

# NYRHUG OpenStack Presentation 12/9/20

<https://www.meetup.com/NYRHUG-New-York-Red-Hat-Users-Group/events/274712240/>

# About me

I've has been with Red Hat for 5 years where I worked in front line support for OpenStack. Later I moved up to be an OpenStack SME and earned my RHCA in cloud. I now work directly with OpenStack customers as a Technical Account Manager.

# Agenda

1. OpenStack history
2. Openstack, the virtual computer
3. Red Hat OpenStack Director
4. Openstack tripleo install
5. Architecture
6. Adding an image
7. Adding a volume
8. Launching a vm
9. Networking
10. Demo: Launching a VM
11. Openshift on stack
12. features
13. Q & A

# Openstack History

## Packstack

- All in one
- Single controller
- Local storage
- Could add computes
- Answer file
- No hardware provisioning

## Rhosp7

- First version with director
- Systemd services
- 3 controllers
- Pacemaker
- ceph



openstack®

## RHOSP10

- Non-containerized overcloud

## RHOSP13

- Containerized Overcloud
- Ceph 3
- OVN available (ovs default)
- Octavia
- Tech preview: config download
- STF backported

## RHOSP14

- Containerized undercloud
- Config download
- OVS-ovn in place migration

## RHOSP15

- RHEL8
- Podman
- Python 3 openstack
- OVN default
- All in one overcloud
- Pacemaker 2.0

## RHOSP16

- Service Telemetry Framework (STF)
- CEPH 4
- Nova compute cells

# OpenStack, The virtual computer!

CPU - nova

HDD - cinder, swift , ceph

Motherboard - rabbitmq

NIC - neutron

Mouse and keyboard - heat and ansible automation

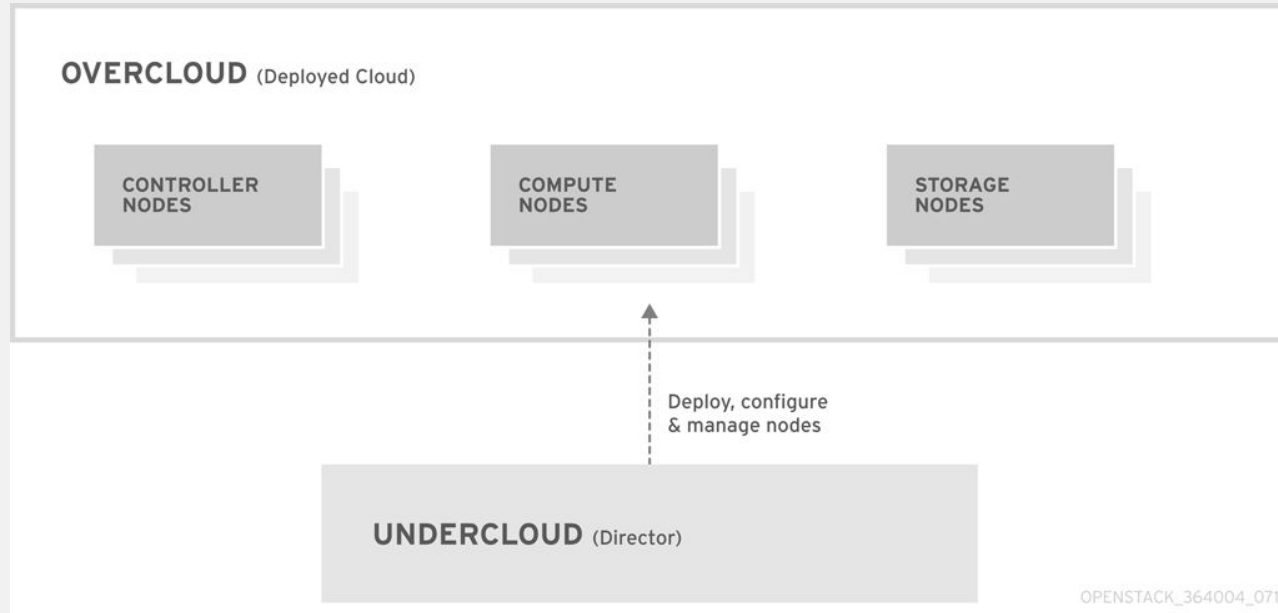
Security - keystone

Monitor- Horizon GUI



# Red Hat OpenStack Director

- Deploys the cloud
- Maintains configuration
- All config maintained by templates
- Updates the cloud
- Control plane network
- Upgrades the cloud
- 



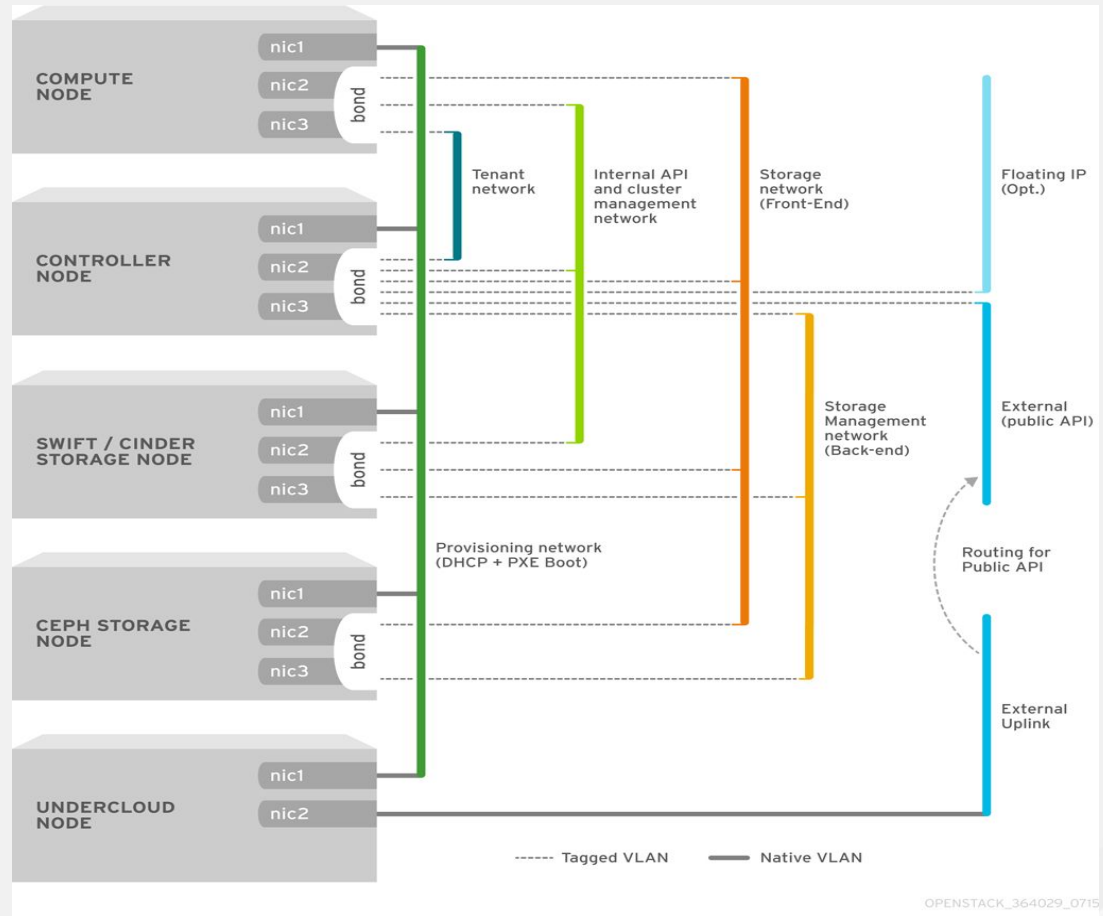
# Tripleo installation

- The Undercloud node deploys and manages the overcloud
- Baremetal nodes are imported and deployed to using ironic, nodes are imaged with RHEL
- Heat orchestration is used to deploy openstack configuration and set up services / containers
- Heat uses ansible and puppet to accomplish this
- End result is a working overcloud with running services and ready to start vms.
- Heat runs using deploy command and templates

```
[stack@undercloud-0 ~]$ . stackrc
(undercloud) [stack@undercloud-0 ~]$ heat stack-list
WARNING (shell) "heat stack-list" is deprecated, please use "openstack stack list" instead
+-----+-----+-----+-----+-----+-----+
| id                | stack_name | stack_status | creation_time | updated_time | project |
+-----+-----+-----+-----+-----+-----+
| fa081cc0-e490-4059-9b5b-b1eff06ee1cd | overcloud | UPDATE_COMPLETE | 2020-10-31T17:23:46Z | 2020-11-01T23:22:47Z | 2b875ccc8d884bc69d219cf94cf5deb8 |
+-----+-----+-----+-----+-----+-----+
(undercloud) [stack@undercloud-0 ~]$
```

# Architecture

- Director node (undercloud)
- 3 controllers
- Custom roles
- Clustered by pacemaker
- Multiple compute nodes
- Ceph nodes: mons,osds
- Ctl plane Isolated networks
- Tenant networks
- External networks





# Adding an Image

```
[root@rhospbl-5 images]# scp rhel-guest-image-8.1-423.x86_64.qcow2 stack@10.0.0.8:/home/stack
The authenticity of host '10.0.0.8 (10.0.0.8)' can't be established.
ECDSA key fingerprint is SHA256:f7aPn9FfDXyc8aM2Xkuwn1HN4SgdyX+Hb0om2T8yb8.
ECDSA key fingerprint is MD5:d5:7d:39:27:47:07:b4:64:b3:a1:25:f7:7c:b6:9d:c5.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.0.0.8' (ECDSA) to the list of known hosts.
rhel-guest-image-8.1-423.x86_64.qcow2 100% 790MB 23.7MB/s 00:33
```

```
(overcloud) [stack@undercloud-0 ~]$ openstack image create --disk-format qcow2 --container-format bare --public --file rhel-guest-image-8.1-423.x86_64.qcow2 rhel8.1-423
```

```
(overcloud) [stack@undercloud-0 ~]$ glance image-list
+-----+-----+
| ID | Name |
+-----+-----+
| c0e1217f-650e-4bb4-b4c7-d3e212a0b905 | cirros |
| f890243d-f639-4c9a-9e36-3bf065f467f3 | rhel8.1-423 |
+-----+-----+
```

The screenshot shows the Red Hat OpenStack Platform dashboard. The breadcrumb navigation is 'Project / Compute / Images'. The page title is 'Images'. There is a search bar with the text 'Click here for filters or full text search.'. Below the search bar, it says 'Displaying 2 items'. The image list is as follows:

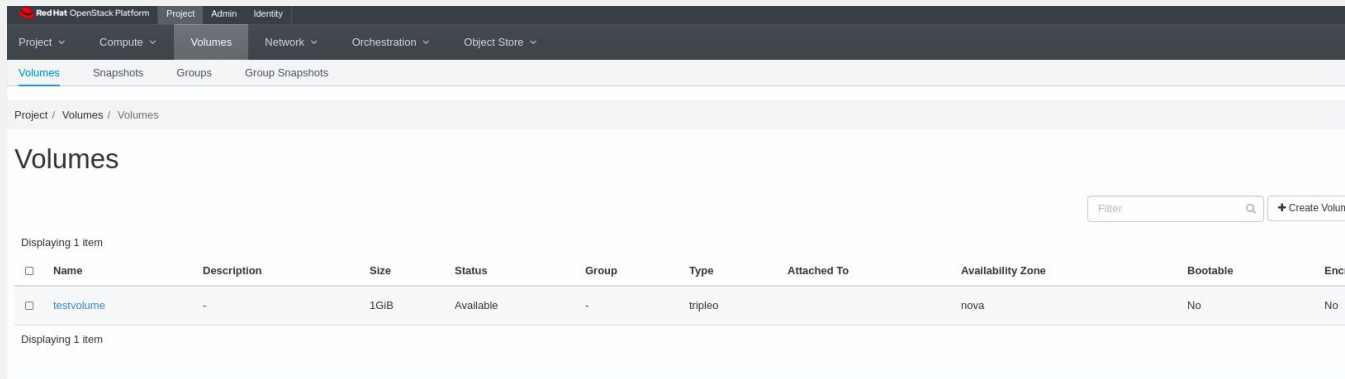
<input type="checkbox"/>	Owner	Name ^
<input type="checkbox"/>	> admin	<a href="#">cirros</a>
<input type="checkbox"/>	> admin	<a href="#">rhel8.1-423</a>

At the bottom, it says 'Displaying 2 items'.

# Creating a volume

- Volume types for backends
- Bootable volume
- Volume attachments

```
(overcloud) [stack@undercloud-0 ~]$ openstack volume create --size 1 testvolume
-----+-----+-----+
Field | Value
-----+-----+-----+
attachments | []
availability_zone | nova
bootable | false
consistencygroup_id | None
created_at | 2020-11-17T23:29:35.000000
description | None
encrypted | False
id | 40cfa0f8-529e-42a5-9cc4-fb466fc03c6e
migration_status | None
multiattach | False
name | testvolume
properties | 
replication_status | None
size | 1
snapshot_id | None
source_volid | None
status | creating
type | tripleo
updated_at | None
user_id | c4227abcd9004f47be547af3a8ffde61
-----+-----+-----+
```



The screenshot shows the Red Hat OpenStack Platform interface. The top navigation bar includes 'Project', 'Admin', and 'Identity'. The main menu has 'Project', 'Compute', 'Volumes', 'Network', 'Orchestration', and 'Object Store'. The 'Volumes' section is active, with sub-links for 'Volumes', 'Snapshots', 'Groups', and 'Group Snapshots'. The breadcrumb trail is 'Project / Volumes / Volumes'. The page title is 'Volumes'. There is a search filter and a '+ Create Volume' button. Below the header, it says 'Displaying 1 item'. A table lists the volume details:

Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encr
testvolume	-	1GiB	Available	-	tripleo		nova	No	No

At the bottom, it says 'Displaying 1 item'.

# Launching a VM

- Volume attachments
- Networks, private public
- Ssh key
- Security groups
- Compute node

```
(overcloud) [stack@undercloud-0 ~]$ #openstack server create --flavor allang-tiny --image cirros --nic net-id=de150c16-16cf-4bdc-95a7-0f2a389542a2 --allang-vm01
(overcloud) [stack@undercloud-0 ~]$ openstack server show 8b15a563-af14-44c3-985e-b6f0c866795b
-----
| Field | Value |
|-----|-----|
| OS-DCF:diskConfig | MANUAL |
| OS-EXT-AZ:availability_zone | nova |
| OS-EXT-SRV-ATTR:host | compute-1.redhat.local |
| OS-EXT-SRV-ATTR:host_name | allang-vm01 |
| OS-EXT-SRV-ATTR:hypervisor_hostname | compute-1.redhat.local |
| OS-EXT-SRV-ATTR:instance_name | instance-00000001 |
| OS-EXT-SRV-ATTR:kernel_id | 0 |
| OS-EXT-SRV-ATTR:launch_index | 0 |
| OS-EXT-SRV-ATTR:ramdisk_id | 0 |
| OS-EXT-SRV-ATTR:reservation_id | r-txhbjwv7 |
| OS-EXT-SRV-ATTR:root_device_name | /dev/vda |
| OS-EXT-SRV-ATTR:user_data | None |
| OS-EXT-STS:power_state | Running |
| OS-EXT-STS:task_state | None |
| OS-EXT-STS:vm_state | active |
| OS-SRV-USG:launched_at | 2020-10-18T22:55:20.000000 |
| OS-SRV-USG:terminated_at | None |
| accessIPv4 | |
| accessIPv6 | |
| addresses | allang-privnet=172.16.1.238, 10.0.0.206 |
| config_drive | |
| created | 2020-10-05T16:27:46Z |
| description | None |
| flavor | disk1-10', ephemeral='0', , original name='allang-tiny', ram='512', swap='0', vcpus='1' |
| hostId | b39da25cb7690b4de6d1dec0ad32e3dcb35ea92feaf849bb447cc6a |
| host_status | UP |
| id | 8b15a563-af14-44c3-985e-b6f0c866795b |
| image | cirros (c0e1217f-650e-4bb4-b4c7-d3e212a0b505) |
| key_name | allang-vmkey |
| locked | False |
| locked_reason | None |
| name | allang-vm01 |
| progress | 0 |
| project_id | ef2d46f59cda4355bce2cfd82914e46d |
| properties | |
| security_groups | name='allang-sec' |
| server_groups | [] |
| status | ACTIVE |
| tags | [] |
| trusted_image_certificates | None |
| updated | 2020-10-19T00:30:18Z |
| user_id | c4227abcd9004f47be547af3a8ffde61 |
| volumes_attached | |
-----
```

Project / Compute / Instances

## Instances

Instance ID =  Filter [Launch Instance](#) [Delete Instances](#) [More Actions](#)

Displaying 2 items

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
<input type="checkbox"/>	allang-vm02	cirros	172.16.1.196, 10.0.0.219	allang-tiny	allang-vmkey	Active	us-east-1-nova	None	Running	1 month, 1 week	<a href="#">Create Snapshot</a>
<input type="checkbox"/>	allang-vm01	cirros	172.16.1.238, 10.0.0.206	allang-tiny	allang-vmkey	Active	us-east-1-nova	None	Running	1 month, 1 week	<a href="#">Create Snapshot</a>

Displaying 2 items

# OpenStack Networking

- Software defined networking
- Neutron with OVN
- Tenant networks using Geneve overlay encapsulation
- Provider external networks
- Controllers run northd and southd
- Computes run ovn-controller, ovnsdb-server, dhcp, l3 etc
- More distributed than older OVS ml2 driver

Red Hat OpenStack Platform Project Admin Identity

Project Compute Volumes Network Orchestration Object Store

Network Topology Networks Routers Security Groups Load Balancers Floating IPs Trunks

Project / Network / Network Topology

## Network Topology

Topology Graph

Small Normal

alltop-pubnet 10.0.0.0/24

alltop-private 172.16.1.0/24

Launch Instance Create Network Create Router

# Demo: Launching a VM

- Show images
- Show volumes
- Show network topology
- Launch a vm
- See console
- See vm on network topology
- Associate floating ip

# OpenShift on OpenStack

## OpenShift on Stack

- Enable swift on openstack if not already used
- Create install config file
- Setup ssh
- Deploy the cluster - `./openshift-install create cluster --dir=<installation_directory>`
- [https://access.redhat.com/documentation/en-us/openshift\\_container\\_platform/4.2/html-single/installing\\_on\\_openstack/index](https://access.redhat.com/documentation/en-us/openshift_container_platform/4.2/html-single/installing_on_openstack/index)

## Service Telemetry Framework

- Uses openshift
- Operators to easily install STF components
- [https://access.redhat.com/documentation/en-us/red\\_hat\\_openstack\\_platform/16.1/html-single/service\\_telemetry\\_framework/index](https://access.redhat.com/documentation/en-us/red_hat_openstack_platform/16.1/html-single/service_telemetry_framework/index)

# Features

DPDK, - for high network performance

(pin cpu's for nics for better performance)

Cpu Pinning, huge pages- better vm performance and dedicated cpus.

DCN - hub and spoke, computes outside of the datacenter.

Multiple storage solutions - ceph, Dell , Fujitsu, file, swift, nfs,etc

Auto scaling- Automatically increase number of instances by monitoring load

Monitoring and Metrics (STF) - uses Grafana, prometheus, collectd, smart gateway

Much more!

# Q & A







# Thank you

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