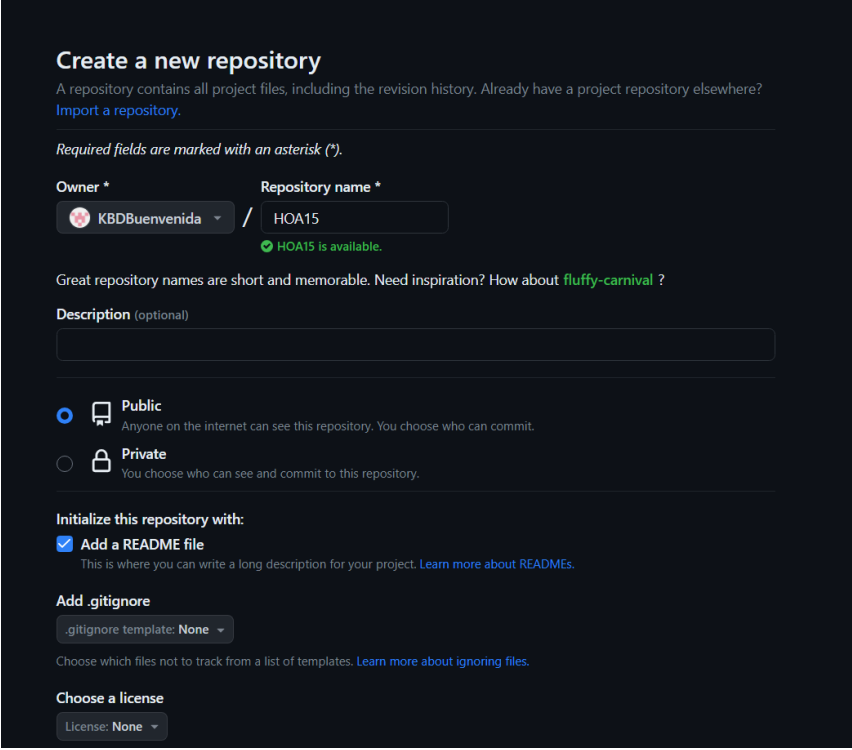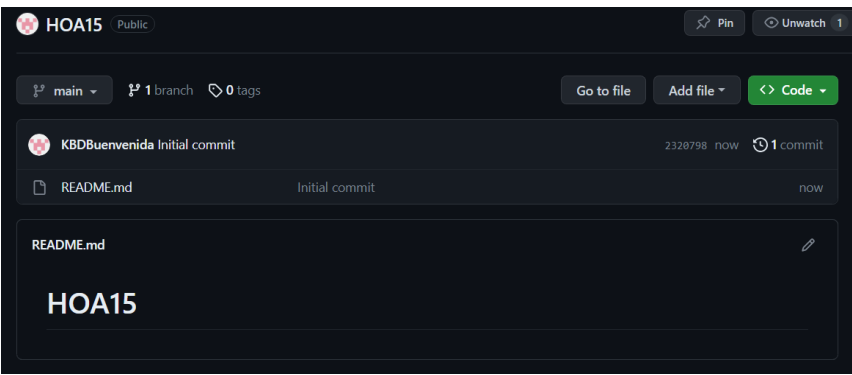| Name: Buenvenida, Ken Benedict D	Date Performed: December 01, 2023
Course/Section: CpE232 - CpE31S4	Date Submitted: December 04, 2023
Instructor: Dr. Jonathan Taylar	Semester and SY: 1st Semester 2023 - 2024

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)

1. Create a new repository for this activity.

Input	
	Create a new repository A repository contains all project files, including the revision history. Already have a project repository elsewhere? Import a repository. *Required fields are marked with an asterisk (*).* **Owner *** / **Repository name *** KBDBuenvenida / HOA15 ✓ HOA15 is available. Great repository names are short and memorable. Need inspiration? How about fluffy-carnival ? **Description** (optional) [ ] ◉ 🖥 **Public** Anyone on the internet can see this repository. You choose who can commit. ○ 🔒 **Private** You choose who can see and commit to this repository. **Initialize this repository with:** ☑ **Add a README file** This is where you can write a long description for your project. Learn more about READMEs. **Add .gitignore** .gitignore template: None ▾ Choose which files not to track from a list of templates. Learn more about ignoring files. **Choose a license** License: None ▾
Output	**HOA15** Public 📌 Pin 👁 Unwatch 1 ⑂ main ▾ ⑂ **1** branch 🏷 **0** tags Go to file Add file ▾ <> Code ▾ KBDBuenvenida Initial commit 2320798 now 🕐 **1** commit 📄 README.md Initial commit now README.md ✎ # HOA15

git clone the repository you just created

Input & Output	
| | ```
ken@controlNode:~$ git clone git@github.com:KBDBuenvenida/HOA15.git
Cloning into 'HOA15'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
ken@controlNode:~$ cd HOA15
ken@controlNode:~/HOA15$
``` |

copy the previous inventory and ansible.cfg

Input & Output	
| | ```
ken@controlNode:~/HOA14$ cp inventory ansible.cfg ~/HOA15
ken@controlNode:~/HOA14$ cd ..
ken@controlNode:~$ cd HOA15
ken@controlNode:~/HOA15$ ls
ansible.cfg  inventory  README.md
``` |

create a directory named roles

Input & Output	
| | ```
ken@controlNode:~/HOA15$ mkdir roles
``` |

create a directory named cinder, horizon, and neutron

Input & Output	
| | ```
ken@controlNode:~/HOA15/roles$ mkdir cinder horizon neutron
ken@controlNode:~/HOA15/roles$ ls
cinder  horizon  neutron
``` |

create a directory inside cinder named tasks

Input	
| | ```
ken@controlNode:~/HOA15/roles/cinder$ mkdir tasks
``` |

Output	
| | ```
ken@controlNode:~/HOA15/roles/cinder$ ls
tasks
``` |

create a directory inside horizon named tasks, handlers, and templates

Input	
| | ```
ken@controlNode:~/HOA15/roles/horizon$ mkdir tasks
``` |

Output	
| | ```
ken@controlNode:~/HOA15/roles/horizon$ ls
tasks
``` |

create a directory inside neutron named tasks

Input	`ken@controlNode:~/HOA15/roles/neutron$ mkdir tasks`
Output	`ken@controlNode:~/HOA15/roles/neutron$ ls` `tasks`

create main.yml for cinder directory

Input	`ken@controlNode:~/HOA15/roles/cinder/tasks$ sudo nano main.yml`
Output	

```
  GNU nano 6.2                                              main.yml
---
### Install and configure components (controller node)

- name: Install the packages for cinder controller node
  apt:
    name: cinder-api

- name: Install cinder scheduler
  shell: sudo apt install cinder-scheduler

- name: Configure database access
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [database]
      connection = mysql+pymysql://cinder:1234@controller/cinder

- name: Configure RabbitMQ message queue access
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [DEFAULT]
      transport_url = rabbit://openstack:1234@controller

- name: Configure identity services access
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [DEFAULT]
      auth_strategy = keystone

      [keystone_authtoken]
      www_authenticate_uri = http://controller:5000
      auth_url = http://controller:5000
      memcached_servers = controller:11211
      auth_type = password
```

create a main.yml for horizon

| **Input** | ```
ken@controlNode:~/HOA15/roles/horizon/tasks$ sudo nano main.yml
[sudo] password for ken:
``` |
| **Output** | ```
  GNU nano 6.2                                          main.yml
---
#Install and configure horizon for Ubuntu
- name: Installing the packages for horizon
  apt:
    name: openstack-dashboard
  when: ansible_distribution == "Ubuntu"

- name: Configuring the dashboard to use Openstack services
  copy:
    dest: /etc/openstack-dashboard/local_settings.py
    content: |
      OPENSTACK_HOST = "controller"

- name: Allowing all hosts to access dashboard
  copy:
    dest: /etc/openstack-dashboard/local_settings.py
    content: |
      ALLOWED_HOSTS = ['*']

- name: Configure the memcached session storage service
  copy:
    dest: /etc/openstack-dashboard/local_settings.py
    content: |
      SESSION_ENGINE = 'django.contrib.sessions.backends.cache'

      CACHES = {
          'default': {
              'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache', 'LOCATION': 'controller:11211',
          }
      }

- name: Enable the identity API version 3
  copy:
    dest: /etc/openstack-dashboard/local_settings.py
    content: |
      OPENSTACK_KEYSTONE_URL = "http://%s/identity/v3" % OPENSTACK_HOST
``` |

create main.yml for horizon tasks

| **Input** | ```
ken@controlNode:~/HOA15/roles/horizon/tasks$ sudo nano main.yml
``` |
| **Output** | ```
  GNU nano 6.2                                          main.yml
---
- name: Install Horizon Service
  hosts: horizon
  become: true
  tasks:
    - name: Install openstack-dashboard package
      apt:
        name: openstack-dashboard
        state: present

    - name: Configure local_settings.py
      template:
        src: local_settings.py.j2
        dest: /etc/openstack-dashboard/local_settings.py
      notify: Reload Apache

  handlers:
  - name: Reload Apache
    systemd:
      name: apache2
      state: reloaded
``` |

create main.yml for neutron tasks

Input

```
ken@controlNode:~/HOA15/roles/neutron/tasks$ sudo nano main.yml
```

Output

```
  GNU nano 6.2                                              main.yml
---
### Install and configure neutron compute node

- name: Installing  the components for neutron
  apt:
    name: neutron-linuxbridge-agent
  when: ansible_distribution == "Ubuntu"

- name: Configuring RabbitMQ message queue access
  copy:
    dest: /etc/neutron/neutron.conf
    content: |
      [DEFAULT]
      transport_url = rabbit://openstack:1234@controller

- name: Configuring Identity service access (1)
  copy:
    dest: /etc/neutron/neutron.conf
    content: |
      [DEFAULT]
      auth_strategy = keystone

      [keystone_authtoken]
      www_authenticate_uri = http://controller:5000
      auth_url = http://controller:5000
      memcached_servers = controller:11211
      auth_type = password
      project_domain_name = default
      user_domain_name = default
      project_name = service
      username = neutron
      password = 1234

- name: Configuring the lock path
  copy:
    dest: /etc/neutron/neutron.conf
                                                [ Wrote 64 lines ]
```

Test of playbook

Test 1

```
ken@controlNode:~/HOA1$ ansible-playbook --ask-become-pass openstack.yml
BECOME password:

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

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

TASK [update repository index (CentOS)] ***************************************************************
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot import
name 'environmentfilter' from 'jinja2.filters' (/home/ken/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ken/.local/lib/python3.10/site-packages/jinja2/filters.py)
skipping: [192.168.56.103]

TASK [update repository index (Ubuntu)] ***************************************************************
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot import
name 'environmentfilter' from 'jinja2.filters' (/home/ken/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ken/.local/lib/python3.10/site-packages/jinja2/filters.py)
changed: [192.168.56.103]

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

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

TASK [cinder : install the packages for cinder (1) controller node] ***********************************
changed: [192.168.56.103]

TASK [cinder : install cinder scheduler] *************************************************************
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running sudo
changed: [192.168.56.103]

TASK [cinder : configure database access] ***********************************************************
changed: [192.168.56.103]

TASK [cinder : configure RabbitMQ message queue access] ********************************************
```

```
TASK [cinder : configure RabbitMQ message queue access] ********************************************
changed: [192.168.56.103]

TASK [cinder : configure identity services access] *************************************************
changed: [192.168.56.103]

TASK [cinder : configure my_ip option to use the management interface IP add of controller node] *******
changed: [192.168.56.103]

TASK [cinder : configure the lock path] *************************************************************
changed: [192.168.56.103]

TASK [cinder : populate the block storage database] ***********************************************
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running su
changed: [192.168.56.103]

TASK [cinder : adding the following line for block storage] ****************************************
changed: [192.168.56.103]

TASK [cinder : install nova-api] *******************************************************************
changed: [192.168.56.103]

TASK [cinder : restarting the compute API service] ************************************************
[WARNING]: Consider using the service module rather than running 'service'.  If you need to use command because service is
insufficient you can add 'warn: false' to this command task or set 'command_warnings=False' in ansible.cfg to get rid of this
message.
changed: [192.168.56.103]

TASK [cinder : restart the block storage services (1)] ********************************************
changed: [192.168.56.103]

TASK [cinder : restart the block storage services (2)] ********************************************
changed: [192.168.56.103]

TASK [cinder : install the supporting utility packages] ******************************************
ok: [192.168.56.103]
```

```
TASK [cinder : install the supporting utility packages] ***********************************************
ok: [192.168.56.103]

TASK [cinder : create the LVM physical volume /dev/sdb] **********************************************
changed: [192.168.56.103]

TASK [cinder : create the LVM volume group cinder-volume] ********************************************
changed: [192.168.56.103]

TASK [cinder : install the packages for cinder (2) storage node] ************************************
changed: [192.168.56.103]

TASK [cinder : configure the LVM backend with the LVM driver] ***************************************
changed: [192.168.56.103]

TASK [cinder : enabling the LVM backend] ***********************************************************
changed: [192.168.56.103]

TASK [cinder : configuring the location of the image service API] **********************************
changed: [192.168.56.103]

TASK [cinder : configuring the lock path] **********************************************************
changed: [192.168.56.103]

TASK [cinder : Restarting the block storage volume service including its dependencies (1)] *********
changed: [192.168.56.103]

TASK [cinder : Restarting the block storage volume service including its dependencies (2)] *********
changed: [192.168.56.103]

TASK [cinder : install the packages for cinder (3) backup service] *********************************
changed: [192.168.56.103]

TASK [cinder : configuring the backup options] ****************************************************
changed: [192.168.56.103]

TASK [cinder : restart the block storage backup service] ****************************************
changed: [192.168.56.103]
```

```
TASK [cinder : restart the block storage backup service] ****************************************
changed: [192.168.56.103]

PLAY RECAP *************************************************************************************
192.168.56.103             : ok=29    changed=26   unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
```

checking of status

Neutron

```
ken@controlNode2:~$ systemctl status neutron-server
● neutron-server.service - OpenStack Neutron Server
     Loaded: loaded (/lib/systemd/system/neutron-server.service; enabled; vendo>
     Active: active (running) since Sun 2023-12-03 20:23:26 PST; 9s ago
       Docs: man:neutron-server(1)
   Main PID: 12010 (neutron-server)
      Tasks: 1 (limit: 4594)
     Memory: 51.5M
        CPU: 964ms
     CGroup: /system.slice/neutron-server.service
             └─12010 /usr/bin/python3 /usr/bin/neutron-server --config-file=/et>

Dec 03 20:23:26 controlNode2 systemd[1]: Started OpenStack Neutron Server.
```

| **Horizon** | ```
ken@controlNode2:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
     Active: active (running) since Sun 2023-12-03 20:01:12 PST; 22min ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 1490 (apache2)
      Tasks: 46 (limit: 4594)
     Memory: 84.4M
        CPU: 1.013s
     CGroup: /system.slice/apache2.service
             ├─1490 /usr/sbin/apache2 -k start
             ├─4929 "(wsgi:cinder-wsgi" -k start
             ├─4930 "(wsgi:cinder-wsgi" -k start
             ├─4931 "(wsgi:cinder-wsgi" -k start
             ├─4932 "(wsgi:cinder-wsgi" -k start
             ├─4933 "(wsgi:cinder-wsgi" -k start
             ├─4934 "(wsgi:keystone-pu" -k start
             ├─4935 "(wsgi:keystone-pu" -k start
             ├─4936 "(wsgi:keystone-pu" -k start
             ├─4937 "(wsgi:keystone-pu" -k start
             ├─4938 "(wsgi:keystone-pu" -k start
             └─4939 /usr/sbin/apache2 -k start
``` |
| **Cinder** | ```
ken@controlNode2:~$ service cinder-api status
Unit cinder-api.service could not be found.
ken@controlNode2:~$ service cinder-scheduler status
● cinder-scheduler.service - OpenStack Cinder Scheduler
     Loaded: loaded (/lib/systemd/system/cinder-scheduler.service; enabled; ven>
     Active: active (running) since Sun 2023-12-03 23:48:32 PST; 12h ago
       Docs: man:cinder-scheduler(1)
   Main PID: 2468 (cinder-schedule)
      Tasks: 2 (limit: 4594)
     Memory: 66.5M
        CPU: 5.661s
     CGroup: /system.slice/cinder-scheduler.service
             └─2468 /usr/bin/python3 /usr/bin/cinder-scheduler --config-file=/e>

Dec 03 23:48:32 controlNode2 systemd[1]: Started OpenStack Cinder Scheduler.
Dec 03 23:49:09 controlNode2 cinder-scheduler[2468]: /usr/lib/python3/dist-pack>
Dec 03 23:49:09 controlNode2 cinder-scheduler[2468]:     last_heartbeat = column_>
Dec 03 23:49:09 controlNode2 cinder-scheduler[2468]: /usr/lib/python3/dist-pack>
Dec 03 23:49:09 controlNode2 cinder-scheduler[2468]:     num_hosts = column_prope>
Dec 03 23:49:09 controlNode2 cinder-scheduler[2468]: /usr/lib/python3/dist-pack>
Dec 03 23:49:09 controlNode2 cinder-scheduler[2468]:     num_down_hosts = column_>
lines 1-18/18 (END)
``` |

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services
   - Neutron is used for networking services for OpenStack where it is responsible for managing and provisioning virtual networks, including routers, switches, and firewalls
   - Horizon is used for OpenStack Dashboard where it is providing a web-based interface for users to interact with OpenStack.
   - Cinder is used for block storage service for OpenStack where it is responsible for the block storage of virtual machines.

Conclusions:

In conclusion, I was able to implement these OpenStack services properly into my virtual machine where all my play in my playbook was successful. I was also able to learn about the usage of each service where it is mostly used for managing, storage, and interacting with OpenStack. Overall, this activity has deeply enhanced my knowledge about these services in Virtual Machines.