Setup

hafelago@DESKTOP-208TC4I:~\$ docker run hello-world Unable to find image 'hello-world:latest' locally latest: Pulling from library/hello-world c1ec31eb5944: Pull complete Digest: sha256:a26bff933ddc26d5cdf7faa98b4ae1e3ec20c4985e6f87ac0973052224d24302 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. 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/ hafelago@DESKTOP-208TC4I:~\$ Name Tag Status Created Size Actions hello-world

1.0 Running your first Container

d2c94e258dcb

latest

hafelago@DESKTOP-208TC4I:~\$ docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
4abcf2066143: Pull complete
Digest: sha256:c5b1261d6d3e43071626931fc004f70149baeba2c8ec672bd4f27761f8e1ad6b
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
hafelago@DESKTOP-208TC4I:~\$

In use

1 year ago

13.25 KB ▶ ;

| Name | Tag | Status | Created | Size | Action | S | |
|-----------------------------|--------|---------------|--------------|----------|-------------|---|---|
| alpine 05455a08881e 🗇 | latest | Unused | 3 months ago | 7.37 MB | > | : | ì |
| hello-world d2c94e258dcb | latest | <u>In use</u> | 1 year ago | 13.25 KB | > | : | î |

Docker Images to see all images

```
What's Next?

View a summary of image vulnerabilities and recommendations → docker scout quickview alpine hafelago@DESKTOP-208TC4I:~$ docker images

REPOSITORY TAG IMAGE ID CREATED SIZE
alpine latest 05455a08881e 3 months ago 7.38MB
hello-world latest d2c94e258dcb 12 months ago 13.3kB
hafelago@DESKTOP-208TC4I:~$
```

Docker run

| hafelago@DES | SKTOR | P-208T | C4I:~\$ docker | run alpi | ine 1 | ls - | -l | |
|------------------------------|-------|--------|----------------|----------|-------|------|-------|-------|
| total 56 | | | | | | | | |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | bin |
| drwxr-xr-x | 5 | root | root | 340 | May | 10 | 03:06 | dev |
| drwxr-xr-x | 1 | root | root | 4096 | May | 10 | 03:06 | etc |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | home |
| drwxr-xr-x | 7 | root | root | 4096 | Jan | 26 | 17:53 | lib |
| drwxr-xr-x | 5 | root | root | 4096 | Jan | 26 | 17:53 | media |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | mnt |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | opt |
| dr-xr-xr-x | 330 | root | root | 0 | May | 10 | 03:06 | proc |
| drwx | 2 | root | root | 4096 | Jan | 26 | 17:53 | root |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | run |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | sbin |
| drwxr-xr-x | 2 | root | root | 4096 | Jan | 26 | 17:53 | srv |
| dr-xr-xr-x | 11 | root | root | 0 | May | 10 | 03:06 | sys |
| drwxrwxrwt | 2 | root | root | 4096 | Jan | 26 | 17:53 | tmp |
| drwxr-xr-x | 7 | root | root | 4096 | Jan | 26 | 17:53 | usr |
| drwxr-xr-x | | | | 4096 | Jan | 26 | 17:53 | var |
| hafelago@DESKTOP-208TC4I:~\$ | | | | | | | | |

docker run alpine echo "hello from alpine"

```
hafelago@DESKTOP-208TC4I:~$ docker run alpine echo "hello from alpine"
hello from alpine
hafelago@DESKTOP-208TC4I:~$
```

docker run -it alpine /bin/sh.

```
hafelago@DESKTOP-208TC4I:~$ docker run -it alpine /bin/sh
/ # ls -l
total 56
drwxr-xr-x
              2 root
                                        4096 Jan 26 17:53 bin
                         root
              5 root
                                         360 May 10 03:13 dev
drwxr-xr-x
                         root
                                        4096 May 10 03:13 etc
drwxr-xr-x
              1 root
                         root
drwxr-xr-x
              2 root
                                        4096 Jan 26 17:53 home
                         root
drwxr-xr-x
              7 root
                                        4096 Jan 26 17:53 lib
                         root
drwxr-xr-x
                                        4096 Jan 26 17:53 media
              5 root
                         root
drwxr-xr-x
              2 root
                                        4096 Jan 26 17:53 mnt
                         root
                                        4096 Jan 26 17:53 opt
drwxr-xr-x
              2 root
                         root
dr-xr-xr-x
            336 root
                                           0 May 10 03:13 proc
                         root
drwx----
              1 root
                                        4096 May 10 03:13 root
                         root
              2 root
                                        4096 Jan 26 17:53 run
drwxr-xr-x
                         root
                                        4096 Jan 26 17:53 sbin
drwxr-xr-x
              2 root
                         root
drwxr-xr-x
             2 root
                                        4096 Jan 26 17:53 srv
                         root
dr-xr-xr-x
             11 root
                                           0 May 10 03:13 sys
                         root
                                        4096 Jan 26 17:53 tmp
drwxrwxrwt
             2 root
                         root
             7 root
                                        4096 Jan 26 17:53 usr
drwxr-xr-x
                         root
                                        4096 Jan 26 17:53 var
drwxr-xr-x
             12 root
                         root
/ #
```

docker ps -a

CONTAINER ID

angry_euison

hafelago@DESKTOP-208TC4I:~\$

hafelago@DESKTOP-208TC4I:~\$ docker ps

COMMAND

IMAGE

| docker ps -a | | | | | | | | |
|---|----------|------------------------|----------------|-----------------------------|--|--|--|--|
| hafelago@DESKTOP-208TC4I: ~\$ docker ps -a | | | | | | | | |
| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS | | | | |
| ORTS NAMES | | | | | | | | |
| f88aea22611b | • | "/bin/sh" | 2 minutes ago | Exited (127) 49 seconds ago | | | | |
| pensive_hoover | | | | | | | | |
| b77bc845f6a2 | • | "echo 'hello from al…" | 5 minutes ago | Exited (0) 5 minutes ago | | | | |
| , | l_carver | | | - 1. 1.6-2 - 1 | | | | |
| 3d9ea50b8ecc | | "ls -l" | 9 minutes ago | Exited (0) 9 minutes ago | | | | |
| suspicious_roentgen | | | | | | | | |
| b75ee6f5f068 | | "/hello" | 17 minutes ago | Exited (0) 17 minutes ago | | | | |
| angry_edison | | | | | | | | |
| hafelago@DESKTOP-208TC4I: ~\$ docker ps -a | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

CREATED

STATUS

PORTS

NAMES

```
afelago@DESKTOP-208TC4I:~$ docker run --help
Jsage: docker run [OPTIONS] IMAGE [COMMAND] [ARG...]
Create and run a new container from an image
Aliases:
 docker container run, docker run
Options:
      --add-host list
                                          Add a custom host-to-IP mapping (host:ip)
     --annotation map
                                          Add an annotation to the container (passed through to
                                          the OCI runtime) (default map[])
Attach to STDIN, STDOUT or STDERR
 -a, --attach list
                                          Block IO (relative weight), between 10 and 1000, or 6
      --blkio-weight uint16
                                          to disable (default 0)
     --blkio-weight-device list
                                          Block IO weight (relative device weight) (default [])
     --cap-add list
                                          Add Linux capabilities
     --cap-drop list
                                          Drop Linux capabilities
                                          Optional parent cgroup for the container
     --cgroup-parent string
     --cgroupns string
                                          Cgroup namespace to use (host|private)
                                          'host':
                                                    Run the container in the Docker host's
                                          cgroup namespace
                                          'private': Run the container in its own private cgrou
                                          namespace
                                                     Use the cgroup namespace as configured by
                                          the
                                                     default-cgroupns-mode option on the daemor
                                          (default)
     --cidfile string
                                          Write the container ID to the file
                                          Limit CPU CFS (Completely Fair Scheduler) period
     --cpu-period int
      --cpu-quota int
                                          Limit CPU CFS (Completely Fair Scheduler) quota
      --cpu-rt-period int
                                          Limit CPU real-time period in microseconds
      --cpu-rt-runtime int
                                          Limit CPU real-time runtime in microseconds
```

1.2 Terminology

```
hafelago@DESKTOP-208TC4I:~$ docker inspect alpine
        "Id": "sha256:05455a08881ea9cf0e752bc48e61bbd71a34c029bb13df01e40e3e70e0d007bd",
        "RepoTags": [
             "alpine:latest"
        ],
"RepoDigests": [
_________
             "alpine@sha256:c5b1261d6d3e43071626931fc004f70149baeba2c8ec672bd4f27761f8e1ad6b"
        ],
"Parent": "",
"Comment": "",
        "Created": "2024-01-27T00:30:48.743965523Z",
        "ContainerConfig": {
             "Hostname": "",
             "Domainname": "",
             "User": "".
             "AttachStdin": false,
             "AttachStdout": false,
             "AttachStderr": false,
             "Tty": false,
"OpenStdin": false,
"StdinOnce": false,
             "Env": null,
             "Cmd": null,
             "Image": "",
             "Volumes": null,
             "WorkingDir": ""
             "Entrypoint": null,
             "OnBuild": null,
             "Labels": null
```

2.1 Run a static website in a container

```
hafelago@DESKTOP-208TC4I:~$ docker pull dockersamples/static-site
Using default tag: latest
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
docker.io/dockersamples/static-site:latest
What's Next?
View a summary of image vulnerabilities and recommendations → docker scout quickview dockersamples/static-site
hafelago@DESKTOP-208TC41:~$
```

hafelago@DESKTOP-208TC4I:~\$ docker pull dockersamples/static-site
Using default tag: latest
latest: Pulling from dockersamples/static-site
Digest: sha256:daa686c61d7d239b7977e72157997489db49f316b9b9af3909d9f10fd28b2dec
Status: Image is up to date for dockersamples/static-site:latest
docker.io/dockersamples/static-site:latest

What's Next?

View a summary of image vulnerabilities and recommendations > docker scout quickview dockersamples/static-site
hafelago@DESKTOP-208TC4I:~\$ docker run -d dockersamples/static-site
08231a2a77d90c2e01c4509d303ea11d024f0b086a74f55a747b911253243889
hafelago@DESKTOP-208TC4I:~\$

hafelago@DESKTOP-208TC4I:~\$ docker ps

CONTAINER ID IMAGE COMMAND CREATED STATUS POR

TS NAMES

08231a2a77d9 dockersamples/static-site "/bin/sh -c 'cd /usr..." 2 minutes ago Up 2 minutes 80/
tcp, 443/tcp hopeful_elbakyan
hafelago@DESKTOP-208TC4I:~\$

hafelago@DESKTOP-208TC4I:~\$ docker ps CONTAINER ID IMAGE COMMAND CREATED **STATUS** POR NAMES TS 08231a2a77d9 dockersamples/static-site "/bin/sh -c 'cd /usr..." 8 minutes ago Up 8 minutes 80/ tcp, 443/tcp hopeful_elbakyan hafelago@DESKTOP-208TC4I:~\$ docker stop 08231a2a77d9 ^[[A^[[B08231a2a77d9 hafelago@DESKTOP-208TC4I:~\$
hafelago@DESKTOP-208TC4I:~\$ docker ps CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES hafelago@DESKTOP-208TC4I:~\$ docker rm 08231a2a77d9 hafelago@DESKTOP-208TC4I:~\$

Containers Give feedback



Your running containers show up here

A container is an isolated environment for your code



View more in the Learning center

```
hafelago@DESKTOP-208TC4I:~$ docker ps

CONTAINER ID IMAGE COMMAND CREATED STATUS

PORTS NAMES

463d6ad9d940 dockersamples/static-site "/bin/sh -c 'cd /usr..." About a minute ago Up About a mi
nute 0.0.0.32771->80/tcp, 0.0.0.32770->443/tcp static-site
hafelago@DESKTOP-208TC4I:~$ docker run --name static-site -e AUTHOR="HAROLD" -d -P dockersamples/static-site
3527657d328f8fcd4fcab66da958a2edc0a277d4676d075a12ece9d0042bf242
hafelago@DESKTOP-208TC4I:~$
```

hafelago@DESKTOP-208TC4I:~\$ docker port static-site 80/tcp -> 0.0.0.0:32773 443/tcp -> 0.0.0.0:32772 hafelago@DESKTOP-208TC4I:~\$



Hello HAROLD!

This is being served from a **docker** container running Nginx.

```
hafelago@DESKTOP-208TC4I:~$ docker stop static-site
static-site
hafelago@DESKTOP-208TC4I:~$ docker rm static-site
static-site
hafelago@DESKTOP-208TC4I:~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
hafelago@DESKTOP-208TC4I:~$
```

2.2 Docker Images

```
hafelago@DESKTOP-208TC4I:~$ docker images
REPOSITORY
                           TAG
                                     IMAGE ID
                                                    CREATED
                                                                    SIZE
alpine
                           latest
                                     05455a08881e
                                                    3 months ago
                                                                    7.38MB
hello-world
                                     d2c94e258dcb
                                                                    13.3kB
                           latest
                                                    12 months ago
dockersamples/static-site latest
                                     f589ccde7957
                                                    8 years ago
                                                                    191MB
hafelago@DESKTOP-208TC4I:~$
```

```
nafelago@DESKTOP-208TC4I:~$ docker pull ubuntu:12.04

12.04: Pulling from library/ubuntu

18868e50ac4c: Pull complete

33251ac64627: Pull complete

589bba2f1b36: Pull complete

162ecaceda39: Pull complete

5693b41cfc6b: Pull complete

5093b41cfc6b: Pull complete

Digest: sha256:18305429afa14ea462f810146ba44d4363ae76e4c8dfc38288cf73aa07485005

Status: Downloaded newer image for ubuntu:12.04

docker.io/library/ubuntu:12.04
```

```
hafelago@DESKTOP-208TC4I:~$ docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
49b384cc7b4a: Pull complete
Digest: sha256:3f85b7caad41a95462cf5b787d8a04604c8262cdcdf9a472b8c52ef83375fe15
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
What's Next?
 View a summary of image vulnerabilities and recommendations → docker scout quickview ubuntu
 nafelago@DESKTOP-208TC4I:~$ docker images
                              TAG
                                         IMAGE ID
REPOSITORY
                                                          CREATED
                                                                            SIZE
ubuntu
                              latest
                                         bf3dc08bfed0 11 days ago
                                                                            76.2MB
                             latest 05455a08881e 3 months ago
latest d2c94e258dcb 12 months ago
12.04 5b117edd0b76 7 years ago
alpine
                                                                            7.38MB
hello-world
                                                                            13.3kB
ubuntu
                                                                            104MB
dockersamples/static-site latest
                                         f589ccde7957 8 years ago
                                                                            191MB
hafelago@DESKTOP-208TC4I:~$
```

2.3.1

```
hafelago@DESKTOP-208TC4I:~/flask-app$ ls
Dockerfile app.py requirements.txt templates
hafelago@DESKTOP-208TC4I:~/flask-app$
```

2.3.2 write a dockerfile

2.3.3 Build the image

```
| Said Suppose | Said
```

```
hafelago@DESKTOP-208TC4I:~$ docker run -p 5000:5000 hafelago

* Serving Flask app 'app'

* Debug mode: off

WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.

* Running on all addresses (0.0.0.0)

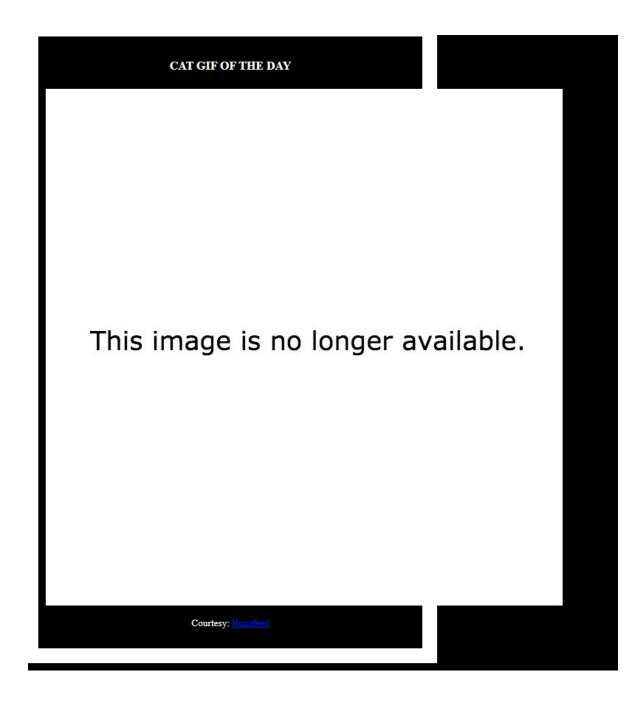
* Running on http://127.0.0.1:5000

* Running on http://172.17.0.2:5000

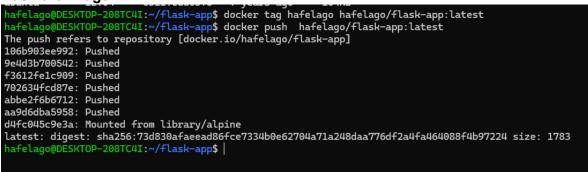
Press CTRL+C to quit

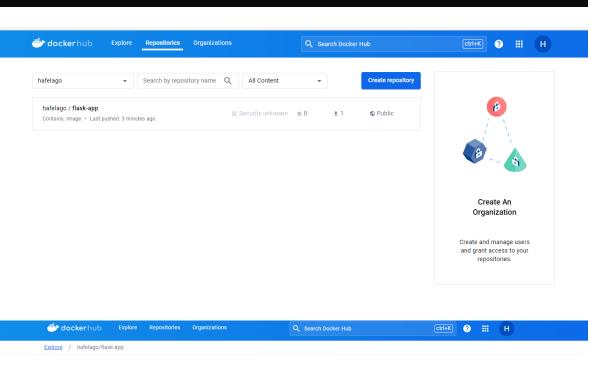
172.17.0.1 - - [11/May/2024 01:42:52] "GET / HTTP/1.1" 200 -

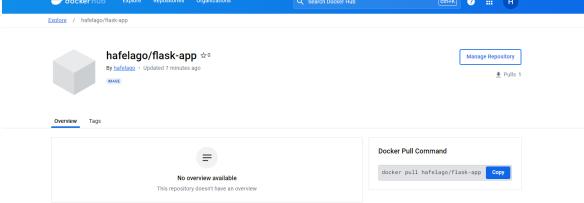
172.17.0.1 - - [11/May/2024 01:42:53] "GET /favicon.ico HTTP/1.1" 404 -
```



Push the image







3.0 Deploying an app to a Swarm

Creating network vote_frontend Creating network vote_backend Creating service vote_worker Creating service vote_redis Creating service vote_db Creating service vote_vote Creating service vote_result

```
hafelago@DESKTOP-208TC4I:~$ git clone https://github.com/docker/example-voting-app.git
cd example-voting-app
Cloning into 'example-voting-app'...
remote: Enumerating objects: 1140, done.
remote: Counting objects: 100% (8/8), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 1140 (delta 1), reused 3 (delta 0), pack-reused 1132
Receiving objects: 100% (1140/1140), 1.21 MiB | 4.38 MiB/s, done.
Resolving deltas: 100% (435/435), done.
hafelago@DESKTOP-208TC4I:~/example-voting-app$
```

Verify

```
hafelago@DESKTOP-208TC4I:~/example-voting-app$ docker stack deploy --compose-file docker-stack.yml vote

Since --detach=false was not specified, tasks will be created in the background.

In a future release, --detach=false will become the default.

Creating network vote_frontend

Creating service vote_backend

Creating service vote_worker

Creating service vote_db

Creating service vote_db

Creating service vote_tost

Creating service vote_result

hafelago@DESKTOP-208TC4I:~/example-voting-app$ docker stack services vote

ID NAME MODE REPLICAS IMAGE PORTS

mf7txonlifv6 vote_db replicated 1/1 postgres:15-alpine

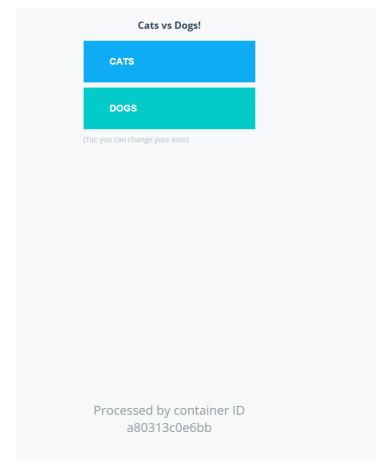
e4wadw1z0x9r vote_redis replicated 1/1 redis:alpine

e4wadw1z0x9r vote_result replicated 1/1 dockersamples/examplevotingapp_result:latest *:5001->80/tcp

xeex7dns81xu vote_vote replicated 2/2 dockersamples/examplevotingapp_worker:latest

hafelago@DESKTOP-208TC4I:~/example-voting-app$
```

Localhost:5000





nafelago@DESKTOP-208TC4I:~/example-voting-app\$ docker stack deploy --compose-file docker-stack.yml vote
Since --detach=false was not specified, tasks will be created in the background.

In a future release, --detach=false will become the default.

Updating service vote_redis (id: e4wadw1z0x9r6ohsp4725eozh)

Updating service vote_db (id: mf7txonlifv66w2fkxlbwkbxp)

Updating service vote_vote (id: xeex7dns81xuanrbjps0cbhh0)

Updating service vote_result (id: flyp19y97z6lk2zv14tczlea2)

Updating service vote_worker (id: p3x7l8y24r2yv35vip1j1hfgs)

nafelago@DESKTOP-208TC41:~/example-voting-app\$

CATS 100.0% DOGS 0.0%

```
hafelago@DESKTOP-208TC4I:~/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_backend
Removing network vote_frontend
hafelago@DESKTOP-208TC4I:~/example-voting-app$
```