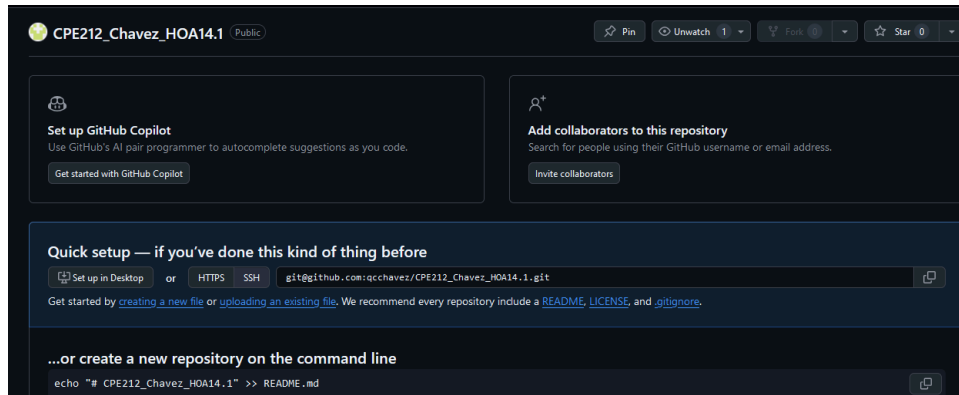


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Activity 14: OpenStack Installation (Keystone, Glance, Nova)	
1. Objectives	
Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).	
2. Intended Learning Outcomes	
<ol style="list-style-type: none"> 1. Analyze the 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. 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)

```
qcchavez@workstation: ~/CPE212_Chavez_HOA14.1/roles/identity/tasks
GNU nano 6.2 main.yml
--
- name: Install Keystone and the necessary packages
  apt:
    name:
      - keystone
      - apache2
      - libapache2-mod-wsgi-py3
    state: present
- name: Create Keystone service file
  copy:
    dest: /etc/systemd/system/keystone.service
    content: |
      [Unit]
      Description=Keystone OpenStack Identity Service
      After=network.target

      [Service]
      User=keystone
      ExecStart=/usr/bin/keystone-manage serve --config-file /etc/keystone/keystone.conf
      ExecStop=/bin/kill -TERM $MAINPID
      Restart=always

      [Install]
      WantedBy=multi-user.target
- name: Enable Keystone service
  service:
    name: keystone
    state: restarted
```

- 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.

```
PLAY [Install and configure Imaging role] *****
TASK [Gathering Facts] *****
ok: [192.168.56.113]
TASK [Imaging : Install Glance packages] *****
ok: [192.168.56.113]
TASK [Imaging : Enable Glance service] *****
changed: [192.168.56.113]
```

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

```
qcchavez@server2:~$ systemctl status glance-api
● glance-api.service - OpenStack Image Service API
   Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor pr
   Active: active (running) since Fri 2024-12-06 13:40:46 CST; 25min ago
     Docs: man:glance-api(1)
    Main PID: 23881 (glance-api)
       Tasks: 2 (limit: 2271)
      Memory: 108.0M
         CPU: 14.694s
    CGroup: /system.slice/glance-api.service
            └─23881 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/gl
              └─23994 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/gl
```

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

Task 4.2c (Nova Service)

```
qcchavez@workstation: ~/CPE212_Chavez_HOA14.1/roles/Compute/tasks
GNU nano 6.2 main.yml
---
- name: Install Nova controller packages
  apt:
    name:
      - nova-api
      - nova-scheduler
      - nova-conductor
      - python3-novaclient
    state: present
- name: Restart Nova services
  service:
    name: "{{ item }}"
    state: restarted
  loop:
    - nova-api
    - nova-scheduler
    - nova-conductor
```

- 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_H0A14.1$ 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 prese>
   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

```
qcchavez@workstation:~/CPE212_Chavez_H0A14.1$ tree
.
├── ansible.cfg
├── install_openstack.yml
├── inventory
├── README.md
└── roles
    ├── Compute
    │   └── tasks
    │       └── main.yml
    ├── Identity
    │   └── tasks
    │       └── main.yml
    └── Imaging
        └── tasks
            └── main.yml

7 directories, 7 files
```

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

Task 4.2e

```
qcchavez@workstation:~/CPE212_Chavez_H0A14.1$ git add .
qcchavez@workstation:~/CPE212_Chavez_H0A14.1$ git commit -m "This is the file for H0A14.1"
[main (root-commit) 112e080] This is the file for H0A14.1
7 files changed, 119 insertions(+)
create mode 100644 README.md
create mode 100644 ansible.cfg
create mode 100644 install_openstack.yml
create mode 100644 inventory
create mode 100644 roles/Compute/tasks/main.yml
create mode 100644 roles/Identity/tasks/main.yml
create mode 100644 roles/Imaging/tasks/main.yml
qcchavez@workstation:~/CPE212_Chavez_H0A14.1$ git push origin main
Enumerating objects: 16, done.
Counting objects: 100% (16/16), done.
Compressing objects: 100% (9/9), done.
Writing objects: 100% (16/16), 1.81 KiB | 927.00 KiB/s, done.
Total 16 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:qcchavez/CPE212_Chavez_H0A14.1.git
 * [new branch]      main -> main
```

- 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.