

# VMware Tanzu Kubernetes Grid: Install, Configure, Manage

## Course Overview

During this four-day course, you learn about installing VMware Tanzu® Kubernetes Grid™ in a VMware vSphere® environment and provisioning and managing Tanzu Kubernetes Grid clusters. The course covers how to install Tanzu Kubernetes Grid packages to provide services such as image registry, authentication, logging, ingress, multipod network interfaces, service discovery, image registry, and monitoring, in addition to day 2 operations such as backup, life cycle management, and application-specific tools. The concepts learned in this course are applicable for users who must install Tanzu Kubernetes Grid on supported clouds.

## Course Objectives

By the end of the course, you should be able to meet the following objectives:

- Describe how Tanzu Kubernetes Grid fits in the VMware Tanzu® portfolio
- Describe the Tanzu Kubernetes Grid architecture
- Deploy and manage Tanzu Kubernetes Grid management and supervisor clusters
- Deploy and manage Tanzu Kubernetes Grid workload clusters
- Deploy, configure, and manage Tanzu Kubernetes Grid packages
- Perform day 2 operations
- Perform basic troubleshooting

## Target Audience

Platform operators who are responsible for deploying and managing Tanzu Kubernetes Grid clusters

## Prerequisites

- Understanding of Kubernetes and the Kubernetes cluster architecture
- Experience deploying and managing multiple Kubernetes clusters

## Course Modules

### 1 Course Introduction

- Introductions and course logistics
- Course objectives

### 2 Introducing Tanzu Kubernetes Grid

- Describe Tanzu Kubernetes Grid
- Describe VMware vSphere® with VMware Tanzu®
- Describe VMware Tanzu® Mission Control™
- Describe VMware Tanzu® for Kubernetes Operations
- Describe the Tanzu Kubernetes Grid components
- Discuss bootstrapping multiple Tanzu Kubernetes Grid instances
- Describe vSphere Namespaces
- Describe the benefits of registering with VMware Tanzu Mission Control

### 3 CLI Tools and Cluster API

- Describe the Tanzu CLI and plug-ins
- Describe the Kubernetes CLI Tools for vSphere
- Describe the Carvel tool set
- Describe Cluster API
- List the infrastructure providers
- Detail the Cluster API controllers
- List the Cluster API custom resource definitions

### 4 Authentication

- Define Kubernetes roles and RBAC API objects
- Define Pinniped and OpenID Connect
- Define Dex and LDAP authentication
- Define VMware vCenter® Single Sign-On integration with Tanzu Kubernetes Grid
- Identify the management cluster authentication components
- Describe the Pinniped workflow in Tanzu Kubernetes Grid on a management cluster
- Describe vSphere Namespace permissions and roles
- Define authentication using vCenter Single Sign-On
- Define authentication using external identity providers
- Identify the authentication options for kubectl and the Tanzu CLI

### 5 Load Balancers

- Explain load balancing in Tanzu Kubernetes Grid
- Describe the different load balancers that integrate with Tanzu Kubernetes Grid
- Describe the components of VMware NSX® Advanced Load Balancer™
- Explain how Tanzu Kubernetes Grid integrates with NSX Advanced Load Balancer

### 6 VMware Tanzu Kubernetes Grid on vSphere

- Outline the requirements for deploying a supervisor cluster in a vSphere environment
- Describe the different options for deploying the supervisor cluster
- Describe the licensing requirements for supervisor clusters
- List the steps to install a Tanzu Kubernetes Grid supervisor cluster and retrieve its status
- Describe how to apply a full license to the supervisor cluster
- List the requirements for deploying a management cluster in a vSphere environment
- List the requirements for a bootstrap machine
- List the requirements for Internet-restricted environments
- Explain how the Tanzu Kubernetes Grid version relates to specific OVA versions
- Describe the optional configuration for deploying a management cluster in a vSphere environment
- List the steps to install a Tanzu Kubernetes Grid management cluster
- Summarize the creation of a management cluster
- Define the commands available for working with management clusters
- List the steps to register Tanzu Kubernetes Grid management clusters with VMware Tanzu Mission Control

### 7 Tanzu Kubernetes Grid Workload Clusters

- List the options for deploying Tanzu Kubernetes Grid workload clusters
- Describe the different types of Tanzu Kubernetes Grid workload clusters



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- Explain how Tanzu Kubernetes Grid clusters are created
- Describe the VMs that are included in a workload cluster
- Describe the components of a workload cluster
- Describe the difference between machine images and custom machine images
- List the available customizations
- Explain how to build custom images
- Describe how to use custom images
- Describe the commands available for working with workload clusters
- Explain how to scale workload clusters
- Describe machine health checks

## 8 Tanzu Kubernetes Grid Packages

- Explain how Tanzu Kubernetes Grid uses packages
- Identify the different package repositories
- Describe the different types of packages and their dependencies
- Define auto-managed packages
- Identify the auto-managed packages that are installed to every cluster and those that are installed based on configuration
- Explain how auto-managed packages are installed and configured
- Define CLI-managed packages
- Explain how CLI-managed packages are installed and configured
- Use the Tanzu CLI to configure and install optional packages and repositories

## 9 Configuring and Managing Tanzu Kubernetes Grid Networking Packages

- Describe cert-manager
- Explain how to install cert-manager
- Describe the Contour ingress controller
- Explain how to install Contour
- Describe service discovery
- Describe ExternalDNS
- Detail the configuration options for BIND servers
- Explain how to install ExternalDNS
- Describe Multus
- Describe Multus pod configuration

- Describe Whereabouts
- Explain how to install Multus and Whereabouts

## 10 Configuring and Managing Tanzu Kubernetes Grid Operation and Analytics Packages

- Describe Fluent Bit
- Detail the logs that Fluent Bit collects
- Describe basic Fluent Bit configuration
- Explain how to install Fluent Bit
- Describe Prometheus
- Describe Grafana
- Describe the Harbor image registry
- Explain Harbor vulnerability scanning

## 11 Tanzu Kubernetes Grid Day 2 Operations

- Explain the process of authenticating Tanzu Kubernetes Grid workload clusters
- Identify the method of creating restricted role-based access to components inside a workload cluster
- Explain how Tanzu Kubernetes Grid integrates with NSX Advanced Load Balancer for ingress
- Describe VMware Tanzu® Application Platform™
- List the steps to install Tanzu Application Platform on Tanzu Kubernetes Grid workload clusters
- Describe the prerequisites and steps for upgrading Tanzu Kubernetes Grid instances
- Describe the prerequisites and steps for updating Tanzu Kubernetes Grid workload clusters
- Understand how VMware Tanzu Mission Control manages the life cycle of Tanzu Kubernetes Grid
- Define Velero Plugin for vSphere and standalone Velero
- Describe Velero Plugin for vSphere
- Identify the steps to install Velero on workload clusters
- Explain how to back up and restore workload clusters with the Velero CLI and VMware Tanzu Mission Control

## 12 Troubleshooting Tanzu Kubernetes Grid

- Describe the various Tanzu Kubernetes Grid logs
- Explain how to review the Cluster API controller logs



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- Identify the location of the Tanzu Kubernetes Grid logs
- Explain the purpose of Crash Diagnostics
- Describe how to use SSH to connect to Tanzu Kubernetes Grid nodes
- Explain how to troubleshoot package installation errors



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