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Course/Section: CPE 232-CPE31S23	Date Submitted:
Instructor: Dr. Taylar	Semester and SY:

<div align="center">

Activity 14: OpenStack Installation (Keystone, Glance, Nova)

</div>

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

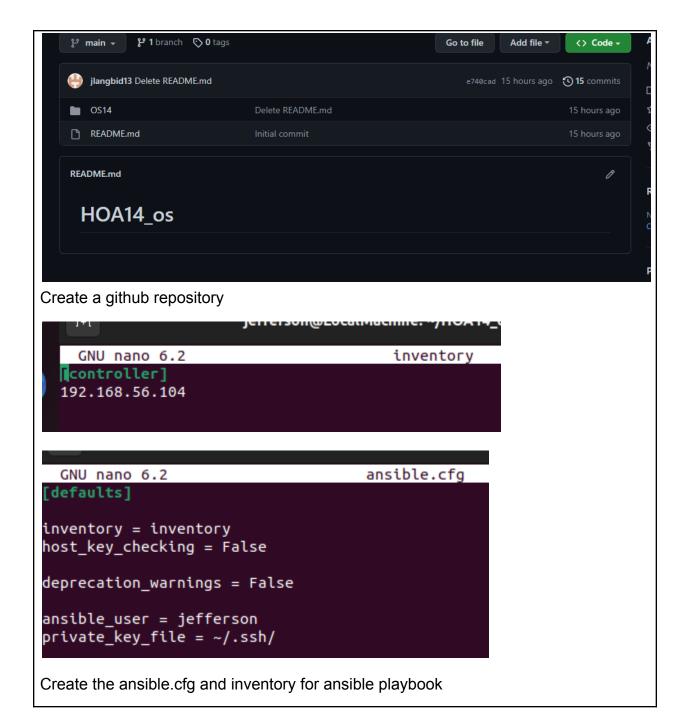3. Create a workflow to install and configure OpenStack base services using Ansible as documentation and execution.

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. Keystone (Identity Service)
    b. Glance (Imaging Service)
    c. Nova (Compute Service)

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

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

5. Output (screenshots and explanations)

Create a github repository


```
  GNU nano 6.2                    inventory
[controller]
192.168.56.104
```



```
  GNU nano 6.2                    ansible.cfg
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

ansible_user = jefferson
private_key_file = ~/.ssh/
```

Create the ansible.cfg and inventory for ansible playbook

```
  ⌶⊞                 jefferson@LocalMachine: ~/HOA14_os/OS14        Q   ≡

 GNU nano 6.2                              KGN.yml *
---
- hosts: all
  become: true
  pre_tasks:

  - name: Install updates for ubuntu
    apt:
      upgrade: dist
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "ubuntu"S

- hosts: controller
  become: true
  roles:
    - Keystone
    - Glance
    - Nova
```

Create the yml for the ansible

```
jefferson@LocalMachine:~/HOA14_os/OS14$ cd roles
jefferson@LocalMachine:~/HOA14_os/OS14/roles$ tree
.
├── Glance
│   └── tasks
│       └── main.yml
├── Keystone
│   └── tasks
│       └── main.yml
└── Nova
    └── tasks
        └── main.yml
```

I created the roles for the installation of OpenStack

```
GNU nano 6.2                              main.yml *
- name: Install the Glance for ubuntu
  apt:
    name: glance
    state: present
    update_cache: yes

- name: Restart Glance for ubuntu
  service:
     name: glance-api
     state: restarted
     enabled: yes
```

Main.yml of Glance

```
GNU nano 6.2                              main.yml
- name: Install the Keystone for ubuntu
  apt:
    name: keystone
    state: present
    update_cache: yes

- name: Restart Keystone for ubuntu
  service:
    name: keystone
    state: restarted
    enabled: yes
```

main.yml of Keystone

```
  GNU nano 6.2                              main.yml *
- name: Install the Nova for ubuntu
  apt:
    name:
      - nova-compute
      - python3-openstackclient
    state: present
    update_cache: yes

- name: Restart Nova for ubuntu
  service:
    name: nova-compute
    state: restarted
    enabled: yes
```

main.yml of Nova

```
*
TASK [Gathering Facts] ************************************************
*
ok: [192.168.56.104]

TASK [Keystone : Install the Keystone for ubuntu] *********************
*
ok: [192.168.56.104]
```

```
ok. [132.100.50.104]

TASK [Glance : Install the Glance for ubuntu] ************************
*
changed: [192.168.56.104]

TASK [Glance : Restart Glance for ubuntu] ***************************
*
changed: [192.168.56.104]

TASK [Nova : Install the Nova for ubuntu] **************************
*
```

```
TASK [Nova : Install the Nova for ubuntu] **********************************
*
ok: [192.168.56.104]

TASK [Nova : Restart Nova for ubuntu] **************************************
*
changed: [192.168.56.104]

PLAY RECAP ****************************************************************
*
192.168.56.104             : ok=7     changed=3     unreachable=0     failed=0
skipped=1     rescued=0     ignored=0
```

jefferson@LocalMachine: ~/HOA14_os/OS14

```
*
ok: [192.168.56.104]

TASK [Keystone : Install the Keystone for ubuntu] **************************
*
ok: [192.168.56.104]

TASK [Glance : Install the Glance for ubuntu] *****************************
*
changed: [192.168.56.104]

TASK [Glance : Restart Glance for ubuntu] ********************************
*
changed: [192.168.56.104]

TASK [Nova : Install the Nova for ubuntu] ********************************
*
ok: [192.168.56.104]

TASK [Nova : Restart Nova for ubuntu] ***********************************
*
changed: [192.168.56.104]

PLAY RECAP **************************************************************
*
192.168.56.104             : ok=7     changed=3     unreachable=0     failed=0
skipped=1     rescued=0     ignored=0
```

The code ran successfully and installed the Glance, Keystone, and Nova services.

```
jefferson@Server2:~$ sudo systemctl status glance-api status
Unit status.service could not be found.
● glance-api.service - OpenStack Image Service API
     Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor p>
     Active: active (running) since Sat 2022-12-10 14:50:45 PST; 8min ago
       Docs: man:glance-api(1)
   Main PID: 5732 (glance-api)
      Tasks: 2 (limit: 1075)
     Memory: 83.2M
        CPU: 8.780s
     CGroup: /system.slice/glance-api.service
             ├─5732 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/gl>
             └─5937 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/gl>
```

```
[+]                          jefferson@Server2: ~

jefferson@Server2:~$ keystone-manage --version
21.0.0
jefferson@Server2:~$
```

```
lines 1-17/17 (END)
jefferson@Server2:~$ sudo systemctl status nova-compute
● nova-compute.service - OpenStack Compute
     Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor
     Active: active (running) since Sat 2022-12-10 14:50:51 PST; 8min ago
   Main PID: 6041 (nova-compute)
      Tasks: 2 (limit: 1075)
     Memory: 104.7M
        CPU: 2.573s
     CGroup: /system.slice/nova-compute.service
             └─6041 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/

Dec 10 14:50:51 Server2 systemd[1]: nova-compute.service: Deactivated successf
Dec 10 14:50:51 Server2 systemd[1]: Stopped OpenStack Compute.
Dec 10 14:50:51 Server2 systemd[1]: nova-compute.service: Consumed 2.918s CPU
Dec 10 14:50:51 Server2 systemd[1]: Started OpenStack Compute.
Dec 10 14:50:52 Server2 nova-compute[6041]: Modules with known eventlet monkey
lines 1-15/15 (END)
```

Proofs that the Glance, Keystone, and Nova are installed.

```
jefferson@LocalMachine:~/HOA14_os/OS14$ git status
On branch main
Your branch is behind 'origin/main' by 1 commit, and can be fast-forwarded.
  (use "git pull" to update your local branch)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   KGN.yml
        modified:   inventory
        modified:   roles/Glance/tasks/main.yml
        modified:   roles/Keystone/tasks/main.yml
        modified:   roles/Nova/tasks/main.yml

no changes added to commit (use "git add" and/or "git commit -a")
jefferson@LocalMachine:~/HOA14_os/OS14$ git add KGN.yml
jefferson@LocalMachine:~/HOA14_os/OS14$ git add inventory
jefferson@LocalMachine:~/HOA14_os/OS14$ git add roles/Glance/tasks/main.yml
jefferson@LocalMachine:~/HOA14_os/OS14$ git add roles/Keystone/tasks/main.yml
jefferson@LocalMachine:~/HOA14_os/OS14$ git add roles/Nova/tasks/main.yml
jefferson@LocalMachine:~/HOA14_os/OS14$ git commit -m "HOA14"
[main aafb5a6] HOA14
 5 files changed, 9 insertions(+), 11 deletions(-)
jefferson@LocalMachine:~/HOA14_os/OS14$ git push origin main
To github.com:jlangbid13/HOA14_os.git
```

I added, committed, and pushed it to my github repository.

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

    Keystone- It provides identity and authentication

    Glance- It provides discovery, registration and delivery services for disk and server images.

    Nova- It provides virtual servers upon demand. Nova is the most complicated and distributed component of OpenStack. A large number of processes cooperate to turn end user API requests into running virtual machines.

Conclusions:

　　　　All in all, in this activity, we are tasked to install the prerequisites of openstack which is Keystone, Glance, and Nova using ansible to another server. First, I created a github repository and cloned it to the local machine and also created the ansible.cfg and then the inventory for the ansible. After that I created the roles for the computer and controller. I created the yml for the installation of the prerequisites which are Keystone, Glance, and Nova. I created the role directory to store the main.yml of each role and after inputting the codes the ansible ran successfully. I added, committed, and pushed the files to my github repository