

Name: Aldwin Joseph B. Revilla	Date Performed: 12/09/2023
Course/Section: CPE31S5	Date Submitted: 12/10/2023
Instructor: Engr. Roman Richard	Semester and SY: 1st Sem 2023-2024
Activity 14: OpenStack Installation (Keystone, Glance, Nova)	
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	
Oracle VirtualBox (Hypervisor) 1x Ubuntu VM or Centos VM	
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. Keystone (Identity Service) b. Glance (Imaging Service) c. Nova (Compute Service) 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)	
<ol style="list-style-type: none"> 1. Create a new repository for this activity. 	

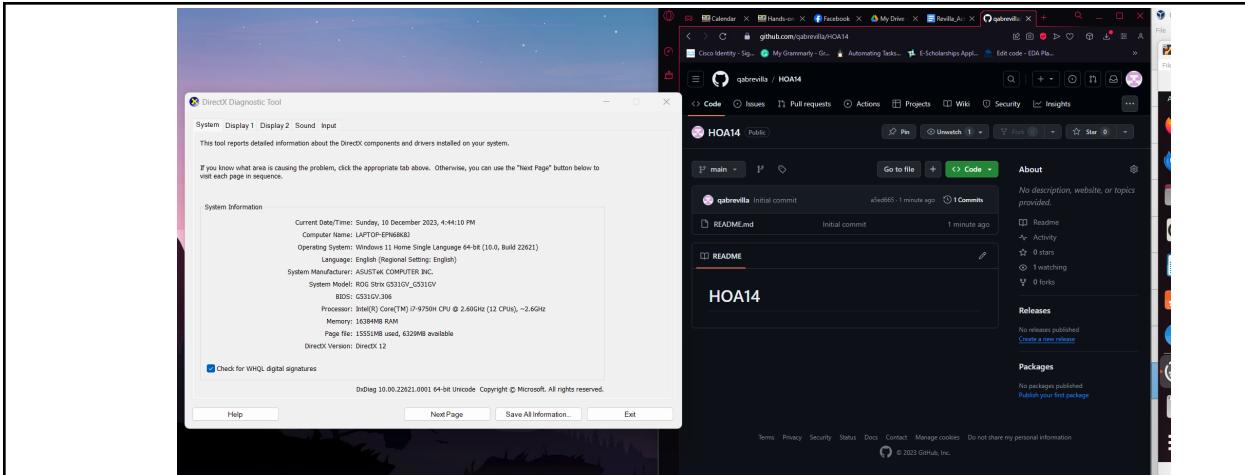


Figure 1.1 Github repository

On the github website, I've created a new repository for Hands-on-Activity 14. I also added a readme file inside the new repository.

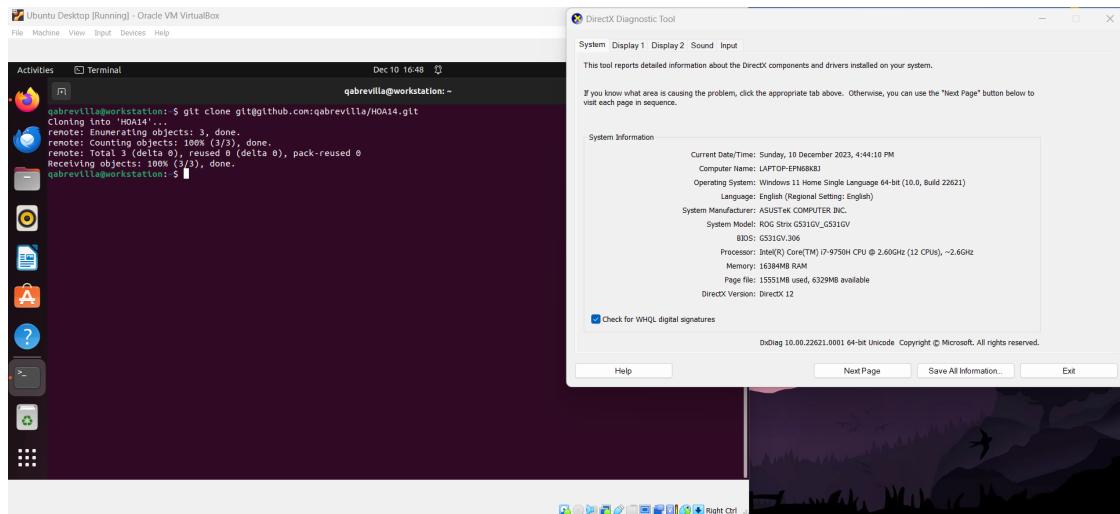


Figure 1.2 Git Clone

In my new HOA14 repository, I copied the ssh code and used it to clone the github. This will be useful later when committing changes.

2. Create a playbook that converts the steps in the following items in <https://docs.openstack.org/install-guide/>

2.1 Keystone (Identity Service)

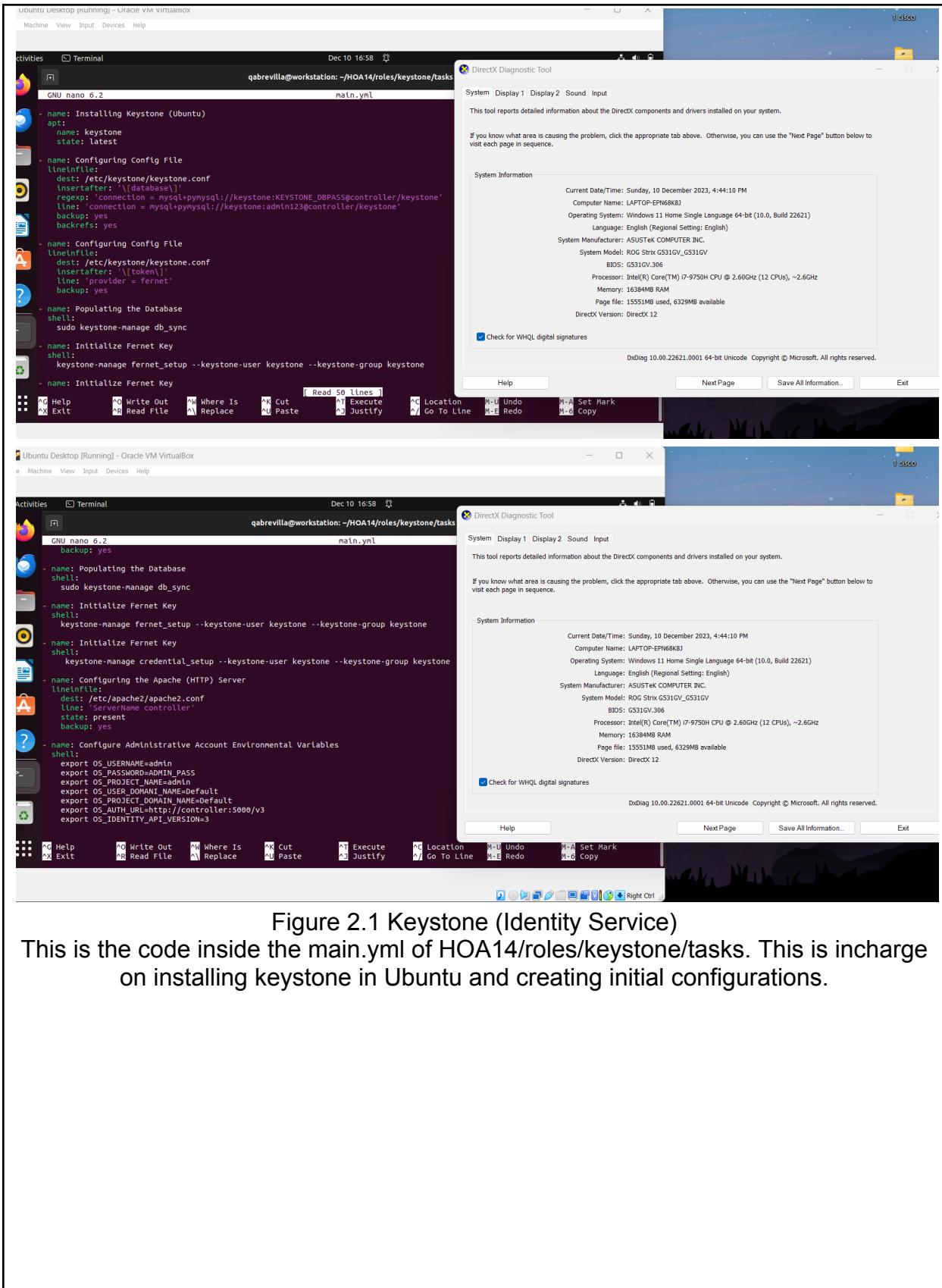


Figure 2.1 Keystone (Identity Service)

This is the code inside the `main.yml` of `HOA14/roles/keystone/tasks`. This is incharge on installing keystone in Ubuntu and creating initial configurations.

2.2 Glance (Imaging Service)

The figure consists of three vertically stacked screenshots of a Linux desktop environment, likely Ubuntu, running in Oracle VM VirtualBox. Each screenshot shows a terminal window and a DirectX Diagnostic Tool window.

Screenshot 1 (Top):

- Terminal:** Shows the command `qabrevilla@workstation: ~/HOA14/roles/glance/tasks` and the file `main.yml` containing configuration for Glance installation and database setup.
- DirectX Diagnostic Tool:** Reports system information for a Windows 10 Home Single Language 64-bit system (Build 22621). Processor: Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz (12 CPUs), ~2.6GHz. Memory: 16384MB RAM. DirectX Version: DirectX 12.

Screenshot 2 (Middle):

- Terminal:** Shows the command `qabrevilla@workstation: ~/HOA14/roles/glance/tasks` and the file `main.yml` containing configuration for Glance paste deployment and glance_store.
- DirectX Diagnostic Tool:** Reports system information for a Windows 10 Home Single Language 64-bit system (Build 22621). Processor: Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz (12 CPUs), ~2.6GHz. Memory: 16384MB RAM. DirectX Version: DirectX 12.

Screenshot 3 (Bottom):

- Terminal:** Shows the command `qabrevilla@workstation: ~/HOA14/roles/glance/tasks` and the file `main.yml` containing configuration for Glance oslo_limits, endpoint creation, and database population.
- DirectX Diagnostic Tool:** Reports system information for a Windows 10 Home Single Language 64-bit system (Build 22621). Processor: Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz (12 CPUs), ~2.6GHz. Memory: 16384MB RAM. DirectX Version: DirectX 12.

Figure 2.2 Glance (Imaging Service)

This is the code inside the main.yml of HOA14/roles/glance/tasks. It is incharge on installing the latest Glance in Ubuntu and has the prerequisites needed for the Glance. It also has the code for creating initial configurations for the remote server.

2.3 Nova (Compute Service)

Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 16:54 qabrevilla@workstation:~/HOA14/roles/nova/tasks

```
GNU nano 6.2 main.yaml
- name: Installing Nova (Ubuntu)
  apt:
    name:
      - nova-api
      - nova-conductor
      - nova-novncproxy
      - nova-scheduler
    state: latest

- name: Configuring Nova API
  lineinfile:
    dest: /etc/nova/nova.conf
    regexp: connection = mysql+pymysql://nova:NOVA_DBPASS@controller/nova_api
    line: connection = mysql+pymysql://nova:admin123@controller/nova_api
    backup: yes
    backrefs: yes

- name: Configure Nova API
  lineinfile:
    dest: /etc/nova/nova.conf
    insertafter: '([apiv1])'
    line: auth_strategy = keystone
    state: present
    backup: yes

- name: Configuring Nova Database
  lineinfile:
    dest: /etc/nova/nova.conf
    regexp: mysql+pymysql://nova:NOVA_DBPASS@controller/nova
    line: mysql+pymysql://nova:admin123@controller/nova
    backup: yes
    backrefs: yes

- name: Configure Nova Authentication Token (for Keystone)
  lineinfile:
    dest: /etc/glance/glance-api.conf
    regexp: ([keystone_auth_token])
    line: ([item])
    state: present
    backup: yes
    with_items:
      - webauthenticate_url = 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 = nova
      - password = admin123

- name: Configure Nova VNC
  lineinfile:
    dest: /etc/glance/glance-api.conf
```

Help Write Out Where Is Cut Execute Location Undo Set Mark Copy

DirectX Diagnostic Tool

System Display 1 Display 2 Sound Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time: Sunday, 10 December 2023, 4:44:10 PM
Computer Name: LAPTOP-EPN6K83
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTAK COMPUTER INC.
System Model: ROG Strix GS310GV_GS310V
BIOS: GS310V_306
Processor: Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz (12 CPUs), ~2.6GHz
Memory: 16384MB RAM
Page file: 15551MB used, 6329MB available
DirectX Version: DirectX 12

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Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 16:55 qabrevilla@workstation:~/HOA14/roles/nova/tasks

```
GNU nano 6.2 main.yaml
- name: Configuring Nova Database
  lineinfile:
    dest: /etc/nova/nova.conf
    regexp: mysql+pymysql://nova:NOVA_DBPASS@controller/nova
    line: mysql+pymysql://nova:admin123@controller/nova
    backup: yes
    backrefs: yes

- name: Configure Nova Authentication Token (for Keystone)
  lineinfile:
    dest: /etc/glance/glance-api.conf
    regexp: ([keystone_auth_token])
    line: ([item])
    state: present
    backup: yes
    with_items:
      - webauthenticate_url = 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 = nova
      - password = admin123

- name: Configure Nova VNC
  lineinfile:
    dest: /etc/glance/glance-api.conf
```

Help Write Out Where Is Cut Execute Location Undo Set Mark Copy

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Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 16:55 qabrevilla@workstation:~/HOA14/roles/nova/tasks

```
GNU nano 6.2 main.yaml
- password: admin123

- name: Configure Nova VNC
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertbefore: '[placement]'
    line: ([item])
    state: present
    backup: yes
    with_items:
      - server_listen = $nv_ip
      - server_proxyclient_address = $nv_ip

- name: Configure Nova placement
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertbefore: '[placement]'
    line: ([item])
    state: present
    backup: yes
    with_items:
      - region_name = RegionOne
      - project_name = default
      - auth_type = password
      - user_domain_name = default
      - auth_url = http://controller:5000/v3
      - username = placement
```

Help Write Out Where Is Cut Execute Location Undo Set Mark Copy

DirectX Diagnostic Tool

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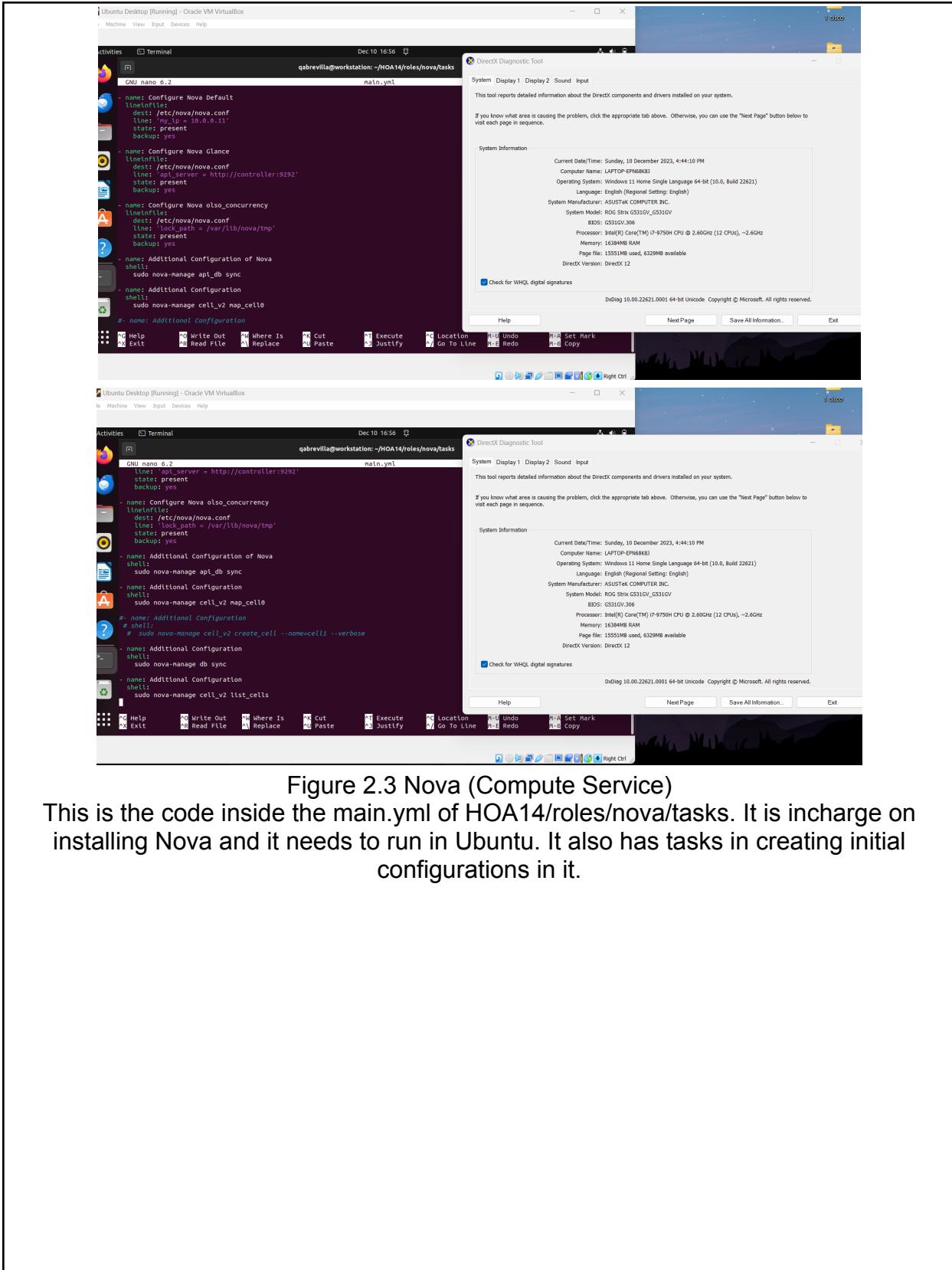


Figure 2.3 Nova (Compute Service)

This is the code inside the main.yml of HOA14/roles/nova/tasks. It is incharge on installing Nova and it needs to run in Ubuntu. It also has tasks in creating initial configurations in it.

3. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.

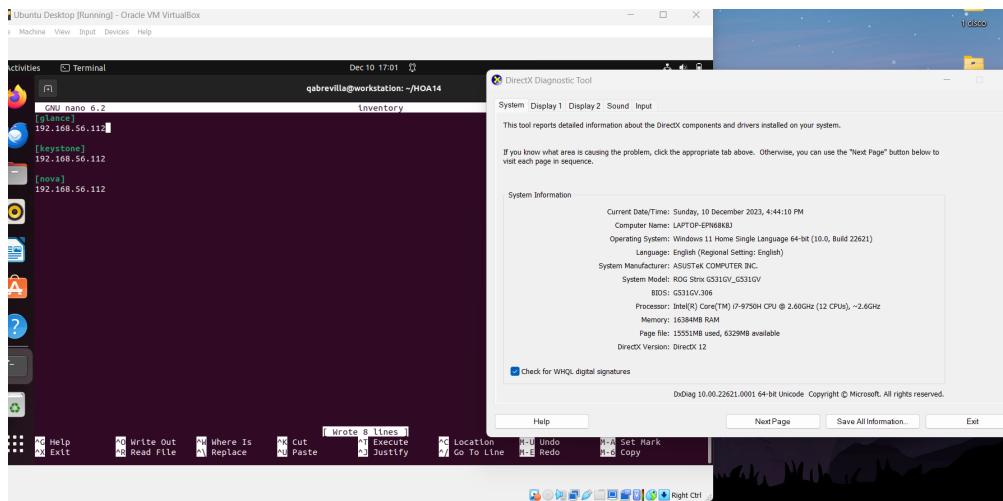


Figure 3.1 Inventory

In the inventory file, It contains the ip addresses of the remote servers. In my case I only used 1 remote server because it is the instruction of our instructor. It has the ip address of one Ubuntu remote server.

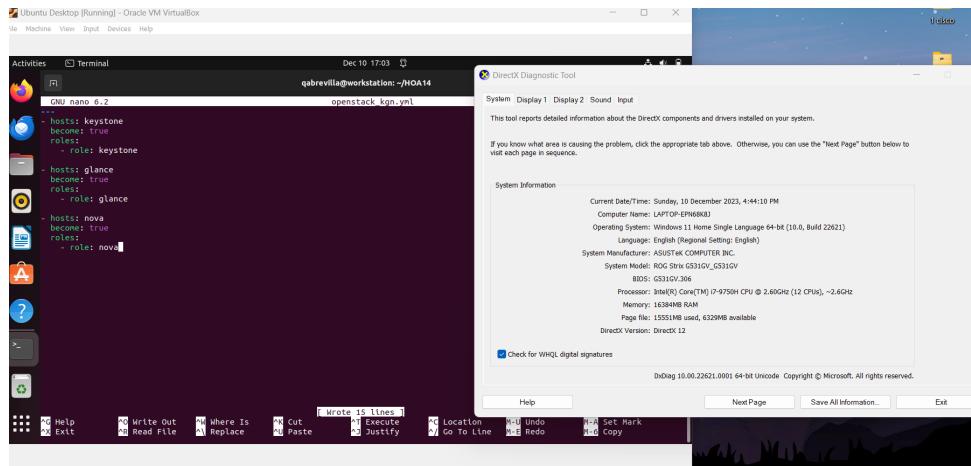


Figure 3.2 Ansible playbook

This is the main brain of the process of installation. It has the step by step program of how the playbook works.

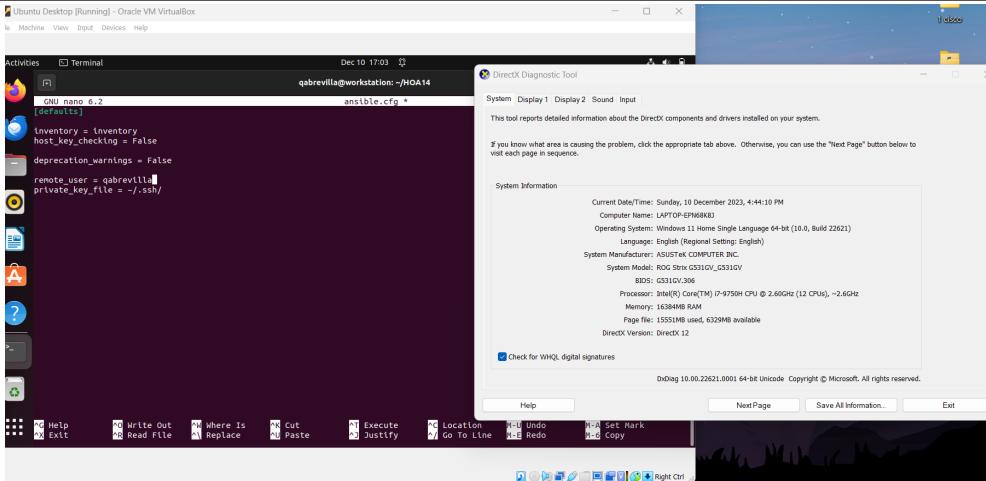


Figure 3.3 Ansible.cfg

It contains how it will communicate between systems and also has the user's name and the ssh key so that running the playbook will work.

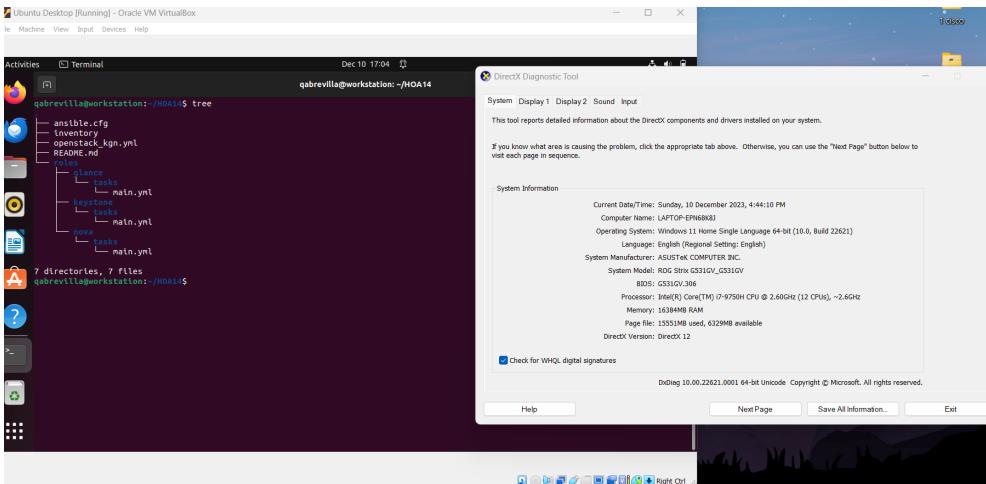


Figure 3.4 Tree

I use the tree command by downloading sudo apt install tree. This will show the structure of the files and directories.

Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 17:09

```
qabrevilla@workstation:~/HOA14
BECOME password:
PLAY [keystone] ****
TASK [Gathering Facts] ****
ok: [192.168.56.112]
TASK [keystone : Installing Keystone (Ubuntu)] ****
changed: [192.168.56.112]
TASK [keystone : Configuring Config File] ****
ok: [192.168.56.112]
TASK [keystone : Configuring Config File] ****
changed: [192.168.56.112]
TASK [keystone : Populating the Database] ****
changed: [192.168.56.112]
TASK [keystone : Initialize Fernet Key] ****
changed: [192.168.56.112]
TASK [keystone : Initialize Fernet Key] ****
changed: [192.168.56.112]
TASK [keystone : Configuring the Apache (HTTP) Server] ****
changed: [192.168.56.112]
TASK [keystone : Configure Administrative Account Environmental Variables] ****
changed: [192.168.56.112]
PLAY [glance] ****
TASK [Gathering Facts] ****
ok: [192.168.56.112]
```

Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 17:10

```
qabrevilla@workstation:~/HOA14
TASK [Gathering Facts] ****
ok: [192.168.56.112]
TASK [glance : Install Glance (Ubuntu)] ****
changed: [192.168.56.112]
TASK [glance : Configure Glance database] ***
ok: [192.168.56.112]
TASK [glance : Configure Glance Authentication Key] ****
changed: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
changed: [192.168.56.112] => (item=itemauth_type = password)
changed: [192.168.56.112] => (item=itemauth_user = glance)
changed: [192.168.56.112] => (item=itemauth_password = Default)
changed: [192.168.56.112] => (item=itemproject_name = glance)
changed: [192.168.56.112] => (item=itemusername = glance)
changed: [192.168.56.112] => (item=itempassword = admin123)
TASK [glance : Configure Glance paste_deploy] ***
changed: [192.168.56.112]
TASK [glance : Configure Glance glance_store] ***
changed: [192.168.56.112] => (item=itemdefault_store = file)
changed: [192.168.56.112] => (item=itemfilesystem_store_datadir = /var/lib/glance/images/)
TASK [glance : Configure Glance oslo_lmt] ***
ok: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
ok: [192.168.56.112] => (item=itemauth_type = password)
ok: [192.168.56.112] => (item=itemauth_user = glance)
ok: [192.168.56.112] => (item=itemauth_password = Default)
changed: [192.168.56.112] => (item=itemusername = MY_SERVICE)
changed: [192.168.56.112] => (item=itempassword = MY_PASSWORD)
changed: [192.168.56.112] => (item=itemregion_id = ENDPOINT_ID)
changed: [192.168.56.112] => (item=itemregion_name = RegionOne)
TASK [glance : Configure Glance DEFAULT] ***
changed: [192.168.56.112]
TASK [glance : Populating Image Service Database] ***
changed: [192.168.56.112]
PLAY [nova] ****
TASK [gathering Facts] ***
ok: [192.168.56.112]
TASK [nova : Installing Nova (Ubuntu)] ***
changed: [192.168.56.112]
TASK [nova : Configuring Nova API] ***
ok: [192.168.56.112]
TASK [nova : Configure Nova API] ***
changed: [192.168.56.112]
TASK [nova : Configuring Nova Database] ***
ok: [192.168.56.112]
TASK [nova : Configure Nova Authentication Token (for Keystone)] ***
changed: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
```

DirectX Diagnostic Tool

System Display 1 Display 2 Sound Input

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Computer Name: LAPTOP-EPH68K8
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: ROG Strix G531GV_O531GV
BIOS: CS310V3.06
Processor: Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz (12 CPUs), ~2.6GHz
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Page file: 15551MB used, 6329MB available
DirectX Version: DirectX 12

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Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 17:10

```
qabrevilla@workstation:~/HOA14
TASK [Gathering Facts] ****
ok: [192.168.56.112]
TASK [glance : Install Glance (Ubuntu)] ****
changed: [192.168.56.112]
TASK [glance : Configure Glance database] ***
ok: [192.168.56.112]
TASK [glance : Configure Glance Authentication Key] ****
changed: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
changed: [192.168.56.112] => (item=itemauth_type = password)
changed: [192.168.56.112] => (item=itemauth_user = glance)
changed: [192.168.56.112] => (item=itemauth_password = Default)
changed: [192.168.56.112] => (item=itemproject_name = glance)
changed: [192.168.56.112] => (item=itemusername = glance)
changed: [192.168.56.112] => (item=itempassword = admin123)
TASK [glance : Configure Glance paste_deploy] ***
changed: [192.168.56.112]
TASK [glance : Configure Glance glance_store] ***
changed: [192.168.56.112] => (item=itemdefault_store = file)
changed: [192.168.56.112] => (item=itemfilesystem_store_datadir = /var/lib/glance/images/)
TASK [glance : Configure Glance oslo_lmt] ***
ok: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
ok: [192.168.56.112] => (item=itemauth_type = password)
ok: [192.168.56.112] => (item=itemauth_user = glance)
ok: [192.168.56.112] => (item=itemauth_password = Default)
changed: [192.168.56.112] => (item=itemusername = MY_SERVICE)
changed: [192.168.56.112] => (item=itempassword = MY_PASSWORD)
changed: [192.168.56.112] => (item=itemregion_id = ENDPOINT_ID)
changed: [192.168.56.112] => (item=itemregion_name = RegionOne)
TASK [glance : Configure Glance DEFAULT] ***
changed: [192.168.56.112]
TASK [glance : Populating Image Service Database] ***
changed: [192.168.56.112]
PLAY [nova] ****
TASK [gathering Facts] ***
ok: [192.168.56.112]
TASK [nova : Installing Nova (Ubuntu)] ***
changed: [192.168.56.112]
TASK [nova : Configuring Nova API] ***
ok: [192.168.56.112]
TASK [nova : Configure Nova API] ***
changed: [192.168.56.112]
TASK [nova : Configuring Nova Database] ***
ok: [192.168.56.112]
TASK [nova : Configure Nova Authentication Token (for Keystone)] ***
changed: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
```

DirectX Diagnostic Tool

System Display 1 Display 2 Sound Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

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Ubuntu Desktop [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 17:10

```
qabrevilla@workstation:~/HOA14
TASK [glance : Configure Glance oslo_lmt] ***
ok: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
ok: [192.168.56.112] => (item=itemauth_type = password)
ok: [192.168.56.112] => (item=itemauth_user = glance)
ok: [192.168.56.112] => (item=itemauth_password = Default)
changed: [192.168.56.112] => (item=itemusername = MY_SERVICE)
changed: [192.168.56.112] => (item=itempassword = MY_PASSWORD)
changed: [192.168.56.112] => (item=itemregion_id = ENDPOINT_ID)
changed: [192.168.56.112] => (item=itemregion_name = RegionOne)
TASK [glance : Configure Glance DEFAULT] ***
changed: [192.168.56.112]
TASK [glance : Populating Image Service Database] ***
changed: [192.168.56.112]
PLAY [nova] ****
TASK [gathering Facts] ***
ok: [192.168.56.112]
TASK [nova : Installing Nova (Ubuntu)] ***
changed: [192.168.56.112]
TASK [nova : Configuring Nova API] ***
ok: [192.168.56.112]
TASK [nova : Configure Nova API] ***
changed: [192.168.56.112]
TASK [nova : Configuring Nova Database] ***
ok: [192.168.56.112]
TASK [nova : Configure Nova Authentication Token (for Keystone)] ***
changed: [192.168.56.112] => (item=itemauth_url = http://controller:5000)
```

DirectX Diagnostic Tool

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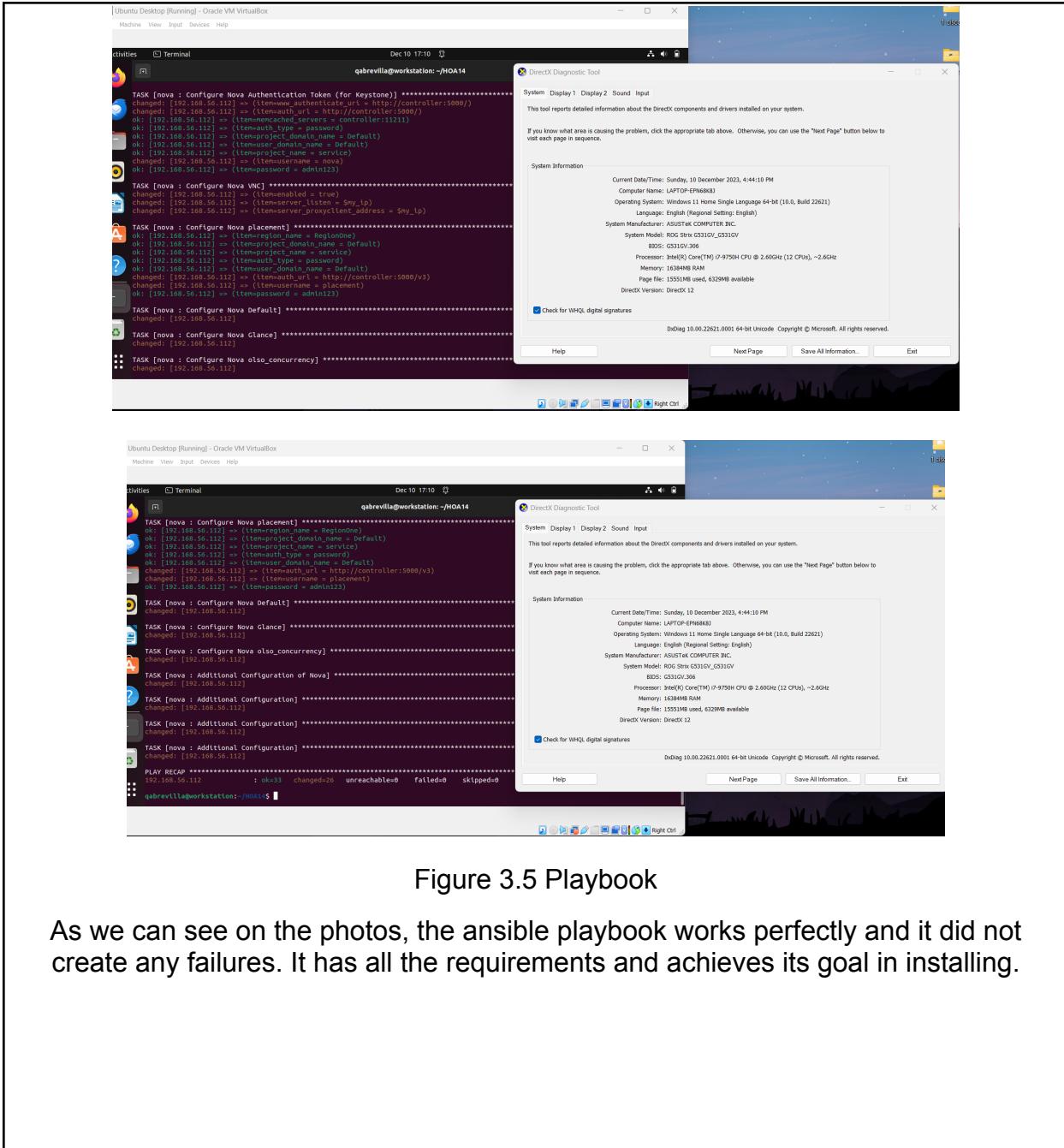


Figure 3.5 Playbook

As we can see on the photos, the ansible playbook works perfectly and it did not create any failures. It has all the requirements and achieves its goal in installing.

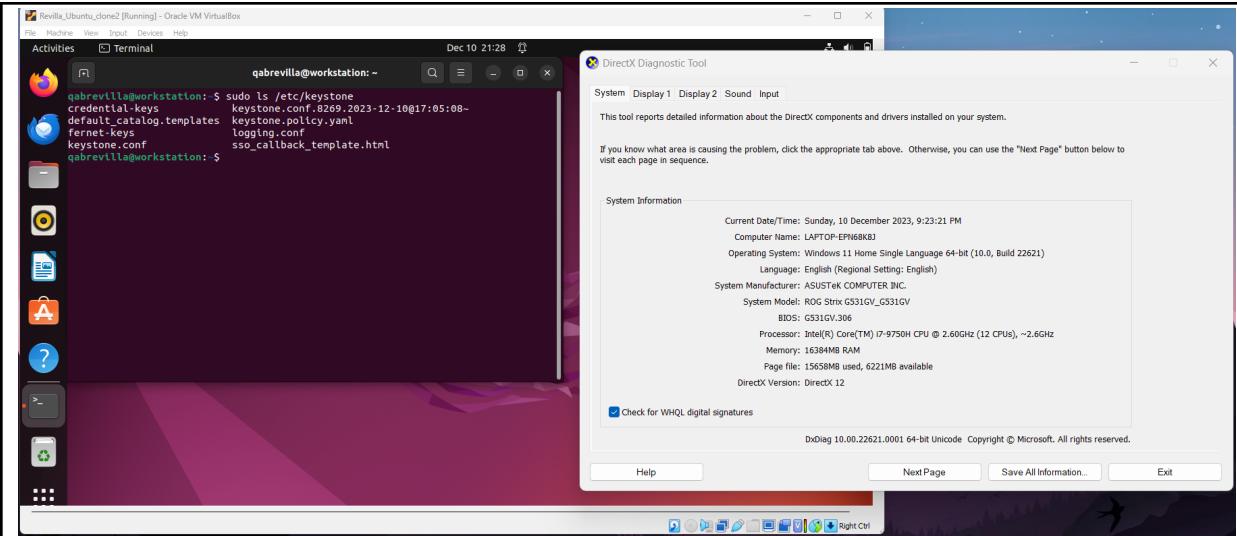


Figure 3.6 Proof of installation (Keystone)

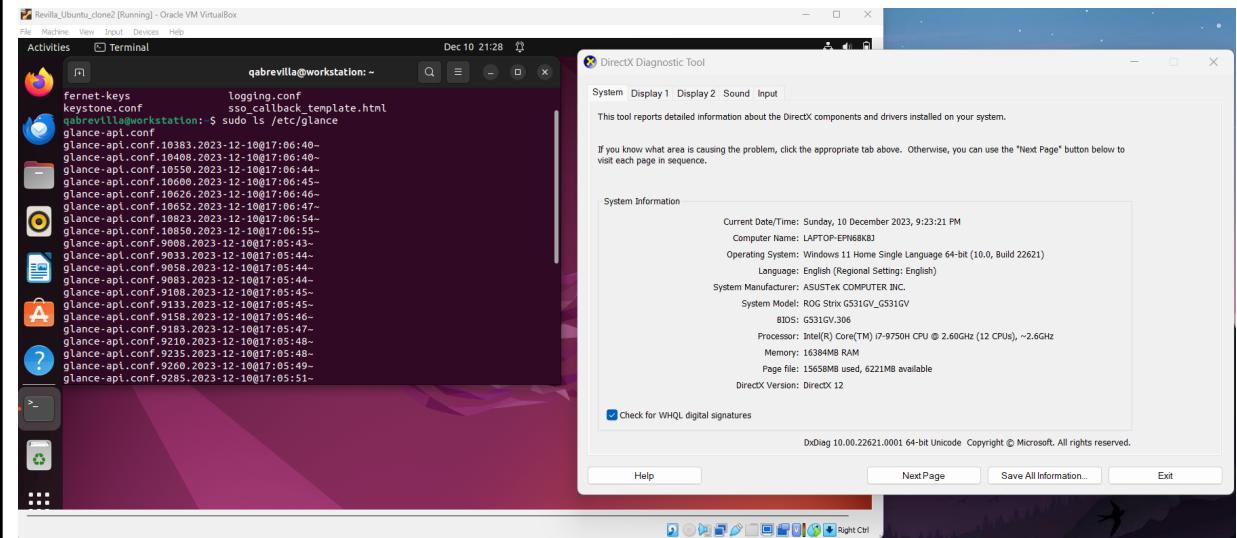


Figure 3.7 Proof of installation (Glance)

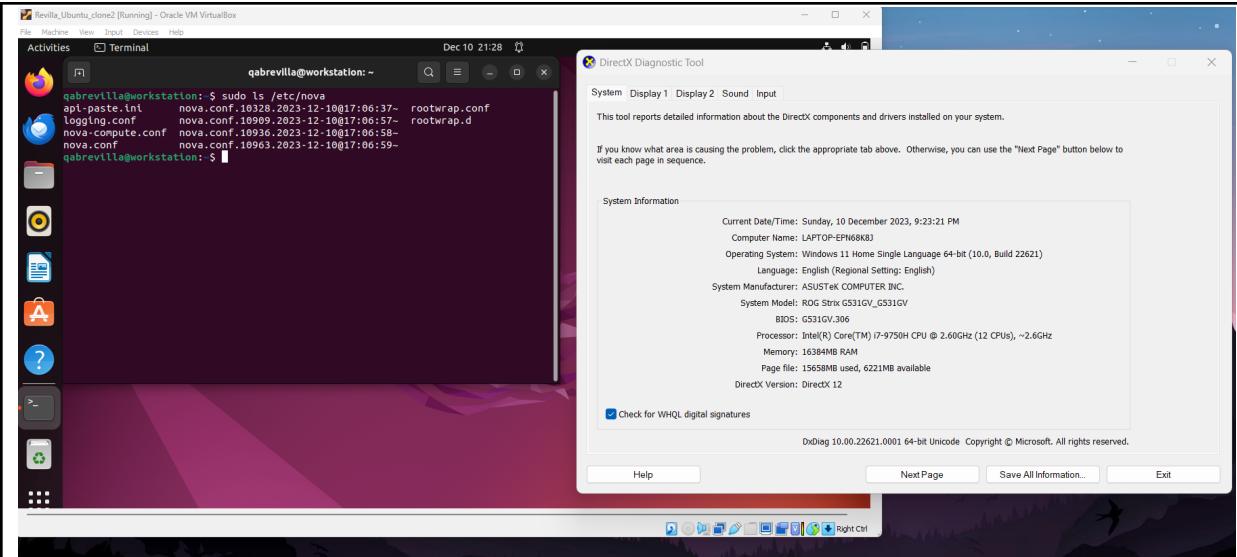


Figure 3.8 Proof of installation (Nova)

4. Add, commit and push it to your GitHub repo.

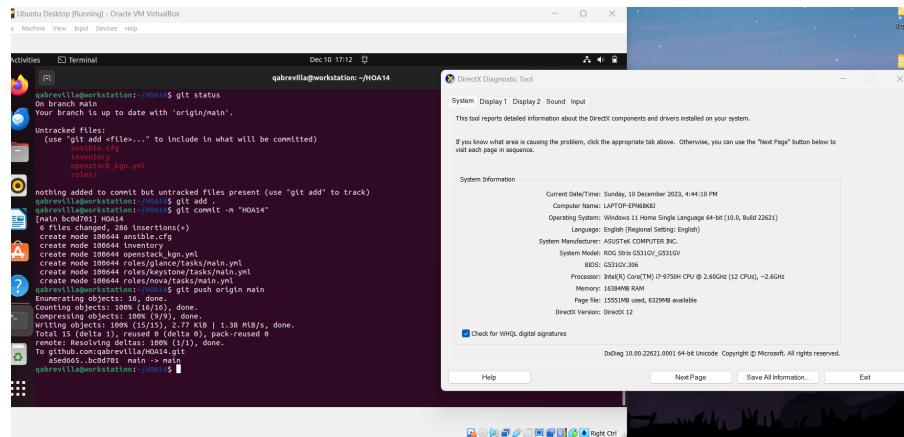


Figure 4.1 Git add, commit, and push

Doing this process will initialize all the files and will save the file changes done on to the github repository.

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

Keystone - In openstack, It provides authorization and authentication for all the users using the open stack by having a list of users with their permission, roles, and other important information. In short keystone is the one who is incharge to identify users, and allow them the access based on the resources.

Glance - It is the catalog and the repository for virtual machine images that can manage various formats of images like (raw,qcow2,VMDK). It is also flexible in different operating systems where any virtual machines can deploy templates within the openstack environment.

Nova - It provides quick access to compute resources and allow the provisioning instances. It manages the hardware resources and support different instances like KVM, Xen, and VMware and allows users to choose configurations suitable for their application.

Conclusions:

This activity helps us to understand more about openstack installations, more specifically for keystone, Glance, and Nova. For the objectives in this activity, we need to know them and familiarize how to install and make initial configuration using ansible playbooks. It also helps us analyze advantages and disadvantages of cloud services. I really hope that I can use the openstack tools/managers like this so that I can be able to experience what it does. But for now what really matters is that I can install them using playbook and run initial configuration on remote servers by just entering one command. Addressing these advantages and disadvantages will help us as an administrator to make good decisions and develop skills in adopting cloud services. I hope that this knowledge and skills I get from this activity will help me in my career in the future.