

OpenStack: Networking Roadmap, Collaboration and Contribution

Open Networking Summit

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Santa Clara, CA

Paul Carver, AT&T

Armando Migliaccio, SUSE

Ildiko Vanca, OpenStack Foundation

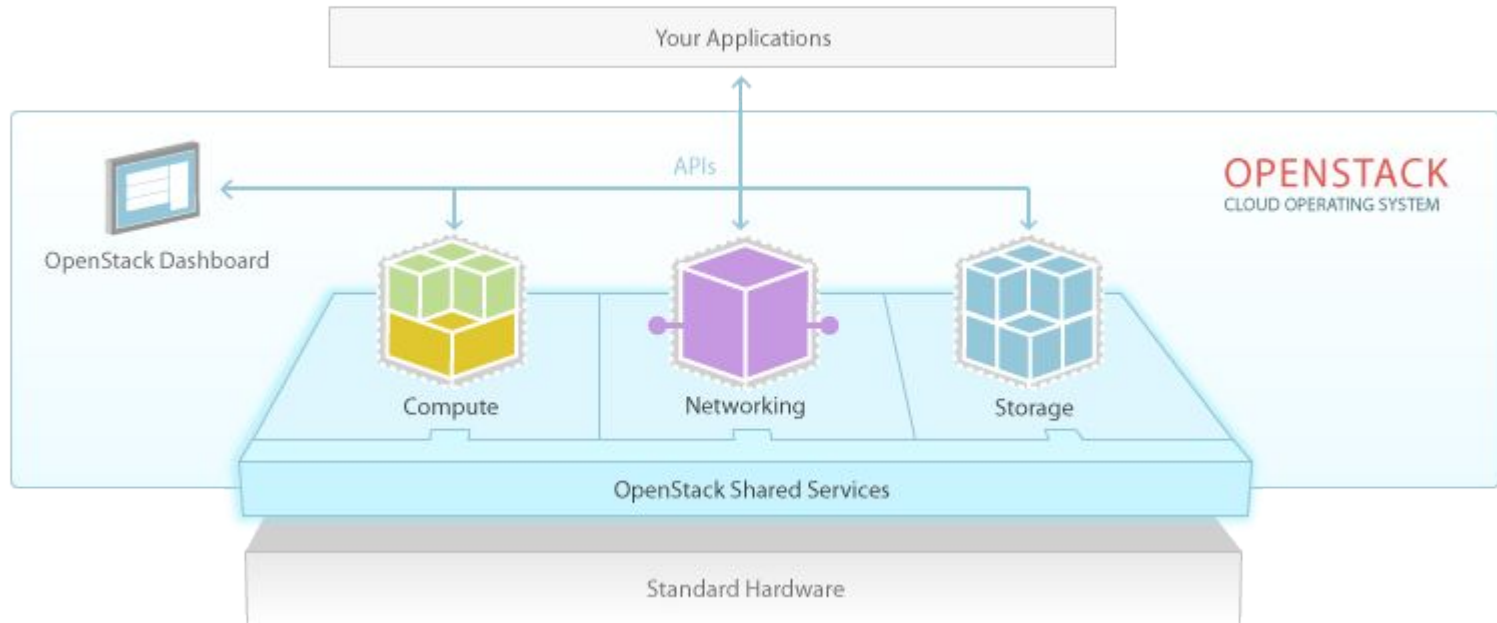
Agenda

- Who are we and why should you care
- OpenStack Networking Overview
- Q & A Intermission
- OpenStack Networking Deep Dive
- Q & A Intermission
- OpenStack, Product WG, LCOO, Telco involvement
- Final Q & A

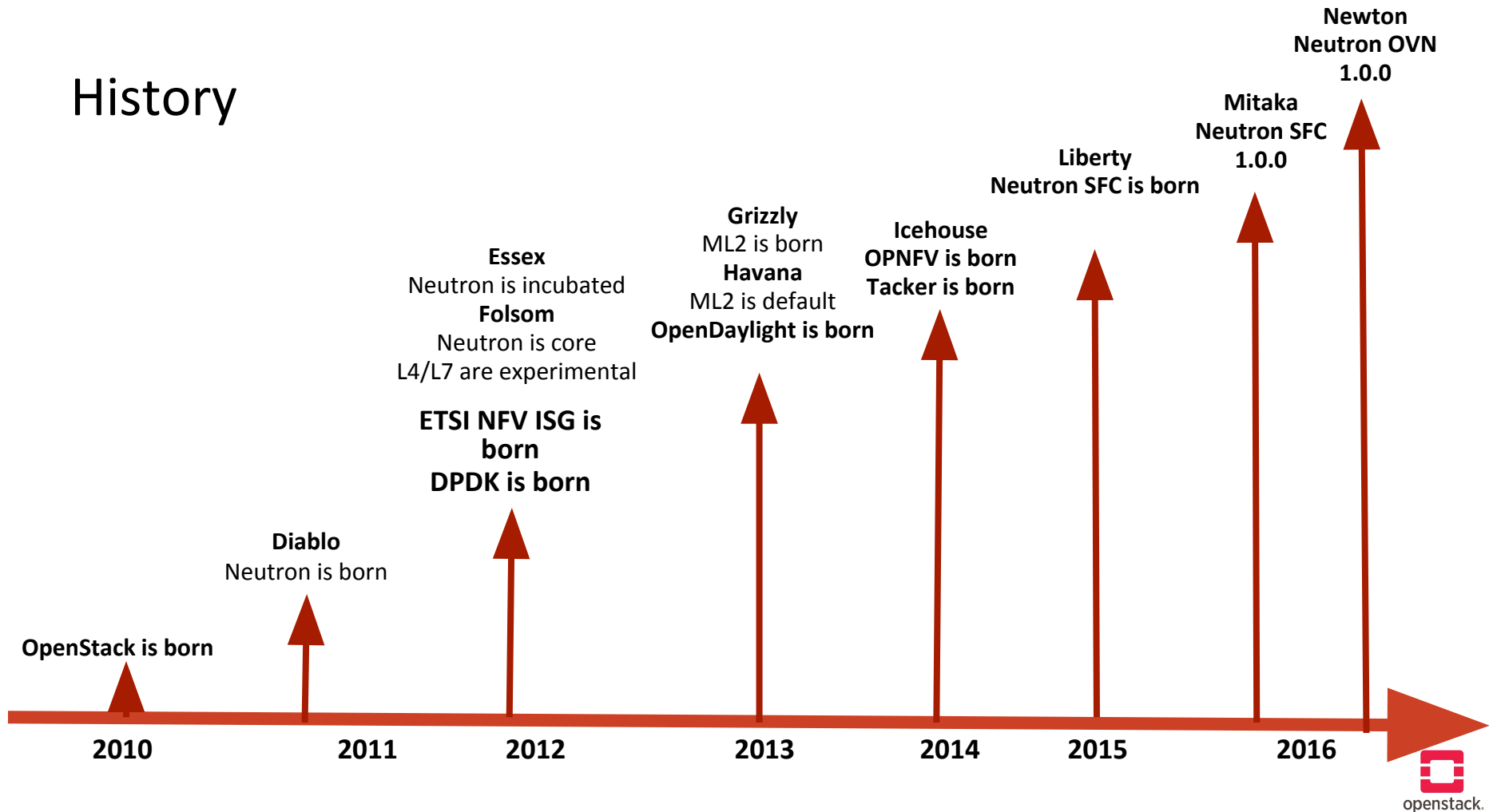
Introductions

Where are our perspectives coming from?

OpenStack



History



What is Neutron anyway?

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

Neutron architecture

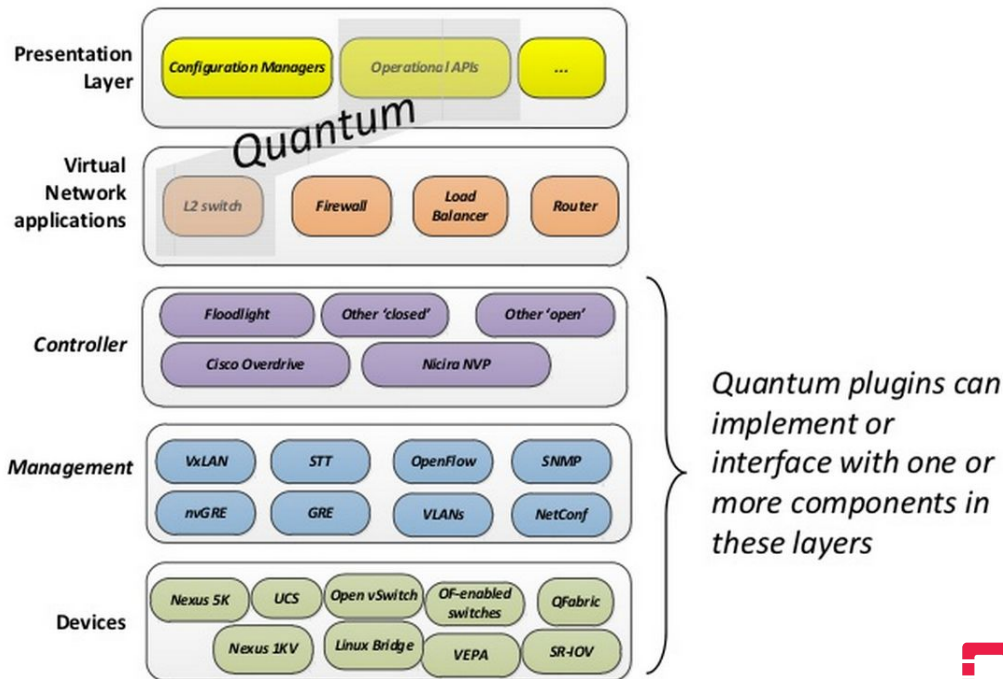
Inception tenets

- Any network abstraction as as Service
- L2 as overlays
- Extension capabilities
- Technology agnostic

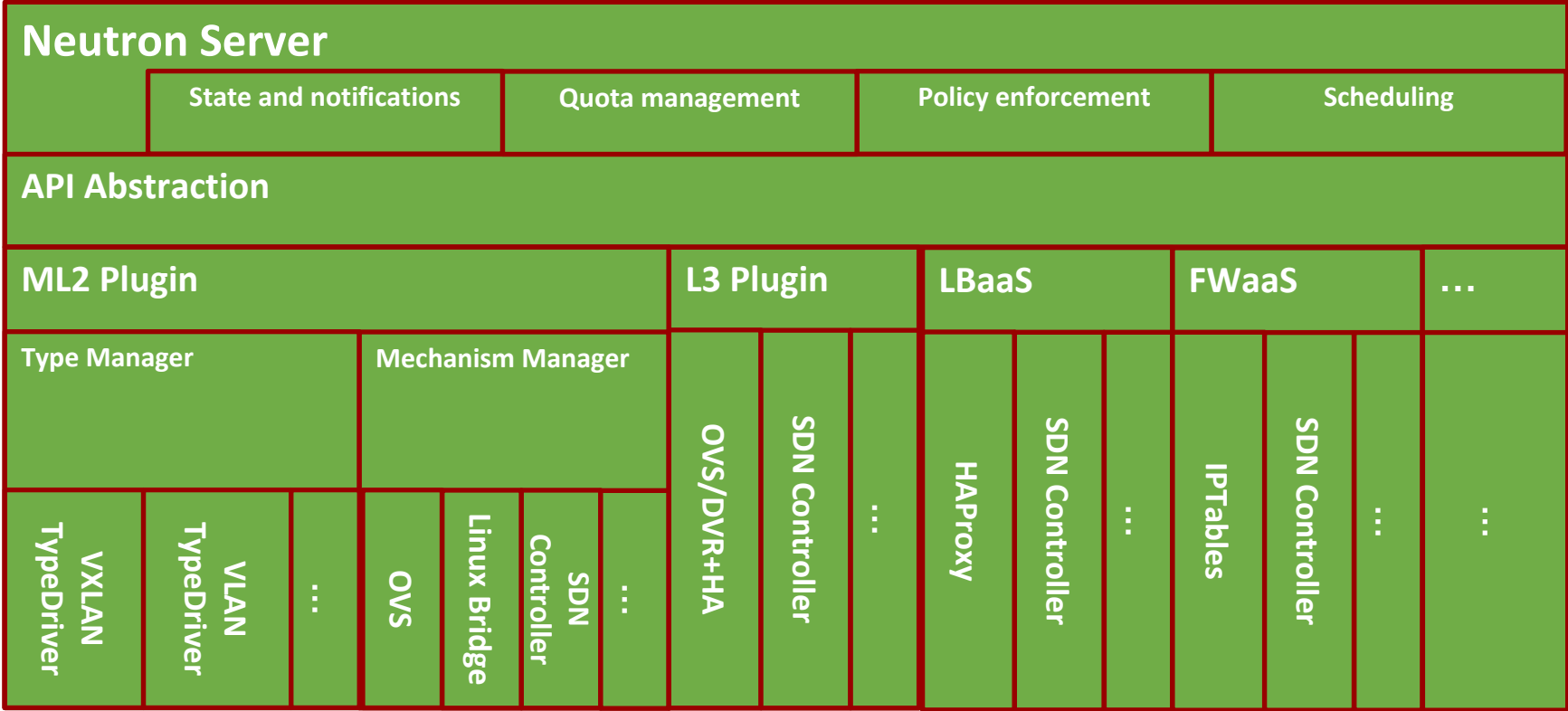
Stadium

- A collection of components to provide a networking solution
- Tight governance to preserve sanity of the project
- Gaps vetted by Neutron Drivers

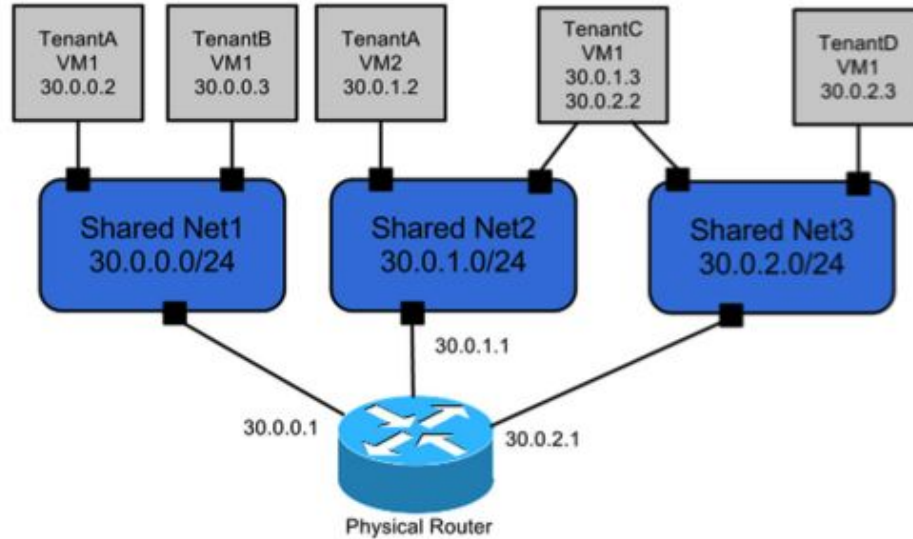
Quantum in the SDN space



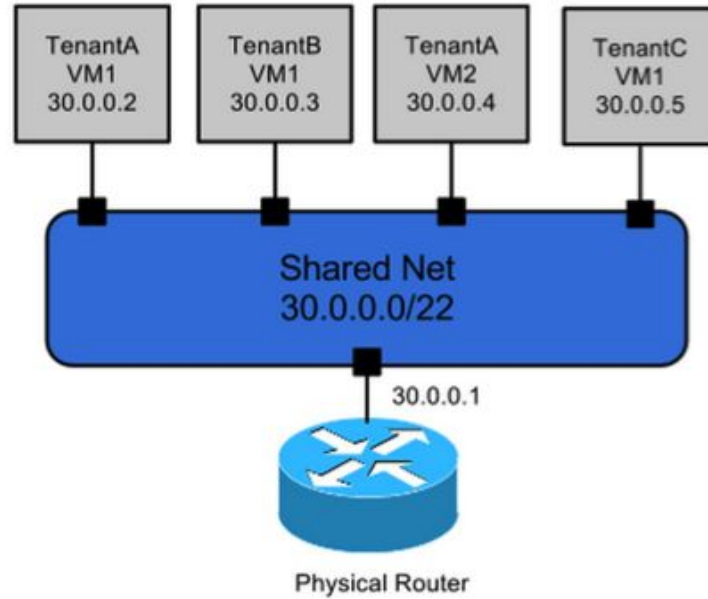
Neutron architecture



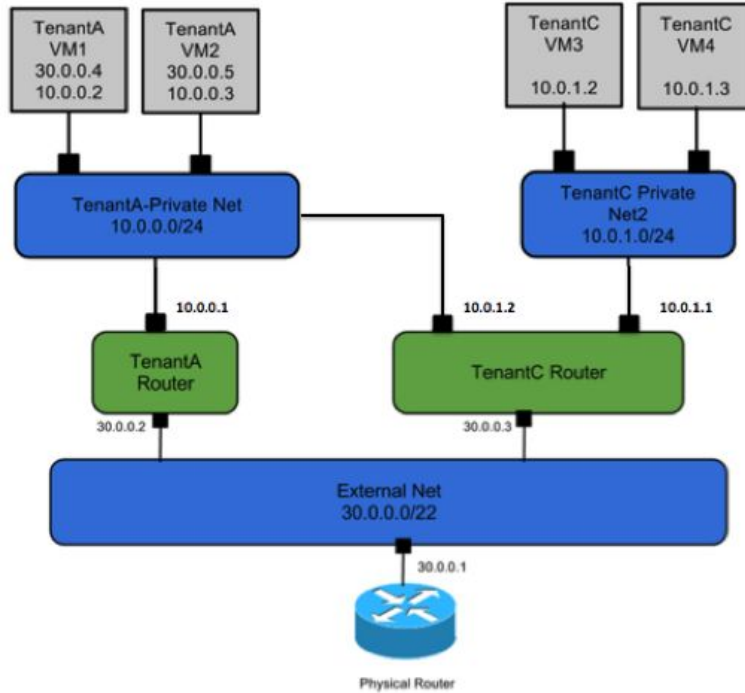
Topologies



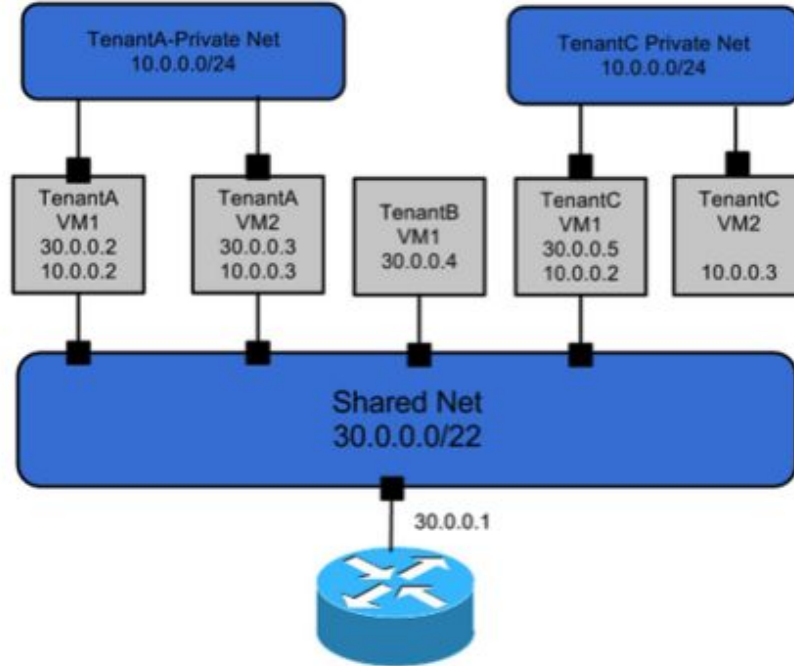
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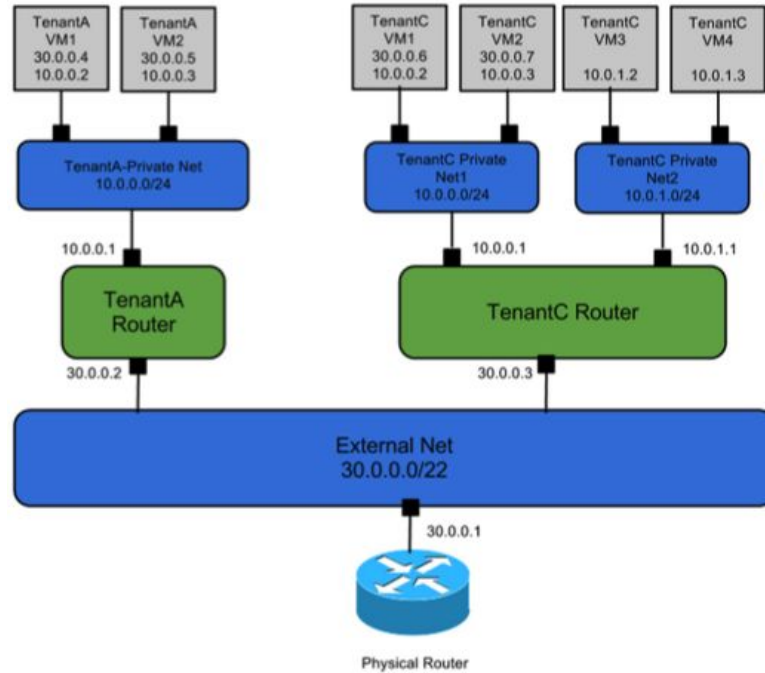
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Topologies



Topologies

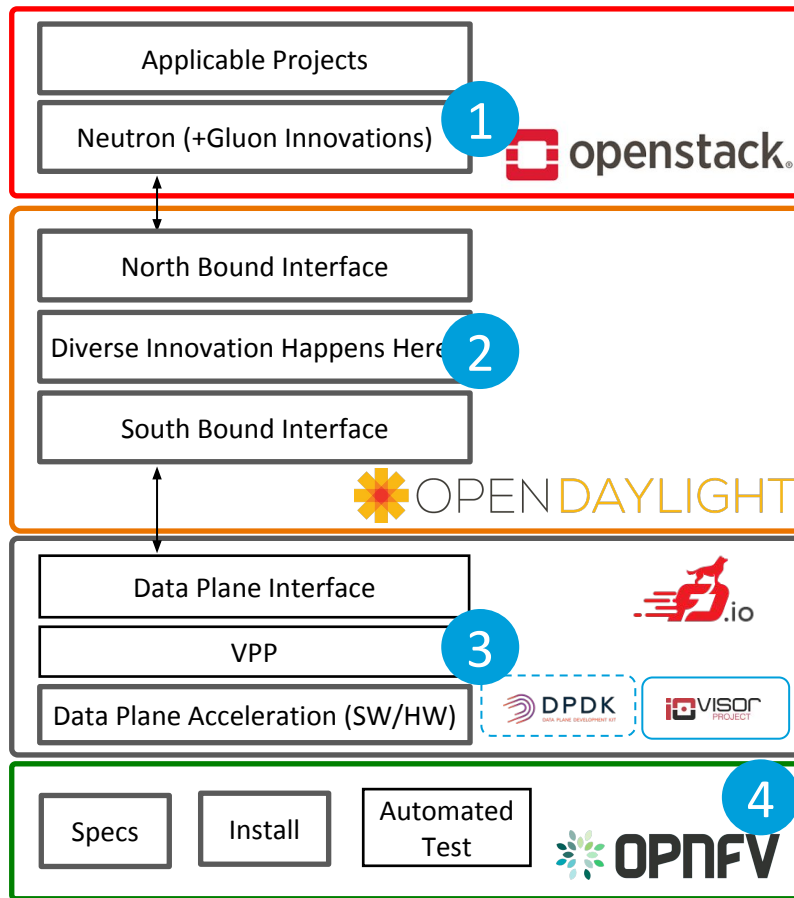


OpenStack Networking and SDN Controllers

Nirvana Stack

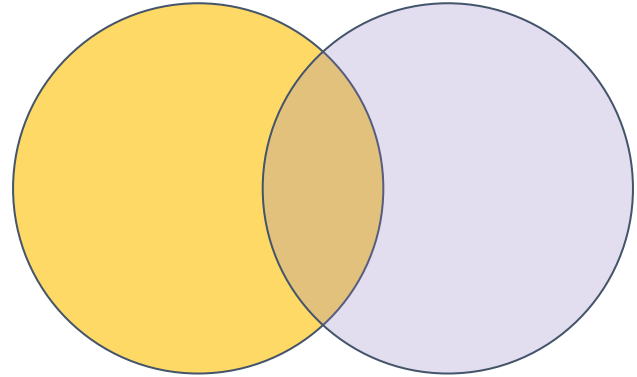
A Proposed Target Stack with Evolvability

A “Nirvana” SDN Stack?



Neutron and Gluon

- Similarities
- Differences
- How do they interact
- Opinions



Q & A #1

A glance at neutron sub-projects

- Midonet
- OpenDaylight
- OVN
- BAGPIPE
- BGPVPN
- Dynamic Routing
- Firewall as a Service
- Service Function Chaining

Midonet

- Midokura SDN solution
- Feature rich Neutron backend
 - L2 gateways
 - Firewall
 - Dynamic Routing
 - QoS
 - Load Balancing
 - Tap-as-a-Service
- <https://docs.openstack.org/releasenotes/networking-midonet/>

OpenDaylight

- SDN controller backend
 - Neutron integration gone through a couple of architectural iterations
- Features
 - L2 gateways
 - Firewall
 - QoS
 - Load Balancing
 - Service Function Chaining
- <https://docs.openstack.org/releasenotes/networking-odl/>

Open vSwitch OVN

- Open vSwitch scope expansion
 - Neutron features done the “OVS way”
 - Similar integration to other SDN controllers e.g. ODL
- Features
 - Scale and performance
 - L2/L3/DHCP
 - Trunking
 - QoS
 - Integration with Container Orchestrators
- <https://docs.openstack.org/releasenotes/networking-ovn/>

BaGPipe

- Set of Neutron drivers developed initially by Orange Telecom
 - ML2 driver for tenant isolation through BGP BGP VPNs
 - Building block for creating reachability between Neutron ports (typically VMs) and BGP VPNs outside the cloud
- <https://docs.openstack.org/releasenotes/networking-bagpipe/>

BGPVPN

- Interconnect neutron networks with WAN BGP-based VPNs
- Multi-vendor API
 - OVS driver
 - OpenDaylight
 - OpenContrail
 - Nuage
- <https://docs.openstack.org/releasenotes/networking-bgpvpn/>

Firewall as a Service

- Neutron zero-trust security model (as opposed to security groups)
 - v1 (Router-oriented API)
 - v2 (Port-oriented API)
 - Enforcement applied on specified router port
 - Consistent API for applying policies to VM ports
 - <https://docs.openstack.org/releasenotes/neutron-fwaas/>

Service Function Chaining

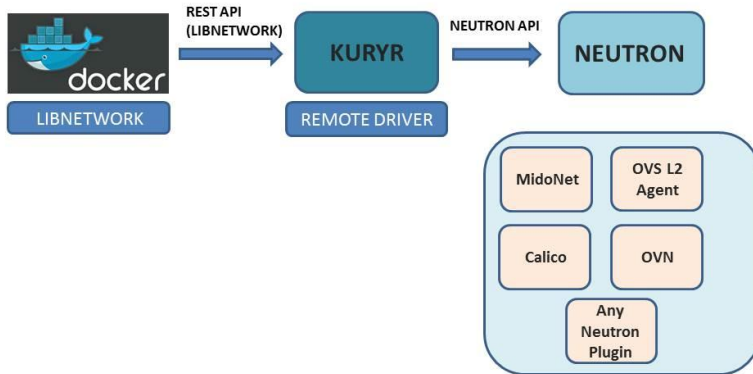
- API to define a neutron port chain to connect SFs that consume classified traffic
- Multi-vendor API
 - OVS driver
 - OpenDaylight
 - ONOS
 - OVN
- <https://docs.openstack.org/releasenotes/networking-sfc/>

Kuryr

- Container networking in Openstack
- Leverages Neutron as building block
- Started as Docker libnetwork driver

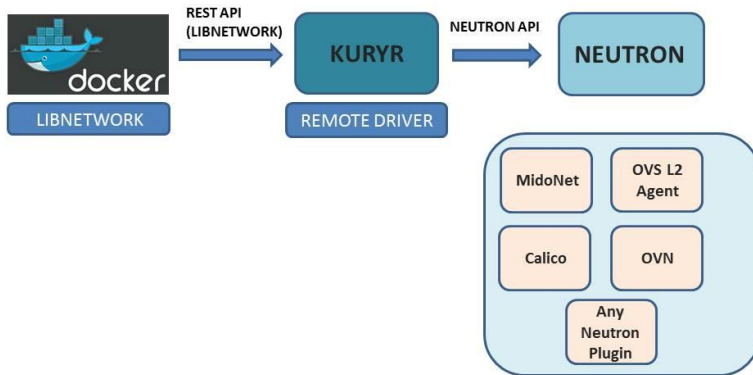
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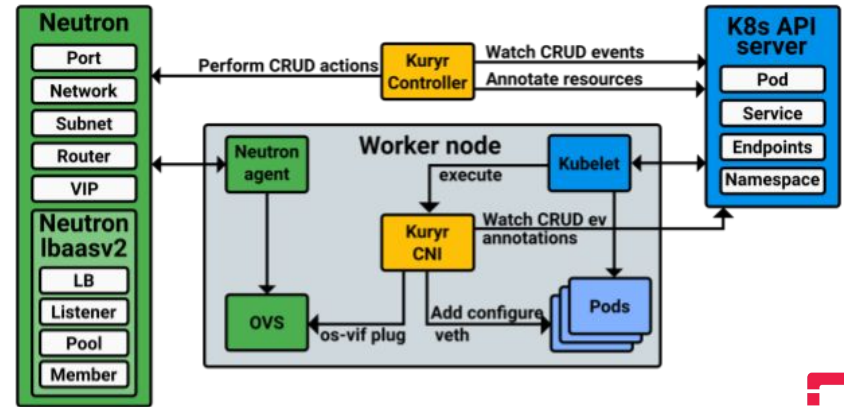
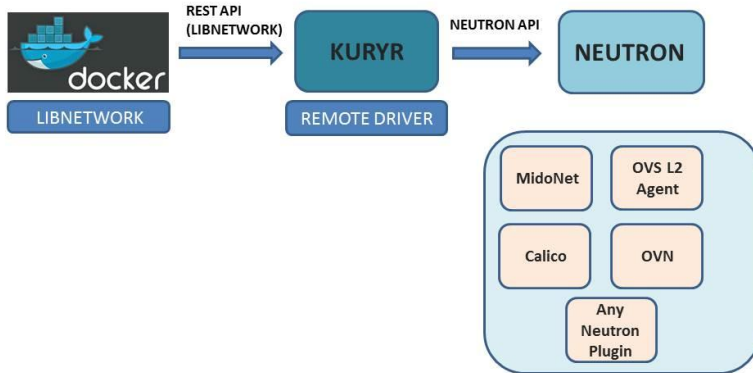
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- Extends network capabilities to Kubernetes



Kuryr

- Container networking in Openstack
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- Started as Docker libnetwork driver
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The two Kuryr-Kubernetes components depicted with all the main components they interact with.

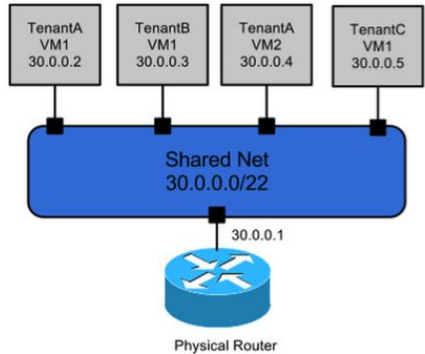


Ironic

- Shared networking
- Multi-tenant networking
- Some limitations: e.g. ACLs, Trunking, hardware routing

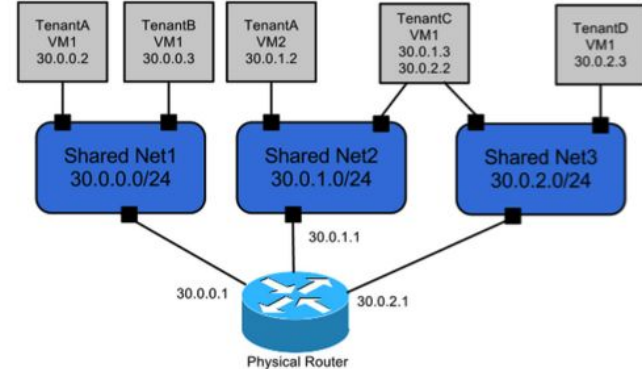
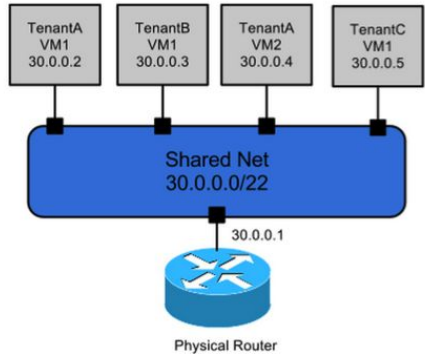
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Roadmap

- Ocata (Feb 2017), Pike (Sep 2017), Queens (~Apr 2018)
- Midonet
 - Ironic, IPv6, Container integration
- OpenDaylight
 - Scalability improvements, incremental refinements
- OVN
 - ML2 OVS migration, metadata API, L3 HA, Distributed SNAT, DNS
- Bagpipe/BGPVPN
 - Finer-grained control over routing
- FWaaS
 - SFC integration, rules logging and counters, OpenDaylight integration
- SFC
 - NSH, Service Graph, Chaining of L2 SFs

Q & A #2

OpenStack Product Working Group

- Creating Development Proposals
- Development Proposals
 - Reflect the voice of end-users/operators
 - Requiring cross-community coordination
 - Spanning multiple releases
- Maintaining a multi-release roadmap

<https://wiki.openstack.org/wiki/ProductTeam>

User Survey Sneak Peek

- More than 1400 completed surveys
- Nearly 600 deployments
- Two-thirds of the deployments are in production
- 16% of the users are in the Telecommunications area
- **Online dashboard** - <http://www.openstack.org/analytics>

Next survey results are by the **19th of April**

<https://www.openstack.org/user-survey>

OpenStack Roadmap

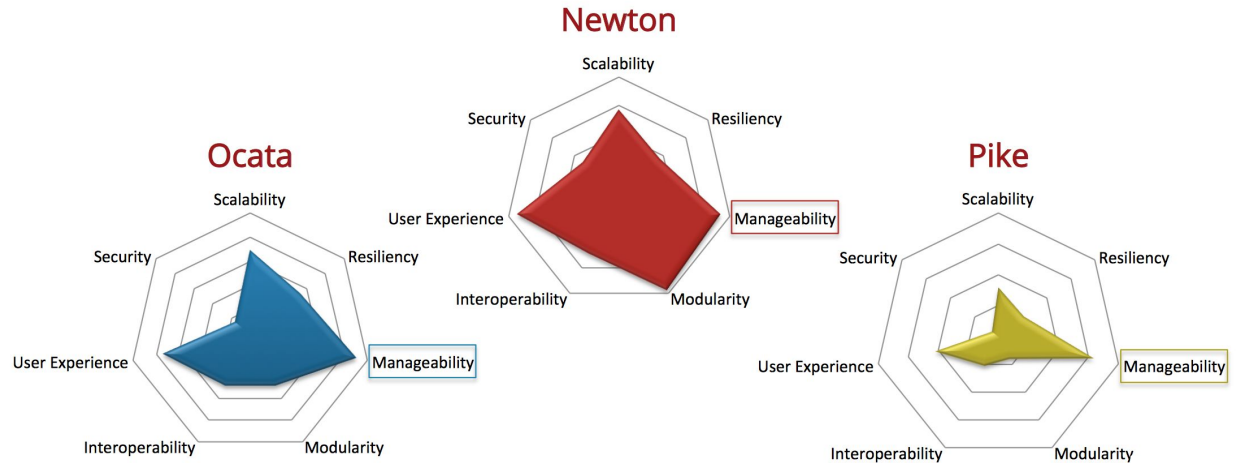
- Creation and maintenance is lead by the Product Working Group
- Mid-term planning
- Items are grouped into themes

Latest version is planned to be released in May

<https://www.openstack.org/software/roadmap/>

Focus areas

- Scalability
- Resiliency
- Manageability
- Modularity
- Interoperability
- User Experience
- Security



Telecom/NFV Related Working Groups

- Telecom/NFV Operators Functional Team
 - Group formed by Telecom operators
 - Experience with running OpenStack in production
 - Focus on pain points and missing functionality
 - <https://wiki.openstack.org/wiki/Ops-telecom-nfv>
- LCOO
 - Use cases of
 - Network service providers
 - Massively distributed cloud operators
 - Focus on end-to-end feature implementation upstream
 - <https://wiki.openstack.org/wiki/LCOO>

Cross-community Collaboration

- Full stack CI/CD pipeline in OPNFV
 - Deploy the latest code base
 - Fast feedback on new development
- NFV Interoperability testing
 - NFV specific testing in RefStack
 - In collaboration with OPNFV Functest and CVP
- Feature development activities
- Neutron integration
 - ODL
 - FD.io
 - ...

Community Involvement

- Write code
 - New features
 - Bug fixes
- Write documentation
 - OpenStack Manuals
 - Developer documentation
- Participate in Working Groups
- Attend/organize User Group meet-ups

OpenStack Upstream Institute

- Upstream collaboration training
- 1.5 days long
- Interactive, hands-on course
- Face to face training
- Held before the OpenStack Summits

Next training - May 6-7, 2017, Boston

<https://docs.openstack.org/upstream-training/>

Events - OpenStack Summit

- Open Infrastructure Event
- Conference
- Forum
- Open Source Days
 - Meet related open source communities
 - See OpenStack as part of a bigger picture

Upcoming Summit: May 8-11, 2017, Boston

<https://www.openstack.org/summit/boston-2017/>

Events - PTG

- Developer focused event
- First PTG was held in February, 2017 in Atlanta
- Cross-project discussions
- Per project design discussions

Save the date - September 11-15, 2017, Denver

<https://www.openstack.org/ptg/>

Q & A #3