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Activity 15: OpenStack Installation (Neutron, Horizon, Cinder)

1. Objectives

Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).

2. Intended Learning Outcomes

1. Analyze the advantages and disadvantages of cloud services
2. Evaluate different Cloud deployment and service models
3. Create a workflow to install and configure OpenStack base services using Ansible as documentation and execution.

3. Resources

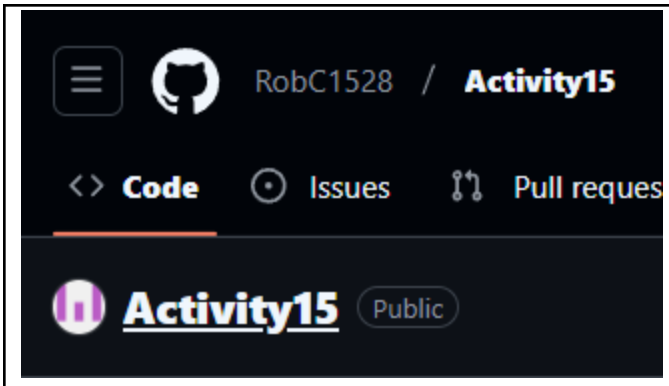
Oracle VirtualBox (Hypervisor)

1x Ubuntu VM or Centos VM

4. Tasks

1. Create a new repository for this activity.
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/
    a. Neutron
    b. Horizon
    c. Cinder
    d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.
    e. Add, commit and push it to your GitHub repo.

5. Output (screenshots and explanations)




```
catapang@Workstation:~/Activity15$ tree
.
├── ansible.cfg
├── group_vars
│   └── all.yml
├── inventory
├── playbook.yml
├── README.md
└── tasks
    ├── cinder.yml
    ├── horizon.yml
    └── neutron.yml

2 directories, 8 files
```

- Inside my Activity15 repo you can see the files and directory that are needed to install cinder, horizon, and neutron.

```
catapang@Workstation:~/Activity15$ ansible-playbook --ask-become-pass playbook.y
ml
BECOME password:

PLAY [Deploy OpenStack Services] ***********************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.11]

TASK [Install Neutron packages] ************************************************
ok: [192.168.56.11]

TASK [Configure Neutron] *******************************************************
ok: [192.168.56.11]

TASK [Restart Neutron services] ************************************************
changed: [192.168.56.11] => (item=neutron-server)
changed: [192.168.56.11] => (item=neutron-linuxbridge-agent)
changed: [192.168.56.11] => (item=neutron-dhcp-agent)
changed: [192.168.56.11] => (item=neutron-metadata-agent)

TASK [Install Horizon] *********************************************************
ok: [192.168.56.11]

TASK [Restart Apache2] *********************************************************
changed: [192.168.56.11]
```

```
TASK [Install Cinder packages] *************************************************
ok: [192.168.56.11]

TASK [Configure Cinder] ********************************************************
ok: [192.168.56.11]

TASK [Restart Cinder services] *************************************************
changed: [192.168.56.11] => (item=cinder-scheduler)

PLAY RECAP *********************************************************************
192.168.56.11              : ok=9    changed=3    unreachable=0    failed=0    s
kipped=0    rescued=0    ignored=0
```

- As you can see here in the screenshot I managed to install Neutron, Horizon, and Cinder without encountering any errors.

```
# Cinder
- name: Install Cinder packages
  apt:
    name:
      - cinder-api
      - cinder-scheduler
      - python3-cinderclient
    state: present

- name: Configure Cinder
  lineinfile:
    path: /etc/cinder/cinder.conf
    regexp: "^#?connection=.*"
    line: "connection = mysql+pymysql://cinder:{{ db_password }}@{{ controller_ip }}/cinder"

#- name: Populate Cinder database
#  shell: |
#    su -s /bin/bash cinder -c "cinder-manage db sync"

- name: Restart Cinder services
  service:
    name: "{{ item }}"
    state: restarted
  with_items:
#    - cinder-api
    - cinder-scheduler
```

```
# Horizon
- name: Install Horizon
  apt:
    name: openstack-dashboard
    state: present

- name: Restart Apache2
  service:
    name: apache2
    state: restarted
```

```
# Neutron
- name: Install Neutron packages
  apt:
    name:
      - neutron-server
      - neutron-plugin-ml2
      - neutron-linuxbridge-agent
      - neutron-dhcp-agent
      - neutron-metadata-agent
    state: present

- name: Configure Neutron
  lineinfile:
    path: /etc/neutron/neutron.conf
    regexp: "^#?connection=.*"
    line: "connection = mysql+pymysql://neutron:{{ db_password }}@{{ controller_ip }}/neutr

#- name: Populate Neutron database
#  shell: |
#    su -s /bin/bash neutron -c "neutron-db-manage upgrade head"

- name: Restart Neutron services
  service:
    name: "{{ item }}"
    state: restarted
  with_items:
    - neutron-server
    - neutron-linuxbridge-agent
    - neutron-dhcp-agent
    - neutron-metadata-agent
```

- Here are my playbooks for Cinder, Horizon, and Neutron.

```
catapang@server1:~$ systemctl status cinder-scheduler
● cinder-scheduler.service - OpenStack Cinder Scheduler
     Loaded: loaded (/lib/systemd/system/cinder-scheduler.service; enabled; ven>
     Active: active (running) since Fri 2024-12-06 15:42:54 +08; 28s ago
       Docs: man:cinder-scheduler(1)
   Main PID: 37545 (cinder-schedule)
      Tasks: 1 (limit: 1062)
     Memory: 120.2M
        CPU: 6.792s
     CGroup: /system.slice/cinder-scheduler.service
             └─37545 /usr/bin/python3 /usr/bin/cinder-scheduler --config-file=/>
lines 1-10/10 (END)
```

```
catapang@server1:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
     Active: active (running) since Fri 2024-12-06 15:26:01 +08; 17min ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 34197 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/S>
   Main PID: 34201 (apache2)
      Tasks: 65 (limit: 1062)
     Memory: 7.3M
        CPU: 2.669s
     CGroup: /system.slice/apache2.service
             ├─34201 /usr/sbin/apache2 -k start
             ├─34202 "(wsgi:cinder-wsgi" -k start
             ├─34203 "(wsgi:cinder-wsgi" -k start
             ├─34204 "(wsgi:cinder-wsgi" -k start
             ├─34206 "(wsgi:cinder-wsgi" -k start
             ├─34207 "(wsgi:cinder-wsgi" -k start
             ├─34209 "(wsgi:horizon)   " -k start
             ├─34212 "(wsgi:horizon)   " -k start
             ├─34213 "(wsgi:horizon)   " -k start
             ├─34216 /usr/sbin/apache2 -k start
             ├─34217 /usr/sbin/apache2 -k start
             ├─34219 /usr/sbin/apache2 -k start
             ├─34225 /usr/sbin/apache2 -k start
```

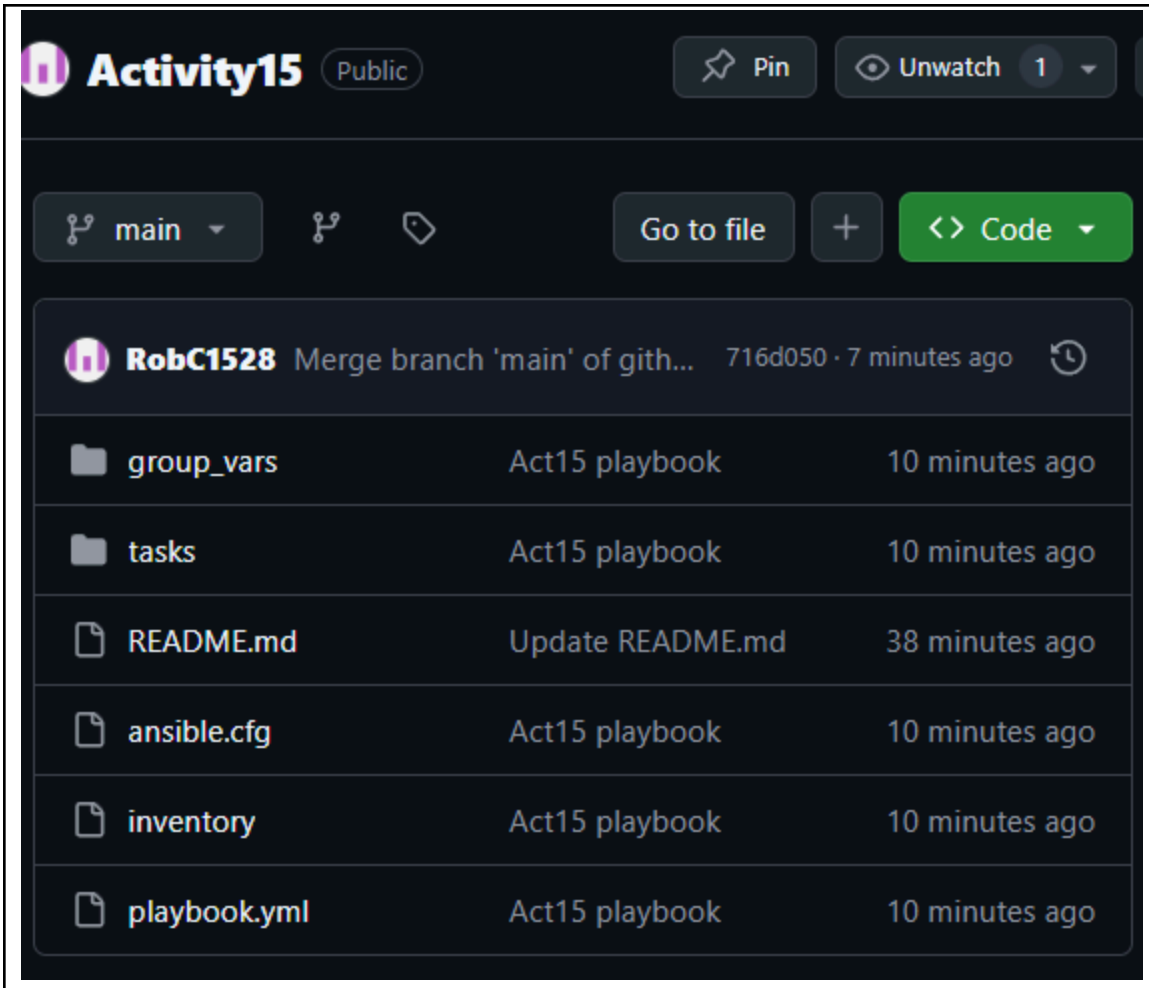
```
catapang@server1:~$ systemctl status neutron-server
● neutron-server.service - OpenStack Neutron Server
     Loaded: loaded (/lib/systemd/system/neutron-server.service; enabled; vendo>
     Active: active (running) since Fri 2024-12-06 15:43:36 +08; 10s ago
       Docs: man:neutron-server(1)
   Main PID: 37659 (neutron-server)
      Tasks: 1 (limit: 1062)
     Memory: 134.0M
        CPU: 8.946s
     CGroup: /system.slice/neutron-server.service
             └─37659 /usr/bin/python3 /usr/bin/neutron-server --config-file=/et>
lines 1-10/10 (END)
```

- Proof that Cinder, Horizon, and Neutron are active and Installed in my server 1.

```
catapang@Workstation:~/Activity15$ git add .
catapang@Workstation:~/Activity15$ git commit -m "Act 15"
On branch main
Your branch and 'origin/main' have diverged,
and have 1 and 8 different commits each, respectively.
  (use "git pull" to merge the remote branch into yours)

nothing to commit, working tree clean
catapang@Workstation:~/Activity15$ git pull
Merge made by the 'ort' strategy.
 README.md | 69 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++-
 1 file changed, 68 insertions(+), 1 deletion(-)
catapang@Workstation:~/Activity15$ git push origin main
Enumerating objects: 15, done.
Counting objects: 100% (15/15), done.
Delta compression using up to 4 threads
Compressing objects: 100% (11/11), done.
Writing objects: 100% (13/13), 1.87 KiB | 638.00 KiB/s, done.
Total 13 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:RobC1528/Activity15.git
   2f64ad2..716d050  main -> main
```

- After finishing the tasks I used the “git add .” command to add all the files at the same time inside my github repo.



- Here is the proof that I git added all the files.

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services
   - Neutron, Horizon, and Cinder are critical OpenStack components, with each playing a unique function in cloud administration. Neutron offers networking-as-a-service, allowing customers to manage networks, subnets, and routers using advanced features such as load balancing and VPNs. Horizon is an online dashboard that provides users with a graphical interface for managing resources like instances, networks, and volumes. Cinder is a block storage service that lets you create, attach, and manage persistent storage volumes for virtual machines. Together, these services provide a cloud infrastructure that is adaptable, scalable, and efficient.

Conclusions:

- In conclusion, this activity demonstrates the importance of each service in the OpenStack ecosystem and provides hands-on experience in setting up a private cloud on a single server. The installation of Cinder, Neutron, and Horizon on a single Ubuntu server demonstrates the key components required to set up a functional OpenStack setup. By installing and configuring these services, you will be able to control block storage (Cinder), networking (Neutron), and the web-based dashboard (Horizon) within your cloud architecture. Neutron enables flexible networking, Cinder provides dependable persistent storage, and Horizon provides a user-friendly interface for cloud management. Successfully deploying and configuring these services lays the groundwork for a scalable, resilient cloud environment, allowing users and administrators to efficiently manage resources and workloads.