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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

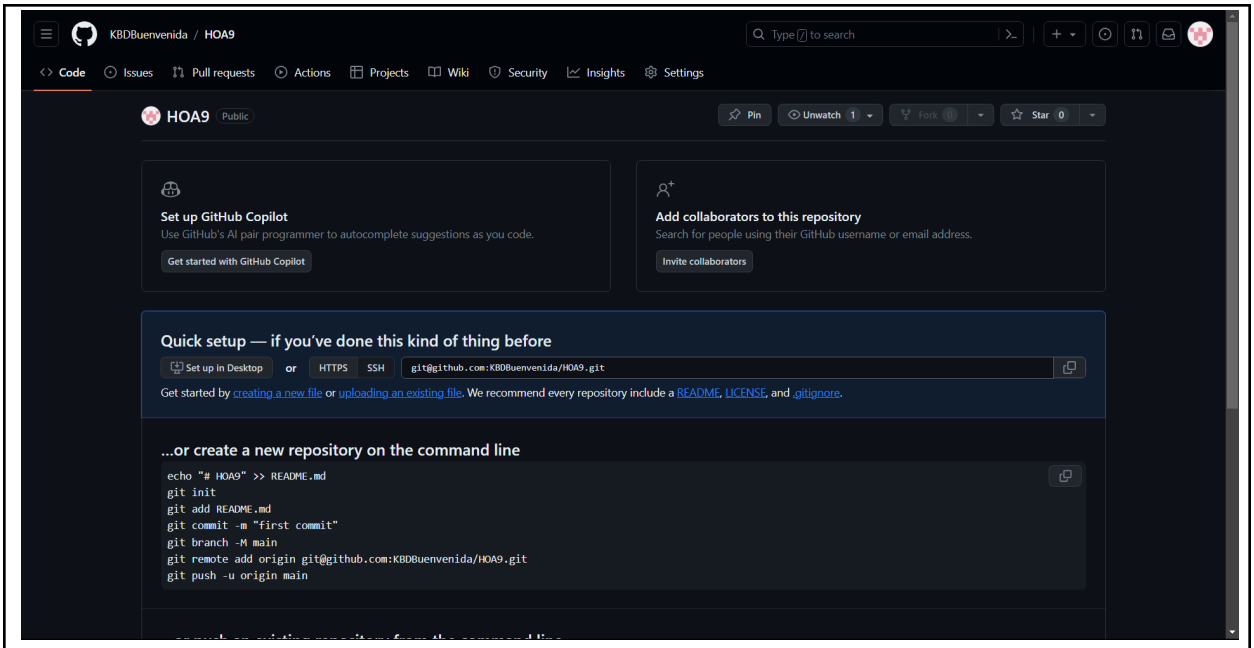
3. Tasks

1. Create a playbook that installs Prometheus in both Ubuntu and CentOS. Apply the concept of creating roles.
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 playbook that installs Prometheus in both Ubuntu and CentOS. Apply the concept of creating roles.

Step 1: Create a Repository



Step 2: Clone the repository you just created

INPUT	`ken@controlNode:~$ git clone git@github.com:KBDBuenvenida/HOA9.git`

PROCESS	`ken@controlNode:~$ git clone git@github.com:KBDBuenvenida/HOA9.git`
	`Cloning into 'HOA9'...`
	`warning: You appear to have cloned an empty repository.`

OUTPUT	`ken@controlNode:~$ ls`
	`ansible  Buenvenida_HOA6  Buenvenida_HOA8  CPE232_Buenvenida  Documents  HOA9`
	`ansible-workspace  Buenvenida_HOA7  Buenvenida_PrelimExam  Desktop  Downloads  inventory`

Step 3: Change your current working directory to the repository you just created.

```
ken@controlNode:~$ cd HOA9
```

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.)

Step 4: Create an inventory

INPUT	`ken@controlNode:~/HOA9$ sudo nano inventory`

PROCESS	GNU nano 6.2 [Ubuntu] 192.168.56.102 [CentOS] 192.168.56.106

OUTPUT	ken@controlNode:~/HOA9$ ansible -m ping all
	192.168.56.102 | SUCCESS => {
	"ansible_facts": {
	"discovered_interpreter_python": "/usr/bin/python3"
	},
	"changed": false,
	"ping": "pong"
	}
	192.168.56.106 | SUCCESS => {
	"ansible_facts": {
	"discovered_interpreter_python": "/usr/libexec/platform-python"
	},
	"changed": false,
	"ping": "pong"

Step 5: Create an ansible.cfg

INPUT	ken@controlNode:~/HOA9$ sudo nano ansible.cfg
OUTPUT	GNU nano 6.2 [defaults] inventory = inventory host_key_checking = False deprecation_warnings= False remote_user = ken private_key_file = ~/.ssh/

Step 6: Create prometheus.yml

INPUT	ken@controlNode:~/HOA9$ sudo nano prometheus.yml

PROCESS	GNU nano 6.2
	`---`
	`- hosts: all`
	`  become: true`
	`  tasks:`
	`  roles:`
	`  - prometheus`

OUTPUT	`ken@controlNode:~/HOA9$ ansible-playbook --ask-become-pass prometheus.yml`
	`BECOME password:`
	`ERROR! the role 'prometheus' was not found in /home/ken/HOA9/roles:/home/ken/.ansible/roles:/usr/sh`
	`les:/home/ken/HOA9`
	
	`The error appears to be in '/home/ken/HOA9/prometheus.yml': line 6, column 7, but may`
	`be elsewhere in the file depending on the exact syntax problem.`
	
	`The offending line appears to be:`
	
	`  roles:`
	`  - prometheus`
	`  ^ here`

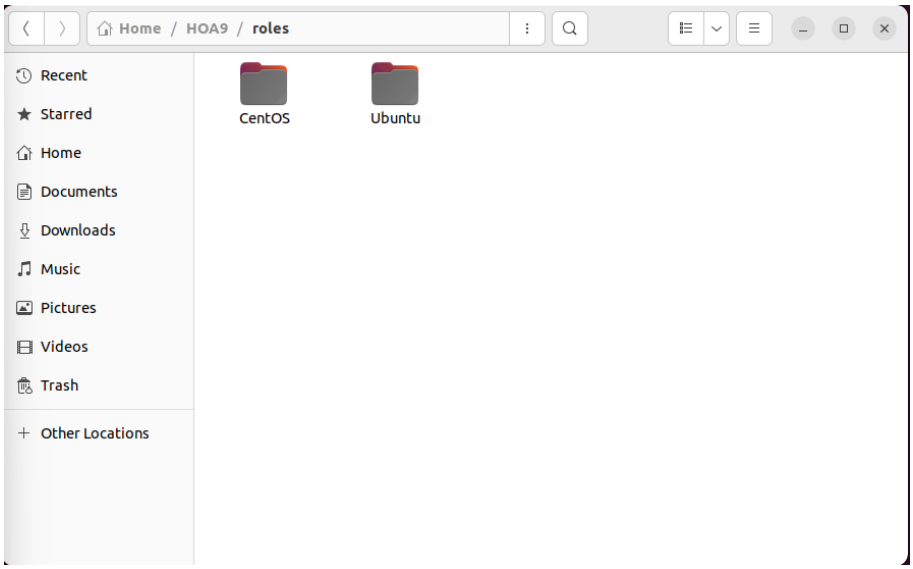
EXPLANATION	**The reason why it didn't work yet is because the main.yml doesn't exist yet.**

Step 7: Create a directory inside named "roles"

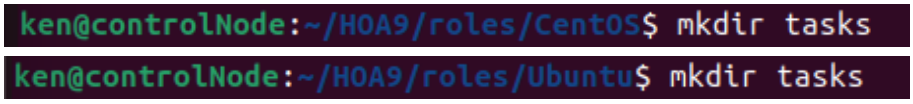
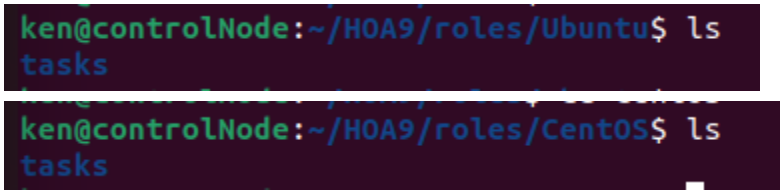
INPUT	`ken@controlNode:~/HOA9$ mkdir roles`
PROCESS	`ken@controlNode:~/HOA9$ ls` `ansible.cfg  inventory  prometheus.yml  roles`
OUTPUT	`ken@controlNode:~/HOA9$ cd roles` `ken@controlNode:~/HOA9/roles$`

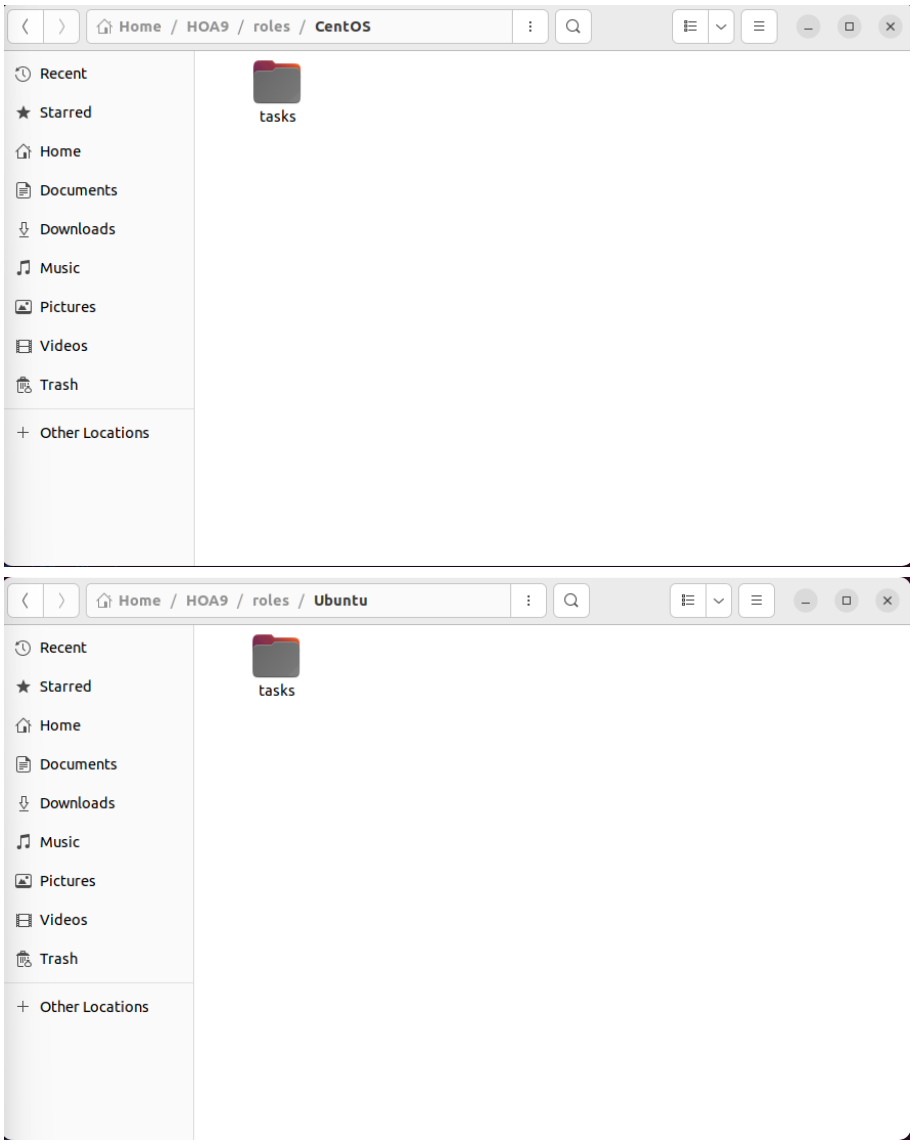
Step 8: Create a directory again inside "roles" named "Ubuntu" and "CentOS"

INPUT	`ken@controlNode:~/HOA9/roles$ mkdir Ubuntu` `ken@controlNode:~/HOA9/roles$ mkdir CentOS`
PROCESS	`ken@controlNode:~/HOA9/roles$ ls` `CentOS  Ubuntu`

OUTPUT	

Step 9: Create a directory again but this time inside the Ubuntu and CentOS and name it “tasks”

INPUT	
PROCESS	

OUTPUT	

Step 10: Create main.yml inside “tasks” directory for Ubuntu

INPUT	`ken@controlNode:~/HOA9/roles/Ubuntu/tasks$ sudo nano main.yml`

PROCESS

```
---
- name: Install Package for Prometheus (Ubuntu)
  apt:
    name:
      - nginx
      - wget
      - python3-jmespath
    state: latest

- name: Directory for extraction of Prometheus
  file:
    path: ~/prometheus
    state: directory

- name: Download Prometheus (Ubuntu)
  unarchive:
    src: https://github.com/prometheus/prometheus/releases/download/v2.43.0/prometheus-2.43.0.linux-amd64.tar.gz
    dest: ~/prometheus
    remote_src: yes
    mode: 0777
    owner: root
    group: root

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

- name: Import additional files for Prometheus
  copy:
    src: prometheus.service
    dest: /etc/systemd/system
    mode: 777
    owner: root
    group: root
```

OUTPUT

```
ken@controlNode:~/HOA9$ ansible-playbook --ask-become-pass prometheus.yml
BECOME password:

PLAY [Ubuntu] ***********************************************************************************************************************************

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

TASK [Ubuntu : Install Package for Prometheus (Ubuntu)] *****************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Directory for extraction of Prometheus] ******************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Download Prometheus (Ubuntu)] ****************************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Executable for Prometheus] *******************************************************************************************************
changed: [192.168.56.102]

TASK [Ubuntu : Import additional files for Prometheus] ******************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Verification of Prometheus if installed] *****************************************************************************************
changed: [192.168.56.102]

PLAY [CentOS] ***********************************************************************************************************************************

TASK [Gathering Facts] **************************************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Install Package for Prometheus (CentOS)] *****************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Import Prometheus GPG key if not installed (CentOS)] *****************************************************************************
skipping: [192.168.56.106]

TASK [CentOS : Install Prometheus (CentOS)] *****************************************************************************************************
skipping: [192.168.56.106]
```

```
PLAY [CentOS] ***********************************************************************************************************************************

TASK [Gathering Facts] **************************************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Directory for Prometheus] ********************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Download Prometheus for CentOS] **************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Exec File for Prometheus] ********************************************************************************************************
fatal: [192.168.56.106]: FAILED! => {"changed": true, "cmd": "cd ~/prometheus/prometheus*\ncp -r . /usr/local/bin/prometheus\n", "de
lta": "0:00:00.004459", "end": "2023-10-10 08:21:15.376800", "msg": "non-zero return code", "rc": 1, "start": "2023-10-10 08:21:15.3
72341", "stderr": "cp: cannot overwrite non-directory '/usr/local/bin/prometheus' with directory '.'", "stderr_lines": ["cp: cannot
overwrite non-directory '/usr/local/bin/prometheus' with directory '.'"], "stdout": "", "stdout_lines": []}

PLAY RECAP **************************************************************************************************************************************
192.168.56.102             : ok=7    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
192.168.56.106             : ok=3    changed=0    unreachable=0    failed=1    skipped=0    rescued=0    ignored=0
```

Step 11: Create main.yml for CentOS

INPUT

```
ken@controlNode:~/HOA9/roles/CentOS/tasks$ sudo nano main.yml
```

PROCESS

```
---
- name: Directory for Prometheus
  file:
    path: ~/prometheus
    state: directory

- name: Download Prometheus for CentOS
  unarchive:
    src: https://github.com/prometheus/prometheus/releases/download/v2.31.2/prometheus-2.31.2.linux-amd64.tar.gz
    dest: ~/prometheus
    remote_src: yes
    mode: 0777
    owner: root
    group: root

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

- name: Import Additional files for Prometheus
  copy:
    src: prometheus.service
    dest: /etc/systemd/system
    mode: 777
    owner: root
    group: root

- name: Verification of Installation of Prometheus
  service:
    name: prometheus
    state: restarted
    enabled: true
```

OUTPUT

```
ken@controlNode:~/HOA9$ ansible-playbook --ask-become-pass prometheus.yml
BECOME password:

PLAY [Ubuntu] ******************************************************************************************************************************

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

TASK [Ubuntu : Install Package for Prometheus (Ubuntu)] ************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Directory for extraction of Prometheus] *************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Download Prometheus (Ubuntu)] ***********************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Executable for Prometheus] **************************************************************************************************
changed: [192.168.56.102]

TASK [Ubuntu : Import additional files for Prometheus] *************************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Verification of Prometheus if installed] ************************************************************************************
changed: [192.168.56.102]
```

```
TASK [Ubuntu : Verification of Prometheus if installed] ************************************************************************************
changed: [192.168.56.102]

PLAY [CentOS] ******************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Directory for Prometheus] ***************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Download Prometheus for CentOS] *********************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Import Additional files for Prometheus] *************************************************************************************
changed: [192.168.56.106]

TASK [CentOS : Verification of Installation of Prometheus] *********************************************************************************
changed: [192.168.56.106]

PLAY RECAP *********************************************************************************************************************************
192.168.56.102             : ok=7    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
192.168.56.106             : ok=5    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Step 12: Run the playbook and test it if works

INPUT

```
ken@controlNode:~/HOA9$ ansible-playbook --ask-become-pass prometheus.yml
```

PROCESS

```yaml
---
- name: Install Package for Prometheus (Ubuntu)
  apt:
    name:
      - nginx
      - wget
      - python3-jmespath
    state: latest

- name: Directory for extraction of Prometheus
  file:
    path: ~/prometheus
    state: directory

- name: Download Prometheus (Ubuntu)
  unarchive:
    src: https://github.com/prometheus/prometheus/releases/download/v2.43.0/prometheus-2.43.0.linux-amd64.tar.gz
    dest: ~/prometheus
    remote_src: yes
    mode: 0777
    owner: root
    group: root

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

- name: Import additional files for Prometheus
  copy:
    src: prometheus.service
    dest: /etc/systemd/systen
    mode: 777
    owner: root
    group: root
```

```yaml
---
- name: Directory for Prometheus
  file:
    path: ~/prometheus
    state: directory

- name: Download Prometheus for CentOS
  unarchive:
    src: https://github.com/prometheus/prometheus/releases/download/v2.31.2/prometheus-2.31.2.linux-amd64.tar.gz
    dest: ~/prometheus
    remote_src: yes
    mode: 0777
    owner: root
    group: root

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

- name: Import Additional files for Prometheus
  copy:
    src: prometheus.service
    dest: /etc/systemd/system
    mode: 777
    owner: root
    group: root

- name: Verification of Installation of Prometheus
  service:
    name: prometheus
    state: restarted
    enabled: true
```

OUTPUT

```
ken@controlNode:~/HOA8$ ansible-playbook --ask-become-pass prometheus.yml
BECOME password:

PLAY [Ubuntu] ******************************************************************************************************************

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

TASK [Ubuntu : Install Package for Prometheus (Ubuntu)] ************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Directory for extraction of Prometheus] *************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Download Prometheus (Ubuntu)] ***********************************************************************************
ok: [192.168.56.102]

TASK [Ubuntu : Executable for Prometheus] **************************************************************************************
changed: [192.168.56.102]

TASK [Ubuntu : Import additional files for Prometheus] *************************************************************************
changed: [192.168.56.102]

TASK [Ubuntu : Verification of Prometheus if installed] ************************************************************************
changed: [192.168.56.102]

PLAY [CentOS] ******************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Directory for Prometheus] ***************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Download Prometheus for CentOS] *********************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Import Additional files for Prometheus] *************************************************************************
changed: [192.168.56.106]
```

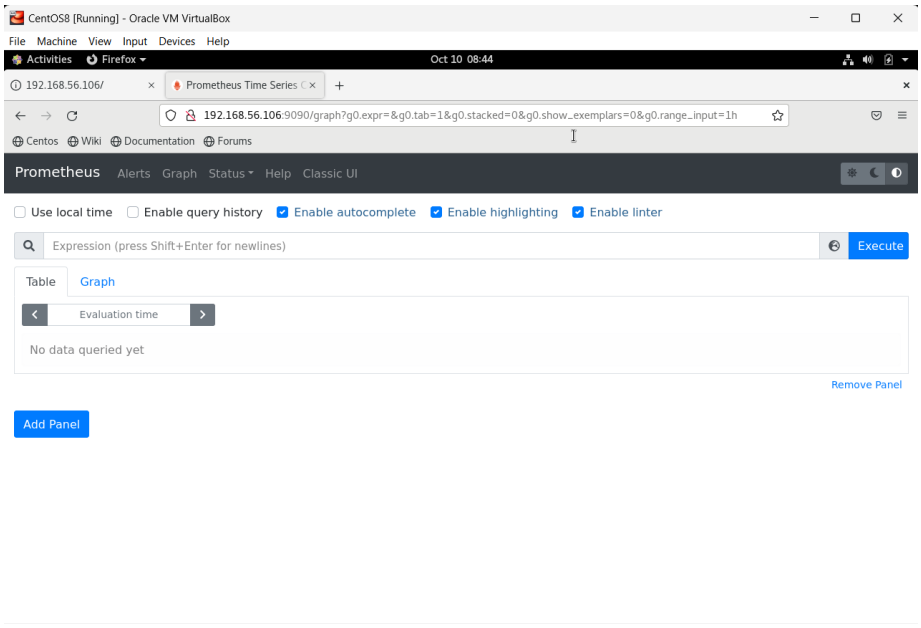
```
TASK [Ubuntu : Verification of Prometheus if installed] ************************************************************
changed: [192.168.56.102]

PLAY [CentOS] ******************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Directory for Prometheus] ***************************************************************************
ok: [192.168.56.106]

TASK [CentOS : Download Prometheus for CentOS] *********************************************************************
ok: [192.168.56.106]

TASK [CentOS : Import Additional files for Prometheus] *************************************************************
changed: [192.168.56.106]

TASK [CentOS : Verification of Installation of Prometheus] *********************************************************
changed: [192.168.56.106]

PLAY RECAP *********************************************************************************************************
192.168.56.102             : ok=7    changed=3    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
192.168.56.106             : ok=5    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

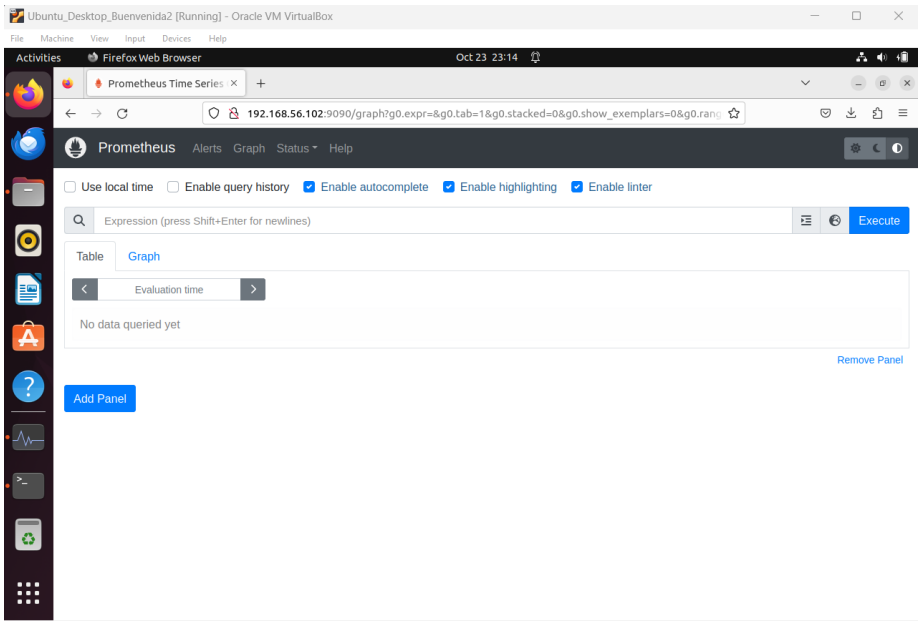
EXPLANATION	**The reason why the last part of CentOS wasn't able to copy the Executable file is because Ubuntu has already did that task and it can only be done once.**

3. Show an output of the installed Prometheus for both Ubuntu and CentOS.

Step 13: Test the Prometheus if it works, this should be displayed.

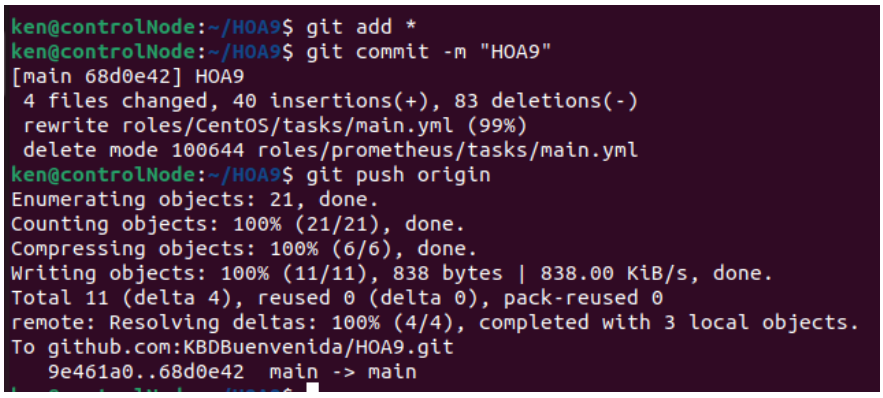
CentOS

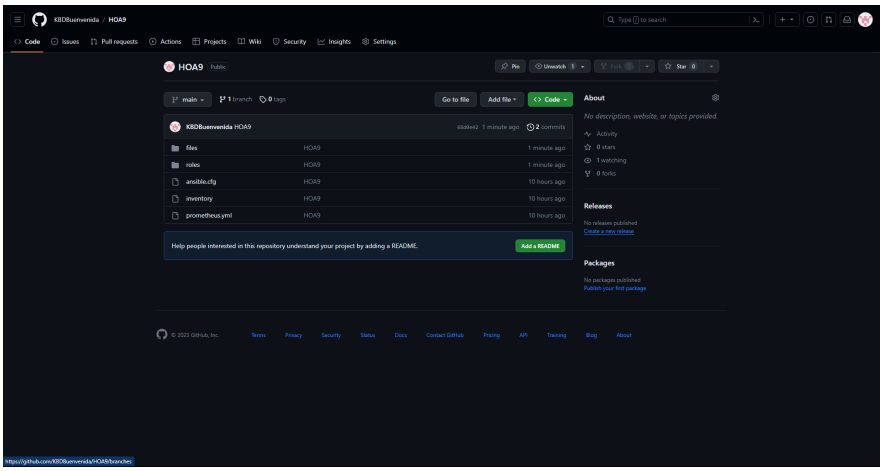


Ubuntu	

4. Make sure to create a new repository in GitHub for this activity.

Step 14: git add *, git commit -m, and git push origin the activity that we just did

INPUT	

OUTPUT	

Reflections:

Answer the following:

1. What are the benefits of having a performance monitoring tool?
    - **Having a performance monitoring tool has a great benefit for us users that enables us to monitor our system. We can see what happens to our system by using a monitoring tool by displaying the GID, CPU Utilization, Memory Consumed, Memory Usage, and etc. Prometheus is a great monitoring tool that doesn't consume a lot of resources while still being stable and constantly updating the user on what is happening.**

Conclusions:

- **In conclusion, Activity 9 has helped me learn about the implementation of Prometheus Monitoring Tool. Using Ansible to use Prometheus has made me more knowledgeable on how to use Ansible efficiently and precisely. I used Prometheus on 2 of my servers, which is Ubuntu and CentOS. I was also able to gain knowledge about the Prometheus config files, Starting and Stopping the Prometheus service. Lastly, I was able to learn that Prometheus is not only for Monitoring the user's system but it can also create an alert for the user if the system is reaching its limit.**