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Course/Section: CPE31S2	**Date Submitted: 13/11/2024**
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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/

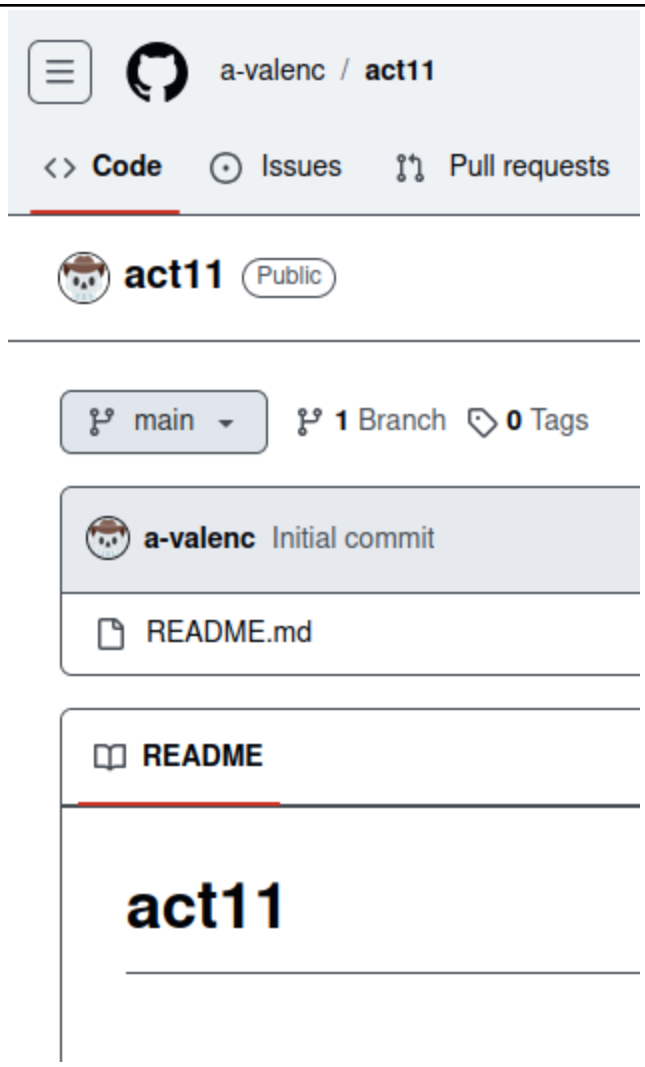
You may also check the difference between containers and virtual machines. Click the link given below.

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. 
a-valenc / act11
Code
Issues
Pull requests
act11
Public
main
1 Branch
0 Tags
a-valenc Initial commit
README.md
README
act11

2.
```
avalencia@workstation:~/Desktop$ sudo apt install docker.io
[sudo] password for avalencia:
Sorry, try again.
[sudo] password for avalencia:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required
  python3-resolvelib
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  bridge-utils containerd pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools btrfs-progs cgroupfs-mount | cgroup-lite debootstrap
  docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils containerd docker.io pigz runc ubuntu-fan
0 upgraded, 6 newly installed, 0 to remove and 6 not upgraded.
Need to get 75.2 MB of archives.
After this operation, 283 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ph.archive.ubuntu.com/ubuntu jammy/universe amd64 pigz amd64 2
[63.6 kB]
Get:2 http://ph.archive.ubuntu.com/ubuntu jammy/main amd64 bridge-utils amd
```

```
avalencia@workstation:~/Desktop$ sudo systemctl enable docker
avalencia@workstation:~/Desktop$ sudo systemctl start docker
avalencia@workstation:~/Desktop$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:d211f485f2dd1dee407a80973c8f129f00d54604d2c90732e8e320e5038a0348
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.
```

3.
```
avalencia@workstation:~/act11$ sudo usermod -aG docker $USER
avalencia@workstation:~/act11$
```

4.
```
avalencia@workstation: ~/act11/setup_docker
  GNU nano 6.2                          Dockerfile *
FROM ubuntu:22.04

RUN apt-get update
RUN apt-get install apache2 -y
RUN apt-get install mariadb-server -y
COPY . /var/www/html

EXPOSE 80

CMD ["apache2ctl","-D","FOREGROUND"]
```

5.

```
avalencia@workstation:~/act11$ ansible-playbook --ask-become-pass DOCKER.yaml
BECOME password:

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

TASK [Gathering Facts] *********************************************************
ok: [sv_1]

TASK [Installing prerequisites] ************************************************
ok: [sv_1]

TASK [Installing Docker] *******************************************************
ok: [sv_1]

TASK [Start Docker service] ****************************************************
ok: [sv_1]

TASK [Add current user to Docker group] ****************************************
ok: [sv_1]

TASK [Create a directory for Docker] *******************************************
ok: [sv_1]

TASK [Create Dockerfile] *******************************************************
ok: [sv_1]

TASK [Building a Docker Image] *************************************************
changed: [sv_1]

PLAY RECAP *********************************************************************
sv_1                       : ok=8    changed=1    unreachable=0    failed=0

avalencia@workstation:~/act11$ SS
```

```yaml
---
- hosts: all
  become: true
  tasks:

    - name: Installing prerequisites
      apt:
        name:
          - python3-pip
          - python3-docker

    - name: Installing Docker
      apt:
        name: docker.io
        state: present

    - name: Start Docker service
      ansible.builtin.service:
        name: docker
        state: started
        enabled: true

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

    - name: Create a directory for Docker
      file:
        path: /home/{{ansible_user}}/Docker_files
        state: directory

    - name: Create Dockerfile
      copy:
        dest: /home/{{ansible_user}}/Docker_files/Dockerfile
```

6. https://github.com/a-valenc/act11

```
avalencia@workstation:~/act11$ git add .
avalencia@workstation:~/act11$ git commit -m "finished"
[main fde1a3f] finished
 4 files changed, 82 insertions(+)
 create mode 100644 DOCKER.yaml
 create mode 100644 ansible.cfg
 create mode 100644 inventory.yaml
 create mode 100644 setup_docker/Dockerfile
avalencia@workstation:~/act11$ git push origin main
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Compressing objects: 100% (6/6), done.
Writing objects: 100% (7/7), 1.31 KiB | 1.31 MiB/s, done.
Total 7 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:a-valenc/act11.git
   d99eb43..fde1a3f  main -> main
avalencia@workstation:~/act11$ sudo nano inventory.yaml
avalencia@workstation:~/act11$ S
```

Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?
    - It is much easier and efficient than using VMs. It also uses less hardware load compared to using VMs.

Conclusions:

- **For a large scale usage of a compact command and tasks, it is much better to have a more lightweight application especially when using it for testing, installing, or executing many tasks in one file.**