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|---|---|
| **Name:** Angelo E. Zamora | **Date Performed:** 12-04-2024 |
| **Course/Section:** CpE31S2 | **Date Submitted:** 12-04-2024 |
| **Instructor:** Engr. Robin Valenzuela | **Semester and SY:** 1st Semester 2024 - 2025 |

**CPE212_Hands-on Final Exam**

## 1. Tools

1. VM with Ubuntu, CentOS and Ansible installed

2. Web browser

## 2. Procedure

1. Create a repository and label it as "Final_Exam_Surname"

2. Clone your new repository in your VM

3. Create an Ansible playbook that does the following with an input of a config.yml file and structure inventory file.

3.1 Install and configure one enterprise service that can be installed in Debian and Centos servers

3.2 Install and configure one monitoring tool that can be installed in Debian and Centos servers (if it is a stack there should be option of different host)

3.4 Change Motd as "Ansible Managed by <username>"

4. Push and commit your files in GitHub

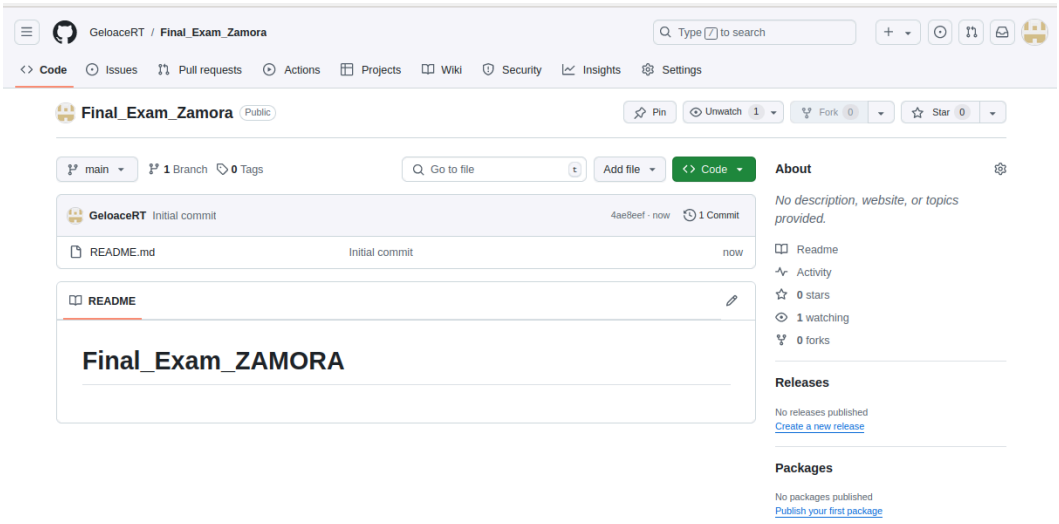
5. Make sure to show evidence of input (codes) process (codes successfully running) and output (evidence of installation)

6. For your final exam to be counted, please paste your repository link as an answer in this exam.

Note: Extra points if you will implement the said services via containerization.

**Output:**

1. Create a repository and label it as "Final_Exam_Surname"



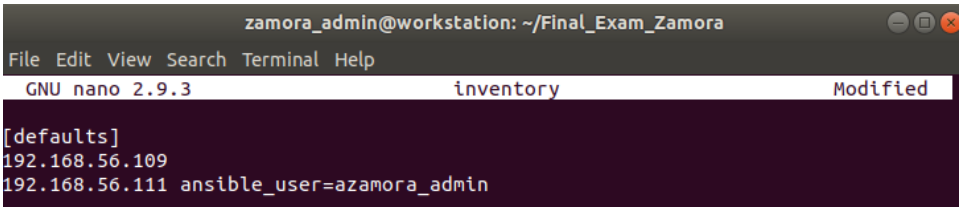

2. Clone your new repository in your VM

```
zamora_admin@workstation:~$ git clone git@github.com:GeloaceRT/Final_Exam_Zamora
.git
Cloning into 'Final_Exam_Zamora'...
Warning: Permanently added the ECDSA host key for IP address '4.237.22.38' to th
e list of known hosts.
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (3/3), done.
```

```
zamora_admin@workstation:~$ ls Final_Exam_Zamora/
README.md
zamora_admin@workstation:~$
```

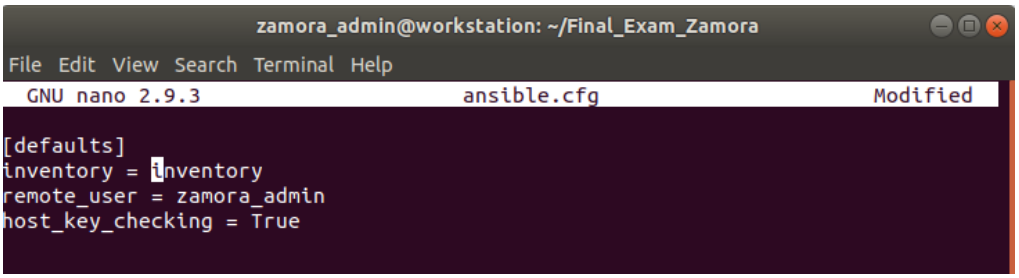
3. Create an Ansible playbook that does the following with an input of a config.yml file and structure inventory file.

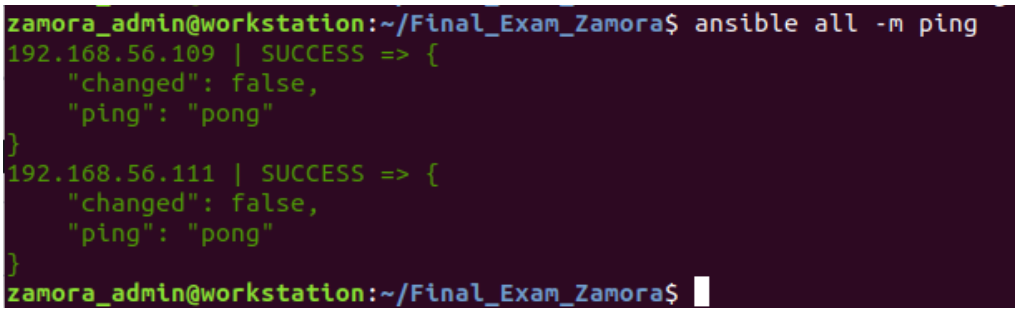
Inventory:




192.168.56.109 - Ubuntu Server 2
192.168.56.111 - CentOS Node 2

Ansible.cfg:



Config.yml:

```
zamora_admin@workstation: ~/Final_Exam_Zamora
File  Edit  View  Search  Terminal  Help
  GNU nano 2.9.3                        config.yml

---

- hosts: all
  become: true
  pre_tasks:

  - name: install updates (CentOS)
    tags: always
    dnf:
      name: "*"
      state: latest
    when: ansible_distribution == "CentOS"

  - name: install updates (Ubuntu)
    tags: always
    apt:
      upgrade: dist
      update_cache: yes
    when: ansible_distribution == "Ubuntu"

- hosts: all
  become: true
  roles:
      - prometheus
      - apache2
```

Roles:

```
zamora_admin@workstation:~/Final_Exam_Zamora$ tree roles
roles
├── apache2
│   └── tasks
└── prometheus
    └── tasks

4 directories, 0 files
zamora_admin@workstation:~/Final_Exam_Zamora$
```

3.1 Install and configure one enterprise service that can be installed in Debian and Centos servers

Role: apache2 playbook

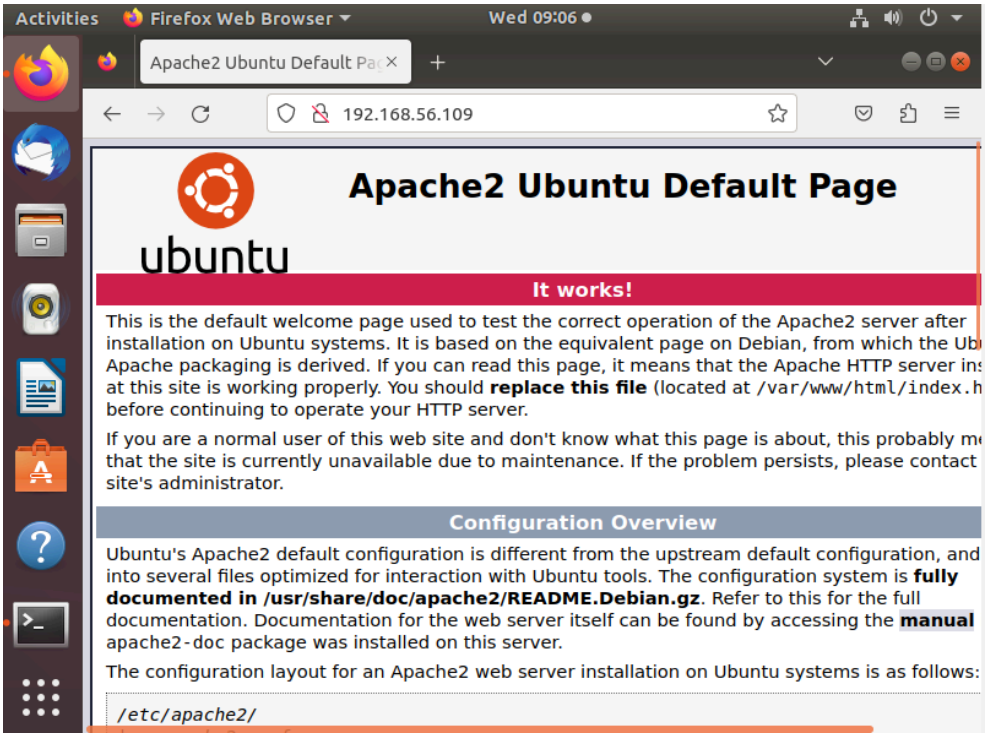
```
zamora_admin@workstation: ~/Final_Exam_Zamora/roles/apache2/tasks
File  Edit  View  Search  Terminal  Help
  GNU nano 2.9.3                                  main.yml

---

  - name: install apache and php for Ubuntu servers
    tags: apache2-ubuntu
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
      update_cache: yes
    when: ansible_distribution == "Ubuntu"

  - name: install apache and php for CentOS Servers
    tags: centos-httpd
    dnf:
      name:
        - httpd
        - php
      state: latest
    when: ansible_distribution == "CentOS"

  - name: start httpd (CentOS)
    tags: centos-httpd
    service:
      name: httpd
      state: started
      enabled: true
    when: ansible_distribution == "CentOS"
```

Running the Playbook:

Apache2 for Ubuntu:

```
zamora_admin@workstation:~/Final_Exam_Zamora$ ansible-playbook --tags apache2-ubuntu --ask-bec
me-pass config.yml
SUDO password:

PLAY [all] *********************************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [192.168.56.111]
ok: [192.168.56.109]

TASK [apache2 : install apache and php for Ubuntu servers] *********************************
skipping: [192.168.56.111]
ok: [192.168.56.109]

PLAY RECAP *********************************************************************************
192.168.56.109             : ok=2    changed=0    unreachable=0    failed=0
192.168.56.111             : ok=1    changed=0    unreachable=0    failed=0

zamora_admin@workstation:~/Final_Exam_Zamora$
```

Proof of Installation (Ubuntu):



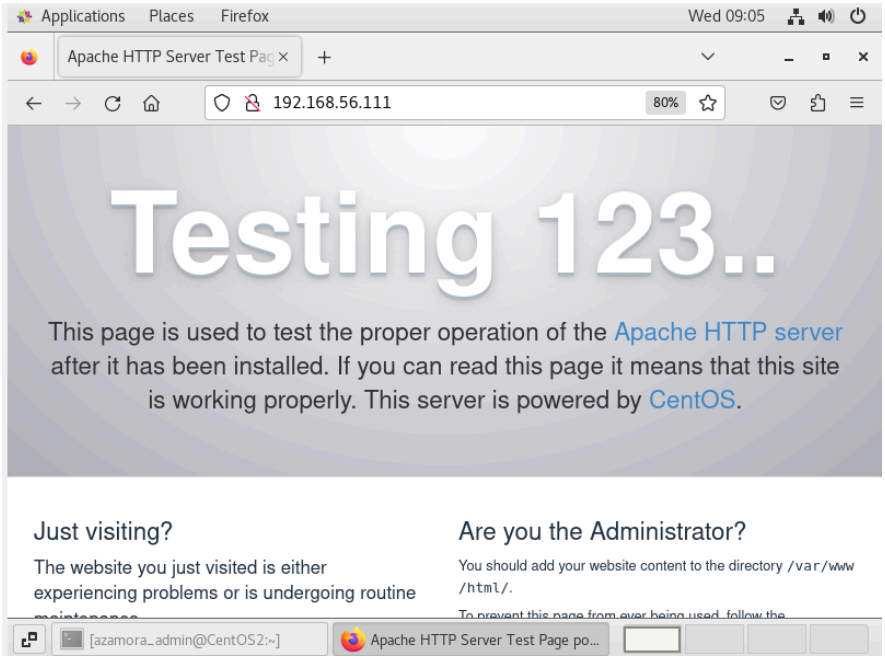

```
zamora_admin@server2:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset:
  Drop-In: /lib/systemd/system/apache2.service.d
           └─apache2-systemd.conf
   Active: active (running) since Wed 2024-12-04 08:55:13 +08; 13min ago
 Main PID: 2945 (apache2)
    Tasks: 27 (limit: 4656)
   CGroup: /system.slice/apache2.service
           ├─2945 /usr/sbin/apache2 -k start
           ├─3118 (wsgi:keystone-pu -k start
           ├─3119 (wsgi:keystone-pu -k start
           ├─3120 (wsgi:keystone-pu -k start
           ├─3121 (wsgi:keystone-pu -k start
           ├─3122 (wsgi:keystone-pu -k start
           ├─3124 /usr/sbin/apache2 -k start
           ├─3125 /usr/sbin/apache2 -k start
           ├─3126 /usr/sbin/apache2 -k start
           ├─3127 /usr/sbin/apache2 -k start
           ├─3128 /usr/sbin/apache2 -k start
           └─8735 /usr/sbin/apache2 -k start
```

```
zamora_admin@server2:~$ php --version
PHP 7.2.24-0ubuntu0.18.04.17 (cli) (built: Feb 23 2023 13:29:25) ( NTS )
Copyright (c) 1997-2018 The PHP Group
Zend Engine v3.2.0, Copyright (c) 1998-2018 Zend Technologies
    with Zend OPcache v7.2.24-0ubuntu0.18.04.17, Copyright (c) 1999-2018, by Ze
nd Technologies
zamora_admin@server2:~$
```

HTTPD for CentOS:

```
zamora_admin@workstation:~/Final_Exam_Zamora$ ansible-playbook --tags centos-httpd --ask-become
-pass config.yml
SUDO password:

PLAY [all] *********************************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [192.168.56.111]
ok: [192.168.56.109]

TASK [apache2 : install apache and php for CentOS Servers] *********************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

TASK [apache2 : start httpd (CentOS)] ******************************************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

PLAY RECAP *********************************************************************************
192.168.56.109             : ok=1    changed=0    unreachable=0    failed=0
192.168.56.111             : ok=3    changed=0    unreachable=0    failed=0

zamora_admin@workstation:~/Final_Exam_Zamora$
```

Proof of Installation (CentOS):

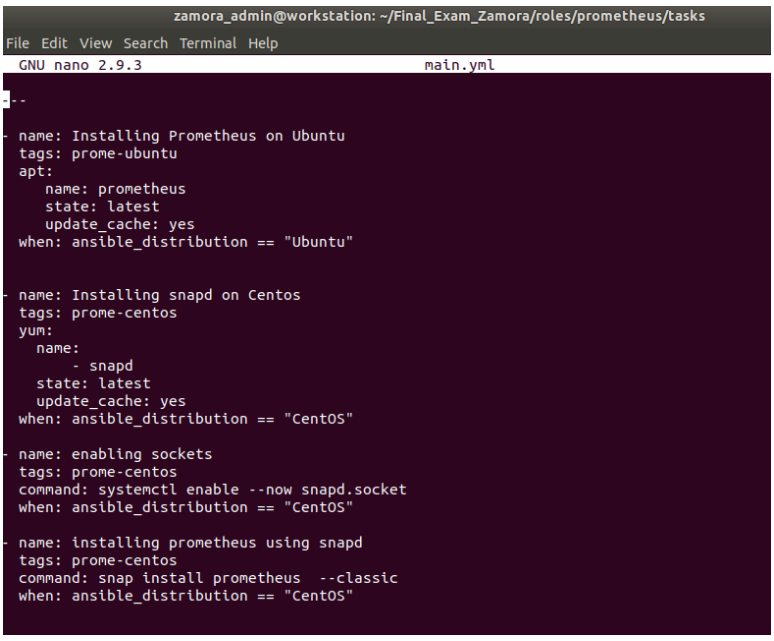


```
[azamora_admin@CentOS2 ~]$ systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disab
led)
   Active: active (running) since Wed 2024-12-04 08:07:17 PST; 59min ago
     Docs: man:httpd(8)
           man:apachectl(8)
 Main PID: 1181 (httpd)
   Status: "Total requests: 22; Current requests/sec: 0; Current traffic:   0 B/sec"
    Tasks: 8
   CGroup: /system.slice/httpd.service
           ├─1181 /usr/sbin/httpd -DFOREGROUND
           ├─2002 /usr/sbin/httpd -DFOREGROUND
           ├─2003 /usr/sbin/httpd -DFOREGROUND
           ├─2004 /usr/sbin/httpd -DFOREGROUND
           ├─2005 /usr/sbin/httpd -DFOREGROUND
           ├─2006 /usr/sbin/httpd -DFOREGROUND
           ├─2437 /usr/sbin/httpd -DFOREGROUND
           └─3847 /usr/sbin/httpd -DFOREGROUND

Dec 04 08:07:08 CentOS2 systemd[1]: Starting The Apache HTTP Server...
Dec 04 08:07:15 CentOS2 httpd[1181]: AH00558: httpd: Could not reliably determine ...ge
Dec 04 08:07:17 CentOS2 systemd[1]: Started The Apache HTTP Server.
Hint: Some lines were ellipsized, use -l to show in full.
[azamora_admin@CentOS2 ~]$
```

```
[azamora_admin@CentOS2 ~]$ php --version
PHP 5.4.16 (cli) (built: Apr  1 2020 04:07:17)
Copyright (c) 1997-2013 The PHP Group
Zend Engine v2.4.0, Copyright (c) 1998-2013 Zend Technologies
[azamora_admin@CentOS2 ~]$
```

3.2 Install and configure one monitoring tool that can be installed in Debian and Centos servers (if it is a stack there should be option of different host)

Prometheus Playbook:

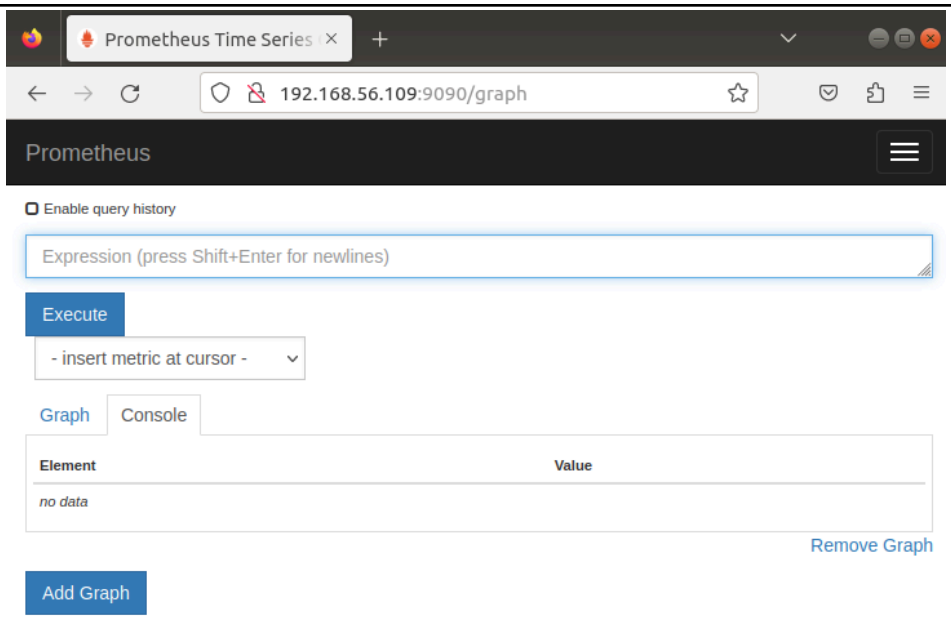


```
zamora_admin@workstation:~/Final_Exam_Zamora$ ansible-playbook --tags prome-ubuntu --ask-become
-pass config.yml
SUDO password:

PLAY [all] *********************************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [192.168.56.111]
ok: [192.168.56.109]

TASK [prometheus : Installing Prometheus on Ubuntu] ****************************************
skipping: [192.168.56.111]
ok: [192.168.56.109]

PLAY RECAP *********************************************************************************
192.168.56.109             : ok=2    changed=0    unreachable=0    failed=0
192.168.56.111             : ok=1    changed=0    unreachable=0    failed=0

zamora_admin@workstation:~/Final_Exam_Zamora$
```

```
zamora_admin@workstation:~/Final_Exam_Zamora$ ansible-playbook --tags prome-centos --ask-become
-pass config.yml
SUDO password:

PLAY [all] *********************************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [192.168.56.111]
ok: [192.168.56.109]

TASK [prometheus : Installing snapd on Centos] *********************************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

TASK [prometheus : enabling sockets] *******************************************************
skipping: [192.168.56.109]
changed: [192.168.56.111]

TASK [prometheus : installing prometheus using snapd] **************************************
skipping: [192.168.56.109]
changed: [192.168.56.111]

PLAY RECAP *********************************************************************************
192.168.56.109             : ok=1    changed=0    unreachable=0    failed=0
192.168.56.111             : ok=4    changed=2    unreachable=0    failed=0

zamora_admin@workstation:~/Final_Exam_Zamora$
```

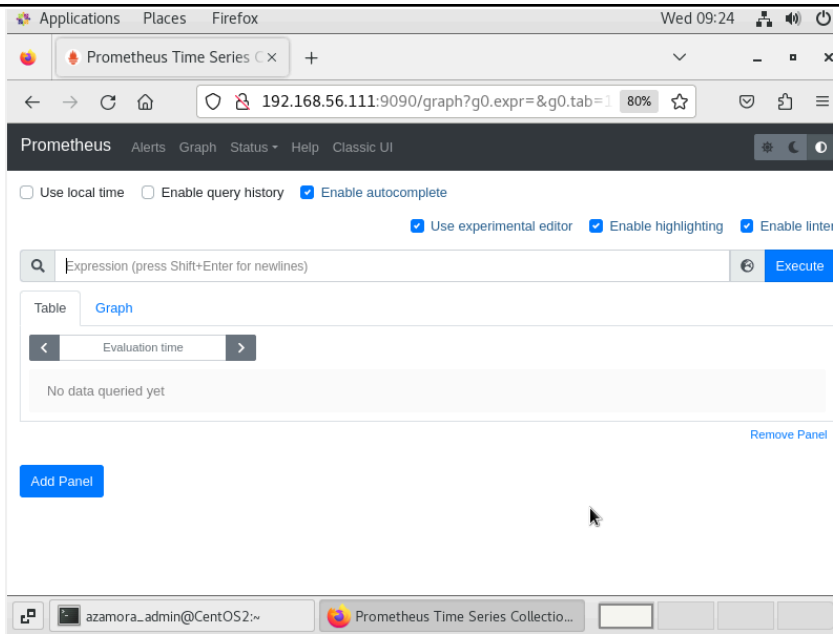
Proof of Installation (Ubuntu):

```
zamora_admin@server2:~$ systemctl status prometheus
● prometheus.service - Monitoring system and time series database
     Loaded: loaded (/lib/systemd/system/prometheus.service; enabled; vendor pres
     Active: active (running) since Wed 2024-12-04 08:55:00 +08; 26min ago
       Docs: https://prometheus.io/docs/introduction/overview/
   Main PID: 1321 (prometheus)
      Tasks: 12 (limit: 4656)
     CGroup: /system.slice/prometheus.service
             └─1321 /usr/bin/prometheus

Warning: Journal has been rotated since unit was started. Log output is incompl
lines 1-10/10 (END)
```




Proof of Installation (CentOS):

```
[azamora_admin@CentOS2 ~]$ systemctl status prometheus
● prometheus.service - Prometheus
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; vendor preset: disa
bled)
   Active: active (running) since Wed 2024-12-04 08:07:07 PST; 1h 16min ago
 Main PID: 1173 (prometheus)
    Tasks: 8
   CGroup: /system.slice/prometheus.service
           └─1173 /usr/local/bin/prometheus --config.file /etc/prometheus/prometheus...

Dec 04 08:07:36 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:36.532Z c...ml
Dec 04 08:07:36 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:36.533Z cal…µs
Dec 04 08:07:36 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:36.533Z c...."
Dec 04 08:07:44 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:44.674Z c...ms
Dec 04 08:07:44 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:44.675Z c…05µs
Dec 04 08:07:45 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:45.750Z c...ms
Dec 04 08:07:45 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:45.946Z c...KP
Dec 04 08:07:45 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:45.947Z c…88µs
Dec 04 08:07:45 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:45.947Z c...00
Dec 04 08:07:46 CentOS2 prometheus[1173]: level=info ts=2024-12-04T00:07:46.348Z c...ms
Hint: Some lines were ellipsized, use -l to show in full.
[azamora_admin@CentOS2 ~]$
```




Running the playbook as a whole:

```
zamora_admin@workstation:~/Final_Exam_Zamora$ ansible-playbook --ask-become-pass config.yml
SUDO password:

PLAY [all] *********************************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [192.168.56.109]
ok: [192.168.56.111]

TASK [update repository index / install Updates (CentOS)] **********************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

TASK [update repository index / install Updates (Ubuntu)] **********************************
skipping: [192.168.56.111]
ok: [192.168.56.109]
```

```
PLAY [all] *********************************************************************************

TASK [Gathering Facts] *********************************************************************
ok: [192.168.56.111]
ok: [192.168.56.109]

TASK [prometheus : Installing Prometheus on Ubuntu] ****************************************
skipping: [192.168.56.111]
ok: [192.168.56.109]

TASK [prometheus : Installing snapd on Centos] *********************************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

TASK [prometheus : enabling sockets] *******************************************************
skipping: [192.168.56.109]
changed: [192.168.56.111]

TASK [prometheus : installing prometheus using snapd] **************************************
skipping: [192.168.56.109]
changed: [192.168.56.111]

TASK [apache2 : install apache and php for Ubuntu servers] *********************************
skipping: [192.168.56.111]
ok: [192.168.56.109]

TASK [apache2 : install apache and php for CentOS Servers] *********************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

TASK [apache2 : start httpd (CentOS)] ******************************************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

PLAY RECAP *********************************************************************************
192.168.56.109             : ok=5    changed=0    unreachable=0    failed=0
192.168.56.111             : ok=8    changed=2    unreachable=0    failed=0
```

3.4 Change Motd as "Ansible Managed by <username>"

```
---
- hosts: all
  become: true
  pre_tasks:

  - name: update repository index / install Updates (CentOS)
    tags: always
    yum:
      name: "*"
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "CentOS"

  - name: update repository index / install Updates (Ubuntu)
    tags: always
    apt:
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "Ubuntu"

  - name: motd player
    copy:
        content: "Ansible Managed by Zamora\n"
        dest: /etc/motd

- hosts: all
  become: true
  roles:
      - prometheus
      - apache2
```

```
zamora_admin@workstation:~/Final_Exam_Zamora$ ansible-playbook --ask-become-pass config.yml
SUDO password:

PLAY [all] ********************************************************************************

TASK [Gathering Facts] ********************************************************************
ok: [192.168.56.109]
ok: [192.168.56.111]

TASK [update repository index / install Updates (CentOS)] *********************************
skipping: [192.168.56.109]
ok: [192.168.56.111]

TASK [update repository index / install Updates (Ubuntu)] *********************************
skipping: [192.168.56.111]
ok: [192.168.56.109]

TASK [motd player] ************************************************************************
changed: [192.168.56.109]
changed: [192.168.56.111]
```

Server 2:

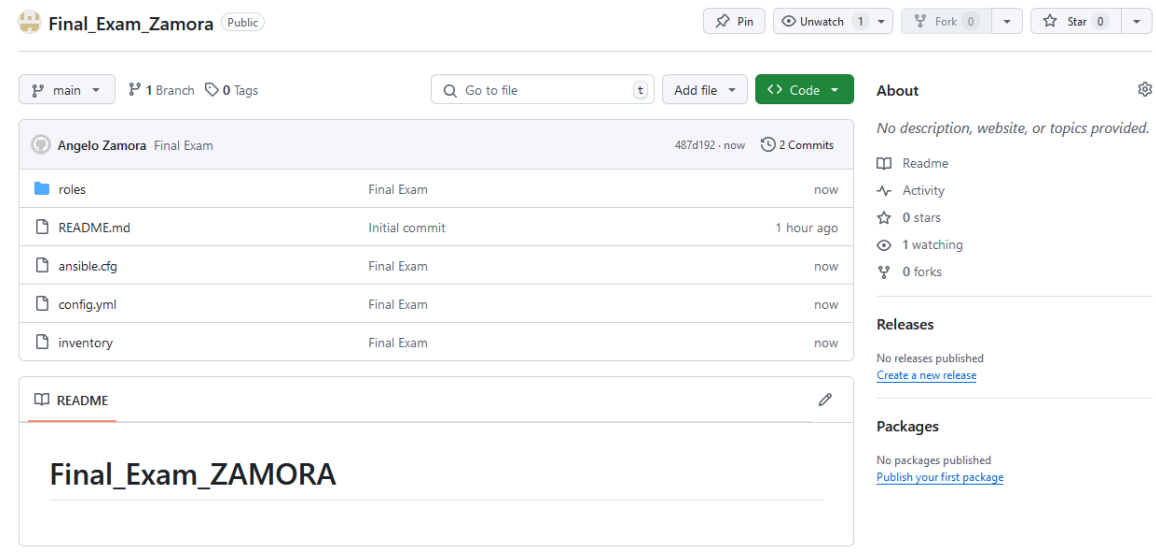
```
zamora_admin@workstation:~$ ssh zamora_admin@server2
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-150-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

Expanded Security Maintenance for Infrastructure is not enabled.

0 updates can be applied immediately.

267 additional security updates can be applied with ESM Infra.
Learn more about enabling ESM Infra service for Ubuntu 18.04 at
https://ubuntu.com/18-04

New release '20.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Your Hardware Enablement Stack (HWE) is supported until April 2023.
Ansible Managed by Zamora
Last login: Wed Dec  4 09:36:14 2024 from 192.168.56.107
zamora_admin@server2:~$
```

CentOS Node 2:

```
zamora_admin@workstation:~$ ssh azamora_admin@CentOS2
Last login: Wed Dec  4 09:36:18 2024 from 192.168.56.107
Ansible Managed by Zamora
[azamora_admin@CentOS2 ~]$
```

4. Push and commit your files in GitHub

```
zamora_admin@workstation:~/Final_Exam_Zamora$ git add *
zamora_admin@workstation:~/Final_Exam_Zamora$ git commit -m "Final Exam"
[main 487d192] Final Exam
 5 files changed, 95 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 config.yml
 create mode 100644 inventory
 create mode 100644 roles/apache2/tasks/main.yml
 create mode 100644 roles/prometheus/tasks/main.yml
zamora_admin@workstation:~/Final_Exam_Zamora$ git push
Counting objects: 12, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (12/12), 1.49 KiB | 763.00 KiB/s, done.
Total 12 (delta 0), reused 0 (delta 0)
To github.com:GeloaceRT/Final_Exam_Zamora.git
   4ae8eef..487d192  main -> main
zamora_admin@workstation:~/Final_Exam_Zamora$
```




GitHub Link: https://github.com/GeloaceRT/Final_Exam_Zamora

Note: Extra points if you will implement the said services via containerization.