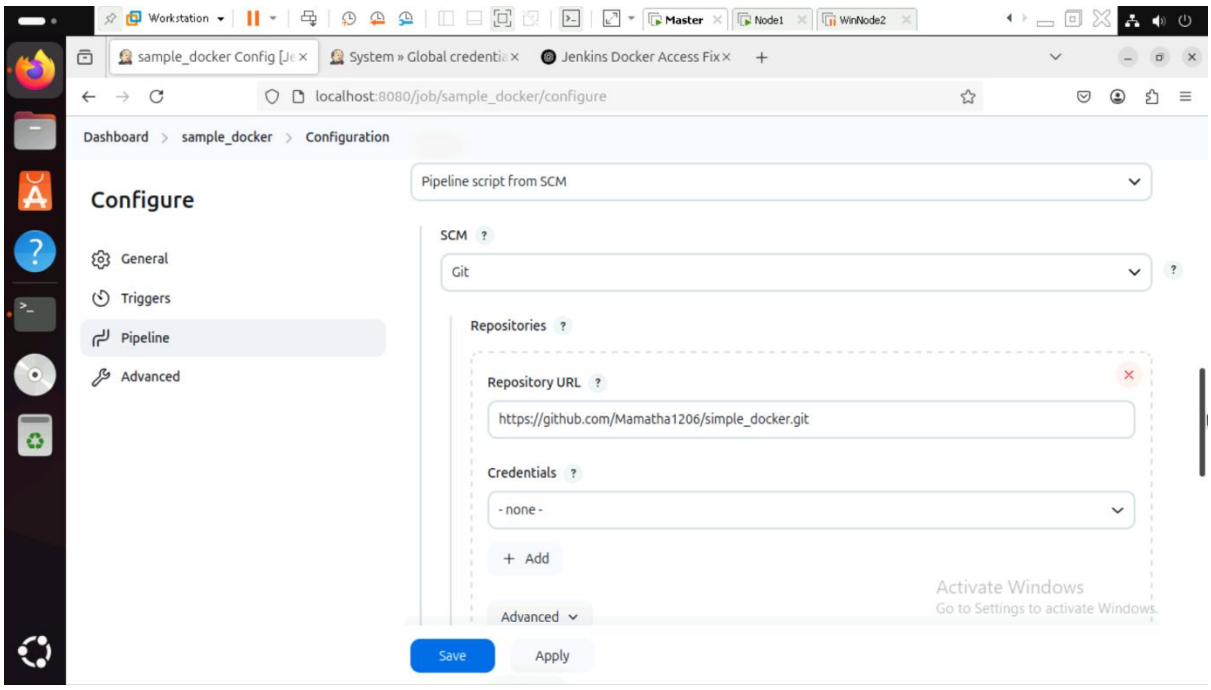
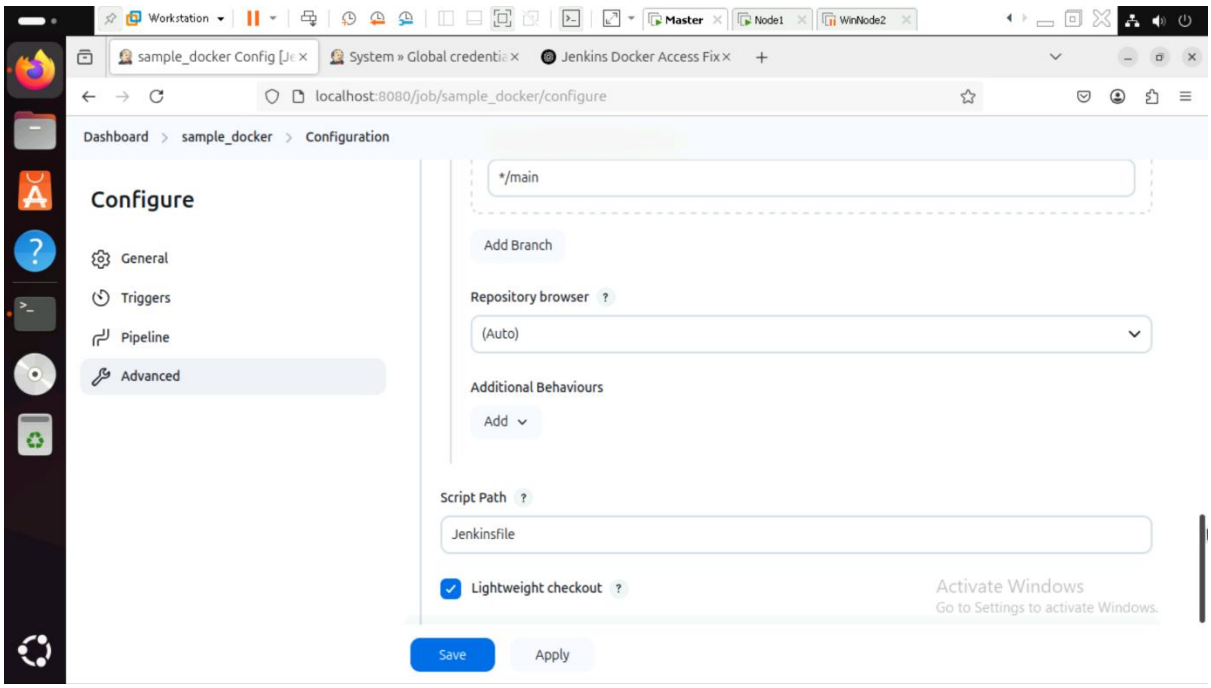
Docker Assignment

Deploy a Python Flask App using Docker

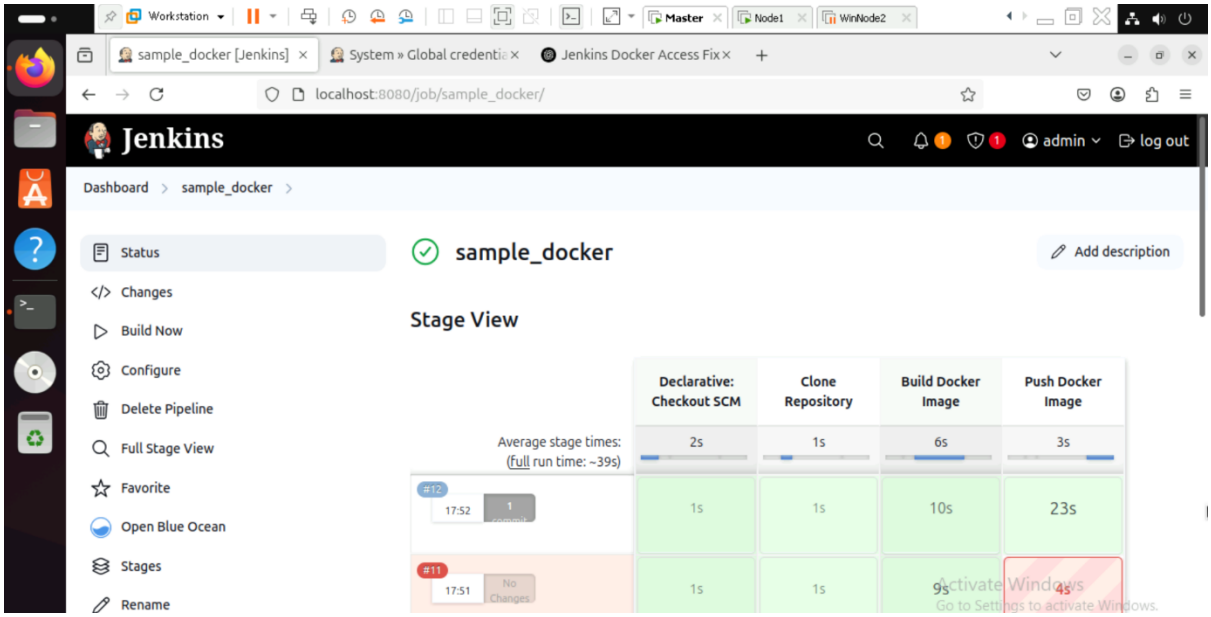
Step 1: Jenkins Pipeline



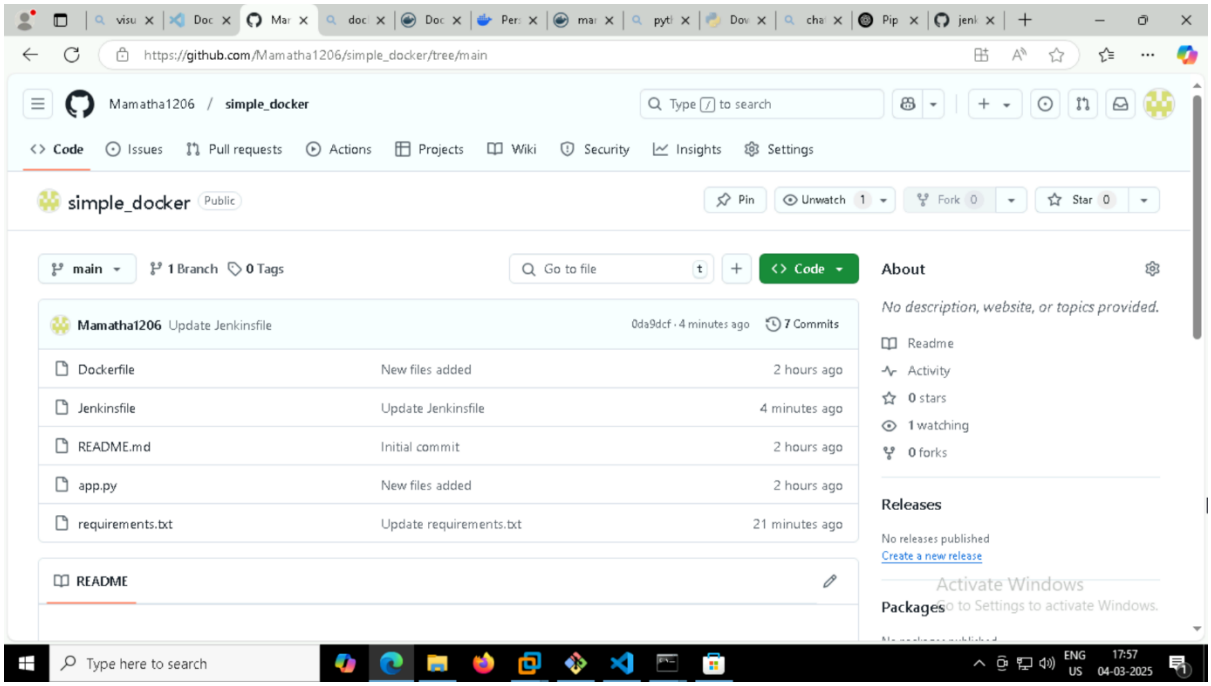
Step 2 : Save the Pipeline



Step 3: Build and run the docker container



Step 4: Push the docker files to Github



Installing and enabling docker inside ubuntu terminal:

Step 1: sudo apt upgrade -y

```
master@master-vm:~$ sudo apt upgrade -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
Get more security updates through Ubuntu Pro with 'esm-apps' enabled:
  libpostproc55 libavcodec58 libavutil56 libswscale5 libswresample3
  libavformat58 libavfilter7
Learn more about Ubuntu Pro at https://ubuntu.com/pro
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Step 2 : sudo apt install -y ca-certificates curl gnupg lsb-release

```
master@master-vm:~$ sudo apt install -y ca-certificates curl gnupg lsb-release
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
lsb-release is already the newest version (11.1.0ubuntu4).
lsb-release set to manually installed.
ca-certificates is already the newest version (20240203~22.04.1).
ca-certificates set to manually installed.
gnupg is already the newest version (2.2.27-3ubuntu2.1).
gnupg set to manually installed.
The following NEW packages will be installed:
  curl
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 194 kB of archives.
After this operation, 455 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 curl amd64 7.81.0-1ubuntu1.20 [194 kB]
Fetched 194 kB in 1s (225 kB/s)
Selecting previously unselected package curl.
(Reading database ... 205241 files and directories currently installed.)
Preparing to unpack .../curl_7.81.0-1ubuntu1.20_amd64.deb ...
Unpacking curl (7.81.0-1ubuntu1.20) ...
Setting up curl (7.81.0-1ubuntu1.20) ...
Processing triggers for man-db (2.10.2-1) ...
```

Step 3 : sudo mkdir -p /etc/apt/keyrings

```
master@master-vm:~$ sudo mkdir -p /etc/apt/keyrings
```

Step 4 : curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo tee /etc/apt/keyrings/docker.asc > /dev/null

```
master@master-vm:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo tee /etc/apt/keyrings/docker.asc > /dev/null
[sudo] password for master:
```

Step 5 : sudo chmod a+r /etc/apt/keyrings/docker.asc

```
master@master-vm:~$ sudo chmod a+r /etc/apt/keyrings/docker.asc
```

Step 6 : echo "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null

Step 7 : sudo apt update

```
master@master-vm:~$ echo "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com
/linux/ubuntu $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
master@master-vm:~$ sudo apt update
Get:1 https://download.docker.com/linux/ubuntu jammy InRelease [48.8 kB]
Get:2 https://download.docker.com/linux/ubuntu jammy/stable amd64 Packages [45.7 kB]
Hit:3 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:5 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [762 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [2,114 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2,354 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/main i386 Packages [594 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [392 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 DEP-11 Metadata [103 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [3,008 kB]
Get:14 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [330 kB]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/main amd64 DEP-11 Metadata [43.1 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [528 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2,904 kB]
Get:18 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 DEP-11 Metadata [208 B]
Get:19 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [759 kB]
Get:20 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [510 kB]
Get:21 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 DEP-11 Metadata [208 B]
Get:22 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1,192 kB]
Get:23 http://security.ubuntu.com/ubuntu jammy-security/universe i386 Packages [652 kB]
Get:24 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [906 kB]
Get:25 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [293 kB]
Get:26 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [207 kB]
```

Step 8 : sudo apt install -y docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin

```
master@master-vm:~$ sudo apt install -y docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-
compose-plugin
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Package 'docker' is not installed, so not removed
The following additional packages will be installed:
  docker-ce-rootless-extras
  docker-compose-plugin git git-man
  liberror-perl libslirp0 pigz
  slirp4netns
Suggested packages:
  cgroupfs-mount | cgroup-lite
  git-daemon-run | git-daemon-sysvinit
  git-doc git-email git-gui gitk gitweb
  git-cvs git-mediawiki git-svn
The following NEW packages will be installed:
  containerd.io docker-buildx-plugin
  docker-ce docker-ce-cli
  docker-ce-rootless-extras
  docker-compose-plugin git git-man
  liberror-perl libslirp0 pigz
  slirp4netns
0 upgraded, 12 newly installed, 0 to remove and 19 not upgraded.
```

Step 9 : sudo systemctl start docker

Step 10 : sudo systemctl enable docker

Step 11 : sudo docker --version

Step 12 : sudo usermod -aG docker $USER

Step 13 : newgrp docker

```
master@master-vm:~$ sudo systemctl start docker
master@master-vm:~$ sudo systemctl start docker
master@master-vm:~$ sudo docker --version
Docker version 28.0.1, build 068a01e
master@master-vm:~$ sudo usermod -aG docker $USER
master@master-vm:~$ newgrp docker
```

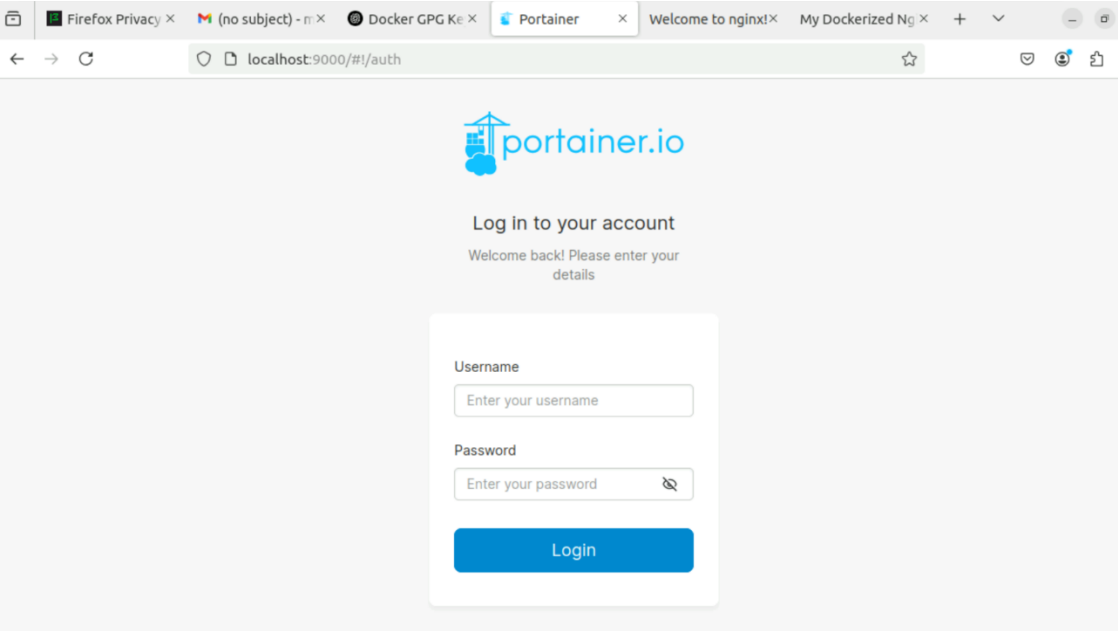
Connecting ubuntu terminal with GUI based portainer

Step 1 : sudo docker pull portainer/portainer-ce

Step 2 : sudo docker run -d -p 9000:9000 --name=portainer --restart=always \-v /var/run/docker.sock:/var/run/docker.sock \-v portainer_data:/data \portainer/portainer-ce

```
master@master-vm:~$ sudo docker pull portainer/portainer-ce
Using default tag: latest
latest: Pulling from portainer/portainer-ce
436768c74267: Pull complete
d61825c69234: Pull complete
04de093ad5ed: Pull complete
a528983d077c: Pull complete
26eb502a78ed: Pull complete
b2724536dfda: Pull complete
5b45cfb2ea0c: Pull complete
20b115ea6339: Pull complete
8e73efb50b28: Pull complete
4f4fb700ef54: Pull complete
Digest: sha256:99c3047d44991af08f2a34df16e69ae2654bee43444b2e9857aa6b5864c4f602
Status: Downloaded newer image for portainer/portainer-ce:latest
docker.io/portainer/portainer-ce:latest
master@master-vm:~$ sudo docker run -d -p 9000:9000 --name=portainer --restart=always \
-v /var/run/docker.sock:/var/run/docker.sock \
-v portainer_data:/data \
portainer/portainer-ce
09ca4a984d3119de16ca1ed2a0557a776bd9b103f3f76a1a562033e2391a9fa8
```

Step 3 : go to http://localhost:9000 and enter password



Deploy an Nginx Web Server with Docker

Goal: Run an Nginx server using Docker.

Prerequisites: Install Docker

Step 1: Pull the Nginx Image

Run the following command to pull the official Nginx image:

docker pull nginx

```
master@master-vm:~$ docker pull nginx
Using default tag: latest
latest: Pulling from library/nginx
7cf63256a31a: Pull complete
bf9acace214a: Pull complete
513c3649bb14: Pull complete
d014f92d532d: Pull complete
9dd21ad5a4a6: Pull complete
943ea0f0c2e4: Pull complete
103f50cb3e9f: Pull complete
Digest: sha256:9d6b58feebd2dbd3c56ab5853333d627cc6e281011cfd6050fa4bcf2072c9496
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
```

Step 2: Run an Nginx Container

Start a container and map port 80 to access it from your browser:

docker run -d -p 8080:80 --name my-nginx nginx

```
master@master-vm:~$ docker run -d -p 8080:80 --name my-nginx nginx
75a598e8e8c67a578886d1da9d87af36ac3886784c55b3e4af705e015ed42b90
```

Now, open http://localhost:8080 in your browser, and see the Nginx welcome page.

Step 3: Customize Nginx with Your Own HTML Page

Create a directory for your Nginx files:

mkdir nginx_project && cd nginx_project

```
master@master-vm:~$ mkdir nginx_project
master@master-vm:~$ cd nginx_project
```

Create an index.html file inside this directory:

```
master@master-vm: ~/nginx_project
  GNU nano 6.2                                  index.html *
<!DOCTYPE html>
<html>
<head>
  <title>My Dockerized Nginx</title>
</head>

<body>
  <h1>Hello, this is a custom Nginx page inside Docker!</h1>
</body>
</html>
```

Run a new Nginx container with your custom HTML page:

docker run -d -p 8081:80 --name custom-nginx -v $(pwd):/usr/share/nginx/html nginx

```
master@master-vm:~/nginx_project$ docker run -d -p 8081:80 --name custom-nginx -v $(pwd):/usr/share/nginx/html nginx
1298710adfb18b4b19ebd9472e4fd53900a7af119c2cd337c11ecfc626f47d6e
```

Refresh http://localhost:8081, and see the custom page

Hello, this is a custom Nginx page inside Docker!