorization
 - TLS certificates management
 - Security contexts and network policies

12: Cluster Maintenance

- Topics:
 - Cluster upgrade processes
 - Backup and restore methodologies
 - etcd backup and restore

13: Logging, monitoring

- Topics:
 - Monitoring applications and cluster components
 - Managing logs

- Kubernetes dashboard and metric server

14: Troubleshooting, Network Policy and Helm Chart

Topics:

- Troubleshooting application, control plane, and worker node failures
- Networking issues
- Ingress and Egress policies
- Default policies
- Installing Helm on Kubernetes
- Initializing Helm Chart Repository

16 :Real-World Kubernetes Use Cases

- Topics:
 - Deploy production grade three real projects