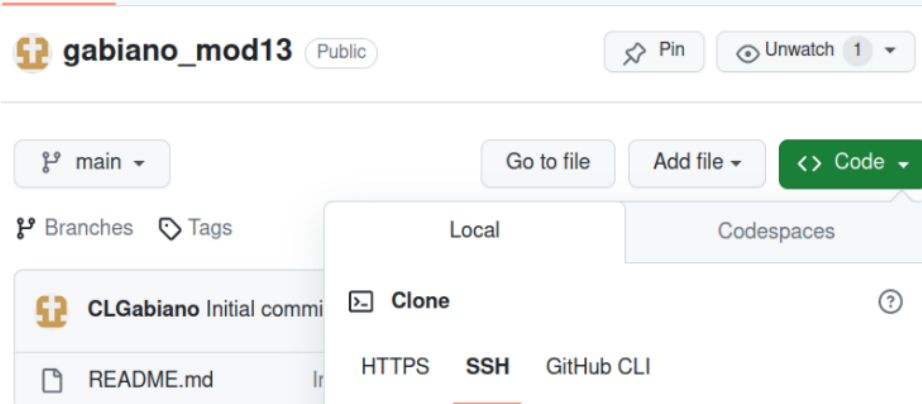


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Course/Section: CPE31S6	Date Submitted: Nov 28, 2023
Instructor: Engr. Jonathan Taylar	Semester and SY: 2023 - 24
Activity 13: OpenStack Prerequisite Installation	
1. Objectives	
Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).	
2. Intended Learning Outcomes	
<div>1. Analyze the advantages and disadvantages of cloud services</div> <div>2. Evaluate different Cloud deployment and service models</div> <div>3. Create a workflow to install and configure OpenStack base services using Ansible as documentation and execution.</div>	
3. Resources	
Oracle VirtualBox (Hypervisor) 1x Ubuntu VM or Centos VM	
4. Tasks	
<div>1. Create a new repository for this activity.</div> <div></div> <div>2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/</div> <div><div>a. NTP</div><div>b. OpenStack packages</div><div>c. SQL Database</div><div>d. Message Queue</div><div>e. Memcached</div><div>f. Etcd</div><div>g. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in Inventory file.</div><div>h. Add, commit and push it to your GitHub repo.</div></div>	

```
leonard@WORKSTATION:~/gabiano_mod13/roles$ tree
.
├── etcd
│   └── tasks
│       └── main.yml
├── memcache
│   └── tasks
│       └── main.yml
├── mesque
│   └── tasks
│       └── main.yml
├── ntp
│   └── tasks
│       └── main.yml
├── openstack
│   └── tasks
│       └── main.yml
└── sql
    └── tasks
        └── main.yml

12 directories, 6 files
```

fig 2. create directories (tree)

```
leonard@WORKSTATION:~/gabiano_mod13$ sudo nano openstack.yml
leonard@WORKSTATION:~/gabiano_mod13$ ls
ansible.cfg  inventory  openstack.yml  README.md  roles
```

fig 2.1 create a playbook

```
GNU nano 6.2                                openstack.yml
This is the main playbook for openstack installation
...

hosts: all
become: true
roles:
  - role: ntp
  - role: openstack
  - role: sql
  - role: mesq
  - role: memcache
  - role: etcd
```

fig 2.2 openstack.yml

Task #3

a. ntp

```
1  #this is the main.yml playbook for installing NTP
2
3  - name: Installing Chrony (Ubuntu)
4    apt:
5      name: chrony
6      state: latest
7
8  - replace:
9      dest: /etc/chrony/chrony.conf
10     regexp: server NTP_SERVER iburst
11     replace: server 192.168.56.102 iburst
12     backup: yes
13
14  - name: add key to chrony.conf
15    ansible.builtin.lineinfile:
16      dest: /etc/chrony/chrony.conf
17      line: allow 10.0.0.0/24
18      backup: yes
19
20  - name: Verifying Installation (Chrony for Ubuntu)
21    service:
22      name: chrony
23      state: restarted
24      enabled: true
```

b. openstack

```
1  #this is the main\yml file for installing Openstack
2
3  - name: Installing OpenStack (Ubuntu)
4    apt:
5      name:
6        - nova-compute
7        - python3-openstackclient
8      state: latest
```

c. sql

```
1  #this is the main.yml file for installing SQL Database
2
3  - name: Installing Packages (SQL for Ubuntu)
4    apt:
5      name:
6        - mariadb-server
7        - python3-pymysql
8      state: latest
9
10  - name: Create Config File
11    file:
12      path: /etc/mysql/mariadb.conf.d/99-openstack.cnf
13      state: touch
14      owner: root
15      group: root
16      mode: 0777
17
18  - name: Editing Config File
19    lineinfile:
20      dest: /etc/mysql/mariadb.conf.d/99-openstack.cnf
21      line: "{{ item }}"
22      state: present
23      backup: yes
24    with_items:
25      - '[mysqld]'
26      - 'bind-address = 10.0.0.11'
27      - ' '
28      - 'default-store-engine = innodb'
29      - 'innodb_file_per_table = on'
30      - 'max_connections = 4096'
31      - 'collation-server = utf8_general_ci'
32      - 'character-ser-server = utf8'
```

```

34 - name: Restarting Service
35   service:
36     name: mysql
37     state: restarted
38     enabled: true
39
40 - name: Finalizing Installation
41   expect:
42     command: mysql_secure_installation
43     responses:
44       'Enter current password for root:': ' '
45       'Set root password': 'n'
46       'Remove anonymous users': 'y'
47       'Disallow root login remotely': 'y'
48       'Remove test database': 'y'
49       'Reload privilege tables now': 'y'
50     timeout: 1
51   register: secure_mariadb
52   failed_when: "'... Failed!' in secure_mariadb.stdout_lines"

```

d. message queue

```

1 - name: Install Message Queue
2   apt:
3     name: rabbitmq-server
4     state: present
5     update_cache: yes
6
7 - name: Starting service
8   service:
9     name: rabbitmq-server.service
10    state: started
11    enabled: true

```

e. memcached

```

1 #This is the main.yml file for installing Memory Cached
2
3 - name: Installing MemCached (Ubuntu)
4   apt:
5     name:
6       - memcached
7       - python3-memcache
8     state: latest
9
10 - name: Editing Config File
11   lineinfile:
12     dest: /etc/memcached.conf
13     regexp: "-l 127.0.0.1"
14     line: "-l 10.0.0.11"
15     state: present
16     backup: yes
17
18 - name: Restart Service
19   service:
20     name: memcached
21     state: restarted
22     enabled: true

```

f. etcd

```

1 #This is the main.yml file for installing etcd
2
3 - name: Installing Packages (etcd for Ubuntu)
4   apt:
5     name:
6       - etcd
7     state: latest
8
9 - name: Editing Config File
10  lineinfile:
11    dest: /etc/default/etcd
12    regexp: '{{ item.regexp }}'
13    line: '{{ item.line }}'
14    state: present
15    backup: yes
16
17  with_items:
18    - { regexp: 'ETCD_INITIAL_CLUSTER=', line: 'ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"' }
19    - { regexp: 'ETCD_INITIAL_ADVERTISE_PEER_URLS=', line: 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"' }
20    - { regexp: 'ETCD_ADVERTISE_CLIENT_URLS=', line: 'ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"' }
21    - { regexp: 'ETCD_LISTEN_PEER_URLS=', line: 'ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380" ' }
22    - { regexp: 'ETCD_LISTEN_CLIENT_URLS=', line: 'ETCD_LISTEN_CLIENT_URLS="http:// 10.0.0.11:2379" ' }

```

5. Output (playbook)

```
Leonard@WORKSTATION:~/gabiano_mod13$ ansible-playbook --ask-become-pass openstack.yml
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.103]

TASK [ntp : Installing Chrony (Ubuntu)] *****
ok: [192.168.56.103]

TASK [ntp : replace] *****
ok: [192.168.56.103]

TASK [ntp : add key to chrony.conf] *****
ok: [192.168.56.103]

TASK [ntp : Verifying Installation (Chrony for Ubuntu)] *****
changed: [192.168.56.103]

TASK [openstack : Installing OpenStack (Ubuntu)] *****
ok: [192.168.56.103]

TASK [sql : Installing Packages (SQL for Ubuntu)] *****
changed: [192.168.56.103]

TASK [sql : Create Config File] *****
changed: [192.168.56.103]
```

```
TASK [sql : Editing Config File] *****
changed: [192.168.56.103] => (item=[mysqld])
changed: [192.168.56.103] => (item=bind-address = 10.0.0.11)
changed: [192.168.56.103] => (item= )
changed: [192.168.56.103] => (item=default-store-engine = innodb)
changed: [192.168.56.103] => (item=innodb_file_per_table = on)
changed: [192.168.56.103] => (item=max_connections = 4096)
changed: [192.168.56.103] => (item=collation-server = utf8_general_ci)
changed: [192.168.56.103] => (item=character-ser-server = utf8)

TASK [sql : Restarting Service] *****
LibreOffice Writer .68.56.103]

TASK [sql : Finalizing Installation] *****
changed: [192.168.56.103]

TASK [mesque : Install Message Queue] *****
changed: [192.168.56.103]

TASK [mesque : Starting service] *****
ok: [192.168.56.103]

TASK [memcache : Installing MemCached (Ubuntu)] *****
changed: [192.168.56.103]

TASK [memcache : Editing Config File] *****
changed: [192.168.56.103]

TASK [memcache : Restart Service] *****
changed: [192.168.56.103]
```

```
TASK [etcd : Installing Packages (etcd for Ubuntu)] *****
changed: [192.168.56.103]

TASK [etcd : Editing Config File] *****
changed: [192.168.56.103] => (item={'regex': 'ETCD_INITIAL_CLUSTER=', 'line': 'ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"'})
changed: [192.168.56.103] => (item={'regex': 'ETCD_INITIAL_ADVERTISE_PEER_URLS=', 'line': 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"'})
changed: [192.168.56.103] => (item={'regex': 'ETCD_ADVERTISE_CLIENT_URLS=', 'line': 'ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"'})
changed: [192.168.56.103] => (item={'regex': 'ETCD_LISTEN_PEER_URLS=', 'line': 'ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380 "'})
changed: [192.168.56.103] => (item={'regex': 'ETCD_LISTEN_CLIENT_URLS=', 'line': 'ETCD_LISTEN_CLIENT_URLS="http:// 10.0.0.11:2379"'})

PLAY RECAP *****
192.168.56.103 : ok=18 changed=12 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

Leonard@WORKSTATION:~/gabiano_mod13$ S
```

verifying

a. ntp

```
leonard@SERVER1:~$ systemctl status ntp
● ntp.service - Network Time Service
   Loaded: loaded (/lib/systemd/system/ntp.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-11-28 23:17:06 +08; 10s ago
     Docs: man:ntpd(8)
  Process: 3791 ExecStart=/usr/lib/ntp/ntp-systemd-wrapper (code=exited, status=0/SUCCESS)
    Main PID: 3797 (ntpd)
       Tasks: 2 (limit: 4594)
      Memory: 1.4M
         CPU: 45ms
    CGroup: /system.slice/ntp.service
            └─3797 /usr/sbin/ntpd -p /var/run/ntpd.pid -g -u 140:149

leonard@SERVER1:~$
```

```
leonard@SERVER1:~$ ntpq -p
      remote           refid      st t when poll reach  delay  offset jitter
=====
0.ubuntu.pool.n .POOL.          16 p   -   64    0   0.000  +0.000   0.000
1.ubuntu.pool.n .POOL.          16 p   -   64    0   0.000  +0.000   0.000
2.ubuntu.pool.n .POOL.          16 p   -   64    0   0.000  +0.000   0.000
3.ubuntu.pool.n .POOL.          16 p   -   64    0   0.000  +0.000   0.000
ntp.ubuntu.com .POOL.          16 p   -   64    0   0.000  +0.000   0.000
185.125.190.56 194.121.207.249 2 u   50   64    1 207.009  +2.137   0.000
Trash 125.190.57 201.68.88.106 2 u   48   64    1 196.884  -2.286   0.000
alphyn.canonica 132.163.96.1 2 u   48   64    1 240.340 +11.076   0.000
185.125.190.58 37.15.221.189 2 u   49   64    1 197.616  -1.797   0.000

leonard@SERVER1:~$
```

b. OpenStack packages

```
leonard@SERVER1:~$ dpkg -l | grep openstack
ii python3-openstackclient 5.8.0-0ubuntu1
all OpenStack Command-line Client - Python 3.x
ii python3-openstacksdk 0.61.0-0ubuntu1
all SDK for building applications to work with OpenStack - Python 3.x

leonard@SERVER1:~$
```

c. sql

```
leonard@SERVER1:~$ systemctl status mysql
● UbuntuSoftwareService - MariaDB 10.6.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-11-28 23:15:19 +08; 4min 12s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
  Main PID: 877 (mariadb)
    Status: "Taking your SQL requests now..."
       Tasks: 9 (limit: 4594)
      Memory: 90.3M
         CPU: 1.259s
    CGroup: /system.slice/mariadb.service
            └─877 /usr/sbin/mariadb

Warning: some journal files were not opened due to insufficient permissions.
leonard@SERVER1:~$
```

```
leonard@SERVER1:~$ systemctl status mariadb
● mariadb.service - MariaDB 10.6.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-11-28 23:15:19 +08; 4min 43s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
  Main PID: 877 (mariadb)
    Status: "Taking your SQL requests now..."
       Tasks: 9 (limit: 4594)
      Memory: 90.3M
         CPU: 1.280s
    CGroup: /system.slice/mariadb.service
            └─877 /usr/sbin/mariadb

Warning: some journal files were not opened due to insufficient permissions.
leonard@SERVER1:~$
```


d. Message Queue

```
leonard@SERVER1:~$ systemctl status mariadb
● mariadb.service - MariaDB 10.6.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-11-28 23:15:19 +08; 4min 43s ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 877 (mariabdb)
    Status: "Taking your SQL requests now..."
     Tasks: 9 (limit: 4594)
    Memory: 90.3M
       CPU: 1.280s
    CGroup: /system.slice/mariadb.service
            └─877 /usr/sbin/mariabdb

Warning: some journal files were not opened due to insufficient permissions.
```

```
leonard@SERVER1:~$ sudo rabbitmqctl list_users
Listing users ...
user    tags
guest   [administrator]
leonard@SERVER1:~$ sudo rabbitmqctl list_vhosts
sudo: rabbitmqctl: command not found
leonard@SERVER1:~$ sudo rabbitmqctl list_vhosts
Listing vhosts ...
name
/
```

e. Memcached

```
leonard@SERVER1:~$ sudo systemctl status memcached
● memcached.service - memcached daemon
   Loaded: loaded (/lib/systemd/system/memcached.service; enabled; vendor prese
   Active: active (running) since Thu 2023-11-30 17:00:53 PST; 2min 9s ago
     Docs: man:memcached(1)
   Main PID: 3187 (memcached)
      Tasks: 10 (limit: 4884)
    CGroup: /system.slice/memcached.service
            └─3187 /usr/bin/memcached -m 64 -p 11211 -u memcache -l 127.0.0.1 -P

Nov 30 17:00:53 SERVER1 systemd[1]: Started memcached daemon.
```

d. Etcd

```
leonard@SERVER1:~$ sudo systemctl status etcd
● etcd.service - etcd - highly-available key value store
   Loaded: loaded (/lib/systemd/system/etcd.service; enabled; vendor preset: en
   Active: active (running) since Thu 2023-11-30 17:04:19 PST; 33s ago
     Docs: https://github.com/coreos/etcd
           man:etcd
   Main PID: 5611 (etcd)
      Tasks: 11 (limit: 4884)
    CGroup: /system.slice/etcd.service
            └─5611 /usr/bin/etcd

Nov 30 17:04:19 SERVER1 etcd[5611]: 8e9e05c52164694d received MsgVoteResp from
Nov 30 17:04:19 SERVER1 etcd[5611]: 8e9e05c52164694d became leader at term 2
Nov 30 17:04:19 SERVER1 etcd[5611]: raft.node: 8e9e05c52164694d elected leader
Nov 30 17:04:19 SERVER1 etcd[5611]: setting up the initial cluster version to 3
Nov 30 17:04:19 SERVER1 etcd[5611]: set the initial cluster version to 3.2
Nov 30 17:04:19 SERVER1 etcd[5611]: enabled capabilities for version 3.2
Nov 30 17:04:19 SERVER1 etcd[5611]: published {Name:SERVER1 ClientURLs:[http://
Nov 30 17:04:19 SERVER1 etcd[5611]: ready to serve client requests
Nov 30 17:04:19 SERVER1 etcd[5611]: serving insecure client requests on 127.0.0
Nov 30 17:04:19 SERVER1 systemd[1]: Started etcd - highly-available key value s
lines 1-20/20 (END)
```

github link: https://github.com/CLGabiano/gabiano_mod13.git

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

Utilizing OpenStack offers businesses a versatile and budget-friendly way to handle their cloud infrastructure, allowing easy scalability and adaptability without being tied to a specific vendor. It also promotes teamwork among different departments, improving overall efficiency in delivering and managing IT services.

Conclusions:

In conclusion, deploying OpenStack with Ansible streamlines the complex process of setting up efficient cloud infrastructure. The benefits include improved scalability, resource optimization, and rapid deployment, aided by Ansible's automation capabilities. However, challenges like complex configurations and compatibility issues may arise. Choosing between public, private, or hybrid cloud models depends on priorities—public for cost-effective scalability, private for enhanced security, and hybrid for a balance between flexibility and control. Thorough evaluation ensures alignment with business goals, maximizing the benefits of OpenStack deployment for a dynamic IT infrastructure.