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Course/Section: CPE31S2	**Date Submitted:** 12/02/2024
Instructor: Engr. Robin Valenzuela	**Semester and SY:** 1st Sem - S.Y. 2024-2025

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

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

   a. NTP

```
PLAY [all] *********************************************

TASK [Gathering Facts] *********************************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [update repository index (Ubuntu)] ******************
ok: [192.168.56.101]
ok: [192.168.56.100]

PLAY [UbuntuServers] ***********************************

TASK [Gathering Facts] *********************************
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuNTP : Install Chrony NTP] ********************
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuNTP : Configure Chrony] **********************
ok: [192.168.56.101] => (item=server pool.ntp.org iburst)
ok: [192.168.56.100] => (item=server pool.ntp.org iburst)
ok: [192.168.56.101] => (item=allow 192.168.56.100)
ok: [192.168.56.100] => (item=allow 192.168.56.100)

TASK [UbuntuNTP : Ensure Chrony service is started and ena
ok: [192.168.56.100]
ok: [192.168.56.101]

PLAY RECAP *********************************************
192.168.56.100             : ok=6    changed=0    unreacha
192.168.56.101             : ok=6    changed=0    unreacha

jose@workstation:~/CPE212ACT13.1$
```

b. Openstack packages

```
PLAY [all] *********************************************************
*************

TASK [Gathering Facts] *********************************************
*************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [update repository index (Ubuntu)] ****************************
*************
ok: [192.168.56.100]
ok: [192.168.56.101]

PLAY [UbuntuServers] ***********************************************
*************

TASK [Gathering Facts] *********************************************
*************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuOstack : Install the python3-openstackclient package] *
*************
ok: [192.168.56.100]
ok: [192.168.56.101]

PLAY RECAP *********************************************************
*************
192.168.56.100             : ok=4    changed=0    unreachable=0
failed=0    skipped=0    rescued=0    ignored=0
192.168.56.101             : ok=4    changed=0    unreachable=0
failed=0    skipped=0    rescued=0    ignored=0
```

c. SQL Database

```
PLAY [all] *********************************

TASK [Gathering Facts] *********************
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [update repository index (Ubuntu)] ******
ok: [192.168.56.101]
ok: [192.168.56.100]

PLAY [UbuntuServers] ***********************

TASK [Gathering Facts] *********************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuSQL : Install MariaDB server and Py
ok: [192.168.56.101]
changed: [192.168.56.100]

TASK [UbuntuSQL : Create /etc/mysql/mariadb.cor
on] ***
changed: [192.168.56.100]
changed: [192.168.56.101]

TASK [UbuntuSQL : Ensure MariaDB service is sta
ok: [192.168.56.101]
ok: [192.168.56.100]

PLAY RECAP *********************************
192.168.56.100             : ok=6    changed=2
ed=0    rescued=0    ignored=0
192.168.56.101             : ok=6    changed=1
ed=0    rescued=0    ignored=0

jose@workstation:~/CPE212ACT13.1$
```

d. Message Queue

```
PLAY [all] *********************************

TASK [Gathering Facts] *********************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [update repository index (Ubuntu)] *******
ok: [192.168.56.101]
ok: [192.168.56.100]

PLAY [UbuntuServers] ***********************

TASK [Gathering Facts] *********************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuMQ : Install RabbitMQ server] *****
changed: [192.168.56.100]
changed: [192.168.56.101]

TASK [UbuntuMQ : Enable the RabbitMQ management
changed: [192.168.56.100]
changed: [192.168.56.101]

TASK [UbuntuMQ : Ensure RabbitMQ service is sta
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuMQ : Set permissions for the OpenSt
skipping: [192.168.56.100]
skipping: [192.168.56.101]

PLAY RECAP *********************************
192.168.56.100             : ok=6    changed=2
ed=1    rescued=0    ignored=0
192.168.56.101             : ok=6    changed=2
ed=1    rescued=0    ignored=0
```

e. Memcached

```
PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [update repository index (Ubuntu)] ****************************************
ok: [192.168.56.101]
ok: [192.168.56.100]

PLAY [UbuntuServers] ***********************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuMC : Install Memcached and Python Memcache client] *****************
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuMC : Configure Memcached to listen on the management IP address] ***
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuMC : Ensure Memcached service is started and enabled] **************
ok: [192.168.56.100]
ok: [192.168.56.101]

PLAY RECAP *********************************************************************
192.168.56.100             : ok=6    changed=0    unreachable=0    failed=0    skipp
ed=0    rescued=0    ignored=0
192.168.56.101             : ok=6    changed=0    unreachable=0    failed=0    skipp
ed=0    rescued=0    ignored=0
```

f. Etcd

```
PLAY [all] ************************************

TASK [Gathering Facts] ************************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [update repository index (Ubuntu)] *******
ok: [192.168.56.101]
ok: [192.168.56.100]

PLAY [UbuntuServers] **************************

TASK [Gathering Facts] ************************
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuEtcd : Download etcd binary] ******
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuEtcd : Extract etcd binary] *******
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuEtcd : Move etcd and etcdctl binari
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuEtcd : Create etcd user] **********
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuEtcd : Create the data directory fo
ok: [192.168.56.100]
ok: [192.168.56.101]

TASK [UbuntuEtcd : Create etcd systemd service
ok: [192.168.56.101]
ok: [192.168.56.100]

TASK [UbuntuEtcd : Reload systemd to pick up th
changed: [192.168.56.100]
changed: [192.168.56.101]

TASK [UbuntuEtcd : Start and enable etcd servic
changed: [192.168.56.101]
changed: [192.168.56.100]

PLAY RECAP ************************************
192.168.56.100             : ok=11   changed=2
=0
192.168.56.101             : ok=11   changed=2
=0
```

(The files and codes are pushed to the Github)

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?
    - OpenStack is a powerful and flexible Cloud platform that can be used to create and automate cloud systems. Openstack is free to use, and it is also a popular option among businesses and organizations.

      OpenStack, however, saves you money. Since the software is open source, businesses will not have to spend their finances in purchasing expensive licenses that many other Cloud solutions offer. That is why, it is economical, especially for an organization with a low budget. With support from a global community, upgrades and enhancements are available for low or no charge.

Conclusions:

- By utilizing Ansible playbooks and roles, I created an automatic workflow to install and configure essential OpenStack base services, including NTP, OpenStack packages, SQL Database, Message Queue, Memcached, and Etcd. This approach not only automated the deployment process but also served as a way for my other chosen servers to acquire the packages i have installed, ensuring consistent, error-free installations and making the setup easily improvable and easy to replace.

Github Repository link: https://github.com/Liglig14/CPE212ACT13.1