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Course/Section:CPE31S2	Date Submitted:
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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

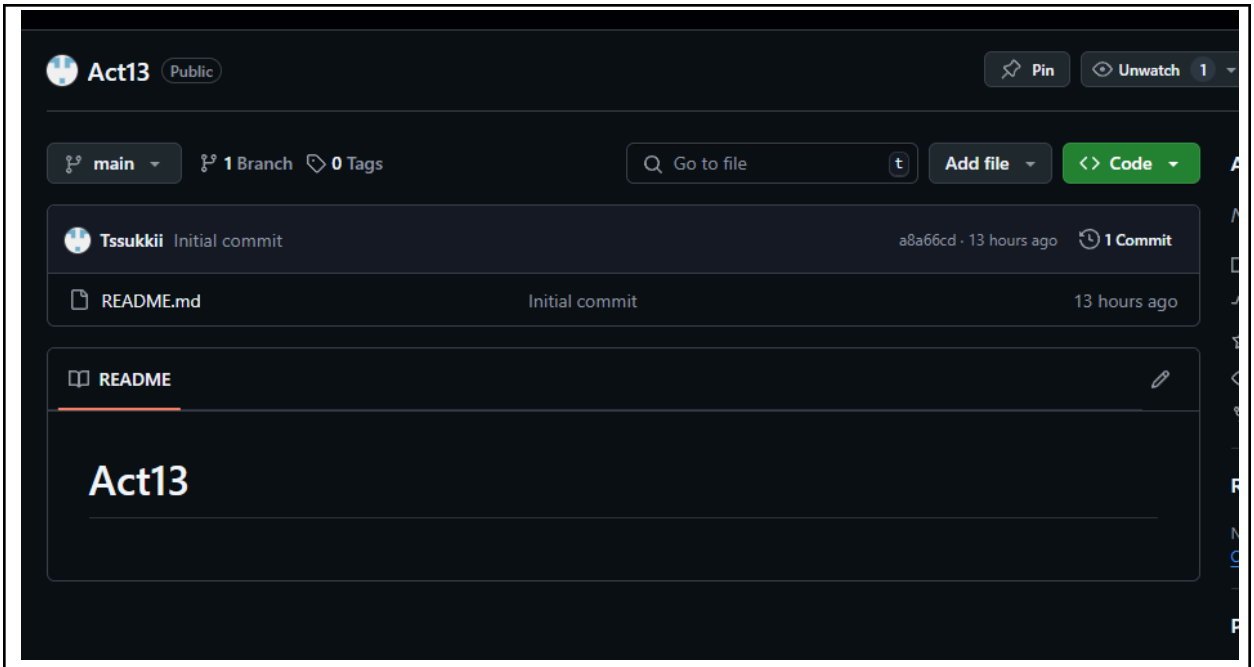
Oracle VirtualBox (Hypervisor)

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)



created the github repository

```
TASK [Extract etcd binary (CentOS only)] ***************************************
*
skipping: [compute1]
ok: [controller1]

TASK [Create etcd systemd service file] ****************************************
*
changed: [compute1]
ok: [controller1]

TASK [Reload systemd daemon] ***************************************************
*
changed: [compute1]
changed: [controller1]

TASK [Enable and start etcd service] *******************************************
*
ok: [compute1]
ok: [controller1]

PLAY RECAP *********************************************************************
*
compute1                   : ok=20   changed=7    unreachable=0    failed=0
skipped=6    rescued=0    ignored=0
controller1                : ok=21   changed=3    unreachable=0    failed=0
                 cued=0    ignored=0
Show Applications
vboxuser@workstation:~/Act13$
```

this shows that the playbook runs

```
        TX packets 183  bytes 16476 (16.4 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

vboxuser@server1:~$ sudo systemctl status ntp
[sudo] password for vboxuser:
● ntp.service - Network Time Service
     Loaded: loaded (/lib/systemd/system/ntp.service; enabled; vendor preset: e
nabled)
     Active: active (running) since Sun 2024-12-01 22:02:16 CST; 5h 47min ago
       Docs: man:ntpd(8)
   Main PID: 7536 (ntpd)
      Tasks: 2 (limit: 2270)
     Memory: 1.5M
        CPU: 5.553s
     CGroup: /system.slice/ntp.service
             └─7536 /usr/sbin/ntpd -p /var/run/ntpd.pid -g -u 131:139

Dec 02 03:48:06 server1 ntpd[7536]: Soliciting pool server 2400:6180:0:d0::1157
:4002
Dec 02 03:48:11 server1 ntpd[7536]: Soliciting pool server 2620:2d:4000:1::41
Dec 02 03:48:35 server1 ntpd[7536]: Soliciting pool server 222.127.1.22
Dec 02 03:48:40 server1 ntpd[7536]: Soliciting pool server 222.127.1.20
Dec 02 03:48:51 server1 ntpd[7536]: Soliciting pool server 222.127.1.27
Dec 02 03:49:11 server1 ntpd[7536]: Soliciting pool server 222.127.1.19
Dec 02 03:49:17 server1 ntpd[7536]: Soliciting pool server 2620:2d:4000:1::40
Dec 02 03:49:42 server1 ntpd[7536]: Soliciting pool server 222.127.1.18
Dec 02 03:49:46 server1 ntpd[7536]: Soliciting pool server 222.127.1.20
Dec 02 03:49:58 server1 ntpd[7536]: Soliciting pool server 222.127.1.24
vboxuser@server1:~$
```

LibreOffice Writer

this shows that the ntp is running in ubuntu

```
vboxuser@server1:~$ mysql --version
mysql  Ver 15.1 Distrib 10.6.18-MariaDB, for debian-linux-gnu (x86_64) using  E
ditLine wrapper
```

```
[tdee@MiWiFi-R4A-srv ~]$ mysql --version
mysql  Ver 15.1 Distrib 10.5.22-MariaDB, for Linux (x86_64) using  EditLine wrap
per
```

this shows that mariadb is working on both ubuntu and centos

```
vboxuser@server1:~$ memcached -V
memcached 1.6.14
```

```
[tdee@MiWiFi-R4A-srv ~]$ memcached -V
memcached 1.6.9
```

```
vboxuser@server1:~$ sudo systemctl status etcd
Unit etcd.service could not be found.
vboxuser@server1:~$ memcached -V
memcached 1.6.14
vboxuser@server1:~$ sudo systemctl status memcached
● memcached.service - memcached daemon
     Loaded: loaded (/lib/systemd/system/memcached.service; enabled; vendo
     Active: active (running) since Sun 2024-12-01 22:03:26 CST; 5h 54min
       Docs: man:memcached(1)
   Main PID: 9420 (memcached)
      Tasks: 10 (limit: 2270)
     Memory: 2.1M
        CPU: 5.676s
     CGroup: /system.slice/memcached.service
             └─9420 /usr/bin/memcached -m 64 -p 11211 -u memcache -l 127.0

Dec 01 22:03:26 server1 systemd[1]: Started memcached daemon.
lines 1-12/12 (END)
```

```
[tdee@MiWiFi-R4A-srv ~]$ sudo systemctl status memcached
[sudo] password for tdee:
● memcached.service - memcached daemon
     Loaded: loaded (/usr/lib/systemd/system/memcached.service; enabled; preset>
     Active: active (running) since Sun 2024-12-01 14:26:55 EST; 31min ago
   Main PID: 12147 (memcached)
      Tasks: 10 (limit: 10963)
     Memory: 6.0M
        CPU: 249ms
     CGroup: /system.slice/memcached.service
             └─12147 /usr/bin/memcached -p 11211 -u memcached -m 64 -c 1024 -l >

Dec 01 14:26:55 MiWiFi-R4A-srv systemd[1]: Started memcached daemon.
lines 1-11/11 (END)
```

this shows that memcached is working and active in ubuntu and centos

```
r@server1:~$ sudo systemctl status etcd
service - etcd key-value store
aded: loaded (/etc/systemd/system/etcd.service; enabled; vendor preset: en
tive: active (running) since Mon 2024-12-02 04:25:40 CST; 4min 49s ago
Docs: https://etcd.io
 PID: 23197 (etcd)
asks: 8 (limit: 2270)
mory: 5.3M
 CPU: 4.007s
roup: /system.slice/etcd.service
      └─23197 /usr/bin/etcd
Help
04:25:40 server1 etcd[23197]: 8e9e05c52164694d became leader at term 2
04:25:40 server1 etcd[23197]: raft.node: 8e9e05c52164694d elected leader 8
04:25:40 server1 etcd[23197]: published {Name:server1 ClientURLs:[http://l
04:25:40 server1 etcd[23197]: setting up the initial cluster version to 3.
04:25:40 server1 etcd[23197]: ready to serve client requests
04:25:40 server1 etcd[23197]: serving insecure client requests on 127.0.0.
04:25:40 server1 systemd[1]: Started etcd - highly-available key value sto
04:25:40 server1 etcd[23197]: set the initial cluster version to 3.3
04:25:40 server1 etcd[23197]: enabled capabilities for version 3.3
04:29:28 server1 systemd[1]: etcd.service: Current command vanished from t
lines 21/21 (END)
```

```
[tdee@MiWiFi-R4A-srv ~]$ sudo systemctl status etcd
[sudo] password for tdee:
● etcd.service - etcd key-value store
     Loaded: loaded (/etc/systemd/system/etcd.service; enabled; preset: disable>
     Active: activating (auto-restart) (Result: exit-code) since Sun 2024-12-01>
       Docs: https://etcd.io
    Process: 50413 ExecStart=/usr/local/bin/etcd --data-dir=/var/lib/etcd (code>
   Main PID: 50413 (code=exited, status=203/EXEC)
        CPU: 2ms
```

this shows that the etcd is enabled and running

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?
   Implementing OpenStack provides cost-effectiveness as it is open-source, reducing licensing expenses and avoiding vendor lock-in. Its scalability allows

organizations to adapt their cloud infrastructure to changing needs, from small environments to large-scale deployments. Additionally, OpenStack offers flexibility and customization, supporting diverse hypervisors, storage solutions, and network configurations to fit varied IT environments.

Conclusions:

This workflow utilizes Ansible to automate the installation and configuration of OpenStack base services, including NTP, OpenStack packages, SQL Database, Message Queue, Memcached, and Etcd. By organizing services into plays for each server type and grouping them in an inventory file, the process ensures clarity and efficiency. Using Oracle VirtualBox and a single Ubuntu or CentOS VM, we translated OpenStack installation steps into reproducible and documented playbooks. The completed workflow and playbooks are version-controlled and shared via a GitHub repository for collaboration and reusability.