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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)

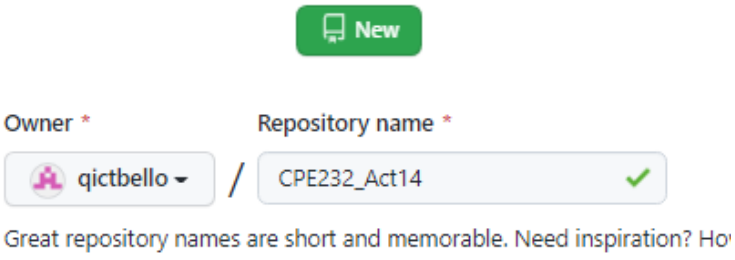
1x Ubuntu VM or Centos VM

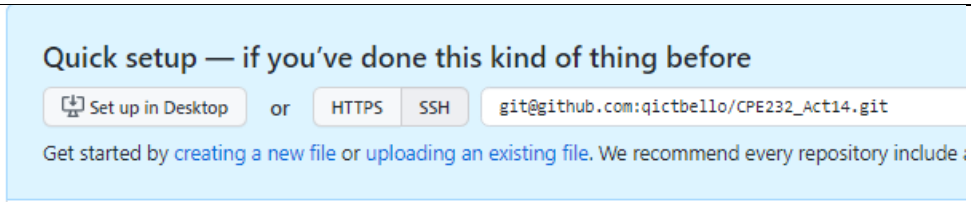
4. Tasks

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)

First, we will create our GitHub repository for this activity





Then we will clone it in our workstation

```
ubuntuhost@workstation:~$ git clone git@github.com:qictbello/CPE232_Act14.git
Cloning into 'CPE232_Act14'...
warning: You appear to have cloned an empty repository.
ubuntuhost@workstation:~$ cd CPE232_Act14/
ubuntuhost@workstation:~/CPE232_Act14$
```

Next, we will create inventory file for our servers and our ansible config

```
  GNU nano 6.2                                ansible.cfg
[defaults]
command_warnings=False
deprecation_warnings=False
inventory=inventory
private_key_file = ~/.ssh/ansible
```

```
  GNU nano 6.2                                  inventory
[controller]
server1
[compute]
server1
```

```
ubuntuhost@workstation:~/CPE232_Act14$ nano ansible.cfg
ubuntuhost@workstation:~/CPE232_Act14$ nano inventory
ubuntuhost@workstation:~/CPE232_Act14$ ls
ansible.cfg  inventory
ubuntuhost@workstation:~/CPE232_Act14$
```

Next, we will create the roles per installation

```
ubuntuhost@workstation:~/CPE232_Act14$ mkdir -p roles/{Keystone,Glance,Nova}/ta
sks
ubuntuhost@workstation:~/CPE232_Act14$ ls -R
.:
ansible.cfg  inventory  roles

./roles:
Glance  Keystone  Nova

./roles/Glance:
tasks

./roles/Glance/tasks:

./roles/Keystone:
tasks

./roles/Keystone/tasks:

./roles/Nova:
tasks

./roles/Nova/tasks:
ubuntuhost@workstation:~/CPE232_Act14$
```

Then we will work on each installation

Keystone

```
 GNU nano 6.2                  roles/Keystone/tasks/main.yml
- name: Install openstack-Keystone
  apt:
    name:
      - keystone
      - apache2
      - php
      - libapache2-mod-php
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Glance

```
 GNU nano 6.2                   roles/Glance/tasks/main.yml
- name: Install openstack-Glance
  apt:
    name: glance
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

Nova

```
 GNU nano 6.2                    roles/Nova/tasks/main.yml
- name: Install openstack-Nova
  apt:
    name:
      - nova-compute
      - python3-openstackclient
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

After we created our installation as roles, we can now create our playbook we will name it KGN.yml

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

  -  name: install updates Ubuntu
     tags: always
     apt:
       upgrade: dist
       update_cache: yes
     changed_when: false
     when: ansible_distribution == "Ubuntu"

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

- hosts: compute
  become: true
  roles:
    - Nova
```

Next, we will run the playbook

```
ubuntuhost@workstation:~/CPE232_Act14$ ansible-playbook --ask-become-pass KGN.yml
BECOME password:

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

TASK [Gathering Facts] *********************************************************
ok: [server1]

TASK [install updates Ubuntu] **************************************************
ok: [server1]

PLAY [controller] **************************************************************

TASK [Gathering Facts] *********************************************************
ok: [server1]

TASK [Keystone : Install openstack-Keystone] ***********************************
changed: [server1]

TASK [Glance : Install openstack-Glance] ***************************************
changed: [server1]

PLAY [compute] *****************************************************************

TASK [Gathering Facts] *********************************************************
ok: [server1]

TASK [Nova : Install openstack-Nova] *******************************************
ok: [server1]

PLAY RECAP *********************************************************************
server1                    : ok=7    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

We will check it in our server if it was successfully installed

```
ubuntuhost@server1:~$ systemctl status nova-compute.service
● nova-compute.service - OpenStack Compute
     Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset: enabled)
     Active: active (running) since Tue 2022-12-06 21:22:51 PST; 17min ago
   Main PID: 3747 (nova-compute)
      Tasks: 2 (limit: 2283)
     Memory: 90.4M
        CPU: 4.376s
     CGroup: /system.slice/nova-compute.service
             └─3747 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova.conf --c

Dec 06 21:22:51 server1 systemd[1]: Started OpenStack Compute.
Dec 06 21:25:00 server1 nova-compute[3747]: Modules with known eventlet monkey patching issues w
lines 1-12/12 (END)
```

```
ubuntuhost@server1:~$ systemctl status glance-api.service
● glance-api.service - OpenStack Image Service API
     Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabled)
     Active: active (running) since Tue 2022-12-06 21:36:33 PST; 4min 38s ago
       Docs: man:glance-api(1)
   Main PID: 31725 (glance-api)
      Tasks: 2 (limit: 2283)
     Memory: 144.1M
        CPU: 6.249s
     CGroup: /system.slice/glance-api.service
             ├─31725 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.
             └─33155 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.

Dec 06 21:36:33 server1 systemd[1]: Started OpenStack Image Service API.
lines 1-13/13 (END)
```

```
ubuntuhost@server1:~$ sudo ls -R /etc/keystone
/etc/keystone:
default_catalog.templates  keystone.conf         logging.conf
fernet-keys                keystone.policy.yaml  sso_callback_template.html

/etc/keystone/fernet-keys:
ubuntuhost@server1:~$ sudo cat /etc/keystone/keystone.conf
[DEFAULT]
log_dir = /var/log/keystone

#
# From keystone
#

# Using this feature is *NOT* recommended. Instead, use the `keystone-manage
# bootstrap` command. The value of this option is treated as a "shared secret"
# that can be used to bootstrap Keystone through the API. This "token" does no
# represent a user (it has no identity), and carries no explicit authorization
# (it effectively bypasses most authorization checks). If set to `None`, the
# value is ignored and the `admin_token` middleware is effectively disabled.
# (string value)
#admin_token = <None>
```

Now we successfully installed the tools in our openstack we will update our repository

```
ubuntuhost@workstation:~/CPE232_Act14$ git add -A
ubuntuhost@workstation:~/CPE232_Act14$ git commit -m "Activity 14"
[main (root-commit) 558f8e5] Activity 14
 6 files changed, 57 insertions(+)
 create mode 100644 KGN.yml
 create mode 100644 ansible.cfg
 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
ubuntuhost@workstation:~/CPE232_Act14$ git push
Enumerating objects: 15, done.
Counting objects: 100% (15/15), done.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (15/15), 1.30 KiB | 664.00 KiB/s, done.
Total 15 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:qictbello/CPE232_Act14.git
 * [new branch]      main -> main
ubuntuhost@workstation:~/CPE232_Act14$
```

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

The Image Service (Glance) project offers a service where users can upload and discover data assets that are meant to be used with other services. Keystone is an OpenStack service that provides API client authentication, service discovery, and distributed multi-tenant authorization by implementing OpenStack's Identity API. Images and metadata definitions are currently included in this. The OpenStack project called Nova offers a method for provisioning compute instances (aka virtual servers). The creation of virtual machines, baremetal servers (using Ironic), and system containers are all supported by Nova to varying degrees. To offer such service, Nova runs as a group of daemons on top of current Linux servers.

Conclusions:

In conclusion, we created a workflow for installing OpenStack services using an Ansible playbook. We deployed the services on the server based on the given OpenStack documentation. It was very helpful, but it would have been better if it was explained and specified what to do. In the end, we finished installing the services of OpenStack using Ansible.