Installing the Cisco Prime NSC and Cisco VSG-Quick Start

This chapter contains the following sections:

Information About Installing Cisco Prime NSC and Cisco VSG

This chapter describes how to install and set up a basic working configuration of Cisco Prime Network Services Controller (Cisco PNSC) and Cisco Virtual Security Gateway (Cisco VSG). The example in this chapter uses the ISO files of the software for installation. The steps assume that Cisco Nexus 1000V Series switch is operational, and endpoint VMs are already installed.

Cisco VSG and Cisco Prime NSC Installation Planning Checklists

Planning the arrangement and architecture of your network and equipment is essential for a successful operation of Cisco PNSC and Cisco VSG.

Basic Hardware and Software Requirements

The following table lists the basic hardware and software requirements for Cisco VSG and Cisco PNSC installation.

Requirement	Description
Virtual CPUs	• Cisco VSG: 1 (1.5 GHz) • Cisco PNSC: 4 (1.8 GHz each)
Memory	• Cisco VSG: 2GB RAM • Cisco PNSC: 4GB RAM
Disk Space	Cisco VSG: 3 GB Cisco Prime NSC: Without InterCloud functionality, 40 GB on shared NFS or SAN, and configured on two disks as follows: • Disk 1: 20 GB • Disk 2: 20 GB
Processor	x86 Intel or AMD server with a 64-bit processor.
Network Interfaces	• Cisco VSG: 3 • Cisco PNSC: 1
Microsoft SCVMM	SCVMM 2012 SP1, SCVMM 2012 R2, or SCVMM 2016
Browser	Any of the following browsers: • Internet Explorer 9.0 or higher • Mozilla Firefox 23.0 or higher • Google Chrome 29.0 or higher **Note** If you are running Firefox or IE and do not have Flash, or you have a version of Flash that is older than 11.2, a message displays asking you to install Flash and provides a link to the Adobe website. **Note** Before using Google Chrome with Cisco PNSC, you must disable the Adobe Flash Players that are installed by default with Chrome.

Requirement	Description
Ports	Access to the Cisco PNSC application using a web browser and the following ports (if the deployment uses a firewall, make sure to permit the following ports): • 443 (HTTPS) • 80 (HTTP/TCP) • 843 (Adobe Flash)
Flash Player	Adobe Flash Player plugin 11.2 or higher

Note The Cisco VSG software is available for download at http://www.cisco.com/en/US/products/ps13095/index.html and the Cisco PNSC software is available for download at http://www.cisco.com/en/US/products/ps13213/index.html.

License Requirements

Cisco VSG license is integrated with the Nexus1000V Multi-Hypervisor License. You need to install the Nexus1000V Multi-Hypervisor License for Cisco VSG for Microsoft Hyper-V. The Cisco N1kv VSM is available in two modes: essential and advanced. VSG functionality is available only in the advanced mode. You need to install the Nexus1000V Multi-Hypervisor License and change the VSM mode to advanced mode. When the Nexus1000V Multi-Hypervisor License is installed, the license for Cisco VSG is automatically included.

Note If you try to access VSG services with VSM in essential mode, an error message is generated on VSM console indicating that the Nexus1000V Multi-Hypervisor License is required for VSG.

Starting with Release 5.2(1)SM1(5.2), Cisco Nexus1000V Multi-Hypervisor License is available in three different types:

- Default: The Nexus 1000v switch may be configured in Essential or Advanced mode.
  - Essential Mode: Not Supported.
  - Advanced Mode: After upgrade to Software Release 5.2(1)SM(5.2) or later- Nexus1000V Multi-Hypervisor License is available with 1024 Socket Count and expires in 60 days.

    Note You must install either the evaluation or the permanent (MSFT PKG) license prior to upgrading to the Software Release 5.2(1)SM1(5.2) or later.

- Evaluation: The Nexus 1000V switch should be in Advanced mode. After upgrading to Software Release 5.2(1)SM1(5.2) or later - Nexus1000V Multi-Hypervisor License is available with1024 Socket Count and expires in 60 days.

- Permanent: The Nexus 1000V switch should be in Advanced mode. After upgrading to Software Release 5.2(1)SM1(5.2) or later - Nexus1000V Multi-Hypervisor License is available with 1024 Socket Count and expires in 60 days.

Note You have to request for an evaluation or permanent Nexus1000V Multi-Hypervisor License.

For more information about the Cisco Nexus 1000V for Microsoft Hyper-V licenses, see the *Cisco Nexus 1000V for Microsoft Hyper-V License Configuration Guide*.

VLAN Configuration Requirements for VSG

You must have two port-profiles configured on two different VLANs in the VSM:

- Service interface VLAN
- HA interface VLAN

Required Cisco Prime NSC and Cisco VSG Information

The following information can be used during the Cisco PNSC and Cisco VSG installation.

Type	Your Information
Cisco VSG name—Unique within the inventory folder and up to 80 characters	
Hostname—Where the Cisco VSG will be installed in the inventory folder	
ISOs—Managed within SCVMM library, if stored at C:\ProgramData\Virtual Machine Manager Library Files\ISO to manage. Refresh the SCVMM library after saving the ISO file to the specified location.	
Cisco VSG management IP address	
VSM management IP address	
Cisco PNSC instance IP address	
Mode for installing the Cisco VSG	• Standalone • HA primary • HA secondary
Cisco VSG VLAN number • Service (1) • Management (2) • High availability (HA) (3)	

Type	Your Information
Cisco VSG port profile name • Data (1) • Management (2) • High availability (HA) (3) **Note** The numbers indicate the Cisco VSG port profile that must be associated with the Cisco VSG VLAN number.	
HA pair ID (HA domain ID)	
Cisco VSG admin password	
Cisco PNSC admin password	
Cisco VSM admin password	
Shared secret password (Cisco PNSC, Cisco VSG policy agent, Cisco VSM policy agent)	
NSC DNS IP address	
NSC NTP IP address	

Host Requirements

- Microsoft SCVMM 2012 R2 or Microsoft SCVMM 2016
- Windows Server 2012 R2 or Windows Server 2016
- 6 GB RAM

Obtaining Cisco Prime NSC and Cisco VSG Software

Cisco VSG software is available for download at the following URL:

http://software.cisco.com/download/navigator.html

Cisco PNSC software is available for download at the following URL:

http://software.cisco.com/download/navigator.html

Task 1: Installing the Cisco Prime NSC from an ISO Image

Before you begin

Ensure that you have:

- Verified that the Hyper-V host on which to deploy Cisco PNSC VM is available in SCVMM.

- Copied the Cisco PNSC 3.4 ISO image to the SCVMM library location on the file system. To make this image available in SCVMM, choose **Library** > **Library Servers**, right-click the library location, and then refresh.
- NTP server information.

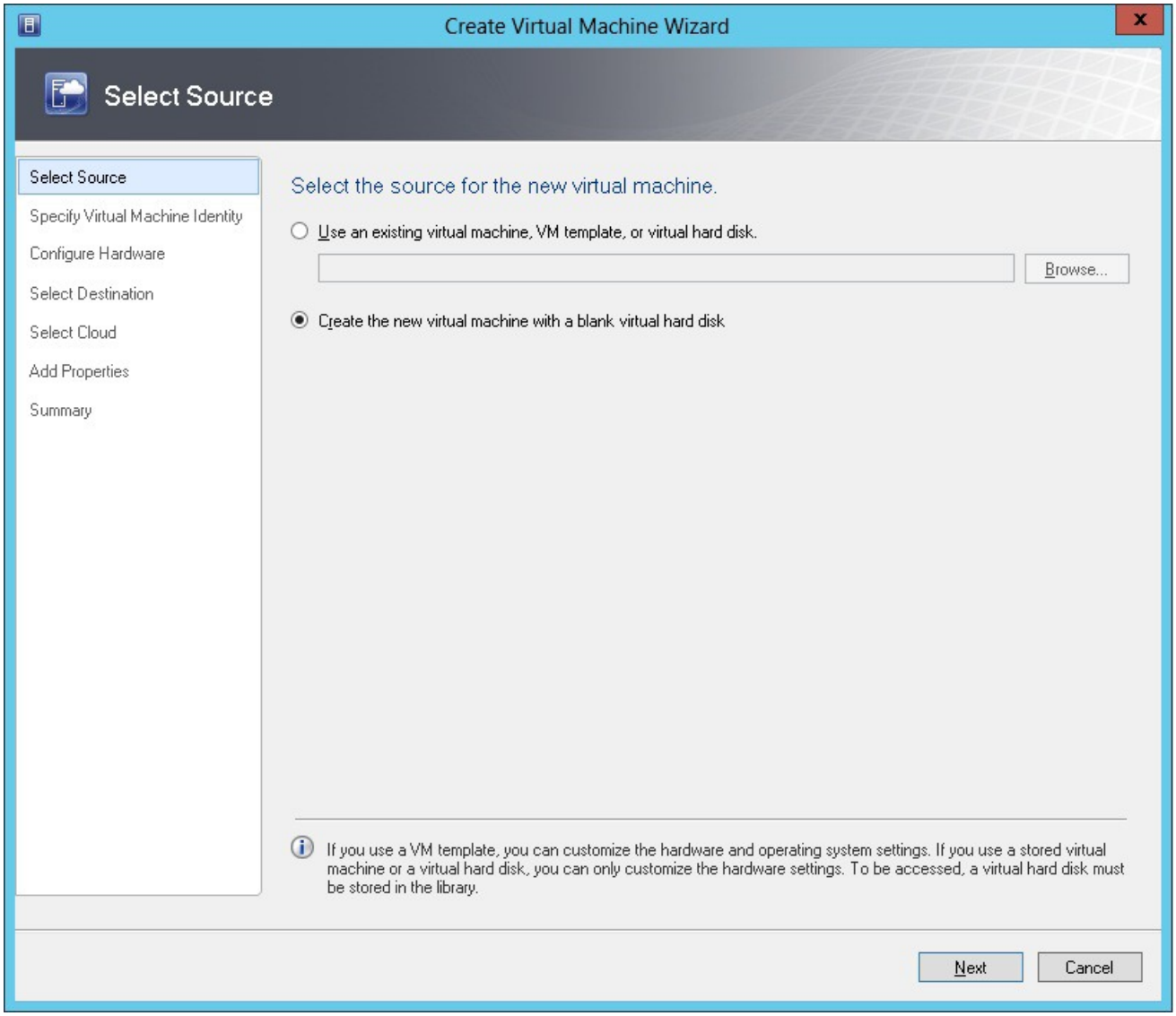
SUMMARY STEPS

1. Launch the SCVMM.
2. In the **VMs and Services** pane, choose the Hyper-V host on which to deploy the Cisco PNSC VM.
3. Right-click the Hyper-V host and choose **Create Virtual Machine**.
4. In the Create Virtual Machine wizard, from the **Select Source** screen, choose the **Create the new virtual machine with a blank virtual hard disk** radio button, and then click **Next.**
5. In the **Specify Virtual Machine Identity** screen, Specify the name and description for the virtual machine, and then click **Next.**
6. In the **Configure Hardware** screen, do the following:
7. In the **Select Destination** screen, do the following:
8. In the **Select Host** screen, choose the destination, and then click **Next.**
9. In the **Configure Settings** screen, click **Browse** and navigate to the storage location of virtual machine file, and then click **Next.**
10. In the **Add properties** screen, choose the **Red Hat Enterprise Linux 5 (64 bit)** operating system, and then click **Next.**
11. In the **Summary** screen, do the following:
12. After the VM is successfully created, right-click the new Virtual Machine and choose **Connect or View > Connect Via Console**.
13. Launch the console and install Cisco PNSC.
14. After Cisco PNSC is successfully deployed, click **Close** and power on the Cisco PNSC VM.

DETAILED STEPS

Step 1 Launch the SCVMM.

Figure 1: Create Virtual Machine Wizard - Select Source



Step 2 In the **VMs and Services** pane, choose the Hyper-V host on which to deploy the Cisco PNSC VM.

Step 3 Right-click the Hyper-V host and choose **Create Virtual Machine**.

Step 4 In the Create Virtual Machine wizard, from the **Select Source** screen, choose the **Create the new virtual machine with a blank virtual hard disk** radio button, and then click **Next.**

Step 5 In the **Specify Virtual Machine Identity** screen, Specify the name and description for the virtual machine, and then click **Next.**

Step 6 In the **Configure Hardware** screen, do the following:

a) From General, do the following:

- Choose **Processor** and set the number of processors.
- Choose **Memory** and choose the required memory value. You will need a minimum 4 GB of memory.

b) From **Bus Configuration > IDE Devices**, do the following:

- Choose the hard disk with the virtual machine name you specified and enter the required size of the hard disk. You will need at least 20 GB.
- Click **New** > **Disk** to add a new hard disk, enter hard disk name in the **File Name** field, set the hard disk size to 20 GB and click **Ok**.
- Choose **Virtual DVD Drive**, choose the **Existing ISO image file** radio button, and browse to select the Cisco PNSC 3.4 ISO image file from the library in the **Select ISO** dialog box.

c) Choose **Network Adapters > Network Adapter 1**, select the **Connect to a VM Network** radio button, and browse to select a VM Network.

d) Click **Next.**

Step 7 In the **Select Destination** screen, do the following:

a) Choose the **Place the virtual machine on a host** radio button.

b) From the **Destination** drop-down list, choose **All hosts**.

c) Click **Next.**

Step 8 In the **Select Host** screen, choose the destination, and then click **Next.**

Step 9 In the **Configure Settings** screen, click **Browse** and navigate to the storage location of virtual machine file, and then click **Next.**

Step 10 In the **Add properties** screen, choose the **Red Hat Enterprise Linux 5 (64 bit)** operating system, and then click **Next.**

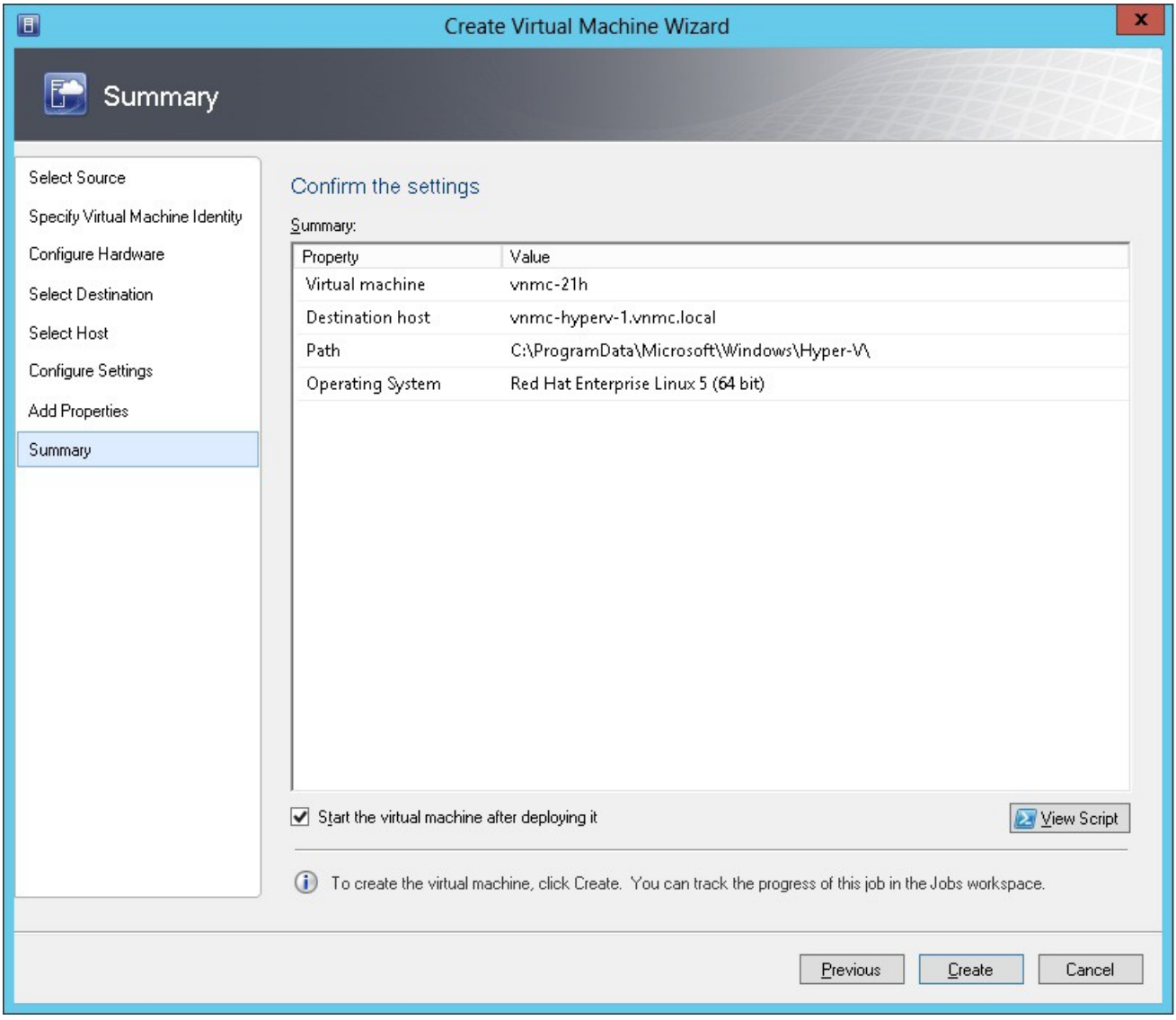
Step 11 In the **Summary** screen, do the following:

a) Verify the settings.

b) Check the **Start the virtual machine after deploying it** check box.

c) Click **Create.**

Figure 2: Create Virtual Machine Wizard - Summary



The job Create VM starts. You can see the status of this job in the **Recent Jobs** window. Ensure that the job completes without any errors.

Step 12 After the VM is successfully created, right-click the new Virtual Machine and choose **Connect or View > Connect Via Console**.

Step 13 Launch the console and install Cisco PNSC.

Note Before the final Cisco PNSC installation step, before you reboot, launch SCVMM again, and right-click the Virtual machine and choose **Properties > Hardware Configuration > Bus Configuration > Virtual DVD Drive > no media**, so that Cisco PNSC does not use the ISO image at boot time.

Step 14 After Cisco PNSC is successfully deployed, click **Close** and power on the Cisco PNSC VM.

Task 2: On the VSM, Configuring Cisco Prime NSC Policy Agent

Once Cisco PNSC is installed, you must register the VSM with Cisco PNSC.

Before you begin

Ensure that you have:

- Cisco PNSC policy-agent image on the VSM (for example, vsmhv-pa.3.2.1e.bin)

Note The string **vsmhv-pa** must appear in the image name as highlighted.

- The IP address of Cisco PNSC
- The shared secret password you defined during Cisco PNSC installation
- IP connectivity between the VSM and Cisco PNSC is working

Note If you upgrade your VSM, you must also copy the latest Cisco VSM policy agent image. This image is available in Cisco PNSC image bundle to boot from a flash drive and to complete registration with Cisco PNSC.

Note VSM clock should be synchronized with Cisco PNSC clock.

SUMMARY STEPS

1. On the VSM, enter the following commands:
2. Check the status of the NSC policy agent configuration to verify that you have installed Cisco PNSC correctly and it is reachable by entering the **show nsc-pa status** command. This example shows that Cisco PNSC is reachable and the installation is correct:

DETAILED STEPS

Step 1 On the VSM, enter the following commands:

```
vsm# configure terminal
vsm(config)# nsc-policy-agent
vsm(config-nsc-policy-agent)# registration-ip 10.193.75.95
vsm(config-nsc-policy-agent)# shared-secret Example_Secret123
vsm(config-nsc-policy-agent)# policy-agent-image vsmhv-pa.3.2.1e.bin
vsm(config-nsc-policy-agent)# exit
vsm(config)# copy running-config startup-config
vsm(config)# exit
```

Step 2 Check the status of the NSC policy agent configuration to verify that you have installed Cisco PNSC correctly and it is reachable by entering the **show nsc-pa status** command. This example shows that Cisco PNSC is reachable and the installation is correct:

```
vsm# show nsc-pa status
NSC Policy-Agent status is - Installed Successfully. Version 3.2(1e)-vsm
vsm
```

The VSM is now registered with Cisco PNSC.

Example

This example shows that Cisco PNSC is unreachable or an incorrect IP is configured:

```
vsm# show nsc-pa status
nsc Policy-Agent status is - Installation Failure
Cisco PNSC not reachable.
vsm#
```

This example shows that the NSC policy-agent is not configured or installed:

```
vsm# show nsc-pa status
NSC Policy-Agent status is - Not Installed
```

Task 3: On the VSM, Preparing Cisco VSG Port Profiles

To prepare Cisco VSG port profiles, you must create the VLANs and use the VLANs in Cisco VSG data port profile and the Cisco VSG-ha port profile.

Before you begin

Ensure that you have:

- Logical Switch name (Network Uplink port-profile name).
- VLAN ID for the Cisco VSG data interface (for example,100).
- VLAN ID for the Cisco VSG-ha interface (for example, 200).
- Management VLAN (management).

Note None of these VLANs need to be system VLANs.

SUMMARY STEPS

1. Create a Cisco VSG data port profile and a Cisco VSG-ha port profile by first enabling the Cisco VSG data port-profile configuration mode. Cisco VSG data interface should be in the system VLAN. To configure VSG data interface in the system VLAN, you need a system network segment, a system port-profile, and an uplink configured as a system uplink. Use the **configure** command to enter global configuration mode.

2. Create Network Uplink port-profile and use it in the Logical Switch.
3. Create the network segment and port-profile for the Data VLAN.
4. Create the network segment and port-profile for the HA VLAN.

DETAILED STEPS

Step 1 Create a Cisco VSG data port profile and a Cisco VSG-ha port profile by first enabling the Cisco VSG data port-profile configuration mode. Cisco VSG data interface should be in the system VLAN. To configure VSG data interface in the system VLAN, you need a system network segment, a system port-profile, and an uplink configured as a system uplink. Use the **configure** command to enter global configuration mode.

Important Ensure that all the critical VMs are configured in the system VLANs.

```
vsm# configure
```

Step 2 Create Network Uplink port-profile and use it in the Logical Switch.

```
vsm(config)# nsm  logical network vsm_LogicalNet
vsm(config-logical-net)# exit

vsm(config)# nsm network segment pool vsm_NetworkSite
vsm(config-net-seg-pool)# member-of logical network vsm_LogicalNet
vsm(config-net-seg-pool)# exit

vsm(config)# nsm ip pool template pool-vmk-n
vsm(config-ip-pool-template)# address family ipv4
vsm(config-ip-pool-template)# network 90.90.90.0/24
vsm(config-ip-pool-template)# ip address 90.90.90.2 90.90.90.100
vsm(config-ip-pool-template)# default-router 90.90.90.1
vsm(config-ip-pool-template)# exit

vsm(config)#port-profile type ethernet sys-uplink
vsm(config-port-prof)#channel-group auto
vsm(config-port-prof)#no shutdown
vsm(config-port-prof)#system port-profile
vsm(config-port-prof)#state enabled
vsm(config-port-prof)#exit

vsm(config)# nsm network uplink vsm_Uplink
vsm(config-uplink-net)# allow network segment pool vsm_NetworkSite
vsm(config-uplink-net)# import port-profile sys_Uplink
vsm(config-uplink-net)# system network uplink
vsm(config-uplink-net)# publish uplink-network
vsm(config-uplink-net)# exit
```

Step 3 Create the network segment and port-profile for the Data VLAN.

```
vsm(config)# nsm network segment VMAccess_502
vsm(config-net-seg)# member-of network segment pool vsm_NetworkSite
vsm(config-net-seg)# system network segment
vsm(config-net-seg)# switchport access vlan 502
vsm(config-net-seg)# ip pool import template VM_IP_Pool
vsm(config-net-seg)# publish network-segment
vsm(config-net-seg)# exit
vsm(config)# port-profile type vethernet VSG_Data
vsm(config-port-prof)# no shutdown
vsm(config-port-prof)# state enabled
vsm(config-port-prof)# system port-profile
```

```
vsm(config-port-prof)# publish port-profile
vsm(config-port-prof)# exit
```

Step 4 Create the network segment and port-profile for the HA VLAN.

```
vsm(config)# nsm network segment VMAccess_503
vsm(config-net-seg)# member-of network segment pool vsm_NetworkSite
vsm(config-net-seg)# switchport access vlan 503
vsm(config-net-seg)# ip pool import template VM_IP_Pool
vsm(config-net-seg)# publish network-segment
vsm(config-net-seg)# exit
vsm(config)# port-profile type vethernet VSG_HA
vsm(config-port-prof)# no shutdown
vsm(config-port-prof)# state enabled
vsm(config-port-prof)# publish port-profile
vsm(config-port-prof)# exit
```

Task 4: On the VSM, Configuring Virtual Network Adapters on the Hosts

Now that you have prepared Cisco VSG port profiles on VSM, you should configure virtual network adapters on the hosts.

This task includes the following subtasks:

- Create Port-profile for the Virtual Network Adapter, on page 13
- Creating Virtual Network Adapter, on page 14

Before you begin

Ensure that you have:

- Cisco VSG port-profile configured on VSM.

Create Port-profile for the Virtual Network Adapter

You need to log in to VSM to create port-profile for the virtual network adapter.

SUMMARY STEPS

1. Create port-profile for the virtual network adapter in VSM.

DETAILED STEPS

Create port-profile for the virtual network adapter in VSM.

Example:

```
vsm#configure terminal
vsm(config)#port-profile type vethernet Virtual-Net-PP
```

```
vsm(config-port-prof)#capability l3-vservice
vsm(config-port-prof)#no shutdown
vsm(config-port-prof)#state enabled
vsm(config-port-prof)#publish port-profile
vsm(config-port-prof)#exit
vsm#copy running-config startup-config
```

Creating Virtual Network Adapter

Before you begin

Make sure that you know the following:

- Port-profile for virtual network adapter is created.

Step 1 Launch SCVMM.

Step 2 In the **VMs and Services** tab, click **All Hosts**.

Step 3 Choose the host on which you want to add the virtual network adapter.

Step 4 Right-click the host and choose **Properties** from the pop-up menu.

Step 5 In the **Properties** window, click **Virtual Switches**.

Step 6 On the **Virtual Switches** tab, click **New Virtual Network Adapter**.

Step 7 In the **Name** field, enter name of virtual network adapter.

Step 8 Under the **Connectivity**, in the **VM Network** field, choose an appropriate VM network.

Step 9 Under **Port profile**, select L3 service enabled port-profile that you created from the **Classification** drop-down list.

Step 10 Under **IP address configuration**, check **Static** radio-button and do the following:

a) Choose IP-pool for virtual network adapter from the **IPv4 pool** drop-down list.
b) In the **IPv4 address** field, enter IP address for virtual network adapter.

Step 11 Click **Ok**.

Step 12 The VM manager warning message appears, click **Ok**.

What to do next

Add a physical router between VSG and virtual network adapter.

Task 5: Installing Cisco VSG from an ISO Image

Note Cisco VSG is supported as VSB on Nexus Cloud Services platform only.

Before you begin

Ensure that you have:

- Installed Microsoft SCVMM 2012 R2 or Microsoft SCVMM 2016.
- Downloaded the Cisco VSG ISO image and uploaded it to the server (C:\ProgramData\Virtual Machine Manager Library Files\ISO). Refresh the library server under the Library tab.
- Cisco VSG-Data port profile: VSG-Data.
- Cisco VSG-ha port profile: VSG-ha.
- HA ID.
- IP/subnet mask/gateway information for Cisco VSG
- Administrator password
- Minimum of 2 GB RAM and 3 GB hard disk space, recommended space is 4 GB RAM and 4 GB hard disk.
- Cisco PNSC IP address.
- The shared secret password.
- IP connectivity between Cisco VSG and Cisco PNSC is okay.
- Cisco VSG NSC-PA image name (vnmc-vsgpa.2.1.2a.bin) is available.

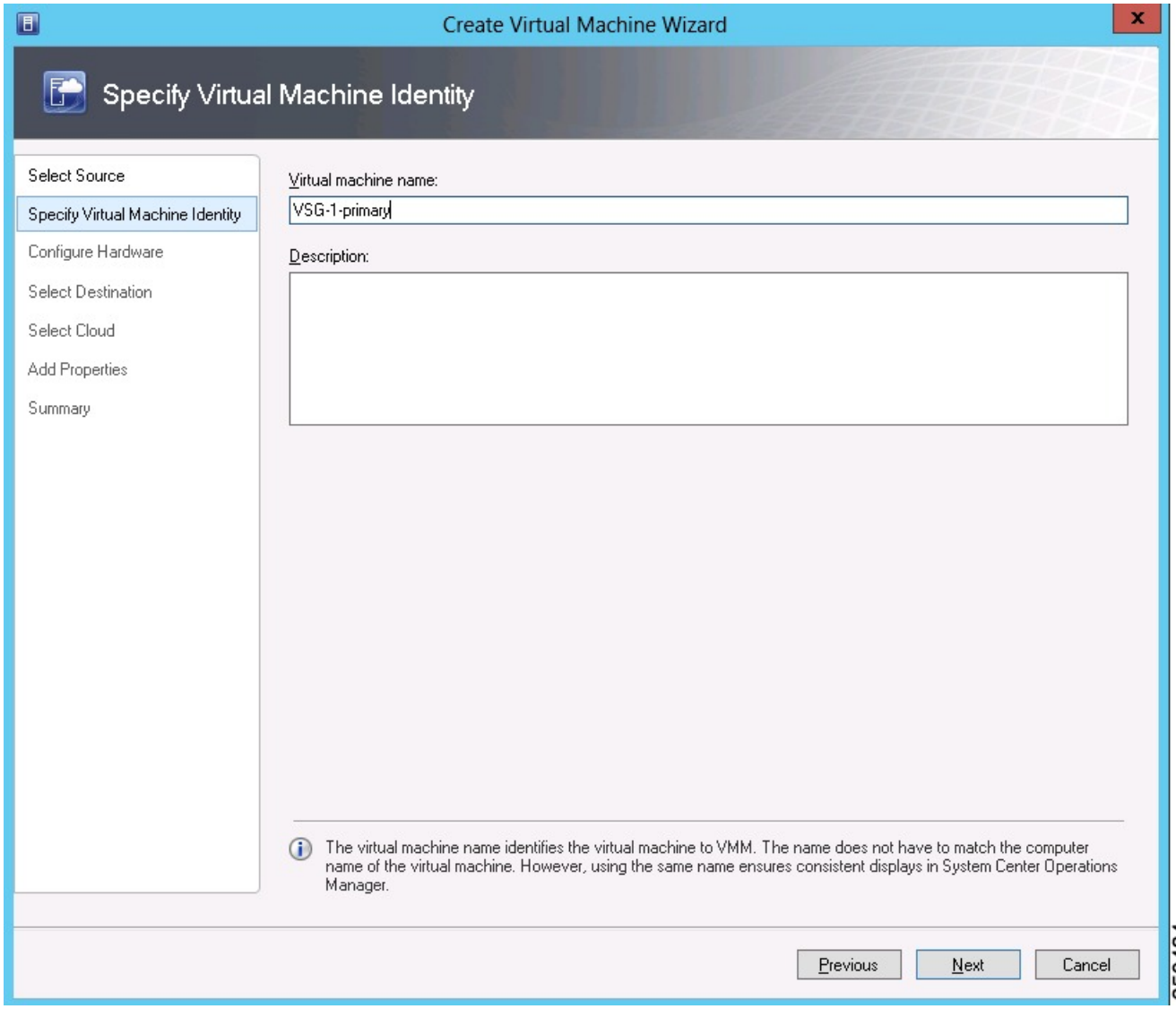
Step 1 Launch SCVMM.

Step 2 On the **VMs and Services** tab, click **Create Virtual Machine**.

Step 3 In the Create Virtual Machine Wizard, in the **Select Source** screen, check the **Create the new virtual machine with a blank virtual hard disk** radio button, and click **Next**.

Step 4 In the **Specify Virtual Machine Identity** screen, enter the name for the Cisco VSG in the **Virtual machine name** field and click **Next.**

Figure 3: Create Virtual Machine Wizard - Specify Virtual Machine Identity



Step 5 In the **Configure Hardware** section, do the following:

a) Under **General**, choose **Memory**, choose the **Static** option, and enter 2048 MB in the **Virtual machine memory** field.

b) Under **Bus Configuration**, choose the primary disk and enter 2 in the Size (GB) field.

c) Choose the virtual DVD Drive, select the **Existing ISO image file** radio button and browse for the VSG ISO within the SCVMM Library.

d) Click **New** > **Network Adapter** to create a total of three new Network Adapters.

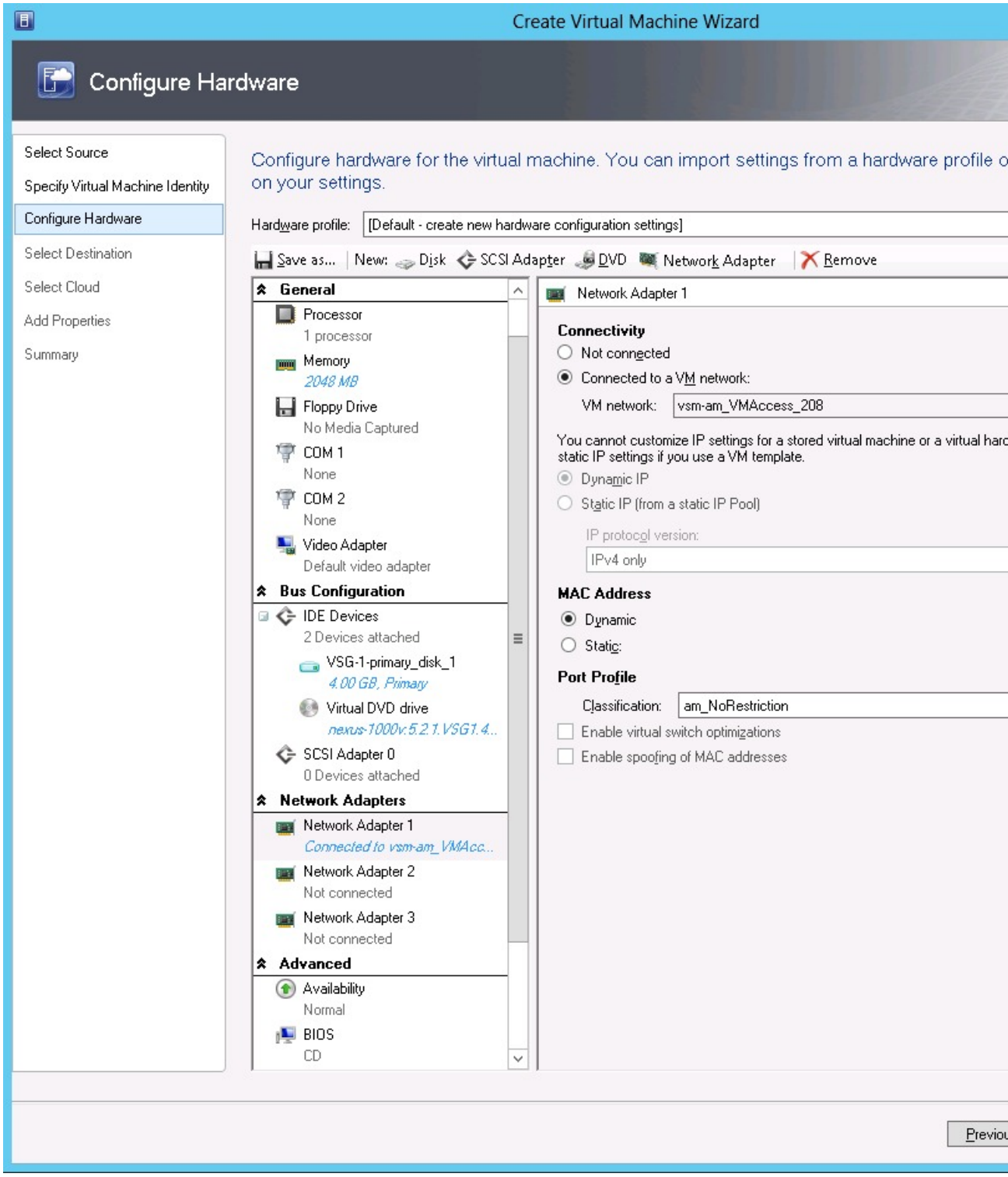
- Under the **Network Adapters** section, choose **Network Adapter 1**, and then choose **Connected to a VM network** and browse for the appropriate network that corresponds to the network segment for the VSG's data interface.

Note Network Adapter 1 is Service/Data network, use it to connect to the Data network.

Note Network Adapter 2 is the management network, connect it to the management network for the VSG.

Note Network Adapter 3 is the HA network, connect it to the HA network.

Figure 4: Create Virtual Machine Wizard - Configure Hardware



- From the **Classification** drop-down list, choose the port-profile corresponding to the VSG's data interface.

Note Repeat Step d to create network adapters for management and HA.

Step 6 In the **Select Destination** section, choose **Place the virtual machine in a host**, choose the host group on which you want to store the VSG from the drop-down list, and click **Next**.

Step 7 In the **Select Host** section, choose the host that you want to place the VSG on and click **Next.**

Step 8 In the **Configure Settings** section, review the virtual machine settings to ensure they are correct, and click **Next**.

Step 9 (Optional) In the **Add Properties** section, choose the **Other Linux (64-bit) from the Operating System** from the drop-down list, and then click **Next.**

Step 10 In the **Summary** section, click **Create.**

Step 11 Once the VSG is successfully installed, choose the VSG on the **VMs and Services** tab, and click **Power On**.

Step 12 Connect to the VSG using **Connect or View** > **Connect via Console**.

Task 6: On the VSG, Configuring the Cisco Prime NSC Policy Agent

Once Cisco PNSC is installed, you must register Cisco VSG with Cisco PNSC.

Before you begin

Ensure that you have:

- The Cisco PNSC policy-agent image on Cisco VSG (for example, vnmc-vsgpa.2.1.2a.bin).

Note The string **vsgpa** must appear in the image name as highlighted.

- IP address of the Cisco PNSC.
- Shared secret password you defined during the Cisco PNSC installation.
- IP connectivity between the VSG and the Cisco PNSC.

Note If you upgrade your VSG, you must also copy the latest Cisco VSG policy agent image. This image is available in Cisco PNSC image bundle to boot from a flash drive and to complete registration with Cisco PNSC.

Note VSG clock should be synchronized with Cisco PNSC clock.

SUMMARY STEPS

1. On Cisco VSG, configure the NSC policy agent:

2. Check the status of the NSC policy agent configuration to verify that you have installed Cisco PNSC correctly and it is reachable by entering the **show nsc-pa status** command. This example shows that Cisco PNSC is reachable and the installation is correct:

DETAILED STEPS

Step 1 On Cisco VSG, configure the NSC policy agent:

```
VSG-Firewall# configure
Enter configuration commands, one per line.  End with CNTL/Z.
VSG-Firewall(config)# nsc-policy-agent
VSG-Firewall(config-nsc-policy-agent)# registration-ip 10.193.72.242
VSG-Firewall(config-nsc-policy-agent)# shared-secret Sgate123
VSG-Firewall(config-nsc-policy-agent)# policy-agent-image vnmc-vsgpa.2.1.2a.bin
VSG-Firewall(config-nsc-policy-agent)# copy running-config startup-config
[########################################] 100%
Copy complete, now saving to disk (please wait)...
VSG-Firewall(config-nsc-policy-agent)# exit
```

Step 2 Check the status of the NSC policy agent configuration to verify that you have installed Cisco PNSC correctly and it is reachable by entering the **show nsc-pa status** command. This example shows that Cisco PNSC is reachable and the installation is correct:

```
VSG-Firewall(config)# show nsc-pa status
NSC Policy-Agent status is - Installed Successfully. Version 2.1(2a)-vsg
```

Cisco VSG is now registered with Cisco PNSC.

Example

This example shows that Cisco PNSC is unreachable or an incorrect IP is configured:

```
vsg# show nsc-pa status
NSC Policy-Agent status is - Installation Failure
Cisco PNSC not reachable.
vsg#
```

This example shows that the NSC policy-agent is not configured or installed:

```
vsg# show nsc-pa status
NSC Policy-Agent status is - Not Installed
```

Task 7: On Cisco VSG, Cisco VSM, and Cisco PNSC, Verifying the NSC Policy-Agent Status

You can use the **show nsc-pa status** command to verify the nsc policy-agent status on Cisco VSG, Cisco VSM, and Cisco Prime NSC (which can indicate that you have installed the policy-agent successfully).

SUMMARY STEPS

1. Log in to the Cisco VSG.
2. Check the status of NSC-PA configuration by entering the following command:

3. Log in to the Cisco VSM.
4. Check the status of NSC-PA configuration by entering the following command:
5. Log in to Cisco PNSC.
6. Click **Resource Management** and then click **Resources**.
7. In the **navigation** pane, click **VSMs** and verify the VSM information in the **VSMs** pane.
8. In the **navigation** pane, click **VSGs** and verify the VSG information in the **VSGs** pane.

DETAILED STEPS

Step 1 Log in to the Cisco VSG.

Step 2 Check the status of NSC-PA configuration by entering the following command:

```
vsg# show nsc-pa status
NSC Policy-Agent status is - Installed Successfully. Version 2.1(2a)-vsg
vsg#
```

Step 3 Log in to the Cisco VSM.

Step 4 Check the status of NSC-PA configuration by entering the following command:

```
VSM# show nsc-pa status
NSC Policy-Agent status is - Installed Successfully. Version 3.2(1e)-vsm
VSM#
```

Step 5 Log in to Cisco PNSC.

Step 6 Click **Resource Management** and then click **Resources**.

Step 7 In the **navigation** pane, click **VSMs** and verify the VSM information in the **VSMs** pane.

Step 8 In the **navigation** pane, click **VSGs** and verify the VSG information in the **VSGs** pane.

Task 8: On Cisco PNSC, Configuring a Tenant, Security Profile, Compute Firewall, and Assigning Cisco VSG to the Compute Firewall

Now that you have Cisco PNSC and Cisco VSG successfully installed with the basic configurations, you should configure the basic security profiles and policies.

This task includes the following subtasks:

- Configuring a Tenant on Cisco Prime NSC, on page 22
- Configuring a Security Profile on the Cisco Prime NSC, on page 22
- Configuring a Compute Firewall and Assigning Cisco VSG to Cisco Prime NSC, on page 23

What to do next

Go to Configuring a Tenant on Cisco Prime NSC, on page 22

Configuring a Tenant on Cisco Prime NSC

Tenants are entities (businesses, agencies, institutions, and so on) whose data and processes are hosted on VMs on the virtual data center. To provide firewall security for each tenant, the tenant must first be configured in Cisco PNSC.

SUMMARY STEPS

1. From the Cisco PNSC toolbar, click the **Tenant Management** tab.
2. In the Navigation pane directory tree, right-click **root**, and from the drop-down list, choose **Create Tenant**.
3. In the **Create Tenant** dialog box, do the following:
4. Click **OK**.

DETAILED STEPS

Step 1 From the Cisco PNSC toolbar, click the **Tenant Management** tab.

Step 2 In the Navigation pane directory tree, right-click **root**, and from the drop-down list, choose **Create Tenant**.

Step 3 In the **Create Tenant** dialog box, do the following:

a) In the **Name** field, enter the tenant name; for example, Tenant-A.
b) In the **Description** field, enter a description for that tenant.

Step 4 Click **OK**.

Notice that the tenant that you have just created is listed in the left-side pane under root.

What to do next

See Configuring a Security Profile on the Cisco Prime NSC, on page 22

Configuring a Security Profile on the Cisco Prime NSC

You can configure a security profile on Cisco PNSC.

Step 1 In the Cisco PNSC toolbar, click the **Policy Management**>**Service Profiles**.

Step 2 In the **Root** navigation window, from the directory path, choose **Tenant** > **Compute Firewall** > **Compute Security Profile**.

Step 3 Right-click **Compute Security Profile** and choose **Add Compute Security Profile**.

The **Add Compute Security Profile** dialog box opens.

Step 4 In the **Add Compute Security Profile** dialog box, do the following:

a) In the **Name** field, enter a name for the security profile; for example, sp-web.
b) In the **Description** field, enter a brief description of this security profile.

Step 5 Click **OK**

What to do next

See Configuring a Compute Firewall and Assigning Cisco VSG to Cisco Prime NSC, on page 23

Configuring a Compute Firewall and Assigning Cisco VSG to Cisco Prime NSC

The compute firewall is a logical virtual entity that contains the device profile that you can bind (assign) to Cisco VSG VM. The device policy in the device profile is then pushed from Cisco PNSC to Cisco VSG. Once this is complete, the compute firewall is in the applied configuration state on Cisco PNSC.

Step 1 From Cisco PNSC, choose **Resource Management** > **Managed Resources**.

Step 2 On the left-pane directory tree, navigate to choose a tenant.

Step 3 Click the **Action** drop-down list, choose **Add Compute Firewall**. The **Add Compute Firewall** dialog box opens.

Step 4 In the **Add Compute Firewall** dialog box, do the following:

a) In the **Name** field, enter a name for the compute firewall.
b) In the **Description** field, enter a brief description of the compute firewall.
c) In the **Host Name** field, enter the name for your Cisco VSG.

Step 5 Click **Next**.

The new Compute Firewall pane displays with the information that you provided.

Step 6 In the **Select Service Devices** pane, choose **Assign VSG** radio button, from the **VSG Devices** drop-down, choose a VSG. then and click **Next**.

Step 7 In the **Interface** tab, **Configure Data Interface** pane, enter data interface (data0) IP address and subnet mask, and click **Next**.

Step 8 Verify the configuration in **Summary** tab and click **Finish**.

Step 9 Click **Root** > **Tenant** > **Network Services** and verify the status of the firewall.

Task 9: On the Prime NSC, Configuring a Permit-All Rule

You can configure a permit-all rule in the Cisco PNSC.

Step 1 Log in to the Cisco PNSC.

Step 2 Choose **Policy Management** > **Service Profiles**.

Step 3 Choose **Root** > **Tenant** > **Compute Firewall** > **Compute Security Profile**, and then select a security profile.

Step 4 In the right pane, click **Add ACL Policy Set**.

Step 5 In the **Add ACL Policy** dialog box, do the following:

a) In the **Name** field, enter the ACL Policy Set name.
b) In the **Description** field, enter a brief description of the ACL Policy Set.
c) Click **Add ACL Policy**.

Step 6 In the **Add ACL Policy** dialog-box, enter the policy name, enter policy description, and then click **Add Rule**.

Step 7 In the **Add Rule dialog** box, do the following:

a) In the **Name** field, enter the rule name.
b) For the **Action** radio button, choose the matching condition (for example, Permit-All to permit all the traffic).
c) On the **Condition Match Criteria** field, choose the required condition.
d) On the **Source - Destination - Service** tab, click **Add** to add source/destination conditions or service.
e) On the **Protocol** tab, uncheck **Any** to choose specific protocols. Do not uncheck **Any** if you wish to match all the protocols.
f) On the **Ether-Type** tab, click **Add** to specify an Ether type for the rule.
g) On the **Time Range** tab, keep the default option to leave the rule enabled.
h) On the **Advanced** tab, click **Add** to add checks for source ports.
i) Click **Ok**.

Step 8 In the **Add Policy** dialog box, click **OK**.

The newly created policy is displayed in the **Assigned** field.

Step 9 In the **Add Policy Set** dialog box, click **OK**.

Step 10 In the **Service Profile** window, click **Save**.

Task 10: On Cisco VSG, Verifying the Permit-All Rule

You can verify the rule presence in Cisco VSG, by using the Cisco VSG CLI and the **show** commands.

```
vsg# show running-config rule
rule POL-DEMO/R-DEMO@root/Tenant/VDC
cond-match-criteria: match-allaction permit
rule POL1/R1@root/Tenant/VDC
cond-match-criteria: match-allaction permit
rule default/default-rule@root
cond-match-criteria: match-allaction drop
vsg#
```

Task 11: Enabling Logging

To enable logging follow these procedures:

- Enabling Logging level 6 for Policy-Engine Logging, on page 24
- Enabling Global Policy-Engine Logging, on page 25

Enabling Logging level 6 for Policy-Engine Logging

Logging enables you to see what traffic is going through your monitored virtual machine. This logging is helpful for verifying that you have a proper configuration and to help in troubleshooting. You can enable Logging Level 6 for policy-engine logging in a monitor session.

Step 1 Log in to Cisco PNSC.

Step 2 Choose **Policy Management** > **Device Configurations**.

Step 3 In the **Navigation** pane, choose **root** > **Policies** > **Syslog** > **Default**, and then click **Edit**.

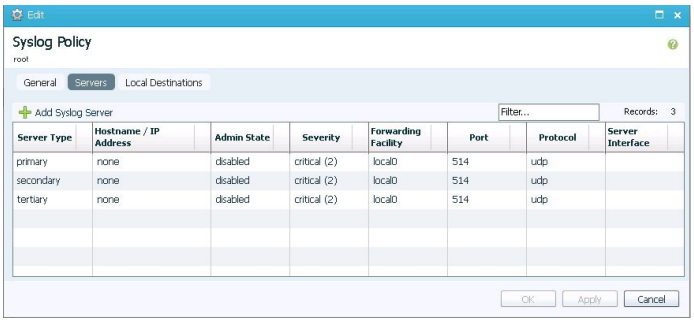
Step 4 In the **Edit Syslog** dialog box, do the following:

a) Click the **Servers** tab.

b) In the **Server Type** column, choose the **primary** server type from the displayed list.

c) From the pane toolbar, click **Edit.**

Figure 5: Edit Syslog Dialog Box



Step 5 In the **Edit Syslog Client** dialog box, do the following:

a) In the **Hostname/IP address** field, enter the **`syslog server IP address.`**

b) From the **Severity** drop-down list, choose **Information(6).**

c) From the **Admin State** drop-down list, check **Enabled** radio button.

d) Click **OK**.

Step 6 Click **OK**.

What to do next

See Enabling Global Policy-Engine Logging, on page 25.

Enabling Global Policy-Engine Logging

Logging enables you to see what traffic is going through your monitored VM. This logging is helpful for verifying that you have a proper configuration and to help in troubleshooting.

Step 1 Log in to Cisco PNSC.

Step 2 In the **Cisco Prime NSC** window, choose **Policy Management** > **Device Configurations** > **root** > **Device Profiles** > **default**. The **default** Device Profile window opens.

Step 3 In the **default** pane, do the following:

a) In the **Work** pane, click the **General** tab.

b) In the **Policy Engine Logging** field, check the **Enabled** radio button.

Step 4 Click **Save**.

Task 12: Enabling the Traffic VM Port-Profile for Firewall Protection and Verifying the Communication Between the VSM, VEM, and VSG

This section includes the following topics:

Before you begin

Ensure that you have:

- Server VM that runs with an access port profile (for example, web server)
- Cisco VSG data IP address (for example, 10.10.10.200) and VLAN ID (for example, 100)
- Set up the Virtual Network Adapter
- Security profile name (for example, sp-web)
- Organization (Org) name (for example, root/Tenant-A)
- Port profile that you would like to edit to enable firewall protection

Enabling Traffic VM Port-Profile for Firewall Protection

You can enable a traffic VM port profile for traffic protection.

SUMMARY STEPS

1. Create VSG node.
2. Create the network segment and Traffic VM Port-Profile for Firewall Protection.

DETAILED STEPS

Step 1 Create VSG node.

```
vsm#configure terminal
vsm (config)# vservice node VSG type vsg
vsm (config-vservice-node)# ip address 10.10.10.200
vsm (config-vservice-node)# adjacency l3
vsm (config-vservice-node)# exit
vsm (config)# copy running-config startup-config
```

Step 2 Create the network segment and Traffic VM Port-Profile for Firewall Protection.

```
vsm(config)# nsm network segment VMAccess_400
vsm(config-net-seg)# member-of network segment pool vsm_NetworkSite
vsm(config-net-seg)# switchport access vlan 400
vsm(config-net-seg)# ip pool import template VM_IP_Pool
vsm(config-net-seg)# publish network-segment
vsm(config-net-seg)# exit

vsm(config)# port-profile type vethernet pp-webserver
vsm(config-port-prof)# org root/Tenant-A
vsm(config-port-prof)# vservice node VSG profile sp-web
vsm(config-port-prof)# no shutdown
vsm(config-port-prof)# state enabled
vsm(config-port-prof)# publish port-profile
vsm(config-port-prof)# exit
vsm(config)# show port-profile name pp-webserver
```

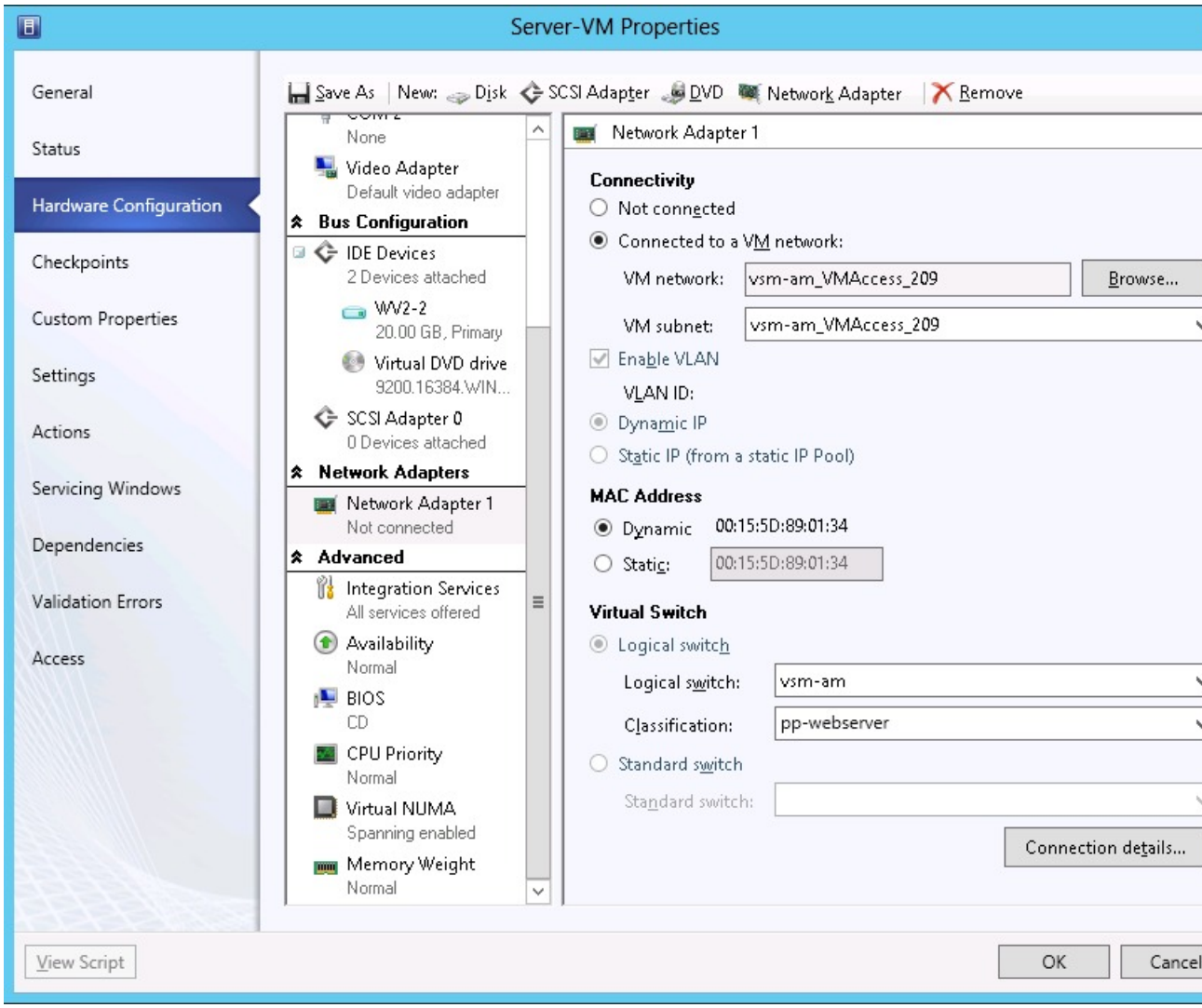
What to do next

See Verifying the VSM or VEM for Cisco VSG Reachability, on page 27.

Verifying the VSM or VEM for Cisco VSG Reachability

Ensure that you have assigned the traffic VM port profile with firewall protection to the traffic VM.

Figure 6: Virtual Machine Properties Window



This example shows how to verify the communication between the VEM and the VSG:

```
VSM# show vservice brief
------------------------------------------------------------------------------
                                Node Information
------------------------------------------------------------------------------
 ID Name                    Type    IP-Address      Mode    State   Module
  1 VSG-1                   vsg     192.161.0.85    l3      Alive   3,4,

------------------------------------------------------------------------------
                                Path Information
------------------------------------------------------------------------------
------------------------------------------------------------------------------
                                Port Information
------------------------------------------------------------------------------
PortProfile:PP-VSERVICE
Org:root/Tenant1
Node:VSG-1(192.161.0.85)                    Profile(Id):SP1(6)
Veth Mod VM-Name                            vNIC IP-Address
```

```
   4    4 traffic-vm-win-22                       192.163.0.53,
   8    3 traffic-vm-win-12                       192.163.0.76
  10    3 traffic-vm-ubuntu-61                    192.163.0.80,
  11    3 traffic-vm-ubuntu-52                    192.163.0.52,
```

A display showing the IP-ADDR Listing and Alive state verifies that the VEM can communicate with the Cisco VSG.

Checking the VM Virtual Ethernet Port for Firewall Protection

This example shows how to verify the VM Virtual Ethernet port for firewall protection:

```
VSM(config)# show vservice port brief port-profile VSGDemo-WEB-FW
------------------------------------------------------------------------------
                                  Port Information
------------------------------------------------------------------------------
PortProfile:VSGDemo-WEB-FW
Org:root/Demo
Node:VSG(153.1.1.13)                          Profile(Id):Demo-Default-Security-Profile(6)
Veth Mod VM-Name                              vNIC IP-Address
   1    3 web-server1                              152.1.1.11,
```

Note Make sure that your VNSP ID value is greater than 1.

Task 13: Installing Microsoft Service Provider Foundation

After installing Cisco Prime NSC, you need to enable communication between the Prime NSC and Microsoft SCVMM. This is required for virtual machine attribute based policies to work on VSG. Microsoft Service Provider Foundation (SPF) is a plugin that enables communication between Microsoft SCVMM and Cisco Prime NSC. The following table lists the SPF versions compatible with Cisco Prime NSC 3.4:

Table 1: SPF versions compatible with Cisco Prime NSC 3.4

SCVMM Version	SPF Version
System Center 2012 Service Pack 1	7.1.3117.0
System Center 2016	7.2.379.0

This task includes the following subtasks:

- Installing Service Provider Foundation, on page 30
- Configuring Service Provider Foundation, on page 30
- Verifying Service Provider Foundation Installation, on page 31
- Creating VM Manager on Cisco Prime NSC, on page 31

What to do next

See Installing Service Provider Foundation, on page 30

Installing Service Provider Foundation

For detailed information about installing Service Provider Foundation, see *How to Install Service Provider Foundation for System Center 2012 R2* or *How to Install Service Provider Foundation for System Center 2016* available at: http://technet.microsoft.com/en-us/library/dn266007.aspx.

Before you begin

Ensure that you have:

- Downloaded install system center 2012 R2 or 2016 orchestrator based on your requirement.
- Verified the system requirements for Service Provider Foundation (SPF). For information on system requirements, refer to *System Requirements for Service Provider Foundation for System Center 2012 SP1* or *System Requirements for Service Provider Foundation for System Center 2016* , available at: http://technet.microsoft.com/en-us/library/jj642899.aspx.
- NTP server information.

Configuring Service Provider Foundation

After the Service Provider Foundation (SPF) is successfully installed, you need to a create stamp ID (stampId) and associate it with the Microsoft SCVMM server. For more information about configuring SPF, see http://technet.microsoft.com/en-us/library/jj613915.aspx.

Before you begin

See Verifying Service Provider Foundation Installation, on page 31

Step 1 Open a **Windows** powers shell.

Step 2 Run **import-module spfadmin**.

Step 3 Enter **$server = New-SCSPFServer -Name** *"scvmm server"* **-ServerType VMM**

This is the server name that is displayed in the login window.

Step 4 **$tenant = New-SCSPFTenant -Name** *"tenant-name"*

Step 5 $tenant = New-SCSPFTenant -Name "<tenant-name>"

Enter the VM name as the tenant name.

Step 6 **$stamp = New-SCSPFStamp -Name "Stamp" -Servers $server**

Step 7 **Set-SCSPFStamp -Stamp $stam -Tenants $tenant**

Verifying Service Provider Foundation Installation

To check if the SPF installation is successful and functional, launch the following VMM REST interface web link:

`https://<spf_host>:8090/SC2016R2/VMM/Microsoft.Management.Odata.Svc`

where <spf_host> is the IP address for the Microsoft SCVMM VM.

Use the following link to launch the Virtual Machines REST URL:

`https://<spf_host>:8090/SC2016R2/VMM/Microsoft.Management.Odata.Svc/VirtualMachines`

where <spf_host> is the IP address for the SCVMM VM.

Creating VM Manager on Cisco Prime NSC

You need to create a VM manager to enable Prime NSC to retrieve VM information from Microsoft SCVMM.

Step 1 Launch Cisco Prime NSC.

Step 2 Choose **Resource Management** > **VM Manager** > **Add VM Manager**.

Step 3 In the **Add VM Manager** dialog box, enter the following:

a) Name for VM manager.
b) Description for the VM manager
c) Hostname/IP address of SCVMM.
d) Domain-Name/User-name.
e) Password SCVMM host.
f) Keep the default Port Number.
g) Click **OK**.

Task 14: Sending Traffic Flow and on Cisco VSG Verifying Statistics and Logs

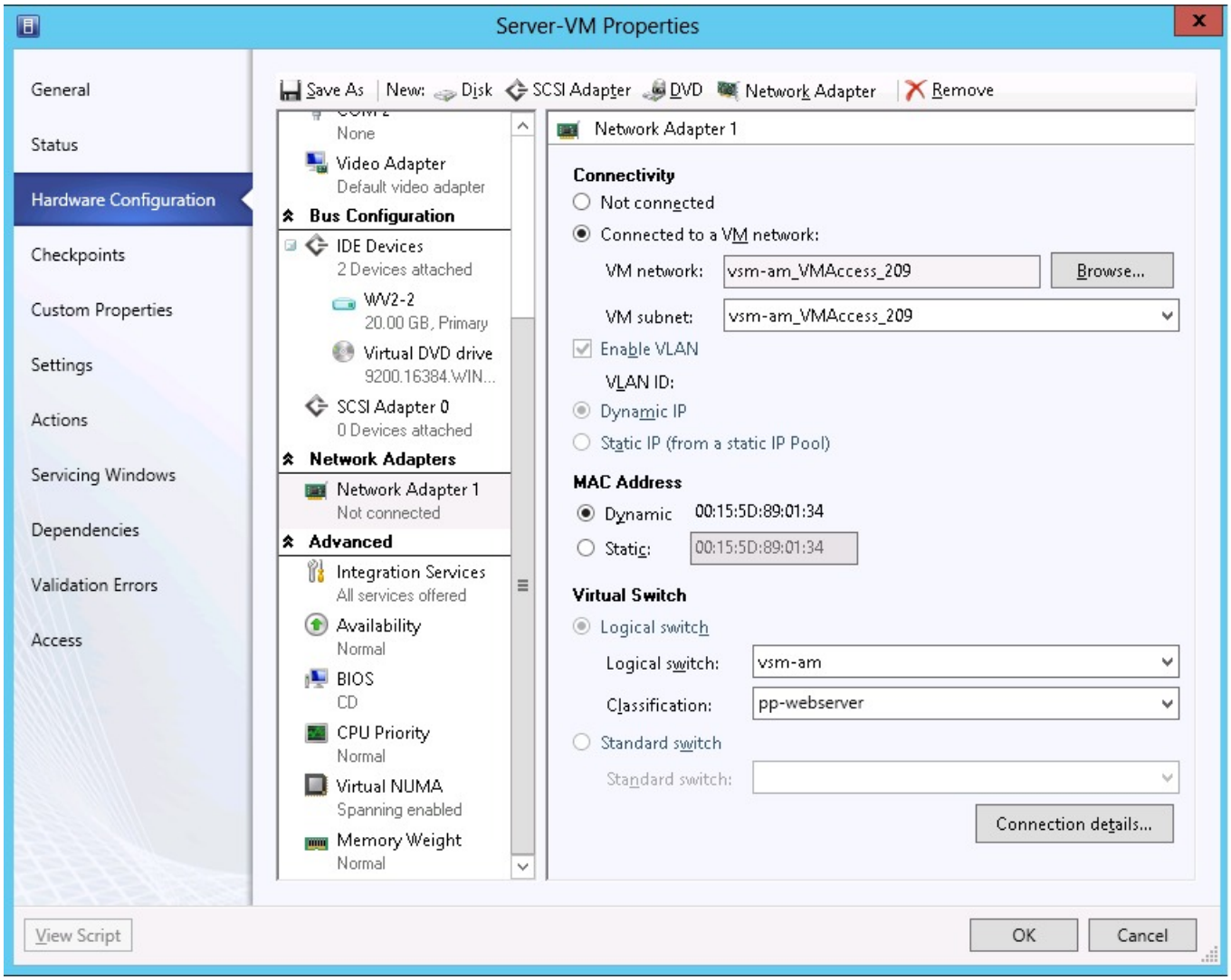
This section includes the following topics:

Sending Traffic Flow

You can send traffic flow through the Cisco VSG to ensure that it is functioning properly.

Step 1 Ensure that you have the VM (Server-VM) that is using the port profile (pp-webserver) configured for firewall protection.

Figure 7: Virtual Machine Properties Window



Step 2 Log in to any of your client virtual machine (Client-VM).

Step 3 Send traffic (for example, HTTP) to your Server-VM.

```
[root@]# wget http://172.31.2.92/
--2014-11-28 13:38:40--  http://172.31.2.92/
Connecting to 172.31.2.92:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 258 [text/html]
Saving to: `index.html'

100%[======================================================================>] 258         --.-K/s
  in 0s

2014-11-28 13:38:40 (16.4 MB/s) - `index.html' saved [258/258]

[root]#
```

Step 4 Check the policy-engine statistics and log in to Cisco VSG.

In the Cisco VSG Layer 3 mode, IP fragmentation is not supported on the VEM virtual machine network interface card (vmnic) for traffic leaving the host. Hence, after vPath encapsulation, if an IP packet is received by a VEM from a virtual machine with a packet size greater than the outgoing interface MTU value, it will be dropped, and an ICMP error message (error code = 4) will be sent back to the source virtual machine. To avoid packet drops in this scenario, increase the outgoing server port MTU value by 94 bytes. For example, if the MTU values of client and server virtual machines and uplinks are all 1500 bytes, set the uplink MTU value to 1594 bytes

What to do next

See Verifying Policy-Engine Statistics and Logs on Cisco VSG, on page 33.

Verifying Policy-Engine Statistics and Logs on Cisco VSG

Log in to Cisco VSG and check the policy-engine statistics and logs.

This example shows how to check the policy-engine statistics and logs:

```
vsg# show policy-engine stats
Policy Match Stats:
default@root                 :         0
  default/default-rule@root  :         0 (Drop)
  NOT_APPLICABLE             :         0 (Drop)

PS_web@root/Tenant-A :         1
  pol_web/permit-all@root/Tenant-A :         1 (Log, Permit)
  NOT_APPLICABLE               :         0 (Drop)

vsg# terminal monitor
vsg# 2014 Nov 28 05:41:27 firewall %POLICY_ENGINE-6-POLICY_LOOKUP_EVENT:
policy=PS_web@root/Tenant-A rule=pol_web/permit-all@root/Tenant-A action=Permit
direction=egress src.net.ip-address=172.31.2.91 src.net.port=48278
dst.net.ip-address=172.31.2.92 dst.net.port=80 net.protocol=6 net.ethertype=800
```