Configuring Virtual Networks Using OpenStack

This chapter contains the following sections:

Information About Virtual Networks

This chapter provides general information about using the OpenStack dashboard to create several different types of virtual networks. For specific information about implementing virtual network components to deploy the VXLAN Gateway, see the VXLAN Configuration Guide or the Cisco Nexus 1000V for KVM Installation Guide.

Guidelines and Limitations for the OpenStack Dashboard

The OpenStack dashboard has the following guidelines and limitations when you use it to create virtual networks for Cisco Nexus 1000V for KVM:

- Network profile creation by an administrator is not supported in Cisco Nexus 1000V for KVM Release 5.2(1)SK3(2.2) software and highter. Network profiles are automatically created for each network type.
- To create a network profile and associate it with a tenant, you must log in to the OpenStack dashboard as a user with admin privileges. Any user can use a network profile that is associated with a tenant.
- You cannot create policy profiles or assign them to a tenant in OpenStack dashboard. You must first create them as part of the port profiles in the VSM. The OpenStack dashboard retrieves them from the VSM and displays them on the **Router** dashboard.
- When there are multiple VSMs, the port profile must be configured on all the VSMs.

Creating a Virtual Network Workflow

This workflow describes how to create a virtual network.

Steps		Notes
1. Create tenants.		See Creating a Tenant Using the OpenStack Dashboard, on page 2.
2. Create policy and port profiles.		See the *Cisco Nexus 1000V for KVM Port Profile Configuration Guide* .
3.Create the network using the OpenStack Dashboard or OpenStack CLI:		
• Create a network using the OpenStack Dashboard		
	1. Create a network profile **Note** This step is not necessary for Cisco Nexus 1000V for KVM Release 5.2(1)SK3(2.2).	See Creating a Network Profile Using the OpenStack Dashboard, on page 3. Network profile creation by an administrator is not supported in Cisco Nexus 1000V for KVM Release 5.2(1)SK3(2.2) software and highter. Network profiles are automatically created for each network type.
	2. Create a network	See Creating a Virtual Network Using OpenStack Dashboard, on page 5.
	3. Create a network subnet	See Creating a Subnet for a Network Using the OpenStack Dashboard, on page 5.
	4. Create and launch a VM instance	See Creating and Launching a VM Instance Using the OpenStack Dashboard, on page 6.
• Create a network using the OpenStack CLI		See Creating VLAN and VXLAN Networks Using the OpenStack CLI, on page 6.

Creating a Tenant Using the OpenStack Dashboard

In the OpenStack dashboard, tenants are also known as projects.

Procedure

Step 1 In the **Navigation** pane, click **Admin** > **Projects**.

Step 2 In the **Projects** panel, click **Create Project**.

Step 3 In the **Create Project** dialog box, complete the following fields on the **Project Info** tab:

a) In the **Name** field, enter a unique name for the project.
The name can have a maximum length of 255 characters, and can contain uppercase or lowercase characters, numerals, and special characters such as an "at" sign (@), ampersand (&), and exclamation point (!).

b) (Optional) In the **Description** field, enter a description for the project.

c) In the **Enabled** check box, check the box if you want to enable the project.

Step 4 On the **Project Members** tab, click the + button for all members that you want to add to the project.

Step 5 On the **Quota** tab, change the defaults in the fields if desired.

Step 6 Click **Create Project**.

What to Do Next

Create the desired network profiles.

Creating a Network Using the OpenStack Dashboard

Creating a Network Profile Using the OpenStack Dashboard

Note This procedure is not required for Cisco Nexus 1000V for KVM Release 5.2(1)SK3(2.2). Network profiles are created automatically for each network type.

Before You Begin

- Create one or more policy profiles as part of the port profiles in the VSM.
- Create one or more tenant in the OpenStack dashboard.

Procedure

Step 1 In the **Navigation** pane, click the **Router** dashboard.

Step 2 In the **Cisco Nexus 1000v** panel, click **Create Network Profile**.

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

a) In the **Name** field, enter a unique name for the network profile.
The name can have a maximum length of 255 characters, and can contain uppercase or lowercase characters, numerals, and special characters such as an "at" sign (@), ampersand (&), and exclamation point (!).

b) From the **Segment Type** drop-down list, choose one of the following:

- **VLAN—**For networks as access mode.
- **Overlay—**For VXLAN.
- **Trunk—**For networks as trunk mode.

c) From the **Sub Type** drop-down list, choose a sub type. The sub type that you can choose depends on the segment type that you chose:

Chosen Segment Type	Possible Sub Types
VLAN	**None**
Overlay	• **Enhanced** for unicast VXLAN • **Native VXLAN** for multicast VXLAN
Trunk	**VLAN**

d) In the **Segment Range** field, enter the segment range for the network profile.
Separate the first and last segments in the range with a hyphen (-). For example, enter a range of 80-86. If the segment type is **VLAN**, the range can be from 1 to 3967, or from 4048 to 4093. If the segment type is **Overlay**, the range can be from 4096 to 16000000.

e) In the **Physical Network** field, enter the name of the associated physical network.

f) If you chose the **Overlay** segment type, enter the IP address range in the **Multicast IP Range** field.
Separate the first and last IP addresses in the range with a hyphen (-). The reserved multicast IP address range is 224.0.0.0 to 224.0.0.255.

g) If you chose the **Other** segment type, complete the **Other** field.
Complete this field with a string only if you need to specify a network profile subtype that is not one of the subtypes that is currently supported and available in the drop-down list.

h) From the **Project** check box, check a tenant that you want to associate with this network profile.

i) Click **Create Network Profile**.

OpenStack dashboard creates the network profile and then updates the OpenStack Neutron database and the VSM.

What to Do Next

Create one or more networks.

Creating a Virtual Network Using OpenStack Dashboard

Before You Begin

Create one or more port profiles in the VSM. These port profiles are displayed as policy profiles in OpenStack dashboard. For more information, see *Cisco Nexus 1000V for KVM Port Profile Configuration Guide* .

Procedure

Step 1 If you have not already done so, log in to OpenStack dashboard as a user with admin privileges.

Step 2 Create a tenant.

Note If using Cisco Nexus 1000V for KVM Release 5.2(1)SK3(2.2), skip Steps 3 and 4. Network profiles are created automatically for each network type.

Step 3 Create a network profile of type trunk.

Step 4 Create a network profile of type VLAN.

Step 5 Create a network.

Step 6 Create a subnet for the network.
You do not need to create a port for the network. OpenStack dashboard creates a port for the network when you launch the instance.

Step 7 Create and launch the virtual machine (VM) instance.

Creating a Subnet for a Network Using the OpenStack Dashboard

Procedure

Step 1 In the **Navigation** pane, click **Admin** > **Networks**.

Step 2 In the **Networks** panel, click the network to which you want to add a subnet.

Step 3 In the **Create Subnet** dialog box, click the **Subnet** tab an do the following:

a) In the **Name** field, enter a unique name for the subnet.
The name can have a maximum length of 255 characters and can contain uppercase or lowercase characters, numerals, and special characters such as an "at" sign (@), ampersand (&), and exclamation point (!).

b) In the **Network Address** field, enter the address for the subnet.
The subnet address must be in classless interdomain routing (CIDR) format. For example, 192.168.0.0/16.

c) From the **IP Version** drop-down list, choose IPv4.

d) (Optional) In the **Gateway IP** field, enter a gateway IP address for the subnet.

Step 4 Optionally, click the **Subnet Detail** tab and do the following:

a) (Optional) Click the **Enable DHCP** checkbox.

b) Enter one or more allocation pools in the **Allocation Pools** text box.

c) Enter one or more name servers in the **DNS Name Servers** text box.

d) Enter one or more host routes in the **Host Routes** text box.

Step 5 Click **Create** to create the subnet.

Creating and Launching a VM Instance Using the OpenStack Dashboard

Procedure

Step 1 From the **Current Project** drop-down list, choose the project in which you created the network.

Step 2 In the **Navigation** pane, click the **Project** dashboard.

Step 3 In the **Instances** panel, click **Launch Instance**.

Step 4 On the **Details** tab of the **Launch Instance** dialog box, do the following:

a) From the **Instance Source** drop-down list, choose **Image**.

b) From the **Image** drop-down list, choose the image you want to associate with the instance.
For VXLAN Gateway, choose the VXLAN Gateway image.

c) In the **Name** field, enter a unique name for the instance.
The name can have a maximum length of 255 characters, and can contain uppercase or lowercase characters, numerals, and special characters such as an "at" sign (@), ampersand (&), and exclamation point (!).

Step 5 On the **Networking** tab of the **Launch Instance** dialog box, do the following:

a) In the **Networks** area, check the check box for the networks that you want to assign to the instance.
The networks should be the networks you created previously.

b) From the **Policy Profiles** drop-down list, choose the policy profile that you want to assign to the network.

Step 6 Click **Launch**.
The OpenStack dashboard creates the instance and launches it.

Creating VLAN and VXLAN Networks Using the OpenStack CLI

You can create a virtual network for VLAN and VXLAN traffic using the using the OpenStack CLI.

Note This procedure is not required for Cisco Nexus 1000V for KVM Release 5.2(1)SK3(2.2). Network profiles are created automatically for each network type.

Step	Command	Description
1. Create one of the following types of networks:		

Step	Command	Description
• VLAN network	**neutron cisco-network-profile-create** *name* **vlan --segment_range***segment-range* **--physical_network** *network*	Creates a VLAN type network profile. For more information about this command, see the cisco-network-profile-create command reference page.
• Trunk network	**neutron cisco-network-profile-create** *name* **trunk --sub_type vlan**	Creates a trunk type of network profile with a sub type of VLAN. For more information about this command, see the cisco-network-profile-create command reference page.
• Trunk network	**neutron cisco-network-profile-create** *name* **overlay --subtype native_vxlan --segment_range** *segment-range* **--multicast_ip_range** *ip-range*	Creates a multicast VXLAN type network profile. For more information about this command, see the cisco-network-profile-create command reference page.
• Multicast VXLAN network	**neutron cisco-network-profile-create** *name* **overlay --subtype enhanced --segment_range** *segment-range*	Creates a unicast VXLAN type network profile. For more information about this command, see the cisco-network-profile-create command reference page.
• Unicast VXLAN network	**neutron net-create** *name* **--n1kv:profile_id** *networkProfileId* For Release 5.2(1)SK3(2.2) or higher use the following command: **neutron net-create** *name* **--n1kv:profile** *networkProfileID*	Creates a network and associates it with a Cisco Nexus 1000V switch network profile.
3. Create the subnet.	**neutron subnet-create** *network-name IP-address-range* **--name** *subnet-name*	For more information about this command, see the OpenStack documentation
4. Create a port profile.	**neutron port-create** *network-name* **--n1kv:profile_id** *policyProfileID* For Release 5.2(1)SK3(2.2) or higher use the following command: **neutron net-create** *name* **--n1kv:profile** *PolicyProfileID* or *PolicyProfileName*	Creates ports and associates them with either the policy profile UUID or policy profile name.

Step	Command	Description
5. Bring up the virtual machine with the network.	**nova boot --image** *image-id* **--flavor** *flavor-id* **--nic port-id** *=port-id vm-name*	For more information about this command, see the OpenStack documentation.

Note The profile_id in the neutron net-create command refers to the network profile ID. The profile_id in the neutron port-create command refers to the policy profile ID.

The following example shows how to create a VLAN network:

```
$
$ neutron cisco-network-profile-create netprof vlan --segment_range 100-200 --physical_network
 physnet1
$ neutron net-create NetworkOne --n1kv:profile_id a9355268-5aed-8030-f3ab-e367ef4c9acc
$ neutron subnet-create NetworkOne 172.23.181.0/24 --name subnet1
$ neutron port-create NetworkOne --n1kv:profile_id b9b8d5fa-41a3-4e59-bb1e-6a5e296908e1
$ nova boot --image image-name --flavor m1.medium --nic
port-id=d341926c-21ca-48cd-ae18-c51f899f6d3f VM-1
```

The following example shows how to create a VLAN trunk network:

```
$ neutron cisco-policy-profile-update polprofId --add-tenant 1234-1234-1234-1234
$ neutron cisco-network-profile-create trunkprof trunk --sub_type vlan
$ neutron net-create NetworkOne --n1kv:profile_id b9b8d5fa-41a3-4e59-bb1e-6a5e296908e1
$ neutron port-create NetworkOne --n1kv:profile_id a9355268-5aed-8030-f3ab-e367ef4c9acc
$ nova boot --image image-name --flavor m1.medium --nic
port-id=d341926c-21ca-48cd-ae18-c51f899f6d3f --nic
port-id=7acf56b5-2d0d-e35d-def7-bdbe3960ea30 VM-1
```

The following example shows how to create a multicast VXLAN type network:

```
$ neutron cisco-policy-profile-update polprofId --add-tenant 1234-1234-1234-1234
$ neutron cisco-network-profile-create netprof overlay --subtype native_vxlan --segment_range
 5000-5300 --multicast_ip_range 224.99.0.0-224.99.0.1
$ neutron net-create NetworkOne --n1kv:profile_id b9b8d5fa-41a3-4e59-bb1e-6a5e296908e1
$ neutron port-create NetworkOne --n1kv:profile_id a9355268-5aed-8030-f3ab-e367ef4c9acc
$ nova boot --image image-name --flavor flavor-id --nic
port-id=d341926c-21ca-48cd-ae18-c51f899f6d3f VM-1
```

Note To obtain a list of all images and their UUIDs, type `nova image-list`.

The following example shows how to create a unicast VXLAN type network:

```
$ neutron cisco-policy-profile-update polprofId --add-tenant 1234-1234-1234-1234
$ neutron cisco-network-profile-create netprof overlay --subtype enhanced --segment_range
5000-5300
$ neutron net-create NetworkOne --n1kv:profile_id b9b8d5fa-41a3-4e59-bb1e-6a5e296908e1
$ neutron port-create NetworkOne --n1kv:profile_id a9355268-5aed-8030-f3ab-e367ef4c9acc
$ nova boot --image imageid --flavor flavor-id --nic
port-id=d341926c-21ca-48cd-ae18-c51f899f6d3f VM-1
```