

DOCKER

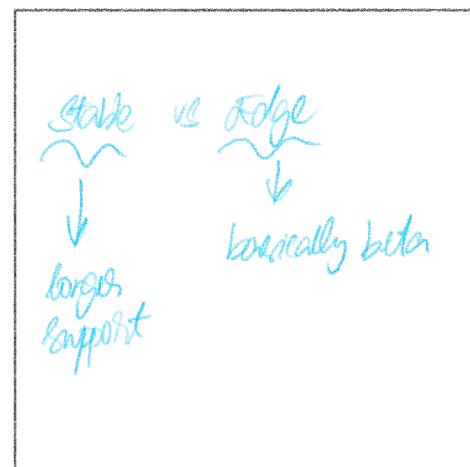
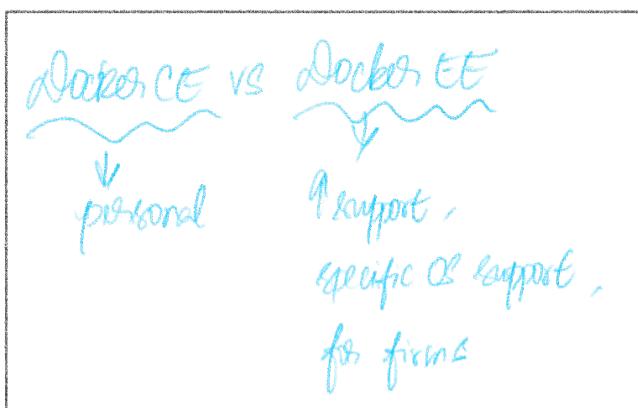


- Section 1: Open source project - Docker Inc - Containers - once in a decade shift
- point of Docker - Speed - full software life cycle gets much faster
- Matrix of Hell → Docker/Containers are run everywhere and build once -

→ March celebrations

Static Website	?	?	?	?	?	?	?	?
Web Frontend	?	?	?	?	?	?	?	?
Background Workers	?	?	?	?	?	?	?	?
User DB	?	?	?	?	?	?	?	?
Analytics DB	?	?	?	?	?	?	?	?
Queue	?	?	?	?	?	?	?	?
	Desktop 	Test/QA Cluster 	Production Cluster 	Public Cloud 	Data Center 	Mainframe 	Windows Server 	Edge Device

Section-1: Installation



Docker install link - <https://hub.docker.com/editions/community/docker-ce-desktop-mac> <https://hub.docker.com/editions/community/docker-ce-desktop-mac>

place example code snippets in permitted paths in file sharing

Section 2 - Containers

Image vs. Container

- An Image is the application we want to run
- A Container is an instance of that image running as a process
- You can have many containers running off the same image
- In this lecture our image will be the Nginx web server
- Docker's default image "registry" is called Docker Hub (hub.docker.com)

\$ docker container run --publish 80:80  nginx (new way)

* Downloads nginx from Docker Hub (source for the img)

Github to Github for
openbortill

- * Start new containers for the image
- * left is client port, right host port
- * routes traffic from host ip/port to container ip (client)

↳ client ip should be free.

\$ docker containers run --publish 80:80 --detach nginx

\$ docker containers stop (stop but dont remove) ↳ run in background

\$ docker container ls (→ list running containers)

\$ docker container ls -a

↳ since no name is specified during create its autogenerated

\$ docker containers run --publish 80:80 --detach --name anyName nginx

↳ after custom container name

\$ docker container logs anyName

\$ docker containers top anyName

\$ docker containers rm b2f 690 0de

↳ each is a set of 1st 3 chars from the container's generated id

↳ rm multiple containers (non-ready stopped) - else we "if" flag

What happens in 'docker container run'

1. Looks for that image locally in image cache, doesn't find anything
2. Then looks in remote image repository (defaults to Docker Hub)
3. Downloads the latest version (nginx:latest by default)
4. Creates new container based on that image and prepares to start
5. Gives it a virtual IP on a private network inside docker engine
6. Opens up port 80 on host and forwards to port 80 in container
7. Starts container by using the CMD in the image Dockerfile

Containers vs VMs

→ Containers are just restricted processes running inside the host OS.

→ running db as a docker process : \$ docker run --name mongo -d mongo
→ docker ps
→ docker top mongo
→ docker stop mongo

→ in Linux → ps aux looks mongo as just a process nothing in
in Mac/Win → since docker runs as small VM its one to three
check out this link :

<https://www.bretfisher.com/docker-for-mac-commands-for-getting-into-local-docker-vm/>

Assignment Question

Assignment: Manage Multiple Containers

- docs.docker.com and --help are your friend
- Run a nginx, a mysql, and a httpd (apache) server
- Run all of them --detach (or -d), name them with --name
- nginx should listen on 80:80, httpd on 8080:80, mysql on 3306:3306
- When running mysql, use the --env option (or -e) to pass in MYSQL_RANDOM_ROOT_PASSWORD=yes
- Use docker container logs on mysql to find the random password it created on startup
- Clean it all up with docker container stop and docker container rm (both can accept multiple names or ID's)
- Use docker container ls to ensure everything is correct before and after cleanup

Assignment Answer

```
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
4938ffddfb42 mysql "docker-entrypoint.s..." About a minute ago Up About a minute 33060/tcp, 0.0.0.0:3307->330
6/tcp mysql c9fee66b9628 httpd "httpd-foreground" 4 minutes ago Up 4 minutes 0.0.0.0:8080->80/tcp
httpd
64c69fba10c3 nginx "/docker-entrypoint..." 7 minutes ago Up 7 minutes 0.0.0.0:80->80/tcp
nginx
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container stop 49 c9 64
49
c9
64
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container rm 49 c9 64
49
c9
64
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
sanjitzkumar@Sanjits-MacBook-Air ~ %
```

```

CONTAINER ID  IMAGE      COMMAND             CREATED            STATUS    PORTS      NAMES
c9fee66b9628  httpd      "httpd-foreground"   8 seconds ago     Up 7 seconds  0.0.0.0:8080->80/tcp  httpd
64c69fba10c3  nginx      "/docker-entrypoint..."  2 minutes ago     Up 2 minutes  0.0.0.0:80->80/tcp  nginx
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container run --publish 3306:3306 --detach -e MYSQL_RANDOM_ROOT_PASSWORD=yes
--name mysql mysql
Unable to find image 'mysql:latest' locally
latest: Pulling from library/mysql
852e50cd189d: Already exists
29969fdb0fffb: Pull complete
a43f41a44c48: Pull complete
5cdd802543a3: Pull complete
b79b040de953: Pull complete
938c64119969: Pull complete
7689ec51a0d9: Pull complete
a880ba7c411f: Pull complete
984f656ec6ca: Pull complete
9f497bce458a: Pull complete
b9940f97694b: Pull complete
2f069358dc96: Pull complete
Digest: sha256:4bb2e81a40e9d0d59bd8e3dc2ba5e1f2197696f6de39a91e90798dd27299b093
Status: Downloaded newer image for mysql:latest
582b3d3db454f3ab697cde0d260080447cee65d470dd28f21f2ea83f38838c8d
docker: Error response from daemon: Ports are not available: listen tcp 0.0.0.0:3306: bind: address already in use.
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container run --publish 3307:3306 --detach -e MYSQL_RANDOM_ROOT_PASSWORD=yes
--name mysql mysql
docker: Error response from daemon: Conflict. The container name "/mysql" is already in use by container "582b3d3db454f3ab697cde0d260080447cee65d470dd28f21f2ea83f38838c8d". You have to remove (or rename) that container to be able to reuse that name.
See 'docker run --help'.
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls -a
CONTAINER ID  IMAGE      COMMAND             CREATED            STATUS    PORTS      NAMES
582b3d3db454  mysql      "/docker-entrypoint.s..."  54 seconds ago     Created          mysql
c9fee66b9628  httpd      "httpd-foreground"   2 minutes ago     Up 2 minutes  0.0.0.0:8080->80/tcp  httpd

```

```

AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.3. Set the 'ServerName' directive globally to suppress this message
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[Sat Dec 05 07:12:49.665318 2020] [mpm_event:notice] [pid 1:tid 140245473633408] AH00489: Apache/2.4.46 (Unix) configured -- resuming normal operations
[Sat Dec 05 07:12:49.665767 2020] [core:notice] [pid 1:tid 140245473633408] AH00094: Command line: 'httpd -D FOREGROUND'
^C[Sat Dec 05 07:13:31.628687 2020] [mpm_event:notice] [pid 1:tid 140245473633408] AH00491: caught SIGTERM, shutting down
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls
CONTAINER ID  IMAGE      COMMAND             CREATED            STATUS    PORTS      NAMES
64c69fba10c3  nginx      "/docker-entrypoint..."  2 minutes ago     Up 2 minutes  0.0.0.0:80->80/tcp  nginx
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls -a
CONTAINER ID  IMAGE      COMMAND             CREATED            STATUS    PORTS      NAMES
  NAMES
73edfdad11bd5  httpd      "httpd-foreground"   About a minute ago  Exited (0) 20 seconds ago
  httpd
64c69fba10c3  nginx      "/docker-entrypoint..."  2 minutes ago     Up 2 minutes          0.0.0.0:80->80/tcp
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sanjitzkumar@Sanjits-MacBook-Air ~ % docker container rm 73e -f
73e
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64c69fba10c3  nginx      "/docker-entrypoint..."  2 minutes ago     Up 2 minutes  0.0.0.0:80->80/tcp  nginx
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container run --publish 8080:80 --detach --name httpd httpd
c9fee66b9628c4df18685f10051a21b16e9d556024b7e60935c44c88ae3cb6e8
sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls
CONTAINER ID  IMAGE      COMMAND             CREATED            STATUS    PORTS      NAMES
c9fee66b9628  httpd      "httpd-foreground"   4 seconds ago     Up 2 seconds  0.0.0.0:8080->80/tcp  httpd
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sanjitzkumar@Sanjits-MacBook-Air ~ % docker container ls
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```

The files /Users/sanjitkumar/app and /Users/sanjitkumar/safari do not exist.
sanjitkumar@Sanjits-MacBook-Air ~ % docker container run --publish 80:80 --detach --name nginx nginx
64c69fba10c30734910e0515e1577afeb6f05f5c539cc7dff62b63f41d038354
sanjitkumar@Sanjits-MacBook-Air ~ % docker container ls
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
64c69fba10c3 nginx "/docker-entrypoint..." 8 seconds ago Up 8 seconds 0.0.0.0:80->80/tcp nginx
sanjitkumar@Sanjits-MacBook-Air ~ % docker container run --publish 8080:80 --name httpd httpd
Unable to find image 'httpd:latest' locally
latest: Pulling from library/httpd
852e50cd189d: Already exists
67d51c33d390: Pull complete
b0ad2a3b9567: Pull complete
136f1f71f30c: Pull complete
01f8ace29294: Pull complete
Digest: sha256:fddc534b7f6bb6197855be559244adb11907d569aae1283db8e6ce8bb8f6f456
Status: Downloaded newer image for httpd:latest
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938cc64119969: Pull complete
7689ec51a0d9: Pull complete
a880ba7c411f: Pull complete
984f656ec6ca: Pull complete
9f497bce458a: Pull complete
b9940f97694b: Pull complete
2f069358dc96: Pull complete
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136f1f71f30c: Pull complete
01f8ace29294: Pull complete
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Status: Downloaded newer image for httpd:latest
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.3. Set the 'ServerName' directive globally to suppress this message

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