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<b>Course/Section:</b> CPE31S4	<b>Date Submitted:</b> 12/09/2023
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<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>	
<b>5. Output</b> (screenshots and explanations)	
<ol style="list-style-type: none"> <li>1. Create a new repository in Github.</li> </ol>	

## Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository.](#)

Required fields are marked with an asterisk (\*).

Owner \*

 jrstendencia

Repository name \*

HOA14

HOA14 is available.

Great repository names are short and memorable. Need inspiration? How about [fictional-rotary-phone](#) ?

Description (optional)

☒  **Public**

Anyone on the internet can see this repository. You choose who can commit.

☐  **Private**

You choose who can see and commit to this repository.

Initialize this repository with:

☒ **Add a README file**

This is where you can write a long description for your project. [Learn more about READMEs.](#)

Add .gitignore


.gitignore template: **None**


Choose which files not to track from a list of templates. [Learn more about ignoring files.](#)

Choose a license


License: **None**

A license tells others what they can and can't do with your code. [Learn more about licenses.](#)

This will set  **main** as the default branch. Change the default name in your settings.

 You are creating a public repository in your personal account.


Create repository

 **HOA14** Public

 Pin

 Unwatch 1

 **main**


 1 branch


 0 tags


Go to file

Add file

 Code

 jrstendencia Initial commit

1c86ee now  1 commit

 README.md

Initial commit

now

README.md



# HOA14

```
tendencia@workstation:~$ git clone git@github.com:jrstendencia/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.
tendencia@workstation:~$ ls
Ansible_S4          HOA10  HOA4          HOA9  Templates
CPE232_JasminTendencia HOA11  HOA5          HOA9_Final Tendencia_PrelimExam
CPE_MIDEXAM_TENDENCIA HOA12  HOA6          Music  Videos
Desktop            HOA13  HOA7          Pictures
Documents          HOA14  HOA8          Public
Downloads          HOA2   HOA8_Tendencia snap
tendencia@workstation:~$
```

2. Setup the ansible environment by creating an inventory file to specify the target hosts (Ubuntu and CentOS) to be configured. Also, create the ansible.cfg.

**ansible.cfg:**

```
[defaults]

inventory = inventory
host_key_checking = false

deprecation_warnings = false

remote_user = tendencia
private_key_file = ~/.ssh/
```

**inventory:**

Ubuntu	<pre>192.168.56.103 ansible_python_interpreter=/usr/bin/python3  [controller] 192.168.56.103  [compute] 192.168.56.103</pre>
CentOS	<pre>192.168.56.104 ansible_python_interpreter=/usr/bin/python3  [controller_node] 192.168.56.104</pre>

3. Create a role for Keystone (Identity Service), Glance (Imaging Service), Nova (Compute Service) installation for Ubuntu and CentOS by generating the role structure. Then, create directories need that contains either a .conf or .yaml file.

**tree:**

```
tendencia@workstation:~/HOA14$ tree
.
├── CentOS
│   ├── ansible.cfg
│   ├── inventory
│   ├── keyglnv.yml
│   └── roles
│       ├── glance
│       │   ├── files
│       │   │   └── glance-api.conf
│       │   └── tasks
│       │       ├── configure.yml
│       │       ├── install.yml
│       │       └── main.yml
│       ├── keystone
│       │   ├── files
│       │   │   └── admin-openrc
│       │   ├── handlers
│       │   │   └── main.yml
│       │   └── tasks
│       │       ├── configure.yml
│       │       ├── install.yml
│       │       ├── main.yml
│       │       └── prereq.yml
│       └── nova
│           ├── files
│           │   └── nova.conf
│           └── tasks
│               ├── configure.yml
│               ├── install.yml
│               └── main.yml
├── README.md
└── Ubuntu
    ├── ansible.cfg
    ├── inventory
    ├── keyglnv.yml
    └── roles
        ├── glance
        │   └── tasks
        │       └── main.yml
        ├── keystone
        │   └── tasks
        │       └── main.yml
        └── nova
            └── tasks
                └── main.yml

20 directories, 24 files
```

4. The scripts should define the tasks for Keystone (Identity Service), Glance (Imaging Service), Nova (Compute Service) installation for both Ubuntu and CentOS.

**Ubuntu:**

	Keystone		
	Directory	File	Ansible Script
	tasks	main.yml	<pre>--- - name: install Keystone for Ubuntu   tags: mysql, apache, db,mariadb   apt:     name: keystone     state: latest   when: ansible_distribution == "Ubuntu"</pre>
	Glance		
	Directory	File	Ansible Script
	tasks	main.yml	<pre>--- - name: install Glance for Ubuntu   tags: mysql, db, mariadb   apt:     name: glance     state: latest   when: ansible_distribution == "Ubuntu"  - name: "Glance- Restarting/Enabling"   service:     name: glance-api     state: restarted   when: ansible_distribution == "Ubuntu"</pre>
	Nova		
	Directory	File	Ansible Script
	tasks	main.yml	<pre>--- - name: install Nova for Ubuntu   tags: openstack, ansible, cloud, nova   apt:     name: nova-compute     state: latest   when: ansible_distribution == "Ubuntu"  - name: "Nova- Restarting/Enabling"   service:     name: nova-compute     state: restarted   when: ansible_distribution == "Ubuntu"</pre>

## CentOS:

Keystone		
Directory	File	Ansible Script
files	admin-openrc	<pre>export OS_USERNAME=admin export OS_PASSWORD=adminpass export OS_PROJECT_NAME=admin export OS_USER_DOMAIN_NAME=Default export OS_PROJECT_DOMAIN_NAME=Default export OS_AUTH_URL=http://controller:5000/v3 export OS_IDENTITY_API_VERSION=3</pre>
handlers	main.yml	<pre>- name: Creating link   command: ln -s /usr/share/keystone/wsgi-keystone.conf /etc/httpd/conf.d/   failed_when: false   no_log: true  - name: Reloading firewall   command: firewall-cmd --reload</pre>
tasks	configure.yml	<pre>- name: Configuring the connection variable   replace:     path: /etc/keystone/keystone.conf     regexp: '#connection = &lt;None&gt;'     replace: 'connection = mysql+pymysql://keystone:keystonepass@controller/keystone'  - name: Configuring memcached variable   replace:     path: /etc/keystone/keystone.conf     regexp: '#memcache_servers = localhost:11211'     replace: 'memcache_servers = controller:11211'  - name: Configuring the fernet variable   replace:     path: /etc/keystone/keystone.conf     regexp: '#provider = fernet'     replace: 'provider = fernet'  - name: Initialize fernet repositories   shell:       keystone-manage fernet_setup --keystone-user keystone --keystone-group keystone     keystone-manage credential_setup --keystone-user keystone --keystone-group keystone  - name: Configuring setbools   shell:       setsebool -P httpd_use_opensstack on     setsebool -P httpd_can_network_connect on     setsebool -P httpd_can_network_connect_db on  - name: Opening firewall for port 5000   ansible.builtin.shell:     cmd: "firewall-cmd --permanent --add-port=5000/tcp &amp;&amp; firewall-cmd --reload"   notify: Reloading firewall  - name: Configuring apache   replace:     path: /etc/httpd/conf/httpd.conf     regexp: '#ServerName www.example.com:80'     replace: 'ServerName controller'   notify: Creating link  - name: Starting and enabling service   service:     name: httpd     state: started     enabled: true  - name: Copying admin-openrc   copy:     src: admin-openrc     dest: /home/cserver/     owner: root     group: root  - name: Changing permission   shell:       sudo chmod 755 /home/cserver/admin-openrc     source /home/cserver/admin-openrc</pre>

		install.yml	<pre> - name: Installing keystone and its dependencies   yum:     name:       - openstack-keystone       - httpd       - mod_wsgi       - openstack-utils </pre>
		main.yml	<pre> - import_tasks: prereq.yml - import_tasks: install.yml - import_tasks: configure.yml  - block:   - name: Verifying if apache status     command: systemctl status httpd     register: httpd_service    - debug:     msg="{{ httpd_service }}" </pre>
		prereq.yml	<pre> - name: Creating keystone database   mysql_query:     login_user: root     login_password: mysqlpass     login_unix_socket: /var/lib/mysql/mysql.sock     query:       - CREATE DATABASE keystone;       - GRANT ALL PRIVILEGES ON keystone.* TO 'keystone'@'localhost' IDENTIFIED BY 'keystonepass';       - GRANT ALL PRIVILEGES ON keystone.* TO 'keystone'@'%' IDENTIFIED BY 'keystonepass';     single_transaction: yes     failed_when: false     no_log: true </pre>

Glance		
Directory	File	Ansible Script
files	glance-api.conf	<pre> [DEFAULT]  # # From glance.api #  # DEPRECATED: # Set the image owner to tenant or the authenticated user. # # Assign a boolean value to determine the owner of an image. When set to # True, the owner of the image is the tenant. When set to False, the # owner of the image will be the authenticated user issuing the request. # Setting it to False makes the image private to the associated user and # sharing with other users within the same tenant (or "project") # requires explicit image sharing via image membership. # # Possible values: #   * True #   * False # # Related options: #   * None # # (boolean value) # This option is deprecated for removal since Rocky. # Its value may be silently ignored in the future. # Reason: # The non-default setting for this option misaligns Glance with other # OpenStack services with respect to resource ownership. Further, surveys # indicate that this option is not used by operators. The option will be # removed early in the 'S' development cycle following the standard OpenStack # deprecation policy. As the option is not in wide use, no migration path is # proposed. #owner_is_tenant = true # </pre> <p>Note: too long to be displayed</p>

	tasks	configure.yml	<pre> - name: Copying the config file   copy:     src: glance-api.conf     dest: /etc/glance/glance-api.conf     owner: root     group: glance     mode: 0640  - name: Populating the database   command: su -s /bin/sh -c "glance-manage db_sync" glance   failed_when: false   no_log: true  - name: Restarting glance-api   service:     name: openstack-glance-api.service     state: started     enabled: true </pre>
		install.yml	<pre> - name: Installing glance   yum:     name: openstack-glance </pre>
		main.yml	<pre> - import_tasks: install.yml - import_tasks: configure.yml  - block:   - name: Verifying openstack-glance-api installation     command: systemctl status openstack-glance-api     register: glance_service    - debug:     msg="{{ glance_service }}" </pre>

Nova		
Directory	File	Ansible Script
files	nova.conf	<pre> [DEFAULT] # # From nova.conf # # # Availability zone for internal services. For more information, refer to the # documentation. (string value) #internal_service_availability_zone=internal # # Default availability zone for compute services. For more information, refer to # the documentation. (string value) #default_availability_zone=nova # # Default availability zone for instances. For more information, refer to the # documentation. (string value) #default_schedule_zone=None&gt; # # Length of generated instance admin passwords (integer value) # Minimum value: 0 #password_length=12 # # Time period to generate instance usages for. It is possible to define optional # offset to given period by appending @ character followed by a number defining # offset. For more information, refer to the documentation. (string value) #instance_usage_audit_period=month # # Start and use a daemon that can run the commands that need to be run with # root privileges. This option is usually enabled on nodes that run nova compute # processes. # (boolean value) #use_rootwrap_daemon=false </pre> <p>Note: too long to be displayed</p>



tasks	configure.yml	<pre> - name: Copying the config file   copy:     src: nova.conf     dest: /etc/nova/nova.conf     owner: root     group: nova     mode: 0640  - name: Populating the database   command:     su -s /bin/sh -c "nova-manage api_db sync" nova     su -s /bin/sh -c "nova-manage cell_v2 map_cell0" nova     su -s /bin/sh -c "nova-manage cell_v2 create_cell --name=cell1 --verbose" nova     su -s /bin/sh -c "nova-manage db sync" nova   failed_when: false   no_log: true  - name: Restarting nova services   service:     name:       - openstack-nova-api.service       - openstack-nova-scheduler.service       - openstack-nova-conductor.service       - openstack-nova-novncproxy.service     state: started     enabled: true     failed_when: false     no_log: true </pre>
	install.yml	<pre> - name: Install nova and its dependencies   yum:     name:       - openstack-nova-api       - openstack-nova-conductor       - openstack-nova-novncproxy       - openstack-nova-scheduler </pre>
	main.yml	<pre> - import_tasks: install.yml - import_tasks: configure.yml </pre>

5. Create a playbook in the current working directory. This playbook will use the created roles for Keystone (Identity Service), Glance (Imaging Service), Nova (Compute Service).

	Ubuntu	<pre> --- - hosts: all   become: true   tasks:      - name: install updates (Ubuntu)       tags: always       apt:         upgrade: dist         update_cache: yes         when: ansible_distribution == "Ubuntu"  - hosts: compute   become: true   roles:     - keystone     - glance  - hosts: controller   become: true   roles:     - nova </pre>	
	CentOS	<pre> --- - hosts: all   become: true   pre_tasks:      - name: Updating and upgrading the operating system       yum:         name: "*"         state: latest         update_cache: true  - hosts: controller_node   become: true   roles:     - keystone     - glance     - nova </pre>	

6. Run the playbook to install on the target hosts using the command *ansible-playbook --ask-become-pass name-of-playbook.yml*.

**Ubuntu:**

```
tendencia@workstation:~/H0A14/Ubuntu$ ansible-playbook --ask-become-pass keyglnv.yml
BECOME password:

PLAY [all] *****
TASK [Gathering Facts] *****
ok: [192.168.56.103]
TASK [install updates (Ubuntu)] *****
ok: [192.168.56.103]
PLAY [compute] *****
TASK [Gathering Facts] *****
ok: [192.168.56.103]
TASK [keystone : install Keystone for Ubuntu] *****
changed: [192.168.56.103]
TASK [glance : install Glance for Ubuntu] *****
changed: [192.168.56.103]
TASK [glance : Glance- Restarting/Enabling] *****
changed: [192.168.56.103]
PLAY [controller] *****
TASK [Gathering Facts] *****
ok: [192.168.56.103]
TASK [nova : install Nova for Ubuntu] *****
changed: [192.168.56.103]
TASK [nova : Nova- Restarting/Enabling] *****
changed: [192.168.56.103]
PLAY RECAP *****
192.168.56.103      : ok=9   changed=5   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0

tendencia@workstation:~/H0A14/Ubuntu$
```

**CentOS:**

```
TASK [keystone : Verifying If apache status] .....
changed: [192.168.56.104]

TASK [keystone : debug] .....
ok: [192.168.56.104] => {
    "msg": {
        "changed": true,
        "cmd": [
            "systemctl",
            "status",
            "httpd"
        ],
        "delta": "0:00:00.013000",
        "end": "2023-12-09 21:46:34.684000",
        "failed": false,
        "msg": "",
        "rc": 0,
        "start": "2023-12-09 21:46:34.671000",
        "stderr": "",
        "stdout_lines": [
            "●httpd.service - The Apache HTTP Server\n Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)\n Active: active (running) since Sat 2023-12-09 21:44:33 PST; 2min 1s ago\n Docs: man:httpd(8)\n Main PID: 1545 (httpd)\n Status: \"Total requests: 1; Current requests/sec: 0.1; Current traffic: 0 B/sec\".\n Tasks: 7\n      └─1545 /usr/sbin/httpd -DFOREGROUND\n          ├-1795 /usr/sbin/httpd -DFOREGROUND\n          │   └-1797 /usr/sbin/httpd -DFOREGROUND\n          └-1796 /usr/sbin/httpd -DFOREGROUND\n              └-1797 /usr/sbin/httpd -DFOREGROUND\n                  └-1797 /usr/sbin/httpd -DFOREGROUND\n                      └-1797 /usr/sbin/httpd -DFOREGROUND\n                          └-1797 /usr/sbin/httpd -DFOREGROUND\n                              └-1797 /usr/sbin/httpd -DFOREGROUND\n                                  └-1797 /usr/sbin/httpd -DFOREGROUND\n                                      └-1797 /usr/sbin/httpd -DFOREGROUND\n                                          └-1797 /usr/sbin/httpd -DFOREGROUND\n                                              └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                  └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                      └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                          └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                              └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                  └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                      └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                          └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                              └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                  └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                      └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                          └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                            └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                    └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                        └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                            └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                                └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                                    └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                                        └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                                            └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                                                └-1797 /usr/sbin/httpd -DFOREGROUND\n                                                                                                                                                        \nDec 09 21:44:31 controller systemd[1]: Starting The Apache HTTP Server...\nDec 09 21:44:33 controller systemd[1]: Started The Apache HTTP Server."
```

```

TASK [glance : Installing glance] *****
ok: [192.168.56.104]

TASK [glance : Copying the config file] *****
ok: [192.168.56.104]

TASK [glance : Populating the database] *****
changed: [192.168.56.104]

TASK [glance : Restarting glance-api] *****
changed: [192.168.56.104]

TASK [glance : Verifying openstack-glance-api installation] *****
changed: [192.168.56.104]

TASK [glance : debug] *****
ok: [192.168.56.104] => {
  "msg": {
    "changed": true,
    "cmd": [
      "systemctl",
      "status",
      "openstack-glance-api"
    ],
    "delta": "0:00:00.019530",
    "end": "2023-12-09 21:46:44.561319",
    "failed": false,
    "msg": "",
    "rc": 0,
    "start": "2023-12-09 21:46:44.541701",
    "stderr": "",
    "stderr_lines": [],
    "stdout": "\u25cf openstack-glance-api.service - OpenStack Image Service (code-named Glance) API server\n Loaded: loaded (/usr/lib/systemd/system/openstack-glance-api.service; enabled; vendor preset: disabled)\n Active: active (running) since Sat 2023-12-09 21:46:43 PST; 747ms ago\n Main PID: 6719 (glance-api)\n Tasks: 1\n CGroup: /system.slice/openstack-glance-api.service\n\u2514\u25006719 /usr/bin/python2 /usr/bin/glance-api\n\nDec 09 21:46:43 controller systemd[1]: Started OpenStack Image Service (code-named Glance) API server."
  },
  "stdout_lines": [
    "\u25cf openstack-glance-api.service - OpenStack Image Service (code-named Glance) API server",
    "\u2514\u2500 Loaded: loaded (/usr/lib/systemd/system/openstack-glance-api.service; enabled; vendor preset: disabled)",
    "\u2514\u2500 Active: active (running) since Sat 2023-12-09 21:46:43 PST; 747ms ago",
    "\u2514\u2500 Main PID: 6719 (glance-api)",
    "\u2514\u2500 Tasks: 1",
    "\u2514\u2500 CGroup: /system.slice/openstack-glance-api.service",
    "\u2514\u2500\u2514\u25006719 /usr/bin/python2 /usr/bin/glance-api",
    "\u2514\u2500",
    "\u2514\u2500 Dec 09 21:46:43 controller systemd[1]: Started OpenStack Image Service (code-named Glance) API server."
  ]
}

TASK [nova : Install nova and its dependencies] *****
ok: [192.168.56.104]

TASK [nova : Copying the config file] *****
ok: [192.168.56.104]

TASK [nova : Populating the database] *****
skipping: [192.168.56.104]

TASK [nova : Restarting nova services] *****
ok: [192.168.56.104]

PLAY RECAP *****
192.168.56.104 : ok=18 changed=1 unreachable=0 failed=0 skipped=9 rescued=0 ignored=0

tendencia@workstation:~/H0A14/CentOS$

```

7. Verification of installation in both Ubuntu and CentOS by using the command `systemctl status <>`.

Ubuntu	
Keystone	<pre> tendencia@server2:~\$ pip show keystone Name: keystone Version: 21.0.1 Summary: OpenStack Identity Home-page: https://docs.openstack.org/keystone/latest Author: OpenStack Author-email: openstack-discuss@lists.openstack.org License: UNKNOWN Location: /usr/lib/python3/dist-packages Requires: Required-by: </pre>
Glance	<pre> tendencia@server2:~\$ systemctl status glance-api \u25cf glance-api.service - OpenStack Image Service API Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabled) Active: active (running) since Sat 2023-12-09 22:02:09 PST; 2min 57s ago Docs: man:glance-api(1) Main PID: 2156 (glance-api) Tasks: 5 (limit: 3432) Memory: 29.0M CPU: 8.523s CGroup: /system.slice/glance-api.service \u2514\u25002156 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf \u2514\u25003150 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf \u2514\u25003151 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf \u2514\u25003152 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf \u2514\u25003157 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf  Dec 09 22:02:09 server2 systemd[1]: Started OpenStack Image Service API. lines 1-16/16 (END) </pre>

	Nova	<pre>tendencia@server2:~\$ systemctl status nova-compute ● nova-compute.service - OpenStack Compute    Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset: disabled)    Active: active (running) since Sat 2023-12-09 22:02:37 PST; 2min 6s ago    Main PID: 3508 (nova-compute)      Tasks: 1 (limit: 3432)     Memory: 40.3M       CPU: 7.731s    CGroup: /system.slice/nova-compute.service            └─3508 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova.conf  Dec 09 22:02:37 server2 systemd[1]: Started OpenStack Compute. Dec 09 22:02:40 server2 nova-compute[3508]: Modules with known eventlet monkey patching support: lines 1-12/12 (END)</pre>	
CentOS			
	Keystone	<pre>[tendencia@controller ~]\$ pip show keystone --- Metadata-Version: 1.1 Name: keystone Version: 14.2.0 Summary: OpenStack Identity Home-page: https://docs.openstack.org/keystone/latest Author: OpenStack Author-email: openstack-dev@lists.openstack.org License: UNKNOWN Location: /usr/lib/python2.7/site-packages Requires: Classifiers:   Environment :: OpenStack   Intended Audience :: Information Technology   Intended Audience :: System Administrators   License :: OSI Approved :: Apache Software License   Operating System :: POSIX :: Linux   Programming Language :: Python   Programming Language :: Python :: 2   Programming Language :: Python :: 2.7   Programming Language :: Python :: 3   Programming Language :: Python :: 3.5 Entry-points:   [console_scripts]     keystone-manage = keystone.cmd.manage:main   [keystone.application_credential]     sql = keystone.application_credential.backends.sql:ApplicationCredential   [keystone.assignment]     sql = keystone.assignment.backends.sql:Assignment   [keystone.auth.application_credential]     default = keystone.auth.plugins.application_credential:ApplicationCredential   [keystone.auth.external]     DefaultDomain = keystone.auth.plugins.external:DefaultDomain     Domain = keystone.auth.plugins.external:Domain     default = keystone.auth.plugins.external:DefaultDomain   [keystone.auth.kerberos]     default = keystone.auth.plugins.external:KerberosDomain   [keystone.auth.mapped]     default = keystone.auth.plugins.mapped:Mapped   [keystone.auth.oauth1]     default = keystone.auth.plugins.oauth1:OAuth   [keystone.auth.openid]     default = keystone.auth.plugins.mapped:Mapped   [keystone.auth.password]     default = keystone.auth.plugins.password:Password   [keystone.auth.saml2]</pre>	
	Glance	<pre>tendencia@controller ~\$ sudo systemctl status openstack-glance-api [tendencia@controller ~]\$ sudo 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 Sat 2023-12-09 22:21:31 PST; 344ms ago    Main PID: 15064 (glance-api)      Tasks: 1     CGroup: /system.slice/openstack-glance-api.service            └─15064 /usr/bin/python2 /usr/bin/glance-api  Dec 09 22:21:31 controller systemd[1]: Started OpenStack Image Service (code-named Glance) API server. Hint: Some lines were ellipsized, use -l to show in full. [tendencia@controller ~]\$</pre>	

## Nova

```
[tendencia@controller ~]$ sudo systemctl status openstack-nova-api
● openstack-nova-api.service - OpenStack Nova API Server
   Loaded: loaded (/usr/lib/systemd/system/openstack-nova-api.service; disabled; vendor preset: disabled)
   Active: active (running) since Sat 2023-12-09 22:28:09 PST; 3min 58s ago
     Main PID: 15980 (nova-api)
        Tasks: 9
      CGroup: /system.slice/openstack-nova-api.service
              └─15980 /usr/bin/python2 /usr/bin/nova-api
                 └─16185 /usr/bin/python2 /usr/bin/nova-api
                 └─16186 /usr/bin/python2 /usr/bin/nova-api
                 └─16187 /usr/bin/python2 /usr/bin/nova-api
                 └─16189 /usr/bin/python2 /usr/bin/nova-api
                 └─16190 /usr/bin/python2 /usr/bin/nova-api
                 └─16191 /usr/bin/python2 /usr/bin/nova-api
                 └─16192 /usr/bin/python2 /usr/bin/nova-api
                 └─16193 /usr/bin/python2 /usr/bin/nova-api

Dec 09 22:26:47 controller systemd[1]: Starting OpenStack Nova API Server...
Dec 09 22:27:23 controller nova-api[15980]: Deprecated: Option "notificati....
Dec 09 22:28:09 controller systemd[1]: Started OpenStack Nova API Server.
Hint: Some lines were ellipsized, use -l to show in full.
```

8. Sync changes in github.

```
tendencia@workstation:~/HOA14$ git add *
tendencia@workstation:~/HOA14$ git commit -m "Updates"
[main 7bd13a4] Updates
23 files changed, 18534 insertions(+)
create mode 100644 CentOS/ansible.cfg
create mode 100644 CentOS/inventory
create mode 100644 CentOS/keyglv.yml
create mode 100644 CentOS/roles/glance/files/glance-api.conf
create mode 100644 CentOS/roles/glance/tasks/configure.yml
create mode 100644 CentOS/roles/glance/tasks/install.yml
create mode 100644 CentOS/roles/glance/tasks/main.yml
create mode 100644 CentOS/roles/keystone/files/admin-openrc
create mode 100644 CentOS/roles/keystone/handlers/main.yml
create mode 100644 CentOS/roles/keystone/tasks/configure.yml
create mode 100644 CentOS/roles/keystone/tasks/install.yml
create mode 100644 CentOS/roles/keystone/tasks/main.yml
create mode 100644 CentOS/roles/keystone/tasks/prereq.yml
create mode 100644 CentOS/roles/nova/files/nova.conf
create mode 100644 CentOS/roles/nova/tasks/configure.yml
create mode 100644 CentOS/roles/nova/tasks/install.yml
create mode 100644 CentOS/roles/nova/tasks/main.yml
create mode 100644 Ubuntu/ansible.cfg
create mode 100644 Ubuntu/inventory
create mode 100644 Ubuntu/keyglv.yml
create mode 100644 Ubuntu/roles/glance/tasks/main.yml
create mode 100644 Ubuntu/roles/keystone/tasks/main.yml
create mode 100644 Ubuntu/roles/nova/tasks/main.yml
tendencia@workstation:~/HOA14$ git push origin main
Enumerating objects: 45, done.
Counting objects: 100% (45/45), done.
Delta compression using up to 2 threads
Compressing objects: 100% (34/34), done.
Writing objects: 100% (44/44), 145.26 KiB | 546.00 KiB/s, done.
Total 44 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), done.
To github.com:jrstendencia/HOA14.git
1c866ee..7bd13a4 main -> main
tendencia@workstation:~/HOA14$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
tendencia@workstation:~/HOA14$
```

HOA14
Public
Pin
Unwatch

main
1 branch
0 tags
Go to file
Add file
Code

jrstendencia Updates
7bd13a4 now
2 commits

CentOS	Updates	now
Ubuntu	Updates	now
README.md	Initial commit	last week

README.md

HOA14

Reflections:



Answer the following:

1. Describe Keystone, Glance and Nova services

- In the preceding task, the student gained an introduction to OpenStack, an open-source cloud software platform offering both private and public cloud infrastructure as a service (IaaS) solution. This platform comprises components that empower users to manipulate various elements, including the Identity Service, Compute Service, and Imaging Service. In the current activity, three specific components are explored: Keystone, serving as an OpenStack Identity management service, implements customizable authentication and authorization. It validates user/project credentials, manages user databases similar to Apache2, and facilitates service discovery for users. Simultaneously, it collaborates with Imaging/Virtual Machine Image Management Services like Glance. Glance allows users to discover, retrieve, and register Virtual Machine Images and Container Images, usable as storage backend services between Swift or Ceph. Given that Glance exclusively supports image services, the introduction of Nova becomes necessary. Nova is a key element of the IaaS system, designed to handle computing, networking, storage, image services, and provide swift access to computing resources. This functionality is integral to managing the virtual machine server.

**Conclusions:**

This current task, titled 'OpenStack Installation (Keystone, Glance, Nova),' builds upon the preceding task, 'OpenStack Prerequisite Installation.' In the prior activity, students installed specific OpenStack components, namely keystone, serving as the Identity Management Service. Keystone facilitates customizable authentication and authorization for verification purposes, managing user databases using Apache in this instance. Additionally, glance, functioning as the Image Management Service, enables users to discover, retrieve, and register Virtual Machine Images and Container Images. Lastly, nova, the Computation Management Service, was essential because Glance solely supports image services. Nova is utilized to perform image services and ensure quick access to resources for the Virtual Machine Server.