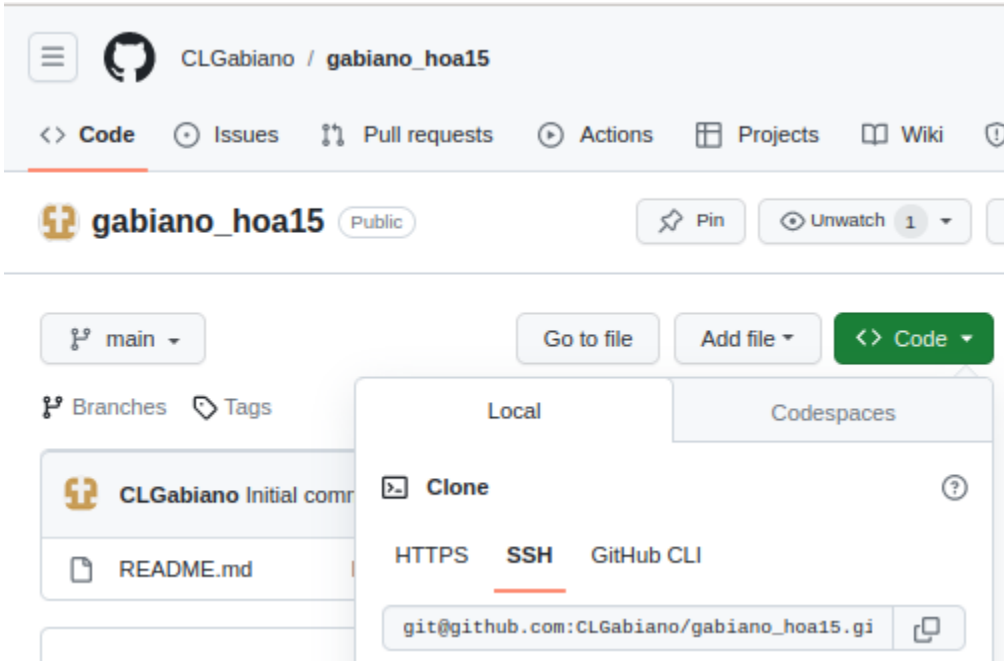


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<b>Course/Section: CPE31s6</b>	<b>Date Submitted: Nov 30, 2023</b>
<b>Instructor: Engr. Jonathan Taylar</b>	<b>Semester and SY: 2023 - 24</b>
<b>Activity 15: OpenStack Installation (Neutron, Horizon, Cinder)</b>	
<b>1. Objectives</b>	
Create a workflow 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> </ol>  <p>The screenshot shows a GitHub repository page for 'gabiano_hoa15' by user 'CLGabiano'. The 'Code' tab is selected, showing options for cloning the repository. A 'Clone' modal is open, displaying the repository URL 'git@github.com:CLGabiano/gabiano_hoa15.git' under the 'SSH' method. The modal also shows the 'Local' and 'Codespaces' tabs, and a 'Clone' button with a question mark icon.</p>	

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

a. Neutron

```
1 #This is the main.yml file for installing Cinder
2
3 - name: Installing Cinder (Ubuntu)
4   apt:
5     name:
6       - cinder-api
7       - cinder-scheduler
8     state: latest
9
10  - name: Configure Cinder
11    replace:
12      dest: /etc/cinder/cinder.conf
13      regexp: connection = mysql+pymysql://cinder:CINDER_DBPASS@controller/cinder
14      replace: connection = mysql+pymysql://cinder:admin123@controller/cinder
15      backup: yes
16
17  - name: Configure Cinder
18    replace:
19      dest: /etc/cinder/cinder.conf
20      regexp: transport_url = rabbit://openstack:RABBIT_PASS@controller
21      replace: transport_url = rabbit://openstack:admin123@controller
22      backup: yes
23
24  - name: Configure Cinder
25    lineinfile:
26      dest: /etc/cinder/cinder.conf
27      line: 'auth_strategy = keystone'
28      state: present
29      backup: yes
30
31  - name: Configure Cinder
32    lineinfile:
33      dest: /etc/cinder/cinder.conf
34      insertafter: '[keystone_authtoken]'
35      line: '{{ item }}'
36      state: present
37      backup: yes
38
```

```
39   with_items:
40     - www_authenticate_uri = http://controller:5000
41     - auth_url = http://controller:5000
42     - memcached_servers = controller:11211
43     - auth_type = password
44     - project_domain_name = default
45     - user_domain_name = default
46     - project_name = service
47     - username = cinder
48     - password = pass123
49
50  - name: Configure Cinder
51    lineinfile:
52      dest: /etc/cinder/cinder.conf
53      line: 'my_ip = 192.168.52.103'
54      state: present
55      backup: yes
56
57  - name: Configure Cinder
58    lineinfile:
59      dest: /etc/cinder/cinder.conf
60      line: 'lock_path = /var/lib/cinder/tmp'
61      state: present
62      backup: yes
63
64  - name: Populate the Database
65    shell: |
66      sudo cinder-manage db sync
67
68  - name: Configure Cinder
69    lineinfile:
70      dest: /etc/nova/nova.conf
71      line: 'os_region_name = RegionOne'
72      state: present
73      backup: yes

```

## b. Horizon

```
1  #This is the main.yml file for installing Horizon
2
3  - name: Installing Horizon
4    apt:
5      name:
6        - openstack-dashboard
7      state: latest
8
9  - name: Configure Openstack file
10   lineinfile:
11     dest: /etc/openstack-dashboard/local_settings.py
12     regexp: 'OPENSTACK_HOST ='
13     line: 'OPENSTACK_HOST = "controller"'
14     state: present
15     backup: yes
16
17  - name: Configure Openstack file
18   lineinfile:
19     dest: /etc/openstack-dashboard/local_settings.py
20     regexp: 'ALLOWED_HOST ='
21     line: 'ALLOWED_HOST = ["localhost", ""]'
22     state: present
23     backup: yes
24     backuprefs: yes
25
26  - name: Configure Openstack file
27   lineinfile:
28     dest: /etc/openstack-dashboard/local_settings.py
29     regexp: 'SESSION_ENGINE ='
30     line: '{{ item }}'
31     state: present
32     backup: yes
33
34   with_items:
35     - "SESSION_ENGINE = 'django.contrib.sessions.backends.cache'"
36     - ""
37     - "CACHES = {"
38     -   "default": {"
39     -     "BACKEND": 'django.core.cache.backends.memcached.MemcachedCache',"
40     -     "LOCATION": 'controller:11211',"
41     -   }"
42     - "}"
43
44  - name: Configure Openstack file
45   lineinfile:
46     dest: /etc/openstack-dashboard/local_settings.py
47     regexp: 'OPENSTACK_KEYSTONE_URL ='
48     line: 'OPENSTACK_KEYSTONE_URL = "http://%(ssohost)s/identity/v3" % OPENSTACK_HOST'
49     state: present
50     backup: yes
51
52  - name: Configure Openstack file
53   lineinfile:
54     dest: /etc/openstack-dashboard/local_settings.py
55     regexp: 'OPENSTACK_KEYSTONE_MULTIDOMAIN_SUPPORT ='
56     line: 'OPENSTACK_KEYSTONE_MULTIDOMAIN_SUPPORT = True'
57     state: present
58     backup: yes
59
60  - name: Configure Openstack file
61   lineinfile:
62     dest: /etc/openstack-dashboard/local_settings.py
63     regexp: 'OPENSTACK_API_VERSIONS ='
64     line: '{{ item }}'
65     state: present
66     backup: yes
67
68   with_items:
69     - "OPENSTACK_API_VERSIONS = {"
70     -   "identity": 3,"
71     -   "image": 2,"
72     -   "volume": 3,"
73     -   }"
74
75  - name: Configure Openstack file
76   lineinfile:
77     dest: /etc/openstack-dashboard/local_settings.py
78     regexp: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN ='
79     line: 'OPENSTACK_KEYSTONE_DEFAULT_DOMAIN = "Default"'
80     state: present
81     backup: yes
82
83  - name: Configure Openstack file
84   lineinfile:
85     dest: /etc/openstack-dashboard/local_settings.py
86     regexp: 'OPENSTACK_KEYSTONE_DEFAULT_ROLE ='
87     line: 'OPENSTACK_KEYSTONE_DEFAULT_ROLE = "user"'
88     state: present
89     backup: yes
90
91  - name: Configure Openstack file
92   lineinfile:
93     dest: /etc/openstack-dashboard/local_settings.py
94     regexp: 'OPENSTACK_NEUTRON_NETWORK ='
95     line: '{{ item }}'
96     state: present
97     backup: yes
98
99   with_items:
100     - "OPENSTACK_NEUTRON_NETWORK = {"
101     -   "..."
102     -   "enable_router": False,"
103     -   "enable_quotas": False,"
104     -   "enable_ipv6": False,"
105     -   "enable_distributed_router": False,"
106     -   "enable_ha_router": False,"
107     -   "enable_fip_topology_check": False,"
108     -   }"
109
110  - name: Configure Openstack file
111   lineinfile:
112     dest: /etc/apache2/conf-available/openstack-dashboard.conf
113     line: 'WSGIApplicationGroup %{GLOBAL}'
```

## c. Cinder

```
1 #this is the main.yml for installation of neutron
2
3 - name: Installing Neutron (Ubuntu)
4 apt:
5   name:
6     - neutron-server
7     - neutron-plugin-ml2
8     - neutron-openvswitch-agent
9     - neutron-dhcp-agent
10    - neutron-ml2data-agent
11   state: latest
12
13 - name: Configure Neutron
14 replace:
15   dest: /etc/neutron/neutron.conf
16   regexp: connection = mysql+mysqldb://neutron:NEUTRON_DBPASS@controller:neutron
17   replace: connection = mysql+mysqldb://neutron:admin123@controller:neutron
18   backup: yes
19
20 - name: Configure Neutron
21 lineinfile:
22   dest: /etc/neutron/neutron.conf
23   line: core_plugin = ml2
24   state: present
25   backup: yes
26
27 - name: Configure Neutron
28 lineinfile:
29   dest: /etc/neutron/neutron.conf
30   regexp: 'service_plugins = '
31   state: absent
32   backup: yes
33
34 - name: Conf Neutron
35 replace:
36   dest: /etc/neutron/neutron.conf
37   regexp: transport_url = rabbit://openstack:RABBIT_PASS@controller
38   replace: transport_url = rabbit://openstack:admin123@controller
39   backup: yes
40
41 - name: Configure Neutron
42 lineinfile:
43   dest: /etc/neutron/neutron.conf
44   line: 'auth_strategy = keystone'
45   state: present
46   backup: yes
47
48 - name: Configure Neutron
49 lineinfile:
50   dest: /etc/neutron/neutron.conf
51   insertafter: '[keystone_authtoken]'
52   line: '[[ item ]]'
53   state: present
54   backup: yes
55
56   with_items:
57     - www_authenticate_url = http://controller:5000
58     - auth_url = http://controller:5000
59     - memcached_servers = controller:11211
60     - auth_type = password
61     - project_domain_name = Default
62     - user_domain_name = Default
63     - project_name = service
64     - username = neutron
65     - password = admin123
66
67 - name: Configure Neutron
68 lineinfile:
69   dest: /etc/neutron/neutron.conf
70   insertafter: '[DEFAULT]'
71   line: '[[ item ]]'
72   state: present
73   backup: yes
74
75   with_items:
76     - notify_nova_on_port_status_changes = true
77     - notify_nova_on_port_data_changes = true
78
79 - name: Configure Neutron
80 lineinfile:
81   dest: /etc/neutron/neutron.conf
82   insertafter: '[nova]'
83   line: '[[ item ]]'
84   state: present
85   backup: yes
86
87   with_items:
88     - auth_url = http://controller:5000
89     - auth_type = password
90     - project_domain_name = Default
91     - user_domain_name = Default
92     - region_name = RegionOne
93     - project_name = service
94     - username = nova
95     - password = admin123
96
97 - name: Configure Neutron
98 lineinfile:
99   dest: /etc/neutron/neutron.conf
100  line: 'lock_path = /var/lib/neutron/tmp'
101  state: present
102  backup: yes
103
104 - name: Configure Neutron
105 lineinfile:
106   dest: /etc/neutron/plugins/ml2/ml2_conf.ini
107   line: 'type_drivers = flat,vlan'
108   state: present
109   backup: yes
110
111 - name: Configure Neutron
112 lineinfile:
113   dest: /etc/neutron/plugins/ml2/ml2_conf.ini
114   regexp: 'tenant_network_types ='
115   state: absent
116   backup: yes
```

```

118 - name: Configure Neutron
119   lineinfile:
120     dest: /etc/neutron/plugins/ml2/ml2_conf.ini
121     insertafter: '\[ml2\]'
122     line: "{{ item }}"
123     state: present
124     backup: yes
125
126   with_items:
127     - mechanism_drivers = openvswitch
128     - extension_drivers = portsecurity
129
130 - name: Configure Neutron
131   lineinfile:
132     dest: /etc/neutron/plugins/ml2/ml2_conf.ini
133     line: 'flat_networks = provider'
134     state: present
135     backup: yes
136
137 - name: Configure Neutron
138   lineinfile:
139     dest: /etc/neutron/plugins/ml2/openvswitch_agent.ini
140     regexp: 'bridge_mappings = provider: PROVIDER_INTERFACE_NAME'
141     line: 'bridge_mappings = provider:LocalMachine'
142     backup: yes
143
144 - name: Configure Neutron
145   lineinfile:
146     dest: /etc/neutron/plugins/ml2/openvswitch_agent.ini
147     insertafter: '\[securitygroup\]'
148     line: "{{ item }}"
149     state: present
150     backup: yes
151
152   with_items:
153     - enable_security_group = true
154     - firewall_driver = openvswitch
155
156 - name: Configure Neutron
157   lineinfile:
158     dest: /etc/neutron/dhcp_agent.ini
159     insertafter: '\[DEFAULT\]'
160     line: "{{ item }}"

```

```

160     line: "{{ item }}"
161     state: present
162     backup: yes
163
164   with_items:
165     - interface_driver = openvswitch
166     - dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq
167     - enable_isolated_metadata = true
168
169 - name: Configure Neutron
170   lineinfile:
171     dest: /etc/neutron/metadata_agent.ini
172     line: 'nova_metadata_host = controller'
173     state: present
174     backup: yes
175
176 - name: Configure Neutron
177   lineinfile:
178     dest: /etc/neutron/metadata_agent.ini
179     regexp: 'metadata_proxy_shared_secret = METADATA_SECRET'
180     line: 'metadata_proxy_shared_secret = admin123'
181     state: present
182     backup: yes
183
184 - name: Configure Neutron
185   lineinfile:
186     dest: /etc/nova/nova.conf
187     insertafter: '\[neutron\]'
188     line: "{{ item }}"
189     state: present
190     backup: yes
191
192   with_items:
193     - auth_url = http://controller:5000
194     - auth_type = password
195     - project_domain_name = Default
196     - user_domain_name = Default
197     - region_name = RegionOne
198     - project_name = service
199     - username = neutron
200     - password = admin123
201     - service_metadata_proxy = true
202     - metadata_proxy_shared_secret = admin123

```

- d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.

```
1 #This is the playbook for installing OpenStack prerequisites
2
3 ---
4
5 - hosts: all
6   become: true
7   pre_tasks:
8
9   - name: Install Apache (Ubuntu)
10     apt:
11       name:
12         - apache2
13       state: latest
14       when: ansible_distribution == "Ubuntu"
15
16   - name: Install MySQL (Ubuntu)
17     apt:
18       name:
19         - mysql-server
20       state: latest
21       when: ansible_distribution == "Ubuntu"
22
23   - hosts: neutron
24     become: true
25     roles:
26       - role: neutron
27
28   - hosts: horizon
29     become: true
30     roles:
31       - role: horizon
32
33   - hosts: cinder
34     become: true
35     roles:
36       - role: cinder
```

## INVENTORY

```
Code Blame 8 lines (6 loc) · 76 Bytes Code 55% faster with GitHub Copilot
1 [neutron]
2 192.168.56.102
3
4 [horizon]
5 192.168.56.102
6
7 [cinder]
8 192.168.56.102
```

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

```
Leonard@workstation:~/gabiano_hoa15$ git add *
Leonard@workstation:~/gabiano_hoa15$ git commit -m "ugh"
[main 6c81441] ugh
6 files changed, 442 insertions(+)
create mode 100644 ansible.cfg
create mode 100644 inventory
create mode 100644 openstack.yml
create mode 100644 roles/cinder/tasks/main.yml
create mode 100644 roles/horizon/tasks/main.yml
create mode 100644 roles/neutron/tasks/main.yml
Leonard@workstation:~/gabiano_hoa15$ 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), 3.41 KiB | 3.41 MiB/s, done.
Total 15 (delta 0), reused 0 (delta 0)
To github.com:CLGabiano/gabiano_hoa15.git
3d1bea7..6c81441 main -> main
Leonard@workstation:~/gabiano_hoa15$
```

## 5. Output (screenshots and explanations)

```
leonard@workstation:~/gabiano_hoa15$ ansible-playbook --ask-become-pass opensta
ck.yml
/home/leonard/.local/lib/python2.7/site-packages/ansible/parsing/vault/__init_
.py:44: CryptographyDeprecationWarning: Python 2 is no longer supported by the
Python core team. Support for it is now deprecated in cryptography, and will be
removed in the next release.
  from cryptography.exceptions import InvalidSignature
BECOME password:

PLAY [all] *****
*

TASK [Gathering Facts] *****
*
ok: [192.168.56.102]

TASK [Install Apache (Ubuntu)] *****
*
ok: [192.168.56.102]

TASK [Install MySQL (Ubuntu)] *****
*
changed: [192.168.56.102]

PLAY [neutron] *****
*
```

```
TASK [Gathering Facts] *****
*
ok: [192.168.56.102]

TASK [Install Apache (Ubuntu)] *****
*
ok: [192.168.56.102]

TASK [Install MySQL (Ubuntu)] *****
*
changed: [192.168.56.102]

PLAY [neutron] *****
*

TASK [Gathering Facts] *****
*
ok: [192.168.56.102]

TASK [neutron : Installing Neutron (Ubuntu)] *****
*
changed: [192.168.56.102]
```

```
TASK [neutron : Configure Neutron] *****
*
ok: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
ok: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
ok: [192.168.56.102]

TASK [neutron : Conf Neutron] *****
*
ok: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=www_authenticate_uri = http://controller:500
0)
```

```

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=www_authenticate_uri = http://controller:5000
0)
changed: [192.168.56.102] => (item=auth_url = http://controller:5000)
changed: [192.168.56.102] => (item=memcached_servers = controller:11211)
changed: [192.168.56.102] => (item=auth_type = password)
changed: [192.168.56.102] => (item=project_domain_name = Default)
changed: [192.168.56.102] => (item=user_domain_name = Default)
changed: [192.168.56.102] => (item=project_name = service)
changed: [192.168.56.102] => (item=username = neutron)
changed: [192.168.56.102] => (item=password = admin123)

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=notify_nova_on_port_status_changes = true)
changed: [192.168.56.102] => (item=notify_nova_on_port_data_changes = true)

TASK [neutron : Configure Neutron] *****
*
ok: [192.168.56.102] => (item=auth_url = http://controller:5000)
ok: [192.168.56.102] => (item=auth_type = password)
ok: [192.168.56.102] => (item=project_domain_name = Default)
ok: [192.168.56.102] => (item=user_domain_name = Default)
changed: [192.168.56.102] => (item=region_name = RegionOne)

```

```

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=mechanism_drivers = openvswitch)
changed: [192.168.56.102] => (item=extension_drivers = portsecurity)

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*

```

```

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=enable_security_group = true)
changed: [192.168.56.102] => (item=firewall_driver = openvswitch)

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=interface_driver = openvswitch)
changed: [192.168.56.102] => (item=dhcp_driver = neutron.agent.linux.dhcp.Dnsmasq)
changed: [192.168.56.102] => (item=enable_isolated_metadata = true)

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102]

TASK [neutron : Configure Neutron] *****
*
changed: [192.168.56.102] => (item=auth_url = http://controller:5000)
changed: [192.168.56.102] => (item=auth_type = password)
changed: [192.168.56.102] => (item=project_domain_name = Default)
changed: [192.168.56.102] => (item=user_domain_name = Default)
changed: [192.168.56.102] => (item=region_name = RegionOne)

```



```
PLAY [horizon] *****
*
TASK [Gathering Facts] *****
*
ok: [192.168.56.102]

TASK [horizon : Installing Horizon] *****
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
ok: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102] => (item=SESSION_ENGINE = 'django.contrib.sessions.ba
ckends.cache')
changed: [192.168.56.102] => (item= )
ok: [192.168.56.102] => (item=CONFIGURE = {})
```

```
ok: [192.168.56.102] => (item=)
ok: [192.168.56.102] => (item=)

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102] => (item=OPENSTACK_API_VERSIONS = {})
changed: [192.168.56.102] => (item="identity": 3,)
changed: [192.168.56.102] => (item="image": 2,)
changed: [192.168.56.102] => (item="volume": 3,)
ok: [192.168.56.102] => (item=)

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102]
```

```
TASK [horizon : Configure Openstack file] *****
*
changed: [192.168.56.102]

TASK [horizon : Configure Openstack file] *****
*
ok: [192.168.56.102] => (item=OPENSTACK_NEUTRON_NETWORK = {})
changed: [192.168.56.102] => (item=...)
changed: [192.168.56.102] => (item='enable_router': False,)
changed: [192.168.56.102] => (item='enable_quotas': False,)
changed: [192.168.56.102] => (item='enable_ipv6': False,)
changed: [192.168.56.102] => (item='enable_distributed_router': False,)
changed: [192.168.56.102] => (item='enable_ha_router': False,)
changed: [192.168.56.102] => (item='enable_fip_topology_check': False,)
ok: [192.168.56.102] => (item=)

TASK [horizon : Configure Openstack file] *****
*
ok: [192.168.56.102]

PLAY [cinder] *****
*
TASK [Gathering Facts] *****
*
ok: [192.168.56.102]

TASK [cinder : Installing Cinder (Ubuntu)] *****
*
```

```
TASK [cinder : Installing Cinder (Ubuntu)] *****
*
changed: [192.168.56.102]

TASK [cinder : Configure Cinder] *****
*
ok: [192.168.56.102]

TASK [cinder : Configure Cinder] *****
*
ok: [192.168.56.102]

TASK [cinder : Configure Cinder] *****
*
ok: [192.168.56.102]

TASK [cinder : Configure Cinder] *****
*
changed: [192.168.56.102] => (item=www_authenticate_uri = http://controller:5000)
changed: [192.168.56.102] => (item=auth_url = http://controller:5000)
changed: [192.168.56.102] => (item=memcached_servers = controller:11211)
changed: [192.168.56.102] => (item=auth_type = password)
changed: [192.168.56.102] => (item=project_domain_name = default)
changed: [192.168.56.102] => (item=user_domain_name = default)
changed: [192.168.56.102] => (item=project_name = service)
```

```
changed: [192.168.56.102] => (item=username = cinder)
changed: [192.168.56.102] => (item=password = pass123)
```

```
TASK [cinder : Configure Cinder] *****
*
changed: [192.168.56.102]
```

```
TASK [cinder : Configure Cinder] *****
*
changed: [192.168.56.102]
```

```
TASK [cinder : Populate the Database] *****
*
changed: [192.168.56.102]
```

```
TASK [cinder : Configure Cinder] *****
*
changed: [192.168.56.102]
```

```
PLAY RECAP *****
*
```

```
192.168.56.102      : ok=46   changed=32   unreachable=0   failed=0
skipped=0          rescued=0   ignored=0
```

## OUTPUT:

### CINDER:

```
leonard@SERVER1:~$ sudo apt list --installed | grep cinder
[sudo] password for leonard:

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

cinder-api/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.0.10-0ubuntu2.2 all [installed]
cinder-common/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.0.10-0ubuntu2.2 all [installed,automatic]
cinder-scheduler/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.0.10-0ubuntu2.2 all [installed]
python-cinder/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.0.10-0ubuntu2.2 all [installed,automatic]
python-cinderclient/bionic,bionic,now 1:3.5.0-0ubuntu1 all [installed,automatic]
```

### HORIZON:

```
leonard@SERVER1:~$ sudo apt list --installed | grep horizon

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

python-django-horizon/bionic-updates,bionic-updates,bionic-security,bionic-security,now 3:13.0.3-0ubuntu2 all [installed,automatic]
leonard@SERVER1:~$ sudo apt list --installed | grep neutron
```

### NEUTRON:

```
leonard@SERVER1:~$ sudo apt list --installed | grep neutron

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

neutron-common/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed,automatic]
neutron-dhcp-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-metadata-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-openvswitch-agent/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-plugin-ml2/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
neutron-server/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed]
python-neutron/bionic-updates,bionic-updates,bionic-security,bionic-security,now 2:12.1.1-0ubuntu8.1 all [installed,automatic]
python-neutron-fwaas/bionic-updates,bionic-updates,now 1:12.0.2-0ubuntu1 all [installed,automatic]
python-neutron-lib/bionic,bionic,now 1.13.0-0ubuntu1 all [installed,automatic]
python-neutronclient/bionic,bionic,now 1:6.7.0-0ubuntu1 all [installed,automatic]
```

github link: [https://github.com/CLGabiano/gabiano\\_hoa15.git](https://github.com/CLGabiano/gabiano_hoa15.git)

**Reflections:**

Answer the following:

1. Describe Neutron, Horizon and Cinder services

Neutron is like the traffic cop of OpenStack, managing the networking aspects. It ensures that different parts of your cloud system communicate effectively, directing the flow of data like a traffic controller on the information highway.

Horizon is the user interface, essentially the dashboard for OpenStack. It's like the control center where users can visually manage and monitor their cloud resources, providing an easy-to-use interface for tasks like creating virtual machines or checking system status.

Cinder, on the other hand, is the storage manager. It's responsible for handling the storage aspects in OpenStack, acting like a virtual storage clerk that helps organize and allocate storage resources for your cloud applications and services.

**Conclusions:**

In conclusion, cloud services offer flexibility and cost efficiency but raise concerns about security. Public clouds are cost-effective, private clouds offer more security control, and hybrid clouds balance both. In OpenStack, Neutron manages communication, Horizon serves as a user-friendly dashboard, and Cinder organizes storage. Together, they make OpenStack efficient and user-friendly for effective cloud infrastructure management.