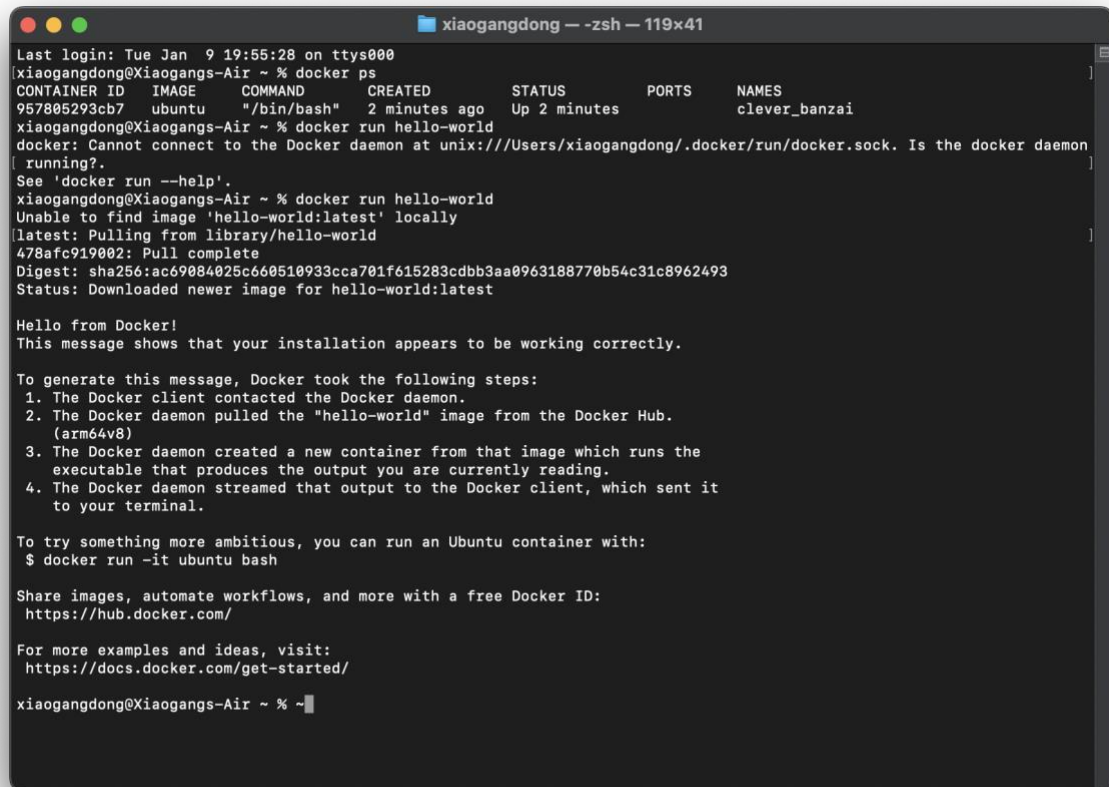


- Verify the installation of my Docker:

A terminal window titled 'xiaogangdong - zsh - 119x41' showing the process of verifying Docker installation. The user runs 'docker ps' and 'docker run hello-world'. The output shows a table of running containers, an error message about the Docker daemon, and the successful execution of the 'hello-world' container which prints a message and lists the steps Docker took to generate it. The terminal text is as follows:

```
Last login: Tue Jan 9 19:55:28 on ttys000
xiaogangdong@Xiaogangs-Air ~ % docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
957805293cb7   ubuntu   "/bin/bash"   2 minutes ago   Up 2 minutes   clever_banzai
xiaogangdong@Xiaogangs-Air ~ % docker run hello-world
docker: Cannot connect to the Docker daemon at unix:///Users/xiaogangdong/.docker/run/docker.sock. Is the docker daemon
running?.
See 'docker run --help'.
xiaogangdong@Xiaogangs-Air ~ % docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
478afc919002: Pull complete
Digest: sha256:ac69084025c660510933cca701f615283cddb3aa0963188770b54c31c8962493
Status: Downloaded newer image for hello-world:latest

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

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (arm64v8)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

xiaogangdong@Xiaogangs-Air ~ % ~
```

- Running my first container:

```
xiaogangdong — zsh — 121x49

For more examples and ideas, visit:
https://docs.docker.com/get-started/

[xiaogangdong@Xiaogangs-Air ~ % docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
c30352492317: Pull complete
Digest: sha256:51b67269f354137895d43f3b3d810bfacd3945438e94dc5ac55fdac340352f48
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest

What's Next?
View a summary of image vulnerabilities and recommendations → docker scout quickview alpine
[xiaogangdong@Xiaogangs-Air ~ % docker images
REPOSITORY    TAG       IMAGE ID   CREATED    SIZE
ubuntu        latest    da935f064913  4 weeks ago  69.3MB
alpine         latest    1dc785547989  4 weeks ago  7.73MB
hello-world    latest    ee301c921b8a  8 months ago  9.14kB
[xiaogangdong@Xiaogangs-Air ~ % docker run alpine ls -l
total 56
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 bin
drwxr-xr-x  5 root    root          340 Jan 10 03:05 dev
drwxr-xr-x  1 root    root          4096 Jan 10 03:05 etc
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 home
drwxr-xr-x  7 root    root          4096 Dec  7 09:45 lib
drwxr-xr-x  5 root    root          4096 Dec  7 09:45 media
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 mnt
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 opt
dr-xr-xr-x 226 root    root           0 Jan 10 03:05 proc
drwx----- 2 root    root          4096 Dec  7 09:45 root
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 run
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 sbin
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 srv
dr-xr-xr-x 12 root    root           0 Jan 10 03:05 sys
drwxrwxrwt  2 root    root          4096 Dec  7 09:45 tmp
drwxr-xr-x  7 root    root          4096 Dec  7 09:45 usr
drwxr-xr-x 12 root    root          4096 Dec  7 09:45 var
[xiaogangdong@Xiaogangs-Air ~ % docker run alpine echo "Hello Dong! from Alpine daemon"
Hello Dong! from Alpine daemon
[xiaogangdong@Xiaogangs-Air ~ % docker run -it alpine /bin/sh
/ # ls -l
total 56
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 bin
drwxr-xr-x  5 root    root          340 Jan 10 03:08 dev
drwxr-xr-x  1 root    root          4096 Jan 10 03:08 etc
drwxr-xr-x  2 root    root          4096 Dec  7 09:45 home
drwxr-xr-x  7 root    root          4096 Dec  7 09:45 lib
drwxr-xr-x  5 root    root          4096 Dec  7 09:45 media
```

```
xiaogangdong — -zsh — 121x49

drwxr-xr-x  2 root    root      4096 Dec  7 09:45 srv
dr-xr-xr-x 12 root    root        0 Jan 10 03:08 sys
drwxrwxrwt  2 root    root      4096 Dec  7 09:45 tmp
drwxr-xr-x  7 root    root      4096 Dec  7 09:45 usr
drwxr-xr-x 12 root    root      4096 Dec  7 09:45 var

[/ # uname -a
Linux db9277edca19 6.5.11-linuxkit #1 SMP PREEMPT Wed Dec  6 17:08:31 UTC 2023 aarch64 Linux
[/ # exit

xiaogangdong@Xiaogangs-Air ~ % docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES
xiaogangdong@Xiaogangs-Air ~ % docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
db9277edca19   alpine    "/bin/sh"  38 seconds ago Exited (0) 11 seconds ago   strange_hugl
e
198c9311182d   alpine    "echo 'Hello Dong! f..." 2 minutes ago Exited (0) 2 minutes ago   vigorous_car
son
92d73235f30d   alpine    "ls -l"    4 minutes ago Exited (0) 4 minutes ago   distracted_t
esla
d5404c80e669   hello-world "/hello"   11 minutes ago Exited (0) 11 minutes ago   elastic_bana
ch
957805293cb7   ubuntu    "/bin/bash" 2 hours ago   Exited (137) 2 hours ago   clever_banza
i

xiaogangdong@Xiaogangs-Air ~ % docker inspect alpine
[
  {
    "Id": "sha256:1dc785547989b0db1c3cd9949c57574393e69bea98bfe044b0588e24721aa402",
    "RepoTags": [
      "alpine:latest"
    ],
    "RepoDigests": [
      "alpine@sha256:51b67269f354137895d43f3b3d810bfacd3945438e94dc5ac55fdac340352f48"
    ],
    "Parent": "",
    "Comment": "",
    "Created": "2023-12-08T01:39:30.654248953Z",
    "Container": "2ab63aa21f434290efe092b165617a90f9014ff17f86edb6e0df8c8b40e19e8a",
    "ContainerConfig": {
      "Hostname": "2ab63aa21f43",
      "Domainname": "",
      "User": "",
      "AttachStdin": false,
      "AttachStdout": false,
      "AttachStderr": false,
      "Tty": false,
      "OpenStdin": false,
      "StdinOnce": false,
      "Env": [
        "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
      ],
    },
  },
]
```

- Webapps with docker:

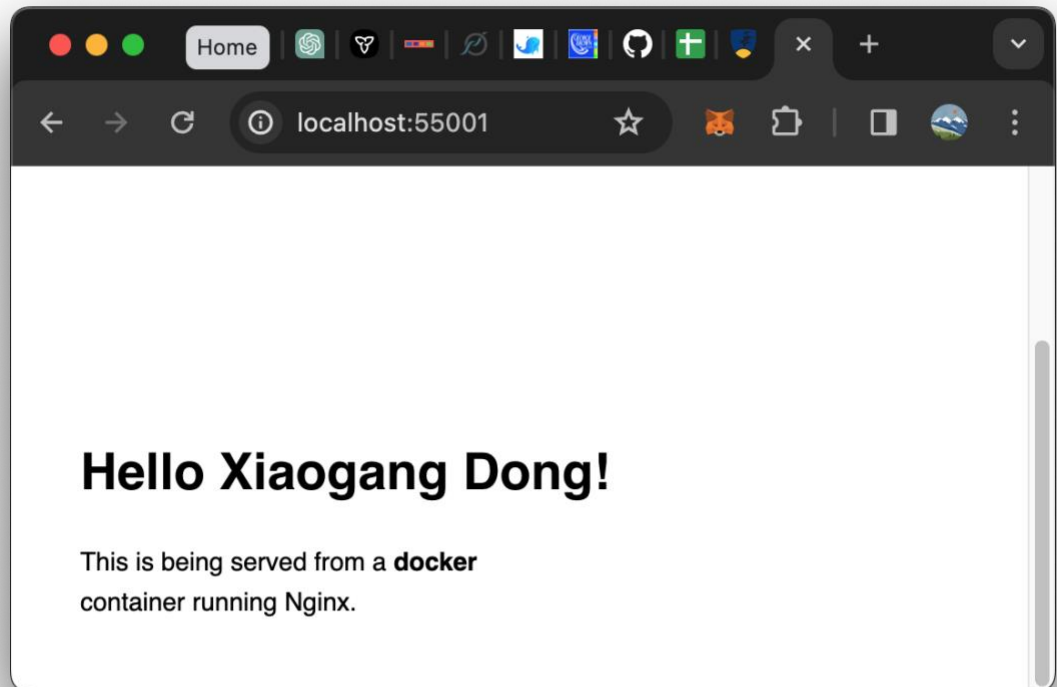
```

xiaoangdong@Xiaogangs-Air ~ % 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
WARNING: The requested image's platform (linux/amd64) does not match the detected host platform (linux/arm64/v8) and no s
pecific platform was requested
6a81adc1cb2a447ab9841ab7a6760a66da2b9c91bdafa411f2f499bde848783f
xiaoangdong@Xiaogangs-Air ~ % docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS        NAME
6a81adc1cb2a   dockersamples/static-site          "/bin/sh -c 'cd /usr-"  2 minutes ago  Up 2 minutes  80/tcp, 443/tcp  infallible_torvalds
xiaoangdong@Xiaogangs-Air ~ % docker stop 6a81adc1cb2a
6a81adc1cb2a
xiaoangdong@Xiaogangs-Air ~ %
xiaoangdong@Xiaogangs-Air ~ % docker rm 6a81adc1cb2a
6a81adc1cb2a
xiaoangdong@Xiaogangs-Air ~ % $ docker run --name static-site -e AUTHOR="Xiaogang Dong" -d -P dockersamples/static-site
e61d12292d69556eabe2a44c16cbd54486b2527e2ce4f95438e504afb7b02810
zsh: command not found: $
xiaoangdong@Xiaogangs-Air ~ % docker run --name static-site -e AUTHOR="Xiaogang Dong" -d -P dockersamples/static-site
e61d12292d69556eabe2a44c16cbd54486b2527e2ce4f95438e504afb7b02810
WARNING: The requested image's platform (linux/amd64) does not match the detected host platform (linux/arm64/v8) and no s
pecific platform was requested
2421524a91b771aa53f299d98c4528a85839897accf0423f34eb00a834dfd179
zsh: command not found: e61d12292d69556eabe2a44c16cbd54486b2527e2ce4f95438e504afb7b02810
xiaoangdong@Xiaogangs-Air ~ % docker run --name static-site -e AUTHOR="Xiaogang Dong" -d -P dockersamples/static-site
docker: Error response from daemon: Conflict. The container name "/static-site" is already in use by container "2421524a9
1b771aa53f299d98c4528a85839897accf0423f34eb00a834dfd179". You have to remove (or rename) that container to be able to reu
se that name.
See 'docker run --help'.
xiaoangdong@Xiaogangs-Air ~ % docker port
"docker port" requires at least 1 and at most 2 arguments.
See 'docker port --help'.

Usage: docker port CONTAINER [PRIVATE_PORT[/PROTO]]

List port mappings or a specific mapping for the container
xiaoangdong@Xiaogangs-Air ~ % docker port static-site
80/tcp -> 0.0.0.0:55001
443/tcp -> 0.0.0.0:55000

```



## 2.3

### Flask-app

```
[xiaogangdong@Xiaogangs-MacBook-Air Lab 1 % docker build -t xiaogang/myfirstapp .
[+] Building 3.9s (12/12) FINISHED
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 606B
=> [internal] load metadata for docker.io/library/alpine:3.14
=> [auth] library/alpine:pull token for registry-1.docker.io
=> [1/6] FROM docker.io/library/alpine:3.14@sha256:0f2d5c38dd7a4f4f733e688e3a6733cb5ab1ac6e3cb4603a5dd564e5bfb80eed
=> [internal] load build context
=> => transferring context: 2.96kB
=> CACHED [2/6] RUN apk add --update python3 py3-pip
=> [3/6] COPY requirements.txt /usr/src/app/
=> [4/6] RUN pip3 install --no-cache-dir -r /usr/src/app/requirements.txt
=> [5/6] COPY app.py /usr/src/app/
=> [6/6] COPY templates/ /usr/src/app/templates/
=> exporting to image
=> => exporting layers
=> => writing image sha256:a2d55379a5eb6b0655205fc7047a4e0c2620d93f9605b5361773a8431024363a
=> => naming to docker.io/xiaogang/myfirstapp
```

docke

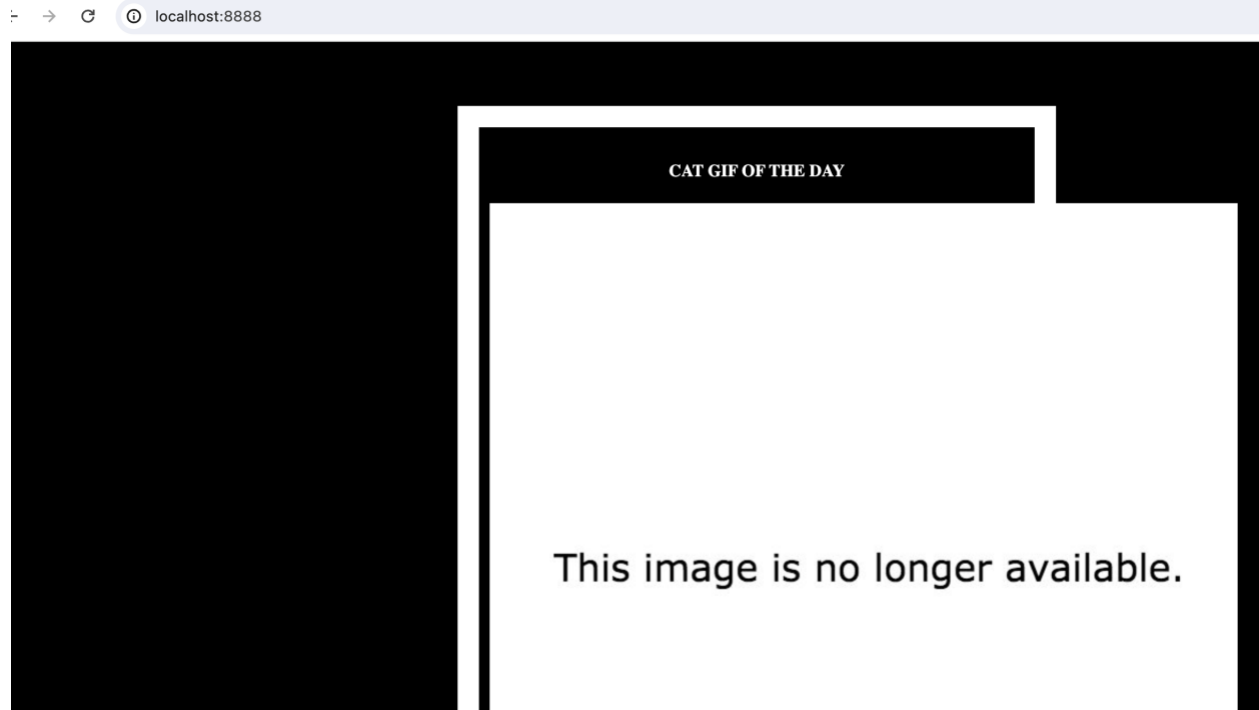
View build details: [docker-desktop://dashboard/build/desktop-linux/desktop-linux/nfgrhupt83b1nf350z4o8humk](https://docker-desktop://dashboard/build/desktop-linux/desktop-linux/nfgrhupt83b1nf350z4o8humk)

#### What's Next?

View a summary of image vulnerabilities and recommendations → [docker scout quickview](#)

```
[xiaogangdong@Xiaogangs-MacBook-Air Lab 1 % docker run -p 8888:5000 --name myfirstapp xiaogang/myfirstapp
* Serving Flask app 'app' (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on all addresses.
  WARNING: This is a development server. Do not use it in a production deployment.
* Running on http://172.17.0.2:5000/ (Press CTRL+C to quit)
192.168.65.1 - - [01/Feb/2024 21:27:20] "GET / HTTP/1.1" 200 -
192.168.65.1 - - [01/Feb/2024 21:27:20] "GET /favicon.ico HTTP/1.1" 404 -
```





### 3.0 Deploying an app to a Swarm

#### Deployment (swarm enabled earlier)

```
xiaogangdong@Xiaogangs-MacBook-Air Lab 1 % git clone https://github.com/docker/example-voting-app.git
fatal: destination path 'example-voting-app' already exists and is not an empty directory.
xiaogangdong@Xiaogangs-MacBook-Air Lab 1 % cd example-voting-app
xiaogangdong@Xiaogangs-MacBook-Air example-voting-app % docker swarm init

Error response from daemon: This node is already part of a swarm. Use "docker swarm leave" to leave this swarm and join another one.

xiaogangdong@Xiaogangs-MacBook-Air example-voting-app % docker stack deploy --compose-file docker-stack.yml vote

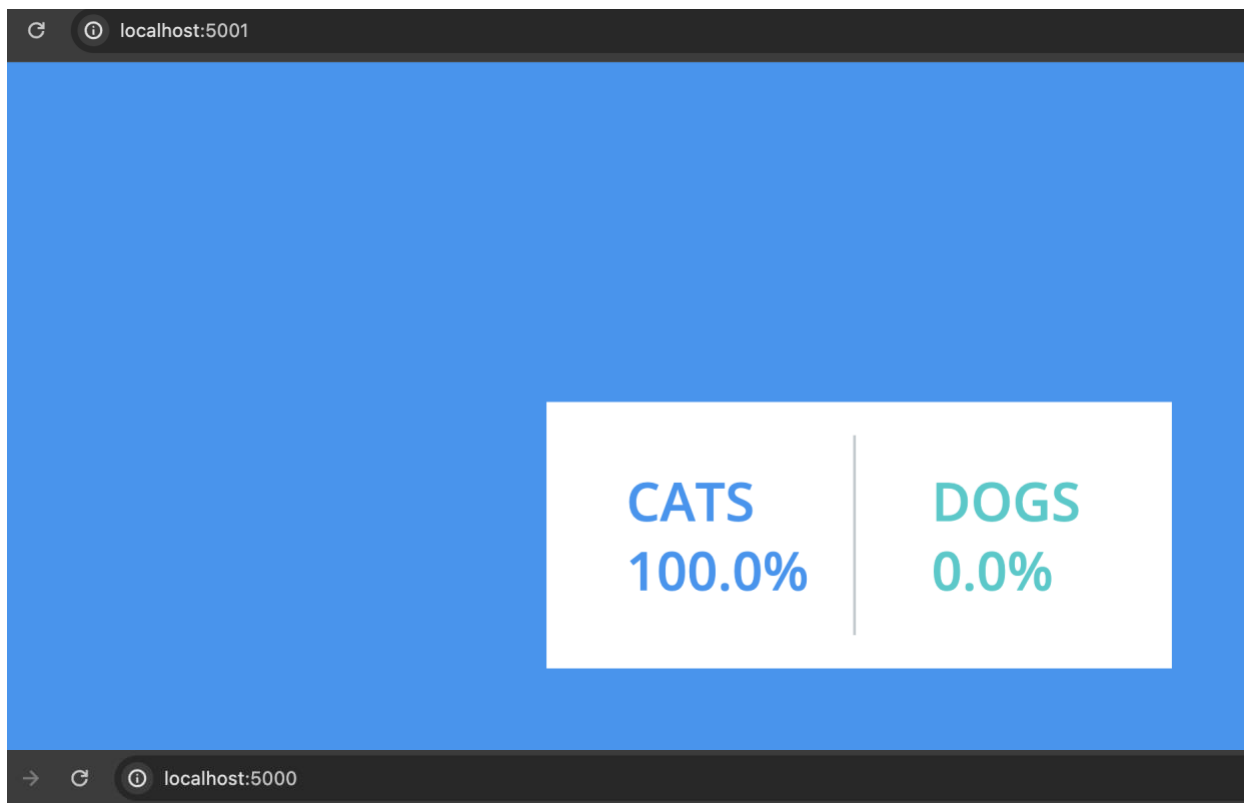
Creating network vote_frontend
Creating network vote_backend
Creating service vote_redis
Creating service vote_db
Creating service vote_vote
Creating service vote_result
Creating service vote_worker
xiaogangdong@Xiaogangs-MacBook-Air example-voting-app % docker stack services vote

```

| ID           | NAME        | MODE       | REPLICAS | IMAGE  | PORTS          |
|--------------|-------------|------------|----------|--|----------------|
| c8h4v3cdr80i | vote_db     | replicated | 1/1      | postgres:15-alpine                           |                |
| 750ihysxdkug | vote_redis  | replicated | 1/1      | redis:alpine                                 |                |
| 8vvm1ybrm2eq | vote_result | replicated | 1/1      | dockersamples/examplevotingapp_result:latest | *:5001->80/tcp |
| a1usfafn5ggg | vote_vote   | replicated | 2/2      | dockersamples/examplevotingapp_vote:latest   | *:5000->80/tcp |
| p3pncqs2tljh | vote_worker | replicated | 1/2      | dockersamples/examplevotingapp_worker:latest |                |

```
xiaogangdong@Xiaogangs-MacBook-Air example-voting-app %
```

UI: Cat vs Dog



**Cats vs Dogs!**

CATS ✓

DOGS

(Tip: you can change your vote)

Processed by container ID  
1e56c3911ca7

## Customize the app(changed from before to after)

```
xiaogangdong@Xiaogangs-MacBook-Air example-voting-app % docker stack deploy --compose-file docker-stack.yml vote
Updating service vote_visualizer (id: m8y33gm2deymn2771fmngo9)
Updating service vote_redis (id: 750ihysxdkugpzmvmwqojppu)
Updating service vote_db (id: c8h4v3cdr80iz7jzkrhh1ywk)
Updating service vote_vote (id: a1usfafn5ggul011zomtschc2)
Updating service vote_result (id: 8vvm1ybrm2eqydcjhet4ijciy)
Updating service vote_worker (id: p3pncqs2tljhm8u5gw2o03o6)
xiaogangdong@Xiaogangs-MacBook-Air example-voting-app % docker stack services vote
```

| ID            | NAME            | MODE       | REPLICAS | IMAGE  | PORTS            |
|---------------|-----------------|------------|----------|--|------------------|
| c8h4v3cdr80i  | vote_db         | replicated | 0/1      | postgres:9.4                                 |                  |
| 750ihysxdkug  | vote_redis      | replicated | 2/2      | redis:alpine                                 | *:3000->6379/tcp |
| 8vvm1ybrm2eq  | vote_result     | replicated | 1/1      | dockersamples/examplevotingapp_result:after  | *:5001->80/tcp   |
| m8y33gm2deym  | vote_visualizer | replicated | 0/1      | dockersamples/visualizer:latest              | *:8080->8080/tcp |
| a1usfafn5ggul | vote_vote       | replicated | 2/2      | dockersamples/examplevotingapp_vote:after    | *:5000->80/tcp   |
| p3pncqs2tljh  | vote_worker     | replicated | 1/1      | dockersamples/examplevotingapp_worker:latest |                  |

```
xiaogangdong@Xiaogangs-MacBook-Air example-voting-app %
```