



How to install docker on PFC100

**Not officially supported! Use at your own risk.
Please use PFC200 G2 with Docker in production.**



Question: Why can't I install docker on the PFC100? Why does it fail when I try to install it?

The PFC100 only has 256MB of eMMC flash memory internally, of which only 32.6MB is available in root partition. This is not enough storage for docker + containers.

The work around is to prepare a special SD card to boot and run docker, which this procedure explains.

This requires many steps, and is not ideal.

This is not recommended for production use, only testing as SD cards are not as reliable as eMMC.

```
MBP:stacks kurtbraun$ ssh root@192.168.4.180
root@192.168.4.180's password:

WAGO Linux Terminal on PFC100-44840A.

root@PFC100-44840A:~ df -h
Filesystem      Size      Used Available Use% Mounted on
/dev/root       144.7M    104.7M    32.6M    76% /
devtmpfs       119.1M    12.0K    119.1M    0% /dev
none           119.6M    12.0K    119.6M    0% /tmp
none           119.6M     0      119.6M    0% /media
none            4.0M    160.0K     3.8M    4% /var/log
none           119.6M    116.0K    119.5M    0% /var/run
none           119.6M     0      119.6M    0% /var/lock
none           119.6M     0      119.6M    0% /var/tmp
none           119.6M     0      119.6M    0% /sys/fs/cgroup
tmpfs          119.6M    68.0K    119.5M    0% /run
/dev/mmcblk0p1  16.0M     2.6M    13.3M   17% /boot/loader
root@PFC100-44840A:~
```



Step 1:

Download FW17 from this location

<https://github.com/WAGO/pfc-firmware/releases>

Step 2:

- Download Balena Etcher from this location

<https://www.balena.io/etcher/>

- Install the application

Step 3:

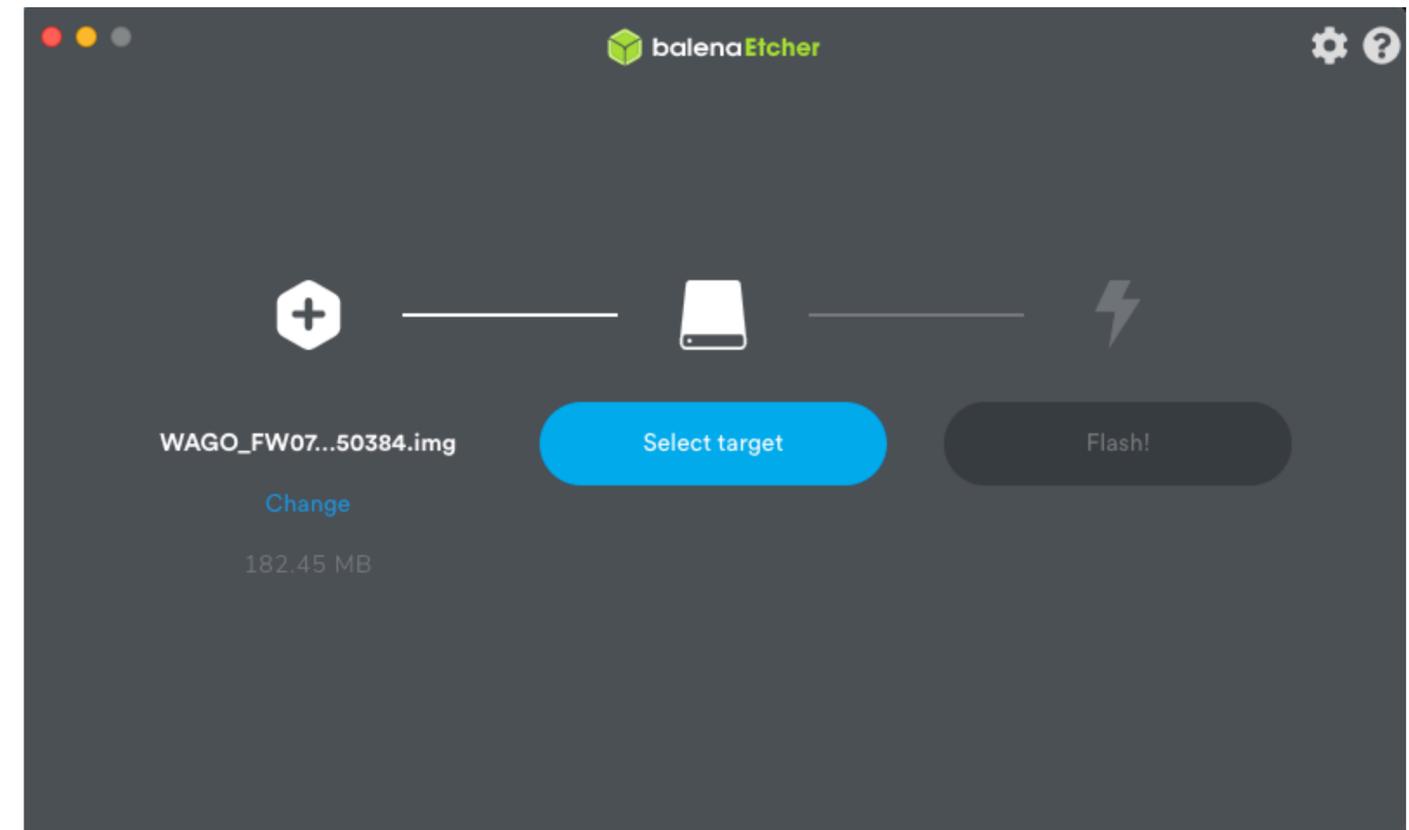
- Insert a blank SD Card (8GB or 16GB) into USB SD Card Reader

- Plug this into your computer



Step 4:

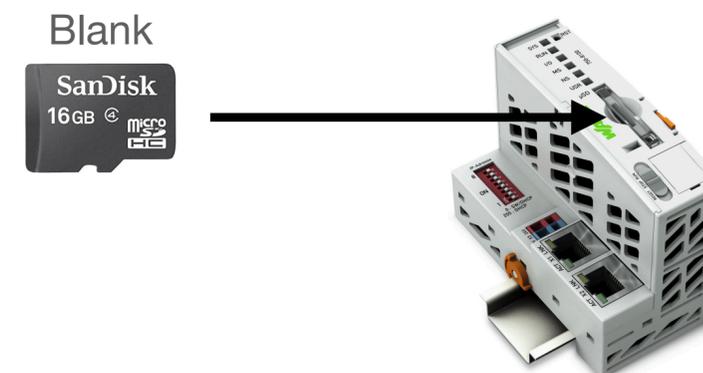
Use Balena to create a bootable FW17 image on the SD Card.



Step 5:

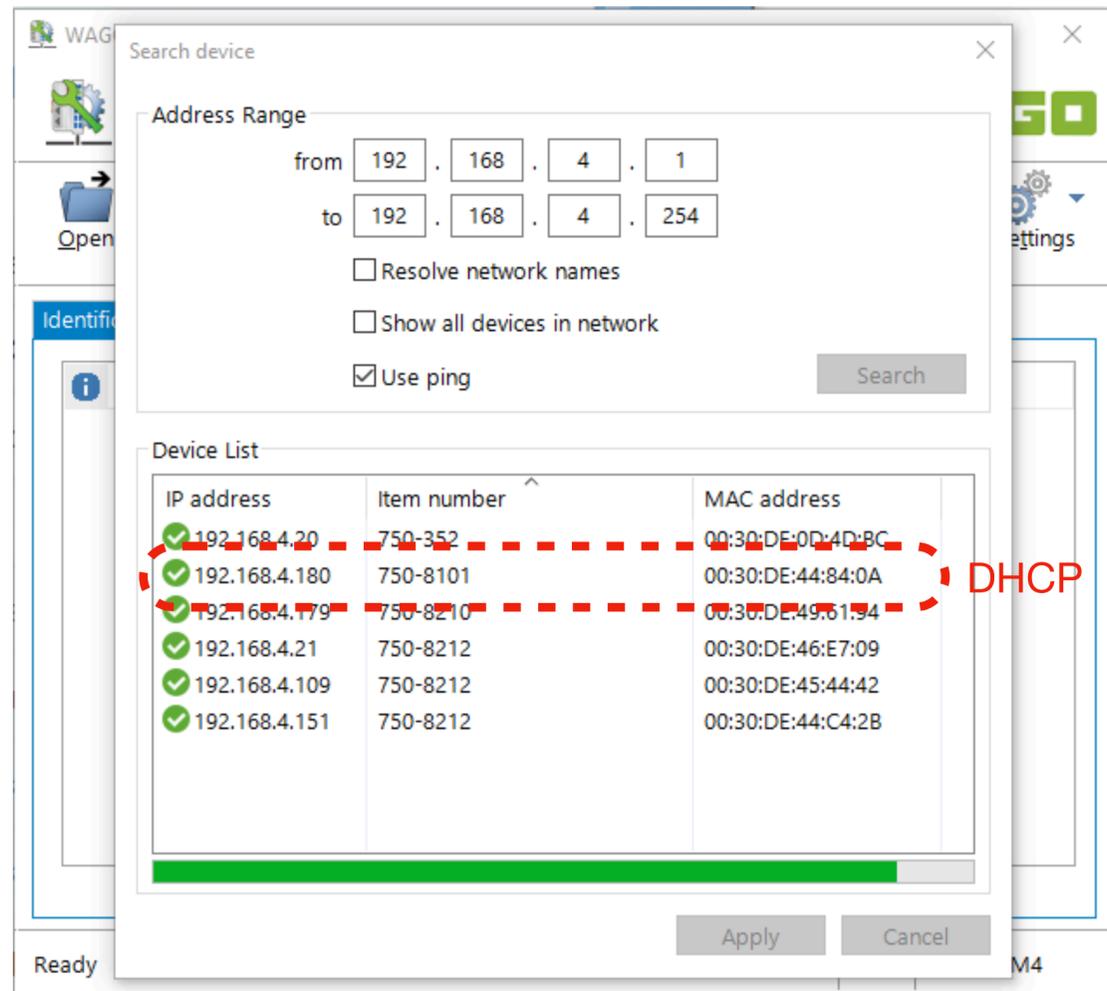
- Insert this SD card into the PFC100.

- Apply 24VDC power



Step 6:

Use Ethernet Settings find the PFC100 IP address if you have a DHCP server. If not, you can use the 'RST button trick' (See below) optionally.



'RST button trick'



Put PLC in stop



Press RST for 7 seconds



SYS light blinks orange

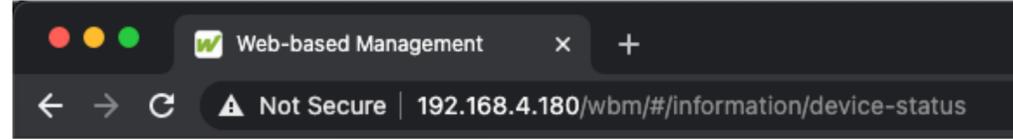


Static IP: 192.168.1.17/24

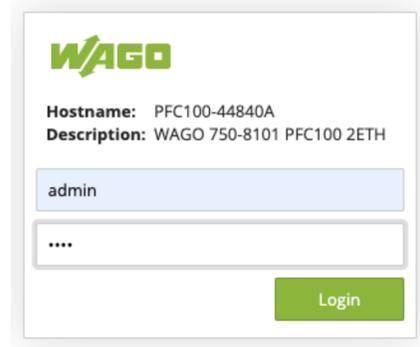
Note: this is temporary, a reboot will go back to the firmware IP settings (DHCP, Static IP, etc.)

Step 7:

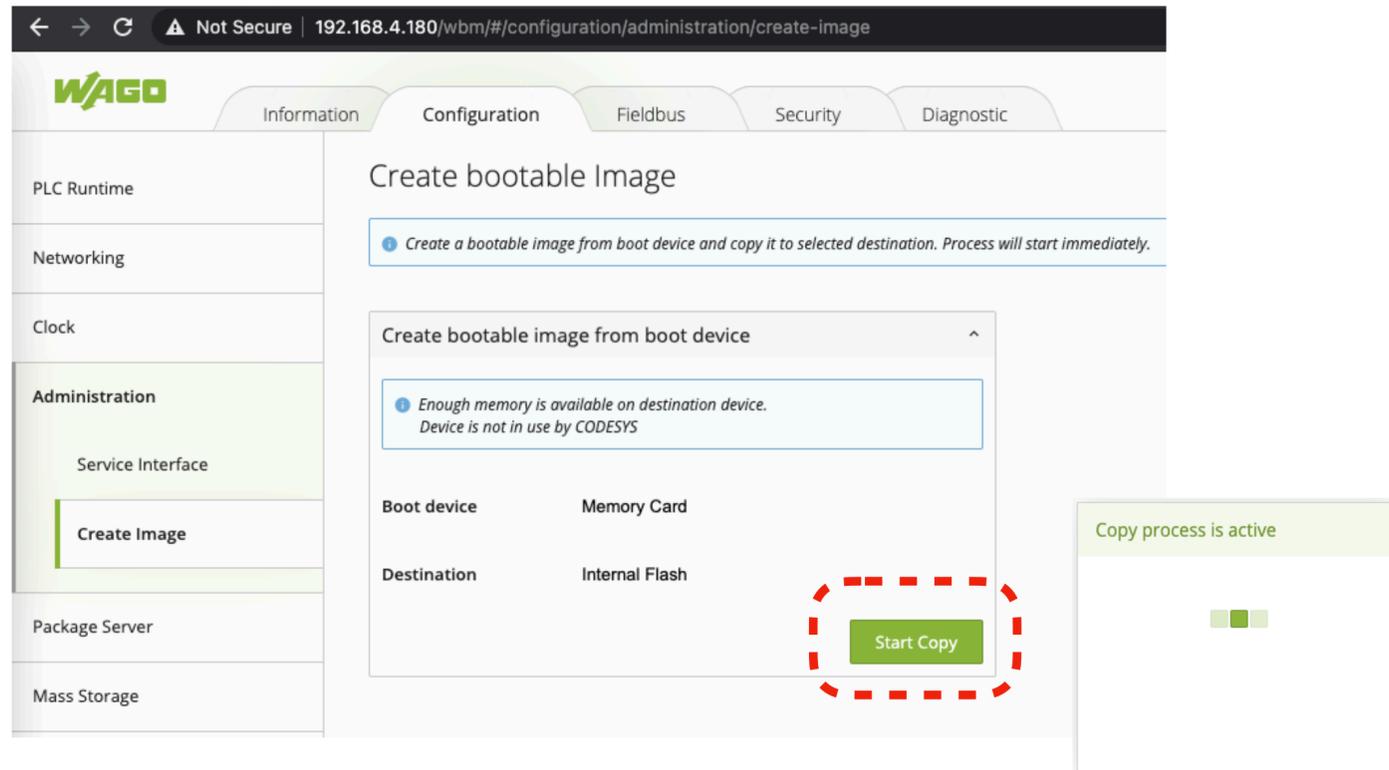
- Connect to the web based management using IP from step 6.



- Log in with admin / wago)

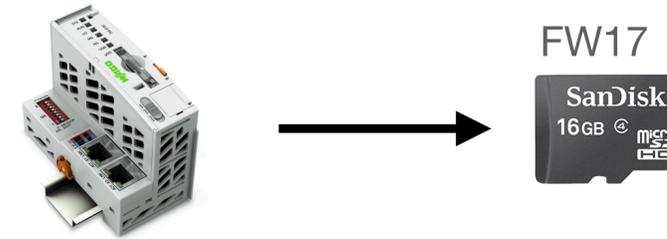


- Verify FW17 on Information>Status page.
- Navigate to Configuration>Administration>Create Image
- Click [Start Copy] Button to prepare the internal flash with FW17.
- Wait until copy is complete (~2 min)



Step 8:

- Turn off PLC
- Remove SD Card



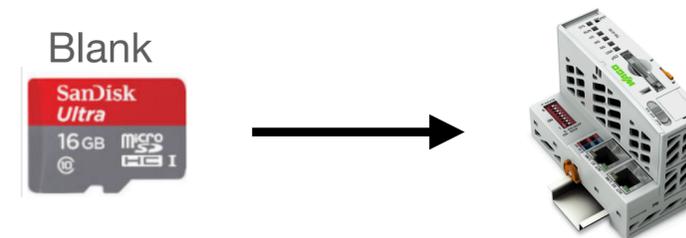
- Apply 24VDC to power PLC



Wait about 2 minutes for boot up

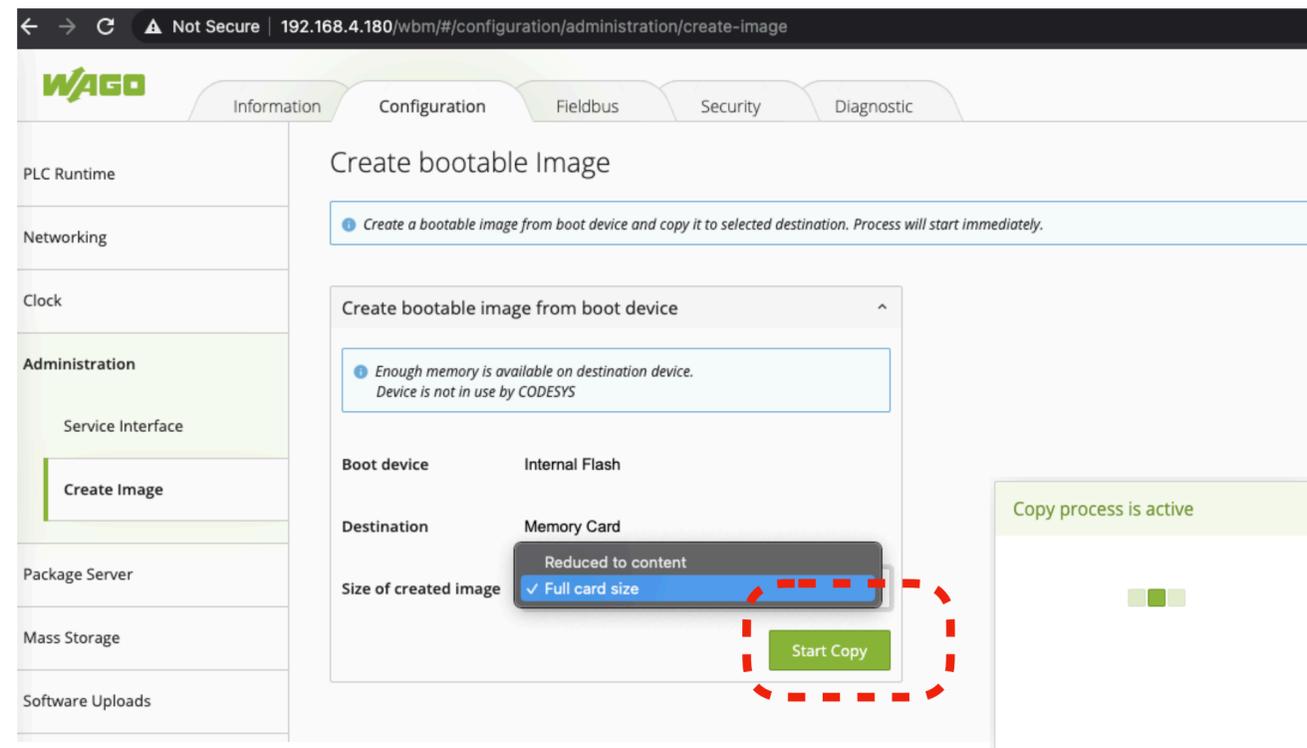
Step 9:

- Insert a blank high quality 8GB or 16GB SD Card into PFC100

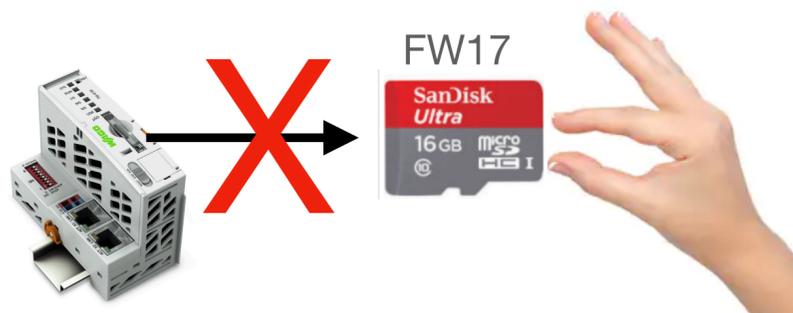


Step 10:

- Connect to the web based management using IP from step 6.
(Log in with admin / wago)
- Navigate to Configuration>Administration>Create Image
- Select menu option “Full Card Size”
- Click [Start Copy] Button to prepare the internal flash with FW17.
- Wait until copy is complete (~3-5 min).



Do not remove SD Card from this point on!

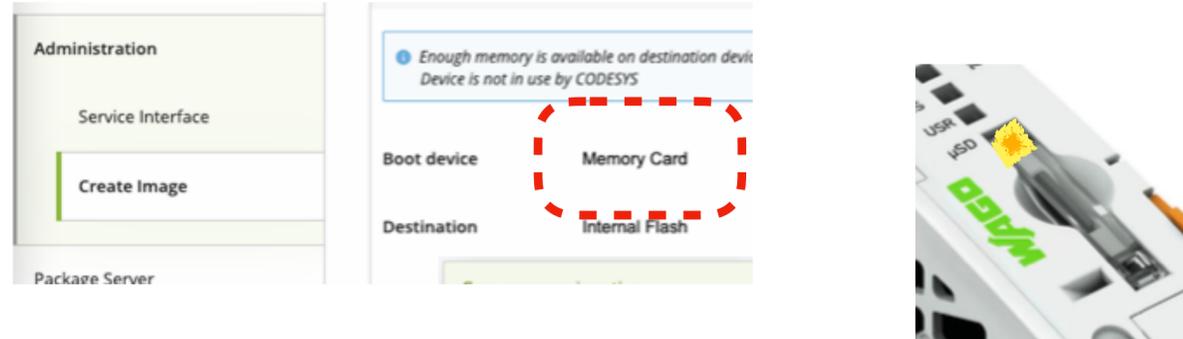


Consider putting tape over SD Card bay door to prevent accidental removal.



Step 11:

- Power cycle the PFC100
- Verify the PFC is running from SD Card.
- *You should see yellow activity light on SD card during boot process.*



Step 12:

- Now you have the full 8GB (or 16GB) of flash memory for docker to use.

Before (stock)

```
MBP:stacks kurtbraun$ ssh root@192.168.4.180
root@192.168.4.180's password:

WAGO Linux Terminal on PFC100-44840A.

root@PFC100-44840A:~ df -h
Filesystem      Size      Used Available Use% Mounted on
/dev/root        144.7M    104.7M    32.6M   76% /
devtmpfs         119.1M     12.0K    119.1M   0% /dev
none             119.6M     12.0K    119.6M   0% /tmp
none             119.6M      0        119.6M   0% /media
none              4.0M     160.0K     3.8M   4% /var/log
none             119.6M    116.0K    119.5M   0% /var/run
none             119.6M      0        119.6M   0% /var/lock
none             119.6M      0        119.6M   0% /var/tmp
none             119.6M      0        119.6M   0% /sys/fs/cgroup
tmpfs            119.6M     68.0K    119.5M   0% /run
/dev/mmcblk0p1   16.0M      2.6M     13.3M  17% /boot/loader
root@PFC100-44840A:~
```

32.6MB Available

After (Boot from SD Card)

```
MBP:stacks kurtbraun$ ssh root@192.168.4.180
root@192.168.4.180's password:

WAGO Linux Terminal on PFC100-44840A.

root@PFC100-44840A:~ df -h
Filesystem      Size      Used Available Use% Mounted on
/dev/root        7.2G      119.6M    6.7G    2% /
devtmpfs         119.1M      8.0K    119.1M   0% /dev
none             119.6M     12.0K    119.6M   0% /tmp
none             119.6M      0        119.6M   0% /media
none              4.0M     76.0K     3.9M   2% /var/log
none             119.6M    108.0K    119.5M   0% /var/run
none             119.6M      0        119.6M   0% /var/lock
none             119.6M      0        119.6M   0% /var/tmp
none             119.6M      0        119.6M   0% /sys/fs/cgroup
tmpfs            119.6M     68.0K    119.5M   0% /run
/dev/mmcblk0p1   16.0M      2.2M     13.8M  14% /boot/loader
root@PFC100-44840A:~
```

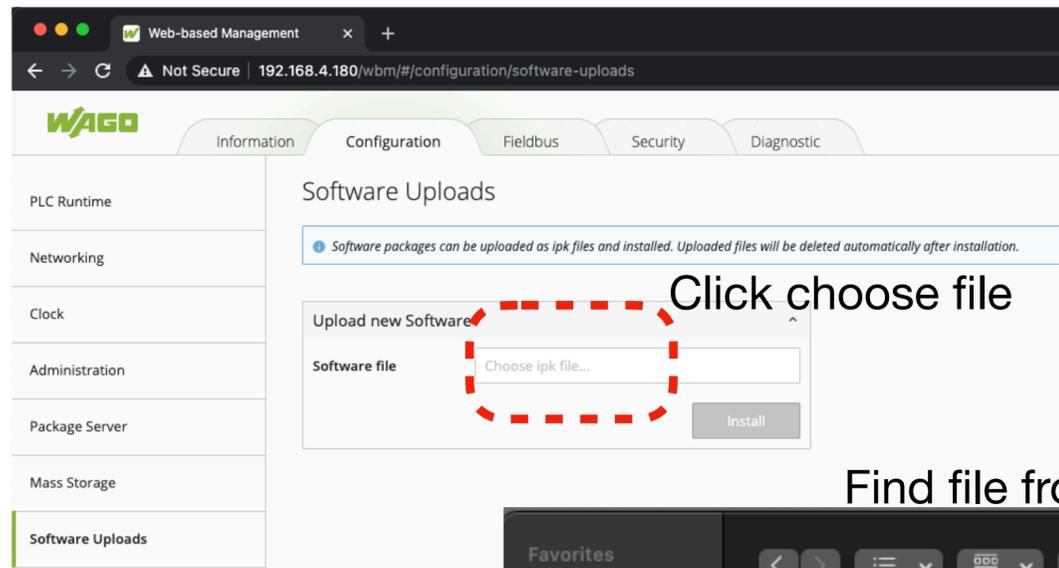
6.7GB Available

Step 13:

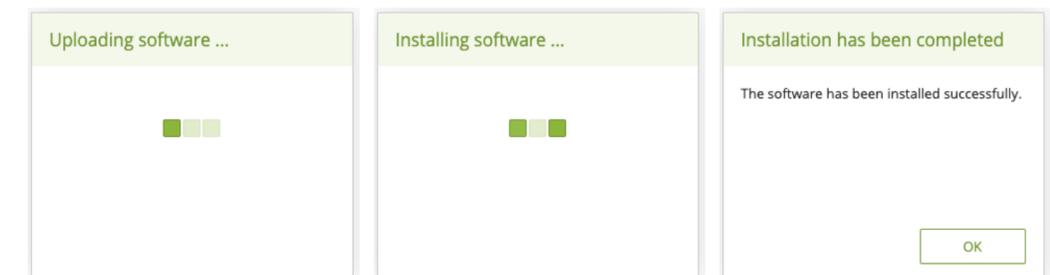
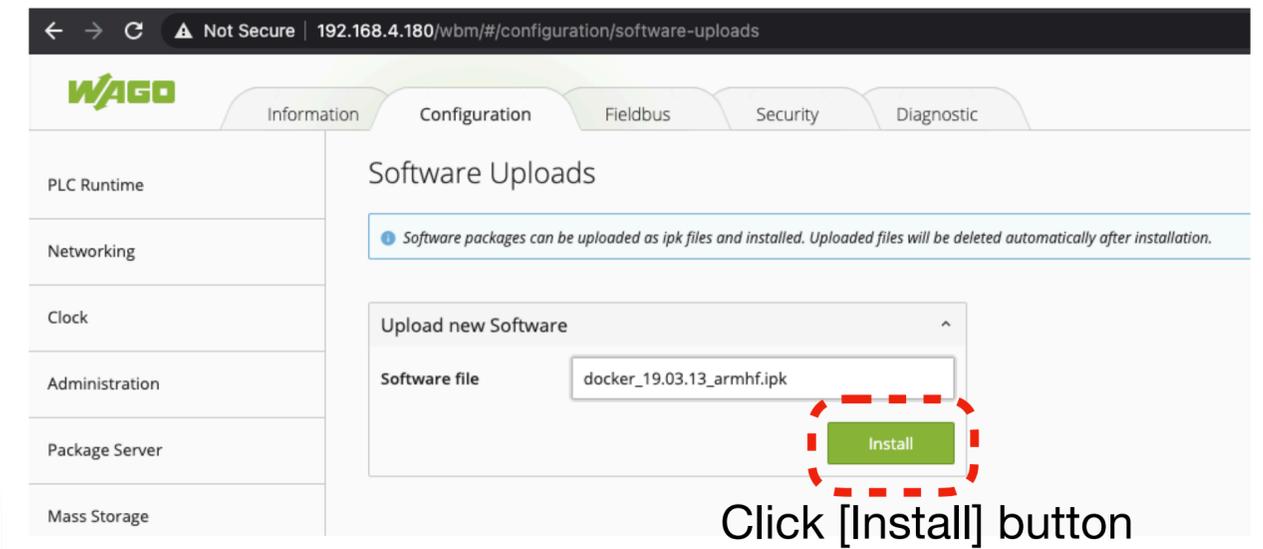
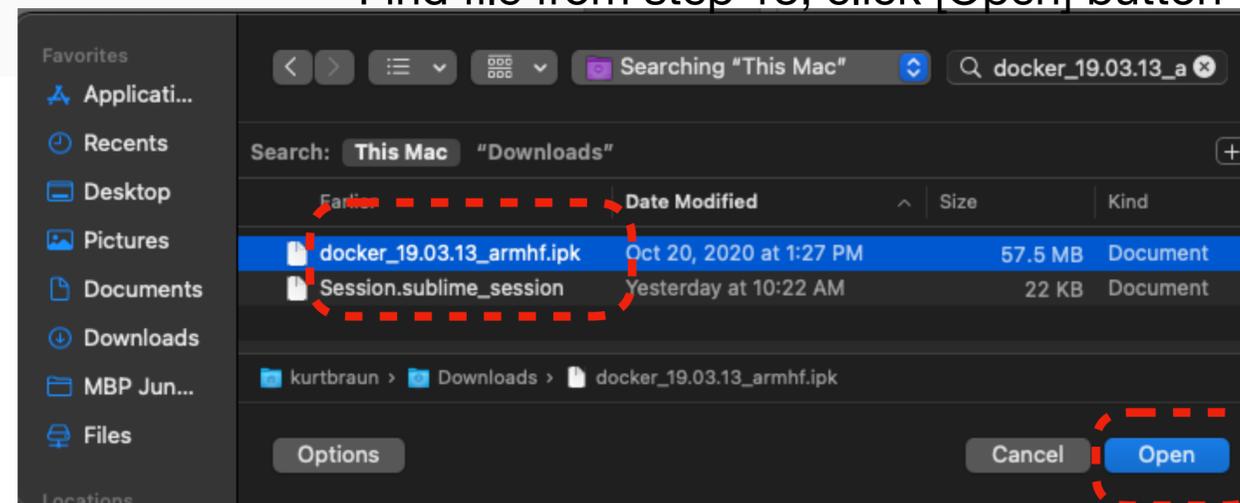
- Download the docker ipk file. This can be found here:
<https://github.com/WAGO/docker-ipk/releases>
- Download the file:
[docker_19.03.13_armhf.ipk](#)

Step 14:

- Navigate to Configuration>Software Uploads



Find file from step 13, click [Open] button



Wait about 2 minutes. Click [OK] button.

Step 15:

Docker is installed!

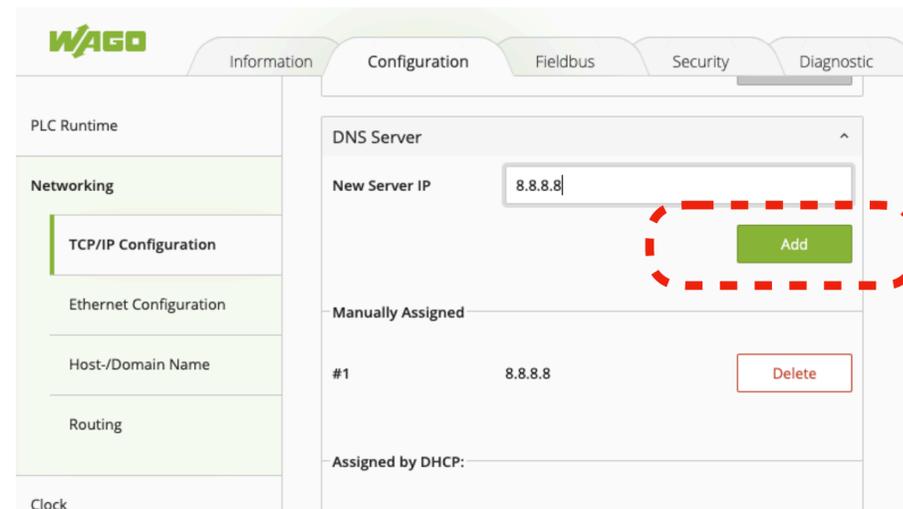
```
~/Downloads — pi@raspberrypi: ~/certs — -bash
MBP:stacks kurtbraun$ ssh root@192.168.4.180
root@192.168.4.180's password:

WAGO Linux Terminal on PFC100-44840A.

root@PFC100-44840A:~ docker -v
Docker version 19.03.13, build 4484c46
root@PFC100-44840A:~
```

Step 16:

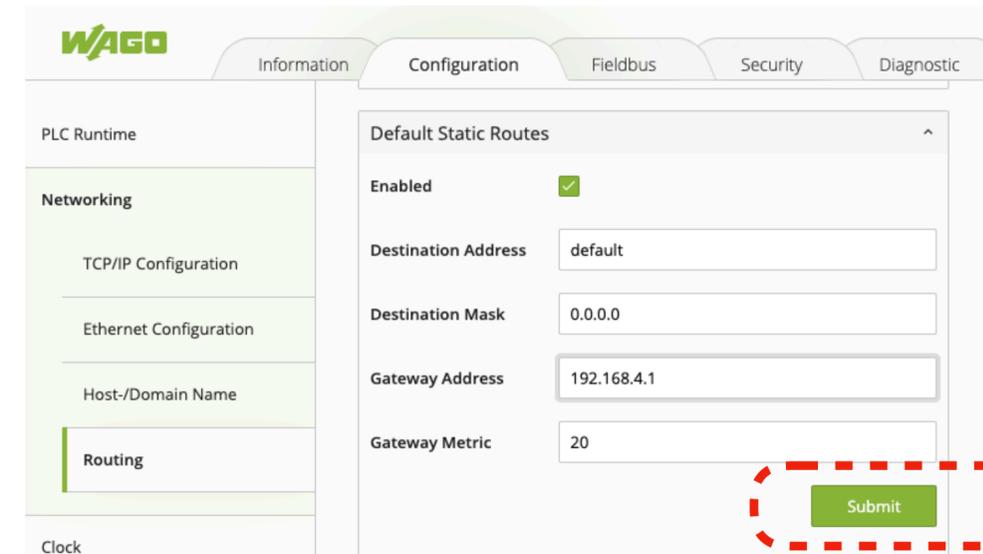
- If using DHCP, proceed to step 18.
- If using Static IP, set network DNS to 8.8.8.8



Click [Add]

Step 17:

- If using DHCP, proceed to step 18.
- If using Static IP, enable and set gateway address.
Typically this is xxx.xxx.xxx.1



Click [Submit]

Step 18:

- Verify PLC can ping google with ssh.

If not using macOS, Linux or Win10, then you can use putty for ssh.

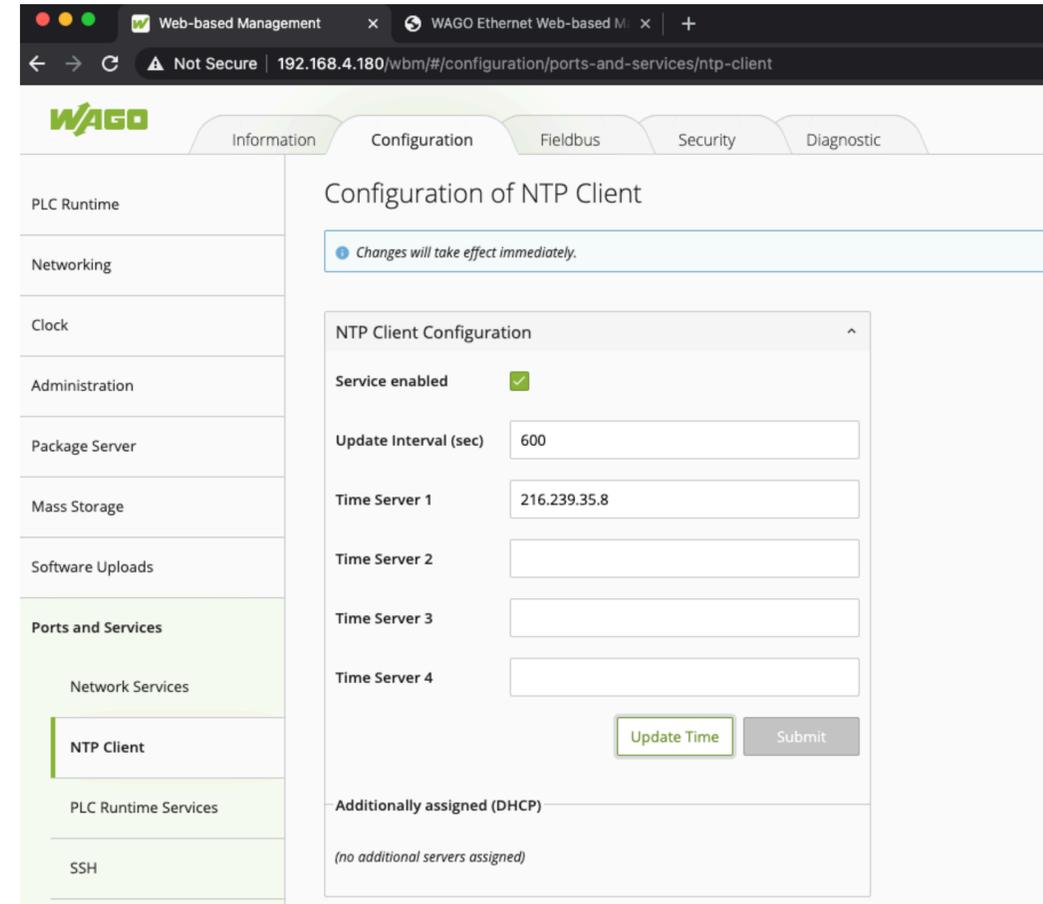
```
MBP:stacks kurtbraun$ ssh root@192.168.4.180
root@192.168.4.180's password:

WAGO Linux Terminal on PFC100-44840A.

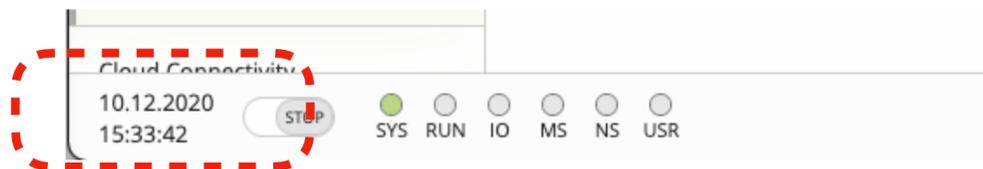
root@PFC100-44840A:~ ping google.com
PING google.com (172.217.14.110): 56 data bytes
64 bytes from 172.217.14.110: seq=0 ttl=115 time=19.090 ms
64 bytes from 172.217.14.110: seq=1 ttl=115 time=20.004 ms
64 bytes from 172.217.14.110: seq=2 ttl=115 time=14.812 ms
64 bytes from 172.217.14.110: seq=3 ttl=115 time=12.758 ms
64 bytes from 172.217.14.110: seq=4 ttl=115 time=14.701 ms
```

Step 18:

- Set time server & press [Submit] button



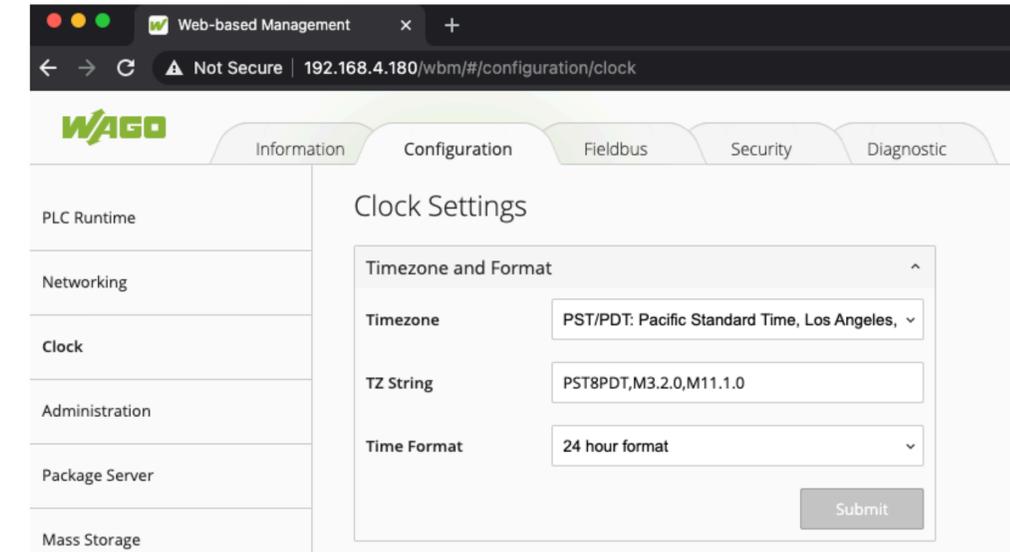
- Press [Update Time] button, and verify correct time with PC



Thu Dec 10 3:34 PM

Step 19:

- Set time zone



Step 20:

- Verify you can pull an image

```
root@PFC100-44840A:~# docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
5f2023fd85a4: Extracting [=====] 2.406MB/2.406MB
```

- Verify image completes.

```
root@PFC100-44840A:~# docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
5f2023fd85a4: Pull complete
Digest: sha256:c0e9560cda118f9ec63ddefb4a173a2b2a0347082d7dff7dc14272e7841a5b5a
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest
root@PFC100-44840A:~# docker images
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
alpine               latest      187f426e38b1     7 weeks ago     3.77MB
root@PFC100-44840A:~#
```