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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

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

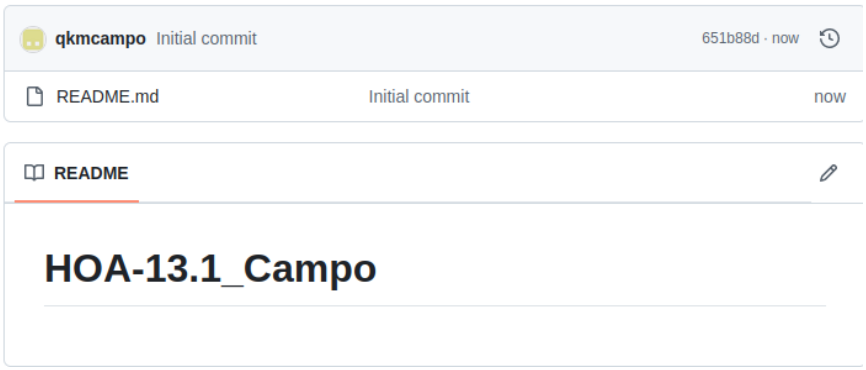
4. Tasks

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)

Task 1:

1. create a new repository




```
kcampo@kcampo-VirtualBox:~$ git clone git@github.com:qkmcampo/HOA-13.1_Campo.gi
Cloning into 'HOA-13.1_Campo'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (3/3), done.
```

2. create a playbook

```
 GNU nano 7.2                          ansible.cfg

[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

remote_user = campo
private_key_file = ~/.ssh/
```

```
 GNU nano 7.2                                inventory

[controller]
192.168.56.104
```

```
  GNU nano 7.2                    install_openstack.yml

---
- hosts: all
  become: true
  pre_tasks:

  - name: Install updates (Ubuntu)
    apt:
      upgrade: dist
      update_cache: yes
    changed_when: false

-  hosts: controller
   become: true
   roles:
     - NTP
     - OpenStack
     - SQL
     - MessageQ
     - Memcached
```

a.

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ mkdir NTP
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ cd NTP
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/NTP$ mkdir tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/NTP$ cd tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/NTP/tasks$
```

b.

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ mkdir OpenStack
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ cd OpenStack
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/OpenStack$ mkdir tas
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/OpenStack$ cd tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/OpenStack/tasks$ cd
```

c.

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ mkdir SQL
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ cd SQL
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/SQL$ mkdir tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/SQL$ cd tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/SQL/tasks$
```

d.

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ mkdir MessageQ
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ cd MessageQ
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/MessageQ$ mkdir tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/MessageQ$ cd tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/MessageQ/tasks$
```

e.

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ mkdir Memcached
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ cd Memcached
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/Memcached$ mkdir ta
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/Memcached$ cd tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/Memcached/tasks$
```

f.

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles$ cd Etcd
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/Etcd$ cd tasks
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo/roles/Etcd/tasks$
```

NTP

```
 GNU nano 7.2                                  main.yml *

- name: Installing the Network Time Protocol (NTP)
  apt:
    name: chrony
    state: present
    update_cache: yes

- name: Enbale the chrony
  service:
    name: chrony.service
    state: restarted
    enabled: yes
```

OpenStack

```
kcampo@kcampo-VirtualBox: ~/HOA-13.1_Campo/OpenStack/tasks
 GNU nano 7.2                                main.yml *

- name: Install the Openstack Packages
 apt:
   name:
     - nova-compute
     - python3-opensatckclient
   state: present
   update_cache: yes
```

SQL

```
 GNU nano 7.2                                                main.yml *
name: Install the SQL Database
 apt:
  name:
    - mariadb-server
    - python3-pymysql
  state: present
  update_cached: yes

- name: Edit the maria-db.conf 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: Restart the mariadb-server
  service:
      name: mysql
      state: restarted
```

MessageQ

```
 GNU nano 7.2                                                main.yml *
- name: Install Mesage Queue
  apt:
    name: rabbitmq-server
    state: present
    update_cache: yes

- name: Starting service
  service:
    name: rabbitmq-server.service
    state: started
    enabled: true
```

Memcached

```
 GNU nano 7.2                                                main.yml *
- name: Install the Memcached
  apt:
    name:
      - memcached
      - python3-memcache
    state: present
    update_cached: yes

- name: Restart the Memcached
  service:
     name: memcached
     state: restarted
     enabled: yes
```

ETCD

```
  GNU nano 7.2                                                main.yml *
- name: Install the Etcd
  apt:
     name: etcd
     state: present
     update_cached: yes

- name: Edit the Etcd file
  copy:
    content:
      ETCD_NAME="controller"
      ETCD_DATA_DIR="/var/lib/etcd"
      ETCD_INITIAL_CLUSTER_STATE="new"
      ETCD_INITIAL_CLUSTER_TOKEN="etcd-cluster-01"
      ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"
      ETCD_INITIAL_ADVERTISE_PEER_URLS="HTTP://10.0.0.11:2380"
      ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380"
      ETCD_LISTEN_CLIENT_URLS="http://10.0.0.11:2379
    dest: /etc/default/etcd
    mode: "0755"
- name: Enable the Etcd
  service:
     name: etcd
     enabled: yes
```

Result

NTP

```
kcampo@kcampo-VirtualBox:~/HOA-13.1_Campo$ ntpq -p
     remote                                refid      st t when poll reach   delay   offset   jitter
==============================================================================================================
 0.ubuntu.pool.ntp.org                   .POOL.          16 p    -  256    0   0.0000   0.0000   0.0001
 1.ubuntu.pool.ntp.org                   .POOL.          16 p    -  256    0   0.0000   0.0000   0.0001
 2.ubuntu.pool.ntp.org                   .POOL.          16 p    -  256    0   0.0000   0.0000   0.0001
 3.ubuntu.pool.ntp.org                   .POOL.          16 p    -  256    0   0.0000   0.0000   0.0001
 prod-ntp-4.ntp1.ps5.canonical.com       17.253.28.251    2 u   51   64    1 409.6447 -108.067   0.0000
 222.127.1.26                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 222.127.1.18                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 222.127.1.23                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 port.iwiphil.com                        .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 222.127.1.21                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 222.127.1.24                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 time2.gin.ntt.net                       .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 2001:ac8:81:65:0:2:0:3                  .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 2400:6180:0:d0::1157:4002               .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 2405:a640::149                          .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 222.127.1.22                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
 222.127.1.25                            .INIT.          16 u    -   64    0   0.0000   0.0000   0.0001
```

Git hub link: qkmcampo/HOA-13.1_Campo

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?
    - Implementing OpenStack offers numerous benefits, including scalability, cost-effectiveness, and flexibility. As an open-source platform, it allows organizations to customize their cloud environments without incurring licensing fees, making it accessible for businesses of all sizes. The active community surrounding OpenStack fosters continuous improvements and innovations, while its support for multi-cloud environments enables seamless integration with various cloud services. Additionally, built-in automation tools simplify management tasks, and the platform's vendor independence allows organizations to avoid lock-in with a single provider. OpenStack supports diverse workloads, enhances security through robust features, and accelerates development and deployment cycles, positioning it as a compelling solution for organizations seeking a versatile and efficient cloud infrastructure.

Conclusions:

This activity analyzed the advantages and disadvantages of cloud services, evaluated different cloud deployment and service models, and created a workflow to install and configure OpenStack base services using Ansible. The workflow involved creating a playbook to automate the installation of essential components, organizing tasks into plays for different server types, and maintaining an inventory file. The outcome is a structured and scalable approach to deploying OpenStack infrastructure.