



Installing the Cisco Nexus 1000V for Microsoft Hyper-V

This chapter includes the following sections:

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Prerequisites for Installing the VSM Software

This section includes the following sections:

- [Before You Begin, page 1-1](#)
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Note

For information about your software and platform compatibility, see the *Cisco Nexus 1000V and Microsoft Hyper-V Compatibility Information, Release 5.2(1) SM1(5.2)* document.

Before You Begin

Ensure that you have installed and configured the following components on the target setup:

- Windows Active Directory service
- Microsoft System Center Virtual Machine Manager (SCVMM) 2012 SP1 UR3 (build version 3.1.6027.0) or Microsoft System Center Virtual Machine Manager (SCVMM) WS2012-R2 (build version 3.2.7510)
- Windows Server 2012 Hosts
- Windows Server 2012 R2 Hosts
- For the hosts that are running the Virtual Ethernet Module (VEM), you should enable the Hyper-V module for Windows PowerShell.

Guidelines and Limitations

It is your responsibility to monitor and install all the relevant patches from Microsoft on the Windows hosts.

System Requirements

This section describes the hardware and software requirements.

- [Hardware Requirements, page 1-2](#)
- [Software Requirements, page 1-2](#)

Hardware Requirements

The hardware must meet the requirements set by Microsoft to run the Hyper-V role. The Cisco Nexus 1000V for Microsoft Hyper-V Virtual Supervisor Module (VSM) requires VMs with the following configuration:

- 4 GB minimum of hard disk space
- 4 GB minimum of RAM
- As a best practice, we recommend that you have four network adapters (network interface cards—NICs) on the host where Microsoft Hyper-V is installed. You can have various combinations depending on the hardware that you have. For example, you can have one NIC with four ports or four NICs with one port each.

Software Requirements

To install and bring up a Cisco Nexus 1000V for Microsoft Hyper-V, you need the following server setup:

- Microsoft System Center Virtual Machine Manager (SCVMM) 2012 SP1 UR3 (build version 3.1.6027.0) or Microsoft System Center Virtual Machine Manager (SCVMM) WS2012-R2 (build version 3.2.7510)
- Windows 2012 hosts
- Windows 2012 R2 hosts
- Active Directory server

To configure the VSM, you need the following information:

- VSM IP address
- VSM domain ID (1—1023)—This ID is used for high availability (HA)
- Layer 3 connectivity between a VSM and the hosts that run a VEM is required.
 - Layer2 mode is not supported.
 - Layer3 UDP port number 4785
 - Communication between the VSM and VEM occurs over UDP port number 4785 that uses the Cisco Nexus Control Protocol (CNCP)
- TCP Port 80 is open on the network for communication from the SCVMM to VSM. In case of https, the TCP Port is 443.

VSM NIC Ordering

The VSM creates interfaces in an ascending MAC address order of the virtual NIC offered by Microsoft Hyper-V. Currently, Microsoft Hyper V provides no guarantees that this order is the same as displayed at the VSM VM Settings panel. The VSM always uses its first interface as control0 and its second interface as mgmt0. The network profiles for these two interfaces might need different VLANs. Therefore, you should verify that the interfaces are selected by the VSM in the same order that are displayed in the Settings panel.

Execute the following CLI on the VSM to verify the order of the management and control mac addresses.

```
Nexus1000V# show interface mac-address
```

```
-----
Interface Mac-Address Burn-in Mac-Address
-----
mgmt0 001d.d8b7.1e61 001d.d8b7.1e61
control0 001d.d8b7.1e60 001d.d8b7.1e60
```

If the order is not the same, you can use the following commands to specify the preferred MAC to control0/mgmt0 interface mappings:

- **system internal control-mac XXXX.XXXX.XXXX**
- **system internal mgmt-mac XXXX.XXXX.XXXX**

These commands require that you enter the **copy running-config startup-config** command afterwards to make the change persistent and effective after the next VSM reload.

```
switch# show system internal interface mac-address
Sample output:
Interface Preferred MAC
sh interface mac-address
-----
mgmt0 cccc.bbbb.aaaa
control0 aaaa.bbbb.cccc
```

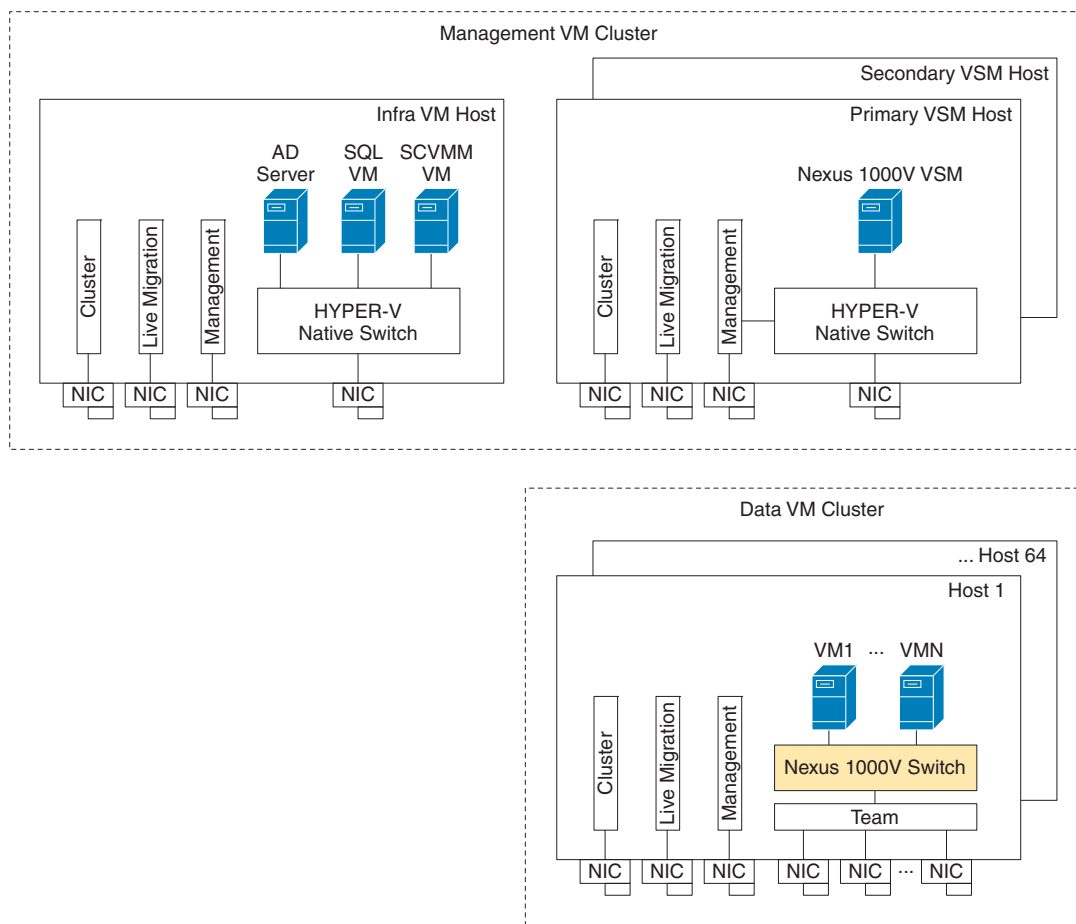
If any of the preferred MAC for control0/mgmt0 selected by users is not available at VSM boot up, the driver ignores it and it picks another interface instead (following MAC ascending order). In that case, the system logs an error with a syslog as follows:

```
%KERN-3-SYSTEM_MSG: Preferred MAC (aaaa.bbbb.cccc) for control0 not found - kernel
```

Basic Topology

Figure 1-1 displays the basic Hyper-V topology on a Cisco Nexus 1000V for Microsoft Hyper-V VEM.

Figure 1-1 Basic Topology for the Cisco Nexus 1000V for Microsoft Hyper-V



Note

- The Management NIC is actually on the Microsoft switch.
- The Management VM cluster is for Infra VMs.
- The Data VM Cluster is for Workload VMs
- The Minimum topology is three servers with four NICs each.

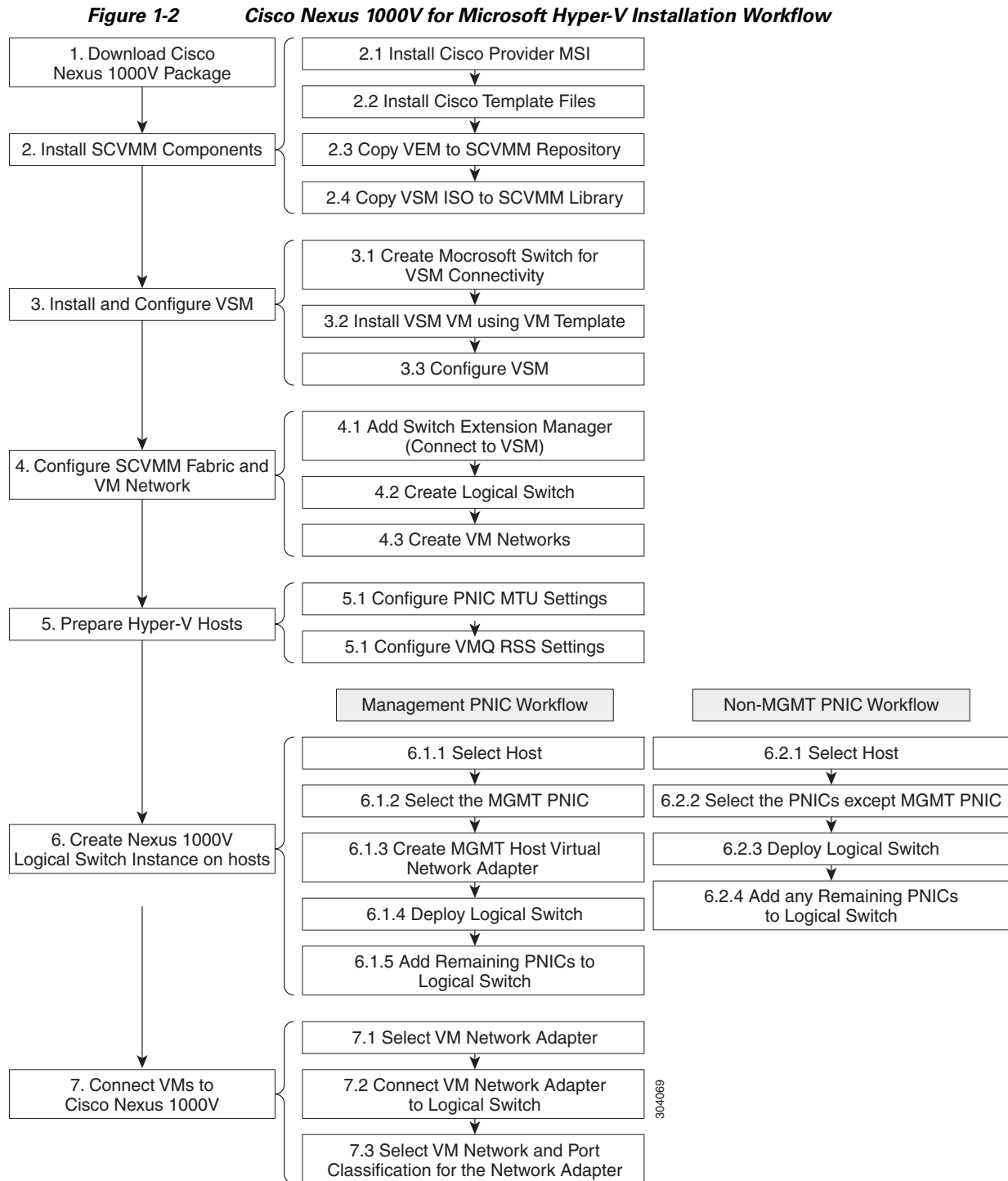
Figure 1-1 displays the Cisco Nexus 1000V for Microsoft Hyper-V deployment on two servers with the following network configuration:

- Management NIC—This network adapter is connected to an external network for the host OS connectivity.
- Microsoft Virtual Switch—The Microsoft virtual switch has one physical network adapter for the VSM connectivity.

- Two Physical Network adapters—These adapters are connected to the Cisco Nexus 1000V logical switch instance of the Hyper-V host.

Installation Workflow

Figure 1-2 displays the Cisco Nexus 1000V for Microsoft Hyper-V installation process on Microsoft SCVMM.



Installing the VSM Software

To install the VSM software, perform the following steps:

1. [Downloading the Cisco Nexus 1000V Package, page 1-7](#)
2. [Configuring SCVMM and VSM, page 1-7](#)
3. [Installing the VSM Certificate, page 1-18](#)
4. [Preparing the Microsoft Hyper-V Hosts \(Optional\), page 1-22](#)
5. [Adding Hosts to a Logical Switch, page 1-24](#)
6. [Connecting the VM Network Adapter to the Logical Switch, page 1-24](#)

Downloading the Cisco Nexus 1000V Package

The Cisco Nexus 1000V for Microsoft Hyper-V package (a zip file) is available at the download URL location provided with the software.

To download the Cisco Nexus 1000V for Microsoft Hyper-V package, download the Cisco Nexus 1000V for Microsoft Hyper-V package for Microsoft System Center Virtual Machine Manager (SCVMM) 2012 SP1. This package contains the following files:

- Virtual Supervisor Module (VSM) ISO
(Nexus1000V.5.2.1.SM1.5.2\VSM\install\Nexus-1000V.5.2.1.SM1.5.2.iso)
- Virtual Ethernet Module (VEM) MSI package
(Nexus1000V.5.2.1.SM1.5.2\VEM\Nexus1000V-VEM-5.2.1.SM1.5.2.0.msi)
- Cisco VSEM Provider MSI package
(Nexus1000V.5.2.1.SM1.5.2\VMM\Nexus1000V-VSEMPProvider-5.2.1.SM1.5.2.0.msi)
- Kickstart file
(Nexus1000V.5.2.1.SM1.5.2\VSM\Upgrade\Nexus-1000V-kickstart.5.2.1.SM1.5.2.bin)
- System file (Nexus1000V.5.2.1.SM1.5.2\VSM\Upgrade\Nexus-1000V.5.2.1.SM1.5.2.bin)
- WSUS scripts (Nexus1000V.5.2.1.SM1.5.2\WSUS\)
 - Publish-CiscoUpdate.ps1
 - Remove-CiscoUpdates.ps1
 - Get-CiscoUpdates.ps1
 - Get-MSIDetails.ps1

Configuring SCVMM and VSM

This section describes how to install the Cisco Nexus 1000V for Microsoft Hyper-V VSM software and includes the following topics:

- [Installing SCVMM Components, page 1-8](#)
- [Installing and Configuring the VSM Workflow, page 1-9](#)
- [Configuring the SCVMM Fabric Workflow, page 1-13](#)

Installing SCVMM Components

To install the SCVMM components, perform the following steps:

- Step 1** Install the Cisco Provider MSI.
- a. Install the *Nexus1000V-VSEMPProvider-5.2.1.SM1.5.2.0.msi* from the Cisco Nexus1000V zip location on the SCVMM server in order to establish communication between SCVMM and the Cisco Nexus1000V VSM.



Note The MSI installation restarts the SCVMM service.

- b. Verify that the Cisco Provider is installed properly as follows:
 - Open the SCVMM console.
 - Navigate to the Settings Pane.
 - Click on **Configuration Providers**.
 - c. Verify the Cisco Systems Nexus 1000V extension is displayed.
- Step 2** Install Cisco VSM template files as follows:

After downloading the Cisco Nexus 1000V for Microsoft Hyper-V package, complete the following steps to install the VSM template:

- On the SCVMM server, open the PowerShell console from the SCVMM console.
- Run the script **Register-Nexus1000VVSMTemplate.ps1** from the following location **C:\Program Files\Cisco\Nexus1000V\Nexus1000V-VSMTemplate**.

This script imports the Cisco VSM Template in the SCVMM Library

- To verify the template, do the following:
 - Navigate to the **Templates** tab.
 - Choose **Templates**. On the right pane, the Nexus 1000V-VSM-Template is listed.

- Step 3** Copy the VEM to the SCVMM repository.

The VEM is an MSI file that needs to be placed in the following location on SCVMM server: *ALLUSERSPROFILE%\Switch Extension Drivers*. For example, *C:\ProgramData\Switch Extension Drivers*. SCVMM uses the MSI file during Add host operation.



Caution Do not install the VEM on the SCVMM server. Only copy the file to the location specified.

- Step 4** Copy the VSM ISO file. For example, copy N1000vh-dk9.5.2.1.SM1.5.0.339 to the SCVMM library in the following location on SCVMM server: *\\VMName\MSSCVMMLibrary*. After copying the ISO file, make sure to refresh the SCVMM library so that SCVMM detects the copied ISO.

Installing and Configuring the VSM Workflow

To install and configure the VSM workflow, use an existing Microsoft Switch with external connectivity or create a new one, for the VSM connectivity.

1. [Installing the VSM using a VM Template, page 1-9](#)
2. [Configuring the VSM, page 1-10](#)
3. [Deploying the VSM, page 1-11](#)
4. [Configuring the VSM, page 1-12](#)

Installing the VSM using a VM Template

To install the VSM using a VM template, perform the following steps:

-
- Step 1** From the left navigation pane in the SCVMM user interface, click the **VMs and Services** icon and from the top menu bar, choose **Create Virtual Machine**. The **Create Virtual Machine Wizard** window opens.
 - Step 2** In the **Select Source** panel, choose the **Use an existing virtual machine, VM template, or virtual hard disk** option and click **Browse**.
 - Step 3** Choose the **Nexus1000V_VSM_Template** file listed under the **Type: VM Template** header.
 - Step 4** Click **OK** and click **Next**.
 - Step 5** In the **Specify Virtual Machine Identity** panel, enter the name of the virtual machine and click **Next**.
 - Step 6** In the **Configure Hardware** panel, configure the hardware settings for the virtual machine. If you are using a template, most of the settings have already been configured (For example, the hard drive is set to 4 GB and there are three network adapters). The only item that you have to manually configure is the ISO image.
 - Step 7** Click **Virtual DVD drive** below the **Bus Configuration** header in the center pane.
 - Step 8** Click **Existing ISO image file** and click **Browse**.
 - Step 9** Choose the ISO image from the SCVMM library, click **OK**, and click **Next**.
 - Step 10** In the **Select Destination** panel, keep the default settings of **Place the virtual machine on a host; Destination: All Hosts** and click **Next**.
 - Step 11** After the host is displayed in the **Select Host** panel, choose it, and click **Next**.
 - Step 12** In the **Configure Settings** panel, review the settings and click **Next**.
 - Step 13** In the **Select Networks** panel, choose the virtual switches that are used for the virtual machine. For each network adapter, select the type of the virtual switch, for example, choose **Standard Switch** or **Logical Switch** and click **Next**.
 - Step 14** In the **Add Properties** panel, keep the default settings of the **Automatic Actions** and click **Next**.
 - Step 15** In the **Confirm the Settings** panel in the final Summary window, review and confirm the settings.
 - Step 16** Click **Create** to begin the virtual machine creation. A progress bar is displayed in the **Job Status** column in the VM window.
 - Step 17** After the virtual machine creation is complete, right-click the **Name** of the virtual machine in the SCVMM user interface and choose **Power On**.
 - Step 18** Right-click the **Name** of the virtual machine again, click **Connect or View**, and choose **Connect via Console**.

See [Table 1-1](#) for more information about the Cisco Nexus 1000V ISO boot options.

Table 1-1 Cisco Nexus 1000V ISO Boot Options

No	Boot Option	If the disk is unformatted	If disk is formatted
1	Install the Cisco Nexus 1000V and bring up the new image	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash: • Load the system image 	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Copy the images from ISO to bootflash: • Load the system image
2	Install the Cisco Nexus 1000V and go to the VSH shell	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash: • Start the VSH shell 	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Copy the images from ISO to bootflash: • Start the VSH shell
3	Install the Cisco Nexus 1000V only if the disk is unformatted, and bring up the new image	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash: • Load the system image 	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Try to load the system image from the disk with the same name as that in ISO • If the image is not found, start the VSH shell
4	Install Cisco Nexus 1000V only if the disk is unformatted and go to the VSH shell	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash: • Load the system image 	<ul style="list-style-type: none"> • Boot the kickstart image from ISO • Start the VSH shell

Configuring the VSM

After installing VSM using a VM template, connect to a VM console and configure the VSM. We recommend that the VSM is deployed using the template provided by Cisco. After the deployment is complete, power on the VSM. The following basic inputs are required for the VSM configuration:

1. Switch name
2. Domain ID
3. Management address
4. Subnet mask
5. Gateway address



Note Make sure that you eject the virtual ISO image from the CD ROM.

Deploying the VSM

To deploy the VSM, perform the following steps:

- Step 1** When the **Virtual Machine Viewer** window opens, the message “Do you want to format it? (y/n)” appears. Enter **Y** for yes at the prompt.
- Step 2** At the command prompt, when the message “Perform r/w tests (takes very long time) on target disks? (y/n)” appears, enter **Y** for yes at the prompt.



Note The default action is taken if you do not immediately respond to the message prompts.

- Step 3** After the software is copied and the CD-ROM drive is mounted, you are prompted to enter the **System Administrator Account Setup**. At the Enter the password for “admin”: prompt, enter the password. At the Confirm the password for “admin”: prompt, reenter the password.
- Step 4** Enter the high availability (HA) role at the prompt **Enter HA role [standalone/primary/secondary]**.



Note We recommend that you create a VSM high availability pair. Configure the first VM as the primary VSM and install the second VM as the secondary VSM.

If you set the HA role as secondary, the following question is displayed at the prompt: **Setting HA role to secondary will cause a system reboot. Are you sure (yes/no)?**: Enter **Yes** if you want to set the HA role to **Secondary**.

- Step 5** At the prompt, enter the domain ID: **Enter the domain ID[1-1023]**, for example, 199. A domain ID is required for the VSMs to communicate with each other. While installing the secondary VSM, enter the same domain ID that was specified for the primary VSM.
- Step 6** After step 5 for secondary VSM, the message is displayed: **saving boot configuration** and the system reloads.
- Step 7** At the prompt, the **Basic System Configuration Dialog** is displayed. Enter **Yes** at the prompt.
- Step 8** At the command prompt, the following message is displayed: **Create another login account? [yes/no] (n)**. Select **No** to skip creating another login account.



Note The defaults are used if you do not change the values.

- Step 9** Enter the switch name, for example, **Nexus1000V-Eng**.
- Step 10** Press **Y** for yes when prompted to continue with the out-of-band management configuration.
- Step 11** Enter the *Mgmt0* IPv4 address for the VSM, for example, 10.10.10.4.
- Step 12** Enter the *Mgmt0* IPv4 netmask, for example, 255.255.255.0.
- Step 13** At the command prompt, the following message is displayed: **Configure the default gateway?** Enter **Y** for yes.
- Step 14** Enter the IPv4 address of the default gateway, for example, 10.10.10.5.

- Step 15** At the command prompt, the following message is displayed: **Vem feature level will be set to 5.2(1)SM1(5.2). Do you want to reconfigure? (yes/no) [n]:** Press **Enter** at the prompt to enter the default value.
- Step 16** Enter **n** when the following command prompt message is displayed: **Configure Advanced Options? (yes/no)[n]:**.
- Step 17** The following message is displayed: **Would you like to edit the configuration? (yes/no) [n]:** Press **Enter** at the prompt to enter the default value.
- Step 18** Enter **y** when the following command prompt message is displayed: **Use this configuration and save it ? (yes/no) [y]:**.
- Step 19** Complete steps 1 to 5 to configure the secondary VSM with an HA role.
- Step 20** Verify the HA role using the command **show system redundancy status** on primary and secondary VSMs.
-

Configuring the VSM

After completing these steps, you are prompted to log into the VSM. Access the VSM via SSH using the IP address configured in the VSM installation section. The following minimal objects need to be created on the VSM:

- Logical Network
- Network Segment Pool
- IP Pool Template
- Network Segment
- Virtual Ethernet Port Profile
- Ethernet Port Profile
- Network Uplink

To configure the VSM, perform the following steps:

- Step 1** Enter the configuration mode using the command **config t**.
- Step 2** Create a Logical Network using the command **nsm logical network <name>** at the prompt to configure the SCVMM networking fabric, for example, **nsm logical network Intranet**. Type **exit**. You can enter any name for the Logical Network.
- Step 3** Create a Network Segment Pool using the command **nsm network segment pool <name>**, for example, **nsm network segment pool IntranetSJ**.
- Step 4** Associate the Network Segment Pool to the Logical Network using the command: **member-of logical-network <name>**, for example, **member-of logical-network Intranet**. Type **exit**.
- Step 5** Create an IP pool template using the command **nsm ip pool template <name>**, for example, **nsm ip pool template pool10**.
- Step 6** Configure the IP address range, for example, **ip address <30.0.0.2> <30.0.0.100>**.
- Step 7** Configure the network, for example, **network <30.0.0.2> <255.255.255.0>**. Type **exit**.
- Step 8** Create a Network Segment using the command, **nsm network segment <name>**, for example, **nsm network segment VMNetworkA**.

- Step 9** Create a VLAN inside the Network Segment using the command **switchport access vlan <number>**, for example, **switchport access vlan 100**.
- Step 10** Associate the Network Segment Pool to the Network Segment using the command **member-of network segment pool <name>**, for example, **member-of network segment pool IntranetSJ**.
- Step 11** Import the IP pool template to the Network Segment using the command **ip pool import template <name>**, for example, **ip pool import template pool10**.
- Step 12** Publish the Network Segment using the command **publish network segment <name>**, for example, **publish network segment VMNetworkA**. Type **exit**.
- Step 13** Create a virtual Ethernet port profile of type vethernet using the command **port-profile type vethernet <name>**, for example, **port-profile type vethernet Veth-policy**.
- Step 14** Enter the **no shutdown** command to keep the system in a power-on state. Enter **state enabled** at the prompt.
- Step 15** Publish the port profile using the command **publish port-profile** and type **exit**. The port profile is imported for publishing the Network uplink.
- Step 16** Create a virtual Ethernet port profile of type ethernet using the command **port-profile type ethernet <name>**, for example, **port-profile type ethernet UplinkNoPortChannel**.
- Step 17** Enter the **no shutdown** command to keep the system in a power-on state. Enter **state enabled** at the prompt.
- Step 18** Create a Network Uplink using the command **nsm network uplink NexusUplink**.
- Step 19** Associate the Network Segment Pool using the command **allow network segment pool IntranetSJ**, for example, **allow network segment pool IntranetSJ**.
- Step 20** Import the port profile that was created earlier using the command **import port-profile <name>**, for example, **import port-profile eth-pp-policy**.
- Step 21** Publish the Network Uplink using the command **publish network uplink <name>**, for example, **publish network uplink NexusUplink**. Type **exit**.
- Step 22** Copy the running configuration to the start-up configuration using the **copy running-config startup-config** command. The following message is displayed in the window: *Copy complete, now saving to disk (please wait)*
- Step 23** Enter the **show running-config** command to verify the configuration.

**Note**

The setup script configures the VSM to function in L3 control mode. L2 control mode is not supported with Cisco Nexus 1000V for Microsoft Hyper-V. When configuring L3 control with Microsoft Hyper-V, you do not need to create a port profile with capability L3control. The VSM communicates with the Microsoft Server 2012 management interface directly. There is no need to create a special vEthernet port profile to be assigned to the Windows 2012 host.

Configuring the SCVMM Fabric Workflow

**Note**

The entire workflow to configure the SCVMM Fabric Workflow can also be performed using scripts. For more information, see the [“PowerShell Scripts for Configuring the SCVMM Fabric Workflow”](#) section on page 1-19.

To install and configure the VSM workflow, create a Microsoft switch for VSM connectivity and then perform the following steps:

1. [Connecting SCVMM to VSM, page 1-14](#)
2. [Creating a Logical Switch in SCVMM, page 1-16](#)
3. [Configuring the VM Network, page 1-17](#)

Connecting SCVMM to VSM

Once the VSM is up, configure the SCVMM networking fabric for the Nexus 1000V.



Note

Check and turn off the proxy server settings for your LAN in the Internet Options settings window of Internet Explorer before proceeding to the next steps.

This section includes the following:

- [Connecting SCVMM 2012 SP1 to VSM, page 1-14](#)
- [Connecting SCVMM 2012-R2 to VSM, page 1-15](#)

Connecting SCVMM 2012 SP1 to VSM

To retrieve the objects from the VSM to SCVMM, perform the following steps:

- Step 1** When the VSM is up, log in to the VSM using SSH and the IP address configured in the previous section.
- Step 2** From the SCVMM administrator console, navigate to the **Fabric** pane.
- Step 3** On Fabric Pane under **Networking**, select **Switch Extension Manager**.
- Step 4** Right click to add a **New Extension Manager**. The **Add Virtual Switch Extension Manager Wizard** window is displayed.
- Step 5** In the General panel of the **Add Virtual Switch Extension Manager Wizard** window, enter the connection settings for the extension manager as outlined in the following steps:
 - a. Select a manufacturer, for example, *Cisco Systems*.
 - b. Select the model type, for example, *Nexus 1000V*.
 - c. Select the configuration provider for the extension manager, for example, *Cisco Systems Nexus 1000V*.
 - d. Enter the IP address of the VSM in the connection string, for example, *http://10.10.10.4*.
 - e. Create a run as account for the VSM. In the **Run As account** field, click **Browse...** The **Select a Run As Account** window opens up.
 - f. In the **Select a Run As Account** window, select an account from the available options or click **Create Run As account** tab to create an account for the VSM. A **Create Run As account** window opens up.
 - g. In the **Create Run As account** window, enter the following VSM credentials:
 - Enter the name of the account in the **Name** field as *VSM_admin*.
 - Enter the description of the account in the **Description** field.
 - Enter the user name in the **User Name** field and the password in the **Password** field.
 - Confirm the password in the **Confirm password** field.

- Uncheck the **Validate Domain Credentials** box as the Active Directory cannot be validated with the credentials.
 - Click **OK**.
 - The new account, for example, *VSM_admin* is displayed in the **Select a Run As Account** window. This is a one-time procedure for the VSM.
- h. Select the new account and click **OK** in the **Select a Run As Account** window.

Step 6 Click **Next**.

Step 7 In the Host Groups panel, select a few or all the host groups that can use the virtual switch extension manager and click **Next**.

Step 8 In the Summary panel, confirm the settings and click **Finish**.

Once the Virtual Switch Extension Manager has been successfully added, it is listed in the main window in the SCVMM user interface at the path: **Fabric -> Switch Extension Managers**.

Connecting SCVMM 2012-R2 to VSM

To retrieve the objects from the VSM to SCVMM 2012 R2, perform the following steps:

Step 1 When the VSM is up, log in to the VSM using SSH and the IP address configured in the previous section.

Step 2 From the SCVMM administrator console, navigate to the **Fabric** pane.

Step 3 On Fabric Pane under **Networking**, select **Network Service**.

Step 4 Right click to add a **Add Network Service**. The **Add Network Service Wizard** window is displayed.

Step 5 Enter a name for the Network Service and click **Next**. In the description, mention that it is a virtual switch extension.

Step 6 Step 6: In the **Manufacturer and Model** window, select the settings as outlined in the following steps:

- a. Select a manufacturer, for example, *Cisco Systems*.
- b. Select the model type, for example, *Nexus 1000V*.

Step 7 Step 7: In the next window, select **Run As Account**.

Step 8 In the **Run As account** field, click **Browse...** The **Select a Run As Account** window opens up.

- a. In the **Select a Run As Account** window, select an account from the available options or click **Create Run As account** tab to create an account for the VSM. A **Create Run As account** window opens up.
- b. In the **Create Run As account** window, enter the following VSM credentials:
 - Enter the name of the account in the **Name** field as *VSM_admin*.
 - Enter the description of the account in the **Description** field.
 - Enter the user name in the **User Name** field and the password in the **Password** field.
 - Confirm the password in the **Confirm password** field.
 - Uncheck the **Validate Domain Credentials** box as the Active Directory cannot be validated with the credentials.
 - Click **OK**.
 - The new account, for example, *VSM_admin* is displayed in the **Select a Run As Account** window. This is a one-time procedure for the VSM.


- c. Select the new account and click **OK** in the **Select a Run As Account** window.
- Step 9** Enter the IP address of the VSM in the connection string, for example, `http://10.10.10.4`. To use https, see the [“Installing the VSM Certificate” section on page 1-18](#)
- Step 10** In the Providers window, choose the provider as *Cisco Systems Nexus 1000V* and click **Test**. This verifies the communication between the Cisco VSM and the SCVMM.
- Step 11** In the Host Groups panel, select a few or all the host groups that can use the virtual switch extension manager and click **Next**.
- Step 12** In the Summary panel, confirm the settings and click **Finish**.

Once the Virtual Network Service has been successfully added, it is listed in the main window in the SCVMM user interface at the path: **Fabric>Networking>Network Service**.

Creating a Logical Switch in SCVMM

Once the Virtual Switch Extension Manager has been added, create a logical switch on VMM. Define the extensions and port profiles for the logical switch, create classifications that contain the native port profile and a port profile for each extension as outlined in the following steps.

To create a logical switch, perform the following steps:

- Step 1** In the SCVMM user interface, under **Networking**, right click **Logical Switches** and then click **Create Logical Switch**. The **Create Logical Switch Wizard** appears.
 - Step 2** The Getting Started panel opens up. Review the instructions and click **Next**.
 - Step 3** In the General panel, add a name and the description for the logical switch in the **Name** and **Description** fields, for example, *N1000V_Test*.
 - Step 4** Click **Next**.
 - Step 5** In the Extensions panel, the virtual switch extensions are listed. Choose the extension that you created in the previous steps. This is listed as a forwarding extension. Do not change any selections of the auto-selected extensions.
 - Step 6** Click **Next**.
 - Step 7** In the Uplink panel, specify the uplink port profiles that are part of this logical switch. The uplink port profiles are available for use on the hosts where an instance of the logical switch is created.
 - Choose **Team** in the **Uplink mode** field to select multiple uplinks.
-  **Note** Even if you use a single uplink or multiple uplinks, the mode should always be **Team**.
- In the Uplink port profiles field, click **Add**. The Add Uplink Port Profile window opens up. Select a port profile that is available for use by the host physical adapter that connects to this logical switch.
 - Click **Next**.
- Step 8** In the Virtual Port panel, click **Add**. The **Add Virtual Port** window opens up.
 - Choose the VSM by checking the name that was created earlier. For example, *Nexus 1000v-Test* check box.
 - Select the port profile from the drop-down menu.

- Click **Browse..** in the **Port Classification** field.
- Click **Create Port Classification...** The **Create Port Classification Wizard** window opens up. Enter the name for the port profile classification in the **Name** field, for example, *AllAccess1*. Enter the description for the port profile classification in the **Description** field.
- Assign the selected port profile to a port classification created in the earlier step, that is the *AllAccess1* in the **Select a Port Profile Classification** window.
- Click **OK**. Now the selected port classification, *AllAccess1* is displayed in the **Select a Port Profile Classification** window.
- Click **OK**.

Step 9 Click **OK** to finish adding the Virtual Port.

Step 10 Click **Next** to close the **Create Logical Switch Wizard** window.

Step 11 In the Summary panel, confirm the settings and click **Finish**. Now the logical switch is created.

The defined configuration is available on every host that uses the logical switch and the hosts, virtual switches, and virtual machines remain in compliance with their associated logical switch



Note

If you want to add more port profiles to the VSM, you have configure the properties again. All the hosts should be configured for multiple uplinks. To update the properties and add more uplink port profiles, right-click the logical switch in the SCVMM user interface and click **Properties**.

Configuring the VM Network

Once the logical switch and the hosts are configured, complete the following steps to configure the VMs and associate the network segments to the VMs.

Step 1 Click **VMs and Services** in the left navigation panel of the SCVMM user interface.

Step 2 Click **VM Networks**. Right-click and select the **Create VM Network** option. The **Create VM Network Wizard** window opens up.

Step 3 In the **Name** panel, specify the name for the VM network in the **Name** field. Enter the description for the VM network in the **Description** field. For example, add a name for the **VM network** as *VM_network*. If the name is same as the network-segment name, it is easy for the customers to do the mapping.

Step 4 Select the Logical Network which is created on the VSM.

Step 5 Click **Next**.

Step 6 To configure VM network in SCVMM 2012 SP1, do the following:

- a. In the Isolation panel, select **Specify an externally supplied VM network** to configure the isolation externally. Confirm the **External VM Network** that was previously created, for example, *VM_Network*.

Step 7 To configure VM network in SCVMM 2012 R2, do the following:

- a. In the Isolation panel, select the Network manager in which is the logical switch was created.
- b. Click **Next**.

- c. In the Isolation options panel, select **Specify an externally supplied VM network** to configure the isolation externally. Confirm the **External VM Network** that was previously created, for example, VM_Network.

Step 8 Click **Next**.

Step 9 In the Summary panel, confirm the settings, and click **Finish**.

The new VM network is displayed in the **VM Networks and IP Pools** panel in the SCVMM user interface.

Installing the VSM Certificate

To enable HTTPS communication between the Cisco Nexus 1000V for Microsoft Hyper-V VSM software and the SCVMM server, you must first install the Cisco Nexus 1000V for Microsoft Hyper-V VSM certificate. You can install this certificate either manually or nu using a script.

This section includes the following topics:

- [Installing the VSM Certificate Manually, page 1-18](#)
- [Installing the VSM Certificate Using a Script, page 1-19](#)

Installing the VSM Certificate Manually

To install the Cisco Nexus 1000V for Microsoft Hyper-V VSM software certificate, perform the following steps:

Step 1 From the SCVMM Server, open Internet Explorer, and connect to the VSM using https://vsm-ip.

The Certificate Error window opens.

Step 2 Choose the **Continue to this website** option.

The Cisco Nexus 1000V window opens.

Step 3 Select the **Certificate Error** link that is available on the address bar of the same window.

Step 4 From the Untrusted Certificate dialog box click **View Certificates**.

The Nexus1000V VSM certificate appears.

Step 5 Click the **Install Certificate** button.

The **Certificate Import Wizard** window opens.

Step 6 Choose **Local Machine** as the installation location and click **Next**.

Step 7 Based on the VM settings, a pop up window for the User Account Control (UAC) may open.

Step 8 On the next window, select the **Place all certificates in the following store** option and click **Browse**.

Step 9 Choose the **Trusted Root Certification Authorities** option available on the certificate store and click **OK**.

Step 10 Click **Next** on the Certificate Import Wizard.

Step 11 Review the summary on the final window and Select **Finish**. This completes the importing of the certificate.

Step 12 Press **OK** on the Certificate Import Wizard.

Step 13 Press **OK** on the Certificate window.

Installing the VSM Certificate Using a Script

Use the following PowerShell script to install the VSM certificate:

Install-Nexus1000V-VSMCertificate.ps1

This script is available at the following location on the SCVMM server:

`%ProgramFiles%\Cisco\Nexus1000V\Scripts\VMMConfig` , example "C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig"

PowerShell Scripts for Configuring the SCVMM Fabric Workflow

After the Cisco VSM Provider (Nexus1000V-VSEMPProvider-5.2.1.SM1.5.2.0.msi) is installed from the download package on the SCVMM Server, the following scripts are available in the location "`%ProgramFiles%\Cisco\Nexus1000V\Scripts\VMMConfig`" example C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig.

- [Deploy-Nexus1000V-VSEM.ps1](#)
- [Refresh-Nexus1000V-VSEM.ps1](#)
- [Install-Nexus1000V-VSMCertificate.ps1](#)
- [Cleanup-Nexus1000V-VSEM.ps1](#)

Deploy-Nexus1000V-VSEM.ps1

The usage, purpose, and the sample run of the scripts are explained in this script.

This script takes care of the following operations that you would need to do on the SCVMM server.

- a. Add Extension Manager / Network Service.
- b. Create a Logical Switch.
- c. Associate Cisco Uplink Port Profiles with Logical Switch (created in step b)
- d. Associate Virtual Port Profiles with Logical Switch (created in step b)
- e. Create VM Networks from Cisco published Network Segments.

Below is a sample run :-

```
PS C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig> .\Deploy-Nexus1000V-VSEM.ps1
#####
## SCRIPT NAME: Deploy-Nexus1000V-VSEM.ps1 ##
## VERSION: 1.1 ##
## DESCRIPTION: This script will add a new Cisco Nexus1000V Extension to ##
## SCVMM and create the following SCVMM objects: ##
## 1. Extension Manager / Network Service. ##
## 2: Logical Switch. ##
## 3: Associate Uplink Port Profiles with Logical Switch. ##
## 4: Associate Virtual Port Profile with Logical Switch. ##
## 5: Create VMNetworks from Cisco published Network Segments. ##
## ##
#####
Enter IP Address for the Nexus1000V VSM: 10.105.234.211
```

```

Enter Username for the Nexus1000V VSM: admin
Enter Password for the Nexus1000V VSM: *****
Enter Name of Logical Switch to be Created on SCVMM: Nexus-Logical-Switch
Importing Virtual Machine Manager Libraries ..

```

```

-----
Deploying Cisco Nexus1000V Logical Switch:
-----

```

```

VSM IP : 10.105.234.211
RUN-AS-ACCOUNT: CiscoVSM-10.105.234.211-1-23-14_12-44
HOSTGROUP: All Hosts
NAME: Cisco Systems Nexus 1000V
LOGICAL SWITCH NAME: Nexus-Logical-Switch
SCVMM VERSION: 3.2.7510.0

```

```

-----
Adding Cisco Extension over 'https' with IP = 10.105.234.211
-----

```

```

This may take a while depending on VSM configuration Size...
Cisco Switch Extension Manager Added Successfully to VMM-Server.

```

```

-----
Creating Logical Switch 'Nexus-Logical-Switch'.
-----

```

```

Logical Switch 'Nexus-Logical-Switch' Created Successfully

```

```

-----
Populating Uplink Port Profile Sets for Logical Switch 'Nexus-Logical-Switch'.
-----

```

```

1 : Uplink Port Profile Set ==> 'NexusUplink'

```

```

-----
Populating Virtual Port Profile Sets and Classifications for Logical Switch
'Nexus-Logical-Switch'.
-----

```

```

1 : Port Classification ==> 'Veth-policy'

```

```

-----
Populating VM Networks for Logical Switch 'Nexus-Logical-Switch'.
-----

```

```

INFO : List of VMnetworks Created (1):
      1 : 'VMNetworkA'

```

```

-----
Execution Complete!
-----

```

```

Transcript stopped, output file is C:\Program
Files\Cisco\Nexus1000V\Scripts\VMMConfig\Deploy-Nexus1000V-VSEM-logs\Depl
oy-Nexus1000V-VSEM-1-23-14_12-44.log
PS C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig>

```

Refresh-Nexus1000V-VSEM.ps1

In a situation where the Cisco VSEM is already added to the SCVMM server and you need to configure new objects such as port-profiles, network segments, uplink networks on the VSM. You may also need to refresh the Cisco VSEM in order to associate the Nexus 1000v Objects on the SCVMM and make them available for usage.

This script simplifies the approach, as it helps you to refresh the VSEM and make the necessary associations.

To demonstrate this, we will create a new VM network (eg. VMNetworkB), a new port classification (eg. Veth-policy-new), and new uplink network (eg. NexusUplink-New) on the Cisco VSM.

**Note**

The following were already created on Cisco VSM as shown in [Deploy-Nexus1000V-VSEM.ps1](#).

- Existing VM network (VMNetworkA)
- existing port classification (Veth-policy)
- existing uplink network (NexusUplink)

Below is a sample run :-

```
PS C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig> .\Refresh-Nexus1000V-VSEM.ps1
-VsmIP 10.105.234.211 -LogicalSwitch Nexus-Logical-Switch
#####
## SCRIPT NAME: Refresh-Nexus1000V-VSEM.ps1 ##
## VERSION: 1.1 ##
## DESCRIPTION: This script will refresh an existing Cisco Nexus1000V ##
## Extension to SCVMM and create the following SCVMM objects: ##
## 1: Associate Uplink Port Profiles with Logical Switch. ##
## 2: Associate Virtual Port Profile with Logical Switch. ##
## 3: Create VMNetworks from Cisco published Network Segments. ##
#####
Importing Virtual Machine Manager Libraries ..

-----
Refresh Cisco Nexus1000V VSEM :
-----

VSM IP : 10.105.234.211
HOSTGROUP: All Hosts
NAME: Cisco Systems Nexus 1000V
LOGICAL SWITCH NAME: Nexus-Logical-Switch
SCVMM VERSION: 3.2.7510.0

-----
Retrieve Cisco Extension with IP = 10.105.234.211
-----
Cisco Switch Extension Manager with ip '10.105.234.211' is detected on this VMM
server.
Reading Cisco Switch Extension Manager now...

-----
Retrieving Logical Switch 'Nexus-Logical-Switch'.
-----
Logical Switch 'Nexus-Logical-Switch' with extension ip '10.105.234.211' was detected
on this VMM server.

-----
Populating Uplink Port Profile Sets for Logical Switch 'Nexus-Logical-Switch'.
-----
1 : Uplink Port Profile Set ==> 'NexusUplink-New'

-----
Populating Virtual Port Profile Sets and Classifications for Logical Switch
'Nexus-Logical-Switch'.
```

```

-----
1 : Port Classification ==> 'Veth-policy-new'
-----
Populating VM Networks for Logical Switch 'Nexus-Logical-Switch'.
-----
INFO : List of VMnetworks Created (1):
      1 : 'VMNetworkB'
-----
Execution Complete!
-----
Transcript stopped, output file is C:\Program
Files\Cisco\Nexus1000V\Scripts\VMMConfig\Refresh-Nexus1000V-VSEM-logs\Ref
resh-Nexus1000V-VSEM-1-23-14_12-54.log
PS C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig>

```

Install-Nexus1000V-VSMCertificate.ps1

This script is used to install the Cisco Nexus1000V VSM certificate on the SCVMM server. This certificate is required to establish an HTTPS connection between the SCVMM Server and the VSM.

Below is a sample run :-

```

PS C:\Program Files\Cisco\Nexus1000V\Scripts\VMMConfig>
.\Install-Nexus1000V-VSMCertificate.ps1 -ip 10.105.234.211
True

```

The script returns "True" for a successful install.

Cleanup-Nexus1000V-VSEM.ps1

This script is used to perform a cleanup of the Nexus1000V components available on the SCVMM server.

**Note**

This script will exit if it encounters any Nexus1000V objects being used.

Preparing the Microsoft Hyper-V Hosts (Optional)

Before you add the hosts to the logical switch, you can prepare the Microsoft Hyper-V hosts. This step is optional.

This section includes the following topics:

- [Configuring the MTU with the Cisco Nexus 1000V, page 1-22](#)
- [VMQ Processor Configuration with the Cisco Nexus 1000V, page 1-23](#)
- [Changing the RSS Registry, page 1-23](#)

Configuring the MTU with the Cisco Nexus 1000V

In Microsoft Hyper-V, the VSM does not manage the Maximum Transmission Unit (MTU) setting of VM NIC or physical adapters. All physical adapters added to the Cisco Nexus 1000V switch should have the same MTU configured and the PNIC MTU should not be changed after it is added to the switch.

To configure the MTU, perform the following steps:

-
- Step 1** Open **View Network Connections** from the Server Manager or Control Panel or by typing `ncpa.cpl` from a command line.
- Step 2** Right click the adapter and choose **Properties**.
- Step 3** Click **Configure** under the **adapter properties** window.
- Step 4** Click the **Advanced** tab.
- Step 5** Under **Property**, click on **Jumbo Packet**.
- Step 6** Set the desired value of the Jumbo Packet property.
- Repeat this procedure for all the adapters that are added to Cisco Nexus 1000V logical switch.



Note Certain adapters allow the MTU change only through their own adapter manager. For example, the MTU of the Cisco VIC cards can be changed through the UCSM or ILO.

VMQ Processor Configuration with the Cisco Nexus 1000V

VMQ allows the network traffic received on an adapter to be spread over multiple CPU cores which provides better performance. The following two factors are important in determining if the VMQ operates correctly:

- The receive side scaling (RSS) CPU number determines the lowest CPU core that can be used by RSS.
- The maximum number of RSS CPU determines how many CPU cores can be used by RSS.

The above two factors can be configured so that the same CPU core is not used by multiple NICs.



Note Changing the RSS registry is a disruptive operation and causes the Ethernet adapter to flap.

The Cisco Nexus 1000V supports the following port-channel operational modes: Link Aggregation Control Protocol (LACP) and vPC.

The LACP utilizes the same Subgroup id for all the members of a port-channel. The RSS Base CPU and Max RSS Processors should be configured with same value for all member ports.

MAC pinning / manual pinning port-channel use multiple subgroup ids within the members of the port-channel. Therefore, the RSS Base CPU and Max RSS processors should be configured so that the same CPU core is not used by multiple NICs.

Changing the RSS Registry

To change the RSS registry, perform the following steps:

-
- Step 1** Open **View Network Connections** from the Server Manager or Control Panel or by typing `ncpa.cpl` from a command line.
- Step 2** Right-click the adapter and choose **properties**.
- Step 3** Under the **Adapter Properties** window, click **Configure**.

- Step 4** Click the **Advanced** tab.
- Step 5** Click **Maximum Number of RSS Processor** and enter a value.
- Step 6** Click **Starting RSS CPU** and enter a value.

Repeat this procedure for all the adapters that you want VMQ to be enabled on.

The RSS setting cannot be modified through the network connections for certain adapters. For those adapters, you must set the registry keys directly using the registry editor. Check the Microsoft documentation for information about changing the registry.

Adding Hosts to a Logical Switch

After a logical switch is created, you can update the properties of the logical switch.

- Step 1** In the left navigation pane, choose the server, under **Fabric > Servers > All Hosts**, right-click, and choose **Properties**. The **Properties** window opens.
- Step 2** In the left navigation pane of the **Properties** window, click **Virtual Switches**.
- Step 3** In the **Virtual Switches** pane, in the **New Virtual Switches** field, click **New Logical Switch**. Choose the correct logical switch and physical adapters to assign to the logical switch. The module is added to Cisco Nexus1000V VSM.



Note The MGMT PNIC can be added to the logical switch only when the switch is created. Adding it later results in a loss of host connectivity.

- Step 4** Under the **Physical Adapter** header, choose a network adapter from the drop-down list in the **Adapter** field. In the **Uplink Port Profile** field, confirm the uplink port profile for the adapter.
- Step 5** For port-channeling, click **Add** to add a second network adapter. Choose a different network adapter, confirm the uplink port profile, and click **OK**.



Note Do not use the same port profile for both adapters. If you have configured the port channels, then you can use the same port-profile on both the adapters. Refer the NSM Configuration Guide for more details.

Now, the Cisco Nexus 1000V package that was copied on the SCVMM is installed on the host.



Note We recommend that one logical switch is created per VSM.

Connecting the VM Network Adapter to the Logical Switch

To connect the VM network adapter to the Logical Switch, perform the following steps:

- Step 1** Choose the VM network adapter.

- Step 2** Choose the server on which the VM is installed in the SCVMM user interface. In the left navigation pane under **VMs and Services > All Hosts**, click the **Hyper-V server**. In the main window, right-click the virtual machine that you have created, and choose **Properties**.
- Step 3** In the properties file, click **Hardware Configuration** in the left navigation pane.
- Step 4** In the **Hardware Configuration** panel, choose **NetWork Adapter**.
- Step 5** In the Network Adapter 1 pane on the right, choose **Connected to a VM Network**.
- Step 6** Browse to find the VM network created in an earlier section.
- Step 7** Click **OK**.
- Step 8** In the **Hardware Configuration** pane, under Virtual Switch, choose the logical switch in the **Logical Switch** field. For the classification, choose the previously created port profile in the **Classification** field.

**Note**

If you set the default port profile earlier as outlined in step 8 of the [“Creating a Logical Switch in SCVMM” section on page 1-16](#) and if you do not select a port classification for the logical switch in this window, the default port classification is applied to the logical switch.

- Step 9** Click **OK**.
- The Cisco Nexus 1000V for Microsoft Hyper-V installation is now complete.
-

