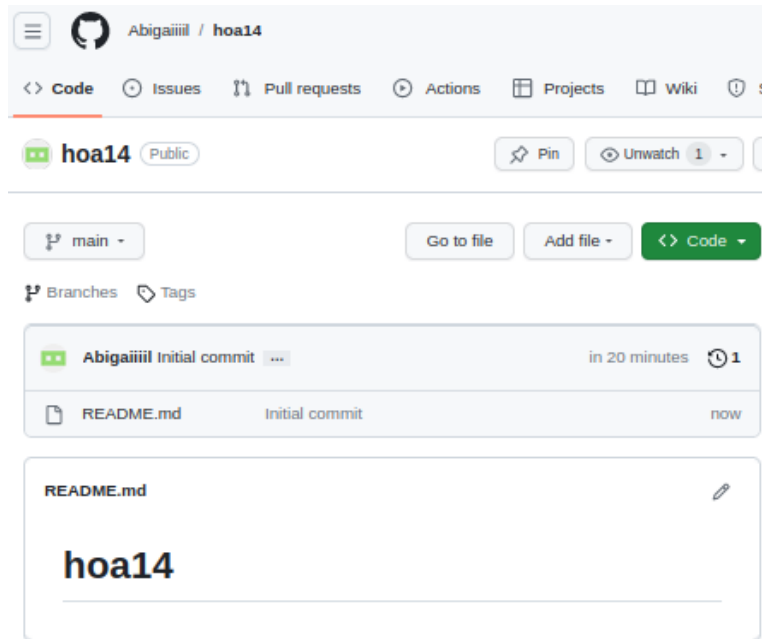


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Instructor: Dr. Jonathan Taylar	Semester and SY: 1st sem, SY: 2023-2024
Activity 14: OpenStack Installation (Keystone, Glance, Nova)	
1. Objectives	
Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).	
2. Intended Learning Outcomes	
<ol style="list-style-type: none"> 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	
<p>Oracle VirtualBox (Hypervisor)</p> <p>1x Ubuntu VM or Centos VM</p>	
4. Tasks	
<ol style="list-style-type: none"> 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/ <ol style="list-style-type: none"> 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 new repository for this activity in Github.



Step 2. clone your repository to your workstation using **git clone** command.

```
laxamana_ubuntu@workstation:~$ git clone git@github.com:Abigaiiiiil/hoa14.git
Cloning into 'hoa14'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
```

Step 3. Create an inventory file that contains the addresses of the servers to be used, and create an ansible file which contains the settings.

```
laxamana_ubuntu@workstation:~/hoa14$ sudo nano inventory
[sudo] password for laxamana_ubuntu:
laxamana_ubuntu@workstation:~/hoa14$ cat inventory
[ubuntu]
192.168.56.103
laxamana_ubuntu@workstation:~/hoa14$ sudo nano ansible.cfg
laxamana_ubuntu@workstation:~/hoa14$ cat ansible.cfg
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

remote_user = laxamana_ubuntu

private_key_file = ~/.ssh/
```

Step 4. Create roles and files/folders for each prerequisite. Inside those, create a directory named **tasks** that contain **main.yml** file.

```
laxamana_ubuntu@workstation:~/hoa14$ mkdir roles
laxamana_ubuntu@workstation:~/hoa14$ cd roles
laxamana_ubuntu@workstation:~/hoa14/roles$ mkdir keystone
laxamana_ubuntu@workstation:~/hoa14/roles$ cd keystone
laxamana_ubuntu@workstation:~/hoa14/roles/keystone$ mkdir tasks
laxamana_ubuntu@workstation:~/hoa14/roles/keystone$ cd tasks
laxamana_ubuntu@workstation:~/hoa14/roles/keystone/tasks$ sudo nano main.yml
laxamana_ubuntu@workstation:~/hoa14/roles/keystone/tasks$ cd ~/hoa14/roles
laxamana_ubuntu@workstation:~/hoa14/roles$ mkdir glance
laxamana_ubuntu@workstation:~/hoa14/roles$ cd glance
laxamana_ubuntu@workstation:~/hoa14/roles/glance$ mkdir tasks
laxamana_ubuntu@workstation:~/hoa14/roles/glance$ cd tasks
laxamana_ubuntu@workstation:~/hoa14/roles/glance/tasks$ sudo nano main.yml
laxamana_ubuntu@workstation:~/hoa14/roles/glance/tasks$ cd ~/hoa14/roles
laxamana_ubuntu@workstation:~/hoa14/roles$ mkdir nova
laxamana_ubuntu@workstation:~/hoa14/roles$ cd nova
laxamana_ubuntu@workstation:~/hoa14/roles/nova$ mkdir tasks
laxamana_ubuntu@workstation:~/hoa14/roles/nova$ cd tasks
laxamana_ubuntu@workstation:~/hoa14/roles/nova/tasks$ sudo nano main.yml
```

Keystone main.yml

```
laxamana_ubuntu@workstation:~/hoa14$ cd ~/hoa14/roles/keystone/tasks
laxamana_ubuntu@workstation:~/hoa14/roles/keystone/tasks$ cat main.yml
- name: Install Keystone
  apt:
    name:
      - keystone
      - apache2
      - php
      - libapache2-mod-php
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Glance main.yml

```
laxamana_ubuntu@workstation:~/hoa14/roles/keystone/tasks$ cd ~/hoa14/roles/glance/tasks
laxamana_ubuntu@workstation:~/hoa14/roles/glance/tasks$ cat main.yml
- name: Installation Glance
  apt:
    name:
      - glance
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Nova main.yml

```
laxamana_ubuntu@workstation:~/hoa14/roles/glance/tasks$ cd ~/hoa14/roles/nova/tasks
laxamana_ubuntu@workstation:~/hoa14/roles/nova/tasks$ cat main.yml
- name: Installation Glance
  apt:
    name:
      - glance
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Step 5. outside roles, create the main yml file.

```
laxamana_ubuntu@workstation:~/hoa14$ sudo nano hoa14laxamana.yml
laxamana_ubuntu@workstation:~/hoa14$ cat hoa14laxamana.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:
    - keystone
    - glance
    - nova
```

Playbook Process:

```
laxamana_ubuntu@workstation:~/hoa14$ ansible-playbook --ask-become-pass hoa14laxamana.yml
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.103]

TASK [Ubuntu Update] *****
skipping: [192.168.56.103]

PLAY [ubuntu] *****

TASK [Gathering Facts] *****
ok: [192.168.56.103]

TASK [keystone : Install Keystone] *****
changed: [192.168.56.103]

TASK [glance : Installation Glance] *****
changed: [192.168.56.103]

TASK [nova : Installation Glance] *****
ok: [192.168.56.103]

PLAY RECAP *****
192.168.56.103      : ok=5    changed=2    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
```

Proofs:

```
laxamana_ubuntu@server1:~$ sudo apt list --installed | grep keystone
[sudo] password for laxamana_ubuntu:

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

keystone/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:13.0.4-0ubuntu1 all [installed]
python-keystone/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:13.0.4-0ubuntu1 all [installed,automatic]
python-keystoneauth1/bionic,bionic,now 3.4.0-0ubuntu1 all [installed,automatic]
python-keystoneclient/bionic,bionic,now 1:3.15.0-0ubuntu1 all [installed,automatic]
python-keystonemiddleware/bionic,bionic,now 4.21.0-0ubuntu1 all [installed,automatic]
python3-keystoneauth1/bionic,bionic,now 3.4.0-0ubuntu1 all [installed,automatic]
python3-keystoneclient/bionic,bionic,now 1:3.15.0-0ubuntu1 all [installed,automatic]
```

```
laxamana_ubuntu@server1:~$ sudo systemctl status glance-api
● glance-api.service - OpenStack Image Service API
   Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2023-11-30 17:52:27 PST; 7min ago
     Main PID: 23643 (glance-api)
        Tasks: 3 (limit: 4656)
      CGroup: /system.slice/glance-api.service
              └─23643 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance-api.conf
                 └─24412 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance-api.conf
                    └─24415 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance-api.conf

Nov 30 17:52:29 server1 glance-api[23643]: /usr/lib/python2.7/dist-packages/pas
Nov 30 17:52:29 server1 glance-api[23643]: return pkg_resources.EntryPoint.pa
Nov 30 17:52:29 server1 glance-api[23643]: /usr/lib/python2.7/dist-packages/pas
Nov 30 17:52:29 server1 glance-api[23643]: return pkg_resources.EntryPoint.pa
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Nov 30 17:52:30 server1 glance-api[23643]: /usr/lib/python2.7/dist-packages/pas
Nov 30 17:52:30 server1 glance-api[23643]: val = callable(*args, **kw)
lines 1-20/20 (END)
```

```
laxamana_ubuntu@server1:~$ sudo systemctl status nova-compute
● nova-compute.service - OpenStack Compute
   Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor pr
   Active: active (running) since Thu 2023-11-30 17:16:44 PST; 44min ago
   Main PID: 2497 (nova-compute)
     Tasks: 1 (limit: 4656)
    CGroup: /system.slice/nova-compute.service
            └─2497 /usr/bin/python2 /usr/bin/nova-compute --config-file=/etc/nov

Nov 30 17:16:44 server1 systemd[1]: Started OpenStack Compute.
lines 1-9/9 (END)
```

Git commit

```
laxamana_ubuntu@workstation:~/hoa14$ git add .
laxamana_ubuntu@workstation:~/hoa14$ git commit -m "HOA 14 is a success!"
[main 135e2d9] HOA 14 is a success!
6 files changed, 56 insertions(+)
create mode 100644 ansible.cfg
create mode 100644 hoa14laxamana.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
laxamana_ubuntu@workstation:~/hoa14$ git push origin
Counting objects: 12, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (7/7), done.
Writing objects: 100% (12/12), 1.19 KiB | 1.19 MiB/s, done.
Total 12 (delta 0), reused 0 (delta 0)
To github.com:Abigaiiiiil/hoa14.git
   35e5ddc..135e2d9  main -> main
```

Github link:

<https://github.com/Abigaiiiiil/hoa14.git>

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

The core identification service inside the OpenStack ecosystem is called Keystone. Keystone is in charge of controlling access for users, permissions, and roles throughout the many OpenStack services as an authorization and security service. By offering tokens for gaining access to additional OpenStack services, it concentrates the authentication process while guaranteeing safe, role-based access management. Keystone's adaptable design makes it possible to integrate it with several identity backends, including

LDAP and SQL, which makes it easier to manage users and projects (tenants) in an OpenStack context. As OpenStack's image repository service, Glance serves as a center for organizing and storing a variety of image formats that are essential for launching instances. It facilitates the finding and retrieval of pictures by managing an image catalog that includes virtual machines and container-based images. Administrators may correlate metadata with photographs, store and manage them, and work with a variety of image formats using Glance. With the help of this service, users may construct and launch instances in the OpenStack architecture with ease by accessing and using images. On the other hand, the foundation of OpenStack's virtualization capabilities is Nova, the computing service. Nova facilitates the lifecycle management of compute instances, allowing virtual machines to be created, managed, and terminated. It works with various hypervisors, such as KVM or VMware, to control how these instances' CPU, memory, and storage are distributed. In addition, Nova manages resource optimization and instance scheduling, guaranteeing effective use of computing resources and offering a solid base for controlling the computational requirements in an OpenStack cloud environment.

Conclusions:

The installation of Glance, Nova, and Keystone using an Ansible playbook is the final step in building a complete OpenStack system. This deployment's success is a testament to the coordination and integration of crucial elements required for cloud computing. Secure authentication and permission are guaranteed for all OpenStack services by installing Keystone, the identity service. The image service Glance makes it easier to manage and save virtual machine images, which speeds up the provisioning of instances. Furthermore, by including Nova, the compute service, which offers

the fundamental features for instance creation and maintenance, the groundwork for virtual machine management has been laid. The deployment process is streamlined by utilizing Ansible's playbook automation, which also ensures configuration consistency and lowers the risk of human mistake. With this achievement, the OpenStack environment is one step closer to becoming fully operational and able to provide scalable, adaptable, and dependable cloud services for a wide range of workloads and applications.