

Oracle® Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron Installation Guide

ORACLE®

Part No: E64527-01
June 2015

Part No: E64527-01

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Contents

Using This Documentation	7
Understanding OpenStack and Related Components	9
OpenStack Overview	9
OpenStack Neutron Overview	9
OpenStack Neutron ML2 Layer	10
OpenStack Components in Oracle Ethernet Switch	10
Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron	11
Understanding the Oracle Ethernet Switch Required Configuration	12
Server Hardware Requirements	12
Oracle Server Software Requirements	12
Installing the Software	15
Installing the OpenStack Software	15
▼ Install OpenStack	15
Installing the Oracle Fabric Manager Software	17
▼ Install Oracle Fabric Manager	18
Setting Up the Ethernet Switch and the Host	18
▼ Set Up the Switch	18
▼ Set Up the Host	19
▼ Test With Ping Manually (Optional)	19
▼ Install and Configure the Oracle Ethernet Switch ML2 Mechanism Driver	20
▼ Install the ES2 OFM Plugin into OFM	21
▼ Add a Switch to the ES2 OFM Plugin	22
Checking the Log Files	24
▼ Check the Log Files on the Controller	24
▼ Check the Log File on the Compute Nodes	25
Verifying the OpenStack Configuration Through Oracle Fabric Manager	27
Creating and Verifying Tenant Networks	27

▼ Create a Tenant Network	27
Creating and Verifying a VM	29
▼ Create a VM	29
▼ Connect and Verify VMs on Different Networks	31
Glossary	33

Using This Documentation

- **Overview** – Describes how to install the Oracle Ethernet Switch ES2 ML2 Mechanism Driver for OpenStack Neutron
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

These topics describe how to access the documentation and leave feedback on it.

- [“Product Documentation Library” on page 7](#)
- [“Feedback” on page 7](#)

Product Documentation Library

Documentation and resources for this product and related products are available at http://www.oracle.com/goto/es2-72_es2-64/docs.

Feedback

Provide feedback about this documentation at <http://www.oracle.com/goto/docfeedback>.

Understanding OpenStack and Related Components

These topics introduce high-level information about OpenStack and related components, including the Oracle Ethernet Switch ML2 Mechanism Driver:

- “OpenStack Overview” on page 9
- “OpenStack Neutron Overview” on page 9
- “OpenStack Neutron ML2 Layer” on page 10
- “OpenStack Components in Oracle Ethernet Switch” on page 10
- “Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron” on page 11
- “Understanding the Oracle Ethernet Switch Required Configuration” on page 12

OpenStack Overview

OpenStack is a free, open-source, cloud-computing software platform.

The technology consists of a series of software modules that control pools of processing, storage, and networking resources.

For more information about OpenStack, refer to: <http://www.openstack.org>

OpenStack Neutron Overview

OpenStack Neutron is an OpenStack module for managing networks and IP addresses, which ensures the network availability in cloud-based deployments. OpenStack Neutron provides different networking models for different applications or user groups, including flat networks, VLANs, and so on. OpenStack Neutron supports static IP addresses, DHCP, and floating IP addresses to enable dynamic rerouting of traffic whenever needed. With OpenStack Neutron:

- Users can create private or public networks, control traffic, and connect servers whenever needed.
- Administrators can use software-defined networking (SDN) solutions, which enable large and scalable multitenant networks.

OpenStack Neutron supports extensions for various networking functionality — for example, load balancing, firewalls, virtual private networks (VPNs), and so on. For more information about OpenStack Neutron, refer to <https://wiki.openstack.org/wiki/Neutron>

OpenStack Neutron ML2 Layer

The OpenStack Neutron Modular Layer 2 (ML2) plugin allows OpenStack Neutron to simultaneously use different Layer-2 networking technologies. The plugin currently works with industry-standard Layer-2 solutions, including OpenvSwitch (OVS), linuxbridge, and HyperV L2.

The ML2 plugin is designed as a framework to allow you to add existing and future Layer-2 networking technologies quickly and easily. For more information about the OpenStack ML2 Layer 2 plugin, refer to: <https://wiki.openstack.org/wiki/Neutron/ML2>

OpenStack Components in Oracle Ethernet Switch

This topic provides a brief introduction of the components in the OpenStack Neutron deployment and describes how the Oracle Ethernet Switch (ES2) solution fits into it.

Neutron relies on the ML2 plugin which delegates to one or multiple ML2 type drivers and mechanism drivers for network connectivity configuration. Each available tenant network type must have a corresponding ML2 type driver, which handles network allocation, validation and state maintenance. The mechanism driver uses the information provided by the type driver to perform the necessary vendor-specific actions to support a particular network type.

The ES2 Mechanism Driver leverages OpenvSwitch agents to configure VLAN network connectivity within an OpenStack node such as for virtual machines within a compute node, and instead focuses connecting nodes together on the data network. As tenant networks and virtual machines are created, the ES2 Mechanism Driver provides on-demand ES2 configuration through the Oracle Fabric Manager (OFM) ES2 plugin.

These are the major OpenStack software components.

- **Openstack controller**, which is the OpenStack server where control processes, configuration, and management occur.

In the Oracle Ethernet Switch solution, the controller runs on either an Oracle VM server or Oracle Linux operating system. The Oracle Ethernet Switch ML2 Mechanism Driver is installed on the controller and leverages the existing OpenvSwitch agents on the controller and compute nodes.

It is possible to install the Oracle Fabric Manager software on the controller so that the same physical server is both the OpenStack controller and the Oracle Fabric Manager server.

- **OpenStack compute nodes**, which are the OpenStack servers where instance VMs are hosted.
The Oracle Ethernet Switch ML2 Mechanism Driver is not installed on the compute nodes. Compute nodes use OpenvSwitch agents.
- **OpenStack Horizon**, which is the OpenStack graphical user interface (GUI).
Horizon passes requests to OpenStack Neutron, and then to the Oracle Ethernet Switch ML2 Mechanism Driver which ultimately implements the requests.
- **Oracle Fabric Manager**, which is the Oracle Ethernet Switch GUI. OFM is installed on one server, preferably on the controller.
- **OpenStack network**, also called a *tenant network*, is typically a private data network.
In the ES2 ML2 Mechanism Driver, each network maps to a VLAN that is configured on each ES2 switch as it is needed.
The exception is external, or public, networks. External networks are not configured through the ES2 ML2 Mechanism Driver, and if needed, should be configured through the standard OpenStack Neutron procedure. For information, refer to the OpenStack documentation.
- **OpenStack port**, which is the virtual connection from an instance VM to the network.

Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron

The Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron is one component of OpenStack software and nodes, Oracle Fabric Manager, and individual hosts and operating systems in the OpenStack deployment.

The Oracle Ethernet Switch ML2 Mechanism Driver allows OpenStack installations to configure network connectivity for Oracle VMs on Oracle Ethernet Switches, including Oracle Switch ES2-72 and Oracle Switch ES2-64. OpenStack deployments can create private OpenStack networks that use the 40 Gbps Oracle Ethernet Switch technology.

Starting from OpenStack, communication passes through the Oracle Ethernet Switch ML2 Mechanism Driver to Oracle Fabric Manager. Oracle Fabric Manager sends the communication to the ES2 CLI, which adds or deletes a VLAN network, or modifies VLAN member ports.

The Oracle Ethernet Switch ML2 Mechanism Driver enables OpenStack installations to configure network connectivity for instance VMs.

Understanding the Oracle Ethernet Switch Required Configuration

These topics document the configuration in which the Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron is supported.

- [“Server Hardware Requirements” on page 12](#)
- [“Oracle Server Software Requirements” on page 12](#)

Server Hardware Requirements

- Your configuration must have a minimum of two Oracle servers to fill the role of control and compute nodes.
- All compute nodes should be identical in hardware configuration, memory, and software installed.
- All compute nodes must have significant RAM.

A general guideline is to assume 4 GB or more for each instance VM, and reserve at least 4 GB of RAM for overhead and additional processing power. For example, if the compute node has only 16GB of RAM it could run three, 4-GB instance VMs.

Oracle Server Software Requirements

The versions shown in this list are minimum requirements.

- OpenStack Controller
 - Runs either OVM 3.3.1 or Oracle Linux 6 update 5. If you use OVM, the controller node can also act as a compute node.
 - Runs OpenStack Controller processes and OpenStack Agent processes. (Use the OVM Icehouse release.)
 - Runs OFM 4.3.1.
- OpenStack Compute
 - Runs OVM 3.3.1.
 - Runs OpenStack agent processes.

Sample Server Configurations

In a minimum configuration, only two servers are required, both of which must be running the required version of Oracle VM.

- One server runs all installed components.
This server is the Oracle Fabric Manager server, the OpenStack controller, and also acts as an OpenStack compute node.
- The second server acts as a compute node only.

Depending on your needs, you might find it helpful to separate the Oracle Fabric Manager, the OpenStack controller, and compute nodes among multiple servers. For example:

- A dedicated Oracle Linux server would be the OpenStack controller.
The Oracle Fabric Manager server could be co-located on the Oracle Linux server acting as the OpenStack controller. Or, you could install it on a separate Oracle Linux server not acting as the OpenStack controller.
- Additional servers would be running Oracle VM.
Each of these servers would be a compute node and each can host one or more instance VMs.

Installing the Software

These topics describe how to install the various software for an OpenStack deployment that uses Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron:

- [“Installing the OpenStack Software” on page 15](#)
- [“Installing the Oracle Fabric Manager Software” on page 17](#)
- [“Setting Up the Ethernet Switch and the Host” on page 18](#)
- [“Install and Configure the Oracle Ethernet Switch ML2 Mechanism Driver” on page 20](#)
- [“Install the ES2 OFM Plugin into OFM” on page 21](#)
- [“Add a Switch to the ES2 OFM Plugin” on page 22](#)
- [“Checking the Log Files” on page 24](#)

Installing the OpenStack Software

This section lists a number of differences between the basic OpenStack Icehouse installation and the OpenStack installation with modifications for Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron.

Here are some differences to look for during the installation:

- When installing the OpenStack default software, you are installing and using the OpenvSwitch Neutron plugin.
- When installing OpenStack for use with the Oracle Ethernet Switch solution, you use the ML2 plugin.
- You might need to allocate more memory in [Step 2](#).
- You will use a modified version of the packstack command, as shown in [Step 5](#).
- [“Install OpenStack” on page 15](#)

▼ Install OpenStack

Note - Understand the overall installation of OpenStack software before beginning the OpenStack software installation with the Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron.

1. **Review these documents for instructions on installing OpenStack on OVM:**

<http://www.oracle.com/technetwork/server-storage/openstack/linux/documentation/oracle-openstack-user-guide-2296176.pdf>

<http://www.oracle.com/technetwork/server-storage/openstack/linux/documentation/openstack-hol-virtualbox-2326937.pdf>

2. **If you are installing Oracle Fabric Manager on an Oracle VM controller, make sure the controller has an appropriate amount of memory by editing `/boot/grub/grub.conf` to set the `dom0_mem` variable to a high-enough value for Oracle Fabric Manager and the other controller processes.**

This consideration applies only if Oracle Fabric Manager is installed on an Oracle VM—for example, in a small 2-node install.

3. **Verify that each node has:**

- A management port to the management network
- A data port to the Oracle Ethernet Switch, which forms an internal data network also known as a physical network

For external network connectivity, the controller node also needs:

- An external port, which provides tenant networks with access to the outside world.

For more information, refer to OVM documentation at https://docs.oracle.com/cd/E38500_01/.

4. **Note the host to port mapping.**

Determine which host data ports connect to which ports on the ES2 switches.

5. **Read the following to understand the `packstack` command.**

On each OpenStack node, in order for the OpenvSwitch (OVS) agent to properly manage the **data port** connected to the ES2 switch, the data port must plug into an OVS bridge, known as the **physical bridge**. The **physical bridge name** is typically the data network interface name prefixed by `br-`.

For instance, the physical bridge name for `eth1` is `br-eth1`.

Each physical bridge also maps to a **physical network name**. You can create VLAN allocation pools based on a single physical network name to avoid using multiple actual interface names on each node.

By default, the `packstack` command assumes the OVS agent on all nodes have homogeneous OVS-bridge-to-physical-interface mappings. For heterogeneous deployments, these mappings can be specified manually after the `packstack` completes.

```
packstack --install-hosts=<controller
```



```

IP> ,<compute1
IP> ,<compute2
IP... etc>
--neutron-l2-plugin=ml2 --neutron-ovs-bridge-mappings=<physical
network>:<ovsbridge
name> --neutron-ovs-bridge-interfaces=<ovs
bridge
name>:<interface>

```

When you have installed OpenStack, use the following steps to set up bridges.

- (As needed) For each node, add the integration bridge (e.g. br-int), and map the physical bridge (e.g. br-eth1) to the physical port (e.g. eth1):**

```

ovs-vsctl add-br br-int
ovs-vsctl add-br br-eth1
ovs-vsctl add-port br-eth1 eth1

```

- (As needed) Verify that OpenvSwitch bridges were created correctly:**

```

ovs-vsctl br-exists br-int
ovs-vsctl br-exists br-eth1
ovs-vsctl port-to-br-eth1 eth1
ovs-vsctl show

```

- (As needed) Edit the file `/etc/neutron/plugins/openvswitch/ovs_neutron_plugin.ini` and add the physical network name (e.g. default) to the physical bridge (e.g. br-eth1):**

```

[ovs]
bridge_mappings = default:br-eth1

[SECURITYGROUP]
firewall_driver=neutron.agent.linux.iptables_firewall.OVSHybridIptablesFirewallDriver
enable_security_group = True

```

- Then restart the OpenvSwitch agent:**

```

service neutron-openvswitch-agent restart

```

Installing the Oracle Fabric Manager Software

Oracle Fabric Manager software can be installed on any server in the OpenStack deployment. However, because Oracle Fabric Manager performs control and management functions, you

should install it on its own dedicated Oracle Linux server, or co-locate it with the OpenStack controller.

- [“Install Oracle Fabric Manager” on page 18](#)

▼ Install Oracle Fabric Manager

This procedure assumes that you have already downloaded the supported version of Oracle Fabric Manager to a valid host server in the OpenStack deployment.

For information about installation and its requirements, refer to the section about installing Oracle Fabric Manager software in the *Oracle Fabric Manager User's Guide*.

1. **Install the Oracle Fabric Manager software on the server that will be the Oracle Fabric Manager server.**

For example:

```
rpm -i xsigo-xms-4.3.1_OFM-1.noarch.rpm
```

2. **Open ports required for communication with Oracle Fabric Manager server.**

```
iptables -I INPUT -p tcp --dport 8880 -j ACCEPT
iptables -I INPUT -p tcp --dport 8443 -j ACCEPT
service iptables save
```

Setting Up the Ethernet Switch and the Host

- [“Set Up the Switch” on page 18](#)
- [“Set Up the Host” on page 19](#)
- [“Test With Ping Manually \(Optional\)” on page 19](#)

▼ Set Up the Switch

1. **Configure the switch host network management settings.**

For instructions, refer to the *Oracle Switch ES2-72 and Oracle Switch ES2-64 Configuration Guide*, “Configure the Host Network Management From the CLI”.

2. **On the switch, bring up all the ports connected to the controller and compute nodes, and set the port mode to hybrid:**

```
configure terminal
interface extreme-ethernet 0/11
switchport mode hybrid
no shutdown
end
```

3. Then verify that the switch port is now active (it may take a few moments):

```
show interface status
```

4. To save your switch configuration:

```
write startup-config
```

Related Information

- [“Set Up the Host” on page 19](#)
- [“Test With Ping Manually \(Optional\)” on page 19](#)

▼ Set Up the Host

1. On the hosts, activate the ports (e.g. eth1) connected to the switch:

```
ip link set eth1 up
```

2. Use `ethtool` to verify that physical link is up:

```
ethtool eth1 | grep Link
```

Note - Configure network interfaces to start at boot.

Related Information

- [“Set Up the Switch” on page 18](#)
- [“Test With Ping Manually \(Optional\)” on page 19](#)

▼ Test With Ping Manually (Optional)

You can use this procedure to troubleshoot the switch setups before installing OpenStack.

1. **When two hosts are connected to the switch and the associated switch ports are activated, add the two host switch ports (e.g. ex 0/16 and ex 0/18) to the same VLAN (e.g. 2000):**

```
configure terminal
vlan 2000
ports add ex 0/16 ex 0/18
end
```

2. **Verify that the member ports were correctly added to VLAN 2000:**

```
show vlan id 2000
```

3. **On each host, segment the network interface (e.g. eth1) connected to the switch and assign an IP (e.g. 10.1.20.16):**

```
vconfig add eth1 2000
ifconfig eth1.2000 up 10.1.20.16/24
```

4. **After the VLAN 2000 is setup on both hosts, confirm host 1 can ping host 2's IP and vice versa.**

5. **For debugging purposes, the VLAN on the switch can also be configured with an IP address:**

```
configure terminal
interface vlan 2000
ip address 10.1.20.10 255.255.255.0
end
```

Related Information

- [“Set Up the Switch” on page 18](#)
- [“Set Up the Host” on page 19](#)

▼ Install and Configure the Oracle Ethernet Switch ML2 Mechanism Driver

1. **On the controller, get and install the ES2 ML2 Mechanism Driver package. Unzip package and install the rpm.**

```
yum localinstall openstack-neutron-es2-2014.1-1.0.0.el6.noarch.rpm
```

2. Point the plugin.ini configuration at the ml2_conf_oracle_es2.ini for the oracle_es2 mechanism driver.

```
unlink /etc/neutron/plugin.ini
ln -s /etc/neutron/plugins/ml2/ml2_conf_oracle_es2.ini /etc/neutron/plugin.ini
```

3. Update [ml2_oracle_ofm] section/etc/neutron/plugins/ml2/ml2_conf_oracle_es2.ini with your OFM hostname, port and login credentials:

```
ofm_hostname = localhost
ofm_port = 8443
ofm_username = user
ofm_password= password
ofm_verify_certificate = True
```

4. For each switch managed by OpenStack and OFM, create a new section [ml2_type_vlan] in /etc/neutron/plugins/ml2/ml2_conf_oracle_es2.ini with the range of VLANs (for example, 1000-2999) that are available on the physical network (for example, default):

```
openstack-config --set /etc/neutron/plugin.ini ml2_type_vlan
network_vlan_ranges "default:1000:2999"
```

5. For each switch managed by OpenStack and OFM, create a new section [ml2_oracle_es2:switch_ip] and specify the mapping of switch ports to hosts. For example:

```
[ml2_oracle_es2:10.129.86.24]
extreme-ethernet 0/36 = host1
extreme-ethernet 0/38 = host2
```

6. Configure the OpenvSwitch agent to start at boot.

```
chkconfig neutron-openvswitch-agent on
```

7. Restart neutron services on the controller and restart OpenvSwitch agent on all nodes after changes to the configuration file:

```
openstack-service restart neutron
service neutron-openvswitch-agent restart
```

▼ Install the ES2 OFM Plugin into OFM

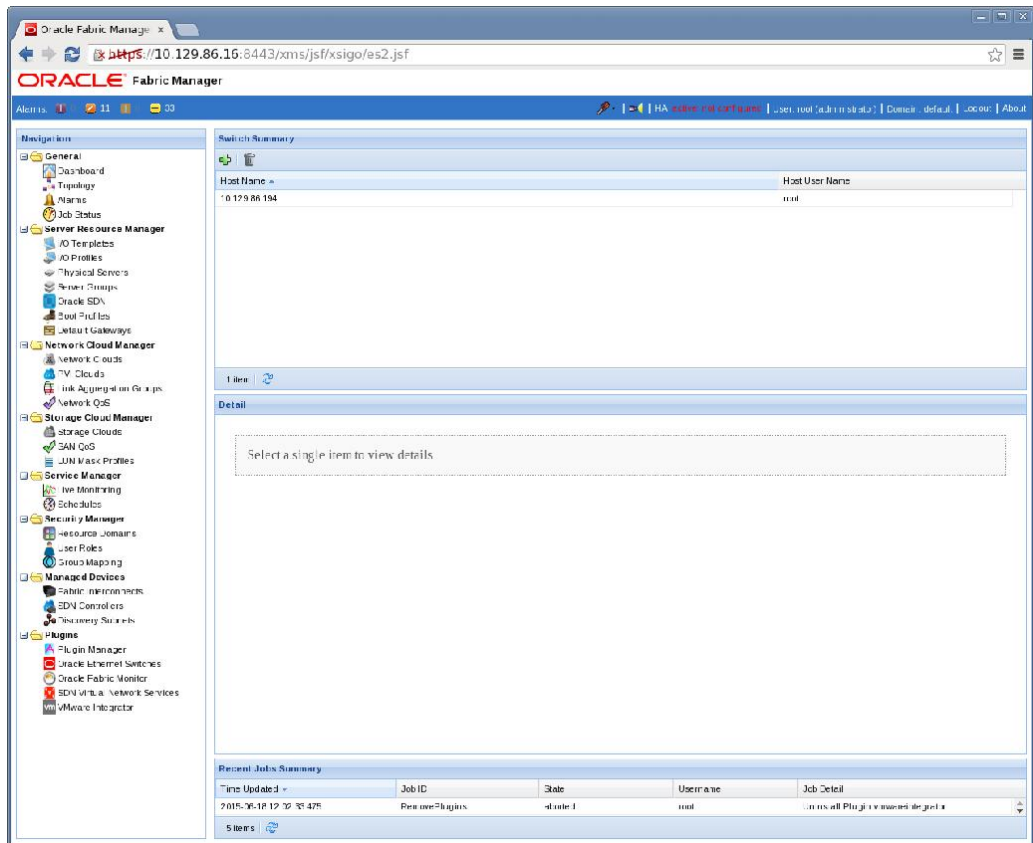
1. Log into OFM.

2. Go to the Plugin Manager.
3. Select Add Plugin and select ES2.

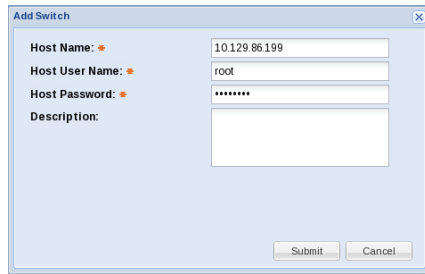
▼ Add a Switch to the ES2 OFM Plugin

Configure the switch before adding it to the plugin. For instructions, refer to the configuration guide or user guide for your switch.

1. Log into OFM.
2. Select Oracle Ethernet Switches from the Plugins section.
3. Under Switch Summary, select the Add button.



4. Add the switch hostname, username, and password.

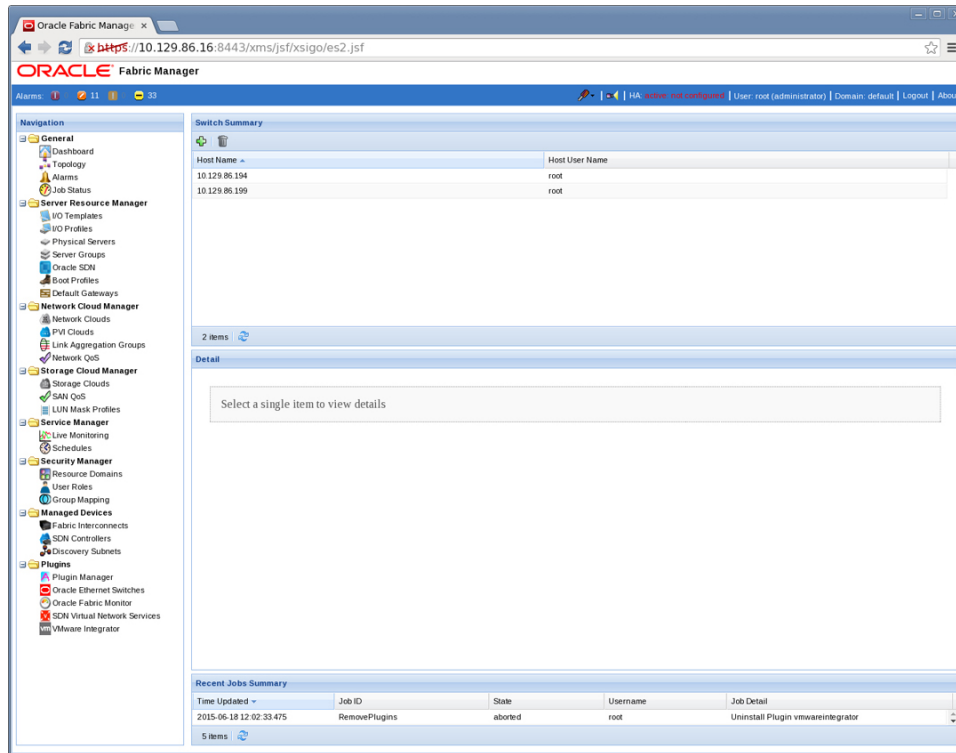


The 'Add Switch' dialog box contains the following fields:

- Host Name: 10.129.86.199
- Host User Name: root
- Host Password: [masked]
- Description: [empty text area]

Buttons: Submit, Cancel

5. Click the Submit button.
Verify that the switch has been added.



The Oracle Fabric Manager interface shows the following components:

- Navigation:** A tree view on the left with categories like General, Server Resource Manager, Network Cloud Manager, Storage Cloud Manager, Service Manager, Security Manager, and Plugins.
- Switch Summary:** A table with 2 items.

Host Name	Host User Name
10.129.86.194	root
10.129.86.199	root
- Detail:** A section with the text "Select a single item to view details".
- Recent Jobs Summary:** A table with 5 items.

Time Updated	Job ID	State	Username	Job Detail
2015-06-18 12:02:33.475	RemovePlugins	aborted	root	Uninstall Plugin vmwareintegrator

Checking the Log Files

Oracle Ethernet Switch logs are located in `/var/log/neutron`. You must be logged in to the controller or compute nodes as root user to check log files.

When the installation procedure is complete, agents and services should be up and running without errors.

As an option, you can verify that agents and services are running correctly by checking a few log files on the controller and compute nodes:

- [“Check the Log Files on the Controller” on page 24](#)
- [“Check the Log File on the Compute Nodes” on page 25](#)

- [“Check the Log Files on the Controller” on page 24](#)
- [“Check the Log File on the Compute Nodes” on page 25](#)

▼ Check the Log Files on the Controller

The driver runs on the controller within the overall Neutron controller service, `neutron-server`. After installing software, you can access the controller and check log files.

1. **Search `server.log` for `es2` to find the controller part of the Oracle Ethernet Switch ML2 Mechanism Driver.**
2. **Check the status of the `neutron-server` service.**

```
service neutron-server status
```

The service should be running without errors.

3. **Search the `openvswitch-agent.log` for `ovs` to find the agent part of the Oracle Ethernet Switch ML2 Mechanism Driver.**

The presence of this file indicates that the driver is installed.

4. **Check the status of the `neutron-openvswitch-agent` service and verify that it is running.**

```
service neutron-openvswitch-agent status
```

The agent should be running without errors.

▼ Check the Log File on the Compute Nodes

The OVS agent runs on the compute nodes. After installing software, you can access the compute nodes and check the log file.

1. **Search the `openvswitch-agent.log` for `ovs` to find the agent part of the Oracle Ethernet Switch ML2 Mechanism Driver.**

The presence of this file indicates that the driver is installed.

2. **Check the status of the `neutron-openvswitch-agent` service and verify that it is running.**

```
service neutron-openvswitch-agent status
```

The agent should be running without errors.

Verifying the OpenStack Configuration Through Oracle Fabric Manager

These topics show the parallels in functionality between the OpenStack GUI (Horizon) and the Oracle Fabric Manager GUI. By seeing the OpenStack changes reflected in Oracle Fabric Manager, you can verify that the OpenStack configuration is being processed by the Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron:

- [“Creating and Verifying Tenant Networks” on page 27](#)
- [“Creating and Verifying a VM” on page 29](#)

Creating and Verifying Tenant Networks

Resources, such as DHCP and VMs, must be given a port on a network in order to have access to network traffic.

The ES2 ML2 Mechanism Driver implements on-demand VLAN port membership only if a resource that it hosts requests a port connection to that VLAN. The on-demand switch configuration is triggered not by network events, but by port creation, port update, and port deletion events.

When you create a **network** in the OpenStack Horizon GUI, no ports are created and the network creation does not trigger any action from the ES2 ML2 Mechanism Driver. However, when you create a **VM** on a network, Neutron sends a port event to the ML2 Plugin which delegates to ES2 ML2 Mechanism Driver. Because the port event contains a host identifier, the ES2 ML2 Mechanism Driver is able to determine what network interface on that host is connected to what port on which ES2 switch, and tells OFM to how configure them.

- [“Create a Tenant Network” on page 27](#)

▼ Create a Tenant Network

This topic documents how to create a tenant network through Horizon and describes how that network is represented in the Oracle Fabric Manager.

When you create the tenant network in Horizon, the interface relays the network-creation request to the driver. The driver does not need to do anything for a network-creation request, therefore no operation is done on the ES2 switch.

On Horizon:

1. **Check the Networks board to verify that the IP address you want to create is not already assigned.**
2. **Create a tenant network by completing the Create Network wizard.**

For example:

The screenshot shows a 'Create Network' wizard window with a close button (X) in the top right. The wizard has three steps: 'Network', 'Subnet', and 'Subnet Detail'. The 'Subnet' step is currently active. On the left, there is a 'Create Subnet' section with a checked checkbox. Below it are input fields for 'Subnet Name' (containing 'pubsn1'), 'Network Address' (containing '12.10.5.0/24'), 'IP Version *' (a dropdown menu set to 'IPv4'), and 'Gateway IP' (an empty field). There is also a 'Disable Gateway' checkbox which is unchecked. On the right side of the form, there is a text box that reads: 'You can create a subnet associated with the new network, in which case "Network Address" must be specified. If you wish to create a network WITHOUT a subnet, uncheck the "Create Subnet" checkbox.' At the bottom of the form, there are two buttons: '« Back' and 'Next »'.

3. **Find the ID field on the Network Detail page.**

For example:

Network Detail: pubstest

Network Overview

Name
pubstest
ID
381c669a-679d-44ee-a929-f5c78b5a79ab
Project ID
99cba42dcd854108809e83b780ec9fdd
Status
ACTIVE
Admin State
UP
Shared
No
External Network
No
Provider Network
Network Type: vlan
Physical Network: physnet1
Segmentation ID: 2650

Creating and Verifying a VM

These topics show the creation of VMs in the OpenStack environments. VMs are created from an image and then launched on a tenant network.

- [“Create a VM” on page 29](#)
- [“Connect and Verify VMs on Different Networks” on page 31](#)

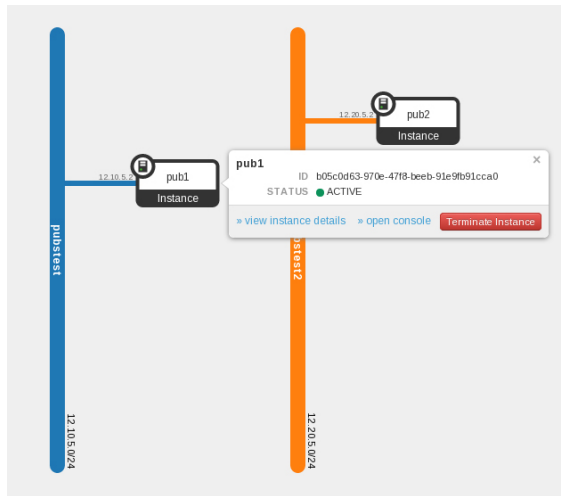
▼ Create a VM

When you launch the VM, it attaches to whichever tenant network you specify.

1. **Create and launch the instance VM by specifying its characteristics, such as its flavor and boot image, which define the size and compute power of the instance VM.**
2. **Select the appropriate network for the VM.**

You will see the VM on Horizon transition through various states as it is added and connected to the network. During this time, the driver is receiving communication from the OpenStack controller, and directing Oracle Fabric Manager to set up the correct VLAN connections.

Create a VM



3. Check Oracle Fabric Manager's VLANs tab.

The screenshot shows the Oracle Fabric Manager web interface. The navigation sidebar on the left includes sections for General, Server Resource Manager, Network Cloud Manager, Storage Cloud Manager, Service Manager, Security Manager, Managed Devices, and Plugins. The main content area displays the 'Switch Summary' and 'VLANs' tab. The 'VLANs' tab shows a table with columns: Vlan ID, Name, Member Ports, Untagged Ports, Blocked Trunk Ports, and Forbidden Ports.

Vlan ID	Name	Member Ports	Untagged Ports	Blocked Trunk Ports	Forbidden Ports
1		Ex01, Ex02, Ex03, Ex04, Ex05, Ex06, ...	Ex01, Ex02, Ex03, Ex04, Ex05, Ex06, ...		
105		Ex036, Ex040, mt1			
999	interswitch	Ex09			
2650	mt2-381c669a	Ex036, Ex040			
2651	mt2-38454e05	Ex034, Ex035, Ex036			

Below the VLANs table, there is a 'Recent Jobs Summary' table with columns: Time Updated, Job ID, State, Username, and Job Detail.

Time Updated	Job ID	State	Username	Job Detail
2015-06-18 12:02:33.475	RemovePlugins	aborted	root	Uninstall Plugin vmwareintegrator

4. Repeat this procedure for each VM you need to launch on the network.
5. Open a console to one of the VMs and ping the IP addresses of the other VMs.

▼ Connect and Verify VMs on Different Networks

To connect VMs on different networks, you create a router and then add an interface on each tenant network.

1. On Horizon, create two networks.
See [“Creating and Verifying Tenant Networks” on page 27](#).
2. Create one or more instance VMs on each network.
See [“Creating and Verifying a VM” on page 29](#).
3. Create a router.
4. On the Routers page, click the router name.
5. On the Router Details page, add an interface for one tenant network.

For example:

Add Interface
✕

Subnet *

Select Subnet ▼

IP Address (optional)

Router Name *

pubs-rtr1

Router ID *

76054309-906e-4d6f-939f-a4911af82b5

Description:

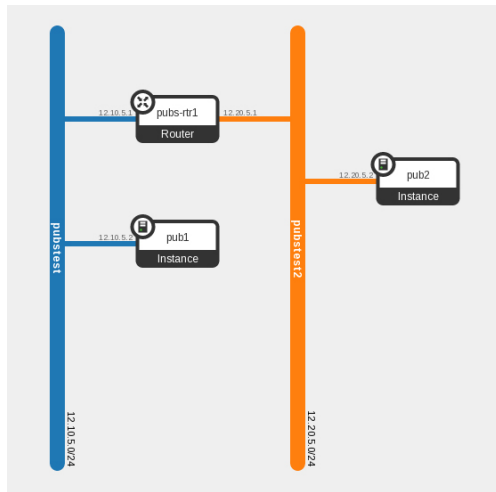
You can connect a specified subnet to the router.

The default IP address of the interface created is a gateway of the selected subnet. You can specify another IP address of the interface here. You must select a subnet to which the specified IP address belongs to from the above list.

Cancel

Add Interface

6. Repeat the preceding step to add another interface for the second tenant network.



7. Open a console to one of the VMs and ping the other VM's IP address.

Glossary

C

cloud computing Cloud computing provides a user with a virtual machine which is based on shared resources and services.

E

ES2 ES2 refers to an Oracle Ethernet Switch, such as the Oracle Switch ES2-72 and Oracle Switch ES2-64.

ES2 ML2 Mechanism Driver See Oracle Ethernet Switch ML2 Mechanism Driver.

I

interface OpenStack supports these interfaces:

- OpenStack UI, also known as Horizon
- OpenStack CLI
- OpenStack Rest API

L

L2 L2 (Level 2) is one of seven levels in the OSI model of the communications functions of a computing system. The model divides communication functions into seven abstract layers. Level 2 is the data link layer that links two directly connected nodes in a local area network (LAN).

M

mechanism driver Each networking mechanism is managed by an ML2 MechanismDriver. The MechanismDriver is responsible for taking the information established by the TypeDriver and ensuring that it is properly applied given the specific networking mechanisms that have been enabled.

ML2 Modular layer 2. See [OpenStack Neutron ML2 plugin](#).

O

OFM Oracle Fabric Manager is a GUI that manages and provisions virtual I/O.

OpenStack OpenStack is a free, open-source, cloud-computing software platform. The technology consists of a series of software modules that control pools of processing, storage, and networking resources.

OpenStack Neutron OpenStack Neutron is the module for managing networks and IP addresses for OpenStack cloud-computing software.

OpenStack Neutron ML2 plugin The OpenStack Neutron Modular Layer 2 (ML2) plugin is a framework allowing OpenStack Neutron to simultaneously use different industry-standard Layer-2 solutions, including OpenvSwitch, linuxbridge, and HyperV L2.

Oracle Ethernet Switch ML2 Mechanism Driver The Oracle Ethernet Switch ML2 Mechanism Driver allows OpenStack installations to configure network connectivity for Oracle VMs on Oracle Ethernet Switches

Oracle Virtual Networking ML2 Mechanism Driver for OpenStack Neutron This is an incompatible version of mechanism driver and is used only for installations of OpenStack on Oracle Virtual Networking (OVN) systems. This document deals with the Oracle Ethernet Switch ML2 Mechanism Driver for OpenStack Neutron instead of the OVN version.

To install OpenStack on OVM systems, refer to the *Oracle Virtual Networking ML2 MechanismDriver for OpenStack Neutron Installation Guide*.

OSI model Open Systems Interconnection model.

OVM OVM is Oracle Virtual Machine (VM)

OVS OVS is OpenvSwitch agent, a part of the OpenStack software.

P

Plug-in An OpenStack plugin is a module that is designed to be easily replaced by a module that you have customized to investigate and test new software concepts.

T

tenant network A tenant network is a VLAN network for an Oracle VM that is connected to an Oracle Ethernet Switch.

type driver Each available network type is managed by an ML2 TypeDriver. TypeDrivers maintain any needed type-specific network state, and perform provider network validation and tenant network allocation.

V

VLAN Virtual local area network (LAN).

VM VM is a virtual machine, a virtual computer composed of processing power and memory supplied by a physical server. A single server can provision a relatively large number of VMs with high-speed access to networks and VLANs, virtual storage, a shared printer, and other resources.

