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Course/Section: CPE212 - CPE32S2	**Date Submitted: 10/24/2025**
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Activity 11: Containerization

1. Objectives

Create a Dockerfile and form a workflow using Ansible as Infrastructure as Code (IaC) to enable Continuous Delivery process

2. Discussion

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.

Source: https://docs.docker.com/get-started/overview/

You may also check the difference between containers and virtual machines. Click the link given below.

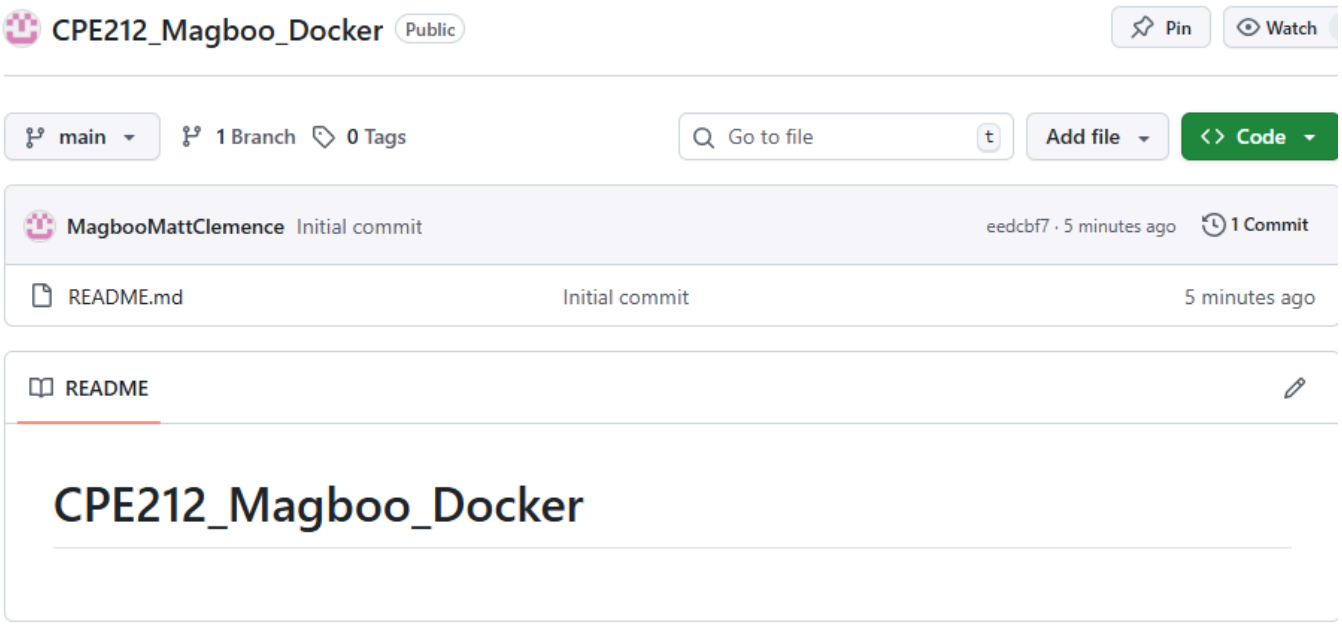
Source: https://docs.microsoft.com/en-us/virtualization/windowscontainers/about/containers-vs-vm

3. Tasks

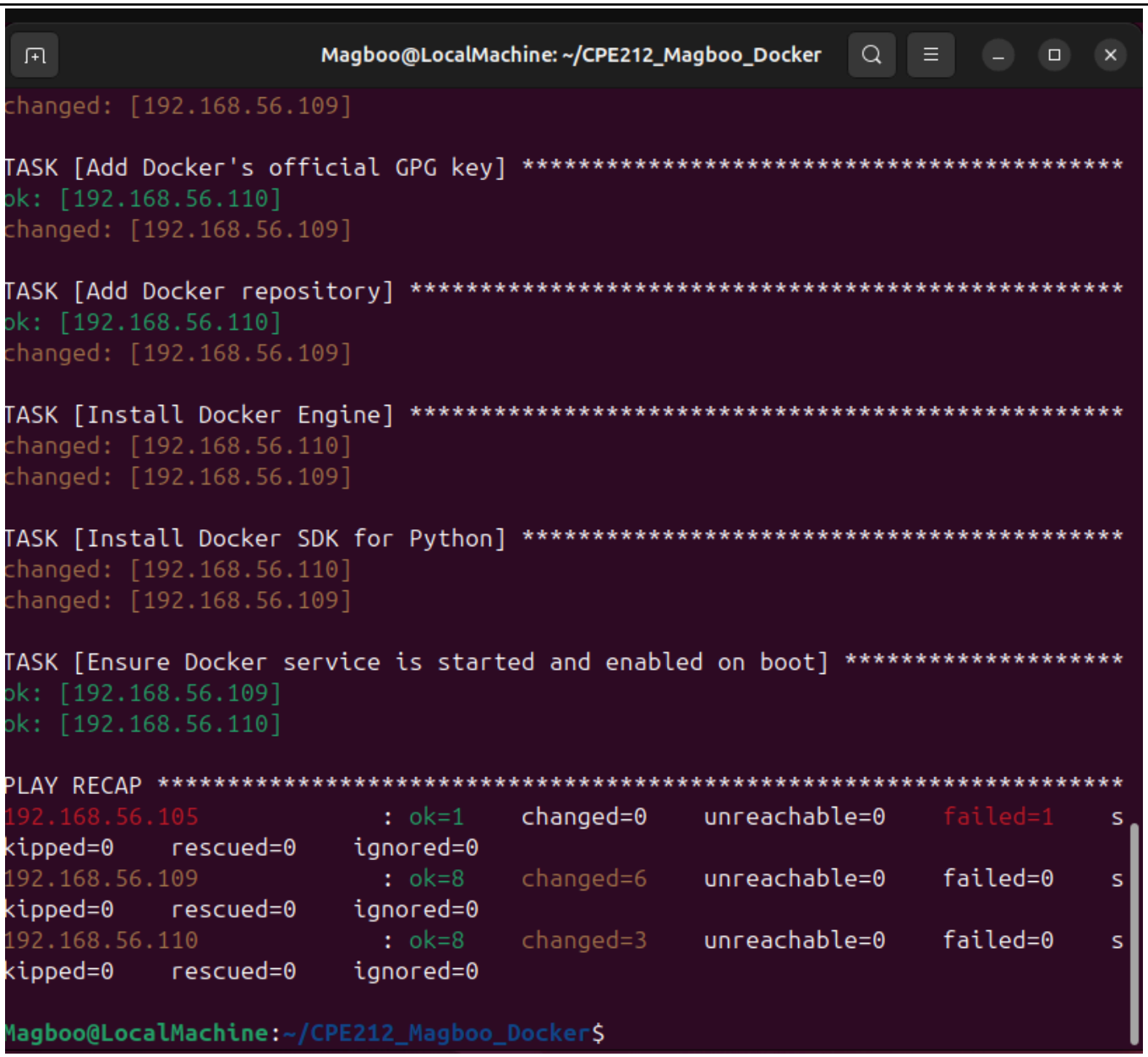
1. Create a new repository for this activity.
2. Install Docker and enable the docker socket.
3. Add to Docker group to your current user.
4. Create a Dockerfile to install web and DB server.
5. Install and build the Dockerfile using Ansible.
6. Add, commit and push it to your repository.

4. Output (screenshots and explanations)

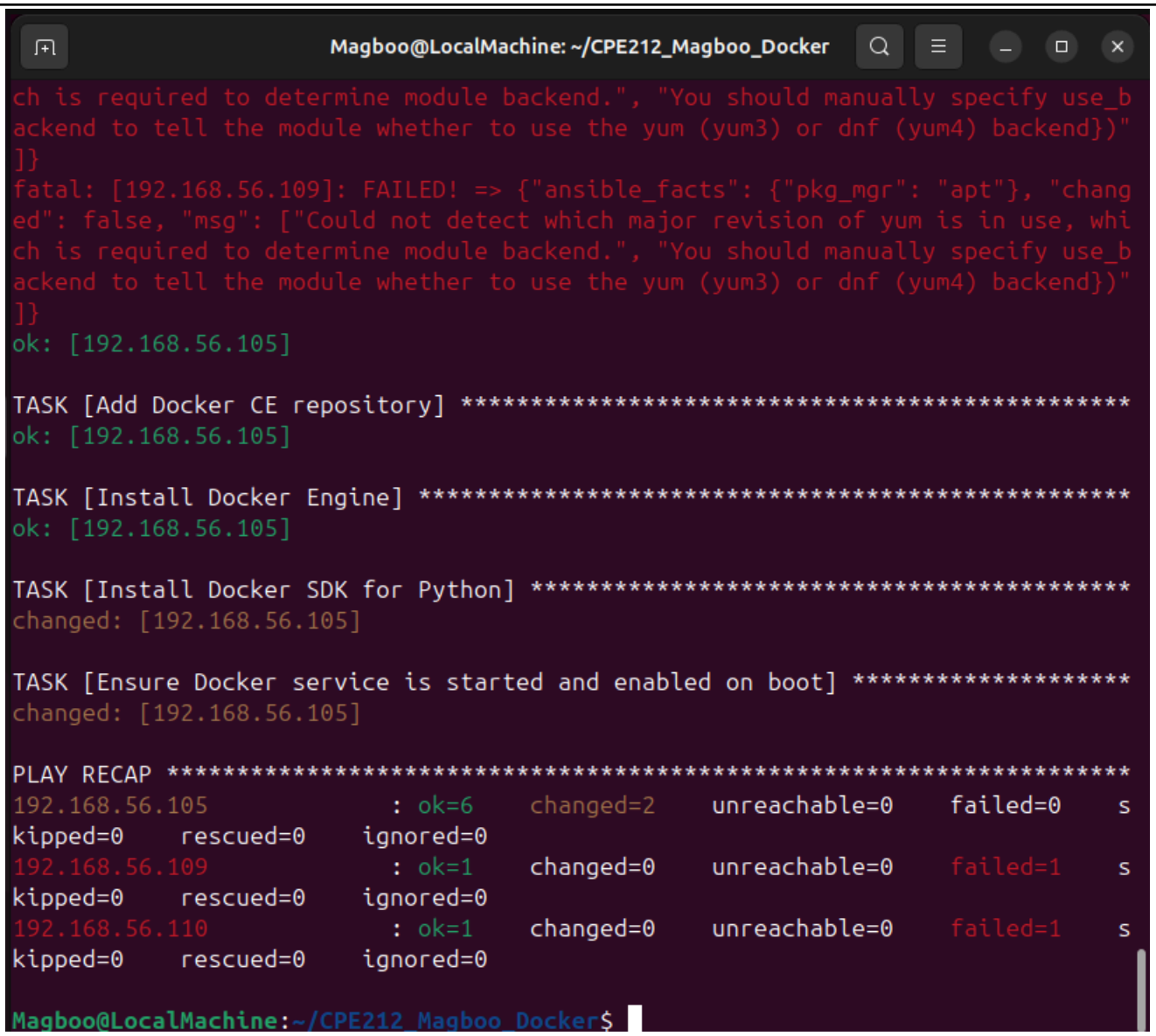
1.


CPE212_Magboo_Docker
Public
Pin
Watch
main
1 Branch
0 Tags
Go to file
t
Add file
Code
MagbooMattClemence Initial commit
eedcbf7 · 5 minutes ago
1 Commit
README.md
Initial commit
5 minutes ago
README
CPE212_Magboo_Docker

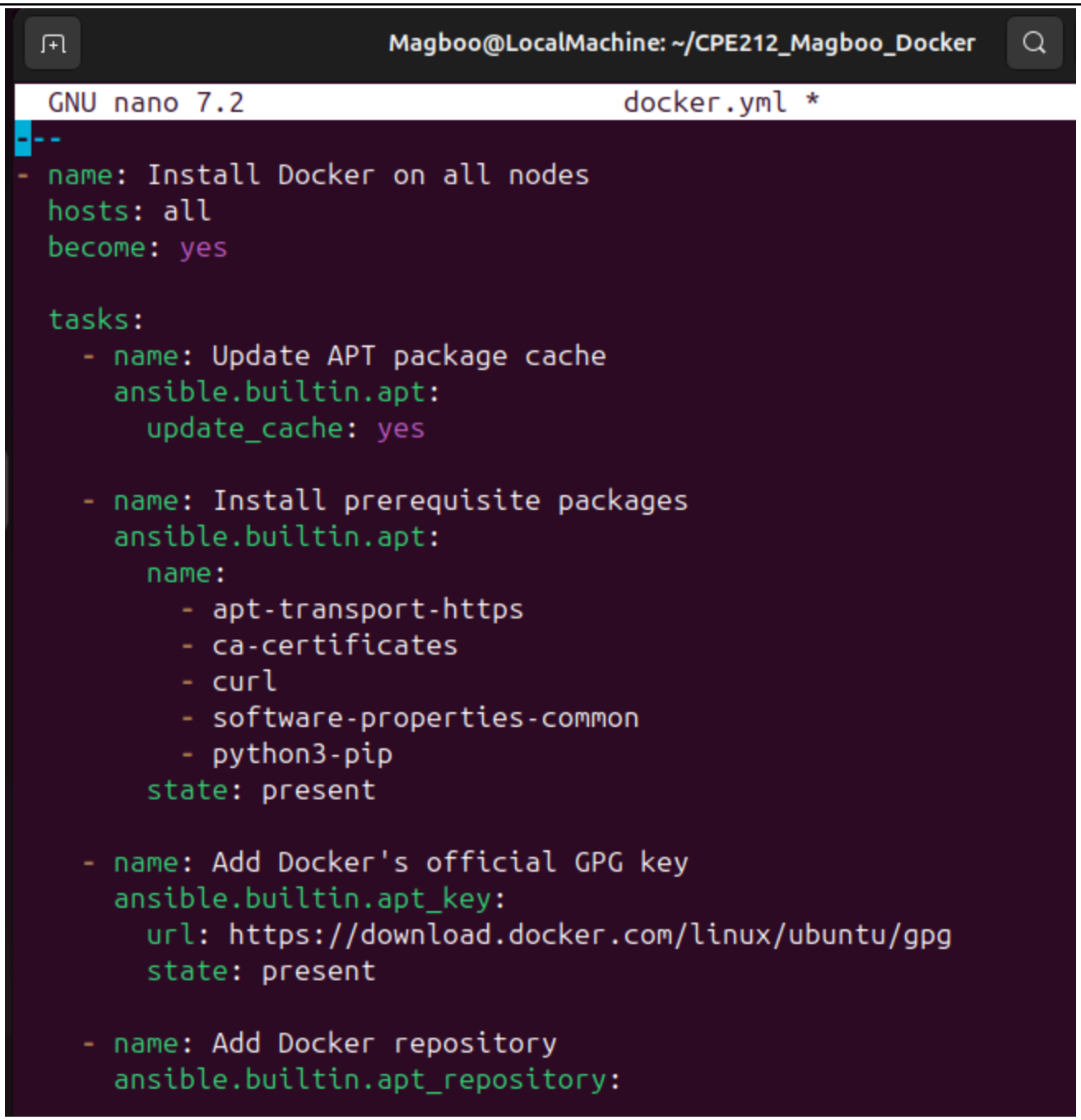
2.



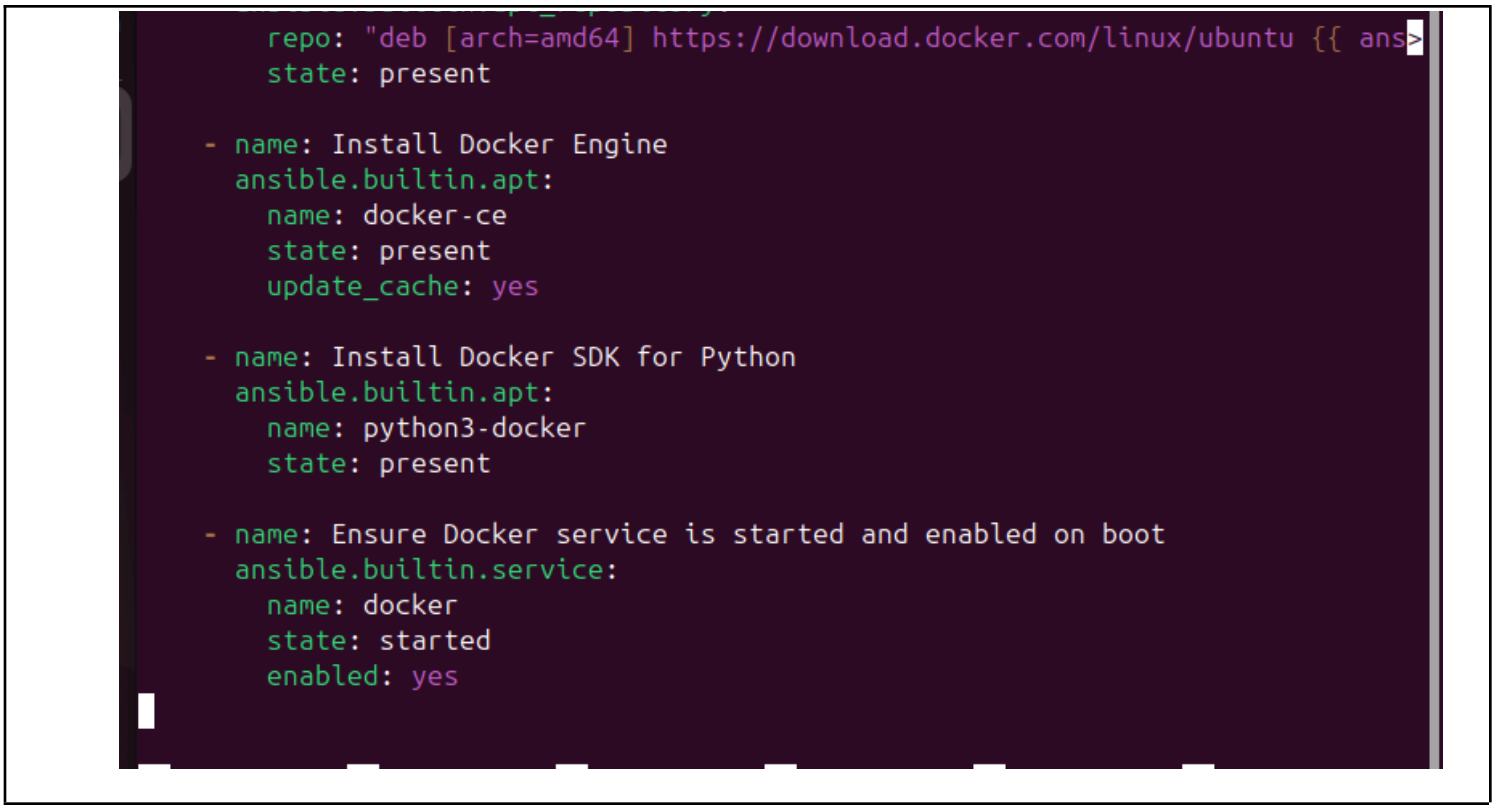
install docker for ubuntu

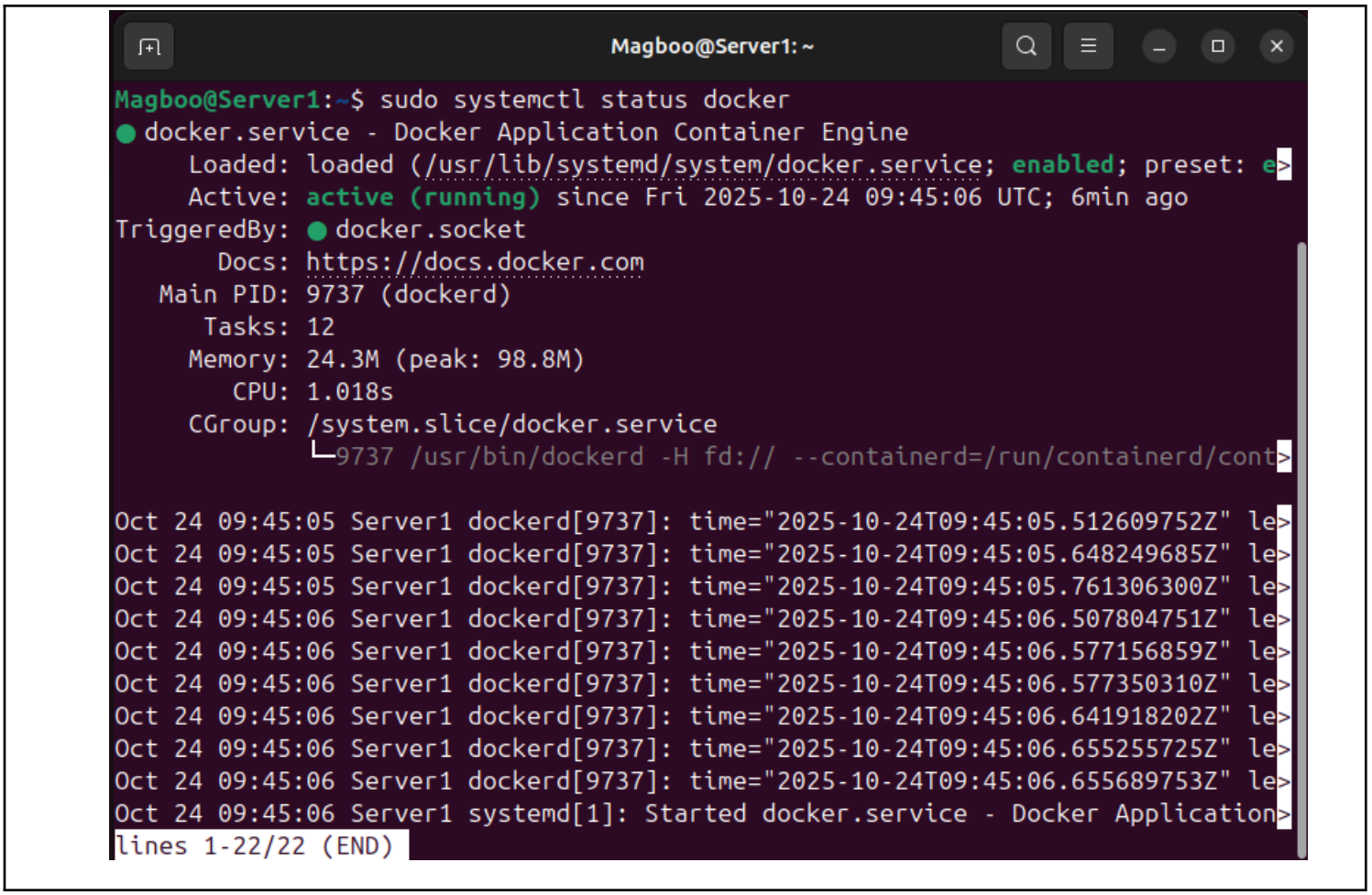


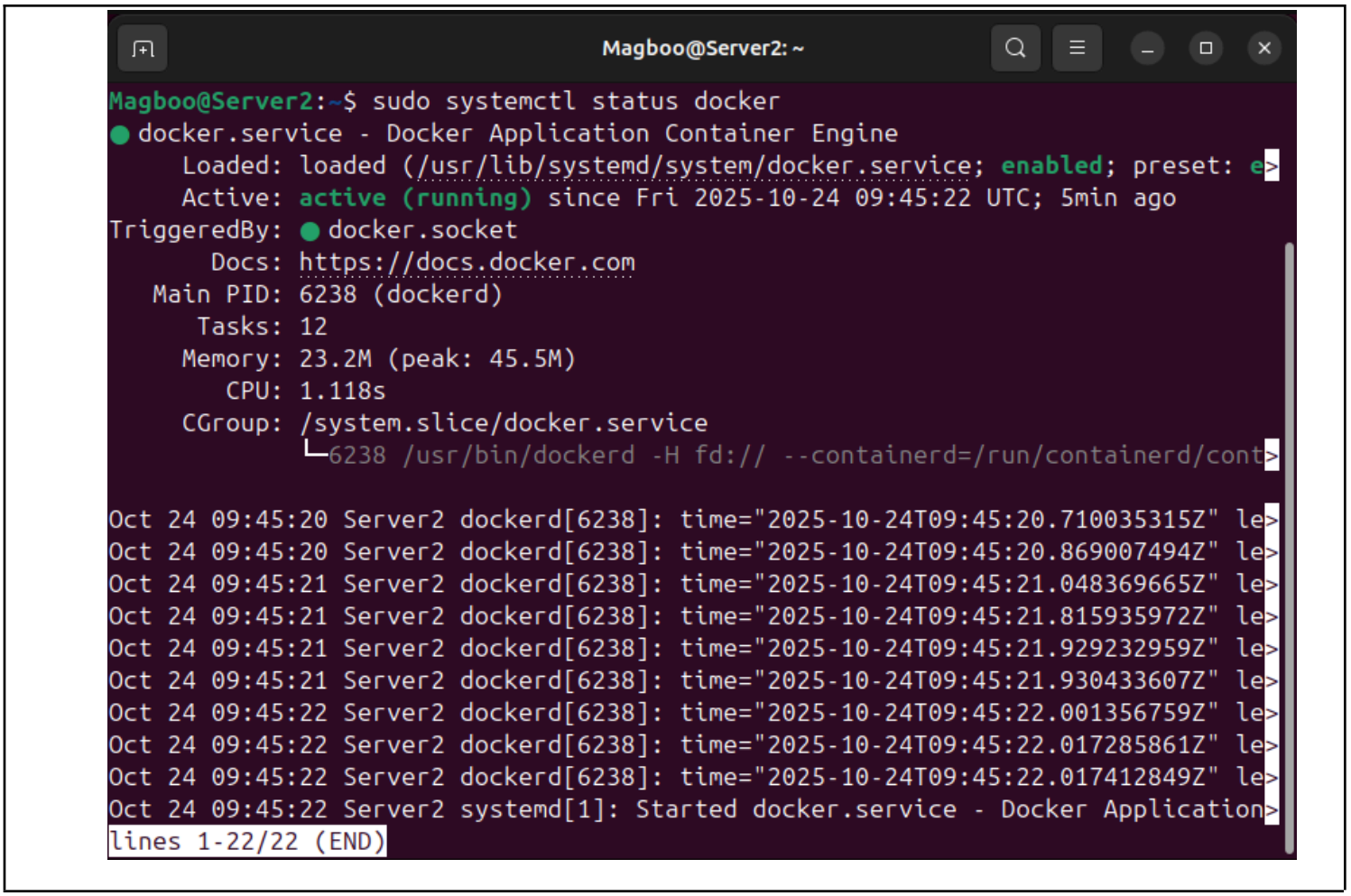
install docker on centos

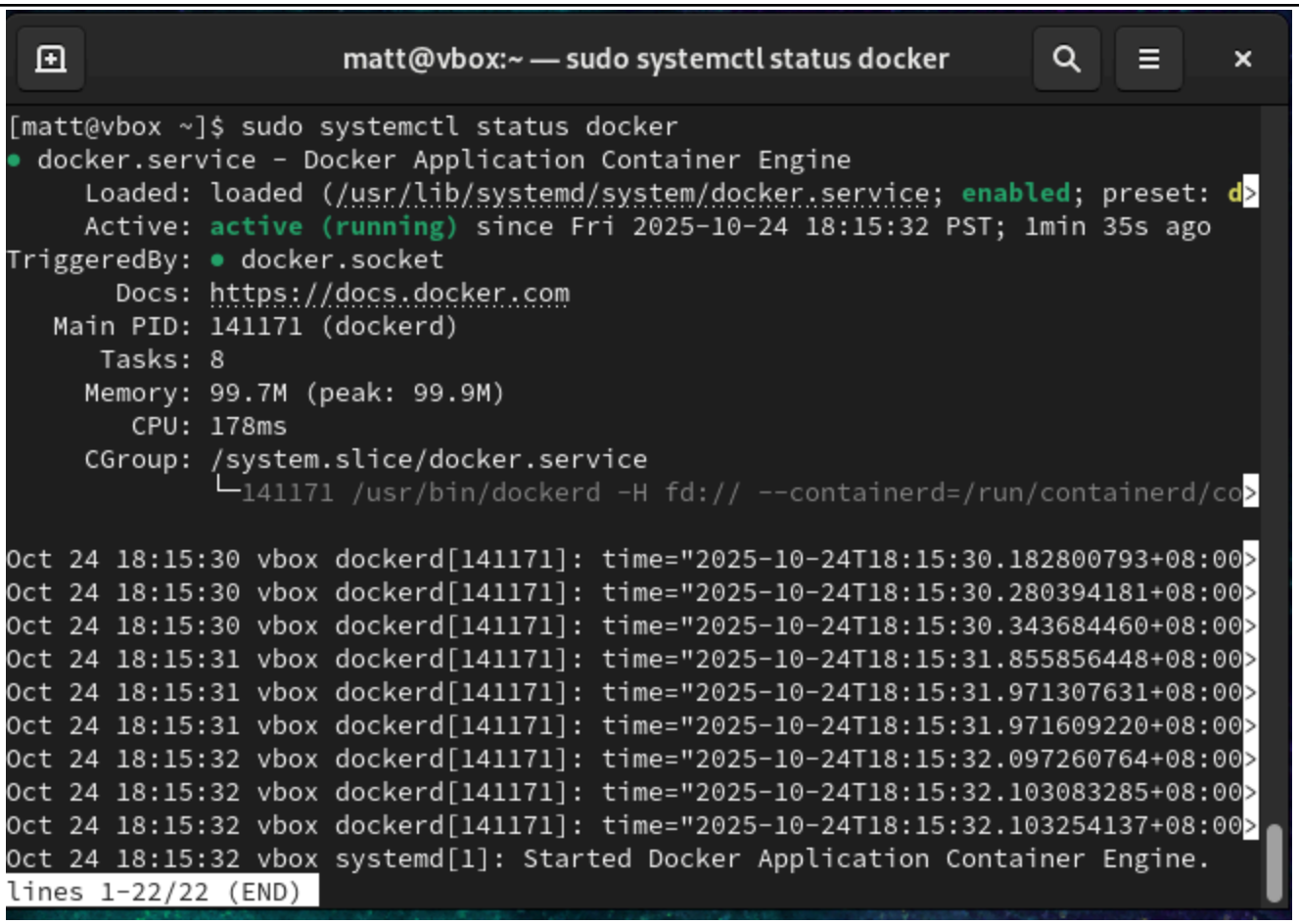

Magboo@LocalMachine: ~/CPE212_Magboo_Docker
GNU nano 7.2 docker.yml *

- name: Install Docker on all nodes
hosts: all
become: yes
tasks:
- name: Update APT package cache
ansible.builtin.apt:
update_cache: yes
- name: Install prerequisite packages
ansible.builtin.apt:
name:
- apt-transport-https
- ca-certificates
- curl
- software-properties-common
- python3-pip
state: present
- name: Add Docker's official GPG key
ansible.builtin.apt_key:
url: https://download.docker.com/linux/ubuntu/gpg
state: present
- name: Add Docker repository
ansible.builtin.apt_repository:

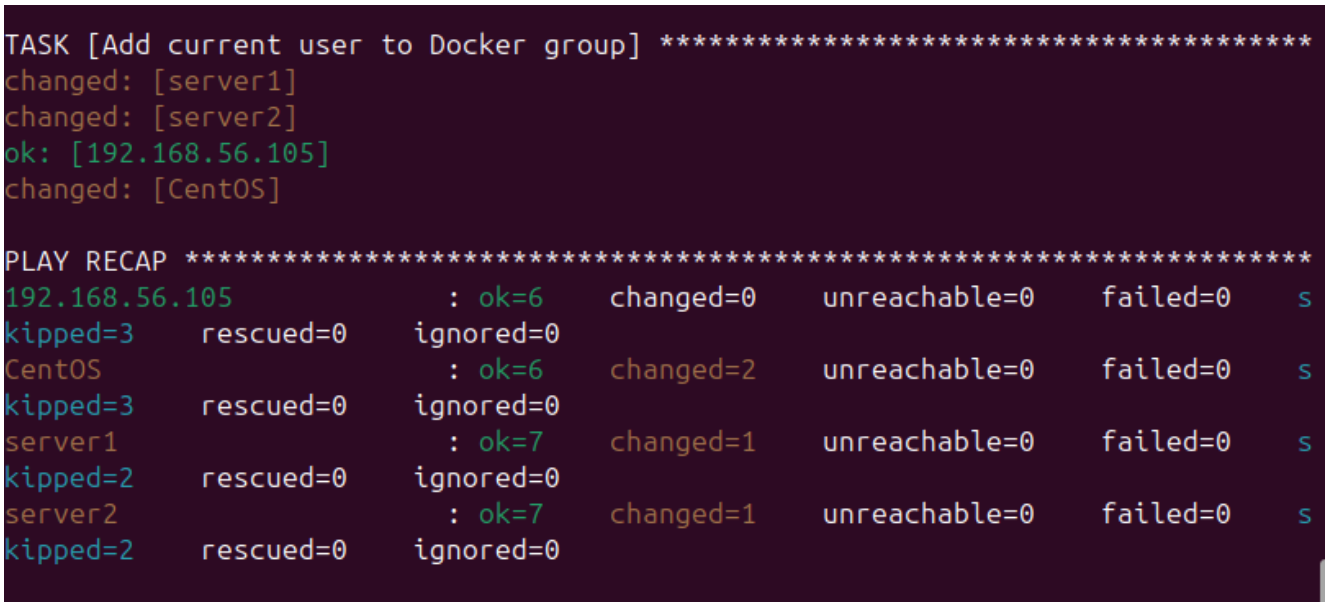

repo: "deb [arch=amd64] https://download.docker.com/linux/ubuntu {{ ans
state: present
- name: Install Docker Engine
ansible.builtin.apt:
name: docker-ce
state: present
update_cache: yes
- name: Install Docker SDK for Python
ansible.builtin.apt:
name: python3-docker
state: present
- name: Ensure Docker service is started and enabled on boot
ansible.builtin.service:
name: docker
state: started
enabled: yes


Magboo@Server1: ~
Magboo@Server1:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: e>
Active: active (running) since Fri 2025-10-24 09:45:06 UTC; 6min ago
TriggeredBy: ● docker.socket
Docs: https://docs.docker.com
Main PID: 9737 (dockerd)
Tasks: 12
Memory: 24.3M (peak: 98.8M)
CPU: 1.018s
CGroup: /system.slice/docker.service
└─9737 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/cont>
Oct 24 09:45:05 Server1 dockerd[9737]: time="2025-10-24T09:45:05.512609752Z" le>
Oct 24 09:45:05 Server1 dockerd[9737]: time="2025-10-24T09:45:05.648249685Z" le>
Oct 24 09:45:05 Server1 dockerd[9737]: time="2025-10-24T09:45:05.761306300Z" le>
Oct 24 09:45:06 Server1 dockerd[9737]: time="2025-10-24T09:45:06.507804751Z" le>
Oct 24 09:45:06 Server1 dockerd[9737]: time="2025-10-24T09:45:06.577156859Z" le>
Oct 24 09:45:06 Server1 dockerd[9737]: time="2025-10-24T09:45:06.577350310Z" le>
Oct 24 09:45:06 Server1 dockerd[9737]: time="2025-10-24T09:45:06.641918202Z" le>
Oct 24 09:45:06 Server1 dockerd[9737]: time="2025-10-24T09:45:06.655255725Z" le>
Oct 24 09:45:06 Server1 dockerd[9737]: time="2025-10-24T09:45:06.655689753Z" le>
Oct 24 09:45:06 Server1 systemd[1]: Started docker.service - Docker Application>
lines 1-22/22 (END)


Magboo@Server2: ~
Magboo@Server2:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: e>
Active: active (running) since Fri 2025-10-24 09:45:22 UTC; 5min ago
TriggeredBy: ● docker.socket
Docs: https://docs.docker.com
Main PID: 6238 (dockerd)
Tasks: 12
Memory: 23.2M (peak: 45.5M)
CPU: 1.118s
CGroup: /system.slice/docker.service
└6238 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/cont>
Oct 24 09:45:20 Server2 dockerd[6238]: time="2025-10-24T09:45:20.710035315Z" le>
Oct 24 09:45:20 Server2 dockerd[6238]: time="2025-10-24T09:45:20.869007494Z" le>
Oct 24 09:45:21 Server2 dockerd[6238]: time="2025-10-24T09:45:21.048369665Z" le>
Oct 24 09:45:21 Server2 dockerd[6238]: time="2025-10-24T09:45:21.815935972Z" le>
Oct 24 09:45:21 Server2 dockerd[6238]: time="2025-10-24T09:45:21.929232959Z" le>
Oct 24 09:45:21 Server2 dockerd[6238]: time="2025-10-24T09:45:21.930433607Z" le>
Oct 24 09:45:22 Server2 dockerd[6238]: time="2025-10-24T09:45:22.001356759Z" le>
Oct 24 09:45:22 Server2 dockerd[6238]: time="2025-10-24T09:45:22.017285861Z" le>
Oct 24 09:45:22 Server2 dockerd[6238]: time="2025-10-24T09:45:22.017412849Z" le>
Oct 24 09:45:22 Server2 systemd[1]: Started docker.service - Docker Application>
lines 1-22/22 (END)

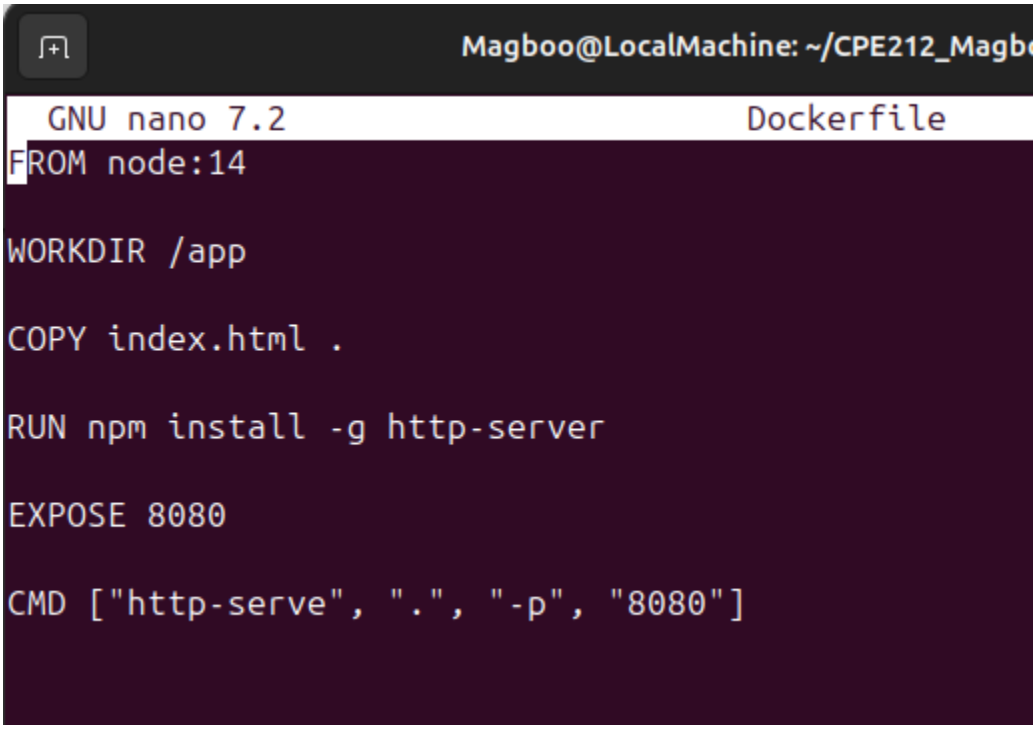

matt@vbox:~ — sudo systemctl status docker
[matt@vbox ~]$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: d
Active: active (running) since Fri 2025-10-24 18:15:32 PST; 1min 35s ago
TriggeredBy: ● docker.socket
Docs: https://docs.docker.com
Main PID: 141171 (dockerd)
Tasks: 8
Memory: 99.7M (peak: 99.9M)
CPU: 178ms
CGroup: /system.slice/docker.service
└141171 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/co
Oct 24 18:15:30 vbox dockerd[141171]: time="2025-10-24T18:15:30.182800793+08:00
Oct 24 18:15:30 vbox dockerd[141171]: time="2025-10-24T18:15:30.280394181+08:00
Oct 24 18:15:30 vbox dockerd[141171]: time="2025-10-24T18:15:30.343684460+08:00
Oct 24 18:15:31 vbox dockerd[141171]: time="2025-10-24T18:15:31.855856448+08:00
Oct 24 18:15:31 vbox dockerd[141171]: time="2025-10-24T18:15:31.971307631+08:00
Oct 24 18:15:31 vbox dockerd[141171]: time="2025-10-24T18:15:31.971609220+08:00
Oct 24 18:15:32 vbox dockerd[141171]: time="2025-10-24T18:15:32.097260764+08:00
Oct 24 18:15:32 vbox dockerd[141171]: time="2025-10-24T18:15:32.103083285+08:00
Oct 24 18:15:32 vbox dockerd[141171]: time="2025-10-24T18:15:32.103254137+08:00
Oct 24 18:15:32 vbox systemd[1]: Started Docker Application Container Engine.
lines 1-22/22 (END)

3.


TASK [Add current user to Docker group] **
changed: [server1]
changed: [server2]
ok: [192.168.56.105]
changed: [CentOS]
PLAY RECAP ***
192.168.56.105 : ok=6 changed=0 unreachable=0 failed=0 s
kipped=3 rescued=0 ignored=0
CentOS : ok=6 changed=2 unreachable=0 failed=0 s
kipped=3 rescued=0 ignored=0
server1 : ok=7 changed=1 unreachable=0 failed=0 s
kipped=2 rescued=0 ignored=0
server2 : ok=7 changed=1 unreachable=0 failed=0 s
kipped=2 rescued=0 ignored=0

```
    - name: Add current user to Docker group
      user:
        name: "{{ ansible_user }}"
        groups: docker
        append: yes
```

4.

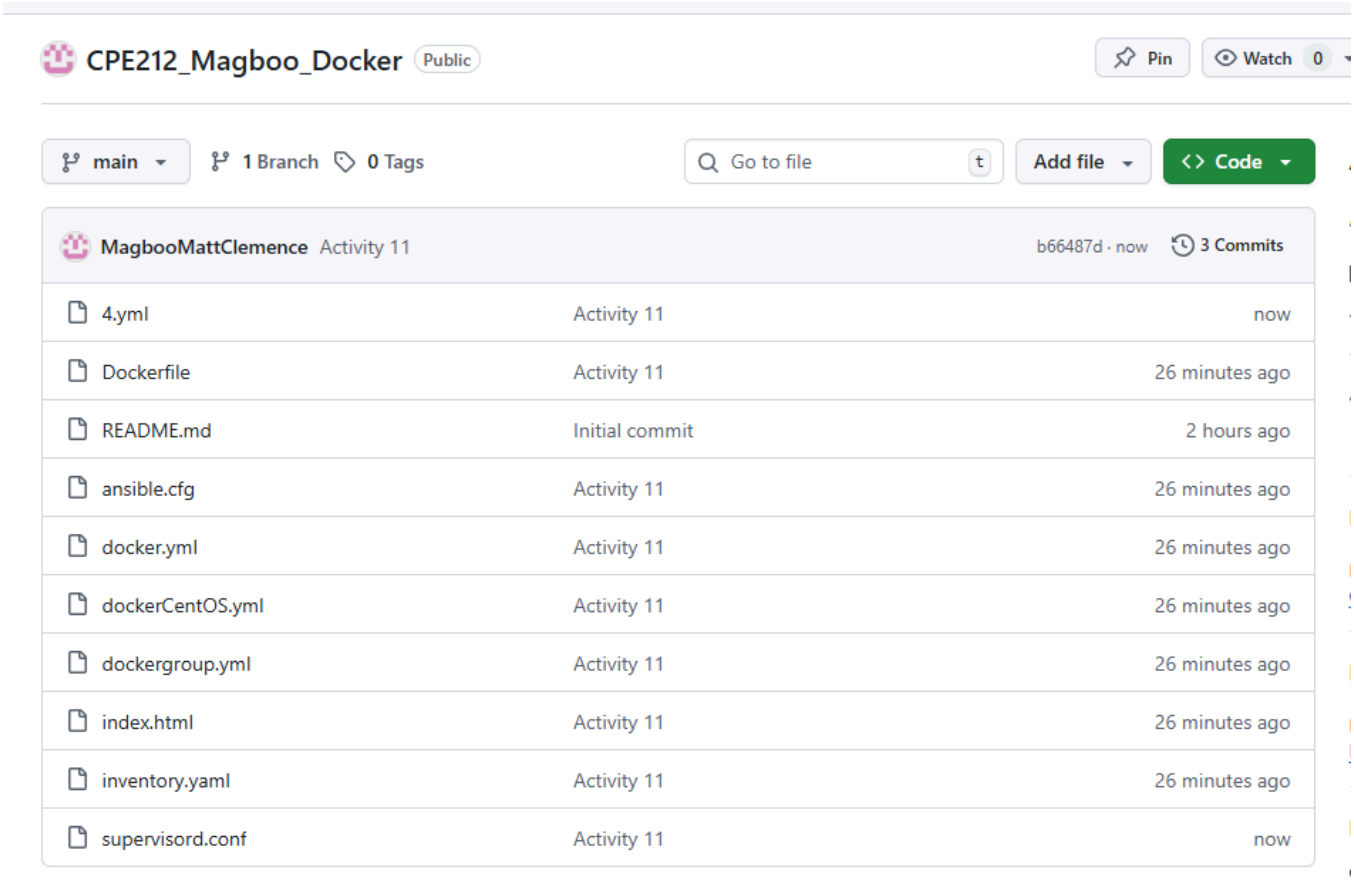


```
Magboo@LocalMachine: ~/CPE212_M
  GNU nano 7.2                                  index.html
<!DOCTYPE html>
<html lang="en">
<head>
<body>
        <h1>Hello, World</h1>
        <p1>This page is index</p1>
</body>
</head>
</html>
```

5.

```
Magboo@LocalMachine: ~/CPE212_Magboo_Docker
Start a build
Magboo@LocalMachine:~/CPE212_Magboo_Docker$ sudo docker build -t contsysad .
[+] Building 188.0s (9/9) FINISHED                                  docker:default
 => [internal] load build definition from Dockerfile                          0.0s
 => => transferring dockerfile: 169B                                          0.0s
 => [internal] load metadata for docker.io/library/node:14                    4.2s
 => [internal] load .dockerignore                                             0.1s
 => => transferring context: 2B                                               0.0s
 => [1/4] FROM docker.io/library/node:14@sha256:a158d3b9b4e3fa813fa6c8c  175.7s
 => => resolve docker.io/library/node:14@sha256:a158d3b9b4e3fa813fa6c8c59  0.0s
 => => sha256:b253aeafeaa7e0671bb60008df01de101a38a045ff 7.86MB / 7.86MB  12.9s
 => => sha256:3d2201bd995cccf12851a50820de03d34a17011d 10.00MB / 10.00MB  13.5s
 => => sha256:1d12470fa662a2a5cb50378dcdc8ea228c1735747db 7.51kB / 7.51kB  0.0s
 => => sha256:2ff1d7c41c74a25258bfa6f0b8adb0a727f84518 50.45MB / 50.45MB  57.5s
 => => sha256:a158d3b9b4e3fa813fa6c8c590b8f0a860e015ad4e59bbc 776B / 776B  0.0s
 => => sha256:2cafa3fbb0b6529ee4726b4f599ec27ee557ea3dea7 2.21kB / 2.21kB  0.0s
 => => sha256:1de76e268b103d05fa8960e0f77951ff54b912b6 51.88MB / 51.88MB  70.3s
 => => sha256:d9a8df5894511ce28a05e2925a75e8a4acbd0 191.85MB / 191.85MB  147.0s
 => => sha256:6f51ee005deac0d99898e41b8ce60ebf250ebe1a31 4.19kB / 4.19kB  66.7s
 => => extracting sha256:2ff1d7c41c74a25258bfa6f0b8adb0a727f84518f55f65ca  9.8s
 => => sha256:5f32ed3c3f278edda4fc571c880b5277355a29ae 35.24MB / 35.24MB  95.3s
 => => extracting sha256:b253aeafeaa7e0671bb60008df01de101a38a045ff7bc656  1.1s
 => => extracting sha256:3d2201bd995cccf12851a50820de03d34a17011dcbb9ac9f  0.8s
 => => sha256:0c8cc2f24a4dcb64e602e086fc9446b0a541e8acd9 2.29MB / 2.29MB  74.1s
```

6.



Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?
   it compresses all the actions needed and it makes the running of commands smoother even with the use of ansible containerization help in for the docker container in which the docker container is the application for the docker images.

Conclusions:

in conclusion though containerization have too many steps it could ease the process for each modules so that it could run smoothly and upon the utilization of ansible it makes it more easy to contain and deploy using docker