



OPENSTACK NEUTRON PLUG-IN FOR ALCATEL-LUCENT OMNISWITCH

APPLICATION NOTE

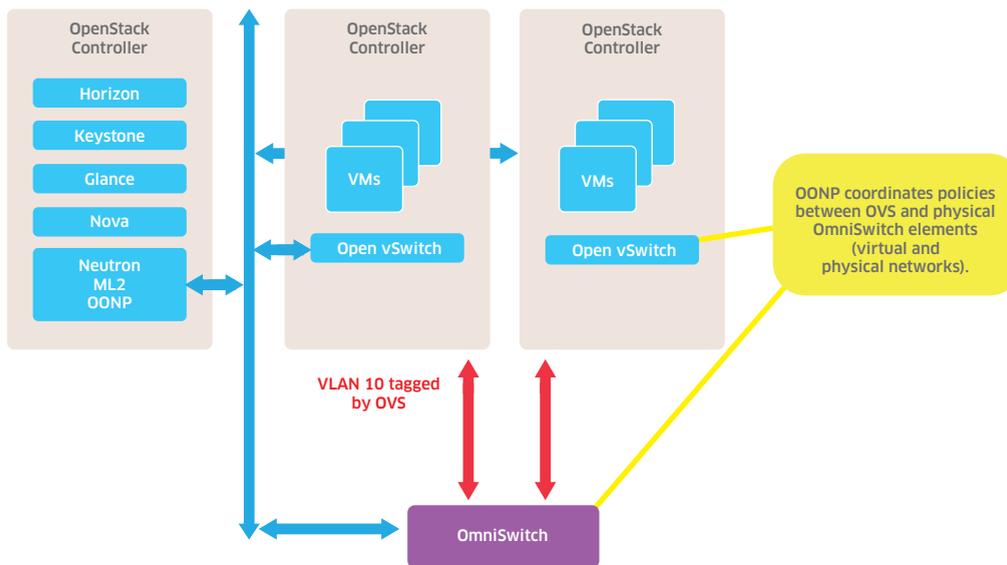
INTRODUCTION

OpenStack® is an open-source infrastructure as a service (IaaS) initiative for creating and managing large groups of virtual private servers in a cloud computing environment. OpenStack not only provides for management of the virtual machines (VMs, known as Nova) but also orchestrates the virtual network configuration through the OpenStack Networking components (known as Neutron).

In these cloud environments with VMs hosted by physical servers, a virtual network access layer is provided by the host machine. This layer is typically supplied by a software virtual switch, usually Open vSwitch (OVS), whose configuration is controlled directly by Neutron. The underlying physical transport network configuration must be somehow coordinated with the virtual switch configuration of the VM hosts.

The OmniSwitch® OpenStack Neutron Plug-in (OONP) provides a Modular Layer 2 (ML2) mechanism driver that allows OpenStack Neutron to orchestrate the physical configurations of OmniSwitch. When the virtual network access layer is configured for specific VM connectivity, the physical network elements are automatically configured to match it. In virtual LAN (VLAN) based VM connectivity, this correct VLAN configuration must be mapped to the physical attachment point of the VM and VLAN availability must be ensured throughout the rest of the transport network. This is performed automatically without operator intervention at the appropriate times in the life cycle of a Neutron network and VMs.

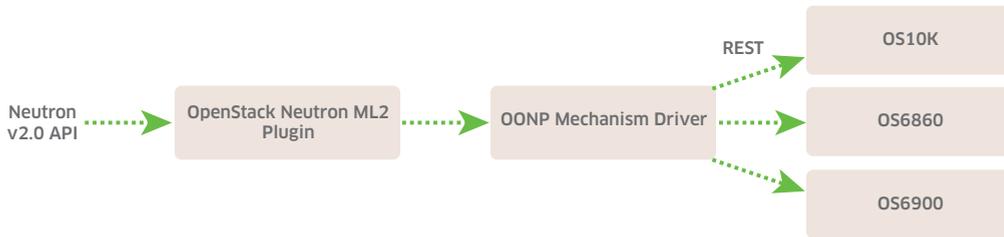
Figure 1: OONP architecture



OONP provides a Python®-based Neutron ML2 mechanism driver that has been validated against OpenStack IceHouse through Juno releases. The driver supports the standard Neutron v2.0 APIs for the network, subnet, and port objects.

KEY FEATURES OF OONP

Figure 2: OONP virtual network configuration



The Neutron ML2 plug-in communicates with the OONP mechanism driver, which uses REST (or telnet) to configure the physical OmniSwitch devices. All OmniSwitch products support using the basic OONP configuration; however, advanced OONP configurations require feature support that some of the product families do not have. The following products are supported: 6250, 6450, 6850E, 6860(E), 6900 and 10K. OONP currently only supports for VLAN-based network segmentation.

Basic operation provides automatic VLAN assignment and end-to-end tenant network provisioning. Additionally, virtual chassis (on compatible platforms) and Link Aggregation Control Protocol (LACP) based connections are supported, to provide redundant network connections (high availability) for VM hosts.

OONP can be configured to benefit from advanced features found in the OmniSwitch product line, such as shortest path bridging (SPB) for efficient backbone traffic distribution and redundancy and multiple VLAN registration protocol (MVRP) for automated VLAN discovery and propagation. Advanced edge-based traffic classification, implemented using universal network profiles (UNPs) and based on either the VM's media access control (MAC) address or VLAN tag, directs traffic into the correct VLAN. By using these features, OONP offloads the network configuration tasks onto the switching infrastructure, reducing the OONP configuration traffic and simplifying the switch configuration.

Optionally, predefined OmniSwitch quality-of-service (QoS) policies may be associated with specified tenant networks through the OpenStack dashboard. These are subsequently applied to traffic flows on the specified virtual networks, which enables tenant-specific traffic optimization.

CONCLUSION

OONP extends the capabilities of OpenStack Neutron to include the physical configuration of an OmniSwitch-based transport topology. The plug-in provides automatic end-to-end provisioning of VLAN-based tenant networks. The provisioning method is user-configurable, allowing the appropriate technology to be used for a given deployment. Advanced features of the OmniSwitch products are used to provide fast and efficient network configuration and data path optimization.

Benefits

- Provides automatic physical network configuration required to achieve virtual network defined in the OpenStack UI, based on the API events of the Neutron network.
- Provides advanced QoS policy linkage to the virtual networks identified by the operator, allowing different service level agreements to be applied to virtual (tenant) networks.
- Can use advanced core network topologies like SPB to provide efficient link use and path redundancy.
- Works across the entire OmniSwitch product family, so that OpenStack environments can be realized using the appropriate hardware and scaled as needed.

Availability

You can download OONP on the GitHub. Future releases will be aligned with the OpenStack release and included as part of the official OpenStack release. Alcatel-Lucent Enterprise customers can also download OONP at

<http://support.ind.alcatel.com/releasefiles/ReleaseTemplate.cfm?E=468>.

(Note, login required)