Installing the Cisco Nexus 1000V

Prerequisites for Installing the VSM Software

For information about your software and platform compatibility, see the Cisco Nexus 1000V and Microsoft Hyper-V Compatibility Information 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 R2 UR4 or later.
- Windows Server 2012 R2 hosts with 3014795 hotfix applied. 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
VSM NIC Ordering

- 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 Center Virtual Machine Manager (SCVMM) 2012 R2 UR4 or later
- 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. 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
cntrol0 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

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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

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**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

1. Download Cisco Nexus 1000V Package

2. Install SCVMM Components
   - 2.1 Install Cisco Provider MSI
   - 2.2 Install Cisco Template Files
   - 2.3 Copy VEM to SCVMM Repository
   - 2.4 Copy VSM ISO to SCVMM Library

3. Install and Configure VSM
   - 3.1 Create Microsoft Switch for VSM Connectivity
   - 3.2 Install VSM VM using VM Template
   - 3.3 Configure VSM

4. Configure SCVMM Fabric and VM Network
   - 4.1 Add Switch Extension Manager (Connect to VSM)
   - 4.2 Create Logical Switch
   - 4.3 Create VM Networks

5. Prepare Hyper-V Hosts
   - 5.1 Configure PNIC MTU Settings
   - 5.1 Configure VMQ RSS Settings

6. Create Nexus 1000V Logical Switch Instance on hosts
   - Non-MGMT PNIC Workflow
     - 6.1.1 Select Host
     - 6.1.2 Select the MGMT PNIC
     - 6.1.3 Create MGMT Host Virtual Network Adapter
     - 6.1.4 Deploy Logical Switch
     - 6.1.5 Add Remaining PNICS to Logical Switch
   - 6.2.1 Select Host
     - 6.2.2 Select the PNICS except MGMT PNIC
     - 6.2.3 Deploy Logical Switch
     - 6.2.4 Add any Remaining PNICS to Logical Switch

7. Connect VMs to Cisco Nexus 1000V
   - 7.1 Select VM Network Adapter
   - 7.2 Connect VM Network Adapter to Logical Switch
   - 7.3 Select VM Network and Port Classification for the Network Adapter
Installing the VSM Software

To install the VSM software, perform the following steps:

1. Downloading the Cisco Nexus 1000V Package, page 1-6.
2. Configuring SCVMM and VSM, page 1-6.
3. Installing the VSM Certificate, page 1-16.
4. Preparing the Microsoft Hyper-V Hosts (Optional), page 1-20.
5. Adding Hosts to a Logical Switch, page 1-21.
6. Connecting the VM Network Adapter to the Logical Switch, page 1-22.

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 Microsoft System Center Virtual Machine Manager (SCVMM) 2012 SP1. This package contains the following files:

- VSM ISO (Nexus1000V.5.2.1.SM3.1.1\VSM\install\Nexus-1000V.5.2.1.SM3.1.1.iso)
- VEM MSI package (Nexus1000V.5.2.1.SM3.1.1\VEM\Nexus1000V-VEM-5.2.1.SM3.1.1.0.msi)
- Cisco VSEM Provider MSI package (Nexus1000V.5.2.1.SM3.1.1\VMM\Nexus1000V-VSEMProvider-5.2.1.SM3.1.10.msi)
- Kickstart file (Nexus1000V.5.2.1.SM3.1.1\VSM\Upgrade\Nexus-1000V-kickstart.5.2.1.SM3.1.10.bin)
- System file (Nexus1000V.5.2.1.SM3.1.1\VSM\Upgrade\Nexus-1000V-5.2.1.SM3.1.1.bin)
- PNSC-PA (Nexus1000V.5.2.1.SM3.1.1\PNSC-PA\vsmhv-pa.3.2.1e.bin)
- WSUS scripts (Nexus1000V.5.2.1.SM3.1.1\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, page 1-7
- Installing and Configuring the VSM Workflow, page 1-8
- Configuring the SCVMM Fabric Workflow, page 1-12
Installing SCVMM Components

To install the SCVMM components, perform the following steps:

---

**Step 1** Install the Cisco Provider MSI.

a. Install the `Nexus1000V-VSEMProvider-5.2.1.SM3.1.1.0.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.SM3.1.1.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.
Installing the VSM Software

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 1-9
3. Deploying the VSM, page 1-9
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 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, chose 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**

<table>
<thead>
<tr>
<th>No</th>
<th>Boot Option</th>
<th>If the disk is unformatted</th>
<th>If disk is formatted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Install the Cisco Nexus 1000V and bring up the new image</td>
<td>• Boot the kickstart image from ISO</td>
<td>• Boot the kickstart image from ISO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Format the disk and copy the images from ISO to bootflash:</td>
<td>• Copy the images from ISO to bootflash:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Load the system image</td>
<td>• Load the system image</td>
</tr>
<tr>
<td>2</td>
<td>Install the Cisco Nexus 1000V and go to the VSH shell</td>
<td>• Boot the kickstart image from ISO</td>
<td>• Boot the kickstart image from ISO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Format the disk and copy the images from ISO to bootflash:</td>
<td>• Copy the images from ISO to bootflash:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Start the VSH shell</td>
<td>• Start the VSH shell</td>
</tr>
<tr>
<td>3</td>
<td>Install the Cisco Nexus 1000V only if the disk is unformatted, and bring up</td>
<td>• Boot the kickstart image from ISO</td>
<td>• Boot the kickstart image from ISO</td>
</tr>
<tr>
<td></td>
<td>the new image</td>
<td>• Format the disk and copy the images from ISO to bootflash:</td>
<td>• Try to load the system image from the disk with the same name as that in ISO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Load the system image</td>
<td>• If the image is not found, start the VSH shell</td>
</tr>
<tr>
<td>4</td>
<td>Install Cisco Nexus 1000V only if the disk is unformatted and go to the</td>
<td>• Boot the kickstart image from ISO</td>
<td>• Boot the kickstart image from ISO</td>
</tr>
<tr>
<td></td>
<td>VSH shell</td>
<td>• Format the disk and copy the images from ISO to bootflash:</td>
<td>• Start the VSH shell</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Load the system image</td>
<td></td>
</tr>
</tbody>
</table>

### 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).
Installing the VSM Software

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 [CIDR notation]` 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.

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### 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 1-17*.

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 1-12.**
2.  **Creating a Logical Switch in SCVMM, page 1-14.**
3.  **Configuring the VM Network, page 1-15.**

#### 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 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**
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. 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 Account**.

**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:
      - 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 1-16

**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. 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. 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.

- 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**. The **Create Port Classification** wizard opens. 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 9** Click **OK** to finish adding the Virtual Port.

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

**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 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**.

---

### 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 opens.

**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 R2, do the following:

a. In the Isolation panel, select the Network manager in which 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.
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 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 Untrusted 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.SM3.1.1.0.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:

```powershell
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
```

---

Cisco Nexus 1000V for Microsoft Hyper-V Installation and Upgrade Guide, Release 5.2(1)SM3(1.1)
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\Deploy-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.

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
##
# Chapter 1      Installing the Cisco Nexus 1000V

## Installing the VSM Software

### 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.

Export 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\Refresh-Nexus1000V-VSEM-logs_1-23-14_12-54.log

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:

1. Open **View Network Connections** from the Server Manager or Control Panel or by typing `ncpa.cpl` from a command line.
2. Right-click the adapter and choose **Properties**.
3. Click **Configure** under the **adapter properties** window.
4. Click the **Advanced** tab.
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.
Installing the VSM Software

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.

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 **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.