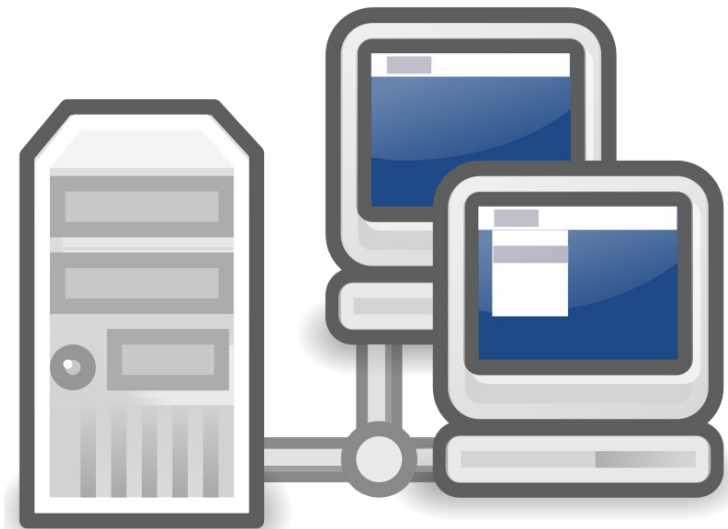# Bring your virtualized networking stack to the next level

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# Agenda

- oVirt network configuration

- Neutron overview

  - Key features

  - Integration benefits

  - External providers

  - Neutron as an external provider

- Future work

# oVirt Network Configuration

# Network View

- Network - a logical entity that represents a layer 2 broadcast domain

- Defined within the scope of a data center

# Adding a New Network

oVirt

**New Logical Network**

| General |
| Cluster |
| Profiles |

Data Center      dc3_0

Name      myNet

Description

Comment

**Export**

☐ Create on external provider

External Provider      Neutron

**Network Parameters**

☑ Enable VLAN tagging      1500

☑ VM network

☑ Override MTU      9000

Network Label

Host Network QoS      [Unlimited]      New

OK   Cancel

# Adding a New Network

oVirt

**New Logical Network**

| | |
|---|---|
| **General** | |
| Cluster | |
| Profiles | |

Data Center: dc3_0

Name: myNet

Description:

Comment:

Name | myNet

☐ Create on external provider

External Provider: Neutron

**Network Parameters**

☑ Enable VLAN tagging | 1500

☑ VM network

☑ Override MTU | 9000

Network Label: 

Host Network QoS: [Unlimited] | New

OK | Cancel

# Adding a New Network

oVirt

**New Logical Network**

General

Clu

Pro

Data Center                    dc3_0

**Network Parameters**

☑ Enable VLAN tagging          1500

☑ VM network

☑ Override MTU                 9000

Network Label

Host Network QoS               [Unlimited] ▼    New

Override MTU                   9000

Network Label

Host Network QoS               [Unlimited] ▼    New

OK   Cancel

# Host Level Configuration

oVirt

# Adding Networks to a VM

oVirt

**New Virtual Machine**                                                    ⊗

| | | |
|---|---|---|
| **General** | Cluster | Default/Default ▾ |
| Console | Based on Template | Blank ▾ |
| | Operating System | Other OS ▾ |
| | Optimized for | Server ▾ |

Name                    myVM

Description             

Comment                 

☐ Stateless     ☐ Start in Pause Mode     ☐ Delete Protection

VM has 2 network interfaces. Assign profiles to them.

nic1    blue/blue ▾         −

nic2    qreen/qreen ▾       −

nic3    _____ ▾     +

| green (green) | |
| ovirtmgmt (ovirtmgmt) | |
| **red (red)** | |
| | Do not assign any profile to |
| <Empty> | this virtual network interface |

Show Advanced Options                                    OK   Cancel

# Adding Networks to a VM

oVirt

# Integration Benefits

- Add support in oVirt for the various network technologies provided via Neutron plugins

- Leverage L3 services modeled in Neutron

- Enjoy both worlds:

  - Neutron for managing VM networks

  - oVirt for managing infrastructure networks (Migration network, storage network etc.)

- Neutron networks are exposed side by side with oVirt networks which allows the user to use oVirt mature implementation for network configuration

# Neutron Overview

# OpenStack Networking - Neutron
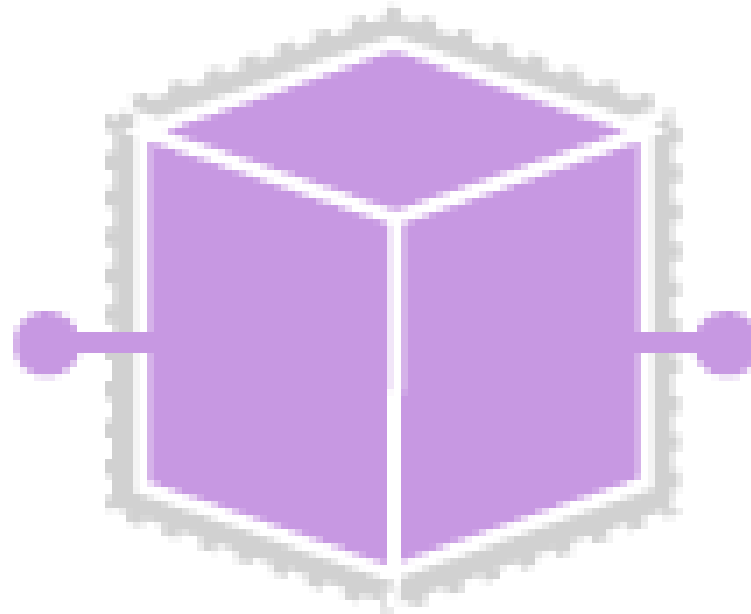
- Neutron provides network connectivity-as-a-service

- It offers a plug-in architecture designed to support various network technologies through vendor specific plug-ins and API extensions

- Exposes REST API for accessing the service

- Available plugins: Linux Bridge, OVS, ML2, Cisco Nexus, NVP, Ryu, NEC, etc...

# Neutron high level architecture
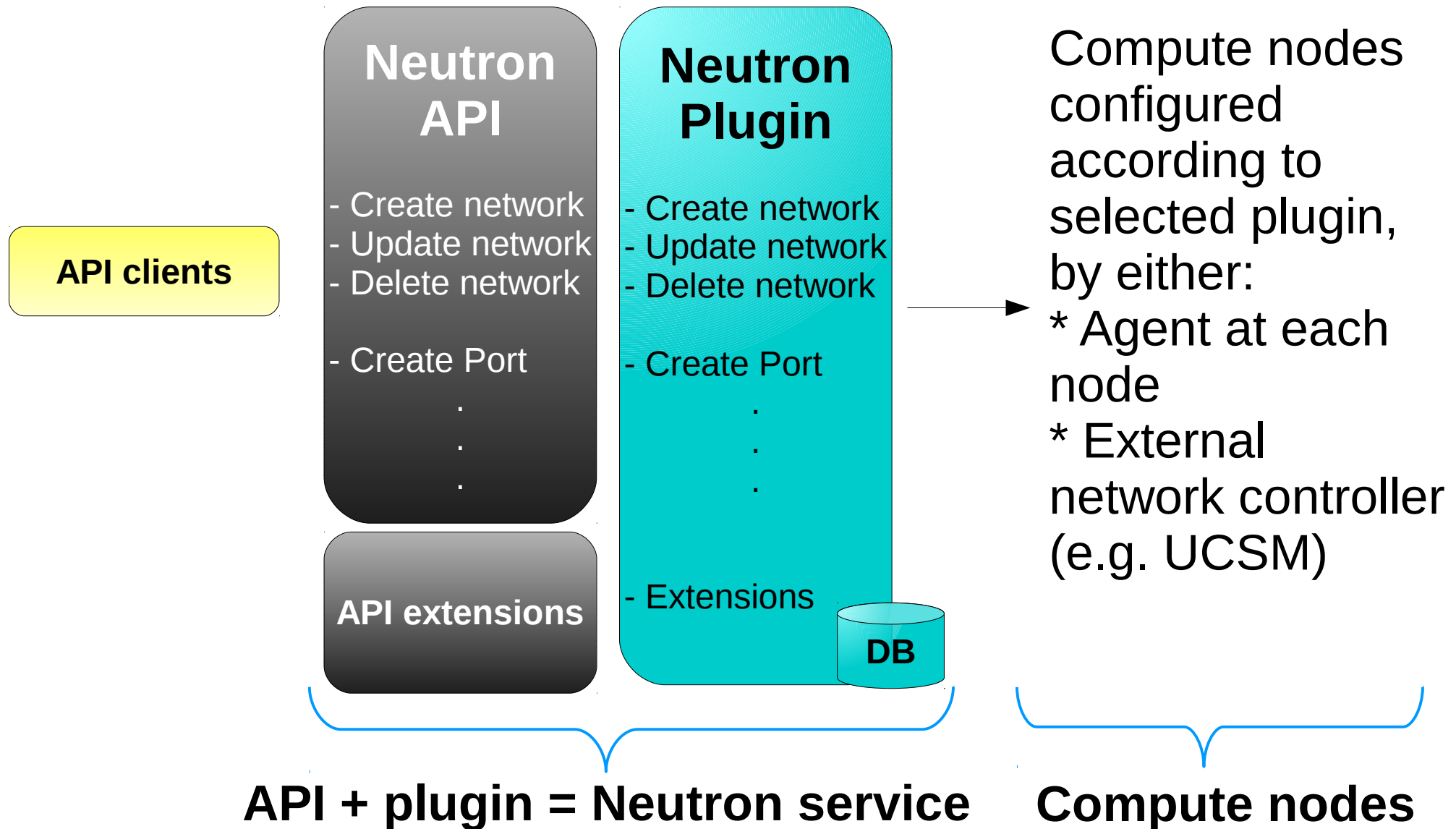
**oVirt**

**API clients**

**Neutron API**
- Create network
- Update network
- Delete network

- Create Port

.
.
.

**API extensions**

**Neutron Plugin**
- Create network
- Update network
- Delete network

- Create Port

.
.
.

- Extensions

**DB**

Compute nodes configured according to selected plugin, by either:
* Agent at each node
* External network controller (e.g. UCSM)

**API + plugin = Neutron service**          **Compute nodes**

# Key features in Neutron

- Better network virtualization using Overlay networks

- IPAM - IP Address Management

- Security Groups

- Virtualized services

  - Virtual Routing

  - VPN as a Service

  - Firewall as a Service

  - Load Balancing as a Service

  - And many more, as a service..

# Key features in Neutron

- **Better network virtualization using Overlay networks**
- IPAM - IP Address Management
- Security Groups
- Virtualized services
  - Virtual Routing
  - VPN as a Service
  - Firewall as a Service
  - Load Balancing as a Service
  - And many more, as a service..

# Why overlay?

oVirt

- VLAN as the most basic virtual networking
  - Very limited
  - Hard to maintain
  - "No brains"
- Overlay networks as the new virtual networking
  - "Unlimited"
  - Easy to maintain
  - Can be "smart" - SDN
- In the end, depends on the use case

# Key features in Neutron

- Better network virtualization using Overlay networks

- **IPAM - IP Address Management**

- Security Groups

- Virtualized services

  - Virtual Routing

  - VPN as a Service

  - Firewall as a Service

  - Load Balancing as a Service

  - And many more, as a service..

# IPAM basics

- The cornerstones:

  - Network

  - Subnet

  - Port

- Port gets IP from a Subnet

- IP gets delivered via DHCP

  - Also gets other net info

# Key features in Neutron

oVirt

- Better network virtualization using Overlay networks

- IPAM - IP Address Management

- **Security Groups**

- Virtualized services

  - Virtual Routing

  - VPN as a Service

  - Firewall as a Service

  - Load Balancing as a Service

  - And many more, as a service..

# Security Groups

- Segregate VMs from the world

- Allow in/outbound traffic

- One group to rule them all:

  - Security Group

    - Security rules

- Each port can have security group(s)

# Integration bits

# External Providers

- An external product that can be used to provide resources for oVirt

- Resources that can be provided: hosts, networks, etc..

- Configure once, use everywhere

# The Neutron External Provider

- Created as an external network provider

- Can be deployed with the user's choice of plugin

- Can be used in either of the flavors:

  - oVirt centric – Neutron is an implementation detail, the networks are actually managed in oVirt.

  - Neutron centric – Existing Neutron installation, oVirt is just a "user" of some of the networks.

# How to Use Neutron in oVirt?

- It's simple! Just follow these few steps:

  1. Install a Neutron instance

  2. Add the instance as an external provider

  3. Add networks on the provider:

     3.1. Add a new network on the provider

     3.2. Import networks

  4. Install host with the provider's agent

  5. Use the network in a VM's NIC

  6. Run the VM

# Step 1: Installing Neutron

- Install Neutron service and configure your choice of plugin

- Install Keystone

  - Configure Keystone for the Neutron service

# Step 2: Adding a Neutron Provider

oVirt

**Add Provider** ⊗

General

Agent Configuration

Name: My Neutron

Description:

Type: OpenStack Network ▾

Networking Plugin: Linux Bridge

Provider URL: http://localhost:9696

v2.0 ▾

☑ Requires Authentication

Username:

Password:

Tenant Name:

Test

OK   Cancel

# Step 2: Adding a Neutron Provider

oVirt

**Add Provider**

General

**Agent Configuration**

Interface Mappings ❓ red:eth1

**QPID**

Host my.host.fqdn

Port 5672

Username quantum

Password ••••••|

OK   Cancel

# Step 3 (1): Adding a New Network

# Step 3 (1): Adding a New Network

**oVirt**

## New Logical Network

| General | |
|---|---|
| **General** | |
| Cluster | |
| Subnet | |

Data Center: Default

Name: exported_red

**Export**

☑ Create on external provider

External Provider: Neutron

External Provider: Neutron

**Network Parameters**

☑ Enable VLAN tagging: 150

☑ VM network

☐ Override MTU

Network Label: red

Host Network QoS: [Unlimited]    New

OK    Cancel

# Step 3 (1): Adding a New Network

# Step 3 (2): Importing Networks

**Import Networks**  ⊗

Network Provider      Neutron ▼

**Provider Networks**

| ☐ | Name | Provider Network ID |
|---|------|---------------------|
| ☐ | external_red | 91680074-3299-401b-bde4-228bbe09e67c |
| ☐ | nicless | cd3e23fa-ca33-4d74-ae1a-b1c58987614d |
| ☐ | test | 54b37199-203b-48fd-897a-edc74a56188e |
| ☐ | test2 | da4e6bf0-848f-4551-8234-87d97e0aabe5 |
| ☐ | test3 | af5efdca-a9d9-4cec-8562-a75447108618 |

▼    ▲

**Networks to Import**

| ☐ | Name | Provider Network ID | Data Center | ☑ Allow All ❓ |
|---|------|---------------------|-------------|----------------|
| ☐ | newnet | 7a75f104-7c08-4e3b-bb82-5d68e5c9def8 | oVirt ⇕ | ☑ |
| ☐ | foo | a072f05d-0ab6-4205-a406-c4aed41238bc | Default ⇕ | ☑ |

Import   Cancel

# Step 4: Installing Host With Agent

oVirt

# Step 4: Installing Host With Agent

oVirt

**New Host**

| General | External Provider | Neutron |
| Power Management | Type | OpenStack Network |
| SPM | Networking Plugin | Open vSwitch |
| Console | | |
| **Network Provider** | **Bridge Mappings** | ❓ red:eth1 |
| | OPID | |

External Provider    Neutron

| | Username | quantum |
| | Password | • • • • • • • |

OK  Cancel

# Step 4: Installing Host With Agent

oVirt

**New Host**

| | |
|---|---|
| General | |
| Power Management | |
| SPM | |
| Console | |
| **Network Provider** | |

External Provider     Neutron

Type     OpenStack Network

Networking Plugin     Open vSwitch

Bridge Mappings   ❓  red:eth1

**QPID**

Host     quantum.example.com

Bridge Mappings   ❓  red:eth1

OK   Cancel

# Step 5: Adding Network to a vNIC

oVirt

**New Network Interface** ⊗

| | |
|---|---|
| Name | nic2 |
| Profile | ▼ |

blue (blue)

external_red (external_red)    Profile for external RED network

green (green)

ovirtmgmt (ovirtmgmt)

| | |
|---|---|
| Type | |
| Link State | |
| Card Status | |

☐ Custom MAC address

Example: 00:14:4a:23:67:55

...ions    Sessions

OK   Cancel

# Step 6: Running the VM

oVirt

# Future Work

# Future Work

- Integrate advanced services

- Improve VM scheduling, taking into account the networks availability on the host

  - Which host has access to which network

- Monitor vNIC connectivity after VM/vNIC started

- Integrate Security Group management

- Integrate L3 functionality

- Support more Plugin types

# In Conclusion

- oVirt network configuration

- Neutron overview

  - Key features

  - Integration benefits

  - External providers

  - Neutron as an external provider

- Future work

# More info

- Neutron
  - https://wiki.openstack.org/Neutron
- oVirt
  - http://www.ovirt.org/Network_Provider
- Mailing lists
  - users@ovirt.org
  - arch@ovirt.org
  - engine-devel@ovirt.org
  - vdsm-devel@lists.fedorahosted.org
- IRC Channel
  - #ovirt channel on irc.OFTC.net

oVirt

# THANK YOU !

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