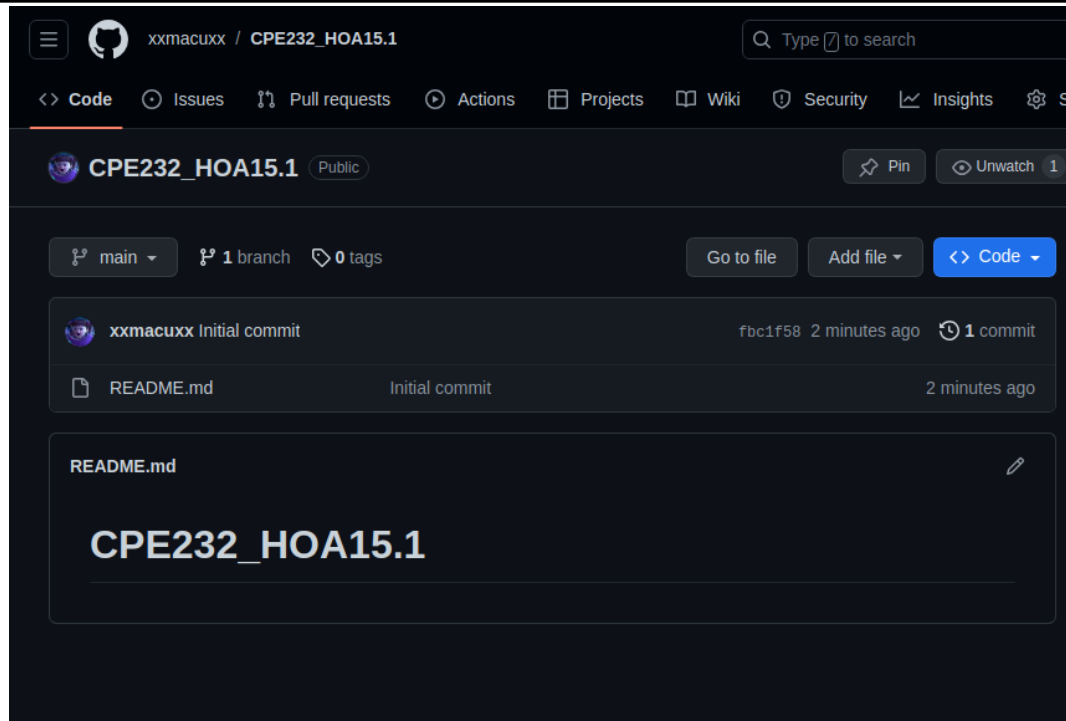


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Course/Section: CPE232/CPE31S6	Date Submitted: 12/04/23
Instructor: Dr. Jonathan V. Taylar	Semester and SY: 1st Sem(2023-2024)
Activity 15: OpenStack Installation (Neutron, Horizon, Cinder)	
1. Objectives	
Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).	
2. Intended Learning Outcomes	
<ol style="list-style-type: none"> 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	
<p>Oracle VirtualBox (Hypervisor)</p> <p>1x Ubuntu VM or Centos VM</p>	
4. Tasks	
<ol style="list-style-type: none"> 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/ <ol style="list-style-type: none"> 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)	
Task 1: Create a File <ol style="list-style-type: none"> 1. Create a new repository for this Hands-On Activity. 	



```
jai@workstation: ~  
jai@workstation:~$ git clone git@github.com:xxmacuxx/CPE232_HOA15.1.git  
Cloning into 'CPE232_HOA15.1'...  
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.  
jai@workstation:~$
```

2. Create the ansible.cfg and inventory file (*must include one Ubuntu*)

```
jai@workstation: ~/CPE232_HOA15.1
GNU nano 6.2 ansible.cfg *
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

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

```
jai@workstation: ~/CPE232_HOA15.1
GNU nano 6.2 inventory *
[Neutron]
192.168.56.110

[Horizon]
192.168.56.110

[Cinder]
192.168.56.110
```

Task 2: Create Playbook for Installing OpenStack

1. Create a playbook and name it install_openstack.yml.

jai@workstation: ~/CPE232_HOA15.1

GNU nano 6.2

install_openstack.yml

```
---
- 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
```

Code explanation:

This Ansible playbook automates the installation of Apache and MySQL on all hosts. It first checks if the distribution is Ubuntu, then installs the latest version of Apache and MySQL using the apt package manager. The 'become: true' allows privilege escalation for installation.

```

- 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"

```

This Ansible playbook orchestrates tasks on different hosts. It installs and configures roles on hosts named Neutron, Horizon, and Cinder. The 'become: true' enables privileged actions, and each 'roles' section specifies a role to apply, ensuring specific configurations are set up on the respective hosts

```

- hosts: Neutron
  become: true
  roles:
    - role: Neutron

- hosts: Horizon
  become: true
  roles:
    - role: Horizon

- hosts: Cinder
  become: true
  roles:
    - role: Cinder

```

2. Save the file and exit.

Task 3: Create Roles

1. Create a new directory and name it "roles". Enter the roles directory and create new directories: Neutron, Horizon, and Cinder. For each directory, create a directory and name it tasks.

For Neutron

```
jai@workstation:~/CPE232_H0A15.1/roles$ mkdir Neutron
jai@workstation:~/CPE232_H0A15.1/roles$ cd Neutron
jai@workstation:~/CPE232_H0A15.1/roles/Neutron$ mkdir tasks
jai@workstation:~/CPE232_H0A15.1/roles/Neutron$ cd tasks
jai@workstation:~/CPE232_H0A15.1/roles/Neutron/tasks$
```

For Horizon

```
jai@workstation:~/CPE232_H0A15.1/roles$ mkdir Horizon
jai@workstation:~/CPE232_H0A15.1/roles$ cd Horizon
jai@workstation:~/CPE232_H0A15.1/roles/Horizon$ mkdir tasks
jai@workstation:~/CPE232_H0A15.1/roles/Horizon$ cd tasks
jai@workstation:~/CPE232_H0A15.1/roles/Horizon/tasks$
```

For Cinder

```
jai@workstation:~/CPE232_H0A15.1/roles/Horizon/tasks$ cd ../..
jai@workstation:~/CPE232_H0A15.1/roles$ mkdir Cinder
jai@workstation:~/CPE232_H0A15.1/roles$ cd Cinder
jai@workstation:~/CPE232_H0A15.1/roles/Cinder$ mkdir tasks
jai@workstation:~/CPE232_H0A15.1/roles/Cinder$ cd tasks
jai@workstation:~/CPE232_H0A15.1/roles/Cinder/tasks$
```

2. In each of the tasks for the three directory (*Neutron*, *Horizon*, *Cinder*), create another file and name it `main.yml`

For Neutron

```
jai@workstation:~/CPE232_H0A15.1/roles/Cinder/tasks$ cd ../../
jai@workstation:~/CPE232_H0A15.1/roles$ cd Neutron/tasks
jai@workstation:~/CPE232_H0A15.1/roles/Neutron/tasks$ sudo nano main.yml
jai@workstation:~/CPE232_H0A15.1/roles/Neutron/tasks$
```

For Horizon

```
jai@workstation:~/CPE232_H0A15.1/roles/Neutron/tasks$ cd ../../
jai@workstation:~/CPE232_H0A15.1/roles$ cd Horizon/tasks
jai@workstation:~/CPE232_H0A15.1/roles/Horizon/tasks$ sudo nano main.yml
jai@workstation:~/CPE232_H0A15.1/roles/Horizon/tasks$
```

For Cinder

```
jai@workstation:~/CPE232_H0A15.1/roles$ cd Cinder/tasks
jai@workstation:~/CPE232_H0A15.1/roles/Cinder/tasks$ sudo nano main.yml
jai@workstation:~/CPE232_H0A15.1/roles/Cinder/tasks$
```

Tree for roles

```
jai@workstation:~/CPE232_HOA15.1/roles$ tree
.
├── Cinder
│   └── tasks
│       └── main.yml
├── Horizon
│   └── tasks
│       └── main.yml
└── Neutron
    └── tasks
        └── main.yml

6 directories, 3 files
```

3. Copy the code to the main.yml of the each subdirectory.

For Neutron

```
jai@workstation: ~/CPE232_HOA15.1/roles/Neutron/tasks
GNU nano 6.2 main.yml *

- name: Installing Neutron for 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/neu
    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
```

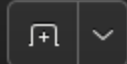
```
jai@workstation: ~/CPE232_HOA15.1/roles/Neutron/tasks
GNU nano 6.2 main.yml *

- 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

- 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: '\[keystone_auth\]'
    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
```

jai@workstation: ~/CPE232_HOA15.1/roles/Neutron/tasks

GNU nano 6.2

main.yml *

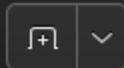
```
- name: Configure Neutron
  lineinfile:
    dest: /etc/neutron/neutron.conf
    insertafter: '\[DEFAULT\]'
    line: "[{ item }]"
    state: present
    backup: yes

  with_items:
    - notify_nova_on_port_status_changes = true
    - notify_nova_on_port_data_changes = true

- 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
```



jai@workstation: ~/CPE232_HOA15.1/roles/Neutron/tasks

GNU nano 6.2

main.yml *

```
- 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:
```

```
jai@workstation: ~/CPE232_HOA15.1/roles/Neutron/tasks
GNU nano 6.2 main.yml *

- 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 }}"
    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
```

```
jai@workstation: ~/CPE232_HOA15.1/roles/Neutron/tasks
GNU nano 6.2 main.yml *

- 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: Configure 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
```

For Horizon

```
jai@workstation: ~/CPE232_HOA15.1/roles/Horizon/ta...
GNU nano 6.2 main.yml

- 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
```

```

- 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"'

```

```

- 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}'

```

For Cinder

```
jai@workstation: ~/CPE232_HOA15.1/roles/Cinder/tasks
GNU nano 6.2 main.yml

- 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

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

```

Task 4: Run and Verify

1. Run the command `ansible-playbook - - ask-become-pass install_openstack.yml` to completely install the OpenStack base services.

```
jal@workstation: ~/CPE232_HOA15.1
jal@workstation:~/CPE232_HOA15.1$ ansible-playbook --ask-become-pass install_openstack.yml
BECOME password:

PLAY [all] *****

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

TASK [Install Apache (Ubuntu)] *****
ok: [192.168.56.110]

TASK [Install MySQL (Ubuntu)] *****
ok: [192.168.56.110]

PLAY [Neutron] *****

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

TASK [Neutron : Installing Neutron (Ubuntu)] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Conf Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110] => (item=www_authenticate_uri = http://controller:5000)
ok: [192.168.56.110] => (item=auth_url = http://controller:5000)
ok: [192.168.56.110] => (item=memcached_servers = controller:11211)
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)
ok: [192.168.56.110] => (item=project_name = service)
ok: [192.168.56.110] => (item=username = neutron)
ok: [192.168.56.110] => (item=password = admin123)
```

```
jai@workstation: ~/CPE232_HOA15.1

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110] => (item=notify_nova_on_port_status_changes = true)
ok: [192.168.56.110] => (item=notify_nova_on_port_data_changes = true)

TASK [Neutron : Configure Neutron] *****
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)
ok: [192.168.56.110] => (item=region_name = RegionOne)
ok: [192.168.56.110] => (item=project_name = service)
ok: [192.168.56.110] => (item=username = nova)
ok: [192.168.56.110] => (item=password = admin123)

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110] => (item=mechanism_drivers = openvswitch)
ok: [192.168.56.110] => (item=extension_drivers = portsecurity)

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110] => (item=enable_security_group = true)
ok: [192.168.56.110] => (item=firewall_driver = openvswitch)

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110] => (item=interface_driver = openvswitch)
ok: [192.168.56.110] => (item=dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq)
ok: [192.168.56.110] => (item=enable_isolated_metadata = true)

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]
```

```
jai@workstation: ~/CPE232_HOA15.1

TASK [Neutron : Configure Neutron] *****
ok: [192.168.56.110]

TASK [Neutron : Configure Neutron] *****
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)
ok: [192.168.56.110] => (item=region_name = RegionOne)
ok: [192.168.56.110] => (item=project_name = service)
ok: [192.168.56.110] => (item=username = neutron)
ok: [192.168.56.110] => (item=password = admin123)
ok: [192.168.56.110] => (item=service_metadata_proxy = true)
ok: [192.168.56.110] => (item=metadata_proxy_shared_secret = admin123)

PLAY [Horizon] *****

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

TASK [Horizon : Installing Horizon] *****
changed: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
changed: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
ok: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
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 : Configure Openstack file] *****
changed: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
changed: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
changed: [192.168.56.110] => (item=OPENSTACK_API_VERSIONS = {})
changed: [192.168.56.110] => (item="identity": 3 )
```

```
jai@workstation: ~/CPE232_HOA15.1

TASK [Horizon : Configure Openstack file] *****
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 : Configure Openstack file] *****
changed: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
changed: [192.168.56.110]

TASK [Horizon : Configure Openstack file] *****
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 : Configure Openstack file] *****
ok: [192.168.56.110]

PLAY [Cinder] *****

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

TASK [Cinder : Installing Cinder (Ubuntu)] *****
changed: [192.168.56.110]

TASK [Cinder : Configure Cinder] *****
ok: [192.168.56.110]

TASK [Cinder : Configure Cinder] *****
ok: [192.168.56.110]

TASK [Cinder : Configure Cinder] *****
ok: [192.168.56.110]

TASK [Cinder : Configure Cinder] *****
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)
```

```

TASK [Cinder : Configure Cinder] *****
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 : Configure Cinder] *****
changed: [192.168.56.110]

TASK [Cinder : Configure Cinder] *****
changed: [192.168.56.110]

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

TASK [Cinder : Configure Cinder] *****
changed: [192.168.56.110]

PLAY RECAP *****
192.168.56.110      : ok=46   changed=15   unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

2. Show the screenshot of the Neutron, Horizon, and Cinder that are working.

Neutron

```

Executing: /lib/systemd/systemd-sysv-install enable neutron-server
jai@server2:~$ systemctl start neutron-server
jai@server2:~$ systemctl status neutron-server
● neutron-server.service - OpenStack Neutron Server
   Loaded: loaded (/lib/systemd/system/neutron-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2023-12-04 15:56:21 PST; 247ms ago
     Docs: man:neutron-server(1)
  Main PID: 4518 (neutron-server)
    Tasks: 1 (limit: 4594)
   Memory: 19.8M
      CPU: 229ms
   CGroup: /system.slice/neutron-server.service
           └─4518 /usr/bin/python3 /usr/bin/neutron-server --config-file=/etc/neutron/neutron.conf

Dec 04 15:56:21 server2 systemd[1]: Started OpenStack Neutron Server.
lines 1-12/12 (END)...skipping...
● neutron-server.service - OpenStack Neutron Server
   Loaded: loaded (/lib/systemd/system/neutron-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2023-12-04 15:56:21 PST; 247ms ago
     Docs: man:neutron-server(1)
  Main PID: 4518 (neutron-server)
    Tasks: 1 (limit: 4594)
   Memory: 19.8M
      CPU: 229ms
   CGroup: /system.slice/neutron-server.service
           └─4518 /usr/bin/python3 /usr/bin/neutron-server --config-file=/etc/neutron/neutron.conf

Dec 04 15:56:21 server2 systemd[1]: Started OpenStack Neutron Server.

```

Horizon

```
jai@server2:~$ systemctl status apache2
* apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enable)
   Active: failed (Result: exit-code) since Mon 2023-12-04 15:52:02 PST; 8min ago
     Docs: https://httpd.apache.org/docs/2.4/
    CPU: 53ms

Dec 04 15:52:02 server2 apachectl[1370]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name: []
Dec 04 15:52:02 server2 apachectl[1370]: (98)Address already in use: AH00072: make_sock: could not bind to address 0.0.0.0:80
Dec 04 15:52:02 server2 apachectl[1370]: (98)Address already in use: AH00072: make_sock: could not bind to address ::::80
Dec 04 15:52:02 server2 apachectl[1370]: no listening sockets available, shutting down
Dec 04 15:52:02 server2 apachectl[1370]: AH00015: Unable to open logs
Dec 04 15:52:02 server2 apachectl[1300]: Action 'start' failed.
Dec 04 15:52:02 server2 apachectl[1300]: The Apache error log may have more information.
Dec 04 15:52:02 server2 systemd[1]: apache2.service: Control process exited, code=exit, status=1
Dec 04 15:52:02 server2 systemd[1]: apache2.service: Failed with result 'exit-code'.
Dec 04 15:52:02 server2 systemd[1]: Failed to start The Apache HTTP Server.

lines 1-16/16 (END)
```

Cinder

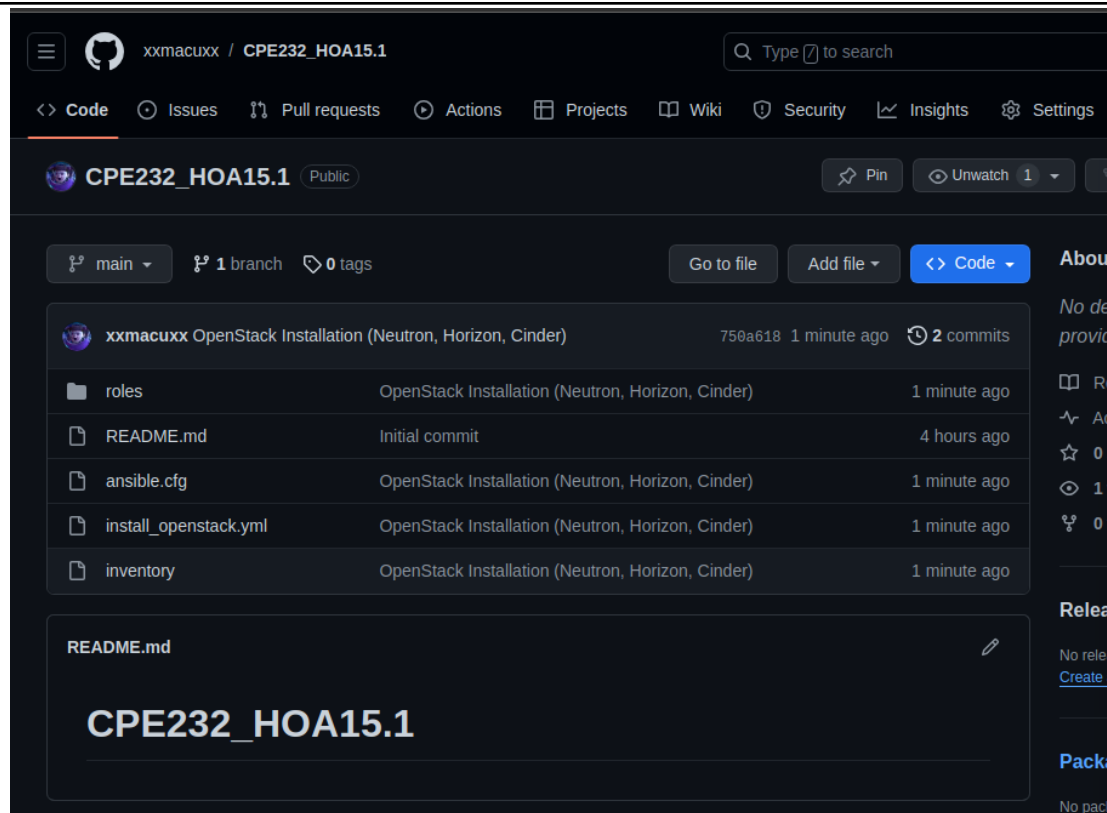
```
jai@server2:~$ systemctl status cinder-scheduler
● cinder-scheduler.service - OpenStack Cinder Scheduler
   Loaded: loaded (/lib/systemd/system/cinder-scheduler.service; enabled; vendor preset: enable)
   Active: active (running) since Mon 2023-12-04 15:52:38 PST; 6min ago
     Docs: man:cinder-scheduler(1)
    Main PID: 3366 (cinder-schedule)
      Tasks: 2 (limit: 4594)
     Memory: 129.8M
        CPU: 3.014s
    CGroup: /system.slice/cinder-scheduler.service
            └─3366 /usr/bin/python3 /usr/bin/cinder-scheduler --config-file=/etc/cinder/cinder.conf

Dec 04 15:52:38 server2 systemd[1]: Started OpenStack Cinder Scheduler.
Dec 04 15:52:47 server2 cinder-scheduler[3366]: /usr/lib/python3/dist-packages/cinder/exceptions.py:10: DeprecationWarning: Using or importing the ABCs from 'collections' instead of from 'collections.abc' is deprecated, and in 3.10 will be stopped from working.
Dec 04 15:52:47 server2 cinder-scheduler[3366]: last_heartbeat = column_property(last_heartbeat)
Dec 04 15:52:48 server2 cinder-scheduler[3366]: /usr/lib/python3/dist-packages/cinder/exceptions.py:10: DeprecationWarning: Using or importing the ABCs from 'collections' instead of from 'collections.abc' is deprecated, and in 3.10 will be stopped from working.
Dec 04 15:52:48 server2 cinder-scheduler[3366]: num_hosts = column_property(num_hosts)
Dec 04 15:52:48 server2 cinder-scheduler[3366]: /usr/lib/python3/dist-packages/cinder/exceptions.py:10: DeprecationWarning: Using or importing the ABCs from 'collections' instead of from 'collections.abc' is deprecated, and in 3.10 will be stopped from working.
Dec 04 15:52:48 server2 cinder-scheduler[3366]: num_down_hosts = column_property(num_down_hosts)

lines 1-18/18 (END)
```

3. Upload it in the github.

```
jai@workstation:~/CPE232_H0A15.1$ git add *
jai@workstation:~/CPE232_H0A15.1$ git commit -m "OpenStack Installation (Neutron, Horizon, Cinder)"
[main 750a618] OpenStack Installation (Neutron, Horizon, Cinder)
 6 files changed, 439 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 install_openstack.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
jai@workstation:~/CPE232_H0A15.1$ git push origin
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), 3.34 KiB | 3.34 MiB/s, done.
Total 15 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:xxmacuxx/CPE232_H0A15.1.git
 fbc1f58..750a618 main -> main
```

GITHUB LINK:https://github.com/xxmacuxx/CPE232_HOA15.1.git

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services.

Neutron orchestrates networking in OpenStack, managing virtual networks and IP addresses. It's like the backstage crew ensuring seamless communication between virtual machines. Horizon is the user interface, OpenStack's friendly face that lets you control and monitor your cloud resources through a web dashboard. Think of it as the control center. Cinder handles block storage, functioning like a digital storage manager that ensures your data has a reliable and flexible home within the OpenStack cloud.

Conclusions:

In this activity, I encountered the other three OpenStack base services, which are the Neutron, Horizon and Cinder Services. In this activity, I haven't encountered any issue with installing the three. Establishing a repository and crafting an Ubuntu playbook to mirror OpenStack installation steps was enlightening. Converting intricacies of Neutron, Horizon, and Cinder into executable actions fostered a deeper

understanding. This Hands-On Activity not only refined my technical skills but underscored the significance of methodical documentation. Creating a playbook isn't just about automation; it's about distilling complexity into a coherent, reproducible narrative for seamless deployment. By orchestrating the installation and configuration of OpenStack base services using Ansible on Ubuntu, we've not just embraced innovation but equipped ourselves with a dynamic toolkit. The exploration wasn't merely technical; it was a voyage into the future, arming us with the knowledge to harness the power of cloud technology while mindful of its intricacies.