

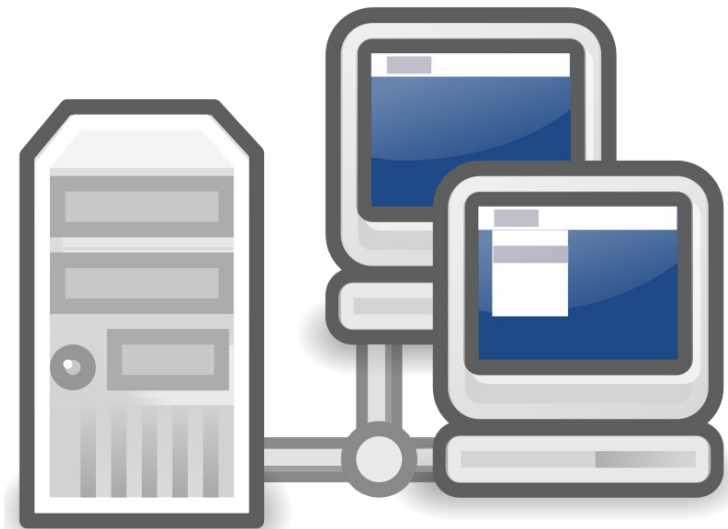
Bring your virtualized networking stack to the next level

Mike Kolesnik, mkolesni@redhat.com
Senior Software Engineer, Red-Hat

FOSDEM – February 2014

- 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

The screenshot shows the oVirt Open Virtualization Manager interface. The top navigation bar includes the oVirt logo, the text "Open Virtualization Manager", and a login status "Logged in user: admin@internal" with links for "Configure", "Guide", "About", and "Sign Out". Below the navigation bar is a search bar containing the text "Network: datacenter = Default".

The main content area is divided into two panels. The left panel, titled "System", contains a tree view with the following structure:

- System
 - Data Centers
 - Default
 - Storage
 - Networks
 - Templates
 - Clusters
 - External Providers
 - Lior

The right panel, titled "Networks", displays a table of networks. The table has the following columns: Name, Data Center, Description, Role, VLAN tag, and Provider. The data rows are:

Name	Data Center	Description	Role	VLAN tag	Provider
ext_blue	Default		✔	101	Lior
ext_red	Default		✔	-	Lior
ovirtmgmt	Default	Management Network	👑 ✔	-	

The bottom status bar shows the last message: "2013-Jul-14, 07:33" with a green checkmark. It also displays a notification: "Network ext_blue was updated on Data Center: Default". On the right side of the status bar, there are icons for "Alerts (0)", "Events", and "Tasks (0)".

Adding a New Network

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

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

New Logical Network

General

Data Center: dc3_0

Network Parameters

☒ Enable VLAN tagging

☒ VM network

☒ Override MTU

Network Label

Host Network QoS: [Unlimited]

New

OK Cancel

Host Level Configuration

Setup Host Networks

Drag to make changes

Interfaces

bond0

eth1

eth2

bond1

eth3

eth4

eth0

Assigned Logical Networks

NOVM_VLAN_MTU_5 (VLAN 500)

VLAN_MTU_5000 (VLAN 222)

VLAN_MTU_5000_2 (VLAN 52)

no network assigned

ovirtmgmt

Unassigned Logical Networks

Required

NON_VM_MTU_5000

Non Required

NON_VM_MTU_9000

NOVM_VLAN_MTU_9 (VLAN 900)

VLAN_MTU_9000 (VLAN 9)

VLAN_MTU_9000_2 (VLAN 92)

☒ Verify connectivity between Host and Engine

☐ Save network configuration

OK

Cancel

8/42

Adding Networks to a VM

New Virtual Machine

General

Cluster: Default/Default

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: green/green

nic3: [dropdown menu]

green (green)

ovirtmgmt (ovirtmgmt)

red (red)

<Empty>

Do not assign any profile to this virtual network interface

Show Advanced Options

OK Cancel

Adding Networks to a VM

New Virtual Machine

General

Cluster: Default/Default

Based on Template: Blank

VM has 2 network interfaces. Assign profiles to them.

nic1: blue/blue

nic2: green/green

nic3:

green (green)

ovirtmgmt (ovirtmgmt)

red (red)

<Empty>

Do not assign any profile to this virtual network interface

Show Advanced Options

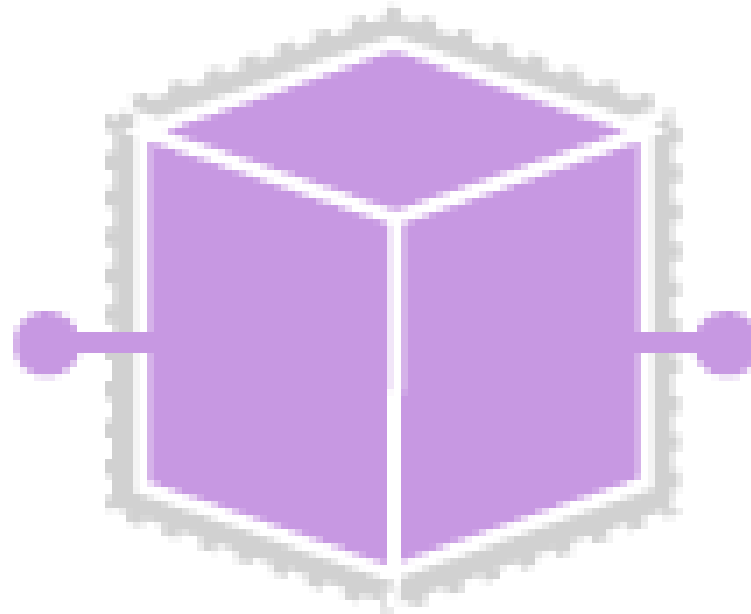
OK Cancel

Integration Benefits



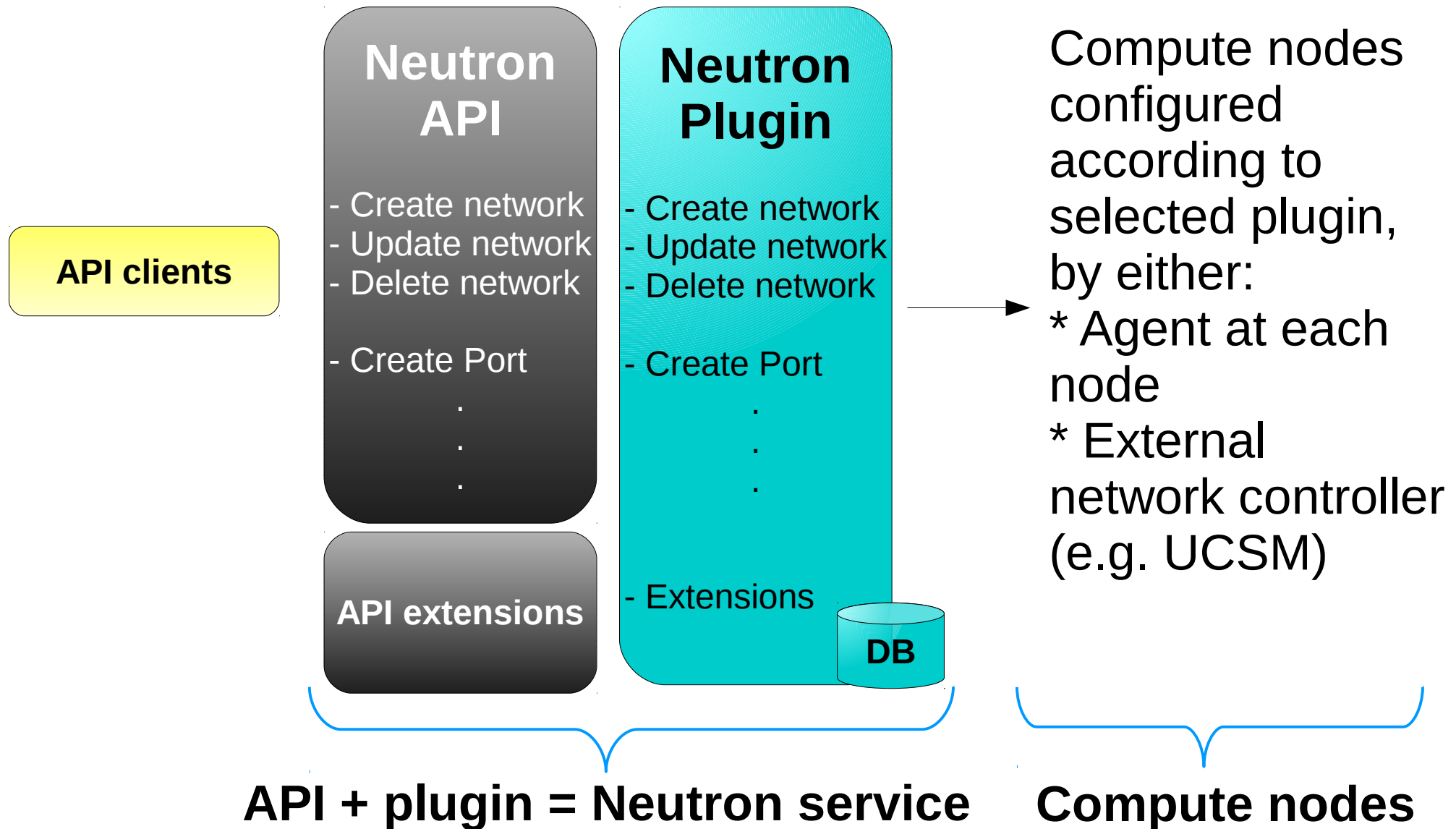
- Add support in oVirt for the various network technologies provided via Neutron plugins
- Leverage L3 services modeled in Neutron
- Enjoy both worlds:
 - Neutron for managing VM networks
 - oVirt for managing infrastructure networks (Migration network, storage network etc.)
- Neutron networks are exposed side by side with oVirt networks which allows the user to use oVirt mature implementation for network configuration

Neutron Overview



- 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



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?



- 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..

- 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



- 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 screenshot shows the oVirt Open Virtualization Manager web interface. The top navigation bar includes the oVirt logo, the title "Open Virtualization Manager", and a user status bar indicating "Logged in user: admin@internal" with links for "Configure", "Guide", "About", and "Sign Out". Below the navigation bar is a search bar labeled "Search: Provider:". The main content area is titled "Providers" and contains a table with columns: Name, Type, Description, and Provider URL. The table lists two providers: "Boss" (Type: Foreman, Description: Like a boss, URL: http://the.boss) and "Lior" (Type: Openstack Network, URL: http://10.35.0.192:9696). On the left sidebar, the "System" menu is expanded, showing "Data Centers" and "External Providers". Under "External Providers", "Boss" and "Lior" are listed. The bottom status bar shows "Last Message: 2013-Jul-14, 08:45" and "Network ext_blue was updated on Data Center: Default", along with "Alerts (0)", "Events", and "Tasks (0)".

Name	Type	Description	Provider URL
Boss	Foreman	Like a boss	http://the.boss
Lior	Openstack Network		http://10.35.0.192:9696

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

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

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

New Logical Network

General
Cluster
Subnet
Profiles

Data Center
Name
Description
Comment

Default
exported_red

Export
☒ Create on external provider
External Provider
Neutron

Network Parameters
☒ Enable VLAN tagging
☒ VM network
☐ Override MTU
Network Label
Host Network QoS

150

red
[Unlimited]

New

OK Cancel

Step 3 (1): Adding a New Network

New Logical Network

General

Cluster

Subnet

Data Center

Name

Default

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

New Logical Network

General
Cluster
Subnet
Profiles

Name: ext_red_subnet
CIDR: 10.0.0.0/24
IP Version: IPv4

Name: ext_red_subnet
CIDR: 10.0.0.0/24
IP Version: IPv4

OK Cancel

Step 3 (2): Importing Networks

Import Networks

Network Provider

Neutron

Provider Networks

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

Networks to Import

<input type="checkbox"/>	Name	Provider Network ID	Data Center	<input checked="" type="checkbox"/> Allow All ?
<input type="checkbox"/>	newnet	7a75f104-7c08-4e3b-bb82-5d68e5c9def8	<div>oVirt</div>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	foo	a072f05d-0ab6-4205-a406-c4aed41238bc	<div>Default</div>	<input checked="" type="checkbox"/>

Import

Cancel

Step 4: Installing Host With Agent

New Host

General

Power Management

SPM

Console

Network Provider

External Provider

Type

Networking Plugin

Bridge Mappings

QPID

Host

Port

Username

Password

Neutron

OpenStack Network

Open vSwitch

red:eth1

quantum.example.com

5672

quantum

.....

OK

Cancel

Step 4: Installing Host With Agent

New Host

General
Power Management
SPM
Console
Network Provider

External Provider: Neutron
Type: OpenStack Network
Networking Plugin: Open vSwitch
Bridge Mappings: red:eth1

External Provider Neutron

Username: quantum
Password:

OK Cancel

Step 4: Installing Host With Agent

The screenshot shows the 'New Host' dialog box in oVirt. The 'Network Provider' tab is selected in the left sidebar. The main area shows the following configuration:

- External Provider: Neutron
- Type: OpenStack Network
- Networking Plugin: Open vSwitch
- Bridge Mappings: red:eth1
- QPID Host: quantum.example.com

A red box highlights the 'Bridge Mappings' field, and a callout box provides a larger view of this field.

Field	Value
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

New Network Interface

Name:

Profile:

Type:

Link State:

Card Status:

☐ Custom MAC address

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

OK Cancel

Step 6: Running the VM

The screenshot displays the oVirt Open Virtualization Manager web interface. The top navigation bar includes the oVirt logo, the title 'Open Virtualization Manager', and a user login status 'Logged in user: admin@internal' with links for 'Configure', 'Guide', 'About', and 'Sign Out'. A search bar at the top left contains the text 'Vms: cluster = cl3_3-dc3_0'. The main content area is titled 'Virtual Machines' and features a toolbar with actions like 'New VM', 'Edit', 'Remove', 'Run Once', 'Migrate', 'Cancel Migration', 'Make Template', 'Export', 'Create Snapshot', and 'Change CD'. Below the toolbar is a table of virtual machines. The first row shows a VM named 'vm1' with a status icon of a monitor and a green arrow, indicating it is running. A 'Run' button is overlaid on the 'Host' column for this VM. The table columns include 'Name', 'Host', 'IP Address', 'Cluster', 'Data Center', 'Memory', and 'CPU'. The left sidebar shows a tree view of the system hierarchy: 'System' (expanded) contains 'Data Centers' (expanded to 'dc3_0'), which includes 'Storage', 'Networks', 'Templates', 'Clusters' (expanded to 'cl3_3-dc3_0'), and 'Hosts'. Below this are 'VMs', 'Default', and 'External Providers' (including 'Lior' and 'Koles'). The bottom of the interface shows a 'Bookmarks' section and a 'Tags' section. A status bar at the very bottom displays the last message: 'VM vm1 was powered off ungracefully by admin@internal (Host: saturn-vd)' and includes an 'Alerts (6)' icon.

oVirt Open Virtualization Manager

Logged in user: admin@internal | Configure | Guide | About | Sign Out

Search: Vms: cluster = cl3_3-dc3_0

Virtual Machines

New VM Edit Remove Run Once Migrate Cancel Migration Make Template Export Create Snapshot Change CD

Name	Host	IP Address	Cluster	Data Center	Memory	CPU
vm1			cl3_3-dc3_0	dc3_0	0%	

Run

General Network Interfaces Disks Snapshots Applications Permissions Sessions Events

New Edit Remove

Name	Plugged	Network Name
nic1	<input checked="" type="checkbox"/>	ovirtmgmt
nic2	<input checked="" type="checkbox"/>	external_red

Statistics Guest Agent Data

Rx (Mbps)	Tx (Mbps)	Drops
< 1	< 1	0

Last Message: 2013-Jul-14, 20:06 VM vm1 was powered off ungracefully by admin@internal (Host: saturn-vd) Alerts (6) Events Tasks (0)

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

- oVirt network configuration
- Neutron overview
 - Key features
 - Integration benefits
 - External providers
 - Neutron as an external provider
- Future work

- 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

THANK YOU !

Mike Kolesnik
mkolesni@redhat.com