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Course/Section: CPE31S24	**Date Submitted: 11/16/2022**
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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)

Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.

Owner * **Repository name** *

Bencitoo / Bencito_Docker ✓

Great repository names are short and memorable. Need inspiration? How about **cuddly-rotary-phone**?

Description (optional)

Activity 11: Containerization

Public
Anyone on the internet can see this repository. You choose who can commit.

Private
You choose who can see and commit to this repository.

Initialize this repository with:
Skip this step if you're importing an existing repository.

Add a README file
This is where you can write a long description for your project. Learn more.

Add .gitignore
Choose which files not to track from a list of templates. Learn more.

.gitignore template: None

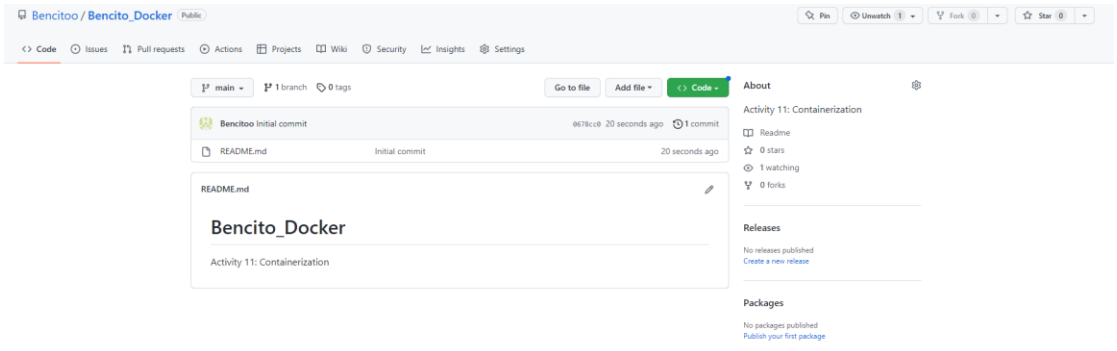
Choose a license
A license tells others what they can and can't do with your code. Learn more.

License: None

This will set `main` as the default branch. Change the default name in your settings.

You are creating a public repository in your personal account.

Create repository



I create a repository named Bencito_Docker

```
bencito@workstation:~$ git clone git@github.com:Bencitoo/Bencito_Docker.git
Cloning into 'Bencito_Docker'...
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.
bencito@workstation:~$
```

I git clone it

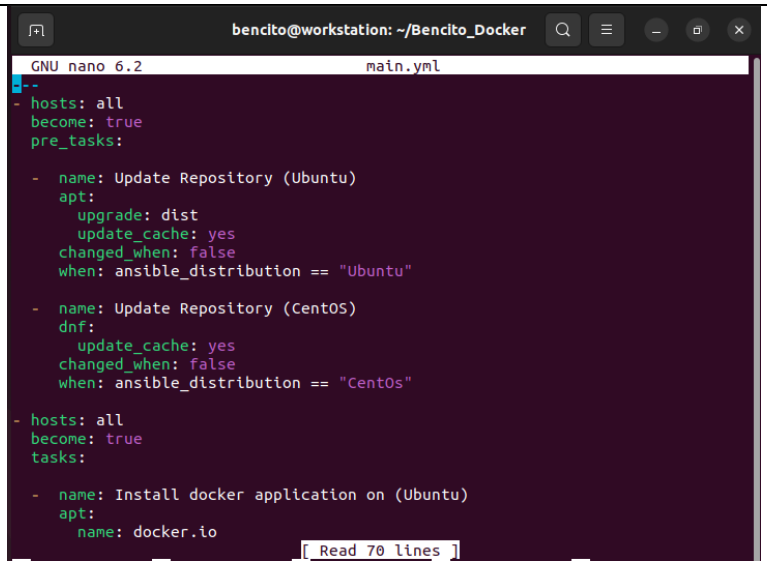
```
bencito@workstation:~/Bencito_Docker$ nano ansible.cfg
bencito@workstation:~/Bencito_Docker$ nano inventory
bencito@workstation:~/Bencito_Docker$
```

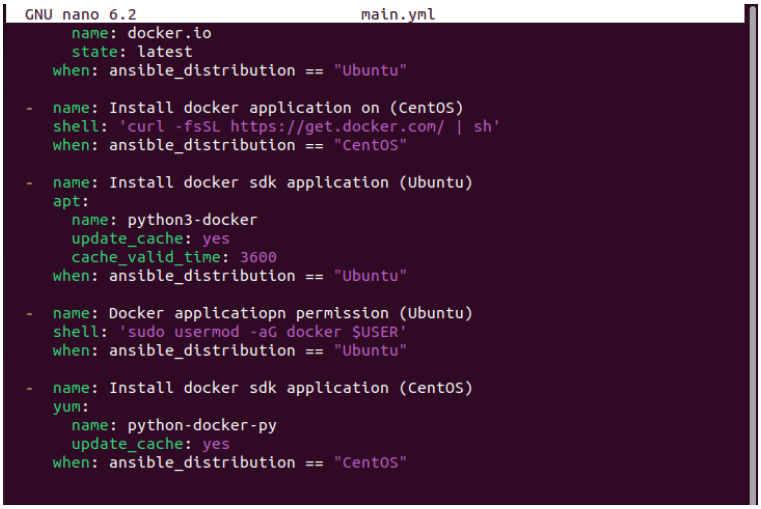
```
  GNU nano 6.2                          ansible.cfg
[defaults]

inventory = inventory
Host_key_checking = False

deprecation_warnings = False
command_warnings = False

remote_user = bencito
private_key_file = /.ssh/
```

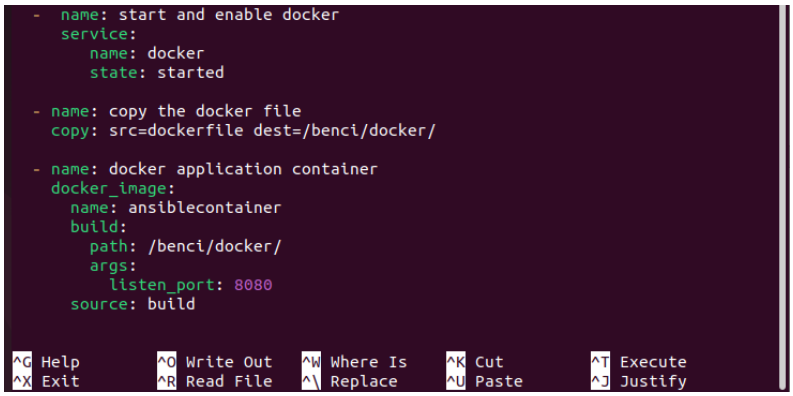
```
  GNU nano 6.2                          inventory
192.168.56.101
192.168.56.105
```

```
bencito@workstation:~/Bencito_Docker$ ansible all -m ping
192.168.56.105 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python"
    },
    "changed": false,
    "ping": "pong"
}
192.168.56.101 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
bencito@workstation:~/Bencito_Docker$
```

After that I create an inventory file and the ansible.cfg. Also, I check if it's see each other.







After that I create a playbook named main.yml. Inside of it was the installer and configuration of the docker.

```
bencito@workstation:~/Bencito_Docker$ ansible-playbook --ask-become-pass main.y
ml
BECOME password:

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

TASK [Gathering Facts] ********************************************************
*
ok: [192.168.56.105]
ok: [192.168.56.101]

TASK [Update Repository (Ubuntu)] *********************************************
*
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [Update Repository (CentOS)] *********************************************
*
skipping: [192.168.56.101]
skipping: [192.168.56.105]

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

TASK [Gathering Facts] ********************************************************
*
ok: [192.168.56.101]
ok: [192.168.56.105]
```

```
TASK [Install docker application on (Ubuntu)] *********************************
*
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [Install docker application on (CentOS)] *********************************
*
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [Install docker sdk application (Ubuntu)] ********************************
*
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [Docker applicatiopn permission (Ubuntu)] ********************************
*
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [Install docker sdk application (CentOS)] ********************************
*
skipping: [192.168.56.101]
ok: [192.168.56.105]

TASK [Docker application permission (CentOS)] *********************************
*
skipping: [192.168.56.101]
changed: [192.168.56.105]
```

```
*
An exception occurred during task execution. To see the full traceback, use -vv
v. The error was: If you are using a module and expect the file to exist on the
 remote, see the remote_src option
fatal: [192.168.56.101]: FAILED! => {"changed": false, "msg": "Could not find o
r access 'dockerfile'\nSearched in:\n\t/home/bencito/Bencito_Docker/files/docke
rfile\n\t/home/bencito/Bencito_Docker/dockerfile\n\t/home/bencito/Bencito_Docke
r/files/dockerfile\n\t/home/bencito/Bencito_Docker/dockerfile on the Ansible Co
ntroller.\nIf you are using a module and expect the file to exist on the remote
, see the remote_src option"}
An exception occurred during task execution. To see the full traceback, use -vv
v. The error was: If you are using a module and expect the file to exist on the
 remote, see the remote_src option
fatal: [192.168.56.105]: FAILED! => {"changed": false, "msg": "Could not find o
r access 'dockerfile'\nSearched in:\n\t/home/bencito/Bencito_Docker/files/docke
rfile\n\t/home/bencito/Bencito_Docker/dockerfile\n\t/home/bencito/Bencito_Docke
r/files/dockerfile\n\t/home/bencito/Bencito_Docker/dockerfile on the Ansible Co
ntroller.\nIf you are using a module and expect the file to exist on the remote
, see the remote_src option"}

PLAY RECAP *********************************************************************
*
192.168.56.101             : ok=7    changed=1    unreachable=0    failed=1
skipped=4    rescued=0    ignored=0
192.168.56.105             : ok=6    changed=2    unreachable=0    failed=1
skipped=5    rescued=0    ignored=0

bencito@workstation:~/Bencito_Docker$ ansible-playbook --ask-become-pass main.y
ml
```

<u>After on my first run. I have an error on the copying the docker file. Because I don't have installer on each control node.</u>

Adding the dockerfiles Installer

```
bencito@workstation: ~/Bencito_Docker
  GNU nano 6.2                                dockerfile
FROM ubuntu
MAINTAINER qsjbencito <qsjbencito@tip.edu.ph>

#Skip prompts
ARG DEBIAN_FRONTEND=noninteractive

#Update packages
RUN apt update; apt dist-upgrade -y

# Instal packages
RUN apt install -y apache2 mariadb-server

# Set entrypoint
ENTRYPOINT apache2ctl -D FOREGROUND
```

<u>I add the Installer of the apache and the mariadb-server on my main repository</u>

Re-run again

```
bencito@workstation:~/Bencito_Docker$ ansible-playbook --ask-become-pass main.y
ml
BECOME password:

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

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.101]
ok: [192.168.56.105]

TASK [Update Repository (Ubuntu)] **********************************************
*
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [Update Repository (CentOS)] **********************************************
*
skipping: [192.168.56.101]
skipping: [192.168.56.105]

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

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.101]
ok: [192.168.56.105]
```

```
TASK [Install docker application on (Ubuntu)] **********************************
*
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [Install docker application on (CentOS)] **********************************
*
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [Install docker sdk application (Ubuntu)] *********************************
*
skipping: [192.168.56.105]
ok: [192.168.56.101]

TASK [Docker applicatiopn permission (Ubuntu)] *********************************
*
skipping: [192.168.56.105]
changed: [192.168.56.101]

TASK [Install docker sdk application (CentOS)] **********************************
*
skipping: [192.168.56.101]
ok: [192.168.56.105]

TASK [Docker application permission (CentOS)] **********************************
*
skipping: [192.168.56.101]
changed: [192.168.56.105]
```

```
TASK [Docker application permission (CentOS)] **********************************
*
skipping: [192.168.56.101]
changed: [192.168.56.105]

TASK [start and enable docker] *************************************************
*
ok: [192.168.56.101]
ok: [192.168.56.105]

TASK [copy the docker file] ****************************************************
*
ok: [192.168.56.101]
ok: [192.168.56.105]

TASK [docker application container] ********************************************
*
ok: [192.168.56.105]
changed: [192.168.56.101]

PLAY RECAP *********************************************************************
*
192.168.56.101             : ok=9    changed=2    unreachable=0    failed=0
skipped=4    rescued=0    ignored=0
192.168.56.105             : ok=8    changed=2    unreachable=0    failed=0
skipped=5    rescued=0    ignored=0

bencito@workstation:~/Bencito_Docker$
```

After I add the installer of the apache and mariadb. It was successfully run without error

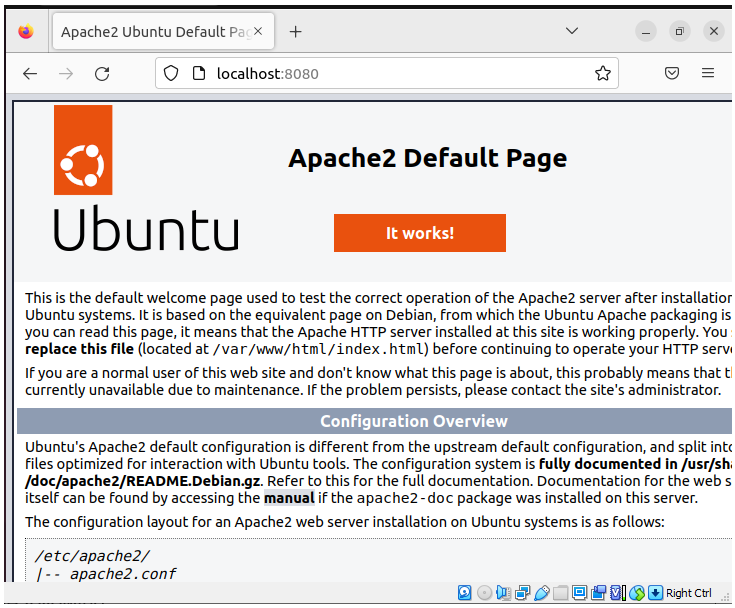
OUTPUT

Ubuntu

```
bencito@Server1:~$ systemctl status docker
● docker.service - Docker Application Container Engine
     Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor prese>
     Active: active (running) since Tue 2022-11-15 22:45:34 PST; 1h 10min ago
TriggeredBy: ● docker.socket
       Docs: https://docs.docker.com
   Main PID: 39682 (dockerd)
      Tasks: 10
     Memory: 295.0M
        CPU: 17.794s
     CGroup: /system.slice/docker.service
             └─39682 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/co>

Nov 15 22:45:34 Server1 dockerd[39682]: time="2022-11-15T22:45:34.275289850+08>
Nov 15 22:45:34 Server1 systemd[1]: Started Docker Application Container Engin>
Nov 15 22:45:34 Server1 dockerd[39682]: time="2022-11-15T22:45:34.588256136+08>
Nov 15 23:44:46 Server1 dockerd[39682]: time="2022-11-15T23:44:46.473422311+08>
Nov 15 23:44:46 Server1 dockerd[39682]: time="2022-11-15T23:44:46.474749208+08>
Nov 15 23:50:16 Server1 dockerd[39682]: time="2022-11-15T23:50:16.833154261+08>
Nov 15 23:50:17 Server1 dockerd[39682]: time="2022-11-15T23:50:17.205275365+08>
Nov 15 23:51:55 Server1 dockerd[39682]: time="2022-11-15T23:51:55.181336334+08>
Nov 15 23:52:58 Server1 dockerd[39682]: time="2022-11-15T23:52:58.687291319+08>
Nov 15 23:53:35 Server1 dockerd[39682]: time="2022-11-15T23:53:35.696967162+08>
lines 1-22/22 (END)
```

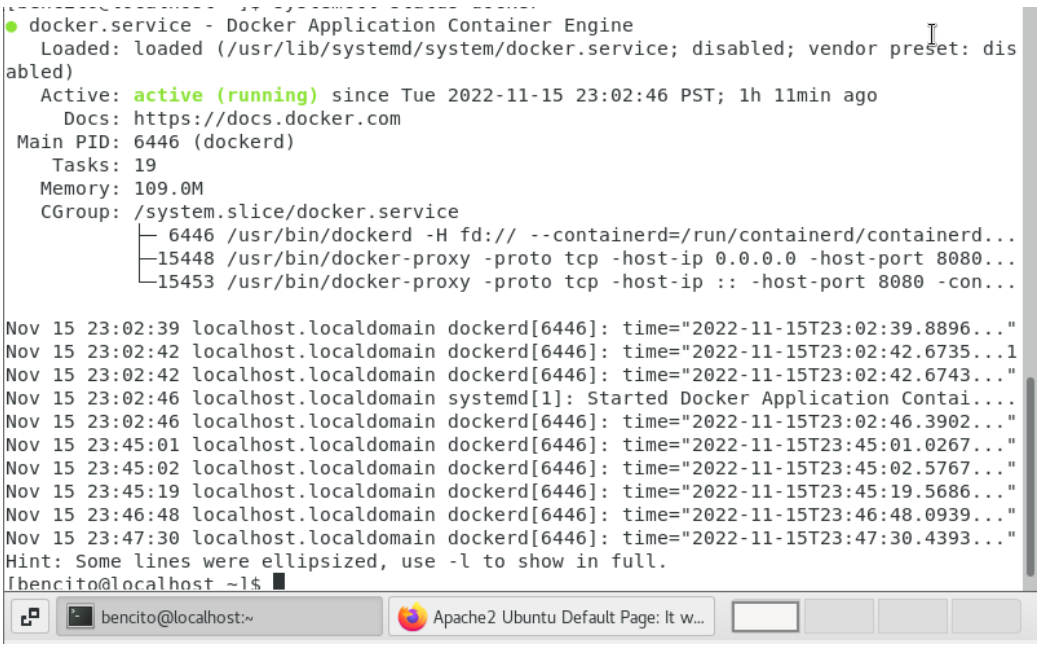
```
bencito@Server1:~$ sudo docker images
REPOSITORY          TAG       IMAGE ID       CREATED          SIZE
ansiblecontainer    latest    30e6c50a2fc6   13 minutes ago   512MB
ubuntu              latest    a8780b506fa4   12 days ago      77.8MB
bencito@Server1:~$ sudo docker run -d -it -p 8080:80 ansiblecontainer
020517e64bc20fa81b3ea6a56d5e1496a44b03ca99a9cf39e1527ae3249c31ea
bencito@Server1:~$ sudo docker ps
CONTAINER ID   IMAGE              COMMAND                  CREATED         STAT
US         PORTS                                  NAMES
020517e64bc2   ansiblecontainer   "/bin/sh -c 'apache2…"   6 seconds ago   Up 3
 seconds   0.0.0.0:8080->80/tcp, :::8080->80/tcp   determined_bartik
bencito@Server1:~$
```

```
bencito@Server1:~$ sudo usermod -aG docker $USER
bencito@Server1:~$
```

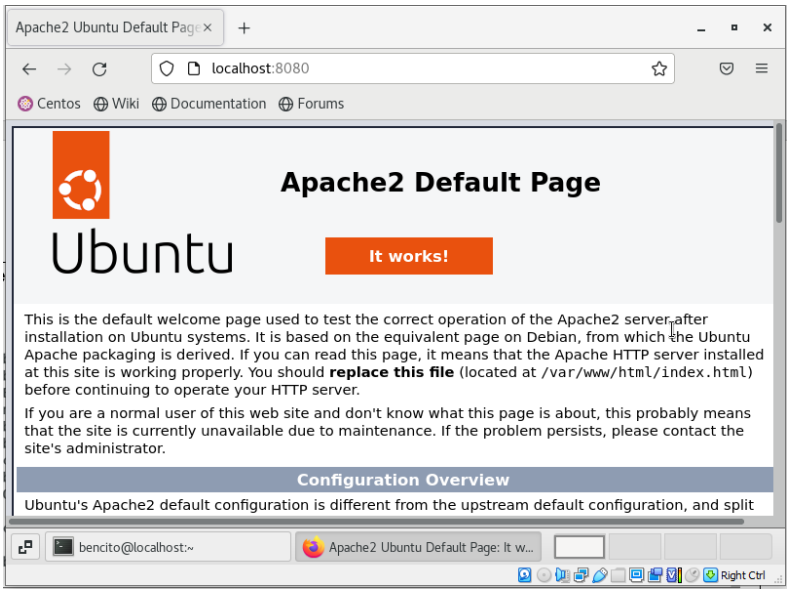


CentOS

```
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: dis
abled)
   Active: active (running) since Tue 2022-11-15 23:02:46 PST; 1h 11min ago
     Docs: https://docs.docker.com
 Main PID: 6446 (dockerd)
    Tasks: 19
   Memory: 109.0M
   CGroup: /system.slice/docker.service
           ├─ 6446 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd...
           ├─15448 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 8080...
           └─15453 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 8080 -con...

Nov 15 23:02:39 localhost.localdomain dockerd[6446]: time="2022-11-15T23:02:39.8896..."
Nov 15 23:02:42 localhost.localdomain dockerd[6446]: time="2022-11-15T23:02:42.6735...1
Nov 15 23:02:42 localhost.localdomain dockerd[6446]: time="2022-11-15T23:02:42.6743..."
Nov 15 23:02:46 localhost.localdomain systemd[1]: Started Docker Application Contai....
Nov 15 23:02:46 localhost.localdomain dockerd[6446]: time="2022-11-15T23:02:46.3902..."
Nov 15 23:45:01 localhost.localdomain dockerd[6446]: time="2022-11-15T23:45:01.0267..."
Nov 15 23:45:02 localhost.localdomain dockerd[6446]: time="2022-11-15T23:45:02.5767..."
Nov 15 23:45:19 localhost.localdomain dockerd[6446]: time="2022-11-15T23:45:19.5686..."
Nov 15 23:46:48 localhost.localdomain dockerd[6446]: time="2022-11-15T23:46:48.0939..."
Nov 15 23:47:30 localhost.localdomain dockerd[6446]: time="2022-11-15T23:47:30.4393..."
Hint: Some lines were ellipsized, use -l to show in full.
[bencito@localhost ~]$
```



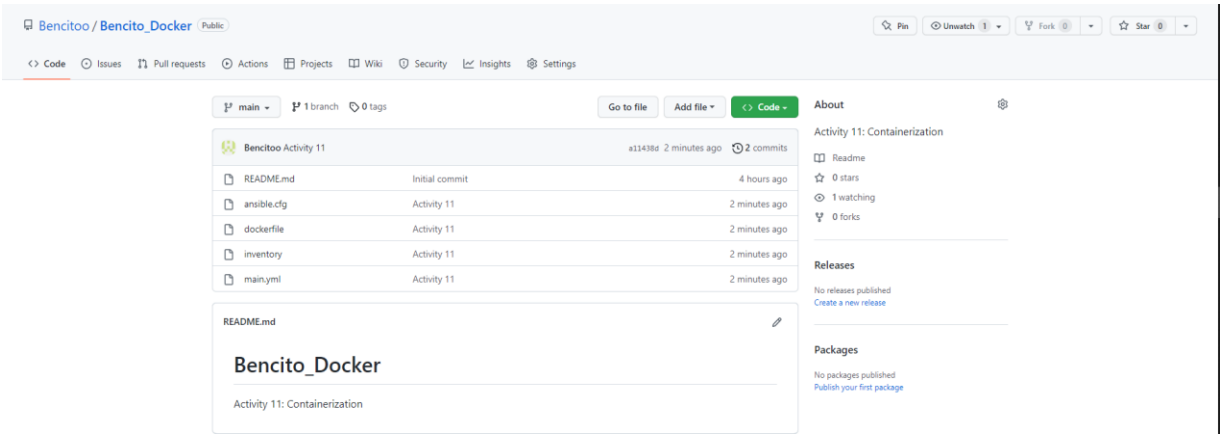

```
[bencito@localhost ~]$ sudo usermod -aG docker $USER
[bencito@localhost ~]$ sudo docker images
REPOSITORY          TAG       IMAGE ID       CREATED          SIZE
ansiblecontainer    latest    37c4122729c3   23 minutes ago   512MB
ubuntu              latest    a8780b506fa4   12 days ago      77.8MB
[bencito@localhost ~]$ sudo docker run -d -it -p 8080:80 ansiblecontainer
7c59addc10f984506123c0a059a557c85e02d11e76edeeb7443ff268a8f3d4c0
[bencito@localhost ~]$ sudo docker ps
CONTAINER ID   IMAGE              COMMAND                  CREATED         STATUS
   PORTS                                  NAMES
7c59addc10f9   ansiblecontainer   "/bin/sh -c 'apache2…"   5 seconds ago   Up 3 seconds
   0.0.0.0:8080->80/tcp, :::8080->80/tcp   tender_babbage
[bencito@localhost ~]$
```



As you can see it was successfully installed on my two control nodes and I add the usermod to read the installer that I add on my main playbook.

Adding to the repository

```
bencito@workstation:~/Bencito_Docker$ git add inventory
bencito@workstation:~/Bencito_Docker$ git add ansible.cfg
bencito@workstation:~/Bencito_Docker$ git add main.yml
bencito@workstation:~/Bencito_Docker$ git add dockerfile
bencito@workstation:~/Bencito_Docker$ git commit -m "Activity 11"
[main a11438d] Activity 11
 4 files changed, 96 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 dockerfile
 create mode 100644 inventory
 create mode 100644 main.yml
bencito@workstation:~/Bencito_Docker$ git push
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Compressing objects: 100% (5/5), done.
Writing objects: 100% (6/6), 1.22 KiB | 65.00 KiB/s, done.
Total 6 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:Bencitoo/Bencito_Docker.git
   0678cc0..a11438d  main -> main
bencito@workstation:~/Bencito_Docker$ git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
bencito@workstation:~/Bencito_Docker$
```



Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?
   - The benefits of implementing the containering it was easy to share a resource to other workmate and many containers can be placed in a single host. It also, it was easier to manage and fastest app startup.

Conclusions:

A Docker container image is a lightweight, standalone, executable package of software that includes everything needed to run an application: code, runtime, system tools, system libraries and settings. After creating this activity, I learn that you need to check all the codes before you run it. Because while doing this I didn't notice that my copying file was empty. I remember that you need to add the installer on your repository with

the main playbook. Also, you need some more storage on your computer before doing this activity. Overall, I'm thankful on the guide that are given to us.

I affirm that I shall not give or receive any unauthorized help on this assignment and that all work shall be my own.