OpenStack: Networking Roadmap, Collaboration and Contribution

Open Networking Summit
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Santa Clara, CA
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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
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 a 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
# Neutron architecture

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<th>Neutron Server</th>
<th>State and notifications</th>
<th>Quota management</th>
<th>Policy enforcement</th>
<th>Scheduling</th>
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- Neutron architecture
- Quota management
- Policy enforcement
- Scheduling
- State and notifications

- ML2 Plugin
- Type Manager
- TypeDriver
- VHLD TypeDriver
- VLAN TypeDriver
- ... OVS
- Linux Bridge
- Controller
- SDN
- ... OVS/DVR+HA
- SDN Controller
- HAPerxy
- SDN Controller
- IPTables
- SDN Controller
- ...
- ...
Topologies
Topologies
Topologies
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/](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/](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/](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
Kuryr

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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](http://www.openstack.org/analytics)

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

[https://www.openstack.org/user-survey](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

• **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](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
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