
Fuel VMware DVS plugin testing documentation

Release 1.1.0

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December 17, 2015

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INTRODUCTION

1.1 Key terms, acronyms and abbreviation

Term/abbreviation	Definition
VM	Virtual Machine
MOS	Mirantis OpenStack
OVS	Open vSwitch
Neutron ML2 plugin	The Neutron Modular Layer 2 plugin is a framework allowing OpenStack Networking to simultaneously utilize the variety of layer 2 networking technologies
vmware_dvs driver	The driver in the Neutron ML2 plugin which provides interaction with dvSwitch on vCenter
VMware DVS plugin	The plugin for Fuel which installs and configures vmware_dvs driver on a MOS environment
dvSwitch	distributed vSwitch on VMware ESXi
VMware ESXi	bare-metal hypervisor
VMware vCenter Server	Central control point for VMware vSphere
VMware vSphere	VMware's cloud computing virtualization operating system

1.2 The VMware DVS plugin

MOS supports using vCenter as a hypervisor in a vCenter-only or heterogeneous, mixed with KVM environments. There is the vmware_dvs driver for Neutron ML2 plugin which provides usage Neutron for networking in such environments. Thereby environments receives an advanced network features:

- Ability to create multi-tier networks (e.g., web tier, db tier, app tier).
- Control over IP addressing.
- Ability to insert an configure their own services (e.g., firewall, IPS)
- VPN/Bridge to remote physical hosting or customer premises.

1.3 Licensing information

Component	License
vmware_dvs driver	Apache 2.0
VMware DVS plugin	Apache 2.0

1.4 Requirements

The plugin has the following requirements for software:

Requirement	Version
Fuel	7.0
vCenter	5.5/6.0

1.5 Limitations

- VMware DVS plugin be enabled only in environments with Neutron as the networking option.
- Only VLANs are supported for tenant network separation.
- Only vSphere 5.5 & 6.0 are supported.

INSTALLATION AND CREATE AN ENVIRONMENT

2.1 Installing the VMware DVS plugin

Make sure that:

- you have the installed the [Fuel Master node](#)
- all the nodes of your future environment are discovered and functional.
- there is a connectivity to correctly configured vCenter with dvSwitch and clusters created. Please, see the [Mirantis OpenStack Planning Guide](#), [User Guide](#) and [this plugin's specification](#) for information on configuring vCenter.

1. Download the plugin from the [Fuel Plugin Catalog](#).

2. Copy the plugin into Fuel Master node:

```
$ scp fuel-plugin-vmware-dvs-1.1-1.1.0-1.noarch.rpm <Fuel Master node ip>:/tmp
```

3. Log into the Fuel Master node and install the plugin:

```
$ ssh root@<Fuel Master node ip>
[root@nailgun ~]# fuel plugins --install /
/tmp/fuel-plugin-vmware-dvs-1.1-1.1.0-1.noarch.rpm
[root@nailgun ~]# fuel plugins
DEPRECATION WARNING: /etc/fuel/client/config.yaml exists and will
be used as the source for settings. This behavior is deprecated.
Please specify the path to your custom settings file in the
FUELCLIENT_CUSTOM_SETTINGS environment variable.
```

```
+-----+-----+-----+-----+
| id    | name                | version | package\_version |
+-----+-----+-----+-----+
| 2     | fuel-plugin-vmware-dvs | 1.1.0   | 3.0.0            |
+-----+-----+-----+-----+
```

2.2 Removing the VMware DVS plugin

To uninstall VMware DVS plugin, follow these steps:

1. Delete all environments in which VMware DVS plugin has been enabled.
2. Uninstall the plugin:

```
# fuel plugins --remove fuel-plugin-vmware-dvs--1.1.0
```

3. Check if the plugin was uninstalled successfully:

```
+-----+-----+-----+-----+
| id   | name   | version | package_version |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
```

There is one issue with wizard on the Fuel WEB UI. Please be informed that after removing this plugin the option “Neutron with VLAN segmentation” stays unlocked when the ‘vCenter’ checkbox is selected. Therefore there is a possibilities for deployment environment with vCenter as a hypervisor, Neutron for networking and without the VMware DVS plugin. If no other plugin provides this functionality such environment will be misconfigured.

2.3 Create and Configure an environment with VMware DVS plugin

1. Create a new OpenStack environment with Fuel UI wizard.

Create a new OpenStack environment
×

Name and Release

Compute

Networking Setup

Storage Backends

Additional Services

Finish

Name

OpenStack Release

By default, packages will be fetched from external repositories. Please make sure your Fuel master node has internet access. To specify alternate repositories, or to create a local mirror, please check the Settings tab before deployment.

This option will install the OpenStack Kilo packages using Ubuntu as a base operating system. With high availability features built in, you are getting a robust, enterprise-grade OpenStack deployment.

Cancel

← Prev

Next →

2. In *Compute* menu, select *vCenter* checkbox:

The screenshot shows a wizard window titled "Create a new OpenStack environment". On the left, a sidebar lists steps: "Name and Release" (checked), "Compute" (highlighted), "Networking Setup", "Storage Backends", "Additional Services", and "Finish". The main area shows three options for hypervisor type:

- KVM**
Choose this type of hypervisor if you run OpenStack on hardware
- QEMU**
Choose this type of hypervisor if you run OpenStack on virtual hosts
- vCenter**
Choose this option if you have a vCenter environment with ESXi servers to be used as hypervisors

At the bottom, there are buttons for "Cancel", "← Prev", and "Next →".

3. Select *Neutron with VLAN segmentation* for *Networking Setup* - it is the only networking configuration supported with VMware DVS plugin:

The screenshot shows the same wizard window, now at the "Networking Setup" step. The sidebar highlights "Networking Setup". The main area contains a heading "Choose the private (guest) network configuration. The choice you make here cannot be changed after you finish the wizard. More information see the [Mirantis OpenStack Planning Guide for Network Topology](#)" and three options:

- Neutron with VLAN segmentation (default)**
The networking equipment must be configured for VLAN segmentation. This option supports up to 4095 networks.
- Neutron with GRE segmentation**
The networking equipment must support GRE segmentation. This option supports up to 65535 networks.
- (DEPRECATED) Legacy Networking (nova-network)**
Choose this option if you use VMware vCenter or require different subnets for public and floating IP addresses. Note that OpenStack is moving to deprecate nova-network in upcoming releases.

At the bottom, there are buttons for "Cancel", "← Prev", and "Next →".

4. Finish environment creation following [documentation](#).
5. Open the *Nodes* tab and **add** at least 1 Controller and 1 Compute node to the environment:

The screenshot shows the Fuel Web UI interface. At the top, there is a navigation bar with tabs for Dashboard, Nodes, Networks, Settings, VMware, Logs, and Health Check. Below the navigation bar, there are several icons for actions like Add, Refresh, Filter, and Search. A 'Sort By' dropdown is set to 'Status'. The main content area is titled 'Assign Roles' and contains two checked options:

- Controller**
The Controller initiates orchestration activities and provides an external API. Other components like Glance (image storage), Keystone (identity management), Horizon (OpenStack dashboard) and Nova-Scheduler are installed on the controller as well.
- Compute VMware**
A node that runs nova-compute with VCDriver, that manages ESXi computing resources via VMware vCenter.

Below the role assignment section, there is a 'Discovered (2)' section with a 'Select All' button. It shows a single discovered node:

Node Name	Type	Status	Resources
Untitled (c1:53)	COMPUTE-VMWARE	DISCOVERED	CPU: 0 (4) HDD: 150.0 GB RAM: 4.0 GB

6. Open the *Settings* tab of the Fuel Web UI and scroll down the page. Select the *use Neutron VMware DVS ML2 plugin* checkbox and specify correct name of dvSwitch:

The screenshot shows the Fuel Web UI interface with the 'Settings' tab selected. The 'OpenStack Settings' section is visible, and the 'Neutron VMware DVS ML2 plugin' checkbox is checked. Below this, there is a form to enter the dvSwitch's name:

Enter the dvSwitch's name. Set the name of dvSwitch on vCenter.

The left sidebar shows the following settings categories:

- Access
- Additional Components
- Common
- Kernel parameters
- Neutron Advanced Configuration
- Repositories
- Syslog
- Public network assignment
- Storage
- Neutron VMware DVS ML2 plugin (highlighted)

VMware DVS ML2 plugin does not support DVR feature. Keep Neutron DVR checkbox on Neutron Advanced Configuration tab at unchecked state.

7. Fill in the VMware configuration fields on the *VMware* tab:



VMware vCenter Settings

vCenter

Availability zone	<input type="text" value="vcenter"/>	Availability zone name
vCenter host	<input type="text" value="172.16.0.254"/>	vCenter host or IP
vCenter username	<input type="text" value="administrator@vsphere.local"/>	vCenter username
vCenter password	<input type="password" value="....."/> <input type="checkbox"/>	vCenter password

Nova Computes

+ Nova Compute Instance

vSphere cluster	<input type="text" value="Cluster2"/>	vSphere cluster
Service name	<input type="text" value="lloip"/>	Service name
Datastore regex	<input type="text" value=".*"/>	Datastore regex
Target node	<input type="text" value="controllers"/>	Target node for nova-compute service

(Optional) Choose Compute VMware node if your environment has the role:

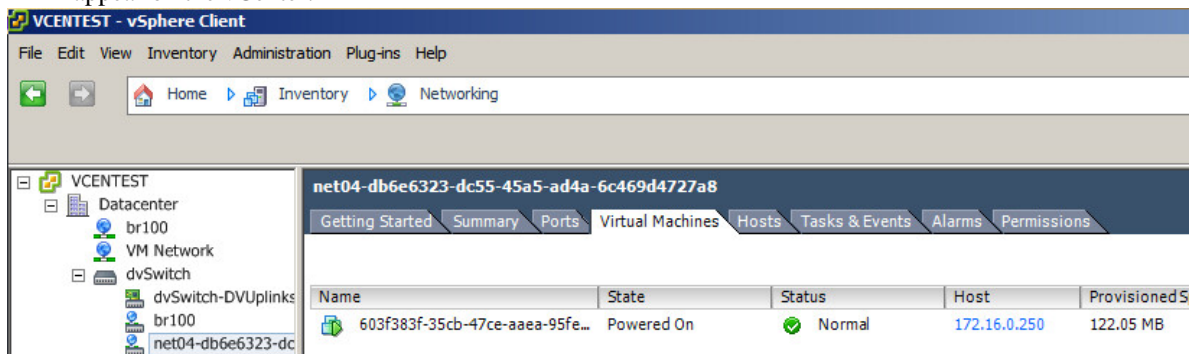
Target node	<input type="text" value="controllers"/> <ul style="list-style-type: none"> <li style="background-color: #f0f0f0; padding: 2px;">controllers <li style="background-color: #f08080; padding: 2px;">controllers <li style="padding: 2px;">Untitled (c1:53) (28:c1:53) 	Target node for nova-compute service
-------------	--	--------------------------------------

8. The rest of configuration is up to you. See [Mirantis OpenStack User Guide](#) for instructions.

9. Click *Deploy changes* button to finish.

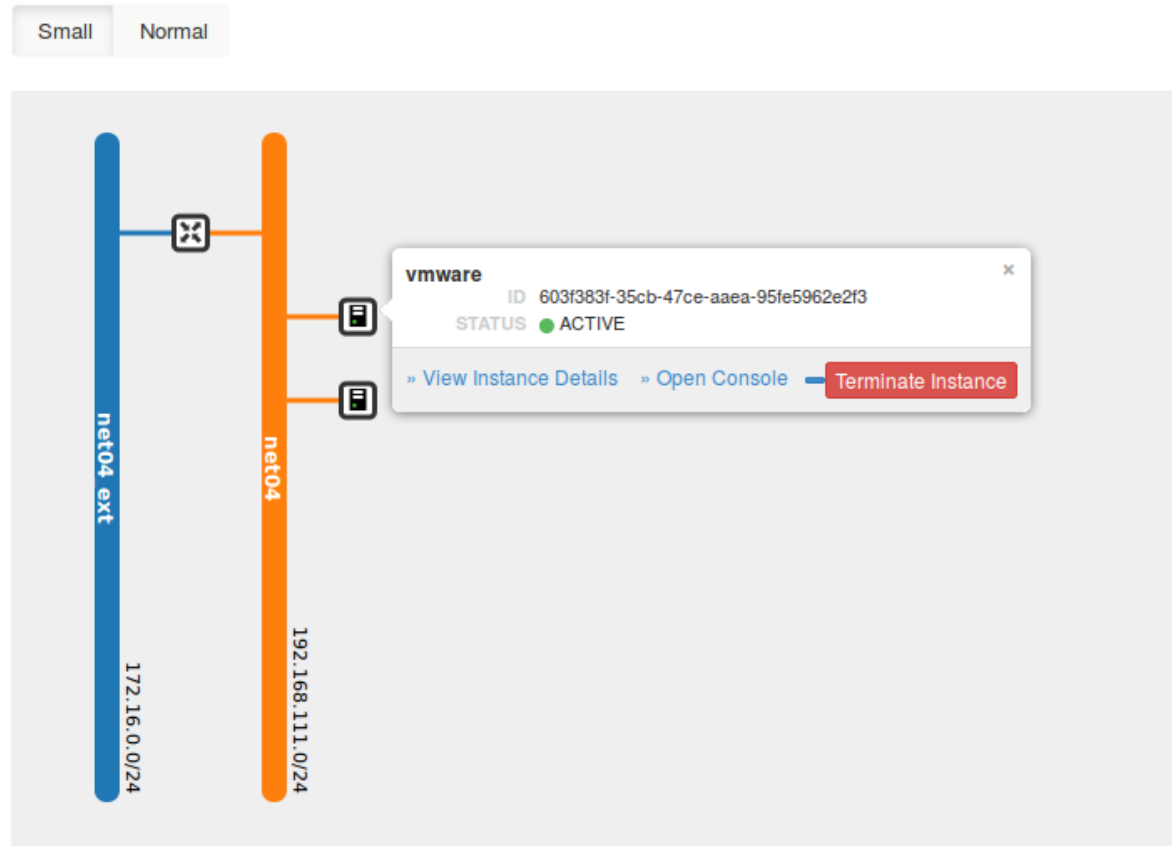
3.1 Using advanced neutron's possibilities with VMware DVS plugin

1. Once OpenStack has been deployed, we can start using Neutron for networking. The net04 port group should appear on the vCenter:



2. In Horizon, the network topology should look like:

Network Topology



where VMware is the name of the instance located on the vCenter.

3. You can use Neutron for such instance brand the same way as for KVM-located instances.
4. DVS Security groups functionality differs from KVM implementation. VMware DVS does not support stateful firewall properties and ICMP types. DVS Plugin realises emulation logic to support the similar behavior. It installs reverse traffic rule for each SG rule. VMware DVS plugin state emulation logic uses ephemeral port range filter to rise security of reverse rules implementation.

Does not recommended to use Remote Security Group in your rules. SG engine for DVS ignores those rules.

Just add only those rules if you want to correctly launch EC2 compatible image with metadata request and DNS access:

Implement Custom TCP Egress rule to 169.254.169.254/32 CIDR port 80 Implement Custom UDP Egress rule to '<DNS server IP or 0.0.0.0/0>' CIDR port 53

DVS plugin will install four rules:

TCP Egress from any IP ports 32768-65535 to metadata IP port 80 TCP Ingress from metadata IP port 80 to any IP ports 32768-65535 UDP Egress from any IP ports 32768-65535 to DNS IP port 53 UDP Ingress from DNS IP port 53 to any IP ports 32768-65535

32768-65535 is the useful ethemetal port range for most Linux kernels and Windows hosts.

Common egress TCP rule looks like this:

TCP Egress to any ports 0.0.0.0/0 CIDR

It works like:

TCP Egress from any IP ports 32768-65535 to any IP any port TCP Ingress from any IP any port to any IP ports 32768-65535

and private ports of your VM like http or ssh will be closed.

DVS plugin support only symmetric ICMP interaction. If your host can ping destination host, it means the destination host can ping your host by reverse rules.

5. Sometimes the error at log files happens “Cannot complete operation due to concurrent modification by another operation.” due to absence of concurrent access to modify resources by vSphere. Do not panic. Driver has special wrapper for this exception.