

Trabajo desde la Raspberry Pi 4 Model B

ACTUALIZAR BOOTLOADER DE LA RASPBERRY PI 4

Actualizar el bootloader de las raspberry, que está alojado en la eprom interna, el bootloader indica desde dónde se arranca y se va a modificar la prioridad de arranque que será por usb.

para saber que version tiene mi eprom

```
vcgencmd bootloader_version
```

```
pi@raspberrypi: ~
Archivo Editar Ver Buscar Terminal Pestañas Ayuda
jsmartinez@jsmartinez:~/apicolaEmb/Tele... x pi@raspberrypi: ~ x
} cd
} ssh pi@192.168.1.72
pi@192.168.1.72's password:
Linux raspberrypi 5.10.52-v7l+ #1441 SMP Tue Aug 3 18:11:56 BST 2021 armv7l
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sun Jan 16 12:29:19 2022

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ vcgencmd bootloader_version
Sep 3 2020 13:11:43
version c305221a6d7e532693cc7ff57fddfc8649def167 (release)
timestamp 1599135103
update-time 0
capabilities 0x00000000
pi@raspberrypi:~ $
```

mirar como está configurado

```
vcgencmd bootloader_config
```

```
pi@raspberrypi:~ $ vcgencmd bootloader_config
BOOT_UART=0
WAKE_ON_GPIO=1
POWER_OFF_ON_HALT=0
```

actualizar

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

```
pi@raspberrypi:~ $ sudo apt-get update
Des:1 https://download.docker.com/linux/debian buster InRelease [54,0 kB]
Des:2 http://archive.raspberrypi.org/debian buster InRelease [32,6 kB]
Des:3 https://download.docker.com/linux/debian buster/stable armhf Packages [22,
6 kB]
Des:4 http://raspbian.raspberrypi.org/raspbian buster InRelease [15,0 kB]
Des:5 http://archive.raspberrypi.org/debian buster/main armhf Packages [393 kB]
Des:6 http://raspbian.raspberrypi.org/raspbian buster/main armhf Packages [13,0
MB]
Des:7 http://raspbian.raspberrypi.org/raspbian buster/contrib armhf Packages [58
,8 kB]
Des:8 http://raspbian.raspberrypi.org/raspbian buster/non-free armhf Packages [1
04 kB]
Descargados 13,7 MB en 13s (1.090 kB/s)
Leyendo lista de paquetes... Hecho
N: Repository 'http://archive.raspberrypi.org/debian buster InRelease' changed i
ts 'Suite' value from 'testing' to 'oldstable'
```

Para hallar donde están contenidos los firmware de raspberry

```
cd /lib/firmware/raspberry/bootloader/
```

```
pi@raspberrypi:/ $ cd /lib/firmware/raspberry/bootloader/
pi@raspberrypi:/lib/firmware/raspberry/bootloader $ ls -la
total 52
drwxr-xr-x 5 root root 4096 ene 18 08:34 .
drwxr-xr-x 3 root root 4096 mar 4 2021 ..
drwxr-xr-x 2 root root 4096 ene 18 08:34 beta
drwxr-xr-x 2 root root 4096 ene 18 08:34 critical
lrwxrwxrwx 1 root root 8 feb 26 2021 default -> critical
lrwxrwxrwx 1 root root 6 feb 26 2021 latest -> stable
-rw-r--r-- 1 root root 31064 dic 13 09:56 release-notes.md
drwxr-xr-x 2 root root 4096 ene 18 08:34 stable
```

en el vamos a la carpeta critical qué es la que está por defecto y donde se pueden ver las versiones de los bootloaders

```
ruta: /lib/firmware/raspberry/bootloader/critical
```

```
pi@raspberrypi:/lib/firmware/raspberry/bootloader $ cd critical/
pi@raspberrypi:/lib/firmware/raspberry/bootloader/critical $ ls
pieeprom-2020-04-16.bin pieeprom-2021-04-29.bin vl805-000138a1.bin
pieeprom-2020-09-03.bin recovery.bin
pieeprom-2021-03-18.bin vl805-000137ad.bin
pi@raspberrypi:/lib/firmware/raspberry/bootloader/critical $
```

en la carpeta stable has otros firmware

```
ruta: /lib/firmware/raspberry/bootloader/stable
```

```
pi@raspberrypi:/lib/firmware/raspberrypi/bootloader $ cd stable/
pi@raspberrypi:/lib/firmware/raspberrypi/bootloader/stable $ ls -la
total 7464
drwxr-xr-x 2 root root 4096 ene 18 08:34 .
drwxr-xr-x 5 root root 4096 ene 18 08:34 ..
-rw-r--r-- 1 root root 524288 abr 23 2020 pieeprom-2020-04-16.bin
-rw-r--r-- 1 root root 524288 jun 17 2020 pieeprom-2020-06-15.bin
-rw-r--r-- 1 root root 524288 jul 20 2020 pieeprom-2020-07-16.bin
-rw-r--r-- 1 root root 524288 ago 10 2020 pieeprom-2020-07-31.bin
-rw-r--r-- 1 root root 524288 sep  7 2020 pieeprom-2020-09-03.bin
-rw-r--r-- 1 root root 524288 dic 15 2020 pieeprom-2020-12-11.bin
-rw-r--r-- 1 root root 524288 ene 14 2021 pieeprom-2021-01-11.bin
-rw-r--r-- 1 root root 524288 ene 16 2021 pieeprom-2021-01-16.bin
-rw-r--r-- 1 root root 524288 feb 22 2021 pieeprom-2021-02-16.bin
-rw-r--r-- 1 root root 524288 mar 18 2021 pieeprom-2021-03-18.bin
-rw-r--r-- 1 root root 524288 abr 30 2021 pieeprom-2021-04-29.bin
-rw-r--r-- 1 root root 524288 jul  7 2021 pieeprom-2021-07-06.bin
-rw-r--r-- 1 root root 524288 dic 13 09:56 pieeprom-2021-11-22.bin
-rw-r--r-- 1 root root 524288 dic 13 09:56 pieeprom-2021-12-02.bin
-rw-r--r-- 1 root root 89304 nov 30 06:43 recovery.bin
-rw-r--r-- 1 root root 98904 feb 28 2020 vl805-000137ad.bin
-rw-r--r-- 1 root root 99224 jul 20 2020 vl805-000138a1.bin
pi@raspberrypi:/lib/firmware/raspberrypi/bootloader/stable $
```

Vamos a modificar el archivo rpi-eeprom-update con el editor nano

```
sudo nano /etc/default/rpi-eeprom-update
```

```
pi@raspberrypi:/etc/default $ sudo nano /etc/default/rpi-eeprom-update
pi@raspberrypi: /etc/default
Archivo Editar Ver Buscar Terminal Ayuda
GNU nano 3.2           /etc/default/rpi-eeprom-update

FIRMWARE_RELEASE_STATUS="default"

[ 1 línea leída ]
^G Ver ayuda ^O Guardar ^W Buscar ^K Cortar txt^J Justificar^C Posición
^X Salir    ^R Leer fich.^Y Reemplazar^U Pegar txt ^T Ortografía^L Ir a línea
```

```
pi@raspberrypi: /etc/default
Archivo Editar Ver Buscar Terminal Ayuda
GNU nano 3.2           /etc/default/rpi-eeprom-update

FIRMWARE_RELEASE_STATUS="stable"

[ 1 línea escrita ]
^G Ver ayuda ^O Guardar ^W Buscar ^K Cortar txt^J Justificar^C Posición
^X Salir      ^R Leer fich.^\\ Reemplazar^U Pegar txt ^T Ortografía^L Ir a línea
```

Se debe actualizar el firmware entonces se usa el comando

```
rpi-eeprom-update -d -f /lib/firmware/raspberrypi/bootloader/stable/
rpi-eeprom-update -d -f
```

```
/lib/firmware/raspberrypi/bootloader/stable/pieeprom-2021-12-02.bin1
```

```
pi@raspberrypi:/etc/default $ sudo rpi-eeprom-update -d -f /lib/firmware/raspber
rypi/bootloader/stable/pieeprom-2021-12-02.bin
*** INSTALLING /lib/firmware/raspberrypi/bootloader/stable/pieeprom-2021-12-02.b
in ***
CURRENT: jue sep  3 12:11:43 UTC 2020 (1599135103)
UPDATE: jue dic  2 11:08:03 UTC 2021 (1638443283)
BOOTFS: /boot
```

```
EEPROM updates pending. Please reboot to apply the update.
To cancel a pending update run "sudo rpi-eeprom-update -r".
```

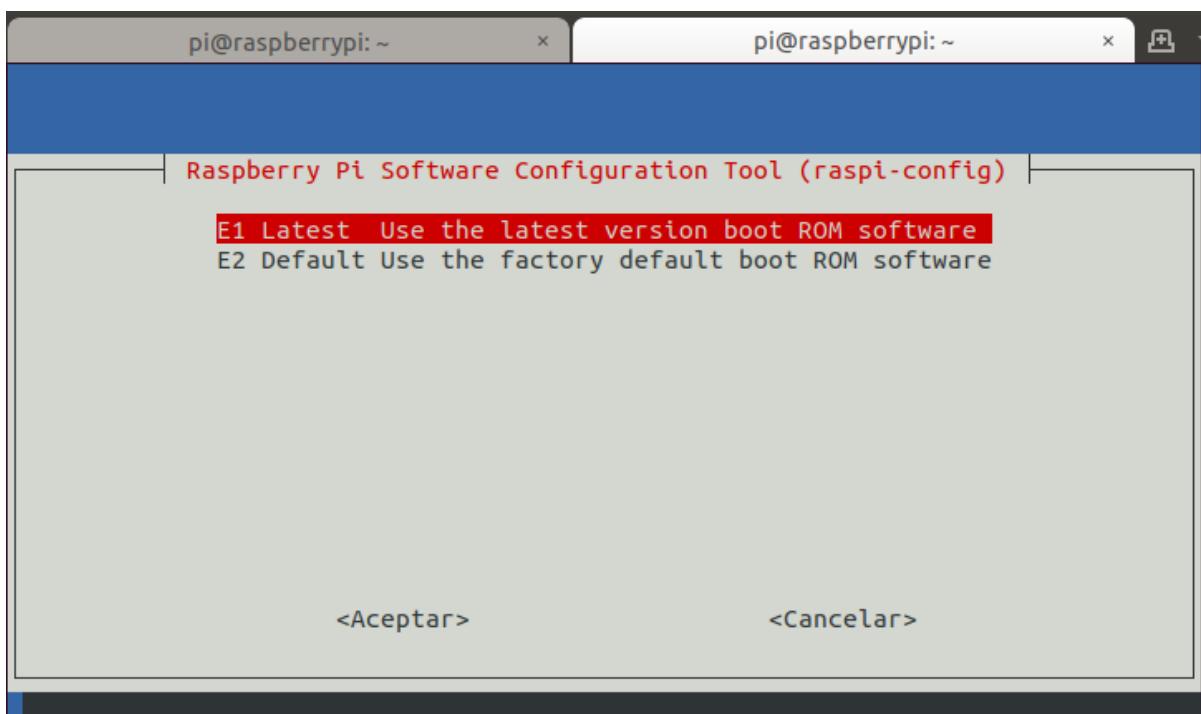
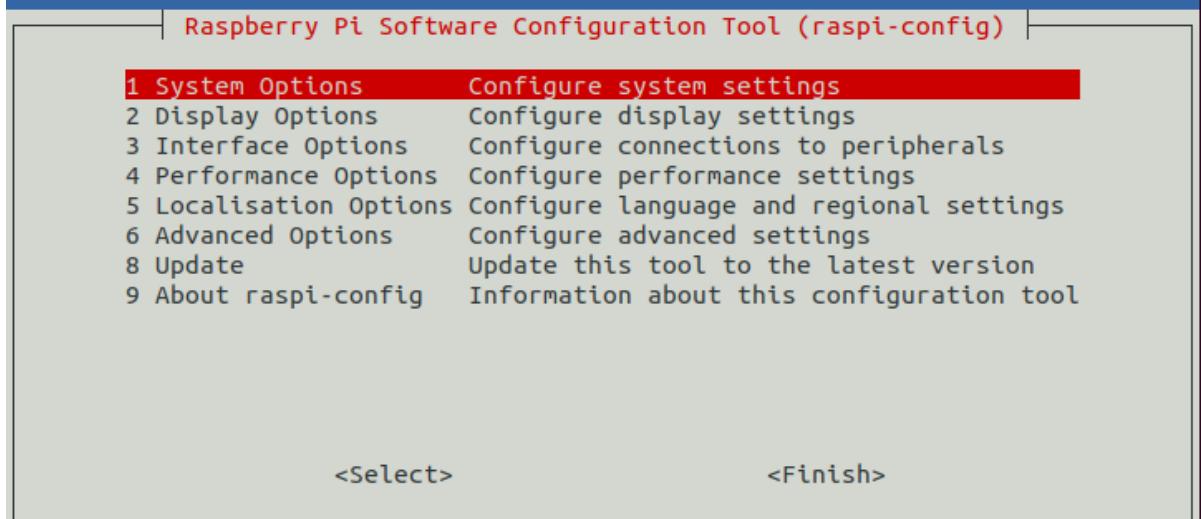
Comprobar la versión de bootloader: vcgencmd bootloader_version

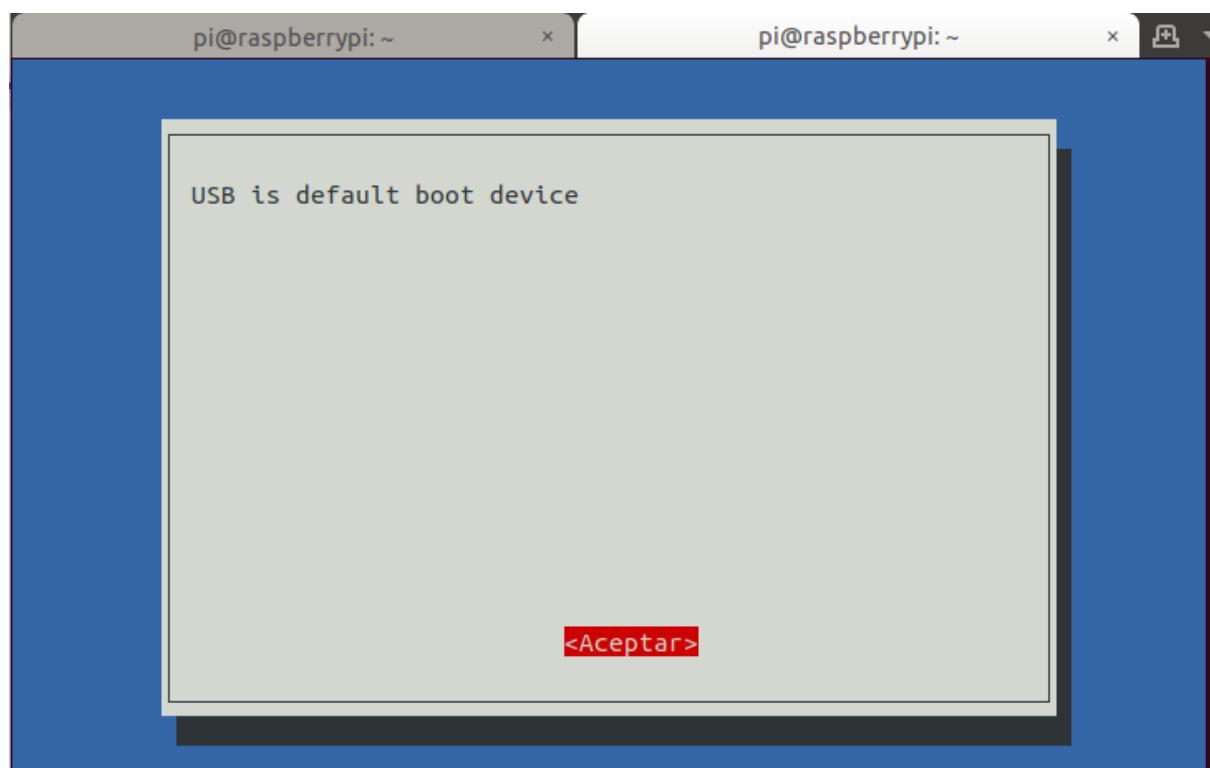
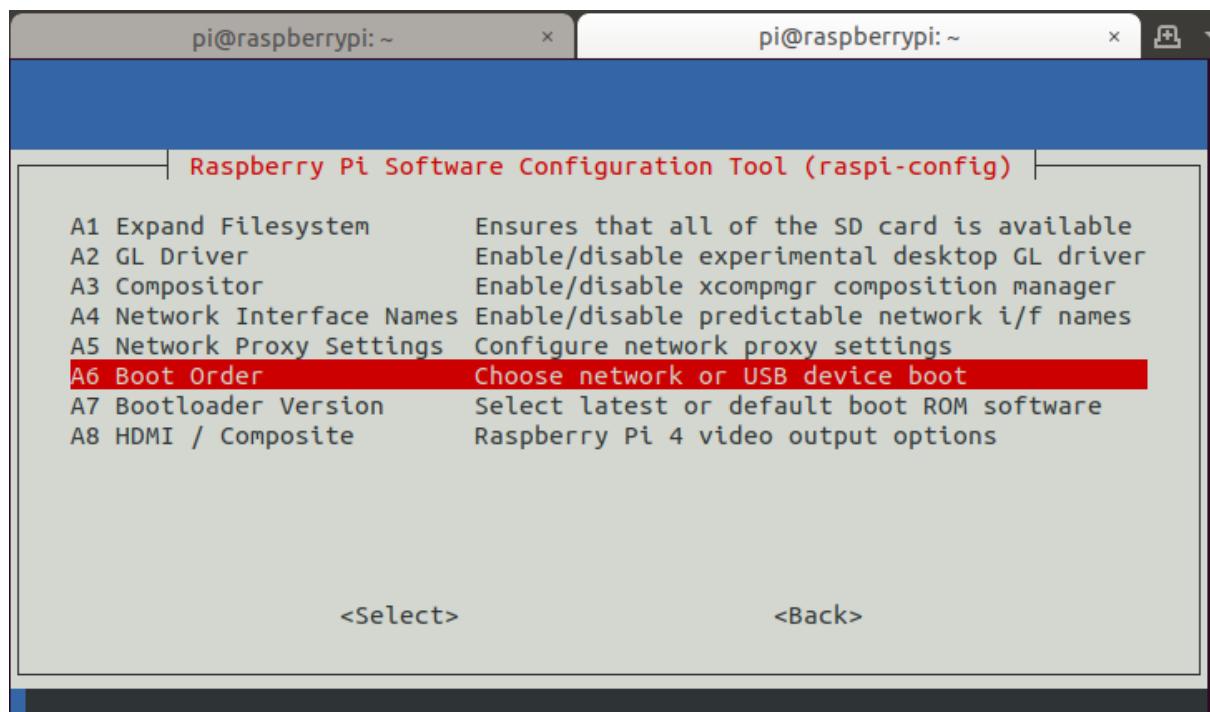
```
pi@raspberrypi:~ $ vcgencmd bootloader_version
2021/12/02 11:08:03
version 78ec57468d6bb1dd7051698539ec814d22a98c64 (release)
timestamp 1638443283
update-time 1642533428
capabilities 0x00000007f
pi@raspberrypi:~ $
```

comprobar configuración:vcgencmd bootloader_config

abrir configuración de raspberry: sudo raspi-config

Raspberry Pi 4 Model B Rev 1.2

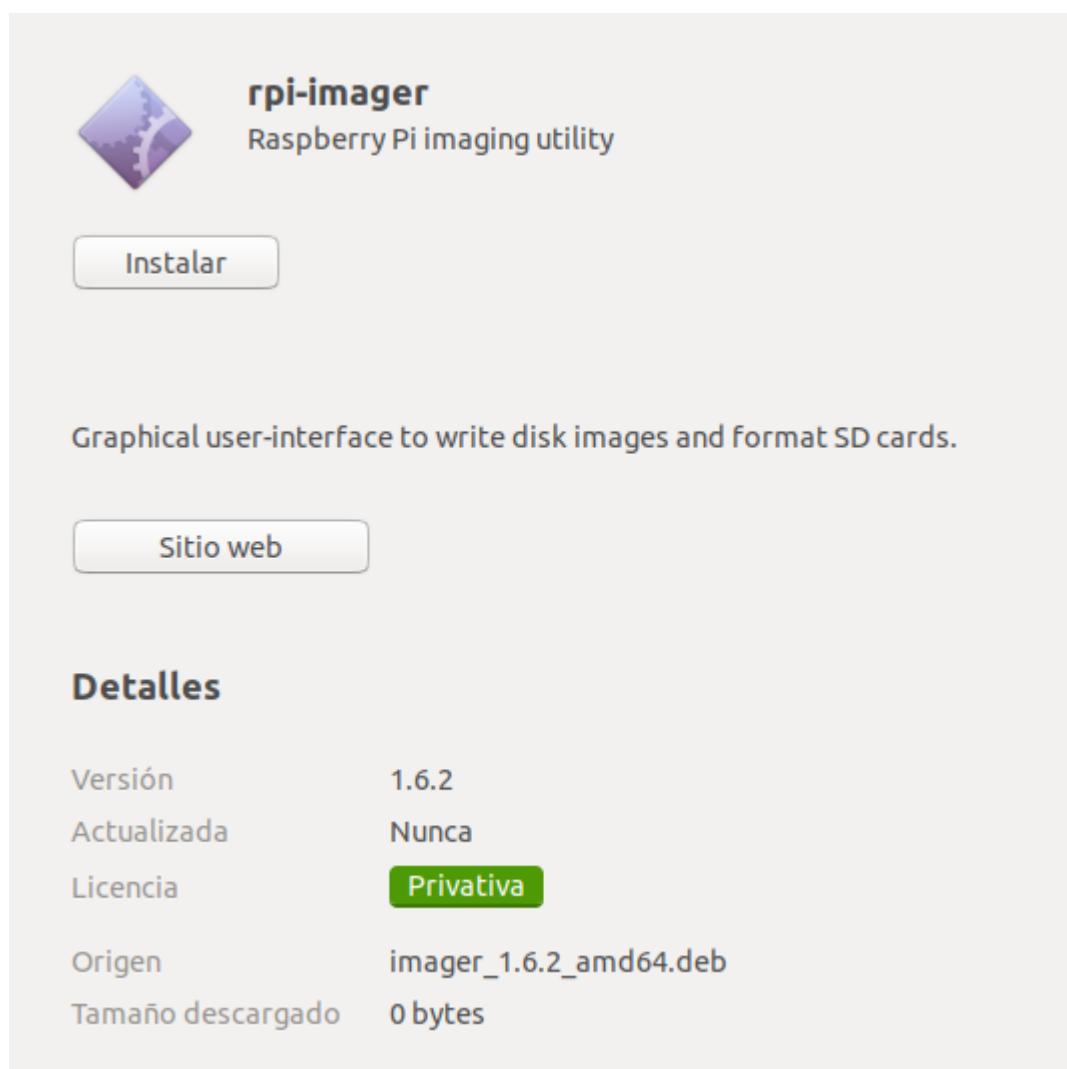




```
pi@raspberrypi:~ $ sudo -E rpi-eeprom-config --edit
```

Instalación de Raspberry Pi OS (raspbian)

```
> sudo apt install rpi-imager
```

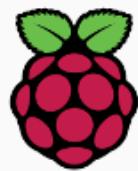
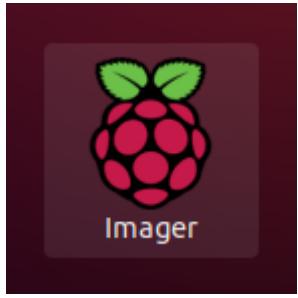


```
pi@raspberrypi: ~ x pi@raspberrypi: ~ x sudo snap install rpi-imager x
```

```
> sudo apt install rpi-imager
[sudo] contraseña para jsmartinez:
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho

No hay un paquete apt "rpi-imager", pero hay un snap con ese nombre.
Intente «snap install rpi-imager»

E: No se ha podido localizar el paquete rpi-imager
> sudo snap install rpi-imager
Descargar snap "rpi-imager" (184) del canal "stable" 77% 4.96MB/s 9.61s
```



Raspberry Pi

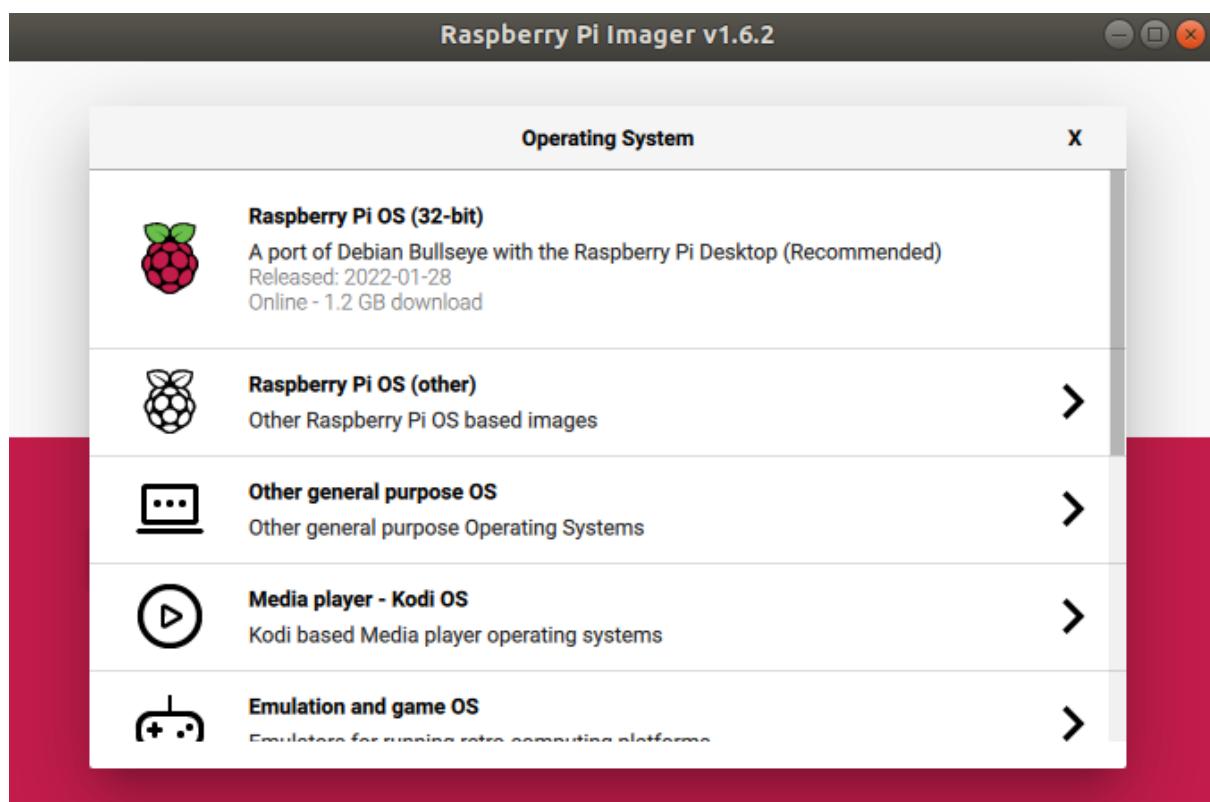
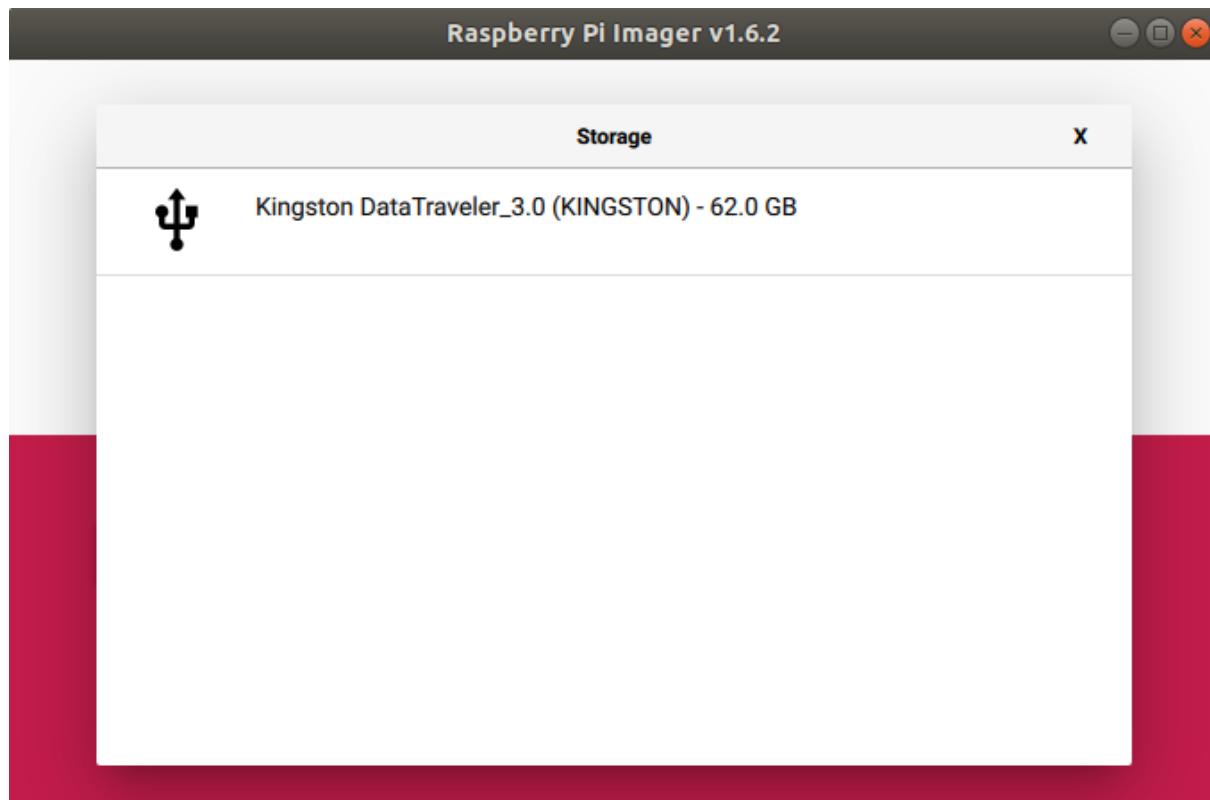
Operating System

Storage

CHOOSE OS

KINGSTON DATATRAVE...

WRITE



Raspberry Pi Imager v1.6.2

Operating System

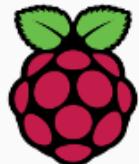
Back Go back to main menu

 **Raspberry Pi OS Lite (32-bit)**
A port of Debian Bullseye with no desktop environment
Released: 2022-01-28
Online - 0.5 GB download

 **Raspberry Pi OS Full (32-bit)**
A port of Debian Bullseye with desktop and recommended applications
Released: 2022-01-28
Online - 3.2 GB download

 **Raspberry Pi OS (Legacy)**
A port of Debian Buster with desktop with security updates
Released: 2022-01-28

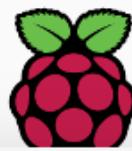
Raspberry Pi Imager v1.6.2



Raspberry Pi

Operating System Storage

RASPBERRY PI OS FULL (32-BIT) KINGSTON DATA... WRITE



Warning

X

All existing data on 'Kingston DataTraveler_3.0 (KINGSTON)' will be erased.

Are you sure you want to continue?

NO

YES



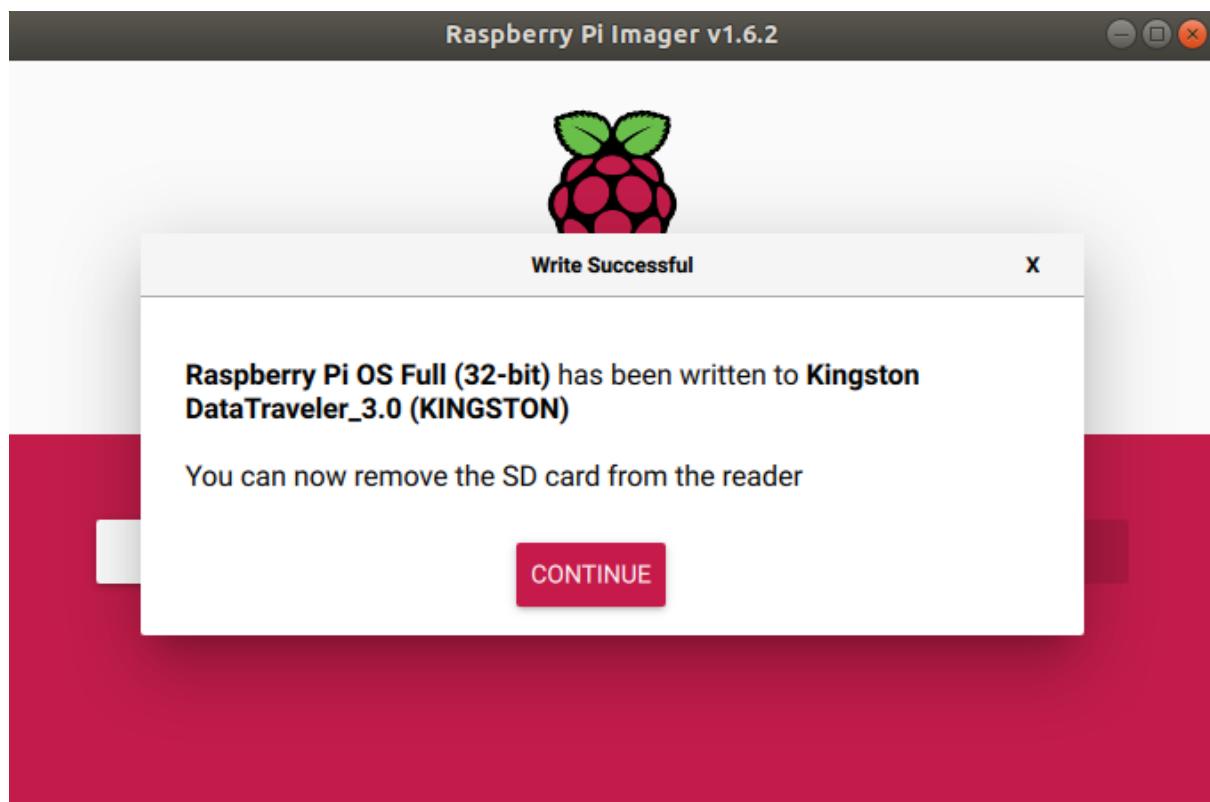
Error

X

Cannot open storage device '/dev/sdb'.

CONTINUE

```
> sudo rpi-imager
```



Se crea un archivo sin extensión llamado ssh para conectarse de despu  s forma remota a la raspberry utilizando la direcci  n IP

```

> cd boot
> ls
bcm2708-rpi-b.dtb      bcm2711-rpi-cm4.dtb   kernel7.img
bcm2708-rpi-b-plus.dtb bcm2711-rpi-cm4s.dtb kernel7l.img
bcm2708-rpi-b-rev1.dtb bootcode.bin        kernel8.img
bcm2708-rpi-cm.dtb    cmdline.txt        kernel.img
bcm2708-rpi-zero.dtb   config.txt        LICENCE.broadcom
bcm2708-rpi-zero-w.dtb COPYING.linux      overlays
bcm2709-rpi-2-b.dtb   fixup4cd.dat     start4cd.elf
bcm2710-rpi-2-b.dtb   fixup4.dat       start4db.elf
bcm2710-rpi-3-b.dtb   fixup4db.dat    start4.elf
bcm2710-rpi-3-b-plus.dtb fixup4x.dat    start4x.elf
bcm2710-rpi-cm3.dtb   fixup_cd.dat    start_cd.elf
bcm2710-rpi-zero-2.dtb fixup_dat       start_db.elf
bcm2710-rpi-zero-2-w.dtb fixup_db.dat    start.elf
bcm2711-rpi-400.dtb   fixup_x.dat     start_x.elf
bcm2711-rpi-4-b.dtb   issue.txt
> pwd
/mmedia/jsmartinez/boot
> touch ssh

```

```

> ssh pi@192.168.1.62
The authenticity of host '192.168.1.62 (192.168.1.62)' can't be established.
ECDSA key fingerprint is SHA256:qs7Txh41rn22MFHGb1iPm+pJJTkgsYck/j4bLaQdOss.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.1.62' (ECDSA) to the list of known hosts.
pi@192.168.1.62's password:
Linux raspberrypi 5.10.92-v7l+ #1514 SMP Mon Jan 17 17:38:03 GMT 2022 armv7l

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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Jan 28 01:48:30 2022

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set a new password.

Wi-Fi is currently blocked by rfkill.
Use raspi-config to set the country before use.

```

```

pi@raspberrypi:~ $ sudo apt-get update
Get:1 http://archive.raspberrypi.org/debian bullseye InRelease [23.5 kB]
Get:2 http://raspbian.raspberrypi.org/raspbian bullseye InRelease [15.0 kB]
Get:3 http://raspbian.raspberrypi.org/raspbian bullseye/main armhf Packages [13.2 MB]
Get:4 http://archive.raspberrypi.org/debian bullseye/main armhf Packages [247 kB]
Fetched 13.5 MB in 9s (1,585 kB/s)
Reading package lists... Done
pi@raspberrypi:~ $ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done

```

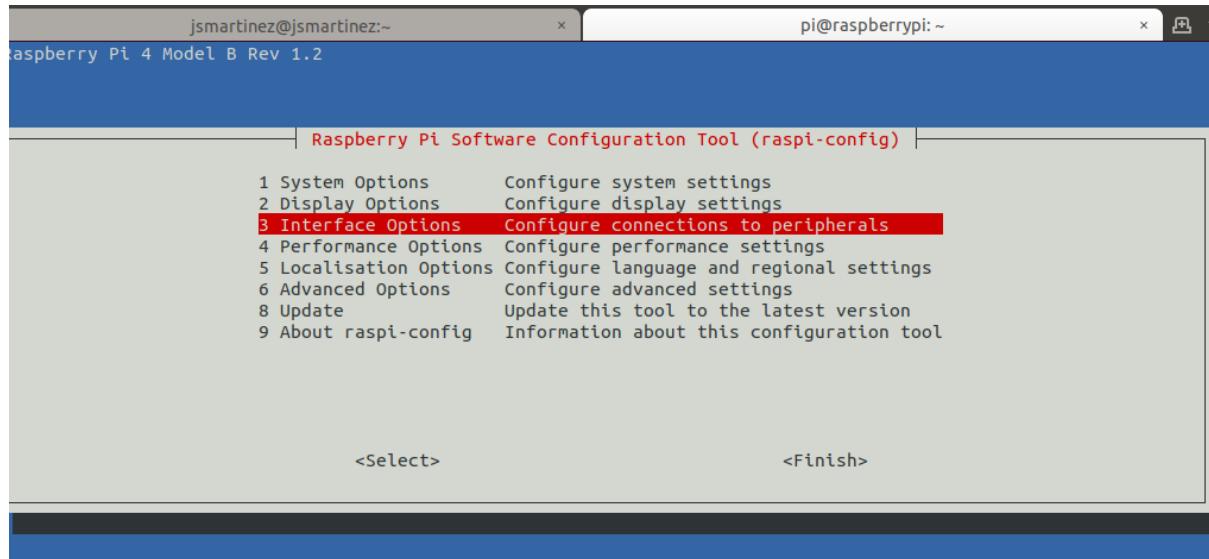
Se instala Real VNC, para ver la pantalla del sistema operativo

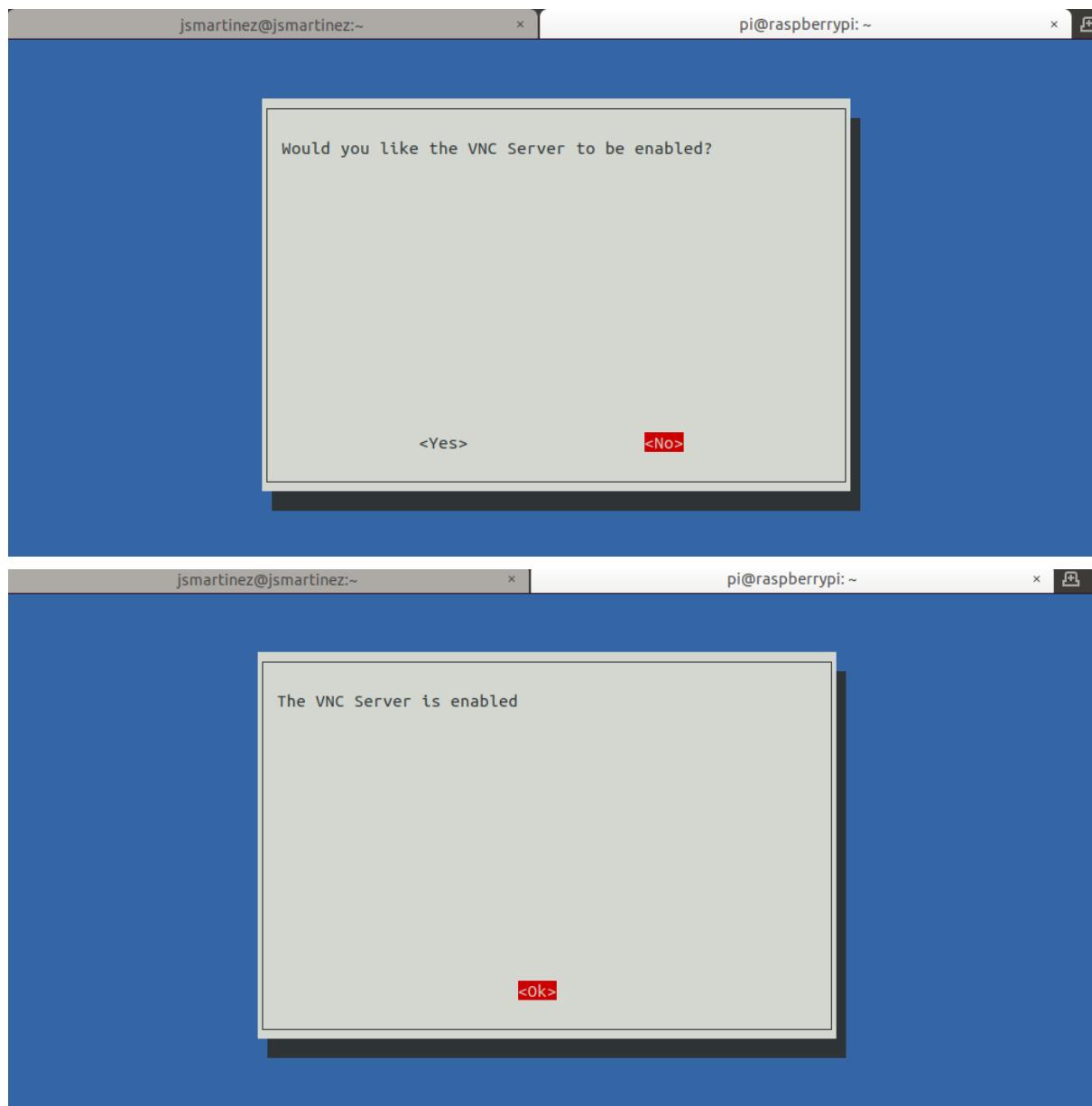
```
sudo apt-get install realvnc-vnc-viewer
```

Para poner en funcionamiento el VNC server en tu Raspberry Pi mediante la interfaz de línea de comandos necesitas la herramienta de configuración **raspi-config**, que se inicia de la siguiente manera:

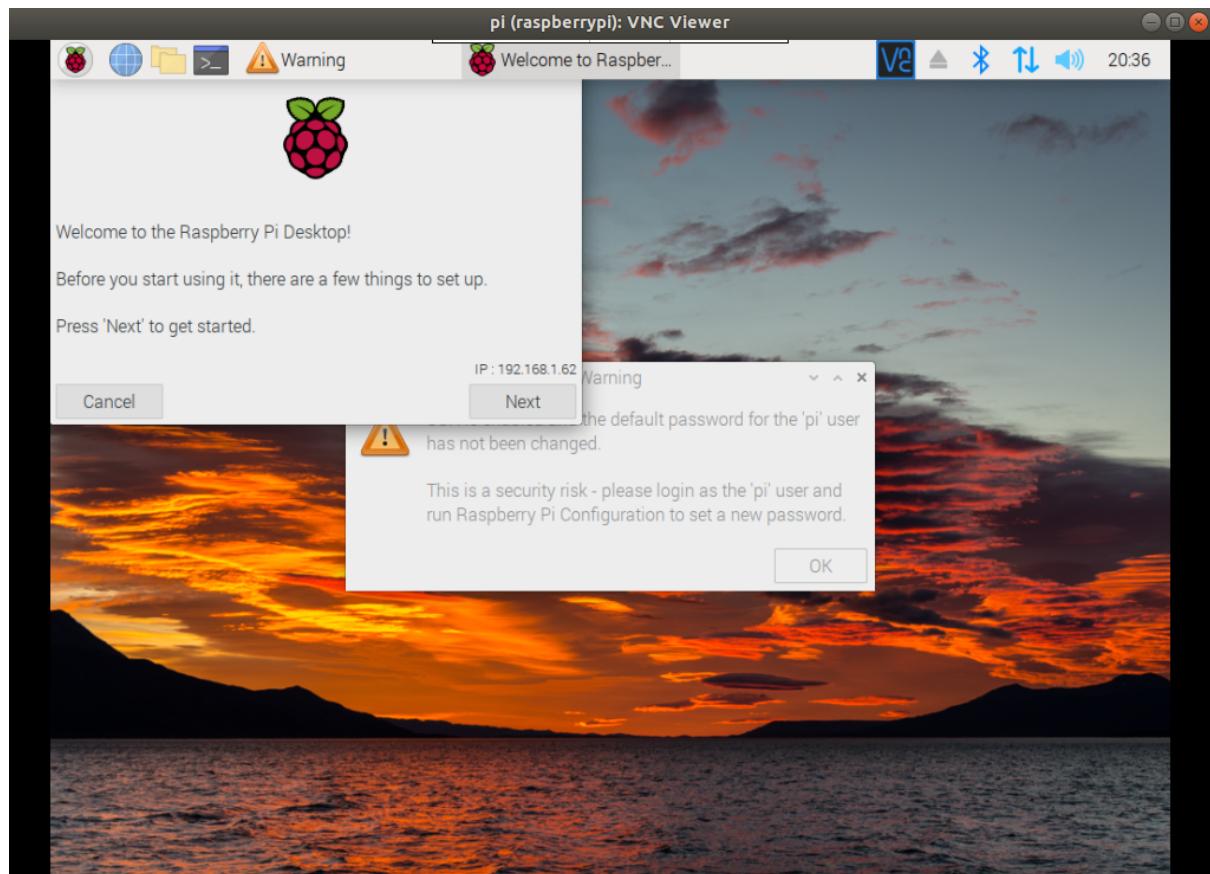
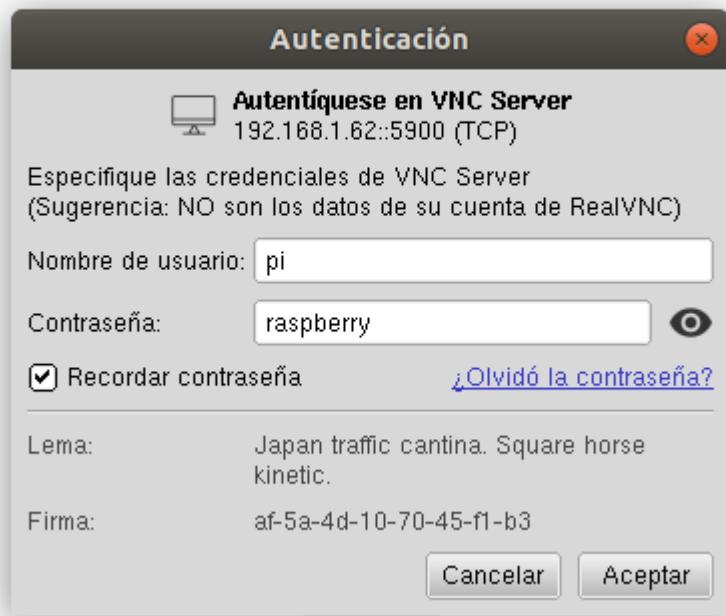
```
sudo raspi-config
```

Navega hasta llegar al botón “**Interfacing Options**” (opciones de interconexión) y desplaza el ratón hasta la opción “VNC” para activarlo en última instancia pulsando “Yes”. Tras activar el servidor, este se iniciará automáticamente al arrancar el Raspberry Pi.





Real VNC viewer



```
> ssh pi@192.168.1.72
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED! @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@IT IS POSSIBLE THAT SOMEONE IS DOING SOMETHING NASTY!
Someone could be eavesdropping on you right now (man-in-the-middle attack)!
It is also possible that a host key has just been changed.
The fingerprint for the ECDSA key sent by the remote host is
SHA256:qs7Txh41rn22MFHGb1iPm+pJJTkgSYck/j4bLaQd0ss.
Please contact your system administrator.
Add correct host key in /home/jsmartinez/.ssh/known_hosts to get rid of this message.
Offending ECDSA key in /home/jsmartinez/.ssh/known_hosts:2
remove with:
  ssh-keygen -f "/home/jsmartinez/.ssh/known_hosts" -R "192.168.1.72"
ECDSA host key for 192.168.1.72 has changed and you have requested strict checking.
Host key verification failed.
>
> ssh-keygen -f "/home/jsmartinez/.ssh/known_hosts" -R "192.168.1.72"
# Host 192.168.1.72 found: line 2
/home/jsmartinez/.ssh/known_hosts updated.
Original contents retained as /home/jsmartinez/.ssh/known_hosts.old
> ssh pi@192.168.1.72
The authenticity of host '192.168.1.72 (192.168.1.72)' can't be established.
ECDSA key fingerprint is SHA256:qs7Txh41rn22MFHGb1iPm+pJJTkgSYck/j4bLaQd0ss.
Are you sure you want to continue connecting (yes/no)? yes
```

```
pi@raspberrypi:~ $ sudo apt-get install \
>     apt-transport-https \
>     ca-certificates \
>     curl \
>     gnupg \
>     lsb-release
Reading package lists... Done
Building dependency tree... 50%
```

DOCKER

<https://docs.docker.com/engine/install/debian/>

Configurar el repositorio

1. Actualice el índice de paquetes e instale paquetes para permitir apt el uso de un repositorio a través de HTTPS:

```

pi@raspberrypi:~ $ sudo apt-get update
Obj:1 http://archive.raspberrypi.org/debian bullseye InRelease
Obj:2 http://raspbian.raspberrypi.org/raspbian bullseye InRelease
Leyendo lista de paquetes... Hecho
pi@raspberrypi:~ $ sudo apt-get install \
    ca-certificates \
    curl \
    gnupg \
    lsb-release
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias... Hecho
Leyendo la información de estado... Hecho
ca-certificates ya está en su versión más reciente (20210119).
curl ya está en su versión más reciente (7.74.0-1.3+deb11u1).
gnupg ya está en su versión más reciente (2.2.27-2).
lsb-release ya está en su versión más reciente (11.1.0+rpi1).
fijado lsb-release como instalado manualmente.
El paquete indicado a continuación se instaló de forma automática y ya no es necesario.
  libfuse2
Utilice «sudo apt autoremove» para eliminarlo.
0 actualizados, 0 nuevos se instalarán, 0 para eliminar y 0 no actualizados.

```

2. Agregue la clave GPG oficial de Docker:

```
$ curl -fsSL https://download.docker.com/linux/debian/gpg | sudo gpg
--dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
```

```

pi@raspberrypi:~ $ curl -fsSL https://download.docker.com/linux/debian/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg

```

3. Utilice el siguiente comando para configurar el repositorio **estable** . Para agregar el repositorio **nocturno** o **de prueba** , agregue la palabra **o test**(o ambas) después de la palabra **stable** en los comandos a continuación. [Más información sobre los canales nocturnos y de prueba](#) .

```
$ echo \ "deb [arch=$(dpkg --print-architecture)
signed-by=/usr/share/keyrings/docker-archive-keyring.gpg]
https://download.docker.com/linux/debian \
$(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list >
/dev/null
```

```

pi@raspberrypi:~ $ echo \
"deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] https://download.docker.com/linux/debian \
$(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
pi@raspberrypi:~ $ 

```

-Instalar el motor Docker

Este procedimiento funciona para Debian en x86_64/ amd64, armhf, arm64 y Raspbian.

Actualice el apt índice del paquete e instale la *última versión* de Docker Engine y containerd, o vaya al siguiente paso para instalar una versión específica:

```
$ sudo apt-get update
```

```
pi@raspberrypi:~ $ sudo apt-get update
Des:1 https://download.docker.com/linux/debian bullseye InRelease [43,3 kB]
Obj:2 http://raspbian.raspberrypi.org/raspbian bullseye InRelease
Obj:3 http://archive.raspberrypi.org/debian bullseye InRelease
Des:4 https://download.docker.com/linux/debian bullseye/stable armhf Packages [6.630 B]
Descargados 50,0 kB en 1s (37,2 kB/s)
Leyendo lista de paquetes... Hecho
pi@raspberrypi:~ $
```

1. \$ sudo apt-get install docker-ce docker-ce-cli containerd.io

```
pi@raspberrypi:~ $ sudo apt-get install docker-ce docker-ce-cli containerd.io
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias... Hecho
Leyendo la información de estado... Hecho
El paquete indicado a continuación se instaló de forma automática y ya no es necesario.
  libfuse2
Utilice «sudo apt autoremove» para eliminarlo.
Se instalarán los siguientes paquetes adicionales:
  docker-ce-rootless-extras iptables libip6tc2 libnetfilter-conntrack3 libnfnetlink0 libslirp0 slirp4netns
Paquetes sugeridos:
  cgroupfs-mount | cgroup-lite firewalld
Se instalarán los siguientes paquetes NUEVOS:
  containerd.io docker-ce docker-ce-cli docker-ce-rootless-extras iptables libip6tc2 libnetfilter-conntrack3
  libnfnetlink0 libslirp0 slirp4netns
0 actualizados, 10 nuevos se instalarán, 0 para eliminar y 0 no actualizados.
Se necesita descargar 71,4 MB de archivos.
Se utilizarán 293 MB de espacio de disco adicional después de esta operación.
¿Desea continuar? [S/n] $
```

Para verificar que docker funciona correctamente

```
pi@raspberrypi:~ $ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
9b157615502d: Pull complete
Digest: sha256:507ecde44b8eb741278274653120c2bf793b174c06ff4eaa672b713b3263477b
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.
```

To generate this message, Docker took the following steps:

1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
(arm32v7)
3. The Docker daemon created a new container from that image which runs the executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it to your terminal.

To try something more ambitious, you can run an Ubuntu container with:

```
$ docker run -it ubuntu bash
```

Share images, automate workflows, and more with a free Docker ID:
<https://hub.docker.com/>

For more examples and ideas, visit:
<https://docs.docker.com/get-started/>

```
pi@raspberrypi:~ $
```

¿Hay alguna máquina corriendo sobre mi docker?-rta no
\$sudo docker ps

```
pi@raspberrypi:~ $ sudo docker ps
CONTAINER ID        IMAGE               COMMAND       CREATED          STATUS          PORTS          NAMES
pi@raspberrypi:~ $
```

Instalación de Portainer en la Raspberry Pi

<https://pimylifeup.com/raspberry-pi-portainer/>

Ahora que hemos preparado nuestra Raspberry Pi, finalmente podemos instalar el software Portainer.

Afortunadamente para nosotros, este es un proceso muy simple ya que Portainer se ejecuta dentro de un contenedor Docker.

1. Con Docker instalado y configurado, podemos usarlo para instalar Portainer en nuestra Raspberry Pi.

Como Portainer está disponible como contenedor de Docker en el [hub oficial de Docker](#), podemos obtener la última versión con el siguiente comando.

```
sudo docker pull portainer/portainer-ce:latest
```

Este comando descargará la imagen de la ventana acopable a su dispositivo, lo que nos permitirá ejecutarla.

Usando "[:linux-arm](#)" al final de la solicitud de extracción, le pedimos explícitamente que descargue la versión ARM del contenedor.

```
pi@raspberrypi:~ $ sudo docker pull portainer/portainer-ce:latest
latest: Pulling from portainer/portainer-ce
0ea73420e2bb: Pull complete
c367f59be2e1: Pull complete
4bb294c1afcb: Downloading [=====>] 55.37MB/76.57MB
```

```
pi@raspberrypi:~ $ sudo docker pull portainer/portainer-ce:latest
latest: Pulling from portainer/portainer-ce
0ea73420e2bb: Pull complete
c367f59be2e1: Pull complete
4bb294c1afcb: Pull complete
Digest: sha256:4f126c5114b63e9d1bceb4b368944d14323329a9a0d4e7bb7eb53c9b7435d498
Status: Downloaded newer image for portainer/portainer-ce:latest
docker.io/portainer/portainer-ce:latest
```

2. Una vez que Docker termine de descargar la imagen de Portainer en su Raspberry Pi, ya podemos ejecutarlo.

Decirle a Docker que ejecute este contenedor requiere que pasemos algunos parámetros adicionales.

En la terminal de su Pi, ejecute el siguiente comando para iniciar Portainer.

```
$ sudo docker run -d -p 9000:9000 --name=portainer --restart=always -v
/var/run/docker.sock:/var/run/docker.sock -v portainer_data:/data portainer/portainer-ce:latest
```

Algunas de las cosas importantes que hacemos aquí son definir primero los puertos a los que queremos que Portainer tenga acceso. En nuestro caso, este será port [9000](#).

Asignamos a este contenedor docker el nombre “portainer” para que podamos identificarlo rápidamente si alguna vez lo necesitamos.

Además, también le decimos al administrador de Docker que queremos que reinicie este Docker si alguna vez se desconecta involuntariamente.

```
pi@raspberrypi:~ $ sudo docker run -d -p 9000:9000 --name=portainer --restart=always -v /var/run/docker.sock:/var/run/docker.sock -v portainer_data:/data portainer/portainer-ce:latest
b34a68c038f277890c025a738d5ff5b2946a5add8a971007c8c070c2f26ad103
pi@raspberrypi:~ $
```

Ahora ya está instalado el portainer que funciona como un contenedor en docker.

```
pi@raspberrypi:~ $ sudo docker ps
CONTAINER ID        IMAGE               COMMAND             CREATED            STATUS              PORTS
 NAMES
b34a68c038f2      portainer/portainer-ce:latest   "/portainer"       45 seconds ago    Up 43 seconds   8000/tcp, 9443/tcp
 , 0.0.0.0:9000->9000/tcp, :::9000->9000/tcp   portainer
pi@raspberrypi:~ $
```

Para entrar a la parte gráfica del docker - portainer ingreso a la ip:puerto en el navegador (en mi caso <http://192.168.1.72:9000/#/init/admin>) y me pide la clave y el nombre de usuario del portainer:

- admin
- 87654321

Se crea el usuario y se elige docker como servicio del portainer

No seguro | 192.168.1.72:9000/#!/init/admin

New Portainer installation

Please create the initial administrator user.

Username	admin
Password	
Confirm password	

The password must be at least 8 characters long

Create user

Allow collection of anonymous statistics. You can find more information about this in our [privacy policy](#).

No seguro | 192.168.1.72:9000/#!/wizard

Quick Setup

Environment Wizard

Welcome to Portainer

We have connected your local environment of docker to Portainer. Get started below with your local portainer or connect more container environments.

Get Started
Proceed using the local environment which Portainer is running in

Add Environments
Connect to other environments

admin
[my account](#) [log out](#)

The screenshot shows the Portainer.io interface with the following details:

- Host Overview:** Docker host named **raspberrypi**.
- Host Details:**
 - Hostname: **raspberrypi**
 - OS Information: **linux armv7l Raspbian GNU/Linux 11 (bullseye)**
 - Kernel Version: **5.10.92-v7l+**
 - Total CPU: **4**
 - Total memory: **4 GB**
- Engine Details:**
 - Version: **20.10.12 (API: 1.41)**
 - Root directory: **/var/lib/docker**
 - Storage Driver: **overlay2**
 - Logging Driver: **json-file**
 - Volume Plugins: **local**
 - Network Plugins: **bridge, host, ipvlan, macvlan, null, overlay**

Montar otros servicios en DOCKER -PORTAINER:
COMO MOSQUITTO, NGINX, VERNE, ETC

MOSQUITTO

Se va a crear un directorio en la carpeta raíz de la raspberry que se llame docker

\$ cd

\$ mkdir docker

En esa carpeta voy a alojar las diferentes máquinas que voy a montar sobre el docker
(como mosquitto, vernemq, nginx, apache, etc)

creo una carpeta para mosquitto

\$ cd docker

\$ mkdir mosquitto

```
pi@raspberrypi:/boot $ cd
pi@raspberrypi:~ $ pwd
/home/pi
pi@raspberrypi:~ $ mkdir docker
pi@raspberrypi:~ $ cd docker
pi@raspberrypi:~/docker $ pwd
/home/pi/docker
pi@raspberrypi:~/docker $ mkdir mosquitto
pi@raspberrypi:~/docker $ ls
mosquitto
pi@raspberrypi:~/docker $
```

Se crean dos directorios dentro de la carpeta mosquitto: data y config

```
pi@raspberrypi:~/docker/mosquitto $ mkdir data config
pi@raspberrypi:~/docker/mosquitto $ ls
config data
pi@raspberrypi:~/docker/mosquitto $
```

De manera gráfica en el portainer —containers/add container

Container list

Name	State	Quick actions	Stack	Image	Created	IP Address	Published Ports	Ownership
portainer	running	[Start, Stop, Kill, Restart, Pause, Resume, Remove]	-	portainer/portainer-ce:latest	2022-02-01 17:29:49	172.17.0.2	9000:9000	admin
vibrant_sammel	stopped	[Start, Stop, Kill, Restart, Pause, Resume, Remove]	-	hello-world	2022-02-01 17:01:25	-	-	admin

https://hub.docker.com/_/eclipse-mosquitto

pongo un nombre, copio la imagen eclipse-mosquitto, expongo los puertos 1883:1883

Create container

Name: mosquito

Image configuration

Registry: DockerHub (anonymous)

Image: docker.io/eclipse-mosquitto

Always pull the image:

You are currently using an anonymous account to pull images from DockerHub and will be limited to 100 pulls every 6 hours. You can configure DockerHub authentication in the [Registries View](#). Remaining pulls: 100/100

Network ports configuration

Publish all exposed network ports to random host ports:

Manual network port publishing: publish a new network port

host	1883	→	container	1883	TCP	UDP	<input type="button" value="Add"/>
------	------	---	-----------	------	-----	-----	------------------------------------

Hago deploy al contenedor y miro los logs y dice que no lo ha podido lanzar, se debe configurar bien

Log viewer settings

Auto-refresh logs

Wrap lines

Display timestamps

Fetch: All logs

Search: Filter...

Lines: 100

Actions: Download logs, Copy, Copy selected lines, Unselect

```

1643896036: mosquitto version 2.0.14 starting
1643896036: Config loaded from /mosquitto/config/mosquitto.conf.
1643896036: Starting in local only mode. Connections will only be possible from clients running on this machine.
1643896036: Create a configuration file which defines a listener to allow remote access.
1643896036: For more details see https://mosquitto.org/documentation/authentication-methods/
1643896036: Opening ipv4 listen socket on port 1883.
1643896036: Opening ipv6 listen socket on port 1883.
1643896036: Error: Address not available
1643896036: mosquitto version 2.0.14 running

```

En configuración avanzada de contenedor → Volumes

Se agregan las rutas de las carpetas data y config creadas anteriormente pero debo sacar la información de config que se creó cuando puse a correr el contenedor por primera vez

```

pi@raspberrypi:~/docker/mosquitto $ sudo docker cp mosquitto:/mosquitto/config .
pi@raspberrypi:~/docker/mosquitto $ cd config/
pi@raspberrypi:~/docker/mosquitto/config $ ls
mosquitto.conf

```

Advanced container settings

Command & logging	Volumes	Network	Env	Labels	Restart policy	Runtime & Resources	Capabilities
	Volumes						
Volume mapping + map additional volume							
container	/mosquitto/data	Volume	Bind	<input checked="" type="checkbox"/>			
→ host	/home/pi/docker/mosquitto/data	Writable	Read-only				
container	/mosquitto/config	Volume	Bind	<input checked="" type="checkbox"/>			
→ host	/home/pi/docker/mosquitto/config	Writable	Read-only				

Lo que va a hacer es mapear las rutas del contenedor a una dirección (carpeta) específica dentro de la raspberry

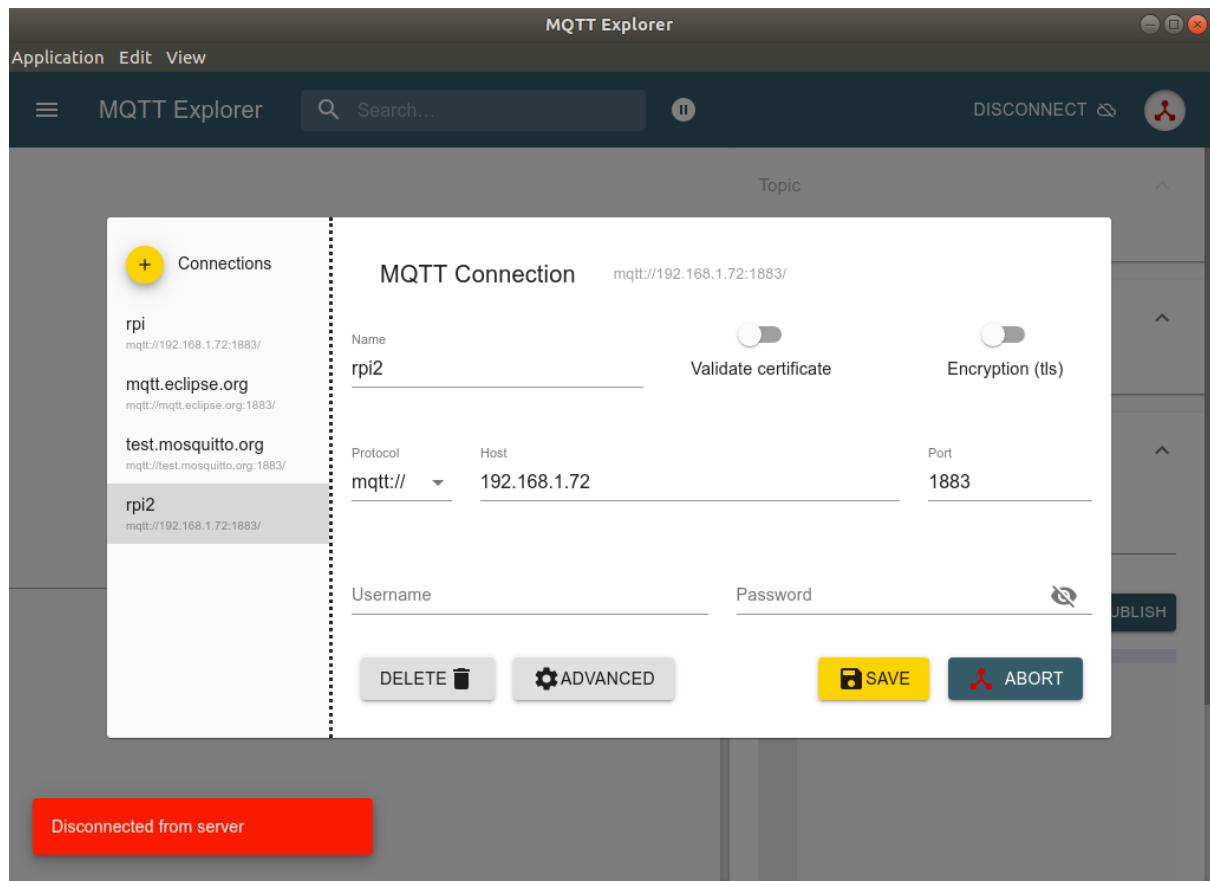
Le doy en deploy container

Containers									<input type="checkbox"/> Columns	<input type="checkbox"/> Settings
	<input type="button"/> Start	<input type="button"/> Stop	<input type="button"/> Kill	<input type="button"/> Restart	<input type="button"/> Pause	<input type="button"/> Resume	<input type="button"/> Remove	<input type="button"/> + Add container		
<input type="text"/> Search...										
	Name	State <input type="button"/>	Quick actions	Stack	Image	Created	IP Address	Published Ports	Ownership	
<input type="checkbox"/>	mosquitto	running	<input type="button"/> <input type="button"/> <input type="button"/> <input type="button"/> <input type="button"/>	-	eclipse-mosquitto:latest	2022-02-03 09:06:57	172.17.0.3	<input type="button"/> 1883:1883	<input type="checkbox"/> administrators	
<input type="checkbox"/>	portainer	running	<input type="button"/> <input type="button"/> <input type="button"/> <input type="button"/> <input type="button"/>	-	portainer/portainer-ce:latest	2022-02-01 17:29:49	172.17.0.2	<input type="button"/> 9000:9000	<input type="checkbox"/> administrators	
<input type="checkbox"/>	vibrant_sammet	stopped	<input type="button"/> <input type="button"/>	-	hello-world	2022-02-01 17:01:25	-	-	<input type="checkbox"/> administrators	

sudo chmod -R 0777 mosquitto/

```
pi@raspberrypi:~/docker $ ls -la
total 12
drwxr-xr-x  3 pi pi 4096 feb  3 08:20 .
drwxr-xr-x 16 pi pi 4096 feb  3 08:19 ..
drwxr-xr-x  4 pi pi 4096 feb  3 08:56 mosquitto
pi@raspberrypi:~/docker $ sudo chmod -R 0777 mosquitto/
pi@raspberrypi:~/docker $ ls -la
total 12
drwxr-xr-x  3 pi pi 4096 feb  3 08:20 .
drwxr-xr-x 16 pi pi 4096 feb  3 08:19 ..
drwxrwxrwx  4 pi pi 4096 feb  3 08:56 mosquitto
pi@raspberrypi:~/docker $
```

En el log de portainer contenedor mosquitto aparece que la dirección no está disponible y tampoco se puede conectar por mqtt explorer.



razón por la que se debe configurar el archivo mosquitto.conf se debe agregar el listener.

The screenshot shows a log viewer with the following configuration:

- Auto-refresh logs**: Enabled (green switch)
- Wrap lines**: Enabled (green switch)
- Display timestamps**: Disabled (gray switch)
- Fetch**: Set to "All logs"
- Search**: Input field containing "Filter..."
- Lines**: Set to 100
- Actions**: Buttons for "Download logs", "Copy", "Copy selected lines", and "Unselect".

The log output area displays the following MQTT messages:

```

1643897220: mosquitto version 2.0.14 starting
1643897220: Config loaded from /mosquitto/config/mosquitto.conf.
1643897220: Starting in local only mode. Connections will only be possible from clients running on this machine.
1643897220: Create a configuration file which defines a listener to allow remote access.
1643897220: For more details see https://mosquitto.org/documentation/authentication-methods/
1643897220: Opening ipv4 listen socket on port 1883.
1643897220: Opening ipv6 listen socket on port 1883.
1643897220: Error: Address not available
1643897220: mosquitto version 2.0.14 running
1643897565: mosquitto version 2.0.14 terminating
1643897567: mosquitto version 2.0.14 starting
1643897567: Config loaded from /mosquitto/config/mosquitto.conf.
1643897567: Starting in local only mode. Connections will only be possible from clients running on this machine.
1643897567: Create a configuration file which defines a listener to allow remote access.
1643897567: For more details see https://mosquitto.org/documentation/authentication-methods/
1643897567: Opening ipv4 listen socket on port 1883.
1643897567: Opening ipv6 listen socket on port 1883.
1643897567: Error: Address not available
1643897567: mosquitto version 2.0.14 running

```

Toca configurarlo mirar pagina

<https://stackoverflow.com/questions/45260068/setting-up-mosquitto-on-home-server>

Así es como funcionará:

1.) Configurar mosquitto.conf como

```

listener 1883 0.0.0.0
#cafile <path to ca file>
#certfile <path to server cert>
#keyfile <path to server key>
#require_certificate false

```

0.0.0.0 vincula el servidor a todas las interfaces presentes.

Puede descomentar el código para habilitar TLS para mayor seguridad. Pero tendrás que configurar el cliente para usar lo mismo también...

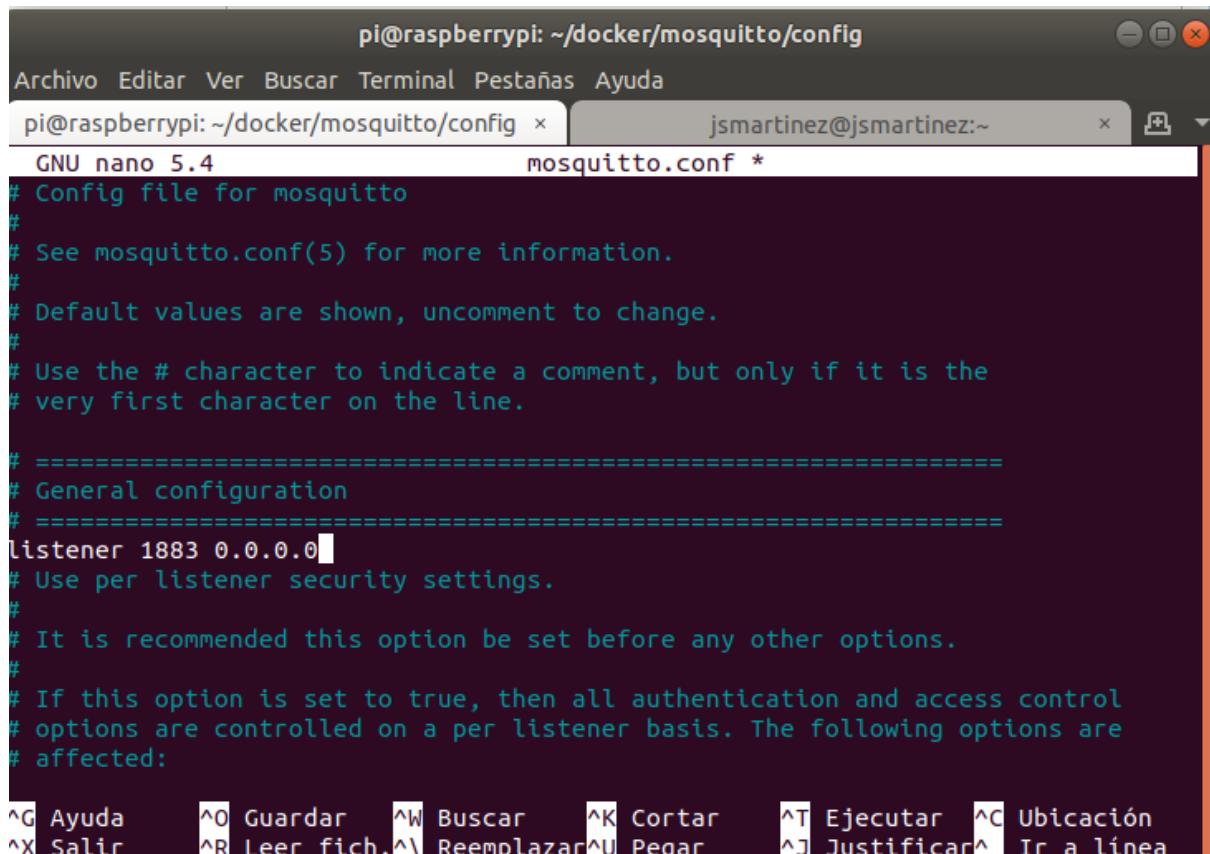
2.) El número de puerto 1883 del enrutador de reenvío de puertos al puerto 1883 de la IP de la máquina que ejecuta el intermediario.

3.) ¡Inicie el corredor y pruebe a su cliente!

Se abre el archivo mosquitto.conf

\$ nano /mosquitto/config/mosquitto.conf

Se le agrega la linea listener 18883 0.0.0.0



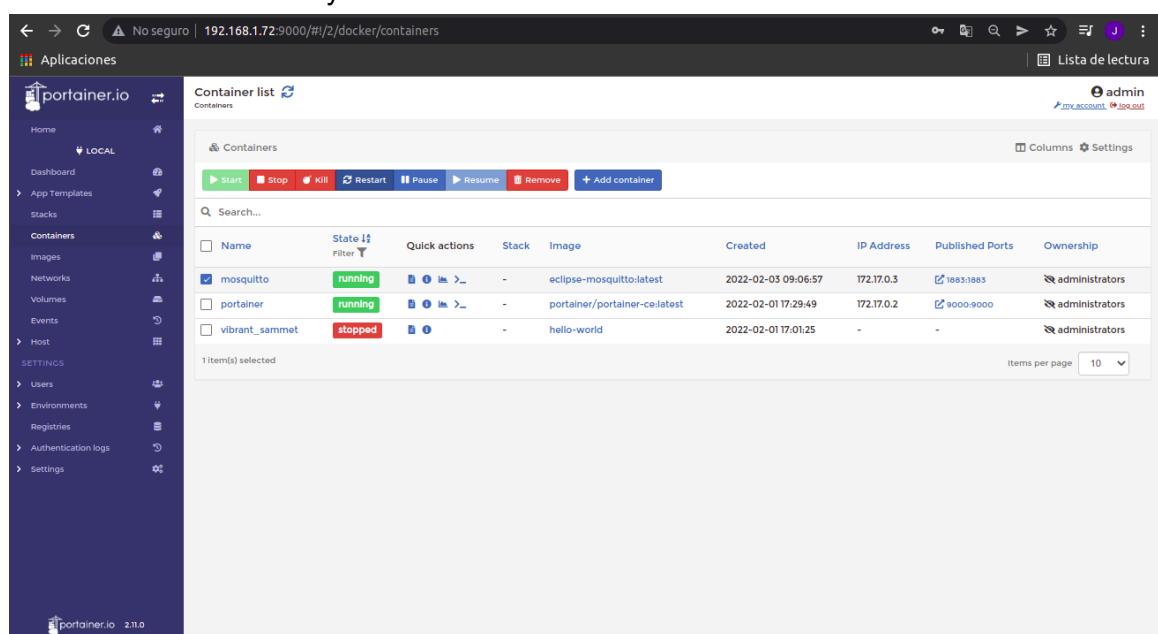
```
pi@raspberrypi: ~/docker/mosquitto/config
Archivo Editar Ver Buscar Terminal Pestañas Ayuda
pi@raspberrypi: ~/docker/mosquitto/config x jsmartinez@jmartinez:~ + ▾
GNU nano 5.4 mosquitto.conf *
# Config file for mosquitto
#
# See mosquitto.conf(5) for more information.
#
# Default values are shown, uncomment to change.
#
# Use the # character to indicate a comment, but only if it is the
# very first character on the line.

# =====
# General configuration
# =====
listener 18883 0.0.0.0
# Use per listener security settings.
#
# It is recommended this option be set before any other options.
#
# If this option is set to true, then all authentication and access control
# options are controlled on a per listener basis. The following options are
# affected:

^G Ayuda      ^O Guardar     ^W Buscar      ^K Cortar      ^T Ejecutar    ^C Ubicación
^X Salir      ^R Leer fich.  ^\ Reemplazar  ^U Pegar       ^J Justificar ^_ Ir a línea
```

Ahora se debe reiniciar el contenedor, se puede desde portainer o desde la terminal

Portainer: se selecciona y se clickea restart



Name	Status	Quick actions	Stack	Image	Created	IP Address	Published Ports	Ownership
mosquitto	running		-	eclipse-mosquitto:latest	2022-02-03 09:06:57	172.17.0.3	1883:1883	administrators
portainer	running		-	portainer/portainer-ce:latest	2022-02-01 17:29:49	172.17.0.2	9000:9000	administrators
vibrant_sammet	stopped		-	hello-world	2022-02-01 17:01:25	-	-	administrators

Sin embargo no me deja conectarme aun pues dice que el usuario no está autorizado

Auto-refresh logs

Wrap lines

Display timestamps

Fetch

Search

Lines

Actions

```
1643905445: opening ipv4 listen socket on port 1883.
1643903973: Opening ipv6 listen socket on port 1883.
1643903973: Error: Address not available
1643903973: mosquitto version 2.0.14 running
1643905415: mosquitto version 2.0.14 terminating
1643905416: mosquitto version 2.0.14 starting
1643905416: Config loaded from /mosquitto/config/mosquitto.conf.
1643905416: Opening ipv4 listen socket on port 1883.
1643905416: mosquitto version 2.0.14 running
1643905417: New connection from 192.168.1.64:53624 on port 1883.
1643905417: Client mqtt-explorer-c6ba5856 disconnected, not authorised.
1643905446: New connection from 192.168.1.64:53628 on port 1883.
1643905446: Client mqtt-explorer-70c83f79 disconnected, not authorised.
1643905449: New connection from 192.168.1.64:53630 on port 1883.
1643905449: Client mqtt-explorer-70c83f79 disconnected, not authorised.
1643905450: New connection from 192.168.1.64:53634 on port 1883.
1643905450: Client mqtt-explorer-70c83f79 disconnected, not authorised.
1643905452: New connection from 192.168.1.64:53636 on port 1883.
1643905452: Client mqtt-explorer-70c83f79 disconnected, not authorised.
1643905454: New connection from 192.168.1.64:53638 on port 1883.
1643905454: Client mqtt-explorer-70c83f79 disconnected, not authorised.
```

Se debe dar permiso para conexión anónima
en el archivo mosquito.conf, se debe descomentar allow_anonymous true

```
pi@raspberrypi: ~/docker/mosquitto/config
Archivo Editar Ver Buscar Terminal Pestañas Ayuda
pi@raspberrypi: ~/docker/mosquitto/config x jsmartinez@jsmartinez:~ x [+]
GNU nano 5.4 mosquitto.conf *
#clientid_prefixes

# Boolean value that determines whether clients that connect
# without providing a username are allowed to connect. If set to
# false then a password file should be created (see the
# password_file option) to control authenticated client access.
#
# Defaults to false, unless there are no listeners defined in the configuration
# file, in which case it is set to true, but connections are only allowed from
# the local machine.
#allow_anonymous false

#
# -----
# Default authentication and topic access control
# -----
# Control access to the broker using a password file. This file can be
# generated using the mosquitto_passwd utility. If TLS support is not compiled
# into mosquitto (it is recommended that TLS support should be included) then
# plain text passwords are used, in which case the file should be a text file

^G Ayuda ^O Guardar ^W Buscar ^K Cortar ^T Ejecutar ^C Ubicación
^X Salir ^R Leer fich.^V Reemplazar^U Pegar ^J Justificar^_ Ir a línea
```

```
pi@raspberrypi: ~/docker/mosquitto/config
Archivo Editar Ver Buscar Terminal Pestañas Ayuda
pi@raspberrypi: ~/docker/mosquitto/config x jsmartinez@jsmartinez:~ x [+]
GNU nano 5.4 mosquitto.conf *
#clientid_prefixes

# Boolean value that determines whether clients that connect
# without providing a username are allowed to connect. If set to
# false then a password file should be created (see the
# password_file option) to control authenticated client access.
#
# Defaults to false, unless there are no listeners defined in the configuration
# file, in which case it is set to true, but connections are only allowed from
# the local machine.
allow_anonymous true

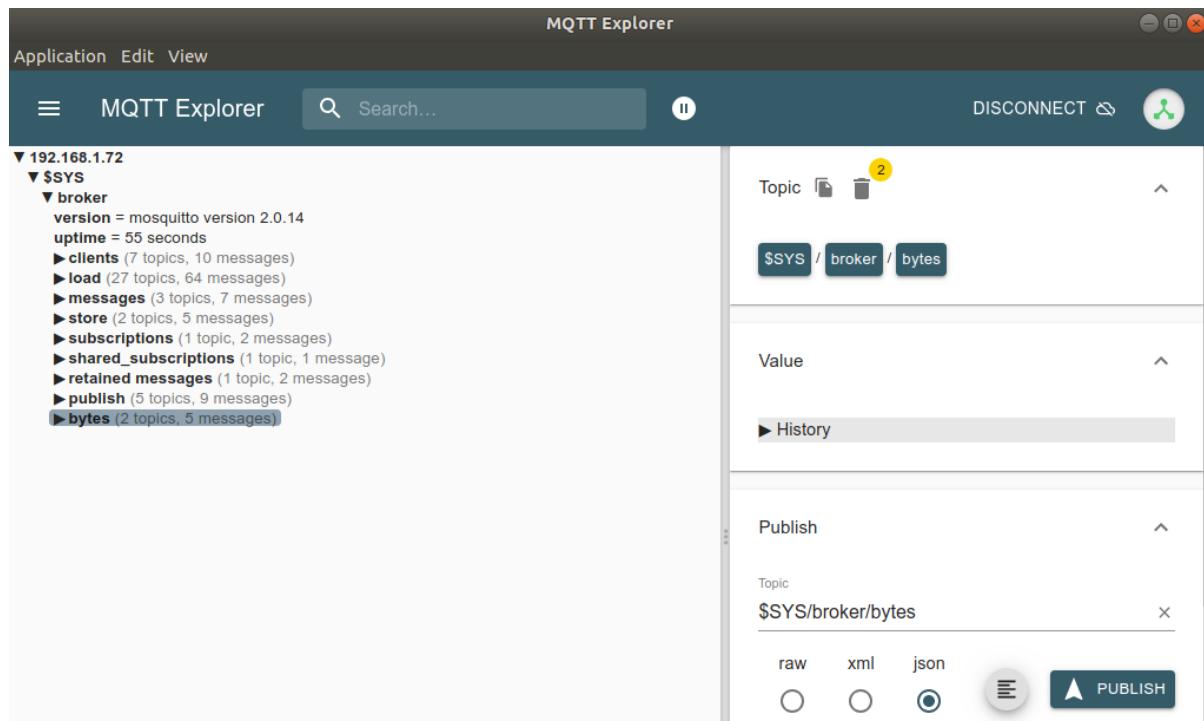
#
# -----
# Default authentication and topic access control
# -----
# Control access to the broker using a password file. This file can be
# generated using the mosquitto_passwd utility. If TLS support is not compiled
# into mosquitto (it is recommended that TLS support should be included) then
# plain text passwords are used, in which case the file should be a text file

^G Ayuda ^O Guardar ^W Buscar ^K Cortar ^T Ejecutar ^C Ubicación
^X Salir ^R Leer fich.^V Reemplazar^U Pegar ^J Justificar^_ Ir a línea
```

Ahora se va a reiniciar desde la consola
sudo docker restart mosquitto

```
pi@raspberrypi:~/docker/mosquitto/config $ sudo docker restart mosquitto  
mosquitto
```

Ahora si se puede conectar a mqtt



NGINX

Se puede agregar nginx en docker

https://hub.docker.com/_/nginx

se pone en la terminal de raspberry

```
sudo docker run --name nginx -v /some/content:/usr/share/nginx/html:ro -d nginx
```

```
pi@raspberrypi:~/docker/mosquitto/config $ sudo docker run --name nginx -v /some  
/content:/usr/share/nginx/html:ro -d nginx  
Unable to find image 'nginx:latest' locally  
latest: Pulling from library/nginx  
aaef1f1162ec: Pull complete  
158fdbcad3be: Pull complete  
e91a8f81054f: Pull complete  
5dac8ed1dcde: Pull complete  
f4ad1f3b674e: Pull complete  
83c0cd4ca302: Pull complete  
Digest: sha256:2834dc507516af02784808c5f48b7cbe38b8ed5d0f4837f16e78d00deb7e7767  
Status: Downloaded newer image for nginx:latest  
c1a09260b0de20c1358b5749c0ad5e6e8ae89e65a2a7a0cd5cf75a260df3ad4a  
pi@raspberrypi:~/docker/mosquitto/config $
```

En portainer ya aparece el servidor nginx

Container list								
Containers								
Columns Settings								
Start Stop Kill Restart Pause Resume Remove + Add container								
Search...								
Name	State	Quick actions	Stack	Image	Created	IP Address	Published Ports	Ownership
nginx	running	Stop Restart Logs Open	-	nginx	2022-02-03 13:21:33	172.17.0.4	-	administrators
mosquitto	running	Stop Restart Logs Open	-	eclipse-mosquitto:latest	2022-02-03 09:06:57	172.17.0.3	1883:1883	administrators
portainer	running	Stop Restart Logs Open	-	portainer/portainer-ce:latest	2022-02-01 17:29:49	172.17.0.2	9000:9000	administrators
vibrant_sammet	stopped	Start Logs	-	hello-world	2022-02-01 17:01:25	-	-	administrators

Toca editar en el portainer el contenedor de NGINX y toca exponer los puertos de raspberry desde la parte gráfica y pongo que el puerto 80 interno lo uno al 80 externo y pongo deploy the container

Image configuration

Registry	DockerHub (anonymous)
Image	docker.io nginx
Search	
Advanced mode	
<input checked="" type="checkbox"/> Always pull the image ? <input checked="" type="button"/>	
<small>You are currently using an anonymous account to pull images from DockerHub and will be limited to 100 pulls every 6 hours. You can configure DockerHub authentication in the Registries View. Remaining pulls: 99/100</small>	

Network ports configuration

<input checked="" type="checkbox"/> Publish all exposed network ports to random host ports ? <input checked="" type="button"/>	
<input checked="" type="checkbox"/> Manual network port publishing ? publish a new network port	
host	80
→	container
80	<input type="text"/>
	<input type="button" value="TCP"/> <input type="button" value="UDP"/> <input type="button" value="Delete"/>

Access control

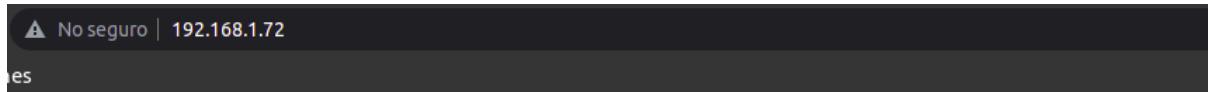
Container logs

Containers > nginx > Logs

The screenshot shows the 'Container logs' interface for the 'nginx' container. At the top, there are several configuration options: 'Auto-refresh logs' (on), 'Wrap lines' (on), 'Display timestamps' (off), 'Fetch' dropdown set to 'All logs', 'Search' input field with 'Filter...', and 'Lines' input field set to '100'. Below these are four action buttons: 'Download logs', 'Copy', 'Copy selected lines', and 'Unselect'. The main area displays the log output:

```
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2022/02/03 18:26:10 [notice] 1#1: using the "epoll" event method
2022/02/03 18:26:10 [notice] 1#1: nginx/1.21.6
2022/02/03 18:26:10 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2022/02/03 18:26:10 [notice] 1#1: OS: Linux 5.10.92-v7l+
2022/02/03 18:26:10 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2022/02/03 18:26:10 [notice] 1#1: start worker processes
2022/02/03 18:26:10 [notice] 1#1: start worker process 31
2022/02/03 18:26:10 [notice] 1#1: start worker process 32
2022/02/03 18:26:10 [notice] 1#1: start worker process 33
2022/02/03 18:26:10 [notice] 1#1: start worker process 34
```

En el log de nginx ya aparece funcionando y en el navegador debe aparecer 403 forbidden sobre el nginx



403 Forbidden

nginx/1.21.6

Toca mapear la ruta a la que se dirige en /usr/share/nginx/html y como no existe vamos a crearlo

The screenshot shows the Docker interface. In the top section, under 'Volumes', there is one entry: 'Host/volume' is '/some/content' and 'Path in container' is '/usr/share/nginx/html'. Below this, under 'Connected networks', there is one network listed: 'bridge' with IP 172.17.0.4, Gateway 172.17.0.1, and MAC 02:42:ac:11:00:04. There is a red 'Leave network' button next to it.

```
pi@raspberrypi:/usr/share $ sudo mkdir /usr/share/nginx
pi@raspberrypi:/usr/share $ sudo mkdir /usr/share/nginx/html
pi@raspberrypi:/usr/share $ sudo chmod -R 777 /usr/share/nginx/html
pi@raspberrypi:/usr/share/nginx/html $ 
```

y se crean 2 archivos ahí dentro, un index.html y una carpeta con un estilo.css dentro

```
pi@raspberrypi:/usr/share/nginx/html $ touch index.html
pi@raspberrypi:/usr/share/nginx/html $ mkdir css
pi@raspberrypi:/usr/share/nginx/html $ cd css
pi@raspberrypi:/usr/share/nginx/html/css $ touch estilo.css
pi@raspberrypi:/usr/share/nginx/html/css $ cd ..
pi@raspberrypi:/usr/share/nginx/html $ ls
css  estilo  index.html
```

```
pi@raspberrypi:/usr/share/nginx/html $ tree
.
└── css
    └── estilo.css
└── index.html
```

y se editan los contenidos de esos archivos

```
<html>
  <head>
    <title>
      Embebidos - Telemetria apicola
    </title>
    <link rel="stylesheet" href="css/estilo.css" />
  </head>
  <body>
    <div id="container">
      <div id="cabecera">
        Esta web es una prueba de Nginx para montar un servicio web
        <span id="tagline">Telemetria Apicola</span>
      </div>
      <div id="post">
        <h1>parrago 0</h1>
        <p>parrago 1</p>
        <p>Parrago 2</p>
        <p>parrago 3</p>
      </div>
      <div id="footer">
        Ejemplo de servicio web
      </div>
    </div>
  </body>
</html>
```

```

1 body
2 {
3     background: black;
4     color: blue;
5     text-align: center;
6     font-family: "Arial";
7     font-size: 20px;
8 }
9 #cabecera
10 [
11     background: black;
12     box-shadow: 0px 2px 20px 0px rgba(0, 0, 0, 75);
13     color: white;
14     font-weight: bold;
15     margin: 0;
16     padding: 0.5em 0 0.5em 2em;
17 ]
18 #cabecera #logo
19 {
20     width: 20px;
21     vertical-align: middle;
22 }
23 #cabecera #tagline

```

Se debe editar el contenedor desde portainer y agregar la ruta en volumes

The screenshot shows two separate configurations for Docker containers in Portainer. Both configurations are set to 'Volumes' mode.

- Top Configuration:**
 - Container Volume: /usr/share/nginx/html
 - Host Volume: /some/content
 - Mode: Bind
 - Access: Writable
- Bottom Configuration:**
 - Container Volume: /usr/share/nginx/html
 - Host Volume: /home/pi/docker/nginx/html
 - Mode: Bind
 - Access: Writable

El .html y css deben estar en esta ruta no en la otra entonces vamos a copiarlos a esta ruta desde consola

```

pi@raspberrypi:~/docker/nginx/html $ sudo cp /usr/share/nginx/html/index.html .
pi@raspberrypi:~/docker/nginx/html $ sudo cp /usr/share/nginx/html/css/ .
cp: -r not specified; omitting directory '/usr/share/nginx/html/css/'
pi@raspberrypi:~/docker/nginx/html $ sudo cp -ri /usr/share/nginx/html/css/ .
pi@raspberrypi:~/docker/nginx/html $ ls
css  index.html

```

Se va a probar ahora síesta corriendo una pagina web desde el navegador



Se instala visual studio code en la raspberry

```
pi@raspberrypi:~ $ sudo apt install code
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias... Hecho
Leyendo la información de estado... Hecho
El paquete indicado a continuación se instaló de forma automática y ya no es necesario.
  libfuse2
Utilice «sudo apt autoremove» para eliminarlo.
Se instalarán los siguientes paquetes NUEVOS:
  code
0 actualizados, 1 nuevos se instalarán, 0 para eliminar y 5 no actualizados.
Se necesita descargar 69,3 MB de archivos.
Se utilizarán 242 MB de espacio de disco adicional después de esta operación.
Des:1 http://archive.raspberrypi.org/debian bullseye/main armhf code armhf 1.63.2-1639561205 [69,3 MB]
Descargados 69,3 MB en 21s (3.365 kB/s)
Seleccionando el paquete code previamente no seleccionado.
(Leyendo la base de datos ... 177391 ficheros o directorios instalados actualmente.)
```

Ahora falta una base de datos del tipo relacionales (sql) o no relacionales

Base de datos - MariaDB

<https://www.luisllamas.es/como-instalar-mariadb-en-raspberry-pi/>

sudo apt install mariadb-server

```
pi@raspberrypi:~/docker $ sudo apt install mariadb-server mariadb-client
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias... Hecho
Leyendo la información de estado... Hecho
El paquete indicado a continuación se instaló de forma automática y ya no es necesario.
  libfuse2
```

sudo mysql_secure_installation

```
pi@raspberrypi:~/docker $ sudo mysql_secure_installation
```

```
NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB  
SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!
```

```
In order to log into MariaDB to secure it, we'll need the current  
password for the root user. If you've just installed MariaDB, and  
haven't set the root password yet, you should just press enter here.
```

```
Enter current password for root (enter for none): [ ]
```

```
pi@raspberrypi:~/docker $ sudo mysql_secure_installation
```

```
NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB  
SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!
```

```
In order to log into MariaDB to secure it, we'll need the current  
password for the root user. If you've just installed MariaDB, and  
haven't set the root password yet, you should just press enter here.
```

```
Enter current password for root (enter for none):
```

```
OK, successfully used password, moving on...
```

```
Setting the root password or using the unix_socket ensures that nobody  
can log into the MariaDB root user without the proper authorisation.
```

```
You already have your root account protected, so you can safely answer 'n'.
```

```
Switch to unix_socket authentication [Y/n] n [ ]
```

```
Change the root password? [Y/n] y
```

```
New password:
```

```
Re-enter new password:
```

```
Password updated successfully!
```

```
Reloading privilege tables..
```

```
... Success!
```

```
By default, a MariaDB installation has an anonymous user, allowing anyone  
to log into MariaDB without having to have a user account created for  
them. This is intended only for testing, and to make the installation  
go a bit smoother. You should remove them before moving into a  
production environment.
```

```
Remove anonymous users? [Y/n] [ ]
```

```
Remove anonymous users? [Y/n] y
... Success!
```

Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

```
Disallow root login remotely? [Y/n] y
... Success!
```

By default, MariaDB comes with a database named 'test' that anyone can access. This is also intended only for testing, and should be removed before moving into a production environment.

```
Remove test database and access to it? [Y/n] y
- Dropping test database...
... Success!
- Removing privileges on test database...
... Success!
```

Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

```
Reload privilege tables now? [Y/n] y
... Success!
```

Cleaning up...

All done! If you've completed all of the above steps, your MariaDB installation should now be secure.

Thanks for using MariaDB!

```
pi@raspberrypi:~/docker $
```

con mysql -u root -p entro al prompt de mysql. o la administración por línea de comando

```
pi@raspberrypi:~/docker $ mysql -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 52
Server version: 10.5.12-MariaDB-0+deb11u1 Raspbian 11

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]>
```

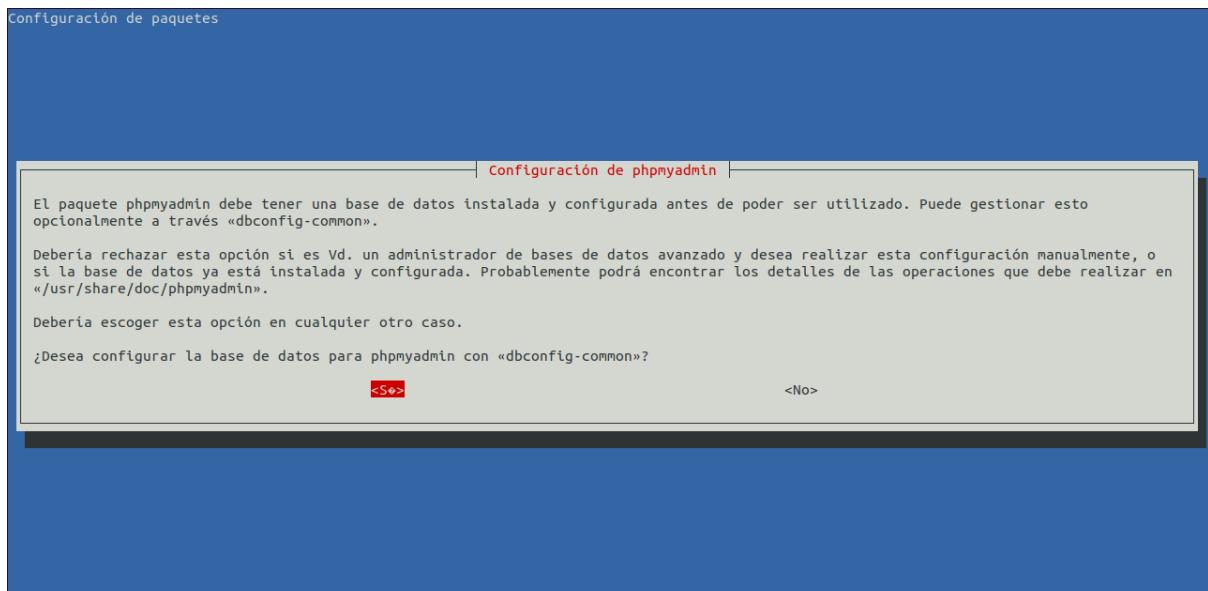
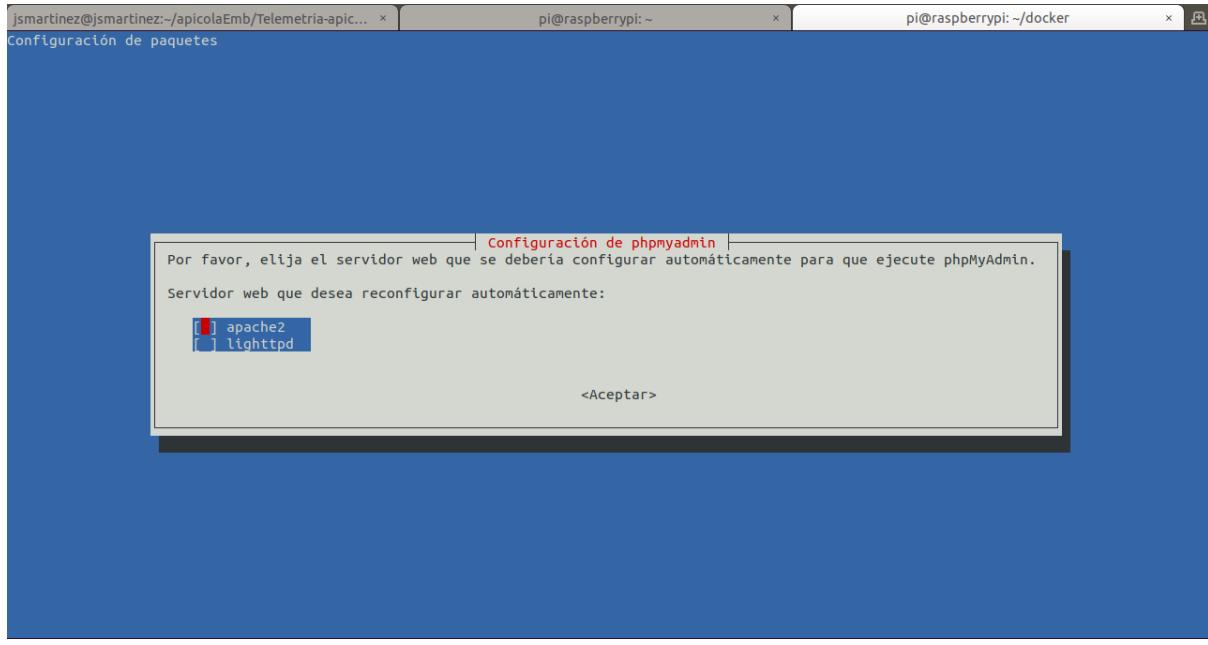
Para administrar gráficamente uso PHPMYADMIN

sudo apt install phpmyadmin

```

pi@raspberrypi:~/docker $ sudo apt install phpmyadmin
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias... Hecho
Leyendo la información de estado... Hecho
El paquete indicado a continuación se instaló de forma automática y ya no es necesario.
  libfuse2
Utilice «sudo apt autoremove» para eliminarlo.
Se instalarán los siguientes paquetes adicionales:
  apache2 apache2-bin apache2-data apache2-utils dbconfig-common dbconfig-mysql icc-profiles-free libapr1 libaprutil1 libaprutil1-db-sqlite3
  libaprutil1-dpap libjs-bootstrap4 libjs-codemirror libjs-jquery-mousewheel libjs-jquery-timepicker libjs-openlayers libjs-popper.js
  libjs-sizzle liblua5.3-0 libonig5 libzip4 node-jquery php-bz2 php-cli php-common php-curl php-gd php-google-recaptcha php-mariadb-mysql-kbs
  php-mbstring php-mysql php-phpmyadmin-motranslator php-phpmyadmin-shapefile php-phpmyadmin-sql-parser php-phpseclib php-psr-cache
  php-psr-container php-psr-log php-symfony-cache php-symfony-cache-contracts php-symfony-config php-symfony-dependency-injection
  php-symfony-expression-language php-symfony-filesystem php-symfony-service-contracts php-symfony-var-exporter php-symfony-yaml php-tcpdf
  php-twig php-twig-i18n-extension php-xml php-zip php7.4-bz2 php7.4-common php7.4-curl php7.4-gd php7.4-json php7.4-mbstring
  php7.4-mysql php7.4-opcache php7.4-readline php7.4-xml php7.4-zip
Paquetes sugeridos:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom libjs-requirejs php-dbase php-libodium php-mcrypt php-gmp php-symfony-finder
  php-symfony-proxy-manager-bridge php-symfony-console php-imagick php-twig-doc php-peachy php-recode php-gd2 php-pragmarx-google2fa-qrcode
  php-samyoul-u2f-php-server
Paquetes recomendados:
  php-mcrypt

```



PHPMYADMIN Funciona con apache2, entonces lo que se debe hacer es iniciarla
Compruebo su estado

```
pi@raspberrypi:~/docker $ sudo service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: failed (Result: exit-code) since Thu 2022-02-10 01:25:50 -05; 4min 29s ago
     Docs: https://httpd.apache.org/docs/2.4/
        CPU: 65ms

feb 10 01:25:50 raspberrypi apachectl[13311]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.0.1
feb 10 01:25:50 raspberrypi apachectl[13311]: (98)Address already in use: AH00072: make_sock: could not bind to address [::]:80
feb 10 01:25:50 raspberrypi apachectl[13311]: (98)Address already in use: AH00072: make_sock: could not bind to address 0.0.0.0:80
feb 10 01:25:50 raspberrypi apachectl[13311]: no listening sockets available, shutting down
feb 10 01:25:50 raspberrypi apachectl[13311]: AH00015: Unable to open logs
feb 10 01:25:50 raspberrypi apachectl[13301]: Action 'start' failed.
feb 10 01:25:50 raspberrypi apachectl[13301]: The Apache error log may have more information.
feb 10 01:25:50 raspberrypi systemd[1]: apache2.service: Control process exited, code=exited, status=1/FAILURE
feb 10 01:25:50 raspberrypi systemd[1]: apache2.service: Failed with result 'exit-code'.
feb 10 01:25:50 raspberrypi systemd[1]: Failed to start The Apache HTTP Server.
```

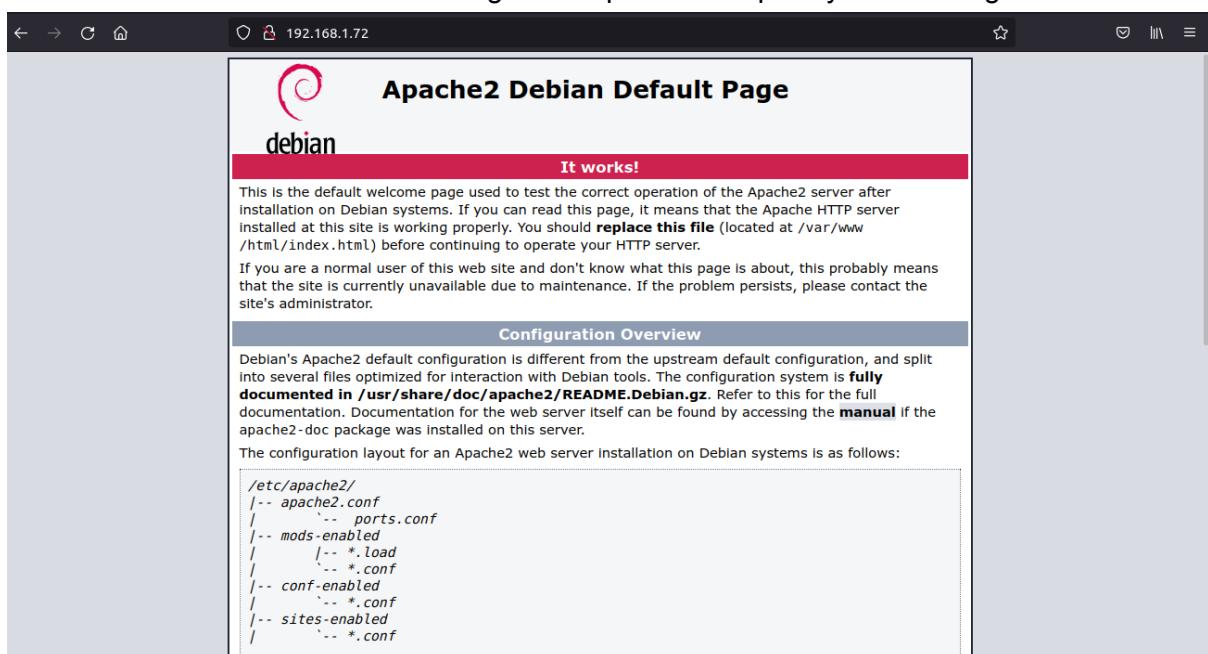
Ahora si se debe habilitar

```
pi@raspberrypi:~/docker $ sudo service apache2 start
pi@raspberrypi:~/docker $ sudo service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2022-02-10 01:31:21 -05; 12s ago
     Docs: https://httpd.apache.org/docs/2.4/
    Process: 14262 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 14266 (apache2)
      Tasks: 55 (limit: 4915)
        CPU: 79ms
      CGroup: /system.slice/apache2.service
              └─14266 /usr/sbin/apache2 -k start
                  ├─14267 /usr/sbin/apache2 -k start
                  ├─14268 /usr/sbin/apache2 -k start

feb 10 01:31:21 raspberrypi systemd[1]: Starting The Apache HTTP Server...
feb 10 01:31:21 raspberrypi apachectl[14265]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.0.1
feb 10 01:31:21 raspberrypi systemd[1]: Started The Apache HTTP Server.
[lines 1-16/16 (END)]
```

se sale del menú mysql con la letra q

Para confirmar si esta funcionando ingreso la ip de las raspberry en el navegador



```
pi@raspberrypi:~/docker $ sudo mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 64
Server version: 10.5.12-MariaDB-0+deb11u1 Raspbian 11

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

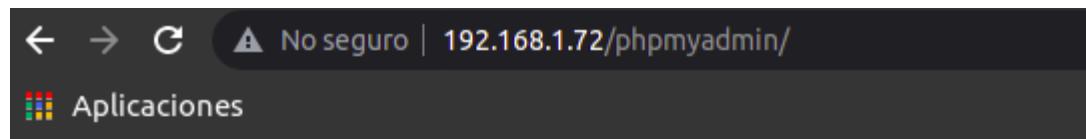
MariaDB [(none)]> GRANT ALL PRIVILEGES ON *.* TO 'jsmartinezv'@'localhost' IDENTIFIED BY 'ag1948' WITH GRANT OPTION;
```

```
pi@raspberrypi:~/docker $ sudo nano /etc/apache2/apache2.conf  
pi@raspberrypi:~/docker $
```

The screenshot shows a terminal window with three tabs. The active tab is titled '/etc/apache2/apache2.conf *' and contains the Apache configuration file. The file includes various log format definitions, global directives like 'IncludeOptional conf-enabled/*.conf' and 'IncludeOptional sites-enabled/*.conf', and specific sections for virtual hosts. A note at the bottom indicates the addition of a line for PHPMyAdmin identification. The terminal is running on a Raspberry Pi, as indicated by the prompt 'pi@raspberrypi:~/'.

```
GNU nano 5.4  
pi@raspberrypi:~/  
/etc/apache2/apache2.conf *  
  
#  
# The following directives define some format nicknames for use with  
# a CustomLog directive.  
#  
# These deviate from the Common Log Format definitions in that they use %  
# (the actual bytes sent including headers) instead of %b (the size of the  
# requested file), because the latter makes it impossible to detect partial  
# requests.  
#  
# Note that the use of %{X-Forwarded-For}i instead of %h is not recommended.  
# Use mod_remoteip instead.  
#  
LogFormat "%v:%p %h %l %u %t \"%r\" %>s %O \"%{Referer}i\" \"%{User-Agent}i\" vhost_combined  
LogFormat "%h %l %u %t \"%r\" %>s %O \"%{Referer}i\" \"%{User-Agent}i\" combined  
LogFormat "%{Referer}i -> %U referer  
LogFormat "%{User-Agent}i" agent  
  
# Include of directories ignores editors' and dpkg's backup files,  
# see README.Debian for details.  
  
# Include generic snippets of statements  
IncludeOptional conf-enabled/*.conf  
  
# Include the virtual host configurations:  
IncludeOptional sites-enabled/*.conf  
  
# vim: syntax=apache ts=4 sw=4 sts=4 sr noet  
  
## SE AGREGO ESTÁ ULTIMA LINEA PARA QUE PHPMYADMIN IDENTIFIQUE APACHE!  
Include /etc/phpmyadmin/apache.conf  
  
^D Ayuda      ^O Guardar      ^N Buscar      ^K Cortar      ^T Ejecutar      ^C Ubicación      M-U Deshacer      M-A Poner marca M-I A llave  
^X Salir      ^R Leer fich.  ^R Reemplazar  ^U Pegar       ^J Justificar    ^I Ir a linea    M-F Rehacer     M-G Copiar     ^Q Buscar atrás
```

```
pi@raspberrypi:~/docker $ sudo service apache2 restart  
pi@raspberrypi:~/docker $
```



```
<?php
/* vim: set expandtab sw=4 ts=4 sts=4: */
/**
 * Main loader script
 *
 * @package PhpMyAdmin
 */
declare(strict_types=1);

use PhpMyAdmin\Controllers\HomeController;
use PhpMyAdmin\Core;
use PhpMyAdmin\DatabaseInterface;
use PhpMyAdmin\Response;
use PhpMyAdmin\Url;
use PhpMyAdmin\Util;

if (! defined('ROOT_PATH')) {
    define('ROOT_PATH', __DIR__ . DIRECTORY_SEPARATOR);
}

global $server;

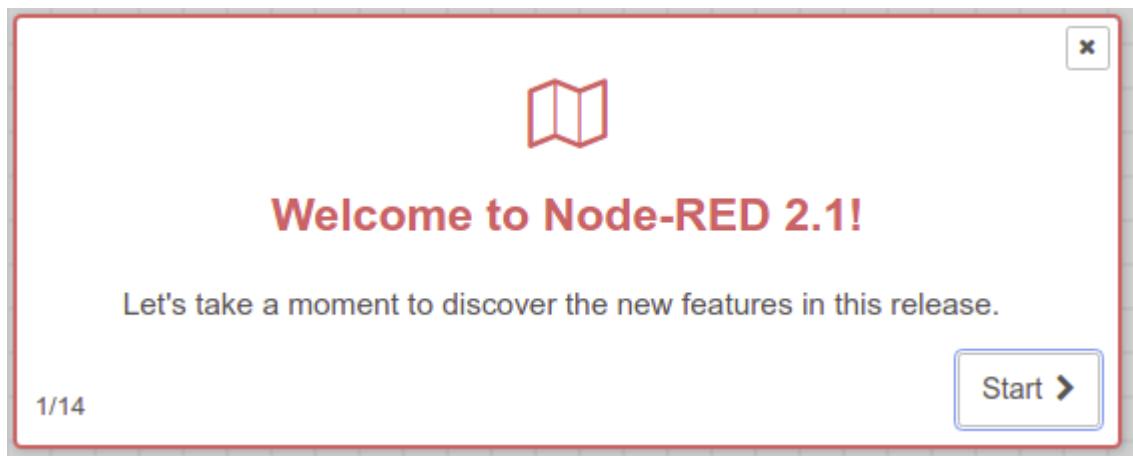
require_once ROOT_PATH . 'libraries/common.inc.php';

/**
 * pass variables to child pages
 */
$drops = [
    'lang',
    'server',
    'collation_connection',
    'db',
    'table',
];
foreach ($drops as $each_drop) {
problema entrando a phpmyadmin
```

systemctl status mariadb.service

Node-red

```
pi@raspberrypi:~ $ node-red
```



Se agrega un nodo de entrada MQTT

Para probarlo se va a probar con dos sensores de luz BH1750, suscritos a dos tópicos llamados oficina/ESP32/luz1 y oficina/ESP32/luz2

Se modifican los valores de ese nodo- (servidor=IP_RASPBERRY:1880)

The screenshot shows the Node-RED interface with the following details:

- Central Panel:** A dialog titled "Edit mqtt in node > Add new mqtt-broker config node".
 - Properties:** Name field is empty.
 - Connection:** Server is set to "192.168.1.72", Port is "1883".
 - Connect automatically
 - Use TLS
 - Protocol:** MQTT V3.1.1
 - Client ID:** Leave blank for auto generated
- Left Sidebar:** Shows categories like "random", "smooth", and "network". Under "network", there are nodes for "mqtt in", "mqtt out", "http in", "http response", "http request", "websocket in", and "websocket out".
- Right Sidebar:** Shows the flow configuration and a node details panel for "undefined:1883".
 - info:** Node: "a1f0fb3706455fea", Type: "mqtt-broker".
 - A note says: "Your flow configuration nodes are listed in the sidebar panel. It can be accessed from the menu or with **ctrl-g**".

Edit mqtt in node > **Add new mqtt-broker config node**

Cancel
Add

Properties

Name: mosquito-rpi1

Connection

Server: 192.168.1.72 **Port**: 1883

Connect automatically

Use TLS

Protocol: MQTT V3.1.1

Client ID: Leave blank for auto generated

Enabled 0 nodes use this config On all flows

Edit mqtt in node

Delete
Cancel
Done

Properties

Server: mosquito-rpi1

Action: Subscribe to single topic

Topic: oficina/ESP32/luz2

QoS: 2

Output: auto-detect (string or buffer)

Name: Name

debug
i
o
!
g
▼

all nodes
all

"166.67"
10/2/2022, 12:14:28 a.m. node: 1e697066a3c44c96 oficina/ESP32/luz1 : msg.payload : string[6]
"165.83"
10/2/2022, 12:14:28 a.m. node: 1e697066a3c44c96 oficina/ESP32/luz1 : msg.payload : string[6]
"166.67"
10/2/2022, 12:14:28 a.m. node: 1e697066a3c44c96 oficina/ESP32/luz1 : msg.payload : string[6]
"166.67"
10/2/2022, 12:14:28 a.m. node: 1e697066a3c44c96 oficina/ESP32/luz1 : msg.payload : string[6]
"166.67"
10/2/2022, 12:14:28 a.m. node: 1e697066a3c44c96 oficina/ESP32/luz1 : msg.payload : string[6]

a

