VMware HCX User Guide

23 FEB 2021

VMware HCX

You can find the most up-to-date technical documentation on the VMware website at:

https://docs.vmware.com/

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About the VMware HCX User Guide

The VMware® HCX™ *User Guide* describes how to plan for, install, and operate VMware HCX services in a vSphere data center. The information includes step-by-step configuration instructions and operational procedures.

Intended Audience

This information is for anyone who wants to install, upgrade, or use VMware HCX. The information is for Windows or Linux system administrators who are familiar with virtual machine technology and data center operations.

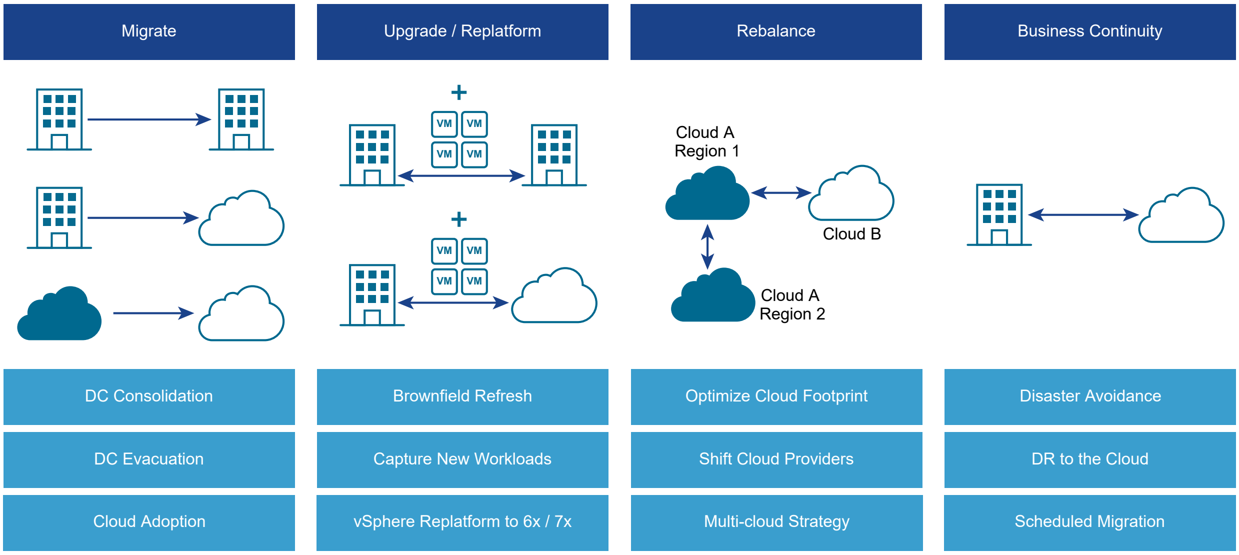
VMware Technical Publications Glossary

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

VMware HCX Overview

1

VMware HCX is an application mobility platform that is designed for simplifying application migration, workload rebalancing, and business continuity across data centers and clouds.



Migrate	Upgrade / Replatform	Rebalance	Business Continuity
DC Consolidation	Brownfield Refresh	Optimize Cloud Footprint	Disaster Avoidance
DC Evacuation	Capture New Workloads	Shift Cloud Providers	DR to the Cloud
Cloud Adoption	vSphere Replatform to 6x / 7x	Multi-cloud Strategy	Scheduled Migration

VMware HCX enables:

- Application migration

  You can schedule and migrate thousands of vSphere virtual machines within and across data centers without requiring a reboot.

- Change platforms or upgrade vSphere versions

  With HCX, you can migrate workloads from vSphere and from non-vSphere (KVM and Hyper-V) environments within and across data centers or clouds to current vSphere versions without requiring an upgrade.

- Workload rebalancing

  Workload rebalancing provides a mobility platform across cloud regions and cloud providers to allow customers to move applications and workloads at any time to meet scale, cost management, compliance, and vendor neutrality goals.

- Business continuity and protection

Using HCX capabilities, administrators can protect workloads by replicating them to other HCX enabled sites. Workload migration is available on-demand, or it can be scheduled for business or for maintenance planning.

VMware HCX Services

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The HCX offers various services based on the type of license installed with the system.

HCX is available with an Advanced and an Enterprise license. HCX Advanced delivers basic connectivity and mobility services to enable hybrid interconnect and migration services. HCX Enterprise offers add-on functionality for scalability and performance when transforming large data centers or moving large quantities of virtual machines to cloud infrastructures.

HCX Advanced is a requirement for HCX Enterprise in all deployments except for VMware HCX for Cloud on AWS, which includes support for all HCX Advanced services as well as select HCX Enterprise features and services with no additional license requirement and at no additional cost.

For more information, see VMware HCX Licensing and Packaging Overview.

Advanced Services	Description
Interconnect	This service creates and secures connections between HCX installations, supporting management, migration, replication, and disaster recovery operations. This service is deployed as a virtual appliance.
WAN Optimization	The WAN Optimization service works with the HCX Interconnect service to improve the network performance through a combination of deduplication, compression, and line conditioning techniques. This service is deployed as a virtual appliance.
Network Extension	This service extends the Virtual Machine networks from an HCX-enabled source site to an HCX-enabled remote site. Virtual Machines that are migrated or created on the extended segment at the remote site are Layer 2 adjacent to virtual machines placed on the origin network. This service is deployed as a virtual appliance.
Bulk Migration	This service uses VMware vSphere Replication protocol to move virtual machines in parallel between HCX enabled sites.
vMotion Migration	This migration method uses the VMware vMotion protocol to move a single virtual machine between HCX enabled sites with no service interruption.
Disaster Recovery	The HCX Disaster Recover service replicates and protects virtual machines to a remote data center.

Enterprise Services	Description
Mobility Groups	This service supports assembling one or more virtual machines into logical sets for migration and monitoring as a group. Group migration provides the flexibility to manage migrations by application, network, or other aspects of your environment.
OS Assisted Migration	This migration service moves Linux- or Windows-based non-vSphere guest virtual machines from their host environment to a VMware vSphere enabled data center. This service comprises two appliances. The HCX Sentinel Gateway appliance is deployed the source site, and the HCX Sentinel Data Receiver appliance at the destination site. This service also requires the installation of HCX Sentinel software on each guest machine.
Replication Assisted vMotion (RAV)	This service uses both VMware Replication and vMotion technologies for large-scale, parallel migrations with no service interruption.
Site Recovery Manager (SRM) Integration	This service integrates HCX functionality with the VMware SRM for protection and recovery operations.
Traffic Engineering ■ Application Path Resiliency ■ TCP Flow Conditioning	VMware HCX provides settings for optimizing network traffic for HCX Interconnect and Network Extension services. ■ The Application Path Resiliency service creates multiple tunnel flows, for both Interconnect and Network Extension traffic, those may follow multiple paths across the network infrastructure from the source to the destination data centers. The service then intelligently forwards traffic through the tunnel over the optimal path and dynamically switches between tunnels depending on traffic conditions. ■ The TCP Flow Conditioning service adjusts the segment size during the TCP connection handshake between end points across the Network Extension. This optimizes the average packet size to reduce fragmentation and lower the overall packet rate.
Mobility Optimized Networking (MON)	MON is an enterprise capability of the VMware HCX Network Extension (HCX-NE) feature. MON enables optimized application mobility for virtual machine application groups that span multiple segmented networks or for virtual machines with inter-VLAN dependencies, as well as for hybrid applications, throughout the migration cycle. Migrated virtual machines can be configured to access the internet and cloud provider services optimally, without experiencing the network tromboning effect.

VMware HCX Components

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VMware HCX comprises a virtual management component at both the source and destination sites, and up to five types of VMware HCX Interconnect service appliances depending on the HCX license. VMware HCX services are configured and activated at the source site, and then deployed as virtual appliances at the source site, with a peer appliance at the destination site.

HCX Connector and HCX Cloud Installations

In the HCX site-to-site architecture, there is notion of an HCX source and an HCX destination environment. Depending on the environment, there is a specific HCX installer: HCX Connector or HCX Cloud. HCX Connector is always deployed as the source. HCX Cloud is typically deployed as the destination, but it can be used as the source in cloud-to-cloud deployments. In HCX-enabled public clouds, the cloud provider deploys HCX Cloud. The public cloud tenant deploys HCX Connector on-premises.

The source and destination sites are paired together for HCX operations.

Note An HCX Connector cannot be paired with another HCX Connector.

In both the source and the destination environments, HCX is deployed to the management zone, next to each site's vCenter Server, which provides a single plane (HCX Manager) for administering VMware HCX. This HCX Manager provides a framework for deploying HCX service virtual machines across both the source and destination sites. VMware HCX administrators are authenticated, and each task authorized through the existing vSphere SSO identity sources. VMware HCX mobility, extension, protection actions can be initiated from the HCX User Interface or from within the vCenter Server Navigator screen's context menus.

In the NSX Data Center Enterprise Plus (HCX for Private to Private deployments), the tenant deploys both source and destination HCX Managers.

HCX-IX Interconnect Appliance

The HCX-IX service appliance provides replication and vMotion-based migration capabilities over the Internet and private lines to the destination site whereas providing strong encryption, traffic engineering, and virtual machine mobility.

The HCX-IX appliance includes deployment of the Mobility Agent service that appears as a host object in the vCenter server. Mobility Agent is the mechanism that HCX uses to perform vMotion, Cold, and Replication Assisted vMotion (RAV) migrations to a destination site.

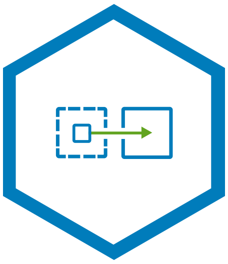
HCX WAN Optimization Appliance

The VMware HCX WAN Optimization service improves performance characteristics of the private lines or Internet paths by applying WAN optimization techniques like the data de-duplication and line conditioning. It makes performance closer to a LAN environment. It accelerates on-boarding to the destination site using Internet connections, without waiting for Direct Connect/MPLS circuits.

HCX Network Extension Virtual Appliance

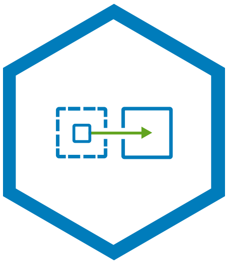
The HCX Network Extension service provides a low-touch operation for faster performance (4–6 Gbps) Layer 2 Extension from environments that use a vSphere Distributed Switch, or NSX Networking. HCX Network Extension provides the ability to keep the same IP and MAC addresses during virtual machine migrations. HCX Network Extension with Mobility Optimized Networking eliminates "tromboning" between migrated virtual machines on different extended segments, and virtual machines on native NSX-T networks at the destination.

HCX Sentinel Gateway Appliance



Using VMware HCX OS Assisted Migration (OSAM), you can migrate guest (non-vSphere) virtual machines from on-premise data centers to the cloud. The OSAM service has several components: the HCX Sentinel software that is installed on each virtual machine to be migrated, a Sentinel Gateway (SGW) appliance for connecting and forwarding guest workloads in the source environment, and a Sentinel Data Receiver (SDR) in the destination environment.

HCX Sentinel Data Receiver Appliance



The HCX Sentinel Data Receiver (SDR) appliance works with the HCX Sentinel Gateway appliance to receive, manage, and monitor data replication operations at the destination environment.

VMware HCX Deployment Types

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The HCX deployment type varies depending on the environments being connected.

HCX deployments use the following terminology:

Software Defined Data Center (SDDC)

Software Defined Data Center (SDDC) refers to an environment using current VMware software. An SDDC can refer to a private (on-premise) cloud or public cloud that meets the requirements of the HCX destination. The SDDC is typically the destination for HCX migrations and network extension. See Software Version Requirements.

Legacy vSphere

A legacy environment uses vSphere Version 6.0 or higher and optionally uses NSX. These environments typically contain the workloads to migrate and the networks to extend.

Public Cloud

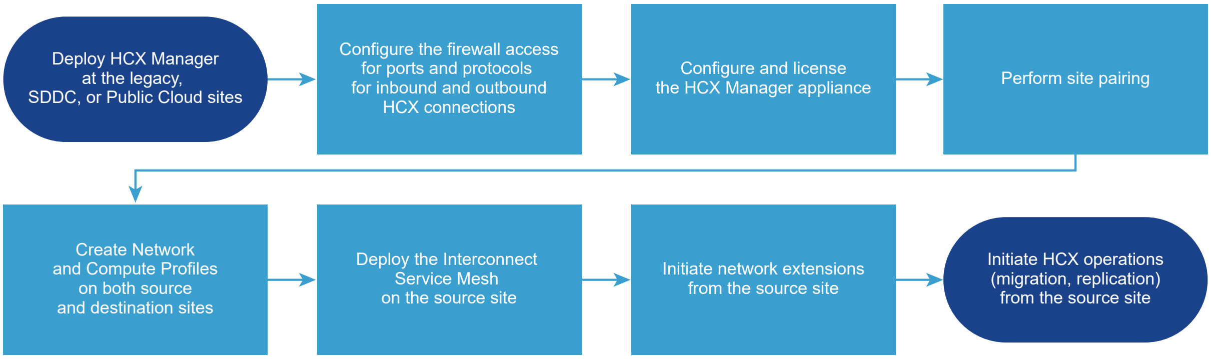
An SDDC that is offered as a service by HCX-enabled public cloud providers. For example, VMware Cloud on AWS (VMC). A public cloud is typically the destination for migrations and network extension.

> **Note** VMC uses the term "SDDC" to describe a compute instance in the cloud.

HCX deployments fall into several types:

Deployment	Description
Legacy vSphere to SDDC	In this deployment type, the HCX Connector at the Legacy site initiates Site Pairing, and the Service Mesh appliances initiate the Interconnect tunnels. The HCX Cloud Manager and the Service Mesh appliances at the SDDC site are the receivers.
Legacy vSphere to Public Cloud	In this deployment type, the HCX Connector at the Legacy site initiates Site Pairing, and the Service Mesh appliances initiate the Interconnect tunnels. The HCX Cloud Manager and the Service Mesh appliances at the Public Cloud are the receivers.
Cloud-to-Cloud (Public Cloud to Public Cloud, SDDC to SDDC, or SDDC to Public Cloud)	In this deployment type, the HCX Manager at the SDDC or the Public Cloud can initiate or receive Site Pairing requests and act as the initiator or receiver during the HCX Interconnect tunnel creation. **Note** Cloud-to-cloud deployment is not available for VMware Cloud Director (vCD) and VMware Integrated OpenStack (VIO).

In any of these deployment types, HCX is functionally the same, and the same general workflow applies:


Deploy HCX Manager at the legacy, SDDC, or Public Cloud sites
Configure the firewall access for ports and protocols for inbound and outbound HCX connections
Configure and license the HCX Manager appliance
Perform site pairing
Create Network and Compute Profiles on both source and destination sites
Deploy the Interconnect Service Mesh on the source site
Initiate network extensions from the source site
Initiate HCX operations (migration, replication) from the source site

Preparing for HCX Installations

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This section describes the system requirements, network ports, and protocols that must be allowed and various other requirements, like software versions and feature interoperability requirements.

This chapter includes the following topics:

System Requirements for HCX

Before installing or deploying HCX, consider the required resources for both the source and destination environments.

Hardware Requirements for HCX Appliances

Appliance	vCPU	Memory	Disk Space/IOPS
HCX Manager	4	12 GB	60 GB
HCX-IX	8	3 GB	2 GB
HCX-NE	8	3 GB	2 GB
HCX-WAN-OPT	8	14 GB	100 GB / 5000 IOPS

Appliance	vCPU	Memory	Disk Space/IOPS
HCX-SGW (source only)	8	8 GB	21 GB (disks: 2 GB, 6 GB, 4 GB, and 9 GB)
HCX-SDR (destination only)	8	8 GB	21 GB (disks: 2 GB, 6 GB, 4 GB, and 9 GB)

Note The storage requirement per appliance is doubled during the HCX upgrade and redeploy operations, as a second appliance is created for the duration of the operation.

Scaling the HCX Deployment

HCX Manager is deployed per vCenter Server.

The other HCX virtual appliances deploy per service mesh.

The network extension appliance (HCX-NE) has a one-to-one relationship to a distributed virtual switch (DVS).

Software Version Requirements

Infrastructure components must be running the supported software versions.

Software Version Requirements for HCX Installations

Note In cloud-to-cloud deployments, the HCX Cloud environment requirements apply to both sides of a site pair.

Note For granular compatibility information, select **VMware HCX** in the VMware Product Interoperability Matrix.

For information about General Availability (GA), End of Support (EoS), End of Technical Guidance (EoTG) for VMware software, see VMware Product Lifecycle Matrix.

Component Type	HCX Connector Environment Requirements	HCX Cloud Environment Requirements
HCX	A compatible version is provided automatically as a download link in the HCX Cloud Manager interface.	■ New HCX Cloud installations must be deployed using the latest HCX software. Use the VMware HCX Installer at `downloads.vmware.com`. **Note** New deployments automatically upgrade to the latest version as part of the HCX installer operation. ■ To expand existing HCX installations not running the latest release, you can choose to use the HCX version currently deployed in the environment. In this case, the HCX Installer from downloads.vmware.com cannot be used because it automatically upgrades the HCX appliance to the latest version. **Note** Engage Global Support Services to obtain the HCX Cloud and the Connector OVAs for the required version.
vSphere version	■ vSphere versions within Technical Guidance or newer	■ Generally available vSphere versions listed in the VMware Product Interoperability Matrix.
NSX	■ Generally available NSX versions listed in the VMware Product Interoperability Matrix.	■ Generally available NSX versions listed in the VMware Product Interoperability Matrix.
Cloud Director	■ Not supported at the source.	■ Generally available Cloud Director versions listed in the VMware Product Interoperability Matrix.

Additional Software Version Considerations

This section highlights requirements currently in the footnotes of the VMware Product Interoperability Matrix for clarity.

HCX Component	Version Requirements
HCX Connector with End of Support software	vSphere and NSX versions in the End of Support phase are supported only with HCX Connector installations, for evacuation purposes, until the End of Technical Guidance: ■ NSX-T 2.5 until Sept 19, 2022 ■ vSphere 6.0 until March 12, 2022 ■ vSphere 5.5 is no longer supported.
HCX Cloud Manager with vSphere 7.x	NSX-T 3.0.1 or later.
HCX Cloud Manager with VMware Cloud Director	NSX-T 3.1.1 or later.
HCX Cloud Manager with NSX for vSphere	NSXv 6.4.8 or later.
Mobility Optimized Networking (MON)	NSX-T 3.0 or later.
Replication Assisted vMotion (RAV)	vSphere 6.5 U3F+ or vSphere 6.7 U3+.
Coexistence with vSphere Replication and Site Recovery Manager (SRM)	vSphere Replication 8.1 or later, and SRM 8.1 or later.

Network Port and Protocol Requirements

HCX deployments require setting various ports for communication between services on the HCX appliance itself and between HCX pairs at the source and destination sites.

The following ports must be allowed in HCX deployments:

- The source site firewalls must be configured to allow outbound connections to the destination HCX systems.
- The destination site firewalls must be configured to allow inbound connections from the source HCX system.
- Connections initiated from the source HCX to the destination HCX.
- Connections within a single HCX site, either at the source or destination environment. These connections never traverse from source to destination or from destination to source.
- Connections made when the HCX is added as a solution in a vRealize Operations installation.

For a complete list of network port and protocol requirements, see VMware Ports and Protocols.

User Account and Role Requirements

HCX configuration and operation requires an understanding of the various accounts and roles involved in deploying, managing, and operating the system.

User Accounts

HCX has the following account requirements:

Account	Requirements	Additional Information
admin	■ The admin password must be set. ■ The root password must be set.	■ Created during the OVA deployment. ■ Used in the Appliance Management (https://*hcx-ip-or-fqdn*:9443) ■ Used for CLI/terminal shell access.
Account for vCenter Server Registration	The account must belong to the vSphere administrators group, or have the administrator role assigned.	■ The administrator@vsphere.local account is suggested by default, but not required. ■ Alternate vSphere SSO local users that meet the requirements can be used. ■ Active Directory service accounts that meet the requirements can be used.
Account for NSX Registration	If NSX-T, this account must have the Enterprise Admin role assigned. If NSXv, this account must have the Enterprise Administrator role assigned.	■ The NSX admin account is suggested by default, but not required. ■ Alternate NSX local accounts that meet the requirements can be used. ■ Active Directory service accounts that meet the requirements can be used. ■ Prior to NSX-T Data Center 3.0, it is mandatory to use the NSX admin account. **Note** This account is generally not required for HCX Connector installations. It is required only when extending NSX Segments, or migrating NSX Tags.
Account for vCloud Director Registration	The account must have the System Administrator role assigned.	■ The VMware Cloud Director's sysadmin account is suggested by default, but not required. ■ An alternate local account that meets the requirements can be used. ■ LDAP service accounts that meet the requirements can be used. **Note** This account is only required for provider installations of VMware HCX with vCloud Director. A tenant does not require this account.

Account	Requirements	Additional Information
Accounts for HCX Role Mapping (This refers to SSO User accounts that will be mapped to an HCX role.)	The user’s group must be included in the HCX Role Mapping configuration.	■ HCX supports two user roles: Administrator and Tenant: ■ HCX Administrator is for those who configure and operate HCX (create and manage Compute Profiles, Site Pairings, Service Meshes, Network Extensions, Migrations, and DR operations). ■ HCX Tenants are for Service Provider installations only. This role does not support adding or deleting Network Profiles. ■ The vsphere.local\Administrators vSphere SSO Group is added by default to HCX Administrator. However, it is not mandatory to use this SSO group. For the HCX Tenant role, no default group is provided. ■ A common practice is to create an hcx-administrators vSphere SSO Group. SSO and Active Directory users are populated into the hcx-administrators vSphere SSO group. The default vsphere.local\Administrators HCX Administrator user group entry in the HCX Role Mapping configuration is replaced with the new hcx-administrators vSphere SSO group.
Site Pairing Accounts	The user’s group must be included in the HCX Role Mapping configuration (on the remote HCX Cloud system being paired). The user's group can be in either the HCX Administrators group or the HCX Tenant group.	The site pairing user is entered along with the HCX Cloud’s URL in the site pairing configuration on the source HCX Manager system. The following are typical scenarios: ■ In a private data center HCX deployment, the site pairing user is traditionally the administrate user for the destination vSphere environment. ■ In a dedicated public cloud HCX deployment , the site pairing user is traditionally the SDDC administrator account provided to the tenant. ■ In a VMware Cloud Director HCX deployment, the site pairing user is the Organization Administrator account.

Note vCenter Server, NSX Manager, and VMware Cloud Director registration accounts (“service accounts”) must have global object access.

HCX Role Mapping

Access to HCX services and features depends on the assigned user role. User roles are assigned in the HCX appliance management interface during the initial HCX activation and configuration.

HCX Administrator

SSO groups assigned to the HCX Administrator role have unrestricted access to perform all HCX configurations and operations.

HCX Tenant

This role is intended for use by HCX Service Providers. SSO groups assigned to the HCX Tenant role cannot add or delete HCX Network Profiles.

Note The HCX Tenant role is not available in HCX Connector deployments.

vSphere Privileges for Migration Operations

User groups assigned to the HCX Administrator or the HCX Tenant role must have these vSphere vCenter Server privileges to perform migrations.

vCenter Resource Type	User Privilege	Description
ComputeResource	■ VirtualMachine.Inventory.Create ■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.State.CreateSnapshot ■ VirtualMachine.State.RemoveSnapshot	Privileges required on the destination ComputeResource object when performing a migration operation.
HostSystem	■ VirtualMachine.Inventory.Create ■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.State.CreateSnapshot ■ VirtualMachine.State.RemoveSnapshot	Privileges required on the destination HostSystem object when performing a migration operation.
ClusterComputeResource	■ VirtualMachine.Inventory.Create ■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.State.CreateSnapshot ■ VirtualMachine.State.RemoveSnapshot	Privileges required on the destination ClusterComputeResource object when performing a migration operation.

vCenter Resource Type	User Privilege	Description
ResourcePool	■ VirtualMachine.Inventory.Create ■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.State.CreateSnapshot ■ VirtualMachine.State.RemoveSnapshot	Privileges required on the destination ResourcePool object when performing a migration operation.
Folder	■ VirtualMachine.Inventory.Create ■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.State.CreateSnapshot ■ VirtualMachine.State.RemoveSnapshot	Privileges required on the destination Folder object when performing a migration operation.
Datacenter	■ VirtualMachine.Inventory.Create ■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.Interact.PowerOff ■ Resouce.HotMigrate ■ Resouce.ColdMigrate ■ Folder.Create ■ Folder.Delete	Privileges required on the destination Datacenter objects when performing a migration operation.
Datastore	■ Datastore.UpdateVirtualMachineMetadata ■ Datastore.DeleteFile	Privileges required on the destination Datastore objects when performing a migration operation.
DistributedVirtualPortgroup/Network	Network.Assign	Privileges required on the destination Network objects when performing a migration operation.
VirtualMachine	■ VirtualMachine.Interact.PowerOn ■ VirtualMachine.Interact.PowerOff ■ Resource.HotMigrate ■ Resource.ColdMigrate ■ VirtualMachine.State.CreateSnapshot ■ VirtualMachine.State.RemoveSnapshot ■ VirtualMachine.Hbr.ConfigureReplication ■ VirtualMachine.Hbr.MonitorReplication	Privileges required on the source Virtual Machines when performing a migration operation.

Using the HCX Interface

You access HCX services and appliances through one of several interfaces.

VMware HCX has the following user interfaces:

Interface	Description
vSphere Client	You can perform all operations related to HCX services from the HCX Plug-in in the vSphere Client. This interface is not available in vCD clouds.
HCX Manager UI	At both the source or destination site, you perform all operations related to HCX services by logging in to the HCX Manager at <https://hcx-ip-or-fqdn:443>.
HCX Appliance Management	At both the source or destination site, you perform system management, licensing, and upgrade operations by logging in to the HCX Manager at <https://hcx-ip-or-fqdn:9443>.
Central CLI	You access the CCLI for debugging or troubleshooting HCX issues with VMware representatives. For access to the CCLI, see Logging in to the VMware HCX Manager Shell.

HCX Activation and Licensing

The HCX service features are available based on the installed license.

HCX licenses are available in two types: Advanced and Enterprise. The Advanced license is packaged with NSX Data Center Enterprise Plus, VMware Cloud on AWS, VCF Enterprise and from VMware Cloud Provider Partners. The HCX Enterprise license is available for purchase to NSX Enterprise Plus customers. For a list of services available with each license type, see Chapter 2 VMware HCX Services.

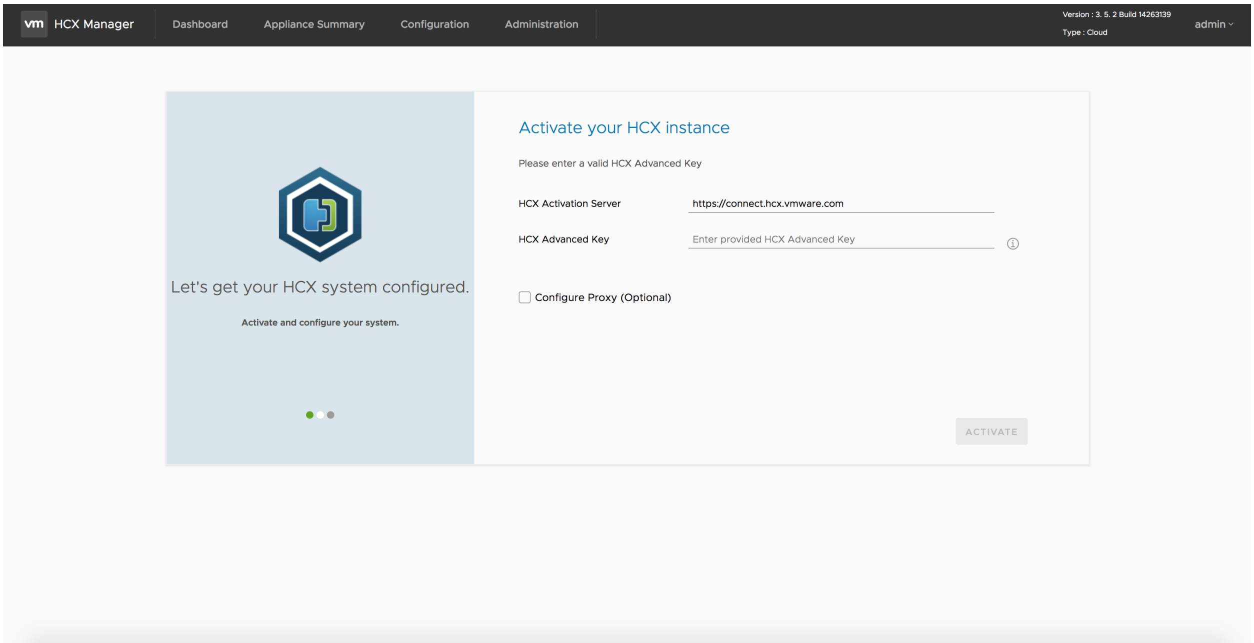
Activating or Licensing New HCX Systems

Activation requirements refer to any information required to activate a newly deployed HCX system.

HCX Activation Requirements

The HCX system must be activated before services like migration and extension can be triggered.

During the initial configuration of the HCX Manager, the wizard displays an activation screen:


vm HCX Manager
Dashboard
Appliance Summary
Configuration
Administration
admin
Let's get your HCX system configured.
Activate and configure your system.
☐ Configure Proxy (Optional)
ACTIVATE

Version : 3. 5. 2 Build 14263139

Type : Cloud

Activate your HCX instance

Please enter a valid HCX Advanced Key

HCX Activation Server: https://connect.hcx.vmware.com

HCX Advanced Key: Enter provided HCX Advanced Key

Requirement	Details
Activating the system requires network access from the HCX Manager system to https://connect.hcx.vmware.com and a valid activation key or license key.	To test connectivity from the HCX Manager, use SSH to connect to the HCX Manager shell. `curl -k -v https://connect.hcx.vmware.com`
Network access from the HCX Manager system to `https://connect.hcx.vmware.com` when there is a proxy for outbound HTTPS connections.	If there is a proxy server in the environment, the proxy server must be configured on the HCX Manager. The proxy settings can be configured in the Administration interface. To resume the Initial Configuration Wizard, click the dashboard tab. Caution By default, when you configure a proxy server, the system uses that server for all HTTPS connections, including the local vCenter Server, ESXi, NSX, and HCX-IX. For a successful deployment, define all related proxy exceptions when you configure a proxy server.
Activating an HCX Connector in a private cloud HCX installation.	An HCX Connector does not require unique activation keys. It uses the same HCX Advanced and HCX Enterprise licenses used on the destination HCX Cloud. Enter NSX Datacenter Enterprise Plus license when prompted for the **HCX Advanced Key**. The **HCX Enterprise Key** can be added to the HCX Connector after providing an HCX Advanced license key.
Activating HCX Cloud systems when using a private vSphere or vCloud Director as the destination environment.	Use NSX Data Center Enterprise Plus licenses from my.vmware.com. Enter this license when prompted for the **HCX Advanced Key**. NSX Data Center Enterprise Plus evaluation licenses may be used, but they must be updated to full keys for operations exceeding the trial limits.

Requirement	Details
Activating HCX with VMware Cloud on AWS.	Obtain the activation keys for the HCX system following the cloud provider's procedures. Enter this activation key when prompted for the **HCX Advanced Key**. Obtaining the activation keys for VMware HCX in VMware Cloud on AWS. ■ Log in to console.cloud.vmware.com. ■ Open VMware HCX > Activation Keys > CREATE ACTIVATION KEYS. ■ Create an HCX Cloud key for VMware Cloud on AWS SDDC. ■ Create a key for the HCX Connector on-premises system.
Activate Later	This option allows HCX activation to be temporarily skipped. To complete the installation while waiting for proxy or firewall allow additions, choose this option. The activation keys can be entered in the Appliance Management Configuration interface.
Grace Period	A small grace period allows the installation of HCX components. After the grace period expires, the system stops all associated services and operations. After the installation, the HCX systems must maintain an outbound connection to the central service URL, `connect.hcx.vmware.com`.

Updating an HCX Evaluation License Key

You can update VMware HCX installations using evaluation or trial activation keys to use a standard HCX Advanced License key.

Note This procedure is applicable to both the source and destination HCX systems activated with NSX Data Center Enterprise Plus trial licenses (or expiring licenses).

This procedure, however, does not apply for HCX systems connecting with a VMware HCX-enabled public cloud.

Prerequisites

- Administrative access to the HCX system.
- NSX Data Center Enterprise Plus purchased license.

Procedure

1. Navigate to the HCX Appliance Management interface: `https://hcx-ip-or-fqdn:9443`.
2. Navigate to the **Configuration** tab.
3. Select **License** on the side menu and click **Edit**.
4. Enter the new HCX Advanced license (NSX Enterprise Plus key), and click **UPDATE**.

Removing or Adding the HCX Enterprise Upgrade Key

You can update evaluation or trial activation keys to use a premium HCX Enterprise license, or if no license exists, you can add the HCX Enterprise license.

This procedure is applicable to both the source and destination HCX Manager systems.

Prerequisites

- Administrator access to the HCX Manager system.
- HCX Enterprise purchased license.

Procedure

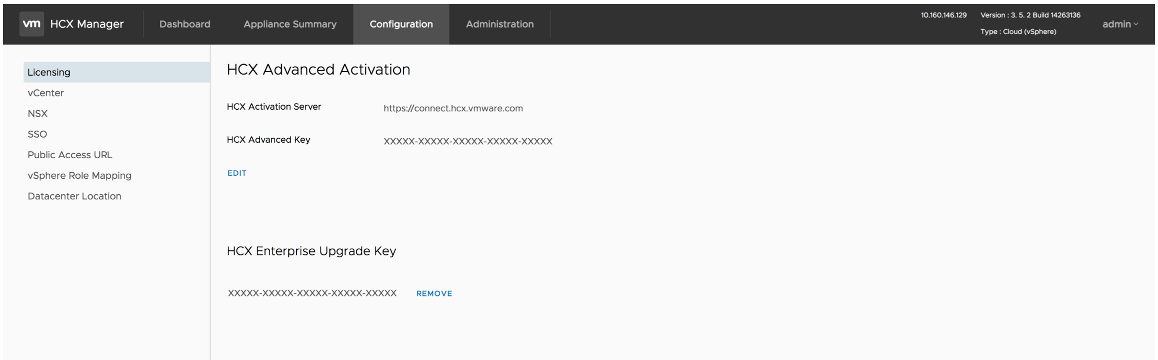
1 Navigate to the Appliance Management Interface `https://hcx-ip-or-fqdn:9443`.

2 Navigate to the **Configuration** tab.

3 Select **License** on the side menu and click **Edit**.

4 Remove or add the HCX Enterprise license key:

◆ Remove an HCX Enterprise license key.



10.160.146.129 Version : 3. 5. 2 Build 14263136
Type : Cloud (vSphere)

HCX Advanced Activation

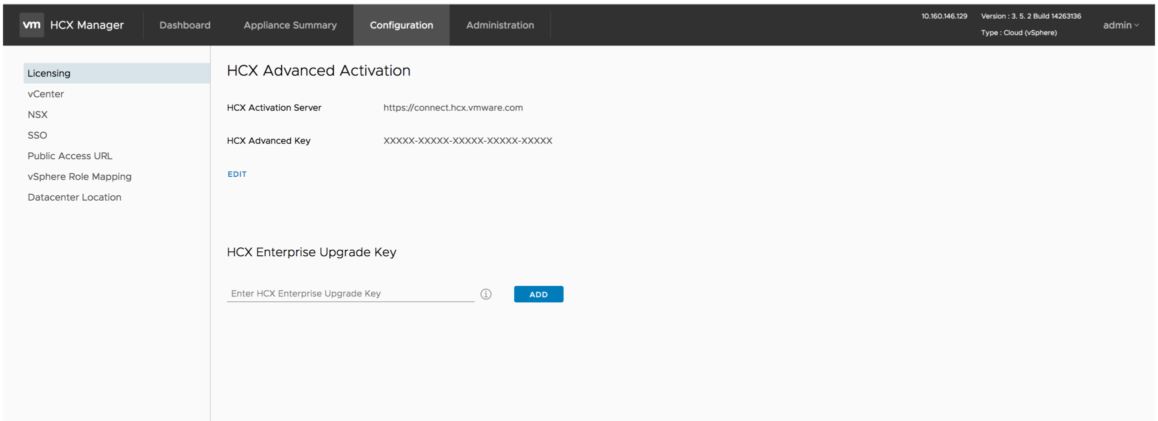
HCX Activation Server https://connect.hcx.vmware.com
HCX Advanced Key XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

HCX Enterprise Upgrade Key

XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

a Click **REMOVE** to remove the existing license key.

◆ Add an HCX Enterprise license key.



10.160.146.129 Version : 3. 5. 2 Build 14263136
Type : Cloud (vSphere)

HCX Advanced Activation

HCX Activation Server https://connect.hcx.vmware.com
HCX Advanced Key XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

HCX Enterprise Upgrade Key

a Enter the HCX Enterprise license, and click **ADD**.

NSX Requirements for HCX Deployments

In VMware HCX installations connecting private environments, NSX must be installed and configured before deploying HCX. This section details the requirements.

NSX Requirements for HCX Appliance Deployments

NSX must be installed and configured, including integration with the target vCenter Server, before deploying the HCX appliance.

- In the destination environment, NSX Manager must be installed and integrated with the target vCenter Server. Minimum supported NSX versions:
  - NSX for vSphere 6.4.8 and higher.
  - NSX-T 2.4 and higher.
- An NSX Data Center Enterprise Plus license is required. This license is used to activate the HCX systems, and provides access to HCX Advanced features.
- The NSX Manager must be registered during the HCX install with the admin user.
  - If the NSX Manager IP or FQDN uses self-signed certificates, it may be necessary to trust the NSX system manually using the Import Cert by URL interface in the HCX Appliance Management interface.
- The HCX Deployment Cluster (selected during the Compute Profile creation) must be NSX Prepared:
  - NSX Data Center for vSphere - Preparing Clusters for NSX.
  - NSX-T Data Center - Host Preparation.
- NSX requires a Transport Zone capable of creating overlay networks:
  - NSX Data Center for vSphere - Add a Transport Zone.
  - NSX-T Data Center - Create Transport Zones.
- When NSX-T is registered, both Overlay and VLAN segments can be used during the Network Profile creation.
- In multi-vCenter deployments using NSX for vSphere, where HCX is connected with primary and secondary NSX Managers, the secondary NSX Manager must have a local transport zone. Otherwise, HCX is not able to use the transport zone to deploy the Interconnect appliances.
- In NSX-T deployments, HCX supports integration with networking objects created with the NSX Simplified UI/API only.
- Deployment of HCX in environments with multiple Data Centers prepped for NSX and a single vCenter (sharing transport zones and datastores) is not supported.

Note The HCX Network Extension service has additional NSX requirements. See Requirements for Network Extension.

NSX Requirements for the HCX Connector Installation

NSX is not required for HCX Connector installation, but requirements apply if NSX overlay networks are extended with HCX.

- For more information, see NSX Requirements for HCX Appliance Deployments.

Installing the System

6

This section describes how to install and activate the VMware HCX Cloud Manager and VMware HCX Connector components.

VMware HCX has two component services: HCX Cloud Manager and HCX Connector. These components work together to provide the VMware HCX services. In cloud-to-cloud environments, you deploy HCX Cloud Manager at both the source and destination sites. In legacy vSphere-to-cloud (private or public) deployments, you install HCX Connector at your on-premises or legacy site and HCX Cloud Manager at the destination cloud site.

This chapter includes the following topics:

- HCX Installation Workflow
- Downloading the HCX OVAs
- Deploying the Installer OVA in the vSphere Client
- Activating and Configuring HCX

HCX Installation Workflow

This section provides an overview of the HCX installation flow for supported installation scenarios.

HCX Installation Workflow for HCX Public Clouds

A sample public installation workflow using HCX on the VMware Cloud on AWS.

Important Follow the HCX installation procedures provided by your public cloud service.

This section provides an example procedure demonstrating how to use HCX with the VMware Cloud on AWS. Not all these steps must be repeated for each source and destination site pair:

- Steps 1—3, 8, 9 must be performed for each SDDC.
- Steps 4—7 are only required once for each source site.

An HCX Connector installation can pair with many VMware Cloud on AWS SDDCs when the Network Profiles are configured to support them.

1 Prepare the deployment configurations using Checklist B in Getting Started with VMware HCX.

2 Enable HCX in the **Add Ons** tab of your VMware Cloud on AWS SDDC. See Deploying HCX from the VMC Console.

3 In the VMware Cloud on AWS SDDC Console go to the Network and Security tab to perform the following actions:

   a Configure the Management Gateway to allow the HCX Cloud Manager (use the pre-defined HCX group as the destination) to receive inbound TCP-443 connections.

   b If configuring HCX to use AWS Direct Connect with a Private Virtual Interface, see Configuring VMware HCX for Direct Connect Private Virtual Interfaces.

   For more details on the network port configuration, see Network Port and Protocol Requirements.

4 Download the HCX Connector for the Source on-premises installation and site pairing.

   a On the **Add Ons** tab of your SDDC, click **Open HCX** on the HCX card.

   b Navigate to the SDDC tab and click **Open HCX**.

   The browser redirects to `hcx.sddc-*.vmwarevmc.com`.

   c Enter the cloudadmin@vmc.local user and password and click **Log In**.

   d Under the Administration tab, select **System Updates** and click **Request Download Link**.

   An option is provided to download the HCX Connector OVA locally or copy the download link.

5 Deploy HCX Manager in the source environment using the HCX Connector OVA. See Deploying the Installer OVA in the vSphere Client.

6 Configure the source site (on-premises) firewall to allow inbound and outbound connectivity based on the HCX services or features used. See https://ports.vmware.com/home/VMware-HCX.

7 Create and activate keys for the source site HCX Connector that will be paired with the HCX Cloud Manager in VMware Cloud on AWS.

   a Log in to console.cloud.vmware.com.

   b On the **Add Ons** tab of your SDDC, click **Open HCX** on the HCX card.

   c Navigate to the **Activation Keys** tab.

   d Create an Activation Key for the source HCX Connector.

   e Enter the created activation key in the source HCX Connector and click **Activate**.

8 Pair HCX Connector with HCX Cloud. See Adding a Site Pair.

   If the HCX Cloud system is prepared using the Multi-Site Service Mesh, see Adding a Site Pair.

9 Enable HCX services to deploy the HCX Interconnect.

   See Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh.

If the HCX Cloud system is prepared using the Multi-Site Service Mesh, see Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh.

HCX Installation Workflow for vSphere Private Clouds

This topic summarizes a fully private HCX installation, where both the destination/modernized environment and the source/legacy environments must be considered.

1. Prepare the deployment configurations using Checklist A in Getting Started with VMware HCX.
2. Download the HCX Installer for the destination site first. See Downloading the Installer OVA.
3. Deploy HCX Manager in the destination environment using the HCX Cloud OVA. See Deploying the Installer OVA in the vSphere Client.
4. Configure firewall rules at source and destination sites to allow inbound and outbound connectivity based on the HCX services or features used. See https://ports.vmware.com/home/VMware-HCX.
5. Activate and Configure the HCX Cloud system. See Activating and Configuring HCX
6. Configure the Compute Profile on the HCX Cloud system, see: Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh.

   Compute Profiles are defined in both HCX Connector and HCX Cloud systems. Later in the workflow, the **Multi-Site Service Mesh** wizard is used to deploy HCX Interconnect services.
7. Deploy the HCX Manager in the source environment using the HCX Connector OVA. See Deploying the Installer OVA in the vSphere Client.
8. Activate and Configure the HCX Connector system. See Activating and Configuring HCX
9. Pair HCX Connector with HCX Cloud. See Adding a Site Pair.
10. To deploy the HCX Interconnect, enable HCX services at the source site. See Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh.

HCX Installation Workflow for vCloud Director Private Clouds

This topic summarizes a fully private HCX installation, where both the destination/modernized environment and the source/legacy environments must be considered. In this workflow, the destination system is integrated with vCloud Director.

1. Prepare the deployment configurations using Checklist A in Getting Started with VMware HCX.
2. Download the HCX Installer for the destination site first. See Downloading the Installer OVA.
3. Deploy HCX Manager in the destination environment using the HCX Cloud OVA. See Deploying the Installer OVA in the vSphere Client.
4. Configure firewall rules at source and destination sites to allow inbound and outbound connectivity based on the HCX services or features used. See https://ports.vmware.com/home/VMware-HCX.
5. Activate and Configure the HCX Cloud system. See Activating and Configuring HCX .

During this step, select vCloud Director as the installation type and select the additional vCloud Director-specific details (for example, Public Access URL, AMQP).

6 Prepare the destination site's HCX Cloud system for Interconnect Deployments using the Multi-Site Service Mesh, see: Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh. Define Compute and Network Profiles.

7 Deploy HCX Connector in the source environment using the HCX Connector OVA. See Deploying the Installer OVA in the vSphere Client.

8 Activate and Configure the HCX Connector system. See Activating and Configuring HCX .

9 Pair HCX Connector with HCX Cloud. See Adding a Site Pair. Note the vCloud Director-specific information when connecting a vCloud Director-based target site.

10 To deploy the HCX Interconnect, enable HCX services at the source site. See Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh.

Downloading the HCX OVAs

You use separate OVA files to deploy HCX Connector and HCX Cloud Manager.

The installer OVA provides the image necessary to deploy HCX Cloud Manager. You obtain the installer OVA from the VMware downloads site. You obtain the HCX Connector OVA file by accessing the HCX Cloud Manager service interface after you have fully deployed and activated HCX Cloud Manager.

Downloading the Installer OVA

The installer OVA is used for deploying HCX Cloud Manager in a vSphere cloud environment.

In public cloud deployments, the cloud service provider may deploy HCX Cloud Manager.

Use this procedure to download the installer OVA.

Procedure

1 Navigate to `https://downloads.vmware.com`.

2 Search for **HCX**.

3 Select **VMware HCX**.

4 Click **Download Now**.

Results

This installer updates itself to the most current service updates.

What to do next

Deploy the downloaded installer OVA in the vCenter Server. See Deploying the Installer OVA in the vSphere Client.

Downloading the HCX Connector OVA

The HCX Connector OVA is used when deploying VMware HCX at the legacy site in legacy-to-vSphere cloud environments.

You obtain the HCX Connector OVA from the **System Updates** selection in the HCX Cloud Manager service UI.

Prerequisites

Before you can download the HCX Connector OVA, you must install, activate, and configure the HCX Cloud Manager.

Procedure

1. Navigate to the HCX Cloud Manager service interface: **https://*hcxcloudmgr-ip-or-fqdn***.
2. Log in using the vSphere SSO user credentials (or vCloud Directory system administrator in VCD-integrated HCX Managers).
3. Navigate to the **Administration** tab.
4. Navigate to **System Updates** using the left-side menu.
5. Click **Request Download Link**.

What to do next

Deploy the downloaded HCX Connector OVA in the vCenter Server. See Deploying the Installer OVA in the vSphere Client.

Note The same procedure for deploying the installer OVA applies to deploying the Connector OVA.

Deploying the Installer OVA in the vSphere Client

Deploying the installer OVA requires a standard OVA template installation through the vSphere Client.

Procedure

1. Connect to the vCenter Server client and deploy the OVF Template.
2. Browse and select the `<filename>.ova` file, and click **Next**.
3. Enter a virtual machine name and the inventory location, and click **Next**.
4. Select a compute resource location, and click **Next**.
5. Review the Deploy OVF Template Details and click **Next**.
6. Read and accept the VMware End User License Agreement, and click **Next**.
7. Select the virtual disk format, Storage Policy, storage name, and then click **Next**.

8 Select the Destination Network, and click **Next**.

9 Set the appropriate properties.

- **Passwords**
  - Provide an admin password.
  - Provide a root password.
- **Network Properties**
  - Enter a host name for the virtual machine that you are installing.
- **Static Route**
  - Optionally, provide the IPv4 Network, the Prefix Length, and Gateway IP address for any networks that cannot be accessed through the default gateway.
- **DNS**
  - Enter the DNS server.
- **Services Configuration**
  - NTP Server List.

10 Click **Next**.

11 Review the deployment settings and click **Finish**.

What to do next

Allow up to 5 minutes for initialization, then browse to the appliance management interface for the initial activation using `https://hcx-ip-or-fqdn:9443`.

Activating and Configuring HCX

After you have deployed the OVA file, activate the system and perform the initial configuration immediately when you next open the appliance management interface.

Note You use this same procedure for both HCX Cloud Manager and HCX Connector deployments.

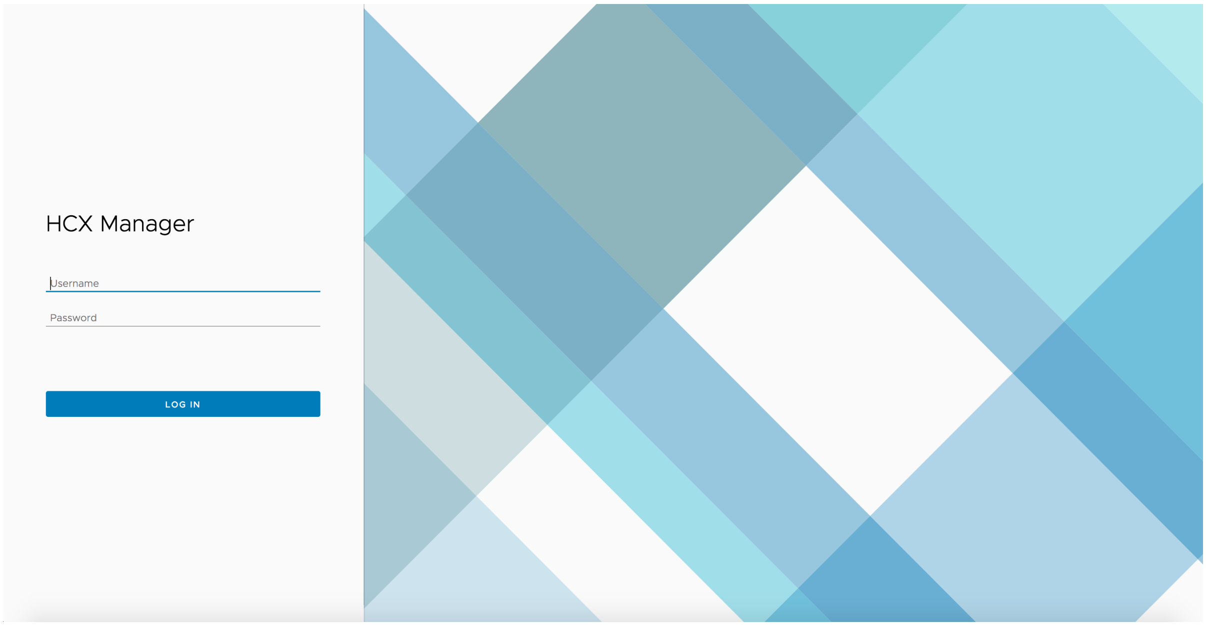
Prerequisites

- The OVA deployment must complete before you begin. Allow up to five minutes after the installer OVA deployment for the services to initialize.
- Configure firewall rules at source and destination sites to allow inbound and outbound connectivity based on the HCX services or features used. See https://ports.vmware.com/home/VMware-HCX.
- Obtain the activation key based on the HCX destination type. See Activating or Licensing New HCX Systems.

Procedure

1 Browse to the appliance management interface and log in using the admin user credentials.

Browse to `https://hcx-ip-or-fqdn:9443`.

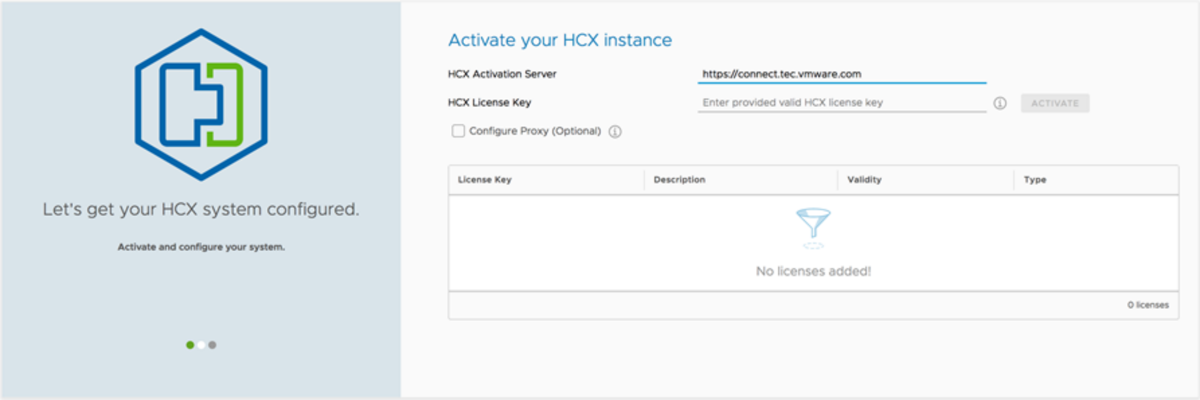


After you log in, the installation welcome screen appears.

2 Click **Continue**.

The activation screen appears.

3 Enter the License Key.


Let's get your HCX system configured.

Activate and configure your system.

Activate your HCX instance

HCX Activation Server: https://connect.tec.vmware.com

HCX License Key: Enter provided valid HCX license key

☐ Configure Proxy (Optional)

License Key	Description	Validity	Type

No licenses added!

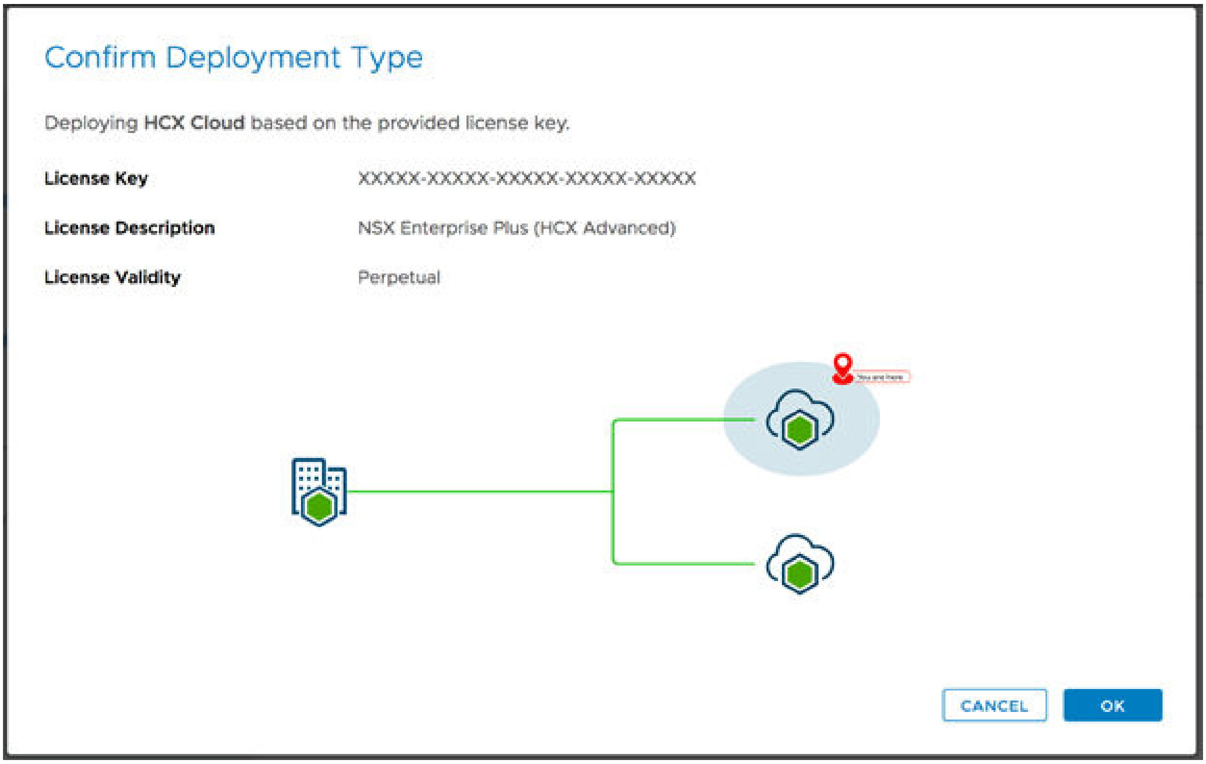
0 licenses

4 (Optional) If there is a proxy server in the environment in the path for outbound HTTPS connections, check Configure Proxy.

If a proxy server is entered, add the local vCenter, ESXi, NSX, SSO, and HCX-IX systems as exceptions not to be sent to the proxy server.

5 Click **Activate**.

The system prompts you to confirm the deployment type. The system detects the deployment type based on the license key and displays a graphic illustrating the installation component.



Confirm Deployment Type

Deploying **HCX Cloud** based on the provided license key.

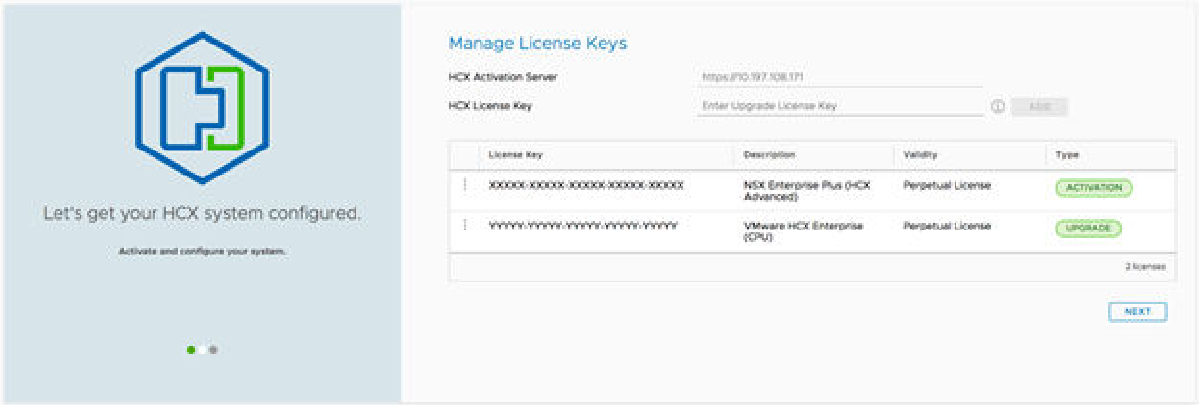
License Key	XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
License Description	NSX Enterprise Plus (HCX Advanced)
License Validity	Perpetual

6 Click **OK**.

The Manage License Keys screen appears.

7 (Optional) If you have an HCX Enterprise License (upgrade) key, enter it in the HCX License Key field, and click **Add**.

The upgrade license key is added to the license key table with the activation key. The table includes information about each license key and its duration.



Let's get your HCX system configured.

Activate and configure your system.

Manage License Keys

HCX Activation Server: https://10.197.108.171

HCX License Key: Enter Upgrade License Key

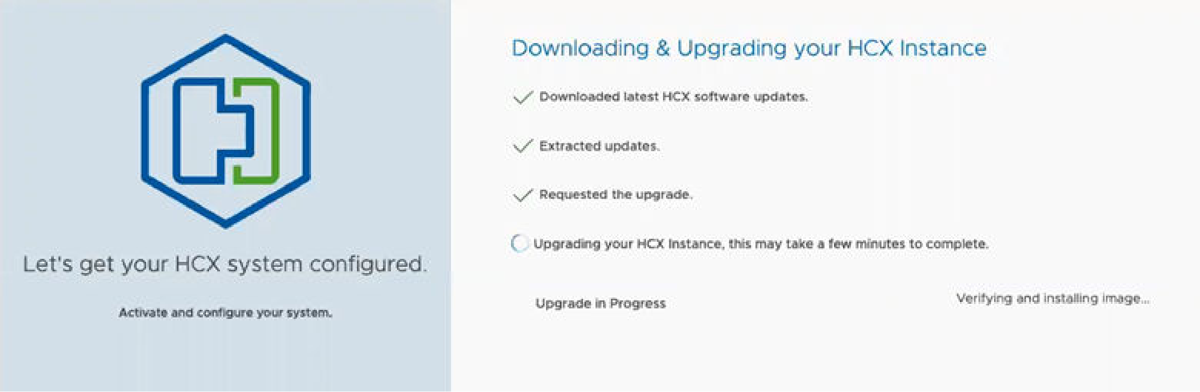
License Key	Description	Validity	Type
XXXXX-XXXXX-XXXXX-XXXXX-XXXXX	NSX Enterprise Plus (HCX Advanced)	Perpetual License	ACTIVATION
YYYYY-YYYYY-YYYYY-YYYYY-YYYYY	VMware HCX Enterprise (CPU)	Perpetual License	UPGRADE

2 licenses

8 Click Next.

9 Observe the system download information.

After you enter the license information and confirm the deployment type, the system begins downloading the image file that is specific to the deployment type. If upgrades are available, they are applied before the download. The download process can take several minutes depending on your environment. A display screen provides the download status.



Downloading & Upgrading your HCX Instance

✓ Downloaded latest HCX software updates.

✓ Extracted updates.

✓ Requested the upgrade.

○ Upgrading your HCX Instance, this may take a few minutes to complete.

Upgrade in Progress

Verifying and installing image...

Let's get your HCX system configured.
Activate and configure your system.

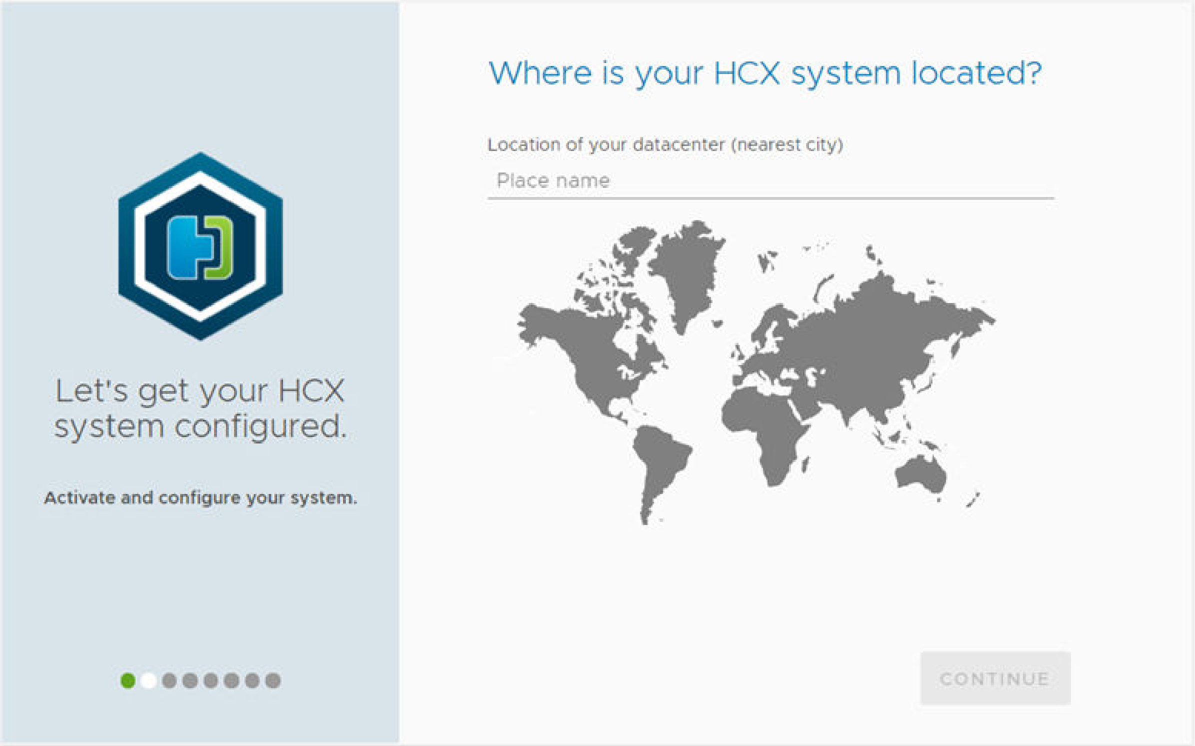
When the download is complete, the system reloads, and the log in screen appears.

10 To start the configuration wizard, log in to the system using the admin user credentials.

The system location screen appears.

11 Enter the location where you are deploying the system.

Select the nearest major city to where the HCX system is geographically located. HCX sites are represented visually in the Dashboard.



Where is your HCX system located?

Location of your datacenter (nearest city)

Place name

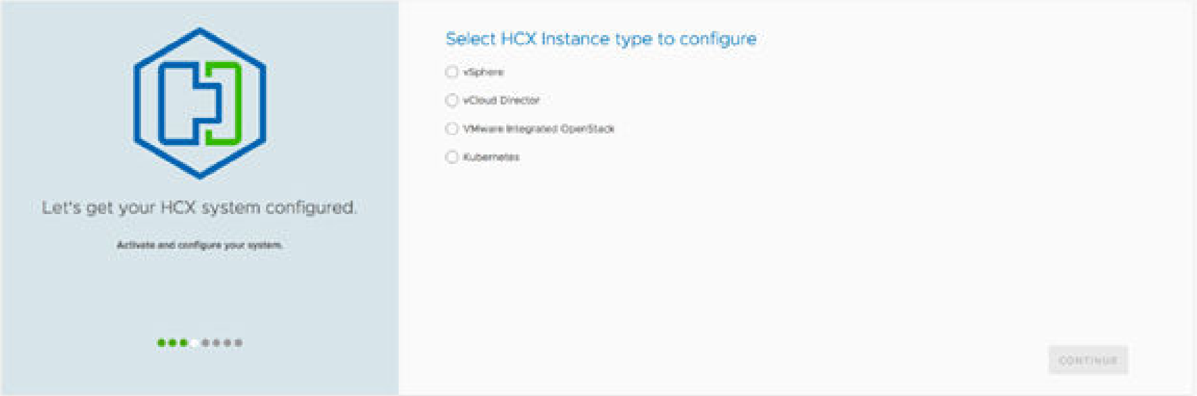
Let's get your HCX system configured.
Activate and configure your system.
CONTINUE

12 Click **Continue**.

A screen appears prompting you for a system name.

13 Enter the system name, and click **Continue**.

A screen appears prompting you to select the cloud instance type.


Let's get your HCX system configured.
Activate and configure your system.
Select HCX Instance type to configure
○ vSphere
○ vCloud Director
○ VMware Integrated OpenStack
○ Kubernetes
CONTINUE

14 Select the cloud instance to which VMware HCX will be connected: vSphere, vCloud Director, or VMware Integrated OpenStack.

The HCX can connect to only one cloud instance per deployment.

Note Kubernetes is not available for VMware HCX.

---

15 Click **Continue**.

A series of screens appears, prompting you for the selection details.

16 Enter the configuration details for the selected cloud instance.

After entering the information, click **Continue** to proceed to the next screen

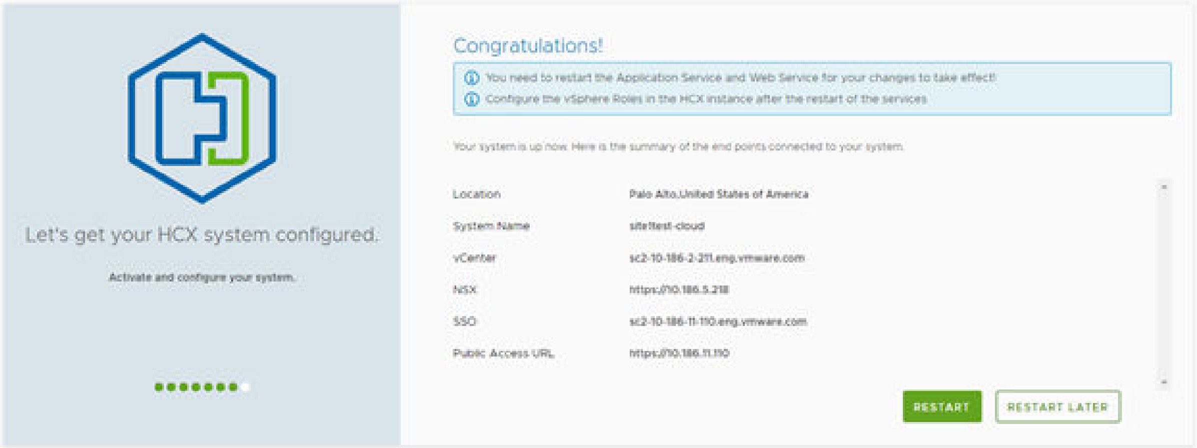
Cloud Instance	Configuration Parameters
vSphere	a vCenter Server and NSX details 1 vCenter Server ■ vCenter URL ■ User name ■ Password 2 NSX ■ NSX URL ■ User name ■ Password b SSO details ■ vCenter Server or Platform Services Controller URL c Public Access URL details ■ URL through which the HCX Manager is accessed. **Note** This is typically the HCX Manager services UI: https//*<hcx-mgr-fqdn-or-ip>*.
vCloud Director	a vCloud Director details ■ vCloud Director URL ■ System Administrator user name ■ System Administrator password b vCenter Server and NSX details **Note** The HCX Manager automatically fetches the vCenter Server and NSX URLs. 1 vCenter Server ■ User name ■ Password 2 NSX ■ User name ■ Password c AMQP details **Note** The HCX Manager automatically fetches the AMQP parameters. Edit the parameters as appropriate. ■ AMQP Host name ■ Port ■ vHost ■ User name ■ Password ■ Use SSL
VMware Integrated OpenStack	a VMware Integrated OpenStack (VIO) details ■ OpenStack Management Server (OMS) URL ■ User name

Cloud Instance	Configuration Parameters
	- Password b Keystone details - Admin user name - Admin password c Domains and Projects details **Note** You can add Multiple VIO Domains and Projects. 1 Add New Domain For each Domain, provide the following details. - Domain Name (select from the drop-down) - User name - Password - Projects (optional) For each Domain, you can add multiple Projects. - Project Name (select from the drop- down) - User name - Password d vCenter and NSX details 1 vCenter Server - vCenter URL - User name - Password 2 NSX - NSX URL - User name - Password e AMQP details - AMQP Host name - Port - vHost - User name - Password - Use SSL

The system verifies the configuration and then generates a configuration summary.

17 Review the system summary information.

Summary information can vary depending on the cloud instance type.


Let's get your HCX system configured.
Activate and configure your system.
RESTART
RESTART LATER

Congratulations!

You need to restart the Application Service and Web Service for your changes to take effect!

Configure the vSphere Roles in the HCX instance after the restart of the services

Your system is up now. Here is the summary of the end points connected to your system.

Location Palo Alto,United States of America

System Name sitetest-cloud

vCenter sc2-10-186-2-211.eng.vmware.com

NSX https://10.186.5.218

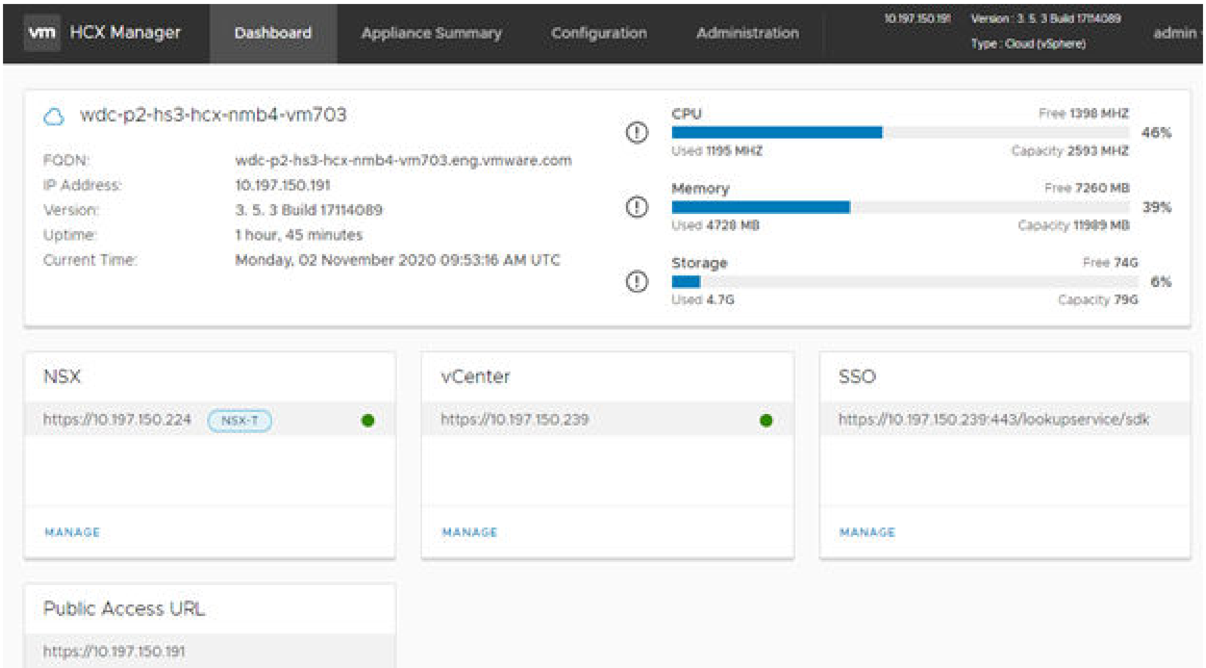
SSO sc2-10-186-11-110.eng.vmware.com

Public Access URL https://10.186.11.110

18 To reload the system, click **Restart**.

It can take several minutes to reinitialize the system completely. During this process, the appliance management interface is not available.

After the system reloads, it displays the appliance management dashboard. For more information about the dashboard, see Understanding the Appliance Management Dashboard.



wdc-p2-hs3-hcx-nmb4-vm703

FQDN: wdc-p2-hs3-hcx-nmb4-vm703.eng.vmware.com

IP Address: 10.197.150.191

Version: 3. 5. 3 Build 17114089

Uptime: 1 hour, 45 minutes

Current Time: Monday, 02 November 2020 09:53:16 AM UTC

NSX

https://10.197.150.224

vCenter

https://10.197.150.239

SSO

https://10.197.150.239:443/lookupservice/sdk

Public Access URL

https://10.197.150.191

19 (vSphere instance only) Configure vSphere roles for the cloud instance.

   a In the appliance management dashboard, navigate to **Configuration > vSphere Role-Mapping**.

   b Assign the HCX Roles to the vCenter User Groups that are allowed to perform HCX operations.

   The groups assigned must have the minimum privileges to perform the HCX-related operations in vCenter Server.

vCenter Resource Type	User Privilege	Description
ComputeResource/HostSystem/ClusterComputeResource/ResourcePool	VirtualMachine.Inventory.Create	On the selected destination compute resource, assign user privileges to create a virtual machine.
ComputeResource/HostSystem/ClusterComputeResource/ResourcePool	VirtualMachine.Interact.PowerOn	On the selected destination compute resource, assign user privileges to power on a virtual machine.
Folder/Datacenter	VirtualMachine.Inventory.Create	On the selected destination folder (vCenter Inventory), assign user privileges to create a virtual machine.
Folder/Datacenter	VirtualMachine.Interact.PowerOn	On the selected destination folder (vCenter Inventory), assign user privileges to power on a virtual machine.
Datastore	Datastore.UpdateVirtualMachineMetadata	On the selected destination datastore, assign user privileges to update virtual machine related files.
Datastore	Datastore.DeleteFile	On the selected destination datastore, assign user privileges to delete files.
DistributedVirtualPortgroup/Network	Network.Assign	On the selected destination Network, assign user privileges to connect NICs.
VirtualMachine	VirtualMachine.Interact.PowerOn	On the selected virtual machine, assign user power-on privileges. This permission is required on source side. All the other permissions are required on destination side.

   c Click **Save**.

Results

The system configuration is complete.

What to do next

Deploy additional HCX systems.

Configuration and Service Limits for VMware HCX

7

When you are configuring, deploying, and operating VMware HCX, you must stay within the supported limits.

VMware HCX maintains an updated list of system and operational limits in the following categories:

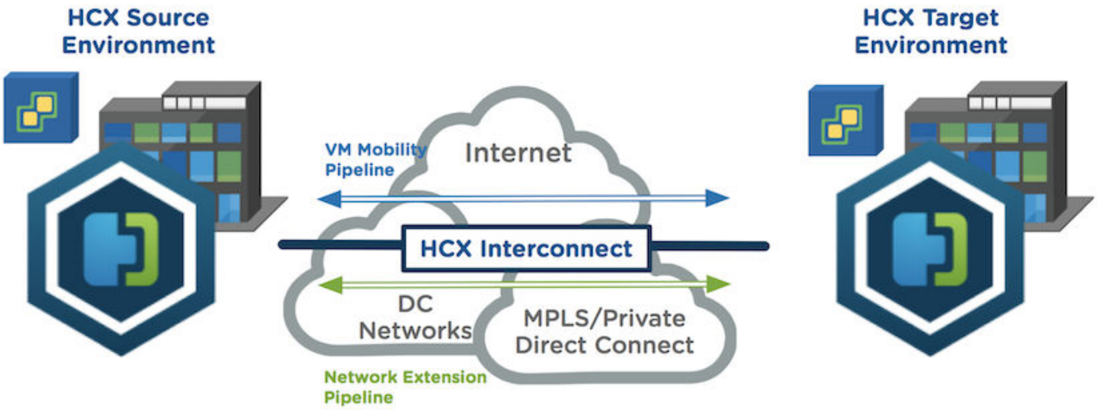
- Sites and Service Components
- Migrations
- Disaster Recovery and Site Recovery Manager
- Network Extension
- Migration-Centric Virtual Machine Limits

For a detailed list of the system limits, refer to the VMware Configurations Maximum tool.

Configuring and Managing the HCX Interconnect

8

The VMware HCX Interconnect provides a secure pipeline for migration, extension, and Virtual Machine protection between two connected VMware HCX sites.



This chapter includes the following topics:

- Overview of the HCX Interconnect Services Deployment with Multi-Site Service Mesh
- Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh
- Sentinel Management

Overview of the HCX Interconnect Services Deployment with Multi-Site Service Mesh

HCX services are deployed and managed using the Multi-Site Service Mesh.

The following steps use the Interconnect Multi-Site Service Mesh interface. Configuration preparation steps are symmetrical.

1 Site Pairing: Register the destination HCX system at the source.

2 Create a Compute Profile in the source and destination HCX environments.

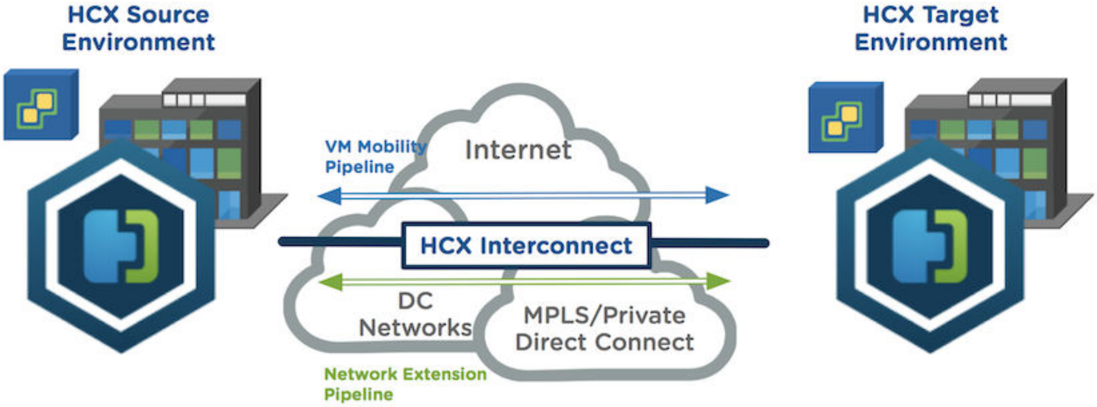
3 Add the Service Mesh at the source:

   a Select a source and destination Compute Profile.

   b Enable a Multi-Site Service Mesh.

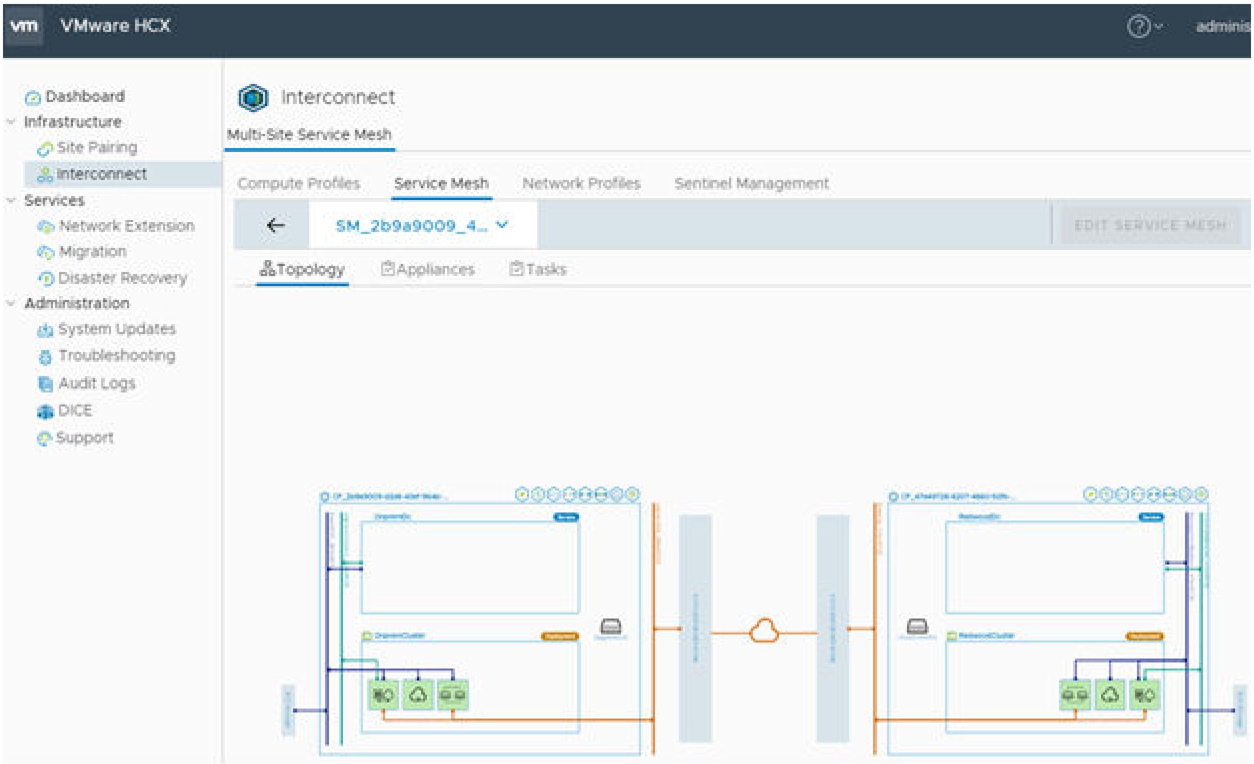
Configuring and Managing the HCX Interconnect with the Multi-Site Service Mesh

The Multi-Site Service mesh is used to create a secure optimized transport fabric between any two sites managed by HCX.



About the HCX Multi-Site Service Mesh

When HCX Migration, Disaster recovery, Network Extension, and WAN Optimization services are enabled, HCX deploys Virtual Appliances in the source site and corresponding "peer" virtual appliances on the destination site. The Multi-Site Service Mesh enables the configuration, deployment, and serviceability of these Interconnect virtual appliance pairs.



Multi-Site Service Mesh Benefits

New Configuration Options:

- Uniformity: the same configuration patterns at the source and remote sites.
- Reusability: Once a compute profile is created, it can be used to connect to multiple HCX sites.
- Multisite ready: Compute Profiles and Network Profiles can be shared across multiple sites.
- Ease of reconfiguration: New capability to pool datastores or modify them after deploying an Interconnect network structure.
- Scale-out deployment: The HCX-IX can be deployed per cluster or a single HCX-IX can be shared across multiple clusters.

Performance Enhancements:

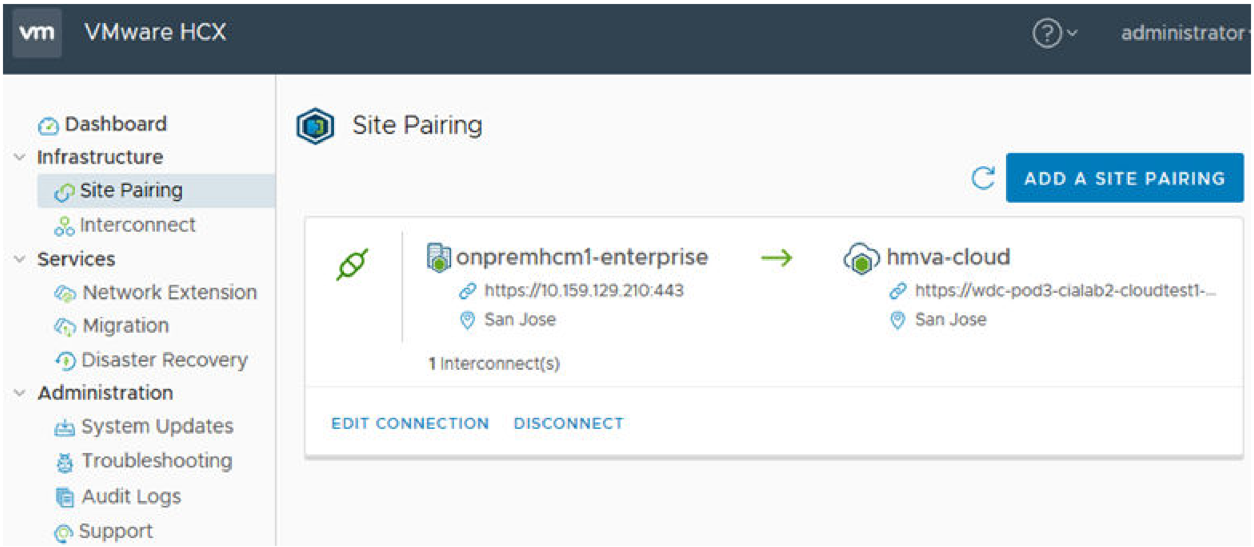
- Parallel execution ensures faster Interconnect deployments (in under 5 minutes).
- The new lockless model ensures parallel configuration of network stretches.

Usability Enhancements:

- Improved interfaces display a clear deployment diagram.
- New task-tracking features provide incremental details for each step of the progress of operations.
- Preview of required firewall rules to avoid configuration difficulties.

Multi-Site Service Mesh Site Pairs

You register the destination HCX system in the Site Pairing Interface at the source site. Pairing the source and destination sites is a requirement for creating a Service Mesh.



onpremhcm1-enterprise → hmva-cloud

https://10.159.129.210:443

San Jose

https://wdc-pod3-cialab2-cloudtest1-...

San Jose

1 Interconnect(s)

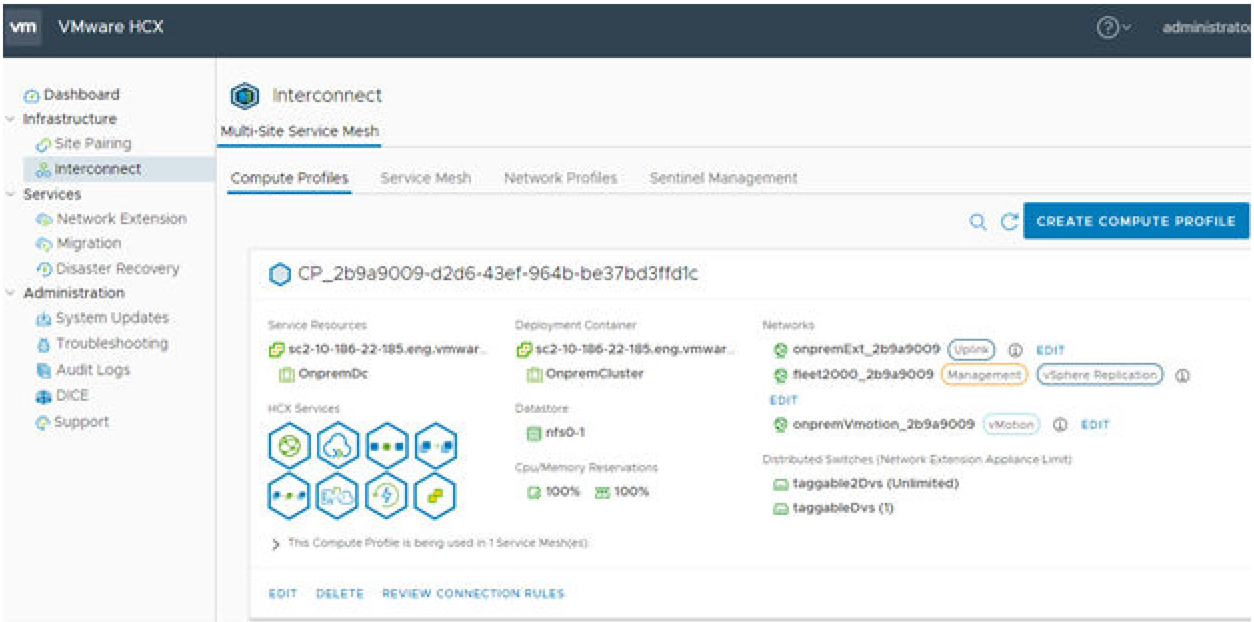
Compute and Network Profiles

The compute profile defines the structure and operational details for the virtual appliances used in a Multi-Site Service Mesh deployment architecture. The compute profile:

- Provisions the infrastructure at the source and destination site.
- Provides the placement details (Resource Pool, Datastore) where the system places the virtual appliances.
- Defines the networks to which the virtual appliances connect.

The following conditions apply when deploying a service mesh network:

- The integrated compute profile creation wizard can be used to create the compute and network profiles (or Network Profiles can be pre-created).
- HCX Interconnect service appliances are not deployed until a service mesh is created.



CP_2b9a9009-d2d6-43ef-964b-be37bd3ffd1c

Service Resources
sc2-10-186-22-185.eng.vmwar...
OnpremDc

Deployment Container
sc2-10-186-22-185.eng.vmwar...
OnpremCluster

Networks
onpremExt_2b9a9009 (Uplink) EDIT
fleet2000_2b9a9009 (Management) (vSphere Replication) EDIT
onpremVmotion_2b9a9009 (vMotion) EDIT

HCX Services

Datastore
nfs0-1

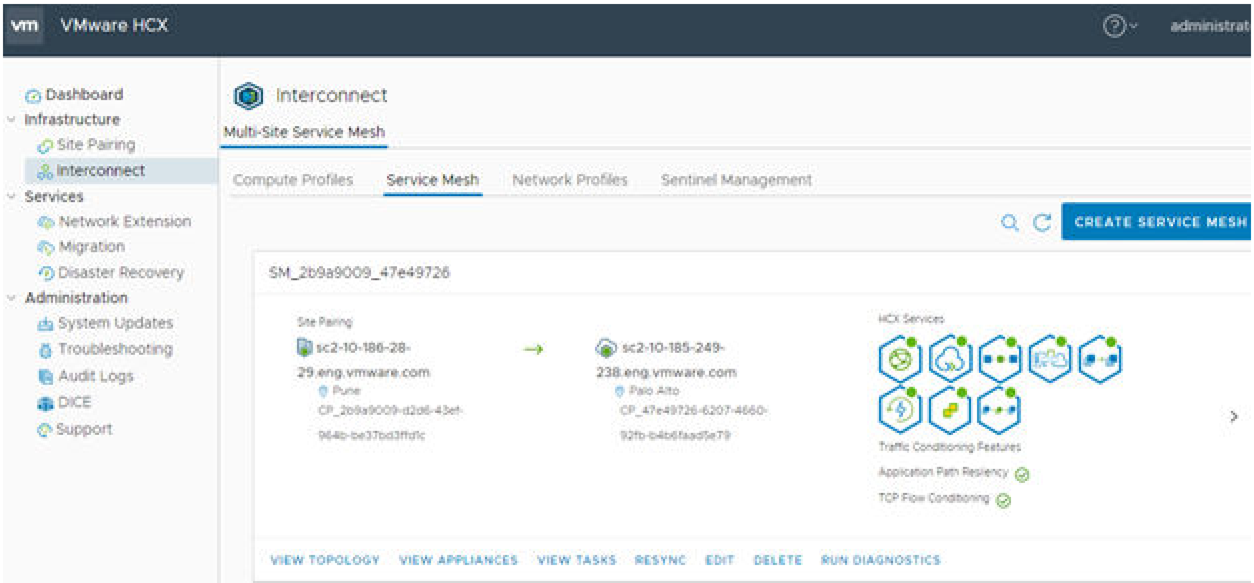
Cpu/Memory Reservations
100% 100%

Distributed Switches (Network Extension Appliance Limit)
taggable2Dvs (Unlimited)
taggableDvs (1)

This Compute Profile is being used in 1 Service Mesh(es).

Service Mesh

A **Service Mesh** specifies a local and remote Compute Profile pair. When a **Service Mesh** is created, the HCX Service appliances are deployed on both the source and destination sites and automatically configured by HCX to create the secure optimized transport fabric.



SM_2b9a9009_47e49726

Site Pairing

sc2-10-186-28-29.eng.vmware.com → sc2-10-185-249-238.eng.vmware.com

Pune
CP_2b9a9009-d2d6-43ef-964b-be37bd3ffd1c

Palo Alto
CP_47e49726-6207-4660-92fb-b4b6faad5e79

HCX Services

Traffic Conditioning Features

Application Path Resiliency ✓

TCP Flow Conditioning ✓

Sentinel Management

You must install HCX Sentinel on all guest virtual machines requiring migration using HCX OS Assisted Migration. Sentinel gathers the system configuration from the guest VM and assists with the data replication.

The source system information is used by various HCX OS Assisted Migration service processes. In part, the information is used to create an inventory of guest VM systems for migration and to help replication processes prepare the disks on the replica VM for replication and migration.

Sentinel also helps with the data replication by reading data written to the source disks and passing that data to the SDR appliance at the destination site.

Adding a Site Pair

A Site Pair establishes the connection needed for management, authentication, and orchestration of HCX services across a source and destination environment.

In HCX Connector to HCX Cloud deployments, the HCX Connector is deployed at the legacy or source vSphere environment. The HCX Connector creates a unidirectional site pairing to an HCX Cloud system. In this type of site pairing, all HCX Service Mesh connections, Migration and Network Extension operations, including reverse migrations, are always initiated from the HCX Connector at the source.

In HCX cloud-to-cloud deployments, site pairing can be unidirectional or bidirectional:

- In unidirectional site pairing, the HCX Cloud containing the virtual machine inventory and networks (similar to HCX Connectors) will site pair to the destination HCX Cloud. In this type of site pairing, all HCX Service Mesh connections, Migration and Network Extension operations, including reverse migrations, are always initiated from the source HCX Cloud system. In this case, an administrator may see the message URL not available when viewing site pairing from the destination site. This is expected behavior because HCX Connector to HCX Cloud site pairing is uni-directional.
- In bidirectional site pairing, the HCX Cloud systems are site paired with each other, share a common Service Mesh, and can initiate Migration and Network Extension operations from either HCX Cloud system.

In the case of unidirectional site pairing, an administrator may see the message `URL not available` when viewing site pairing from the destination site. This is expected behavior because HCX Connector to HCX Cloud site pairing is unidirectional. In the case of bidirectional site pairing, the URLs for the paired sites are visible from either the source or destination.

An HCX Connector cannot be the target for a site pairing.

Prerequisites

- HCX Manager installed and configured in the source and destination environments.
- The Site URL and User:
  - When the destination is a private vSphere-based private cloud, the Site URL refers to the HCX Cloud Manager at the target site:

    ```
    https://hcx-cloud-ip-or-fqdn
    ```

    Provide a user from the destination site's SSO configuration. The user must be included in the HCX Role-Mapping Group configuration.

    The `administrator@vsphere.local` user is included by default.
  - When the destination system is a Public Cloud, the Site URL may use a trusted domain name pre-created by the cloud provider.

    HCX for VMC SDDC uses the following Site URL format:

    https://hcx.sddc-*.vmwarevmc.com

    Use a cloud administrative account. For example, when registering a VMware Cloud on AWS SDDC, use the `cloudadmin@vmc.local` user.
  - When registering a vCloud Director Organization as the HCX destination endpoint, the Site URL refers to the HCX Cloud system with a suffix referencing the Org:

    ```
    https://hcx-cloud-ip-or-fqdn/cloud/org/<orgname>
    ```

Provide a Local or LDAP Organization User with the Organization Administrator role. Use the format `username@orgname`.

- The destination Site URL must use a CA signed trusted certificate or be manually trusted on the source HCX system. See Managing CA and Self-Signed Certificates.

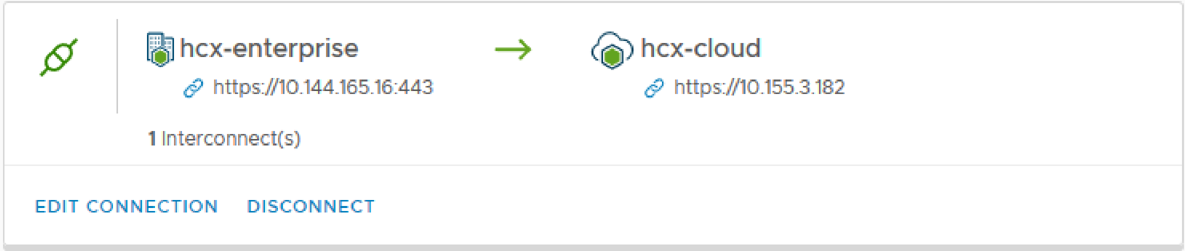
Procedure

1. From the HCX dashboard, go to **Infrastructure** > **Site Pairs**.
2. Click **Add a Site Pairing**.
3. Enter the Remote HCX URL and credentials, then click **Connect**.
4. (Optional) To achieve bidirectional site pairing in cloud-to-cloud deployments, repeat this procedure at both cloud sites.

Results

If all validations succeed, the system displays the remote site in the list as a connected site. With bidirectional site pairing, both sites show up in the list.

Example: Connected Site


hcx-enterprise

https://10.144.165.16:443

→

hcx-cloud

https://10.155.3.182

1 Interconnect(s)

What to do next

Create the Network and Compute Profiles, followed by the Multi-Site Service Mesh.

Creating a Network Profile

The Network Profile is an abstraction of a Distributed Port group, Standard Port group, or NSX Logical Switch, and the Layer 3 properties of that network. A **Network Profile** is a subcomponent of a complete **Compute Profile**.

Create a **Network Profile** for each network you intend to use with the HCX services. The extension selects these network profiles when creating a **Compute Profile** and assigned one or more of four Network Profile functions.

Caution Although a Network Profile can be assigned any of the functions during the Compute Profile configuration, consider creating a separate profile for each function as a best practice.

- Management Network:

The HCX Interconnect appliances use this network to communicate with management systems like the HCX Manager, vCenter Server, ESXi Management, NSX Manager, DNS, NTP.

- Uplink Network:

  The HCX Interconnect appliances use this network for WAN communications, like TX/RX of transport packets.

- vMotion Network:

  The HCX Interconnect appliances use this network for the traffic exclusive to vMotion protocol operations.

  Important The HCX Interconnect uses a Network Profile configuration dedicated to vMotion traffic. This configuration does not include the vMotion NFC traffic. HCX always uses its Management interface for vMotion NFC traffic.

- vSphere Replication Network:

  The HCX Interconnect appliances use this network for the traffic exclusive to vSphere Replication.

  Important In deployments where ESXi servers use a dedicated VMkernel configuration for vSphere Replication services, the HCX Interconnect uses a Network Profile configuration dedicated to the vSphere Replication traffic. This configuration does not include the vSphere Replication NFC traffic. HCX always uses its Management interface for vSphere Replication NFC traffic.

- Guest Network for OS Assisted Migration

  The Sentinel Gateway appliances use this vSphere network to connect with non-vSphere virtual machines.

Important When creating a separate Network Profile for vMotion or vSphere Replication services, although the option is available to configure a GW as a standard Network Profile, traffic for those services will only use the default GW in the Management Network Profile to attempt to access resources in a different subnet. If ESXi resources are not L2 adjacent to the IX appliance on those networks, there is a requirement to configure “Static Routes” as part of the “Advance Configurations” option in the Compute Profile to ensure traffic is directed to the default GW on those networks.

Refer to Steps Step 9 and Step 10 in the section Creating a Compute Profile.

Prerequisites

- The HCX Manager must be installed and configured.
- Use the planned network configurations prepared using the checklist described in Getting Started with VMware HCX.

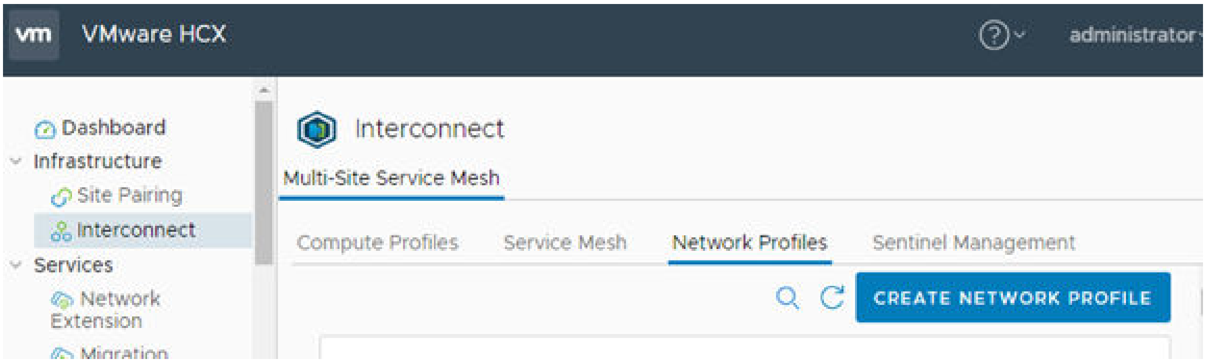
Procedure

1 Navigate to the **Network Profiles** interface:

   a In the vSphere Client, navigate To **HCX** > **Interconnect** > **Multi-Site Service Mesh** > **Network Profiles**.

   b At the destination site, navigate to https://hcx-cloud-ip-or-fqdn > **Multi-Site Service Mesh** > **Network Profiles**.

2 Click **Create Network Profile**.

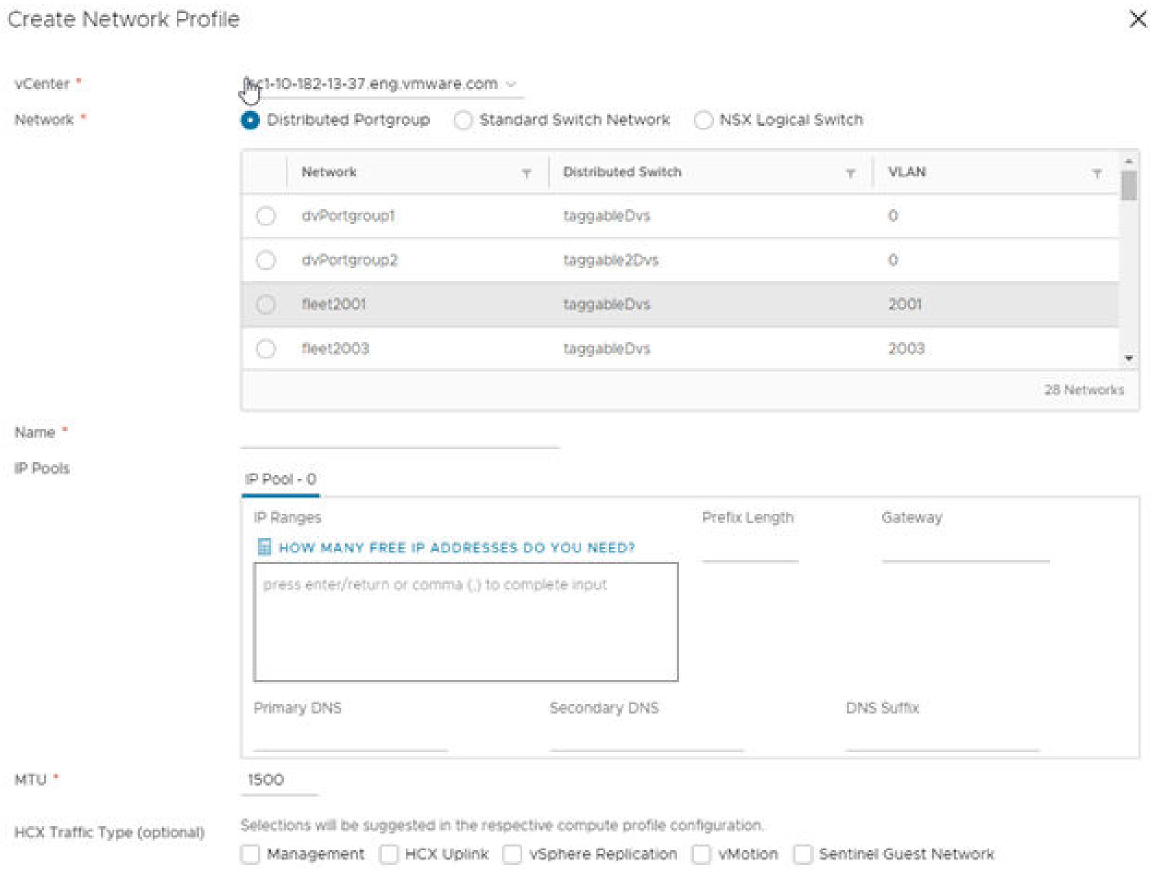


3 Select a vCenter Server and existing Network.

   a Select a vCenter Server from the drop-down menu.

   b Select Distributed Port Group, Standard Switch Port Group, or NSX Logical Switch to filter the available networks by type.

   c Select one of the available networks.



Create Network Profile

vCenter * hc1-10-182-13-37.eng.vmware.com

Network * ● Distributed Portgroup ○ Standard Switch Network ○ NSX Logical Switch

	Network	Distributed Switch	VLAN
○	dvPortgroup1	taggableDvs	0
○	dvPortgroup2	taggable2Dvs	0
○	fleet2001	taggableDvs	2001
○	fleet2003	taggableDvs	2003

28 Networks

Name *

IP Pools

IP Pool - 0

IP Ranges

HOW MANY FREE IP ADDRESSES DO YOU NEED?

press enter/return or comma (,) to complete input

Prefix Length

Gateway

Primary DNS

Secondary DNS

DNS Suffix

MTU * 1500

HCX Traffic Type (optional)

Selections will be suggested in the respective compute profile configuration.

☐ Management ☐ HCX Uplink ☐ vSphere Replication ☐ vMotion ☐ Sentinel Guest Network

4 Name the Network Profile.

5 Provide the IP address pool details for the network profile.

   a Provide an IP address range available for the HCX appliances. Use a comma to separate multiple discontiguous ranges within the same subnet.

   b Enter the **Prefix Length** for the network containing the IP ranges provided.

   c Enter the **Default Gateway Address** for the network.

   d Specify the DNS server information.

6 Enter the MTU value.

7 (Optional) Using the check boxes, associate one or more suggested traffic types with the network selection: Management, HCX Uplink, vSphere Replication, vMotion, Sentinel Guest Network.

   The traffic type selection appears as a suggestion of which networks to use when creating the Compute Profile. It does not prevent the network from being used for other types of network traffic.

8 To complete the **Network Profile** configuration, click **Create**.

9 (Optional)

What to do next

Created **Network Profiles** are designated to one or more specific functions during a **Compute Profile** configuration, or when to override default Network Profiles when creating a **Service Mesh**.

Note To edit an existing Network Profile, navigate to the specific Network Profile and click **Edit**.

Creating a Compute Profile

A **Compute Profile** contains the compute, storage, and network settings that HCX uses on this site to deploy the Interconnect-dedicated virtual appliances when a Service Mesh is added.

Create a Compute Profile in the Multi-Site Service Mesh interface in both the source and the destination HCX environments using the planned configuration options for each site, respectively.

Prerequisites

- Install and configure HCX Manager.
- To obtain the optimum system usage, assign resource configurations based on HCX deployment considerations.
- Use the planned configurations collected using the checklist described in Getting Started with VMware HCX.

Procedure

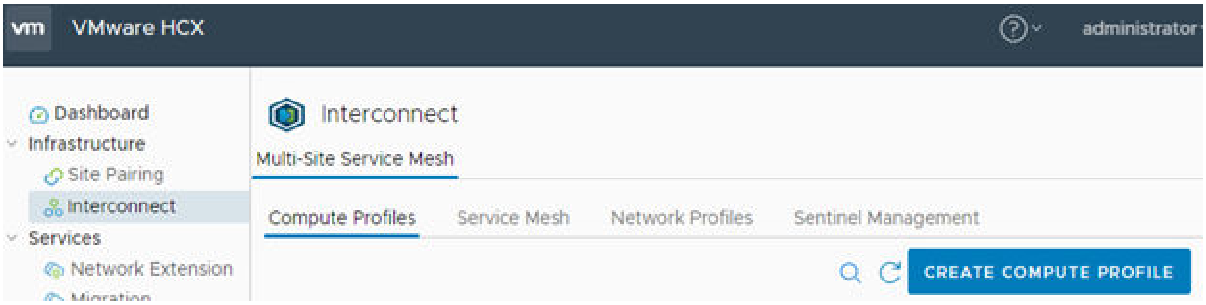
1 Navigate to the **Compute Profiles** interface:

   a At the source site, open vSphere Client and navigate to the **HCX** plug-in > **Interconnect** > **Multi-Site Service Mesh** > **Compute Profiles**.

   b At the destination site, navigate to https://hcx-cloud-ip-or-fqdn > **Multi-Site Service Mesh** > **Compute Profiles**.

   The system displays all the defined **Compute Profiles**. If no profiles have been configured, the system highlights the **Create Compute Profile** option.

2 Click **Create Compute Profile**.



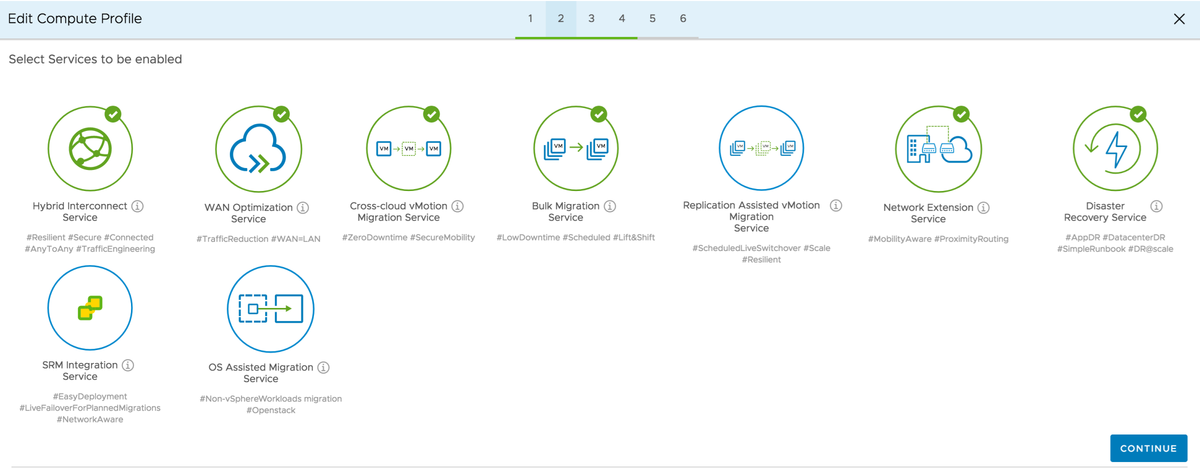
3 Name the Compute Profile:

   a Enter a name for the Compute Profile

   b Click **Continue**.

4 Select the HCX services to be enabled. Click **Continue**.

Note Premium services require the HCX Enterprise license.


Edit Compute Profile
1
2
3
4
5
6
Select Services to be enabled
Hybrid Interconnect Service
#Resilient #Secure #Connected #AnyToAny #TrafficEngineering
WAN Optimization Service
#TrafficReduction #WAN=LAN
Cross-cloud vMotion Migration Service
#ZeroDowntime #SecureMobility
Bulk Migration Service
#LowDowntime #Scheduled #Lift&Shift
Replication Assisted vMotion Migration Service
#ScheduledLiveSwitchover #Scale #Resilient
Network Extension Service
#MobilityAware #ProximityRouting
Disaster Recovery Service
#AppDR #DatacenterDR #SimpleRunbook #DR@scale
SRM Integration Service
#EasyDeployment #LiveFailoverForPlannedMigrations #NetworkAware
OS Assisted Migration Service
#Non-vSphereWorkloads migration #Openstack
CONTINUE

5 Select the Service Resources:

   a Click the **Select Resources** drop-down menu.

   b Select each cluster to be enabled for HCX services.

   If there is only one cluster, it is selected automatically.

   c Click **Continue**.

   The Select Deployment Resources and Reservations screen appears.

6 Make your resource, and resource reservation selections.

   a From the **Select Resource** drop-down menu, and select each cluster or resource pool to be used when deploying HCX Interconnect appliances.

   b From the **Select Datastore** drop-down menu, and select the datastore to be used when deploying HCX Interconnect appliances.

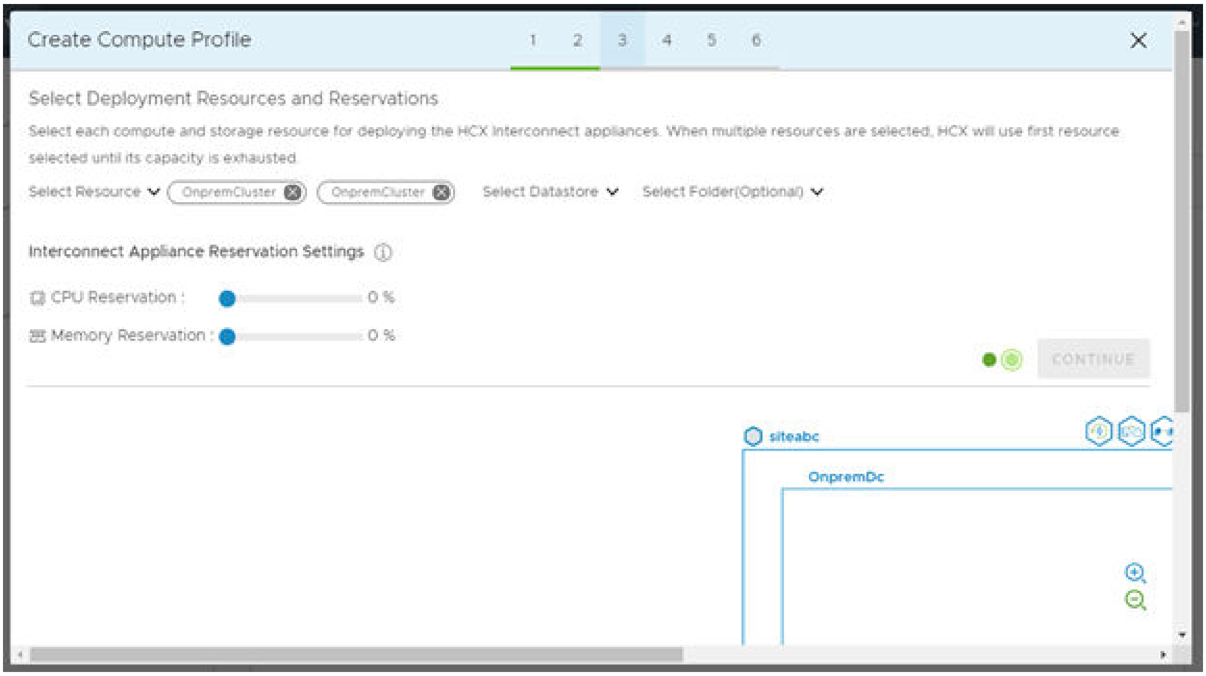
      When multiple compute resources or datastores are selected, HCX uses the first selection until its capacity is exhausted.

   c (Optional) From the **Select Folder** drop-down menu, and specify a folder in which to deploy the HCX appliances.

   d Using the slide bar, select the amount of CPU and memory to reserve for HCX operations.

      As a best practice, set the CPU and memory reservation to 100 percent.

      For example, setting **Memory Reservation** to 100 percent ensures that all of the memory allocated for HCX appliances is always available for HCX operations.



Create Compute Profile

Select Deployment Resources and Reservations

Select each compute and storage resource for deploying the HCX Interconnect appliances. When multiple resources are selected, HCX will use first resource selected until its capacity is exhausted.

Select Resource: OnpremCluster, OnpremCluster

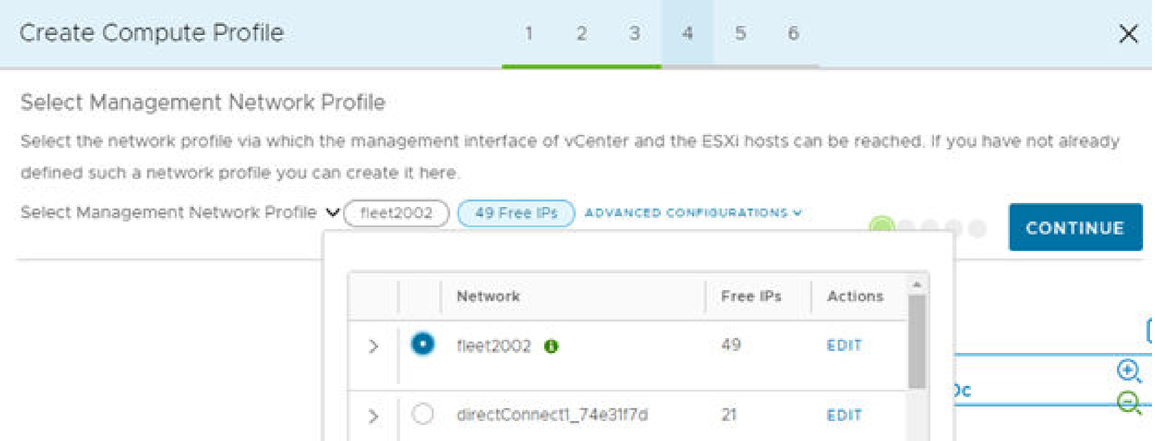
Interconnect Appliance Reservation Settings

CPU Reservation : 0 %

Memory Reservation : 0 %

7 Select the Management Network Profile:

   a Click the **Select Management Network Profile** drop-down menu.



Create Compute Profile

Select Management Network Profile

Select the network profile via which the management interface of vCenter and the ESXi hosts can be reached. If you have not already defined such a network profile you can create it here.

Select Management Network Profile: fleet2002 (49 Free IPs)

		Network	Free IPs	Actions
>	●	fleet2002	49	EDIT
>	○	directConnect1_74e31f7d	21	EDIT

   b Select an existing Network Profile or click **Create Network Profile** to create it.

   Reference the Creating a Network Profile topic for more details.

   Note Networks identified with an information icon have been suggested for use with this type of network in the Network Profile. This is only a suggestion, and you can select other networks for this traffic type.

   c Expand the selected Management Network Profile to view its details and free IP Addresses. Click **Close** when done reviewing.

   d Click **Continue**.

8 Select the Uplink Network Profile:

- The **Network Profile** previously selected for another function, like Management can also be assigned as the **Uplink Network Profile**.
- Multiple Network Profiles can be selected.

   a Click the **Select Uplink Network Profile** drop-down menu.

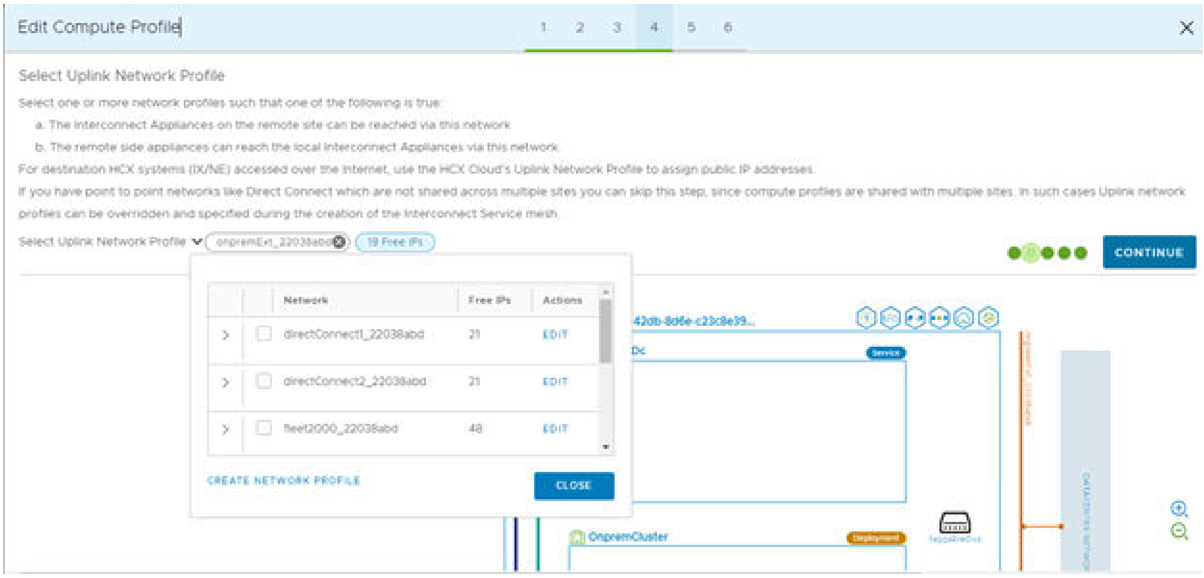
   b Select one or more existing **Network Profile**, or click **Create Network Profile** to create it.

   Reference the Creating a Network Profile topic for more details.

   c Expand the selected **Uplink Network Profile** to view its details and free IP Addresses. Click **Close** when done reviewing.

   d Click **Continue**.

HCX Manager now updates the topology view to depict the configured Network Profile. As shown in the diagram, the Compute Profile configuration tool displays a symbolic map of the network links between the Interconnect appliance virtual machines to be deployed for the selected Uplink network.



Edit Compute Profile

Select Uplink Network Profile

Select one or more network profiles such that one of the following is true:

a. The Interconnect Appliances on the remote site can be reached via this network

b. The remote side appliances can reach the local Interconnect Appliances via this network.

For destination HCX systems (IX/NE) accessed over the Internet, use the HCX Cloud's Uplink Network Profile to assign public IP addresses.

If you have point to point networks like Direct Connect which are not shared across multiple sites you can skip this step, since compute profiles are shared with multiple sites. In such cases Uplink network profiles can be overridden and specified during the creation of the Interconnect Service mesh.

Select Uplink Network Profile: onpremExt_22038abd (19 Free IPs)

Network	Free IPs	Actions
directConnect1_22038abd	21	EDIT
directConnect2_22038abd	21	EDIT
fleet2000_22038abd	48	EDIT

9 Select the vMotion Network Profile:

a Click the **Select vMotion Network Profile** drop-down menu.

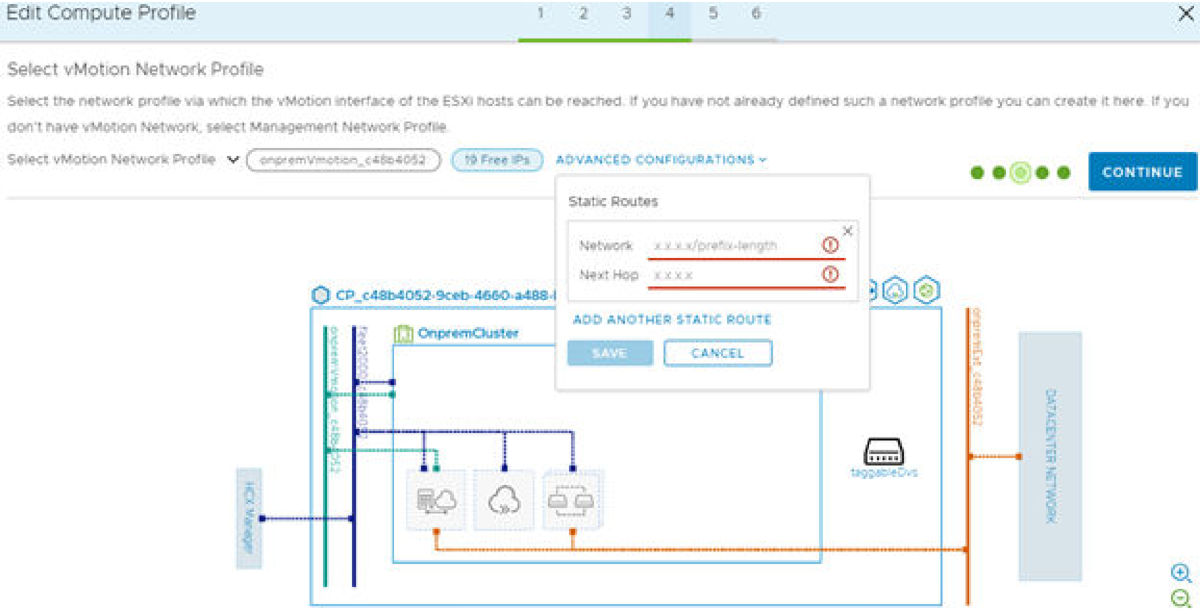
b Select an existing Network Profile or click **Create Network Profile** to create it.

Reference the Creating a Network Profile topic for more details.

c Expand the selected vMotion Network Profile to view its details and free IP Addresses. Click **Close** when done reviewing.

d Click **Continue**.

The Network Profile tool now displays a topology view that shows how the selected vMotion Network connects the HCX Interconnect appliances assigned to the profile.



Edit Compute Profile

Select vMotion Network Profile

Select the network profile via which the vMotion interface of the ESXi hosts can be reached. If you have not already defined such a network profile you can create it here. If you don't have vMotion Network, select Management Network Profile

Select vMotion Network Profile: onpremVmotion_c48b4052 (19 Free IPs)

Static Routes

Network: x.x.x.x/prefix-length

Next Hop: x.x.x.x

10 Select the vSphere Replication Network Profile:

Assigning a vSphere Replication Network Profile is useful when there is a VMkernel interface for the network traffic that is exclusive to vSphere Replication operations. If the Management Network Profile is used for Replication operations, click **Continue** to skip this step.

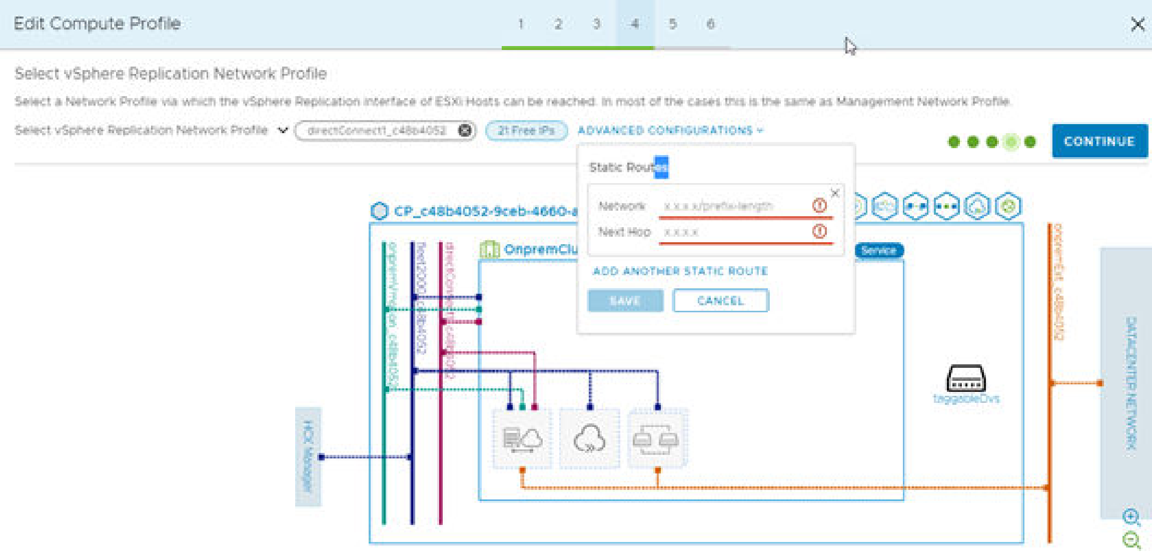
a Click the **Select vSphere Replication Network Profile** drop-down menu.

b Select an existing Network Profile or click **Create Network Profile** to create it.

Reference the Creating a Network Profile topic for more details.

c Expand the selected vSphere Replication Network Profile to view its details and free IP Addresses. Click **Close** when done reviewing.

d Click **Continue**.



Edit Compute Profile

Select vSphere Replication Network Profile

Select a Network Profile via which the vSphere Replication interface of ESXi Hosts can be reached. In most of the cases this is the same as Management Network Profile.

Select vSphere Replication Network Profile: directConnect1_c48b4052

Network: x.x.x.x/prefix-length

Next Hop: x.x.x.x

11 If HCX OS Assisted Migration is enabled, select the Guest Network Profile:

- This is the network on which guest virtual machines communicate with the HCX SGW for OS Assisted Migration.
- The **Network Profile** previously selected for another function, like Management can also be assigned as the **Guest Network Profile**.

Note This step appears on only the source Compute Profile interface, and only if you have selected OS Assisted Migration from the list of available services.

---

a Click the **Select Guest Network Profile** drop-down menu.

b Select a network, or click **Create Network Profile** to create it.

For additional information see Creating a Network Profile.

- c Expand the selected **Guest Network Profile** to view its details and free IP Addresses, and click **Close**.
- d Click **Continue**.

  The Guest Network is depicted in the topology.

12 Select Network Containers Eligible for Network Extension:

- a Click the **Select Network Containers** drop-down menu.

  The system displays the list of network containers found in the service resources selected in a previous step.

- b Select entries with virtual machine networks. Click **Close**.

  You can select vDS, N-VDS, Transport Zones, or some combination for Network Extension. If only one network container is found in the previously selected service resources, it is pre-selected.

  Note Only the virtual machine networks on the selected switches or Transport Zones may be used during network extension operations.

- c Optionally, use the **Advanced Configurations** to restrict the Network Extensions for your selection.
- d Click **Continue**.

The topology view is dynamically updated, depicting your selections.

13 If HCX OS Assisted Migration is enabled, select **Target Datastores**.

Note This step appears only on the destination Compute Profile interface, and only if you have selected OS Assisted Migration from the list of available services.

- a Click **Select Target Datastores**.

  The menu contains a list of all the datastores present in the resource pool or cluster selected in Deployment cluster.

- b Select the datastore and click **Continue**.

14 Pre-Deployment Validation:

HCX checks whether the selected configurations are valid for interconnect deployments.

- a Address any errors reported by the validation.
- b To see which firewall rules may be required if the service mesh uses this service profile, click **Review Connection Rules**.
- c To export the rules, click **COPY ALL** to copy them to the clipboard in the JSON format.
- d Click **Next**.

15 Ready to Complete:

   a Review the configuration. The topology diagram depicts the selected configurations.

   b To create the Compute Profile, click **Finish**.

Results

A Compute Profile is created, and can be used when creating a service mesh.

What to do next

Once there are valid Compute Profiles in the source and destination environments, use the HCX Manager UI at the source site to create the Interconnect Service Mesh.

Note To edit an existing Compute Profile, navigate to the specific Compute profile, and click **Edit**.

Creating a Service Mesh

An HCX Service Mesh is the effective HCX services configuration for a source and destination site. A Service Mesh can be added to a connected Site Pair that has a valid Compute Profile created on both of the sites.

Adding a Service Mesh initiates the deployment of HCX Interconnect virtual appliances on both of the sites. An interconnect Service Mesh is always created at the source site.

Prerequisites

Creating a Service Mesh requires:

- A connected Site Pair.
- A valid compute profile at the HCX Source site.
- A valid compute profile at the HCX destination site.
- For each switch that is present in the Compute Profile at both the source and destination sites, the switch must span all hosts in at least one of the compute clusters. If the switch does not span all hosts in the compute cluster, then it is possible that the Network Extension appliance is deployed on a different host in a compute cluster and spans across a different switch. In this case, the Service Mesh deployment can fail.

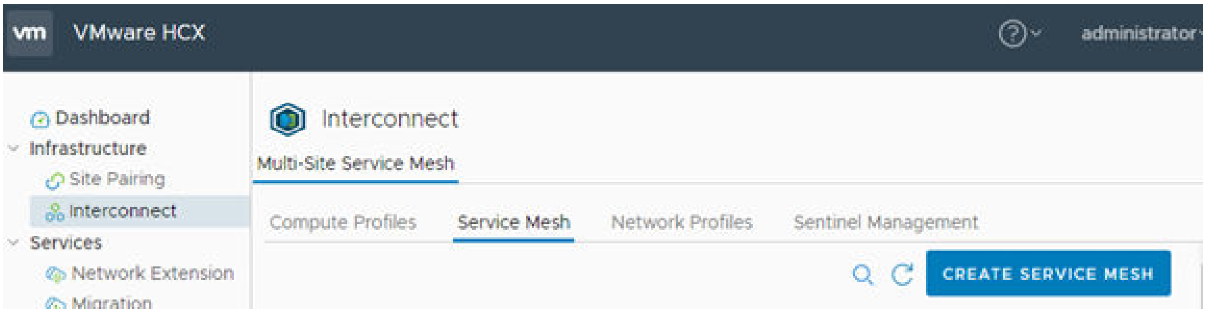
Procedure

1 Navigate to the **Service Mesh** interface:

   a In the vSphere Client, navigate to **HCX** > **Interconnect** > **Multi-Site Service Mesh** > **Service Mesh** tab.

   Created **Service Mesh** configurations are listed.

2 Click **Create Service Mesh**:



3 Select Sites:

   a Click each drop-down and select a source and destination site. Only connected **Site Pairs** are displayed.

   b Click **Continue**.

4 Select Compute Profiles:

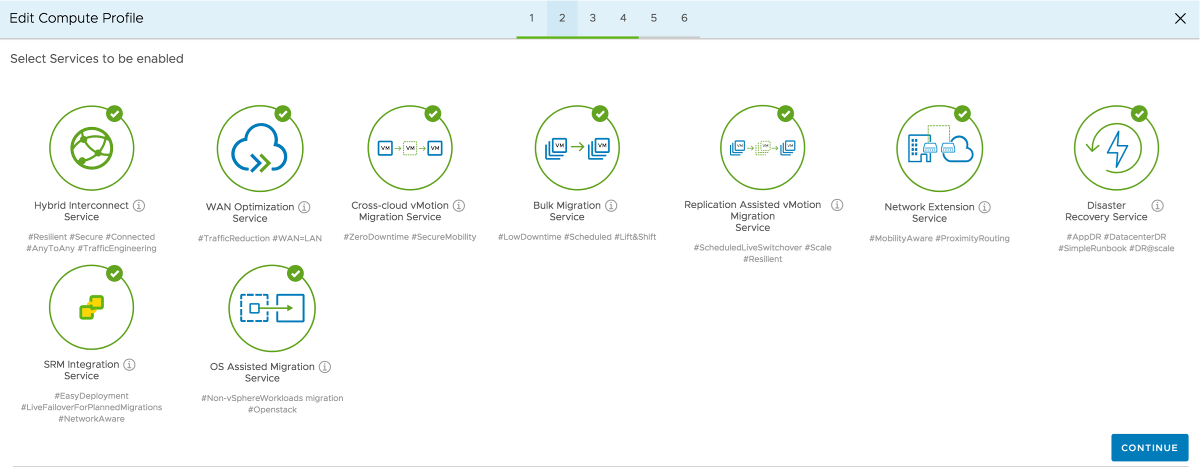
   a Click the **Select Source Compute Profile** drop-down and select a **Compute Profile**.

   b Click the **Select Remote Compute Profile** drop-down and select a **Compute Profile**.

   c Click **Continue**.

5 Select the HCX services to be enabled, and click **Continue**:

Note Premium services require an additional HCX Enterprise license.


Edit Compute Profile
1 2 3 4 5 6
Select Services to be enabled
Hybrid Interconnect Service
#Resilient #Secure #Connected #AnyToAny #TrafficEngineering
WAN Optimization Service
#TrafficReduction #WAN=LAN
Cross-cloud vMotion Migration Service
#ZeroDowntime #SecureMobility
Bulk Migration Service
#LowDowntime #Scheduled #Lift&Shift
Replication Assisted vMotion Migration Service
#ScheduledLiveSwitchover #Scale #Resilient
Network Extension Service
#MobilityAware #ProximityRouting
Disaster Recovery Service
#AppDR #DatacenterDR #SimpleRunbook #DR@scale
SRM Integration Service
#EasyDeployment #LiveFailoverForPlannedMigrations #NetworkAware
OS Assisted Migration Service
#Non-vSphereWorkloads migration #Openstack
CONTINUE

6 (Optional) Override the default Uplink Network Profile:

   By default, the HCX interconnect uses the Uplink Network Profiles defined in the Compute Profile for the source and destination sites. You can override the default. As an example, an override can be useful in vCloud Director-based deployments where an uplink network that deviates from a common configuration is created for an Organization to consume during the **Service Mesh** creation.

   a Click the **Select Source Uplink Network Profile** drop-down.

   b Select one or more networks. Click **Close**.

      The HCX Service Mesh can use up to three HCX Uplinks, adding network path failover and improving overall resiliency for HCX services. Multiple HCX Uplinks are not aggregated for increased throughput capacity. The following specific behaviors apply:

      - HCX attempts to load balance traffic on the Network Extension (HCX-NE) appliance based on characteristics of the flow and the performance of the uplinks.
      - HCX does not load balance migration traffic on the Interconnect (HCX-IX) appliance. Additional uplinks may or may not be used.

   c Click **Continue**.

   d Optionally, repeat these steps for the destination site.

7 (Optional) Configure the Network Extension appliances deployed per switch or Transport Zone:

   As an example, this advanced configuration can be useful when deploying Network Extension appliances to extend high volume source networks.

   a In **Advanced Configuration - Network Network Extension Appliance Scale**, review the default Extension appliances per Network Container.

   b For each entry, set the number of Network Extension appliances that HCX deploys when it enables a Service Mesh configuration. Click **OK**.

   c Click **Continue**.

8 (Optional) Configure HCX Traffic Engineering features:

   The Application Path Resiliency and TCP Flow Conditioning features are available with the HCX Enterprise license.

   a To create multiple transport tunnels for directing the HCX traffic to a destination site, check **Application Path Resiliency**.

      Note To view the available tunnels after completing the Multi-Site Service Mesh configuration, navigate to **Interconnect > Multi-Site Service Mesh > Service Mesh > View Appliances** and expand the HCX-WAN-IX appliance.

      ---

   b To dynamically manage the TCP segment size and optimize the transport performance for the HCX Network Extension service traffic, check **TCP Flow Conditioning**.

      This option is available only after enabling the HCX Network Extension service.

   c To manage the bandwidth consumed for migrations across all uplink networks, use the up and down arrows to change the bandwidth setting.

      This option is available only after enabling the HCX WAN Optimization service.

      Note It is a best practice to retain the default setting of 10000 Mb/S.

      ---

9 Review Topology Preview:

   a Review the selected clusters and resources.

   b Click **Continue**.

10 Ready to Complete:

   a To view a summary of the **Service Mesh** selections, click the **here** link.

   b Name the **Service Mesh**.

   c To create the service mesh, click **Finish**.

What to do next

If it is necessary to make any direct changes to an existing Services Mesh, such enabling or disabling services and overriding uplinks, select **Interconnect > Service Mesh > Edit**. The editing workflow includes a preview screen, listing the changes and describing the impact of those changes on related services prior to finishing the procedure. You can select to complete or cancel the update.

Synchronizing the Multi-Site Service Mesh

The Multi-Site Service Mesh is the effective HCX service configuration between a source and destination site and must be kept in synchronization between the pair.

Synchronizing the Multi-Site Service Mesh is necessary whenever there is an update to the Compute or Network configurations at either the HCX source or destination site.

Note Synchronizing the Service Mesh is available from the HCX Manager where the Service Mesh was created.

Procedure

1 Log in to the HCX Manager at the source site: <https://hcxmgr-ip-or-fqdn>.

2 Go to **Interconnect** > **Multi-Site Service Mesh** > **Service Mesh**.

3 Click **RESYNC**.

4 Verify that the changes appear in the Compute Profile though the HCX Interconnect interface UI.

Sentinel Management

You must download and install HCX Sentinel on all guest virtual machines requiring migration using HCX OS Assisted Migration. Sentinel gathers the system configuration from the guest VM and assists with the data replication.

The guest VM information is used by various HCX OS Assisted Migration service processes. In part, the information is used to create an inventory of guest VM systems for migration and to help replication processes prepare the disks on the replica VM for replication and migration.

Sentinel also helps with the data replication by reading data written to the source disks and passing that data to the SDR appliance at the destination site.

The Sentinel Management tab, which provides access to downloading the Sentinel software, appears in the HCX Interconnect interface when an HCX Enterprise license is activated, and you have a deployed a service mesh with an SGW/SDR pair deployed. For more information about OS Assisted Migration, see Understanding VMware HCX OS Assisted Migration.

Downloading and Installing HCX Sentinel Agent Software

When performing migrations from non-vSphere virtual machines, you must install the HCX Sentinel on all guest virtual machines requiring migration using HCX OS Assisted Migration. The sentinel agent gathers the system configuration from the guest virtual machine and assists with the data replication.

Prerequisites

HCX Enterprise license is activated.

HCX OS Assisted Migration is enabled in Service Mesh.

Procedure

1 In the vCenter Server for the HCX Connector, navigate to **Interconnect** > **Multi-Site Service Mesh** > **Sentinel Management**.

2 Download the software bundle appropriate for the environment that you are migrating.

   The Sentinel software bundle is downloaded to the local machine with the name `<SGW-name>-linux-sentinel-installer.sh` or `<SGW-name>-windows-sentinel-bundle.zip`.

3 Install the Linux or Windows software on all guest VMs that require migration.

   ◆ HCX Sentinel installation for Linux

   a Connect to your guest system using SSH.

   b Copy the linux-sentinel-installer.sh file to the guest system.

   c At the terminal, enter the command `bash linux-sentinel-installer.sh`.

      The software prompts you for permission to start the installation.

   d Enter **yes**, and press **Enter**.

   ◆ HCX Sentinel installation for Windows

   a Log in to the guest system.

   b Copy the `windows-sentinel-bundle.zip` file to the guest system.

   c Unzip the bundle.

   d To run the installer, double-click **install-sentinel.exe**.

   e Click **Next** to continue.

   f Accept the license agreement and click **Next** to continue.

   g Choose the location where you to install the software and click **Next**.

   h Click **Finish**.

Uninstalling HCX Sentinel Agent Software

The HCX OS Assisted Migration (OSAM) service automatically uninstalls the Sentinel software from the guest system after a successful migration. Alternatively, you can manually remove the software using the Sentinel Management interface.

Following a successful migration, the OSAM service automatically sends instructions to the guest virtual machine to power off and uninstall the Sentinel agent software upon reboot. The OSAM service then removes the VM from the inventory of non-vSphere virtual machines on the HCX.

You can manually uninstall the software from a source VM using the **Uninstall** button in the Sentinel Management interface. The action taken by the OSAM service to uninstall the Sentinel software depends on whether the service has access to the source system:

- OSAM service has a connection to the source VM—OSAM uninstalls the Sentinel software from the source VM. Also, OSAM removes the source VM from the inventory of non-vSphere virtual machines on the HCX.

- OSAM service has no connection to the source VM—OSAM removes the source VM from the inventory of non-vSphere virtual machines on the HCX, but the Sentinel software remains installed on the source VM. In this case, if a connection to the source VM is reestablished with the OSAM service, the source VM reappears in the inventory of non-vSphere virtual machines on the HCX. To remove the Sentinel agent software and delete the source VM from the inventory, repeat the uninstall the procedure.

Note The OSAM service prevents you from uninstalling the HCX Sentinel software during the source VM migration.

To uninstall the Sentinel agent software manually, use the following procedure .

Procedure

1. Go to **Interconnect** > **Multi-Site Service Mesh** > **Sentinel Management**.

   The system displays the list of source VMs installed with the Sentinel agent software.

2. Select the source systems.
3. Click **Uninstall**.

   The system prompts you to verify the action.

4. Click **Yes**.

   The OSAM service begins the process of uninstalling the software from the source VM.

5. In the Sentinel Management interface, verify that the entry is removed from the inventory of non-vSphere virtual machines.

Upgrading HCX Sentinel Agent Software

To maintain compatibility with OS Assisted Migration (OSAM) service appliances, update the HCX Sentinel agent software on guest virtual machines.

The OS Assisted Migration (OSAM) upgrade bundle includes the HCX Sentinel agent, Sentinel Gateway (SGW) appliance, and Sentinel Data Receiver (SDR) appliance software. This software is downloaded to the HCX only after you upgrade the HCX Manager. This means you must upgrade to the latest HCX software to get the latest OSAM updates.

The OSAM upgrade bundle has two versions depending on the HCX deployment: On-premise or Cloud. The Sentinel agent software is only downloaded with on-premise HCX deployment upgrades.

Prerequisites

The Sentinel Gateway and Sentinel Data Receiver appliances are updated to the latest version as described in Upgrading the HCX Service Mesh Appliances.

Procedure

1 Navigate to the HCX Dashboard, and select **Interconnect** > **Multi-Site Service Mesh** > **Sentinel Management**.

   The system displays the inventory of guest virtual machines. Each entry lists the current Sentinel software version and the available software version installed after upgrading the HCX Manager.

2 Select the guest VMs to update:

   It is a best practice to update all guest virtual machines to the same version at the same time.

   - To update all guest VMs, check the box at the top of the **Hostname** column.
   - To update individual VMs, check the box next to each VM.

3 Click **Upgrade**.

   The upgrade begins for the selected guest VMs. For the upgrade status, review **Task Details**.

   Note Sentinel upgrade is allowed only when the migration is not in the switchover phase for that guest virtual machine. An attempt to upgrade Sentinel on a guest virtual machine that has a switchover in progress results in an upgrade request failure.

Extending Networks with VMware HCX

9

The HCX Network Extension can be used to create bridged multi-gigabit network segments at the destination HCX data center. The new stretched network is automatically bridged/aggregated with the vSphere Network at the source HCX data center.

This chapter includes the following topics:

About VMware HCX Network Extension

You can bridge local network segments between HCX-enabled data centers with HCX Network Extension.

With VMware HCX Network Extension (HCX-NE), a High-Performance (4–6 Gbps) service, you can extend the Virtual Machine networks to a VMware HCX-enabled remote site. Virtual Machines that are migrated or created on the extended segment at the remote site are Layer 2 next to virtual machines placed on the origin network. Using Network Extension a remote site's resources can be quickly consumed. With Network Extension , the default gateway for the extended network only exists at the source site. Traffic from virtual machines (on remote extended networks) that must be routed returns to the source site gateway.

Using VMware HCX Network Extension with VMware HCX Migration you can:

- Retain the IP and MAC addresses of the Virtual Machine and honor the existing network policies.
- Extend VLAN networks from a VMware vSphere Distributed Switch.
- Extend NSX overlay networks.

VMware HCX deploys the Remote Site HCX-NE appliance automatically whenever a local appliance is deployed. The HCX-NE service appliance is always deployed as a pair.

Requirements for Network Extension

The HCX appliance supports extending networks from VMware vSphere Distributed Switch and NSX overlay networks.

The following information and requirements apply when extending networks:

- Requirements in deployments using NSX for vSphere at the destination:
  - Use a Distributed Logical Router (DLR) or Edge Services Gateway (ESG) to connect the extended network.
  - If a single Edge Services Gateway is used for more than 8 networks, use a trunk interface.
- Requirements in deployments using the NSX-T Data Center at the destination:
  - HCX connects to Tier-1 Gateways and Segments created in the Networking tab (simplified UI). NSX configurations created in the Advanced Networking & Security tab cannot be used with HCX Network Extension and Migration operations.
  - Additional network extension appliances may be required when extending more than 8 networks.
- Requirements when extending Virtual Distributed Switch networks:
  - vSphere Distributed Switch Version 5.1.0 or higher is required.
- Requirements for extending NSX-T networks in source environments:

  Note Registering NSX-T in an HCX Connector is optional, except when extending NSX networks or migrating NSX Security Tags. If NSX-T is registered, the following requirements apply:

  - The NSX-T Manager must be registered during the HCX Manager deployment.
  - The NSX-T Manager must be Version 2.4 or higher.
  - NSX-T Overlay or VLAN Transport Zones must be configured in the vCenter Server where the network originates.
    - The ESX hosts where the NSX-T segment originates must be configured as NSX-T transport nodes.
    - NSX-T Overlay and NSX-T VLAN networks can be extended.
  - NSX-T Overlay or VLAN Transport Zones must be configured in the destination vCenter Server or SDDC.
    - HCX will always create or connect to an existing NSX-T Overlay network during the network extension operation.

- Requirements when extending NSX for vSphere Logical Switches:
  - The NSX-V Manager must be registered during the HCX Manager deployment.
  - The NSX-V Manager must be Version 6.4.8 or higher.
- Requirements when extending vSphere Standard Switch networks:
  - Not supported.
- General requirements:
  - Never extend the networks used to create the network profiles.
  - Never use HCX to extend the vSphere Management network or other VMkernel networks (for example: vMotion, vSAN, replication) to the remote site.

Restrictions and Limitations for Network Extension

HCX Network Extension may be prevented, disallowed, or allowed under explicit conditions.

Detected and Restricted Source Network Types

The HCX Network Extension service detects and prevents several non-supported Network Extension scenarios (items are dimmed in the Network Extension UI):

- vSphere cluster infrastructure networks (ESXi VMkernel networks).
- HCX Network Profile networks (Distributed Port Groups or Segments selected in a Network Profile).
- Untagged networks (Distributed Port Groups with VLAN type None, ID 0 or NULL).
- HCX Network Extension does not support Private VLAN (PVLAN) networks.
- Virtual machine networks with shared or overlapping VLAN configurations should not be extended to the same destination router. This can result in a network outage.

Unsupported Source Configurations

HCX Network Extension does not support the following source configurations:

- vSphere Standard Switch (VSS) networks.
- Cisco NSX1000v or other third-party switches.
- Cisco Application Centric Infrastructure (ACI) with VMware Virtual Machine Monitor (VMM).
- vSphere Distributed Switches configured with LACP.
- Daisy-chaining a single network to three separate destination sites is not supported. For example, A to B to C to D is not supported.

- Virtual machine networks must only be extended with a single solution. HCX does not support Network Extension for networks already extended to the same NSX router by an external solution. For example, HCX Network Extension or NSX L2 VPN can be used to provide connectivity, but both must not be used simultaneously . Using multiple bridging solutions simultaneously can result in a network outage.

Unsupported Destination Configurations

HCX Network Extension does not support the following destination configurations:

- NSX-T Global Federation configurations.

  HCX does not integrate with the NSX Global Manager (only the NSX Local Manager).
- NSX-T environments without a Tier 1 Router.
- NSX-T environments without an Overlay Transport Zone.
- Destination environments without NSX-T.

Additional Considerations

- HCX supports one Network Extension to a maximum of 3 distinct destinations or routers.
- One HCX Network Extension configuration cannot be extended multiple times to the same destination/router
- One HCX Network Extension appliance can only connect to one Distributed Virtual Switch or NSX Transport Zone.
- One HCX Network Extension configuration cannot use multiple HCX Network Extension appliances.
- HCX Network Extension does not detect or mitigate loops.
- Virtual machine networks that span more than one vCenter Server should not be extended from more than one vCenter to the same destination router. This can result in a network outage.
- HCX Network Extension does not detect or mitigate IP conflicts on the network.
- HCX Network Extension does not detect or mitigate MAC conflicts on the network.
- For a cloud/site pair, a given network can be extended through only one appliance and is subject to the resource and performance limitations of that appliance.
- When a network is extended using an incorrect gateway IP or Prefix List, unextending and re-extending with the correct information will fail due to the mismatch on the NSX gateway configuration at the destination. In this case, it is necessary to manually remove the previous network extension configuration from the NSX gateway.
- HCX Network Extension connects to an existing segment on the target site if it has the same gateway IP and Prefix configured for the extension, and it disconnects the NSX tier-1 interface from the segment. If the NSX tier-1 interface was previously connected and in service, all communication to the gateway on that cloud segment is disrupted.

Network Extension to Destinations with Universal Distributed Logical Routers

When working with destination environments with Cross-vCenter NSX configurations, HCX supports extending source networks to destination environments using a Universal Distributed Logical Router (UDLR). When a UDLR is selected during the network extension operation, HCX creates a Universal Logical Switch on the destination, across multiple vCenter Servers.

The following information and requirements apply for Network Extension when specifying a UDLR as the gateway.

- The HCX Cloud Manager configuration includes all secondary NSX systems as specified in **Configuration** > **NSX**. Each secondary NSX listed must have the administrative credentials of its associated vCenter Server.
- HCX Network Extension does not support the local egress feature of UDLRs.

Importing Routers for Network Extension with NSX-V

Extending networks to a destination site that is running NSX-V may require importing the NSX-V Edge router information if it is not present in the HCX Cloud Manager inventory.

iWithout the NSX-V Edge router information, network extension operations can fail.

Note When extending networks to an NSX-T supported destination, the Edge router information is imported automatically.

Procedure

1. Log in to the destination HCX Cloud Manager: <https://hcxcloudmgr-ip-or-fqdn>.
2. Go to **Services** > **Networking** and click **Router**.
3. Click **IMPORT**.

   A window appears for entering vCenter and NSX gateway information.
4. Using the pull-down menus, select the vCenter Server and gateway required for network extension.
5. Click **OK**.

Extending Networks Using VMware HCX

VMware HCX Network Extension is an L2 bridging function initiated at the source.

If you are using the HCX Manager UI (stand-alone or vSphere Client plug-in), you can extend networks by selecting one or more Distributed Port Groups or NSX Logical Switches. When you extend a network, a corresponding NSX Logical Switch is created at the destination site.

If you are using the vSphere Client Networking interface, you can select a single Distributed virtual Port Group and extend it.

Note For a list of restrictions regarding Network Extension, see Restrictions and Limitations for Network Extension.

For the operational limits supported with HCX Network Extension, see Chapter 7 Configuration and Service Limits for VMware HCX.

Procedure

1. If you are using the HCX Manager UI, follow these steps to select a network for extension:
   a. In the HCX Services menu, select **Network Extension**.

      A summary screen appears displaying all configured site pairs. Expand a site pair to see the associated Service Mesh information. Expand a Service Mesh to see the associated Network Extensions.

   b. At the top of the page, select **Extend Networks**.

      A screen appears prompting you for the target site network selections.

   c. Select a Service Mesh.

      Note If you have only one Service Mesh, it is selected by default.

   d. Select one or more Distributed Port Groups or NSX Logical Switches.

      You can use the available filters to hide networks that are ineligible for extension, hide networks that do not have virtual machines associated with them, or hide networks without extension.

   e. Click **Next**.
2. If you are using the vSphere Client Networking interface, follow these steps to select a network for extension:
   a. From the vSphere menu, select **Networking**.
   b. Right-click a Distributed Port Group.
   c. Locate HCX Actions near the bottom of the list, and select **Extend Network to HCX Target Site**.

      A screen appears prompting you for the target site network selections.

   d. Expand Remote Site Connection and select a site.

      Note If you have only one site pairing, it is selected by default.
3. Use the drop-down menu to select the Destination First Hop Router.

   If you are extending a network to a vCenter with NSXv, select an Edge Services Gateway (ESG) or Distributed Logical Router (DLR) from the drop-down menu.

If you are extending a network to a vCenter with NSX-T, select a tier-1 router.

4 Provide the Gateway IP address and Prefix Length for the network being extended in the format <gateway IP/Prefix Length>. For example: 192.168.10.1/24.

For a vCD target cloud, click the extended option drop-down menu and optionally specify the DNS configuration.

5 Select the Extension appliance.

6 (Optional) For each source network, expand **Settings - optional** and check the appropriate options:

Allow Overlapping VLAN

The HCX Manager prevents you from extending networks that have the same VLAN ID and Gateway IP address. Select this option to override system and allow duplicate VLAN IDs.

DNS entries

For a vCD target cloud, optionally specify the DNS configuration: **Primary DNS**, **Secondary DNS**, and **DNS Suffix**.

7 (Optional) Depending on the NSX version running in your data center, enable Mobility Optimized Networking for all workloads that require routing through the local gateway at the target site.

With MON, you can configure individual workloads for local routing, or create policy routes to control which networks are routed locally. For more information about MON and additional configuration settings, see HCX Network Extension with Mobility Optimized Networking for NSX-T.

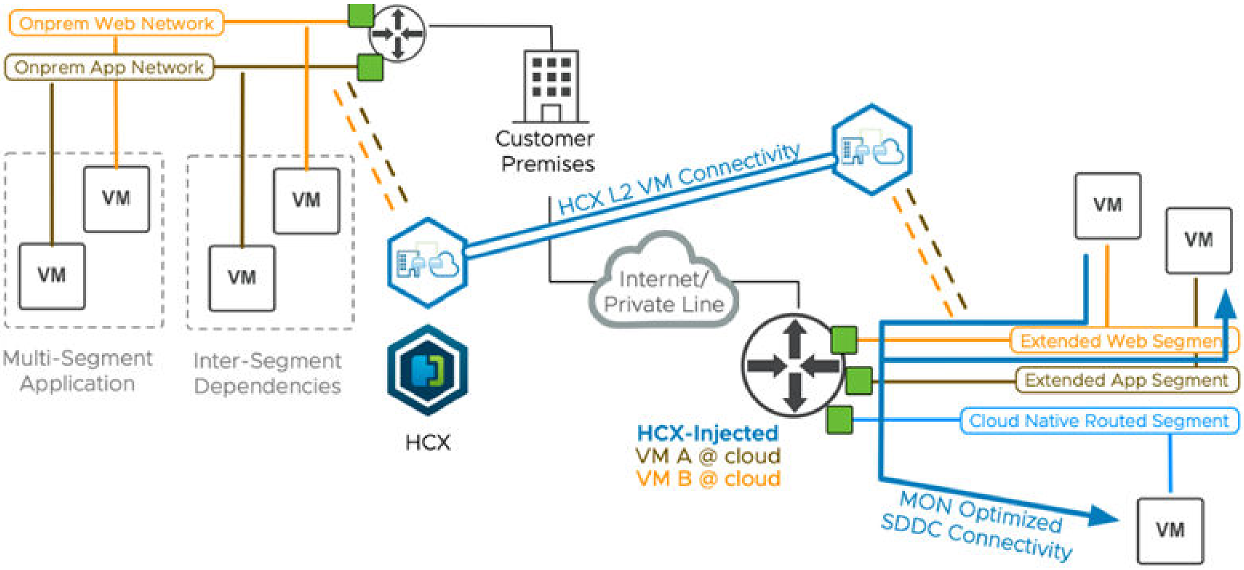
8 To finish, click **Extend**.

To view the task status, navigate to the HCX Dashboard and scroll down to the Activity Logs display.

HCX Network Extension with Mobility Optimized Networking for NSX-T

When extending networks to a remote VMware NSX-T Data Center, you can use Mobility Optimized Networking service to route migrated virtual machine traffic within the cloud, without tromboning.

HCX Mobility Optimized Networking (MON) is an enterprise capability of the VMware HCX Network Extension (HCX-NE) feature. MON enables optimized application mobility for virtual machine application groups that span multiple segmented networks or for virtual machines with inter-VLAN dependencies, as well as for hybrid applications, throughout the migration cycle. Migrated virtual machines can be configured to access the internet from the SDDC without experiencing the network tromboning effect.



The Mobility Optimized Networking service ensures traffic from the local and remote data centers uses an optimal path to reach its destination, while all flows remain symmetric.

In the absence of MON, all traffic from workloads on an extended network at the destination site is routed through the source environment router.

About HCX Mobility Optimized Networking

This section provides an overview of workload traffic flows using HCX Network Extension with and without Mobility Optimized Networking.

Mobility Optimized Networking Terminology

The following definitions apply when discussing HCX MON.

Flat Network

A network design approach where the topology is flattened to simplify configuration and administration. Flat networks with large broadcast domains are contrary in principle to segmented networks, which restrict broadcast domains and relies on VLANs, subnets and routers.

Segmented (Hierarchical) Network

A network design approach where the topology is segmented using variable length subnetting and VLANs to create a hierarchical routing configuration. Segmented, or hierarchical networks have controlled broadcast domains and are contrary in principle to flat networks, which rely on large broadcast domains and ARP discovery.

Network Latency

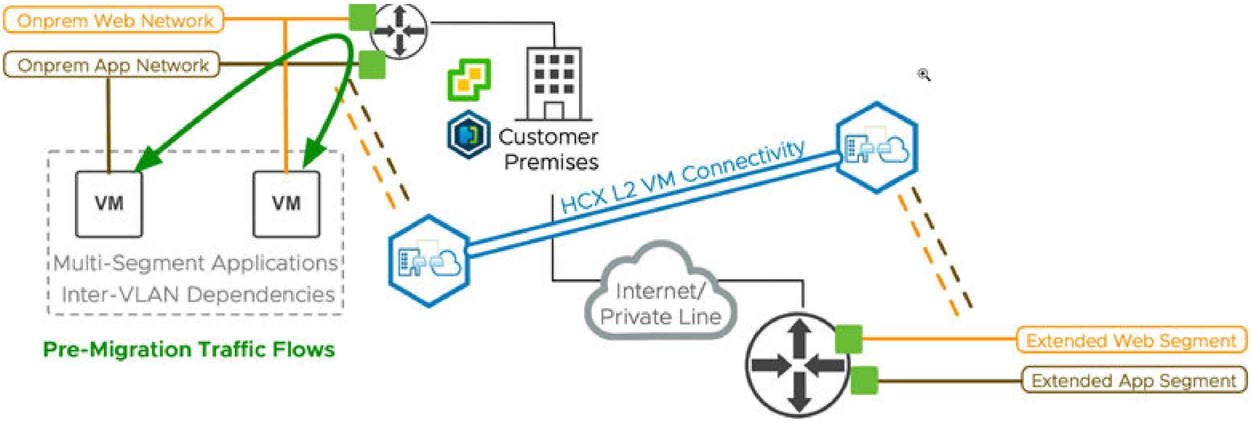
A measure of delay for data to go from the source server to the destination over a network

Round-Trip Time / Delay

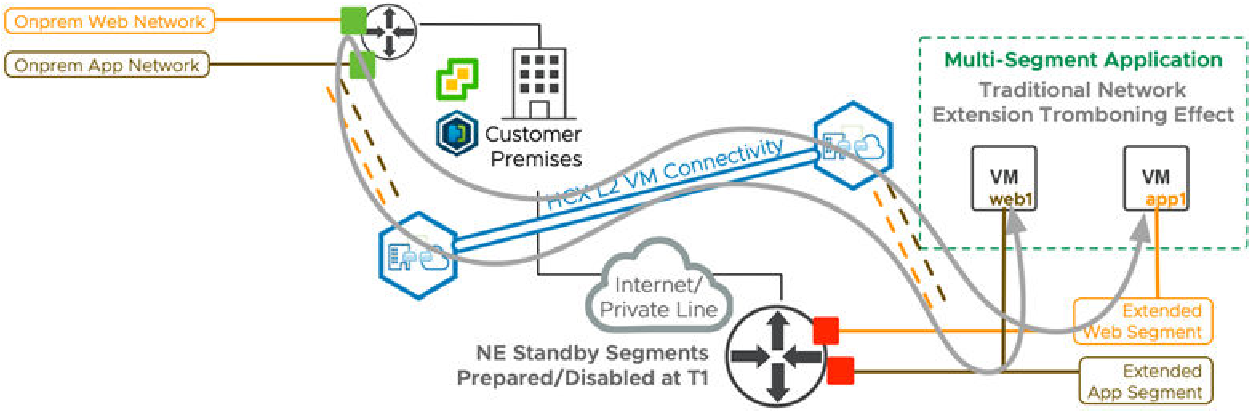
The length time it takes for a signal to be sent to a destination, plus the time it takes for the acknowledgement to be received.

Use Cases for Mobility Optimized Networking

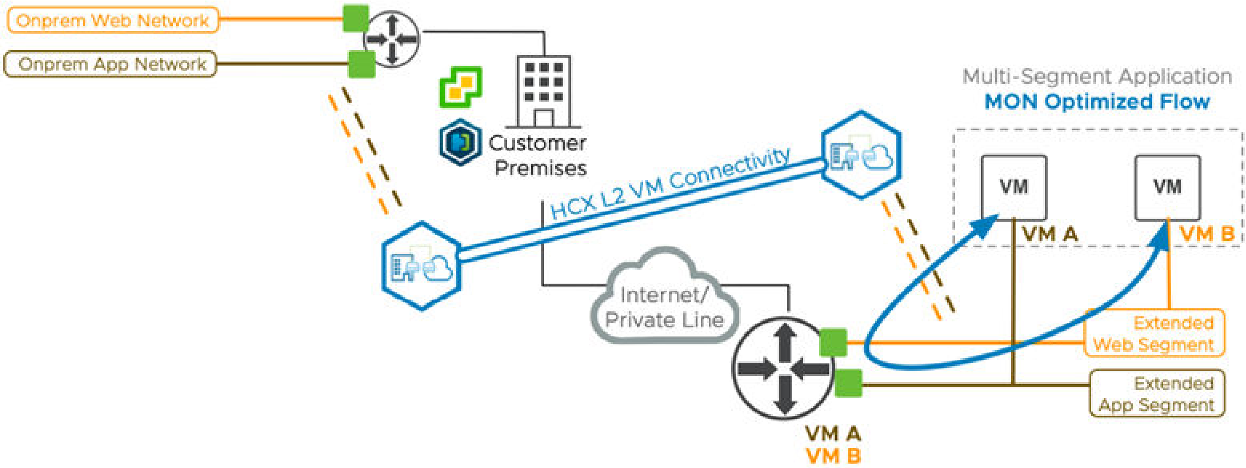
Mobility Optimized Networking improves routed connectivity patterns for multi-segment applications and virtual machines with inter-VLAN dependencies as those virtual machines are migrated into the cloud.



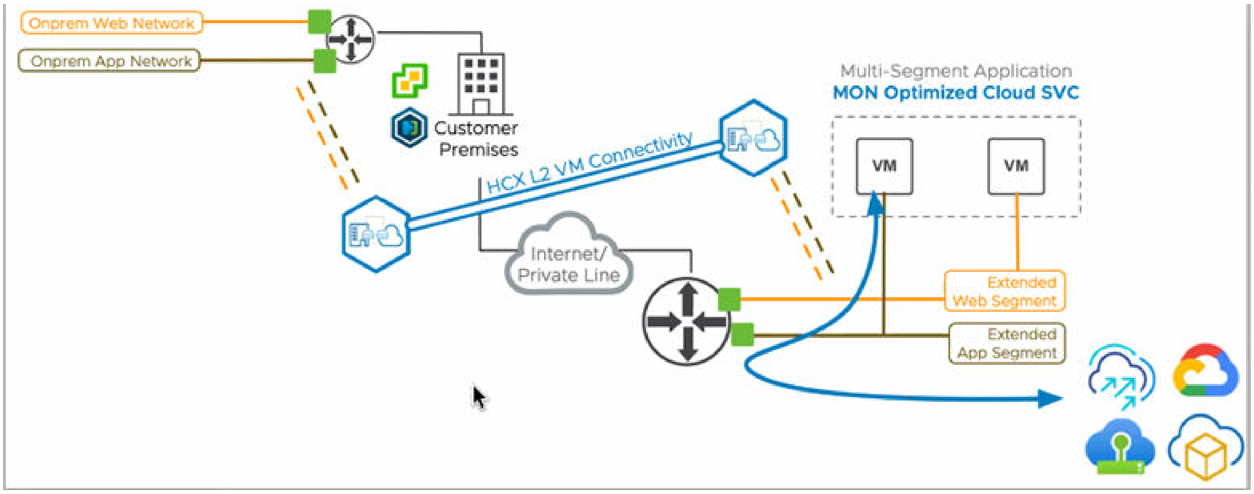
Without MON, HCX Network Extension expands the on-premises broadcast domain to the cloud SDDC while the first hop routing function remains at the source. The network tromboning effect is observed when virtual machines connected to different extended segments communicate.



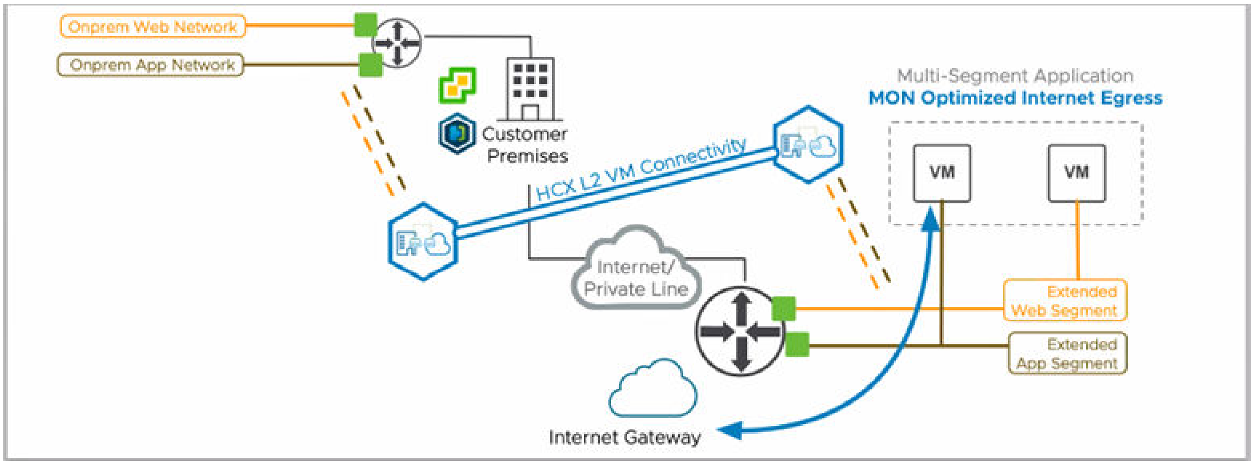
MON optimization enables migrated virtual machines to reach segments within the SDDC.



Mobility Optimized Networking can be configured to allow migrated virtual machines to reach services hosted within a public cloud.



Mobility Optimized Networking enables migrated virtual machines to use the SDDC Internet interface (with SNAT).



Mobility Optimized Networking Outcomes by Migration Type

- HCX Bulk migrated virtual machines are automatically MON optimized in the SDDC.
- HCX vMotion migrated virtual machines use the on-premises gateway until they are specifically configured to use the cloud gateway in the MON interface.
- HCX RAV migrated virtual machines use the on-premises gateway until they are specifically configured to use the cloud gateway in the MON interface.
- Virtual machines created in the segment prior to enabling the MON feature use the on-premises gateway until they are specifically configured to use the cloud gateway in the MON interface.

Mobility Optimized Networking Operation

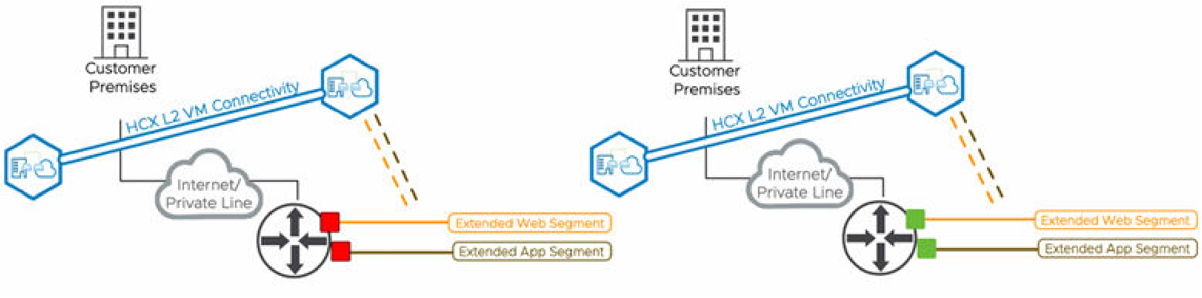
Network Extension with HCX Mobility Optimized Networking provides the following functionality:

- Select or deselect Mobility Optimized Networking at the time of stretching a network
- Select or deselect MON for already extended networks
- Select or deselect MON on an individual VM basis for VMs residing on extended networks in the SDDC
- Display which VMs are using Mobility Optimized Networking.
- When using HCX to vMotion a VM, preserve existing network connections while providing an option to activate Mobility Optimized Networking on that VM after migration
- Configure MON Route Policy to define on-premises (non-SDDC) subnets or exception/deny subnets for local egress.

The following process explains what happens during the various phases of Mobility Optimized Networking.

1. Mobility Optimized Neworking is enabled for an HCX extended segment.

   HCX enables the network ID (gateway IP) in the SDDC Compute Gateway. It is enabled with a limited /32 255.255.255.255 network mask.



2. Static routes are added in the SDDC Compute Gateway for migrated virtual machines on HCX extended network.

HCX adds reachability information for the migrated virtual machine (in the form of a virtual machine specific static route) to the SDDC Compute Gateway, allowing reachability within the SDDC. This vm static route is not advertised to the on-premises environment. The HCX L2 path is used to reach subnets not in the SDDC.

3 Using SDDC forwarding technology, the virtual machine uses the SDDC Compute Gateway to reach the SDDC networks.

For reachability outside of the SDDC tier-1, the MON policy configuration is evaluated according to the MON policy configuration. Matching subnets are sent to the original premises router. Nonmatched subnets are sent to the SDDC tier-0 router. For more information on MON policy routes, see Mobility Optimized Networking Policy Routes.

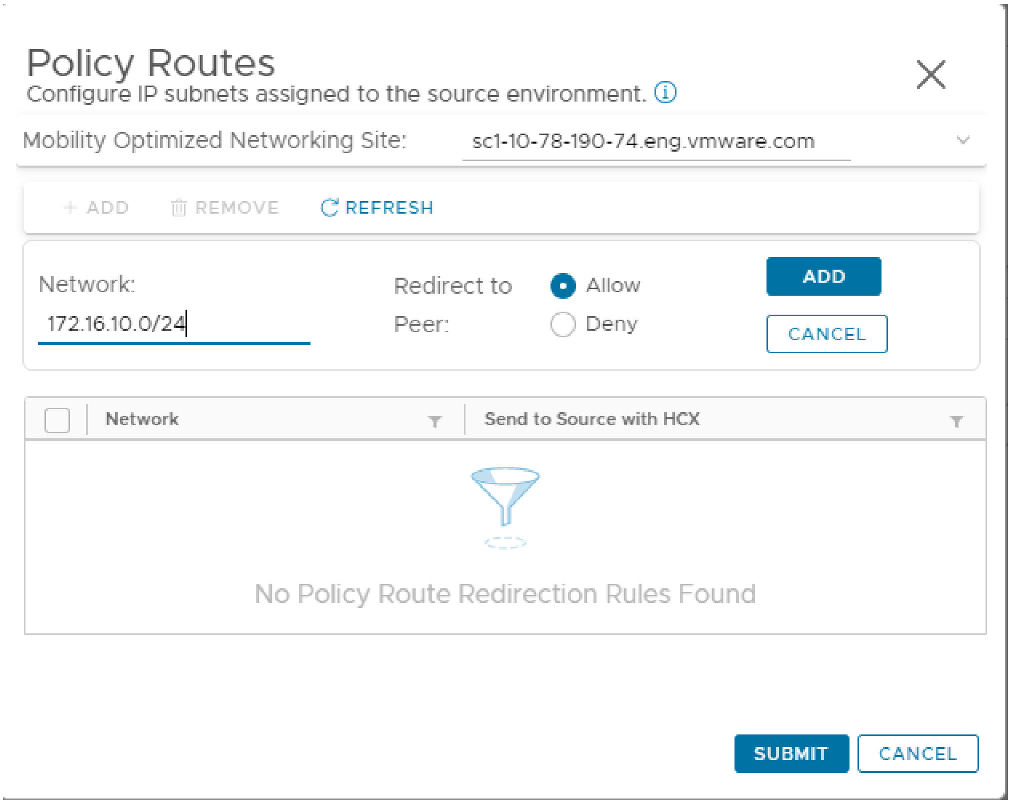
Mobility Optimized Networking Policy Routes

When the destination network for a traffic flow is not within the SDDC, the Mobility Optimized Networking policy is evaluated.

MON policy routes define which traffic is routed through the source gateway versus traffic that is routed through the cloud gateway. The Advanced tab in the HCX Network Extension interface provides an option for configuring policy routes.

When the destination network for a traffic flow is not within the SDDC tier-1 router, the MON policy is evaluated:

- If the destination IP is matched and configured as allow in the MON policy configuration, the packet is forwarded to the premises gateway using the HCX Network Extension appliance.
- If the destination IP is not matched, or configured to deny in the MON policy, the packet is forwarded to the SDDC Tier-0 to be routed.



Policy Routes
Configure IP subnets assigned to the source environment.
+ ADD
REMOVE
REFRESH
ADD
CANCEL
Network
Send to Source with HCX
No Policy Route Redirection Rules Found
SUBMIT
CANCEL

Mobility Optimized Networking Site: sc1-10-78-190-74.eng.vmware.com

Network: 172.16.10.0/24

Redirect to Peer: ● Allow ○ Deny

Example Policy Route Configurations

Mobility Optimized Networking policy route configuration settings can vary depending on the HCX deployment.

This section describes the default MON policy configuration and provides best practices and considerations for configuring policy routes in these environments: VMware Cloud on AWS, Amazon S3 Object Storage, deployments with Route-based VPN (RBVPN).

Default MON Policy Configuration

The default MON policy includes all RFC-1918 networks. This policy configuration forwards private subnet traffic (not destined to segments within the SDDC) to the on-premises router and sends internet egress traffic to the SDDC tier-0 router.

Policy Configuration for Internet Egress On-premises

For MON deployments where security policies require internet access on-premises, replace the default MON Policy Configuration:

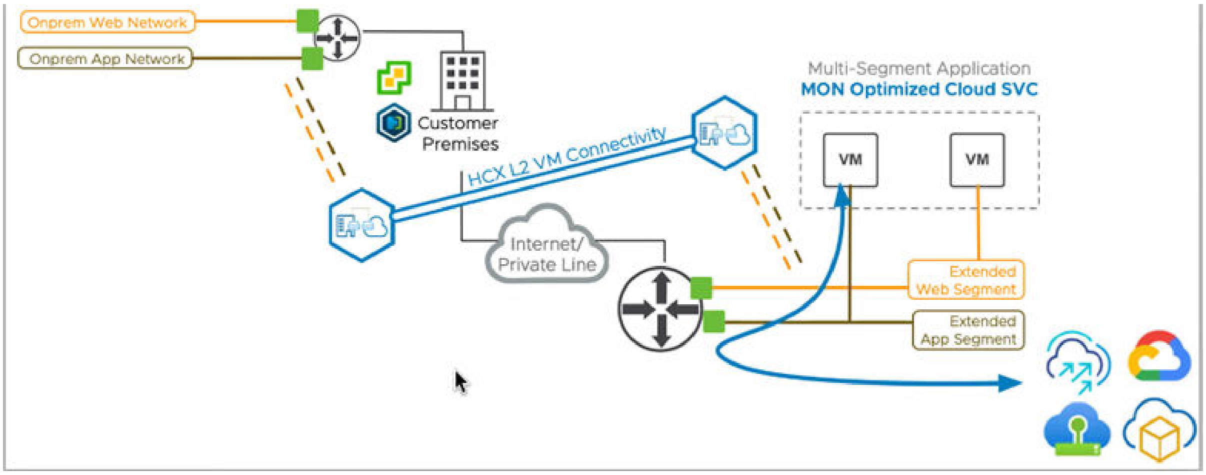
- Remove the default RFC-1918 entries from the Policy Routes interface.
- Add a single Allow entry for network 0.0.0.0/0.

  This policy configuration forwards private subnet traffic (not destined to segments within the SDDC) to the on-premises router and internet egress traffic, while maintaining routing symmetry.

Policy Configuration for Cloud Services

MON policy routing can be revised to achieve cloud service reachability.

- Configure the IP address ranges for the cloud based service as Deny entries (exclusions) to the MON Policy.
- Deny entries are sent to the SDDC tier-1 router.



Limitations and Caveats for HCX Mobility Optimized Networking

The HCX Mobility Optimized Networking feature routes network traffic based on locality of the source and destination virtual machines.

When using HCX Mobility Optimized Networking, limitations and caveats apply.

Limitations for any HCX Deployment

- Virtual Machines need VMware Tools installed for the HCX management plane to learn their IP address.
- A virtual machine must have a unique IP address in the same subnet for the MON activated segment it is connected to.
- MON functionality is supported for one vNIC with one IP address.
- MON functionality is only supported on one vNIC of virtual machines with multiple vNICs. Additional vNICs must be connected to cloud segments or other stretched segments without MON enabled.
- MON does not support extended segments that rely on DHCP services provided on the source gateway for the segment. Communications to the source gateway are filtered.
- Traffic between MON-enabled migrated virtual machines to virtual machines on Extensions without MON is not optimized.
- MON does not optimize intra-VLAN (virtual machine traffic within one VLAN or network). Deployments with large flat networks on-premises may not benefit from the MON feature.

- MON does not optimize within the on-premises network or source environment. In SDDC-to-SDDC migrations, the optimization functions happen within the destination SDDC.
- MON only provides ingress optimization in deployments where the HCX injected virtual machine static routes can be learned by the source gateway for the MON enabled network.
- MON supports architectures where the SDDC has multiple tier-1 routers under the tier-0 router, and each tier-1 is isolated from the others.
- MON does not support architectures where the SDDC has multiple tier-1 routers under the tier-0 router, and tier-1 networks are reachable to other tier-1 networks.
- Some 3rd-party implementations for First Hop Redundancy Protocol (FHRP) may be incompatible with MON. Under these conditions, the on-premise Default Gateway Router MAC address cannot be identified, so cloud VMs with MON enabled will not be able to communicate to it. See VMware KB 85849.

Limitations specific to HCX for VMware Cloud on AWS deployments

- Editing the Mobility Optimized Networking segment properties from VMware Cloud on AWS "Networking & Security" tab is not supported.
- Routes for migrated virtual machines are currently not advertised over Direct Connect or Transit Connect.
- Route-based VPN connections always advertise the virtual machine static route injected by the MON feature.

  Caution MON is not supported with route-based VPN connections to native AWS VPCs as the routes cannot be filtered, and reaching the route limit impacts VPN connections. Reaching the 100 route limit with VMware Cloud on AWS transitions the VPN to a down state.

- Traffic between MON-enabled migrated virtual machines and the SDDC management networks is not optimized.
- Traffic between MON-enabled migrated virtual machines and Connected VPC Private IP addresses is not supported.
- Traffic between MON-enabled migrated virtual machines and virtual machines in other SDDCs (traffic over private Transit Connect) is not supported.
- Traffic between MON-enabled migrated virtual machines across Multi-Tenancy Cloud Director Service boundaries is not supported.

Configuring HCX Mobility Optimized Networking

For data centers using NSX-T, configure Mobility Optimized Networking for workloads that require routing through the local gateway.

Prerequisites

- NSX-T 3.0+ is required at the destination.

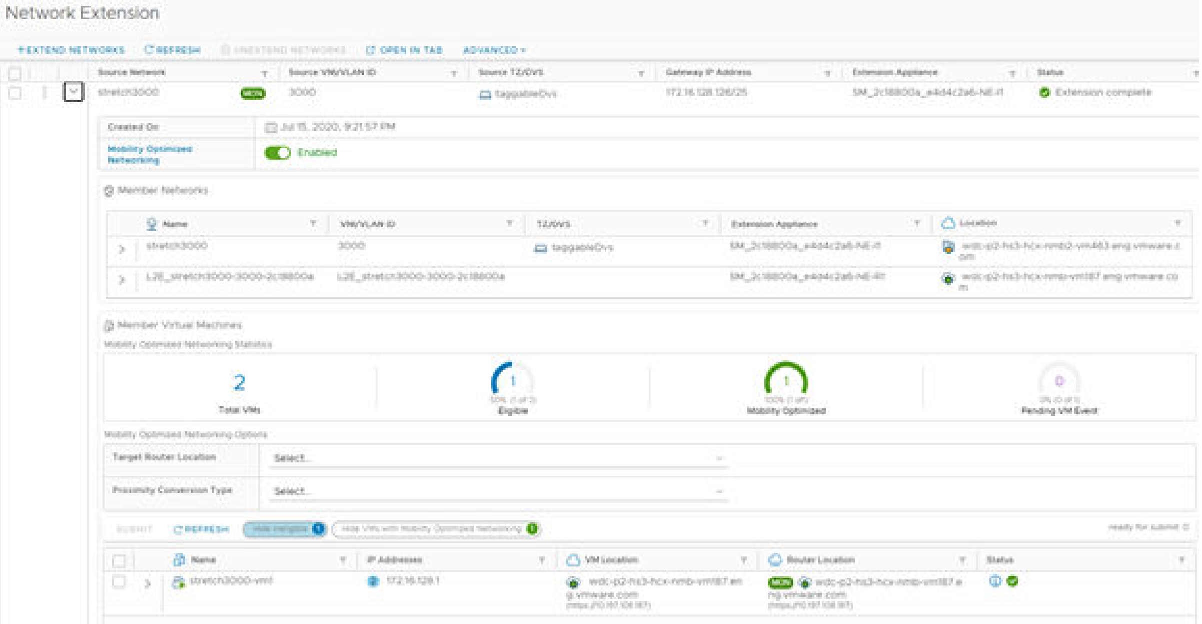
- The HCX Service Mesh component appliances are upgraded to the latest versions.

Note In VMware Cloud on AWS environments the SDDC must be upgraded to at least M8v2 for both the control and data plane.

Procedure

1. In the HCX Manager UI, navigate to **Services** > **Network Extension**.
2. In the Network Extension screen, expand a site pair to see the extended networks.

   Network Extensions enabled for MON are highlighted with an icon.
3. Expand each extension to display network details.

4. Select a Network Extension and enable the slider for Mobility Optimized Networking.

   Enabling Mobility Optimized Networking applies to all subsequent events, such as VM migrations and new VMs connected to the network. VMs in the source environment and VMs not having VM Tools, are ineligible for Mobility Optimized Networking.

   Note Workloads that were connected to the network prior enabling Mobility Optimized Networking continue to be routed through the source site.

5 For existing VMs requiring Mobility Optimized Networking, complete the following steps:

   a Select a VM and expand the row.

   You can select multiple VMs using the check box next to each workload.

   Note Transition VMs to Mobility Optimized Networking in batches of 25 or less at a time. Maintain a gap of 30 seconds between the batches.

   b Select **Target Router Location** and choose the cloud option from the drop-down menu.

   c Select **Proximity Conversion Type**: **Immediate Switchover** or **Switchover on VM Event**.

   Immediate Switchover: This selection transfers the router location immediately. If a workload VM has ongoing flows to the source router, they are impacted.

   Switchover on VM Event: This selection transfers the router location upon VM events like NIC disconnect and connect operations, and VM power cycle operations.

6 Click **Submit**.

All selected VM workloads are configured for Mobility Optimized Networking.

Note VMs that have been set for Switchover on VM Event stay in a pending state until that event occurs.

Configuring Policy Routing for Mobility Optimized Networking

With Mobility Optimized Networking, you have the option to control which traffic is routed locally using the cloud gateway versus traffic that goes out through the source gateway. Policy routes define which traffic is routed through the source gateway. All other traffic is routed through the cloud gateway.

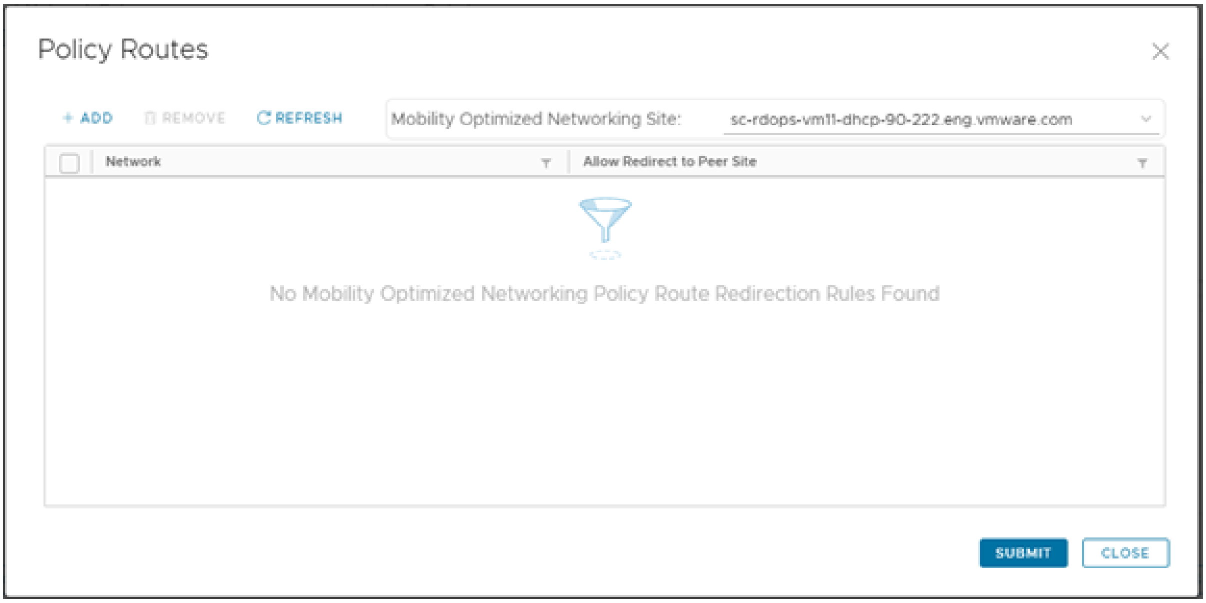
Procedure

1 In the HCX Manager UI, navigate to **Network Extension**.

2 In the Network Extension screen, click the **Advanced** tab.

3 Click **Policy Routes**.

A new screen appears with options to Add or Remove networks.



Mobility Optimized Networking Site: sc-rdops-vm11-dhcp-90-222.eng.vmware.com

No Mobility Optimized Networking Policy Route Redirection Rules Found

4 Using the pull-down menu, select a destination site.

5 In the Network field, for which you want traffic routed through the source gate, click **Add**.

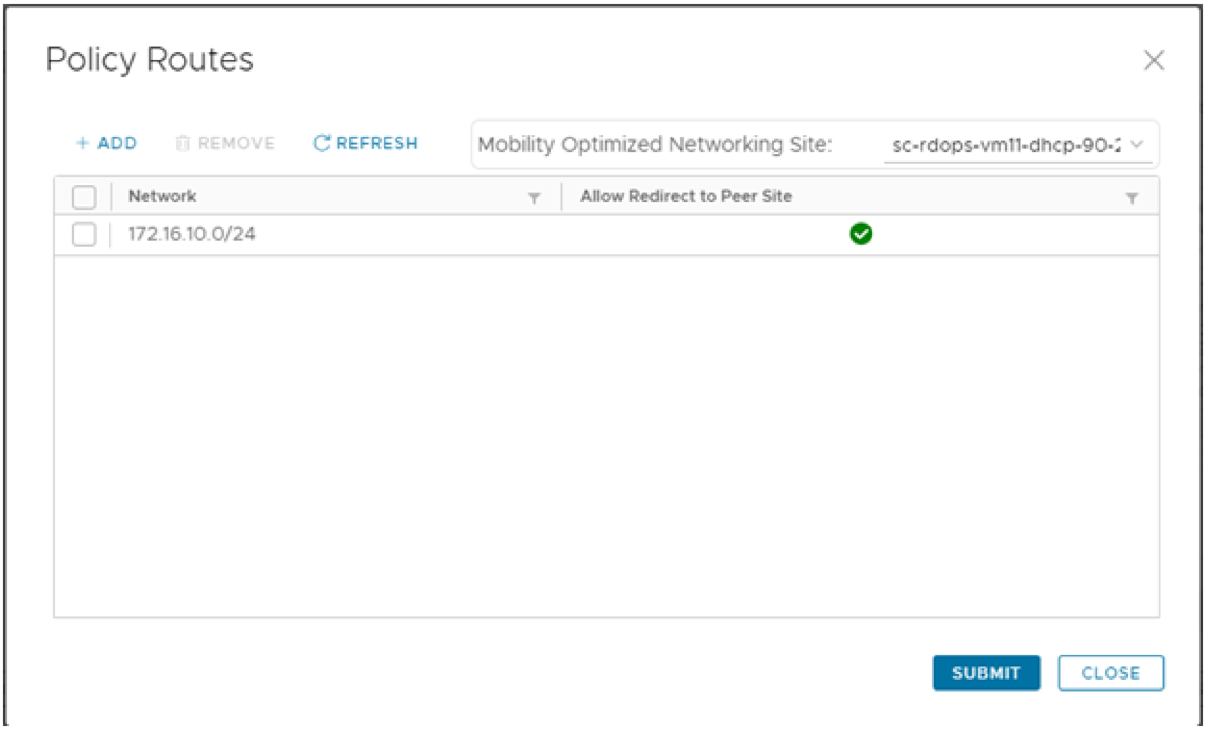
6 Complete the entries for **Network IP Address** and **Prefix Length**.

By default, **Redirect to Peer** is selected.

7 (Optional) To specify a policy that blocks a network from being redirected, uncheck **Allow Redirect to Peer**.

8 Click **Submit**.

The policy is applied to the network.



Mobility Optimized Networking Site: sc-rdops-vm11-dhcp-90-

☐	Network	Allow Redirect to Peer Site
☐	172.16.10.0/24	✓

Viewing Network Extension Details

HCX provides detailed tunnel state information for the Network Extension appliance, and connection information for each extended network associated with that appliance.

HCX maintains Up or Down state information regarding the tunnel used for Network Extension. The information includes the tunnel ID, local IP address and port number, remote IP address and port number, and tunnel status.

Connection statistics for extended networks includes the bit rate, bytes transferred and received, packet rate, and packets transferred and received. The statistics are updated every 1 minute and stored in the HCX database. The bytes and packets transferred and received information reflects the total number since the Network Extension appliance was powered on.

Network Extension statistics also detect and display the MAC address of each virtual machine NIC on the extended network, which can be helpful in determining the status of a particular virtual machine on that network. A search option is provided to filter the list of addresses.

Procedure

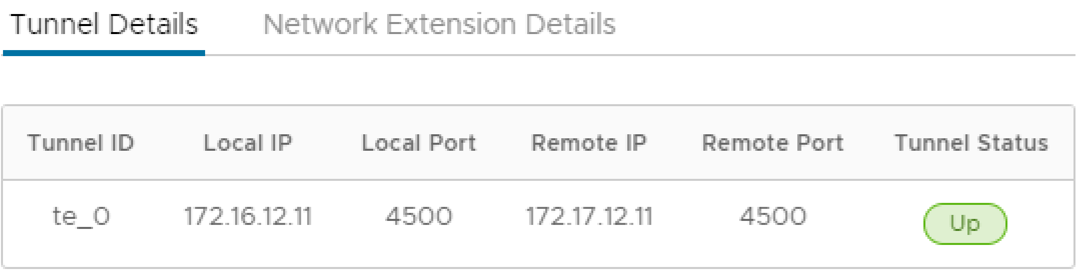
1 From the HCX Dashboard, go to **Infrastructure > Interconnect > Service Mesh**.

2 Click **View Appliances**.

HCX displays a list appliances that have been enabled in the Service Mesh.

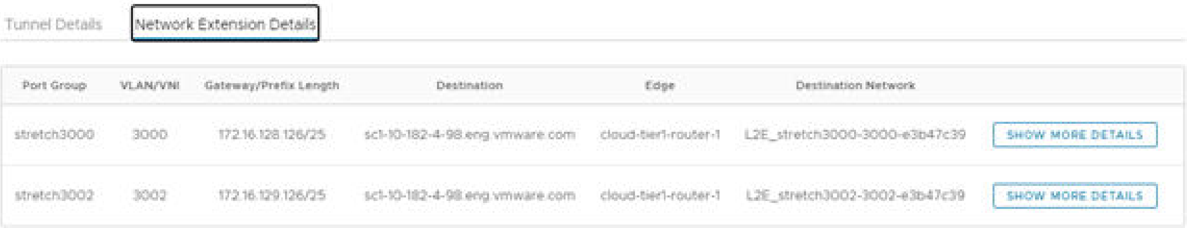
3 Expand the Network Extension appliance.

The system displays options for selecting **Tunnel Details** or **Network Extension Details**. **Tunnel Details** is selected by default.



Tunnel ID	Local IP	Local Port	Remote IP	Remote Port	Tunnel Status
te_0	172.16.12.11	4500	172.17.12.11	4500	Up

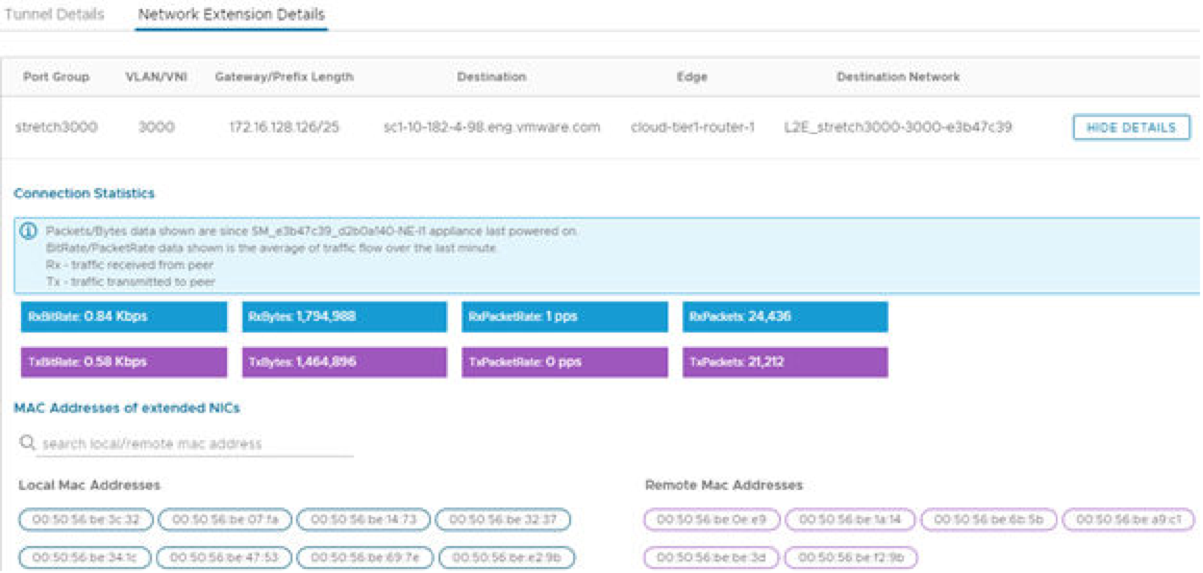
4 To view details regarding extended networks, click **Network Extension Details**.



Port Group	VLAN/VNI	Gateway/Prefix Length	Destination	Edge	Destination Network	
stretch3000	3000	172.16.128.126/25	sc1-10-182-4-98.eng.vmware.com	cloud-tier1-router-1	L2E_stretch3000-3000-e3b47c39	SHOW MORE DETAILS
stretch3002	3002	172.16.129.126/25	sc1-10-182-4-98.eng.vmware.com	cloud-tier1-router-1	L2E_stretch3002-3002-e3b47c39	SHOW MORE DETAILS

5 To view the connection statics information for a specific network, click **Show More Details**.

HCX displays the connection statistics information. To see updated information, click the refresh icon.



Port Group	VLAN/VNI	Gateway/Prefix Length	Destination	Edge	Destination Network	
stretch3000	3000	172.16.128.126/25	sc1-10-182-4-98.eng.vmware.com	cloud-tier1-router-1	L2E_stretch3000-3000-e3b47c39	HIDE DETAILS

Connection Statistics

Packets/Bytes data shown are since SM_e3b47c39_d2b0a140-NE-I1 appliance last powered on.
BitRate/PacketRate data shown is the average of traffic flow over the last minute.
Rx - traffic received from peer
Tx - traffic transmitted to peer

RxBitRate: 0.84 Kbps
RxBytes: 1,794,988
RxPacketRate: 1 pps
RxPackets: 24,436
TxBitRate: 0.58 Kbps
TxBytes: 1,464,896
TxPacketRate: 0 pps
TxPackets: 21,212

MAC Addresses of extended NICs

Local Mac Addresses

00:50:56:be:3c:32
00:50:56:be:07:fa
00:50:56:be:14:73
00:50:56:be:32:37
00:50:56:be:34:1c
00:50:56:be:47:53
00:50:56:be:69:7e
00:50:56:be:e2:9b

Remote Mac Addresses

00:50:56:be:0e:e9
00:50:56:be:1a:14
00:50:56:be:6b:5b
00:50:56:be:a9:c1
00:50:56:be:be:3d
00:50:56:be:f2:9b

6 To close the display, click **Hide Details**.

What to do next

Log in to the peer HCX site to view connection statistics information from that site.

In-Service Upgrade for Network Extension Appliances

HCX provides options for Network Extension upgrade or redeployment that help to minimize service downtime and disruptions to on-going L2 traffic.

The Network Extension appliance is a critical component of many HCX deployments, not only during migration but post migration as extended networks continue to be used after migration in a hybrid environment. HCX operations using extended networks can be impacted during Network Extension appliance upgrades or when a change to the HCX Compute Profile or Service Mesh requires redeploying the Network Extension appliance.

Network Extension appliances are available for **In-Service** or **Standard** (default) upgrade.

Note HCX Network Extension In-Service/Standard Upgrade or Redeploy operation will fail, if one of the stretched networks has Port Bindings set as “Ephemeral – no binding” for a DVPG.

With an In-Service upgrade or redeployment, the following high-level workflow applies:

- A new appliance is provisioned at the source and destination site.
- New Uplink and Management IP addresses are reserved for each new Network Extension appliance.
- NICs on the new appliances are connected, including NICs for extended networks, except the NIC connection state is flagged as Down.
- Secure tunnel connections are established between sites.
- Old appliance Bridge NICs are disconnected. New Appliances Bridge NICs are connected.
- The old appliance is deleted. IP addresses used for the old appliance are released and made available.

As a result of this workflow, switchover from the old appliance to the new appliance requires only minimal action and can happen within a few seconds or less. The actual time it takes to return to forwarding traffic depends on the overall environment.

With a Standard upgrade or redeployment of the Network Extension appliance, the new appliances use the same Uplink and Management IP addresses as the existing appliance. Using the same IP addresses means that HCX must disconnect the existing appliance so that the IP addresses are available for the new appliance. In this case, tunnel connections are established only after switchover happens, requiring 30 seconds or more to reestablish data traffic across extended networks.

Network Extension upgrade or redeployment operations display a pop-up window with the option for In-Service or Standard mode deployment.

For more information about upgrading HCX appliances, see Chapter 13 Updating VMware HCX.

Prerequisites

The following prerequisites apply for In-Service upgrade or deployment.

Note In the event that the prerequisites for In-Service mode are not met, use Standard mode to complete Network Appliance upgrade or redeployment operations.

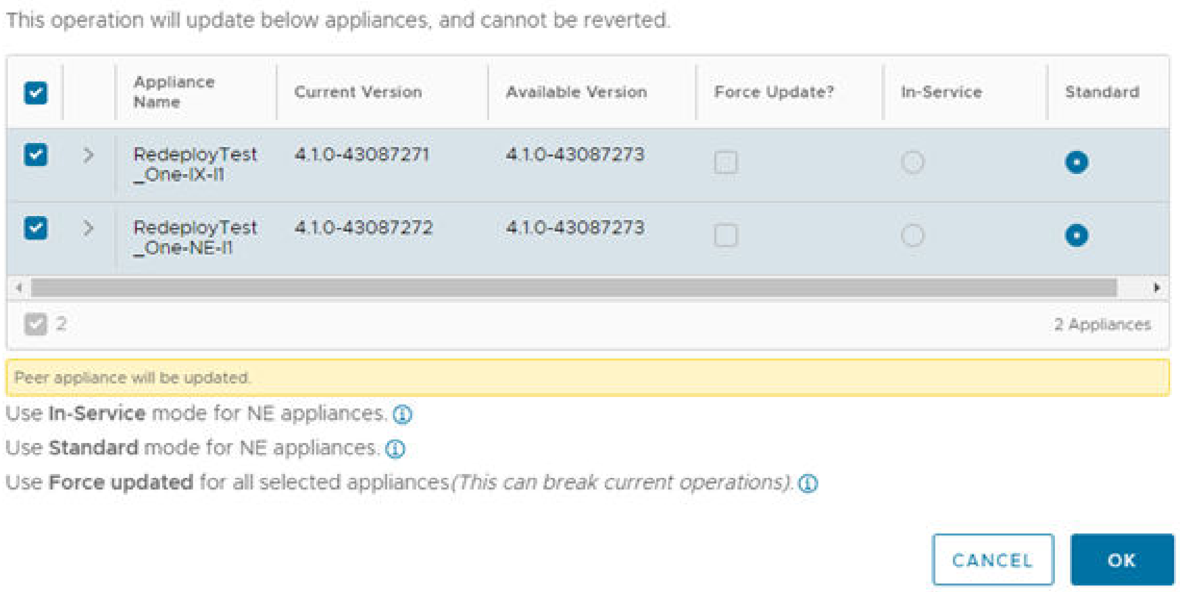
- Existing HCX-NET-EXT appliances must be running HCX 4.0 or later. This feature cannot be used while upgrading from HCX 3.5.x to HCX 4.0.
- Appliance tunnels must be in Up state as shown by navigating to **Interconnect > Service Mesh > Appliances**. Appliances with Down or Degraded tunnels are not supported.
- HCX Manager must be able to reach HCX-NET-EXT appliances via the management network.
- For each Network Appliance, free IP addresses are available in both the HCX Management and Uplink Network profile address pools during the Upgrade or Redeploy process. For example, upgrading 3 Network Extension appliances at the same time requires 3 available Management IP addresses and 3 available Uplink IP addresses. Once the process completes, the IP addresses used by the previous appliance are released.

Procedure

1. Select the Network Extension appliances for update or deployment.
2. Click **Update** or **Redeploy**.

   The selections that appears depends on the operation being performed. The option for selecting Standard or In-Service mode can appear when updating or redeploying the Network Extension appliances from either the Service Mesh View Appliances or View Topology window, or from the Service Mesh Edit or Resync window. The following are examples of the update and deployment windows.

   Update screen:



This operation will update below appliances, and cannot be reverted.

☑		Appliance Name	Current Version	Available Version	Force Update?	In-Service	Standard
☑	>	RedeployTest_One-IX-I1	4.1.0-43087271	4.1.0-43087273	☐	○	●
☑	>	RedeployTest_One-NE-I1	4.1.0-43087272	4.1.0-43087273	☐	○	●

☑ 2   2 Appliances

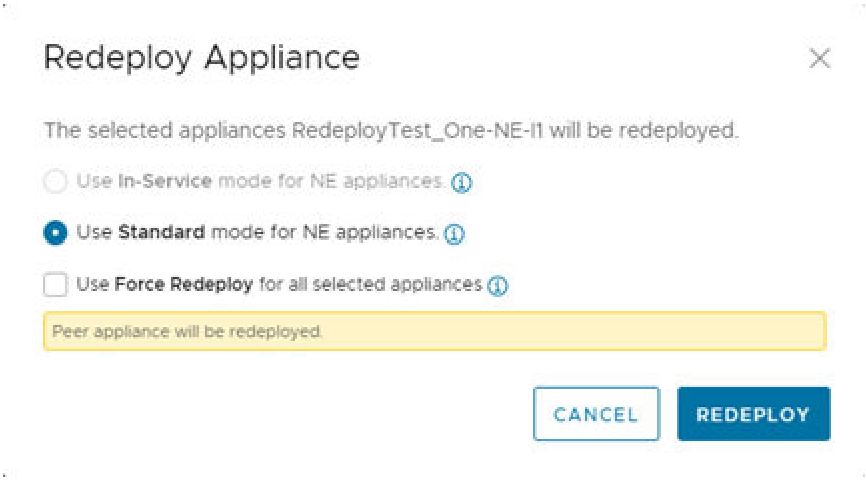
Peer appliance will be updated.

Use **In-Service** mode for NE appliances.

Use **Standard** mode for NE appliances.

Use **Force updated** for all selected appliances*(This can break current operations).*

Deployment screen:



Redeploy Appliance

The selected appliances RedeployTest_One-NE-I1 will be redeployed.

○ Use **In-Service** mode for NE appliances.

● Use **Standard** mode for NE appliances.

☐ Use **Force Redeploy** for all selected appliances

Peer appliance will be redeployed.

3 Depending on the operation, click **OK** or **Redeploy**.

What to do next

Verify the Update or deployment task by navigating to **Interconnect** > **Service Mesh** > **Tasks**. After the task completes, check that the tunnel status is Up.

Removing a Network Extension

Removing a network extension prevents further cross-site communications between virtual machines residing on that network. This operation is typical when the source side network is vacated.

Procedure

1 In the HCX Manager UI, select **Services** > **Network Extension**.

The system displays a list of extended networks.

2 Select the network or networks that must be unextended, and click the ellipsis menu to see a list of actions.

3 Select the action: **Unextend Network** or **Force Unextend Network**.

The interface opens and displays the selected network.

Note To remove multiple network extensions simultaneously, select the networks and click the **Unextend Networks** tab.

4 (Optional) Expand the network entry and select **Connect cloud network to cloud edge gateway after unextending** to connect the remote side gateway.

   Dynamic routing can be enabled on the Cloud Edge Gateway as part of the OSPF or the BGP configuration. By default, the cloud segment is left disconnected from the Edge Gateway after removing the network extension. This is done to prevent an Edge Gateway from advertising a route to the cloud segment and causing a potential routing conflict with the network in the on-premises datacenter. Checking this option will connect the segment to the Cloud Edge Gateway after removing the network extension. If dynamic routing is enabled, the network will be advertised from the Cloud Edge Gateway. Refer to VMware Cloud on AWS Networking and Security guide to ensure proper routing configuration.

   Note Unextending a network removes the HCX L2 bridged path without removing the NSX Segment or vSphere Port Group, or NSX interface. The NSX router interface remains disconnected when the option **Connect cloud network** is not used.

5 To confirm the operation, click **Unextend**.

Migrating Virtual Machines with VMware HCX

10

Workloads can be migrated bi-directionally between data centers using various VMware HCX migration technologies.

Organizations migrate application workloads for many reasons. From data center consolidation and evacuation to modernization and maintenance, migrating workloads requires analysis and planning. Administrators identify individual workloads for migration, or waves of workloads based on, for example, cluster, network, or application landscape. HCX provides an array of migration types for moving these workloads including cold, warm, and live migration.

HCX also provides procedures for migrating groups, or waves, of virtual machines. And through integration with VMware vRealize Network Insight, Application Group information can be exported to HCX for migration as Mobility Groups. HCX Mobility Groups and vRealize Network Insight integration with HCX are available with the HCX Enterprise license.

This chapter includes the following topics:

VMware HCX Migration Types

Virtual Machines can be moved to and from VMware HCX-enabled data centers using multiple migration technologies.

VMware HCX Bulk Migration

This migration method uses the VMware vSphere Replication protocols to move the virtual machines to a destination site.

- The Bulk migration option is designed for moving virtual machines in parallel.
- This migration type can set to complete on a pre-defined schedule.
- The virtual machine runs at the source site until the failover begins. The service interruption with the bulk migration is equivalent to a reboot.

VMware HCX vMotion

This migration method uses the VMware vMotion protocol to move a virtual machine to a remote site.

- The vMotion migration option is designed for moving single virtual machine at a time.
- Virtual machine state is migrated. There is no service interruption during the VMware HCX vMotion migration.

VMware HCX Cold Migration

This migration method uses the VMware NFC protocol. It is automatically selected when the source virtual machine is powered off.

VMware HCX Replication Assisted vMotion

VMware HCX Replication Assisted vMotion (RAV) combines advantages from VMware HCX Bulk Migration (parallel operations, resiliency, and scheduling) with VMware HCX vMotion (zero downtime virtual machine state migration).

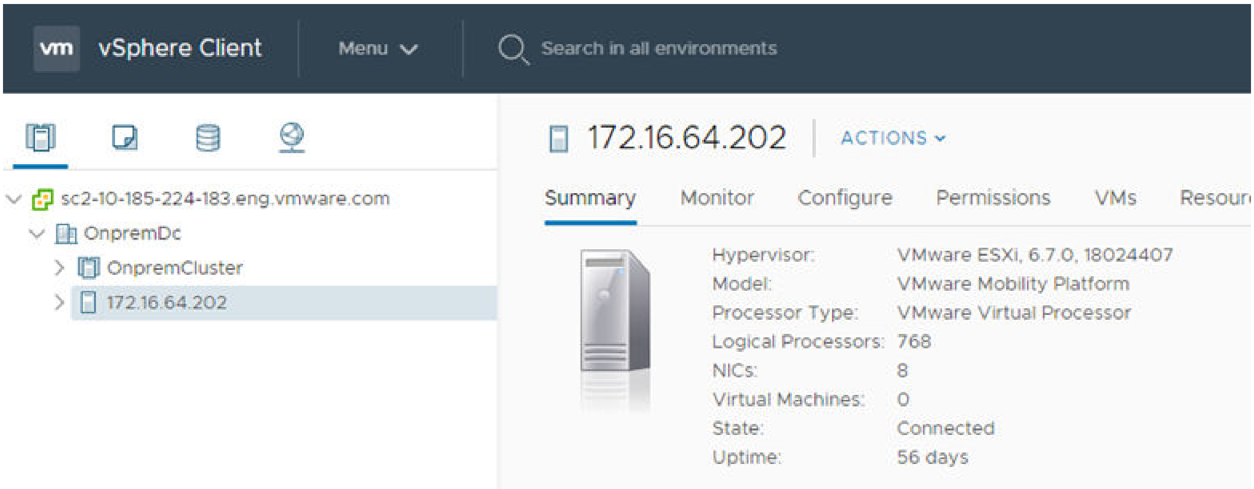
VMware HCX OS Assisted Migration

This migration method provides for the bulk migration of guest (non-vSphere) virtual machines using OS Assisted Migration to VMware vSphere on-premise or cloud-based data centers. Enabling this service requires additional HCX licensing.

Mobility Agent vSphere Host for HCX Migrations

The HCX Interconnect (HCX-IX) appliance uses the Mobility Agent service to perform vMotion, Cold, and Replication Assisted vMotion (RAV) migrations.

The HCX-IX appliance adds the Mobility Agent service as a host object in the vCenter Server. The processor, memory, storage and networking resources displayed on this object does not represent actual consumption on the physical hypervisor hosting the IX appliance.



Hypervisor: VMware ESXi, 6.7.0, 18024407
Model: VMware Mobility Platform
Processor Type: VMware Virtual Processor
Logical Processors: 768
NICs: 8
Virtual Machines: 0
State: Connected
Uptime: 56 days

Caution The Mobility Agent host is required. Deleting this host can disrupt HCX Cold, vMotion, and Replication Assisted vMotion (RAV) migrations.

Understanding VMware HCX Bulk Migration

Bulk migration uses the host-based replication to move a virtual machine between HCX data centers.

To reduce the downtime, the source VM remains online during the replication and is bootstrapped on the destination ESX host after replication completes.

A Bulk Migration request triggers the following actions:

1. Replication begins a full synchronization transfer to the remote site. The time it takes to replicate is a function of the size of the VM and available bandwidth.
2. Replication bandwidth consumption varies depending on how the workload changes blocks on the disk.
3. When full synchronization finishes, a delta synchronization occurs.
4. When the delta synchronization finishes, a switchover is triggered. You can start immediately or delay the switchover until a specific time using the scheduled migration option. By using the scheduled migration option, the switchover can occur during a maintenance window.
5. Following the switchover, the source VM is powered-off, and the migrated replica is powered-on. If for some reason the VM cannot power on, the new VM is powered off (or remains powered off) and the original is powered on. You must have sufficient resources to power on the VM.
6. HCX Manager renames the original VM using a POSIX timestamp suffix to avoid a naming conflict with the migrated VM. If you have not enabled the **Retain MAC** option, the migrated VM obtains a new MAC address.
7. The migration completes.

VMware HCX copies the original VM to the `Migrated VMs` folder in the vSphere Templates view. You can recover a saved VM.

Note There are two uses for these copies:

1 The copy can act as seed, in the event the VM on Site B must be protected on Site A.

2 Protect against any VM corruption (due to external factors) during migration.

Requirements for HCX Bulk Migration

- The Hybrid Interconnect Service and the Bulk Migration Service must be enabled and in a healthy state in the relevant service mesh.
- The resources to create, power on and use the virtual machine must be available in the destination environment.
- Virtual machines must be running Hardware Version 7 or higher.
- Virtual machines must have VMware Tools installed.
- Virtual machines must reside in a Service Cluster (defined in the Compute Profile).
- Network Extension is required for low downtime migration operations.
- Personalization Scripts and System Identity changes (Hostname, IP, SID) require the system to be rebooted one additional time during the switchover phase.
- Bulk Migration potential throughput can vary depending on bandwidth available for migrations, latency, available CPU/MEM/IOPS, and disk read speed. For successful switchover phase, the bandwidth and network conditions must be sufficient to satisfy the operation considering the dataset and virtual machine data change rate. For more information about how to determine bandwidth requirements, see Bandwidth Requirements for vSphere Replication.

Restrictions for HCX Bulk Migration

- Virtual machines with Raw Device Mappings (RDM) in Physical Compatibility mode cannot be migrated. Vitual machines with RDM in Virtual Compatibility mode can be migrated. They are converted to VMDKs at the destination.
- Virtual machines with mounted ISO images cannot be migrated. The HCX bulk migration operation can be used for force unmount ISO images.
- Virtual machine snapshots are not migrated. The HCX bulk migration operation has an option to remove the snapshots.
- Virtual machines with DirectPath I/O configurations cannot be migrated without first removing the DirectPath device.
- Virtual machines with Multi-Writer or FT-enabled virtual machines can be migrated, but the multi-writer configuration is no longer functional.

- Virtual machines with SCSI bus sharing cannot be migrated.
- Virtual machines that cannot be gracefully powered off cannot be migrated. HCX can override with the Force Power-off VM option.
- With the Bulk migration option, new disk UUIDs are generated at the destination environment. Use HCX vMotion when the application has disk UUID-related dependencies.
- Virtual machines using virtual NVMe (vNVME) Controllers cannot be migrated.
- Migration to or from vVOL datastores is not supported.
- If either the source or destination vCenter version is 6.0 or earlier, VMware vCenter tags attached to a virtual machine are not retained during migration. Tags can be created manually for those virtual machines after migration.
- VMware software appliances (including, but not limited to vCenter Server, NSX Manager, Site Recovery Manager) cannot be migrated with HCX Bulk migration.

Guest OS Customization with Bulk Migration

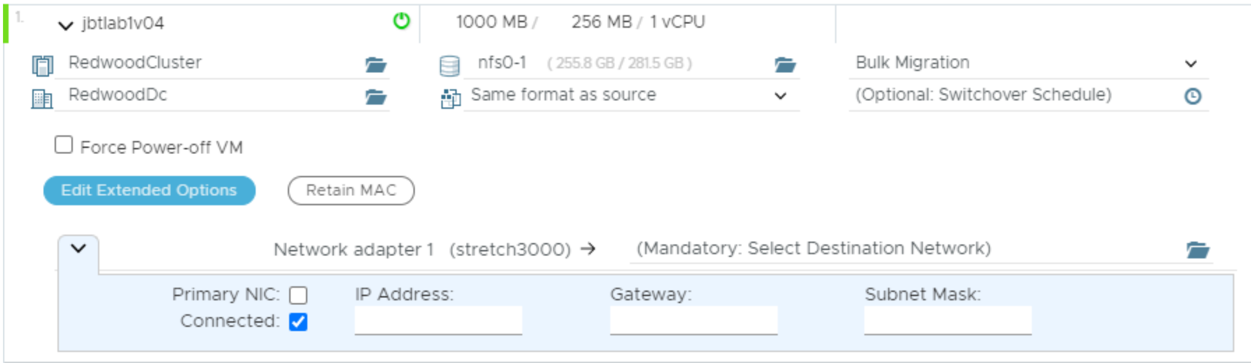
One characteristic of Bulk Migration is the ability to customize several aspects of the Guest OS.

In general, it is best practice to migrate virtual machines on an extended network to keep a virtual machine's IP address, MAC address, and overall identity. But in some scenarios, it can be beneficial to modify a VM’s characteristics. For example, it might be necessary to migrate non-production workloads to free up private network prefixes, and making these changes during the migration can save the effort of manually updating the VM settings after the migration. The following guest customizations are available:

- Guest OS Hostname
- IP Address
- Gateway
- Netmask (Subnet Mask)
- Primary DNS
- Secondary DNS
- Security Identifier (Windows SID)
- Run Pre- or Post-Guest Customization scripts

Guest customization is available only for specific guest OS types. See Guest OS Types for Guest Customization.

You select guest customizations using the Edit Extended Options in the Migration interface. To make Guest OS IP address changes, expand the NIC entry listed under **Extended Options**.



jbtlab1v04
1000 MB / 256 MB / 1 vCPU
RedwoodCluster
RedwoodDc
nfs0-1 (255.8 GB / 281.5 GB)
Same format as source
Bulk Migration
(Optional: Switchover Schedule)
☐ Force Power-off VM
Network adapter 1 (stretch3000) → (Mandatory: Select Destination Network)
Primary NIC: ☐
Connected: ☑
IP Address:
Gateway:
Subnet Mask:

HCX applies the guest customization options during the switchover phase when the virtual machine is powered on.

This functionality is also supported for reverse migrations.

Caution When changing Guest OS information, HCX does not store the original settings.

All values must be specified in the wizard, even those that must remain unchanged.

Values will be cleared on the migrated virtual machine for fields left empty if IP Customization is configured.

For details about the Extended Options available for Bulk migration, see Additional Migration Settings.

Note Changing the Security Identifier of a Windows machine that is already the member of a Windows domain breaks the domain relationship and requires the machine to be re-joined. On a domain controller, this operation can impact the domain. By default, the Generate New Security Identifier (SID) option is not selected.

Guest OS Types for Guest Customization

HCX supports guest OS customization for specific Windows and Linux operating systems.

For Bulk migrations, HCX supports customizing various aspects of the guest OS on the destination virtual machine. For more information about guest OS customization, see Guest OS Customization with Bulk Migration.

The virtual machine Guest OS type and guestID are reflected as virtual machine **config** parameters in the vCenter Server Managed Object Browser (`https://`*`vcenterfqdn`*`/mob`). For IP Customization to work, the virtual machine guestId entry must match the supported Guest OS types.

Windows Operating System Types Supported for Customization

vCenter GuestOS ID (guestID)	Guest OS Type	Minimum HCX Version
win31Guest	Windows 3.1	4.0.0
win95Guest	Windows 95	4.0.0

vCenter GuestOS ID (guestID)	Guest OS Type	Minimum HCX Version
win98Guest	Windows 98	4.0.0
winntGuest	Windows NT	4.0.0
win2000ProGuest	Windows 2000 Professional	4.0.0
win2000ServGuest	Windows 2000 Server	4.0.0
win2000AdvServGuest	Windows 2000 Advanced Server	4.0.0
winXPProGuest	Windows XP (32-bit)	4.0.0
winXPPro64Guest	Windows XP (64-bit)	4.0.0
winNetEnterpriseGuest	Windows Server 2003 Enterprise (32-bit)	4.0.0
winNetDatacenterGuest	Windows Server 2003 Data Center (32-bit)	4.0.0
winNetStandardGuest	Windows Server 2003 Standard (32-bit)	4.0.0
winNetWebGuest	Windows Server 2003 Web (32-bit)	4.0.0
winNetBusinessGuest	Windows Server 2003 Business (32-bit)	4.0.0
winNetEnterprise64Guest	Windows Server 2003 Enterprise (64-bit)	4.0.0
winNetDatacenter64Guest	Windows Server 2003 Enterprise_DC_(64-bit)	4.0.0
winNetStandard64Guest	Windows Server 2003 Enterprise_SE_(64-bit)	4.0.0
winVistaGuest	Windows Vista (32-bit)	4.0.0
winVista64Guest	Windows Vista (64-bit)	4.0.0
winLonghornGuest	Windows Server 2008 (32-bit)	4.0.0
winLonghorn64Guest	Windows Server 2008 (64-bit)	4.0.0
windows7Guest	Windows 7 (32-bit)	4.0.0
windows7_64Guest	Windows 7 (64-bit)	4.0.0
indows7Server64Guest	Windows 7 Server (64-bit)	4.0.0
windows8Guest	Windows 8 (32-bit)	4.0.0
windows8_64Guest	Windows 8 (64-bit)	4.0.0
windows8Server64Guest	Windows 8 Server (64-bit)	4.0.0
windows9Guest	Windows 9 (32-bit)	4.0.0
windows9_64Guest	Windows 9 (64-bit)	4.0.0
windows9Server64Guest	Windows 9 Server (64-bit)	4.0.0
windows2019srv_64Guest	Windows 9 Server (64-bit)	4.2.2

Linux Operating System Types Supported for Customization

vCenter GuestOS ID (guestID)	Guest OS Type	Minimum HCX Version
asianux3Guest	Asianux Server 3 (32-bit)	4.0.0
asianux3_64Guest	Asianux Server 3 (64-bit)	4.0.0
asianux4Guest	Asianux Server 4 (32-bit)	4.0.0

vCenter GuestOS ID (guestID)	Guest OS Type	Minimum HCX Version
asianux4_64Guest	Asianux Server 4 (64-bit)	4.0.0
asianux5_64Guest	Asianux Server 5 (64-bit)	4.0.0
centosGuest	CentOS 4/5 (32-bit)	4.0.0
centos64Guest	CentOS 4/5 (64-bit)	4.0.0
coreos64Guest	CoreOS (64-bit)	4.0.0
debian4Guest	Debian GNU/Linux 4 (32 bit)	4.0.0
debian4_64Guest	Debian GNU/Linux 4 (64-bit)	4.0.0
debian5Guest	Debian GNU/Linux 4 (32-bit)	4.0.0
debian5_64Guest	Debian GNU/Linux 5 (64-bit)	4.0.0
debian6Guest	Debian GNU/Linux 6 (64-bit)	4.0.0
debian6_64Guest	Debian GNU/Linux 6 (64-bit)	4.0.0
debian7Guest	Debian GNU/Linux 7 (32-bit)	4.0.0
debian7_64Guest	Debian GNU/Linux 7 (64-bit)	4.0.0
debian8Guest	Debian GNU/Linux 8 (32-bit)	4.0.0
debian8_64Guest	Debian GNU/Linux 8 (64-bit)	4.0.0
oracleLinuxGuest	Oracle Linux 4/5 (32-bit)	4.0.0
oracleLinux64Guest	Oracle Linux 4/5 (64-bit)	4.0.0
rhel7Guest	Red Hat Enterprise Linux 7 (32-bit)	4.0.0
rhel7_64Guest	Red Hat Enterprise Linux 7 (64-bit)	4.0.0
rhel6Guest	Red Hat Enterprise Linux 6 (32-bit)	4.0.0
rhel6_64Guest	Red Hat Enterprise Linux 6 (64-bit)	4.0.0
rhel5Guest	Red Hat Enterprise Linux 5 (32-bit)	4.0.0
rhel5_64Guest	Red Hat Enterprise Linux 5 (64-bit)	4.0.0
fedoraGuest	Red Hat Fedora Linux (32-bit)	4.0.0
fedora64Guest	Red Hat Fedora Linux (64-bit)	4.0.0
sles12Guest	Suse Linux Enterprise Server 12 (32-bit)	4.0.0
sles12_64Guest	Suse Linux Enterprise Server 12 (64-bit)	4.0.0
sles11Guest	Suse Linux Enterprise Server 11 (32-bit)	4.0.0
sles11_64Guest	Suse Linux Enterprise Server 11 (64-bit)	4.0.0
sles10Guest	Suse Linux Enterprise Server 10 (32-bit)	4.0.0
sles10_64Guest	Suse Linux Enterprise Server 10 (64-bit)	4.0.0
opensuseGuest	OpenSUSE Linux (32-bit)	4.0.0
opensuse64Guest	OpenSUSE Linux (64-bit)	4.0.0
ubuntuGuest	Ubuntu Linux (32-bit)	4.0.0
ubuntu64Guest	Ubuntu Linux (64-bit)	4.0.0

vCenter GuestOS ID (guestID)	Guest OS Type	Minimum HCX Version
otherlinuxguest	Linux 2.2x Kernel (32-bit)	4.0.0
otherlinux64guest	Linux (64-bit) (experimental)	4.0.0

Understanding VMware HCX vMotion and Cold Migration

The VMware HCX Interconnect integrates with ESXi to perform vMotion migrations for powered on virtual machines, and with Cold Migration for powered off virtual machines.

HCX vMotion

VMware HCX vMotion can transfer a live Virtual Machine from a VMware HCX-enabled vCenter Server to a VMware HCX-enabled destination site (or from the VMware HCX-enabled destination site towards the local site). The vMotion transfer captures the virtual machine's active memory, its execution state, its IP address, and its MAC address. Migration duration depends on the connectivity, including both the bandwidth available and the latency between the two sites.

HCX Cold Migration

Cold migration uses the same network path as VMware HCX vMotion to transfer a powered-off virtual machine. During a cold migration, the Virtual Machine IP address and MAC address are preserved. Cold migrations must satisfy the vMotion requirements.

Requirements and Limitations for VMware HCX vMotion and Cold Migration

- VMware HCX Interconnect Tunnels must be up/active.
- VMware HCX vMotion requires 100 Mbps or above throughput capability.
- The virtual machine hardware version must be at least version 9 or higher.
- The underlying architecture, regardless of OS, must be x86.
- Virtual machines with Raw Disk Mapping in compatibility mode (RDM-V) can only be migrated using Cold Migration & Bulk Migration.
- Forward vMotion based migrations are supported from source ESXi hosts running versions 5.5 to 6.7. Reverse vMotion based migration is only supported with vSphere 6.0 and higher. Reverse migrations to ESXi 5.5 hosts can be accomplished with HCX Bulk migration.

- VMware NFC is used as the primary protocol during Cold Migration and as a secondary protocol during HCX vMotion..

  Note The HCX Interconnect uses a Network Profile configuration dedicated to the vMotion traffic. This configuration does not include the Cold and vMotion NFC traffic. HCX always uses its Management interface for Cold and vMotion NFC traffic. In deployments where ESXi servers use a dedicated Provisioning vmkernel for NFC traffic, the HCX continues to route Cold and vMotion NFC traffic through the Management interface.

Virtual Machine Restrictions for HCX vMotion

Virtual machines with the following attributes are not supported for migration.

- Shared VMDK files.
- Attached virtual media or ISOs.
- Virtual Machine Hardware Version 8 or below.
- Although concurrent VMware HCX vMotion migrations can be initiated up to the vSphere limits, VMware only supports serial VMware HCX vMotion migrations between a source and destination site. For simultaneous migrations in parallel, select VMware HCX Bulk Migration.
- VMware HCX vMotion defaults to **Opportunistic** mode for per-VM vMotion Encryption if it is set to **Required**. During the migration operation - the mode is changed to Opportunistic during the migration initialization, and then set back to **Required** after the migration is completed.
- Virtual Machines with Change Block Tracking (CBT) can be migrated, but HCX disables CBT.
- If either the source or destination vCenter version is 6.0 or earlier, VMware vCenter tags attached to a virtual machine are not retained during migration. Tags can be created manually for those virtual machines after migration.
- VMware software appliances (including, but not limited to vCenter Server, NSX Manager, Site Recovery Manager) cannot be migrated with HCX vMotion migration.

Understanding VMware HCX Replication Assisted vMotion

VMware HCX Replication Assisted vMotion (RAV) uses the HCX Interconnect appliance along with replication and vMotion technologies to provide large scale, parallel migrations with zero downtime.

HCX RAV provides the following benefits:

- Large-scale live mobility: Administrators can submit large sets of VMs for a live migration.
- Switchover window: With RAV, administrators can specify a switchover window.
- Continuous replication: Once a set of VMs is selected for migration, RAV does the initial syncing, and continues to replicate the delta changes until the switchover window is reached.

- Concurrency: With RAV, multiple VMs are replicated simultaneously. When the replication phase reaches the switchover window, a delta vMotion cycle is initiated to do a quick, live switchover. Live switchover happens serially.
- Resiliency: RAV migrations are resilient to latency and varied network and service conditions during the initial sync and continuous replication sync.
- Switchover larger sets of VMs with a smaller maintenance window: Large chunks of data synchronization by way of replication allow for smaller delta vMotion cycles, paving way for large numbers of VMs switching over in a maintenance window.

HCX RAV migration triggers the following events:

1. Replication begins with a full synchronization (replication) of the virtual machine's disks to the destination site.
2. Migrated VMs enter a continuous synchronization cycle until a switchover is triggered.
3. You can have the switchover process start immediately following the initial sync or delay the switchover until a specific time using the scheduled migration option. If the switchover is scheduled, the synchronization cycle continues until the switchover begins.
4. The final delta synchronization begins when the switchover phase starts. During this phase, vMotion is engaged for migrating the disk delta data and virtual machine state.
5. As the final step in the switchover, the source VM is removed, and the migrated VM is connected to the network powered on.

   Replication Assisted vMotion creates two folders at the destination site. One folder contains the virtual machine infrastructure definition, and the other contains the virtual machine disk information. This is normal behavior for RAV migrations and has no impact on the functionality of the virtual machine at the destination site.

Note In some cases, having two folders might impact other applications, such as back-up tools, that require access the virtual machines folders. If necessary, you can consolidate the contents of these two folders using VMware Storage vMotion.

Requirements for HCX Replication Assisted vMotion

- VMware HCX Interconnect tunnels must be up/active.
- VMware HCX vMotion requires 100 Mbps or above throughput capability.
- The virtual machine hardware version must be Version 9 or higher.
- The underlying architecture, regardless of OS, must be x86.
- The Hybrid Interconnect, Bulk Migration, vMotion, and Replication Assisted vMotion services must be enabled and in a healthy state in the relevant service mesh.
- The resources to create, power on and use the virtual machine must be available in the destination environment.
- Virtual machines must reside in a Service Cluster (defined in the Compute Profile).

- RAV uses vSphere Replication whose potential throughput can vary depending on bandwidth available for migrations, latency, available CPU/MEM/IOPS, and disk read speed. For more information about how to determine bandwidth requirements, see Bandwidth Requirements for vSphere Replication.
- VMware NFC is used as a secondary protocol during HCX Replication Assisted vMotion migration.

  Note HCX always uses its Management interface NFC traffic. In deployments where ESXi servers use a dedicated Provisioning vmkernel for NFC traffic, the HCX continues to route NFC traffic through the Management interface.

Restrictions for HCX Replication Assisted vMotion

- Virtual machines with the following attributes are not supported for migration.
  - Shared VMDK files.
  - Attached virtual media or ISOs.
  - Virtual Machine Hardware Version 8 or below.
- Live switchover of concurrent RAV migrations is run serially.
- VMware HCX vMotion defaults to **Opportunistic** mode for per-VM vMotion Encryption if it is set to **Required**. During the migration operation - the mode is changed to Opportunistic on the migration initialization, and then set back to **Required** after the migration is completed.
- VMware HCX Replication Assisted vMotion does not support migration of workloads with Independent persistent and Independent non-persistent disks.
- Virtual machines with Raw Device Mappings (RDM) in Physical Compatibility mode cannot be migrated.
- Virtual machines with Raw Device Mappings in compatibility mode cannot be migrated using RAV and vMotion.
- Virtual machines with DirectPath I/O configurations cannot be migrated without first removing the DirectPath device.
- To migrate FT-enabled VMs, temporarily turn off Fault Tolerance, and perform RAV. When this operation is complete, turn Fault Tolerance back on.
- Virtual machines with SCSI bus sharing cannot be migrated.
- Virtual machines that cannot be gracefully powered off cannot be migrated. HCX can override with the Force Power-off VM option.
- Virtual Machines with Change Block Tracking (CBT) can be migrated, but HCX disables CBT.
- With the RAV migration option, new disk UUIDs are generated at the destination environment. Use HCX vMotion when the application has disk UUID-related dependencies.
- VIO and vCD cloud types are not supported.

- RAV migration to VMFS6 target datastores requires the following minimum vSphere version at the target site: vSphere 6.5U3f or vSphere 6.7U3.
- RAV migration from a source environment running vCenter Server 5.5 to any destination vCenter Server with VMFS6 datastore as the target, is not supported.
- When RAV migration is to environments with vSAN Datastores, an individual virtual machine disk (vmdk) cannot exceed 2 TB.
- RAV migration for virtual machines with any disk in independent persistent mode is not supported as taking a snapshot of such a virtual machine does not produce delta disks, which are required for the underlying RAV migration technology.
- Virtual machines using virtual NVMe (vNVME) Controllers cannot be migrated.
- Virtual machine Snapshots cannot be migrated.
- If either the source or destination vCenter version is 6.0 or earlier, VMware vCenter tags attached to a virtual machine are not retained during migration. Tags can be created manually for those virtual machines after migration.
- VMware software appliances (including, but not limited to vCenter Server, NSX Manager, Site Recovery Manager) cannot be migrated with HCX RAV migration.

Understanding VMware HCX OS Assisted Migration

The HCX OS Assisted Migration service uses the Sentinel software that is installed on Linux- or Windows-based guest virtual machines to assist with communication and replication from their environment to a VMware vSphere SDDC.

You must install HCX Sentinel on all guest virtual machines requiring migration using HCX OS Assisted Migration. Sentinel gathers the system configuration from the guest virtual machine and assists with the data replication. The source system information is used by various HCX OS Assisted Migration service processes. In part, the information is used to create an inventory of guest virtual machine systems for migration and to help replication processes prepare the disks on the replica virtual machine for replication and migration.

Sentinel also helps with the data replication by reading data that is written to the source disks and passing that data to the SDR appliance at the destination site.

Guest virtual machines connect and register with an HCX Sentinel Gateway (SGW) appliance at the source site. The SGW then establishes a forwarding connection with an HCX Sentinel Data Receiver (SDR) appliance at the destination vSphere site. You specify the network connections between the guest virtual machines and SGW in the compute profile.

You must install the HCX Sentinel software on each guest virtual machine requiring migration to enable the guest virtual machine discovery and data replication. After Sentinel is installed, a secure connection is established between the guest virtual machine and the HCX SGW. HCX builds an inventory of candidates for migration as the Sentinel software is installed on the guest virtual machines.

Using the established connection between the SGW and SDR, replication connections are made between the Sentinel software on the guest virtual machines and the SDR, with one connection each for control operations and data replication.

An OS Assisted Migration request triggers the following events:

1. Replication begins a full synchronization transfer to the destination site. The guest virtual machine remains online during replication until the final delta synchronization.
2. Before the final delta synchronization, the OS Assisted Migration service quiesces the guest virtual machine.

   The OS Assisted Migration service quiesces the guest virtual machine on a best-effort basis. For example, it is possible for a Linux service running on the guest virtual machine to start immediately after OS Assisted Migration has quiesced the services and stopped all known processes. If some process starts after quiescing the system, it can potentially lead to final synchronization not completing and appear as though the switchover process is stuck.

   Note As part of both continuous and final synchronization, the system checks for changed blocks or files and replicates them.

   - On a Windows system, the OS Assisted Migration service reads the entire disk to determine the changed blocks to replicate. The process of reading the entire disk can be time consuming.
   - On a Linux system, the OS Assisted Migration service walks the entire file system to determine the changed files to replicate.

3. When the delta synchronization finishes, a switchover is triggered. You can have the switchover process start immediately following the initial sync or delay the switchover until a specific time using the scheduled migration option. By using the scheduled migration option, the switchover can occur during a maintenance window. The final delta synchronization begins when the switchover phase starts.

   During scheduled migrations, HCX Sentinel performs continuous synchronization by transferring only the deltas since the previous sync cycle. For Windows HCX Sentinel, this synchronization is achieved by identifying the changed file system blocks, whereas for Linux HCX Sentinel this synchronization is achieved by monitoring the changed files. To improve time it takes to reach that final consistency point for Linux systems, a pre-determined set of files and directories listed in `/opt/vmware/hcx/osam/excluded_paths` is excluded from the continuous synchronization. If you have additional files that do not require monitoring, you can exclude them from continuous synchronization by editing the file. Excluding files requires a restart of the Sentinel service named `vmware-hcx-osam-sentinel` using service or systemctl commands.

   Note Excluded files are always synchronized to the target virtual machine during the initial and final synchronization phases.

4 HCX performs a hardware mapping of the replicated volumes to ensure proper operation, including updates of the software stack on the replica. This fix-up process includes adding drivers and modifying the OS configuration files at the destination. The migrated virtual machine reboots during this process.

   Note When migrating Windows systems, HCX OS Assisted Migration software creates a temporary local user on the migrated Windows system during the switchover phase. This user gets deleted after the fix-up process is completed.

   Note When migrating Linux systems, HCX OS Assisted Migration software uses an independent software stack residing on a separate disk for the fix-up process. This fix-up boot disk is detached and deleted at the end of the switchover process.

5 As the final step in the switchover, the source is powered-off, the migrated replica is connected to the network, and the switchover completes.

   The vSphere target virtual machine reboots twice during the switchover phase.

   If the synchronization process fails for any reason, such as a broken network connection, by default the synchronization is retried for eight hours. To improve the time it takes to reach a final consistency point for Switchover to begin, you can shorten the retry period to as little as one hour by editing the file `/opt/vmware/hcx/osam/etc/sync.params` and setting the **max_retry_interval** from one to eight hours. After setting the interval, restart the Sentinel service named `vmware-hcx-osam-sentinel` using service or systemctl commands.

6 HCX Manager names the replica virtual machine with the host name of the source virtual machine.

7 VMware Tools is installed on the migrated virtual machine and migration completes.

8 If the source does not power off, an attempt is made to power off the replica virtual machine.

   If the replica virtual machine successfully powers off, it remains connected to the NICs. In this case, you can manually power off the source and power on the replica. If the replica does not power off, both the guest virtual machine and the replica remain on, but the replica is not connected to the network. In this case, you enable the NICs manually that are attached to the replica virtual machine using vCenter, power-off source virtual machine (if not already), and power-on Migrated virtual machine.

Considerations for OSAM Deployment

The OS Assisted Migration (OSAM) service includes several components that work together for connecting and forwarding guest workloads in the source environment.

Refer to the following considerations when deploying and operating OS Assisted Migration in your environment.

- The OSAM service converts non-vSphere guests to vSphere virtual machines. This conversion process involves halting OS services to quiesce the guest virtual machine. The downtime for this conversion process can vary from minutes to hours depending on a virtual machine size and activity.
- HCX deployments for OSAM migrations assume that there is (at minimum) a vSphere HA-compliant cluster to host the source HCX components (HCX-SGW).
- The HCX Sentinel Agent encrypts all connections to the Sentinel Gateway. The encryption cannot be disabled.
- The HCX Sentinel Gateway must be deployed in a vSphere environment, and not within KVM or Hyper-V.
- To use HCX Network Extension with OSAM deployments, VLANs in the non-vSphere environment are first made available as Distributed Port Groups.
- When the non-vSphere (KVM or Hyper-V) environment is collocated in the same data center or Metro area, it is an option to deploy the HCX Connector and source Service Mesh components at the destination vCenter Server.
- Each Service Mesh deploys one Sentinel Gateway (SGW) and its peer Sentinel Data Receiver (SDR), and supports up to 50 active replica disks.
- HCX OSAM deployments support 200 concurrent VM disk migrations across a four Service Mesh scale out deployment. In this Service Mesh scale out model for OSAM, the HCX Sentinel download operation is presented per Service Mesh.
- Guest virtual machines can only be migrated to a datastore that is accessible by the SDR.
- Redeployment of SGW and SDR appliances is not allowed when any migration is in-progress.
- The OSAM service is not available with VMware Cloud on AWS.
- Only "thin" and "thick" disk provisioning types are supported as the disk provision type for the migrated system. The "Same as Source" option is not supported.
- OSAM Migration using PowerCLI:
  - PowerCLI 11.5 is not supported.
  - Migrations with vCD as target are not supported using PowerCLI.
  - Mobility Group migration is not supported through PowerCLI for vCD (all services).
- The OSAM migration service applies the default storage policy to the migrated VMs and their disks. Currently, the OSAM service does not support a user-selected storage policy.
- Changes to source Guest virtual machine configurations while a migration is in progress may not take effect in migrated virtual machines and sometimes may lead to migration failure.

Supported Guest Operating Systems

The OS Assisted Migration service supports migration of virtual machines running non-vSphere guest operating systems in Linux or Windows environments.

Linux Environments

HCX supports various Linux-based guest operating systems on KVM or Hyper-V hypervisors.

Supported Linux OS versions on KVM Hypervisor (BIOS and EFI)	Supported Linux OS versions on Hyper-V Hypervisor (BIOS and EFI)
CentOS 6.1 - CentOS 6.10 (32-bit, 64-bit)	RHEL 7.1 - RHEL 7.8 64-bit (BIOS/GEN-1 & UEFI/GEN-2)
RHEL 6.1 - RHEL 6.10 (32-bit, 64-bit)	RHEL 6.4 - RHEL 6.10 32-bit and 64-bit (BIOS/GEN-1 Only)
CentOS 7.1 - CentOS 7.8 (64-bit)	CentOS 7.0 - CentOS 7.8 64-bit (BIOS/GEN-1 & UEFI/GEN-2)
RHEL 7.1 - RHEL 7.8 (64-bit)	CentOS 6.4 - RHEL 6.10 32-bit and 64-bit (BIOS/GEN-1 Only)
Ubuntu 14.04 LTS (32-bit, 64-bit)	Ubuntu 14.04 LTS 32-bit (BIOS/GEN-1) and 64-bit (BIOS/GEN-1 & UEFI/GEN-2)
Ubuntu 16.04 LTS (32-bit, 64-bit)	Ubuntu 16.04 LTS 32-bit and 64-bit (BIOS/GEN-1 & UEFI/GEN-2)
Ubuntu 18.04 LTS (64-bit)	Ubuntu 18.04 LTS 64-bit (BIOS/GEN-1 & UEFI/GEN-2)

Windows Environments

HCX supports various Windows guest operating systems on KVM or Hyper-V supervisors.

Supported OS versions on KVM Hypervisor	Supported OS versions on Hyper-V Hypervisor
Windows Server 2012	Windows Server 2012
Windows Server 2012 R2	Windows Server 2012 R2
Windows Server 2016	Windows Server 2016
Windows Server 2008 R2 (64-bit)	Windows Server 2008 R2 (64-bit)
Windows Server 2008 SP2 (32-bit and 64-bit)	Windows Server 2008 SP2 (32-bit and 64-bit)

Guest Operating System Considerations

The OS Assisted Migration service supports a variety of hypervisors and guest operating systems in both Linux and Windows environments with limitations and requirements that are both general and specific to these environments.

General Operating System Considerations

Some service limitations are common to Linux and Windows environments where OS Assisted Migration is deployed.

- The HCX Sentinel Agents are installed in the guest operating system and automatically make connections to the HCX Sentinel Gateway.

- Guest virtual machines with the locale and the UI language other than English US are not supported.
- UEFI-based source systems using legacy BIOS boot mode are not supported.
- Anti-virus software, or any OS application that is actively accessing file systems, can significantly delay the OSAM switchover phase. It is a best practice to disable these types of applications prior to configuring the OSAM migration.
- Network file shares are not supported with OSAM Migrations. This includes NFS, SMB, and CIFS, with varying outcomes:
  - Mounted files shares like CIFS may result in migration failures.
  - NFS shares are ignored during the fix-up phase and do not result in migration failure.

Linux Specific Considerations

- Block devices (partitions) with unrecognized content will not be migrated to the destination.
  - Unsupported file systems (supported file systems: ext2, ext3, ext4, XFS).
  - Unmounted file systems (Linux specific).
  - Unknown content with a partition or a block device.
  - Encrypted file systems.
  - md devices (software RAID).
- Statics routes are not supported.
- VLAN interfaces are not supported.
- On RHEL/CentOS 7.0, 7.1, and 7.2, the XFS file system UUID is not restored to the original UUID for the file system where /boot resides because mkfs.xfs does not support the functionality (-m option). A new random UUID is generated. Modifying the UUID after the file system is created triggers RHEL bug 1579390.
- /etc/fstab entries for removable media (floppy, CD) are not supported; such entries must be commented-out before migration.
- When migrating Linux systems, the HCX OSAM software uses an independent software stack residing on a separate disk for the fix-up process. This fix-up boot disk is detached and deleted at the end of the switchover process.
- The configuration files of Linux system services, such as dhcpd, that reference network interface names are not modified. You must manually modify these files on the migrated system.

Windows Specific Considerations

- No support for syncing logical volumes.

- Basic MBR and GPT disk partitions are supported. Dynamic GPT and Dynamic MBR disks partitions are not supported.
  - If the boot disk is dynamic, migration is not supported.
  - If the data disks are dynamic, the data on the disks is not migrated, and the disks appear as raw disks on the migrated system.
- Only NTFS formatted volumes are supported. ESP (EFI system partition) with the FAT32 file system is an exception.
- No support for non-Windows service applications from the system quiescing perspective during the final sync.
- Systems with more than 64 volumes are not supported since VSS allows a maximum of 64 snapshots on a system.
- Any VSS snapshots present on the source Windows system before migration are not usable on the migrated system.
- VLAN interfaces are not supported.
- For Windows systems, in general the pre-requisites for the VMware Tools installation have to be satisfied on the source system. The pre-requisites for the VMware Tools installation can vary based on the target VC and ESX version, and Windows OS version on the source system. For example, if the target ESXi version is 6.5.0 (or higher), VMware Tools version is 10.3.x. To view the list of prerequisites based on different Windows OS versions see VMware KB 55798.
- When migrating Windows systems, the HCX OS Assisted Migration software creates a temporary local user on the migrated Windows system during the switchover phase. This user gets deleted after the fix-up process is completed.
- Do not run Windows updates on the source system during a migration. If Windows updates are in progress, the migration can fail.
- A Windows source system configured as a failover cluster node is not supported.

Migrating Virtual Machines with HCX

Through the HCX Migration interface, you can configure multiple virtual machine migrations, including reverse migrations.

This section describes migration operations using HCX Advanced License functionality. For information about migration operations using HCX Mobility Groups, which is available as an HCX Enterprise License feature, see Migrating Virtual Machines with Mobility Groups.

Migrations are always configured using the HCX Connector or Cloud system that initiated site pairing. In Cloud-to-Cloud deployments with bi-directional site pairing, HCX in both paired sites can initiate migrations. For more information, see Adding a Site Pair.

The HCX system automatically detects virtual machine disk additions or removals and reconfigures running migrations to accommodate these changes. These disk changes are honored only if the changes occur before the migration switchover phase. If disk changes occur during the switchover phase, the changes are not recognized, which can affect the success of the migration operation. Support for adding or removing disks is available only with Bulk and Replication Assisted vMotion migrations.

Taking snapshots of a VM during migration, either manually or via a third-party backup solution, it can disrupt the migration process. In order to prevent any impact, it is required to stop those services that may create or remove snapshots during migration. Refer to KB79220 for more information.

Note For the operational limits supported with HCX migrations, see Chapter 7 Configuration and Service Limits for VMware HCX.

Prerequisites

- The migration service is enabled in both the source and destination site Compute Profile.
- The migration service is enabled in the HCX Service Mesh.
- For RAV or OSAM migrations, the HCX Enterprise license is activated.
- Sentinel software is installed on all guest virtual machines requiring OSAM migration. See Sentinel Management.

Procedure

1. Navigate to the HCX dashboard.
2. Select the **Services** > **Migration**.

   The Migrate Tracking window displays a summary of virtual machine migrations.
3. Select **Migrate Virtual Machines**.
4. Select the **Remote Site Connection**.

   The list of virtual machines available for migration appears in the display.

   Note For OSAM, select **Non vSphere Inventory** > **Remote connections** to display the list of guest virtual machines on which you installed HCX Sentinel.
5. (Optional) To display the list remote site virtual machines available for the reverse migration, click the **Reverse Migration** check box.
6. Select the virtual machines you want to migrate.

   Note Click **hide unselected** to keep only selected virtual machines on the screen.

7 Set the Transfer and Placement, Switchover, and Extended options.

- To apply default settings for all selected virtual machines, use the green area of the interface at the top of the window.
- To set machine-specific Transfer, Placement, and Switchover options, select a specific virtual machine and expand the entry.

Note

- For Bulk, RAV, and OSAM migrations, you can schedule the migration date and time as part of the Switchover settings. Scheduling vMotion migrations is not available.
- If the VM is powered off, Cold Migration is set by default.
- Extended Options provide additional settings based on the selected migration type.
- For additional information, see Additional Migration Settings.

---

8 Select the destination network for each virtual machine to be migrated.

In most cases, the stretched network between the source and destination sites is automatically selected. You can change this selection as needed.

a Expand each virtual machine selection.

b Next to each guest virtual machine NIC name, click the folder for a list of available target networks.

c Click the check box next to the network you want the guest virtual machine to map to, and then click **Select**.

d (Optional) To specify a new guest OS IP address for the virtual machine at the target network, expand the NIC entry and enter the new IP address, gateway, and subnet mask.

9 Click **Finish**.

The HCX Manager validates your selections and starts the migrations. If a warning is generated, click **Finish** again to proceed.

Monitoring Migration Progress with HCX

The HCX Migration Tracking page displays a summary of migrations, reporting the status and progress of individual virtual machine migrations.

Procedure

1 In the HCX dashboard, select **Services** > **Migration**.

The Migration Tracking page provides a list of all ongoing or recent migrations.

2 To determine the migration status, review the Progress information.

While the migration is underway, the Progress column displays a progress bar with the percentage of replication completed for a specific virtual machine.

For Bulk migrations, the Progress column includes a best-effort, real-time estimate of the amount of time remaining for the transfer phase of a specific virtual machine. This estimate is based on sampling the underlying metrics of the environment, such as bytes transferred, rate of transfer, network throughput, and number of disks. Changes in the underlying metrics can impact the estimate. The interval between estimates varies with the size of the migrated virtual machine:

Virtual Machine Size	Estimate Interval
Less than 50 GB	Every 1 1/2 minutes.
Greater than or equal to 50 GB but less than 1 TB	Every 5 minutes.
Greater than or equal to 1 TB	Every 15 minutes.

Note The estimate interval begins after the system has gathered the underlying metrics and completed calculations, meaning there may appear to be a delay in presenting the initial estimate. For relatively small transfers, the transfer may complete before providing an estimate.

3 To sort the information in the list, use the filter option provided in each column of the display.

You can use the search option at the top-right corner of the display to narrow down the list of migrations. You can search by virtual machine name, state message, migration type, or other attributes.

Canceling a Migration with HCX

The HCX Migration interface includes an option for canceling in-progress migrations.

For OSAM, the effect of canceling a migration depends on the state of the migration when selecting the Cancel option:

- Canceling a migration while the HCX appliance is replicating data to the destination site deletes the associated resources created at the destination site with no effect on the source VM.
- Canceling a migration when the source system is in the final sync phase reboots the source system and deletes the associated resources.
- Canceling a migration after the target VM has been created deletes the destination virtual machine and the associated resources.
- Canceling a migration after the source virtual machine is powered down requires you to restart the virtual machine at the source site. Also, the HCX deletes the associated resources at the destination site.

For Bulk Migration, you can cancel a migration at any point with no effect on the source site virtual machine. Replication is canceled on the source site VM, and replicated data is deleted from the destination site.

Procedure

1. In the HCX dashboard, select **Services > Migration**.

   The Migration Management interface displays a summary of migration information.

2. Identify the virtual machine on which to cancel migration, and expand the entry.
3. In the Status column, select **Cancel Migration**.

   This operation can take several minutes. When finished, the UI displays the message **Migration cancelled**.

Managing Failed or Canceled Migrations

Following a failed or canceled migration, you can use the Force Cleanup selection to clear internal operations and processes manually.

Sometimes following a failed or canceled migration, the system might not clean up migration-related processes that were started but did not complete. These processes occur on both the source and destination systems. If migration clean-up does not succeed, future migration operations can fail.

The Force Cleanup selection provides the method for manually cleaning up failed or canceled system migration processes.

Procedure

1. Navigate to **Services > Migration > Tracking**.
2. Review the Progress and Status columns for `Cancelling Migration` or `Migration Failed` messages.

   If the message is `Migration Cancelled`, the clean-up operation was successful and you can skip this procedure.

3. Expand the selection for the unsuccessful migration.
4. Click **Force Cleanup**.

   A pop-up window appears prompting you to confirm the clean-up operation.

   Note Ignore the check box labeled **Local Cleanup Only**, which is provided only for special cases. It is a best practice always to clean up both the source and destination sides of a failed or canceled migration.

5. Click **Yes**.

What to do next

If the clean-up operation did not succeed, click **Force Clean** again. Repeat the clean-up operation until it succeeds.

Clearing the Migration History

You can clear the migration activity for a site using the **Archive** option.

Use the **Archive** option to clear failed, canceled, and completed migration activity. Clearing the migration history updates the HCX Dashboard migration counters but does not remove the migration-related details from the HCX log files.

Procedure

1. Navigate to the HCX dashboard.
2. Select the **Service** > **Migration** > **Tracking**.

   The Tracking window displays a summary of virtual machine migrations for a site pair.
3. Select the migration entries that you want to clear from the display.

   Note You cannot clear migrations that are in progress.
4. Click **Archive**.

   A pop-up screen appears prompting you to acknowledge the request to archive the migration entries.
5. Click **Archive**.

   The selected entries are cleared from the migration history.

Migrating Virtual Machines with Mobility Groups

Mobility Groups is an HCX Enterprise License feature that supports assembling one or more virtual machines into logical sets, for execution and monitoring of migrations as a group.

With Mobility Groups, you have the flexibility to manage migrations for sets of virtual machines by application, network, pod, or other aspects of your environment.

Migrations are always configured using the HCX Connector or Cloud system that initiated site pairing. In Cloud-to-Cloud deployments with bidirectional site pairing, HCX in both paired sites can initiate migrations. For more information, see Adding a Site Pair.

The HCX system automatically detects virtual machine disk additions or removals and reconfigures running migrations to accommodate these changes. These disk changes are honored only if the changes occur before the migration switchover phase. If disk changes occur during the switchover phase, the changes are not recognized, which can affect the success of the migration operation. Support for adding or removing disks is available only with Bulk and Replication Assisted vMotion migrations.

Taking snapshots of a VM during migration, either manually or using a third-party backup solution, it can disrupt the migration process. To prevent any impact, it is required to stop those services that may create or remove snapshots during migration. Refer to KB79220 for more information.

Note For the operational limits supported with HCX migrations, see Chapter 7 Configuration and Service Limits for VMware HCX.

Prerequisites

The HCX Enterprise license is activated.

Procedure

1 Open the HCX plug-in in the vSphere Client.

2 Select **Services** > **Migration**.

The Migration Management interface displays a summary of groups and provides the group migration progress. For detailed group information, you can expand each group.

3 Click **Migrate** and select **Remote Site Connection** .

The Workload Mobility interface displays a list of virtual machines (workloads) that are available for migration and that can be added to a group. You can select the **Networks** or **Hosts and Clusters** icon to update the list of virtual machines. In addition, you can use a regular expression search to filter the list of virtual machines by name.

Note If you have only one site pair, it is selected by default. For OS Assisted Migrations, select **Non vSphere Inventory** > **Remote connections** to populate the list of guest virtual machines on which you installed HCX Sentinel.

4 (Optional) To display a list of remote site virtual machines available for the reverse migration, click the **Reverse Migration** check box.

Note Reverse migration refers to the migration of virtual machines from an HCX-enabled destination site to a source site.

5 Specify a **Group Name**.

Note If no group name is provided, the system automatically assigns a five character identifier as the group name. You can change this name later by editing the group information. See Managing Migrations with Mobility Groups.

6 Select the set of virtual machines to include in the group and click **ADD**.

Note You can add additional virtual machines to the group at any time.

7 Select the group Transfer and Placement, Switchover, and Extended options.

The settings you provide are applied to all members of the group by default. To override the default settings for specific virtual machines in the group, select and expand the virtual machine entry, and set different options.

Note

- For Bulk, Replication Assisted vMotion (RAV), or OS Assisted Migration (OSAM) type migrations, you can schedule the migration. Scheduling migrations for vMotion is not supported.
- If the VM is powered off, Cold Migration is set by default.
- Extended Options provide additional settings.
- For additional information, see Additional Migration Settings.

---

8 Select the destination network for each virtual machine to be migrated.

In most cases, the stretched network between the source and destination sites is automatically selected. You can change this selection as needed.

a Expand each virtual machine selection.

b Next to each guest virtual machine NIC name, click the folder for a list of available target networks.

c Click the check box next to the network you want the guest virtual machine to map to, and then click **Select**.

d (Optional) To specify a new guest OS IP address for the virtual machine at the target network, expand the NIC entry and enter the new IP address, gateway, and subnet mask.

9 To complete the Mobility Group migration operation, select **Go**, **Validate**, **Save**, or **Close** to complete the Mobility Group migration operation:

Migration operation	Result
Go	Validates your virtual machine migration selections, saves the group, and then starts the migration.
Validate	Validates readiness of selected virtual machine for migration without starting the migration. Validation can be done at any time on selected virtual machines or a group.
Save	Saves migration selections as drafts for future editing or scheduling without starting the migration.
Close	Cancels your selections without creating a group or starting a migration.

Monitoring Migration Progress with Mobility Groups

The HCX Migration interface provides a summary of group migration progress along with the progress of individual virtual machines in the group.

Procedure

1 Navigate to **Services > Migration > Management** .

The Migration Management window displays Mobility Group information for each site pair. The window displays both forward and reverse migration information.

2 Review the progress column to view the status of the group migration. While migrations are underway, the Progress column displays a progress bar with the percentage of replication completed for the group, along with the number of migrations completed.

3 For detailed information, expand each virtual machine migration entry in the group. The Progress column displays individual transfer progress.

For Bulk migrations, the Progress column provides a best-effort, real-time estimation of the time required to complete the transfer phase for a specific virtual machine. This estimate is based on sampling the underlying metrics of the environment, such as bytes transferred, rate of transfer, network throughput, and number of disks. Changes in the underlying metrics can impact the estimate. The interval between estimates varies with the size of the migrated virtual machine:

Virtual Machine Size	Estimate Interval
Less than 50 GB	Every 1.5 minutes
Greater than or equal to 50 GB but less than 1 TB	Every 5 minutes
Greater than or equal to 1 TB	Every 15 minutes

Note The estimate interval begins after the system has gathered the underlying metrics and completed calculations, meaning there may appear to be a delay in presenting the initial estimate. For relatively small transfers, the transfer may complete before providing an estimate.

4 To display a list of all virtual machine migrations and migration progress, click the **Tracking** tab.

The Migration Tracking page provides a list of all ongoing or recent migrations regardless of group.

Sort the tracking information using the filter option provided in each column heading. You can search by virtual machine name, state message, migration type, or other attributes.

5 To return to the Migration Management window, click the **Management** tab.

Managing Migrations with Mobility Groups

From the HCX Migration interface, you can edit any group, delete groups, initiate and stop migrations, and schedule migrations.

Procedure

1 Navigate to **Services** > **Migration**.

The Migration Management window displays a summary of Mobility Group information for each site pair. The window displays both forward and reverse migration information.

Note You can switch between Migration Management (group migration) and Migration Tracking (individual migration) displays at any time using the menu button.

2 From the migration management window, you can edit or delete any group.

Mobility Group Operation	Description
Edit Group	To display the Workload Mobility window, click this option. From this window, you have several options: ■ Add additional virtual machines to the group. ■ Change the default migration profile for the group. ■ Change the migration profile of individual virtual machines. ■ Delete a specific virtual machine from the group. ■ Restart failed or canceled migrations.
Delete Group	To delete a group entry, click this option. You can delete a group only when all entries in the group are in the Draft state.

3 To show information about all members of the group, expand the group.

The system displays a list of virtual machines in a group with their migration status.

4 From the expanded group, you can also start, cancel, schedule, or archive one or more **selected** migrations.

Mobility Group Operation	Description
Go	Validates your virtual machine migration selections and then prompts you to start the migration. After the migration starts, the migration progress changes with each phase of the migration.
Schedule	Provides an option to reschedule a switchover for the migration.
Cancel	Cancels a migration that is in progress. This operation is supported only for Bulk, Replication Assisted vMotion, and OS Assisted Migration (OSAM) migrations types. For information about the effects of canceling an OSAM migration, see Canceling a Migration with HCX. For information about cleaning up failed or canceled migrations, see Managing Failed or Canceled Migrations.
Archive	Clears the migration entry from the display. Use the **Archive** option to clear failed, canceled, and completed migration activity. Clearing the migration history updates the HCX Dashboard migration counters but does not remove the migration-related details from the HCX log files.

Viewing HCX Migration Event Details

When migrating content between peer sites, HCX performs a detailed set of actions that are visible in the system as migration events.

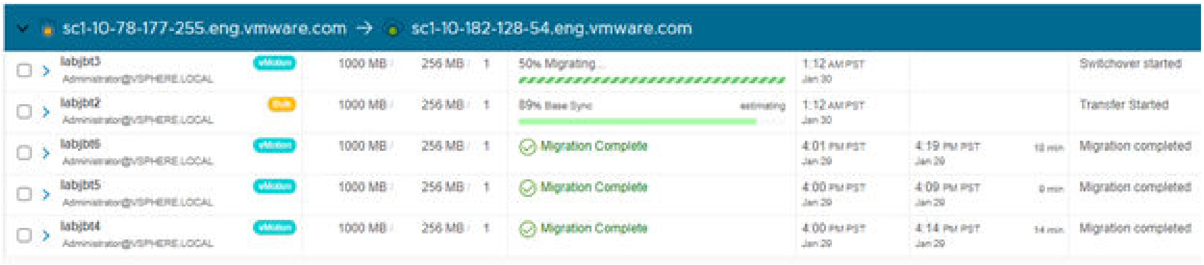
Viewing these events provides diagnostic information about the migration. This information provides the detailed migration workflow, the state of the migration, how long the migration remains in a certain state, and whether the migration has succeeded or failed.. Understanding what is happening at any point in the migration can provide insight into what infrastructure or configuration changes might be necessary to address any migration issues that might occur.

HCX displays event information for all migration types: Bulk, vMotion, Replication assisted vMotion, and OS Assisted Migration.

Procedure

1 In the HCX dashboard, navigate to **Services > Migration > Tracking** or, if you have Mobility Groups enabled, **Services > Migration > Management**.

The system displays a list of completed and ongoing migrations.

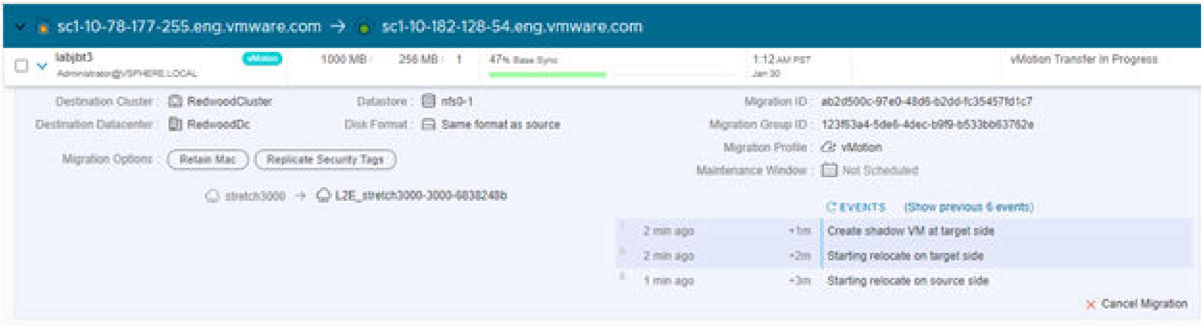


sc1-10-78-177-255.eng.vmware.com → sc1-10-182-128-54.eng.vmware.com

☐	labjbt3 Administrator@VSPHERE.LOCAL	vMotion	1000 MB	256 MB	1	50% Migrating...	1:12 AM PST Jan 30			Switchover started
☐	labjbt2 Administrator@VSPHERE.LOCAL	Bulk	1000 MB	256 MB	1	89% Base Sync estimating	1:12 AM PST Jan 30			Transfer Started
☐	labjbt6 Administrator@VSPHERE.LOCAL	vMotion	1000 MB	256 MB	1	Migration Complete	4:01 PM PST Jan 29	4:19 PM PST Jan 29	18 min	Migration completed
☐	labjbt5 Administrator@VSPHERE.LOCAL	vMotion	1000 MB	256 MB	1	Migration Complete	4:00 PM PST Jan 29	4:09 PM PST Jan 29	9 min	Migration completed
☐	labjbt4 Administrator@VSPHERE.LOCAL	vMotion	1000 MB	256 MB	1	Migration Complete	4:00 PM PST Jan 29	4:14 PM PST Jan 29	14 min	Migration completed

2 For a specific migration in the list, expand the entry.

The system displays information specific to that migration.



sc1-10-78-177-255.eng.vmware.com → sc1-10-182-128-54.eng.vmware.com

☐	labjbt3 Administrator@VSPHERE.LOCAL	vMotion	1000 MB	256 MB	1	47% Base Sync	1:12 AM PST Jan 30		vMotion Transfer In Progress

Destination Cluster : RedwoodCluster

Destination Datacenter : RedwoodDc

Datastore : nfs0-1

Disk Format : Same format as source

Migration Options : Retain Mac, Replicate Security Tags

stretch3000 → L2E_stretch3000-3000-6838248b

Migration ID : ab2d500c-97e0-48d6-b2dd-fc35457fd1c7

Migration Group ID : 123f53a4-5de6-4dec-b9f9-b533bb63762e

Migration Profile : vMotion

Maintenance Window : Not Scheduled

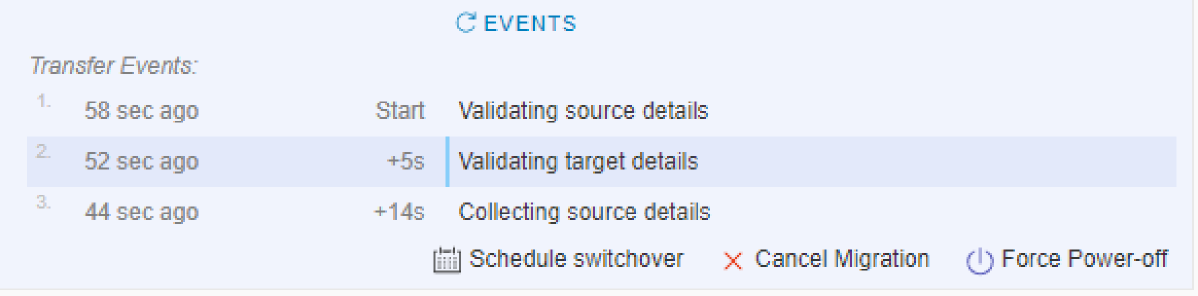
EVENTS (Show previous 6 events)

2 min ago	+1m	Create shadow VM at target side
2 min ago	+2m	Starting relocate on target side
1 min ago	+3m	Starting relocate on source side

3 Review the Events portion of the screen display for details about the migration.

   By default, the latest three events are displayed. Use the refresh button to update the list of events.

   Note While the migration is in progress, the systems provides options for managing the migration, including scheduling the migration switchover, canceling the migration, or forcing a power off.



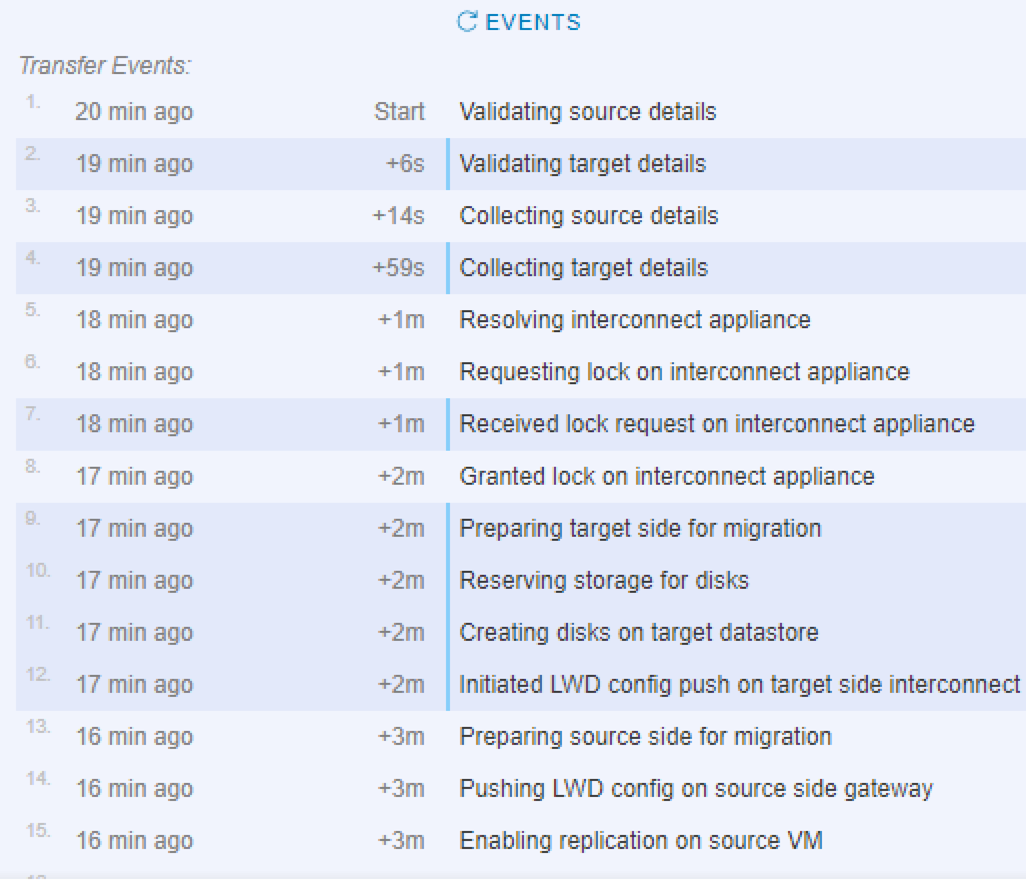
Transfer Events:

1.	58 sec ago	Start	Validating source details
2.	52 sec ago	+5s	Validating target details
3.	44 sec ago	+14s	Collecting source details

4 To display additional details related to the migration, click **Show previous events**.

   The migration events are color-coded for source and destination events. Destination events are shaded, while source events are not. Each event provides an offset time from the "Start" event.

   Note Shading is relative to the peer. When viewing the migrations from the peer site, shading appears but is reversed.

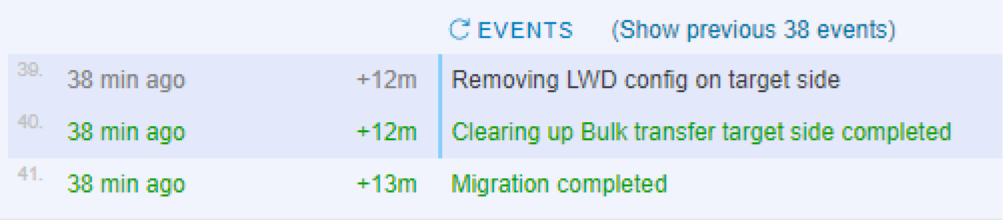


Transfer Events:

1.	20 min ago	Start	Validating source details
2.	19 min ago	+6s	Validating target details
3.	19 min ago	+14s	Collecting source details
4.	19 min ago	+59s	Collecting target details
5.	18 min ago	+1m	Resolving interconnect appliance
6.	18 min ago	+1m	Requesting lock on interconnect appliance
7.	18 min ago	+1m	Received lock request on interconnect appliance
8.	17 min ago	+2m	Granted lock on interconnect appliance
9.	17 min ago	+2m	Preparing target side for migration
10.	17 min ago	+2m	Reserving storage for disks
11.	17 min ago	+2m	Creating disks on target datastore
12.	17 min ago	+2m	Initiated LWD config push on target side interconnect
13.	16 min ago	+3m	Preparing source side for migration
14.	16 min ago	+3m	Pushing LWD config on source side gateway
15.	16 min ago	+3m	Enabling replication on source VM

Note Events that are more than 24 hours old include a date stamp.

When the migration has finished, event messages indicating that the source and destination sides of the migration have been cleaned up and the migration is complete.



39.	38 min ago	+12m	Removing LWD config on target side
40.	38 min ago	+12m	Clearing up Bulk transfer target side completed
41.	38 min ago	+13m	Migration completed

Results

The system displays a list of migrated virtual machines and the migration status.

Additional Migration Settings

The VMware HCX migration interface provides a set of options that can be used to tailor the behaviors and conditions of the virtual machine before or after the migration operation.

HCX has two types of optional settings for use when migrating virtual machines: Switchover and Extended.

Note Available options depend on the selected migration type.

Switchover Options

Force Power-Off VM

By default, VMware HCX attempts to shut down the virtual machine guest gracefully during the VMware HCX Bulk migration operation. If the OS interrupts the termination process, the migration operation fails. Checking this option causes VMware HCX to force the power-off.

Remove Snapshots

Causes VMware HCX to consolidate snapshot files before migrating the virtual machine. If there are snapshots present, the system enables the option by default.

Force Unmount ISO Images

Causes VMware HCX to remove mounted ISO images before migrating the virtual machine.

Extended Options

Retain MAC

Causes a virtual machine to keep its current MAC address during VMware HCX bulk migration operation, allowing communications to resume gracefully, and allows for MAC-based security policies to be honored. This option is selected by default for vMotion and Replication Assisted vMotion migration types and is cannot be changed.

Upgrade Virtual Hardware

Allows VMware HCX to upgrade virtual machine Hardware to the latest supported version as part of the migration operation, making current virtual machine Hardware features immediately available to the migrated virtual machine.

Upgrade VMware Tools

Allows VMware HCX to upgrade VMware Tools to the latest supported version as part of the migration operation, making current VMware Tools features immediately available to bulk migrated virtual machine.

Deactivate Per Virtual Machine EVC

vSphere Enhanced vMotion Compatibility (EVC) ensures that workloads can be live migrated, using vMotion, between ESXi hosts in a cluster that is running different CPU generations. EVC is a cluster level setting that supports virtual machine mobility within a cluster. For virtual machines implementing per-VM EVC, the EVC mode becomes an attribute of the virtual machine rather than the specific processor generation it happens to be booted on in the cluster. If this option is selected then this virtual machine may not be able to vMotion back to the Source Site.

Host Name

Sets the host name of the migrated virtual machines at the destination site.

Domain Name

Sets the domain name for the virtual machine at the destination site. This option is available only with Linux virtual machines.

Personalization Script

Uploads a customization script to a migrated virtual machine. The script runs before and after guest customization. The customization script cannot exceed 1500 characters.

DNS Customization

Sets the Primary and Secondary DNS servers for the migrated virtual machine.

Generate a new Security Identifier (SID)

Generates a new Security Identifier (SID) for the migrated virtual machine. This option is supported only for Windows virtual machines. Please make sure virtual machine has an active "local administrator" present. If the virtual machine is connected to the domain, it will be moved to workgroup, and no DNS suffix is set.

Resize CPU

Changes the number of vCPUs for the migrated virtual machine. For more information about VMware virtual machine vCPU limitations, see the VMware vSphere product documentation.

Resize Memory

Changes the memory size for the migrated virtual machine. For more information about VMware virtual machine memory limitations, see the VMware vSphere product documentation.

Replicate Security Tag

Replicates VMware NSX-V and NSX-T security tags associated with a virtual machine undergoing migration. The security tags are replicated from the source site to the destination site.

Migrate Custom Attributes

Migrates VMware Custom Attributes associated with a virtual machine undergoing migration. The Custom Attributes are replicated from the source site to the destination site. Custom Attributes are migrated to the destination site without the user-specific values of the Custom Attributes.

The following table summarizes the extended options that apply to each migration type.

Extended Option	Cold Migration	vMotion Migration	Bulk Migration	Replication Assisted vMotion Migration	OS Assisted Migration
Retain MAC	No	Yes (default setting; not selectable)	Yes	Yes (default setting; not selectable)	Yes (default setting; not selectable)
Upgrade Virtual Hardware	Yes	Yes (upgrades on reboot)	Yes	Yes	N/A
Upgrade VMware Tools	No	Yes	Yes	Yes	N/A
Deactivate Per-VM EVC	No	Yes	No	Yes	N/A
Hostname	No	No	Yes	No	No
Domain Name	No	No	Yes	No	No
Personalization Script	No	No	Yes	No	No
DNS Customization	No	No	Yes	No	No
Generate a new Security Identifier (SID)	No	No	Yes	No	No
Resize CPU	No	No	No	No	Yes
Resize Memory	No	No	No	No	Yes
Replicate Security Tags	Yes	Yes	Yes	Yes	N/A
Migrate Custom Attributes	No	Yes	No	No	N/A

HCX Integration with vRealize Network Insight

You can export waves of VMware vRealize Network Insight discovered applications to HCX for migration as Mobility Groups. HCX integration with vRealize Network Insight is available through API calls.

In many cases, the relationships, dependencies, and boundaries among application workloads is complex, and knowing what application to migrate and in which order can be challenging. vRealize Network Insight uses Application Discovery and Dependency Analytics to identify migration waves. From this information, vRealize Network Insight defines Application Groups that are then exported using public APIs to HCX as established Mobility Groups.

After HCX creates the Mobility Groups, you prepare for migration using the HCX Mobility Group configuration procedures.

Note All limitations and requirements for HCX migrations and migration types apply to Mobility Groups created from vRealize Network Insight.

Prerequisites

Public APIs are available for exporting vRealize Network Insight Application Groups to HCX as Mobility Groups. To view the HCX API for creating Mobility Groups, log in to access the HCX API documentation: https://*hcx_ip_or_fqdn*/hybridity/docs. Navigate to **Mobility > Migration Group APIs** in the documentation.

Procedure

1 Import the vRealize Network Insight discovered application groups into HCX using API calls.

2 Navigate to **Services > Migration** and verify that HCX created the Mobility Groups.

   Note Mobility groups created by vRNI have a vRNI label and a timestamp to differentiate them from other Mobility Groups created by HCX admins.

3 Configure the Mobility Groups for migration.

   All Mobility Group operations are available for configuration, including setting the migration type, scheduling the migration, and editing the group information. See Migrating Virtual Machines with Mobility Groups.

4 Complete the migration.

Results

The workloads included in the API are created and migrated as Mobility Groups in HCX.

Protecting Virtual Machines with VMware HCX

11

VMware HCX provides various services for protecting virtual machines based on the type of license installed.

The HCX Disaster Recovery service, standard with HCX, replicates and protects virtual machines to a remote data center. The HCX Integration with the Site Recovery Manager service is available with Enterprise licensing. HCX with SRM takes advantage of the HCX Interconnect and Network Extension components for protection and recovery operations from the SRM interface.

This chapter includes the following topics:

- VMware HCX Disaster Recovery
- HCX Integration with Site Recovery Manager

VMware HCX Disaster Recovery

Virtual Machine replication-based protection with a nimble architecture that uses existing VMware HCX mobility components.

VMware HCX Disaster Recovery is a service intended to protect virtual workloads managed by VMware vSphere that are either deployed in a private or a public cloud. It is simple to set up, manage, and costs less than the traditional disaster recovery solutions. VMware HCX Disaster Recovery can accommodate the most demanding business critical applications and allows you to scale your protection capacity to meet variable demands. This user guide addresses configuration, setup, and management aspects of VMware HCX Disaster Recovery.

Limitations

VMware HCX Disaster Recovery has the following limitations:

- HCX DR does not support using datastore clusters for VM protection operations.
- Virtual machines using virtual NVMe (vNVME) Controllers cannot be recovered during Test Recovery or Recovery VM operations.
- Guest customization is not available for HCX DR protection or recovery operations.

Benefits

VMware HCX Disaster Recovery provides the following benefits:

- Simple and easy to use the management platform that allows secure (enterprise to cloud and cloud to cloud) asynchronous replication and recovery of virtual machines.
- Introduces major efficiency gains over traditional business continuity and disaster recovery (BC/DR) practices.
- Allows for an improved recovery point objective (RPO) and recovery time objective (RTO) policy compliance while reducing total cost of ownership (TCO).

  Note RPO is the interval of time that might pass during a disruption before the quantity of data lost during that period exceeds your BC/DR maximum allowable threshold. Whereas RTO is the duration of time, and a service level within which data must be restored after a disaster to avoid unacceptable consequences associated with a break in continuity.

- Reverse failover of workflows to your source site.
- Self-service RPO settings from 5 minutes to 24 hours per virtual machine.

  Note RPO policy compliance depends on the available bandwidth from the source site to the destination site.

- Multiple points in time recovery snapshots that allow you to recover back up to 24 previous replication point in time.
- Optimized replication throughput by use of Wan Optimizer.
- Routing replication traffic through a customer preferred direct connect network
- On-premises monitoring and management with the fully integrated vSphere Web Client.
- Access to production-level support from VMware.
- While workloads are being protected by HCX Disaster Recovery, the VMware HCX system automatically detects virtual machine disk additions or removals and reconfigures running protections to accommodate these changes. HCX keeps monitoring such disk changes until workloads are recovered, or protection is removed on them.
- Taking snapshots of a VM while protected, either manually or using a third-party backup solution, it can disrupt the replication process. To prevent any impact, it is required to stop those services that may create or remove snapshots during replication. Refer to KB79220 for more information.

Planning for HCX Protection

HCX Disaster Recovery service operation requires planning for the amount of storage consumed at the target location.

HCX Protection Workflow

Replication based operations such as HCX Bulk Migration, Replication Assisted vMotion and HCX Disaster Recovery use the vSphere Replication technologies to transfer virtual machine disk data. When a virtual machine protection operation is first run, the replication engine performs a full synchronization of all the data that makes up the virtual machine to the target location datastore. Following that baseline synchronization, the system performs a delta synchronization, meaning that only changed data blocks are replicated.

Delta synchronization occurs based on the recovery point objective (RPO) interval configured for the virtual machine, creating a replication instance. The selectable RPO ranges from 5 minutes to 24 hours. For example, setting the Recovery Point Objective (RPO) to 2 hours means that the maximum data loss that your organization can tolerate is 2 hours.

Setting an RPO does not mean replication occurs on a specific interval. A replication instance reflects the state of a virtual machine at the time the synchronization starts. The system schedules replications so that the RPO is not violated. For example, assuming a 15 minute RPO, if the synchronization starts at 12:00 and it takes five minutes to transfer to the target site, the instance becomes available on the target site at 12:05. That instance reflects the state of the virtual machine at 12:00. The next synchronization can start no later than 12:10 so that instance is available no later than 12:15.

Note To determine the replication transfer time, the replication scheduler uses the duration of the last few instances to estimate the next one.

Following a full synchronization, the HCX DR service prompts you to run a test recovery operation to verify the replication.

Using Snapshots with HCX DR Protection

HCX allows for multiple recovery points, or replica instances, which are converted to snapshots when you recover a virtual machine. You set a retention policy for these instances by configuring a snapshot interval along with the number of snapshots to retain for each protected virtual machine. Snapshot intervals range from 1 hour to 7 days. The maximum number of snapshots taken during that interval can range from 1 to 24. For example, setting the number of snapshots to 4 and the snapshot interval to 1 day, means you can restore that virtual machine to any of 4 recovery points over the past 24 hours. In another example, setting the number of snapshots to 24 and the snapshot interval to 3-hours results in 8 snapshots per day for 4 days.

Note The RPO interval and snapshot interval may not be the same. Snapshots are taken from the latest replication instance based on the RPO. The RPO must be set low enough to create the number of configured snapshots. For example, setting a retention policy of 6 snapshots per day means the RPO period must not exceed 4 hours to create at least 6 replication instances in 24 hours.

With snapshots, delta synchronizations are written to a new (replica) disk created for the snapshot in the same datastore as the baseline. Each new snapshot becomes the child of the previous version. For example, the first snapshot (replica 1) becomes the child and the baseline becomes the parent and all delta synchronization are written to replica 1. When a second snapshot (replica 2) is created, replica 2 becomes the child and replica 1 becomes the parent, and all delta synchronizations are written to replica 2.

Best Practices for HCX Protection Planning

Storage and bandwidth planning for replication at the target site depends on several factors:

Data set size

Consider the data set for replication and the capacity of the virtual disks (VMDK files) that make up the target site virtual machine. Consider whether the target site virtual disks are thick- or thin-provisioned. For example, a 100 GB virtual disk that is thick-provisioned always consumes 100 GB. A 100 GB disk that is thin provisioned will consume only the actual amount of data stored on the disk up to 100 GB. While a thin provisioned disk may initially use only a fraction of the provisioned storage, it can grow to the fill the total storage space.

Data change rate

Consider the amount of data replicated to the target location based on the rate of change in source virtual machine data. For example, a source virtual machine disk with 50 GB of data has an estimated daily change rate of 5 percent, meaning 2.5 GB of data is replicated each day.

Also, consider the maximum amount of data transferred for any one replication instance. Network bandwidth must be capable of meeting the RPO interval for the amount of data transferred.

Recovery Point Objective interval

Assuming consistent rate of change on the source virtual machine, a lower RPO generally means smaller delta synchronizations but higher bandwidth consumption to meet the lower RPO. Setting the RPO interval to the largest interval that your organization can tolerate can help to reduce network issues.

Network bandwidth

The replication network bandwidth must be sufficient to meet the RPO interval for the amount of data transferred. For example, if the RPO interval is 15 minutes, and the rate of change during that period is 1 GB, the network must capable of transferring that amount of data during the 15 minute interval. Set the number of recovery points as low as possible while still meeting business requirements.

Retention policy

Having multiple recover points means having a copy of the point in time changes for each snapshot, which increases storage requirements by the amount of changes over the RPO interval times the amount of snapshots configured.

Protection concurrency with migration operations

Ongoing HCX migrations use the HCX Interconnect (HCX-IX) appliance for virtual machine disk replications. Resources used during a Bulk or RAV transfer affect the total resources available for HCX Disaster Recovery (and vice versa) when the same service mesh appliances are used for both services

Recovery and recovery testing

During recovery operations, or when testing a recovery plan with HCX Disaster Recovery, additional space is consumed by each recovered virtual machine. Normally, redo logs are consolidated into the replica base disk or into other redo logs if multiple recover points is enabled. During a test recovery, some or all of the redo logs may be in use until the test recovery is cleaned up (completed). If redo logs are in use, HCX cannot consolidate the redo logs. Replication continues during a test recovery, which generates additional redo logs. The actual amount of storage capacity consumed depends on factors such as data change rates, replication frequencies, and how long the test recovery lasts.

Enabling DR Protection for a Virtual Machine

The VMware HCX virtual machine protection operation is used to configure the disaster recovery settings for a virtual machine, with specific remote site resources and recovery point objectives.

Note For the number of concurrent virtual machine protections supported with HCX, see Chapter 7 Configuration and Service Limits for VMware HCX.

Procedure

1. In the **vSphere Web Client**, navigate to VMware HCX.
2. Navigate to the **Disaster Recovery** tab and click **Protect VMs**.

   Protection Configuration screen appears.

   Note For the number of concurrent VM protections supported with HCX, see Chapter 7 Configuration and Service Limits for VMware HCX.
3. Set these options as appropriate:
   - Replication Destination Site – When selected, the site loads the virtual machine Inventory for Site B. When deselected (default), Site B’s virtual machine inventory is loaded.
   - Remote Site – The 2 Sites that are paired and the current direction of Protection.
   - Source Inventory
   - Default Replication options – Global Setting Policy for all VMs within the DC or Cluster, Resource Pool, or Host.

- Virtual Machine Replication Options:
  - Enable Compression – Helps during the seeding process of the VM. Helps if there is a low throughput LAN/WAN connectivity.
  - Enable Quiescence – Pauses the virtual machine to ensure that the most consistent copy of the virtual machine is protected on Site B.
  - Seed Virtual Machine – Used when a previous action created a copy of the VM, for example, a Bulk Migration of a virtual machine.
  - Specify Destination Container – data center, Cluster, or Resource Pool where the protected copy of the virtual machine is going to live.
  - Storage – Datastore on which the protected copy of the virtual machine resides. The Storage Policy drop-down menu lists all compatible datastores. Default Storage Policy and the corresponding datastore are used if there is no selection.
  - RPO – Recovery Point Objective for the VM. With VMware HCX, it can go from 5 minutes – 24 hours.

    Note The 5 minute RPO requires the source host to be ESXi 6.0 or later for vSAN, and ESXi 6.5 for other supported datastores.
  - Snapshots Interval – Interval between Snapshots. In the event, a corrupted change was synchronized to the protect site, providing an option to recover from an earlier point in time. The event provides a Multiple Point in the Time Recovery plan for the protected VM.
  - No. of Snapshots – Total number of snapshots within the established snapshot interval.
  - Network Port group – Corresponding port group that the protected virtual machine uses. In the illustration used, the port group that the source virtual machine is using has been stretched to Site B, as a result it is automatically populated.

  Note Always verify the Storage Policy and associated datastore selection, and evaluate the expected storage usage at the DR site. The settings cannot be changed once the protection is in place. Storage Policy selection is NOT available during Recovery or Test Recovery operations.

4. Click **Next.** A validation of the configuration for protection is performed.
5. Click **Finish**.

   The DR Dashboard is displayed. You can monitor the progress of virtual machine protection.
6. The dashboard now shows the virtual machine being protected. Expand the dashboard.
   - Local VMs – Reflects the total # of VMs on Site B that are protected. In the preceding illustration, it shows that one local virtual machine is being protected.
   - Remote VMs – Reflects the total # of VMs on Site B that are being protected from other Sites.

  - Activity – To monitor any ongoing Disaster Recovery related operations.
  - Green Shield – DR protection is active.
  - Yellow triangle – Protection has not been tested.
  - In/Out – Direction of protection between a local site and a remote site.
7. Log in to Site B.
8. Go to **Services** > **Disaster Recovery**.

   The Protected virtual machine is displayed. This process shows how a virtual machine on Site A is protected on Site B using VMware HCX.

Performing a Virtual Machine Test Recovery

A VMware HCX Disaster Recovery protection configuration can be tested by bringing the virtual machine online with a test recovery operation, which does not disrupt the ongoing replication.

Prerequisites

- An initial full synchronization of the protected virtual machine is required. The interface dims the virtual machine test recovery option while the initial synchronization is in progress, to indicate that the option is disabled until the initial synchronization procedure completes.
- When working with protected virtual machines on extended networks:
  - Do not connect a test-recovered virtual machine to the extended network. Doing so may impact the original protected virtual machine due to the duplicate IP address.
  - To test the recovery, create or use a test network at the Disaster Recovery site.

Procedure

1. Log in to the **vSphere Web Client** and access the VMware HCX plugin.
2. Go to the **Disaster Recovery** tab.
3. Select the virtual machine and under **Actions**, click **Test Recovery**.
4. If the Protected virtual machine is on a stretched network, an error similar to the illustration shows up. The option to use none is available for **Test Recovery** operations.
5. Clicking **Test**.

   After the test completes, the yellow triangle changes to a certificate to show a test been completed. The solid yellow triangle shows that a test cleanup is needed.
6. Select the VM, click **Actions**, and then click **Test Cleanup**.
7. Click **Cleanup** on the next screen.

Results

The test is now cleaned up. The solid yellow triangle disappears.

Performing a Virtual Machine Recovery

Using the VMware HCX Disaster Recovery's Virtual Machine recovery operation, you can enable the Virtual Machine replica at the HCX destination site.

Prerequisites

This procedure applies when a protected virtual machine has become unavailable due to a disaster event. This unavailable state is indicated with a red lightning bolt status in the Services - Disaster Recovery interface.

Procedure

1. Open the VMware HCX Cloud interface at the destination site.
2. Navigate to **Services** > **Disaster Recovery**.
3. Click : (colon icon) and click **Recover**.

   The recovery process starts. After the recovery completes, the Virtual Machine is visible in the VMware HCX Disaster Recovery destination site's vSphere Inventory.

VMware HCX Disaster Recovery - Protect Operations for VMs

VMware HCX provides various operations that provide more control and granularity in replication policies.

Available Operations include:

1. Reverse – After a disaster has occurred. Reverse helps make Site B the source site where the protected VM now lives.
2. Pause – Pause the current replication policy associated with the virtual machine selected.
3. Resume - Pause the current replication policy associated with the virtual machine selected.
4. Remove - Remove the current replication policy associated with the virtual machine selected.
5. Sync Now – Out of bound sync source virtual machine to the protected VM.

HCX Integration with Site Recovery Manager

The HCX integration with the Site Recovery Manager (SRM) enables protection and recovery operations from the SRM interface.

SRM DR backup and recovery operations use the HCX hybrid interconnect to optimize the bandwidth and connectivity, secure VMs in transit, and stretch networks to simplify the IP address management for recovered VMs.

Requirements

The HCX Integration with the Site Recovery Manager service has the following requirements:

- It is supported with HCX private cloud (NSX Enterprise Plus) deployments.

- Tested with SRM 8.2 and 8.3.

Enabling SRM Integration in HCX

Enabling SRM integration in HCX requires adding the SRM Integration Service in the Compute Profile and preparing the system configuration file on the SRM server.

Prerequisites

HCX Enterprise license is activated.

SRM is installed successfully for both the source and destination sites.

Procedure

1. On both the source and destination HCX, select the SRM Integration Service when creating or updating the Compute Profile. See Creating a Compute Profile.
2. On both the source and destination HCX, check that the SRM Integration Service is included in the Service Mesh . See Creating a Service Mesh.
3. On both the source and target SRM server, edit the file `C:\Program Files\VMware\VMware vCenter Site Recovery Manager\config\vmware-dr.xml` to add the HCX extensions:

   ```
   <extension>
   <hmsType>com.vmware.hcx</hmsType>
   <hmsKey>com.vmware.vcHcx</hmsKey>
   </extension>
   ```

4. Restart the SRM client service followed by the SRM server.

   The plugin com.vmware.hcx appears in the vCenter Managed Object Browser.

Protecting VMs with SRM Integration Enabled

You must configure the HCX disaster recovery protection for a virtual machine, with specific remote site resources and recovery point objectives, before they are available in Site Recovery Manager.

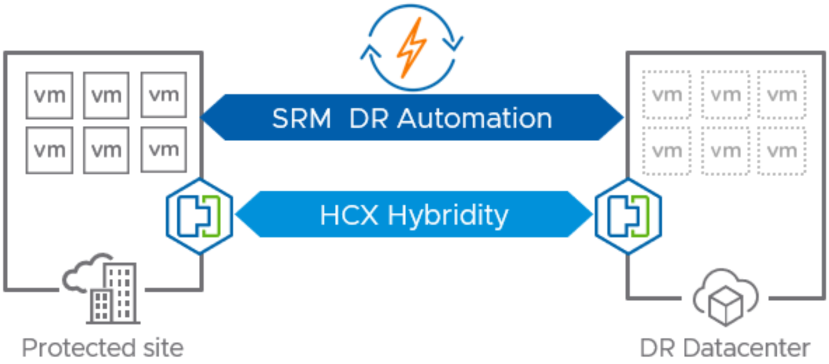
Procedure

1. For each virtual machine you want to manage in SRM, configure the protection settings as described in Enabling DR Protection for a Virtual Machine.
2. In Site Recovery Manager, verify that all protected virtual machines are available.

Performing Test and Recovery Operations Using SRM Integration

The HCX Interconnect with Site Recovery Manager (SRM) makes available the suite of features and tools provided by SRM for virtual machines protected by HCX.

The HCX integration with the Site Recovery Manager service takes advantage HCX Interconnect and Network Extension components for protection and recovery operations from the SRM interface. VMware SRM provides resources that help you to plan, test, and run recovery of virtual machines between a protected vCenter Server site and a recovery vCenter Server site.



For information about test and recovery operations available in SRM, see the *VMware Site Recovery Manager*documentation.

Managing System Settings

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Use the appliance management interface for viewing, configuring, and managing system-level functions.

The appliance management interface is reached by navigating to the management port: <https://hcx-ip-or-fqdn:9443>. This interface uses the system administration credentials set up during the OVA deployment.

The appliance management interface provides access to the system Dashboard, Appliance Summary, Configuration, and Administration information.

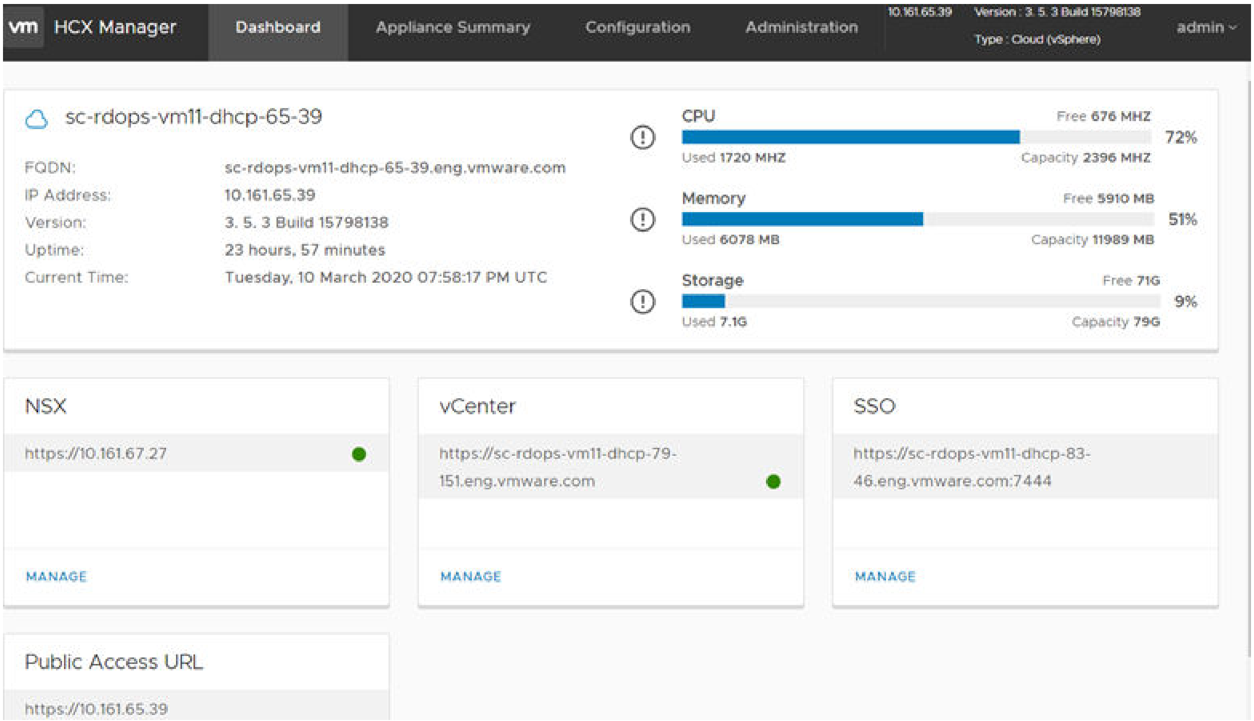
Note Appliance management operations may be done by your cloud service provider .

This chapter includes the following topics:

Understanding the Appliance Management Dashboard

The system Dashboard provides access to status and services, configuration settings, and system-level administration tasks.

The Dashboard is the first screen that appears after you log in to the appliance management interface port (:9443).



sc-rdops-vm11-dhcp-65-39

FQDN: sc-rdops-vm11-dhcp-65-39.eng.vmware.com
IP Address: 10.161.65.39
Version: 3. 5. 3 Build 15798138
Uptime: 23 hours, 57 minutes
Current Time: Tuesday, 10 March 2020 07:58:17 PM UTC

CPU
Free 676 MHZ
72%
Used 1720 MHZ
Capacity 2396 MHZ

Memory
Free 5910 MB
51%
Used 6078 MB
Capacity 11989 MB

Storage
Free 71G
9%
Used 7.1G
Capacity 79G

NSX
https://10.161.67.27

vCenter
https://sc-rdops-vm11-dhcp-79-151.eng.vmware.com

SSO
https://sc-rdops-vm11-dhcp-83-46.eng.vmware.com:7444

Public Access URL
https://10.161.65.39

The Dashboard provides access to various system management settings through a set of tabs at the top of the display.

Note For installations where the vCenter Servers are in linked-mode, the Dashboard includes information from all vCenter Servers registered to a system.

Tab Entry	Description
Dashboard	Displays the appliance status as a set of summary panels: ■ System information and resource usage ■ NSX status ■ vCenter status ■ SSO status ■ Public Access URL status The panels that are visible in the display depend on the HCX installation type. To change the configuration settings for a panel, click **Manage.** The system redirects you to the Configuration tab, where you can update the settings.
Appliance Summary	Displays the status of services running on the system: ■ Hybridity Services ■ Common Services ■ System Level Services Options are provided to stop and restart services. The list of services in the display varies based on the installation type.

Tab Entry	Description
Configuration	Displays the list of service configuration settings. ■ Licensing ■ vCenter ■ SSO ■ Public Access URL ■ vSphere Role Mapping ■ Data Center location To display the current settings, click an item in the list. To modify the current settings, click **Edit**.
Administration	Displays the list of system-level configuration settings. ■ General Settings ■ Time Settings ■ Syslog Server ■ System Name ■ Network Settings ■ General Network ■ DNS Servers ■ Proxy ■ Static Routes ■ Troubleshooting ■ Technical Support ■ Logs ■ Upgrade ■ Backup & Restore ■ Certificate ■ Trusted CA Certificate ■ Server Certificate To display or edit the settings, click an item .

Updating the Time Settings

The system provides initial NTP Server settings during the OVA deployment in the vCenter Server. These settings can be updated in the appliance management interface.

Caution Editing NTP Settings requires restarting the Appliance Management Service. You can restart this service from within the **Appliance Summary** tab.

Editing and Removing the NTP Server Configuration

NTP Settings can be modified in the appliance management interface.

HCX requires a valid NTP server synchronized time for integrated systems operations.

1 Navigate to the appliance management interface: `https://hcx-ip-or-fqdn:9443`.

2 Navigate to the **Administration** tab.

3 Select **Time Settings** on the side menu, click **Edit** (or **Unconfigure NTP Servers**).

4 Enter the NTP server.

  Multiple servers can be specified using a separated comma-separated list.

5 Navigate to the Appliance Summary tab in the dashboard, locate the Appliance Management Service, and click **Restart**.

Updating the System Name

The initial Hostname is provided during the OVA deployment. The system name can be updated in the Appliance Management interface.

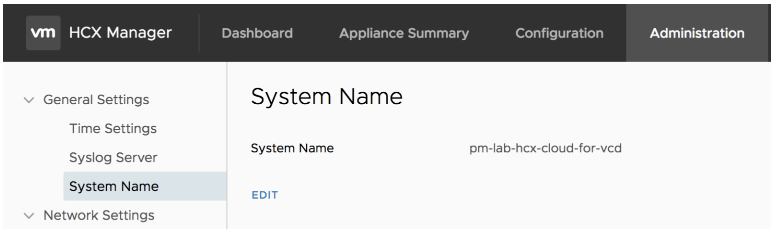
Editing the System Name

1 Navigate to the Appliance Management interface `https://hcx-ip-or-fqdn:9443`.

2 Navigate to the **Administration** tab.

3 Select **System Name** on the side menu, then click **Edit**.

4 Enter the System Name. Click **Save**.



System Name

System Name pm-lab-hcx-cloud-for-vcd

Adding or Updating a Proxy Server

Add or edit the proxy server configuration to control outbound HTTPS connections from the HCX Manager.

A proxy server can be set up during HCX system installation and activation. Alternatively, you can add or update the proxy server at any time through the HCX system management interface.

Procedure

1 Log in to the HCX management interface: https://*hcx-ip-or-fqdn*:9443.

2 Navigate to the **Administration** tab, and select **Proxy**.

3 Enter or edit the proxy server settings:

  a Proxy Server IP address or FQDN.

  b Proxy Server Port.

   c Proxy Server User.

   d Proxy Server Password.

   e Proxy Exclusions.

      Using a comma separated list to define all related proxy server exclusions, enter any IP, subnet, host, and/or domain names. Use * for wildcard values and do not include complete URLs (no https://).

      Note By default, when you configure a proxy server, the HCX Manager sends it all HTTPS connections, including the local vCenter Server, ESXi, NSX, and HCX-IX. These local systems must be encompassed in the list of exclusions. The site-paired HCX Cloud Manager also should be excluded when it is local and the proxy server is not traversed.

4 To verify the configuration, click **Test Connection** and enter the test URL.

5 Click **Save**.

6 Restart the HCX services.

   Restarting HCX services is required for the proxy exclusions to take effect. For more information, see Monitoring HCX Services from the Appliance Management Interface.

Managing CA and Self-Signed Certificates

The appliance management interface can be used to add or remove certificates from the system certificate store.

Importing Certificates with a Remote Site URL

This procedure allows you to manually import and trust certificates from remote systems on the HCX Manager appliance.

1 Navigate to the appliance management interface `https://hcx-ip-or-fqdn:9443`.

2 Navigate to the **Administration** tab.

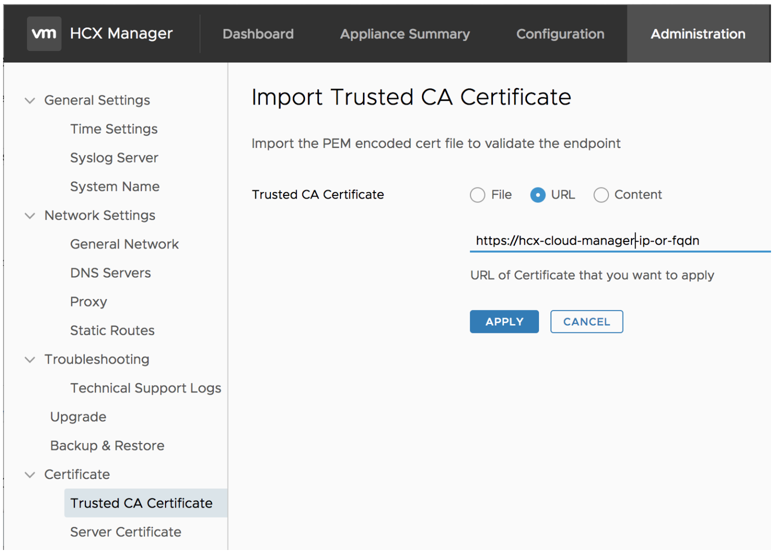
3 Select **Certificate > Trusted CA Certificate** on the side menu.

4 Select the certificate import option: **File**, **URL**, or **Content**.

5 Enter the information for the selected option.

   For example, when selecting the URL option, enter the IP or FQDN that the source HCX Manager uses to reach the HCX Cloud Manager.

6 Click **Apply**.



Import Trusted CA Certificate

Import the PEM encoded cert file to validate the endpoint

Trusted CA Certificate ○ File ● URL ○ Content

https://hcx-cloud-manager-ip-or-fqdn

URL of Certificate that you want to apply

Backing Up and Restoring the System

You can back up and restore the appliance from the appliance management interface.

Backup and restore operations are available in the appliance management interface except when restricted by a cloud service provider. You first use the appliance management interface to generate a configuration file and then use that file to restore to a healthy system.

The HCX service appliances, which include HCX-IX and HCX-NE, do not require individual backups. A restored HCX Manager reconnects to existing service appliances that were created within the backup time frame. If the service appliances are no longer functional, the HCX Manager deploys new appliance virtual machines based on the backed-up configuration.

Backing Up HCX Manager

You use the appliance management interface to create a backup file.

This operation backs up the following information:

- Inventory data
- Configuration files
- Certificates
- System UUID

The backup file is saved in tar.gz format.

Procedure

1. Log in to the appliance management interface: <https://hcx-ip-or-fqdn:9443>.
2. Navigate to **Administration** > **Troubleshooting** > **Backup & Restore**.

3 (Optional) Set up an FTP or SFTP server for uploading the backup file:

   a Click the **FTP server setting** tab.

   b Click **Add**.

   Note The best practice to use a Linux-based OpenSSH host for file transfer operations.

   ---

   c Enter the FTP or SFTP server information and click **Save**.

4 (Optional) Configure a backup schedule:

   Note The best practice is to schedule **Daily** backups. Restoring from backup files that are more than two days old is not supported due to potential inventory changes from the backup time to present.

   ---

   a Click the **Scheduling** tab.

   b Click **Add**.

   The scheduling window appears.

   c Select the Backup Frequency.

   d Enter the hour and minute of the backup.

   e Click **Save**.

5 Click the **Backup and Restore** tab.

6 Click **Generate**.

   If a backup schedule is configured, the system creates the backup file at the scheduled time.

7 For manual backups, save the backup file:

   Note If you have scheduled backups, the system automatically generates the backup file at the scheduled time and saves the file to the FTP or SFTP server.

   - To save the generated file to an FTP of SFTP server, check the box **Upload to server** .
   - To download the generated file to the client browsing system, click **Download**.

Restoring the System

You use the appliance management interface to restore the system from a backup file. The restore operation is used in cases where the system has become corrupt or unusable due to resource or system failures.

This operation restores the appliance to the state it was in at the time of the backup. The contents of the backup file supersede configuration changes made before restoring the appliance.

Note A restored HCX Manager cannot connect to HCX service appliances that were created during a time after the backup file was generated.

Prerequisites

You have deployed a replacement system that is clean of prior configuration settings. The replacement system has the same software version and IP address as the original system.

Note A clean system deployment requires only the minimum configuration to be manageable and that the system is network reachable from the operator or client system.

Procedure

1. Log in to the appliance management interface: <https://hcx-ip-or-fqdn:9443>.
2. Navigate to **Administration** > **Troubleshooting** > **Backup & Restore**.
3. Within the **Restore** section, browse to the backup file and open it.

   Note Restoring from backup files that are more than two days old is not supported due to potential inventory changes from the backup time to present.

4. Click **Continue**.

   The system verifies the uploaded file.

5. Click **Restore**.

   The restoration begins. This process can take several minutes to complete.

6. Verify that the system is operating properly:
   a. Navigate to the Dashboard tab and confirm that the NSX and vCenter Server status is green.
   b. Navigate to the Appliance Summary tab and verify that the Hybridity Services, Common Services, and System Level Services are running.

Managing HCX Alerts

The HCX generates alerts with different severity levels to flag events such as migration, network stretch failure, or reachability issues connecting to an endpoint or paired site.

Based on the type of alert, you can perform various actions to acknowledge, reset, or suppress the message.

Alert Type	Action	Action Description
Critical	Acknowledge	The alert has been noted and the corrective actions will be taken. The HCX records the user who acknowledged the alert, including a time stamp for the entry.
	Reset to Green	Action has been taken to correct the alert. The HCX records the user who resets the alert, including a time stamp for the entry. The alert is removed from the display.
Warning	Acknowledge	The alert has been noted and the corrective actions will be taken. The HCX records the user who acknowledged the alert, including a time stamp for the entry.
	Reset to Green	Action has been taken to correct the alert. The HCX records the user who resets the alert, including a time stamp for the entry. The alert is removed from the display.
Info	Suppress	Signifies that the alert has been reviewed. The alert is removed from the display.

Procedure

1. Log in to the HCX Manager Service UI:

   The system displays the HCX Dashboard.

2. To locate the Alerts panel, scroll through the display
3. Review the list of alerts.
   a. (Optional) Expand an entry to see more information regarding an alert.
   b. (Optional) To sort the list by **Status**, use the Status filter to select **Info**, **Warning**, or **Critical**.
   c. (Optional) To sort the list by **Entity Name** or **Creation Date**, select the respective filter and enter the search information.
4. To take action on an alert, click the ellipsis next to the alert, and select the action.

Updating VMware HCX

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The information includes step-by-step instructions for updating HCX components.

Important For details on the support and upgrade requirements for HCX releases, review the HCX Release Notes specific to the update.

This chapter includes the following topics:

About HCX Service Updates

HCX service updates may include new features, software fixes and security patches.

HCX service updates are published periodically as a set for HCX Connector and HCX Cloud types.

Overview of HCX Component Updates

- HCX service updates can be summarized in the following steps:
  - During a new HCX implementation, the latest updates are applied automatically.
  - When VMware releases a service update, metadata for the release is published to the HCX client systems. The HCX Manager displays a notification banner noting the update.
  - The HCX admin identifies site paired HCX client systems, and applies the new service updates to the paired HCX Manager systems. You can update HCX Connector and HCX Cloud systems during separate maintenance windows, but for optimal compatibility update both systems together.
  - Apply service updates during a maintenance window where no new HCX operations are queued up.
    - The HCX Manager and Service Mesh can be upgraded independently, during separate maintenance windows.
    - The upgrade window accounts for a brief disruption to the Network Extension service, while the appliances are redeployed with the updated code.

  - During the window, the Interconnect service components are updated to the new release.
- Component updates are triggered for each Interconnect or Service Mesh using the source side HCX plugin, but are run symmetrically at the source and destination site.

Planning for HCX Updates

As part of HCX update planning, and to ensure that HCX components are updated successfully, review the service update considerations and requirements.

Service Update Requirements

- HCX Manager systems periodically connect to **connect.hcx.vmware.com** and query the server for published service updates. A continuous connection is required. The VMware HCX UI displays a banner when an updated HCX release is available.
  - VMware HCX client systems must be able to reach **connect.hcx.vmware.com** using HTTPS throughout the entire lifecycle of the system. When this connection is not available, the VMware HCX client system cannot display updates available to other VMware HCX systems.
  - If the connection is not maintained, the client system can miss a published update.
  - A client system without a maintained connection to **connect.hcx.vmware.com** is placed out of support if the connection is not restored. Also, the system displays a banner stating that the system will be deactivated.
- If the HCX service update is not reflected on all site paired HCX systems, contact VMware Support. Partial updates are not supported.
- VMware HCX client systems must be able to reach **hybridity-depot.vmware.com** using HTTPS for the download of update files, without connectivity to the depot, the Update Download fails.
- HCX Site Pairing must reflect healthy connections before applying the service update.
- Unless directed by VMware Support to upgrade to resolve a known issue, HCX components reporting degraded state must be restored to a healthy state before the update.

Service Update Considerations

- The HCX service update file can be downloaded to the HCX Manager systems before the upgrade to reduce the time of the maintenance windows.
  - If Site A is paired with Site B, and Site A is also paired with Site C, plan the updates for Site A, B and C for the maximum compatibility across all environments. The environments can be updated in separate windows.
- Applying a service update causes the HCX Manager system to be rebooted:
  - Existing Network Extensions continue to work during the HCX Manager reboot. New Network Extensions cannot be configured while the HCX Manager is rebooting.

  - Existing VM Protections continue to work during the HCX Manager reboot. New replications cannot be configured while the manager is rebooting.
  - Because upgrading the HCX Managers does not disrupt the Interconnect Service Mesh, the HCX team encourages installing updated releases when they become available to ensure that systems have the most recent fixes and security patches.
- HCX Interconnect (Migration, WAN Optimization, and Network Extension) service component upgrades are performed independently to the manager upgrades:
  - Upgrade the Service Mesh appliances only after all Site Paired HCX Managers are upgraded.
  - Updating the Interconnect service components disrupts those services while the updates are being applied.
    - Ensure that migrations are not running or new migrations or replications are scheduled when updating the IX/CGW or WAN-OPT appliances.
    - Updating the HCX-NE (L2C) appliances disrupts connectivity that crosses the Network Extension path. The tunnel state re-converges in less than one minute after triggering the update.
      - Update the Network Extension components during a maintenance window.
- HCX client systems to be running within the latest three releases to be eligible for support.

Service Update Sequence

1. When a published update is available:
   - Identify the environments connected through HCX Site Pairing. The paired systems are displayed in the two tables in the Administration tab.
     - Connect to all paired HCX Managers and ensure that the update is available.
     - Download the update on all the paired HCX Managers.
     - Ensure that no new migrations, protections, or network extensions are configured during the update.
     - Ensure that all ongoing migrations have finished.
     - Ongoing synchronizations for Disaster Recovery are supported.
     - Ensure that there are no failovers scheduled during the upgrade.
2. Initiate the Upgrade task on all paired HCX Connector and HCX Cloud systems:
   - The HCX Manager system reboots during the upgrade procedure.
   - Allow the system several minutes to complete the initialization process.
   - Use the System Updates view to verify that the current version is updated.

3 The HCX Service Mesh can be upgraded once all paired HCX Manager systems are updated and all services have returned to a fully converged state.

   - HCX Interconnect service components can be upgraded from the source HCX system. Use the Service Mesh interface to redeploy or upgrade the VMware HCX Interconnect service appliances:
     - Upgrade or redeploy the HCX-IX (CGW) and HCX-WAN-OPT together.
       - Verify that the required tunnels are functional before resuming services or proceeding to the next component.
     - Upgrade or redeploy the HCX-NE (L2C) appliance.
       - Verify that the required tunnels are functional before resuming services or proceeding to the next component.
     - If the HCX topology has multiple source sites paired to a destination environment, the components upgrade has to be triggered at each source site.

HCX Service Update Procedures

Updating a VMware HCX system installs the latest features, problem fixes, and security patches.

Upgrading the HCX Manager

The HCX update is applied to the HCX Manager systems first.

Note It is a best practice to create a backup prior to upgrading HCX Manager. See Backing Up and Restoring the System. This back up option may not be available in some Public Clouds where HCX is managed by the cloud service provider.

In addition to backing up HCX Manager, optionally use the vSphere snapshot feature to take a snapshot of the HCX Manager at the source and destination sites. If necessary, you can use snapshots to roll back the HCX Manager version. See Rolling Back an Upgrade Using Snapshots.

Prerequisites

- Verify the HCX Manager system reports healthy connections to the connected vCenter Server, NSX Manager (if applicable), vCloud Director/RMQ (if applicable).
- Verify that the HCX Manager reports that there are healthy connections to the HCX Interconnect service components.
- Verify that Site Pair configurations are healthy.

Procedure

1 Open the HCX Manager Service UI.

   Note You can update site-paired HCX Managers simultaneously.

2 Navigate to the **Administration** tab.

3 Navigate to the **System Updates** section.

4 In the Local HCX section, under **Available Service Update Versions**, click **Check for Updates**.

In normal operation, the HCX automatically receives the latest service update. But if the HCX is offline or unable to access the Internet when a service update is pushed out, the HCX can miss the update. This selection checks for the latest version and adds it to your available service updates.

5 Right-click the available version link and select one of the operations from the drop-down menu.

If Service Updates have not been installed for more than one release, older updates are displayed. The newest updates are on the top.

Option	Description
Download.	The upgrade file is downloaded, but not installed.
Upgrade.	The file previously downloaded is used during the upgrade. If there is no file available, the option is dimmed.
Download & Upgrade.	The upgrade file is downloaded. The upgrade begins immediately after the download completes.
Release Notes.	View the Release Notes.

6 To begin the selected process, click **OK**.

The system reports that the upgrade is underway. After the upgrade file is downloaded and installed. The HCX system reboots. Allow a few minutes for the system to reinitialize.

7 Open the HCX Appliance management interface in a browser tab.

This option might not be available in HCX enabled Public Clouds.

`https://hcx-ip-or-fqdn:9443`.

8 Navigate to the dashboard and verify the registered systems display a healthy connected state.

9 Open the **System Updates** interface and confirm that **Current Version** is updated.

Results

With the HCX Managers upgraded, the HCX Service Mesh reflects that an update is available.

The HCX Managers apply the updates, reboot, and become operational in less than five minutes after rebooting. If the HCX Manager does not return to service within that time frame, contact VMware Support.

Upgrading the HCX Service Mesh Appliances

The Service Mesh appliances are upgraded independently of the managers. These appliances are flagged for new available updates anytime the HCX Manager has newer software available.

Prerequisites

- The site-paired HCX Managers are updated.
- Service Mesh appliances must be initiated using the HCX plug-in at the source site.
- While Service Mesh appliances are upgraded independently to the HCX Manager, they must be upgraded.

Procedure

1. Open the HCX plugin in the vSphere Client.
2. Navigate to the **Interconnect** tab > **Multi-Site Service Mesh** > **Service Mesh** tab.
3. Click **View Appliances**.

   Interconnect appliances show a green flag in the **Available Versions** column if there is an update available.
4. Select each Interconnect appliance that needs to be upgraded.
5. Click **Update Appliance**.

   The **Update Appliance** option is not displayed when there are no available updates.

   Note Network Extension appliances are available for in-service upgrades. For more information, see In-Service Upgrade for Network Extension Appliances.
6. Verify the Current and Available versions are valid.
7. To confirm the operation, click **Update**.
8. The selected component and its peer component at the destination site are upgraded at the same time. Use the **Tasks** tab to view the upgrade progress details.

Results

When the Service Mesh appliances reconverge to a Tunnel Up state, the upgrade is complete.

The Interconnect service appliances will apply the updates, reboot, and become operational in less than two minutes after rebooting. If the Interconnect services do not return to service within that time frame, contact VMware Support.

Rolling Back an Upgrade Using Snapshots

You can roll back an HCX Connector or an HCX Cloud Manager upgrade using VMware snapshots, which preserve the state and data of the HCX virtual machine at a specific point in time.

If a rollback is absolutely necessary due to an unexpected issue in the new version that cannot be resolved or workaround in a timely manner, follow this procedure.

Prerequisites

- The ability to take and apply a vSphere snapshot for all site-paired HCX Managers.
- For the rollback procedure, a snapshot of the source and destination HCX Manager systems must exist. For more information, see Upgrading the HCX Manager.

Procedure

1 Roll back the HCX systems:

Note Use snapshots to roll back only the HCX Connector and the HCX Cloud Manager versions. After rolling back the HCX Manager versions, restore the HCX appliances through the Service Mesh configuration in HCX Interconnect UI. Do not attempt to restore snapshots of any fleet appliances..

Rollback Scenario	Process
The HCX Connector and HCX Cloud Manager version have been updated but the Service Mesh appliances have not been updated.	1 Roll back the HCX Connector and the Cloud Manager versions using the snapshots. 2 To validate the Service Mesh for the roll back version, navigate to **Interconnect > Service Mesh** and click **Resync**.
The HCX Connector and HCX Cloud Manager version have been updated, and the Service Mesh appliances also have been updated.	1 Roll back the HCX Connector and the HCX Cloud Manager versions using the snapshots. 2 For both HCX Connector and the Cloud Manger, navigate to **Interconnect > Service Mesh > View Appliances**. 3 Select all the appliances. 4 To restore the Service Mesh appliances for the rollback version, click **Redeploy**. 5 For each appliance, confirm that the tunnel status is **Up** and the appliance versions are reverted.

2 To verify the rollback, navigate to **Administration > System Updates** and confirm that the HCX Manager has the rollback version.

Removing VMware HCX

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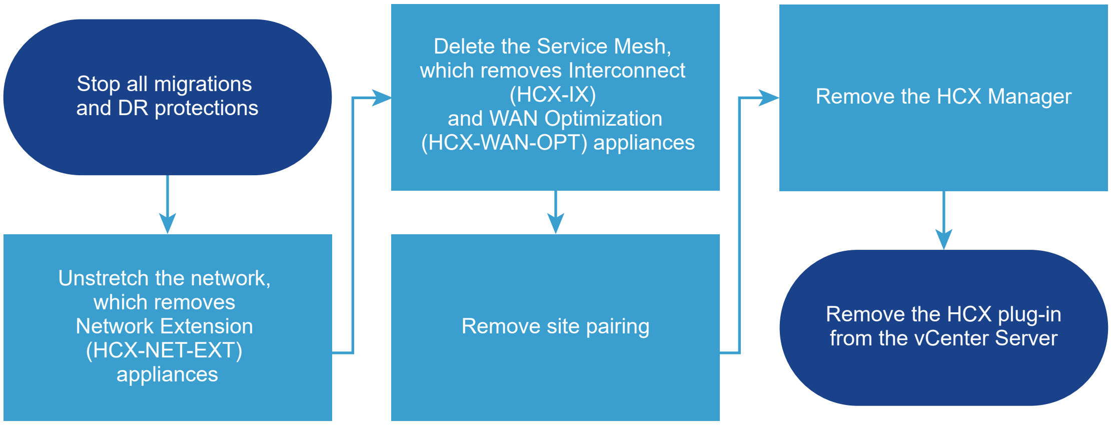
You can remove the HCX service from your environment by uninstalling the site-paired HCX Managers.

HCX supports on-going operations, including application migration and workload rebalancing while servicing the deployment. If HCX must be removed, stop all ongoing operations.

The procedure for uninstalling HCX may vary based on your environment and privileges. For deployments involving public clouds, uninstalling HCX may require actions from your cloud service provider.

Uninstalling HCX from VMware Cloud on AWS (VMC) deployments requires removing the service from both source and destination site. It is a self-serviceable process and there are no actions required from VMC.

The process for removing HCX has the following general workflow:


Stop all migrations and DR protections
Unstretch the network, which removes Network Extension (HCX-NET-EXT) appliances
Delete the Service Mesh, which removes Interconnect (HCX-IX) and WAN Optimization (HCX-WAN-OPT) appliances
Remove site pairing
Remove the HCX Manager
Remove the HCX plug-in from the vCenter Server

This chapter includes the following topics:

- Uninstalling VMware HCX
- Uninstalling HCX in VMware Cloud on AWS Deployments

Uninstalling VMware HCX

Uninstalling HCX requires removing the service from both source and destination site.

Note This procedure applies to non-VMC deployments. To uninstall HCX in VMC environments, see Uninstalling HCX in VMware Cloud on AWS Deployments.

A graceful uninstall of HCX appliances is always initiated from the source side. The process requires that HCX is fully functional, including site pairings and communication between source and destination site appliances.

Prerequisites

All migrations and replications, including DR operations, are finalized.

Procedure

1. Navigate to the HCX Manager Service UI.
2. Verify that no migration or protection operations are running.
3. To remove all network extensions from source-site data centers, complete the following substeps:
    a. Go to **Services > Network Extension**.
    b. Review each stretched network and decide whether you want the network to be connected on the destination site after uninstalling HCX.
    c. Expand each extended network and click **Unextend**.

       The system displays information about the Unextend Network.
    d. Under **Cloud Network**, expand the network entry.

       Note By default, the cloud network is disconnected from the cloud Edge Gateway after the network is unextended. This disconnection is done to prevent an edge gateway with dynamic routing enabled from advertising the route of the network and causing a potential routing conflict with the network in the source site.
    e. (Optional) Use the check boxes to keep the cloud network connected or force unextend the network.
    f. Click **Unextend**.
4. In the HCX system containing the Service Mesh configuration, complete the following substeps to delete all Service Mesh instances:
    a. Go to **Interconnect > Multi-Site Service Mesh > Service Mesh**.
    b. For each Service Mesh, click **Delete**.

       Note Removing the Multi-Service Mesh from the source site also deletes it from the destination site.

5 To disconnect all HCX site pairings, complete the following substeps:

   a From the HCX dashboard, navigate to **Site Pairing**.

   b For each site pair, click **Disconnect**.

6 To remove the HCX Manager, complete the following substeps:

   Note For public cloud deployments, contact your cloud service provider to remove HCX.

   a At the destination site, navigate to the vCenter **Hosts and Clusters** tab.

   b Expand the cluster where the HCX Manager is deployed and locate the virtual machine.

   c Right-click on the HCX entry and power off the selection.

   d Right-click on the HCX entry and select **Delete from Disk**.

   e Repeat this procedure at the source site.

7 Unregister the HCX Plug-in from the vCenter Server using the instructions on how to remove or disable unwanted plug-ins using the KB article, https://kb.vmware.com/s/article/1025360.

   Note Remove all HCX extensions that include com.vmware.hybridity in the path. Also, remove the following extensions:

   - com.vmware.hcsp.alarm
   - com.vmware.vca.marketing.ngc.ui

Uninstalling HCX in VMware Cloud on AWS Deployments

Uninstalling HCX from VMware Cloud on AWS (VMC) deployments requires removing the service from both the source and destination site.

A graceful uninstall of HCX appliances is always initiated from the source side. The process requires that HCX is fully functional, including site pairings and communication between source and destination site appliances.

Prerequisites

All migrations and replications, including DR operations, are finalized.

Procedure

1 Navigate to the HCX Manager Service UI.

2 Verify that no migration or protection operations are running.

3 To remove all network extensions from source-site data centers, complete the following substeps:

   a Go to **Services > Network Extension**.

   b Review each stretched network and decide whether you want the network to be connected on the cloud side gateway after uninstalling HCX.

   c Expand each extended network and click **Unextend**.

     The system displays information about the Unextend Network.

   d Under **Cloud Network**, expand the network entry.

     Note By default, the cloud network is disconnected from the cloud Edge Gateway after the network is unextended. This disconnection is done to prevent an edge gateway with dynamic routing enabled from advertising the route of the network and causing a potential routing conflict with the network in the source site.

   e (Optional) Use the check boxes to keep the cloud network connected or to force the network to unextend.

   f Click **Unextend**.

4. For any of the unextended networks that are unused, complete the following substeps to remove them from the destination site:

   Note Unextending networks does not remove them from the destination.

   a Access the VMC management interface: `https://console.cloud.vmware.com`

   b Select your organization and data center (SDDC).

   c Select **Network & Security > Network > Segments**.

   d Select the unextended network from the list and click **Delete**.

5. In the HCX Manager containing the Service Mesh configuration, complete the following substeps to delete all Service Mesh instances:

   Note Removing a Multi-Service Mesh from the source site also deletes it from the destination site.

   a Go to **Interconnect > Multi-Site Service Mesh**.

   b For each Service Mesh, click **Delete**.

   c Before proceeding to the next step, check that the Service Mesh no longer appears in the HCX Manager Service UI.

6. To disconnect all HCX site pairings, complete the following substeps:

   a From the HCX dashboard, navigate to **Site Pairing**.

   b For each site pair, click **Disconnect**.

7. (DX only) To remove direct connect private interfaces from the destination (VMC) site, complete the following substeps:

   a Access the VMC management interface: `https://console.cloud.vmware.com`

   b Select your organization and data center (SDDC).

   c Select **Add Ons**.

d Navigate to the SDDC tab and click **Open HCX**.

e Enter the cloudadmin@vmc.local user and credentials and click **Log In**.

f Navigate to the **Infrastructure** > **Interconnect**.

g Click the **Network Profiles** tab.

h Select the direct connect network profile and click **Edit**.

i Clear the IP ranges, Prefix length, and Gateway address.

j Click **Update**.

8 To remove HCX Manager from the destination (VMC) site, complete the following substeps:

Note For deployments between HCX enabled clouds on VMC (cloud-to-cloud), repeat this procedure at the source site.

a Access the VMC management interface: `https://console.cloud.vmware.com`

b Select your organization and data center (SDDC).

c Click **Add Ons**.

The system displays all SDDCs with HCX deployed.

d Click **Undeploy HCX**.

VMC automation cleans up SDDC HCX Manager services and removes the HCX Cloud Manager.

9 To remove HCX Connector on-premise, complete the following substeps:

Note For cloud-to-cloud deployments using VMC, skip this step. This step applies only in on-premise to VMC deployments.

a Navigate to the vCenter **Hosts and Clusters** tab.

b Expand the cluster where the HCX Manager is deployed and locate the virtual machine.

c Right-click on the HCX Manager virtual machine and power off the selection.

d Right-click on the HCX Manager virtual machine and select **Delete from Disk**.

10 Unregister the HCX Plug-in from the vCenter Server using the instructions on how to remove or disable unwanted plug-ins using the KB article, https://kb.vmware.com/s/article/1025360.

Remove all HCX extensions that include com.vmware.hybridity in the path. Also, remove entries with the following extensions:

- com.vmware.hcsp.alarm
- com.vmware.vca.marketing.ngc.ui

VMware HCX Troubleshooting

15

The following sections contain common VMware HCX troubleshooting scenarios, troubleshooting methodology, general information collection, and how to use built in diagnostic tools like the VMware HCX Central CLI.

This chapter includes the following topics:

- Enabling SSH on the VMware HCX Manager
- Logging in to the VMware HCX Manager Shell
- Locating the VMware HCX System IDs Using VMware HCX Manager Shell
- Locating the VMware HCX System IDs Using VMware HCX Plug-In
- Using Central CLI to Connect to VMware HCX Services
- Gathering VMware HCX Technical Support Logs from the VMware HCX Plug-In
- Gathering VMware HCX Technical Support Logs from the VMware HCX Appliance Management
- Viewing Logs in the VMware HCX Manager Shell
- Monitoring HCX Services from the Appliance Management Interface
- VMware HCX Manager Services from the VMware HCX CLI
- Viewing VMware HCX System State
- Viewing VMware HCX-Related Entries in the vSphere Task Console
- Enabling the VMware HCX Central CLI
- HCX Password Recovery
- Updating System Passwords

Enabling SSH on the VMware HCX Manager

This section describes how to enable the **SSH Service** on the HCX Manager to access to the command-line interface.

To access to the HCX Manager shell, use a VMware Remote Console session in the vSphere Client or establish an SSH session. If the **SSH Service** was not enabled during the initial HCX Manager installation, you must first enable it:

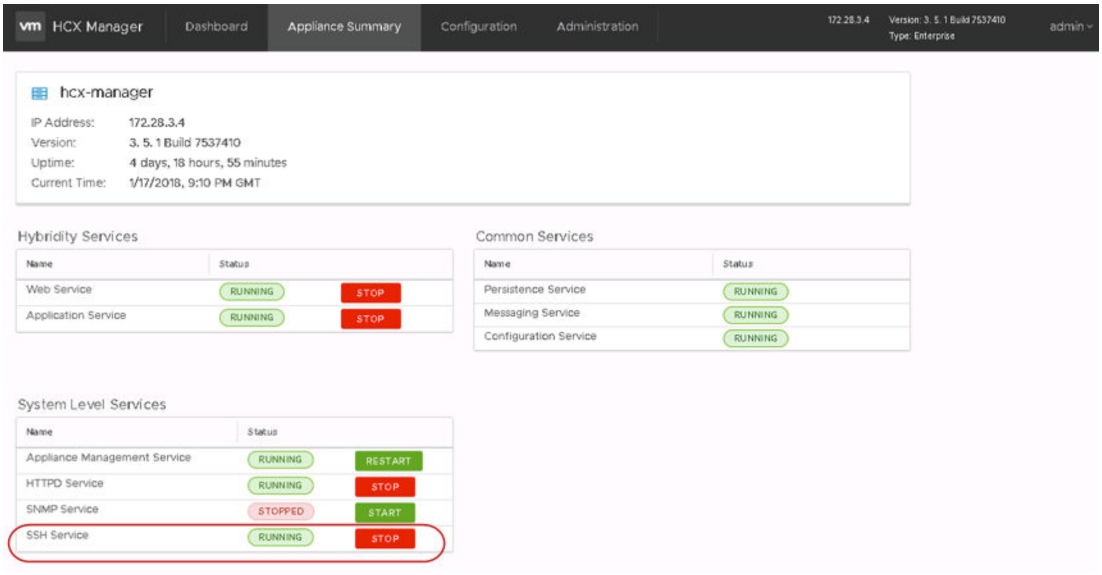
Procedure

1 Log in to the HCX Appliance Management interface: `https://hcx-ip-or-fqdn:9443`.

2 Go to **Appliance Summary**.

3 Under System Level Services, locate the **SSH Service**.

4 Click **Start**.



172.28.3.4
Version: 3. 5. 1 Build 7537410
Type: Enterprise

hcx-manager

IP Address: 172.28.3.4
Version: 3. 5. 1 Build 7537410
Uptime: 4 days, 18 hours, 55 minutes
Current Time: 1/17/2018, 9:10 PM GMT

Hybridity Services

Name	Status	
Web Service	RUNNING	STOP
Application Service	RUNNING	STOP

Common Services

Name	Status
Persistence Service	RUNNING
Messaging Service	RUNNING
Configuration Service	RUNNING

System Level Services

Name	Status	
Appliance Management Service	RUNNING	RESTART
HTTPD Service	RUNNING	STOP
SNMP Service	STOPPED	START
SSH Service	RUNNING	STOP

Logging in to the VMware HCX Manager Shell

This topic contains information on how to connect to the HCX Manager shell.

Prerequisites

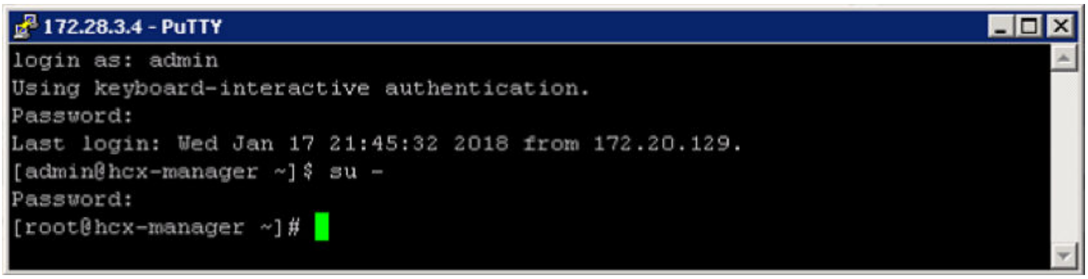
You can log in to the HCX Manager shell using VMRC or an SSH session. The first-level access uses the admin account created during the initial installation of the HCX Manager. If requested to do so by support, you can switch the User to root once you log in with the admin account.

Procedure

1 Connect to the HCX Manager using VMRC or SSH.

2 When prompted for credentials, enter *admin* as the user name and password.

3 Switch to root by typing `su root`and providing the **`root password`**.



```
login as: admin
Using keyboard-interactive authentication.
Password:
Last login: Wed Jan 17 21:45:32 2018 from 172.20.129.
[admin@hcx-manager ~]$ su -
Password:
[root@hcx-manager ~]#
```

Locating the VMware HCX System IDs Using VMware HCX Manager Shell

When working with support, you may have to provide the VMware HCX System IDs. You can get the IDs from the VMware HCX plug-in and from the HCX Manager shell.

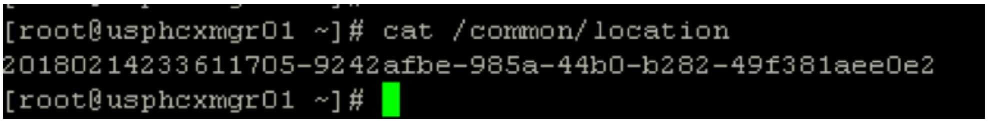
Procedure

1 Connect to the HCX Manager shell using VMRC or SSH.

2 Switch user to root: `su`

3 Type `cat /common/location`

4 Note the System ID.



```
[root@usphcxmgr01 ~]# cat /common/location
20180214233611705-9242afbe-985a-44b0-b282-49f381aee0e2
[root@usphcxmgr01 ~]#
```

Locating the VMware HCX System IDs Using VMware HCX Plug-In

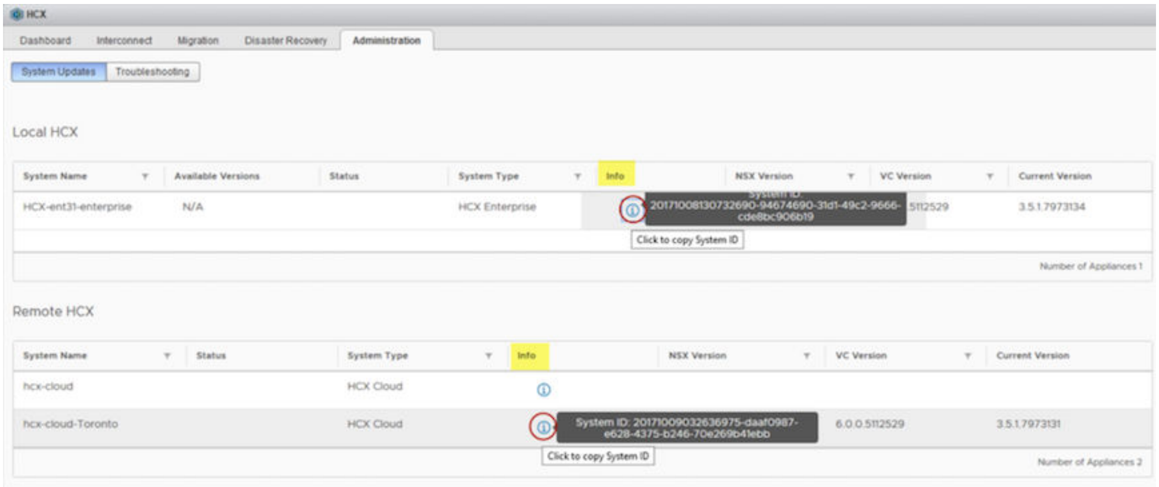
When working with support, you may have to provide the VMware HCX System IDs. The IDs can be obtained from the VMware HCX plug-in and from the HCX Manager shell.

Procedure

1 In the vSphere Web Client, navigate to the VMware HCX plug-in > **Administration** > **System Updates**.

2 Under Local HCX, in the Info column, click the ⓘ (information) icon. Doing so copies the System ID to your clipboard. Do the same to obtain the Remote HCX System ID.

3 Note the IDs and provide them to VMware when requested.



Local HCX

System Name	Available Versions	Status	System Type	Info	NSX Version	VC Version	Current Version
HCX-ent31-enterprise	N/A		HCX Enterprise	System ID: 20171008130732690-94674690-31d1-49c2-9666-cde8bc906b19		5112529	3.5.1.7973134

Number of Appliances 1

Remote HCX

System Name	Status	System Type	Info	NSX Version	VC Version	Current Version
hcx-cloud		HCX Cloud				
hcx-cloud-Toronto		HCX Cloud	System ID: 20171009032636975-daaf0987-e628-4375-b246-70e269b41ebb		6.0.0.5112529	3.5.1.7973131

Number of Appliances 2

Using Central CLI to Connect to VMware HCX Services

From the HCX Manager Central CLI, you can connect to the various VMware HCX services for troubleshooting or gathering information.

Procedure

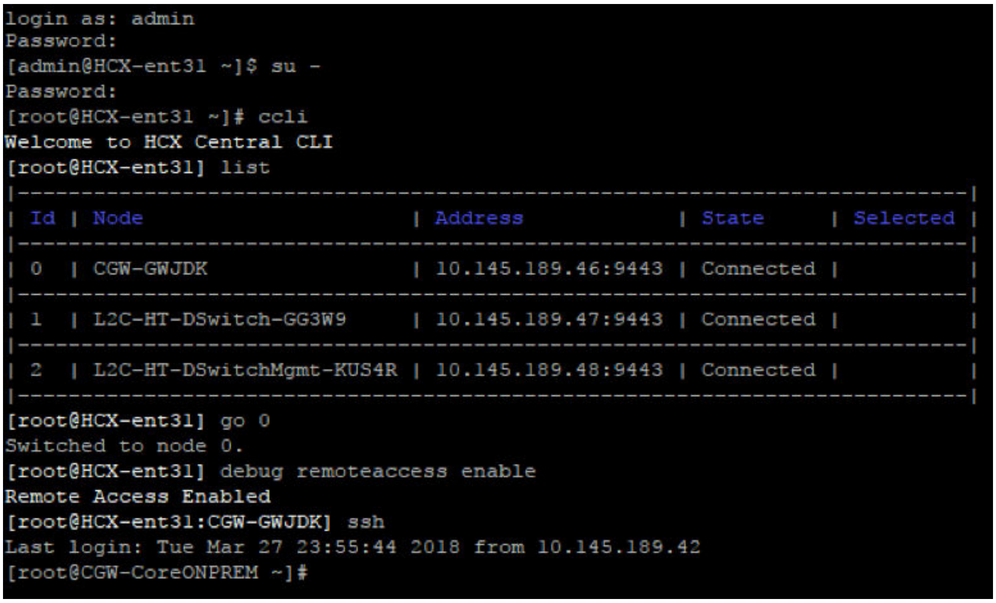
1 Enable CCLI on the HCX Manager: `ccli`.

2 Type `list` to view a list of VMware HCX nodes.

3 Identify the VMware HCX Node **ID** for the VMware HCX service to which you want to connect.

4 Type `go #` where # is the node **ID**.

5 Type `ssh`.



```
login as: admin
Password:
[admin@HCX-ent31 ~]$ su -
Password:
[root@HCX-ent31 ~]# ccli
Welcome to HCX Central CLI
[root@HCX-ent31] list
|------------------------------------------------------------------------------|
| Id | Node                     | Address             | State      | Selected |
|------------------------------------------------------------------------------|
| 0  | CGW-GWJDK                | 10.145.189.46:9443 | Connected |           |
|------------------------------------------------------------------------------|
| 1  | L2C-HT-DSwitch-GG3W9     | 10.145.189.47:9443 | Connected |           |
|------------------------------------------------------------------------------|
| 2  | L2C-HT-DSwitchMgmt-KUS4R | 10.145.189.48:9443 | Connected |           |
|------------------------------------------------------------------------------|
[root@HCX-ent31] go 0
Switched to node 0.
[root@HCX-ent31] debug remoteaccess enable
Remote Access Enabled
[root@HCX-ent31:CGW-GWJDK] ssh
Last login: Tue Mar 27 23:55:44 2018 from 10.145.189.42
[root@CGW-CoreONPREM ~]#
```

6 Use the `help` command to display available commands.

Gathering VMware HCX Technical Support Logs from the VMware HCX Plug-In

Locating the VMware HCX logs for review and knowing how to gather them is an important part of the troubleshooting process. It is helpful to include at least the HCX Manager Technical Support log when experiencing an issue and contacting support.

Procedure

1 From the HCX Manager Service UI, navigate to the log options at > **Administration** > **Troubleshooting** > **Download Log Bundles**.

Note From the HCX Appliance Management interface, navigate to **Administration > Troubleshooting > Technical Support Logs**.

2 Select the box next to one or more logs that you want to generate.

3 Click **Request**.

4 After the bundle is prepared, you are prompted to download them.

5 (Optional) To allow the HCX Admin to download logs from your HCX system for troubleshooting, locate the **Settings** section at the bottom of the page, and select **Auto Approve**.

Note This setting is available only from the HCX Manager Service UI.

Gathering VMware HCX Technical Support Logs from the VMware HCX Appliance Management

Locating the VMware HCX logs for review and knowing how to gather them is an important part of the troubleshooting process. It is helpful to include at least the HCX Manager Technical Support log when experiencing an issue and reach for support.

Procedure

1 Log in to the HCX Appliance Management interface: `https://hcx-ip-or-fqdn:9443`.

2 Navigate to **Administration** > **Troubleshooting** > **Technical Support Logs**.

3 Select the box next to one or more logs that you want to generate.

4 Click **Generate**.

5 After the bundle is prepared, you are prompted to download them.

Viewing Logs in the VMware HCX Manager Shell

VMware HCX service logs are useful when troubleshooting failures.

Prerequisites

There are two key logs in the HCX Manager that can be reviewed and used when troubleshooting problems or to monitor system activities. Both are located in `/common/logs/admin` and they are the Application log (`app.log`) which logs all activities for the App-engine service and Web log (`web.log`) which logs all activities for the VMware HCX Web Engine service. The process requires a good understanding of the VMware HCX system so it is best to review with a VMware support engineer.

Procedure

1. Use VMRC or SSH to connect to the HCX Manager shell.
2. Switch user to root: `su -`.
3. Change directory to `/common/logs/admin`.
4. From within this directory, you can open the relevant logs using standard Linux text commands.
5. When troubleshooting failures, search using keywords such as Fail, ERROR, exception, migration.

Monitoring HCX Services from the Appliance Management Interface

You can monitor or restart the HCX Manager services from the Appliance Management interface.

Prerequisites

There are several HCX Manager services critical for VMware HCX operations. Two key services to observe are the Application Engine and the Web Engine.

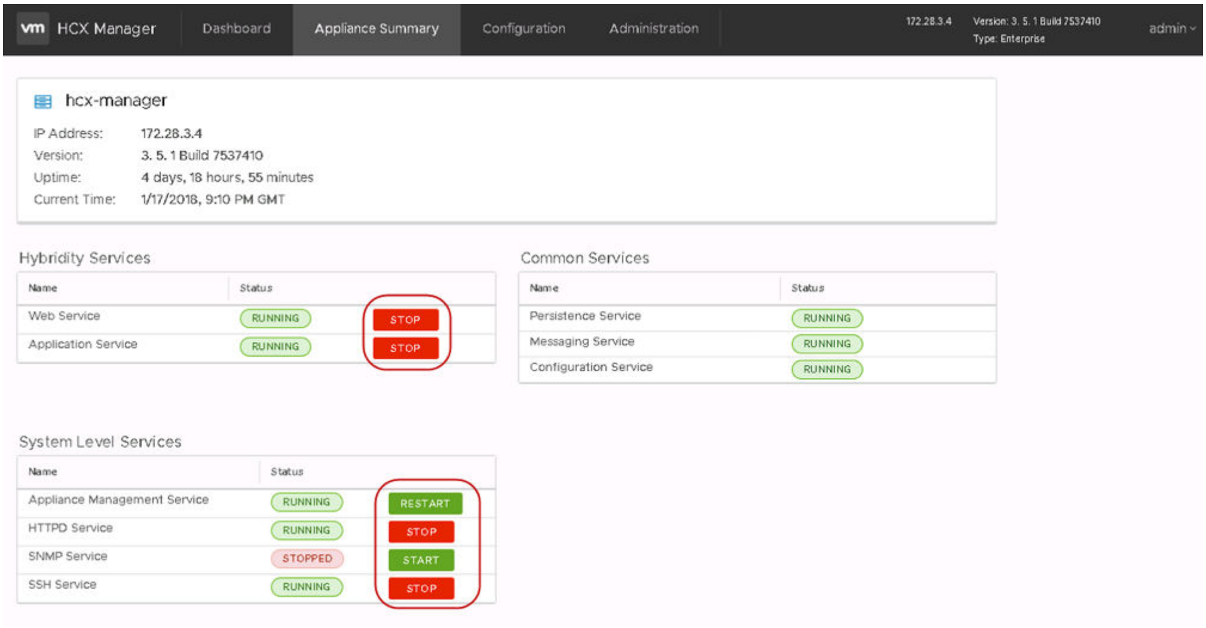
When working with a support team at VMware, you may have to confirm that these services are running or may have to restart them. The HCX Manager services can be viewed and restarted in several places.

Important Do not restart services unless directed to do so by VMware Global Support Services.

Procedure

1. Log in to the VMware HCX Appliance Management interface: https://*hcx-ip-or-fqdn*:9443.
2. Navigate to **Appliance Summary**.

3 You can find all services and can monitor or restart them. The only two services that are optional are the SNMP and SSH services. All others must always be running.



hcx-manager

IP Address: 172.28.3.4
Version: 3. 5. 1 Build 7537410
Uptime: 4 days, 18 hours, 55 minutes
Current Time: 1/17/2018, 9:10 PM GMT

Hybridity Services

Name	Status
Web Service	RUNNING
Application Service	RUNNING

Common Services

Name	Status
Persistence Service	RUNNING
Messaging Service	RUNNING
Configuration Service	RUNNING

System Level Services

Name	Status
Appliance Management Service	RUNNING
HTTPD Service	RUNNING
SNMP Service	STOPPED
SSH Service	RUNNING

VMware HCX Manager Services from the VMware HCX CLI

You can manage the HCX service using the VMware HCX CLI.

Procedure

1 VMRC or SSH into the HCX Manager.

2 Switch user to root: `su -`.

3 Type `systemctl`*actionservice_name*.

- Action can be status, stop, start, restart.
- Service name can be that of a web-engine or an app-engine.

`systemctl` status web-engine

`systemctl` status web-engine

`systemctl` stop web-engine

`systemctl` restart web-engine

Viewing VMware HCX System State

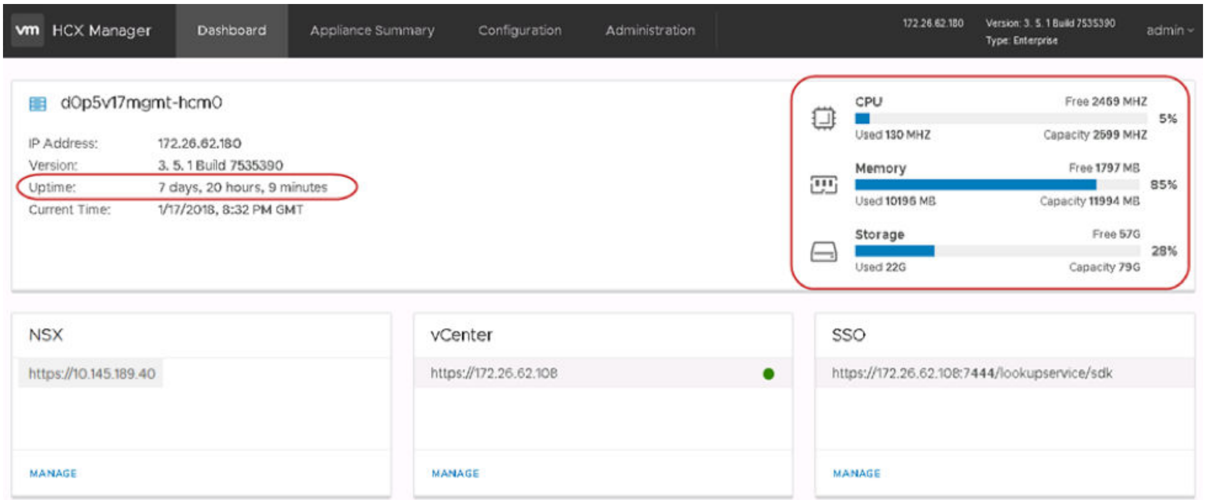
You can view the HCX system state from the appliance management dashboard.

Prerequisites

For HCX to run properly, it is important that it has sufficient available resources. You can view the key system resources such as CPU, memory, and storage from the Dashboard section in the HCX Appliance Management interface. The dashboard section also provides other useful information such as the version that the HCX Manager is running, the uptime, its IP address, and current time. All useful information when reviewing logs or required by support.

Procedure

1. Log in to the HCX Appliance Management interface: https://<hcx-ip-or-fqdn>:9443
2. Navigate to **Dashboard**.
3. Review the CPU, Memory, Storage, Uptime, and Version.



Version: 3. 5. 1 Build 7535390
Type: Enterprise

d0p5v17mgmt-hcm0

IP Address: 172.26.62.180
Version: 3. 5. 1 Build 7535390
Uptime: 7 days, 20 hours, 9 minutes
Current Time: 1/17/2018, 8:32 PM GMT

CPU Free 2469 MHZ 5% Used 130 MHZ Capacity 2599 MHZ
Memory Free 1797 MB 85% Used 10196 MB Capacity 11994 MB
Storage Free 57G 28% Used 22G Capacity 79G

NSX https://10.145.189.40
vCenter https://172.26.62.108 ●
SSO https://172.26.62.108:7444/lookupservice/sdk

Viewing VMware HCX-Related Entries in the vSphere Task Console

Most VMware HCX Operations such as the initial appliance deployment, extending a network, or a migration can be monitored from the vSphere Web Client Task Console.

Procedure

1. Open the vSphere Web Client and navigate to **Home**.
2. Navigate to **Tasks**.
3. In the Task Console, filter the results by using `HCX` in the search filter.
4. Look for any failures or errors. If you see an error, you can review the logs to find additional details.

Enabling the VMware HCX Central CLI

The VMware HCX Central CLI is used for diagnostic information collection and secure connections to the Service Mesh.

The Central CLI on VMware HCX allows you to run commands available centrally on the HCX Manager to view the run time state for HCX services. The Central CLI reduces troubleshooting time by providing centralized diagnostics and improves the security posture of the Service Mesh appliances by eliminating the need to run the SSH service on them. To use it, first you must enable the Central CLI on the VMware HCX Manager.

Procedure

1. Use VMRC or SSH to connect to the VMware HCX Manager shell.
2. Switch user to root: `su -`.
3. Type `ccli`.

   The VMware HCX Central CLI is now enabled.
4. Begin using it by exploring the `p` command output.

HCX Password Recovery

You can reset the admin or root password on either the HCX Connector or HCX Cloud Manager.

If an account password is lost of forgotten, a standard Linux password recovery procedure can be used to reset it.

The recovery procedure, which requires a reboot of the HCX Connector or Cloud manager, does not impact the following scenarios:

- Network Extensions actively forwarding.
- Virtual machine protections in continuous synchronization.
- Migration operations in the transfer phase or "waiting for switchover."

To reset the root or admin password, see the VMware KB article 79362.

Prerequisites

Active migration and configuration workflows may be impacted by a password reset. Allow those operations to complete before proceeding to recover the password.

Updating System Passwords

Update the system admin or root passwords from the command line interface.

Note For information about recovering a password, see HCX Password Recovery.

Procedure

1 Login to the HCX Manager as the admin user: `ssh admin@`*IP address*.

2 Enter the admin password.

   The system prompt appears.

   ```
   [admin@hcxmgr ~] $
   ```

3 Enter the `passwd` command.

   ```
   [admin@hcxmgr ~]$ passwd
   ```

   Follow the prompts to complete the password change.

4 (Optional) Change the root user password:

   a At the system prompt, elevate to root user using the `su root` command:

      The root prompt appears.

      ```
      root@hcxmgr /home/admin]#
      ```

   b At the root prompt, enter the `passwd` command.

      Follow the prompts to complete the password change.

What to do next

Log out and log back in to confirm the change.

Monitoring VMware HCX Systems

16

VMware HCX native tools and views can be used to collect the current state of the system and general system health. Also, VMware HCX can be integrated with vRealize Log Insight and vRealize Operations using Management Pack.

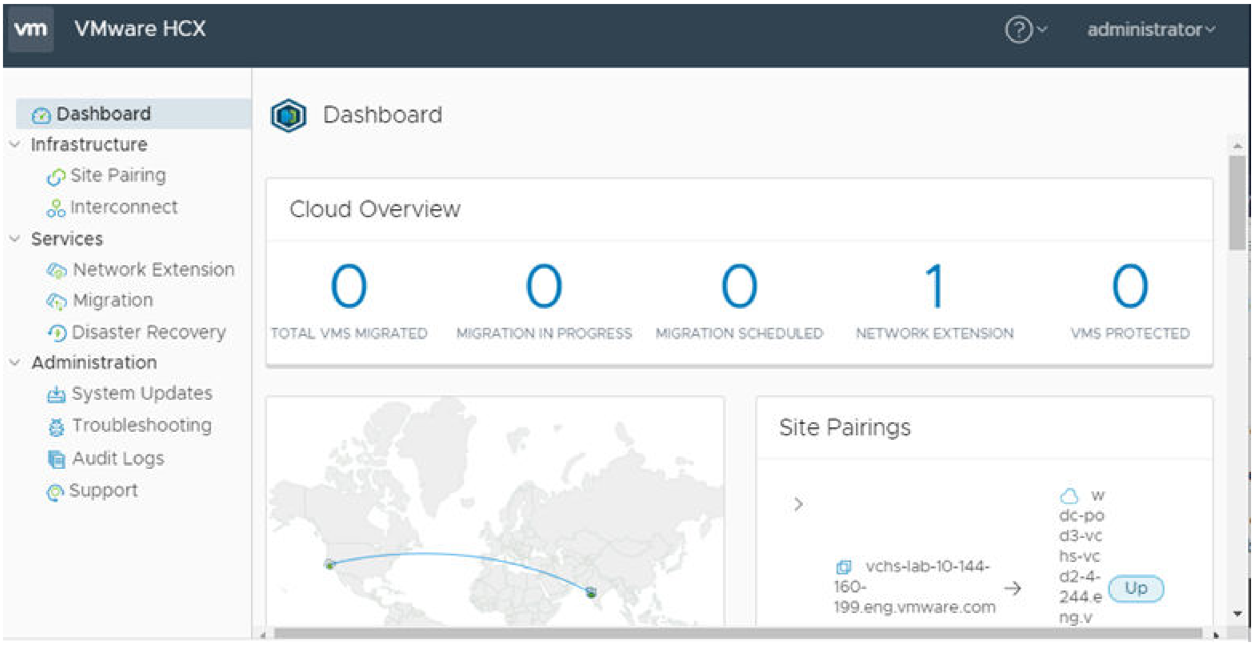
This chapter includes the following topics:

- Understanding the HCX Manager Dashboard
- vRealize Operations Management Pack for HCX
- DICE Integration for HCX
- VMware vCenter HCX Alarms

Understanding the HCX Manager Dashboard

The Dashboard provides a summary of HCX operations, data center locations, resource usage, status, and activity.

The Dashboard is the first screen that appears when you open the HCX Service UI.



The Dashboard highlights various HCX functions in a set of panels. You can change settings related to those panels.

Note For HCX installations where the vCenter Servers are in linked-mode, the Dashboard includes information from all vCenter Servers registered to an HCX system.

Panel	Description
Cloud Overview	Lists HCX operations: ■ Number of virtual machines migrated ■ Number of migrations in progress ■ Number of scheduled migrations not started ■ Number of extended networks ■ Number of protected virtual machines for business continuity
Site Pairs	Displays connected site pairs and lists the pair status, Up or Down. To create a site pair, click New Site Pairing. To view detailed instructions for adding a site pair, see Adding a Site Pair.
Active Migrations	Displays ongoing migrations for the selected HCX system. Use the pull-down menu to change the source site.
Migrations Overview	Summarizes completed migrations for the selected HCX system. Use the date pull-down menu to display migrations for a specified period: ■ Last 6 Months ■ Last 3 Months ■ This Month
Cloud Resource Usage	For the selected source system, provides a summary view of resource usage for the site pair. Use the pull-down menu to change the source site.
Alerts	Provides a comprehensive the list of logged Alert messages: Critical, Warning, Info. For a description of Alert messages and available actions, see Managing HCX Alerts.
Activity Logs	For the selected source system, displays a historical log of system tasks: ■ Job Type ■ Entity Name ■ Percentage of task completed. ■ Task status ■ Task Start Time ■ Task Completion Time To change the source site or to display tasks by status (All, Running, Failed), select from the pull-down menus . Use the search field to identify specific tasks or groups of tasks.

vRealize Operations Management Pack for HCX

The Management Pack (MP) for HCX adds monitoring capabilities with integrated dashboards and reports. It triggers problem alerts for the HCX services.

The Management Pack for HCX extends the Operations Management capabilities of vRealize Operations for HCX Hybrid Mobility, Interconnect Management and Data Center and Cloud Migrations.

Installing the HCX Management Pack

The Management Pack for HCX is downloaded from the VMware Solutions Exchange and added to an existing vRealize Operations installation.

Prerequisites

- You have a **my.vmware.com** account to download the management pack.
- vRealize Operations version 8.1.1 or above requires HCX Management Pack 5.1.
- The vRealize Operations Manager connects to HCX Manager systems using TCP-443 when they are added with the vROPs HCX Management Pack.

Procedure

1. Navigate to the VMware Solutions Exchange.
2. Locate the Management Pack for HCX.
3. Log in using my.vmware.com credentials.
4. To download the Management Pack, click the **Try** button.
5. On the Download window, click **Proceed**.
6. Log in to the vRealize Operations Manager user interface with administrator privileges.
7. Navigate to **Administration** > **Repository**.
8. Click **Add/Upgrade**.
9. Browse to the downloaded an HCX Management Pack PAK file.
10. If you had previously installed an HCX Management Pack, check the box that prompts you to install the PAK files even if it is already installed.
11. Click **Upload**. After the upload completes, click **Next**.
12. Accept the EULA, click **Next**.
13. After the installation is finished, click **Finish**.

    The Management Pack is listed in the Repository.
14. Navigate to **Administration** > **Solutions** > **Other Accounts**.

15 Add an HCX account:

   Note For each HCX Connector and HCX Cloud Manager that uses vRealize Operations, you must add an account.

   a Click **Add Account**.
   b Select the account type **HCX adapter**.
   c Enter a Cloud Account name.
   d Enter the HCX Connector or HCX Cloud Manager IP address.
   e Click **+** to add the vCenter credentials.
   f Enter the **Collector/Group** information or use the default entry.
   g Click **Validate Connection**.

      If the connection is not successful, verify the credentials and try again.

   h Click **Save**.
   i If prompted, accept the certificate.
   j Repeat this procedure for each HCX Connector and HCX Cloud Manager.

16 Create the vCenter Server accounts:

   Note For each vCenter Server associated with an HCX Connector and HCX Cloud Manager, you must add an account.

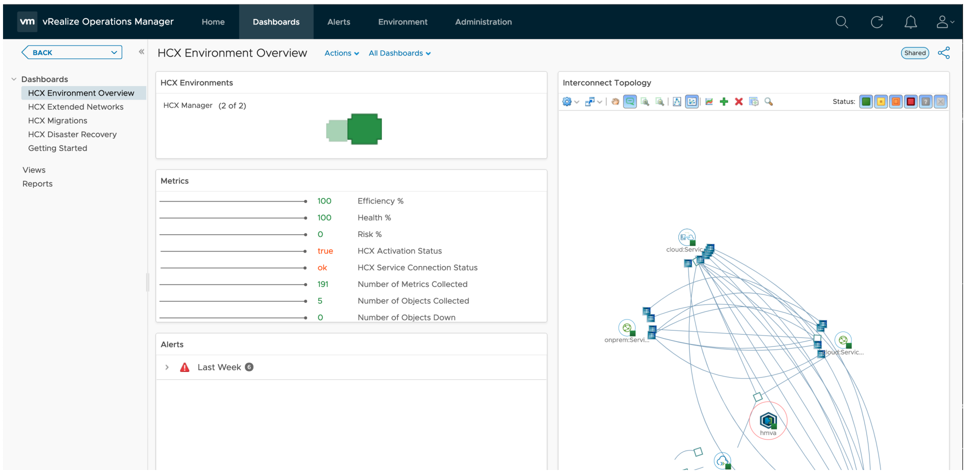
   a Navigate to **Administration > Solutions > Cloud Accounts**.
   b Click **Add Account**.
   c Select account type **vCenter**.
   d Enter a Cloud Account Name.
   e Enter the **vCenter Server** IP address.
   f Enter the vCenter credentials.
   g Enter the **Collector/Group** information or use the default entry.
   h Click **Validate Connection**.

      If the connection is not successful, verify the credentials and try again.

17 Click **Save**.

18 Authenticate to the HCX system using a vSphere SSO-integrated user with access to HCX.

   After sufficient metrics are collected, the vRealize Operations dashboards are populated with views based on enabled HCX services.



Viewing the HCX Adapter Logs

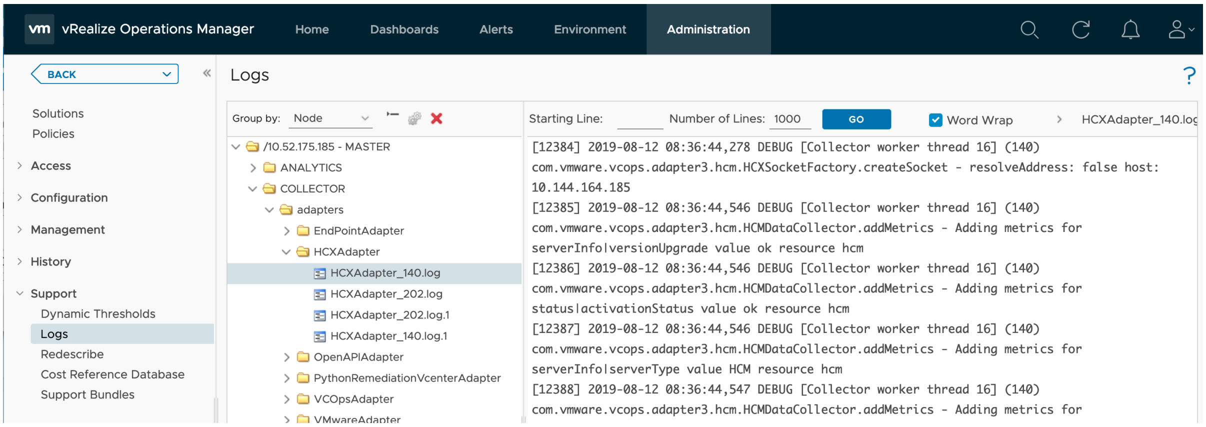
Adapter Logs are useful when diagnosing issues with the Management Pack for HCX.

Prerequisites

- Administrative access to the vRealize Operations Manager.
- The Management Pack for HCX is listed in Solutions.

Procedure

1. In the vRealize Operations Manager, navigate to the **Administration** tab.
2. On the left side navigator, expand **Support** and click **Logs**.
3. In the file navigator, expand the main folder and navigate to **Collector** > **Adapter** > **HCXAdapter**.
4. Select the log and click **GO**.



```
[12384] 2019-08-12 08:36:44,278 DEBUG [Collector worker thread 16] (140)
com.vmware.vcops.adapter3.hcm.HCXSocketFactory.createSocket - resolveAddress: false host:
10.144.164.185
[12385] 2019-08-12 08:36:44,546 DEBUG [Collector worker thread 16] (140)
com.vmware.vcops.adapter3.hcm.HCMDataCollector.addMetrics - Adding metrics for
serverInfo|versionUpgrade value ok resource hcm
[12386] 2019-08-12 08:36:44,546 DEBUG [Collector worker thread 16] (140)
com.vmware.vcops.adapter3.hcm.HCMDataCollector.addMetrics - Adding metrics for
status|activationStatus value ok resource hcm
[12387] 2019-08-12 08:36:44,546 DEBUG [Collector worker thread 16] (140)
com.vmware.vcops.adapter3.hcm.HCMDataCollector.addMetrics - Adding metrics for
serverInfo|serverType value HCM resource hcm
[12388] 2019-08-12 08:36:44,547 DEBUG [Collector worker thread 16] (140)
com.vmware.vcops.adapter3.hcm.HCMDataCollector.addMetrics - Adding metrics for
```

What to do next

To download logs, use **Support Bundles** on the left side navigator.

Management Pack for HCX Reference Topics

The Management Pack dashboards, alerts, and metrics are listed for reference.

HCX MP Alerts

List of possible HCX Alerts, and their severity.

HCX services are using trial period limits. To remove the limits, activate HCX. – Warning

The HCX trial period has ended. To continue using services, activate HCX. - Critical

The HCX Manager is unable to reach https://connect.hcx.vmware.com. This connection is required for authorization, critical updates, and support. - Warning

The HCX Manager has failed to reach https://connect.hcx.vmware.com beyond the grace period. To resume HCX services, restore this connection . - Critical

Site Pair Link Status is not OK. - Immediate

Site Pair Remote Status is not OK. - Immediate

Interconnect Service Status is Down. - Critical

vMotion Service Status is Down. - Critical

Disaster Recovery Service Status is Down. - Critical

Bulk Migration Service Status is Down. - Critical

Network Extension Service Status is Down. - Critical

WANOPT Service Status is Down. - Critical

VM Migration status is Failed. - Immediate

Hybrid Interconnect Service Pipeline Status is down. - Critical

Hybrid Interconnect Service Transport Status is down. - Critical

Hybrid Interconnect Service Encryption Tunnel Status is down. - Critical

Hybrid Interconnect Service service is not running. - Critical

Hybrid Interconnect Service System State is Fatal. - Critical

Hybrid Interconnect Service System State is Critical. - Critical

High Throughput Network Extension service is not running. - Critical

Network Extension Service System State is Fatal. - Critical

Network Extension Service System State is Critical. - Critical

Network Extension Service Pipeline Status is down. - Critical

Network Extension Service Transport Status is down. - Critical

Network Extension Service Encryption Tunnel Status is down. - Critical

WAN Optimization Service is not running.- Critical

Hybrid Interconnect Service Tunnel is down. - Warning

High Throughput Network Extension Tunnel is down. - Warning

All tunnels on Hybrid Interconnect Service are down. - Critical

All tunnels on High Throughput Network Extension are down. - Critical

Hybrid Interconnect Service status is degraded. - Info

Hybrid Interconnect Service Pipeline Status is degraded. - Info

Hybrid Interconnect Service Transport Status is degraded. - Info

Hybrid Interconnect Service Encryption Tunnel Status is degraded. - Info

Network Extension Service status is degraded. - Info

Network Extension Service Pipeline Status is degraded. - Info

Network Extension Service Transport Status is degraded. - Info

Network Extension Service Encryption Tunnel Status is degraded. - Info

Hybrid Interconnect Service Tunnel status is degraded. - Info

Network Extension Service Tunnel status is degraded. - Info

WAN Optimization Service is degraded. - Info

Hybrid Interconnect Service status is unknown. - Warning

Hybrid Interconnect Service Pipeline Status is unknown. - Warning

Hybrid Interconnect Service Transport Status is unknown. - Warning

Hybrid Interconnect Service Encryption Tunnel Status is unknown. - Warning

High Throughput Network Extension service status is unknown. - Warning

Network Extension Service Pipeline Status is unknown. - Warning

Network Extension Service Transport Status is unknown. - Warning

Network Extension Service Encryption Tunnel Status is unknown. - Warning

Hybrid Interconnect Service Tunnel status is unknown. - Warning

High Throughput Network Extension Tunnel status is unknown. - Warning

WAN Optimization Service status is unknown. - Warning

Incoming replication is in an error state. - Critical

Outgoing Replication is in an error state. - Critical

Incoming Replication has an RPO violation. - Warning

Outgoing Replication has an RPO violation. - Warning

HCX MP Dashboards

Descriptions for the vROPS HCX dashboards added when the MP for HCX is installed.

HCX Environment Overview

Widget 1	HCX Environments
Widget 2	Interconnect Topology
Widget 3	Metrics
Widget 4	Alerts

HCX Extended Networks

Widget 1	HCX Environments
Widget 2	Extended Networks Topology
Widget 3	Metrics

HCX Migrations

Widget 1	Recent Completed Migrations
Widget 2	Ongoing Migrations
Widget 3	Recent Error Migrations
Widget 4	Mobility Groups

HCX Disaster Recovery

Widget 1	Incoming Replications
Widget 2	Outgoing Replications
Widget 3	Replications by Status
Widget 4	Replications with RPO Violation

HCX MP Metrics

Descriptions for the vROPS HCX Metrics available with the MP for HCX.

Resource: Site Pairing (HCX Adapter)

Metric Group	Metric Name
Migration	Average Rate of Data Migrated
Migration	Average Time Taken per Migration (mins)
Migration	Distribution of Successful Migrations
Migration	Distribution of Failed Migrations

Resource: Migration (HCX Adapter)

Metric Group	Metric Name
LWD, LWD In Progress, NFC, NFC In Progress	Received Traffic
LWD, LWD In Progress, NFC, NFC In Progress	Received Operations
LWD, LWD In Progress, NFC, NFC In Progress	Received Throughput
LWD, LWD In Progress, NFC, NFC In Progress	Transmitted Traffic
LWD, LWD In Progress, NFC, NFC In Progress	Transmitted Operations
LWD, LWD In Progress, NFC, NFC In Progress	Transmitted Throughput
LWD, LWD In Progress, NFC, NFC In Progress	Error Count
Progress Info	Progress
Progress Info	Rate of Transfer
Progress Info	Checksum Total
Progress Info	Checksum Compared
Summary	Instances Completed
Summary	Instances Aborted
Summary	Images Created
Summary	Disks Configured
Summary	Group Errors
Summary	Source Migration State
Summary	Destination Migration State
Summary (P)	Migration Start Time
Summary (P)	Migration End Time
Summary (P)	Source Datacenter Name
Summary (P)	Destination Datacenter Name
Summary (P)	Time Taken (minutes)
Summary (P)	VM Size
Summary (P)	Status
Summary (P)	Protocol
Summary (P)	Latest State at Source
Summary (P)	Latest State at Destination

Resource: vMotion (HCX Adapter)

Metric Group	Metric Name
Progress Info	Progress
Summary (P)	Migration Start Time
Summary (P)	Migration End Time

Metric Group	Metric Name
Summary (P)	Source Datacenter Name
Summary (P)	Destination Datacenter Name
Summary	Time Taken (minutes)
Summary	VM Size
Summary (P)	Estimated Completion Time
Summary (P)	Status
Summary (P)	Protocol

Resource: RAV Migration (HCX Adapter)

Metric Group	Metric Name
Progress Info	Progress
Summary (P)	Migration Start Time
Summary (P)	Migration End time
Summary (P)	Source Datacenter Name
Summary	Time Taken (minutes)
Summary	VM Size
Summary (P)	Estimated Completion Time
Summary (P)	Status
Summary (P)	Protocol

Resource: OsAssistedMigration (HCX Adapter)

Metric Group	Metric Name
Progress Info	Progress
Summary (P)	Migration Start Time
Summary (P)	Migration End Time
Summary (P)	Source Datacenter Name
Summary (P)	Destination Datacenter Name
Summary	Time Taken (minutes)
Summary	VM Size
Summary (P)	Estimated Completion Time
Summary (P)	Status
Summary (P)	Protocol

Resource: DR Replication (HCX Cloud for VC/VCD Adapters)

Metric Group	Metric Name
Summary	Replication State

Summary (P)	RPO Violation
Summary (P)	No. of Snapshots
Summary (P)	Quiesce Guest Enabled
Summary (P)	Compression Enabled
Summary (P)	Source
Summary (P)	Target
Summary (P)	Datacenter
Summary (P)	Storage
Summary	Instances Completed
Summary	Instances Aborted
Summary	Images Created
Summary	Disks Configured
Summary	Group Errors
Summary (P)	Guest OS
Summary (P)	RPO
Summary (P)	Cluster
Summary (P)	No. of CPUs
Summary (P)	Detailed Status

DICE Integration for HCX

The Data Integrated Customer Engagement (DICE) tool uses customer utilization data to model the business benefits of VMware software-defined data center (SDDC) products. Through integration with DICE, you can upload the host and virtual machine inventory of the vCenter Server registered with an HCX.

Contact your account team for help with configuring and using this feature.

Prerequisites

Firewall rules allow access to the DICE portal through port 443.

Procedure

1 Navigate to the HCX Dashboard and select **Administration > DICE**.

The system displays the DICE configuration page.

2 Enter the DICE configuration parameters:

DICE Parameter	Description
API Key	Provides API key information for the REST authentication with the DICE portal. Obtain this key from the DICE website under Account Settings in your profile.
API Secret	Provides API secret key information for the REST authentication with the DICE portal. Obtain this secret from the DICE website under Account Settings in your profile. **Note** If you must change any of the DICE parameters in the future, you must reenter the secret key.
Customer ID	Obtain this ID from your account team.
Model ID	(Optional) Assigned by DICE after the first time you upload the inventory. The Model ID is unique to each HCX. **Note** If the Model ID is deleted from the DICE inventory, edit the configuration to remove the Model ID, and upload the inventory again.

3 Click **Save**.

4 Click **Upload VC Inventory to DICE**.

The HCX uploads the vCenter virtual machine and host inventory. In the DICE portal, a new model is created in the Library, and this Model ID is displayed in the HCX screen.

Note The time it takes to complete the upload depends on the size of the vCenter inventory. To refresh the inventory for the Model ID in the future, click **Upload VC Inventory to DICE** again.

What to do next

Conduct periodic updates once migrations and project milestones are completed to show the overall transformation progress. To compare results before and after, navigate to **Value Realization > Infrastructure Tracking**. Work with your account team for performing analysis on the Model in the DICE portal.

VMware vCenter HCX Alarms

The HCX service generates default vCenter Alarms that are reported to vCenter Server.

You can use these alarms to trigger additional actions or notifications.

HCX Event Alarm in vCenter (Event Code)	Description
HCX RAV Migration Error Encountered (65005)	The HCX RAV Migration did not succeed. See the HCX Migration Tracker for details.
HCX Bulk Migration Error Encountered (65006)	The HCX Bulk Migration did not succeed. See the HCX Migration Tracker for details.
HCX vMotion Migration Error Encountered (65007)	The HCX vMotion Migration did not succeed. See the HCX Migration Tracker for details.
HCX Cold Migration Error Encountered (65008)	The HCX Cold Migration did not succeed. See the HCX Migration Tracker for details.
HCX RAV Migration Cancelled (66001)	The HCX Replication Assisted vMotion migration is cancelled.
vSphere Bulk Migration Cancelled (66002)	The HCX Bulk migration is cancelled.
HCX vMotion Migration Cancelled (66003)	The HCX vMotion migration is cancelled.
HCX Cold Migration Cancelled (66004)	The HCX Cold migration is cancelled.
HCX Cloud Database Upgrade Failed (com.vmware.hcx.cloud.database.upgrade)	The HCX Cloud database upgrade has failed. Contact VMware Support.
HCX Connector Database Upgrade Failed (com.vmware.hcx.enterprise.database.upgrade)	The HCX Connector database upgrade has failed. Contact VMware Support.
HCX Interconnect Service Mesh Tunnel State Change (com.vmware.hcx.interconnect.TunnelStatusDownEvent, com.vmware.hcx.interconnect.TunnelStatusDegradedEvent, com.vmware.hcx.interconnect.TunnelStatusUpEvent, com.vmware.hcx.interconnect.TunnelStatusUnknownEvent)	The HCX Interconnect Tunnel status has changed. See HCX Service Mesh Diagnostics for details. To access Service Mesh Diagnostics, navigate to **Interconnect > Service Mesh > Run Diagnostics**. To view the current topology without running diagnostics, see **Service Mesh > View Topology.**
HCX Service connection is degraded (com.vmware.hcx.communication.HcxCommunicationCritical, com.vmware.hcx.communication.HcxCommunicationWarning,com.vmware.hcx.communication.HcxCommunicationUp)	The HCX Manager system is unable to reach `connnect.hcx.vmware.com`. After a grace period of 7 days, the HCX system becomes disabled.

VMware HCX in the VMware Cloud on AWS

17

VMware HCX enables cloud on-boarding without retrofitting your source infrastructure, supporting migration from vSphere 6.0+ to VMware Cloud on AWS (VMC) without introducing application risk and complex migration assessments.

This chapter includes the following topics:

HCX Services for VMware Cloud on AWS

HCX for VMware Cloud on AWS includes support for all HCX Advanced services as well as select HCX Enterprise features and services with no additional license requirement and at no additional cost.

In addition to all HCX Advanced services, installing HCX for VMware Cloud on AWS provides support for these HCX Enterprise class services:

- Replication Assisted vMotion
- Mobility Optimized Networking
- Traffic Engineering features
  - Application Path Resiliency
  - TCP Flow Conditioning

- Mobility Groups

  Note HCX Mobility Groups support integration with vRealize Network Insight, available as a separate license. This integration allows the creation of mobility groups from VMware vRealize Network Insight discovered applications to HCX for wave migration.

The HCX Connector (source) site inherits the available services from the HCX for VMware Cloud on AWS license, and no additional license is required at the source site.

For a detailed description of HCX services, see Chapter 2 VMware HCX Services.

Requirements

- Site paring with HCX Cloud Manager is established through Internet network (INET), AWS Direct Connect, or VPN connections.
- HCX Interconnect and HCX Network Extension tunnels are established through INET and AWS Direct Connect only. Connectivity through a VPN tunnel terminated on the NSX Edge for the SDDC is not supported

HCX Replication Assisted vMotion for VMware Cloud on AWS

HCX Replication Assisted vMotion works the same in VMware Cloud on AWS SDDCs as it does in on-premises or private cloud environments.

- The service must be selected in the Compute Profile of both the source and destination sites.
- The service must be enabled in the Service Mesh deployed for the respective source and destination Compute Profiles.

To migrate virtual machines using Replication Assisted vMotion, see Chapter 10 Migrating Virtual Machines with VMware HCX.

HCX Mobility Optimized Networking for VMware Cloud on AWS

HCX Mobility Optimized Networking (MON) is an enterprise capability of the VMware HCX Network Extension (HCX-NE) feature. MON enables optimized application mobility for virtual machine application groups that span multiple segmented networks or for virtual machines with inter-VLAN dependencies, as well as for hybrid applications, throughout the migration cycle. Migrated virtual machines can be configured to access the internet and AWS S3 storage buckets optimally, without experiencing the network tromboning effect.

- You must explicitly set Mobility Optimized Networking when extending a network.
- You can set Mobility Optimized Networking on an existing network extension.

  Note For existing network extensions, the network may experience a brief outage while the system publishes routes corresponding to the migrated virtual machines residing on the MON activated extended network.

To use HCX Mobility Optimized Networking, see HCX Network Extension with Mobility Optimized Networking for NSX-T.

HCX Traffic Engineering for VMware Cloud on AWS

The Application Path Resiliency and TCP Flow Conditioning features define the HCX Traffic Engineering services. These services function the same in VMware Cloud on AWS SDDCs as they do in on-premises or private cloud environments.

- For new installations, optionally select these services when creating the Service Mesh.
- For existing installations, edit the Service Mesh to select these features.
- For existing installations, updating the Service Mesh for Application Path Resiliency has the following operational impact:
  - Redeployment of both the Interconnect and Network Extension appliances.
  - Disruption of Bulk and vMotion migrations. Quiese migration operations prior to finishing the Service Mesh update.
  - Brief disruption of traffic over extended networks.

To configure the HCX Service Mesh for these features, see Creating a Service Mesh.

HCX Mobility Groups for VMware Cloud on AWS

HCX Mobility Groups function the same in VMware Cloud on AWS SDDCs as it does in on-premises or private cloud environments. Support for Mobility Groups includes integration with vRealize Network Insight.

- Mobility Groups support assembling one or more virtual machines into logical sets for execution and monitoring of migrations as a group.
- Migration management functionality allows you to edit and delete groups, initiate and stop migrations, and schedule migrations.
- Through integration with VMware vRealize Network Insight, you can export waves of discovered applications to HCX for migration as Mobility Groups.

For more information about Mobility Groups, see Migrating Virtual Machines with Mobility Groups.

For more information about Mobility Group integration with vRealize Network Insight, see HCX Integration with vRealize Network Insight.

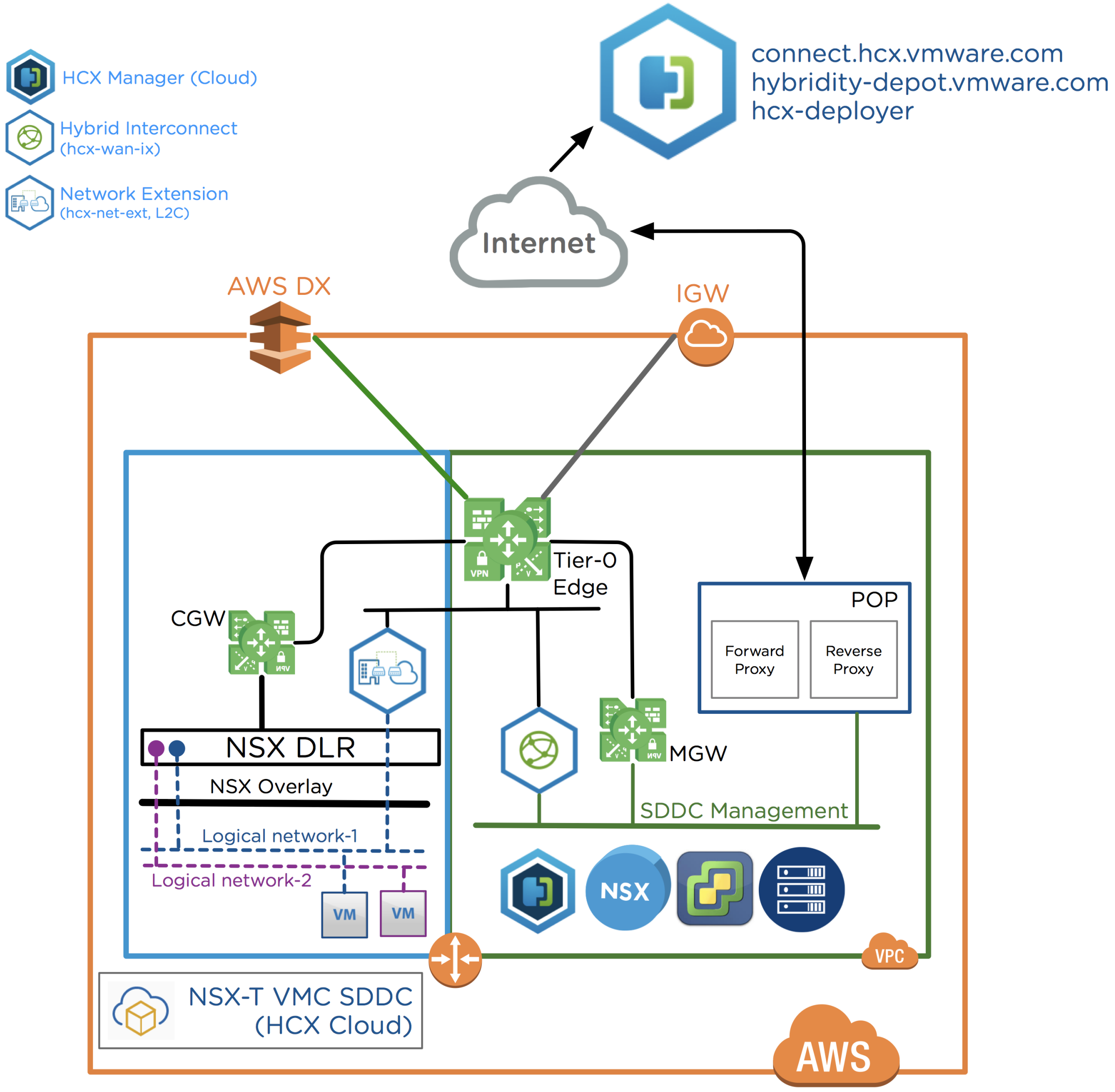
Topology Overview of VMware HCX on VMware Cloud on AWS

This section describes the behavior and features of VMware HCX services on the SDDCs operating with a set of network connectivity features provided by NSX-T.

Summary of Changes to VMware HCX for NSX-T Operations in Support of VMC SDDCs

- Updated component architecture uses the NSX Service Insertion Framework.
- The AWS Direct Connect with Private Virtual Interface is now supported. User-defined Private IP Subnets can be used during the VMware HCX Interconnect configuration.
- Network Extension L2 bridging is done with MAC Address learning on the Network Extension L2 switch port.

VMware HCX Architecture of SDDCs Supported by NSX-T



VMware HCX Features of SDDCs Supported by NSX-T

Feature	Details
VMware HCX Virtual Machine Migrations	■ VMware HCX vMotion for serial migrations. ■ VMware HCX Bulk Migration for scheduled, replication-based, parallel migrations. ■ VMware HCX Cold Migrations for powered-off virtual machines.
VMware HCX WAN Optimization	■ Deduplication, compression, and line conditioning of VMware HCX migration and protection network flows.
VMware HCX Network Extension	■ A maximum of eight networks can be extended to the SDDC per VMware HCX Network Extension appliance. ■ After a Network Extension operation, there is a five minute delay until the network is available for a migration operation. ■ Network Extension with Mobility Optimized Networking is available with VMware Cloud on AWS NSX-T SDDCs.
VMware HCX over AWS Direct Connect	■ VMware HCX supports connections over AWS Direct Connect with a Private Virtual Interface.

Deploying HCX from the VMC Console

VMware HCX is an add-on to the VMC SDDC. After enabling the add-on from the VMC console, the HCX Cloud components are deployed and the HCX plug-in is available in the vSphere Client.

Prerequisites

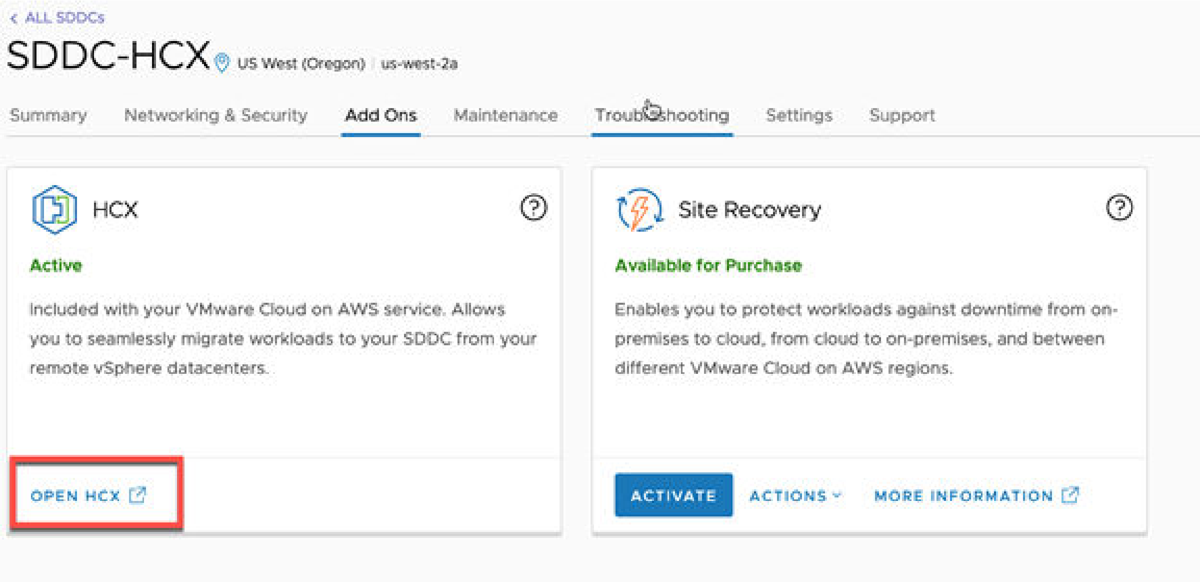
- The user performing this procedure must have access to the VMC Console.

Procedure

1 Log in to the VMC Console at vmc.vmware.com.

2 Click View Details.

The SDDC interface opens.



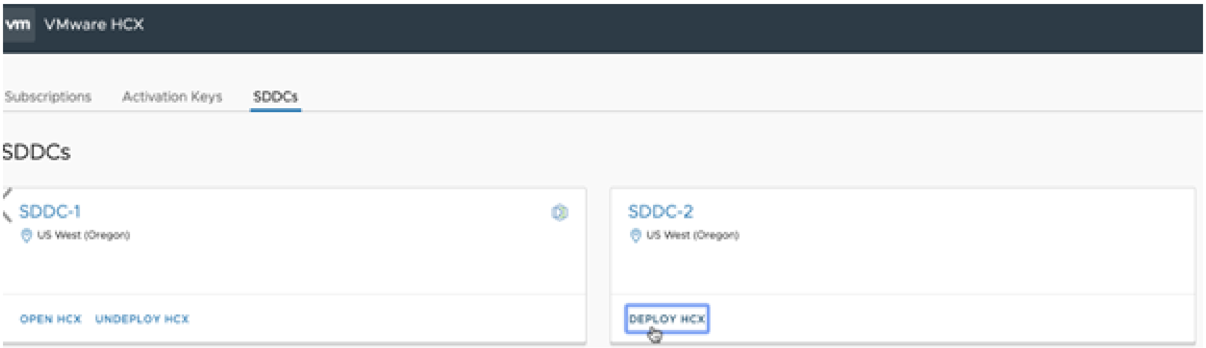
Included with your VMware Cloud on AWS service. Allows you to seamlessly migrate workloads to your SDDC from your remote vSphere datacenters.

Enables you to protect workloads against downtime from on-premises to cloud, from cloud to on-premises, and between different VMware Cloud on AWS regions.

3 On the **Add Ons** tab of your SDDC, click **Open HCX** on the **HCX** card.

The VMware HCX interface opens.

4 Navigate to the SDDC tab and click **Deploy HCX** and click **Confirm** to initiate the deployment.



The VMC activation is created and displayed, and the deployment begins. This step takes several minutes to complete. After the deployment is complete, hcx_cloud_manager appears in the vCenter console.

5 Create a firewall rule to open the necessary ports to access the HCX Cloud Manager.

a From the VMC Console, select **Networking & Security**.

b Under Security go to **Gateway Firewall** and select **Management Gateway**.

c Click **Add Rule** and create a new inbound firewall rule with these parameters:

- Source: Where the connection to the HCX manager is coming from.
- Destination: **HCX**
- Services: **HTTPS (TCP 443)**

Note HCX is already a system defined group that can be selected as a destination. A user-defined group can be created for the source.

d To save the new rule, click **Publish**

6 On the **Add Ons** tab of your SDDC, click **Open HCX** on the **HCX** card.

A new browser tab opens.

7 Navigate to the SDDC tab and click **Open HCX**.

The VMware HCX Cloud service interface opens.

8 Enter the cloudadmin@vmc.local user and password and click **Log In**.

Note Use the vCenter password.

Results

The HCX Cloud Manager UI is available for HCX operations.

What to do next

Navigate to **Administration > System Updates** and download the HCX Connector OVA, which is needed for the on-premises HCX installation. Downloading the HCX Connector OVA is detailed in Downloading the HCX Connector OVA. For a complete installation workflow, see HCX Installation Workflow for HCX Public Clouds.

Setting DNS Resolution from Public to Private

Use this procedure to route HCX management communications over Direct Connect networks.

HCX for VMware Cloud on AWS can connect the source and the destination site using public or private networks. When switching between public or private networks, set the DNS resolution in VMware Cloud on AWS to use a public or private IP address. For example, changing the Management Network in the HCX Compute Profile to use a Direct Connect network type, means changing the DNS resolution in the VMware Cloud on AWS console to use a private IP address.

Caution Changing the DNS resolution can disrupt site-pairing connectivity while the system updates the local cache for the DNS entry. The time it takes to update the DNS server can vary depending on the TTL value. For HCX, the TTL value is 300 seconds.

Procedure

1 Log in to the VMC Console at vmc.vmware.com.

2 Select the organization .

3 Select the VMware Cloud on AWS service.

4 Click **SDDCs**.

5 Locate the SDDC and click **View Details**.

6 Click the **Settings** tab.

7 In the HCX Information section, expand the selection and click **Edit**.

8 In the Resolution Address field, use the drop-down menu to select the Private IP address, and click **Save**.

> **Note** Use this same field to set a Private IP address to Public.

Configuring VMware HCX for Direct Connect Private Virtual Interfaces

The private virtual interface allows VMware HCX migration and network extension traffic to flow over the Direct Connect connection between your on-premises or cloud source environment and your destination SDDC.

Caution Ensure the IP Address Range configured does not overlap with the VMware Cloud on AWS management subnet CIDR block or any other IP range already in use for services in VMC. Overlap can cause routing and network reachability issues for those other components.

Prerequisites

- The AWS Direct Connect with Private Virtual Interface is only supported on VMC SDDC backed by NSX-T networking.
- The SDDC must be configured to use the Direct Connect Private Virtual Interface.

  See Configure AWS Direct Connect Between Your SDDC and On-Premises Data Center.
- A private subnet that can be reached from on-premises over the Direct Connect with Private VIF, ideally reserved for VMware HCX component deployments.
- Existing VMware HCX Interconnect, Optimization Network Extension appliances must be removed before beginning this configuration.

  See Removing VMware HCX Interconnect Virtual Appliances.

Procedure

1 Log in to the VMware Cloud on AWS console at vmc.vmware.com.

2 Select your organization and data center (SDDC).

3 Select **Add Ons**.

4 Click **OPEN HCX** on the **HCX** card.

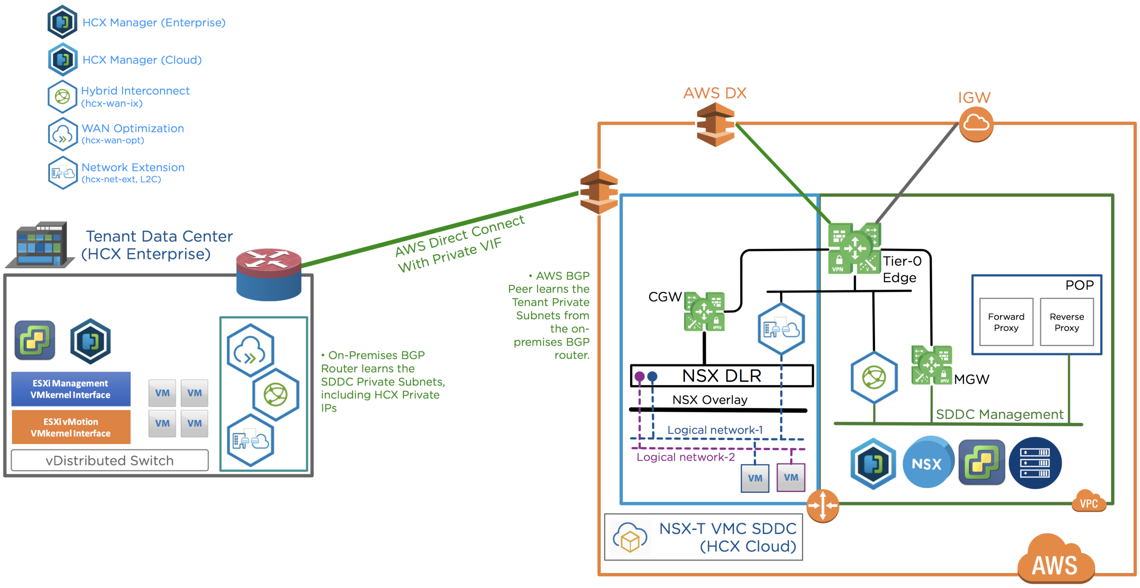
5. Navigate to the SDDC tab and click **OPEN HCX**.
6. Enter the cloudadmin@vmc.local user and credentials and click **LOG IN**.
7. Navigate to **Infrastructure > Interconnect**.
8. Click the **Network Profiles** tab.
9. In the Direct Connect network profile template, click **Edit**.
10. Enter the private IP address ranges reserved for VMware HCX.
11. Enter the Prefix Length and the Gateway IP address.
12. Click **Update**.

    Important Either **directConnectNetwork1** or **externalNetwork** must be configured as the Uplink Network Profile in the Compute Profile. The **Mgmt-app-network** profile cannot be used and can result in a Service Mesh deployment failure.

Results

When the Service Mesh is deployed, it uses the Uplink Network Profile, private IP addresses assigned by the user. The assigned IP addresses are reachable over the AWS Direct Connect.

Figure 17-1. VMware HCX over Direct Connect Private Virtual Interface



Scaling Out HCX Deployments in a Multi-Edge SDDC

An HCX Service Mesh configured with Multi-Edge traffic groups uses dedicated high-bandwidth network paths for HCX Network Extension and Migration operations.

About HCX with Multi-Edge SDDC

In the default configuration, an SDDC network has a single edge (T0) gateway through which all North-South traffic flows. You configure additional bandwidth for North-South traffic flows for direct-connect networks by creating one or more network traffic groups, each of which creates an additional T0 edge router in AWS. Traffic groups are created for each SDDC using the VMC Console.

When traffic groups are created in VMware Cloud on AWS, the HCX Cloud Manager at the destination site automatically detects those groups and adds them to the list of networks in the HCX Network Profile. HCX assigns a logical name to the traffic group, and the HCX Manager communicates any changes to the SDDC. HCX Manager can take advantage of the bandwidth provided by T0 routers to enhance HCX operations.

Requirements for HCX Multi-Edge Deployments

The HCX Multi-Edge solution requires AWS SDDCs configured with VMware Transit Connect.

Best Practices and Limitations

Review these best practices and systems limitations when scaling-out HCX deployments.

- It is a best practice to create a dedicated traffic group for HCX virtual machine migration.
  - The HCX-IX migration services cannot load balance across multiple traffic groups.
- It is a best practice to create a traffic group for HCX Network Extension.
  - If using a single traffic group for Network Extension, assign a /25 prefix to accommodate the maximum Network Extension appliance scale.
  - Create multiple traffic groups to distribute network extension traffic, which can be done using smaller prefixes.
  - The HCX enabled SDDC supports a maximum of 100 HCX Network Extension appliances.

Configuring SDDC Traffic Groups in HCX

You can configure HCX to associate a traffic group with an Uplink Network in the Multi-site Service Mesh for improved migration or workload bandwidth.

By default, VMware HCX uses the management network for all uplink traffic. By overriding the default Uplink Network for the destination site with a specific traffic group, you isolate traffic for the HCX service. By isolating network traffic in this way, you gain any performance advantage by separating the traffic and utilizing the available bandwidth of the T0 router. For example, you can isolate migration and workload traffic by creating one Service Mesh for Bulk Migration and one Service Mesh for Network Extension. Within each specific Service Mesh, you then configure a unique traffic group for the Uplink Network.

Prerequisites

- Each SDDC is configured with traffic groups.

- A separate Service Mesh exists for each HCX service that is using traffic groups. For more information about creating and modifying a Service Mesh, see Creating a Service Mesh.

Procedure

1. In the HCX Cloud Manger UI, Navigate to **Interconnect > Network Profile**.

   The system displays the available SDDC traffic groups.

2. Select a traffic group Network Profile, and click **Edit**.

   They system displays the profile information for the traffic group.

3. Enter a logical name for the Network Profile.
4. Under **IP Pools**, add a range of IP addresses and enter the network prefix.

   The HCX Manager communicates with the SDDC, updating the traffic group with an association map that includes the HCX network profile name and prefix list. At the same time, the traffic group becomes available in the Service Mesh for overriding the uplink networks at the destination site.

5. Click **Update**.
6. In the HCX Manager UI at the source site (HCX Connect), navigate to **Interconnect > Service Mesh**.
7. Select the Service Mesh in which to add the traffic group, and click **Edit**.
8. Step through the Service Mesh dialog until you come to **Override Uplink Network profiles**.
9. Expand the list of **Destination Site Uplink Network Profiles.**.
10. Select the named network to associate with the traffic group for the Service Mesh, and click **Continue**.
11. Step through the rest of the Service Mesh dialog, and click **Finish**.

Results

The HCX services enabled in the Service Mesh are configured to use the T0 gateway created by the traffic group.

Note Before you can delete a traffic group from an SDDC, you must either delete the HCX Service Mesh that is using the traffic group or override the Uplink Network in the Service Mesh with a different network.

What to do next

Repeat this procedure to isolate traffic and enhance bandwidth for other HCX services.

Configuring HCX for VMware Transit Connect

You can configure VMware HCX to use VMware Transit Connect™ for migration and network extension traffic.

VMware Transit Connect connects your SDDCs and VPCs to provide high-bandwidth, low-latency connections between SDDCs in the group and to other VPCs in the same region. The Direct Connect network profile is used for Transit Connect. For instructions on how to configure Direct Connect, refer to the section Configuring VMware HCX for Direct Connect Private Virtual Interfaces.