



**PLUM**grid

# Introduction to PLUMgrid Open Networking Suite for OpenStack

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# Infrastructure Transformation

*Enable rapid service delivery models*



Mobile & Self Service



Simple & Social



Instant & On-demand

*While avoiding rigid infrastructure & lock-in*



# Road to Cloud Networking



#1

DEPLOYMENT  
ROADBLOCK

75

Open  
Tickets

4

Months  
Delay

#1

DEPLOYMENT  
ENABLER

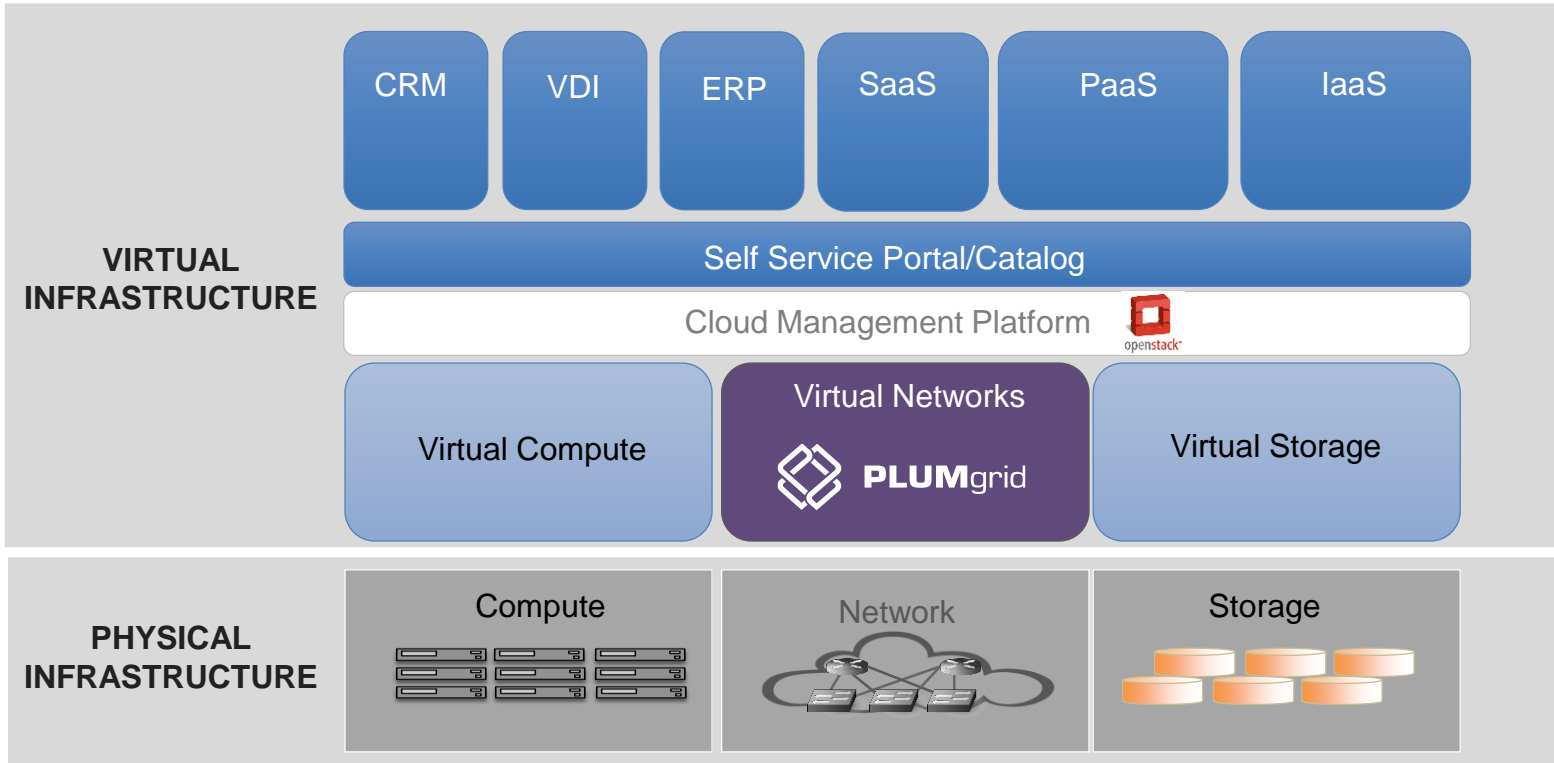
0

Open  
Tickets

0

Weeks  
Delay

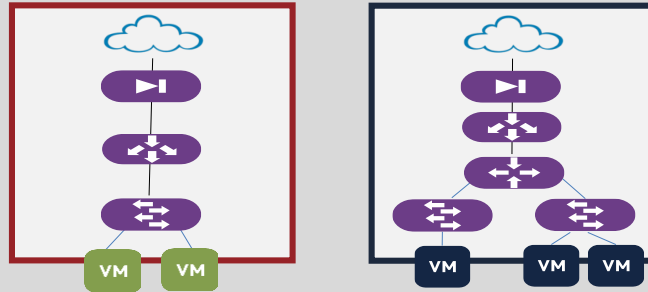
# Virtual Networks in OpenStack



# From Physical to Virtual Networks

VIRTUAL  
INFRASTRUCTURE  
VIEW

TENANT  
NETWORKS

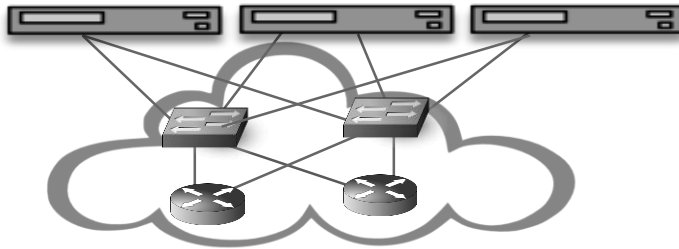


Overlay Network

## Virtual Network Infrastructure

- On-Demand & Multi Tenant
- Automated & Self Service
- Virtual Domains
- Rich set of Network Functions
- Secure

PHYSICAL  
INFRASTRUCTURE  
VIEW



## Physical Network Infrastructure

- QoS, Bandwidth & Latency
- Multicast
- Capacity
- Connectivity

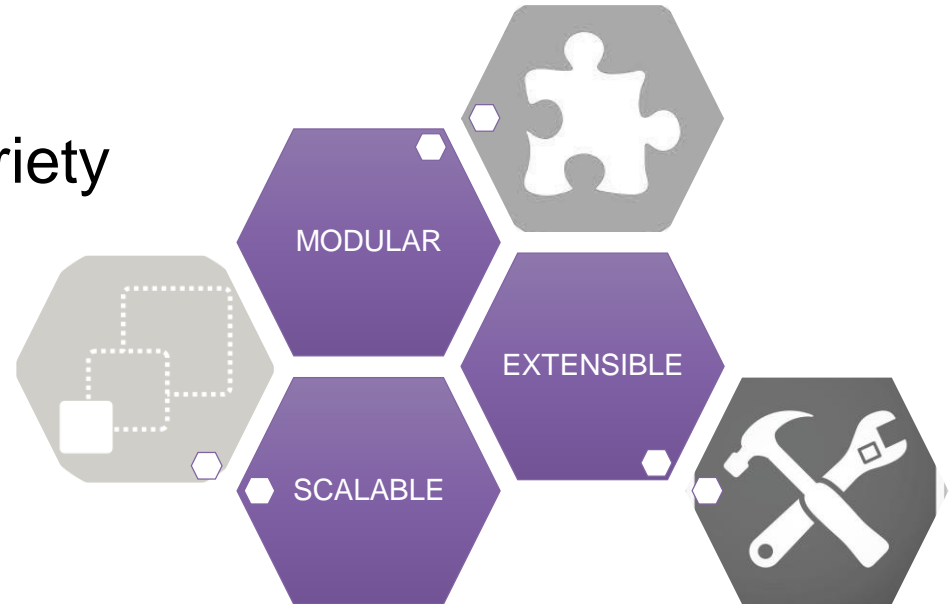


# PLUMgrid Open Networking Suite



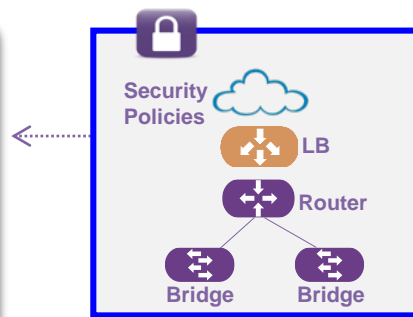
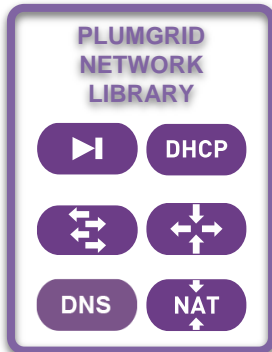
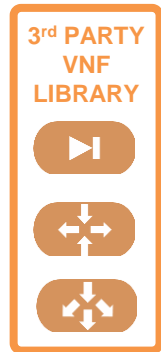
# PLUMgrid: Transforming Networking

- A Platform approach
- No lock-in SDN solution
- Modularity satisfies a variety of use case
- Built-in isolation capability

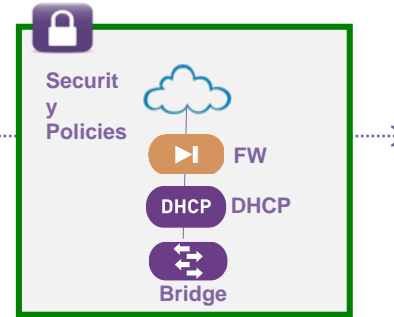


# PLUMgrid Open Networking Suite

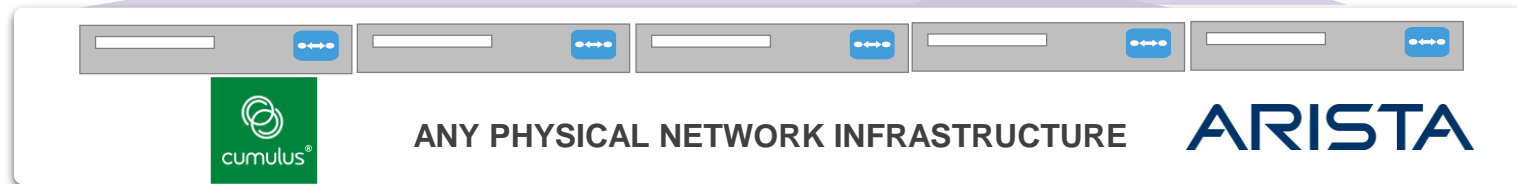
Scalable Architecture Non-Stop Forwarding Service Insertion



VIRTUAL DOMAIN  
Tenant A



VIRTUAL DOMAIN  
Tenant B



ANY PHYSICAL NETWORK INFRASTRUCTURE

ARISTA





# Built on PLUMgrid Platform + IO Visor™

## *Designed for Next-Generation Cloud Network Infrastructure*

### PLUMgrid Platform

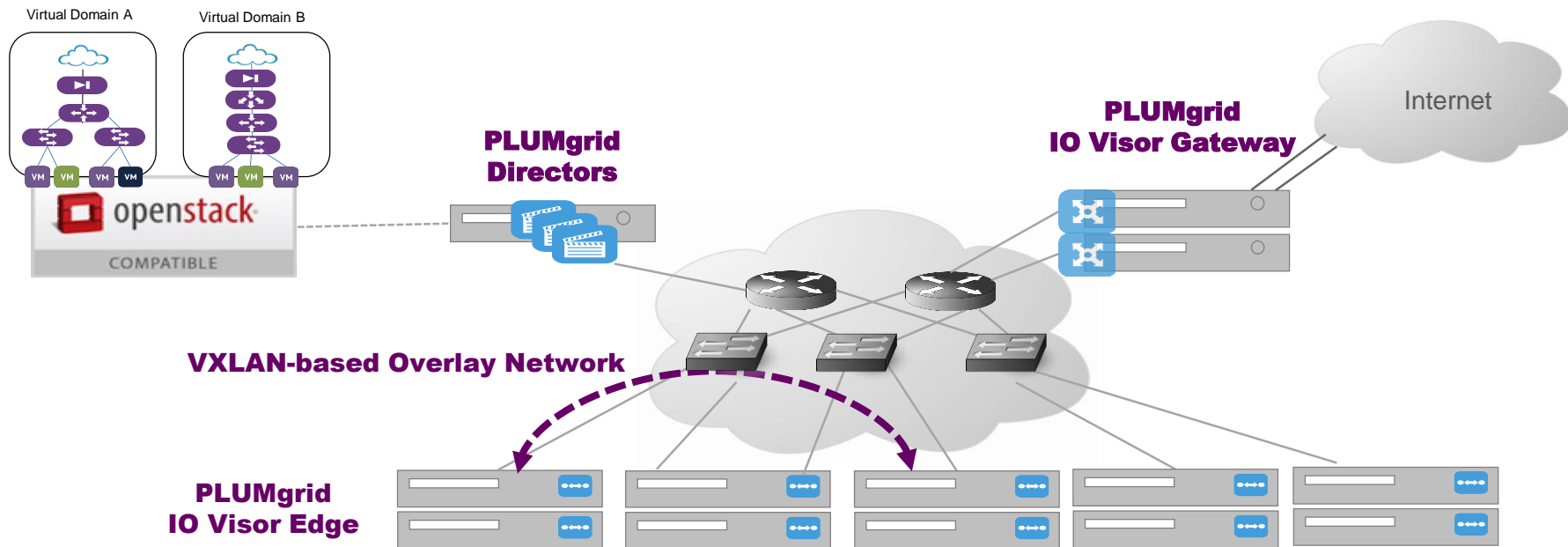
- Custom built for large cloud performance and scale needs & SDN Use Cases
- Distributed storage of run time data
- Distributed control & data plane

### PLUMgrid IO Visor

- Programmable Data Plane
- Enables all VNFs to be fully distributed & dynamically loaded on each Compute Node
- No hair-pinning or bottleneck
- Upstreamed in Linux Kernel



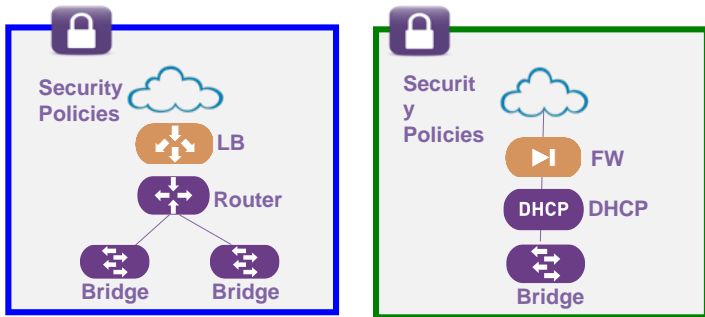
# PLUMgrid Open Networking Suite Components



- ✓ No single point of failure
- ✓ Highly resilient & self-healing
- ✓ Terabits of distributed scale out performance



# Understanding Virtual Domains



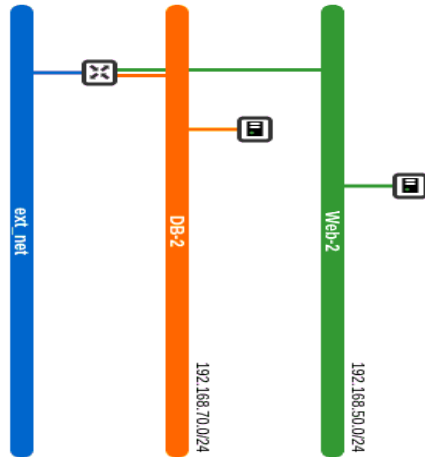
## Your Private Virtual Data Center

- Isolate workloads
- Self-service provision of all network functions
- Decouple changes from physical infrastructure
- Fully distributed within IO Visor layer

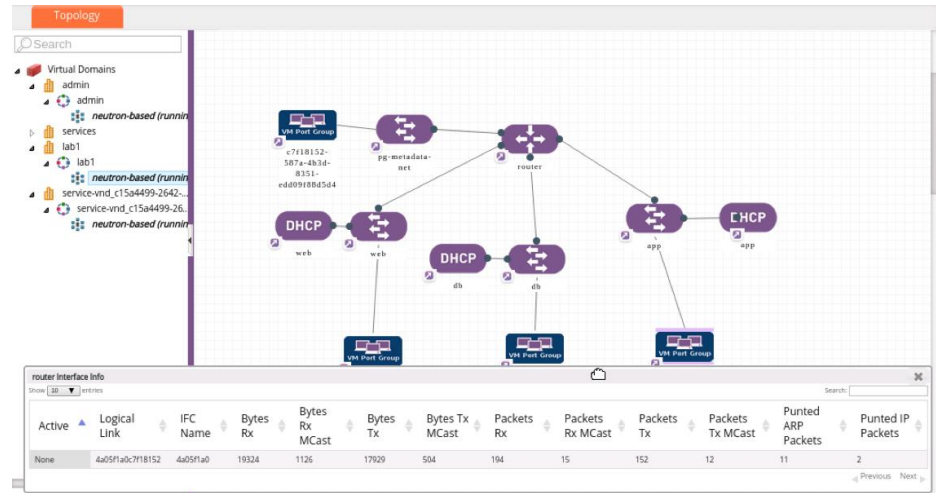


# From OpenStack Networks to PLUMgrid Virtual Domains

## OpenStack Networks

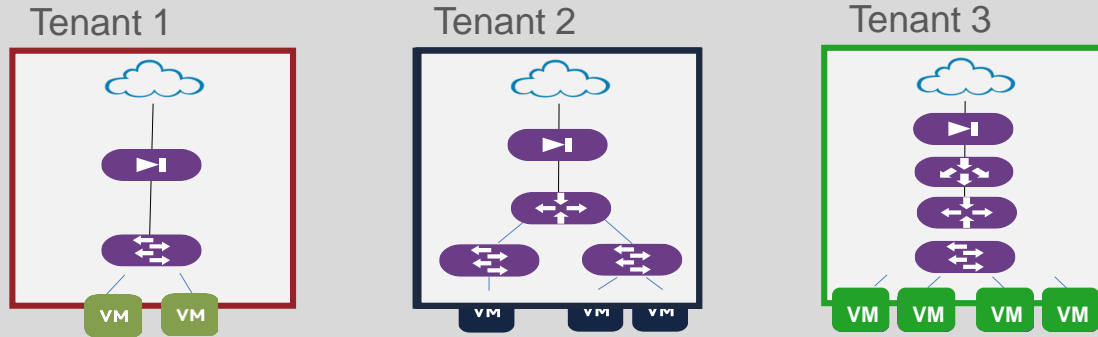


## PLUMgrid Virtual Domains

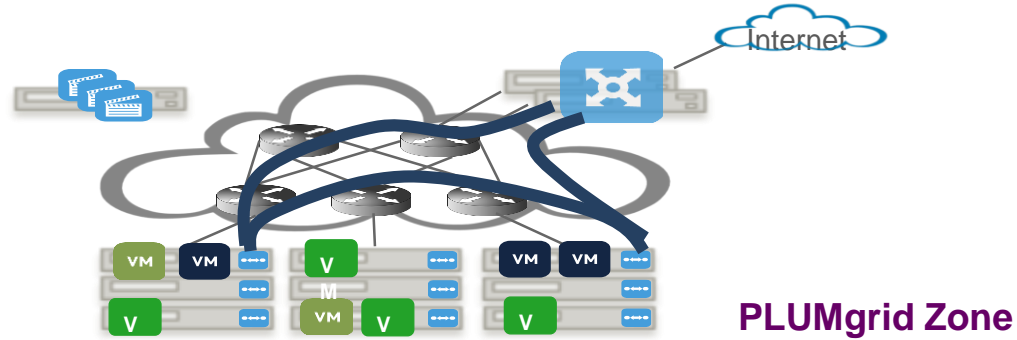


# Distributed Virtual Domains

VIRTUAL  
INFRASTRUCTURE  
VIEW



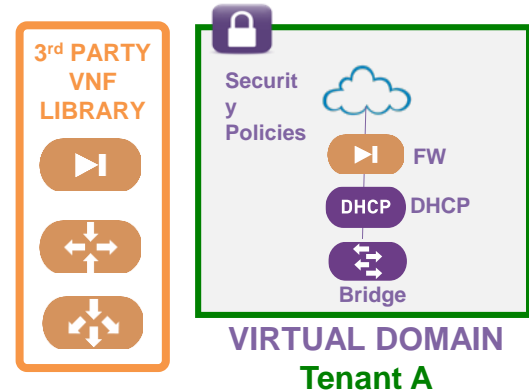
PHYSICAL  
INFRASTRUCTURE  
VIEW



Custom or Template based Virtual Network Domains per Tenant

# Service Insertion Architecture (SIA)

- Seamless insertion of **3<sup>rd</sup> party services** – **three modes of operation**:
  - Virtual appliance
  - Physical appliance
  - Container-based appliance
- **Complement and augment** PLUMgrid Virtual Domains with additional network functions
- Supports both **open source** and **commercial versions** for faster time to service.



# Enhancing OpenStack Networking



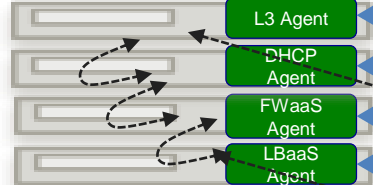
# Architecture Challenges: Neutron & OVS



## Single Point of Failure

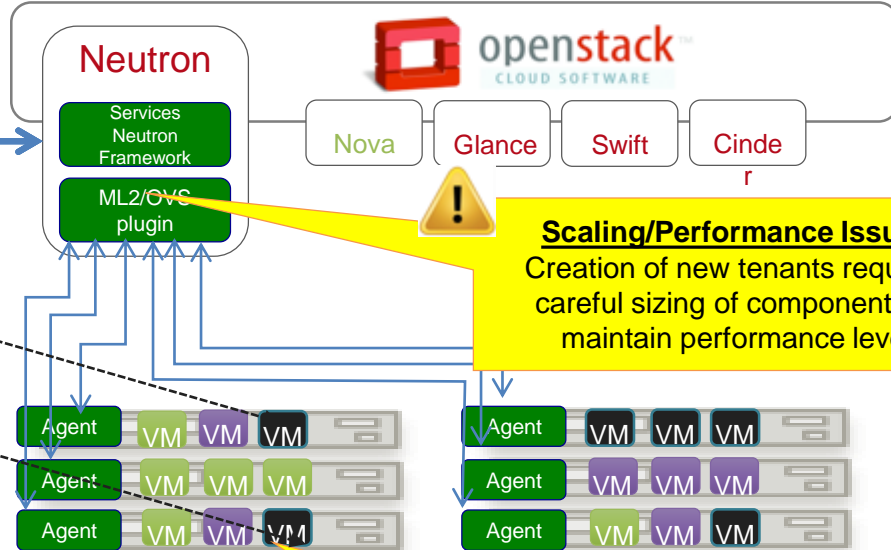
Advanced Services run on dedicated nodes.  
Limited HA.

### Network Nodes



## Traffic Bottleneck

Placement of these components is critical; They are in data path and become bottlenecks



## Scaling/Performance Issues

Creation of new tenants requires careful sizing of components to maintain performance level



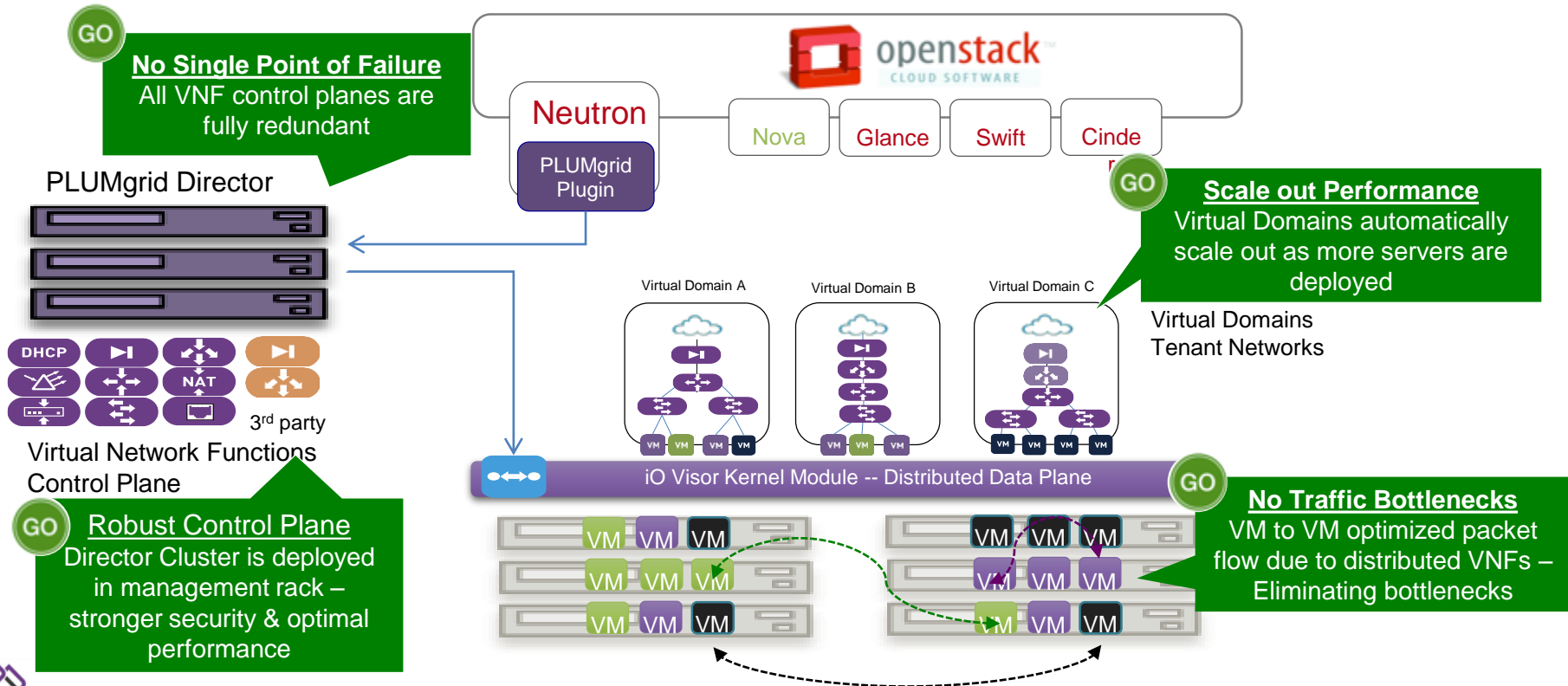
## Performance Challenges

VM traffic flow can be handled in kernel, in local user space or in network nodes with different performance level





# Architecture Solution: Neutron & PLUMgrid



# PLUMgrid Toolbox



**Comprehensive**

**Real Time**

**Automated**

**Simple to Use**



Zone Report



Virtual Trace Route



Status Monitor



Log Collector



Virtual Traffic Dump



System Alerts

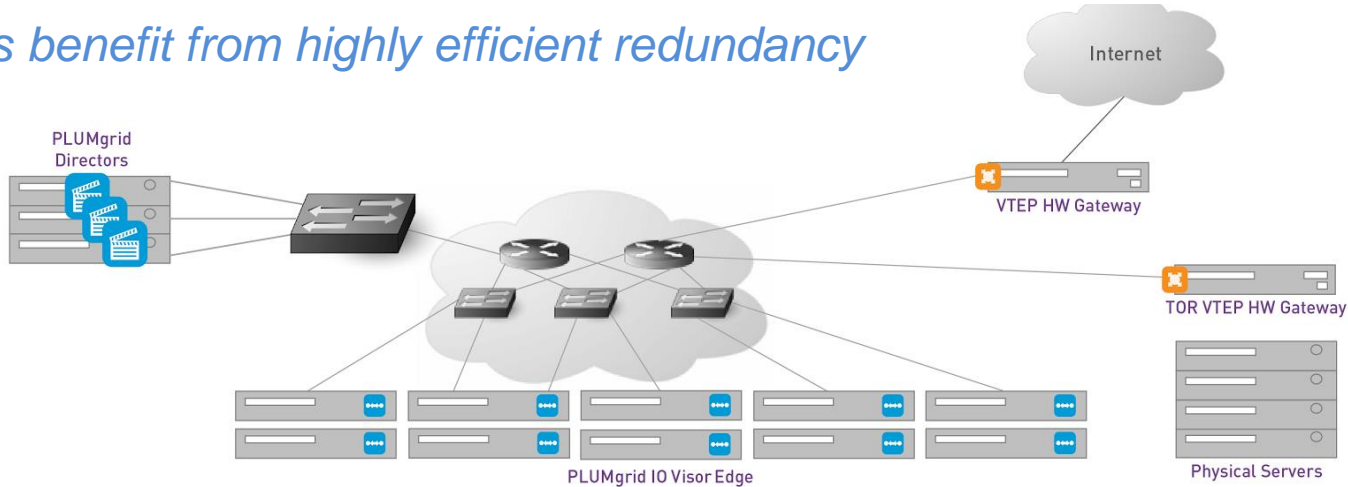


Virtual SSH



# Active/Active Gateway

Customers benefit from highly efficient redundancy



PLUMgrid ONS supports VTEP\* with:

- ✓ Hardware and software gateways; Active/Active preferred to Active/Standby
- ✓ **Load balancing** and **redundancy** over multi-chassis links
- ✓ Seamless integration with hardware switches in active/active configuration, i.e. Arista



# Designed for Mission Critical Networks

## OpenStack Nova Simple Networks

- Simple Topology
- VLAN based isolation
- Limited features development
- Will be obsoleted

## OpenStack Neutron Reference Design

Multi-tenant Networks  
Limited HA, Scale

- Designed to support multi-tenant Network Topologies
- Modular Plugin Architecture
- Limited High Availability
- Performance Limitations due to Network Node (NAT) and use of IP tables
- Limited Scale

## PLUMgrid Neutron Plugin

Rich, Mission Critical Networks  
High Performance, Scale, HA, Functions

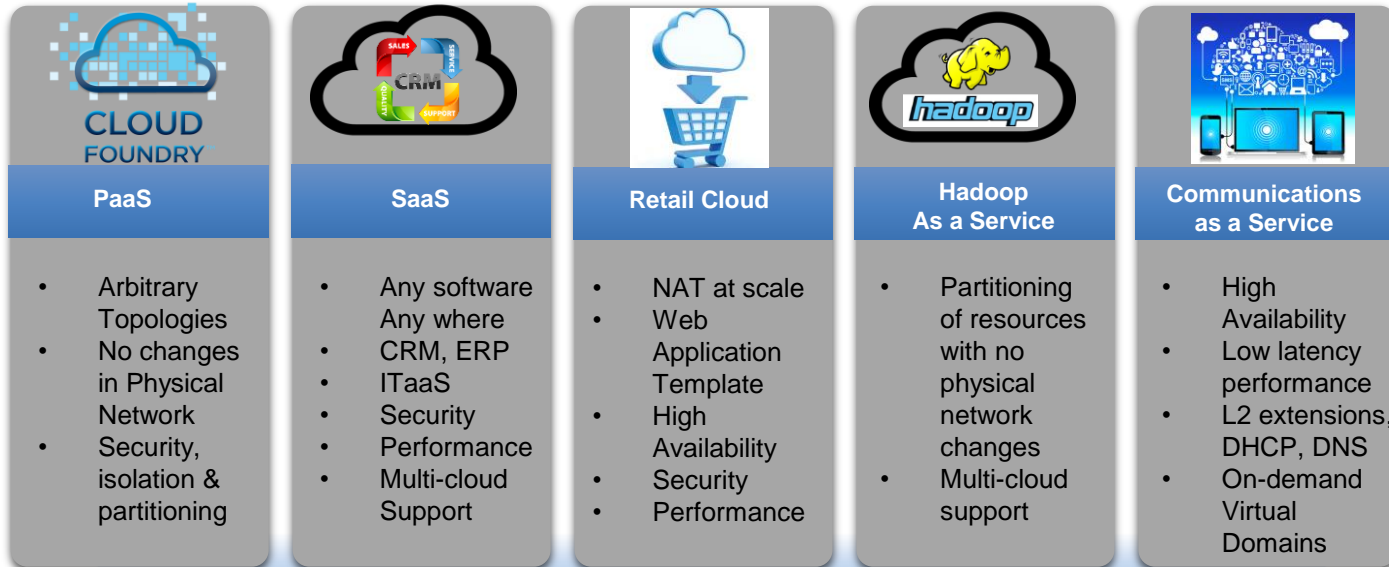
- Designed for mission critical SDN & Distributed Systems from the ground up
- Automated Installation
- Virtual Domains + Distributed Virtual Network Functions
- Built-in HA of all VNFs
- Inherent performance due to all VNFs being distributed in IO Visor
- Designed to scale-out across racks (1000 nodes)
- Extensible (IO Visor + PLUMgrid Platform)



# Customer Case Studies & Benefits



# Deployment Use Cases

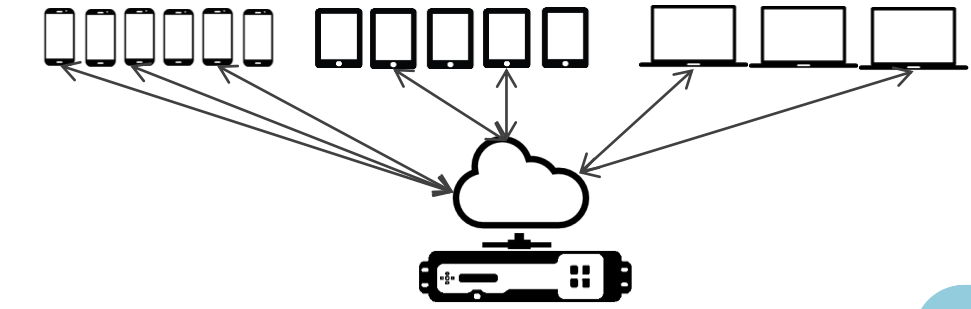


# Solving IP Address Exhaustion with PLUMgrid

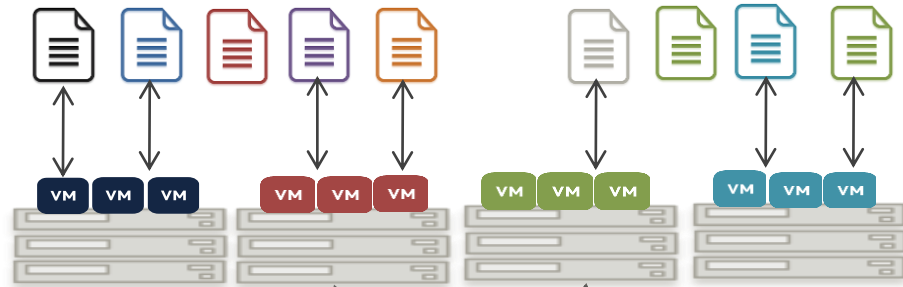


Online Retailer

Shoppers



Product Catalogs



Catalog Classes

Database



- Problems**
- Manual Network Provisioning
  - IP exhaustion
  - Limited IP address management option with OpenStack
  - Multi-hypervisor environment

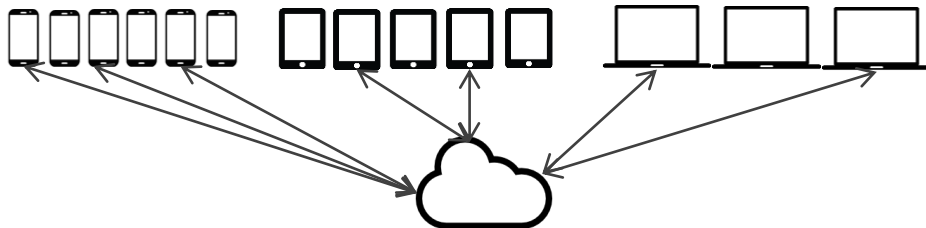


# Solving IP Address Exhaustion with PLUMgrid

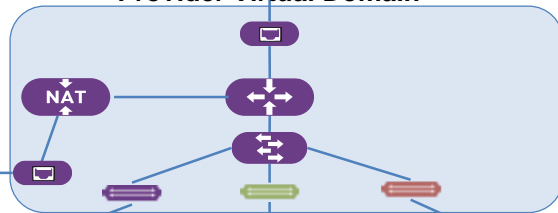


Online Retailer

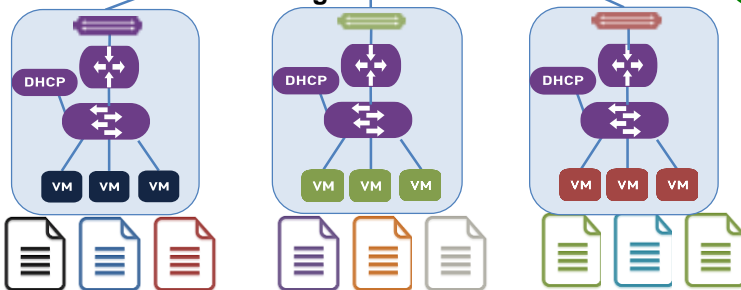
Shoppers



Provider Virtual Domain



Catalog Virtual Domain



Product Catalogs

## Solution

- Simplified IP address management with NAT
- Dynamic sizing to adjust to seasonal workload
- No IP exhaustion when connecting to external database
- Virtual Domains scale-out on-demand

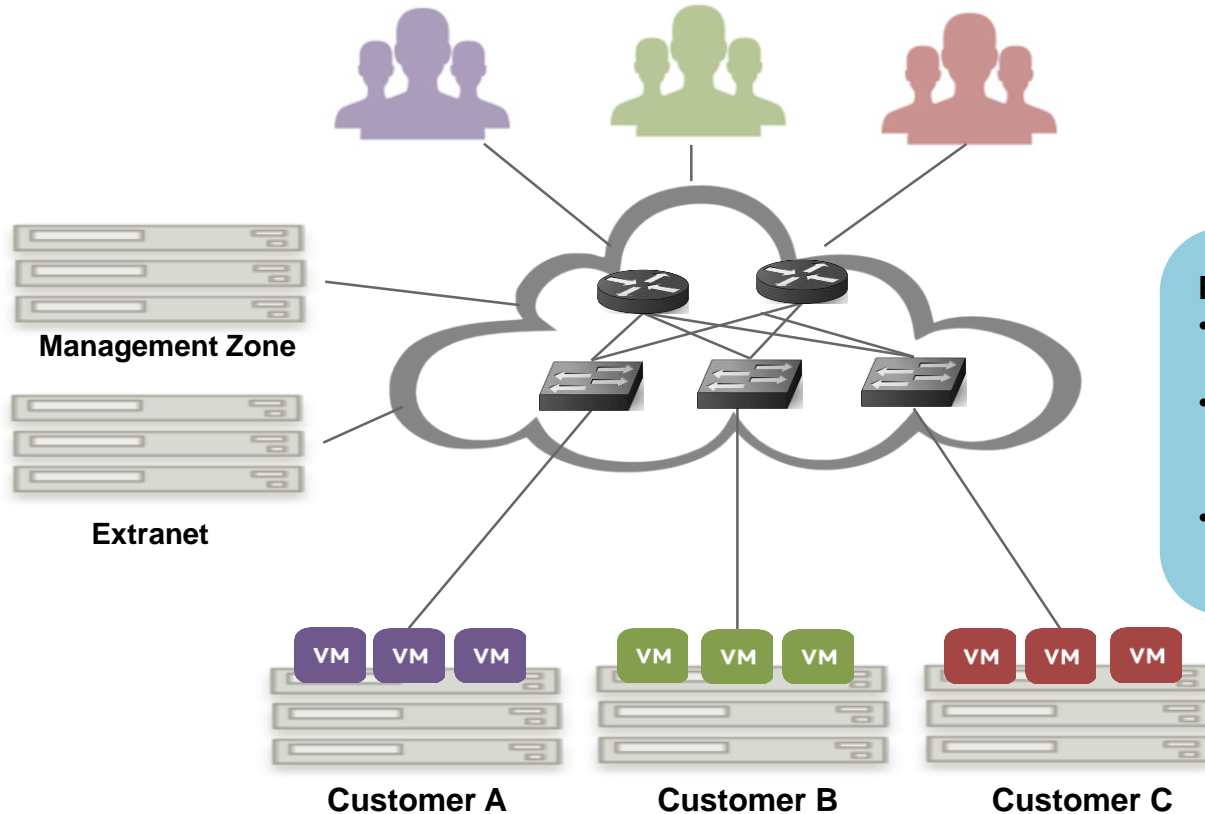




# Building Agile Virtual Networks in OpenStack



VoIP Service Provider



## Problems:

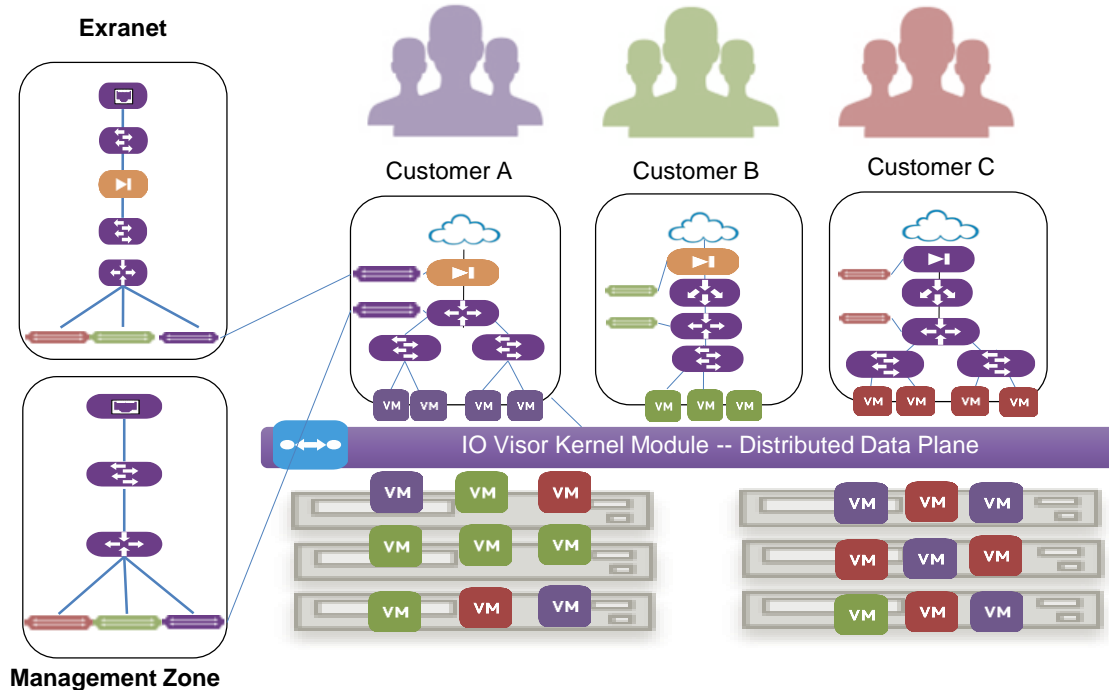
- Hardware based networking solution
- Long deployment cycle due to custom network requirements
  - Average 3 – 4 weeks
- Manual provisioning of network resources



# Building Agile Virtual Networks in OpenStack



VoIP Service Provider



## Solution

- Software based network infrastructure
- Customized and secure network deployment for each tenant in hours
- Scale-out/ scale-in network resources as per customer requirements



# Customer Benefits



Open Networking  
Suite for  
OpenStack

PLUMgrid provides a Comprehensive Cloud Networking Platform

## Cloud Scale and Multi Location



- HW Independent
- No Vendor Lock In
- Work across Assets
- High Performance
- Built to Scale Out

## Secure and Multi Tenant



- Identity Aware
- Policy Enforcement
- Provably Isolated
- Contain Exposure
- Meet Compliance

## Open and Extensible



- Open APIs
- Open Data Models
- Open Interfaces
- Open SDKs
- Ready for Unknown

## Agile and Simple



- On Demand
- User Defined
- Saves Time
- Easy to Operate
- Highly Available

## Automated and Policy Driven



- No Human in loop
- Admin Delegation
- Auto Provisioning
- Less Time to Rev
- Lower TCO

# Additional PLUMgrid Offerings

## Support

- ❖ 5x12 or 7x24 access
- ❖ Voice or chat access
- ❖ Online case tracking

## Training

- ❖ Instructor led training
- ❖ 1/2, 2 or 3 days options
- ❖ Technology deep dive
- ❖ Hands on labs
- ❖ Designed for your OpenStack distribution

## Professional Services

- ❖ Arch. & Design
- ❖ Testing services
- ❖ Project management
- ❖ Resident engineer



# PLUMgrid Ignition



**Immersive PLUMgrid Technology Experience**



# PLUMgrid Ignition



## Sandbox

Take a virtual test drive with PLUMgrid ONS in a PLUMgrid hosted virtual environment.

**TEST DRIVE NOW**



## Hosted

Put your hands on the wheel by driving an PLUMgrid ONS deployment in a bare-metal environment.

**START YOUR ENGINE**



## Onsite

Test drive PLUMgrid ONS in the comfort of your own datacenter or lab environment.

**READY,SET,GO!**

Go to: [www.plumgrid.com/plumgrid-ignition/](http://www.plumgrid.com/plumgrid-ignition/)



# PLUMgrid Ignition Options

	Sandbox	Hosted	Onsite (Starter Kit)
Product	ONS	ONS	ONS
Distro	RDO	Custom	Custom
Description	Virtual	Bare Metal	Onsite hardware
Benefits	Evaluate ONS in virtual environment	Evaluate ONS on bare metal hardware	Evaluate ONS on premise per user requirement

Pros	Sandbox	Hosted	Onsite (Starter Kit)
	<ul style="list-style-type: none"> <li>• Quick and Easy</li> <li>• Learn how to use ONS in OpenStack environment</li> <li>• Eliminate physical environment setup and teardown time</li> </ul>	<ul style="list-style-type: none"> <li>• Provides installation and deployment experience in addition to ONS runtime experience</li> <li>• Eliminate physical environment setup and teardown time</li> </ul>	<ul style="list-style-type: none"> <li>• Leverage existing infrastructure in the datacenter</li> <li>• Provides complete experience from concept phase to successful runtime analysis</li> </ul>

Cons	Sandbox	Hosted	Onsite (Starter Kit)
	<ul style="list-style-type: none"> <li>• No installation experience</li> <li>• No performance benchmarking</li> <li>• Limited scalability testing due to VM size</li> </ul>	<ul style="list-style-type: none"> <li>• No hardware based scalability evaluation</li> <li>• No advanced features evaluation</li> <li>• No custom configuration evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Longer installation and deployment time for evaluation</li> <li>• Longer approval cycle to get internal approvals to access to custom configuration</li> </ul>



# ONS Starter Kit





# PLUMgrid ONS Starter Kit – 6 Months (EMEA)

ONS-2.0-START-6	Description	Estimated Duration
<b>ONS Licenses</b>	10 node ONS Premium license	6 months
<b>Price</b>	10 node ONS Premium license	\$10,000
<b>Assessment and Design</b>	Jointly plan and design POC project Understand business drivers, use cases and technical requirements Jointly develop & deliver architecture document for the virtual network infrastructure	1 day
<b>Training</b>	An overview of PLUMgrid ONS includes design and operation principles Deep dive into OpenStack Neutron Deep Dive architecture sessions on PLUMgrid ONS components Conducted Remotely	2 days
<b>Installation</b>	Jointly install PLUMgrid ONS for OpenStack for virtual network infrastructure Conducted Remotely	2 days
<b>Support</b>	Provide standard customer support	6 months

All-inclusive offering to get OpenStack project started on the right networking path

# PLUMgrid ONS Starter Kit – 12 Months (EMEA)

ONS-2.0-START-12	Description	Estimated Duration
<b>ONS Licenses</b>	10 node ONS Premium license	12 months
<b>Price</b>	10 node ONS Premium license	\$15,000
<b>Assessment and Design</b>	Jointly plan and design POC project Understand business drivers, use cases and technical requirements Jointly develop & deliver architecture document for the virtual network infrastructure	1 day
<b>Training</b>	An overview of PLUMgrid ONS includes design and operation principles Deep dive into OpenStack Neutron Deep Dive architecture sessions on PLUMgrid ONS components Conducted Remotely	2 days
<b>Installation</b>	Jointly install PLUMgrid ONS for OpenStack for virtual network infrastructure Conducted Remotely	2 days
<b>Support</b>	Provide standard customer support	12 months

All-inclusive offering to get OpenStack project started on the right networking path



**PLUM**grid

**THANK YOU!**