

Lecture 11: Docker Tutorial (1/2024)

(5 Marks)

DES424 Cloud-based Application Development

ICT, SIIT

ID: 6422782423

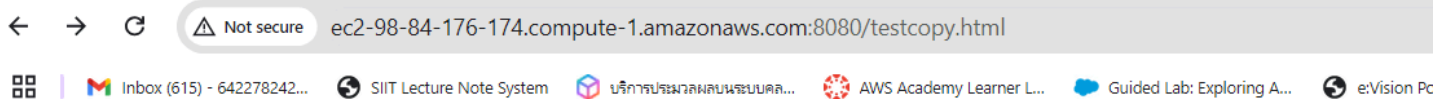
Instructor: Dr. Apichon Witayangkurn

Name: Teetawat Bussabarati

For this tutorial, you will practice on docker and how to deploy it both in local and on azure. It consists of multiple sub-topics with checkpoints. At each checkpoint, you will need to capture the screen and paste them here on this sheet.

ssh via mobaxterm or `ssh -i "C:\Users\mew\Documents\college\cloud\docker\labsuser.pem" ubuntu@54.226.208.36`

1. Check Point: working with docker volume (internal volume, myweb_v)



My Name: Teetawat Bussabarati

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My School: SIIT

```
ec2-98-84-176-174.compute-1.amazonaws.com (ubuntu)
Terminal Sessions View Xserver Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit

Quick connect...
/home/ubuntu/
Name
..
.cache
.local
.ssh
mytestweb
snap
.bash_history
.bash_logout
.bashrc
.profile
.sudo_as_admin_su
.xauthority
Remote monitoring
Follow terminal folder

Usage: docker stop [OPTIONS] CONTAINER [CONTAINER...]
Stop one or more running containers
ubuntu@ip-172-31-26-10:~$ docker stop myweb_v
myweb_v
ubuntu@ip-172-31-26-10:~$ docker rm myweb_v
myweb_v
ubuntu@ip-172-31-26-10:~$ docker volume ls
DRIVER VOLUME NAME
local myvol_data
ubuntu@ip-172-31-26-10:~$ docker run --name myweb_v -d -p 8080:80 -v myvol_data:/usr/
d456ad41bb971ecfbec997f1f0386afda93ad22f34de988bd3a6d644d6499b1
ubuntu@ip-172-31-26-10:~$ docker exec -it myweb_v bash
root@d456ad41bb97:/# cd /usr/share/nginx/html
root@d456ad41bb97:/usr/share/nginx/html# ls
50x.html index.html testcopy.html
root@d456ad41bb97:/usr/share/nginx/html# exit
exit
ubuntu@ip-172-31-26-10:~$ docker exec myweb_v ls /usr/share/nginx/html
50x.html
index.html
testcopy.html
ubuntu@ip-172-31-26-10:~$
```

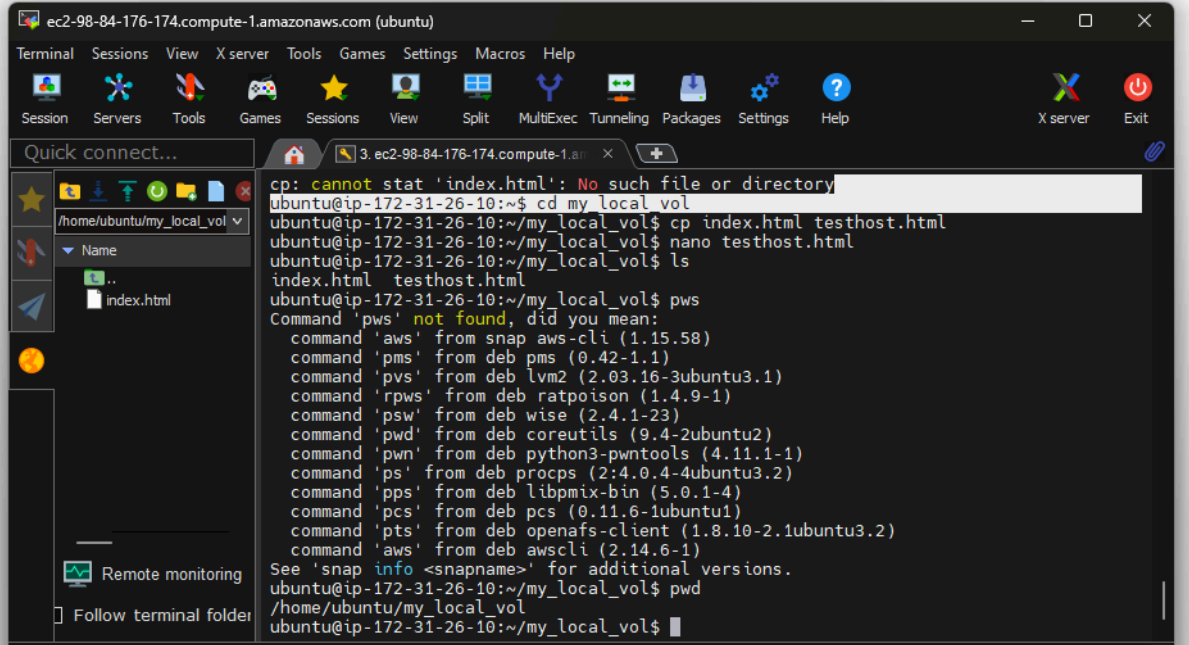
2. Check Point: working with bind host (external volume, myweb_h)



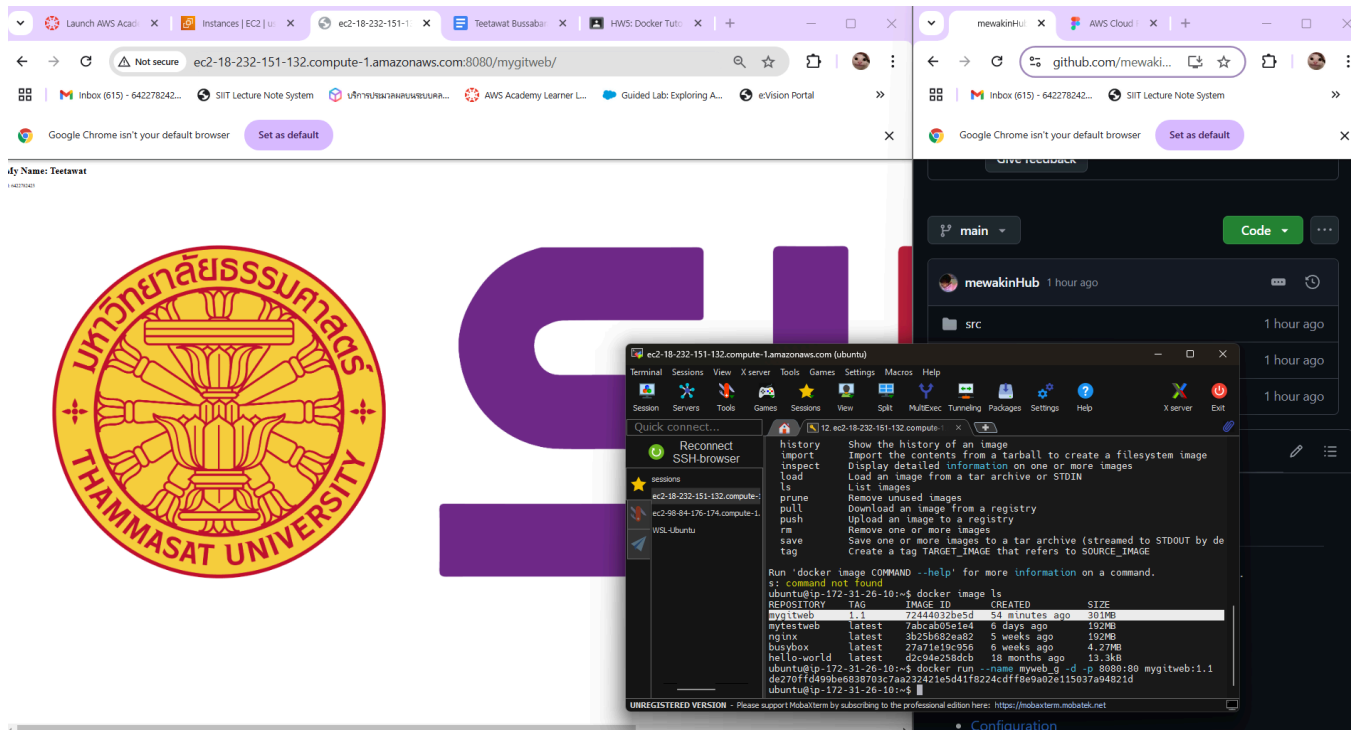
Welcome to DES424: Test bind host

Id: 6422782423

Country: Thailand



3. Check Point: working with dockerfile and build arguments

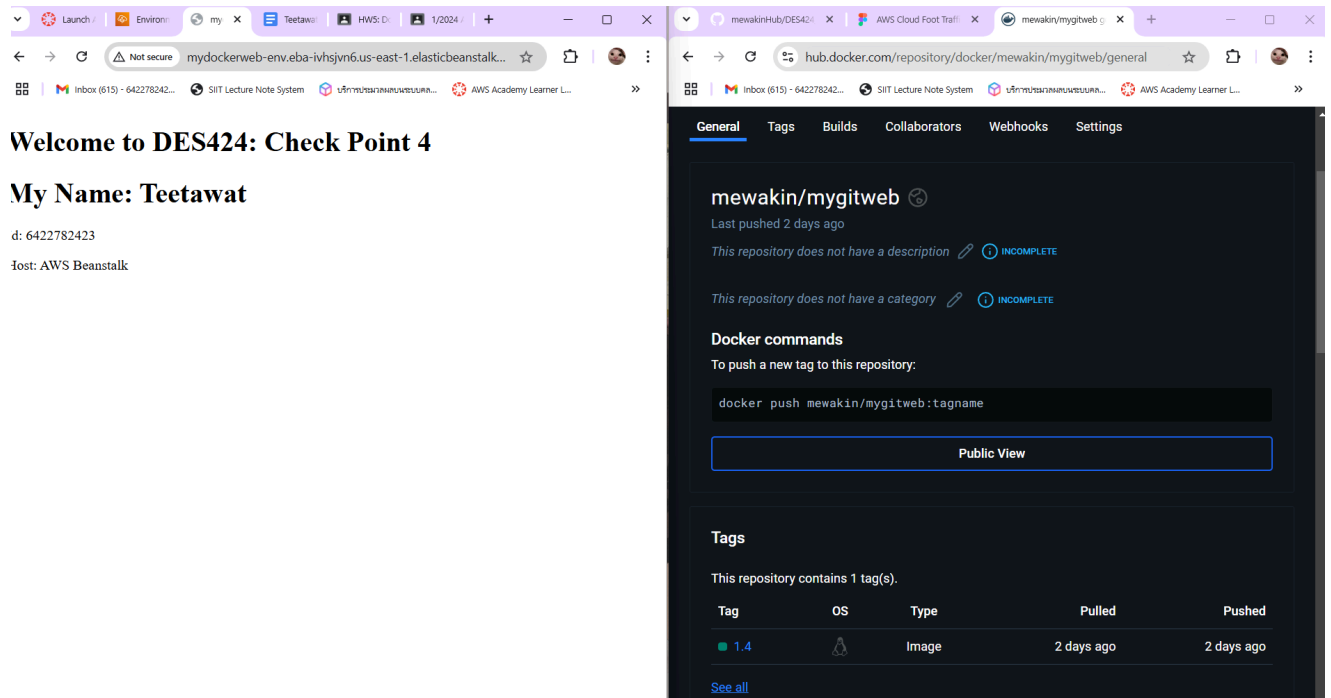


4. Check Point: working with dockerfile and environment

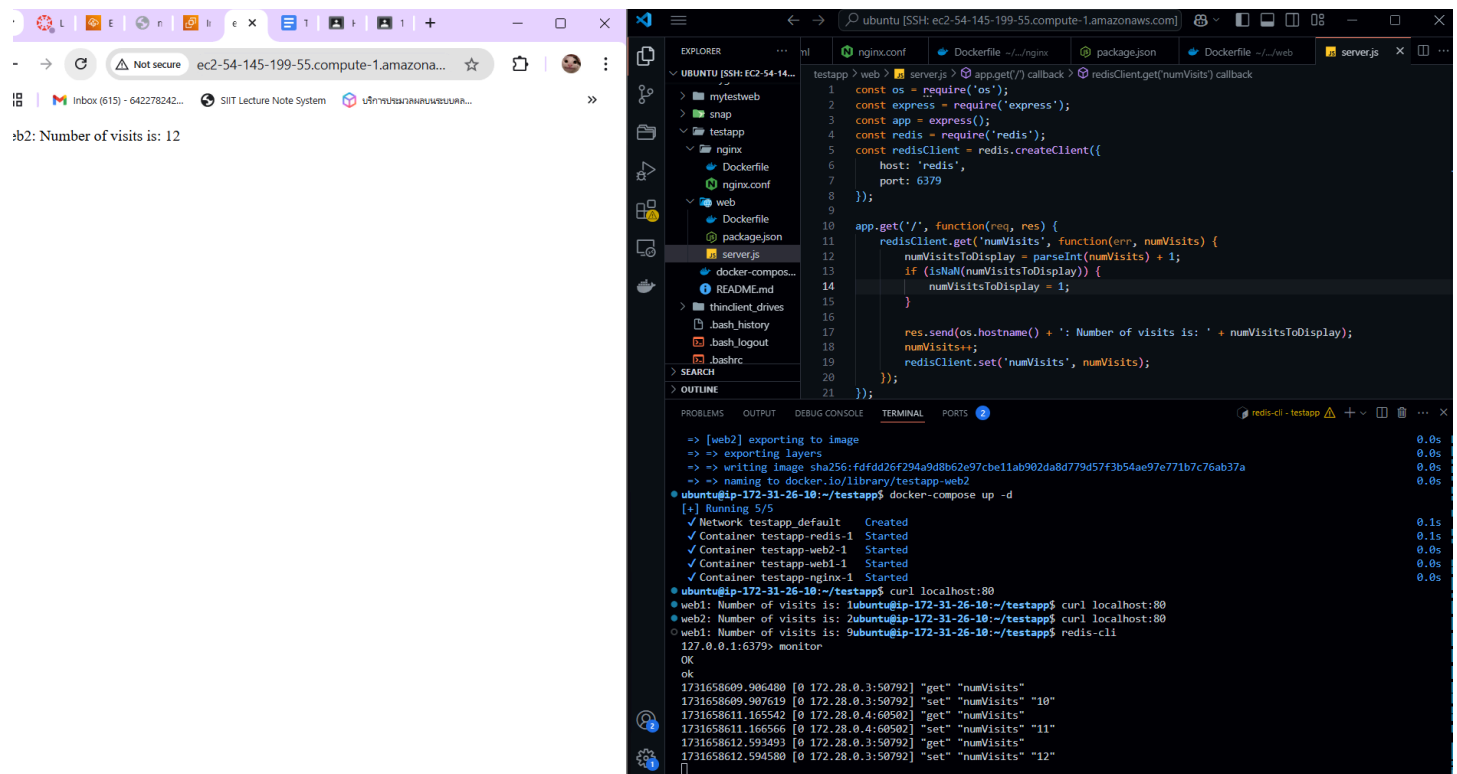
The screenshot shows a web browser window with the URL `ec2-18-232-151-132.compute-1.amazonaws.com:8080/mygitweb/check4.html`. The browser's address bar indicates it is not secure. Below the browser, a terminal window is open, displaying the following commands and output:

```
ec2-18-232-151-132.compute-1.amazonaws.com (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 14. ec2-18-232-151-132.compute-1
=> [5/7] RUN mkdir /mycode && cd /mycode && git clone https://github.com/mewakinHub/DES424_6422782423.git
=> [6/7] RUN cp -r /mycode/DES424_6422782423/src /usr/share/nginx/html/mygitweb
=> [7/7] RUN echo "Running dotask.sh with CMD" && cat /dotask.sh
=> exporting to image
=> exporting layers
=> writing image sha256:4e34c0fc682784db916153369a5793a0f12b6550f7fa4a5b45e63824702e69ab
=> naming to docker.io/library/mygitweb:1.4
ubuntu@ip-172-31-26-10:~/mygitweb$ docker run -d --name myweb_g -e MY_HOST=MyDockerOnVM -p 8080:80 mygitweb:1.4
22b754d885a5bf186a3093c61bf76e75e9e9c8afb8ec7f7728405aa1d08572c2
ubuntu@ip-172-31-26-10:~/mygitweb$ docker logs myweb_g
MY_HOST is set to: MyDockerOnVM
/usr/share/nginx/html/mygitweb/check4.html
<!DOCTYPE html>
<html>
<body>
<h1>Welcome to DES424: Check Point 4</h1>
<h1>My Name: Teetawat</h1>
<p>Id: 6422782423</p>
<p>Host: <MY_HOST></p>
</body>
</html>
<!DOCTYPE html>
<html>
<body>
<h1>Welcome to DES424: Check Point 4</h1>
<h1>My Name: Teetawat</h1>
<p>Id: 6422782423</p>
<p>Host: MyDockerOnVM</p>
</body>
</html>
2024/11/13 03:26:46 [notice] 11#11: using the "epoll" event method
2024/11/13 03:26:46 [notice] 11#11: nginx/1.27.2
2024/11/13 03:26:46 [notice] 11#11: built by gcc 12.2.0 (Debian 12.2.0-14)
2024/11/13 03:26:46 [notice] 11#11: OS: Linux 6.8.0-1017-aws
2024/11/13 03:26:46 [notice] 11#11: getrlimit(RLIMIT_NOFILE): 1024:524288
2024/11/13 03:26:46 [notice] 11#11: start worker processes
2024/11/13 03:26:46 [notice] 11#11: start worker process 12
2024/11/13 03:26:46 [notice] 11#11: start worker process 13
ubuntu@ip-172-31-26-10:~/mygitweb$
```

5. Check Point: deploy your container on Azure App Service



6. Check Point: A Node.js application using Nginx, Docker, and Redis



7. Check Point: dashboard for monitoring dockers

The image is a composite of two screenshots. The left screenshot shows a terminal window with the following content:

```
prometheus
/prometheus/prometheus.yml

ds.

series scraped from this config.
ery 5 seconds.

container
```

The right screenshot shows a web browser displaying the Prometheus 'Cadvisor exporter' dashboard. The browser's address bar shows the URL: `54.91.17.35:3000/d/pMed7m0Mz/cadvis...`. The dashboard has a dark theme and includes the following elements:

- Navigation:** Home > Dashboards > Cadvisor exporter
- Filters:** Host: All, Container: All
- Section: CPU**
 - CPU Usage Graph:** A line graph showing CPU usage over time from 13:30 to 19:00. The y-axis ranges from 0% to 3%.
 - Table:**
- Section: Memory**
 - Memory Usage Graph:** A line graph showing memory usage over time from 13:30 to 19:00. The y-axis ranges from 32 MiB to 192 MiB.

Name	Mean	Max
cadvisor	1.32%	1.95%
grafana	0.247%	0.431%

```
21fb1408f5fc portainer/portainer-ce "/portainer" 53 seconds ago Up 48 seconds 8000/tcp, 9443/tcp, 0.0.0.0:9000->9000/tcp, :::9000->9000/tcp portainer
bc3827a61675 hello-world 4 minutes ago Exited (0) 4 minutes ago
ubuntu@ip-172-31-28-19:~$ cd /etc/prometheus
-bash: cd: /etc/prometheus: No such file or directory
ubuntu@ip-172-31-28-19:~$ cd /etc/prometheus
ubuntu@ip-172-31-28-19:~$ sudo nano prometheus.yml
ubuntu@ip-172-31-28-19:~$ cat prometheus.yml
global:
  scrape_interval: 15s # By default, scrape targets every 15 seconds.
  # A scrape configuration containing exactly one endpoint to scrape:
  # Here it's Prometheus itself.
  scrape_configs:
    # The job name is added as a label 'job=<job_name>' to any timeseries scraped from this config.
    - job_name: 'prometheus'
      # Override the global default and scrape targets from this job every 5 seconds.
      scrape_interval: 5s
      static_configs:
        - targets: ['localhost:9090']
    # Example job for node_exporter
    - job_name: 'node_exporter'
      static_configs:
        - targets: ['node_exporter:9100']
    # Example job for cadvisor
    - job_name: 'cadvisor'
      static_configs:
        - targets: ['cadvisor:8080']
ubuntu@ip-172-31-28-19:~$ cat prometheus.yml
```

8. Check Point: Voting App

docs.google.com/document/d/1luRnM6eC7VCpZLuLmp...

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CPU Usage

8. Check Point: Voting App

END.

Cats vs Dogs!

CATS

DOGS

Cats vs Dogs -- Result

CATS 100.0%

DOGS 0.0%

vote

```
Quick connect...
127.0.0.1 - [17/Nov/2024 12:36:14] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:36:29] "GET / HTTP/1.1" 200 -
vote-1 64.62.197.122 - [17/Nov/2024 12:36:35] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:36:45] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:37:00] "GET / HTTP/1.1" 200 -
vote-1 64.62.197.126 - [17/Nov/2024 12:37:14] "GET http://api.inify.org/?format=json HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:37:15] "GET / HTTP/1.1" 200 -
vote-1 64.62.197.135 - [17/Nov/2024 12:37:26] "GET /gossamer/web/ HTTP/1.1" 404 -
vote-1 127.0.0.1 - [17/Nov/2024 12:37:30] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:37:45] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:38:00] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:38:15] "GET / HTTP/1.1" 200 -
vote-1 110.169.136.84 - [17/Nov/2024 12:38:22] "GET / HTTP/1.1" 200 -
vote-1 110.169.136.84 - [17/Nov/2024 12:38:22] "GET /static/stylesheets/style.css HTTP/1.1" 200 -
vote-1 110.169.136.84 - [17/Nov/2024 12:38:23] "GET /favicon.ico HTTP/1.1" 404 -
vote-1 127.0.0.1 - [17/Nov/2024 12:38:30] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:38:45] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:39:00] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:39:15] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:39:30] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:39:45] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:40:00] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:40:16] "GET / HTTP/1.1" 200 -
db-1 2024-11-17 12:40:21.121 UTC [52] LOG: checkpoint starting: time
vote-1 [2024-11-17 12:40:23.177] INFO in app: Received vote for a
vote-1 110.169.136.84 - [17/Nov/2024 12:40:23] "POST / HTTP/1.1" 200 -
worker-1 [2024-11-17 12:40:23.345] INFO in app: Received vote for a
vote-1 Processing vote for 'a' by '576c4bace389290'
vote-1 110.169.136.84 - [17/Nov/2024 12:40:23] "POST / HTTP/1.1" 200 -
worker-1 Processing vote for 'a' by '576c4bace389290'
db-1 2024-11-17 12:40:23.454 UTC [70] ERROR: duplicate key value violates unique constraint "votes_id_key"
db-1 2024-11-17 12:40:23.454 UTC [70] DETAIL: Key (id)=(576c4bace389290) already exists.
db-1 2024-11-17 12:40:23.454 UTC [70] STATEMENT: INSERT INTO votes (id, vote) VALUES ($1, $2)
vote-1 110.169.136.84 - [17/Nov/2024 12:40:23] "GET /static/stylesheets/style.css HTTP/1.1" 304 -
db-1 [2024-11-17 12:40:28.765 UTC [52] LOG: checkpoint complete: wrote 79 buffers (0.5%); 0 WAL file(s) added, 0 removed, 0 recycled; write=7.623 s, sync=0.010 s, total=7.643 s; sync files=45, longest=0.00
3 s, average=0.001 s; distance=367 kB, estimate=187 kB
vote-1 127.0.0.1 - [17/Nov/2024 12:40:31] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:40:46] "GET / HTTP/1.1" 200 -
vote-1 [2024-11-17 12:40:49.598] INFO in app: Received vote for b
vote-1 110.169.136.84 - [17/Nov/2024 12:40:49] "POST / HTTP/1.1" 200 -
worker-1 Processing vote for 'b' by '576c4bace389290'
db-1 2024-11-17 12:40:49.603 UTC [70] ERROR: duplicate key value violates unique constraint "votes_id_key"
db-1 2024-11-17 12:40:49.603 UTC [70] DETAIL: Key (id)=(576c4bace389290) already exists.
db-1 2024-11-17 12:40:49.603 UTC [70] STATEMENT: INSERT INTO votes (id, vote) VALUES ($1, $2)
vote-1 110.169.136.84 - [17/Nov/2024 12:40:51] "GET /static/stylesheets/style.css HTTP/1.1" 304 -
vote-1 [2024-11-17 12:40:52.273] INFO in app: Received vote for a
vote-1 110.169.136.84 - [17/Nov/2024 12:40:52] "POST / HTTP/1.1" 200 -
worker-1 Processing vote for 'a' by '576c4bace389290'
db-1 2024-11-17 12:40:52.331 UTC [70] ERROR: duplicate key value violates unique constraint "votes_id_key"
db-1 2024-11-17 12:40:52.331 UTC [70] DETAIL: Key (id)=(576c4bace389290) already exists.
db-1 2024-11-17 12:40:52.331 UTC [70] STATEMENT: INSERT INTO votes (id, vote) VALUES ($1, $2)
vote-1 110.169.136.84 - [17/Nov/2024 12:40:52] "GET /static/stylesheets/style.css HTTP/1.1" 304 -
vote-1 127.0.0.1 - [17/Nov/2024 12:41:01] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:41:16] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:41:31] "GET / HTTP/1.1" 200 -
vote-1 127.0.0.1 - [17/Nov/2024 12:41:46] "GET / HTTP/1.1" 200 -

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```

```
Last login: Sun Nov 17 12:00:22 2024 from 110.169.136.84
ubuntu@ip-172-31-28-101:~$ docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
99a646ee4eab	example-voting-app-vote	"python app.py"	7 minutes ago	Up 7 minutes (healthy)	0.0.0.0:8080->80/tcp, [::]:8080->80/tcp	example-voting-app-
f18ba1d2f972	example-voting-app-worker	"dotnet Worker.dll"	7 minutes ago	Up 7 minutes		example-voting-app-
57eb3bc0c7c3	example-voting-app-result	"nodemon --inspect=0.0.0.0"	7 minutes ago	Up 7 minutes	127.0.0.1:9229->9229/tcp, 0.0.0.0:8081->80/tcp, [::]:8081->80/tcp	example-voting-app-
00e9d0edf7f5	redis:alpine	"docker-entrypoint.s..."	7 minutes ago	Up 7 minutes (healthy)	6379/tcp	example-voting-app-
1bf19e9b1c29	postgres:15-alpine	"docker-entrypoint.s..."	7 minutes ago	Up 7 minutes (healthy)	5432/tcp	example-voting-app-
db-1						

END.