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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)

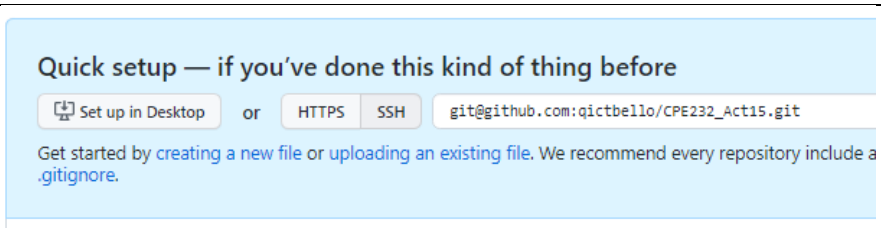
1x Ubuntu VM or Centos VM

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)

First, we will create a playbook for this activity



Next, we will clone it in our workstation

```
ubuntuhost@workstation:~$ git clone git@github.com:qictbello/CPE232_Act15.git
Cloning into 'CPE232_Act15'...
warning: You appear to have cloned an empty repository.
ubuntuhost@workstation:~$ cd CPE232_Act15
ubuntuhost@workstation:~/CPE232_Act15$ ls
ubuntuhost@workstation:~/CPE232_Act15$
```

Next, we will create our ansible config and inventory for our servers

```
 GNU nano 6.2                                                ansible.cfg
[defaults]
command_warnings=False
deprecation_warnings=False
inventory=inventory
private_key_file = ~/.ssh/ansible
```

```
 GNU nano 6.2                                                  inventory *
[controller]
server1
[compute]
server1
```

```
ubuntuhost@workstation:~/CPE232_Act15$ nano ansible.cfg
ubuntuhost@workstation:~/CPE232_Act15$ nano inventory
ubuntuhost@workstation:~/CPE232_Act15$ ls
ansible.cfg  inventory
ubuntuhost@workstation:~/CPE232_Act15$
```

Next, we will create roles for each installation

```
ubuntuhost@workstation:~/CPE232_Act15$ mkdir -p roles/{Neutron,Horizon,Cinder}/tasks
ubuntuhost@workstation:~/CPE232_Act15$ ls -R
.:
ansible.cfg  inventory  roles

./roles:
Cinder  Horizon  Neutron

./roles/Cinder:
tasks

./roles/Cinder/tasks:

./roles/Horizon:
tasks

./roles/Horizon/tasks:

./roles/Neutron:
tasks

./roles/Neutron/tasks:
ubuntuhost@workstation:~/CPE232_Act15$
```

Next, we will create the script for installing each.

```
ubuntuhost@workstation:~/CPE232_Act15$ nano roles/Neutron/tasks/main.yml
ubuntuhost@workstation:~/CPE232_Act15$ nano roles/Horizon/tasks/main.yml
ubuntuhost@workstation:~/CPE232_Act15$ nano roles/Cinder/tasks/main.yml
```

Neutron

```
GNU nano 6.2                                    roles/Neutron/tasks/main.yml *
- name: Install openstack (Neutron)
  apt:
    name:
      - neutron-server
      - neutron-plugin-ml2
      - neutron-linuxbridge-agent
      - neutron-l3-agent
      - neutron-dhcp-agent
      - neutron-metadata-agent
      - python3-neutronclient
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Horizon

```
GNU nano 6.2                    roles/Horizon/tasks/main.yml *
- name: Install openstack (Horizon)
  apt:
    name: openstack-dashboard
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Cinder

```
GNU nano 6.2                    roles/Cinder/tasks/main.yml
- name: Install openstack (Cinder)
  apt:
    name:
      - cinder-volume
      - python3-mysqldb
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

After creating our installation in our roles, we will create the playbook we will name it NHC.yml

```
  GNU nano 6.2                                  NHC.yml
---
- hosts: all
  become: true
  pre_tasks:

  -  name: install updates Ubuntu
     tags: always
     apt:
       upgrade: dist
       update_cache: yes
     changed_when: false
     when: ansible_distribution == "Ubuntu"

- hosts: controller
  become: true
  roles:
    - Neutron
    - Horizon

- hosts: compute
  become: true
  roles:
    - Cinder
```

We will run the playbook to the server

```
ubuntuhost@workstation:~/CPE232_Act15$ ansible-playbook --ask-become-pass NHC.yml
BECOME password:

PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [server1]

TASK [install updates Ubuntu] **************************************************
ok: [server1]

PLAY [controller] **************************************************************

TASK [Gathering Facts] *********************************************************
ok: [server1]

TASK [Neutron : Install openstack (Neutron)] ***********************************
changed: [server1]

TASK [Horizon : Install openstack (Horizon)] ***********************************
changed: [server1]

PLAY [compute] *****************************************************************

TASK [Gathering Facts] *********************************************************
ok: [server1]

TASK [Cinder : Install openstack (Cinder)] *************************************
changed: [server1]

PLAY RECAP *********************************************************************
server1                    : ok=7    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Next, we will check if it is installed

```
ubuntuhost@server1:~$ systemctl status neutron-server.service
● neutron-server.service - OpenStack Neutron Server
     Loaded: loaded (/lib/systemd/system/neutron-server.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2022-12-07 00:34:23 PST; 19s ago
       Docs: man:neutron-server(1)
   Main PID: 47931 (neutron-server)
      Tasks: 1 (limit: 2283)
     Memory: 113.3M
        CPU: 2.964s
     CGroup: /system.slice/neutron-server.service
             └─47931 /usr/bin/python3 /usr/bin/neutron-server --config-file=/etc/neutron/neutron.conf --config-

Dec 07 00:34:23 server1 systemd[1]: neutron-server.service: Scheduled restart job, restart counter is at 21.
Dec 07 00:34:23 server1 systemd[1]: Stopped OpenStack Neutron Server.
Dec 07 00:34:23 server1 systemd[1]: neutron-server.service: Consumed 3.904s CPU time.
Dec 07 00:34:23 server1 systemd[1]: Started OpenStack Neutron Server.
lines 1-15/15 (END)
```

```
ubuntuhost@server1:~$ systemctl status cinder-volume.service
● cinder-volume.service - OpenStack Cinder Volume
     Loaded: loaded (/lib/systemd/system/cinder-volume.service; enabled; vendor preset: enabled
     Active: active (running) since Wed 2022-12-07 00:36:18 PST; 12s ago
       Docs: man:cinder-volume(1)
   Main PID: 52084 (cinder-volume)
      Tasks: 1 (limit: 2283)
     Memory: 94.8M
        CPU: 1.890s
     CGroup: /system.slice/cinder-volume.service
             └─52084 /usr/bin/python3 /usr/bin/cinder-volume --config-file=/etc/cinder/cinder.c

Dec 07 00:36:18 server1 systemd[1]: cinder-volume.service: Scheduled restart job, restart count
Dec 07 00:36:18 server1 systemd[1]: Stopped OpenStack Cinder Volume.
Dec 07 00:36:18 server1 systemd[1]: cinder-volume.service: Consumed 2.452s CPU time.
Dec 07 00:36:18 server1 systemd[1]: Started OpenStack Cinder Volume.
Dec 07 00:36:27 server1 cinder-volume[52084]: /usr/lib/python3/dist-packages/cinder/db/sqlalche
Dec 07 00:36:27 server1 cinder-volume[52084]:   last_heartbeat = column_property(
Dec 07 00:36:27 server1 cinder-volume[52084]: /usr/lib/python3/dist-packages/cinder/db/sqlalche
Dec 07 00:36:27 server1 cinder-volume[52084]:   num_hosts = column_property(
Dec 07 00:36:27 server1 cinder-volume[52084]: /usr/lib/python3/dist-packages/cinder/db/sqlalche
Dec 07 00:36:27 server1 cinder-volume[52084]:   num_down_hosts = column_property(
lines 1-21/21 (END)
```

We will update our repository in github

```
ubuntuhost@workstation:~/CPE232_Act15$ git add -A
ubuntuhost@workstation:~/CPE232_Act15$ git commit -m "Activity 15"
[main (root-commit) 93899ac] Activity 15
 6 files changed, 59 insertions(+)
 create mode 100644 NHC.yml
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 roles/Cinder/tasks/main.yml
 create mode 100644 roles/Horizon/tasks/main.yml
 create mode 100644 roles/Neutron/tasks/main.yml
ubuntuhost@workstation:~/CPE232_Act15$ git push
Enumerating objects: 15, done.
Counting objects: 100% (15/15), done.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (15/15), 1.36 KiB | 1.36 MiB/s, done.
Total 15 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:qictbello/CPE232_Act15.git
 * [new branch]      main -> main
ubuntuhost@workstation:~/CPE232_Act15$
```

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services

To provide "networking as a service" across interface devices (such vNICs) controlled by other OpenStack services, Neutron is an OpenStack project (e.g., Nova). The OpenStack Dashboard, which offers a web-based user interface to services like Nova, Swift, Keystone, etc., is canonically implemented as Horizon. A block storage service for OpenStack is called Cinder. It's intended to provide end customers with storage resources that the OpenStack Compute Project can utilize (Nova). A reference implementation (LVM) or plugin drivers for other storage are used to do this.

Conclusions:

In conclusion, we created a workflow to install OpenStack using an Ansible playbook. We learned the advantages and disadvantages of these services. We installed the OpenStack services using Ansible and checked how they ran on our server. This service provides efficiency and more utilization when using OpenStack. This is the same as the previous hands-on activity. I am looking forward to face-to-face configuration of OpenStack so that I can be guided more on how it will work and how it is working in enterprise.