

Setup docker in ubuntu: end to end docker process:

I have created one aws ec2 instance with instance type c7iflex.large --> availability zone -> eu-north-1b.

And connected to above server by git bash using below commands

```
ssh -i /c/Users/kasev/Downloads/aws_key_manju_mail.pem.pem ubuntu@16.171.36.240
```

Step 1: Install Docker on Ubuntu

Run these commands one by one in your EC2 terminal 

```
# Update your packages  
sudo apt update -y  
  
# Install Docker engine  
sudo apt install docker.io -y  
  
# Enable and start Docker service  
sudo systemctl enable docker  
sudo systemctl start docker  
  
# Check Docker version  
docker --version
```

 You should see output like:

```
Docker version 24.x.x, build ...
```



Step 2: Add your user to the Docker group

This lets you run docker commands without using sudo every time.

```
sudo usermod -aG docker $USER
```

Then **logout and login again**, or run:

```
newgrp docker
```

To verify:

```
docker ps
```

If it shows no errors → good to go ✅

📁 Step 3: Create the Project

Create a simple directory for our app:

```
mkdir docker-flask-app  
cd docker-flask-app
```

🛠️ Step 4: Create Flask App Files

1 Create app.py

```
nano app.py
```

Paste this code:

```
from flask import Flask
```

```

app = Flask(__name__)

@app.route('/')
def hello():

    return "Hello Everyone, Thanks for watching this video!! please
like this video and subscribe my channel!!"

if __name__ == '__main__':
    app.run(host='0.0.0.0', port=5000)

:wq!

```

```

ubuntu@ip-172-31-42-32:~/docker-flask-app$ cat app.py
from flask import Flask
app = Flask(__name__)
@app.route('/')
def hello():
    return " hello everyone, thanks for watching this video"

if __name__ == '__main__':
    app.run(host='0.0.0.0', port=5000)

```

2 Create requirements.txt

flask

3 Create Dockerfile

nano Dockerfile

Paste this:

```

FROM python:3.9-slim
WORKDIR /app
COPY . /app
RUN pip install -r requirements.txt
EXPOSE 8080
CMD ["python", "app.py"]

```

Save and exit.

Step 5: Build Docker Image

```
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker build -t flask-docker-app:1.0 .
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 4.096kB
Step 1/6 : FROM python:3.9-slim
--> 085da638e1b8
Step 2/6 : WORKDIR /app
--> Using cache
--> e9e1df6de85d
Step 3/6 : COPY . /app
--> Using cache
--> 9324c3892b32
Step 4/6 : RUN pip install -r requirements.txt
--> Using cache
--> 8b775014caea
Step 5/6 : EXPOSE 8080
--> Using cache
--> 97d85bed08f1
Step 6/6 : CMD ["python", "app.py"]
--> Using cache
--> 0e12cb0f7dc9
Successfully built 0e12cb0f7dc9
Successfully tagged flask-docker-app:1.0
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker images
REPOSITORY      TAG          IMAGE ID      CREATED       SIZE
flask-docker-app  1.0          0e12cb0f7dc9  16 minutes ago  133MB
<none>          <none>        03f8bf9ebddc  38 minutes ago  133MB
python           3.9-slim     085da638e1b8   2 days ago    122MB
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker run -d -p 8080:5000 flask-docker-app:1.0
docker: invalid reference format

Run 'docker run --help' for more information
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker run -d -p 8080:5000 flask-docker-app:1.0
928e1d9b30307ab6d28305dd3b0bbe91817206d24f125e88186748242f7795f0
ubuntu@ip-172-31-33-209:~/docker-flask-app$ |
```

docker build -t flask-docker-app:1.0 .

Step 6: Verify the Image

docker images

You should see flask-docker-app:1.0 in the list.

What Happened

- Docker pulled the **Python 3.9 base image**.
- Installed **Flask** and its dependencies (`click`, `werkzeug`, `jinja2`, etc.) inside the image.
- Successfully completed the `RUN pip install -r requirements.txt` step.
- Finally executed the `CMD ["python", "app.py"]` instruction – meaning when you run the container, it'll start your Flask app automatically.
- The image `flask-docker-app:1.0` is now ready.

The **warning about “running pip as root”** is harmless inside containers – you can safely ignore it since containers are isolated environments.

Step 7: Run Container

```
docker run -d -p 8080:5000 flask-docker-app:1.0 -- to create and start  
the new container from the flask-docker-app image
```

or

```
docker run -p hostport:containerport <imagename>
```

Now your container is running!

Check with:

```
docker ps
```

Step 7: Test Your App

Go to your AWS instance's **Public IP**, open in browser:

<http://<your-public-ip>:8080>



You should see:

Hello, Docker! 🚀 Flask app running inside AWS EC2 container.

the above content we can edit in app.py file.

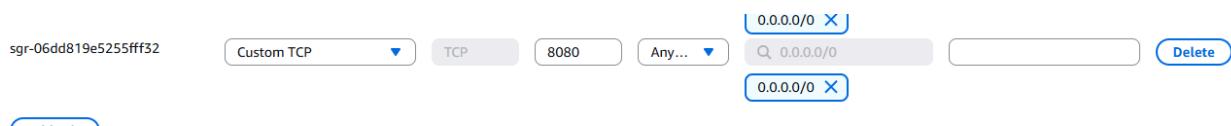
⚠️ If You Don't See It:

Make sure your **EC2 Security Group** allows **Inbound Rule: Port 8080 (TCP)**.

To fix:

- Go to **AWS Console** → **EC2** → **Security Groups** → **Inbound Rules** → **Edit**
- Add:
 - Type: Custom TCP
 - Port Range: 8080
 - Source: 0.0.0.0/0

Then reload your browser.



Congratulations!

You just completed:

Docker Build → Run → Deploy → Access via Public IP on AWS EC2

NOTE: IF YOU MAKE ANY CHANGES IN APP.PY WE SHOULD RUN BELOW COMMANDS

2. Rebuild your Docker image (so the fixed app.py is used):

```
docker build -t flask-docker-app:1.0 .
```

3. Run the container again:

```
docker run -d -p 8080:5000 flask-docker-app:1.0 -- before run this  
command pls stop existed containers or change port numbers on above  
command.
```

Host server port no is 8080, container port no is 5000
8080:500

Finally, Flask app is now **successfully deployed and running** inside the Docker container, and you can access it through the browser (e.g., <http://<your-EC2-public-IP>:8080>).

Step 8: push the image to docker hub (registry)

```

ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker login
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker login

USING WEB-BASED LOGIN

Info - To sign in with credentials on the command line, use 'docker login -u <username>'

Your one-time device confirmation code is: RGZK-GVGM
Press ENTER to open your browser or submit your device code here: https://login.docker.com/activate

Waiting for authentication in the browser...
^CLogin canceled
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker login -u kmuthyal

Info - A Personal Access Token (PAT) can be used instead.
To create a PAT, visit https://app.docker.com/settings

Password:
WARNING! Your credentials are stored unencrypted in '/home/ubuntu/.docker/config.json'.
Configure a credential helper to remove this warning. See
https://docs.docker.com/go/credential-store/

Login Succeeded
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker tag flask-docker-app:1.0 kmuthyal/flask-docker-app:1.0
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker tag
docker: 'docker tag' requires 2 arguments

Usage: docker tag SOURCE_IMAGE[:TAG] TARGET_IMAGE[:TAG]

Run 'docker tag --help' for more information
ubuntu@ip-172-31-33-209:~/docker-flask-app$ docker push kmuthyal/flask-docker-app:1.0
The push refers to repository [docker.io/kmuthyal/flask-docker-app]
538496566941: Pushed ✓
3a7c0c1b74c7: Pushed ✓
05a7e960f516: Pushed ✓
c8f6b54339a8: Mounted from library/python
298992e09a03: Mounted from library/python
4f237755fbae: Mounted from library/python
d7c97cb6f1fe: Mounted from library/python
1.0: digest: sha256:03ba5f7c4cde603ff2d483ee27aede1526d22df10b3a4fa483e2d0d7bae3240d size: 1783
ubuntu@ip-172-31-33-209:~/docker-flask-app$ ...

```

The screenshot shows the Docker Hub 'My Hub' interface. The left sidebar shows the user's profile (kmuthyal) and navigation links for Repositories, Hardened Images, Collaborations, Settings, Billing, Usage, Pulls, and Storage. The main area is titled 'Repositories' and displays a list of repositories under the 'kmuthyal' namespace. The repository 'kmuthyal/flask-docker-app' is highlighted with a pink oval. The table columns are Name, Last Pushed, Contains, Visibility, and Scout. The repository details are as follows:

Name	Last Pushed	Contains	Visibility	Scout
kmuthyal/flask-docker-app	11 minutes ago	IMAGE	Public	Inactive
kmuthyal/my-first-docker-image	about 2 months ago	IMAGE	Public	Inactive
kmuthyal/app1	over 1 year ago	IMAGE	Public	Inactive
kmuthyal/app2	over 1 year ago	IMAGE	Public	Inactive
kmuthyal/cart	over 2 years ago	IMAGE	Public	Inactive

Topic: how to pull and use the existed image from docker-hub

Perfect 🎉 — since you've already pushed your Docker image to **Docker Hub**, pulling and running it on a **new Ubuntu server** is very straightforward. Let's go step-by-step.

⌚ Step-by-step: Pull and run your image on a new server

Step 1 — Install Docker (if not installed yet)

If your new Ubuntu server doesn't have Docker installed, run:

```
sudo apt update  
sudo apt install -y docker.io  
sudo systemctl start docker  
sudo systemctl enable docker
```

You can verify Docker is running:

```
docker --version
```

Step : Add your user to the Docker group

This lets you run docker commands without using sudo every time.

```
sudo usermod -aG docker $USER
```

Then **logout and login again**, or run:

```
newgrp docker
```

Step 2 — Log in to Docker Hub

Use your Docker Hub credentials to log in so the new server can pull private or public images:

```
docker login -u kmuthyal (username of dockerhub)  
Passwd: password of above user
```

It will prompt for your **Docker Hub username** and **password (or access token)**.

Step 3 — Pull your image

Now, pull your image from Docker Hub:

```
docker pull <your-dockerhub-username>/<image-name>:<tag>
```

Example:

```
docker pull kmuthyal/flask-docker-app:1.0
```

This downloads the image layers to your new server.

You can verify it's there:

```
docker images
```

Step 4 — Run the container

Now run the Flask app container and expose it on your desired port:

```
docker run -d -p 8080:5000 --name flask-app kmuthyal/flask-docker-app:1.0
```

Explanation:

- `-d` → run in detached mode
- `-p 8080:5000` → map host port 8080 to container's internal port 5000 (Flask default)
- `--name flask-app` → container name
- `kmuthyal/flask-docker-app:1.0` → image from Docker Hub

Step 5 — Verify it's running

```
docker ps
```

You should see something like:

CONTAINER ID	IMAGE	COMMAND	STATUS
POR	T NAMES		
abcd1234efgh	kmuthyal/flask-docker-app:1.0	"python app.py"	Up 5
seconds	0.0.0.0:8080->5000/tcp	flask-app	

Step: please enable inbound rules (tcp and 8080 port) in aws server.
Before access in browser

Step 6 — Access in browser

Now open your Flask app in the browser using your new server's **public IP**:

<http://<your-server-public-ip>:8080>

You should see your Flask app page (e.g., “Hello World!”).