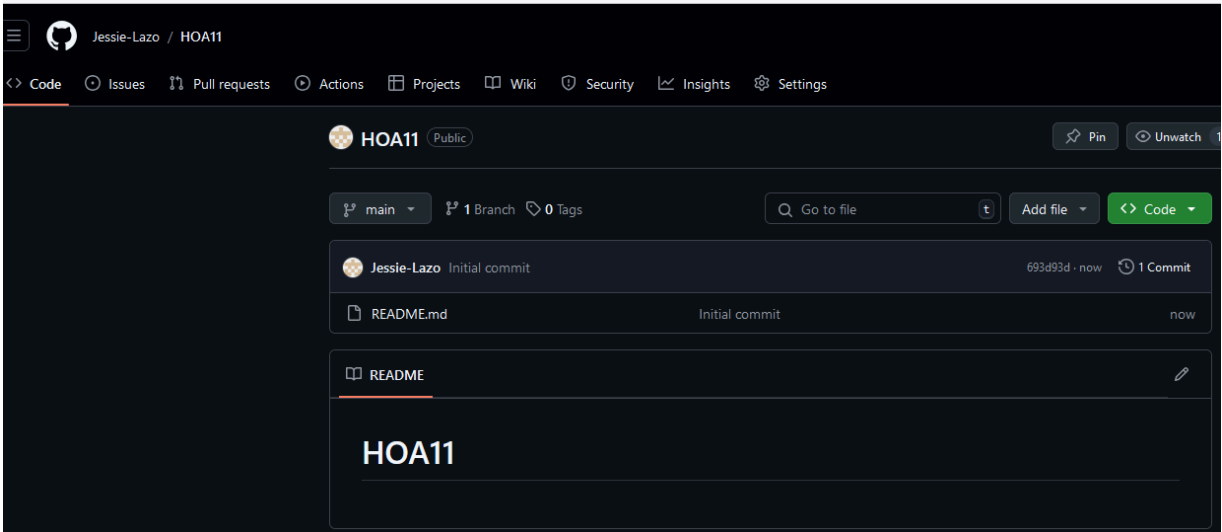


Name: Jessie Robert Lazo	Date Performed:11/13/2024
Course/Section:CPE 212-CPE31S2	Date Submitted:11/13/2024
Instructor: Engr. Robin Valenzuela	Semester and SY:
Activity 11: Containerization	
1. Objectives	
Create a Dockerfile and form a workflow using Ansible as Infrastructure as Code (IaC) to enable Continuous Delivery process	
2. Discussion	
<p>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.</p> <p>Source: https://docs.docker.com/get-started/overview/</p> <p>You may also check the difference between containers and virtual machines. Click the link given below.</p> <p>Source: https://docs.microsoft.com/en-us/virtualization/windowscontainers/about/containers-vs-vm</p>	
3. Tasks	
1. Create a new repository for this activity.	
	

```
jessielazo@Desktop:~$ git clone https://github.com/Jessie-Lazo/HOA11.git
Cloning into 'HOA11'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), done.
jessielazo@Desktop:~$
```

2. Install Docker and enable the docker socket.

```
jessielazo@Desktop:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
Some packages could not be installed. This may mean that you have
requested an impossible situation or if you are using the unstable
distribution that some required packages have not yet been created
or been moved out of Incoming.
The following information may help to resolve the situation:

The following packages have unmet dependencies:
 docker.io : Depends: containerd (>= 1.2.6-0ubuntu1~)
E: Unable to correct problems, you have held broken packages.
jessielazo@Desktop:~$ sudo systemctl enable docker
Synchronizing state of docker.service with SysV service script with /lib/system
d/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable docker
jessielazo@Desktop:~$ sudo systemctl restart docker
jessielazo@Desktop:~$
```

3. Add to Docker group to your current user.

```
jessielazo@Desktop:~$ sudo systemctl restart docker
jessielazo@Desktop:~$ sudo usermod -aG docker jessielazo
jessielazo@Desktop:~$ sudo systemctl restart docker
jessielazo@Desktop:~$
```

4. Create a Dockerfile to install web and DB server.

```
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile

FROM ubuntu:latest
MAINTAINER jessielazo <qjrlazo@tip.edu.ph>

# skip prompts
ARG DEBIAN_FRONTEND=noninteractive

# update packages
RUN apt update
RUN apt upgrade -y

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

# set entrypoint
ENTRYPOINT apache2ctl -D FOREGROUND
```

```
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile2

FROM centos:latest
MAINTAINER jessielazo <qjrlazo@tip.edu.ph>

# skip prompts
ARG DEBIAN_FRONTEND=noninteractive

# update packages
RUN yum -y install epel-release && yum -y update

# install packages
RUN yum install -y httpd mariadb-server

# set entrypoint
ENTRYPOINT apache2ctl -D FOREGROUND
```

5. Install and build the Dockerfile using Ansible.

```
es  Terminal  Wed 07:57 ●
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 ansible.cfg

[defaults]

inventory = inventory
host_key_checking = False

deprecation_warning = False

remote_user = jessielazo
private_key_file = ~/.ssh/

jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 inventory

192.168.56.105 ansible_user=jessieserve ansible_python_interpreter=/usr/bin/py$
192.168.56.108 ansible_user=lazocentos ansible_python_interpreter=/usr/bin/py$

jessielazo@Desktop:~/HOA11$ ansible -m ping all
192.168.56.105 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
192.168.56.108 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
```

```
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile.yml

- --
- hosts: all
  become: true
  pre_tasks:

    - name: install docker
      shell:
        sudo apt-get install docker.io -y
      when: ansible_distribution == "Ubuntu"

    - name: install docker
      yum:
        name: docker
        state: present
      when: ansible_distribution == "CentOS"

    - name: install docker sdk
      shell:
        pip3 install docker-py

    - name: start / enable docker service
      service:
        name: docker

[ Read 74 lines ]
```

```
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile.yml

  name: docker
  state: present
  when: ansible_distribution == "CentOS"

- name: install docker sdk
  shell:
    pip3 install docker-py

- name: start / enable docker service
  service:
    name: docker
    state: started
    enabled: true

- name: add docker to user group
  shell:
    usermod -aG docker jessielazo

- name: restart docker service
  service:
    name: docker
    state: restarted
    enabled: true

[ Read 74 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify
```

```
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile.yml

    enabled: true

- name: add docker to user group
  shell:
    usermod -aG docker jessielazo

- name: restart docker service
  service:
    name: docker
    state: restarted
    enabled: true

- name: dockerfile directory
  file:
    path: /root/demo-dockerfile
    state: directory
    owner: root
    group: root
    mode: '0755'

- name: copy dockerfile
  copy:
    src: dockerfile1

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify
```

```
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile.yml

  owner: root
  group: root
  mode: '0755'
when: ansible_distribution == "Ubuntu"

- name: copy dockerfile
  copy:
    src: dockerfile2
    dest: /root/demo-dockerfile/dockerfile
    owner: root
    group: root
    mode: '0755'
  when: ansible_distribution == "CentOS"

- name: build docker image
  shell:
    cmd: docker build -t docker_image /root/demo-dockerfile
  when: ansible_distribution == "Ubuntu"

- name: build docker image
  shell:

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify

es Terminal ▾ Wed 10:17 ●
jessielazo@Desktop: ~/HOA11
File Edit View Search Terminal Help
GNU nano 2.9.3 dockerfile.yml

  mode: '0755'
when: ansible_distribution == "CentOS"

- name: build docker image
  shell:
    cmd: docker build -t docker_image /root/demo-dockerfile
  when: ansible_distribution == "Ubuntu"

- name: build docker image
  shell: docker build -t docker_image /root/demo-dockerfile
  when: ansible_distribution == "CentOS"
```


6. Add, commit and push it to your repository.

4. Output (screenshots and explanations)

Ansible playbook run:

```
jessielazo@Desktop:~/H0A11$ ansible-playbook --ask-become-pass dockerfile.yml
SUDO password:

PLAY [all] *****
*

TASK [Gathering Facts] *****
*
ok: [192.168.56.105]
ok: [192.168.56.108]

TASK [install docker] *****
*
skipping: [192.168.56.108]
[WARNING]: Consider using 'become', 'become_method', and 'become_user' rather
than running sudo
changed: [192.168.56.105]

TASK [install docker] *****
*
skipping: [192.168.56.105]
ok: [192.168.56.108]

TASK [install docker sdk] *****
*
changed: [192.168.56.108]
changed: [192.168.56.105]
```

```
TASK [start / enable docker service] *****
*
ok: [192.168.56.105]
ok: [192.168.56.108]

TASK [create user] *****
*
ok: [192.168.56.105]
ok: [192.168.56.108]

TASK [create docker group] *****
*
ok: [192.168.56.105]
changed: [192.168.56.108]

TASK [add user to docker group] *****
*
ok: [192.168.56.105]
changed: [192.168.56.108]

TASK [add docker to user group] *****
*
changed: [192.168.56.105]
changed: [192.168.56.108]

TASK [restart docker service] *****
```

```

TASK [restart docker service] *****
*
changed: [192.168.56.105]
changed: [192.168.56.108]

TASK [dockerfile directory] *****
*
ok: [192.168.56.105]
changed: [192.168.56.108]

TASK [copy dockerfile] *****
*
skipping: [192.168.56.108]
ok: [192.168.56.105]

TASK [copy dockerfile] *****
*
skipping: [192.168.56.105]
changed: [192.168.56.108]

TASK [build docker image] *****
*
skipping: [192.168.56.108]
changed: [192.168.56.105]

TASK [build docker image] *****
*
skipping: [192.168.56.105]

```

Right Ctrl

```

TASK [build docker image] *****
*
skipping: [192.168.56.108]
changed: [192.168.56.105]

TASK [build docker image] *****
*
skipping: [192.168.56.105]
skipping: [192.168.56.108]

PLAY RECAP *****
*
192.168.56.105      : ok=12    changed=5    unreachable=0    failed=0
192.168.56.108      : ok=11    changed=7    unreachable=0    failed=0

jessielazo@Desktop:~/HOA11$

```

Right Ctrl

Proof of mariadb for ubuntu linux

```
jessieserve@Server2: ~  
File Edit View Search Terminal Help  
jessieserve@Server2:~$ systemctl status mariadb  
● mariadb.service - MariaDB 10.1.48 database server  
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset:  
   Active: active (running) since Wed 2024-11-13 08:01:23 +08; 32min ago  
     Docs: man:mysqld(8)  
           https://mariadb.com/kb/en/library/systemd/  
 Main PID: 1010 (mysqld)  
   Status: "Taking your SQL requests now..."  
    Tasks: 27 (limit: 4656)  
   CGroup: /system.slice/mariadb.service  
           └─1010 /usr/sbin/mysqld  
  
Warning: Journal has been rotated since unit was started. Log output is incompl  
lines 1-12/12 (END)
```

Proof of docker images and status in ubuntu:

```
jessieserve@Server2:~$ sudo docker images  
[sudo] password for jessieserve:  
REPOSITORY      TAG         IMAGE ID      CREATED        SIZE  
docker_image    latest     580d7ce64583  7 minutes ago  552MB  
ubuntu          latest     59ab366372d5  4 weeks ago   78.1MB  
jessieserve@Server2:~$
```

```

jessieserve@Server2: ~
File Edit View Search Terminal Help
jessieserve@Server2:~$ sudo systemctl status docker
[sudo] password for jessieserve:
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset:
   Active: active (running) since Wed 2024-11-13 09:34:55 +08; 2s ago
     Docs: https://docs.docker.com
   Main PID: 5900 (dockerd)
      Tasks: 9
    CGroup: /system.slice/docker.service
            └─5900 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/contai

Nov 13 09:34:54 Server2 dockerd[5900]: time="2024-11-13T09:34:54.079063426+08:0
Nov 13 09:34:54 Server2 dockerd[5900]: time="2024-11-13T09:34:54.079113610+08:0
Nov 13 09:34:54 Server2 dockerd[5900]: time="2024-11-13T09:34:54.079264867+08:0
Nov 13 09:34:54 Server2 dockerd[5900]: time="2024-11-13T09:34:54.079458856+08:0
Nov 13 09:34:54 Server2 dockerd[5900]: time="2024-11-13T09:34:54.749524892+08:0
Nov 13 09:34:54 Server2 dockerd[5900]: time="2024-11-13T09:34:54.812362631+08:0
Nov 13 09:34:55 Server2 dockerd[5900]: time="2024-11-13T09:34:55.393005260+08:0
Nov 13 09:34:55 Server2 dockerd[5900]: time="2024-11-13T09:34:55.550986782+08:0
Nov 13 09:34:55 Server2 systemd[1]: Started Docker Application Container Engine
Nov 13 09:34:55 Server2 dockerd[5900]: time="2024-11-13T09:34:55.675774848+08:0
lines 1-19/19 (END)

```

Proof of docker images and status in centos:

```

[lazocentos@localhost ~]$ systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; vendor preset: disa
   blled)
   Active: active (running) since Tue 2024-11-05 21:46:26 EST; 4min 14s ago
     Docs: http://docs.docker.com
   Main PID: 18231 (dockerd-current)
      Tasks: 17
    CGroup: /system.slice/docker.service
            └─18231 /usr/bin/dockerd-current --add-runtime docker-runc=/usr/libexec/d...
              18236 /usr/bin/docker-containerd-current -l unix:///var/run/docker/libc...

Nov 05 21:46:25 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Nov 05 21:46:26 localhost.localdomain systemd[1]: Started Docker Application Contai...
Nov 05 21:46:26 localhost.localdomain dockerd-current[18231]: time="2024-11-05T21:46...
Hint: Some lines were ellipsized, use -l to show in full.
[lazocentos@localhost ~]$

```

```
[lazocentos@localhost ~]$ sudo docker images
[sudo] password for lazocentos:
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
<none>              <none>             532d5dd69a76       6 minutes ago      231 MB
docker.io/centos     latest             5d0da3dc9764       3 years ago        231 MB
[lazocentos@localhost ~]$
```

Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?

The benefits of containerization is that it makes work between the different remote machines more efficient.

Conclusions:

In this activity, our objective is to build a Dockerfile and formulate a workflow using Ansible as IaC that allows a Continuous Delivery process.

I have experienced many errors when performing the activity, but at the end of I could debug errors and know how docker works in the remote Machines. I achieved what I aimed to learn.