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Course and Section: CPE232 – CPE31S24	**Date Submitted:** October 29, 2022
Instructor: Engr. Jonathan V. Taylar	**Semester and SY:** 1st Semester SY 2022-2023

Midterm Skills Exam – Install, Configure and Manage Monitoring tools using Ansible

1. Objectives

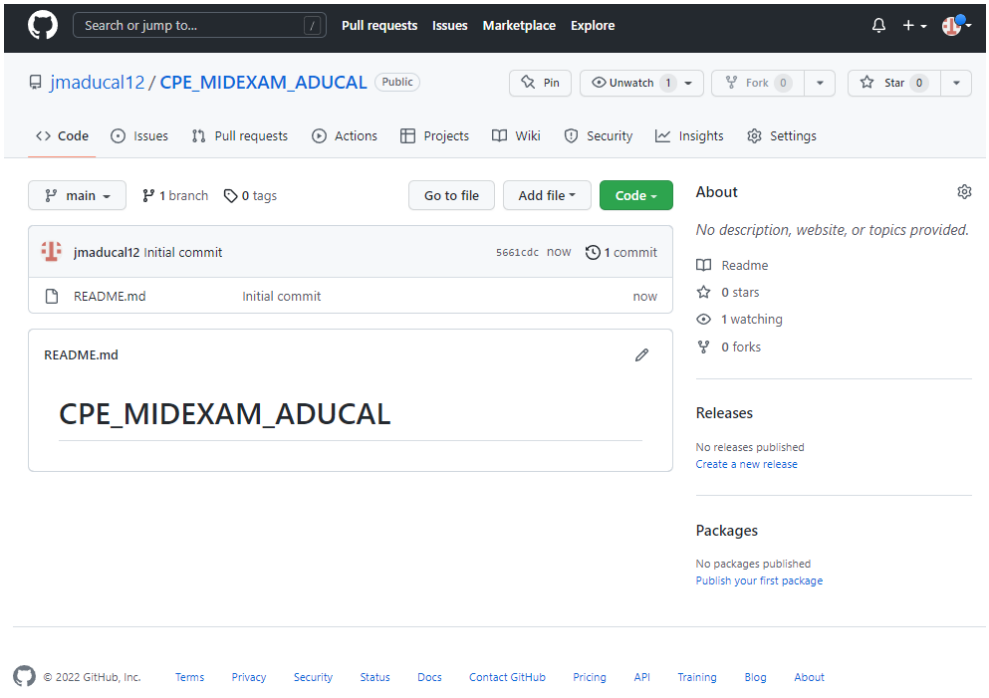
Create and design a workflow that installs, configure and manage enterprise availability, performance and log monitoring tools using Ansible as an Infrastructure as Code (IaC) tool.

2. Instructions

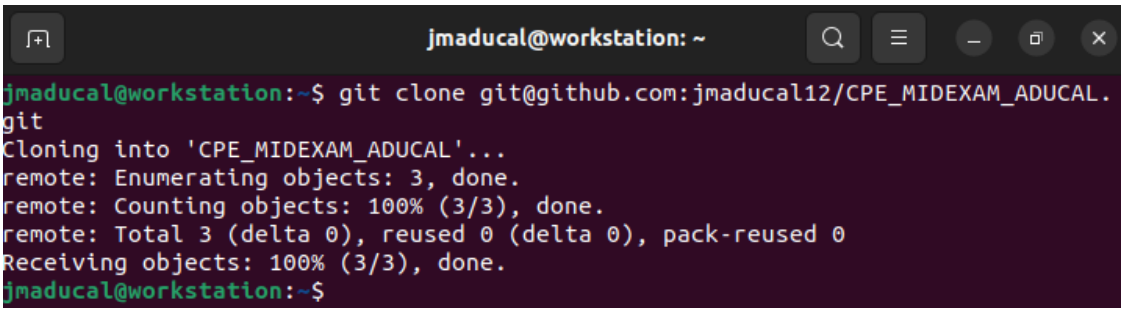
1. Create a repository in your GitHub account and label it CPE_MIDEXAM_SURNAME.
2. Clone the repository and do the following:
   2.1 Create an Ansible playbook that does the following with an input of a config.yaml file and arranged Inventory file:
   2.2 Install and configure Elastic Stack in separate hosts (Elastic Search, Kibana, Logstash) • Install Nagios in one host
   2.3 Install Grafana,Prometheus and Influxdb in seperate hosts (Influxdb,Grafana,Prometheus)
   2.4 Install Lamp Stack in separate hosts (Httpd + Php,Mariadb)
3. Document all your tasks using this document. Provide proofs of all the ansible playbooks codes and successful installations.
4. Document the push and commit from the local repository to GitHub.
5. Finally, paste also the link of your GitHub repository in the documentation.

3. Output (screenshots and explanations)

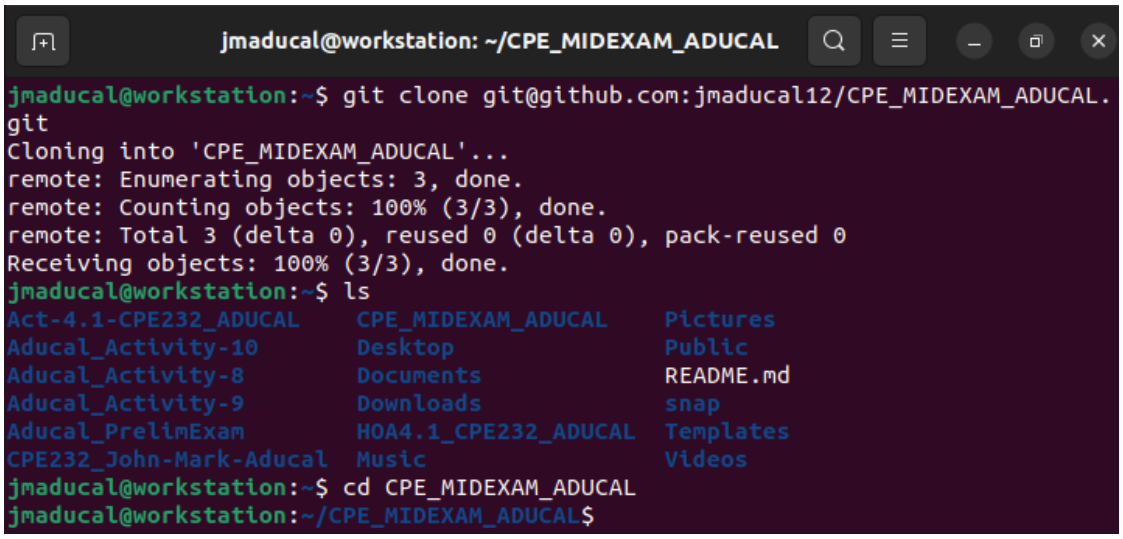
Task 1: Creating a new Repository in GitHub



I created a new repository named CPE_MIDEXAM_ADUCAL

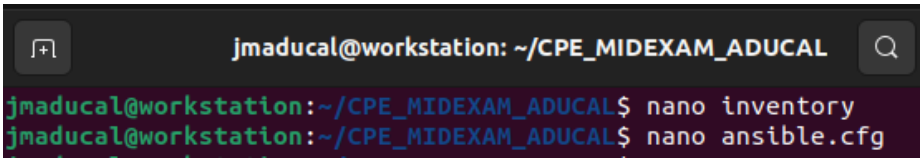


I used git clone command to copy the new repository I have created into my workstation.

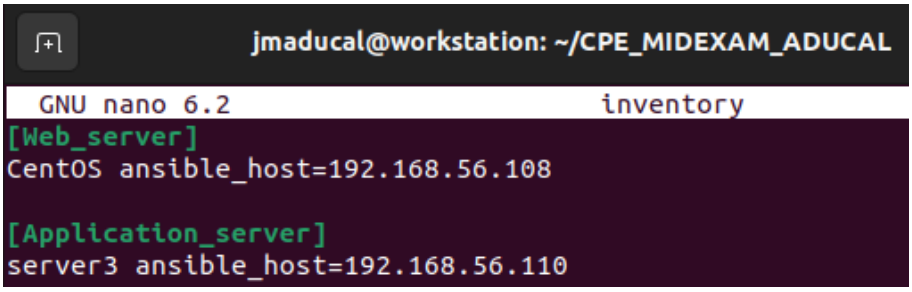


Now we can use the new repository we created earlier, using cd command to change directory into CPE_MIDEXAM_ADUCAL.

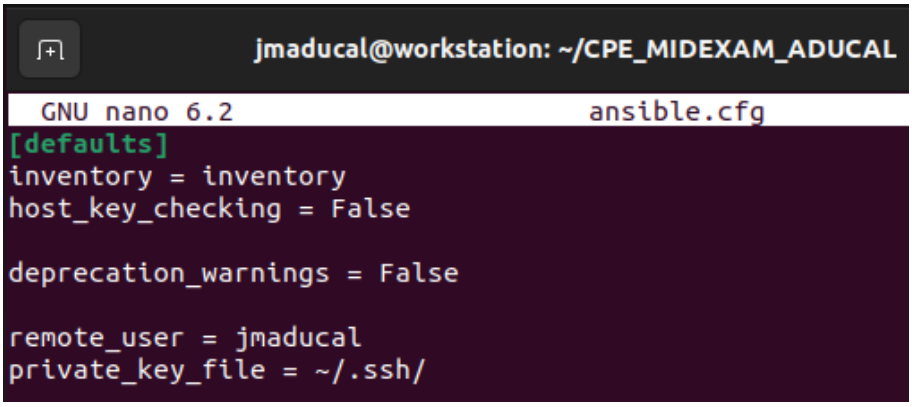
Task 2: Targeting Specific Nodes



I create a new inventory and ansible.cfg file

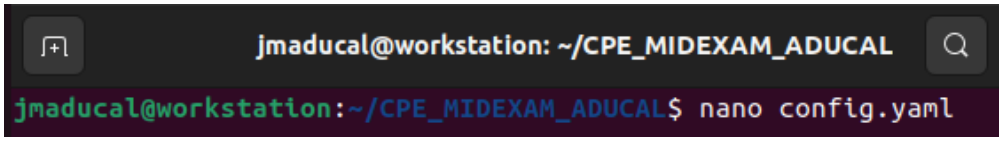


The new Inventory file contains the groups Web_server and Application_server together with the IP Addresses of Ubuntu server3 and CentOS.

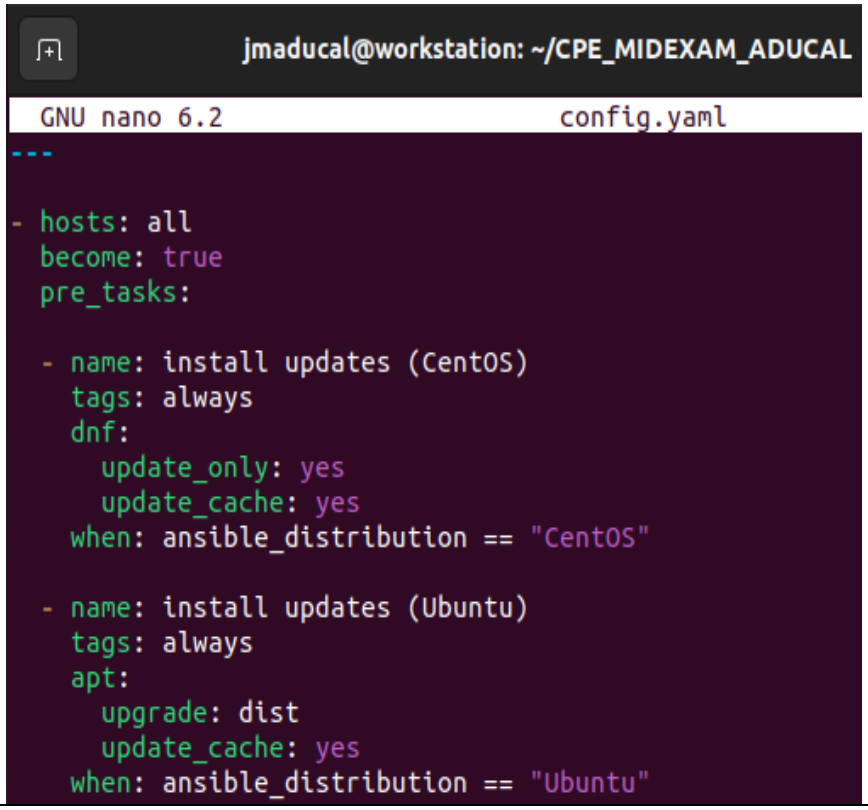


The ansible.cfg file contains the ansible configurations need to administer the behavior of the task performed by control node used to manage the remote hosts or managed nodes.

Task 3: Create Roles



I create a new file name config.yaml



```
- hosts: Web_server
  become: true
  roles:
    - Web_server

- hosts: Application_server
  become: true
  roles:
    - Application_server
```

Inside of config.yaml file, there are pre_tasks for installing updates for CentOS and Ubuntu and particular roles for Web server and Application_server.

```
jmaducal@workstation: ~/CPE_MIDEXAM_ADUCAL/roles
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ mkdir roles
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ cd roles
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ mkdir Web_server
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ mkdir Application_server
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ ls
Application_server  Web_server
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ cd Web_server
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Web_server$ mkdir tasks
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Web_server$ cd tasks
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Web_server/tasks$ nano main.yml
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Web_server/tasks$ cd ..
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Web_server$ cd ..
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ cd Application_serrver
bash: cd: Application_serrver: No such file or directory
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ cd Application_server
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Application_server$ mkdir tasks
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Application_server$ cd tasks
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles/Application_server/tasks$ nano
main.yml
```

```
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL/roles$ tree
.
├── Application_server
│   └── tasks
│       └── main.yml
└── Web_server
    └── tasks
        └── main.yml

4 directories, 2 files
```

I create a new directory roles inside CPE_MIDEXAM_ADUCAL directory. And then, Inside the roles directory, I created Web_server and Application_Server directory. Inside of both directories I create again new directory named tasks. Inside the directory tasks for both directories I created a file named main.yml

jmaducal@workstation: ~/CPE_MIDEXAM_ADUCAL/roles/W...

GNU nano 6.2 main.yml

```
- name: install Elastic stack on Ubuntu
  apt:
    name:
      - elasticsearch
      - kibana
      - logstash
      - filebeat
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"

- name: install Elastic stack on CentOS
  dnf:
    name:
      - elasticsearch
      - kibana
      - logstash
      - filebeat
    state: latest
    update_cache: yes
  when: ansible_distribution == "CentOS"
```

```
- name: install nagios in Ubuntu
  apt:
    name:
      - nagios4
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

```
- name: install grafana and influxdb on Ubuntu
  apt:
    name:
      - grafana
      - influxdb
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: install grafana and influxdb on CentOS
  dnf:
    name:
      - grafana
      - influxdb
    state: latest
  when: ansible_distribution == "CentOS"
```

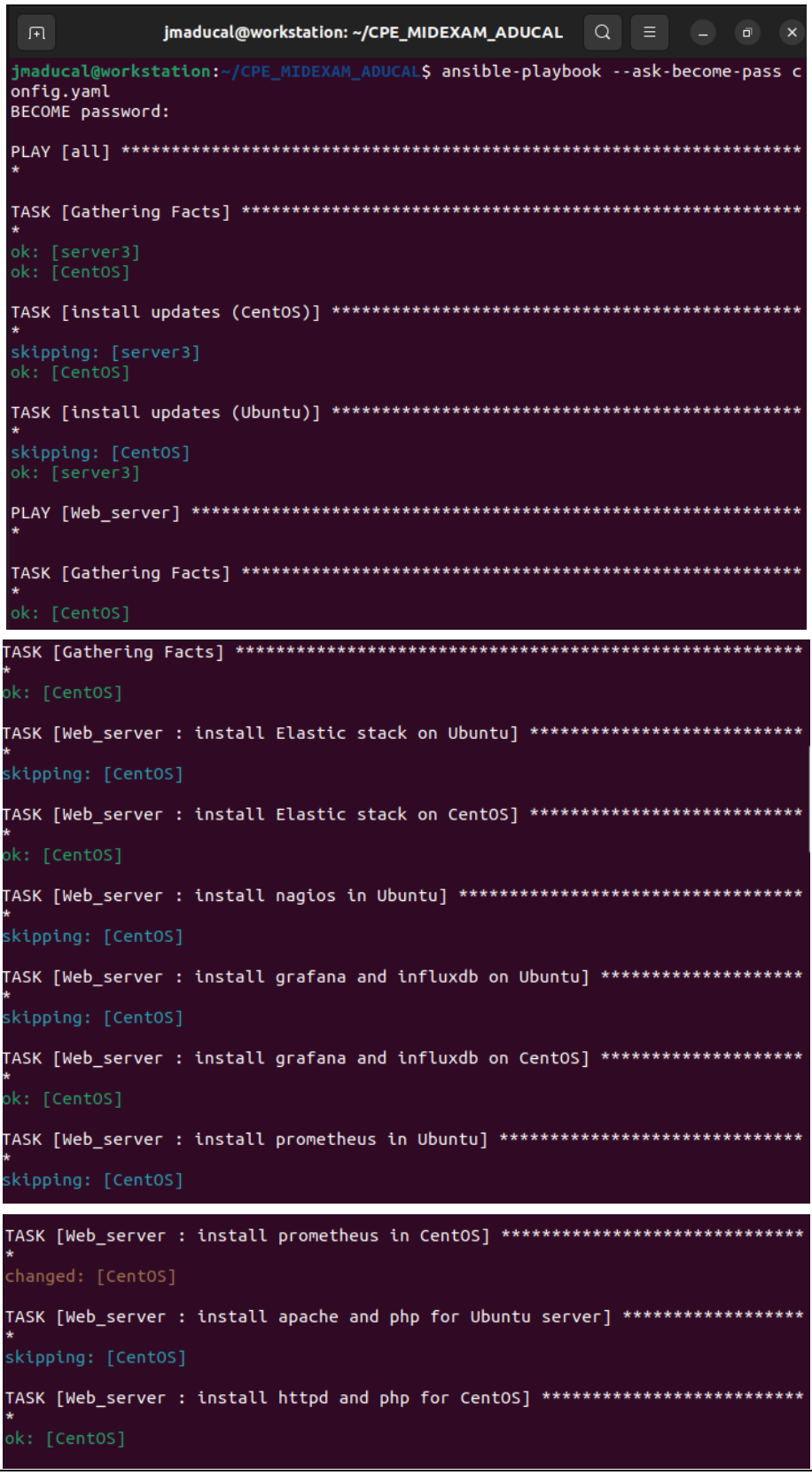
```
- name: install grafana and influxdb on CentOS
  dnf:
    name:
      - grafana
      - influxdb
    state: latest
  when: ansible_distribution == "CentOS"

- name: install prometheus in Ubuntu
  command: apt install prometheus -y
  when: ansible_distribution == "Ubuntu"

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

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

- name: install httpd and php for CentOS
  dnf:
    name:
      - httpd
      - php
    state: latest
  when: ansible_distribution == "CentOS"
```

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

- name: install mariadb package (CentOS)
  yum:
    name: mariadb-server
    state: latest
  when: ansible_distribution == "CentOS"
```

```
- name: install mariadb package (Ubuntu)
  apt:
    name: mariadb-server
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: "Mariadb- Restarting/Enabling"
  service:
    name: mariadb
    state: restarted
    enabled: true
```

The contents of main.yml file inside of tasks of Web_server and Application_server directories.


jmaducal@workstation: ~/CPE_MIDEXAM_ADUCAL
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ ansible-playbook --ask-become-pass config.yaml
BECOME password:
PLAY [all] ***
TASK [Gathering Facts] ***
ok: [server3]
ok: [CentOS]
TASK [install updates (CentOS)] **
skipping: [server3]
ok: [CentOS]
TASK [install updates (Ubuntu)] **
skipping: [CentOS]
ok: [server3]
PLAY [Web_server] **
TASK [Gathering Facts] ***
ok: [CentOS]
TASK [Gathering Facts] ***
ok: [CentOS]
TASK [Web_server : install Elastic stack on Ubuntu] ******************************
skipping: [CentOS]
TASK [Web_server : install Elastic stack on CentOS] ******************************
ok: [CentOS]
TASK [Web_server : install nagios in Ubuntu] *************************************
skipping: [CentOS]
TASK [Web_server : install grafana and influxdb on Ubuntu] ***********************
skipping: [CentOS]
TASK [Web_server : install grafana and influxdb on CentOS] ***********************
ok: [CentOS]
TASK [Web_server : install prometheus in Ubuntu] *********************************
skipping: [CentOS]
TASK [Web_server : install prometheus in CentOS] *********************************
changed: [CentOS]
TASK [Web_server : install apache and php for Ubuntu server] *********************
skipping: [CentOS]
TASK [Web_server : install httpd and php for CentOS] *****************************
ok: [CentOS]

```
TASK [Web_server : start httpd (CentOS)] ************************************
*
changed: [CentOS]

TASK [Web_server : install mariadb package (CentOS)] ************************
*
ok: [CentOS]

TASK [Web_server : install mariadb package (Ubuntu)] ************************
*
skipping: [CentOS]

TASK [Web_server : Mariadb- Restarting/Enabling] *****************************
*
changed: [CentOS]

PLAY [Application_server] ****************************************************
*

TASK [Gathering Facts] *******************************************************
*
ok: [server3]

TASK [Application_server : install Elastic stack on Ubuntu] ******************
*
changed: [server3]
```

```
TASK [Application_server : install Elastic stack on CentOS] ******************
*
skipping: [server3]

TASK [Application_server : install nagios in Ubuntu] *************************
*
changed: [server3]

TASK [Application_server : install grafana and influxdb on Ubuntu] ************
*
changed: [server3]

TASK [Application_server : install grafana and influxdb on CentOS] ************
*
skipping: [server3]

TASK [Application_server : install prometheus in Ubuntu] *********************
*
changed: [server3]
```

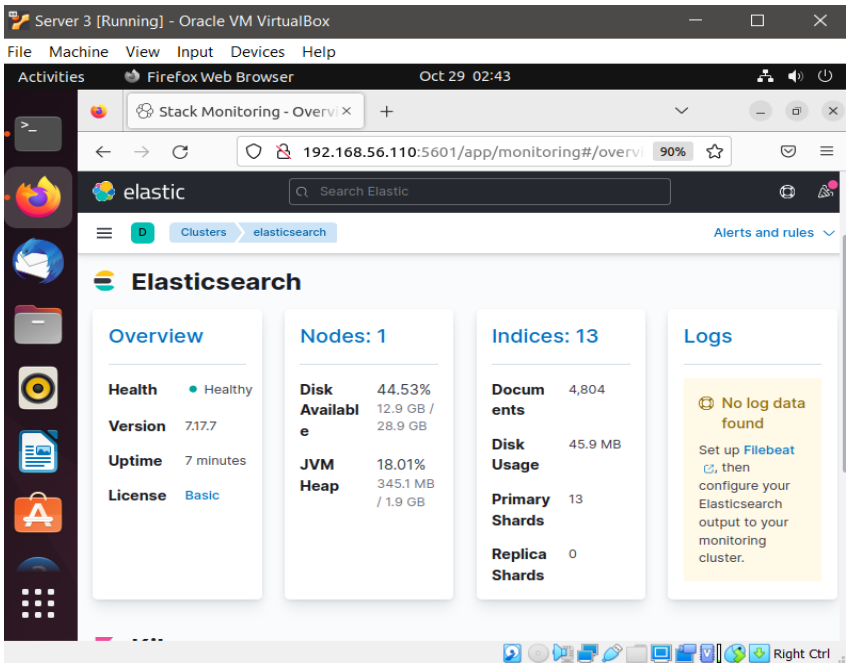
```
TASK [Application_server : install prometheus in CentOS] *********************
*
skipping: [server3]

TASK [Application_server : install apache and php for Ubuntu server] **********
*
ok: [server3]

TASK [Application_server : install httpd and php for CentOS] *****************
*
skipping: [server3]
```

```
TASK [Application_server : install httpd and php for CentOS] ******************
*
skipping: [server3]

TASK [Application_server : start httpd (CentOS)] ******************************
*
skipping: [server3]

TASK [Application_server : install mariadb package (CentOS)] ******************
*
skipping: [server3]

TASK [Application_server : install mariadb package (Ubuntu)] ******************
*
changed: [server3]

TASK [Application_server : Mariadb- Restarting/Enabling] **********************
*
changed: [server3]

PLAY RECAP *********************************************************************
*
CentOS                     : ok=10   changed=3    unreachable=0    failed=0
skipped=7    rescued=0    ignored=0
server3                    : ok=10   changed=6    unreachable=0    failed=0
skipped=7    rescued=0    ignored=0
```

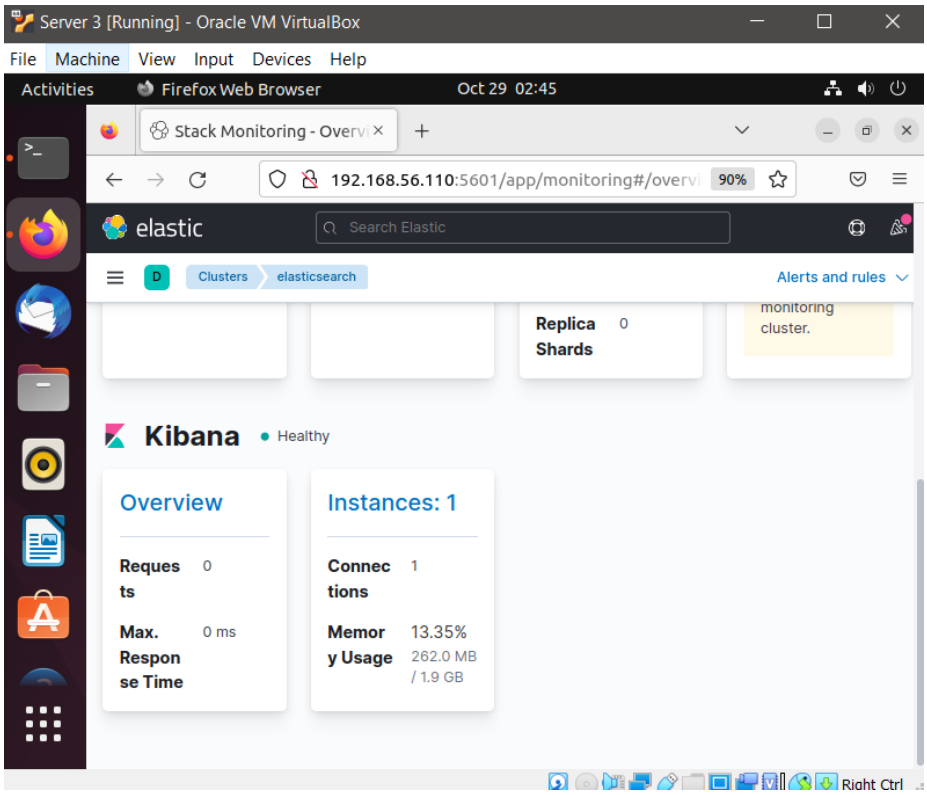
After executing config.yaml file, I have notice that the roles (Web_server and Application_server) plays the tasks in the main.yml file of installing ELK stack, nagios, grafana, influxdb, prometheus and LAMP stack(httpd + Php and Mariadb) to remote servers Ubuntu server 3 and CentOS.

After installing the monitoring tools such as ELK stack, nagios, grafana, influxdb, prometheus and LAMP stack(httpd + Php and Mariadb), next step is to check whether it is successfully installed in our remote servers (Ubuntu server 3 and CentOS).

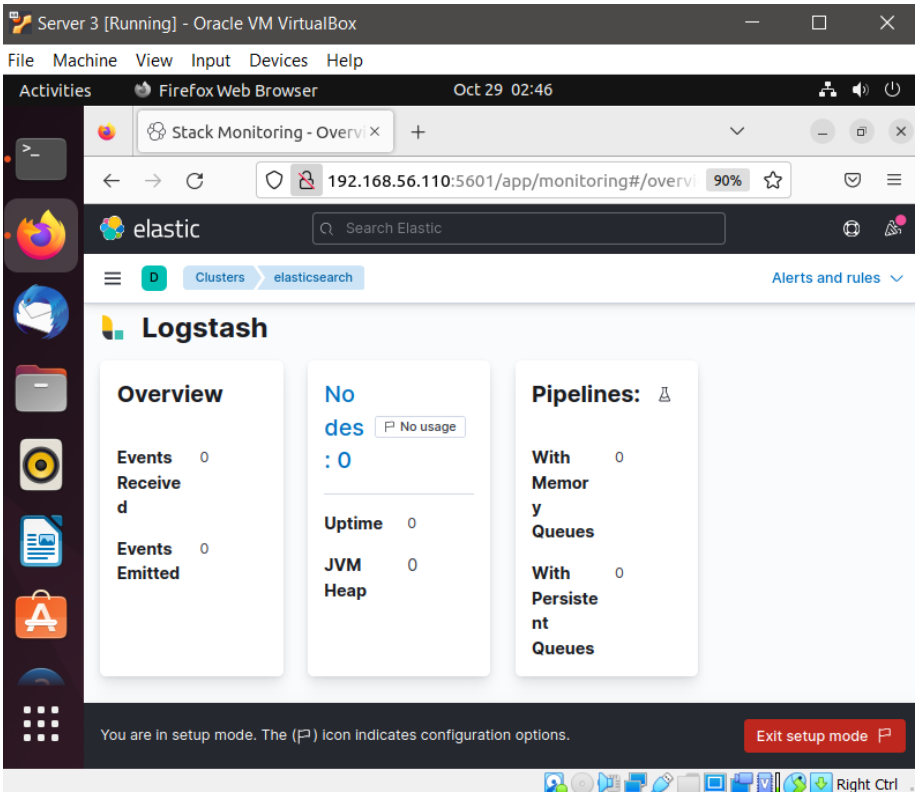
Elastic stack ELK(Elasticsearch, Logstash and Kibana) on Server 3



Elastic stack (Elasticsearch) for Server 3

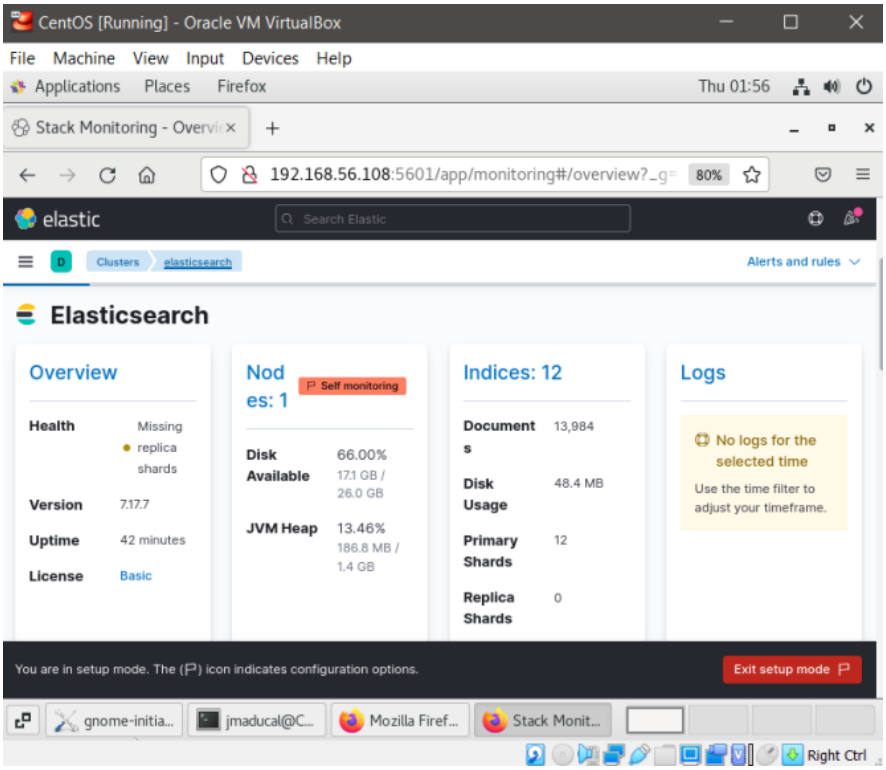


Elastic stack (Kibana) for Server 3

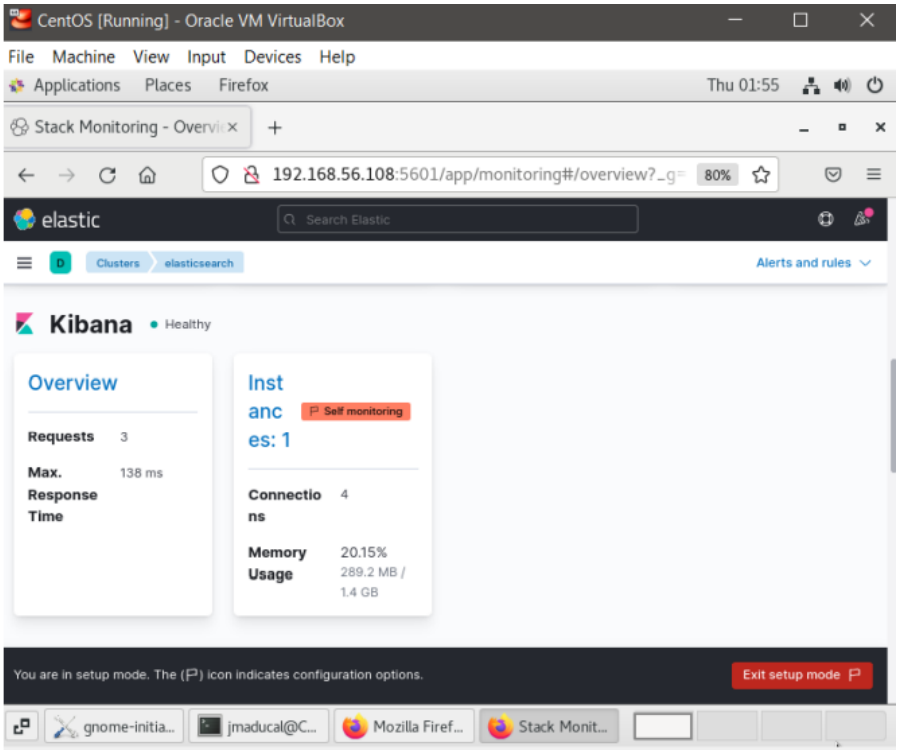


Elastic stack (Logstash) for Server 3

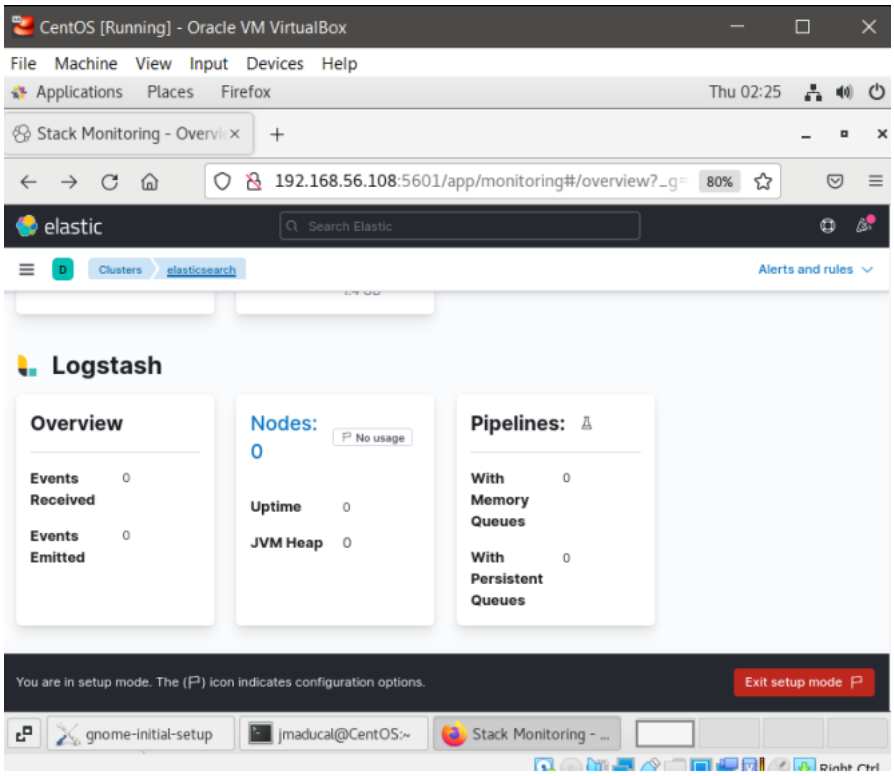
Elastic stack ELK(Elasticsearch, Logstash and Kibana) on CentOS



Elastic stack (Elasticsearch) for CentOS

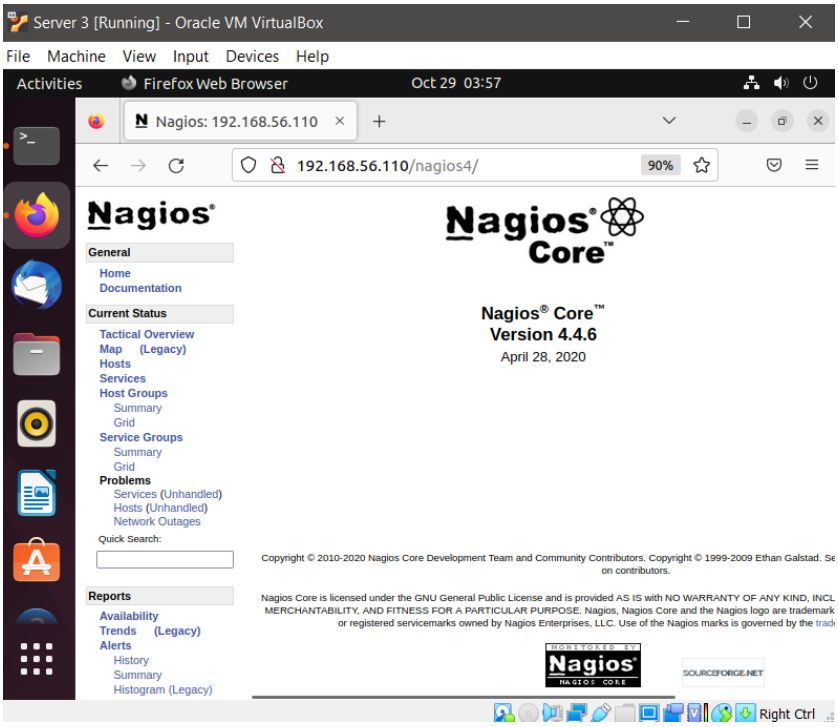


Elastic stack (Kibana) for CentOS



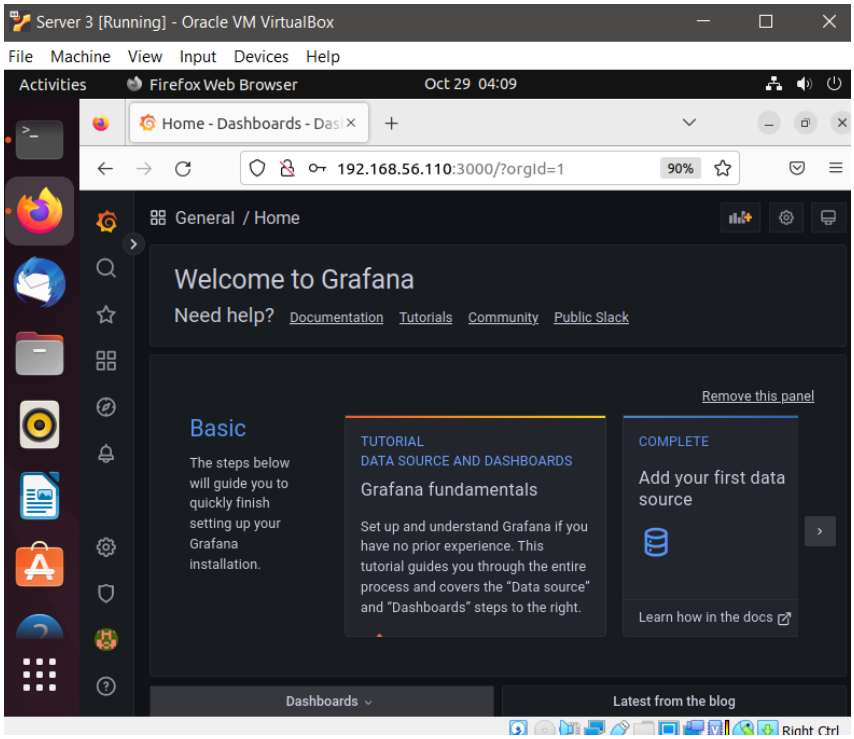
Elastic stack (Logstash) for CentOS

Install Nagios in one host (Ubuntu)

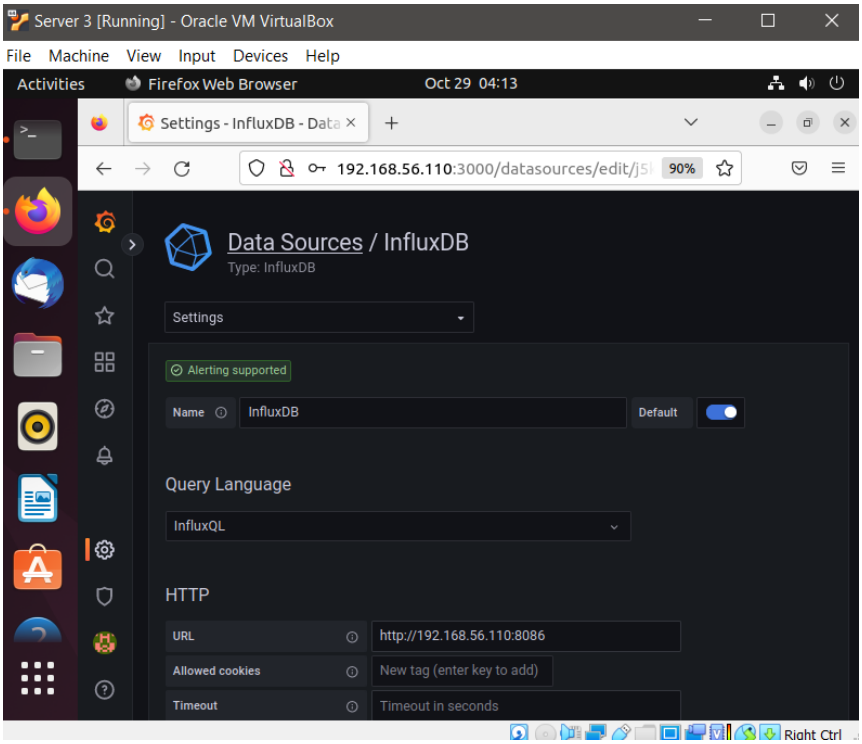


Nagios Core for Ubuntu Server 3

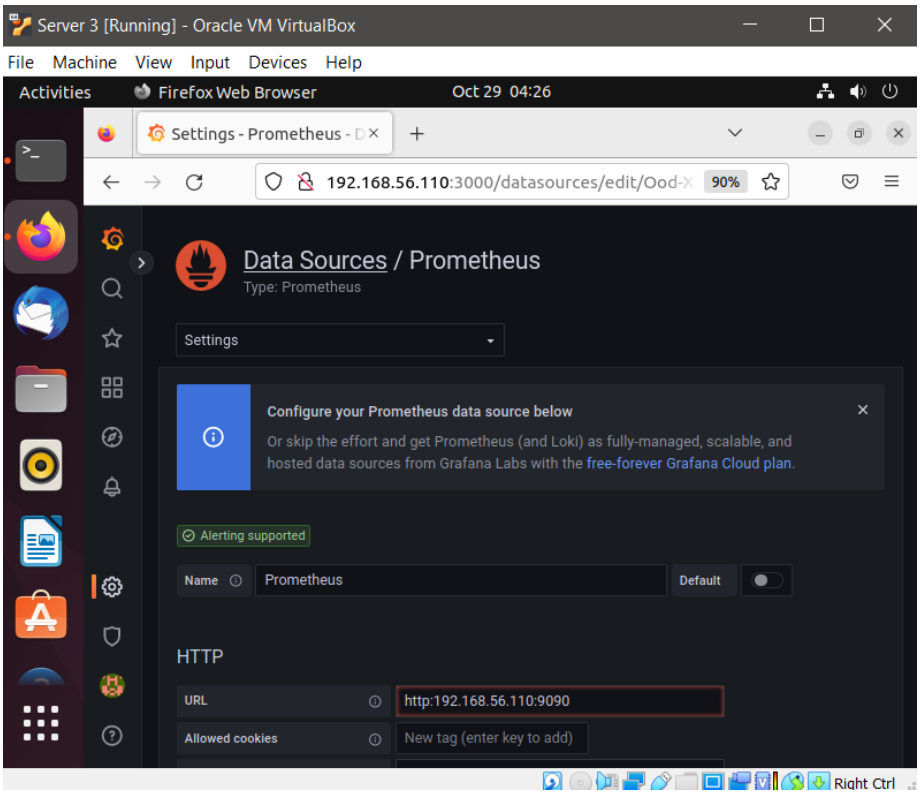
Grafana, Prometheus and Influxdb in Server 3



Grafana in Ubuntu Server 3

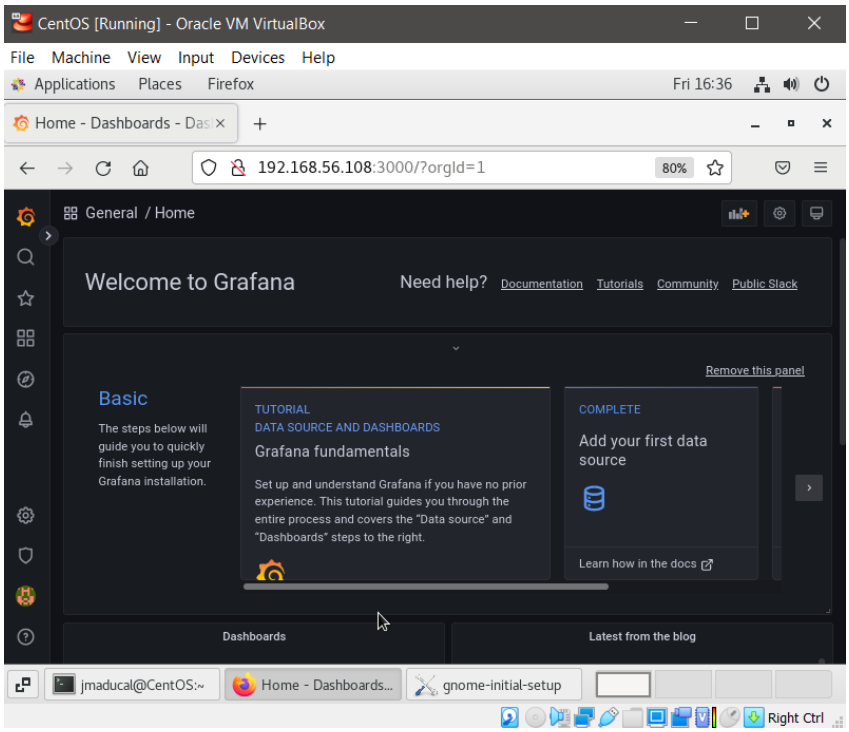


InfluxDB in Ubuntu Server 3

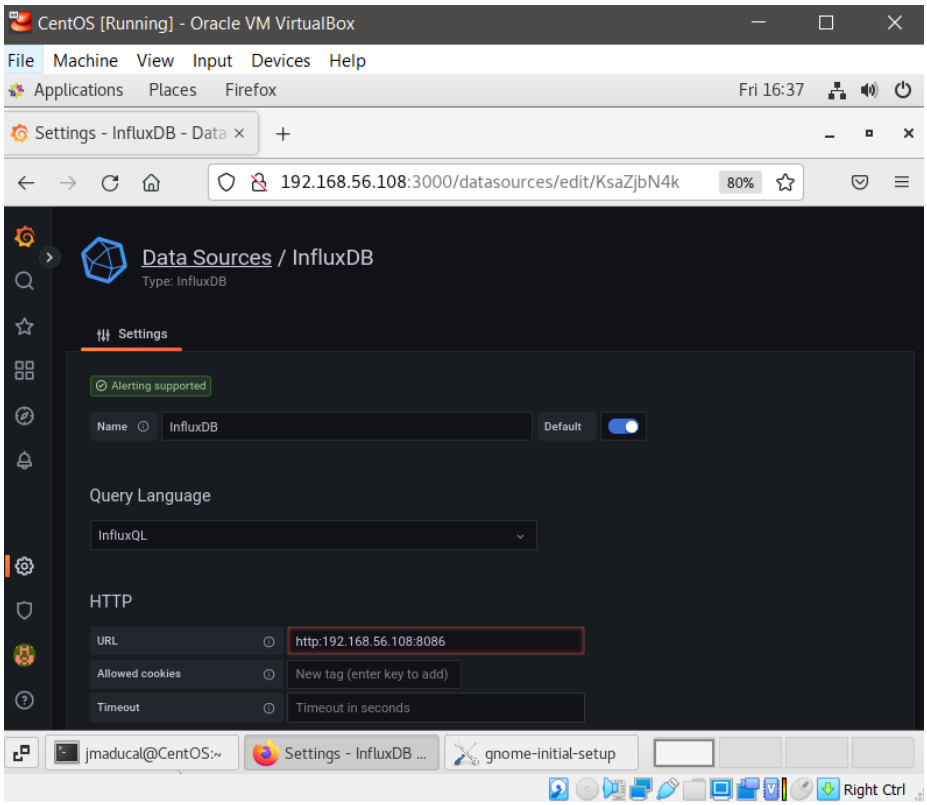


Prometheus in Ubuntu Server 3

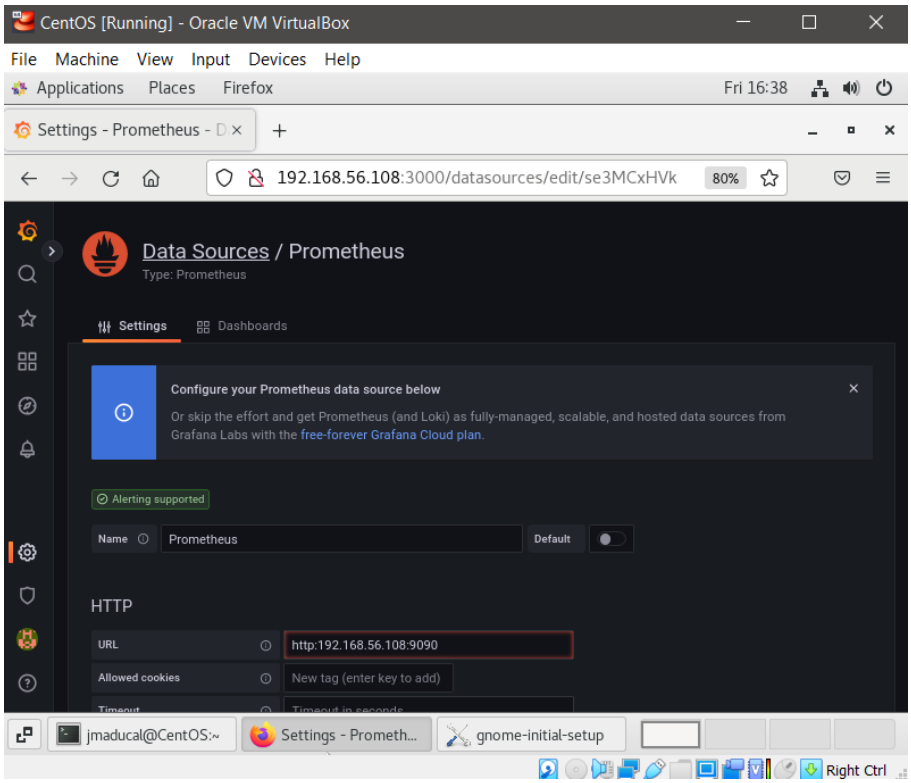
Grafana, Prometheus and Influxdb in CentOS



Grafana in CentOS

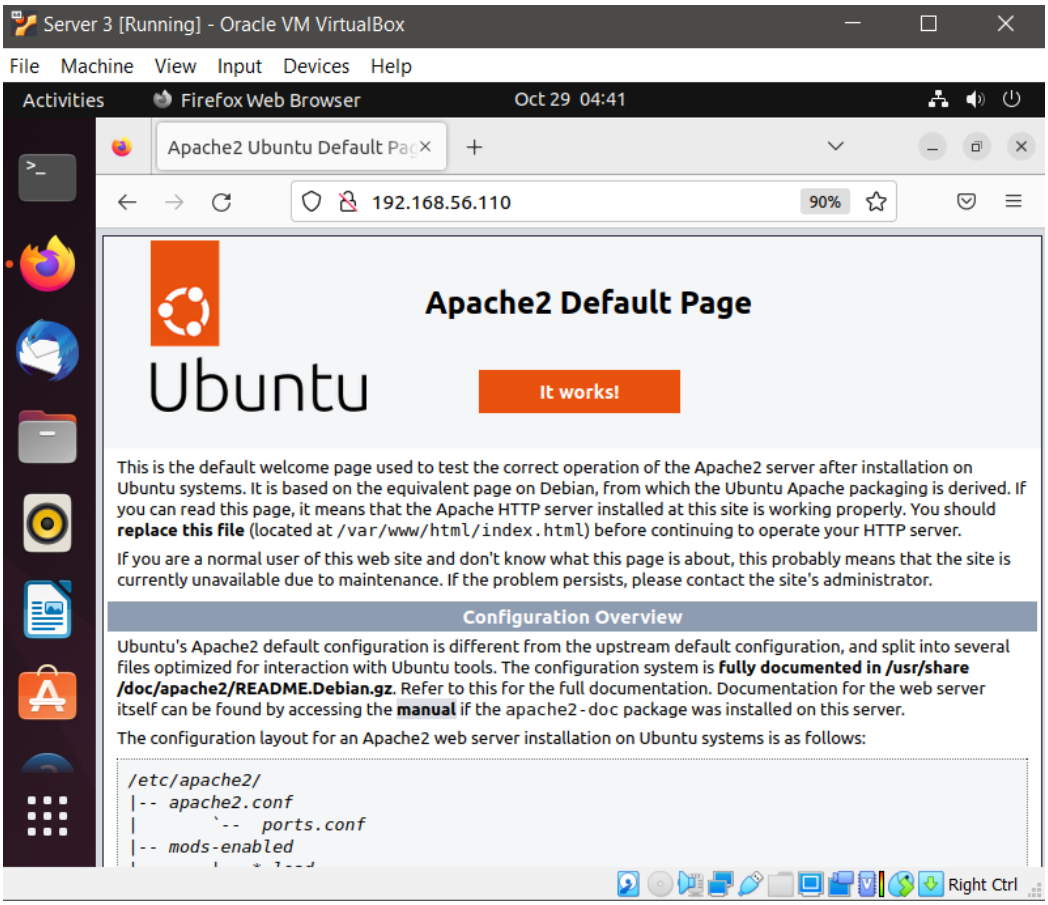


InfluxDB in CentOS

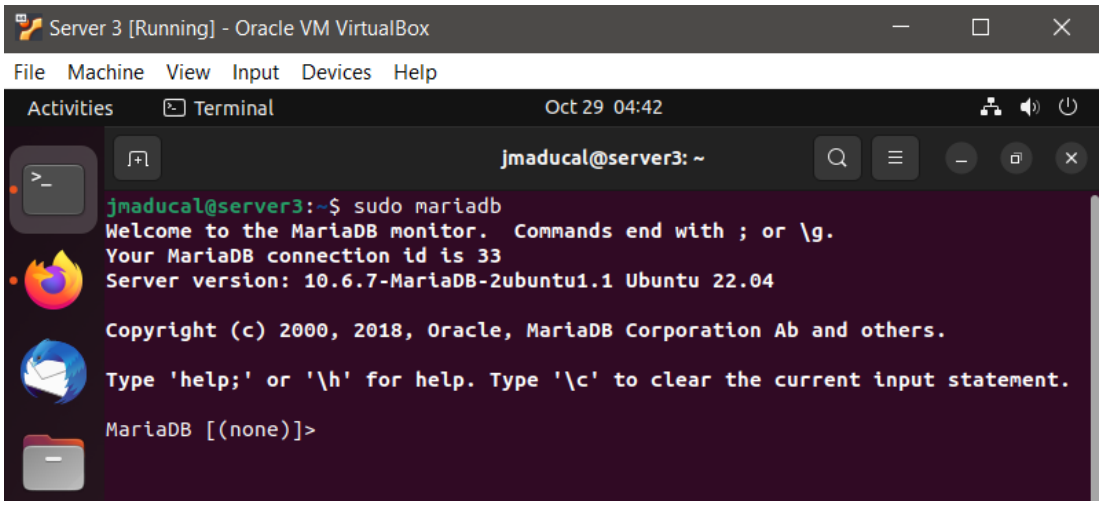


Prometheus in CentOS

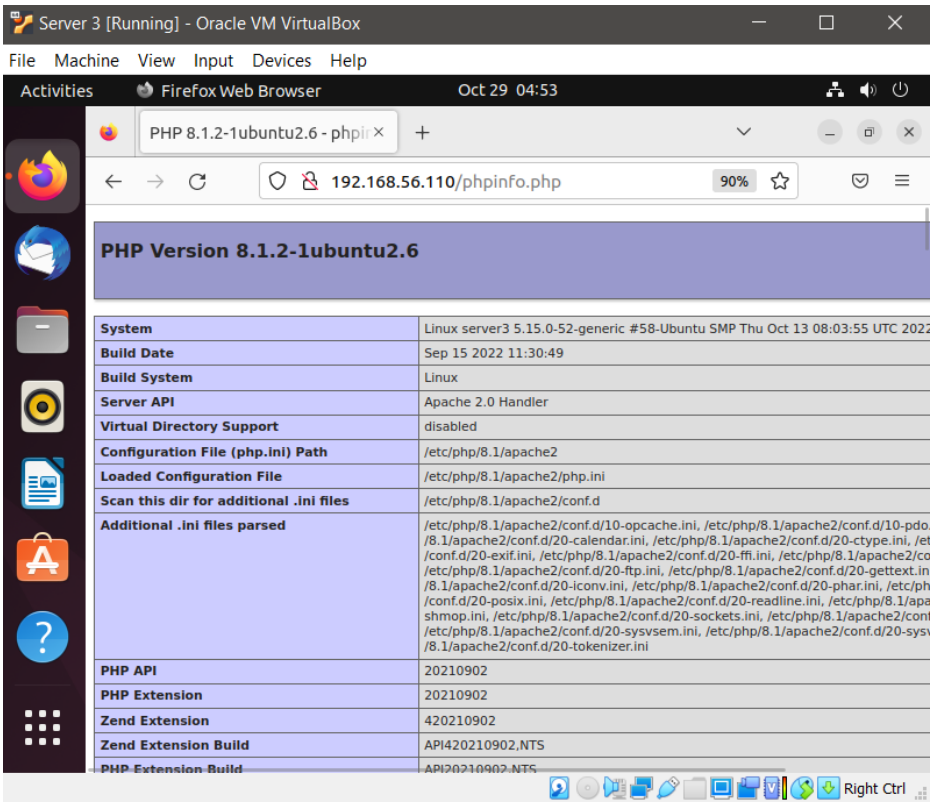
LAMP Stack (httpd/apache+php, Mariadb) in Ubuntu Server 3



Apache2 in Ubuntu Server 3

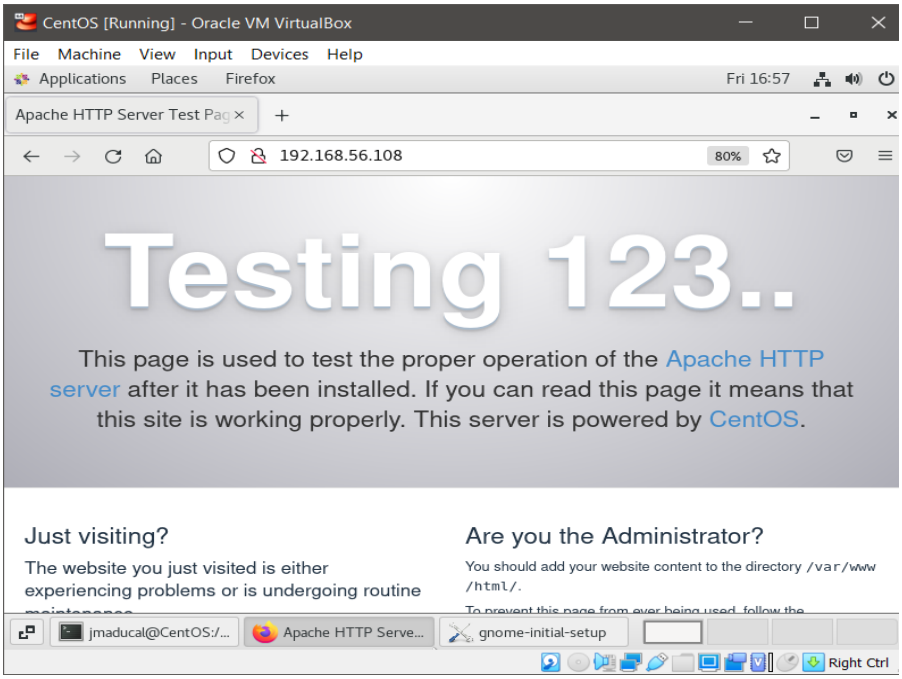


MariaDB in Ubuntu Server 3

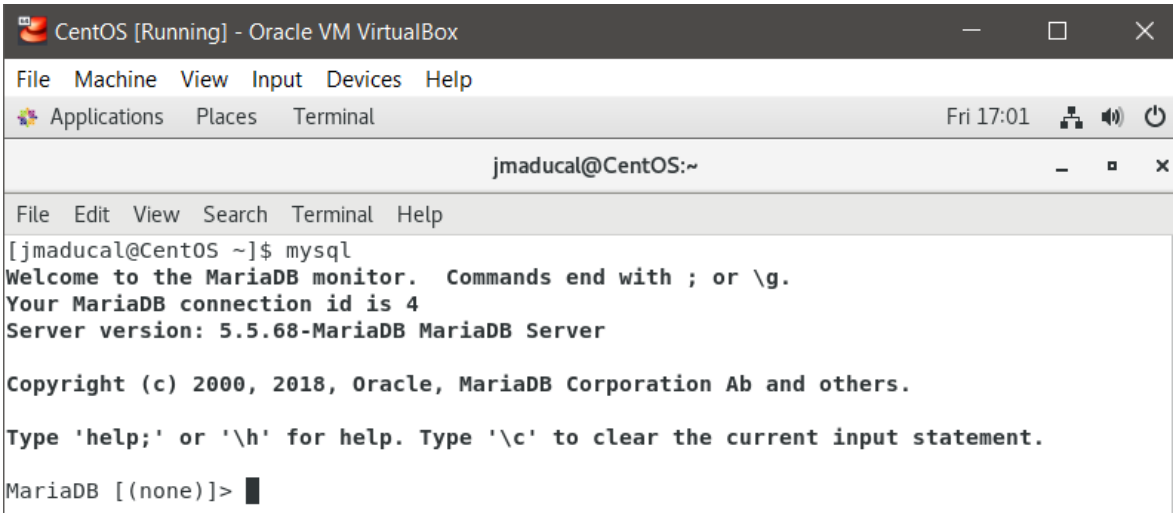


PHP in Ubuntu Server 3

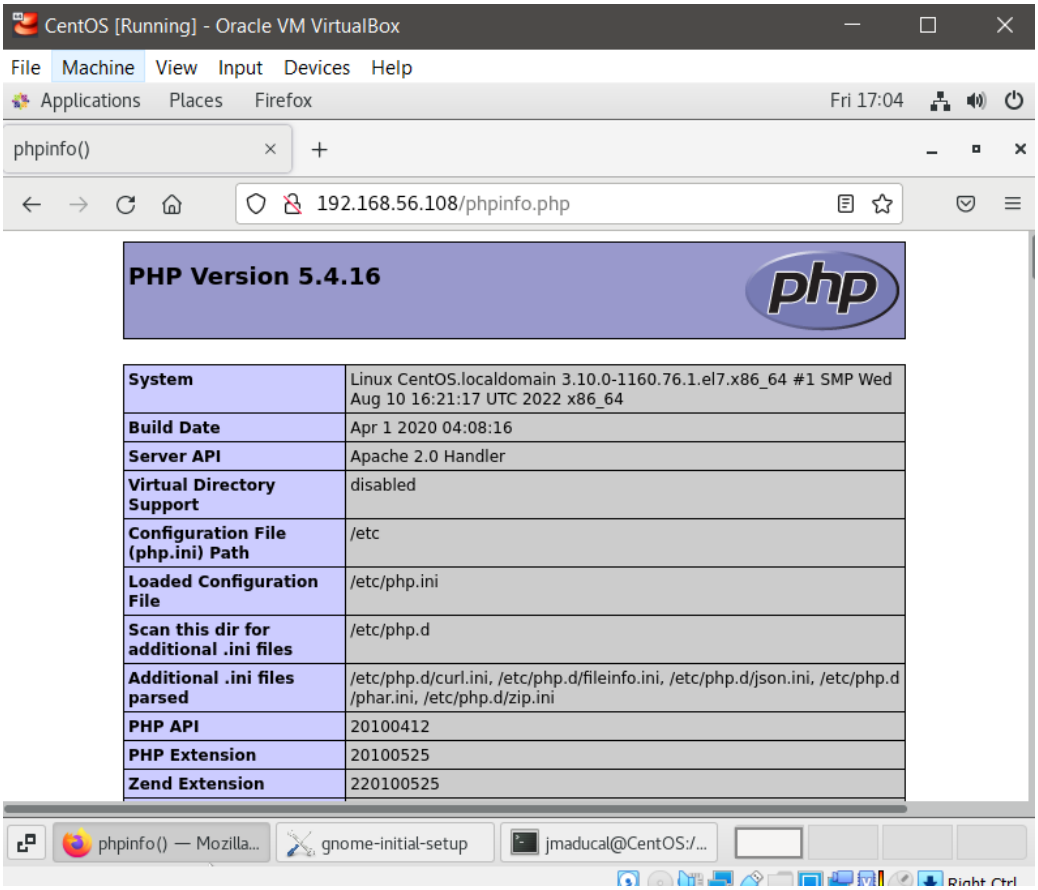
LAMP Stack (httpd/apache+php, Mariadb) in Ubuntu Server 3



Apache Httpd in CentOS



MariaDB in CentOS

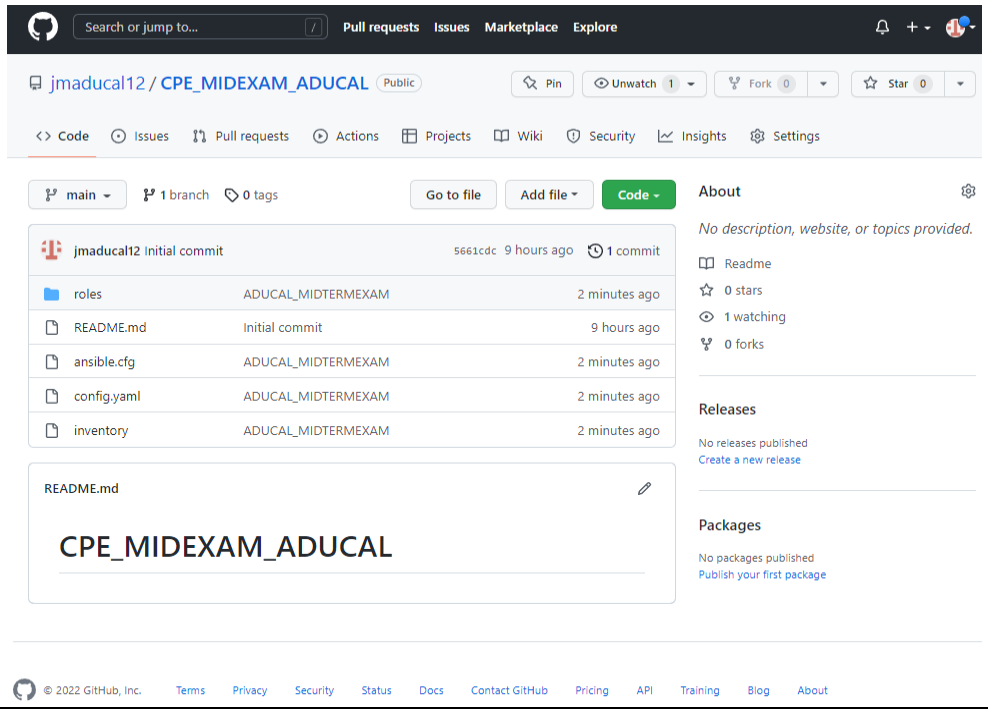


PHP in CentOS

Task 4: Upload and save changes from local repo into GitHub repo

```
jmaducal@workstation: ~/CPE_MIDEXAM_ADUCAL
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git status
On branch main
Your branch is up to date with 'origin/main'.

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

nothing added to commit but untracked files present (use "git add" to track)
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git add ansible.cfg
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git add config.yaml
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git add inventory
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git add roles/
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git commit -m "ADUCAL_MIDTERMEXAM"
[main cf595b3] ADUCAL_MIDTERMEXAM
 5 files changed, 230 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 config.yaml
 create mode 100644 inventory
 create mode 100644 roles/Application_server/tasks/main.yml
 create mode 100644 roles/Web_server/tasks/main.yml
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$
```

```
jmaducal@workstation:~/CPE_MIDEXAM_ADUCAL$ git push origin main
Enumerating objects: 10, done.
Counting objects: 100% (10/10), done.
Compressing objects: 100% (7/7), done.
Writing objects: 100% (9/9), 1.33 KiB | 1.33 MiB/s, done.
Total 9 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:jmaducal12/CPE_MIDEXAM_ADUCAL.git
   5661cdc..cf595b3  main -> main
```



GitHub Repository Link:

https://github.com/jmaducal12/CPE_MIDEXAM_ADUCAL.git

Conclusions: (link your conclusion from the objective)
In this activity, I learned how to create and design a workflow that installs, configures and manages enterprise availability, performance and log monitoring tools using Ansible as an Infrastructure as Code (IaC) tool. In installing different tools, I used ansible playbooks for both Ubuntu and CentOS remote servers.

HONOR PLEDGE:
I affirm that I will not give or receive any unauthorized help on this exam, and that all work will be my own.

John Mark Aducal

Screenshot of the Faculty Evaluation: