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Activity 15: OpenStack Installation (Neutron, Horizon, Cinder)

1. Objectives

Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).

2. Intended Learning Outcomes

1. Analyze the advantages and disadvantages of cloud services
2. Evaluate different Cloud deployment and service models
3. Create a workflow to install and configure OpenStack base services using Ansible as documentation and execution.

3. Resources

Oracle VirtualBox (Hypervisor)

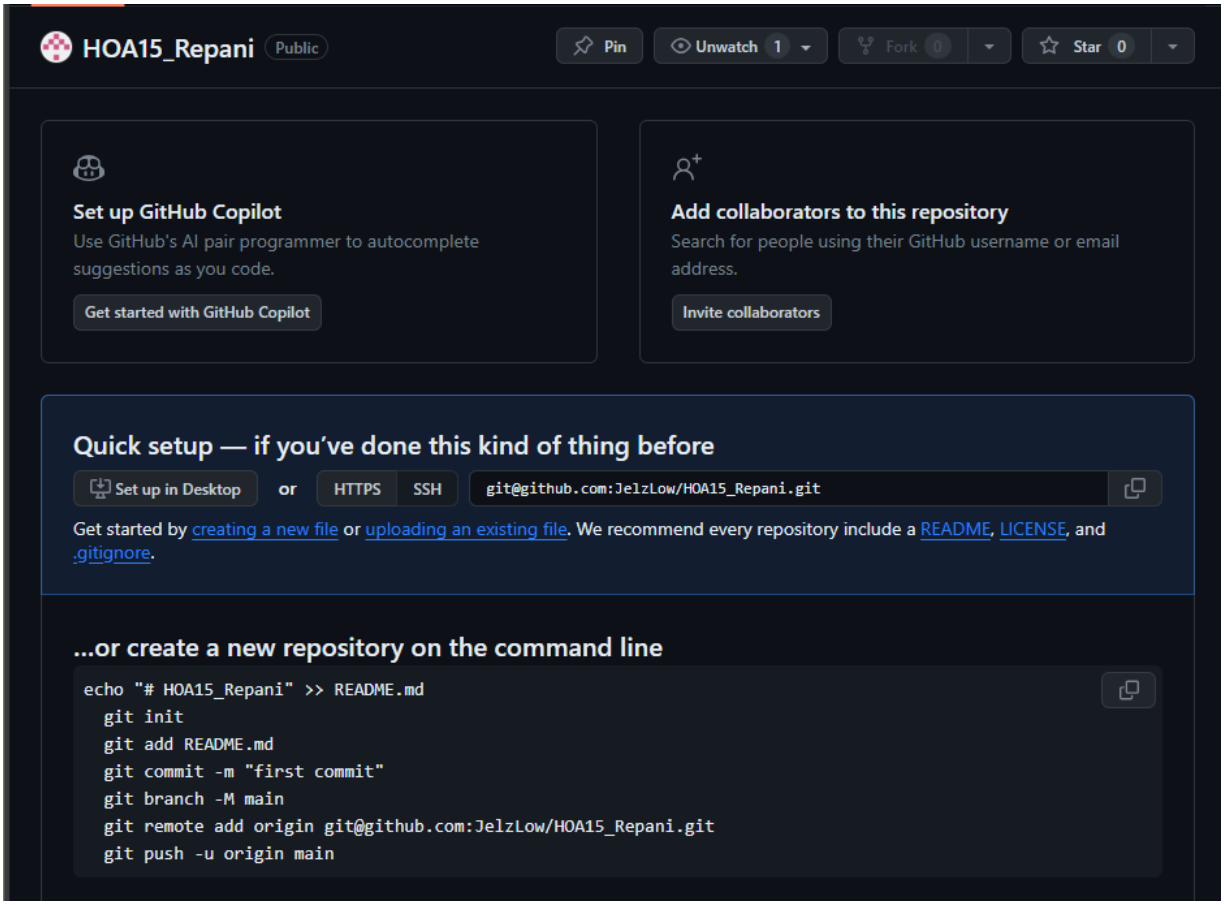
1x Ubuntu VM or Centos VM

4. Tasks

1. Create a new repository for this activity.
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/
    a. Neutron
    b. Horizon
    c. Cinder
    d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.
    e. Add, commit and push it to your GitHub repo.

5. Output (screenshots and explanations)

Create new repository for HOA15 and clone to workstation




```
jello@workstation:~$ git clone git@github.com:JelzLow/HOA15_Repani.git
Cloning into 'HOA15_Repani'...
warning: You appear to have cloned an empty repository.
```

Add the directories and files needed

```
jello@workstation:~/HOA15_Repani$ tree
.
├── ansible.cfg
├── cinder.conf.j2
├── install.yml
├── inventory
├── local_settings.py.j2
├── ml2_conf.ini.j2
├── neutron.conf.j2
├── openstack-dashboard.conf.j2
└── roles
    ├── cinder
    │   └── tasks
    │       └── main.yml
    ├── horizon
    │   └── tasks
    │       └── main.yml
    └── neutron
        └── tasks
            └── main.yml

7 directories, 11 files
```

Inventory file content

```
  GNU nano 2.9.3                    inventory                         Modified

[horizon]
192.168.56.103

[neutron]
192.168.56.103

[cinder]
192.168.56.103
```

Contents of roles/cinder/tasks/

Code Blame 20 lines (15 loc) · 386 Bytes Raw

```yaml
---


    - name: Install Cinder packages
      apt:
        name:
          - cinder-api
          - cinder-scheduler
          - cinder-volume
        state: present

    - name: Configure Cinder
      template:
        src: cinder.conf.j2
        dest: /etc/cinder/cinder.conf

    - name: Create Cinder database
      command: cinder-manage db sync
      become_user: cinder

```

Contents of roles/horizon/tasks/main.yml

Code Blame 21 lines (18 loc) · 525 Bytes Raw

```yaml
---
    - name: Install Horizon packages
      apt:
        name:
          - openstack-dashboard
        state: present

    - name: Configure Apache for Horizon
      template:
        src: openstack-dashboard.conf.j2
        dest: /etc/apache2/sites-available/openstack-dashboard.conf

    - name: Configure Horizon settings
      template:
        src: local_settings.py.j2
        dest: /etc/openstack-dashboard/local_settings.py

    - name: Restart Apache
      service:
        name: apache2
        state: restarted
```

Contents of roles/neutron/tasks/main.yml

Code Blame 27 lines (23 loc) · 630 Bytes Raw

```
---

    - name: Install Neutron packages
      apt:
        name:
          - neutron-server
          - neutron-plugin-ml2
          - neutron-linuxbridge-agent
          - neutron-l3-agent
          - neutron-dhcp-agent
          - neutron-metadata-agent
        state: present

    - name: Configure Neutron
      template:
        src: neutron.conf.j2
        dest: /etc/neutron/neutron.conf

    - name: Configure ML2 plugin
      template:
        src: ml2_conf.ini.j2
        dest: /etc/neutron/plugins/ml2/ml2_conf.ini

    - name: Restart Neutron
      service:
        name: neutron-server
        state: restarted
```

Contents of cinder.conf.j2

Code Blame 20 lines (17 loc) · 469 Bytes Raw

```
[DEFAULT]
transport_url = rabbit://guest:guest@localhost
auth_strategy = keystone

[database]
connection = sqlite:////var/lib/cinder/cinder.sqlite

[keystone_authtoken]
auth_uri = http://controller:5000
auth_url = http://controller:35357
memcached_servers = controller:11211
auth_type = password
project_domain_name = default
user_domain_name = default
project_name = service
username = cinder
password = CINDER_PASS

[oslo_concurrency]
lock_path = /var/lib/cinder/tmp
```

Contents of install.yml

Code Blame 18 lines (13 loc) · 194 Bytes Raw

```
---


- hosts: neutron
  become: true
  roles:
    - role: neutron

- hosts: horizon
  become: true
  roles:
    - role: horizon

- hosts: cinder
  become: true
  roles:
    - role: cinder
```

Contents of local_settings.py.j2

Code Blame 8 lines (5 loc) · 319 Bytes Raw

```
# The file is automatically created by the ansible role openstack-horizon
# during the installation of the openstack-dashboard package.

# Please use the "template" module for updates.

# Modifications to this file will be overwritten by the next update.

from openstack_dashboard.settings import *  # noqa: F403, F401
```

Contents of ml2_conf.ini.j2

Code Blame 17 lines (13 loc) · 320 Bytes Raw

```
[ml2]
type_drivers = flat,vlan,vxlan
tenant_network_types = vxlan
mechanism_drivers = linuxbridge,l2population
extension_drivers = port_security

[ml2_type_flat]
flat_networks = provider

[ml2_type_vlan]
network_vlan_ranges = physnet1:1000:2999

[ml2_type_vxlan]
vni_ranges = 1:1000

[securitygroup]
enable_ipset = True
```

Contents of neutron.conf.j2

Code Blame 19 lines (17 loc) · 468 Bytes Raw

```
[DEFAULT]
core_plugin = ml2
service_plugins = router
allow_overlapping_ips = True
transport_url = rabbit://guest:guest@localhost

[database]
connection = sqlite:////var/lib/neutron/neutron.sqlite

[keystone_authtoken]
auth_uri = http://controller:5000
auth_url = http://controller:35357
memcached_servers = controller:11211
auth_type = password
project_domain_name = default
user_domain_name = default
project_name = service
username = neutron
password = NEUTRON_PASS
```

Contents of openstack-dashboard.conf.j2

Code Blame 15 lines (12 loc) · 523 Bytes Raw

```
<VirtualHost *:80>
  ServerName your_horizon_server_domain_or_ip

  WSGIDaemonProcess horizon user=www-data group=www-data processes=3 threads=10 home=/usr/share/openstack-dashboard display-name=%{GROUP}
  WSGIProcessGroup horizon
  WSGIScriptAlias / /usr/share/openstack-dashboard/openstack_dashboard/wsgi/django.wsgi
  WSGIPassAuthorization On

  <IfModule mod_ssl.c>
    SSLEngine Off
  </IfModule>

  ErrorLog ${APACHE_LOG_DIR}/horizon_error.log
  CustomLog ${APACHE_LOG_DIR}/horizon_access.log combined
</VirtualHost>
```

Running the playbook

```
jello@workstation:~/HOA15_Repani$ ansible-playbook --ask-become-pass install.yml
BECOME password:

PLAY [neutron] *****************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.103]

TASK [neutron : Install Neutron packages] **************************************
ok: [192.168.56.103]

TASK [neutron : Configure Neutron] *********************************************
ok: [192.168.56.103]

TASK [neutron : Configure ML2 plugin] ******************************************
ok: [192.168.56.103]

TASK [neutron : Restart Neutron] ***********************************************
changed: [192.168.56.103]

PLAY [horizon] *****************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.103]

TASK [horizon : Install Horizon packages] **************************************
ok: [192.168.56.103]

TASK [horizon : Configure Apache for Horizon] **********************************
ok: [192.168.56.103]

TASK [horizon : Configure Horizon settings] ************************************
ok: [192.168.56.103]

TASK [horizon : Restart Apache] ************************************************
changed: [192.168.56.103]
```

```
PLAY [cinder] ******************************************************************
*

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.103]

TASK [cinder : Install Cinder packages] ****************************************
*
ok: [192.168.56.103]

TASK [cinder : Configure Cinder] ***********************************************
*
ok: [192.168.56.103]

TASK [cinder : Create Cinder database] *****************************************
*
changed: [192.168.56.103]

PLAY RECAP *********************************************************************
*
192.168.56.103             : ok=14   changed=3    unreachable=0    failed=0
skipped=0    rescued=0    ignored=0

jello@workstation:~/HOA15_Repani$
```

Proof

```
jello@server2:~$ sudo apt list --installed | grep cinder
[sudo] password for jello:

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

cinder-api/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:
12.0.10-0ubuntu2.2 all [installed]
cinder-common/bionic-updates,bionic-updates,bionic-security,bionic-security,now
 2:12.0.10-0ubuntu2.2 all [installed,automatic]
cinder-scheduler/bionic-updates,bionic-updates,bionic-security,bionic-security,
now 2:12.0.10-0ubuntu2.2 all [installed]
cinder-volume/bionic-updates,bionic-updates,bionic-security,bionic-security,now
 2:12.0.10-0ubuntu2.2 all [installed]
python-cinder/bionic-updates,bionic-updates,bionic-security,bionic-security,now
 2:12.0.10-0ubuntu2.2 all [installed,automatic]
python-cinderclient/bionic,bionic,now 1:3.5.0-0ubuntu1 all [installed,automatic
]
python3-cinderclient/bionic,bionic,now 1:3.5.0-0ubuntu1 all [installed,automati
c]
```

```
jello@server2:~$ sudo apt list --installed | grep horizon

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

python-django-horizon/bionic-updates,bionic-updates,bionic-security,bionic-secu
rity,now 3:13.0.3-0ubuntu2 all [installed,automatic]
```

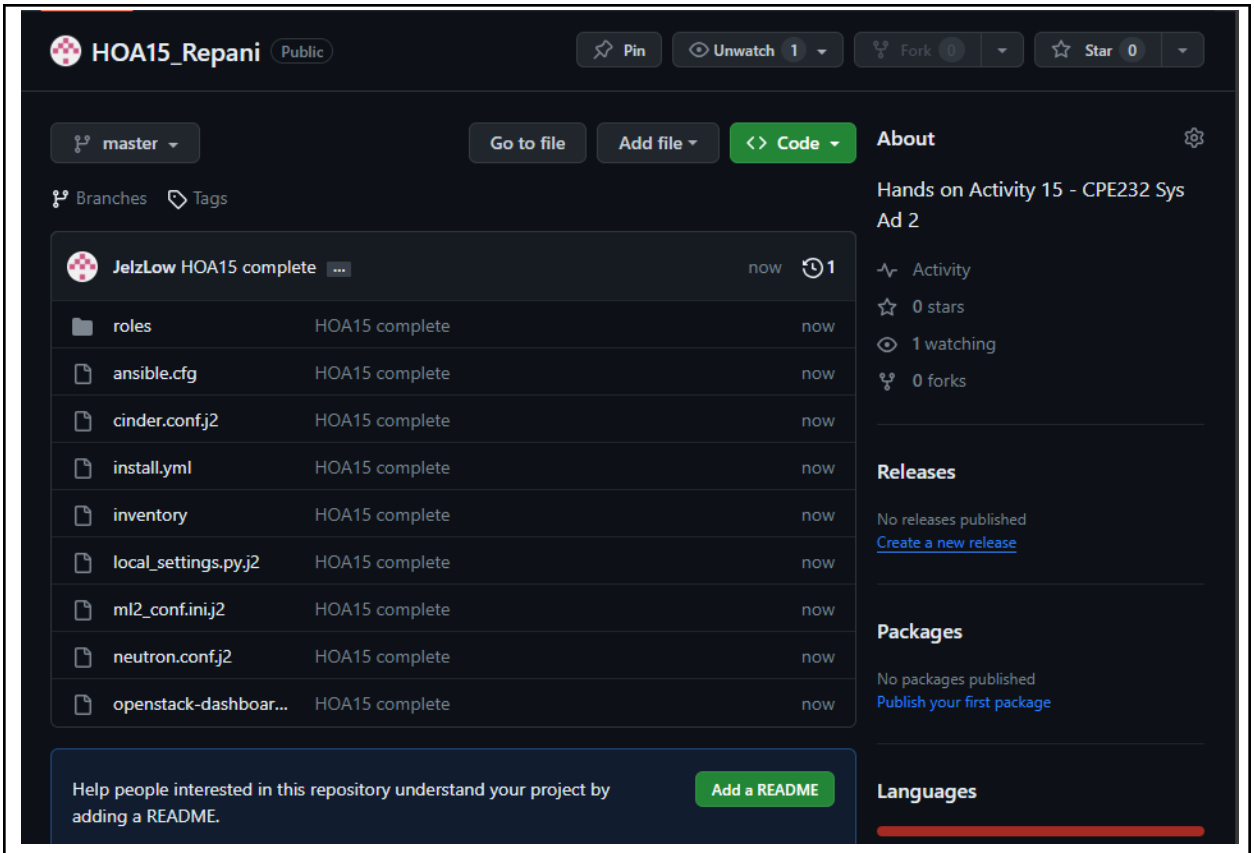
```
jello@server2:~$ sudo apt list --installed | grep neutron

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

neutron-common/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed,automatic]
neutron-dhcp-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-l3-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-linuxbridge-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-metadata-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-plugin-ml2/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-server/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
python-neutron/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed,automatic]
python-neutron-fwaas/bionic-updates,bionic-updates,now 1:12.0.2-0ubuntu1 all [installed,automatic]
python-neutron-lib/bionic,bionic,now 1.13.0-0ubuntu1 all [installed,automatic]
python-neutronclient/bionic,bionic,now 1:6.7.0-0ubuntu1 all [installed,automatic]
python3-neutronclient/bionic,bionic,now 1:6.7.0-0ubuntu1 all [installed,automatic]
```

Pushing to git

```
jello@workstation:~/HOA15_Repani$ git add *
jello@workstation:~/HOA15_Repani$ git commit -m "HOA15 complete"
[master (root-commit) dcb9bff] HOA15 complete
 11 files changed, 182 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 cinder.conf.j2
 create mode 100644 install.yml
 create mode 100644 inventory
 create mode 100644 local_settings.py.j2
 create mode 100644 ml2_conf.ini.j2
 create mode 100644 neutron.conf.j2
 create mode 100644 openstack-dashboard.conf.j2
 create mode 100644 roles/cinder/tasks/main.yml
 create mode 100644 roles/horizon/tasks/main.yml
 create mode 100644 roles/neutron/tasks/main.yml
jello@workstation:~/HOA15_Repani$ git push origin
Counting objects: 20, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (14/14), done.
Writing objects: 100% (20/20), 2.87 KiB | 1.43 MiB/s, done.
Total 20 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), done.
To github.com:JelzLow/HOA15_Repani.git
 * [new branch]      master -> master
```



https://github.com/JelzLow/HOA15_Repani

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services
    - Neutron, Horizon, and Cinder services are part of OpenStack. Each of these have its own specific function. The Neutron service is able to provide networking as a service between different devices that use OpenStack. The Horizon service can help in managing and securing the different devices and applications and as well as accessing the cloud service with the use of a GUI. And lastly is the Cinder service is a block storage service. This enables users to create and manage a block service which can store data separately from the virtual machines. This is mostly used for data management.

Conclusions:

In this hands-on activity the topic is about the installation of additional services used in OpenStack. This one specifically uses Neutron, Horizon, and Cinder. Each of these provides a lot of functions and quality of life in terms of creating and managing servers and different devices. In the procedure part of the activity, I made use of the

ansible playbook in order to install these services. I made use of a lot of online resources and references in order to complete the task and come up with the intended output.