Learn how to run RaaS project with Docker in Win10

1. Docker installation

We can use Docker for Mac, Docker for Windows, or Docker Toolbox.

- Docker for Mac

Docker for Mac uses HyperKit, a lightweight macOS virtualization solution built on top of the Hypervisor.framework in macOS 10.10 Yosemite and higher.

- Docker for Windows

Docker for Windows uses Microsoft Hyper-V for virtualization, and Hyper-V is not compatible with Oracle VirtualBox. We can't run the two solutions simultaneously.

- Docker Toolbox

Docker for Mac and Docker for Windows both require newer versions of their respective operating systems.

I am using Windows 10 Home Edition, which doesn't have Hyper-V, so Docker Toolbox need to be installed.

2. Test the correction of Docker installation

docker run hello-world

3. Container in Docker

- Without Docker, if we want to start writing a Python app, the first order was to install a Python runtime onto our PCs. This creates a situation where the environment on our machines have to be just so in order for the app to run as expected.

- With Docker, we can just grab a portable Python runtime as an image, no installation necessary. Then, our build can include the base Python image right alongside your app code, ensuring that the app, its dependencies, and the runtime, all travel together. These portable images are defined by something called a Dockerfile

- When creating an application with Docker, container is at the bottom of the application.

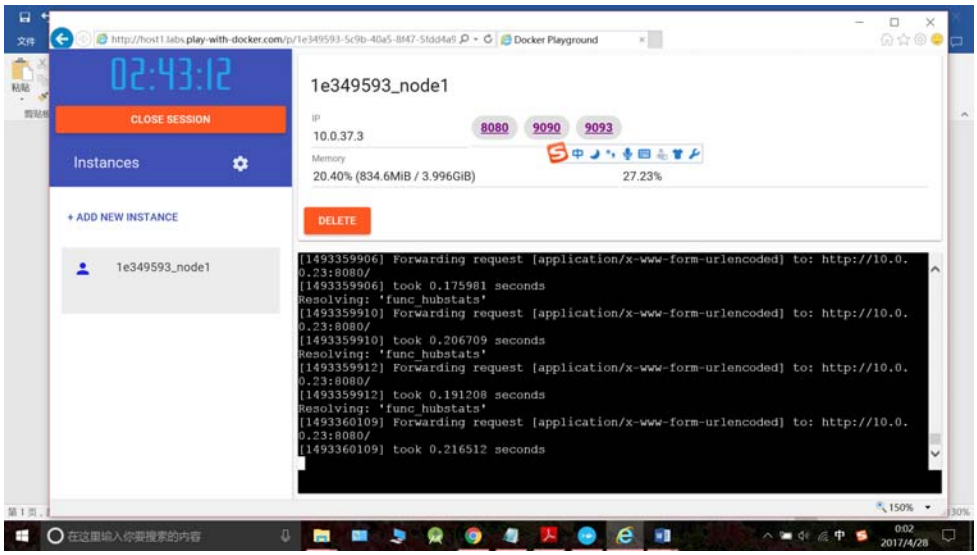
- Dockerfile will define what goes on in the environment inside the container. Access to resources like networking interfaces and disk drives is virtualized inside this environment, which is isolated from the rest of the system, so we have to map ports to the outside world, and be specific about what files we want to "copy in" to that environment. However, after doing that, we can expect that the build of the app defined in this Dockerfile will behave exactly the same wherever it runs.

4. Run with http://play-with-docker.com/

Notes: There may be some problems when using http://play-with-docker.com/ in Google Chrome. Recommend using IE.

Steps:

- Go to http://play-with-docker.com/



- Add new instance to create Docker host
- Launch Docker swarm mode

Run: docker swarm init

If there are multiple addresses on different interfaces, we need choose one with new command such as:

docker swarm init --advertise-addr=10.0.37.3

```
[node1] (local) root@10.0.37.3 ~
$ ls
[node1] (local) root@10.0.37.3 ~
$ ls
[node1] (local) root@10.0.37.3 ~
$ docker swarm init
Error response from daemon: could not choose an IP address to advertise since this system has multiple addresses on different interfaces (10.0.37.3 on eth0 and 172.18.0.30 on eth1) - specify one with --advertise-addr
[node1] (local) root@10.0.37.3 ~
$ docker swarm init --advertise-addr=10.0.37.3
Swarm initialized: current node (cr54eq06oqx593756wj80hbqe) is now a manager.

To add a worker to this swarm, run the following command:

    docker swarm join \
```

- Deploy the FaaS sample stack

Execute the following commands:

git clone https://github.com/alexellis/faas

cd faas

./deploy_stack.sh

docker service ls

```
deploy_stack.armhf.sh  deploy_stack.sh
[node1] (local) root@10.0.37.3 ~/faas
$ ./deploy_stack.sh
Deploying stack
Creating network func_functions
Creating service func_prometheus
Creating service func_nodeinfo
Creating service func_decodebase64
Creating service func_base64
Creating service func_alertmanager
Creating service func_webhookstash
Creating service func_markdown
Creating service func_gateway
Creating service func_echoit
Creating service func_wordcount
Creating service func_hubstats
```

```
Creating service func_wordcount
Creating service func_hubstats
[node1] (local) root@10.0.37.3 ~/faas
$ docker service ls
ID                  NAME                MODE                REPLICAS            IMAG
E
0ajb3kf3uszs        func_prometheus     replicated          1/1                 func
tions/prometheus:1.5.2
0tlbvck9ff5t        func_markdown       replicated          1/1                 alex
ellis2/faas-markdownrender:latest
51x6snldwibw        func_echoit         replicated          1/1                 func
tions/alpine:health
iseewd4pwg5r        func_decodebase64   replicated          1/1                 func
tions/alpine:health
ixceg699nwcp        func_gateway        replicated          1/1                 func
tions/gateway:0.5.3
```

Docker stack ps func

```
$ docker stack ps func
ID                  NAME                  IMAGE                                     N
ODE                 DESIRED STATE         CURRENT STATE            ERROR
PORTS
li3lqc8j8d2n        func_hubstats.1       alexellis2/faas-dockerhubstats:latest     n
ode1                Running               Running 42 seconds ago
zo9a3kqbphxv        func_wordcount.1      functions/alpine:health                   n
ode1                Running               Running 46 seconds ago
g20qjve7t0aq        func_echoit.1         functions/alpine:health                   n
ode1                Running               Running 47 seconds ago
062cm1dm51bg        func_gateway.1        functions/gateway:0.5.3                   n
ode1                Running               Running 43 seconds ago
matyv8vr0gjm        func_markdown.1       alexellis2/faas-markdownrender:latest     n
ode1                Running               Running 51 seconds ago
qrbdem7xujlk        func_webhookstash.1   functions/webhookstash:latest             n
ode1                Running               Running 53 seconds ago
```

Docker ps

The field Container ID is used to get the logs of the corresponding functions.

```
[node1] (local) root@10.0.37.3 ~/faas
$ docker ps
CONTAINER ID        IMAGE                                    COMMAND
  CREATED             STATUS                     PORTS             NAMES
3a36d23d0419        alexellis2/faas-dockerhubstats:latest    "/usr/bin/fwatchdog"
  5 minutes ago       Up 5 minutes                                 func_hubstats.1.l
i3lqc8j8d2nf2bqigbnioz51
423bcf92631e        functions/prometheus:1.5.2               "/bin/prometheus -..."
  5 minutes ago       Up 5 minutes               9090/tcp          func_prometheus.1
.lmkei0pexq3d7lhrukchbkzkm
e5f662b8534c        alexellis2/faas-nodeinfo:latest          "fwatchdog"
  5 minutes ago       Up 5 minutes                                 func_nodeinfo.1.h
htz06933rwyl3mkpdgioasqg
0bce78b427cf        quay.io/prometheus/alertmanager:latest   "/bin/alertmanager..."
  5 minutes ago       Up 5 minutes               9093/tcp          func_alertmanager
```

Docker logs -f 16576262d322

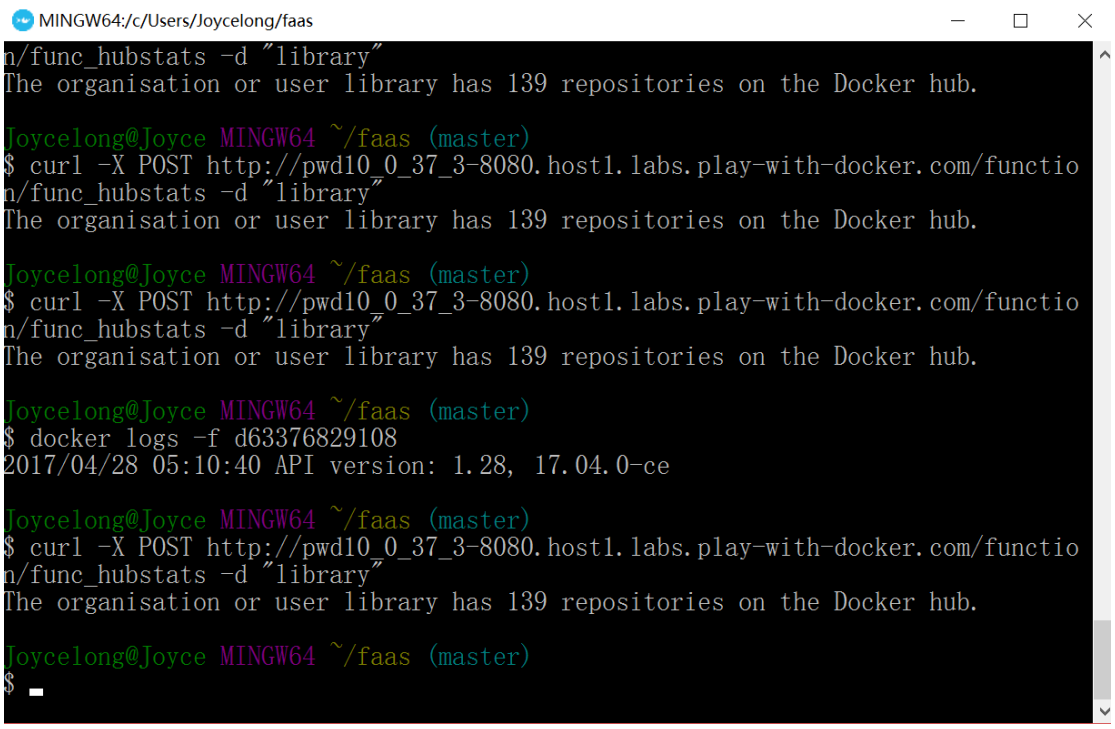
16576262d322 is the Container ID for gateway.

- Open a command line

Run:

curl -X POST ~~http://localhost:8080~~/function/func_hubstats -d "library"

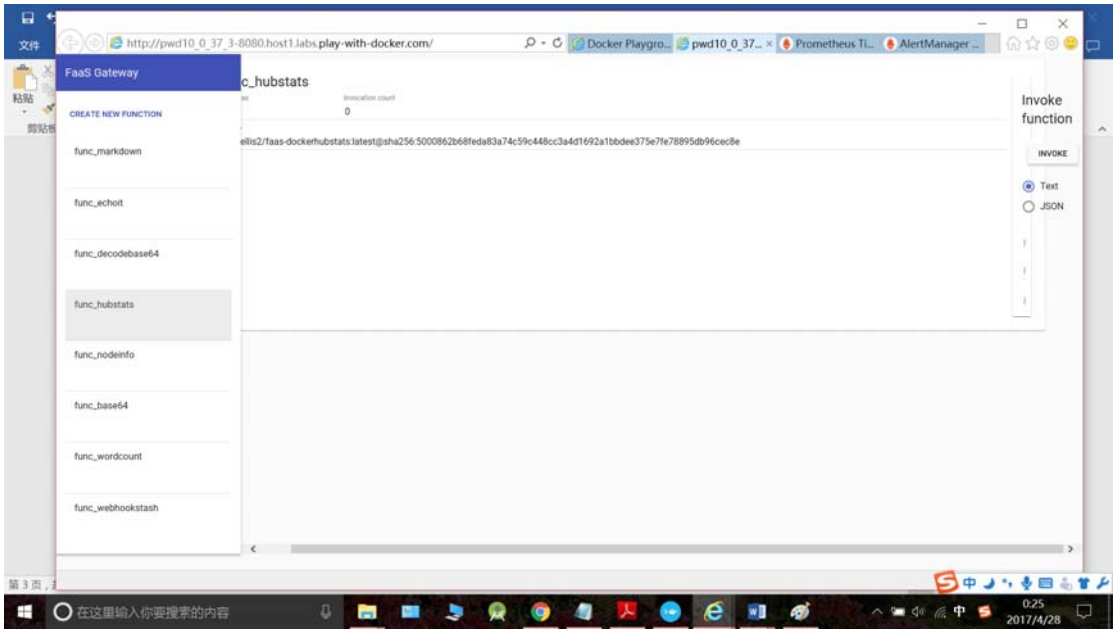
Replace http://localhost:8080 with the hyperlink of http://pwd10_0_37_3-8080.host1.labs.play-with-docker.com



Then we can see the updating logs in play-with-docker.

```
README.md                  contrib                    prometheus
ROADMAP.md                 debug.md                   sample-functions
TestDrive.md               deploy_stack.armhf.sh      watchdog
appveyor.yml               deploy_stack.sh
build.armhf.sh             docker-compose.armhf.yml
[node1] (local) root@10.0.37.3 ~/faas
$ docker logs -f 16576262d322
2017/04/28 05:52:30 API version: 1.28, 17.04.0-ce
Resolving: 'func_hubstats'
[1493359584] Forwarding request [application/x-www-form-urlencoded] to: http://10.0.
0.23:8080/
[1493359584] took 0.234338 seconds
Resolving: 'func_hubstats'
[1493359603] Forwarding request [application/x-www-form-urlencoded] to: http://10.0.
0.23:8080/
[1493359603] took 0.232575 seconds
```

●



5. Run locally on laptop

Similar to the steps in ‘play-with-docker’. There are some issues for me when running locally on laptop.

Reference:

1. https://docs.docker.com/machine/get-started/#prerequisite-information
2. https://github.com/alexellis/faas/blob/master/TestDrive.md
3. https://docs.docker.com/get-started/part2/#define-a-container-with-a-dockerfile