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<b>Course/Section:</b> CPE232 - CPE31S4	<b>Date Submitted:</b> 12-06-23
<b>Instructor:</b> Dr. Jonathan V. Taylar	<b>Semester and SY:</b> 1st Sem: '23 - '24
<b>Activity 14: OpenStack Installation (Keystone, Glance, Nova)</b>	
<b>1. Objectives</b>	
Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).	
<b>2. Intended Learning Outcomes</b>	
<ol style="list-style-type: none"> <li>1. Analyze the advantages and disadvantages of cloud services</li> <li>2. Evaluate different Cloud deployment and service models</li> <li>3. Create a workflow to install and configure OpenStack base services using Ansible as documentation and execution.</li> </ol>	
<b>3. Resources</b>	
<p>Oracle VirtualBox (Hypervisor)</p> <p>1x Ubuntu VM or Centos VM</p>	
<b>4. Tasks</b>	
<ol style="list-style-type: none"> <li>1. Create a new repository for this activity.</li> <li>2. Create a playbook that converts the steps in the following items in <a href="https://docs.openstack.org/install-guide/">https://docs.openstack.org/install-guide/</a> <ol style="list-style-type: none"> <li>a. Keystone (Identity Service)</li> <li>b. Glance (Imaging Service)</li> <li>c. Nova (Compute Service)</li> <li>d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.</li> <li>e. Add, commit and push it to your GitHub repo.</li> </ol> </li> </ol>	


## 5. Output (screenshots and explanations)


### INPUT


Create a new repository for this activity

 CPE232\_HOA14 Public

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About



 Branches  Tags

 Angela-Pacinos Initial commit

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 README.md Initial commit 4 minutes ago

README.md




# CPE232\_HOA14

CPE232 - CPE31S4 Hands-on Activity 14

CPE232 - CPE31S4 Hands-on Activity 14

 Readme

 Activity

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Releases

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```
angela@workstation: ~/CPE232_HOA14
angela@workstation:~$ git clone https://github.com/Angela-Pacinos/CPE232_HOA14.git
Cloning into 'CPE232_HOA14'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
angela@workstation:~$ cd CPE232_HOA14
angela@workstation:~/CPE232_HOA14$ sudo nano ansible.cfg
[sudo] password for angela:
angela@workstation:~/CPE232_HOA14$ sudo nano inventory
angela@workstation:~/CPE232_HOA14$ sudo nano controller.yml
angela@workstation:~/CPE232_HOA14$ ls
ansible.cfg  controller.yml  inventory  README.md
angela@workstation:~/CPE232_HOA14$
```

```
angela@workstation:~/CPE232_HOA14$ tree
.
├── ansible.cfg
├── controller.yml
├── inventory
├── README.md
└── roles
    ├── c_server
    │   └── tasks
    │       └── main.yml
    └── u_server
        └── tasks
            └── main.yml

5 directories, 6 files
```

Create a playbook that converts the steps in the following items in <https://docs.openstack.org/install-guide/>

### install.yml

```
angela@workstation: ~/CPE232_HOA14
GNU nano 6.2 install.yml
--
- hosts: all
  become: true
  pre_tasks:
    - name: Install updates (Ubuntu)
      apt:
        upgrade: dist
        update_cache: yes
        when: ansible_distribution == "Ubuntu"
    - name: Install updates (CentOS)
      yum:
        update_only: yes
        update_cache: yes
        when: ansible_distribution == "CentOS"
- hosts: u_controller
  become: true
  roles:
    - controller
- hosts: c_compute
  become: true
  roles:
    - compute
```

### for Ubuntu (controller)

```
angela@workstation: ~/CPE232_HOA14
GNU nano 6.2 roles/u_server/tasks/main.yml
# Keystone
- name: Install Keystone packages
  apt:
    name:
      - keystone
      - apache2
      - libapache2-mod-wsgi
    state: latest
- name: Keystone Starting / Enabling
  service:
    name: apache2
    state: started
    enabled: true
# Glance
- name: Install Glance package
  apt:
    name: glance
    state: latest
- name: Glance Starting / Enabling
  service:
    name: glance-api
    state: started
    enabled: true
# Nova
- name: Install Nova package
  apt:
    name: nova-compute
    state: latest
- name: Nova Starting / Enabling
  service:
    name: nova-compute
    state: started
    enabled: true
```

for CentOS (compute)

```
angela@workstation: ~/CPE232_HOA14
GNU nano 6.2 roles/c_server/tasks/main.yml
# Keystone
- name: Install Keystone packages
  yum:
    name:
      - openstack-keystone
      - httpd
      - mod_wsgi
    state: latest

- name: Keystone Starting / Enabling
  service:
    name: httpd.service
    state: started
    enabled: true

# Glance
- name: Install Glance package
  yum:
    name: openstack-glance-api.service
    state: latest

- name: Glance Starting / Enabling
  service:
    name: glance
    state: started
    enabled: true

# Nova
- name: Install Nova package
  yum:
    name: openstack-nova-compute
    state: latest

- name: Nova Starting / Enabling
  service:
    name: libvirtd.service openstack-nova-compute.service
    state: started
    enabled: true
```

Add, commit, and push it to your GitHub repo.

```
angela@workstation:~/CPE232_HOA14$ git add *
angela@workstation:~/CPE232_HOA14$ git commit -m "HOA14"
[main 5684503] HOA14
 1 file changed, 1 insertion(+), 1 deletion(-)
angela@workstation:~/CPE232_HOA14$ git push origin main
Username for 'https://github.com': Angela-Pacinos
Password for 'https://Angela-Pacinos@github.com':
Enumerating objects: 16, done.
Counting objects: 100% (16/16), done.
Delta compression using up to 2 threads
Compressing objects: 100% (11/11), done.
Writing objects: 100% (15/15), 1.55 KiB | 227.00 KiB/s, done.
Total 15 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), done.
To https://github.com/Angela-Pacinos/CPE232_HOA14.git
   be9640e..5684503  main -> main
angela@workstation:~/CPE232_HOA14$
```

## PROCESS

```
angela@workstation: ~/CPE232_HOA14
angela@workstation: ~/CPE232_HOA14$ ansible-playbook --ask-become-pass controller.yml
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.119]
ok: [192.168.56.117]

TASK [Install updates (Ubuntu)] *****
skipping: [192.168.56.119]
ok: [192.168.56.117]

TASK [Install updates (CentOS)] *****
skipping: [192.168.56.119]
ok: [192.168.56.117]

PLAY [u_server] *****

TASK [Gathering Facts] *****
ok: [192.168.56.117]

TASK [u_server : Install Keystone packages] *****
ok: [192.168.56.117]

TASK [u_server : Keystone Starting / Enabling] *****
ok: [192.168.56.117]

TASK [u_server : Install Glance package] *****
ok: [192.168.56.117]

TASK [u_server : Glance Starting / Enabling] *****
ok: [192.168.56.117]

TASK [u_server : Install Nova package] *****
ok: [192.168.56.117]

TASK [u_server : Nova Starting / Enabling] *****
ok: [192.168.56.117]

PLAY [c_server] *****

TASK [Gathering Facts] *****
ok: [192.168.56.119]
```

```

PLAY [c_server] *****

TASK [Gathering Facts] *****
ok: [192.168.56.119]

TASK [c_server : Install Keystone packages] *****
ok: [192.168.56.119]

TASK [c_server : Keystone Starting / Enabling] *****
ok: [192.168.56.119]

TASK [c_server : Install Glance package] *****
ok: [192.168.56.119]

TASK [c_server : Glance Starting / Enabling] *****
ok: [192.168.56.119]

TASK [c_server : Install Nova packages] *****
ok: [192.168.56.119]

TASK [c_server : Nova Starting / Enabling] *****
changed: [192.168.56.119]

PLAY RECAP *****
192.168.56.117      : ok=9    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.119     : ok=9    changed=1    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0

angela@workstation:~/CPE232_H0A14$

```

## OUTPUT

### Keystone

```

angela@server1:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: active (running) since Sun 2023-12-03 12:18:33 +08; 1h 43min ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 10977 (apache2)
    Tasks: 26 (limit: 5652)
   Memory: 48.3M
      CPU: 6.058s
   CGroup: /system.slice/apache2.service
           └─10977 /usr/sbin/apache2 -k start
             └─10979 "(wsgi:keystone-pu" -k start
               └─10980 "(wsgi:keystone-pu" -k start
                 └─10981 "(wsgi:keystone-pu" -k start
                   └─10982 "(wsgi:keystone-pu" -k start
                     └─10983 "(wsgi:keystone-pu" -k start
                       └─10984 /usr/sbin/apache2 -k start
                         └─10985 /usr/sbin/apache2 -k start
                           └─10986 /usr/sbin/apache2 -k start
                             └─10987 /usr/sbin/apache2 -k start
                               └─10988 /usr/sbin/apache2 -k start

angela@server1:~$ keystone-manage --version
21.0.1
angela@server1:~$

```

```

angela@localhost:~
File Edit View Search Terminal Help
[angela@localhost ~]$ systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Mon 2023-12-04 23:06:20 PST; 40min ago
     Docs: man:httpd(8)
           man:apachectl(8)
  Main PID: 24133 (httpd)
    Status: "Total requests: 0; Current requests/sec: 0; Current traffic:  0 B/sec"
     Tasks: 6
    CGroup: /system.slice/httpd.service
            └─24133 /usr/sbin/httpd -DFOREGROUND
              └─24137 /usr/sbin/httpd -DFOREGROUND
                └─24138 /usr/sbin/httpd -DFOREGROUND
                  └─24139 /usr/sbin/httpd -DFOREGROUND
                    └─24140 /usr/sbin/httpd -DFOREGROUND
                      └─24141 /usr/sbin/httpd -DFOREGROUND

Dec 04 23:06:20 localhost.localdomain systemd[1]: Starting The Apache HTTP Server...
Dec 04 23:06:20 localhost.localdomain httpd[24133]: AH00558: httpd: Could not rela...
Dec 04 23:06:20 localhost.localdomain systemd[1]: Started The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.

```

## Glance

```

angela@server1:~
angela@server1:~$ systemctl status glance-api
● glance-api.service - OpenStack Image Service API
   Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enable
   Active: active (running) since Sun 2023-12-03 12:19:11 +08; 1h 43min ago
     Docs: man:glance-api(1)
  Main PID: 11458 (glance-api)
    Tasks: 4 (limit: 5652)
  Memory: 118.5M
     CPU: 2min 7.192s
    CGroup: /system.slice/glance-api.service
            └─11458 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance>
              └─11530 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance>
                └─11531 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance>
                  └─11532 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance>

lines 1-13/13 (END)
angela@server1:~$ glance --version
3.6.0
angela@server1:~$

```

```
angela@localhost:~  
File Edit View Search Terminal Help  
[angela@localhost ~]$ systemctl status openstack-glance-api  
● openstack-glance-api.service - OpenStack Image Service (code-named Glance) API server  
   Loaded: loaded (/usr/lib/systemd/system/openstack-glance-api.service; enabled; vendor preset: disabled)  
   Active: active (running) since Mon 2023-12-04 23:30:26 PST; 19min ago  
 Main PID: 27465 (glance-api)  
    Tasks: 3  
   CGroup: /system.slice/openstack-glance-api.service  
           └─27465 /usr/bin/python2 /usr/bin/glance-api  
             └─27612 /usr/bin/python2 /usr/bin/glance-api  
               └─27613 /usr/bin/python2 /usr/bin/glance-api  
  
Dec 04 23:30:26 localhost.localdomain systemd[1]: Started OpenStack Image Service (...  
Dec 04 23:30:35 localhost.localdomain glance-api[27465]: /usr/lib/python2.7/site-pac...  
Dec 04 23:30:35 localhost.localdomain glance-api[27465]: return pkg_resources.EntryP...  
Hint: Some lines were ellipsized, use -l to show in full.  
[angela@localhost ~]$
```

## Nova

```
angela@server1: ~  
angela@server1:~$ systemctl status nova-compute  
● nova-compute.service - OpenStack Compute  
   Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset: ena  
   Active: active (running) since Sun 2023-12-03 12:12:41 +08; 2h 4min ago  
 Main PID: 1916 (nova-compute)  
    Tasks: 2 (limit: 5652)  
  Memory: 169.3M  
     CPU: 12.788s  
   CGroup: /system.slice/nova-compute.service  
           └─1916 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova.co  
  
Warning: some journal files were not opened due to insufficient permissions.  
  
angela@server1:~$ nova-compute --version  
Modules with known eventlet monkey patching issues were imported prior to eventlet monkey p  
atching: urllib3. This warning can usually be ignored if the caller is only importing and n  
ot executing nova code.  
25.2.1
```



```
angela@localhost:~  
File Edit View Search Terminal Help  
[angela@localhost ~]$ systemctl status openstack-nova-api  
● openstack-nova-api.service - OpenStack Nova API Server  
   Loaded: loaded (/usr/lib/systemd/system/openstack-nova-api.service; enabled; vendor  
   preset: disabled)  
   Active: active (running) since Mon 2023-12-04 23:43:49 PST; 7min ago  
   Main PID: 31880 (nova-api)  
     Tasks: 4  
    CGroup: /system.slice/openstack-nova-api.service  
            └─ 1063 /usr/bin/python2 /usr/bin/nova-api  
              └─ 1064 /usr/bin/python2 /usr/bin/nova-api  
                └─ 31880 /usr/bin/python2 /usr/bin/nova-api  
  
Dec 04 23:43:28 localhost.localdomain systemd[1]: Starting OpenStack Nova API Server...  
Dec 04 23:43:42 localhost.localdomain nova-api[31880]: /usr/lib/python2.7/site-pack...  
Dec 04 23:43:42 localhost.localdomain nova-api[31880]: return pkg_resources.EntryPo...  
Dec 04 23:43:49 localhost.localdomain systemd[1]: Started OpenStack Nova API Server.  
Hint: Some lines were ellipsized, use -l to show in full.  
[angela@localhost ~]$
```

**Reflections:**

**1. Describe Keystone, Glance and Nova services**

Keystone is an Openstack Identity service that provides API identity, Authentication and Authorization. It usually is the first service where the users interact with the authenticated. It ensures that only authenticated users can access the openstack resources.

Glance or the image service is for VMs to retrieve, discover, register, etc. images. The said images are the templates used to create new virtual machines. It provides a centralized repository for organizing and managing the different operating system images.

Nova is used to give the users the authorization to use the for launching applications in virtual machines. It is developed to provide quick access to compute resources and allow the managing of the VMs. It also has features for managing storage, security, etc aspects of virtual machines.

**Conclusions:**

For this activity, it is connected to the previous one as we needed to install openstack packages that are inside the main openstack that we have installed from the previous one. What I did first was to ensure that the openstack package was properly installed for the packages to smoothly install. I had a problem with

openstack in centos about the subscription but I just had to install another type of openstack in this case the openstack-train and eventually was able to figure it out. I created the playbook of the installation based on the given website and structured it as for the playbook. I tried running the playbook and there were errors but it was easy to fix and I just had to remove or add some wordings for it to work.