

Docker y Docker Compose

Ejecutando contenedores con Docker

Creamos la red my_test_network

```
daniel@magi:~$ docker network create --driver bridge my_test_network
295041e1f85711da0a07f559155fa855a0a358361e77623057d53df9a3a4c8a2
daniel@magi:~$
```

Hacemos pull de de imagen de Jupyter Notebook

```
daniel@magi:~$ docker pull jupyter/base-notebook
Using default tag: latest
latest: Pulling from jupyter/base-notebook
7b1a6ab2e44d: Pull complete
5aa2fa3625cd: Pull complete
28a7dc0afe24: Pull complete
60704649d322: Pull complete
0d122562ccc2: Pull complete
a63c0498c07b: Pull complete
ec953fac3ecc: Pull complete
6db1568369b9: Pull complete
ce14d014e8bd: Pull complete
6763b4f7efb6: Pull complete
6c1d7d331d8c: Pull complete
Digest: sha256:37f879d1621529324c890ad2fa8d8432e2ca67c62874878b9b5e93d78671a3c7
Status: Downloaded newer image for jupyter/base-notebook:latest
docker.io/jupyter/base-notebook:latest
```

Corremos un contenedor de Jupyter en el puerto TCP 8888 y red my_test_network

```
daniel@magi:~$ docker run -p 8888:8888 --name jupyter --network my_test_network jupyter/base-notebook
WARN: Jupyter Notebook deprecation notice https://github.com/jupyter/docker-stacks#jupyter-notebook-deprecation-notice.
Executing the command: jupyter notebook
[I 05:03:55.933 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook_cookie_secret
[W 2021-10-26 05:03:56.489 LabApp] 'ip' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-26 05:03:56.489 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-26 05:03:56.489 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
```

Hacemos pull de de imagen de MySQL versión 5.7.35

```
daniel@magi:~ 🍺 docker pull mysql:5.7.35
5.7.35: Pulling from library/mysql
b380bbd43752: Pull complete
f23cbf2ecc5d: Pull complete
30cfc6c29c0a: Pull complete
b38609286cbe: Pull complete
8211d9e66cd6: Pull complete
2313f9eeca4a: Pull complete
7eb487d00da0: Pull complete
bb9cc5c700e7: Pull complete
88676eb32344: Downloading   33.9MB/108.6MB
8fea0b38a348: Download complete
3dc585bfc693: Download complete
```

Creamos el contenedor de MySQL con las respectivas variables de entorno en el puerto TCP 3306 y red my_test_network

```
daniel@magi:~ 🍺 docker run -it --network my_test_network -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_USER=test" -e "MYSQL_PASSWORD=test123" -p 3306:3306 --name mysql_server mysql:5.7.35
2021-10-26 05:20:34+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-26 05:20:34+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2021-10-26 05:20:34+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-26 05:20:34+00:00 [Note] [Entrypoint]: Initializing database files
2021-10-26T05:20:34.992818Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --explicit_defaults_for_timestamp server option (see documentation for more details).
2021-10-26T05:20:35.264385Z 0 [Warning] InnoDB: New log files created, LSN=45790
2021-10-26T05:20:35.292981Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
2021-10-26T05:20:35.350089Z 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 UUID: 72bb3dbd-361c-11ec-8fc5-0242ac120003.
```

Probamos la conexión al servidor de MySQL desde el cliente de MySQL

```
daniel@magi:~$ mysql -u test -h 127.0.0.1 -P 3306 -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.7.35 MySQL Community Server (GPL)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database                |
+-----+
| information_schema       |
| test                    |
+-----+
2 rows in set (0.00 sec)

mysql> 
```

Validamos que ambos contenedores se encuentren corriendo con el comando **docker ps**


```
daniel@magi:~$ docker ps --format "table {{.ID}}\t{{.Image}}\t{{.Ports}}"
CONTAINER ID   IMAGE                                PORTS
58f2a14b328    mysql:5.7.35                       0.0.0.0:3306->3306/tcp, :::3306->3306/tcp, 33060/tcp
edd5b763bcd    jupyter/base-notebook              0.0.0.0:8888->8888/tcp, :::8888->8888/tcp
daniel@magi:~$ 
```

Instalamos mysql-connector en el contenedor de Jupyter

```
daniel@magi:~$ docker exec -it jupyter /bin/bash
(base) jovyan@aedd5b763bcd:~$ pip install mysql-connector-python
Collecting mysql-connector-python
  Downloading mysql_connector_python-8.0.27-1commercial-cp39-cp39-manylinux1_x86_64.whl (37.5 MB)
    |████████████████████| 37.5 MB 336 kB/s
Collecting protobuf<=3.0.0
  Downloading protobuf-3.19.0-cp39-cp39-manylinux2014_x86_64.whl (1.1 MB)
    |████████████████████| 1.1 MB 3.8 MB/s
Installing collected packages: protobuf, mysql-connector-python
Successfully installed mysql-connector-python-8.0.27 protobuf-3.19.0
(base) jovyan@aedd5b763bcd:~$
```

Se confirma la IP del contenedor de MySQL con el comando **docker inspect my_test_network**

```
{
  "Name": "jupyter",
  "EndpointID": "0a56ec58a233fb6a3783165b380ff9",
  "IPAddress": "172.18.0.2/16",
  "IPv6Address": ""
}
```



Probamos la conexión desde el contenedor de Jupyter hacia MySQL

```
In [1]: from sqlalchemy import create_engine
        source = create_engine('mysql+mysqlconnector://test:test123@172.18.0.3/test')

In [2]: pip install pandas
Collecting pandas
  Downloading pandas-1.3.4-cp39-cp39-manylinux2014_x86_64.whl (11.5 MB)
    |████████████████████| 11.5 MB 3.7 MB/s
Requirement already satisfied: python-dateutil>=2.7.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2.8.2)
Collecting numpy>=1.17.3
  Downloading numpy-1.21.3-cp39-cp39-manylinux2010_x86_64.whl (15.7 MB)
    |████████████████████| 15.7 MB 2.5 MB/s
Requirement already satisfied: pytz>=2017.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2021.3)
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.9/site-packages (from python-dateutil>=2.7.3->pandas) (1.16.0)
Installing collected packages: numpy, pandas
Successfully installed numpy-1.21.3 pandas-1.3.4
Note: you may need to restart the kernel to use updated packages.

In [3]: import pandas as pd
        pd.read_sql('select now()', con=source)

Out[3]:
```

	now()
0	2021-10-26 05:38:12

Docker Compose

Definimos el archivo docker-compose.yml para el contenedor de Jupyter Notebooks y MySQL.

```
docker-compose.yml
1  version: '3.7'
2
3  services:
4    db:
5      image: mysql:5.7.35
6      volumes:
7        - db_data:/var/lib/mysql
8      restart: always
9      ports:
10       - 3306:3306
11      environment:
12        MYSQL_ROOT_PASSWORD: test123
13        MYSQL_DATABASE: test
14        MYSQL_USER: test
15        MYSQL_PASSWORD: test123
16    jupyter:
17      image: jupyter/base-notebook
18      ports:
19        - 8888:8888
20  volumes:
21    db_data:
22
```

Iniciamos los contenedores con el comando **docker-compose up**

```
daniel@magi:~$ docker-compose up
Creating network "docker_default" with the default driver
Creating volume "docker_db_data" with default driver
Creating docker_db_1 ... done
Creating docker_jupyter_1 ... done
Attaching to docker_jupyter_1, docker_db_1
db_1 | 2021-10-26 05:58:39+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 start
jupyter_1 | WARN: Jupyter Notebook deprecation notice https://github.com/jupyter/docker-stacks#jupyter-notebook-depr
jupyter_1 | Executing the command: jupyter notebook
db_1 | 2021-10-26 05:58:40+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
db_1 | 2021-10-26 05:58:40+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 start
db_1 | 2021-10-26 05:58:40+00:00 [Note] [Entrypoint]: Initializing database files
db_1 | 2021-10-26T05:58:40.094200Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use
documentation for more details).
db_1 | 2021-10-26T05:58:40.289658Z 0 [Warning] InnoDB: New log files created, LSN=45790
jupyter_1 | [I 05:58:40.309 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/
db_1 | 2021-10-26T05:58:40.327936Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
db_1 | 2021-10-26T05:58:40.383545Z 0 [Warning] No existing UUID has been found, so we assume that this is the f
ng a new UUID: c4b7adee-3621-11ec-b409-0242ac130002.
db_1 | 2021-10-26T05:58:40.384403Z 0 [Warning] Gtid table is not ready to be used. Table 'mysql.gtid_executed'
db_1 | 2021-10-26T05:58:40.724426Z 0 [Warning] A deprecated TLS version TLSv1 is enabled. Please use TLSv1.2 or
db_1 | 2021-10-26T05:58:40.724439Z 0 [Warning] A deprecated TLS version TLSv1.1 is enabled. Please use TLSv1.2
db_1 | 2021-10-26T05:58:40.724879Z 0 [Warning] CA certificate ca.pem is self signed.
db_1 | 2021-10-26T05:58:40.839705Z 1 [Warning] root@localhost is created with an empty password ! Please consid
```

Validamos la conexión desde el contenedor de Jupyter Notebook hacia MySQL Server

```
In [1]: !pip install mysql-connector-python
!pip install pandas
```

```
Collecting mysql-connector-python
  Downloading mysql_connector_python-8.0.27-1commercial-cp39-cp39-manylinux1_x86_64.whl (37.5 MB)
    |████████████████████████████████████████| 37.5 MB 2.1 MB/s
Collecting protobuf<=3.0.0
  Downloading protobuf-3.19.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (1.1 MB)
    |████████████████████████████████████████| 1.1 MB 3.8 MB/s
Installing collected packages: protobuf, mysql-connector-python
Successfully installed mysql-connector-python-8.0.27 protobuf-3.19.0
Collecting pandas
  Downloading pandas-1.3.4-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.5 MB)
    |████████████████████████████████████████| 11.5 MB 717 kB/s
Collecting numpy>=1.17.3
  Downloading numpy-1.21.3-cp39-cp39-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (15.7 MB)
    |████████████████████████████████████████| 15.7 MB 3.8 MB/s
Requirement already satisfied: python-dateutil>=2.7.3 in /opt/conda/lib/python3.9/site-packages (from pandas)
8.2)
Requirement already satisfied: pytz>=2017.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2021.3)
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.9/site-packages (from python-dateutil>=2.7.3
ndas) (1.16.0)
Installing collected packages: numpy, pandas
Successfully installed numpy-1.21.3 pandas-1.3.4
```

```
In [2]: from sqlalchemy import create_engine

source = create_engine('mysql+mysqlconnector://test:test123@db/test')
```

```
In [5]: import pandas as pd

pd.read_sql('select now()', con=source)
```

```
Out[5]:
```

	now()
0	2021-10-26 06:17:24