Configuring Hyper-V Network Virtualization

This chapter contains the following sections:

Prerequisites for HNV

HNV has the following prerequisites

- VM's connected to an HNV network segment that is backed by a Nexus 1000V for Hyper-V must have static MAC addresses.
- All uplinks using HNV should be in port-channel mode.

Default Settings for HNV

The following table lists the default settings for HNV parameters.

Parameter	Default
Feature Segmentation	Enabled

Steps for Creating an HNV Network

You can use the following high-level procedure to guide you through the process of creating an HNV network.

Procedure

	Command or Action	Purpose
Step 1	From the VSM, create an HNV logical network with no isolation mode.	See Creating an HNV Logical Network, on page 3.
Step 2	From the VSM, create a network segment pool of type HNV. Associate the network segment pool to the logical network created in step 1.	See Creating an HNV Network Segment Pool, on page 4.
Step 3	From the VSM, create an IP pool for the Provider Address (PA) space. This IP pool is used with the Ethernet network segments.	See Creating an IP Pool for HNV Ethernet Network Segments, on page 5.
Step 4	From the VSM, create an Ethernet network segment, and import the IP pool created in step 3.	See Creating an Ethernet Network Segment, on page 6
Step 5	From the VSM, create a port profile for the network uplink.	See Configuring Port Profile for Network Uplink, on page 7
Step 6	From the VSM, create an uplink network and allow the network segment pool that you created in step 2.	See Creating an Uplink Network and Allowing the Network Segment Pool, on page 8.
Step 7	From SCVMM, perform a refresh on the Network Service Switch Extension.	See the SCVMM documentation.
Step 8	From SCVMM, create a VM network for HNV.	See Configuring a VM Network, on page 9.
Step 9	From SCVMM, create an IP pool for the Customer Address (CA) space and the VM network created in step 7. This address space is used to assign the CA IP addresses to the tenant's VMs.	See Creating an IP Address Pool, on page 10.

	Command or Action	Purpose
Step 10	From SCVMM, connect a VM to the VM network created in step 7 and to port classification.	See Connecting a VM to the VM Network, on page 10

Configuring NSM for HNV on the VSM

Creating an HNV Logical Network

You need to create an HNV logical network in no isolation mode.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **nsm logical network** *name*	Creates a logical network and enters logical network configuration mode for the named logical network. The name can be up to 80 alphanumeric characters and must be unique on the Cisco Nexus 1000V.
Step 3	switch(config-logical-net)# **no mode isolated**	Configures the logical network in no isolation mode. **Note** The no isolation mode on VSM helps the Nexus 1000V distinguish HNV logical networks from others. The meaning of isolation mode in this context is different from the isolation options seen on SCVMM.
Step 4	switch(config-logical-net)# **exit**	Returns you to the previous configuration mode.
Step 5	switch(config)# **show nsm logical network name** *name*	(Optional) Displays the configuration for the logical network that you just created.
Step 6	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to create an HNV logical network in no isolation mode.

```
switch# configure terminal
switch(config)# nsm logical network Cisco-HNV-Logical-Network
switch(config-logical-net)# no mode isolated
switch(config-logical-net)# exit
```

```
switch(config)# show nsm logical network name Cisco-HNV-Logical-Network
Name: Cisco-HNV-Logical-Network
  Description:
  GUID: 723132b6-3afe-4732-bea8-e9ca4923757b
  HNV Tenant VRF count: 0
  Network segment pool count: 0
  AreLogicalNetworkDefinitionsIsolated: false
  Publish-name: <unpublished>
switch(config)# copy running-config startup-config
```

Creating an HNV Network Segment Pool

You need to create an HNV type of network segment pool.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **nsm network segment pool** *name*	Creates a network segment pool and enters configuration mode for the named network segment pool. The name can be up to 80 alphanumeric characters and must be unique on the Cisco Nexus 1000V.
Step 3	switch(config-net-seg-pool)# **segment-type hnv**	Configures the network segment pool as HNV type.
Step 4	switch(config-net-seg-pool)# **member-of logical network** *name*	Assigns the network segment pool to the named HNV logical network.
Step 5	switch(config-net-seg-pool)# **exit**	Returns you to the previous configuration mode.
Step 6	switch(config)# **show nsm network segment pool name** *name*	(Optional) Displays the configuration for the network segment pool that you just created.
Step 7	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows you how to create an HNV type of network segment pool called Cisco-HNV-Network-Segment-Pool.

```
switch# configure terminal
switch(config)# nsm network segment pool Cisco-HNV-Network-Segment-Pool
switch(config-net-seg-pool)# segment-type hnv
switch(config-net-seg-pool)# member-of logical network Cisco-HNV-Logical-
Network
switch(config-net-seg-pool)# exit
switch(config)# show nsm network segment pool name Cisco-HNV-Network-
Segment-Pool
Name: Cisco-HNV-Network-Segment-Pool
  GUID: ab64935b-1d7d-4cca-b3df-20269cf0b540
```

```
  Multicast-ip:
  Logical network Name: Cisco-HNV-Logical-Network
  Logical network GUID: 723132b6-3afe-4732-bea8-e9ca4923757b
  Segment type: HNV
  Publish-name: <unpublished>
switch(config)# copy running-config startup-config
```

Creating an IP Pool for HNV Ethernet Network Segments

You need to create an IP pool for HNV Ethernet network segments.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **nsm ip pool template** *name*	Creates a network segment ip pool template and enters configuration mode for the named ip pool template. The name can be up to 80 alphanumeric characters and must be unique on the Cisco Nexus 1000V.
Step 3	switch(config-ip-pool-template)# **network** *ip-addr*/*subnet-mask*	Configures the network IP address and subnet mask.
Step 4	switch(config-ip-pool-template)# **ip address** *ip-addr-start ip-addr-end*	Configures the range of IP addresses in the NSM IP pool template.
Step 5	switch(config-net-seg-pool)# **exit**	Returns you to the previous configuration mode.
Step 6	switch(config)# **show nsm ip pool template name** *name*	(Optional) Displays the configuration for the NSM ip pool template that you just created.
Step 7	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows you how to create an IP pool called Cisco-HNV-PA-IP-Address-Pool.

```
switch# configure terminal
switch(config)# nsm ip pool template Cisco-HNV-PA-IP-Address-Pool
switch(config-ip-pool-template)# network 195.168.30.0/24
switch(config-ip-pool-template)# ip address 195.168.30.100 195.168.30.200
switch(config-ip-pool-template)# exit
switch(config)# show nsm ip pool template name Cisco-HNV-PA-IP-Address-Pool
Name: Cisco-HNV-PA-IP-Address-Pool
  Description:
  Address family: IPv4
  IP-address-range: 195.168.30.100-195.168.30.200
  Network: 195.168.30.0/24
  Subnet mask: 255.255.255.0
  Default router:
  Netbios: Disabled
  Reserved-ip-list:
  Netbios-name-server-list:
```

```
  DNS-server-list:
  DNS-suffix-list:
switch(config)# copy running-config startup-config
```

Creating an Ethernet Network Segment

You need to create an Ethernet network segment.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **nsm network segment type ethernet** *name*	Creates an Ethernet network segment and enters configuration mode for the named network segment. The name can be up to 80 alphanumeric characters and must be unique on the Cisco Nexus 1000V.
Step 3	switch(config-net-seg)# **member-of network segment pool** *name*	Assigns the network segment to an IP address pool.
Step 4	switch(config-net-seg)# **switchport access vlan** *vlan-id*	Configures the network segment with an access VLAN. Specifiy the VLAN ID.
Step 5	switch(config-net-seg)# **ipsubnet** *ip-addr*/*subnet*	Specify the IP address and subnet of the network segment.
Step 6	switch(config-net-seg)# **ip pool import template** *name*	Configure the network segment with an IP pool template.
Step 7	switch(config-net-seg)# **publish network segment**	Pushes the network segment configuration to the SCVMM.
Step 8	switch(config-net-seg-pool)# **exit**	(Optional) Returns you to the previous configuration mode.
Step 9	switch(config)# **show nsm network segment name** *name*	Displays the configuration for the NSM network segment that you just created.
Step 10	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to create and configure an Ethernet type network segment and publish it to the SCVMM.

```
switch# configure terminal
switch(config)# nsm network segment type ethernet CISCO-HNV-PA-SEGMENT
switch(config-net-seg)# member-of network segment pool Cisco-HNV-Network-Segment-Pool
switch(config-net-seg)# switchport access vlan 2150
switch(config-net-seg)# ipsubnet 192.0.2.0/24
switch(config-net-seg)# ip pool import template Cisco-HNV-PA-IP-Address-Pool
```

```
switch(config-net-seg)# publish network segment
switch(config-net-seg)# exit
switch(config)# show nsm network segment name CISCO-HNV-PA-SEGMENT
Name: CISCO-HNV-PA-SEGMENT
  Tenant VRF Name: CISCO-HNV-PA-SEGMENT
  Tenant VRF GUID: 1f7c4430-6b48-4690-b46b-083959338d42
  Type: Ethernet
  GUID: 5feac57a-578e-4037-a7f5-45218f11f879
  DHCP: Disabled
  Address family: IPv4
  Network segment pool: Cisco-HNV-Network-Segment-Pool
  Network segment pool guid: ab64935b-1d7d-4cca-b3df-20269cf0b540
  Intra Port Communication: Enabled
  Isolation type: vlan
  Segment ID: 0
  Vlan: 2150
  System Network Segment: FALSE
  ip pool template: Cisco-HNV-PA-IP-Address-Pool
  ip pool template GUID: 49dd8c69-6d7d-465a-8e35-140f84d0b881
  ipsubnet: 192.0.2.0/24
  ipsubnet GUID: 74827288-28f7-435d-9dfe-5360cd10d75e
  Publish-name: CISCO-HNV-PA-SEGMENT
switch(config)# copy running-config startup-config
```

Configuring Port Profile for Network Uplink

You can configure an Ethernet port profile policy so that it can be imported to the network uplink.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **port-profile type ethernet** *name*	Enters a name for the Ethernet port profile.
Step 3	switch(config-port-prof)# **channel-group auto mode on** *name*	Specifies the uplink configuration for a port channel. The Ethernet port profile must have a port channel for HNV to be functional.
Step 4	switch(config-port-prof)# **state enabled**	Enables the port profile and applies its configuration to the assigned ports
Step 5	switch(config-port-prof)# **no shutdown**	Administratively enables all ports in the profile.
Step 6	switch(config-net-seg)# **exit**	Exits the configuration.
Step 7	switch(config-net-seg)# **show running-config port-profile** *name*	(Optional) Displays the port profile configuration.
Step 8	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to configure an Ethernet port profile policy named PC-Macpinning with a classification profile named PC-Macpinning.

```
switch# configure terminal
switch(config)# port-profile type ethernet PC-Macpinning
switch(config-port-prof)# channel-group auto mode on mac-pinning
switch(config-port-prof)# state enabled
switch(config-port-prof)# no shutdown
switch(config-port-prof)# exit
switch(config)# show running-config port-profile PC-Macpinning

port-profile type ethernet vpc-mac
     channel-group auto mode on mac-pinning
     no shutdown
     guid 371036b5-7e82-4faf-aad4-09c0d2da2c7e
     max-ports 512
     state enabled
```

Creating an Uplink Network and Allowing the Network Segment Pool

You need to create an uplink network and allow the network segment pool.

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **nsm network uplink** *name*	Creates an NSM network uplink and enters configuration mode for the named uplink. The name can be up to 80 alphanumeric characters and must be unique on the Cisco Nexus 1000V.
Step 3	switch(config-uplink-net)# **import port-profile** *name*	Imports the port profile settings into the uplink configuration.
Step 4	switch(config-uplink-net)# **allow network segment pool** *name*	Allows the named network segment pool to use the uplink.
Step 5	switch(config-uplink-net)# **publish network uplink**	Publishes the network uplink configuration to the SCVMM.
Step 6	switch(config-uplink-net)# **exit**	Returns you to the previous configuration mode.
Step 7	switch(config)# **show nsm network uplink name** *name*	(Optional) Displays the configuration for the NSM network uplink that you just created.
Step 8	switch(config)# **copy running-config startup-config**	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to create a network uplink called CISCO-HNV-UPLINK and allow the network segment pool called Cisco-HNV-Network-Segment-Pool on it. It also shows how to publish the uplink configuration to the SCVMM.

```
switch# configure terminal
switch(config)# nsm network uplink CISCO-HNV-UPLINK
switch(config-uplink-net)# import port-profile PC-Macpinning
switch(config-uplink-net)# allow network segment pool Cisco-HNV-Network-Segment-Pool
switch(config-uplink-net)# publish network uplink
switch(config-uplink-net)# exit
switch(config)# show nsm network uplink name CISCO-HNV-UPLINK
uplink network: CISCO-HNV-UPLINK
  Publish-name: CISCO-HNV-UPLINK
  import port-profile: PC-Macpinning
  network segment pool:
    Cisco-HNV-Network-Segment-Pool
  System Uplink-Network: FALSE
  switchport mode override: auto
  Native network segment:
  port-profile config:
    switchport mode trunk
    switchport trunk allowed vlan 2150
switch(config)# copy running-config startup-config
```

Creating an HNV VM Network on SCVMM

Configuring a VM Network

The following procedure describes how to configure a VM Network using Microsoft SCVMM.

Procedure

Step 1 Launch the SCVMM.

Step 2 From the VMs and Services pane, right-click VM Networks, and choose **Create VM Network**.

Step 3 In the Create VM Network wizard, provide the information as described in the following table:

Screen	Action
Name	1 Enter the name for the VM network. 2 Select the HNV logical network from the Logical network drop-down list.
Isolation	Select the Cisco Nexus 1000V service from the Network Manager drop-down list.
Isolation Type	Select **Isolate using HyperV Network Virtualization**
Connectivity	Click **Next**.

Screen	Action
VM Subnets	1 Click **Add**. 2 Enter the VM subnet name and the subnet IP address to be used.
Summary	Confirm that the information is correct and click **Finish**.

Creating an IP Address Pool

You need to create an IP address pool that defines a range of IP addresses for the HNV network to use.

Procedure

Step 1 Launch the SCVMM.
Step 2 From the VMs and Services pane, right-click the HNV network that you previously created.
Step 3 From the drop-down list, select **Create IP Pool**.
Step 4 In the Name screen, enter a name for the IP address pool.
Step 5 In the IP address range screen, enter the starting and ending IP addresses.
Step 6 In the remaining screens, enter the IP pool parameters that are needed in your network.
Step 7 Click **Finish**.

Connecting a VM to the VM Network

The following procedure describes how to connect a VM to the VM network with the vEthernet port profile policy using Microsoft SCVMM.

Procedure

Step 1 Launch the SCVMM.
Step 2 From the VMs and Services pane, right-click the VM that you previously created. This is the VM where the network adapter needs to be mapped to the VM network.
Step 3 From the drop-down list, select **Properties**.
Step 4 In the host Properties screen, select **Hardware Configuration**.
Step 5 In the Hardware Configuration screen, click the network adapter to be mapped to the VXLAN.
Step 6 In the Network Adapter screen, do the following:

Field	Action
Connectivity: VM Network	Click **Connected to a VM network**, click **Browse**, and select the VM network to be mapped.
Connectivity: VM Subnet	Select the VM subnet.
Virtual Switch	From the Logical Switch Classification drop-down list, select the vEthernet port profile policy. **Note** The vEthernet port profile policy is referred to as a port classification on the SCVMM user interface.

Step 7 Click **OK**.

Feature History for HNV

Feature Name	Releases	Feature Information
HNV Configuration	5.2(1)SM3(1.1)	This feature was introduced.