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Course/Section: CPE31S5	Date Submitted: 10/12/2023
Instructor: Engr. Roman Richard	Semester and SY: 1st 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	
<p>Oracle VirtualBox (Hypervisor)</p> <p>1x Ubuntu VM or Centos VM</p>	
4. Tasks	
<ol style="list-style-type: none"> 1. Create a new repository for this activity. 2. Create a playbook that converts the steps in the following items in https://docs.openstack.org/install-guide/ <ol style="list-style-type: none"> a. 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 github repository and clone it in your workstation

The screenshot shows the GitHub repository page for 'Hands-on-Activity-14' by user 'qajlsalvador'. The repository is public and has 1 branch (main) and 0 tags. The 'About' section states: 'No description, website, or topics provided.' The 'README.md' file is visible, showing the title 'Hands-on-Activity-14-'. The 'Code' button is highlighted in green.

The screenshot shows a terminal window with the following commands and output:

```
salvador@Workstation: ~/Hands-on-Activity-14-  
salvador@Workstation:~$ git clone git@github.com:qajlsalvador/Hands-on-Activity-14-.git  
Cloning into 'Hands-on-Activity-14-'...  
remote: Enumerating objects: 3, done.  
remote: Counting objects: 100% (3/3), done.  
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0  
Receiving objects: 100% (3/3), done.  
salvador@Workstation:~$ ls  
ansible Hands-on-Activity-14- nagios-ansible  
CPE232_AndreuSalvador Hands-on-Activity-4- Pictures  
CPE_MIDEXAM_Salvador Hands-on-Activity-5- pract  
Desktop Hands-on-Activity-6- Prometheus  
Docker Hands-on-Activity-7- Public  
Documents id_rsa Salvador_PrelimExam  
Downloads id_rsa.pub snap  
Elastic Music Templates  
Hands-on-Activity-13- Nagios Videos  
salvador@Workstation:~$ cd Hands-on-Activity-14-  
salvador@Workstation:~/Hands-on-Activity-14-$
```

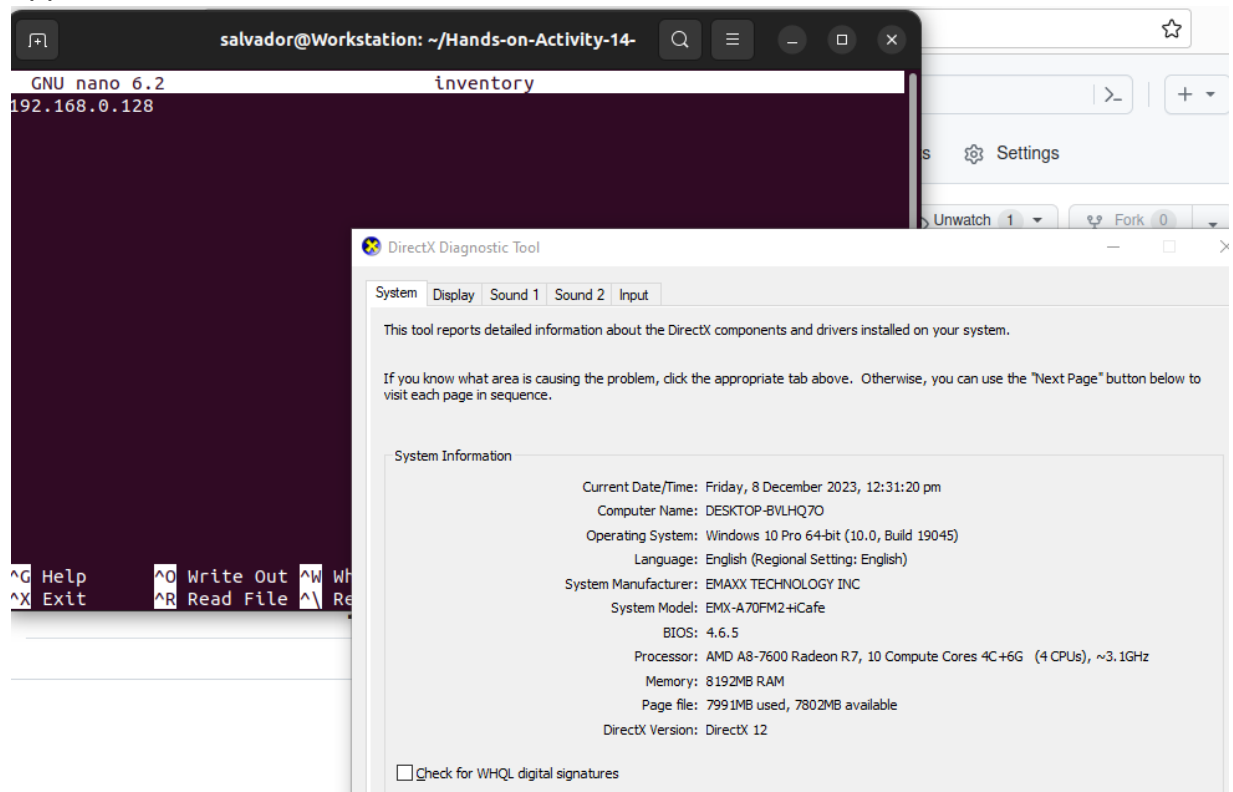
The 'DirectX Diagnostic Tool' window is also visible, showing system information:

System Information

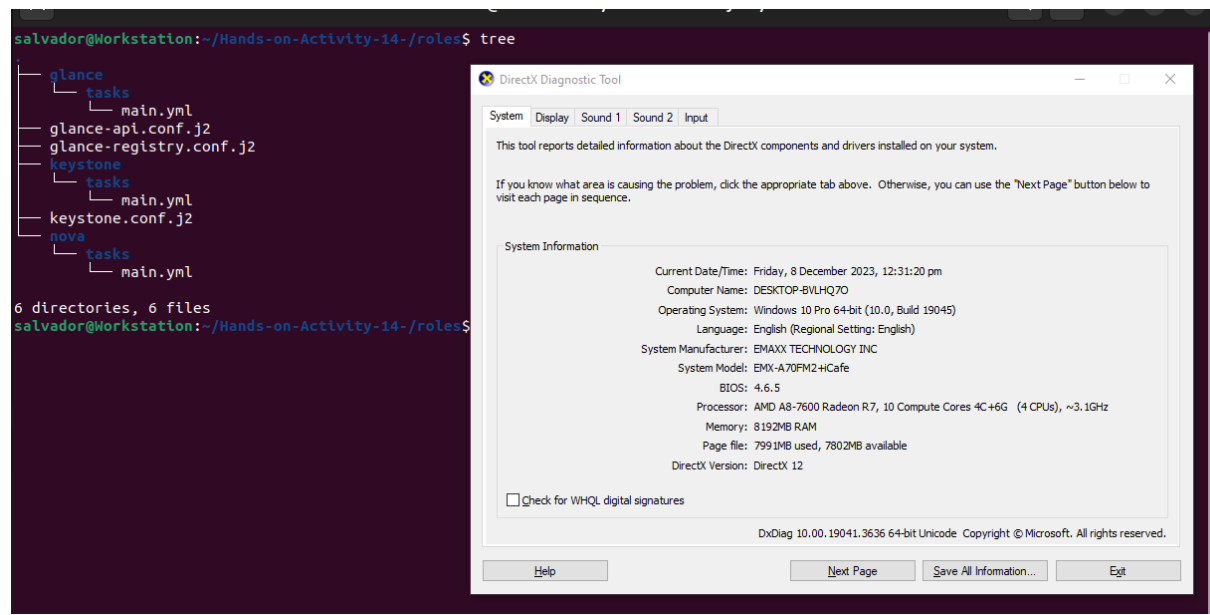
- Current Date/Time: Friday, 8 December 2023, 12:31:20 pm
- Computer Name: DESKTOP-BVLHQ70
- Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
- Language: English (Regional Setting: English)
- System Manufacturer: EMAXX TECHNOLOGY INC
- System Model: EMX-A70FM2+HcAfe
- BIOS: 4.6.5
- Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz
- Memory: 8192MB RAM
- Page file: 7991MB used, 7802MB available
- DirectX Version: DirectX 12

There is a checkbox for 'Check for WHQL digital signatures' at the bottom.

2. Create an inventory to store the ip address of the server you want to install the applications to.

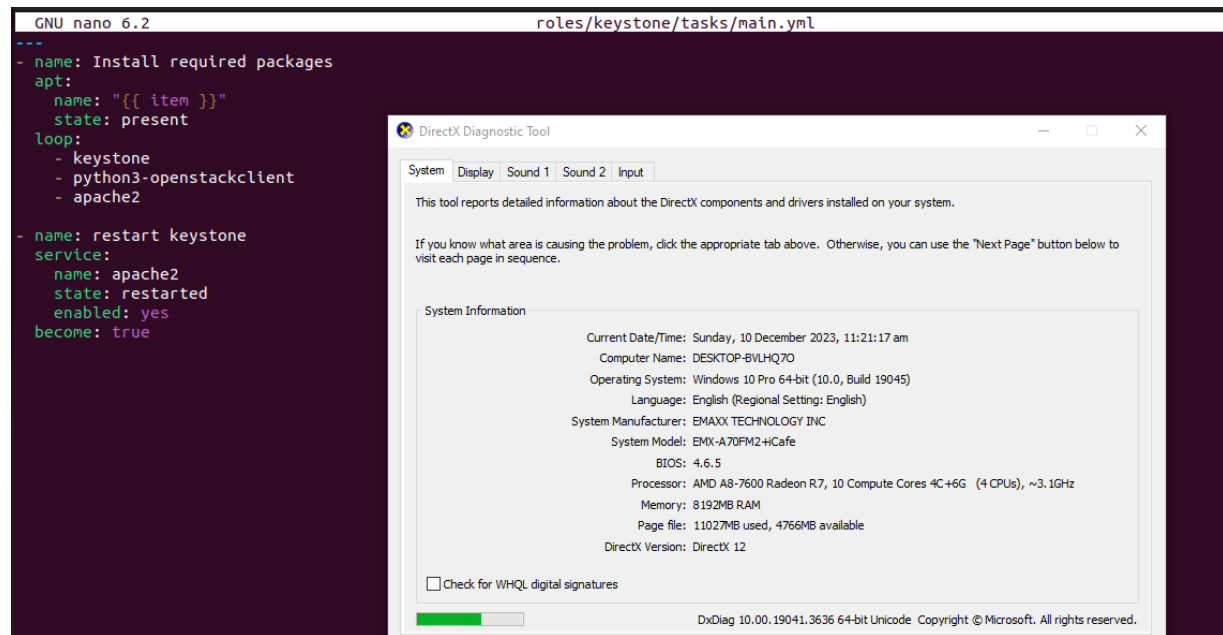


3. Creating the roles directory and creating a tasks directory within each roles and naming main.yml the yaml file that will contain the codes that is needed in automating the installation of the said items.



Writing the codes inside each main.yml for the automation

Keystone:



The screenshot shows a terminal window with the title "GNU nano 6.2" and the file path "roles/keystone/tasks/main.yml". The code in the terminal is as follows:

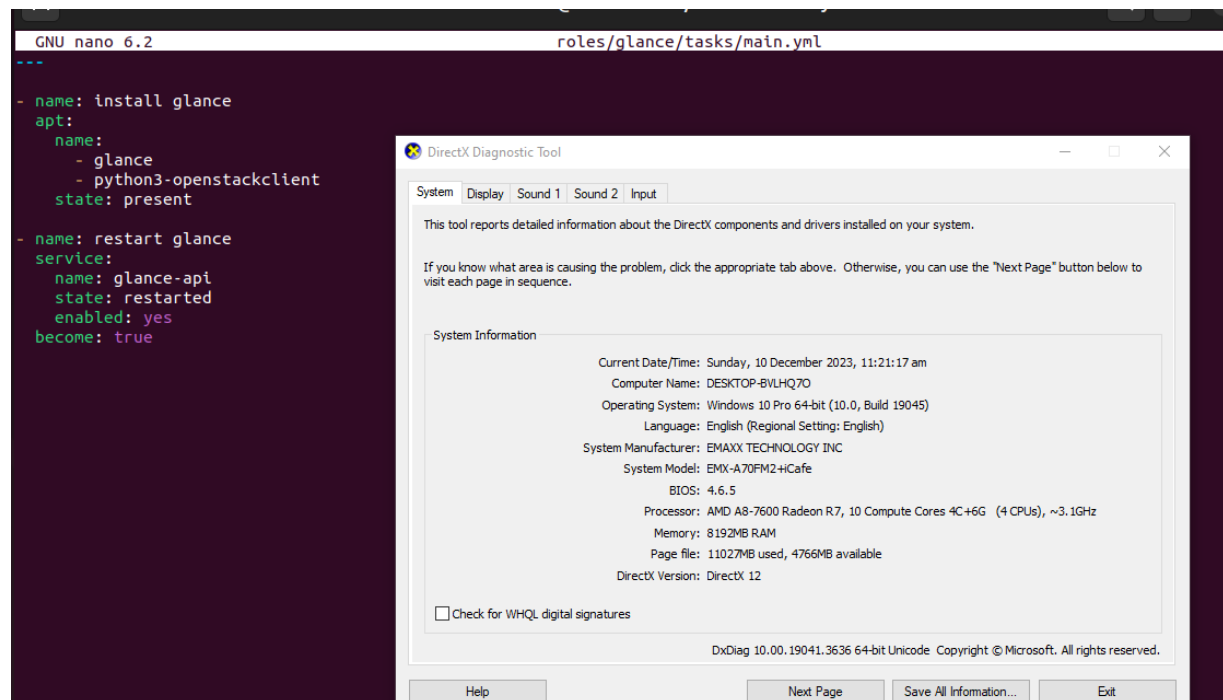
```
---  
- name: Install required packages  
  apt:  
    name: "[[ item ]]"  
    state: present  
  loop:  
    - keystone  
    - python3-openstackclient  
    - apache2  
  
- name: restart keystone  
  service:  
    name: apache2  
    state: restarted  
    enabled: yes  
    become: true
```

Overlaid on the terminal is a Windows "DirectX Diagnostic Tool" window. The "System" tab is selected, showing the following system information:

- Current Date/Time: Sunday, 10 December 2023, 11:21:17 am
- Computer Name: DESKTOP-BVLHQ70
- Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
- Language: English (Regional Setting: English)
- System Manufacturer: EMAXX TECHNOLOGY INC
- System Model: EMX-A70FM2-HCafe
- BIOS: 4.6.5
- Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz
- Memory: 8192MB RAM
- Page file: 11027MB used, 4766MB available
- DirectX Version: DirectX 12

At the bottom of the window, there is a checkbox for "Check for WHQL digital signatures" and a progress bar. The footer text reads: "DxDiag 10.00.19041.3636 64-bit Unicode Copyright © Microsoft. All rights reserved."

Glance:

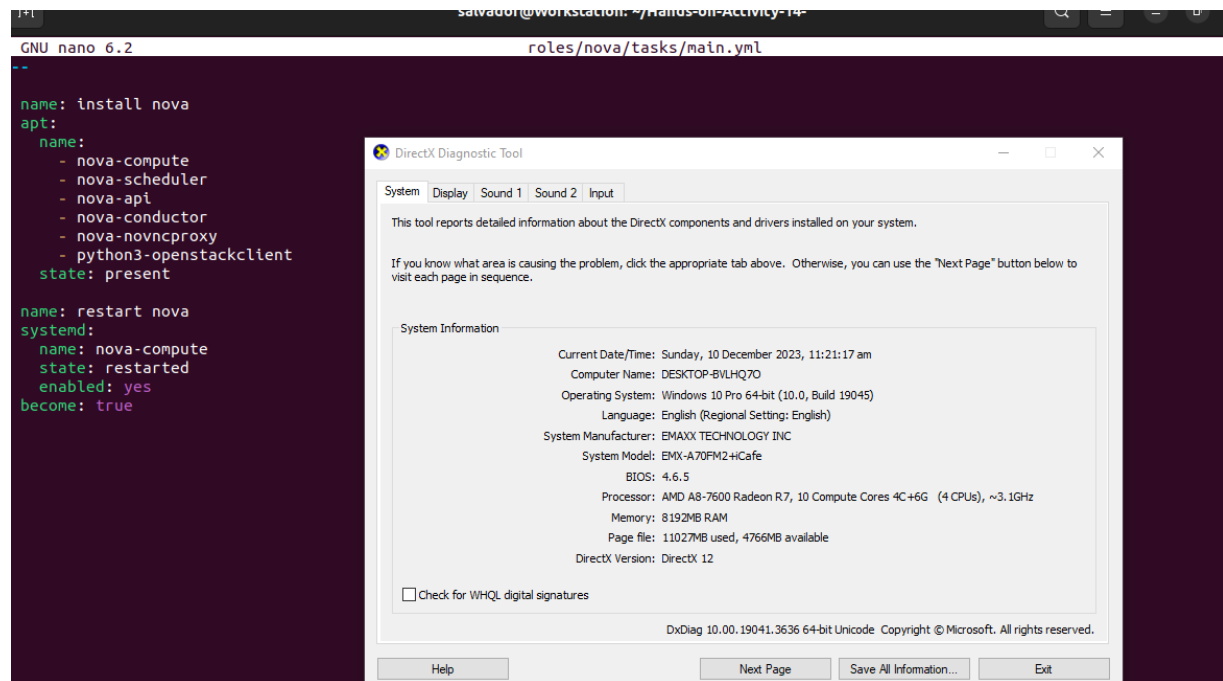


The screenshot shows a terminal window with the title "GNU nano 6.2" and the file path "roles/glance/tasks/main.yml". The code in the terminal is as follows:

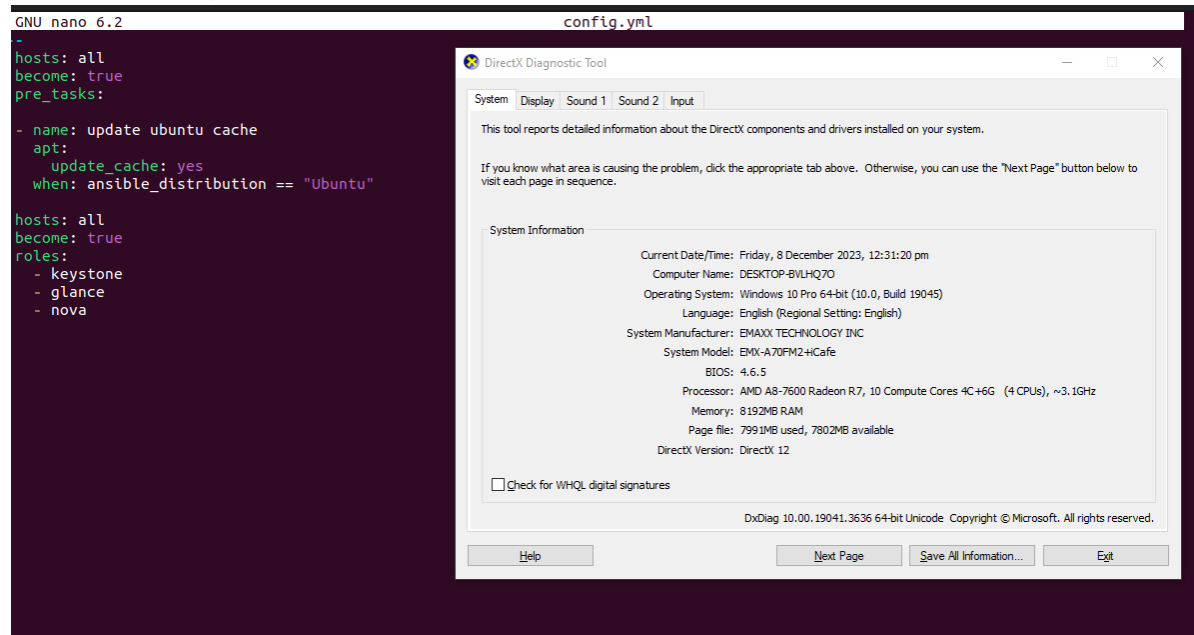
```
---  
- name: install glance  
  apt:  
    name:  
      - glance  
      - python3-openstackclient  
    state: present  
  
- name: restart glance  
  service:  
    name: glance-api  
    state: restarted  
    enabled: yes  
    become: true
```

Overlaid on the terminal is a Windows "DirectX Diagnostic Tool" window, identical to the one in the previous screenshot, showing the same system information.

Nova:



4. Creating the playbook to play the roles



5. Running the main.yml file which is the config.yml

```
salvador@Workstation: ~/Hands-on-Activity-14-
salvador@Workstation:~/Hands-on-Activity-14-$ ansible-playbook -i inventory --ask-become-pass config.yml
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.0.128]

TASK [update ubuntu cache] *****
changed: [192.168.0.128]

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.0.128]

TASK [keystone : Install required packages] *****
ok: [192.168.0.128] => (item=keystone)
ok: [192.168.0.128] => (item=python3-oauthlib)
ok: [192.168.0.128] => (item=apache2)

TASK [keystone : restart keystone] *****
changed: [192.168.0.128]

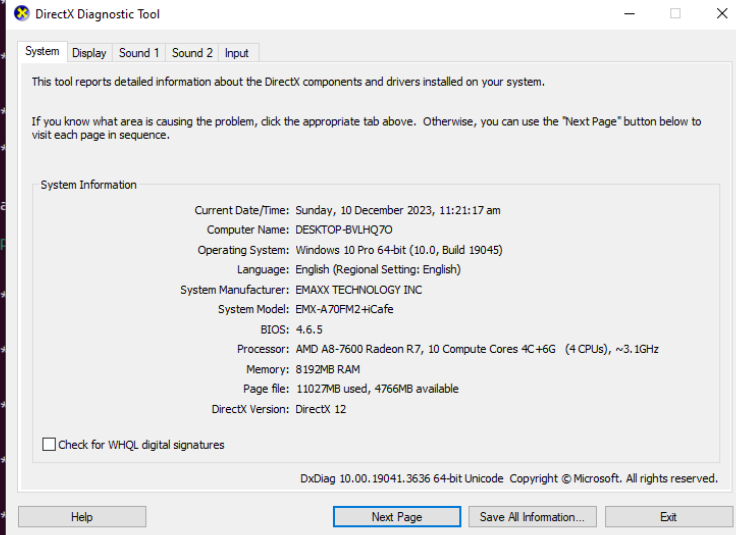
TASK [glance : install glance] *****
ok: [192.168.0.128]

TASK [glance : restart glance] *****
changed: [192.168.0.128]

TASK [nova : install nova] *****
ok: [192.168.0.128]

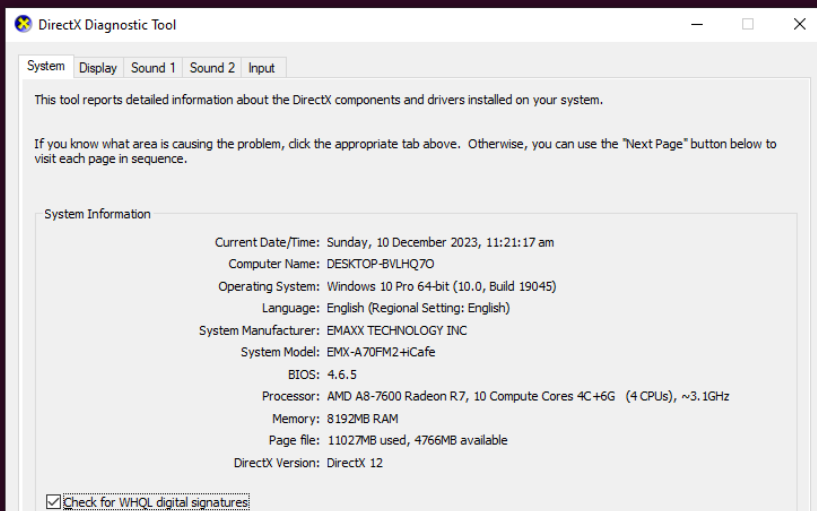
TASK [nova : restart nova] *****
changed: [192.168.0.128]

PLAY RECAP *****
192.168.0.128 : ok=9 changed=4 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0
```



6. Checking: Keystone:

```
salvador@Server2: ~
salvador@Server2:~$ dpkg -l keystone
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name          Version          Architecture Description
+++-+-----+
ii keystone       2:21.0.1-0ubuntu1 all          OpenStack identity service - Daemons
salvador@Server2:~$
```

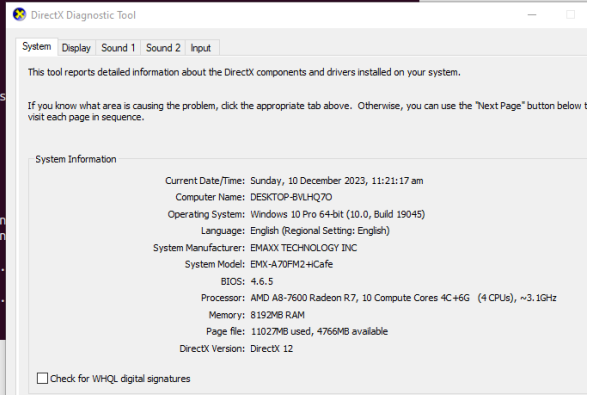


Glance:

Learn more about enabling ESM Apps service at <https://ubuntu.com/esm>

```
Last login: Sun Dec 10 03:23:38 2023 from 192.168.0.118
salvador@Server2:~$ systemctl status glance
Unit glance.service could not be found.
salvador@Server2:~$ systemctl status glance-api
● 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 03:23:34 UTC; 3min 42s ago
     Docs: man:glance-api(1)
    Main PID: 18368 (glance-api)
      Tasks: 2 (limit: 2966)
     Memory: 104.9M
        CPU: 5.787s
    CGroup: /system.slice/glance-api.service
            └─18368 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf
              └─18469 /usr/bin/python3 /usr/bin/glance-api --config-file=/etc/glance-api.conf

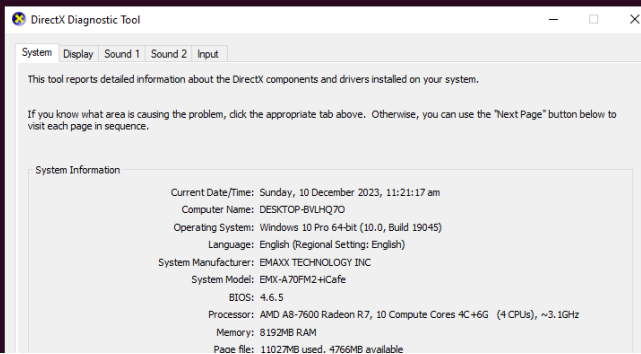
Dec 10 03:23:34 Server2 systemd[1]: glance-api.service: Deactivated successfully.
Dec 10 03:23:34 Server2 systemd[1]: Stopped OpenStack Image Service API.
Dec 10 03:23:34 Server2 systemd[1]: glance-api.service: Consumed 6.748s CPU time.
Dec 10 03:23:34 Server2 systemd[1]: Started OpenStack Image Service API.
lines 1-16/16 (END)
```



Nova:

```
salvador@Server2:~$ systemctl status nova-compute
● nova-compute.service - OpenStack Compute
   Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset: enabled)
   Active: active (running) since Sun 2023-12-10 03:23:39 UTC; 5min ago
     Main PID: 18444 (nova-compute)
       Tasks: 2 (limit: 2966)
      Memory: 109.8M
         CPU: 3.880s
     CGroup: /system.slice/nova-compute.service
             └─18444 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova.conf --config-file=/etc/nova/nova-compute.conf

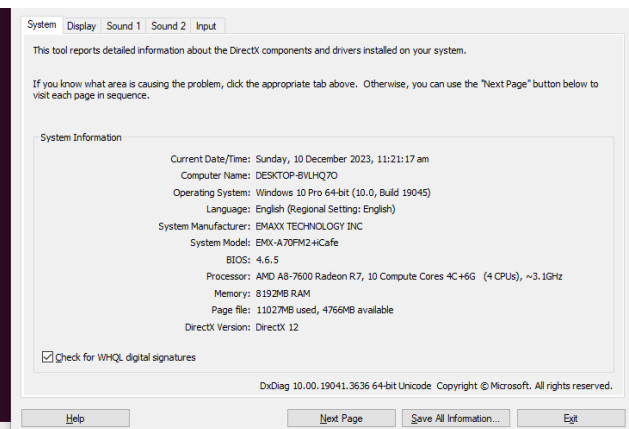
Dec 10 03:23:39 Server2 systemd[1]: nova-compute.service: Deactivated successfully.
Dec 10 03:23:39 Server2 systemd[1]: Stopped OpenStack Compute.
Dec 10 03:23:39 Server2 systemd[1]: nova-compute.service: Consumed 3.885s CPU time.
Dec 10 03:23:39 Server2 systemd[1]: Started OpenStack Compute.
Dec 10 03:23:44 Server2 nova-compute[18444]: Modules with known eventlet monkey patching issues were imported prior to eventlet mon
lines 1-15/15 (END)
```

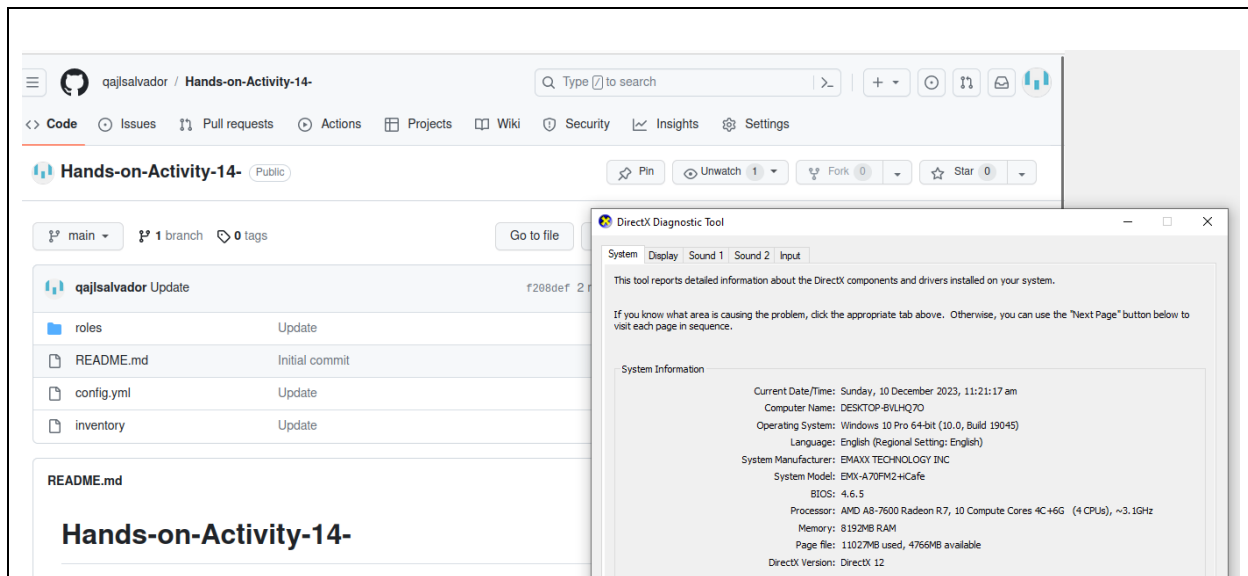


7. Pushing the everything to github

```
salvador@Workstation:~/Hands-on-Activity-14$ git add *
salvador@Workstation:~/Hands-on-Activity-14$ git commit -m "Update"
[main f208def] Update
 7 files changed, 82 insertions(+)
 create mode 100644 config.yml
 create mode 100644 inventory
 create mode 100644 roles/glance/tasks/glance-api.conf.j2
 create mode 100644 roles/glance/tasks/glance-registry.conf.j2
 create mode 100644 roles/glance/tasks/main.yml
 create mode 100644 roles/keystone/tasks/main.yml
 create mode 100644 roles/nova/tasks/main.yml
salvador@Workstation:~/Hands-on-Activity-14$ git push origin main
Enumerating objects: 17, done.
Counting objects: 100% (17/17), done.
Compressing objects: 100% (10/10), done.
Writing objects: 100% (16/16), 1.50 KiB | 512.00 KiB/s, done.
Total 16 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), done.
To github.com:qajlsalvador/Hands-on-Activity-14-.git
 659df6e..f208def main -> main
salvador@Workstation:~/Hands-on-Activity-14$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
salvador@Workstation:~/Hands-on-Activity-14$
```





Github code: <https://github.com/qajlsalvador/Hands-on-Activity-14-.git>

Reflections:

Answer the following:

1. Describe Keystone, Glance and Nova services

Keystone, Glance, and Nova are cloud services that openstack offers, it has different use for each services. Keystone is used for identifying what a certain resources a user tried and tries to access, it also identifies the user's identity while giving information about that event access. Glance is an image service which allows users to discover and retrieve the Virtual Machine's images or container images. And last, Nova is a cloud computing service that computes the instances of which the user used the VM for such as managing computing systems.

Conclusions:

Throughout the activity, the implementation of using ansible playbook in order to install the different openstack cloud services was done. Making the tasks and yml files inside where you will write the code for the installation of each services was done with respect to how a tasks should be implemented in ansible playbook. The goal was to successfully install and check whether the installation was right plus verifying if the cloud services was enabled or in an active state. In the end it shows in the play recap how many changes occurred after playing the playbook hence successfully finishing the tasks without errors.