# vSphere Kubernetes Service: Design, Deploy and Operate [V9.0] Training

Duration: **5 Day**

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**vSphere Kubernetes Service: Design, Deploy and Operate [V9.0]** is a five-day course focused on designing, configuring, deploying, and operating **VMware vSphere Kubernetes Service (VKS)** within VMware Cloud Foundation (VCF) environments.

The programme begins with Kubernetes architecture and progresses into vSphere Supervisor, VKS clusters, and VCF Cloud Services. Participants examine Supervisor deployment models, networking and load-balancing options, storage topologies, and the architecture of vSphere Namespaces and Zones.

The course provides practical coverage of VKS cluster provisioning with`kubectl`, workload deployment through YAML manifests and Helm, and ongoing cluster lifecycle management. Monitoring, upgrades, snapshots, backup and restore, and other day-2 activities are explored to support reliable operation of VKS environments in production.

Participants also examine VM Service, VCF Automation, Harbor, Argo CD, and extensible services as components of a broader cloud-native ecosystem. The programme concludes with VKS cluster management and **Istio Service Mesh**, including Kiali visualisation and Gateway API-based traffic routing.

Hands-on labs and realistic scenarios reinforce the skills required to design scalable Kubernetes infrastructure on VCF and operate enterprise VKS environments effectively.

## Prerequisites

Participants should have:

- Completed **VCF Stage-1 Training**,
- Working experience with VMware vSphere,
- Practical knowledge of VMware NSX,
- Working knowledge of vSAN environments.

## Who Should Attend

This course is designed for:

- System Administrators,
- Solution Engineers,
- Consultants,
- Architects,
- Support Personnel.

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## What You Will Learn

By the end of the course, participants will be able to:

- Identify the core components of Kubernetes architecture and networking,
- Explain Kubernetes volumes and persistent storage,
- Describe vSphere Supervisor architecture, components, and deployment models,
- Explain vCenter Single Sign-On authentication for vSphere Supervisor,
- Understand the key capabilities of VCF Consumption CLI,
- Evaluate networking, load-balancing, and storage requirements for Supervisor deployments,
- Configure and manage vSphere Namespaces and Zones,
- Explain VCF Cloud Services enablement options,
- Identify Supervisor services, including VKS, Velero, and extensible services,
- Explain monitoring, backup, restore, and upgrade processes for vSphere Supervisor,
- Describe VM provisioning workflows through VM Service,
- Deploy vSphere Pods with kubectl and expose them through a Load Balancer IP,
- Describe VKS provisioning using TanzuKubernetesCluster and ClusterClass,
- Deploy and upgrade applications with Helm,
- Explain VKS monitoring and Standard Package management,
- Work with snapshots and VKS lifecycle operations,
- Explain VKS version upgrades and cluster updates through VCF CLI,
- Understand approaches for managing VKS clusters at scale,
- Describe Istio installation and Service Mesh visualisation with Kiali,
- Configure Istio traffic routing through the Gateway API.

## Training Outline

### Kubernetes Foundations

- Kubernetes architecture and core concepts
- Containers compared with virtual machines
- Docker build, ship, and run workflow
- Container networking
- CRI and the role of containerd
- Kubernetes objects and Services
- Volumes and persistent storage
- Kubernetes networking
- Antrea, Calico, and Multus CNI plug-ins
- Whereabouts IPAM
- Istio Service Mesh
- Helm Package Manager

### VCF Cloud Services and vSphere Supervisor

- vSphere Supervisor concepts and architecture
- Supervisor Services
- Folder hierarchy
- Identity providers
- Namespace roles and permissions
- vCenter Single Sign-On authentication

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- VCF Consumption CLI

## vSphere Supervisor Deployment Models

- NSX VPC Networking
- NSX Segment Networking
- VDS with Foundation Load Balancer
- NSX with Avi Load Balancer
- VDS with Avi Load Balancer
- Networking stack requirements
- Load-balancer options and requirements
- Supervisor Zone deployment models
- Zone attributes
- Control Plane availability models

## VCF Cloud Services Enablement

- Activate Supervisor during Workload Domain creation
- Deploy with NSX VPC and NSX Load Balancer
- Connect using VCF CLI
- Deploy using NSX Segment
- Deploy with VDS and Foundation Load Balancer
- NSX/VDS and Avi Load Balancer deployment options
- Deploy Supervisor from an exported configuration

## vSphere Supervisor Storage Topologies

- Storage options for Supervisor in VCF
- Storage topology for vSphere Zones and Supervisor
- vSphere Storage integration
- Data persistence across Zones
- Supported vSAN-based topologies

## Configuring vSphere Namespaces and Zones

- Create vSphere Namespaces
- Configure resource and object limits
- Apply NSX security policies
- Add clusters as vSphere Zones
- Associate Zones with Namespaces
- Remove Zones from Namespaces and Supervisor

## Services in vSphere Supervisor

- VKS architecture and capabilities
- VKS topology with vSphere Zones
- Networking and load balancing
- Storage policies
- VKS Core and Standard Packages
- Integrated backup and restore
- Supervisor Control Plane protection
- Velero protection considerations
- Extensible Services and requirements

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## Supervisor Monitoring and Lifecycle Management

- Monitor Namespace resources through vCenter
- Supervisor monitoring
- Monitoring through VCF Operations
- Update options
- Content Libraries for Supervisor Images
- Supervisor updates
- Default CNI configuration
- Register, install, upgrade, and deactivate Supervisor Services
- Backup and restore approaches

## Managing Virtual Machines with VM Service

- Traditional versus API-driven declarative VMs
- VM Service architecture and capabilities
- VM creation and deployment workflows
- Configurable OVF Properties
- vSphere Pod storage and networking
- VM Classes
- Deploy vSphere Pods using kubectl
- Expose Pods through Load Balancer IPs

## Multi-Tenancy in VCF

- VCF multi-tenancy
- Private Cloud experience by persona
- Supervisor instances, Regions, and Zones
- VCF Automation Organizations
- Organizations and Content Libraries
- Projects and Namespaces

## Building an Extensible Cloud-Native Ecosystem

- Build integrated cloud-native service environments
- Deploy Contour Ingress Controller
- Deploy Harbor Image Registry
- Use Argo CD for GitOps continuous delivery
- Manage VMs through VCF Automation
- Deploy and manage VKS clusters
- Manage Harbor repositories
- Connect to VKS clusters
- Deploy container-based applications

## VKS Cluster Deployment with kubectl

- vSphere Kubernetes releases (VKrs)
- TanzuKubernetesCluster provisioning
- ClusterClass provisioning
- Subscribed and Local Content Libraries
- Calico CNI provisioning
- Retrieve administrator kubeconfig

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- Connect through VCF CLI
- Private Container Registry integration
- Harbor integration

### Monitoring and Lifecycle Management of VKS Clusters

- Supported Standard Packages
- Package installation requirements
- Manage VKS Standard Packages
- VKS cluster monitoring
- Enable monitoring
- Monitor through VCF Operations, vCenter, VCF Automation, and kubectl

### Deploying Workloads with Helm

- Helm application deployment workflow
- Manage Docker images and Helm charts in Harbor OCI Registry
- Deploy applications with Helm
- Upgrade applications with Helm

### VKS Cluster Day-2 Operations

- Volume Snapshots
- Volume Snapshot and Volume Snapshot Content lifecycle
- vSphere pvCSI Webhook
- External CSI Snapshot Webhook
- Restore Volume Snapshots
- Register new VKS versions
- Upgrade VKS versions
- Update clusters using VCF CLI

### VKS Cluster Management and Istio Service Mesh

- Manage VKS clusters at scale
- VKS cluster management architecture
- Centralised visibility across the cluster fleet
- Consistent policy enforcement
- Cluster backup
- Standard Package deployment and management
- Istio Service Mesh architecture and components
- Install Istio on VKS
- Deploy the Kiali dashboard
- Visualise the Service Mesh with Kiali
- Configure traffic routing with Gateway API
- Collect Istio support bundle files