

Kubernetes Administration with Additional Security

Duration: 5 Days

Prerequisites for this course: Kubernetes Admin Knowledge

Hands-On Format: This hands-on class is approximately 80/20 lab to lecture ratio, combining engaging lecture, demos, group activities and discussions with comprehensive machine-based practical programming labs and project work.

Module 1 - Installation, Configuration and Validation

Design a Kubernetes Cluster Lab: Installing 1 Master and 2 Worker Nodes Cluster using Kubeadm Lab: Verify Installation

Module 2 - Revise Managing Resources (Overview Level Considering Participant already have knowledge)

Managing Pods Lab: Managing Pods Managing Labels and Selectors Lab: Managing Labels and Selectors Managing Replication Controller and Replica Set Lab: Managing ReplicaSet Managing Service Lab: Managing Service – ClusterIP and NodePort Managing Deployments Lab: Working with Deployments – Rolling Update, Recreate, Blue Green

Module 3 – Storage

Understand storage classes Persistent Volume – HostPath Lab: HostPath Persistent Volume – NFS Lab: PV with NFS Understand volume mode, access modes and reclaim policies for volumes Understand persistent volume claims primitive Know how to configure applications with persistent storage

Module 4 - Managing Statefulset

What is StatefulSet Why StatefulSet Manage StatefulSet Lab: Creating StatefulSet Managing Headless Service Lab: Creating Headless Service Storage with StatefulSet Lab: Storage with StatefulSet



Module 5 – Logging and Monitoring

Understand how to monitor all cluster components Prometheus Tool Lab: Integration Prometheus and Grafana with Kubernetes Integration of Elastic Search and Kibana with Kubernetes Lab: Installing Elasticsearch and Kibana in Kubernetes

Module 6 - Networking in Kubernetes

Understand CoreDNS Configure Custom DNS for Pod Lab: Configure Custom DNS for Pod Ingress – Host Based Lab: Ingress Host Based Lab: Ingress Path Based Ingress with TLS Lab: Ingress with TLS Metal Load Balancer

Module 7 – Helm

Understand Helm and Helm Charts Helm Commands Lab: Helm Commands Deploy Kubernetes Dashboard using Helm Create Helm Chart and Deploy Applications using Helm Chart Lab: Create Helm Chart Lab: Test Helm Chart Lab: Upgrade Application using Helm Chart Lab: Downgrade Application using Helm Chart

Module 8 – Istio

Istio Installation Lab: Installing Istio Understand Istio Architecture Lab: Deploy Application and Work with Kiali Understand Destination Rule and Virtual Service Lab: Create Application with Istio Lab: Ingress Host Based and Path Based with Istio Lab: Ingress – Subdomain with Istio

Module 9 – Security

Understanding Kubernetes Security Lab: Creating and Managing Users in Kubernetes Lab: Creating Service Accounts Understanding Role and RoleBindings Lab: Role and Rolebindings Understanding ClusterRole and ClusterRoleBinding Lab: ClusterRole and ClusterRoleBinding Understanding Security Context Lab: Adding Security Context to Pod to Enable Ping



Module 10 – Cluster Maintenance

Understanding OS Upgrade Lab: Upgrade a Kubernetes Cluster Version Static Pod Lab: Deploying Pods as a Static Pod Lab: ETCD Backup CronJob Lab: Deploying Pod as CronJob

Module 11 – Troubleshooting

Ways to Troubleshoot CrashLoopBack Errors Ways to Troubleshoot Service Errors Ways to Troubleshoot Kubernetes Components - ETCD, Scheduler, Kubelet, Container Runtime

Module 12 – Extra Security Topics

Use CIS Benchmark to Review the Security Configuration of Kubernetes Components Lab: CIS Benchmark for Kubernetes Lab: Encrypting Secrets in ETCD Use GVisor Lab: Implementing Gvisor on Pods Lab: Custom Security Policies using OPA Scan Images for Known Vulnerabilities Lab: Checking Image Vulnerability with Trivy