Technical White Paper: June 2022



Getting started

vmware[®]

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Executive summary

Regardless of whether you're focused on operations or application development, organizations are looking to ensure they make sustainable and future-proof choices as they modernize their infrastructure. Infrastructure modernization goes together with application modernization and can yield substantial benefits.

No matter your industry or maturity level, organizations are winning customers by providing new applications faster. In fact, by 2022, the number of organizations that will release code to production daily for select applications will rise to 70%, up from 65% in 2021.¹

With the introduction of containers, Infrastructure and Operations (I&O) teams need to keep pace with faster and more frequent development delivery. With more frequent infrastructure redeployment, I&O teams can get bogged down in manual processes. VMware® Tanzu Mission Control helps organizations by centralizing cluster redeployment and Day 2 management tasks so I&O teams can be more efficient and maintain velocity.

Tanzu Mission Control enables enterprises to manage all their Kubernetes clusters regardless of where they reside. In addition, Tanzu Mission Control facilitates delivery of infrastructure for multiple user audiences: Developers can access the resources they need, when they need them, and operators can apply consistent policy against single clusters or fleets of clusters.

Let's explore how Tanzu Mission Control meets the needs of both key user groups by creating a hybrid cloud development environment for two application teams. We're going to start with best practices by creating Cluster groups and Workspaces for the two application teams. We'll follow up by creating a cluster in vSphere, attaching an existing cluster from a hyperscaler, and creating application-specific Namespaces.

Oct 2021 - IDC FutureScape: Worldwide Developer and DevOps 2022 Predictions - Doc #US47148521. IDC.



Activity checklist

Step 1: Create Cluster groups and Workspaces to begin organizing assets.

- □ <u>Create Dev Cluster group</u>
- Create Dev Workspace for App A
- □ <u>Create Dev Workspace for App B</u>

Step 2: Register Supervisor or Management clusters.

- □ Register vSphere with Tanzu Supervisor cluster
- Tanzu Kubernetes Management cluster

Step 3: Create a cluster.

- □ Provision a new cluster on vSphere
- □ Provision a new cluster on hyperscaler/private cloud
- Step 4: Attach a cluster for management.
 - □ <u>Attach an existing Kubernetes cluster</u>
- Step 5: Create dedicated application Namespaces.
 - □ <u>Create Namespace for App A</u>
 - □ Create Namespace for App B

Step 1: Grouping team and deployment resources with Cluster groups and Workspaces for consistent policies

Tanzu Mission Control maintains consistency and control of all clusters in a fleet. However, clusters must be organized for maximum effect. To achieve this, Tanzu Mission Control introduces two key architectural concepts to meet the needs of both operators and developers:

Cluster groups: Platform operators can create logical Cluster groups which they can manage as a fleet (e.g., operators can apply a common set of access policies to a group of clusters such as dev, staging, or prod). A Cluster group can include clusters that exist in one or more environments and is shared across teams. Platform operators can create, view, and delete Cluster groups, or move a cluster from one group to another as needed.

Workspaces: Kubernetes Namespaces are a way to divide cluster resources for various purposes (e.g., many development teams organize application services by Namespaces). Often, developers must work across different clusters for certain projects. Tanzu Mission Control includes Workspaces to meet this need by allowing platform or application operators to group Namespaces from one or more clusters.



FIGURE 1: Example showing access policies applied to Cluster groups and Workspaces.

The next few steps show you how to create Cluster groups and Workspaces to organize your clusters.



Create a Dev Cluster group

- 1. Access the Tanzu Mission Control console and click **Cluster groups** on the left menu.
- 2. Click Create Cluster group.

vmw Tanzu Mission Control			<u>۞</u>	Corey Dinkens tanzu-tmm
۲ Launchpad	& Cluster groups	9	C Last updated less than a minute ago	CREATE CLUSTER GROUP
& Cluster groups	Cluster group	↑ Labels	Description	
WorkspacesNamespaces	corey-cg	(teamowner: tanzu-tmm)	Default cluster group	
III Workloads	eg-cg	user: egrigson	Ed's test cluster group	
III Catalog	nicks-clusters rogerssc-demo-clusters	usage: demos		

FIGURE 2: View Cluster groups.

3. Enter dev or development for the name and click Next.

Create team or application Workspaces

1. Within the Tanzu Mission Control console, click **Workspaces** on the left menu, then click **Create Workspace**.

vmw Tanzu Mission Control		
≪ ≜ Launchpad	≅ Workspaces	C Last updated less than a minute ago
& Cluster groups & Clusters	Name	Description Y
Workspaces	default tanzutmm-nimbus owner. mambg-tanzutmm	Default workspace Tanzu TMM Shared Workspace
Workloads		1 to 3 of 3 Workspaces < < 1 / 1 > >
Image: Catalog Image: C		

FIGURE 3: Workspaces list.



2. Enter a name such as "dev-app-a" or "app-a-ws," add any desired labels, then click Create.

vmw Tanzu Mission Control		
د ا المعادم المع المعادم المعادم	 Create workspace 	
🚯 Cluster groups	Name	s.
& Clusters	Description (optional)	
(⊞) Namespaces	Labels (optional)	
I Workloads	key : value	
## Catalog		
② Access		

FIGURE 4: Create a Workspace.

3. Repeat Steps 1 and 2 to create the Workspace for application b.

Step 2: Enable Tanzu Kubernetes cluster lifecycle management

Kubernetes has officially entered the mainstream in 2022. A recent Gartner report revealed that by 2027, more than 90% of global organizations will be running containerized applications in production, and 25% of all enterprise applications will run in containers.² As a result, the typical enterprise may have development teams working with containers that span a packaged Kubernetes distribution, a managed Kubernetes service, and/or a DIY Kubernetes footprint.

How do you effectively manage a fleet of clusters, residing in disparate environments? Tanzu Mission Control enables you to bring clusters under management in two ways:

- Provision clusters directly through Tanzu Mission Control.
- Attach existing clusters that you've already created.

In the following steps, we'll focus on the cluster registration workflows so that we can create a Tanzu Kubernetes cluster with Tanzu Mission Control in the following steps.

Here are the differences between the two registration options in this guide:

Option 1: Tanzu Kubernetes Management cluster*

You can run this multi-cloud Kubernetes footprint both on-premises on vSphere, Amazon EC2, and Microsoft Azure. These clusters are deployed with a standalone, web-based installer and managed with the Tanzu CLI instead of vSphere client.

• Option 2: vSphere with Tanzu Supervisor cluster enabled on vCenter version 7u3c and greater*

Create and operate Tanzu Kubernetes clusters natively in vSphere with VMware Tanzu. You can verify if your vSphere instance has Tanzu Services enabled by clicking the hamburger (three horizontal lines) menu in the top left corner and selecting **Workload management**, then clicking the **Supervisor clusters** tab.

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² Gartner - CTO's Guide to Containers and Kubernetes May 2022 – Doc ID G00763328

*If you don't have a Management cluster to register, you can <u>create one for free</u> with VMware Tanzu Community Edition. If you're a licensed VMware Tanzu user, you can <u>download the VMware Tanzu Kubernetes Grid installer</u>.

Option 1: Register a Tanzu Kubernetes Management cluster

This section covers how to register a Tanzu Kubernetes Grid Management cluster with Tanzu Mission Control. This provides Tanzu Mission Control the capability to provision and deploy Kubernetes clusters directly from the Tanzu Mission Control interface without using the Tanzu CLI.

Create the registration link in Tanzu Mission Control

Create the registration link for the Management cluster so that Tanzu Kubernetes Grid clusters can be lifecycle managed and deployed through Tanzu Mission Control.

1. Click Administration in the left menu bar, then Management clusters.

vmw Tanzu Mission Control		¢
~		
🚯 Cluster groups	lacktriane Administration	2
& Clusters	Accounts Access Integrations	Management clusters Roles Suk
🔠 Workspaces	Account credentials	10000
(⊞) Namespaces	This is a view of your organization and	I the associated credentials for accounts yo
I Workloads	To create an account for cluster creati	on, go to the aws-hosted management clu
## Catalog	CREATE ACCOUNT CREDENTIAL	
Q Policies >		
⊘ Inspections		
년 Events		
& Administration	Name	T Provider name T Account type
Automation center	tanzutmm-aws-cdinkens	AWS Data protec

FIGURE 5: Administration view: Accounts tab.

2. Next, click on the Register Management cluster dropdown and click Tanzu Kubernetes Grid.

						²	?	Corey Dinkens tanzu-tmm
Acco	Administration	Manage	ement clusters	Roles Sul	bscription	Target locations	Pro	C Last updated 2 minutes ago
							REG	ISTER MANAGEMENT CLUSTER ~ Tanzu Kubernetes Grid
	Name	1 τ	Health	Status	Provide	r		vSphere with Tanzu
:	arcas-mgmt-cluster		Itealthy	✓ Ready	🛃 Tan	zu Kubernetes Grid or	vSph∈	Tanzu Community Edition
:	aws-hosted		🔗 Healthy	✓ Ready	aws Tan	zu Kubernetes Grid Ho	osted or	n AWS
;	eg-tkg15-homelab		Disconnected	P Unknow	n 🛃 Tan	zu Kubernetes Grid or	n vSphei	re v1.22.5+vmware.1
:	tanzutmm-nimbus-haas		Healthy	V Ready	🗗 vSp	here with Tanzu		v1.21.0+vmware.wcp.2
:	tanzutmm-nimbus-w1		Healthy	√ Ready	🛃 vSp	here with Tanzu		v1.21.0+vmware.wcp.2
:	tkg-aws-tanzutmm		Healthy	V Ready	aws Tan	zu Kubernetes Grid or	AWS	v1.22.5+vmware.1

FIGURE 6: Register Management cluster view: Register Management cluster dropdown.

3. In the first step of the registration wizard, select the Cluster group created in earlier steps for the **Default Cluster** group for managed workload clusters, then click Next.

← Register manageme	nt cluster
✓ 1. Name and assign	Name this management cluster registration and select its default cluster group
Name tanzutmm-nimbus Name must start and end with a letter or number, and ca Default cluster group for managed workload cl	n contain only lowercase letters, numbers, and hyphens.
Lanzutmm-nimbus ×	
Labels (optional) key : value ADD LABEL :	2
NEXT	
2. Proxy Configuration (optional)	Choose a proxy configuration to enable the connection
3. Register	Register access to the management cluster

FIGURE 7: Registering a Management cluster: Selecting a default Cluster group.

- 4. Select any proxy configurations if applicable, then click Next.
- 5. In the final step of the wizard, copy the registration URL that generates, as you'll need it in the following step.



			۵	?	Corey Dinkens tanzu-tmm			
←	← Register management cluster							
>	\oslash	Name and assign	Name this management cluster registration and select its default cluster grou	р				
>	\oslash	Proxy Configuration (optional)	Choose a proxy configuration to enable the connection					
~	3.	Register	Register access to the management cluster					
	Give this registration URL to your vSphere administrator to install the Tanzu Mission Control agent on the Tanzu Kubernetes Grid management cluster. This URL expires in 48 hours.							
	https://OrgName.tmc.cloud.vmware.com/installer?id=longvalue&source=registration&type=tkgs > View YAML							
VI	EW MA	ANAGEMENT CLUSTER						

FIGURE 8: Generating the registration URL for a Management cluster in Tanzu Mission Control.

Registering the Tanzu Kubernetes Grid Management cluster

- 1. Continuing from the registration wizard, open a terminal and log in to the Tanzu Kubernetes Grid Management cluster Namespace. If you're unsure how, <u>follow these steps</u>.
- 2. Next, apply the Tanzu Mission Control configuration YAML to the cluster:

kubectl apply -f "<Insert registration URL here>"

3. After waiting about 30–60 seconds, switch back to the Tanzu Mission Control console, click **View Management** cluster, then click **Verify connection** to check if the Tanzu Mission Control agent has finished installation on the cluster. You'll see their health icons begin to update:

Default cluster group	Gria (VI.4)	Television (C	Default		se
Labels	corey-cg	February 16, 2022, 09:10am	Default p	proxy for workload clus	se
Description Azure TKG	1.4.1				
Component health		Agent and extens	ions health	h	
controller-manager scheduler		 agent-updater extension-manager lcm-tkg-operator tmc-auto-attach) cluster-hea ⊘ extens ⊘ resource	ilth-extension sion-updater ⊘ inter e-retriever ○ sync-a	nt-agent agent

FIGURE 9: Registering a cluster in Tanzu Mission Control.



4. Verify that the cluster is appearing in Tanzu Mission Control. Open Tanzu Mission Control and click **Administration** in the left-hand menu, then **Management clusters**, and verify that your cluster shows in the list.

				⊉ (?)	Со	orey Dinkens tanzu-tmm	
& Administration				C L	ast updat	ted less than a minu	ute ago
Accounts Access Integrations	Management clusters	Roles	Subscription	Target location:	s Pro	oxy configurations	
				RE	GISTER M	IANAGEMENT CLUST	rer 🗸 🔪
Name	↑ ▼ Health	Status 🔻	Provider			Version	Ŧ
aws-hosted	🕑 Healthy	🗸 Ready	aws Tanzu Kuber	netes Grid Hosted o	n AWS		
tanzutmm-nimbus	🥑 Healthy	🗸 Ready	🛃 vSphere with	Tanzu		v1.20.8+vmware.v	wcp.1
tkg-azure-tanzutmm	🔗 Healthy	🗸 Ready	🔥 Tanzu Kuber	netes Grid on Azure		v1.21.2+vmware.1	
4							+
			1 to	3 of 3 Management clu	isters	< 1 / 1 >	>

FIGURE 10: Verifying that your Management cluster appears in Tanzu Mission Control.

 Follow these steps to create workload Namespace(s) on the Tanzu Kubernetes Management cluster. The Namespace you create is referred to as a *provisioner* from within Tanzu Mission Control. Depending on the desired configuration, you might want to create a workload Namespace on a per-application basis.

Option 2: Register a vSphere with Tanzu Supervisor

These steps will cover registering a vSphere Supervisor cluster with Tanzu Mission Control. This provides Tanzu Mission Control the capability to provision and upgrade Kubernetes clusters directly from the Tanzu Mission Control interface without using the Tanzu CLI.

It's important to note that going forward, two types of clusters will be referenced: *Supervisor clusters* and *Management clusters*. Once a Supervisor cluster is registered, it becomes a Tanzu Mission Control Management cluster that can provision other Tanzu Kubernetes clusters.

Create the registration link in Tanzu Mission Control

1. Click Administration in the left menu bar, then click the Management clusters tab.

vmw Tanzu Mission Control		Д (?	Corey Dinkens tanzu-tmm
*			
🗞 Cluster groups 📩	& Administration	C Las	t updated less than a minute ago
🖧 Clusters	Accounts Access Integrations Management clusters Rol	les Subscription	Target locations Proxy cor
B Workspaces	Account credentials		×
(⊞) Namespaces	This is a view of your organization and the associated credentials for a credential allows you to start using VMware Tanzu Mission Control add	ccounts you use. Ac d data protection an	ding an account
I Workloads	To create an account for cluster creation, go to the aws-hosted manag	gement cluster	
## Catalog	CREATE ACCOUNT CREDENTIAL		
Q Policies >			Do not show this again
⊘ Inspections			
번 Events			
& Administration	Name T Provider name T	Account type y D	escription T
Automation center	tanzutmm-aws-cdinkens AWS	Data protection T	MC provisioned AWS S3 storage
	4		

FIGURE 11: Creating a registration link for a Supervisor cluster in Tanzu Mission Control.

2. Next, click on the **Register Management cluster** dropdown and click **vSphere with Tanzu** (vSphere 7 with workload management enabled).

								Corey Dinkens tanzu-tmm
Administration C Last updated 6 minute								C Last updated 6 minutes ago
Acco	unts	Access	Integrations	Manag	ement clusters	Roles	Subscriptic	on Target locations Proxy con
							R	EGISTER MANAGEMENT CLUSTER V
	Name			↑ т	Health	Status T	Provider	Tanzu Kubernetes Grid VSphere with Tanzu
:	aws-ł	nosted			🔗 Healthy	🗸 Ready	aws Tanz	u Kubernetes Grid Hosted on AWS
:	eg-tk	g15-homelak)		Itealthy	🗸 Ready	🛃 Tanz	u Kubernetes Grid on vSphere
:	tanzu	tmm-nimbus	s-haas		Itealthy	🗸 Ready	🛃 vSph	nere with Tanzu
:	tkg-a	zure-tanzutn	nm		🕑 Healthy	🗸 Ready	🔥 Tanz	u Kubernetes Grid on Azure
:	tmm-	vmc			Unknown	C Pending	y 🛃 vSph	nere with Tanzu
•						1 to 5 of 1	5 Management o	↓ clusters < 1 / 1 > >

FIGURE 12: Registering a Management cluster in Tanzu Mission Control.

3. In the first step of the registration wizard, select the name of the desired Cluster group for the **Default Cluster** group for managed workload clusters.



- Register manageme	nt cluster
✓ 1. Name and assign	Name this management cluster registration and select its default cluster group
Name tanzutmm-nimbus Name must start and end with a letter or number, and car Default cluster group for managed workload cl tanzutmm-nimbus × Description (optional)	n contain only lowercase letters, numbers, and hyphens. Iusters
Labels (optional) key ADD LABEL	2
NEXT	
2. Proxy Configuration (optional)	Choose a proxy configuration to enable the connection
3. Register	Register access to the management cluster

FIGURE 13: Selecting a Cluster group in Tanzu Mission Control.

4. Copy the registration URL generated in the final step of the wizard, as you'll need it for the next steps.

	□ ○ Corey Dinkens tanzu-trum ↓ ○ ↓							
← Register manageme	- Register management cluster							
> 📀 Name and assign	Name this management cluster registration and select its default cluster group							
> 🧿 Proxy Configuration (optional)	Choose a proxy configuration to enable the connection							
∽ 3. Register	Register access to the management cluster							
Give this registration URL to your vSphere in 48 hours.	dministrator to install the Tanzu Mission Control agent on the Tanzu Kubernetes Grid management cluster. This URL expires							
View MANAGEMENT CLUSTER								

FIGURE 14: The generated URL used to register a Management cluster in Tanzu Mission Control.



Registering vSphere with Tanzu Services

- 1. Log in to your vCenter Server, click on the **Inventory** view, and click on the cluster with workload management enabled.
- 2. Click the **Configure** tab, then scroll down to the **TKG Service** section, click **Tanzu Mission Control**, and paste the URL copied in the first step into the **Registration URL** box. Then click **Register**.

Compute-cluster									
Summary	Monitor	Configure	Permissions	Hosts	VMs	Namespaces	Datastores	Networks	Updates
vSAN Clu Supervise Trust Autho Alarm Defir Scheduled Namespace General Network Storage Certificate Image Re	ster or Cluster ority hitions Tasks es V	Tanz Add a U Tanzu N Registra https: id=121	U Mission C JRL token here to Aission Control. Ation URL (1) //myorg.tmc.cloud. f2verylongstring23	ontrol automatic vmware.cor e&source=r	Regist ally conne m/installer egistratior	ration ect all of your Tan:	zu Kubernetes d	clusters to	
TKG Servic	e v					13			
Default C Tanzu Mis	NI ssion Control			REG	ISTER	CANCEL			

FIGURE 15: Tanzu Mission Control Registration in vSphere.

3. Once registration has been completed, you'll verify that the cluster is appearing in Tanzu Mission Control. Open Tanzu Mission Control and click **Administration**, then **Management clusters**, and verify your cluster shows in the list.

			<u></u> ٢	Corey Dinkens tanzu-tmm
& Administration			C Las	t updated less than a minute ago
Accounts Access Integrations	Management clusters	Roles	Subscription Target locations	Proxy configurations
			REGI	STER MANAGEMENT CLUSTER 🗸
Name	↑ ▼ Health	Status 🔻	Provider	Version T
aws-hosted	S Healthy	🗸 Ready	aws Tanzu Kubernetes Grid Hosted on	AWS
tanzutmm-nimbus	🔗 Healthy	🗸 Ready	🤣 vSphere with Tanzu	v1.20.8+vmware.wcp.1
tkg-azure-tanzutmm	🔗 Healthy	🗸 Ready	🔥 Tanzu Kubernetes Grid on Azure	v1.21.2+vmware.1
4				•
			1 to 3 of 3 Management clust	ers $ \langle \langle 1 \rangle / 1 \rangle \rangle $





6. <u>Follow these steps</u> to create workload cluster Namespace(s) on the vSphere Supervisor. The Namespace you create is referred to as a *provisioner* from within Tanzu Mission Control. Depending on the desired configuration, you might want to create a workload Namespace on a per-application basis.

Step 3: Create a cluster

To begin deploying application workloads on Tanzu Kubernetes Grid, you must create a Tanzu Kubernetes cluster.

This next step assumes that a Namespace has already been created on the vSphere Supervisor or Management cluster; if you've not already created one, you can follow the steps <u>here</u> or <u>here</u> to create a vSphere Namespace for Tanzu Kubernetes Grid. The Namespace you create is referred to as a *provisioner* from within Tanzu Mission Control.

1. In Tanzu Mission Control, click **Clusters** on the left, then click **Create cluster** in the top right corner.

vmw Tanzu Mission Control				ф (?)	Corey Dinkens tanzu-tmm
*					2
Launchpad	& Clusters 🛛		C Last updated 1 minu	ite ago CREATE CLUS	ATTACH CLUSTER
& Cluster groups	Name Y Health Y Status Y	Version Y Cluster g	group Y Type Y	Management clust	er 🗡
& Clusters	Ŷ ALL FILTERS				
Workspaces	Name	↑ Health	Status	Provider	Version
(⊞) Namespaces	aks-prod-westus2	Healthy	V Ready	🔥 Microsoft Azure	v1.21.9
	tkg-azure-prod-westus2	Healthy	V Ready	🔥 Microsoft Azure	v1.21.2+vmware.1
I Workloads				1 to 2 of 2 Clusters	► < < 1 /1 > >
## Catalog					
Q Policies >					
⊘ Inspections					
[번] Events					
20 Administration					
Automation center					
訚 Audit logs					
(DARK					

FIGURE 17: Clusters view.

2. Select the desired Management cluster and click **Continue to create cluster**.

				Corey Dinkens tanzu-tmm	
← Create cluster					
Select the management cluster from which t	his cluster wil	l be provisio	oned.		
CONTINUE TO CREATE CLUSTER				Show only available o	lusters
Management cluster	Status 👻	Health	Provider	Cluster group	Vers
aws-hosted	✓ Ready	Itealthy	Tanzu Kubernetes Grid Hosted on AWS		
• tanzutmm-nimbus	Ready	🕑 Healthy	🛃 vSphere with Tanzu	tanzutmm-nimbus	v1.20
O tkg-azure-tanzutmm	🗸 Ready	Healthy	🔥 Tanzu Kubernetes Grid on Azure	corey-cg	v1.2
			1 to 3 of 3 Management clusters	< 1 / 1 >	+ >

FIGURE 18: Selecting a Management cluster in Tanzu Mission Control.

- 3. In the next step, select the *provisioner* (which is the desired workload *cluster* Namespace) and click Next.
- 4. Provide a cluster name and select the desired default Cluster group. Click Continue to create cluster.
- 5. If you're using AWS, follow sub-step A below; if using Azure, follow sub-step B. Otherwise, select the desired Kubernetes version and network settings.
 - A. *For Tanzu Kubernetes Management clusters on AWS*: Select the same region where your Management cluster was deployed and select the correct SSH key.
 - B. *For Tanzu Kubernetes Management clusters on Azure*: Select the region and enter a name for the resource group. Select versions, enter the same public SSH key that was used to deploy the Tanzu Kubernetes Management cluster, and select the cluster VNET configuration.
- 6. If you're using vSphere with Tanzu Services, complete sub-steps A and B below. Otherwise, continue to Step 7.
 - A. For vSphere with Tanzu Services: Add the desired storage class in the dropdown, then click **Add storage class**. You'll know the storage class was added properly if the trash icon appears to the right of it.

Note: If you don't select a *Default storage class* when using vSphere with Tanzu Services, you may run into issues deploying pods with dynamic persistent volumes.

B. Under **Default storage class**, select the desired default. As you can see here, we're using "vsan-defaultstorage-policy."



Service CIDR 👔
10.96.0.0/16
These network defaults can not be changed after the cluster is created.
RESET NETWORKING DEFAULTS
Proxy Configuration (optional)
Set proxy for this cluster 🕥 No
Dersistent volume storage
Allowed storage classes (optional) ()
vsan-default-storage-policy 🗸 前
Select storage class v
ADD STORAGE CLASS
Default storage class (ontional)
vsan-default-storage-policy ×

FIGURE 19: Confirming correct storage class.

- 7. Click **Next** and select the deployment plan that fits your needs. Sub-step A only applies to vSphere with Tanzu Services clusters.
 - A. Add data volumes to control plane nodes (available on vSphere with Tanzu Services): Add data volumes to your control plane nodes by clicking Add Volume and enter the desired parameters. A common use is to add a dedicated volume for /var/lib/etcd in case /var fills up.

	1/2.20.0.0	ט וט. ספועונפ כוטא. וט.סט.ט.ט,	סוי
4. Select control plane	Choose b	etween a single node or highl	y available control plane
Single no Recommended for developed	de ment environments	Highly avai Recommended for produce	lable tion environments
Instance type guarantee Storage class vsan-defa	d-large (4vCPU, 1 V ult-storage-policy V	Instance type guarantee Storage class vsan-defa	ed-large (4vCPU, 1) \vee sult-storage-policy \vee
Configure volumes (C	Optional)		
Name	Mount path	Capacity	
etcd-0	/var/lib/etcd	10 Value must be in a range	GB e from 0.001 (1 MB) to
面 ADD VOLUME		10240 (10 TB)	
NEXT			

FIGURE 20: Selecting a deployment plan in Tanzu Mission Control.

- 8. Click Next and select the desired node pool settings, such as worker count. Sub-step A only applies to vSphere with Tanzu Services clusters.
 - A. Add data volumes to nodes in a vSphere with Tanzu cluster nodepool: Add data volumes to your worker nodes by expanding the desired nodepool, click Add Volume, and enter the desired parameters. A common use is adding a dedicated volume for /var/lib/containerd in case /var fills up.

✓ default-nodepool			
Name default-nodepool			
Description (optional)			
Number of worker nodes			
Worker instance type guaranteed-large (4vCPU, 16GB F $\scriptstyle \lor$			
Storage class vsan-default-storage-policy v			
Configure volumes (Op	otional)		
Name	Mount path	Capacity	
containerd-0	/var/lib/containerd	10	GB
面 ADD VOLUME		Value must be in a range from 0.001 (1 MB) to 10240 (10 TB)	
Node label			
key	value		

FIGURE 21: Configure additional nodepool volumes.

9. Click Create cluster.

You'll be taken to the status of the cluster where you can observe baseline health statistics once creation has completed.

Step 4: Attaching any CNCF-conformant Kubernetes cluster

Tanzu Mission Control helps I&O teams increase management efficiency and consistency across their clusters by allowing you to attach any Cloud Native Computing Foundation (CNCF)-conformant Kubernetes cluster living on any environment—whether on-premises, in public clouds, or at the edge. Amazon Elastic Kubernetes Service (EKS), Azure Kubernetes Service (AKS), Google Kubernetes Engine (GKE), or OpenShift clusters can be attached to Tanzu Mission Control to enable global management of packages, policies, data protection, and more.

Here's how to attach clusters in Tanzu Mission Control:

1. Log in to your Tanzu Mission Control console and click **Clusters** in the left-hand menu. Then click the **Attach cluster** in the top right corner to start attaching existing clusters.

vmw Tanzu Mission Control					nkens u-tmm 🎽 🖬
A Launchpad	& Clusters	Version Y Cluster	C Last updated less than a minute a	ago CREATE CLUSTER	ATTACH CLUSTER
& Cluster groups	Name	↑ Health	Status Provider	Version	Requested/Allo
	aks-prod-westus2	S Healthy	✓ Ready	e v1.21.9	92% (5.98 GB
Workspaces	arcas-service-cluster	S Healthy	✓ Ready ✓ Sphere	v1.22.5+vmware.1	7% (4.55 GB/
m Namespaces	arcas-workload-cluster	🔗 Healthy	🗸 Ready 🛃 vSphere	v1.22.5+vmware.1	7% (4.50 GB/
Workloads	corey-tkgm-aws-uswest2	S Healthy	✓ Ready as AWS	v1.22.5+vmware.1	13% (3.84 GB
## Catalog	corey-tkgs-addlstor	🔗 Healthy	✓ Ready 🛃 vSphere	v1.21.6+vmware.1	11% (15.26 GB
义 Access	corey-tkgs-nimbus2	Healthy	✓ Ready ✓ Pready ✓ VSphere	v1.21.6+vmware.1	9% (6.64 GB/
✓ Inspections	rogerssc-tkg-demo-07	Healthy	✓ Ready 🛃 vSphere	v1.21.6+vmware.1	6% (3.62 GB/
번 Events	tkg-azure-prod-westus2	🕑 Healthy	✓ Ready	v1.21.2+vmware.1	7% (4.31 GB/
9. Administration				1 to 8 of 8 Clusters $\qquad < \qquad <$	

FIGURE 22: View Clusters.

2. Select a Cluster group, provide a unique cluster name and description, and add labels as needed.

	\triangle	?	tanzu-tmm
Attach cluster			
Allach cluster			
1. Name and assign	Choose your cluster's name and assign it to a cluster group		
	3		
Cluster name			
corey-tkgs-nimbus-cli			
Name must start and end with a letter or number	r contain only lowercase letters, numbers, and hyphens, and be a max length of 63 characters.		
Cluster group			
Description (optional)	-		
Labels (optional)			
key	: value		
ADD LABEL			
NEXT			

FIGURE 23: Attach a cluster.

- 3. If you require a proxy configuration, complete Step 2; otherwise, click Next.
- 4. Tanzu Mission Control generates a YAML script specifically for your cluster and displays the *kubect*/command to run the script. Open a Terminal window and execute the *kubect*/command against the desired cluster context. The YAML script runs a small set of extensions in your cluster to connect it with the Cluster Agent service.



÷	At	tach cluster				
>	\oslash	Name and assign	Cluster name: corey-tkgs-nimbus-cli Cluster group: tanzutmm-nimbus			
>	\oslash	Proxy Configuration (optional)	Choose a proxy configuration to enable the connection			
~	3.	Install agent	Install the Tanzu Mission Control agent on your cluster and verify its connection			
	This command installs the cluster agent extensions on your namespace named vmware-system-tmc. This link expires in 48 hours.					
	kubectl create -f " <u>https://tanzutmm.tmc.cloud.vmware.com/installer?id=4ffcae092tfafz</u>					
	You can view the full configuration details of the VMware Tanzu Mission Control agent and copy it to your system before applying it on your Kubernetes cluster. View YAML					
	V	ERIFY CONNECTION				

FIGURE 24: Attach a cluster—Install agent CLI command.

5. After a minute or two, return to Tanzu Mission Control console and click **Verify Connection**. You can now start taking advantage of Tanzu Mission Control to manage clusters and users.

				\square	?	Corey Dinkens tanzu-tmm	#	
← ,	← Attach cluster							
>	\oslash	Name and assign	Cluster name: corey-tkgs-nimbus-cli Cluster group: t	anzutn	nm-nim	bus		
>	\oslash	Proxy Configuration (optional)	Choose a proxy configuration to enable the connecti	on				
~	3.	Install agent	Install the Tanzu Mission Control agent on your cluste	er and	verify it	s connection		
	This command installs the cluster agent extensions on your namespace named vmware-system-tmc. This link expires in 48 hours. kubectl create -f "https://tanzutmm.tmc.cloud.vmware.com/installer?id=4ffcae092cfbaf200 You can view the full configuration details of the VMware Tanzu Mission Control agent and copy it to your system before applying it on your Kubernetes cluster. Y View YAML							
	Success! The connection to your cluster has been established.							
VIE	w yo	UR CLUSTER						





Step 5: Create dedicated application Namespaces for consistent policies

When you create a new **Namespace**, you can specify which **Workspace** you'd like to associate it with and apply policies against. For example, we can specify that images can only be pulled from specific trusted repositories. We'll create a Namespace for the corresponding application and assign it to the Workspaces we created in the previous steps.

- 1. In the Tanzu Mission Control console, click on Namespaces.
- 2. Then click on Create Namespace.

vmw Tanzu Mission Control				Ĺ	2 ?	Corey Di tanz	nkens ru-tmm	
*	🖲 Namespaces 🚳			C Last update	ed 1 minute ag	JO CREAT	TE NAMESPACE	2
A Launchpad	ATTACH NAMESPACES		C) Hide Tanzu nam	espaces 🗨	Hide syst	tem namespace:	3
& Cluster groups	Name	↑ τ	Cluster	т	Status	Managed	Workspace 🔻	
& Clusters	cert-manager		tkg-azure-prod-westus2		🗸 Ready	No		
	cert-manager		corey-tkgs-nimbus2		🗸 Ready	No		
Namespaces	cert-manager		corey-tkgs-addlstor		🗸 Ready	No		
	certman-nimbus-b511e3aa		corey-tkgs-nimbus2		🗸 Ready	No		
Workloads	certman-tkg-azure-test-cae92145		tkg-azure-prod-westus2		🗸 Ready	No		
## Catalog	default		corey-tkgs-nimbus-cli		🗸 Ready	No		
(B) A								

FIGURE 26: Namespace view.

3. Enter the name of the first application Namespace, such as app-a or application-a, select the corresponding Workspace, and click **Create**.

vmw Tanzu Mission Control	
*	
A Launchpad	 Create namespace
& Cluster groups	Name tanzutmm-nimbus-namespace
& Clusters	Name must be lowercase letters, numbers and hyphens, and unique within the cluster
🗃 Workspaces	Description (optional)
(⊞) Namespaces	Cluster corey-tkgs-nimbus2 ×
III Workloads	Workspace
## Catalog	Labels
图 Access	key value
Q Policies >	
⊘ Inspections	ADD LABEL
la Administration	CREATE





4. Repeat Steps 1–3 again for application b and any additional desired Namespaces.

Conclusions

VMware Tanzu Mission Control allows you to consistently manage all your Kubernetes clusters from a single control point.

If you're an operator, you'll have complete visibility of your entire Kubernetes estate, always know the health of each cluster, and have consistent policy application for access, container registry, network, security, and more. That's remarkable control over a diverse environment.

If you're a developer, you'll have the freedom to use modern constructs and the self-service access to Kubernetes resources. You won't need to worry about infrastructure and can instead focus on what you do best—writing code.

The bottom line is that Tanzu Mission Control helps your organization build modern applications on a modern infrastructure.

Glossary

vSphere with Tanzu Services	Use your existing vSphere environment to manage Kubernetes clusters alongside virtual machines through vCenter.
IDC	International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets.
Cluster group	This is a logical grouping of clusters that can include clusters in different environments and shared across teams.
Workspace	This is a logical grouping of Namespaces that spans clusters and that policies can be applied against.
Supervisor cluster	When a vSphere cluster is configured for Kubernetes workloads, it becomes a Supervisor cluster and adds objects to the vCenter Server inventory, such as Namespaces, vSphere Pods, and Tanzu Kubernetes. vSphere with Tanzu creates a Kubernetes control plane directly on the hypervisor, creating a Kubernetes layer within the ESXi hosts that are part of the cluster.
Management cluster	A Management cluster is a Kubernetes cluster that runs and operates Tanzu Kubernetes Grid. The Management cluster runs Cluster API to create and manage workload clusters that host application and deploys and manages shared and in- cluster services that the workloads use. The Management cluster is purpose-built for managing workload clusters and packaged services, and for running container networking and other system-level agents.
Tanzu Kubernetes cluster	A Tanzu Kubernetes cluster is a full distribution of the open source Kubernetes container orchestration platform that is built, signed, and supported by VMware. You can provision and operate Tanzu Kubernetes clusters on the Supervisor cluster by using the Tanzu Kubernetes Grid Service.
Cluster attach	This is the process of connecting a cluster to Tanzu Mission Control for management, excluding any lifecycle management capabilities such as cluster create, update, or delete.
Cluster registration	This is the process of connecting a vSphere with Tanzu Supervisor cluster or Tanzu Kubernetes Grid Management cluster to Tanzu Mission Control for management. This enables the ability to create, update, and delete clusters with Tanzu Mission Control.

Provisioner

This is a Namespace on a Supervisor or Management cluster that is used for deploying Tanzu Kubernetes clusters.

Version table

vCenter Enterprise+	7u3d - 7.0.3 build 19480866
Tanzu Kubernetes Cluster	1.21.6+vmware.1-tkg.1.b3d708a
Virtual Distributed Switch	7.0.2
NSX Advanced Load Balancer	21.1.4-9210
Tanzu Kubernetes Grid Management cluster	1.4.1





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