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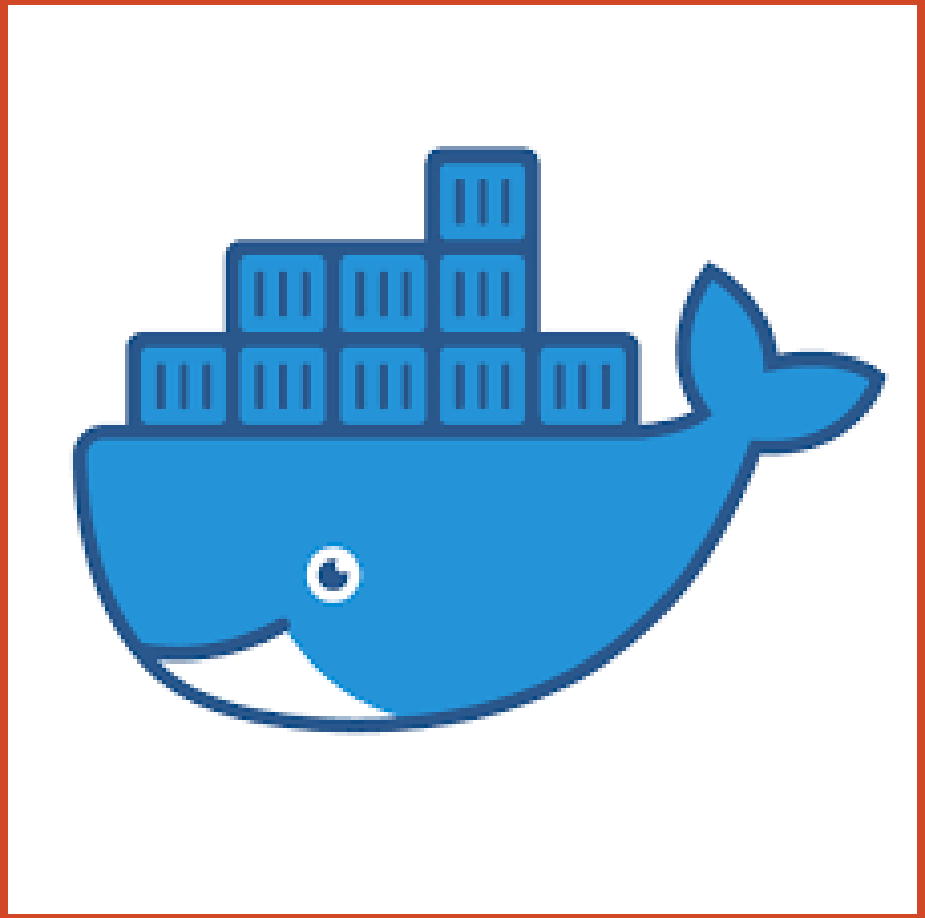
ICF233 Ingeniería de Software II

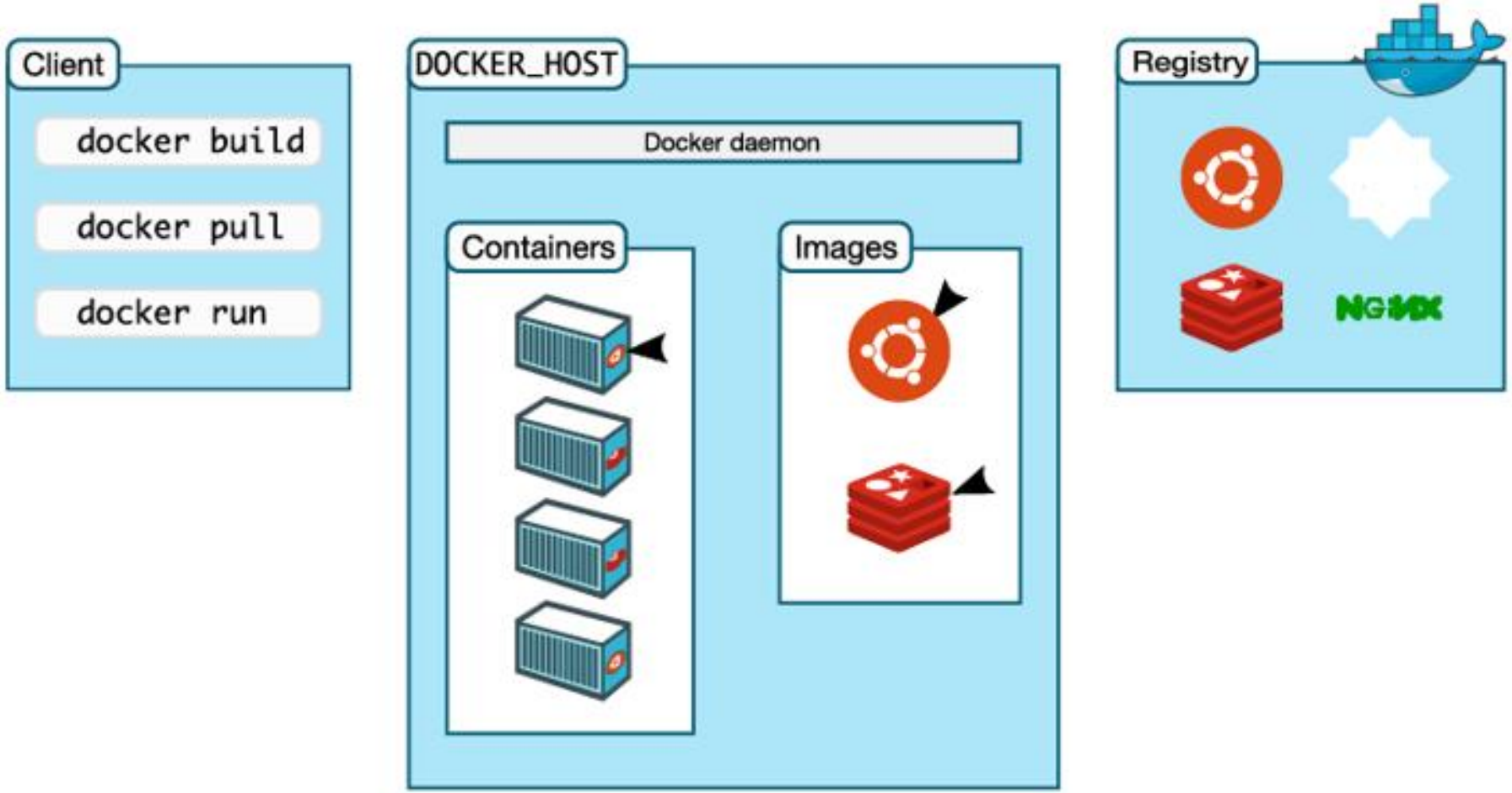
Segundo Semestre 2020

Docker



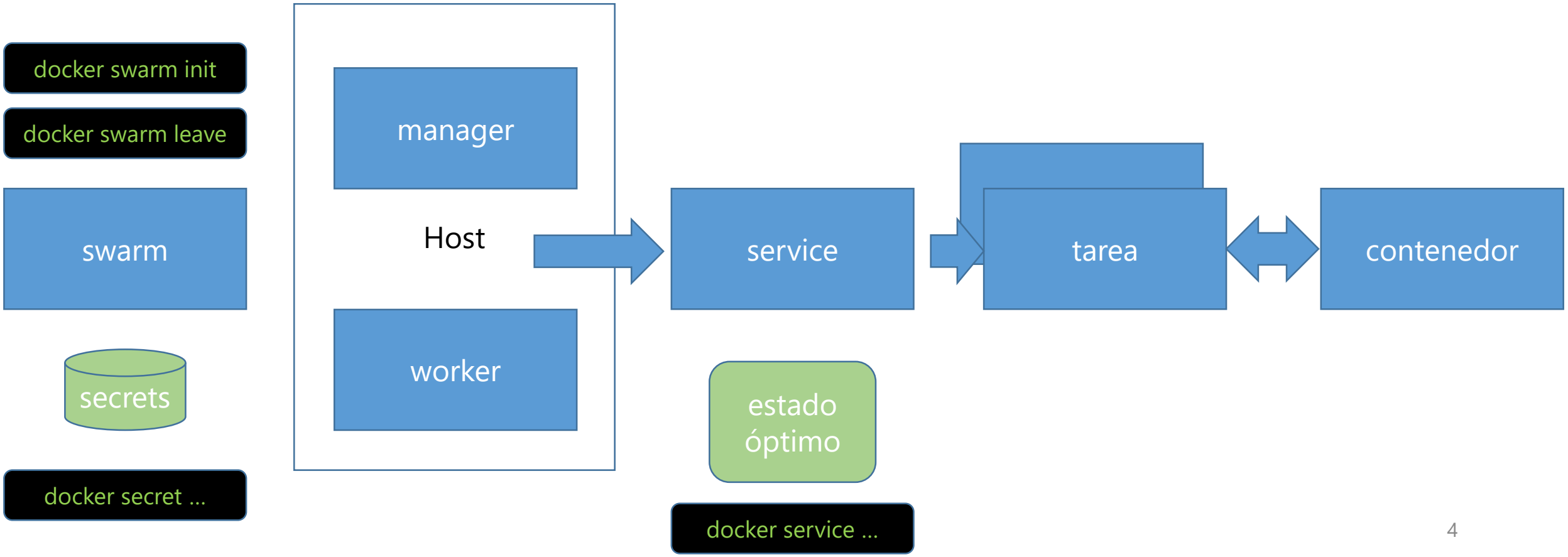
https://hub.docker.com/editions/community/docker-ce-desktop-windows/

¿Qué es docker?



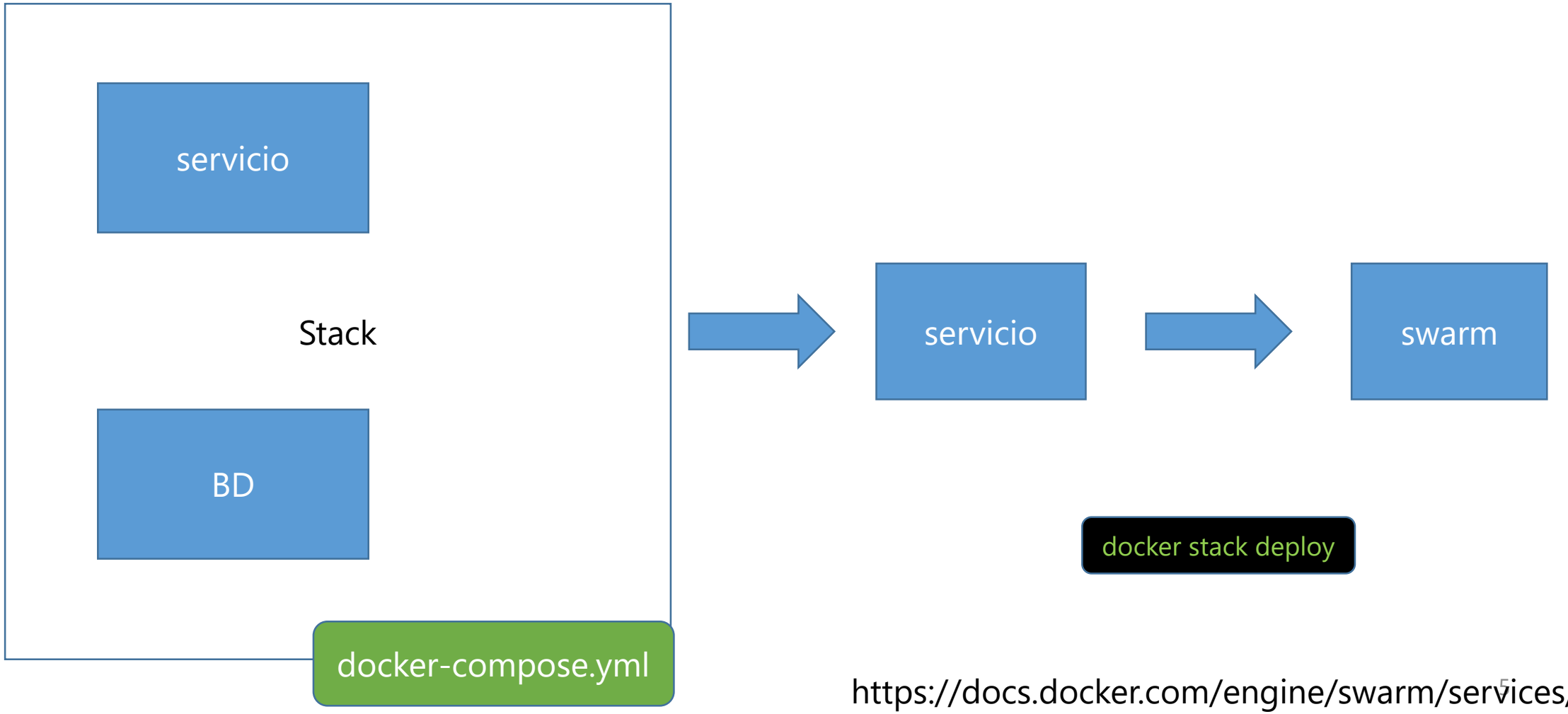
https://docs.docker.com/engine/docker-overview/

Docker: conceptos relevantes



https://docs.docker.com/engine/context/ecs-integration/

Docker conceptos relevantes

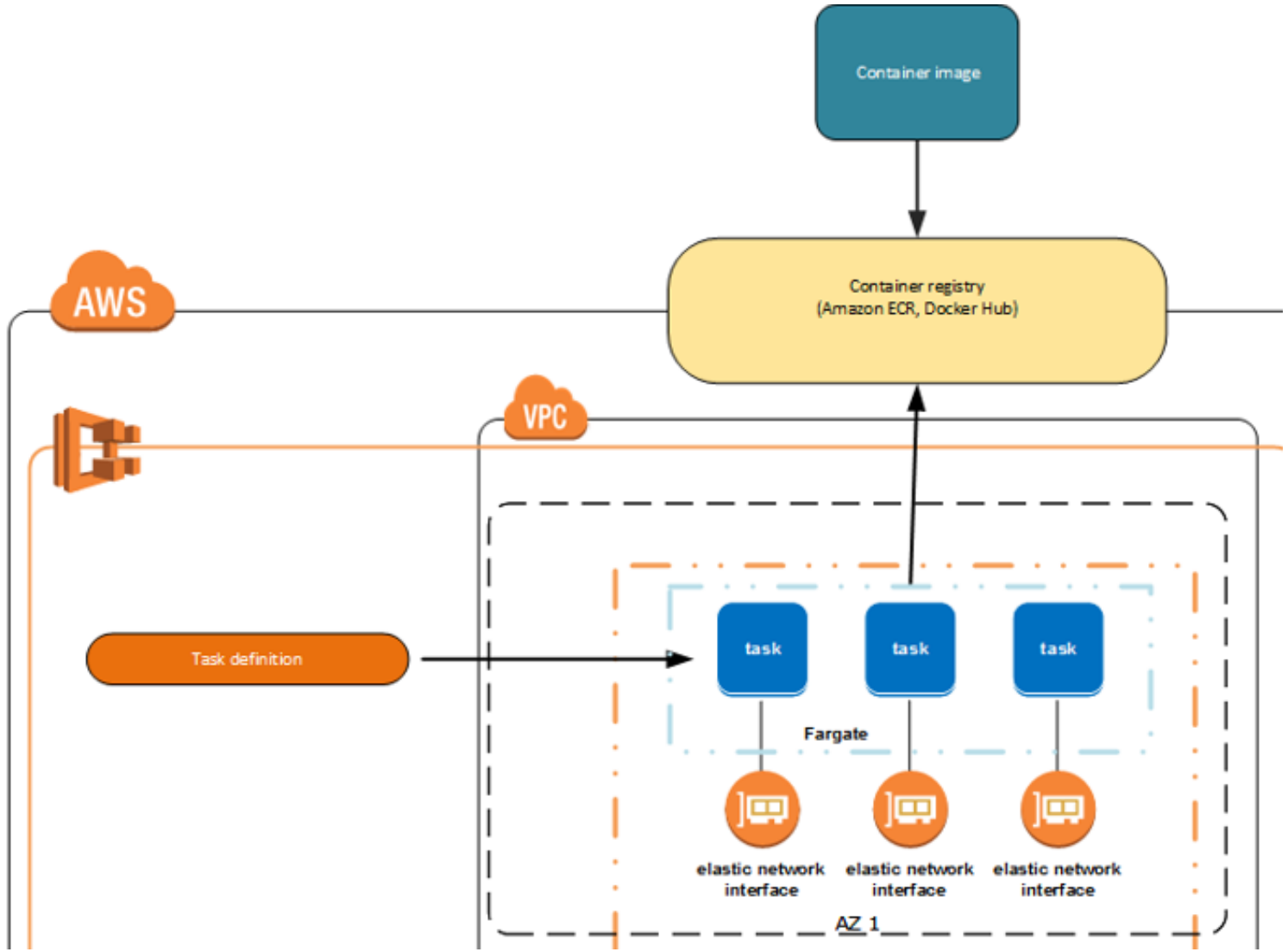


https://docs.docker.com/engine/swarm/services/

Amazon ECR/ECS y aws cli

https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2-windows.html

aws --version



Obtener imagen base

```
C:\Users\pablo>docker run -it ubuntu
root@0eb0304b8724:/# ls -l
total 64
drwxr-xr-x   2 root root 4096 Mar  7 21:01 bin
drwxr-xr-x   2 root root 4096 Apr 24  2018 boot
drwxr-xr-x   5 root root  360 May  9 04:38 dev
drwxr-xr-x   1 root root 4096 May  9 04:38 etc
drwxr-xr-x   2 root root 4096 Apr 24  2018 home
drwxr-xr-x   8 root root 4096 May 23  2017 lib
drwxr-xr-x   2 root root 4096 Mar  7 21:00 lib64
drwxr-xr-x   2 root root 4096 Mar  7 21:00 media
drwxr-xr-x   2 root root 4096 Mar  7 21:00 mnt
drwxr-xr-x   2 root root 4096 Mar  7 21:00 opt
dr-xr-xr-x 142 root root    0 May  9 04:38 proc
drwx------   2 root root 4096 Mar  7 21:01 root
drwxr-xr-x   1 root root 4096 Mar 12 00:20 run
drwxr-xr-x   1 root root 4096 Mar 12 00:20 sbin
drwxr-xr-x   2 root root 4096 Mar  7 21:00 srv
dr-xr-xr-x  13 root root    0 May  9 04:37 sys
drwxrwxrwt   2 root root 4096 Mar  7 21:01 tmp
drwxr-xr-x   1 root root 4096 Mar  7 21:00 usr
drwxr-xr-x   1 root root 4096 Mar  7 21:01 var
root@0eb0304b8724:/# cat /etc/lsb-release
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=18.04
DISTRIB_CODENAME=bionic
DISTRIB_DESCRIPTION="Ubuntu 18.04.2 LTS"
```

Entramos en modo interactivo
en la imagen
Para salir exit

Listar imágenes

```
C:\Users\pablo>docker images
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
ubuntu                      latest              94e814e2efa8        8 weeks ago         88.9MB
docker4w/nsenter-dockerd    latest              2f1c802f322f        6 months ago        187kB
```

Para borrar una imagen
docker rmi <imagen>
o
docker image rm

Containers en ejecución

```
C:\Users\pablo>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS
          NAMES
```

```
C:\Users\pablo>docker run -it --name "t3" ubuntu
root@11afdd2ad18b:/#
C:\Users\pablo>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS
          NAMES
11afdd2ad18b        ubuntu              "/bin/bash"         18 seconds ago      Up 16 seconds
          t3
```

Para salir del container y dejarlo activo
CTRL P+Q
Para reingresar usar docker attach

```
C:\Users\pablo>docker attach t3
root@11afdd2ad18b:/# ls -l
total 64
drwxr-xr-x   2 root root 4096 Mar  7 21:01 bin
drwxr-xr-x   2 root root 4096 Apr 24  2018 boot
drwxr-xr-x   5 root root  360 Jun  1 12:10 dev
drwxr-xr-x   1 root root 4096 Jun  1 12:10 etc
drwxr-xr-x   2 root root 4096 Apr 24  2018 home
```

Ver contenedores activos

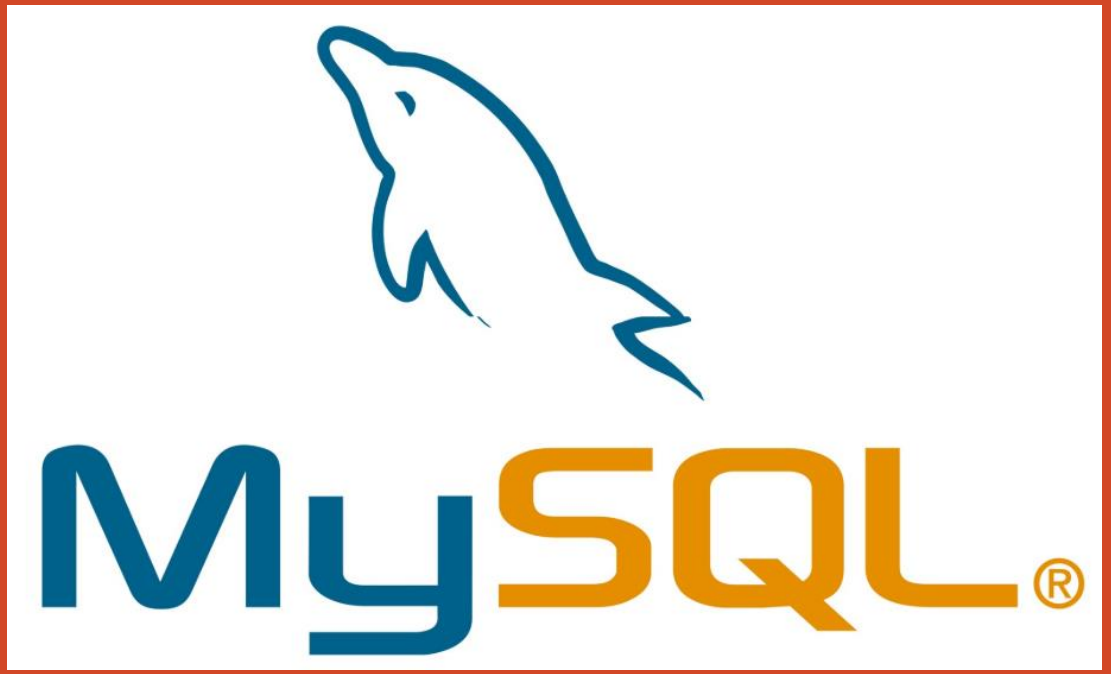
```
C:\Users\pablo>docker container ls -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS                      POR
TS                  NAMES
11afdd2ad18b        ubuntu              "/bin/bash"         About a minute ago   Exited (0) 7 seconds ago
                    t3
```

Para eliminar containers detenidos
docker container prune

```
C:\Users\pablo>docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
11afdd2ad18b5ba5c0512f7e4e2fe8949814825fca1db8a8df700a3adc0ae5b6

Total reclaimed space: 12B
```

MySQL en Docker



Obtenemos la imagen de mysql 5.7
En cada reinicio la base de datos se borra y no hay seguridad

```
C:\Users\pablo>docker run --name dbserver -e MYSQL_ROOT_PASSWORD=Secret.123 -p 3306:3306 -d mysql:5.7
Unable to find image 'mysql:5.7' locally
5.7: Pulling from library/mysql
743f2d6c1f65: Pull complete
3f0c413ee255: Pull complete
aef1ef8f1aac: Pull complete
f9ee573e34cb: Pull complete
3f237e01f153: Pull complete
f9da32e8682a: Pull complete
4b8da52fb357: Pull complete
6f38e9cfd49b: Pull complete
9f4834b3f44f: Pull complete
af631d92fdba: Pull complete
0e771ddab25c: Pull complete
Digest: sha256:196fe3e00d68b2417a8cf13482bdab1fcc2b32cf7c7575d0906c700688b352b4
Status: Downloaded newer image for mysql:5.7
f1fec265a0284e859aa74528e0e4121e0ed855e4373532d282d0d9a31c6cc500
```

```
C:\Users\pablo>docker container ls
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS                               NAMES
f1fec265a028        mysql:5.7           "docker-entrypoint.s…"   36 seconds ago      Up 32 seconds       0.0.0.0:3306->3306/tcp, 33060/tcp   dbser
ver
```

Para entrar en modo interactivo al container

```
C:\Users\pablo>docker exec -it f1fec265a028 bash
root@f1fec265a028:/# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 2
Server version: 5.7.26 MySQL Community Server (GPL)

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owners.

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

mysql>
```

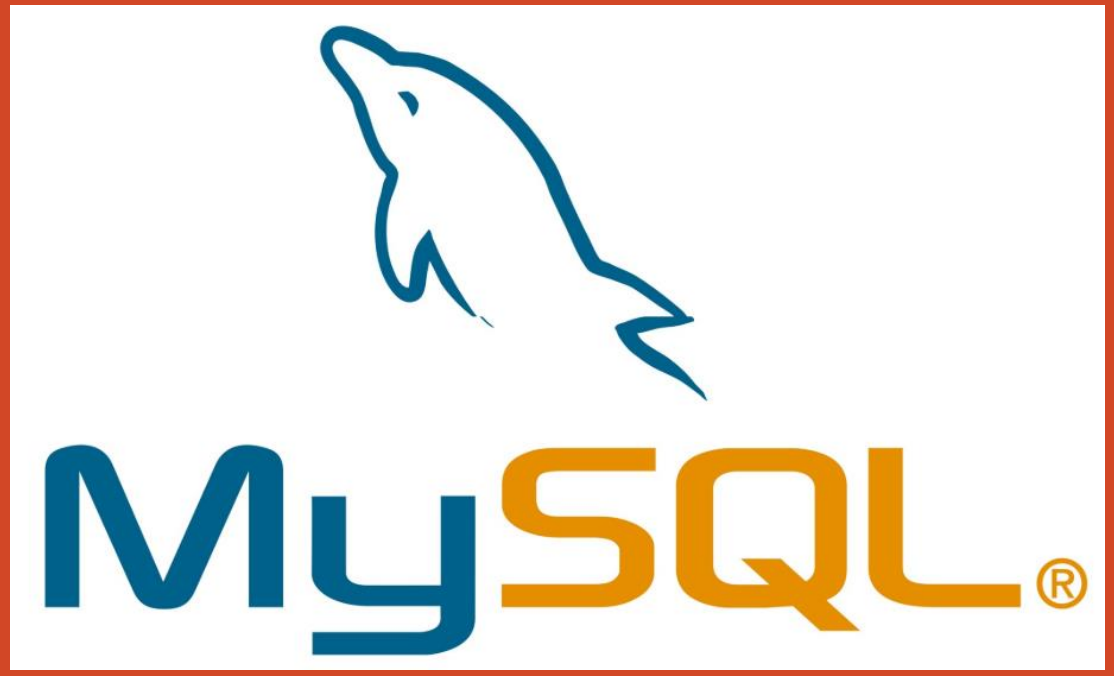

Creando una imagen de MySQL

Primero construiremos manualmente la imagen

Crearemos nuestra propia imagen de mysql usando como base la imagen ubuntu

```
C:\Users\pablo>docker run -it --name mysqlserver ubuntu
root@752ca6d9c74d:/# apt-get update
Get:1 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:2 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [324 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [4168 B]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [486 kB]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [5436 B]
Get:12 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [829 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1215 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [10.8 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [7236 B]
Get:17 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [3902 B]
Get:18 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [2496 B]
Fetched 16.3 MB in 40s (405 kB/s)
Reading package lists... Done
root@752ca6d9c74d:/#
```

Instalamos mysql y nano

```
C:\Users\pablo>docker run -it --name mysqlserver ubuntu
root@752ca6d9c74d:/# apt-get update
Get:1 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:2 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [324 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
```

```
root@752ca6d9c74d:/# apt-get -y install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 15 not upgraded.
Need to get 231 kB of archives.
After this operation, 778 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic/main amd64 nano amd64 2.9.3-2 [231 kB]
Fetched 231 kB in 1s (179 kB/s)
```

Configuramos el servidor

```
root@752ca6d9c74d:/# cd /etc
root@752ca6d9c74d:/etc# cd mysql
root@752ca6d9c74d:/etc/mysql# cd conf.d
root@752ca6d9c74d:/etc/mysql/conf.d# ls
mysql.cnf  mysqldump.cnf
root@752ca6d9c74d:/etc/mysql/conf.d# nano docker.cnf
```

CTRL O
CTRL X
Para grabar y luego salir

Configuramos la seguridad de mysql

```
root@752ca6d9c74d:/etc/mysql/conf.d# nano docker.cnf
root@752ca6d9c74d:/etc/mysql/conf.d# cd
root@752ca6d9c74d:~# usermod -d /var/lib/mysql mysql
root@752ca6d9c74d:~# service mysql start
 * Starting MySQL database server mysqld                                [ OK ]
root@752ca6d9c74d:~# mysql_secure_installation

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.
```

Y a todas las opciones
Nivel STRONG (3)
Escogemos una clave
Ej. Secret.123

Deshabilitamos el acceso anónimo de root

```
root@752ca6d9c74d:~# mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 5.7.26-0ubuntu0.18.04.1 (Ubuntu)

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owners.

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

mysql> alter user "root"@"localhost" identified with mysql_native_password by "Secret.123";
Query OK, 0 rows affected (0.00 sec)

mysql> exit
Bye
```

```
root@752ca6d9c74d:~# mysql
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: NO)
```

Creamos el usuario icf

```
root@752ca6d9c74d:~# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 5.7.26-0ubuntu0.18.04.1 (Ubuntu)

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owners.

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

mysql> create user "icf"@"%" identified by "Secret.123";
Query OK, 0 rows affected (0.00 sec)

mysql> grant all privileges on *.* to "icf"@"%" identified by "Secret.123";
Query OK, 0 rows affected, 1 warning (0.00 sec)

mysql> flush privileges;
Query OK, 0 rows affected (0.00 sec)

mysql> exit
Bye
```

Configuramos el acceso remoto en mysqld.cnf comentando bind-address

CTRL O
CTRL X
Para grabar y luego salir

```
root@752ca6d9c74d: ~
  GNU nano 2.9.3 /etc/mysql/mysql.conf.d/mysqld.cnf

[mysqld_safe]
socket          = /var/run/mysqld/mysqld.sock
nice            = 0

[mysqld]
#
# * Basic Settings
#
user            = mysql
pid-file        = /var/run/mysqld/mysqld.pid
socket          = /var/run/mysqld/mysqld.sock
port            = 3306
basedir         = /usr
datadir         = /var/lib/mysql
tmpdir          = /tmp
lc-messages-dir = /usr/share/mysql
skip-external-locking
#
# Instead of skip-networking the default is now to listen only on
# localhost which is more compatible and is not less secure.
#bind-address = 127.0.0.1 127.0.0.1
#

^G Get Help    ^O Write Out   ^W Where Is    ^K Cut Text    ^J Justify     ^C Cur Pos     M-U Undo
^X Exit        ^R Read File   ^\ Replace     ^U Uncut Text  ^T To Spell    ^_ Go To Line  M-E Redo
```

Reiniciamos el servidor de base de datos, ajustamos las protecciones, lo detenemos y salimos

```
root@752ca6d9c74d:~# nano /etc/mysql/mysql.conf.d/mysqld.cnf
root@752ca6d9c74d:~# service mysql stop
 * Stopping MySQL database server mysqld                                  [ OK ]
root@752ca6d9c74d:~# chown -R mysql:mysql /var/lib/mysql
root@752ca6d9c74d:~# service mysql start
 * Starting MySQL database server mysqld                                  [ OK ]
root@752ca6d9c74d:~# service mysql stop
 * Stopping MySQL database server mysqld                                  [ OK ]
root@752ca6d9c74d:~# exit
exit
```

Hacemos el commit de la versión final de la imagen

```
C:\Users\pablo>docker container ls -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS
 PORTS               NAMES
752ca6d9c74d        ubuntu              "/bin/bash"         29 minutes ago      Exited (0) About a minute ago
                    mysqlserver
```

```
C:\Users\pablo>docker commit 752ca6d9c74d mysql
sha256:b08836e5be6554067e98c25c991ceb1043cdfe32af8c08ecbf7f2209dff2f3ac

C:\Users\pablo>docker image ls
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
mysql                       latest              b08836e5be65        7 seconds ago       444MB
```

```
C:\Users\pablo>docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
752ca6d9c74df797cdf5f9ee9ebe4bfba17ce92c2de15e6a7b2aa32a7614b161

Total reclaimed space: 354.8MB
```

Ahora tenemos nuestro servidor mysql en docker

chown -R mysql:mysql /var/lib/mysql && service mysql start

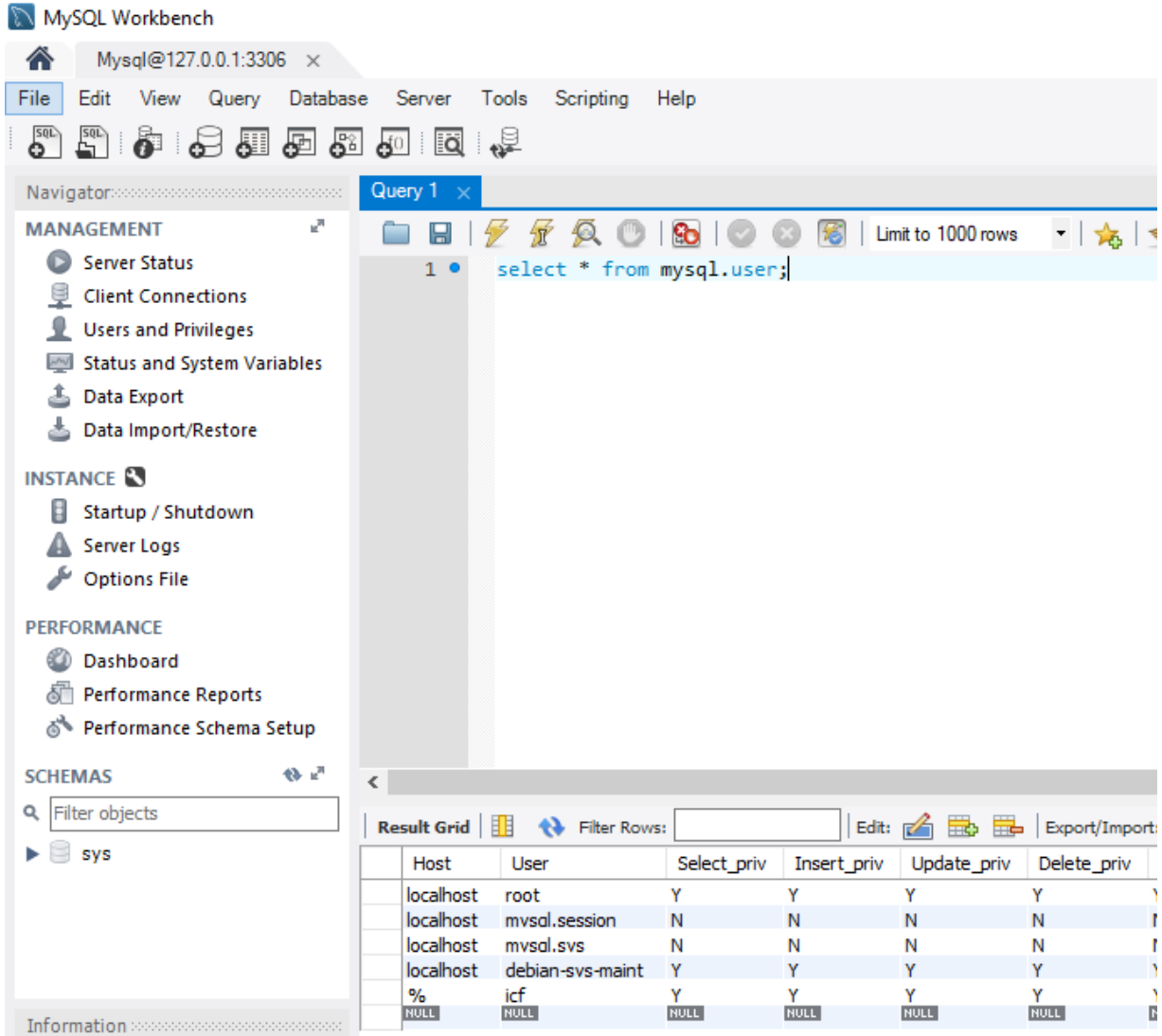
```
C:\Users\pablo>docker run -it --name dbserver -p 3306:3306 mysql
root@4ef238a9face:/# chown -R mysql:mysql /var/lib/mysql && service mysql start

 * Starting MySQL database server mysqld                                [ OK ]
root@4ef238a9face:/#
```

Para salir del contenedor y mantenerlo activo
CTRL P+Q

```
root@4ef238a9face:/#
C:\Users\pablo>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS                    NAMES
4ef238a9face        mysql               "/bin/bash"         2 minutes ago       Up About a minute   0.0.0.0:3306->3306/tcp   dbserver
```

Nos conectamos a nuestro servidor desde el host



Detener, reiniciar y volver a ingresar al contenedor y activar nuevamente el servidor

```
C:\Users\pablo>docker stop 4ef238a9face
4ef238a9face

C:\Users\pablo>docker start 4ef238a9face
4ef238a9face

C:\Users\pablo>docker attach 4ef238a9face
root@4ef238a9face:/# chown -R mysql:mysql /var/lib/mysql && service mysql start
 * Starting MySQL database server mysqld                                                                    [ OK ]
root@4ef238a9face:/# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 4
Server version: 5.7.26-0ubuntu0.18.04.1 (Ubuntu)

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owners.

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

mysql> select user,host from mysql.user;
+------------------+-----------+
| user             | host      |
+------------------+-----------+
| icf              | %         |
| debian-sys-maint | localhost |
| mysql.session    | localhost |
| mysql.sys        | localhost |
| root             | localhost |
+------------------+-----------+
5 rows in set (0.00 sec)
```
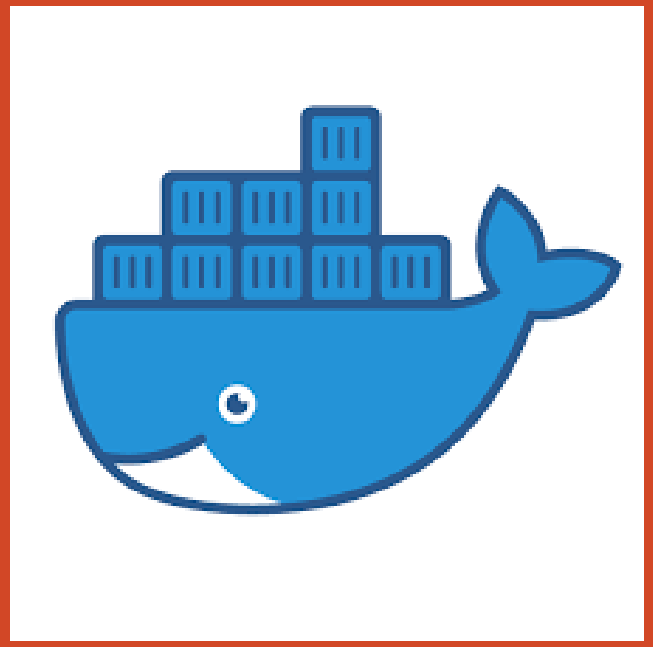
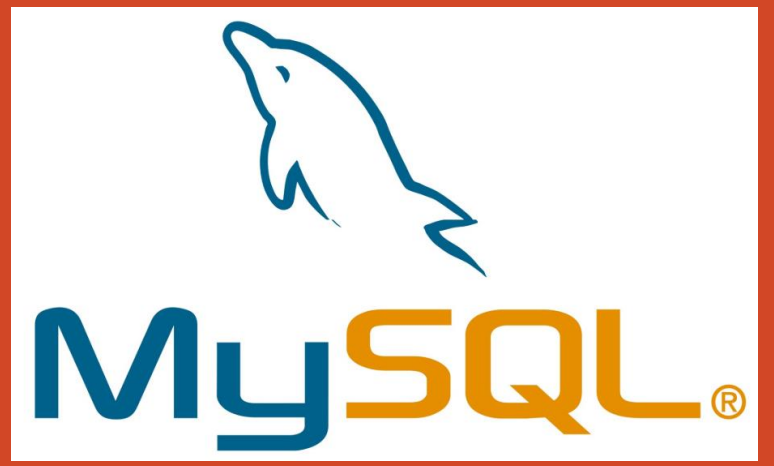
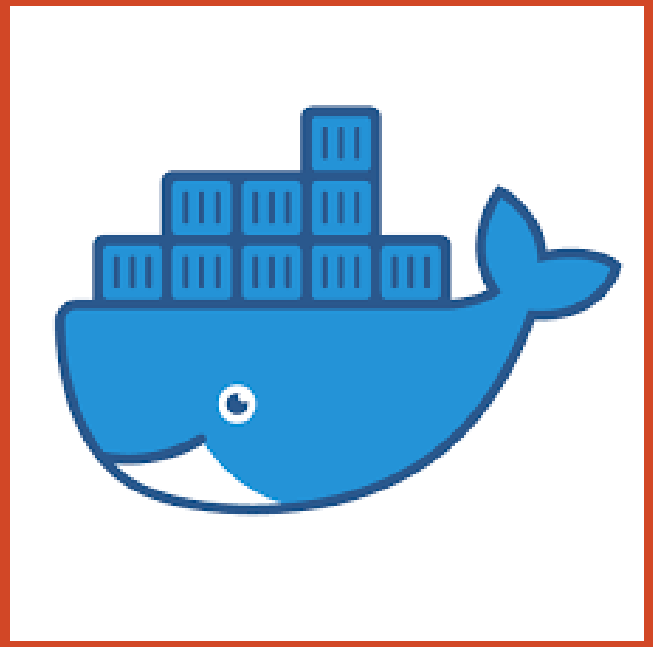

Consideraciones

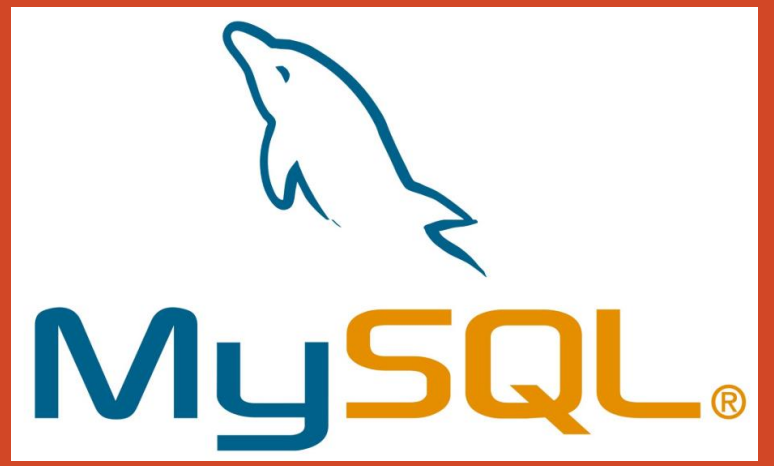
- Cada vez que realizamos un nuevo commit la imagen aumenta de tamaño, por lo que lo ideal es usar los menos pasos posibles
- El proceso de creación manual nos permite probar y depurar los pasos que nos permitirán automatizar la construcción usando un dockerfile
- Teniendo un dockerfile podemos usar docker build para construir la imagen





Dockerizando un servicio





Paso 1: Creamos una imagen de Mysql

Un Dockerfile simple y la shell asociada, start.sh

dockerfile

```
1  FROM mysql
2
3  COPY start.sh /
4
5  ENTRYPOINT ["/start.sh"]
6
7  EXPOSE 3306/tcp
```

start.sh

```
1  #!/bin/bash
2  chown -R mysql:mysql /var/lib/mysql && service mysql start && tail -f /dev/null
```

https://docs.docker.com/engine/reference/builder/

Construimos la imagen con docker build desde la carpeta en donde está el dockerfile

```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion\mysql>docker build . -t mysqlserver
Sending build context to Docker daemon  3.072kB
Step 1/4 : FROM mysql
 ---> b08836e5be65
Step 2/4 : COPY start.sh /
 ---> 637c43be308c
Step 3/4 : ENTRYPOINT ["/start.sh"]
 ---> Running in 7e95603f3cc9
Removing intermediate container 7e95603f3cc9
 ---> 1c6efcf987ea
Step 4/4 : EXPOSE 3306/tcp
 ---> Running in d7c38dc7c5a1
Removing intermediate container d7c38dc7c5a1
 ---> c9628a43407b
Successfully built c9628a43407b
Successfully tagged mysqlserver:latest
SECURITY WARNING: You are building a Docker image from Windows against a non-Windows Docker host. All files and directories added to build context
 will have '-rwxr-xr-x' permissions. It is recommended to double check and reset permissions for sensitive files and directories.

D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion\mysql>docker image ls
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
mysqlserver                 latest              c9628a43407b        24 seconds ago      444MB
mysql                       latest              b08836e5be65        17 minutes ago      444MB
```

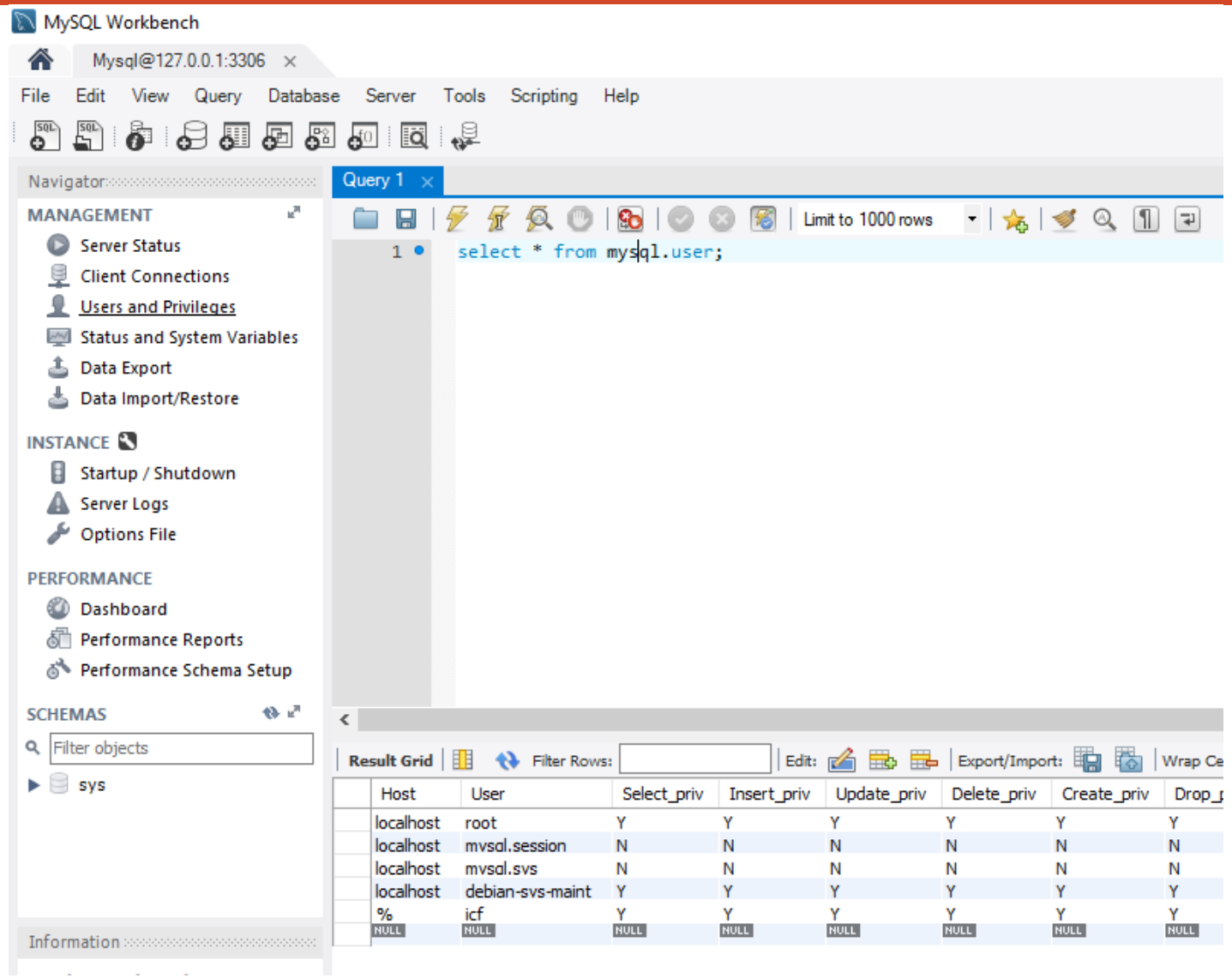
Creamos un contenedor usando la imagen en modo background, luego ejecutamos bash para ingresar

```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion\mysql>docker run -d --name dbserver -p 3306:3306 mysqlserver
d1cc0e378f4526df7ddeed9b2cfd42f128d1cd868029377639e393728477e976

D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion\mysql>docker exec -it dbserver bash
root@d1cc0e378f45:/# ps -fea
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 13:50 ?        00:00:00 /bin/bash /start.sh
root         6     1  1 13:50 ?        00:00:00 chown -R mysql:mysql /var/lib/mysql
root         7     0  0 13:50 pts/0    00:00:00 bash
root        16     7  0 13:50 pts/0    00:00:00 ps -fea
root@d1cc0e378f45:/#
```

El contenedor ahora inicia el servidor en forma automática

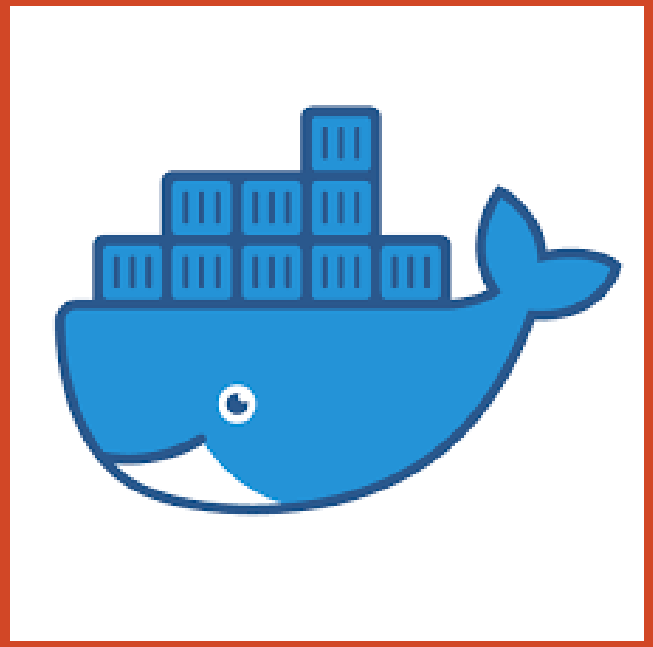
Todo contenedor requiere un proceso que quede activo para mantenerse en ejecución de lo contrario terminaría

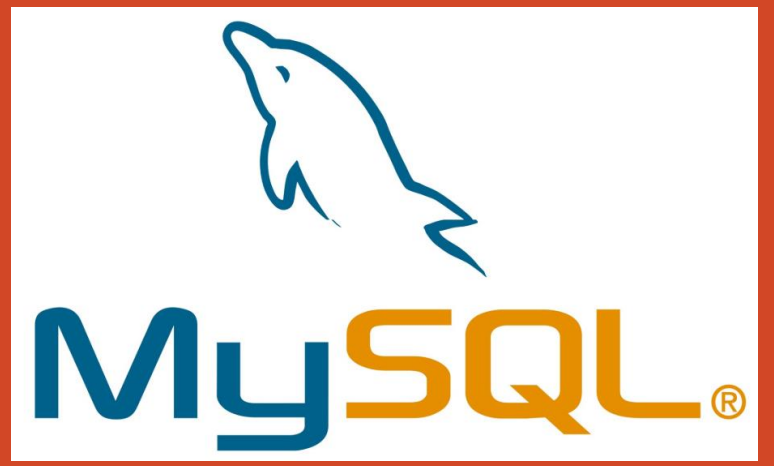
La base de datos está activa con las configuraciones asignadas



Salimos del contenedor, lo detenemos y lo eliminamos

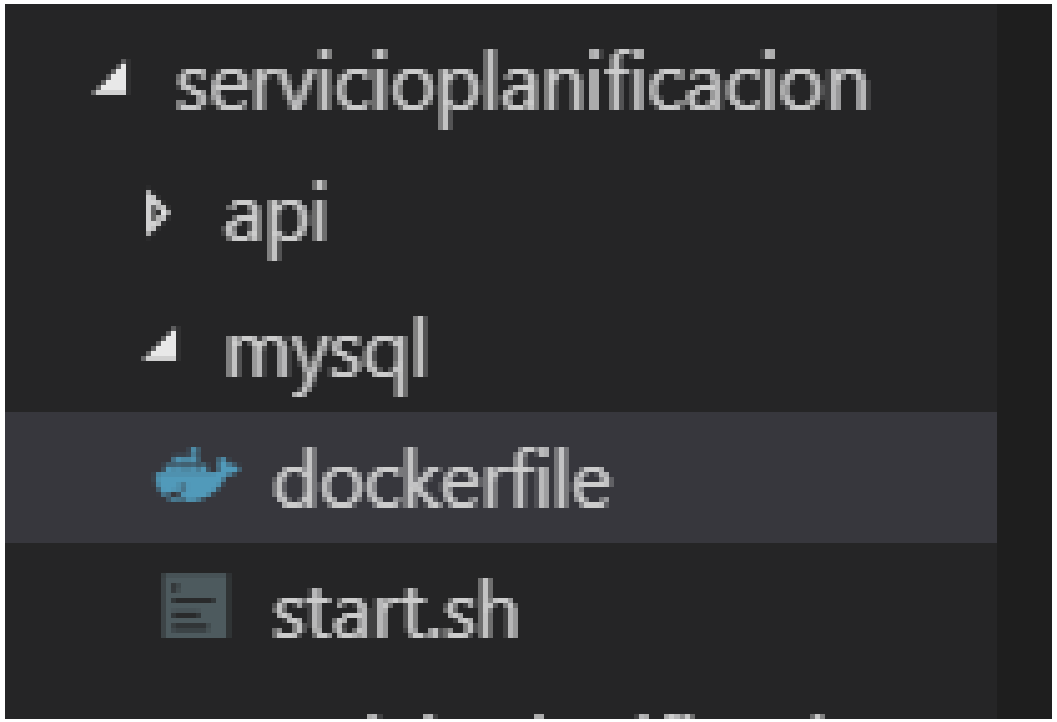
```
root@d1cc0e378f45:/# exit
exit

D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion\mysql>docker stop dbserver
dbserver

D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion\mysql>docker container rm dbserver
dbserver
```





Paso 2: Conectando el servicio a Mysql

Creamos una carpeta mysql dentro de servicioplanificacion con el dockerfile y start.sh



Crearemos una red para los servidores
Esto habilita un DNS entre las máquinas

```
C:\Users\pablo>docker network create --driver=bridge --subnet=192.168.0.0/24 br0
c1f03e8d27a58dc5a116e3298cb1340fec9937ec69e49a75ef620e409bfff36b

C:\Users\pablo>docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
c1f03e8d27a5        br0                 bridge              local
a67e1013ad82        bridge              bridge              local
340f6dd84793        host                host                local
3c35cce5ac19        none                null                local
```

Ejecutamos el contenedor dentro de la red

docker run -d --name dbserver --network br0 -p 3306:3306 mysqlserver

docker exec -it dbserver bash

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker run -d --name dbserver --network br0 -p 3306:3306 mysqlserver
b44187d9e605326c3a757290c2d075820857756ca140f5a3fb5864e10c9cf3e2

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker exec -it dbserver bash

root@b44187d9e605:/#
```

Instalamos ping para probar la conectividad

```
root@b44187d9e605:/# cat /etc/hosts
127.0.0.1       localhost
::1     localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
192.168.0.2     b44187d9e605
root@b44187d9e605:/# apt-get install iputils-ping
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libcap2 libcap2-bin libidn11 libpam-cap
The following NEW packages will be installed:
  iputils-ping libcap2 libcap2-bin libidn11 libpam-cap
0 upgraded, 5 newly installed, 0 to remove and 15 not upgraded.
Need to get 141 kB of archives.
After this operation, 537 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

```
root@b44187d9e605:/# ping dbserver
PING dbserver (192.168.0.2) 56(84) bytes of data.
64 bytes from b44187d9e605 (192.168.0.2): icmp_seq=1 ttl=64 time=0.054 ms
64 bytes from b44187d9e605 (192.168.0.2): icmp_seq=2 ttl=64 time=0.053 ms
^C
--- dbserver ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1050ms
rtt min/avg/max/mdev = 0.053/0.053/0.054/0.007 ms
root@b44187d9e605:/#
```

El DNS habilitado por docker resuelve el nombre del contenedor

Creamos la base de datos planificacion y asignamos privilegios al usuario icf

```
root@b44187d9e605:/# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 4
Server version: 5.7.26-0ubuntu0.18.04.1 (Ubuntu)

Copyright (c) 2000, 2019, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

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

mysql> create database planificacion character set utf8 collate utf8_bin;
Query OK, 1 row affected (0.00 sec)

mysql> grant all on planificacion.* to "icf"@"%" identified by "Secret.123";
Query OK, 0 rows affected, 1 warning (0.11 sec)

mysql> exit
Bye
root@b44187d9e605:/#
```

Verificamos el acceso

```
root@b44187d9e605:/# mysql -u icf -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.7.26-0ubuntu0.18.04.1 (Ubuntu)

Copyright (c) 2000, 2019, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

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

mysql> use planificacion;
Database changed
mysql> exit
Bye
root@b44187d9e605:/# exit
exit
```

Hacemos commit del contenedor para crear testdb

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker exec -it dbserver bash
root@b44187d9e605:/# service mysql stop
 * Stopping MySQL database server mysqld                                    [ OK ]
root@b44187d9e605:/# exit
exit

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker commit dbserver testdb
sha256:d855e69773604c8d8fa2514087007c1d5cc1acb4ea930515a89a405e075f59ab
```

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker image ls
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
testdb                      latest              d855e6977360        47 seconds ago      572MB
mysqlserver                 latest              c9628a43407b        4 hours ago         444MB
mysql                       latest              b08836e5be65        4 hours ago         444MB
```

Liberamos el espacio

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker image prune
WARNING! This will remove all dangling images.
Are you sure you want to continue? [y/N] y
Total reclaimed space: 0B

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker container stop dbserver
dbserver

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
b44187d9e605326c3a757290c2d075820857756ca140f5a3fb5864e10c9cf3e2

Total reclaimed space: 128.5MB
```

Iniciamos el contenedor de base de datos a partir de testdb

docker run -d --name dbserver --network br0 -p 3306:3306 testdb

docker exec -it dbserver bash

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker run -d --name dbserver --network br0 -p 3306:3306 testdb
2bea17f9dda291aa1e68ea611ded6c1c814e2e6a7cc175fd16cc8d049c066781

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS                    NAMES
2bea17f9dda2        testdb              "/start.sh"         18 seconds ago      Up 16 seconds       0.0.0.0:3306->3306/tcp   dbserver
```

Agregamos conector a mysql y coverage a requirements.txt dentro de servicioplanificacion e instalamos

requirements.txt

```
1  django
2  djangorestframework
3  gunicorn
4  mysqlclient
5  coverage
```

coverage nos permitirá ver la cobertura de las pruebas unitarias más adelante

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>pip3 install -r requirements.txt
```

```
Collecting mysqlclient
  Downloading https://files.pythonhosted.org/packages/e9/30/b40f39fcc6c39038cad3263b3b4280133fb033e0565fe4127d507aa011fe/mysqlclient-1.4.2.post1-c
p37-cp37m-win_amd64.whl (178kB)
     |████████████████████████████████| 184kB 2.2MB/s
Installing collected packages: mysqlclient
Successfully installed mysqlclient-1.4.2.post1
```

Conectamos el servicio REST a Mysql editando settings.py

```
DATABASES = {
    #'default': {
    #    'ENGINE': 'django.db.backends.sqlite3',
    #    'NAME': os.path.join(BASE_DIR, 'db.sqlite3'),
    #},
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME' : 'planificacion',
        'USER' : 'icf',
        'PASSWORD' : 'Secret.123',
        'DEFAULT-CHARACTER-SET' : 'utf8',
        'HOST' : '127.0.0.1',
        'PORT' : '3306',
        'TEST': {
            'NAME': 'planificacion_test',
        }
    },
}
```

https://docs.djangoproject.com/en/2.2/ref/databases/

Creamos tres archivos de settings para los ambientes y la carpeta static en la raíz del componente

utest.py

```python
from .settings import *

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': os.path.join(BASE_DIR, 'db.sqlite3'
    },
}
```

test.py

```python
from .settings import *

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME' : 'planificacion',
        'USER' : 'icf',
        'PASSWORD' : 'Secret.123',
        'DEFAULT-CHARACTER-SET' : 'utf8',
        'HOST' : '127.0.0.1',
        'PORT' : '3306',
        'TEST': {
            'NAME': 'planificacion_test',
        }
    },
}
```

production.py

```python
from .settings import *

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME' : 'planificacion',
        'USER' : 'icf',
        'PASSWORD' : 'Secret.123',
        'DEFAULT-CHARACTER-SET' : 'utf8',
        'HOST' : '192.168.0.2',
        'PORT' : '3306',
        'TEST': {
            'NAME': 'planificacion_test',
        }
    },
}

STATIC_ROOT = '/servicioplanificacion/static'
```

https://docs.djangoproject.com/en/2.1/howto/static-files/

Podemos usar sqlite para pruebas locales rápidas con los test unitarios

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>set DJANGO_SETTINGS_MODULE=servicioplanificacion.utest

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).
June 09, 2019 - 11:33:29
Django version 2.2.1, using settings 'servicioplanificacion.utest'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.
```

Usamos MySQL para el ambiente de test usando el contenedor de mysql

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>set DJANGO_SETTINGS_MODULE=servicioplanificacion.test

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).
```

Usamos MySQL para el ambiente de produccion usando el contenedor de mysql con la red br0

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>set DJANGO_SETTINGS_MODULE=servicioplanificacion.production

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).
```

Ejecutamos las migraciones usando las settings de test

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python manage.py migrate
Operations to perform:
  Apply all migrations: admin, api, auth, authtoken, contenttypes, sessions
Running migrations:
  Applying contenttypes.0001_initial... OK
  Applying auth.0001_initial... OK
  Applying admin.0001_initial... OK
  Applying admin.0002_logentry_remove_auto_add... OK
  Applying admin.0003_logentry_add_action_flag_choices... OK
  Applying api.0001_initial... OK
  Applying api.0002_auto_20190507_2306... OK
  Applying contenttypes.0002_remove_content_type_name... OK
  Applying auth.0002_alter_permission_name_max_length... OK
  Applying auth.0003_alter_user_email_max_length... OK
  Applying auth.0004_alter_user_username_opts... OK
  Applying auth.0005_alter_user_last_login_null... OK
  Applying auth.0006_require_contenttypes_0002... OK
  Applying auth.0007_alter_validators_add_error_messages... OK
  Applying auth.0008_alter_user_username_max_length... OK
  Applying auth.0009_alter_user_last_name_max_length... OK
  Applying auth.0010_alter_group_name_max_length... OK
  Applying auth.0011_update_proxy_permissions... OK
  Applying authtoken.0001_initial... OK
  Applying authtoken.0002_auto_20160226_1747... OK
  Applying sessions.0001_initial... OK
```

Creamos un superusuario

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python manage.py createsuperuser
Username (leave blank to use 'pablo'): servidor
Email address:
Password:
Password (again):
Superuser created successfully.
```

Podemos hacer un nuevo commit si deseamos que la imagen tenga el superusuario disponible en testdb, y algunos datos de prueba.
De lo contrario la base de datos comienza en blanco y las pruebas deben cargar los datos

Hacemos commit de testdb

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker exec -it dbserver bash
root@2bea17f9dda2:/# service mysql stop
 * Stopping MySQL database server mysqld                                                                    [ OK ]
root@2bea17f9dda2:/# exit
exit

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker container commit dbserver testdb
sha256:7d75c9f8750b9d82fae8632fafc027072f18f065f48eeaead2eb94261b32dbd6

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker image ls
REPOSITORY                  TAG                 IMAGE ID            CREATED             SIZE
testdb                      latest              7d75c9f8750b        6 seconds ago       700MB
mysqlserver                 latest              c9628a43407b        4 hours ago         444MB
mysql                       latest              b08836e5be65        5 hours ago         444MB
```

Reiniciamos el servidor

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS                    NAMES
2bea17f9dda2        d855e6977360        "/start.sh"         11 minutes ago      Up 11 minutes       0.0.0.0:3306->3306/tcp   dbserver

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker container stop dbserver
dbserver

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
2bea17f9dda291aa1e68ea611ded6c1c814e2e6a7cc175fd16cc8d049c066781

Total reclaimed space: 128.2MB
```

docker run -d --name dbserver --network br0 -p 3306:3306 testdb

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker run -d --name dbserver --network br0 -p 3306:3306 testdb
0a631b3d3b5dfdff0678fa8bf04a437a380642b66dd1df7efc6ed165017a2ffb
```

Actualizamos tests.py para usar la seguridad

```
from django.test import Client
from django.contrib.auth.models import User
```

```
class ViewTestCase(TestCase):
    """Esta clase define la testsuite para la API REST."""
    def setUp(self):
        """Definición de variables generales"""
        self.user=User.objects.create_superuser('servidor', 'api@test.com', "Secret.123")
        c = Client()
        response = c.post('/api/login/', {'username': 'servidor', 'password': 'Secret.123'})
        self.token = response.json()["token"]
        self.client = APIClient()
        self.client.credentials(HTTP_AUTHORIZATION='Token ' + self.token)

        curso_data = {'sigla': 'ICF121','nombre':'Introducción a la Ingeniería Civil Informática', 'creditos':6}
        self.response_setup = self.client.post(
            reverse('create'),
            curso_data,
            format="json")
```

https://docs.djangoproject.com/en/2.2/topics/testing/tools/

https://docs.djangoproject.com/en/2.2/ref/request-response/

https://www.django-rest-framework.org/api-guide/testing/

Ejecutamos los test usando la nueva base de datos

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python manage.py test -v 2
Creating test database for alias 'default' ('planificacion_test')...
Operations to perform:
  Synchronize unmigrated apps: messages, rest_framework, staticfiles
  Apply all migrations: admin, api, auth, authtoken, contenttypes, sessions
Synchronizing apps without migrations:
  Creating tables...
    Running deferred SQL...
Running migrations:
  Applying contenttypes.0001_initial... OK
test_creacion_de_curso (api.tests.CursoTestCase)
Test de creación de un curso ... ok
test_api_actualizar_curso (api.tests.ViewTestCase)
Test de actualización de curso a través de la API. ... ok
test_api_borrar_curso (api.tests.ViewTestCase)
Test borrado de curso a través de la API. ... ok
test_api_creacion_de_cursos (api.tests.ViewTestCase)
Test creación de curso a través de la API. ... ok
test_api_obtener_curso (api.tests.ViewTestCase)
Test de obtención de curso a través de la API. ... ok

----------------------------------------------------------------------
Ran 5 tests in 5.558s

OK
Destroying test database for alias 'default' ('planificacion_test')...
```

Ejecutamos las pruebas con cálculo de cobertura

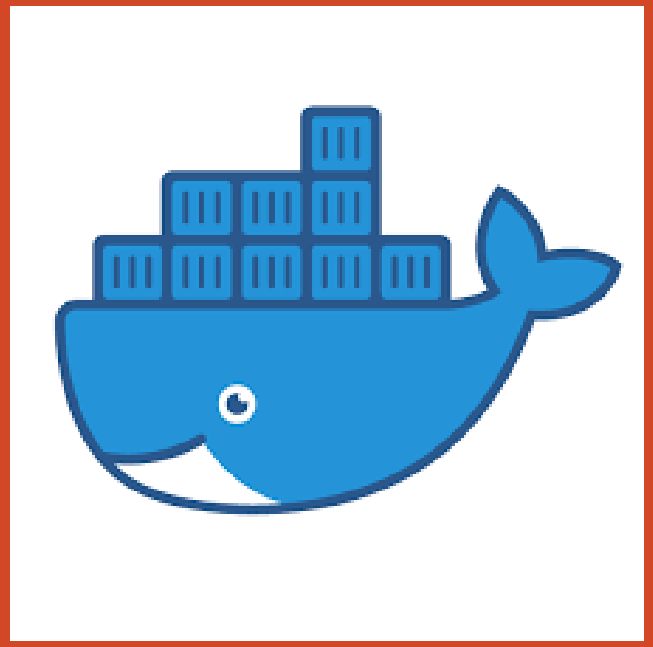
```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>coverage run --source="." manage.py test api
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
.....
----------------------------------------------------------------------
Ran 5 tests in 4.012s

OK
Destroying test database for alias 'default'...
```

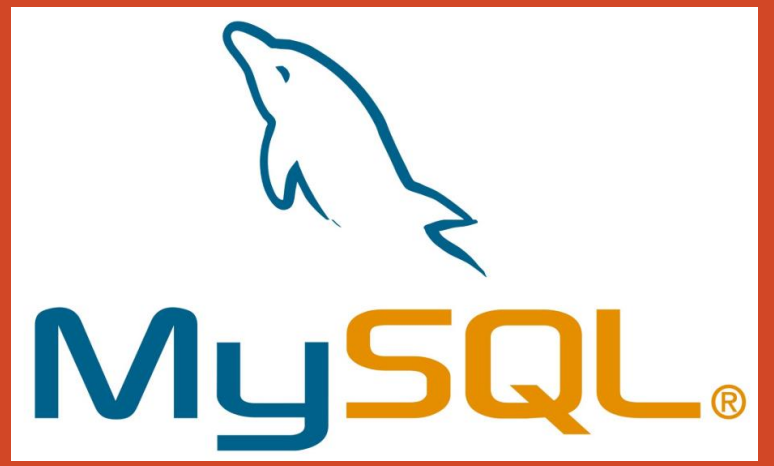
https://docs.djangoproject.com/en/2.2/topics/testing/advanced/

Obtenemos el informe de cobertura

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>coverage report
Name                                             Stmts   Miss  Cover
--------------------------------------------------------------------
api\__init__.py                                      0      0   100%
api\admin.py                                         1      0   100%
api\apps.py                                          3      3     0%
api\migrations\0001_initial.py                       5      0   100%
api\migrations\0002_auto_20190507_2306.py            4      0   100%
api\migrations\__init__.py                           0      0   100%
api\models.py                                        7      0   100%
api\serializers.py                                   7      0   100%
api\tests.py                                        44      0   100%
api\urls.py                                          7      0   100%
api\views.py                                        31      2    94%
manage.py                                            9      2    78%
servicioplanificacion\__init__.py                    0      0   100%
servicioplanificacion\production.py                  2      2     0%
servicioplanificacion\settings.py                   19      0   100%
servicioplanificacion\test.py                        2      0   100%
servicioplanificacion\urls.py                        5      0   100%
servicioplanificacion\utest.py                       2      2     0%
servicioplanificacion\wsgi.py                        4      4     0%
--------------------------------------------------------------------
TOTAL                                              152     15    90%
```

https://coverage.readthedocs.io/en/v4.5.x/





Paso 2: Preparamos el componente

Creamos README.MD

README.MD

```
1  # Servicio de Planificación
2
3  Este servicio permite el registro de cursos y sus NRC asociados para el
   servicio de inscripción de asignaturas.
4
```

Preview README.MD

Servicio de Planificación

> Este servicio permite el registro de cursos y sus NRC asociados para el servicio de inscripción de asignaturas.

Creamos .gitignore

```
# Byte-compiled / optimized / DLL files
__pycache__/
*.py[cod]
*$py.class

# C extensions
*.so

# Distribution / packaging
.Python
build/
develop-eggs/
dist/
downloads/
eggs/
.eggs/
lib/
lib64/
parts/
sdist/
var/
wheels/
*.egg-info/
.installed.cfg
*.egg
MANIFEST
```

```
# Unit test / coverage reports
htmlcov/
.tox/
.coverage
.coverage.*
.cache
nosetests.xml
coverage.xml
*.cover
.hypothesis/
.pytest_cache/

# Django stuff:
*.log
local_settings.py
db.sqlite3

# Environments
.env
.venv
env/
venv/
ENV/
env.bak/
venv.bak/
```

https://github.com/github/gitignore/blob/master/Python.gitignore

En el directorio del proyecto iniciamos el repositorio

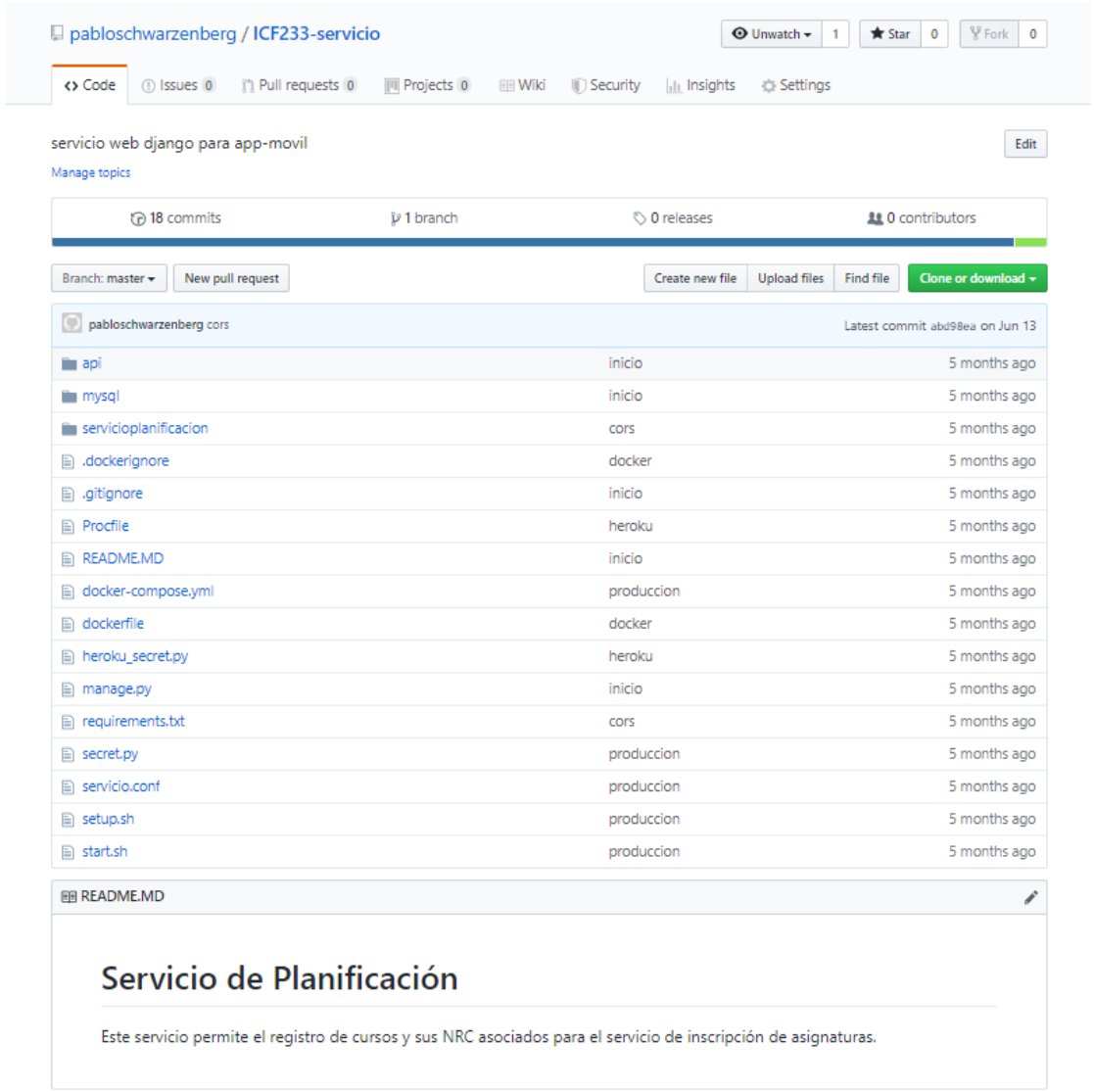
```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git init
Initialized empty Git repository in D:/Clases/UNAB/ICF232-201910/servicios/servicioplanificacion/.git/

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git add .
warning: LF will be replaced by CRLF in .gitignore.
The file will have its original line endings in your working directory.
warning: LF will be replaced by CRLF in mysql/start.sh.
The file will have its original line endings in your working directory.

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git config user.name "pabloschwarzenberg"

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git config user.email "pablo.schwarzenberg@unab.cl"

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git commit -m "inicio"
[master (root-commit) 9c3d4de] inicio
 25 files changed, 609 insertions(+)
 create mode 100644 .gitignore
 create mode 100644 README.MD
 create mode 100644 api/__init__.py
```

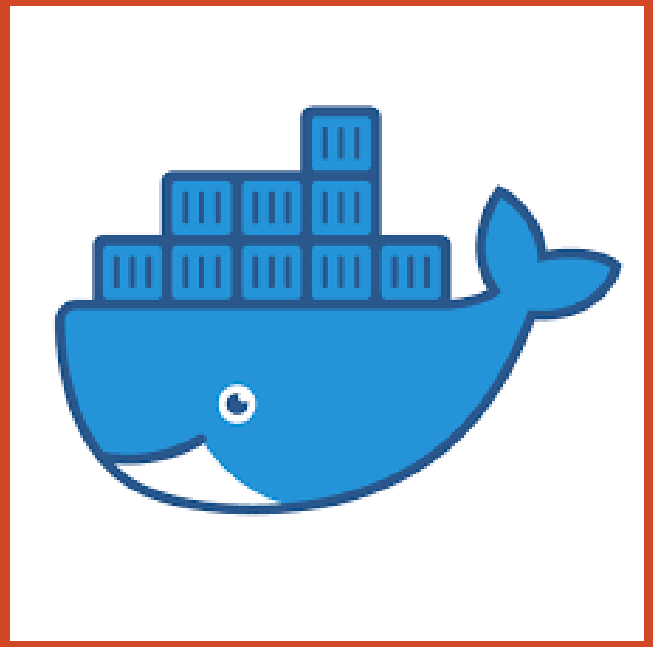
Creamos el proyecto en GitHub y conectamos el proyecto

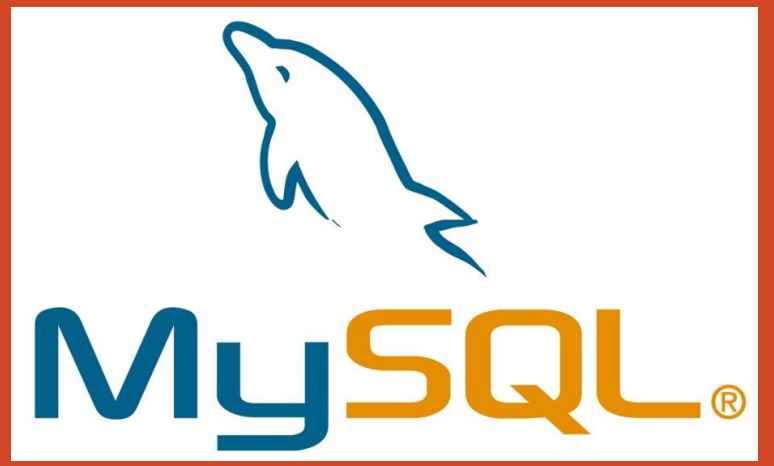
https://github.com/pabloschwarzenberg/ICF233-servicio

```
D:\Clases\UNAB\201910\ICF232-201910\servicios\servicioplanificacion>git remote add origin https://github.com/pabloschwarzenberg/ICF233-servicio.gi
t

D:\Clases\UNAB\201910\ICF232-201910\servicios\servicioplanificacion>git push -u origin master
fatal: HttpRequestException encountered.
   An error occurred while sending the request.
Username for 'https://github.com': pabloschwarzenberg
Password for 'https://pabloschwarzenberg@github.com':
Counting objects: 105, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (100/100), done.
Writing objects: 100% (105/105), 15.29 KiB | 355.00 KiB/s, done.
```

El proyecto en github







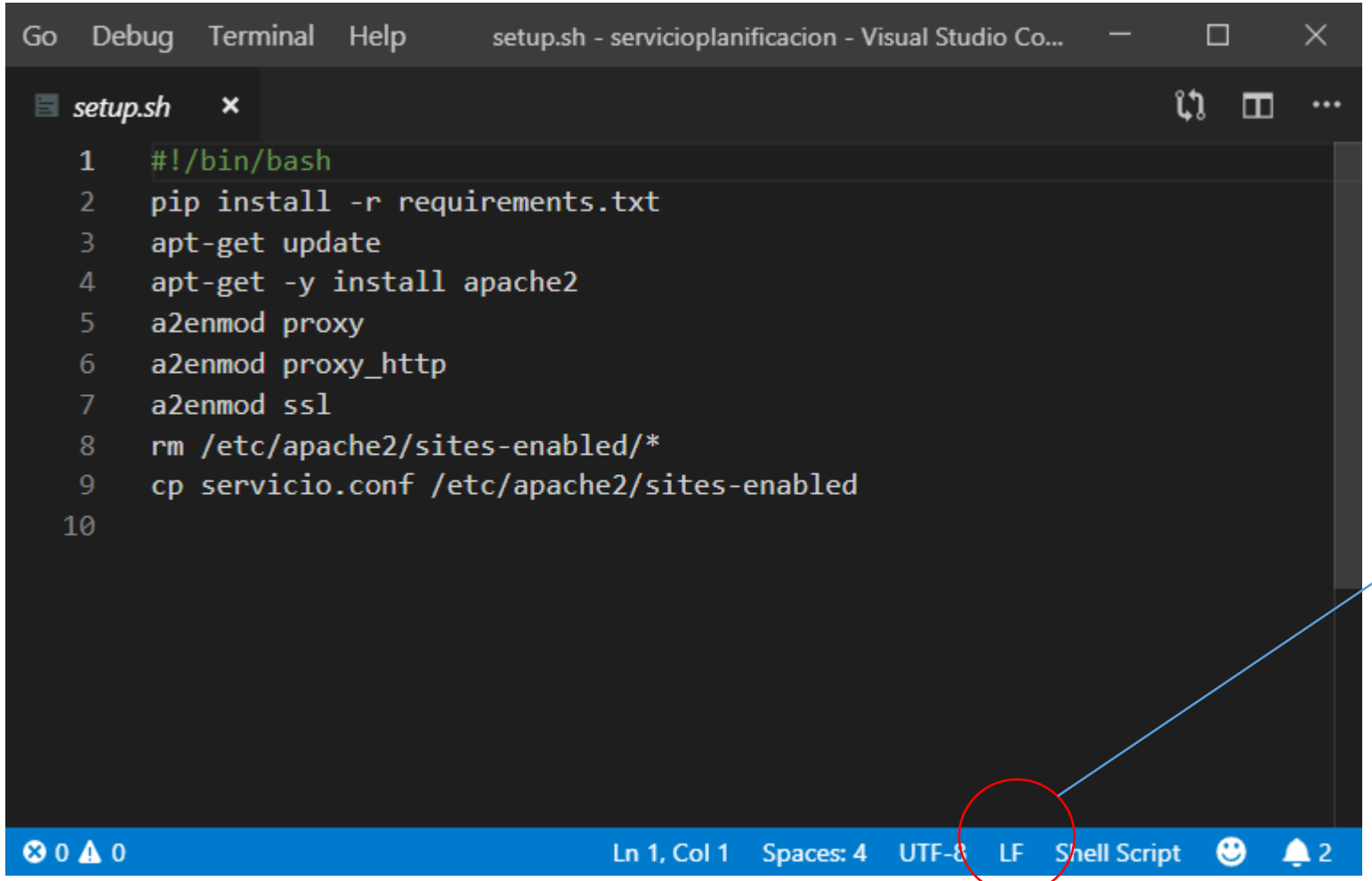
Paso 3: Preparamos el servicio

Creamos .dockerignore igual a .gitignore y agregamos .git en la primera línea

.dockerignore

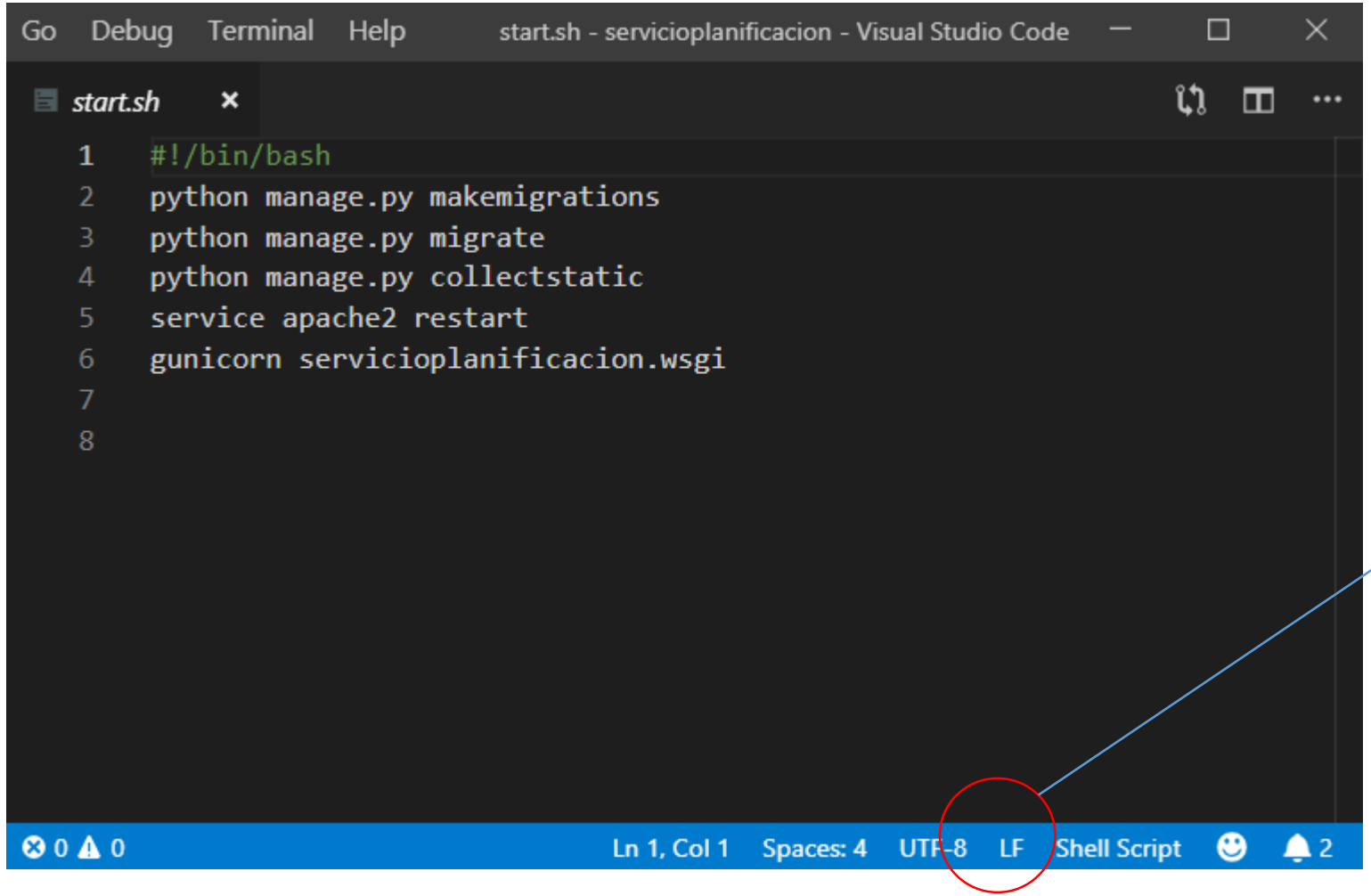
```
.git

# Byte-compiled / optimized / DLL files
__pycache__/
*.py[cod]
*$py.class

# C extensions
*.so

# Distribution / packaging
.Python
build/
develop-eggs/
dist/
downloads/
eggs/
.eggs/
lib/
```

Creamos la shell setup.sh en la raíz del proyecto (formato UNIX)



Al hacer clic en el terminador de línea podemos definir LF

Creamos la shell start.sh en la raíz del proyecto (formato UNIX)



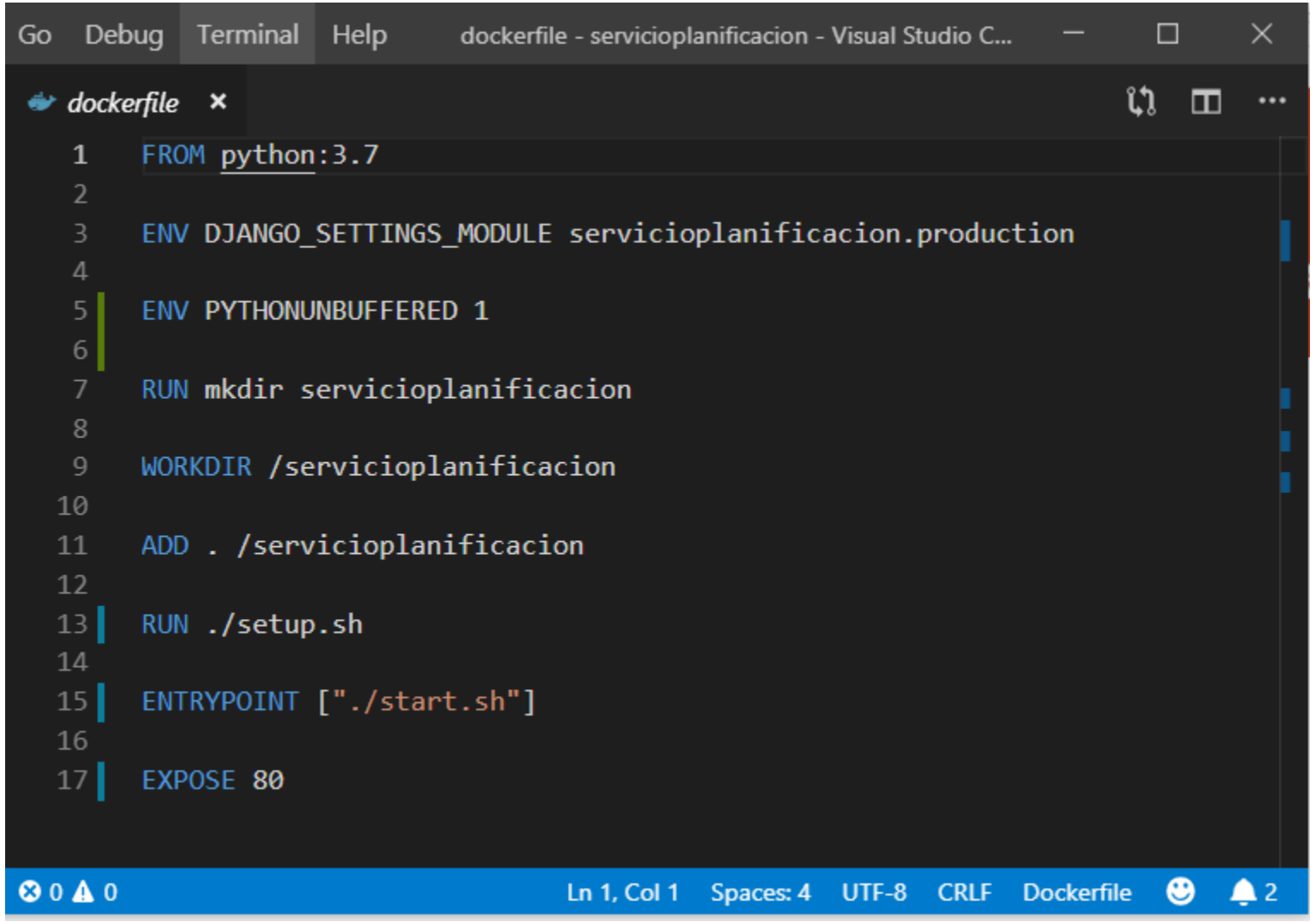
Al hacer clic en el terminador de línea podemos definir LF

Creamos servicio.conf para apache

servicio.conf

```
<VirtualHost *:80>
        DocumentRoot "/servicioplanificacion"
        LogLevel error ssl:warn

        ErrorLog ${APACHE_LOG_DIR}/servicio-error.log
        CustomLog ${APACHE_LOG_DIR}/servicio-access.log combined

        Alias /static /servicioplanificacion/static
        <Directory "/servicioplanificacion/static">
                Order Allow,Deny
                Allow from All
                Require all granted
        </Directory>

        ProxyPass /static !
        ProxyPass / http://localhost:8000/
        ProxyPassReverse / http://localhost:8000/
</VirtualHost>
```

Creamos el dockerfile en la raíz del componente



Construimos la imagen

```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker build . -t servicio
Sending build context to Docker daemon  73.73kB
Step 1/9 : FROM python:3.7
 ---> a4cc999cf2aa
Step 2/9 : ENV DJANGO_SETTINGS_MODULE servicioplanificacion.production
 ---> Using cache
 ---> 754c94907e14
Step 3/9 : ENV PYTHONUNBUFFERED 1
 ---> Using cache
 ---> 6b1a4bc80fb4
Step 4/9 : RUN mkdir servicioplanificacion
 ---> Using cache
 ---> d1720ca98dda
Step 5/9 : WORKDIR /servicioplanificacion
 ---> Using cache
```

Iniciamos el container del servicio en la misma red

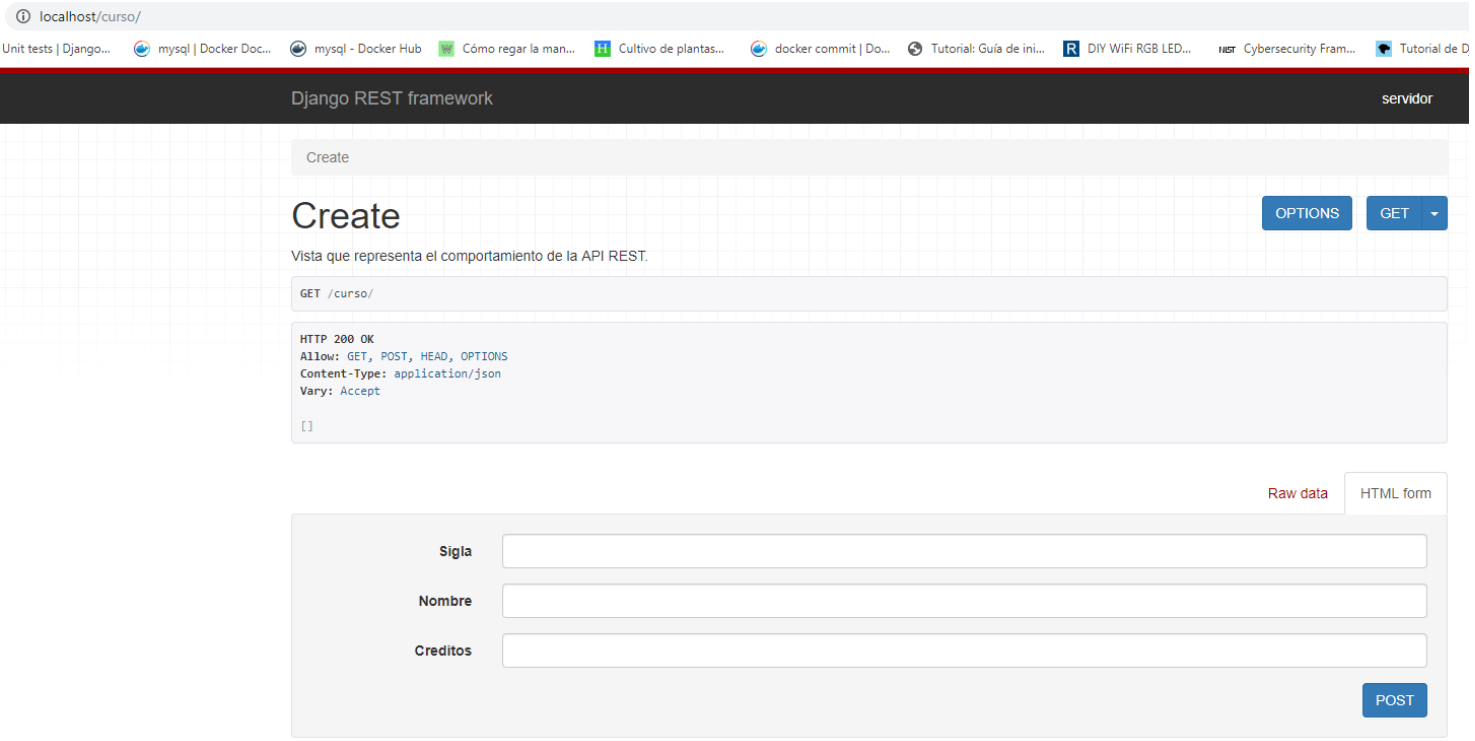
```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker run -d --name server --network br0 -p 80:80 servicio
45dae628609148912e5e2feef7b736b51bdfee0e7266500d131965c681b5821c

D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS                    NAMES
45dae6286091        servicio            "./start.sh"        8 seconds ago       Up 6 seconds        0.0.0.0:80->80/tcp       server
0a631b3d3b5d        testdb              "/start.sh"         5 hours ago         Up 5 hours          0.0.0.0:3306->3306/tcp   dbserver

D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker logs server
No changes detected
Operations to perform:
  Apply all migrations: admin, api, auth, authtoken, contenttypes, sessions
Running migrations:
  No migrations to apply.

152 static files copied to '/servicioplanificacion/static'.
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 192.168.0.3. Set the 'ServerName' directive globall
y to suppress this message
Restarting Apache httpd web server: apache2.
[2019-06-09 22:53:09 +0000] [52] [INFO] Starting gunicorn 19.9.0
[2019-06-09 22:53:09 +0000] [52] [INFO] Listening at: http://127.0.0.1:8000 (52)
[2019-06-09 22:53:09 +0000] [52] [INFO] Using worker: sync
[2019-06-09 22:53:09 +0000] [95] [INFO] Booting worker with pid: 95
```

docker ps muestra los contenedor en ejecución
docker logs muestra el log de un contenedor

Probamos el servicio

curl -X POST -F "username=servidor" -F "password=Secret.123" http://localhost/api/login

```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>curl -X POST -F "username=servidor" -F "password=Secret.123" http://localhost/api/log
in
{"token":"0e35f50dd34a2a10b4d9386f2196d526cc567721"}
```



Ajustes para paso a producción y uso de docker-compose

Creamos un generador de SECRET_KEY y modificamos setup.sh y start.sh

secret.py

```python
import random
secret="".join([random.SystemRandom().choice('abcdefghijklmnopqrstuvwxyz0123456789!@#$%^&*(-_=+)') for i in range(50)])
print("export SECRET_KEY='{0}'".format(secret))
```

setup.sh

```
#!/bin/bash
pip install -r requirements.txt
apt-get update
apt-get -y install apache2
a2enmod proxy
a2enmod proxy_http
a2enmod ssl
rm /etc/apache2/sites-enabled/*
cp servicio.conf /etc/apache2/sites-enabled
python secret.py >> ~/.bashrc
```

start.sh

```
#!/bin/bash
source ~/.bashrc
python manage.py makemigrations
python manage.py migrate
python manage.py collectstatic
service apache2 restart
gunicorn servicioplanificacion.wsgi
```

Editamos production.py para incorporar seguridad

production.py

```python
from .settings import *

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME' : 'planificacion',
        'USER' : 'icf',
        'PASSWORD' : 'Secret.123',
        'DEFAULT-CHARACTER-SET' : 'utf8',
        'HOST' : '192.168.0.2',
        'PORT' : '3306',
        'TEST': {
            'NAME': 'planificacion_test',
        }
    },
}

STATIC_ROOT="/servicioplanificacion/static"

DEBUG=False

SECRET_KEY=os.environ["SECRET_KEY"]

ALLOWED_HOSTS = ['*']
USE_X_FORWARDED_HOST=True
USE_X_FORWARDED_PORT=True
```

https://docs.djangoproject.com/en/2.2/howto/deployment/checklist/

Creamos docker-compose.yml

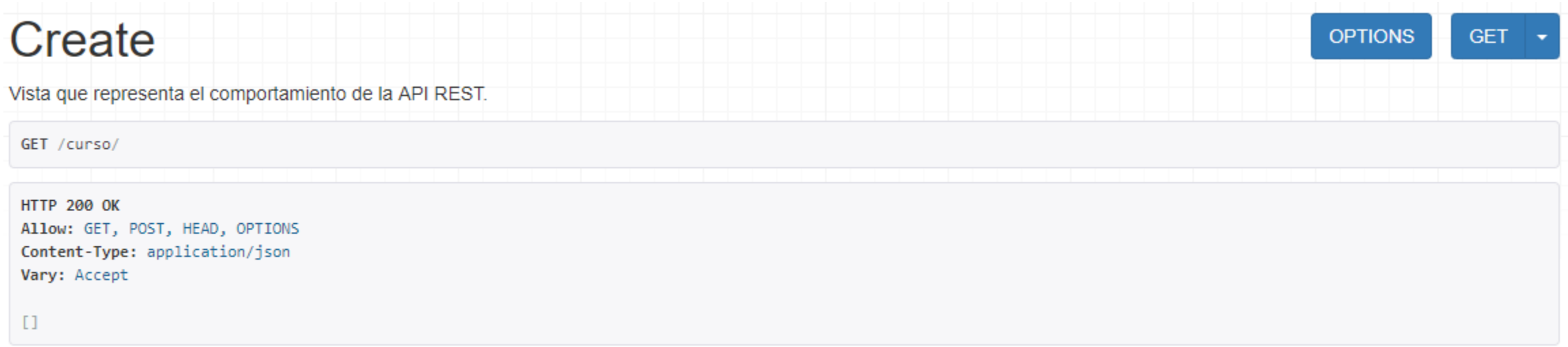
docker-compose.yml

```yaml
version: '3'

services:
  server:
    image: servicio
    links:
      - dbserver
    ports:
      - "80:80"

  dbserver:
    image: testdb

networks:
    default:
        external:
            name: br0
```

https://docs.docker.com/compose/reference/

Iniciamos, testeamos y detenemos los servicios

```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker-compose up -d
Creating servicioplanificacion_dbserver_1 ... done
Creating servicioplanificacion_server_1   ... done
```




```
D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>docker-compose stop
Stopping servicioplanificacion_server_1   ... done
Stopping servicioplanificacion_dbserver_1 ... done
```

Amazon ECS/ECR

Creamos un generador de SECRET_KEY y modificamos setup.sh y start.sh para crear un usuario admin

secret.py

```python
import random
secret="".join([random.SystemRandom().choice('abcdefghijklmnopqrstuvwxyz0123456789!@#$%^&*(-_=+)') for i in range(50)])
print("export SECRET_KEY='{0}'".format(secret))
print("export DJANGO_SUPERUSER_PASSWORD='{0}'".format("Secret.123"))
print("export DJANGO_SUPERUSER_EMAIL='{0}'".format("servidor@icfunab.cl"))
print("export DJANGO_SUPERUSER_USERNAME='{0}'".format("servidor"))
```

start.sh

```
#!/bin/bash
source ~/.bashrc
python manage.py makemigrations
python manage.py migrate
python manage.py collectstatic
python manage.py createsuperuser --noinput --username $DJANGO_SUPERUSER_USERNAME --email $DJANGO_SUPERUSER_EMAIL
service apache2 restart
gunicorn servicioplanificacion.wsgi
```

setup.sh

```
#!/bin/bash
pip install -r requirements.txt
apt-get update
apt-get -y install apache2
a2enmod proxy
a2enmod proxy_http
a2enmod ssl
rm /etc/apache2/sites-enabled/*
cp servicio.conf /etc/apache2/sites-enabled
python secret.py >> ~/.bashrc
```

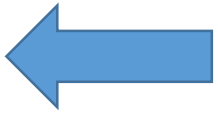
Editamos production.py para incorporar seguridad y deshabilitar la conexión a la interfaz de prueba

production.py

servicioplanificacion > production.py > ...

```python
from .settings import *

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME' : 'planificacion',
        'USER' : 'icf',
        'PASSWORD' : 'Secret.123',
        'DEFAULT-CHARACTER-SET' : 'utf8',
        'HOST' : 'grupo00.c5d4mi2dthpc.us-east-1.rds.amazonaws.com',
        'PORT' : '3306',
        'TEST': {
            'NAME': 'planificacion_test',
        }
    },
}

REST_FRAMEWORK = {
    'DEFAULT_RENDERER_CLASSES': (
        'rest_framework.renderers.JSONRenderer',
    )
}
```

```python
STATIC_ROOT="/servicioplanificacion/static"
#ADMIN_ENABLED=False
DEBUG=False
SECRET_KEY=os.environ["SECRET_KEY"]

ALLOWED_HOSTS = ['*']
USE_X_FORWARDED_HOST=True
USE_X_FORWARDED_PORT=True

INSTALLED_APPS += ('corsheaders',)
MIDDLEWARE += ('corsheaders.middleware.CorsMiddleware',)
CORS_ORIGIN_ALLOW_ALL = True

```



Aquí usamos la base de datos en el servidor en amazon RDS

https://docs.djangoproject.com/en/2.2/howto/deployment/checklist/

Construimos la imagen y la ejecutamos localmente Revisamos los logs de inicio con el ID del contenedor

build.bat

```
docker build . -t "grupo00"
```

run.bat

```
docker run -d -p 80:80 grupo00
```

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker logs --tail 20 6b81d72c8f42
No changes detected
System check identified some issues:

WARNINGS:
?: (mysql.W002) MySQL Strict Mode is not set for database connection 'default'
        HINT: MySQL's Strict Mode fixes many data integrity problems in MySQL, such as data truncation upon ins
ertion, by escalating warnings into errors. It is strongly recommended you activate it. See: https://docs.djang
oproject.com/en/3.1/ref/databases/#mysql-sql-mode
Operations to perform:
  Apply all migrations: admin, api, auth, authtoken, contenttypes, sessions
Running migrations:
  No migrations to apply.

165 static files copied to '/servicioplanificacion/static'.
CommandError: Error: That username is already taken.
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. Set
the 'ServerName' directive globally to suppress this message
Restarting Apache httpd web server: apache2.
[2020-11-25 17:01:07 +0000] [95] [INFO] Starting gunicorn 20.0.4
[2020-11-25 17:01:07 +0000] [95] [INFO] Listening at: http://127.0.0.1:8000 (95)
[2020-11-25 17:01:07 +0000] [95] [INFO] Using worker: sync
[2020-11-25 17:01:07 +0000] [98] [INFO] Booting worker with pid: 98
```

La migración y la creación del usuario solamente ocurren la primera vez que se sube el contenedor o si borramos la base de datos

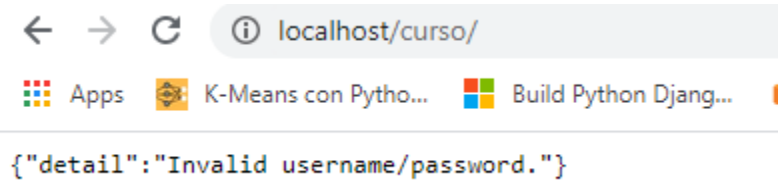
Testeamos el servicio en el contenedor local usando curl

curl -X POST -F "username=servidor" -F "password=Secret.123" http://localhost/api/login

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>curl -X POST -F "username=servidor" -F "password=Secret.123" http://localhost/api/login
{"token":"bf53bc1a0a6ce0fd900b370f84b7f114eef1e7bb"}
```

curl -X POST -F “sigla=ICF233" -F “nombre=IngenieriaSoftwareII“ –F “creditos=4” -H “token: bf53bc1a0a6ce0fd900b370f84b7f114eef1e7bb” http://localhost/curso/

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>curl -X POST -F "sigla=ICF233" -F "nombre=IngenieriaSoftwareII" -F "creditos=4" -H "token: bf53
bc1a0a6ce0fd900b370f84b7f114eef1e7bb" http://localhost/curso/
{"id":2,"sigla":"ICF233","nombre":"IngenieriaSoftwareII","creditos":4}
```



curl -X GET -H "token: bf53bc1a0a6ce0fd900b370f84b7f114eef1e7bb" http://localhost/curso/

Instalar aws cli y etiquetar la imagen

https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2-windows.html

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker image ls
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
grupo00             latest              3d63f5b37935        14 minutes ago      955MB
python              3.7                 94c9a318e47a        7 days ago          876MB
optic               latest              c2918afc5a2e        5 weeks ago         516MB
nvidia/cuda         10.2-base           038eb67e1704        7 weeks ago         107MB
ubuntu              bionic              56def654ec22        2 months ago        63.2MB

D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker tag 3d63f5b37935 913808666659.dkr.ecr.us-east-1.amazonaws.com/grupo00
```

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>aws configure
AWS Access Key ID [None]: AKIA5JQZ5WARUYSK4VNI
AWS Secret Access Key [None]: 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
Default region name [us-east-1]: us-east-1
Default output format [None]:
```

Autenticar docker con Amazon ECR y hacer el push

aws ecr get-login-password | docker login --username AWS --password-stdin 913808666659.dkr.ecr.us-east-1.amazonaws.com/grupo00

docker push 913808666659.dkr.ecr.us-east-1.amazonaws.com/grupo00

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>aws ecr get-login-password | docker login --username AWS --password-stdin 913808666659.dkr.ecr.
us-east-1.amazonaws.com/grupo00
Login Succeeded

D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker push 913808666659.dkr.ecr.us-east-1.amazonaws.com/grupo00
The push refers to repository [913808666659.dkr.ecr.us-east-1.amazonaws.com/grupo00]
7ea290ac2c93: Pushed
b4fcf22d25d0: Pushed
53994b9a2da5: Pushed
adec77bceebb: Pushed
026c477245c5: Pushed
ee78bcfefc78: Pushed
c4a6d8ca5d2c: Pushed
059ed1793a98: Pushed
712264374d24: Pushed
475b4eb79695: Pushed
f3be340a54b9: Pushed
114ca5b7280f: Pushed
latest: digest: sha256:b1862699acdf3ddc7ba531162ada5c5a8ca13180240888eb00eca6eea7b76d06 size: 2846
```

Copiar el contenedor a otro computador como archivo
Usamos *docker save* para guardar la imagen

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker save grupo00 -o grupo00.docker
```

grupo00.docker	30/11/2020 15:35	DOCKER File	961,843 KB
secret.py	25/11/2020 14:14	Python File	1 KB
run.bat	25/11/2020 14:00	Windows Batch File	1 KB
start.sh	25/11/2020 13:50	Shell Script	1 KB
build.bat	25/11/2020 12:43	Windows Batch File	1 KB
README.MD	13/10/2020 18:19	MD File	1 KB
.coverage	13/10/2020 17:24	Code Coverage X...	3 KB
requirements.txt	13/6/2019 11:12	Text Document	1 KB
Procfile	11/6/2019 21:26	File	1 KB
heroku_secret.py	11/6/2019 20:59	Python File	1 KB
docker-compose.yml	11/6/2019 20:13	YML File	1 KB
setup.sh	11/6/2019 19:28	Shell Script	1 KB

Copiar el contenedor a otro computador como archivo Usamos *docker load* para recuperar la imagen

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker load -i grupo00.docker
Loaded image: grupo00:latest
```

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker image ls
REPOSITORY                                          TAG                 IMAGE ID            CREATED             SIZE
ubuntu                                              latest              f643c72bc252        4 days ago          72.9MB
913808666659.dkr.ecr.us-east-1.amazonaws.com/grupo00   latest              3d63f5b37935        5 days ago          955MB
grupo00                                             latest              3d63f5b37935        5 days ago          955MB
python                                              3.7                 94c9a318e47a        12 days ago         876MB
```

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker run -d -p 80:80 grupo00
217737f14b39b7827cb9ab85862237b0bcf46832872820b699e5977c7903f4b6
```

```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>curl -X POST -F "username=servidor" -F "password=Secret.123" http://localhost/api/login
{"token":"bf53bc1a0a6ce0fd900b370f84b7f114eef1e7bb"}
```

Habilitar un container para que se reinicie cuando se reinicie el host

```
C:\Users\pablo>docker run -d -p 80:80 --restart always grupo00
d2e2bc7ec8320c42ffa386fabac2d6aff0e56794ae414454228ffcf1f16cd7e9
```

Activa siempre el container

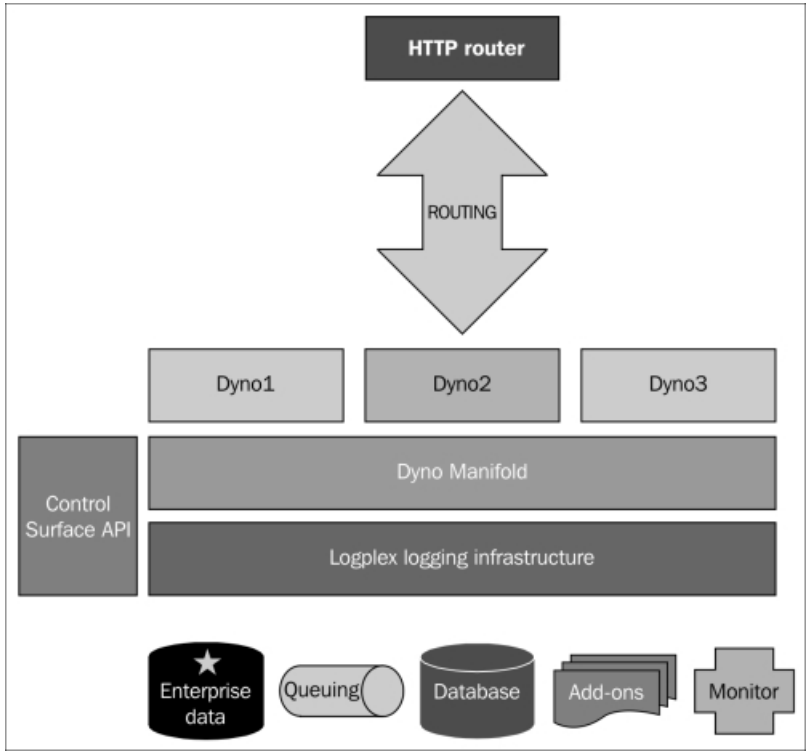
https://docs.docker.com/config/containers/start-containers-automatically/

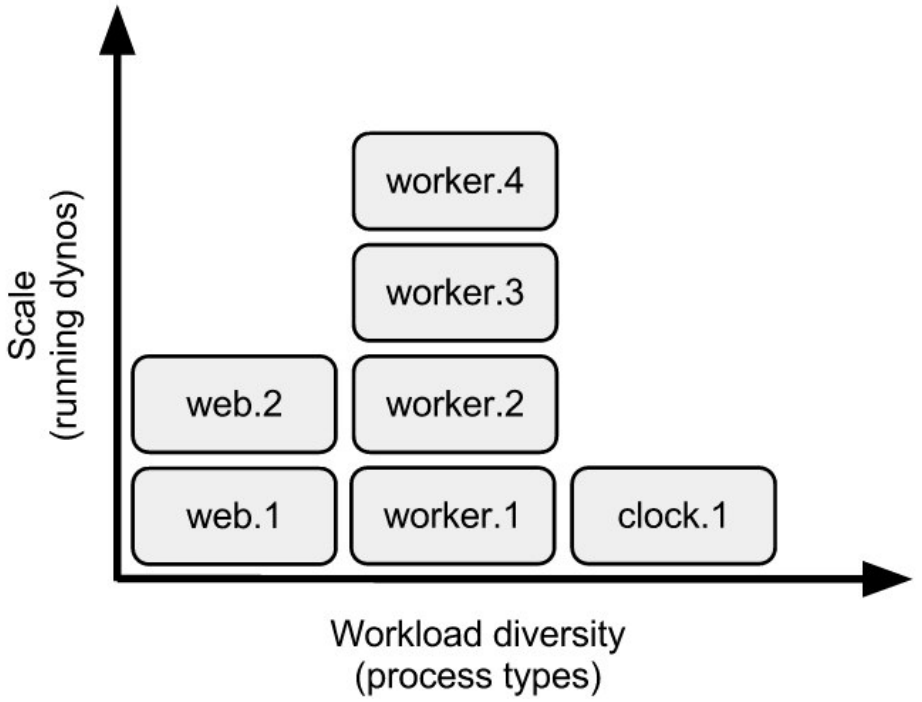
```
D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker container ls
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS
          NAMES
d2e2bc7ec832        grupo00             "./start.sh"        7 minutes ago       Up 2 minutes        0.0.0.0:80-
>80/tcp   distracted_haslett

D:\Clases\UNAB\202020\ICF233\servicioplanificacion>docker update --restart no d2e2bc7ec832
d2e2bc7ec832
```

Actualiza la política para el contenedor

Heroku

¿Qué es heroku?





https://www.heroku.com/
https://devcenter.heroku.com/articles/getting-started-with-python
https://devcenter.heroku.com/articles/how-heroku-works
https://devcenter.heroku.com/articles/dyno-types
https://hub.docker.com/r/finalgene/heroku-cli/

HEROKU

Creamos el Procfile, agregamos django-heroku a requirements.txt y lo instalamos

Procfile

```
1   web: gunicorn servicioplanificacion.wsgi
```

La P mayúscula inicial es importante en el nombre de Procfile

requirements.txt

```
1   django
2   djangorestframework
3   gunicorn
4   mysqlclient
5   coverage
6   django-heroku
```

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios>pip3 install django-heroku
Collecting django-heroku
```

Creamos una nueva setting: heroku.py

heroku.py

```python
from .settings import *
import django_heroku

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': os.path.join(BASE_DIR, 'db.sqlite3'),
    },
}

DEBUG=False

SECRET_KEY=os.environ["SECRET_KEY"]

ALLOWED_HOSTS = ['*']
USE_X_FORWARDED_HOST=True
USE_X_FORWARDED_PORT=True

PROJECT_ROOT = os.path.dirname(os.path.abspath(__file__))
STATIC_URL = '/static/'
STATIC_ROOT = os.path.join(PROJECT_ROOT, 'static')
django_heroku.settings(locals())
```

Creamos la aplicación en heroku, el archivo heroku_secret.py, lo ejecutamos y configuramos variables de entorno

heroku_secret.py

```python
import random
secret="".join([random.SystemRandom().choice('abcdefghijklmnopqrstuvwxyz0123456789!@#$%^&*(-_=+)') for i in range(50)])
print("heroku config:set SECRET_KEY=\"{0}\"".format(secret))
```

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku create
Creating app... done, ⬚ sleepy-gorge-24969
https://sleepy-gorge-24969.herokuapp.com/ | https://git.heroku.com/sleepy-gorge-24969.git
```

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>python heroku_secret.py
heroku config:set SECRET_KEY="j)%5#d=u$-+pei2c@krq&04&@n**+-q2!y_+l5e@dogk8r_&#+"

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku config:set SECRET_KEY="j)%5#d=u$-+pei2c@krq&04&@n**+-q2!y_+l5e@dogk8r_&
#+"
Setting SECRET_KEY and restarting ⬚ sleepy-gorge-24969... done, v4
SECRET_KEY: j)%5#d=u$-+pei2c@krq&04&@n**+-q2!y_+l5e@dogk8r_&#+
```

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku config:set DJANGO_SETTINGS_MODULE=servicioplanificacion.heroku
Setting DJANGO_SETTINGS_MODULE and restarting ⬚ sleepy-gorge-24969... done, v5
DJANGO_SETTINGS_MODULE: servicioplanificacion.heroku
```

Hacemos commit de los cambios y enviamos la aplicación

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git add .

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git commit -m "heroku"
[master a50fc25] heroku
 1 file changed, 1 insertion(+)
```

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git push heroku master
Counting objects: 4, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 430 bytes | 215.00 KiB/s, done.
Total 4 (delta 2), reused 0 (delta 0)
remote: Compressing source files... done.
remote: Building source:
remote:
remote: -----> Python app detected
remote: -----> Installing requirements with pip
remote:
remote: -----> $ python manage.py collectstatic --noinput
remote:        152 static files copied to '/tmp/build_4ce57f24b96248bde84530d36ad6b73c/staticfiles', 454 post-processed.
remote:
remote: -----> Discovering process types
remote:        Procfile declares types -> web
remote:
remote: -----> Compressing...
remote:        Done: 55.7M
remote: -----> Launching...
remote:        Released v12
remote:        https://sleepy-gorge-24969.herokuapp.com/ deployed to Heroku
remote:
remote: Verifying deploy... done.
To https://git.heroku.com/sleepy-gorge-24969.git
   86d8a81..5dadd42  master -> master
```

Preparamos la aplicación

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku run python manage.py makemigrations
Running python manage.py makemigrations on ⬢ sleepy-gorge-24969... up, run.8247 (Free)
No changes detected

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku run python manage.py migrate
Running python manage.py migrate on ⬢ sleepy-gorge-24969... up, run.2041 (Free)
Operations to perform:
  Apply all migrations: admin, api, auth, authtoken, contenttypes, sessions
Running migrations:
  Applying contenttypes.0001_initial... OK
  Applying auth.0001_initial... OK
  Applying admin.0001_initial... OK
  Applying admin.0002_logentry_remove_auto_add... OK
  Applying admin.0003_logentry_add_action_flag_choices... OK
  Applying api.0001_initial... OK
  Applying api.0002_auto_20190507_2306... OK
  Applying contenttypes.0002_remove_content_type_name... OK
  Applying auth.0002_alter_permission_name_max_length... OK
  Applying auth.0003_alter_user_email_max_length... OK
  Applying auth.0004_alter_user_username_opts... OK
  Applying auth.0005_alter_user_last_login_null... OK
  Applying auth.0006_require_contenttypes_0002... OK
  Applying auth.0007_alter_validators_add_error_messages... OK
  Applying auth.0008_alter_user_username_max_length... OK
  Applying auth.0009_alter_user_last_name_max_length... OK
  Applying auth.0010_alter_group_name_max_length... OK
  Applying auth.0011_update_proxy_permissions... OK
  Applying authtoken.0001_initial... OK
  Applying authtoken.0002_auto_20160226_1747... OK
  Applying sessions.0001_initial... OK
```

Definimos la cantidad de procesos, creamos el superusuario y probamos la api con curl

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku ps:scale web=1
Scaling dynos... done, now running web at 1:Free
```

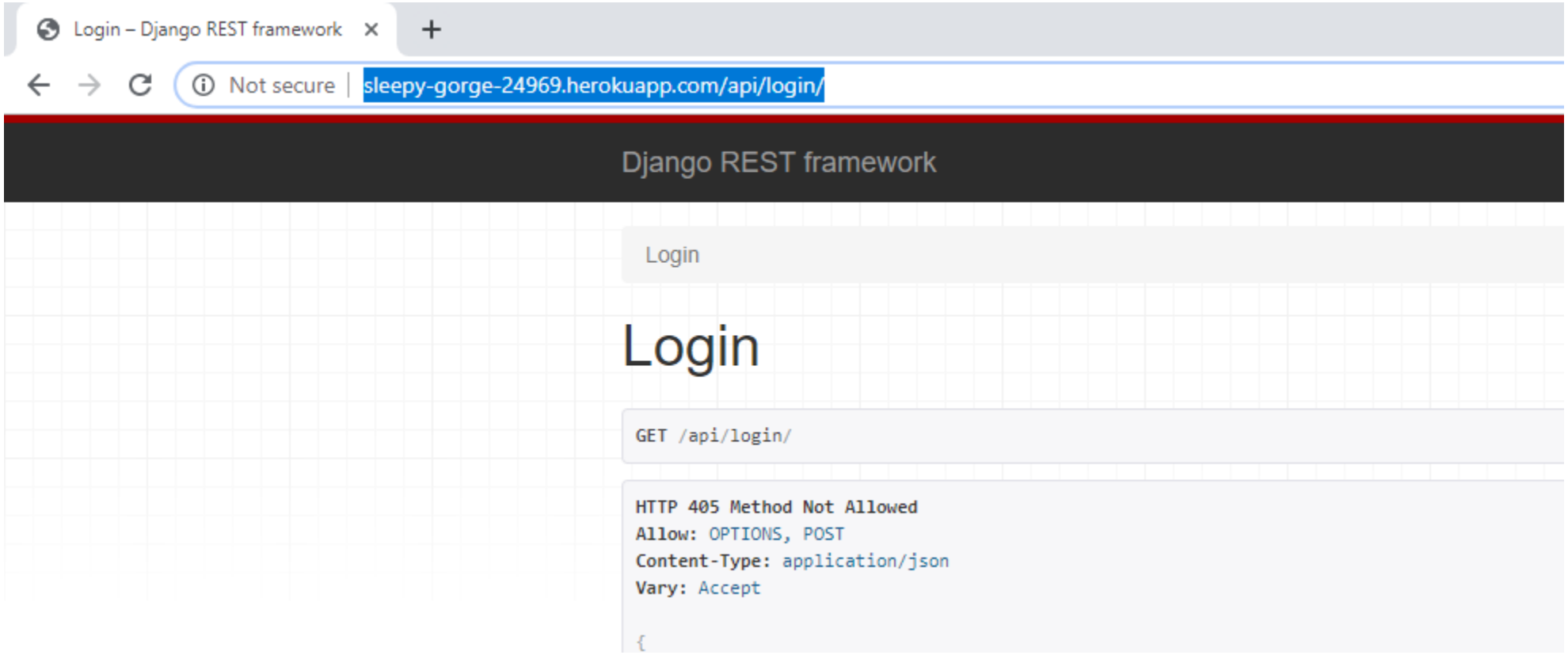
```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>heroku run python manage.py createsuperuser
Running python manage.py createsuperuser on ⬢ sleepy-gorge-24969... up, run.7799 (Free)
Username (leave blank to use 'u45763'): servidor
Email address:
Password:
Password (again):
Superuser created successfully.
```

curl -X POST -F "username=servidor" -F "password=Secret.123" http://sleepy-gorge-24969.herokuapp.com/api/login

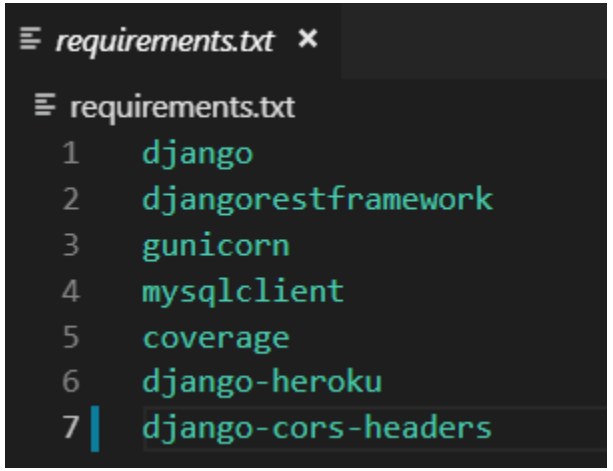
```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>curl -X POST -F "username=servidor" -F "password=Secret.123" http://sleepy-gor
ge-24969.herokuapp.com/api/login
{"token":"327891e38c89a354bafc4df85ff9c93a5b771bd5"}
```

Si obtenemos un token nuestra aplicación está funcionando

También podemos revisarla en un browser en el dominio herokuapp.com



Para permitir acceso desde otras aplicaciones necesitamos habilitar CORS en nuestro servicio



Agregamos django-cors-headers a requirements.txt

Incorporamos la configuración en production.py y heroku.py

production.py

servicioplanificacion ▸ production.py ▸ ...

```python
from .settings import *

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME' : 'planificacion',
        'USER' : 'icf',
        'PASSWORD' : 'Secret.123',
        'DEFAULT-CHARACTER-SET' : 'utf8',
        'HOST' : '192.168.0.2',
        'PORT' : '3306',
        'TEST': {
            'NAME': 'planificacion_test',
        }
    },
}

STATIC_ROOT="/servicioplanificacion/static"

DEBUG=False

SECRET_KEY=os.environ["SECRET_KEY"]

ALLOWED_HOSTS = ['*']
USE_X_FORWARDED_HOST=True
USE_X_FORWARDED_PORT=True

INSTALLED_APPS += ('corsheaders',)
MIDDLEWARE += ('corsheaders.middleware.CorsMiddleware',)
CORS_ORIGIN_ALLOW_ALL = True
```

heroku.py

servicioplanificacion ▸ heroku.py ▸ ...

```python
from .settings import *
import django_heroku

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': os.path.join(BASE_DIR, 'db.sqlite3'),
    },
}

DEBUG=False

SECRET_KEY=os.environ["SECRET_KEY"]

ALLOWED_HOSTS = ['*']
USE_X_FORWARDED_HOST=True
USE_X_FORWARDED_PORT=True

PROJECT_ROOT = os.path.dirname(os.path.abspath(__file__))
STATIC_URL = '/static/'
STATIC_ROOT = os.path.join(PROJECT_ROOT, 'static')
django_heroku.settings(locals())

INSTALLED_APPS += ('corsheaders',)
MIDDLEWARE += ('corsheaders.middleware.CorsMiddleware',)
CORS_ORIGIN_ALLOW_ALL = True
```

Hacemos commit y recompilamos la aplicación

```
(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git add .

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git commit -m "cors"
[master 174fa14] cors
 3 files changed, 10 insertions(+), 1 deletion(-)

(venv) D:\Clases\UNAB\ICF232-201910\servicios\servicioplanificacion>git push heroku master
Counting objects: 6, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (6/6), done.
Writing objects: 100% (6/6), 696 bytes | 174.00 KiB/s, done.
Total 6 (delta 5), reused 0 (delta 0)
remote: Compressing source files... done.
remote: Building source:
remote:
remote: -----> Python app detected
```

Preguntas