

Solution Architecture

Table of contents

Executive summary 3
Overview 3
Document purpose 3
Audience 3
Business use case 4
About VMware Cloud on Dell EMC
VMware Tanzu Standard
VMware Tanzu Kubernetes Grid 5
VMware Tanzu Mission Control 5
Prerequisite
Solution architecture
Design
Solution components
Software-defined data centers-as-a-service 8
Management component 8
Compute components 9
NSX-T components 9
Resource pool
Network configuration
Virtual network segment 10
VMware Tanzu Standard Edition
Technical specification 10
Hardware 10
Software 10
Conclusion
Additional resources/references
Author

Appendix	.12
Create a Network Segment for TKG	12
Add Management group	12
Set Firewall Rules	13
Compute Gateway	15
Add FQDN Zone	16
Preparing bootstrap VM	. 17
Download and install Tanzu CLI	17
Installing kubectl	17
Download and install Docker	17
Download and unpack the Tanzu CLI	19
Prepare to deploy management clusters to vSphere	. 21
Create a resource pool in which to deploy the Tanzu Kubernetes Grid Instance	21
Create SSH key pair	22
Import the base OS image template into vSphere	22
Deploy management clusters to vSphere with the Installer	
interface	24
Tanzu Mission Control (TMC)	28
Register Tanzu Kubernetes Grid with Tanzu Mission Control (TMC)	28
Create a Cluster Group	28
Register Management Cluster	28
Create a Cluster from TMC Console	29

Executive summary

Tanzu Standard gives enterprises what they need to build a consistent Kubernetes infrastructure across multiple clouds, with governance and efficiency in place. It offers a full Kubernetes runtime distribution which can be deployed across on-premises, on public clouds and at the edge, and at the same time gives platform operators a global control plane, with which they can manage Tanzu clusters, as well as any other conformant Kubernetes clusters, consistently, securely, and efficiently at scale. This solution allows customers to quickly deploy and support modern applications in core data center, edge, and co-location contexts. Tanzu Standard provides the services that a production Kubernetes environment requires, including networking, authentication, ingress control and logging, to alleviate significant infrastructure management burdens. For customers who are already familiar with Kubernetes, or have micro services environments on-premises, deploying Tanzu Standard on VMware Cloud™ on Dell EMC lets you leverage a unified architecture and familiar tools. This means that you can use the same expertise acquired for VMware vSphere® for operational consistency, while also leveraging the same rich feature set and flexibility. By outsourcing the management of the SDDC to VMware you can simplify operation of TKG deployments.

Overview

You can deploy Tanzu Standard on VMware Cloud on Dell EMC to simplify operations of large-scale, multi-cluster Kubernetes environments, and keep your workloads properly isolated. The solution delivers the simplicity and agility of the public cloud and the security and control of on-premises infrastructure delivered as a service to data center and edge locations. It is built upon the latest VMware software-defined data center suite, including industry-leading compute, storage, and network virtualization, and optimized for Dell EMC VxRail hyperconverged infrastructure. It's quick and easy to procure and delivers a cloud-style consumption model for a range of use cases. VMware provides fully automated lifecycle management and monitors the health of the entire SDDC stack around the clock. The combined software, hardware, and services offering enables customers to focus technology resources on initiatives that differentiate the business instead of spending time on infrastructure management.

Document purpose

The purpose of this guide is to provide administrators and architects with a set of steps and best practices for deploying Tanzu Standard on VMware Cloud on Dell EMC. This guide is designed to be used in conjunction with Tanzu Standard documentation and VMware Cloud on Dell EMC documentation.

Audience

This white paper is intended for administrators who want to install Tanzu Kubernetes Grid and use it to create and manage Tanzu Kubernetes clusters and their associated resources. This information is also intended for application administrators and developers who want to use Tanzu Standard to deploy and manage modern applications in a Kubernetes architecture on VMware Cloud on Dell EMC. The information is written for users who have a basic understanding of Kubernetes and are familiar with container deployment concepts. In-depth knowledge of Kubernetes is not required.

Business use case

Evolving architectures require enhanced tooling and infrastructure. Digital transformation drives the need for speed as companies are under increasing pressure to innovate more quickly with much of the transformation being achieved in software. Application developers are evolving to achieve shorter development cycles, faster delivery times and more frequent deployments.

Consequently, application architectures are also evolving from monolithic to microservices, delivering flexible architectural choices, improved scale and availability, faster release cadence, and easier maintenance. Successfully deploying and managing those microservices depends on several fundamental requirements:

- Simplify Kubernetes for developers
- Ease Day 1 and Day 2 operations
- Consistent Kubernetes everywhere
- Automated multi-cluster operations

The Tanzu Standard on VMware Cloud on Dell EMC solution addresses the gap by simplifying the process and providing tooling and infrastructure to quickly deploy rapidly maturing distributed applications.

About VMware Cloud on Dell EMC

VMware Cloud on Dell EMC combines the simplicity and agility of the public cloud with the security and control of on-premises infrastructure delivered as a service to data center and edge locations. It is built upon on the latest VMware software-defined data center suite, including industry-leading compute, storage, and network virtualization that is optimized for Dell EMC VxRail hyperconverged infrastructure. It's quick and easy to procure and delivers a cloud-style consumption model for a range of use cases.

VMware provides fully automated lifecycle management from the cloud and monitors the health of the entire stack around the clock. The combined software, hardware, and services offering enables customers to focus technology resources on initiatives that differentiate the business, instead of spending time on infrastructure management. Many thousands of VMware customers depend on hybrid cloud infrastructure—spanning from private data centers and edge locations to public clouds. Only VMware can offer a consistent operational experience across all of these locations, accommodating the geographical demands driven by business or technical requirements.

In the public cloud, customers have embraced VMware Cloud on AWS—the SDDC-as-a-Service offering that is jointly engineered by VMware and Amazon Web Services (AWS). But many applications cannot be moved to the public cloud due to business policies or technical constraints, such as latency and bandwidth requirements. For customers that are interested in the combined benefits of a fully managed SDDC that still accommodates the demand for on-premises infrastructure, VMware Cloud on Dell EMC is the answer.

VMware Tanzu Standard

VMware Tanzu Standard provides a consistent, upstream-compatible implementation of Kubernetes that is tested, signed, and supported by VMware. Tanzu Standard offerings provision and manage the lifecycle of Tanzu Kubernetes clusters. A Tanzu Kubernetes cluster is an opinionated installation of Kubernetes open-source software that is built and supported by VMware. In this offering, you provision and use Tanzu Kubernetes clusters in a declarative manner that is familiar to Kubernetes operators and developers.

VMware Tanzu Kubernetes Grid

VMware Tanzu Kubernetes Grid, informally known as TKG, is a multi-cloud Kubernetes footprint that you can run both on-premises in vSphere, VMware Cloud on Dell EMC, VMware Cloud on AWS, Microsoft AVS and in the public cloud on Amazon EC2 and Microsoft Azure. In addition to Kubernetes binaries that are tested, signed, and supported by VMware, Tanzu Kubernetes Grid includes signed and supported versions of open-source applications to provide the registry, networking, monitoring, authentication, ingress control, and logging services that a production Kubernetes environment requires. If you are using Tanzu Kubernetes Grid, see the <u>VMware Tanzu Kubernetes Grid Documentation</u>.



FIGURE 1: Tanzu Basic for VMware Cloud on Dell EMC architecture hosts and components

VMware Tanzu Mission Control

VMware Tanzu Mission Control, informally known as TMC, provides a hosted Tanzu Kubernetes Grid implementation as a managed service for public cloud environments. Tanzu Mission Control is available through VMware Cloud services. Tanzu Mission Control provides a centralized management platform to consistently operate and secure your Kubernetes infrastructure and modern applications across multiple teams and clouds. If you are using the Tanzu Kubernetes Grid service that Tanzu Mission Control provides, see the <u>VMware Tanzu Mission Control Documentation</u>.

Prerequisite

A variety of external services are required for the initial deployment of Tanzu Kubernetes Grid Cluster on VMware Cloud on Dell EMC.

The following table lists the required external services and dependencies for Tanzu Kubernetes Grid Cluster

Service	Purpose
Internet Service	Make sure that the Internet is available to download packages on your bootstrap image.
Domain Name Services (DNS)	Provides name resolution for the various components in the solution.
Dynamic Host Configuration Protocol (DHCP)	Provides automated IP address allocation for Tanzu Kubernetes Grid Cluster.
Network Time Protocol (NTP)	Synchronizes time between the various management components.

In the VMware Cloud on Dell EMC web portal console, please ensure the following:

- Network Uplink connectivity is configured with upstream network router/switch for external data center connectivity or if you want to connect your Tanzu Kubernetes Grid Cluster from outside of your VMware Cloud Dimension environment.
- Appropriate static routes are in place for both VMware Cloud on Dell EMC and Customer Data Center to ensure that you have connectivity to Kubernetes cluster.
- By default, there is no external access to the vCenter® Server system in your SDDC. You can open access to your vCenter Server system by configuring a firewall rule. Set the firewall rule in the compute gateway of VMware Cloud on Dell EMC to enable communication to the vCenter public IP address and TCP port 443 from the desired logical network of your SDDC.
- Configure DNS to allow Kubernetes cluster in your SDDC to resolve fully qualified domain names (FQDNs) to IP addresses belonging to the Internet.

Solution architecture

The following figure shows the deployment architecture options for the Tanzu Kubernetes Grid Basic on VMware Cloud on Dell EMC.

- In this design all the nodes are configured as a single vSphere cluster in the vCenter.
- In this deployment architecture, all SDDC management components, such as VMware vCenter, NSX® Manager and NSX Edge, are placed under Management Resource Pool. This is fully automated as part of VMware Cloud Dell EMC offering.
- All Kubernetes management components, such as API Server, Controller Manager, Schedular and etcd are placed under Compute Resource Pool along with Kubernetes Worker.



Design

A customer can start with a minimum configuration of VMware Cloud on Dell EMC and then scale their Kubernetes environment as needed according to the following architecture and design guidelines. The minimum configuration for Tanzu Kubernetes Grid with VMC on Dell EMC is currently 4 nodes.

Note: Even though you have configured three node cluster, VMC on Dell EMC reserves a 4th node as dark node to supplement if there is any failure in the cluster to provide resiliency and high availability to the cluster.





Figure 2: Tanzu Kubernetes with VMware Cloud on Dell EMC

- In this design, we have shown one vSphere Cluster with two Resource Pool (Management and Compute) part of VMware Cloud Dell EMC SDDC deployment.
- Management Resource Pool consists of vCenter Server, NSX-T Manager and NSX Edge, and it is fully managed by VMware. All of the management components are placed on a management vSAN datastore, called vsanDatastore in VMware Cloud on DellEMC.
- Compute Resource Pool is dedicated for Kubernetes Cluster components and cloud native workloads. This is managed by the customer.
- Kubernetes cluster components are connected with a network under Compute Gateway and this network provides DHCP service to the Kubernetes cluster.
- Kubernetes nodes are placed on WorkloadDatastore on VMware Cloud Dell EMC SDDC.

Note: In this design we have used Ubuntu v20.04 Kubernetes v1.20.5 OVA as the base Image template for Kubernetes nodes. Photon base image is not supported on VMware Cloud on Dell EMC in this release.

Solution components



This section describes major components for this solution architecture.

Software-defined data centers-as-a-service

Based on industry-leading virtualization software technology from VMware and proven hyperconverged hardware from Dell EMC, VMware Cloud on Dell EMC is a complete solution for data center infrastructure. The software components include VMware vSphere compute, VMware vSAN™ all-flash storage, and VMware NSX-T networking and security. Dell EMC foundational elements include VxRail hyperconverged infrastructure appliances and high-performance top of rack network switches.

All services delivery hardware is factory integrated inside a standard data center rack enclosure that can be positioned right alongside other racks in your data center, remote office and edge compute locations. Customers are given the choice of using 110 or 220-volt power circuits. See the following table for specific rack details:

Rack Specifications	Rack R2 (42U)
Number of VxRail E560F Nodes	Single-phase power: Min. 3 – Max 12 Three-phase power: Min. 3 – Max. 26
Spare / Standby Hosts per rack	1
Power Requirements	4 x 30 amp single-phase 2 x 60 amp three-phase
Power Source Location	Floor or Ceiling
Top of Rack Switches	2 x 25GbE
Secure Management	

For details on current service infrastructure hardware specifications, see the VMware Cloud on Dell EMC Datasheet.

Management component

The management component for the SDDC and Tanzu Kubernetes Grid includes VMware vCenter® Server.

Note: For common services, such as DNS, customers can bring their own or they can deploy a new set of DNS services in VMware Cloud on Dell EMC SDDC infrastructure under Compute Resource Pool. For the validation of this deployment architecture, we have kept DNS outside of this environment.

Compute components

The compute component includes the Kubernetes Control Plane nodes and Worker nodes.

Please note that, as we are deploying both Kubernetes Control plane nodes and worker nodes on the same vSphere cluster under Compute Resource Pool, we have called out all Kubernetes cluster components as Compute Component on VMware Cloud Dell EMC.

Note: While VMware Cloud on Dell EMC is fully managed by VMware, the Tanzu Kubernetes Grid Cluster infrastructure component are customer managed.

NSX-T components

VMware NSX-T is the network virtualization platform for the VMware Cloud on Dell EMC Software-Defined Data Center, delivering networking and security entirely in software, abstracted from the underlying physical infrastructure.

- Tier-O router: Handles Internet, route or policy-based IPSEC VPN, and serves as an edge firewall for the Tier-1 Compute Gateway (CGW).
- Tier-1 Compute Gateway (CGW): Serves as a distributed firewall for all customer internal networks.
- The Tier-1 Management Gateway (MGW): Serves as a firewall for the VMware maintained components, including vCenter and NSX.

Resource pool

A resource pool is a logical abstraction for flexible management of resources. Resource pools can be grouped into hierarchies and used to hierarchically partition available CPU and memory resources.

After an SDDC instance on VMware Cloud on Dell EMC is created, two resource pools exist:

- A Management Resource Pool with reservations that contain vCenter Server plus NSX, which is managed by VMware
- A Compute Resource Pool within which everything is managed by the customer

When deploying both management and user resources in the same SDDC, it is recommended that two sub-resource pools are created within the Compute Resource Pool for your Tanzu Kubernetes Grid deployments:

• A Tanzu Kubernetes Grid Resource Pool for your Kubernetes cluster components, such as control plane node and worker nodes.

Note: If you are using NSX advanced load balancer for Kubernetes cluster then you can place It In the same resource pool.

Network configuration

When SDDCs are deployed on VMware Cloud on Dell EMC, NSX-T is used for network configuration. After you deploy an SDDC instance, two isolated networks exist: a management network and a compute network. Each has its own NSX Edge Gateway and NSX Distributed Logical Router for extra networks in the compute section.

Note: Because the Tanzu Kubernetes Grid components must communicate with the vCenter Server, traffic must be allowed on the MGW Edge Firewall. See Appendix section for more detail.

Virtual network segment

The following networks must be configured in VMware Cloud on Dell EMC web portal console in Network Segment section when preparing for Tanzu Kubernetes Grid deployment on VMware Cloud on Dell EMC.

Tanzu Kubernetes Grid network (sddc-cgw-tkg-network)

VMware Tanzu Standard Edition

VMware Tanzu Standard simplifies operation of Kubernetes for multi-cloud deployment, centralizing management and governance for many clusters and teams across on-premises, public clouds, and edge. It delivers an open source-aligned Kubernetes distribution with consistent operations and management to support your infrastructure and app modernization.

For more details, refer to VMware Tanzu documentation

Technical specification

Hardware

The table below shows the technical specification of this solution validation. However please refer the full list of supported hardware specification at <u>VMware Cloud on Dell EMC Datasheet</u>.

Solution specification	Quantity
VxRail E560N (Node Type M1d .medium) Intel(R) Xeon(R) Platinum 8260 CPU @ 2 .39GHz, 24 Core, 2 Socket per/core 768 GB RAM 3 .49 TB NVMe Flash Disk (Capacity) x 6 1 .46 TB NVMe Flash Disk (Cache) x 2 Disks per vSAN Disk Group – 4 Disk Groups per host – 2	11
Dell EMC Power Switch – s5248	2
VMware SD-WAN 620s	2

Software

The table below shows the software version that was tested.

Components	Version
VMware vSphere	7.0.1
VMware vCenter	7.0.1
VMware NSX	3.0.2
Tanzu Kubernetes Grid	1.3.1



Conclusion

Tanzu Standard with VMware Cloud on Dell EMC eliminates the costly and cumbersome process of refreshing, managing, and maintaining the infrastructure that supports modern application deployments.

When deploying Tanzu Kubernetes Grid on VMware Cloud on Dell EMC you gain the ability to scale microservices and modern applications with the simplicity and agility of the public cloud and the security and control of on-premises infrastructure delivered as a service to data center and edge locations.

Built upon on the latest VMware software-defined data center suite, including industry-leading compute, storage, and network virtualization that is optimized for Dell EMC VxRail hyperconverged infrastructure, VMware TKG on VMware Cloud on Dell EMC is quick and easy to procure and delivers a cloud-style consumption model for a range of use cases.

Because VMware provides fully automated lifecycle management and monitors the health of the SDDC stack around the clock, you can take advantage of a combination of software, hardware, and services to focus technology resources on initiatives that differentiate the business, instead of spending time on infrastructure management.

Additional resources/references

- VMC on Dell EMC: <u>https://www.vmware.com/products/vmc-on-dell-emc.html</u>
- Tanzu: https://tanzu.vmware.com/tanzu

Author

Shree Das is a Director, Product Solution Architect in the Cloud Infrastructure Business Unit and is responsible for architecture and design of various customer focused reference architecture solutions.

Acknowledgements

The author would like to thank Neeraj Patalay, Matt Herreras for their input, review and feedback and Shruthin Reddy for the outstanding effort validating this design.

Appendix

This section provides the steps necessary to configure Tanzu Kubernetes Grid on VMware Cloud on Dell EMC. Refer to VMware Tanzu Kubernetes Grid document on how to <u>Deploy Management Cluster to vSphere</u>.

By default, there is no external access to the vCenter Server system in your SDDC (Software Defined Data Center). You can open access to your vCenter Server system by configuring a firewall rule. Set the firewall rule in the compute gateway of VMware Cloud on Dell EMC to enable communication to the vCenter public IP address and tcp port 443 from the desired logical network of your SDDC.

Configure DNS to allow machines in your SDDC to resolve fully-qualified domain names (FQDNs) to IP addresses belonging to the customers.

Configure firewall to allow traffic between your local bootstrap machine and port 6443 of all VMs in the clusters you create. Port 6443 is where the Kubernetes API is exposed.

Create a Network Segment for TKG

We must create a Network Segment for TKG if you don't have a segment.

Note: This is an optional step. You can utilize an existing Network Segment or create a new segment for TKG

- 1. Click on Network
- 2. Click on Network & Security
- 3. Click on Segments → ADD SEGMENT
- 4. Enter Details Segment Name, Type, Gateway IP, DHCP Range and click SAVE



Add Management group

This section talks about adding a new management group. We will add the TKG subnet IP range to the group and create firewall rule for this group to access vCenter, this setting is necessary as it opens the communication for the group members with vCenter.

Follow the steps below to create a Security Group

- 1. Click on Network
- 2. Click on Network & Security
- 3. Click on Groups under Inventory Tab
- 4. Click on Management Groups \rightarrow ADD GROUP
- 5. Type Group Name TKG-Segment
- 6. Click on Set Members



Let's add the IP range of TKG-Segment subnet.

- 1. Type 192.168.18.0/24 in the IP addresses Tab
- 2. Click on Apply \rightarrow Save



Set Firewall Rules

Management Gateway

We must create firewall rules so that we can communicate with management resources, in this case vCenter. This firewall rule will allow inbound traffic to vCenter from the compute resource group. In this case we are enabling this rule so that "sddc-cgw-tkg" segment IP's can send traffic to vCenter. Below are the steps to create the rule.

- 1. Click on Network
- 2. Click on Network & Security
- 3. Click on Gateway Firewall
- 4. Click on Management Gateway
- 5. Click on ADD NEW RULE
- 6. Type vCenter Inbound Rule TKG under Name
- 7. Click on Set Source





- Click on user Defined groups and Select TKG-Segment as source (Depending on customer requirement you can choose the specific source IP/ addresses, if any)
- 9. Click on Apply

iect		• A	.ny	System Defined groups	O User Defined Groups		
TKG-S	seqme	ent X	•				
ADD G							
				Name	Compute Members	Status	
⊻				TKG-Segment			
1 (

1 Lancage Contro SDOC Veen the in Softie: " See UR, California Underläus of Aveeca Contro Control SDOC Veen the in Softie: " See UR, California Underläus of Aveeca Softie: Softie: " Softie: " Control Softie: " Softie: " Control Softie: " Softie: " Control Softi
Network betting: Mature: Location file Order Histing: Response Networks betting: Same and the state in the s
Network Editals Statu Metwork Status Autor Status Autor Status Status Metwork Status Metwork Status Status Metwork Status Cateway Fiendal Metwork Status Comple Subary Comple Subary Comple Subary
Ownerware Gateway Firewall Newsk Anagement Stateway Segment Compute Stateway
Network Management Galaway Compute Galaway Compute Galaway
Security + ADD MULE CLONE + UNDO C DELETE (Unabled Onge)
izventary : 🛛 vCenter Inbound Rule Taris 😭 Taris Gegment 🎯 Any Any example a state in 🖉 Barrier et al and a state in the state in t

ect		•	System Defined groups			
rCen	ter X					
			Name	Compute Members	Status	
			vCenter			

10. Click on Set Destination

11. Select vCenter

12. Click on Apply

- 13. Click in Services
 - Click on HTTPS
 - Click on SSO
 - Click on ICMP
- 14. Click on PUBLISH



Compute Gateway

Create a Service for Kubernetes API to allow traffic between your local bootstrap machine and port 6443 of all VMs in the clusters you create. Port 6443 is where the Kubernetes API is exposed

- 1. Click on Network
- 2. Click on Network & Security
- 3. Click On Services \rightarrow Add New Service



- Click on Set Service Entries → Add New service Entry
- 5. Add Name, Service type as TCP and Destination port number- 6443
- 6. Click Save to create the service



- Create a Compute Gateway Firewall Rule to allow bootstrap machine to communicate with the service we just created
 - Create a group for Tanzu-Bootstrap machine. This contains the IP address of bootstrap machine (Refer to ADD management group section to create the Tanzu-Bootstrap VM group)
 - Create a sddc-cgw-tkg group and add the segment IP address
 - Now create a Rule to allow traffic between bootstrap VM port 6443 to tkg segment and Publish

Note: Please refer to <u>Tanzu Kubernetes Grid</u> <u>product documentation</u> for more up to date Information



Add FQDN Zone

- 1. Click on DNS
- 2. Click on ADD DNS ZONE \rightarrow Add FQDN Zone
- 3. Type under Zone Name vx.dts.local
- 4. Type under Domain vx.dts.local
- 5. Type under DNS SERVER 192.168.200.10
- 6. Click on SAVE



Preparing bootstrap VM

To use Tanzu Kubernetes Grid, download and run the Tanzu CLI on a local system, known as the bootstrap environment. The bootstrap environment is the laptop, host, or server on which the initial bootstrapping of a management cluster is performed. Here is where you run Tanzu CLI commands.

Download and install Tanzu CLI

Prerequisites

The bootstrap environment on which you run the Tanzu CLI must meet the following requirements:

- kubectl is installed
- Docker is installed and running, if you are installing Tanzu Kubernetes Grid on Linux
- Download and unpack the Tanzu CLI
- System time is synchronized with a Network Time Protocol (NTP) server
- DNS

Installing kubectl

1. Update the apt package index needed for kubernetes repository

```
sudo apt-get update
sudo apt-get install -y apt-transport-https ca-certificates curl
```

2. Download the google cloud public key

```
sudo curl -fsSLo /usr/share/keyrings/kubernetes-archive-keyring.gpg
https://packages.cloud.google.com/apt/doc/apt-key.gpg
```

3. Add Kubernetes apt repository

```
echo ``deb [signed-by=/usr/share/keyrings/kubernetes-archive-keyring.gpg] https://apt.kubernetes.
io/ kubernetes-xenial main" | sudo tee /etc/apt/sources.list.d/kubernetes.list
```

4. Update apt package and install kubectl by running the command below

sudo apt-get update sudo apt-get install -y kubectl

5. Verify the installation

kubectl version



Download and install Docker

Download Docker

Before you install Docker Engine for the first time on a new host machine, you need to set up the Docker repository. Afterward, you can install and update Docker from the repository.

1. Update the package repository

sudo apt-get update



2. Install Packages to allow apt to use the repository over HTTPS

```
sudo apt-get install \
apt-transport-https \
ca-certificates \
curl \
gnupg-agent \
lsb-release
```

3. Add Docker's official GPG key:

```
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/
keyrings/docker-archive-keyring.gpg
```

4. Use the following command to set up the stable repository

```
echo \
```

```
``deb [arch=amd64 signed-by=/usr/share/keyrings/docker-archive-keyring.gpg]
https://download.docker.com/linux/ubuntu \
$(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
```

Install Docker Engine

1. Install Docker

```
sudo apt-get update
sudo apt-get install docker-ce docker-ce-cli containerd.io
```

2. Check installed Docker version

docker version

root@tanzu-131:/home	e/vmware-user# docker version
Client: Docker Engir	ne - Community
Version:	20.10.6
API version:	1.41
Go version:	go1.13.15
Git commit:	370c289
Built:	Fri Apr 9 22:47:17 2021
OS/Arch:	linux/amd64
Context:	default
Experimental:	true
Server: Docker Engir	ne - Community
Engine:	
Version:	20.10.6
API version:	1.41 (minimum version 1.12)
Go version:	go1.13.15
Git commit:	8728dd2
Built:	Fri Apr 9 22:45:28 2021
OS/Arch:	linux/amd64
Experimental:	false
containerd:	
Version:	1.4.4
GitCommit:	05f951a3781f4f2c1911b05e61c160e9c30eaa8e
runc:	
Version:	1.0.0-rc93
GitCommit:	12644 e 614 e 25 b 05 d a 6 f d 08 a 38 f f a 0 c f e 1903 f d e c
docker-init:	
Version:	0.19.0
GitCommit:	de40ad0

Download and unpack the Tanzu CLI

Go to https://www.vmware.com/go/get-tkg and log in with your My VMware credentials.

- 1. Under Product Downloads, click Go to Downloads.
- 2. Scroll to the VMware Tanzu 1.3.1 CLI entries and click the Download Now button for the type of machine that you are using as the bootstrap environment.
 - For Linux, download VMware Tanzu CLI bundle 1.3.1 Linux.



3. Use the tar command to unpack the binaries.

```
tar -xf tanzu-cli-bundle-v1.3.1-linux-amd64.tar
```

```
root@tanzu-131:/home/vmware-user/Downloads# tar -xf tanzu-cli-bundle-v1.3.1-linux-amd64.tar
root@tanzu-131:/home/vmware-user/Downloads# ls
cli tanzu-cli-bundle-v1.3.1-linux-amd64.tar
```

Install the Tanzu CLI

- 1. Navigate to Tanzu/CLI folder that you unpacked in the previous section.
- 2. Install the CLI binary to /usr/local/bin

```
apt-get update
sudo install core/v1.3.1/tanzu-core-linux_amd64 /usr/local/bin/tanzu3.
root@tanzu-131:/home/vmware-user/Downloads/cli# sudo install core/v1.3.1/tanzu-core-linux_amd64 /usr/local/bin/tanzu
root@tanzu-131:/home/vmware-user/Downloads/cli# cd /usr/local/bin
root@tanzu-131:/usr/local/bin# 1s
```

3. At the command line in a new terminal, run tanzu version to check that the correct version of the binary is properly installed

- You should see information about the installed tanzu version.

root@tanzu-131:/usr/local/bin#	tanzu	version
version: v1.3.1		
ouildDate: 2021-05-07		
sha: e5c37c4		

Install Tanzu CLI plugins

- 1. After installing tanzu core executable, you must install the CLI plugins related to Tanzu Kubernetes cluster management and feature operations.
 - Navigate to the tanzu cli folder which we have extracted in the earlier step. In the example below I have it in the Downloads folder, so I will navigate to /home/user/Downloads folder
- 2. Run the command below to install tanzu plugins tanzu plugin install --local cli all

root@tanzu-131:/home/vmware-user/Downloads# tanzu plugin install --local cli all

 Check plugin installation status by running the command tanzu plugin list

root@tanzu-131:/home/vmware-user/Downloads# tanzu plugin list						
NAME	LATEST VERSION	DESCRIPTION	REPOSITORY	VERSION	STATUS	
alpha	v1.3.0	Alpha CLI commands	core		not installed	
cluster	v1.3.0	Kubernetes cluster operations	core	v1.3.1	installed	
kubernetes-release	v1.3.0	Kubernetes release operations	core	v1.3.1	installed	
login	v1.3.0	Login to the platform	core	v1.3.1	installed	
management-cluster	v1.3.0	Kubernetes management cluster operations	tkg	v1.3.1	installed	
management-cluster		Kubernetes management cluster operations	core	v1.3.1	installed	
pinniped-auth	v1.3.0	Pinniped authentication operations (usually not directly invoked)	core	v1.3.1	installed	

Prepare to deploy management clusters to vSphere

Create a resource pool in which to deploy the Tanzu Kubernetes Grid Instance

 Click on Compute resource pool in VMware Cloud on DellEMC vSphere cluster and create a new resource pool for TKG (This is an optional step).

2. Name the resource pool. Choose the CPU and Memory reservations for the pool and click OK to create the resource pool.

- 3. Create a VM folder in which to collect the Tanzu Kubernetes Grid VMs.
 - Go to your cluster \rightarrow VMs and Templates \rightarrow Click on SDDC Datacenter \rightarrow Right click and select new folder \rightarrow New VM and Template folder

– Enter folder name and click ok to create folder

vmware[®]

4. A datastore with sufficient capacity for the control plane and worker node VM files.



CANCEL OK







5. A network with a DHCP server to which to connect the cluster node VMs that Tanzu Kubernetes Grid deploys. The node VMs must be able to connect to vSphere.

Note: If you intend to deploy multiple Tanzu Kubernetes Grid instances to this vSphere instance, create a dedicated resource pool, VM folder, and network for each instance that you deploy.

- 6. Traffic to vCenter Server is allowed from the network on which clusters will run.
- 7. The Network Time Protocol (NTP) service is running on all hosts, and the hosts are running on UTC. To check the time settings on hosts, perform the following steps:
 - Use SSH to log in to the ESXi host
 - Run the date command to see the timezone settings
 - If the timezone is incorrect, run esxcli system time set
- 8. We will be using the <u>cloudadmin@VMC.local</u> account for the deployment, which will have all the necessary permissions to deploy TKG.

Create SSH key pair

SSH key pair is needed for the Tanzu Kubernetes Grid CLI to connect to vSphere from the machine on which it is running, and you must provide the public key part of an SSH key pair to Tanzu Kubernetes Grid when you deploy the management cluster. If you do not already have one on the machine on which you run the CLI, you can use a tool such as **ssh-keygen** to generate a key pair.

ssh-keygen -t rsa -b 4096 -C cloudadmin@vmc.local



Import the base OS image template into vSphere

- 1. Go to https://www.vmware.com/go/get-tkg and log in with your My VMware credentials.
- 2. Download the Tanzu Kubernetes Grid OVAs for node VMs.
 - Kubernetes v1.19.3: Photon v3 Kubernetes v1.19.3 OVA
- 3. In the vSphere Client, right-click an object in the vCenter Server inventory, select Deploy OVF template.



4. Select Local file, click the button to upload files, and navigate to the downloaded OVA file on your local machine.

1 Select an OVF template	Select an OVF template
2 Select a name and Tolder 3 Select a compute resource 4 Review details 5 Select storage 6 Ready to complete	sweet and unty temporate informational use, or local me system. Enter a LRL to download and install the OVF package from the Internet, or browse to a location accessible from your computer, such a to local hand drive, a network share, or a CD/DVD drive. O URL
	Inst./Teroteserver.adveruffetboligibly.orl low Coal Tile Unc.O.D.F.K.ES photon-3-kube-v1/19.3-vmware1.ova

Deploy OVF Template

5. Accept or modify the appliance name and select the destination datacenter or folder.

 1 Select an OVF template 	Select a name and folder	
2 Select a name and folder	Specify a unique name and target location	
3 Select a compute resource		
4 Review details	Virtual machine name: photon-3-kube-v1.19.3+vmware.1	
5 Select storage		
6 Ready to complete	Select a location for the virtual machine.	
	√	
	✓ In SDDC-Datacenter	
	> ClonePrepinternalTemplateFolder	
	> ClonePrepParentVmFolder	
	> ClonePrepReplicaVmFolder	
	> ClonePrepResyncVmFolder	
	> Discovered virtual machine	
	> Management VMs	
	> Templates	
	> tkg	
	> Workloads	1
		_
	CANCEL BACK NEX	т
Deploy OVF Templat	e	
 1 Select an OVF template 	Celert a compute recourse	
 2 Select a name and folder 	Select the destination compute resource for this operation	
3 Select a compute resource		-
4 Review details	V In SDDC-Datacenter	1
5 Select storage	V III Cluster-1	
6 Ready to complete	172.18.1.4	

1 Select an OVF template 2 Select a name and folder	Select a compute resource Select the destination compute resource for this operation
3 Select a compute resource	
4 Review details	SDDC-Datacenter
5 Select storage	V Cluster-1
6 Ready to complete	1 172.18.1.4
	172.18.1.5
	172.18.1.6
	Compute-ResourcePool
	> 🔗 Horizon-Mgmt-ResourcePool
	> O Horizon-User-ResourcePool
	> TKG-ResourcePaol
	> A Mant-ResourcePool
	Compatibility
	✓ Compatibility checks succeeded.

7. Review Details and Accept the end user license agreements (EULA).

6. Select the destination host, cluster, or resource pool.

8. Select the disk format and WorkloadDatastore and click Next.

1 Select an OVF template 2 Select a name and folder 2 Select a compute proving	Select storage Select the storage for the co	nfiguration and di	sk files					
 3 Select a compute resource 4 Review details 	Select virtual disk format:			As defined in	the VM storage	e policy 🗸		
 5 License agreements 	VM Storage Policy:				Datastore	Default	×	
6 Select storage	Name	Capacity	Provisioned	Free	Type	Cluster		
7 Select networks	vsanDatastore	31.44 TB	6.98 TB	24.46 TB	VSAN			
8 Ready to complete	UvrkloadDatastore	31.44 TB	14.69 TB	24.46 TB	VSAN			
	Compatibility							
	 Compatibility checks su 	cceeded.						

1 Select an OVF template 2 Select a name and folder	Select networks Select a destination network for each source	network.			
3 Select a compute resource 4 Review details	Source Network	Ϋ́	Destination Network		
5 License agreements	nic0		sddc-cgw-network-1		~
6 Select storage					1 items
7 Select networks					
8 Ready to complete	IP Allocation Settings				
	IP allocation:	Static	- Manual		
	ID protocol:	in.d			

- 9. Select the network to which the VM will connect.
- 10. Click Finish to deploy the VM.



- When the OVA deployment finishes, right-click the VM and select Template > Convert to Template.
 Note: Do not power on the VM before you convert it to a template.
- 12. In the VMs and Templates view, right-click the new template, select Add Permission, and assign the tkg-user to the template with the TKG role.

vm vSphere Client Menu V		
		photon-3-kube-v1.1
vcenter.sddc-k5y62nd2.fractal.vmwarevmc.	com	Summary Monitor Config
■ 172.18.1.4 ■ 172.18.1.5		Gues Com Powered Off
Ompute-ResourcePool	Actions - photon-3-kube-v	1.19.3+vmware.1 DNS
> 🕞 Horizon-Mgmt-ResourcePool	Power	▶ IP Ac
Horizon-User-ResourcePool TKG-ResourcePool TKG-ResourcePool ResourcePool	Guest OS	to Console Host
centos centos-desk	🔮 Open Remote Console	Iware
SR-TKG-Ubuntu	Aligrate	1
🗗 Ubuntu	Fault Tolerance	nory
Ubuntu-Desktop	VM Policies	d disk 1
win2kos	Template	Convert to Template
2 The manufacture of CEPOOL	Compatibility	Export OVE Templat

Deploy management clusters to vSphere with the Installer interface

This topic describes how to use the Tanzu Kubernetes Grid installer interface to deploy a management cluster to a vSphere instance. The Tanzu Kubernetes Grid installer interface guides you through the deployment of the management cluster and provides different configurations for you to select or reconfigure.

- Run tkg init -ui command to start the Kickstart UI on localhost:8080.
- Open a browser and enter the IP <u>http://127.0.0.1:8080</u> to access the installer page. Choose the option "Deploy your management cluster on VMware vSphere."

- 3. Enter the public facing FQDN of the vCenter, user name and password and click Connect.
- Validating the pre-requisites... Serving kickstart UI at http://127.0.0.1:8080 unable to open browser: exit status 3 € → @ @ 0 127.0.0.1:8 80% ... 🖂 🕁 IN ED ® Welcome to the VMware Tanzu Kubernetes Grid Installe AWS EC2 æ Δ ← 🗗 Deploy Management Cluster on vSphere ✓ 1. IaaS Provide (1) You mus vSphere VCENTER SERVER ① vcenter.sddc-k5y62nd2.fractal CONNECT Ø vSphere 7.0.0 Environment Detected ×

root@tanzu-131:/home/vmware-user# tanzu management-cluster create

4. Select "Deploy TKG management Cluster" option.

Technical White Paper | 24



 Select the SDDC datacenter, enter the SSH public key. Run cat ~/.ssh/id_rsa.pub command to get the public key that was created earlier. Copy the public key to TKG deployment screen and click Next.

root@tanzu-131:/home/vmware-user# cat ~/.ssh/id rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQC1TLGw0RTj7bVLyGZf130QAQTCxSJiHxFQsElL1
kAeqq9QCF+J0141mTsj5YwUThtUpu4CYcMjRG1ADk1P5dhiYnMfV279YYMSZeFrxSQkn0oIdN6EBF
to1ApI+CmW54Zl1qiZkWLD/3r2zrz3mclVeVCxZ96cCWPyIx14R1kJF+XZsT0PTdb+cwYrMfi8bKH
RAZ0xgA0y13db1/db1E0FGuoVw0sAydCntbxk8Z0GWow+AGVtMfcE0csKg12iBigdJPZa2WhvfkgB
OrquZZXuqWpeQVTldB5tb15PgRDzAhx300ekhW3z2lwuppK8kmL1VUgmLCK1TiK+MdHo/rqXN172j
oUEySkiYmW08s0pbn30rYGMGcKFAKo3q1qeU4KwZ6qpF82YQGqR6DZT0TqR4UE0AQ0sLf3JSquoms
NzU38/OUCWJMA/0/2sbi2s8rHsWe/+10VT3V+2ggQkRCKGwNWl1wi0Dsip6HMBlsBl+h8s14ZXvFI
GJIoVOjU3M7yC7vczk7TX/uZEkU6bgrSZ2RtLQ414dBWa5Y605SJZ0/k6CJg7ISbT3XI3YhgEi1XV
xot0uAz9juTputzplzC4SCLGS/H5FoKGIrUm6q110Hz+CjtADtt4eRxVnNL6QcJsEKDd2hU1BbUky
nNshonrYyJINMINMiG5dZNJXyMIfO== cloudadmin0ymc_local

 Choose the Production instance type. Give a name for management cluster, Worker Node Instance Type and a Control Plane Endpoint IP address.

7. Fill in the NSX load balancer details and click Next. Note: This is optional

8. Fill in the optional data and click next.

i. laas Provider vo	enter vcenter.sddc-k5y62nd2.fractal.vmware	vmc.com connected
vSphere 7.0.0		
VCENTER SERVER () vcenter.sddc-k5y62nd2.fractal	USERNAME cloudadmin@vmc.local	PASSWORD
DATACENTER ①	SSH PUBLIC KEY ①	
/SDDC-Datacenter >	SSI-158 AAAAB3NzaC1yc2EAAAADAQABA PODwmu5rsaxrxORmtFcDRhXut2XI caw+u8sgJMtX+00Z+n+100r2tqXvi	AACAQCSuvb17EBr15zUyqwq2bMO DVVliqu//VGxztTaNQIHuJGILpcBrqY3 000pD/UuQNRNSSF8ZZ5AzVroLDD

IaaS Provider vCenter vo	enter.sddc-k5y62nd2.fractal.vmwarevmc.c	om connected
2. Management Cluster Settings Produc	tion cluster selected: 3 node control plane	
Management Cluster Settings		
Development Single control plane node. Recommended for environment. INSTANCE TYPE ①	r a development Three contro environment	Production plane nodes. Recommended for a production PE O medium (cpu: 2, ram: 4 GB, ~_
MANAGEMENT CLUSTER NAME ① tanzu-mgmt	CONTROL PLANE ENDPOINT () 192.168.2.83	MACHINE HEALTH CHECKS ①
WORKER NODE INSTANCE TYPE () medium (cpu: 2, ram: 4 GB, ~		

← 🛃 Deploy Management Cluster on vSphere

3. VMware NSX Advanced Load Balancer Control Ontional VMware NSX Advanced Load Balan	er: 192.168.2.30	
CONTROLLER HOST () 192.968.2.30	USERNAME admin	PASSWORD
CONTROLLER CERTIFICATE AUTHORITY		
/55glox2bx00Gyy/29A3x5o5g2A2v urs20FsL8+/urs205x9Wg3e2suag+f8sbAbGuP+r7Uypm == ENO CERTIPICATE		
CONDIMIE ()	SERVICE ENGINE ADDUID NAME ()	
Default-Cloud ~	Default-Group	
VIP NETWORK NAME	VIP NETWORK CIDR	
tanzu v	192.168.2.0/24 v	
CLUSTER LABELS ()		
By default, all clusters will have NSX Advanced Load Bala	ncer enabled. Here you may optionally specify cluster labels to identif	fy a subset of clusters that should have NSX Advanced Load Balancer enabled.

Þ	\odot	laa5 Provider	vCenter vcenter.sddc-k5y62nd2.fractal.vmwarevmc.com connected
>	0	Management Cluster Settings	Production cluster selected: 3 node control plane
>	0	VMware NSX Advanced Load I	Balancer Optionally specify VMware NSX Advance Load Balancer settings
,	4.	Metadata	Specify metadata for the management cluster
	DES	ptional	
	LAB	els ()	
	key	/ : value	400

9. Choose the VM Folder, Datastore and resource pool and click Next.

>	\odot	laaS Provider	vCenter vcenter.sddc-k5y62nd2.fractal.vmwarevmc.com connected	
>	ø	Management Cluster Settings	Production cluster selected: 3 node control plane	
>	ø	Metadata	Location: US	
/	4.	Resources	Resource Pool: /SDDC-Datacenter/host/Cluster-VResources/Compute ResourcePool, VM Folder: /SDDC-Datacenter/vm/tkg, Datastore: /SDD /WorkloadDatastore	-ResourcePool/TKG- IC-Datacenter/datastore
	Sp	ecify the Resources ℃		
		EQUIDED (1)	DITIGTORS ()	
	/S	FOLDER () DDC-Datacenter/vm/tkg	DATASTORE () × * /SDDC-Datacenter/datastore	/WorkloadDatastore × +

10. Choose a network name and leave the Cluster Service CIDR and Cluster POD CIDR default.

~	e ا	Deploy Manager	nent Cluster on vSphere							
>	> 😔 IaaS Provider		vCenter vcenter.sddc-k5y62nd2.fractal.vmwarevmc.com connected							
>	ø	Management Cluster Settings	Production cluster selected: 3 node control plane							
>	0	VMware NSX Advanced Load	Balancer Optionally specify VMware NSX Advance Load Balancer settings							
>	0	Metadata	specify metadata for the management cluster							
>	0	Resources	Resource Prod. / RDOC. Diducation Mont/Chates - VMIssion real/Computer ResourceProd/1160 ResourceProd. VM Prüder / RDOC. Diducenter/vm/Vilag. Datastorer / RDOC. Diducenter/vilatastore / Mont/Sada/Datastore							
~	6.	Kubernetes Network	Network: sddc-cgw-TKG							
		bernetes Network Settin Il Provider: Antrea rwork NAME @ dc-cgw-ТКО	до С сцитая заячися сов © торака.on тора за.on тора за.on							
		Enable Proxy Settings								

11. Disable Optional identity management setting and click next.

÷	P I	Deploy Manage	ment Cluster on vSphere
>	0	laaS Provider	vCenter vcenter.sddc-k8y62nd2.fractal.vmwarevmc.com connected
>	0	Management Cluster Setting	s Production cluster selected: 3 node control plane
>	ø	VMware NSX Advanced Load	d Balancer Optionally specify VMware NSX Advance Load Balancer settings
>	0	Metadata	Specify metadata for the management cluster
,	0	Resources	Research Pool: ADDC Datacenter/host/Claster-Unrecorces/Compute-ResearcePool/TKR- ResoarcePool, VM Poliser /BDDC Datacenter/myReg, Datastore //PoolsacdDatastore //PoolsacdDatastore
>	0	Kubernetes Network	Network: sddc-cgw-TKG
~	7.	Identity Management	Specify identity management
		tionally Specify Identity Enable identity Management S	Management with ODC or LDAPS

12. Select the OS image (Ubuntu) and click Next.

	C, I	Deploy Manager	ment Cluster on vSphere
>	0	taaS Provider	vCenter vcenter.sddc-k5y62nd2.fractal.vmwarevmc.com connected
>	0	Management Cluster Settings	Production cluster selected: 3 node control plane
>	ø	VMware NSX Advanced Load	I Balancer Optionally specify VMware NSX Advance Load Balancer settings
>	0	Metadata	Specify metadata for the management cluster
>	0	Resources	Resource Pool, //BDC-Datacenter/host/Cluster-VResources/Compute ResourcePool/YRG- ResourcePool, VM Folder //BDC-Datacenter/mr/Bg, Datastore //BDC-Datacenter/Satastore //WindbadDatastore
>	0	Kubernetes Network	Network: sddc-cgw-TKG
>	0	Identity Management	Specify identity management
~	8.	OS Image	OS Image: /SDDC-Datacenter/vm/lkg/ubuntu-2004-kube-v1.20.4+vmware.1
	05 05 /5	Elmage with Kubernetes MAGE () DDC-Datacenter/m/tkg () (EXT	v120.4+vmware 3-8ig1

13. Register the cluster with Tanzu Management Control (TMC) and click next, this is an optional step. Login to your TMC account to get the URL and register the tanzu cluster.

14. Review the information and click Deploy Management Cluster to start the deployment.

15. You should see a similar screen displaying the progress of the deployment. The deployment will take about 15 minutes. You should have the supervisor cluster ready once it is finished.



LOTING STRUCTURE	vCanter vander addi 49pE2x42 Institut omnervens and connected
	Vanite Jobs-10/vElveE Ashter meansureme, com
USERVINE	Obudati Indune, Kole
PASSWORD	
DATAGENTER	/stock-basement
SSH PUBLIC KEY	
Management Duster Bellings	Production duater selected 3 reads carted plans
DEVELOPMENT INSTANCE TYPE	
PRODUCTION INSTANCE TYPE	medum (pp. 2, nm: 4, 08, dat, 43, 08)
MANAGEMENT CLUSTER NAME	tata-nyint
CONTROL PLANE ENDPOINT	10.462.83
INABLE MADINE HEALTH DIEDIS	75
WORKER NODE INSTANCE TYPE	medium (rpu 2, nem 4 08, etc) (80
Baladata	London 18
LOCATION	
nescentron	
LABELS	
Response	Fassers Park / 2005 Belacester her ("Daste "Massersel") on gete Researches ("ME Baserseles), WE John / 2005 Belacester/solling Belactore / 2005 Belacester/solling/HardsonBelactore
VM POLDER	/SDC- Balannins/un/kig
DATASTORE	/SDDC Extension for Unit instance (Warking Extension
RESOLACE POOL	/SDDC Coloumien/host/Counter-Utessavices/Computer-Resource/Host/Resource/Host
Kulterneles Releach	Network with cape-boolgand
CN PROVIDER	40m
NETWORK NAME	NATION AND THE REPORT OF THE R
CUUSTER SERVICE COR	0044.0/13
CLUSTER POD CDR	10.80.0.1
	Di Inane ABR (delavariar) erhadetete Jaka (13 Presava 1
05 mare	

3 / 8 Complete. Set	up bootstrap cluster
ogs	
(0222 20:08:24.24334):	init.go:98] Validating configuration

Tanzu Mission Control (TMC)

VMware Tanzu Mission Control is a centralized management platform for consistently operating and securing your Kubernetes infrastructure and modern applications across teams and clouds. For more details refer to <u>VMware Tanzu Mission</u> <u>Control Documentation</u>.

Register Tanzu Kubernetes Grid with Tanzu Mission Control (TMC)

- Prerequisites
- Create a Cluster Group

Create a Cluster Group

A cluster group is an organizational grouping in the VMware Tanzu Mission Control object hierarchy that provides for better management of your Kubernetes clusters

- 1. Sign in to TMC portal.
- 2. Click on Cluster Groups
- 3. Enter a Name and click on Create

Register Management Cluster

- Click on Administration → Management Cluster, Click on Register Management Cluster and choose the Deployment type as Tanzu Kubernetes Grid
- 2. Enter a name for management cluster, Description and click Next





www Tanzu Mission Control			
« & Ouster groups	← Create cluster group		
Clusters Workspaces Mil Namesources	tean annal Tean an an an an sea tean an an an ann an ann an ann ann ann a		
III Workloads	Later Isomotion		
G, Policies >	ana ana		







- 3. Copy the URL and save it. We will use the URL while deploying the Tanzu Kubernetes Grid cluster and register it with TMC
- 4. Go to administration \rightarrow Management Clusters to check the status and health of the cluster Note: The cluster status is updated after we register the Tanzu Kubernetes Cluster with TMC during the deployment process

Create a Cluster from TMC Console

Now that we have registered the VMC vCenter, we can either attach an existing cluster or create a new cluster

- 1. Click on cluster \rightarrow Create Cluster
- 2. Select the management cluster and click on Continue to Create Cluster
- 3. Choose the default cluster provisioner and click Next



vmware[®]

O Deally O Healthy d Tanan Ka o vno-deferricisódo

www Tanzu Mission Control			
& Cluster groups & Clusters	Create cluster This cluster will be provisioned using Testay Rubermeters Grid on vigatives		
BE Workspaces (e) Namespaces BE Workloads Q, Policies > Q monostime	Concerptionary Concerpt		
Events Administration Automation center	Team and assign Oneses your cluster's name and assign it to a cluster group Oneses your cluster's name and assign attacks Oneses your clustered as writes, watacent and storage options		
重 Audit logs	Expert/y the resource taking the chain Expert/y the resource taking the chain Expert centre plane Choice before a range holder index a length on board plane Expert centre Expert centre plane Expert centre plane Ex		

	> 🙆 Choose provisioner	Management cluster, vinc-dellemc-sidde. Provisioner: default.
	 2. Name and assign 	Choose your clusters name and assign it to a cluster group
5 001	Outer name type procession of the state or services a Counter small counter of the state or services a Counter small services or services a Description captioned Line (splinway) Line (sp	маниялар (мания Ма), мани, на Чарана. М
	3. Configure	Select your kubernetes version, network and storage options
	 Specify resources 	Specify the resources backing this cluster
	5. Select control plane	Choose between a single node or highly available control plane
		Customize the default node pool

ts. Cluster groups	 Register management cluster 							
S. Clusters	> 🛞 Name and assign Name this management cluster registration and select its default cluster group							
B Workspaces III Namespaces	v 2. Register Register access to the management cluster							
III Woldoads	One this registration UA, to your administrator to initial the Tanza Motion Control agent on the Tanza Motionneted find management duster suring on your initiatructure. This UR, repres in 48 hours, Instructions of how your administrator can complete the registration of this management duster are decolled in the VMaxw documentation.							
0, Policies >	Magazi/Milline, New climit somew constrainties/Mil-Arthrad Marketta							
2 Events	3 VenvYAM,							
Administration	VIEW MANAGEMENT CLUSTER							
C Automation center								





Create cluster

5. Enter the configuration details and click on Next

6. Specify the resources and click Next

 Choose the Control plane type you want to deploy, I have chosen the HA configuration below

 Select the worker node instance type and the number of worker nodes required and click on Create Cluster to start the deployment



e, Ouster groups	Create cluster The cluster Tanto Kalementes Grid an Vigiliare	
	O Choose provisioner Management cluster: vmc-dellemc-sidd; Provisioner: default;	
88 Workspaces (#) Namespaces	> 🛞 Name and assign Cluster name: tanza-100-m-clus. Cluster group: nihruthin	
IE Workloads	Configure Kolevenetes version v12.0.4+vmware 1 kg 1. Pod CDR: 172.20.0.014. Service CDR: 10.360.0.019	
Q, Policies	v 4. Specify resources Specify the resources backing this cluster	
() Inspectation () Events () Automatication () A	Ben and a series of the annual data under a series of the annual data. Later a series of an annual data and an annual data annual data and an annual data annual	
	5. Select control plane Choose between a single node or highly available control plane	
	6. Edit node pool Customize the default node pool	

K b. Chatter groups	•	C	reate clus	Jer sioned using Tanzu Kubern	retes Grid on vSphere			
	í.	> 1	Choose pro	visioner Mar	nagement cluster, vmc-deli	erno-addo. Provisioner: defai	suit.	
Namepaces	Ľ		Name and a	enign Out	ater name, tanzo 130-m-clu	s. Ouster group: rshruthin		
Workloads	H	2.1	Contigure	Kup 10-3	bernetes version, v1.20.4+vr 95.0.0/16	meane.1-big.1. Pod CIDR: 172	220.0.0%. Service CDR:	
Differences		> 1	Specify residence	Surces Des Des /10	source pool /SDDC-Datace sourcePool/TKD-ResourceP DDC-Datacenter/Satastore/	ntechost/Ouster-Stasouro sol. VM folder /SDOC Data WorkbadDatastore)	ces/Compute- scenter/ww/tig_ Dutastone	
Dients	1		5. Select corb	rol piane Cho	oose between a single node	a or highly available control p	glane	
Administration				O Sindle rode	•			
Auditiogs			Recommend	nå for development environments	Reunnendel	for production environments		
			Instance type CPU Memory Disk	snatogo 2 ran 4 68 da 1 2 v090 4 68 20 68	- Instance type CPU Wemory Disk	medium (() µ 2 ram 8 08,		
			Control plane endpo 192168.2.72	m ()			-	
			6. Edtrodep	ool Cur	stomize the default node pr	201		

Custer groups	+ C This clu	reate cluster for will be provisioned using Tanasa	Kalenneliss Drid on väghene	
Winistances	> 0	Choose provisioner	Management cluster vinc-delienc-odds: Provisioner default.	
Namespaces	> 0	Name and assign	Outlier name: tatzu-100-m-clus. Outlier group: nihruthin	
Workbads	2.0	Configure	Rubernetes version: v120.4-verware 56g 1 Pod CDR: 172.20.0.076. Service CDR: 10.56.0.076	
Polices) Inspections	> 0	Specify resources	Besource pool /SDDC-Oatlaneter/HostICulate-LResources/Compute- Descenter/Industrial_SecondexDev (und forer /SDDC-Oatlaneter/HostICulater) /SDDC-Oatlaneter/HostICulater/HostIC	
Events	> 0	Select control plane	Control plane type: Highly available. CPU. 2. Memory: 8 Gb. Disk. 40 Gb.	
Administration Automation center	~ 1	. Edit node pool	Castomize the default node pool	
Audt logs		* default rodepool		
		Name Default-rockspoor	Note later	
		Description (optional)		
		Instance type medium (zour 2, sam: 8.68, disk - v.	Crock label	
		010 1.000		
		Nemary 8-08		
		Number of worker nodes 25		





Copyright © 2021 VMware, Inc. All rights reserved. VMware, Inc. 3401 Hillview Avenue Palo Alto CA 94304 USA Tel 877-486-9273 Fax 650-427-5001 VMware and the VMware logo are registered trademarks of trademarks of VMware, Inc. and its subsidiaries in the United States and other jurisdictions. All other marks and names mentioned herein may be trademarks of their respective companies. VMware products are covered by one or more patents listed at vmware.com/go/patents. Item No: Tanzu Kubernetes Grid with VMware Cloud on Dell EMC 11/21