



# Advanced Kubernetes Workshop

NWV\_434x | Expert-Led Live | 5G Core | ⚙️⚙️⚙️

Course Duration: 3 days

Hands-on operational exercises are provided with detailed explanations of advanced Kubernetes concepts, along with the basics of the technology that assist troubleshooting. Participants explore multi-tiered network topologies and web service applications, enabling the participant to more adeptly deploy and support containerized applications in a Kubernetes environment.

## Intended Audience

A hands-on in-depth technical training workshop for personnel involved in engineering and operations and monitoring of applications on Kubernetes infrastructure.

## Objectives

After completing this course, the learner will be able to:

- Modify and explain ConfigMaps and Secrets
- Explore resource limits, requests, and Quality of Service
- Use Helm to instantiate 3-tier application
- Apply security contexts and network policies
- Explore Istio Service Mesh networking options
- Explore ingress and ingress controller networking options
- Describe application monitoring and logging
- Explain application scaling and resource management

## Course Prerequisites

Cloud-Native NFV Architecture and Operations

Kubernetes Orchestration Workshop

Required Equipment: An additional monitor to run exercises is recommended

## Outline

1. Application Configuration
  - 1.1 Configuration with ConfigMaps
  - 1.2 Configuration with SecretsExercise: ConfigMap use in Pod  
Exercise: Secrets use in Pod
2. Resource Quotas and Limits
  - 2.1 Resource limits
  - 2.2 Resource requests
  - 2.3 Quality of Service (QoS)Exercise: Modify limits and requests to affect QoS
3. Application Deployment using Helm
  - 3.1 K8S Elements (Deployment, Service)Exercise: Deploy 3-Tier with Config1  
Exercise: Deploy 3-Tier with Config2
4. Custom Resource Definitions and Operators
  - 4.1 Custom Resources (CRs) and Definitions (CRDs)
  - 4.2 Operators and Operator Lifecycle ManagerExercise: Modify/Use an Operator to deploy/manage app
5. Security in Kubernetes
  - 5.1 Certificate Usage
  - 5.2 Security Contexts for applications
  - 5.3 Network policies for application isolationExercise: Security Context Use  
Exercise: Create and apply network policy  
Exercise: Deploy and observe certificate use
6. Advanced Networking - Service Mesh
  - 6.1 Istio architecture and Custom Resources
  - 6.2 Traffic management and observabilityExercise: Configure application networking using Istio

7. Adv Networking - Ingress/Ingress Controllers
  - 7.1 Kubernetes Ingress Controllers
  - 7.2 Relation to Service Mesh GatewaysExercise: External access using Ingress Controller
8. Monitoring and Logging
  - 8.1 Log management with EFK
  - 8.2 Metrics with PrometheusExercise: Use Prometheus to monitor application  
Exercise: Use EFK to collect and analyze logs
9. Scaling and Resource Management
  - 9.1 Horizontal and vertical pod autoscalingExercise: Configure and monitor autoscaling