



Hewlett Packard
Enterprise

HPE Distributed Cloud Networking Modular Layer 2 User Guide Release 4.0R3

Abstract

This guide is intended for system administrators who are responsible for enterprise network configuration and administrators for the DCN/VNS software. The information in this guide is subject to change without notice.

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Contents

1 Using OpenStack with modular layer 2 (ML2) mechanism driver for VSD-managed VMS	4
Overview.....	4
Prerequisites.....	4
Configuration files – locations and changes.....	4
Software and Hardware Version.....	5
Use cases.....	5
SR-IOV.....	5
Neutron API and CLI support.....	6
Binding VSD redirection targets on Neutron.....	7
Potential user impact.....	7
Create a VM with an SR-IOV port.....	8
2 Support and other resources	9
Contacting HPE.....	9
HPE security policy.....	9
Related information.....	9
Documents.....	9
Websites.....	10
3 Documentation feedback	11

1 Using OpenStack with modular layer 2 (ML2) mechanism driver for VSD-managed VMS

This document describes the functionality of the Neutron modular layer 2 (ML2) mechanism driver that supports VSD-managed networking using networks, subnets, and ports/APIs.

Overview

This feature allows an OpenStack installation to support **SR-IOV-attached VMs** in conjunction with Distributed Cloud Networking (DCN)-managed VMs on the same KVM hypervisor cluster. It provides an ML2 mechanism driver that coexists with the sriovnicswitch mechanism driver.

Neutron ports attached via SR-IOV are configured by the sriovnicswitch mechanism driver. Neutron ports attached to VSD-managed networks are configured by the ML2 mechanism driver.

Since VSD-managed subnets appear in OpenStack as isolated subnets, there is no interaction with any L3 agent or router service plugin that may be installed.

NOTE:

- SR-IOV-backed networks require separate orchestration to attach each SR-IOV VF to the appropriate VLAN network. If VSG is used as top of rack switch, this can be done through VSD APIs.
 - Switching between the plugin and ML2 mechanism driver is not supported. If switching is required, the existing resources (such as subnets, routers, network, or ports) need to be manually deleted prior to switching.
-

Prerequisites

- OpenStack Kilo
- DCN 3.2R5 or above
- Neutron ML2 mechanism driver plugin

Configuration files – locations and changes

The Neutron plugin configuration file locations are described in this section, along with necessary changes for ML2 support.

Nova configuration file: `/etc/nova/nova.conf`

Changes:

```
network_api_class = nova.network.neutronv2.api.API
neutron_ovs_bridge = alubr0
ibvirt_vif_driver = nova.virt.libvirt.vif.LibvirtGenericVIFDriver
security_group_api = nova
firewall_driver=nova.virt.firewall.NoopFirewallDriver
```

Neutron (standard) configuration file: `/etc/neutron/neutron.conf` :

Changes:

```
[DEFAULT]
api_extensions_path = $PYTHON_PATH_TO_NEUTRON/neutron/nuage/
extensions
allow_overlapping_ips = True
core_plugin = neutron.plugins.ml2.plugin.Ml2Plugin
```

To spawn VMs using Horizon, add the following line to the file:

`/etc/neutron/neutron.conf`:

```
[DEFAULT]
service_plugins = router
```

The HPE driver needs the `nuage_plugin.ini` file as configuration input. For Ubuntu, this is done by changing file `/etc/default/neutron-server`.

Changes:

```
NEUTRON_PLUGIN_CONFIG="/etc/neutron/plugins/nuage/nuage_plugin.ini"
```

For Redhat, this file is selected, creating the symbolic link:

```
ln -s /etc/neutron/plugins/nuage/nuage_plugin.ini /etc/neutron/plugin.ini
```

VSD managed subnets configuration file: `/etc/neutron/plugins/ml2/ml2_conf.ini`

Changes:

```
[ml2]
tenant_network_types = vxlan
type_drivers = vxlan
mechanism_drivers = nuage
extension_drivers = nuage_subnet,nuage_port

[ml2_type_vxlan]
vni_ranges = 1001:2000
[securitygroup]
firewall_driver = neutron.agent.linux.iptables_firewall.OVSHybridIptablesFirewallDriver
```

ML2 mechanism driver plugin configuration file: `/etc/init/neutron-server.conf`

Add the following:

```
script
[ -x "/usr/bin/neutron-server" ] || exit 0
DAEMON_ARGS="--config-file=/etc/neutron/plugins/ml2/ml2_conf.ini"
```

After making the configuration changes, restart the Neutron server.

Software and Hardware Version

OpenStack Kilo with 3.2R5 and above

Use cases

For mixed networking environments in OpenStack, having multiple network drivers is important. The monolithic plugin cannot handle applications with multiple network needs, especially customers whose VMs require different attachment mechanisms. The initial use case for this is SR-IOV support, which includes a passthrough to an underlying VLAN-backed network.

In addition to the SR-IOV support for VMs requiring direct connectivity for maximum throughput and minimum latency, this feature enables VSD-managed subnet support for standard VMs using virtio drivers.

SR-IOV

VMs on the same hypervisor can be attached to either a network via a VRS bridge or a VLAN network via SR-IOV VF/macvtap. These are separate networks, and if connectivity between them is required, it is provided outside the ML2 driver context. See [“Neutron API and CLI support” \(page 6\)](#).

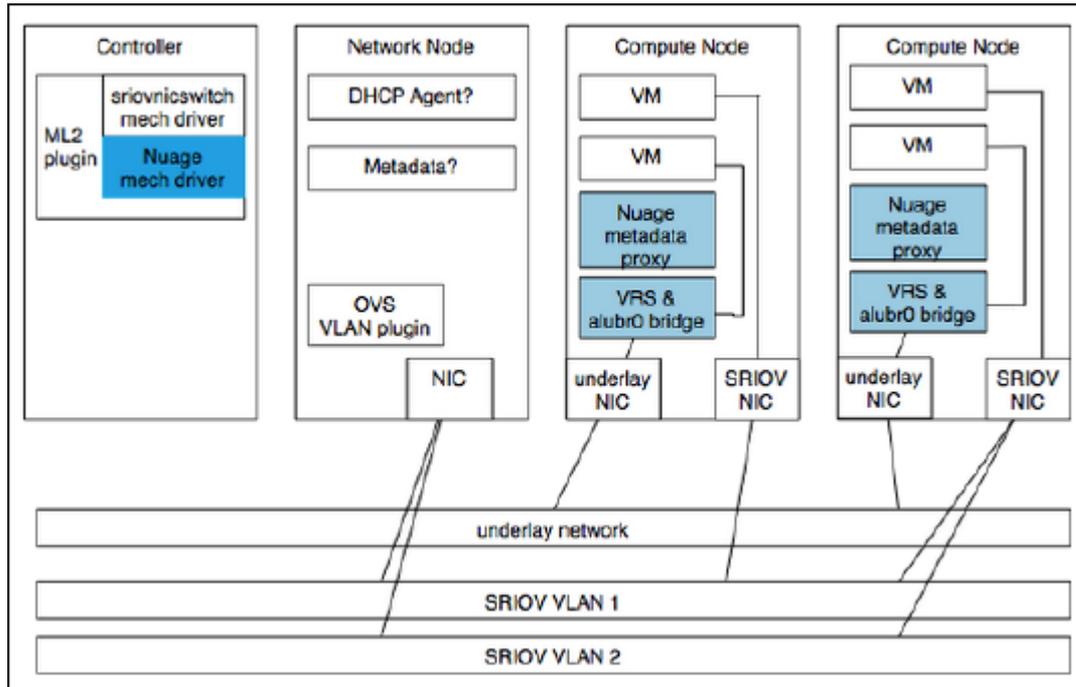
VMs on different hypervisors can be attached to the same VLAN network via SR-IOV. The ML2 mechanism driver will not supply DHCP or metadata services to these VLAN-backed networks. It is possible, however, to provide these services via OpenStack using the procedure for upstream implementation.

NOTE:

- Any routing between SR-IOV networks must be provisioned outside of OpenStack.
- Any connectivity between SR-IOV VLANs and ML2 subnets must also be provisioned outside of OpenStack, using VSD API calls to create gateway bridge ports on VSG or third-party gateways.

Figure 1 (page 6) illustrates a topology overview using an ML2 mechanized driver.

Figure 1 Topology overview



Neutron API and CLI support

There are slight differences between VSD-managed subnet support in the Neutron plugin and the ML2 mechanism driver.

NOTE: To configure the VSD organization for a given VSD-managed subnet, there is no need to create a net partition in OpenStack first.

Table 1 (page 6) lists supported and unsupported resources and attributes by driver and ML2 plugin. Only attributes and resources supported by the driver will result in customized behavior, such as creating or changing resources on VSD, creating custom rules, and adding extra attributes.

Table 1 Supported ML2 driver resources

Resource/attribute)	ML2 plugin	Nuage driver
network	Supported	Supported
port	Supported	Supported if subnet is VSD managed
> port:nuage_redirect_targets	Allowed	Supported
security_group	Supported	Ignored
subnet	Supported	Supported if subnet is VSD managed
> subnet:net_partition	Allowed	Supported

Table 1 Supported ML2 driver resources (continued)

Resource/attribute)	ML2 plugin	Nuage driver
> subnet:nuagenet	Allowed	Supported
> subnet:underlay	Allowed	Ignored
> subnet:vsd_managed	Allowed	Supported

This support includes:

- The /networks API
- The /subnets API (the driver performs actions only for VSD-Managed subnets), meaning:
 - For a create / POST request, **nuagenet** and **net_partition** must be provided. Also, when these parameters are passed, it is required that the network has **provider:network_type** set to **vxlan**, or it has such a segment.
 - For update / PUT and delete / DELETE requests, the subnet must be created with the required attributes.
- The /ports api
 - Only ports attached to a network with VSD-managed subnet attached are supported.

When non-VSD-managed resources are created, the driver will not act and will not cause exceptions.

The primary use case for the ML2 mechanism driver (VSD-managed) is to support VMs where both

Binding VSD redirection targets on Neutron

The VSD redirection target must have been created via VSD API or UI calls, and can be associated with a specific Neutron port using the nuage-redirect-target attribute.

```
::neutron port-update <port-id> --nuage-redirect-targets=<redirect-target name>
```

Potential user impact

The following are potential issues that can be caused by the driver running outside the transactions of the main ML2 plugin:

- Failures during update and delete:
 - If an update to port/network/subnet fails in the driver, in the part that is not in the main transaction, the resource might be updated in OpenStack (and other mechanized drivers), but the change might not be reflected in the VSD.
 - The same applies for delete. If something unexpected happens that results in the driver not deleting the resource from VSD, the resource will no longer be available in OpenStack.

These API/CLI calls will generate an error response, but are still processed by the ML2 plugin, and the database changed. This is the recommended VSD.

- Gateway IP:
 - For VSD-managed subnets, the driver retrieves the gateway IP from the VSD and overrides the default set by OpenStack. While this is not important for combinations with SR-IOV, other drivers may use gateway x.x.x.1, causing the gateway to overwrite to x.x.x.254 in the database.

Create a VM with an SR-IOV port

The following steps describe how to create a VM with an SR-IOV port. For specific details, see the OpenStack documentation:

1. Create a Neutron network.

```
neutron net-create --provider:physical_network=service_provider_net \  
--provider:network_type=vlan --provider:segmentation_id=100 <networkName>
```

Note that the `--provider:` arguments may not be provided. In that case, proper values for each of the arguments will be used, depending on the configuration of the underlying physical network. With the above command, a Neutron network is created and associated with a physical network.

2. Create a Neutron subnet.

Follow the standard procedure for creating a subnet on the above network.

3. Create a Neutron port.

```
neutron port-create <net-uuid-from-step-1> \  
--name sriov_port --vnic-type direct
```

The port `sriov_port` is created and associated with the network that is created from step 1. This port is on the physical network `service_provider_net`.

4. Boot up an instance.

```
nova boot --flavor m1.large --image <image-uuid> \  
-nic port-id=<port-uuid-from step-3> <name of instance>
```

2 Support and other resources

Contacting HPE

For additional information or assistance, contact HPE Networking Support:

www.hpe.com/networking/support

Before contacting HPE, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

HPE security policy

A Security Bulletin is the first published notification of security vulnerabilities and is the only communication vehicle for security vulnerabilities.

- Fixes for security vulnerabilities are not documented in manuals, release notes, or other forms of product documentation.
- A Security Bulletin is released when all vulnerable products still in support life have publicly available images that contain the fix for the security vulnerability.

To find security bulletins:

1. Go to the HPE Support Center website at www.hpe.com/go/hpsc.
2. Enter your product name or number and click **Go**.
3. Select your product from the list of results.
4. Click the **Top issues & solutions** tab.
5. Click the **Advisories, bulletins & notices** link.

To initiate a subscription to receive future HPE Security Bulletin alerts via email, sign up at:

www4.hpe.com/signup_alerts

Related information

Documents

To find related documents, see the HPE Support Center website:

www.hpe.com/support/manuals

- Enter your product name or number and click **Go**. If necessary, select your product from the resulting list.
- For a complete list of acronyms and their definitions, see *HPE FlexNetwork Technology Acronyms*.

Related documents

The following documents provide related information:

HPE Distributed Cloud Networking 4.0R3 Release Notes

HPE Distributed Cloud Network 4.0R3 User Guide

Websites

- Official HPE Home page: www.hpe.com
- HPE Networking: www.hpe.com/go/networking
- HPE product manuals: www.hpe.com/support/manuals
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