

Lab 5 – Docker Compose

Multi-container Docker applications

1. Install Docker Compose.

- check that Docker Compose is installed correctly, and that you have the correct version

(≥ 1.8):

```
vagrant@Manager:~/dockercoins$ sudo apt install docker-compose
Reading package lists... Done
Building dependency tree
Reading state information... Done
docker-compose is already the newest version (1.25.0-1).
0 upgraded, 0 newly installed, 0 to remove and 102 not upgraded.
vagrant@Manager:~/dockercoins$ docker-compose version
docker-compose version 1.25.0, build unknown
docker-py version: 4.1.0
CPython version: 3.8.10
OpenSSL version: OpenSSL 1.1.1f 31 Mar 2020
vagrant@Manager:~/dockercoins$
```

2. Clone the following Git repository :

<https://github.com/brahimhamdi/dockercoins>

- Change to dockercoins directory

```
vagrant@Manager:~$ git clone https://github.com/brahimhamdi/dockercoins
Cloning into 'dockercoins'...
remote: Enumerating objects: 147, done.
remote: Counting objects: 100% (147/147), done.
remote: Compressing objects: 100% (105/105), done.
remote: Total 147 (delta 45), reused 136 (delta 34), pack-reused 0
Receiving objects: 100% (147/147), 146.78 KiB | 677.00 KiB/s, done.
Resolving deltas: 100% (45/45), done.
vagrant@Manager:~$ cd dockercoins/
vagrant@Manager:~/dockercoins$ tree
.
├── hasher
│   ├── Dockerfile
│   └── hasher.rb
├── rng
│   ├── Dockerfile
│   └── rng.py
├── webui
│   ├── Dockerfile
│   ├── Dockerfile.old
│   └── files
│       ├── d3.min.js
│       ├── index.html
│       ├── jquery-1.11.3.min.js
│       ├── jquery.js
│       ├── rickshaw.min.css
│       └── rickshaw.min.js
└── webui.js
worker
├── Dockerfile
└── worker.py

5 directories, 15 files
vagrant@Manager:~/dockercoins$
```

3. Create the docker-compose.yml file with the following specifications:

- 5 services: rng, hasher, webui, worker and redis (DB)
- The containers of the 5 services execute images which have the same names as the services. All images are built from Dockerfile, exception redis (official image) and webui (*brahimhamdi/webui*)
- Ports 80 of the webui, rng and hasher services container are published, respectively, on ports 8000, 8001 and 8002 of the host

```

vagrant@Manager:~/dockercoins$ vim docker-compose.yml
vagrant@Manager:~/dockercoins$ cat docker-compose.yml
version: "3"
services:
  rng:
    image: rng
    build: ./rng
    ports:
      - "8001:80"
  hasher:
    image: hasher
    build: ./hasher
    ports:
      - "8002:80"
  worker:
    image: worker
    build: ./worker
  webui:
    image: brahimhamdi/webui
    ports:
      - "8000:80"
  redis:
    image: redis
vagrant@Manager:~/dockercoins$ █

```

4. Deploy dockercoins application.

```

vagrant@Manager:~/dockercoins$ docker-compose up -d
Creating network "dockercoins_default" with the default driver
Building rng
Step 1/6 : FROM python:alpine
alpine: Pulling from library/python
8a49fdb3b6a5: Already exists
0357922e53aa: Already exists
a5c7ada51cb6: Already exists
9ebc4081ccad: Already exists
839b27ab4d66: Already exists
Digest: sha256:995c7fcdf9a10e0e1a4555861dac63436b456822a167f07b6599d4f105de6fa0
Status: Downloaded newer image for python:alpine
---> 35f8462d36fe
Step 2/6 : MAINTAINER brahim.hamdi.consult@gmail.com
---> Running in 773ba2e9824d
Removing intermediate container 773ba2e9824d
---> 580fbc83be20
Step 3/6 : RUN pip install Flask
---> Running in 0dd7696e9fd3
Collecting Flask
  Downloading Flask-2.3.2-py3-none-any.whl (96 kB)
  96.9/96.9 kB 679.7 kB/s eta 0:00:00
Collecting Werkzeug>=2.3.3 (from Flask)
  Downloading Werkzeug-2.3.6-py3-none-any.whl (242 kB)

```

```

Creating dockercoins_worker_1 ... done
Creating dockercoins_hasher_1 ... done
Creating dockercoins_redis_1 ... done
Creating dockercoins_webui_1 ... done
Creating dockercoins_rng_1 ... done
vagrant@Manager:~/dockercoins$

```

- List all application containers (with docker and docker-compose commands).

```

vagrant@Manager:~/dockercoins$ docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                    NAMES
b27ef881dc97   nginx         "/docker-entrypoint..." 5 seconds ago  Up 3 seconds  80/tcp                  test
a41fa82d9c00   rng          "python rng.py"          5 minutes ago  Up 5 minutes  0.0.0.0:8001->80/tcp     dockercoins_rng_1
43f087c022ce   brahimhandi/webui "node webui.js"          5 minutes ago  Up 5 minutes  0.0.0.0:8000->80/tcp     dockercoins_webui_1
cd2a344aa7b9   hasher       "ruby hasher.rb"          5 minutes ago  Up 5 minutes (healthy)  0.0.0.0:8002->80/tcp     dockercoins_hasher_1
28b84bbc2f6c   worker      "python worker.py"          5 minutes ago  Up 5 minutes                        dockercoins_worker_1
60de492bbb8e   redis       "docker-entrypoint.s..." 5 minutes ago  Up 5 minutes  6379/tcp                dockercoins_redis_1
vagrant@Manager:~/dockercoins$
vagrant@Manager:~/dockercoins$ docker-compose ps

```

Name	Command	State	Ports
dockercoins_hasher_1	ruby hasher.rb	Up (healthy)	0.0.0.0:8002->80/tcp
dockercoins_redis_1	docker-entrypoint.sh redis ...	Up	6379/tcp
dockercoins_rng_1	python rng.py	Up	0.0.0.0:8001->80/tcp
dockercoins_webui_1	node webui.js	Up	0.0.0.0:8000->80/tcp
dockercoins_worker_1	python worker.py	Up	

```

vagrant@Manager:~/dockercoins$

```

- Test with web interfaces. What is the hash rate ?



5. We want to increase the number of Dockercoins generated by the application, for this you are asked to increase the number of containers running the service worker to 2.

```

brahim@Training: /sauvegarde/formations/forma... x    vagrant@Manager: ~/dockercoins x
vagrant@Manager:~/dockercoins$ docker-compose scale worker=2
WARNING: The scale command is deprecated. Use the up command with the --scale flag instead.
Starting dockercoins_worker_1 ... done
Creating dockercoins_worker_2 ... done
vagrant@Manager:~/dockercoins$
vagrant@Manager:~/dockercoins$ docker-compose ps

```

Name	Command	State	Ports
dockercoins_hasher_1	ruby hasher.rb	Up (healthy)	0.0.0.0:8002->80/tcp
dockercoins_redis_1	docker-entrypoint.sh redis ...	Up	6379/tcp
dockercoins_rng_1	python rng.py	Up	0.0.0.0:8001->80/tcp
dockercoins_webui_1	node webui.js	Up	0.0.0.0:8000->80/tcp
dockercoins_worker_1	python worker.py	Up	
dockercoins_worker_2	python worker.py	Up	

```

vagrant@Manager:~/dockercoins$
vagrant@Manager:~/dockercoins$ docker-compose ps worker

```

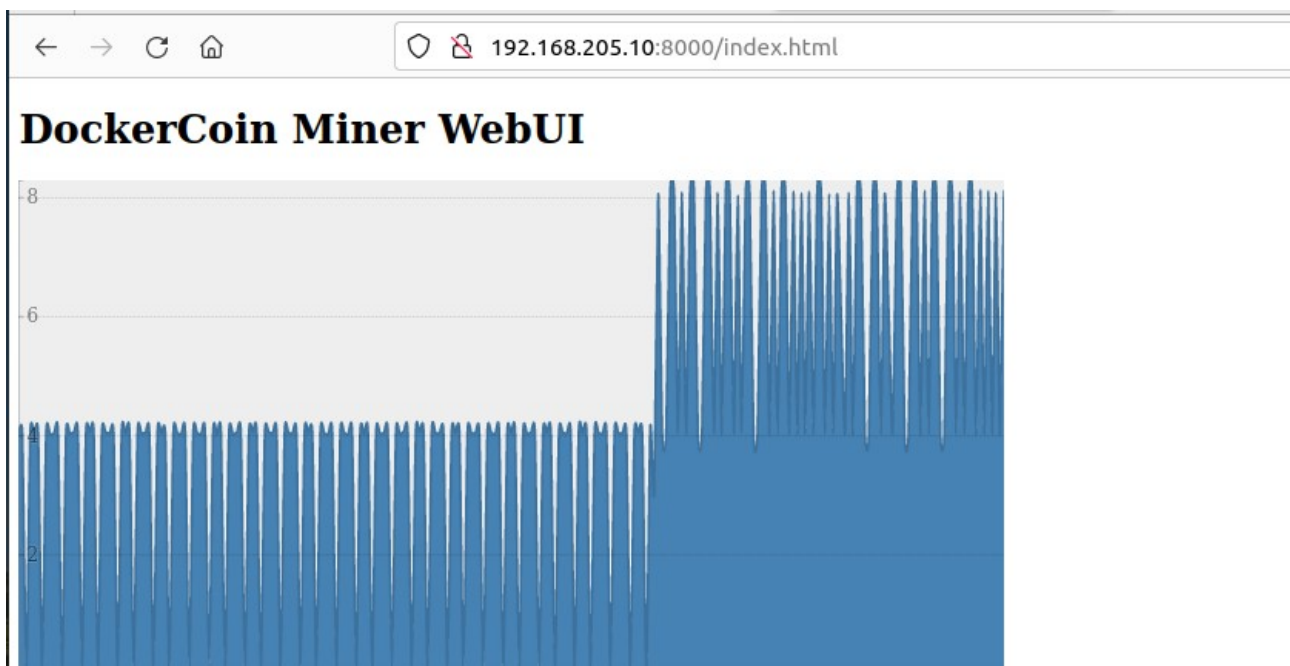
Name	Command	State	Ports
dockercoins_worker_1	python worker.py	Up	
dockercoins_worker_2	python worker.py	Up	

```

vagrant@Manager:~/dockercoins$

```

- What is the hash rate now ?



6. Increase the number of workers to 10.


```

brahim@Training: /sauvegarde/formations/forma... x Vous pouvez coller l'image depuis le presse-papiers.

vagrant@Manager:~/dockercoins$ docker-compose scale worker=10
WARNING: The scale command is deprecated. Use the up command with the --scale flag instead.
Starting dockercoins_worker_1 ... done
Starting dockercoins_worker_2 ... done
Creating dockercoins_worker_3 ... done
Creating dockercoins_worker_4 ... done
Creating dockercoins_worker_5 ... done
Creating dockercoins_worker_6 ... done
Creating dockercoins_worker_7 ... done
Creating dockercoins_worker_8 ... done
Creating dockercoins_worker_9 ... done
Creating dockercoins_worker_10 ... done
vagrant@Manager:~/dockercoins$ docker-compose ps worker

```

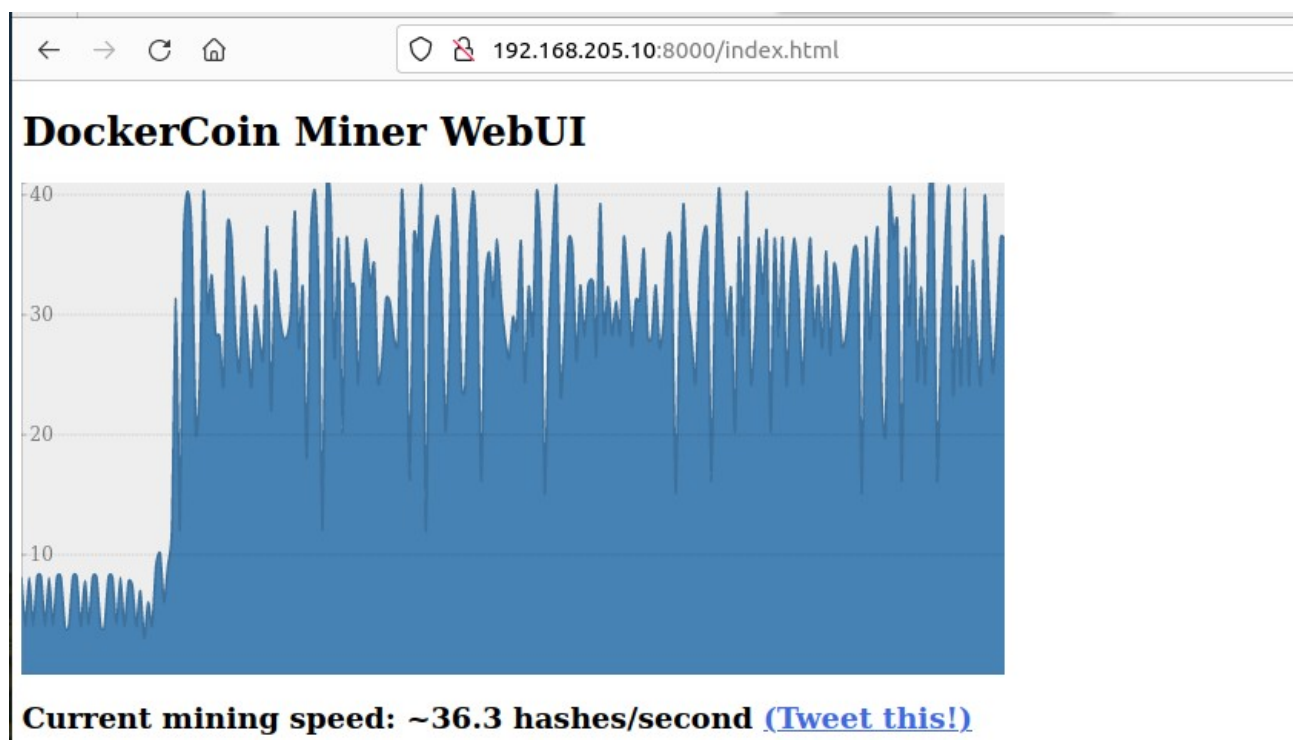
Name	Command	State	Ports
dockercoins_worker_1	python worker.py	Up	
dockercoins_worker_10	python worker.py	Up	
dockercoins_worker_2	python worker.py	Up	
dockercoins_worker_3	python worker.py	Up	
dockercoins_worker_4	python worker.py	Up	
dockercoins_worker_5	python worker.py	Up	
dockercoins_worker_6	python worker.py	Up	
dockercoins_worker_7	python worker.py	Up	
dockercoins_worker_8	python worker.py	Up	
dockercoins_worker_9	python worker.py	Up	

```

vagrant@Manager:~/dockercoins$

```

- Has the generation rate multiplied by 10?



7. Install *htping* which will detect the latency of these two services (rng and hasher).

```
vagrant@Manager:~/dockercoins$ sudo apt install htping
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libfftw3-double3
Suggested packages:
  libfftw3-bin libfftw3-dev
The following NEW packages will be installed:
  htping libfftw3-double3
0 upgraded, 2 newly installed, 0 to remove and 102 not upgraded.
Need to get 795 kB of archives.
After this operation, 2,422 kB of additional disk space will be used.
Do you want to continue? [Y/n]
Get:1 http://us.archive.ubuntu.com/ubuntu focal/main amd64 libfftw3-double3 amd64 3.3.8-2ubuntu1 [728 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 htping amd64 2.5-5 [67.1 kB]
Fetched 795 kB in 3s (274 kB/s)
Selecting previously unselected package libfftw3-double3:amd64.
(Reading database ... 55%
```

- run the command to test the latency of the service **hasher**:

htping localhost:8002

```
vagrant@Manager:~/dockercoins$
vagrant@Manager:~/dockercoins$ htping localhost:8002
PING localhost:8002 (/):
connected to 127.0.0.1:8002 (210 bytes), seq=0 time= 29.62 ms
connected to 127.0.0.1:8002 (210 bytes), seq=1 time= 2.63 ms
connected to 127.0.0.1:8002 (210 bytes), seq=2 time= 2.65 ms
connected to 127.0.0.1:8002 (210 bytes), seq=3 time= 3.20 ms
connected to 127.0.0.1:8002 (210 bytes), seq=4 time= 2.93 ms
connected to 127.0.0.1:8002 (210 bytes), seq=5 time= 3.91 ms
connected to 127.0.0.1:8002 (210 bytes), seq=6 time= 5.59 ms
connected to 127.0.0.1:8002 (210 bytes), seq=7 time= 2.42 ms
connected to 127.0.0.1:8002 (210 bytes), seq=8 time= 3.14 ms
connected to 127.0.0.1:8002 (210 bytes), seq=9 time= 3.03 ms
connected to 127.0.0.1:8002 (210 bytes), seq=10 time= 2.79 ms
connected to 127.0.0.1:8002 (210 bytes), seq=11 time= 2.63 ms
connected to 127.0.0.1:8002 (210 bytes), seq=12 time= 2.24 ms
connected to 127.0.0.1:8002 (210 bytes), seq=13 time= 3.39 ms
connected to 127.0.0.1:8002 (210 bytes), seq=14 time= 2.42 ms
connected to 127.0.0.1:8002 (210 bytes), seq=15 time= 2.34 ms
```

- Conclude.