

# Couch to OpenStack

Eric Wright

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vagrant up

# about:me

- **Eric Wright**

- Blogger, Cloud Pundit, Podcaster
- Principal Solutions Engineer and Technology Evangelist, VMTurbo
- @DiscoPosse on Twitter
- LinkedIn (Just search for DiscoPosse)
- gcOnDemand.io
- Co-Creator VirtualDesignMaster.io



# Agenda

- OpenStack Learning Challenges
- OpenStack Distributions
- OpenStack Project Topologies
- OpenStack Cookbook Lab
- Nova and Neutron
- Online Resources

Goal: Coaching you from zero to hero on OpenStack!

# Introduction to OpenStack

Eric Wright  
DiscoPosse.com  
@DiscoPosse



**pluralsight**   
hardcore dev and IT training

# Why OpenStack?

“Notable Fortune 100 enterprises like BMW, Disney, and Walmart have irrefutably proven that OpenStack is viable for production environments.”

— LAUREN E. NELSON, FORRESTER RESEARCH

But, I'm not Walmart or eBay...

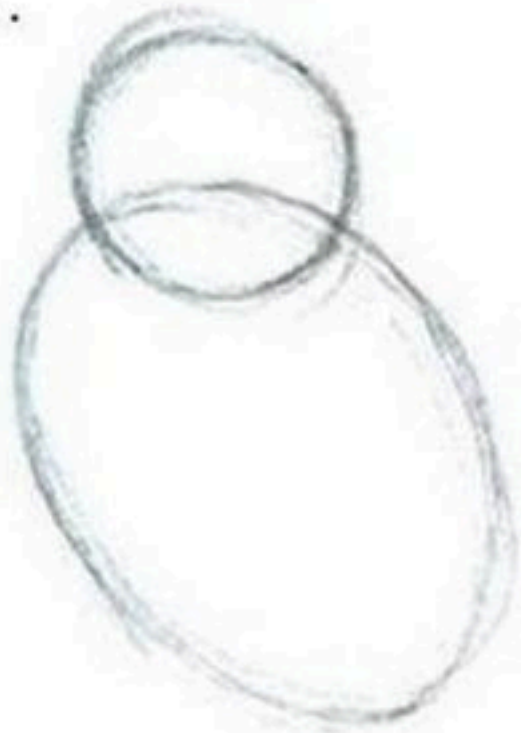


Your bank has more developers than your hypervisor vendor. It's time to accept that.

# OpenStack Learning Challenges

## How to draw an owl

1.



1. Draw some circles

2.



2. Draw the rest of the owl

A man with dark hair, wearing a light blue long-sleeved shirt, is seated at a computer workstation. He is leaning forward with his head bowed, his hands resting on the desk. The background is a dimly lit room with several computer monitors and chairs, suggesting a classroom or office environment. The overall mood is one of intense emotional distress.

[SOBBING MATHEMATICALLY]

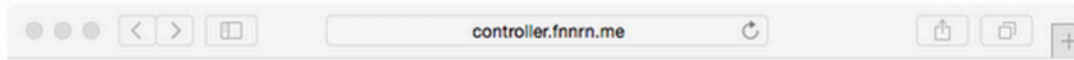


**Dan**  
@thebsdbox



+ Follow

Perhaps one of the most hideous installation procedures known to man.. Thanks **#openstack** I've made it..



The screenshot shows the OpenStack Dashboard login page. At the top center is the OpenStack logo, a red square with a white 'O' inside, and the text 'openstack' in a sans-serif font. Below the logo is a light blue button labeled 'DASHBOARD'. Underneath is the heading 'Log In'. There are two input fields: 'User Name' and 'Password'. At the bottom right of the form is a blue button labeled 'Sign In'.



**DiscoPosse.com**  
People. Process. Technology.

# OpenStack Distributions

# Lots of options

- There are many options for OpenStack distributions including these and more



CANONICAL

cloudscaling

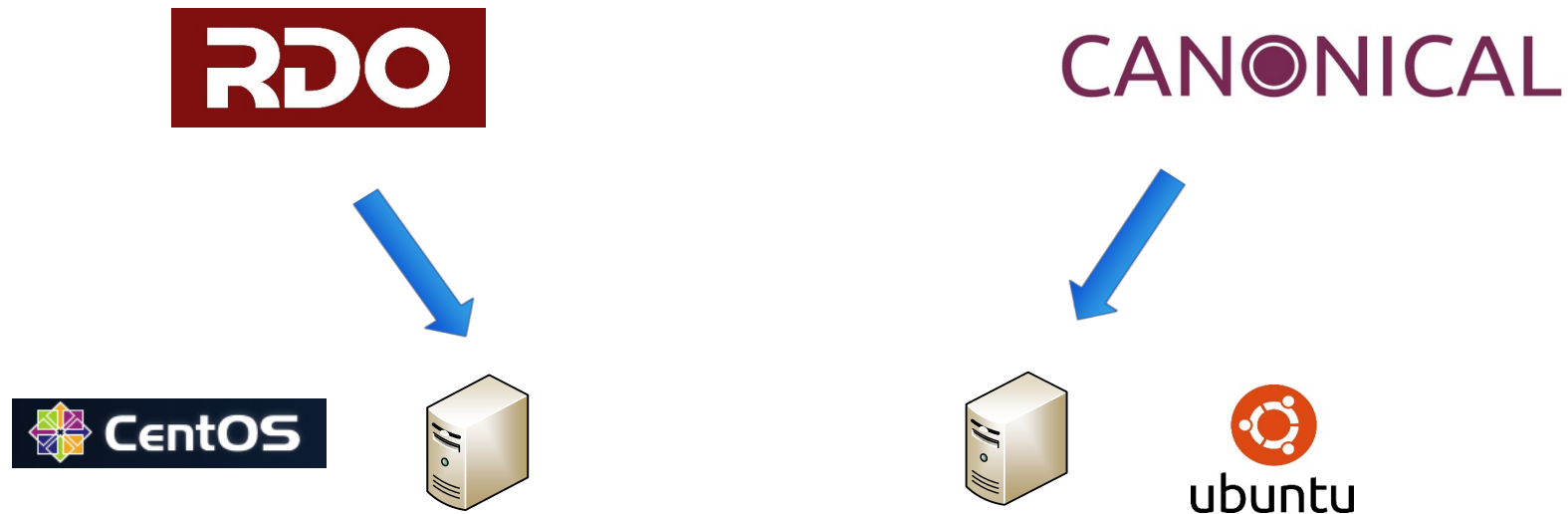


vmware®



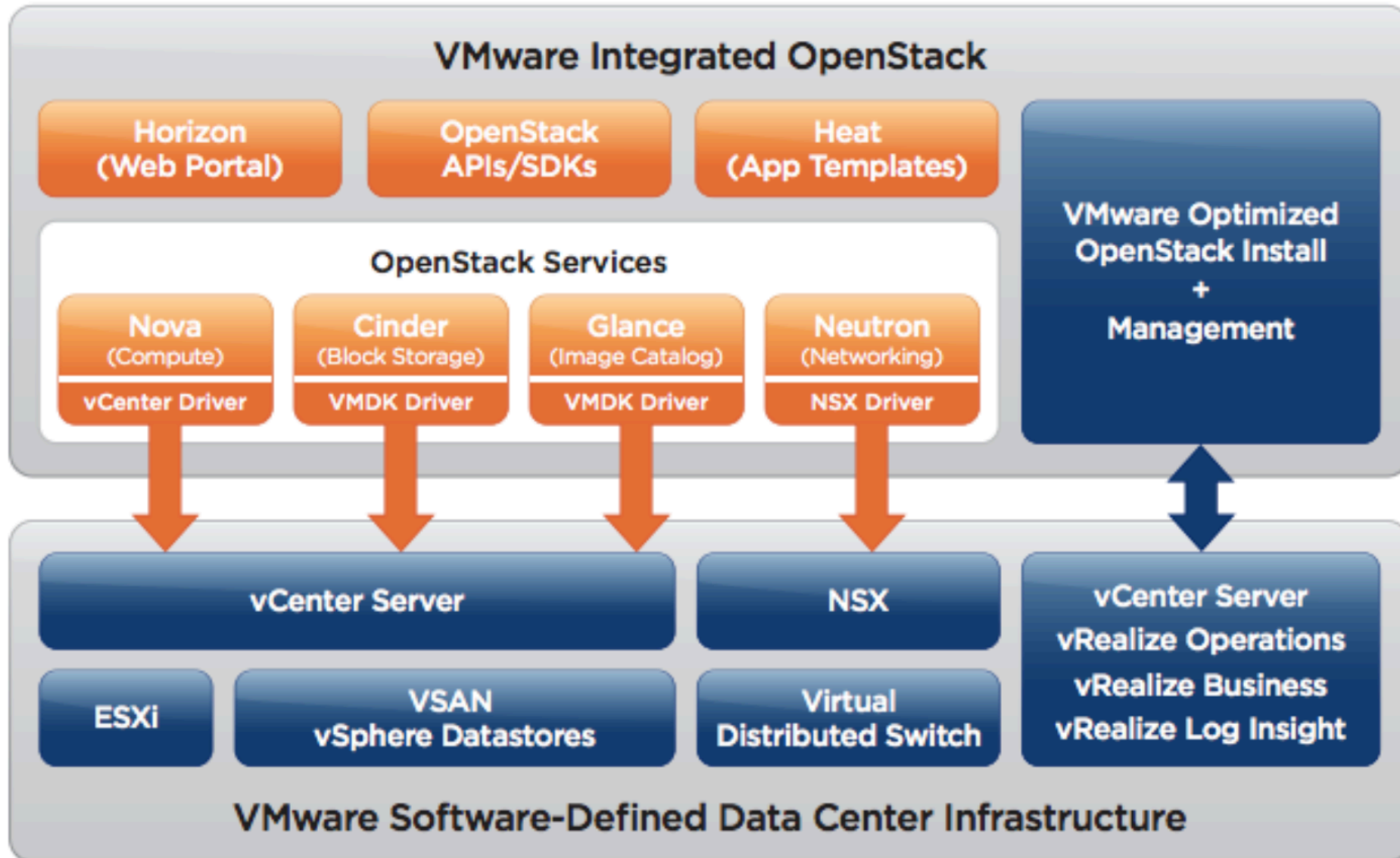
# Common Free Platforms

- Ubuntu – freely available
- CentOS – freely available
- Canonical and RDO





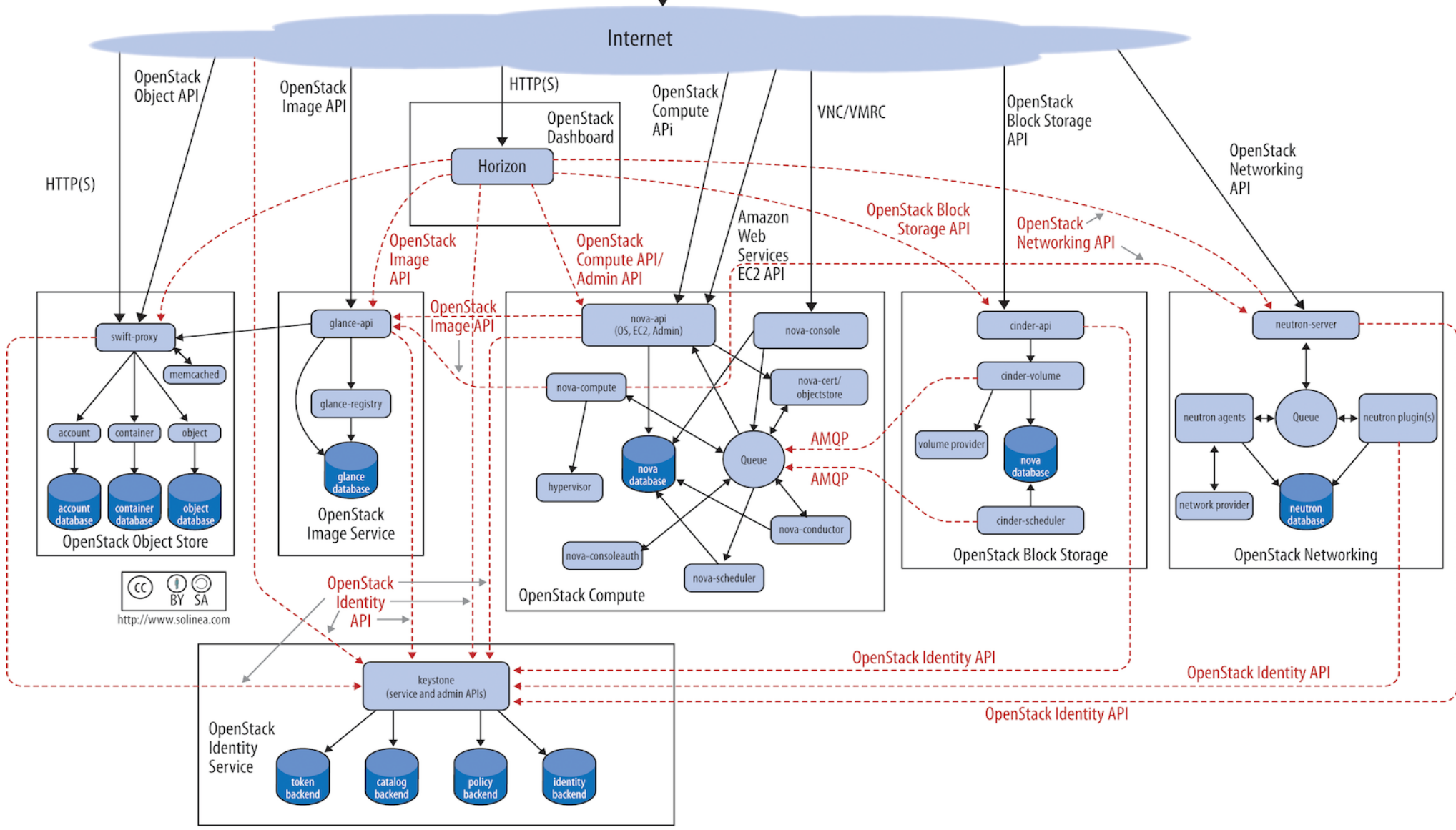
# VMware VIO

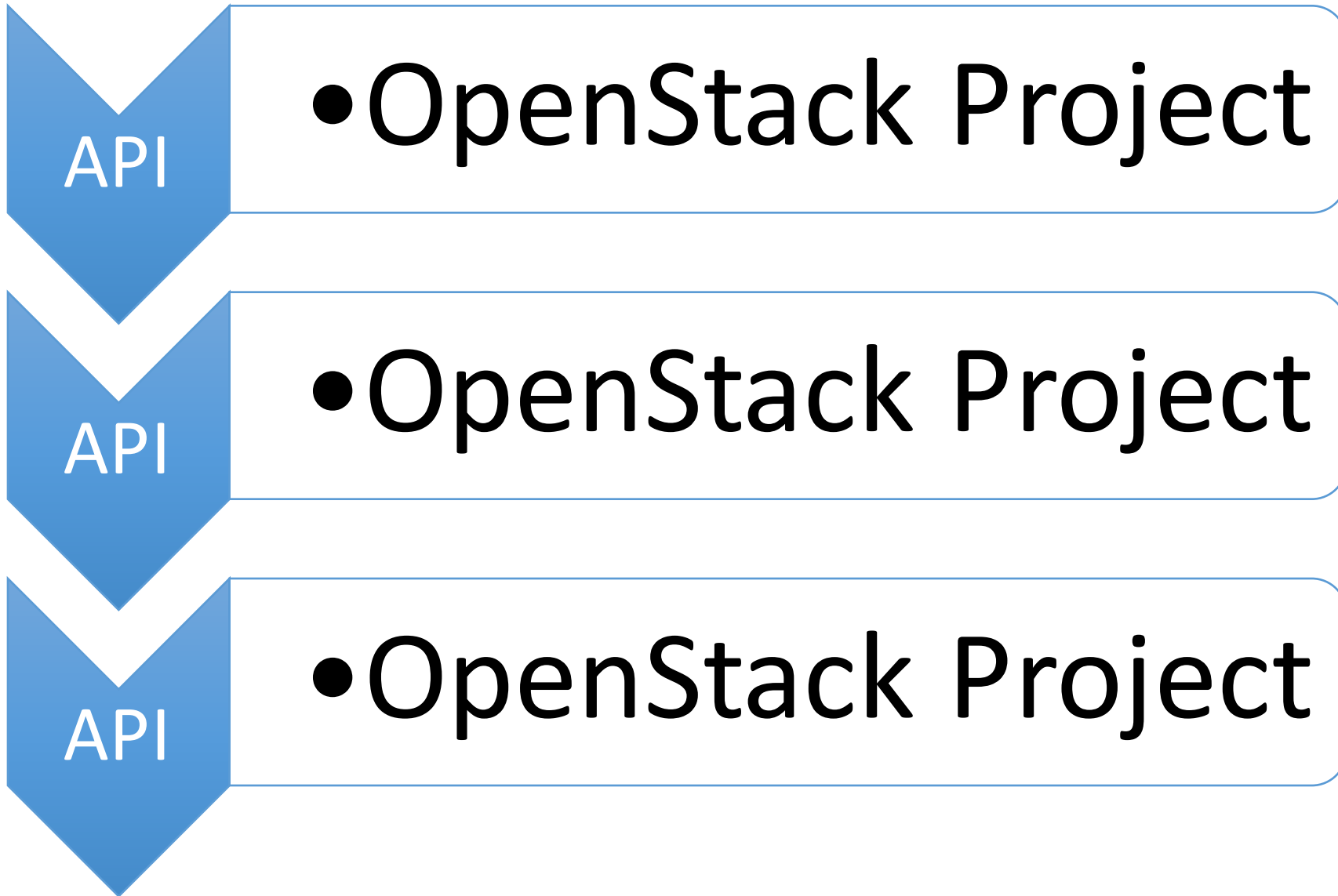


# OpenStack Project Topology



- Command-line interfaces (nova, neutron, swift, etc)
- Cloud Management Tools (Rightscale, Enstratus, etc)
- GUI tools (Dashboard, Cyberduck, iPhone client, etc)






# OpenStack Projects Navigator - Core

Core Services ( 6 Results )

### NOVA


Compute 

Manages the lifecycle of compute instances in an OpenStack environment. Responsibilities include spawning, scheduling and decommissioning of machines on demand.

96 %	8 OF 8	6 YRS
Adoption	Maturity	Age

[MORE DETAILS](#)

### NEUTRON


Networking 

Enables network connectivity as a service for other OpenStack services, such as OpenStack Compute. Provides an API for users to define networks and the attachments into them. Has a pluggable architecture that supports many popular networking vendors and technologies.

89 %	6 OF 8	4 YRS
Adoption	Maturity	Age

[MORE DETAILS](#)

### SWIFT


Object Storage 

Stores and retrieves arbitrary unstructured data objects via a RESTful, HTTP based API. It is highly fault tolerant with its data replication and scale out architecture. Its implementation is not like a file server with mountable directories.

62 %	7 OF 8	6 YRS
Adoption	Maturity	Age

[MORE DETAILS](#)

### CINDER


Block Storage 

Provides persistent block storage to running instances. Its pluggable driver architecture facilitates the creation and management of block storage devices.

86 %	7 OF 8	4 YRS
Adoption	Maturity	Age

[MORE DETAILS](#)

### KEYSTONE


Identity 

Provides an authentication and authorization service for other OpenStack services. Provides a catalog of endpoints for all OpenStack services.

96 %	7 OF 8	4 YRS
Adoption	Maturity	Age

[MORE DETAILS](#)

### GLANCE

Image Service 

Stores and retrieves virtual machine disk images. OpenStack Compute makes use of this during instance provisioning.

94 %	5 OF 8	6 YRS
Adoption	Maturity	Age

[MORE DETAILS](#)

# OpenStack Project Navigator - Optional

## Optional Services ( 13 Results )

NAME	SERVICE	MATURITY <small>▾</small>	AGE <small>▾</small>	ADOPTION <small>▾</small>	DETAILS
<b>Horizon</b>	Dashboard	6 of 8	4 Yrs	95 %	<a href="#">More Details</a>
<b>Ceilometer</b>	Telemetry	2 of 8	3 Yrs	61 %	<a href="#">More Details</a>
<b>Heat</b>	Orchestration	6 of 8	3 Yrs	68 %	<a href="#">More Details</a>
<b>Trove</b>	Database	2 of 8	2 Yrs	27 %	<a href="#">More Details</a>
<b>Sahara</b>	Elastic Map Reduce	1 of 8	2 Yrs	20 %	<a href="#">More Details</a>
<b>Ironic</b>	Bare-Metal Provisioning	2 of 8	2 Yrs	17 %	<a href="#">More Details</a>
<b>Zaqar</b>	Messaging Service	1 of 8	2 Yrs	1 %	<a href="#">More Details</a>
<b>Manila</b>	Shared Filesystems	3 of 8	2 Yrs	8 %	<a href="#">More Details</a>
<b>Designate</b>	DNS Service	1 of 8	2 Yrs	25 %	<a href="#">More Details</a>
<b>Barbican</b>	Key Management	2 of 8	2 Yrs	4 %	<a href="#">More Details</a>
<b>Magnum</b>	Containers	1 of 8	1 Yrs	7 %	<a href="#">More Details</a>
<b>Murano</b>	Application Catalog	1 of 8	1 Yrs	7 %	<a href="#">More Details</a>
<b>Congress</b>	Governance	1 of 8	1 Yrs	1 %	<a href="#">More Details</a>



## Project details

MATURITY INDICATORS		TAG DETAILS	MEETS MATURITY REQUIREMENTS?
<b>Is there an install guide for this project guide (at docs.openstack.org)?</b>	● Yes	<a href="#">View Install Guide</a>	Yes
<b>Number of software development kits (SDKs) which support this project.</b>	● 15	<a href="#">View Details</a>	Yes
<b>Percentage of deployments using this project in production environments. <sup>?</sup></b>	● 96%	<a href="#">View Details</a>	Yes
<b>Has this project team achieved corporate diversity? <sup>?</sup></b>	● Yes	<a href="#">View Details</a>	Yes
<b>Does this project have stable branches?</b>	● Yes	<a href="#">View Details</a>	Yes
<b>Does this project follows standard deprecation? <sup>?</sup></b>	● Yes	<a href="#">View Details</a>	Yes
<b>Does this project support minimal cold (offline) upgrade capabilities? <sup>?</sup></b>	● Yes	<a href="#">View Details</a>	Yes
<b>Does this project support minimal rolling upgrade capabilities? <sup>?</sup></b>	● Yes	<a href="#">View Details</a>	Yes

**How is this project released?** 

- Cycle with milestones
- Cycle with intermediary
- Independent

[View Details](#)

**Existence and quality of packages for this project in popular distributions.**

- Good
- No
- Warning
- Beginning

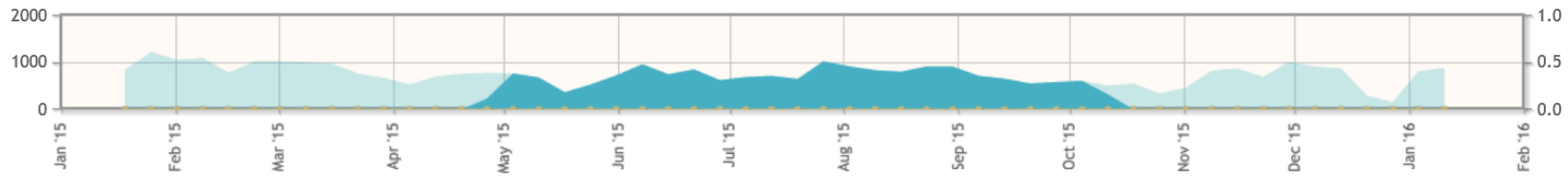
[View Details](#)

**Are vulnerability issues managed by the OpenStack security team?**

- Yes

[View Details](#)

Contributions to Nova



PTL for Latest Release



**Matt Riedemann**

IBM



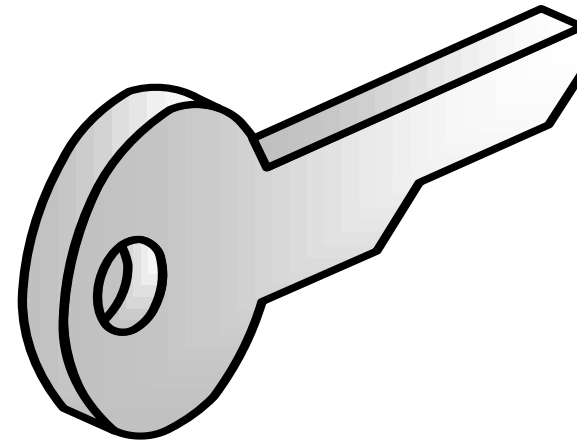
Matt Riedemann has been with IBM for over 10 years. He started working on build tools and frameworks to spending 5 years working in the Update Manager component of IBM Systems Director.

Matt has worked on OpenStack for over 2 years and is part of one of the earliest teams in IBM to be involved with contributing to the OpenStack community. He has experience with continuous integration/build/packaging systems for OpenStack, is a top contributor to OpenStack from IBM and is a core reviewer in multiple projects.



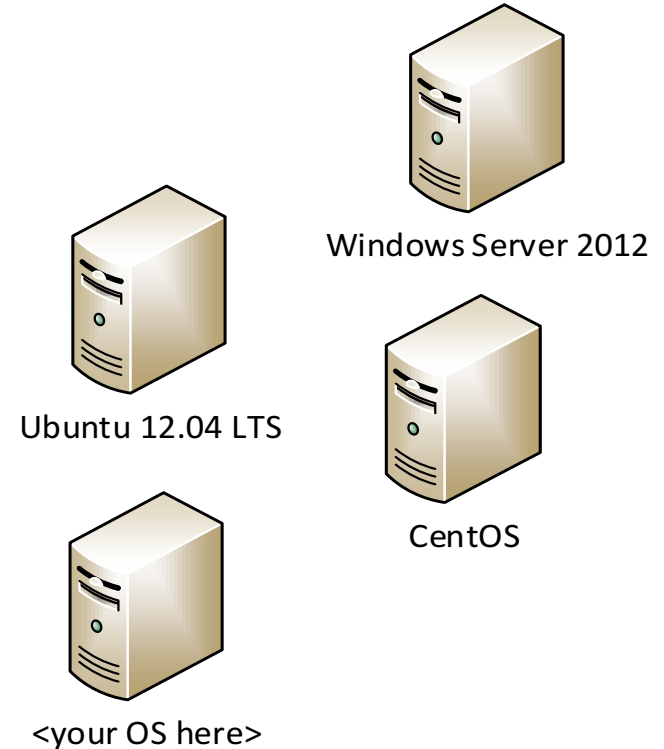
# Keystone (Identity Service)

- Authentication (user/pass)
- Authorization – using RBAC
- Token management
- Service Catalog
- Keystone-to-Keystone



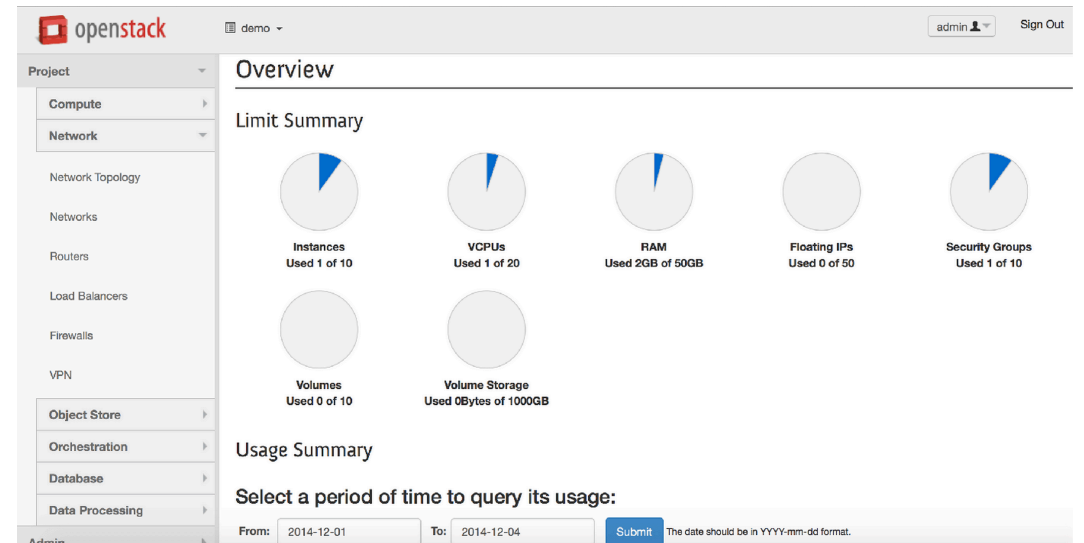
# Glance (Image Service)

- Used to store and manage guest images
- Images can be managed globally and per tenant
- Users can be authorized to upload custom images
- Stores images in Swift, Cinder, or in the native file system
- Can store remotely (e.g. AWS S3)

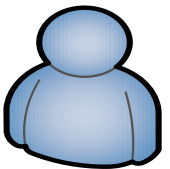
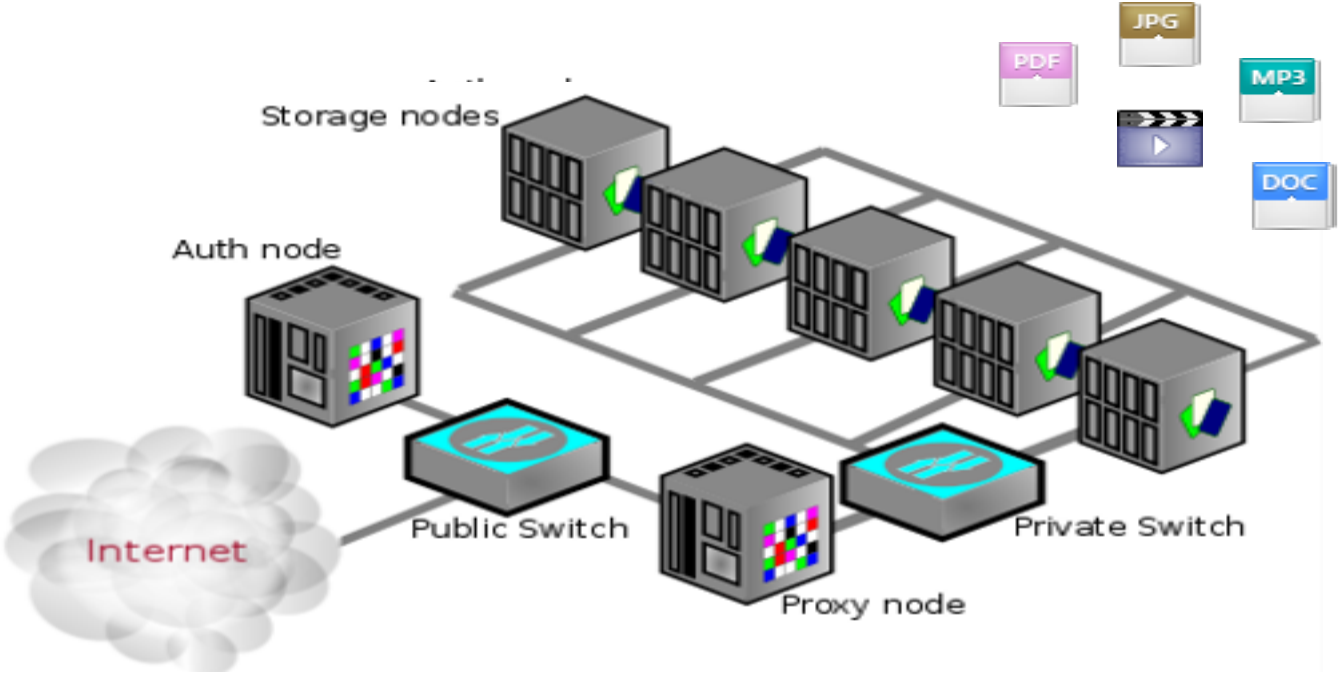


# Horizon (Dashboard)

- Self-service web portal
- Perform common administrative tasks
- Not required for OpenStack
- Not all components have Horizon integration
- Multi-language enhancements growing



# Swift (Object Storage)



Jens



# Cinder (Block Storage)

- Similar to AWS Elastic Block Storage (EBS)
- Block volumes are created and attached to instances
- Block storage volumes survive the termination of an instance



Ubuntu 12.04 LTS



CentOS



20 GB



150 GB



# Neutron (Networking)

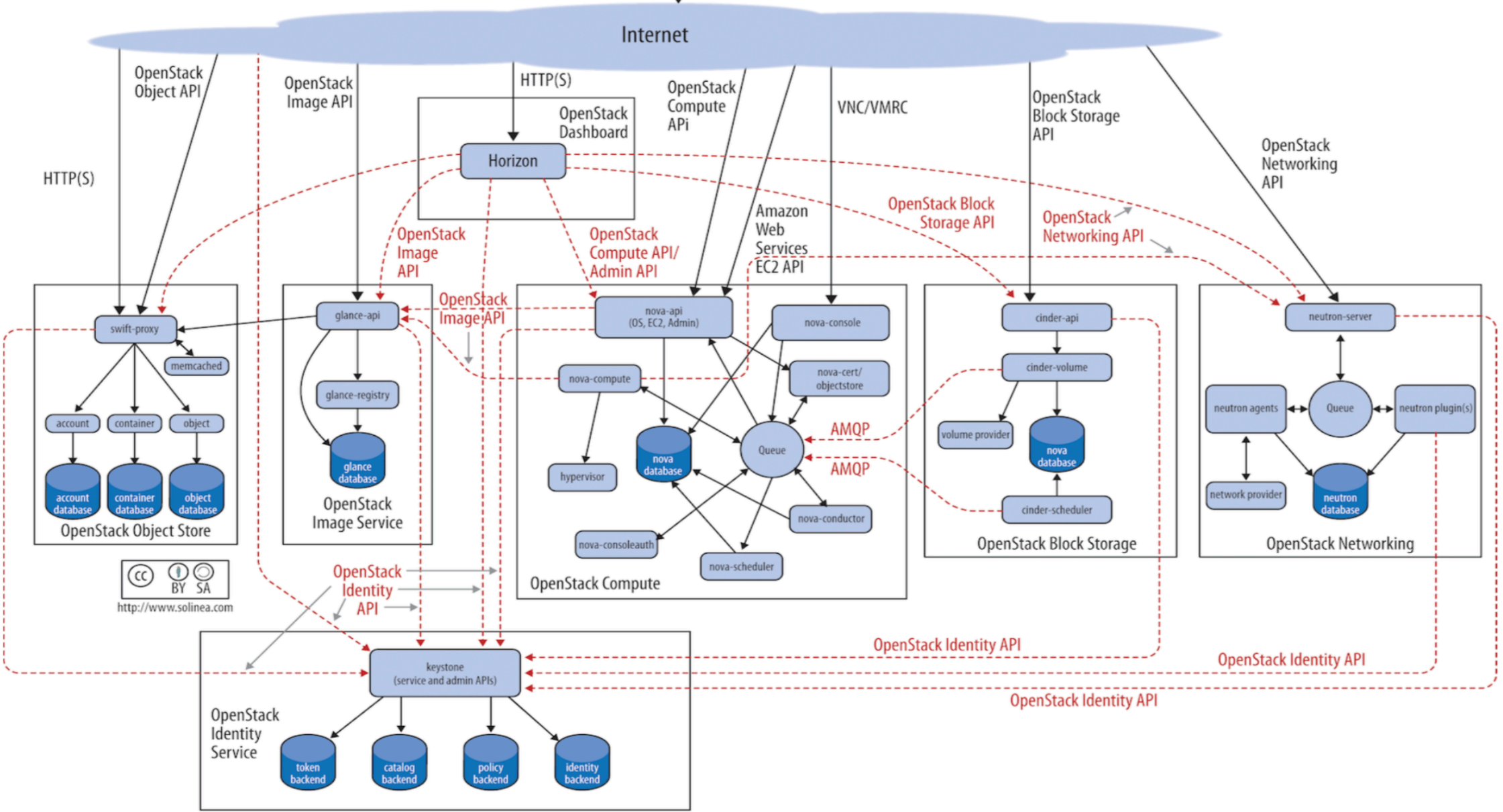
- Modular Layer 2 Plugin framework (ML2) for maximum flexibility and interoperability
- Multiple topologies
  - Local
  - Flat
  - VLAN
  - GRE
  - VXLAN
- Able to tap into existing physical networking builds with ease and less dependencies on intermediary drivers

# Compute (Nova)

- Compute platform to run our guest machines
- Boots instances from our Glance images
- Multi-hypervisor support
  - KVM
  - Xen
  - vSphere
  - Hyper-V
- Currently requires separate Nova instances per hypervisor
- Nova is our management platform for the hypervisor



- Command-line interfaces (nova, neutron, swift, etc)
- Cloud Management Tools (Rightscale, Enstratus, etc)
- GUI tools (Dashboard, Cyberduck, iPhone client, etc)



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http://www.solinea.com



# Marketplace and App Catalog



TRAINING



DISTROS &  
APPLIANCES



PUBLIC  
CLOUDS



HOSTED  
PRIVATE CLOUDS



CONSULTING &  
INTEGRATORS



DRIVERS

**BETA** CHECK OUT THE NEW **Community App Catalog** Find cloud apps to run on OpenStack

**The OpenStack Marketplace** will help you make an informed decision, whether you're building a cloud, looking to use one by the hour, or pursuing a hybrid model.

### Building a cloud

- You'll want to understand which [Software Distributions](#) and [Converged Appliance](#) options there are.
- Many users start by hiring experts, which you can find in our [Consultants and System Integrators](#) section.
- Want to train your staff? Check out our [Training](#) section.
- Wondering if your compute, storage, and networking gear has compatible drivers? Check out the [Drivers section](#) to learn the status of ongoing testing.

### Using a cloud

There are OpenStack powered public clouds all over the world. Explore the possibilities.

Map data ©2016 Terms of Use Report a map error

## Murano Packages



In Murano Packages you will find complete applications, in both simple and clustered configurations, ready to deploy on your cloud. To use them:

1. Verify that you have [Murano](#) installed
2. Browse the list and find the app package you want
3. Highlight and copy the name of the app package
4. In Horizon, navigate to Murano > Manage > Package Definitions and click Import Package
5. Paste the app package name into the labeled text field, and click Next. This will download and install the package components.
6. Now deploy the app on your cloud by navigating to Application Catalog > Environments, then creating and deploying that environment.

## Heat Templates



In Heat Templates you will find templates for creating complete stacks in your cloud. To use them:

1. Browse the list and find the one you want
2. Download the template yaml (.yaml) file to your local machine
3. Use Horizon to add the template to Heat (by uploading it via file selector, or copy/pasting it into the editable field)
4. Use the [Heat client](#) to create a stack

## Glance Images



In Glance Images you will find a library of preconfigured images ready to launch virtual machines on your cloud. To use them:

1. Browse the list and find the one you want
2. Copy the URL for the image file
3. Use the [Glance client](#) to add it to your cloud with the --copy-from option, or add the image from Horizon by creating a new image, and specifying the URL as the image location.
4. You can use Nova to launch a VM from the new image; or, you can choose an image to launch from the Glance images list shown in Horizon. Of course, if a service is preconfigured to launch VMs by itself directly from specific guest images, you're good to go.



MURANO PACKAGES

HEAT TEMPLATES

GLANCE IMAGES

ADD NEW CONTENT

Release:  Search:  Show **All** entries

Template	Description	Release	Format
<b>Chef - Standalone Server</b>	template to build a Standalone Chef server instance. It uses Ubuntu 14.04 as the base image to build it. Documentation on how to install it located here: <a href="http://docs.chef.io/server/install_server.html">http://docs.chef.io/server/install_server.html</a> If you would like more information on how to configure the image please take a look at the <a href="https://github.com/chef-partners/chef-heat-templates/blob/master/README.md">https://github.com/chef-partners/chef-heat-templates/blob/master/README.md</a> .	Kilo	HOT
<b>Hello World</b>	This is a hello world HOT template just defining a single compute server.	Icehouse, Juno, Kilo	HOT
<b>Lattice</b>	Lattice is an open source project for running containerized workloads on a cluster ( <a href="http://lattice.cf/docs">http://lattice.cf/docs</a> ). Lattice bundles up http load-balancing, a cluster scheduler, log aggregation/streaming and health management into an easy-to-deploy and easy-to-use package. This is a Lattice template for deploying a Lattice cluster on a Ubuntu Cloud VM. More details on usage and options can be found at: <a href="https://github.com/LaynePeng/heat-lattice">https://github.com/LaynePeng/heat-lattice</a>	Icehouse, Juno, Kilo	HOT
<b>OpenShift Origin 3</b>	OpenShift 3 is a free and open source platform as a service tool designed on top of Docker and Kubernetes. The templates have been tested with CentOS 7.1. For more details on how to configure and use them, see: <a href="https://github.com/redhat-openstack/openshift-on-openstack">https://github.com/redhat-openstack/openshift-on-openstack</a>	Kilo, Liberty	HOT
<b>OpenShift-CentOS65</b>	This is an OpenShift template for deploying an OpenShift cluster on a CentOS 6.5 VM. More details on usage and options can be found at: <a href="https://github.com/openstack/heat-templates/tree/master/openshift-origin/centos65">https://github.com/openstack/heat-templates/tree/master/openshift-origin/centos65</a>	Juno, Kilo	HOT
<b>OpenShift-F19</b>	This is an OpenShift template for deploying an OpenShift cluster on a Fedora 19 VM. More details on usage and options can be found at: <a href="https://github.com/openstack/heat-templates/tree/master/openshift-origin/F19">https://github.com/openstack/heat-templates/tree/master/openshift-origin/F19</a>	Juno, Kilo	HOT

Showing 1 to 6 of 6 entries

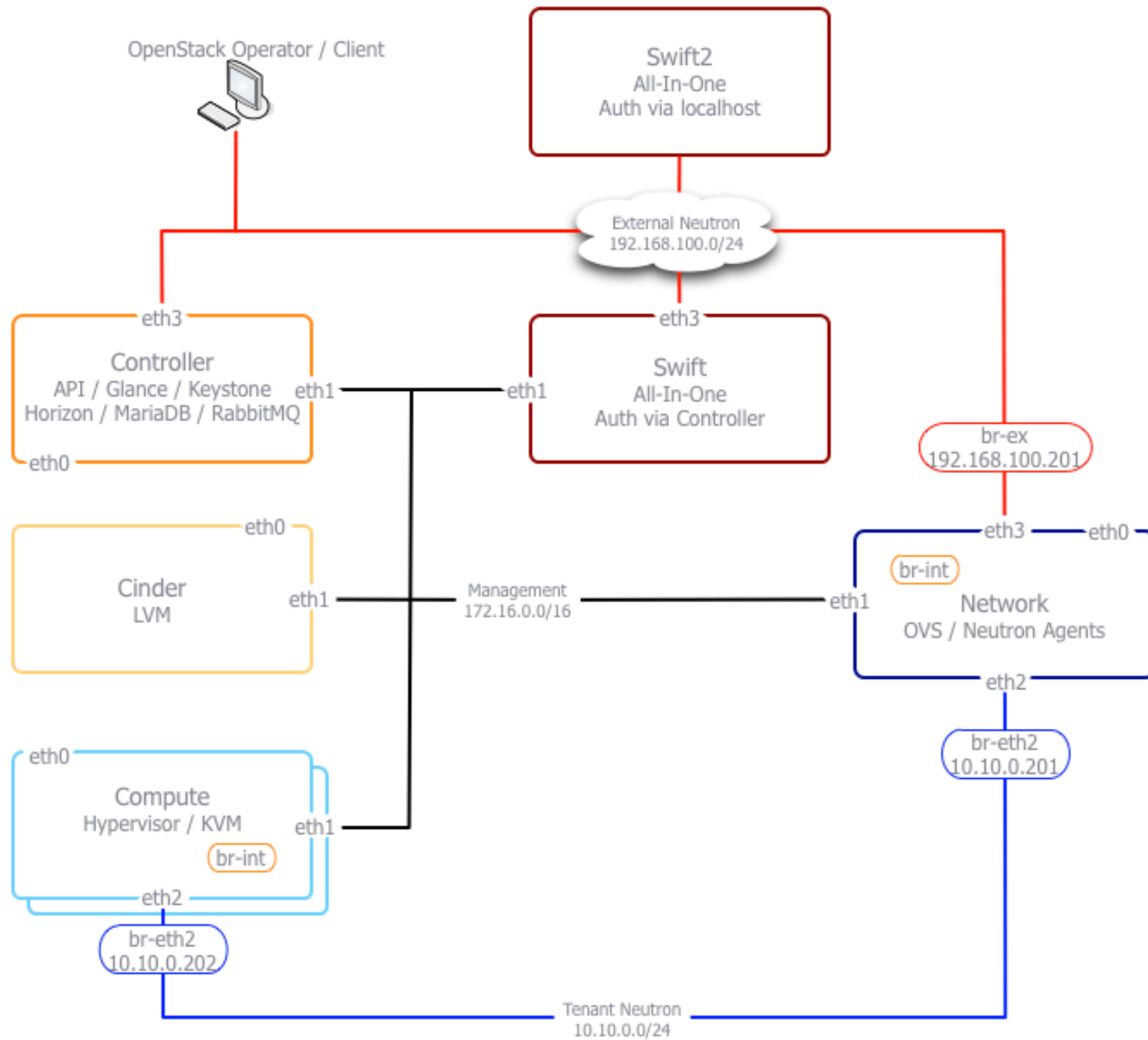
First Previous **1** Next Last

# OpenStack Cookbook Lab

# vagrant up

- Vagrant – [vagrantup.com](http://vagrantup.com)
- VirtualBox – [virtualbox.org](http://virtualbox.org)
- GitHub – [github.com](http://github.com)
- Mac/Windows/Linux

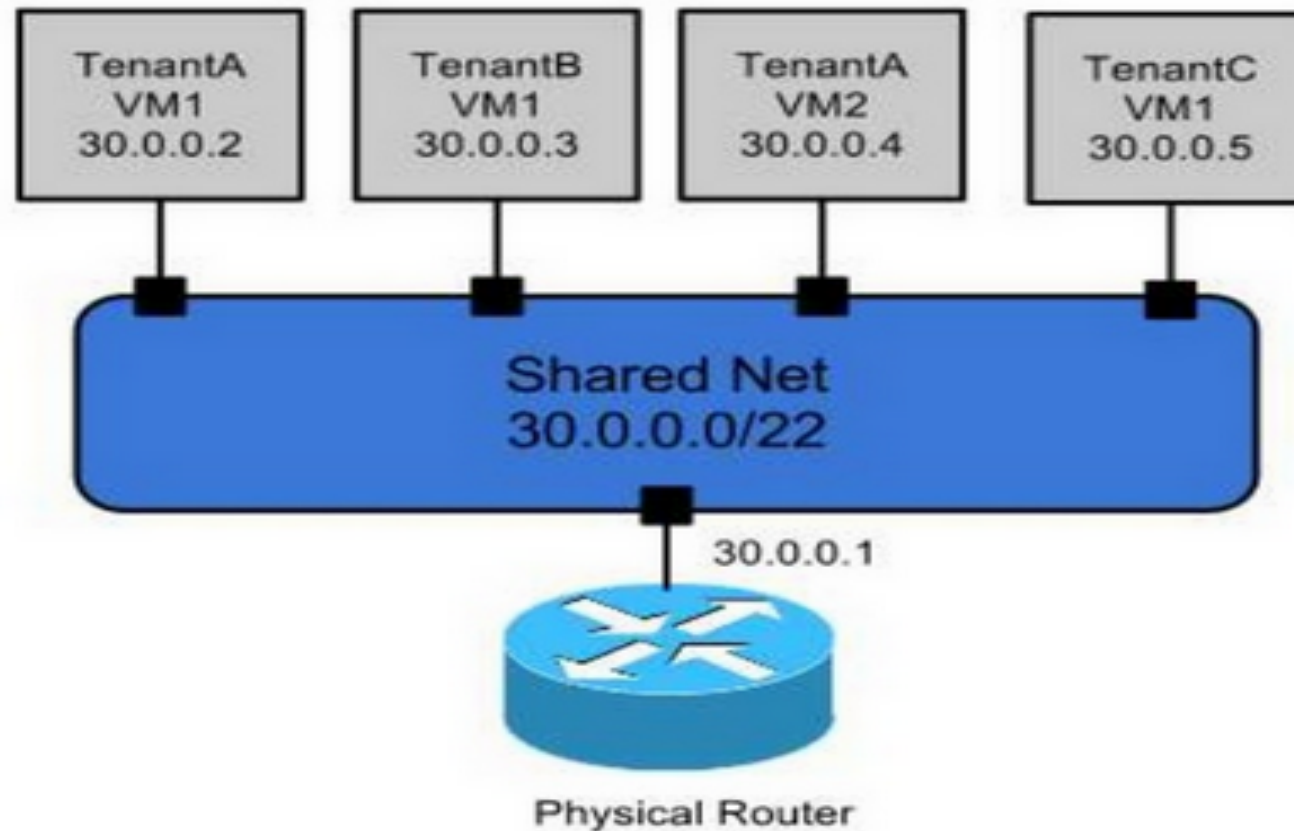




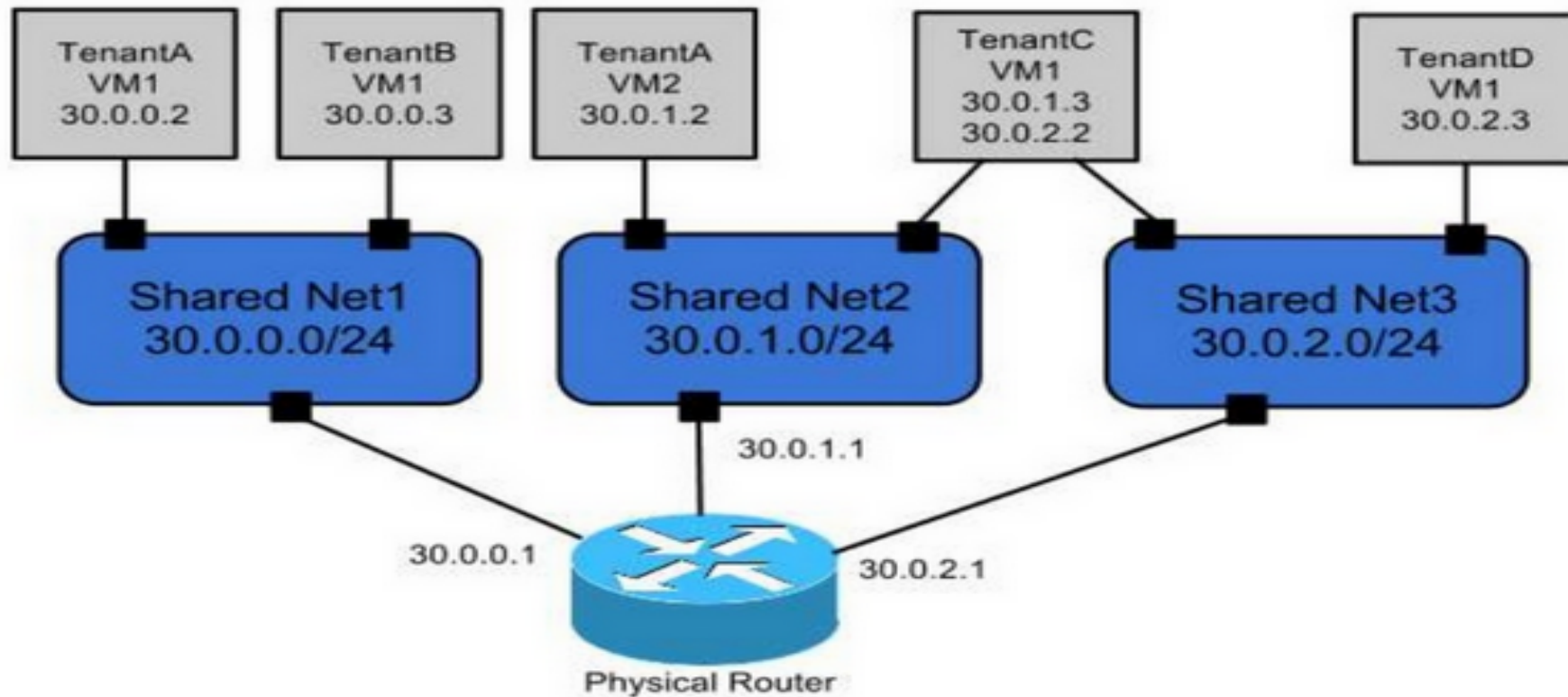
# Nova and Neutron Networking



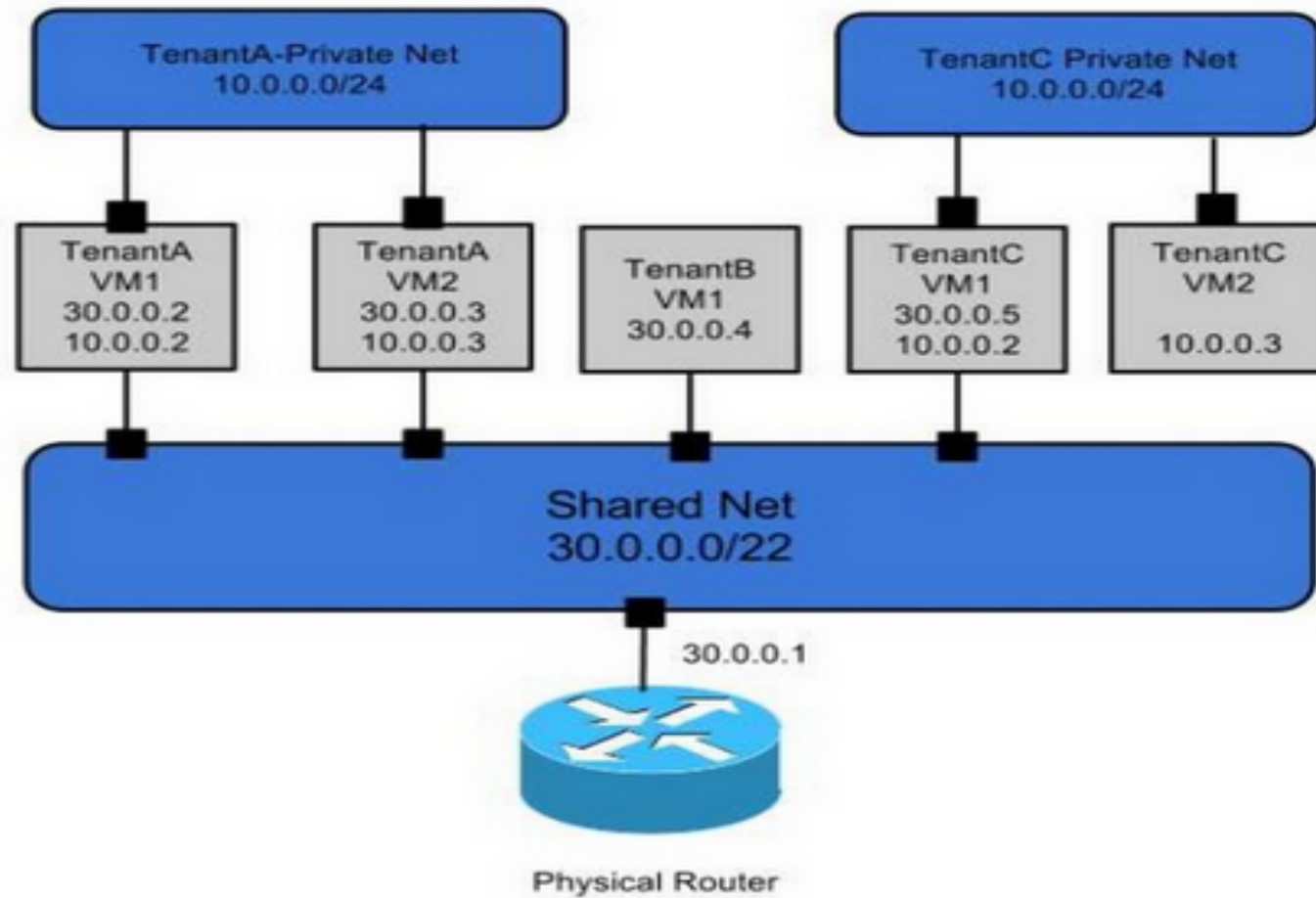
# Network types – Single Flat



# Network types – Multiple Flat



# Network types – Flat and Private



# Online Resources

# OpenStack Docs: [docs.openstack.org](https://docs.openstack.org)

- Install guides for multiple base operating environments
- Operations guide
- High Availability guide
- Security guide
- Architecture and Design guide
- [openstackcookbook.com](https://openstackcookbook.com)



# Wiki all the things!

- OpenStack wiki provides details on every project
- Development wiki includes deployment and operational guides
- Launchpad links to current development and feature backlog
- Etherpad for general development notes



# Thank you!

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