Name: Shaniah Rose Hope M. Sumaoang	Date Performed: December 13, 2023
Course/Section: CPE 232 – CPE31S5	Date Submitted: December 14, 2023
Instructor: Engr. Roman Richard	Semester and SY: 1st Sem S.Y. 23-24

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

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

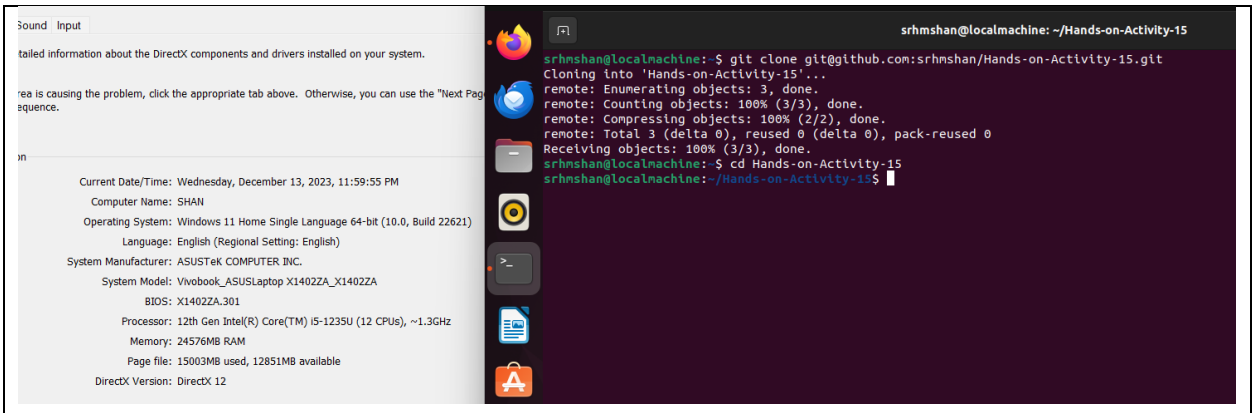
Oracle VirtualBox (Hypervisor)

1x Ubuntu VM or Centos VM

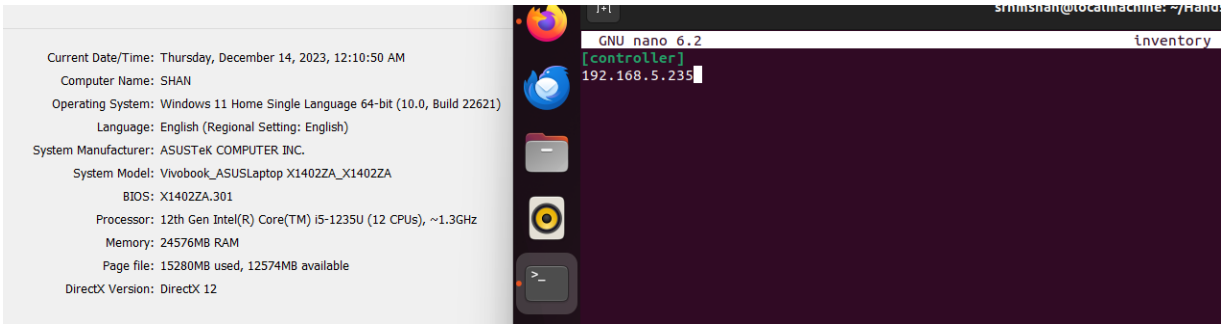
4. Tasks

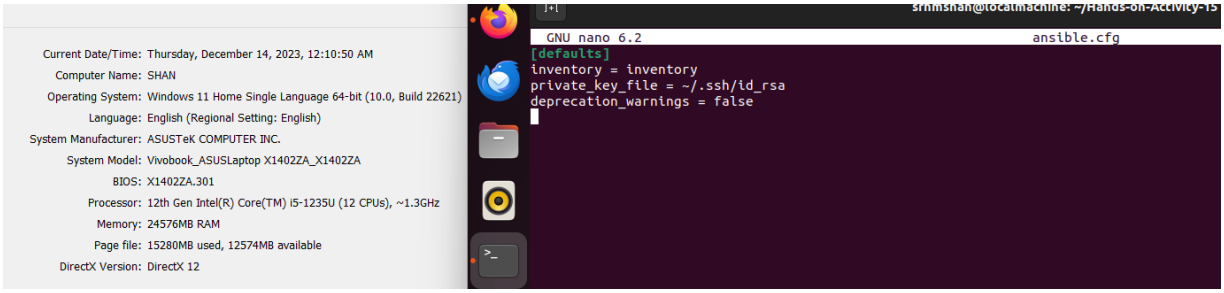
1. Create a new repository for this activity.
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/
   a. Neutron
   b. Horizon
   c. Cinder
   d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.
   e. Add, commit and push it to your GitHub repo.

5. Output (screenshots and explanations)

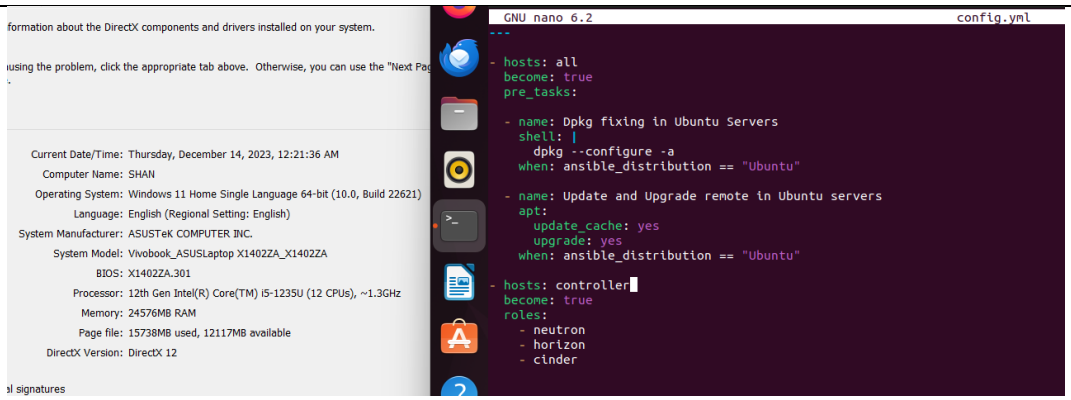


For this activity, I created a repository named “Hands-on-Activity-15” on my GitHub and then cloned it to my workstation.

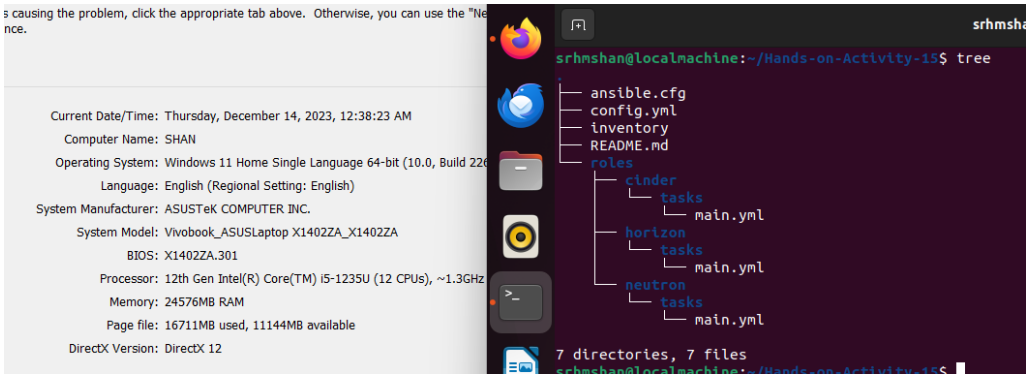




After successfully cloning the created repository, I changed my directory to the added repository and then worked on creating my ansible.cfg and inventory files. My Ubuntu server will be my controller.



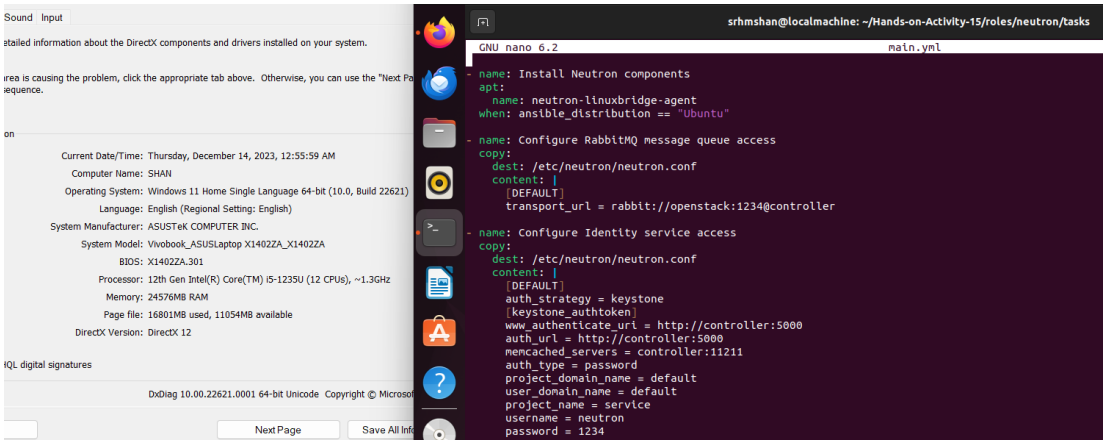
I also created “config.yml” which is designed to handle maintenance tasks, for Ubuntu servers. It focuses on resolving dpkg problems and ensuring that packages are up, to date. Additionally, it simplifies the process of configuring hosts within the controller group by assigning them roles related to Neutron, Horizon and Cinder.

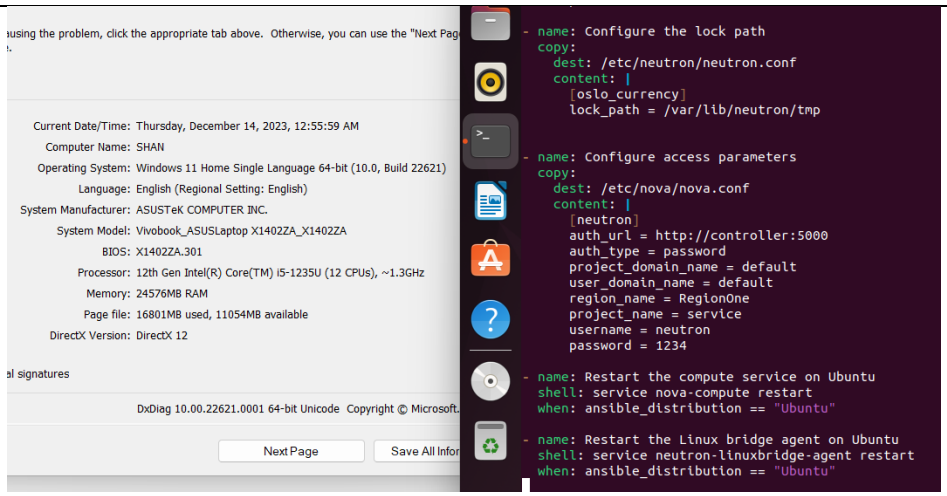


This is a tree of how I structured the directories, for the next steps of my tasks.

Under each role, I used the nano command to edit the “main.yml”

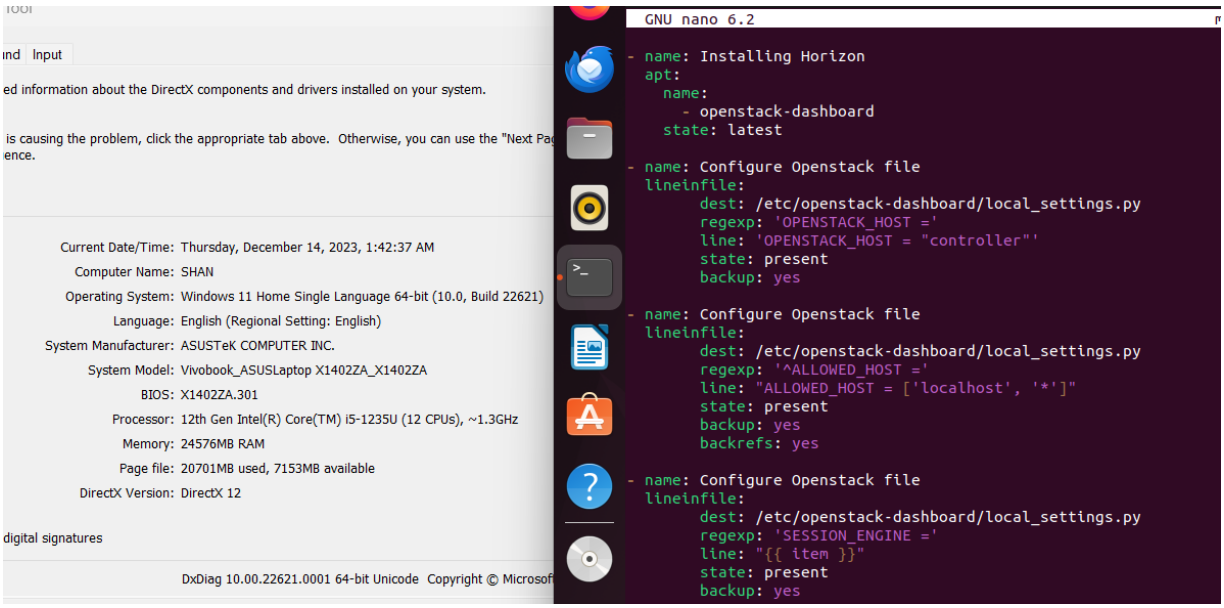
1. **Neutron**





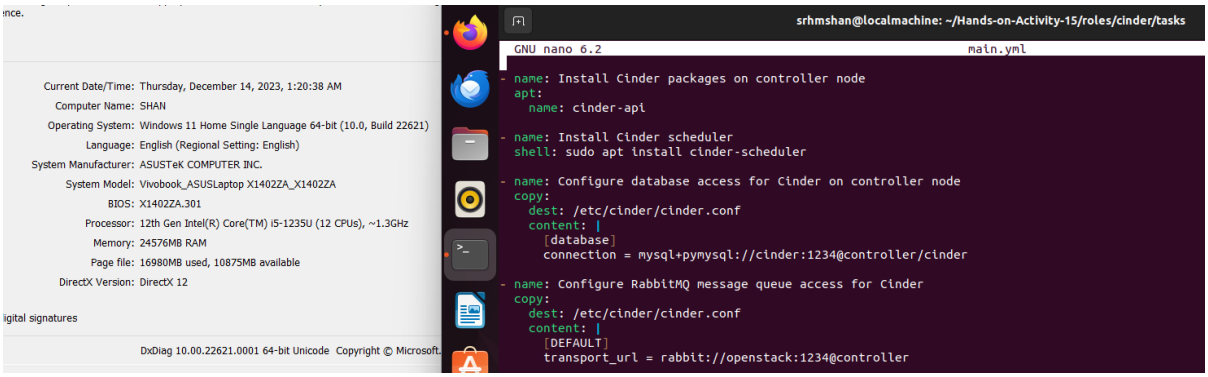
This is for installing the required packages configuring access, to the RabbitMQ message queue setting up access to the Identity service and specifying the lock path. Next, it configures the compute service to use the networking service. It adjusts access parameters and restarts services based on whether the distribution's Ubuntu.

2. **Horizon**



This sets up the OpenStack Dashboard by configuring parameters such, as host, access, storage and API. It ensures that it is compatible with Identity API version 3 supports domains and defines default settings, for user creation. The script has the capability to disable networking services if needed.

3. **Cinder**



Current Date/Time: Thursday, December 14, 2023, 1:20:38 AM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16980MB used, 10875MB available
DirectX Version: DirectX 12

DxDiag 10.00.22621.0001 64-bit Unicode Copyright © Microsoft.

srhmshan@localmachine: ~/Hands-on-Activity-15/roles/cinder/tasks

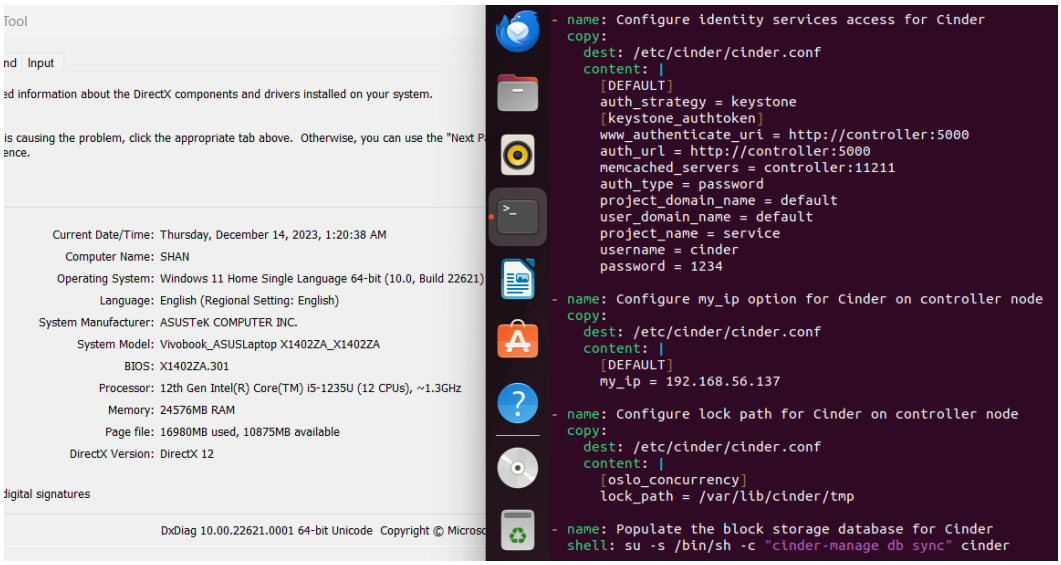
GNU nano 6.2 main.yml

```
- name: Install Cinder packages on controller node
  apt:
    name: cinder-api

- name: Install Cinder scheduler
  shell: sudo apt install cinder-scheduler

- name: Configure database access for Cinder on controller node
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [database]
      connection = mysql+pymysql://cinder:1234@controller/cinder

- name: Configure RabbitMQ message queue access for Cinder
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [DEFAULT]
      transport_url = rabbit://openstack:1234@controller
```



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Current Date/Time: Thursday, December 14, 2023, 1:20:38 AM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
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Memory: 24576MB RAM
Page file: 16980MB used, 10875MB available
DirectX Version: DirectX 12

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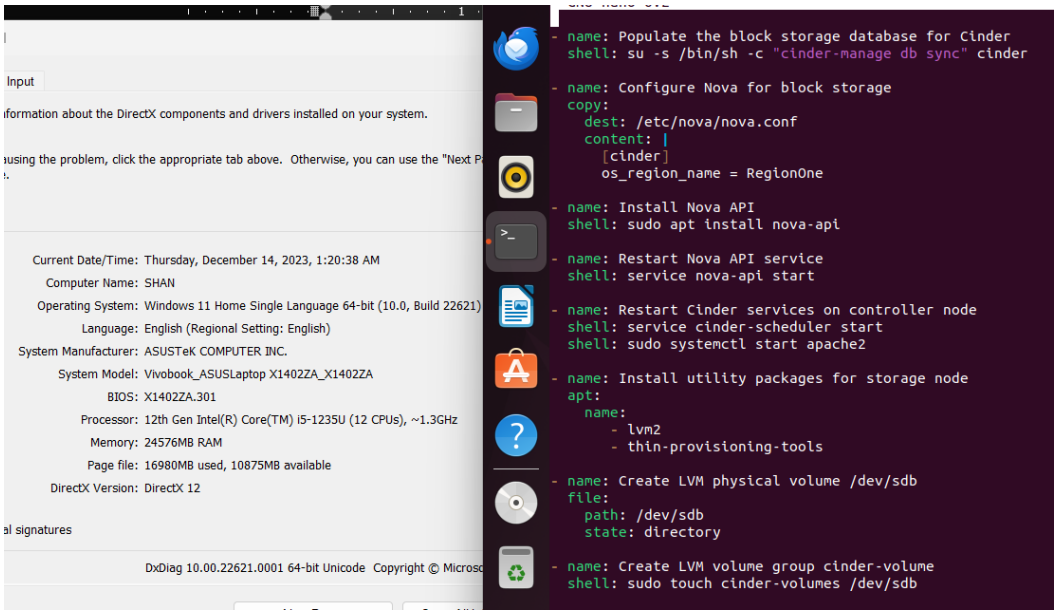
```
- name: Configure identity services access for Cinder
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [DEFAULT]
      auth_strategy = keystone
      [keystone_authtoken]
      www_authenticate_uri = http://controller:5000
      auth_url = http://controller:5000
      memcached_servers = controller:11211
      auth_type = password
      project_domain_name = default
      user_domain_name = default
      project_name = service
      username = cinder
      password = 1234

- name: Configure my_ip option for Cinder on controller node
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [DEFAULT]
      my_ip = 192.168.56.137

- name: Configure lock path for Cinder on controller node
  copy:
    dest: /etc/cinder/cinder.conf
    content: |
      [oslo_concurrency]
      lock_path = /var/lib/cinder/tmp

- name: Populate the block storage database for Cinder
  shell: su -s /bin/sh -c "cinder-manage db sync" cinder
```



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Current Date/Time: Thursday, December 14, 2023, 1:20:38 AM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16980MB used, 10875MB available
DirectX Version: DirectX 12

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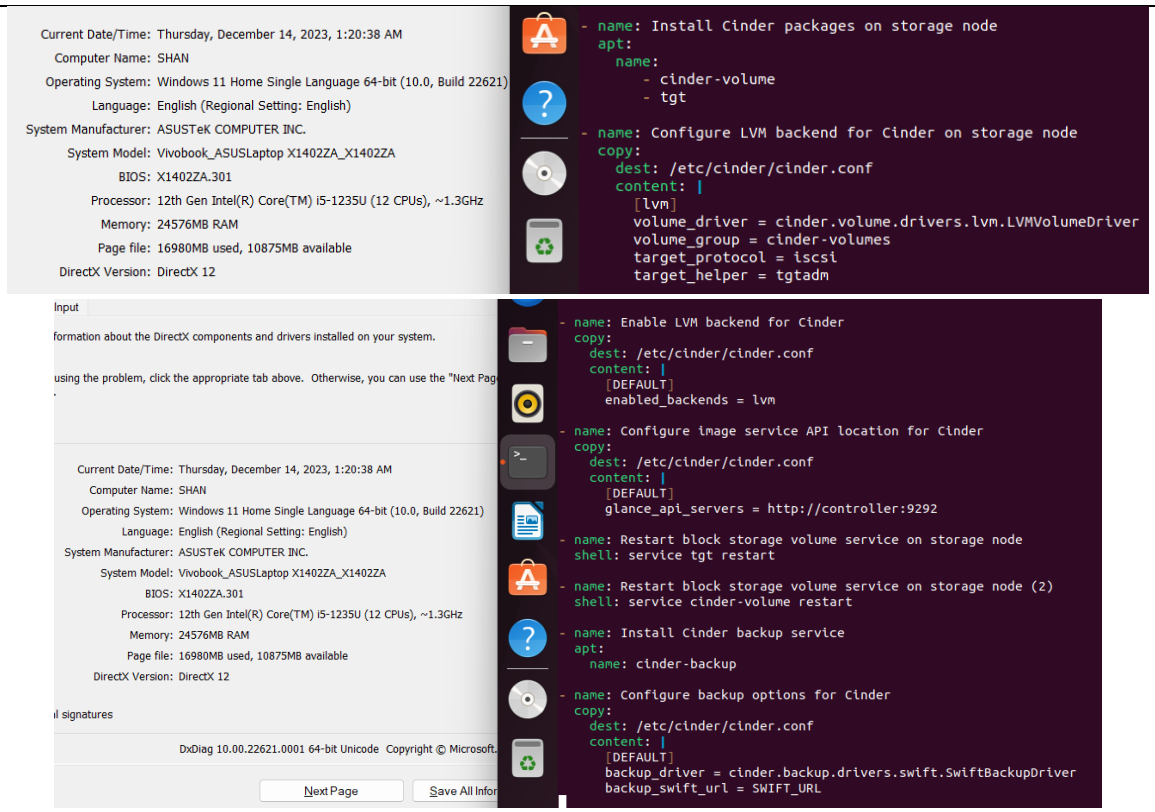
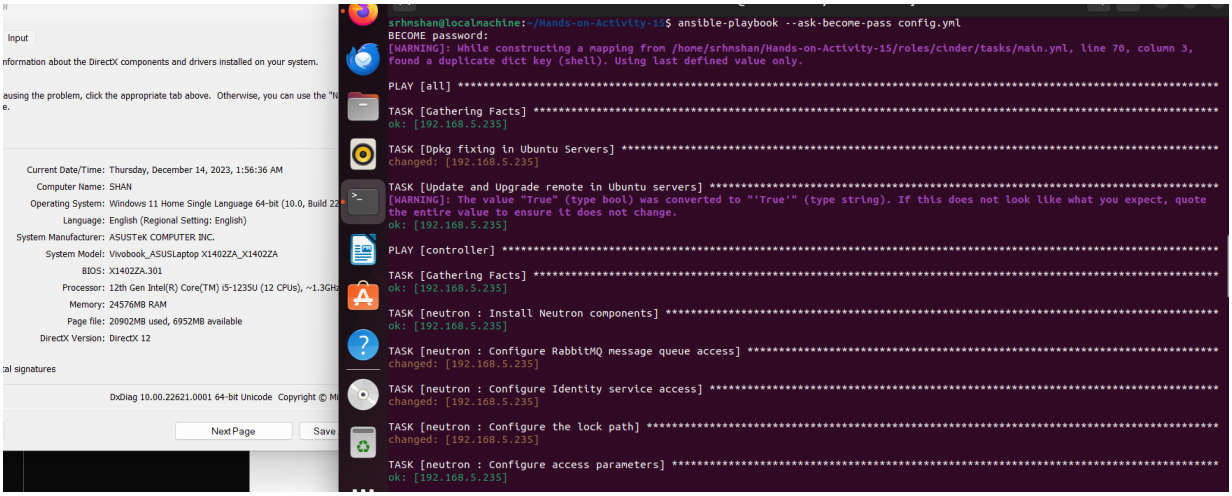
```
- name: Populate the block storage database for Cinder
  shell: su -s /bin/sh -c "cinder-manage db sync" cinder

- name: Configure Nova for block storage
  copy:
    dest: /etc/nova/nova.conf
    content: |
      [cinder]
      os_region_name = RegionOne

- name: Install Nova API
  shell: sudo apt install nova-api

- name: Restart Nova API service
  shell: service nova-api start

- name: Restart Cinder services on controller node
  shell: service cinder-scheduler start
  shell: sudo systemctl start apache2

- name: Install utility packages for storage node
  apt:
    name:
      - lvm2
      - thin-provisioning-tools

- name: Create LVM physical volume /dev/sdb
  file:
    path: /dev/sdb
    state: directory

- name: Create LVM volume group cinder-volume
  shell: sudo touch cinder-volumes /dev/sdb
```



This script sets up the controller node, which includes configuring the database, RabbitMQ and Nova integration. It also handles the configuration of the storage node, for the LVM backend. The playbook efficiently manages the installation and setup of the Cinder backup service. It simplifies tasks such, as package installation, service configuration and node specific adjustments to ensure an effective deployment of OpenStack block storage.

Running config.yml:

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e.
Current Date/Time: Thursday, December 14, 2023, 1:56:36 AM
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Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 20902MB used, 6952MB available
DirectX Version: DirectX 12
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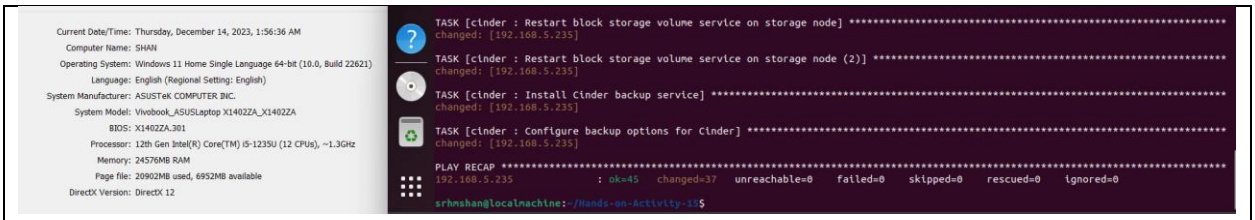
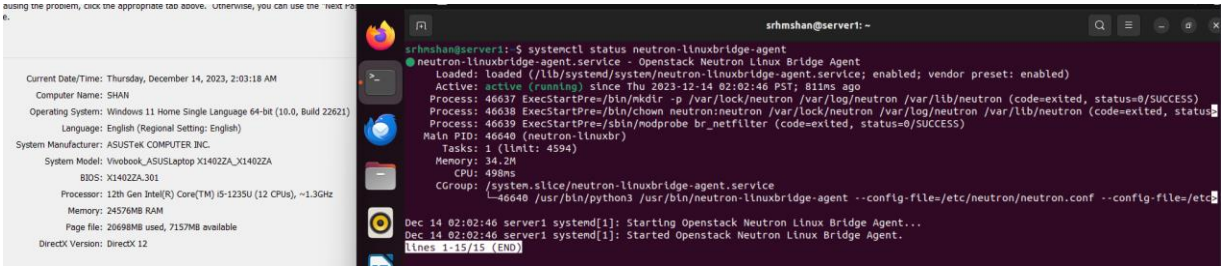
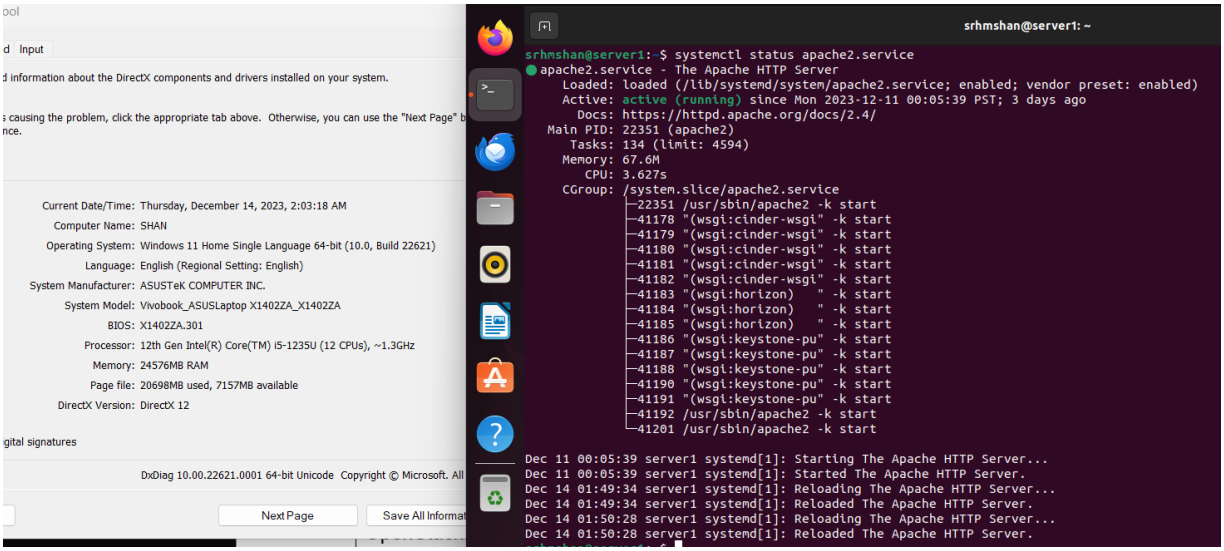
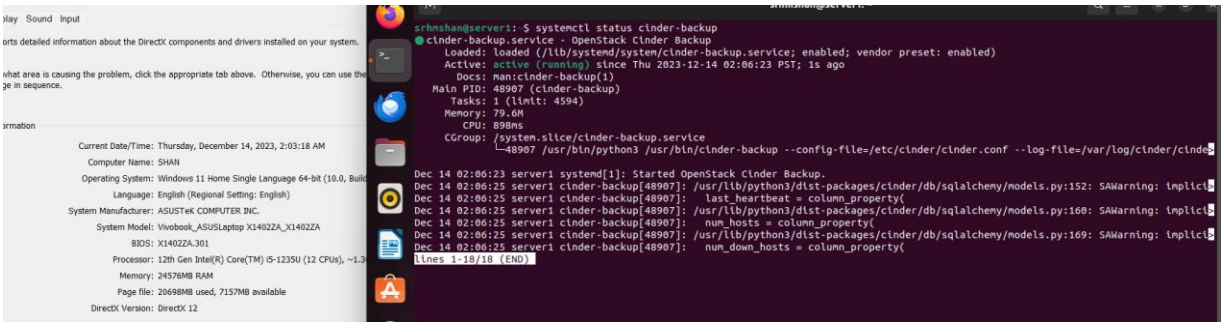
Save
TASK [neutron : Restart the compute service on Ubuntu] **
[WARNING]: Consider using the service module rather than running 'service'. If you need to use command because service is
insufficient you can add 'warn: false' to this command task or set 'command_warnings=False' in ansible.cfg to get rid of this
message.
changed: [192.168.5.235]
TASK [neutron : Restart the Linux bridge agent on Ubuntu] **
changed: [192.168.5.235]
TASK [horizon : Installing Horizon] **
changed: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
ok: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235] => (item=SESSION_ENGINE = 'django.contrib.sessions.backends.cache')
changed: [192.168.5.235] => (item=)
ok: [192.168.5.235] => (item=CACHES = {)
changed: [192.168.5.235] => (item='default': {)
changed: [192.168.5.235] => (item='BACKEND': 'django.core.cache.backends.memcached.MemcachedCache',)
changed: [192.168.5.235] => (item='LOCATION': 'controller:11211',)
ok: [192.168.5.235] => (item=})
ok: [192.168.5.235] => (item=})
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235] => (item=OPENSTACK_API_VERSIONS = {)
changed: [192.168.5.235] => (item="identity": 3,)
changed: [192.168.5.235] => (item="image": 2,)
changed: [192.168.5.235] => (item="volume": 3,)
ok: [192.168.5.235] => (item=})
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235]
TASK [horizon : Configure Openstack file] **
changed: [192.168.5.235] => (item=OPENSTACK_NEUTRON_NETWORK = {)
changed: [192.168.5.235] => (item=...)
changed: [192.168.5.235] => (item='enable_router': False,)
changed: [192.168.5.235] => (item='enable_quotas': False,)
changed: [192.168.5.235] => (item='enable_ipv6': False,)
changed: [192.168.5.235] => (item='enable_distributed_router': False,)
changed: [192.168.5.235] => (item='enable_ha_router': False,)
changed: [192.168.5.235] => (item='enable_fip_topology_check': False,)
ok: [192.168.5.235] => (item=})
TASK [horizon : Configure Openstack file] **
ok: [192.168.5.235]
TASK [cinder : Install Cinder packages on controller node] ***
changed: [192.168.5.235]
TASK [cinder : Install Cinder scheduler] ***
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running sudo
changed: [192.168.5.235]
TASK [cinder : Configure database access for Cinder on controller node] **
changed: [192.168.5.235]
TASK [cinder : Configure RabbitMQ message queue access for Cinder] ***
changed: [192.168.5.235]
TASK [cinder : Configure identity services access for Cinder] **
changed: [192.168.5.235]
TASK [cinder : Configure my_ip option for Cinder on controller node] ***
changed: [192.168.5.235]
TASK [cinder : Configure lock path for Cinder on controller node] **
changed: [192.168.5.235]
TASK [cinder : Populate the block storage database for Cinder] ***
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather than running su
changed: [192.168.5.235]
TASK [cinder : Configure Nova for block storage] ***
changed: [192.168.5.235]
TASK [cinder : Install Nova API] ***
changed: [192.168.5.235]
TASK [cinder : Restart Nova API service] ***
changed: [192.168.5.235]
TASK [cinder : Restart Cinder services on controller node] ***
changed: [192.168.5.235]
TASK [cinder : Install utility packages for storage node] **
ok: [192.168.5.235]
TASK [cinder : Create LVM physical volume /dev/sdb] **
changed: [192.168.5.235]
TASK [cinder : Create LVM volume group cinder-volume] **
changed: [192.168.5.235]
TASK [cinder : Install Cinder packages on storage node] **
changed: [192.168.5.235]
TASK [cinder : Configure LVM backend for Cinder on storage node] ***
changed: [192.168.5.235]
TASK [cinder : Enable LVM backend for Cinder] **
changed: [192.168.5.235]
TASK [cinder : Configure image service API location for Cinder] **
changed: [192.168.5.235]



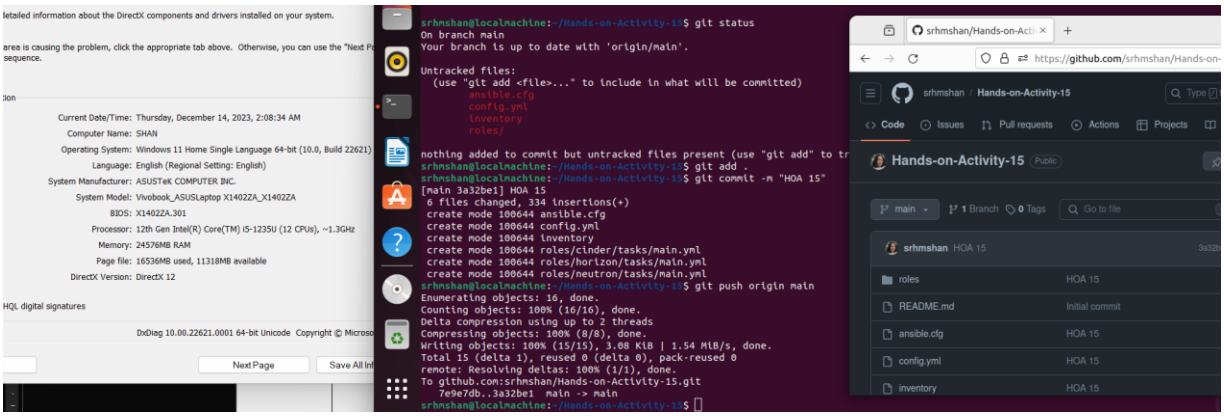
Verifying successful installations:







Adding, committing and pushing to GitHub:



Reflections:

Answer the following:

1. Describe Neutron, Horizon and Cinder services

Neutron: Neutron plays a role in the OpenStack ecosystem as it handles networking capabilities for OpenStack services. It facilitates the management and creation of networks, subnets, routers and floating IPs. These components are essential for facilitating communication between instances and external networks.

Horizon: Horizon serves as the web based graphical user interface dashboard for OpenStack. It offers users a centralized platform to interact with and manage OpenStack services. This simplifies the experience of managing resources within the OpenStack environment.

Cinder: Cinder acts as the Block Storage service in OpenStack providing block storage for compute instances. Users can easily. Detach volumes to their instances ensuring that data persists beyond the lifecycle of virtual machines.

Conclusions:

Completing this activity involved developing an Ansible based workflow to install OpenStack using Infrastructure as Code (IaC) principles. The main objectives included analyzing advantages and disadvantages of cloud services evaluating deployment and service models and creating a step-by-step workflow for installing OpenStack with Ansible. Throughout this process we utilized Oracle VirtualBox as our hypervisor along with either an Ubuntu VM or Centos VM. Tasks included creating repositories developing playbooks for Neutron, Horizon and Cinder services organizing servers, in the inventory file and pushing code to GitHub.

The results consisted of folder hierarchies YAML files tailored to roles and configurations, for each service. For analyzation, the functions performed by Neutron, Horizon and Cinder within the OpenStack framework while the final remarks emphasized the achievement of establishing an installation workflow, for OpenStack using Ansible.