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Course/Section:CPE 212-CPE31S2	Date Submitted:12/2/24
Instructor: Engr. Robin Valenzuela	Semester and SY:

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

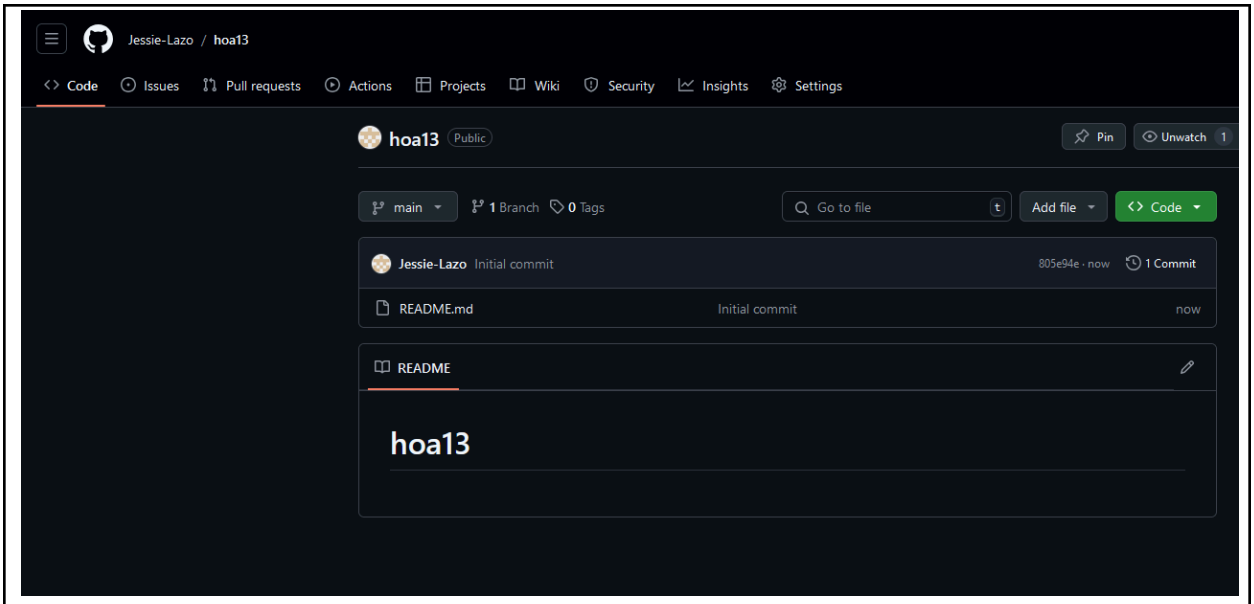
Oracle VirtualBox (Hypervisor)

1x Ubuntu VM or Centos VM

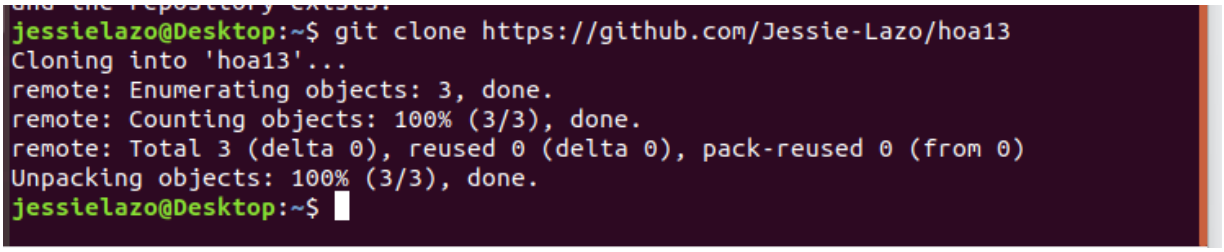
4. Tasks

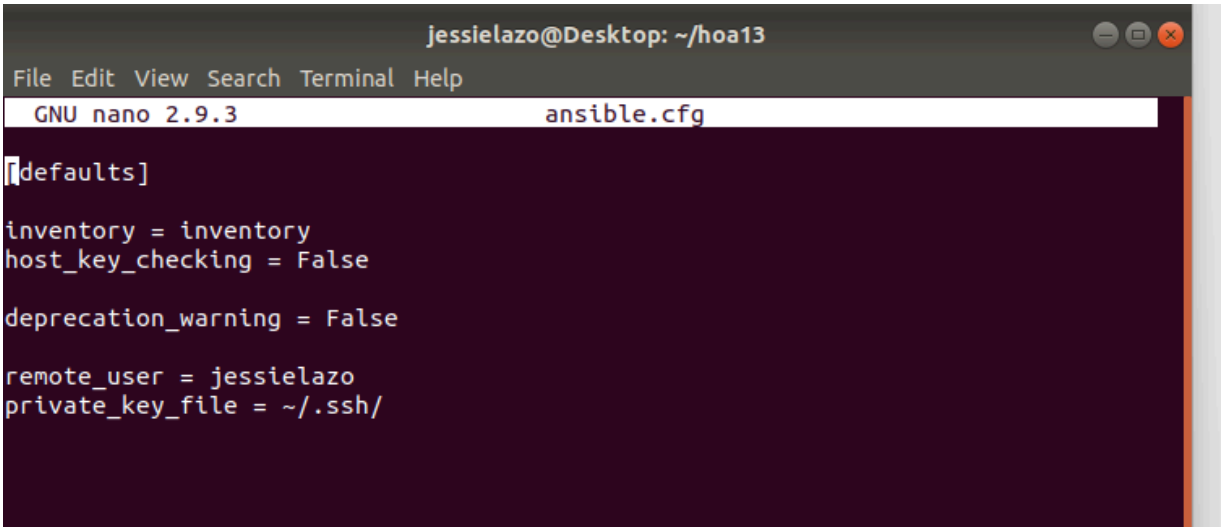
1. Create a new repository for this activity.
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/
    a. NTP
    b. OpenStack packages
    c. SQL Database
    d. Message Queue
    e. Memcached
    f. Etcd
    g. Create different plays in installing 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.

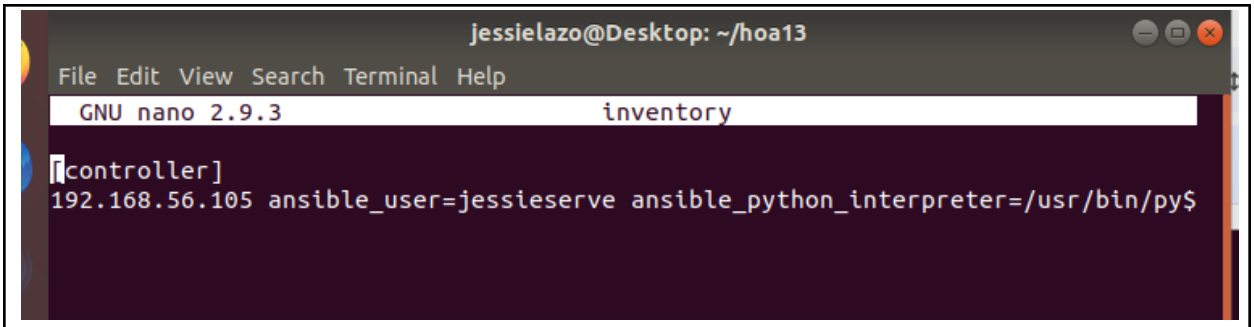
TASKS: 1.Create a new GitHub repository hoa13

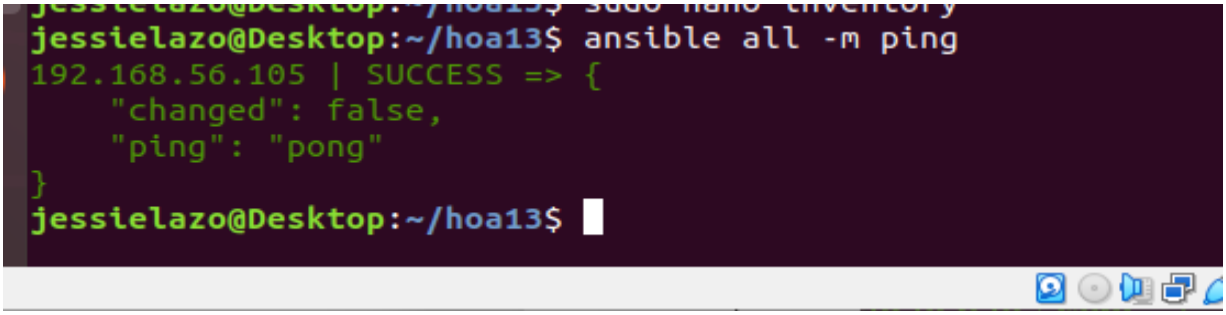


2. Clone the GitHub repository to the local machine, and set up the Ansible environment with one Ubuntu remote node (since only one machine was asked in the resources section). Make an ansible configuration file and an inventory file needed for the ansible environment.

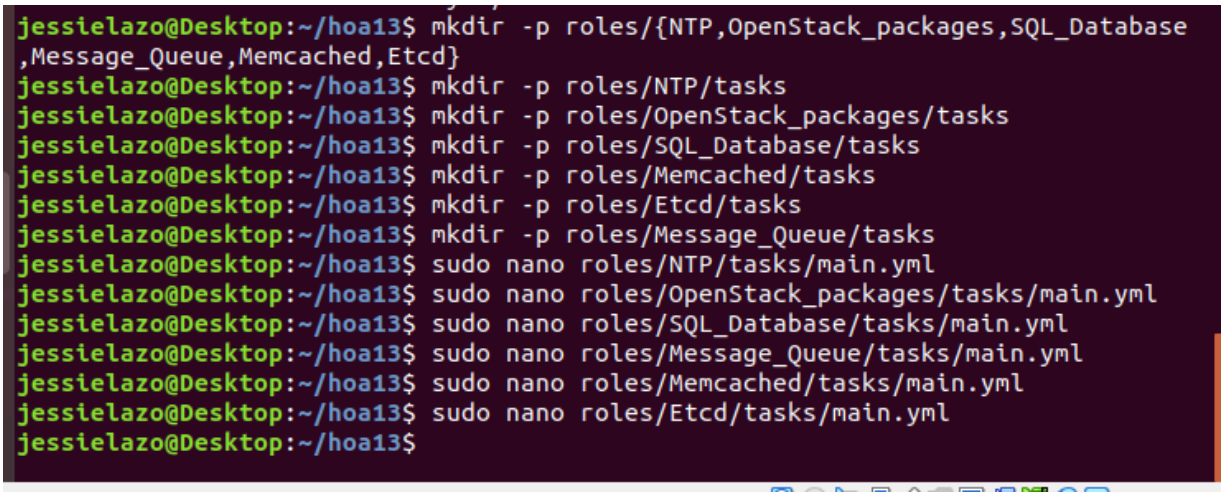


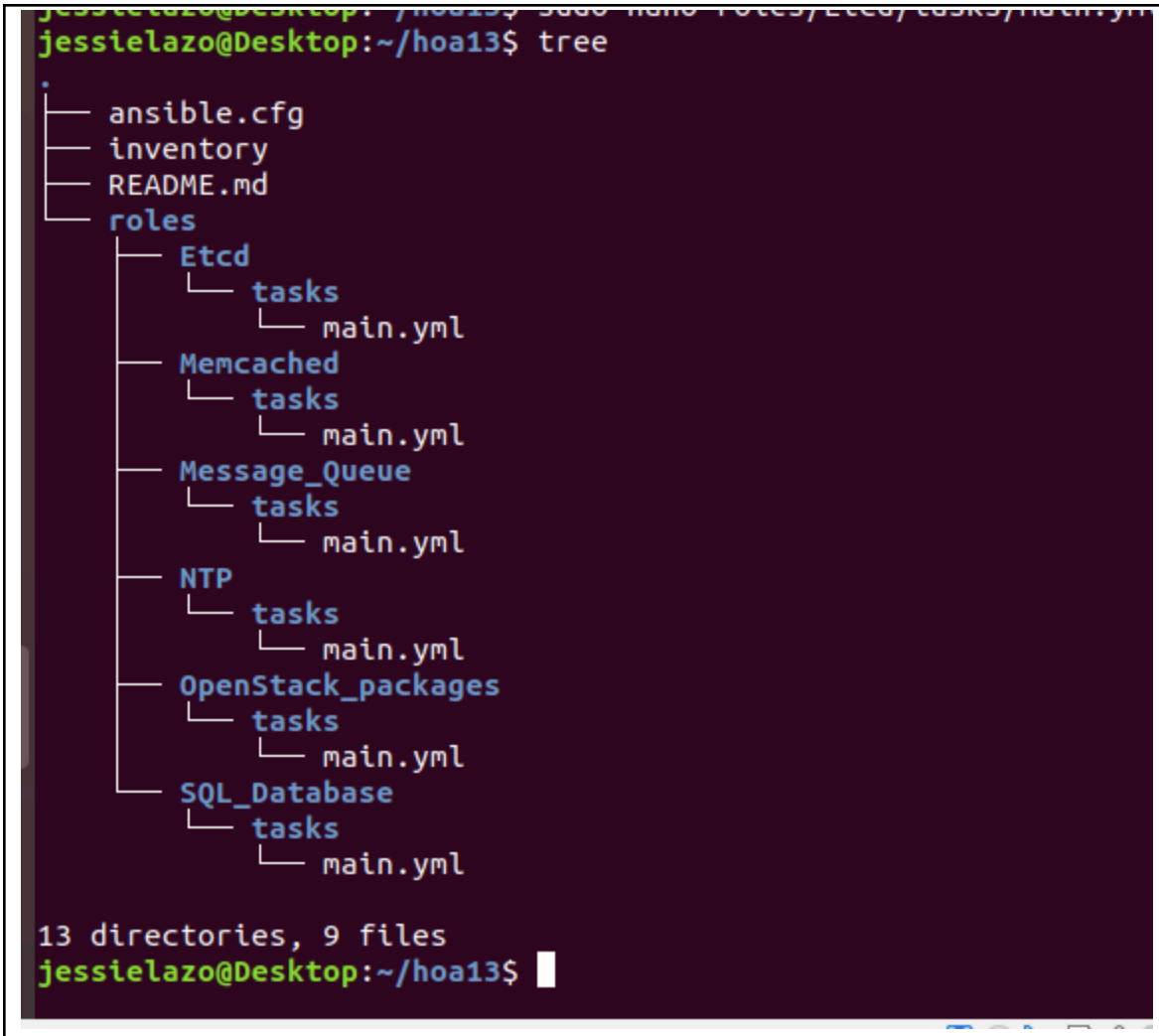




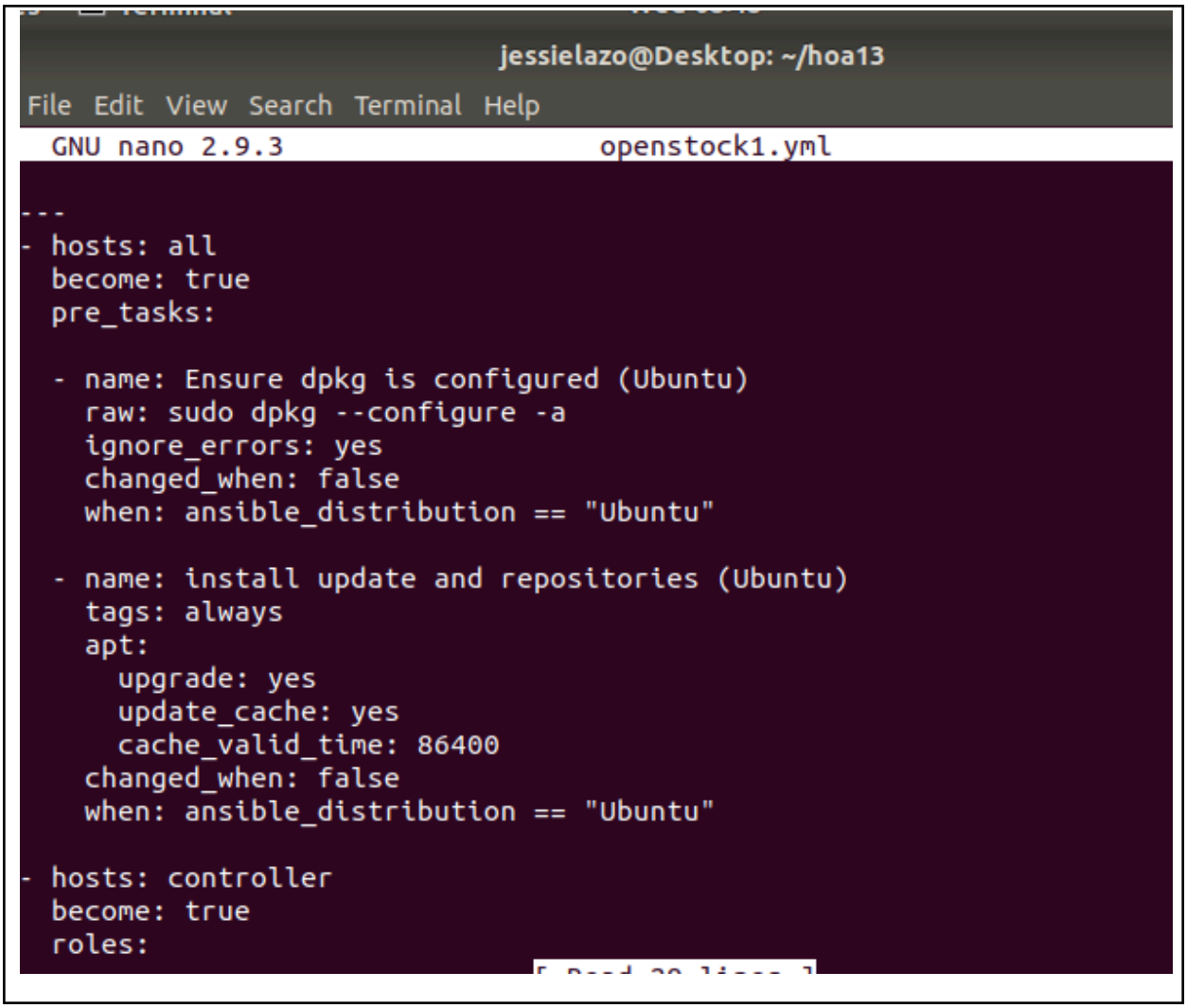


3. Apply the concept of roles and create the necessary folders, subfolders, and files which will soon be used in the following procedures.

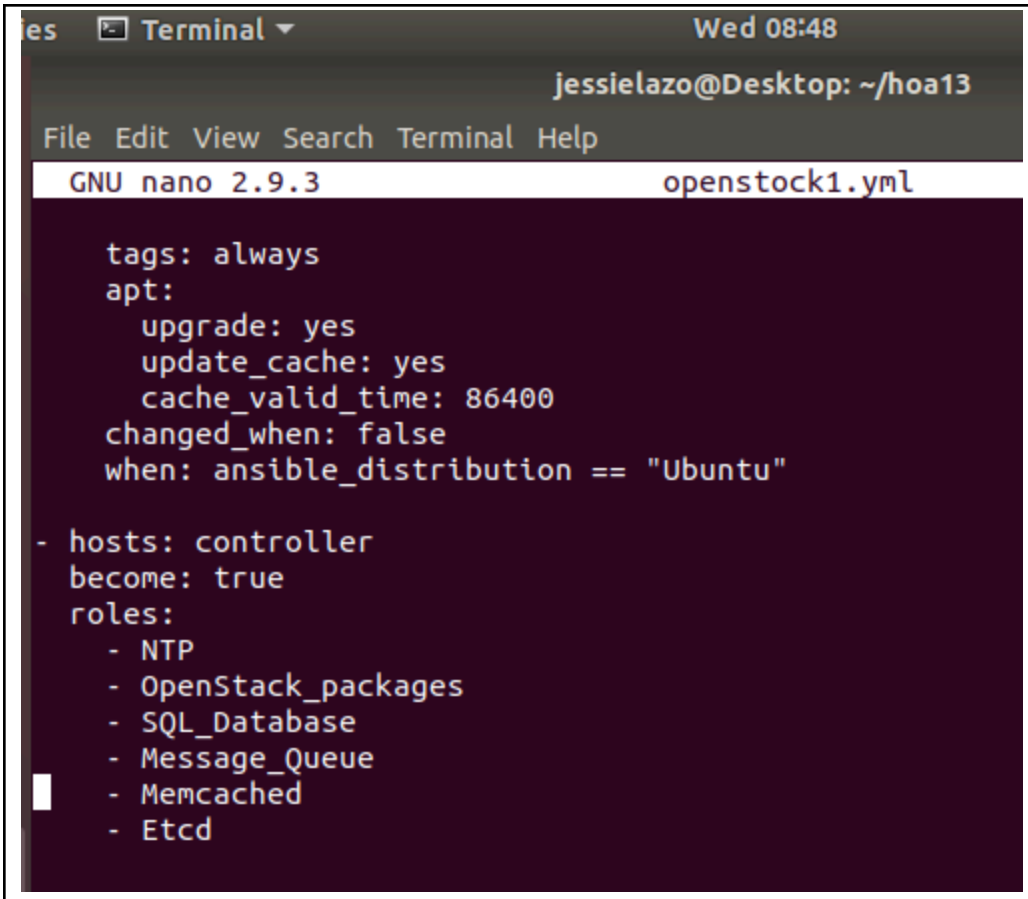




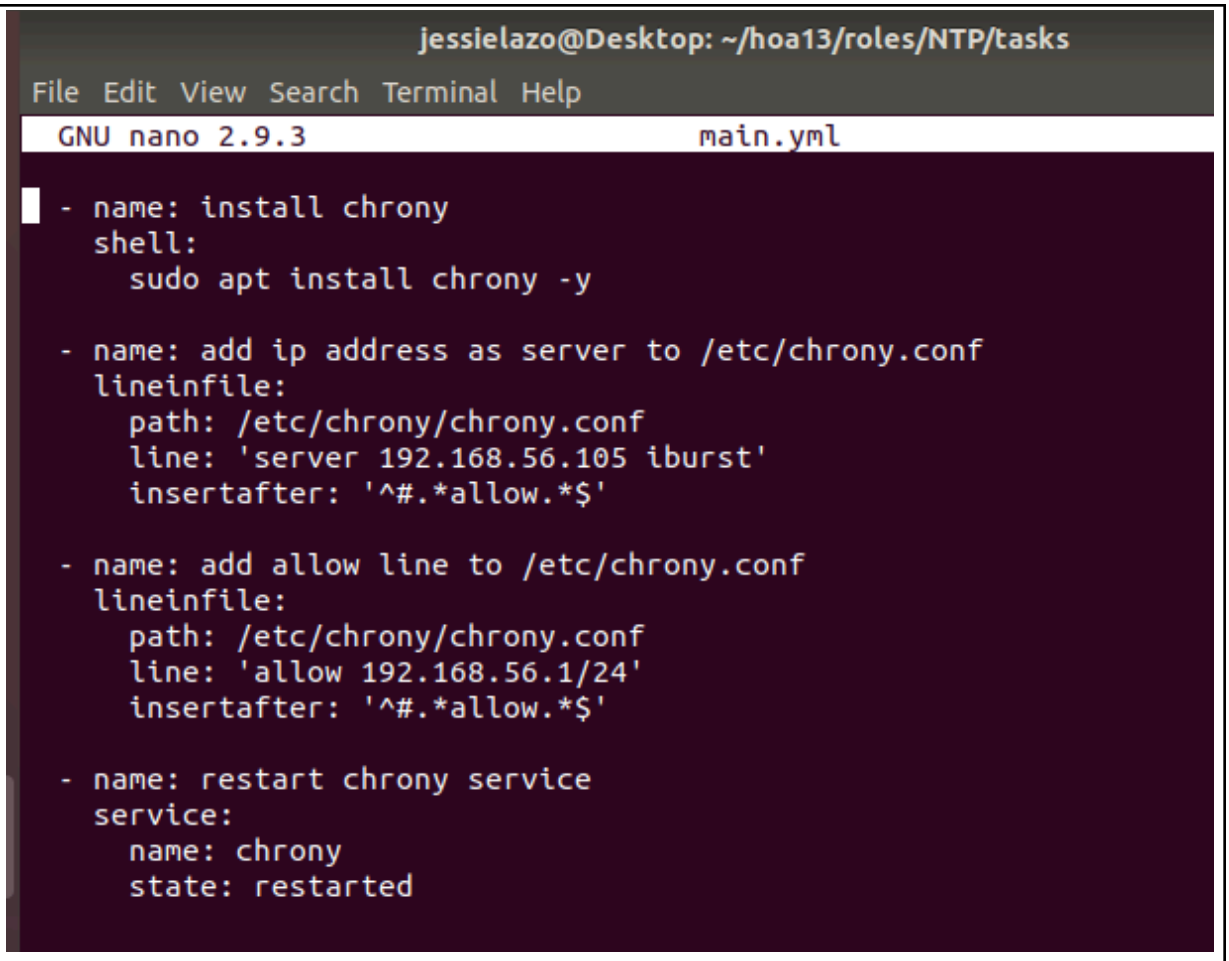
4. Create a playbook 'openstock1.yml' which contains basic repository updates for TyUbuntu followed by the actual program with the concept of roles.


jessielazo@Desktop: ~/hoa13
File Edit View Search Terminal Help
GNU nano 2.9.3 openstock1.yml

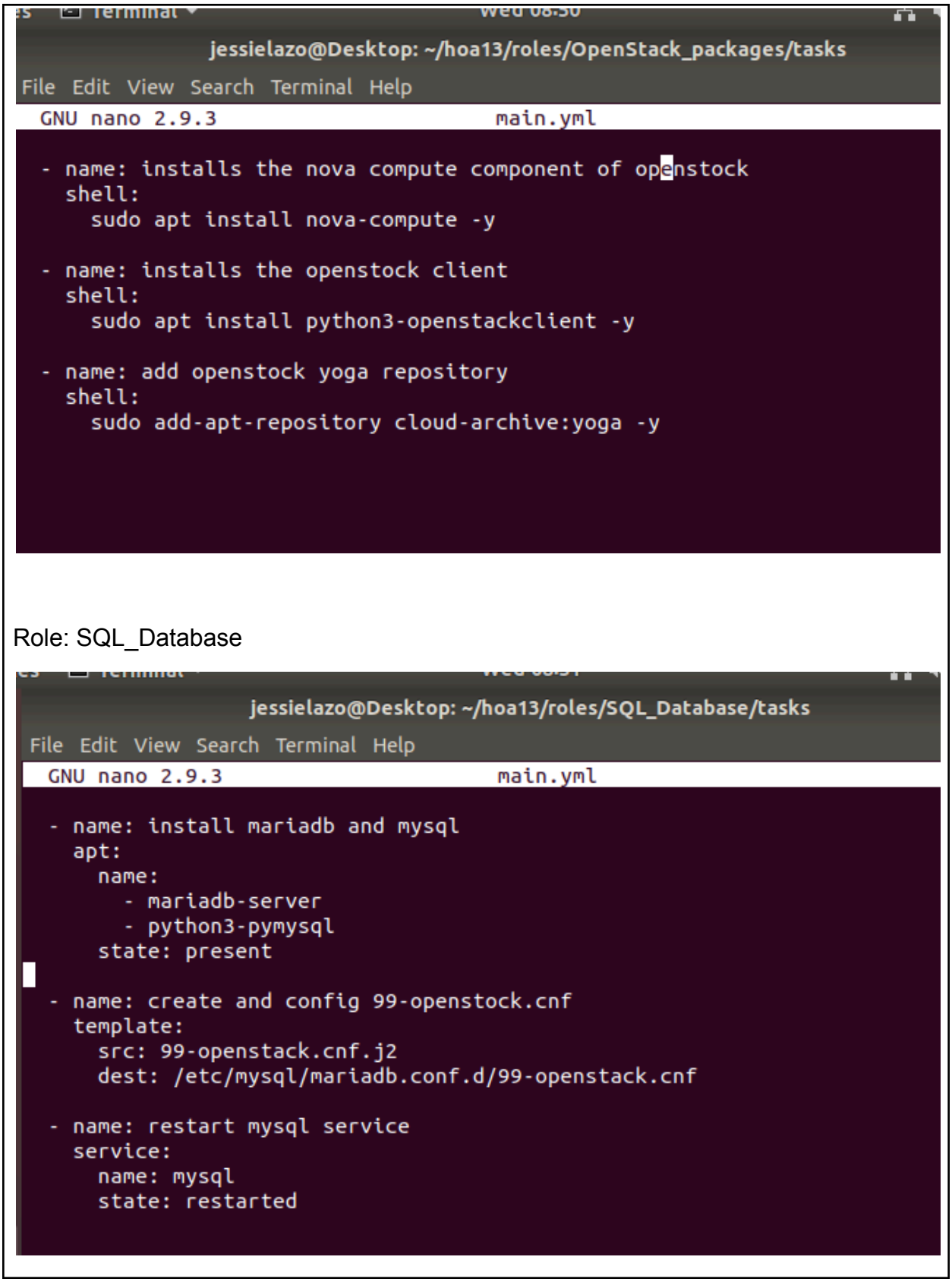
- hosts: all
become: true
pre_tasks:
- name: Ensure dpkg is configured (Ubuntu)
raw: sudo dpkg --configure -a
ignore_errors: yes
changed_when: false
when: ansible_distribution == "Ubuntu"
- name: install update and repositories (Ubuntu)
tags: always
apt:
upgrade: yes
update_cache: yes
cache_valid_time: 86400
changed_when: false
when: ansible_distribution == "Ubuntu"
- hosts: controller
become: true
roles:



5. Copy and paste the following codes for setting up the OpenStock in Ubuntu, and its necessary configurations. Role: NTP

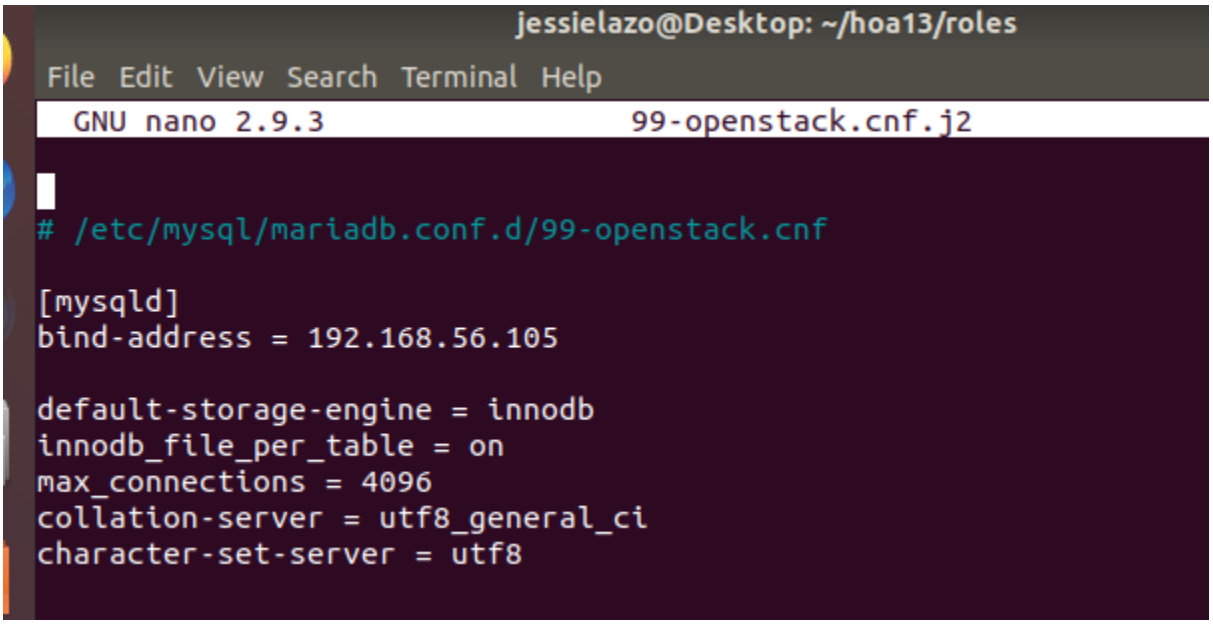


Role: OpenStack_packages

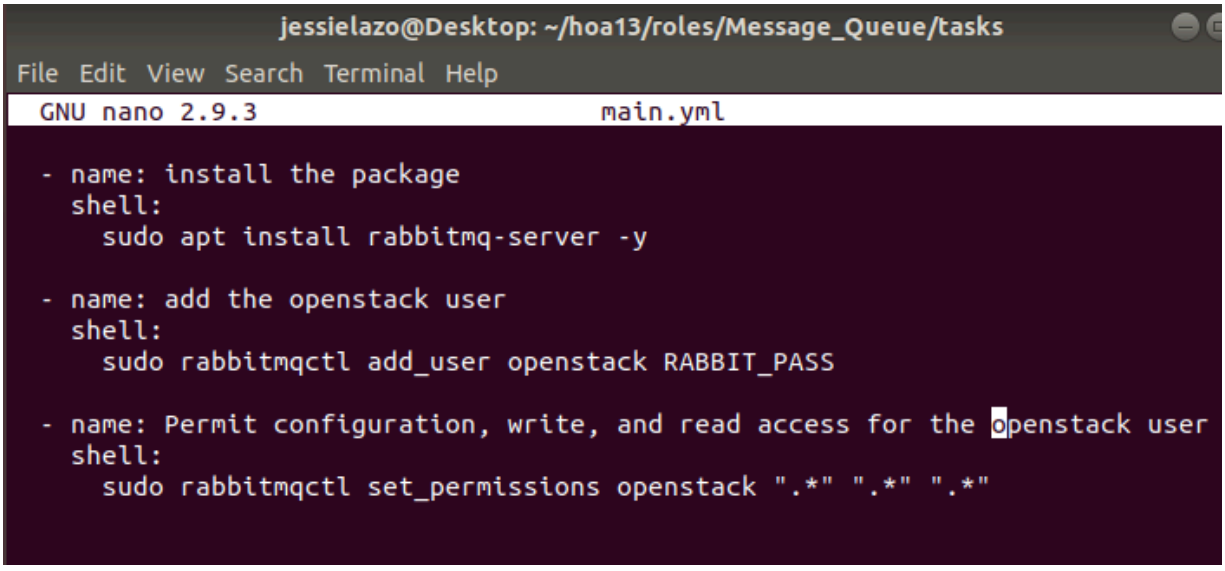


Role: SQL_Database

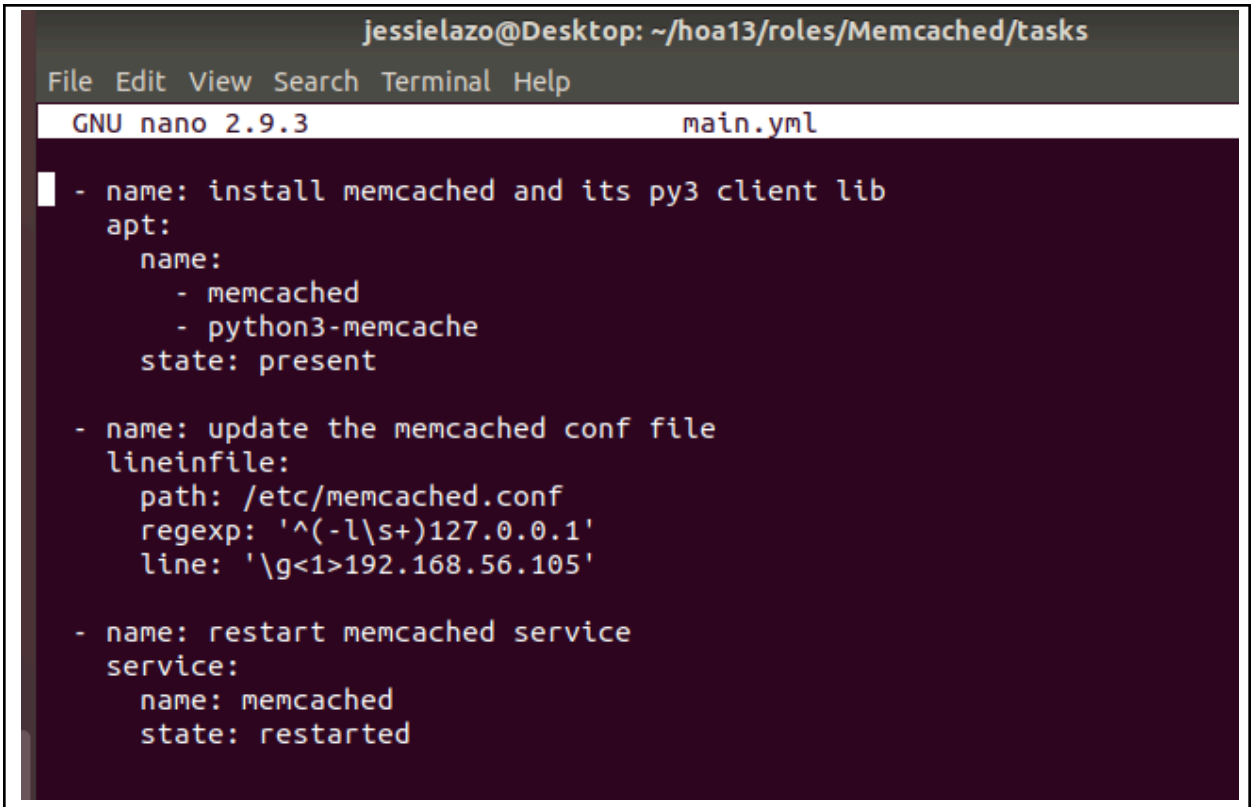
99-openstack.cnf.j2



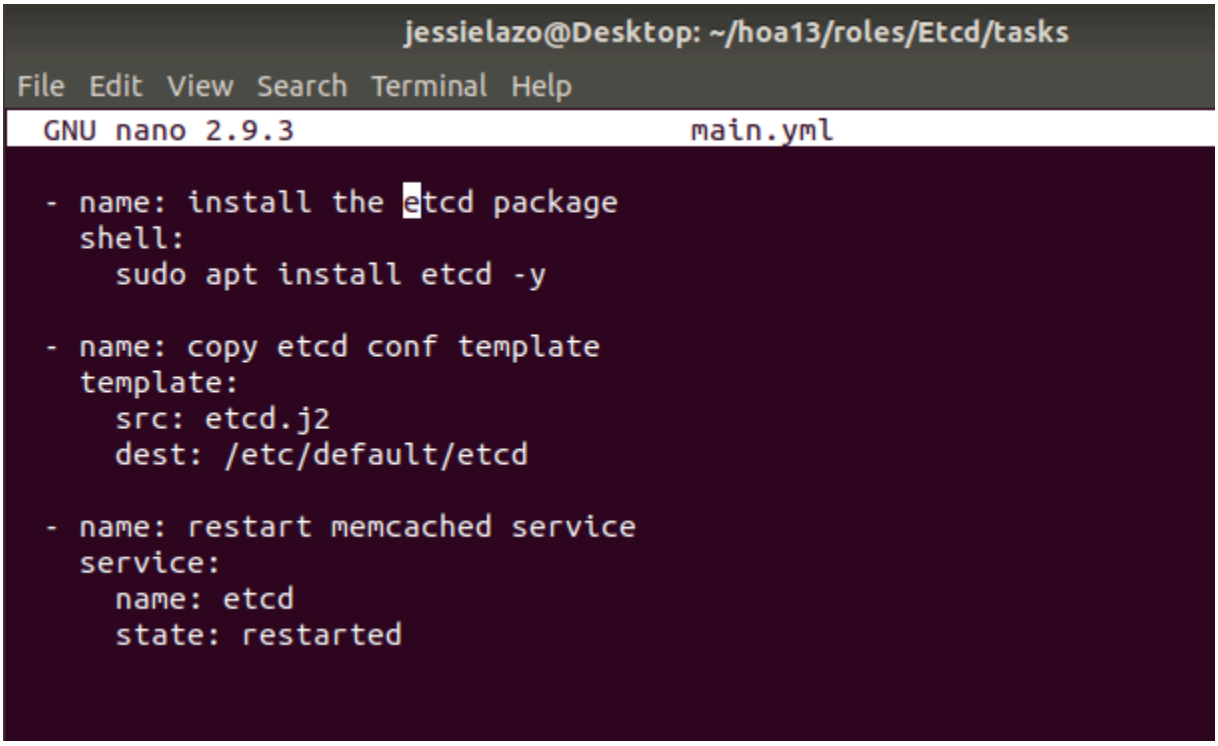
Role: Message_Queue



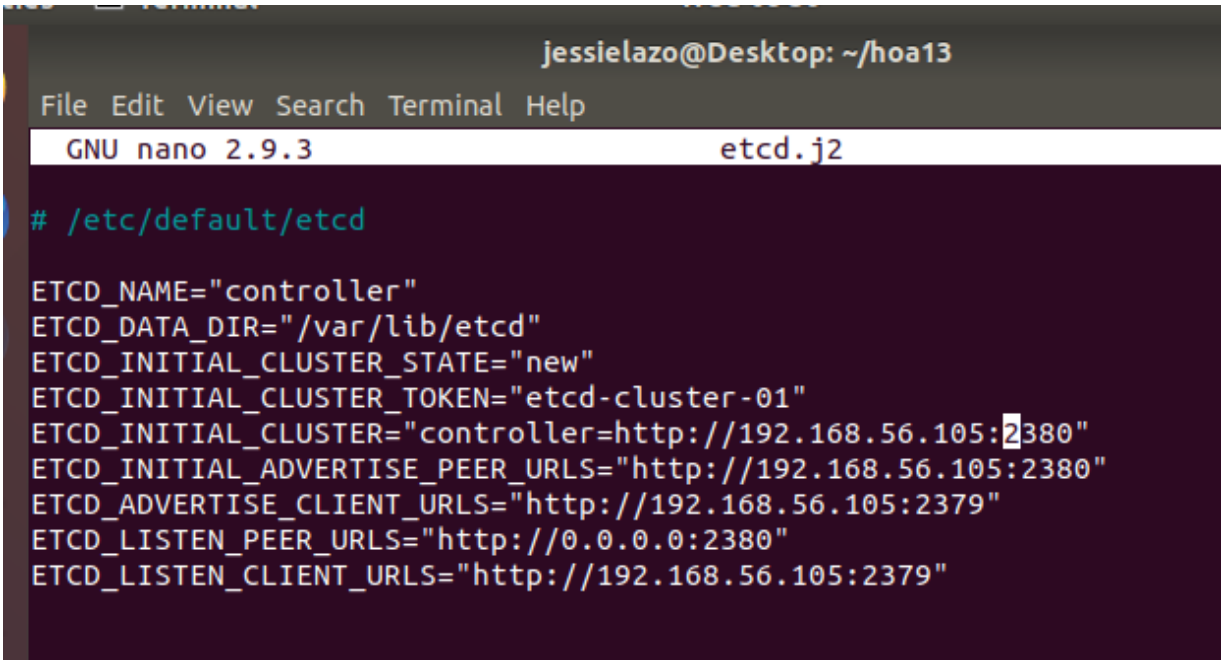
Role: Memcached


jessielazo@Desktop: ~/hoa13/roles/Memcached/tasks
File Edit View Search Terminal Help
GNU nano 2.9.3 main.yml
- name: install memcached and its py3 client lib
apt:
name:
- memcached
- python3-memcache
state: present
- name: update the memcached conf file
lineinfile:
path: /etc/memcached.conf
regexp: '^(-l\s+)127.0.0.1'
line: '\g<1>192.168.56.105'
- name: restart memcached service
service:
name: memcached
state: restarted

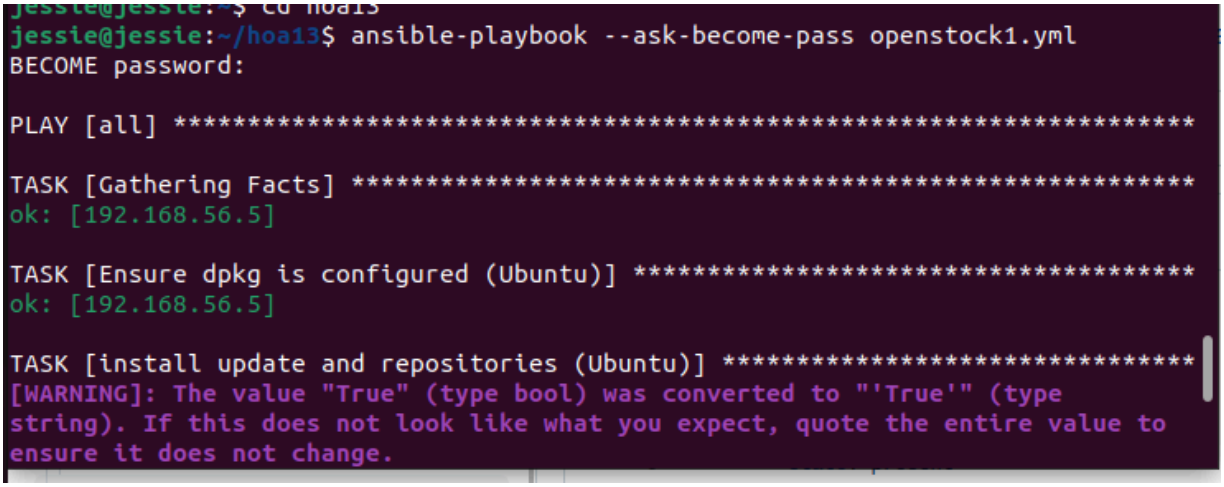
Role: Etcd


jessielazo@Desktop: ~/hoa13/roles/Etcd/tasks
File Edit View Search Terminal Help
GNU nano 2.9.3 main.yml
- name: install the etcd package
shell:
sudo apt install etcd -y
- name: copy etcd conf template
template:
src: etcd.j2
dest: /etc/default/etcd
- name: restart memcached service
service:
name: etcd
state: restarted

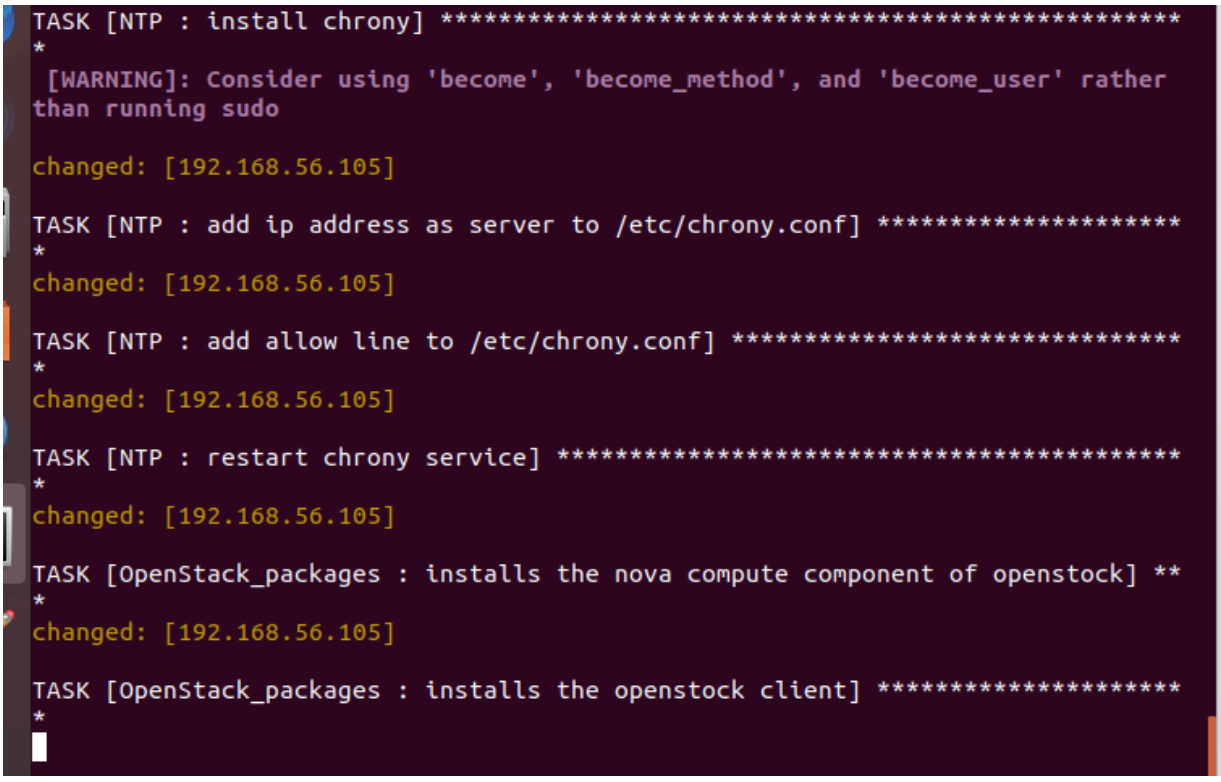
etcd.j2



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

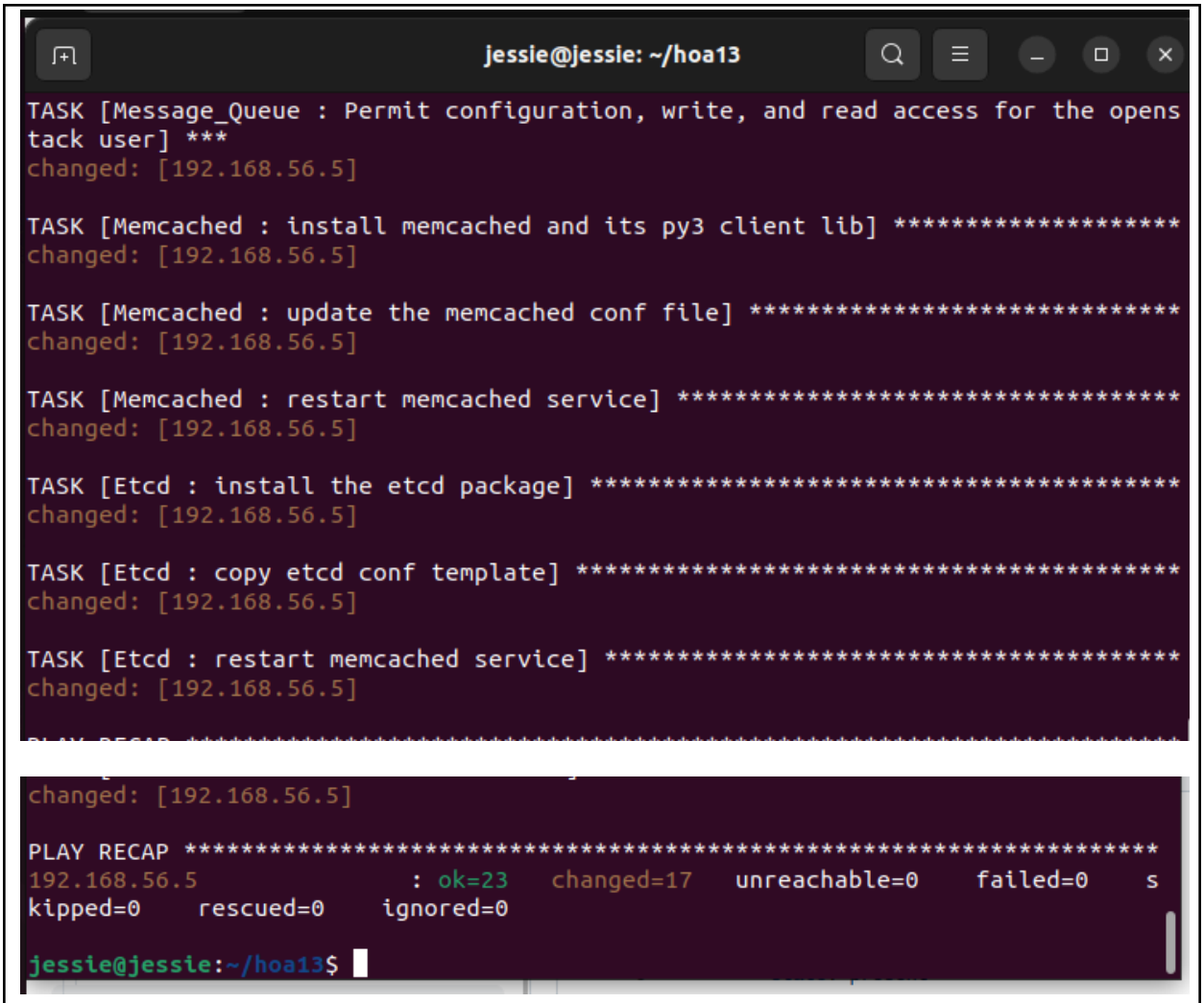



PLAY [controller] **
TASK [Gathering Facts] **
ok: [192.168.56.5]
TASK [NTP : install chrony] **
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather
than running sudo
changed: [192.168.56.5]
TASK [NTP : add ip address as server to /etc/chrony.conf] *********************
ok: [192.168.56.5]
TASK [NTP : add allow line to /etc/chrony.conf] *******************************
ok: [192.168.56.5]
TASK [NTP : restart chrony service] **
changed: [192.168.56.5]


TASK [NTP : install chrony] **
*
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather
than running sudo
changed: [192.168.56.105]
TASK [NTP : add ip address as server to /etc/chrony.conf] *********************
*
changed: [192.168.56.105]
TASK [NTP : add allow line to /etc/chrony.conf] *******************************
*
changed: [192.168.56.105]
TASK [NTP : restart chrony service] **
*
changed: [192.168.56.105]
TASK [OpenStack_packages : installs the nova compute component of openstock] **
*
changed: [192.168.56.105]
TASK [OpenStack_packages : installs the openstock client] **********************
*

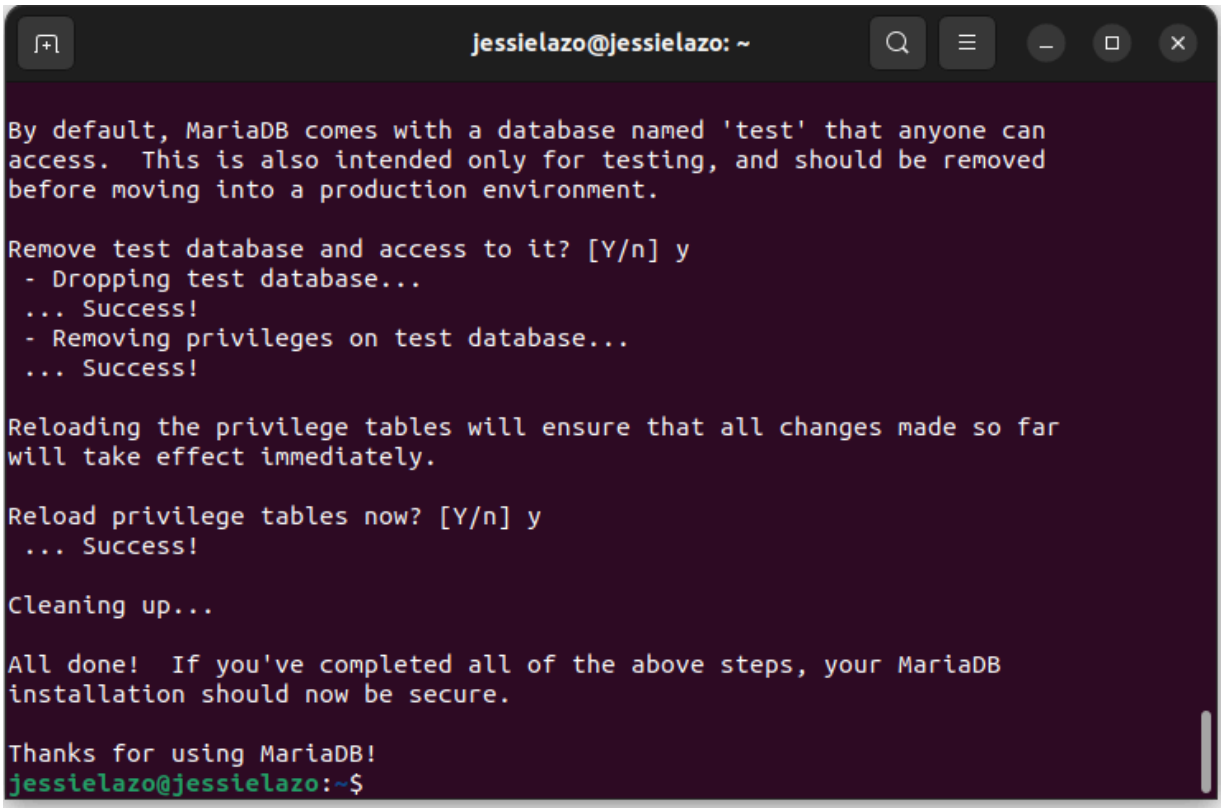
```
TASK [OpenStack_packages : installs the nova compute component of openstock] ***
changed: [192.168.56.5]

TASK [OpenStack_packages : installs the openstock client] **********************
changed: [192.168.56.5]

TASK [OpenStack_packages : add openstock Zed repository] ***********************
changed: [192.168.56.5]

TASK [SQL_Database : install mariadb and mysql] ********************************
changed: [192.168.56.5]

TASK [SQL_Database : create and config 99-openstock.cnf] ***********************
changed: [192.168.56.5]

TASK [SQL_Database : restart mysql service] ************************************
changed: [192.168.56.5]
```

```
TASK [SQL_Database : install mariadb and mysql] ********************************
changed: [192.168.56.5]

TASK [SQL_Database : create and config 99-openstock.cnf] ***********************
changed: [192.168.56.5]

TASK [SQL_Database : restart mysql service] ************************************
changed: [192.168.56.5]

TASK [Message_Queue : install the package] *************************************
changed: [192.168.56.5]

TASK [Message_Queue : add the openstack user] **********************************
changed: [192.168.56.5]

TASK [Message_Queue : Permit configuration, write, and read access for the opens
tack user] ***
changed: [192.168.56.5]

TASK [Memcached : install memcached and its py3 client lib] ********************
changed: [192.168.56.5]

TASK [Memcached : update the memcached conf file] ******************************
changed: [192.168.56.5]
```



Running ‘sudo mysql_secure_installation’ on server1:

```
jessielazo@jessielazo:~$ sudo mysqp_secure_installation
[sudo] password for jessielazo:
sudo: mysqp_secure_installation: command not found
jessielazo@jessielazo:~$ sudo mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE!  PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
haven't set the root password yet, you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password or using the unix_socket ensures that nobody
can log into the MariaDB root user without the proper authorisation.

You already have your root account protected, so you can safely answer 'n'.
```



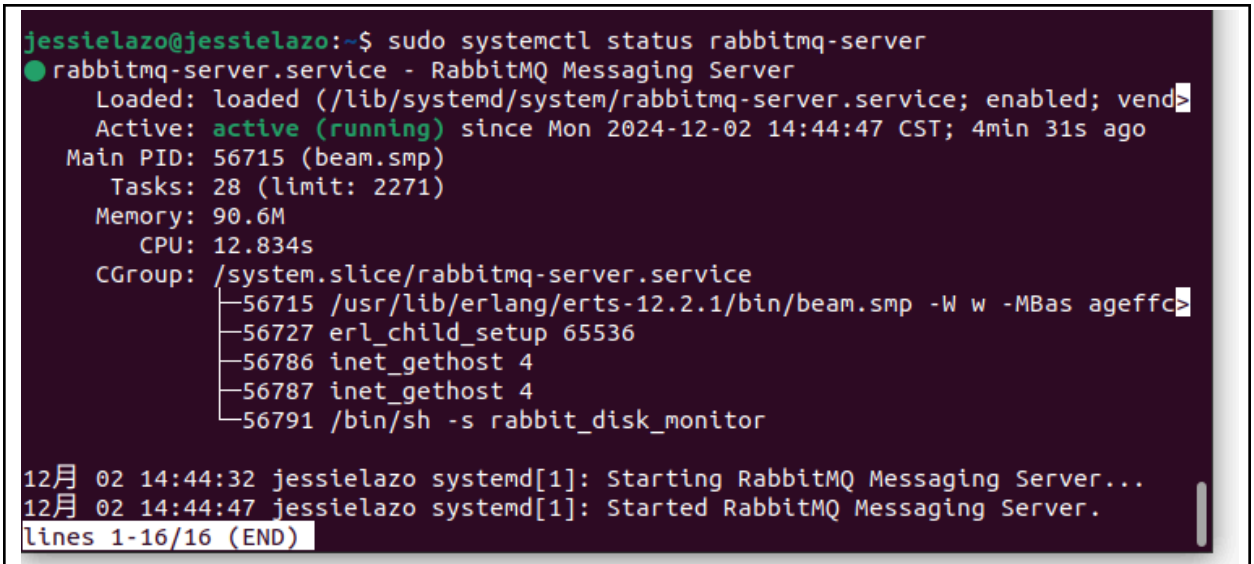
Proofs:

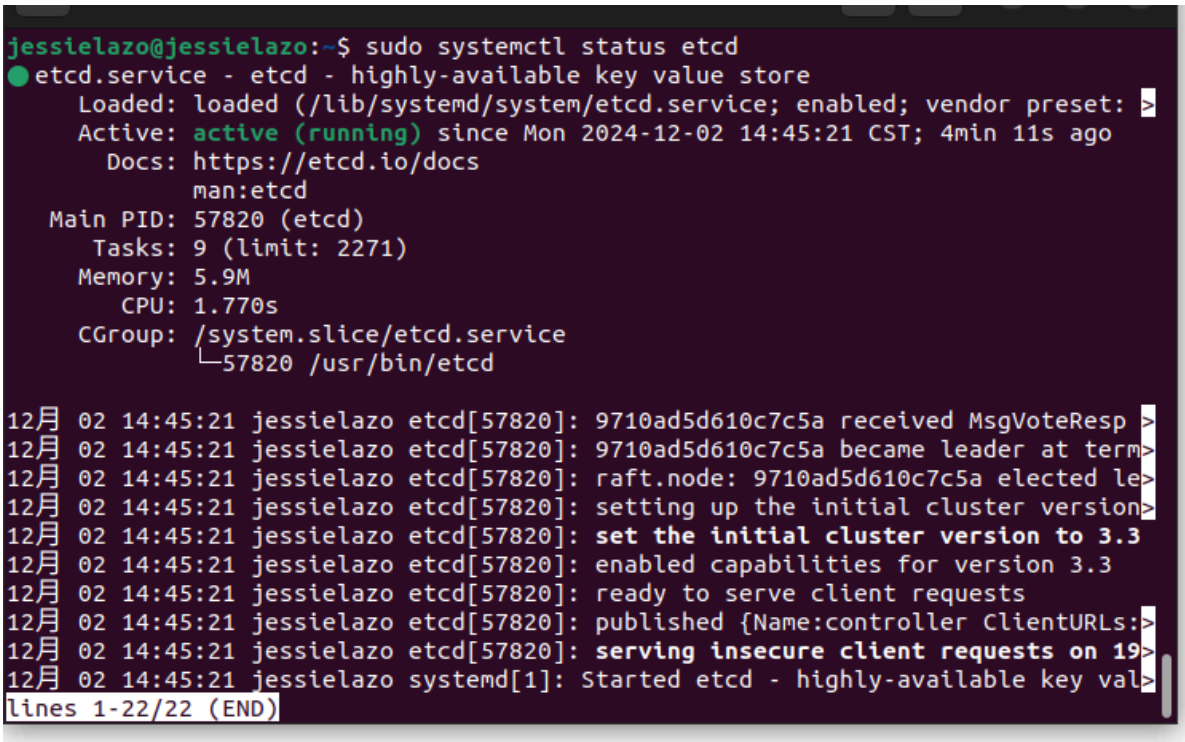
```
jessielazo@jessielazo:~$ chronyc sources
\MS Name/IP address         Stratum Poll Reach LastRx Last sample
===============================================================================
^- prod-ntp-5.ntp1.ps5.cano>     2   6     3    41    +20ms[  +20ms] +/-  134ms
^* prod-ntp-3.ntp1.ps5.cano>     2   6   377    53  +8667us[  +21ms] +/-  149ms
^- alphyn.canonical.com          2   6   203    42  -6855us[-6855us] +/-  149ms
^- prod-ntp-4.ntp1.ps5.cano>     2   6     3    43  -3467us[-3467us] +/-  161ms
^? 222.127.1.21                  0   8     0     -    +0ns[   +0ns] +/-    0ns
^? 222.127.1.24                  0   8     0     -    +0ns[   +0ns] +/-    0ns
^? 222.127.1.25                  0   8     0     -    +0ns[   +0ns] +/-    0ns
^? 222.127.1.27                  0   8     0     -    +0ns[   +0ns] +/-    0ns
^? 222.127.1.23                  0   7     0     -    +0ns[   +0ns] +/-    0ns
^? 222.127.1.22                  0   8     0     -    +0ns[   +0ns] +/-    0ns
^? port.iwiphil.com              0   8     0     -    +0ns[   +0ns] +/-    0ns
^? jessielazo                    0   7   177     -    +0ns[   +0ns] +/-    0ns
jessielazo@jessielazo:~$ \
```

```
jessielazo@jessielazo:~$ sudo systemctl status nova-compute
● nova-compute.service - OpenStack Compute
     Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor >
     Active: active (running) since Mon 2024-12-02 14:35:30 CST; 12min ago
   Main PID: 52957 (nova-compute)
      Tasks: 1 (limit: 2271)
     Memory: 148.7M
        CPU: 2.099s
     CGroup: /system.slice/nova-compute.service
             └─52957 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/>

12月 02 14:35:30 jessielazo systemd[1]: Started OpenStack Compute.
12月 02 14:35:31 jessielazo nova-compute[52957]: Modules with known eventlet mo>
lines 1-12/12 (END)
```

```
lines 1-12/12 (END)
jessielazo@jessielazo:~$ sudo systemctl status mariadb
● mariadb.service - MariaDB 10.6.18 database server
     Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor prese>
     Active: active (running) since Mon 2024-12-02 14:43:52 CST; 4min 41s ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 56255 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 9 (limit: 14990)
     Memory: 63.4M
        CPU: 523ms
     CGroup: /system.slice/mariadb.service
             └─56255 /usr/sbin/mariadbd

12月 02 14:43:52 jessielazo mariadbd[56255]: Version: '10.6.18-MariaDB-0ubuntu0>
12月 02 14:43:52 jessielazo systemd[1]: Started MariaDB 10.6.18 database server.
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56270]: Upgrading MySQL tab>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: Looking for 'mariad>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: Looking for 'mariad>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: This installation o>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: There is no need to>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: You can use --force>
```

```
jessielazo@jessielazo:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.6.18 database server
     Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor prese>
     Active: active (running) since Mon 2024-12-02 14:43:52 CST; 5min ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 56255 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 9 (limit: 14990)
     Memory: 63.4M
        CPU: 527ms
     CGroup: /system.slice/mariadb.service
             └─56255 /usr/sbin/mariadbd

12月 02 14:43:52 jessielazo mariadbd[56255]: Version: '10.6.18-MariaDB-0ubuntu0>
12月 02 14:43:52 jessielazo systemd[1]: Started MariaDB 10.6.18 database server.
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56270]: Upgrading MySQL tab>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: Looking for 'mariad>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: Looking for 'mariad>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: This installation o>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: There is no need to>
12月 02 14:43:52 jessielazo /etc/mysql/debian-start[56273]: You can use --force>
```





Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

Implementing OpenStack on a controller provides for central, scalable management of the infrastructure of the cloud. Organizations can efficiently orchestrate and allocate computing, storage, and networking while making available

flexibility and responsiveness to ever-changing demands. Such control from a single source results in streamlined operations with decreased administrative overhead, leading to rapid provisioning of resources. Thus, OpenStack on a controller enables organizations to design an agile and powerful cloud environment.
enhancing overall productivity and flexibility in the constantly changing face of modern computing

Conclusions:

The activity was mainly focused on tackling the OpenStack Prerequisite Installation, and our objective is to create a workflow to install OpenStack using Ansible as Infrastructure as Code (IaC). In the installation guide URL, I found the pages I was looking for which were the guide for installing the NTP, OpenStack packages, SQL Database, Message Queue,Memcached, and Etcd. After compiling the procedures for all of them, then I began creating a playbook to automate the process. Thankfully through the process of playing the playbook, I have encountered just a few errors that I was able to debug quickly, then evaluate different Cloud deployment and service models, then create a workflow to install and configure OpenStack-based services using Ansible as documentation and execution.