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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	
<ol style="list-style-type: none"> 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	
<p>Oracle VirtualBox (Hypervisor)</p> <p>1x Ubuntu VM or Centos VM</p>	
4. Tasks	
<ol style="list-style-type: none"> 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/ <ol style="list-style-type: none"> 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)	
First, create a repository for the activity and clone.	

Create a new repository

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

Owner *



DavonnEscobilla ▾

Repository name *

/ Act13 ✓

Great repository names are short and memorable. Need inspiration? How about [scaling-octo-giggle?](#)

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:

Skip this step if you're importing an existing repository.

☒ Add a README file

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

```
davonn@workstation:~$ git clone git@github.com:DavonnEscobilla/Act13.git
Cloning into 'Act13'...
warning: You appear to have cloned an empty repository.
davonn@workstation:~$ ls
Act13          Downloads      Pictures
Container      Escobilla_Act10  Public
CPE232_Davonn  Escobilla_Act8Nagios  snap
CPE232_Escobilla  Escobilla_Act9Prometheus  Templates
CPE_MIDEXAM_ESCOBILLA  main.yml        Videos
Desktop        Music
Documents      nano.save
```

Create ansible.cfg and inventory.

```
davonn@workstation:~/Act13$ nano ansible.cfg
```

```
GNU nano 6.2                                ansible.cfg *
[defaults]
deprecation_warnings=False
command_warnings=False
inventory=inventory
private_key_file = ~/.ssh/ansible
```

Here, I created a group to install some specifically.

```
GNU nano 6.2                                inventory *
[controller]
192.168.56.106
[compute]
192.168.56.106
```

Next, we create the main.yml

```
davonn@workstation: ~/Act13
GNU nano 6.2 main.yml *
- hosts: all
  become: true
  pre_tasks:
    - name: install updates Ubuntu
      tags: always
      apt:
        upgrade: dist
        update_cache: yes
        changed_when: false
        when: ansible_distribution == "Ubuntu"
- hosts: controller
  become: true
  roles:
    - NTP
    - OpenStack
    - SQL
- hosts: compute
  beocme: true
  roles:
    - Message
    - memcached
    - etcd
```

Next, create roles for each installation together with the task assigned.

```
davonn@workstation:~/Act13/roles$ mkdir -p {NTP,OpenStack,SQL,Message,memcached,etcd}/tasks
```

```
davonn@workstation:~/Act13/roles$ tree
```

```
├── etcd
│   └── tasks
├── memcached
│   └── tasks
├── Message
│   └── tasks
├── NTP
│   └── tasks
├── OpenStack
│   └── tasks
└── SQL
    └── tasks
```

Enter each directories and edit each task assigned to them.

Etcd

```
---
- name: install etcd
  apt:
    name: etcd
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"

- name: enable etcd
  systemd:
    name: etcd
    enabled: yes
```

Memcached

```
---  
  
- name: Install memcached  
  apt:  
    name:  
      - memcached  
      - python3-memcache  
    state: latest  
    update_cache: yes  
  when: ansible_distribution == "Ubuntu"  
  
- name: Restart the memcached  
  systemd:  
    name: memcached  
    state: restarted
```

Message queue

```
---  
  
- name: Install Message Queue  
  apt:  
    name: rabbitmq-server  
    state: latest  
    update_cache: yes  
  when: ansible_distribution == "Ubuntu"
```

NTP

```
---  
  
- name: Install the chrony  
  apt:  
    name: chrony  
    state: latest  
    update_cache: yes  
  
- name: Start the chrony  
  systemd:  
    name: chrony  
    state: started  
  
- name: Enable the chrony  
  systemd:  
    name: chrony  
    enabled: yes
```

OpenStack

```
---  
  
- name: Install the OpenStack  
  apt:  
    name:  
      - nova-compute  
      - python3-openstackclient  
    state: latest  
    update_cache: yes  
  when: ansible_distribution == "Ubuntu"
```

SQL

```
GNU nano 6.2                                tasks.yml *
- name: Install the SQL
  apt:
    name:
      - mariadb-server
      - python3-pymysql
    state: latest
    update_cache: yes
    when: ansible_distribution == "Ubuntu"

- name: Edit mariadb file
  copy:
    content:
      default-storage-engine = innodb
      innodb_file_per_table = on
      max_connections = 4096
      collation-server = utf_general_ci
      character-set-server = utf8
    dest: /etc/mysql/mariadb.conf.d/99-openstack.cnf
    mode: "0755"

- name: Enable the mariadb
  systemd:
    name: mariadb
    enabled: yes
```



```
GNU nano 6.2                                tasks.yml *
  state: latest
  update_cache: yes
  when: ansible_distribution == "Ubuntu"

- name: Edit mariadb file
  copy:
    content:
      default-storage-engine = innodb
      innodb_file_per_table = on
      max_connections = 4096
      collation-server = utf_general_ci
      character-set-server = utf8
    dest: /etc/mysql/mariadb.conf.d/99-openstack.cnf
    mode: "0755"

- name: Enable the mariadb
  systemd:
    name: mariadb
    enabled: yes

- name: Restart the mariadb
  systemd:
    name: mariadb
    state: restarted
```

Next, run the main.yml created earlier to perform all the assigned tasks.

```
davonn@workstation: ~/Act13
davonn@workstation:~/Act13$ ansible-playbook --ask-become-pass main.yml
BECOME password:

PLAY [all] *****
*

TASK [Gathering Facts] *****
*
ok: [192.168.56.106]

TASK [install updates Ubuntu] *****
*
ok: [192.168.56.106]

PLAY [controller] *****
*

TASK [Gathering Facts] *****
*
ok: [192.168.56.106]

TASK [NTP : Install the chrony] *****
*
changed: [192.168.56.106]

TASK [NTP : Start the chrony] *****
*
ok: [192.168.56.106]
```

```
davonn@workstation: ~/Act13

TASK [NTP : Enable the chrony] *****
*
ok: [192.168.56.106]

TASK [OpenStack : Install the OpenStack] *****
*
changed: [192.168.56.106]

TASK [SQL : Install the SQL] *****
*
changed: [192.168.56.106]

TASK [SQL : Edit mariadb file] *****
*
changed: [192.168.56.106]

TASK [SQL : Enable the mariadb] *****
*
ok: [192.168.56.106]

TASK [SQL : Restart the mariadb] *****
*
changed: [192.168.56.106]

PLAY [compute] *****
*

TASK [Gathering Facts] *****
*
```

```
davonn@workstation: ~/Act13
*
ok: [192.168.56.106]

TASK [Message : Install Message Queue] *****
*
changed: [192.168.56.106]

TASK [memcached : Install memcached] *****
*
changed: [192.168.56.106]

TASK [memcached : Restart the memcached] *****
*
changed: [192.168.56.106]

TASK [etcd : install etcd] *****
*
changed: [192.168.56.106]

TASK [etcd : enable etcd] *****
*
ok: [192.168.56.106]

PLAY RECAP *****
192.168.56.106 : ok=17  changed=9  unreachable=0  failed=0
skipped=0     rescued=0  ignored=0

Check each task installation if they are running.
```

```
davonn@server3:~$ systemctl status chrony
● chrony.service - chrony, an NTP client/server
   Loaded: loaded (/lib/systemd/system/chrony.service; enabled; vendor prese>
   Active: active (running) since Fri 2022-12-02 15:09:21 PST; 8min ago
     Docs: man:chronyd(8)
           man:chronyc(1)
           man:chrony.conf(5)
  Main PID: 28497 (chronyd)
    Tasks: 2 (limit: 1640)
   Memory: 1.3M
      CPU: 80ms
   CGroup: /system.slice/chrony.service
           └─28497 /usr/sbin/chronyd -F 1
             └─28498 /usr/sbin/chronyd -F 1

Dec 02 15:09:21 server3 systemd[1]: Starting chrony, an NTP client/server...
Dec 02 15:09:21 server3 chronyd[28497]: chronyd version 4.2 starting (+CMDMON >
Dec 02 15:09:21 server3 chronyd[28497]: Initial frequency 27.118 ppm
Dec 02 15:09:21 server3 chronyd[28497]: Using right/UTC timezone to obtain lea>
Dec 02 15:09:21 server3 chronyd[28497]: Loaded seccomp filter (level 1)
Dec 02 15:09:21 server3 systemd[1]: Started chrony, an NTP client/server.
Dec 02 15:09:26 server3 chronyd[28497]: Selected source 162.159.200.123 (0.ubu>
Dec 02 15:09:26 server3 chronyd[28497]: System clock TAI offset set to 37 seco>
Dec 02 15:09:29 server3 chronyd[28497]: Source 185.125.190.58 replaced with 18>
lines 1-23/23 (END)
```

```
davonn@server3:~$ systemctl status nova-compute.service
● nova-compute.service - OpenStack Compute
   Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor>
   Active: active (running) since Fri 2022-12-02 15:13:26 PST; 5min ago
  Main PID: 42048 (nova-compute)
    Tasks: 2 (limit: 1640)
   Memory: 122.4M
      CPU: 4.124s
   CGroup: /system.slice/nova-compute.service
           └─42048 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc>

Dec 02 15:13:26 server3 systemd[1]: Started OpenStack Compute.
Dec 02 15:13:45 server3 nova-compute[42048]: Modules with known eventlet monke>
lines 1-12/12 (END)
```

```
davonn@server3:~$ systemctl status rabbitmq-server.service
● rabbitmq-server.service - RabbitMQ Messaging Server
   Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2022-12-02 15:15:23 PST; 4min 8s ago
     Main PID: 43945 (beam.smp)
        Tasks: 21 (limit: 1640)
      Memory: 79.6M
         CPU: 5.646s
       CGroup: /system.slice/rabbitmq-server.service
               └─43945 /usr/lib/erlang/erts-12.2.1/bin/beam.smp -W w -MBas ageff
                 └─43956 erl_child_setup 65536
                   └─44003 inet_gethost 4
                     └─44004 inet_gethost 4

Dec 02 15:15:19 server3 systemd[1]: Starting RabbitMQ Messaging Server...
Dec 02 15:15:23 server3 systemd[1]: Started RabbitMQ Messaging Server.
lines 1-15/15 (END)
```

```
davonn@server3:~$ systemctl status etcd
● etcd.service - etcd - highly-available key value store
   Loaded: loaded (/lib/systemd/system/etcd.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2022-12-02 15:15:49 PST; 4min 9s ago
     Docs: https://etcd.io/docs
    man:etcd
   Main PID: 45092 (etcd)
        Tasks: 7 (limit: 1640)
      Memory: 5.2M
         CPU: 1.028s
       CGroup: /system.slice/etcd.service
               └─45092 /usr/bin/etcd

Dec 02 15:15:49 server3 etcd[45092]: 8e9e05c52164694d received MsgVoteResp from 8e9e05c52164694d
Dec 02 15:15:49 server3 etcd[45092]: 8e9e05c52164694d became leader at term 2
Dec 02 15:15:49 server3 etcd[45092]: raft.node: 8e9e05c52164694d elected leader 8e9e05c52164694d
Dec 02 15:15:49 server3 etcd[45092]: setting up the initial cluster version to 3.3
Dec 02 15:15:49 server3 etcd[45092]: set the initial cluster version to 3.3
Dec 02 15:15:49 server3 etcd[45092]: enabled capabilities for version 3.3
Dec 02 15:15:49 server3 etcd[45092]: published {Name:server3 ClientURLs:[http://127.0.0.1:2379, http://127.0.0.1:2380]}
Dec 02 15:15:49 server3 etcd[45092]: ready to serve client requests
Dec 02 15:15:49 server3 etcd[45092]: serving insecure client requests on 127.0.0.1
Dec 02 15:15:49 server3 systemd[1]: Started etcd - highly-available key value store.
lines 1-22/22 (END)
```

```
davonn@server3:~$ systemctl status memcached.service
● memcached.service - memcached daemon
   Loaded: loaded (/lib/systemd/system/memcached.service; enabled; vendor pre
   Active: active (running) since Fri 2022-12-02 15:15:38 PST; 4min 56s ago
     Docs: man:memcached(1)
    Main PID: 44612 (memcached)
      Tasks: 10 (limit: 1640)
     Memory: 2.0M
        CPU: 131ms
    CGroup: /system.slice/memcached.service
            └─44612 /usr/bin/memcached -m 64 -p 11211 -u memcache -l 127.0.0.1

Dec 02 15:15:38 server3 systemd[1]: memcached.service: Deactivated successfully.
Dec 02 15:15:38 server3 systemd[1]: Stopped memcached daemon.
Dec 02 15:15:38 server3 systemd[1]: Started memcached daemon.
lines 1-14/14 (END)
```

```
davonn@server3:~$ systemctl status mariadb.service
● mariadb.service - MariaDB 10.6.11 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pre
   Active: active (running) since Fri 2022-12-02 15:14:56 PST; 6min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
    Main PID: 43168 (mariabdb)
      Status: "Taking your SQL requests now..."
      Tasks: 7 (limit: 1640)
     Memory: 60.7M
        CPU: 468ms
    CGroup: /system.slice/mariadb.service
            └─43168 /usr/sbin/mariabdb

Dec 02 15:14:56 server3 systemd[1]: Started MariaDB 10.6.11 database server.
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43185]: Upgrading MySQL tables
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43188]: error: Found option wi
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43188]: Looking for 'mariadb'
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43188]: Looking for 'mariadb-c
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43188]: This installation of M
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43188]: There is no need to ru
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43188]: You can use --force if
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43219]: Checking for insecure
Dec 02 15:14:56 server3 /etc/mysql/debian-start[43223]: Triggering myisam-reco
lines 1-23/23 (END)
```

Perform git commands to save the work in the repository.

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

OpenStack provides scalability, easy automation, fast development, and it has a strong community. It is also popular since it can be accessed by many people due to its free use and open-source capability.

Conclusions:

This activity provides the prerequisites about the tools that are needed in order to set up OpenStack. I have performed these various installations via grouping each task assigned to their designated purpose upon navigating into the inventory file. Also, this is performed with the optimization usage of roles to organize the task and distribute it properly on the Ubuntu environment. There are no probable cause to have an error as the configuration about the installation is already given in the link above.