

Name: Andreu John L. Salvador	Date Performed: 30/11/2023
Course/Section: CPE31S5	Date Submitted: 01/12/2023
Instructor: Engr. Roman Richard	Semester and SY: 1st sem 2023-2024
Activity 13: OpenStack Prerequisite Installation	
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. NTP b. OpenStack packages c. SQL Database d. Message Queue e. Memcached f. Etcd g. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in Inventory file. h. Add, commit and push it to your GitHub repo. 	
5. Output (screenshots and explanations)	

Creating the repository in github

The screenshot shows a GitHub repository page for 'Hands-on-Activity-13' by user 'qajlsalvador'. The repository is public and has 1 branch and 0 tags. The README.md file is visible, showing the title 'Hands-on-Activity-13-'. Overlaid on the right is a Windows Diagnostic Tool window titled 'DirectX Diagnostic Tool'. The 'System' tab is selected, displaying system information: Current Date/Time: Thursday, 30 November 2023, 10:32:45 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-iCafe; BIOS: 4.6.5; Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz; Memory: 8192MB RAM; Page file: 11051MB used, 5254MB available; DirectX Version: DirectX 12.

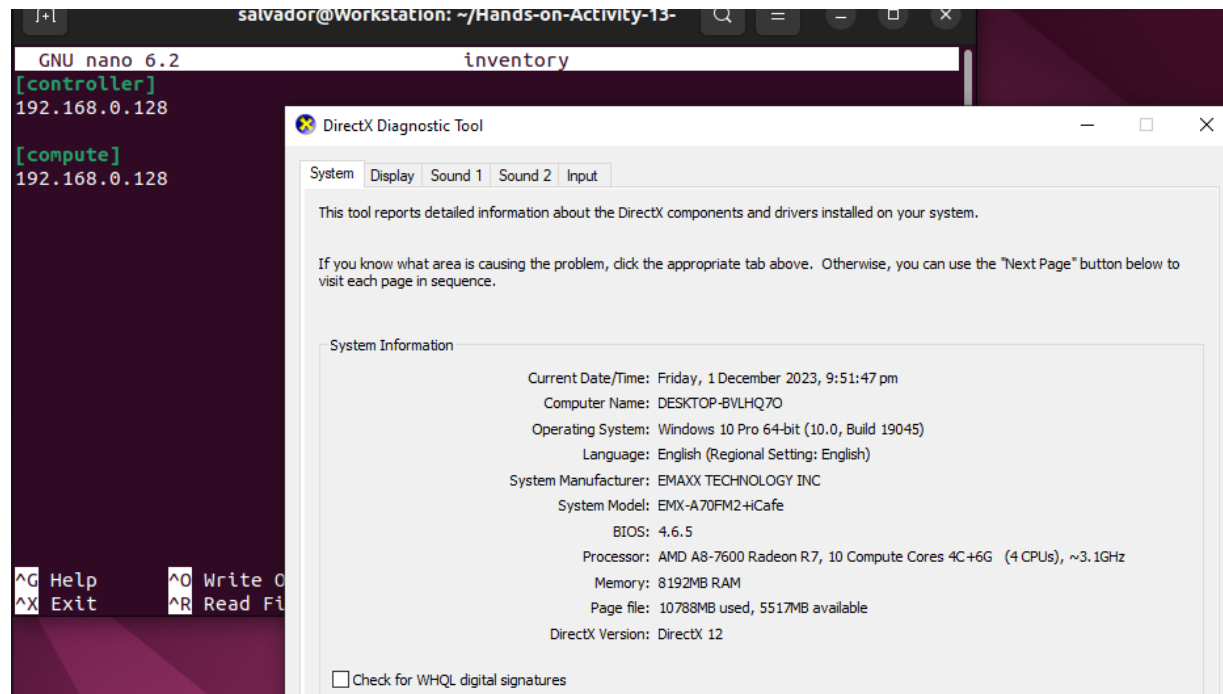
Cloning the repository to the workstation in Ubuntu

The screenshot shows a terminal window in Ubuntu where the repository is being cloned. The commands and output are as follows:

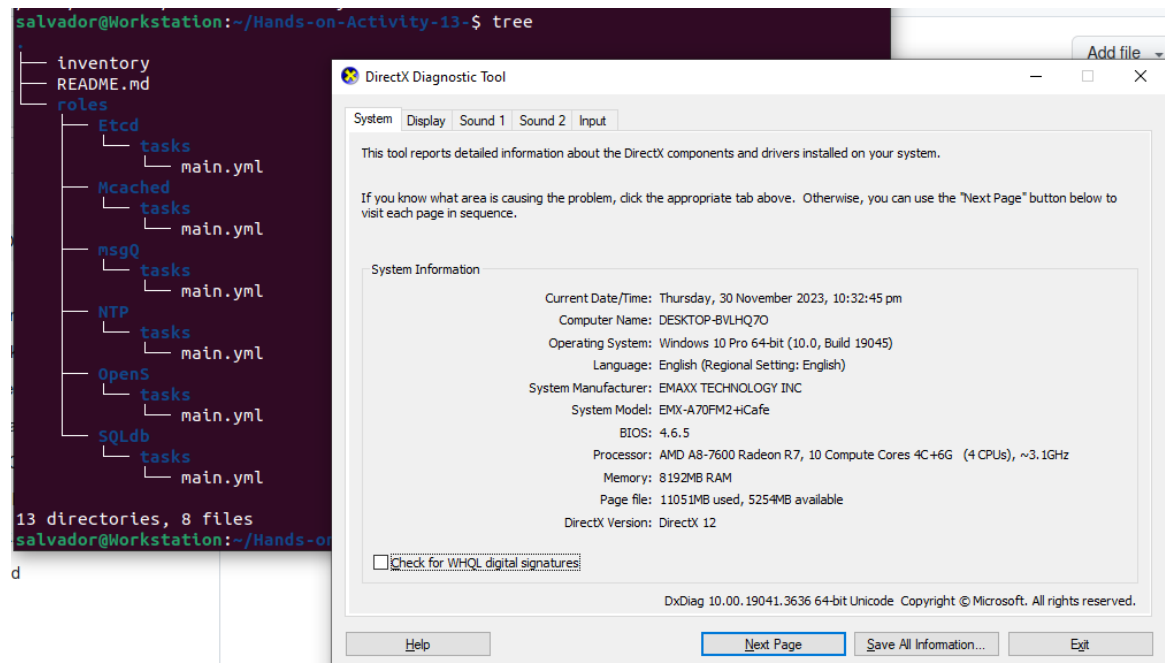
```
salvador@Workstation:~$ git clone git@github.com:qajlsalvador/Hands-on-Activity-13-.git
Cloning into 'Hands-on-Activity-13-'...
remote: Enumerating objects: 6, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 6 (delta 0), reused 0 (delta 0), pack-reused 0
Receiving objects: 100% (6/6), done.
salvador@Workstation:~$ ls
ansible Hands-on-Activity-4- Pictures
CPE232_AndreuSalvador Hands-on-Activity-5- pract
CPE_MIDEXAM_Salvador Hands-on-Activity-6- Prometheus
Desktop Hands-on-Activity-7- Public
Docker id_rsa Salvador_PrelimExam
Documents id_rsa.pub snap
Downloads Music Templates
Elastic Nagios Videos
Hands-on-Activity-13- nagios-ansible
salvador@Workstation:~$ cd Hands-on-Activity-13-
salvador@Workstation:~/Hands-on-Activity-13-$
```

Overlaid on the right is a Windows Diagnostic Tool window titled 'DirectX Diagnostic Tool'. The 'System' tab is selected, displaying system information: Current Date/Time: Thursday, 30 November 2023, 10:32:45 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-iCafe; BIOS: 4.6.5; Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz; Memory: 8192MB RAM; Page file: 11051MB used, 5254MB available; DirectX Version: DirectX 12.

Creating the inventory to store the ip address of the server where the items will be installed.



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.

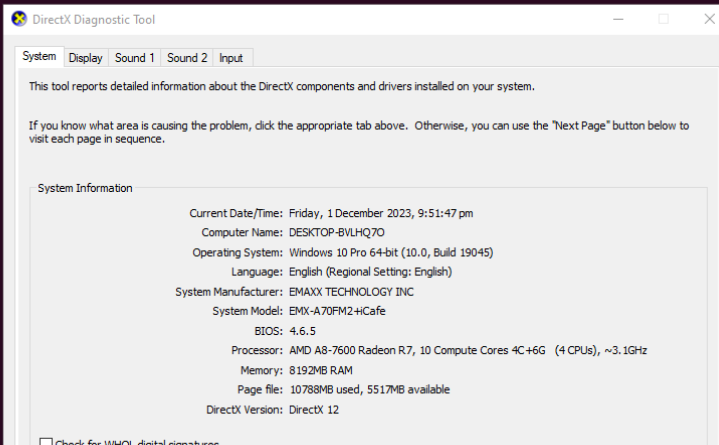


Writing the codes inside each main.yml for the automation

a. NTP

```
GNU nano 6.2 main.yml
--
- name: install NTP
  apt:
    name: ntp
    state: present

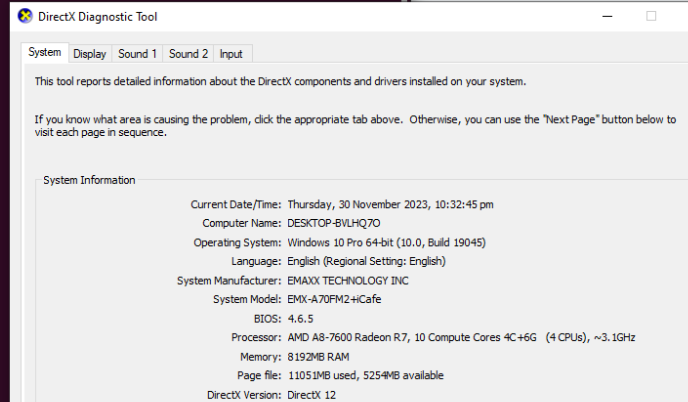
- name: run and enable ntp
  service:
    name: ntp
    state: restarted
    enabled: yes
```



The screenshot shows the DirectX Diagnostic Tool window. It has tabs for System, Display, Sound 1, Sound 2, and Input. The System tab is selected. The text inside says: "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." Below this is a section titled "System Information" with the following details: Current Date/Time: Friday, 1 December 2023, 9:51:47 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-iCafe; BIOS: 4.6.5; Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz; Memory: 8192MB RAM; Page file: 10768MB used, 5517MB available; DirectX Version: DirectX 12. At the bottom, there is a checkbox labeled "Check for WHQL digital signatures".

b. OpenStack

```
salvador@Workstation: ~/Hands-on-Activity-13/roles
GNU nano 6.2 Opens/tasks/main.yml
--
- name: install OpenStack packages
  apt:
    name: "{{ item }}"
    state: present
  loop:
    - nova-compute
    - python3-openstackclient
  become_method: sudo
```



The screenshot shows the DirectX Diagnostic Tool window, identical to the one in section 'a'. It displays the same system information: Current Date/Time: Thursday, 30 November 2023, 10:32:45 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-iCafe; BIOS: 4.6.5; Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz; Memory: 8192MB RAM; Page file: 11051MB used, 5254MB available; DirectX Version: DirectX 12. The checkbox "Check for WHQL digital signatures" is also present.

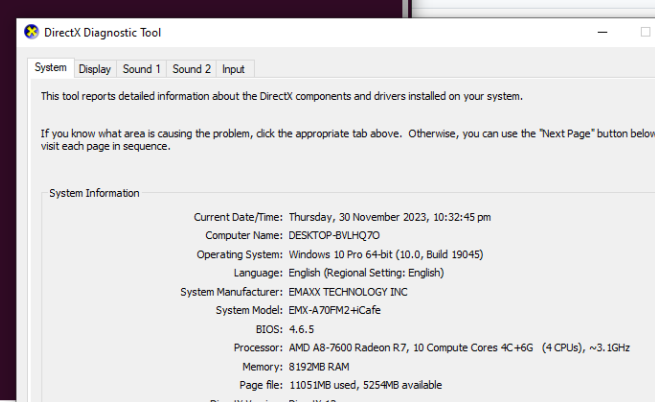
c. SQL Database

```
salvador@Workstation: ~/Hands-on-Activity-13/roles
GNU nano 6.2 SQLdb/tasks/main.yml
--
- name: install mariadb server
  apt:
    name: mariadb-server
    state: present

- name: install mysql
  apt:
    name: python3-pymysql
    state: present

- name: start Mariadb
  service:
    name: mariadb
    state: started
    enabled: yes
  become: true

- name: restart mysql
  system:
    name: mysql
    state: restarted
    enabled: yes
  become: true
```



The screenshot shows the DirectX Diagnostic Tool window, identical to the ones in the previous sections. It displays the same system information: Current Date/Time: Thursday, 30 November 2023, 10:32:45 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-iCafe; BIOS: 4.6.5; Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz; Memory: 8192MB RAM; Page file: 11051MB used, 5254MB available; DirectX Version: DirectX 12. The checkbox "Check for WHQL digital signatures" is also present.

d. Message Queue

The screenshot shows a terminal window with the title 'salvador@Workstation: ~/Hands-on-Activity-13/roles' and a file editor showing 'msgQ/tasks/main.yml'. The terminal content is as follows:

```
GNU nano 6.2
--
name: install msgQueue
apt:
  name: rabbitmq-server
  state: present
```

Overlaid on the terminal is the 'DirectX Diagnostic Tool' window. It has tabs for 'System', 'Display', 'Sound 1', 'Sound 2', and 'Input'. The 'System' tab is active, showing the following information:

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: Thursday, 30 November 2023, 10:32:45 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-iCafe
- BIOS: 4.6.5
- Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~3.1GHz
- Memory: 8192MB RAM
- Page file: 11051MB used, 5254MB available
- DirectX Version: DirectX 12

At the bottom, there is a checkbox labeled 'Check for WHQL digital signatures' which is currently unchecked.

e. Memcached

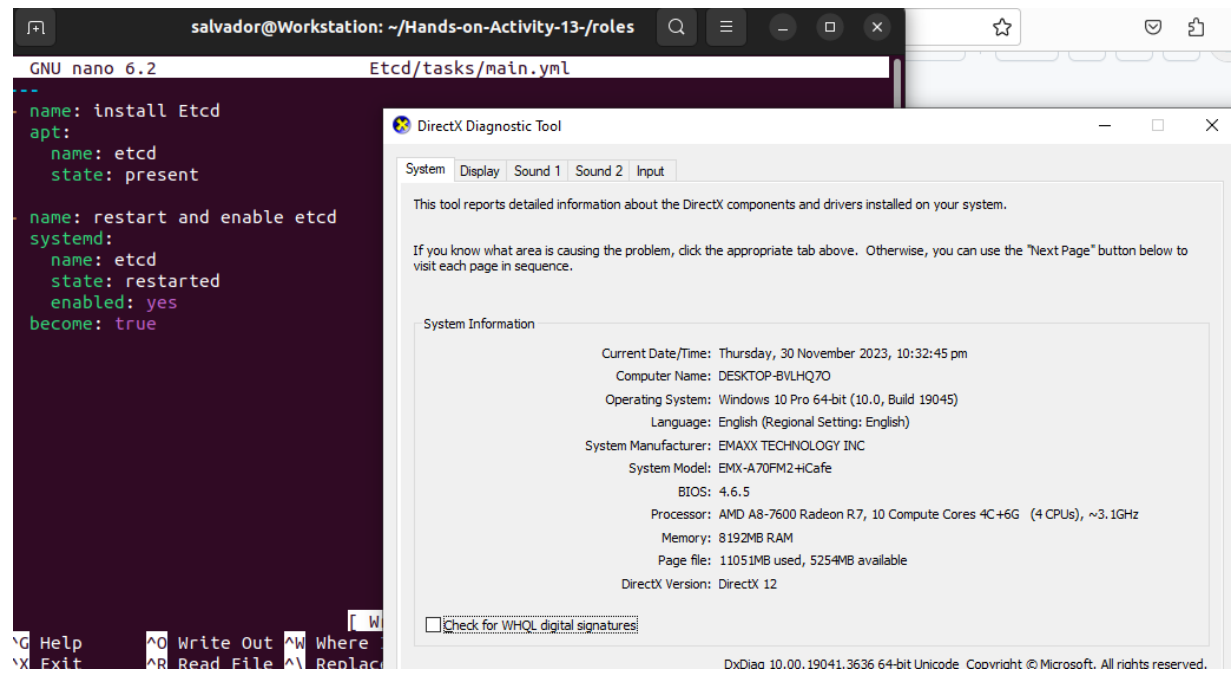
The screenshot shows a terminal window with the title 'salvador@Workstation: ~/Hands-on-Activity-13/roles' and a file editor showing 'Mcached/tasks/main.yml'. The terminal content is as follows:

```
GNU nano 6.2
--
name: install Memcached
apt:
  name: memcached
  state: present

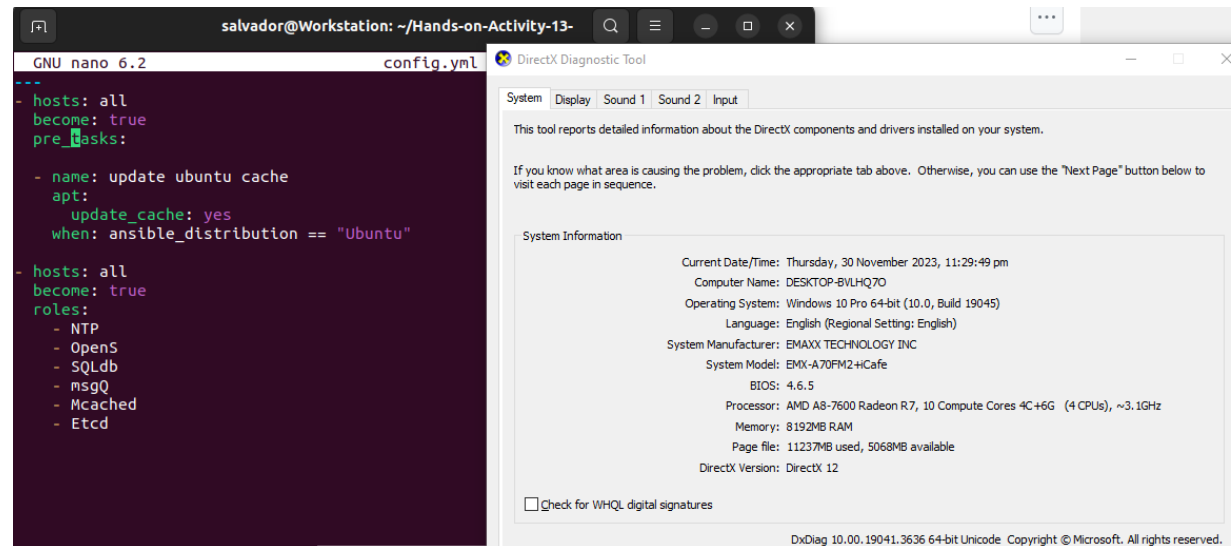
name: restart Memcached
systemd:
  name: memcached
  state: restarted
  enabled: yes
  become: true
```

Overlaid on the terminal is the 'DirectX Diagnostic Tool' window, which is identical to the one in the previous screenshot, showing system information and the 'Check for WHQL digital signatures' checkbox.

f. Etc



Creating the config.yml to run each role



Running the file:

```
TASK [NTP : run and enable ntp] *****
changed: [192.168.0.128]

TASK [OpenS : install OpenStack packages] *****
changed: [192.168.0.128] => (item=nova-com
changed: [192.168.0.128] => (item=python3-

TASK [SQLdb : install mariadb server] *****
changed: [192.168.0.128]

TASK [SQLdb : install mysql] *****
ok: [192.168.0.128]

TASK [SQLdb : start Mariadb] *****
ok: [192.168.0.128]

TASK [SQLdb : restart mysql] *****
changed: [192.168.0.128]

TASK [msgQ : install msgQueue] *****
changed: [192.168.0.128]

TASK [Mcached : install Memcached] *****
changed: [192.168.0.128]

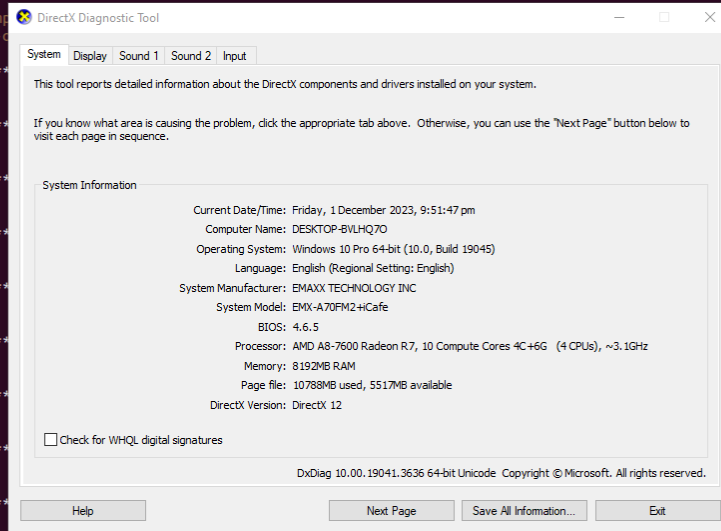
TASK [Mcached : restart Memcached] *****
changed: [192.168.0.128]

TASK [Etcid : install Etcid] *****
changed: [192.168.0.128]

TASK [Etcid : start and enable etcd] *****
ok: [192.168.0.128]

PLAY RECAP *****
192.168.0.128      : ok=15   changed=10   unreachable=0   failed=0   skipped=0   rescued=0   ignored=0

salvador@Workstation:~/Hands-on-Activity-13-$
salvador@Workstation:~/Hands-on-Activity-13-$
```



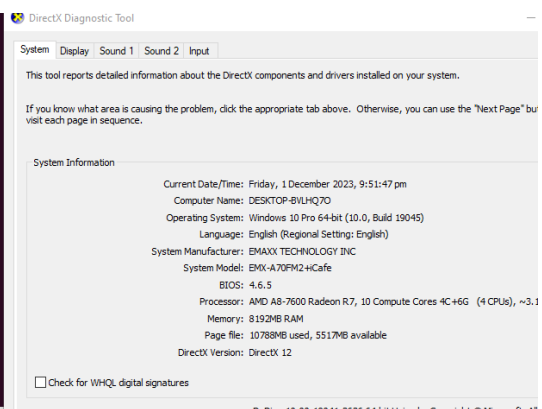
Ok indicates that the code ran successfully and the changes indicates the changes that was made when the code was run. It is the installation that was made for the server.

Checking the status

NTP:

```
Last login: Fri Dec 1 14:11:39 2023 from 192.168.0.118
salvador@Server2:~$ systemctl status ntp
● ntp.service - Network Time Service
   Loaded: loaded (/lib/systemd/system/ntp.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-12-01 14:04:35 UTC; 12min ago
     Docs: man:ntpd(8)
    Main PID: 2174 (ntpd)
      Tasks: 2 (limit: 2966)
     Memory: 1.3M
        CPU: 115ms
    CGroup: /system.slice/ntp.service
            └─2174 /usr/sbin/ntpd -p /var/run/ntpd.pid -g -u 116:121

Dec 01 14:15:26 Server2 ntpd[2174]: Soliciting pool server 203.177.21.124
Dec 01 14:15:29 Server2 ntpd[2174]: Soliciting pool server 203.177.21.122
Dec 01 14:15:36 Server2 ntpd[2174]: Soliciting pool server 203.177.21.122
Dec 01 14:15:38 Server2 ntpd[2174]: Soliciting pool server 203.177.21.122
Dec 01 14:15:58 Server2 ntpd[2174]: Soliciting pool server 2620:2d:4000:1::3f
Dec 01 14:16:32 Server2 ntpd[2174]: Soliciting pool server 203.177.21.121
Dec 01 14:16:36 Server2 ntpd[2174]: Soliciting pool server 203.177.21.124
Dec 01 14:16:40 Server2 ntpd[2174]: Soliciting pool server 203.177.21.123
Dec 01 14:16:44 Server2 ntpd[2174]: Soliciting pool server 203.177.21.123
Dec 01 14:17:04 Server2 ntpd[2174]: Soliciting pool server 2620:2d:4000:1::41
salvador@Server2:~$
```



Openstack:

```
Unknown command 'sudo' for nova-compute.
salvador@Server2:~$ systemctl status nova-compute
● nova-compute.service - OpenStack Compute
   Loaded: loaded (/lib/systemd/system/nova-compute.service; enabled; vendor preset:
   Active: active (running) since Fri 2023-12-01 14:09:08 UTC; 10min ago
   Main PID: 9754 (nova-compute)
     Tasks: 2 (limit: 2966)
    Memory: 118.3M
       CPU: 4.375s
   CGroup: /system.slice/nova-compute.service
           └─9754 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova

Dec 01 14:09:08 Server2 systemd[1]: Started OpenStack Compute.
Dec 01 14:09:10 Server2 nova-compute[9754]: Modules with known eventlet monkey patching
lines 1-12/12 (END)
^C
salvador@Server2:~$
```

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: Friday, 1 December 2023, 9:51:47 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-iCafe
BIOS: 4.6.5
Processor: AMD A8-7600 Radeon R7, 10 Compute Cores 4C+6G (4 CPUs), ~
Memory: 8192MB RAM
Page file: 10788MB used, 5517MB available
DirectX Version: DirectX 12

SQL:

```
salvador@Server2:~$ systemctl status mysql
● mariadb.service - MariaDB 10.6.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-12-01 14:10:17 UTC; 10min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 10966 (mariadb)
   Status: "Taking your SQL requests now..."
     Tasks: 7 (limit: 2966)
    Memory: 60.6M
       CPU: 658ms
   CGroup: /system.slice/mariadb.service
           └─10966 /usr/sbin/mariadb

Dec 01 14:10:17 Server2 mariadb[10966]: Version: '10.6.12-MariaDB-0ubuntu0.22.04.1' socket: '/run/mysqld/mysqld.sock' port: 3306
Dec 01 14:10:17 Server2 systemd[1]: Started MariaDB 10.6.12 database server.
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10984]: Upgrading MySQL tables if necessary.
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10987]: Looking for 'mariadb' as: /usr/bin/mariadb
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10987]: Looking for 'mariadb-check' as: /usr/bin/mariadb-check
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10987]: This installation of MariaDB is already upgraded to 10.6.12-MariaDB.
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10987]: There is no need to run mysql_upgrade again for 10.6.12-MariaDB.
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10987]: You can use --force if you still want to run mysql_upgrade
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[10995]: Checking for insecure root accounts.
Dec 01 14:10:17 Server2 /etc/mysql/debian-start[11000]: Triggering myisam-recover for all MyISAM tables and aria-recover for all Ar
lines 1-23/23 (END)
```

DirectX Diagnostic Tool

System Display Sound 1 Sound 2 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.

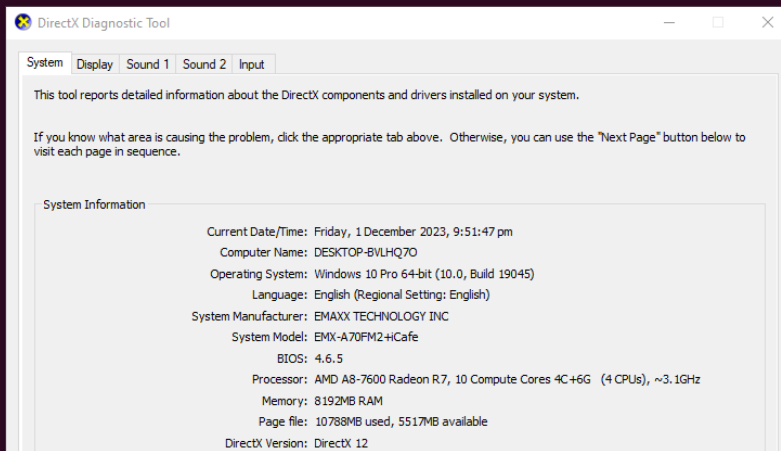
System Information

Current Date/Time: Friday, 1 December 2023, 9:51:47 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-iCafe
BIOS: 4.6.5

Message Queue:

```
salvador@Server2:~$ systemctl status rabbitmq-server
● rabbitmq-server.service - RabbitMQ Messaging Server
   Loaded: loaded (/lib/systemd/system/rabbitmq-server.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-12-01 14:10:58 UTC; 12min ago
     Main PID: 11427 (beam.smp)
        Tasks: 21 (limit: 2966)
       Memory: 88.3M
          CPU: 11.947s
      CGroup: /system.slice/rabbitmq-server.service
              └─11427 /usr/lib/erlang/erts-12.2.1/bin/beam.smp -W w -MBas ageffcbf -MHas ageffcbf -MBmbcs 512 -MHmbcs 512 -h
                  └─11438 erl_child_setup 65536
                      └─11485 inet_gethost 4
                          └─11486 inet_gethost 4

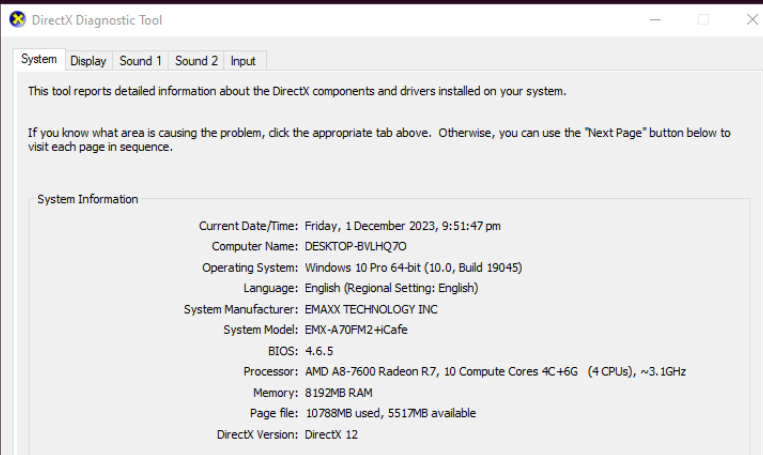
Dec 01 14:10:51 Server2 systemd[1]: Starting RabbitMQ Messaging Server...
Dec 01 14:10:58 Server2 systemd[1]: Started RabbitMQ Messaging Server.
lines 1-15/15 (END)
```



Memcached:

```
salvador@Server2:~$ systemctl status memcached
● memcached.service - memcached daemon
   Loaded: loaded (/lib/systemd/system/memcached.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-12-01 14:11:21 UTC; 13min ago
     Docs: man:memcached(1)
     Main PID: 11973 (memcached)
        Tasks: 10 (limit: 2966)
       Memory: 1.7M
          CPU: 265ms
      CGroup: /system.slice/memcached.service
              └─11973 /usr/bin/memcached -m 64 -p 11211 -u memcache -l 127.0.0.1 -P /var/run/memcached/memcached.pid

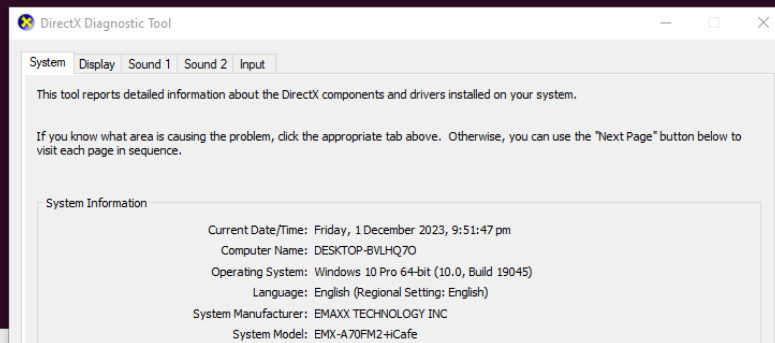
Dec 01 14:11:21 Server2 systemd[1]: Stopped memcached daemon.
Dec 01 14:11:21 Server2 systemd[1]: Started memcached daemon.
salvador@Server2:~$
```



Etcd:

```
salvador@Server2:~$ systemctl status etcd
● etcd.service - etcd - highly-available key value store
   Loaded: loaded (/lib/systemd/system/etcd.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2023-12-01 14:11:33 UTC; 14min ago
     Docs: https://etcd.io/docs
    Man: etcd
   Main PID: 12211 (etcd)
      Tasks: 7 (limit: 2966)
     Memory: 5.6M
        CPU: 3.279s
    CGroup: /system.slice/etcd.service
            └─12211 /usr/bin/etcd

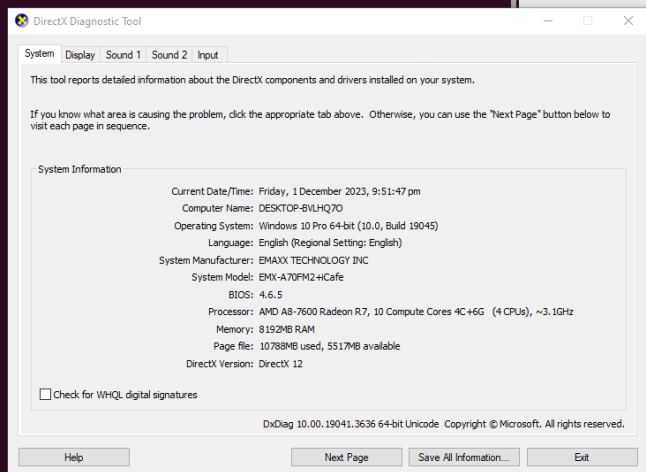
Dec 01 14:11:33 Server2 etcd[12211]: 8e9e05c52164694d received MsgVoteResp from 8e9e05c52164694d at term 2
Dec 01 14:11:33 Server2 etcd[12211]: 8e9e05c52164694d became leader at term 2
Dec 01 14:11:33 Server2 etcd[12211]: raft.node: 8e9e05c52164694d elected leader 8e9e05c52164694d at term 2
Dec 01 14:11:33 Server2 etcd[12211]: published {Name:Server2 ClientURLs:[http://localhost:2379]} to cluster cdf818194e3a8c32
Dec 01 14:11:33 Server2 etcd[12211]: setting up the initial cluster version to 3.3
Dec 01 14:11:33 Server2 etcd[12211]: ready to serve client requests
Dec 01 14:11:33 Server2 etcd[12211]: serving insecure client requests on 127.0.0.1:2379, this is strongly discouraged!
Dec 01 14:11:33 Server2 systemd[1]: Started etcd - highly-available key value store.
Dec 01 14:11:33 Server2 etcd[12211]: set the initial cluster version to 3.3
Dec 01 14:11:33 Server2 etcd[12211]: enabled capabilities for version 3.3
salvador@Server2:~$
```

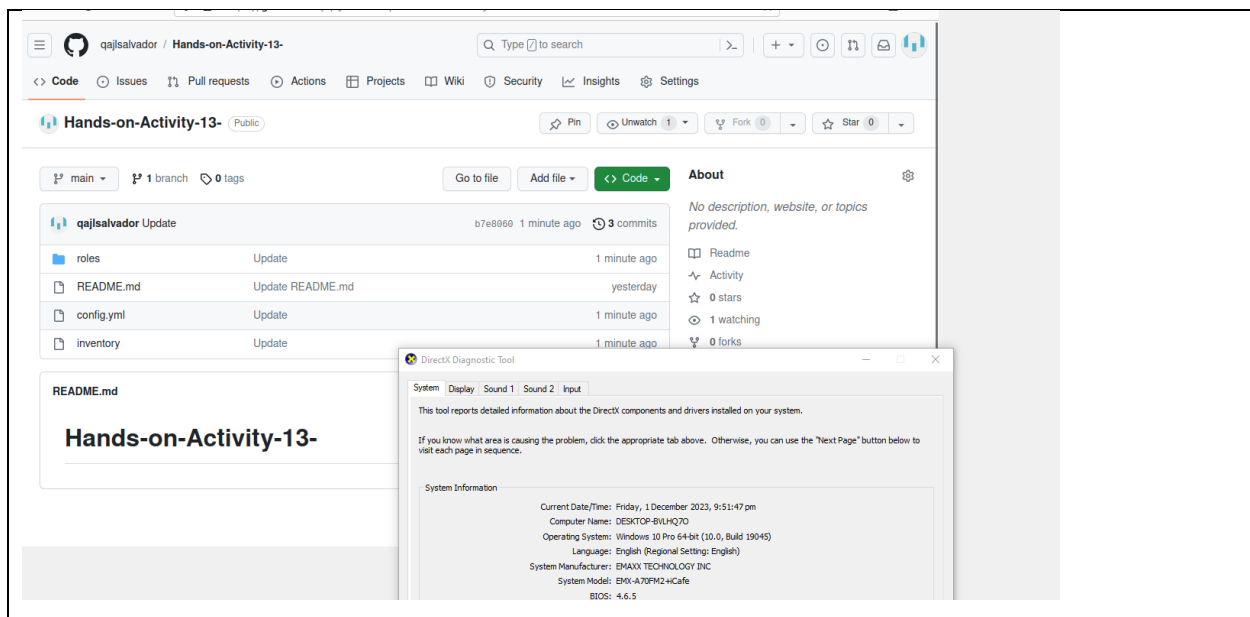


Pushing the files to the github repository

```
salvador@Workstation:~$ cd Hands-on-Activity-13-
salvador@Workstation:~/Hands-on-Activity-13$ ls
config.yml  inventory  README.md  roles
salvador@Workstation:~/Hands-on-Activity-13$ git add *
salvador@Workstation:~/Hands-on-Activity-13$ git commit -m "Update"
[main b7e8060] Update
 8 files changed, 100 insertions(+)
 create mode 100644 config.yml
 create mode 100644 inventory
 create mode 100644 roles/Etcd/tasks/main.yml
 create mode 100644 roles/Mcched/tasks/main.yml
 create mode 100644 roles/NTP/tasks/main.yml
 create mode 100644 roles/OpenS/tasks/main.yml
 create mode 100644 roles/SQLdb/tasks/main.yml
 create mode 100644 roles/msgQ/tasks/main.yml
salvador@Workstation:~/Hands-on-Activity-13$ git push origin main
Enumerating objects: 24, done.
Counting objects: 100% (24/24), done.
Compressing objects: 100% (11/11), done.
Writing objects: 100% (23/23), 1.90 KiB | 650.00 KiB/s, done.
Total 23 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:qajlsalvador/Hands-on-Activity-13-.git
 f6061fa..b7e8060  main -> main
salvador@Workstation:~/Hands-on-Activity-13$ 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-13$
```





Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

Managing nodes and private or public clouds are the used of Openstack, It is an open source platform for developers and Administrators to handle projects in cloud-computing, with this they can organize the application and tools they need to handle the core cloud-computing services. With Openstack thye can manage the tools and utilize it to make more and fast innovation.

Conclusions:

Throughout the activity, the main goal was to establish a workflow in installing OpenStack. A guide was provided in the beginning in explaining the prerequisites that should be installed inside the server. Using the ansible playbook, I was able to use automation in installing the needed tools and application that was intended to do in the first place, this automation will make the installation more convenient and less complexity when it comes to the installation. To further utilize the function of ansible playbook, roles was implemented in the playbook to organize each application and prerequisite that was needed, then creating the main playbook in the directory where the roles directory was also there for the automation to be done. Lastly we check whether the applications and tools that was given in the beginning was already installed by running the systemctl status in the terminal and the pictures shows that it was successfully been installed within the server as the status of each applications and tools was active. The goal of the activity was achieved and demonstrated the how it was implemented and created.