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VMWARE NSX® APPLICATION PLATFORM

Automation Guide

VMware NSX Application Platform Automation Guide

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1 Version history

Date	Rev.	Author	Description	Reviewers
24 Mar 2022	0.1	Ray Budavari	Initial Document – Early Access Release	
15 April 2022	0.2	Ray Budavari	Update for UI Based Release	
28 Oct 2022	0.3	Ray Budavari	Simplification	
24 Jan 2023	0.4	Antoine Deleporte	Documentation rebranding Screenshot updates	
25 Jan 2023	0.5	Antoine Deleporte	Add troubleshooting content Add new requirements Add Appendixes with default values	



2 Overview

This document details how to deploy and use the NSX Application Platform (NAPP) Automation Appliance. This virtual appliance provides a lightweight bootstrap environment that will automate provisioning of the underlying vSphere with Tanzu and NSX infrastructure for NAPP aligned to VMware best practices. The NAPP Automation appliance will collect configuration details of the environment and then orchestrate the following tasks:

Stage 1:

- Run pre-checks of the vSphere environment
- Create a vSphere Content library
- Subscribe to a library for Tanzu Releases
- Deploy and configure HA Proxy Load Balancer
- Manage HA Proxy certificates
- Enable TKGs on a vSphere cluster
- Create the required VM and Storage classes
- Instantiate a guest cluster for NAPP
- Retrieve kubectl config for the guest cluster

Stage 2:

- Update Helm Charts and Docker registry
- Upload Kubernetes tools to NSX
- Upload Kubeconfig file to NSX
- Run pre-checks of the NAPP guest cluster
- Deploy NSX Application Platform

The NAPP Automation Appliance provides several configuration options to streamline the deployment:

- NSX UI Plugin for an Integrated UI
- Standalone UI
- CLI



The Appliance enables end to end automation of the microservices environment and NAPP in approximately 25-45 minutes dependent on your environment.

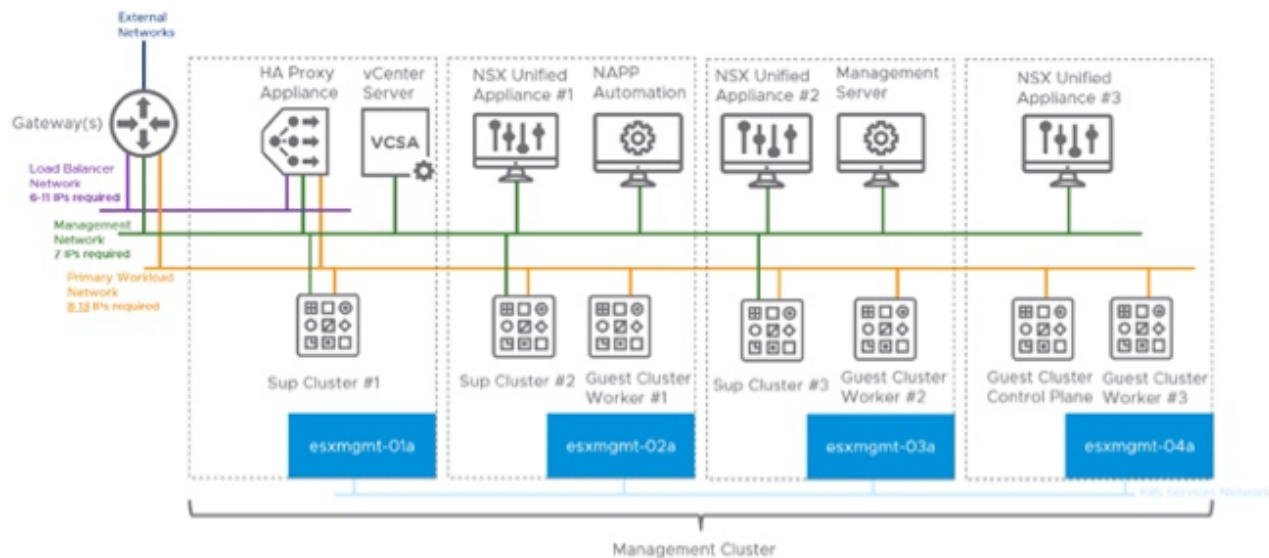
This document assumes you have a basic knowledge of vSphere and NSX, but absolutely no vSphere with Tanzu or NAPP experience is required. It is a companion document to the comprehensive VMware NSX Application Platform Deployment Guide.



3 Requirements

3.1 General requirements

The current release of the NAPP Automation Appliance supports the recommended deployment model of vSphere with Tanzu and VDS Networking. Additional deployment models will be evaluated for automation based on demand.



Please refer to the [NAPP Deployment and POC Guide](#) for detailed Server & Network requirements to ensure the required vSphere Cluster, Datastore and networks are provisioned before you run the NAPP Automation tool.

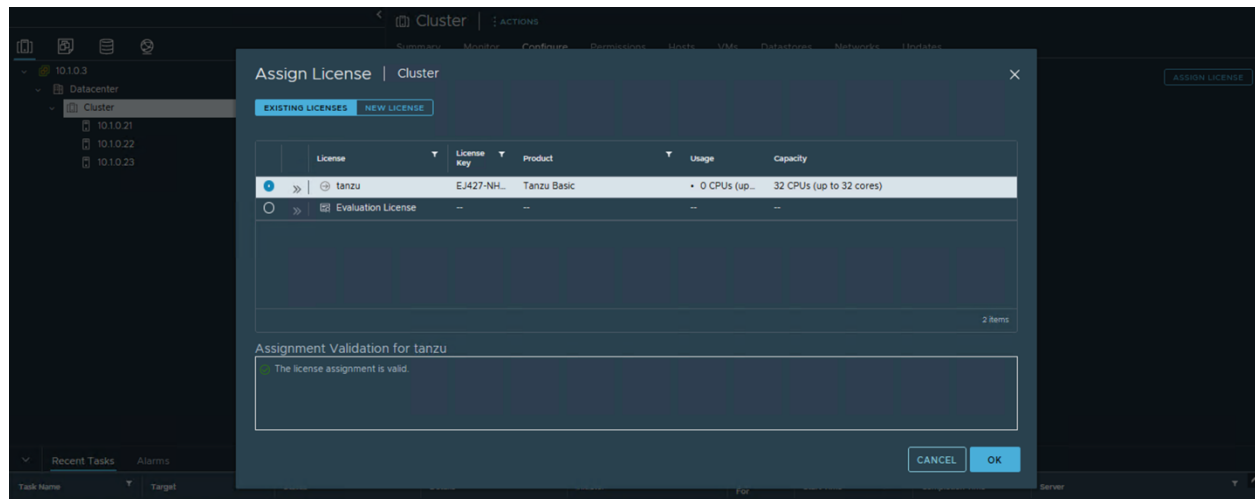
3.2 NAPP Automation specific requirements

Specific requirements of the NAPP Automation Appliance:

In addition of flows indicated in the NAPP Deployment guide, these flows need to be opened:

Source	Destination	Port	Usage
NAPP Automation Appliance	FrontEnd Network	TCP/443 TCP/6443	Login to TKGs
NAPP Automation Appliance	Management Network	TCP/53 UDP/53	DNS
NAPP Automation Appliance	vCenter	TCP/443	vSphere automation
NAPP Automation Appliance	NSX Managers	TCP/443	NSX Automation
NAPP Automation Appliance	NSX Managers	TCP/22	NSX UI Plugin registration (optional)

You will also need a Tanzu Basic license (this can be perpetual or evaluation) for the deployment.

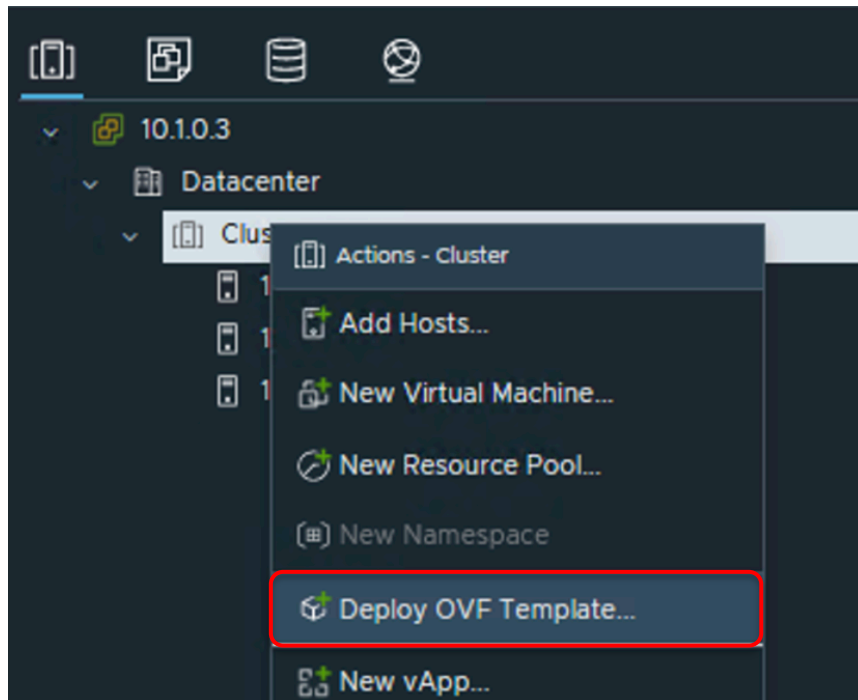


Note: Bundling a small quantity of Tanzu Standard Runtime licenses with all NSX SKUs entitled to run NAPP is in progress. These licenses will be EULA restricted to specifically to run a single guest cluster for NAPP.

4 Installation

As a standard virtual appliance based on Photon OS, deploying the appliance is straightforward and aligns to all other VMware software releases.

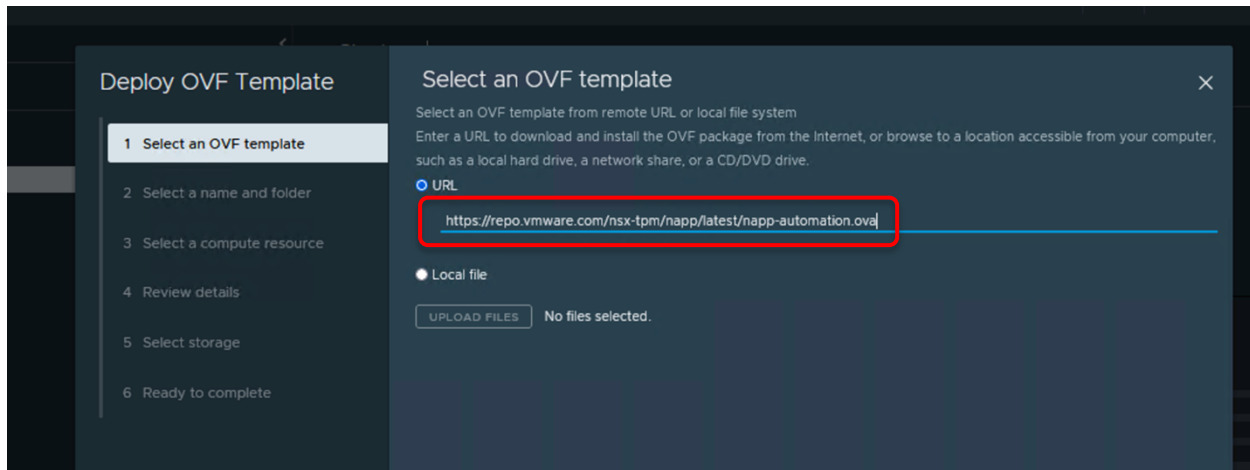
1. Begin by logging in to vCenter Server UI with Admin privileges and navigate to:
Home -> Hosts and Clusters
2. Select the target vSphere Cluster for your NAPP deployment and right- click then select:
Deploy OVF Template



3. Here you Select an OVF template by either:

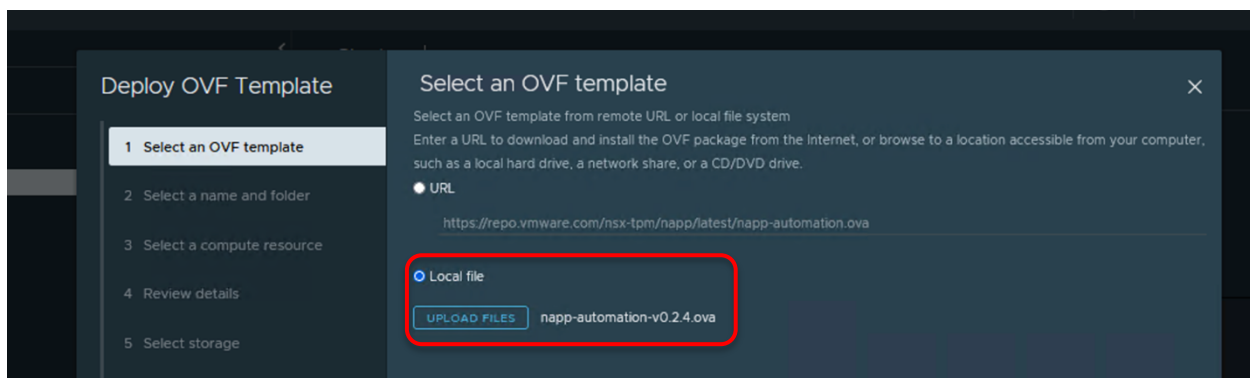
- a. Entering the URL directly if your vCenter Server has outbound external access. The latest release of the NAPP Automation Appliance OVA is accessible at the following URL:

<https://repo.vmware.com/nsx-tpm/napp/latest/napp-automation.ova>

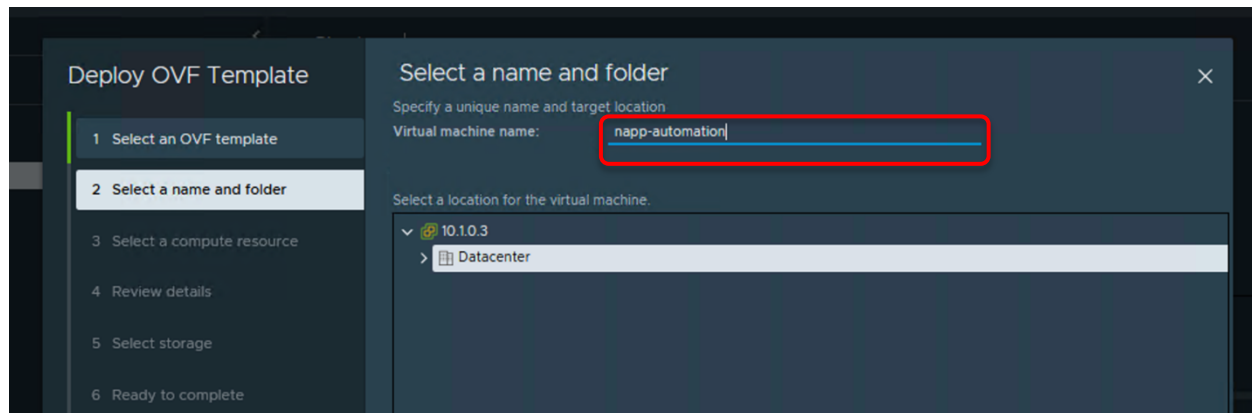


Note: deploying an OVA from a URL may fail on some vSphere version. If needed, use method b (<https://kb.vmware.com/s/article/79986>)

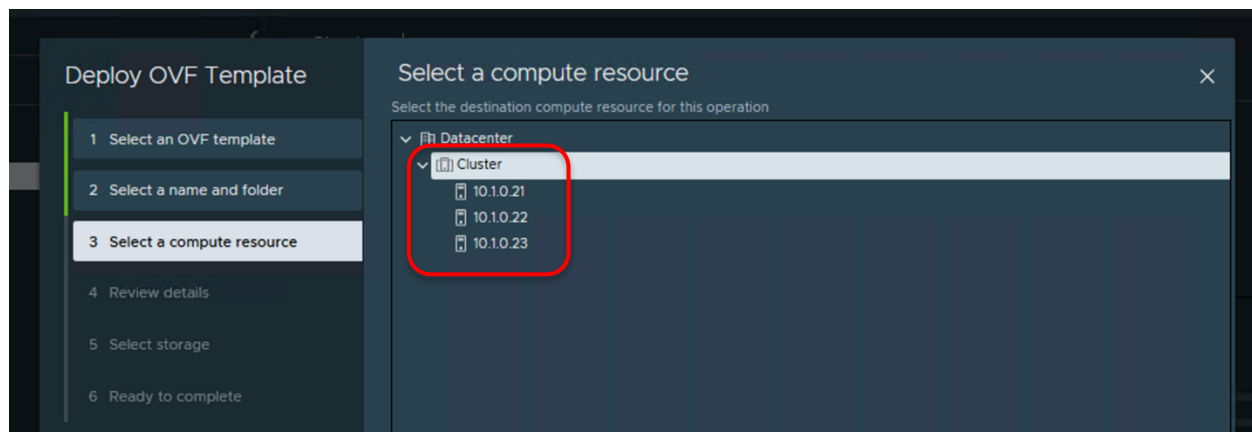
- b. Or, if you do not have external access, you can download the file from the link above, transfer it to your local host and select the Local File option. Then provide the napp-automation.ova after selecting UPLOAD FILES:



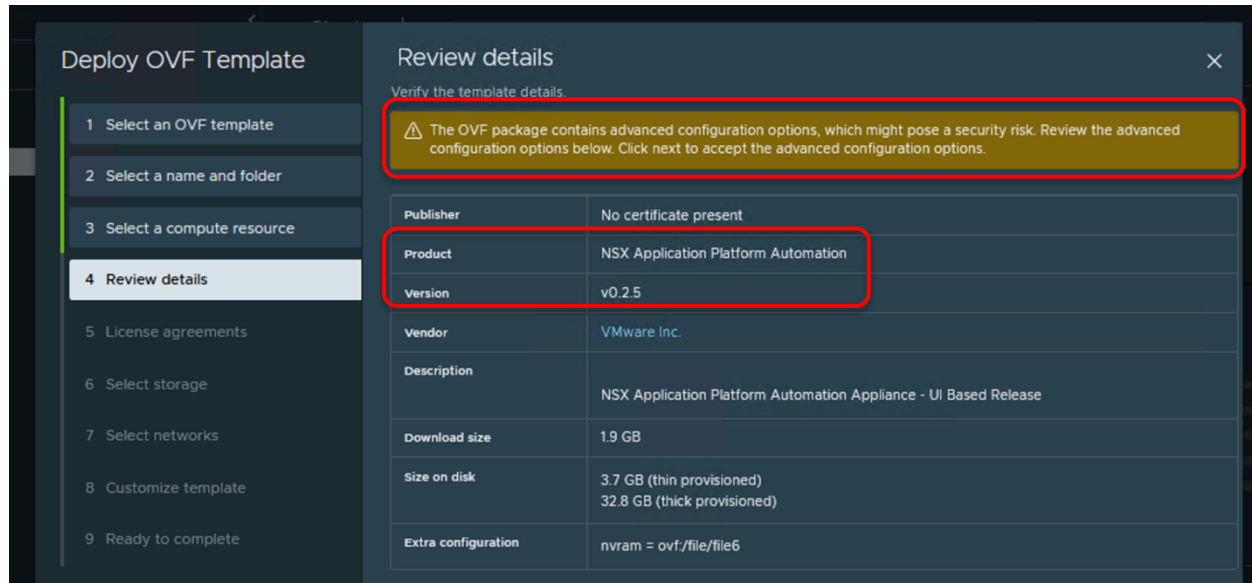
- At the next screen provide a Virtual machine name, then select a Datacenter or Folder and click NEXT



- On the Select a compute resource screen choose the target vSphere Cluster or ESXi host and click NEXT



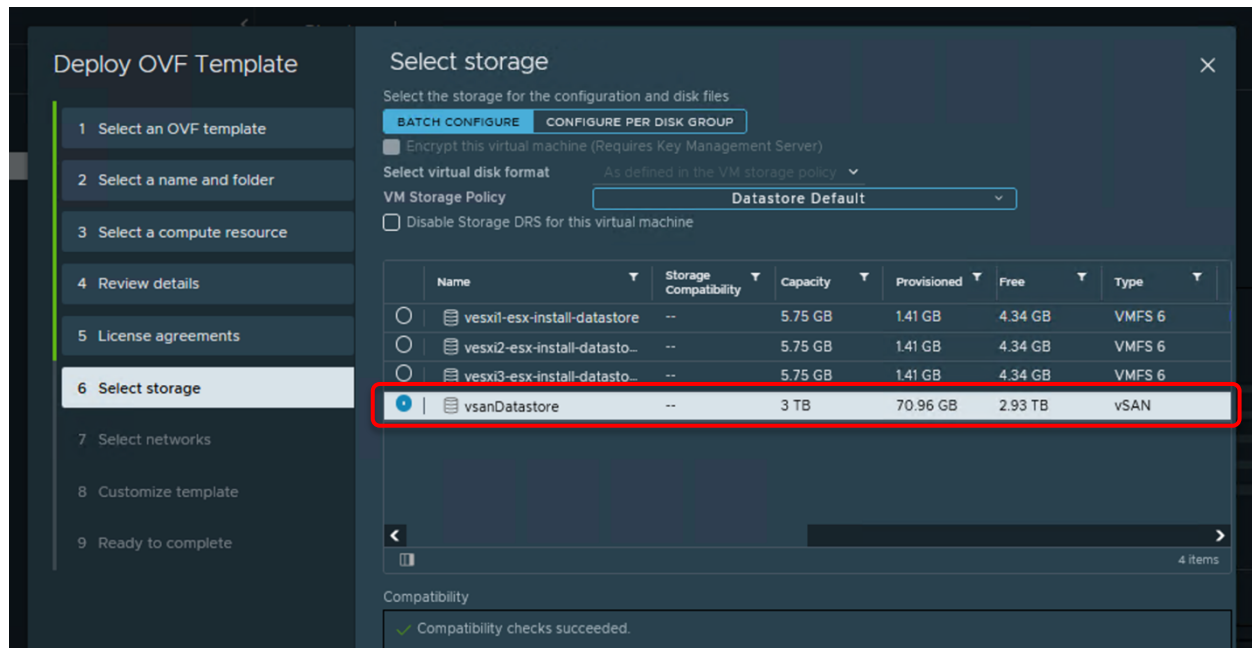
- Next you will Review appliance details, where you can confirm this is the NSX Application Platform Automation Appliance. (You can safely ignore the warning as advanced configuration options are expected. Also, a certificate will be added in the next release). When ready click NEXT



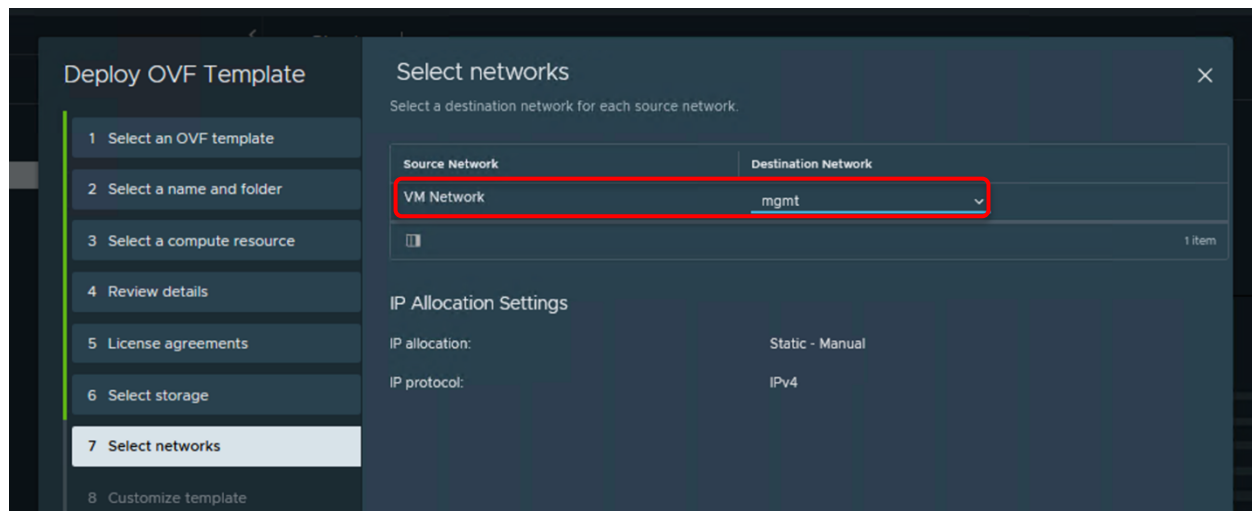
7. Then click to accept the appliance EULA, followed by NEXT



8. At Select storage you will choose your target datastore and NEXT



9. Select network is where you will map the appliance vNICs to a Destination Portgroup then NEXT



10. Finally, under Customize template you will enter the appliance OVF parameters and properties. In the first section NAPP Appliance Properties Initial root password is the only mandatory field, but it is also recommended to set a hostname and enable SSHD for remote access. (Once the mandatory OVF properties are entered the banner will turn green from red):

Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 License agreements
- 6 Select storage
- 7 Select networks
- 8 **Customize template**
- 9 Ready to complete

Customize template

Customize the deployment properties of this software solution.

✓ All properties have valid values

▼ NAPP Automation Appliance Properties 4 settings

Hostname	The hostname for the NSX Application Platform automation appliance. If you leave this field blank the appliance will attempt a reverse lookup of the IP address to set a hostname. nappa
Enable SSHD	Select whether the SSHD service will be enabled and started by default on the NAPP automation appliance. <input checked="" type="checkbox"/>
Initial root password	This value will be used as an initial password for the root account on the NAPP appliance. Password: Confirm Password:

11. The next section is NAPP Automation UI Registration Properties. Here you can optionally enable the NAPP Automation Appliance to register with your NSX Manager as a native UI plugin which provides the most seamless experience (This section is entirely optional, and if you do not enable the Plugin a UI will still run in a standalone mode on the Appliance IP address. It is also possible to register the plugin post deployment)

Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 License agreements
- 6 Select storage
- 7 Select networks
- 8 **Customize template**
- 9 Ready to complete

Customize template

▼ **NAPP Automation UI Registration Properties** 5 settings

Enable NSX Manager UI Plugin	Select whether the NAPP Automation UI will be registered with your NSX Manager as an integrated UI plugin or run as a standalone UI. The next 4 fields are required if the UI plugin is enabled.
	<input checked="" type="checkbox"/>
NSX Manager Instance	The hostname or IP Address of your NSX Manager Unified Appliance. This is the destination for installation of the NAPP Automation UI Plugin.
	10.10.5
NSX Manager API Username	Username on NSX Manager (typically admin) used to make NSX API Calls.
	admin
NSX Manager API Password	Password for the NSX Manager API account in the previous field.
	Password <input type="password"/>
	Confirm Password <input type="password"/>
NSX Manager Root Password	Password for the NSX Manager root account. This is required to install the NSX UI Plugin - SSH with root login must also be enabled on the NSX Manager.
	<input type="password"/>

CANCEL BACK **NEXT**

12. This step is optional if your NSX Manager has not been deployed yet or you do not wish to enable the plugin, although it is recommended. Under NSX Manager Instance enter the FQDN or IP address of the NSX Manager you will be deploying NAPP on. If you enter an FQDN, make sure your appliance network properties include a valid DNS server otherwise the registration will be unsuccessful. It is also advisable to verify your NSX Manager is accessible remotely and the login credentials are correct.

Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 **Review details**

Customize template

▼ **NAPP Automation Appliance Networking Properties** 8 settings

Network IP Address Family	Network IP address family (i.e., 'ipv4').
	ipv4 ▼
Network Mode	Network mode (i.e., 'static', 'dhcp').
	dhcp ▼

CANCEL BACK **NEXT**

13. In the NAPP Automation Networking Properties section the Network Mode is set to DHCP by default. If this is appropriate for your environment just click NEXT. Otherwise change the Network Mode to Static and enter the defined IP, Gateway, DNS, Domain and Prefix information for your Destination network selected in Step 9:

Network Mode	Network mode (i.e., 'static', 'dhcp'). <div>static ▾</div>
Static IP Address	Static IP address for the NAPP automation appliance (if DHCP is not used). <div>10.1.0.6</div>
Network Prefix	The network prefix for this interface, eg 24 for a subnet mask of 255.255.255.0 (if DHCP is not used). <div>24 ▾</div>
Network Default Gateway	The default gateway address for the NAPP automation appliance (if DHCP is not used). <div>10.1.0.1</div>
Domain Name	The domain name of the NAPP automation appliance. <div>corp.local</div>
Domain Search Path	The domain search path (comma separated domain names) for the NAPP automation appliance. <div>corp.local</div>
Domain Name Servers	The domain name server IP Addresses for the NAPP automation appliance (enter a single DNS server). <div>10.1.0.1</div>

14. Once you have completed the appliance configuration click NEXT, then at the final Review to Deploy screen verify your inputs and click FINISH

Deploy OVF Template

Ready to complete

1 Select an OVF template

2 Select a name and folder

3 Select a compute resource

4 Review details

5 License agreements

6 Select storage

7 Select networks

8 Customize template

9 Ready to complete

Select storage

Size on disk: 32.8 GB

Storage mapping: 1

All disks: Datastore: vsanDatastore; Format: As defined in the VM storage policy

Select networks

Network mapping: 1

VM Network: mgmt

IP allocation settings

IP protocol: IPV4

IP allocation: Static - Manual

Customize template

Properties

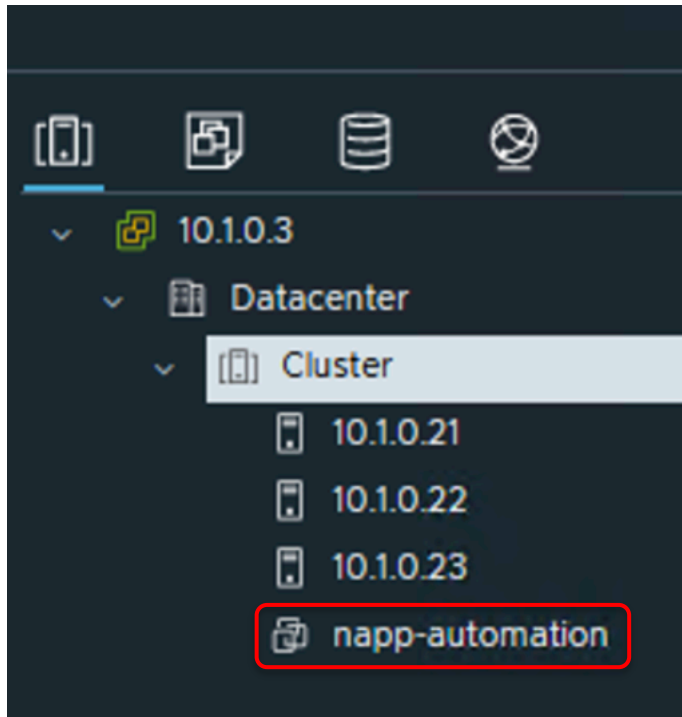
Hostname = nappa
 Enable SSHD = True
 NTP Servers = 10.1.0.1
 Enable NSX Manager UI Plugin = True
 NSX Manager Instance = 10.1.0.5
 NSX Manager API Username = admin
 Network IP Address Family = ipv4
 Network Mode = static
 Static IP Address = 10.1.0.6
 Network Prefix = 24
 Network Default Gateway = 10.1.0.1
 Domain Name = corp.local
 Domain Search Path = corp.local
 Domain Name Servers = 10.1.0.1

CANCEL BACK **FINISH**

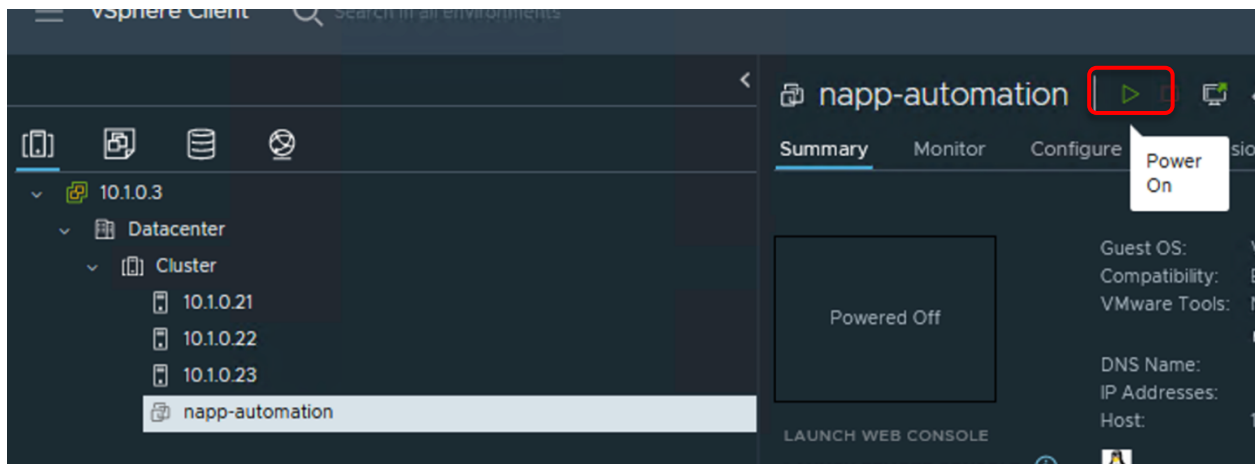
15. Your NAPP Automation Appliance will begin deploying and should only take a minute or two to complete. You can track the deployment status under Recent Tasks:

Recent Tasks					
Task Name	Target	Status	Details	Initiated	
Deploy OVF template	Cluster	67%	Copying Virtual Machine co...	VSPH	
Import OVF package	Cluster	68%		vsph	

16. You will also see a new VM in your inventory under Hosts and Clusters or VMs and Templates:



17. Once the Deploy OVF template task completes, right-click on your NAPP automation VM and select Power On



18. Then open a Web or Remote Console where you will shortly see a login screen

19. At this point the appliance is going through the first boot initialization and configuration and the parameters set during deployment have not been configured yet, as you can see by the default hostname of photon. Once this initialization process is complete your console screen will refresh, and you will see the hostname, assigned IP address and status of your registration with NSX Manager:

```
Welcome to the NSX Application Platform Automation Appliance (Version: v0.2.5)

If your network was initialized correctly, access the NAPP Automation UI at the following URL:
https://10.1.0.6

Your NSX UI Plugin registration status is:
Unsuccessful

If the registration status is successful you can also login to the following NSX Manager:
10.1.0.5
to access the NAPP Automation UI under the System Menu.

Alternatively you can use the CLI by logging in as root, change to the /opt/napp directory and run:
napp-automation
to get started with your NAPP Deployment.

Note: Please provide your feedback on usage of the NAPP Automation Appliance.

nappa login: [ OK ] Started Appliance initialization script.
```

20. You can now access the NAPP Automation UI through either NSX Manager or via https using the displayed URL to complete your TKGs and NAPP deployment.

If required for any post deployment configuration or CLI based deployment you can also either login to the console directly or login remotely via SSH, using the password set during OVF deploy:

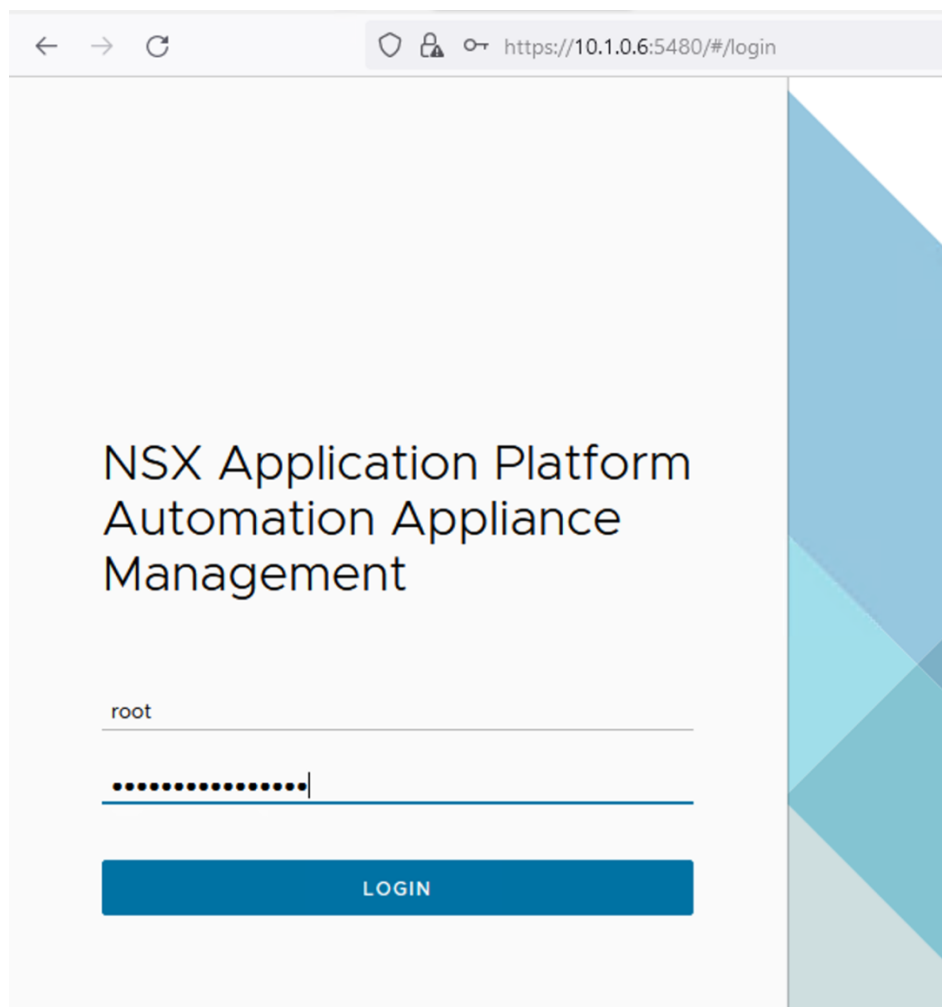
```
[root@cPodEdge [ ~ ]# ssh root@10.1.0.6
Warning: Permanently added '10.1.0.6' (ECDSA) to the list of known hosts.
[Password:
15:06:17 up 4 min, 0 users, load average: 0.12, 0.08, 0.03
tdnf update info not available yet!
root@nappa [ ~ ]#
```

Once you have confirmed an IP address has been assigned and accessible for your NAPP Automation Appliance you can continue with the deployment. If the IP configured during

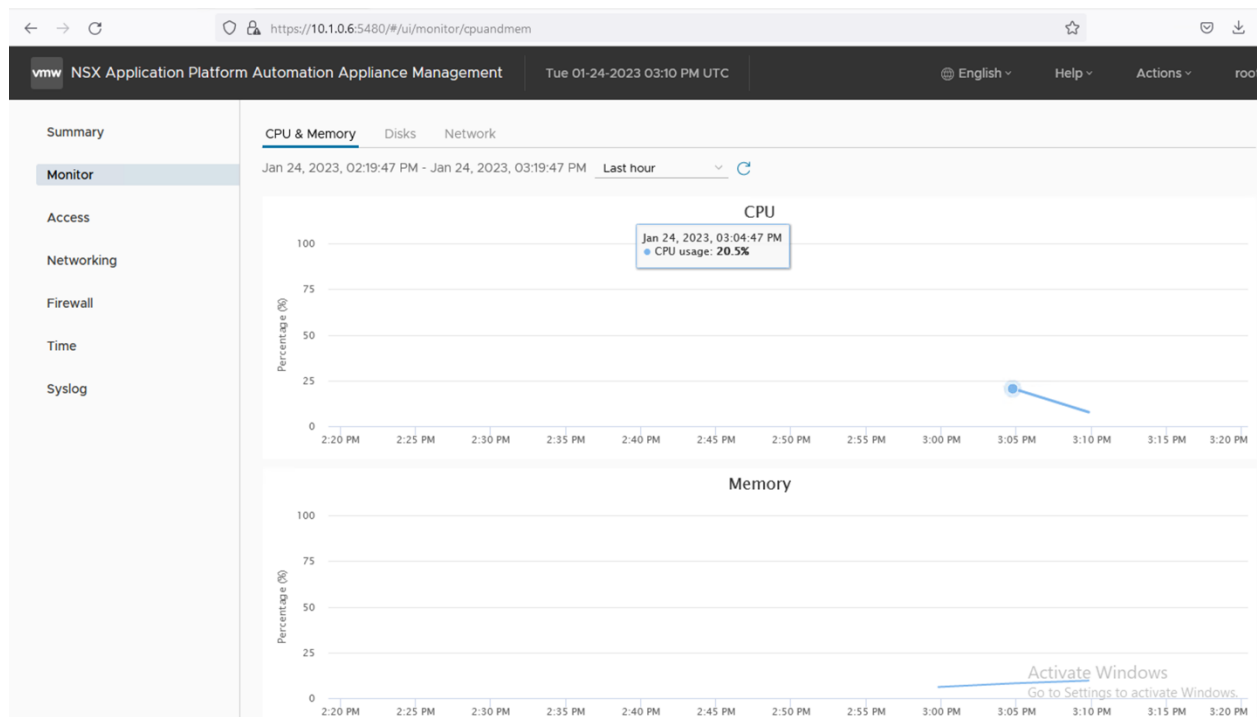
deployment is not assigned or you have connectivity issues you can login via the console to troubleshoot or just redeploy the appliance if it is an external configuration issue.

Note: The NAPP Automation Appliance is secured and only the minimal required traffic is permitted. ICMP, Inbound SSH, SSL on ports 443 and 5480 are the external services available, and the appliance will not respond to any other ports.

If you need to check the health of the appliance, you can connect to the Web Management interface on port 5480:



From this interface, you can reboot the appliance, check the cpu/memory/disk/nic usage:

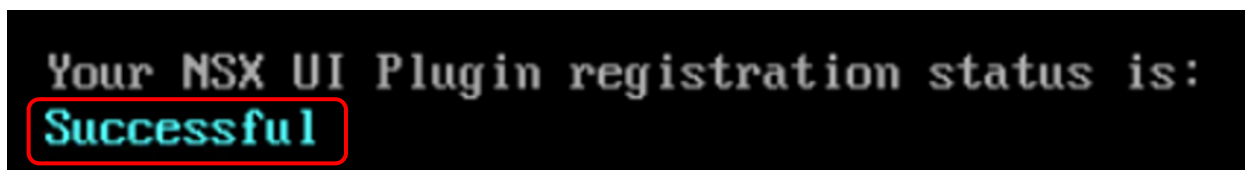


5 Running the NAPP Automation tool

5.1 NSX UI Plugin

The NSX Application Platform automation appliance provides the option of registering as an NSX UI plugin. This enables an integrated, seamless experience for configuring the microservices environment and NAPP and is the recommended approach. Using the UI based installation simplifies process of configuration by connecting to vCenter and discovering environment parameters and also provides validation of settings before deployment. This minimizes configuration inputs and reduces the potential for errors. It also includes built in input validation of parameters and pre-checks that will validate the environment before making any configuration changes.

You can register the UI extension during the appliance provisioning as part of the OVF parameter configured. Based on the details for NSX Manager the banner will report the status and if the registration was successful:



Other possible status codes for the UI Plugin are:

- Unsuccessful Registration
- No Connectivity to Manager
- Unconfigured

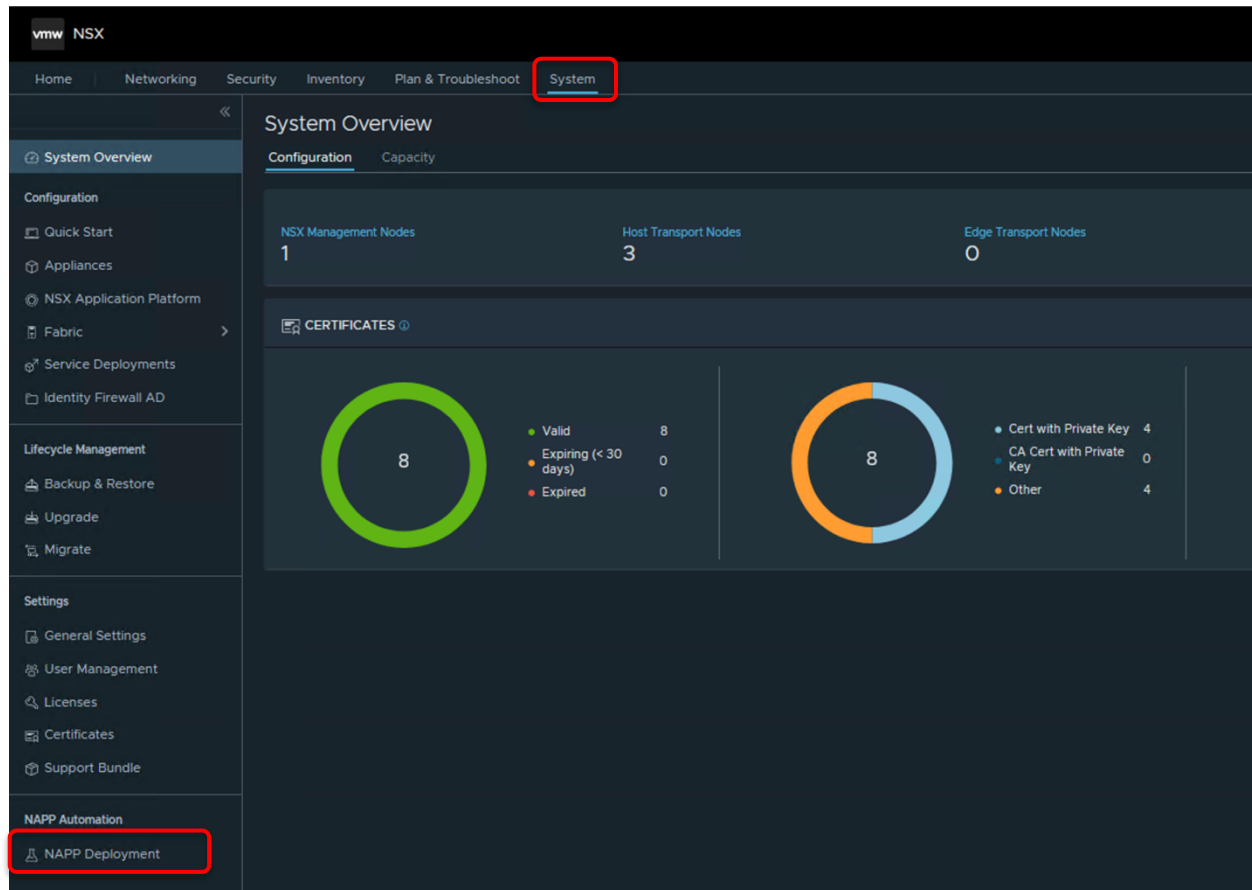
If the plugin registration is not successful, this is generally due to a network connectivity issue or incorrect credentials. You can fix the underlying issue, login to the console and run the following command:

```
/opt/napp/napp-automation register --napp_appliance_ip=$ipaddress --  
nsx_host=$nsxmgr --nsx_root_pwd=$nsxrootpwd --nsx_password=$nsxusernamepwd  
--nsx_username=$nsxusername
```



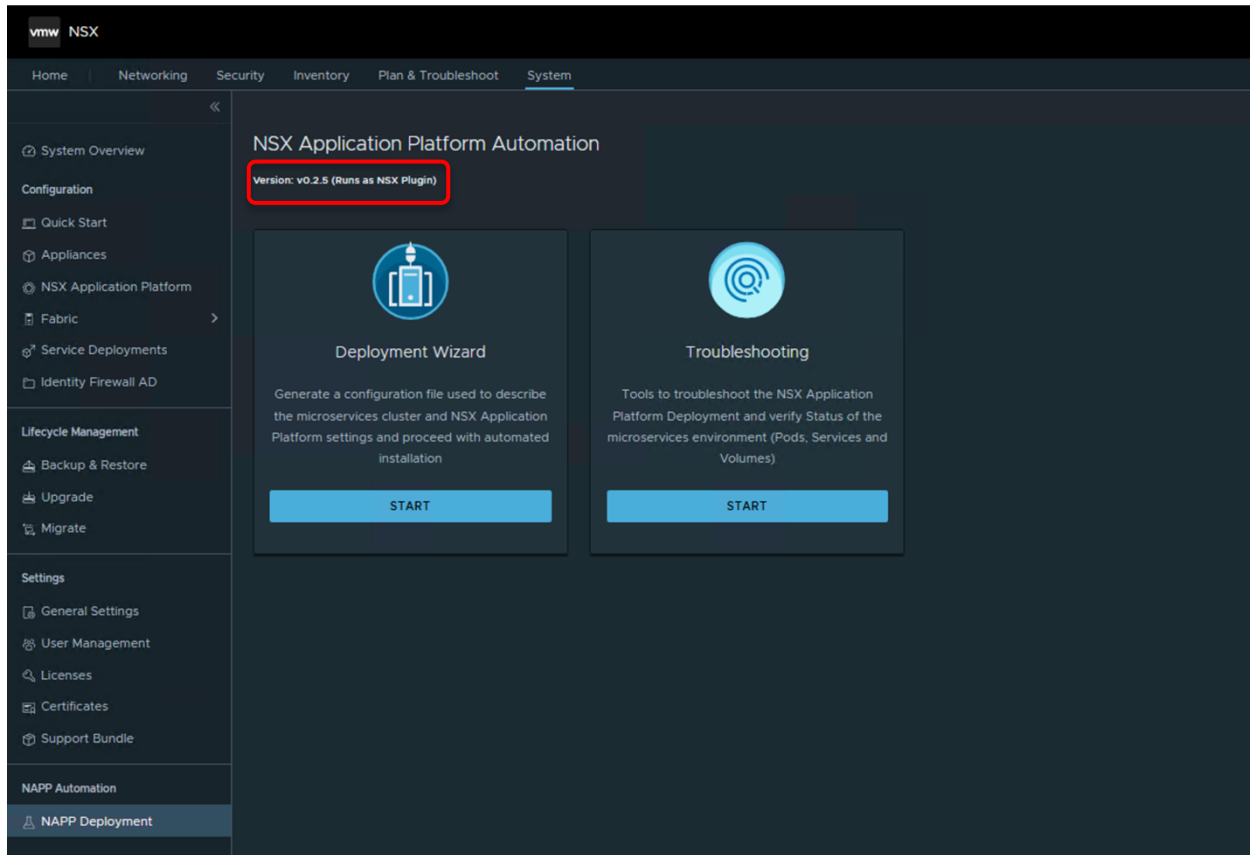
The NAPP Automation UI ensures the deployment process is very straightforward. You access the NSX Application Platform Automation from within the registered NSX Manager instance under:

System -> NAPP Automation -> NAPP Deployment



Note: you must refresh your browser NSX page

Where you will see the following screen with options for a Deployment Wizard and Troubleshooting. When ready click START on the Deployment Wizard tile:



The Deployment workflow will begin by prompting you for the Destination vCenter Server you wish to install TKGs on.

NSX Application Platform Deployment Wizard

Configuration > Pre-Checks > TKGs Deployment > NAPP Deployment

1. vSphere

vSphere

VCENTER SERVER USERNAME PASSWORD

CONNECT

DATACENTER

Select a datacenter

CLUSTER

Select a cluster

DATASTORE

Select a datastore

STORAGE POLICY

Select a policy

NEXT

At this screen, provide the vCenter hostname/IP address, credentials and click on the CONNECT button

NSX Application Platform Deployment Wizard

Configuration > Pre-Checks > TKGs Deployment > NAPP Deployment

1. vSphere

vSphere

VCENTER SERVER USERNAME PASSWORD

10.10.3 Administrator@vsphere.local

CONNECT

Once you have successfully authenticated to vCenter Server you will be able to select the target vSphere Datacenter (typically there is only one which will be pre-selected, but the NAPP Automation tool does support selection of the DC if there are multiple), Cluster, Datastore and Storage Policy used for the deployment. Click NEXT when ready to continue

The screenshot shows the 'NSX Application Platform Deployment Wizard' interface. At the top, a progress bar indicates the current step is 'Configuration', followed by 'Pre-Checks', 'TKGs Deployment', and 'NAPP Deployment'. Below this, a sidebar shows '1. vSphere' as the active step. The main content area is titled 'vSphere' and contains several configuration fields:

- VCENTER SERVER:** 10.10.3
- USERNAME:** Administrator@vsphere.local
- PASSWORD:** A masked password field with a toggle icon.
- CONNECT:** A button to connect to the vSphere environment.
- DATACENTER:** A dropdown menu currently showing 'Datacenter' with a 'Select a datacenter' prompt.
- CLUSTER:** A dropdown menu currently showing 'Cluster' with a 'Select a cluster' prompt.
- DATASTORE:** A dropdown menu currently showing 'vsanDatastore' with a 'Select a datastore' prompt.
- STORAGE POLICY:** A dropdown menu currently showing 'vSAN Default Storage Policy' with a 'Select a policy' prompt.
- NEXT:** A button to proceed to the next step.

The UI will prompt for configuration inputs on each step of the Deployment workflow. The steps are:

- Networking
- Load Balancing
- Tanzu
- NAPP Configuration

This screenshot shows a vertical list of five steps in the deployment workflow, each with a number and a title:

2. Networking
3. Load Balancing
4. Tanzu
5. NAPP configuration

Using the Load Balancing step as an example, many of the input fields are either prepopulated with default values, autocalculated or discovered from the vCenter Server inventory:

The screenshot shows the VMware NSX configuration interface for the 'Load Balancing' step. The sidebar on the left indicates the current step is '3. Load Balancing'. The main form area contains several input fields:

- HOSTNAME:** haproxy
- PASSWORD:** [masked]
- FRONTEND (10.1.1/24):** 10.1.1.10 (with a note 'e.g 10.19.3.52')
- WORKLOAD (10.1.2/24):** 10.1.2.10 (with a note 'e.g 10.19.4.52')

A dropdown menu is open on the left, showing a list of IP ranges from 10.1.1.16/28 to 10.1.1.240/28. The 'NEXT' button is located at the bottom left of the form.

When you have provided all mandatory parameters, you can click on NEXT to continue to the subsequent step in the workflow.

As mentioned, the UI will also validate your inputs to ensure IP ranges and subnets are valid and all essential fields are provided.

Load Balancing

HA Proxy Deployment

VM NAME
haproxy-v0.2.0

HOSTNAME
haproxy

PASSWORD
.....

IP Addresses

MANAGEMENT (10.1.0.1/24)
10.1.0.10
e.g 172.17.9.52

FRONTEND (10.1.1.1/24)
10.1.1.10
e.g 10.19.3.52

WORKLOAD (10.1.2.1/24)
10.1.3.10
Workload IP must part of workload subnet

API

LOAD BALANCER VIP RANGE
10.1.16/28
Select an IP range

NEXT

To complete deployment, follow a similar process for the Networking, Tanzu and NAPP Configuration screens.

If you have are uncertain about the correct values for any of the input fields, what the environment pre-requisites for Compute, Storage and Network resources or topologies for NAPP are please refer to the NSX Application Platform Deployment Guide where these are documented in detail.

Here are some examples:

Networking

Distributed Port-Groups

MANAGEMENT

mgmt

Select a network

FRONTEND

frontend

Select a network

WORKLOAD

workload

Select a network

Default Gateways

MANAGEMENT

10.1.0.1/24

Use CIDR notation (10.1.1/24)

FRONTEND

10.1.1/24

Use CIDR notation (10.1.2/24)

WORKLOAD

10.1.2.1/24

Use CIDR notation (10.1.3/24)

Other settings

NTP SERVER

10.1.0.1

e.g 172.17.9.1

DNS SERVER

10.1.0.1

comma separated list (e.g 1.1.1.2,2.2.2.2)

SEARCH DOMAIN

corp.local

corp.local

NEXT

Load Balancing

HA Proxy Deployment

VM NAME

haproxy-v0.2.0

HOSTNAME

haproxy

PASSWORD

.....

IP Addresses

MANAGEMENT (10.1.0.1/24)

10.1.0.10

e.g 172.17.9.52

FRONTEND (10.1.1/24)

10.1.1.10

e.g 10.19.3.52

WORKLOAD (10.1.2/24)

10.1.2.10

e.g 10.19.4.52


API

LOAD BALANCER VIP RANGE

10.1.16/28

Select an IP range

NEXT

▼  Tanzu

Resources

Supervisor management network (10.1.0.1/24)

FIRST IP ADDRESS
10.1.0.100
(First IP over 5 consecutive IPs)

Workload Network (10.1.2.1/24)

FIRST IP ADDRESS
10.1.2.100
(First IP over 16 consecutive IPs)

NEXT

▼ 5. NAPP configuration

NAPP settings

VERSION
4.0.1-0.0-20606727 ▼
Select a version

FORM FACTOR
advanced ▼
Select a form factor

SERVICE NAME
napp.corp.local
napp.corp.local (should be resolved to 10.1.1.20)

MESSAGING NAME
napp-messaging.corp.local
napp-messaging.corp.local (should be resolved to 10.1.1.21)

DOCKER REGISTRY
projects.registry.vmware.com/nsx_application_platform/clustering
(start without https://)

HELM REPOSITORY
https://projects.registry.vmware.com/chartrepo/nsx_application_platform
(start with https://)

SUBMIT

The NAPP Automation UI also includes a set of Pre-Checks to validate the environment before proceeding with TKGs and NAPP Deployment:

NSX Application Platform Deployment Wizard

Configuration > **Pre-Checks** > TKGs Deployment > NAPP Deployment

① Checks OK!

START PRE-CHECKS

Type	Result	Status
vSphere Version	vSphere version OK: "VMware vCenter Server 7.0.3 build-20150588"	success
vSAN Default Storage Policy	Storage Policy OK	success
Network Config	IP Address Config OK	success
Host Config	Host config OK	success
Guest Cluster CIDRs	Pods CIDR set to 192.168.0.0/16. Services CIDR set to 10.96.0.0/12	success
Check NAPP FQDN(s)	NAPP FQDNs checked	success

6 checks

BACK NEXT

And once you have provided the required parameters the deployment of TKGs, NSX configuration and NAPP provisioning will be fully automated with no further input or intervention required.

NSX Application Platform Deployment Wizard

Configuration > Pre-Checks > **TKGs Deployment** > NAPP Deployment

START TKG DEPLOYMENT

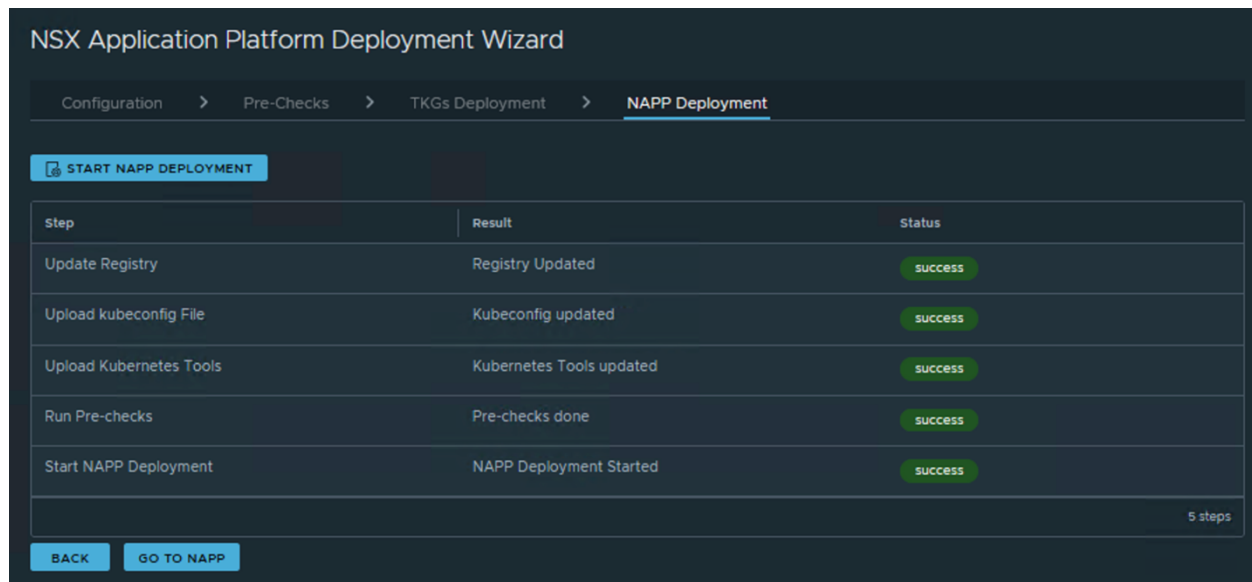
Step	Result	Status
Check vSphere Cluster HA and DRS	DRS Fully Automated and vSphere HA are enabled on cluster "Cluster"	success
Deploy HA Proxy	HA Proxy Load Balancer deployed on cluster "Cluster"	success
Wait for Certificate	HA Proxy Certificate generated	success
Create Content Library	Content Library "NSX Content Library" ready	success
Activate TKG Supervisor Cluster	TKGs supervisor cluster deployed	success
Create Virtual Machine Classes	VM Class updated: CPU=16,RAM=65536	success
Create Namespace	Namespace nsx-01 created	success
Login to TKG	Logged to cluster napp-cluster-01	success
Create Guest Cluster	Guest Cluster created napp-cluster-01	success
Generate NAPP kubeconfig YML File	NAPP Configuration File Generated	success

10 steps

BACK **DOWNLOAD KUBECONFIG FILE** NEXT

At the TKG deployment step, you can download the generated Kubeconfig file that is needed if you want to proceed at the NAPP installation manually. This is a good practice to keep a copy of this file.

You can click NEXT to proceed at the automated NAPP deployment.



Once the Deployment Wizard is done, you can navigate to:

System -> NSX Application Platform

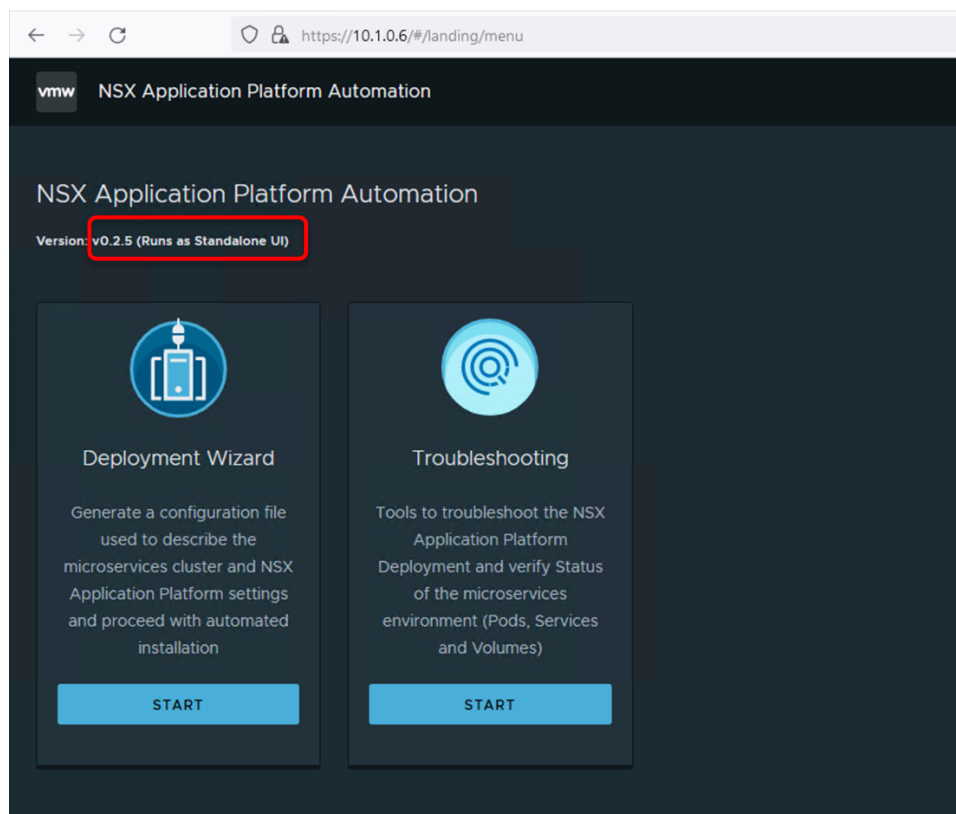
Or click on “GO TO NAPP” to verify your NAPP deployment was successful and continue with enablement of features which run on the platform. Again, refer to the Deployment Guide for the next steps.

5.2 Standalone UI

The NAPP Automation UI can also run standalone without the NSX Plugin. This may be useful if you don't have root access to NSX, or the NSX Manager has not been deployed yet but you want to provision TKGs first. The interface and workflow is exactly the same, however instead of the NSX Manager you will directly access the NAPP Automation Appliance UI via https. This URL can be retrieved directly from the VM console if required:

```
If your network was initialized correctly, access the NAPP Automation UI at the following URL:  
https://10.1.0.6
```

Then follow the same steps and sequence from the previous section of the document to begin your NAPP deployment, except that you will have to fill a section with NSX information (host, username and password):



5.3 CLI

Finally, the automation tool is delivered as a binary called:

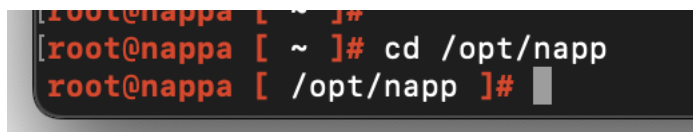
napp-automation

So, you can also use the CLI for your deployment.

Note: This is generally an advanced option that you might leverage if you are redeploying and already have a valid configuration file or if you want to automate deployment across multiple environments.

1. To begin with the CLI installation, login via either SSH or the console as root and once you are at a shell change your directory to /opt/napp:

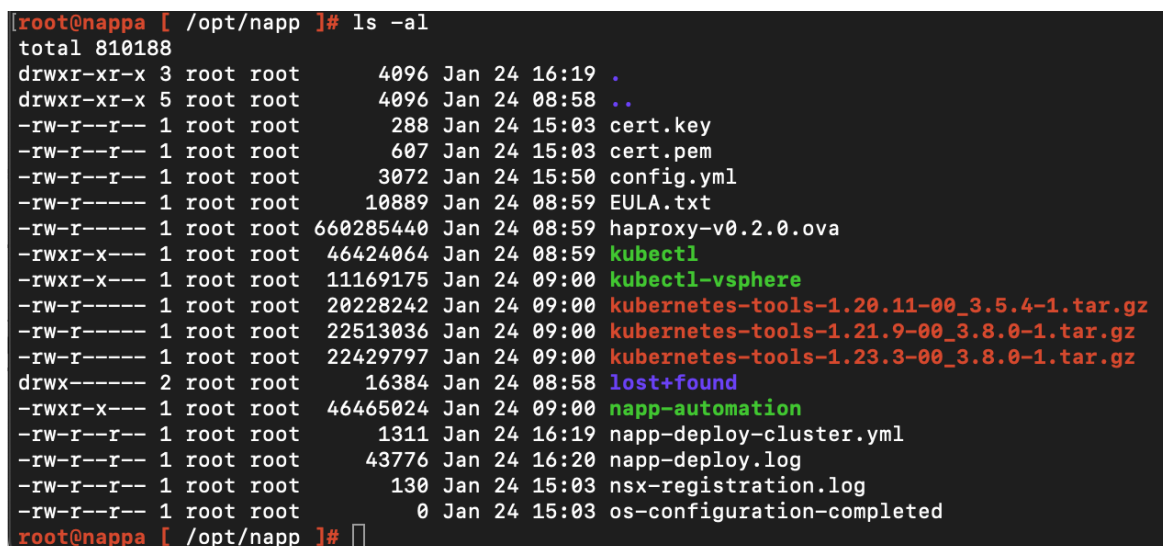
```
cd /opt/napp
```



```
[root@nappa [ ~ ]# cd /opt/napp
root@nappa [ /opt/napp ]#
```

2. Then confirm the required source files such as the napp-automation binary, haproxy appliance, etc are available:

```
ls -al
```



```
[root@nappa [ /opt/napp ]# ls -al
total 810188
drwxr-xr-x 3 root root    4096 Jan 24 16:19 .
drwxr-xr-x 5 root root    4096 Jan 24 08:58 ..
-rw-r--r-- 1 root root    288 Jan 24 15:03 cert.key
-rw-r--r-- 1 root root    607 Jan 24 15:03 cert.pem
-rw-r--r-- 1 root root   3072 Jan 24 15:50 config.yml
-rw-r----- 1 root root   10889 Jan 24 08:59 EULA.txt
-rw-r----- 1 root root 660285440 Jan 24 08:59 haproxy-v0.2.0.ova
-rwxr-x--- 1 root root 46424064 Jan 24 08:59 kubectl
-rwxr-x--- 1 root root 11169175 Jan 24 09:00 kubectl-vsphere
-rw-r----- 1 root root 20228242 Jan 24 09:00 kubernetes-tools-1.20.11-00_3.5.4-1.tar.gz
-rw-r----- 1 root root 22513036 Jan 24 09:00 kubernetes-tools-1.21.9-00_3.8.0-1.tar.gz
-rw-r----- 1 root root 22429797 Jan 24 09:00 kubernetes-tools-1.23.3-00_3.8.0-1.tar.gz
drwx----- 2 root root    16384 Jan 24 08:58 lost+found
-rwxr-x--- 1 root root 46465024 Jan 24 09:00 napp-automation
-rw-r--r-- 1 root root    1311 Jan 24 16:19 napp-deploy-cluster.yml
-rw-r--r-- 1 root root   43776 Jan 24 16:20 napp-deploy.log
-rw-r--r-- 1 root root    130 Jan 24 15:03 nsx-registration.log
-rw-r--r-- 1 root root     0 Jan 24 15:03 os-configuration-completed
root@nappa [ /opt/napp ]#
```

3. Next it is a good idea to test connectivity from your appliance to the target vCenter Server (and optionally NSX Manager) you will be deploying NAPP to:

```
ping -c 3 <your-vcenter-server>
```

```
[root@nappa [ /opt/napp ]# ping -c 3 10.1.0.3
PING 10.1.0.3 (10.1.0.3) 56(84) bytes of data.
64 bytes from 10.1.0.3: icmp_seq=1 ttl=64 time=0.706 ms
64 bytes from 10.1.0.3: icmp_seq=2 ttl=64 time=2.27 ms
64 bytes from 10.1.0.3: icmp_seq=3 ttl=64 time=1.16 ms

--- 10.1.0.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 31ms
rtt min/avg/max/mdev = 0.706/1.378/2.273/0.658 ms
root@nappa [ /opt/napp ]#
```

4. Once you have verified these details you will generate a sample configuration file by running:

```
./napp-automation init
```

This will create a sample configuration file called:
config.yml

5. Next you will open the config.yml file in an editor to add your environment configuration. `vi` is installed on the appliance.

Note: This is the most critical step in your deployment, and while there are validations in the tool, carefully reviewing your input is recommended if you are using the CLI. Unlike the UI when performing the CLI based deployment validation will only occur during the automation steps.

To make all the required inputs clear we have provided an example `config.yml` file below, section by section. You can also refer to the Deployment Guide for detailed topology information to understand the configuration inputs.



Starting with **vsphere** which is where you will enter your vCenter Server hostname and credentials:

```
vsphere:
  host: 10.1.0.3
  username: Administrator@vsphere.local
  password: VMware1!
  datacenter: Datacenter
  cluster: Cluster
  datastore: vsanDatastore
  storage_policy: vSAN Default Storage Policy
```

ha_proxy contains the HAProxy Load Balancer appliance details. The critical inputs are host (target ESXi), **mgmt_network**, **workload_network** and **frontend_network** which are the dvPortgroup names for your destination networks. It is also recommended to double-check your **ip/gateway/range** values:

```
ha_proxy:
  ovf_file: haproxy-v0.2.0.ova
  vm_name: haproxy-v0.2.0
  host: ""
  resource_pool: ""
  mgmt_network: mgmt
  workload_network: workload
  datastore: vsanDatastore
  folder: ""
  hostname: haproxy
  permit_root_login: true
  root_pwd: VMware1!VMware1!
  ca_cert: ""
  ca_cert_key: ""
  management_ip: 10.1.0.10/24
  management_gateway: 10.1.0.1
  workload_ip: 10.1.2.10/24
  workload_gateway: 10.1.2.1
  frontend: true
  frontend_network: frontend
  frontend_ip: 10.1.1.10/24
  frontend_gateway: 10.1.1.1
  service_ip_range: 10.1.1.128/28
  dataplane_port: 5556
  haproxy_user: admin
  haproxy_pwd: VMware1!VMware1!
  name_servers: 10.1.0.1
```

wcp contains the TKGs Supervisor Cluster configuration parameters. Again, pay particular attention to the **network** and **ip** inputs and your **datastore** and **storage policies** to ensure the naming is correct:

```
wcp:
  cluster: Cluster
  content_library_name: NSX Content Library
  content_library_datastore: vsanDatastore
  ntp_servers:
  - 10.1.0.1
  worker_dns: 10.1.0.1
  master_dns: 10.1.0.1
  master_dns_search_domains:
  - corp.local
  load_balancer_config_spec:
    address_ranges:
    - address: 10.1.1.129
      count: 14
  size: SMALL
  service_cidr:
    address: 10.96.0.0
    prefix: 23
  master_storage_policy: vSAN Default Storage Policy
  ephemeral_storage_policy: vSAN Default Storage Policy
  image_storage_policy: vSAN Default Storage Policy
  master_management_network:
    address_range:
      starting_address: 10.1.0.100
      subnet_mask: 255.255.255.0
      gateway: 10.1.0.1
      address_count: 5
    network: mgmt
    mode: STATIC
  workload_networks_spec:
    supervisor_primary_workload_network:
      network: primary-workload
      networkprovider: VSPHERE_NETWORK
      vsphere_network:
        port_group: workload
        address_ranges:
        - address: 10.1.2.100
          count: 16
        subnet_mask: 255.255.255.0
        gateway: 10.1.2.1
```

Under the **namespace** and **nappcluster** sections you will configure the guest cluster details:

```
namespace:
  name: nsx-01
  subject: Administrator
  domain: vsphere.local
nappcluster:
  name: napp-cluster-01
  storage_policy: vSAN Default Storage Policy
  controlplane_vm_class: guaranteed-medium
  workers_vm_class: nappclass
  pods_cidr: 192.168.0.0/16
  services_cidr: 10.96.0.0/12
```

While the **nsx** and **napp** sections cover your NSX Manager host and credentials and NAPP inputs like **service_name** and **form_factor**:

```
nsx:
  host: "10.1.0.5"
  username: admin
  password: "VMware1!VMware1!"
napp:
  version: 4.0.1-0.0-20606727
  service_name: napp.corp.local
  messagingurl: napp-messaging.corp.local
  form_factor: advanced
  tools: kubernetes-tools-1.20.11-00_3.5.4-1.tar.gz
  kubeconfig: napp-deploy-k.yml
  docker_registry: projects.registry.vmware.com/nsx_application_platform/clustering
  helm_repo: https://projects.registry.vmware.com/chartrepo/nsx_application_platform
```

Finally, the **global** section covers the tool configuration. There is no need to change these values:

```
global:
  log_level: debug
  log_destination: file
  log_file: napp-deploy.log
  log_server: ""
  log_format: json
  log_syslog: false
```

6. When you have added your configuration, you will run the following command to enable and fully configure your TKGs environment for NAPP:

```
root@nappa [ /opt/napp ]# ./napp-automation k8s
Starting...
🔧 Reading variables using the model..
👁 Detected vSphere version is VMware vCenter Server 7.0.3 build-20150588
✅ vSphere version OK: "{VMware vCenter Server VMware vCenter Server 7.0.3 build-20150588 VMware, Inc. 7.0.3 00800 20150588 INTL 000 linux-x64 vpx VirtualCenter 7.0.3.0 fb3bfdded-c146-4f4e-b43d-89cdd0f1d28d VMware VirtualCenter Server 7.0}"
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ IP 10.1.0.1 is valid
✅ IP 10.1.2.1 is valid
✅ IP 10.1.1.1 is valid
✅ IP 10.1.0.100 is valid
✅ IP 10.1.0.1 is valid
✅ IP 10.1.2.100 is valid
✅ IP 10.1.2.1 is valid
✅ CIDR 10.1.0.10/24 is valid
✅ CIDR 10.1.2.10/24 is valid
✅ CIDR 10.1.1.10/24 is valid
✅ Subnet 10.1.1.128/28 is valid
✅ Range [10.1.1.129 - 10.1.1.143] is in CIDR 10.1.1.128/28
✅ [Step 2/15] Deploying HA Proxy...OK
✅ [Step 3/15] HA Proxy Load Balancer deployed on ""
🕒 Wait for CA certificate generation
✅ [Step 4/15] CA cert OK
✅ [Step 5/15] Content Library created or already existing
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ [Step 6/15] TKGs is being enabled. Please wait...
🕒 TKGs status is CONFIGURING. Please wait... [Elapsed Time: 15 s ]
🕒 TKGs status is CONFIGURING. Please wait... [Elapsed Time: 30 s ]
🕒 TKGs status is CONFIGURING. Please wait... [Elapsed Time: 45 s ]
...
🕒 TKGs status is ERROR. Please wait... [Elapsed Time: 1113 s ]
👁 Warning: ❌ error configuring TKGs
🕒 TKGs status is ERROR. Please wait... [Elapsed Time: 1129 s ]
👁 Warning: ❌ error configuring TKGs
...
🕒 TKGs status is RUNNING. Please wait... [Elapsed Time: 1460 s ]
✅ [Step 6/15] TKGs status is RUNNING
✅ [Step 6/15] Microservices status is WARNING
✅ [Step 8/15] Virtual Machine class created...
✅ Datastore [vsanDatastore] is compatible with storage policy [vSAN Default Storage Policy]
✅ [Step 9/15] Namespace created

Spawning kubectll vsphere command...
Welcome to Photon 3.0 (\m) - Kernel \r (\l)

KUBECTL_VSPHERE_PASSWORD environment variable is not set. Please enter the password below
```

```

Password:
[Step 10/15] Logged in to TKGs cluster
[Step 11/15] NAPP Cluster Configuration file generated
Check TKR images...
Applying kubectl command...
Switched to context "nsx-01".
Applying kubectl command...
Switched to context "nsx-01".
tanzukubernetescluster.run.tanzu.vmware.com/napp-cluster-01 created

[Step 12/15] NAPP Cluster creation started...
Welcome to Photon 3.0 (\m) - Kernel \r (\l)

KUBECTL_VSPHERE_PASSWORD environment variable is not set. Please enter the password below
Waiting for Guest cluster to be available for login....Welcome to Photon 3.0 (\m) - Kernel \r (\l)

KUBECTL_VSPHERE_PASSWORD environment variable is not set. Please enter the password below
Waiting for Guest cluster to be available for login....Welcome to Photon 3.0 (\m) - Kernel \r (\l)

KUBECTL_VSPHERE_PASSWORD environment variable is not set. Please enter the password below
Password:
[Step 13/15] Logged in to NAPP cluster
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...
1 control node and 3 worker node(s) are expected. Waiting for additional nodes...

[Step 14/15] NAPP Cluster has been created
[Step 15/15] NAPP Configuration file generated
Script duration 35 min

```

Note: The ERROR message in the tool output does not indicate there is an issue. This is simply the returned status of the TKGs environment while it is being provisioned, and the display has been fixed for the next release of the NAPP Automation Appliance

```

TKGs status is ERROR. Please wait... [Elapsed Time: 1113 s ]
Warning: ✗ error configuring TKGs

```

As you can see below the status will change to READY once the TKGs environment has successfully deployed:

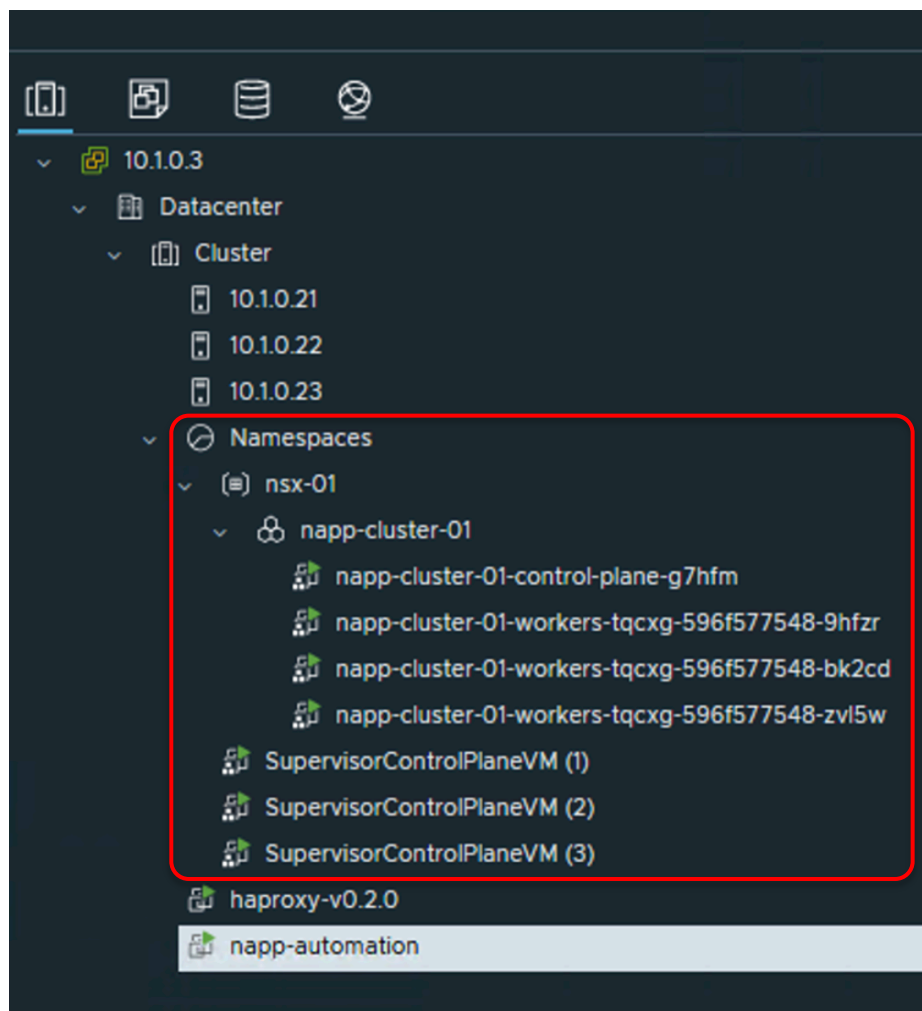
```

TKGs status is RUNNING. Please wait... [Elapsed Time: 1460 s ]
[Step 6/15] TKGs status is RUNNING































```



During deployment you can also track creation of VMs for HAProxy, Supervisor Cluster and Guest Cluster in the vSphere UI:



And also observe the Recent Tasks to make sure all steps are completing:

Recent Tasks		Alarms			
Task Name	Target	Status	Details	Initiator	
Validate the cluster speci...	 Cluster	 Completed		com.vmware	
Update vSAN configurati...	 10.10.23	 Completed		com.vmware	
Migrate virtual machine	 napp-cluster-01-control-plane-g7hfm	<div><div></div></div> 52% 	Migrating Virtual Machine ac...	System	
Migrate virtual machine	 haproxy-v0.2.0	 Completed	Finalizing Virtual Machine liv...	System	
Power On virtual machine	 napp-cluster-01-workers-tqcxg-596f5_	 Completed	Powering on the new Virtual...	VSPHERE.LO	
Attach a virtual disk	 napp-cluster-01-workers-tqcxg-596f5_	 Completed		VirtualCenter	
Attach container volume	 napp-cluster-01-workers-tqcxg-596f5_	 Completed		com.vmware	
Customize virtual machin...	 napp-cluster-01-workers-tqcxg-596f5_	 Completed	Reconfiguring Virtual Machi...	VSPHERE.LO	
Reconfigure virtual mach...	 napp-cluster-01-workers-tqcxg-596f5_	 Completed		VSPHERE.LO	
Reconfigure virtual mach...	 napp-cluster-01-workers-tqcxg-596f5_	 Completed	Executing callbacks	VSPHERE.LO	
Power On virtual machine	 napp-cluster-01-workers-tqcxg-596f5_	 Completed	Powering on the new Virtual...	VSPHERE.LO	
Attach a virtual disk	 napp-cluster-01-workers-tqcxg-596f5_	 Completed		VirtualCenter	
Attach container volume	 napp-cluster-01-workers-tqcxg-596f5_	 Completed		com.vmware	
Power On virtual machine	 napp-cluster-01-workers-tqcxg-596f5_	 Completed	Powering on the new Virtual...	VSPHERE.LO	
Customize virtual machin...	 napp-cluster-01-workers-tqcxg-596f5_	 Completed		VSPHERE.LO	

The tool also provides step-by-step reporting so you can see when the end-to-end NAPP deployment has completed successfully:

```

[Step 2/15] Deploying HA Proxy...OK
[Step 3/15] HA Proxy Load Balancer deployed on ""
[Step 4/15] CA cert OK
[Step 5/15] Content Library created or already existing
[Step 6/15] TKG status is RUNNING
[Step 6/15] Microservices status is WARNING
[Step 8/15] Virtual Machine class created...
[Step 9/15] Namespace created
[Step 10/15] Logged in to TKG cluster
[Step 11/15] NAPP Cluster Configuration file generated
[Step 12/15] NAPP Cluster creation started...
[Step 13/15] Logged in to NAPP cluster
[Step 14/15] NAPP Cluster has been created
[Step 15/15] NAPP Configuration file generated
Script duration 35 min

```

Optional: If your TKG setup and NAPP deployment are separate steps or operated by different teams, you can also run the following command to deploy NAPP after TKGs:

```

root@nappa [ /opt/napp ]# ./napp-automation napp
NAPP installation called
Reading variables using the model..

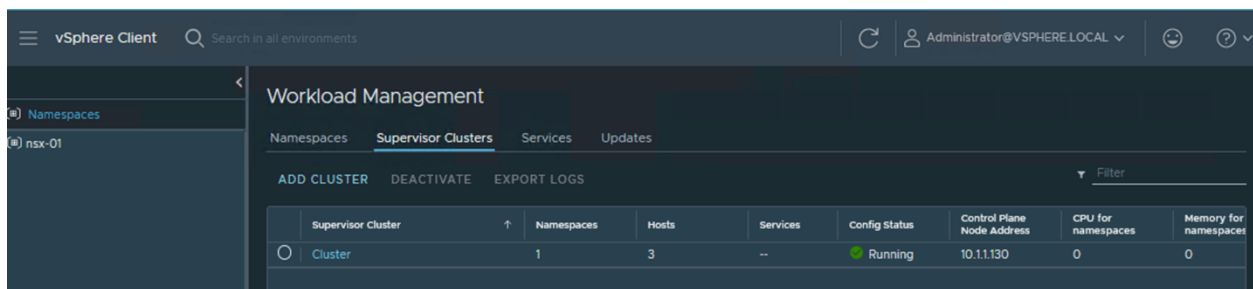
```

```

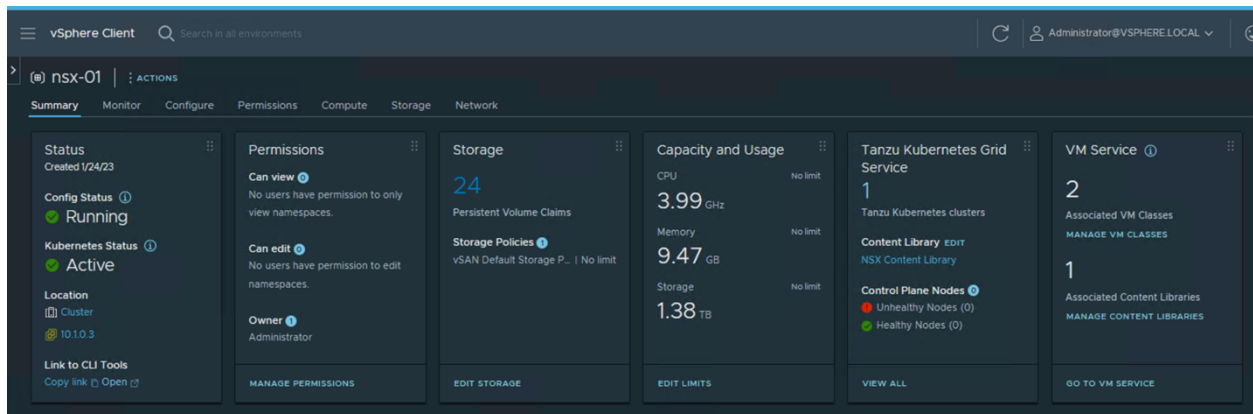
[Step 1] Registry updated
[Step 2] Kubeconfig uploaded
[Step 3] Get Kubeinfo
[Step 3] Detected vSphere version is VMware vCenter Server 7.0.3 build-20150588
Warning: Bundle ID is: 1674589131384
[Step 3] Kubernetes tools bundle ID 1674589131384
[Step 3] Kubernetes tools uploaded
[Step 5] Deployment createdresp:
[Step 6] Deployment Checks started
[Step 7] Deployment started
    
```

- Once the NAPP Automation Tool has completed you can verify the end result in vCenter by navigating to: Home-> Workload Management

Where you can see a Running Supervisor Cluster:

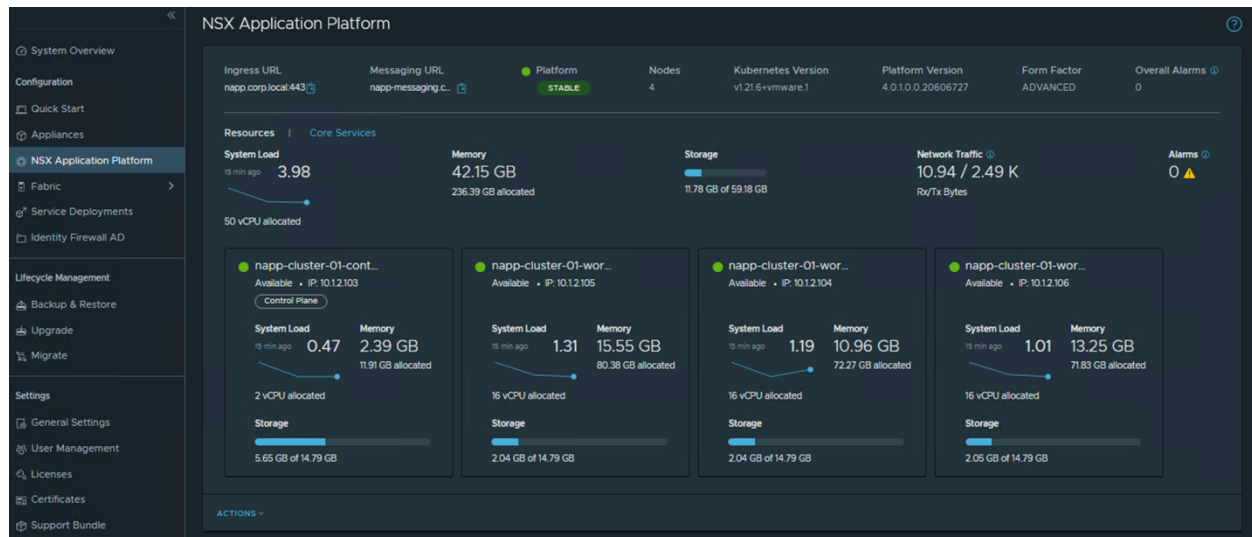


And a Running namespace with a Guest Cluster



Also, within the NSX Manager UI under:

System -> NSX Application Platform



you can see the status of your NSX Application Platform environment and confirm it has deployed successfully.

Any errors in the deployment will be reported by the napp-automation tool on the console with additional details logged to the following file in the current working directory:

napp-automation.log

The most common errors are either:

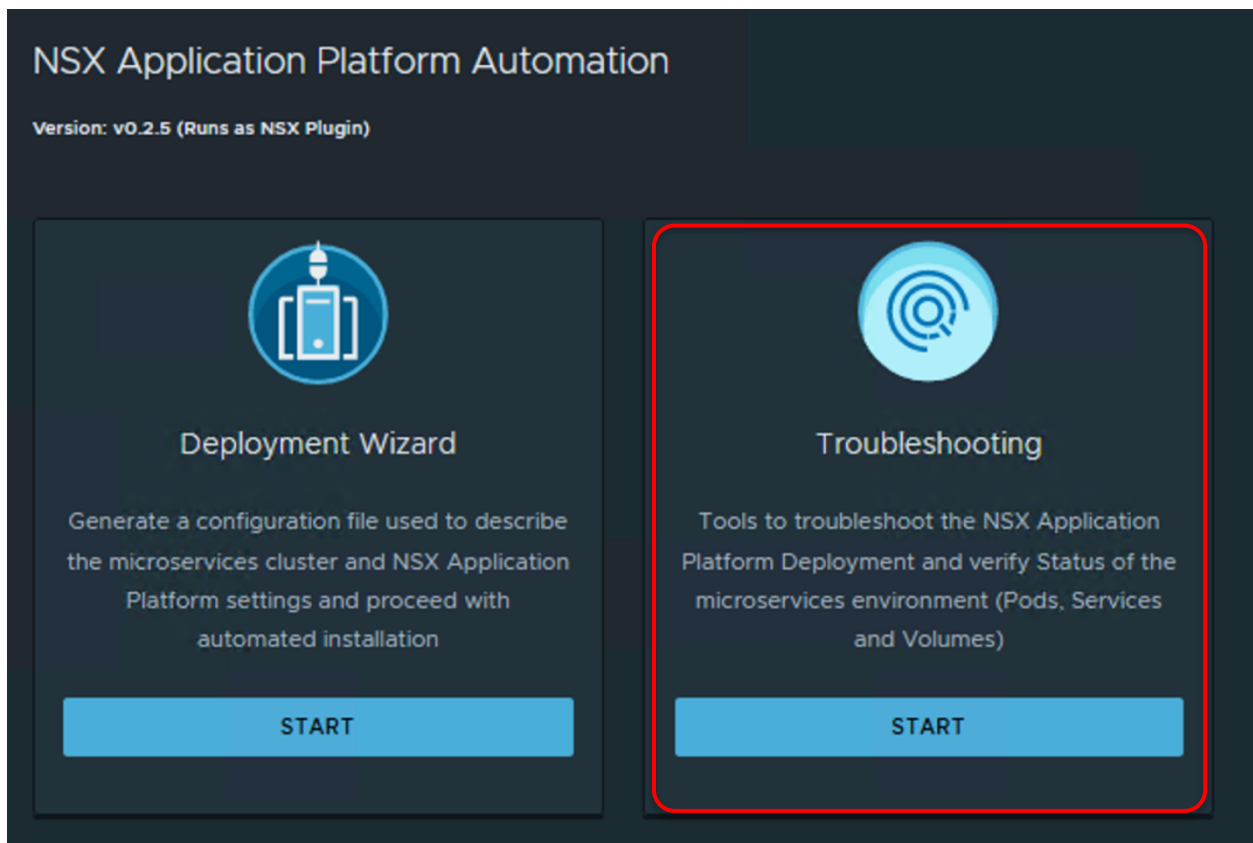
- Related to network inputs which impact connectivity between the load balancer and supervisor or guest clusters
- The service_name for NAPP is not resolving to the correct External IP Address.

6 Troubleshooting

6.1 Integrated troubleshooting tools

If you encounter any issues installing or working with NAPP please refer to the Deployment & POC Guide and Product Documentation for detailed troubleshooting steps. In addition, the Automation Appliance has some additional visibility and troubleshooting available to determine the status of your NAPP environment.

In the NAPP Automation Appliance UI you can also use the **Troubleshooting** tile for additional visibility:



This allows you to view the status of Pods, Services and Volumes in the underlying infrastructure which may be useful for troubleshooting or when raising a Support Request with VMware:

NSX Application Platform Troubleshooting

Pods Services Volumes Logs

GET PODS STATUS

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
cert-manager	cert-manager-7bd4855959-pbtzg	1/1	Running	0	26m20s
cert-manager	cert-manager-cainjector-5c4cbb58c5-djm9j	1/1	Running	0	26m20s
cert-manager	cert-manager-truststoreinjector-86795f9c8f-rnjxv	1/1	Running	0	26m20s
cert-manager	cert-manager-webhook-7488bddfd8-n4p5v	1/1	Running	0	26m20s
kube-system	antrea-agent-hxp4b	2/2	Running	0	42m32s
kube-system	antrea-agent-ssb62	2/2	Running	0	42m30s
kube-system	antrea-agent-wfw82	2/2	Running	0	42m20s
kube-system	antrea-agent-wr6pw	2/2	Running	0	45m20s
kube-system	antrea-controller-7df5d6b46-hsths	1/1	Running	0	45m21s
kube-system	antrea-resource-init-54b68499d-cfk7g	1/1	Running	0	45m20s
kube-system	coredns-df8897b76-2q7dr	1/1	Running	0	45m29s
kube-system	coredns-df8897b76-4rwz8	1/1	Running	0	45m29s
kube-system	docker-registry-napp-cluster-01-control-plane-g7hfm	1/1	Running	0	45m32s
kube-system	docker-registry-napp-cluster-01-workers-tqcxg-596f577548-9hfzr	1/1	Running	0	42m30s

NSX Application Platform Troubleshooting

Pods Services Volumes Logs

GET SERVICES STATUS

NAMESPACE	NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
cert-manager	cert-manager-webhook	ClusterIP	10.105.90.135		443/TCP	27m25s
default	kubernetes	ClusterIP	10.96.0.1		443/TCP	46m51s
default	supervisor	ClusterIP	None		6443/TCP	46m42s
kube-system	antrea	ClusterIP	10.107.45.143		443/TCP	46m26s
kube-system	kube-dns	ClusterIP	10.96.0.10		53/UDP,53/TCP,9153/TCP	46m49s
kube-system	metrics-server	ClusterIP	10.99.65.179		443/TCP	46m23s
nsxi-platform	authserver	ClusterIP	10.108.153.35		9443/TCP	24m25s
nsxi-platform	cluster-api	ClusterIP	10.106.28.31		443/TCP	24m23s
nsxi-platform	druid-broker	ClusterIP	10.100.211.249		8282/TCP	24m24s
nsxi-platform	druid-config-broker	ClusterIP	10.99.102.91		8282/TCP	24m24s
nsxi-platform	druid-config-historical	ClusterIP	10.107.3.50		8283/TCP	24m23s
nsxi-platform	druid-coordinator	ClusterIP	10.98.206.218		8281/TCP	24m24s
nsxi-platform	druid-historical	ClusterIP	10.97.175.92		8283/TCP	24m24s
nsxi-platform	druid-middle-manager	ClusterIP	10.97.122.150		8291/TCP	24m23s
nsxi-platform	druid-overlord	ClusterIP	10.99.255.48		8290/TCP	24m23s
nsxi-platform	druid-router	ClusterIP	10.110.187.206		8280/TCP	24m25s
nsxi-platform	external-nsx-manager	ClusterIP	10.111.179.86		443/TCP	24m29s
nsxi-platform	fluentd-aggregator	ClusterIP	10.98.162.40		9880/TCP,24224/TCP	24m23s

NSX Application Platform Troubleshooting									
Pods Services <u>Volumes</u> Logs									
GET VOLUMES STATUS									
NAMESPACE	NAME	STATUS	VOLUME	CAPACITY	ACCESS MODES	STORAGE CLASS	AGE		
nsxi-platform	data-druid-config-historical-0	Bound	pvc-b4c88433-a9bf-49cb-99b8-12397c05eefc	8Gi	ReadWriteOnce	vsan-default-storage-policy	24m52s		
nsxi-platform	data-druid-historical-0	Bound	pvc-8a39c659-3e3f-4a09-a397-fcd364c13599	64Gi	ReadWriteOnce	vsan-default-storage-policy	24m52s		
nsxi-platform	data-druid-historical-1	Bound	pvc-8af6ad36-08eb-4b8c-afe0-bd36f2c5614f	64Gi	ReadWriteOnce	vsan-default-storage-policy	24m51s		
nsxi-platform	data-druid-middle-manager-0	Bound	pvc-eb5ec416-8b0d-473c-b9e8-e500df23c1bd	16Gi	ReadWriteOnce	vsan-default-storage-policy	24m50s		
nsxi-platform	data-druid-middle-manager-1	Bound	pvc-24f74bf4-a649-4f5c-b7ab-afb4dcdcad33	16Gi	ReadWriteOnce	vsan-default-storage-policy	24m49s		
nsxi-platform	data-druid-middle-manager-2	Bound	pvc-4ee176a7-4639-4b95-8b17-d09d6d772be9	16Gi	ReadWriteOnce	vsan-default-storage-policy	24m48s		
nsxi-platform	data-kafka-0	Bound	pvc-8fab636d-d8a1-4d7a-b983-6abd9736f4d5	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m50s		
nsxi-platform	data-kafka-1	Bound	pvc-cf9db452-a171-4064-99da-a80c5ab7bdfb	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m49s		
nsxi-platform	data-kafka-2	Bound	pvc-0cdeda12-f413-4b99-8534-6aa6cbee525d	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m47s		
nsxi-platform	data-metrics-postgresql-ha-postgresql-0	Bound	pvc-6a39eba6-4830-4099-a7d2-8e69807ec88a	10Gi	ReadWriteOnce	vsan-default-storage-policy	13m41s		
nsxi-platform	data-metrics-postgresql-ha-postgresql-1	Bound	pvc-a37f1698-9521-4771-844a-8f261429751e	10Gi	ReadWriteOnce	vsan-default-storage-policy	13m40s		
nsxi-platform	data-metrics-postgresql-ha-postgresql-2	Bound	pvc-3737e36b-88cb-4a9c-904f-1c4e6bfcd751	10Gi	ReadWriteOnce	vsan-default-storage-policy	13m39s		
nsxi-platform	data-minio-0	Bound	pvc-aa650018-d817-42d2-87b6-f2fb4049e04f	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m50s		
nsxi-platform	data-minio-1	Bound	pvc-c330dcff-ecdd-478d-a4b9-d60238858f3c	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m49s		
nsxi-platform	data-minio-2	Bound	pvc-ee25f70a-888a-4217-ab38-04a09816a85b	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m48s		
nsxi-platform	data-minio-3	Bound	pvc-6a599d3e-bf88-4927-bb19-23f8b535c29d	128Gi	ReadWriteOnce	vsan-default-storage-policy	24m47s		
nsxi-platform	data-postgresql-ha-postgresql-0	Bound	pvc-32154c9e-7634-4e9f-95ff-6dfdb784bc35	20Gi	ReadWriteOnce	vsan-default-storage-policy	24m52s		
nsxi-platform	data-zookeeper-0	Bound	pvc-9de79ebc-b06b-4501-8b19-0c454be5f9e6	8Gi	ReadWriteOnce	vsan-default-storage-policy	24m50s		

6.2 NSX Plugin Registration failure

If the NAPP Deployment Plugin doesn't appear in the NSX UI (Under System -> NAPP Automation), this is probably caused by:

- Wrong NSX credentials
- Expired NSX credentials
- Wrong NSX IP/FQDN
- NSX Manager SSH access disabled
- NSX Manager root access disabled
- SSH traffic being dropped between the NAPP Automation Appliance and NSX Manager appliances

NAPP Automation Appliance logs are located here:

```
root@nappa [ /opt/napp ]# cat nsx-registration.log
register called
ssh: handshake failed: ssh: unable to authenticate, attempted methods
[none password], no supported methods remain
```

You can verify that the values entered during the OVA deployment step are correct, with these commands:

```
root@nappa [ /opt/napp ]# /opt/vmware/bin/ovfenv
[napp.enableFileIntegrity.NAPP_Automation]=False
[napp.enable_sshd.NAPP_Automation]=True
[napp.ntpserver.NAPP_Automation]=10.1.0.1
[napp.vami.hostname.NAPP_Automation]=nappa
[napp.varoot-password.NAPP_Automation]=VMware1!VMware1!
[network.DNS.NAPP_Automation]=10.1.0.1
[network.addrfamily.NAPP_Automation]=ipv4
[network.domain.NAPP_Automation]=corp.local
[network.gateway.NAPP_Automation]=10.1.0.1
[network.ip0.NAPP_Automation]=10.1.0.6
[network.netmode.NAPP_Automation]=static
[network.netprefix0.NAPP_Automation]=24
[network.searchpath.NAPP_Automation]=corp.local
[uiplugin.enable_reg.NAPP_Automation]=True
[uiplugin.nsxapi_pwd.NAPP_Automation]=VMware1!VMware1!
[uiplugin.nsxapi_uname.NAPP_Automation]=admin
[uiplugin.nsxmgr.NAPP_Automation]=10.1.0.5
[uiplugin.nsxroot_pwd.NAPP_Automation]=VMware1!VMware1!
```



```
[vm.vmname]=NAPP_Automation
root@nappa [ /opt/napp ]#
```

If needed, you can register the plugin manually with this command:

```
root@nappa [ /opt/napp ]# /opt/napp/napp-automation register --
napp_appliance_ip=$ipaddress --nsx_host=$nsxmgr --
nsx_root_pwd=$nsxroot --nsx_password=$nsxpwd --nsx_username=$nsxuname
```

If plugin has been registered successfully, you should see a new location entry in the NSX nginx proxy configuration file:

```
root@nappa [ /opt/napp ]# ssh root@10.1.0.5 "cat /etc/nginx/conf.d/ui-
service.conf"
root@10.1.0.5's password:
[omitted]

        location ^~ /policy-ui/napp-automation/ {
            proxy_pass https://10.1.0.6/;
        }

[omitted]
```

6.3 NSX Plugin Un-registration

If you need to unregister the NSX UI plugin for any reason, you can use the following command:

```
root@nappa [ /opt/napp ]# ./napp-automation unregister --help
Unregister the NAPP Automation Appliance as a UI Plugin on NSX
Manager. Root access is needed to run this command
```

Usage:

```
napp-automation unregister [flags]
```

Flags:

-h, --help	help for unregister
--nsx_host string	NSX IP Address
--nsx_password string	NSX API Password
--nsx_root_pwd string	NSX Root Password
--nsx_username string	NSX API Username

```
root@nappa [ /opt/napp ]#
```

```
root@nappa [ /opt/napp ]#
```

This will remove the location entry in the NSX nginx proxy configuration file. This command might fail for the exact same reason as the “register” one.



6.4 NAPP-Automation not accessible

If the NAPP Automation UI is not accessible (from NSX UI or directly to the appliance), check the following:

Communication on TCP/443 should be opened between NSX Manager appliances and the NAPP Automation appliance. You can check that this communication is allowed with this command:

```
root@nappa [ /opt/napp ]# ssh root@10.1.0.5 "curl -k https://10.1.0.6"
root@10.1.0.5's password:
% Total    % Received % Xferd  Average Speed   Time    Time     Time
Current                                  Dload  Upload  Total  Spent  Left
Speed
  0      0    0     0    0     0      0  --:--:-- --:--:-- --:--:--
:-- 0<!DOCTYPE html><html lang="en"><head>
  <meta charset="utf-8">
  <title>NAPP Deploy</title>
  <base href=".">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link rel="icon" type="image/x-icon" href="favicon.ico">
<link rel="stylesheet" href="styles.31d6cfe0d16ae931b73c.css"></head>
<body>
  <app-root></app-root>
<script src="runtime.1cdc763592f5baa484a8.js" defer></script><script
src="polyfills.79a2399ec53ad550f645.js" defer></script><script
src="main.263ddb88999b99185a55.js" defer></script>

100  540  100  540    0    0 10588    0 --:--:-- --:--:-- --:--:--
:-- 10588
root@nappa [ /opt/napp ]#
```

The NAPP Automation service must be active. You can check its status with this command:

```
root@nappa [ /opt/napp ]# systemctl status napp-automation
● napp-automation.service – NAPP Automation UI/API Service
   Loaded: loaded (/etc/systemd/system/napp-automation.service;
   enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-01-24 15:27:54 UTC; 17h ago
   Main PID: 952 (napp-automation)
     Tasks: 6 (limit: 4693)
    Memory: 760.5M
    CGroup: /system.slice/napp-automation.service
```



```

└─952 /opt/napp/napp-automation ui --nsx_host=10.1.0.5 --
nsx_username=admin --nsx_password=VMware1!VMware1!

Jan 24 17:16:31 nappa napp-automation[952]: /rest/version
Jan 25 08:36:12 nappa napp-automation[952]: /
Jan 25 08:36:12 nappa napp-automation[952]:
/styles.31d6cfe0d16ae931b73c.css
Jan 25 08:36:12 nappa napp-automation[952]:
/polyfills.79a2399ec53ad550f645.js
Jan 25 08:36:12 nappa napp-automation[952]:
/runtime.1cdc763592f5baa484a8.js
Jan 25 08:36:12 nappa napp-automation[952]:
/main.263ddb88999b99185a55.js
Jan 25 08:36:12 nappa napp-automation[952]: /dark-theme.css
Jan 25 08:36:12 nappa napp-automation[952]: /light-theme.css
Jan 25 08:36:12 nappa napp-automation[952]: /rest/version
Jan 25 09:08:06 nappa napp-automation[952]: /
root@nappa [ /opt/napp ]#

```

If the NAPP Automation UI is not accessible (from NSX UI or directly to the appliance), check the following:

```

root@nappa [ /opt/napp ]# journalctl -u napp-automation
-- Logs begin at Tue 2023-01-24 14:58:24 UTC, end at Wed 2023-01-25
09:11:20 UTC. --
Jan 24 15:03:59 nappa systemd[1]: Started NAPP Automation UI/API
Service.
Jan 24 15:03:59 nappa napp-automation[1820]: No config file found!
Jan 24 15:03:59 nappa napp-automation[1820]: NAPP Automation UI is
listening on all interfaces on port 443. Press any key to exit.
[omitted]

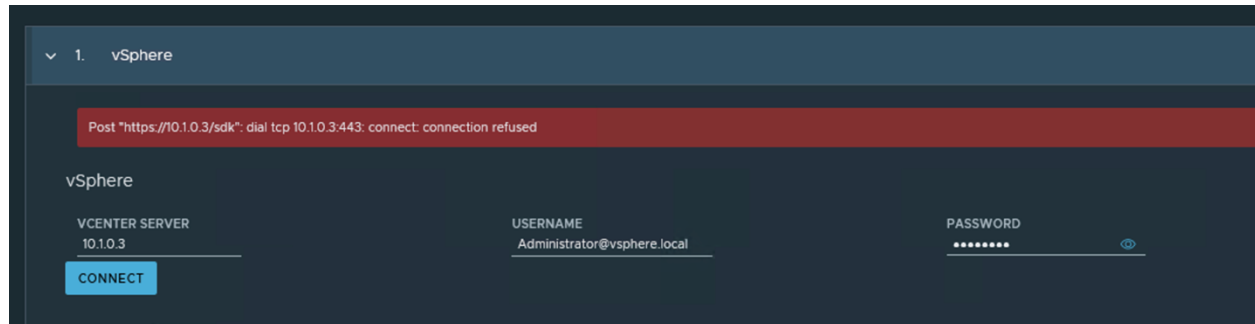
```

Note: you can add `-f` for a live journal



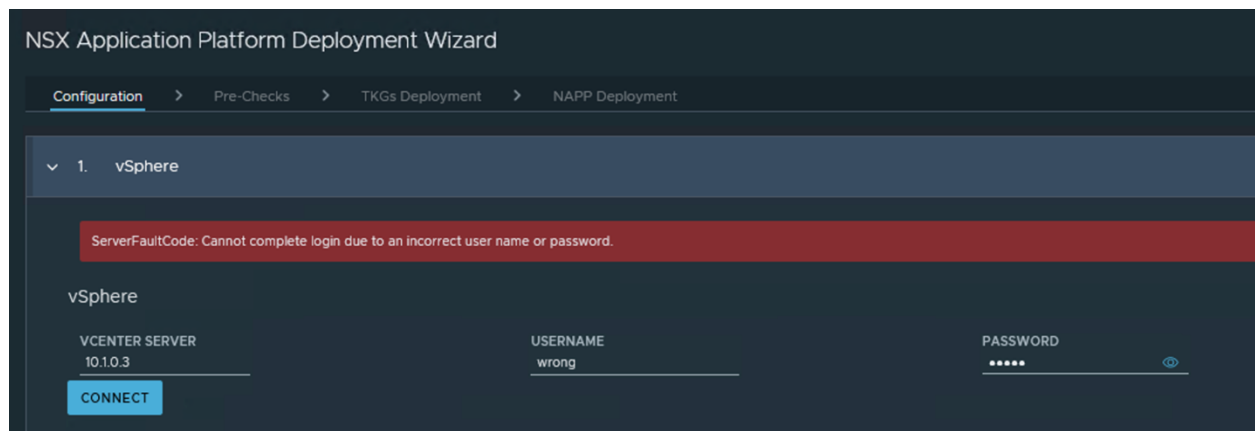
6.5 vCenter details are not listed

The NAPP Automation Appliance needs to communicate with the vCenter to automate a bunch of resources. If this flow is dropped, the UI will display an alert:



With the network/security team, make sure that the flow is allowed and re-connect.

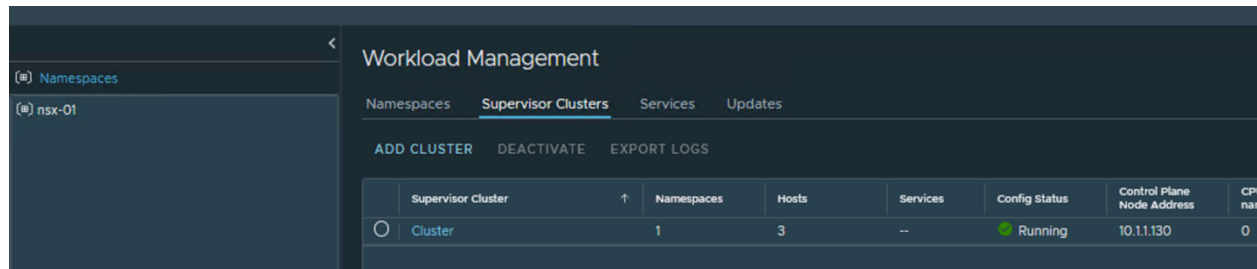
If vSphere credentials are wrong, the UI will also display an appropriate alert:



6.6 NAPP-Automation fails to log in TKGs Supervisor Cluster

At some point, the NAPP Automation Appliance needs to log on the Supervisor Cluster to deploy a Guest Cluster. If it fails, proceed to these following checks:

Make sure that the Supervisor Cluster is in “Running” state and note the “Control Plane Node Address” (This should be the 2nd address of the Service IP Range selected during the Wizard. i.e., If Service IP Range is 10.1.1.128/28, the Supervisor Cluster Control Plane Address should be 10.1.1.130)



Then, make sure that this IP is reachable on TCP/443 and TCP/6443 from the NAPP Automation Appliance:

```
root@nappa [ /opt/napp ]# nc -v 10.1.1.130 443
10.1.1.130 443 (https) open

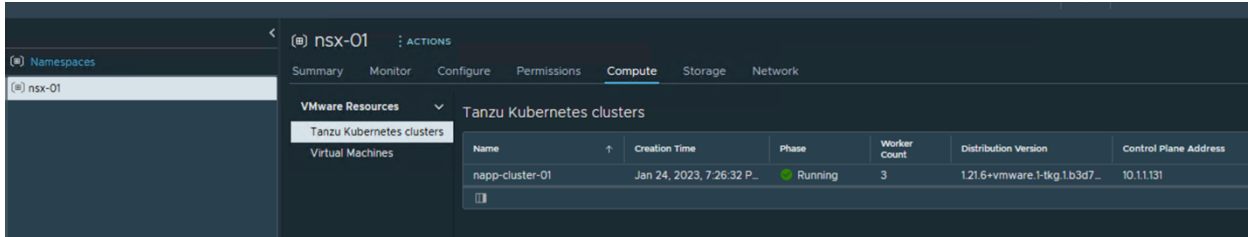
root@nappa [ /opt/napp ]# nc -v 10.1.1.130 6443
10.1.1.130 6443 (sun-sr-https) open
```

If traffic is denied, make appropriate actions to allow it and restart the deployment. The NAPP Automation will skip already deployed resources and will continue.

6.7 NAPP-Automation fails to log in TKGs Guest Cluster

At some point, the NAPP Automation Appliance needs to log on the Guest Cluster. If it fails, proceed to these following checks:

Make sure that the Guest Cluster is in “Running” state and note the “Control Plane Address” (This should be the 3rd address of the Service IP Range selected during the Wizard. i.e., If Service IP Range is 10.1.1.128/28, the Guest Cluster Control Plane Address should be 10.1.1.131)



Tanzu Kubernetes clusters						
Name	Creation Time	Phase	Worker Count	Distribution Version	Control Plane Address	
napp-cluster-01	Jan 24, 2023, 7:26:32 P...	Running	3	1.21.6+vmware.1-tkg.1.b3d7...	10.1.1.131	

Then, make sure that this IP is reachable on TCP/6443 from the NAPP Automation Appliance:

```
root@nappa [ /opt/napp ]# nc -v 10.1.1.131 6443
10.1.1.131 6443 (sun-sr-https) open
```

If traffic is denied, make appropriate actions to allow it and restart the deployment. The NAPP Automation will skip already deployed resources and will start over at failed step

6.8 Generated kubeconfig file is invalid

At some point, the NAPP Automation Appliance generates a kubeconfig file with a long-life authentication token.

Generated file is located here:

```
root@nappa [ /opt/napp ]# cat napp-deploy-k.yml
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data:
LS0tLS1CRUdJTiBDRVJUSUZJQ0FURS0tLS0tCk1JSUM2akNDQWRLZ0F3SUJBZ0lCQURBTK
Jna3Foa2lH0XcwQkFRc0ZBREFTVJNd0VRWURWUVFERXdwcmRXSmwKY201bGRHVnpNQjRY
RFRJek1ERXl0REU1TWpFMU9Wb1hEVE16TURFeU1URTVMNa1kxT1Zvd0ZURVRNQkVHQTFVRQ
pBeE1LYTNWVpYSnVaWFJsY3pDQ0FTSXdEUVlKS29aSWh2Y05BUUVCQlFBRGdnRVBBERND
QVFvQ2dnRUJBTkc4CjJyeU14azI1L1YvdU5Y0GVyYndhakZpMU5iNXhQZWw1YVJDeU90L0
dxcEFrWUtPeU50V2xYMGdDS2VmaWozcU8KUGt5YkFQcWxwMXQ3dEk0TGE2ajYvRXBENXVF
bEFDm1ZwaVJJR0Rya2xIOEhFODdyM2FmZ2o1VjRVTHhLVnbnZQpRWkJOVEQ3UklJcG9xMj
JnNngwR212NGhjN1pHNLpraXUySTFmazVmYWVZekFUDUx0WTM2aFAxd1A5ZkZzVGhMCndV
QjNpUFJFc1R0VlB1bW9YWUpGTHRNVVo4VTNnUUFNRUVjOHd4TEJWZGI0UUNvUGM1OE10Qj
FpdFhJMWFAVfQKZ0d5bkhnSDFuQ3B4THlnN1pLQ0tLOVpsUkozWVRsMk5KM2RjbXdhNkLE
ZEllaEoveDgyMllodDBhWUJkZ1IrSAp0VnkvVlMzNVVBVlJiVGo0MDdjQ0F3RUFBYU5GTU
VNd0RnWURWUjBQOVFIL0JBUURBZ0trTUJJR0ExVWRFd0VCCi93UUlNQVlCQWY4Q0FRQXdI
UVlEVlIiwT0JCWUUVGS21XYzQ5b1phc05TZlZPVjhTYUxKdEpheFcwTUEwR0NTcUcKU0liM0
RRRUJDD1VBQTRJQkFRQzd0NWxRQmwzMldPckNaeUVHU0FzM3o1R1RMRmZtNy9JWDk0a2wv
S1dtUWU2ZQoyQXpieWhFd0JKTUFMeTlIUktPNkJobWNUmtSN0VyU3d0OVJ0MGxCe1R3U3
R2QKNDL1VyTWZXAaGRaZXJqUndaClQvcjdnUHVhcnBoaHRBQ0dITktDNWpMcERCVRsazZE
TkkzeDhoYTF4TWlMZEtNeUZTbUVUeUd4ZXcwSFppVWEKV1F5QS85NGgyS1hUekVZe1zn2
lydFVuSEJvT2kyMjFQcDVRcE1IS09zcnhBSGpFWngyS2pLdE1kY1drMWlRVgpDOFI4b1RQ
aVM2NFdSMXFUR0hJMnJTUW9tcGxMdVh2SDJra3RpeHlIYUllNGVnS0MyQlNnVzBlTHNuS2
9qTTJkClVXRFFLNW4xdENWU1JKVEJlUjUxVG9vR3pqSnBxMDVWTEFxcWfucHQKLS0tLS1F
TkQgQ0VSVElGSUNBVEUtLS0tLQo=
    server: https://10.1.1.131:6443
    name: 10.1.1.131
contexts:
- context:
    cluster: 10.1.1.131
    user: napp-admin
    name: napp-cluster-01
current-context: napp-cluster-01
kind: Config
preferences: {}
users:
- name: napp-admin
```

```

user:
token:
eyJhbGciOiJSUzI1NiIsImtpZCI6ImlpIVVJTUjdUcy15NERPRGFxYTlRYmRpVGZVSmIxdFV1V3FFdUd0S1lyWHcifQ.eyJpc3MiOiJrdWJlcm5ldGVzL3NlcnZpY2VhY2NvdW50Iiwia3ViZXJuZXRlcy5pby9zZXJ2aWNLYWJjb3VudC9uYW1lc3BhY2UiOiJrdWJlLXN5c3RlbSI0sImt1YmVybmV0ZXMuaW8vc2VydmljZWJfY291bnQvc2VjcmV0Lm5hbWUia0IuYXhwLWFKbWluLXRva2VuLTZraGJrIiwia3ViZXJuZXRlcy5pby9zZXJ2aWNLYWJjb3VudC9zZXJ2aWNLWFJfY291bnQubmFtZSI6Im5hcHAtYWRTaW4iLCJrdWJlcm5ldGVzLm1vL3NlcnZpY2VhY2NvdW50L3NlcnZpY2UyYWNjb3VudC51aWQia0IjZmYzMDFhMy1lNGE2LTQwMGU0OWM3NS03NGFkN2QzMUM5MjEiLCJzdWIiOiJzeXN0ZW06c2VydmljZWJfY291bnQ6a3ViZS1zeXN0ZW06bmFwcC1hZG1pbiJ9.fvnicsSZipP-rrN0IB-1y9ciVYDe2ZfJKAfdkizgFUznc3JFPpaWkmHiUYXhVDFfjaCpirPwsnX2bbwxvhAHJwMmp0bd4nsuQXfUkHVg8aoGBqLEL2zkSoQzRrkqtY6xhvBFfX00q66d-d2T1ok0-cvA9os5dQs5R6-4_E08Cu-dompGfF53kXoTC5mQU5y7NGuow8-lP5T40vjQ_PUY4eu9E0Yv1tRoFGNmeS6BM8cpJXQJpJngNAJwM1j_ZdfUdmT9Jc6Yv6Y8Gfj8Gslq1Hy3B_1KlkD0kzsMu_W8sQ-zaHIe0fiJFWzULLiQeCMr9ActTSCd56Pi0-mBHZ5qG7A
root@nappa [ /opt/napp ]#

```

Make sure that this file is valid. An easy way to do so is to try to connect to the Guest Cluster with this kubeconfig file:

```
root@nappa [ /opt/napp ]# kubectl --kubeconfig=napp-deploy-k.yml get
nodes
NAME                                     STATUS    ROLES
AGE      VERSION
napp-cluster-01-control-plane-d4mvd    Ready    control-
plane,master    14h    v1.21.6+vmware.1
napp-cluster-01-workers-fbwx6-666455d688-bw69f    Ready    <none>
14h    v1.21.6+vmware.1
napp-cluster-01-workers-fbwx6-666455d688-jn5zc    Ready    <none>
14h    v1.21.6+vmware.1
napp-cluster-01-workers-fbwx6-666455d688-wt6vr    Ready    <none>
14h    v1.21.6+vmware.1
root@nappa [ /opt/napp ]#
```

If you can't login the Guest Cluster with this kubeconfig file, you can try using this command:

```
root@nappa [ /opt/napp ]# KUBECTL_VSPHERE_PASSWORD=VMware1\! kubectl
vsphere login --server=10.1.1.130 --insecure-skip-tls-verify --
vsphere-username=administrator@vsphere.local --tanzu-kubernetes-
cluster-name napp-cluster-01 --tanzu-kubernetes-cluster-namespace nsx-
01
Welcome to Photon 3.0 (\m) - Kernel \r (\l)

Logged in successfully.
```

You have access to the following contexts:

```
10.1.1.130
napp-cluster-01
nsx-01
```

If the context you wish to use is not in this list, you may need to try logging in again later, or contact your cluster administrator.

To change context, use ``kubectl config use-context <workload name>``
root@nappa [/opt/napp]# `kubectl config use-context napp-cluster-01`
Switched to context "napp-cluster-01".
root@nappa [/opt/napp]# `kubectl get nodes`

NAME	STATUS	ROLES
AGE VERSION		
napp-cluster-01-control-plane-d4mvd	Ready	control-
plane, master 14h v1.21.6+vmware.1		
napp-cluster-01-workers-fbwx6-666455d688-bw69f	Ready	<none>
14h v1.21.6+vmware.1		
napp-cluster-01-workers-fbwx6-666455d688-jn5zc	Ready	<none>
14h v1.21.6+vmware.1		
napp-cluster-01-workers-fbwx6-666455d688-wt6vr	Ready	<none>
14h v1.21.6+vmware.1		

root@nappa [/opt/napp]#

Once logged in the napp-cluster-01 Guest Cluster, you can regenerate the long-life kubeconfig file with this command:

```
root@nappa [ /opt/napp ]# bash .create_yaml.sh
error: failed to create serviceaccount: serviceaccounts "napp-admin"
already exists
error: failed to create clusterrolebinding:
clusterrolebindings.rbac.authorization.k8s.io "napp-admin" already
exists
Cluster "10.1.1.131" set.
User "napp-admin" set.
Context "napp-cluster-01" modified.
Switched to context "napp-cluster-01".
root@nappa [ /opt/napp ]#
```



6.9 Unable to start NAPP deployment

To be able to automate the NAPP deployment on NSX, the NAPP Automation Appliance needs to communicate with the NSX Manager API.

Make sure that NSX is reachable on TCP/443 from the NAPP Automation Appliance:

```
root@nappa [ /opt/napp ]# nc -v 10.1.0.5 443
nsx.lab2.local [10.1.0.5] 443 (https) open
```

```
^CExiting.
```

```
root@nappa [ /opt/napp ]#
```

If traffic is denied, make appropriate actions to allow it and restart the deployment. The NAPP Automation will skip already deployed resources and will start over at failed step.

Also, make sure that the NAPP Automation service has correct information coming from the OVF properties.

```
root@nappa [ /opt/napp ]# cat /etc/systemd/system/napp-
automation.service
[Unit]
Description=NAPP Automation UI/API Service
After=network.target
StartLimitIntervalSec=0

[Service]
Type=simple
Restart=always
RestartSec=5
User=root
ExecStart=/opt/napp/napp-automation ui --nsx_host=10.1.0.5 --
nsx_username=admin --nsx_password=VMware1!VMware1!
WorkingDirectory=/opt/napp

[Install]
WantedBy=multi-user.target
root@nappa [ /opt/napp ]#
```

If needed, correct this file with correct values and restart the napp-automation service:

```
root@nappa [ /opt/napp ]# systemctl restart napp-automation
root@nappa [ /opt/napp ]#
```



7 Appendixes

7.1 Default values

As an effort to simplify the NAPP Automation Wizard UI, some values have been hard-coded. Here are the details of these values:

```

ha_proxy:
  ovf_file: haproxy-v0.2.0.ova
  hostname: haproxy
  permit_root_login: true
  root_pwd: (root_pwd and haproxy_pwd set to the same value from UI)
  service_ip_range: ( /28 range length selected from the UI)
  dataplane_port: 5556
  haproxy_user: admin

wcp:
  content_library_name: NSX Content Library
  load_balancer_config_spec:
    address_ranges:
      - address: (set to service_ip_range second IP)
        count: 14
  size: SMALL
  service_cidr:
    address: 10.96.0.0
    prefix: 23
  master_management_network:
    address_range:
      address_count: 5
    mode: STATIC
  workload_networks_spec:
    supervisor_primary_workload_network:
      network: primary-workload
      networkprovider: VSPHERE_NETWORK
      vsphere_network:
        address_ranges:
          - count: 16
  namespace:
    name: nsx-01
    subject: (set to the vCenter username, before @)
    domain: (set to the vCenter username, after @)
  nappcluster:

```



```
name: napp-cluster-01
controlplane_vm_class: guaranteed-medium
workers_vm_class: nappclass
pods_cidr: 192.168.0.0/16 (is dynamically changed in case of
overlap)
services_cidr: 10.96.0.0/12 (is dynamically changed in case of
overlap)
global:
  log_level: debug
  log_destination: file
  log_file: napp-deploy.log
  log_format: json
  log_syslog: false
```



7.2 List of deployed resources

Once the NAPP Automation appliance has been used to deploy TKGs and NAPP, the following resources has been set or deployed by the tool:

Stage 0: (optional, only if registered as a NSX UI plugin)

- Location entry in NSX nginx config file “/etc/nginx/conf.d/ui-service.conf”

Stage 1:

- HA enabled on the selected Cluster
- DRS enabled on the selected Cluster
- HA Proxy VM deployed (3-legs mode by default)
- Subscribed Content Library “NSX Content Library”
- SMALL Supervisor Cluster
- VM Class “nappclass” (4 vCPU/16 GB RAM or 16vCPU/64GB RAM)
- Namespace “nsx-01”
- Guest Cluster “napp-cluster-01” (1 control plane node and 1 or 3 worker nodes)
- Service Account “napp-admin” in the Guest Cluster
- Cluster Role Binding “napp-admin” in the Guest Cluster

Stage 2:

- NAPP instance

