Name: John Renzo L. Mendoza	**Date Performed:** December 9, 2023
Course/Section: CPE 31S5	**Date Submitted:** December 10, 2023
Instructor: Engr. Roman Richard	**Semester and SY:** 1st Semester 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

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)

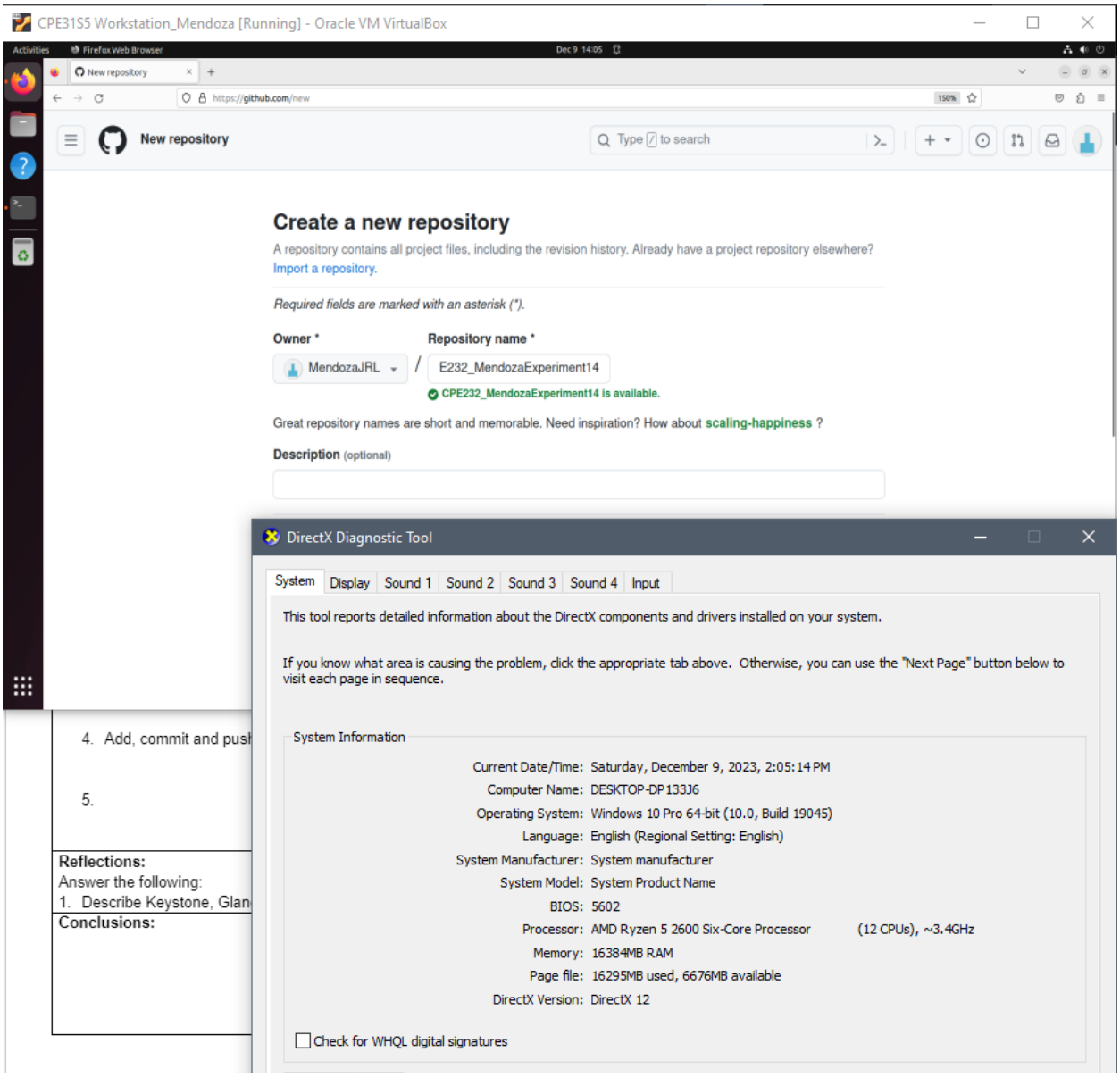
1x Ubuntu VM or Centos VM

4. Tasks

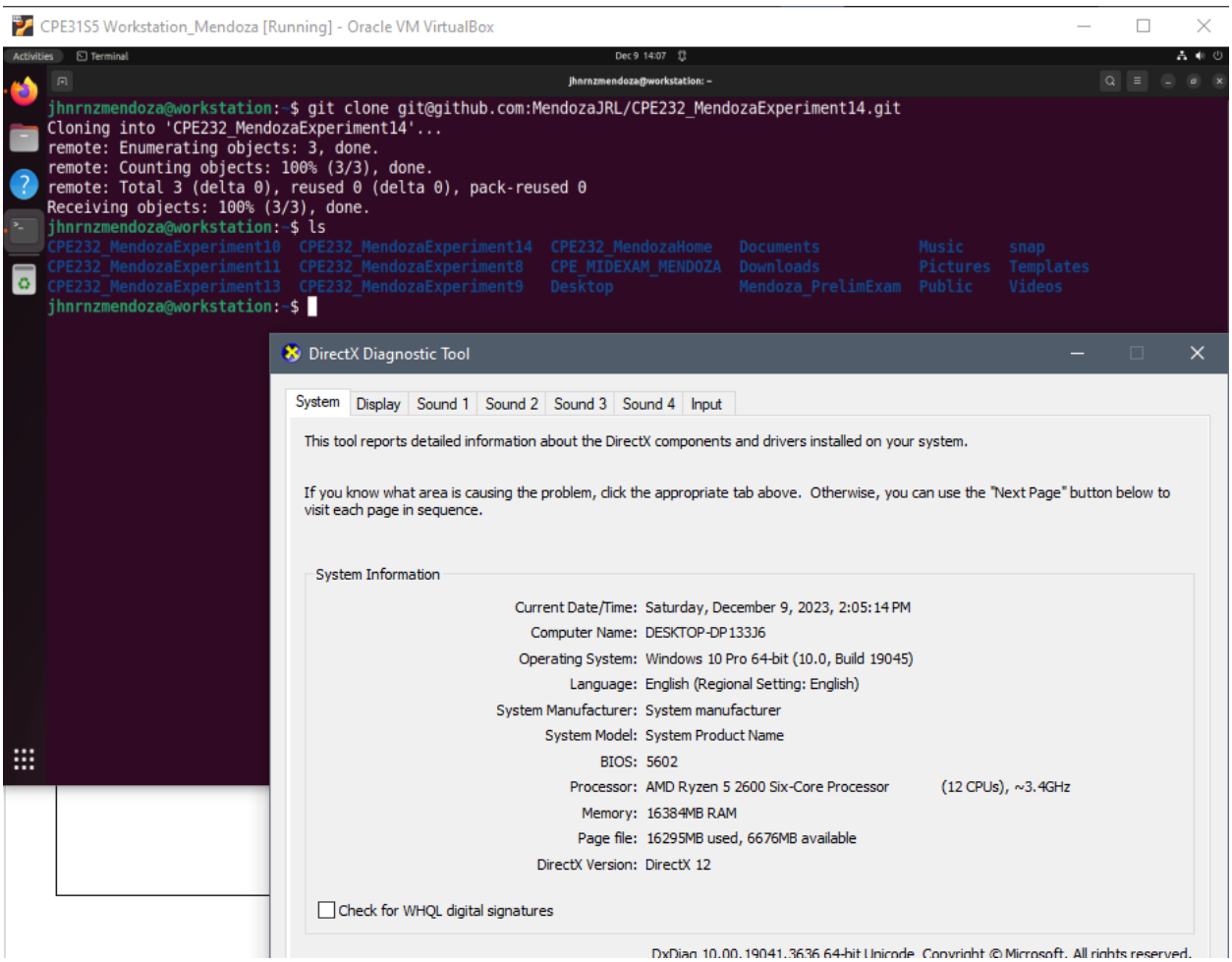
1. Create a new repository for this activity.
2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/
   a. Keystone (Identity Service)
   b. Glance (Imaging Service)
   c. Nova (Compute Service)
   d. Create different plays in installing per server 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)

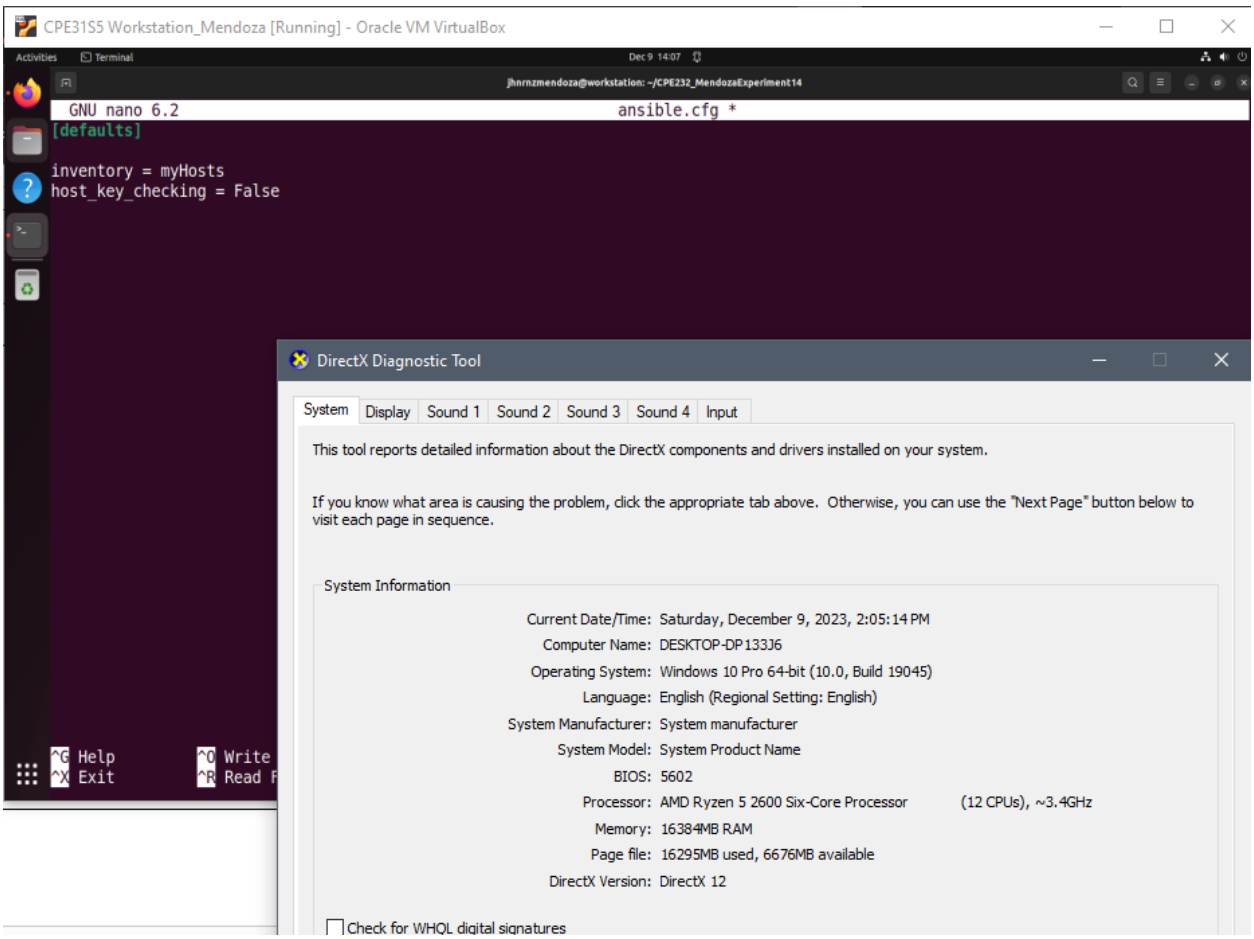
1. Create a new repository for this activity.



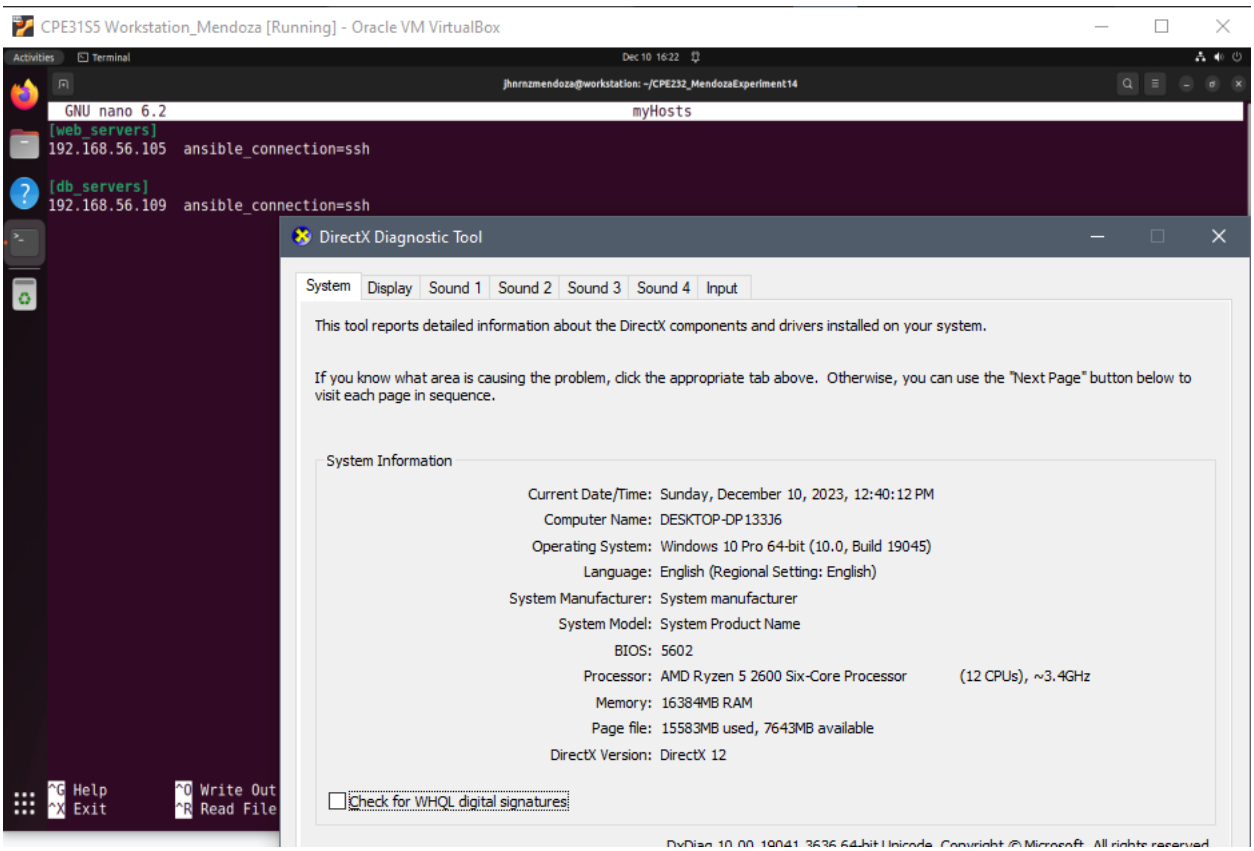
Cloning the Repository to the Local Terminal of the Control Node



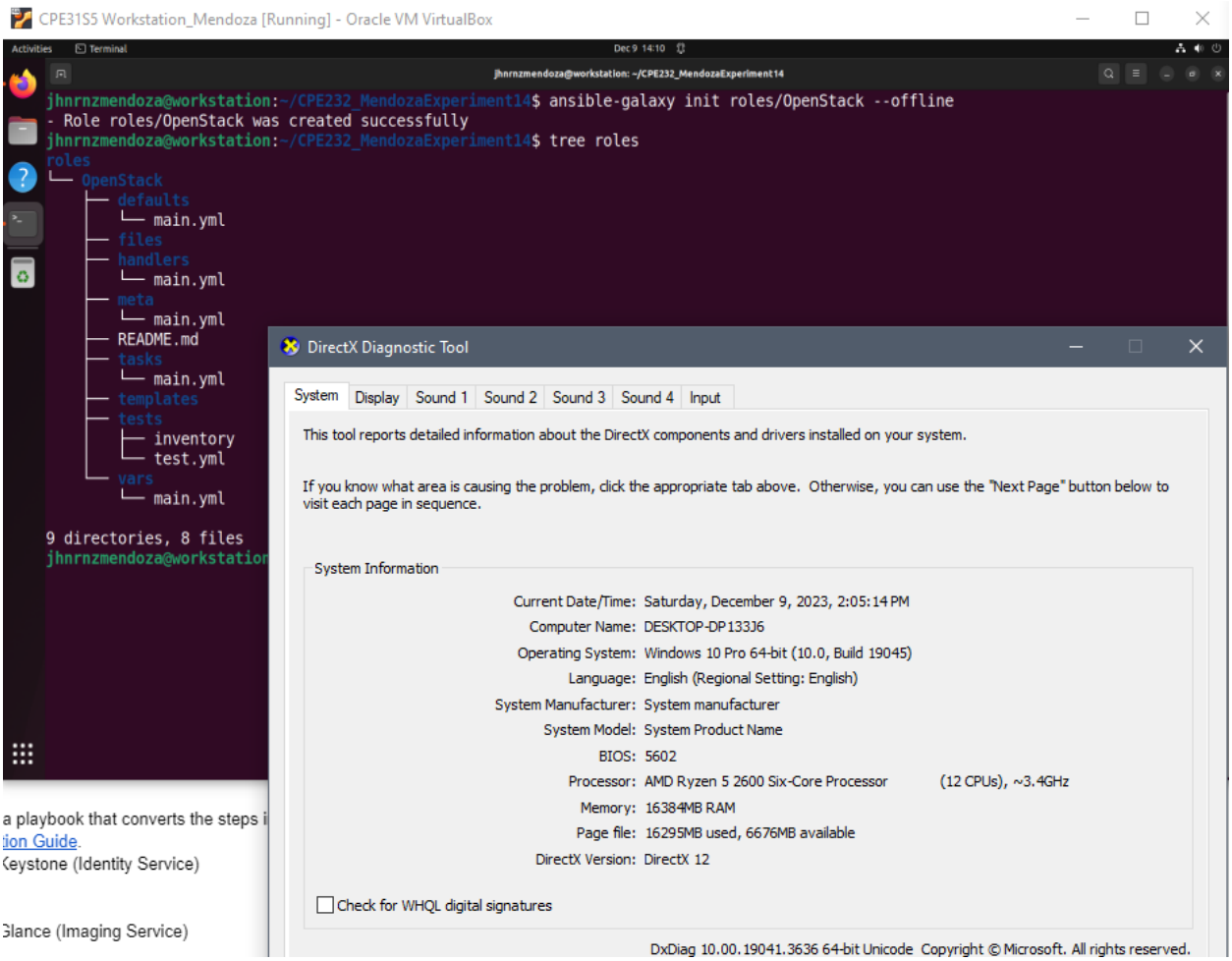
Creation of the Ansible Configuration File.



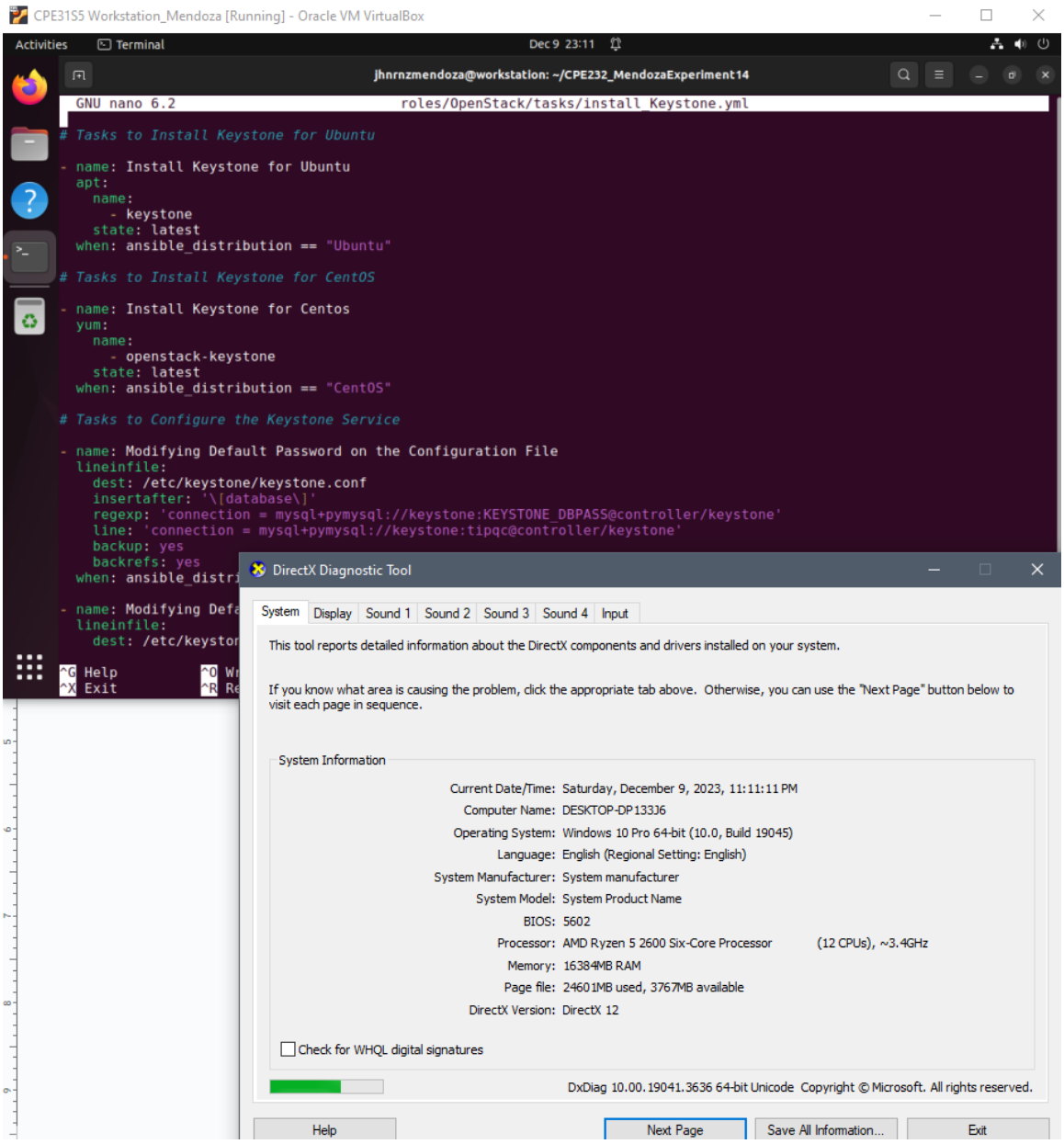
Creation of the Inventory File which defines the Managed Nodes



Creation of Ansible Role “OpenStack” to Organize the Playbook Tasks.



2. Create a playbook that converts the steps in the following items in [OpenStack Installation Guide](#).
    a. Keystone (Identity Service)



CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:15

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
GNU nano 6.2                    roles/OpenStack/tasks/install_Keystone.yml
    backup: yes
    backrefs: yes
  when: ansible_distribution == "Ubuntu"

- name: Modifying Default Provider Configuration File
  lineinfile:
    dest: /etc/keystone/keystone.conf
    insertafter: '\[token\]'
    line: 'provider = fernet'
    backup: yes
  when: ansible_distribution == "Ubuntu"

- name: Populate the Identity Service Database
  shell: sudo keystone-manage db_sync
  when: ansible_distribution == "Ubuntu"

- name: Initialize Fernet Key Repositories
  shell: keystone-manage fernet_setup --keystone-user keystone --keystone-group keystone
  when: ansible_distribution == "Ubuntu"

- name: Initialize Fernet Key Repositories
  shell: keystone-manage credential_setup --keystone-user keystone --keystone-group keystone
  when: ansible_distribution == "Ubuntu"

- name: Bootstrap the Identity Service
  shell:
    keystone-manage bootstrap --bootstrap-password tipqc \
    --bootstrap-admin-url http://controller:35357/v3/ \
    --bootstrap-interr
    --bootstrap-public
    --bootstrap-regior
  when: ansible_distri

- name: Configuring th

^G Help          ^O Wr
^X Exit          ^R Re
```

DirectX Diagnostic Tool

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

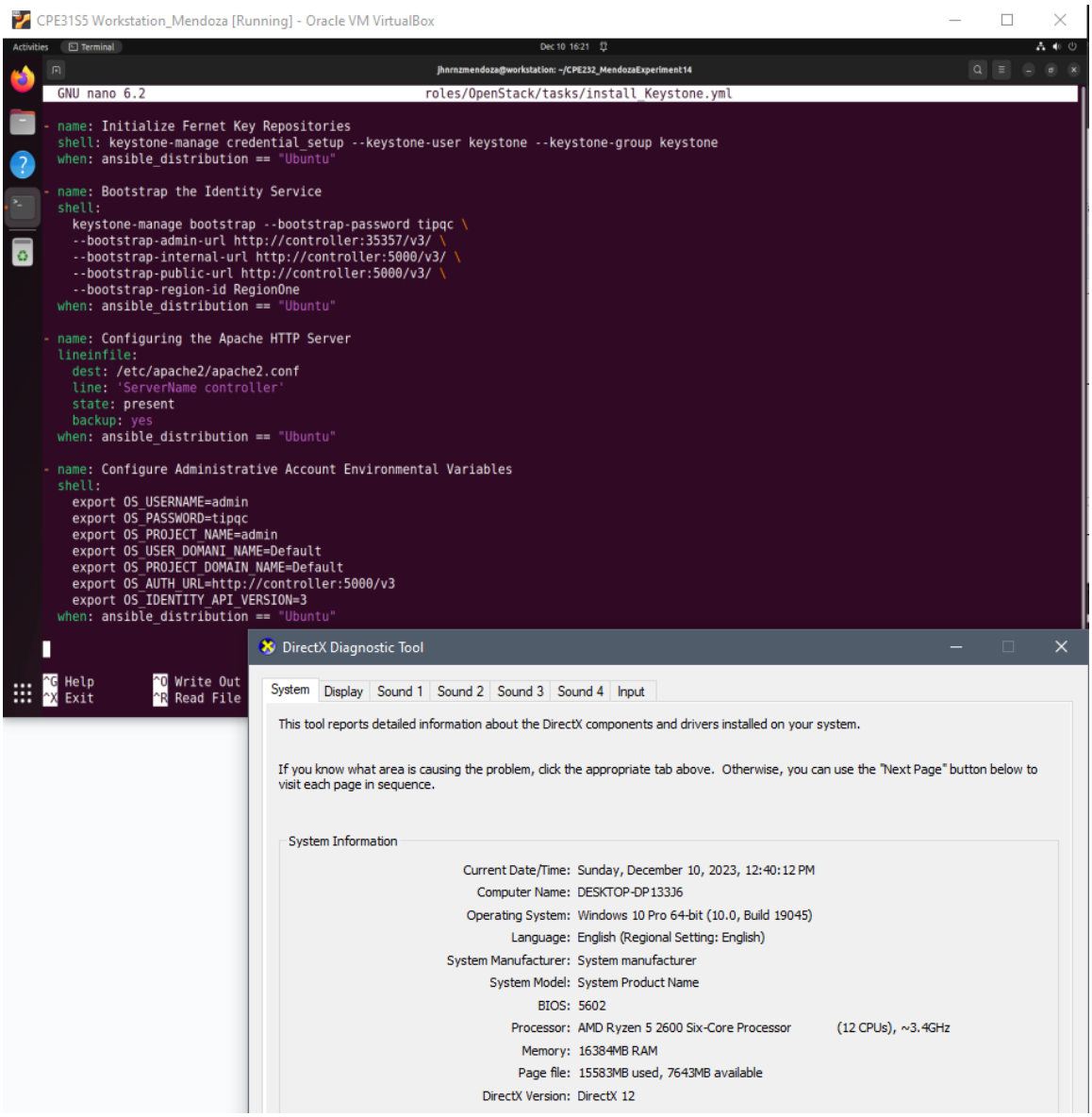
System Information

Current Date/Time:	Saturday, December 9, 2023, 11:11:11 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

Check for WHQL digital signatures

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

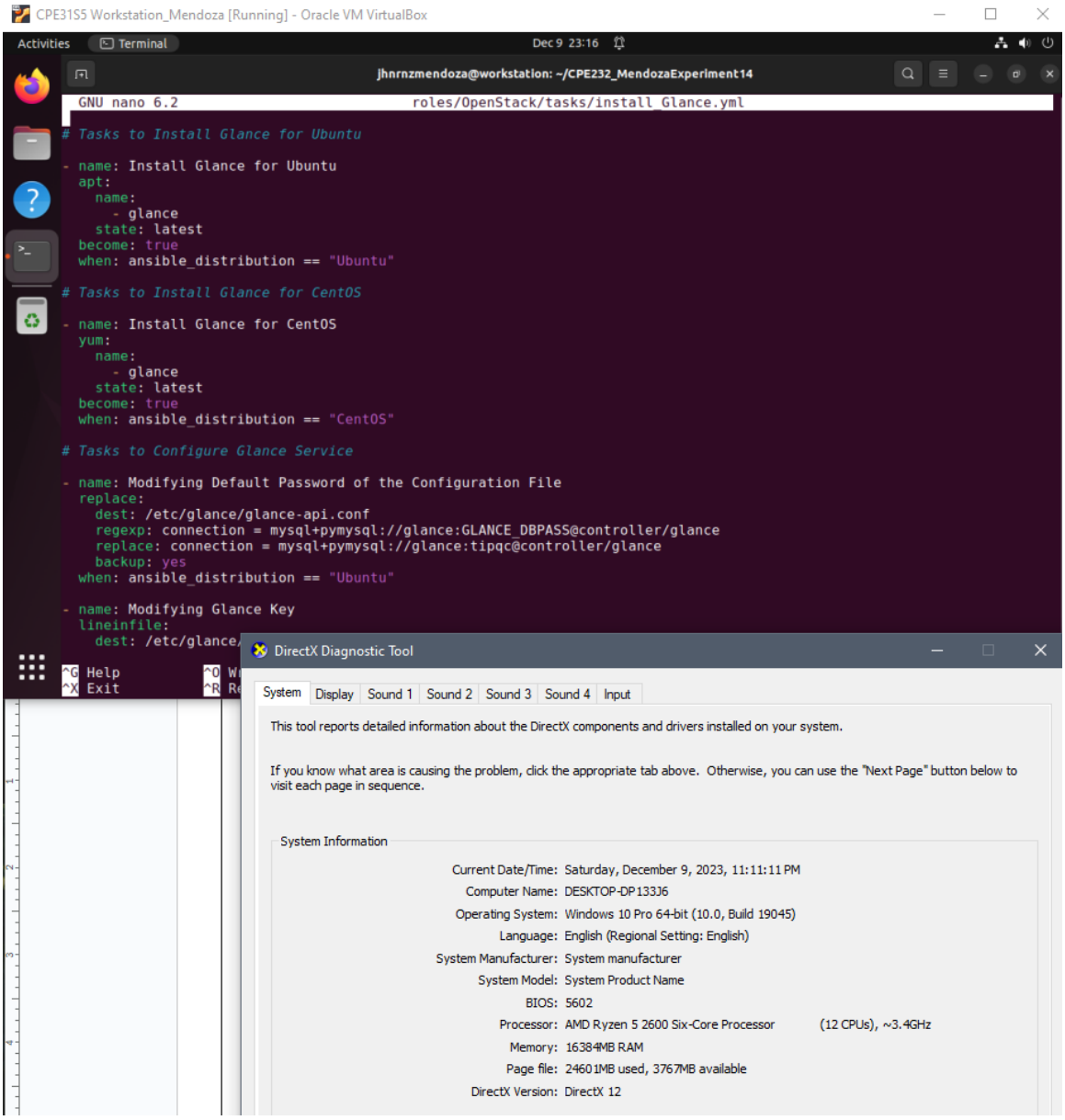
Help | Next Page | Save All Information... | Exit



Observation:

- These tasks are on the yml file install_Keystone.yml. It will initially install the packages of the Keystone OpenStack service. The next task is to configure the default settings of the installed Keystone package. This is necessary in order for the keystone service to work properly.

b. Glance (Imaging Service)



CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:16

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
GNU nano 6.2                    roles/OpenStack/tasks/install_Glance.yml
- name: Modifying Glance Key
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[keystone_authtoken\]'
    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
  when: ansible_distribution == "Ubuntu"

- name: Configure Glance paste_deploy
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[paste_deploy\]'
    line: 'flavor = keystone'
    backup: yes
  when: ansible_distribution == "Ubuntu"

- name: Configure Glance glance_store
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[glance_store\]'
    line: "{{ item }}"
    state: present
^G Help
^X Exit
```

DirectX Diagnostic Tool

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

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DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:17

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
GNU nano 6.2                    roles/OpenStack/tasks/install_Glance.yml
- name: Configure Glance glance_store
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[glance_store\]'
    line: "{{ item }}"
    state: present
    backup: yes

  with_items:
    - stores = file,http
    - default_store = file
    - filesystem_store_datadir = /var/lib/glance/images/
  when: ansible_distribution == "Ubuntu"

- name: Configure Glance oslo_limit
  lineinfile:
    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
  when: ansible_distribution == "Ubuntu"

- name: Configure Glar
^G Help
^X Exit
```

DirectX Diagnostic Tool

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

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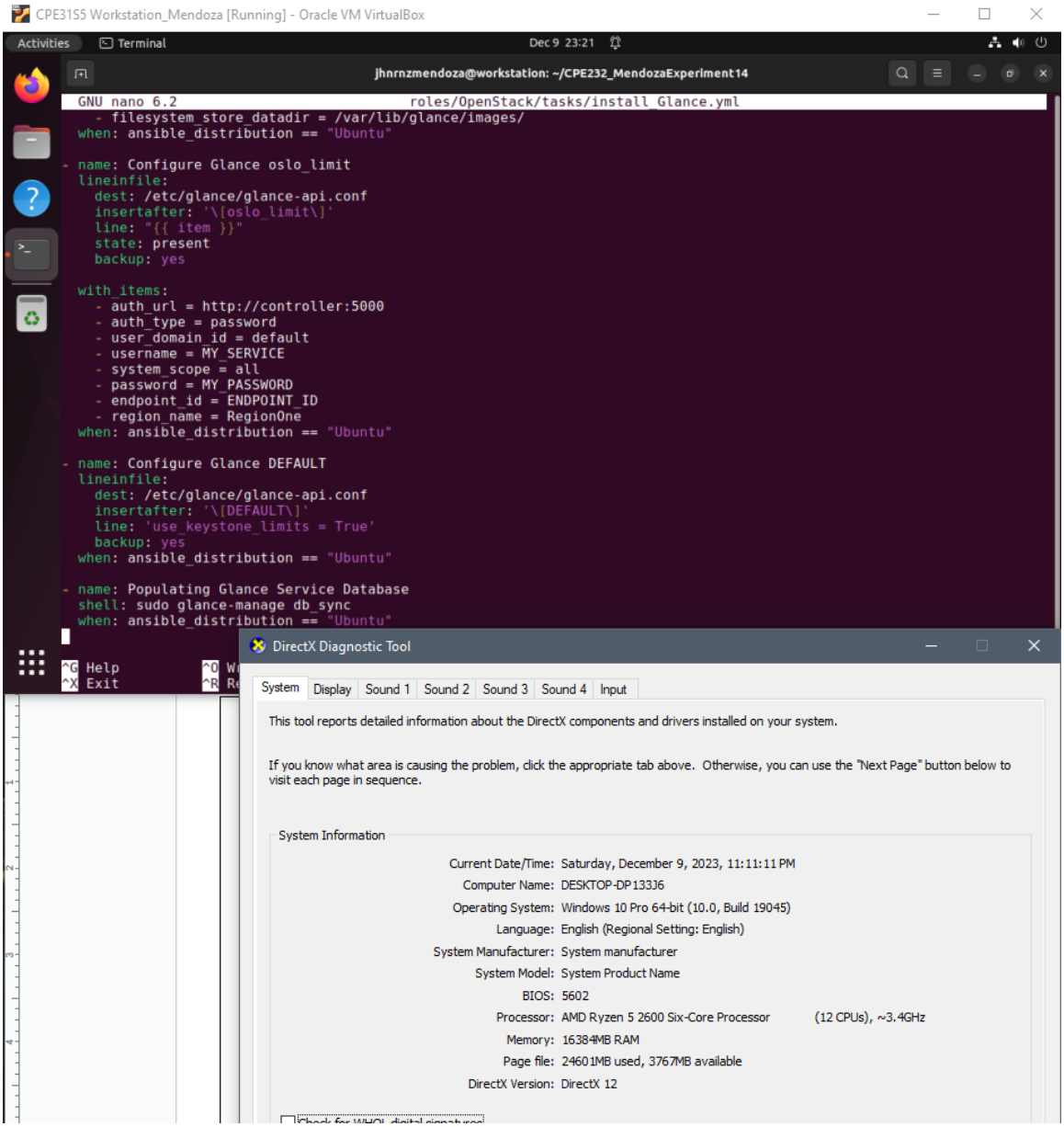
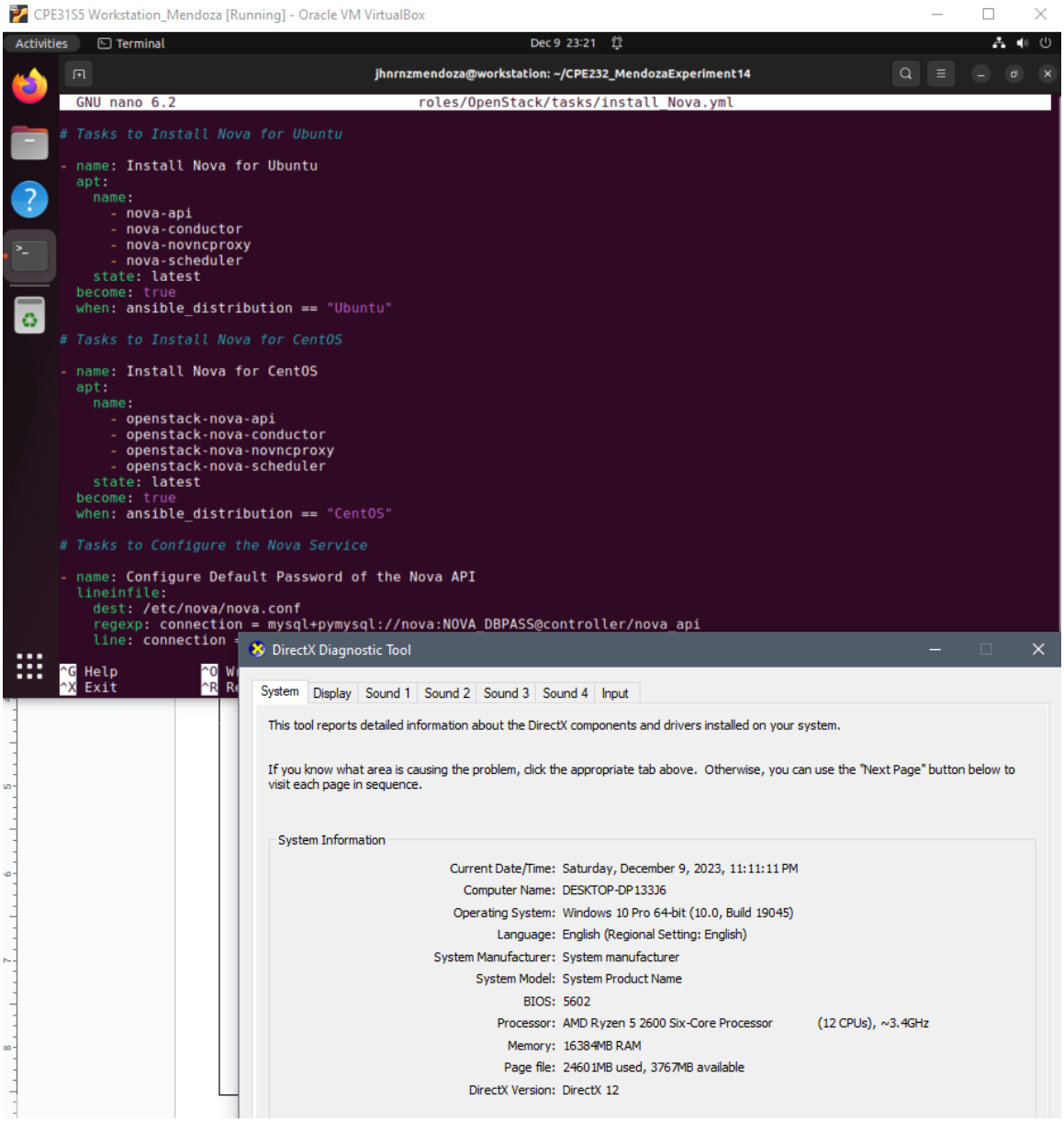


Observation:

- These tasks are on the yml file install_Glance.yml. It will initially install the packages of the Glance OpenStack service. The next task is to configure the default settings of the installed Glance package similar to the Keystone. The Glance-API, and Glance Database are also installed in order for the service to work properly as indicated on the OpenStack Installation guide.

c. Nova (Compute Service)



CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:22

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
GNU nano 6.2                    roles/OpenStack/tasks/install_Nova.yml

- name: Configure Default Password of the 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
  when: ansible_distribution == "Ubuntu"

- name: Configure auth_strategy of the Nova service
  lineinfile:
    dest: /etc/nova/nova.conf
    insertafter: '\[api\]'
    line: 'auth_strategy = keystone'
    state: present
    backup: yes
  when: ansible_distribution == "Ubuntu"

- name: Configure Default Password of the 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
  when: ansible_distribution == "Ubuntu"

- name: Configure Nova Authentication Token
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[keystone_authtoken\]'
    line: "{{ item }}"
    state: present

^G Help        ^O W
^X Exit        ^R R
```

DirectX Diagnostic Tool

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

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CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:22

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
GNU nano 6.2                    roles/OpenStack/tasks/install_Nova.yml
- name: Configure Nova Authentication Token
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[keystone_authtoken\]'
    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 = nova
    - password = tipqc
  when: ansible_distribution == "Ubuntu"

- name: Configure vnc of the Nova Service
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[vnc\]'
    line: "{{ item }}"
    state: present
    backup: yes

  with_items:
    - enabled = true
    - server_listen = $my_ip
    - server_proxyclient_address = $my_ip
  when: ansible_distribution == "Ubuntu"

- name: Configure Nova
^G Help
^X Exit
```

DirectX Diagnostic Tool

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CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:23

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
GNU nano 6.2                    roles/OpenStack/tasks/install_Nova.yml

- name: Configure Nova placement
  lineinfile:
    dest: /etc/glance/glance-api.conf
    insertafter: '\[placement\]'
    line: "{{ item }}"
    state: present
    backup: yes

  with_items:
    - region_name = RegionOne
    - project_domain_name = Default
    - project_name = service
    - auth_type = password
    - user_domain_name = Default
    - auth_url = http://controller:5000/v3
    - username = placement
    - password = admin123
  when: ansible_distribution == "Ubuntu"

- name: Configure Nova Default ip address
  lineinfile:
    dest: /etc/nova/nova.conf
    line: 'my_ip = 10.0.2.15'
    state: present
    backup: yes
  when: ansible_distribution == "Ubuntu"

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

^G Help
^X Exit
```

DirectX Diagnostic Tool

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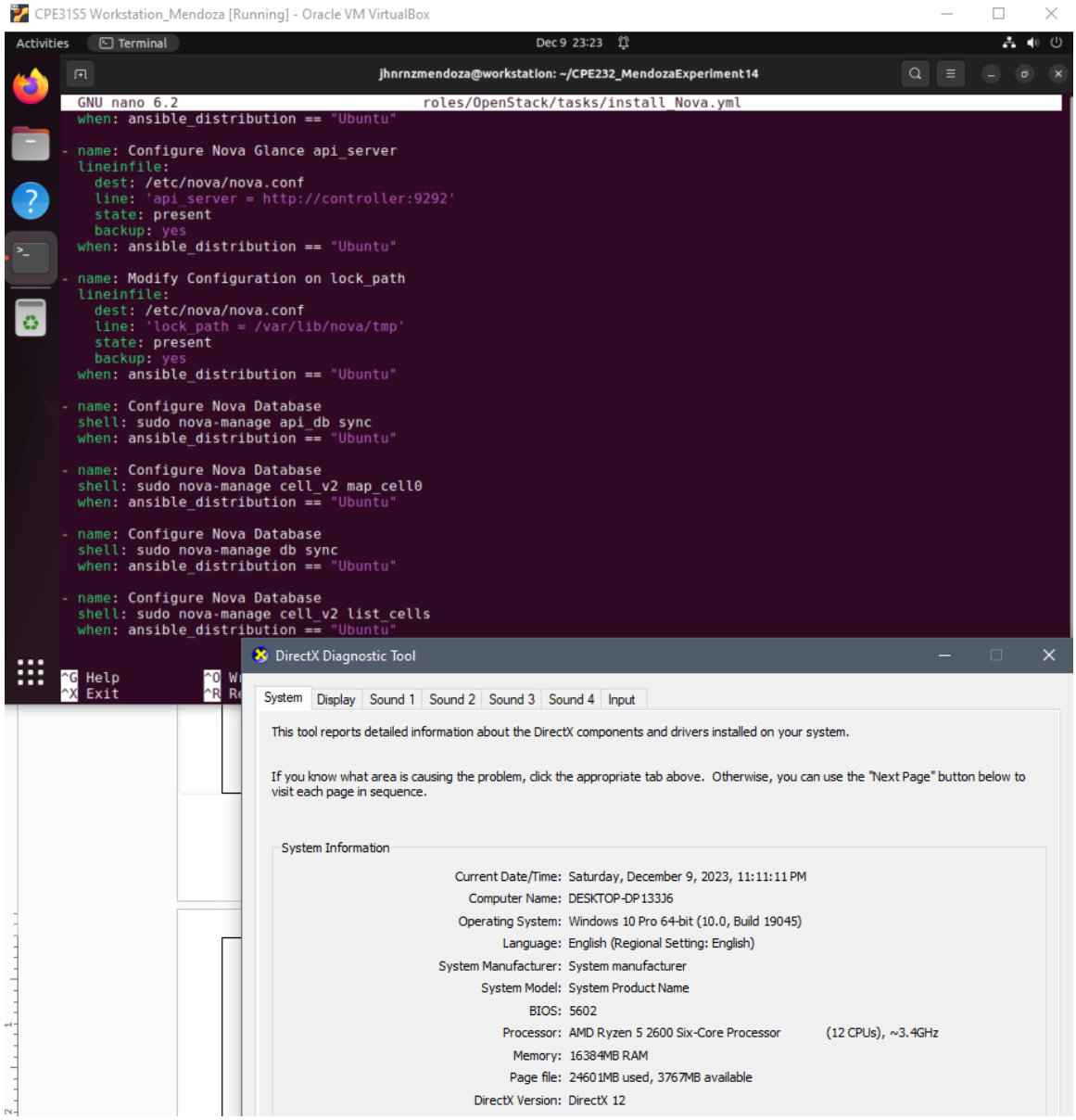
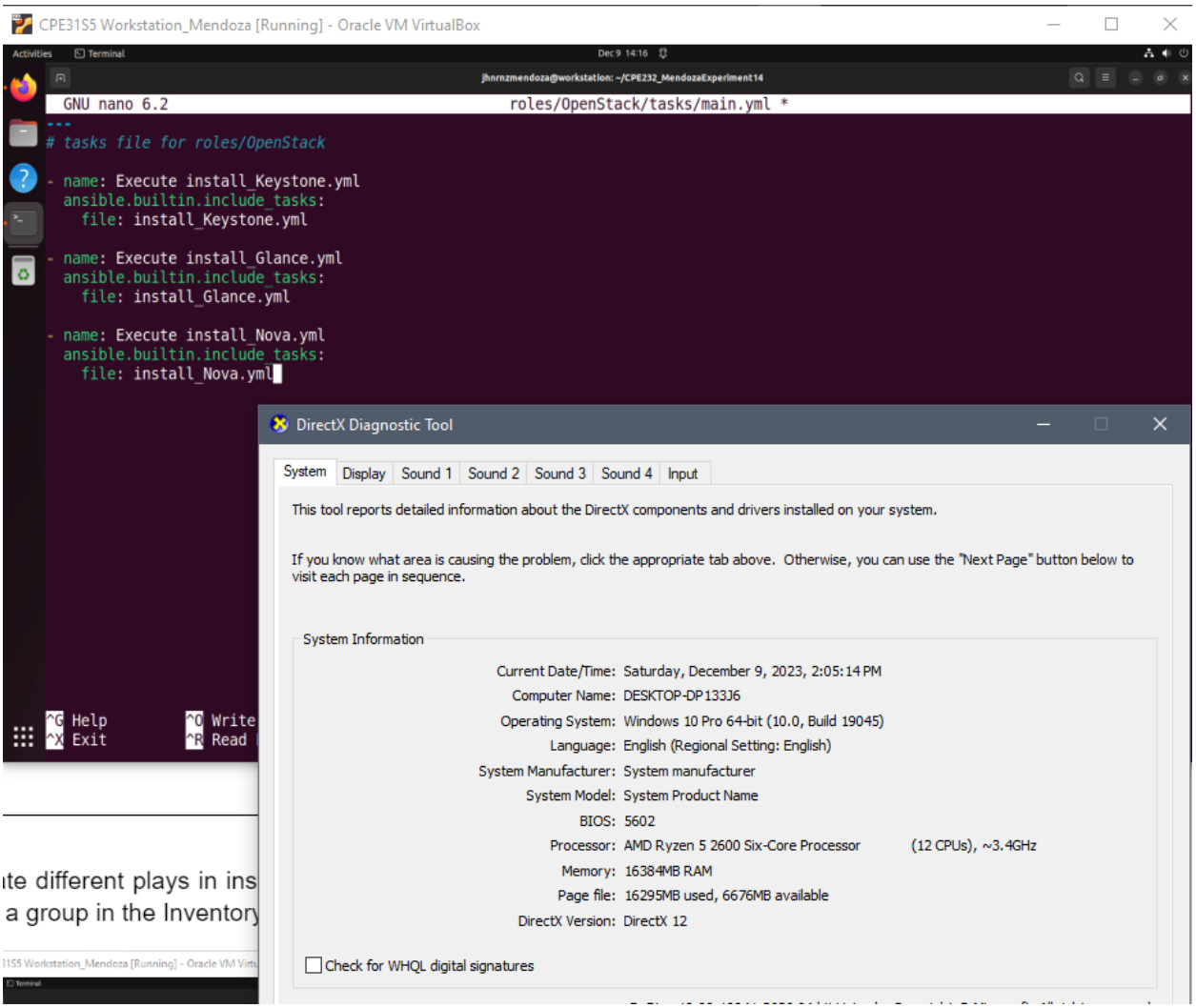


Observation:

- These tasks are on the yml file install_Nova.yml. It will initially install the packages of the Nova OpenStack service. The next task is to configure the default settings of the installed Nova package similar to the previous two. The Nova-API, and Nova Database are also installed in order for the service to work properly as indicated on the OpenStack Installation guide.

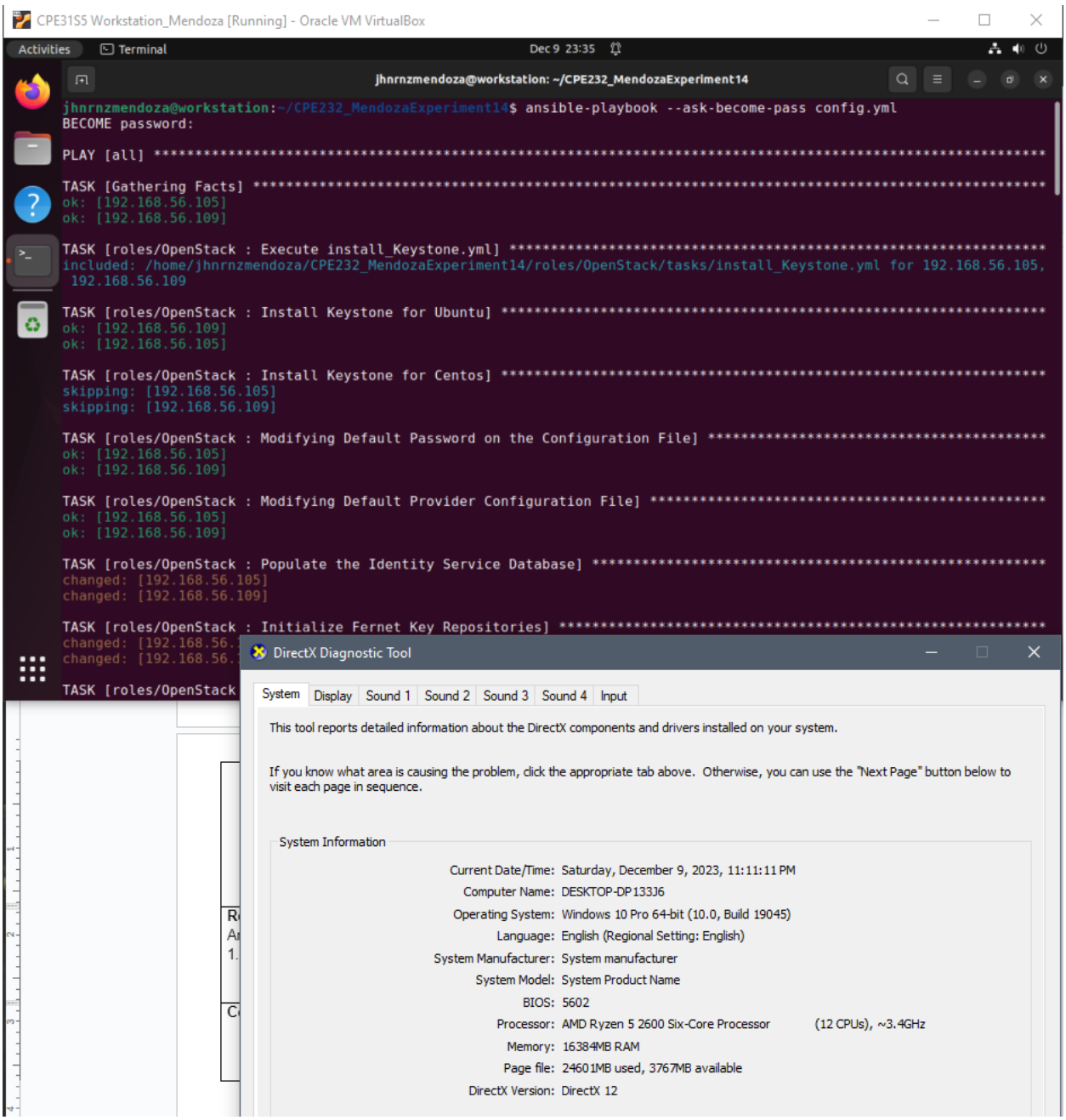
3. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in the Inventory file.



Observation:

- In this main.yml file defined on the roles/OpenStack/tasks/ directory, the tasks required to install the services Keystone, Glance, and Nova are listed. This is made so that the installation is much organized and just importing the tasks if needed.

Ansible Playbook Run:



CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:35

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
TASK [roles/OpenStack : Initialize Fernet Key Repositories] ************************************************************
changed: [192.168.56.109]
changed: [192.168.56.105]

TASK [roles/OpenStack : Bootstrap the Identity Service] ****************************************************************
changed: [192.168.56.105]
changed: [192.168.56.109]

TASK [roles/OpenStack : Configuring the Apache HTTP Server] ************************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Configure Administrative Account Environmental Variables] ******************************************
changed: [192.168.56.105]
changed: [192.168.56.109]

TASK [roles/OpenStack : Execute install_Glance.yml] ********************************************************************
included: /home/jhnrnzmendoza/CPE232_MendozaExperiment14/roles/OpenStack/tasks/install_Glance.yml for 192.168.56.105, 1
92.168.56.109

TASK [roles/OpenStack : Install Glance for Ubuntu] *********************************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Install Glance for CentOS] *********************************************************************
skipping: [192.168.56.105]
skipping: [192.168.56.109]

TASK [roles/OpenStack : Modifying Default Password of the Configuration File] ******************************************
ok: [192.168.56.109]
ok: [192.168.56.105]

TASK [roles/OpenStack : Modifying Glance Key] **************************************************************************
ok: [192.168.56.109]
ok: [192.168.56.105]
ok: [192.168.56.109]
ok: [192.168.56.105]
```

DirectX Diagnostic Tool

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

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Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities | Terminal | Dec 9 23:39

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
TASK [roles/OpenStack : Modifying Glance Key] ***********************************************************
ok: [192.168.56.109] => (item=www_authenticate_uri = http://controller:5000)
ok: [192.168.56.105] => (item=www_authenticate_uri = http://controller:5000)
ok: [192.168.56.109] => (item=auth_url = http://controller:5000)
ok: [192.168.56.105] => (item=auth_url = http://controller:5000)
ok: [192.168.56.109] => (item=memcached_servers = controller:11211)
ok: [192.168.56.105] => (item=memcached_servers = controller:11211)
ok: [192.168.56.109] => (item=auth_type = password)
ok: [192.168.56.105] => (item=auth_type = password)
ok: [192.168.56.109] => (item=project_domain_name = Default)
ok: [192.168.56.105] => (item=project_domain_name = Default)
ok: [192.168.56.109] => (item=user_domain_name = Default)
ok: [192.168.56.105] => (item=user_domain_name = Default)
ok: [192.168.56.109] => (item=project_name = service)
ok: [192.168.56.105] => (item=project_name = service)
ok: [192.168.56.105] => (item=username = glance)
ok: [192.168.56.109] => (item=username = glance)
ok: [192.168.56.105] => (item=password = admin123)
ok: [192.168.56.109] => (item=password = admin123)

TASK [roles/OpenStack : Configure Glance paste_deploy] **************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Configure Glance glance_store] **************************************************
ok: [192.168.56.109] => (item=stores = file,http)
ok: [192.168.56.105] => (item=stores = file,http)
ok: [192.168.56.109] => (item=default_store = file)
ok: [192.168.56.105] => (item=default_store = file)
ok: [192.168.56.109] => (item=filesystem_store_datadir = /var/lib/glance/images/)
ok: [192.168.56.105] => (item=filesystem_store_datadir = /var/lib/glance/images/)

TASK [roles/OpenStack : Configure Glance oslo_limit] ****************************************************
ok: [192.168.56.109]
ok: [192.168.56.105]
ok: [192.168.56.109]
ok: [192.168.56.105]
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | 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:	Saturday, December 9, 2023, 11:11:11 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:40

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
TASK [roles/OpenStack : Configure Glance oslo_limit] ***************************************************************
ok: [192.168.56.109] => (item=auth_url = http://controller:5000)
ok: [192.168.56.105] => (item=auth_url = http://controller:5000)
ok: [192.168.56.109] => (item=auth_type = password)
ok: [192.168.56.105] => (item=auth_type = password)
ok: [192.168.56.109] => (item=user_domain_id = default)
ok: [192.168.56.105] => (item=user_domain_id = default)
ok: [192.168.56.109] => (item=username = MY_SERVICE)
ok: [192.168.56.105] => (item=username = MY_SERVICE)
ok: [192.168.56.109] => (item=system_scope = all)
ok: [192.168.56.105] => (item=system_scope = all)
ok: [192.168.56.109] => (item=password = MY_PASSWORD)
ok: [192.168.56.105] => (item=password = MY_PASSWORD)
ok: [192.168.56.109] => (item=endpoint_id = ENDPOINT_ID)
ok: [192.168.56.105] => (item=endpoint_id = ENDPOINT_ID)
ok: [192.168.56.109] => (item=region_name = RegionOne)
ok: [192.168.56.105] => (item=region_name = RegionOne)

TASK [roles/OpenStack : Configure Glance DEFAULT] ******************************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Populating Glance Service Database] ********************************************************
changed: [192.168.56.105]
changed: [192.168.56.109]

TASK [roles/OpenStack : Execute install_Nova.yml] ******************************************************************
included: /home/jhnrnzmendoza/CPE232_MendozaExperiment14/roles/OpenStack/tasks/install_Nova.yml for 192.168.56.105, 192
.168.56.109

TASK [roles/OpenStack : Install Nova for Ubuntu] *******************************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack
skipping: [192.168.56
skipping: [192.168.56
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | 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:	Saturday, December 9, 2023, 11:11:11 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:47

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
skipping: [192.168.56.105]
skipping: [192.168.56.109]

TASK [roles/OpenStack : Configure Default Password of the Nova API] ***************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Configure auth_strategy of the Nova service] ***************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Configure Default Password of the Nova Database] ***********************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Configure Nova Authentication Token] ***********************************************************
ok: [192.168.56.105] => (item=www_authenticate_uri = http://controller:5000/)
ok: [192.168.56.109] => (item=www_authenticate_uri = http://controller:5000/)
ok: [192.168.56.105] => (item=auth_url = http://controller:5000/)
ok: [192.168.56.109] => (item=auth_url = http://controller:5000/)
ok: [192.168.56.105] => (item=memcached_servers = controller:11211)
ok: [192.168.56.109] => (item=memcached_servers = controller:11211)
ok: [192.168.56.105] => (item=auth_type = password)
ok: [192.168.56.109] => (item=auth_type = password)
ok: [192.168.56.105] => (item=project_domain_name = Default)
ok: [192.168.56.109] => (item=project_domain_name = Default)
ok: [192.168.56.105] => (item=user_domain_name = Default)
ok: [192.168.56.109] => (item=user_domain_name = Default)
ok: [192.168.56.105] => (item=project_name = service)
ok: [192.168.56.109] => (item=project_name = service)
ok: [192.168.56.105] => (item=username = nova)
ok: [192.168.56.109] => (item=username = nova)
ok: [192.168.56.105] => (item=password = tipqc)
ok: [192.168.56.109] => (item=password = tipqc)

TASK [roles/OpenStack
ok: [192.168.56.109]
ok: [192.168.56.105]
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | 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:	Saturday, December 9, 2023, 11:11:11 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:47

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
ok: [192.168.56.105] => (item=password = tipqc)
ok: [192.168.56.109] => (item=password = tipqc)

TASK [roles/OpenStack : Configure vnc of the Nova Service] ***********************************************************
ok: [192.168.56.109] => (item=enabled = true)
ok: [192.168.56.105] => (item=enabled = true)
ok: [192.168.56.105] => (item=server_listen = $my_ip)
ok: [192.168.56.109] => (item=server_listen = $my_ip)
ok: [192.168.56.105] => (item=server_proxyclient_address = $my_ip)
ok: [192.168.56.109] => (item=server_proxyclient_address = $my_ip)

TASK [roles/OpenStack : Configure Nova placement] ********************************************************************
ok: [192.168.56.109] => (item=region_name = RegionOne)
ok: [192.168.56.105] => (item=region_name = RegionOne)
ok: [192.168.56.105] => (item=project_domain_name = Default)
ok: [192.168.56.109] => (item=project_domain_name = Default)
ok: [192.168.56.105] => (item=project_name = service)
ok: [192.168.56.109] => (item=project_name = service)
ok: [192.168.56.105] => (item=auth_type = password)
ok: [192.168.56.109] => (item=auth_type = password)
ok: [192.168.56.105] => (item=user_domain_name = Default)
ok: [192.168.56.109] => (item=user_domain_name = Default)
ok: [192.168.56.105] => (item=auth_url = http://controller:5000/v3)
ok: [192.168.56.109] => (item=auth_url = http://controller:5000/v3)
ok: [192.168.56.105] => (item=username = placement)
ok: [192.168.56.109] => (item=username = placement)
ok: [192.168.56.105] => (item=password = admin123)
ok: [192.168.56.109] => (item=password = admin123)

TASK [roles/OpenStack : Configure Nova Default ip address] ***********************************************************
ok: [192.168.56.109]
ok: [192.168.56.105]

TASK [roles/OpenStack : Configure Nova Glance api server] ************************************************************
ok: [192.168.56.109]
ok: [192.168.56.105]

TASK [roles/OpenStack
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | 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:	Saturday, December 9, 2023, 11:11:11 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

CPE31S5 Workstation_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 9 23:48

jhnrnzmendoza@workstation: ~/CPE232_MendozaExperiment14

```
ok: [192.168.56.105] => (item=username = placement)
ok: [192.168.56.109] => (item=username = placement)
ok: [192.168.56.105] => (item=password = admin123)
ok: [192.168.56.109] => (item=password = admin123)

TASK [roles/OpenStack : Configure Nova Default ip address] ************************************************************
ok: [192.168.56.109]
ok: [192.168.56.105]

TASK [roles/OpenStack : Configure Nova Glance api_server] *************************************************************
ok: [192.168.56.109]
ok: [192.168.56.105]

TASK [roles/OpenStack : Modify Configuration on lock_path] ************************************************************
ok: [192.168.56.105]
ok: [192.168.56.109]

TASK [roles/OpenStack : Configure Nova Database] ***********************************************************************
changed: [192.168.56.105]
changed: [192.168.56.109]

TASK [roles/OpenStack : Configure Nova Database] ***********************************************************************
changed: [192.168.56.105]
changed: [192.168.56.109]

TASK [roles/OpenStack : Configure Nova Database] ***********************************************************************
changed: [192.168.56.109]
changed: [192.168.56.105]

TASK [roles/OpenStack : Configure Nova Database] ***********************************************************************
changed: [192.168.56.105]
changed: [192.168.56.109]

PLAY RECAP *************************************************************************************************************
192.168.56.105             : ok=35   changed=10   unreachable=0    failed=0    skipped=3    rescued=0    ignored=0
192.168.56.109             : ok=35   changed=10   unreachable=0    failed=0    skipped=3    rescued=0    ignored=0

jhnrnzmendoza@workstat
```

DirectX Diagnostic Tool

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

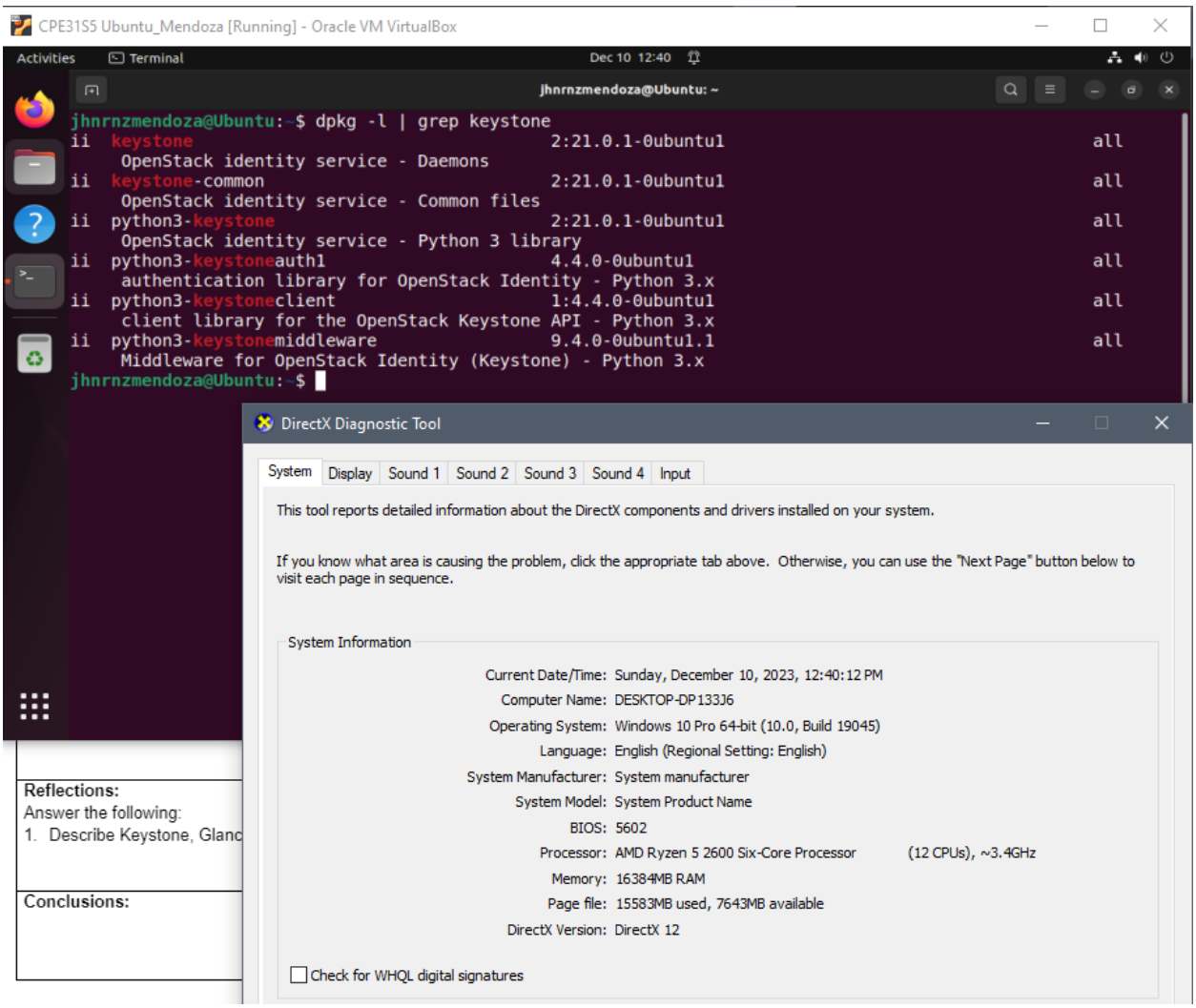
This tool reports detailed information about the DirectX components and drivers installed on your system.

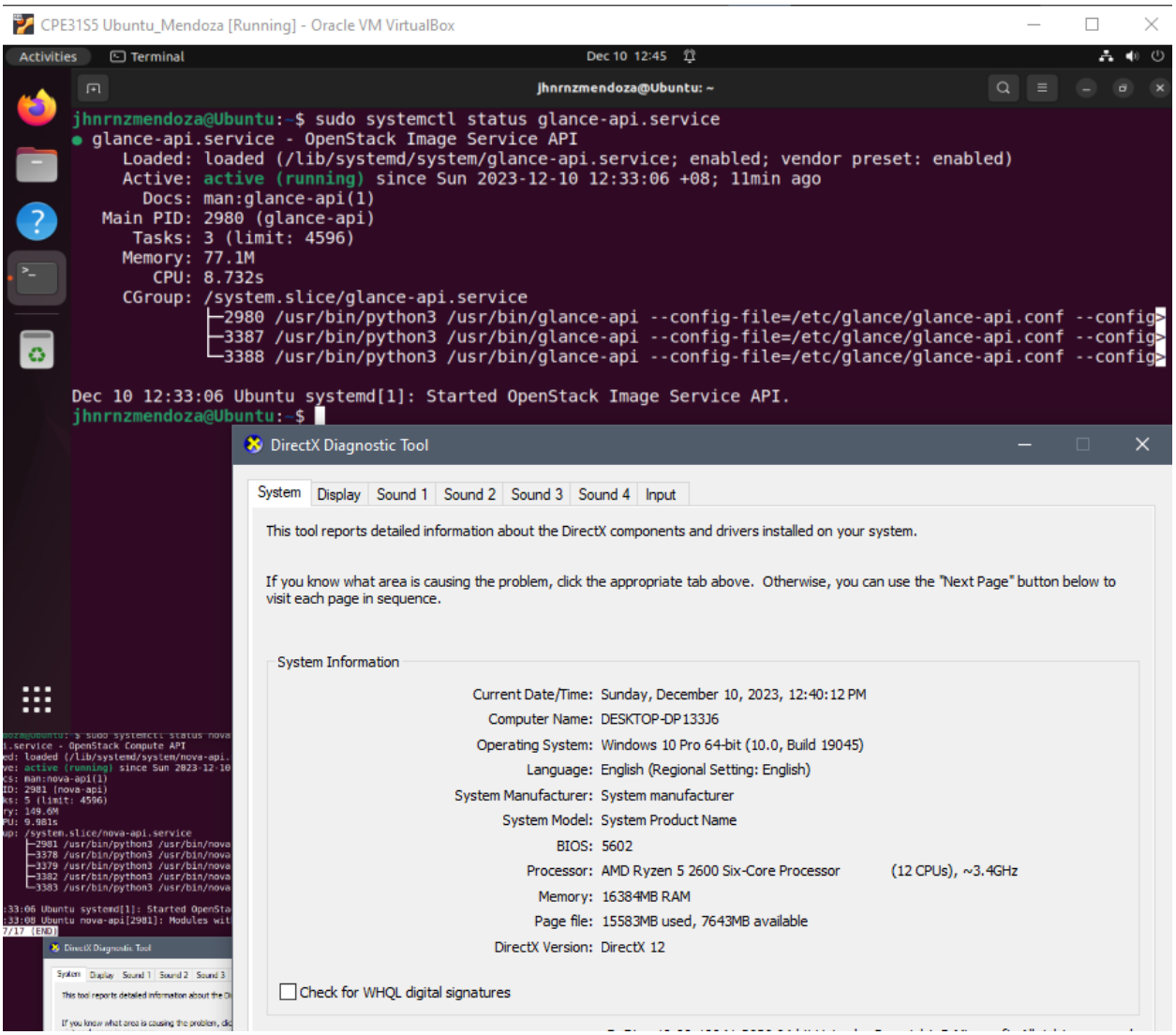
If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time:	Saturday, December 9, 2023, 11:11:11 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	24601MB used, 3767MB available
DirectX Version:	DirectX 12

Verification: Server 1




CPE31S5 Ubuntu_Mendoza [Running] - Oracle VM VirtualBox
Activities
Terminal
Dec 10 12:45
jhnrnzmendoza@Ubuntu: ~
jhnrnzmendoza@Ubuntu:~$ sudo systemctl status glance-api.service
● glance-api.service - OpenStack Image Service API
Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabled)
Active: active (running) since Sun 2023-12-10 12:33:06 +08; 11min ago
Docs: man:glance-api(1)
Main PID: 2980 (glance-api)
Tasks: 3 (limit: 4596)
Memory: 77.1M
CPU: 8.732s
CGroup: /system.slice/glance-api.service
├─2980 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --config>
├─3387 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --config>
└─3388 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --config>
Dec 10 12:33:06 Ubuntu systemd[1]: Started OpenStack Image Service API.
jhnrnzmendoza@Ubuntu:~$
DirectX Diagnostic Tool
System
Display
Sound 1
Sound 2
Sound 3
Sound 4
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, December 10, 2023, 12:40:12 PM
Computer Name: DESKTOP-DP133J6
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
Language: English (Regional Setting: English)
System Manufacturer: System manufacturer
System Model: System Product Name
BIOS: 5602
Processor: AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory: 16384MB RAM
Page file: 15583MB used, 7643MB available
DirectX Version: DirectX 12
Check for WHQL digital signatures

CPE31S5 Ubuntu_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 12:44

jhnrnzmendoza@Ubuntu: ~

```
jhnrnzmendoza@Ubuntu:~$ sudo systemctl status nova-api.service
● nova-api.service - OpenStack Compute API
     Loaded: loaded (/lib/systemd/system/nova-api.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2023-12-10 12:33:06 +08; 11min ago
       Docs: man:nova-api(1)
   Main PID: 2981 (nova-api)
      Tasks: 5 (limit: 4596)
     Memory: 149.6M
        CPU: 9.981s
     CGroup: /system.slice/nova-api.service
             ├─2981 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             ├─3378 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             ├─3379 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             ├─3382 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             └─3383 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>

Dec 10 12:33:06 Ubuntu systemd[1]: Started OpenStack Compute API.
Dec 10 12:33:08 Ubuntu nova-api[2981]: Modules with known eventlet monkey patching issues were imported pri>
lines 1-17/17 (END)
```

DirectX Diagnostic Tool

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

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

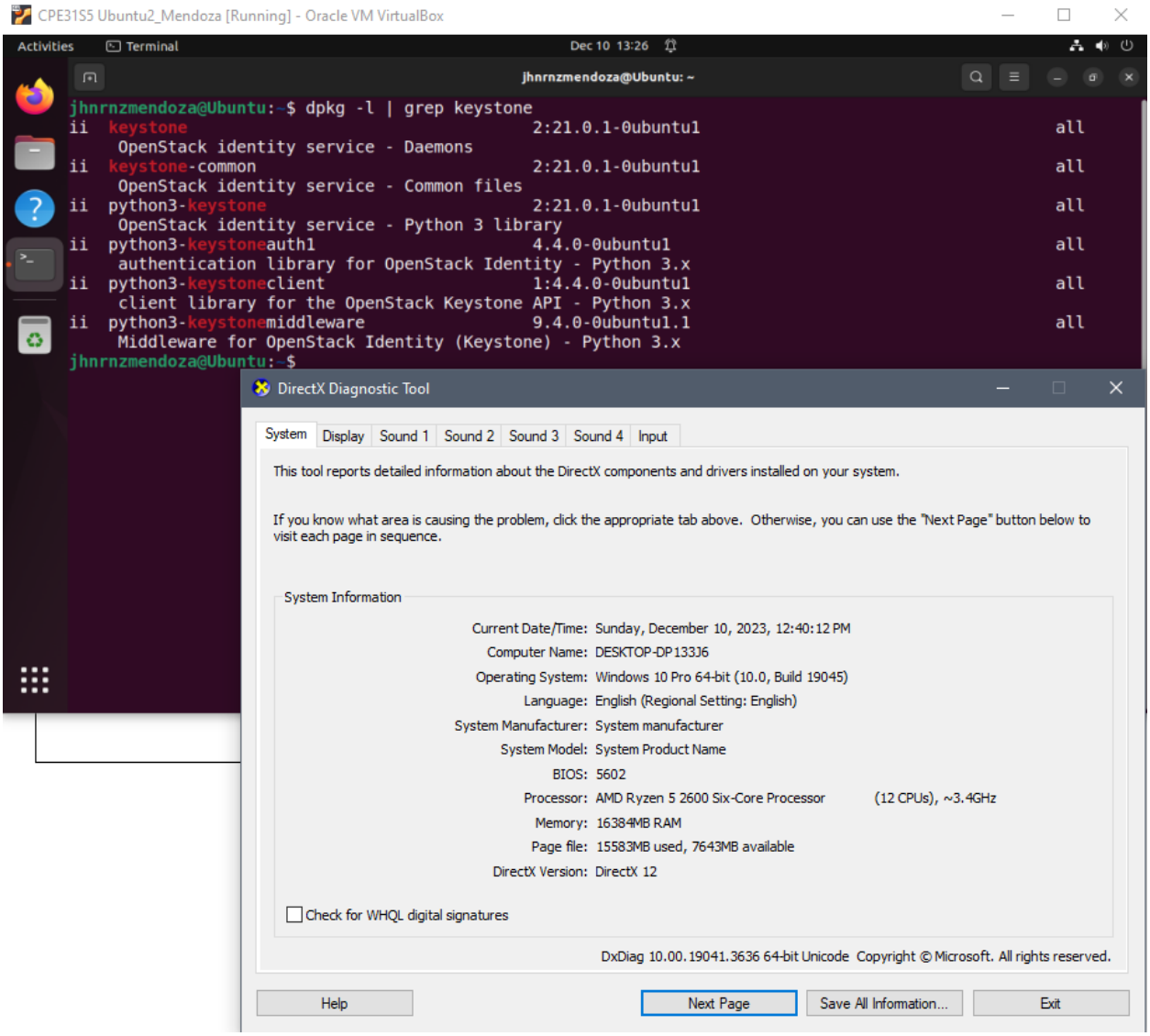
If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time:	Sunday, December 10, 2023, 12:40:12 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	15583MB used, 7643MB available
DirectX Version:	DirectX 12

☐ Check for WHQL digital signatures

Verification: Server 2



CPE31S5 Ubuntu2_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 13:27

jhnrnzmendoza@Ubuntu: ~

```
jhnrnzmendoza@Ubuntu:~$ sudo systemctl status glance-api.service
● glance-api.service - OpenStack Image Service API
     Loaded: loaded (/lib/systemd/system/glance-api.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2023-12-10 13:18:26 +08; 8min ago
       Docs: man:glance-api(1)
   Main PID: 2869 (glance-api)
      Tasks: 3 (limit: 4596)
     Memory: 74.3M
        CPU: 6.789s
     CGroup: /system.slice/glance-api.service
             ├─2869 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --config>
             ├─3203 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --config>
             └─3204 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance/glance-api.conf --config>

Dec 10 13:18:26 Ubuntu systemd[1]: Started OpenStack Image Service API.
jhnrnzmendoza@Ubuntu:~$
```

wing:
ystone, Glance and Nova services

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Sound 3 | Sound 4 | 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, December 10, 2023, 12:40:12 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	15583MB used, 7643MB available
DirectX Version:	DirectX 12

☐ Check for WHQL digital signatures

CPE31S5 Ubuntu2_Mendoza [Running] - Oracle VM VirtualBox

Activities Terminal Dec 10 13:26

jhnrnzmendoza@Ubuntu: ~

```
jhnrnzmendoza@Ubuntu:~$ sudo systemctl status nova-api.service
[sudo] password for jhnrnzmendoza:
● nova-api.service - OpenStack Compute API
     Loaded: loaded (/lib/systemd/system/nova-api.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2023-12-10 13:18:26 +08; 8min ago
       Docs: man:nova-api(1)
   Main PID: 2870 (nova-api)
      Tasks: 5 (limit: 4596)
     Memory: 142.6M
        CPU: 7.703s
     CGroup: /system.slice/nova-api.service
             ├─2870 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             ├─3215 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             ├─3216 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             ├─3221 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>
             └─3222 /usr/bin/python3 /usr/bin/nova-api --config-file=/etc/nova/nova.conf --log-file=/var/lo>

Dec 10 13:18:26 Ubuntu systemd[1]: Started OpenStack Compute API.
Dec 10 13:18:27 Ubuntu nova-api[2870]: Modules with known eventlet monkey patching issues were imported pri>
jhnrnzmendoza@Ubu
```

DirectX Diagnostic Tool

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

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

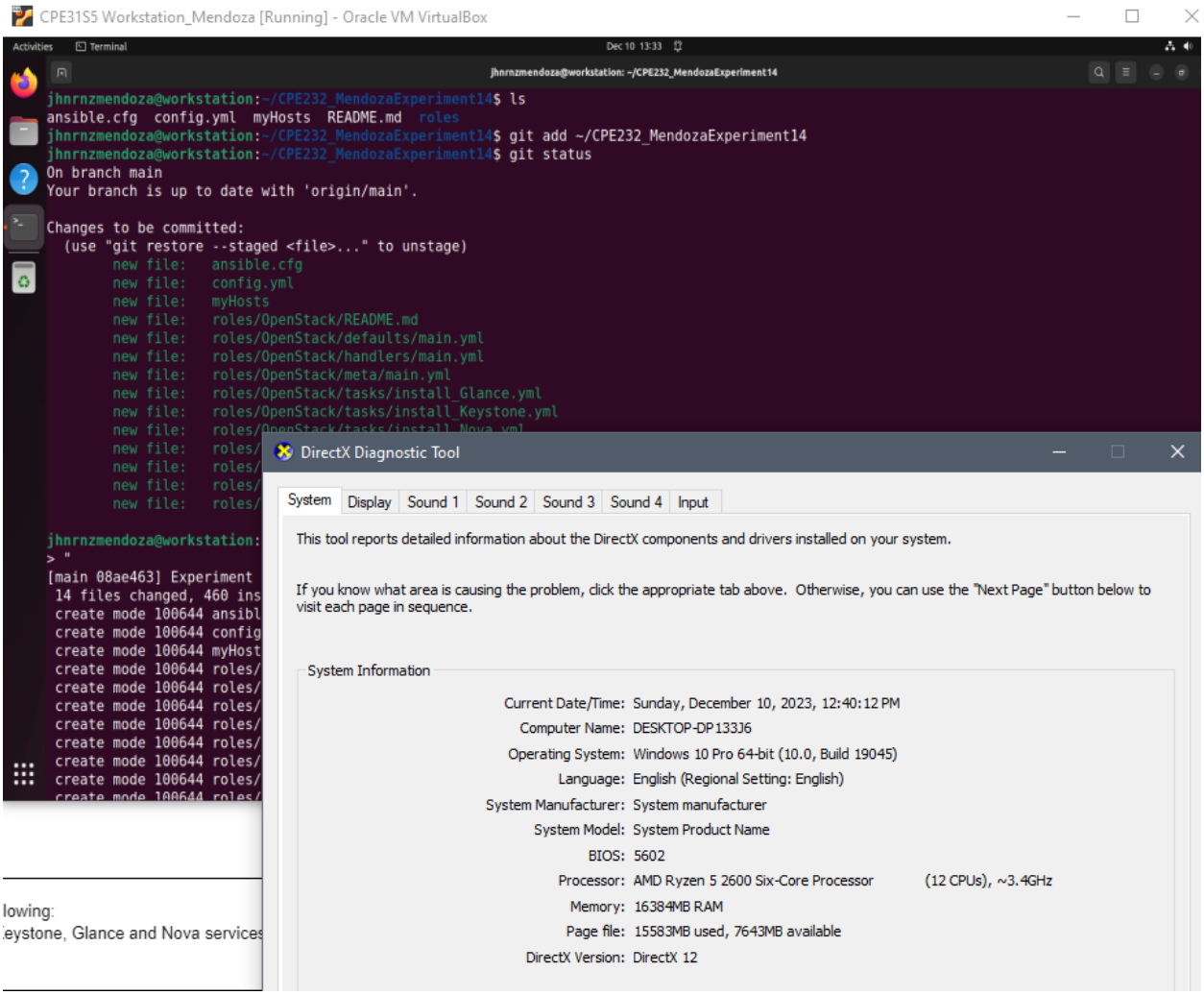
If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time:	Sunday, December 10, 2023, 12:40:12 PM
Computer Name:	DESKTOP-DP133J6
Operating System:	Windows 10 Pro 64-bit (10.0, Build 19045)
Language:	English (Regional Setting: English)
System Manufacturer:	System manufacturer
System Model:	System Product Name
BIOS:	5602
Processor:	AMD Ryzen 5 2600 Six-Core Processor (12 CPUs), ~3.4GHz
Memory:	16384MB RAM
Page file:	15583MB used, 7643MB available
DirectX Version:	DirectX 12

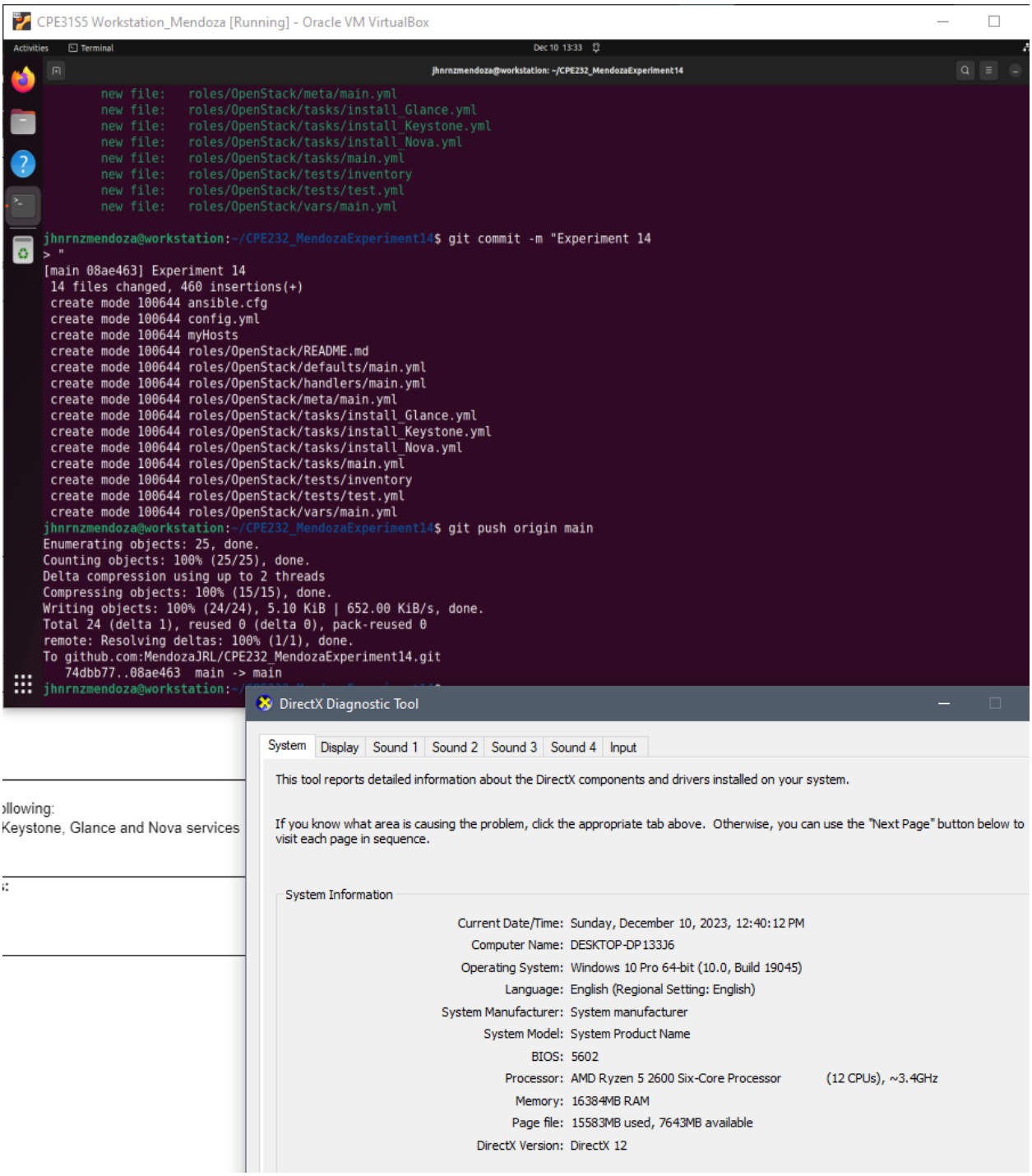
mit and push it to your GitHub rep

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



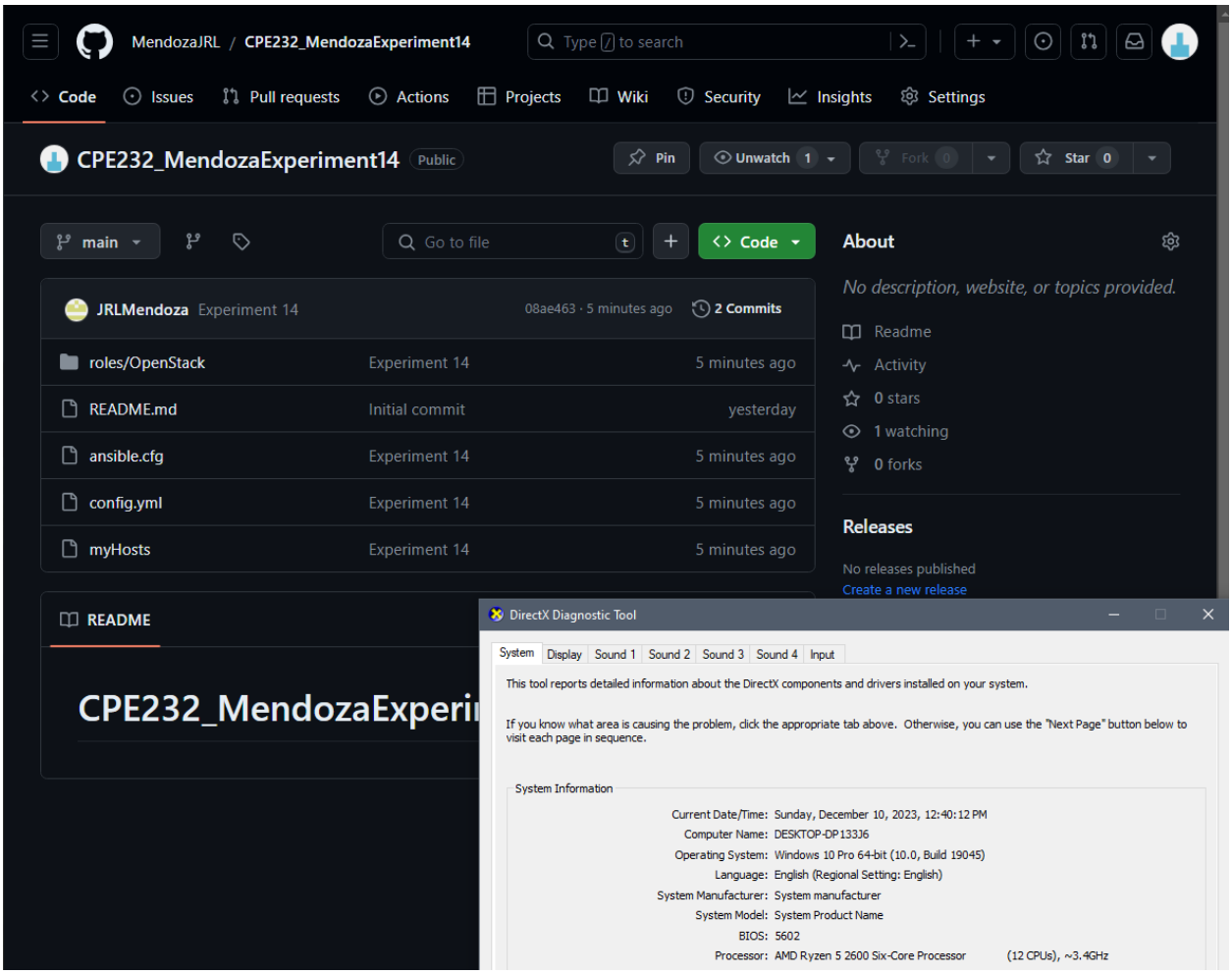
Observation:

- Using the Git Add and Git Status commands the changes that were made in the repository have been uploaded on the GitHub cloud repository.



Observation:

- Using the Git Commit command, the uploaded changes are now saved on the cloud repository and are now ready to be pushed on the main branch.



Observation:

- Upon pushing the changes, we can now observe that the changes made are not on the GitHub cloud repository.

GitHub Repository Link:

https://github.com/MendozaJRL/CPE232_MendozaExperiment14.git

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

Keystone Service is an OpenStack feature which helps the system administrator to identify the users by having their authentication data and authorization data. Using this Identify service, the user can authenticate and get access on other OpenStack services. Glance Service, is also an OpenStack feature which enables the user to have access with metadata (names, images, descriptions, and others). Glance is considered as an Imaging Service due to the fact that it provides information to its users. Lastly, Nova Service is also an OpenStack feature that allows the user to have multiple virtual machines. It is responsible for compute services since it provides infrastructures as its services.

Conclusions:

In this activity, the students were able to install the OpenStack services such as Keystone, Glance, and Nova. These services as previously discussed are identity service, imaging service, and compute service. Identity services are concerned with authentication of the user as well as authorization in accessing the files. Imaging services are concerned with the deployment and distribution of metadata by the use of a database. Lastly, Compute services gives a platform in which the user may use multiple remote nodes, working like an infrastructure.

In addition, the students have implemented a working program which installs the required OpenStack features using ansible. The students have relied on accomplishing this by referring to OpenStack documentation in order to get the commands and packages needed to install the following services.