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OpenStack Networking with Neutron: What Plugin Should I Deploy?

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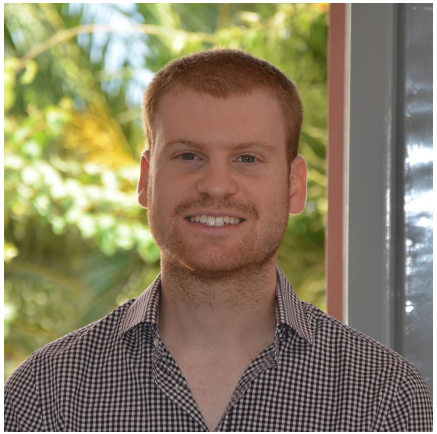
About Me

- OpenStack Community Member
- Working with customers deploying OpenStack in production
- Background in core IP routing/MPLS
- Focused on Neutron, SDN and NFV



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What this talk is about

- Providing an overview of Neutron
- Understanding the problem we are trying to solve
- Reviewing different plugins
  - More importantly, different categories and types of them
- Offer some key takeaways and guidelines

What this talk is NOT about

- Competitive analysis of all plugins or solutions out there
- Telling you what exact plugin would be right for your deployment
- Product pitch

Neutron Overview

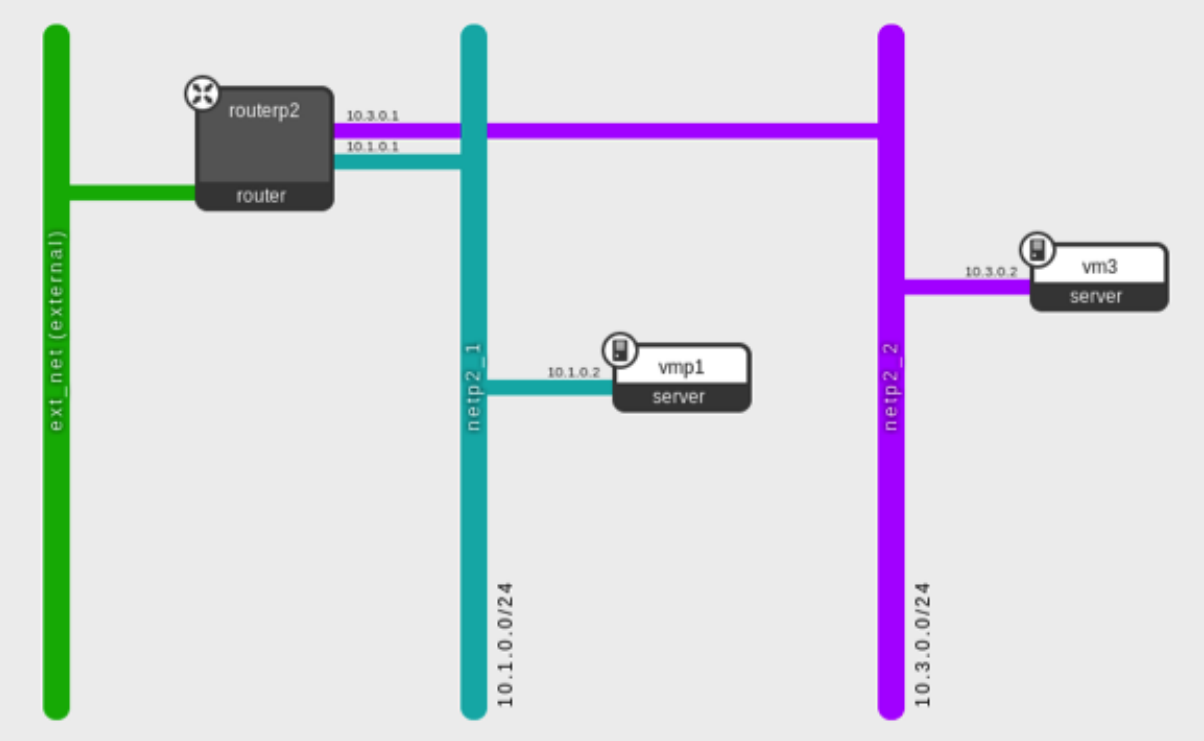
What is Neutron?

- Fully supported and integrated OpenStack project
- Exposes an API for defining network configuration
- Based on a pluggable architecture (more later)
- Offers multi-tenancy with self-service
    - Provides operators and tenants with the ability to create rich network topologies

Neutron Key Features

- L2 connectivity
- IP Address Management
- Security Groups
- East/West L3 routing
- External gateway, NAT and floating IPs
- IPv6 support
- Load balancing, VPN and firewall

Dashboard View



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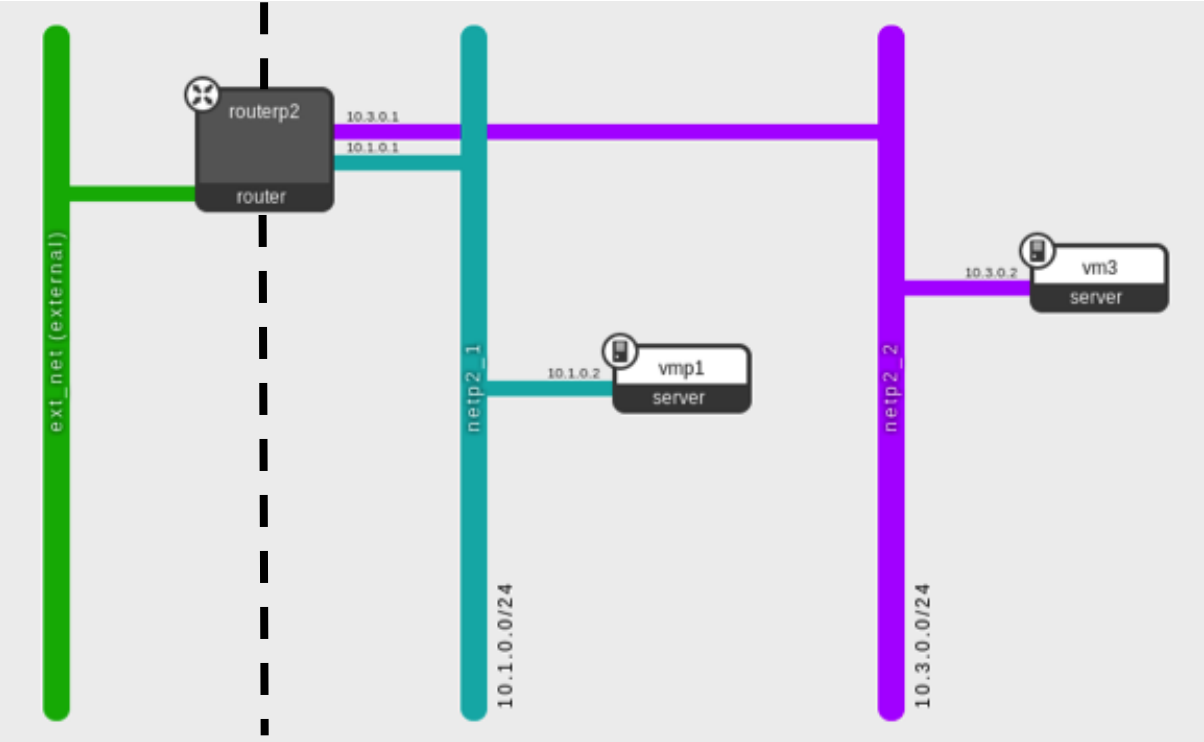
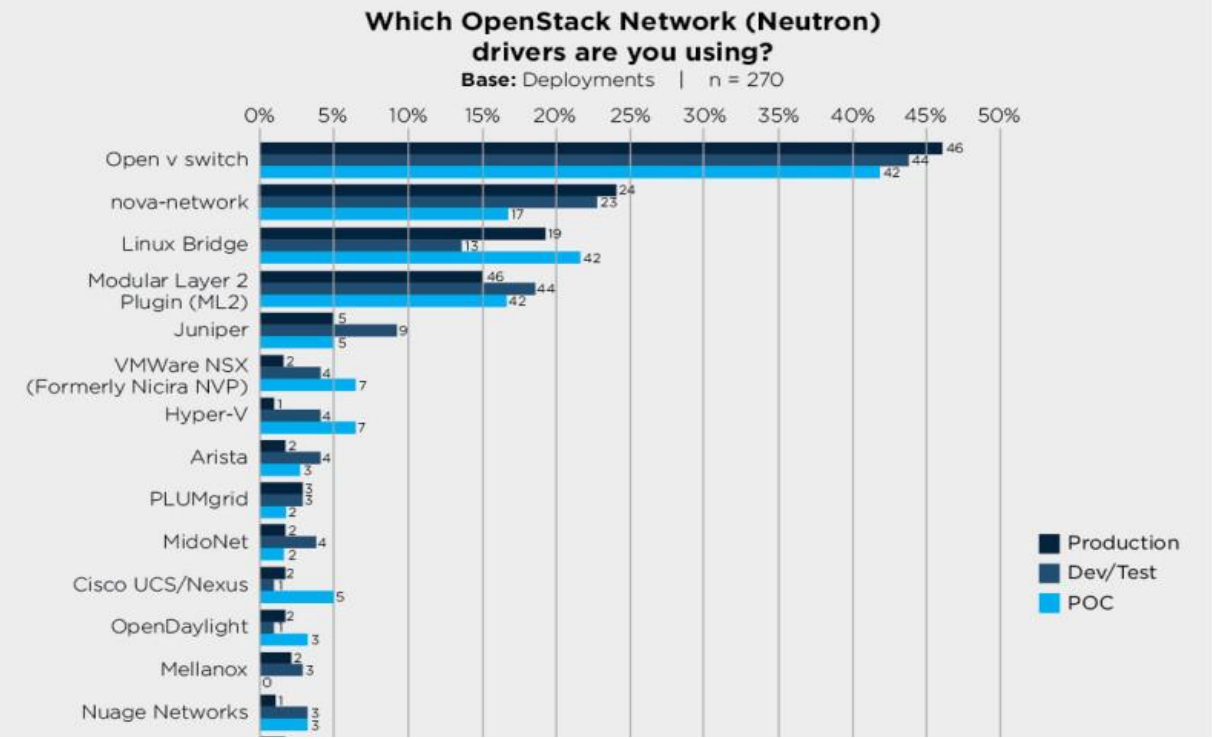


Backend Implementation

- Neutron **does not** implement the networks
  - Acts only as the front-end to the actual backend “magic”
  - Using the concept of plugins
- Reference implementation based on Open vSwitch with additional software agents
  - Showcase the API capabilities
  - Used for upstream testing
  - “Batteries included but swappable”

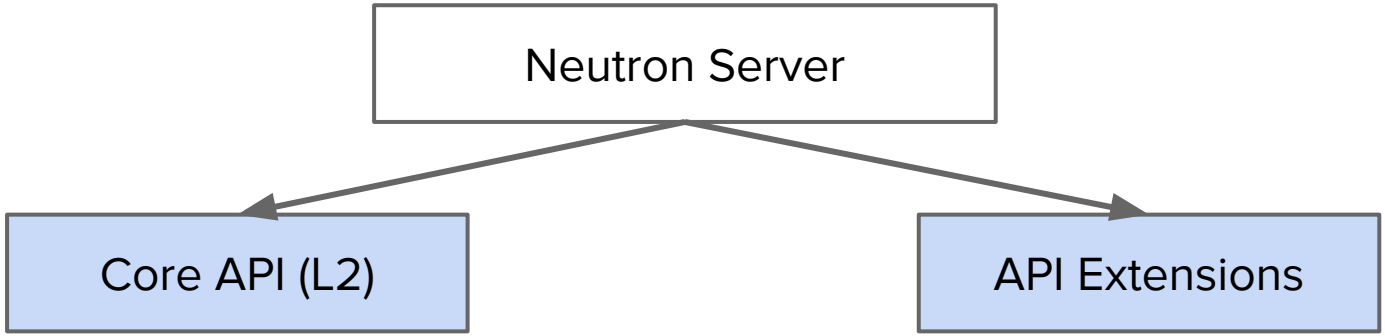
Backend Implementation



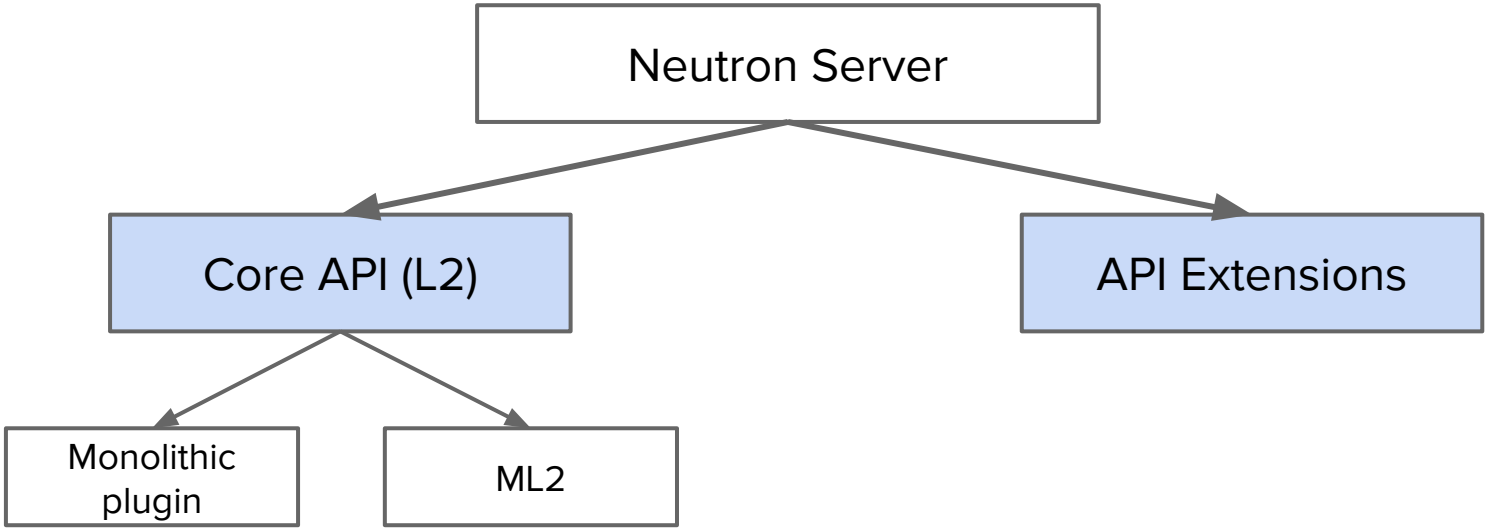
Source: http://superuser.openstack.org/articles/openstack-users-share-how-their-deployments-stack-up

Plugin Architecture

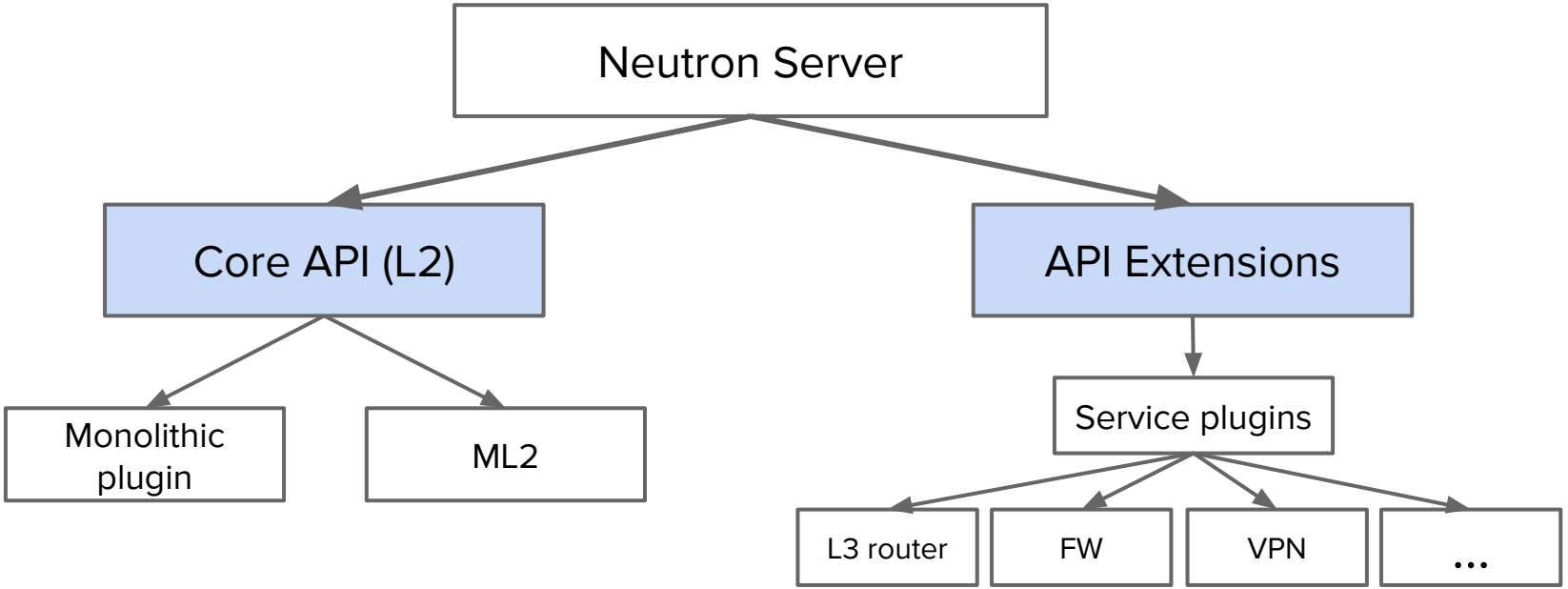
Neutron Plugin Architecture



Neutron Plugin Architecture



Neutron Plugin Architecture



Neutron Plugins

The Plugin Matters...

- Feature set
- Scale
- Performance
- High Availability
- Manageability
- Network topology
- Traffic flow
- Operational tools

Types of Plugins

- Core plugins: monolithic plugins, ML2 drivers
- Service plugins: L3, VPNaaS, LBaaS, FWaaS
- Commercial and open-source

Types of Plugins (cont.)

- **Software centric** - hardware is general-purpose
  - Decouple virtual networking from physical “fabric”
  - e.g Midokura MidoNet, Nuage VSP, PLUMgrid ONS

Types of Plugins (cont.)

- **Software centric** - hardware is general-purpose
  - Decouple virtual networking from physical “fabric”
  - e.g Midokura MidoNet, Nuage VSP, PLUMgrid ONS
- **Hardware centric** - specific network hardware is required
  - Ability to control and interact with the physical network
  - e.g Cisco ACI, Brocade VCS

Open Source Options (Incomplete List)

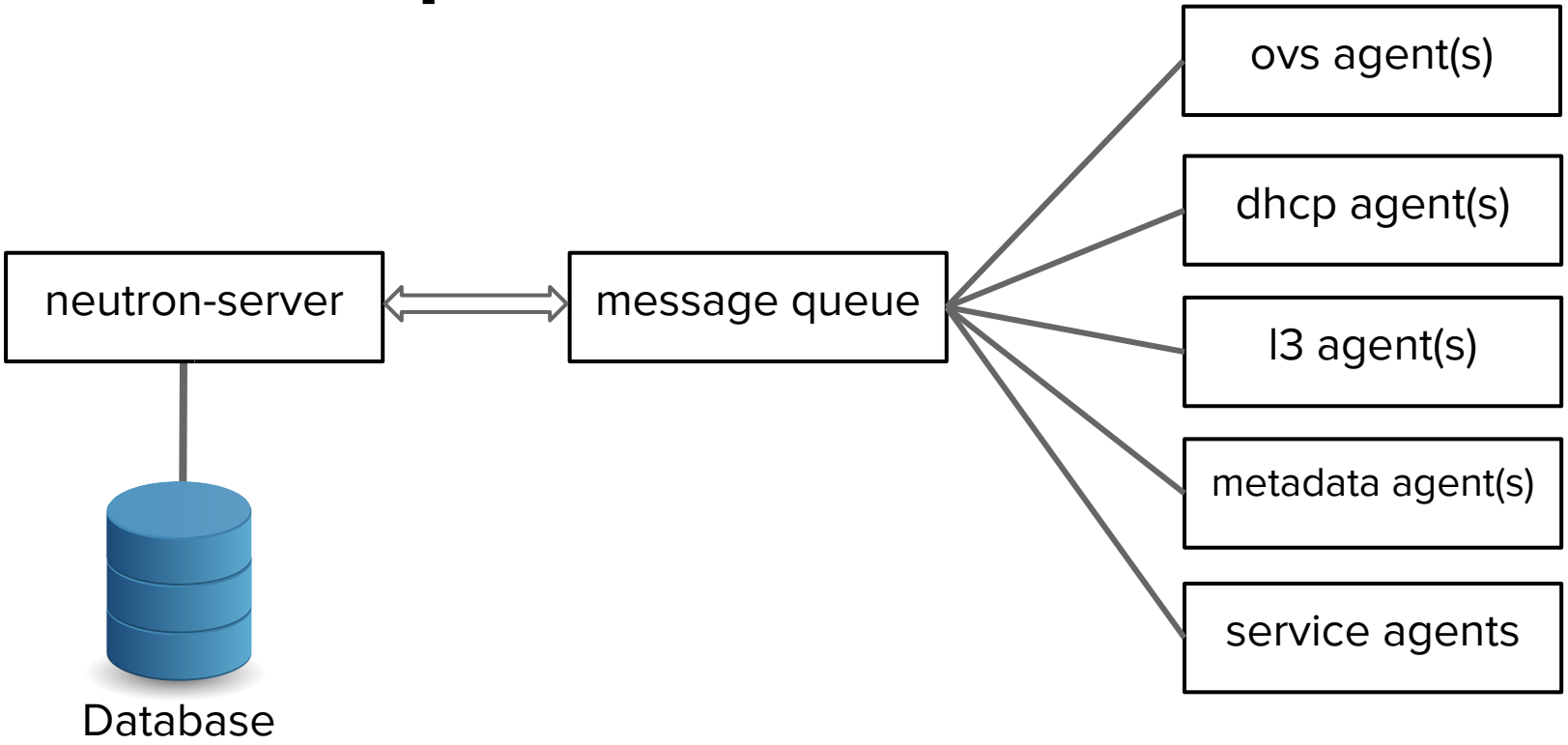
- Open vSwitch
- Linux bridge
- OVN
- OpenDaylight
- Calico
- OpenContrail
- MidoNet
- Ryu

ML2/Open vSwitch Plugin

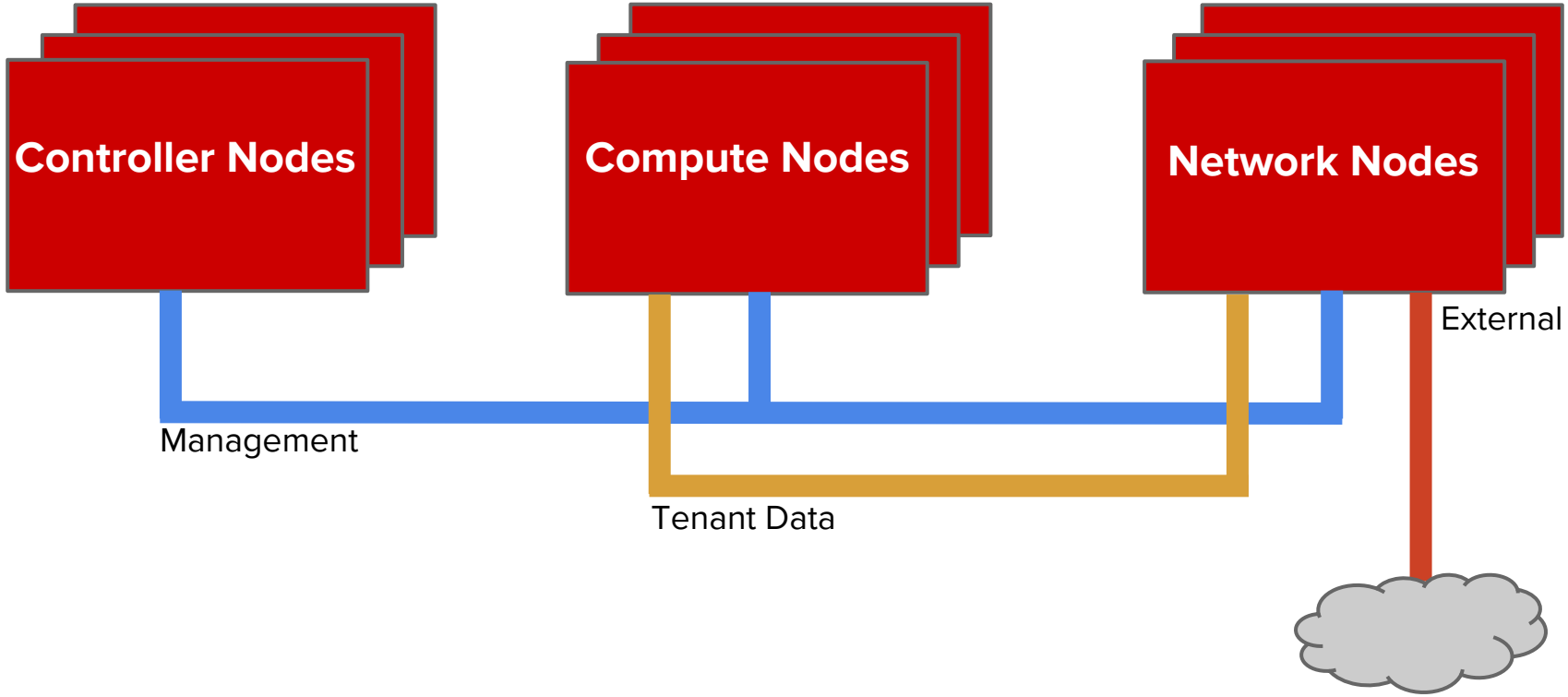
Main Components

- OVS L2 agent
- DHCP agent
- L3 agent
- Metadata agent and proxy
- Load balancing, VPN and firewall served by distinct plugins/agents
  - HAProxy
  - Openswan
  - iptables

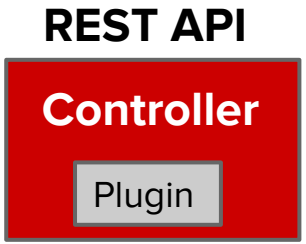
Main Components



Common Deployment



Traffic (Datapath) Flow



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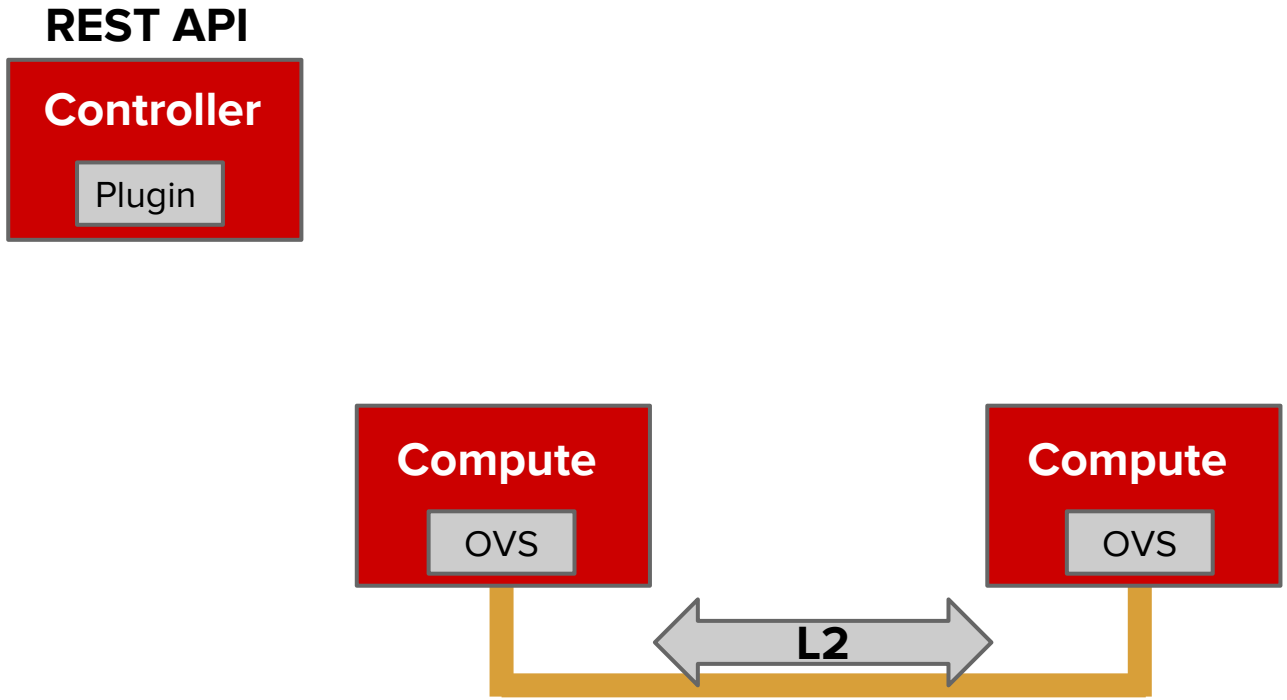

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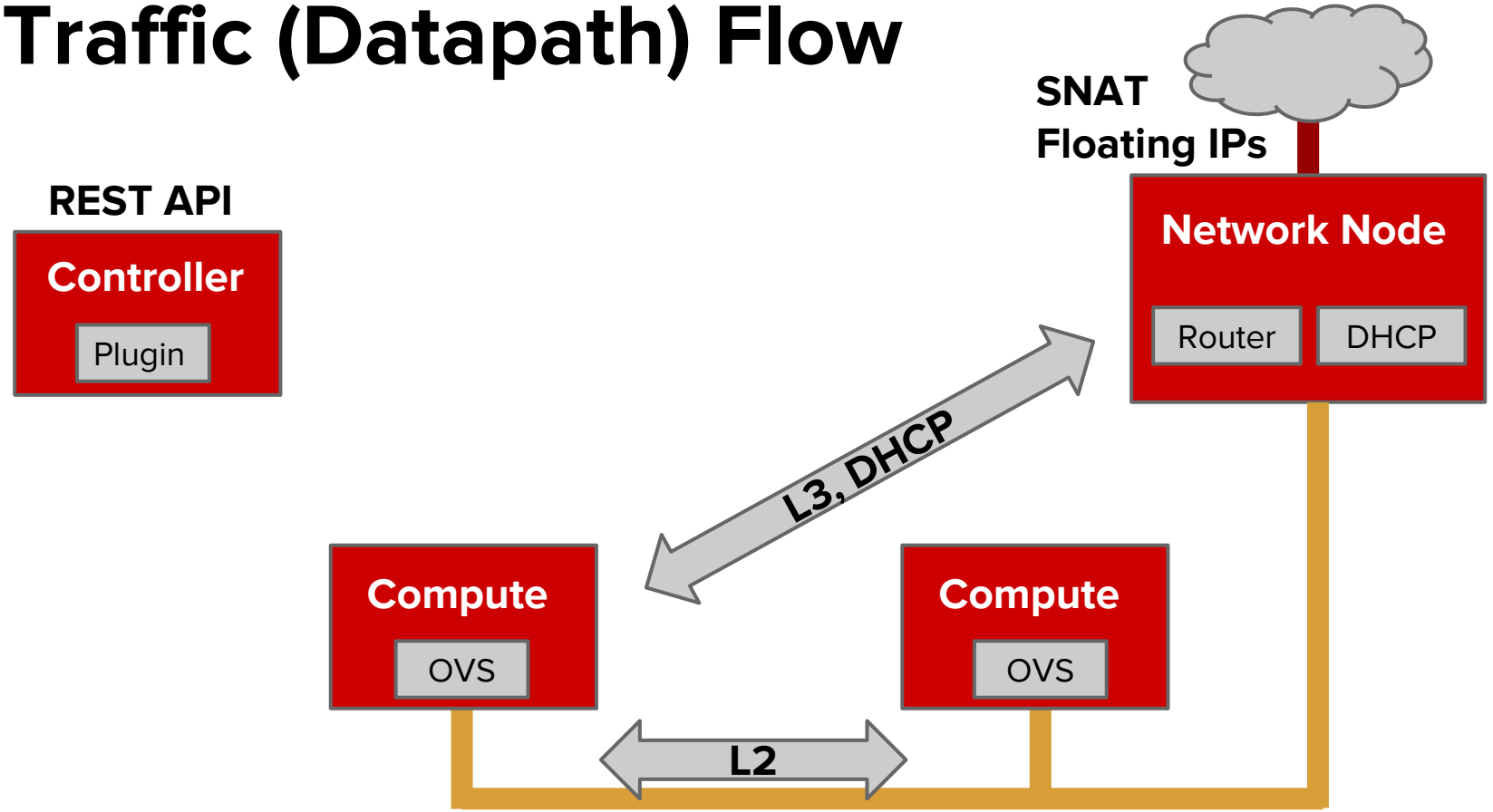


Main Issues Are Being Addressed

- L2 population (Havana)
- OVS ARP Responder (Juno)
- L3 HA (Juno)
- Distributed Virtual Router (Juno)
- Focus on stability and testing (on-going)
- Networking Guide (Kilo, Liberty)

Key Takeaways

Key takeaways (1)

- **Neutron is an API**
  - Plenty of options are available for actual implementation via both core and service plugins

Key takeaways (2)

- **Evaluate the default Open vSwitch based solution first**
  - Even if you end up not choosing it for your production environment, it should at least get you familiar with the Neutron constructs, definitions and concepts

Key takeaways (3)

- **Get to know your business needs**
  - You are not building the network for the sake of building a network...

Key takeaways (4)

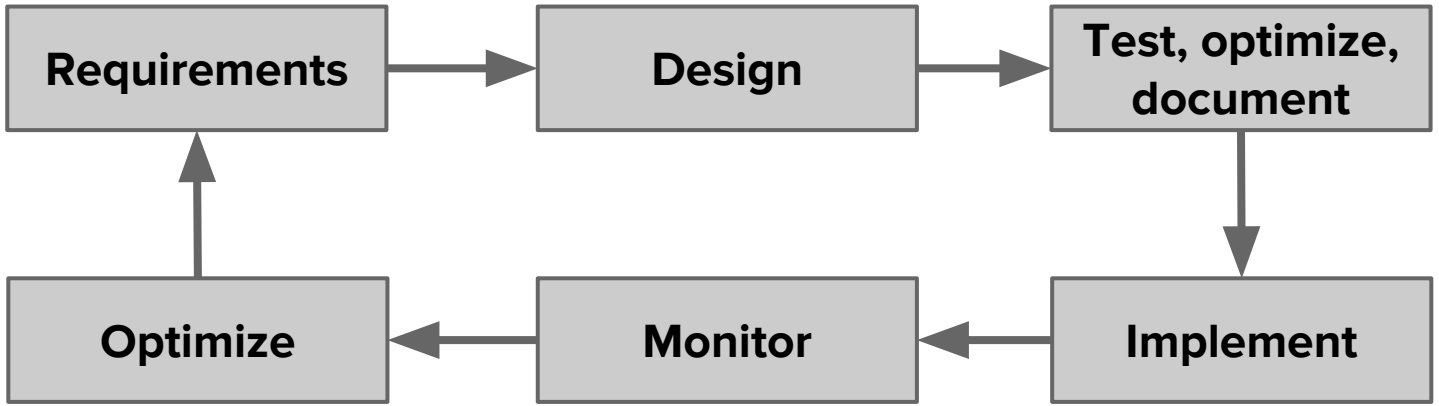
- **Collect and define all technical requirements**
  - Focus on the end users and the applications
  - Key questions:
    - Are you building a greenfield deployment?
    - What level of interaction is expected with your existing network?
    - What type of applications are going to run in your cloud?
    - Is self-service required?
    - Who are the end-users?
    - What level of isolation and security is required?
    - What level of QoS is expected?
    - Multi cloud? Multi datacenter? Hybrid?

Key takeaways (5)

- **Test things up!**
  - Don’t rely on vendor presentations and other marketing materials

Key takeaways (6)

- This exercise is not different than any other network design



Q&A