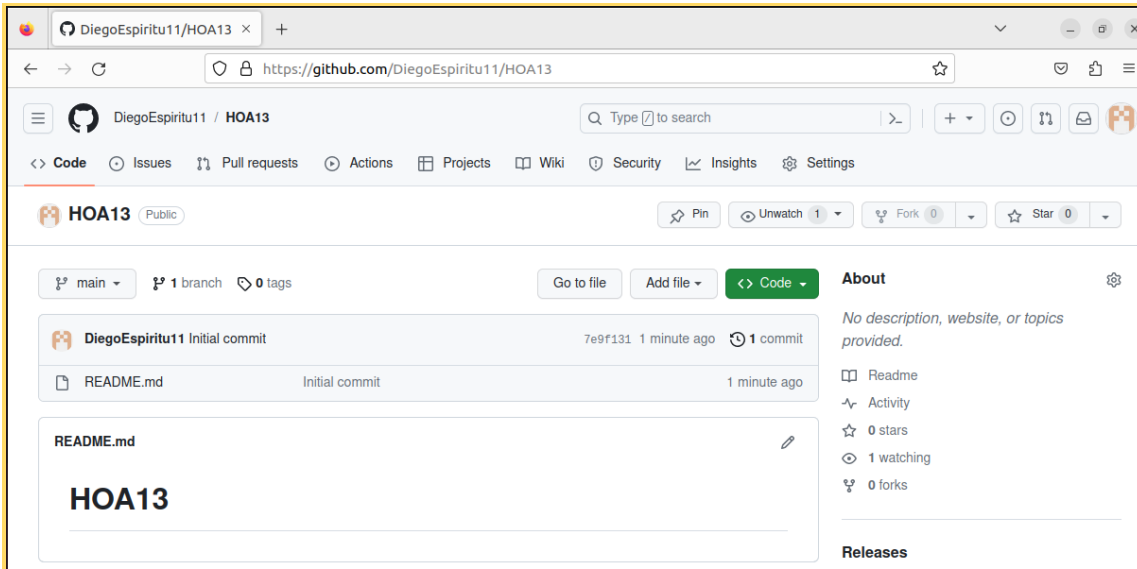


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<b>Course/Section: CPE232/ CPE31S6</b>	<b>Date Submitted: 11/28/2023</b>
<b>Instructor: Dr. Jonathan Vidal Taylar</b>	<b>Semester and SY: 1st sem 2023-2024</b>
<b>Activity 13: OpenStack Prerequisite Installation</b>	
<b>1. Objectives</b>	
Create a workflow to install OpenStack using Ansible as your Infrastructure as Code (IaC).	
<b>2. Intended Learning Outcomes</b>	
<ol style="list-style-type: none"> <li>1. Analyze the advantages and disadvantages of cloud services</li> <li>2. Evaluate different Cloud deployment and service models</li> <li>3. Create a workflow to install and configure OpenStack base services using Ansible as documentation and execution.</li> </ol>	
<b>3. Resources</b>	
<p>Oracle VirtualBox (Hypervisor)</p> <p>1x Ubuntu VM or Centos VM</p>	
<b>4. Tasks</b>	
<ol style="list-style-type: none"> <li>1. Create a new repository for this activity.</li> <li>2. Create a playbook that converts the steps in the following items in <a href="https://docs.openstack.org/install-guide/">https://docs.openstack.org/install-guide/</a> <ol style="list-style-type: none"> <li>a. NTP</li> <li>b. OpenStack packages</li> <li>c. SQL Database</li> <li>d. Message Queue</li> <li>e. Memcached</li> <li>f. Etcd</li> <li>g. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in Inventory file.</li> <li>h. Add, commit and push it to your GitHub repo.</li> </ol> </li> </ol>	

## 5. Output (screenshots and explanations)

### Step 1: Create a repository in github.



### Step 2: Clone the created repository.

```
diego@workstation:~$ git clone https://github.com/DiegoEspiritu11/HOA13.git
Cloning into 'HOA13'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (3/3), done.
diego@workstation:~$
```

### Step 3: Creating a file inside the directory (ansible.cfg, inventory).

```
diego@workstation:~$ cd HOA13
diego@workstation:~/HOA13$ touch ansible.cfg inventory
diego@workstation:~/HOA13$ ls
ansible.cfg  inventory  README.md
diego@workstation:~/HOA13$
```

### Step 4: Put the ip address into the inventory file.

```
diego@workstation: ~/HOA13
GNU nano 6.2 inventory
[defaults]
192.168.56.105
```

## Step 5: Necessary file for ansible.cfg

```
diego@workstation: ~/HOA13
GNU nano 6.2 ansible.cfg *
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

remote_use = diego
private_key_file = ~/.ssh
```

## Step 6: Creating a playbook that converts the steps in the following items in <https://docs.openstack.org/install-guide/>

```
diego@workstation: ~/HOA13/roles/etcd/tasks
diego@workstation:~/HOA13$ mkdir roles
diego@workstation:~/HOA13$ ls
ansible.cfg  inventory  README.md  roles
diego@workstation:~/HOA13$ cd roles
diego@workstation:~/HOA13/roles$ mkdir ntp
diego@workstation:~/HOA13/roles$ cd ntp
diego@workstation:~/HOA13/roles/ntp$ mkdir tasks
diego@workstation:~/HOA13/roles/ntp$ cd tasks
diego@workstation:~/HOA13/roles/ntp/tasks$ sudo nano main.yml
diego@workstation:~/HOA13/roles/ntp/tasks$ cd ..
diego@workstation:~/HOA13/roles/ntp$ cd ..
diego@workstation:~/HOA13/roles$ mkdir openstack
diego@workstation:~/HOA13/roles$ cd openstack
diego@workstation:~/HOA13/roles/openstack$ mkdir tasks
diego@workstation:~/HOA13/roles/openstack$ cd tasks
diego@workstation:~/HOA13/roles/openstack/tasks$ sudo nano main.yml
diego@workstation:~/HOA13/roles/openstack/tasks$ cd ..
diego@workstation:~/HOA13/roles/openstack$ cd ..
diego@workstation:~/HOA13/roles$ mkdir sql
diego@workstation:~/HOA13/roles$ cd sql
diego@workstation:~/HOA13/roles/sql$ mkdir tasks
diego@workstation:~/HOA13/roles/sql$ cd tasks
diego@workstation:~/HOA13/roles/sql/tasks$ sudo nano main.yml
diego@workstation:~/HOA13/roles/sql/tasks$ cd ..
diego@workstation:~/HOA13/roles/sql$ cd ..
diego@workstation:~/HOA13/roles$ mkdir memcache
diego@workstation:~/HOA13/roles$ cd memcache
diego@workstation:~/HOA13/roles/memcache$ mkdir tasks
diego@workstation:~/HOA13/roles/memcache$ cd tasks
diego@workstation:~/HOA13/roles/memcache/tasks$ sudo nano main.yml
diego@workstation:~/HOA13/roles/memcache/tasks$ cd ..
diego@workstation:~/HOA13/roles/memcache$ cd ..
diego@workstation:~/HOA13/roles$ mkdir etcd
diego@workstation:~/HOA13/roles$ cd etcd
diego@workstation:~/HOA13/roles/etcd$ mkdir tasks
diego@workstation:~/HOA13/roles/etcd$ cd tasks
diego@workstation:~/HOA13/roles/etcd/tasks$ sudo nano main.yml
diego@workstation:~/HOA13/roles/etcd/tasks$
```

```
diego@workstation:~/HOA13/role$ 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
diego@workstation:~/HOA13/role$
```

**Step 7: Create a file inside of the main directory (HOA13) and name it openstack.yml, create a playbook for running the installation of openstack.**

```
diego@workstation: ~/HOA13
GNU nano 6.2 openstack.yml *
---
- hosts: all
  become: true
  pre_tasks:
    - name: Install Updates (Ubuntu)
      apt:
        upgrade: dist
        update_cache: yes
        when: ansible_distribution == "Ubuntu"

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

**Step 8: Scripts for other playbooks.**

**NTP:**

```
diego@workstation: ~/HOA13/roles/ntp/tasks
GNU nano 6.2 main.yml *
- name: Installing Chrony (Ubuntu)
  apt:
    name: chrony
    state: latest

- replace:
  dest: /etc/chrony/chrony.conf
  regexp: server NTP_SERVER iburst
  replace: server 192.168.56.105 iburst
  backup: yes

- name: add key to chrony.conf
  ansible.builtin.lineinfile:
    dest: /etc/chrony/chrony.conf
    line: allow 10.0.0.0/24
    backup: yes

- name: Verifying Installation (Chrony for Ubuntu)
  service:
    name: chrony
    state: restarted
    enabled: true
```

## Openstack:

```
diego@workstation: ~/HOA13/roles/openstack/tasks

GNU nano 6.2 main.yml *
- name: Installing OpenStack (Ubuntu)
  apt:
    name:
      - nova-compute
      - python3-openstackclient
    state: latest
```

## SQL Database:

```
diego@workstation: ~/HOA13/roles/sql/tasks

GNU nano 6.2 main.yml
- name: Installing Packages (SQL for Ubuntu)
  apt:
    name:
      - mariadb-server
      - python3-pymysql
    state: latest

- name: Create Config File
  file:
    path: /etc/mysql/mariadb.conf.d/99-openstack.cnf
    state: touch
    owner: root
    group: root
    mode: 0777

- name: Editing Config File
  lineinfile:
    dest: /etc/mysql/mariadb.conf.d/99-openstack.cnf
    line: "[mysqld]"
    state: present
    backup: yes
  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: Restarting Service
  service:
    name: mysql
    state: restarted
    enabled: true
```

```
- name: Finalizing Installation
  expect:
    command: mysql_secure_installation
    responses:
      'Enter current password for root:': ' '
      'Set root password': 'n'
      'Remove anonymous users': 'y'
      'Disallow root login remotely': 'y'
      'Remove test database': 'y'
      'Reload privilege tables now': 'y'
    timeout: 1
  register: secure_mariadb
  failed_when: "'... Failed!' in secure_mariadb.stdout_lines"
```

## Message Queue:

```
diego@workstation: ~/HOA13/roles/mesque/tasks
GNU nano 6.2 main.yml
- name: Configuring rabbitmq-server
  shell: |
    rabbitmqctl add_user openstack server54321
    rabbitmqctl set_permissions openstack ".*" ".*" ".*"
```

## Memcached:

```
diego@workstation: ~/HOA13/roles/memcache/tasks
GNU nano 6.2 main.yml *
- name: Installing MemCached (Ubuntu)
  apt:
    name:
      - memcached
      - python3-memcache
    state: latest

- name: Editing Config File
  lineinfile:
    dest: /etc/memcached.conf
    regexp: "-l 127.0.0.1"
    line: "-l 10.0.0.11"
    state: present
    backup: yes

- name: Restart Service
  service:
    name: memcached
    state: restarted
    enabled: true
```

## Etcd:

```
diego@workstation: ~/HOA13/roles/etcd/tasks
GNU nano 6.2 main.yml *
- name: Installing Packages (etcd for Ubuntu)
  apt:
    name:
      - etcd
    state: latest

- name: Editing Config File
  lineinfile:
    dest: /etc/default/etcd
    regexp: '{{ item.regexp }}'
    line: '{{ item.line }}'
    state: present
    backup: yes

with_items:
  - { 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_PEER_URLS=', line: 'ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380 "' }
  - { regexp: 'ETCD_LISTEN_CLIENT_URLS=', line: 'ETCD_LISTEN_CLIENT_URLS="http:// 10.0.0.11:2379" "' }
```

## Step 8: Running the openstack.yml

```
diego@workstation: ~/HOA13
diego@workstation:~/HOA13$ ansible-playbook --ask-become-pass openstack.yml
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.105]

TASK [Install Updates (Ubuntu)] *****
ok: [192.168.56.105]

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.105]

TASK [ntp : Installing Chrony (Ubuntu)] *****
ok: [192.168.56.105]

TASK [ntp : replace] *****
ok: [192.168.56.105]

TASK [ntp : add key to chrony.conf] *****
ok: [192.168.56.105]

TASK [ntp : Verifying Installation (Chrony for Ubuntu)] *****
changed: [192.168.56.105]

TASK [openstack : Installing OpenStack (Ubuntu)] *****
ok: [192.168.56.105]

TASK [sql : Installing Packages (SQL for Ubuntu)] *****
ok: [192.168.56.105]

TASK [sql : Create Config File] *****
changed: [192.168.56.105]
```

```
diego@workstation: ~/HOA13

TASK [sql : Editing Config File] *****
ok: [192.168.56.105] => (item=[mysqld])
ok: [192.168.56.105] => (item=bind-address = 10.0.0.11)
ok: [192.168.56.105] => (item= )
ok: [192.168.56.105] => (item=default-store-engine = InnoDB)
ok: [192.168.56.105] => (item=innodb_file_per_table = on)
ok: [192.168.56.105] => (item=max_connections = 4096)
ok: [192.168.56.105] => (item=collation-server = utf8_general_ci)
ok: [192.168.56.105] => (item=character-ser-server = utf8)

TASK [sql : Restarting Service] *****
changed: [192.168.56.105]

TASK [sql : Finalizing Installation] *****
changed: [192.168.56.105]

TASK [mesque : installation Message Queue] *****
ok: [192.168.56.105]

TASK [mesque : Openstack user add] *****
changed: [192.168.56.105]

TASK [mesque : permission to configure, write, and read] *****
changed: [192.168.56.105]

TASK [memcache : Installing MemCached (Ubuntu)] *****
changed: [192.168.56.105]

TASK [memcache : Editing Config File] *****
changed: [192.168.56.105]

TASK [memcache : Restart Service] *****
changed: [192.168.56.105]

TASK [etcd : Installing Packages (etcd for Ubuntu)] *****
changed: [192.168.56.105]
```

```
TASK [etcd : Editing Config File] *****
changed: [192.168.56.105] => (item={'regex': 'ETCD_INITIAL_CLUSTER=', 'line': 'ETCD_INITIAL_CLUSTER="controller=http://10.0.0.11:2380"'})
changed: [192.168.56.105] => (item={'regex': 'ETCD_INITIAL_ADVERTISE_PEER_URLS=', 'line': 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"'})
changed: [192.168.56.105] => (item={'regex': 'ETCD_ADVERTISE_CLIENT_URLS=', 'line': 'ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"'})
changed: [192.168.56.105] => (item={'regex': 'ETCD_LISTEN_PEER_URLS=', 'line': 'ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380 "'})
changed: [192.168.56.105] => (item={'regex': 'ETCD_LISTEN_CLIENT_URLS=', 'line': 'ETCD_LISTEN_CLIENT_URLS="http:// 10.0.0.11:2379"'})

PLAY RECAP *****
192.168.56.105      : ok=21   changed=11   unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

diego@workstation:~/HOA13$
```

## Step 9: Git add, commit and push in the github.

```
diego@workstation:~/HOA13$ git add *
diego@workstation:~/HOA13$ git commit -m "done"
[main 0a6b70c] done
9 files changed, 162 insertions(+)
create mode 100644 ansible.cfg
create mode 100644 inventory
create mode 100644 openstack.yml
create mode 100644 roles/etcd/tasks/main.yml
create mode 100644 roles/memcache/tasks/main.yml
create mode 100644 roles/mesque/tasks/main.yml
create mode 100644 roles/ntp/tasks/main.yml
create mode 100644 roles/openstack/tasks/main.yml
create mode 100644 roles/sql/tasks/main.yml
diego@workstation:~/HOA13$ git push origin
Username for 'https://github.com': DiegEspiritu11
Password for 'https://DiegEspiritu11@github.com':
Enumerating objects: 25, done.
Counting objects: 100% (25/25), done.
Delta compression using up to 3 threads
Compressing objects: 100% (11/11), done.
Writing objects: 100% (24/24), 3.03 KiB | 1.01 MiB/s, done.
Total 24 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/DiegEspiritu11/HOA13.git
7e9f131..0a6b70c  main -> main
diego@workstation:~/HOA13$
```

The screenshot shows the GitHub interface for the repository **HOA13** by user **DiegoEspiritu11**. The repository is public and has 1 branch (main) and 0 tags. The file list shows:

File	Commit	Time
roles	done	2 minutes ago
README.md	Initial commit	2 hours ago
ansible.cfg	done	2 minutes ago
inventory	done	2 minutes ago
openstack.yml	done	2 minutes ago

The README section is titled **HOA13** and currently has no description, website, or topic provided. It also shows 0 stars, 1 watching, and 0 forks. There are no releases or packages published yet.

<https://github.com/DiegoEspiritu11/HOA13.git>



**Reflections:**

Answer the following:

1. What are the benefits of implementing OpenStack?

The advantages of implementing OpenStack include its scalability and ease of use activate automation, it is quick to design and simple to implement, and it has a It will provide you with installation tasks that will help you improve your abilities. It is a free and open-source cloud platform for managing distributed computing, network, and storage resources.

**Conclusions:**

In the end, we can learn about the pros and disadvantages of OpenStack and how it works. We can design a procedure for installing OpenStack using Ansible as your infrastructure as code. We may evaluate the benefits and drawbacks of cloud services. We may assess various cloud deployment and service models and design a procedure for installing and configuring OpenStack foundation services with Ansible as documentation and execution.