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Activity 14: OpenStack Installation (Keystone, Glance, Nova)

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)

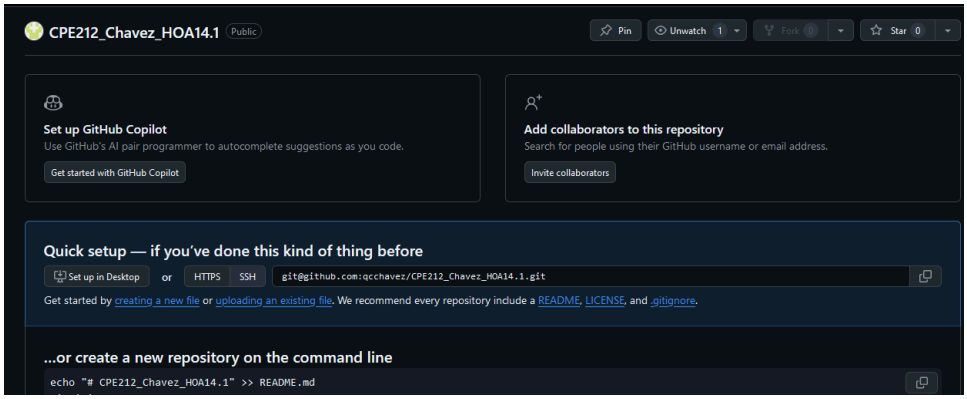
1x Ubuntu VM or Centos VM

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. Keystone (Identity Service)
    b. Glance (Imaging Service)
    c. Nova (Compute Service)
    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.

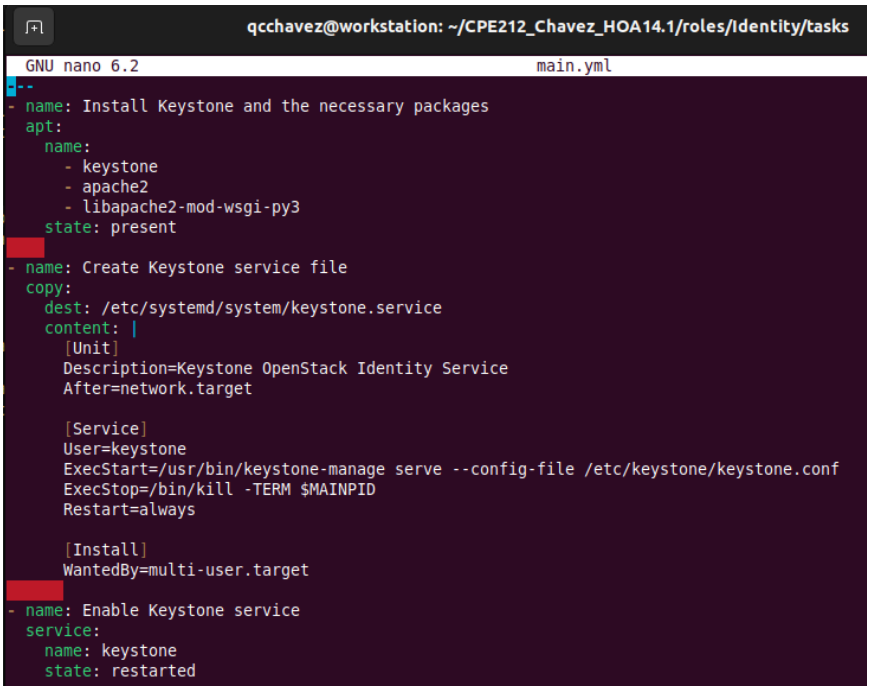
5. **Output** (screenshots and explanations)

Task 4.1



- In this screenshot, I've created a GitHub repository for my HOA 14.1

Task 4.2a (Keystone Service)



- In this screenshot, these are the lines of codes that are needed to install the packages and the keystone service itself, and also, enabling it.

```
PLAY [Install and configure Identity role] *************************************************************

TASK [Gathering Facts] *********************************************************************************
ok: [192.168.56.113]

TASK [Identity : Install Keystone and the necessary packages] ******************************************
ok: [192.168.56.113]

TASK [Identity : Create Keystone service file] *********************************************************
changed: [192.168.56.113]

TASK [Identity : Enable Keystone service] **************************************************************
changed: [192.168.56.113]

PLAY RECAP *********************************************************************************************
192.168.56.113             : ok=14   changed=5    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

- In this screenshot, this is the proof that the lines of codes in the task.yml of Identity role have worked properly.

```
qcchavez@server2:~$ systemctl status keystone
● keystone.service - Keystone OpenStack Identity Service
     Loaded: loaded (/etc/systemd/system/keystone.service; disabled; vendor pre>
     Active: active (running) since Fri 2024-12-06 14:11:24 CST; 4s ago
   Main PID: 25998 (keystone-manage)
      Tasks: 1 (limit: 2271)
     Memory: 87.7M
        CPU: 2.010s
     CGroup: /system.slice/keystone.service
             └─25998 /usr/bin/python3 /usr/bin/keystone-manage serve --config-f>

qcchavez@server2:~$
```

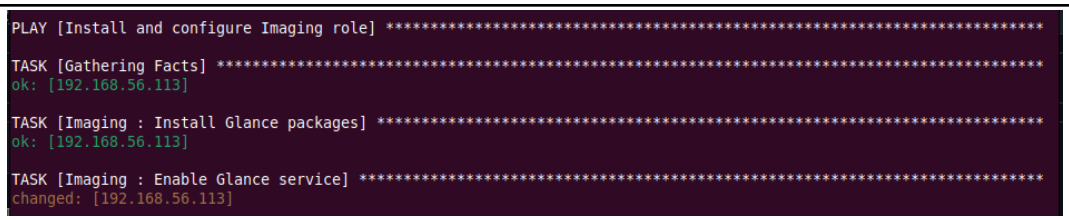
- In this screenshot, this is the proof that Keystone service is active and working.

Task 4.2b (Glance Service)

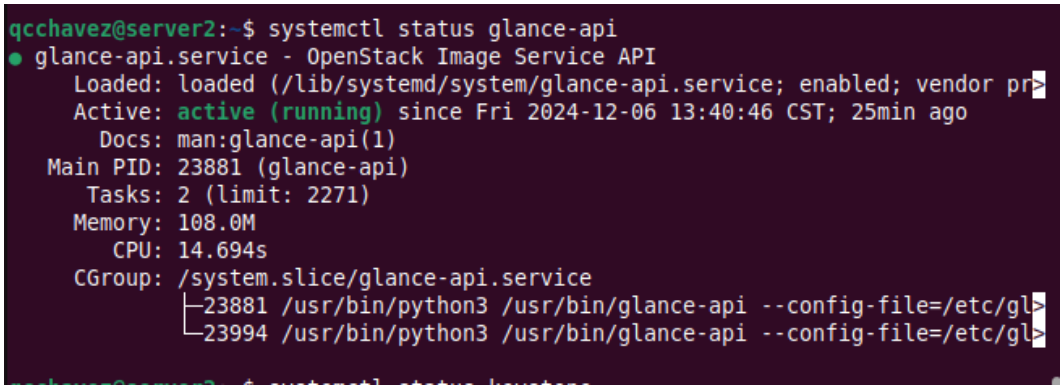
```
qcchavez@workstation: ~/CPE212_Chavez_HOA14.1/roles/Imaging/tasks
 GNU nano 6.2                                        main.yml
---
- name: Install Glance packages
  apt:
    name:
      - glance
      - python3-glanceclient
    state: present

- name: Enable Glance service
  service:
    name: glance-api
    state: restarted
```

- In this screenshot, these are the lines of codes that are needed to install the packages and the glance service itself, and also, enabling it.

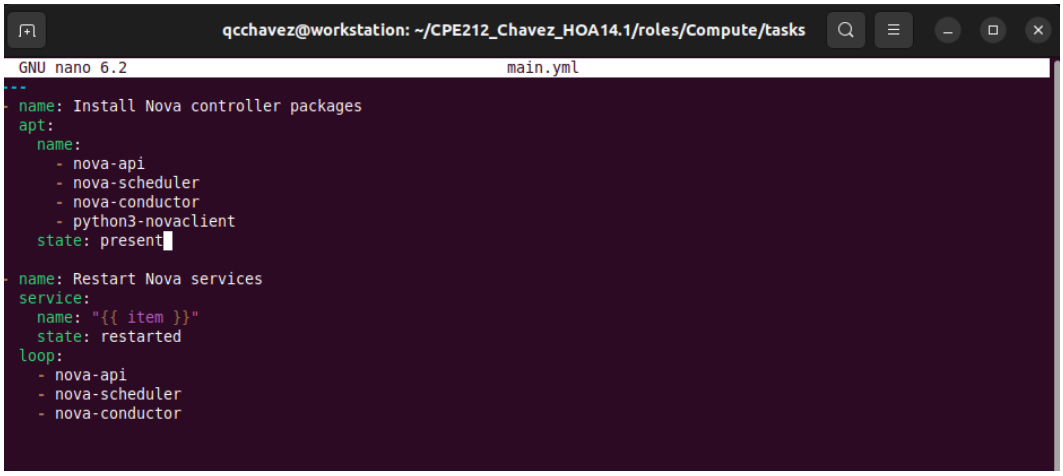


- In this screenshot, this is the proof that the lines of codes in the task.yml of Imaging role have worked properly.



- In this screenshot, this is the proof that Glance service is active and working.

Task 4.2c (Nova Service)



- In this screenshot, these are the lines of codes that are needed to install the packages and the Nova service itself, and also, enabling it.

```
qcchavez@workstation:~/CPE212_Chavez_HOA14.1$ ansible-playbook --ask-become-pass install_openstack.yml
BECOME password:

PLAY [Update repository indexes] ***********************************************************************************

TASK [Gathering Facts] *********************************************************************************************
ok: [192.168.56.113]

TASK [Update repository index (Ubuntu)] ****************************************************************************
changed: [192.168.56.113]

PLAY [Install and configure Compute role] **************************************************************************

TASK [Gathering Facts] *********************************************************************************************
ok: [192.168.56.113]

TASK [Compute : Install Nova controller packages] ******************************************************************
ok: [192.168.56.113]

TASK [Compute : Configure Nova on controller] **********************************************************************
ok: [192.168.56.113]

TASK [Compute : Restart Nova services] *****************************************************************************
changed: [192.168.56.113] => (item=nova-api)
changed: [192.168.56.113] => (item=nova-scheduler)
changed: [192.168.56.113] => (item=nova-conductor)
```

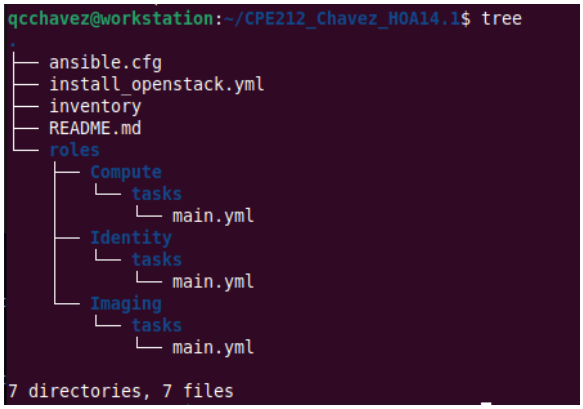
- In this screenshot, this is the proof that the lines of codes in the task.yml of Compute role have worked properly.

```
qcchavez@server2:~$ systemctl status nova-api
● nova-api.service - OpenStack Compute API
     Loaded: loaded (/lib/systemd/system/nova-api.service; enabled; vendor pres>
     Active: active (running) since Fri 2024-12-06 13:40:34 CST; 25min ago
       Docs: man:nova-api(1)
   Main PID: 23644 (nova-api)
      Tasks: 3 (limit: 2271)
     Memory: 148.1M
        CPU: 18.502s
     CGroup: /system.slice/nova-api.service
             ├─23644 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova>
             ├─24360 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova>
             └─24361 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova>
```

```
qcchavez@server2:~$ systemctl status nova-scheduler
● nova-scheduler.service - OpenStack Compute Scheduler
     Loaded: loaded (/lib/systemd/system/nova-scheduler.service; enabled; vendo>
     Active: active (running) since Fri 2024-12-06 14:51:59 CST; 1min 13s ago
       Docs: man:nova-scheduler(1)
   Main PID: 31340 (nova-scheduler)
      Tasks: 1 (limit: 2271)
     Memory: 96.6M
        CPU: 1.606s
     CGroup: /system.slice/nova-scheduler.service
             └─31340 /usr/bin/python3 /usr/bin/nova-scheduler --config-file=/et>
lines 1-10/10 (END)
^C
qcchavez@server2:~$ systemctl status nova-conductor
● nova-conductor.service - OpenStack Compute Conductor
     Loaded: loaded (/lib/systemd/system/nova-conductor.service; enabled; vendo>
     Active: active (running) since Fri 2024-12-06 14:53:25 CST; 120ms ago
       Docs: man:nova-conductor(1)
   Main PID: 31539 (nova-conductor)
      Tasks: 1 (limit: 2271)
     Memory: 6.4M
        CPU: 48ms
```

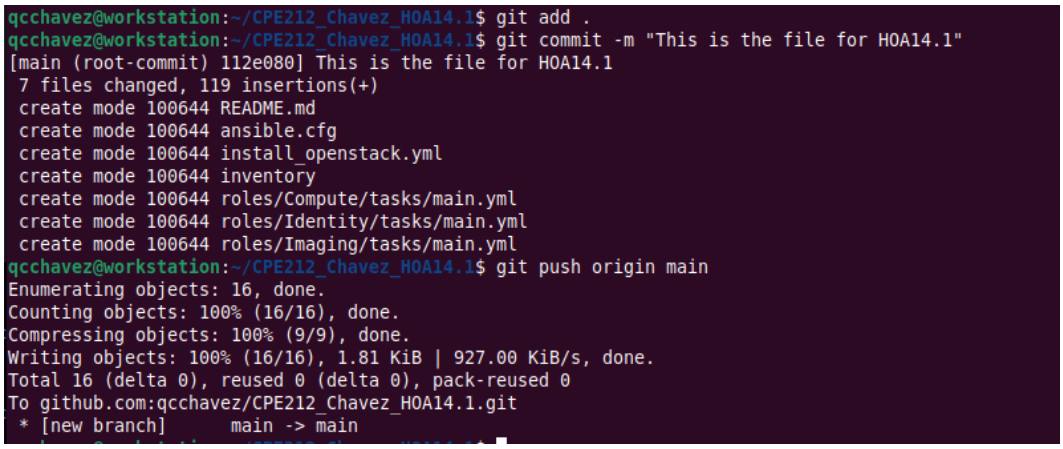
- In this screenshot, this is the proof that Nova service is active and working.

Task 4.2d



- In this screenshot, it shows the file content of the whole repository in tree view.

Task 4.2e



- In this screenshot, this is the proof that I've added, committed, and pushed to Github.

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

Keystone

- A service that is responsible for managing authentication and authorization across all OpenStack services, also provides features such as user and role management, token-based authentication, and a service catalog that enables the discovery of service endpoints.

Glance

- A service that is responsible for managing the lifecycle of virtual machine images, and also allows users to register and retrieve images, as well as associate metadata with them, including format and architecture.

Nova

- A service that is responsible for providing the infrastructure needed to provision and manage virtual machines, and also, handles the entire lifecycle of instances, including their creation, scheduling, and termination.

Conclusions:

- This activity involved setting up and understanding the core services of OpenStack, which are the Keystone, Glance and Nova. I've also learned the importance of configuration and management of OpenStack services to ensure its integration and functionality.