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

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)

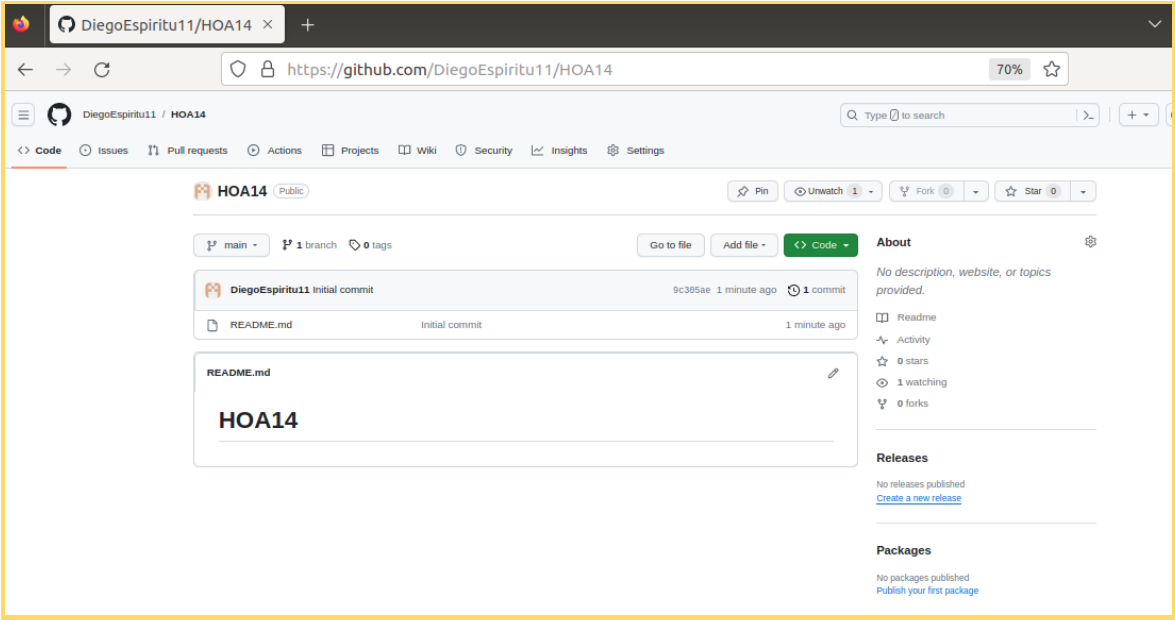
1x Ubuntu VM or Centos VM

4. Tasks

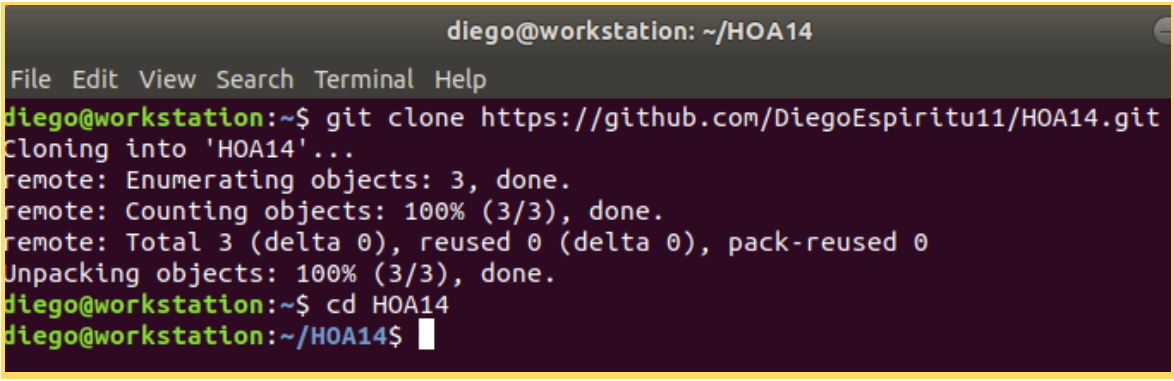
1. Create a new repository for this activity.
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/
    a. Keystone (Identity Service)
    b. Glance (Imaging Service)
    c. Nova (Compute Service)
    d. Create different plays in installing per 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)

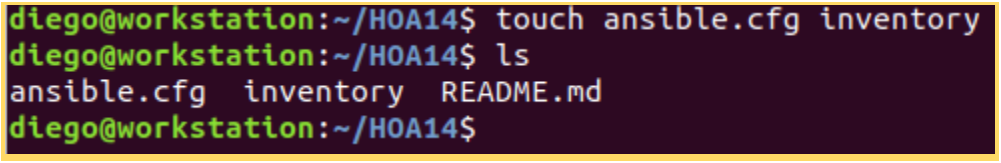
Step 1: Create a repository in github.



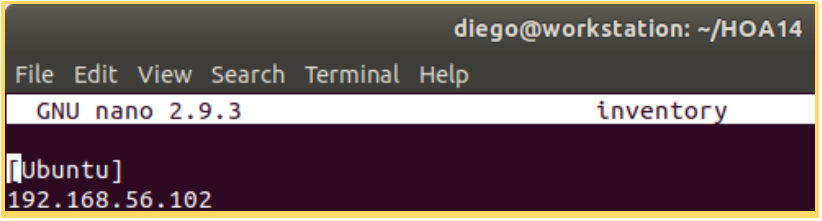
Step 2: Clone the created repository.



Step 3: Creating a file inside the directory (ansible.cfg, inventory).



Step 4: Put the ip address into the inventory file.



Step 5: Necessary file for ansible.cfg

```
diego@workstation: ~/HOA14
File  Edit  View  Search  Terminal  Help
  GNU nano 2.9.3                    ansible.cfg

[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False


remote_user = diego
private_key_file = ~/.ssh/
```

Step 6: Creating a playbook playbook that converts the steps in the following items https://docs.openstack.org/install-guide/.

```
diego@workstation:~/HOA14$ mkdir roles
diego@workstation:~/HOA14$ cd roles
diego@workstation:~/HOA14/roles$ mkdir keystone
diego@workstation:~/HOA14/roles$ cd keystone
diego@workstation:~/HOA14/roles/keystone$ mkdir tasks
diego@workstation:~/HOA14/roles/keystone$ cd tasks
diego@workstation:~/HOA14/roles/keystone/tasks$ sudo nano main.yml
diego@workstation:~/HOA14/roles/keystone/tasks$ cd ..
diego@workstation:~/HOA14/roles/keystone$ cd ..
diego@workstation:~/HOA14/roles$ mkdir glance
diego@workstation:~/HOA14/roles$ cd glance
diego@workstation:~/HOA14/roles/glance$ mkdir tasks
diego@workstation:~/HOA14/roles/glance$ cd tasks
diego@workstation:~/HOA14/roles/glance/tasks$ sudo nano main.yml
diego@workstation:~/HOA14/roles/glance/tasks$ cd ..
diego@workstation:~/HOA14/roles/glance$ cd ..
diego@workstation:~/HOA14/roles$ mkdir nova
diego@workstation:~/HOA14/roles$ cd nova
diego@workstation:~/HOA14/roles/nova$ mkdir tasks
diego@workstation:~/HOA14/roles/nova$ cd tasks
diego@workstation:~/HOA14/roles/nova/tasks$ sudo nano main.yml
diego@workstation:~/HOA14/roles/nova/tasks$ cd ..
diego@workstation:~/HOA14/roles/nova$ cd ..
diego@workstation:~/HOA14/roles$ tree
.
├── glance
│   └── tasks
│       └── main.yml
├── keystone
│   └── tasks
│       └── main.yml
└── nova
    └── tasks
        └── main.yml

6 directories, 3 files
diego@workstation:~/HOA14/roles$
```

Step 7: Create a file inside of the main directory (HOA14) and name it controller.yml, create a playbook for running the installation of the given.

diego@workstation: ~/HOA14

File Edit View Search Terminal Help

GNU nano 2.9.3 controller.yml

```
---

- hosts: all
  become: true
  pre_tasks:

  - name: Ubuntu Update
    tags: always
    apt:
      update_cache: yes
      upgrade: dist
    when: ansible_distribution == "ubuntu"


- hosts: Ubuntu
  become: true
  roles:
    - role: keystone
    - role: glance
    - role: nova
```

Step 8: Scripts for other playbooks.

Glance:

diego@workstation: ~/HOA14/roles/glance/tasks

File Edit View Search Terminal Help

GNU nano 2.9.3 main.yml

```
- name: Installation Glance
  apt:
    name:
      - glance
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Keystone:

diego@workstation: ~/HOA14/roles/keystone/tasks

File Edit View Search Terminal Help

GNU nano 2.9.3 main.yml

```
- name: Install Keystone
  apt:
    name:
      - keystone
      - apache2
      - php
      - libapache2-mod-php
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Nova:

```
diego@workstation: ~/HOA14/roles/nova/tasks
File  Edit  View  Search  Terminal  Help
  GNU nano 2.9.3                        main.yml

- name: Installation Nova
  apt:
    name:
      - nova-compute
      - python3-openstackclient
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Step 8: Running the controller.yml

```
diego@workstation:~/HOA14$ ansible-playbook --ask-become-pass controller.yml
BECOME password:

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

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.102]

TASK [Ubuntu Update] ***********************************************************
skipping: [192.168.56.102]

PLAY [Ubuntu] ******************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.102]

TASK [keystone : Install Keystone] *********************************************
changed: [192.168.56.102]

TASK [glance : Installation Glance] ********************************************
changed: [192.168.56.102]

TASK [nova : Installation Nova] ************************************************
changed: [192.168.56.102]

PLAY RECAP *********************************************************************
192.168.56.102             : ok=5    changed=3    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0

diego@workstation:~/HOA14$
```

Step 9: Checking the installations.

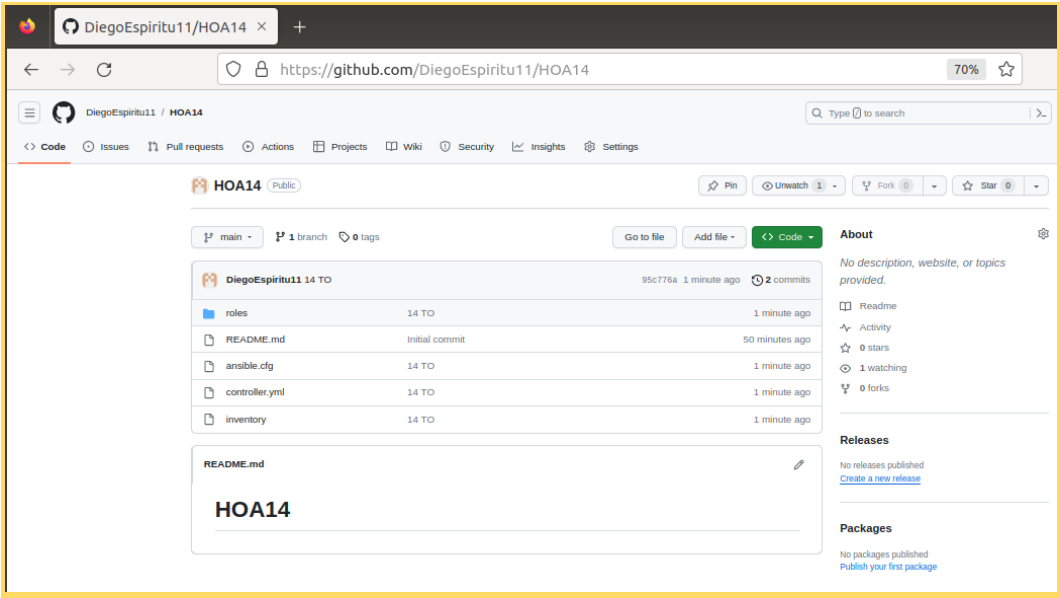
```
diego@server1:~$ keystone-manage --version
13.0.4
diego@server1:~$ glance --version
2.9.1
diego@server1:~$ sudo systemctl status nova-compute
[sudo] password for diego:
● nova-compute.service - OpenStack Compute
   Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset
   Active: active (running) since Thu 2023-11-30 17:33:22 PST; 3min 32s ago
 Main PID: 30060 (nova-compute)
    Tasks: 1 (limit: 4656)
   CGroup: /system.slice/nova-compute.service
           └─30060 /usr/bin/python2 /usr/bin/nova-compute --config-file=/etc/nova/n

Nov 30 17:33:22 server1 systemd[1]: Started OpenStack Compute.

[1]+  Stopped                 sudo systemctl status nova-compute
diego@server1:~$
```

Step 10: Git add, commit and push in the github.

```
diego@workstation:~/HOA14$ git add *
diego@workstation:~/HOA14$ git commit -m "14 TO"
[main 95c776a] 14 TO
 6 files changed, 60 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 controller.yml
 create mode 100644 inventory
 create mode 100644 roles/glance/tasks/main.yml
 create mode 100644 roles/keystone/tasks/main.yml
 create mode 100644 roles/nova/tasks/main.yml
diego@workstation:~/HOA14$ git push origin
Username for 'https://github.com': DiegoEspiritu11
Password for 'https://DiegoEspiritu11@github.com':
Counting objects: 15, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (15/15), 1.42 KiB | 1.42 MiB/s, done.
Total 15 (delta 0), reused 0 (delta 0)
To https://github.com/DiegoEspiritu11/HOA14.git
   9c305ae..95c776a  main -> main
diego@workstation:~/HOA14$
```



https://github.com/DiegoEspiritu11/HOA14.git

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

   The Keystone Service uses the Identity API from OpenStack to provide distributed service discovery, authentication of API clients, and multi-tenant authorization.API client authentication and service are provided via implementing OpenStack's Identity API. finding as well as dispersed multi-tenant authorization while the Glance is an actual storage backend that runs on either Swift or Ceph image service that lets users search for, obtain, and register images for containers and virtual machines. The glimpse feature facilitates seamless app switching and is limited to picture services and lastly Nova Services is a cloud computing instance controller of the Infrastructure as a Service (IaaS) and offers a method for allocating computing instances utilized for cloud computing system management and hosting.

Conclusions:

In this Hands on activity we are able to create an Openstack installation procedure using Ansible as a (IaC). The student demonstrated the ability to distinguish between cloud deployment and service models as well as list the benefits and drawbacks of the cloud service. Using Ansible for documentation and execution, the student was able to configure and install the OpenStack foundation services.