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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.

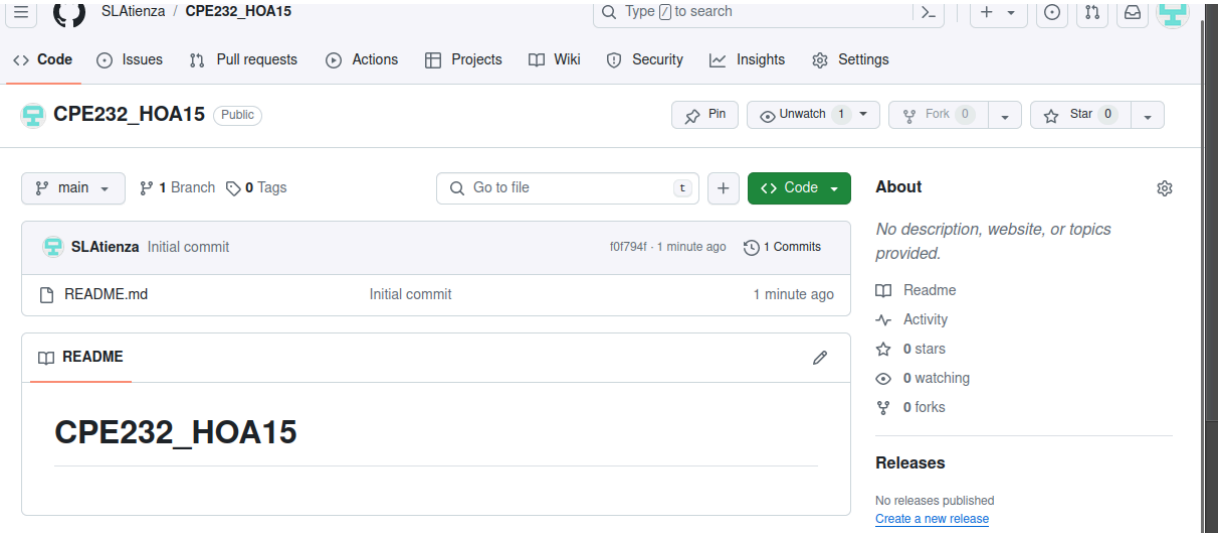
3. Resources

Oracle VirtualBox (Hypervisor)

1x Ubuntu VM or Centos VM

4. Tasks

1. Create a new repository for this activity.



```
stephen@worksation:~$ git clone git@github.com:SLAtienza/CPE232_HOA15.git
Cloning into 'CPE232_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.
stephen@worksation:~$ ls
CPE232_HOA10  CPE232_HOA9       Documents  playbook.yaml  Videos
CPE232_HOA15  CPE232_SLAtienza  Downloads  Public
CPE232_HOA7   CPE323_HOA6       Music      snap
CPE232_HOA8   Desktop           Pictures   Templates
stephen@worksation:~$ CPE232_HOA15
CPE232_HOA15: command not found
stephen@worksation:~$ CPE232_HOA15
CPE232_HOA15: command not found
stephen@worksation:~$ cd CPE232_HOA15
stephen@worksation:~/CPE232_HOA15$
```

Make your Ansible.cfg and Inventory

```
stephen@worksation: ~/CPE232_HOA15/files
  GNU nano 6.2                          ansible.cfg *
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

remote_user = stephen
private_key_file = ~/.ssh/

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^/ Go To Line
```

```
 GNU nano 6.2                          inventory
[neutron]
192.168.56.102

[horizon]
192.168.56.102

[cinder]
192.168.56.102
```

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

```
stephen@worksation:~/CPE232_HOA15/files$ cd roles
stephen@worksation:~/CPE232_HOA15/files/roles$ mkdir neutron
stephen@worksation:~/CPE232_HOA15/files/roles$ mkdir horizon
stephen@worksation:~/CPE232_HOA15/files/roles$ mkdir cinder
stephen@worksation:~/CPE232_HOA15/files/roles$ ls
cinder  horizon  neutron
stephen@worksation:~/CPE232_HOA15/files/roles$
```

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

```
stephen@worksation:~/CPE232_HOA15/files/roles$ cd neutron
stephen@worksation:~/CPE232_HOA15/files/roles/neutron$ mkdir tasks
stephen@worksation:~/CPE232_HOA15/files/roles/neutron$ ls
tasks
stephen@worksation:~/CPE232_HOA15/files/roles/neutron$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles$ cd horizon
stephen@worksation:~/CPE232_HOA15/files/roles/horizon$ mkdir tasks
stephen@worksation:~/CPE232_HOA15/files/roles/horizon$ ls
tasks
stephen@worksation:~/CPE232_HOA15/files/roles/horizon$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles$ cd cinder
stephen@worksation:~/CPE232_HOA15/files/roles/cinder$ mkdir tasks
stephen@worksation:~/CPE232_HOA15/files/roles/cinder$ ls
tasks
stephen@worksation:~/CPE232_HOA15/files/roles/cinder$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles$ cd neutron
stephen@worksation:~/CPE232_HOA15/files/roles/neutron$ cd tasks
stephen@worksation:~/CPE232_HOA15/files/roles/neutron/tasks$ nano main.yml
stephen@worksation:~/CPE232_HOA15/files/roles/neutron/tasks$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles/neutron$ cd horizon
bash: cd: horizon: No such file or directory
stephen@worksation:~/CPE232_HOA15/files/roles/neutron$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles$ cd horizon
stephen@worksation:~/CPE232_HOA15/files/roles/horizon$ mkdir tasks
mkdir: cannot create directory ‘tasks’: File exists
stephen@worksation:~/CPE232_HOA15/files/roles/horizon$ cd tasks
stephen@worksation:~/CPE232_HOA15/files/roles/horizon/tasks$ nano main.yml
stephen@worksation:~/CPE232_HOA15/files/roles/horizon/tasks$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles/horizon$ cd ..
stephen@worksation:~/CPE232_HOA15/files/roles$ cd cinder
stephen@worksation:~/CPE232_HOA15/files/roles/cinder$ cd task
bash: cd: task: No such file or directory
stephen@worksation:~/CPE232_HOA15/files/roles/cinder$ cd tasks
stephen@worksation:~/CPE232_HOA15/files/roles/cinder/tasks$ nano main.yml
stephen@worksation:~/CPE232_HOA15/files/roles/cinder/tasks$
```

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

```
stephen@worksation:~/CPE232_HOA15$ git add -A
stephen@worksation:~/CPE232_HOA15$ git commit -m "HOA15"
[main 3a1f9c1] HOA15
 6 files changed, 377 insertions(+)
 create mode 100644 files/ansible.cfg
 create mode 100644 files/controller.yaml
 create mode 100644 files/inventory
 create mode 100644 files/roles/cinder/tasks/main.yml
 create mode 100644 files/roles/horizon/tasks/main.yml
 create mode 100644 files/roles/neutron/tasks/main.yml
stephen@worksation:~/CPE232_HOA15$ git push origin
Enumerating objects: 17, done.
Counting objects: 100% (17/17), done.
Delta compression using up to 2 threads
Compressing objects: 100% (10/10), done.
Writing objects: 100% (16/16), 3.30 KiB | 845.00 KiB/s, done.
Total 16 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:SLAtienza/CPE232_HOA15.git
   f0f794f..3a1f9c1  main -> main
stephen@worksation:~/CPE232_HOA15$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
stephen@worksation:~/CPE232_HOA15$
```

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

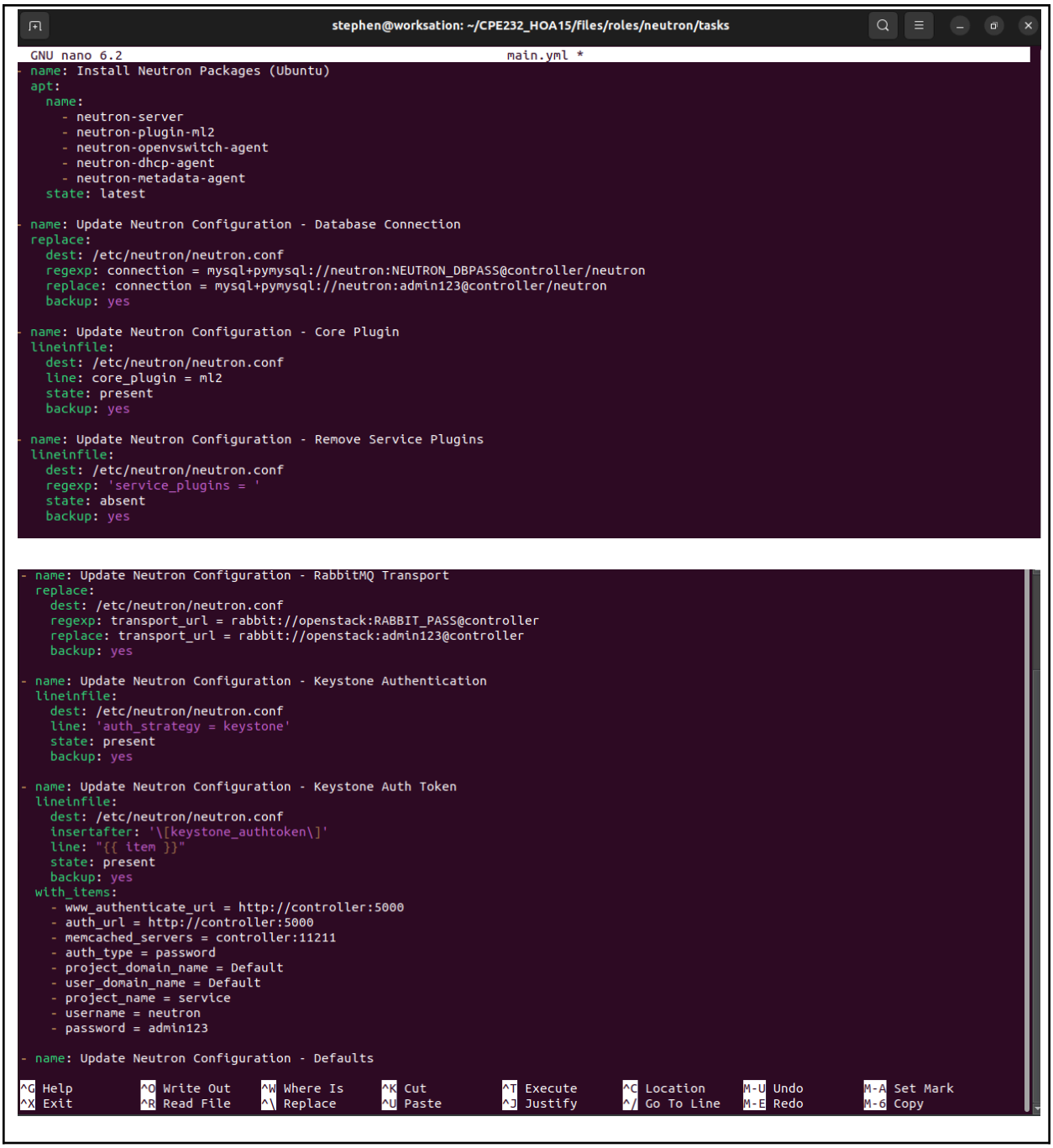
INPUT: [controller.yaml]

```
 GNU nano 6.2                                  controller.yaml *
---
- hosts: neutron
  become: true
  roles:
    - role: neutron

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

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

[neutron - main.yml]


stephen@worksation: ~/CPE232_HOA15/files/roles/neutron/tasks
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 Configuration - 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 Configuration - Core Plugin
lineinfile:
dest: /etc/neutron/neutron.conf
line: core_plugin = ml2
state: present
backup: yes
- name: Update Neutron Configuration - Remove Service Plugins
lineinfile:
dest: /etc/neutron/neutron.conf
regexp: 'service_plugins = '
state: absent
backup: yes
- name: Update Neutron Configuration - 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 Configuration - Keystone Authentication
lineinfile:
dest: /etc/neutron/neutron.conf
line: 'auth_strategy = keystone'
state: present
backup: yes
- name: Update Neutron Configuration - 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
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy

```
    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 Configuration - 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

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

```
    regexp: 'bridge_mappings = provider: PROVIDER_INTERFACE_NAME'
    line: 'bridge_mappings = provider:LocalMachine'
    backup: yes

- name: Update Neutron OVS Agent Configuration - 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

^G Help          ^O Write Out     ^W Where Is      ^K Cut           ^T Execute       ^C Location      M-U Undo         M-A Set Mark
^X Exit          ^R Read File     ^\ Replace       ^U Paste         ^J Justify       ^/ Go To Line    M-E Redo         M-6 Copy
```

```
  lineinfile:
    dest: /etc/neutron/metadata_agent.ini
    line: 'nova_metadata_host = controller'
    state: present
    backup: yes

- name: Update Neutron Metadata Agent Configuration - 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

^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo       M-A Set Mark
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo       M-6 Copy
```

[horizon - main.yml]

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

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

- name: Update OpenStack Dashboard Configuration - 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 Dashboard Configuration - 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'"
```

```
 GNU nano 6.2                                                main.yml *
    - "SESSION_ENGINE = 'django.contrib.sessions.backends.cache'"
    - ' '
    - "CACHES = {"
    -   "'default': {"
    -         "'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',"
    -         "'LOCATION': 'controller:11211',"
    -   "}"
    - "}"

- name: Update OpenStack Dashboard Configuration - 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

- name: Update OpenStack Dashboard Configuration - 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 Dashboard Configuration - API Versions
  lineinfile:
    dest: /etc/openstack-dashboard/local_settings.py
    regexp: '^OPENSTACK_API_VERSIONS ='
    line: "{{ item }}"
    state: present
    backup: yes
```

```
 GNU nano 6.2                                                main.yml *
    regexp: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN ='
    line: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN = "Default"'
    state: present
    backup: yes

- name: Update OpenStack Dashboard Configuration - 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

- name: Update OpenStack Dashboard Configuration - 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}'
```

[cinder - main.yml]

GNU nano 6.2 main.yml *

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

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

- name: Update Cinder Configuration - Keystone Auth Token
  lineinfile:
    dest: /etc/cinder/cinder.conf
```

GNU nano 6.2 main.yml *

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

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

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

- name: Update Cinder Configuration - 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
```

PROCESS:

```
stephen@worksation:~/CPE232_HOA15/files$ ansible-playbook --ask-become-pass controller.yaml
BECOME password:

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

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

TASK [neutron : Install Neutron Packages (Ubuntu)] *****************************
ok: [192.168.56.102]

TASK [neutron : Update Neutron Configuration - Database Connection] ************
ok: [192.168.56.102]

TASK [neutron : Update Neutron Configuration - Core Plugin] ********************
ok: [192.168.56.102]

TASK [neutron : Update Neutron Configuration - Remove Service Plugins] *********
ok: [192.168.56.102]

TASK [neutron : Update Neutron Configuration - RabbitMQ Transport] *************
ok: [192.168.56.102]

TASK [neutron : Update Neutron Configuration - Keystone Authentication] ********
ok: [192.168.56.102]

TASK [neutron : Update Neutron Configuration - Keystone Auth Token] ************
ok: [192.168.56.102] => (item=www_authenticate_uri = http://controller:5000)
ok: [192.168.56.102] => (item=auth_url = http://controller:5000)
ok: [192.168.56.102] => (item=memcached_servers = controller:11211)
ok: [192.168.56.102] => (item=auth_type = password)
ok: [192.168.56.102] => (item=project_domain_name = Default)
```

```
TASK [neutron : Update Neutron Configuration - Defaults] ***********************
ok: [192.168.56.102] => (item=notify_nova_on_port_status_changes = true)
ok: [192.168.56.102] => (item=notify_nova_on_port_data_changes = true)

TASK [neutron : Update Neutron Configuration - Nova Section] *******************
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)
ok: [192.168.56.102] => (item=region_name = RegionOne)
ok: [192.168.56.102] => (item=project_name = service)
ok: [192.168.56.102] => (item=username = nova)
ok: [192.168.56.102] => (item=password = admin123)

TASK [neutron : Update Neutron Configuration - Lock Path] **********************
ok: [192.168.56.102]

TASK [neutron : Update Neutron ML2 Configuration - Type Drivers] ***************
ok: [192.168.56.102]

TASK [neutron : Update Neutron ML2 Configuration - Remove Tenant Network Types] ***
ok: [192.168.56.102]

TASK [neutron : Update Neutron ML2 Configuration - ML2 Section] ****************
ok: [192.168.56.102] => (item=mechanism_drivers = openvswitch)
ok: [192.168.56.102] => (item=extension_drivers = portsecurity)

TASK [neutron : Update Neutron ML2 Configuration - Flat Networks] **************
ok: [192.168.56.102]

TASK [neutron : Update Neutron OVS Agent Configuration - Bridge Mappings] ******
```

```
TASK [neutron : Update Neutron ML2 Configuration - Flat Networks] **************
ok: [192.168.56.102]

TASK [neutron : Update Neutron OVS Agent Configuration - Bridge Mappings] ******
ok: [192.168.56.102]

TASK [neutron : Update Neutron OVS Agent Configuration - Security Group] *******
ok: [192.168.56.102] => (item=enable_security_group = true)
ok: [192.168.56.102] => (item=firewall_driver = openvswitch)

TASK [neutron : Update Neutron DHCP Agent Configuration] ***********************
ok: [192.168.56.102] => (item=interface_driver = openvswitch)
ok: [192.168.56.102] => (item=dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq)
ok: [192.168.56.102] => (item=enable_isolated_metadata = true)

TASK [neutron : Update Neutron Metadata Agent Configuration] *******************
ok: [192.168.56.102]

TASK [neutron : Update Neutron Metadata Agent Configuration - Shared Secret] ***
ok: [192.168.56.102]

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

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

TASK [horizon : Install Horizon Packages] **************************************
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - Host] ***************
ok: [192.168.56.102]
```

```
TASK [horizon : Update OpenStack Dashboard Configuration - Host] ***************
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - Allowed Hosts] ******
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - Session Engine and Cache] ***
changed: [192.168.56.102] => (item=SESSION_ENGINE = 'django.contrib.sessions.backends.cache')
changed: [192.168.56.102] => (item= )
ok: [192.168.56.102] => (item=CACHES = {)
ok: [192.168.56.102] => (item='default': {)
ok: [192.168.56.102] => (item='BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',)
ok: [192.168.56.102] => (item='LOCATION': 'controller:11211',)
ok: [192.168.56.102] => (item=})
ok: [192.168.56.102] => (item=})

TASK [horizon : Update OpenStack Dashboard Configuration - Keystone URL] *******
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - Keystone Multi-Domain Support] ***
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - API Versions] *******
changed: [192.168.56.102] => (item=OPENSTACK_API_VERSIONS = {)
changed: [192.168.56.102] => (item="identity": 3,)
ok: [192.168.56.102] => (item="image": 2,)
ok: [192.168.56.102] => (item="volume": 3,)
ok: [192.168.56.102] => (item=})

TASK [horizon : Update OpenStack Dashboard Configuration - Keystone Default Domain] ***
ok: [192.168.56.102]
```

```
TASK [horizon : Update OpenStack Dashboard Configuration - Keystone Multi-Domain Support] ***
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - API Versions] *******
changed: [192.168.56.102] => (item=OPENSTACK_API_VERSIONS = {)
changed: [192.168.56.102] => (item="identity": 3,)
ok: [192.168.56.102] => (item="image": 2,)
ok: [192.168.56.102] => (item="volume": 3,)
ok: [192.168.56.102] => (item=})

TASK [horizon : Update OpenStack Dashboard Configuration - Keystone Default Domain] ***
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - Keystone Default Role] ***
ok: [192.168.56.102]

TASK [horizon : Update OpenStack Dashboard Configuration - Neutron Network] ****
changed: [192.168.56.102] => (item=OPENSTACK_NEUTRON_NETWORK = {)
changed: [192.168.56.102] => (item=...)
ok: [192.168.56.102] => (item='enable_router': False,)
ok: [192.168.56.102] => (item='enable_quotas': False,)
ok: [192.168.56.102] => (item='enable_ipv6': False,)
ok: [192.168.56.102] => (item='enable_distributed_router': False,)
ok: [192.168.56.102] => (item='enable_ha_router': False,)
ok: [192.168.56.102] => (item='enable_fip_topology_check': False,)
ok: [192.168.56.102] => (item=})

TASK [horizon : Update Apache Configuration for Horizon] **********************
ok: [192.168.56.102]

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

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

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

TASK [cinder : Install Cinder Packages (Ubuntu)] *******************************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Database Connection] **************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - RabbitMQ Transport] ***************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Keystone Authentication] **********
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Keystone Auth Token] **************
ok: [192.168.56.102] => (item=www_authenticate_uri = http://controller:5000)
ok: [192.168.56.102] => (item=auth_url = http://controller:5000)
ok: [192.168.56.102] => (item=memcached_servers = controller:11211)
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)
ok: [192.168.56.102] => (item=project_name = service)
ok: [192.168.56.102] => (item=username = cinder)
ok: [192.168.56.102] => (item=password = pass123)

TASK [cinder : Update Cinder Configuration - IP Address] ***********************
ok: [192.168.56.102]
```

```
TASK [cinder : Install Cinder Packages (Ubuntu)] *******************************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Database Connection] **************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - RabbitMQ Transport] ***************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Keystone Authentication] **********
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Keystone Auth Token] **************
ok: [192.168.56.102] => (item=www_authenticate_uri = http://controller:5000)
ok: [192.168.56.102] => (item=auth_url = http://controller:5000)
ok: [192.168.56.102] => (item=memcached_servers = controller:11211)
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)
ok: [192.168.56.102] => (item=project_name = service)
ok: [192.168.56.102] => (item=username = cinder)
ok: [192.168.56.102] => (item=password = pass123)

TASK [cinder : Update Cinder Configuration - IP Address] ***********************
ok: [192.168.56.102]

TASK [cinder : Update Cinder Configuration - Lock Path] ************************
ok: [192.168.56.102]

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

PLAY RECAP *********************************************************************
192.168.56.102             : ok=41   changed=4    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

stephen@worksation:~/CPE232_HOA15/files$
```

OUTPUT:

NEUTRON:

```
stephen@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 2:20.5.0-0ubuntu1 all [installed,
automatic]
neutron-dhcp-agent/jammy-updates,jammy-updates,now 2:20.5.0-0ubuntu1 all [instal
led]
neutron-metadata-agent/jammy-updates,jammy-updates,now 2:20.5.0-0ubuntu1 all [in
stalled]
neutron-openvswitch-agent/jammy-updates,jammy-updates,now 2:20.5.0-0ubuntu1 all
[installed]
neutron-plugin-ml2/jammy-updates,jammy-updates,now 2:20.5.0-0ubuntu1 all [instal
led]
neutron-server/jammy-updates,jammy-updates,now 2:20.5.0-0ubuntu1 all [installed]
python3-neutron-lib/jammy,jammy,now 2.20.0-0ubuntu1 all [installed,automatic]
python3-neutron/jammy-updates,jammy-updates,now 2:20.5.0-0ubuntu1 all [installed
,automatic]
python3-neutronclient/jammy,jammy,now 1:7.8.0-0ubuntu1 all [installed,automatic]
stephen@server1:~$
```

```
neutron CLI is deprecated and will be removed in the Z cycle. Use openstack CLI
instead.
7.8.0
stephen@server1:~$
```

HORIZON:

```
stephen@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 [in
stalled,automatic]
```

CINDER:

```
stephen@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 2:20.3.1-0ubuntu1.1 all [installed]
cinder-common/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1.1 all [installed
,automatic]
cinder-scheduler/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1.1 all [instal
led]
python3-cinder/jammy-updates,jammy-updates,now 2:20.3.1-0ubuntu1.1 all [installe
d,automatic]
python3-cinderclient/jammy,jammy,now 1:8.3.0-0ubuntu1 all [installed,automatic]
stephen@server1:~$ cinder --version
8.3.0
stephen@server1:~$
```

GITHUB LINK:

https://github.com/SLAtienza/CPE232_HOA15.git

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services
    - Powering OpenStack's networking is Neutron. Neutron is a networking solution that helps with cloud environment networking resource management and orchestration. Users may set up and configure networks, subnets, routers, and ports among other network components. This capability makes it possible to build complex network architectures suited to particular application requirements. Supporting a wide range of networking technologies and plugins, Neutron provides flexibility in network configuration and management and, in The end smooth communication between diverse OpenStack ecosystem components and services. The visual entry point to the OpenStack cloud is Horizon, however. Horizon offers consumers an intuitive web-based dashboard to connect with and control OpenStack resources. Because it provides clear controls and visual depictions of the cloud environment, this graphical user interface (GUI) makes controlling a cloud infrastructure easier. Administrators, operators, and users may do a wide range of jobs with Horizon, including network configuration, resource monitoring, and access control setup in addition to starting and maintaining instances (virtual machines). Horizon's simple interface improves accessibility and user experience, enabling users to effectively discover and control OpenStack services.OpenStack cloud persistent block storage is made possible in large part by Cinder. As the block storage service, Cinder lets users build and control storage volumes that can be linked to instances. With the extra storage capacity these volumes provide cloud-based services and applications, scalable and dependable storage options are made feasible. Cinder meets different storage needs and guarantees data resilience and security in the cloud by supporting a variety of storage backends and features such snapshotting, cloning, encryption, and multi-tenancy.

Conclusions:

- **Installing OpenStack with its networking component Neutron, its user-friendly interface Horizon and its block storage component Cinder offers a strong and flexible cloud infrastructure solution. These elements taken together, provide the basis for creating and maintaining feature-rich, scalable, and flexible cloud infrastructures.Neutron integration gives OpenStack the capacity to manage and design**

sophisticated network topologies that are tailored to particular application needs by orchestrating a variety of networking resources. Through its user-friendly web-based dashboard, Horizon improves user accessibility and streamlines OpenStack resource management, enabling users and administrators to effectively traverse the cloud ecosystem. Persistent block storage from Cinder also provides scalability and dependability, guaranteeing that applications have the storage capacity they need and enabling sophisticated features like encryption and snapshotting. By integrating, customizing, and managing networking, user interface, and storage components seamlessly, the installation and use of these OpenStack components provide a complete approach to cloud architecture. Because it encapsulates the resilience, scalability, and flexibility required to serve a variety of workloads and applications, OpenStack is a strong option for businesses looking for a reliable and flexible cloud computing environment.