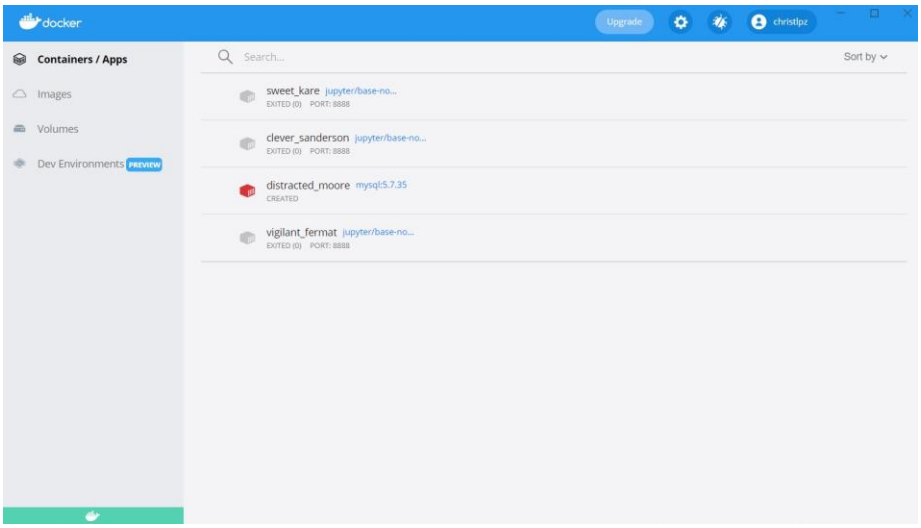
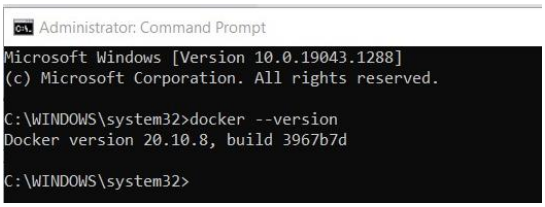
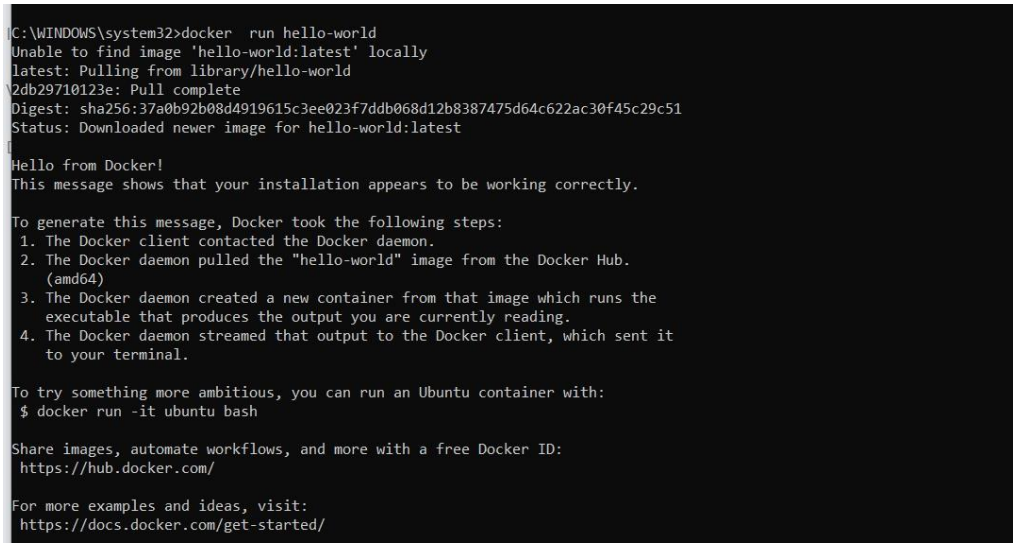
Docker

Evidencia de instalación de Docker





-Ejecución de comando **docker run hello-world**



-Ejecución de comando **docker pull busybox**
El comando Docker pull se utiliza para descarga el contenedor

```
C:\WINDOWS\system32>docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
24fb2886d6f6: Pull complete
Digest: sha256:f7ca5a32c10d51aeda3b4d01c61c6061f497893d7f6628b92f822f7117182a57
Status: Downloaded newer image for busybox:latest
docker.io/library/busybox:latest
```

-Ejecución de comando **docker images**

```
C:\WINDOWS\system32>docker images
REPOSITORY              TAG       IMAGE ID       CREATED       SIZE
mysql                   5.7.35    8a8a506ccfdc   2 weeks ago   448MB
jupyter/base-notebook   latest    f14b646c836f   2 weeks ago   668MB
hello-world             latest    feb5d9fea6a5   4 weeks ago   13.3kB
busybox                 latest    16ea53ea7c65   6 weeks ago   1.24MB
```

-Ejecución de comando **docker ps**
Comando para validar si existe un contenedor corriendo

```
C:\WINDOWS\system32>docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
```

-Ejecución de comando **docker ps -a**
Comando para validar todos los contenedores que se han ejecutado.

```
C:\WINDOWS\system32>docker ps -a
CONTAINER ID   IMAGE                   COMMAND                  CREATED          STATUS                      PORTS     NAMES
80a64fd80e7a   hello-world             "/hello"                 26 minutes ago   Exited (0) 26 minutes ago             confident_zhukovsky
18559e63348f   jupyter/base-notebook   "tini -g -- start-no…"   12 days ago      Exited (0) 12 days ago                sweet_kare
5cffda8f4d83   jupyter/base-notebook   "tini -g -- start-no…"   12 days ago      Exited (0) 12 days ago                clever_sanderson
fe59e9ca0bfd   mysql:5.7.35            "docker-entrypoint.s…"   13 days ago      Created                               distracted_moore
fc00658c1ade   jupyter/base-notebook   "tini -g -- start-no…"   13 days ago      Exited (0) 13 days ago                vigilant_fermat
```

-Ejecución de comando **docker rm fc00658c1ade**
Comando rm + el nombre id / nombre del contenedor para borrar el contenedor.

```
C:\WINDOWS\system32>docker ps -a
CONTAINER ID   IMAGE                   COMMAND                  CREATED          STATUS                      PORTS     NAMES
93645994978a   busybox                 "sh"                     4 minutes ago    Exited (0) 2 minutes ago              frosty_dewdney
80a64fd80e7a   hello-world             "/hello"                 38 minutes ago   Exited (0) 37 minutes ago             confident_zhukovsky
18559e63348f   jupyter/base-notebook   "tini -g -- start-no…"   12 days ago      Exited (0) 12 days ago                sweet_kare
5cffda8f4d83   jupyter/base-notebook   "tini -g -- start-no…"   13 days ago      Exited (0) 12 days ago                clever_sanderson
fe59e9ca0bfd   mysql:5.7.35            "docker-entrypoint.s…"   13 days ago      Created                               distracted_moore
fc00658c1ade   jupyter/base-notebook   "tini -g -- start-no…"   13 days ago      Exited (0) 13 days ago                vigilant_fermat

C:\WINDOWS\system32>docker  rm fc00658c1ade
fc00658c1ade

C:\WINDOWS\system32>docker  ps -a
CONTAINER ID   IMAGE                   COMMAND                  CREATED          STATUS                      PORTS     NAMES
93645994978a   busybox                 "sh"                     4 minutes ago    Exited (0) 2 minutes ago              frosty_dewdney
80a64fd80e7a   hello-world             "/hello"                 38 minutes ago   Exited (0) 38 minutes ago             confident_zhukovsky
18559e63348f   jupyter/base-notebook   "tini -g -- start-no…"   12 days ago      Exited (0) 12 days ago                sweet_kare
5cffda8f4d83   jupyter/base-notebook   "tini -g -- start-no…"   13 days ago      Exited (0) 12 days ago                clever_sanderson
fe59e9ca0bfd   mysql:5.7.35            "docker-entrypoint.s…"   13 days ago      Created                               distracted_moore

C:\WINDOWS\system32>
```

-Ejecución de comando **docker prume**
Permite la eliminación de todos los contendores

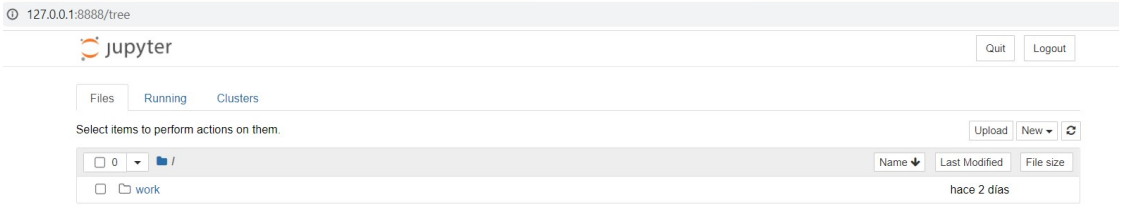
Ejercicio

-Ejecución de comando **Docker pull jupyter/base-notebook**
Comando para decarga jupyter notebook

```
C:\Users\chris>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
```

-Ejecución de comando **docker run -p 8888:8888 jupyter/base-notebook**
Comando para mapear el puerto a utilizar ya que jupyter es un aplicación web.

```
C:\Users\chris>docker run -p 8888:8888 jupyter/base-notebook
WARN: Jupyter Notebook deprecation notice https://github.com/jupyter/docker-stacks#jupyter-notebook-deprecation-notice.
Executing the command: jupyter notebook
[I 02:41:29.693 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook
_cookie_secret
[W 2021-10-27 02:41:30.180 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 2021-10-27 02:41:30.180 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerA
pp. Be sure to update your config before our next release.
[W 2021-10-27 02:41:30.180 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerA
pp. Be sure to update your config before our next release.
[W 2021-10-27 02:41:30.180 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerA
pp. Be sure to update your config before our next release.
[I 2021-10-27 02:41:30.187 LabApp] JupyterLab extension loaded from /opt/conda/lib/python3.9/site-packages/jupyterlab
[I 2021-10-27 02:41:30.187 LabApp] JupyterLab application directory is /opt/conda/share/jupyter/lab
[I 02:41:30.192 NotebookApp] Serving notebooks from local directory: /home/jovyan
[I 02:41:30.192 NotebookApp] Jupyter Notebook 6.4.5 is running at:
[I 02:41:30.192 NotebookApp] http://e0b194fb1397:8888/?token=b3b426f242212f1a5855d393393822c2f43eeba300eac993
[I 02:41:30.192 NotebookApp]  or http://127.0.0.1:8888/?token=b3b426f242212f1a5855d393393822c2f43eeba300eac993
[I 02:41:30.192 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 02:41:30.196 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///home/jovyan/.local/share/jupyter/runtime/nbserver-7-open.html
    Or copy and paste one of these URLs:
        http://e0b194fb1397:8888/?token=b3b426f242212f1a5855d393393822c2f43eeba300eac993
     or http://127.0.0.1:8888/?token=b3b426f242212f1a5855d393393822c2f43eeba300eac993
```



Al ejecutar nuevamente el comando podemos ver que nos da un error debido a que el puerto ya se encuentra ocupado .

```
C:\WINDOWS\system32>docker run -p 8888:8888 jupyter/base-notebook
docker: Error response from daemon: driver failed programming external connectivity on endpoint keen_buck (775ea49696ec0f24f24f8853a7e2cc52309d38c51bac2ebe444223ae3b2cde25):
Bind for 0.0.0.0:8888 failed: port is already allocated.
```

Para corregir el inconveniente cambiamos de puerto del lado de nuestra máquina.
docker run -p 8889:8888 jupyter/base-notebook

y si luego ejecutamos y validamos los contenedores levantados podemos ver que uno esta al puerto 8888 y otro al 8889

```
C:\Users\chris>docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED          STATUS          PORTS                    NAMES
cff06d0f4a6c   jupyter/base-notebook   "tini -g -- start-no…"   41 seconds ago   Up 40 seconds   0.0.0.0:8889->8888/tcp   keen_ishizaka
e0b194fb1397   jupyter/base-notebook   "tini -g -- start-no…"   16 minutes ago   Up 16 minutes   0.0.0.0:8888->8888/tcp   nervous_hypatia
```

-Ejecución de comando **docker network créate –driver bridge my_test**
La red me genera un código de confirmación

```
C:\WINDOWS\system32>docker  network create  --driver bridge my_test
dff7cdb14d48f47fba33267f7481fd6b0ce461e40d7fbf4e4445bf50be61124a
```

-Ejecución de comando **docker run -it --network my_test -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_PASSWORD=test123" mysql:5.7.35**

```
C:\WINDOWS\system32>docker run  -it --network my_test -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_PASSWORD=test123" mysql:5.7.35
2021-10-27 03:40:16+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-27 03:40:16+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2021-10-27 03:40:16+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-27 03:40:16+00:00 [Warn] [Entrypoint]: MYSQL_PASSWORD specified, but missing MYSQL_USER; MYSQL_PASSWORD will be ignored
2021-10-27 03:40:16+00:00 [Note] [Entrypoint]: Initializing database files
2021-10-27T03:40:16.386718Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --explicit_defaults_for_timestamp server option (see d
 more details).
2021-10-27T03:40:16.532309Z 0 [Warning] InnoDB: New log files created, LSN=45790
2021-10-27T03:40:16.563680Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
2021-10-27T03:40:16.572007Z 0 [Warning] No existing UUID has been found, so we assume that this is the first time that this server has been started. Generatin
ac5772-36d7-11ec-9b66-0242ac120002.
2021-10-27T03:40:16.575039Z 0 [Warning] Gtid table is not ready to be used. Table 'mysql.gtid_executed' cannot be opened.
2021-10-27T03:40:17.466921Z 0 [Warning] A deprecated TLS version TLSv1 is enabled. Please use TLSv1.2 or higher.
2021-10-27T03:40:17.466954Z 0 [Warning] A deprecated TLS version TLSv1.1 is enabled. Please use TLSv1.2 or higher.
2021-10-27T03:40:17.467335Z 0 [Warning] CA certificate ca.pem is self signed.
2021-10-27T03:40:17.608623Z 1 [Warning] root@localhost is created with an empty password ! Please consider switching off the --initialize-insecure option.
2021-10-27 03:40:20+00:00 [Note] [Entrypoint]: Database files initialized
2021-10-27 03:40:20+00:00 [Note] [Entrypoint]: Starting temporary server
2021-10-27 03:40:20+00:00 [Note] [Entrypoint]: Waiting for server startup
```

Si vemos el servicio levantado notamos que no mapeamos el puerto

```
C:\WINDOWS\system32>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED         STATUS         PORTS                  NAMES
ae7213aede6f   mysql:5.7.35   "docker-entrypoint.s…"   2 minutes ago   Up 2 minutes   3306/tcp, 33060/tcp   brave_banach
```

Por lo que bajamos el servicio y agregamos el puerto

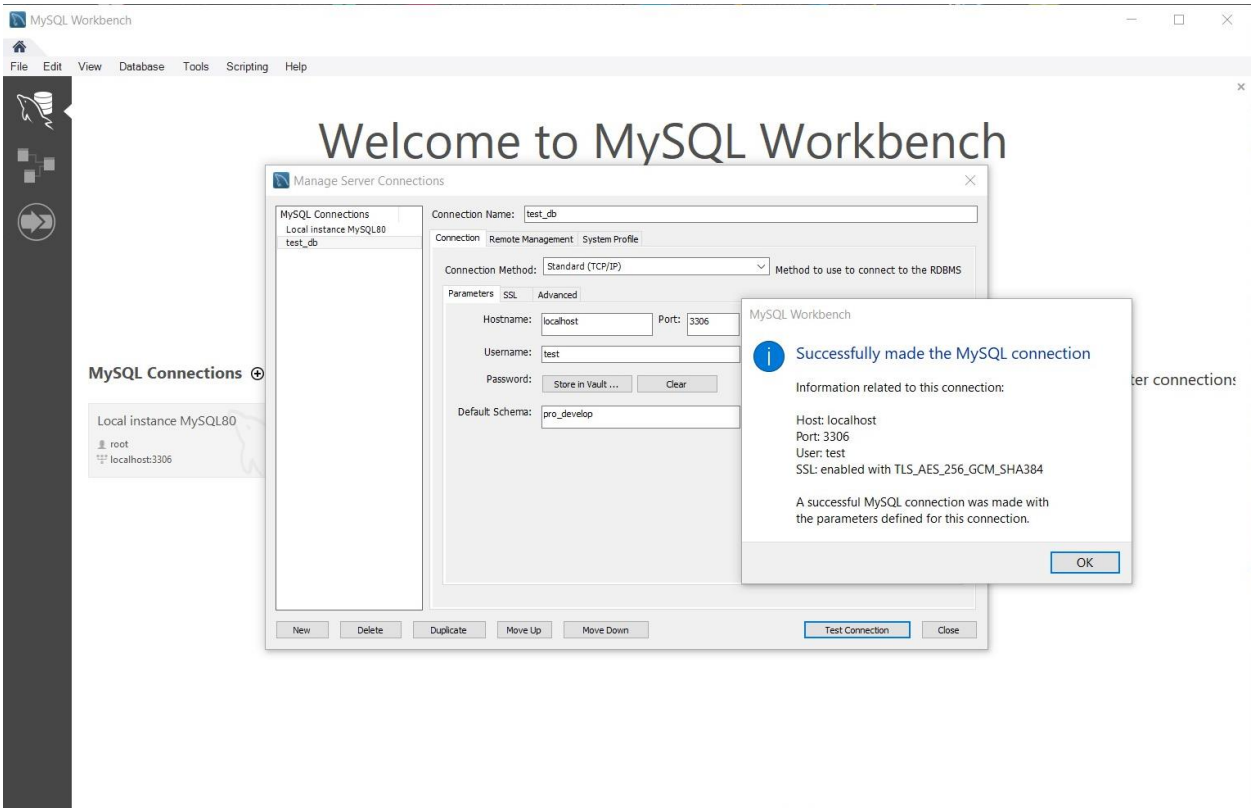
```
C:\WINDOWS\system32>docker stop  brave_banach
brave_banach
```

Ahora se utiliza el puerto 3307 debido a que el puerto 3306 que no pareciera que ya está siendo utilizado (como se cuenta con mysql ejecutado)

docker run -it --network my_test -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MY_USER=test" -e "MYSQL_PASSWORD=test123" -p 3307:3306 mysql:5.7.35

```
C:\WINDOWS\system32>docker run  -it --network my_test -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_PASSWORD=test123"  -p 3306:3306   mysql:5.7.35
docker: Error response from daemon: Ports are not available: listen tcp 0.0.0.0:3306: bind: Only one usage of each socket address (protocol/network address/port) is normally
permitted.

C:\WINDOWS\system32>docker run  -it --network my_test -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_PASSWORD=test123"  -p 3307:3306   mysql:5.7.35
2021-10-27 03:48:12+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-27 03:48:12+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2021-10-27 03:48:12+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-27 03:48:12+00:00 [Warn] [Entrypoint]: MYSQL_PASSWORD specified, but missing MYSQL_USER; MYSQL_PASSWORD will be ignored
2021-10-27 03:48:12+00:00 [Note] [Entrypoint]: Initializing database files
2021-10-27T03:48:12.507692Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --explicit_defaults_for_timestamp server option (see documentation for
 more details).
2021-10-27T03:48:12.627749Z 0 [Warning] InnoDB: New log files created, LSN=45790
2021-10-27T03:48:12.657422Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
2021-10-27T03:48:12.664205Z 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: b5
723f43-36d8-11ec-b172-0242ac120002.
2021-10-27T03:48:12.666193Z 0 [Warning] Gtid table is not ready to be used. Table 'mysql.gtid_executed' cannot be opened.
2021-10-27T03:48:13.192684Z 0 [Warning] A deprecated TLS version TLSv1 is enabled. Please use TLSv1.2 or higher.
2021-10-27T03:48:13.192741Z 0 [Warning] A deprecated TLS version TLSv1.1 is enabled. Please use TLSv1.2 or higher.
2021-10-27T03:48:13.193142Z 0 [Warning] CA certificate ca.pem is self signed.
```

Validación de conexión con en MySQL



Ahora procedemos a abrir jupyter pero en la misma red **docker run -p 8888:8888 --network my_test jupyter/base-notebook**

```
C:\WINDOWS\system32>docker run -p 8888:8888 --network my_test jupyter/base-notebook
WARN: Jupyter Notebook deprecation notice https://github.com/jupyter/docker-stacks#jupyter-notebook-deprecation-notice.
Executing the command: jupyter notebook
[I 05:54:31.776 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook_cookie_secret
[W 2021-10-27 05:54:32.533 LabApp] 'ip' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config befo
re our next release.
[W 2021-10-27 05:54:32.533 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config be
fore our next release.
[W 2021-10-27 05:54:32.533 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config be
fore our next release.
[W 2021-10-27 05:54:32.533 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config be
fore our next release.
[I 2021-10-27 05:54:32.544 LabApp] JupyterLab extension loaded from /opt/conda/lib/python3.9/site-packages/jupyterlab
[I 2021-10-27 05:54:32.544 LabApp] JupyterLab application directory is /opt/conda/share/jupyter/lab
[I 05:54:32.550 NotebookApp] Serving notebooks from local directory: /home/jovyan
[I 05:54:32.550 NotebookApp] Jupyter Notebook 6.4.5 is running at:
[I 05:54:32.550 NotebookApp] http://685e6da0fc5a:8888/?token=fe2f577aa7e06cde552d276dc89cd83736943d36a0a31401
[I 05:54:32.550 NotebookApp]  or http://127.0.0.1:8888/?token=fe2f577aa7e06cde552d276dc89cd83736943d36a0a31401
[I 05:54:32.550 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
```

Y vemos que los 2 servicios estén arriba

```
C:\WINDOWS\system32>docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED          STATUS          PORTS                               NAMES
685e6da0fc5a   jupyter/base-notebook  "tini -g -- start-no…"   22 seconds ago   Up 21 seconds   0.0.0.0:8888->8888/tcp              ecstatic_shtern
b5add541d453   mysql:5.7.35           "docker-entrypoint.s…"   37 minutes ago   Up 37 minutes   33060/tcp, 0.0.0.0:33306->3306/tcp  reverent_goldwasser
```

Ahora se debe de instalar todo lo necesario en Python por lo que se debe de acceder al contenedor con el siguiente comando **docker exec -it ecstatic_shtern Bash**

```
C:\WINDOWS\system32>docker exec -it  ecstatic_shtern bash
(base) jovyan@685e6da0fc5a:~$ python --version
Python 3.9.7
```

Ahora se procede a instalar mysql en Python , así como todos la sibreria necesarias, como pandas, numpy, etc

pip install mysql-connector-python

pip install pandas

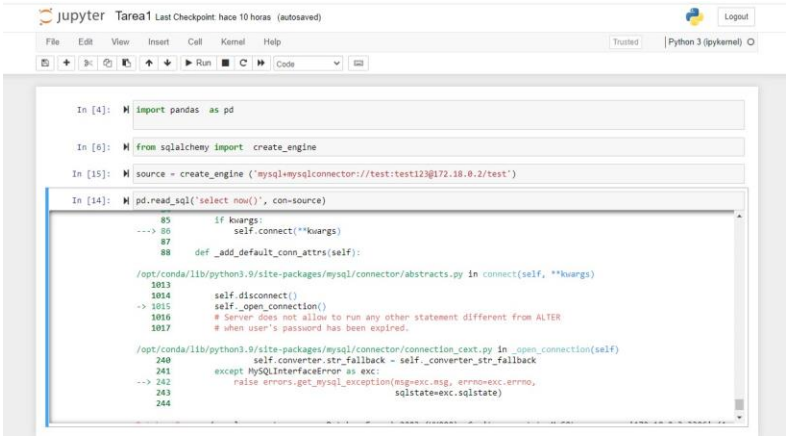
```
(base) jovyan@685e6da0fc5a:~$ pip install mysql-connector-python
Collecting mysql-connector-python
  Downloading mysql_connector_python-8.0.27-1commercial-cp39-cp39-manylinux1_x86_64.whl (37.5 MB)
     |████████████████████████████████| 37.5 MB 175 kB/s
Collecting protobuf>=3.0.0
  Downloading protobuf-3.19.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (1.1 MB)
     |████████████████████████████████| 1.1 MB 905 kB/s
Installing collected packages: protobuf, mysql-connector-python
Successfully installed mysql-connector-python-8.0.27 protobuf-3.19.0
(base) jovyan@685e6da0fc5a:~$ pyp install pandas
bash: pyp: command not found
(base) jovyan@685e6da0fc5a:~$ pip install pandas
Collecting pandas
  Downloading pandas-1.3.4-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.5 MB)
     |████████████████████████████████| 11.5 MB 1.5 MB/s
Requirement already satisfied: pytz>=2017.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2021.3)
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-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (15.7 MB)
     |████████████████████████████████| 15.7 MB 1.0 MB/s
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
```

Ahora que se hará una prueba de conexión desde jupyter a mysql necesitamos saber el host asignado para ello ejecutamos el siguiente comando, considerando el nombre correspondiente

docker network inspect my_test

```
C:\WINDOWS\system32>docker network inspect  my_test
[
    {
        "Name": "my_test",
        "Id": "dff7cdb14d48f47fba33267f7481fd6b0ce461e40d7fbf4e4445bf50be61124a",
        "Created": "2021-10-27T03:33:01.6005446Z",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": {},
            "Config": [
                {
                    "Subnet": "172.18.0.0/16",
                    "Gateway": "172.18.0.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Containers": {
            "685e6da0fc5ac98b926ec65ff85b42ca4619c24903ef3ad25636df8dc3b6fea5": {
                "Name": "ecstatic_shtern",
                "EndpointID": "e690385f7f4d96b4567307c289e5ff1f50398d84ef7e9207f1456cd426118648",
                "MacAddress": "02:42:ac:12:00:03",
                "IPv4Address": "172.18.0.3/16",
                "IPv6Address": ""
            },
            "b5add541d453ef48b7b8898da7810830bf6373b4fc9d3b9d29bb8e0fb66a6eed": {
                "Name": "reverent_goldwasser",
                "EndpointID": "caaadc9c73207261092bde5e58002fb6f0d3e25766012f5ba39a4ad8e2b49c53",
                "MacAddress": "02:42:ac:12:00:02",
                "IPv4Address": "172.18.0.2/16",
                "IPv6Address": ""
            }
```

Al realizar la prueba de conexión en mysql se tuvo inconvenientes, es posible por el puerto asignado considerando que el puerto de mysql no coincide con el asigando en Docker ya que genera colisión.



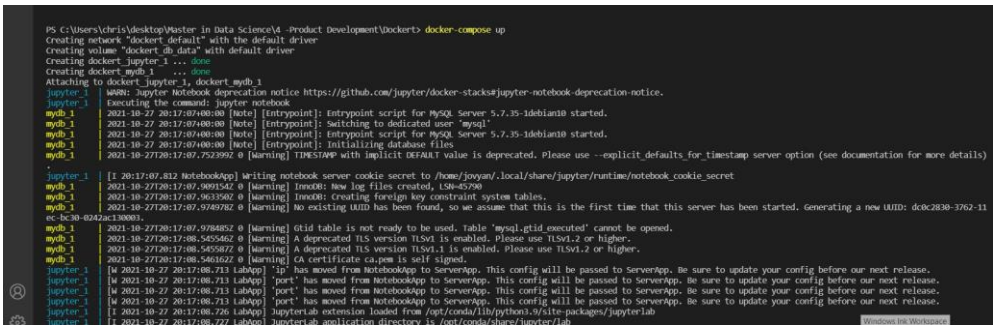
-Opción de configuración Docker Compose

```
C:\WINDOWS\system32>docker - compose --version
Docker version 20.10.8, build 3967b7d
```

Configuracion

```yaml
version: '3.7'

services:

  mydb:
    image: mysql:5.7.35
    volumes:
      - db_data:/var/lib/mysql
    restart: always
    ports:
      - 3306:3306
    environment:
      MYSQL_ROOT_PASSWORD: test123
      MYSQL_DATABASE: test
      MYSQL_USER: test
      MYSQL_PASSWORD: test123

  jupyter:
    image: jupyter/base-notebook
    ports:
      - 8888:8888

volumes:
  db_data:
```

Creación de red



Si se realiza ahora la prueba de la conexión a la base de dato tenemos el siguiente resultado