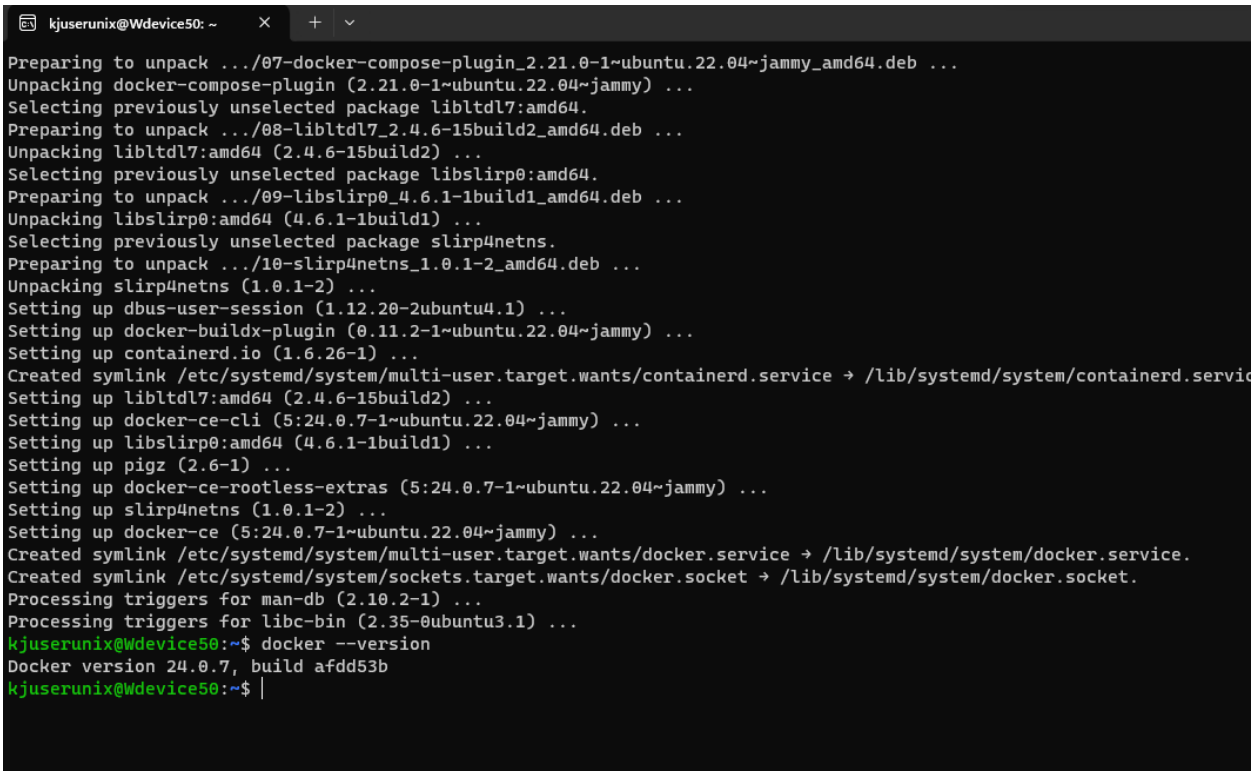
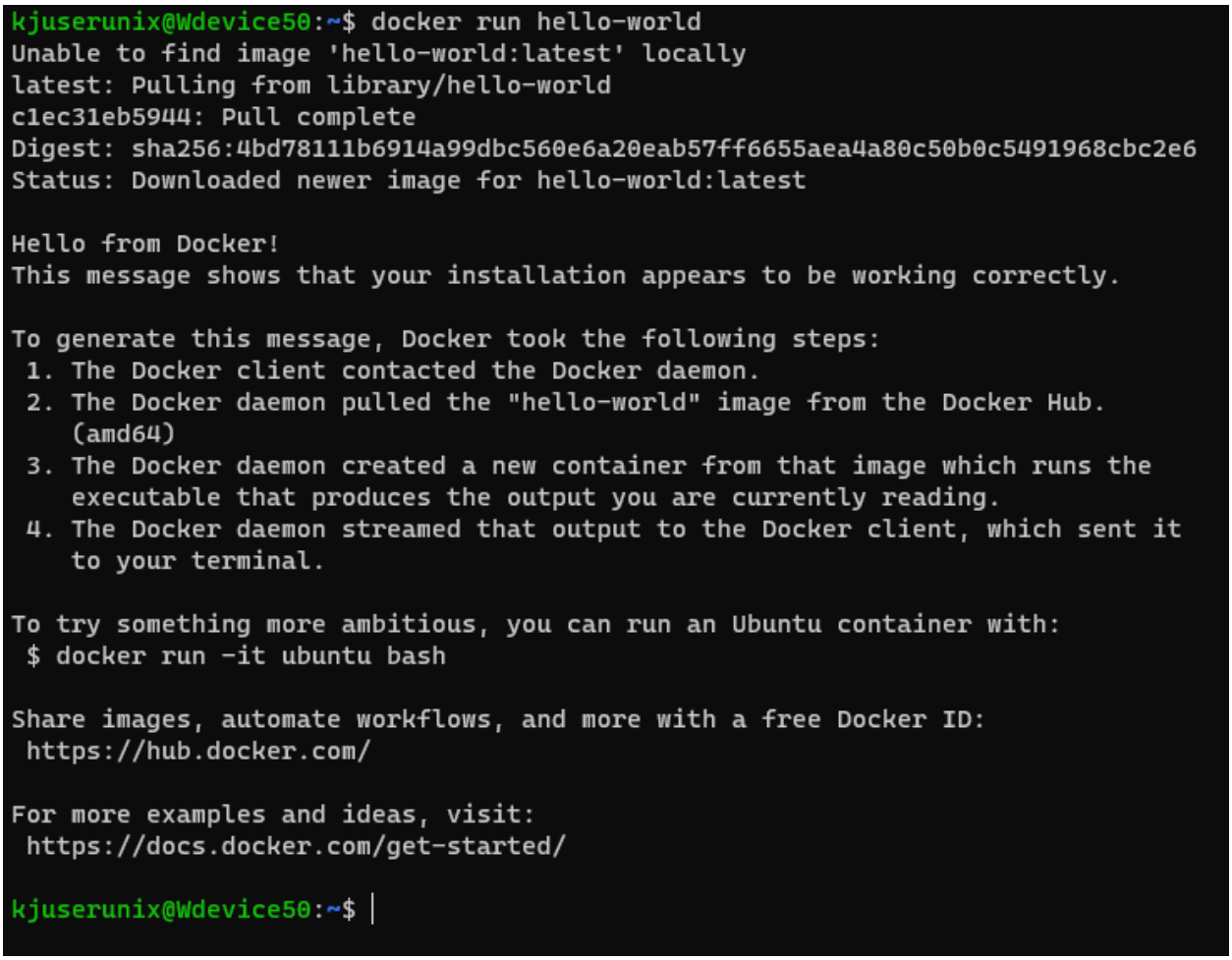
SETUP

1.0 RUNNING YOUR FIRST DOCKER CONTAINER



Docker installed on WSL



docker run hello-world

```
kjuserunix@Wdevice50:~$ docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
661ff4d9561e: Pull complete
Digest: sha256:51b67269f354137895d43f3b3d810bfacd3945438e94dc5ac55fdac340352f48
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest
kjuserunix@Wdevice50:~$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
alpine        latest    f8c20f8bbcb6   5 weeks ago    7.38MB
hello-world   latest    d2c94e258dcb   8 months ago   13.3kB
kjuserunix@Wdevice50:~$ docker run alpine ls -l
total 56
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 bin
drwxr-xr-x    5 root     root           340 Jan 14 16:39 dev
drwxr-xr-x    1 root     root          4096 Jan 14 16:39 etc
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 home
drwxr-xr-x    7 root     root          4096 Dec  7 09:43 lib
drwxr-xr-x    5 root     root          4096 Dec  7 09:43 media
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 mnt
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 opt
dr-xr-xr-x  285 root     root             0 Jan 14 16:39 proc
drwx------    2 root     root          4096 Dec  7 09:43 root
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 run
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 sbin
drwxr-xr-x    2 root     root          4096 Dec  7 09:43 srv
dr-xr-xr-x   11 root     root             0 Jan 14 16:39 sys
drwxrwxrwt    2 root     root          4096 Dec  7 09:43 tmp
drwxr-xr-x    7 root     root          4096 Dec  7 09:43 usr
drwxr-xr-x   12 root     root          4096 Dec  7 09:43 var
kjuserunix@Wdevice50:~$ $ docker run alpine echo "hello from alpine"
hello from alpine
$: command not found
Command 'hello' not found, but can be installed with:
sudo apt install hello              # version 2.10-2ubuntu4, or
sudo apt install hello-traditional  # version 2.10-5
kjuserunix@Wdevice50:~$
```

```
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.15.133.1-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage


This message is shown once a day. To disable it please create the
/home/kjuserunix/.hushlogin file.
kjuserunix@Wdevice50:~$ docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
kjuserunix@Wdevice50:~$ docker ps -a
CONTAINER ID   IMAGE         COMMAND     CREATED          STATUS                      PORTS     NAMES
286fa1cb2452   alpine        "/bin/sh"   5 minutes ago    Exited (0) 5 minutes ago              busy_kowalevski
c07358a016c6   alpine        "ls -l"     12 minutes ago   Exited (0) 12 minutes ago             loving_bartik
96d1209b2552   hello-world   "/hello"    25 minutes ago   Exited (0) 25 minutes ago             laughing_liskov
kjuserunix@Wdevice50:~$ docker run -it alpine /bin/sh
/ # ls
bin    dev    etc    home   lib    media  mnt    opt    proc   root   run    sbin   srv    sys    tmp    usr    var
/ #
```

Section 2.0 Webapps with Docker

```
kjuserunix@Wdevice50:~$ docker --version
Docker version 24.0.7, build afdd53b
kjuserunix@Wdevice50:~$ docker run -d dockersamples/static-site
Unable to find image 'dockersamples/static-site:latest' locally
latest: Pulling from dockersamples/static-site
fdd5d7827f33: Pull complete
a3ed95caeb02: Pull complete
716f7a5f3082: Pull complete
7b10f03a0309: Pull complete
aff3ab7e9c39: Pull complete
Digest: sha256:daa686c61d7d239b7977e72157997489db49f316b9b9af3909d9f10fd28b2dec
Status: Downloaded newer image for dockersamples/static-site:latest
cc456f9ea7d16c9f4d49f49ba7e8674513d7cffc94759bc0c7100fb7739b5d9f
kjuserunix@Wdevice50:~$
```

docker run -d dockersamples/static-site

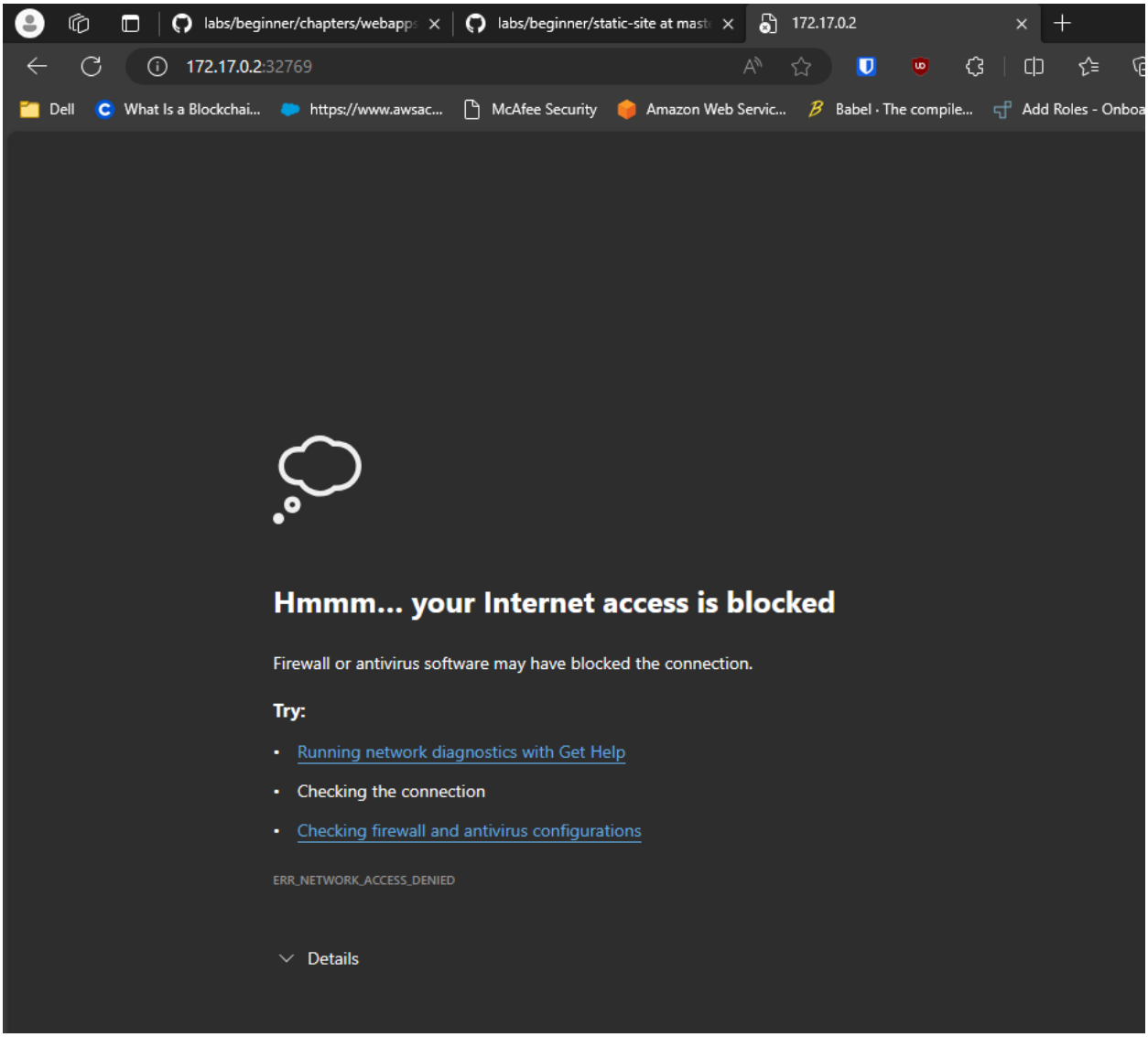
```
kjuserunix@Wdevice50:~$ docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED         STATUS         PORTS             NAMES
cc456f9ea7d1   dockersamples/static-site   "/bin/sh -c 'cd /usr…"   3 minutes ago   Up 3 minutes   80/tcp, 443/tcp   serene_cartwright
kjuserunix@Wdevice50:~$ docker stop cc456f9ea7d1
cc456f9ea7d1
kjuserunix@Wdevice50:~$ docker remove cc456f9ea7d1
cc456f9ea7d1
```

docker stop, docker rm

```
kjuserunix@Wdevice50:~$ docker run --name static-site -e AUTHOR="Your Name" -d -P dockersamples/static-site
1f4fb2886878248d172c52215cadf280481c013e88de30c76d1dc4830fc86095
kjuserunix@Wdevice50:~$ docker ps
CONTAINER ID   IMAGE                         COMMAND                  CREATED          STATUS          PORTS                                                                                                                NAMES
1f4fb2886878   dockersamples/static-site   "/bin/sh -c 'cd /usr…"   15 seconds ago   Up 14 seconds   0.0.0.0:32769->80/tcp, :::32769->80/tcp, 0.0.0.0:32768->443/tcp, :::32768->443/tcp   static-site
kjuserunix@Wdevice50:~$ docker port static-site
80/tcp -> 0.0.0.0:32769
80/tcp -> [::]:32769
443/tcp -> 0.0.0.0:32768
443/tcp -> [::]:32768
```

```
kjuserunix@Wdevice50:~$ docker port static-site
80/tcp -> 0.0.0.0:32769
80/tcp -> [::]:32769
443/tcp -> 0.0.0.0:32768
443/tcp -> [::]:32768
kjuserunix@Wdevice50:~$ docker-machine ip default
Command 'docker-machine' not found, but can be installed with:
sudo snap install docker
kjuserunix@Wdevice50:~$ docker-machine ip static-site
Command 'docker-machine' not found, but can be installed with:
sudo snap install docker
kjuserunix@Wdevice50:~$ docker inspect -f '{{range .NetworkSettings.Networks}}{{.IPAddress}}{{end}}' static-site
172.17.0.2
kjuserunix@Wdevice50:~$ sudo iptables -L -n -v --line-numbers | grep OUTPUT
```

Container ip-address - 172.17.0.2




```
kjuserunix@Wdevice50:~$ docker --version
Docker version 24.0.7, build afdd53b
kjuserunix@Wdevice50:~$ docker stop static-site
static-site
kjuserunix@Wdevice50:~$ docker rm static-site
static-site
kjuserunix@Wdevice50:~$
```

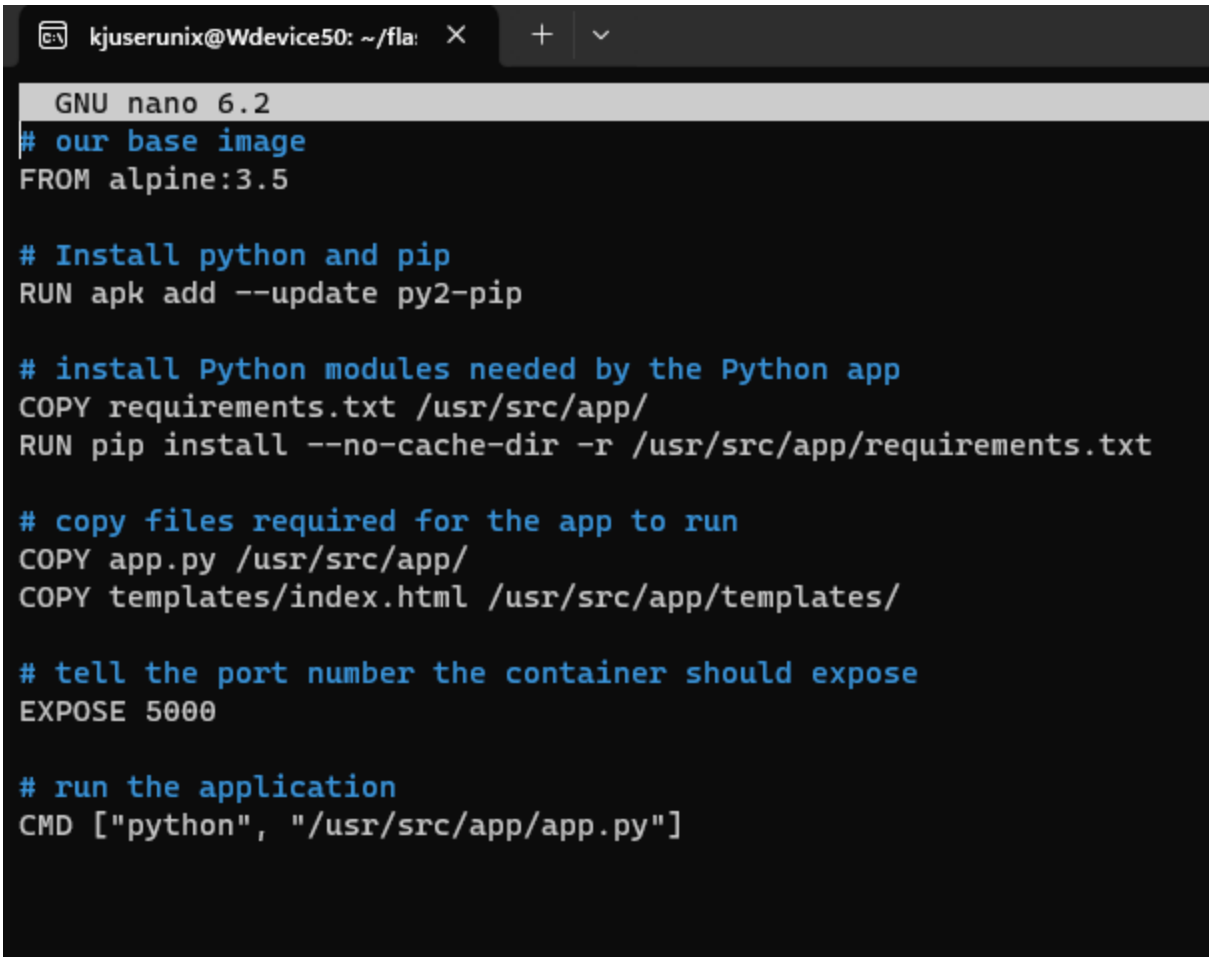
Stop remove static-site

```
kjuserunix@Wdevice50:~$ docker pull ubuntu:12.04
12.04: Pulling from library/ubuntu
d8868e50ac4c: Pull complete
83251ac64627: Pull complete
589bba2f1b36: Pull complete
d62ecaceda39: Pull complete
6d93b41cfc6b: Pull complete
Digest: sha256:18305429afa14ea462f810146ba44d4363ae76e4c8dfc38288cf73aa07485005
Status: Downloaded newer image for ubuntu:12.04
docker.io/library/ubuntu:12.04
kjuserunix@Wdevice50:~$ docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
a48641193673: Pull complete
Digest: sha256:6042500cf4b44023ea1894effe7890666b0c5c7871ed83a97c36c76ae560bb9b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
kjuserunix@Wdevice50:~$
```

Docker pull ubuntu

```
kjuserunix@Wdevice50:~$ mkdir flask-app
kjuserunix@Wdevice50:~$ cd flask-app
kjuserunix@Wdevice50:~/flask-app$ ls
kjuserunix@Wdevice50:~/flask-app$ nano app.py
kjuserunix@Wdevice50:~/flask-app$ ls
app.py
kjuserunix@Wdevice50:~/flask-app$ nano requirements.txt
kjuserunix@Wdevice50:~/flask-app$ ls
app.py  requirements.txt
kjuserunix@Wdevice50:~/flask-app$ mkdir templates
kjuserunix@Wdevice50:~/flask-app$ cd templates
kjuserunix@Wdevice50:~/flask-app/templates$ ls
kjuserunix@Wdevice50:~/flask-app/templates$ nano templates/index.html
kjuserunix@Wdevice50:~/flask-app/templates$ ls
kjuserunix@Wdevice50:~/flask-app/templates$ nano index.html
kjuserunix@Wdevice50:~/flask-app/templates$ ls
index.html
kjuserunix@Wdevice50:~/flask-app/templates$
```

Flask-app, app.py, requirements.txt and index.html



Nano docker file

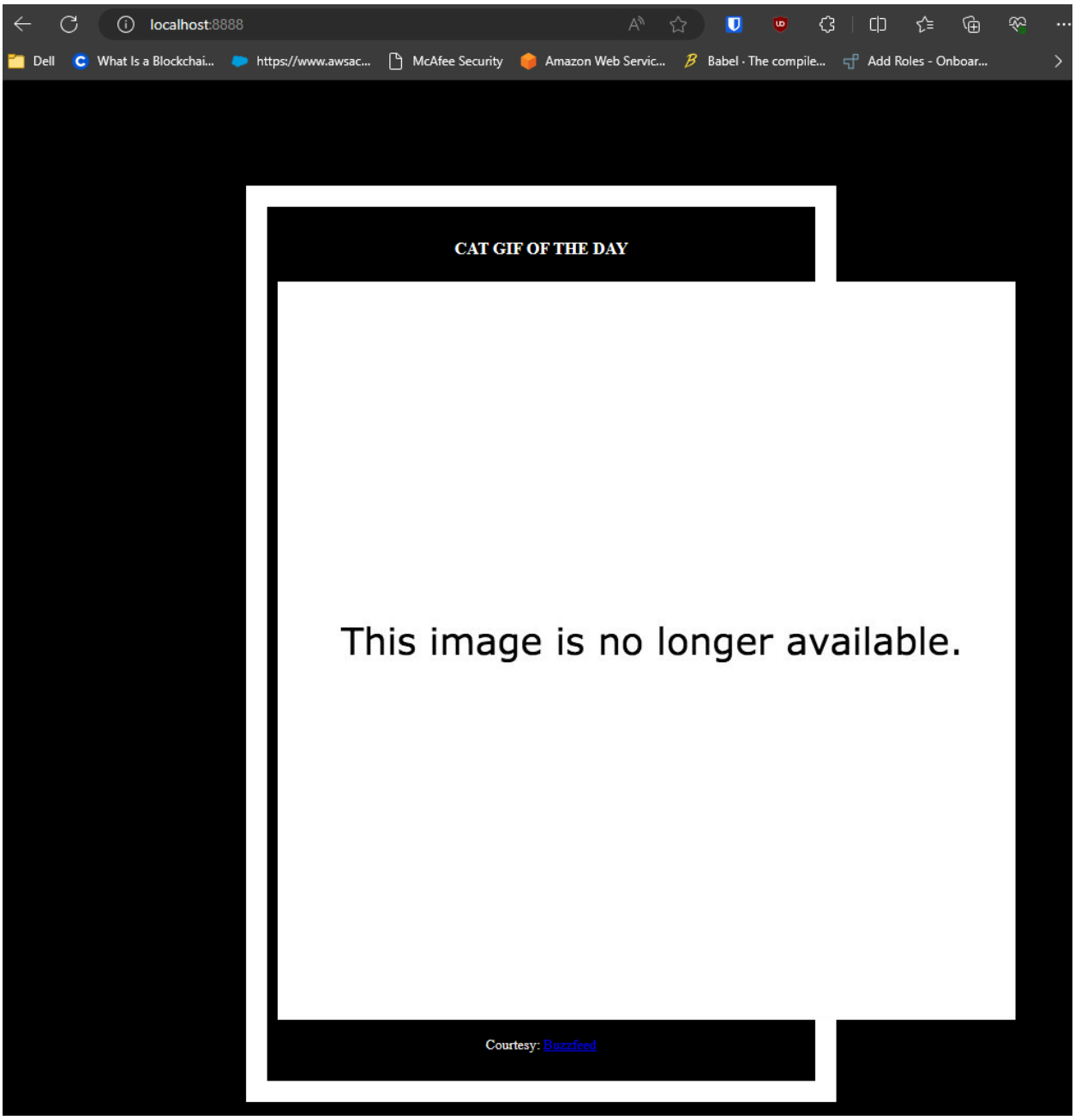
```
kjuserunix@Wdevice50:~/flask-app$ nano dockerfile
kjuserunix@Wdevice50:~/flask-app$ docker build -t kjagg23/myfirstapp .
failed to fetch metadata: fork/exec /usr/local/lib/docker/cli-plugins/docker-buildx: no such file or directory

DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
            Install the buildx component to build images with BuildKit:
            https://docs.docker.com/go/buildx/

Sending build context to Docker daemon   7.68kB
Step 1/8 : FROM alpine:3.5
3.5: Pulling from library/alpine
8cae0e1ac61c: Pull complete
Digest: sha256:66952b313e51c3bd1987d7c4ddf5dba9bc0fb6e524eed2448fa660246b3e76ec
Status: Downloaded newer image for alpine:3.5
 ---> f80194ae2e0c
Step 2/8 : RUN apk add --update py2-pip
 ---> Running in f833ecfd687d
fetch http://dl-cdn.alpinelinux.org/alpine/v3.5/main/x86_64/APKINDEX.tar.gz
fetch http://dl-cdn.alpinelinux.org/alpine/v3.5/community/x86_64/APKINDEX.tar.gz
(1/12) Installing libbz2 (1.0.6-r5)
(2/12) Installing expat (2.2.0-r1)
(3/12) Installing libffi (3.2.1-r2)
(4/12) Installing gdbm (1.12-r0)
(5/12) Installing ncurses-terminfo-base (6.0_p20171125-r1)
(6/12) Installing ncurses-terminfo (6.0_p20171125-r1)
(7/12) Installing ncurses-libs (6.0_p20171125-r1)
(8/12) Installing readline (6.3.008-r4)
(9/12) Installing sqlite-libs (3.15.2-r2)
(10/12) Installing python2 (2.7.15-r0)
(11/12) Installing py-setuptools (29.0.1-r0)
(12/12) Installing py2-pip (9.0.0-r1)
Executing busybox-1.25.1-r2.trigger
OK: 62 MiB in 23 packages
Removing intermediate container f833ecfd687d
 ---> 755fb33592fa
Step 3/8 : COPY requirements.txt /usr/src/app/
 ---> f55b58132be2
Step 4/8 : RUN pip install --no-cache-dir -r /usr/src/app/requirements.txt
 ---> Running in e5e33a407253
Collecting Flask==0.10.1 (from -r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/db/9c/149ba60c47d107f85fe52564133348458f093dd5e6b57a5b60ab9ac517bb/Flask-0.10.1.tar.gz (544kB)
Collecting Werkzeug>=0.7 (from Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/cc/94/5f7079a0e00bd6863ef8f1da638721e9da21e5bacee597595b318f71d62e/Werkzeug-1.0.1-py2.py3-none-any.whl (298kB)
Collecting Jinja2>=2.4 (from Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/7e/c2/1eece8c95ddbc9b1aeb64f5783a9e07a286de42191b7204d67b7496ddf35/Jinja2-2.11.3-py2.py3-none-any.whl (125kB)
Collecting itsdangerous>=0.21 (from Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/76/ae/44b03b253d6fade317f32c24d100b3b35c2239807046a4c953c7b89fa49e/itsdangerous-1.1.0-py2.py3-none-any.whl
Collecting MarkupSafe>=0.23 (from Jinja2>=2.4->Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/b9/2e/64db92e53b86efccfaea71321f597fa2e1b2bd3853d8ce658568f7a13094/MarkupSafe-1.1.1.tar.gz
Installing collected packages: Werkzeug, MarkupSafe, Jinja2, itsdangerous, Flask
  Running setup.py install for MarkupSafe: started
```

```
Step 4/8 : RUN pip install --no-cache-dir -r /usr/src/app/requirements.txt
 ---> Running in e5e33a407253
Collecting Flask==0.10.1 (from -r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/db/9c/149ba60c47d107f85fe52564133348458f093dd5e6b57a5b60ab9ac517bb/Flask-0.10.1.tar.gz (544kB)
Collecting Werkzeug>=0.7 (from Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/cc/94/5f7079a0e00bd6863ef8f1da638721e9da21e5bacee597595b318f71d62e/Werkzeug-1.0.1-py2.py3-none-any.whl (298kB)
Collecting Jinja2>=2.4 (from Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/7e/c2/1eece8c95ddbc9b1aeb64f5783a9e07a286de42191b7204d67b7496ddf35/Jinja2-2.11.3-py2.py3-none-any.whl (125kB)
Collecting itsdangerous>=0.21 (from Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/76/ae/44b03b253d6fade317f32c24d100b3b35c2239807046a4c953c7b89fa49e/itsdangerous-1.1.0-py2.py3-none-any.whl
Collecting MarkupSafe>=0.23 (from Jinja2>=2.4->Flask==0.10.1->-r /usr/src/app/requirements.txt (line 1))
  Downloading https://files.pythonhosted.org/packages/b9/2e/64db92e53b86efccfaea71321f597fa2e1b2bd3853d8ce658568f7a13094/MarkupSafe-1.1.1.tar.gz
Installing collected packages: Werkzeug, MarkupSafe, Jinja2, itsdangerous, Flask
  Running setup.py install for MarkupSafe: started
    Running setup.py install for MarkupSafe: finished with status 'done'
  Running setup.py install for Flask: started
    Running setup.py install for Flask: finished with status 'done'
Successfully installed Flask-0.10.1 Jinja2-2.11.3 MarkupSafe-1.1.1 Werkzeug-1.0.1 itsdangerous-1.1.0
You are using pip version 9.0.0, however version 23.3.2 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
Removing intermediate container e5e33a407253
 ---> 39d8737e0617
Step 5/8 : COPY app.py /usr/src/app/
 ---> 57170e51e3de
Step 6/8 : COPY templates/index.html /usr/src/app/templates/
 ---> 96657cc9719f
Step 7/8 : EXPOSE 5000
 ---> Running in 85db2f6f8f28
Removing intermediate container 85db2f6f8f28
 ---> 183324093abc
Step 8/8 : CMD ["python", "/usr/src/app/app.py"]
 ---> Running in 1cf61c02cd66
Removing intermediate container 1cf61c02cd66
 ---> c78626765782
Successfully built c78626765782
Successfully tagged kjagg23/myfirstapp:latest
kjuserunix@Wdevice50:~/flask-app$ nano dockerfile
kjuserunix@Wdevice50:~/flask-app$
```

docker build -t kjagg23/myfirstapp .

```
kjuserunix@Wdevice50:~/flask-app$ docker images
REPOSITORY                  TAG       IMAGE ID       CREATED         SIZE
kjagg23/myfirstapp          latest    c78626765782   3 minutes ago   56.8MB
ubuntu                      latest    174c8c134b2a   4 weeks ago     77.9MB
alpine                      latest    f8c20f8bbcb6   5 weeks ago     7.38MB
hello-world                 latest    d2c94e258dcb   8 months ago    13.3kB
alpine                      3.5       f80194ae2e0c   4 years ago     4MB
ubuntu                      12.04     5b117edd0b76   6 years ago     104MB
dockersamples/static-site   latest    f589ccde7957   7 years ago     191MB
kjuserunix@Wdevice50:~/flask-app$
```

docker images


localhost:8888
Dell
What Is a Blockchai...
https://www.awsac...
McAfee Security
Amazon Web Servic...
Babel · The compile...
Add Roles - Onboar...
CAT GIF OF THE DAY
This image is no longer available.
Courtesy: Buzzfeed

```
kjuserunix@Wdevice50:~/flask-app$ docker login
Log in with your Docker ID or email address to push and pull imag
You can log in with your password or a Personal Access Token (PAT
-tokens/

Username: kjagg23
Password:
Login Succeeded
kjuserunix@Wdevice50:~/flask-app$
```

docker login

```
kjuserunix@Wdevice50:~/flask-app$ docker push kjagg23/myfirstapp
Using default tag: latest
The push refers to repository [docker.io/kjagg23/myfirstapp]
8f4c87a4fa2e: Pushed
106f8a699446: Pushed
535e78438562: Pushed
f71b7fe5084e: Pushed
9f9819b5720b: Pushed
f566c57e6f2d: Mounted from library/alpine
latest: digest: sha256:6f5321060e77e35393d0f992f6cf0f9abc095f52b60504dd5f4c120c0a7fafa5 size: 1571
kjuserunix@Wdevice50:~/flask-app$
```

docker push kjagg23/myfirstapp

```
kjuserunix@Wdevice50:~/flask-app$ docker rm -f myfirstapp
myfirstapp
kjuserunix@Wdevice50:~/flask-app$
```

3.0 DEPLOYING AN APP TO SWARM

```
kjuserunix@Wdevice50:~$ git clone https://github.com/docker/example-voting-app.git
Cloning into 'example-voting-app'...
remote: Enumerating objects: 1132, done.
remote: Total 1132 (delta 0), reused 0 (delta 0), pack-reused 1132
Receiving objects: 100% (1132/1132), 1.17 MiB | 13.20 MiB/s, done.
Resolving deltas: 100% (435/435), done.
kjuserunix@Wdevice50:~$ cd example-voting-app
kjuserunix@Wdevice50:~/example-voting-app$
```

git clone https://github.com/docker/example-voting-app.git

```
kjuserunix@Wdevice50:~/example-voting-app$ docker swarm init
Swarm initialized: current node (xv9ty76d5t5ck052jnbiduiyw) is now a manager.

To add a worker to this swarm, run the following command:

    docker swarm join --token SWMTKN-1-0hq7prazd76fdhhrn9rypre4bft7v4cqe64f04mtz63kdk3pgs-9w99f3v8342qdiqyztkn0i7tm 172.21.106.210:2377

To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.

kjuserunix@Wdevice50:~/example-voting-app$
```

docker swarm init

```
kjuserunix@Wdevice50:~/example-voting-app$ ls
LICENSE  MAINTAINERS  README.md  architecture.excalidraw.png  docker-compose.images.yml  docker-compose.yml  docker-stack.yml  dockercompose  healthchecks  k8s-specifications  result  seed-data  vote  worker
```

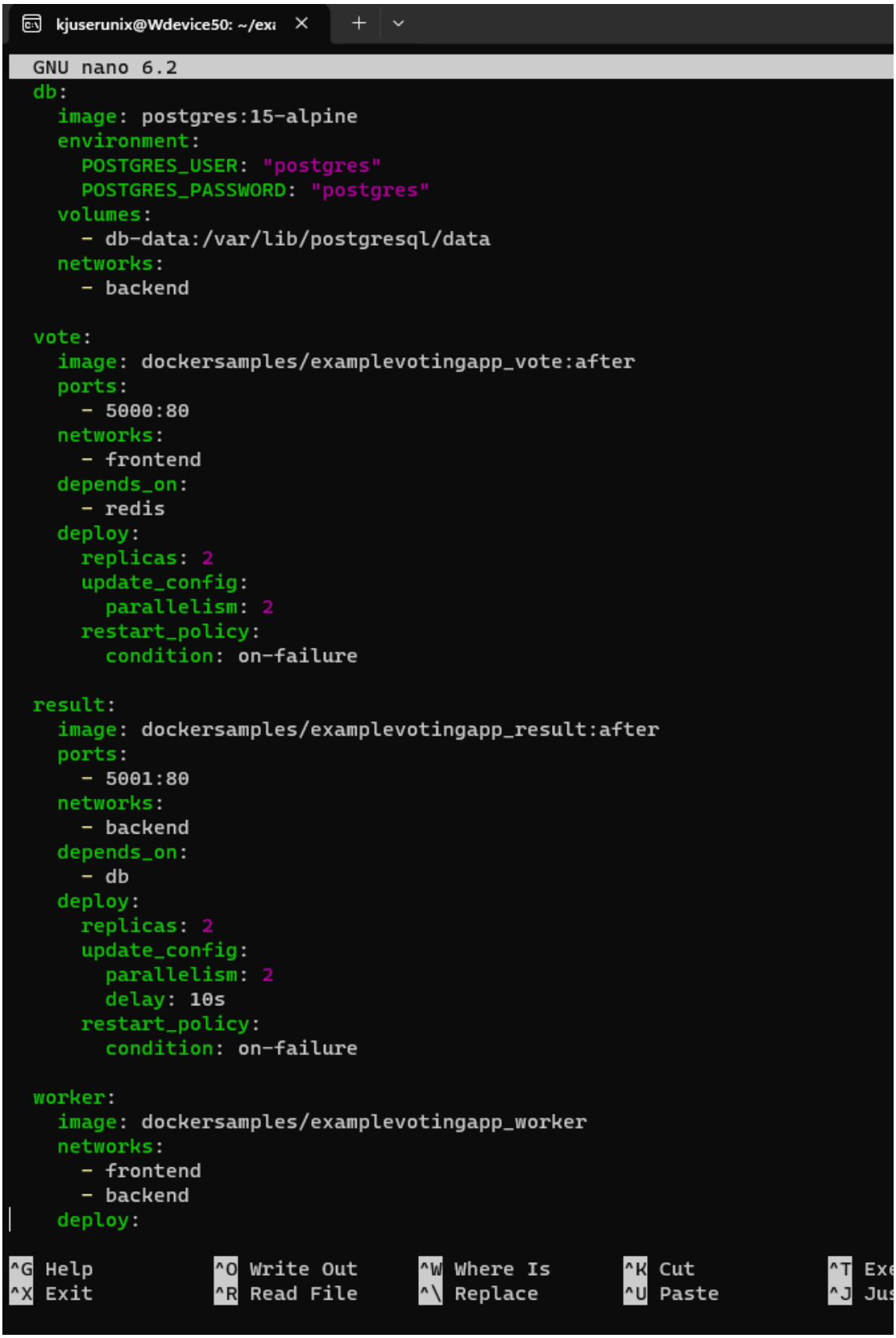
dockercompose file

```
kjuserunix@Wdevice50:~/example-voting-app$ docker stack deploy --compose-file docker-stack.yml vote
Creating network vote_frontend
Creating network vote_backend
Creating service vote_vote
Creating service vote_result
Creating service vote_worker
Creating service vote_redis
Creating service vote_db
kjuserunix@Wdevice50:~/example-voting-app$
```

docker stack deploy --compose-file docker-stack.yml vote

```
kjuserunix@Wdevice50:~/example-voting-app$ docker stack services vote
ID             NAME          MODE         REPLICAS   IMAGE                                          PORTS
i3wqtaconchk   vote_db       replicated   1/1        postgres:15-alpine
ao0mjuulk9tf   vote_redis    replicated   1/1        redis:alpine
lvcipeiuxniv   vote_result   replicated   1/1        dockersamples/examplevotingapp_result:latest   *:5001->80/tcp
7fdviku09t6i   vote_vote     replicated   2/2        dockersamples/examplevotingapp_vote:latest     *:5000->80/tcp
q1g48eoz5w9r   vote_worker   replicated   2/2        dockersamples/examplevotingapp_worker:latest
kjuserunix@Wdevice50:~/example-voting-app$
```

docker stack services vote



Change images to use after tags

```
kjuserunix@Wdevice50:~/example-voting-app$ docker stack deploy --compose-file docker-stack.yml vote
Updating service vote_db (id: i3wqtaconchk1rag2si2o8dwg)
Updating service vote_vote (id: 7fdviku09t6i5u1qinhv24meo)
Updating service vote_result (id: lvcipeiuxnivusgukw3kd6hmq)
Updating service vote_worker (id: q1g48eoz5w9r9fp15azd4gr0p)
Updating service vote_redis (id: ao0mjuulk9tfkr0pqbjwv0ios)
kjuserunix@Wdevice50:~/example-voting-app$
```

Redeployment

```
kjuserunix@Wdevice50:~/example-voting-app$ docker stack rm vote
Removing service vote_db
Removing service vote_redis
Removing service vote_result
Removing service vote_vote
Removing service vote_worker
Removing network vote_frontend
Removing network vote_backend
kjuserunix@Wdevice50:~/example-voting-app$
```

Remove the swarm