Active Fabric Manager (AFM) Plug-in for OpenStack Guide 2.0

Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

2013 - 12

Rev. A0X

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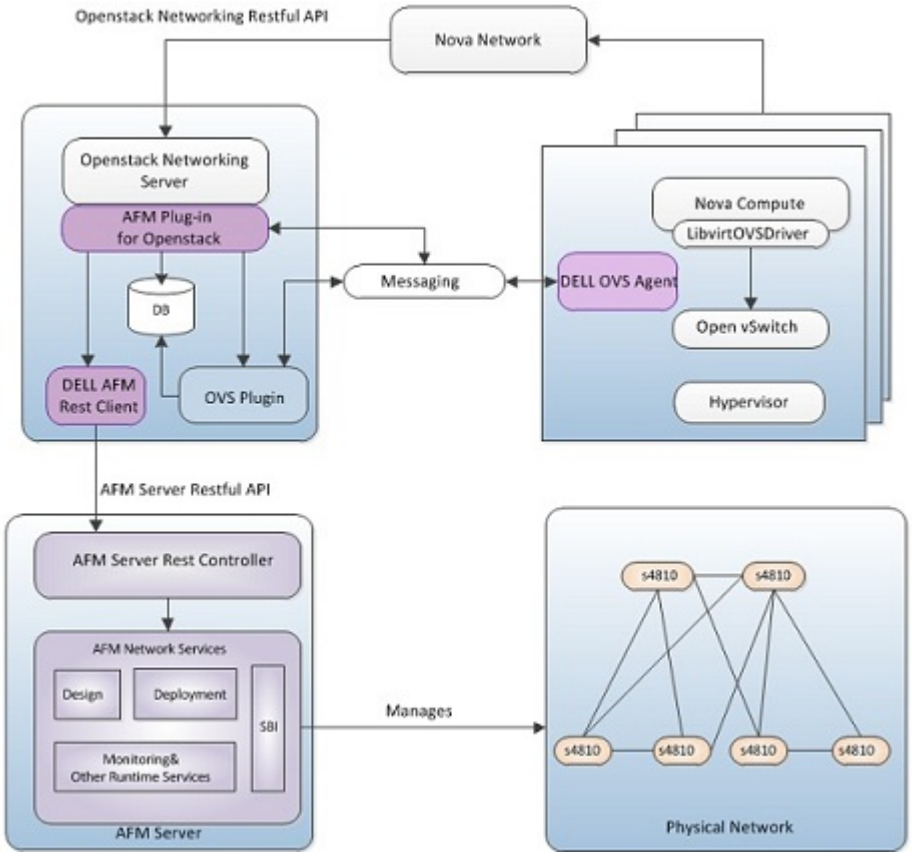
AFM Plug-in Overview

Use the Active Fabric Manager (AFM) plug-in for OpenStack to configure VLAN interfaces on the Dell Force10 Network switches to orchestrate virtual networks through the AFM Restful APIs. The AFM plug-in enables you to configure VLANs for a Layer 2 fabric, which is created by AFM administrators. It delegates the physical network configuration logic to the AFM server by making requests to the AFM server through AFM Restful APIs. Upon receiving requests from the OpenStack server restful API, the Dell Open vSwitch (OVS) agent and AFM plug-in create and maintain the logical port infrastructure for the administrator to tag and untag VLANs.

There are 3 components to managing the physical, virtual networks, and bridges. The first component, AFM, manages the physical network. The second and third components, the Dell OVS agent and AFM Plug-in for OpenStack, manages the virtual networks and bridges. The AFM Plug-in runs on the controller. The Dell OVS agent runs on a Nova compute and network node.

The AFM plug-in does the following:

- Plugs into the standard OpenStack Pluggable Networking Architecture.
- Allows the OpenStack Neutron server to communicate with AFM server.
- Integrates with the DELL AFM (Active Fabric Manager) through Restful APIs
- Provides dynamic VLAN configuration to fulfill OpenStack Cloud services Networking requirements.
- Provides dynamic discovery of Switch-Server connections through LLDP.
- Integrates with the AFM Layer 2 VLT topology to achieve switch-server connection redundancy using 'Port Bonding'.



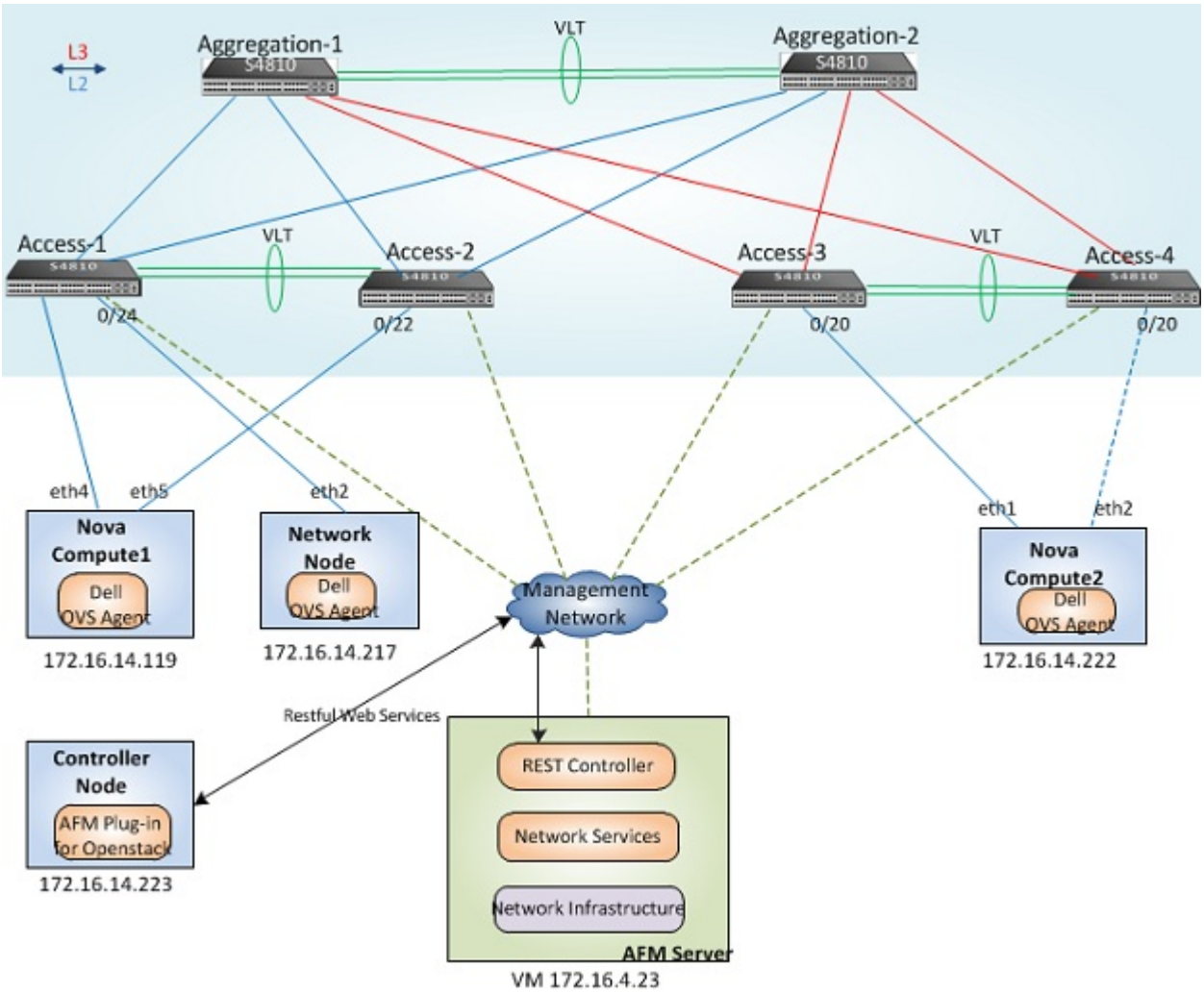
OpenStack Networking Deployment Use Cases

The AFM plug-in supports the following OpenStack use cases:

1. **Single Flat Network** — All VMs can talk to each other via the shared network and to external network through the physical route. In the simplest use case, a single OpenStack Networking network exists. This is a "shared" network, meaning it is visible to all tenants through the OpenStack Networking API. Tenant VMs have a single NIC, and receive a fixed IP address from the subnet(s) associated with that network.
2. **Multiple Flat Network** — VMs share the same shared network and can talk to each other and to VMs in other shared networks and to external networks through the physical router. This use case is very similar to the above Single Flat Network use case, except that tenants see multiple shared networks via the OpenStack Networking API and can choose which network (or networks) to plug into.
3. **Mixed Flat and Private Network** —All VMs can talk to each other through the shared network and to external networks through the physical router. VMs in a Tenant-Private Network can talk to each other but not to other Tenant-Private Networks or external. This use case is an extension of the above flat network use cases in which tenants also optionally have access to private per-tenant networks. In addition to seeing one or more shared networks via the OpenStack Networking API, tenants can create additional networks that are only visible to users of that tenant. When creating VMs, those VMs can have NICs on any of the shared networks and/or any of the private networks belonging to the tenant. This enables the creation of "multi-tier" topologies using VMs with multiple NICs. It also supports a model where a VM acting as a gateway can provide services such as routing, NAT, or load balancing.

Supported Deployment Topologies

The AFM Plug-in supports the following topologies: Six S4810 switches with two aggregation nodes and four access nodes.



The AFM Plugin is installed on the OpenStack Controller Node. The Dell OVS Agent is installed on each Nova Compute node and Network node. At runtime, the OpenStack Neutron Server communicates with the AFM Server through a restful API to manage the physical topology.

Pre-requisites for Using the Plug-In

Before you use the AFM plug-in for OpenStack:

- Install and configure OpenStack software, Ubuntu 12.0.4 (LTS). For information about this topic, see **http://docs.openstack.org/grizzly/basic-install/apt/content/**

  A typical deployment scenario is one controller node, one network node, and a series of nova compute nodes. The OpenStack Neutron server is installed on the controller node. After the installation, make sure all the services are started on all the nodes and the VMs can be launched before you apply the AFM plug-in for OpenStack.

- Ensure that the DNS is enabled in the OpenStack Neutron server.
- Ensure that the AFM administrator has created a fabric with the **Openstack Neutron Managed** option enabled at the **Fabric Name and Type** screen using the AFM Design Wizard and has deployed a complete fabric that is ready for service.

Key Considerations

When using the AFM plug-in consider the following:

- The AFM Plug-in for OpenStack resides on the OpenStack Neutron server.
- The AFM plug-in supports VLANs.
- The AFM plug-in is supported with fabrics that have 10 Gb Access switches.

Using the AFM Plug-in for OpenStack

To use the AFM plug-in for OpenStack:

1. Install the AFM software and start it.
2. Deploy the physical fabric network using the AFM.
3. Install OpenStack.
4. Install and configure the AFM plug-in for OpenStack onto the OpenStack Controller node.
5. Install the LLDP package (for dynamic discovery of server switch connectivity) and Port Bonding in the compute and network node.
6. Install and configure the Dell OVS Agent in the compute and network node.
7. Configure the OpenStack Neutron server and the AFM plug-in.
8. Use the OpenStack GUI to create network and VM instances..

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Step 1: Installing the AFM Plug-in

To install the AFM plug-in for Openstack onto the Controller node where the Neutron server is located:

1. Obtain the AFM Plug-in for Openstack tar file, **AFMOpenStackPlugin2.0.0.0.tar.gz** from iSupport. See the Release Notes.
2. On the Openstack server, go to the **/usr/lib/python2.7/dist-packages/** directory.
3. Untar the **AFMOpenStackPlugin2.0.0.0.tar.gz**. file using the following syntax:

   tar –zxvf AFMOpenStackPlugin2.0.0.0.tar.gz

   After you untar this file, the AFM plug-in is located at the **/usr/lib/python2.7/dist-packages/quantum/plugins/** directory.
4. Make a backup copy of the **quantum-server.conf** file. The file is located at the **/etc/init/** directory.
5. Add the --**config-file /etc/quantum/plugins/dell/dell_quantum_plugins.ini** \ statement in the **quantum-server.conf** file as shown below.

   exec start-stop-daemon --start --chuid quantum --exec /usr/bin/quantum-server -- \

   --config-file /etc/quantum/quantum.conf \

   --**config-file /etc/quantum/plugins/dell/quantum-server.conf** \

   --log-file /var/log/quantum/server.log $CONF_ARG
6. Make a backup copy of the **quantum.conf** file. This file is located in the **/etc/quantum/** directory.
7. Navigate to the **/etc/quantum/** directory and modify the **quantum.conf** file with the following content:

   core_plugin = quantum.plugins.dell.network_plugin.PluginV2
8. In the **/etc/quantum/plugins/dell** directory, create the **dell_quantum_plugins.ini** file with the following content. The default is to use dynamic port mapping (LLDP) and the parameter **static_config** is set **false**. In this file, also, add the **network_node_hostname** with the network node hostname. For example, network_node_hostname=**dev1-openstack01**

   [DELL_PLUGINS]

   #vswitch_plugin = quantum.plugins.openvs

   afm_plugin = quantum.plugins.dell.afm.afm_plugin_v2.AFMPlugin

   vswitch_plugin = quantum.plugins.openvswitch.ovs_quantum_plugin.OVSQuantumPluginV2

   [DELL]

   #model_class=quantum.plugins.dell.models.virt_phy_sw_v2.VirtualPhysicalSwitchModelV2

   #static_config=False

   network_node_hostname=dev1-openstack01

   NOTE: We recommend that you use dynamic port mapping.
9. (Optional) If you want to use static mapping set the **static_config= True** and then add the port mapping entries using the **PORT_MAPPING** syntax. .

   The following example shows how to add port mapping entries.

[PORT_MAPPING:<switch1 ip>]

<host1 ip> = <switch port1>

<host2 ip> = <switch port2>

<host3 ip> = <switch port5>

[PORT_MAPPING:<switch2 ip>]

<host1 ip> = <switch port1>

<host2 ip> = <switch port2>

<host3 ip> = <switch port5>

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Step 2: Configuring the AFM Plug-in

To configure the OpenVSwitch to support the AFM Plug-in:

1. On the Controller where the Neutron server is located, set the parameter in the **ovs_quantum_plugin.ini** file in the **/etc/quantum/plugins/openvswitch/** directory as shown in the following example:

   sql_connection = **mysql://<*username*>:<*password*>@<*mysql_host*>/ovs_quantum?charset=utf8**

2. Set the OpenVSwitch plugin to the VLAN mode and the range of VLAN for each network as shown in the following example:

   tenant_network_type = vlan

   enable_tunneling = False

   network_vlan_ranges = default: <vlan_min>:<vlan_max>

3. Restart the Neutron server:

   root@dev1-openstack06:~# **service quantum-server restart**

For more information about configuring OpenVSwitch plugin, see the *Openstack Network Admin Guide* at http://docs.openstack.org/trunk/openstack-network/admin/content/index.html

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Step 3: (Optional) Configuring Static Switch Server Connectivity

The AFM Plug-in supports dynamic discovery of server switch connectivity using LLDP and static configuration of server switch connectivity. The Dell OVS agent supports dynamic discovery of server switch connectivity on the Nova Compute Node or Network Node. Dell recommends that you use dynamic discovery. For information about dynamic discovery, see Installing the LLDP Package.

To configure static server switch connectivity, include the switch-server binding information in the **dell_quantum_plugins.ini** file in the **/etc/quantum/plugins/dell** directory.

Static Switch Server Connectivity Example:

The following static switch server connectivity example shows you how to add the **PORT_MAPPING** parameter to the **dell_quantum_plugins.ini** file with the following topology:

- Compute node, **dev-openstack05**, connects to the switch with an IP address of **172.16.12.232** through port **0/22**
- Compute node, **dev-openstack03**, connects to the switch with an IP address of **172.16.12.238** through port **0/22**
- Network node, **dev-openstack01**, connects to the switch with an IP address of **172.16.12.232** through port **0/24**

```
[DELL_PLUGINS]
afm_plugin = quantum.plugins.dell.afm.afm_plugin_v2.AFMPlugin
vswitch_plugin = quantum.plugins.openvswitch.ovs_quantum_plugin.OVSQuantumPluginV2

[DELL]
model_class=quantum.plugins.dell.models.virt_phy_sw_v2.VirtualPhysicalSwitchModelV2
static_config=True
network_node_hostname=dev1-openstack01

[PORT_MAPPING:172.16.12.232]
dev-openstack05 = 0/22
dev-openstack01 = 0/24

[PORT_MAPPING:172.16.12.238]
dev-openstack03 = 0/22
```

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Step 4: Installing the LLDP and Port Bonding

Before you install and configure the Dell OVS agent install the following on the Nova compute node and network node:

- LLDP package.

  NOTE: Use the LLDP package for dynamic discovery of server switch connectivity. If you are using static switch server connectivity, see Configuring Static Switch Server Connectivity.

- Port Bonding

Step 4.1: Installing the LLDP Package

To install LLDP on the Nova compute node. :

1. On the Nova compute node and network node, login as root.
2. Install the lldpd package using the **apt-get install lldpd** command.
3. Start the lldpd package using the **service lldpd start** command.
4. Install lldpad (lldptool) using the **apt-get install lldpad** command.
5. Verify the successful installation of LLDP package on the Nova compute node and network node using the **lldpctl** command to detect connected lldp neighbors.

Step 4.2: Install and Configure Port Bonding

When you connect to a Nova compute node and network node to the fabric that the Active Fabric Manager (AFM) manages, you can connect to the Ethernet ports to the two leaf (or access) switches in the AFM supported topologies. These two connections provide redundancy.

When you have two connections from a Nova compute node and network node to the switches, create a Ubuntu Bonding port so that the compute node can use the redundancy from these two ports. For information about port bonding, see https://help.ubuntu.com/community/UbuntuBonding?action=show&redirect=LinkAggregation.

To install and configure port bonding:

1. On the Nova compute node, install port bonding using the following command:

   sudo apt-get install ifenslave-2.6

2. Verify that bonding module is in the kernel system is in the **/etc/modules** configuration file using the following command.

   sudo vi /etc/modules

   The bonding module file should look like the following:

   # /etc/modules: kernel modules to load at boot time.

   #

   # This file contains the names of kernel modules that should be loaded

   # at boot time, one per line. Lines beginning with "#" are ignored.

   loop

lp

rtc

bonding

If the bonding module is not there, add the **bonding** keyword word into **/etc/modules** file.

3. Configure the network interfaces as an active and slave to the bonding interface using the following command:

   sudo vi /etc/network/interfaces

   The following example shows you to associate **eth4** and **eth5** as slaves to the bonding interface **bond0**. In this example, **eth4** is the active interface; **eth5** is the slave interface:

   # This file describes the network interfaces available on your system

   # and how to activate them. For more information, see interfaces(5).

   # The loopback network interface

   auto lo

   iface lo inet loopback

   # The primary network interface

   auto eth0

   iface eth0 inet static

   address 172.16.14.119

   netmask 255.255.255.0

   network 172.16.14.0

   broadcast 172.16.14.255

   gateway 172.16.14.1

   # dns-* options are implemented by the resolvconf package, if installed

   dns-nameservers 10.162.168.102

   dns-search santanet.dell.com

   #eth4 is manually configured, and slave to the "bond0" bonded NIC

   #**associated interface as a slave to the bonding0 interface.**

   auto eth4

   iface eth4 inet manual

   bond-master bond0

   #eth5 ditto, thus creating a 2-link bond

   # **associated interface as a slave to the bonding interface**

   auto eth5

   iface eth5 inet manual

   bond-master bond0

   #bond0 is the bonding NIC and vcan be used like any other normal NIC.

   #bond0 is configured using static network information

   auto bond0

   iface bond0 inet static

   address 192.168.1.10

   gateway 192.168.1.1

netmask 255.255.255.0

bond-mode 802.3ad

bond-miimon 100

bond-lacp-rate 1

bond-slaves none

4. Restart the network service by rebooting the compute node at **/etc/init.d/networking restart**
5. After the reboot is complete, verify the bonding interface by checking the **/proc/net/bonding/** directory

The following example shows how to check the **bond0** interface. In this example, the bonding mode and the slave interface **eth4** and **eth5** have a MII Status of **Up**.

root@dev1-openstack03:/etc/network# **cat /proc/net/bonding/bond0**

Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)

Bonding Mode: IEEE 802.3ad Dynamic link aggregation

Transmit Hash Policy: layer2 (0)

MII Status: up

MII Polling Interval (ms): 100

Up Delay (ms): 0

Down Delay (ms): 0

802.3ad info

LACP rate: fast

Min links: 0

Aggregator selection policy (ad_select): stable

Active Aggregator Info:

Aggregator ID: 1

Number of ports: 1

Actor Key: 33

Partner Key: 1

Partner Mac Address: 00:00:00:00:00:00

Slave Interface: eth4

MII Status: up

Speed: 10000 Mbps

Duplex: full

Link Failure Count: 28

Permanent HW addr: 00:10:18:d0:3d:60

Aggregator ID: 1

Slave queue ID: 0

Slave Interface: eth5

MII Status: up

Speed: 10000 Mbps

Duplex: full

Link Failure Count: 28

Permanent HW addr: 00:10:18:d0:3d:62
Aggregator ID: 2
Slave queue ID: 0

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Step 5: Installing the Dell OVS Agent

The Dell OVS Agent supports dynamic discovery of Server Switch connections using LLDP. To use the Dell OVS agent, install it on the nova compute nodes and network node.

To install the Dell OVS Agent on the nova compute nodes and network nodes:

1. Obtain the AFM Plug-in for Openstack tar file, **AFMOpenStackPlugin2.0.0.0.tar.gz**, from iSupport.
2. On each Nova compute node and network node, go to **/usr/lib/python2.7/dist-packages/**.
3. At the **/usr/lib/python2.7/dist-packages** directory, untar the file using the following command:

   tar –zxvf AFMOpenStackPlugin2.0.0.0.tar.gz command.

   The files are put in the **/usr/lib/python2.7/dist-packages/quantum/plugins/** directory.
4. After you have untar the file, make a backup file of **/usr/bin/quantum-openvswitch-agent**. Then copy the **/usr/lib/python2.7/dist-packages/quantum/plugins/dell/bin/quantum-openvswitch-agent** to the **/usr/bin** directory.

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Step 6: Configuring the Dell OVS Agent

To configure the Dell OVS Agent:

1. Create the physical and integration bridge
2. Configure the Dell OVS Plug-in
3. Configure the Rootwrap
4. Restart the Dell OVS Agent on Nova Compute Node or Network Node
5. Configure the Nova Compute Node or Network Node

Step 1: Creating the Physical and Integration bridge

This section describes how to add the physical port and bonding to the Dell OVS agent. For each Ethernet port that connects to the switches, you create a physical bridge and integration bridge. On each Nova Compute node and network node, the physical bridge and integration bridge can be connected by one of the following ways:

- A single Ethernet port; for example, **eth4**.
- Port bonding two Ethernet ports. For port bonding, configure port bonding **bond0** with two Ethernet ports; for example, **eth4** and **eth5**.

Example: Adding a Physical Port to the Dell OVS Agent

The following example shows how to create an integration bridge and add a physical port to the bridge for **eth4**.

ovs-vsctl add-br br-eth4 #Create a integration bridge to the bridge

ovs-vsctl add-port br-eth4 eth4 #Add a physical port

Example: Adding a Port Bonding to the Dell OVS Agent

The following examples shows how to add port bonding, **bond0** , to the Dell OVS agent.

ovs-vsctl add-br br-bond0 # Create a integration bridge

ovs-vsctl add-port br-bond0 bond0 # Add the port bonding port to the bridge

For information about how to create a port bonding, see the Configuring Port Bonding section.

Step 2: Configuring the Dell OVS Plug-in

To configure the **dell_ovs_quantum_plugin.ini file:**

1. On each compute node and network node, add the following content into the OVS section of the **dell_ovs_quantum_plugin.ini** file:

   [OVS]

   bridge_mappings = default:br-bond0

   network_vlan_ranges = default:1000:1100

   tenant_network_type = vlan

2. If the interfaces for the bridge are not operational, on each Nova compute node and network node , run the following command to bring up all the Ethernet ports and physical bridges:

   # **ifconfig –a** *interface* **up**

For example, on a Nova Compute Node and network node with eth4 and eth5 connected to switches, execute the following commands to ensure that **eth5** and **eth4** are operational:

ifconfig –a eth5 up

ifconfig –a eth4 up

Step 3: Configuring the Rootwrap

The Dell OVS agent uses the Ubuntu shell command, which requires that you configure the Neutron Rootwrap

To configure the Neutron Rootwrap:

1. On the Nova Compute and Network Nodes, navigate to the **/etc/quantum/plugins/dell/agent/ dell_ovs_quantum_plugin.ini** directory
2. In the **dell_ovs_quantum_plugin.ini file,** search for the keyword **[AGENT]**
3. Add the following line under the **[AGENT]** section

   [AGENT]

   root_helper = sudo /usr/bin/quantum-rootwrap /etc/quantum/rootwrap.conf
4. Navigate to the **etc/quantum/** directory.
5. In the **rootwrap.conf** file, search for the **[DEFAULT]** keyword.
6. Add the following line under **[DEFAULT]** section:

   [DEFAULT]

   root_helper = sudo /usr/bin/quantum-rootwrap /etc/quantum/rootwrap.conf
7. Navigate to the **/etc/quantum/rootwrap.d/openvswitch-plugin.filters** directory.
8. In the **openvswitch-plugin.filters** file, add the hostname and **lldpctl** commands to the file as shown in the following example:

   # quantum-rootwrap command filters for nodes on which quantum is

   # expected to control network

   #

   # This file should be owned by (and only-writeable by) the root user

   # format seems to be

   # cmd-name: filter-name, raw-command, user, args

   [Filters]

   # openvswitch-agent

   # unclear whether both variants are necessary, but I'm transliterating

   # from the old mechanism

   ovs-vsctl: CommandFilter, /bin/ovs-vsctl, root

   ovs-vsctl_usr: CommandFilter, /usr/bin/ovs-vsctl, root

   ovs-vsctl_sbin: CommandFilter, /sbin/ovs-vsctl, root

   ovs-vsctl_sbin_usr: CommandFilter, /usr/sbin/ovs-vsctl, root

   ovs-ofctl: CommandFilter, /bin/ovs-ofctl, root

   ovs-ofctl_usr: CommandFilter, /usr/bin/ovs-ofctl, root

ovs-ofctl_sbin: CommandFilter, /sbin/ovs-ofctl, root

ovs-ofctl_sbin_usr: CommandFilter, /usr/sbin/ovs-ofctl, root

xe: CommandFilter, /sbin/xe, root

xe_usr: CommandFilter, /usr/sbin/xe, root

hostname: CommandFilter, /bin/hostname, root

lldpctl: CommandFilter, /usr/sbin/lldpctl, root

ip_lib

ip: IpFilter, /sbin/ip, root

ip_usr: IpFilter, /usr/sbin/ip, root

ip_exec: IpNetnsExecFilter, /sbin/ip, root

ip_exec_usr: IpNetnsExecFilter, /usr/sbin/ip, root

Step 4: Restart the Dell OVS Agent on Nova Compute Node or Network Node

To restart the Dell OVS Agent on Nova Compute Node or Network Node:

1. Navigate to the **/etc/init/** directory
2. Make a backup of the existing q**uantum-plugin-openvswitch-agent.conf** file.
3. Change the **quantum-plugin-openvswitch-agent.conf** file as follows so that the Dell OVS Agent configuration is selected and runs it.

   exec start-stop-daemon --start --chuid quantum --exec /usr/bin/quantum-openvswitch-agent --config-file=/etc/quantum/quantum.conf --config-file=/etc/quantum/plugins/dell/agent/dell_ovs_quantum_plugin.ini --log-file=/var/log/quantum/openvswitch-agent.log

   NOTE: The following configuration picks up the Dell OVS agent and runs it.
   --config-file=/etc/quantum/plugins/dell/agent/dell_ovs_quantum_plugin.ini
4. On each Nova Compute Node or Network Node, start the Dell OVS Agent by executing the **service quantum-plugin-openvswitch-agent restart** command.

Step 5: Configure the Nova Compute Node or Network Node

To test the connectivity of VM instances on different Compute Nodes, apply the nova security rule and modify the administrator password settings. These security rules allow the VMs to ping each other.

Pre-requisities

To execute these commands, install the Nova CLI client needs to be installed on each compute node or network node. For information about install the Nova client, refer to standard CLI installation guide from Openstack. http://docs.openstack.org/cli/quick-start/content/index.html

To test the connectivity of VM instances on different compute nodes:

1. On each Nova Compute Node, add the Nova Security Rule to allow the firewall to have access to ICMP and TCP.

   nova secgroup-add-rule default icmp -1 -1 0.0.0.0/0

   nova secgroup-add-rule default tcp 22 22 0.0.0.0/0
2. The following configuration needs to be done after the Nova CLI is installed

   export OS_USERNAME=admin

   export OS_PASSWORD=password

```
export OS_TENANT_NAME=admin
export OS_AUTH_URL=http://localhost:5000/v2.0
```

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Step 7: Connecting to the AFM Server

To connect to the AFM server:

1. Configure the AFM server IP address and port on the Openstack Controller node
2. Configure the AFM user credentials for the AFM Plug-in on the AFM server

Step 1: Configure the AFM server IP address and Port

The AFM plug-in requires that you configure the AFM server IP and port on the Openstack Controller node to connect to the AFM server for Restful API calls.

To connect to the AFM server from the Controller node:

On the Openstack Controller node, modify the **/etc/quantum/plugins/dell/dell_quantum_plugins.ini** file so that it contains the following information:

- AFM server IP address
- Port number

Example: Connecting to AFM Server from Openstack Controller Node

[AFM_REST_CLIENT]

afm_user_name=

afm_user_key=

host = 172.16.4.221

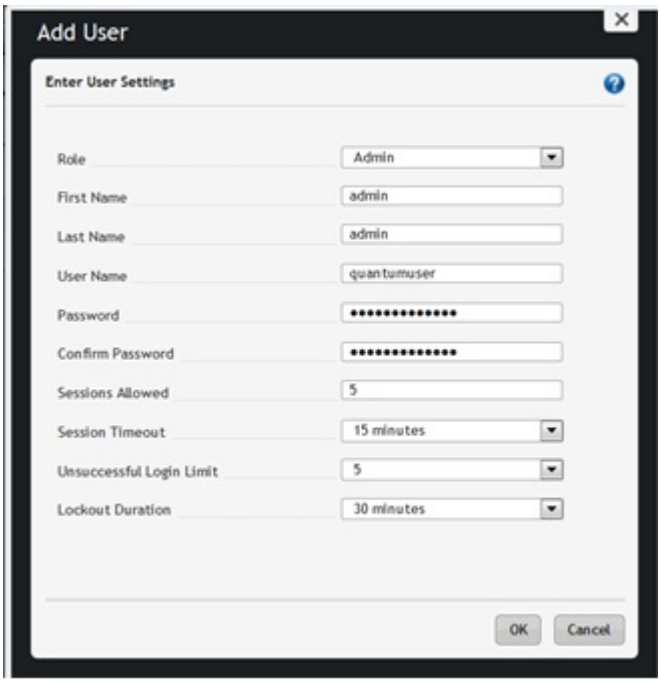
port = 443

Step 2: Configure the AFM User Credentials for the AFM Plug-in

The AFM server requires a user login for the AFM plug-in to make Restful API calls to the AFM server for VLAN tagging and untagging. Although the AFM plug-in can use the **superuser** role to log into the AFM server and tag VLANs associated with Restful APIs on the AFM server, we recommend that you create another user with an **admin** role instead of **superuser** role.

To create a user with an administrative role to make Restful API calls to the AFM server for VLAN tagging and untagging:

1. Log onto AFM server using AFM server URL. For example, if the AFM server IP address is **172.16.4.23**, type **172.16.4.23**/ as the URL from your browser
2. Go to **Administration** > **User Account** screen.



3. Click the **Add User** link.
4. From the **Role** pull-down menu, select the **Admin** option.
5. In the **First Name** and **Last Name** fields, enter the name of the user.
6. In the **User Name** field, enter the user name. For example, **quantumuser**.
7. In the **Password** field, enter the password.
8. In the **Confirm Password** field, confirm the password.
9. In the **Sessions Allowed** pull-down menu, select **5** for the number sessions allowed for the user.
10. For the remaining options: **Sessions Allowed**, **Session Timeout**, **Unsuccessful Login Limit**, and **Lock Duration**, accept the default values.
11. Click **OK** to create the new user on the AFM server.
12. On the Nuetron server, run the encryption scripts from the AFM plug-in

    #cd /usr/lib/python2.7/dist-packages/quantum/plugins/dell/bin

    #./afm_generate_key.sh –u "<userid>" –p "<newpassword>"

    This command updates the following:

    - **afm_user_name** and **afm_user_key** in **/etc/quantum/plugins/dell/dell_quantum_plugins.ini** .file
    - **/usr/lib/python2.7/dist-packages/quantum/plugins/dell/common/cipher_data.txt** file, which is used for encryption/decryption of the password.

    The AFM plug-in uses this user created on the AFM server to log into AFM server to tag VLANs through Restful APIs.

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Uninstalling the AFM Plug-in for OpenStack

The AFM Plug-in is located at the OpenStack Neutron plugins directory.

To uninstall the AFM Plug-in, restore the configuration files that you have changed and then remove the AFM plug-in directory.

1. Run the following command to stop the Dell Neutron plugin.

   root@dev1-openstack06:~# **service quantum-server stop**
2. Modify the following statement by removing the line "**--config-file /etc/quantum/plugins/dell/dell_quantum_plugins.ini ** from the **quantum-server.conf** file located in the **/etc/init/** directory.

   exec start-stop-daemon --start --chuid quantum --exec /usr/bin/quantum-server -- \

   --config-file /etc/quantum/quantum.conf \

   --log-file /var/log/quantum/server.log $CONF_ARG
3. Restore the **/etc/quantum/quantum.conf** file.
4. Remove the **/etc/quantum/plugins/dell** directory and all the files in it.
5. Restore the **/etc/quantum/plugins/openvswitch/ovs_quantum_plugin.ini** file.

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Uninstalling the Dell OVS Agent

To uninstall the Dell OVS agent:

1. Run the **service quantum-plugin-openvswitch-agent stop** command.
2. Restore the **/usr/bin/quantum-openvswitch-agent** file from the backup.
3. Restore the **/etc/init/quantum-plugin-openvswitch-agent.conf** file.
4. Remove the **/etc/quantum/plugins/dell directory** and all the files in it.