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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)

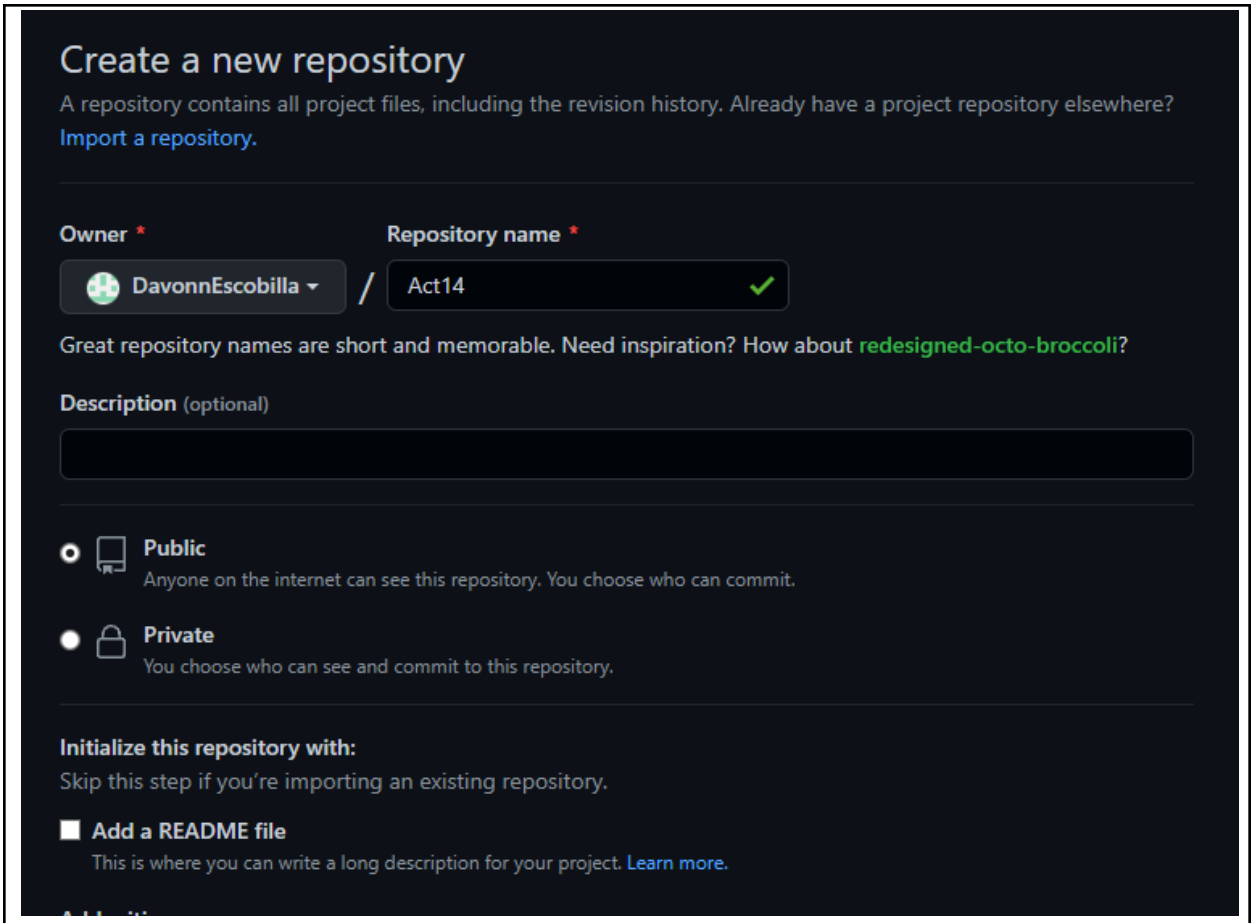
1x Ubuntu VM or Centos VM

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)

First is to create the repository and clone it into the managed node.




```
davonn@workstation:~$ git clone git@github.com:DavonnEscobilla/Act14.git
Cloning into 'Act14'...
warning: You appear to have cloned an empty repository.
davonn@workstation:~$ ls
Act13              CPE_MIDEXAM_ESCOBILLA  Escobilla_Act8Nagios      Pictures
Act14              Desktop                Escobilla_Act9Prometheus  Public
Container          Documents              main.yml                  snap
CPE232_Davonn      Downloads              Music                     Templates
CPE232_Escobilla   Escobilla_Act10        nano.save                 Videos
```

Next step, create ansible.cf for configuration and inventory for control nodes.

```
davonn@workstation: ~/Act14
  GNU nano 6.2                                ansible.cfg *
[defaults]
deprecation_warnings=False
command_warnings=False
inventory=inventory
private_key_file = ~/.ssh/ansible
```

Group the ip addresses.

```
davonn@workstation: ~/Act14
  GNU nano 6.2                                 inventory *
[compute]
192.168.56.106
[controller]
192.168.56.106
```

Next step, create roles for each installation package.

```
cdavonn@workstation:~/Act14$ cd roles
davonn@workstation:~/Act14/roles$ mkdir -p {Keystone,Glance,Nova}/tasks
davonn@workstation:~/Act14/roles$ tree
.
├── Glance
│   └── tasks
├── Keystone
│   └── tasks
└── Nova
    └── tasks

6 directories, 0 files
```

After creating roles, configure the yml to install all basic tasks and the packages on each roles.

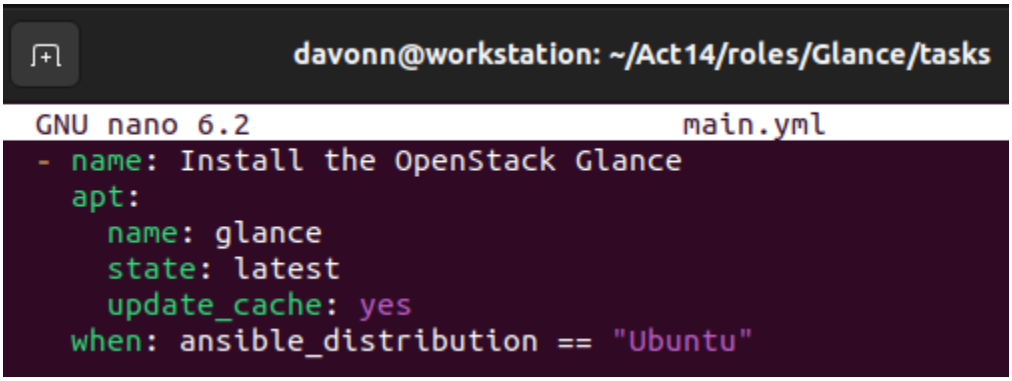
```
davonn@workstation: ~/Act14
 GNU nano 6.2                                Act14.yml
---
- hosts: all
  become: true
  pre_tasks:

  -  name: Install updates Ubuntu
     tags: always
     apt:
       upgrade: dist
       update_cache: yes
     changed_when: false
     when: ansible_distribution == "Ubuntu"

- hosts: controller
  become: true
  roles:
    - Keystone

- hosts: compute
  become: true
  roles:
    - Nova
    - Glance
```

Next is the main.yml on each task.

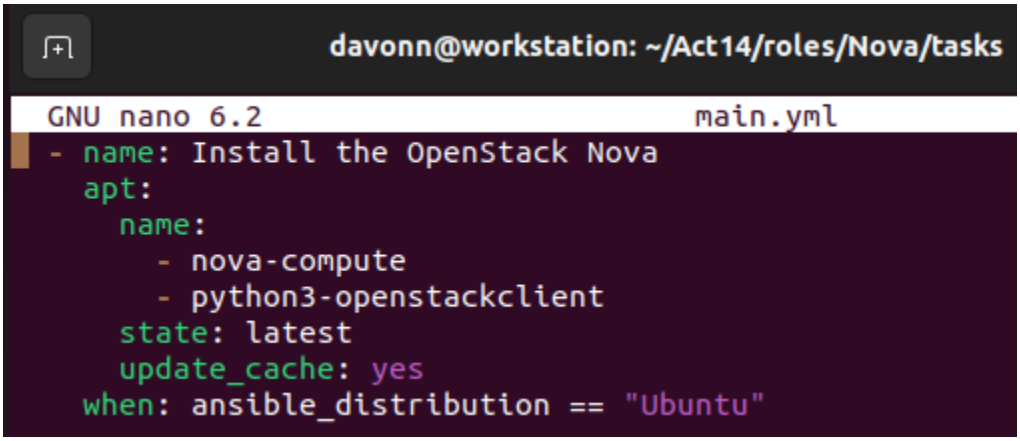
Keystone

```
davonn@workstation: ~/Act14/roles/Keystone/tasks
 GNU nano 6.2                                main.yml
- name: Install the OpenStack Keystone
  apt:
    name:
      - keystone
      - apache2
      - php
      - libapache2-mod-php
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

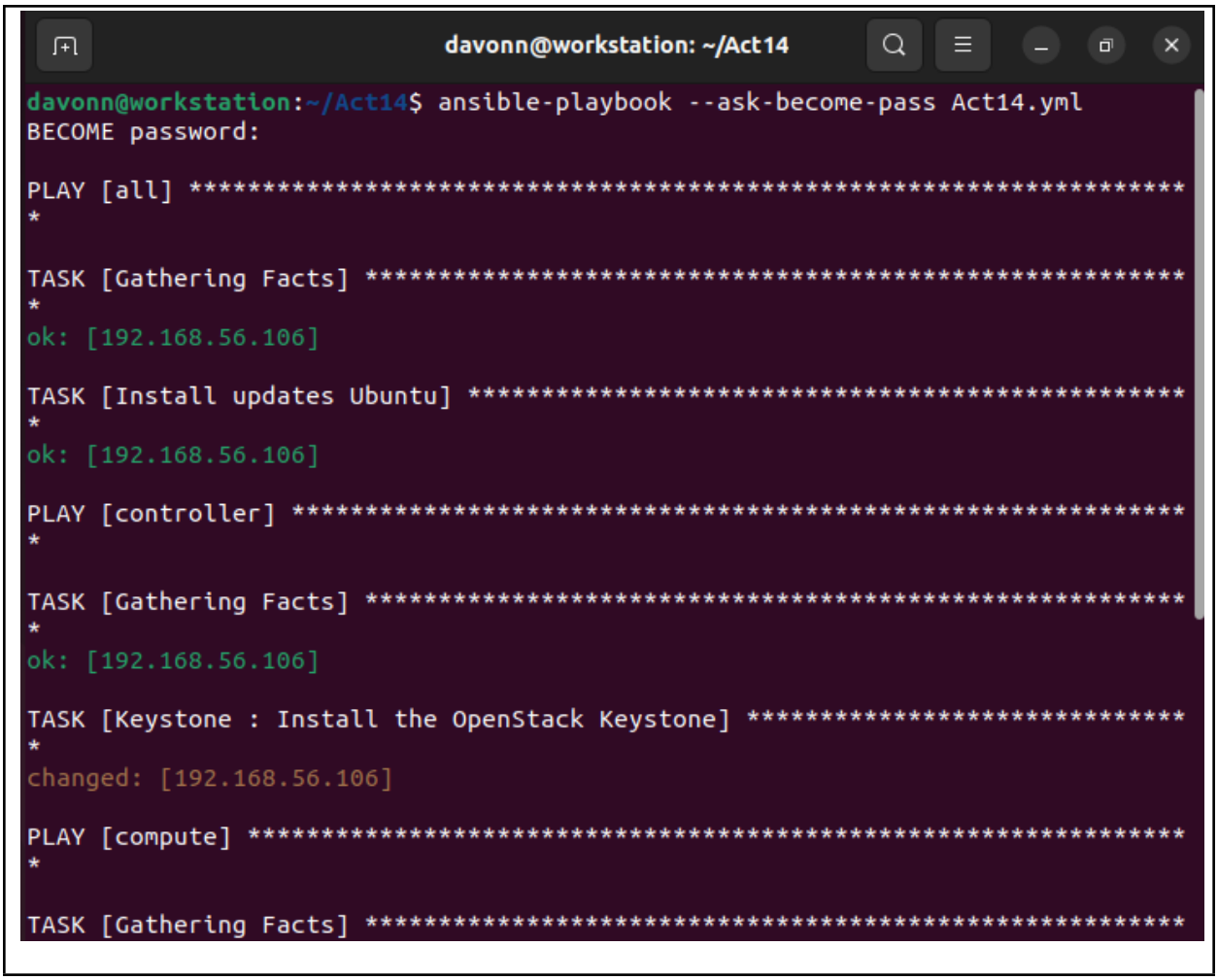
Glance

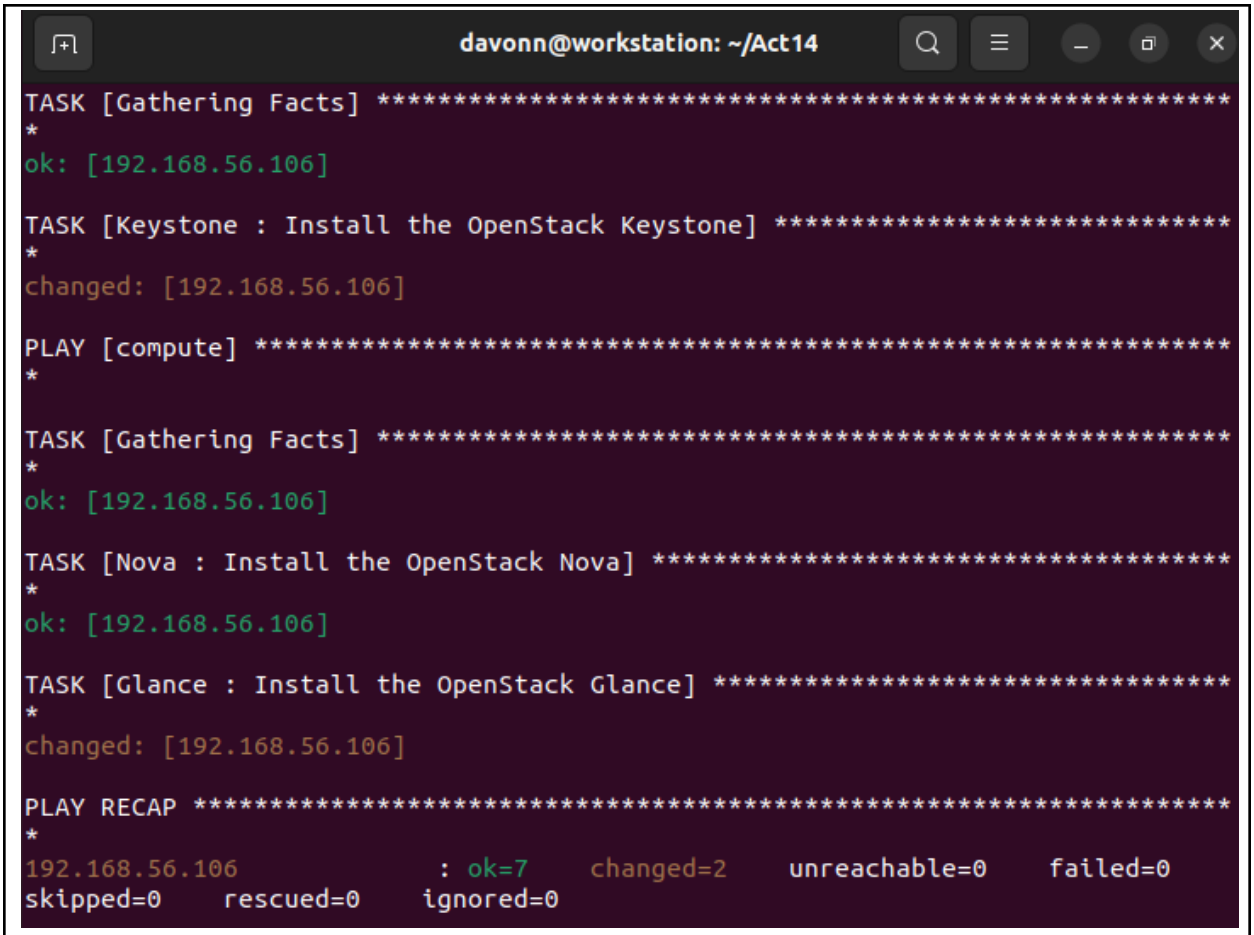


Nova

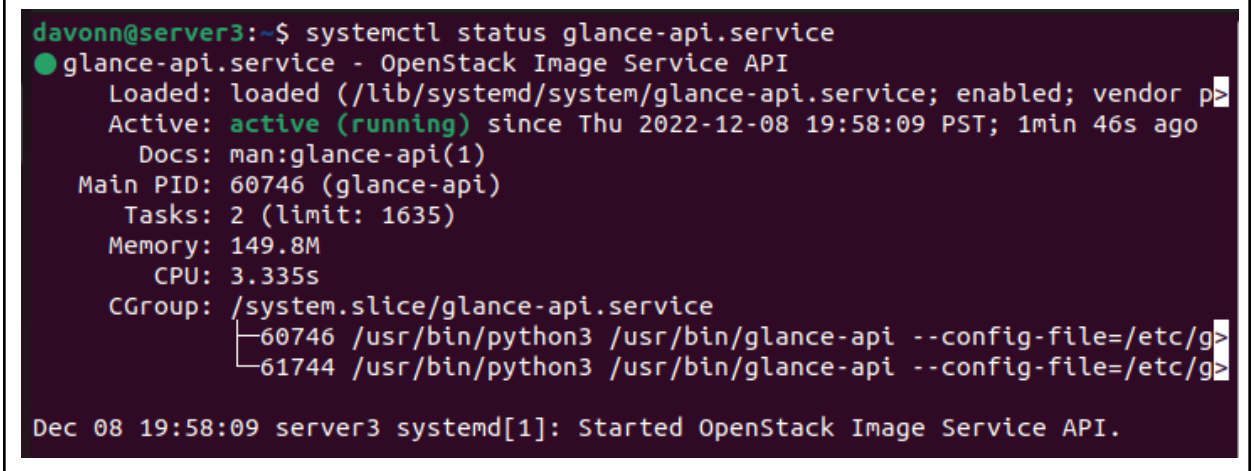


After creating main.yml on each role, run the ansible playbook.


davonn@workstation: ~/Act14
davonn@workstation:~/Act14$ ansible-playbook --ask-become-pass Act14.yml
BECOME password:
PLAY [all] ***
*
TASK [Gathering Facts] ***
*
ok: [192.168.56.106]
TASK [Install updates Ubuntu] **
*
ok: [192.168.56.106]
PLAY [controller] **
*
TASK [Gathering Facts] ***
*
ok: [192.168.56.106]
TASK [Keystone : Install the OpenStack Keystone] *********************************
*
changed: [192.168.56.106]
PLAY [compute] ***
*
TASK [Gathering Facts] ***


davonn@workstation: ~/Act14
TASK [Gathering Facts] ***
*
ok: [192.168.56.106]
TASK [Keystone : Install the OpenStack Keystone] *****************************
*
changed: [192.168.56.106]
PLAY [compute] ***
*
TASK [Gathering Facts] ***
*
ok: [192.168.56.106]
TASK [Nova : Install the OpenStack Nova] *************************************
*
ok: [192.168.56.106]
TASK [Glance : Install the OpenStack Glance] *********************************
*
changed: [192.168.56.106]
PLAY RECAP ***
*
192.168.56.106 : ok=7 changed=2 unreachable=0 failed=0
skipped=0 rescued=0 ignored=0

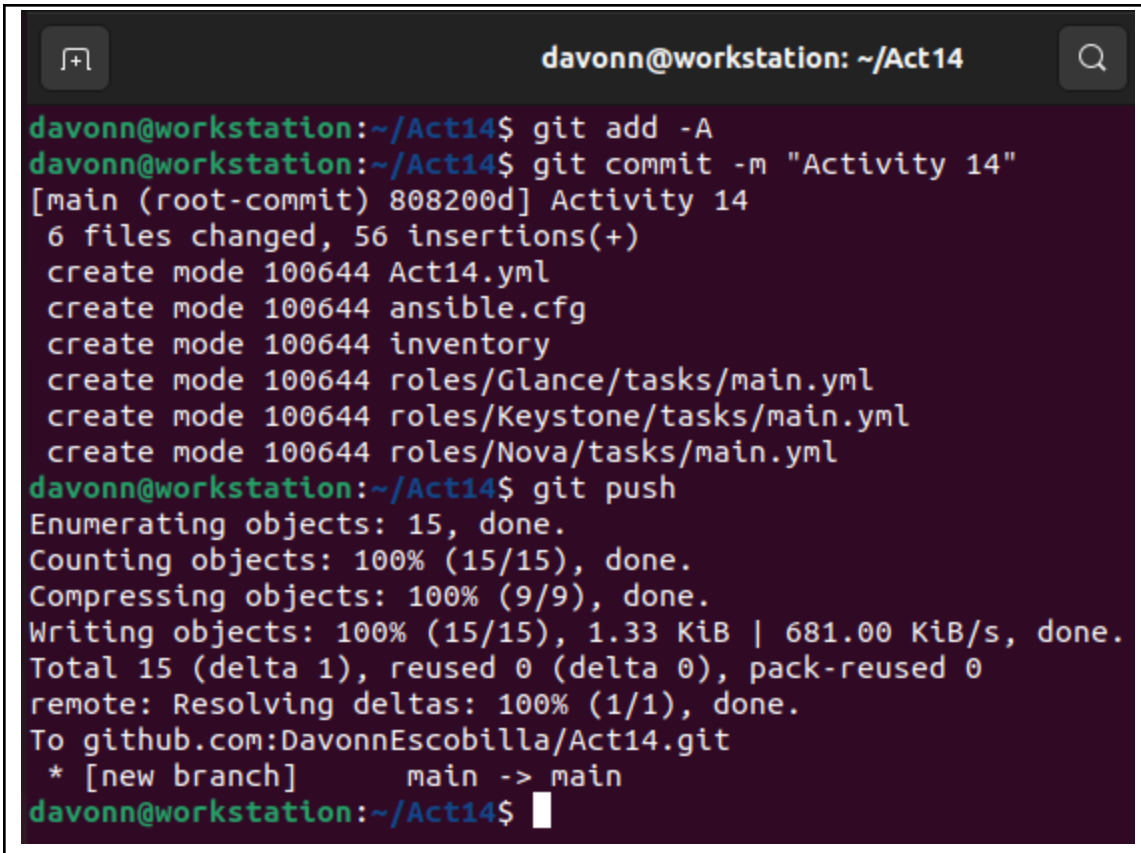
Output:


davonn@server3:~$ systemctl status glance-api.service
glance-api.service - OpenStack Image Service API
Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor p>
Active: active (running) since Thu 2022-12-08 19:58:09 PST; 1min 46s ago
Docs: man:glance-api(1)
Main PID: 60746 (glance-api)
Tasks: 2 (limit: 1635)
Memory: 149.8M
CPU: 3.335s
CGroup: /system.slice/glance-api.service
├─60746 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/g>
└─61744 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/g>
Dec 08 19:58:09 server3 systemd[1]: Started OpenStack Image Service API.

```
davonn@server3:~$ systemctl status apache2.service
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
     Active: active (running) since Thu 2022-12-08 19:57:39 PST; 2min 56s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 58963 (apache2)
      Tasks: 26 (limit: 1635)
     Memory: 52.7M
        CPU: 599ms
     CGroup: /system.slice/apache2.service
             ├─58963 /usr/sbin/apache2 -k start
             ├─59037 "(wsgi:keystone-pu" -k start
             ├─59038 "(wsgi:keystone-pu" -k start
             ├─59039 "(wsgi:keystone-pu" -k start
             ├─59040 "(wsgi:keystone-pu" -k start
             ├─59041 "(wsgi:keystone-pu" -k start
             ├─59042 /usr/sbin/apache2 -k start
             ├─59043 /usr/sbin/apache2 -k start
             ├─59044 /usr/sbin/apache2 -k start
             ├─59045 /usr/sbin/apache2 -k start
             └─59046 /usr/sbin/apache2 -k start

Dec 08 19:57:39 server3 systemd[1]: apache2.service: Deactivated successfully.
Dec 08 19:57:39 server3 systemd[1]: apache2.service: Unit process 58718 (apach>
Dec 08 19:57:39 server3 systemd[1]: apache2.service: Unit process 58719 (apach>
Dec 08 19:57:39 server3 systemd[1]: Stopped The Apache HTTP Server.
Dec 08 19:57:39 server3 systemd[1]: Starting The Apache HTTP Server...
Dec 08 19:57:39 server3 apachectl[58962]: AH00558: apache2: Could not reliably>
Dec 08 19:57:39 server3 systemd[1]: Started The Apache HTTP Server.
```

```
davonn@server3:~$ systemctl status nova-compute.service
● nova-compute.service - OpenStack Compute
     Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor>
     Active: active (running) since Thu 2022-12-08 19:28:27 PST; 32min ago
   Main PID: 2573 (nova-compute)
      Tasks: 2 (limit: 1635)
     Memory: 73.2M
        CPU: 3.409s
     CGroup: /system.slice/nova-compute.service
             └─2573 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/>

Dec 08 19:28:27 server3 systemd[1]: Started OpenStack Compute.
Dec 08 19:29:32 server3 nova-compute[2573]: Modules with known eventlet monkey>
```

Lastly, save the work on github.



Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

   Keystone is a service that gives API client authentication. While Glance, provides service to discover, register, and retrieve virtual machine images. Nova compute service is to provide scalability on a massive scale and have access to compute resources in a self service way.

Conclusions:

Upon performing the activity, there are no struggles on receiving errors since there is a provided manual or code to enter into the configuration. The only challenge here is the management of each task in every role. Using the previous knowledge about creating roles, the activity is performed efficiently and without errors.