



OpenStack: Beyond the Projects

About the Workshop:

Today

OpenStack 101:

What is the Cloud, What is OpenStack?, OpenStack Community, etc

Cloud Administration:

Admin or User?, Identity, Adding Users, etc

OpenStack Project:

Putting what you have learned to the test

Wordpress Project:

Your Objective, Creating an Instance and make a website for your classroom.

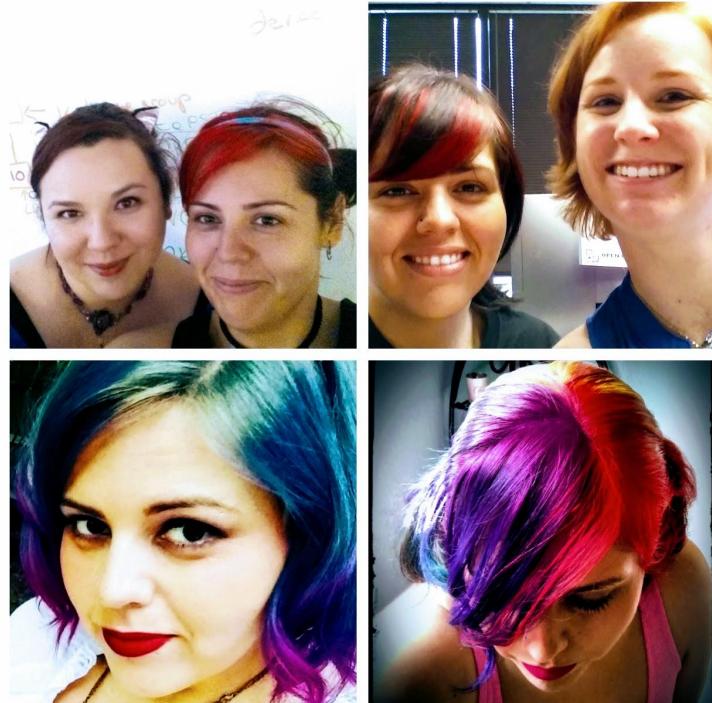


About Us:

About Us:

Elli Marquez

- OpenStack Technical Trainer
 - Previously International Enterprise Linux Administrator
- Graduate of the Open Cloud Academy Linux for Ladies program
- Member of the Women of OpenStack
- Advocate for mentorship and education in the technological community



About Us:

Laura McMaster

- OpenStack Administrator
 - Previously Linux Administrator II
- Graduate of the Open Cloud Academy Linux for Ladies program
- Actively working to encourage women in STEM
- B.S. in Physics from University of Texas at San Antonio



About Us:

Kendall Nelson

- Upstream Developer Advocate, the OpenStack Foundation
 - After 14 months at IBM, started at the Foundation in August of 2016
 - OpenStack Contributor to Storyboard, Cinder, & os-brick
 - New Contributor Trainer, Election Official, Track Chair, member of the Women of OpenStack (WoO) Working Group
- B.S. in Computer Science from the College of Science and Engineering at the University of Minnesota



About Us:

Alyssa Slaughter

- Linux System Administrator
 - Managed Operations (Public Cloud)
 - SMB Hybrid
 - Enterprise
- Graduate of the Open Cloud Academy Linux for Ladies program
- B.S. in Interdisciplinary Studies from the University of Texas at San Antonio





OpenStack 101

What is the Cloud?

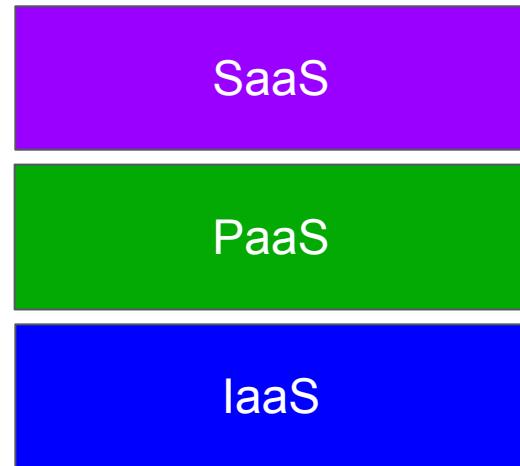
- Network of shared compute, memory and storage resources that can be used on demand
 - Compute: CPU Power
 - Memory: RAM
 - Storage: Hard Drive Space
- 3 layers of the cloud
 - IaaS, PaaS, SaaS
- 3 types of cloud environments
 - Public, Hybrid, Private

Infrastructure as a Service

Virtual Hardware

- Network
- Servers
- Storage
- Load Balancers
- Firewall

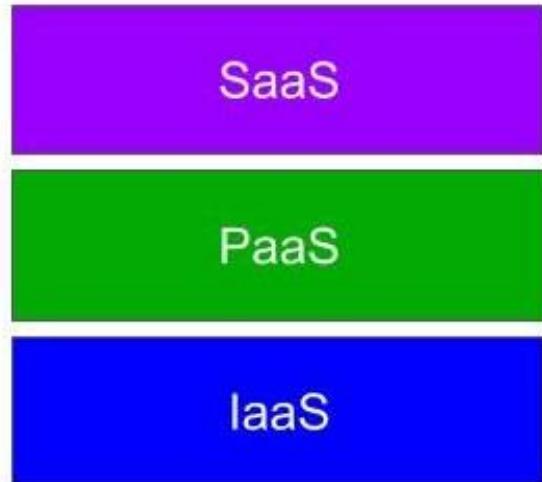
Runs like dedicated/physical hardware



Platform as a Service

Services deployed and offered on remote infrastructure

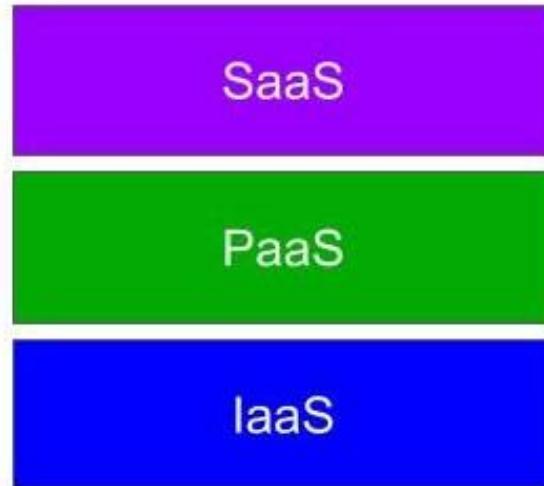
- Database as a service
- Google App Engine
- Microsoft Azure Services



Software as a Service

Software that utilizes remote resources and does not need to be downloaded locally.

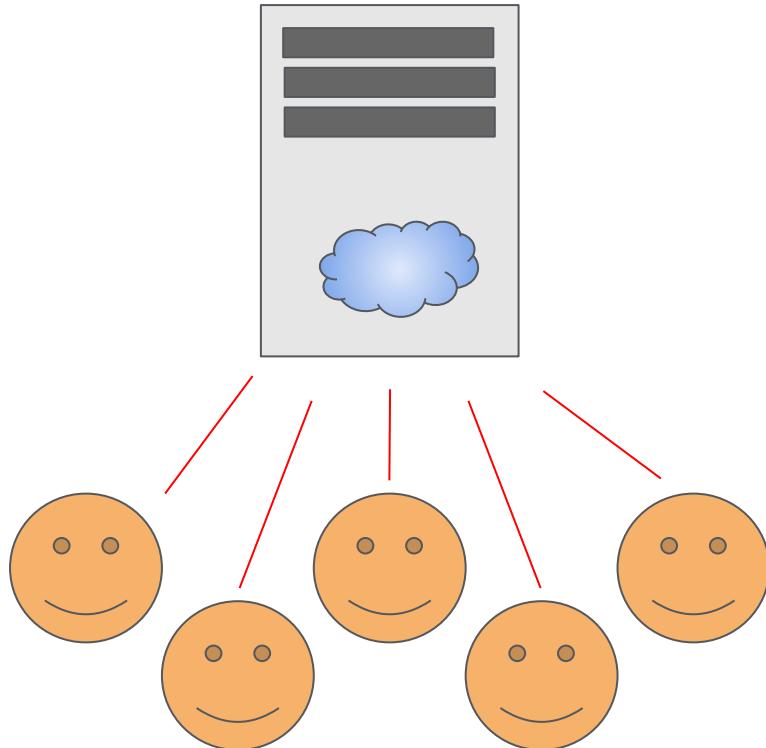
- Office 365
- Gmail
- Google Docs



Public Cloud

A multi tenant or shared environment

- Multiple users sharing the same hardware, network devices and storage



Hybrid Solution

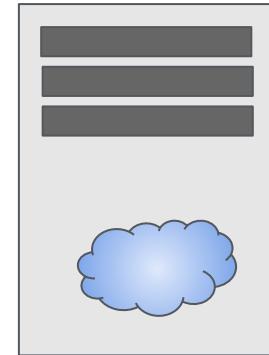
A solution that uses multiple types of environments

- Dedicated/Physical Hardware
- Public Cloud
- Private Cloud

Private Cloud

Single tenant environment

- All hardware, network devices and storage is used for one client/business.



Swag Time!

History of OpenStack?

- March 2006- Moso

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 - NASA - Nebula
 - Anso Labs- Nova
 - Rackspace - “The Rackspace Cloud

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- OpenStack Foundation

OpenStack Foundation

- Stewards of the open source project
- Promote development, adoption, and distribution
- Foundation Staff, Technical Committee, Board of Directors, User Committee, Individual Members

OpenStack Community

- Used by more than 1,100 companies and organizations
 - More than half of the Fortune 100 Companies
 - IBM, Verizon, AT&T, Volkswagen, Walmart, Comcast, FICO, Bloomberg, Snapdeal, etc
- Contributed to by people at more than 600 organizations and companies
 - Almost 3500 people in 2016
- 46 official projects
 - More unofficial projects

What is OpenStack?

- Open source cloud operating system
- Controls large pools of compute, storage and networking resources
- Platform that connects to existing services and other cloud solutions
 - Kubernetes, Docker, OPNFV, etc

Swag Time!

Which industries choose OpenStack?

RETAIL/E-COMMERCE



FINANCIAL



TELECOM



ACADEMIC/RESEARCH



ENERGY



MANUFACTURING



ENTERTAINMENT



See more at
openstack.org/user-stories

OpenStack Summit

- Gathering of developers, users, operators, etc
- ~ Every six months
- Middle of a release
- Review the previous release and provide feedback
- Upcoming Summits:
 - Sydney, Australia (Nov 6-8)
 - **Vancouver, Canada (May 21-24, 2018)**
 - Berlin, Germany (Nov 13-15, 2018)

Environments

- Horizon
- CLI

Break and Lunchtime!

Logging in



DASHBOARD

Log in

User Name

...

Password

...

Connect



OpenStack Administration

Admin or User?

- Admin → control over all projects
- User → limited control
- **Principle of Least Privilege**



Project / Tenant

openstack student0 ▾

student0 ▾

Project > Identity / Projects

Identity

Projects

Project Name = ▾

Filter

<input type="checkbox"/>	Name	Description	Project ID	Domain Name	Enabled	Actions
<input type="checkbox"/>	student0	Project For Student 0	3d69fde642534e0dbff25643414a5d53	Default	Yes	

Displaying 1 item

Quotas

openstack admin ▾

Project > Identity / Projects

Admin

Identity

Projects

Projects

Users

Groups

Roles

	Name	Description	Project ID	Domain Name	Enabled	Actions
<input type="checkbox"/>	student 6	Project For Student 6	0d0aea3cf8ba4865910223454d05794d	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	service	Keystone Identity Service	3773e8e1bcd34d2b8817a1d7769b4f7	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 3	Project For Student 3	39c1dd11e98845aa945236eb55dc26b	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 0	Project For Student 0	3d69fde642534e0dbf25643414a5d53	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	admin	Bootstrap project for initializing the cloud.	4e1c226a87074ede858d669a0f90ebbf	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 7	Project For Student 7	60ca772dc634cf48890b8bb0684e123	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 2	Project For Student 2	7499a609c2694187b4a4ed6518bf7045	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 8	Project For Student 8	74e11aad22bf434e81f4ec460e870b27	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 5	Project For Student 5	e37afff5c34144df8d1866982f52f82c	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 1	Project For Student 1	e47c5984d3cb4bd493bb75f749d5608c	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 4	Project For Student 4	e5b12f434f9d404957e7d8f4f7796d1	Default	Yes	<button>Manage Members</button>
<input type="checkbox"/>	student 9	Project For Student 9	f4fe35c00a14401491288713f0a74ab4	Default	Yes	<button>Manage Members</button>

Project Name = Filter

Edit Project

Project Information * Project Members Project Groups Quota *

Metadata Items *	128
VCPUs *	20
Instances *	10
Injected Files *	5
Injected File Content (Bytes) *	10240
Volumes *	10
Volume Snapshots *	10
Total Size of Volumes and Snapshots (GiB) *	1000
RAM (MB) *	51200
Security Groups *	10
Security Group Rules *	100

Adding a user

openstack human_resources admin

Project > Identity / Users

Admin

Identity > Users

Projects

Users

Groups

Roles

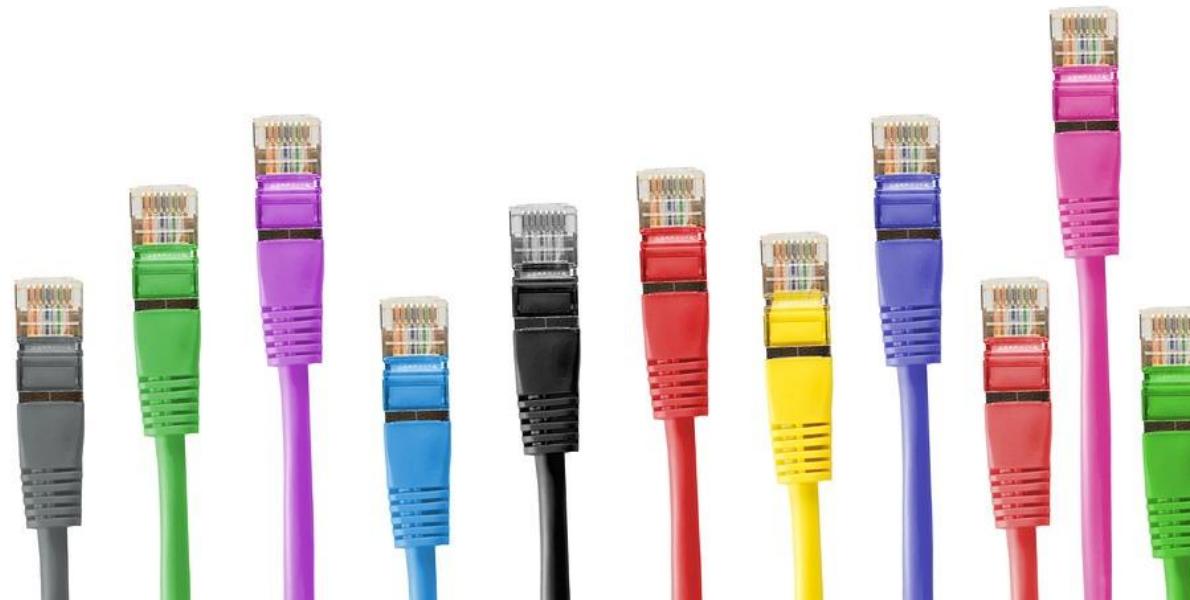
User Name = ▾ Filter + Create User Delete Users

	User Name	Description	Email	User ID	Enabled	Domain Name	Actions
<input type="checkbox"/>	admin	-		0fe94e1b8ff4421793d0394f622ef753	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	keystone	-		6f1a6de7a23e47a784189756ffc8038b	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	glance	-		ead27cc0a56948f3b05f3876d87ed0b1	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	cinder	-		f7280056be1c4267bf1da2e91b232914	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	nova	-		3c52843584dd42abb9f1912721641828	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	neutron	-		86fdbd64304f5483d9b2ff903ef4ef8bb	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	heat	-		c6a84a04139448658bc39df21dd3ca6a	Yes	Default	<button>Edit</button> ▾
<input type="checkbox"/>	swift	-		4ad4583178e34971a009ab3ef4fd3759	Yes	Default	<button>Edit</button> ▾

Swag Time!

Networks

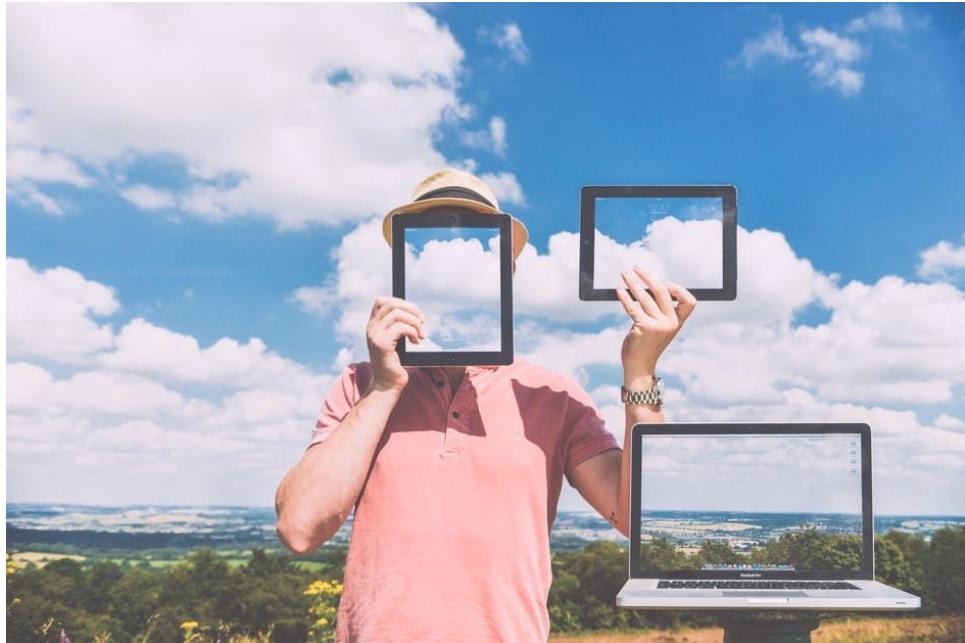
- Private
- Public
- External



Images

Types:

- raw/img
- qcow2
- vmdk
- vdi
- iso
- ari
- ami
- vhd



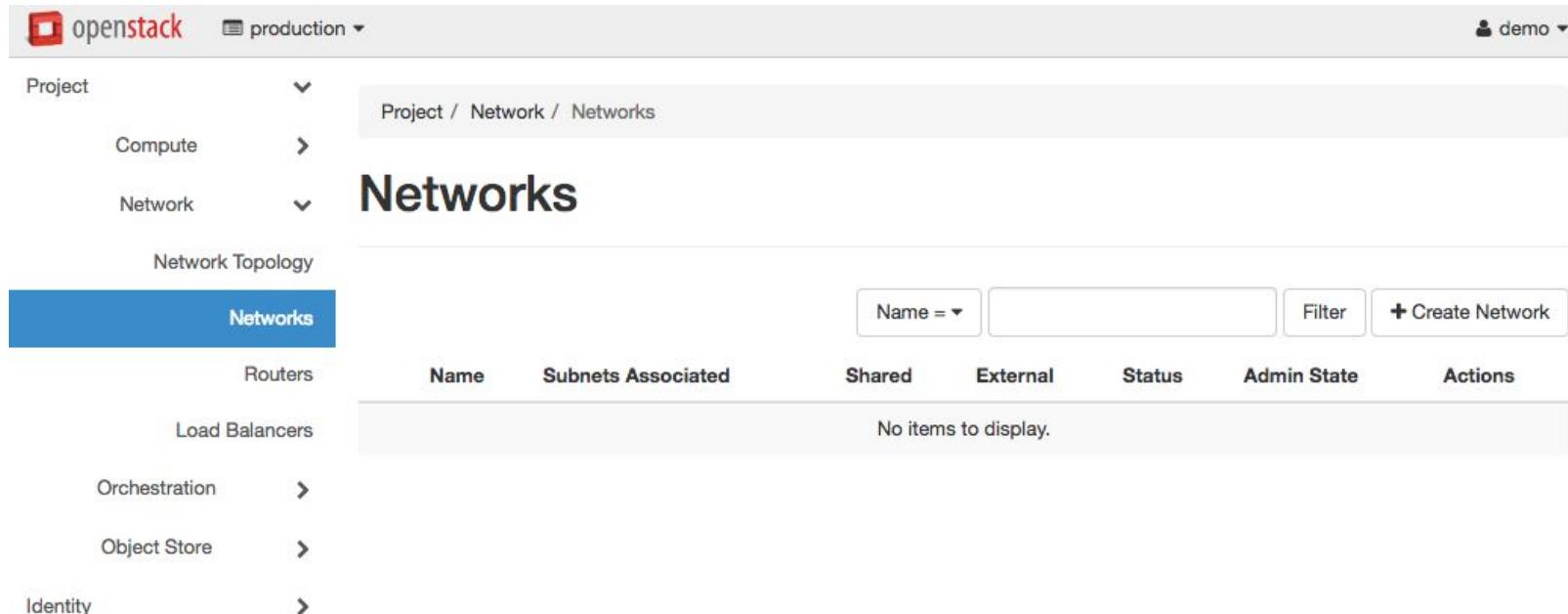
Swag Time!



OpenStack - Regular User

Time to get our
hands dirty!

Creating A Network

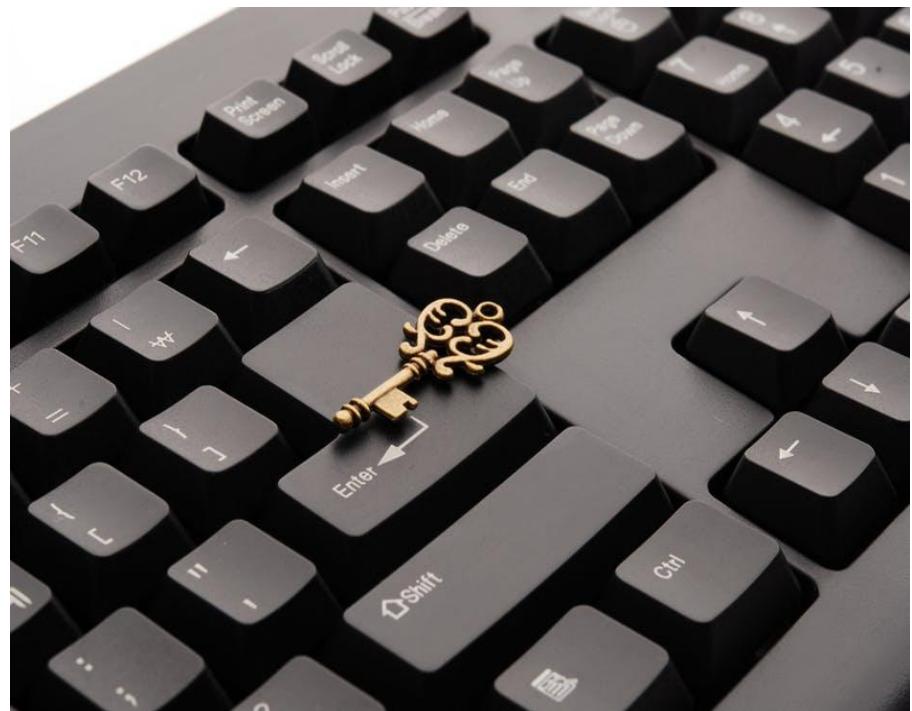


The screenshot shows the OpenStack dashboard interface. At the top, there is a navigation bar with the OpenStack logo, the project name "production" (with a dropdown arrow), and a user account "demo" (with a dropdown arrow). Below the navigation bar, the left sidebar has a "Project" dropdown menu expanded, showing "Compute" and "Network" options. The "Network" option is selected and expanded, revealing a "Network Topology" section with a "Networks" tab highlighted in blue. To the right of the sidebar, the main content area displays a search bar with "Name = ▾" and a "Filter" button, along with a "Create Network" button featuring a plus sign. A table header with columns "Routers", "Name", "Subnets Associated", "Shared", "External", "Status", "Admin State", and "Actions" is shown. Below the table, a message "No items to display." is visible. The bottom of the sidebar lists other project categories: "Load Balancers", "Orchestration", "Object Store", and "Identity".

Security Groups

- Basic characteristics:
 - Rules for **ingress** traffic- traffic to an instance
 - Rules for **egress** traffic- traffic from an instance
- Each tenant has a default security group
 - Usually egress is allowed and ingress is not

Key Pairs

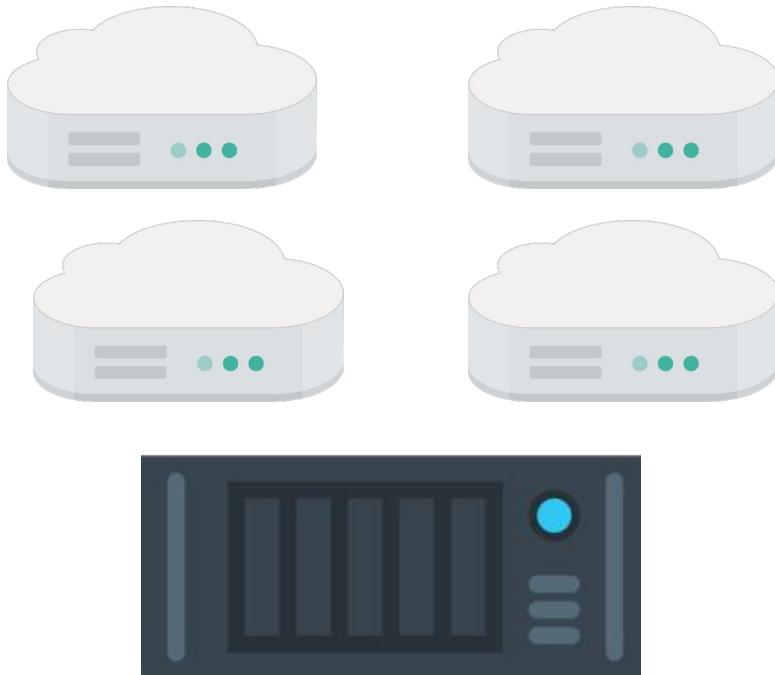


Floating Ips

- An IP address that is not fixed to a single device
- Can only be active on one device at a time



Instances

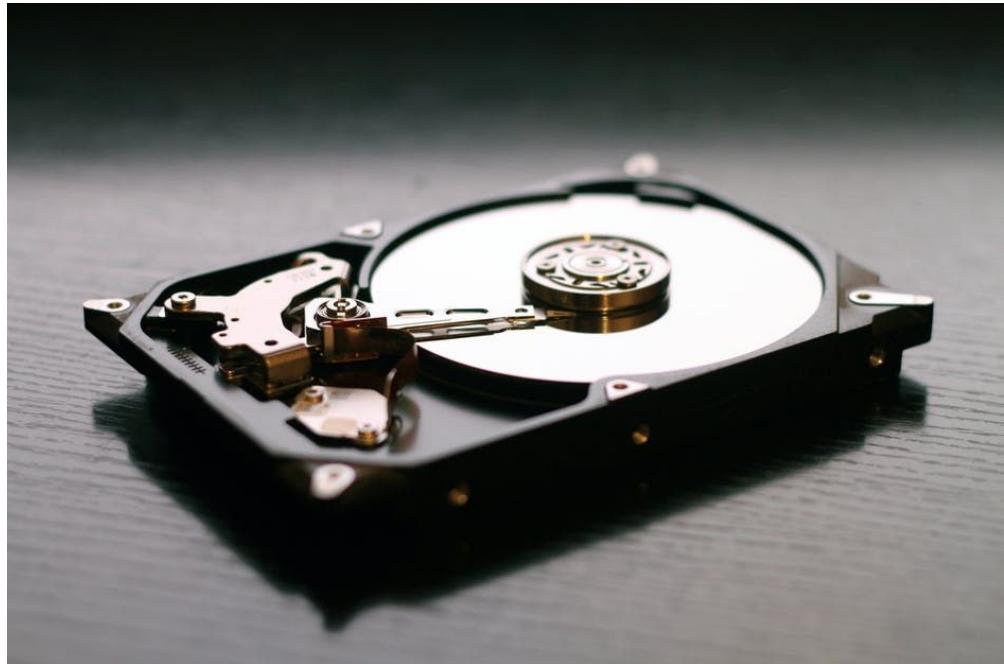


Create an Instance:

- Launch an Instance
 - Overview
 - Log
 - Console
 - Action Log

Volumes & Backups

- Block Storage
- Object Storage



Swag Time!

Object Storage

- File level storage
- Can access files without interacting with an operating system

Examples

- Rackspace Cloud Files
- Rackspace CDN

Components of OpenStack

- Each project provides a set of APIs for a service for running and managing your cloud
- Depending on what a provider wants in their cloud, they select the necessary services
- Base services
 - Compute (Nova)
 - Block Storage (Cinder)
 - Object Storage (Swift)
 - Networking (Neutron)
 - Identity Management (Keystone)
 - Image Management (Glance)

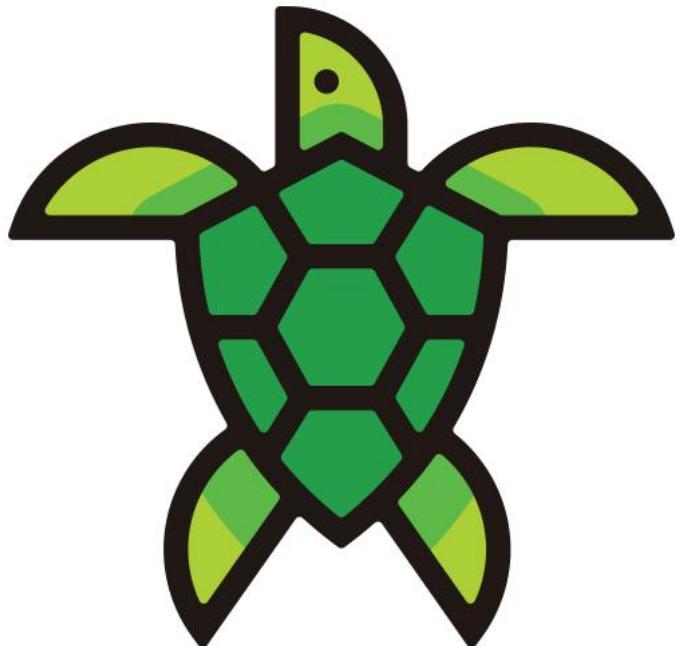
Horizon

- Dashboard
- Provides Graphical User Interface (GUI) for other services.



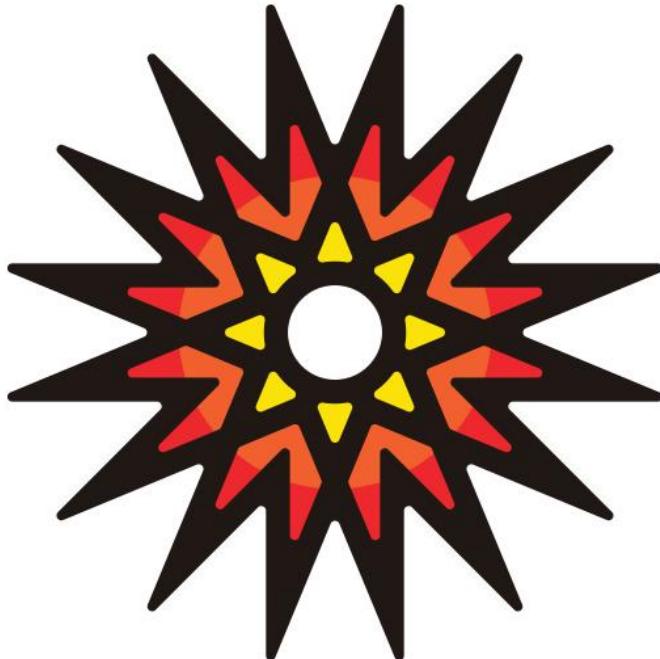
Keystone

- Authentication
- Authorization



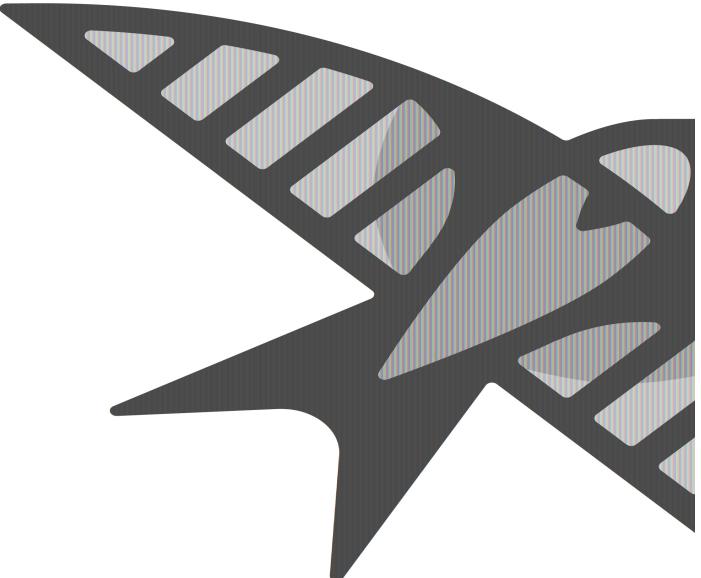
Nova

- Provides a way to provision compute instances
- Provides a way to manage servers with tools or the API



Swift

- Object Storage
- Built for scale and optimized durability, availability and concurrency across the entire data set.



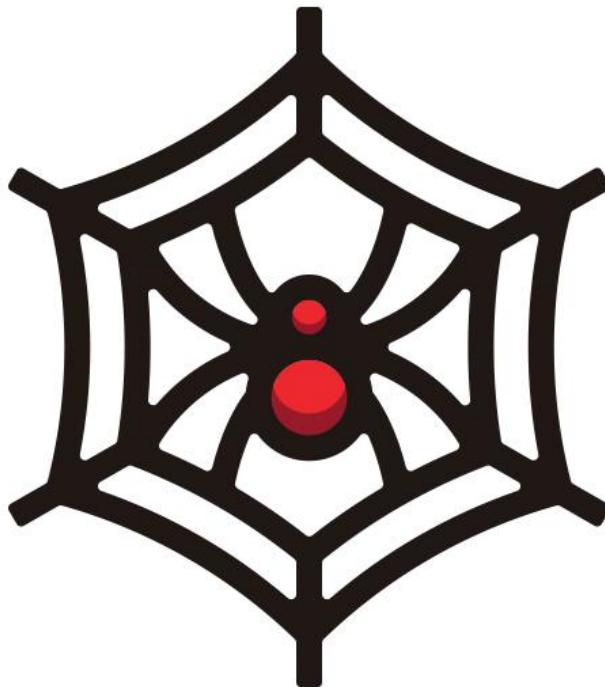
Cinder

- Persistent block storage
- Highly available
- Fault-Tolerant



Neutron

- Networking as a service
- Includes bare metal servers, virtual machines and containers.



Glance

- Image Service



Heat

- A human or machine accessible service for managing the entire lifecycle of infrastructure and applications.



Swag Time!

Questions?

OpenStack Administrator Certification

- openstack.org/coa/requirements
- Student pricing: \$150
 - We have one free pass to give away
- 32 questions, 2.5 hours
- One free retake



15 Min Break

Docs

docs.openstack.org

Hackathon Lab

1. Configure a new security group to allow ssh (22), ping (ICMP), https (443) and http (80) traffic.
2. Create a new server out of our WordPress Image
 - a. Create a snapshot of this server.
3. Create a new 1GB volume so we can have storage for our website.
 - a. Make sure to attach it to our Instance.
 - b. Oops that was too small, resize the volume to 2 GB.
 - c. Can you create an additional 1GB volume ?
4. Create a new container and upload an image into it.
 - a. Can you confirm the image is accessible?
5. Finished early? Tackle our scavenger hunt for some cool prizes!

Wordpress

Wordpress

"WordPress powers 28% of the internet." -wordpress.com

- Content Management System
 - Provides a user interface which allows you to manage elements on a website without having to interact with the code directly, but giving that capability if needed.
- Lower learning curve than code development
 - Allows less tech savvy people to host blogs and websites
- Allows for the integration for third party app development/plugin support



Your Objective Today:

Design a website for the humanitarian project of your group choice:

- World Hunger / Food Banks
- Crisis Relief
- Animal Shelter
- Doctors without Borders

Where can I find help?

Scavenger Hunt



ell.marque@rackspace.com

@ell_o_punk

knelson@openstack.org

@knelson92

lmccloudacademy@gmail.com

Advanced Topics

Training:

Training.rackspace.com

OpenStack Docs:

docs.openstack.org

Install OpenStack 'All In One'

<https://josegonzalez.io/slides/aio-quickguide.html>

Copy of slides at <website>.com