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Course/Section: CPE232 - CPE31S22	**Date Submitted:** 03/12/2022
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Activity 13: OpenStack Prerequisite Installation

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. NTP
   b. OpenStack packages
   c. SQL Database
   d. Message Queue
   e. Memcached
   f. Etcd
   g. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in Inventory file.
   h. Add, commit and push it to your GitHub repo.

5. Output (screenshots and explanations)

```
madiane@workstation:~$ git clone git@github.com:qmja/Agpaoa_HOA_13
Cloning into 'Agpaoa_HOA_13'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
```

Figure 1.1 Creating new repository

I created a new repository for this activity and named it Agpaoa_HOA_13, I used the command git clone to connect the repository in my virtual machine.

Figure 1.2 Creating the roles directory

I created the roles directory by using the command “mkdir”. After that I changed my directory to roles by using the command “cd”.

Figure 1.3 Creating new directories within the roles directory

I created the ntp, openstack, sql, msgqueue, memcached, and etcd directories within the roles directory.

Figure 1.4 Creating the tasks directory

I changed the directory to etcd within the roles directory by using the command “cd” and created the tasks directory by using the command mkdir.

Figure 1.5 Creating the main.yml playbook

I changed the directory to tasks directory within the etcd directory by using the “cd” command and created main.yml by using the command “touch”.

Figure 1.6 Copying the tasks directory and it's contents to other directories within the roles directory

I copied the tasks directory and its content to sql, openstack, ntp, msgqueue, and memcached directories by using the command "cp" and option "-r".

Figure 1.7 Contents of the new repository

The Agpaoa_HOA_13 directory which is the repository for this activity contains the ansible.cfg, inventory, openstpreq.yml. README.md and roles directory.

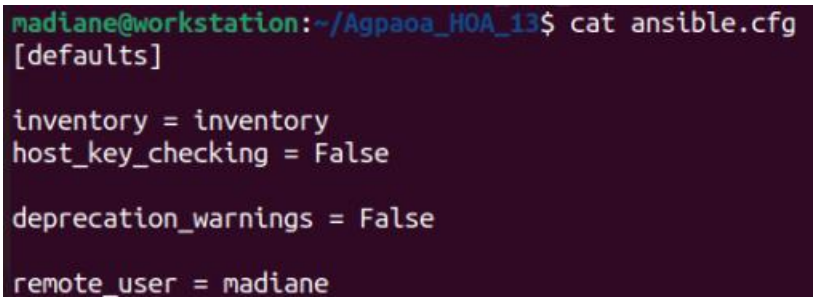

Figure 1.8 Contents of ansible.cfg file

Figure 1.9 Contents of inventory file

The inventory file contains the IP address of my Ubuntu Server 1 which is the 192.168.56.105.

madiane@workstation: ~/Agpaoa_HOA_13

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: db_servers
  become: true
  roles:
    - ntp
    - openstack
    - sql
    - msgqueue
    - memcached
    - etcd
```

Figure 1.10 Contents of openstpreq.yml playbook

The openstpreq.yml contains the pre-tasks and the roles that contains the tasks that will install, configure and set up the OpenStack.

```
madiane@workstation:~/Agpaoa_HOA_13/roles$ tree
.
├── etcd
│   └── tasks
│       └── main.yml
├── memcached
│   └── tasks
│       └── main.yml
├── msgqueue
│   └── tasks
│       └── main.yml
├── ntp
│   └── tasks
│       └── main.yml
├── openstack
│   └── tasks
│       └── main.yml
└── sql
    └── tasks
        └── main.yml

12 directories, 6 files
```

Figure 1.11 List of files within roles directory

```
madiane@workstation: ~/Agpaoa_HOA_13/roles/ntp/tasks
GNU nano 6.2                                  main.yml
- name: Installing Network Time Protocol (NTP)
  apt:
    name: chrony
    state: latest

- name: Starting/Restarting chrony
  service:
    name: chrony.service
    enabled: true
    state: restarted
```

Figure 2.1 Contents of main.yml within the ntp directory

The main.yml playbook within the ntp directory contains the tasks for installing the NTP and starting/restarting the chrony.service.

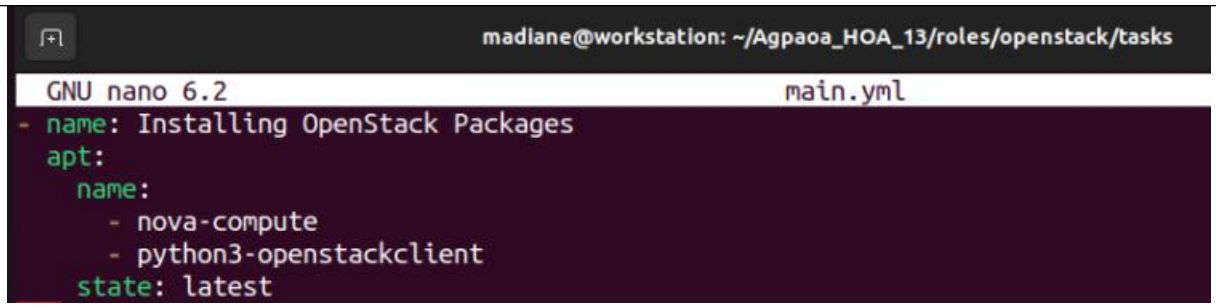

Figure 2.2 Contents of main.yml within the openstack directory

The main.yml playbook within the openstack directory contains the task for installing the OpenStack packages and these are; nova-compute and python3-openstackclient.

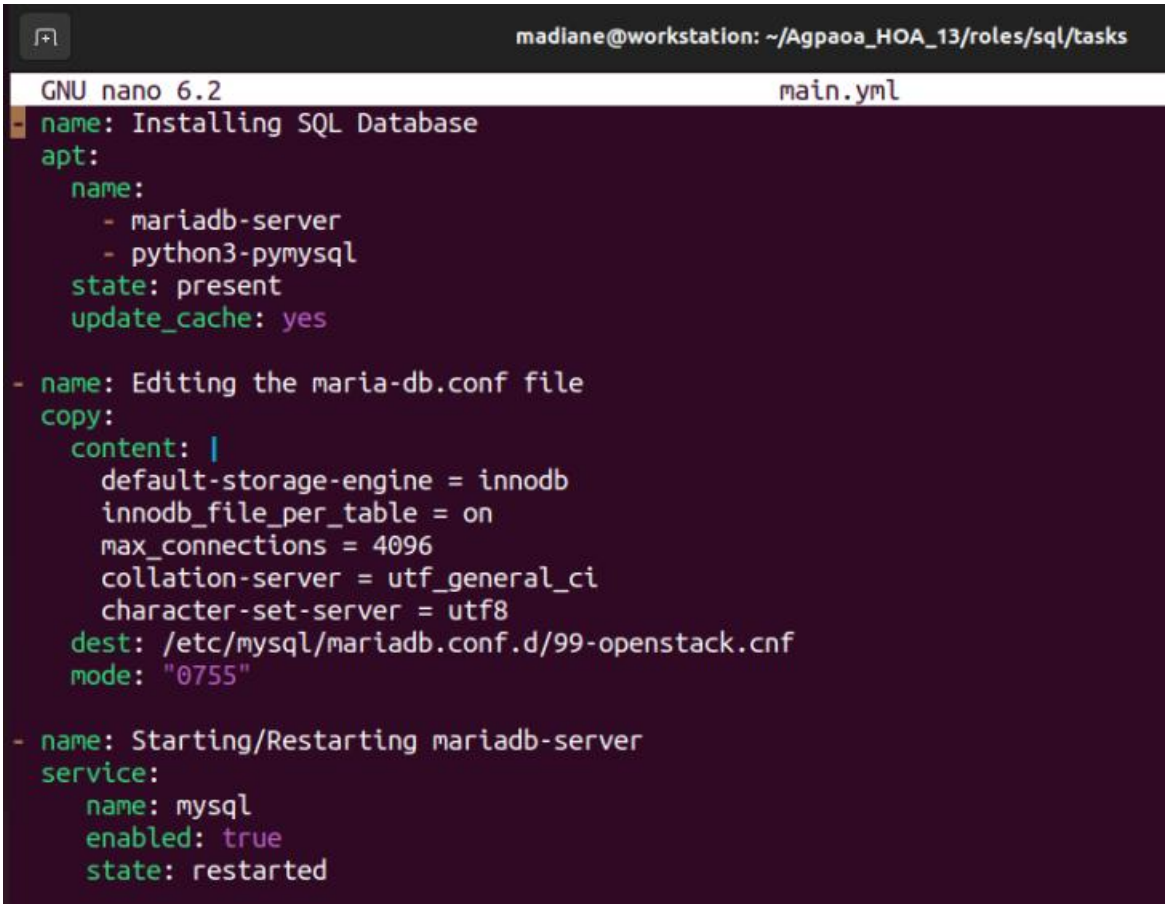

Figure 2.3 Contents of main.yml within the sql directory

The main.yml within the sql directory contains the task that will install the SQL database and these are the mariadb-server and python3-pymysql, task that will edit the maria-db.conf and the task that will start the maria-db server.

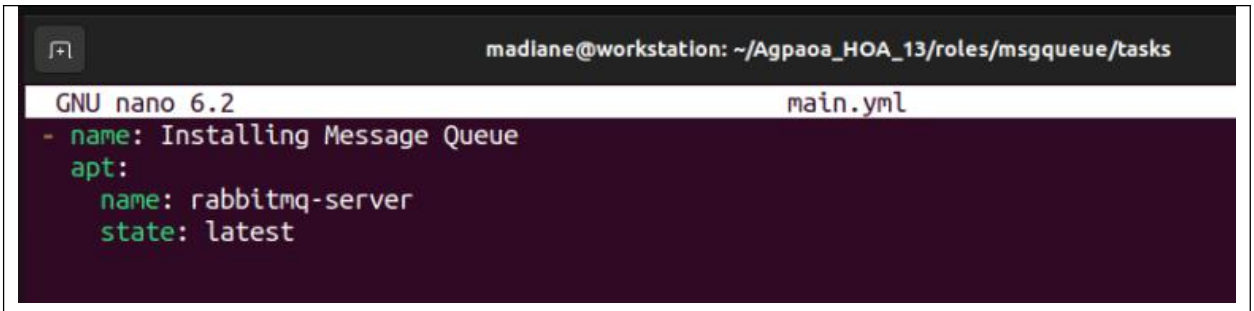

Figure 2.4 Contents of main.yml within the msgqueue directory

The main.yml playbook within the msgqueue directory contains the task for installing the Message Queue.

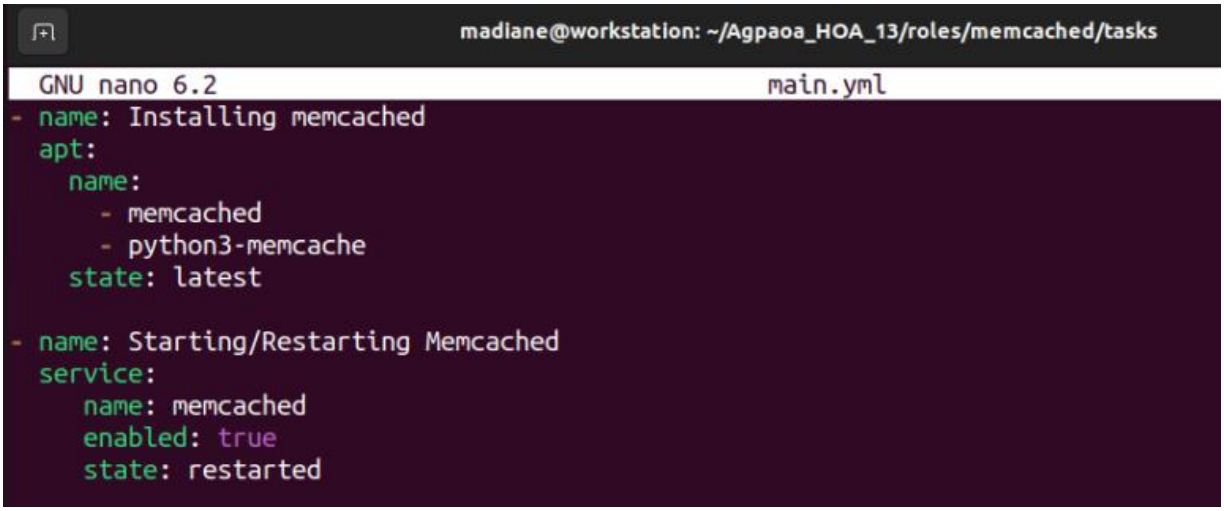

Figure 2.5 Contents of main.yml within the memcached directory

The main.yml playbook withing the memcached directory contains the tasks for installing the memcached and the task for starting/restarting the memcached.

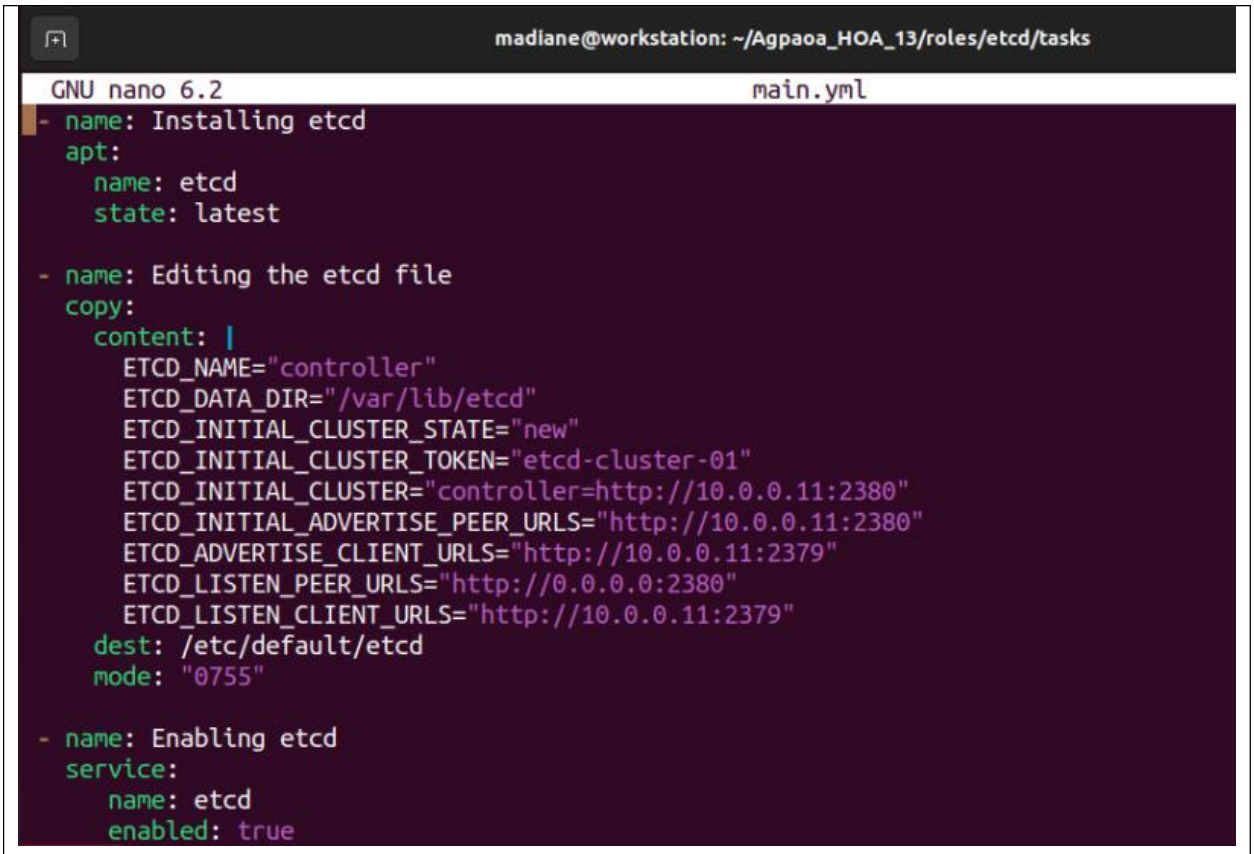

Figure 2.6 Contents of main.yml within the etcd directory

The main.yml playbook within the etcd directory contains the task for installing etcd, editing the etcd file and enabling the service of etcd.

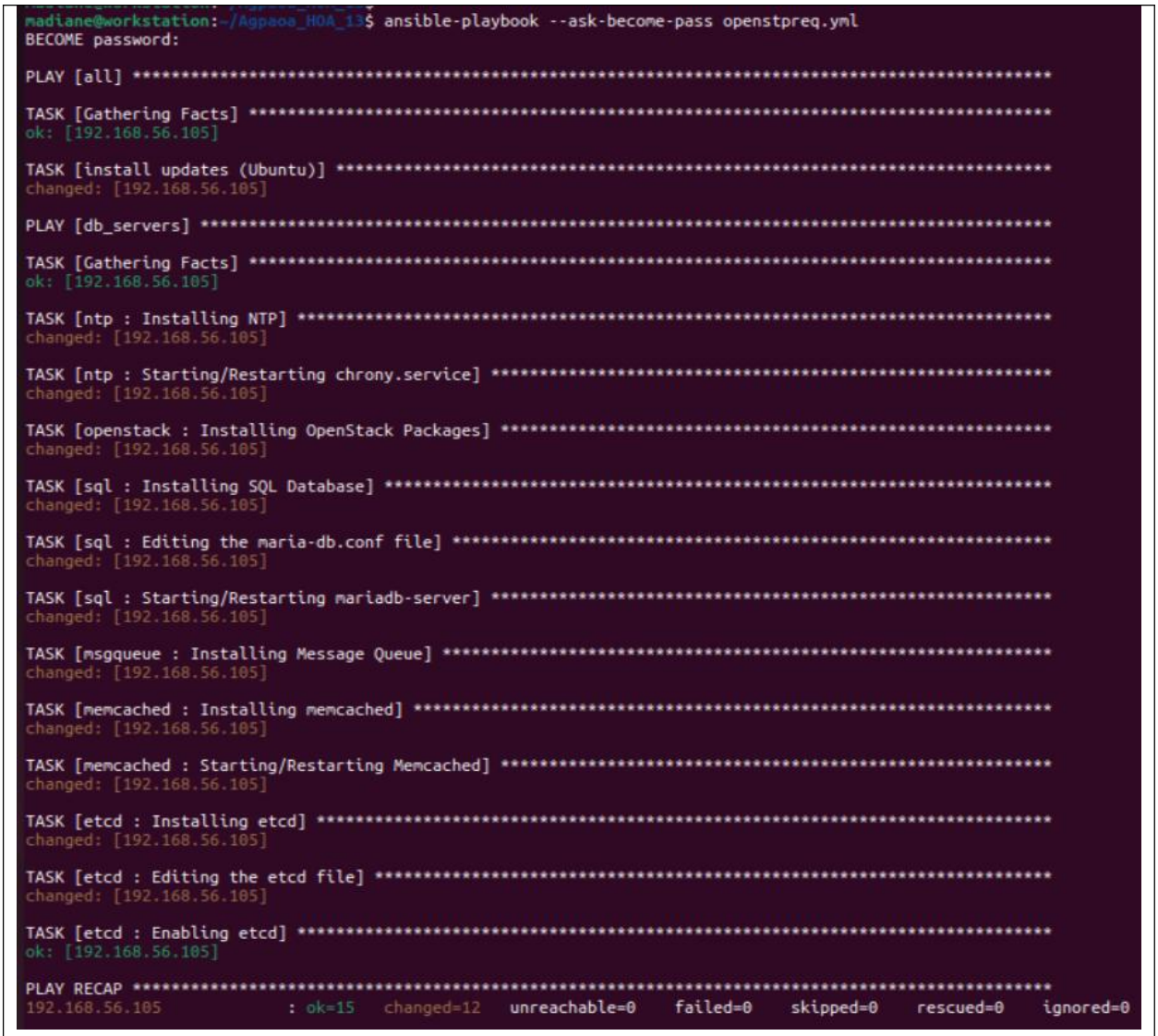

Figure 2.7 Running the playbook openstpreq.yml

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, editing, starting/restarting of services of NTP, OpenStack packages, SQL Database, Message Queue, Memcached, and Etcd. 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_13$ git add *
madiane@workstation:~/Agpaoa_HOA_13$ git commit -m "HOA13"
[main 6da82a2] HOA13
 9 files changed, 118 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 openstpreq.yml
 create mode 100644 roles/etcd/tasks/main.yml
 create mode 100644 roles/memcached/tasks/main.yml
 create mode 100644 roles/msgqueue/tasks/main.yml
 create mode 100644 roles/ntp/tasks/main.yml
 create mode 100644 roles/openstack/tasks/main.yml
 create mode 100644 roles/sql/tasks/main.yml
madiane@workstation:~/Agpaoa_HOA_13$ git push
Enumerating objects: 25, done.
Counting objects: 100% (25/25), done.
Compressing objects: 100% (11/11), done.
Writing objects: 100% (24/24), 2.46 KiB | 2.46 MiB/s, done.
Total 24 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:qmja/Agpaoa_HOA_13
   afe3781..6da82a2  main -> main
```

Figure 2.8 Saving the files to my GitHub Repository

First, I add the files within the Agpaoa_HOA_13 directory to the GitHub Repository by using the command “git add *”. Next, I commit the changes by using the command “git commit -m “HOA13”. Lastly, I upload the files within the GitHub repository using the command “git push”.

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

Implementing OpenStack is beneficial because it improves the scalability for hosting or cloud hosting which is critical because of unpredictable demand for resources. Using OpenStack also improves effectiveness of work and easier cloud management because the user can automate tasks. In addition, OpenStack is also considered as open source platform which means it can be developed and improved by several experts.

Conclusions:

In conclusion, this actvity helped me to learn the process of installing, configuring and setting up the OpenStack, and practice my skill in creating a flow using ansible. I also learned the benefits that a user, administrator or a company could get in implementing OpenStack. In which, OpenStack improves the scalability of resources, implementing automation of tasks which makes cloud management easier, and its fast development because of its active community that helps develop and improve OpenStack.

Honor Pledge:

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