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Course/Section: CPE31S6 / CPE232	Date Submitted: 12/07/2023
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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)

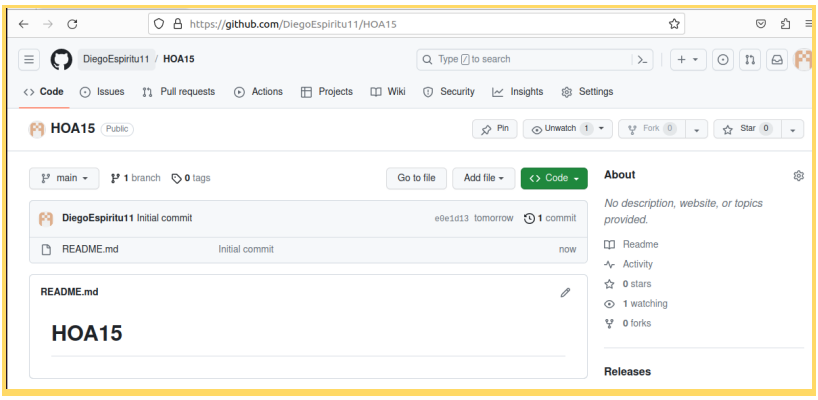
1x Ubuntu VM or Centos VM

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)

Step 1: Create a repository in github.



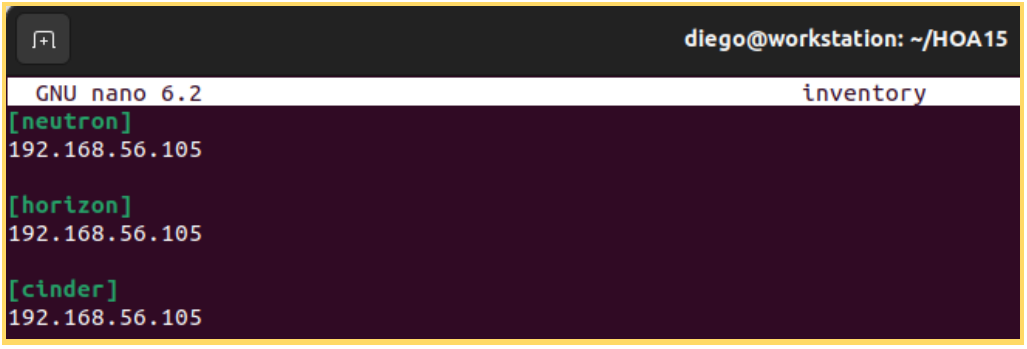
Step 2: Clone the created repository.

```
diego@workstation:~$ git clone https://github.com/DiegoEspiritu11/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.
diego@workstation:~$ cd HOA15
diego@workstation:~/HOA15$
```

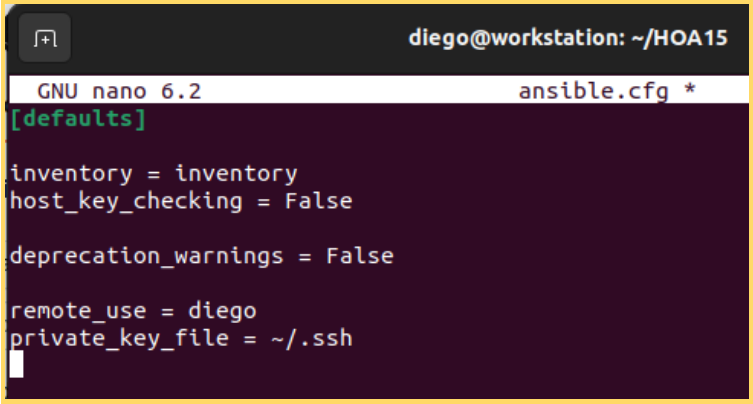
Step 3: Creating a file inside the directory (ansible.cfg, inventory).

```
diego@workstation:~/HOA15$ touch ansible.cfg inventory
diego@workstation:~/HOA15$ ls
ansible.cfg  inventory  README.md
diego@workstation:~/HOA15$
```

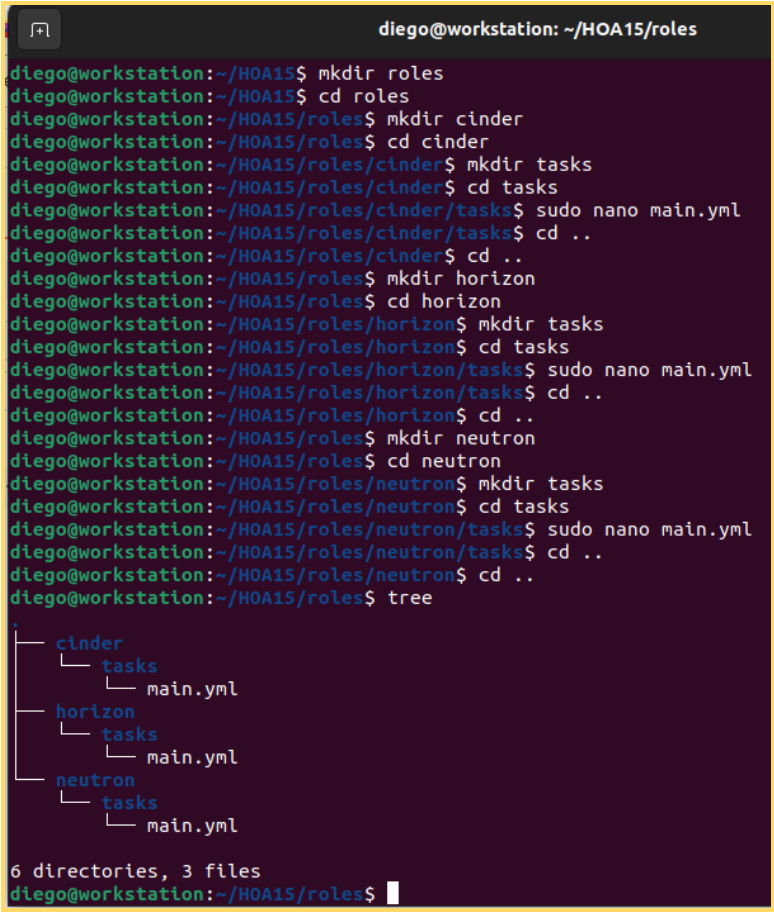
Step 4: Put the ip address into the inventory file.



Step 5: Necessary file for ansible.cfg



Step 6: Creating a playbook playbook that converts the steps in the following items https://docs.openstack.org/install-guide/.



Step 7: Create a file inside of the main directory (HOA15) and name it installNHC.yml, create a playbook for running the installation of the given.

```
diego@workstation: ~/HOA15
  GNU nano 6.2                                        installNHC.yml *
---
- import_playbook: roles/neutron/tasks/main.yml
- import_playbook: roles/horizon/tasks/main.yml
- import_playbook: roles/cinder/tasks/main.yml
```

Step 8: In the created directories create files for its necessary installations.

Cinder main.yml

```
diego@workstation: ~/HOA15/roles/cinder
GNU nano 6.2                                          main.yml
      OS_USERNAME: "admin"
      OS_PASSWORD: "admin"
      OS_PROJECT_NAME: "admin"
      OS_USER_DOMAIN_NAME: "Default"
      OS_PROJECT_DOMAIN_NAME: "Default"

  - name: Add Cinder User to Admin Role
    command: "openstack role add --project service --user cinder admin"
    become: false
    environment:
     HOME: "{{ lookup('env','HOME') }}"
     OS_AUTH_URL: "http://192.168.56.102:5000"
     OS_USERNAME: "admin"
     OS_PASSWORD: "admin"
     OS_PROJECT_NAME: "admin"
     OS_USER_DOMAIN_NAME: "Default"
     OS_PROJECT_DOMAIN_NAME: "Default"

  - name: Create Cinder Service
    command: "openstack service create --name cinderv3 --description 'OpenStack Block Storage' volumev3"
    become: false
    environment:
      HOME: "{{ lookup('env','HOME') }}"
      OS_AUTH_URL: "http://192.168.56.102:5000"
      OS_USERNAME: "admin"
      OS_PASSWORD: "admin"
      OS_PROJECT_NAME: "admin"
```

Horizon main.yml

```
diego@workstation: ~/HOA15/roles/horizon
  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
```

Neutron main.yml

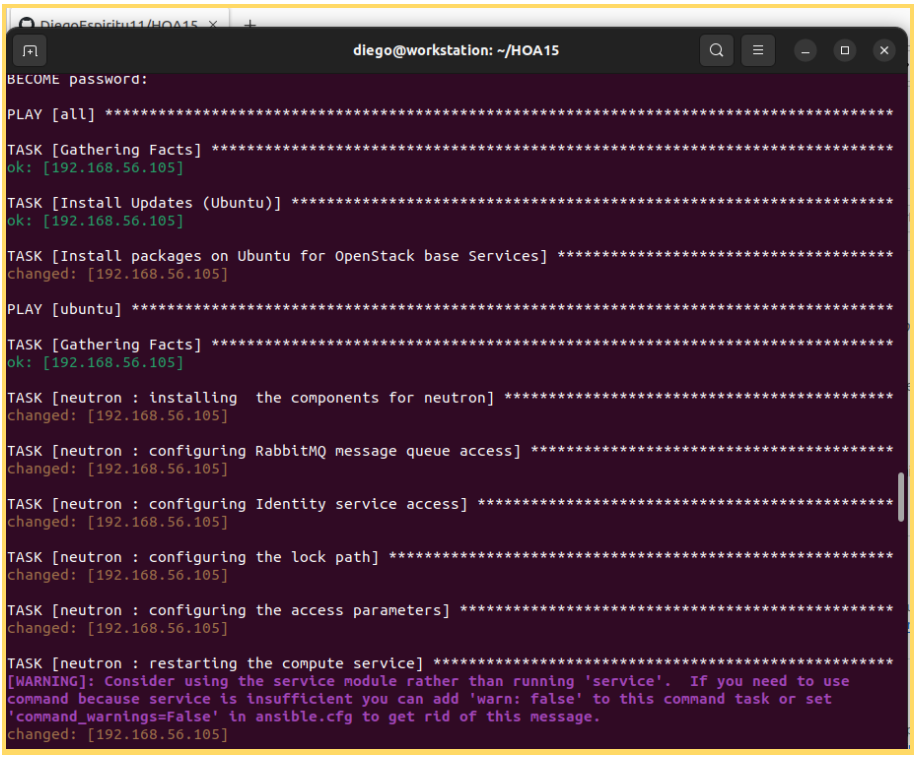
diego@workstation: ~/HOA15/roles/neutron

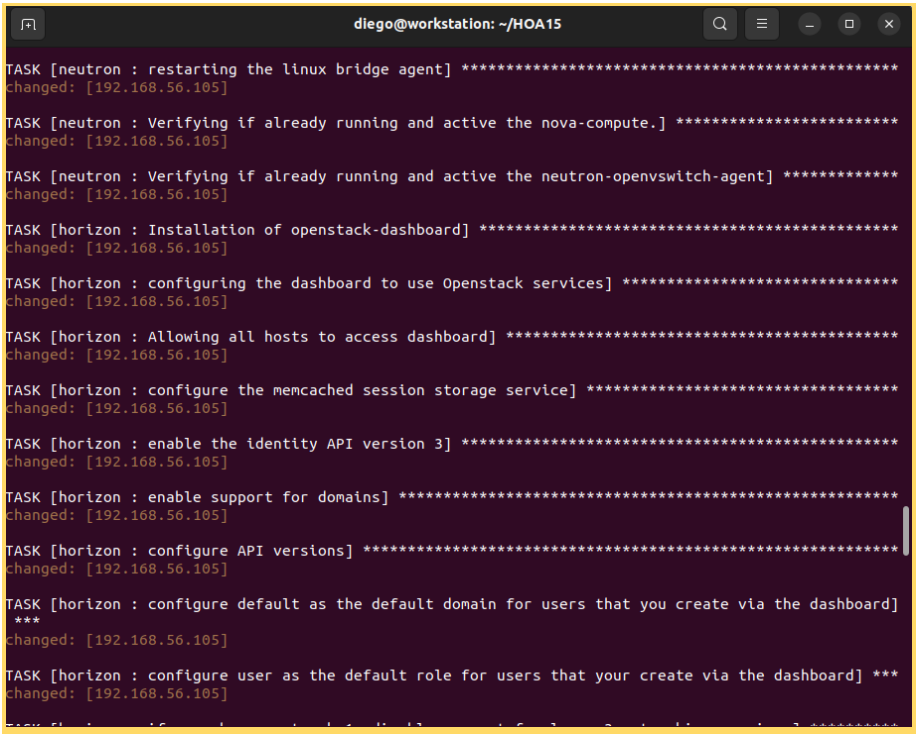
```
  GNU nano 6.2                                                main.yml *
---
- name: Install Neutron Service
  hosts: neutron
  become: true
  vars:
    neutron_db_password: "neutron"
    neutron_user_password: "neutron"
    rabbit_password: "rabbitpass"
    nova_password: "nova"
    provider_interface_name: "enp0s8"
    start_ip_address: "192.168.56.150"
    end_ip_address: "92.168.56.200"
    dns_resolver: "8.8.8.8"
```

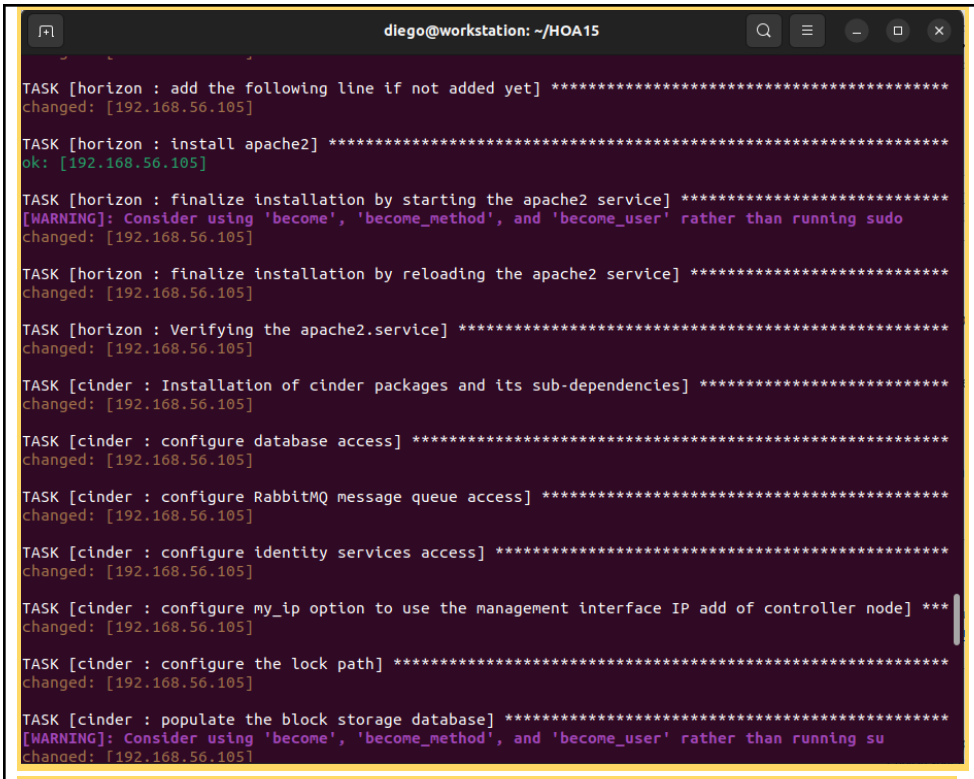
TREE:

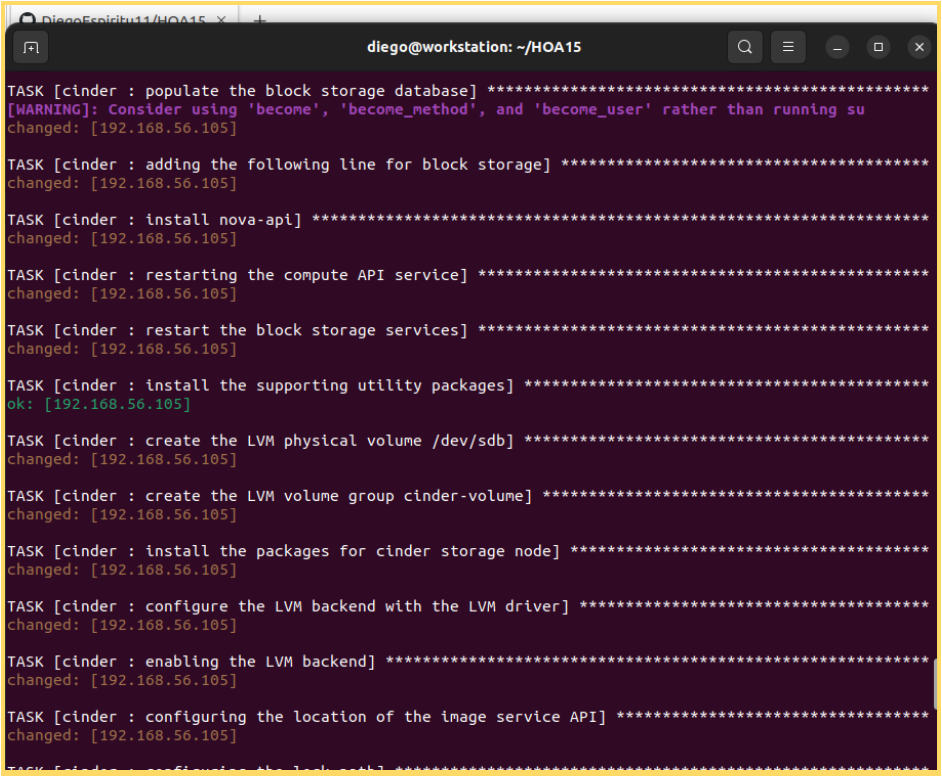
```
diego@workstation:~/HOA15/roles$ tree
.
├── cinder
│   └── tasks
│       ├── main.yml
│       └── templates
│           ├── cinder.conf.j2
│           └── nova.conf.j2
├── horizon
│   └── tasks
│       ├── handlers
│       │   └── main.yml
│       ├── main.yml
│       └── templates
│           └── local_settings.py.j2
└── neutron
    └── tasks
        ├── main.yml
        └── templates
            ├── dhcp_agent.ini.j2
            ├── metadata_agent.ini.j2
            ├── ml2_conf.ini.j2
            ├── neutron.conf.j2
            └── openvswitch_agent.ini.j2

10 directories, 12 files
diego@workstation:~/HOA15/roles$
```

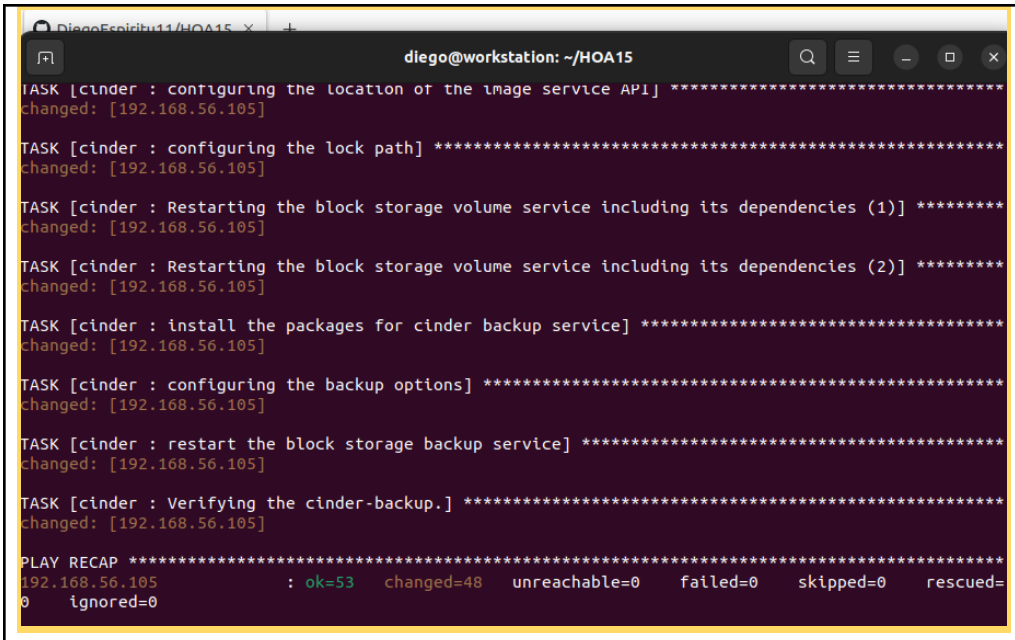
Step 9: Running the installations.






diego@workstation: ~/HOA15
TASK [horizon : add the following line if not added yet] **
changed: [192.168.56.105]
TASK [horizon : install apache2] **
ok: [192.168.56.105]
TASK [horizon : finalize installation by starting the apache2 service] *****************************
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running sudo
changed: [192.168.56.105]
TASK [horizon : finalize installation by reloading the apache2 service] *****************************
changed: [192.168.56.105]
TASK [horizon : Verifying the apache2.service] **
changed: [192.168.56.105]
TASK [cinder : Installation of cinder packages and its sub-dependencies] ****************************
changed: [192.168.56.105]
TASK [cinder : configure database access] ***
changed: [192.168.56.105]
TASK [cinder : configure RabbitMQ message queue access] ***
changed: [192.168.56.105]
TASK [cinder : configure identity services access] **
changed: [192.168.56.105]
TASK [cinder : configure my_ip option to use the management interface IP add of controller node] ***
changed: [192.168.56.105]
TASK [cinder : configure the lock path] ***
changed: [192.168.56.105]
TASK [cinder : populate the block storage database] ***
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running su


diego@workstation: ~/HOA15
TASK [cinder : populate the block storage database] ***
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running su
changed: [192.168.56.105]
TASK [cinder : adding the following line for block storage] ***
changed: [192.168.56.105]
TASK [cinder : install nova-api] **
changed: [192.168.56.105]
TASK [cinder : restarting the compute API service] **
changed: [192.168.56.105]
TASK [cinder : restart the block storage services] **
changed: [192.168.56.105]
TASK [cinder : install the supporting utility packages] ***
ok: [192.168.56.105]
TASK [cinder : create the LVM physical volume /dev/sdb] ***
changed: [192.168.56.105]
TASK [cinder : create the LVM volume group cinder-volume] ***
changed: [192.168.56.105]
TASK [cinder : install the packages for cinder storage node] **
changed: [192.168.56.105]
TASK [cinder : configure the LVM backend with the LVM driver] ***************************************
changed: [192.168.56.105]
TASK [cinder : enabling the LVM backend] **
changed: [192.168.56.105]
TASK [cinder : configuring the location of the image service API] ***********************************
changed: [192.168.56.105]



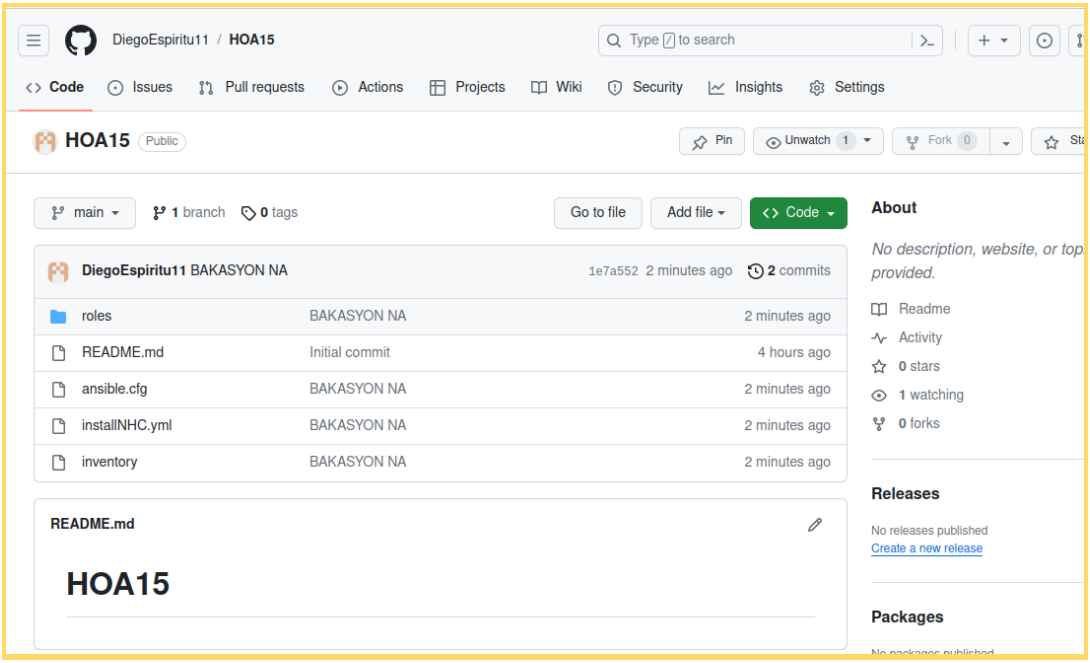
Step 10: Checking the installations.

```
diego@server1:~$ sudo systemctl status neutron-openvswitch-agent
[sudo] password for diego:
● neutron-openvswitch-agent.service - Openstack Neutron Open vSwitch Plugin Agent
     Loaded: loaded (/lib/systemd/system/neutron-openvswitch-agent.service; enabled; vendor preset:>
     Active: active (running) since Thu 2023-12-07 01:15:54 PST; 15min ago
   Main PID: 16834 (neutron-openvsw)
      Tasks: 2 (limit: 3433)
     Memory: 120.8M
        CPU: 4.271s
     CGroup: /system.slice/neutron-openvswitch-agent.service
             └─16834 "neutron-openvswitch-agent (/usr/bin/python3 /usr/bin/neutron-openvswitch-agen>

Dec 07 01:15:54 server1 systemd[1]: Starting Openstack Neutron Open vSwitch Plugin Agent...
Dec 07 01:15:54 server1 systemd[1]: Started Openstack Neutron Open vSwitch Plugin Agent.
lines 1-12/12 (END)
[1]+  Stopped                 sudo systemctl status neutron-openvswitch-agent
diego@server1:~$ cinder --version
8.3.0
diego@server1:~$ sudo systemctl status cinder-backup
● cinder-backup.service - OpenStack Cinder Backup
     Loaded: loaded (/lib/systemd/system/cinder-backup.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2023-12-07 01:17:46 PST; 13min ago
       Docs: man:cinder-backup(1)
   Main PID: 21294 (cinder-backup)
      Tasks: 3 (limit: 3433)
     Memory: 123.0M
        CPU: 10.248s
     CGroup: /system.slice/cinder-backup.service
             ├─21294 /usr/bin/python3 /usr/bin/cinder-backup --config-file=/etc/cinder/cinder.conf >
             └─21353 /usr/bin/python3 /usr/bin/cinder-backup --config-file=/etc/cinder/cinder.conf >

Dec 07 01:17:46 server1 systemd[1]: Started OpenStack Cinder Backup.
Dec 07 01:17:48 server1 cinder-backup[21294]: /usr/lib/python3/dist-packages/cinder/db/sqlalchemy/m>
Dec 07 01:17:48 server1 cinder-backup[21294]:   last_heartbeat = column_property(
Dec 07 01:17:48 server1 cinder-backup[21294]: /usr/lib/python3/dist-packages/cinder/db/sqlalchemy/m>
Dec 07 01:17:48 server1 cinder-backup[21294]:   num_hosts = column_property(
Dec 07 01:17:48 server1 cinder-backup[21294]: /usr/lib/python3/dist-packages/cinder/db/sqlalchemy/m>
```

Step 10: Git add, commit and push in the github.

```
diego@workstation:~/HOA15$ git add *
diego@workstation:~/HOA15$ git commit -m "BAKASYON NA"
git: 'commmit' is not a git command. See 'git --help'.

The most similar command is
        commit
diego@workstation:~/HOA15$ git commit -m "BAKASYON NA"
[main 1e7a552] BAKASYON NA
 15 files changed, 620 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 installNHC.yml
 create mode 100644 inventory
 create mode 100644 roles/cinder/tasks/main.yml
 create mode 100644 roles/cinder/tasks/templates/cinder.conf.j2
 create mode 100644 roles/cinder/tasks/templates/nova.conf.j2
 create mode 100644 roles/horizon/tasks/handlers/main.yml
 create mode 100644 roles/horizon/tasks/main.yml
 create mode 100644 roles/horizon/tasks/templates/local_settings.py.j2
 create mode 100644 roles/neutron/tasks/main.yml
 create mode 100644 roles/neutron/tasks/templates/dhcp_agent.ini.j2
 create mode 100644 roles/neutron/tasks/templates/metadata_agent.ini.j2
 create mode 100644 roles/neutron/tasks/templates/ml2_conf.ini.j2
 create mode 100644 roles/neutron/tasks/templates/neutron.conf.j2
 create mode 100644 roles/neutron/tasks/templates/openvswitch_agent.ini.j2
diego@workstation:~/HOA15$ git push origin
Username for 'https://github.com': DiegoEspiritu11
Password for 'https://DiegoEspiritu11@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/en/get-started/getting-started-with-git/about-remote-repositories#cloning-with-ht
 for information on currently recommended modes of authentication.
fatal: Authentication failed for 'https://github.com/DiegoEspiritu11/HOA15.git/'
diego@workstation:~/HOA15$ git push origin
Username for 'https://github.com': DiegoEspiritu11
Password for 'https://DiegoEspiritu11@github.com':
Enumerating objects: 29, done.
Counting objects: 100% (29/29), done.
Delta compression using up to 3 threads
Compressing objects: 100% (23/23), done.
Writing objects: 100% (28/28), 5.58 KiB | 1.86 MiB/s, done.
Total 28 (delta 3), reused 0 (delta 0), pack-reused 0
```

```
diego@workstation:~/HOA15$ git push origin
Username for 'https://github.com': DiegoEspiritu11
Password for 'https://DiegoEspiritu11@github.com':
Enumerating objects: 29, done.
Counting objects: 100% (29/29), done.
Delta compression using up to 3 threads
Compressing objects: 100% (23/23), done.
Writing objects: 100% (28/28), 5.58 KiB | 1.86 MiB/s, done.
Total 28 (delta 3), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (3/3), done.
To https://github.com/DiegoEspiritu11/HOA15.git
   e0e1d13..1e7a552  main -> main
diego@workstation:~/HOA15$
```



https://github.com/DiegoEspiritu11/HOA15.git

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services

   -Network connection is offered as a service by Neutron, an OpenStack service, to other OpenStack services. In addition to attaching interfaces to these networks, it enables users to establish and maintain networks, subnets, and routers. The OpenStack online dashboard is called Horizon. It offers a graphical user interface (GUI) via which users may interact and control the many OpenStack services (Neutron included). For usage by other OpenStack services, Cinder is an OpenStack block storage solution that offers persistent storage. It enables block storage volume and snapshot creation, attachment, and management for users. Cinder volumes may be utilized as an extra storage device connected to instances or as the primary storage for instances.

Conclusions:

After doing this very last activity for System Administration 2 (Managing Enterprise Servers) I conclude that all of the given activity throughout this course is very knowledgeable and enhance my intellectual thinking, as for this HOA the context of an OpenStack environment, Ansible serves as an Infrastructure as a tool, presenting diverse advantages. Its agentless structure and clear declarative language streamline the management and deployment of intricate infrastructures, alongside its seamless compatibility with various other software solutions. Within OpenStack, distinct elements such as Neutron, Horizon, and Cinder play pivotal roles in automating and refining processes. Neutron, for instance, acts as a service for networking, freeing users to focus on diverse tasks by overseeing networks, subnets, and routers. Horizon, the web-based interface of OpenStack, empowers users to efficiently oversee and engage with a multitude of services offered by the platform through a visually intuitive interface. Cinder, an equally essential component, facilitates block storage services within OpenStack. This feature empowers users to create, attach, and delete block-level persistent storage volumes with ease and flexibility as required