



Neutron and OpenDaylight: Battle of Titans or Cupid and Psyche

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Agenda

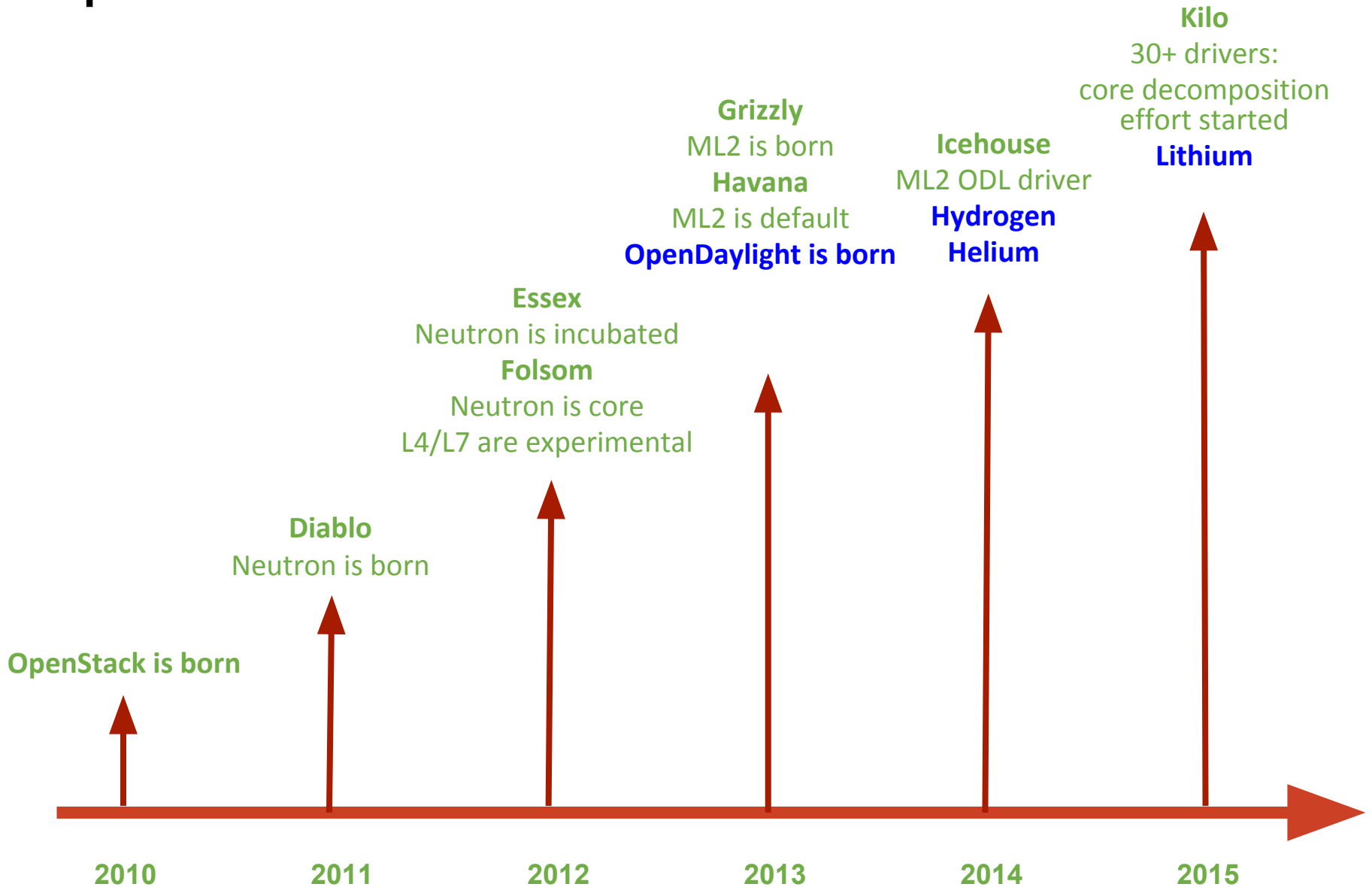
- Background
- Architecture
- Development and Testing
- Demo time!
- Q&A



#ODLSummit

Background

OpenStack Releases

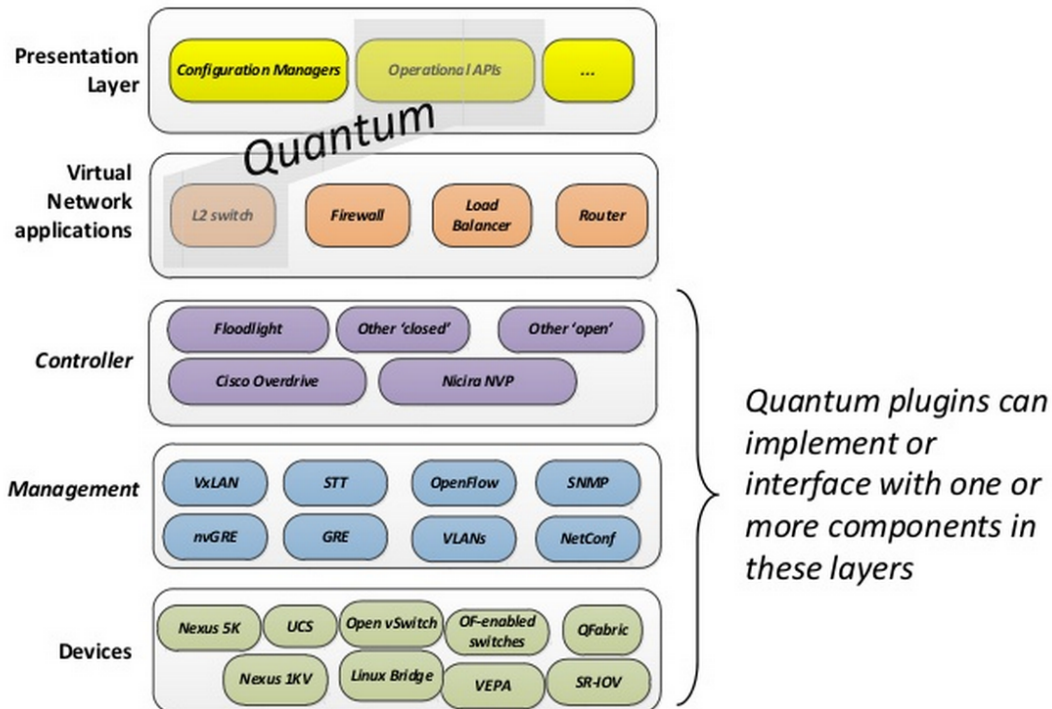


What is Neutron anyway?

- Neutron
 - API exposing logical abstractions for consuming the service
 - One or more backend implementations of that API
- Why?
 - Networking constructs baked into Nova
 - No tenant control over network topology and service insertion
 - Multi-tenancy and scalability

Neutron != SDN

Quantum in the SDN space



- Backend options?
 - Pox
 - Ryu
 - Floodlight
 - OVS

Reference (kudos to @taturiello):

http://www.slideshare.net/salv_orlando/quantum-virtual-networks-for-openstack

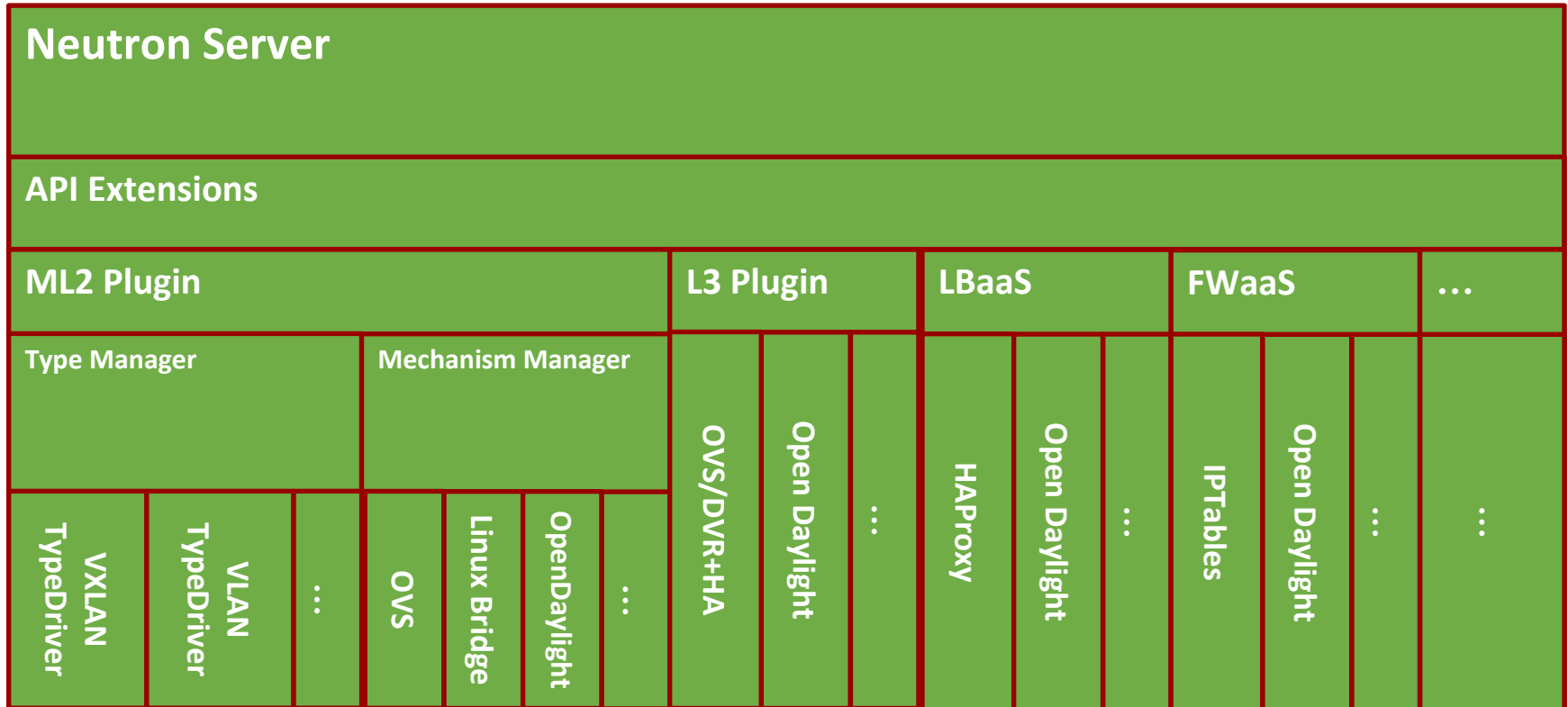


Mission Statements

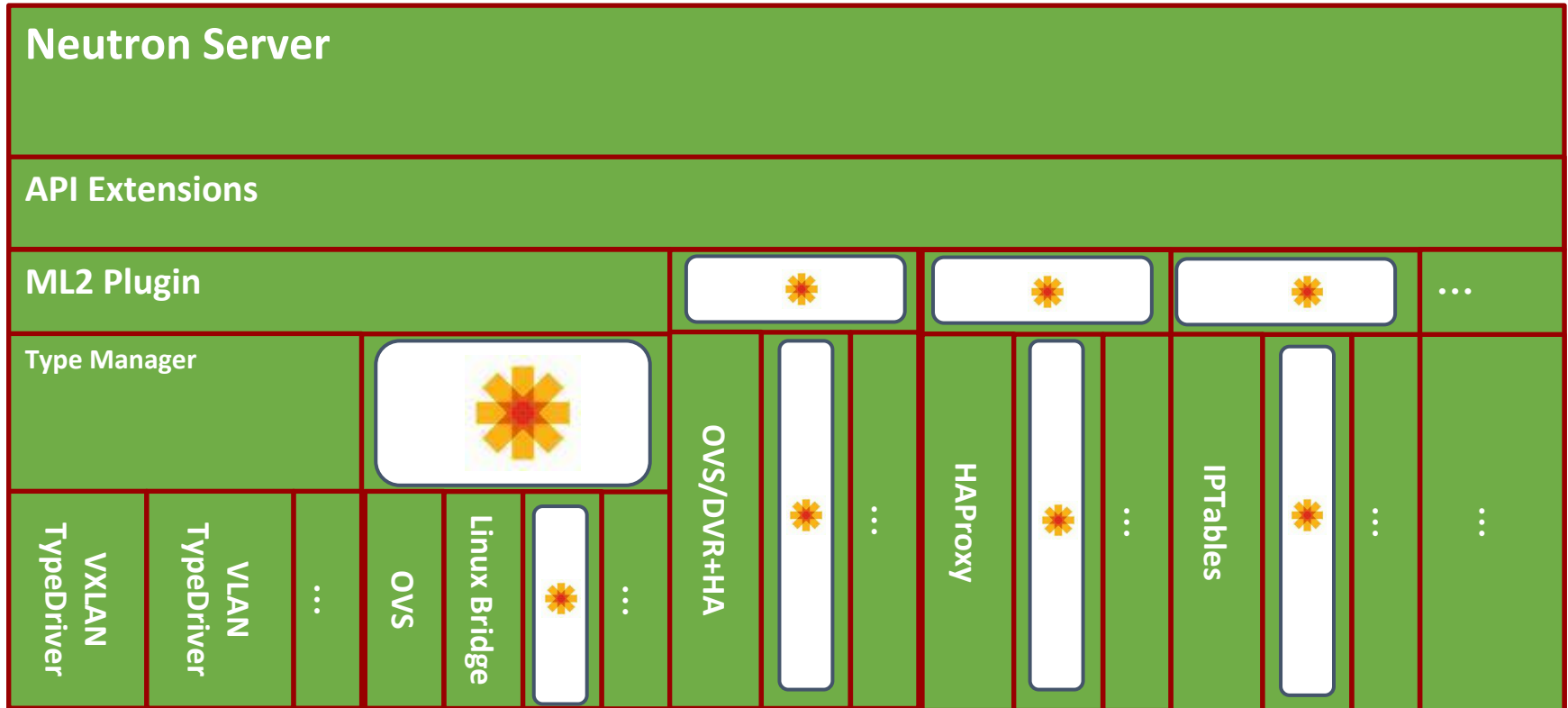
- Neutron mission
 - To implement services and associated libraries to provide on-demand, scalable, and technology-agnostic network abstraction
- OpenDaylight mission
 - Facilitate a community-led, industry-supported open source framework, including code and architecture, to accelerate and advance a common, robust Software Defined Networking platform
- So...Neutron and OpenDaylight: antagonists or lovers?
 - Let's go ahead...we'll get back to this question at the of the slide deck

Architecture

Neutron Architecture



Neutron Architecture



Neutron Architecture

- Workloads
 - Virtual (multi-hypervisor) and bare metal
- L2 connectivity
 - vlan, vxlan, gre
- L3 connectivity
 - DVR, HA, external gateways, floating IPs
- IPAM
 - DHCP/DNS
- Load Balancing
- Firewall
- Site-to-site VPN
- L2 Gateway
- ...

Neutron Platform

- openstack/neutron-fwaas
 - *release:managed*
 - *release:cycle-with-milestones*
 - *release:has-stable-branches*
 - *type:service*
- openstack/neutron-lbaas
 - *tc-approved-release*
 - *release:managed*
 - *release:cycle-with-milestones*
 - *release:has-stable-branches*
 - *type:service*
- openstack/neutron-lbaas-dashboard
 - *tc-approved-release*
 - *release:managed*
 - *release:cycle-with-milestones*
 - *release:has-stable-branches*
 - *type:service*
- openstack/neutron-vpnaas
 - *tc-approved-release*
 - *release:managed*
 - *release:cycle-with-milestones*
 - *release:has-stable-branches*
 - *type:service*
- openstack/python-neutronclient
 - *release:cycle-with-intermediary*
 - *release:has-stable-branches*
 - *type:library*
 - *release:managed*
 - *vulnerability:managed*
- openstack/networking-arista
 - *release:independent*
- openstack/networking-bgpvpn
 - *release:independent*
- openstack/networking-cisco
 - *release:independent*
- openstack/networking-l2gw
 - *release:independent*
- openstack/networking-midonet
 - *release:independent*
- openstack/networking-odl
 - *release:independent*
- openstack/networking-ofagent
 - *release:independent*
- openstack/networking-ovn
 - *release:independent*
- openstack/networking-plumgrid
 - *release:independent*
- openstack/networking-sfc
 - *release:independent*
- openstack/networking-vsphere
 - *release:independent*
- openstack/dragonflow
 - *release:independent*
- openstack/kuryr
 - *release:independent*
- openstack/octavia
 - *release:independent*
- openstack/vmware-nsx
 - *release:independent*
- openstack/python-neutron-pd-driver
 - *release:independent*

"Helium"

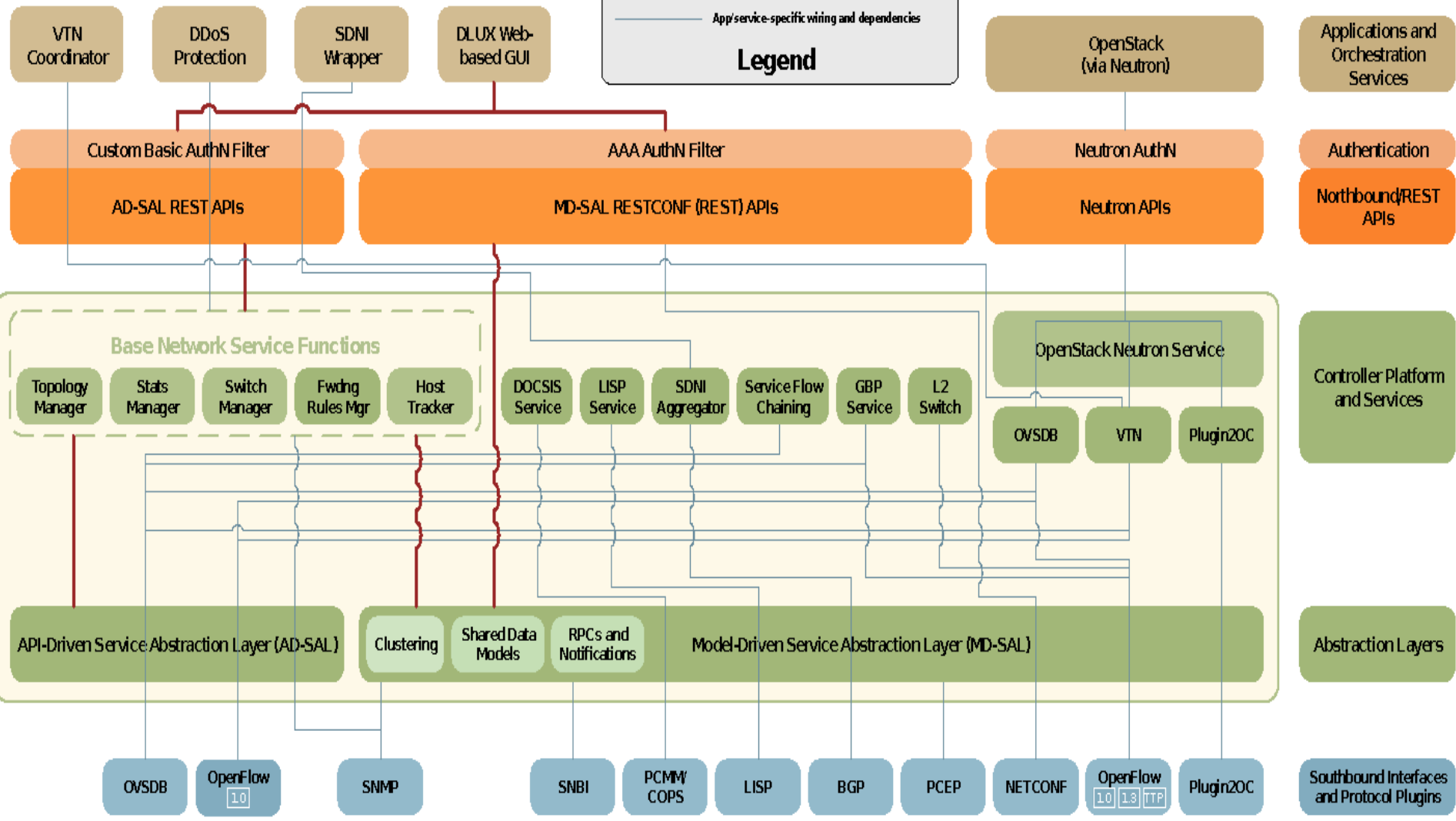
AAA: Authentication, Authorization & Accounting
AuthN: Authentication
BGP: Border Gateway Protocol
CDPS: Common Open Policy Service
DLUX: OpenDaylight User Experience
DDoS: Distributed Denial Of Service

DOCSIS: Data Over Cable Service Interface Specification
GBP: Group Based Policy
LISP: Locator/Identifier Separation Protocol
OVSDB: Open vSwitch DataBase Protocol
PCEP: Path Computation Element Communication Protocol
PCMP: Packet Cable MultiMedia

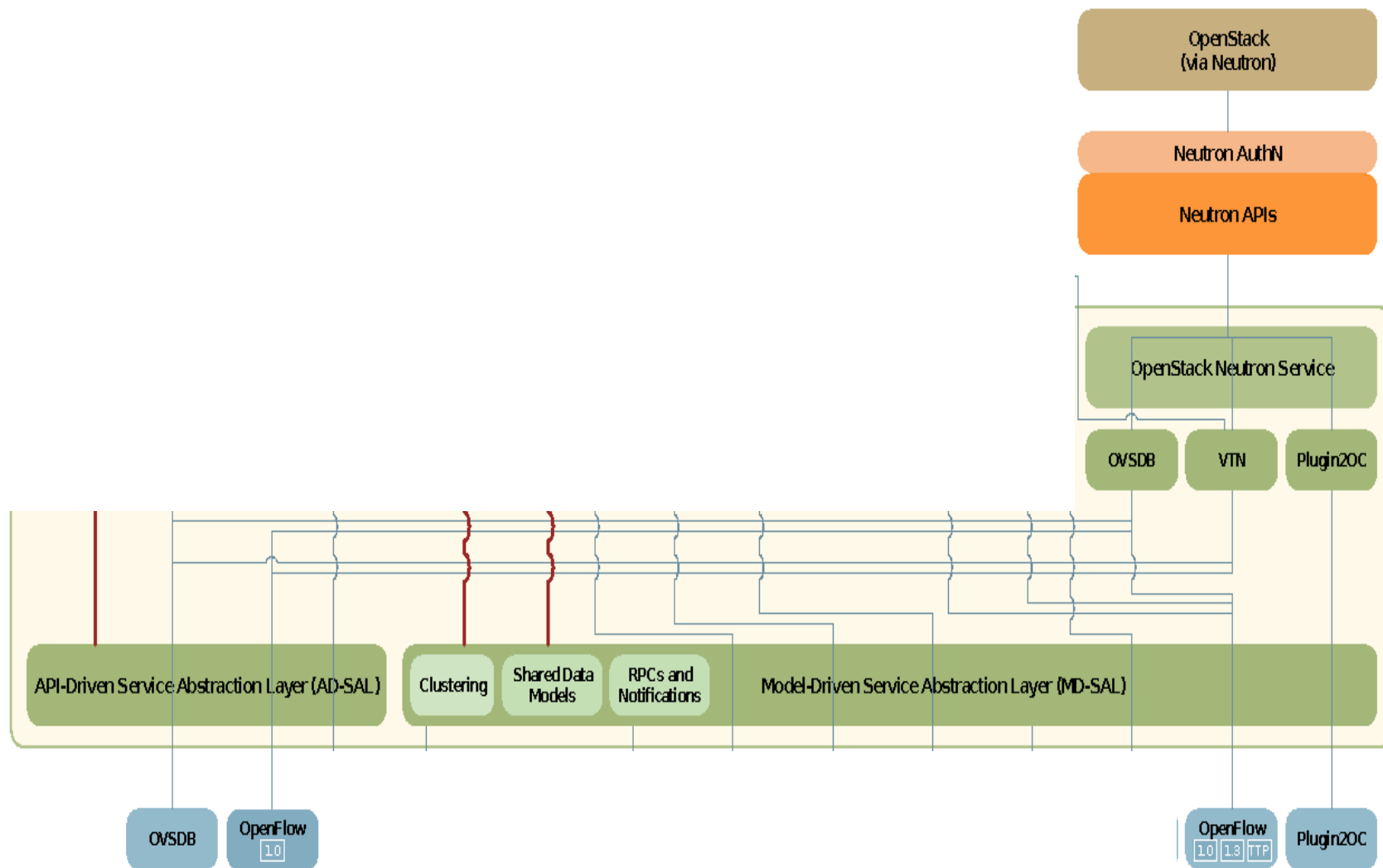
Plugin2OC: Plugin To OpenContrail
SDN: SDN Interface (Cross-Controller Federation)
SNBI: Secure Network Bootstrapping Infrastructure
SNMP: Simple Network Management Protocol
TTP: Table Type Patterns
VTN: Virtual Tenant Network

— Core service wiring and dependencies
 — App/service-specific wiring and dependencies

Legend

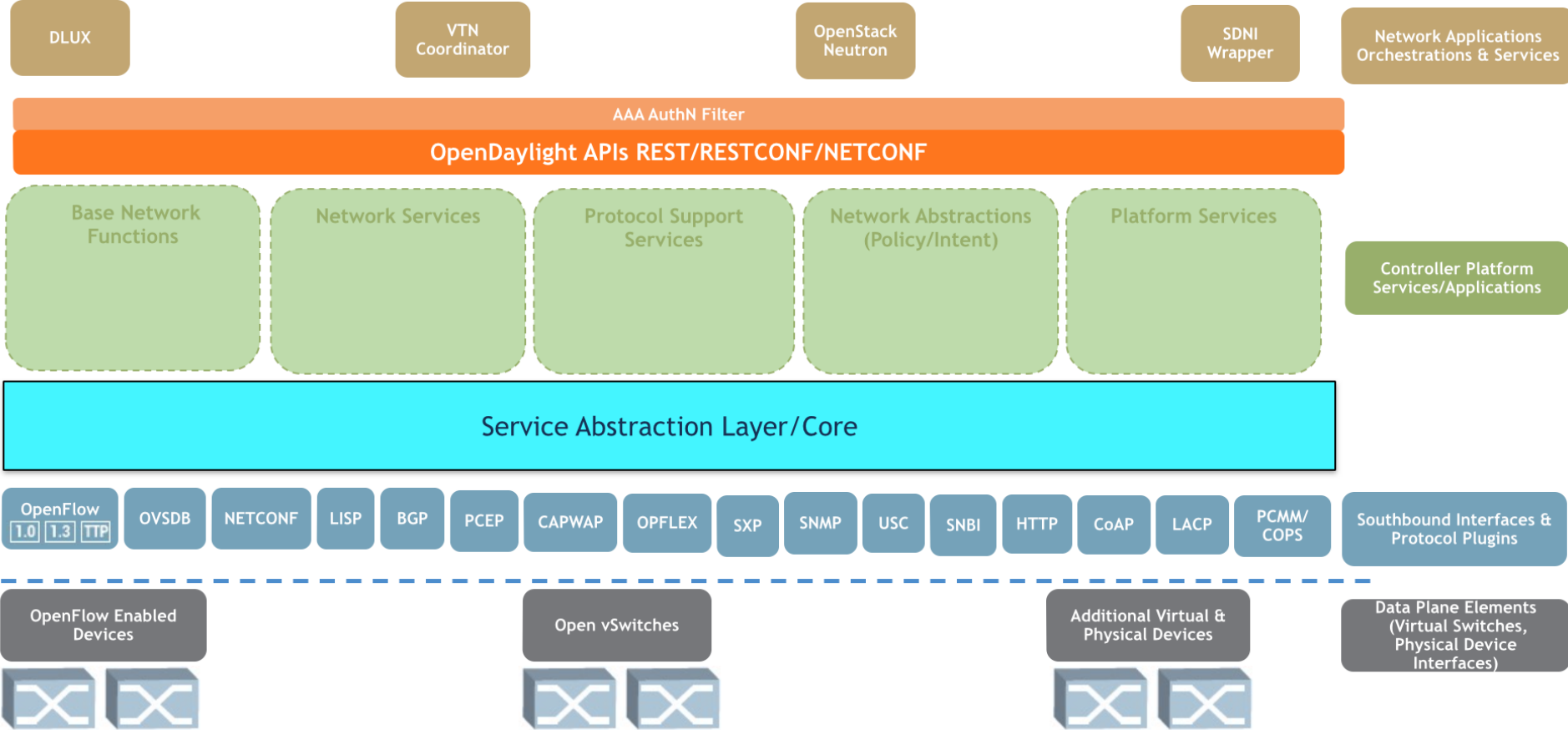


OpenDaylight Architecture (Helium)

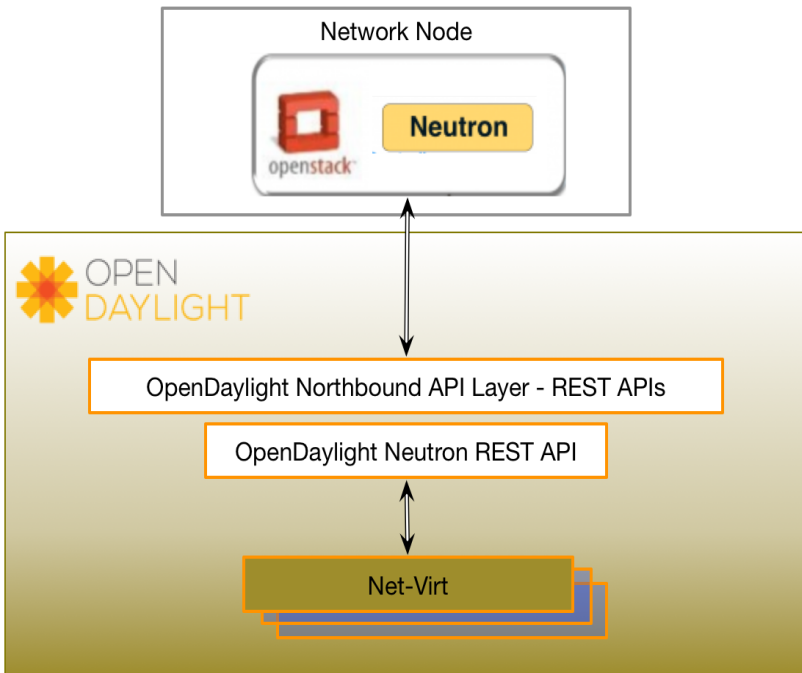




Lithium



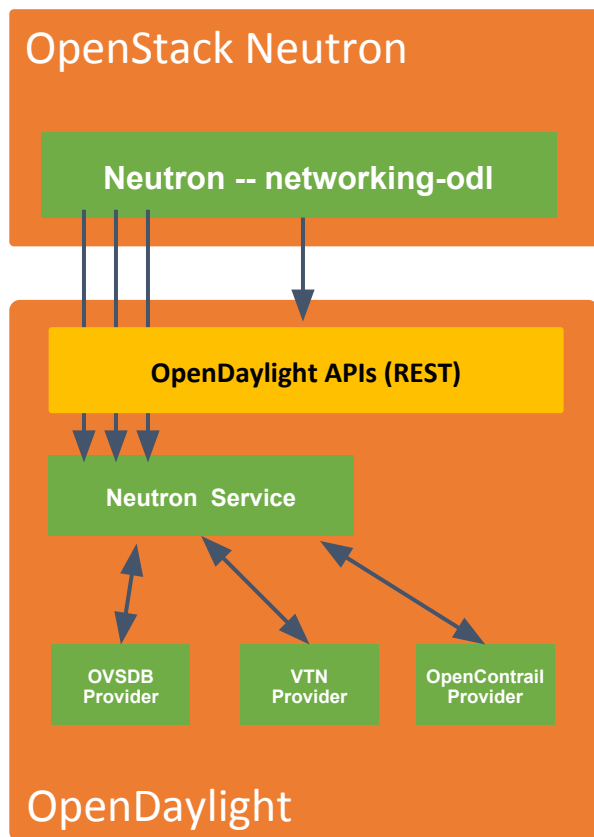
An OpenStack view of OpenDaylight



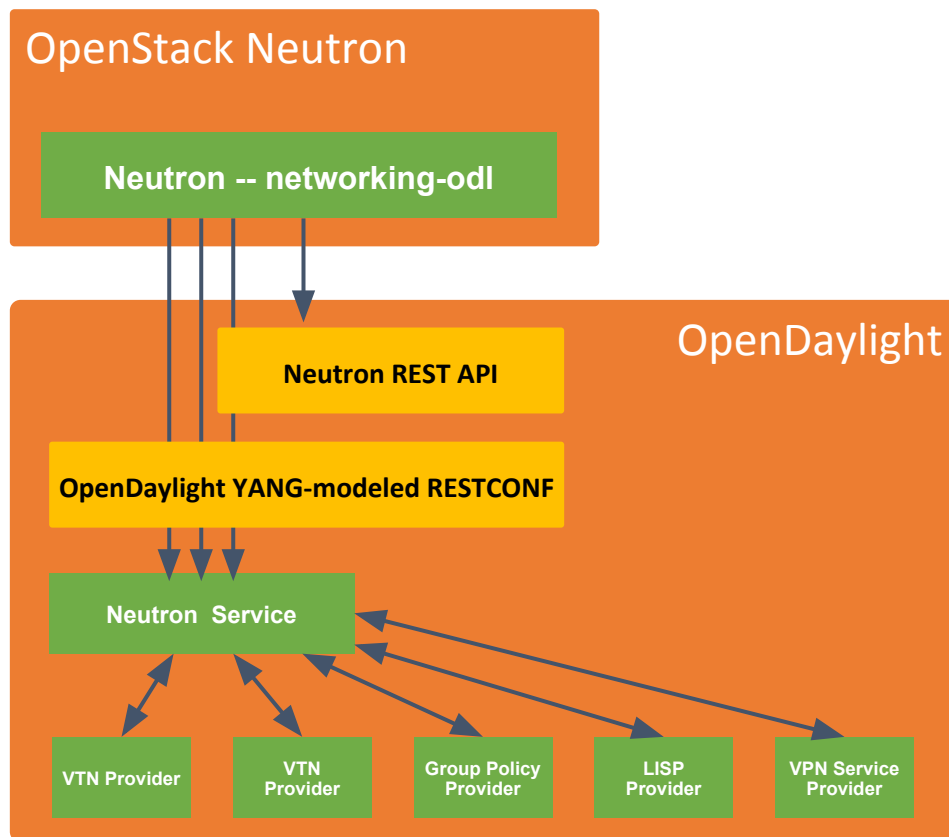
- OpenDaylight has a common Neutron “northbound” provider
 - 3 implementations in Helium
 - OVSDB, OpenContrail, VTN
 - 5+ implementations in Lithium
 - OVSDB, VTN, LISP, Group-based Policy, VPN service
- Supports ML2 and some advanced services

Lithium adds YANG and more providers

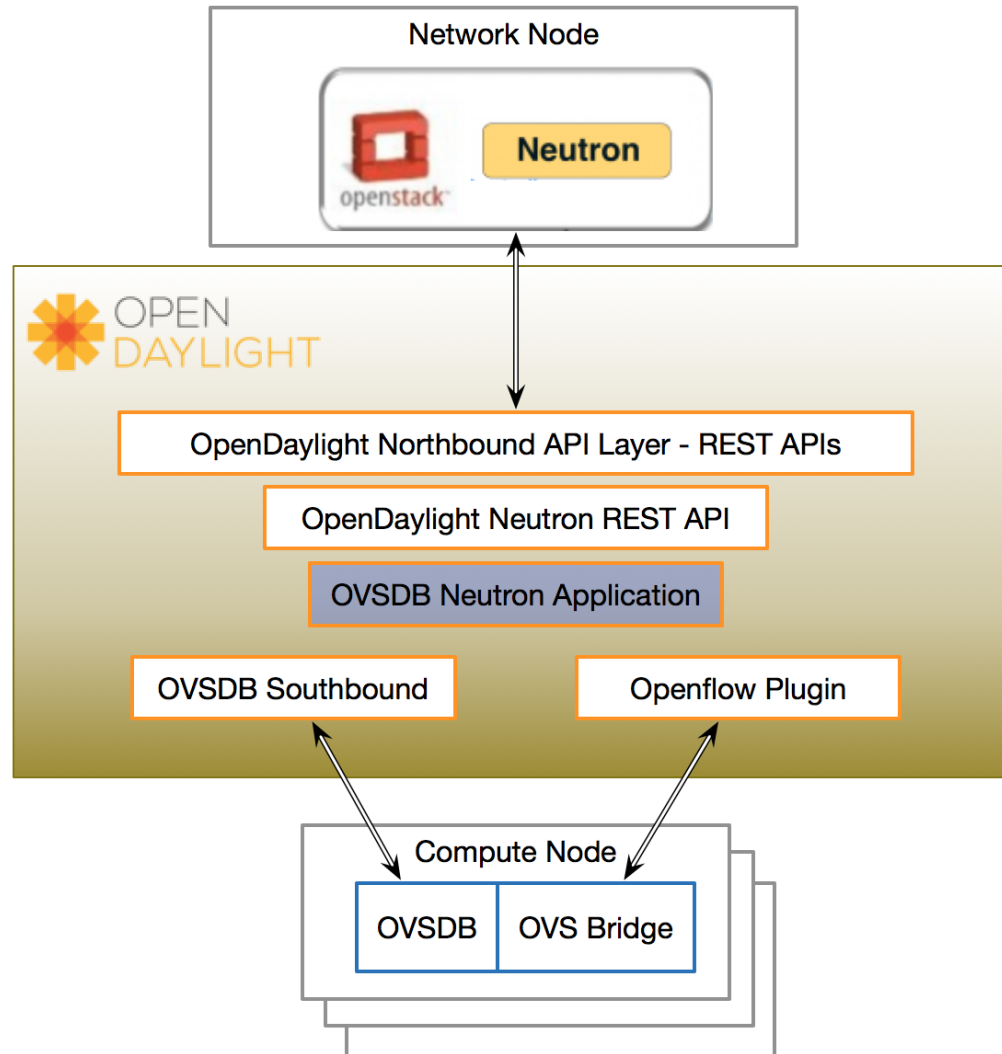
Helium



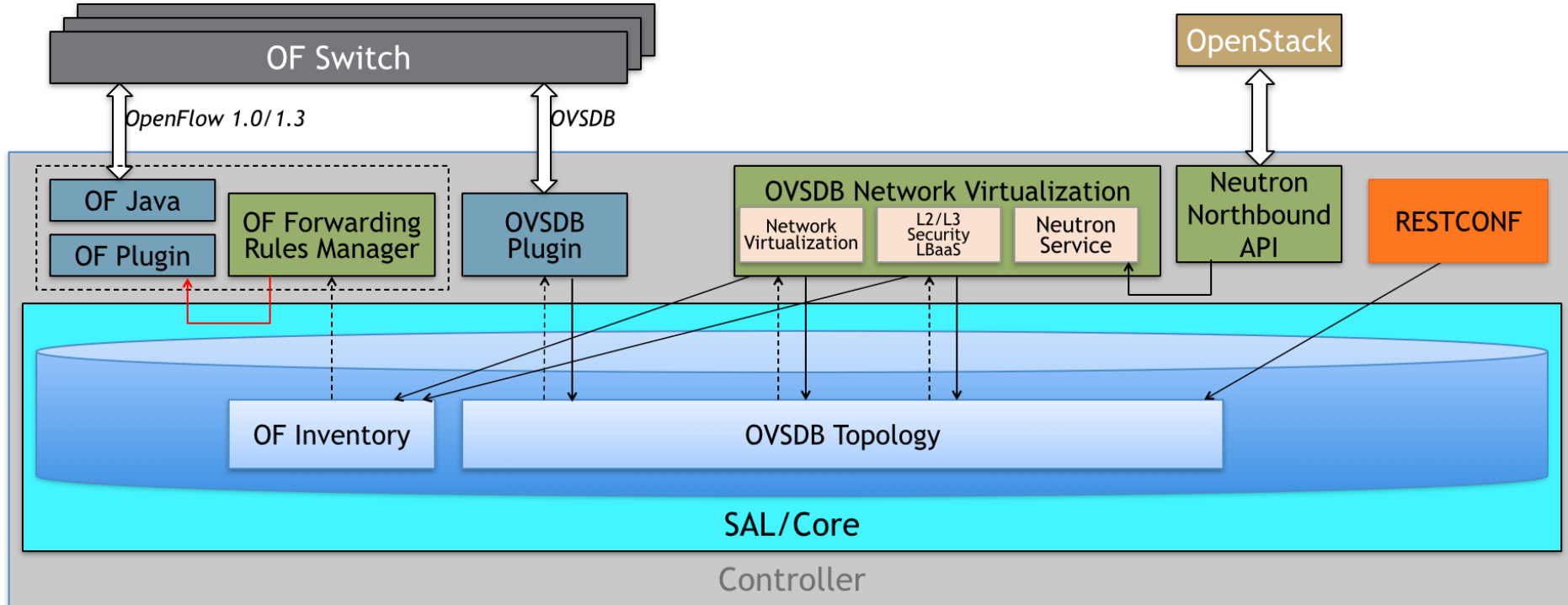
Lithium



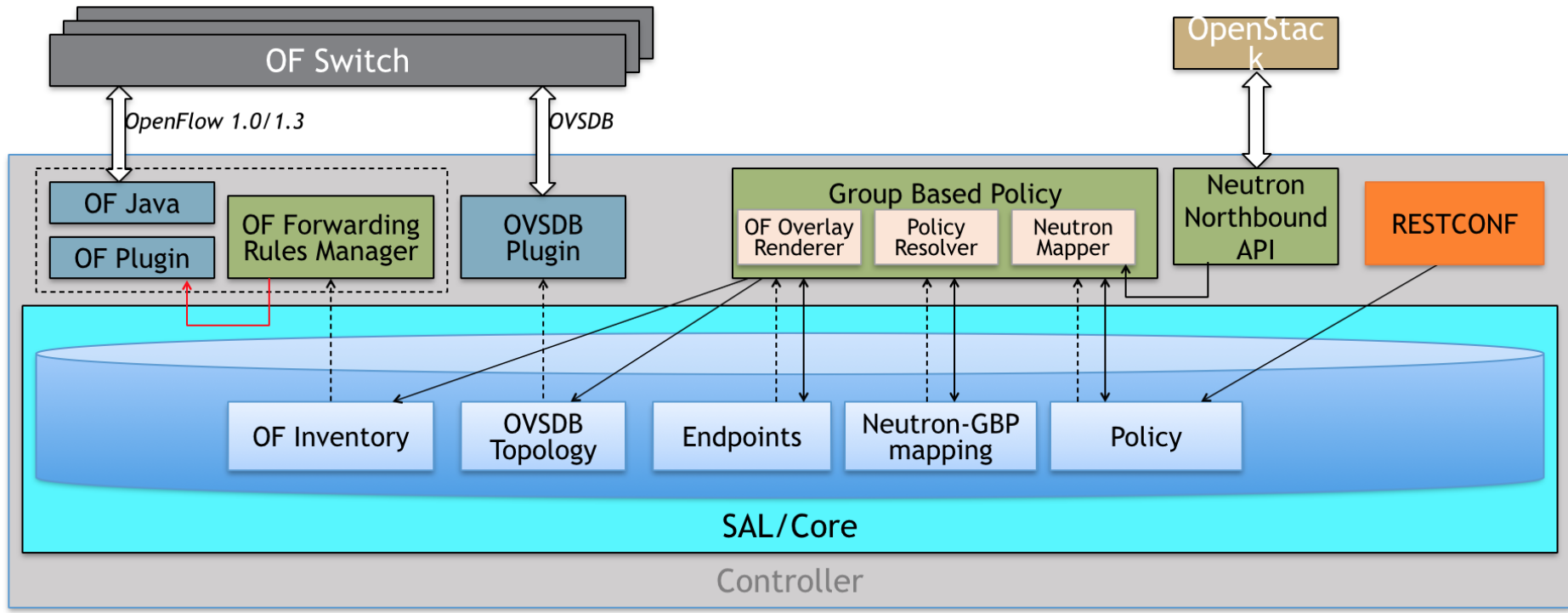
End-to-End Deployment



Example: OpenStack - OVSDB



Example: OpenStack - Group Based Policy



-----> Data Change Notification
 —————> Data Store Write
 —————> RPCs/Notifications

Development and Testing

The meat on the bone

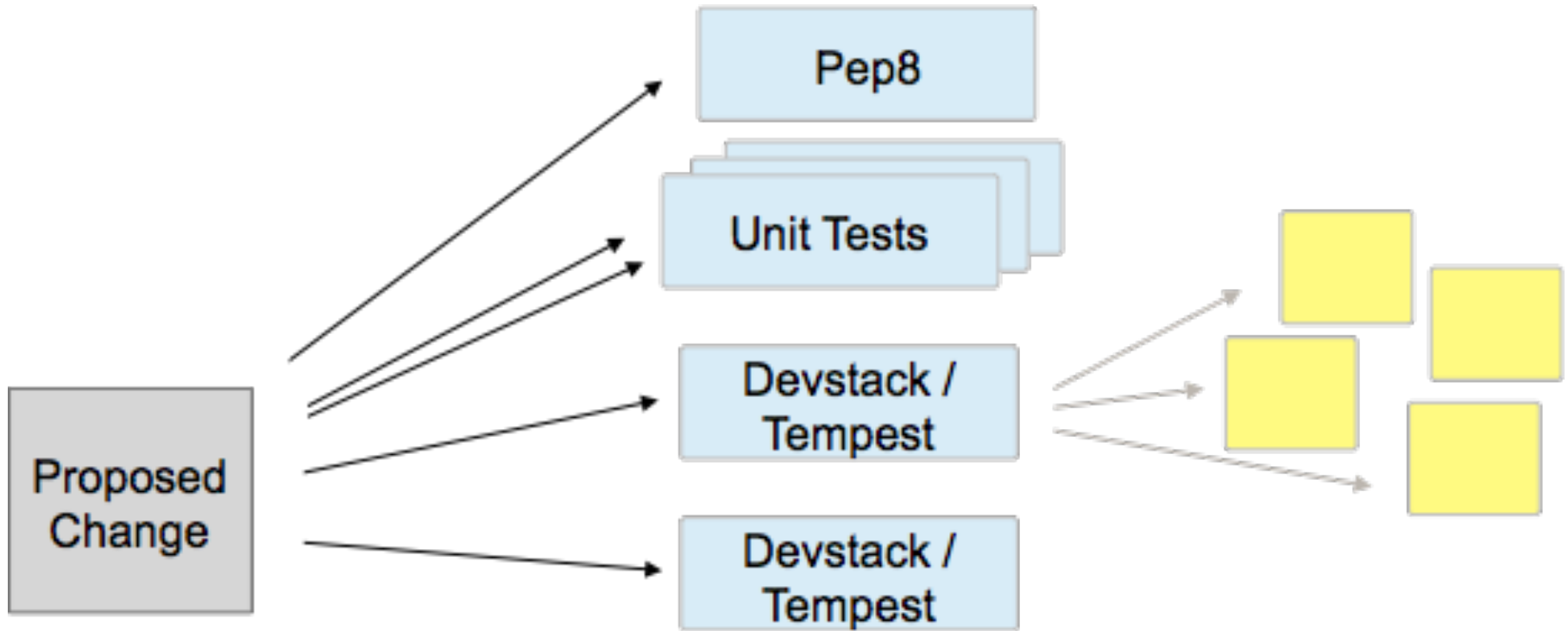
- Neutron OpenDaylight drivers/plugins
 - <https://github.com/openstack/networking-odl>

mech_driver: full_sync uses unrelated context for resources ...		
Isaku Yamahata authored 11 days ago		latest commit 6537676b89
..		
common	Add logic to pass sg and sg-rules to ODL	2 months ago
fwaas	Remove session_timeout parameter	4 months ago
l3	workaround: l3 plugin misses dvr_deletens_if_no_port method	12 days ago
lbaas	lbaas: Fix incorrect url path	12 days ago
ml2	mech_driver: full_sync uses unrelated context for resources	11 days ago
openstack	Sync the latest oslo incubated libraries and use oslo.log	5 months ago
tests	mech_driver: full_sync uses unrelated context for resources	11 days ago
__init__.py	Establish a successful baseline for CI jobs	7 months ago

- OpenDaylight Neutron Northbound
 - <https://github.com/opendaylight/neutron>




When You Submit Code...



One change generates

Change queue: [openstack/networking-odl](#)

 openstack/networking-odl 192003,21	unknown 2 min
gate-networking-odl-pep8:	queued
gate-networking-odl-docs:	queued
gate-networking-odl-python27:	queued
gate-tempest-dsvm-networking-odl: (non-voting)	queued



Jenkins

10:12 AM

Patch Set 21: Verified+1

Build succeeded (check pipeline).

gate-networking-odl-pep8	SUCCESS in 3m 33s
gate-networking-odl-docs	SUCCESS in 3m 36s
gate-networking-odl-python27	SUCCESS in 3m 13s
gate-tempest-dsvm-networking-odl	SUCCESS in 1h 25m 15s (non-voting)

Life is good, if not rinse and repeat

Unit Test Report

Status: Pass 918 Skip 74

Show [Summary](#) [Failed](#) [All](#)

Test Group/Test case	Count	Pass	Fail	Error	Skip	View
	992	918	0	0	74	Detail
TestApiDiscovery)						skip
TestChassis)						skip
TestDrivers)						skip
TestNodes)						skip
TestNodeStates)						skip
TestPorts)						skip
TestPortsNegative)						skip
test_create_agent[id-1fc6bdc8-0b6d-4cc7-9f30-9b04fabe5b90]						pass
test_delete_agent[id-470e0b89-386f-407b-91fd-819737d0b335]						pass
test_list_agents[id-6a326c69-654b-438a-80a3-34bcc454e138]						pass
test_list_agents_with_filter[id-eabadde4-3cd7-4ec4-a4b5-5a936d2d4408]						pass
test_update_agent[id-dc9ffd51-1c50-4f0e-a820-ae6d2a568a9e]						pass
test_aggregate_add_host_create_server_with_az[id-96be03c7-570d-409c-90f8-e4db3c646996]						pass
test_aggregate_add_host_get_details[id-eeef473c-7c52-494d-9f09-2ed7fc8fc036]						pass
test_aggregate_add_host_list[id-7f6a1cc5-2446-4cdb-9baa-b6ae0a919b72]						pass
test_aggregate_add_remove_host[id-c8e85064-e79b-4906-9931-c11c24294d02]						pass
test_aggregate_create_delete[id-0d148aa3-d54c-4317-aa8d-...						pass

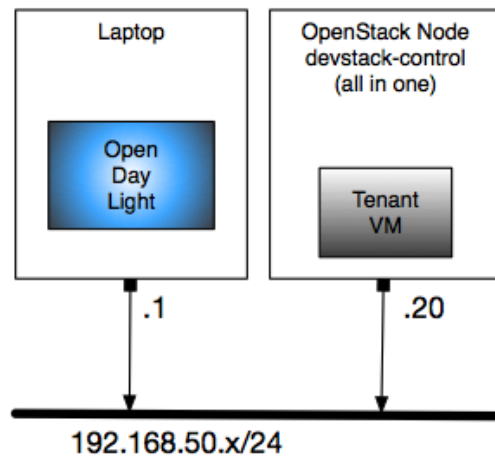
Unit Test Report

Status: Pass 119 Failure 2

Show [Summary](#) [Failed](#) [All](#)

Test Group/Test case	Count	Pass	Fail	Error	Skip	View
	121	119	2	0	0	Detail
test_create_delete_subnet_with_gw[id-e41a4888-65a6-418c-a095-f7c2ef4ad59a]						fail
test_create_delete_subnet_without_gateway[id-d2d596e2-8e76-47a9-ac51-d4648009f4d3]						fail
Total	121	119	2	0	0	

Demo time!



```
cd /home/vagrant/devstack
```

```
source openrc admin admin
```

```
neutron net-create ext-net --router:external --provider:physical_network physnetext1 --provider:network_type flat
```

```
neutron subnet-create --name ext-subnet --allocation-pool start=192.168.111.9,end=192.168.111.14 --disable-dhcp \
--gateway 192.168.111.254 ext-net 192.168.111.0/24
```

```
neutron router-create ext-rtr
```

```
neutron router-gateway-set ext-rtr ext-net
```

```
neutron net-create vx-net --provider:network_type vxlan --provider:segmentation_id 1500
```

```
neutron subnet-create vx-net 10.100.5.0/24 --name vx-subnet --dns-nameserver 8.8.8.8
```

```
neutron router-interface-add ext-rtr vx-subnet
```

```
nova boot --poll --flavor m1.nano --image $(nova image-list | grep 'uec\s' | awk '{print $2}' | tail -1) \
--nic net-id=$(neutron net-list | grep -w vx-net | awk '{print $2}') vmvx1
```

```
VM_ID=$(nova list | grep vmvx1 | awk '{print $2}')
```

```
PORT_ID=$(neutron port-list -c id -c fixed_ips -- --device_id $VM_ID | grep subnet_id | awk '{print $2}')
```

```
neutron floatingip-create --port_id $PORT_ID ext-net
```

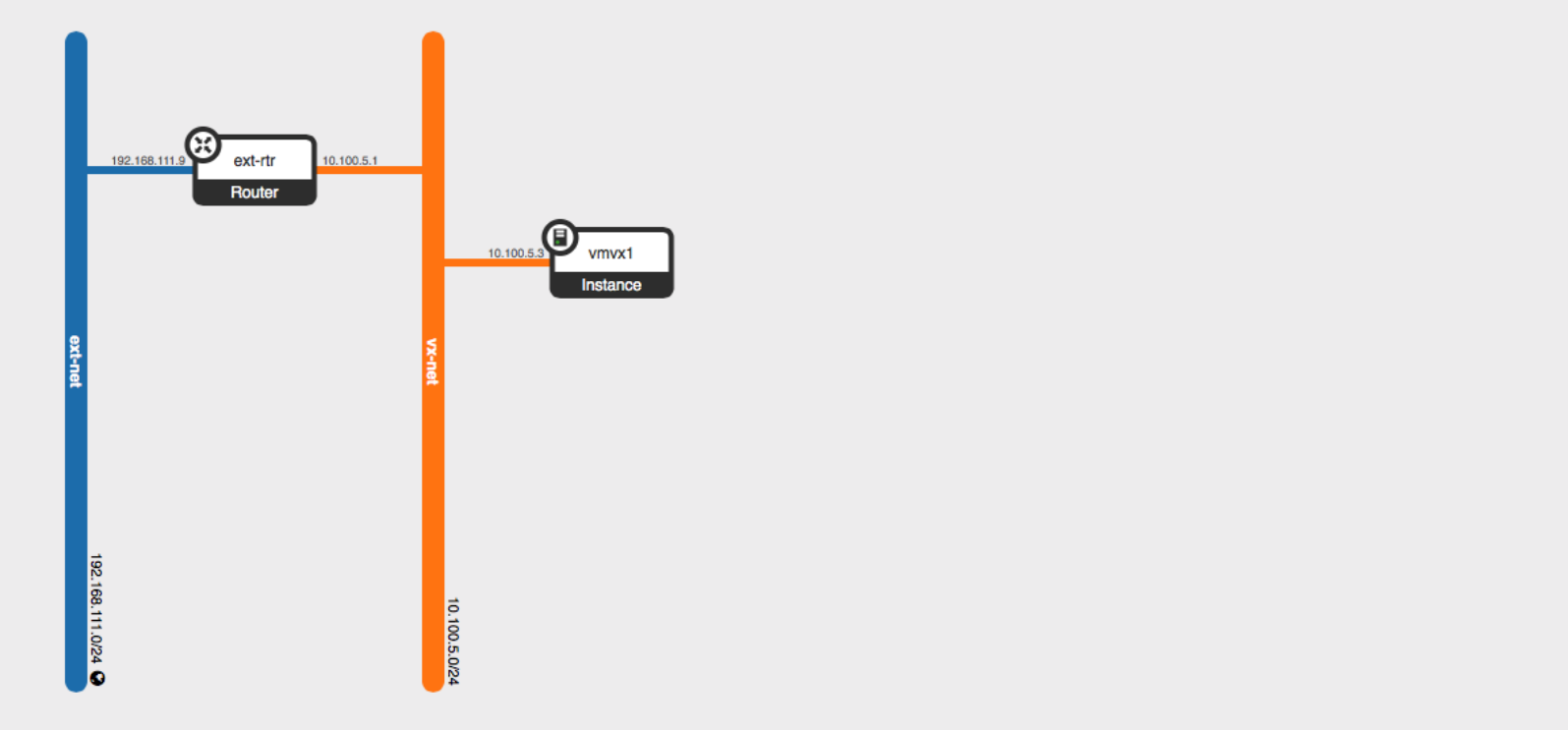
- Project
- Compute
- Network

Network Topology

Small Normal

Launch Instance Create Network Create Router

- Network Topology
- Networks
- Routers
- Admin
- Identity



Demo backup!

YouTube: <https://youtu.be/wnQ0qpakOxA>

[Quoted] Growing Pains with OpenStack Neutron

- Neutron is a tenant facing cloud networking API, but a poor SDN controller implementation
 - Complex architecture with neutron agents and custom protocols to communicate network needs to OVS network devices
 - The result has had fundamental scaling and robustness issues
- Neutron as an API service is focused on tenants
 - It does not provide any APIs or functionality for managing your network
 - This would show up most when debugging a network issue and needing to use two separate tools (Neutron, plus host tools, plus fabric tools).

Q&A

- Symbiotic relationship or antagonism?
 - It is not necessarily either...or
 - It depends on your data center strategy
 - They can complement each other, but...
 - They can live on their own
 - They are both ready to use, and more importantly...
 - They are both in need of love

