Author: Shrikant (Team PSA)

Tanzu Kubernetes Grid Integrated (formerly Enterprise PKS) integration with vRealize Automation Cloud

This document describes the integration between TKGI & vRAC Cloud Assembly using Cloud Proxy

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Introduction:

vRealize Automation Cloud provides different services as VMware Cloud Assembly, VMware Service Broker, VMware Code Stream.

Cloud Assembly helps construct workload specifications as Blueprints, which we can make available to the business groups and deploy them to the cloud resources.

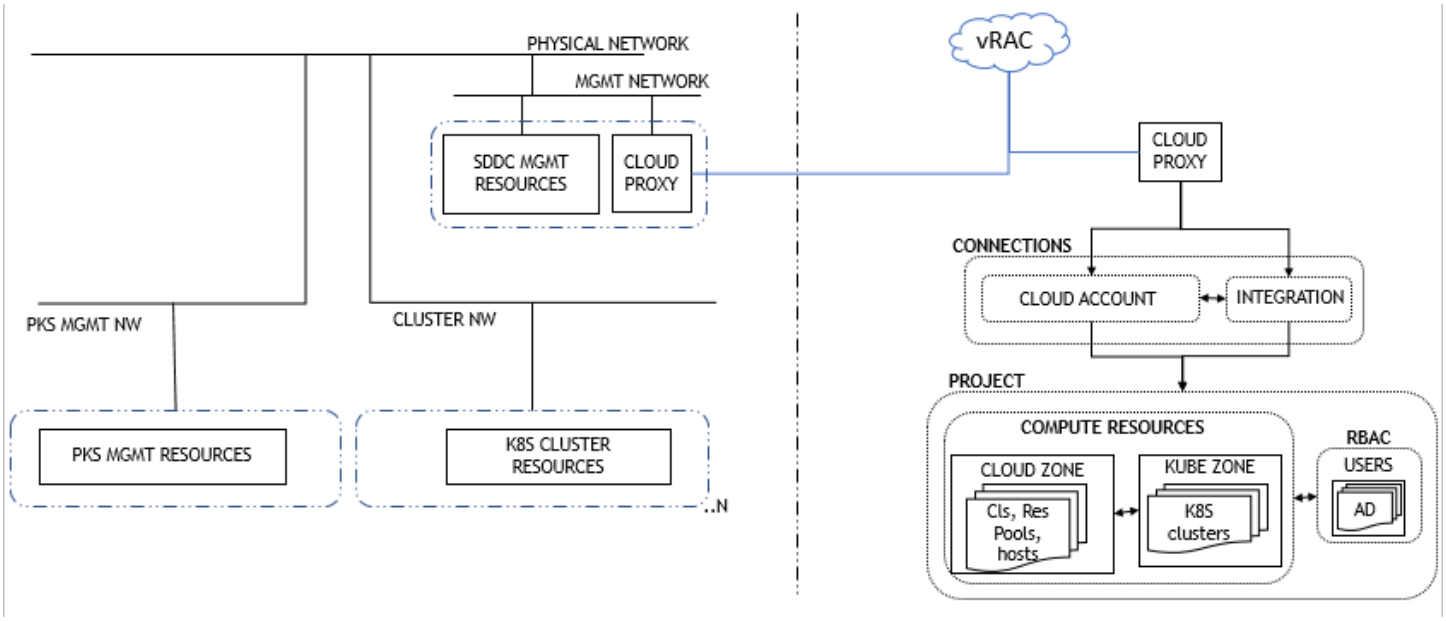
Service Broker provide a catalog of templates and actions to VMware Service Broker consumers.

Code Stream supports DevOps life cycle with pipelines, endpoints, and dashboards using VMware Code Stream.

In this document we'll see the different options Cloud Assembly offers for managing and deploying Kubernetes resources. We'll focus on integration with Pivotal Container Service (PKS) with Cloud Assembly to configure, manage and deploy Kubernetes resources.

We will also understand how to integrate external Kubernetes clusters in Cloud Assembly.

High level design: (Sample topology of integration between vRAC & TKGI)



Brief description of high level design:

The diagram above shows high level integration between TKGI & vRAC. It points out the main components involved in the process such as cloud proxy(for communication between target environment & vRAC), connections as cloud accounts(with SDDC management components) & integrations (with PKS endpoint), configuring compute resources as cloud zone(with clusters, resource pools, hosts) & kubernetes zone(with kubernetes clusters), assigning users & roles.

TKGI(EntPKS) integration with vRAC

Author: Shrikant (Team PSA)

Overview:

This document describes integration between TKGI and vRAC.

We have assumed that the TKGI configuration part is understood by the partners, so primary focus of this document will be on the integration between vRAC & TKGI.

Scope:

> This is a test setup deployment with minimal required configuration for the demo purpose.

> Integration with Cloud Accounts (vCenter, NSX-T)

> Integration with Enterprise PKS endpoint

> Deployment of TKGI cluster with single control plane.

> Deployment of cluster using 'DEPLOY' option

> Deployment of cluster using Blueprint.

> Adding existing cluster

> Adding external cluster

Not in scope:

> TKGI cluster creation with multiple control plane nodes

> Explore usage of services as Code Stream, Service Broker

> Any other operation not listed in Scope section above

TKGI(EntPKS) integration with vRAC

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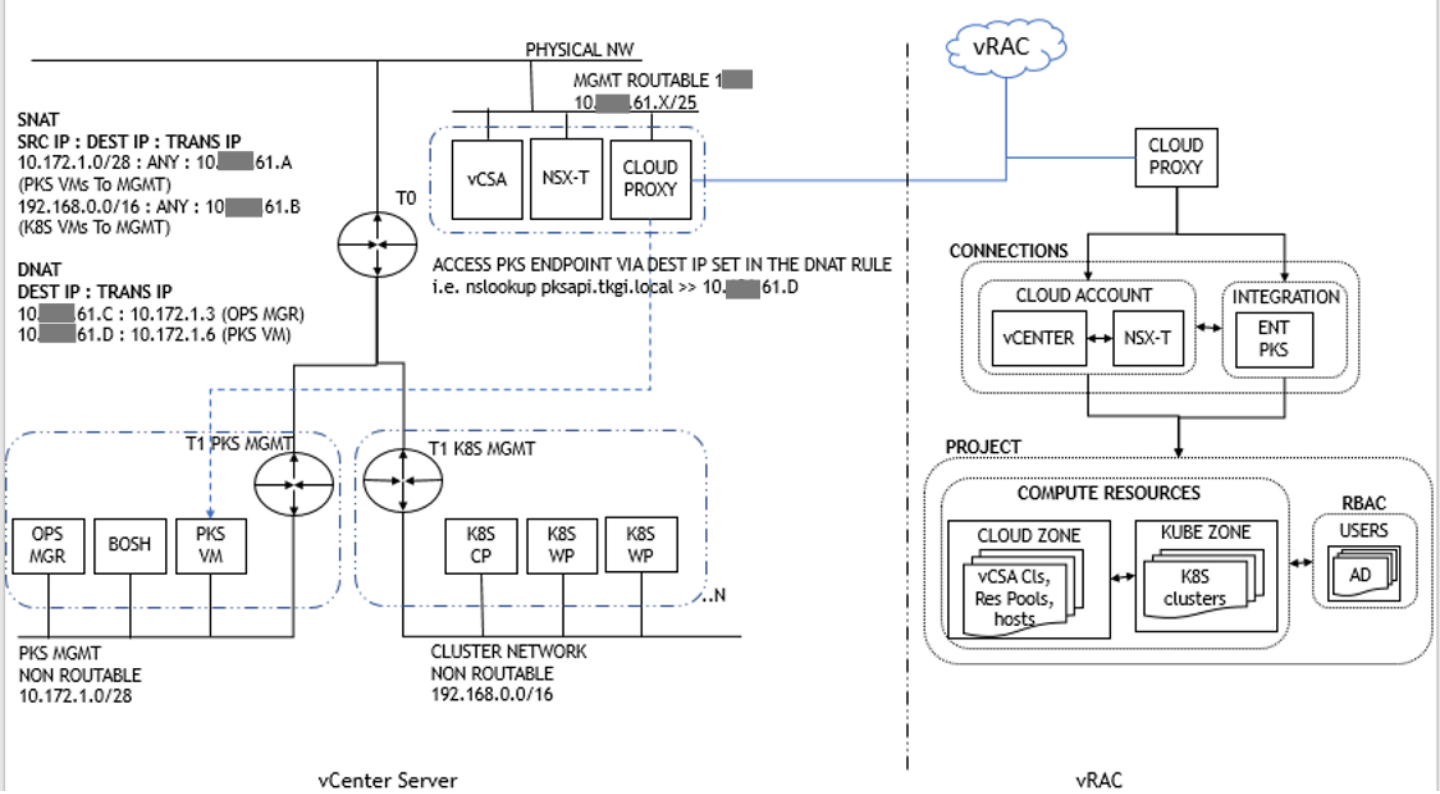
Design topology (Please maximize to get a clear view of the diagram)



Brief description of topology:

Above topology describes integration between vRAC & TKGI(EntPKS) endpoint. The TKGI lab is configured with NAT topology. Cloud Proxy needs to be installed on the target environment. A cloud proxy is a remote virtual appliance that is created in a target vCenter by deploying the supplied cloud proxy OVA. The cloud proxy allows data collection and other communication between a specific cloud account in Cloud Assembly and a specific on-premises endpoint in vCenter. After cloud proxy is installed, it can be used when creating and associating a cloud account with an on-premises endpoint (i.e. vCenter, NSX-T etc). In a similar way cloud proxy can be used to communicate with some integrations, in our case EntPKS. The cloud proxy deployed on a target vCenter Server manages the information between Cloud Assembly and the integration service or application.

TKGI(EntPKS) integration with vRAC

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High level steps:

Below will be the high-level steps:

Prerequisites:

TKGI(EntPKS) lab configured with NAT topology

General steps

Login to VMware Cloud Services

Click on VMware Cloud Assembly

Create Cloud Proxy for the target environment

Create Cloud Accounts (vCenter, NSX-T) for the target environment

Create Integration for the (TKGI(EntPKS)) for the target environment

Create Cloud Zone

Create Kubernetes Zone

Create Project

    # Add Cloud Zone, Kubernetes Zone in the project

    # Add Users in the Project

Create cluster deployment blueprint & assign it to the project

Creating/Adding Kubernetes cluster

 # Creating cluster

Using DEPLOY option

> Go to Infrastructure > Resources > Kubernetes > Clusters > DEPLOY > Enter the necessary values > Click DEPLOY

Using Blueprint

> Go to Design > Select blueprint > Enter the necessary values > Click DEPLOY

 # Adding cluster

Add Existing cluster

> Go to Infrastructure > Resources > Kubernetes > Clusters > ADD EXISTING > Enter the necessary values > Click ADD

Add External cluster

> Go to Infrastructure > Resources > Kubernetes > Clusters > ADD EXTERNAL > Enter the necessary values > Click ADD

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Detailed steps

Below will the detailed steps:

Prerequisites:

TKGI(EntPKS) lab configured with NAT topology

General steps:

Login to VMware Cloud Services

Click on VMware Cloud Assembly

Create Cloud Proxy for the target environment

> Click Infrastructure > Connections > Cloud Proxies > NEW > Download OVA > Copy the One Time Key

> Import OVA file in vCenter instance > Select a name & folder > Select a compute resource

> Review details > Accept license agreements > Select Storage > Select Networks (Management network in SDDC) >

> Customize template by adding the One Time Key, root user password > cloud proxy display name > Network properties for the cloud proxy appliance

> On Ready to complete page review the details & click FINISH

> Power On the cloud proxy & wait for some time

> Check the status is Active in the Cloud assembly > Infrastructure > Connections > Cloud Proxies for the proxy created

Create Cloud Accounts (vCenter, NSX-T) for the target environment

>> Create vCenter Cloud Account

> Click Infrastructure > Connections > Cloud Accounts > ADD CLOUD ACCOUNT > Select vCenter >

> In New Cloud Account page > Enter Name for the cloud account > Enter vCenter IP address/FQDN > In Cloud Proxy drop down Select the cloud proxy created for the target environment > Enter vCenter username & password >

Click VALIDATE > After successful validation Click ADD > Check the vCenter Cloud Account is displayed in the Cloud Accounts

>> Create NSX-T Cloud Account

> Click Infrastructure > Connections > Cloud Accounts > ADD CLOUD ACCOUNT > Select NSX-T >

> In New Cloud Account page > Enter Name for the cloud account > Enter NSX-T IP address/FQDN > In Cloud Proxy drop down Select the cloud proxy created for the target environment > Enter NSX-T username & password >

Click VALIDATE > After successful validation Click ADD > Check the NSX-T Cloud Account is displayed in the Cloud Accounts

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Create Integration for the (TKGI(EntPKS)) target environment

> Click Infrastructure > Connections > Integrations > ADD INTEGRATION > Select Integration Type as VMware Enterprise PKS >

> In New Integration page > Enter Name for the integration > Enter PKS Endpoint IP address/FQDN > In Location dropdown Select Private Cloud > In Cloud Proxy drop down Select the cloud proxy created for the target environment > Enter username & password to access the PKS Endpoint > Enter the CA certificate (i.e. Certificate to secure the PKS API from Enterprise PKS tile) >

Click VALIDATE > After successful validation Click ADD > Check the Enterprise PKS integration is displayed in the Integrations

Create Cloud Zone

> Click Infrastructure > Configure > Cloud Zones > NEW CLOUD ZONE >

> In New Cloud Zone page > In Account / region section search for the vCenter Cloud account created & select the same > Enter name for the Cloud Zone > In the Compute tab select the Compute resources(of type clusters, resource pools, host) to be applied to the Cloud Zone > Click on CREATE > Check the Cloud Zone is displayed in the Cloud Zones

Create Kubernetes Zone

> Click Infrastructure > Configure > Kubernetes Zones > NEW KUBERNETES ZONE >

> In New Kubernetes Zone page > In Account section search for the Enterprise PKS integration created & select the same > Enter name for the Kubernetes Zone > In the On-demand tab select the Deployment Plan as required > Enable the Allow Provisioning for the plan > Click on SAVE > Check the Kubernetes Zone is displayed in the Kubernetes Zones

Create Project

> Click Infrastructure > Configure > Projects > NEW PROJECT >

> In New Project page > Enter the Name of the project >

> In Users tab add the users & define their role >

> In Provisioning tab Click ADD CLOUD ZONE > Search & Select the Cloud Zone created & Click ADD >

> In Kubernetes Provisioning tab > Click ADD ZONE > Search & Select the Kubernetes Zone & Click SAVE

> Click CREATE > Check the Project is displayed in the Projects

Create cluster deployment blueprint & assign it to the project

> Click Design > Blueprints > NEW > Enter the name for the blueprint > Search & Select the Project to which blueprint will be tagged > Select Blueprint sharing in Service Broker as required > Drag K8S Cluster resource type in Design canvas > Modify the code as required > Click Version > mention the Version > Select Release this version to catalog > Click CREATE > Check the Blueprint is displayed in the Blueprints

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Creating/Adding Kubernetes cluster

Creating cluster

Using DEPLOY option

> Click Infrastructure > Resources > Kubernetes > Clusters > DEPLOY > In Account section Search & Select the EntPKS endpoint > Enter the cluster name > Select sharing as required – in case of sharing at Project level then select the Project's name > Enter the Master hostname(e.g. clsname.tkg.local) > Select the Plan > Enter the Worker nodes count (e.g. 1) to be deployed > Click DEPLOY > Monitor the deployment > Check for the cluster created in Infrastructure > Resources > Kubernetes > Clusters

Using Blueprint

> Click Design > Blueprints > Select blueprint > Click DEPLOY > Enter Deployment name > Select Blueprint version > Click Next > Click DEPLOY > Enter the Hostname(e.g. clsname.tkg.local) > In Size Enter the Worker nodes count (e.g. 1) to be deployed > Select the Plan > Click DEPLOY > Monitor the deployment > Check for the cluster created in Infrastructure > Resources > Kubernetes > Clusters

Adding cluster

Add Existing cluster

> Click Infrastructure > Resources > Kubernetes > Clusters > ADD EXISTING > In Account Search & Select the EntPKS integration endpoint > In Cluster select the cluster to be added > Select Connect by Master IP > Select sharing as required – in case of sharing at Project level then select the Project's name > Click ADD > Check for the cluster added in Infrastructure > Resources > Kubernetes > Clusters

Add External cluster

> Click Infrastructure > Resources > Kubernetes > Clusters > ADD EXTERNAL > Enter the name of cluster > Select sharing as required – in case of sharing at Project level then select the Project's name > In Address enter the Server Address for the cluster > In CA certificate enter the clusters CA certificate i.e. certificate-authority-data > Select location as Private Cloud > Select the Cloud proxy created for the target environment >

> In case Credentials type is Certificate > Enter Public certificate i.e. client-certificate-data & Private certificate i.e. client-key-data for the cluster

> In case Credentials type is Bearer token > Enter the Bearer token

Click VALIDATE > Click ADD > > Check for the cluster added in Infrastructure > Resources > Kubernetes > Clusters

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Appendix:

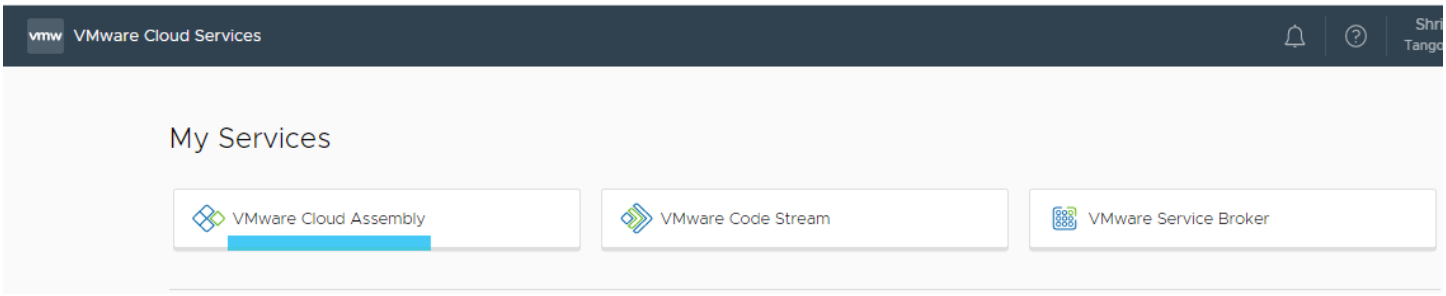
This section contains the detailed steps with screen prints, blueprint etc.

It also has References section where important links are mentioned.

Transcript:

Login to VMware Cloud Services

Click on VMware Cloud Assembly



Create Cloud Proxy for the target environment

> Click Infrastructure > Connections > Cloud Proxies > NEW > Download OVA > Copy the One Time Key

TKGI(EntPKS) integration with vRAC

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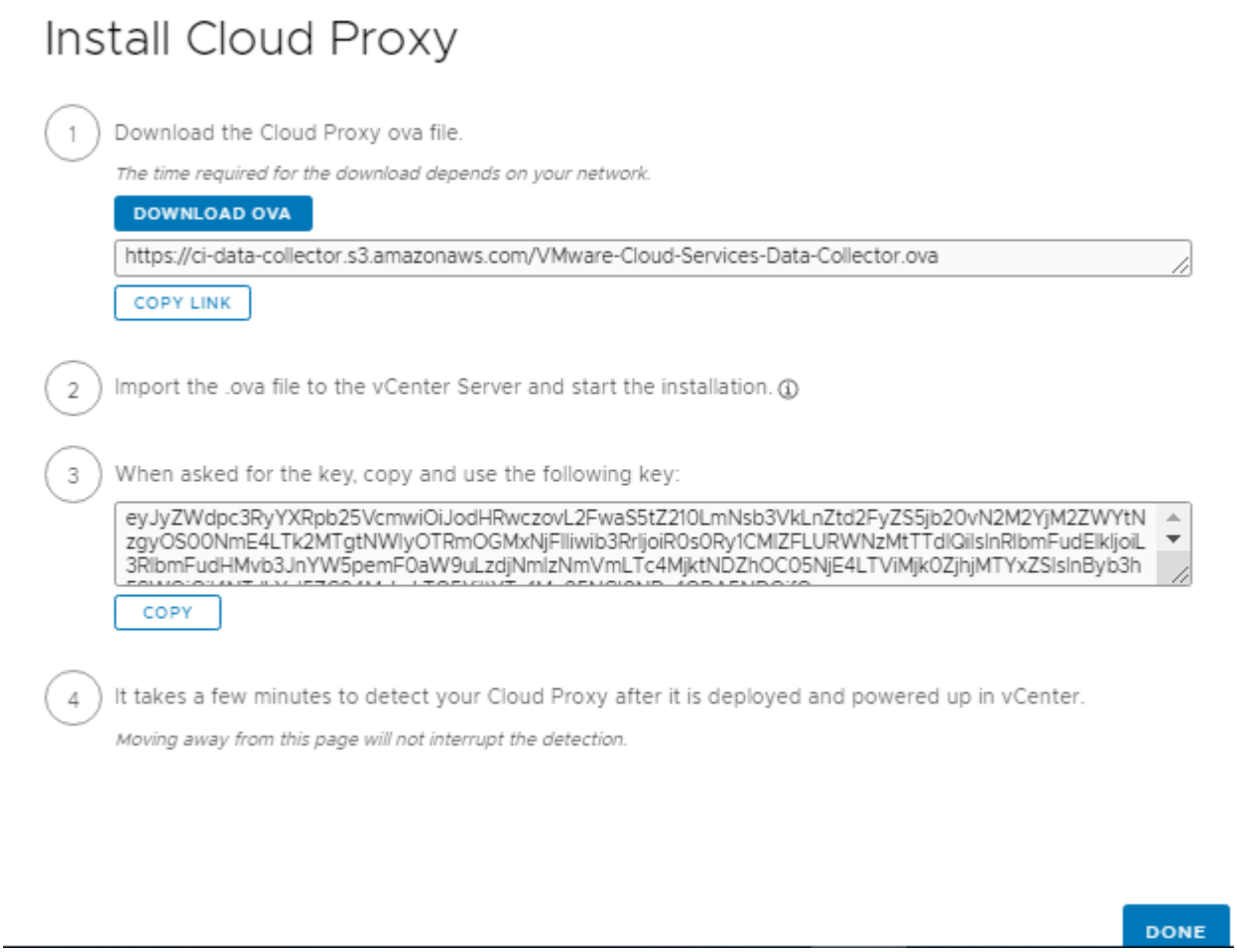


> Import OVA file in vCenter instance > Select a name & folder > Select a compute resource

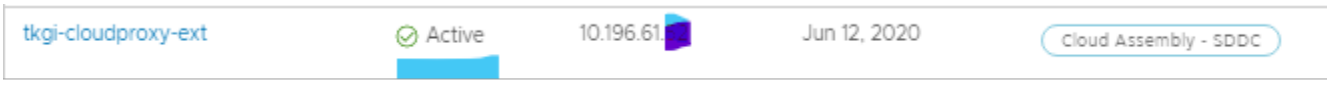
> Review details > Accept license agreements > Select Storage > Select Networks (Management network in SDDC) >

> Customize template by adding the One Time Key, root user password > cloud proxy display name > Network properties for the cloud proxy appliance

> On Ready to complete page review the details & click FINISH

> Power On the cloud proxy & wait for some time

> Check the status is Active in the Cloud assembly > Infrastructure > Connections > Cloud Proxies for the proxy created



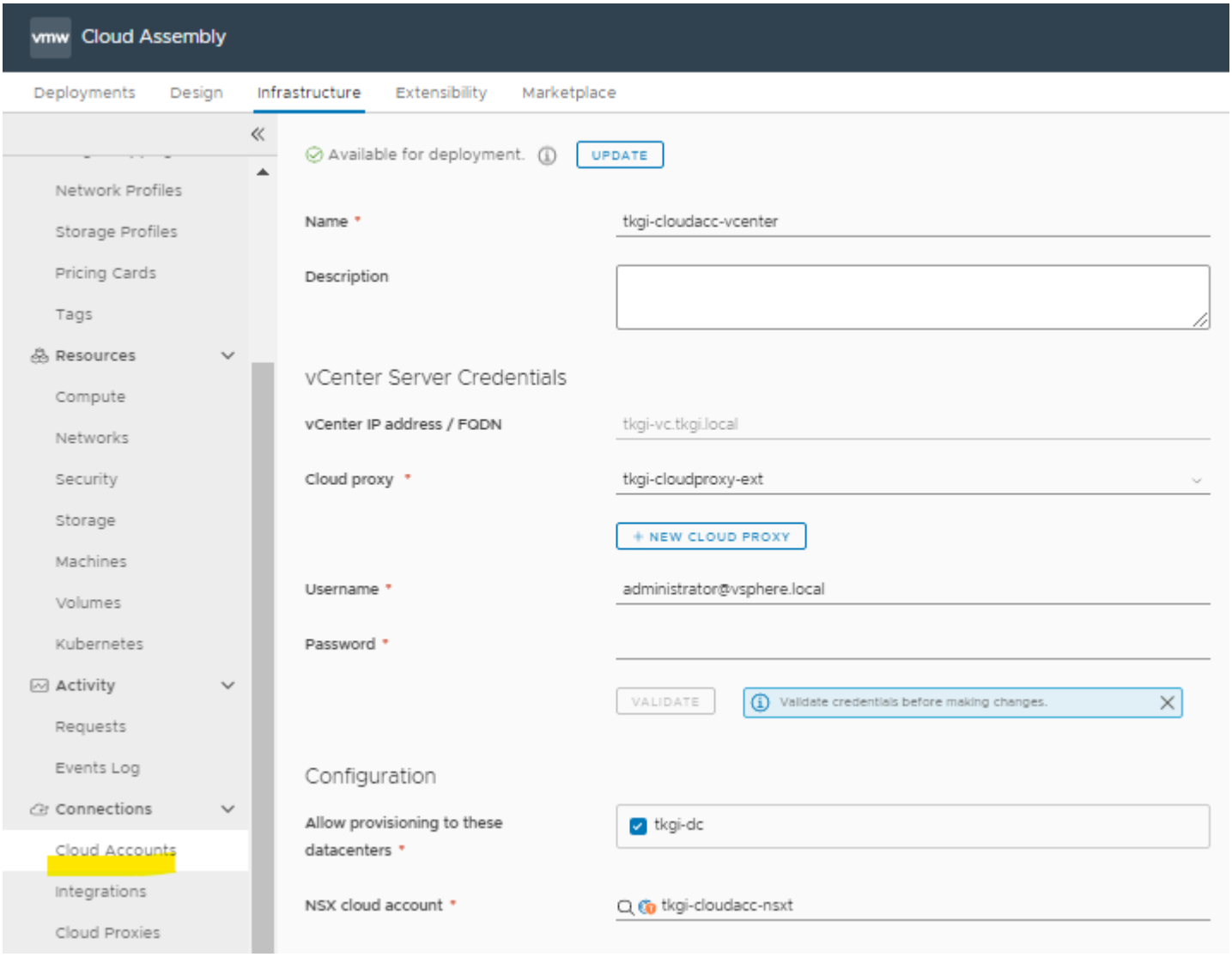
Create Cloud Accounts (vCenter, NSX-T) for the target environment

>> Create vCenter Cloud Account

> Click Infrastructure > Connections > Cloud Accounts > ADD CLOUD ACCOUNT > Select vCenter >

> In New Cloud Account page > Enter Name for the cloud account > Enter vCenter IP address/FQDN > In Cloud Proxy drop down Select the cloud proxy created for the target environment > Enter vCenter username & password >

Click VALIDATE > After successful validation Click ADD > Check the vCenter Cloud Account is displayed in the Cloud Accounts



>> Create NSX-T Cloud Account

> Click Infrastructure > Connections > Cloud Accounts > ADD CLOUD ACCOUNT > Select NSX-T >

> In New Cloud Account page > Enter Name for the cloud account > Enter NSX-T IP address/FQDN > In Cloud Proxy drop down Select the cloud proxy created for the target environment > Enter NSX-T username & password >

Click VALIDATE > After successful validation Click ADD > Check the NSX-T Cloud Account is displayed in the Cloud Accounts

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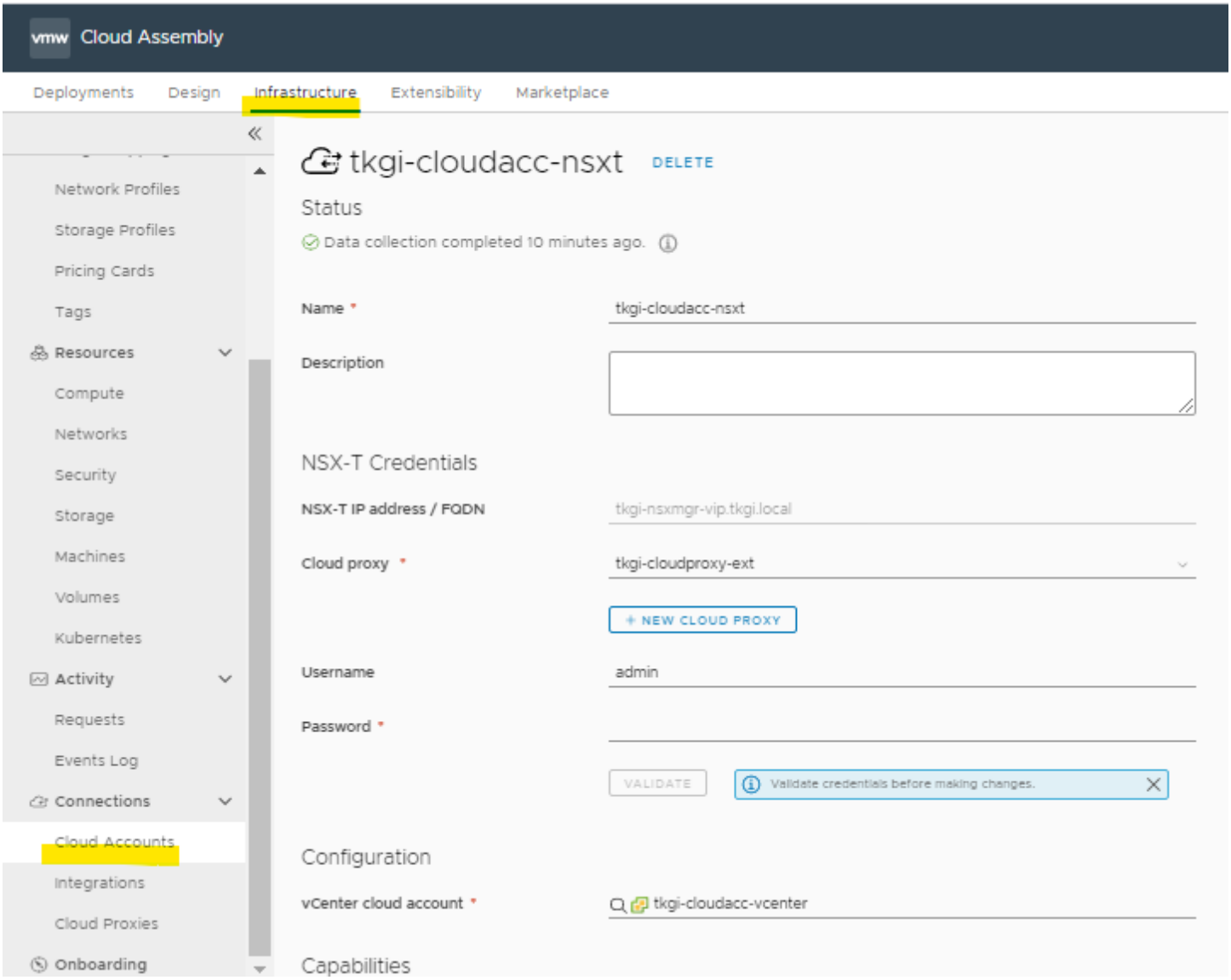

Create Integration for the (TKGI(EntPKS)) target environment

> Click Infrastructure > Connections > Integrations > ADD INTEGRATION > Select Integration Type as VMware Enterprise PKS >

> In New Integration page > Enter Name for the integration > Enter PKS Endpoint IP address/FQDN > In Location dropdown Select Private Cloud > In Cloud Proxy drop down Select the cloud proxy created for the target environment > Enter username & password to access the PKS Endpoint > Enter the CA certificate (i.e. Certificate to secure the PKS API from Enterprise PKS tile) >

Click VALIDATE > After successful validation Click ADD > Check the Enterprise PKS integration is displayed in the Integrations

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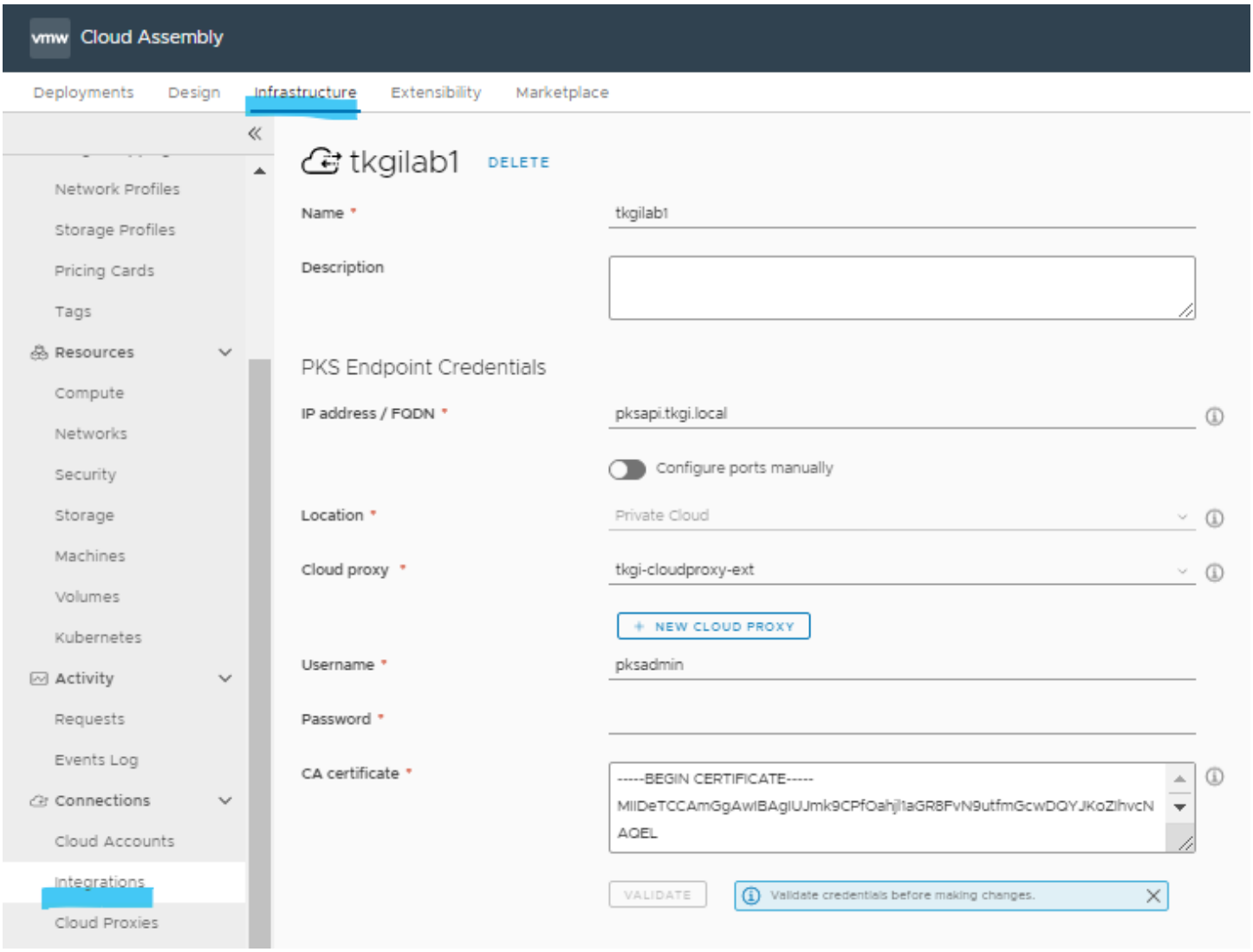

Create Cloud Zone

> Click Infrastructure > Configure > Cloud Zones > NEW CLOUD ZONE >

> In New Cloud Zone page > In Account / region section search for the vCenter Cloud account created & select the same > Enter name for the Cloud Zone > In the Compute tab select the Compute resources(of type clusters, resource pools, host) to be applied to the Cloud Zone > Click on CREATE > Check the Cloud Zone is displayed in the Cloud Zones

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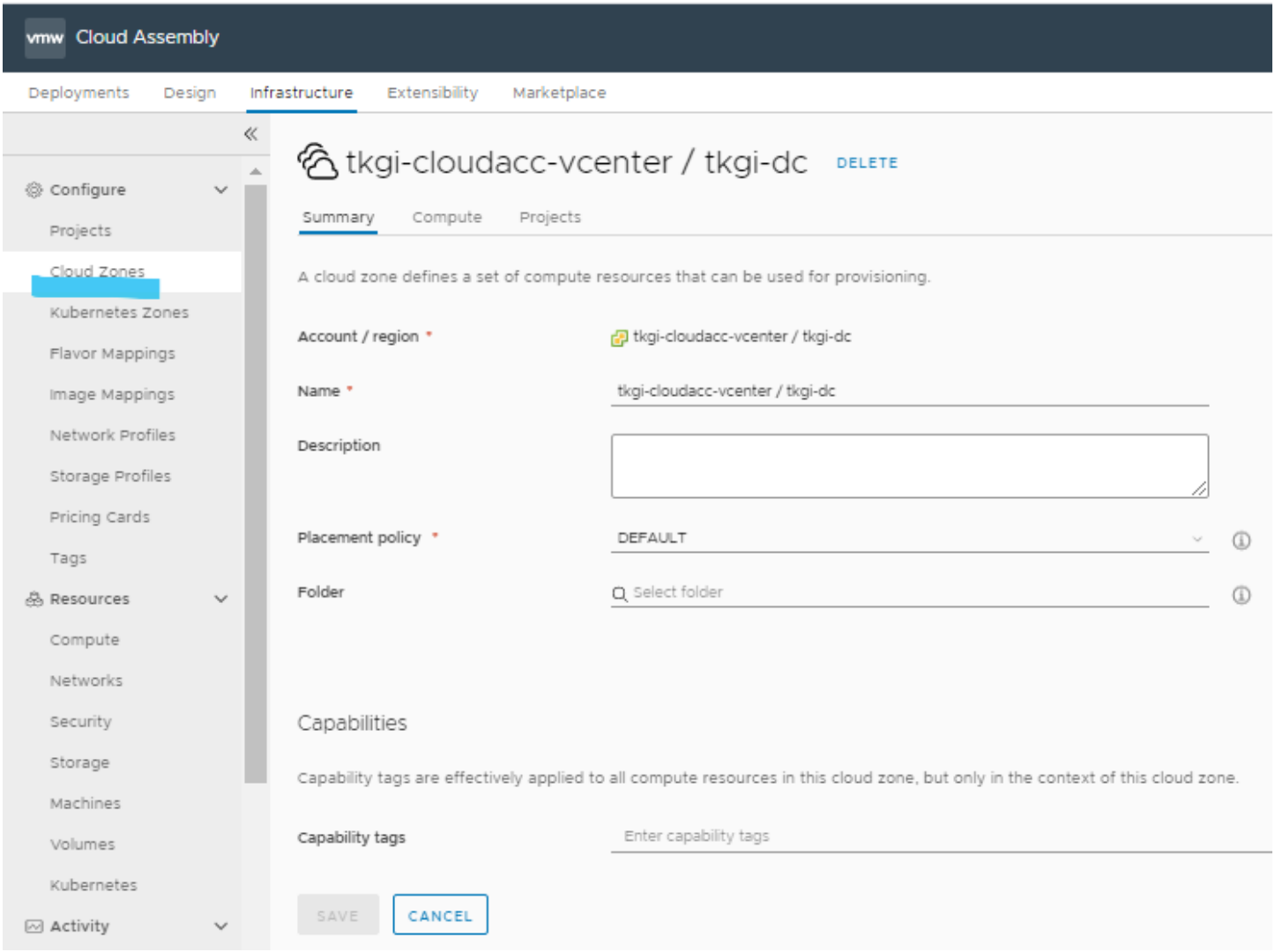

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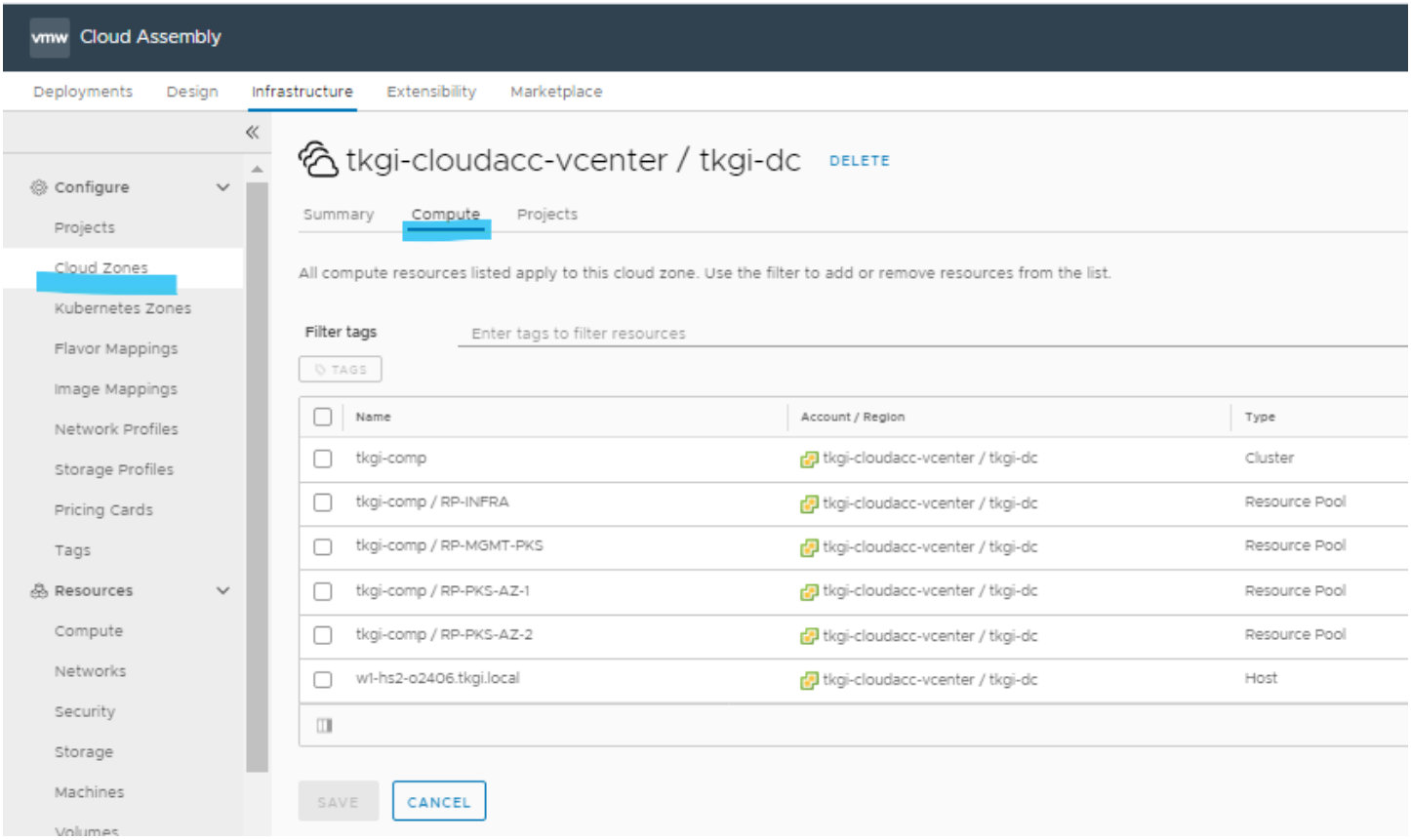

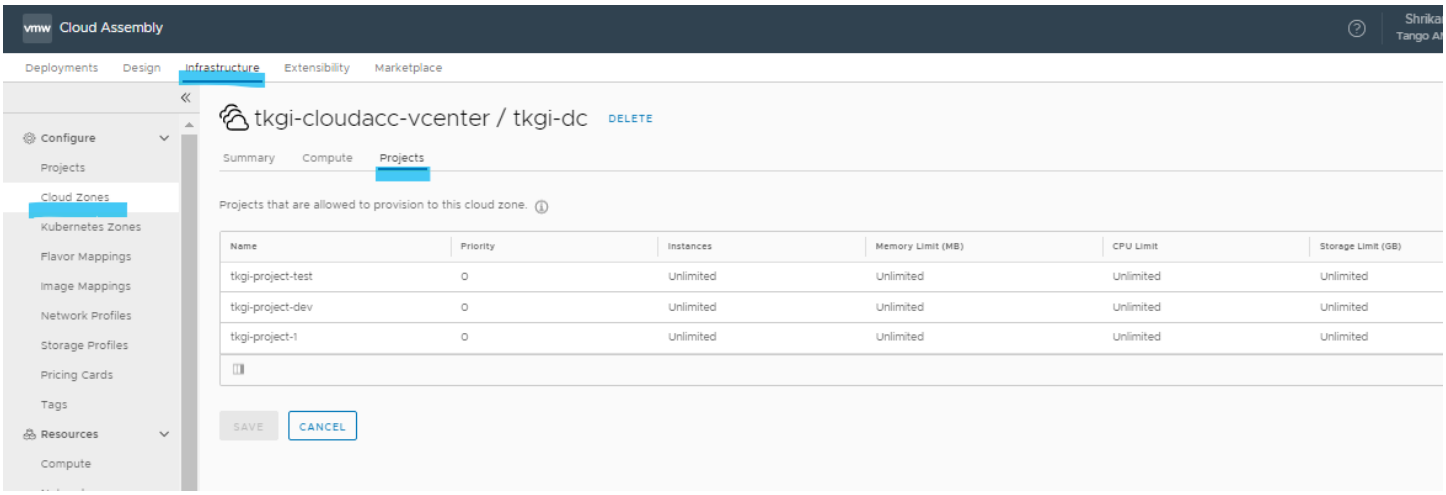

Create Kubernetes Zone

> Click Infrastructure > Configure > Kubernetes Zones > NEW KUBERNETES ZONE >

> In New Kubernetes Zone page > In Account section search for the Enterprise PKS integration created & select the same > Enter name for the Kubernetes Zone > In the On-demand tab select the Deployment Plan as required > Enable the Allow Provisioning for the plan > Click on SAVE > Check the Kubernetes Zone is displayed in the Kubernetes Zones

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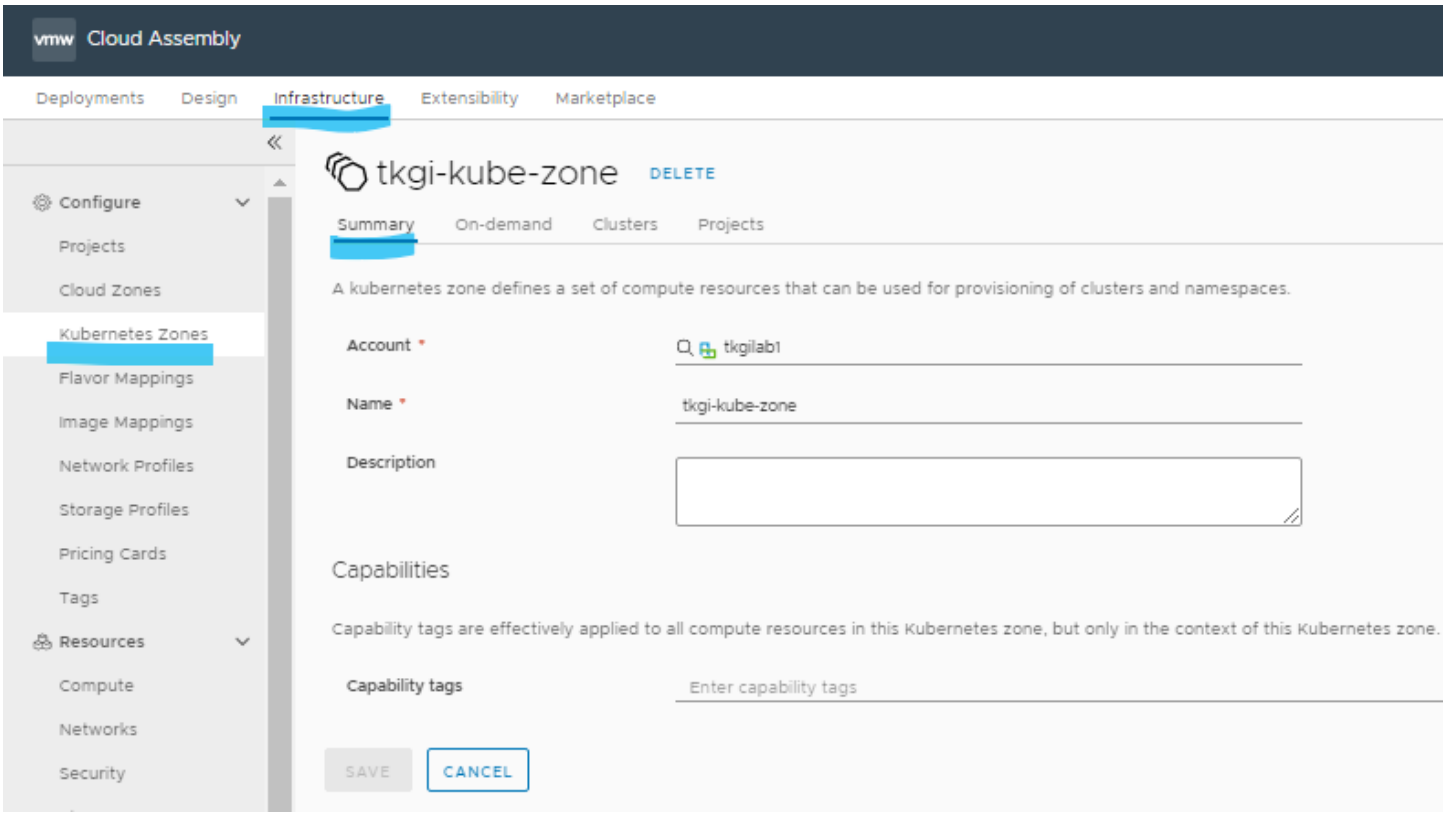

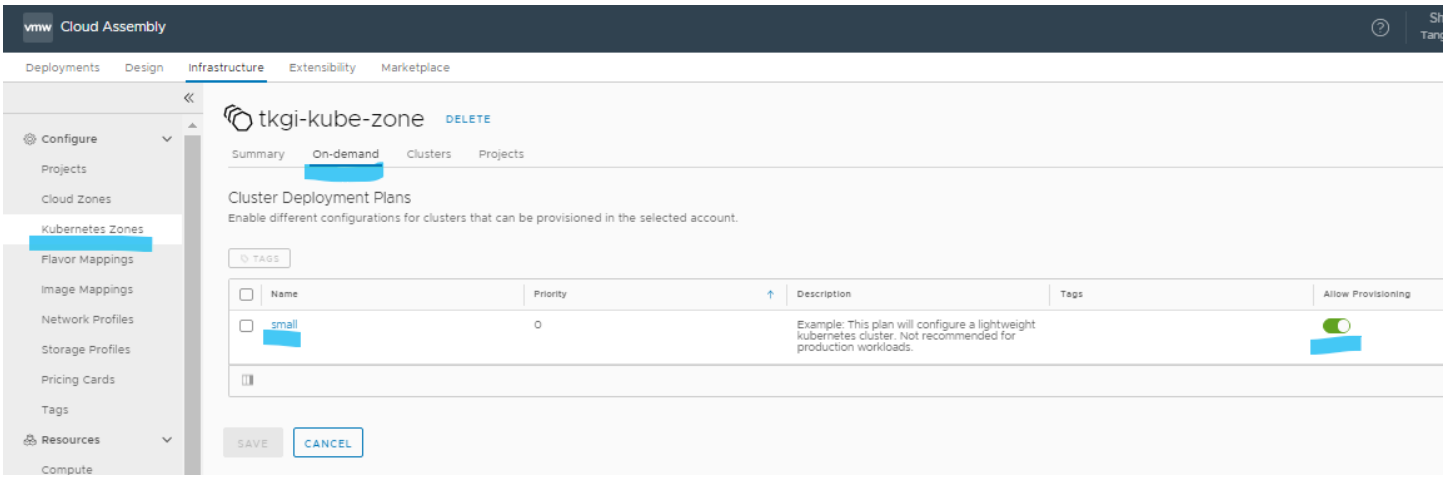

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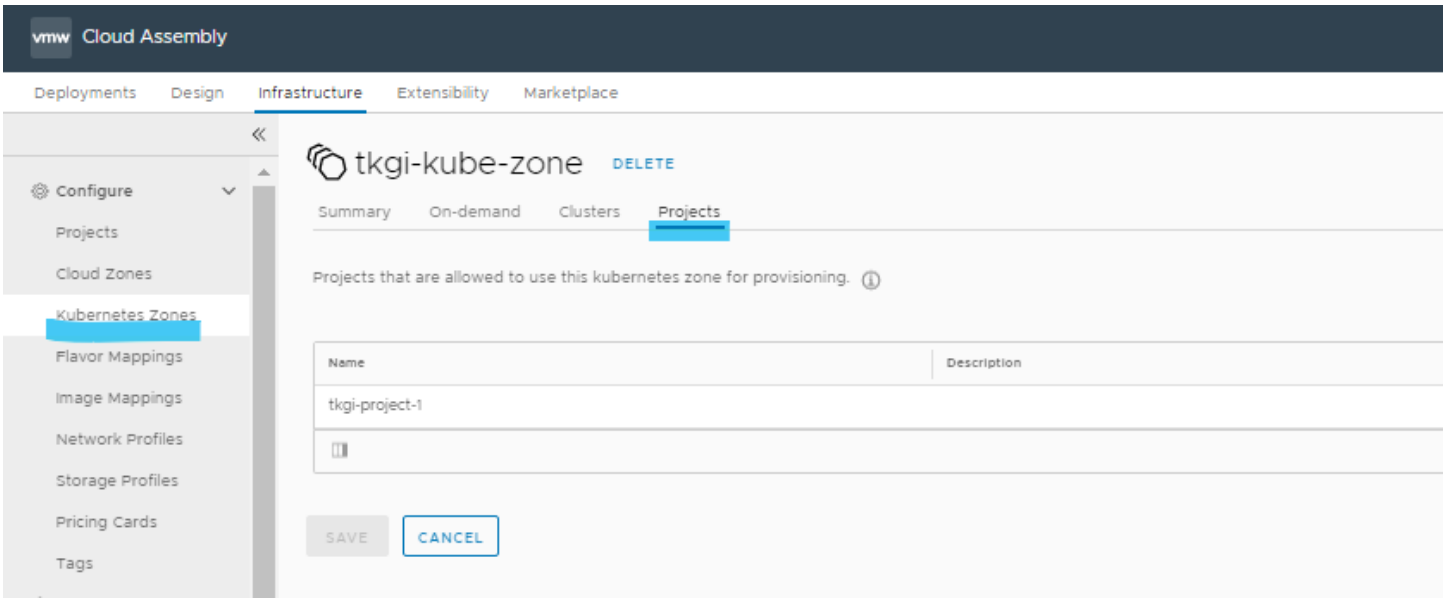

Create Project

> Click Infrastructure > Configure > Projects > NEW PROJECT >

> In New Project page > Enter the Name of the project >

> In Users tab add the users & define their role >

> In Provisioning tab Click ADD CLOUD ZONE > Search & Select the Cloud Zone created & Click ADD >

> In Kubernetes Provisioning tab > Click ADD ZONE > Search & Select the Kubernetes Zone & Click SAVE

> Click CREATE > Check the Project is displayed in the Projects

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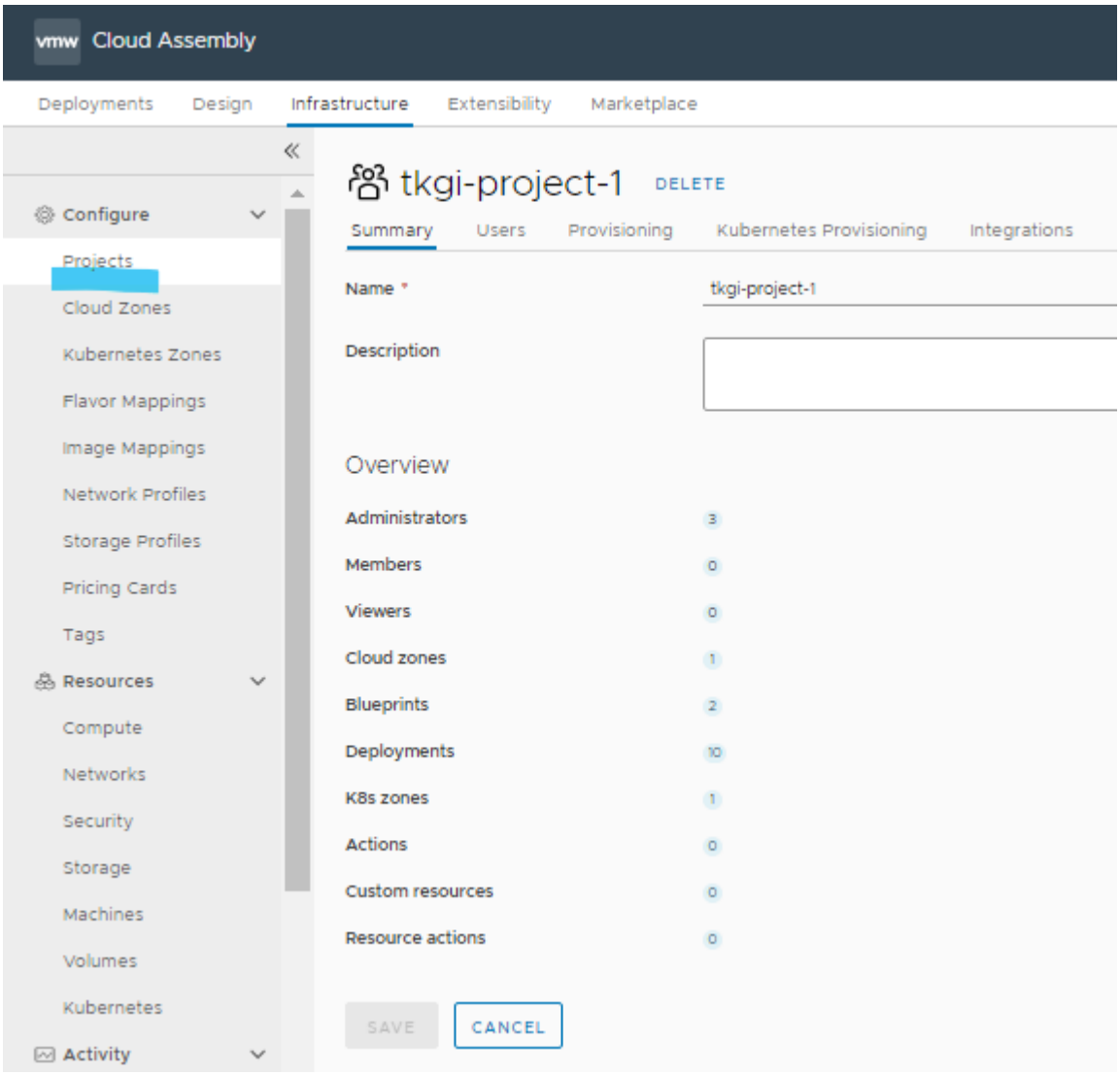

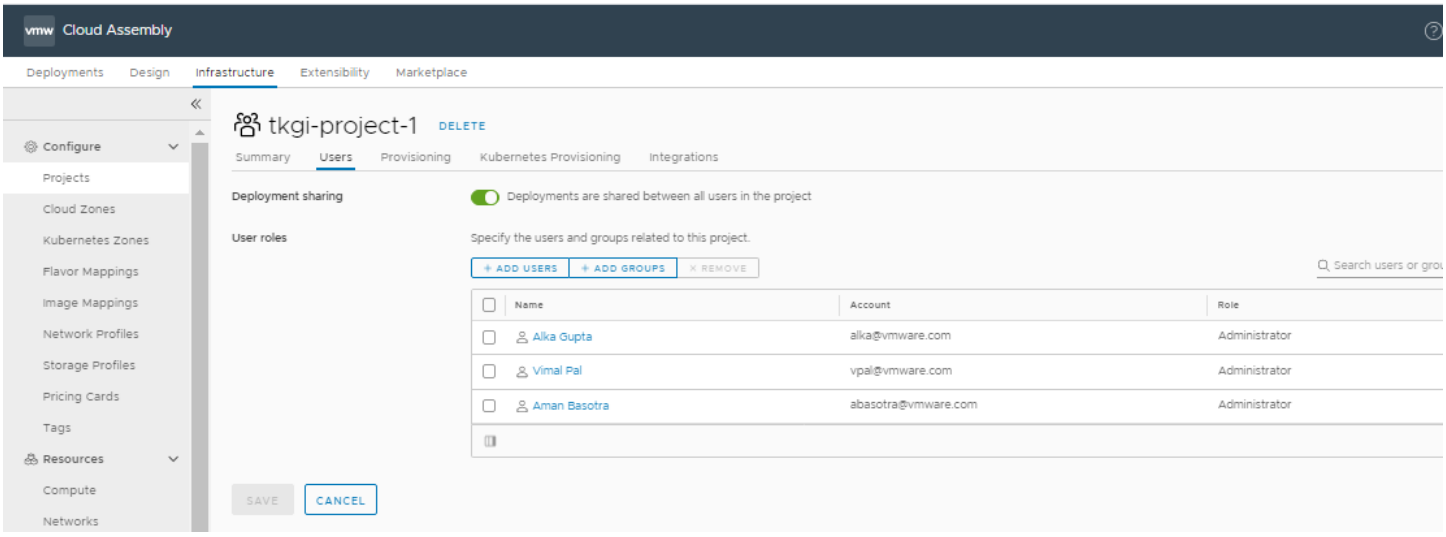

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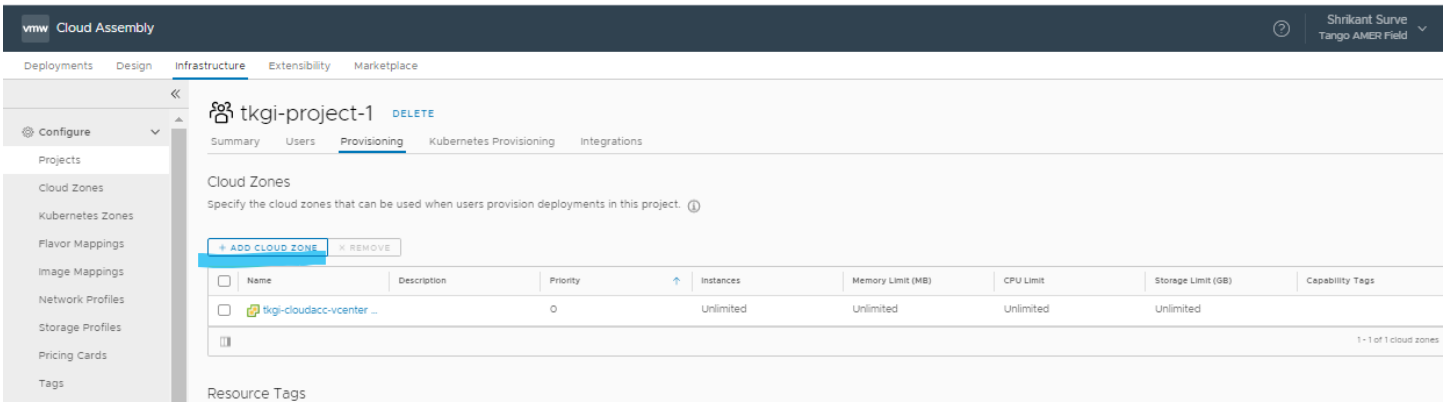

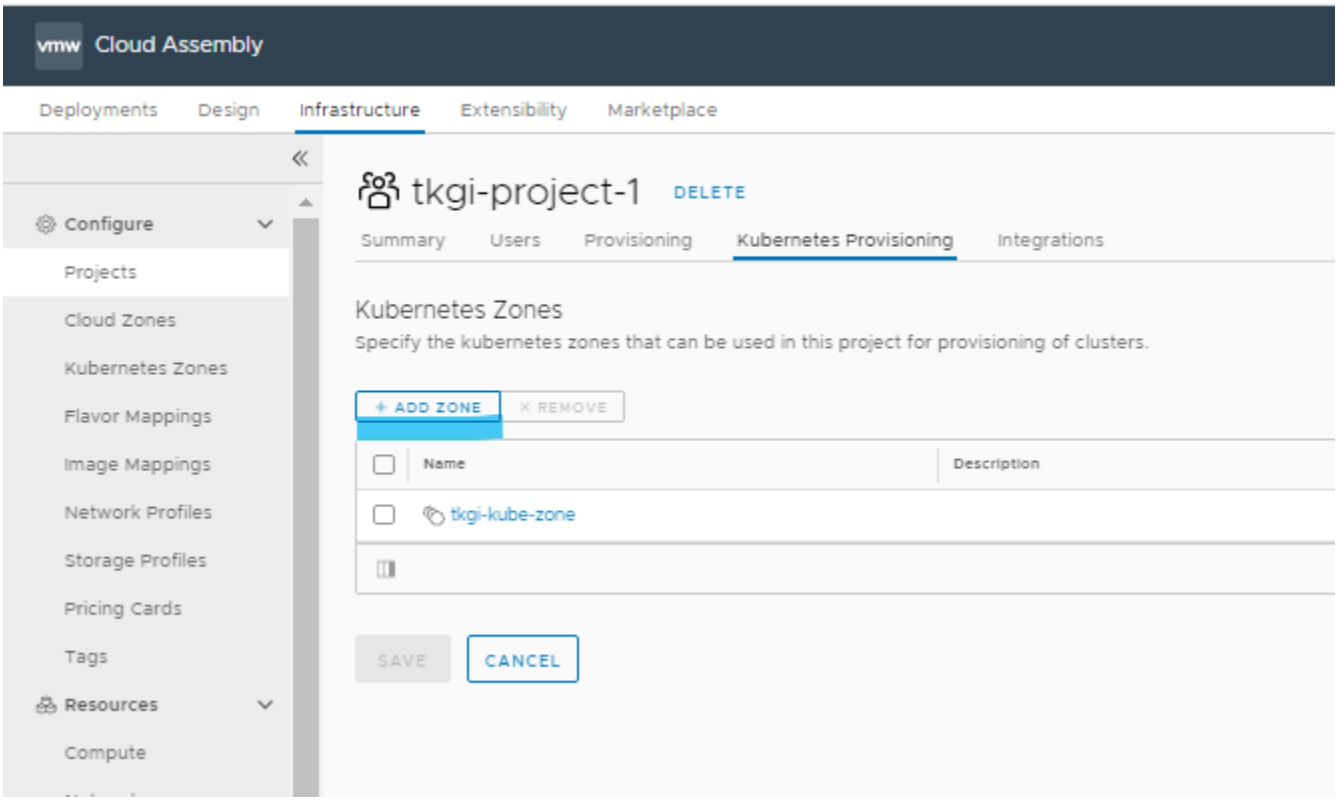

Create cluster deployment blueprint & assign it to the project

> Click Design > Blueprints > NEW > Enter the name for the blueprint > Search & Select the Project to which blueprint will be tagged > Select Blueprint sharing in Service Broker as required > Drag K8S Cluster resource type in Design canvas > Modify the code as required > Click Version > mention the Version > Select Release this version to catalog > Click CREATE > Check the Blueprint is displayed in the Blueprints

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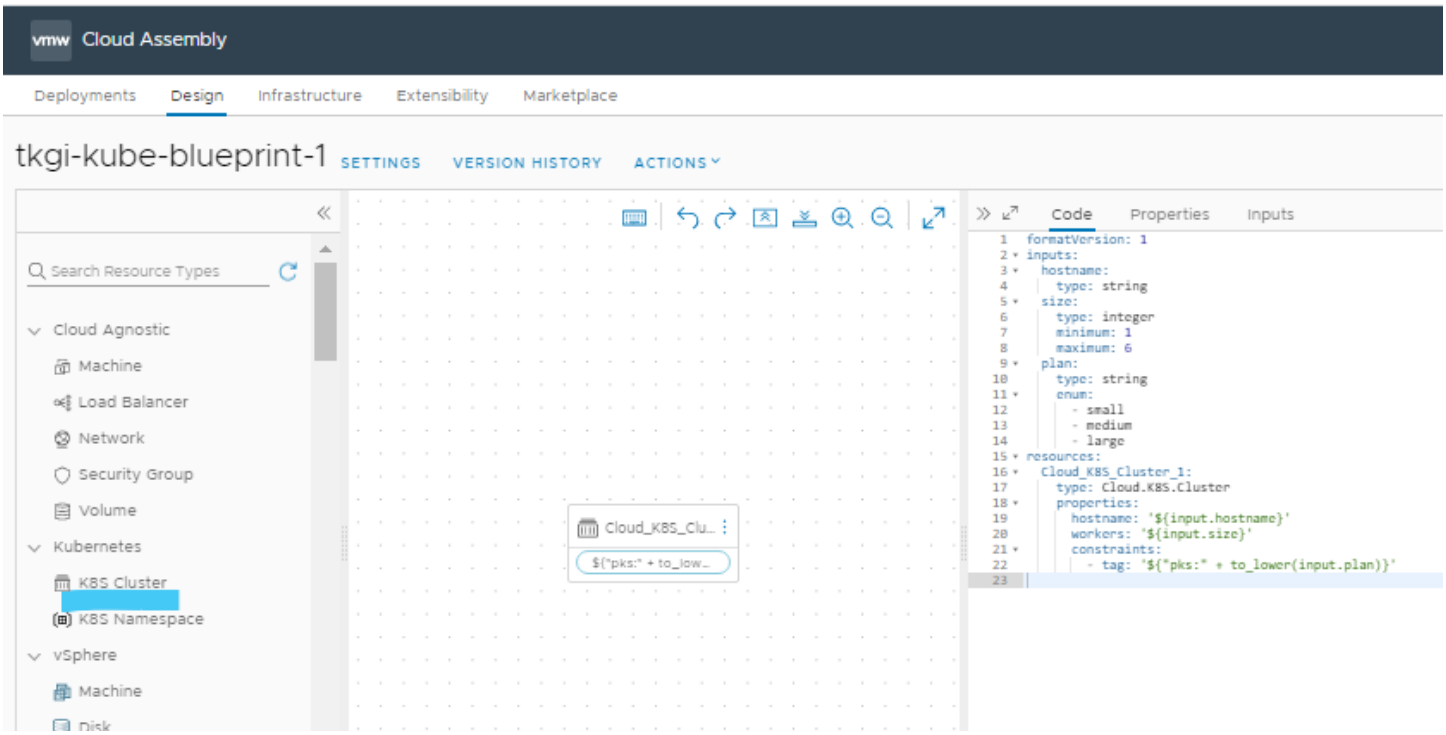

Creating/Adding Kubernetes cluster

Creating cluster

Using DEPLOY option

> Click Infrastructure > Resources > Kubernetes > Clusters > DEPLOY > In Account section Search & Select the EntPKS endpoint > Enter the cluster name > Select sharing as required – in case of sharing at Project level then select the Project's name > Enter the Master hostname(e.g. clsname.tkg.local) > Select the Plan > Enter the Worker nodes count (e.g. 1) to be deployed > Click DEPLOY > Monitor the deployment > Check for the cluster created in Infrastructure > Resources > Kubernetes > Clusters

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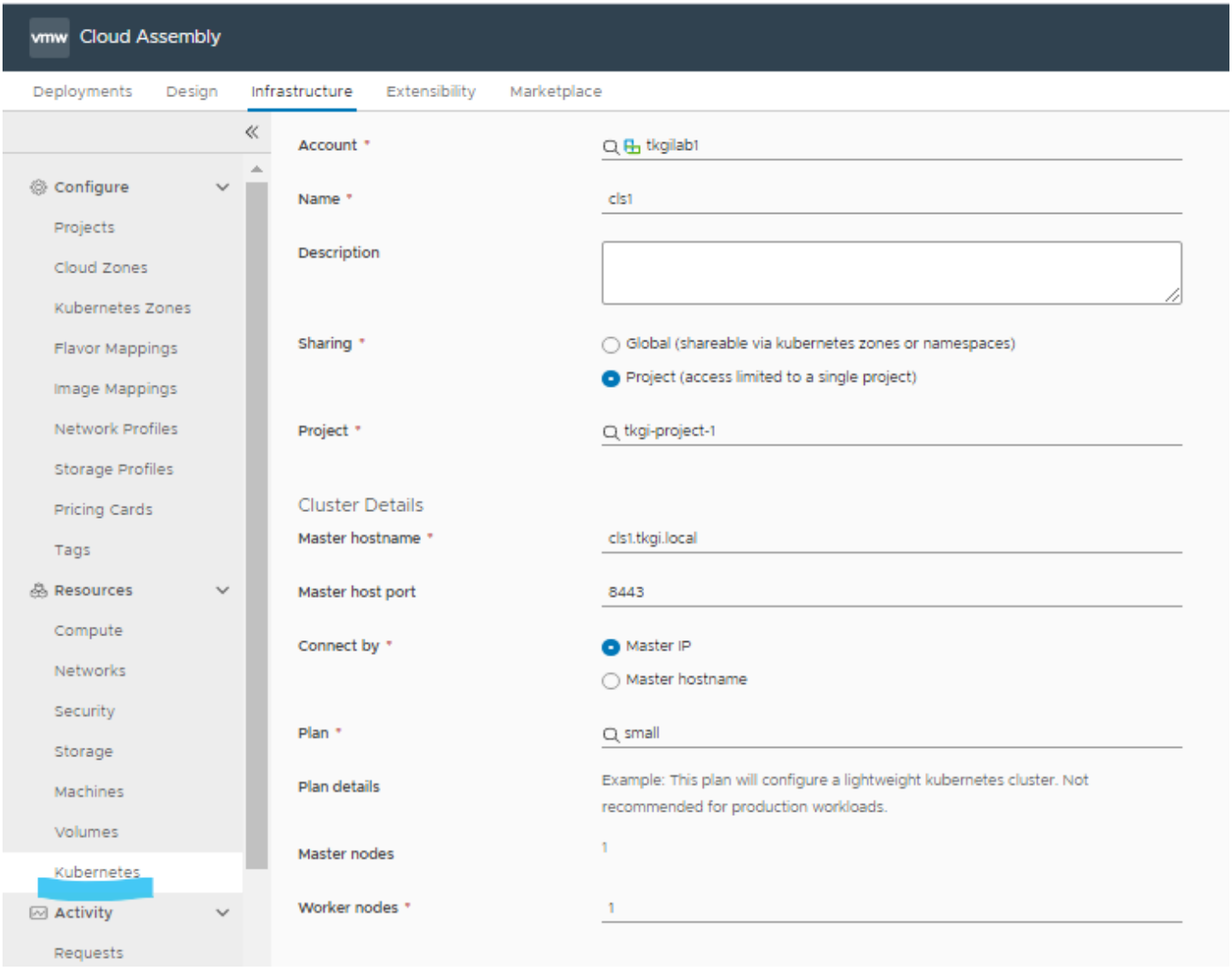

Using Blueprint

> Click Design > Blueprints > Select blueprint > Click DEPLOY > Enter Deployment name > Select Blueprint version > Click Next > Click DEPLOY > Enter the Hostname(e.g. clsname.tkg.local) > In Size Enter the Worker nodes count (e.g. 1) to be deployed > Select the Plan > Click DEPLOY > Monitor the deployment > Check for the cluster created in Infrastructure > Resources > Kubernetes > Clusters

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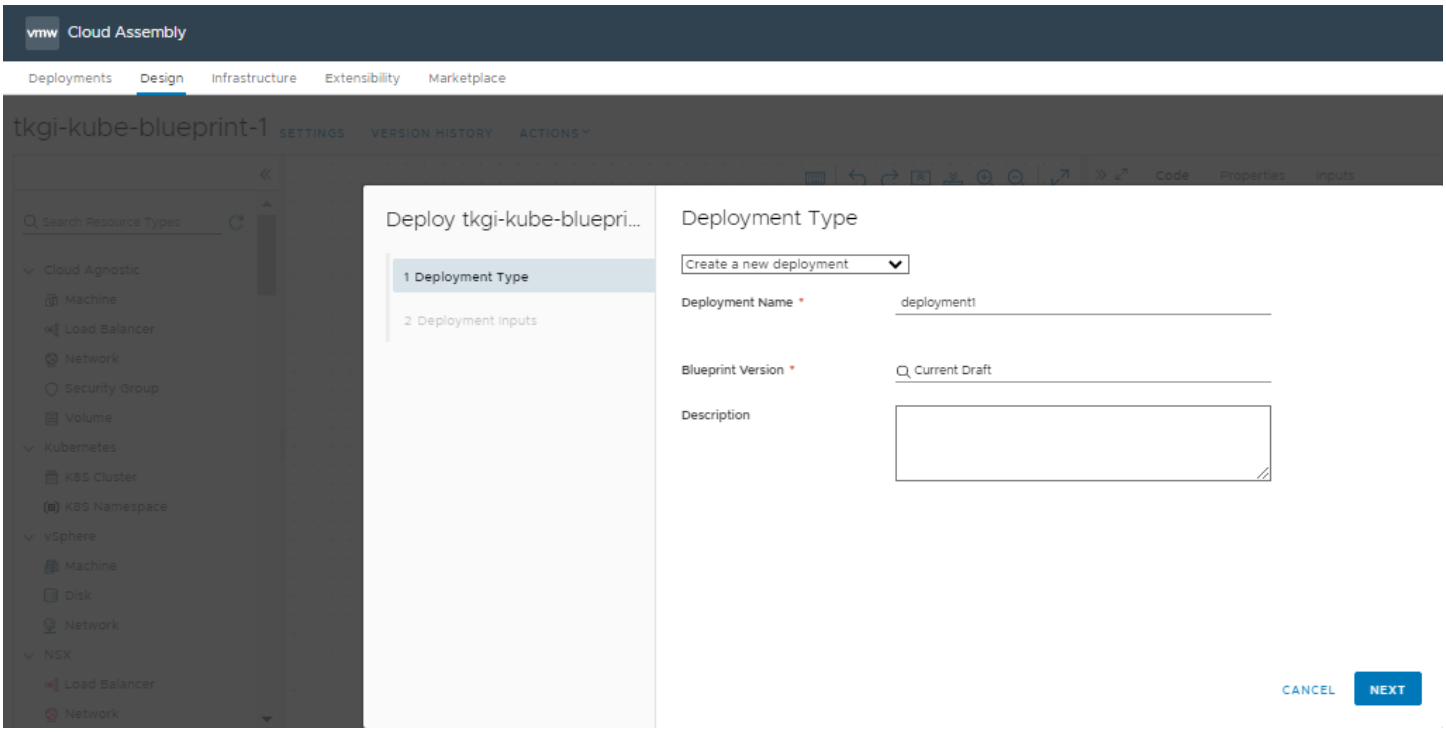

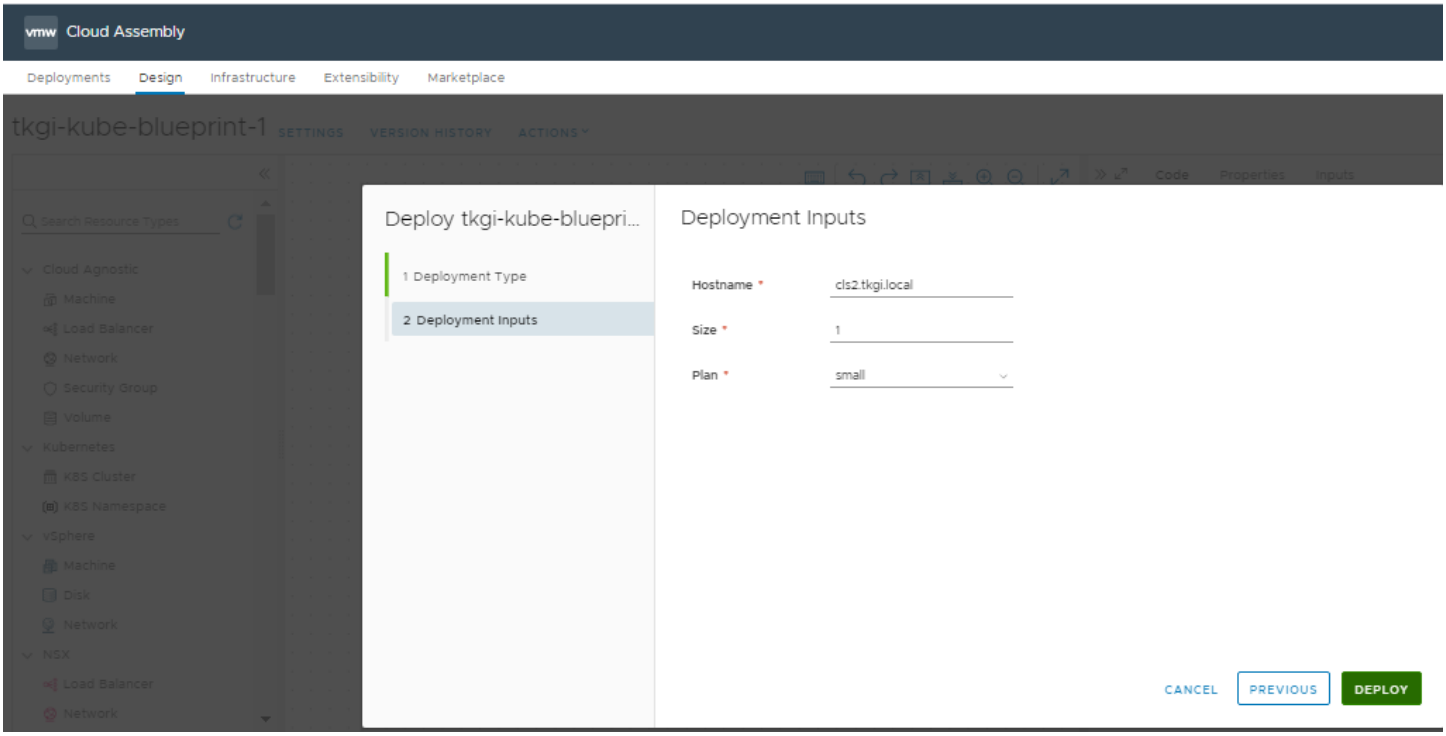

 # Adding cluster

Add Existing cluster

> Click Infrastructure > Resources > Kubernetes > Clusters > ADD EXISTING > In Account Search & Select the EntPKS integration endpoint > In Cluster select the cluster to be added > Select Connect by Master IP > Select sharing as required – in case of sharing at Project level then select the Project's name > Click ADD > Check for the cluster added in Infrastructure > Resources > Kubernetes > Clusters

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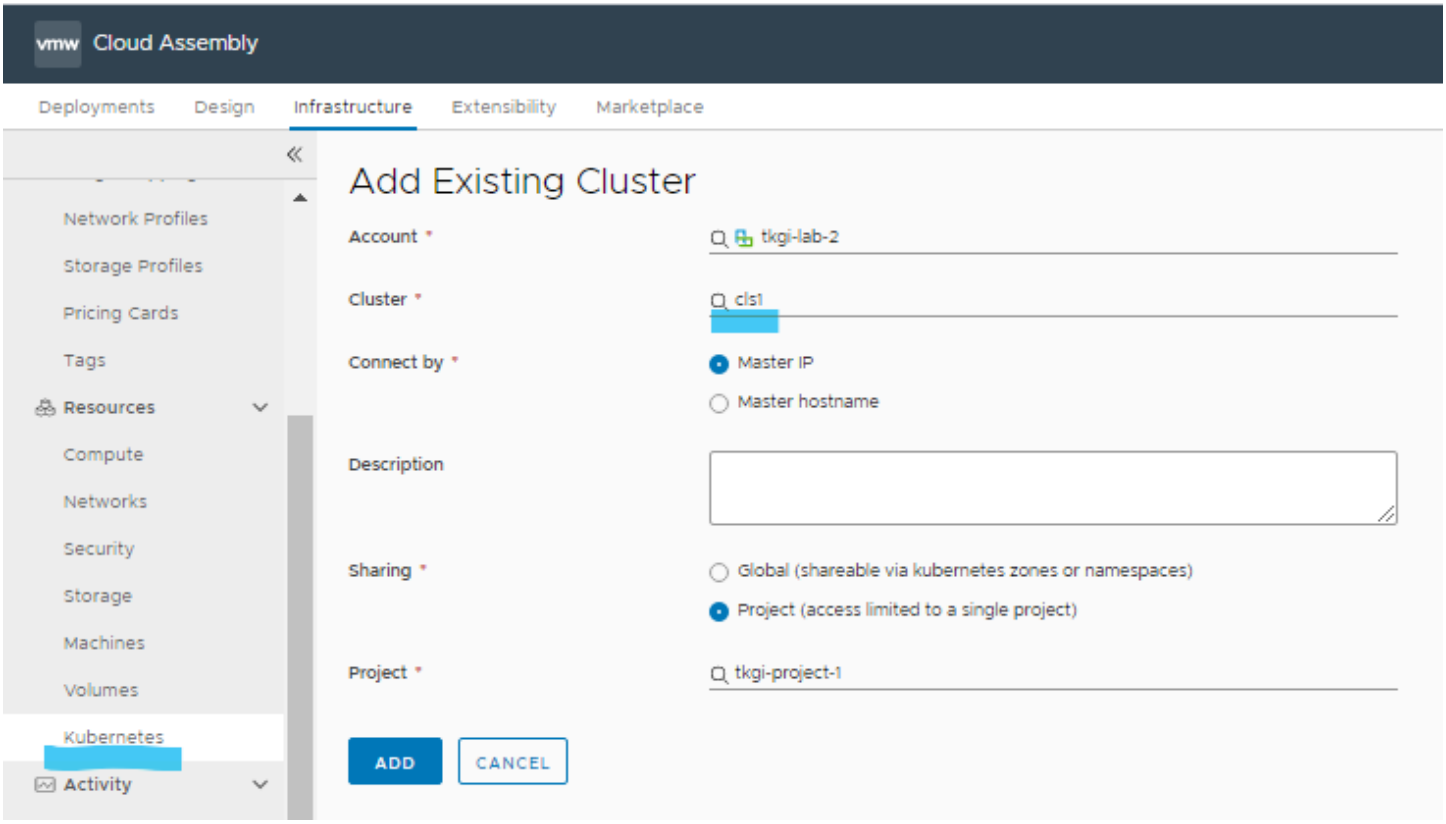

Add External cluster

> Click Infrastructure > Resources > Kubernetes > Clusters > ADD EXTERNAL > Enter the name of cluster > Select sharing as required – in case of sharing at Project level then select the Project's name > In Address enter the Server Address for the cluster > In CA certificate enter the clusters CA certificate i.e. certificate-authority-data > Select location as Private Cloud > Select the Cloud proxy created for the target environment >

> In case Credentials type is Certificate > Enter Public certificate i.e. client-certificate-data & Private certificate i.e. client-key-data for the cluster

> In case Credentials type is Bearer token > Enter the Bearer token

Click VALIDATE > Click ADD > > Check for the cluster added in Infrastructure > Resources > Kubernetes > Clusters

*Note: Please refer configuration file for the necessary input data (config file path is generally $HOME/.kube/config)

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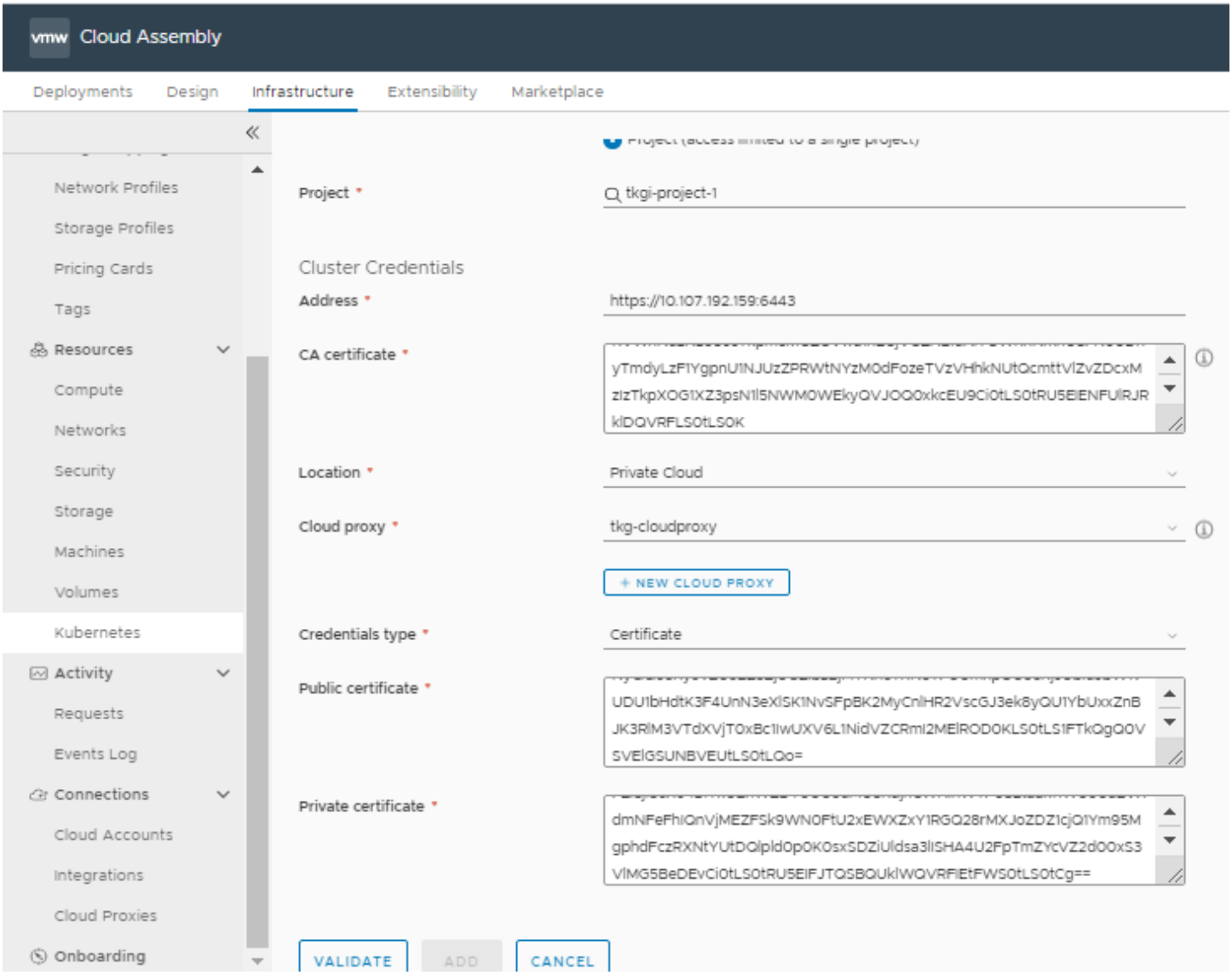

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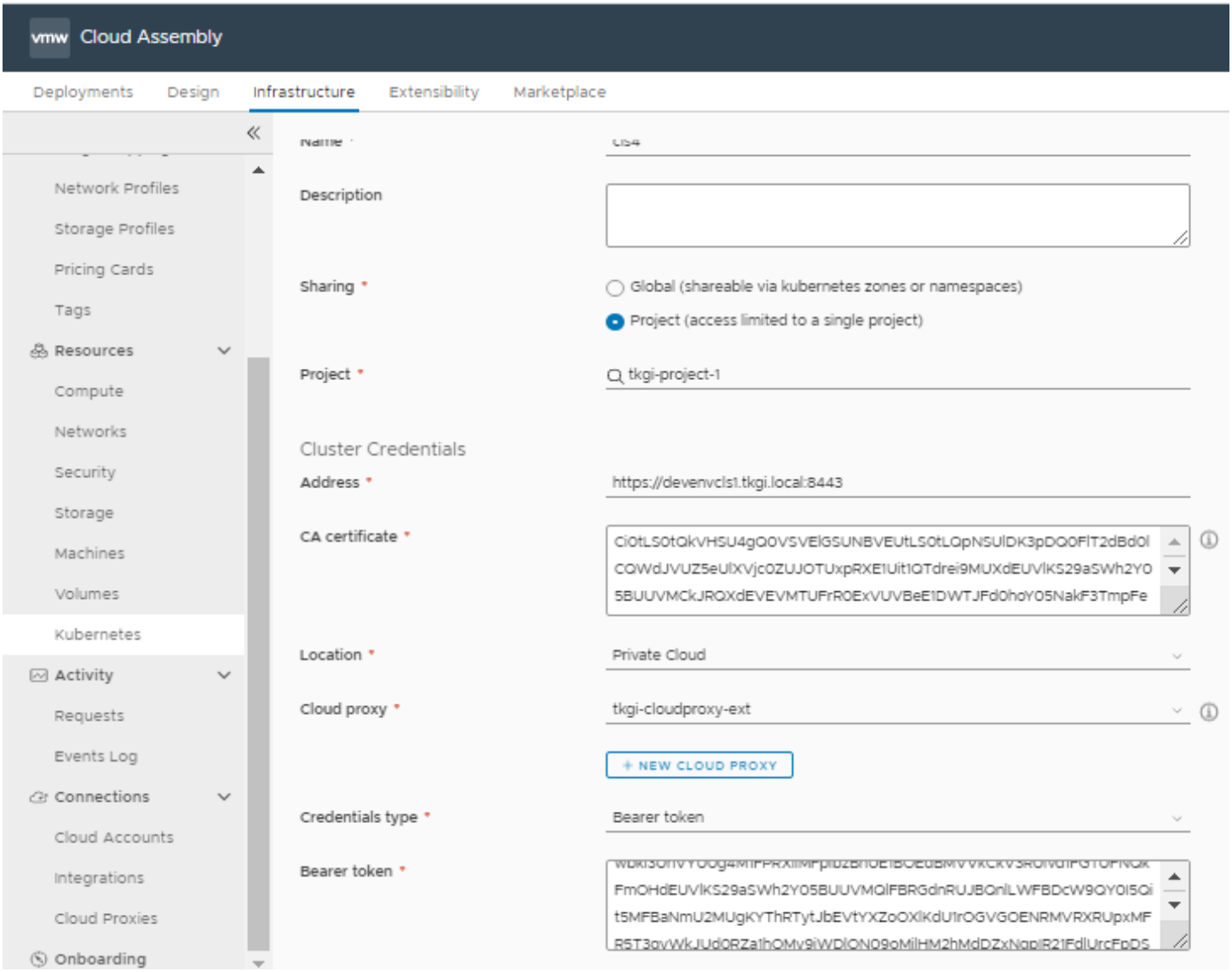

Reference links:

https://docs.vmware.com/en/VMware-Cloud-Assembly/services/Using-and-Managing/GUID-081EA313-129F-4098-B4CC-587A42E7BFFF.html