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Activity 15: OpenStack Installation (Neutron, Horizon, Cinder)	
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. Neutron b. Horizon c. Cinder d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file. e. Add, commit and push it to your GitHub repo. 	
5. Output (screenshots and explanations)	

Task 1: Create a new repository

The screenshot shows the GitHub interface for a new repository named 'Aducal_Activity-15' by user 'jmaducal12'. The repository is public and has no description, website, or topics provided. It shows 1 commit, 0 stars, 1 watching, and 0 forks. The README file is visible, containing the title 'Aducal_Activity-15'. The right sidebar includes sections for Readme, Stars, Watching, Forks, Releases, and Packages, all indicating no content has been published yet.

I create a new repository named Aducal_Activity-14.

```
jmaducal@workstation: ~/Aducal_Activity-15
jmaducal@workstation:~$ git clone git@github.com:jmaducal12/Aducal_Activity-15.
git
Cloning into 'Aducal_Activity-15'...
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.
jmaducal@workstation:~$ ls
Act-4.1-CPE232_ADUCAL  Aducal_PrelimExam  Music
Aducal_Activity-10     cpe                 Pictures
Aducal_Activity-11     CPE232_John-Mark-Aducal  Public
Aducal_Activity-13     CPE_MIDEXAM_ADUCAL  README.md
Aducal_Activity-14     Desktop            snap
Aducal_Activity-15     Documents          Templates
Aducal_Activity-8      Downloads          Videos
Aducal_Activity-9      HOA4.1_CPE232_ADUCAL
jmaducal@workstation:~$ cd Aducal_Activity-15
jmaducal@workstation:~/Aducal_Activity-15$
```

I used the git clone command to link my new repository to my workstation and use the cd command to change directory to Aducal_Activity-15.

```
jmaducal@workstation: ~/Aducal_Activity-15
GNU nano 6.2 inventory
[Controller]
localhost ansible_connection=local

[Block_Storage]
CentOS ansible_host=192.168.56.108

[Networking]
server3 ansible_host=192.168.56.110
```

This are the contents of inventory file including the three groups such as controller, networking and block_storage.

```
jmaducal@workstation: ~/Aducal_Activity-15
GNU nano 6.2 ansible.cfg
[defaults]
inventory = inventory
host_key_checking = False

deprecation_warnings = False

command_warnings = False

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

This are the configurations inside of ansible.cfg file.

```
jmaducal@workstation: ~/Aducal_Activity-15
GNU nano 6.2 openstack.yml
---
- hosts: all
  become: true
  pre_tasks:

  - name: install updates (CentOS)
    tags: always
    dnf:
      update_only: yes
      update_cache: yes
    when: ansible_distribution == "CentOS"

  - name: install updates (Ubuntu)
    tags: always
    apt:
      upgrade: dist
      update_cache: yes
    when: ansible_distribution == "Ubuntu"
```

```
- hosts: Controller
  become: true
  roles:
    - Controller

- hosts: Networking
  become: true
  roles:
    - Networking

- hosts: Block_Storage
  become: true
  roles:
    - Block_Storage
```

Inside of openstack file, there are pre_tasks for installing updates for CentOS and Ubuntu servers and particular roles for Controller, Networking and Block Storage.

```
jmaducal@workstation: ~/Aducal_Activity-15/roles/Block_St...
jmaducal@workstation:~/Aducal_Activity-15$ cd roles
jmaducal@workstation:~/Aducal_Activity-15/roles$ mkdir Controller
jmaducal@workstation:~/Aducal_Activity-15/roles$ mkdir Networking
jmaducal@workstation:~/Aducal_Activity-15/roles$ mkdir Block_Storage
jmaducal@workstation:~/Aducal_Activity-15/roles$ ls
Block_Storage  Controller  Networking
jmaducal@workstation:~/Aducal_Activity-15/roles$ cd Controller
jmaducal@workstation:~/Aducal_Activity-15/roles/Controller$ mkdir tasks
jmaducal@workstation:~/Aducal_Activity-15/roles/Controller$ cd tasks
jmaducal@workstation:~/Aducal_Activity-15/roles/Controller/tasks$ nano main.yml
jmaducal@workstation:~/Aducal_Activity-15/roles/Controller/tasks$ cd ..
jmaducal@workstation:~/Aducal_Activity-15/roles/Controller$ cd ..
jmaducal@workstation:~/Aducal_Activity-15/roles$ cd Networking
jmaducal@workstation:~/Aducal_Activity-15/roles/Networking$ mkdir tasks
jmaducal@workstation:~/Aducal_Activity-15/roles/Networking$ cd tasks
jmaducal@workstation:~/Aducal_Activity-15/roles/Networking/tasks$ nano main.yml
jmaducal@workstation:~/Aducal_Activity-15/roles/Networking/tasks$ cd ..
jmaducal@workstation:~/Aducal_Activity-15/roles/Networking$ cd ..
jmaducal@workstation:~/Aducal_Activity-15/roles$ cd Block_Storage
jmaducal@workstation:~/Aducal_Activity-15/roles/Block_Storage$ mkdir tasks
jmaducal@workstation:~/Aducal_Activity-15/roles/Block_Storage$ cd tasks
jmaducal@workstation:~/Aducal_Activity-15/roles/Block_Storage/tasks$ nano main.
yml
```

```
jmaducal@workstation: ~/Aducal_Activity-15/roles
jmaducal@workstation:~/Aducal_Activity-15/roles$ tree
.
├── Block_Storage
│   └── tasks
│       └── main.yml
├── Controller
│   └── tasks
│       └── main.yml
└── Networking
    └── tasks
        └── main.yml

6 directories, 3 files
jmaducal@workstation:~/Aducal_Activity-15/roles$
```

I named the directories Block_Storage, Controller, and Networking. Then, inside those directories, there were specific tasks for installing Neutron, Horizon and Cinder.

jmaducal@workstation: ~/Aducal_Activity-15/roles/Controll...

```
GNU nano 6.2 main.yml
- name: Install Neutron in Controller Node
  apt:
    name:
      - neutron-server
      - neutron-plugin-ml2
      - neutron-linuxbridge-agent
      - neutron-dhcp-agent
      - neutron-metadata-agent
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: Install Horizon in Controller Node
  apt:
    name:
      - openstack-dashboard
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: Install Cinder in Controller Node
  apt:
    name:
      - cinder-api
      - cinder-scheduler
    state: latest
  when: ansible_distribution == "Ubuntu"
```

The contents of main.yml file inside of Controller Directory.

jmaducal@workstation: ~/Aducal_Activity-15/roles/Network...

```
GNU nano 6.2 main.yml
- name: Install Neutron in Networking Node
  yum:
    name:
      - openstack-neutron-linuxbridge ebtables ipset
    state: latest
  when: ansible_distribution == "CentOS"

- name: Install Horizon in Networking Node
  yum:
    name:
      - openstack-dashboard
    state: latest
  when: ansible_distribution == "CentOS"
```

The contents of main.yml file inside of Networking Directory.

```
jmaducal@workstation: ~/Aducal_Activity-15/roles/Block_St...
GNU nano 6.2 main.yml
- name: Install Cinder in Block_Storage Node
  apt:
    name:
      - lvm2 thin-provisioning-tools
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: Install Horizon in Block_Storage Node
  apt:
    name:
      - openstack-dashboard
    state: latest
  when: ansible_distribution == "Ubuntu"
```

The contents of main.yml file inside of Block_Storage Directory.

My workstation is not working properly not booting up. Other servers are ok.

a) Neutron (Networking service)

```
jmaducal@server3: ~
jmaducal@server3:~$ sudo mysql
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 31
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> CREATE DATABASE neutron;
Query OK, 1 row affected (0.156 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON neutron.* TO 'neutron'@'localhost' \
-> IDENTIFIED BY 'NEUTRON_DBPASS';
Query OK, 0 rows affected (0.278 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON neutron.* TO 'neutron'@'%' IDENTIFIED BY 'NEUTRON_DBPASS';
Query OK, 0 rows affected (0.094 sec)
```

b) Horizon (Dashboard)

```
jmaducal@server3: ~
GNU nano 6.2 /etc/openstack-dashboard/local_settings.py

OPENSTACK_HOST = "Controller"
OPENSTACK_KEYSTONE_URL = "http://%s/identity/v3" % OPENSTACK_HOST
```

```
jmaducal@server3: ~  
GNU nano 6.2 /etc/openstack-dashboard/local_settings.py *  
CACHES = {  
    'default': {  
        'BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',  
        'LOCATION': 'Controller:11211',  
    },  
}
```

c) Cinder (Block Storage service)

```
jmaducal@server3: ~  
GNU nano 6.2 /etc/cinder/cinder.conf *  
[DEFAULT]  
rootwrap_config = /etc/cinder/rootwrap.conf  
api_paste_config = /etc/cinder/api-paste.ini  
iscsi_helper = lioadm  
volume_name_template = volume-%s  
volume_group = cinder-volumes  
verbose = True  
auth_strategy = keystone  
state_path = /var/lib/cinder  
lock_path = /var/lock/cinder  
volumes_dir = /var/lib/cinder/volumes  
enabled_backends = lvm  
transport_url = rabbit://openstackRABBIT_PASS@Controller  
[database]  
connection = mysql+mysql://cinder:CINDER_DBPASS@Controller/cinder
```

Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services

Networking service (Neutron) provides an API that allows users to build rich networking topologies and set up and define network connectivity. Openstack Horizon offers three versions of management dashboards: User, System and Setting Dashboards. Cinder is a Block Storage service for OpenStack. It virtualizes the management of block storage devices.

Conclusions:

In this activity, I learned the difference openstack services such as Neutron (Networking service), Horizon (Dashboard) and Cinder (Block Storage service). As we know the Openstack is built as a set of distributed services. These services communicate with each other and are responsible for the various function expected from virtualization/cloud management.