

TP1 Docker

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B3 DEV A

5) Exécuter un serveur web (apache, nginx, ...) dans un conteneur docker

a. b. Récupérer l'image (avec un pull mais je n'ai pas fait de capture d'écran) et vérifier qu'elle est présente en local

```
PS C:\Users\laura\docker> docker images
```

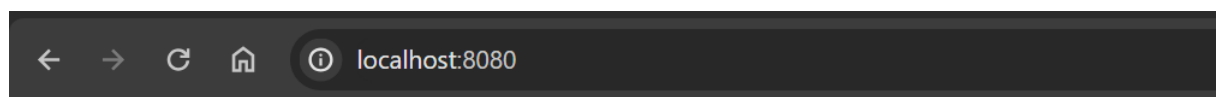
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
my-image	latest	b96fb965ced0	About an hour ago	187MB
nginx	latest	e4720093a3c1	25 hours ago	187MB
phpmyadmin	latest	5b58447efc0f	2 days ago	562MB
wbitt/network-multitool	latest	713337546be6	5 months ago	75.9MB
phpmyadmin/phpmyadmin	latest	933569f3a9f6	7 months ago	562MB
pragma/network-multitool	latest	1631e536ed7d	2 years ago	39.9MB
migs/mysql-5.7	latest	2b876fe1e112	6 years ago	419MB

c. Créer un fichier index.html simple

```
<> index.html U X
C: > Users > laura > Documents > Ynov > DevOps > tp1 > <> index.html > html > body
1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="UTF-8">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>TP1 docker</title>
8 </head>
9
10 <body>
11   <header>
12     <h1>Voici une section</h1>
13     <p>Ce site est hébergé par un conteneur docker.</p>
14   </header>
15 </body>
16 </html>
```

d. Démarrer un conteneur et servir la page html créée précédemment à l'aide d'un volume (option -v de docker run)

```
PS C:\Users\laura> docker run -p 8080:80 -v C:/Users/laura/usr/share/nginx/html nginx
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2024/02/15 15:10:43 [notice] 1#1: using the "epoll" event method
2024/02/15 15:10:43 [notice] 1#1: nginx/1.25.4
2024/02/15 15:10:43 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2024/02/15 15:10:43 [notice] 1#1: OS: Linux 5.15.133.1-microsoft-standard-WSL2
2024/02/15 15:10:43 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2024/02/15 15:10:43 [notice] 1#1: start worker processes
2024/02/15 15:10:43 [notice] 1#1: start worker process 29
2024/02/15 15:10:43 [notice] 1#1: start worker process 30
2024/02/15 15:10:43 [notice] 1#1: start worker process 31
2024/02/15 15:10:43 [notice] 1#1: start worker process 32
2024/02/15 15:10:43 [notice] 1#1: start worker process 33
2024/02/15 15:10:43 [notice] 1#1: start worker process 34
2024/02/15 15:10:43 [notice] 1#1: start worker process 35
2024/02/15 15:10:43 [notice] 1#1: start worker process 36
2024/02/15 15:10:43 [notice] 1#1: start worker process 37
2024/02/15 15:10:43 [notice] 1#1: start worker process 38
2024/02/15 15:10:43 [notice] 1#1: start worker process 39
2024/02/15 15:10:43 [notice] 1#1: start worker process 40
2024/02/15 15:10:43 [notice] 1#1: start worker process 41
2024/02/15 15:10:43 [notice] 1#1: start worker process 42
2024/02/15 15:10:43 [notice] 1#1: start worker process 43
2024/02/15 15:10:43 [notice] 1#1: start worker process 44
172.17.0.1 - - [15/Feb/2024:15:10:51 +0000] "GET / HTTP/1.1" 200 345 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/121.0.0.0 Safari/537.36" "-"
```



Voici une section

Ce site est hébergé par un conteneur docker.

e. Supprimer le conteneur précédent et arriver au même résultat que précédemment à l'aide de la commande docker cp

- Supprimer conteneur

```
PS C:\Users\laura> docker rm -f $(docker ps -aq)
2acf876e9f80
b565eb4e84e7
0b3b860e50bd
42a136aa94af
ef7efa3cbd48
e46458468201
PS C:\Users\laura> docker container ls -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
PS C:\Users\laura>
```

- Créer nouveau conteneur

```
PS C:\Users\laura> docker create -p 8080:80 nginx
69f051c013aaa0988f8949654f58831aff6466f0ec9e4531c9691482470dd85a
PS C:\Users\laura> docker container ls -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
69f051c013aa   nginx    "/docker-entrypoint..." 9 seconds ago  Created                        gifted_lamport
```

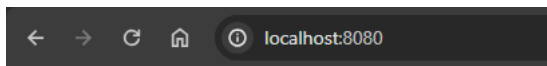
- Copier les fichiers

```
PS C:\Users\laura> docker cp ./index.html 69f051c013aa:/usr/share/nginx/html/index.html
Successfully copied 2.05kB to 69f051c013aa:/usr/share/nginx/html/index.html
```

- Démarrer le conteneur

```
PS C:\Users\laura> docker start 69f051c013aa
69f051c013aa
PS C:\Users\laura> docker container ls
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS          NAMES
69f051c013aa   nginx    "/docker-entrypoint..." 3 hours ago    Up 8 seconds  0.0.0.0:8080->80/tcp  gifted_lamport
PS C:\Users\laura>
```

- Test



Voici une section

Ce site est hébergé par un conteneur docker.

6) Builder une image

a. A l'aide d'un Dockerfile, créer une image (commande docker build)

- dockerfile

```
index.html U  dockerfile X
C: > Users > laura > dockerfile > ...
1 FROM nginx
2 WORKDIR /usr/share/nginx/html
3 COPY . /usr/share/nginx/html/
4 CMD ["nginx", "-g", "daemon off,"]
```

- Build

```
PS C:\Users\laura\docker> docker build . --tag my-image
[+] Building 0.1s (8/8) FINISHED
=> [internal] load build definition from dockerfile
=> => transferring dockerfile: 145B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/nginx:latest
=> [1/3] FROM docker.io/library/nginx
=> [internal] load build context
=> => transferring context: 531B
=> CACHED [2/3] WORKDIR /usr/share/nginx/html
=> [3/3] COPY . /usr/share/nginx/html/
=> exporting to image
=> => exporting layers
=> writing image sha256:b96fb965ced8803dfb6778403a8c21b3f01973412f24593ec45347623aaa9e
=> naming to docker.io/library/my-image
docker:default
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
0.0s
```

b. Exécuter cette nouvelle image de manière à servir la page html (commande docker run)

```
PS C:\Users\laura\docker> docker run -p 8080:80 my-image
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2024/02/15 19:38:38 [emerg] 1#1: unexpected end of parameter, expecting ";" in command line
nginx: [emerg] unexpected end of parameter, expecting ";" in command line
```

Ma commande ne fonctionne pas, je n'ai pas réussi à résoudre le problème.

c. Quelles différences observez-vous entre les procédures 5. et 6. ? Avantages et inconvénients de l'une et de l'autre méthode ? (Mettre en relation ce qui est observé avec ce qui a été présenté pendant le cours)

La méthode 5 est plus rapide pour faire de tests, mais pour une solution finale la méthode 6 semble plus adaptée car définitive : la manipulation n'est à faire qu'une fois. Dans une optique devOps d'automatiser les tâches répétitives, nous allons privilégier la méthode 6.

7) Utiliser une base de données dans un conteneur docker

a. Récupérer les images mysql:5.7 et phpmyadmin depuis le Docker Hub

```
PS C:\Users\laura> docker pull migs/mysql-5.7
Using default tag: latest
latest: Pulling from migs/mysql-5.7
Digest: sha256:5a6267f9d0eb4b16ce0932424e3506500af2a44df20ea95f2926b90618a8827a
Status: Image is up to date for migs/mysql-5.7:latest
docker.io/migs/mysql-5.7:latest

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview migs/mysql-5.7
PS C:\Users\laura> docker pull phpmyadmin
Using default tag: latest
latest: Pulling from library/phpmyadmin
e1caac4eb9d2: Already exists
8c386db9cb1d: Pull complete
bef1b237c949: Pull complete
56c66cb68b0f: Pull complete
9c790c1c009d: Pull complete
e055748d0b38: Pull complete
5a9d72b3b895: Pull complete
a354636f862b: Pull complete
a139fa831a3e: Pull complete
17106305d525: Pull complete
37b86f20916c: Pull complete
aa13ba4f6f48: Pull complete
5d2fe7754d47: Pull complete
73d6987733c3: Pull complete
d4af3f06a655: Pull complete
5647a1b25b86: Pull complete
56e4a0c9d88e: Pull complete
b9ae97e9e90b: Pull complete
Digest: sha256:559cc4ad68986e72008964132195272b5e539b4276b6ee4b8b87f7bf0052e0d7
Status: Downloaded newer image for phpmyadmin:latest
docker.io/library/phpmyadmin:latest

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickview phpmyadmin
```

b. Exécuter deux conteneurs à partir des images et ajouter une table ainsi que quelques enregistrements dans la base de données à l'aide de phpmyadmin

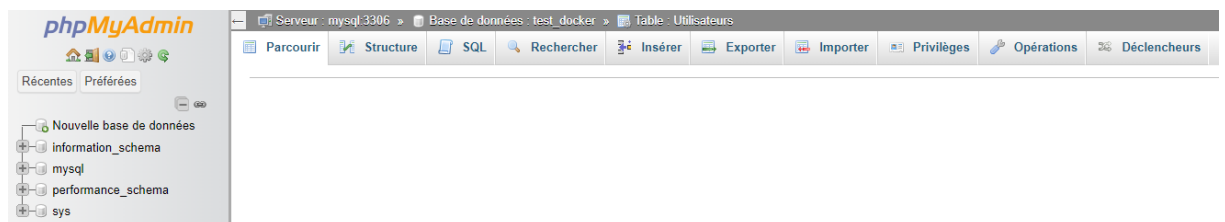
```
PS C:\Users\laura> docker run --name mysql -e MYSQL_ROOT_PASSWORD=1sqlpassword -d migs/mysql-5.7
9cb999104f05c32a8ce33c17c12ef8eded28993e3901286390235e76fe306c2e
PS C:\Users\laura> docker run --name phpmyadmin -p 8080:80 --link mysql -e PMA_HOST=mysql -e PMA_PORT=3306 -d phpmyadmin
9ca170621f0bbda8d3995e07a1b5bdce14048e88df50401e8100ba6b3958d83c
PS C:\Users\laura>
```

The screenshot shows the phpMyAdmin interface. On the left is a sidebar with a tree view of databases: 'information_schema', 'mysql', 'performance_schema', 'sys', 'test_docker', and 'Utilisateurs'. The main area displays the 'Utilisateurs' table with two columns: 'Nom' and 'Classe'. The table contains two rows: 'Laura B3 DEV A' and 'Alan B3 DEV A'. Above the table, there is a message indicating that the current selection does not contain a unique column. Below the table, there are options to 'Tout afficher' (Show all) and 'Nombre de lignes' (Number of lines) set to 25. At the bottom, there are links for 'Imprimer' (Print), 'Copier dans le presse-papiers' (Copy to clipboard), 'Exporter' (Export), 'Afficher le graphique' (Show graph), and 'Créer une vue' (Create view).

8) Faire la même chose que précédemment en utilisant un fichier docker-compose.yml

```
<> index.html U  compose.yaml ●
C: > Users > laura > Docker > compose.yaml
1  services:
2    mysql:
3      image: migs/mysql-5.7
4      container_name: mysql
5      restart: always
6      environment:
7        MYSQL_ROOT_PASSWORD: 1sqlpassword
8      ports:
9        - 3306:3306
10     volumes:
11       - ./mysql:/var/lib/mysql
12
13     phpmyadmin:
14       image: phpmyadmin/phpmyadmin
15       container_name: phpmyadmin
16       ports:
17         - 8080:80
18       restart: always
19       environment:
20         PMA_HOST: mysql
21         PMA_PORT: 3306
22         MYSQL_ROOT_PASSWORD: 1sqlpassword
23       depends_on:
24         - mysql
25       links:
26         - mysql
```

```
PS C:\Users\laura\docker> docker compose up
[+] Running 2/2
  Container mysql      Recreated      0.0s
  Container phpmyadmin Recreated      0.1s
Attaching to mysql, phpmyadmin
mysql      | Initializing database
mysql      | 2024-02-15T19:05:28.672439Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --explicit_defaults_for_timestamp server option (see document
mysql      | 2024-02-15T19:05:28.679156Z 0 [Warning] Setting lower_case_table_names=2 because file system for /var/lib/mysql/ is case insensitive
mysql      | 2024-02-15T19:05:28.986659Z 0 [Warning] InnoDB: New log files created, LSN=45790
phpmyadmin | AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 172.18.0.3. Set the 'ServerName' directive globally to suppress this m
phpmyadmin | AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 172.18.0.3. Set the 'ServerName' directive globally to suppress this m
phpmyadmin | [Thu Feb 15 19:05:28.937127 2024] [mpm_prefork:notice] [pid 1] AH00163: Apache/2.4.57 (Debian) PHP/8.2.8 configured -- resuming normal operations
phpmyadmin | [Thu Feb 15 19:05:28.937163 2024] [core:notice] [pid 1] AH00094: Command line: 'apache2 -D FOREGROUND'
mysql      | 2024-02-15T19:05:29.005959Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
mysql      | 2024-02-15T19:05:29.005995Z 0 [Warning] No existing UUID has been found, so we assume that this is the first time that this server has been started. Generating a new
mysql      | UUID: 2f11c75-cc35-11ee-a045-0242ac128082.
mysql      | 2024-02-15T19:05:29.008972Z 0 [Warning] Gtid table is not ready to be used. Table 'mysql.gtid_executed' cannot be opened.
mysql      | 2024-02-15T19:05:29.010041Z 1 [Warning] root@localhost is created with an empty password ! Please consider switching off the --initialize-insecure option.
mysql      | 2024-02-15T19:05:31.121779Z 1 [Warning] 'user' entry 'root@localhost' ignored in --skip-name-resolve mode.
mysql      | 2024-02-15T19:05:31.121813Z 1 [Warning] 'user' entry 'mysql.sys@localhost' ignored in --skip-name-resolve mode.
mysql      | 2024-02-15T19:05:31.121934Z 1 [Warning] 'db' entry 'sys mysql.sys@localhost' ignored in --skip-name-resolve mode.
mysql      | 2024-02-15T19:05:31.122069Z 1 [Warning] 'proxies_priv' entry '@ root@localhost' ignored in --skip-name-resolve mode.
mysql      | 2024-02-15T19:05:31.122309Z 1 [Warning] 'tables_priv' entry 'sys_config mysql.sys@localhost' ignored in --skip-name-resolve mode.
mysql      | Database initialized
mysql      | Initializing certificates
mysql      | Generating a 2048 bit RSA private key
mysql      | .....+++
mysql      | .....+++
mysql      | unable to write 'random state'
mysql      | writing new private key to 'ca-key.pem'
mysql      | -----
mysql      | Generating a 2048 bit RSA private key
mysql      | .....+++
mysql      | .....+++
mysql      | unable to write 'random state'
mysql      | writing new private key to 'server-key.pem'
mysql      | -----
mysql      | Generating a 2048 bit RSA private key
mysql      | .....+++
mysql      | .....+++
```



a. Qu'apporte le fichier docker-compose par rapport aux commandes docker run ? Pourquoi est-il intéressant ? (cf. ce qui a été présenté pendant le cours)

Un unique fichier compose permet de définir, configurer et lancer plusieurs services, le tout avec une syntaxe assez simple. Il est donc beaucoup plus efficace que plusieurs commandes docker lorsque nous avons une infrastructure complexe.

b. Quel moyen permet de configurer (premier utilisateur, première base de données, mot de passe root, ...) facilement le conteneur mysql au lancement ?

Les variables d'environnement telles que MYSQL_ROOT_PASSWORD (pour définir le mot de passer du superutilisateur root) permettent de configurer le conteneur mysql.

9) Observation de l'isolation réseau entre 3 conteneurs

- Docker compose

```
28     services:
29         web:
30             image: wbitt/network-multitool
31             networks:
32                 - frontend
33             command: sleep 3600
34         app:
35             image: wbitt/network-multitool
36             networks:
37                 - frontend
38                 - backend
39             command: sleep 3600
40         db:
41             image: wbitt/network-multitool
42             networks:
43                 - backend
44             command: sleep 3600
45     networks:
46         frontend:
47         backend:
```