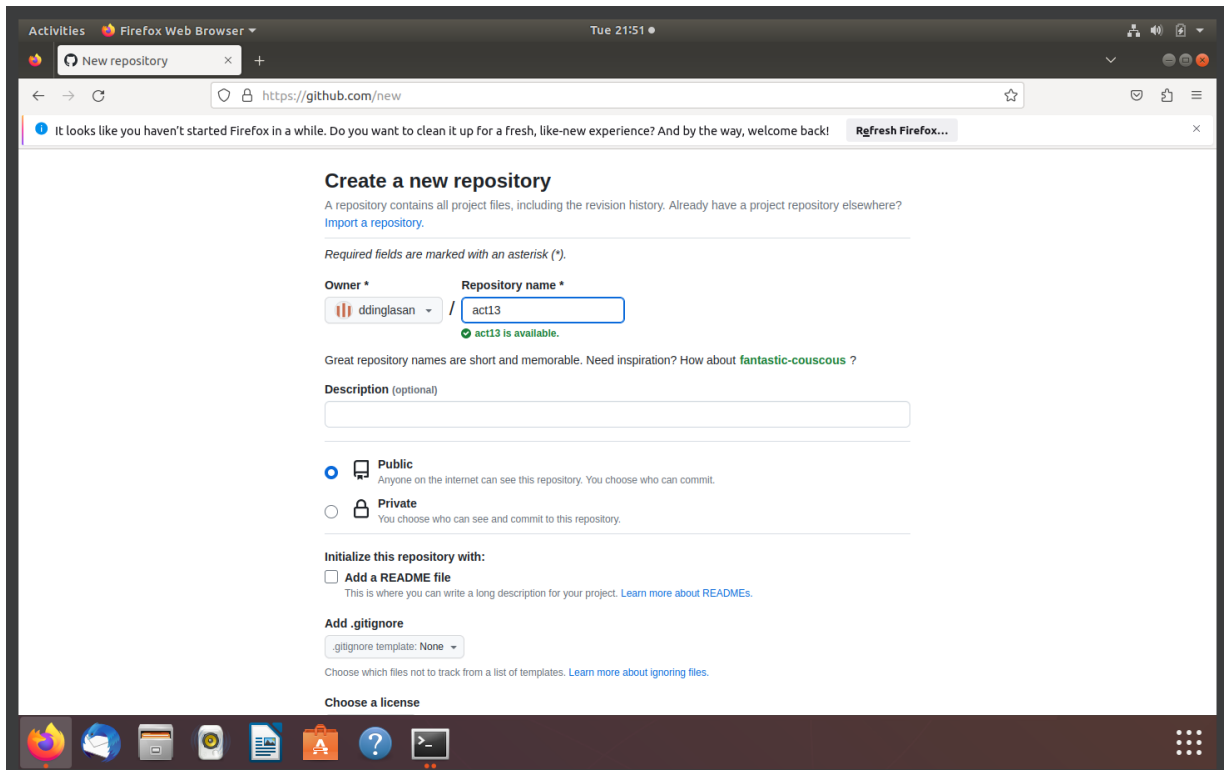
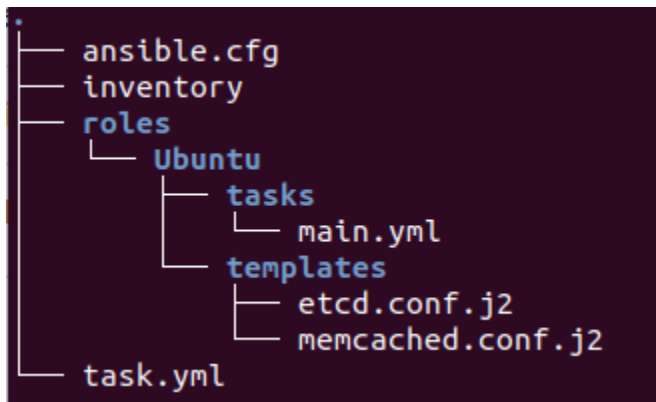


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Course/Section: CPE31S6	Date Submitted: 04/12/2023
Instructor: Dr. Jonathan Vidal Taylar	Semester and SY: 1st Sem 2023 - 2024
Activity 13: OpenStack Prerequisite Installation	
1. Objectives	
Create a workflow to install OpenStack using Ansible as your 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)	

1. Create a new repository for this activity.



Step 2: Create the basic files needed(ansible.cfg & inventory) and create the roles needed for the Ubuntu computer with the main.yml file for the tasks. Also created a task.yml file to run the tasks of the roles.



Step 3: Paste this on the main.yml of the Ubuntu role.

- name: Remove OpenStack as User for Message Queue
command: "rabbitmqctl delete_user openstack"
ignore_errors: yes
changed_when: false
- name: Add OpenStack as User for Message Queue
command: "rabbitmqctl add_user openstack RABBIT_PASS"
ignore_errors: yes
changed_when: false
- name: Modify Permissions for Openstack for Message Queue
command: "rabbitmqctl set_permissions openstack '.*' '.*' '.*'"
ignore_errors: yes
changed_when: false

Memcached

- name: Installation of Memcached
apt:
 name:
 - memcached
 - python3-memcache
 state: present
- name: Creation of Configuration of Memcached
template:
 src: roles/Ubuntu/templates/memcached.conf.j2
 dest: /etc/memcached.conf
 mode: 0644
- name: Enable and Start Memcached
systemd:
 name: memcached
 state: restarted
 enabled: true

ETCD

- name: Installation of ETCD

```
collation-server = utf8_general_ci  
character-set-server = utf8
```

- name: Enable and Start MySQL and MariaDB
systemd:
 name: "{{ item }}"
 state: restarted
 enabled: true
loop:
 - mysql
 - mariadb

Message Queue

- name: Installation of Message Queue (RabbitMQ-Server)
apt:
 name: rabbitmq-server
 state: present

- name: Remove OpenStack as User for Message Queue
command: "rabbitmqctl delete_user openstack"
ignore_errors: yes
changed_when: false
- name: Add OpenStack as User for Message Queue
command: "rabbitmqctl add_user openstack RABBIT_PASS"
ignore_errors: yes
changed_when: false
- name: Modify Permissions for Openstack for Message Queue
command: "rabbitmqctl set_permissions openstack '.*' '.*' '.*'"
ignore_errors: yes
changed_when: false

Memcached

- name: Installation of Memcached
apt:
 name:
 - memcached
 - python3-memcache
 state: present
- name: Creation of Configuration of Memcached
template:
 src: roles/Ubuntu/templates/memcached.conf.j2
 dest: /etc/memcached.conf
 mode: 0644
- name: Enable and Start Memcached
systemd:
 name: memcached
 state: restarted
 enabled: true

ETCD

- name: Installation of ETCD

```
# ETCD
- name: Installation of ETCD
  apt:
    name: etcd
    state: present

- name: Configuration of ETCD
  template:
    src: roles/Ubuntu/templates/etcd.conf.j2
    dest: /etc/default/etcd

- name: Enable and Start ETCD
  systemd:
    name: etcd
    state: restarted
    enabled: true
```

Step 4: Create the following templates.

etcd.conf.j2

```
## etcd(1) daemon options
## See "/usr/share/doc/etcd-server/op-guide/configuration.md.gz"

### Member flags

##### --name
## Human-readable name for this member.
## This value is referenced as this node's own entries listed in the
## `--initial-cluster` flag (e.g., `default=http://localhost:2380`). This
## needs to match the key used in the flag if using static bootstrapping. When
## using discovery, each member must have a unique name. `Hostname` or
## `machine-id` can be a good choice.
## default: "default"
# ETCD_NAME="controller"

##### --data-dir
## Path to the data directory.
## default: "${name}.etcd"
# ETCD_DATA_DIR="/var/lib/etcd"

##### --wal-dir
## Path to the dedicated wal directory. If this flag is set, etcd will write
## the WAL files to the walDir rather than the dataDir. This allows a
## dedicated disk to be used, and helps avoid io competition between logging
## and other IO operations.
## default: ""
# ETCD_WAL_DIR

##### --snapshot-count
## Number of committed transactions to trigger a snapshot to disk.
## default: "100000"
# ETCD_SNAPSHOT_COUNT="100000"

##### --heartbeat-interval
## Time (in milliseconds) of a heartbeat interval.
## default: "100"
# ETCD_HEARTBEAT_INTERVAL="100"

##### --election-timeout
## Time (in milliseconds) for an election to timeout. See
## /usr/share/doc/etcd-server/tuning.md.gz for details.
## default: "1000"
# ETCD_ELECTION_TIMEOUT="1000"
```


memcached.conf.j2

```
# memcached default config file
# 2003 - Jay Bonci <jaybonci@debian.org>
# This configuration file is read by the start-memcached script provided as
# part of the Debian GNU/Linux distribution.

# Run memcached as a daemon. This command is implied, and is not needed for the
# daemon to run. See the README.Debian that comes with this package for more
# information.
-d

# Log memcached's output to /var/log/memcached
logfile /var/log/memcached.log

# Be verbose
# -v

# Be even more verbose (print client commands as well)
# -vv

# Start with a cap of 64 megs of memory. It's reasonable, and the daemon default
# Note that the daemon will grow to this size, but does not start out holding this much
# memory
-m 64

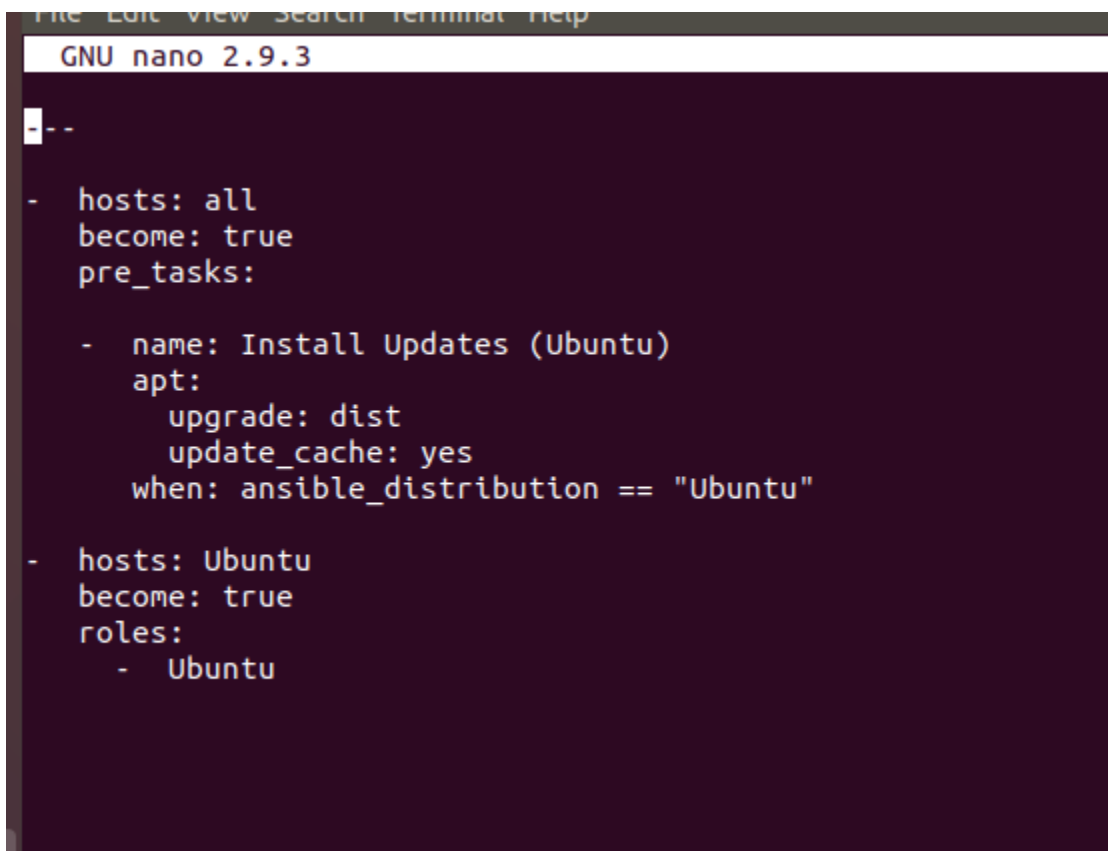
# Default connection port is 11211
-p 11211

# Run the daemon as root. The start-memcached will default to running as root if no
# -u command is present in this config file
-u memcache

# Specify which IP address to listen on. The default is to listen on all IP addresses
# This parameter is one of the only security measures that memcached has, so make sure
# it's listening on a firewalled interface.
-l 127.0.0.1

# Limit the number of simultaneous incoming connections. The daemon default is 1024
# -c 1024
```

Step 5: Paste this on the task.yml in the main directory.

A screenshot of a terminal window with a dark purple background. At the top, a menu bar shows 'File Edit View Search Terminal Help'. Below it, the title bar reads 'GNU nano 2.9.3'. The main area displays the contents of a file named 'task.yml'. The file contains two Ansible tasks. The first task is for 'all' hosts, with 'become: true' and a 'pre_tasks' block containing a task to 'Install Updates (Ubuntu)' for Ubuntu systems. The second task is for 'Ubuntu' hosts, with 'become: true' and a role 'Ubuntu'.

```
--  
  
- hosts: all  
  become: true  
  pre_tasks:  
    - name: Install Updates (Ubuntu)  
      apt:  
        upgrade: dist  
        update_cache: yes  
        when: ansible_distribution == "Ubuntu"  
  
- hosts: Ubuntu  
  become: true  
  roles:  
    - Ubuntu
```

Step 6: Run the playbook with the command *ansible-playbook --ask-become-pass task.yml*

```
dnzl@workstation:~/act13$ ansible-playbook --ask-become-pass task.yml
BECOME password:

PLAY [all] *****

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

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

PLAY [Ubuntu] *****

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

TASK [Ubuntu : Install NTP] *****
ok: [192.168.56.102]

TASK [Ubuntu : Enable and Start NTP] *****
changed: [192.168.56.102]

TASK [Ubuntu : Installation of OpenStack Client] *****
ok: [192.168.56.102]

TASK [Ubuntu : Installation of MariaDB and MySQL] *****
ok: [192.168.56.102]

TASK [Ubuntu : Creation of Configuration of MySQL for MariaDB] *****
changed: [192.168.56.102]

TASK [Ubuntu : Configuration of MySQL for MariaDB] *****
ok: [192.168.56.102]

TASK [Ubuntu : Enable and Start MySQL and MariaDB] *****
changed: [192.168.56.102] => (item=mysql)
changed: [192.168.56.102] => (item=mariadb)

TASK [Ubuntu : Installation of Message Queue (RabbitMQ-Server)] *****
ok: [192.168.56.102]

TASK [Ubuntu : Remove OpenStack as User for Message Queue] *****
ok: [192.168.56.102]
```

```

TASK [Ubuntu : Add OpenStack as User for Message Queue] *****
ok: [192.168.56.102]

TASK [Ubuntu : Modify Permissions for Openstack for Message Queue] *****
ok: [192.168.56.102]

TASK [Ubuntu : Installation of Memcached] *****
ok: [192.168.56.102]

TASK [Ubuntu : Creation of Configuration of Memcached] *****
ok: [192.168.56.102]

TASK [Ubuntu : Enable and Start Memcached] *****
changed: [192.168.56.102]

TASK [Ubuntu : Installation of ETCD] *****
ok: [192.168.56.102]

TASK [Ubuntu : Configuration of ETCD] *****
ok: [192.168.56.102]

TASK [Ubuntu : Enable and Start ETCD] *****
changed: [192.168.56.102]

PLAY RECAP *****
192.168.56.102      : ok=20   changed=5   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0

```

Step 7: Proof

```

dnzl@Server1:~$ openstack --version
openstack 3.14.2

```

```

● chrony.service - chrony, an NTP client/server
   Loaded: loaded (/lib/systemd/system/chrony.service; enabled; vendor preset:
   Active: active (running) since Thu 2023-11-30 17:30:55 PST; 1h 1min ago
     Docs: man:chronyd(8)
           man:chronyc(1)
           man:chrony.conf(5)
  Main PID: 1798 (chronyd)
    Tasks: 1 (limit: 4656)
   CGroup: /system.slice/chrony.service
           └─1798 /usr/sbin/chronyd

```

```

dnzl@Server1:~$ sudo systemctl status mariadb
● mariadb.service - MariaDB 10.1.48 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset:
   Active: active (running) since Thu 2023-11-30 17:31:07 PST; 56min ago
     Docs: man:mysql(8)
           https://mariadb.com/kb/en/library/systemd/
  Main PID: 2318 (mysqld)
    Status: "Taking your SQL requests now..."
    Tasks: 27 (limit: 4656)
   CGroup: /system.slice/mariadb.service
           └─2318 /usr/sbin/mysqld

Nov 30 17:31:05 Server1 systemd[1]: Starting MariaDB 10.1.48 database server...

```

```
dnzl@Server1:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.1.48 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset:
   Active: active (running) since Thu 2023-11-30 17:31:07 PST; 1h 0min ago
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 2318 (mysqld)
    Status: "Taking your SQL requests now..."
     Tasks: 27 (limit: 4656)
    CGroup: /system.slice/mariadb.service
            └─2318 /usr/sbin/mysqld
```

```
dnzl@Server1:~$ sudo systemctl status me rabbitmq-server
Unit me.service could not be found.
● rabbitmq-server.service - RabbitMQ Messaging Server
   Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; vendor
   Active: active (running) since Thu 2023-11-30 16:58:26 PST; 1h 30min ago
   Main PID: 22772 (beam.smp)
    Status: "Initialized"
     Tasks: 87 (limit: 4656)
    CGroup: /system.slice/rabbitmq-server.service
            └─22756 /bin/sh /usr/sbin/rabbitmq-server
               └─22772 /usr/lib/erlang/erts-9.2/bin/beam.smp -W w -A 64 -P 1048576
                  └─22851 /usr/lib/erlang/erts-9.2/bin/epmd -daemon
                     └─22997 erl_child_setup 65536
                        └─23021 inet_gethost 4
                           └─23022 inet_gethost 4
```

```
dnzl@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 17:31:14 PST; 58min ago
     Docs: man:memcached(1)
   Main PID: 3124 (memcached)
     Tasks: 10 (limit: 4656)
    CGroup: /system.slice/memcached.service
            └─3124 /usr/bin/memcached -m 64 -p 11211 -u memcache -l 127.0.0.1 -P
```

```
dnzl@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 17:31:16 PST; 58min ago
     Docs: https://github.com/coreos/etcd
           man:etcd
   Main PID: 3271 (etcd)
     Tasks: 11 (limit: 4656)
    CGroup: /system.slice/etcd.service
            └─3271 /usr/bin/etcd
```

<https://github.com/ddinglasan/act13.git>

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

Organizations opting for a flexibly scalable cloud infrastructure should implement OpenStack as it boasts of numerous advantages. First of all, it is open source which implies that it can be obtained at low costs and is tailor made according to different preferences. Its modular design makes room for a lot of parts in terms of compute, storage and network thus ensuring it scales up to different loads. OpenStack allows a multi-hypervisor cloud infrastructure with open-network protocols and facilitates connectivity to the present network infrastructure. This increases workload mobility and minimizes Vendor Lock. Lastly, the platform has an active community which helps in constant improvement, update, more documentation as well as support. A In summary, deploying and controlling private and public clouds becomes a more effective way for organizations to develop new innovative solutions while making better use of resources.

Conclusions:

In this activity, I learned how to install NTP, OpenStack packages, SQL Database, Message Queue, Memcached, and Etcd. I've also learned their importance in Openstack. I've learned a lot from this activity.