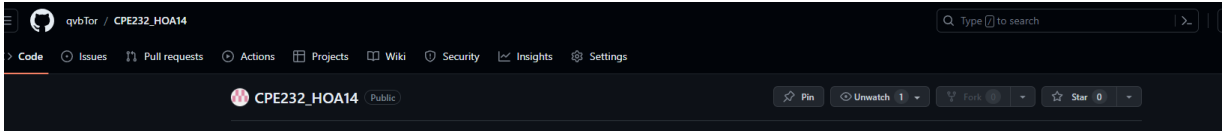


<b>Name: Victor Ortega</b>	<b>Date Performed: 12/03/2023</b>
<b>Course/Section: CPE232 S5</b>	<b>Date Submitted: 12/03/2023</b>
<b>Instructor: Engr. Roman Richard</b>	<b>Semester and SY: 2023-2024</b>
<b>Activity 14: OpenStack Installation (Keystone, Glance, Nova)</b>	
<b>1. Objectives</b>	
Create a 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. Keystone (Identity Service)</li> <li>b. Glance (Imaging Service)</li> <li>c. Nova (Compute Service)</li> <li>d. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.</li> <li>e. Add, commit and push it to your GitHub repo.</li> </ol> </li> </ol>	
<b>5. Output (screenshots and explanations)</b>	
<ol style="list-style-type: none"> <li>1. Creating new repository</li> </ol>  <p>The screenshot shows a GitHub repository page for 'CPE232_HOA14' by user 'qvbTor'. The repository is public and currently has 0 stars and 1 unwatch. The page includes navigation tabs for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. The repository name and 'Public' status are prominently displayed at the top of the content area.</p>	

## 2. Overall of repository

The screenshot displays two windows side-by-side. On the left is a terminal window with the prompt `vector@Workstation:~/CPE232_H0A14$` and the command `tree`. The output shows a directory structure with `ansible.cfg`, `installation.yml`, `inventory`, `README.md`, and a `roles` directory containing `glance`, `keystone`, and `nova`, each with a `tasks` subdirectory and a `main.yml` file. A summary line states "7 directories, 7 files". On the right is the "DirectX Diagnostic Tool" window, which shows system information including the current date/time, computer name, operating system, language, system manufacturer, system model, BIOS, processor, memory, page file, and DirectX version.

```
vector@Workstation:~/CPE232_H0A14$ tree
.
├── ansible.cfg
├── installation.yml
├── inventory
├── README.md
└── roles
    ├── glance
    │   └── tasks
    │       └── main.yml
    ├── keystone
    │   └── tasks
    │       └── main.yml
    └── nova
        └── tasks
            └── main.yml

7 directories, 7 files
vector@Workstation:~/CPE232_H0A14$
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | Sound 5 | 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, 3 December 2023, 6:38:33 am  
Computer Name: DESKTOP-8LSHV3C  
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)  
Language: English (Regional Setting: English)  
System Manufacturer: Gigabyte Technology Co., Ltd.  
System Model: B450M DS3H  
BIOS: F60  
Processor: AMD Ryzen 5 3500 6-Core Processor (6 CPUs), ~3.6GHz  
Memory: 16384MB RAM  
Page file: 17457MB used, 9109MB available  
DirectX Version: DirectX 12

☒ Check for WHQL digital signatures

### a. Keystone

The screenshot displays two windows side-by-side. On the left is a terminal window showing the output of an Ansible playbook for installing and configuring Keystone. The output includes steps for installing Keystone, configuring the config file, configuring the database, populating the database, initializing Fernet keys, and configuring the Apache (HTTP) server. On the right is the "DirectX Diagnostic Tool" window, which shows system information including the current date/time, computer name, operating system, language, system manufacturer, system model, BIOS, processor, memory, page file, and DirectX version.

```
GNU nano 6.2
- name: Installing Keystone (Ubuntu)
  apt:
    name: keystone
    state: latest

- name: Configuring Config File
  lineinfile:
    dest: /etc/keystone/keystone.conf
    insertafter: '\[database\]'
    regexp: 'connection = mysql+pymysql://keystone:KEYSTONE_DBPASS@controller/keystone'
    line: 'connection = mysql+pymysql://keystone:admini23@controller/keystone'
    backup: yes
    backrefs: yes

- name: Configuring Config File
  lineinfile:
    dest: /etc/keystone/keystone.conf
    insertafter: '\[token\]'
    line: 'provider = fernet'
    backup: yes

- name: Populating the Database
  shell:
    sudo keystone-manage db_sync

- name: Initialize Fernet Key
  shell:
    keystone-manage fernet_setup --keystone-user keystone --keystone-group keystone

- name: Initialize Fernet Key
  shell:
    keystone-manage credential_setup --keystone-user keystone --keystone-group keystone

- name: Configuring the Apache (HTTP) Server
  lineinfile:
    dest: /etc/apache2/apache2.conf
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | Sound 5 | 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

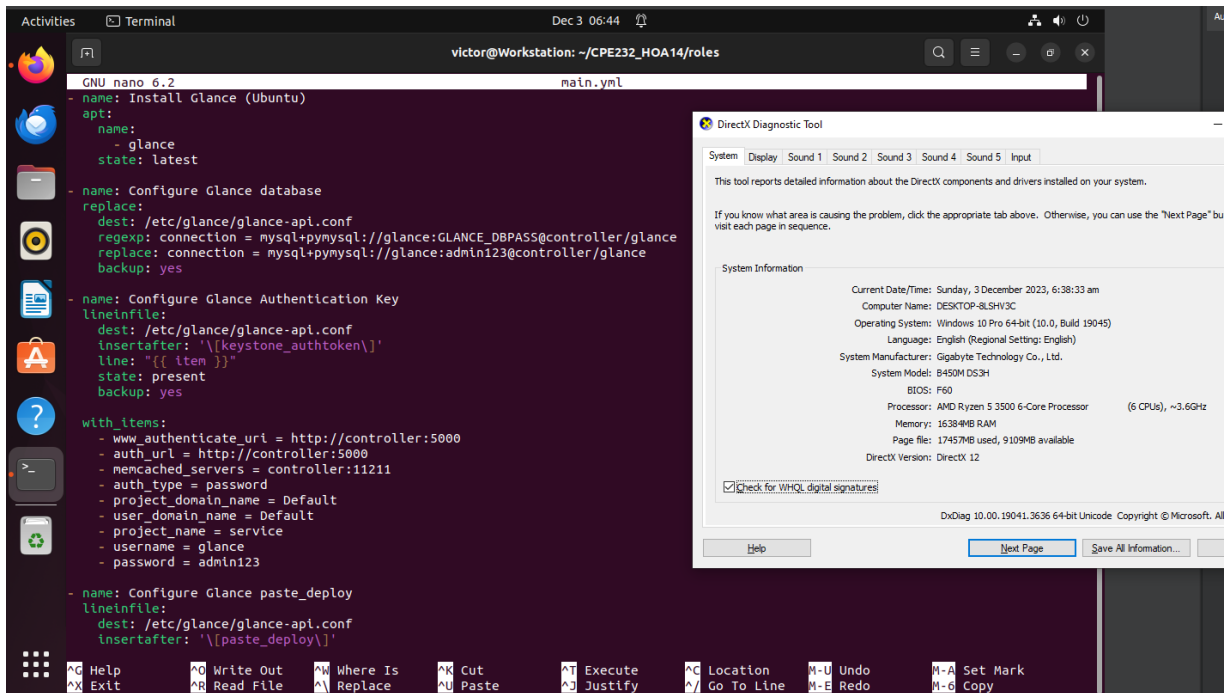
Current Date/Time: Sunday, 3 December 2023, 6:38:33 am  
Computer Name: DESKTOP-8LSHV3C  
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)  
Language: English (Regional Setting: English)  
System Manufacturer: Gigabyte Technology Co., Ltd.  
System Model: B450M DS3H  
BIOS: F60  
Processor: AMD Ryzen 5 3500 6-Core Processor (6 CPUs), ~3.6GHz  
Memory: 16384MB RAM  
Page file: 17457MB used, 9109MB available  
DirectX Version: DirectX 12

☒ Check for WHQL digital signatures

DxDiag 10.00.19041.3636 64-bit Unicode Copyright © Microsoft. All rights reserved.

Help Next Page Save All Information...

## b. Glance



```
GNU nano 6.2 main.yml
- name: Install Glance (Ubuntu)
  apt:
    name: glance
    state: latest

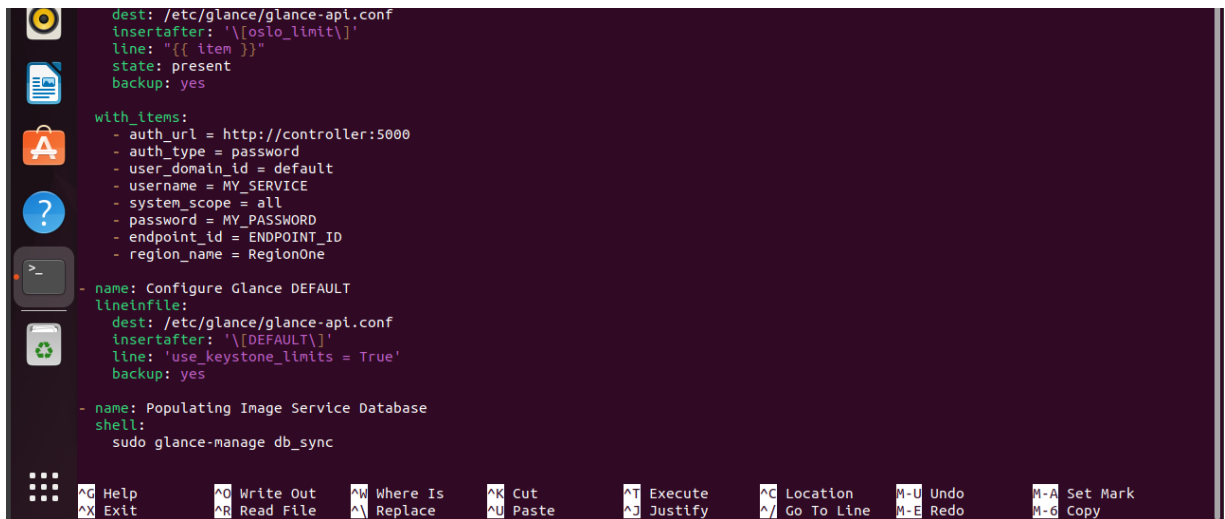
- name: Configure Glance database
  replace:
    dest: /etc/glance/glance-api.conf
    regexp: connection = mysql+pymysql://glance:GLANCE_DBPASS@controller/glance
    replace: connection = mysql+pymysql://glance:admin123@controller/glance
    backup: yes

- name: Configure Glance Authentication Key
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[keystone_auth_token\]'
    line: "([ item ])"
    state: present
    backup: yes

with_items:
  - 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 = glance
  - password = admin123

- name: Configure Glance paste_deploy
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[paste_deploy\]'

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^J Execute    ^_ Location   ^U Undo       ^M Set Mark
^X Exit      ^R Read File  ^I Replace    ^U Paste      ^J Justify    ^/ Go To Line  ^E Redo       ^C Copy
```



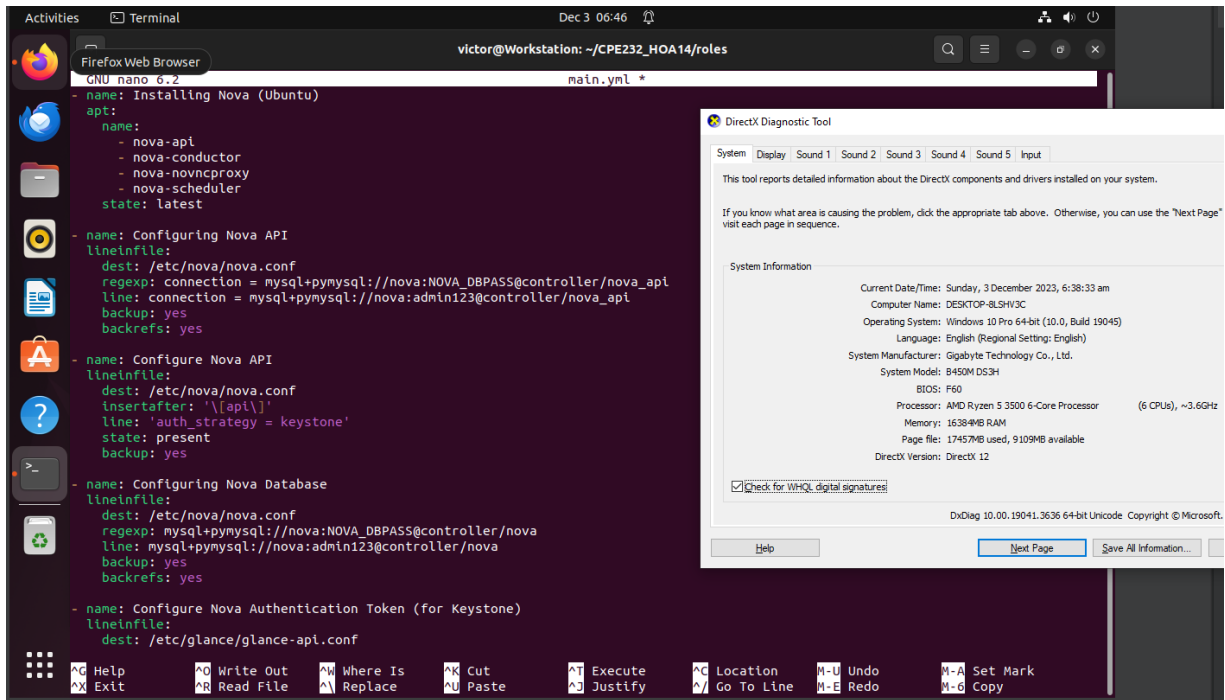
```
    dest: /etc/glance/glance-api.conf
    insertafter: '\[oslo_limit\]'
    line: "([ item ])"
    state: present
    backup: yes

with_items:
  - auth_url = http://controller:5000
  - auth_type = password
  - user_domain_id = default
  - username = MY_SERVICE
  - system_scope = all
  - password = MY_PASSWORD
  - endpoint_id = ENDPOINT_ID
  - region_name = RegionOne

- name: Configure Glance DEFAULT
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[DEFAULT\]'
    line: 'use_keystone_limits = True'
    backup: yes

- name: Populating Image Service Database
  shell:
    sudo glance-manage db_sync
```

## c. Nova



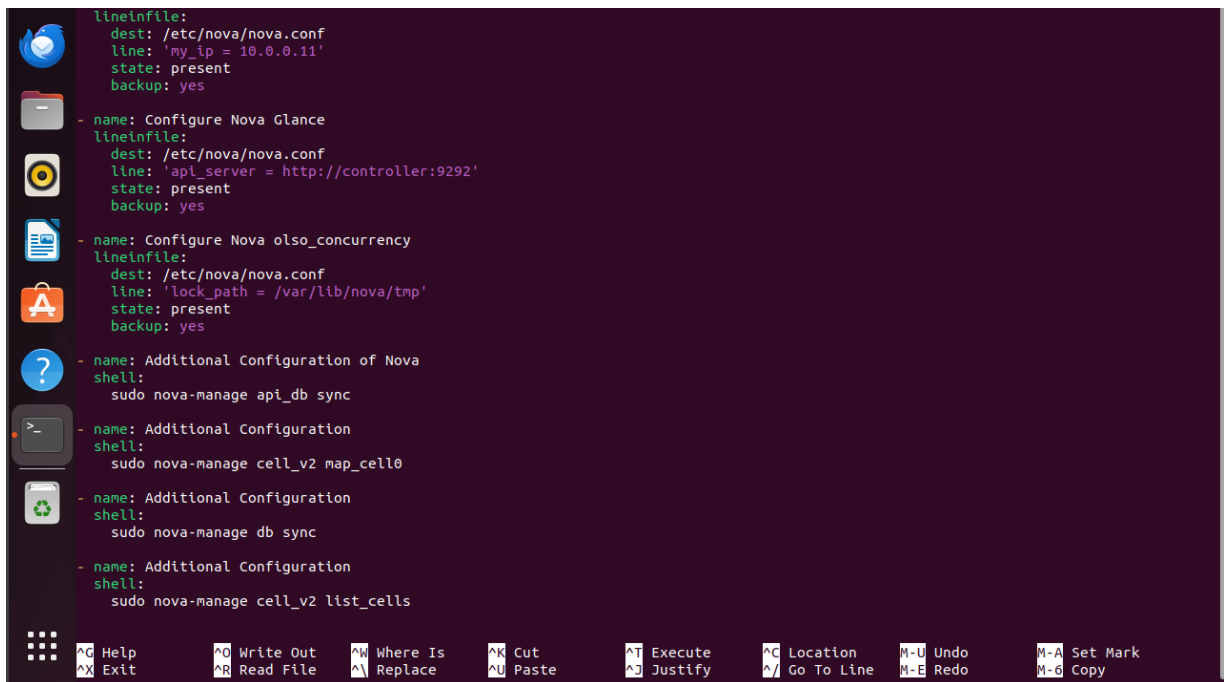
```
Activities Terminal Dec 3 06:46 victor@Workstation: ~/CPE232_HOA14/roles
GNU nano 6.2 main.yml
- name: Installing Nova (Ubuntu)
  apt:
    name:
      - nova-api
      - nova-conductor
      - nova-novncproxy
      - nova-scheduler
    state: latest

- 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: '\[api\]'
    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
```



```
lineinfile:
  dest: /etc/nova/nova.conf
  line: 'my_ip = 10.0.0.11'
  state: present
  backup: yes

- name: Configure Nova Glance
  lineinfile:
    dest: /etc/nova/nova.conf
    line: 'api_server = http://controller:9292'
    state: present
    backup: yes

- name: Configure Nova oslo_concurrency
  lineinfile:
    dest: /etc/nova/nova.conf
    line: 'lock_path = /var/lib/nova/tmp'
    state: present
    backup: yes

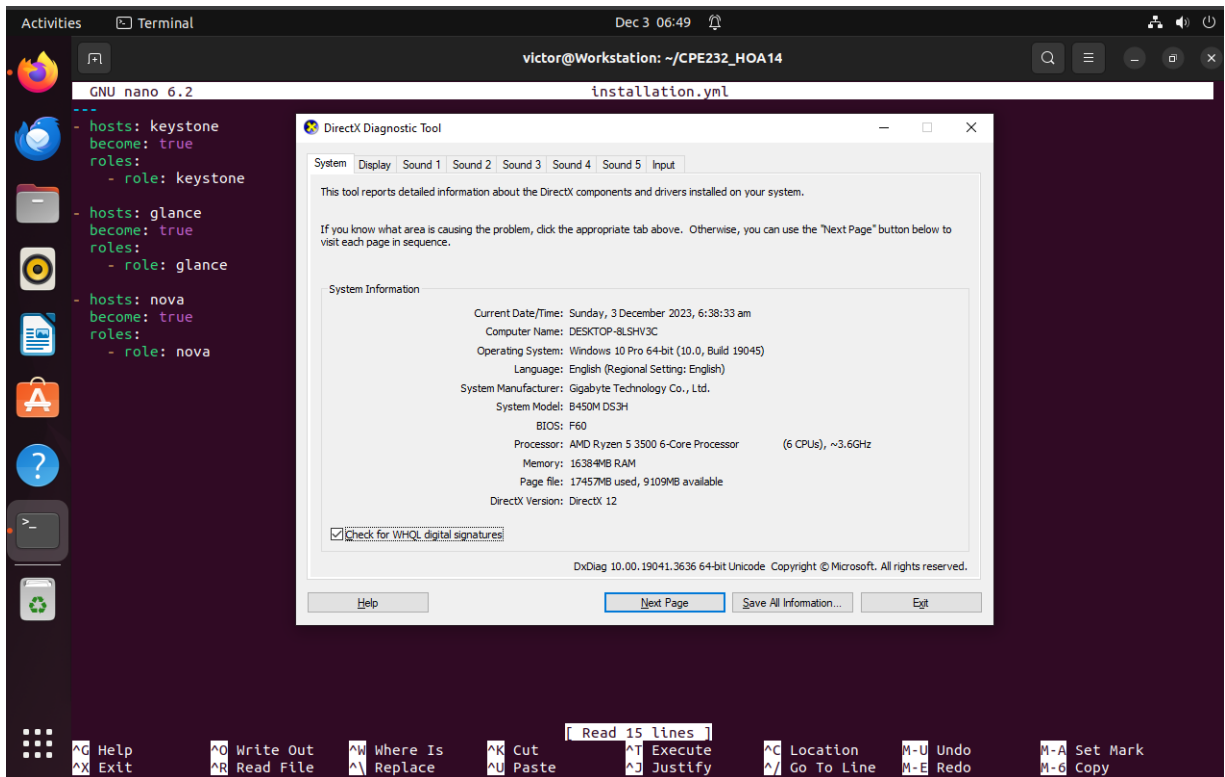
- name: Additional Configuration of Nova
  shell:
    sudo nova-manage api_db sync

- name: Additional Configuration
  shell:
    sudo nova-manage cell_v2 map_cell0

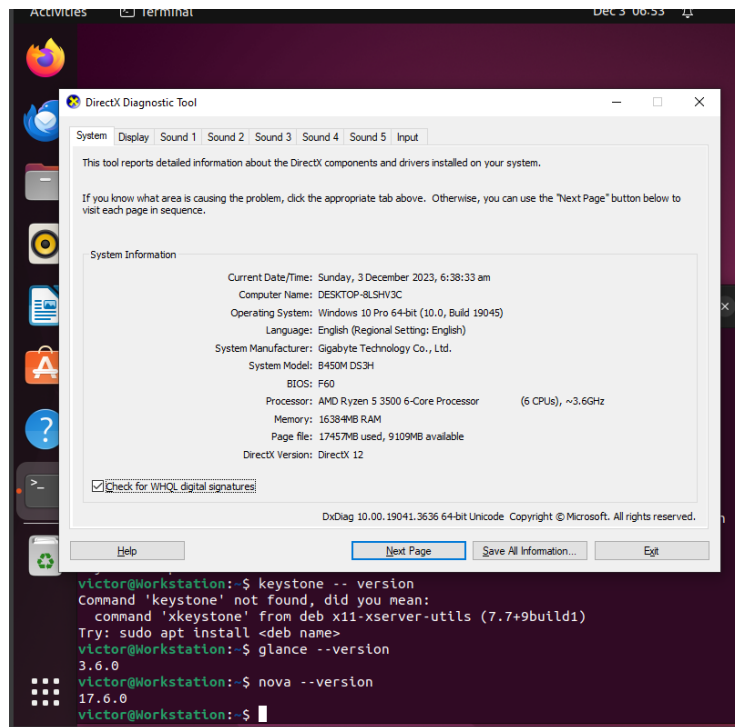
- name: Additional Configuration
  shell:
    sudo nova-manage db sync

- name: Additional Configuration
  shell:
    sudo nova-manage cell_v2 list_cells
```

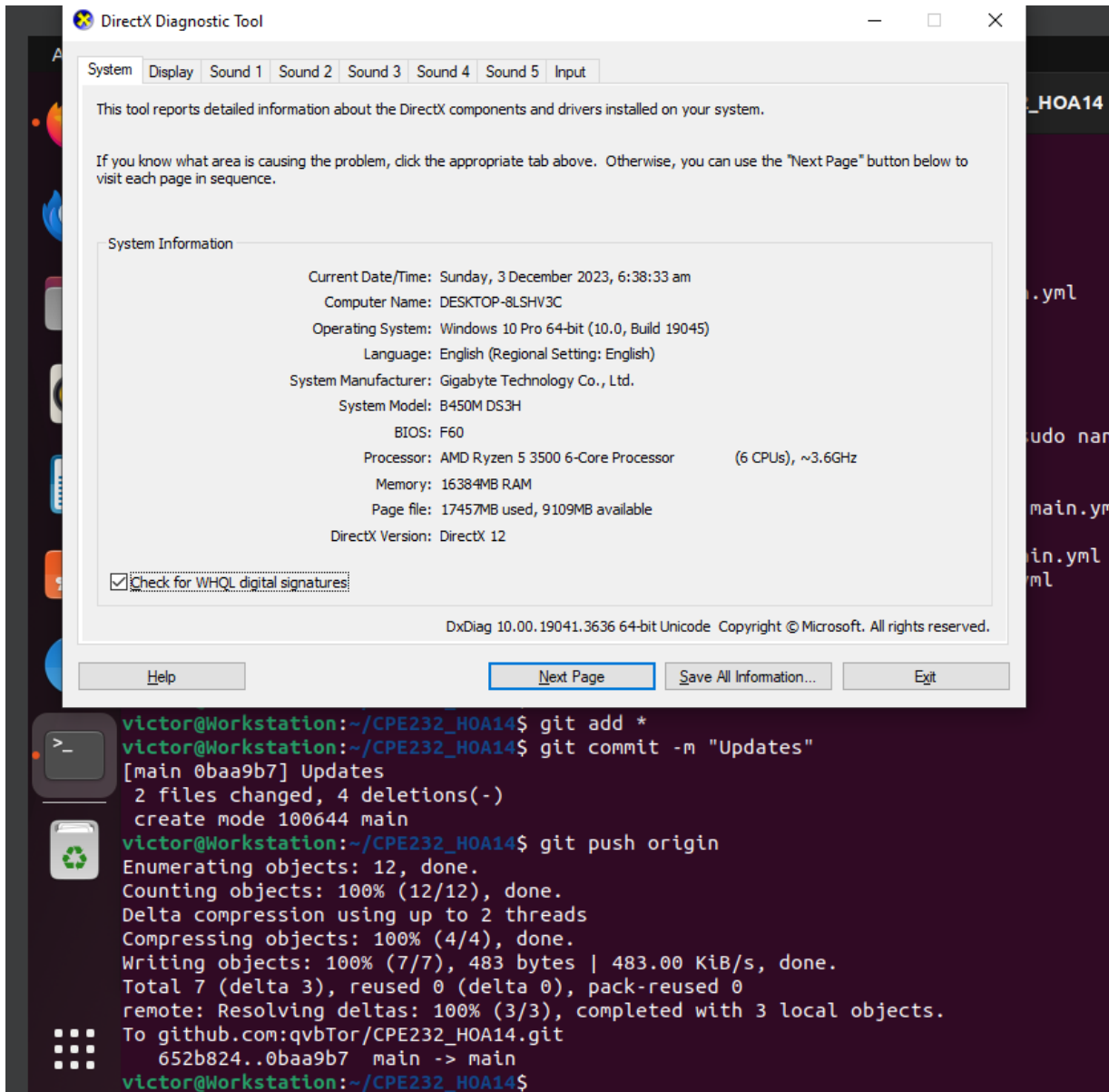
### 3. Playbook.



### 4. Verifying all the requirements are installed.



## 5. Pushing into GitHub repository



The screenshot displays a Windows desktop environment. In the foreground, the DirectX Diagnostic Tool is open, showing the 'System' tab. The tool provides detailed information about the system's hardware and software configuration. Below the system information, there is a checkbox for 'Check for WHQL digital signatures' which is checked. At the bottom of the window, there are buttons for 'Help', 'Next Page', 'Save All Information...', and 'Exit'.

Below the DirectX Diagnostic Tool, a terminal window is open, showing the following commands and output:

```
victor@Workstation:~/CPE232_H0A14$ git add *
victor@Workstation:~/CPE232_H0A14$ git commit -m "Updates"
[main 0baa9b7] Updates
2 files changed, 4 deletions(-)
create mode 100644 main
victor@Workstation:~/CPE232_H0A14$ git push origin
Enumerating objects: 12, done.
Counting objects: 100% (12/12), done.
Delta compression using up to 2 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (7/7), 483 bytes | 483.00 KiB/s, done.
Total 7 (delta 3), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (3/3), completed with 3 local objects.
To github.com:qvbTor/CPE232_H0A14.git
652b824..0baa9b7 main -> main
victor@Workstation:~/CPE232_H0A14$
```

### **Reflections:**

Answer the following:

1. Describe Keystone, Glance and Nova services

**a. Keystone:**

Keystone functions as OpenStack's identity service, overseeing user authentication and authorization. It manages roles, users, and projects to ensure secure access to OpenStack resources.

**b. Glance**

Glance serves as OpenStack's image service, tasked with storing and overseeing virtual machine images. Its role involves the discovery, registration, and retrieval of virtual machine images, facilitating efficient image distribution within the cloud environment.

**c. Nova:**

Nova, the compute service in OpenStack, manages the provisioning and administration of virtual machines or instances. It provides a scalable and adaptable platform for running and coordinating virtualized workloads within the OpenStack cloud.

### **Conclusions:**

Therefore, employing an Ansible playbook simplifies the installation of Keystone, Glance, and Nova services in OpenStack. This method guarantees a smooth deployment, minimizing complications, and fine-tuning the configuration of these vital components. Through the playbook's effectiveness, organizations can quickly set up a strong and seamlessly integrated OpenStack infrastructure, enabling them to leverage secure identity management (Keystone), effective image services (Glance), and scalable compute capabilities (Nova).