Name: Denzel Dinglasan	Date Performed: 30/11/2023
Course/Section: CPE31S6	Date Submitted: 30/11/2023
Instructor: Dr. Jonathan Vidal Taylar	Semester and SY: 1st Sem 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

- 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.

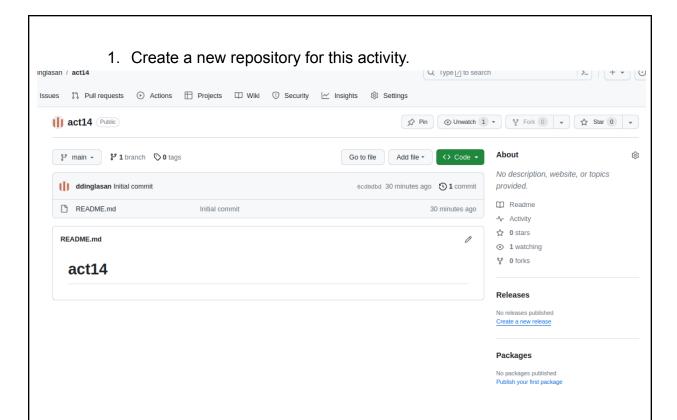
3. Resources

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 2: Create the basic files needed(ansible.cfg & inventory) and create the roles needed for the Ubuntu computer with the main.yml file for the tasks. Also created a task.yml file to run the tasks of the roles.

```
.
— ansible.cfg
— inventory
— README.md
— roles
— Ubuntu
— tasks
— main.yml
— task.yml
```

Step 3: Paste this on the main.yml of the Ubuntu role.

GNU nano 2.9.3 main.yml # Keystone name: Installing Keystone (Ubuntu) apt: name: keystone state: latest - name: Configuring Config File lineinfile: dest: /etc/keystone/keystone.conf insertafter: '\[database\]' regexp: 'connection = mysql+pymysql://keystone:KEYSTONE_DBPASS@controller/keystone' line: 'connection = mysql+pymysql://keystone:admin123@controller/keystone' backup: yes backrefs: yes - name: Configuring Config File lineinfile: dest: /etc/keystone/keystone.conf insertafter: '\[token\]' line: 'provider = fernet' backup: yes name: Populating the Database shell: sudo keystone-manage db_sync - name: Initialize Fernet Key shell: keystone-manage fernet_setup --keystone-user keystone --keystone-group keystone - name: Initialize Fernet Key shell: keystone-manage credential_setup --keystone-user keystone --keystone-group keystone name: Configuring the Apache (HTTP) Server lineinfile: dest: /etc/apache2/apache2.conf
line: 'ServerName controller' state: present backup: yes

```
name: Populating the Database
 shell:
   sudo keystone-manage db sync
 name: Initialize Fernet Key
 shell:
   keystone-manage fernet_setup --keystone-user keystone --keystone-group keystone
 name: Initialize Fernet Key
 shell:
    keystone-manage credential setup --keystone-user keystone --keystone-group keystor
 name: Configuring the Apache (HTTP) Server
 lineinfile:
   dest: /etc/apache2/apache2.conf
line: 'ServerName controller'
   state: present
   backup: yes
 name: Configure Administrative Account Environmental Variables
 shell:
   export OS_USERNAME=admin
   export OS_PASSWORD=ADMIN_PASS
   export OS_PROJECT_NAME=admin
   export OS_USER_DOMANI_NAME=Default
   export OS_PROJECT_DOMAIN_NAME=Default
   export OS_AUTH_URL=http://controller:5000/v3
   export OS IDENTITY API VERSION=3
 name: Install Glance (Ubuntu)
 apt:
  name:
     - glance
   state: latest
- name: Configure Glance database
 replace:
    dest: /etc/glance/glance-api.conf
    regexp: connection = mysql+pymysql://glance:GLANCE_DBPASS@controller/glance
    replace: connection = mysql+pymysql://glance:admin123@controller/glance
    backup: yes
 name: Configure Glance Authentication Key
 lineinfile:
   dest: /etc/glance/glance-api.conf
    insertafter: '\[keystone_authtoken\]'
    line: "{{    item }}"
    state: present
   backup: yes
 with_items:
    - www_authenticate_uri = http://controller:5000
    - auth_url = http://controller:5000
    memcached servers = controller:11211
      auth type = password
```

```
- project_domain_name = Default
  - user_domain_name = Default
 - project_name = service
  - username = glance
  - password = admin123
name: Configure Glance paste_deploy
lineinfile:
  dest: /etc/glance/glance-api.conf
  insertafter: '\[paste_deploy\]'
  line: 'flavor = keystone'
  backup: yes
name: COnfigure Glance glance_store
lineinfile:
  dest: /etc/glance/glance-api.conf
  insertafter: '\[glance_store\]'
  line: "{{ item }}"
  state: present
```

```
backup: yes
 with_items:
   - stores = file,http
   - default store = file
   - filesystem_store_datadir = /var/lib/glance/images/

    name: Configure Glance oslo_limit

 lineinfile:
   dest: /etc/glance/glance-api.conf
   insertafter: '\[oslo_limit\]'
   line: "{{ item }}"
   state: present
   backup: yes
 with items:
   - auth_url = http://controller:5000
   - auth_type = password
   - user_domain_id = default
   - username = MY_SERVICE
   - system_scope = all
   - password = MY_PASSWORD
   - endpoint_id = ENDPOINT ID
   - region_name = RegionOne

    name: Configure Glance DEFAULT

 lineinfile:
   dest: /etc/glance/glance-api.conf
   insertafter: '\[DEFAULT\]'
   line: 'use_keystone_limits = True'
   backup: yes

    name: Populating Image Service Database

 shell:
   sudo glance-manage db_sync
```

```
- name: Installing Nova (Ubuntu)
 apt:
   name:
     - nova-api
     - nova-conductor
     - nova-novncproxy
     - nova-scheduler
   state: latest

    name: Configuring Nova API

 lineinfile:
   dest: /etc/nova/nova.conf
   regexp: connection = mysql+pymysql://nova:NOVA_DBPASS@controller/nova_api
   line: connection = mysql+pymysql://nova:admin123@controller/nova_api
   backup: yes
   backrefs: yes
name: Configure Nova API
 lineinfile:
   dest: /etc/nova/nova.conf
    insertafter: '\[api\]'
    line: 'auth_strategy = keystone'
    state: present
    backup: yes

    name: Configuring Nova Database

  lineinfile:
    dest: /etc/nova/nova.conf
    regexp: mysql+pymysql://nova:NOVA DBPASS@controller/nova
    line: mysql+pymysql://nova:admin123@controller/nova
    backup: yes
    backrefs: yes

    name: Configure Nova Authentication Token (for Keystone)

  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[keystone_authtoken\]'
    line: "{{ item }}"
    state: present
```

```
backup: yes
 with_items:
    - www_authenticate_uri = http://controller:5000/
    - auth url = http://controller:5000/
    - memcached_servers = controller:11211
   - auth type = password
    - project domain name = Default
   - user_domain_name = Default
   - project_name = service
   - username = nova
    - password = admin123
 name: Configure Nova VNC
 lineinfile:
   dest: /etc/glance/glance-api.conf
   insertafter: '\[vnc\]'
   line: "{{ item }}"
   state: present
   backup: yes
 with items:
   - enabled = true
   - server_listen = $my_ip
   - server_proxyclient_address = $my_ip
- name: Configure Nova placement
 lineinfile:
   dest: /etc/glance/glance-api.conf
   insertafter: '\[placement\]'
   line: "{{ item }}"
   state: present
   backup: yes
 with_items:
   - region_name = RegionOne
    - project_domain_name = Default
   - project_name = service
    - auth_type = password
   - user domain name = Default
```

```
- auth_url = http://controller:5000/v3
  - username = placement
  - password = admin123
name: Configure Nova Default
lineinfile:
  dest: /etc/nova/nova.conf
  line: 'my_ip = 10.0.0.11'
  state: present
  backup: yes
name: Configure Nova Glance
lineinfile:
  dest: /etc/nova/nova.conf
  line: 'api_server = http://controller:9292'
  state: present
  backup: yes
name: Configure Nova olso_concurrency
lineinfile:
  dest: /etc/nova/nova.conf
  line: 'lock_path = /var/lib/nova/tmp'
  state: present
  backup: yes
name: Additional Configuration of Nova
  sudo nova-manage api_db sync
name: Additional Configuration
shell:
  sudo nova-manage cell_v2 map_cell0
name: Additional Configuration
shell:
  sudo nova-manage db sync
```

```
    name: Additional Configuration shell:
        sudo nova-manage cell_v2 map_cell0
    name: Additional Configuration shell:
        sudo nova-manage db sync
    name: Additional Configuration shell:
        sudo nova-manage cell_v2 list_cells
```

Step 4: Paste this on the task.yml in the main directory.

```
    hosts: all become: true pre_tasks:
    name: Install Updates (Ubuntu) apt: upgrade: dist update_cache: yes when: ansible_distribution == "Ubuntu"
    hosts: Ubuntu become: true roles:

            Ubuntu
```

Step 5: Run the playbook with the command ansible-playbook –ask-become-pass task.yml



```
ok: [192.168.56.102]
TASK [Ubuntu : Configure Glance Authentication Key] *****************************
       [192.168.56.102] => (item=auth_url = http://controller:5000)

[192.168.56.102] => (item=memcached_servers = controller:11211)

[192.168.56.102] => (item=auth_type = password)

[192.168.56.102] => (item=project_domain_name = Default)
       [192.168.56.102] => (item=user_domain_name = Default)
changed:
       [192.168.56.102] => (item=project_name = service)
changed: [192.168.56.102] => (item=username = glance)
changed: [192.168.56.102] => (item=password = admin123)
changed: [192.168.56.102]
TASK [Ubuntu : COnfigure Glance glance_store] **********************************
changed: [192.168.56.102] => (item=stores = file,http)
changed: [192.168.56.102] => (item=default store = file)
changed: [192.168.56.102] => (item=filesystem store datadir = /var/lib/glance/images/)
changed: [192.168.56.102] => (item=user_domain_id = default)
changed: [192.168.56.102] => (item=username = MY_SERVICE)
changed: [192.168.56.102] => (item=system_scope = all)
changed: [192.168.56.102] => (item=password = MY_PASSWORD)
changed: [192.168.56.102] => (item=endpoint_id = ENDPOINT_ID)
changed: [192.168.56.102] => (item=region name = RegionOne)
changed: [192.168.56.102]
TASK [Ubuntu : Populating Image Service Database] ******************************
changed: [192.168.56.102]
changed: [192.168.56.102]
```

```
TASK [Ubuntu : Configuring Nova Database] *************************
ok: [192.168.56.102]
TASK [Ubuntu : Configure Nova Authentication Token (for Keystone)] **********
changed: [192.168.56.102] => (item=www_authenticate_uri = http://controller:5000/)
changed: [192.168.56.102] => (item=auth_url = http://controller:5000/)
changed: [192.168.56.102] => (item=username = nova)
ok: [192.168.56.102] => (item=password = admin123)
changed: [192.168.56.102] => (item=enabled = true)
changed: [192.168.56.102] => (item=server_listen = $my_ip)
changed: [192.168.56.102] => (item=server_proxyclient_address = $my_ip)
TASK [Ubuntu : Configure Nova placement] ********************************
ok: [192.168.56.102] => (item=region_name = RegionOne)
ok: [192.168.56.102] => (item=project_domain_name = Default)
changed: [192.168.56.102] => (item=auth_url = http://controller:5000/v3) changed: [192.168.56.102] => (item=username = placement)
changed: [192.168.56.102]
changed: [192.168.56.102]
TASK [Ubuntu : Configure Nova olso_concurrency] ********************************
changed: [192.168.56.102]
TASK [Ubuntu : Additional Configuration of Nova] ************************
changed: [192.168.56.102]
TASK [Ubuntu : Additional Configuration] **************************
changed: [192.168.56.102]
changed: [192.168.56.102]
: ok=33 changed=26 unreachable=0
                                        failed=0
                                                skipped=0
                                                                ignored=0
                                                        rescued=0
```

Step 6: Test if it runs on the Ubuntu

```
dnzl@Server1:~$ sudo apt list --installed | grep keystone
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.
    tone/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:13
.0.4-Oubuntu1 all [installed]
python-keystone/bionic-updates.bionic-updates.bionic-security.bionic-security.n
ow 2:13.0.4-Oubuntu1 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,automa
python-keystonemiddleware/bionic,bionic,now 4.21.0-0ubuntu1 all [installed.auto
matic]
python3-keystoneauth1/bionic,bionic,now 3.4.0-0ubuntu1 all [installed,automatic
python3-keystoneclient/bionic,bionic,now 1:3.15.0-0ubuntu1 all [installed,autom
atic]
Inzl@Server1:~$ sudo systemctl status glance-api
glance-api.service - OpenStack Image Service API
  Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor pres
  Active: active (running) since Thu 2023-11-30 17:57:08 PST; 37min ago
Main PID: 9295 (glance-api)
   Tasks: 3 (limit: 4656)
  CGroup: /system.slice/glance-api.service
           —9295 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glanc
           —9673 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glanc
          └─9677 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glanc
dnzl@Server1:~$ sudo systemctl status nova-api
nova-api.service - OpenStack Compute API
   Loaded: loaded (/lib/systemd/system/nova-api.service; enabled; vendor preset
   Active: active (running) since Thu 2023-11-30 17:58:01 PST; 37min ago
 Main PID: 18058 (nova-api)
   Tasks: 5 (limit: 4656)
   CGroup: /system.slice/nova-api.service
           -18058 /usr/bin/python2 /usr/bin/nova-api --config-file=/etc/nova/n
            -19737 /usr/bin/python2 /usr/bin/nova-api --config-file=/etc/nova/n
           —19771 /usr/bin/python2 /usr/bin/nova-api --config-file=/etc/nova/n
```

Step 7: save in the repository

```
dnzl@workstation:~/act14$ git add *
dnzl@workstation:~/act14$ git commit -m "finish"
[main b09182e] finish
 4 files changed, 284 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 roles/Ubuntu/tasks/main.yml
 create mode 100644 task.yml
dnzl@workstation:~/act14$ git push origin
Username for 'https://github.com': ddinglasan
Password for 'https://ddinglasan@github.com':
Counting objects: 9, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (6/6), done.
Writing objects: 100% (9/9), 2.20 KiB | 2.20 MiB/s, done.
Total 9 (delta 0), reused 0 (delta 0)
To https://github.com/ddinglasan/act14.git
   6cd0dbd..b09182e main -> main
```

https://github.com/ddinglasan/act14.git

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

Keystone is a key component of OpenStack that handles user authentication, authorization and token issuance. It guarantees a secure way of accessing through various open stack services. Glance is just the name of the service that supports the storage and retrieval of the images for virtual machines required in creating instances. Nova, which is the compute service, controls the provisioning as well as the management of virtual machines, serving as the central element that sees to scaling and oversight of compute resources within the OpenStack cloud architecture. Thus, Keystone, Glance, and Nova constitute essential elements which together provide secure identity management, effective image handling, and scalable compute capabilities in the OpenStack systems.

Conclusions:

In this activity, I learned how to install Keystone, Glance and Nova. I've also learned their importance in Openstack. I've learned a lot in this activity.