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<div align="center">Activity 15: OpenStack Installation (Neutron, Horizon, Cinder)</div>

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.
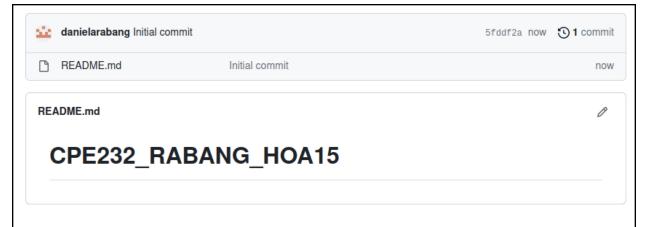
3. Resources

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 a repository.

README.md   ✏️

CPE232_RABANG_HOA15

Clone the repository.

```
daniela@workstation:~$ git clone https://github.com/danielarabang/CPE232_RABANG_HOA15.git
Cloning into 'CPE232_RABANG_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.
```

Create an inventory file.

```
  GNU nano 6.2                                    inventory
[neutron]
192.168.56.110  ansible_python_interpreter=/usr/bin/python3

[horizon]
192.168.56.110  ansible_python_interpreter=/usr/bin/python3

[cinder]
192.168.56.110  ansible_python_interpreter=/usr/bin/python3
```

Create an ansible.cfg file

```
  GNU nano 6.2                                    ansible.cfg *
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warning = False

remote_user = daniela
private_key_file = ~/.ssh/
```

Create an install.yml, this will be run later.

```
  GNU nano 6.2                                    install.yml *
 hosts: neutron
  become: true
  roles:
    - role: neutron

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

- hosts: cinder
  become: true
  roles:
    - role: cinder
```
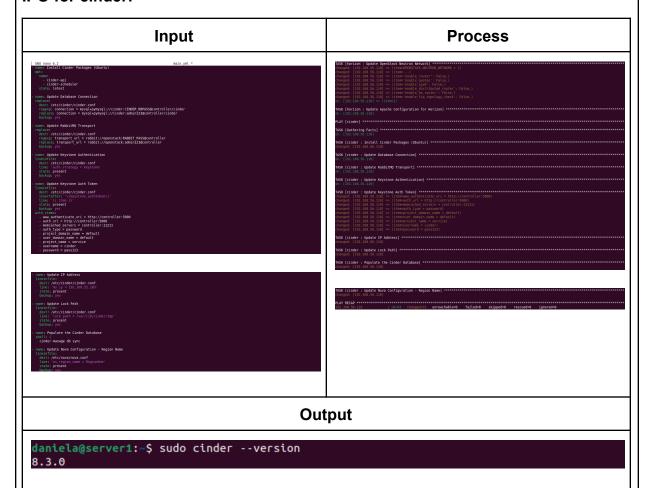
Create the three roles which are the cinder, horizon, and neutron.

```
daniela@workstation:~/CPE232_RABANG_HOA15$ mkdir roles
daniela@workstation:~/CPE232_RABANG_HOA15$ cd roles
daniela@workstation:~/CPE232_RABANG_HOA15/roles$ mkdir cinder
daniela@workstation:~/CPE232_RABANG_HOA15/roles$ cd cinder
daniela@workstation:~/CPE232_RABANG_HOA15/roles/cinder$ mkdir tasks
daniela@workstation:~/CPE232_RABANG_HOA15/roles/cinder$ cd tasks
daniela@workstation:~/CPE232_RABANG_HOA15/roles/cinder/tasks$ sudo nano main.yml
```

```
daniela@workstation:~/CPE232_RABANG_HOA15$ cd roles
daniela@workstation:~/CPE232_RABANG_HOA15/roles$ mkdir horizon
daniela@workstation:~/CPE232_RABANG_HOA15/roles$ cd horizon
daniela@workstation:~/CPE232_RABANG_HOA15/roles/horizon$ mkdir tasks
daniela@workstation:~/CPE232_RABANG_HOA15/roles/horizon$ cd tasks
daniela@workstation:~/CPE232_RABANG_HOA15/roles/horizon/tasks$ sudo nano main.yml
```

```
daniela@workstation:~/CPE232_RABANG_HOA15/roles$ mkdir neutron
daniela@workstation:~/CPE232_RABANG_HOA15/roles$ cd neutron
daniela@workstation:~/CPE232_RABANG_HOA15/roles/neutron$ mkdir tasks
daniela@workstation:~/CPE232_RABANG_HOA15/roles/neutron$ cd tasks
daniela@workstation:~/CPE232_RABANG_HOA15/roles/neutron/tasks$ sudo nano main.yml
```

IPO for cinder:

Input	Process

Output

IPO for horizon:

Input	Process

Output

```
daniela@server1:~$ apt list --installed | grep horizon

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

python3-django-horizon/jammy-updates,jammy-updates,now 4:22.1.1-0ubuntu1 all [installed,automatic]
```

IPO for neutron:

Input	Process

```
  GNU nano 6.2                                main.yml *
- name: Update Neutron Security Group
  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: Update Neutron DHCP Agent Configuration
  lineinfile:
    dest: /etc/neutron/dhcp_agent.ini
    insertafter: '\[DEFAULT\]'
    line: "{{ item }}"
    state: present
    backup: yes
  with_items:
    - interface_driver = openvswitch
    - dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq
    - enable_isolated_metadata = true

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

- name: Update Neutron Shared Secret
  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: Update Nova Configuration for 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
```

Output

```
daniela@server1:~$ sudo neutron --version
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI instead.
7.8.0
```
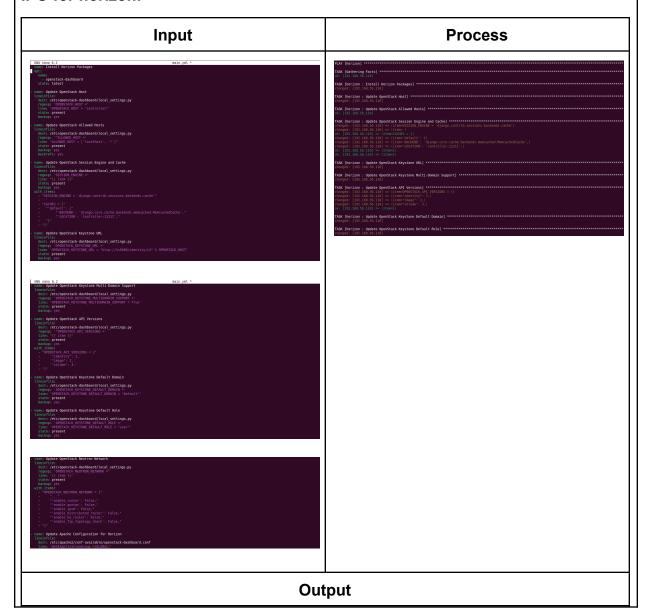
```
daniela@server1:~$ apt list --installed | grep neutron

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

neutron-common/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed,automatic]
neutron-dhcp-agent/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-metadata-agent/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-openvswitch-agent/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-plugin-ml2/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-server/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
python3-neutron-lib/jammy,jammy,now 2.20.0-0ubuntu1 all [installed,automatic]
python3-neutron/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed,automatic]
python3-neutronclient/jammy,jammy,now 1:7.8.0-0ubuntu1 all [installed,automatic]
```

Below is all the Input, Process, and the Output that is complete:

Cinder:

```yaml
- name: Install Cinder Packages (Ubuntu)
  apt:
    name:
      - cinder-api
      - cinder-scheduler
    state: latest

- name: Update Database Connection
  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: Update RabbitMQ Transport
  replace:
    dest: /etc/cinder/cinder.conf
    regexp: transport_url = rabbit://openstack:RABBIT_PASS@controller
    replace: transport_url = rabbit://openstack:admin123@controller
    backup: yes

- name: Update Keystone Authentication
  lineinfile:
    dest: /etc/cinder/cinder.conf
    line: 'auth_strategy = keystone'
    state: present
    backup: yes

- name: Update Keystone Auth Token
  lineinfile:
    dest: /etc/cinder/cinder.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 = cinder
    - password = pass123
```

```yaml
- name: Update IP Address
  lineinfile:
    dest: /etc/cinder/cinder.conf
    line: 'my_ip = 192.168.52.103'
    state: present
    backup: yes

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

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

- name: Update Nova Configuration - Region Name
  lineinfile:
    dest: /etc/nova/nova.conf
    line: 'os_region_name = RegionOne'
    state: present
    backup: yes
```

Horizon:

```
  GNU nano 6.2                                    main.yml *
- name: Install Horizon Packages
  apt:
    name:
      - openstack-dashboard
    state: latest

- name: Update OpenStack Host
  lineinfile:
    dest: /etc/openstack-dashboard/local_settings.py
    regexp: 'OPENSTACK_HOST ='
    line: 'OPENSTACK_HOST = "controller"'
    state: present
    backup: yes

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

- name: Update OpenStack Session Engine and Cache
  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: Update OpenStack Keystone URL
  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
```

```
  GNU nano 6.2                                    main.yml *
- name: Update OpenStack Keystone Multi-Domain Support
  lineinfile:
    dest: /etc/openstack-dashboard/local_settings.py
    regexp: 'OPENSTACK_KEYSTONE_MULTIDOMAIN_SUPPORT ='
    line: 'OPENSTACK_KEYSTONE_MULTIDOMAIN_SUPPORT = True'
    state: present
    backup: yes

- name: Update OpenStack API Versions
  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: Update OpenStack Keystone Default Domain
  lineinfile:
    dest: /etc/openstack-dashboard/local_settings.py
    regexp: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN ='
    line: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN = "Default"'
    state: present
    backup: yes

- name: Update OpenStack Keystone Default Role
  lineinfile:
    dest: /etc/openstack-dashboard/local_settings.py
    regexp: 'OPENSTACK_KEYSTONE_DEFAULT_ROLE ='
    line: 'OPENSTACK_KEYSTONE_DEFAULT_ROLE = "user"'
    state: present
    backup: yes
```

```yaml
- name: Update OpenStack Neutron Network
  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: Update Apache Configuration for Horizon
  lineinfile:
    dest: /etc/apache2/conf-available/openstack-dashboard.conf
    line: 'WSGIApplicationGroup %{GLOBAL}'
```

Neutron:

```
  GNU nano 6.2                                          main.yml *
- name: Install Neutron Packages (Ubuntu)
  apt:
    name:
      - neutron-server
      - neutron-plugin-ml2
      - neutron-openvswitch-agent
      - neutron-dhcp-agent
      - neutron-metadata-agent
    state: latest

- name: Update Neutron Database Connection
  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: Update Neutron Core Plugin
  lineinfile:
    dest: /etc/neutron/neutron.conf
    line: core_plugin = ml2
    state: present
    backup: yes

- name: Update Neutron Remove Service Plugins
  lineinfile:
    dest: /etc/neutron/neutron.conf
    regexp: 'service_plugins = '
    state: absent
    backup: yes

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

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

```yaml
- name: Update Neutron Keystone Auth Token
  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: Update Neutron Configuration - Defaults
  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

- name: Update Neutron Nova Section
  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
```

```yaml
- name: Update Neutron Lock Path
  lineinfile:
    dest: /etc/neutron/neutron.conf
    line: 'lock_path = /var/lib/neutron/tmp'
    state: present
    backup: yes

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

- name: Update Neutron Remove Tenant Network Types
  lineinfile:
    dest: /etc/neutron/plugins/ml2/ml2_conf.ini
    regexp: 'tenant_network_types ='
    state: absent
    backup: yes

- name: Update Neutron ML2 Configuration - ML2 Section
  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: Update Neutron Flat Networks
  lineinfile:
    dest: /etc/neutron/plugins/ml2/ml2_conf.ini
    line: 'flat_networks = provider'
    state: present
    backup: yes

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

```
  GNU nano 6.2                                                main.yml *
- name: Update Neutron Security Group
  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: Update Neutron DHCP Agent Configuration
  lineinfile:
    dest: /etc/neutron/dhcp_agent.ini
    insertafter: '\[DEFAULT\]'
    line: "{{ item }}"
    state: present
    backup: yes
  with_items:
    - interface_driver = openvswitch
    - dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq
    - enable_isolated_metadata = true

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

- name: Update Neutron Shared Secret
  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: Update Nova Configuration for 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
```

Process:

```
daniela@workstation:~/CPE232_RABANG_HOA15$ ansible-playbook --ask-become-pass install.yml
BECOME password:

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

TASK [Gathering Facts] ************************************************************************************
ok: [192.168.56.110]

TASK [neutron : Install Neutron Packages (Ubuntu)] ******************************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Database Connection] ****************************************************
ok: [192.168.56.110]

TASK [neutron : Update Neutron Core Plugin] ***********************************************************
ok: [192.168.56.110]

TASK [neutron : Update Neutron Remove Service Plugins] ************************************************
ok: [192.168.56.110]

TASK [neutron : Update Neutron RabbitMQ Transport] ***************************************************
ok: [192.168.56.110]

TASK [neutron : Update Neutron Keystone Authentication] **********************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Keystone Auth Token] *************************************************
changed: [192.168.56.110] => (item=www_authenticate_uri = http://controller:5000)
changed: [192.168.56.110] => (item=auth_url = http://controller:5000)
changed: [192.168.56.110] => (item=memcached_servers = controller:11211)
changed: [192.168.56.110] => (item=auth_type = password)
changed: [192.168.56.110] => (item=project_domain_name = Default)
changed: [192.168.56.110] => (item=user_domain_name = Default)
changed: [192.168.56.110] => (item=project_name = service)
changed: [192.168.56.110] => (item=username = neutron)
changed: [192.168.56.110] => (item=password = admin123)

TASK [neutron : Update Neutron Configuration - Defaults] ********************************************
changed: [192.168.56.110] => (item=notify_nova_on_port_status_changes = true)
changed: [192.168.56.110] => (item=notify_nova_on_port_data_changes = true)

TASK [neutron : Update Neutron Nova Section] *******************************************************
ok: [192.168.56.110] => (item=auth_url = http://controller:5000)
ok: [192.168.56.110] => (item=auth_type = password)
ok: [192.168.56.110] => (item=project_domain_name = Default)
ok: [192.168.56.110] => (item=user_domain_name = Default)
changed: [192.168.56.110] => (item=region_name = RegionOne)
ok: [192.168.56.110] => (item=project_name = service)
changed: [192.168.56.110] => (item=username = nova)
ok: [192.168.56.110] => (item=password = admin123)
```

```
TASK [neutron : Update Neutron Lock Path] ***********************************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Type Drivers] ********************************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Remove Tenant Network Types] *****************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron ML2 Configuration - ML2 Section] ************************************
changed: [192.168.56.110] => (item=mechanism_drivers = openvswitch)
changed: [192.168.56.110] => (item=extension_drivers = portsecurity)

TASK [neutron : Update Neutron Flat Networks] ******************************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Bridge Mappings] ****************************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Security Group] *****************************************************
changed: [192.168.56.110] => (item=enable_security_group = true)
changed: [192.168.56.110] => (item=firewall_driver = openvswitch)

TASK [neutron : Update Neutron DHCP Agent Configuration] ******************************************
changed: [192.168.56.110] => (item=interface_driver = openvswitch)
changed: [192.168.56.110] => (item=dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq)
changed: [192.168.56.110] => (item=enable_isolated_metadata = true)

TASK [neutron : Update Neutron Metadata Agent Configuration] **************************************
changed: [192.168.56.110]

TASK [neutron : Update Neutron Shared Secret] *****************************************************
changed: [192.168.56.110]

TASK [neutron : Update Nova Configuration for Neutron] ********************************************
changed: [192.168.56.110] => (item=auth_url = http://controller:5000)
changed: [192.168.56.110] => (item=auth_type = password)
changed: [192.168.56.110] => (item=project_domain_name = Default)
changed: [192.168.56.110] => (item=user_domain_name = Default)
changed: [192.168.56.110] => (item=region_name = RegionOne)
changed: [192.168.56.110] => (item=project_name = service)
changed: [192.168.56.110] => (item=username = neutron)
changed: [192.168.56.110] => (item=password = admin123)
changed: [192.168.56.110] => (item=service_metadata_proxy = true)
changed: [192.168.56.110] => (item=metadata_proxy_shared_secret = admin123)
```

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

TASK [Gathering Facts] ************************************************************************
ok: [192.168.56.110]

TASK [horizon : Install Horizon Packages] ***************************************************
changed: [192.168.56.110]

TASK [horizon : Update OpenStack Host] *****************************************************
changed: [192.168.56.110]

TASK [horizon : Update OpenStack Allowed Hosts] ********************************************
ok: [192.168.56.110]

TASK [horizon : Update OpenStack Session Engine and Cache] ********************************
changed: [192.168.56.110] => (item=SESSION_ENGINE = 'django.contrib.sessions.backends.cache')
changed: [192.168.56.110] => (item= )
ok: [192.168.56.110] => (item=CACHES = {)
changed: [192.168.56.110] => (item='default': {)
changed: [192.168.56.110] => (item='BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',)
changed: [192.168.56.110] => (item='LOCATION': 'controller:11211',)
ok: [192.168.56.110] => (item=})
ok: [192.168.56.110] => (item=})

TASK [horizon : Update OpenStack Keystone URL] *******************************************
changed: [192.168.56.110]

TASK [horizon : Update OpenStack Keystone Multi-Domain Support] *************************
changed: [192.168.56.110]

TASK [horizon : Update OpenStack API Versions] ****************************************
changed: [192.168.56.110] => (item=OPENSTACK_API_VERSIONS = {)
changed: [192.168.56.110] => (item="identity": 3,)
changed: [192.168.56.110] => (item="image": 2,)
changed: [192.168.56.110] => (item="volume": 3,)
ok: [192.168.56.110] => (item=})

TASK [horizon : Update OpenStack Keystone Default Domain] ****************************
changed: [192.168.56.110]

TASK [horizon : Update OpenStack Keystone Default Role] *****************************
changed: [192.168.56.110]
```

```
TASK [horizon : Update OpenStack Neutron Network] ******************************************
changed: [192.168.56.110] => (item=OPENSTACK_NEUTRON_NETWORK = {)
changed: [192.168.56.110] => (item=...)
changed: [192.168.56.110] => (item='enable_router': False,)
changed: [192.168.56.110] => (item='enable_quotas': False,)
changed: [192.168.56.110] => (item='enable_ipv6': False,)
changed: [192.168.56.110] => (item='enable_distributed_router': False,)
changed: [192.168.56.110] => (item='enable_ha_router': False,)
changed: [192.168.56.110] => (item='enable_fip_topology_check': False,)
ok: [192.168.56.110] => (item=})

TASK [horizon : Update Apache Configuration for Horizon] ***********************************
ok: [192.168.56.110]

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

TASK [Gathering Facts] ******************************************************************
ok: [192.168.56.110]

TASK [cinder : Install Cinder Packages (Ubuntu)] ***************************************
changed: [192.168.56.110]

TASK [cinder : Update Database Connection] ********************************************
ok: [192.168.56.110]

TASK [cinder : Update RabbitMQ Transport] ********************************************
ok: [192.168.56.110]

TASK [cinder : Update Keystone Authentication] ***************************************
ok: [192.168.56.110]

TASK [cinder : Update Keystone Auth Token] ******************************************
changed: [192.168.56.110] => (item=www_authenticate_uri = http://controller:5000)
changed: [192.168.56.110] => (item=auth_url = http://controller:5000)
changed: [192.168.56.110] => (item=memcached_servers = controller:11211)
changed: [192.168.56.110] => (item=auth_type = password)
changed: [192.168.56.110] => (item=project_domain_name = default)
changed: [192.168.56.110] => (item=user_domain_name = default)
changed: [192.168.56.110] => (item=project_name = service)
changed: [192.168.56.110] => (item=username = cinder)
changed: [192.168.56.110] => (item=password = pass123)

TASK [cinder : Update IP Address] **************************************************
changed: [192.168.56.110]

TASK [cinder : Update Lock Path] **************************************************
changed: [192.168.56.110]

TASK [cinder : Populate the Cinder Database] *************************************
changed: [192.168.56.110]


TASK [cinder : Update Nova Configuration - Region Name] ************************
changed: [192.168.56.110]

PLAY RECAP ********************************************************************
192.168.56.110             : ok=43   changed=31   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0
```

Output:

```
daniela@server1:~$ sudo neutron --version
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI instead.
7.8.0
daniela@server1:~$ sudo cinder --version
8.3.0
```

```
daniela@server1:~$ apt list --installed | grep neutron

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

neutron-common/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed,automatic]
neutron-dhcp-agent/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-metadata-agent/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-openvswitch-agent/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-plugin-ml2/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
neutron-server/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed]
python3-neutron-lib/jammy,jammy,now 2.20.0-0ubuntu1 all [installed,automatic]
python3-neutron/jammy-updates,jammy-updates,now 2:20.4.0-0ubuntu1 all [installed,automatic]
python3-neutronclient/jammy,jammy,now 1:7.8.0-0ubuntu1 all [installed,automatic]
```

```
daniela@server1:~$ apt list --installed | grep cinder

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

cinder-api/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1 all [installed]
cinder-common/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1 all [installed,automatic]
cinder-scheduler/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1 all [installed]
python3-cinder/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1 all [installed,automatic]
python3-cinderclient/jammy,jammy,now 1:8.3.0-0ubuntu1 all [installed,automatic]
```

```
daniela@server1:~$ apt list --installed | grep horizon

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

python3-django-horizon/jammy-updates,jammy-updates,now 4:22.1.1-0ubuntu1 all [installed,automatic]
```

Git push all the work that you had done.

```
daniela@workstation:~/CPE232_RABANG_HOA15$ git add *
daniela@workstation:~/CPE232_RABANG_HOA15$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   ansible.cfg
        new file:   install.yml
        new file:   inventory
        new file:   roles/cinder/tasks/main.yml
        new file:   roles/horizon/tasks/main.yml
        new file:   roles/neutron/tasks/main.yml

daniela@workstation:~/CPE232_RABANG_HOA15$ git commit -m "final"
[main 8bda3da] final
 6 files changed, 402 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 install.yml
 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
daniela@workstation:~/CPE232_RABANG_HOA15$ git push
Username for 'https://github.com': daniela
Password for 'https://daniela@github.com':
Enumerating objects: 16, done.
Counting objects: 100% (16/16), done.
Delta compression using up to 2 threads
Compressing objects: 100% (9/9), done.
Writing objects: 100% (15/15), 3.31 KiB | 3.31 MiB/s, done.
Total 15 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To https://github.com/danielarabang/CPE232_RABANG_HOA15.git
   5fddf2a..8bda3da  main -> main
```

Github repository link:
https://github.com/danielarabang/CPE232_RABANG_HOA15.git

Reflections:
Answer the following:
1. **Describe Neutron, Horizon and Cinder services**

- Neutron serves as OpenStack's networking service, facilitating cloud network connectivity via APIs. It empowers users to define and oversee network components like subnets, routers, and security groups. Horizon, on the other hand, acts as a web-based dashboard service within OpenStack. It presents a user-friendly interface for overseeing diverse facets of an OpenStack cloud environment, including virtual machines, networks, and storage resources. Lastly, Cinder functions as an OpenStack block storage service, empowering users to generate, attach, and manage volumes utilized by virtual machines. It offers adaptable storage options tailored to specific needs such as performance and cost.

Conclusions:

In this hands-on activity I had learned to install the different services that is needed and asked for this activity. Because of this, I am able to weigh the benefits and drawbacks and make well-informed decisions about utilizing cloud solutions. Through out the activity, I had encountered numerous errors from the playbook codes that I had inputted. Several attempts to fix this codes made me realize that it is kind of tricky to execute the different packages that is need to be able to install this services. Therefore, with the proper research and debugging I had done the playbook to run successfully to be able to finish the tasks that is being asked to be done and executed.