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Activity 9: Install, Configure, and Manage Performance Monitoring tools

1. Objectives

Create and design a workflow that installs, configure and manage enterprise performance tools using Ansible as an Infrastructure as Code (IaC) tool.

2. Discussion

Performance monitoring is a type of monitoring tool that identifies current resource consumption of the workload, in this page we will discuss multiple performance monitoring tool.

Prometheus

Prometheus fundamentally stores all data as timeseries: streams of timestamped values belonging to the same metric and the same set of labeled dimensions. Besides stored time series, Prometheus may generate temporary derived time series as the result of queries. Source: Prometheus - Monitoring system & time series database

Cacti

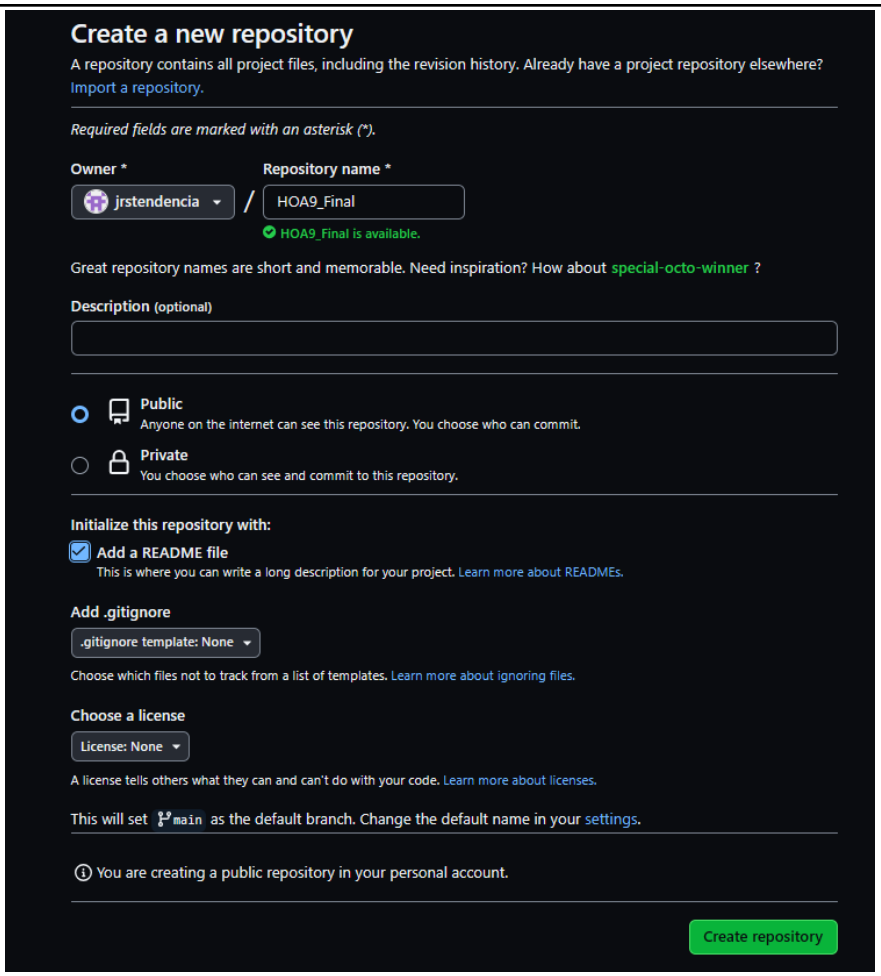
Cacti is a complete network graphing solution designed to harness the power of RRDTool's data storage and graphing functionality. Cacti provides a fast poller, advanced graph templating, multiple data acquisition methods, and user management features out of the box. All of this is wrapped in an intuitive, easy to use interface that makes sense for LAN-sized installations up to complex networks with thousands of devices. Source: Cacti® - The Complete RRDTool-based Graphing Solution

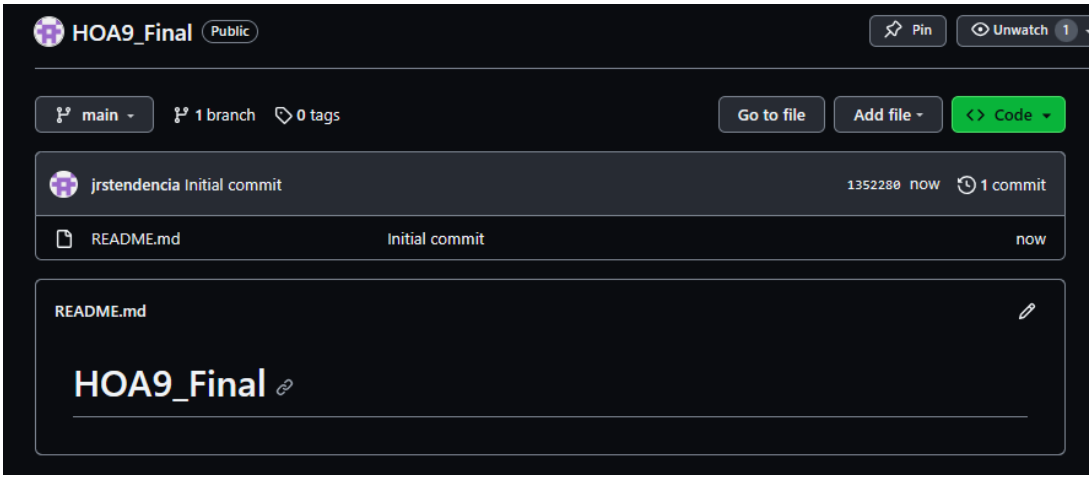
3. Tasks

1. Create a playbook that installs Prometheus in both Ubuntu and CentOS. Apply the concept of creating roles.
   (1 playbook for both Ubuntu and CentOS or 1 playbook for each tanggalin this)
2. Describe how you did step 1. (Provide screenshots and explanations in your report. Make your report detailed such that it will look like a manual.)
3. Show an output of the installed Prometheus for both Ubuntu and CentOS.
4. Make sure to create a new repository in GitHub for this activity.

4. Output (screenshots and explanations)

1. Create a new repository in Github.






```
tendencia@workstation:~$ git clone git@github.com:jrstendencia/HOA9_Final.git
Cloning into 'HOA9_Final'...
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.
```

Explanation: A new repository named HOA9_Final is created in Github for this activity.

2. Setup the ansible environment by creating an inventory file to specify the target hosts (Ubuntu and CentOS) to be configured. Also, create the ansible.cfg.

```
  GNU nano 6.2                                  inventory
[ubuntu_prometheus]
192.168.56.102

[centos_prometheus]
192.168.56.104
```

```
  GNU nano 6.2                                ansible.cfg
[defaults]

inventory = inventory
host_key_checking = False

deprecation_warnings = False

remote_user = tendencia
private_key_file = ~/.ssh/
```

3. Create a role for prometheus installation for Ubuntu and CentOS by generating the role structure. Then, create a directory named *tasks* that contains a *main.yml* file.

```
tendencia@workstation:~/HOA9_Final$ mkdir roles
tendencia@workstation:~/HOA9_Final$ cd roles
```

Ubuntu:

```
tendencia@workstation:~/HOA9_Final/roles$ mkdir ubuntu_prometheus
tendencia@workstation:~/HOA9_Final/roles$ cd ubuntu_prometheus
tendencia@workstation:~/HOA9_Final/roles/ubuntu_prometheus$ mkdir tasks
```

```
tendencia@workstation:~/HOA9_Final/roles/ubuntu_prometheus$ cd tasks
tendencia@workstation:~/HOA9_Final/roles/ubuntu_prometheus/tasks$ sudo nano main.yml
```

CentOS:

```
tendencia@workstation:~/HOA9_Final/roles$ mkdir centos_prometheus
```

```
tendencia@workstation:~/HOA9_Final/roles$ cd centos_prometheus
tendencia@workstation:~/HOA9_Final/roles/centos_prometheus$ mkdir tasks
```

```
tendencia@workstation:~/HOA9_Final/roles/centos_prometheus$ cd tasks
tendencia@workstation:~/HOA9_Final/roles/centos_prometheus/tasks$ sudo nano main.yml
[sudo] password for tendencia:
```

4. Inside the main.yml file, the script should define the tasks for Prometheus installation for both Ubuntu and CentOS.

   Ubuntu:

```
  GNU nano 6.2                                                main.yml
---
 - name: install Prometheus (Ubuntu)
   apt:
     name: prometheus
     state: latest

 - name: Prometheus Start/Enable Check
   service:
     name: prometheus
     state: restarted
     enabled: true

 - name: Apache Start/Enable Check
   service:
     name: prometheus
     state: restarted
     enabled: true
```

   CentOS:

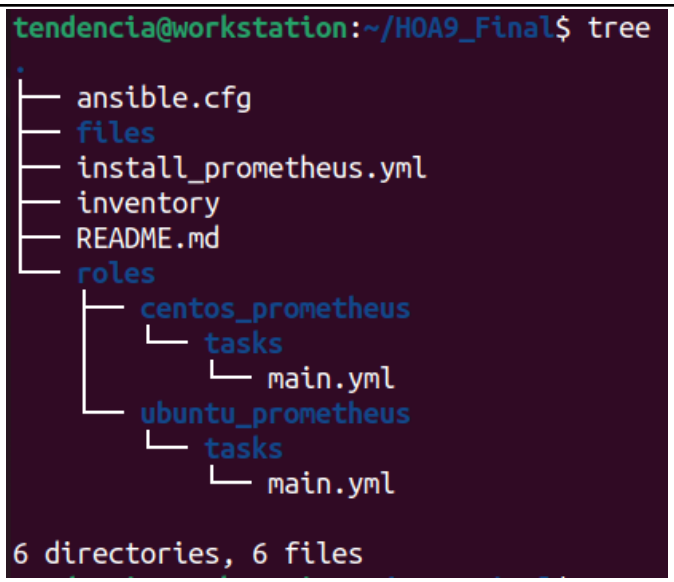
```
GNU nano 6.2                                                    main.yml *
---
- name: Prometheus PATH directory
  file:
    path: ~/prometheus
    state: directory


- name: Creating directory for Prometheus files
  file:
    path:
      - /etc/prometheus
      - /var/lib/prometheus
    mode: 0777
    state: directory

- name: Install Prometheus (CentOS)
  unarchive:
    src: https://github.com/prometheus/prometheus/releases/download/v2.8.1/prometheus-2.8.1.linux-amd64.tar.gz
    dest: ~/prometheus
    remote_src: yes
    mode: 0777
    owner: root
    group: root

- name: Configuring Prometheus
  shell: |
    cd ~/prometheus/prometheus*
    cp -r . /usr/local/bin/prometheus

- name: Prometheus config file duplicate
  copy:
    src: prometheus.service
    dest: /etc/systemd/system
    mode: 7777
    owner: root
    group: root

- name: Prometheus Start/Enable Check
  service:
    name: prometheus.service
    state: restarted
    enabled: true

- name: httpd Start/Enable Check
  service:
    name: httpd
    state: restarted
    enabled: true
```

5. Create a playbook in the current working directory. This playbook will use the Prometheus role.

```
tendencia@workstation:~/HOA9_Final$ sudo nano install_prometheus.yml
```

```yaml
---

- hosts: all
  become: true
  pre_tasks:

  - name: install updates (CentOS)
    package:
      update_only: yes
      update_cache: yes
    when: ansible_distribution == "CentOS"

  - name: install wget (CentOS)
    package:
      name: wget
      state: latest
    when: ansible_distribution == "CentOS"

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

- hosts: ubuntu_prometheus
  become: true
  roles:
    - ubuntu_prometheus

- hosts: centos_prometheus
  become: true
  roles:
    - centos_prometheus
```

Tree:



6. Run the playbook to install Prometheus on the target hosts using the command *ansible-playbook –ask-become-pass install_prometheus.yml*.

Error after running:

```
tendencia@workstation:~/HOA9_Final$ ansible-playbook --ask-become-pass install_prometheus.yml
BECOME password:

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

TASK [Gathering Facts] *********************************************************************************************************************
ok: [192.168.56.102]
ok: [192.168.56.104]

TASK [install updates (CentOS)] ************************************************************************************************************
skipping: [192.168.56.102]
ok: [192.168.56.104]

TASK [install wget (CentOS)] ***************************************************************************************************************
skipping: [192.168.56.102]
ok: [192.168.56.104]

TASK [install updates (Ubuntu)] ************************************************************************************************************
skipping: [192.168.56.104]
changed: [192.168.56.102]

PLAY [ubuntu_prometheus] *******************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************
ok: [192.168.56.102]

TASK [ubuntu_prometheus : install Prometheus (Ubuntu)] *************************************************************************************
ok: [192.168.56.102]

TASK [ubuntu_prometheus : Prometheus Start/Enable Check] ***********************************************************************************
changed: [192.168.56.102]

TASK [ubuntu_prometheus : Apache Start/Enable Check] ***************************************************************************************
changed: [192.168.56.102]
```

```
PLAY [centos_prometheus] *******************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************
ok: [192.168.56.104]

TASK [centos_prometheus : Prometheus PATH directory] ***************************************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : Creating directory for Prometheus files] *************************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : Install Prometheus (CentOS)] *************************************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : Configuring Prometheus] ******************************************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : Prometheus config file duplicate] ********************************************************************************
An exception occurred during task execution. To see the full traceback, use -vvv. The error was: If you are using a module and expec
t the file to exist on the remote, see the remote_src option
fatal: [192.168.56.104]: FAILED! => {"changed": false, "msg": "Could not find or access 'prometheus.service'\nSearched in:\n\t/home/
tendencia/HOA9_Final/roles/centos_prometheus/files/prometheus.service\n\t/home/tendencia/HOA9_Final/roles/centos_prometheus/promethe
us.service\n\t/home/tendencia/HOA9_Final/roles/centos_prometheus/tasks/files/prometheus.service\n\t/home/tendencia/HOA9_Final/roles/
centos_prometheus/tasks/prometheus.service\n\t/home/tendencia/HOA9_Final/files/prometheus.service\n\t/home/tendencia/HOA9_Final/prom
etheus.service on the Ansible Controller.\nIf you are using a module and expect the file to exist on the remote, see the remote_src
option"}

PLAY RECAP *********************************************************************************************************************************
192.168.56.102             : ok=6    changed=3    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.104             : ok=8    changed=4    unreachable=0    failed=1    skipped=1    rescued=0    ignored=0
```

So I created a *files* directory and then a file named *prometheus.service* in it to solve the error.

```
tendencia@workstation:~/HOA9_Final/roles/centos_prometheus$ mkdir files
tendencia@workstation:~/HOA9_Final/roles/centos_prometheus$ cd files
```

```
tendencia@workstation:~/HOA9_Final/roles/centos_prometheus/files$ sudo nano prometheus.service
```

```
  GNU nano 6.2                                    prometheus.service *
[Unit]
Description=Prometheus
After=network.target

[Service]
ExecStart=/usr/local/bin/prometheus --config.file=/opt/prometheus/prometheus.yml --storage.tsdb.path=/opt/prometheus/data --web.con>
Restart=always

[Install]
WantedBy=multi-user.target
```

Here’s the new tree:

```
tendencia@workstation:~/HOA9_Final$ tree
.
├── ansible.cfg
├── install_prometheus.yml
├── inventory
├── README.md
└── roles
    ├── centos_prometheus
    │   ├── files
    │   │   └── prometheus.service
    │   └── tasks
    │       └── main.yml
    └── ubuntu_prometheus
        └── tasks
            └── main.yml

6 directories, 7 files
```

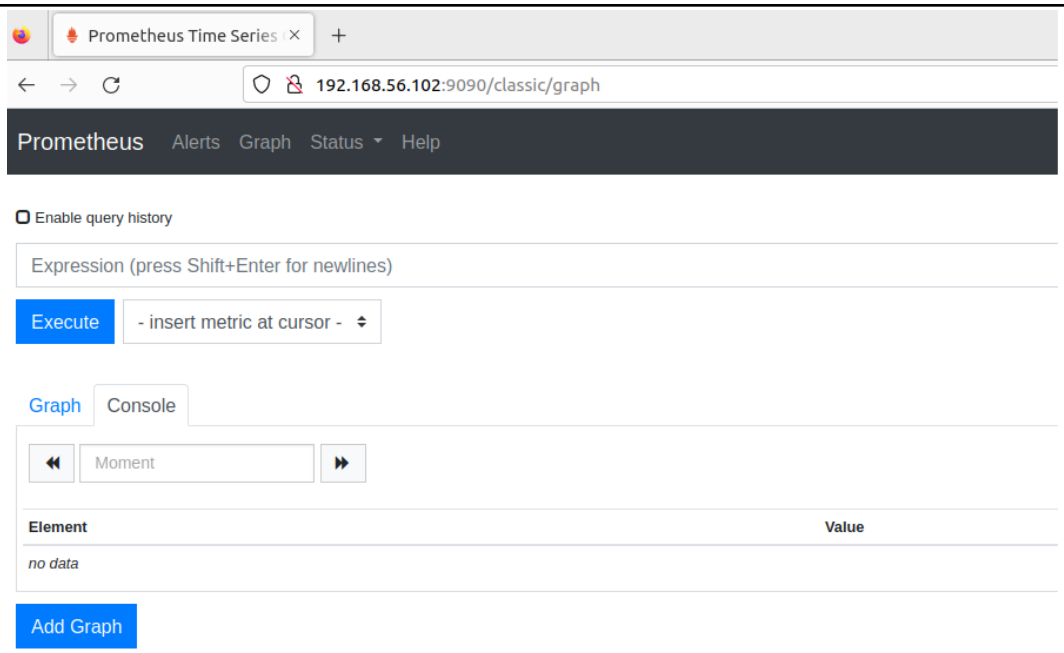
Another run:

```
tendencia@workstation:~/HOA9_Final$ ansible-playbook --ask-become-pass install_prometheus.yml
BECOME password:

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

TASK [Gathering Facts] *********************************************************************************************************
ok: [192.168.56.102]
ok: [192.168.56.104]

TASK [install updates (CentOS)] ************************************************************************************************
skipping: [192.168.56.102]
ok: [192.168.56.104]

TASK [install wget (CentOS)] ***************************************************************************************************
skipping: [192.168.56.102]
ok: [192.168.56.104]

TASK [install updates (Ubuntu)] ************************************************************************************************
skipping: [192.168.56.104]
ok: [192.168.56.102]

PLAY [ubuntu_prometheus] *******************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************
ok: [192.168.56.102]

TASK [ubuntu_prometheus : install Prometheus (Ubuntu)] *************************************************************************
ok: [192.168.56.102]

TASK [ubuntu_prometheus : Prometheus Start/Enable Check] ***********************************************************************
changed: [192.168.56.102]

TASK [ubuntu_prometheus : Apache Start/Enable Check] ***************************************************************************
changed: [192.168.56.102]
```

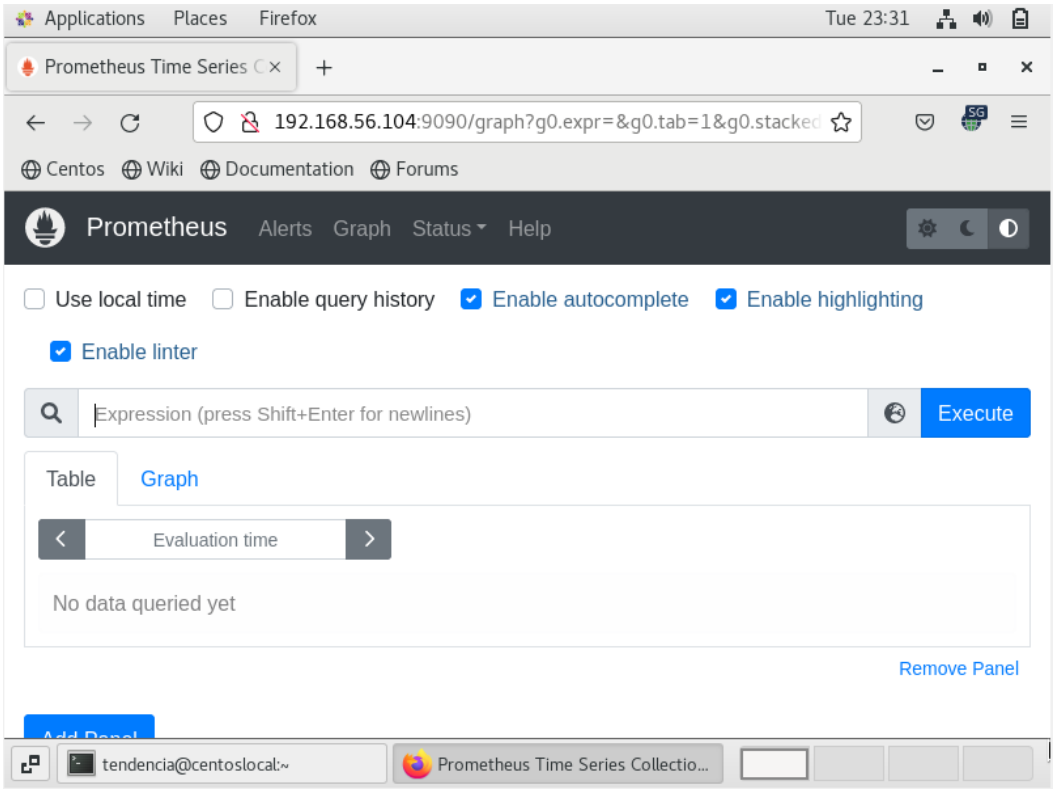
```
PLAY [centos_prometheus] *******************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************
ok: [192.168.56.104]

TASK [centos_prometheus : Prometheus PATH directory] ***************************************************************************
ok: [192.168.56.104]

TASK [centos_prometheus : Creating directory for Prometheus files] *************************************************************
ok: [192.168.56.104]

TASK [centos_prometheus : Install Prometheus (CentOS)] *************************************************************************
ok: [192.168.56.104]

TASK [centos_prometheus : Configuring Prometheus] ******************************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : Prometheus config file duplicate] ********************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : Prometheus Start/Enable Check] ***********************************************************************
changed: [192.168.56.104]

TASK [centos_prometheus : httpd Start/Enable Check] ****************************************************************************
changed: [192.168.56.104]

PLAY RECAP *********************************************************************************************************************
192.168.56.102             : ok=6    changed=2    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.104             : ok=11   changed=4    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
```

7. Verify prometheus installation by accessing both Ubuntu and CentOS browsers by typing *https://<host-ip>:9090*.

Ubuntu:



CentOS:



Unable to connect at first, but after everything I've done from changing the code in the prometheus.service and bringing back the previous script to fixing the SELinux

security yet the issue persists, it only needs an update with the use of the command *sudo yum update -y* which made the prometheus active and running.

8. Sync the changes in Github.

```
tendencia@workstation:~/HOA9_Final$ git add *
tendencia@workstation:~/HOA9_Final$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   ansible.cfg
        new file:   install_prometheus.yml
        new file:   inventory
        new file:   roles/centos_prometheus/files/prometheus.service
        new file:   roles/centos_prometheus/tasks/main.yml
        new file:   roles/ubuntu_prometheus/tasks/main.yml

tendencia@workstation:~/HOA9_Final$ git commit -m "Updates"
[main e6f4588] Updates
 6 files changed, 122 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 install_prometheus.yml
 create mode 100644 inventory
 create mode 100644 roles/centos_prometheus/files/prometheus.service
 create mode 100644 roles/centos_prometheus/tasks/main.yml
 create mode 100644 roles/ubuntu_prometheus/tasks/main.yml
tendencia@workstation:~/HOA9_Final$ git push origin main
Enumerating objects: 15, done.
Counting objects: 100% (15/15), done.
Delta compression using up to 2 threads
Compressing objects: 100% (10/10), done.
Writing objects: 100% (14/14), 1.81 KiB | 265.00 KiB/s, done.
Total 14 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:jrstendencia/HOA9_Final.git
   1352280..e6f4588  main -> main
tendencia@workstation:~/HOA9_Final$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
tendencia@workstation:~/HOA9_Final$
```

Repository Link: *https://github.com/jrstendencia/HOA9_Final.git*

Reflections:

Answer the following:

1. What are the benefits of having a performance monitoring tool?
   - Performance monitoring tools like Prometheus provide real-time visibility, proactive issue detection, resource optimization, and capacity planning for IT systems. They enable trend analysis and efficient troubleshooting, ensuring

reliability and minimizing downtime. These tools support service-level monitoring, custom metrics, and integration with other tools, backed by open-source communities for scalability. Additionally, they aid in maintaining security and compliance standards, making them essential for managing and maintaining complex systems and applications effectively.

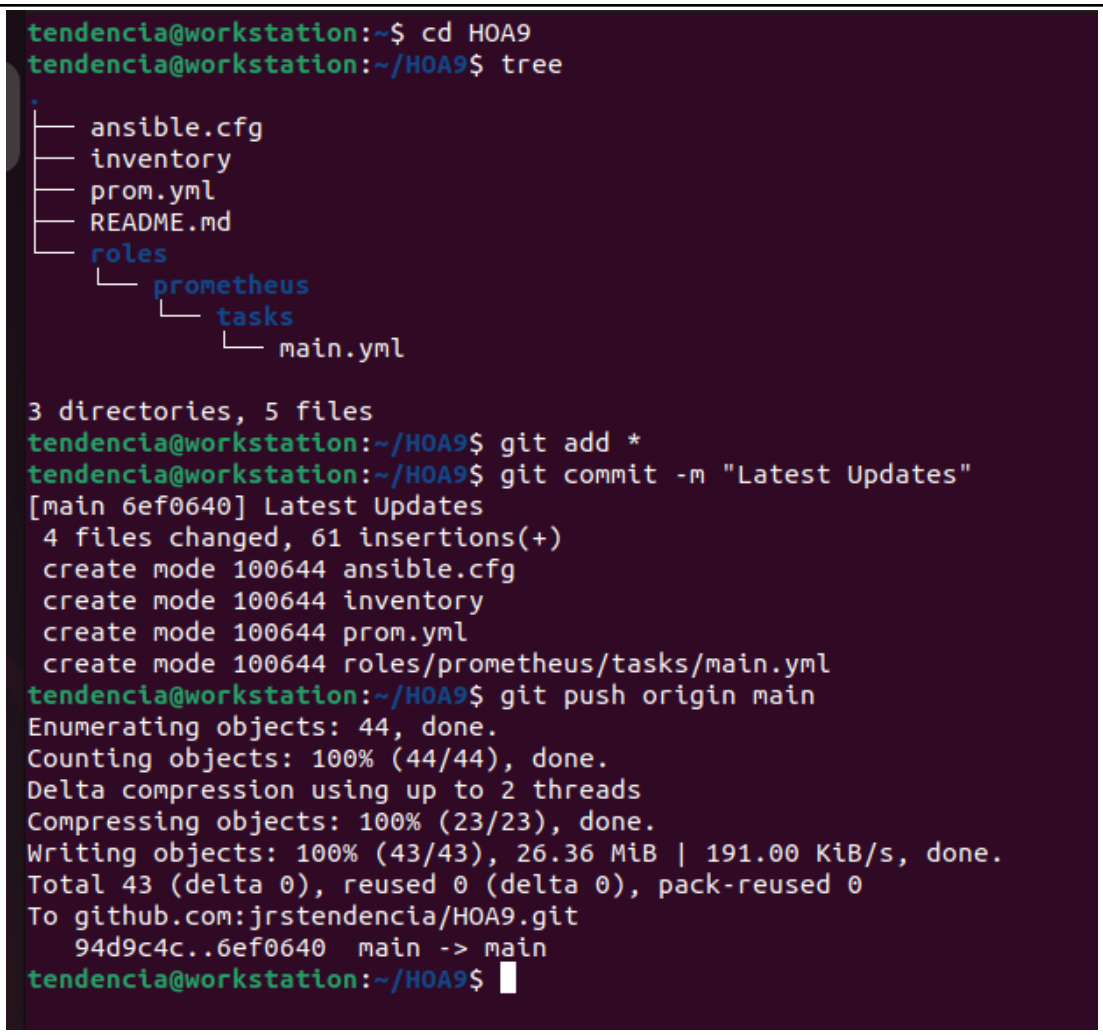
Conclusion:

In this activity, it revolves around the creation of a workflow using Ansible as an Infrastructure as Code (IaC) tool to install, configure, and manage enterprise performance monitoring tools specifically a performance monitoring tool, *Prometheus*, as a time-series database, excels in storing and analyzing data with a focus on metric data and labeled dimensions, making it a valuable tool for monitoring systems and applications.

The project's tasks involve creating an Ansible playbook that installs Prometheus on both Ubuntu and CentOS, leveraging the use of roles to ensure reusability and maintainability. This playbook is detailed enough in its execution, including screenshots and explanations, making it akin to a manual for reference. Finally, the project will conclude with a demonstration of the installed Prometheus on both Ubuntu and CentOS, showcasing the successful implementation of performance monitoring using Ansible. To maintain version control and facilitate collaboration, a dedicated GitHub repository will be created to host the project's code and documentation.

Another way (more effective to activate prometheus):

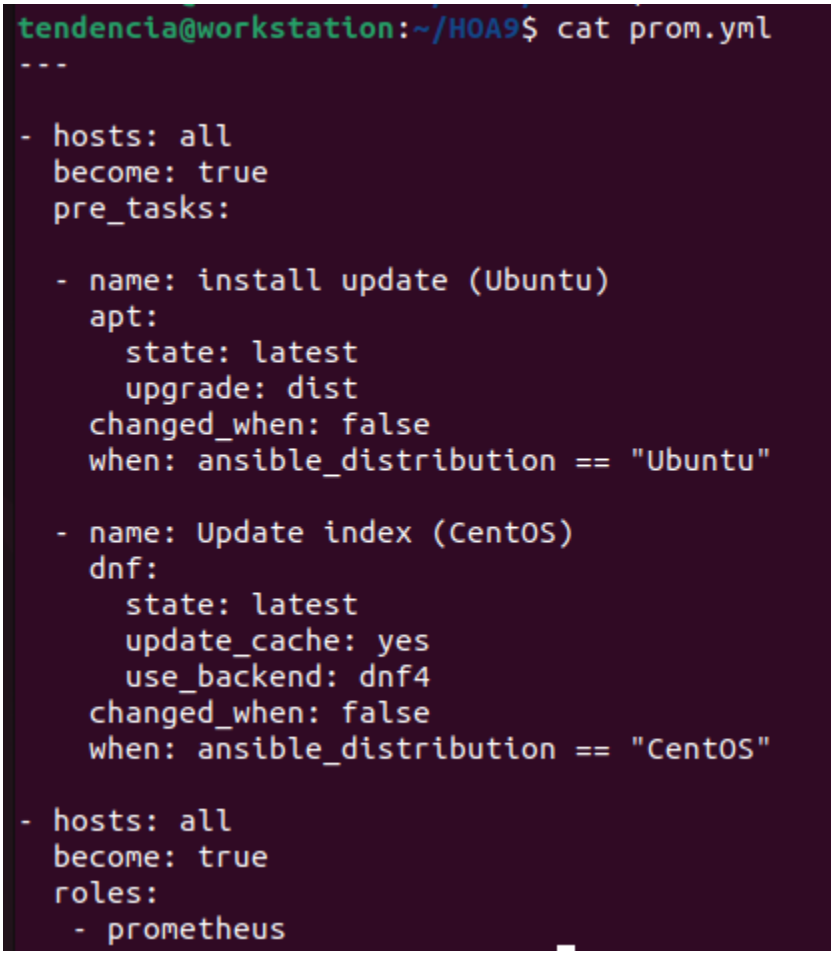
tree:


tendencia@workstation:~$ cd HOA9
tendencia@workstation:~/HOA9$ tree
.
├── ansible.cfg
├── inventory
├── prom.yml
├── README.md
└── roles
    └── prometheus
        └── tasks
            └── main.yml
3 directories, 5 files
tendencia@workstation:~/HOA9$ git add *
tendencia@workstation:~/HOA9$ git commit -m "Latest Updates"
[main 6ef0640] Latest Updates
 4 files changed, 61 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 prom.yml
 create mode 100644 roles/prometheus/tasks/main.yml
tendencia@workstation:~/HOA9$ git push origin main
Enumerating objects: 44, done.
Counting objects: 100% (44/44), done.
Delta compression using up to 2 threads
Compressing objects: 100% (23/23), done.
Writing objects: 100% (43/43), 26.36 MiB | 191.00 KiB/s, done.
Total 43 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:jrstendencia/HOA9.git
   94d9c4c..6ef0640 main -> main
tendencia@workstation:~/HOA9$

roles:

```
tendencia@workstation:~/HOA9$ roles/prometheus/tasks/main.yml
bash: roles/prometheus/tasks/main.yml: Permission denied
tendencia@workstation:~/HOA9$ roles/prometheus/tasks
bash: roles/prometheus/tasks: Is a directory
tendencia@workstation:~/HOA9$ cd roles/prometheus/tasks
tendencia@workstation:~/HOA9/roles/prometheus/tasks$ cat main.yml
---

  - name: Installing Prometheus for (Ubuntu)
    apt:
      name: prometheus
      state: latest
    when: ansible_distribution == "Ubuntu"

  - name: Install Prometheus for (CentOS)
    dnf:
      name:
       - epel-release
       - snapd
      state: latest
      use_backend: dnf4
    when: ansible_distribution == "CentOS"

  - name: Enabling snapd (CentOS)
    command: systemctl enable --now snapd.socket
    when: ansible_distribution == "CentOS"

  - name: Prometheus for CentOS
    command: snap install prometheus --classic
    when: ansible_distribution == "CentOS"
```

main playbook:


tendencia@workstation:~/HOA9$ cat prom.yml

- hosts: all
become: true
pre_tasks:
- name: install update (Ubuntu)
apt:
state: latest
upgrade: dist
changed_when: false
when: ansible_distribution == "Ubuntu"
- name: Update index (CentOS)
dnf:
state: latest
update_cache: yes
use_backend: dnf4
changed_when: false
when: ansible_distribution == "CentOS"
- hosts: all
become: true
roles:
- prometheus