Name: Gabiano, Chris Leonard A.	Date Performed: Nov 30, 2023
Course/Section: CPE31s6	Date Submitted: Nov 30, 2023
Instructor: Engr. Jonathan Taylar	Semester and SY: 2023 - 24

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.

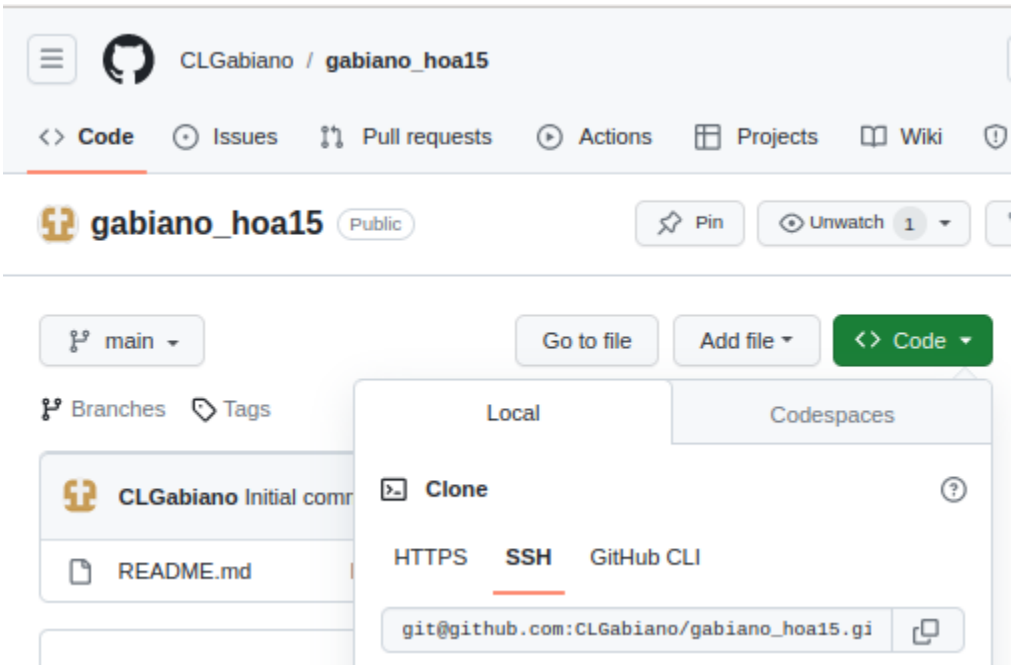
3. Resources

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

```yaml
#This is the main.yml file for installing Cinder

- name: Installing Cinder (Ubuntu)
  apt:
    name:
      - cinder-api
      - cinder-scheduler
    state: latest

- name: Configure Cinder
  replace:
        dest: /etc/cinder/cinder.conf
        regexp: connection = mysql+pymysql://cinder:CINDER_DBPASS@controller/cinder
        replace: connection = mysql+pymysql://cinder:admin123@controller/cinder
        backup: yes

- name: Configure Cinder
  replace:
        dest: /etc/cinder/cinder.conf
        regexp: transport_url = rabbit://openstack:RABBIT_PASS@controller
        replace: transport_url = rabbit://openstack:admin123@controller
        backup: yes

- name: Configure Cinder
  lineinfile:
        dest: /etc/cinder/cinder.conf
        line: 'auth_strategy = keystone'
        state: present
        backup: yes

- name: Configure Cinder
  lineinfile:
        dest: /etc/cinder/cinder.conf
        insertafter: '\[keystone_authtoken\]'
        line: '{{ item }}'
        state: present
        backup: yes
```

```yaml
    with_items:
          - 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 = cinder
          - password = pass123

  - name: Configure Cinder
    lineinfile:
          dest: /etc/cinder/cinder.conf
          line: 'my_ip = 192.168.52.103'
          state: present
          backup: yes

  - name: Configure Cinder
    lineinfile:
          dest: /etc/cinder/cinder.conf
          line: 'lock_path = /var/lib/cinder/tmp'
          state: present
          backup: yes

  - name: Populate the Database
    shell: |
      sudo cinder-manage db sync

  - name: Configure Cinder
    lineinfile:
          dest: /etc/nova/nova.conf
          line: 'os_region_name = RegionOne'
          state: present
          backup: yes
```

b. Horizon

```
#This is the main.yml file for installig Horizon

- name: Installing Horizon
  apt:
    name:
      - openstack-dashboard
    state: latest

- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: 'OPENSTACK_HOST ='
        line: 'OPENSTACK_HOST = "controller"'
        state: present
        backup: yes

- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: '^ALLOWED_HOST ='
        line: "ALLOWED_HOST = ['localhost', '*']"
        state: present
        backup: yes
        backrefs: yes

- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: 'SESSION_ENGINE ='
        line: "{{ item }}"
        state: present
        backup: yes

  with_items:
        - "SESSION_ENGINE = 'django.contrib.sessions.backends.cache'"
        - ' '
        - "CACHES = {"
        -   "'default': {"
        -       "'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',"
        -       "'LOCATION': 'controller:11211',"
        -   "}"
        - "}"
```

```
- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: 'OPENSTACK_KEYSTONE_URL ='
        line: 'OPENSTACK_KEYSTONE_URL = "http://%s5000/identity/v3" % OPENSTACK_HOST'
        state: present
        backup: yes

- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: 'OPENSTACK_KEYSTONE_MULTIDOMAIN_SUPPORT ='
        line: 'OPENSTACK_KEYSTONE_MULTIDOMAIN_SUPPORT = True'
        state: present
        backup: yes

- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: '^OPENSTACK_API_VERSIONS ='
        line: "{{ item }}"
        state: present
        backup: yes

  with_items:
        - "OPENSTACK_API_VERSIONS = {"
        -     "'identity': 3,'
        -     "'image': 2,'
        -     "'volume': 3,'
        - "}"

- name: Configure Openstack file
  lineinfile:
        dest: /etc/openstack-dashboard/local_settings.py
        regexp: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN ='
        line: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN = "Default"'
        state: present
        backup: yes
```

```
  - name: Configure Openstack file
    lineinfile:
          dest: /etc/openstack-dashboard/local_settings.py
          regexp: 'OPENSTACK_KEYSTONE_DEFAULT_ROLE ='
          line: 'OPENSTACK_KEYSTONE_DEFAULT_ROLE = "user"'
          state: present
          backup: yes

  - name: Configure Openstack file
    lineinfile:
          dest: /etc/openstack-dashboard/local_settings.py
          regexp: 'OPENSTACK_NEUTRON_NETWORK ='
          line: '{{ item }}'
          state: present
          backup: yes

    with_items:
          - "OPENSTACK_NEUTRON_NETWORK = {"
          -     "..."
          -     "'enable_router': False,"
          -     "'enable_quotas': False,"
          -     "'enable_ipv6': False,"
          -     "'enable_distributed_router': False,"
          -     "'enable_ha_router': False,"
          -     "'enable_fip_topology_check': False,"
          - "}"

  - name: Configure Openstack file
    lineinfile:
          dest: /etc/apache2/conf-available/openstack-dashboard.conf
          line: 'WSGIApplicationGroup %{GLOBAL}'
```

c. Cinder

```yaml
#This is the main.yml for installation of neutron

- name: Installing Neutron (Ubuntu)
  apt:
    name:
      - neutron-server
      - neutron-plugin-ml2
      - neutron-openvswitch-agent
      - neutron-dhcp-agent
      - neutron-metadata-agent
    state: latest

- name: Configure Neutron
  replace:
    dest: /etc/neutron/neutron.conf
    regexp: connection = mysql+pymysql://neutron:NEUTRON_DBPASS@controller/neutron
    replace: connection = mysql+pymysql://neutron:admin123@controller/neutron
    backup: yes

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    line: core_plugin = ml2
    state: present
    backup: yes

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    regexp: 'service_plugins = '
    state: absent
    backup: yes

- name: Conf Neutron
  replace:
    dest: /etc/neutron/neutron.conf
    regexp: transport_url = rabbit://openstack:RABBIT_PASS@controller
    replace: transport_url = rabbit://openstack:admin123@controller
    backup: yes
```

```yaml
- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    line: 'auth_strategy = keystone'
    state: present
    backup: yes

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    insertafter: '\[keystone_authtoken\]'
    line: "{{ item }}"
    state: present
    backup: yes

  with_items:
    - 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 = admin123

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    insertafter: '\[DEFAULT\]'
    line: "{{ item }}"
    state: present
    backup: yes

  with_items:
    - notify_nova_on_port_status_changes = true
    - notify_nova_on_port_data_changes = true
```

```yaml
- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    insertafter: '\[nova\]'
    line: "{{ item }}"
    state: present
    backup: yes

  with_items:
    - auth_url = http://controller:5000
    - auth_type = password
    - project_domain_name = Default
    - user_domain_name = Default
    - region_name = RegionOne
    - project_name = service
    - username = nova
    - password = admin123

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    line: 'lock_path = /var/lib/neutron/tmp'
    state: present
    backup: yes

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/plugins/ml2/ml2_conf.ini
    line: 'type_drivers = flat,vlan'
    state: present
    backup: yes

- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/plugins/ml2/ml2_conf.ini
    regexp: 'tenant_network_types ='
    state: absent
    backup: yes
```

```
  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/plugins/ml2/ml2_conf.ini
      insertafter: '\[ml2\]'
      line: " {{ item }}"
      state: present
      backup: yes

    with_items:
      - mechanism_drivers = openvswitch
      - extension_drivers = portsecurity

  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/plugins/ml2/ml2_conf.ini
      line: 'flat_networks = provider'
      state: present
      backup: yes

  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/plugins/ml2/openvswitch_agent.ini
      regexp: 'bridge_mappings = provider: PROVIDER_INTERFACE_NAME'
      line: 'bridge_mappings = provider:LocalMachine'
      backup: yes

  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/plugins/ml2/openvswitch_agent.ini
      insertafter: '\[securitygroup\]'
      line: "{{ item }}"
      state: present
      backup: yes

    with_items:
      - enable_security_group = true
      - firewall_driver = openvswitch

  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/dhcp_agent.ini
      insertafter: '\[DEFAULT\]'
      line: "{{ item }}"
```

```
      line: "{{ item }}"
      state: present
      backup: yes

    with_items:
      - interface_driver = openvswitch
      - dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq
      - enable_isolated_metadata = true

  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/metadata_agent.ini
      line: 'nova_metadata_host = controller'
      state: present
      backup: yes

  - name: Configure Neutron
    lineinfile:
      dest: /etc/neutron/metadata_agent.ini
      regexp: 'metadata_proxy_shared_secret = METADATA_SECRET'
      line: 'metadata_proxy_shared_secret = admin123'
      state: present
      backup: yes

  - name: Confgiure Neutron
    lineinfile:
      dest: /etc/nova/nova.conf
      insertafter: '\[neutron\]'
      line: "{{ item }}"
      state: present
      backup: yes

    with_items:
      - auth_url = http://controller:5000
      - auth_type = password
      - project_domain_name = Default
      - user_domain_name = Default
      - region_name = RegionOne
      - project_name = service
      - username = neutron
      - password = admin123
      - service_metadata_proxy = true
      - metadata_proxy_shared_secret = admin123
```

d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.

```yaml
#This is the playbook for installing OpenStack prerequisites

---

- hosts: all
  become: true
  pre_tasks:

  - name: Install Apache (Ubuntu)
    apt:
      name:
        - apache2
      state: latest
    when: ansible_distribution == "Ubuntu"

  - name: Install MySQL (Ubuntu)
    apt:
      name:
        - mysql-server
      state: latest
    when: ansible_distribution == "Ubuntu"

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

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

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

INVENTORY

Code Blame 8 lines (6 loc) · 76 Bytes Code 55% faster with GitHub Copilot

```
[neutron]
192.168.56.102

[horizon]
192.168.56.102

[cinder]
192.168.56.102
```

e. Add, commit and push it to your GitHub repo.

```
leonard@workstation:~/gabiano_hoa15$ git add *
leonard@workstation:~/gabiano_hoa15$ git commit -m "ugh"
[main 6c81441] ugh
 6 files changed, 442 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 openstack.yml
 create mode 100644 roles/cinder/tasks/main.yml
 create mode 100644 roles/horizon/tasks/main.yml
 create mode 100644 roles/neutron/tasks/main.yml
leonard@workstation:~/gabiano_hoa15$ git push origin
Counting objects: 15, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (9/9), done.
Writing objects: 100% (15/15), 3.41 KiB | 3.41 MiB/s, done.
Total 15 (delta 0), reused 0 (delta 0)
To github.com:CLGabiano/gabiano_hoa15.git
   3d1bea7..6c81441  main -> main
leonard@workstation:~/gabiano_hoa15$
```

5. **Output** (screenshots and explanations)

```
leonard@workstation:~/gabiano_hoa15$ ansible-playbook --ask-become-pass opensta
ck.yml
/home/leonard/.local/lib/python2.7/site-packages/ansible/parsing/vault/__init__
.py:44: CryptographyDeprecationWarning: Python 2 is no longer supported by the
Python core team. Support for it is now deprecated in cryptography, and will be
 removed in the next release.
  from cryptography.exceptions import InvalidSignature
BECOME password:

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

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.102]

TASK [Install Apache (Ubuntu)] *************************************************
*
ok: [192.168.56.102]

TASK [Install MySQL (Ubuntu)] **************************************************
*
changed: [192.168.56.102]

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

```
TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.102]

TASK [Install Apache (Ubuntu)] *************************************************
*
ok: [192.168.56.102]

TASK [Install MySQL (Ubuntu)] **************************************************
*
changed: [192.168.56.102]

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

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.102]

TASK [neutron : Installing Neutron (Ubuntu)] ***********************************
*
changed: [192.168.56.102]
```

```
TASK [neutron : Configure Neutron] *********************************************
*
ok: [192.168.56.102]

TASK [neutron : Configure Neutron] *********************************************
*
ok: [192.168.56.102]

TASK [neutron : Configure Neutron] *********************************************
*
ok: [192.168.56.102]

TASK [neutron : Conf Neutron] **************************************************
*
ok: [192.168.56.102]

TASK [neutron : Configure Neutron] *********************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *********************************************
*
changed: [192.168.56.102] => (item=www_authenticate_uri = http://controller:500
0)
```

```
TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102] => (item=www_authenticate_uri = http://controller:500
0)
changed: [192.168.56.102] => (item=auth_url = http://controller:5000)
changed: [192.168.56.102] => (item=memcached_servers = controller:11211)
changed: [192.168.56.102] => (item=auth_type = password)
changed: [192.168.56.102] => (item=project_domain_name = Default)
changed: [192.168.56.102] => (item=user_domain_name = Default)
changed: [192.168.56.102] => (item=project_name = service)
changed: [192.168.56.102] => (item=username = neutron)
changed: [192.168.56.102] => (item=password = admin123)

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102] => (item=notify_nova_on_port_status_changes = true)
changed: [192.168.56.102] => (item=notify_nova_on_port_data_changes = true)

TASK [neutron : Configure Neutron] ******************************************
*
ok: [192.168.56.102] => (item=auth_url = http://controller:5000)
ok: [192.168.56.102] => (item=auth_type = password)
ok: [192.168.56.102] => (item=project_domain_name = Default)
ok: [192.168.56.102] => (item=user_domain_name = Default)
changed: [192.168.56.102] => (item=region_name = RegionOne)
```

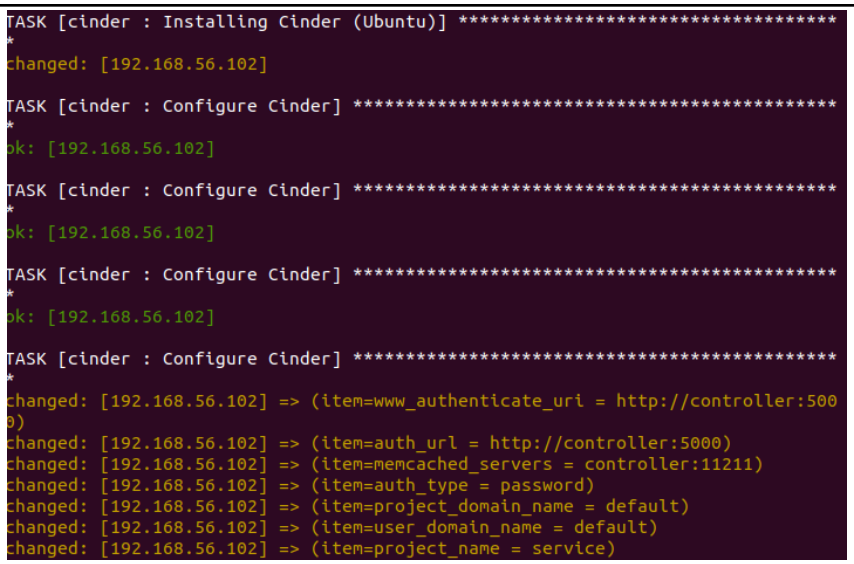
```
TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102] => (item=mechanism_drivers = openvswitch)
changed: [192.168.56.102] => (item=extension_drivers = portsecurity)

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] ******************************************
*
```

```
TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102] => (item=enable_security_group = true)
changed: [192.168.56.102] => (item=firewall_driver = openvswitch)

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102] => (item=interface_driver = openvswitch)
changed: [192.168.56.102] => (item=dhcp_driver = neutron.agent.linux.dhcp.Dnsma
sq)
changed: [192.168.56.102] => (item=enable_isolated_metadata = true)

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] ******************************************
*
changed: [192.168.56.102]

TASK [neutron : Confgiure Neutron] ******************************************
*
changed: [192.168.56.102] => (item=auth_url = http://controller:5000)
changed: [192.168.56.102] => (item=auth_type = password)
changed: [192.168.56.102] => (item=project_domain_name = Default)
changed: [192.168.56.102] => (item=user_domain_name = Default)
changed: [192.168.56.102] => (item=region_name = RegionOne)
```

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

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.102]

TASK [horizon : Installing Horizon] ********************************************
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
ok: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102] => (item=SESSION_ENGINE = 'django.contrib.sessions.ba
ckends.cache')
changed: [192.168.56.102] => (item= )
```

```
ok: [192.168.56.102] => (item=})
ok: [192.168.56.102] => (item=})

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102] => (item=OPENSTACK_API_VERSIONS = {)
changed: [192.168.56.102] => (item="identity": 3,)
changed: [192.168.56.102] => (item="image": 2,)
changed: [192.168.56.102] => (item="volume": 3,)
ok: [192.168.56.102] => (item=})

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102]
```

```
TASK [horizon : Configure Openstack file] **************************************
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] **************************************
*
ok: [192.168.56.102] => (item=OPENSTACK_NEUTRON_NETWORK = {)
changed: [192.168.56.102] => (item=...)
changed: [192.168.56.102] => (item='enable_router': False,)
changed: [192.168.56.102] => (item='enable_quotas': False,)
changed: [192.168.56.102] => (item='enable_ipv6': False,)
changed: [192.168.56.102] => (item='enable_distributed_router': False,)
changed: [192.168.56.102] => (item='enable_ha_router': False,)
changed: [192.168.56.102] => (item='enable_fip_topology_check': False,)
ok: [192.168.56.102] => (item=})

TASK [horizon : Configure Openstack file] **************************************
*
ok: [192.168.56.102]

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

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.102]

TASK [cinder : Installing Cinder (Ubuntu)] *************************************
*
```




```
changed: [192.168.56.102] => (item=username = cinder)
changed: [192.168.56.102] => (item=password = pass123)

TASK [cinder : Configure Cinder] ***********************************************
*
changed: [192.168.56.102]

TASK [cinder : Configure Cinder] ***********************************************
*
changed: [192.168.56.102]

TASK [cinder : Populate the Database] ******************************************
*
changed: [192.168.56.102]

TASK [cinder : Configure Cinder] ***********************************************
*
changed: [192.168.56.102]

PLAY RECAP *********************************************************************
*
192.168.56.102             : ok=46   changed=32   unreachable=0    failed=0
skipped=0    rescued=0    ignored=0
```

OUTPUT:

CINDER:

```
leonard@SERVER1:~$ sudo apt list --installed | grep cinder
[sudo] password for leonard:

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]
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
]
```

HORIZON:

```
leonard@SERVER1:~$ 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]
leonard@SERVER1:~$ sudo apt list --installed | grep neutron
```

NEUTRON:

```
leonard@SERVER1:~$ 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,no
w 2:12.1.1-0ubuntu8.1 all [installed,automatic]
neutron-dhcp-agent/bionic-updates,bionic-updates,bionic-security,bionic-securit
y,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-metadata-agent/bionic-updates,bionic-updates,bionic-security,bionic-sec
urity,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-openvswitch-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-securit
y,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-server/bionic-updates,bionic-updates,bionic-security,bionic-security,no
w 2:12.1.1-0ubuntu8.1 all [installed]
python-neutron/bionic-updates,bionic-updates,bionic-security,bionic-security,no
w 2:12.1.1-0ubuntu8.1 all [installed,automatic]
python-neutron-fwaas/bionic-updates,bionic-updates,now 1:12.0.2-0ubuntu1 all [i
nstalled,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,automati
c]
```

github link: https://github.com/CLGabiano/gabiano_hoa15.git

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services

Neutron is like the traffic cop of OpenStack, managing the networking aspects. It ensures that different parts of your cloud system communicate effectively, directing the flow of data like a traffic controller on the information highway.

Horizon is the user interface, essentially the dashboard for OpenStack. It's like the control center where users can visually manage and monitor their cloud resources, providing an easy-to-use interface for tasks like creating virtual machines or checking system status.

Cinder, on the other hand, is the storage manager. It's responsible for handling the storage aspects in OpenStack, acting like a virtual storage clerk that helps organize and allocate storage resources for your cloud applications and services.

Conclusions:

In conclusion, cloud services offer flexibility and cost efficiency but raise concerns about security. Public clouds are cost-effective, private clouds offer more security control, and hybrid clouds balance both. In OpenStack, Neutron manages communication, Horizon serves as a user-friendly dashboard, and Cinder organizes storage. Together, they make OpenStack efficient and user-friendly for effective cloud infrastructure management.