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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)

```
madiane@workstation:~$ git clone git@github.com:qmja/Agpaoa_HOA_14.git
Cloning into 'Agpaoa_HOA_14'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
Receiving objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
```

Figure 1.1 Cloning Agpaoa_HOA_14 Repository

I created a new repository in GitHub for this activity and named it Agpaoa_HOA_14. After creating the repository, I cloned it in my workstation by using the command “git clone”.

```
madiane@workstation:~/Agpaoa_HOA_14$ mkdir roles
madiane@workstation:~/Agpaoa_HOA_14$ cd roles
madiane@workstation:~/Agpaoa_HOA_14/roles$ mkdir nova glance keystone
```

Figure 1.2 Creating directories for the roles

I created the roles directories by using the command “mkdir”, then changed the directory to roles directory by using the command “cd”. Within the roles directory I created the directory for nova, glance, and keystone by using the command “mkdir”.

```
madiane@workstation:~/Agpaoa_HOA_14/roles$ cd nova
madiane@workstation:~/Agpaoa_HOA_14/roles/nova$ mkdir tasks
madiane@workstation:~/Agpaoa_HOA_14/roles/nova$ cd tasks
madiane@workstation:~/Agpaoa_HOA_14/roles/nova/tasks$ touch main.yml
```

Figure 1.3 Creating task directory and main.yml for nova

First, I changed the directory to nova by using the command “cd” and then I created the tasks directory by using the command “mkdir”. After that I changed the directory to tasks by using the command “cd” and I created the main.yml by using the command “touch”.

```
madiane@workstation:~/Agpaoa_HOA_14/roles/nova$ cp -r tasks ~/Agpaoa_HOA_13/roles/glance
madiane@workstation:~/Agpaoa_HOA_14/roles/nova$ cp -r tasks ~/Agpaoa_HOA_13/roles/keystone
```

Figure 1.4 Copying the tasks directory and it’s contents to other directories within the roles directory

I copied the tasks directory and its content to glance and keystone directories by using the command “cp” and option “-r”.

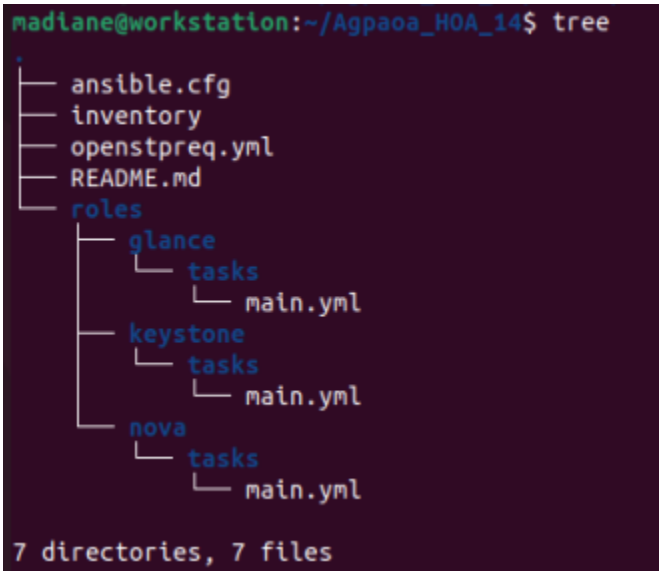

Figure 1.5 Files within the Agpaoa_HOA_14 directory

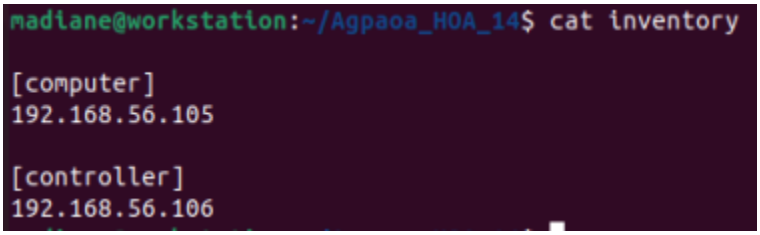

Figure 1.6 Contents of inventory file

The inventory file contains the IP address of my Ubuntu Server 1 and 2 which is 192.168.56.105 (computer group) and 192.168.56.106 (controller group).

```
 GNU nano 6.2                                        openstpreq.yml
---
- hosts: all
  become: true
  pre_tasks:

  - name: install updates (Ubuntu)
    tags: always
    apt:
      upgrade: dist
      update_cache: yes
    when: ansible_distribution == "Ubuntu"

- hosts: computer
  become: true
  roles:
    - keystone
    - glance
    - nova

- hosts: controller
  become: true
  roles:
    - keystone
    - glance
    - nova
```

Figure 1.7 Contents of openstpreq.yml playbook

The openstpreq.yml contains the pre-tasks and the roles that contains the tasks that will install and configure the Keystone, Glance and Nova.

```
madiane@workstation: ~/Agpaoa_HOA_14/roles/keystone/tasks
 GNU nano 6.2                                          main.yml
- name: Installing Keystone
  apt:
    name: keystone
    state: present
    update_cache: yes

- name: Restarting/starting Keystone
  service:
    name: apache2
    state: restarted
    enabled: yes
```

Figure 2.1 Contents of main.yml within the keystone directory

The main.yml within the keystone directory contains the workflow for installing the keystone and restarting the service of apache2, this is because the keystone is configured within apache2.

Figure 2.2 Contents of main.yml within the glance directory

The main.yml within the glance directory contains the workflow for installing and starting/restarting the service of glance.

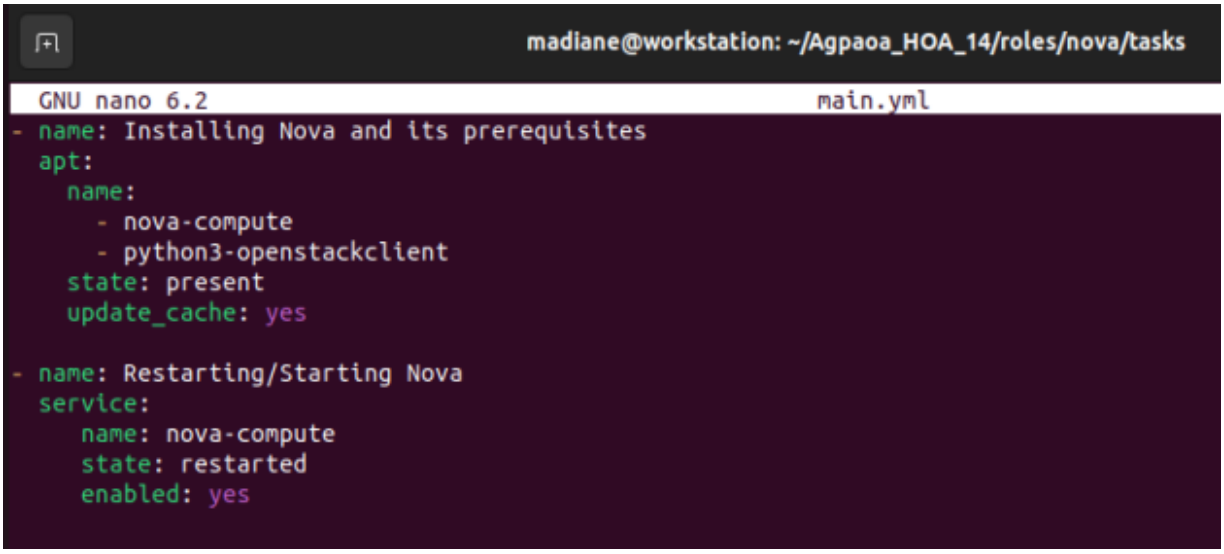

Figure 2.3 Contents of main.yml within the nova directory

The main.yml within the nova directory contains the workflow for installing nova and its prerequisite which is the python3-openstackclient and starting/restarting the service of glance.

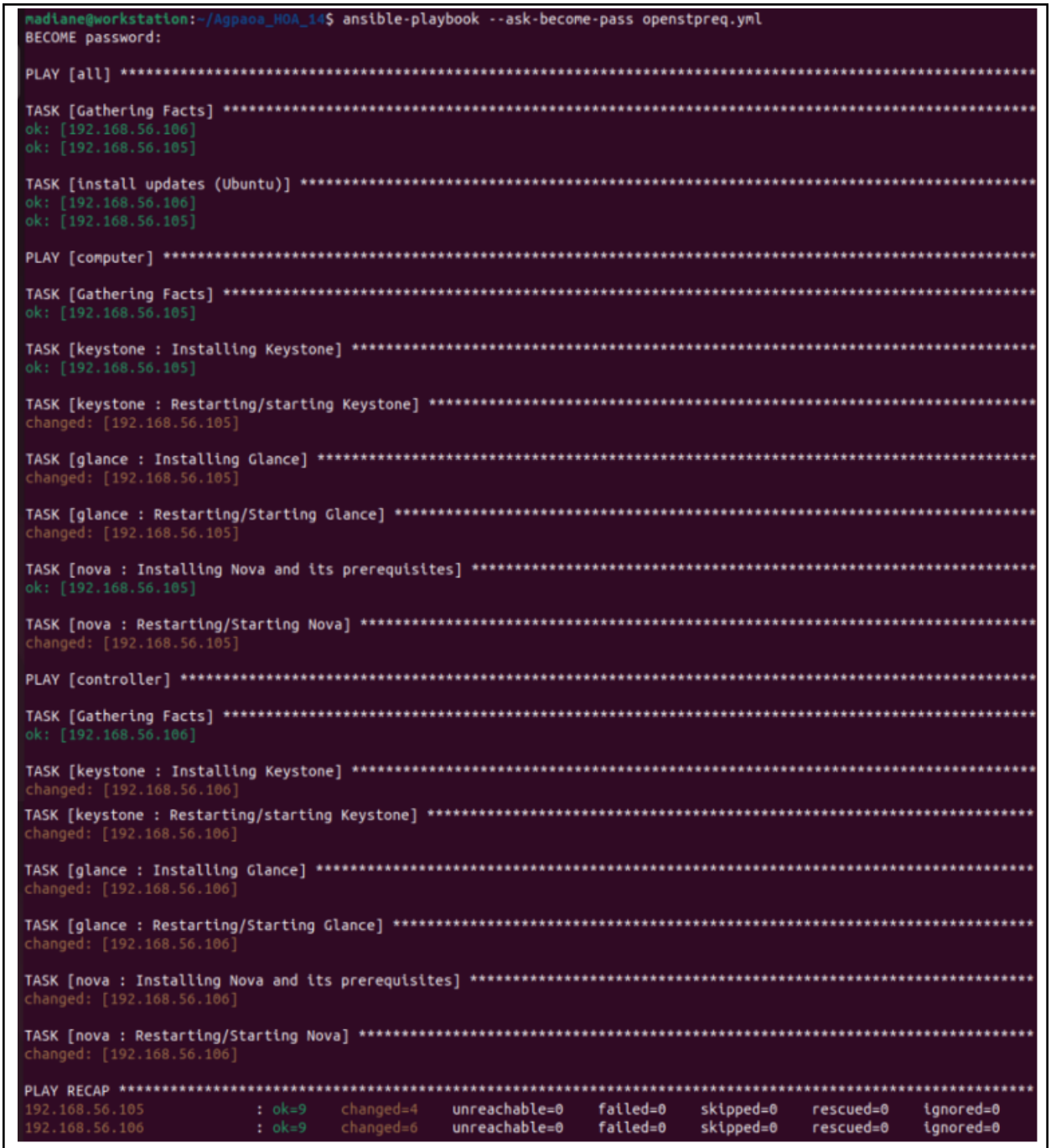

Figure 3.1 Running the playbook openstpreq.yml

I run the playbook openstpreq.yml using the command “ansible-playbook --ask-become-pass openstpreq.yml”. The first task executed was the pre-task for the installation of updates within the Ubuntu Server. After the pre-tasks, the tasks for installing, configuring and starting/restarting of services of Keystone, Glance and

Nova will be executed. According to the play recap, all of the tasks was successfully executed based on their states that shows “ok” and “changed”.

```
madiane@workstation:~/Agpaoa_HOA_14$ git add *
madiane@workstation:~/Agpaoa_HOA_14$ git commit -m "HOA-14"
[main b7c18b2] HOA-14
 6 files changed, 75 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 openstpreq.yml
 create mode 100644 roles/glance/tasks/main.yml
 create mode 100644 roles/keystone/tasks/main.yml
 create mode 100644 roles/nova/tasks/main.yml
madiane@workstation:~/Agpaoa_HOA_14$ git push
Enumerating objects: 16, done.
Counting objects: 100% (16/16), done.
Compressing objects: 100% (9/9), done.
Writing objects: 100% (15/15), 1.49 KiB | 1.49 MiB/s, done.
Total 15 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:qmja/Agpaoa_HOA_14.git
   a46054f..b7c18b2  main -> main
```

Figure 3.2 Saving the files to my GitHub Repository

First, I add the files within the Agpaoa_HOA_14 directory to the GitHub Repository by using the command “git add *”. Next, I commit the changes by using the command “git commit -m “HOA-14”. Lastly, I upload the files within the GitHub repository using the command “git push”.

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

   The Keystone, Glance, and Nova services are part of the OpenStack cloud computing platform. Keystone is considered as the Identity service and its purpose is for authenticating users and giving these users an appropriate access with the services. Glance is considered as the Imaging service which allows the users to store and get virtual machine images. Lastly, Nova is considered as the Compute Service and its purpose is to manage the cloud’s computing resources and giving the users the ability to launch and manage virtual machines.

Conclusions:

In conclusion, this activity helped me to learn the process of installing and configuring the OpenStack with Keystone, Glance and Nova services, and practice my skill in creating a flow using ansible. I also learned about the purpose of Keystone,

Glance and Nova services for Openstack. In which, the Keystone is the Identity Service for OpenStack, Glance is the Imaging Service for OpenStack and Nova is the Compute Service for OpenStack. These three services are important for the OpenStack cloud because these services will give the users secure access and the ability to utilize the cloud's computing resources.

Honor Pledge:

"I affirm that I will not give or receive unauthorized help on this activity and that all work will be my own."