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Course/Section: CPE232S6	**Date Submitted:** 12/04/2023
Instructor: Dr. Jonathan Taylar	**Semester and SY:** 1st sem 2023-2024

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.

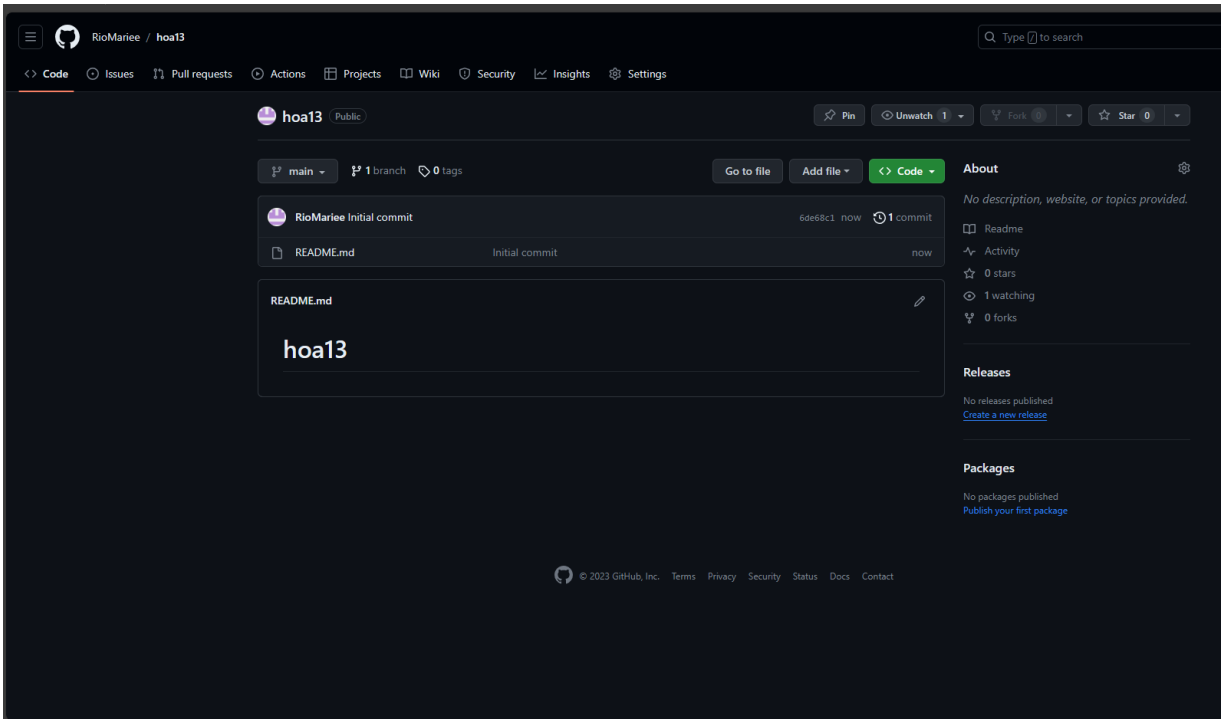
3. Resources

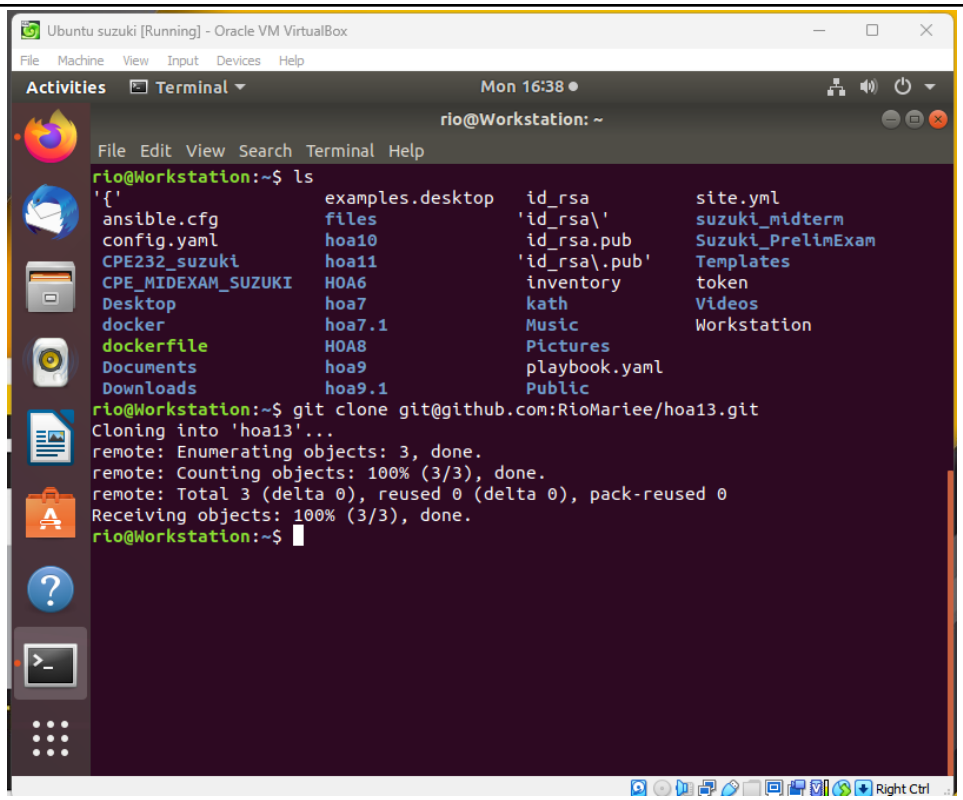
Oracle VirtualBox (Hypervisor)

1x Ubuntu VM or Centos VM

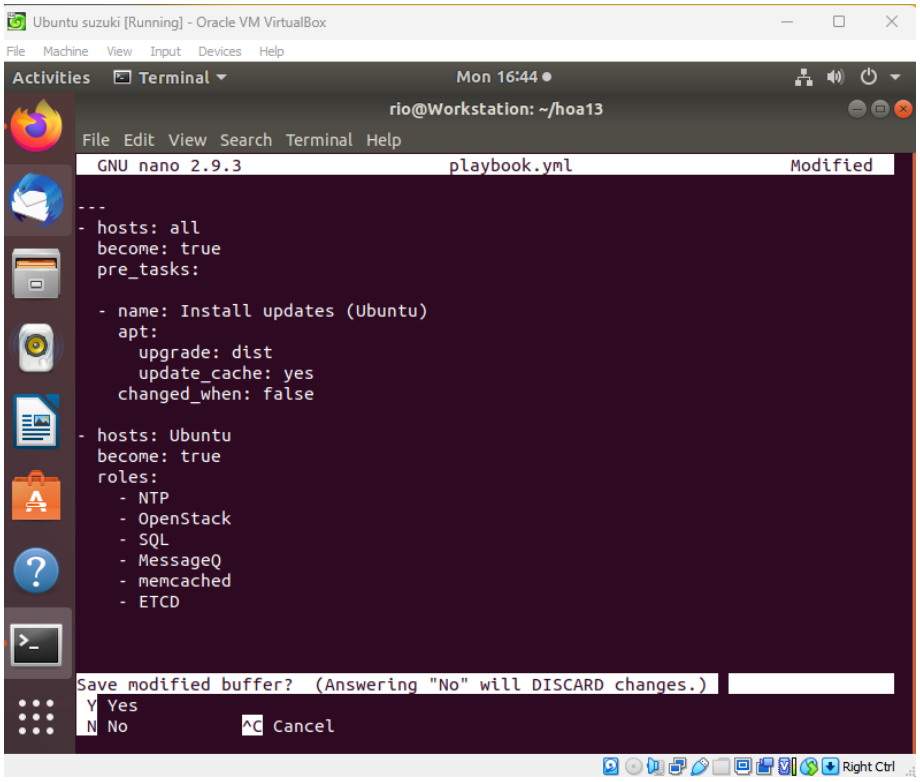
4. Tasks

1. Create a new repository for this activity.

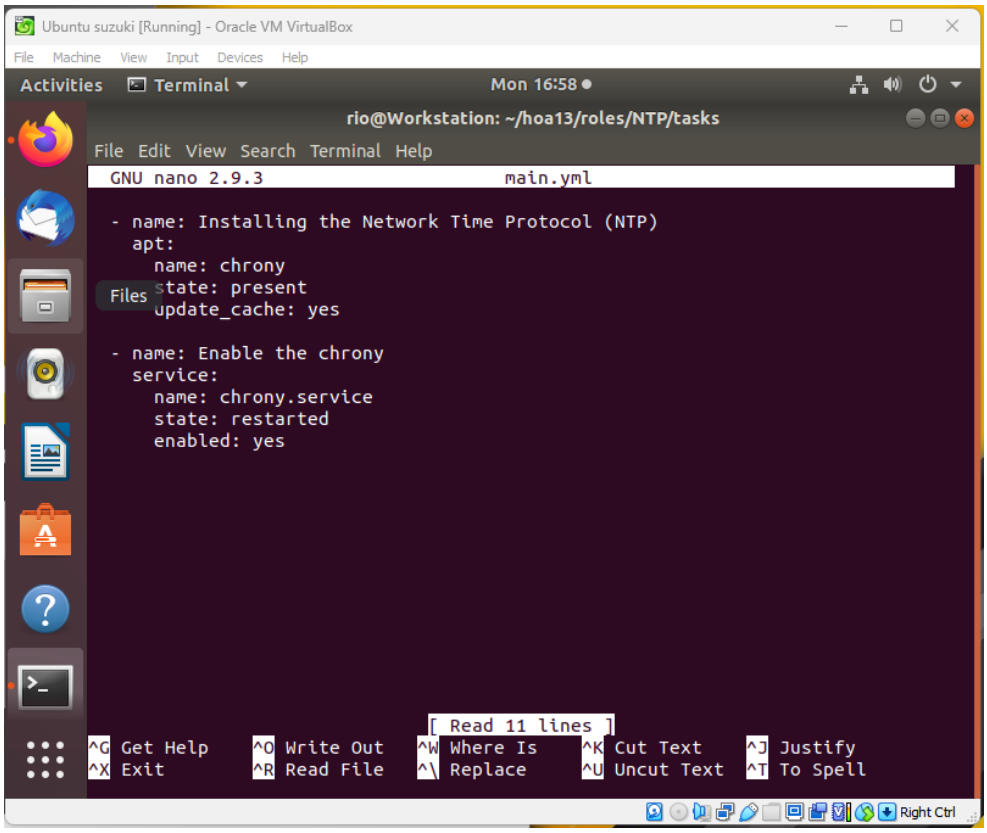




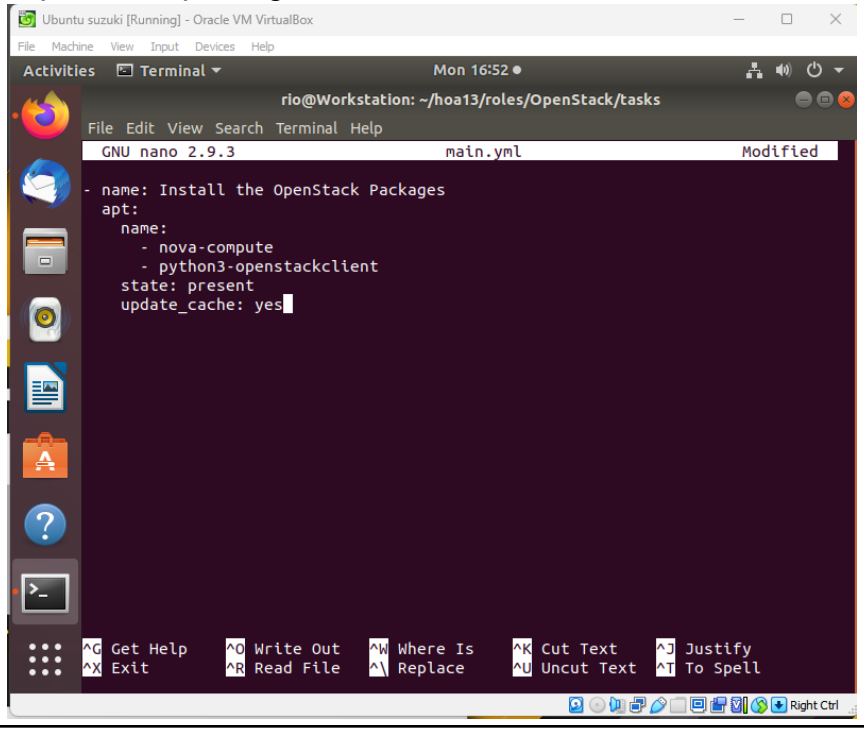
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/



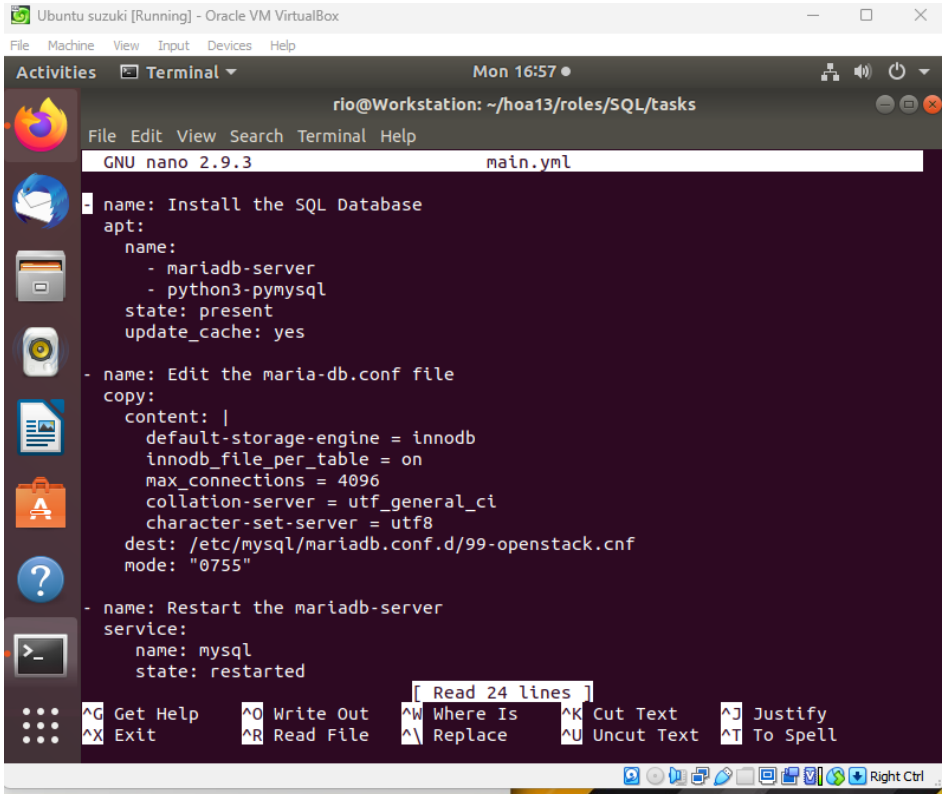
a. NTP

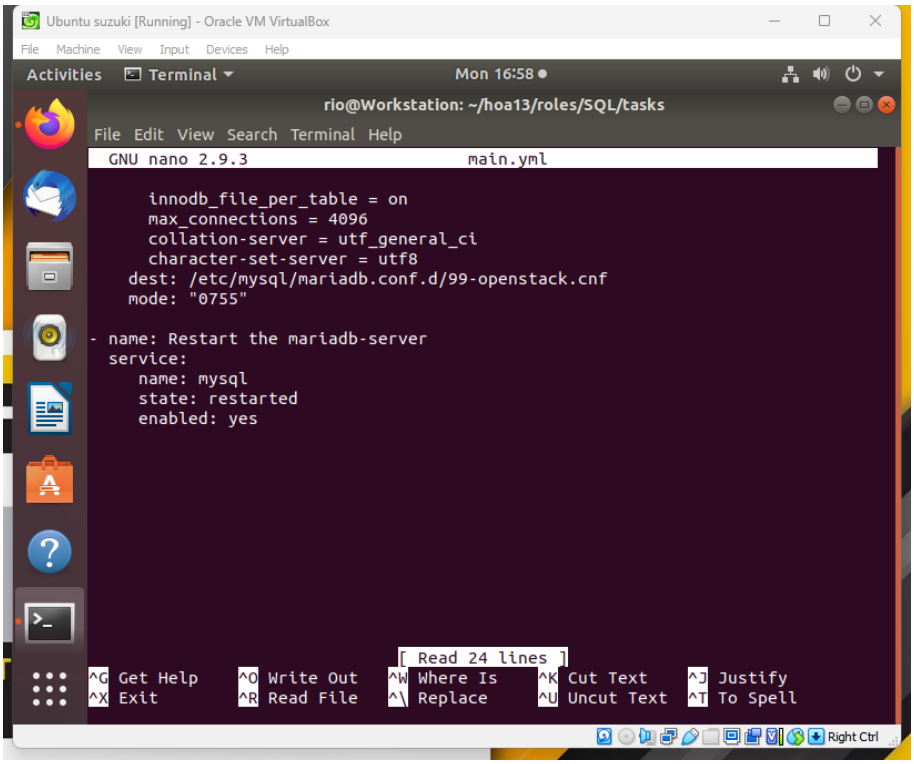


b. OpenStack packages

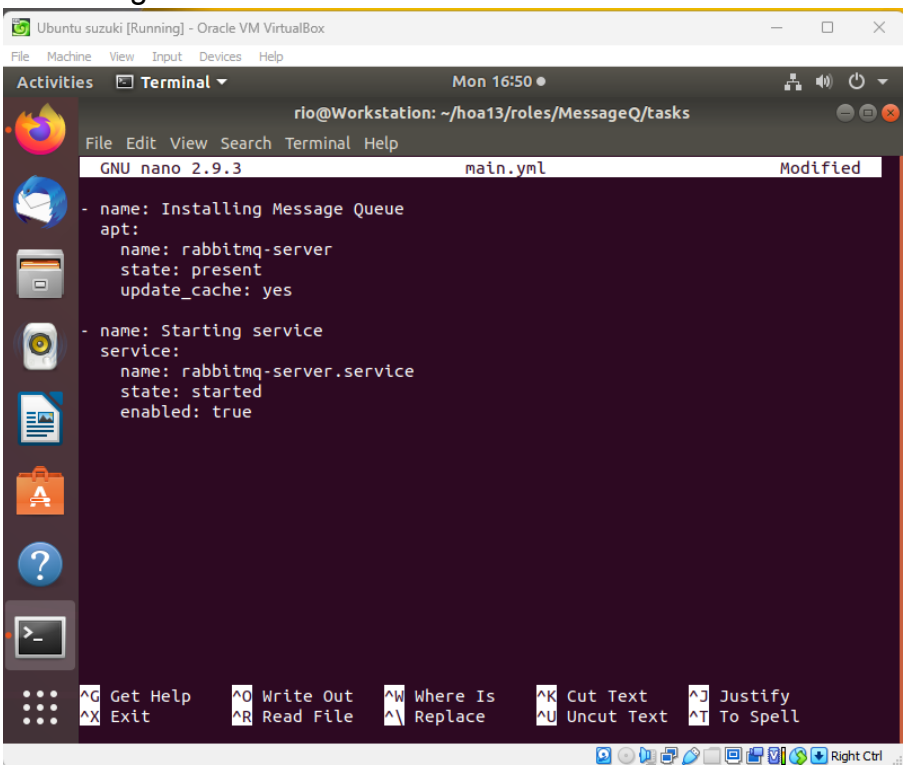


c. SQL Database

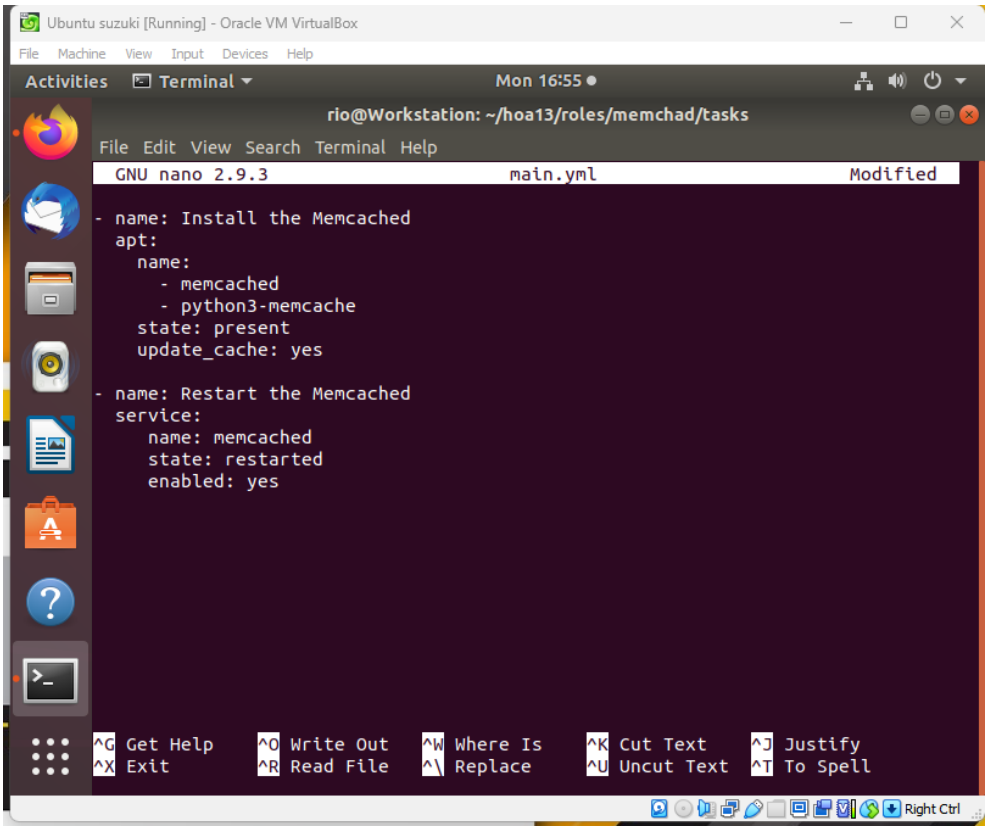




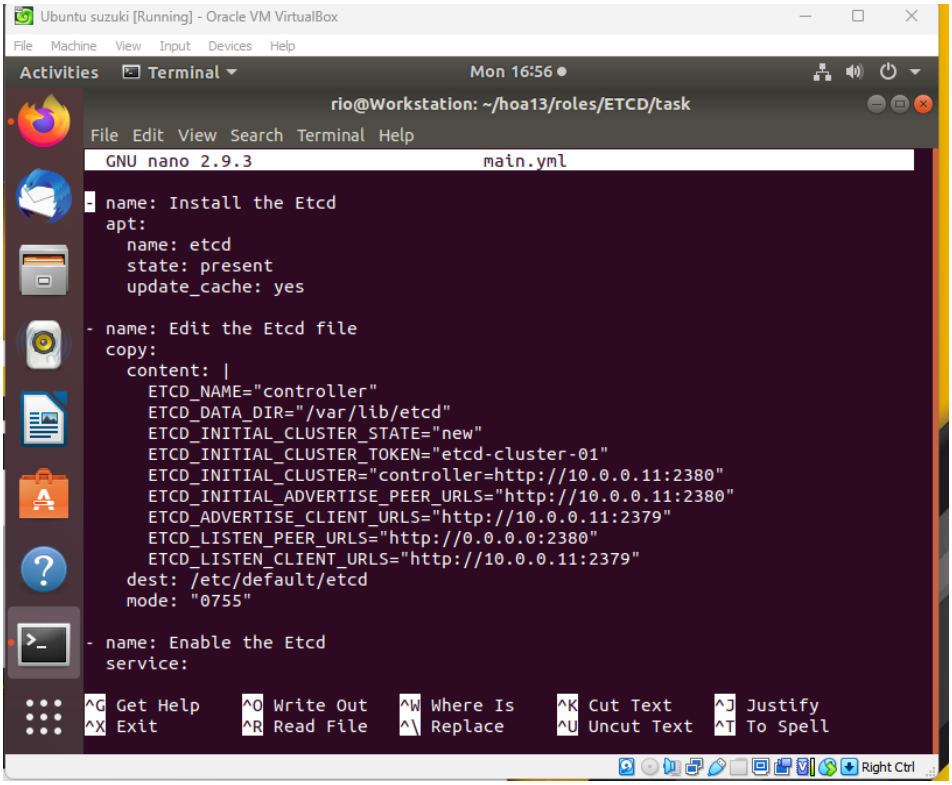
d. Message Queue

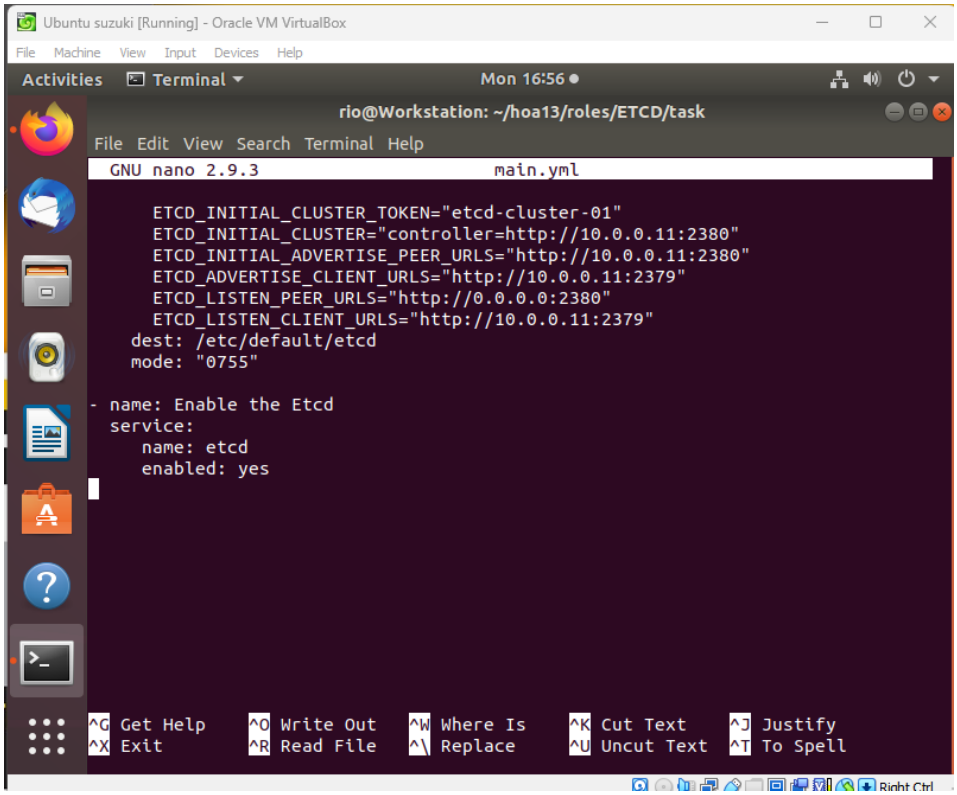


e. Memcached



f. Etcd

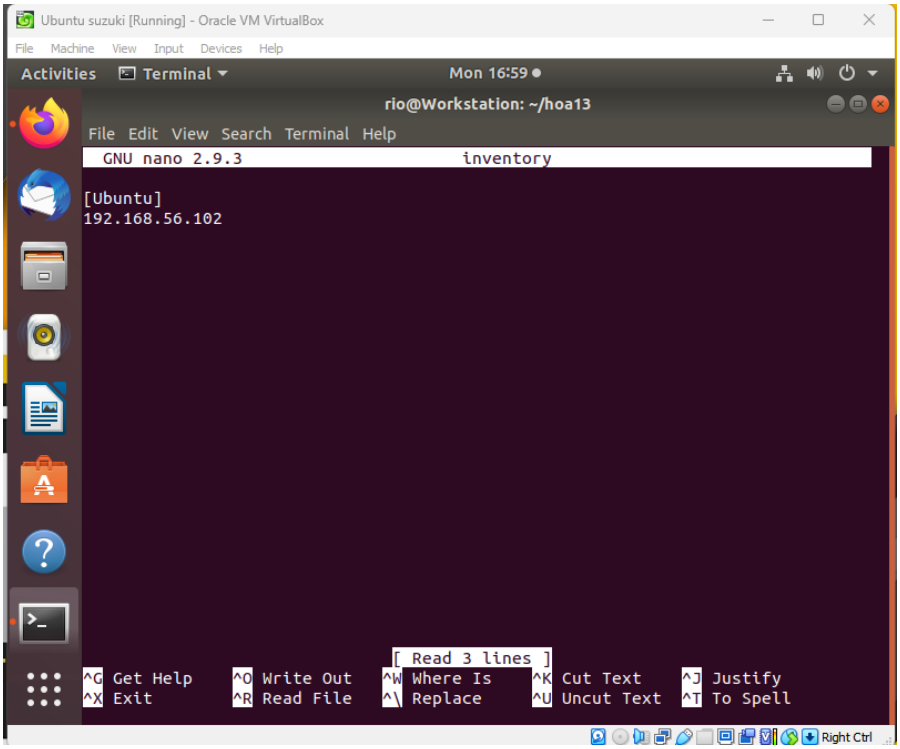

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 16:56
rio@Workstation: ~/hoa13/roles/ETCD/task
File Edit View Search Terminal Help
GNU nano 2.9.3 main.yml
- name: Install the Etcd
apt:
name: etcd
state: present
update_cache: yes
- name: Edit the Etcd file
copy:
content: |
ETCD_NAME="controller"
ETCD_DATA_DIR="/var/lib/etcd"
ETCD_INITIAL_CLUSTER_STATE="new"
ETCD_INITIAL_CLUSTER_TOKEN="etcd-cluster-01"
ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"
ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"
ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"
ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380"
ETCD_LISTEN_CLIENT_URLS="http://10.0.0.11:2379"
dest: /etc/default/etcd
mode: "0755"
- name: Enable the Etcd
service:
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl


Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 16:56
rio@Workstation: ~/hoa13/roles/ETCD/task
File Edit View Search Terminal Help
GNU nano 2.9.3 main.yml
ETCD_INITIAL_CLUSTER_TOKEN="etcd-cluster-01"
ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"
ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"
ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"
ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380"
ETCD_LISTEN_CLIENT_URLS="http://10.0.0.11:2379"
dest: /etc/default/etcd
mode: "0755"
- name: Enable the Etcd
service:
name: etcd
enabled: yes
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl

```
rio@Workstation:~/hoa13/roles$ tree
.
├── Etcd
│   └── tasks
│       └── main.yml
├── Memcached
│   └── tasks
│       └── main.yml
├── Message_Queue
│   └── tasks
│       └── main.yml
├── NTP
│   └── tasks
│       └── main.yml
├── OpenStack
│   └── tasks
│       └── main.yml
└── SQL_Database
    └── tasks
        └── main.yml

12 directories, 6 files
rio@Workstation:~/hoa13/roles$
```

g. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in Inventory file.

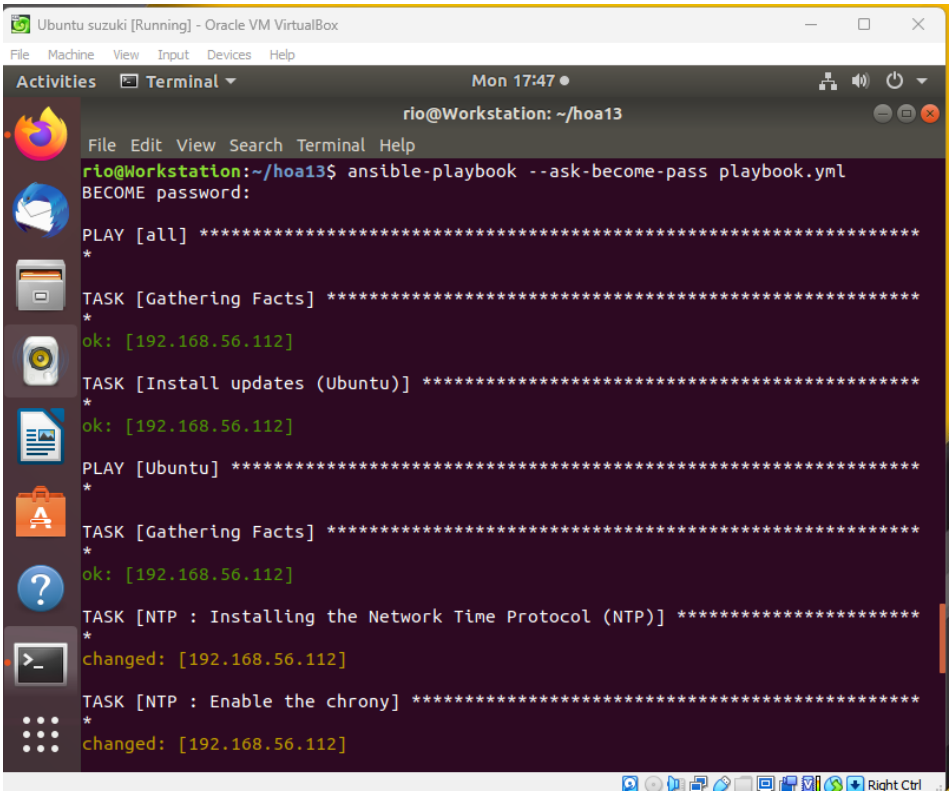


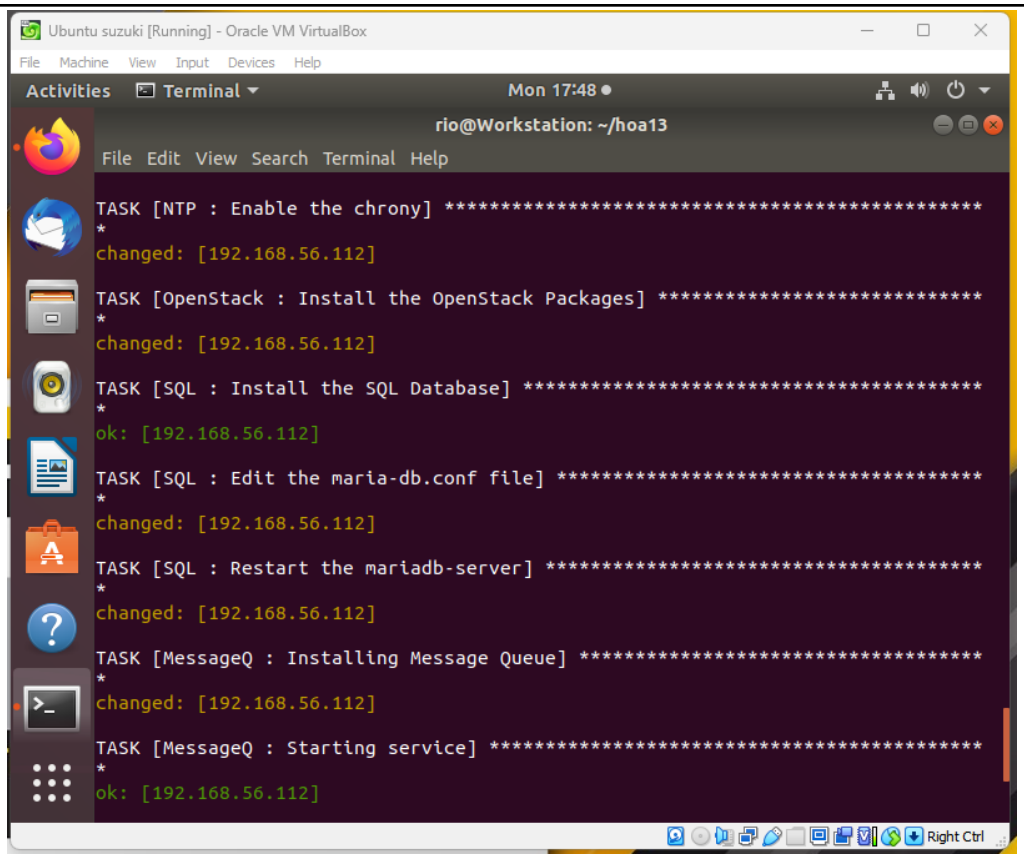
h. Add, commit and push it to your GitHub repo.

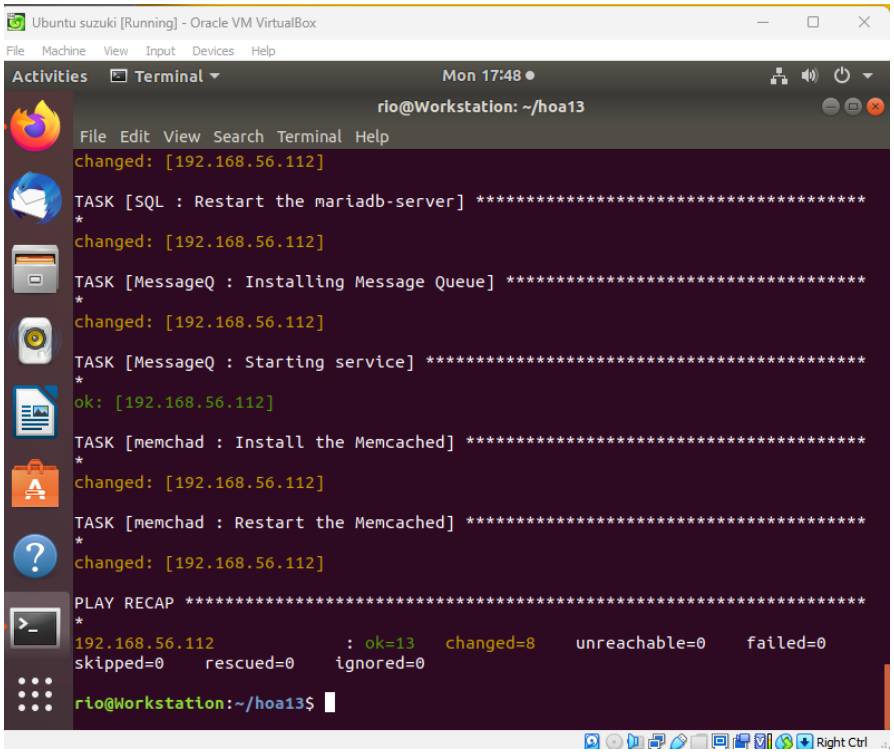
```
rio@Workstation:~/hoa13$ git add .
rio@Workstation:~/hoa13$ git commit -m "hoa13"
[main c0bad25] hoa13
 9 files changed, 124 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 playbook.yml
 create mode 100644 roles/ETCD/task/main.yml
 create mode 100644 roles/MessageQ/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
 create mode 100644 roles/memchad/tasks/main.yml
rio@Workstation:~/hoa13$ git push
Counting objects: 24, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (11/11), done.
Writing objects: 100% (24/24), 2.52 KiB | 2.52 MiB/s, done.
Total 24 (delta 0), reused 0 (delta 0)
To github.com:RioMariee/hoa13.git
   fb4b35f..c0bad25  main -> main
rio@Workstation:~/hoa13$
```

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

Process:

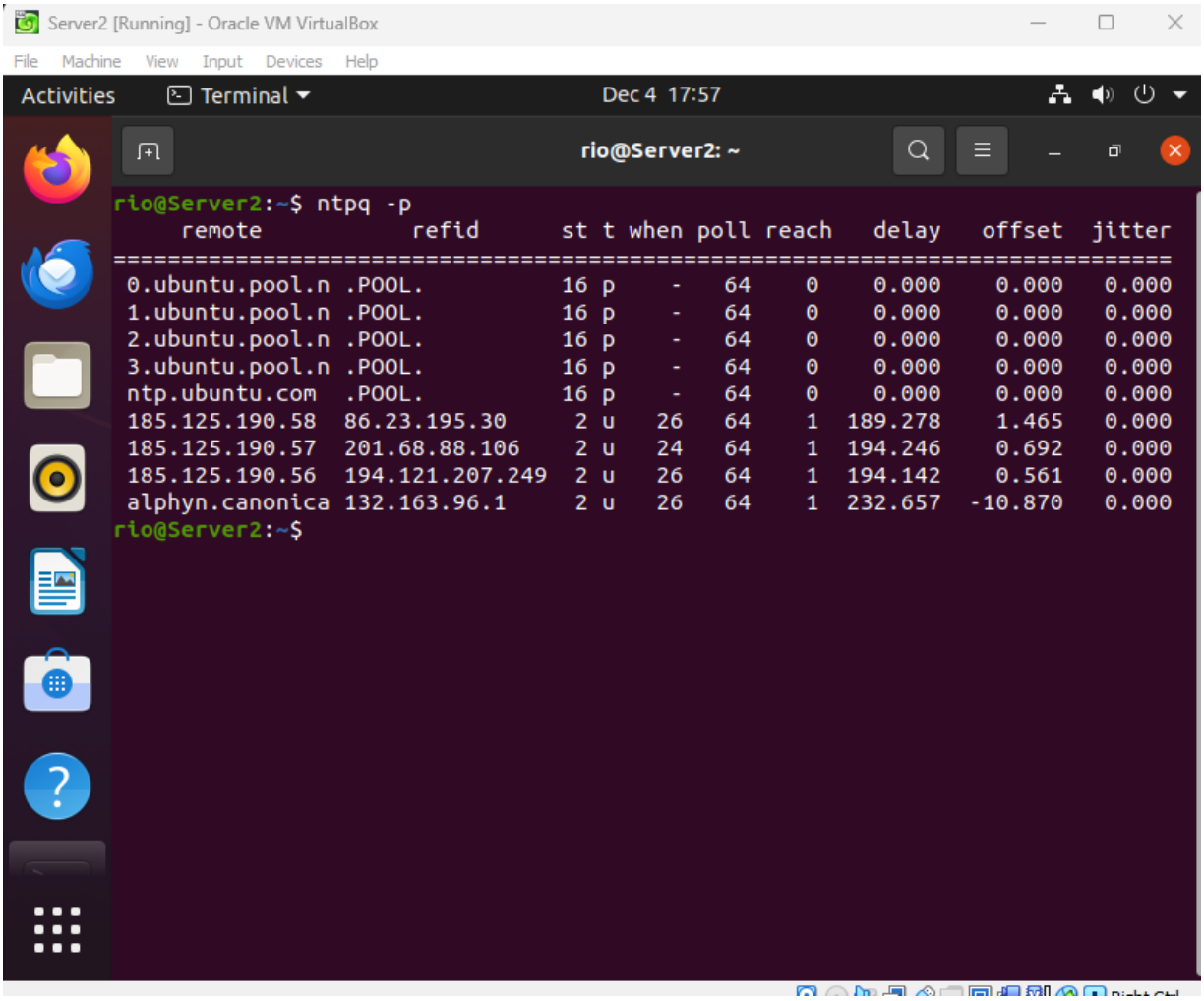


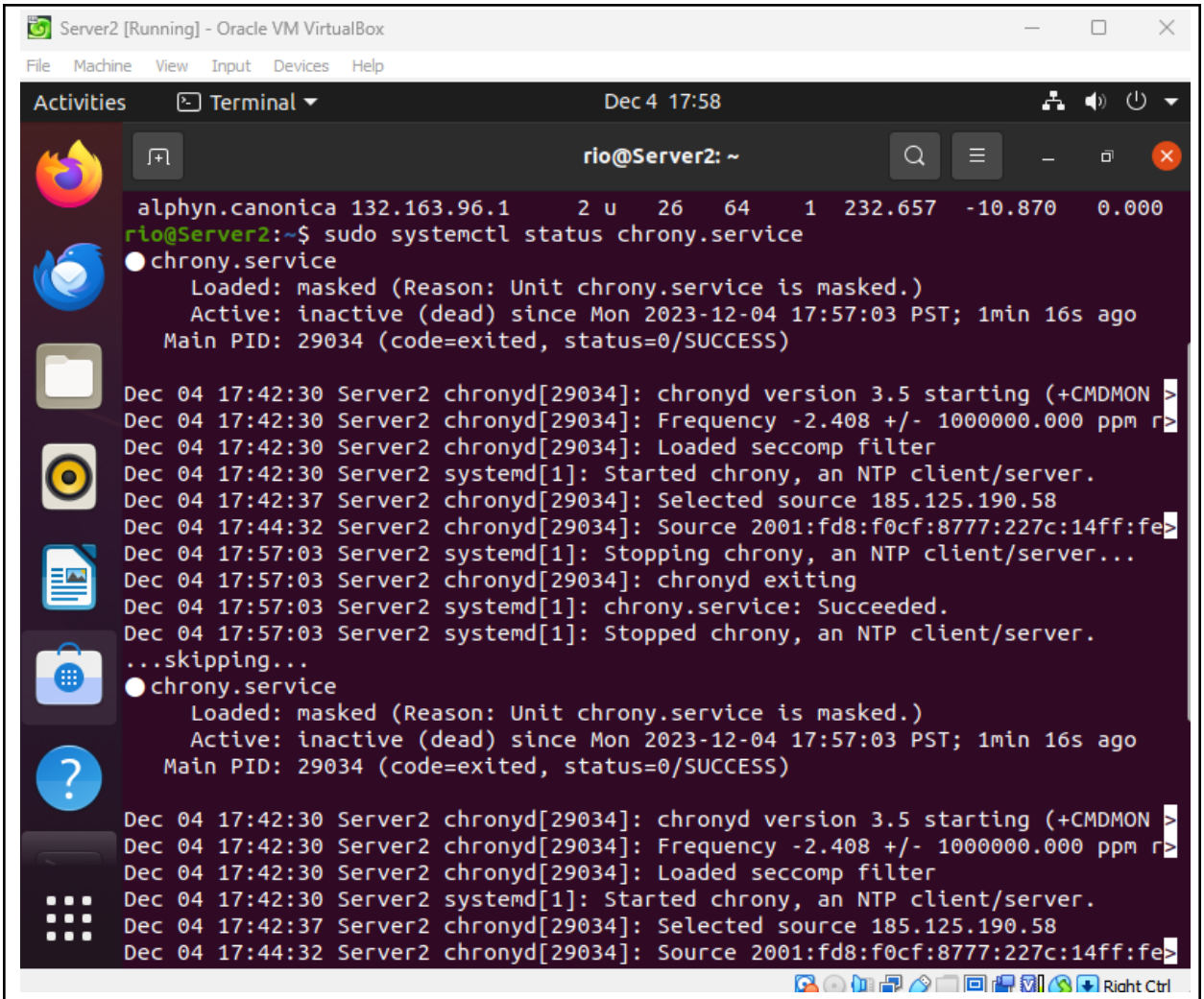

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 17:48
rio@Workstation: ~/hoa13
File Edit View Search Terminal Help
TASK [NTP : Enable the chrony] ***********
changed: [192.168.56.112]
TASK [OpenStack : Install the OpenStack Packages] ***********
changed: [192.168.56.112]
TASK [SQL : Install the SQL Database] ***********
ok: [192.168.56.112]
TASK [SQL : Edit the maria-db.conf file] ***********
changed: [192.168.56.112]
TASK [SQL : Restart the mariadb-server] ***********
changed: [192.168.56.112]
TASK [MessageQ : Installing Message Queue] ***********
changed: [192.168.56.112]
TASK [MessageQ : Starting service] ***********
ok: [192.168.56.112]
Right Ctrl


Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal Mon 17:48
rio@Workstation: ~/hoa13
File Edit View Search Terminal Help
changed: [192.168.56.112]
TASK [SQL : Restart the mariadb-server] ***********
changed: [192.168.56.112]
TASK [MessageQ : Installing Message Queue] ***********
changed: [192.168.56.112]
TASK [MessageQ : Starting service] ***********
ok: [192.168.56.112]
TASK [memchad : Install the Memcached] ***********
changed: [192.168.56.112]
TASK [memchad : Restart the Memcached] ***********
changed: [192.168.56.112]
PLAY RECAP ***********
192.168.56.112 : ok=13 changed=8 unreachable=0 failed=0
skipped=0 rescued=0 ignored=0
rio@Workstation:~/hoa13$
Right Ctrl

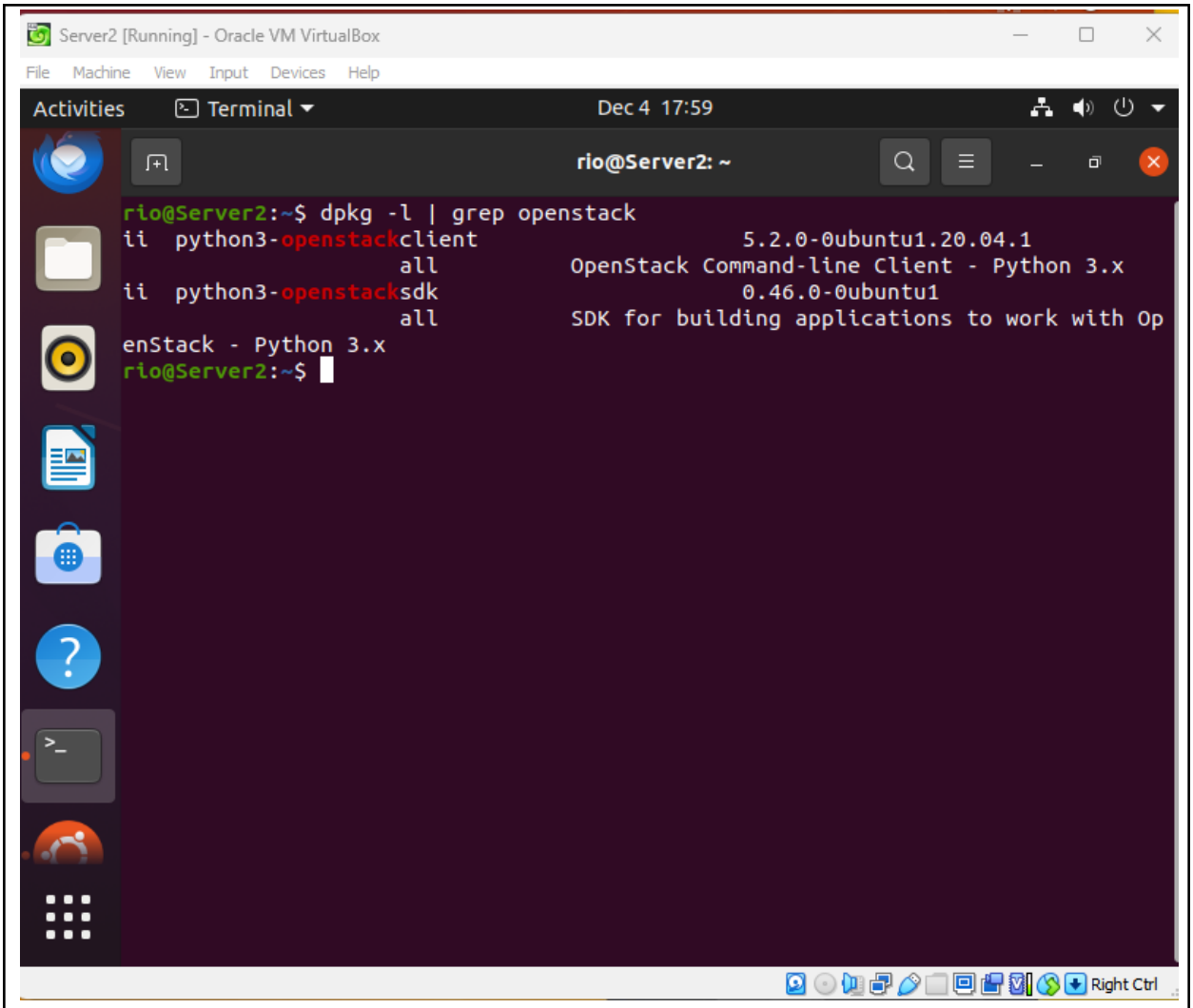
Output:

NTP

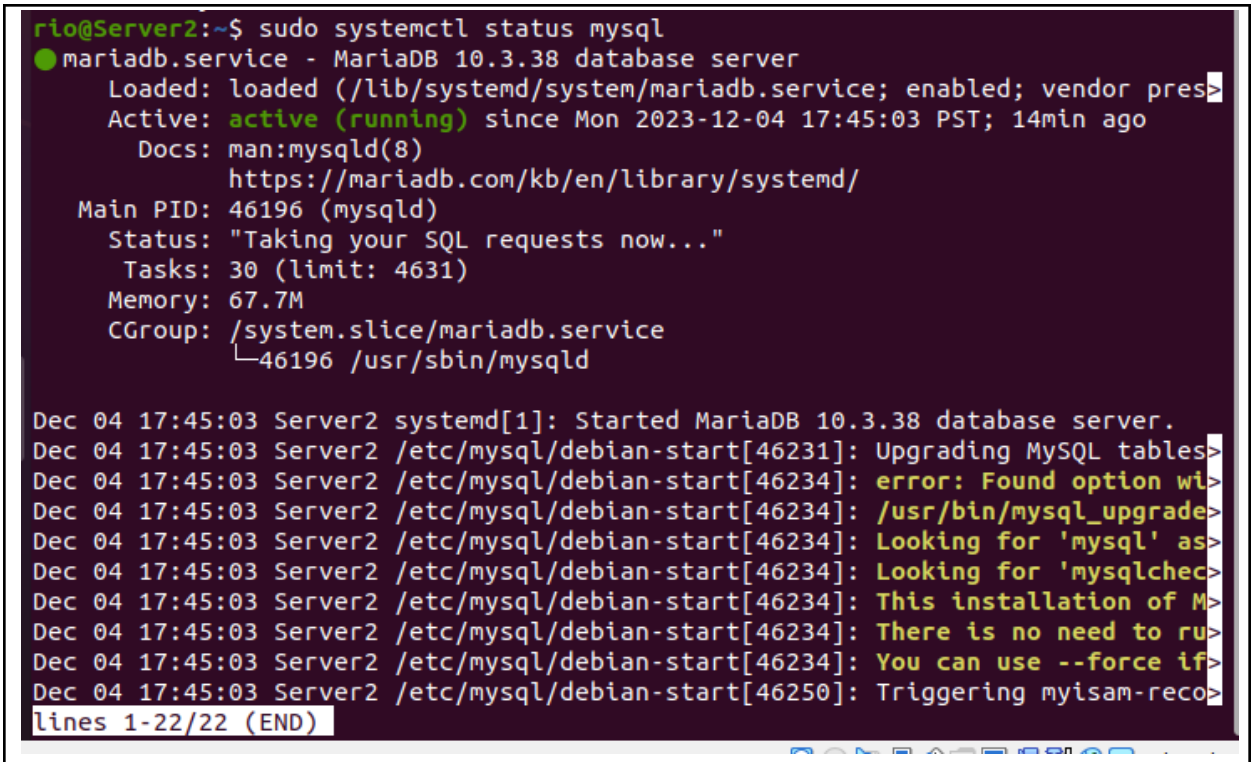

Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Dec 4 17:57
rio@Server2: ~
rio@Server2:~$ ntpq -p
remote refid st t when poll reach delay offset jitter
0.ubuntu.pool.n .POOL. 16 p - 64 0 0.000 0.000 0.000
1.ubuntu.pool.n .POOL. 16 p - 64 0 0.000 0.000 0.000
2.ubuntu.pool.n .POOL. 16 p - 64 0 0.000 0.000 0.000
3.ubuntu.pool.n .POOL. 16 p - 64 0 0.000 0.000 0.000
ntp.ubuntu.com .POOL. 16 p - 64 0 0.000 0.000 0.000
185.125.190.58 86.23.195.30 2 u 26 64 1 189.278 1.465 0.000
185.125.190.57 201.68.88.106 2 u 24 64 1 194.246 0.692 0.000
185.125.190.56 194.121.207.249 2 u 26 64 1 194.142 0.561 0.000
alphyn.canonica 132.163.96.1 2 u 26 64 1 232.657 -10.870 0.000
rio@Server2:~$



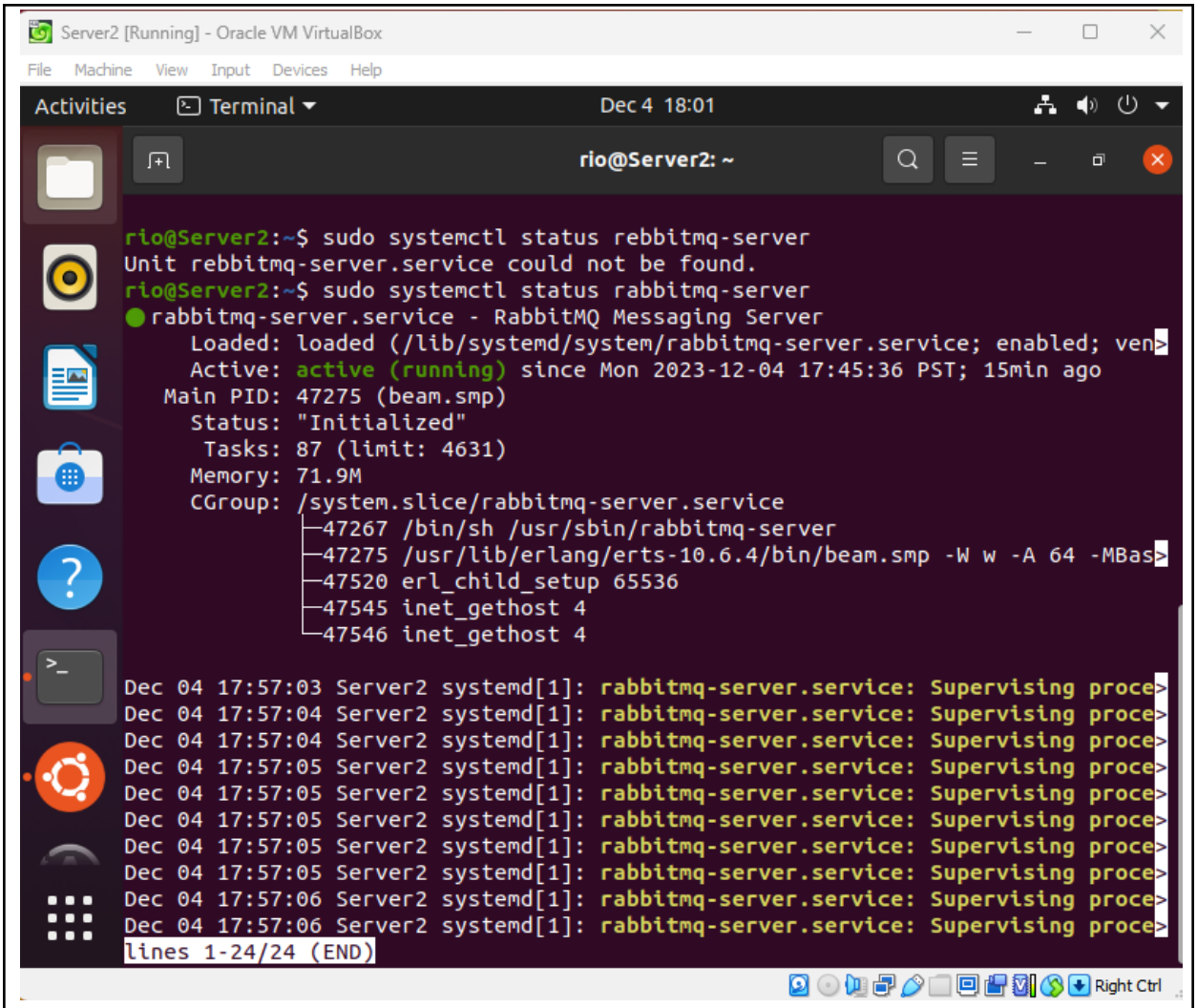
OpenStack packages



SQL Database



Message Queue


Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Dec 4 18:01
rio@Server2: ~
rio@Server2:~$ sudo systemctl status rebbitmq-server
Unit rebbitmq-server.service could not be found.
rio@Server2:~$ sudo systemctl status rabbitmq-server
rabbitmq-server.service - RabbitMQ Messaging Server
Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; ven
Active: active (running) since Mon 2023-12-04 17:45:36 PST; 15min ago
Main PID: 47275 (beam.smp)
Status: "Initialized"
Tasks: 87 (limit: 4631)
Memory: 71.9M
CGroup: /system.slice/rabbitmq-server.service
├─47267 /bin/sh /usr/sbin/rabbitmq-server
├─47275 /usr/lib/erlang/erts-10.6.4/bin/beam.smp -W w -A 64 -MBas
├─47520 erl_child_setup 65536
├─47545 inet_gethost 4
└─47546 inet_gethost 4
Dec 04 17:57:03 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
Dec 04 17:57:04 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
Dec 04 17:57:04 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
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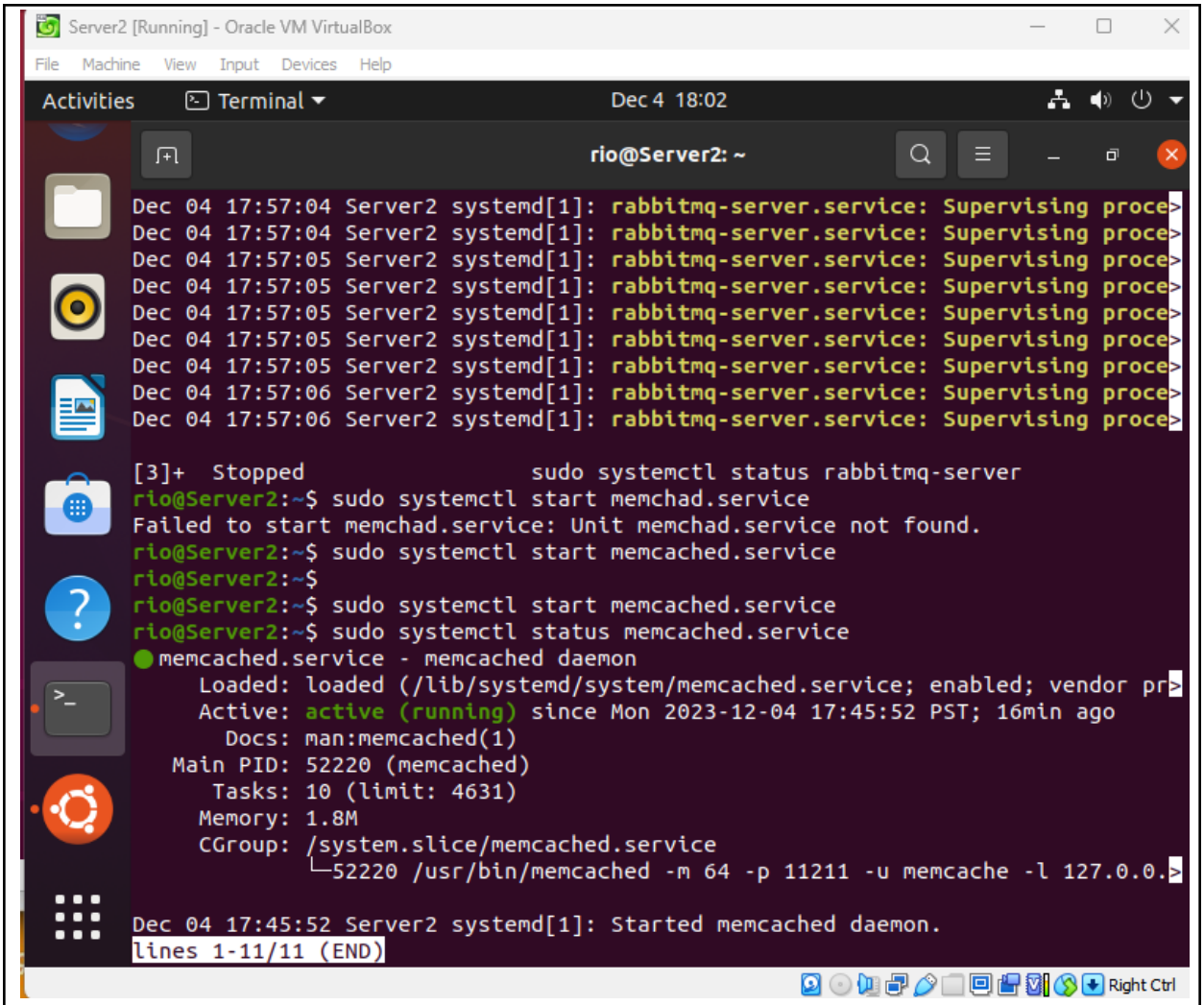
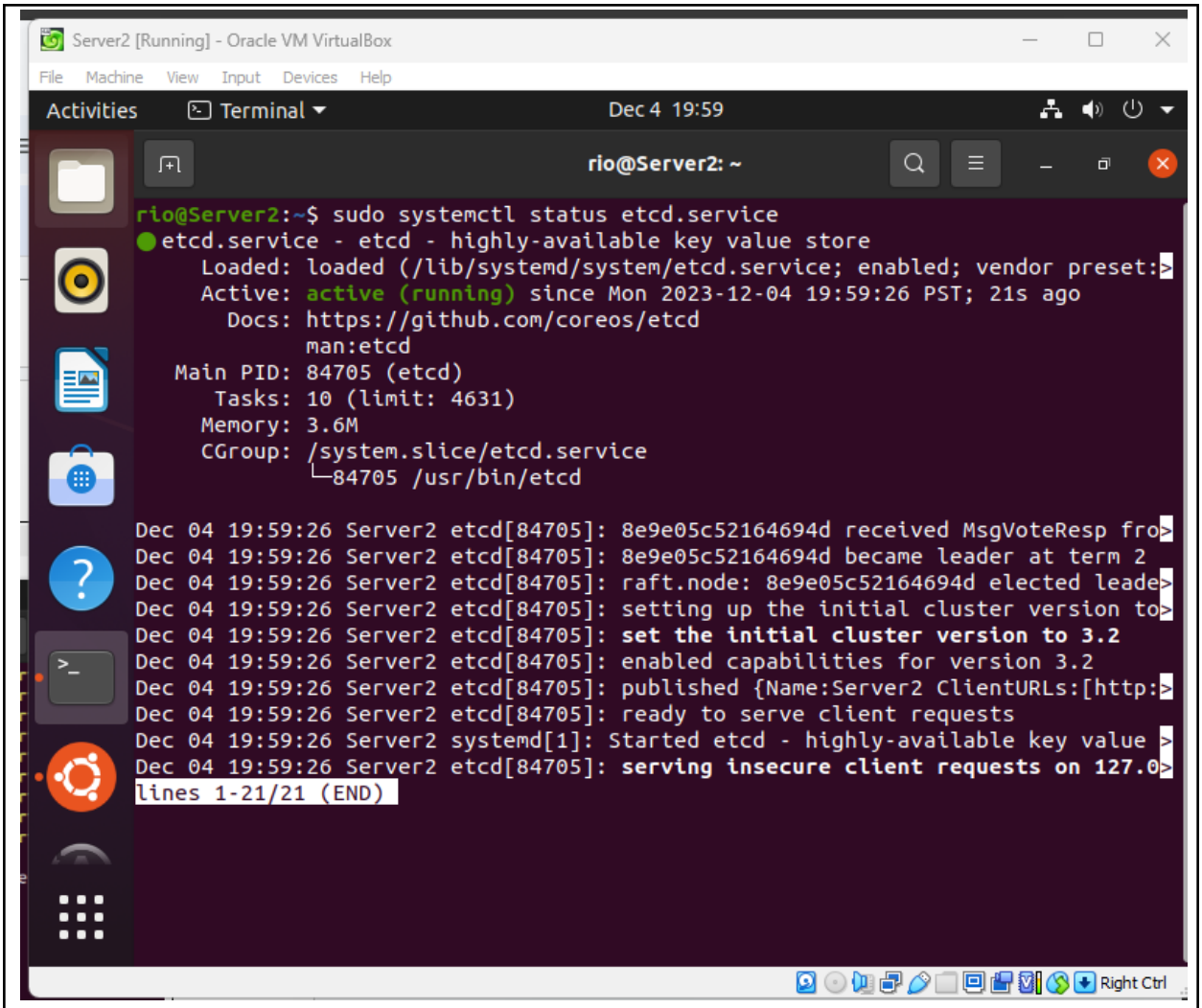
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
Dec 04 17:57:06 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
Dec 04 17:57:06 Server2 systemd[1]: rabbitmq-server.service: Supervising proce
lines 1-24/24 (END)
Right Ctrl

Memcached


Server2 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Dec 4 18:02
rio@Server2: ~
Dec 04 17:57:04 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:04 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:05 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:06 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
Dec 04 17:57:06 Server2 systemd[1]: rabbitmq-server.service: Supervising proce>
[3]+ Stopped sudo systemctl status rabbitmq-server
rio@Server2:~$ sudo systemctl start memchad.service
Failed to start memchad.service: Unit memchad.service not found.
rio@Server2:~$ sudo systemctl start memcached.service
rio@Server2:~$
rio@Server2:~$ sudo systemctl start memcached.service
rio@Server2:~$ sudo systemctl status memcached.service
memcached.service - memcached daemon
Loaded: loaded (/lib/systemd/system/memcached.service; enabled; vendor pr>
Active: active (running) since Mon 2023-12-04 17:45:52 PST; 16min ago
Docs: man:memcached(1)
Main PID: 52220 (memcached)
Tasks: 10 (limit: 4631)
Memory: 1.8M
CGroup: /system.slice/memcached.service
└52220 /usr/bin/memcached -m 64 -p 11211 -u memcache -l 127.0.0.>
Dec 04 17:45:52 Server2 systemd[1]: Started memcached daemon.
lines 1-11/11 (END)
Right Ctrl

Etcd



Github link: https://github.com/RioMariee/hoa13.git

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?
    - Integrating OpenStack provides significant benefits, such as increased scalability, flexibility, and cost-effectiveness in managing cloud infrastructure. This empowers organizations to design and manage private and public clouds efficiently, optimizing resource allocation and automation. OpenStack prioritizes interoperability, enabling smooth integration with various technologies, encouraging collaboration in an open-source environment conducive to ongoing enhancements. Additionally, it supports a range of hypervisors, storage solutions, and networking alternatives, offering a versatile solution customized for various IT environments.

Conclusions:

To conclude, this activity delved into the complex domain of cloud services, meticulously examining their pros and cons. We explored a variety of cloud deployment and service models, conducting a comprehensive assessment to identify their strengths and limitations. Additionally, we undertook a practical initiative, creating a detailed workflow for installing and configuring OpenStack base services. By employing Ansible as both documentation and execution tool, this undertaking not only enhanced my comprehension of cloud technologies but also provided hands-on experience in deploying and managing the infrastructure. As we navigate the dynamic landscape of cloud computing, it is valuable for making informed decisions and ensuring the efficient utilization of cloud resources specially for us Computer engineering students.