Installing Cisco Nexus 1000V

This chapter describes the prerequisites, guidelines and limitations, and the process to install Cisco Nexus 1000V.

For information about your software and platform compatibility, see *Cisco Nexus 1000V and Microsoft Hyper-V Compatibility Information*.

Prerequisites for Installing the VSM Software

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) 2016.
- Windows Server 2016 hosts.

  For more information, see http://support.microsoft.com/kb/3014795/en-us.

- 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

The hardware must meet the requirements set by Microsoft to run the Hyper-V role. The Cisco Nexus 1000V 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, you need the following server setup:

- Microsoft System Virtual Machine Manager (SCVMM) 2016

- Windows 2016 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. With the HTTPS protocol, 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.

Enter the following command 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, 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 MACs are not available at VSM bootup, the driver picks another interface instead (following MAC ascending order). 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 VEM.

Figure 1-1   Basic Topology for the Cisco Nexus 1000V
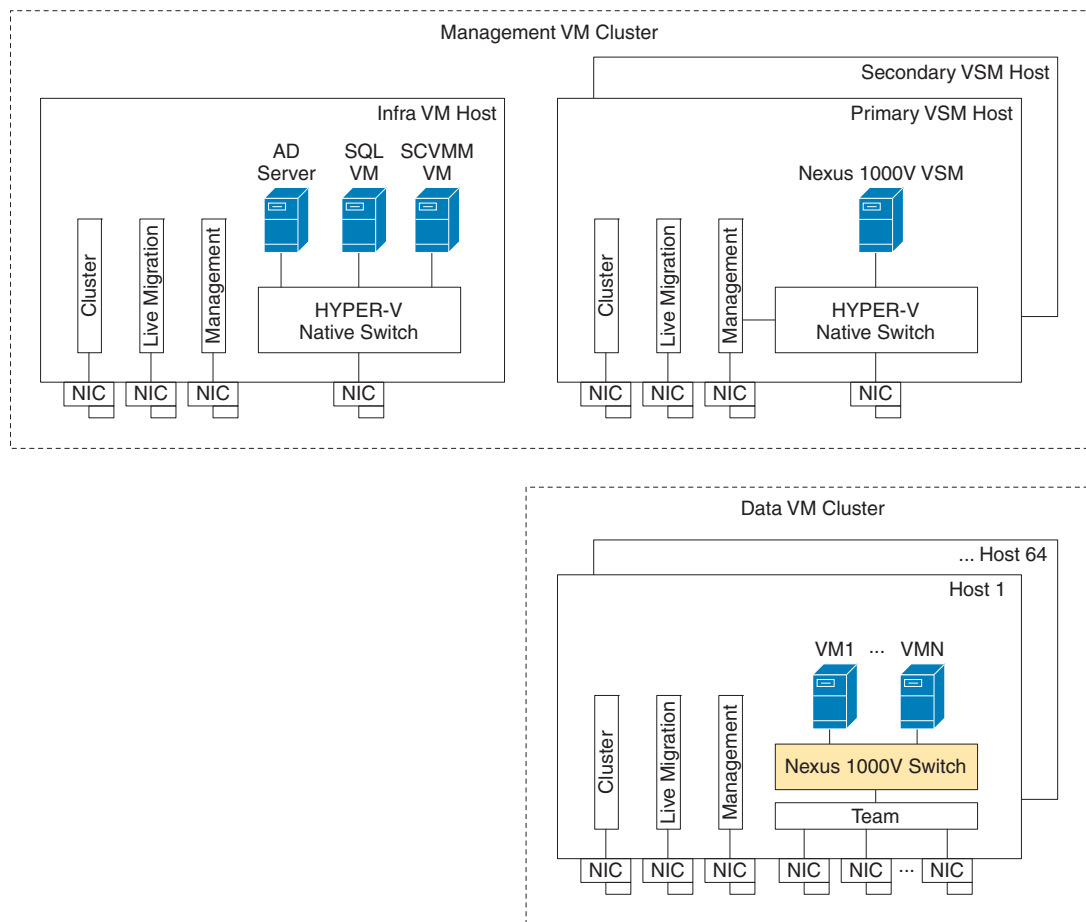
Note   The management NIC is actually on the Microsoft switch. The management VM cluster is for infra VMs. The data VM cluster is for workload VMs. The minimum topology is three servers with four NICs each.

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

Figure 1-2   *Cisco Nexus 1000V Installation Workflow*
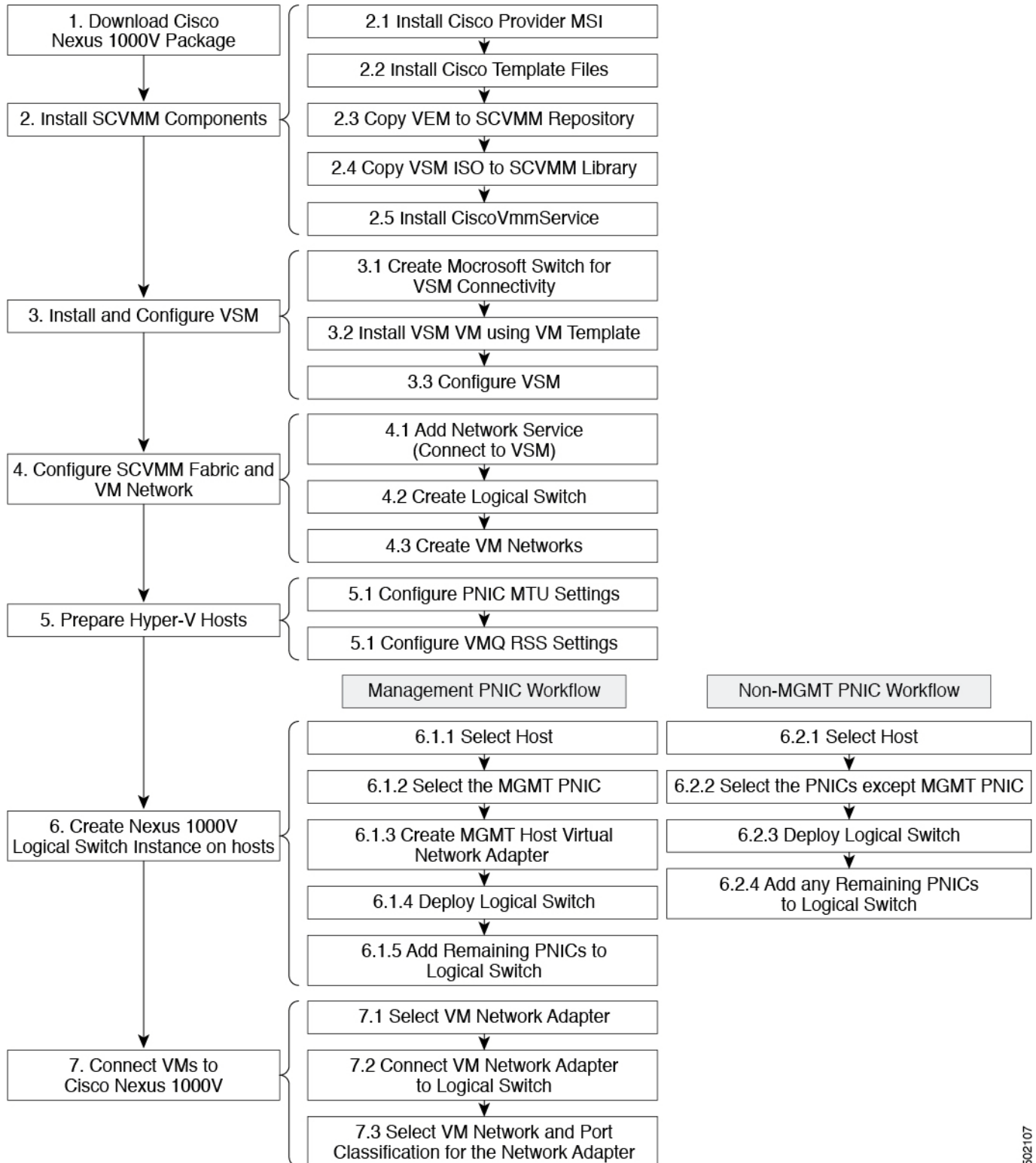
Installing the VSM Software

To install the VSM software, perform the following steps:

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 package, download the Cisco Nexus 1000V package for the HyperV platform. This package contains the following files:

- VSM ISO (Nexus1000V.5.2.1.SM3.2.1\VSM\install\Nexus-1000V.5.2.1.SM3.2.1.iso)
- VEM MSI package (Nexus1000V.5.2.1.SM3.2.1\VEM\Nexus1000V-VEM-5.2.1.SM3.2.1.msi)
- Cisco VSEM Provider MSI package (Nexus1000V.5.2.1.SM3.2.1\VMM\Nexus1000V-NetworkServiceProvider-5.2.1.SM3.2.1.msi)
- Kickstart file (Nexus1000V.5.2.1.SM3.2.1\VSM\Upgrade\Nexus-1000V-kickstart.5.2.1.SM3.2.1.bin)
- System file (Nexus1000V.5.2.1.SM3.2.1\VSM\Upgrade\Nexus-1000V.5.2.1.SM3.2.1.bin)
- PNSC-PA (Nexus1000V.5.2.1.SM3.2.1\PNSC-PA\vsmhv-pa.3.2.1e.bin)
- WSUS scripts (Nexus1000V.5.2.1.SM3.2.1\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

To install the SCVMM components, perform the following steps:

Step 1   Install the Cisco Provider MSI.

    a. Install the *Nexus1000V-NetworkServiceProvider-5.2.1.SM3.2.1.0.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:

       • Open the SCVMM console.

       • Navigate to the Settings Pane.

       • Click **Configuration Providers**.

       • Verify that the Cisco Nexus 1000V extension is displayed.

Step 2   Install the Cisco VSM template files.

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: **%ProgramFiles%\Cisco\Nexus1000V\V2\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 the 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 Nexus-1000V.5.2.1.SM3.2.1.iso 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.

Step 5   Install CiscoVmmService which runs as a Windows service.

The MSI file *Nexus1000V-NetworkServiceProvider-5.2.1.SM3.2.1.0.msi* also includes **CiscoVmmService** which is required for the automatic refresh of the network service and remediate at SCVMM. The files are located at the **%ProgramFiles%\Cisco\Nexus1000V\V2\CiscoVmmService** directory.

For more information, see Installation of CiscoVmmService, page 1-22.

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 1-8

2. Configuring the VSM, page 1-10

3. Deploying the VSM, page 1-10

4. Configuring the VSM, page 1-11

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 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 **Nework Adapter**, choose the **dynamic** option for the MAC-address assignment.

Step 10 Click **OK** and then click **Next**.

Step 11 In the **Select Destination** panel, keep the default settings of **Place the virtual machine on a host; Destination: All Hosts** and click **Next**.

Step 12 After the host is displayed in the **Select Host** panel, chose it, and click **Next**.

Step 13 In the **Configure Settings** panel, review the settings and click **Next**.

Step 14 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 15 In the **Add Properties** panel, under the **Automatic Actions** choose the following options:

- For the **Select an action to perform automatically when the virutalization server starts** option, choose **Turn on the virtual machine if it was running when the physical server stopped**.

- For the **Action to take when the virutalization server stops** option, choose **Turn off virtual machine**.

Step 16 In the **Confirm the Settings** panel in the final Summary window, review and confirm the settings.

Step 17 Click **Create** to begin the virtual machine creation. A progress bar is displayed in the **Job Status** column in the VM window.

Step 18 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 19 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 Options	If the disk is unformatted	If the disk is formatted
1	Install the Cisco Nexus 1000V and bring up the new image	• Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash • Load the system image	• 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	• Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash: • Start the VSH shell	• 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	• Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash • Load the system image	• 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	• Boot the kickstart image from ISO • Format the disk and copy the images from ISO to bootflash • Load the system image	• 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** (yes).

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** (yes).

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 HA role at the prompt **Enter HA role [standalone/primary/secondary]**.

Note We recommend that you create a VSM HA 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)SM3(1.1). 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 and network IP address range using the commands, for example, **ip address** *<30.0.0.2> <30.0.0.100>* and **network** *<30.0.0.2> <255.255.255.0>*. Type **exit**.

Step 7 Create a network segment using the command **nsm network segment <name>**; for example, **nsm network segment VMNetworkA**.

Step 8 Create a VLAN inside the network segment using the command **switchport access vlan <number>**; for example, **switchport access vlan** *100*.

Step 9 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 10 (Optional) Import the IP pool template to the network segment. Specify the IP subnet using the commands **ipsubnet** [*CIDRnotation*] and **ip pool import template** [*name*]. For example:

```
ipsubnet 30.30.30.0/24;
ip pool import template pool10
```

> ✎
>
> **Note**   The IP subnet should be the same as the network specified in the **ip pool template** command.

Step 11 Publish the network segment using the command **publish network segment <name>**; for example, **publish network segment** *VMNetworkA*. Type **exit**.

Step 12 Create a virtual Ethernet port profile using the command **port-profile type vethernet <name>**; for example, **port-profile type vethernet** *Veth-policy*.

Step 13 Enter the **no shutdown** command to keep the system in a power-on state. Enter **state enabled** at the prompt.

Step 14 Publish the port profile using the command **publish port-profile** and type **exit**. The port profile is imported for publishing the network uplink.

Step 15 Create a virtual Ethernet port profile using the command **port-profile type ethernet <name>**; for example, **port-profile type ethernet** *eth-pp-policy*.

Step 16 Enter the **no shutdown** command to keep the system in a power-on state. Enter **state enabled** at the prompt.

Step 17 Create a network uplink using the command **nsm network uplink** *NexusUplink*.

Step 18 Associate the network segment pool using the command **allow network segment pool** *IntranetSJ*; for example, **allow network segment pool** *IntranetSJ*.

Step 19 Import the port profile that was created earlier using the command **import port-profile** <*name*>; for example, **import port-profile eth-pp-policy**.

Step 20 Publish the network uplink using the command **publish network uplink <name>**; for example, **publish network uplink** *NexusUplink*. Type **exit**.

Step 21 Copy the running configuration to the start-up configuration using the command **copy running-config startup-config**. The following message is displayed in the window: *Copy complete, now saving to disk (please wait)*

Step 22 Enter the command **show running-config** 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 L3 control.

Configuring the SCVMM Fabric Workflow

✎
Note   The entire workflow to configure the SCVMM fabric can also be performed using scripts. For more information, see PowerShell Scripts for Configuring the SCVMM Fabric Workflow, page 1-16.

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 1-13

  2. Creating a Logical Switch in SCVMM, page 1-14

Connecting SCVMM to VSM

Once the VSM is up, configure the SCVMM networking fabric for the Cisco 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.

Connecting SCVMM 2016 to VSM

To retrieve the objects from the VSM to SCVMM 2016, 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   Under **Networking**, select **Network Service**.

Step 4   Right-click to add a **Add Network Service**. The **Add Network Service** wizard 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.   a.Select a manufacturer, for example, *Cisco Systems, Inc*.

  b.   Select the model type, for example, *Nexus 1000V Chassis 2.0*.

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

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

  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.

b. In the **Create Run As account** window, enter the following VSM credentials:

> ✎
> **Note** You must not use the Windows credentials. Ensure that you use the VSM credentials only.

– 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 Installing the VSM Certificate, page 1-15.

Step 10 In the **Gather Information** windows click **Scan Provider**.

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. 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*.

– 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.

Step 4 In the **Settings** window, select **Minimum bandwidth mode.**

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 a 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.

    a. Choose **Team** in the **Uplink mode** field to select multiple uplinks.

> **Note** The mode should always be Team, even if you use a single uplink or multiple uplinks.

    b. Click **Add** in the **Uplink port profiles** field. The **Add Uplink Port Profile** window opens. Select a port profile that is available for use by the host physical adapter that connects to this logical switch.

    c. Click **Next**.

Step 8 Click **Next** to close the **Create Logical Switch** wizard.

Step 9 In the **Summary** panel, confirm the settings, and click **Finish** to complete the creation of the logical switch.

Step 10 Click **Next**.

Step 11 Click **Next** to close the **Create Logical Switch** wizard.

Step 12 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 must 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**.

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.

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 Unstrusted Certificate dialog box click **View Certificates**.

         The Cisco Nexus 1000V VSM certificate appears.

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

         The **Certificate Import** wizard opens.

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

Step 7   Based on the VM settings, a popup 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\V2\Scripts\VMMConfig example "C:\Program
Files\Cisco\Nexus1000V\V2\Scripts\VMMConfig"
```

PowerShell Scripts for Configuring the SCVMM Fabric Workflow

After the Cisco VSM Provider (Nexus1000V-NetworkServiceProvider-5.2.1.SM3.2.1.0.msi) is installed from the download package on the SCVMM server, the following scripts are available in %ProgramFiles%\Cisco\Nexus1000V\V2\Scripts\VMMConfig example "C:\Program Files\Cisco\Nexus1000V\V2\Scripts\VMMConfig":

- Deploy-Nexus1000V-VSEM.ps1
- Refresh-Nexus1000V-VSEM.ps1
- Install-Nexus1000V-VSMCertificate.ps1
- Cleanup-Nexus1000V-VSEM.ps1

Deploy-Nexus1000V-VSEM.ps1

This script handles 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 the logical switch (created in step b).

d. Associate virtual port profiles with the 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
Enter Mode of communication between SCVMM and VSM (http/https): https
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

Use this script if the Cisco VSEM is already added to the SCVMM server and you need to configure new objects such as port profiles, network segments, or uplink networks on the VSM. You may also need to refresh the Cisco VSEM to associate the Cisco Nexus 1000V objects on the SCVMM and make them available for usage.

This script helps you refresh the VSEM and make the necessary associations.

The following example creates a new VM network (VMNetworkB), a new port classification (Veth-policy-new), and a new uplink network (NexusUplink-New) on the Cisco VSM.

Note The following were already created on the 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 Cisco Nexus 1000V components available on the SCVMM
server.

This script exits if it encounters any Cisco Nexus 1000V objects.

Preparing the Microsoft Hyper-V Hosts (Optional)

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

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 **Jumbo Packet** and set the desired value.

Repeat this procedure for all 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.

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

We recommend that you create one logical switch per VSM.

Installation of CiscoVmmService

To install CiscoVmmService, perform the following steps:

Step 1 In SCVMM virtual machine, navigate to the following path:,

C:\%ProgramFiles%\Cisco\Nexus1000V\V2\CiscoVmmService directory.

Step 2 Right-click the **Install-CiscoVmmService.bat** file and run as an administrator.

The Windows Service (**CiscoVmmService**) will be installed and start to run.

Step 3 After the successful installation, go to **service.msc** and verify if **CiscoVmmService** is in a running state. If not, try to manually start

> **Note**
> - With this service, if any port-profile is created in the VSM, the Port-Classification and the VM-Network will be created in automatically in SCVMM. It will also check the compliant status of the logical switch. If the logical switch is in non-compliant state, the remediate job will be started (Job name: Change Properties Of Logical switch Instance On Host) to recover the logical switch to the compliant state.
>
> - Optionally, you can monitor or check the logs at **C:\%Program Files%\Cisco\Nexus1000V\V2\CiscoVmmService\nexusps.log**.
>
> - If the installation fails with some exception, go to the location of the **CiscoVmmService.exe** file and right-click **CiscoVmmService.exe > Properties**. In the **Properties** window, navigate to the **General** tab and uncheck the **Unblock** check box, and then click **OK**. Re-install the **CiscoVmmService**.
>
> - If the **CiscoVmmService** is in a running state, but the C**:\%Program Files%\Cisco\Nexus1000V\V2\CiscoVmmService\nexusps.log** file throws an error that states *VMM encountered an exception The user name or password is incorrect*, then right-click **CiscoVmmService > Properties > Log On > This Account under services.msc** and provide the SCVMM user interface credentials, and click **OK**. After this, do restart the **CiscoVmmService**.
>
>   Check the logs again with latest timestamp.
>
> - Before uninstallation of Cisco Network Service Provider (**Nexus1000V-NetworkServiceProvider-5.2.1.SM3.2.1.msi**), you must uninstall **CiscoVmmService**. For information on the uninstallation, see Uninstallation of CiscoVmmService, page 1-24.

Refresh Interval Mechanism

At SCVMM, the default network-service refresh-interval is 1800 sec.

To modify the refresh-interval, do the following:

Step 1 From **Run > cmd**, go **regedit** and edit the 'RefreshInterval' key at *HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CiscoVmmService*.

Step 2 Restart the *CiscoVmmService* under **services.msc**.

Launch SCVMM and navigate to the Jobs section to check if the job named *Read network service device and synchronize with hardware"* is getting triggered every **RefreshInterval** time period.

Creating the Port-Classification and VM Network Manually

The port-classification and the VM network is automatically created once the CiscoVmmService is installed. For information on how to configure the port-classification and the VM network manually, see and ..

Configuring the Port-Classification

To configure the port-classification, perform the following steps:

Step 1   In the SCVMM user interface, navigate to **Fabric > Logical Switches** and right-click *Logical_Switch_Name*. Navigate to *Logical_Switch_Name* **> Properties > Virtual Port**.

Step 2   In the **Virtual Port** panel, click **Add**. In the **Add Virtual Port** window that appears, do the following:.

- Choose the VSM by checking the name that was created earlier, for example, Nexus 1000v-Test.

- Select the port profile from the drop-down menu.

- Select a port profile classification for the port profile, for example, AllAccess1.

- Click **Browse** in the **Port Classification** field. Assign the selected port profile to a port classification in the **Select a Port Profile Classification** window.

- Click **Create Port Classification**. In the **Create Port Classification wizard** that opens, do the following:

  – 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.

- Click **OK**. The selected port classification is displayed in the **Select a Port Profile Classification** window.

- Choose the port classification from the table.

- Click **OK**.

Step 3   Click OK to finish adding the Virtual Port.

Configuring the VM Network

After the logical switch and the hosts are configured, you must configure the VMs and associate the network segments to the VM.

To configure the VMs and associate the network segments to the VM, perform the following steps:

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** opens.

Step 3   In the **Name** panel, specify the name for the VM network in the **Name** field and enter the description for the VM network in the **Description** field. For example, add a name for the VM network as VM_network.

> ✎
>
> **Note**   It is easier to do the mapping if the VM network name is the same as the network segment name.

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

Step 5   Click **Next**.

Step 6   To configure VM network in SCVMM 2016, 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 7   Click **Next**.

Step 8   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.

Uninstallation of CiscoVmmService

To uninstall the CiscoVmmService, perform the following steps:

Step 1   In the SCVMM user interface, navigate to the following path:

C:\%Program Files%\Cisco\Nexus1000V\V2\CiscoVmmService

Step 2   Right-click the **Uninstall-CiscoVmmService.bat** file and run as administrator. This will stop and unistall the **CiscoVmmService** Windows service.

Step 3   Verify that the **CiscoVmmServic**e is not present in s**ervices.msc**.

> ✎
>
> **Note**   If the uninstallation is not successful, the **CiscoVmmService** will still be present as a stale entry (or Disabled state) in **services.msc**. From the Windows Administrator's command prompt, enter the **sc delete CiscoVmmService** command. Also, close the SCVMM user interface, **Services.msc**, and **Event Viewer** windows if they are open. After a while, check if the **CiscoVmmService** entry is present in services.msc. If it is still present as stale entry (or Disabled state), then restart the SCVMM Virtual Machine (in a maintenance window). Till then, the manual refresh of the network services needs to be carried out for any changes in the 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 7 of Creating a Logical Switch in SCVMM, page 1-14. 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.

Guidelines and Limitations for Managing Hyper-V Hosts

When you reboot the HyperV host that runs the Virtual Supervisor module (VSM), the connectivity between the active and the standby VSM is temporarily lost. In this case, both the active and the standby VSMs assume the active role. Therefore, you must reboot one of the VSMs to make it a normal HA setup.

Rebooting the VSMs is based on the following conditions:

- The number of modules attached to the VSM

  If a VSM has more modules attached than the other VSM, the VSM that has fewer modules is rebooted.

- Last configuration change

  .If both VSMs have the same number of modules, the VSM with the latest configuration remains active and the other VSM is rebooted.

  > ✎
  > **Note**   This condition is invoked when the previous conditions are not met.

- Last active VSM

  If the previous conditions are not met, the VSM that became active most recently is rebooted.

Hence, all the hosts under this Nexus 1000v switch will temporarily loose connectivity to the VSMs for a short duration (approximately two minutes), until one of the VSMs assumes the role of a stable active VSM.

We recommend that you perform the following settings while deploying VSM or change the settings from the SCVMM console once the VSM is deployed:

a. Launch SCVMM.

b. In the SCVMM user interface, under the Actions tab, choose Automatic Actions, and then click Properties of the VSM virtual machine.

c. Choose one of the following actions:

   – For the **Action to take when the virutalization server starts** option, choose **Automatically turn on the virtual machine if it was running when the physical server stopped**.

   – For the **Action to take when the virutalization server stops** option, choose **Turn off virtual machine**.