NSX-T Upgrade Guide

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VMware NSX-T 2.2

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Upgrading NSX-T

The *NSX-T Upgrade Guide* provides step-by-step information about upgrading the NSX-T components, which include the data plane, control plane, and management plane with minimum system downtime.

Intended Audience

This information is intended for anyone who wants to upgrade NSX-T 2.1. to NSX-T 2.2. The information is written for experienced system administrators who are familiar with virtual machine technology, virtual networking, and security concepts and operations.

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to http://www.vmware.com/support/pubs.

NSX-T Upgrade Checklist

1

Use the checklist to track your work on the upgrade process.

You must follow the prescribed order and upgrade the hosts, NSX Edge cluster, NSX Controller cluster, and Management plane.

Table 1-1. Upgrade NSX-T

Task	Instructions
❑ Review the known upgrade problems and workaround documented in the NSX-T release notes.	See the *NSX-T Release Notes*.
❑ Prepare and update your infrastructure to meet the system configuration requirements.	See the system requirements section of the *NSX-T Installation Guide*.
❑ Evaluate the operational impact of the upgrade.	See Operational Impact of the NSX-T Upgrade.
❑ Upgrade your supported hypervisor.	See Upgrade to Red Hat 7.4 Host.
❑ Verify that the NSX-T environment is in a healthy state.	See Verify the Current State of NSX-T.
❑ Download the latest NSX-T upgrade bundle.	See Download the NSX-T Upgrade Bundle.
❑ If using NSX Cloud for your public cloud workload VMs, upgrade NSX Cloud components.	See Chapter 3 Upgrading NSX Cloud Components: NSX Agents, PCG, and CSM
❑ Verify that the upgrade coordinator is free of errors.	See Prepare the Upgrade Coordinator .
❑ Upgrade your upgrade coordinator.	See Upgrade the Upgrade Coordinator.
❑ Upgrade the hosts.	See Configure and Upgrade Hosts .
❑ Upgrade the NSX Edge cluster.	See Upgrade NSX Edge Cluster.
❑ Upgrade the NSX Controller cluster.	See Upgrade NSX Controller Cluster.
❑ Upgrade the Management plane.	See Upgrade Management Plane.

Table 1-1. Upgrade NSX-T (Continued)

Task	Instructions
❑ Post-upgrade tasks.	See Verify the Upgrade.
❑ Troubleshoot upgrade errors.	See Troubleshoot a Failed Upgrade.

Preparing to Upgrade NSX-T 2

You must prepare your infrastructure and follow the task sequence provided in the checklist for the upgrade process to be successful.

You can perform the upgrade process in a maintenance time frame defined by your company. You can chose to for example, upgrade only the host and upgrade the other NSX-T components later.

This chapter includes the following topics:

Operational Impact of the NSX-T Upgrade

The duration for the NSX-T upgrade process depends on the number of components you have to upgrade in your infrastructure. It is important to understand the operational state of NSX-T components during an upgrade, such as when some hosts have been upgraded, or when NSX Edge nodes have not been upgraded.

The upgrade process is as follows:

Hosts > NSX Edge cluster > NSX Controller cluster > Management plane.

Hosts Upgrade

During Upgrade	After Upgrade
■ For standalone vSphere ESXi hosts not managed by vCenter Server, power off tenant VMs running on the vSphere ESXi hosts and put these hosts in maintenance mode. ■ For vSphere ESXi hosts that are part of a DRS enabled cluster, do not power off tenant VMs running on the vSphere ESXi hosts. Do not put the vSphere ESXi hosts in maintenance mode. NSX-T migrates the VMs running on the host to another host in the same cluster during the upgrade. ■ For vSphere ESXi hosts that are part of a DRS disabled cluster, power off the tenant VMs running on the vSphere ESXi hosts. Put the vSphere ESXi hosts in maintenance mode. ■ For KVM hosts, you do not have to power off the VMs running on the KVM hosts before upgrading them. ■ Configuration changes are allowed on NSX Manager.	■ Power on the tenant VMs of vSphere ESXi hosts not managed by vCenter Server that were powered off before the upgrade. ■ Migrate the tenant VMs on hosts managed by vCenter Server that are part of the DRS enabled cluster to the upgraded host. ■ Power on the tenant VMs of vSphere ESXi hosts that are part of a DRS disabled cluster that were powered off before the upgrade. ■ Upgraded hosts are compatible with non-upgraded hosts, NSX Edge cluster, NSX Controller cluster, and Management plane. ■ New features introduced in the upgrade are not configurable until the NSX Edge cluster, NSX Controller cluster, and Management plane are upgraded.

NSX Edge Cluster Upgrade

During Upgrade	After Upgrade

■ During the NSX Edge upgrade, you might experience the following traffic interruption:
  ■ North-south datapath is affected if the NSX Edge is part of the datapath.
  ■ East-west traffic between tier-1 routers using NSX Edge firewall, NAT, or load balancing.
  ■ Temporary Layer 2 and Layer 3 interruption.
■ Configuration changes are not blocked on NSX Manager but might be delayed.
	■ Configuration changes are allowed.
	■ Upgraded NSX Edge cluster is compatible with the upgraded hosts and older versions of the NSX Controller cluster and Management plane.
	■ New features introduced in the upgrade are not configurable until the NSX Controller cluster and Management plane are upgraded.

NSX Controller Cluster Upgrade

During Upgrade	After Upgrade
■ Configuration changes are not blocked on NSX Manager but might be delayed.	■ Configuration changes are allowed. ■ Upgraded NSX Controller cluster is compatible with only the upgraded NSX Edge cluster and older version of Management plane. ■ New features introduced in the upgrade are not configurable until the Management plane is upgraded.

Management Plane Upgrade

During Upgrade	After Upgrade
■ Configuration changes are not blocked on the Management plane. It is recommended not to make any changes during the Management plane upgrade. ■ API service is available. ■ User interface is unavailable for a short period.	■ Configuration changes are allowed. ■ New features introduced in the upgrade are configurable.

Supported Hypervisor Upgrade Path

The supported hypervisor upgrade paths for the NSX-T product versions.

NSX-T 1.1	NSX-T 2.0	NSX-T 2.1	NSX-T 2.2
Supported vSphere Hypervisor (ESXi)	Supported vSphere Hypervisor (ESXi)	Supported vSphere Hypervisor (ESXi)	Supported vSphere Hypervisor (ESXi)
Ubuntu 14.04	Ubuntu 16.04.2 LTS with KVM 4.4.0.x	Ubuntu 16.04.2 LTS with KVM 4.4.0.x	Ubuntu 16.04.2 LTS with KVM 4.4.0.x
		Red Hat 7.4 and Red Hat 7.3	Red Hat 7.4

You must upgrade NSX-T in an incremental order. You cannot skip a release and upgrade to the latest version. For example, you must upgrade from NSX-T 1.1 > NSX-T 2.0 > NSX-T 2.1 > NSX-T 2.2.

Upgrade the ESXi Host

To avoid problems during the host upgrade, your ESXi host must be supported in NSX-T.

If your ESXi host is unsupported, you can manually upgrade your ESXi host to the supported version.

Procedure

1 Upgrade the ESXi host.

- Upgrade ESXi 6.5 U1 to ESXi 6.7.

```
esxcli software profile update --depot <build_path> --profile ESXi-6.7.0-7981081-standard --
allow-downgrades
 --no-sig-check
```

- Upgrade ESXi 6.5 U1 to ESXi 6.5 U2.

```
esxcli software profile update --depot <build_path> --profile ESXi-6.5.0-7942877-standard --
allow-downgrades
 --no-sig-check
```

2 Reboot the ESXi host.

```
reboot
```

Upgrade Ubuntu 14.04 KVM Host to Ubuntu 16.04 KVM Host

Depending on your environment needs, you can manually upgrade the Ubuntu 14.04 to 16.04 version.

Procedure

1. (Optional) Show all Linux Standard Base and distribution-specific information.

   ```
   lsb_release –a
   ```

2. Install packages using the apt tool.

   ```
   sudo apt update
   ```

3. Fetch the latest packages.

   ```
   sudo apt-get upgrade
   ```

4. Handle dependencies such as substituting obsolete packages with new packages.

   ```
   sudo apt dist-upgrade
   ```

5. Upgrade to the Ubuntu 16.04 version.

   ```
   do-release-upgrade
   ```

6. If you have an existing Ubuntu KVM host as a transport node, backup the `/etc/network/interfaces` file.

Upgrade to Red Hat 7.4 Host

Depending on your environment needs, you must manually upgrade to the Red Hat 7.4 version.

Procedure

1. Navigate to the `/etc/yum.conf` file.
2. Comment out the following lines.

   ```
   exclude=[existing list] kernel* redhat-release*
   ```

3. Configure the Grub2 file.

   ```
   awk –F\' '$1=="menuentry " {print $2}' /etc/grub2.cfg
   ```

4. Clear the Yum cache.

   ```
   yum clean all
   ```

5. Update the Yum packages.

   ```
   yum ––releasever=7.4 update
   ```

6 Verify the Grub2 configuration file.

```
awk –F\' '$1=="menuentry " {print $2}' /etc/grub2.cfg
```

RHEL 7.4 appears in the grub2.cfg file.

7 Download the Red Hat 7.4 Link Control Protocol (LCP) bundle.

```
wget <RHEL_7.4_NSXT_21_LCP_URL>
```

8 Unzip the downloaded tar LCP bundle.

```
tar zxvf nsx-lcp-*rhel74_x86_64.tar.gz
```

9 Install the LCP bundle.

```
cd nsx-lcp-rhel74_x86_64
rpm –Uvh ––force *.rpm
```

10 Remove the comments from the `/etc/yum.conf` file to revert to the original state.

```
exclude=[existing list] kernel* redhat-release*
```

Verify the Current State of NSX-T

Before you begin the upgrade process, it is important to test the NSX-T working state. Otherwise, you cannot determine if the upgrade caused post-upgrade problems or if the problem existed before the upgrade.

Note Do not assume that everything is working before you start to upgrade the NSX-T infrastructure.

Procedure

1 Identify administrative user IDs and passwords.

2 Verify that you can log in to the NSX Manager Web user interface.

3 Check the Dashboard, system overview, fabric hosts, NSX Edge cluster, transport nodes, and all logical entities to make sure that all the status indicators are green, normal, deployed, and do not show any warnings.

4 Validate North-South connectivity by pinging out from a VM.

5 Validate that there is East-West connectivity between any two VMs in your environment.

6 Record BGP states on the NSX Edge devices.

- `get logical-routers`
- `vrf`
- `get bgp`
- `get bgp neighbor`

7 (Optional) If you have a test environment, check the upgrade functionality before upgrading your production environment.

Download the NSX-T Upgrade Bundle

The upgrade bundle contains all the files to upgrade the NSX-T infrastructure. Before you begin the upgrade process, you must download the correct upgrade bundle version.

Procedure

1 Locate the NSX-T build on the VMware download portal.

2 Navigate to the master upgrade bundle file and click **Read More**.

3 Verify that the master upgrade bundle filename extension ends with `.mub`.

The upgrade bundle filename has a format similar to `VMware-NSX-upgrade-bundle-`*`ReleaseNumberNSXBuildNumber`*`.mub`.

4 Download the NSX-T upgrade bundle to the same system you are using to access the NSX Manager user interface.

Upgrading NSX Cloud Components: NSX Agents, PCG , and CSM

3

NSX Cloud components are upgraded using the NSX-T upgrade coordinator.

Similar to the upgrade of NSX-T, NSX Cloud components are upgraded using the Upgrade Coordinator. See Chapter 2 Preparing to Upgrade NSX-T.

The NSX Cloud Upgrade Workflow

First upgrade NSX Cloud components as follows. After that, upgrade NSX-T following the detailed steps here: Chapter 4 Upgrading NSX-T.

1 Upgrade the Upgrade Coordinator

Begin the upgrade process by upgrading the Upgrade Coordinator.

2 Use the Upgrade Coordinator to Upgrade NSX Agent and PCG

Upload the upgrade bundle to proceed with upgrading NSX agent and PCG.

3 Upgrade CSM

In the current release, CSM can only be upgraded using NSX CLI.

Upgrade the Upgrade Coordinator

Begin the upgrade process by upgrading the Upgrade Coordinator.

The Cross-Cloud upgrade bundle contains all the files to upgrade the NSX Cloud infrastructure. Before you begin the upgrade process, you must download the correct upgrade bundle version.

Procedure

1 Locate the NSX-T build available to upgrade on the VMware download portal.

2 Navigate to the `upgrade_public_cloud` folder and expand that folder.

3 Verify that the master upgrade bundle filename has a format similar to `VMware-CC-upgrade-bundle-`*`ReleaseNumberNSXBuildNumber`*`.mub`.

Note: This is a separate file and must be downloaded in addition to the NSX-T upgrade bundle.

4 Download the NSX Cloud upgrade bundle.

Note: The upgrade bundle is uploaded into the Upgrade Coordinator from CSM. Download it either on the same system from where you access the CSM UI, or note the location of the system where you download it, to provide a remote URL of this system into the Upgrade Coordinator for uploading.

Use the Upgrade Coordinator to Upgrade NSX Agent and PCG

Upload the upgrade bundle to proceed with upgrading NSX agent and PCG.

Prerequisites

Outbound port 8080 must be open on workload VMs that need to be upgraded.

Procedure

1 Log in to CSM with the Enterprise Administrator role.

2 Click **Utilities > Upgrade**

3 Click **Upload Upgrade Bundle**. Pick a location for the upgrade bundle. You can provide a remote location using a URL.

4 After the upgrade bundle finishes uploading in CSM, click **Prepare for Upgrade** to start the process of upgrading the Upgrade Coordinator.

Note: The upgrade bundle must be a valid file in the `.mub` format. Do not use `.nub` or other files. See Upgrade the Upgrade Coordinator for details.

When the Upgrade Coordinator upgrade process finishes, the **Begin Upgrade** button becomes active.

5 Click **Begin Upgrade**. The **Upgrade CSM** wizard starts.

Note: Although the name of the wizard is **Upgrade CSM**, you can only upgrade NSX Agents and PCG from this wizard.

6 In the **Upgrade CSM > Overview** screen, you can see an overview of the default upgrade plan. Based on the upgrade bundle you have uploaded, you can see which versions of NSX agent and PCG are compatible for an upgrade via the upgrade bundle uploaded.

7 Click **Next**. The **CSM > Select NSX Agents** screen appears. A list of all compatible NSX agents that can be upgraded to the target version in all your VNets, are displayed. You can filter the agents based on which private cloud network they are in or which OS they are deployed on.

8 Select the NSX Agents you want to upgrade and move them to the **Selected** window. Click **Next**. CSM downloads the upgrade bits to the PCG on which the NSX agents reside. If you have an HA pair of PCG, CSM downloads the upgrade bits to each PCG and starts upgrading the selected NSX agents.

   Note: 10 agents are upgraded simultaneously. If you have more than 10 agents, they are queued for upgrading. PCG maintains a flag on VMs that are unreachable and attempts to upgrade them when they can be reached. For example, a powered off VM is upgraded when powered on again and able to communicate with PCG. Similarly for a VM on which port 8080 is blocked at first but when port 8080 is opened and PCG can access it, the upgrade for that VM proceeds.

   Until all the agents are upgraded, you cannot upgrade PCG. If some agents are not able to be upgraded, you can skip upgrading them in order to proceed with upgrading PCG. See (Not recommended) Skip Upgrading NSX Agent(s) for details on this option.

9 Click **Next** to proceed with upgrading the PCG. With an HA pair of PCGs, there are two failovers during the upgrade process and when the upgrade finishes, the preferred PCG is reinstated as the active gateway.

10 Click **Finish**.

Example: How long does the upgrade process take?

Note CSM and NSX-T components are upgraded separately and that time is not included here. These are approximate times.

- **NSX Agents**: It takes from 3 to 5 minutes for 1 NSX agent to upgrade, not accounting for the time it takes to upload the upgrade bundle from CSM to the public cloud. 10 agents are upgraded simultaneously. The time to upgrade agents also varies for different operating systems and the VM size.
- **PCGs**: PCGs in different private networks are upgraded in parallel, but PCGs in HA pair upgrade serially. It takes about 20 minutes for one PCG to upgrade.
- **Private Cloud**: For a private cloud network with upto 10 VMs and an HA pair of PCGs, it can take upto 45 minutes to upgrade. This time may vary depending on the OS on the VMs and their size.

(Not recommended) Skip Upgrading NSX Agent(s)

You have the option to skip upgrading NSX agents, but this is not recommended.

You must upgrade NSX agents before upgrading PCG, but you have the option to skip upgrading NSX agents as a feature to continue with the workflow under certain conditions. We do not recommend skipping the upgrade of NSX agents because VMs with NSX agents in a different version compared to PCG will lose connectivity with the PCG.

Why you may consider skipping agent upgrade:

- You want to upgrade only selected private clouds within your public cloud.

- You do not want any downtime on certain critical managed workload VMs.
- You do not want powered off VMs to block the upgrade process.
- You may want to apply a bug-fix patch only to the PCG without affecting the agents.

If you do skip upgrading NSX agents, you cannot upgrade them later using the UI or APIs. This can potentially break connectivity between such NSX agents and the upgraded PCG. The only workaround for restoring connectivity in that case is to uninstall the old NSX agents and reinstall the latest NSX agents on those VMs.

Note If there are any quarantined VMs, they are not included in the upgrade plan and you cannot upgrade them. Quarantined VMs do not have any connectivity with PCG and therefore not upgrading them does not affect the upgrade process.

Upgrade CSM

In the current release, CSM can only be upgraded using NSX CLI.

Copy the Unified Appliance Upgrade Bundle into CSM

You need the file `VMware-NSX-unified-appliance-<version>.nub` in the location `/var/vmware/nsx/file-store/` on the CSM appliance to upgrade CSM.

You can get the file in this location in either of the following ways, depending on your privileges:

- Without `root` privileges for the CSM appliance:
  - Download the file `VMware-NSX-unified-appliance-<version>.nub` from the VMware download portal. This file is typically located under `nsx-unified-appliance` **>** `upgrade`.
  - Use the following NSX CLI commands to copy this file:

    ```
    Autoimport-nsx-cloud-service-manager-thin> copy url
    scp://<username>@<host_where_the_.nub_file_is_downloaded>/<path_to_file>/VMware-NSX-unified-
    appliance-<version>.nub
    ```

- Alternatively, with `root` privileges, you can copy this file from CSM as follows:

  ```
  root@Autoimport-nsx-cloud-service-manager-thin:~#
  cp /repository/<version>/CloudServiceManager/nub/VMware-NSX-unified-appliance-
  <version>.nub /var/vmware/nsx/file-store/
  ```

Follow this procedure to upgrade CSM

1 Extract and verify the `.nub` file:

```
Autoimport-nsx-cloud-service-manager-thin> verify upgrade-bundle VMware-NSX-unified-appliance-
<version>
Checking upgrade bundle /var/vmware/nsx/file-store/VMware-NSX-unified-appliance-<version>.nub
contents
Verifying bundle VMware-NSX-unified-appliance-<version>.bundle with signature VMware-NSX-unified-
appliance-<version>.bundle.sig
Moving bundle to /image/VMware-NSX-unified-appliance-<version>.bundle
Extracting bundle payload
Successfully verified upgrade bundle
Bundle manifest:
    appliance_type: 'nsx-unified-appliance'
    version: '<upgrade version>'
    os_image_path: 'files/nsx-root.fsa'
    os_image_md5_path: 'files/nsx-root.fsa.md5'
Current upgrade info:
{
  "info": "",
  "body": {
    "meta": {
      "from_version": "<current version>",
      "old_config_dev": "/dev/mapper/nsx-config",
      "to_version": "<post-upgrade version>",
      "new_config_dev": "/dev/mapper/nsx-config__bak",
      "old_os_dev": "/dev/xvda2",
      "bundle_path": "/image/VMware-NSX-unified-appliance-<version>",
      "new_os_dev": "/dev/xvda3"
    },
    "history": []
  },
  "state": 1,
  "state_text": "CMD_SUCCESS"
}
Autoimport-nsx-cloud-service-manager-thin>
```

2 Start the upgrade:

```
Autoimport-nsx-cloud-service-manager-thin> start upgrade-bundle VMware-NSX-unified-appliance-
<version> playbook VMware-NSX-cloud-service-manager-<version>-playbook
Validating playbook /var/vmware/nsx/file-store/VMware-NSX-cloud-service-manager-<version>-
playbook.yml
Running "shutdown_csm_svc" (step 1 of 6)
Running "install_os" (step 2 of 6)
Running "migrate_csm_config" (step 3 of 6)

System will now reboot (step 4 of 6)
After the system reboots, use "resume" to start the next step, "start_csm_svc".
{
  "info": "",
  "body": null,
```

```
  "state": 1,
  "state_text": "CMD_SUCCESS"
}
Autoimport-nsx-cloud-service-manager-thin>
Broadcast message from root@Autoimport-nsx-cloud-service-manager-thin (Fri 2017-08-25 21:11:36
UTC):

The system is going down for reboot at Fri 2017-08-25 21:12:36 UTC!
```

3 Wait for the upgrade to complete. CSM reboots during upgrade, and the upgrade is finalized when the CSM UI restarts after rebooting.

4 Verify the version of CSM to confirm that it has upgraded:

```
Autoimport-nsx-cloud-service-manager-thin> get version
VMware NSX Software, Version <upgraded version>
```

What to do next

Follow the steps here for Chapter 4 Upgrading NSX-T.

Upgrading NSX-T

4

After you finish the prerequisites for upgrading, your next step is to prepare the upgrade coordinator for upgrade and update the upgrade coordinator to initiate the upgrade process.

After the upgrade, based on your input, the upgrade coordinator updates the hosts, NSX Edge cluster, NSX Controller cluster, and Management plane.

1 Prepare the Upgrade Coordinator

   The upgrade coordinator runs in the NSX Manager. It is a self-contained Web application that orchestrates the upgrade process of hosts, NSX Edge cluster, NSX Controller cluster, and Management plane.

2 Upgrade the Upgrade Coordinator

   The upgrade coordinator must be upgraded before you start the upgrade process.

3 Configure and Upgrade Hosts

   You can customize the upgrade sequence of the hosts, disable certain hosts from the upgrade, or pause the upgrade at various stages of the upgrade process.

4 Upgrade NSX Edge Cluster

   Edge upgrade unit groups consist of NSX Edge nodes that are part of the same NSX Edge cluster. You can reorder Edge upgrade unit groups and enable or disable an Edge upgrade unit group from the upgrade sequence.

5 Upgrade NSX Controller Cluster

   You can only upgrade the NSX Controller cluster.

6 Upgrade Management Plane

   The upgrade sequence upgrades the Management plane at the end.

Prepare the Upgrade Coordinator

The upgrade coordinator runs in the NSX Manager. It is a self-contained Web application that orchestrates the upgrade process of hosts, NSX Edge cluster, NSX Controller cluster, and Management plane.

The upgrade coordinator guides you through the proper upgrade sequence. You can track the upgrade process in real time and if required you can pause and resume the upgrade process from the user interface.

The upgrade coordinator allows you to upgrade groups in a serial or parallel order. It also provides the option of upgrading the upgrade units within that group in the serial or parallel order.

Procedure

1 From your browser, log in with admin privileges to an NSX Manager at https://*nsx-manager-ip-address*.

2 Select **System > Utilities > Upgrade** from the navigation panel.

If the upgrade coordinator is not running, you receive a notification to enable the upgrade coordinator.

3 Enable the upgrade coordinator.

a Log in to the NSX Manager node using nsx-cli.

b Check whether the upgrade coordinator is enabled and running.

```
get service install-upgrade
```

c Start the install-upgrade service if the service is disabled.

```
set service install-upgrade enabled
```

The upgrade coordinator is ready to be upgraded. See Upgrade the Upgrade Coordinator.

Upgrade the Upgrade Coordinator

The upgrade coordinator must be upgraded before you start the upgrade process.

Prerequisites

Verify the upgrade coordinator status. See Prepare the Upgrade Coordinator.

Procedure

1 From your browser, log in with admin privileges to an NSX Manager at https://*nsx-manager-ip-address*.

2 Select **System > Utilities > Upgrade** from the navigation panel.

The existing NSX-T release version and nodes are listed.

a Identify a component such as, Host or Edge.

b Click the number listed under the Count column.

A list of all the configured hosts or NSX Edge nodes appear in the dialog box.

3 Click **Proceed to Upgrade**.

4 Click **Browse** to navigate to the location you downloaded the upgrade bundle `.mub` file.

5 Click **Upload** to transfer the upgrade bundle into the NSX Manager.

Upgrading the upgrade coordinator might take 25–30 minutes, depending on your network speed. If the network times out, reload the upgrade bundle.

When the upload process finishes, the **Begin Upgrade** button becomes active.

6 Click **Begin Upgrade** to upgrade the upgrade coordinator.

7 Accept the notification to upgrade the upgrade coordinator.

The new upgrade coordinator version such as, `Upgrade Coordinator version: 2.2.0.0.0.9458012` appears.

8 Identify and resolve any errors that appear in the upgrade coordinator.

Note If you see a warning notification, click the notification to see the warning details. Resolve the warning notification before you proceed with the upgrade to avoid problems during the upgrade.

The hosts are ready to be upgraded and the planned upgrade sequence appears. See Configure and Upgrade Hosts.

Configure and Upgrade Hosts

You can customize the upgrade sequence of the hosts, disable certain hosts from the upgrade, or pause the upgrade at various stages of the upgrade process.

All the existing standalone vSphere ESX hosts, vSphere ESX hosts managed by vCenter Server in a single cluster, and KVM hosts are grouped in separate host upgrade unit groups by default.

Before you upgrade the hosts, you can select to update the hosts simultaneously or consecutively. If you select simultaneous upgrade for all the hosts and host upgrade unit groups in your environment, the maximum limit for a simultaneous upgrade is five host upgrade unit groups and five hosts per group.

Note Host upgrade unit group with vSphere ESX hosts managed by vCenter Server in a single cluster can be only upgraded consecutively.

You can customize the host upgrade sequence prior to the upgrade. You can edit a host upgrade unit group to move a host to a different host upgrade unit group that upgrades immediately and another host to a host upgrade unit group that upgrades at a later date. If you have a frequently used host, you can reorder the upgrade sequence of the host within a host upgrade unit group so it is upgraded first and move the least used host to upgrade last.

Note If you register any vSphere ESX host after uploading the latest upgrade bundle, you must click **Reset** so that you can upgrade the recently added vSphere hosts.

Prerequisites

- Verify that for standalone vSphere ESXi hosts not managed by vCenter Server, power off tenant VMs running on the vSphere ESXi hosts and put these hosts in maintenance mode.
- Verify that for vSphere ESXi hosts that are part of a DRS enabled cluster, do not power off tenant VMs running on the vSphere ESXi hosts. Do not put the vSphere ESXi hosts in maintenance mode. NSX-T migrates the VMs running on the host to another host in the same cluster during the upgrade.
- Verify that for vSphere ESXi hosts that are part of a DRS disabled cluster, power off the tenant VMs running on the vSphere ESXi hosts. Put the vSphere ESXi hosts in maintenance mode.

- Verify that for KVM hosts, do not have to power off the VMs running on the KVM hosts before upgrading them.
- Verify that the transport zone or transport node N-VDS name does not contain spaces. If there are spaces, create a transport zone with no spaces in the N-VDS name, reconfigure all the components that are associated with the old transport zone to use the new transport zone, and delete the old transport zone.

Procedure

1 Complete the host upgrade plan details.

You can configure the overall group upgrade order to set the host upgrade unit groups to be upgraded first.

Option	Description
Serial	Upgrade all the host upgrade unit groups consecutively. This menu item is selected by default and applied to the overall upgrade sequence. This selection is useful to maintain the step-by-step upgrade of the host components. For example, if the overall upgrade is set to serial and the host upgrade unit group upgrade is set to parallel, the host upgrade unit group is upgraded one after the other while hosts within the group are updated in parallel.
Parallel	Upgrade all the host upgrade unit groups simultaneously. You can upgrade up to five hosts simultaneously.
When an upgrade unit fails to upgrade	Select to pause the upgrade process if any host upgrade fails. This selection allows you to fix the error on the host upgrade unit group and resume the upgrade.
After each group completes	Select to pause the upgrade process after each host upgrade unit group finishes upgrading. By default, the upgrade pauses when all the hosts are upgraded. After you review the upgrade result, you can proceed to upgrade the next host upgrade unit group or the NSX Edge cluster.

2 (Optional) Change the host upgrade unit group upgrade order.

If you configure the overall group upgrade in the serial order, the upgrade waits for a host upgrade unit group upgrade to finish before proceeding to upgrade the second host upgrade unit group. You can reorder the host upgrade unit group upgrade sequence to set a host upgrade unit group to upgrade first.

a Select the host upgrade unit group and click the **Actions** tab.

b Select **Reorder** from the drop-down menu.

c Select **Before** or **After** from the drop-down menu.

d Click **Save**.

3 (Optional) Remove a host upgrade unit group from the upgrade sequence.

You can disable some host upgrade unit groups and upgrade them later.

a Select the host upgrade unit group and click the **Actions** tab.

b Select **Set State** from the drop-down menu.

c Select **Disabled** to remove the host upgrade unit group.

d Click **Save**.

4 (Optional) Change the individual host upgrade unit group upgrade sequence.

By default, the upgrade sequence is set to the parallel order.

a Select the host upgrade unit group and click the **Actions** tab.

b Select **Set Upgrade Order** from the drop-down menu.

c Select **Serial** to change the upgrade sequence.

d Click **Save**.

5 Click **Reset** to discard your custom upgrade plan and revert to the default state.

Caution You cannot restore your previous upgrade configuration.

What to do next

Determine whether to add, edit, or delete host upgrade unit groups or to upgrade host upgrade unit groups. See Manage Host Upgrade Unit Groups or Upgrade Hosts.

Manage Host Upgrade Unit Groups

You can edit and delete an existing host upgrade unit group before you start the upgrade or after you pause the upgrade.

Hosts in a vSphere ESXi cluster appear in one host upgrade unit group in the upgrade coordinator. You can move these hosts from one host upgrade unit group to another host upgrade unit group.

Prerequisites

Verify that you have configured the overall hosts upgrade. See Configure and Upgrade Hosts.

Procedure

1 Create a host upgrade unit group.

a Click **Add** to include existing hosts into a host upgrade unit group.

b Toggle the **State** button to enable or disable the host upgrade unit group from the upgrade.

c Select an existing host and click the arrow icon to move that host to the newly created host upgrade unit group.

If you select an existing host that was part of a host upgrade unit group, the host is moved to the new host upgrade unit group.

d Select whether to upgrade the host upgrade unit group simultaneously or consecutively.

e Click **Save**.

f (Optional) Select **Reorder** from the drop-down menu to reposition the host upgrade unit groups.

g (Optional) Select **Before** or **After** from the drop-down menu.

h (Optional) Click **Save**.

2 Move an existing host to another host upgrade unit group.

If a DRS enabled vSphere ESXi cluster is part of the upgrade, then a host upgrade unit group is created for the hosts managed by this cluster.

a Select a host upgrade unit group.

b Select a host.

c Click the **Actions** tab.

d Select **Change Group** from the drop-down menu to move the host to another host upgrade unit group.

e Select the host upgrade unit group name from the drop-down menu to move the host to.

f Click **Save**.

g (Optional) Select **Reorder** from the drop-down menu to reposition the host within the host upgrade unit group.

h (Optional) Select **Before** or **After** from the drop-down menu.

i (Optional) Click **Save**.

3 Delete a host upgrade unit group.

You cannot delete a host upgrade unit group that has hosts. You must first move the hosts to another group.

a Select the host upgrade unit group.

b Select a host.

c Click the **Actions** tab.

d Select **Change Group** from the drop-down menu to move the host to another host upgrade unit group.

e Select the host upgrade unit group name from the drop-down menu to move the host to.

f Click **Save**.

g Select the host upgrade unit group you want to remove and click **Delete**.

h Accept the notification.

What to do next

Upgrade the newly configured hosts. See Upgrade Hosts.

Upgrade Hosts

Upgrade the hosts in your environment.

Prerequisites

- Verify that you have configured the overall hosts upgrade plan. See Configure and Upgrade Hosts.
- Verify that for standalone vSphere ESXi hosts not managed by vCenter Server, power off tenant VMs running on the vSphere ESXi hosts and put these hosts in maintenance mode.
- Verify that for vSphere ESXi hosts that are part of a DRS enabled cluster, do not power off tenant VMs running on the vSphere ESXi hosts. Do not put the vSphere ESXi hosts in maintenance mode. NSX-T migrates the VMs running on the host to another host in the same cluster during the upgrade.
- Verify that for vSphere ESXi hosts that are part of a DRS disabled cluster, power off the tenant VMs running on the vSphere ESXi hosts. Put the vSphere ESXi hosts in maintenance mode.
- Verify that for KVM hosts, do not have to power off the VMs running on the KVM hosts before upgrading them.

Procedure

1 Click **Start** to upgrade the hosts.

The EULA appears.

2 Scroll to the bottom of the EULA.

3 Accept the EULA terms and click **Continue**.

4 Click **Continue**.

5 Monitor the upgrade process.

You can view the overall upgrade status and specific progress of each host upgrade unit group in real time. The upgrade duration depends on the number of host upgrade unit groups you have in your environment.

Wait until the in progress upgrade units are successfully upgraded. You can then pause the upgrade to configure the host upgrade unit group that is not upgraded and resume the upgrade.

6 After the upgrade is successful, verify that the latest version of NSX-T packages are installed on the vSphere and Ubuntu hosts.

- For vSphere hosts, enter `esxcli software vib list | grep nsx`
- For Ubuntu hosts, enter `dpkg –l | grep nsx`
- For Red Hat hosts, enter `rpm –qa | egrep 'nsx|openvswitch|nicira'`

7 Power on the tenant VMs of vSphere ESXi hosts not managed by vCenter Server that were powered off before the upgrade.

8 Migrate the tenant VMs on hosts managed by vCenter Server that are part of the DRS enabled cluster to the upgraded host.

The DRS enabled cluster is automatically powered off and migrated prior to the upgrade.

9 Power on the tenant VMs of vSphere ESXi hosts that are part of a DRS disabled cluster that were powered off before the upgrade.

10 (Optional) In the NSX Manager appliance, select **Fabric > Nodes**.

a Under the **Hosts** tab, verify that all the status indicators for deployment appear as installed and connection status is up.

b Under the **Transport Nodes** tab, verify that all the status indicators for configuration is up and green.

What to do next

You can proceed with the upgrade only after the upgrade process finishes successfully. If some of the hosts are disabled, you must enable and upgrade them before you proceed. See Upgrade NSX Edge Cluster.

If there are upgrade errors, you must resolve the errors. See Troubleshoot a Failed Upgrade.

Upgrade NSX Edge Cluster

Edge upgrade unit groups consist of NSX Edge nodes that are part of the same NSX Edge cluster. You can reorder Edge upgrade unit groups and enable or disable an Edge upgrade unit group from the upgrade sequence.

Note You cannot move an NSX Edge node from one Edge upgrade unit group to another because the Edge upgrade unit group membership is determined by the NSX Edge cluster membership prior to the upgrade.

The NSX Edge nodes are upgraded consecutively so that the upgrading node is down and the other nodes in the NSX Edge cluster remain active to continuously forward traffic.

The maximum limit of simultaneous upgrade of Edge upgrade unit groups is five.

Prerequisites

- Verify that the hosts are upgraded successfully. See Upgrade Hosts.

- Familiarize yourself with the upgrade impact during and after the NSX Edge cluster upgrade. See NSX Edge Cluster Upgrade.

Procedure

1 Complete the NSX Edge cluster upgrade plan details.

Option	Description
Serial	Upgrade all the Edge upgrade unit groups consecutively. This menu item is selected by default. This selection is applied to the overall upgrade sequence.
Parallel	Upgrade all the Edge upgrade unit groups simultaneously. For example, if the overall upgrade is set to the parallel order, the Edge upgrade unit groups are upgraded at once and the NSX Edge nodes are upgraded one at a time.
When an upgrade unit fails to upgrade	Selected by default to let you to fix an error on the Edge node and continue the upgrade. You cannot deselect this setting.
After each group completes	Select to pause the upgrade process after each Edge upgrade unit group finishes upgrading. By default, the upgrade pauses when the NSX Edge cluster is updated. After you review the upgrade result, you can proceed to upgrade the next Edge upgrade unit group or the NSX Controller cluster.

2 (Optional) Reorder the upgrade sequence of an Edge upgrade unit group.

For example, if you configure the overall group upgrade as serial, you can reorder the Edge upgrade unit groups serving internal networks or Edge upgrade unit groups interfacing with external networks to be upgraded first.

You cannot reorder the NSX Edge nodes within an Edge upgrade unit group.

a Select the Edge upgrade unit group and click the **Actions** tab.

b Select **Reorder** from the drop-down menu.

c Select **Before** or **After** from the drop-down menu.

d Click **Save**.

3 (Optional) Disable an Edge upgrade unit group from the upgrade sequence.

You can disable some Edge upgrade unit groups and upgrade them later.

a Select the Edge upgrade unit group and click the **Actions** tab.

b Select **Set State > Disabled** to disable the Edge upgrade unit group.

c Click **Save**.

4 (Optional) Click **Reset** to revert to the default state.

Caution After reset, you cannot restore your previous configuration.

5 Click **Start** to upgrade the NSX Edge cluster.

6 Monitor the upgrade process.

You can view the overall upgrade status and progress details of each Edge upgrade unit group in real time. The upgrade duration depends on the number of Edge upgrade unit groups you have in your environment.

You can pause the upgrade to configure the Edge upgrade unit group that is not upgraded and restart the upgrade.

When the upgrade finishes, the status of each Edge upgrade unit group appears as successful or failed.

7 (Optional) In the NSX Manager, select **System > Overview** and verify that the product version is updated on each NSX Edge node.

What to do next

You can proceed with the upgrade if the process is successful. See Upgrade NSX Controller Cluster.

If there are upgrade errors, you must resolve the errors. See Troubleshoot a Failed Upgrade.

Upgrade NSX Controller Cluster

You can only upgrade the NSX Controller cluster.

The NSX Controller nodes are upgraded in parallel order.

Prerequisites

- Familiarize yourself with the details of the temporary interruption. See NSX Controller Cluster Upgrade.
- Verify that the NSX Edge cluster is upgraded successfully. See Upgrade NSX Edge Cluster.

Procedure

1 Click **Start** to upgrade the NSX Controller cluster.

2 Monitor the upgrade process.

You can view the overall upgrade status and progress details of each Controller node in real time.

During the upgrade, the NSX Controller cluster connectivity to the hosts is temporarily interrupted. When the upgrade finishes, the status of each Controller node appears as successful or failed.

3 (Optional) In the NSX Manager appliance, select **System > Overview** and verify that the product version is updated on each NSX Controller node.

What to do next

You can proceed with the upgrade if the process was successful. See Upgrade Management Plane.

If there are upgrade errors, you must resolve the errors. See Troubleshoot a Failed Upgrade.

Upgrade Management Plane

The upgrade sequence upgrades the Management plane at the end.

It is recommended that you do not make any configuration changes while the Management plane is being upgraded.

Note The NSX Manager user interface is accessible for one to two minutes after you initiate upgrade. Then the NSX Manager user interface, API and CLI are not accessible about 10 minutes until the upgrade finishes and the Management plane is restarted.

After you upgrade the Management plane, you can join the Customer Experience Improvement Program (CEIP) for NSX-T. See Customer Experience Improvement Program in the *NSX-T Administration Guide* for more information about the program, including how to join or leave the program.

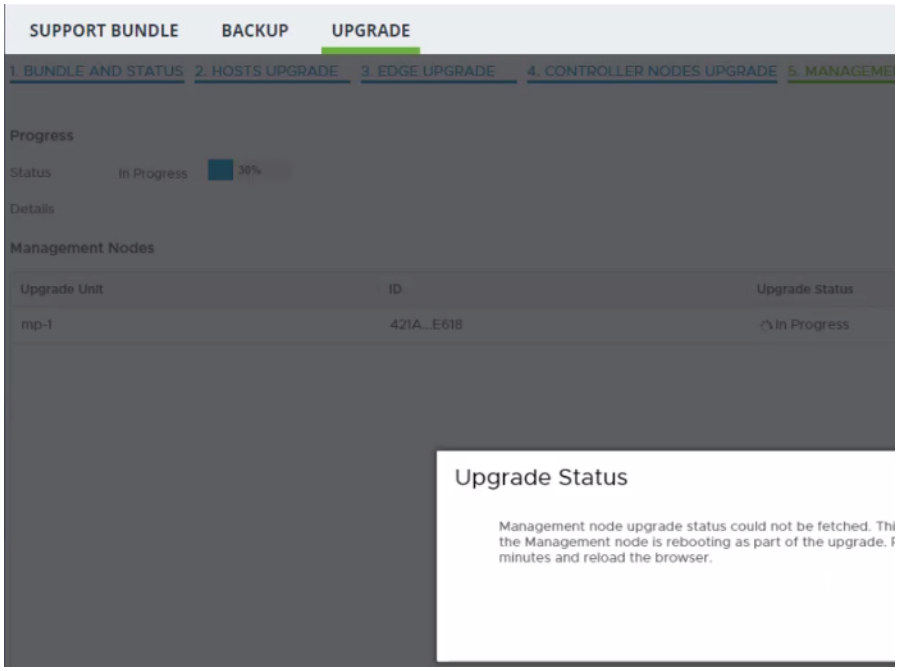
Prerequisites

Verify that the NSX Controller cluster is upgraded successfully. See Upgrade NSX Controller Cluster.

Procedure

1 Click **Start** to upgrade the Management plane.

2 Accept the upgrade notification.



You can safely ignore any upgrade related errors such as, HTTP service disruption that appear at this time. These errors appear because the Management plane is rebooting during the upgrading.

Wait about 10 minutes until the reboot is complete and the services are reestablished.

3 (Optional) In the CLI, log in to the NSX Manager to verify that the services have started.

```
get services
```

When the services start, the Service state appears as running. Some of the services include, SSH, install-upgrade, and manager.

4 In the web browser, click **Reload** to refresh the browser.

5 From your browser, log in with admin privileges to an NSX Manager at https://*nsx-manager-ip-address*.

The EULA appears.

6 Scroll to the bottom of the EULA and accept the EULA terms.

7 Select whether to join the VMware's Customer Experience Improvement Program (CEIP).

8 Click **Save**

9 (Optional) Click the help icon in the top right corner.

10 (Optional) Select **About** to verify that the product version is updated.

What to do next

Perform post-upgrade tasks or troubleshoot errors depending on the upgrade status. See Chapter 5 Post-Upgrade Tasks or Troubleshoot a Failed Upgrade.

Post-Upgrade Tasks

5

After you upgrade NSX-T, perform post-upgrade verification tasks to check whether the upgrade was successful.

Verify the Upgrade

After you upgrade NSX-T, you can check whether the versions of the upgraded components have been updated.

Prerequisites

Perform a successful upgrade. See Chapter 4 Upgrading NSX-T.

Procedure

1. From your browser, log in with admin privileges to an NSX Manager at https://*nsx-manager-ip-address*.
2. Select **System > Utilities > Upgrade** from the navigation panel.
3. Verify that the overall upgrade version, component version, and initial and target product version are accurate.

   The status of the upgrade appears as Successful.
4. (Optional) Verify that the Dashboard, fabric hosts, NSX Edge cluster, transport nodes, and all logical entities status indicators are green, normal, deployed, and do not show any warnings.
5. (Optional) Check the status of several components.
   - Fabric nodes installation
   - Transport node Local Control Plane (LCP) and Management plane agent connectivity
   - Routers connectivity
   - NAT rules
   - DFW rules
   - DHCP lease
   - BGP details
   - Flows in the IPFIX collector

- TOR connectivity to enable network traffic

6 If you have an existing Ubuntu KVM host as a transport node, backup the `/etc/network/interfaces` file.

Troubleshooting Upgrade Failures

6

You can review the support bundle log messages to identify the upgrade problem.

You can also perform any of the following debugging tasks.

- Log in to the NSX Manager CLI as root user and navigate to the upgrade coordinator log files `/var/log/upgrade-coordinator/upgrade-coordinator.log`.
- Navigate to the system log files `/var/log/syslog` or API log files `/var/log/proton/nsxapi.log`.
- Configure a remote logging server and send log messages for troubleshooting. See *NSX-T Administration Guide*.

Note If you are unable to troubleshoot the failure and want to revert to the previous working version of NSX-T, contact VMware support.

This chapter includes the following topics:

Troubleshoot a Failed Upgrade

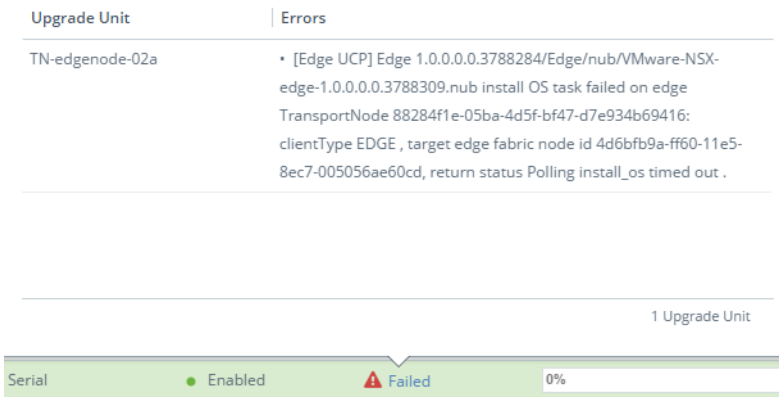
If the upgrade process fails, you can review the error messages to assist you with the troubleshooting process.

Procedure

1. Identify the failed host group, Edge group, Controller node that is highlighted in red.
2. Click the failed component.

   A dialog box with error messages appears.

3 Resolve the error.



In the example, wait for some time and restart the upgrade on the NSX Edge node.

4 Click **Continue** to resume the upgrade.

Collect Support Bundles

You can collect support bundles on registered cluster and fabric nodes and download the bundles to your machine or upload them to a file server.

If you choose to download the bundles to your machine, you get a single archive file consisting of a manifest file and support bundles for each node. If you choose to upload the bundles to a file server, the manifest file and the individual bundles are uploaded to the file server separately.

Procedure

1 From your browser, log in with admin privileges to an NSX Manager at https://*nsx-manager-ip-address*.

2 Select **System > Utilities** from the navigation panel.

3 Click the **Support Bundle** tab.

4 Select the target nodes.

The available types of nodes are management nodes, controller nodes, edges, and hosts.

5 (Optional) Specify log age in days to exclude logs that are older than the specified number of days.

6 (Optional) Toggle the switch that indicates whether to include or exclude core files and audit logs.

Note Core files and audit logs might contain sensitive information such as passwords or encryption keys.

7 (Optional) Select a check box to upload the bundles to a file server.

8 Click **Start Bundle Collection** to start collecting support bundles.

Depending on how many log files exist, each node might take several minutes.

9 Monitor the status of the collection process.

   The status field shows the percentage of nodes that completed support bundle collection.

10 Click **Download** to download the bundle if the option to send the bundle to a file server was not set.