OPENSTACK NETWORKING EVOLUTION

2010

Austin

nova-network

redhat.

OPENSTACK NETWORKING EVOLUTION

2010

2012

Austin

Folsom

nova-network

Quantum

redhat.

OPENSTACK NETWORKING EVOLUTION

2010   2012   2013

Austin   **Folsom**   **Havana**

nova-network   Quantum   Neutron
FWaaS
LBaaS
VPNaaS

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OPENSTACK NETWORKING EVOLUTION

2010   2012   2013   2014

Austin   **Folsom**   **Havana**   **Icehouse**

nova-network   Quantum   Neutron   ML2
                                                FWaaS
                                                LBaaS
                                                VPNaaS

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OPENSTACK NETWORKING EVOLUTION

2010	2012	2013	2014	2015
Austin	**Folsom**	**Havana**	**Icehouse**	**Kilo**
nova-network	Quantum	Neutron FWaaS LBaaS VPNaaS	ML2	48 (!) plugins and drivers Plugin decomposition L4-L7 services split

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"Neutron is now used by 95% of OpenStack production deployments"

- OpenStack User Survey, April 2017

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NEUTRON: TRENDS AND INNOVATION

- Generic abstraction ⟷ powerful enough for users and vendors

- OpenStack service ⟷ a standalone network platform?

- Beyond VMs, support for containers and bare-metal nodes
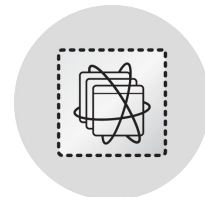
redhat.

USE CASES DRIVING SDN

HYBRID CLOUD

NETWORK FUNCTIONS VIRTUALIZATION

BARE METAL AS A SERVICE

CONTAINER INTEGRATION

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KEY FEATURES FOR PIKE AND BEYOND

- SmartNICs Offload
- OVN
- Octavia
- Kuryr
- Ironic Integration

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SmartNIC Offload

- Rich data plane offload to the network adapter
  - i.e overlay encapsulation, classifier, forwarding rules, security policies, QoS

- Evolution of OpenStack's data path
  - OVS (kernel) ➜ SR-IOV ➜ OVS-DPDK ➜ SmartNICs
  - No "one solution fits all"

- Lead by NIC vendors (Mellanox, Netronome, Cavium)

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Open Virtual Network (OVN)

- OVN is an open source virtual networking solution for Open vSwitch
  - Developed by the same community as Open vSwitch
  - Offers L2-L3 virtual network services
  - Not specific to OpenStack; integration via Neutron

- Why OVN for OpenStack?
  - Simplified networking architecture; features are implemented natively in OVS
  - More shared technology with other open source communities
  - More consistent user experience for those using multiple cloud platforms

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Octavia

- Octavia is the new LBaaS default solution
  - Started as an implementation of the v2 LBaaS API
  - Now being moved into a separate API endpoint

- Replaces the namespace/agent based LBaaS implementation
  - Actual load balancing performed by "Amphora" service
  - Built for cloud-based scaling

OCTAVIA

an OpenStack Community Project

redhat.

Kuryr

- Bridges between containers networking models to Neutron abstraction
  - Implements VIF binding between the container namespace and Neutron
  - NOT a networking solution by itself nor does it attempt to become one

- Why Kuryr?
  - Remove double encapsulation on Swarm/Kubernetes/OpenShift on OpenStack
  - Enable infrastructure for mixed workloads (VMs, containers)
  - Compliance with existing Neutron plugin ecosystem

KURYR

an OpenStack Community Project

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Ironic Integration

- Allows for true multi tenant bare metal as a service

- Why Neutron-Ironic?
  - Isolation: enforce VLAN configuration on ToR switch
  - Port Groups: setup LAG/bonding between bare metal and ToR switch
  - Security Groups: modify ACL rules on ToR switch ports

IRONIC

an OpenStack Community Project

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NETWORKING TALKS TODAY

- *Can the Open vSwitch bottleneck be resolved? (Erez Cohen, Mellanox)*
  - Keynote, 10:20

- *Kuryr services at scale (Irena Berezovsky and Omer Anson, Huawei)*
  - London Wall, 11:00

- *Meshing OpenStack and bare metal networks with EVPN (Philip Hofstad, Mellanox)*
  - Broadgate 2, 16:45

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