

Dockerfiles & FastAPI

Lecture 21

Dr. Colin Rundel

Dockerfile(s)

Common commands

command	Description
FROM	specify a base image
RUN	run commands (e.g. apt or yum), changes saved to image
COPY	copy a local file into the image
ENV	set environment variables for Dockerfile and image
USER	set user to use (affects subsequent RUN , CMD , ENDPOINT)
WORKDIR	set the working directory
EXPOSE	specify which ports will be used (not published automatically)
CMD	specify what (default) action should run when running the image
...	

A tidy example

tidy1/Dockerfile:

```
1 FROM ubuntu:22.02
2
3 ENV DEBIAN_FRONTEND=noninteractive
4
5 RUN apt update
6 RUN apt install -y r-base
7 RUN Rscript -e "install.packages('tibble')"
8
9 CMD ["R"]
```

Building

```
1 $ docker build -t tidy1 .
2
3 Sending build context to Docker daemon 2.048kB
4 Step 1/6 : FROM ubuntu:18.10
5 ----> d4452947e3fa
6 Step 2/6 : ENV DEBIAN_FRONTEND=noninteractive
7 ----> Using cache
8 ----> e0d77908f64a
9 Step 3/6 : RUN apt update
10 ----> Running in fa6969a427d9
11 ...
12 ----> 979edce6cc0b
13 Step 4/6 : RUN apt install -y r-base
14 ----> Running in 1cc3e97a8258
15 ...
16 ----> 87a882be95d7
17 Step 5/6 : RUN Rscript -e "install.packages('tibble')"
18 ----> Running in e9de97c98208
19 ...
20 Removing intermediate container e9de97c98208
21 ----> 5f1666e4e342
22 Step 6/6 : CMD ["R"]
23 ----> Running in 07f9ea769466
24 ...
```

Images

```
1 $ docker images
2
3 REPOSITORY          TAG          IMAGE ID      CREATED       SIZE
4 tidy1               latest       b29115e0a5d2  29 seconds ago 697MB
5 ubuntu              18.10       d4452947e3fa  3 weeks ago   73.7MB
6 ubuntu              latest       1d9c17228a9e  3 weeks ago   86.7MB
7
8 $ docker images -a
9
10 REPOSITORY          TAG          IMAGE ID      CREATED       SIZE
11 <none>               <none>       598100ea4878  25 seconds ago 697MB
12 tidy1               latest       b29115e0a5d2  25 seconds ago 697MB
13 <none>               <none>       75296565d476  56 seconds ago 690MB
14 <none>               <none>       d82af2f4083b  2 minutes ago  96.3MB
15 <none>               <none>       6bb4e2b36ade  2 minutes ago  73.7MB
16 ubuntu              18.10       d4452947e3fa  3 weeks ago   73.7MB
17 ubuntu              latest       1d9c17228a9e  3 weeks ago   86.7MB
```

A better tidy example

tidy2/Dockerfile:

```
1 FROM ubuntu:21.10
2
3 ENV DEBIAN_FRONTEND=noninteractive
4
5 RUN apt update \
6     && apt install -y r-base \
7     && Rscript -e "install.packages('tibble')"
8
9 CMD ["R"]
```

Building

```
1 $ docker build -t tidy2 .
2
3 Sending build context to Docker daemon  2.048kB
4 Step 1/4 : FROM ubuntu:18.10
5   ----> d4452947e3fa
6 Step 2/4 : ENV DEBIAN_FRONTEND=noninteractive
7   ----> Running in be9c52bb8db9
8 Removing intermediate container be9c52bb8db9
9   ----> e0d77908f64a
10 Step 3/4 : RUN apt update  && apt install -y r-base  && Rscript -e "install.packages('tibble'
11 ...
12 Step 4/4 : CMD ["R"]
13   ----> Running in d98129eb112c
14 Removing intermediate container d98129eb112c
15   ----> be418f99be82
16 Successfully built be418f99be82
17 Successfully tagged tidy2:latest
```


Images

```
1 $ docker images
2 REPOSITORY          TAG                IMAGE ID           CREATED            SIZE
3 tidy2               latest            be418f99be82      7 seconds ago     697MB
4 ubuntu             18.10            d4452947e3fa      3 weeks ago       73.7MB
5 ubuntu             latest           1d9c17228a9e      3 weeks ago       86.7MB
6
7 $ docker images -a
8 REPOSITORY          TAG                IMAGE ID           CREATED            SIZE
9 tidy2               latest            be418f99be82      9 seconds ago     697MB
10 <none>              <none>            7869e0549108      10 seconds ago    697MB
11 <none>              <none>            e0d77908f64a      About a minute ago 73.7MB
12 ubuntu             18.10            d4452947e3fa      3 weeks ago       73.7MB
13 ubuntu             latest           1d9c17228a9e      3 weeks ago       86.7MB
```

Dangling images

```
1 $ docker images -a
2 REPOSITORY          TAG                IMAGE ID           CREATED            SIZE
3 <none>               <none>            83384d4f0d1c      14 minutes ago    714MB
4 <none>               <none>            b656b4674ab9      15 minutes ago    209MB
5 <none>               <none>            c02c49f3aed2      15 minutes ago    96.3MB
6 <none>               <none>            cff3a89309ff      15 minutes ago    73.7MB
7 ubuntu               18.10             d4452947e3fa      3 weeks ago       73.7MB
8 ubuntu               latest            1d9c17228a9e      3 weeks ago       86.7MB
```

```
1 $ docker image prune
2 WARNING! This will remove all dangling images.
3 Are you sure you want to continue? [y/N] y
4 Deleted Images:
5 deleted: sha256:83384d4f0d1c6989ad492aee44dd44ca0a6aa013c0b80a78294d2d63e13c6d0c
6 deleted: sha256:ada707994b5f0aacd91d44b221e78fb4674c2f53afed87ac9c8f3db39b993d48
7 deleted: sha256:b656b4674ab989f57e1dc3dab682bcbfe6b8634206935cb630e09cfcecf5f645
8 deleted: sha256:8769da78ba480413ba7b3ee505008b88e549214a96238744bc328901367c38c1
9 deleted: sha256:c02c49f3aed2b3131f4e636745f713aab28ba870e9ec2ac2c0b13b008e9a2fd3
10 deleted: sha256:095edb1ee39242ed717542420ab9a4911f7cd805713bfd94b321d52d25091eda
11 deleted: sha256:cff3a89309ffcc08fe80a3558e1c6715574a4ec3ac926bbd49cd90519aa62241
12
13 Total reclaimed space: 640.4MB
```

Course docker images

Sta523-fa22/docker-base

Sta663-sp23/docker-base