

Exercise 1 - Docker Basic

Hints

1. Check the [toyota-data-feeder](#) repository
2. Create a Dockerfile that executes `feeder.py` on container startup
Only include files that are actually needed for the application to run
For example, be sure to not include `/assets` folder in your image
3. Build the image and push it to the registry
You can use either DockerHub or CSC Rahti registry, but we recommend the latter.
If you are using CSC Rahti registry, be sure to assign assistants to your project and to change image pull policy to Anonymous. Check exercise 1 slides for more.
Tag the image with 1.0 tag
4. Run the image with correct `MQTT_URL`, `MQTT_PORT` and `CLIENT_ID` values
Don't hardcode these values!
5. Use `mosquitto_sub` to confirm you are receiving messages from your Docker container
Use flags `--verbose --insecure` and `--cafile ca.crt`. Get `ca.crt` and other certificates from exercises page.
6. Execute a command which lists working directory's files of the running container (that directory where you copied application files in step 2)

Deliverables

1. Dockerfile, and other files if needed.
2. Small text report with the commands and outputs of each step (except step 2)
Include your name and CSC Rahti account name in this text file
Please, don't copy-paste the whole output when data is being sent/received, just a small snippet.
(Steps 4,5)

My Text Report

INFO:

My name: Xinyuan Ma

CSC Rahti account: student297

STEPS:

1. Open [toyota-data-feeder](#) to download the zip and unzip it

>  `toyota-data-feeder`

Yesterday at 10.44 AM

2. Create a [Dockerfile](#)

3. Build the image:

```
FROM python:3.9
```

```
# add a line in our Dockerfile that tells Docker what base image we
would like to use for our application.

ADD feeder.py .

COPY requirements.txt requirements.txt

COPY ca.crt ca.crt

COPY toyota_data.csv toyota_data.csv
# add feeder.py, requirements.txt, ca.crt, toyota_data.csv in out
working directory.

ENV MQTT_URL=mqtt-test.rahtiapp.fi

ENV MQTT_PORT=443

ENV CLIENT_ID=student297
# set env

RUN pip3 install -r requirements.txt
# tell Docker to use pip3 to install requirements what python file
needs.

CMD ["python3", "./feeder.py"]
# tell Docker what command we want to run when our image is
executed inside a container.
```

Push the image to the registry:

```
docker login -p dcWUDRs5kvq1FQo-hvBc2FsZQcCMfFf6n0CqAszDCGs -u
unused docker-registry.rahti.csc.fi
# login rahti
oc login --token dcWUDRs5kvq1FQo-hvBc2FsZQcCMfFf6n0CqAszDCGs
rahti.csc.fi:8443
# login oc
docker build -t toyatafeeder .
# Build image named toyatafeeder
sudo docker tag toyatafeeder docker-registry.rahti.csc.fi/xinyuan-
ma/toyatafeeder:1.0
# tag your toyatafeeder with 1.0 tag
sudo docker push docker-registry.rahti.csc.fi/xinyuan-
ma/toyatafeeder:1.0
# push it to registry
```

Results:

```
[(base) ericma@EricdeMacBook-Pro ~ % docker login -p dcWUDRs5kvq1FQo-hvBc2FsZQcCMfFf6n0CqAszDCGs -u unused docker-registry.rahti.csc.fi
WARNING! Using --password via the CLI is insecure. Use --password-stdin.
Login Succeeded
[(base) ericma@EricdeMacBook-Pro ~ % oc login --token dcWUDRs5kvq1FQo-hvBc2FsZQcCMfFf6n0CqAszDCGs rahti.csc.fi:8443
Logged into "https://rahti.csc.fi:8443" as "student297" using the token provided.
```

You have one project on this server: "xinyuan-ma"

Using project "xinyuan-ma".

```
[(base) ericma@EricdeMacBook-Pro toyota-data-feeder % sudo docker tag toyotafeeder docker-registry.rahti.csc.fi/xinyuan-ma/toyotafeeder:1.0
Password:
[(base) ericma@EricdeMacBook-Pro toyota-data-feeder % sudo docker push docker-registry.rahti.csc.fi/xinyuan-ma/toyotafeeder:1.0
The push refers to repository [docker-registry.rahti.csc.fi/xinyuan-ma/toyotafeeder]
eae38a3acb47: Pushed
9722d2d72ba2: Pushed
9328e598343c: Pushed
6d2d0093c442: Pushed
5126a112771c: Pushed
a72159c52993: Pushed
e2c76cd11859: Pushed
3df869d4494c: Pushed
a526c9d4de30: Pushed
c7aa687e7a85: Pushed
18320cd39819: Pushed
0fb5b043362b: Pushed
36c70f90a1d4: Pushed
99edc4aae253: Pushed
1.0: digest: sha256:86bbc59d0f0c3e074bbff2fe5b1cf848d5a07d40871ae118e9997fc64777e0fc size: 3259
```

INFO in Rahti:

Images pushed recently

Project: xinyuan-ma

xinyuan-ma/toyotafeeder

an hour ago



[All images](#)

[+ New image stream](#)

4. Run the image:

```
docker run docker-registry.rahti.csc.fi/xinyuan-ma/toyotafeeder:1.0
```

5. Use mosquitto_sub:

```
mosquitto_sub -h mqtt-test.rahtiapp.fi -p 443 -t 'student297/#' -v --
cafile ca.crt --insecure -i student297 -d
```

Results:

```
toyota-data-feeder -- zsh -- 153x49
Use 'mosquitto_sub --help' to see usage.
(base) ericma@EricdeMacBook-Pro toyota-data-feeder % mosquitto_sub -h mqtt-test.rahtiapp.fi -p 443 -t \# -v --cafile ca.crt --insecure -i student297 -d
Client student297 sending CONNECT
Client student297 received CONNACK (0)
Client student297 sending SUBSCRIBE (Mid: 1, Topic: #, QoS: 0, Options: 0x00)
Client student297 received SUBACK
Subscribed (mid: 1): 0
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/CHECKSUM', ... (2 bytes))
student297/toyota/CHECKSUM 49
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/LOW_SPEED_LOCKOUT', ... (1 bytes))
student297/toyota/LOW_SPEED_LOCKOUT 1
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/SET_SPEED', ... (2 bytes))
student297/toyota/SET_SPEED 57
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/GAS_PEDAL', ... (1 bytes))
student297/toyota/GAS_PEDAL 0
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/CHECKSUM', ... (2 bytes))
student297/toyota/CHECKSUM 52
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/LOW_SPEED_LOCKOUT', ... (1 bytes))
student297/toyota/LOW_SPEED_LOCKOUT 1
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/SET_SPEED', ... (2 bytes))
student297/toyota/SET_SPEED 57
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/ENCODER', ... (3 bytes))
student297/toyota/ENCODER 253
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/SPEED', ... (5 bytes))
student297/toyota/SPEED 50.78
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/CHECKSUM', ... (3 bytes))
student297/toyota/CHECKSUM 162
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/BRAKE_AMOUNT', ... (1 bytes))
student297/toyota/BRAKE_AMOUNT 0
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/BRAKE_PEDAL', ... (2 bytes))
student297/toyota/BRAKE_PEDAL 31
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/CHECKSUM', ... (2 bytes))
student297/toyota/CHECKSUM 56
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/LOW_SPEED_LOCKOUT', ... (1 bytes))
student297/toyota/LOW_SPEED_LOCKOUT 1
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/SET_SPEED', ... (2 bytes))
student297/toyota/SET_SPEED 57
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/CHECKSUM', ... (2 bytes))
student297/toyota/CHECKSUM 61
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/LOW_SPEED_LOCKOUT', ... (1 bytes))
student297/toyota/LOW_SPEED_LOCKOUT 1
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/SET_SPEED', ... (2 bytes))
student297/toyota/SET_SPEED 57
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/CHECKSUM', ... (2 bytes))
student297/toyota/CHECKSUM 64
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/LOW_SPEED_LOCKOUT', ... (1 bytes))
student297/toyota/LOW_SPEED_LOCKOUT 1
Client student297 received PUBLISH (d0, q0, r0, m0, 'student297/toyota/SET_SPEED', ... (2 bytes))
student297/toyota/SET_SPEED 57
```

6. Execute a command:

```
docker ps
```

Results:

(base) ericma@EricdeMacBook-Pro toyota-data-feeder % docker ps					
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
76cc16e7576b	docker-registry.rahti.csc.fi/xinyuan-ma/toyotafeeder:1.0	"python3 ./feeder.py"	About an hour ago	Up About an hour	NAMES youthful_knuth