

VMware Networking



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Purpose of this Document

Migrating to NSX Data Center, is top of mind for customers who are today on NSX for vSphere. Rich feature set and the diverse use cases supported by NSX-T are some of the driving factors for this desire to migrate to NSX Data Center. There are several approaches available to migrate from NSX-V to NSX-T including Migration Coordinator a built-in, automated migration tool, designed to help migrate from NSX for vSphere to NSX-T. This tool is fully supported by VMware and is built into NSX-T Manager Appliance.

In this white paper, we will take a look at the various migration approaches, their pros and cons and how Migration Coordinator helps enables these approaches.



Target Audience

This white paper is primarily for the benefit of customers who are currently using NSX-V. It focuses on the options available to migrate from NSX-V to NSX-T. Knowledge of both of NSX-V and NSX-T is essential for a successful outcome. Please check out the design guides for both versions of NSX.

- VMware NSX for vSphere Network Virtualization Design Guide
- VMware NSX-T Reference Design

Additionally, try out NSX-T in a lab environment to get hands-on experience with the product before embarking on a migration project.



Migration Approaches - High Level Overview

At a high level, there are three primary approaches—co-exist, lift and shift, and in-place—for migrating to NSX-T. These options are visualized in Figure 1.



Figure 1: High Level Migration Approaches

Co-Exist

In this model, NSX-T is deployed alongside NSX-V. The two infrastructures may share some hardware resources such as management and Edge clusters. Migration in this case is limited to deploying new apps in the new infrastructure and letting the old apps die over time. As the NSX-T environment grows and NSX-V environment shrinks, compute resources may be repurposed from NSX-V to NSX-T.

Figure 2 shows one possible design for the co-exist model. While only management is shared in this design, it would also be possible to share Edge clusters. In the case of NSX-T, customers may also choose to deploy bare metal Edges.



¹ Can also be bare-metal Edge. Edge cluster can be shared between NSX-V and NSX-T

Figure 2 Co-Exist

This model is useful when planning to deploy NSX-T with a different architecture/design. In this case, NSX-T design does not depend on the existing NSX-V; however, there is an additional burden of managing two different infrastructures.

Lift-and-Shift Migration Model

With this method, NSX-T infrastructure is deployed in parallel along with the existing NSX-V infrastructure. The key difference from the co-exist model is migration of the configuration and workloads from NSX-V to NSX-T. In this model, there are two distinct steps of migration:

- 1. Configuration Migration
- 2. Workload Migration

Configuration Migration Approaches

There are several approaches available for configuration migration.

- Migration Coordinator Modular Migration: Migration Coordinator is a free tool that is included in NSX-T Manager appliance. With the NSX-T 3.1 Data Center release, Migration Coordinator includes Modular Migration, a feature that enables configuration migration. In this first release, Modular Migration supports migrating firewall rules and groups via API.
- 2. Scripting: An alternate approach is to use scripting if such expertise exists in house. Scripting provides flexibility in terms of how and what gets migrated; however, it may require significant effort.
- 3. Third Party Tools: A third approach is to use a third party tool such as SPJ's clTopus or RestNSX MAT.

This white paper will focus on the Migration Coordinator's Modular Migration.

Advantages of Lift and Shift Migration

In the lift-and-shift model of migration, customers have the flexibility to both rearchitect and choose the components to migrate from NSX-V to NSX-T.

Design Flexibility

Modular Migration allows customers to rearchitect their NSX-T design. They could deploy a new edge design—ECMP or Active Standby—without matching it with their existing NSX-V. They could leverage the tier-0 and tier-1 constructs from the NSX-T in ways that may not have been possible or were not done with NSX-V.

Component Migration Flexibility

Modular Migration allows customers to choose what gets migrated. Options include:

- 1. Which workloads are migrated over to NSX-T
- 2. What hardware can be repurposed into NSX-T as the NSX-V workload footprint decreases.

Migration Timing Flexibility

Modular Migration also allows timing the migration based on workload requirements. In cases where there are multiple workloads, each with their own maintenance and downtime windows, Modular Migration would help break this down into multiple steps for individual workload migration.

Minimal Downtime



Modular Migration, in combination with NSX-T bridging and vSphere vMotion, helps minimize downtime while moving workloads over to NSX-T. There are two areas that could potentially contribute to downtime.

- 1. Moving the north/south gateway over to NSX-T.
- 2. Moving the workloads to NSX-T Data Center using vMotion.

Downsides to Lift-and-Shift Migration

While the lift-and-shift approach has benefits such as on-demand planning and migration based on workload requirements, there are certain downsides that need to be considered.

Separate hardware

NSX-T and NSX-V cannot coexist on a single host, so there is a need for separate HW to run NSX-T-based compute clusters. Separate does not necessarily mean new. Some customers have leveraged existing HW to carve out resources that can be released from NSX-V and reallocated to NSX-T. This approach is slower and requires moving hardware resources to NSX-T as workloads are migrated. Another approach is to use new hardware where the migration aligns with a refresh cycle. In this case, NSX-T could be installed on the new hardware.

vMotion

vMotion may be needed to move the existing workloads; however, vMotion has certain limitations which could result in downtime based on the approaches available. Review the KB article 56991, vMotion Between VDS/VSS and N-VDS (NSX-T switch), for more details.

Managing policy

A workload may exist in either of the two infrastructures. There may be a need to add or remove new workloads or to change the security posture. Care should be taken to update both infrastructures to ensure that these modifications do not compromise the security posture.

Managing two infrastructures

Plan for supporting two different environments for the duration of the migration.

In-Place Migration

The final model, in-place migration, leverages NSX-T's built-in Migration Coordinator tool. Available since version 2.4, Migration Coordinator helps with replacing NSX-V in place on existing hardware. It imports an existing configuration for application on the new NSX-T infrastructure in a workflow that is similar to an upgrade with very little downtime. Migration Coordinator is also fully automated and has pre-migration checks to ensure successful migration.

The Migration Coordinator tool also supports maintenance mode, automatically placing ESXi hosts into maintenance mode and vMotioning VMs off before replacing the VIBs. This feature was introduced in NSX-T 3.0. The goal of this tool is to completely transform an existing NSX-V infrastructure into NSX-T. Later sections of this chapter will focus on Migration Coordinator.



Migration Coordinator Tool

This tool was initially introduced with NSX-T 2.4 and has had several updates increasing its usability and adding health check capabilities.

The following are steps are recommended during an NSX-T migration:

- 1. Learn and try out NSX-T
 - 1. Learn more with curated learning paths on NSX Tech Zone
 - 2. Try out for free with an NSX-T Hands-on Lab
- 2. Prepare NSX-V for migration
- 3. Install NSX-T Manager appliances; Migration Coordinator is tool located within NSX-T
- 4. Import configuration from NSX-V
- 5. Check and resolve any configuration issues
- 6. Migrate configuration
- 7. Migrate Edges
- 8. Migrate hosts
- 9. Finish configuration

Migration Coordinator as an Assessment Tool for Migration

Migration Coordinator may also be used as an assessment tool to check whether the existing NSX-V environment is suitable for migration with Migration Coordinator. This is non-disruptive and does not make any changes to the NSX-V infrastructure.

Rollback

Migration Coordinator allows GUI-driven rollback for all the steps except the final step of moving the hosts to NSX-T. Since Migration Coordinator can stop after each cluster is migrated, its possible to use a small cluster with only a few nodes to validate the post-migration status prior to migrating the entire NSX-V infrastructure over to NSX-T.



Migration Steps in General

The following sections detail tasks recommended for both in-parallel and in-place migration.

Understand NSX

Before starting migration, get to know the differences between NSX-V and NSX-T. Since NSX-V is already in place and should be familiar, try building an NSX-T lab infrastructure and get to know that platform hands on. One option for this is to try out the Getting Started with NSX-T hands-on labs.

As mentioned previously, review the design guides for both the product lines to understand their full details:

- 1. VMware NSX for vSphere Network Virtualization Design Guide
- 2. VMware NSX-T Reference Design

Plan the Migration Approach

Understand the workloads that are running on NSX-V. This will help figure out whether a quick in-place migration or a longer inparallel approach would be better.

Install NSX-T Manager Appliances and Edges

For both the in-parallel and in-place approaches, begin the migration process by installing the NSX-T Manager appliances. Some of these components may share resources with the existing NSX-V infrastructure. For example, NSX-T Manager appliances may be installed in the same management cluster as the older NSX-V Manager components.

Note that NSX-T Manager is installed via an OVA and not the Manager UI.

Import Configuration from NSX-V

The next step would be to import the configuration from the existing NSX-V infrastructure. Based on the chosen migration strategy, this could happen in couple of ways.

With an in-place migration using Migration Coordinator, configuration import is automated.

For the Lift and Shift migration, there are several approaches based on the migration strategy. Some customers like to start off fresh using a different design and security posture and move the workloads over. Others prefer to keep the new NSX-T infrastructure consistent with the existing infrastructure. With either approach, the new NSX-T infrastructure needs to be built up with the right networking components and security posture. Some parts of this migration, such as importing security posture, could potentially be automated.



Apply Configuration on NSX-T

The imported configuration needs to be applied on the NSX-T infrastructure. With the Migration Coordinator tool, using in-place approach, this step is a single-click automated process to move the entire configuration over to NSX-T. Even in the case of lift and shift, modular migration allows moving the DFW and Groups over with a single API call.

Lift and Shift Model - Migrating Workloads

At this point NSX-T infrastructure should be up and running with the right configuration and ready to accept workloads. Migrating workloads over could mean downtime based on the approach taken to migrate. To minimize downtime, use NSX-T Bridge. Details are in the workload migration section.

In-Place - Migrating Edges and Hosts

Migrate Edges

The next step is to move the north/south connectivity over to NSX-T. In this special instance migration, NSX-T is able to use VXLAN in addition to Geneve. Because of this feature, NSX-T Edges can talk to workloads on the existing NSX-V infrastructure and communicate with the existing NSX-V-based hosts and associated VTEPs.

Migrate Hosts

The final step in this process is to move the hosts over to NSX-T. Note that after this action, changes cannot be reverted.



Lift and Shift Migration

Modular Migration is a feature introduced with NSX-T 3.1 release. This feature enables Lift and Shift Migration approach to migrate DFW rules and groups. With the current release, this feature is available via API. The following section describes how to use Migration Coordinator for Lift and Shift Migration.

Lift and Shift Migration Prerequisites

Following are some prerequisites that need to be met before running Migration Coordinator's Modular Migration. Some of the prerequisites, are generic to running Migration Coordinator.

- 1. NSX for vSphere and the vSphere must be in stable green state
- 2. Export version of Distributed Firewall must be set to 1000
- 3. Migration Coordinator on the NSX-T Manager appliance must be enabled via ssh using the command "start service migration-coordinator"
- 4. NSX-T Manager Appliance has a compute-manager connecting to vSphere with the source NSX-V instance.
- 5. Change the default MAC address of the NSX-T virtual distributed router

Additional requirements to run Modular Migration include:

- 1. No unpublished firewall rules on the NSX for vSphere
- 2. NSX-T configured with the desired topology but with no user defined DFW rules
- 3. NSX-T deployed with enough compute nodes to accommodate workloads migrated via vMotion
- 4. Matching the VNI of the segments on the NSX-T side with the segment ID of logical segments on the NSX-V side
- 5. To minimize downtime, deploy NSX-T bridge to extend each logical segment on the NSX-V into NSX-T Data Center segments.

Start Migration Coordinator Service

The service for Migration Coordinator is not started by default. You could use the UI to quickly check whether Migration Coordinator is running by looking under the system tab on top and migrate on the left side menu. Going to the migrate page before starting the Migration Coordinator service will display a message on top of screen stating that the Migration Coordinator needs to be enabled.



vm NSX-T	Q L	() × ()	admin ∽
Home Networking Sec	urity Inventory Plan & Troubleshoot System Advanced Networking & Security		
*	Currently the migration service is not running. To start migration, please enable the service by running the NSX CLI command "start service migration-coordinator" on the NSX Appliance.		
System Overview			
Configuration			
f Appliances			
El Get Started			
E Fabric >			
⊗ [#] Service Deployments			
Active Directory			
Lifecycle Management			
🖨 Backup & Restore			
由 Upgrade			
10, Migrate			
Settings			
答 Users			
🖏 Licenses			
🛱 Certificates			
Support Bundle			
E Customer Experience Impro			
Proxy Settings			

Figure 3 Migration Coordinator Service is disabled by default

This tool needs to be enabled from CLI. Log into the NSX-T Manager CLI and run the following command:

nsx-manager> start service migration-coordinator

Once the service is enabled, the migrate page on NSX-T UI changes to display the migration options. However, Modular Migration is only available via API in the current release. Hence, use the UI to only confirm whether the Migration Coordinator is running.

Matching VNI

To match the firewall rules and groups, the VNI (overlay id) of segments on the NSX-T Data Center side should match the segment ID of logical segments on the NSX-V side.

In Figure 4, the segment ID of App_Tier_Logical_Switch is 5001.



vm vSphere Client Menu v	$O_{\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$		
Networking and Security Dashboard Installation and Upgrade Logical Switches NSX Edges	Logical Switches NSX Manager: 🙀 192.168.110.42 Standalone Y + ADD 🖉 EDIT 🔟 DELETE 🖉 ADD VM 🛞 REMOVE VM 🛞 ACTIONS Y		
 Security Service Composer Firewall Firewall Settings Application Rule Manager SpoofGuard Groups and Tags Tools Flow Monitoring Traceflow Packet Capture Support Bundle IPFIX System Users and Domains 	Logical Switch IDSegment IDvirtualwire-55001virtualwire-95005virtualwire-105006virtualwire-85004virtualwire-65002virtualwire-115007virtualwire-45000virtualwire-75003	Name App_Tier_Logical_Switch Central_CLI_Network_01 Central_CLI_Network_02 Collapsed_Logical_Switch DB_Tier_Logical_Switch Transit_Network_01 Web_Tier_Logical_Switch Web_Tier_Logical_Switch Windows_Tier	
Co Events			

Figure 4 NSX-V Logical Switches - Showing Segment ID

When creating the matching segment on NSX-T, the VNI should match the corresponding logical switch. The NSX-T API allows specifying the overlay ID to use when creating a segment. For example, to create the segment "App" with the overlay ID: 5001, use the following API call:

URL:	https://nsxt-manager/policy/api/v1/infra/segments/App?force=true
Method:	РАТСН
Payload:	<pre>{ "type" : "ROUTED", "subnets" : [{" "gateway_address" : "172.16.20.1/24", "network" : "172.16.20.0/24"" "}], "connectivity_path" : "/infra/tier-0s/T0-GW-01", "transport_zone_path" : "/infra/sites/default/enforcement-points/default/transport-zones/1b3a2f36-bfd1-443e- a0f6-4de01abc963e", "overlay_id":5001, "admin_state" : "UP", "replication_mode" : "MTEP", "replication_mode" : "MTEP", "resource_type" : "Segment", "id" : "App", "display_name" : "App", "path" : "/infra/segments/App", "relative_path" : "App", "parent_path" : "/infra" }</pre>

The command "get logical-switch" on the NSX-T CLI will help confirm the VNI used to create the segment App.



	nsx-manager> get logical-switch				
	Mon Nov	02 2020 UTC 15:43:13.811			
	VNI	UUID	Name	Туре	
	5002	ebf79a99-6d3e-4df0-a6e0-2d9f1b3ed969	DB	DEFAULT	
	5003	8479ccal-f0ae-4elf-926d-cb0161ac9aal	Windows	DEFAULT	
_	5000	bc598585-ed52-476c-b075-c9c0500bac45	Web	DEFAULT	
	5001	5b688bd7-4314-4192-9f9a-187481f1f84a	Арр	DEFAULT	

Figure 5 NSX-T Manager showing VNI (Overlay ID) of Segment App

This VNI, 5001, shown boxed in blue in Figure 4 helps match up the Segment App on the NSX-T Data Center to the App Tier Logical Switch on the NSX for vSphere side.

NSX-T Bridge

To minimize migration downtime, use an NSX-T bridge stretching and connecting the logical segment on the NSX-T side with the logical switch on NSX-V. Have the north/south connectivity run from the NSX-T side.



Figure 6 Bridging using NSX-T Bridge

Check out the NSX-T Bridging Section in this White Paper for details on how to configure and setup the Bridge. With this NSX-T bridge in place, once the DFW rules and groups are migrated over to NSX-T, workloads may be migrated over with minimum downtime.

Lift and Shift Migration Process

Similar to in-place migration, lift-and-shift migration with Migration Coordinator, is a simple five step process:

- 1. Import configuration
- 2. Resolve any configuration-related issues when migrating from NSX-V to NSX-T
- 3. Migrate configuration to NSX-T



- 4. Migrate workloads using vMotion APIs
- 5. Finalize configuration

The following sections take a close look at the various API calls that are associated with each of these steps. All the APIs for migration are under "/api/v1/migration/".

Import Configuration

Importing configuration requires connecting to the vSphere and the associated NSX-V instance. This can be accomplished with the following API call. To enable Modular Migration mode "migration_mode" parameter must be set to "DFW_ONLY".

URL:	https://nsxt-manager/api/v1/migration/setup
Method:	POST
Request Body	<pre>{ "source_nsx" : [{ "ip" : "192.168.1.101", "nsx_username" : "admin", "nsx_password" : "abc123", "vc_ip" : "192.168.1.11", "vc_username" : "administrator@vsphere.local", "vc_password" : "abc123" }], "destination_nsx" : { "destination_nsx_ip" : "localhost", "destination_nsx_port" : 443 }, "migration_mode" : "DFW_ONLY" } </pre>

To check the configuration, use the get call to the same API https://nsxt-manager/api/v1/migration/setup.

Once the Modular Migration is configured and connected to the VC, the next step is to import the configuration. This process performs the following 3 steps:

- 1. Check prerequisites
- 2. Import config
- 3. Translate config

To start this phase, use the following API:

URL:	https://nsxt-manager/api/v1/migration/plan?action=start
Method:	POST
Request Body	



Migration allows checking the status of this phase by using the following GET API:

URL:	https://nsxt-manager/api/v1/migration/status-summary
Method:	GET
Request Body	

Response shows the current status. In the following status message, Migration Coordinator is 25% done with collecting the config. Config Migration has not yet started.

{

```
"overall migration status" : "IN PROGRESS",
```

```
"component_status" : [ {
```

```
"status" : "IN_PROGRESS",
```

```
"percent_complete" : 25.0,
```

```
"details" : "Collecting VC config",
```

"component_type" : "PRECHECK",

```
"can_skip" : false
```

}, {

}

```
"status" : "NOT_STARTED",

"percent_complete" : 0.0,

"component_type" : "CONFIG_MIGRATION",

"can_skip" : false

} ]
```

Note: This call may be used repeatedly during the migration process to check the status.

Once the import status is done and the status message changes to "PAUSED", progress to the next stage.

Resolve Configuration Issues

This phase checks whether there are any items to resolve. For example, if a logical switch on the NSX-V side is missing a corresponding segment on the NSX-T side, any imports related to that logical switch are skipped. To get the full details use the following GET API:



URL:	https://nsxt-manager/api/v1/migration/feedback-requests
Method:	GET
Request Body	

This provides a list of items that need user input with the suggested options. This example contains an excerpt that calls out a missing VLAN and provides the option to either "skip" or "abort":

```
{
```

```
"results" : [ {
```

"id": "21d3480f79efe1a14ece08e3460c7a75780b2a5cc57381a30ff81b3b50fe207b-dvportgroup-148",

"v_object_id" : "dvportgroup-148",

"v_object_name" : "vMotion-RegionA01-vDS-MGMT",

"vertical" : "L2",

"sub_vertical" : "SWITCHING",

"message" : "Missing VLAN segment",

"suggested_action" : "skip",

```
"accepted_actions" : [ "skip", "abort" ],
```

In this phase, if there are missing items, the best method would be to roll back the import and make the necessary changes on either NSX-V or the NSX-T side.

Rollback

The import phase of Modular Migration not only imports the configuration but it also translates the config as it relates to NSX-T, checking for any issues. If any changes are required, on either the NSX-V or NSX-T side, this phase must be redone. Not only should the configuration be reimported, it also must be compared and retranslated to match the existing configuration on the NSX-T side. To rollback, use the following API:

URL:	https://nsxt-manager/api/v1/migration/plan?action=rollback
Method:	POST
Request Body	

Continue

Once the necessary changes are done, to continue again with the import that includes config import and translation along with check with NSX-T config, use the following API:



URL:	https://nsxt-manager/api/v1/migration/plan?action=continue
Method:	POST
Request Body	

Accept Recommended Actions

Once the configuration matches the desired outcome, if there are any more pending items, choose to accept all the recommended actions using the following API:

URL:	https://nsxt-manager/api/v1/migration/feedback-response?action=accept-recommended
Method:	POST
Request Body	

To check the status of all the items, the following feedback-requests API may be called again:

URL:	https://nsxt-manager/api/v1/migration/feedback-requests
Method:	POST
Request Body	

At this point, the Migration Coordinator is ready for the next step - the actual configuration migration to NSX-T.

Config Migration

Config migration stage has two parts. The first part migrates the firewall rules and the groups to NSX-T, while the second creates specific VIFs for each VM that will be migrated. This stage also creates IPSet-based rules for every VM that will be migrated to ensure there are no security gaps when moving to NSX-T. Notice the IPSet group "IPSet_SG-APP-securitygroup-33" in Figure 7 which is a corresponding IPSet based group for the group "SG-APP".



vm NSX-T			Q 🗘 ⑦~ 🌔 admin
Home Networking Sec	rity Inventory Plan & Troubleshoot System		POLICY MANAGER (
*	R Groups		(
Inventory Overview			
Services	ADD GROUP		EXPAND ALL Filter by Name, Path and more
88 Groups	Name Compute Members	Where Used	Status
🐻 Context Profiles	: > 5 and Internal Services View Members	Where Used	Success C
🔂 Virtual Machines	View Members	Where Used	Success C
Containers			
Physical Servers	Description Temporary IPSet Security Group for Migration	Tags 1	VIEW RELATED GROUPS
🛇 Tags			
	: > 00 IPSet_SG-DB_securitygroup-34 View Members	Where Used	Success C
	: > 99 60 IPSet_SG-IPSET_securitygroup-35 View Members	Where Used	Success C
	: > 20 Main Console View Members	Where Used	Success C
	: V 88 SG-APP View Members	Where Used	🌒 Success 🧭
	Description Not Set	Tags 1	VIEW RELATED GROUPS

Figure 7 NSX-T Groups - Temporary IPSets Created by Migration Coordinator

In this example, the SG-APP group definition also uses the IPSet based group:

View Members | SG-APP

Effective Members	Group Definition		
Criteria (0)	T,	ype All (selected: 1) ~	
Members (1)			· · · · -
IP Addresses (0)		Name	Member Type
		IPSet_SG-APP_securitygroup-33	Groups
MAC Addresses (0))		
AD Groups (0)			

Figure 8 Temporary IPSets Members

Config Migration - DFW and Groups

At this stage, Migration Coordinator is running but in a PAUSED state, allowing for config changes.

To start the config migration stage, simply call the continue API again:

URL:	https://nsxt-manager/api/v1/migration/plan?action=continue
Method:	POST
Request Body	



To track the Migration Coordinator status, use the GET status-summary API:

URL:	https://nsxt-manager/api/v1/migration/status-summary
Method:	GET
Request Body	

Config Migration - VIFs

Once the configuration is migrated over to the NSX-T, the second part of the Config Migration is to create VIFs for every VM that will be migrated over to NSX-T. This phase may be done in batches involving a set of VMs. Create a group for each VM set that will be migrated using the VM's instance ID.

The instance ID for a VM may be located using the vSphere MOB browser or via API calls to vSphere. Figure 9 shows the InstanceUuid (5008f2c6-bab5-a6a1-475f-e91c32b46a1c) for the VM "app-01a.corp.local:

\leftrightarrow \rightarrow C $rac{}$ vcsa-	01a.corp.local/mob/?moid=	vm-278&doPath=summary%2econfig
📙 HOL Admin 📃 Region	nA 🕜 vCenter - Region A	💀 NSX-T Manager 🛛 📊 vRealize Log Insight 🛛 🤣 Custon
Home		
Data Object Ty Parent Manage Property Path:	/pe: VirtualMachi d Object ID: vm-278 summary.config	neConfigSummary
Properties		
NAME	ТҮРЕ	VALUE
annotation	string	"Photon OS - root/VMware1! HOL 3-Tier App : Jan 4, 2016"
cpuReservation	int	0
ftInfo	FaultToleranceConfigInfo	Unset
guestFullName	string	"Other 3.x or later Linux (64-bit)"
guestId	string	"other3xLinux64Guest"
installBootRequired	boolean	false
instanceUuid	string	"5008f2c6-bab5-a6a1-475f-e91c32b46a1c"
managedBy	ManagedByInfo	Unset
memoryReservation	int	0
memorySizeMB	int	2048
name	string	"app-01a.corp.local"

Figure 9 vCenter MOB - VM instanceUuid

Note: Operators familiar with the vSphere API and prefer API calls could use the "vm.config.instanceUuid" after the "vm =



getObject(sinv, [vim.VirtualMachine], args.name, verbose=False)" call.

Use the VM Instance UUID in the Migrate Coordinator's pre-migrate call to set up corresponding VIFs on the NSX-T. The following API call sets up the VIF for the VM "app-01a.corp.local":

URL:	https://nsxt-manager/api/v1/migration/vmgroup?action=pre_migrate
Method:	POST
Request Body	{ "group_id" : "vmGroupApp", "vm_instance_ids" : ["5008f2c6-bab5-a6a1-475f-e91c32b46a1c"] }

Note: vm_instance_ids is a comma separated list and may be used to include multiple VMs at the same time. This call creates VIFs on the NSX-T. Once the VIFs are created, the system is ready for the next stage. This involves migrating those VMs, which now have VIFs created, to NSX-T.

Workload Migration

To ensure the VM uses the proper VIF, use the vSphere API calls to vMotion the VM. For minimal downtime, use the NSX-T bridge that was created as part of the prerequisites. An example script to use the vMotion API is available in the resources section.

Finalize Migration

Finalizing migration is also two-step process. The first step involves the VIFs and the second step involves the config.

Finalize Migration - VIFs

In the first step, any configuration specific to the VIF is finalized. This includes applying tags to the corresponding VIFs to enable tag based dynamic groups. To finalize the VIF related configuration, use the post-migrate API:

URL:	https://nsxt-manager/api/v1/migration/vmgroup?action=post_migrate
Method:	POST
Request Body	{ "group_id" : "vmGroupApp", }

Note: tags cannot be applied before moving the VM over to the NSX-T. A VM moved without tags would create a gap in security. The temporary IPSets, discussed in the config migration section, are used to ensure that there is no gap in security.



Finalize Migration - Config

The final step of the Migration Coordinator's Modular Migration is to remove the temporary IPSets. This is accomplished with the following API call:

URL:	https://nsxt-manager/api/v1/migration?action=finalize_infra
Method:	POST
Request Body	

This step concludes the modular migration of DFW and groups. At this point, the NSX-T bridge may be removed as it is no longer required.



In-Place Migration

Migration Coordinator supports in-place migration, with a upgrade style workflow, since inception. With the NSX-T 3.0 release, Migration Coordinator also supports a automated maintenance mode that allows minimal downtime during host migration by leveraging vMotion. Following sections take a close look at using Migration Coordinator for in-place migration.

In-Place Migration Prerequisites

Before starting the in-place migration process using Migration Coordinator, ensure NSX-V is ready for migration. Apart from backing up the environment, following are some important prerequisites:

- 1. NSX for vSphere and the vSphere must be in stable green state
- 2. Export version of Distributed Firewall must be set to 1000
- 3. VXLAN port must be set to 4789
- 4. Migration Coordinator on the NSX-T Manager appliance must be enabled via ssh using the command "start service migration-coordinator"
- 5. NSX-T Manager Appliance has a compute-manager connecting to vSphere with the source NSX-V instance.

For a full item checklist, refer to the Migration Coordinator guide, paying specific attention to the section Prepare NSX Data Center for vSphere Environment for Migration (NSX-T 3.0).

Install NSX-T Manager Appliances

As Migration Coordinator is available within the NSX-T Manager appliance, these appliances must be installed to start the migration process. While introduced with NSX-T 2.4, use version 2.5 or newer due to usability and health check enhancements.

The recommended approach for production workloads is to use a quorum of three 3 NSX-T Manager appliances. It may be acceptable, based on the type of workload, to start with just one. The implications of having a single NSX-T Manager should be considered before taking this approach.

Create IP Pool for Tunnel End Points

After the NSX-T Manager appliance installation, create an IP pool for tunnel endpoints (TEPs).



vm NSX-T				Q LI @)∽ admin ∽
Home Networking Sec	urity Inventory Plan & Troubleshoot	System Advanced Networking & Security			
*		ESS BLOCKS			0
O Network Overview					
Connectivity	ADD IP ADDRESS POOL			EXPAND ALL Filter by Name, Path or	more
🔁 Tier-O Gateways	Name	Description	Subnets	Status	
🔂 Tier-1 Gateways	: NSXT_VTEP_POOL_Re;	Description	Set		
🝕 Segments					
Network Services	Tags	Tag (Required) Scope (Optional)			
@ VPN		Max 30 allowed. Click (+) to save.			
∃• NAT	SAVE CANCEL				
🐈 Load Balancing					
Forwarding Policies					
IP Management					
III DNS					
DHCP					
P Address Pools					
Settings					

Figure 10 Create IP Pool for TEP

Install Edges

Install the required number of Edges with the amount of resources that match the existing NSX-V deployment.

Home Networking	Se	curity	Inventory	Plan & Troublesh	noot System	Advanced N	Networking & Security	
	~	Hos	st Transport	Nodes Edg	e Transport No	des Edge C	lusters ESXi Bridge CI	usters
System Overview		+ AD	D EDGE VM	🖉 EDIT 📋 DEI	LETE 🔞 ACTION	IS ~		
Configuration			Edge	ID	Deployment Type	Management IP	Host Configuration State	Node Statu:
Appliances		6	edge-01	fd81aed7	Virtual Machin	192.168.110.36	A Configure NSX	Not Availa
Get Started		Q	edge-02	98b9e973	Virtual Machin	192.168.110.37	Configure NSX	Not Availal
E Fabric	>							
g [≉] Service Deployments								
Pa Active Directory								

Figure 11 Install Edge Nodes

Use the Migration Coordinator guide's **Determining NSX Edge Requirements** (NSX-T version 2.5) section to figure out the right number of Edges and the right amount of resources for each Edge. The resolve configuration stage of the Migration Coordinator helps validate whether the Edges deployed are properly sized.

Add Compute Manager

Add a Compute Manager that points to the vCenter attached to the NSX-V deployment.

Click on System -> Fabric -> Compute Managers -> Add



Home Networking	g Secu	rity Inventory	Plan & Troubleshoot	System
	~	Compute Mar	nagers	
🕑 System Overview	Â.	+ ADD 🖉 EDIT	📋 DELETE 🛛 🔞 🗛 🕻	TIONS -
Configuration		Compute Ma	nager ↑	ID
Appliances				
🗖 Get Started				
🗄 Fabric	~			
Nodes				
Profiles				

Figure 12 Add Compute Managers - 1

Provide the details of the connected vCenter.

Name*	vCenter
Description	
Domain Name/IP Address*	192.168.110.22
Type*	vCenter
Username*	administrator@vsphere.local
Password *	
SHA-256 Thumbprint	

Figure 13 Add Compute Manager - 2

Accept the thumbprint from the vCenter.





Figure 14 Accept vCenter Thumbprint

At this point, a pop-up window may need to be resolved. If so, provide the username and password for vCenter and click resolve.

se	Error
	Compute Manager 192.168.110.22 is already registered with other NSX Manager 192.168.110.35
	PESOLVE

Figure 15 Add Compute Manager - Resolve - 1

Resolve E	rors - vCenter	×
🕖 Warning: You ha	ve 1 Warning(s)	Expand Close
selected error.	comprequired for compute manage	A FORMER COTODOTIC
Username*	administrator@vsphere.local	
Deserved		
Password*	••••••	
	CANCEL	RESOLVE

Figure 16 Add Compute Manager - Resolve - 2



Confirm vCenter is connected.

vm NSX-T								Q (1 (?) ∽ admin
Home Networking S	Security	Inventory Plan & Trouble	shoot System	Advanced Networking &	& Security				
«	c	Compute Managers							
System Overview	+	ADD 🖉 EDIT 🍈 DELETE	🖗 ACTIONS 🗸					Q search	
Configuration		Compute Manager ↑	ID	Domain Name/IP Add	ires Type	Registration Status	Version	Connection Status	Last Inventory Update
Appliances		vCenter	deaca43c	192.168.110.22	vCenter	 Registered 	6.5.0	• Up	Jul 9, 2019 12:03:35 .
🖾 Get Started	L E								
🗄 Fabric 🗸 🗸									
Nodes									
Profiles									
Transport Zones									
Compute Managers									



Start Migration Coordinator Service

Migration Coordinator is available from the NSX-T UI under the system tab on top and migrate on the left side menu. The service for Migration Coordinator is not started by default. Going to the migrate page before starting the Migration Coordinator service will display a message on top of screen stating that the Migration Coordinator needs to be enabled.

vm NSX-T										admin	
Home Networking	Security	Inventory	Plan & Troubleshoot	System	A	lvanced Networking & Security					
	«	Currently the	migration service is not ru	inning To start i	migration	nlease enable the service by running the NSY CLI comman	nd "start service migration-coordinate	r" on the NSX J	Appliance		
System Overview		contentity are i		initing. Fo Start	ing aton	prease chapte are service by running the next concentration		· on the most /	-dolonia rec		
Configuration											
Appliances											
E Sabris	~										
© Paprice Deployments	~										
Pa Active Directory											
Lifecycle Management											
🖨 Backup & Restore											
📥 Upgrade											
🔄 Migrate											
Settings											
答 Users											
🖏 Licenses											
E Certificates											
Support Bundle											
🔄 Customer Experience Impr	ro										
Proxy Settings											

Figure 18 Migration Coordinator Service is disabled by default

This tool needs to be enabled from CLI. Log into the NSX-T Manager CLI and run the following command:

nsx-manager> start service migration-coordinator

Once the service is enabled, the migrate page on NSX-T UI changes to display the migration options.



In-Place Migration Process

Start Migration

To start the migration, click on the GET STARTED button. A couple of things to note:



Figure 19 Migration Coordinator Wizard

Note:

- 1. No changes are allowed during the migration process.
- 2. Even though this is technically the start of the migration process, no changes have been made on the NSX-V side. The process may still be abandoned without any negative impact at this time.

Migration Coordinator has 5 main steps:

- 1. Import configuration
- 2. Resolve configuration
- 3. Migrate configuration
- 4. Migrate Edges
- 5. Migrate hosts

The following sections take a close look at each of these steps.



Import Configuration

The import configuration step consists of two sub-steps:

- 1. Authenticate to NSX-V
- 2. Import configuration

Authentication

Click on Select NSX

Home Networking	Se «	Migrate NSX for vSpher	roubleshoot System	Advanced Networking &	Secu	rity		
 System Overview Configuration Appliances 		Import Configuration > Authentication Select NSX for vSphere 	Resolve Configuration >	Migrate Configuration	>	Migrate Edges	>	Migrate Host
Get Started Fabric Service Deployments Active Directory	>	required credentials NSX for vSphere: vCenter: > Import Configuration	Not Selected	Version:	-	Role:	-	
Lifecycle Management 출 Backup & Restore 쇼 Upgrade								

Figure 20 Select NSX

Provide the NSX-V details. Use the vCenter details provided in the earlier step. Use the ADD NEW button for the vCenter field to add vCenter details if this has not yet been done.



Select NSX for vSph	ere ×
vCenter Credentials	
vCenter *	vCenter ~
	🖸 ADD NEW
User Name *	administrator@vsphere.local
Password *	
Port	443
NSX for vSphere Credentials	
Domain Name/IP Address *	192.168.110.42
User Name *	admin
Password *	
	CANCEL AUTHENTICATE

Figure 21 Select NSX for vSphere

Once all the details are provided and verified, click on AUTHENTICATE.

Confirm that the authentication to NSX-V was successful.

vm NSX-T							
Home Networking	Se	curity Inventory Plan & Troubles	hoot System	Advanced Networking	& Securi	ity	
	«	Migrate NSX for vSphere	About				
System Overview	Ĩ	Import Configuration > Resolv	e Configuration >	Migrate Configuration	>	Migrate Edges	> Migrate Hosts
Configuration		✓ Authentication ⊘					
Appliances		Select NSX for vSphere, assoc	iated vCenter and provid	e SELECT NSX			
🖾 Get Started		required credentials					
E Fabric	~	NSX for vSphere:	192.168.110.42	Version:	6.4.4	Role:	Standalone
Nodes		vCenter:	192.168.110.22	Version:	6.5.0		



Import Configuration

The second step involves importing the configuration. Click on START button to begin.



Networking St	ecurity inventory Plan &	Froubleshoot System A	dvanced Networking	g & Security			
*	Migrate NSX for vSphe	re About					
System Overview	Import Configuration >	Resolve Configuration > N	ligrate Configuration	n ≻ Mig	rate Edges	> Migrate Ho	
Configuration	\checkmark Authentication \oslash						
Appliances	Select NSX for vSphe	ere, associated vCenter and provide	SELECT NS	×			
📮 Get Started	required credentials						
🗄 Fabric 🗸 🗸	NSX for vSphere:	192.168.110.42	Version:	6.4.4	Role:	Standalone	
Nodes	vCenter:	192.168.110.22	Version:	6.5.0			
Profiles	 Import Configuration 						
Transport Zones	Import configurations	from NSX for vSphere	START				
Compute Managers	1.						
⊕ [≉] Service Deployments		Checking prerequisites					Not Starte
🗅 Active Directory	2.						
		Import vSphere networking configur	ation				Not Starte
Lifecycle Management	3.						
🚖 Backup & Restore		Import configuration of NSX for vSpl	here				Not Starte
甴 Upgrade	4.						
🛱 Migrate		Translate imported configuration					Not Starte

Figure 23 Start Importing Configuration

Click on the IMPORT button to confirm the process.

Import Configuration	×
This step will import configuration from your current setup, NSX: 192.168.110.42 and VC: 192. checks. If an import step succeeded previously, it will be skipped. Do you want to continue?	168.110.22 and run pre-
	CANCEL

Figure 24 Import Configuration - Click Import

At this point, Migration Coordinator imports the existing configuration from NSX-V. This does not make any changes to NSX-V, so it could be used for a quick check on the Migration Coordinator readiness of any setup.



vm NSX-T							
Home Networking Se	ecurity Inventory Plan &	Troubleshoot System Adva	nced Networking	& Security			
«	Migrate NSX for vSphe	re • About					
 System Overview 	Import Configuration >	Resolve Configuration > Migra		> 10		> Migrate Ho	
Configuration	\lor Authentication \oslash						
Appliances	Select NSX for vSphe	re, associated vCenter and provide	SELECT NSX				
🖾 Get Started	NSX for vSphere:	192.168.110.42	Version	6.4.4	Role:	Standalone	
🛛 Fabric 🗸 🗸	vCenter:	192.168.110.22	Version	6.5.0			
Nodes	Import Configuration P						
Profiles	Import configuration	from NSX for vSphere		ROLLBAC	<		
Transport Zones	1						
e ⁿ Service Deployments		Checking prerequisites					Successful
Active Directory	2.						
		import vSphere networking configuration	1				Successful 🕗
Lifecycle Management	3.						0.0
Backup & Restore		import configuration of NSX for vspriere					Successful
15. Minute	· ·	Translate imported configuration		-			Successful
st mynore		and a second s					A
Settings	View Imported Topo	logy					
셩 Users							

Figure 25 Importing Configuration

View Imported Topology

Once the Migration Coordinator imports the configuration, view the existing NSX-v topology by clicking on the "View Imported Topology" link.



Figure 26 Topology Viewer

To go to the next step of the Migration Coordinator, click on the CONTINUE button.



Liene Netwedine C	anuite Investore Dire & Teachlachant Oustans Advanced Maturalian & Convitu	
Home Networking S	Advanced Networking & Security	
System Overview	Import Configuration > Resolve Configuration > Migrate Configuration > Migrate Edges > Migrate Hosts	
Configuration	\vee Authentication \oslash	
Appliances	Select NSX for vSphere, associated vCenter and provide SELECT NSX	
💷 Get Started	required credentials	
🗄 Fabric 🗸 🗸	NSX for vSphere: 192.168.110.42 Version: 6.4.4 Role: Standalone	
Nodes	vCenter: 192.168.110.22 Version: 6.5.0	
Profiles	\checkmark Import Configuration \bigcirc	
Transport Zones	Import configurations from NSX for vSphere START ROLLBACK	
Compute Managers	1	
⁷ Service Deployments	Checking prerequisites 🖉 Successful	
Active Directory	2.	
	Import vSphere networking configuration 🖉 Successful	
lecycle Management	3.	
Backup & Restore	Import configuration of NSX for vSphere 🖉 Successful	
a Upgrade	4.	
i, Migrate	Translate imported configuration 🖉 Successful	
ettings	View Imported Tepplony	
Users	view imported Topology	
Licenses		
Certificates		
Support Bundle		
Customer Experience Im		BACK TO OVERVIEW CONTU

Resolve Configuration

This stage focuses on resolving any configuration-related issues. To resolve, either accept the recommended value or, where applicable and available, tune it to match the required values.

Home Networking See	curity Inventory Plan & Troubleshoot	System Advanced Networking & Security	
*	Migrate NSX for vSphere		
 System Overview Configuration Appliances Get Started 	Import Configuration > Resolve Config Migration Scope: NSX for vSphere: 192168.110.42 Provide inputs to following listed issues. List of Inputs Total: 21 Resolved: 0	ration > Migrate Configuration > Migrate Edges > Migrate Hosts vCenter: 192168.110.22	(Messages 18
🖥 Fabric 🗸 🗸	Category	L2	
Nodes	▲ L2 >	ACCEPT RECOMMENDATIONS	View: All ~
Profiles	A Profile	Resolve Status Message	Instances
Transport Zones	🔥 Host Switch	Host won't be migrated because NSXV is not installed on it	esx-06a.corp.local, esx-03a.corp.local
g ^a Service Deployments	\Lambda Edge	VTEP VLAN Id for NSX-T Edge TransportNodes	NSXT_EdgeVtepVlanId
Active Directory	▲ NS Service		
ifecycle Management	⚠ Other		
🚖 Backup & Restore	▲ Grouping Objects		
da Upgrade	⚠ RBAC		
ō, Migrate			
Settings			
幣 Users			
ද, Licenses			
🛱 Certificates			
Support Bundle			
Customer Experience Impro			
Proxy Settings	< > 1-8 of 8 Categories	Modified Inputs	K BACK NEXT > 1-2 of 2 Inputs
	CANCEL MIGRATION		BACK TO OVERVIEW PREVIOUS CONTIN

Figure 27 Resolve Configuration Stage

The next two sections show examples of informational and interactive items that need resolution.



Informational Messages

One of the items under the L2 category is a message about a host that will not be migrated because NSX-V is not installed. In this case, user interaction is limited to simply to accepting the information.

Import Configuration > Resolve Config	uration > Migrate Configuration > Migrate Edges > Migrate Hosts	G
Migration Scope: NSX for vSphere: 192.168.110.42 Provide inputs to following listed issues. ()	vCenter: 192.168.110.22	Messages 10
List of Inputs Total: 21 Resolved: 0		
Category	12	
▲ L2 >	ACCEPT RECOMMENDATIONS	View: All v
	Resolve Status Message	Instances
🔥 Host Switch	Host won't be migrated because NSXV is not installed on it	esx-06a.corp.local, esx-03a.corp.local
🔥 Edge	VTEP VLAN Id for NSX-T Edge TransportNodes	NSXT_EdgeVtepVlanId
▲ NS Service		
⚠ Other		
Grouping Objects		

Figure 28 Resolve Configuration - Informational Messages

To see the details, click on the message, then click ACCEPT to accept the recommendation.

resserge			
lost won't I	be migrated because NSXV	/ is not installed on it	
nstances			
'hese instar	nces cannot be migrated to	NSX-T. They will be skipp	bed from migration.
Resolve Status	Instance Name	ID	Detailed Message
⚠	esx-06a.corp.local	esx-06a.corp.local	Host esx-06a.corp.local does not have NSXV installed; i
Δ	esx-03a.corp.local	esx-03a.corp.local	Host esx-03a.corp.local does not have NSXV installed; i
			2 Instances
			2 Instances

Figure 29 Accept Recommendations

Interactive Messages

Some messages may need user interaction. For example, VTEP VLAN id for NSX-T Edge transport nodes. This may need a change based on specific requirements, as shown in Figure 30 and Figure 31.



Import Configuration > Resolve Configu	uration > Migrate	Configuration > Migrate Edges > Migrate Hosts	G
Aigration Scope: NSX for vSphere: 192.168.110.42	vCenter: 192.168.110.22		Messages 10
rovide inputs to following listed issues. ()			
Category	L2		
▲ L2 >	ACCEPT RECOMMEN	DATIONS	View: All v
▲ Profile	Resolve Status	Message	Instances
\Lambda Host Switch		Host won't be migrated because NSXV is not installed on it	esx-06a.corp.local, esx-03a.corp.local
\Lambda Edge		VTEP VLAN Id for NSX-T Edge TransportNodes	NSXT_EdgeVtepVlanId
⚠ NS Service			
⚠́ Other			
▲ Grouping Objects			
A			

Figure 30 Interactive Messages

Click on the above message to change the value:

Click on the message "VTEP VLAN id for NSX-T Edge Transport Nodes" to make a change.



Submit Input(s)	×
Message	
VTEP VLAN Id for NSX-T Edge TransportNo	des
Detail:	
Please set Edge VTEP VLAN: if any NSX-T E	dge VM is inside any NSX-V host
to be migrated, give an id within [0, 4093] b	ut not in [0, 20, 104]; otherwise
choose one from [104] or give a new one wi	thin [0, 4093] but not in [0, 20]
Instance	
NSXT_EdgeVtepVlanId	
Actions	
 Select Value (Recommended) 	
This action requires you to input values(s) as bel	ow. In some cases, system may
recommend default value(s).	
105	
	CANCEL SUBMIT

Figure 31 Interactive Messages - Take Action

Submit Inputs

After all the changes/reviews within a category, select the SUBMIT button in the lower right to record the updates.

Migrate NSX for vSphere About							
Import Configuration > Resolve Configur	ation > Migrate Configuration > Migrate Edges > Migrate Hosts	0					
⚠ Your input(s) has not been submitted. Click 'SU	BMIT' to proceed.	SUBMIT DISCARD					
Migration Scope: NSX for vSphere: 192.168.110.42 I Provide inputs to following listed issues: @	vCenter: 192.168.110.22	(Messages 10)					
Category	L2						
<u>∧</u> L2 >	ACCEPT RECOMMENDATIONS	View: All v					
⚠ Profile	Resolve Status Message	Instances					
🔥 Host Switch	Host won't be migrated because NSXV is not installed on it	esx-06a.corp.local, esx-03a.corp.local					
🔥 Edge	VTEP VLAN Id for NSX-T Edge TransportNodes	NSXT_EdgeVtepVlanId					
▲ NS Service							
⚠ Other							
▲ Grouping Objects							
▲ RBAC							



Figure 32 Resolve Configuration - Submit Inputs

Maintenance Mode Options

One of the options on the resolve configuration menu is selection of automated or manual maintenance mode.

vm NSX-T	Q	\bigtriangleup	?`	admin
Home Networking S	ecurity Inventory Plan & Troubleshoot System			
«	Migrate NSX for vSphere About			
System Overview	Import Configuration Resolve Configuration Migrate Configuration Migrate Edges Migrate Hosts			0
2 -,	Migration Scope: NSX for vSphere: 192.168.110.42 vCenter Server: 192.168.110.22		Δ	10 Warnings
Configuration	Provide inputs to the following listed issues. ()			
Appliances	List of Inputs Total: 20 Resolved: 10			
📃 Get Started				
🗄 Fabric 🔰	Category Maintenance Mode Options			
⊗ [≉] Service Deployments	Profile ACCEPT RECOMMENDATIONS	V	iew: All	~
🗅 Identity Firewall AD	⊘ RBAC □ Resolve Status Message Insta	ances		
	Choose Maintenance mode option for cluster Reg	gionA01-CO	MP01, Regio	nA01-M
Lifecycle Management				
📥 Backup & Restore	Ø Host Switch			
占 Upgrade	Ø NS Service			
🔄 Migrate	▲ Maintenance Mode Options >			

Figure 33 Maintenance Mode

Clicking on the message allows configuration of maintenance mode for automated or manual operation. In automated maintenance mode, ESXi hosts are automatically placed in maintenance mode and the VMs moved automatically; this approach is recommended. In manual maintenance mode, Migration Coordinator will place the ESXi host in maintenance mode but will wait for user intervention to migrate the VMs out of the host.

Once all the changes are accepted and submitted, move to the next step.

Migration Configuration

This stage migrates the configuration from NSX-V to NSX-T. Any changes performed during the resolve configuration step are incorporated into this migration.



m NSX-T				Q L	(?) ∽ admin
ome Networking Sec	curity Inventory Plan & Troubleshoot	System Advanced Networking	& Security		
«	Migrate NSX for vSphere	put			
) System Overview	Import Configuration > Resolve Con	figuration > Migrate Configuration	> Migrate Edges > Migrate Hosts		
onfiguration	Migration Scope: NSX for vSphere: 192.168.110.42	2 vCenter: 192.168.110.22			Messages
Appliances	You are ready to migrate the logical configu	ation. Click Start to begin the migration pro	cess.		
] Get Started	Overall Progress	01/ 51	ART		
Fabric 🗸	Details -	0%			
Nodes	Migration Status				
Profiles	vSphere Object Type	Mapped Object Type in NSX-T	Category	Mapped Object Count/Source Object Count	
Transport Zones					
Compute Managers					
Service Deployments					
Active Directory					
ecycle Management					
Backup & Restore					
) Upgrade			\bigtriangledown		
Migrate					
ttings					
Users					
Licenses					
Certificates					
Support Bundle					
Customer Experience Impro					
Proxy Settings					No Objec

Figure 34 Migrate Configuration

Once the migration of configuration finishes, it displays a table of object types and their mapping results from NSX-V to NSX-T.

vm NSX-T				Q (1 @`	admin
Home Networking Se	ecurity Inventory Plan & Troubleshoot Syste	em Advanced Networking & Security			
«	Migrate NSX for vSphere About				
System Overview	Import Configuration > Resolve Configuration	n > Migrate Configuration > Migrate Ed	Iges > Migrate Hosts		0
Configuration	Migration Scope: NSX for vSphere: 192.168.110.42 vCa	enter: 192.168.110.22			Messages o
Appliances	You are ready to migrate the logical configuration. Cl	lick Start to begin the migration process.			
Get Started	Overall Progress				
Fabric >	Status ⊘ Successful	100% START ROLLBACK	ĸ		
⊗ [#] Service Deployments	Manufus Shaha				
C Active Directory	Migration Status				
	vSphere Object Type	Mapped Object Type in NSX-T	Category	Mapped Object Count/Source Object Count	
Lifecycle Management	Transport Zone	Transport Zone	L2	3/3	^
🚖 Backup & Restore	Enforcement Point	Enforcement Point	L2	1/1	
📥 Upgrade	MAC Management	MAC Discovery Profile	Switching Profiles	6/6	
🗒 Migrate	Traffic Shaping Policy	QOS Profile	Switching Profiles	6/6	
Settings	Security Profile	Segment Security Profile	Switching Profiles	1/1	
然 Users	Spoof Guard Configuration	Spoof Guard Profile	Switching Profiles	1/1	
& Licenses	IP Discovery	IP Discovery Profile	Switching Profiles	2/2	
E Certificates	Virtual Wire	Segment Path	L2	8/8	
M Support Bundle	SwitchingProfiles	Discovery Profile Binding Maps	L2	15/15	
Customer Experience Impro	SwitchingProfiles	Security Profile Binding Maps	L2	15/15	
R Proxy Settings	SwitchingProfiles	QOS Profile Binding Maps	L2	15/15	
	DV Port Groups	Segment Path	L2	13/13	
	DV Switch	NiocProfile	HOSTSWITCH	1/1	
	DV Switch	Unlink Host Switch Profile	HOSTSWITCH	2/2	•
					48 Objects
s://192.168.110.35/nsx/#/app/system/home	e/licences			BACK TO OVERVIEW PREVIOUS	CONTINUE



Move to the next phase, migrate edges, by clicking on CONTINUE.

Migrate Edges

Click on START to begin Edge migration.

vm NSX-T					Q	<u>, © ,</u>	admin
Home Networking Se	curity Inventory Plan & Troublesho	ot System Advanced Netw	rorking & Security				
*	Migrate NSX for vSphere 。	About					
System Overview	Import Configuration > Resolve (Configuration > Migrate Configu	ration > Migrate Edges >	Migrate Hosts			0
Configuration	Migrating Edges will disrupt the traffic. Re-	commend to perform edge & host migratio	n in one maintenance window.				×
Appliances	Migration Scope: NSX for vSphere: 192.168.1	10.42 vCenter: 192.168.110.22					Messages O
Get Started	Overall Progress						
Fabric >	Status Not Started	O% START					
	Detalls -						
C Active Directory	Edge Migration Plan						
Lifecycle Management	NSX Edge	ID	Details	Migration Status	Progress		
📥 Backup & Restore	Edge Services	EDGE		Not Started			
由 Upgrade							
🚊 Migrate							
Settings							
閤 Users							
🖏 Licenses							
Certificates							
Support Bundle							
Customer Experience Impro							
Proxy Settings							
					< BACK	NEXT >	1 - 1 of 1 Edges
	CANCEL MIGRATION			BACK TO O	/ERVIEW	PREVIOUS	CONTINUE

Figure 35 Migrate Edges

This step expects pre-deployment of correctly sized NSX-T Edges. They must be suitable to support NSX-T with the topology deployed on NSX-V.



vm NSX-T					Ql	`© `	admin
Home Networking Se	ecurity Inventory Plan & Troubleshoo	ot System Advanced Netw	orking & Security				
*	Migrate NSX for vSphere	About					
 System Overview 	Import Configuration > Resolve C	Configuration > Migrate Configu	ration > Migrate Edges >	Migrate Hosts			0
Configuration	Migrating Edges will disrupt the traffic. Rec	ommend to perform edge & host migratio	n in one maintenance window.				×
Appliances	Migration Scope: NSX for vSphere: 192.168.11	0.42 vCenter: 192.168.110.22					Messages 0
Get Started	Overall Progress						
Fabric >	Status O Successful	100% START	ROLLBACK				
⊗ [#] Service Deployments	Details -						
Active Directory	Edge Migration Plan						
Lifecycle Management	NSX Edge	ID	Details	Migration Status	Progress		
📥 Backup & Restore	Edge Services	EDGE		⊘ Successful			100%
👍 Upgrade							
🔄 Migrate							
Settings							
쑴 Users							
🖏 Licenses							
🔄 Certificates							
Support Bundle							
Customer Experience Impro							
Proxy Settings							
					< BACK	NEXT >	1-1 of 1 Edges
ps://192.168.110.35/nsx/#/app/system/home	e/users			BACK TO OV	ERVIEW	PREVIOUS	CONTINUE

Figure 36 Migrate Edges - Rollback

Rollback

UI-driven rollback is supported even after migrating the Edges. Click on ROLLBACK if planning to roll back at this stage. Clicking CONTINUE will move to the final stage of migration, migrating hosts.

Migrate Hosts

This panel offers several options:

- 1. Whether the migration should happen serially (i.e., one host at a time) or in parallel (i.e., all the hosts at the same time)
- 2. Whether there should be a pause between each cluster
- 3. Whether the migration should use maintenance mode; this is available in NSX-T release 3.0 and newer.



vm NSX-T		Q	¢ ⊚-	admin
Home Networking S	ecurity Inventory Plan & Troubleshoot System			
~	Migrate NSX for vSphere About			
System Overview	Import Configuration > Resolve Configuration > Migrate Configuration > Migrate Edges	> Migrate Hosts		۲
Configuration	Migrating Hosts will disrupt the traffic. Recommend to perform edge & host migration in one maintenance window.			×
Appliances	Migration Scope: NSX for vSphere: 192.168.110.42 vCenter Server: 192.168.110.22			
🛄 Get Started	Annual Annual Annual			
🛛 Fabric 🔰	Discovered Hosts 6 Status Not Started 0% START			
₿ [#] Service Deployments	Migrated Hosts @ Not Available Details -			
🗈 Identity Firewall AD	Host Migration Plan SETTINGS			
	TUP & DOWN O ACTIONS			
Lifecycle Management ▲ Backup & Restore	Group Group Change Migration Order Within Group Change Migration State Change Migration State	Order Within Group	Migration Status	Progress
da Upgrade	Group for RegionAC Change Migration Mode Maintenance 2 S	Serial	Not Started	
'ti, Migrate	Group for RegionA01-MGMT01 c3d8tbca • Enabled In-Place 2 S	Serial	Not Started	
Settings	Group for RegionA01-NSXT-MOMT01 c3dBTbca * Do not in-Place 2 S migrate	Serial		

Figure 37 Migrate Hosts - Change Migration Mode

Select the correct options based on the requirements and click start.

Rollback is no longer available at this point. If rollback flexibility is desired, consider using a smaller 2-node test cluster to test the migration. Enable the pause between clusters and continue or roll back based on the outcome on the test cluster.



Workload Migration

There are two approaches available for workload migration:

- 1. NSX-T bridging
- 2. HCX

Note: Workload Migration is only necessary in the case of Lift and Shift approach. With In-Place, Migration Coordinator takes care of both config and workload migration.

NSX-T Bridging

In this approach, an NSX-T bridge is placed on a host that is prepared for NSX-V, with an uplink on the NSX-V segment to be bridged. This allows the bridge to take advantage of decapsulation of VXLAN frames on the ESXi host while only performing Geneve encapsulation. With this approach, one network may be bridged per Edge VM. Additionally, both NSX-V and NSX-T can share the same vCenter

Figure 38 shows the design for an NSX-T bridge-based approach for migrating workloads.



Figure 38 NSX-T Bridge

In this design, the recommended approach is to first move the gateway over to the NSX-T side, check the north/south connectivity



for the workload, and then move the workloads over to the NSX-T side. With this approach, if there are any issues with the north/south connectivity after moving the bridge, the gateway can be moved back to the NSX-V side without needing to move the workloads.

Note: Use NSX-V version 6.4.4 or above to migrate firewall state.

Deploying the Edge Nodes for Bridging

It is important to be aware of two things which allow this technique:

- NSX-T Edge Node VM can be deployed on any ESXi since it has its own TEP. Encapsulation in Geneve is done at the VM level.
- At ESXi level, NSX-V VTEP decapsulate VXLAN before sending to the VM. This means VM running on NSX-V prepared hosts never see VXLAN encapsulation.

This means that an Edge Node VM running on a NSX-V prepared host will see packets without encapsulation coming from NSX-V overlay networks but will be able to send packets in the NSX-T overlay network. This aspect will be leveraged to bridge between NSX-V and NSX-T. Figure 39 shows details regarding the configuration of the NIC of the NSX-T Edge VM deployed on NSX-V host:



Figure 39 Edge Node Configuration for Bridging

The following need to be ensured:

- Management NIC needs to be able to reach NSX-T Managers.
- Tunnel NIC (TEP) must have connectivity the other NSX-T transport Nodes (ESXi hypervisor) allowing encapsulated frame (correct MTU set).
- The third NIC is connected directly to the NSX-V virtual wire we wish to bridge.

The connectivity requirements described between the NSX-T Edge Node and the other NSX-T components can be layer 2 or layer 3.

From a NSX-T configuration perspective, the Edge Node VM requires at least two transport Zones:

- 1. Overlay Transport Zone
- 2. VLAN Transport Zone



We will map those to the two hostswitches described previously:

- 1. Hostswitch 1 associated with an Overlay Transport Zone
 - 1. This Transport Zone is the overlay transport zone shared with the ESXi transport nodes
- 2. Hostswich 2 associated with a VLAN transport Zone
 - 1. Will be used to enable bridging from VLAN 0 (no dot1Q encapsulation). This will allow to bridge the virtual wire connected to this interface to a NSX-T segment

The Edge Node VM must then be made part of an Edge Cluster in NSX-T. If HA of the bridge is required at least two Edge Node VM with the same configuration must be made part of the cluster.

Configuring NSX-T Data Center Bridge between NSX-V and NSX-T

Since NSX-T 3.0.0 the configuration of the Edge Bridge is possible from the Policy API/UI, this is what this document will refer to. (Previous version can leverage the Manager API/UI to configure bridging).

Create an Edge Bridge Profile

The Edge Bridge Profile must be associated with the Edges nodes deployed on NSX-T.

It defines the Edge cluster used for bridging, the primary node, the backup node (optional) and failover policy. It is under Networking / Segments in the UI.

VM NSX-T						Q	¢	@~ 🕻	admin ~
Home Networking See	curity Inventory	Plan & Troubleshoot	System					POLICY	MANAGER
 Network Overview 	SEGMENT	S SEGMENT PROFILES	EDGE BRIDGE PROFILES ME	ETADATA PROXIES					0
🔞 Network Topology	ADD EDGE BRIDO	SE PROFILE				COLLAPSE ALL	Filter by N	Name, Path and mor	e =
Connectivity		Name	Edge Cluster	Primary Node		Backup Node		Fail Over	
💮 Tier-0 Gateways	: 🗸	BridgeProfile1	EdgeCluster1	EdgeNode1		Not Set		Preemptive	
🕀 Tier-1 Gateways		HA Mode	Active Standby		Description	Not Set			
🗐 Segments		Tags	0						

Figure 40 Edge Bridge Profile

For any question look at NSX-T Documentation on Edge Bridge: https://docs.vmware.com/en/VMware-NSX-T-Data-Center/3.1/administration/GUID-6EBA95A1-E27A-4364-AACC-64D5D6D40101.ht ml

Configure the bridging on the segment

The bridging configuration is done on the NSX-T segment being bridged (Networking / Segments / Segment). In order to use Modular Migration Firewall it needs to be a segment with the same VNI than the NSX-V logical switch.



vm NSX-T							Q	Δ (D~ (admin ~
Home Networking Se	ecurity In	ventory	Plan & Troubleshoot	System					POLICY	MANAGER (1)
Network Overview	🛱 SE	GMENT	SEGMENT PROFIL	ES EDGE BRIDGE PROFILES	METADATA PROXIES					0
[] Network Topology	ADD SE	GMENT					COLLAPSE ALL	Filter by Na	me, Path and more	=
Connectivity			Segment Name	Connected Gateway	Transport Zone	Subnets	Ports	Admin State	Status (j)	Alarms
💮 Tier-O Gateways		~ B	Segment1	None	TZ1 Overlay	Not Set	1	🔴 Up	Success C	0
Tier-1 Gateways			L2 VPN	Not Set		VPN Tunnel ID	Not Set			
🔁 Segments			VLAN	Not Set		Uplink Teaming Policy	Not Set		VIEW RELA	ATED GROUPS
Network Candisan			Domain Name	Not Set		IP Address Pool	Not Set			
			Edge Bridges	1		Metadata Proxy	Not Set			
O PIN			Address Bindings	Not Set		Replication Mode	Hierarchical Two-Tier rep	olication		
≌ EVPN Tenant			Connectivity	On						
-→ NAT			Description	Not Set		Tags	0			
🝕 Load Balancing										

Figure 41 Segment

The Edge Bridge must be configured using the Edge Bridge Profile previously defined with some additional parameters:

- Transport Zone [] This is the VLAN Transport Zone configured previously on the Edge Node hostswitch 2.
- VLAN ID to 0 (packets received on hostswitch2 are not encapsulated).

Bridge to Segment1 Segment Segment1 #Edge Bridges ()			×
ADD EDGE BRIDGE		COLLAPSE ALL	Q Search
Edge Bridge Profile	Transport Zone	VLAN	
BridgeProfile1 (3) ~ : *	TZ2 VLAN Transport Zone 🛛 🛞 🗠 *	O X Enter VLA VLAN ID or VLAN Trun be between 0 and 409	N ID *
Teaming Policy Select Teaming Policy	<u> </u>		
ADD CANCEL			

Figure 42 Add Edge Bridge

Edit the NSX-V logical Switch to enable connectivity

The NSX-T Edge Node VM acts as a bridge, extending layer 2 between the NSX-V logical switch and the NSX-T segment. However, for this to work we need this VM to be able to send and receive packets with different MAC address than its own.

Enable MAC Learning and Forged Transmit

Since vSphere 6.7 MAC learning is a supported feature of the distributed virtual switch which can be enabled by API.

To validate what needs to be enabled we can look at the vCenter MOB.

First we need to get the dvportgroupId of the virtual wire where the Edge Node VM is connected. The simpler way to get it is to click on the object in the UI and get it from the URL.



NSX X 🛛 🗙 Managed Object Browser	x 🚱 vSphere - vxw-dvs-30-virtual x 😵 https://vdc-download.vmware. x	+				
← → C A Not Secure 10.40.75.11/ui/#?extensionId=vs	phere.core.dvPortgroup.relatedVMsTab&objectId=urn:vmon :DistributedVirtualPortg	group:dvportgroup-81 <mark>c</mark> f42c2	3d-4be7-44e2-95ca-ae8	792423158&navigator	* 🚯 🗰 🗸	
🏢 Apps ♀ Workspace One ♀ HelpNow 🔚 Source 🔗 SoYo	uJustGotAMac 📀 Software Portal 📄 VMware Sites 📄 VMware Tools 📄 RSA 🔞	vRealize Automati 55 VMw	are NSX 🔳			
	A There are expired or expiring licenses in your inventory.	SE YOUR LICENSES				×
vm vSphere Client Menu ∨ Q Search in	all environments		C @~	Administrator@VSPHE	ERE.LOCAL V	٢
10 Q Q <u>Q</u>	≧ vxw-dvs-30-virtualwire-8-sid-10950-Vwire-8	ACTIONS ¥				
 ^Q VM Network ^Q Segment1 ^Q VDS-1 ^Q DPortGroup ^Q PingTest-DVPG-100 ^Q 	Summary Monitor Configure Permissions Ports Hosts V Virtual Machines VM Templates in Folders	Ms			T Filter	
	Name	State v Status	 Provisioned Space 	Used Space \lor Host	CPU 🗸 Host Mem	~
A Public-DVPG-4	3-vm_ubuntu-18.04-server-amd64-shared-368-49a1ef1b-1430-453b-b879-5160c0	Powered On 🗸 Normal	45.82 GB	10.45 GB 60 M	Hz 1.02 GB	
VDS-1-DVUplinks-30	sx-edge-31.0.0.0.16783554	Powered On 🗸 Normal	200 GB	9.2 GB 2.12 G	GHz 6.28 GB	

Figure 43 Locating dvportgroupid via URL

From there we can go into the vCenter MOB and get a look at the configuration (under *defaultPortConfig*).

The URI to put in your browser is (replace vcenter with your vCenter address and replace {{dvportgroupId}} by your id): https://vcenter/mob/?moid={{dvportgroupId}}&doPath=config%2edefaultPortConfig

Here we see the parameter which interest us, the *DVSMacManagementPolicy*.

Home Data Object Type: Parent Managed Obj Property Path: confi	Logout	
Properties		
NAME	ТҮРЕ	VALUE
blocked	BoolPolicy	blocked
filterPolicy	DvsFilterPolicy	filterPolicy
inShapingPolicy	DVSTrafficShapingPolicy	inShapingPolicy
ipfixEnabled	BoolPolicy	ipfixEnabled
lacpPolicy	VMwareUplinkLacpPolicy	lacoPolicy
macManagementPolicy	DVSMacManagementPolicy	macManagementPolicy
networkResourcePoolKey	StringPolicy	networkResourcePoolKey

Figure 44 DVSMacManagementPolicy

Under this we need to set both *forgedTransmits* to true.

https://vcenter/mob/?moid={{dvportgroupId}}&doPath=config%2edefaultPortConfig%2emacManagementPolicy



Home

Data Object Type: **DVSMacManagementPolicy** Parent Managed Object ID: **dvportgroup-81** Property Path: **config.defaultPortConfig.macManagementPolicy**

Properties		
NAME	ТҮРЕ	VALUE
allowPromiscuous	© boolean	false
forgedTransmits	boolean	true
inherited	boolean	false
macChanges	boolean	Unset
macLearningPolicy	DVSMacLearningPolicy	macLearningPolicy

Figure 45 ForgedTransmits

And also set *macLearningPolicy* to true, with a limit set to an integer (here 4096) and a limitPolicy (here "DROP")

 $\label{eq:https://vcenter/mob/?moid={dvportgroupId}}&doPath=config%2edefaultPortConfig%2emacManagementPolicy%2emacLearningPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%2emacLearningPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%2edefaultPortConfig%2emacManagementPolicy%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config%&doPath=config$

Home						
Data Object Type: DVSMacLearningPolicy Parent Managed Object ID: dvportgroup-81 Property Path: config.defaultPortConfig.macManagementPolicy.macLearningPolicy						
Properties						
NAME	ТҮРЕ	VALUE				
allowUnicastFlooding	boolean	Unset				
enabled	boolean	true				
inherited	boolean	false				
limit	int	4096				
limitPolicy	string	"DROP"				

Figure 46 macLearningPolicy

This can be achieved using multiple automation tools like PowerCLI or pyvmomi (python).

Resources section of this whitepaper has an example script in Python.

In the case where your logical switch spans multiple DVS and creates multiple PortGroups keep the configuration consistent across all those PortGroups.

Note: An alternative before vSphere 6.7 is to use Promiscuous and Forged transmit (which can be configured from UI or API). However Promiscuous mode sends all packets to all machines which is why MAC learning is preferable. Also, explicitly set AllowUnicastFlooding to false to avoid unicast flooding which could result in CPU related issues

Note: The UI allows to configure Promiscuous and Forged Transmit, however it has been experienced that those configure *DVSSecurityPolicy* (deprecated in 6.7) and not *DVSMacManagementPolicy* as described earlier. To work both with MAC learning or Promiscuous both parameter must be configured under *DVSMacManagementPolicy*.

Validate the connectivity across the Bridge



VM to VM

One simple way to test is to do a ping between VMs on both side of the bridge (one on NSX-V and one on NSX-T). Keep in mind that distributed firewall is here and depending the security policy might block connectivity.

A VM on NSX-T should also be able to ping the default gateway (which is at this point still on NSX-V).

From the Edge Node

Another thing to do is connect to the Edge Node as admin either through SSH or vSphere console and use the Bridge CLI commands to get the bridge status.

For example:

[10-40-77-161> get bridge							
Sat Aug 29 2020 UTC 22:56:19.964							
Bridge Port UUID	:	753523ae-3b17-4bc1-8cf6-9a105675bc73					
Bridge Logical Switch UUID	:	60c8ee36-20f2-52c4-a844-964250480339					
Attached Logical Switch UUID	:	ea5b2220-7b25-4fc5-b413-84dbc392a5aa					
Attached Logical Switch Name	:	Segment1					
VLAN ID	:	untagged					
State	:	Forwarding					
Transport Zone	:	75bd7352-e4c0-43d6-b7e1-f86811c3964d					
Device	:	fp-eth1					
Device State	:	Up					
Rank	:	0					
HA Failover Mode	:	Non-Preemptive					
State	:	Active					
Event	:	Device Up					
Time	:	2020-08-29T20:14:20.750623					
Last RARP	:	2020-08-29 20:14:21.822					
RARP Count	:	3					

Figure 47 get bridge

Bridge CLI commands are described as part of generic NSX-T documentation.

HCX

A second approach to migrate workloads is to use HCX with its network extender capabilities. HCX Network Extension (NCX-NE) allows simultaneous bridging of multiple networks. This is useful in cases whether the applications are spread across multiple segments and need inter-app connectivity for extended periods of time during the migration.

Figure 48 shows the setup to migrate workloads using HCX.





Figure 48 HCX

Using HCX will allow bridging of 8 segments at a time per HCX-NE pair. This is especially useful if a workload spans multiple segments.

This approach will need:

- 1. $2 \times vCenters$ one at the source and the other at the destination
- 2. Each site must have an HCX Manager, HCX IX, and HCX-NE



Conclusion

There are multiple ways to migrate from NSX-V to NSX-T. Migration Coordinator provides a simple automated in-place approach with minimal downtime. Migration Coordinator also allows migrating only the DFW rules and security groups. NSX-T Bridge may be used, in combination with Migration's Coordinator's Modular Migration, to ensure minimal downtime during workload migration phase of Lift and Shift migration approach.

Please check out the lab to try a hands-on example.



Python Example Scripts

vMotion to a specific VIF

Notes on the script:

- This script is modified from the following source: https://github.com/dixonly/samples/blob/main/vmotion.py to allow vMotion to a specific VIF
- 2. Modified version: https://github.com/samuelkommu/vc-samples/blob/main/vmotion.py
- 3. This script expects a resource pool "nsxt" to be available on the destination cluster.
- 4. This script is designed for Python 3
- 5. Usage note below is for the case where source and destination vCenter is the same

Usage: python vMotionDL.py -s <vCenter> -u <vCenter username> -p <vCenter password> -l <Segment on NSX-T> -n <VM to vMotion> -e <Host to vMotion to>

- # Copyright 2016-2020 VMware, Inc.
- # SPDX-License-Identifier: BSD-2

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DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS

INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE

OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#

Purpose: vMotion to a specific VIF

#



```
#
```

```
from pyVim import connect
from pyVmomi import vim
from pyVmomi import vmodl
#from tools import tasks
import atexit
import argparse
import subprocess
import ssl
def parseParameters():
  parser = argparse.ArgumentParser(
       description='Arguments to connect to vCenter to add a hosts to a cluster')
  parser.add_argument('-s', '--sourcevc',
       required = True,
       action = 'store',
       help = 'Source Vcenter server name or IP')
  parser.add argument('-d', '--destvc',
              required=False,
              action='store',
              help="Destination VC server name or IP")
  parser.add_argument('-u', '--user',
       required=True,
       action='store',
       help='User name to connect to vcenter')
  parser.add_argument('-p', '--password',
       required=True,
       action='store',
       help = 'Password for connection to vcenter')
  parser.add argument('-c', '--cluster',
       required=False,
       action='store',
       help = 'Cluster name to poweron VM. Overides the --servers argument ')
  parser.add argument("-e", '--server',
       required=False,
       action = 'store',
```



```
help = "ESXi server to power on VM. Ignored if servers provided")
  parser.add_argument('-v', '--datastore',
               required=False,
               help="Destination datastore volume")
  parser.add argument('-l', '--network',
               required=False, nargs="*",
               help="Destination network")
  parser.add argument("-n", '--name',
       required = False,
       action='store',
       help = "VM name or name pattern to match for poweron ")
  args = parser.parse_args()
  if not args.server and not args.cluster:
    print("Either destination server or cluster must be provided")
    return False
  return args
def getObject(inv, vimtype, name, verbose=False):
  .....
  Get object by name from vcenter inventory
  .....
  obj = None
  container = inv.viewManager.CreateContainerView(inv.rootFolder, vimtype, True)
  for i in container.view:
    try:
       if verbose:
          print("Checking %s %s against reference %s" %(i.name, i. mold, name))
       if i.name == name:
          obj = i
          break
    except vmodl.fault.ManagedObjectNotFound:
       #print("VM %s no longer exist")
       # This is if object was deleted after container view was created
       pass
  return obj
def setupNetworks(vm, host, networks, vif_id):
```



```
# this requires vsphere 7 API
nics = []
for d in vm.config.hardware.device:
  if isinstance(d, vim.vm.device.VirtualEthernetCard):
    nics.append(d)
if len(nics) > len(networks):
  print("not enough networks for %d nics on vm" %len(nics))
  return None
netdevs = []
for i in range(0,len(nics)):
  v = nics[i]
  n = networks[i]
  if isinstance(n, vim.OpaqueNetwork):
    # Is the source opaque net same as destination?
    opaque=False
    if isinstance(v.backing, vim.vm.device.VirtualEthernetCard.OpaqueNetworkBackingInfo):
       if v.backing.opaqueNetworkId == n.summary.opaqueNetworkId:
         opaque=True
         originalLs=v.backing.opaqueNetworkId
    v.backing = vim.vm.device.VirtualEthernetCard.OpaqueNetworkBackingInfo()
    v.backing.opaqueNetworkId = n.summary.opaqueNetworkId
    v.backing.opaqueNetworkType = n.summary.opaqueNetworkType
    v.externalId = vif id
  elif isinstance(n, vim.DistributedVirtualPortgroup):
    # create dvpg handling
    vdsPgConn = vim.dvs.PortConnection()
    vdsPgConn.portgroupKey = n.key
    vdsPgConn.switchUuid = n.config.distributedVirtualSwitch.uuid
    v.backing = vim.vm.device.VirtualEthernetCard.DistributedVirtualPortBackingInfo()
    v.backing.port = vdsPgConn
  else:
```

v.backing = vim.vm.device.VirtualEthernetCard.NetworkBackingInfo()

v.backing.network = n

v.backing.deviceName = n.name



print("Connect to vcenter: %s" %args.destvc)

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atexit.register(connect.Disconnect, di)

by Broadcom

```
virdev = vim.vm.device.VirtualDeviceSpec()
    virdev.device = v
    virdev.operation = vim.vm.device.VirtualDeviceSpec.Operation.edit
    netdevs.append(virdev)
  return netdevs
def main():
  print("This script is not supported by VMware. Use at your own risk")
  args = parseParameters()
  password = args.password
  if hasattr(ssl, 'SSLContext'):
    context = ssl.SSLContext(ssl.PROTOCOL_SSLv23)
    context.verify mode=ssl.CERT NONE
    si = connect.SmartConnect(host=args.sourcevc, user=args.user, pwd=password, sslContext=context)
  else:
    si = connect.SmartConnect(host=args.sourcevc, user=args.user, pwd=password)
  if not si:
    print("Could not connect to source vcenter: %s " %args.sourcevc)
    return -1
  else:
    print("Connect to vcenter: %s" %args.sourcevc)
    atexit.register(connect.Disconnect, si)
  if not args.destvc or args.sourcevc == args.destvc:
    di = si
  else:
    if hasattr(ssl, 'SSLContext'):
       context = ssl.SSLContext(ssl.PROTOCOL SSLv23)
       context.verify_mode=ssl.CERT_NONE
       di = connect.SmartConnect(host=args.destvc, user=args.user, pwd=password, sslContext=context)
    else:
       di = connect.SmartConnect(host=args.destvc, user=args.user, pwd=password)
    if not di:
       print("Could not connect to destination vcenter: %s " %args.destvc)
      return -1
    else:
```

```
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```

sinv = si.RetrieveContent()

sdc = sinv.rootFolder.childEntity[0]

```
if args.destvc:
  dinv = di.RetrieveContent()
  ddc = dinv.rootFolder.childEntity[0]
else:
  dinv = sinv
  ddc = sdc
relocSpec = vim.vm.RelocateSpec()
#print(sinv)
#print(dinv)
if sinv != dinv:
  if not args.server and not args.cluster and not args.datastore and not args.network:
     print("XV Vmotion requires host, cluster, datastore, and network")
    return None
  up = vim.ServiceLocator.NamePassword(username=args.user, password=password)
  sl = vim.ServiceLocator(credential=up,
                 instanceUuid=dinv.about.instanceUuid,
                 url="https://%s" % args.destvc)
  relocSpec.service = sl
vm = getObject(sinv, [vim.VirtualMachine], args.name, verbose=False)
rp = getObject(sinv, [vim.ResourcePool], "nsxt")
print rp
if not vm:
  print("VM %s not found" %args.name)
  return
```

else:

print("VM %s %s found" % (vm.name, vm._mold))

host=None

```
if args.server:
```

```
host = getObject(dinv, [vim.HostSystem], args.server)
if not host:
```



```
print("Host %s not found" %args.server)
```

return

else:

print("Destination host %s found." % host.name)

cluster=None
if args.cluster:
cluster = getObject(dinv, [vim.ClusterComputeResource], args.cluster)
if not cluster:
print("Cluster %s not found" % args.cluster)
return
else:
print("Destination cluster %s found, checking for DRS recommendation" % cluster.name)
if host and host.parent.resourcePool != cluster.resourcePool:
print("Destination host %s and cluster %s are not resource pool"
%(host.name, cluster.name))
return
if not cluster.configuration.drsConfig.enabled and not host:
print("Destination cluster %s is not DRS enabled, must specify host"
%cluster.name)
return
if not host and cluster resourcePool ym resourcePool
print("Must provide bost when migrating within same cluster")
roture
Tetum
if not host:
rhost = cluster.RecommendHostsForVm(vm=vm, pool=cluster.resourcePool)
if $len(rhost) == 0$:
print("No hosts found in cluster %s from DRS recommendation for migration"
%args.cluster)
return
else:
print("DRS recommends %d hosts" %len(rhost))
host = rhost[0].host
if host:

```
relocSpec.host = host
relocSpec.pool = rp
```

```
if cluster:
    #relocSpec.pool = cluster.resourcePool
    relocSpec.pool = rp
  datastore=None
  if args.datastore:
    datastore = getObject(dinv, [vim.Datastore], args.datastore)
    if not datastore:
       print("Datastore %s not found" % args.datastore)
       return
    else:
       print("Destination datastore %s found." % datastore.name)
       relocSpec.datastore = datastore
  networks=[]
  for n in args.network:
    print("Searching VCenter for destination network(s)")
    network = getObject(dinv, [vim.Network], n, verbose=False)
    if not network:
       print("Network %s not found" % args.network)
       return
    else:
       print("Destination network %s found." % network.name)
       networks.append(network)
  devices = vm.config.hardware.device
  nic_devices = [device for device in devices if isinstance(device, vim.vm.device.VirtualEthernetCard)]
  vnic_changes = []
  for device in nic_devices:
    vif_id = vm.config.instanceUuid + ":" + str(device.key)
    netSpec=setupNetworks(vm, host, networks, vif id)
    relocSpec.deviceChange = netSpec
    print("Initiating migration of VM %s" %args.name)
    vm.RelocateVM Task(spec=relocSpec, priority=vim.VirtualMachine.MovePriority.highPriority)
if __name__ == "__main__":
  main()
```



Enable MAC Learning and Forged Transmit on Port Group

Notes on the script:

- 1. Original script location: https://github.com/tvigneron/vc-script-repo/blob/main/enable_maclearning.py
- 2. This script is based on Python 3

Usage: python enable_maclearning.py -s <vCenter> -u <vCenter username> -p <vCenter password> -pg <portgroup>

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#

Purpose: Enables MAC Learning and Forged Transmit on a given PortGroup

#

#

from pyVim.connect import SmartConnect

import ssl



```
from pyVmomi import vim
import time
import argparse
#Put relevant informations for your environment:
def parseParameters():
  parser = argparse.ArgumentParser(
       description='Arguments to connect to vCenter')
  parser.add_argument('-s', '--sourcevc',
       required = True,
       action = 'store',
       help = 'Vcenter server name or IP')
  parser.add_argument('-u', '--user',
       required=True,
       action='store',
       help='User name to connect to vcenter')
  parser.add argument('-p', '--password',
       required=True,
       action='store',
       help = 'Password for connection to vcenter')
  parser.add argument('-pg', '--portgroup',
              required=True,
               action='store',
               help= 'PortGroup (name) on which to set MAC Learning and Forged Transmit')
  args = parser.parse_args()
  return args
def connect_vcenter(sourcevc, user, password):
  context = ssl. create unverified context()
  si= SmartConnect(host=str(sourcevc), user=str(user), pwd=password,sslContext=context)
  return si
def get all objs(content, vimtype):
```

obj = { }

```
container = content.viewManager.CreateContainerView(content.rootFolder, vimtype, True)
```

for managed_object_ref in container.view:

```
obj.update({managed_object_ref: managed_object_ref.name})
```



return obi

def wait_for_task(task, actionName='job', hideResult=False):

while task.info.state == vim.TaskInfo.State.running or str(task.info.state) == "queued": time.sleep(2)

if task.info.state == vim.TaskInfo.State.success:

output = 'Success.\n The task %s completed successfully.' % actionName

print(output)

else:

output = 'The task %s failed and did not complete successfully: %s' % (actionName, task.info.error)
raise task.info.error
print(output)

return task.info.result

def enable_maclearning_forgedtransmit(si, content, portgroup):

for virtualportgroup in get_all_objs(content, [vim.dvs.DistributedVirtualPortgroup]):

if virtualportgroup.name == portgroup:

spec = vim.dvs.DistributedVirtualPortgroup.ConfigSpec()

spec.defaultPortConfig = vim.dvs.VmwareDistributedVirtualSwitch.VmwarePortConfigPolicy()

spec.configVersion = virtualportgroup.config.configVersion

spec.defaultPortConfig.macManagementPolicy= vim.dvs.VmwareDistributedVirtualSwitch.MacManagementPolicy()

spec.defaultPortConfig.macManagementPolicy.macLearningPolicy= virtualportgroup.config.defaultPortConfig.macManagementPolicy.macLearningPolicy

spec.defaultPortConfig.macManagementPolicy.inherited = False

spec.defaultPortConfig.macManagementPolicy.macLearningPolicy.enabled = True spec.defaultPortConfig.macManagementPolicy.macLearningPolicy.inherited = False spec.defaultPortConfig.macManagementPolicy.macLearningPolicy.limit = 4096 spec.defaultPortConfig.macManagementPolicy.macLearningPolicy.limitPolicy = "DROP"

spec.defaultPortConfig.macManagementPolicy.forgedTransmits = True

task = virtualportgroup.ReconfigureDVPortgroup_Task(spec = spec) wait_for_task(task, si)

if __name__ == "__main__":
 #Get user input from CLI



args = parseParameters()

print(args.sourcevc, args.user, args.password, args.portgroup)

#Initiate a session to vCenter

si = connect_vcenter(args.sourcevc, args.user, args.password)

content = si.content

#Enable Mac learning and forged transmit

enable_maclearning_forgedtransmit(si, content, args.portgroup)



References

Documentation:

- VMware NSX-T Data Center Documentation provides a list of resources, including API and CLI guides
- NSX-T Data Center Migration Coordinator Guide

Design Guides on NSX-T:

• VMware NSX-T Reference Design

Try out NSX-T for free:

• Getting Started Hands-on Lab for NSX-T Data Center

Other resources

- Migration from VMware NSX for vSphere to NSX-T
- Watch the Demo of VMware NSX-T Migration Coordinator
- How to Use Migration Coordinator's Automated Maintenance Mode
- Demo of Migration Coordinator's Automated Maintenance Mode



