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Course/Section: CPE232 - CPE31S4	Date Submitted: 11-28-23
Instructor: Dr. Jonathan V. Taylar	Semester and SY: 1st Sem: '23 - '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

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. NTP
    b. OpenStack packages
    c. SQL Database
    d. Message Queue
    e. Memcached
    f. Etcd
    g. Create different plays in installing per server type (controller, compute, etc.) and identify it as a group in inventory file.
    h. Add, commit and push it to your GitHub repo.

5. Output (screenshots and explanations)

INPUT
Create a new repository for this activity

main ▾

Go to file   Add file ▾   <> Code ▾

⑂ Branches   ⬙ Tags

Angela-Pacinos Initial commit ⋯   now   🕐 1

📄 README.md   Initial commit   now

README.md   ✏️

CPE232_HOA13

CPE232 - CPE31S4 Hands-on Activity 13

About   ⚙️

CPE232 - CPE31S4 Hands-on
Activity 13

📖 Readme

∿ Activity

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👁 1 watching

⑂ 0 forks

Releases

No releases published
Create a new release

```
angela@workstation: ~/CPE232_HOA13          🔍  ☰  —  ☐  ✕

angela@workstation:~$ git clone https://github.com/Angela-Pacinos/CPE232_HOA
13.git
Cloning into 'CPE232_HOA13'...
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_HOA13
angela@workstation:~/CPE232_HOA13$ sudo nano inventory
[sudo] password for angela:
angela@workstation:~/CPE232_HOA13$ sudo nano ansible.cfg
angela@workstation:~/CPE232_HOA13$ ls
ansible.cfg  inventory  README.md
```

```
angela@workstation: ~/CPE232_HOA13          🔍  ☰  —  ☐  ✕

angela@workstation:~/CPE232_HOA13$ tree
.
├── ansible.cfg
├── install_openstack.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/

for Ubuntu


```yaml
# NTP
- name: Install NTP package
  apt:
    name: chrony
    state: latest

- name: Edit chrony.conf file
  lineinfile:
    dest: /etc/chrony/chrony.conf
    regexp: "server NTP_SERVER iburst"
    line: "server 192.168.56.117 iburst"

- name: Chrony Daemon
  lineinfile:
    dest: /etc/chrony/chrony.conf
    line: "allow 10.0.0.0/24"
    backup: yes

- name: NTP Restarting / Enabling
  service:
    name: chrony
    state: restarted
    enabled: true

# OpenStack packages
- name: Install Nova-compute
  apt:
    name: nova-compute
    state: latest

- name: Install OpenStack Client
  apt:
    name: python3-openstackclient
    state: latest

# SQL Database
- name: Install SQL packages
  apt:
    name:
      - mariadb-server
      - python3-pymysql

- name: Create file (SQL)
  file:
    dest: /etc/mysql/mariadb.conf.d/99-openstack.cnf
    state: touch

- name: Edit file (SQL)
  lineinfile:
```

```yaml
- name: Edit file (SQL)
  lineinfile:
    path: /etc/mysql/mariadb.conf.d/99-openstack.cnf
    state: present
    line: "{{ item }}"
  with_items:
  - [mysqld]
  - bind-address = 10.0.0.11
  - |
  - default-storage-engine = innodb
  - innodb_file_per_table = on
  - max_connections = 4096
  - collation-server = utf8_general_ci
  - character-set-server = utf

- name: MySQL Restarting
  service:
    name: mysql
    state: restarted
    enabled: true

# Message Queue
- name: Install Message Queue package
  apt:
    name: rabbitmq-server
    state: latest

- name: Add RabbitMQ user
  command: rabbitmqctl add_user openstack pacinos_tip
  ignore_errors: yes

- name: Permit configuration
  command: rabbitmqctl set_permissions openstack ".*" ".*" ".*"

# memcached
- name: Install memcached packages
  apt:
    name:
      - memcached
      - python3-memcache
    state: latest

- name: Edit file (memcached)
  lineinfile:
    path: /etc/memcached.conf
    regexp: "-l 127.0.0.1"
    line: "-l 10.0.0.11"

- name: memcached Restarting
```

```yaml
- name: memcached Restarting
  service:
    name: memcached
    state: restarted
    enabled: true

# Etcd
- name: Install Etcd package
  apt:
    name: etcd
    state: latest

- name: Edit file (Etcd)
  lineinfile:
    path: /etc/default/etcd
    state: present
    line: "{{ item }}"
  loop:
  - {regexp: "ETCD_INITIAL_CLUSTER",
    line: 'ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"'}
  - {regexp: "ETCD_INITIAL_ADVERTISE_PEER_URLS",
    line: 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"'}
  - {regexp: "ETCD_ADVERTISE_CLIENT_URLS",
    line: 'ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"'}
  - {regexp: "ETCD_LISTEN_CLIENT_URLS",
    line: 'ETCD_LISTEN_CLIENT_URLS="http://10.0.0.11:2379"'}

- name: Etcd Restaring / Enabling
  service:
    name: etcd
    state: restarted
    enabled: true
```

for CentOS

```yaml
GNU nano 6.2              roles/c_server/tasks/main.yml *
# NTP
- name: Install NTP package
  yum:
    name: chrony
    state: latest

- name: Edit chrony.conf file
  lineinfile:
    dest: /etc/chrony.conf
    regexp: "server NTP_SERVER iburst"
    line: "server 192.168.56.115 iburst"

- name: Chrony Daemon
  lineinfile:
    dest: /etc/chrony.conf
    line: "allow 10.0.0.0/24"
    backup: yes

- name: NTP Starting / Enabling
  service:
    name: chronyd
    state: started
    enabled: yes

# OpenStack packages
- name: Install subscription manager
  yum:
    name: subscription-manager
    state: present

- name: Enable repositories (openstack)
  command: "subscription-manager repos --enable=rhel-7-server-optional-rpms"
  ignore_errors: true

- name: Add RDO repository
  apt_repository:
    url: https://rdoproject.org/repos/rdo-release.rpm
    state: present

- name: Install OpenStack Client
  yum:
    name: python-openstackclient

# SQL Database
- name: Install SQL packages
  yum:
    name:
      - mariadb
      - mariadb-server
```

```yaml
# SQL Database
- name: Install SQL packages
  yum:
    name:
      - mariadb
      - mariadb-server
      - python-PyMySQL

- name: Create file (SQL)
  file:
    dest: /etc/my.cnf.d/openstack.cnf
    state: touch

- name: Edit file (SQL)
  lineinfile:
    path: /etc/my.cnf.d/openstack.cnf
    state: present
    line: "{{ item }}"
  with_items:
  - [mysqld]
  - bind-address = 10.0.0.11
  - |
  - default-storage-engine = innodb
  - innodb_file_per_table = on
  - max_connections = 4096
  - collation-server = utf8_general_ci
  - character-set-server = utf8

- name: Mariadb Restarting / Enabling
  service:
    name: mariadb.service
    state: restarted
    enabled: true

# Message Queue
- name: Install Message Queue package
  yum:
    name: rabbitmq-server
    state: present

- name: Rabbitmq-server Starting / Enabling
  service:
    name: rabbitmq-server
    state: started
    enabled: true

- name: Add RabbitMQ user
  command: rabbitmqctl add_user openstack pacinos_tip
  ignore_errors: yes
```

```yaml
# memcached
- name: Install memcached packages
  yum:
    name:
      - memcached
      - python-memcached
    state: latest

- name: Edit file (memcached)
  lineinfile:
    path: /etc/sysconfig/memcached
    regexp: 'OPTIONS="-1 127.0.0.1,::1"'
    line: 'OPTIONS="-1 127.0.0.1,::1,controller"'

- name: memcached Starting / Enabling
  service:
    name: memcached
    state: started
    enabled: true

# Etcd
- name: Install Etcd package
  yum:
    name: etcd
    state: latest

- name: Edit file (Etcd)
  lineinfile:
    dest: /etc/etcd/etcd.conf
    state: present
    line: "{{ item }}"
  loop:
  - {regexp: "ETCD_INITIAL_CLUSTER",
     line: 'ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"'}
  - {regexp: "ETCD_INITIAL_ADVERTISE_PEER_URLS",
     line: 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"'}
  - {regexp: "ETCD_ADVERTISE_CLIENT_URLS",
     line: 'ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"'}
  - {regexp: "ETCD_LISTEN_CLIENT_URLS",
     line: 'ETCD_LISTEN_CLIENT_URLS="http://10.0.0.11:2379"'}

- name: Etcd Starting / Enabling
  service:
    name: etcd
    state: started
    enabled: true
```

install_openstack.yml

```
GNU nano 6.2                    install_openstack.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_server
  become: true
  roles:
    - u_server

- hosts: c_server
  become: true
  roles:
    - c_server
```

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

CPE232_HOA13 Public

main   Go to file   Add file ▾   <> Code ▾

Branches   Tags

Angela-Pacinos HOA13 ...   5 minutes ago   2

roles   HOA13   5 minutes ago
README.md   Initial commit   2 days ago
ansible.cfg HOA13   5 minutes ago
controller.yml HOA13   5 minutes ago
inventory   HOA13   5 minutes ago

README.md

CPE232_HOA13

CPE232 - CPE31S4 Hands-on Activity 13

About

CPE232 - CPE31S4 Hands-on Activity 13

Readme
Activity
0 stars
1 watching
0 forks

Releases

No releases published
Create a new release

Packages

No packages published
Publish your first package

PROCESS

```
angela@workstation: ~/CPE232_HOA13                    ☰  —  ▢  ✕

  angela@workstation: ~/C...  ✕    angela@workstation: ~/C...  ✕    angela@workstation: ~/C...  ✕    ⌄

angela@workstation:~/CPE232_HOA13$ ansible-playbook --ask-become-pass controller.yml
BECOME password:

PLAY [all] *********************************************************************

TASK [Gathering Facts] ********************************************************
ok: [192.168.56.115]
ok: [192.168.56.117]

TASK [Install updates (Ubuntu)] **********************************************
skipping: [192.168.56.115]
ok: [192.168.56.117]

TASK [Install updates (CentOS)] **********************************************
skipping: [192.168.56.117]
ok: [192.168.56.115]

PLAY [u_server] ***************************************************************

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

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

TASK [u_server : Edit chrony.conf file] **************************************
changed: [192.168.56.117]

TASK [u_server : Chrony Daemon] **********************************************
ok: [192.168.56.117]

TASK [u_server : NTP Restarting / Enabling] **********************************
changed: [192.168.56.117]

TASK [u_server : Install Nova-compute] ***************************************
ok: [192.168.56.117]

TASK [u_server : Install OpenStack Client] ***********************************
changed: [192.168.56.117]

TASK [u_server : Install SQL packages] ***************************************
changed: [192.168.56.117]

TASK [u_server : Create file (SQL)] ******************************************
changed: [192.168.56.117]

TASK [u_server : Edit file (SQL)] ********************************************
```

```
TASK [u_server : Edit file (SQL)] ******************************************
changed: [192.168.56.117] => (item=mysqld)
changed: [192.168.56.117] => (item=bind-address = 10.0.0.11)
changed: [192.168.56.117] => (item=)
changed: [192.168.56.117] => (item=default-storage-engine = innodb)
changed: [192.168.56.117] => (item=innodb_file_per_table = on)
changed: [192.168.56.117] => (item=max_connections = 4096)
changed: [192.168.56.117] => (item=collation-server = utf8_general_ci)
changed: [192.168.56.117] => (item=character-set-server = utf8)

TASK [u_server : MySQL Restarting] *****************************************
changed: [192.168.56.117]

TASK [u_server : Install Message Queue package] ****************************
changed: [192.168.56.117]

TASK [u_server : Add RabbitMQ user] ****************************************
changed: [192.168.56.117]

TASK [u_server : Permit configuration] *************************************
changed: [192.168.56.117]

TASK [u_server : Install memcached packages] *******************************
changed: [192.168.56.117]

TASK [u_server : Edit file (memcached)] ************************************
changed: [192.168.56.117]

TASK [u_server : memcached Restarting] *************************************
changed: [192.168.56.117]

TASK [u_server : Install Etcd package] ************************************
changed: [192.168.56.117]

TASK [u_server : Edit file (Etcd)] ****************************************
changed: [192.168.56.117] => (item={'regexp': 'ETCD_INITIAL_CLUSTER', 'line': 'ETCD_INI
TIAL_CLUSTER="controller=http://10.0.0.11:2380"'})
changed: [192.168.56.117] => (item={'regexp': 'ETCD_INITIAL_ADVERTISE_PEER_URLS', 'line
': 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"'})
changed: [192.168.56.117] => (item={'regexp': 'ETCD_ADVERTISE_CLIENT_URLS', 'line': 'ET
CD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"'})
changed: [192.168.56.117] => (item={'regexp': 'ETCD_LISTEN_CLIENT_URLS', 'line': 'ETCD_
LISTEN_CLIENT_URLS="http://10.0.0.11:2379"'})

TASK [u_server : Etcd Restaring / Enabling] *******************************
changed: [192.168.56.117]
```

```
PLAY [c_server] ***********************************************************

TASK [Gathering Facts] ****************************************************
ok: [192.168.56.115]

TASK [c_server : Install NTP package] *************************************
ok: [192.168.56.115]

TASK [c_server : Edit chrony.conf file] ***********************************
ok: [192.168.56.115]

TASK [c_server : Chrony Daemon] ******************************************
ok: [192.168.56.115]

TASK [c_server : NTP Starting / Enabling] ********************************
ok: [192.168.56.115]

TASK [c_server : Install SQL packages] ***********************************
changed: [192.168.56.115]

TASK [c_server : Create file (SQL)] **************************************
changed: [192.168.56.115]

TASK [c_server : Edit file (SQL)] ****************************************
changed: [192.168.56.115] => (item=mysqld)
changed: [192.168.56.115] => (item=bind-address = 10.0.0.11)
changed: [192.168.56.115] => (item=)
changed: [192.168.56.115] => (item=default-storage-engine = innodb)
changed: [192.168.56.115] => (item=innodb_file_per_table = on)
changed: [192.168.56.115] => (item=max_connections = 4096)
changed: [192.168.56.115] => (item=collation-server = utf8_general_ci)
changed: [192.168.56.115] => (item=character-set-server = utf8)
```

```
TASK [c_server : Mariadb Restarting / Enabling] ********************************
changed: [192.168.56.115]

TASK [c_server : Install memcached packages] **********************************
ok: [192.168.56.115]

TASK [c_server : Edit file (memcached)] ***************************************
ok: [192.168.56.115]

TASK [c_server : memcached Starting / Enabling] *******************************
changed: [192.168.56.115]

TASK [c_server : Install Etcd package] ***************************************
ok: [192.168.56.115]

TASK [c_server : Edit file (Etcd)] *******************************************
changed: [192.168.56.115] => (item={'regexp': 'ETCD_INITIAL_CLUSTER', 'line': 'ETCD_INITIAL_CLUSTER="controller=http:
//10.0.0.11:2380"'})
changed: [192.168.56.115] => (item={'regexp': 'ETCD_INITIAL_ADVERTISE_PEER_URLS', 'line': 'ETCD_INITIAL_ADVERTISE_PEE
R_URLS="http://10.0.0.11:2380"'})
changed: [192.168.56.115] => (item={'regexp': 'ETCD_ADVERTISE_CLIENT_URLS', 'line': 'ETCD_ADVERTISE_CLIENT_URLS="http
://10.0.0.11:2379"'})
changed: [192.168.56.115] => (item={'regexp': 'ETCD_LISTEN_CLIENT_URLS', 'line': 'ETCD_LISTEN_CLIENT_URLS="http://10.
0.0.11:2379"'})

TASK [c_server : Etcd Starting / Enabling] ***********************************
changed: [192.168.56.115]

PLAY RECAP *******************************************************************
192.168.56.115             : ok=17    changed=5    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.117             : ok=22    changed=7    unreachable=0    failed=0    skipped=1    rescued=0    ignored=1

angela@workstation:~/CPE232_H0A13$
```

OUTPUT

NTP

```
angela@server1:~$ systemctl status chrony.service
● chrony.service - chrony, an NTP client/server
     Loaded: loaded (/lib/systemd/system/chrony.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2023-11-26 21:20:25 +08; 4min 30s ago
       Docs: man:chronyd(8)
             man:chronyc(1)
             man:chrony.conf(5)
   Main PID: 54534 (chronyd)
      Tasks: 2 (limit: 5657)
     Memory: 1.3M
        CPU: 310ms
     CGroup: /system.slice/chrony.service
             ├─54534 /usr/sbin/chronyd -F 1
             └─54535 /usr/sbin/chronyd -F 1
angela@server1:~$
```

```
Applications    Places    Terminal                                    Tue 17:10

                              angela@localhost:~

File  Edit  View  Search  Terminal  Help
[angela@localhost ~]$ systemctl status chronyd
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset: ena
bled)
   Active: active (running) since Tue 2023-11-28 17:10:20 PST; 17s ago
     Docs: man:chronyd(8)
           man:chrony.conf(5)
  Process: 26933 ExecStartPost=/usr/libexec/chrony-helper update-daemon (code=exited, s
tatus=0/SUCCESS)
  Process: 26929 ExecStart=/usr/sbin/chronyd $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 26931 (chronyd)
    Tasks: 1
   CGroup: /system.slice/chronyd.service
           └─26931 /usr/sbin/chronyd

Nov 28 17:10:19 localhost.localdomain systemd[1]: Starting NTP client/server...
Nov 28 17:10:19 localhost.localdomain chronyd[26931]: chronyd version 3.4 starting ...)
Nov 28 17:10:20 localhost.localdomain systemd[1]: Started NTP client/server.
Hint: Some lines were ellipsized, use -l to show in full.
```

OpenStack packages

```
angela@server1:~$ systemctl status nova-compute
● nova-compute.service - OpenStack Compute
     Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset: e>
     Active: active (running) since Sun 2023-11-26 21:29:02 +08; 1min 30s ago
   Main PID: 67691 (nova-compute)
      Tasks: 1 (limit: 5657)
     Memory: 140.5M
        CPU: 11.295s
     CGroup: /system.slice/nova-compute.service
             └─67691 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova>

[2]+  Stopped                 systemctl status nova-compute
angela@server1:~$
```

SQL Database

```
angela@server1:~$ systemctl status mariadb
● mariadb.service - MariaDB 10.6.12 database server
     Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enable>
     Active: active (running) since Sun 2023-11-26 21:30:50 +08; 6min ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 68977 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 8 (limit: 5657)
     Memory: 61.0M
        CPU: 1.539s
     CGroup: /system.slice/mariadb.service
             └─68977 /usr/sbin/mariadbd

[3]+  Stopped                 systemctl status mariadb
angela@server1:~$
```

```
[angela@localhost ~]$ systemctl status mariadb
● mariadb.service - MariaDB database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; vendor preset: dis
abled)
   Active: active (running) since Tue 2023-11-28 18:15:46 PST; 4min 11s ago
 Main PID: 22844 (mysqld_safe)
    Tasks: 20
   CGroup: /system.slice/mariadb.service
           ├─22844 /bin/sh /usr/bin/mysqld_safe --basedir=/usr
           └─23008 /usr/libexec/mysqld --basedir=/usr --datadir=/var/lib/mysql --plu...

Nov 28 18:15:44 localhost.localdomain mariadb-prepare-db-dir[22808]: error: Found op...
Nov 28 18:15:44 localhost.localdomain mariadb-prepare-db-dir[22808]: Database MariaD...
Nov 28 18:15:44 localhost.localdomain mariadb-prepare-db-dir[22808]: If this is not ...
Nov 28 18:15:44 localhost.localdomain mariadb-wait-ready[22845]: error: Found option...
Nov 28 18:15:44 localhost.localdomain mariadb-wait-ready[22845]: error: Found option...
Nov 28 18:15:44 localhost.localdomain mysqld_safe[22844]: error: Found option withou...
Nov 28 18:15:44 localhost.localdomain mysqld_safe[22844]: error: Found option withou...
Nov 28 18:15:44 localhost.localdomain mysqld_safe[22844]: 231128 18:15:44 mysqld_saf...
Nov 28 18:15:44 localhost.localdomain mysqld_safe[22844]: 231128 18:15:44 mysqld_saf...
Nov 28 18:15:46 localhost.localdomain systemd[1]: Started MariaDB database server.
Hint: Some lines were ellipsized, use -l to show in full.
[angela@localhost ~]$
```

Message Queue

```
angela@server1:~$ systemctl status rabbitmq-server
● rabbitmq-server.service - RabbitMQ Messaging Server
     Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; vendor pre>
     Active: active (running) since Tue 2023-11-28 16:47:08 +08; 55s ago
   Main PID: 24675 (beam.smp)
      Tasks: 25 (limit: 5657)
     Memory: 95.3M
        CPU: 18.498s
     CGroup: /system.slice/rabbitmq-server.service
             ├─24675 /usr/lib/erlang/erts-12.2.1/bin/beam.smp -W w -MBas ageffcbf -MH>
             ├─24686 erl_child_setup 65536
             ├─24741 inet_gethost 4
             └─24742 inet_gethost 4

[5]+  Stopped                 systemctl status rabbitmq-server
angela@server1:~$
```

Etcd

```
angela@server1:~$ systemctl status etcd
● etcd.service - etcd - highly-available key value store
     Loaded: loaded (/lib/systemd/system/etcd.service; enabled; vendor preset: enable>
     Active: active (running) since Tue 2023-11-28 16:48:45 +08; 14min ago
       Docs: https://etcd.io/docs
             man:etcd
   Main PID: 25651 (etcd)
      Tasks: 9 (limit: 5657)
     Memory: 6.4M
        CPU: 6.794s
     CGroup: /system.slice/etcd.service
             └─25651 /usr/bin/etcd
lines 1-11/11 (END)
angela@server1:~$
```

```
angela@localhost:~

File  Edit  View  Search  Terminal  Help
[angela@localhost ~]$ systemctl status etcd
● etcd.service - Etcd Server
   Loaded: loaded (/usr/lib/systemd/system/etcd.service; enabled; vendor preset: disabl
ed)
   Active: active (running) since Tue 2023-11-28 18:16:07 PST; 5min ago
 Main PID: 23963 (etcd)
    Tasks: 12
   CGroup: /system.slice/etcd.service
           └─23963 /usr/bin/etcd --name=default --data-dir=/var/lib/etcd/default.etc...

Nov 28 18:16:07 localhost.localdomain etcd[23963]: 8e9e05c52164694d received MsgVot...2
Nov 28 18:16:07 localhost.localdomain etcd[23963]: 8e9e05c52164694d became leader a...2
Nov 28 18:16:07 localhost.localdomain etcd[23963]: raft.node: 8e9e05c52164694d elec...2
Nov 28 18:16:07 localhost.localdomain etcd[23963]: setting up the initial cluster v...3
Nov 28 18:16:07 localhost.localdomain etcd[23963]: set the initial cluster version ...3
Nov 28 18:16:07 localhost.localdomain etcd[23963]: enabled capabilities for version 3.3
Nov 28 18:16:07 localhost.localdomain etcd[23963]: published {Name:default ClientUR...2
Nov 28 18:16:07 localhost.localdomain etcd[23963]: ready to serve client requests
Nov 28 18:16:07 localhost.localdomain etcd[23963]: serving insecure client requests...!
Nov 28 18:16:07 localhost.localdomain systemd[1]: Started Etcd Server.
Hint: Some lines were ellipsized, use -l to show in full.
[angela@localhost ~]$
```

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

OpenStack is an open-source cloud operating system that provides a large set of services such as storage and networking services. There are many benefits in using OpenStack such as it allows infrastructure to upgrade their scale and provide more users with more storage and network needs. The users can also modify and only configure the things that they may need. There are types of clouds that can be customized based on what is needed in security and control. Overall, Openstack is a great system that has a lot of benefits and can provide a large scale of tools on users and on the infrastructure.

Conclusions:

For this activity we were tasked to install different OpenStack packages on our ubuntu and centos using an ansible playbook. There is a provided website where we can get the instructions on what are the needed steps and how to do it, we just had to convert it to a playbook. What I did first was compile all the steps and convert it into a structure for the playbook. I divided it into 2 roles, one for ubuntu and the other for centos. I then tried to create the repository and all the needed files and plug in my code and tried running it. There were a lot of errors, mostly indentation and missing arguments. I was able to run most of it because it was taking too long to install but I was having an issue with my VM. The VMs kept getting aborted and abruptly stopping that I needed to shut the laptop and tried again and again.