DEVOPS KUBERNETES

1.Introduction to DevOps and Kubernetes

1.1 Understanding DevOps principles
2.1 Overview of containerization and Kubernetes
3.1 Benefits of using Kubernetes in DevOps

2.Docker Fundamentals

2.1 Introduction to Docker containers
2.2 Creating Docker images
2.3 Docker networking and storage
2.4 Docker Compose for multi-container applications

3. Kubernetes Architecture

3.1 Kubernetes components (Master and Node)
3.2 Kubernetes API server
3.3 Etcd cluster for configuration management
3.4 Kubernetes control plane components (kube-scheduler, kube-controller-manager)

4.Deploying Applications with Kubernetes

4.1 Deploying pods, services, and replicasets
4.2 Managing configuration with ConfigMaps
4.3 Health checks and readiness probes
4.4 Rolling updates and rollbacks

5.Kubernetes Networking

5.1 Kubernetes networking models

5.2 Ingress controllers and Ingress resources
5.3 Network policies for security
5.4 Service discovery and DNS

6. Persistent Storage

6.1 Persistent volumes and persistent volume claims
6.2 Storage classes
6.3 Stateful Sets for stateful applications
6.4 Dynamic provisioning of storage

7.Managing Kubernetes Resources with Helm

7.1 Introduction to Helm
7.2 Helm charts and templating
7.3 Installing and upgrading applications with Helm

8.CI/CD with Kubernetes

8.1 Setting up a CI/CD pipeline for Kubernetes
8.2 Building container images
8.3 Deploying applications to Kubernetes with CI/CD tools

9.Monitoring and Logging

9.1 Monitoring Kubernetes clusters with Prometheus
9.2 Logging and log aggregation with tools like Fluentd and Elasticsearch
9.3 Visualizing cluster data with Grafana

10.Scaling and High Availability

10.1 Horizontal pod autoscaling

10.2 Cluster scaling and node management
10.3 Ensuring high availability with Kubernetes

11.Security Best Practices

11.1 Role-based access control (RBAC)
11.2 Pod security policies
11.3 Image scanning and security practices
11.4 Secrets management

12.Kubernetes Operations and Troubleshooting

12.1 Managing and upgrading Kubernetes clusters
12.2 Troubleshooting common issues
12.3 Disaster recovery and backups

13.Advanced Topics (Optional)

13.1 Kubernetes operators
13.2 Custom resource definitions (CRDs)
13.3 Serverless computing with Knative

14. Case Studies and Real-World Examples

14.1 Reviewing real-world use cases and best practices