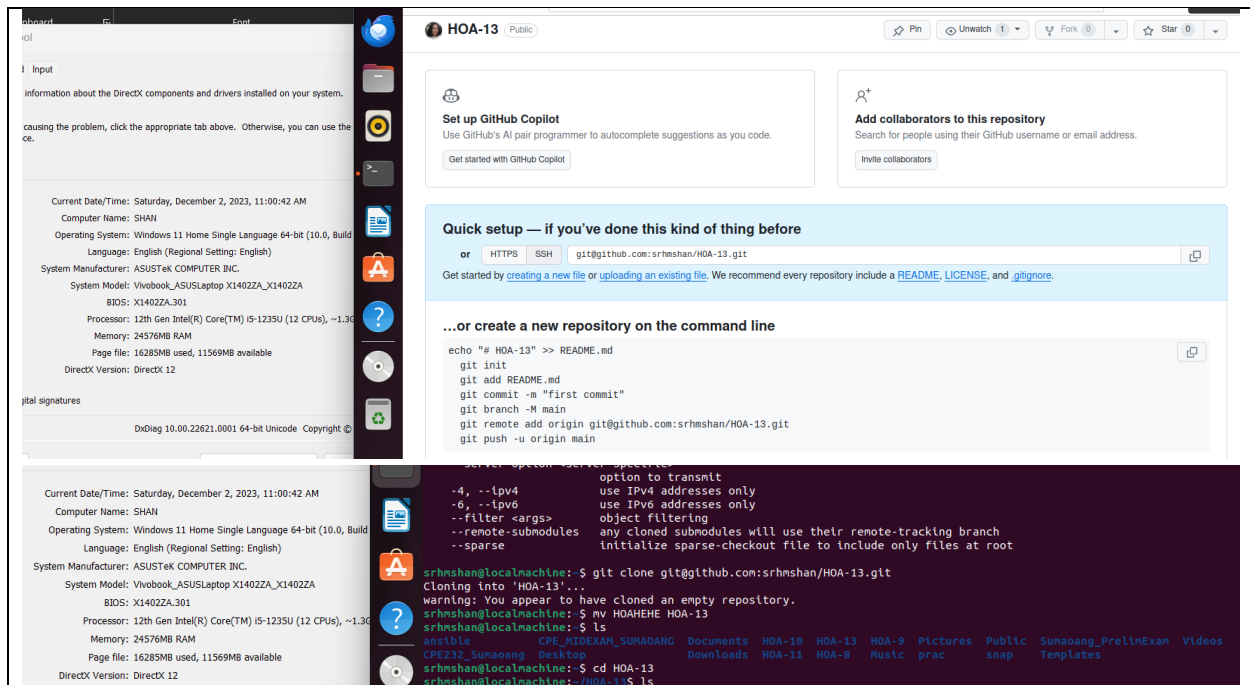


Name: Shaniah Rose Hope M. Sumaoang	Date Performed: December 1, 2023
Course/Section: CPE 232-CPE31S5	Date Submitted: December 2, 2023
Instructor: Engr. Roman Richard	Semester and SY: 1st Sem. 23-24
Activity 13: OpenStack Prerequisite Installation	
1. Objectives	
Create a workflow to install OpenStack 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)	
<ol style="list-style-type: none"> 1. Create a new repository for this activity. 	



I have created a new repository named “HOA-13” and cloned it to my workstation.

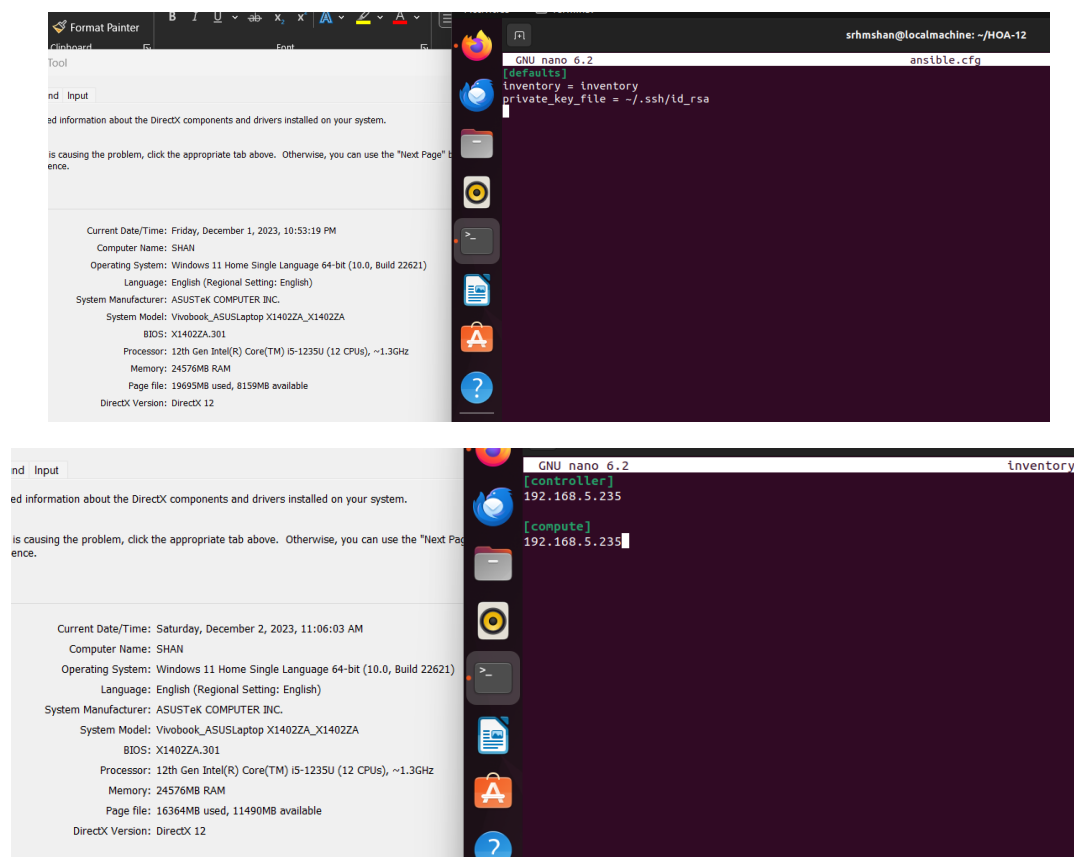
2. Create a playbook that converts the steps in the following items in

<https://docs.openstack.org/install-guide/>

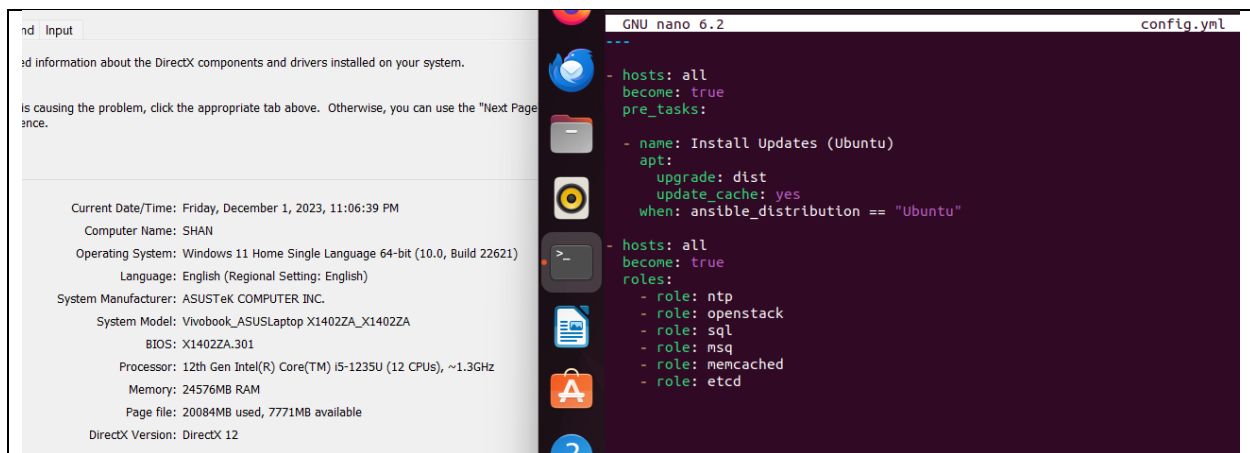
- a. NTP
- b. OpenStack packages
- c. SQL Database
- d. Message Queue
- e. Memcached
- f. Etcd
- g. Create different plays in installing per server type (controller, compute etc.) and identify it as a group in Inventory file.



I used the “tree” command to show the HOA-13 directory’s contents. This includes the ansible.cfg and inventory files, as well as the config.yml playbook. I also added the roles in which it is named corresponding to the ones that I put in config.yml.

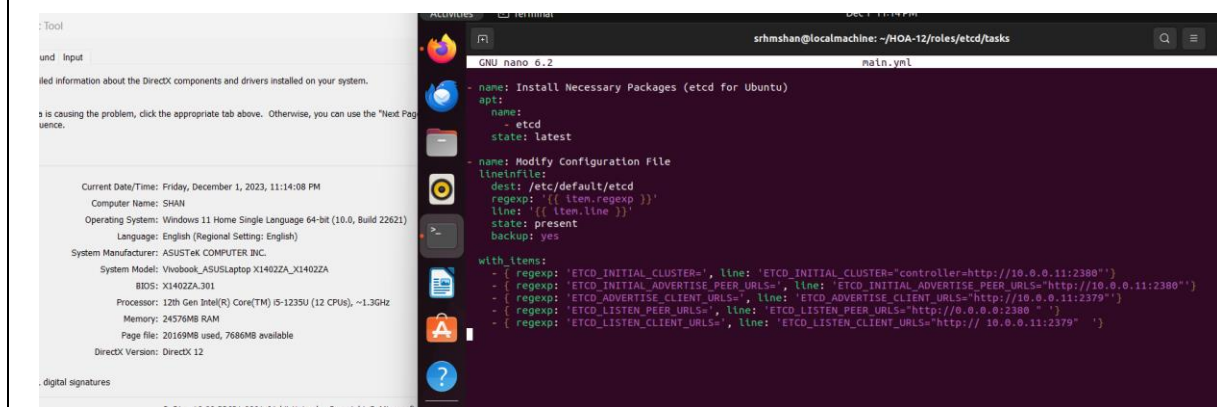


These are the contents of my ansible.cfg and inventory files.

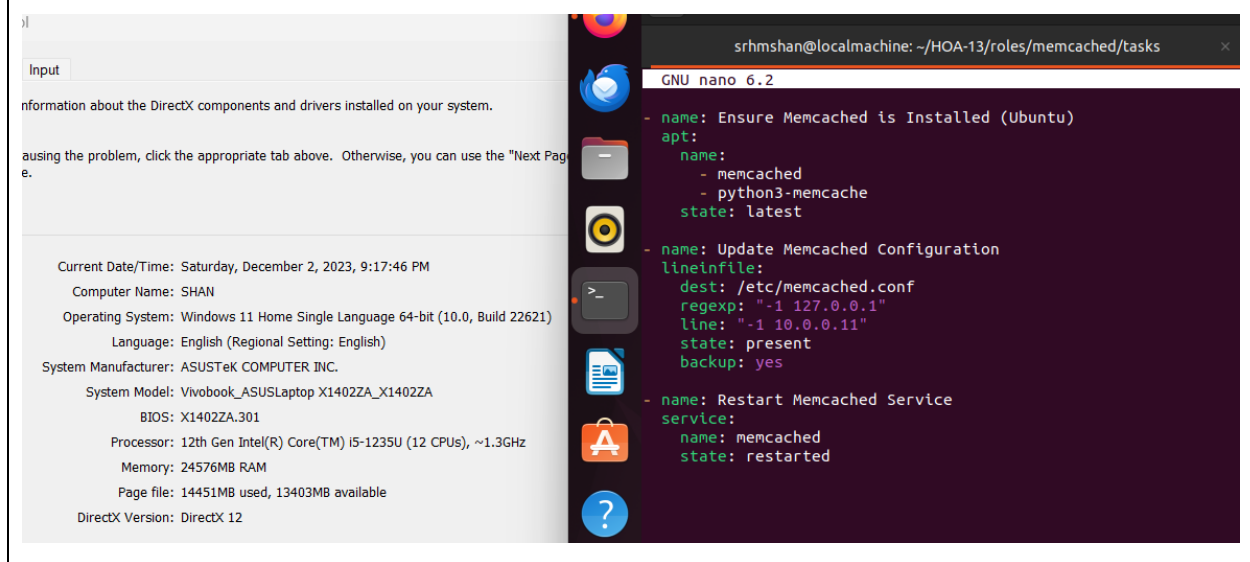


The contents of config.yml are displayed above.

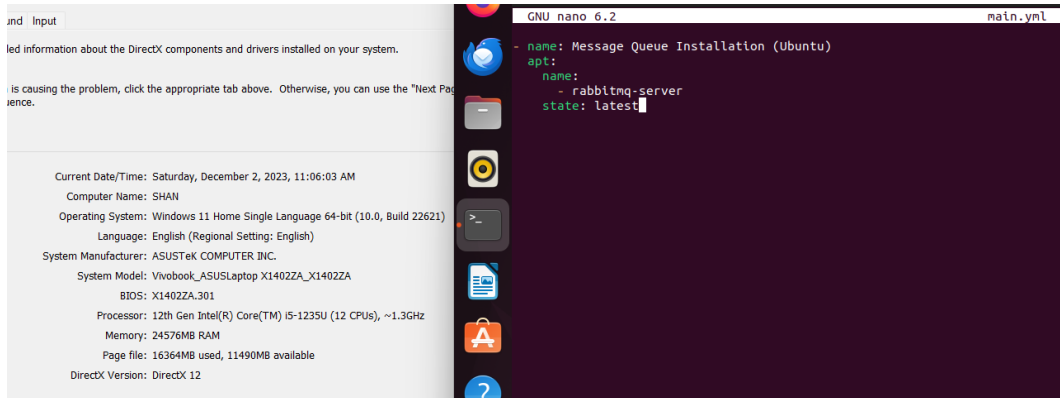
Etcd:



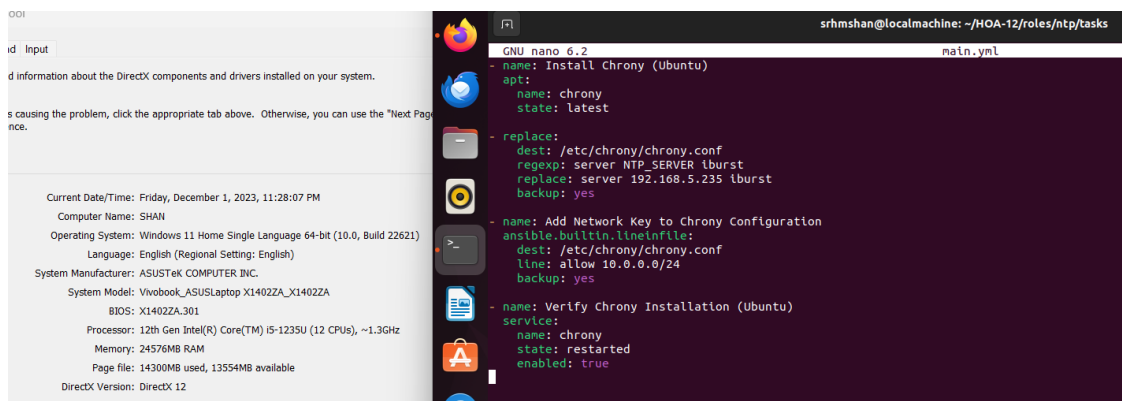
Memcached:



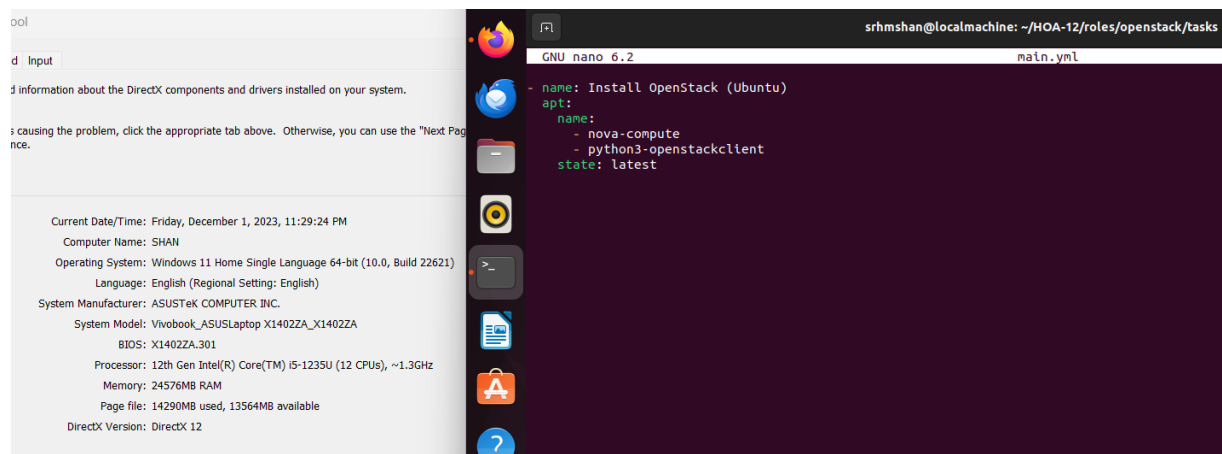
Message Queue:



NTP:



Openstack:



SQL:

put

information about the DirectX components and drivers installed on your system.

ing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page

Current Date/Time: Friday, December 1, 2023, 11:33:02 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 14332MB used, 13523MB available
DirectX Version: DirectX 12

signatures

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GNU nano 6.2

main.yml

srhmshan@localmachine: ~/HOA-12/roles/sql/tasks

- name: SQL Packages Installation (Ubuntu)
apt:
 name:
 - mariadb-server
 - python3-pymysql
 state: latest

- name: Create Database Configuration File
file:
 path: /etc/mysql/mariadb.conf.d/99-openstack.cnf
 state: touch
 owner: root
 group: root
 mode: 0777

- name: Update Database Configuration
lineinfile:
 dest: /etc/mysql/mariadb.conf.d/99-openstack.cnf
 line: "[[item]]"
 state: present
 backup: yes
 with_items:
 - '[mysqld]'
 - 'bind-address = 10.0.0.11'
 - ''
 - 'default-storage-engine = innodb'
 - 'innodb-file-per-table = on'
 - 'max_connections = 4096'
 - 'collation-server = utf8_general_ci'
 - 'character-set-server = utf8'

Current Date/Time: Friday, December 1, 2023, 11:33:02 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 14332MB used, 13523MB available
DirectX Version: DirectX 12

digital signatures

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- name: Restart SQL Service
service:
 name: mysql
 state: restarted
 enabled: true

- name: Finalize SQL Installation
expect:
 command: mysql_secure_installation
 responses:
 'Enter current password for root:': ''
 'Set root password:': 'n'
 'Remove anonymous users:': 'y'
 'Disallow root login remotely:': 'y'
 'Remove test database:': 'y'
 'Reload privilege tables now:': 'y'
 timeout: 1
 register: secure_mariadb
 failed_when: "... Failed!" in secure_mariadb.stdout_lines"

Running "config.yml"

ol

Input

information about the DirectX components and drivers installed on your system.

causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page

Current Date/Time: Saturday, December 2, 2023, 9:12:24 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 14389MB used, 13465MB available
DirectX Version: DirectX 12

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srhmshan@localmachine: ~/HOA-13\$ ansible-playbook --ask-become-pass config.yml

BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.5.235]

TASK [Install Updates (Ubuntu)] *****
ok: [192.168.5.235]

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.5.235]

TASK [ntp : Install Chrony (Ubuntu)] *****
ok: [192.168.5.235]

TASK [ntp : replace] *****
ok: [192.168.5.235]

TASK [ntp : Add Network Key to Chrony Configuration] *****
ok: [192.168.5.235]

TASK [ntp : Verify Chrony Installation (Ubuntu)] *****
changed: [192.168.5.235]

TASK [openstack : Install OpenStack (Ubuntu)] *****
ok: [192.168.5.235]

TASK [sql : SQL Packages Installation (Ubuntu)] *****
ok: [192.168.5.235]

TASK [sql : Create Database Configuration File] *****
changed: [192.168.5.235]

Current Date/Time: Saturday, December 2, 2023, 9:12:24 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 14389MB used, 13465MB available
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Current Date/Time: Saturday, December 2, 2023, 9:12:24 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
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Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 14389MB used, 13465MB available
DirectX Version: DirectX 12

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tal signatures

TASK [sql : Update Database Configuration] *****
ok: [192.168.5.235] => (item=[mysqld])
ok: [192.168.5.235] => (item=bind-address = 10.0.0.11)
ok: [192.168.5.235] => (item=)
ok: [192.168.5.235] => (item=default-store-engine = innodb)
ok: [192.168.5.235] => (item=innodb_file_per_table = on)
ok: [192.168.5.235] => (item=max_connections = 4096)
ok: [192.168.5.235] => (item=collation-server = utf8_general_ci)
ok: [192.168.5.235] => (item=character-ser-server = utf8)

TASK [sql : Restart SQL Service] *****
changed: [192.168.5.235]

TASK [sql : Finalize SQL Installation] *****
changed: [192.168.5.235]

TASK [msq : Message Queue Installation (Ubuntu)] *****
ok: [192.168.5.235]

TASK [memcached : Ensure Memcached is Installed (Ubuntu)] *****
changed: [192.168.5.235]

TASK [memcached : Ensure Memcached is Installed (Ubuntu)] *****
changed: [192.168.5.235]

TASK [memcached : Update Memcached Configuration] *****
changed: [192.168.5.235]

TASK [memcached : Restart Memcached Service] *****
changed: [192.168.5.235]

TASK [etcd : Install Necessary Packages (etcd for Ubuntu)] *****
changed: [192.168.5.235]

TASK [etcd : Modify Configuration File] *****
changed: [192.168.5.235] => (item={'regex': 'ETCD_INITIAL_CLUSTER=', 'line': 'ETCD_INITIAL_CLUSTER=controller=http://10.0.0.11:2380'})
changed: [192.168.5.235] => (item={'regex': 'ETCD_INITIAL_ADVERTISE_PEER_URLS=', 'line': 'ETCD_INITIAL_ADVERTISE_PEER_URLS="http://10.0.0.11:2380"'})
changed: [192.168.5.235] => (item={'regex': 'ETCD_ADVERTISE_CLIENT_URLS=', 'line': 'ETCD_ADVERTISE_CLIENT_URLS="http://10.0.0.11:2379"'})
changed: [192.168.5.235] => (item={'regex': 'ETCD_LISTEN_PEER_URLS=', 'line': 'ETCD_LISTEN_PEER_URLS="http://0.0.0.0:2380"'})
changed: [192.168.5.235] => (item={'regex': 'ETCD_LISTEN_CLIENT_URLS=', 'line': 'ETCD_LISTEN_CLIENT_URLS="http://10.0.0.11:2379"'})

PLAY RECAP *****
192.168.5.235 : ok=19 changed=9 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

Verification of successful installations:

Etcd:

Current Date/Time: Saturday, December 2, 2023, 9:22:51 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTeK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 15795MB used, 12059MB available
DirectX Version: DirectX 12

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ailed information about the DirectX components and drivers installed on your system.

Dec 02 11:10:16 server1 etcd[38322]: 8e9e05c52164694d received MsgVoteResp from 8e9e05c5
Dec 02 11:10:16 server1 etcd[38322]: 8e9e05c52164694d became leader at term 2
Dec 02 11:10:16 server1 etcd[38322]: raft.node: 8e9e05c52164694d elected leader 8e9e05c5
Dec 02 11:10:16 server1 etcd[38322]: published {Name:server1 ClientURLs:[http://localhost
Dec 02 11:10:16 server1 etcd[38322]: setting up the initial cluster version to 3.3
Dec 02 11:10:16 server1 etcd[38322]: ready to serve client requests
Dec 02 11:10:16 server1 etcd[38322]: serving insecure client requests on 127.0.0.1:2379,
Dec 02 11:10:16 server1 systemd[1]: Started etcd - highly-available key value store.
Dec 02 11:10:16 server1 etcd[38322]: set the initial cluster version to 3.3
Dec 02 11:10:16 server1 etcd[38322]: enabled capabilities for version 3.3

srhmshan@server1: ~
\$ 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 Sat 2023-12-02 11:10:16 PST; 10h ago
Docs: https://etcd.io/docs
man:etcd
Main PID: 38322 (etcd)
Tasks: 8 (limit: 4599)
Memory: 6.0M
CPU: 14.225s
CGroup: /system.slice/etcd.service
└─38322 /usr/bin/etcd

Memcached:

Current Date/Time: Saturday, December 2, 2023, 10:04:59 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16815MB used, 11039MB available
DirectX Version: DirectX 12

```
srhmshan@server1: ~  
srhmshan@server1:~$ sudo systemctl status memcached  
● memcached.service - LSB: memcached - Memory caching daemon  
   Loaded: loaded (/etc/init.d/memcached; generated)  
   Active: active (exited) since Sat 2023-12-02 22:04:40 PST; 10s ago  
     Docs: man:systemd-sysv-generator(8)  
   Process: 6326 ExecStart=/etc/init.d/memcached start (code=exited, status=0/SUCCESS)  
    CPU: 4ms  
  
Dec 02 22:04:40 server1 systemd[1]: Starting LSB: memcached - Memory caching daemon...  
Dec 02 22:04:40 server1 systemd[1]: Started LSB: memcached - Memory caching daemon.  
srhmshan@server1:~$
```

Message Queue:

Current Date/Time: Saturday, December 2, 2023, 9:22:51 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 15795MB used, 12059MB available
DirectX Version: DirectX 12

```
srhmshan@server1:~$ 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 Sat 2023-12-02 10:48:17 PST; 10h ago  
     Main PID: 35583 (beam.smp)  
        Tasks: 23 (limit: 4599)  
      Memory: 90.8M  
         CPU: 25.424s  
    CGroup: /system.slice/rabbitmq-server.service  
            └─35583 /usr/lib/erlang/erts-12.2.1/bin/beam.smp -W w -MBas agef  
              └─35594 erl_child_setup 65536  
                └─35645 inet_gethost 4  
                  └─35646 inet_gethost 4  
  
Dec 02 10:48:11 server1 systemd[1]: Starting RabbitMQ Messaging Server...  
Dec 02 10:48:17 server1 systemd[1]: Started RabbitMQ Messaging Server.  
lines 1-15/15 (END)
```

NTP:

Current Date/Time: Saturday, December 2, 2023, 10:04:59 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16815MB used, 11039MB available
DirectX Version: DirectX 12

Intel digital signatures

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```
srhmshan@server1:~$ systemctl status ntp  
● ntp.service - Network Time Service  
   Loaded: loaded (/lib/systemd/system/ntp.service; enabled; vendor preset: enabled)  
   Active: active (running) since Sat 2023-12-02 22:06:19 PST; 40s ago  
     Docs: man:ntpd(8)  
   Process: 6785 ExecStart=/usr/lib/ntp/ntp-systemd-wrapper (code=exited, status=0/SUCCESS)  
     Main PID: 6791 (ntpd)  
        Tasks: 2 (limit: 4594)  
      Memory: 1.5M  
         CPU: 39ms  
    CGroup: /system.slice/ntp.service  
            └─6791 /usr/sbin/ntpd -p /var/run/ntpd.pid -g -u 140:150  
  
Dec 02 22:06:19 server1 systemd[1]: Started Network Time Service.  
Dec 02 22:06:20 server1 ntpd[6791]: Soliciting pool server 203.177.21.123  
Dec 02 22:06:21 server1 ntpd[6791]: Soliciting pool server 203.177.21.124  
Dec 02 22:06:22 server1 ntpd[6791]: Soliciting pool server 203.177.21.123  
Dec 02 22:06:23 server1 ntpd[6791]: Soliciting pool server 203.177.21.121  
Dec 02 22:06:24 server1 ntpd[6791]: Soliciting pool server 185.125.190.58  
Dec 02 22:06:25 server1 ntpd[6791]: Soliciting pool server 185.125.190.56  
Dec 02 22:06:26 server1 ntpd[6791]: Soliciting pool server 91.189.91.157  
Dec 02 22:06:27 server1 ntpd[6791]: Soliciting pool server 185.125.190.57  
Dec 02 22:06:28 server1 ntpd[6791]: Soliciting pool server 2620:2d:4000:1::40  
srhmshan@server1:~$
```

OpenStack:

Current Date/Time: Saturday, December 2, 2023, 10:04:59 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTek COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16815MB used, 11039MB available
DirectX Version: DirectX 12

Intel digital signatures

```
srhmshan@server1:~$ 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 Sat 2023-12-02 21:45:18 PST; 23min ago  
     Main PID: 2569 (nova-compute)  
        Tasks: 2 (limit: 4594)  
      Memory: 141.3M  
         CPU: 4.522s  
    CGroup: /system.slice/nova-compute.service  
            └─2569 /usr/bin/python3 /usr/bin/nova-compute --config-file=/etc/nova/nova.conf --conf  
  
Dec 02 21:45:18 server1 systemd[1]: Started OpenStack Compute.  
Dec 02 21:45:20 server1 nova-compute[2569]: Modules with known eventlet monkey patching issues were  
lines 1-12/12 (END)
```


SQL:

What area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button in sequence.

Information

Current Date/Time: Saturday, December 2, 2023, 10:04:59 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22H2)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTEK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16815MB used, 11039MB available
DirectX Version: DirectX 12

or WHQL digital signatures

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```
srhmshan@server1:~$ 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 Sat 2023-12-02 21:44:50 PST; 23min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 870 (mariadb)
   Status: "Taking your SQL requests now..."
    Tasks: 8 (limit: 4594)
   Memory: 80.9M
      CPU: 1.398s
   CGroup: /system.slice/mariadb.service
           └─870 /usr/sbin/mariadb

Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Note] InnoDB: 10.6.12 started;
Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Note] InnoDB: Loading buffer po
Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Note] Plugin 'FEEDBACK' is disa
Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Warning] You need to use --log
Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Note] InnoDB: Buffer pool(s) lo
Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Note] Server socket created on
Dec 02 21:44:50 server1 mariadb[870]: 2023-12-02 21:44:50 0 [Note] /usr/sbin/mariadb: ready
Dec 02 21:44:50 server1 mariadb[870]: Version: '10.6.12-MariaDB-0ubuntu0.22.04.1' socket:
Dec 02 21:44:50 server1 systemd[1]: Started MariaDB 10.6.12 database server.
Dec 02 21:44:51 server1 /etc/mysql/debian-start[1168]: Triggering mysam-recover for all MyIS
Lines 1-23/23 (END)
```

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

Input

Information about the DirectX components and drivers installed on your system.

What area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button in sequence.

Current Date/Time: Saturday, December 2, 2023, 10:09:11 PM
Computer Name: SHAN
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22H2)
Language: English (Regional Setting: English)
System Manufacturer: ASUSTEK COMPUTER INC.
System Model: Vivobook_ASUSLaptop X1402ZA_X1402ZA
BIOS: X1402ZA.301
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz
Memory: 24576MB RAM
Page file: 16813MB used, 11041MB available
DirectX Version: DirectX 12

Initial signatures

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Next Page

Save All Info

```
srhmshan@localmachine:~/HOA-13$ git status
On branch main

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        ansible.cfg
        config.yml
        inventory
        roles/

nothing added to commit but untracked files present (use "git add" to track)
srhmshan@localmachine:~/HOA-13$ git add .
srhmshan@localmachine:~/HOA-13$ git commit -m "OpenStack Prerequisite Installation"
[main (root-commit) 927ac2e] OpenStack Prerequisite Installation
 9 files changed, 156 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 config.yml
 create mode 100644 inventory
 create mode 100644 roles/etcd/tasks/main.yml
 create mode 100644 roles/memcached/tasks/main.yml
 create mode 100644 roles/mysql/tasks/main.yml
 create mode 100644 roles/ntp/tasks/main.yml
 create mode 100644 roles/openstack/tasks/main.yml
 create mode 100644 roles/sql/tasks/main.yml
srhmshan@localmachine:~/HOA-13$ git push origin main
Enumerating objects: 24, done.
Counting objects: 100% (24/24), done.
Delta compression using up to 2 threads
Compressing objects: 100% (12/12), done.
Writing objects: 100% (24/24), 2.90 KiB | 742.00 KiB/s, done.
Total 24 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:srhmshan/HOA-13.git
 * [new branch]      main -> main
srhmshan@localmachine:~/HOA-13$
```

<https://github.com/srhmschan/HOA-13>

Reflections:

Answer the following:

1. What are the benefits of implementing OpenStack?

The benefits of using OpenStack allows for the adjustment of resources which can save costs by utilizing hardware and reducing the dependency on a single vendor. Its adaptable structure consists of services that can be customized to suit needs. Moreover, as an open-source platform, OpenStack promotes collaboration and encourages innovation. In addition, to its ability to integrate with technologies

OpenStack remains a choice for organizations looking for a cloud platform that provides flexibility and openness to meet their unique requirements among different options available, in the market.

Conclusions:

In this activity, I began by creating a repository called "HOA 13" and an Ansible playbook ("config.yml") to systematically install the necessary components, for OpenStack. The playbook methodically handled aspects like NTP OpenStack packages, SQL Database, Message Queue, Memcached and Etcd. It seamlessly incorporated installation approaches based on the type of server through inventory groups. To showcase what I have learned in Ansible, I provided verification for each installation using screenshots and explanations. In my analysis, I emphasized the benefits of implementing OpenStack focusing on its flexibility cost savings well as its collaborative and innovative nature. By committing to version control practices, I successfully added, committed and pushed the playbook to the GitHub repository. This demonstrates my approach to deployment and highlights my technical competence in utilizing Ansible.