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Course/Section: CPE232/CPE31S6	**Date Submitted:** 11/30/23
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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

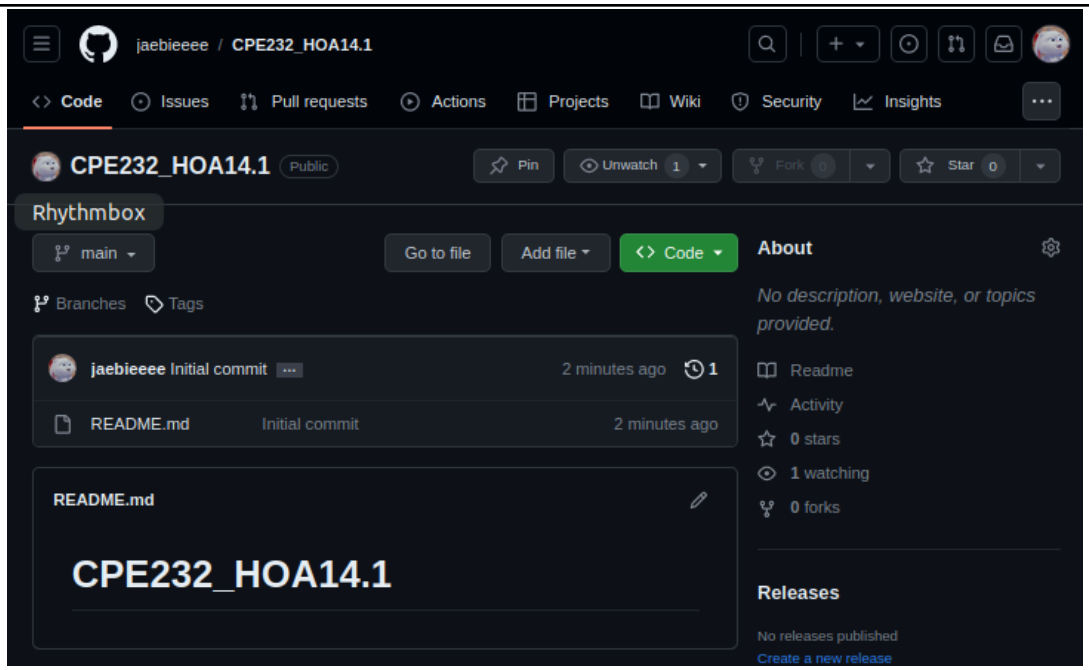
4. Tasks

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)

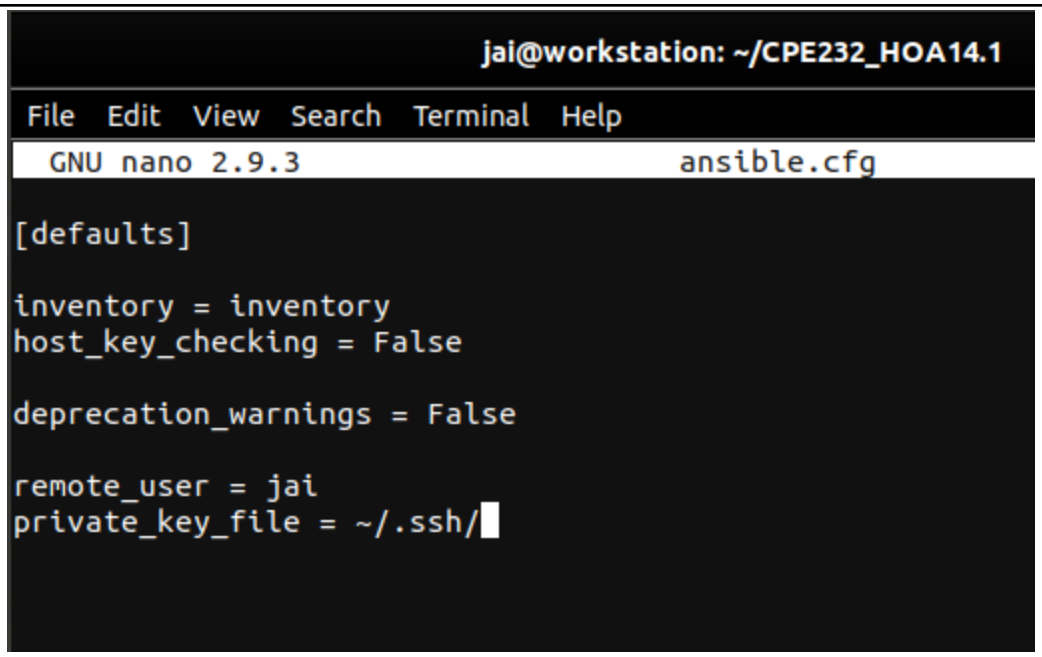
Task 1: Create a File

1. Create a new repository for this Hands-On Activity.




```
jai@workstation:~$ git clone git@github.com:jaebieeee/CPE232_HOA14.1.git
Cloning into 'CPE232_HOA14.1'...
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.
jai@workstation:~$ cd CPE232_HOA14.1
jai@workstation:~/CPE232_HOA14.1$
```

2. Create the ansible.cfg and inventory file (*must include one Ubuntu)*

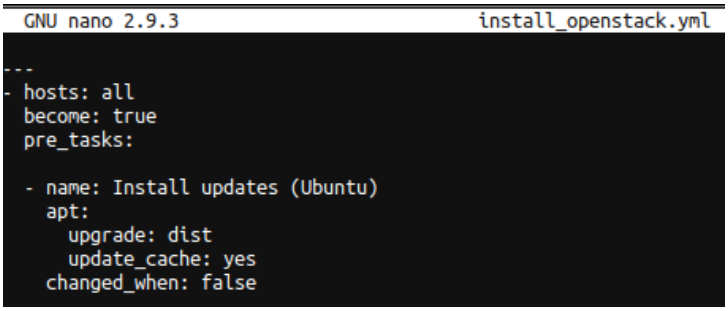


Task 2: Create Playbook for Installing OpenStack

1. Create a playbook and name it install_openstack.yml.

```
jai@workstation: ~/CPE232_HOA14.1
File  Edit  View  Search  Terminal  Help
 GNU nano 2.9.3                          install_openstack.yml

---
- hosts: all
  become: true
  pre_tasks:

  - name: Install updates (Ubuntu)
    apt:
      upgrade: dist
      update_cache: yes
    changed_when: false


- hosts: Keystone
  become: true
  roles:
    - role: Keystone

- hosts: Glance
  become: true
  roles:
    - role: Glance

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

Code explanation:

It instructs Ansible to run tasks on all hosts, become a privileged user, and execute a pre-task. The pre-task installs updates on Ubuntu using the 'apt' module, specifying a distribution upgrade while suppressing changes indication for brevity.	

2. Save the file and exit.

Task 3: Create Roles

1. Create a new directory and name it “roles”. Enter the roles directory and create new directories: Keystone, Nova, and Glance. For each directory, create a directory and name it tasks.

For Keystone

```
jai@workstation:~/CPE232_HOA14.1/roles$ mkdir Keystone
jai@workstation:~/CPE232_HOA14.1/roles$ cd Keystone
jai@workstation:~/CPE232_HOA14.1/roles/Keystone$ mkdir tasks
jai@workstation:~/CPE232_HOA14.1/roles/Keystone$ cd tasks
jai@workstation:~/CPE232_HOA14.1/roles/Keystone/tasks$
```

For Nova

```
jai@workstation:~/CPE232_HOA14.1/roles$ mkdir Nova
jai@workstation:~/CPE232_HOA14.1/roles$ cd Nova
jai@workstation:~/CPE232_HOA14.1/roles/Nova$ mkdir tasks
jai@workstation:~/CPE232_HOA14.1/roles/Nova$ cd tasks
jai@workstation:~/CPE232_HOA14.1/roles/Nova/tasks$
```

For Glance

```
jai@workstation:~/CPE232_HOA14.1/roles$ mkdir Glance
jai@workstation:~/CPE232_HOA14.1/roles$ cd Glance
jai@workstation:~/CPE232_HOA14.1/roles/Glance$ mkdir tasks
jai@workstation:~/CPE232_HOA14.1/roles/Glance$ cd tasks
jai@workstation:~/CPE232_HOA14.1/roles/Glance/tasks$
```

Tree for roles

```
jai@workstation:~/CPE232_HOA14.1/roles$ tree
.
├── Glance
│   └── tasks
├── Keystone
│   └── tasks
└── Nova
    └── tasks
```

2. In each of the tasks for the three directory (*Keystone, Nova, Glance),* create another file and name it main.yml

For Keystone

```
jai@workstation:~/CPE232_HOA14.1/roles$ cd Keystone/tasks
jai@workstation:~/CPE232_HOA14.1/roles/Keystone/tasks$ sudo nano main.yml
jai@workstation:~/CPE232_HOA14.1/roles/Keystone/tasks$
```

For Nova

```
jai@workstation:~/CPE232_HOA14.1/roles$ cd Nova/tasks
jai@workstation:~/CPE232_HOA14.1/roles/Nova/tasks$ sudo nano main.yml
```

For Glance

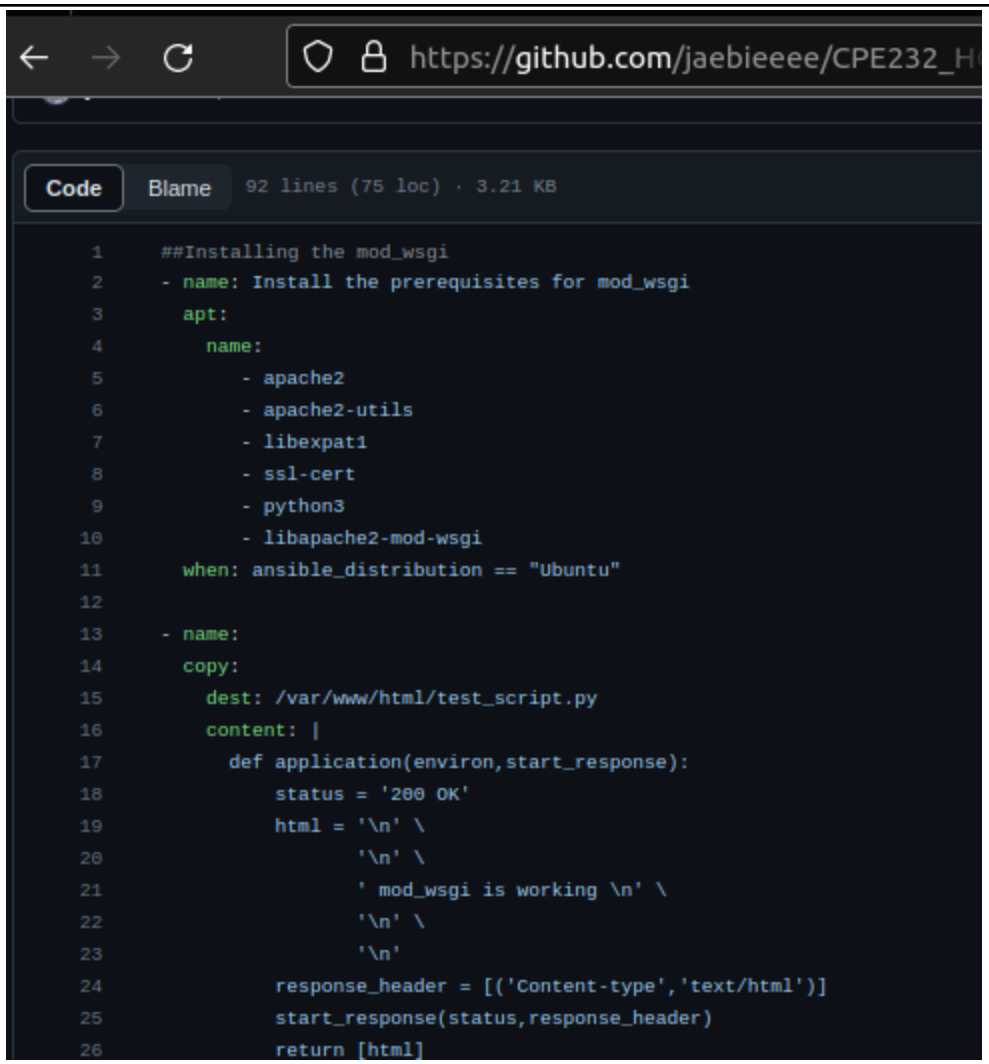
```
jai@workstation:~/CPE232_HOA14.1/roles$ cd Glance/tasks
jai@workstation:~/CPE232_HOA14.1/roles/Glance/tasks$ sudo nano main.yml
```

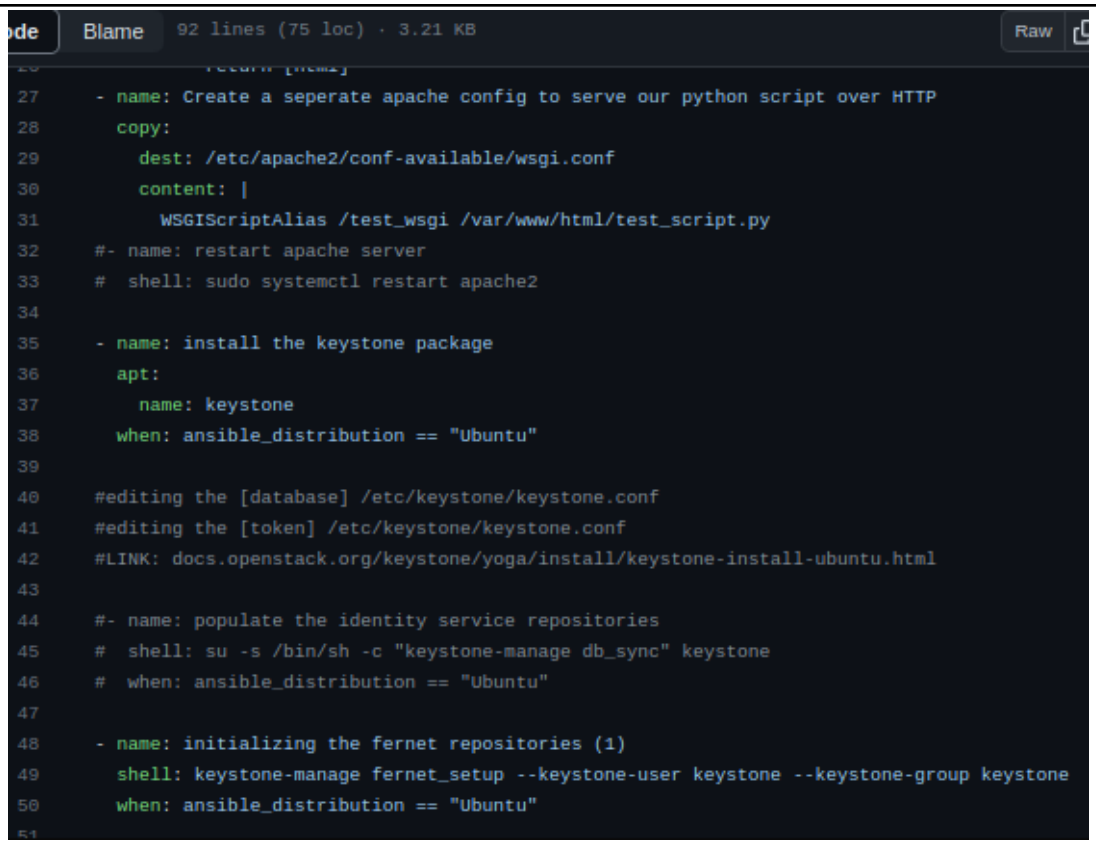
Tree for roles

```
jai@workstation:~/CPE232_HOA14.1/roles$ tree
.
├── Glance
│   └── tasks
│       └── main.yml
├── Keystone
│   └── tasks
│       └── main.yml
└── Nova
    └── tasks
        └── main.yml

6 directories, 3 files
```

3. Copy the code to the main.yml of the each subdirectory.

For Keystone


https://github.com/jaebieeee/CPE232_H
Code
Blame
92 lines (75 loc) · 3.21 KB
##Installing the mod_wsgi
- name: Install the prerequisites for mod_wsgi
apt:
name:
- apache2
- apache2-utils
- libexpat1
- ssl-cert
- python3
- libapache2-mod-wsgi
when: ansible_distribution == "Ubuntu"
- name:
copy:
dest: /var/www/html/test_script.py
content: |
def application(environ,start_response):
status = '200 OK'
html = '\n' \
'\n' \
' mod_wsgi is working \n' \
'\n' \
'\n'
response_header = [('Content-type','text/html')]
start_response(status,response_header)
return [html]



```
ode   Blame   92 lines (75 loc) · 3.21 KB                                Raw
27      - name: Create a seperate apache config to serve our python script over HTTP
28        copy:
29          dest: /etc/apache2/conf-available/wsgi.conf
30          content: |
31            WSGIScriptAlias /test_wsgi /var/www/html/test_script.py
32      #- name: restart apache server
33      #  shell: sudo systemctl restart apache2
34
35      - name: install the keystone package
36        apt:
37          name: keystone
38        when: ansible_distribution == "Ubuntu"
39
40      #editing the [database] /etc/keystone/keystone.conf
41      #editing the [token] /etc/keystone/keystone.conf
42      #LINK: docs.openstack.org/keystone/yoga/install/keystone-install-ubuntu.html
43
44      #- name: populate the identity service repositories
45      #  shell: su -s /bin/sh -c "keystone-manage db_sync" keystone
46      #  when: ansible_distribution == "Ubuntu"
47
48      - name: initializing the fernet repositories (1)
49        shell: keystone-manage fernet_setup --keystone-user keystone --keystone-group keystone
50        when: ansible_distribution == "Ubuntu"
```

```
- name: initializing the fernet repositories (2)
  shell: keystone-manage credential_setup --keystone-user keystone --keystone-group keystone

#- name: bootstrap the identity service (1)
#  shell: keystone-manage bootstrap --bootstrap-password 1234 --bootstrap-admin-url http://controller:5000/v3/

- name: configure apache http server
  copy:
    dest: /etc/apache2/apache2.conf
    content: |
      ServerName controller
  when: ansible_distribution == "Ubuntu"

- name: configuring administrative account by setting the proper environmental variables (1)
  shell: export OS_USERNAME=admin

- name: configuring administrative account by setting the proper environmental variables (2)
  shell: export OS_PASSWORD=1234

- name: configuring administrative account by setting the proper environmental variables (3)
  shell: export OS_PROJECT_NAME=admin

- name: configuring administrative account by setting the proper environmental variables(4)
  shell: OS_USER_DOMAIN_NAME=Default
```

```
- name: configuring administrative account by setting the proper environmental variables(5)
  shell: OS_PROJECT_DOMAIN_NAME=Default

- name: configuring administrative account by setting the proper environmental variables(6)
  shell: OS_AUTH_URL=http://controller:5000/v3

- name: configuring administrative account by setting the proper environmental variables (7)
  shell: OS_IDENTITY_API_VERSION=3

- block:
  - name: Verifying if already active and running the keystone.
    shell: keystone-manage --help
    register: keystone_service

  - debug:
      msg="{{ keystone_service }}"
```

For Nova

Blame 92 lines (80 loc) · 2.24 KB Ra

```
#Nova

- name: install the packages
  apt:
    name: nova-compute
  when: ansible_distribution == "Ubuntu"

- name: configuring RabbitMQ message queue access
  copy:
    dest: /etc/nova/nova.conf
    content: |
      [DEFAULT]
      tranport_url = rabbit://openstack:1234@controller
      my_ip = 192.168.56.103

- name: configuring identity service access (1)
  copy:
    dest: /etc/nova/nova.conf
    content: |
      [api]
      auth_strategy = keystone

- name: configuring identity service access (2)
  copy:
    dest: /etc/nova/nova.conf
    content: |
```

```
        [keystone_authtoken]
        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 = 1234

  - name: enable and configure remote console access
    copy:
      dest: /etc/nova/nova.conf
      content: |
        [vnc]
        enabled = true
        server_listen = 0.0.0.0
        server_proxyclient_address = $my_ip
        novncproxy_base_url = http://controller:6080/vnc_auto.html

  - name: configure the location of the image service API
    copy:
      dest: /etc/nova/nova.conf
      content: |
        [glance]
```

```
- name: configure the lock path
  copy:
    dest: /etc/nova/nova.conf
    content: |
      [solo_currency]
      lock_path = /var/lib/nova/tmp

- name: configure the placement API
  copy:
    dest: /etc/nova/nova.conf
    content: |
      [placement]
      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 = 1234

- name: configuring to make the computer node to support hardware acceleration
  copy:
    dest: /etc/nova/nova-compute.conf
    content: |
```

```
  - name: restarting the computer service
    shell: service nova-compute restart

  - block:
    - name: Verifying if already running and active the nova-compute.
      shell: systemctl status nova-compute
      register: novacompute_service

    - debug:
        msg="{{ novacompute_service }}"
```

For Glance

```
    ##install and config

    - name: install and configure components of glance
      apt:
        name: glance
      when: ansible_distribution == "Ubuntu"

    #editing the [database] /etc/glance/glance-api.conf

    - name: configuring database access
      copy:
        dest: /etc/glance/glance-api.conf
        content: |
          [database]
          connection = mysql+pymysql://glance:1234@controller/glance
          [keystone_authtoken]
          www_authenicate_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 = 1234
```

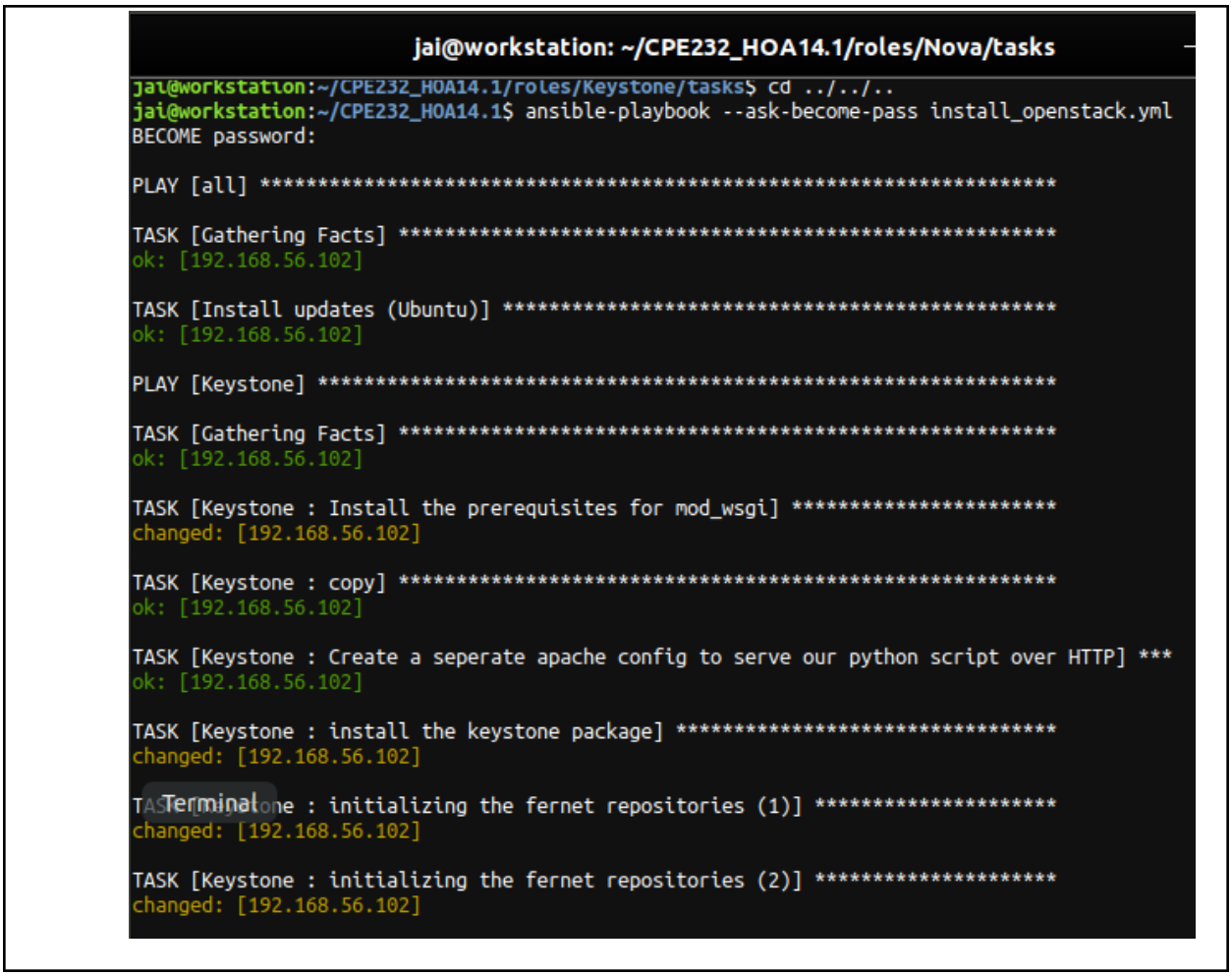
```
          [paste_deploy]
          flavor = keystone

    - name: configuring the local file system store and location of image files
      copy:
        dest: /etc/glance/glance-api.conf
        content: |
          [glance_store]
          stores = file, http
          default_store = file
          filesystem_store_datadir = /var/lib/glance/images/

    - name: configuring the access to keystone
      copy:
        dest: /etc/glance/glance-api.conf
        content: |
          [oslo_limit]
          auth_url = http://controller:5000
          auth_type = password
          user_domain_id = default
          username = MY_SERVICE
          system_scope = all
          password = 1234
          endpoint_id = ENDPOINT_ID
          region_name = RegionOne
```

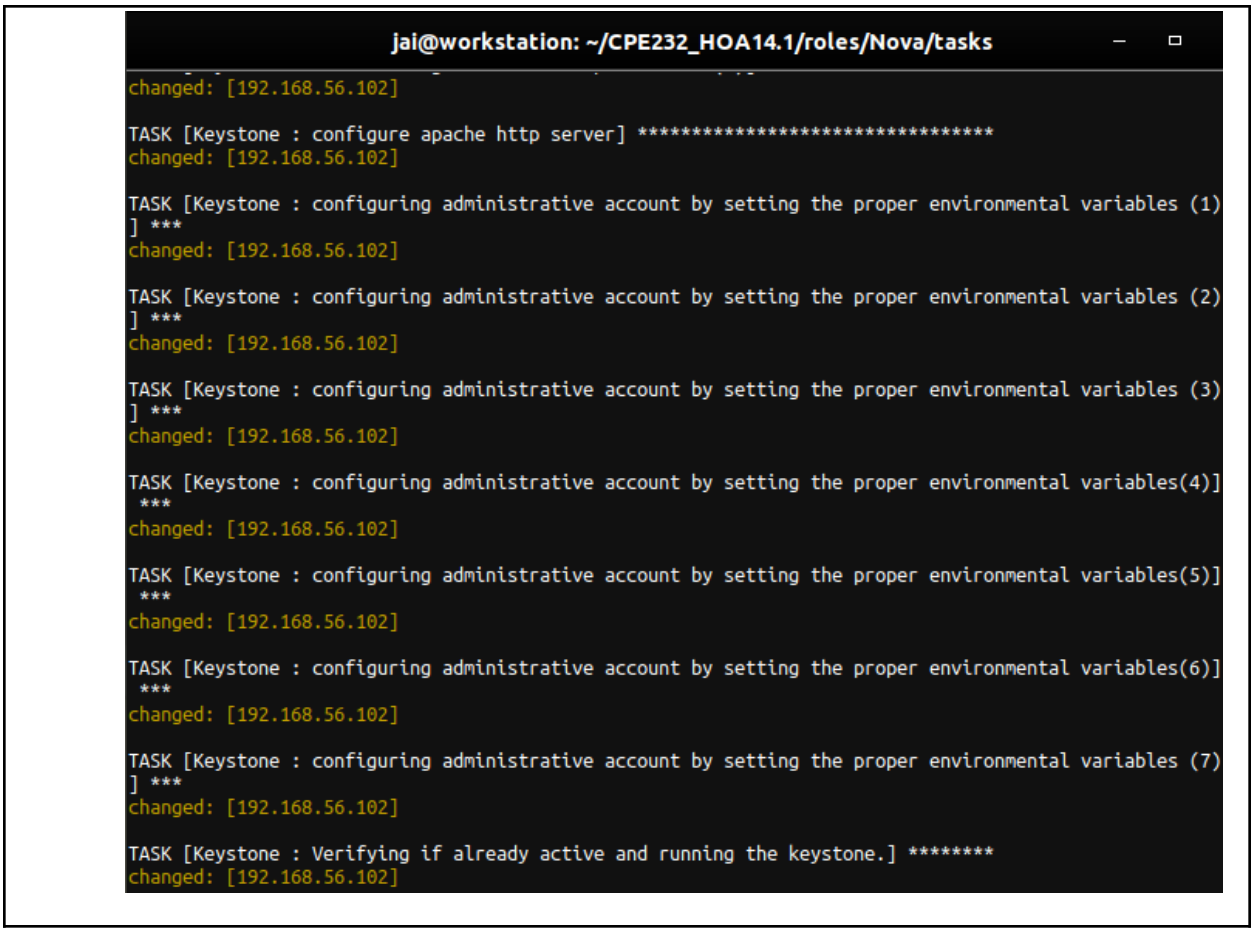
```
- name: enable per-tenant quotas
  copy:
    dest: /etc/glance/glance-api.conf
    content: |
      [DEFAULT]
      use_keystone_quotas = True

#- name: MY_SERVICE read access to systemscope resources
#  shell: openstack role add --user MY_SERVICE --user-domain Default --system all reader
#  when: ansible_distribution == "Ubuntu"

#- name: populate the image service database
#  shell: su -s  /bin/sh -c "glance-manage db_sync" glance
#  when: ansible_distribution == "Ubuntu"

- name: restart the image services
  shell: service glance-api restart
  when: ansible_distribution == "Ubuntu"

- block:
  - name: Verifying if already installed Glance.
    shell: glance --version
    register: glance_version

  - debug:
```

```
      msg="{{ glance_version }}"

- block:
  - name: Verifying if already active and running the Glance.
    shell: systemctl status glance-api
    register: glance_service

  - debug:
      msg="{{ glance_service }}"
```

Task 4: Run and Verify

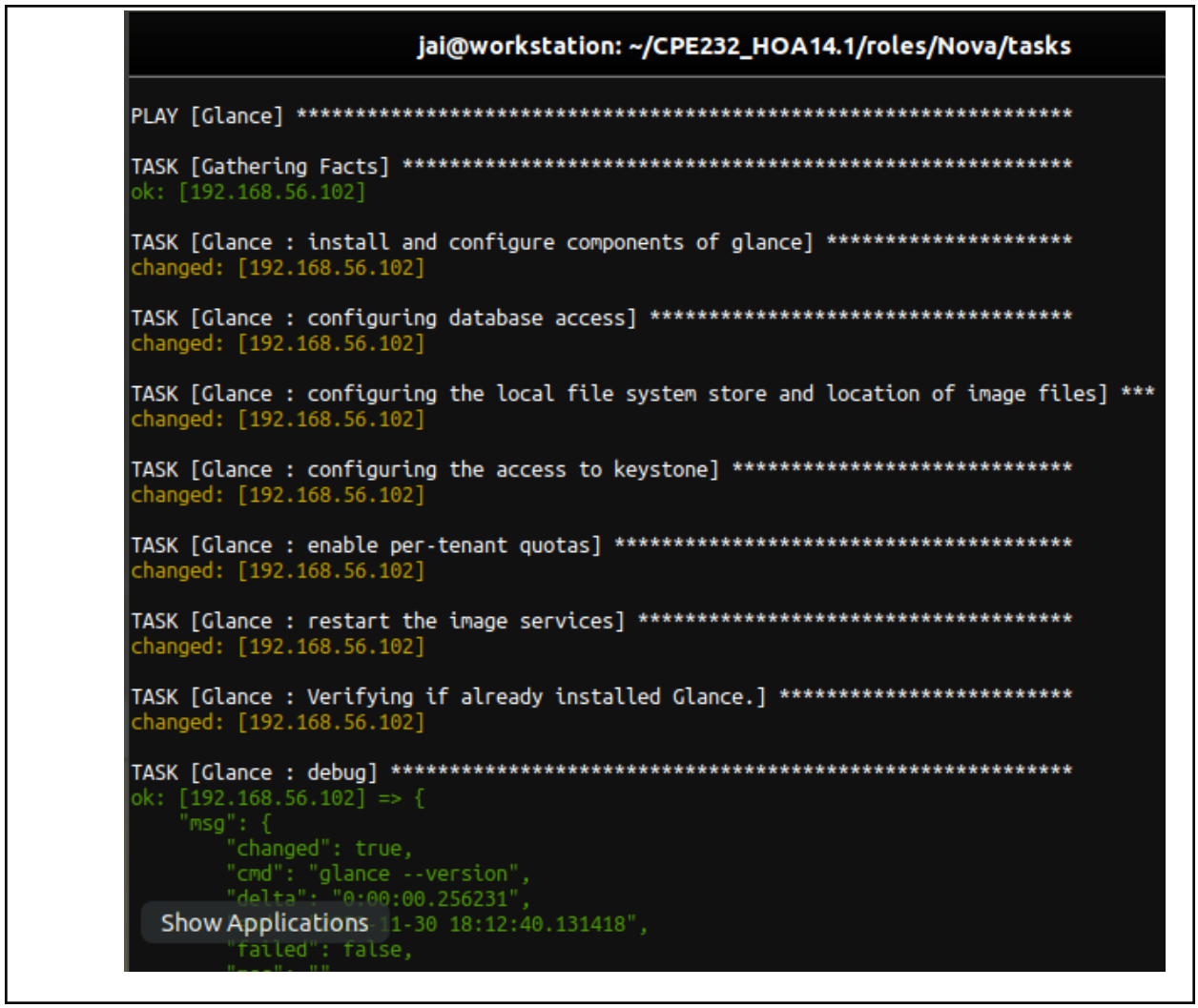
1. Run the command ansible-playbook - - ask-become-pass install_openstack.yml to completely install the OpenStack.

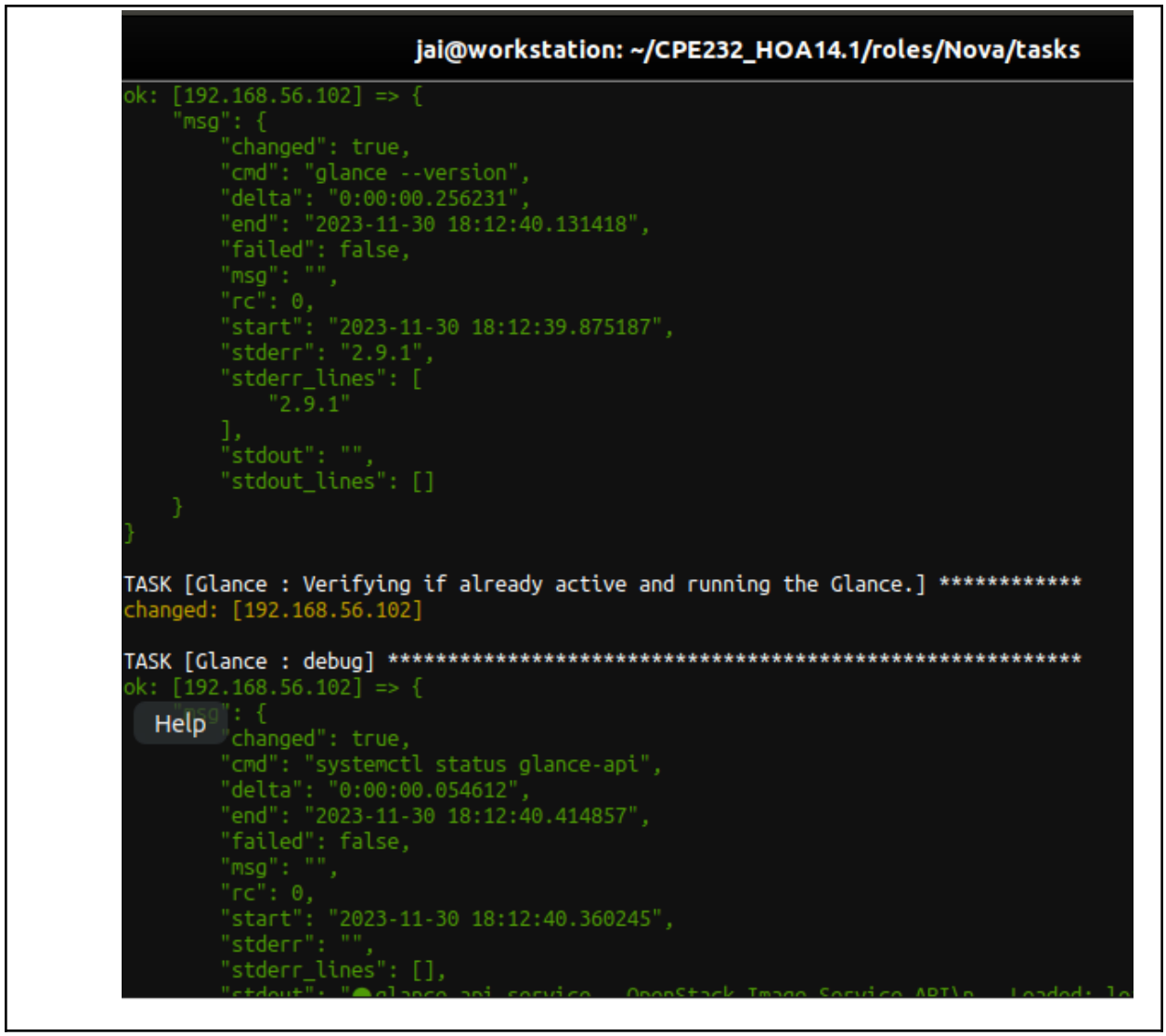

jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
jai@workstation:~/CPE232_HOA14.1/roles/Keystone/tasks$ cd ../../..
jai@workstation:~/CPE232_HOA14.1$ ansible-playbook --ask-become-pass install_openstack.yml
BECOME password:
PLAY [all] ***
TASK [Gathering Facts] ***
ok: [192.168.56.102]
TASK [Install updates (Ubuntu)] **
ok: [192.168.56.102]
PLAY [Keystone] **
TASK [Gathering Facts] ***
ok: [192.168.56.102]
TASK [Keystone : Install the prerequisites for mod_wsgi] *************************
changed: [192.168.56.102]
TASK [Keystone : copy] ***
ok: [192.168.56.102]
TASK [Keystone : Create a seperate apache config to serve our python script over HTTP] ***
ok: [192.168.56.102]
TASK [Keystone : install the keystone package] ***********************************
changed: [192.168.56.102]
Terminal
changed: [192.168.56.102]
TASK [Keystone : initializing the fernet repositories (2)] ***********************
changed: [192.168.56.102]


jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
changed: [192.168.56.102]
TASK [Keystone : configure apache http server] ********************************
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables (1)
] ***
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables (2)
] ***
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables (3)
] ***
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables(4)]
***
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables(5)]
***
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables(6)]
***
changed: [192.168.56.102]
TASK [Keystone : configuring administrative account by setting the proper environmental variables (7)
] ***
changed: [192.168.56.102]
TASK [Keystone : Verifying if already active and running the keystone.] ********
changed: [192.168.56.102]

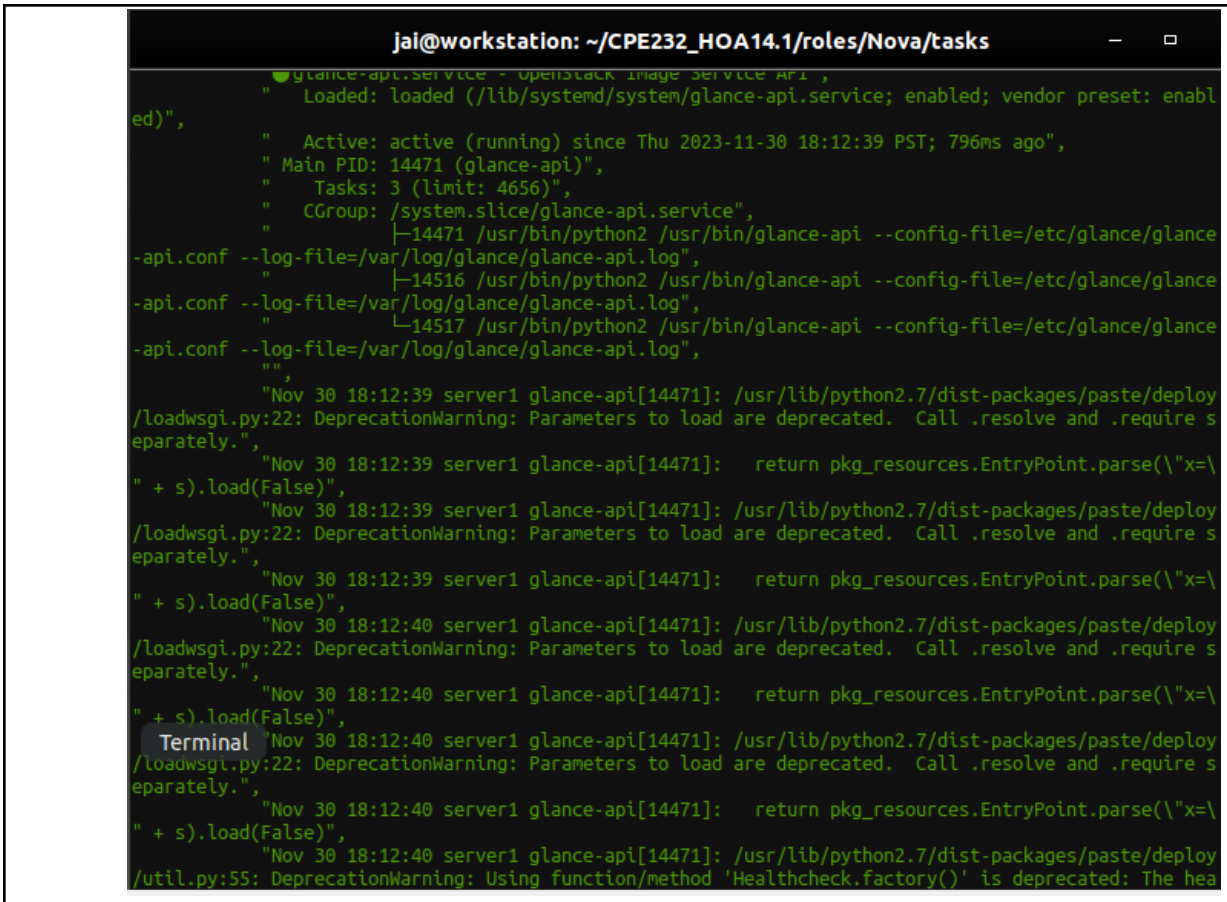

jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
TASK [Keystone : debug] **
ok: [192.168.56.102] => {
"msg": {
"changed": true,
"cmd": "keystone-manage --help",
"delta": "0:00:00.486644",
"end": "2023-11-30 18:12:13.120187",
"failed": false,
"msg": "",
"rc": 0,
"start": "2023-11-30 18:12:12.633543",
"stderr": "",
"stderr_lines": [],
"stdout": "usage: keystone-manage [bootstrap|credential_migrate|credential_rotate|credential_
setup|db_sync|db_version|doctor|domain_config_upload|fernet_rotate|fernet_setup|mapping_populate|mapp
ing_purge|mapping_engine|saml_idp_metadata|token_flush]\n\noptional arguments:\n -h, --help
show this help message and exit\n --config-dir DIR Path to a config directory to pull `*.con
f` files\n from. This file set is sorted, so as to provide a\n
predictable parse order if individual options are\n over-ridden. The s
et is parsed after the file(s)\n specified via previous --config-file, argumen
ts hence\n over-ridden options in the directory take precedence.\n --config-f
ile PATH Path to a config file to use. Multiple config files\n can be speci
fied, with values in later files taking\n precedence. Defaults to None.\n --d
ebug, -d If set to true, the logging level will be set to DEBUG\n in
stead of the default INFO level.\n --log-config-append PATH, --log-config PATH, --log_config PATH\n
The name of a logging configuration file. This file is\n
appended to any existing logging configuration files.\n For details about lo
gging configuration files, see the\n Python logging module documentation. Note
that when\n logging configuration files are used then all logging\n
configuration is set in the configuration file and\n other loggi
ng configuration options are ignored (for\n example, logging_context_format_st
ring).\n --log-date-format DATE_FORMAT\n Defines the format string for %(asct
ime)s in log\n records. Default: None . This option is ignored if\n
log_config_append is set.\n --log-dir LOG_DIR, --logdir LOG_DIR\n

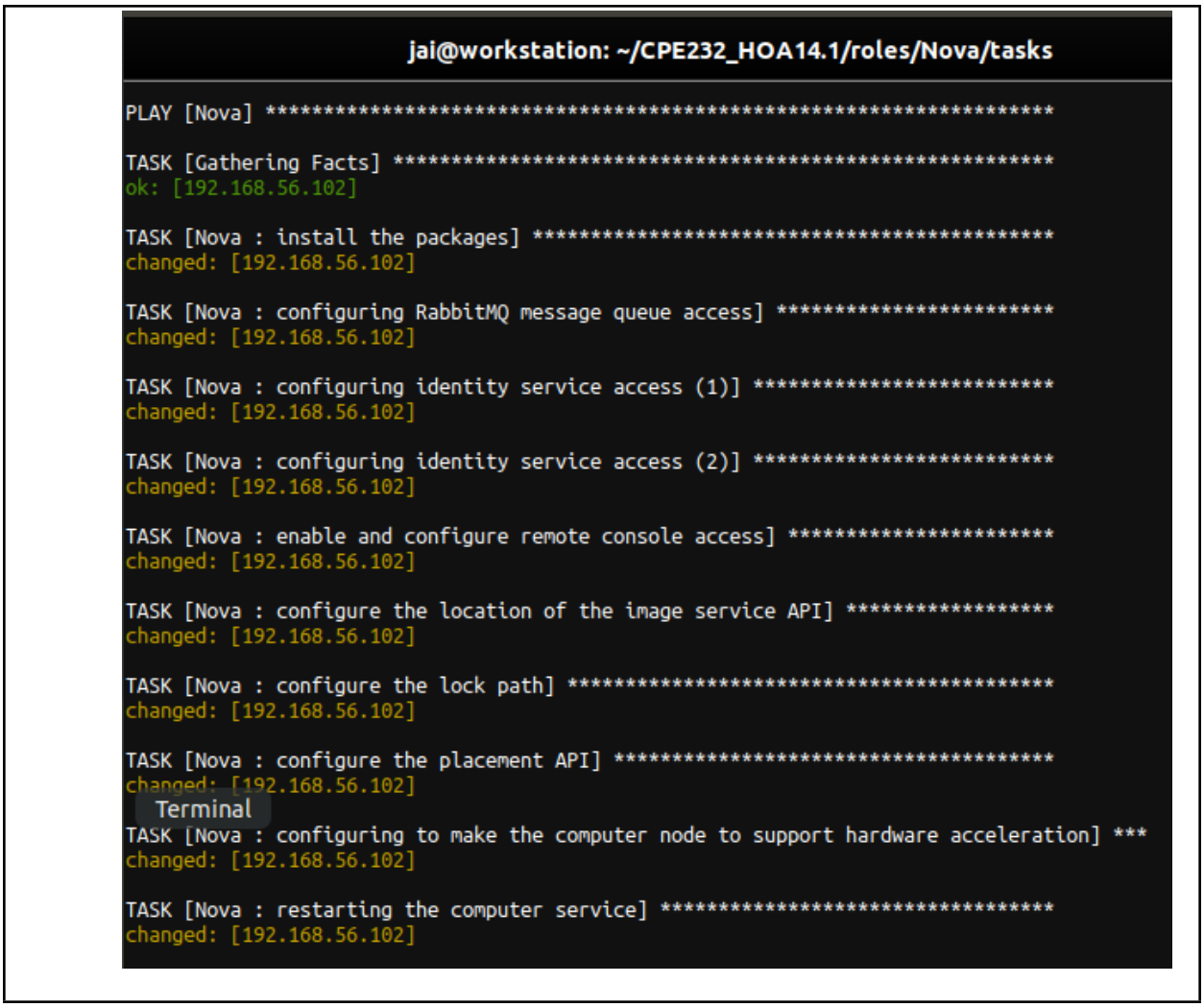

jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
"   Upload the domain specific configuration files to the",
"   database.",
"   fernet_rotate   Rotate Fernet encryption keys. This assumes you have",
"   already run keystone-manage fernet_setup. A new",
"   primary key is placed into rotation, which is used for",
"   new tokens. The old primary key is demoted to",
"   secondary, which can then still be used for validating",
"   tokens. Excess secondary keys (beyond [fernet_tokens]",
"   max_active_keys) are revoked. Revoked keys are",
"   permanently deleted. A new staged key will be created",
"   and used to validate tokens. The next time key",
"   rotation takes place, the staged key will be put into",
"   rotation as the primary key. Rotating keys too",
"   frequently, or with [fernet_tokens] max_active_keys",
"   set too low, will cause tokens to become invalid prior",
"   to their expiration.",
"   fernet_setup   Setup a key repository for Fernet tokens. This also",
"   creates a primary key used for both creating and",
"   validating Fernet tokens. To improve security, you",
"   should rotate your keys (using keystone-manage",
Ubuntu Software
"   fernet_rotate, for example).",
"   mapping_populate   Pre-populate entries from domain-specific backends.",
"   Running this command is not required. It should only",
"   be run right after the LDAP was configured, when many",
"   new users were added, or when \"mapping_purge\" is run.",
"   This command will take a while to run. It is perfectly",
"   fine for it to run more than several minutes.",
"   mapping_purge   Purge the mapping table.",
"   mapping_engine   Execute mapping engine locally.",
"   saml_idp_metadata Generate Identity Provider metadata.",
"   token_flush   Flush expired tokens from the backend."
]
}
}

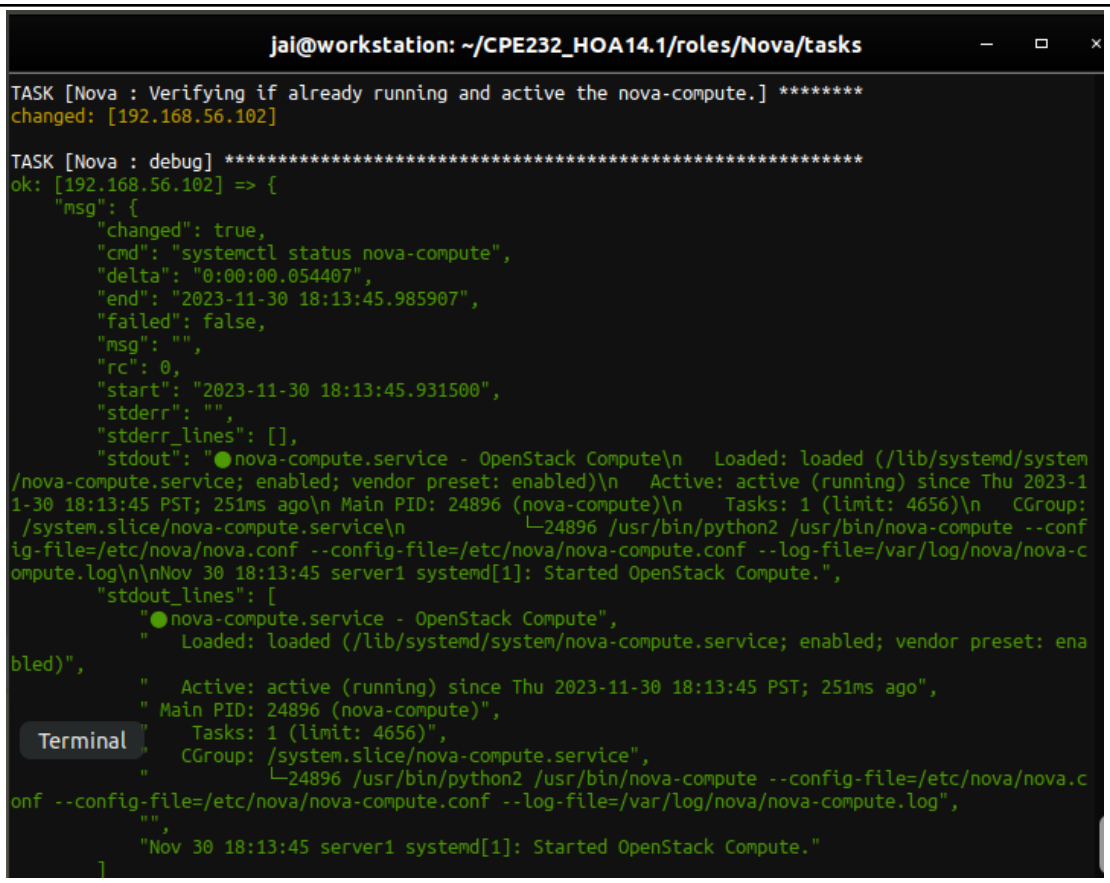

jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
PLAY [Glance] ***
TASK [Gathering Facts] ***
ok: [192.168.56.102]
TASK [Glance : install and configure components of glance] *********************
changed: [192.168.56.102]
TASK [Glance : configuring database access] ***********************************
changed: [192.168.56.102]
TASK [Glance : configuring the local file system store and location of image files] ***
changed: [192.168.56.102]
TASK [Glance : configuring the access to keystone] ****************************
changed: [192.168.56.102]
TASK [Glance : enable per-tenant quotas] **************************************
changed: [192.168.56.102]
TASK [Glance : restart the image services] ************************************
changed: [192.168.56.102]
TASK [Glance : Verifying if already installed Glance.] ************************
changed: [192.168.56.102]
TASK [Glance : debug] ***
ok: [192.168.56.102] => {
"msg": {
"changed": true,
"cmd": "glance --version",
"delta": "0:00:00.256231",
Show Applications
1-30 18:12:40.131418",
"failed": false,

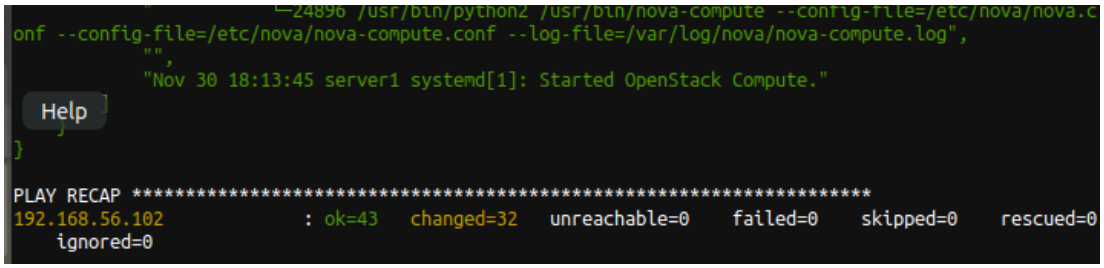

jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
ok: [192.168.56.102] => {
"msg": {
"changed": true,
"cmd": "glance --version",
"delta": "0:00:00.256231",
"end": "2023-11-30 18:12:40.131418",
"failed": false,
"msg": "",
"rc": 0,
"start": "2023-11-30 18:12:39.875187",
"stderr": "2.9.1",
"stderr_lines": [
"2.9.1"
],
"stdout": "",
"stdout_lines": []
}
}
TASK [Glance : Verifying if already active and running the Glance.] ************
changed: [192.168.56.102]
TASK [Glance : debug] **
ok: [192.168.56.102] => {
Help
"changed": true,
"cmd": "systemctl status glance-api",
"delta": "0:00:00.054612",
"end": "2023-11-30 18:12:40.414857",
"failed": false,
"msg": "",
"rc": 0,
"start": "2023-11-30 18:12:40.360245",
"stderr": "",
"stderr_lines": [],


jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
"start": "2023-11-30 18:12:40.360245",
"stderr": "",
"stderr_lines": [],
"stdout": "●glance-api.service - OpenStack Image Service API\n Loaded: loaded (/lib/system
d/system/glance-api.service; enabled; vendor preset: enabled)\n Active: active (running) since Thu
2023-11-30 18:12:39 PST; 796ms ago\n Main PID: 14471 (glance-api)\n Tasks: 3 (limit: 4656)\n CGr
oup: /system.slice/glance-api.service\n ├─14471 /usr/bin/python2 /usr/bin/glance-api --conf
ig-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log\n ├─14516 /us
r/bin/python2 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glanc
e/glance-api.log\n └─14517 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance/g
lance-api.conf --log-file=/var/log/glance/glance-api.log\n\nNov 30 18:12:39 server1 glance-api[14471]
: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Parameters to loa
d are deprecated. Call .resolve and .require separately.\nNov 30 18:12:39 server1 glance-api[14471]:
return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)\nNov 30 18:12:39 server1 glance-api[
14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Parameters
to load are deprecated. Call .resolve and .require separately.\nNov 30 18:12:39 server1 glance-api[1
4471]: return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)\nNov 30 18:12:40 server1 glanc
e-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Param
eters to load are deprecated. Call .resolve and .require separately.\nNov 30 18:12:40 server1 glance
-api[14471]: return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)\nNov 30 18:12:40 server1
glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning:
Parameters to load are deprecated. Call .resolve and .require separately.\nNov 30 18:12:40 server1
glance-api[14471]: return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)\nNov 30 18:12:40 s
erver1 glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/util.py:55: DeprecationWarnin
g: Using function/method 'Healthcheck.factory()' is deprecated: The healthcheck middleware must now b
e configured as an application, not as a filter\nNov 30 18:12:40 server1 glance-api[14471]: val = c
allable(*args, **kw)",
"stdout_lines": [
"●glance-api.service - OpenStack Image Service API",
" Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabl
ed)",
" Active: active (running) since Thu 2023-11-30 18:12:39 PST; 796ms ago",
" Main PID: 14471 (glance-api)",
" Tasks: 3 (limit: 4656)",
" CGroup: /system.slice/glance-api.service",


jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
"● 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 18:12:39 PST; 796ms ago",
" Main PID: 14471 (glance-api)",
"   Tasks: 3 (limit: 4656)",
"   CGroup: /system.slice/glance-api.service",
"   ├─14471 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log",
"   ├─14516 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log",
"   └─14517 /usr/bin/python2 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --log-file=/var/log/glance/glance-api.log",
"",
"Nov 30 18:12:39 server1 glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Parameters to load are deprecated. Call .resolve and .require separately.",
"Nov 30 18:12:39 server1 glance-api[14471]:   return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)",
"Nov 30 18:12:39 server1 glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Parameters to load are deprecated. Call .resolve and .require separately.",
"Nov 30 18:12:39 server1 glance-api[14471]:   return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)",
"Nov 30 18:12:40 server1 glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Parameters to load are deprecated. Call .resolve and .require separately.",
"Nov 30 18:12:40 server1 glance-api[14471]:   return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)",
"Nov 30 18:12:40 server1 glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/loadwsgi.py:22: DeprecationWarning: Parameters to load are deprecated. Call .resolve and .require separately.",
"Nov 30 18:12:40 server1 glance-api[14471]:   return pkg_resources.EntryPoint.parse(\"x=\" + s).load(False)",
"Nov 30 18:12:40 server1 glance-api[14471]: /usr/lib/python2.7/dist-packages/paste/deploy/util.py:55: DeprecationWarning: Using function/method 'Healthcheck.factory()' is deprecated: The hea
Terminal

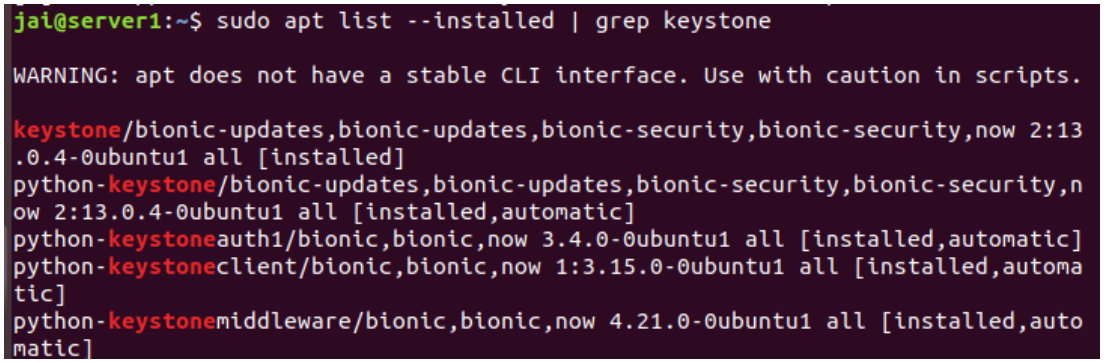

jai@workstation: ~/CPE232_HOA14.1/roles/Nova/tasks
PLAY [Nova] **
TASK [Gathering Facts] ***
ok: [192.168.56.102]
TASK [Nova : install the packages] ***
changed: [192.168.56.102]
TASK [Nova : configuring RabbitMQ message queue access] ************************
changed: [192.168.56.102]
TASK [Nova : configuring identity service access (1)] **************************
changed: [192.168.56.102]
TASK [Nova : configuring identity service access (2)] **************************
changed: [192.168.56.102]
TASK [Nova : enable and configure remote console access] ***********************
changed: [192.168.56.102]
TASK [Nova : configure the location of the image service API] ******************
changed: [192.168.56.102]
TASK [Nova : configure the lock path] **
changed: [192.168.56.102]
TASK [Nova : configure the placement API] **************************************
changed: [192.168.56.102]
Terminal
TASK [Nova : configuring to make the computer node to support hardware acceleration] ***
changed: [192.168.56.102]
TASK [Nova : restarting the computer service] **********************************
changed: [192.168.56.102]





2. Show the screenshot of the Keystone, Nova, and Glance that are working.

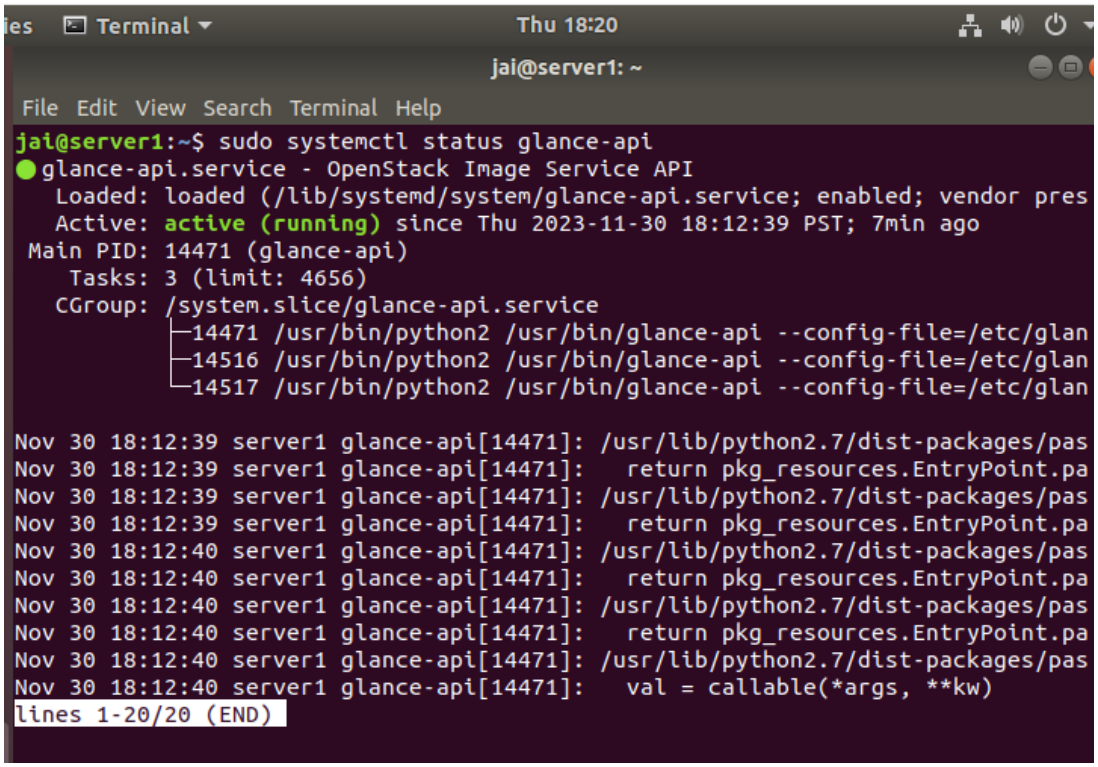
Keystone



Nova

```
jai@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 18:13:45 PST; 10min ago
 Main PID: 24896 (nova-compute)
    Tasks: 1 (limit: 4656)
   CGroup: /system.slice/nova-compute.service
           └─24896 /usr/bin/python2 /usr/bin/nova-compute --config-file=/etc/no

Nov 30 18:13:45 server1 systemd[1]: Started OpenStack Compute.
lines 1-9/9 (END)
```

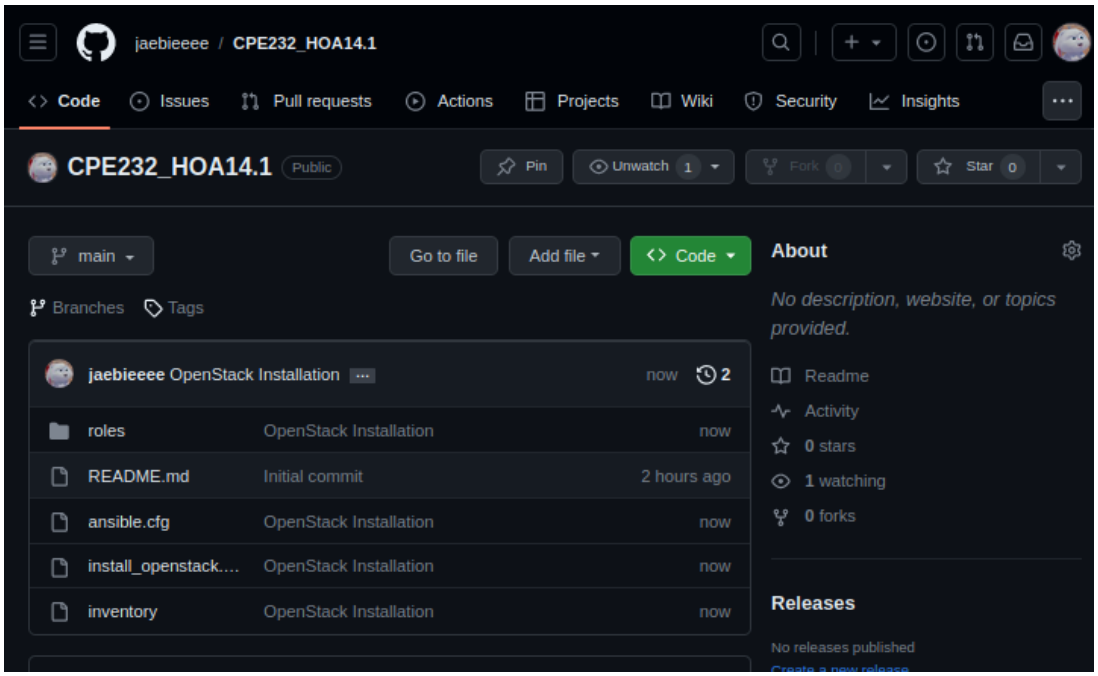
Glance



3. Upload it in the github.

```
jai@workstation:~/CPE232_HOA14.1$ git add *
jai@workstation:~/CPE232_HOA14.1$ git commit -m "OpenStack Installation"
[main da2bc94] OpenStack Installation
 6 files changed, 344 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 install_openstack.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
jai@workstation:~/CPE232_HOA14.1$ git push origin
Counting objects: 15, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (9/9), done.
Writing objects: 100% (15/15), 3.90 KiB | 3.90 MiB/s, done.
Total 15 (delta 0), reused 0 (delta 0)
To github.com:jaebieeee/CPE232_HOA14.1.git
   e840db7..da2bc94  main -> main
jai@workstation:~/CPE232_HOA14.1$
```

Show Applications



GITHUB LINK: https://github.com/jaebieeee/CPE232_HOA14.1.git

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services.

   In OpenStack, Keystone is the identity service, managing user authentication. Glance is the image service, handling virtual machine images. Nova is the compute service, orchestrating the creation and management of virtual machines. Together, they form the backbone of OpenStack, ensuring secure access, efficient image storage, and seamless virtual machine operation for cloud computing.

Conclusion:

In this activity, I was able to encounter the Keystone, Nova, and Glance. Compared to the last activity, which also focuses on OpenStack, it is more complicated to understand the entire concept of the three.In the journey of exploring cloud services, we've unveiled a realm of possibilities and challenges. Embracing the advantages of flexibility and scalability, we also faced the intricacies of security concerns and potential downtime. By delving into diverse cloud deployment and service models, we gained a nuanced understanding of tailoring solutions to specific needs. Notably, orchestrating an OpenStack installation through Ansible illuminated the power of automation and meticulous documentation. The lesson echoes: the cloud's potential is boundless, but success lies in navigating its terrain wisely. It's not just about technology; it's about a mindful fusion of innovation, adaptability, and strategic decision-making.