Enecsys Solar Dashboard

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INSTALLATION GUIDE

This installation Guide will show you how to completely install a Raspberry Pi (RPI) with Debian Jessie, confgure the RPI and install the Enecsys Solar Dasbhoard with the help of installers. This document is a guide, there will also be a video created of the same process. I don't want to make this document to official ;)

STEP 0

You need some software to make it all happen
SD Formatter 4: To format your Micro(SD) card. scroll down to download the windows version.
https://www.sdcard.org/downloads/formatter_4/

Win32Diskmanager : To burn the image on your SD card

Putty: this is an ssh client we need to connect to the rpi and to install and configure it.

downloads:
SD formatter4: http://www.vanmarion.nl/rpi/SDFormatterv4.zip
Win32Diskmanager: http://www.vanmarion.nl/rpi/Win32DiskImager-0.9.5-install.zip
Putty: http://www.vanmarion.nl/rpi/putty.zip

Download empty ssh file. You will need this to enable SSH. You can do it manually or just download the zip and unpack it.
http://vanmarion.nl/rpi/ssh_file_rpi.zip

install these programs

Download RPI Image: https://downloads.raspberrypi.org/raspbian_lite_latest
Unzip the file.

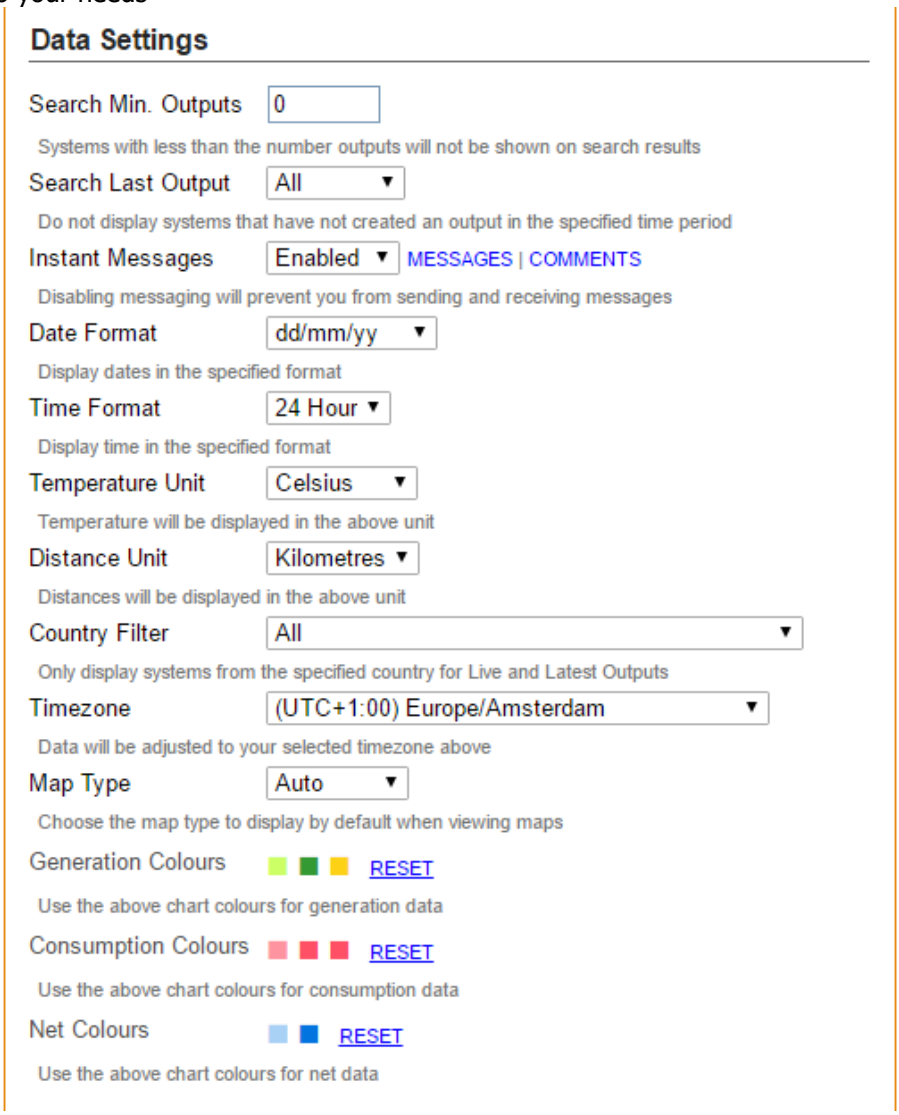
STEP 1

To be able to send your data to pvoutput you have to create an account and setup your system.
NOTE*: IF you already have a pvoutput account you can skip STEP 1

Register an account
http://www.pvoutput.org/register.jsp

After you have logged in go to your account or press settings in the menu

Fill the settings to your needs



The alert settings you can skip

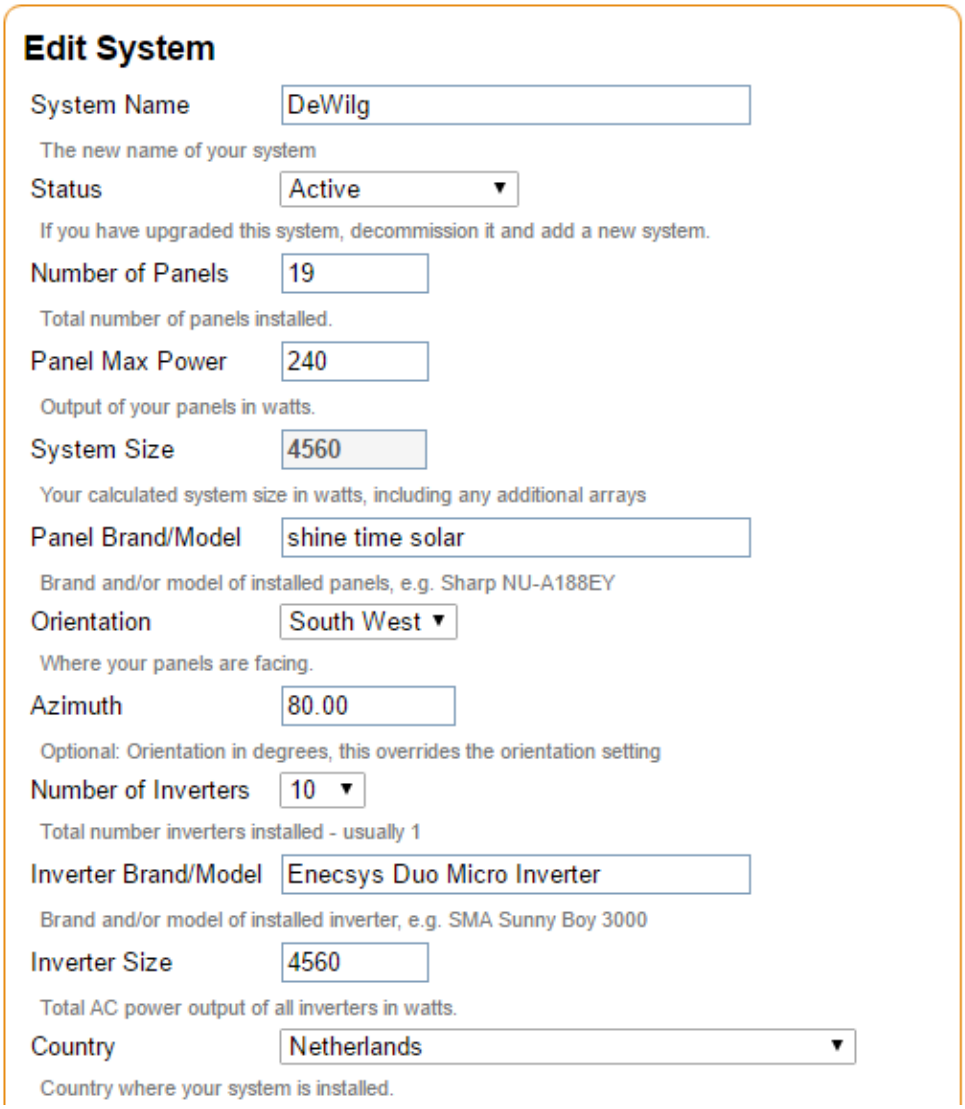
The next settings are very important. You have to create an apikey which has to be set in the dashboard

select the API to enabled. There should be an api key visable. If not, click on New Key.
After that press save settings first

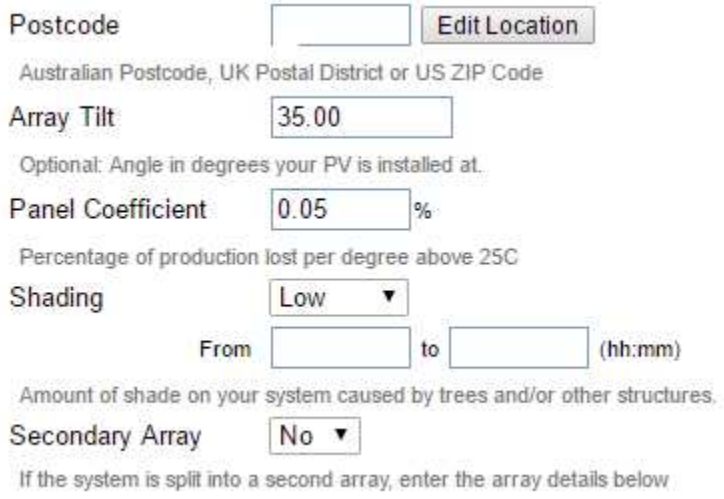
Ok. time to add a system
Fill in the settings to your setup
System settings

System Name	This name will be public to others, so make up a nice one
Status	Active
Number of panels	How many inverters do you have? Set the number
Panel max power	The maximum power of the solar panel
System size	Total power of all panels together
Panel Brand/Model	optional
Orientation	Select your setup
Azimuth	Set a value
Number of inverters	Set the number
Inverter Size	Set same as system size
Country	Set yours
Postal code	Set yours
Array tilt	Set yours
Panel coefficent	Set yours
Shading	Select yours

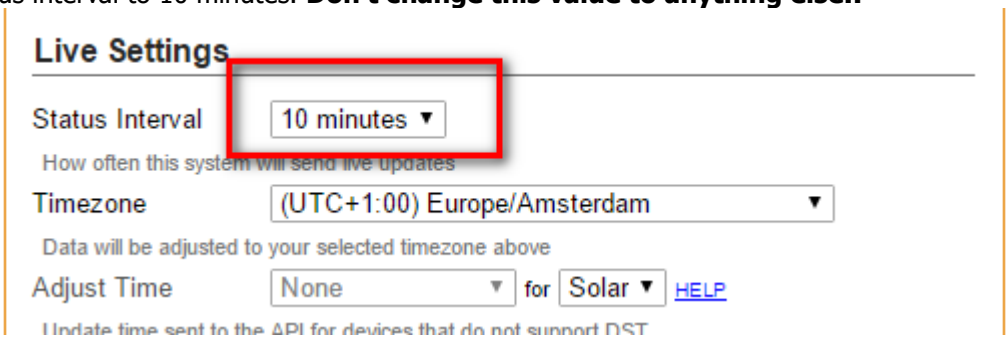
Example part 1



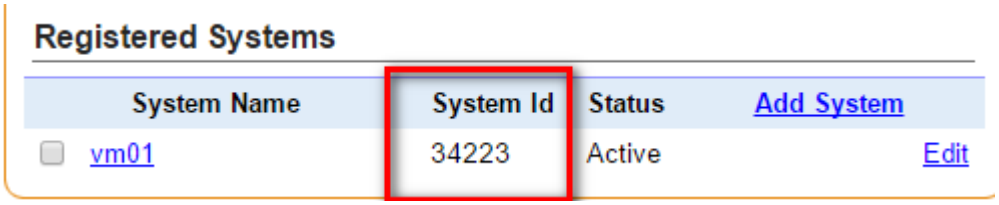
Example part 2



This one is important: Live Settings
Set the status interval to 10 minutes. **Don't change this value to anything else!!**



All the rest is optional. Save the settings.
After that you will see your system. You



To be able to join the Tweakers Team you have to upload at least 20 inputs.
After that you are able to join a team
We have a large group of Enecsys Users, so i would appreciate if you could join the Team :D.

Join the team: open this url: http://www.pvoutput.org/ladder.jsp?tid=1018
On the right top side you will see a button: Join or Leave Team
Feel free to join

2 values you need in the dashboard:
SystemID: you can retreive that one from the settings page (see screenshot above)
PersonalID : click on Your outputs. In the browser url you will see your personal id

STEP 2

Time to insert your MicroSD. Best to format the SD first with sdformatter4. Start SD formatter 4 and select the drive where your sdcard is plugged into. In my case the K drive

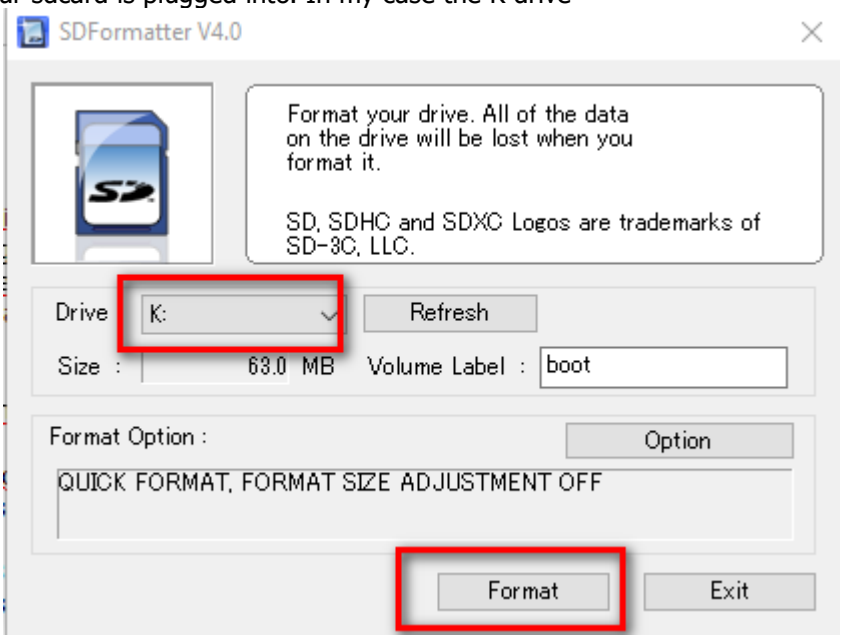
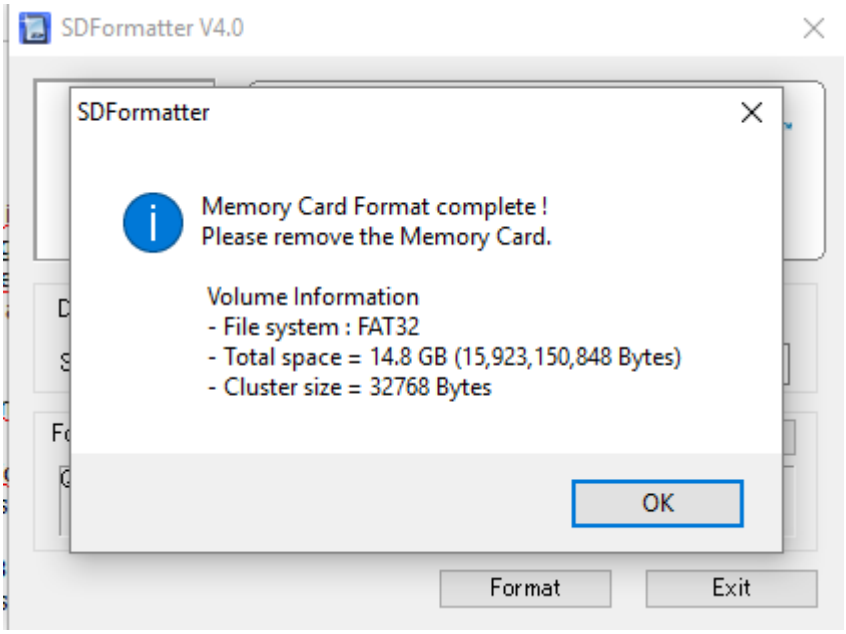


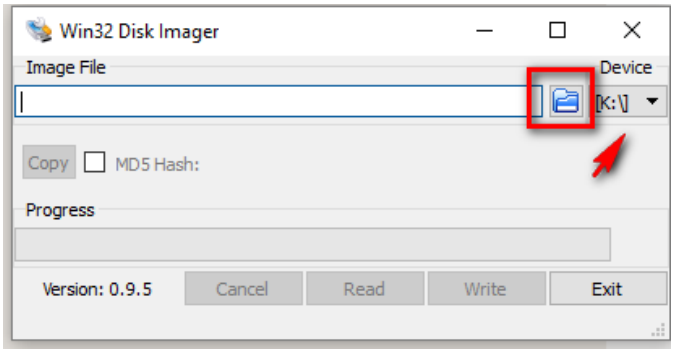
Fig
Click on Format, you will get some warnings, just click OK.



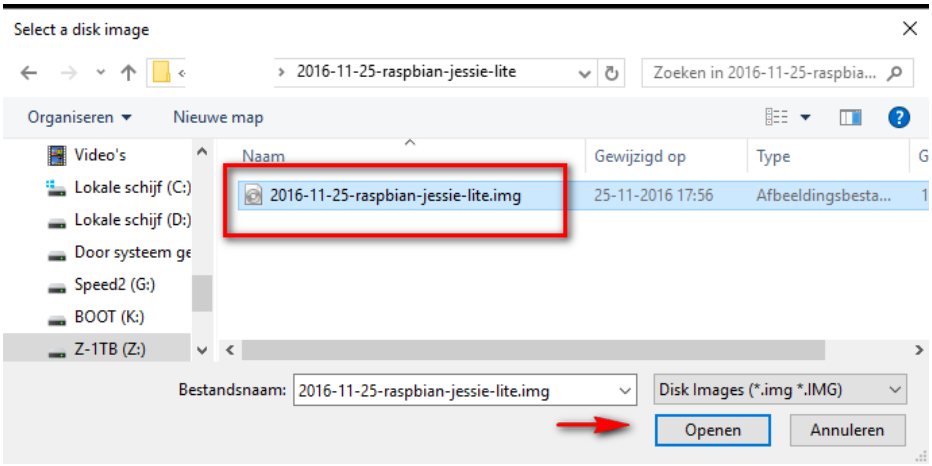
Formatting done. On to the next step.

STEP 3

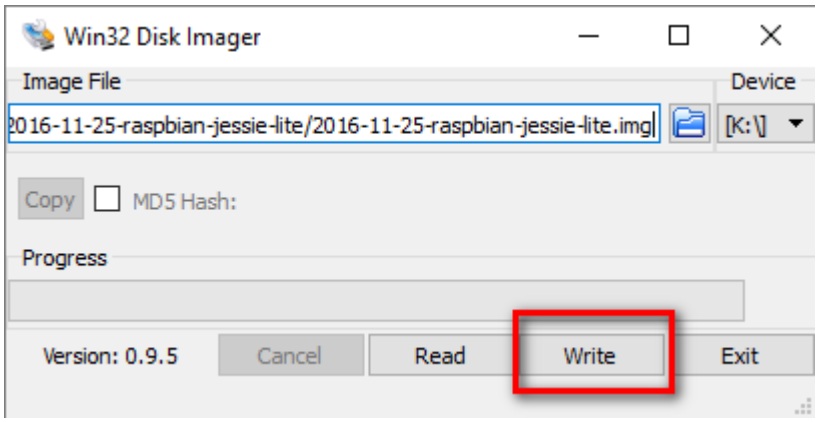
Time to burn the image on the SD Card. Start Win32diskmanager. You will see this screen. Make sure your sd card drive is selected. Click on the browse icon to select the image file you have downloaded and unzipped in step 1



Select the image. If you cant find it on your location, change the Disk Images (*.img *IMG) to *.* and click on open

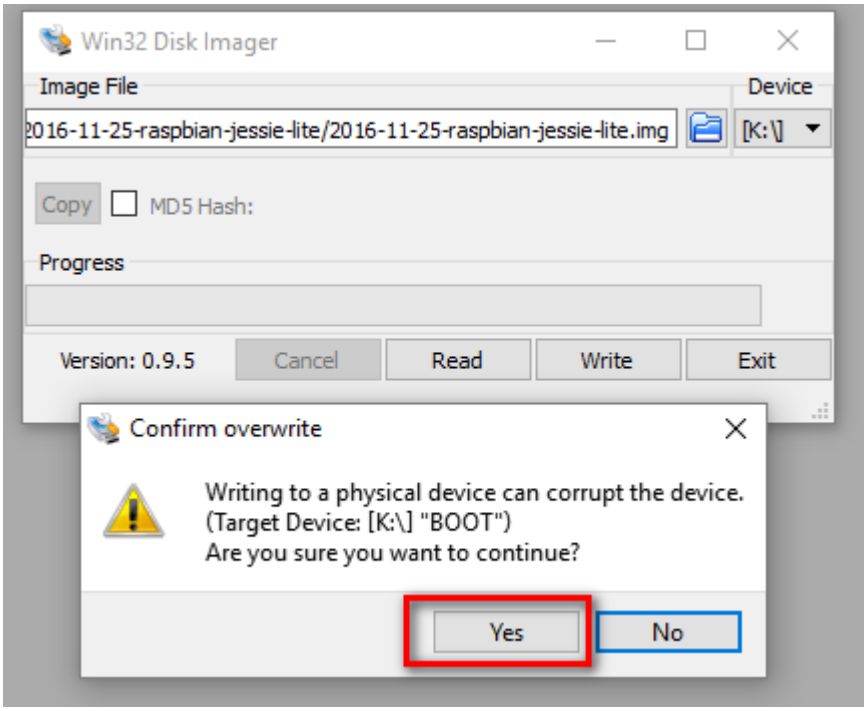


After that the image is selected. Click on Write to burn the image to your SD Card.



This can take about 5 minutes. Depending on the size of your SD. Get some coffee :D
Sometimes the writing is stuck and nothing happens. Then start over from Step 2. It has happened me quite some times, so don't bother too much about it;)

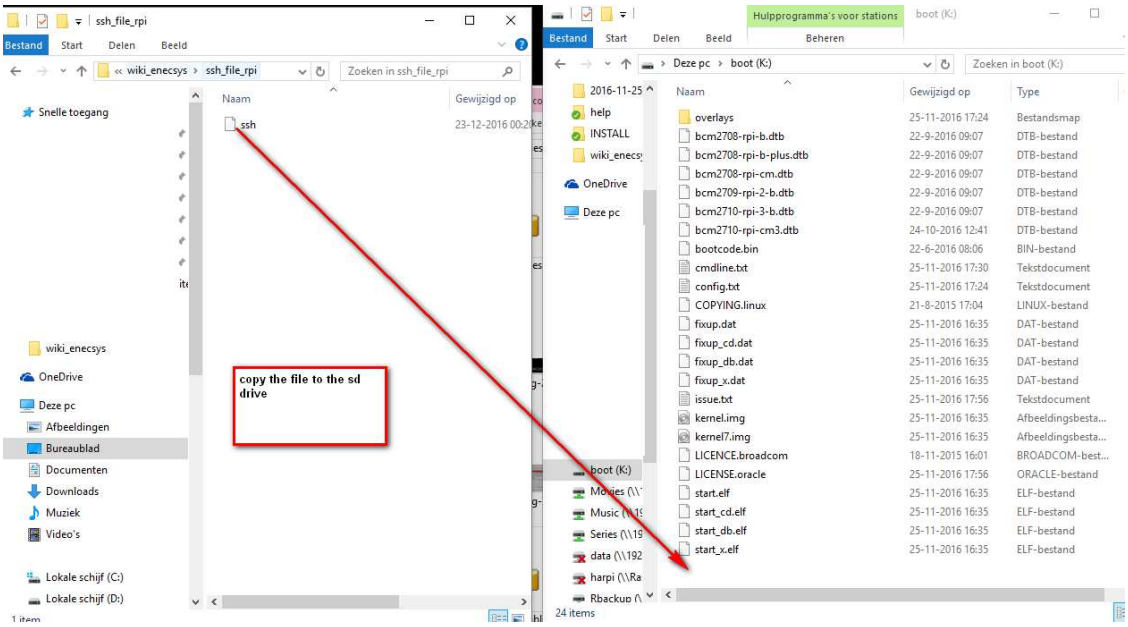
When you have clicked on Write you will get a warning. Just click OK



When the writing is done you will get a popup

OK. at this point we are not done yet.
Raspberry decided to remove default ssh access to the RPI. And we need SSH.

If you want to do it manually, open Notepad++ (NOT notepad). Make an empty file, save it as ssh (no dot, just ssh) and place it in the root of your SD card.
Or download the file i already created: http://vanmarion.nl/rpi/ssh_file_rpi.zip
unpack the zip file and put it in the root directory



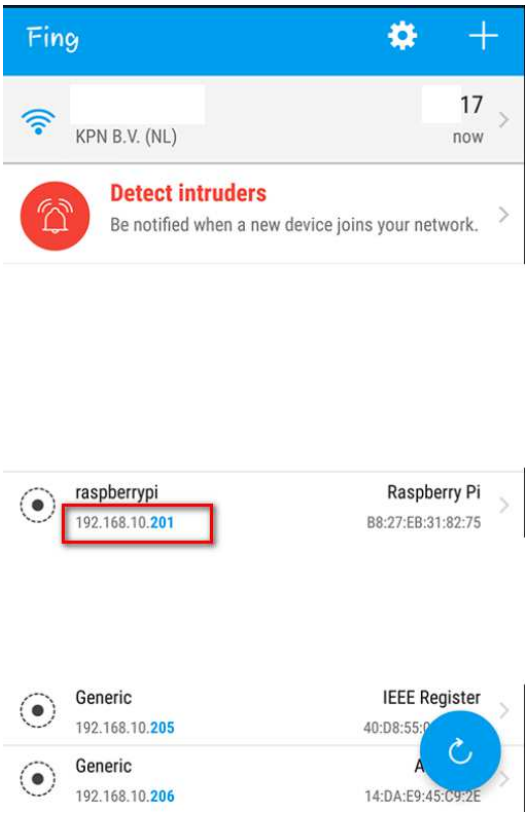
After that you can disconnect the SD Card, stick it in your RPI and power it up and make sure the network cable is connected to your network. It will get an ipaddress automaticly from your router.

STEP 4

OK. How do you find your RPI in your network?
I use a mobile app Fing
https://play.google.com/store/apps/details?id=com.overlook.android.fing&hl=nl

So i can scan my network. It should show a rpi in there

Using Fing (android) will show my RPI in my network

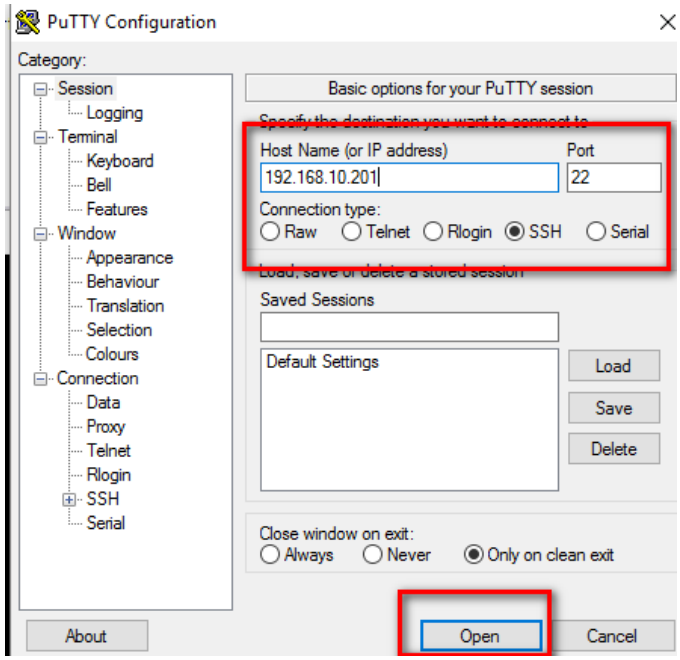


So as soon you have the ipaddress of the RPI we can continue

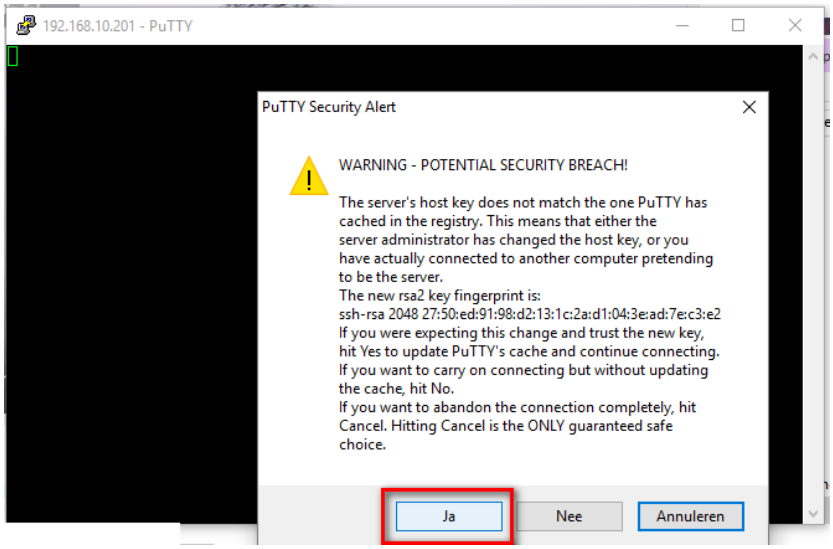
STEP 5

its time to start Putty.exe to connect to your RPI. You have downloaded this in Step 1. in my case my rpi ipadress is 192.168.10.201

the default ssh port is 22 so we need this when connecting
start putty.exe



you will get a warning (thats normal). Press Yes/ja



login with the default user and password

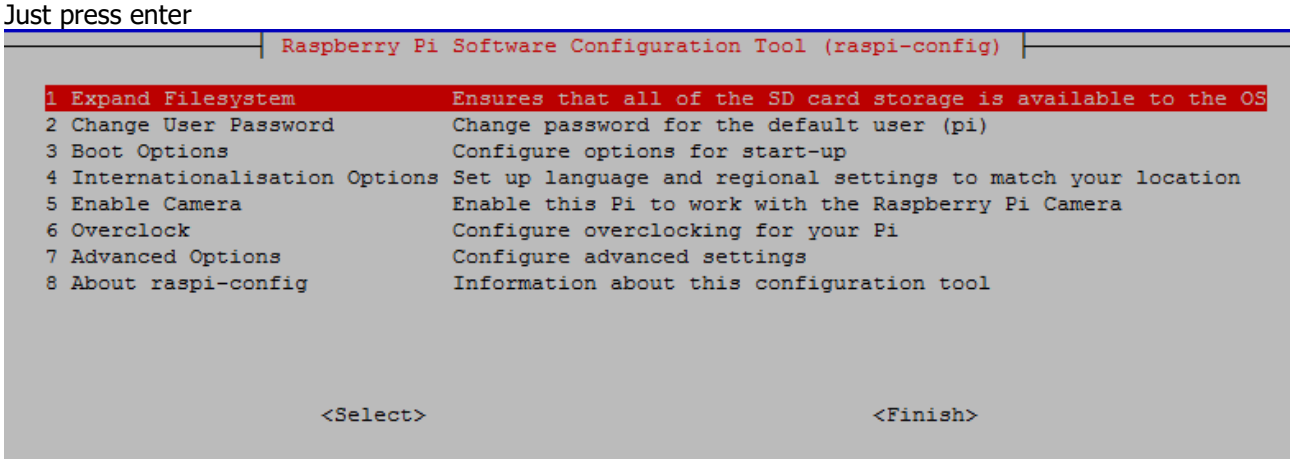
login: pi
password: raspberry

ok. the hardest part is done. Time to install the dashboard.

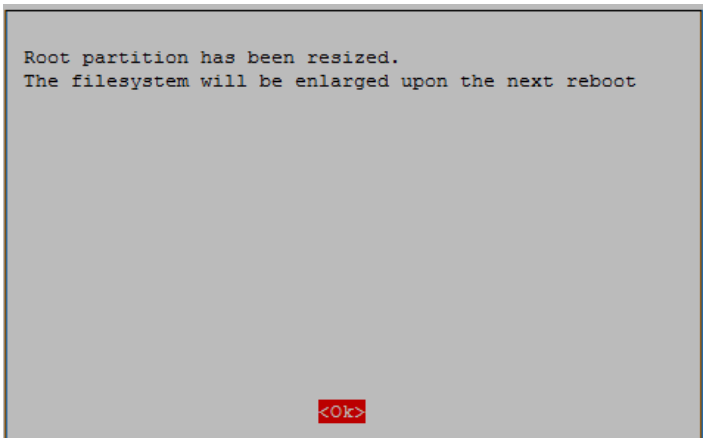
STEP 6

First things first. We have to configure the RPI. Follow the screens and you should be ok. To start it type this command: **sudo raspi-config**

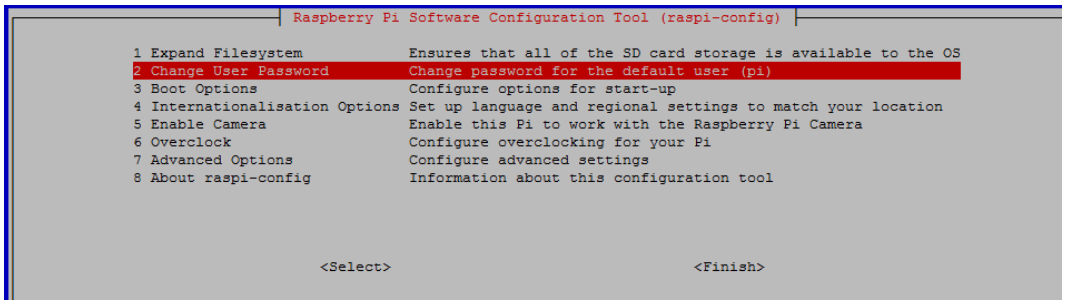
it will show this screen.
There are some steps we have to configure. The first one is to expand the filesystem. Otherwise it will only use a limited space of your SD card.
Just press enter



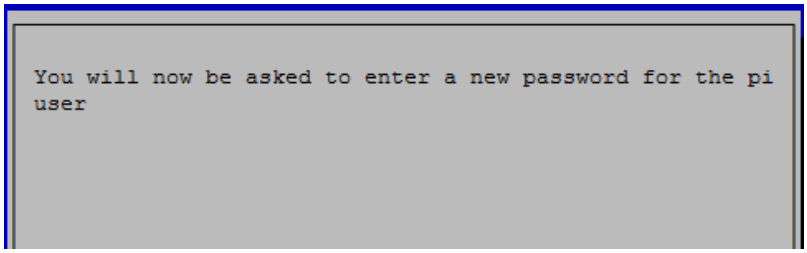
When you pressed enter it will show this screen. Just click OK. We will reboot later



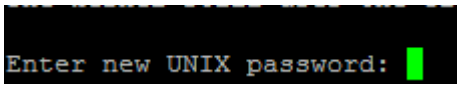
On to changing the password. It is best to set a password of your choice. Make sure to fill it in good (when setting the password it looks like nothing happens, but it will change to what you are typing)



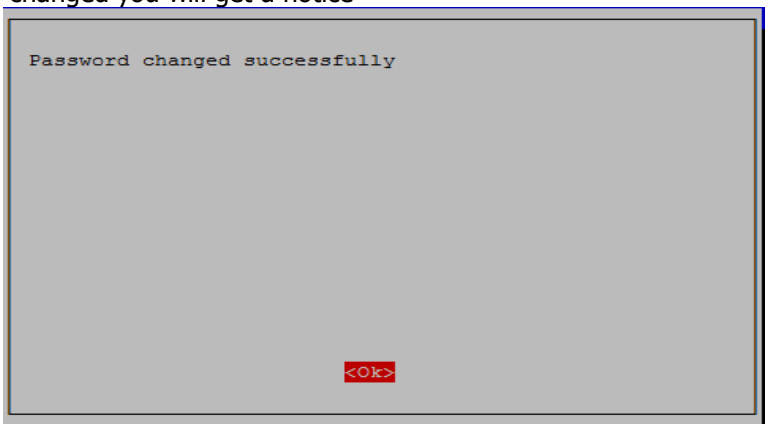
Set the password



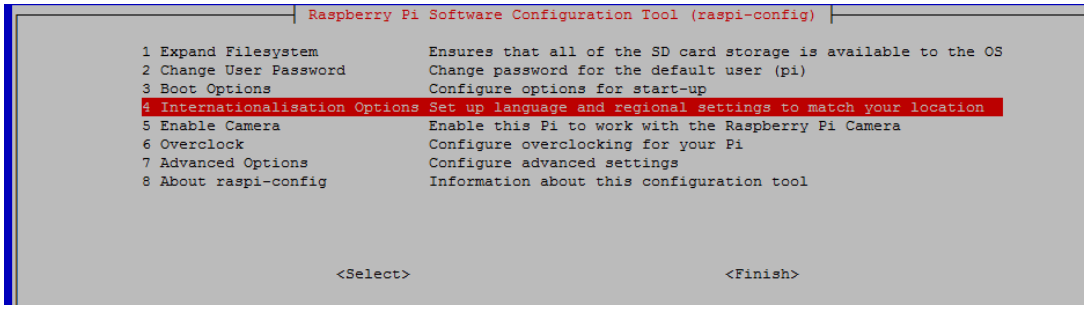
Type the new password twice.



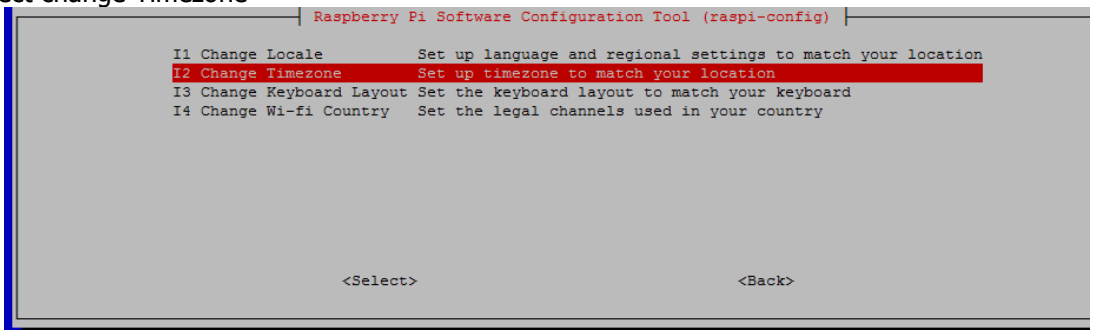
When the password is changed you will get a notice



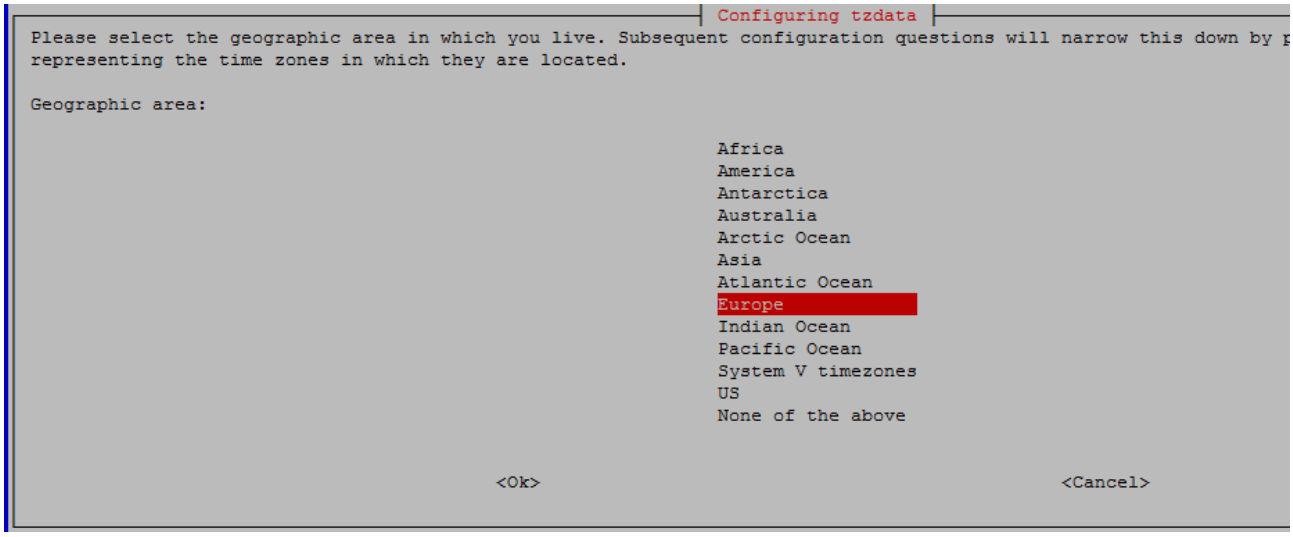
ok after this select 4 (Internationalisation options) and press enter

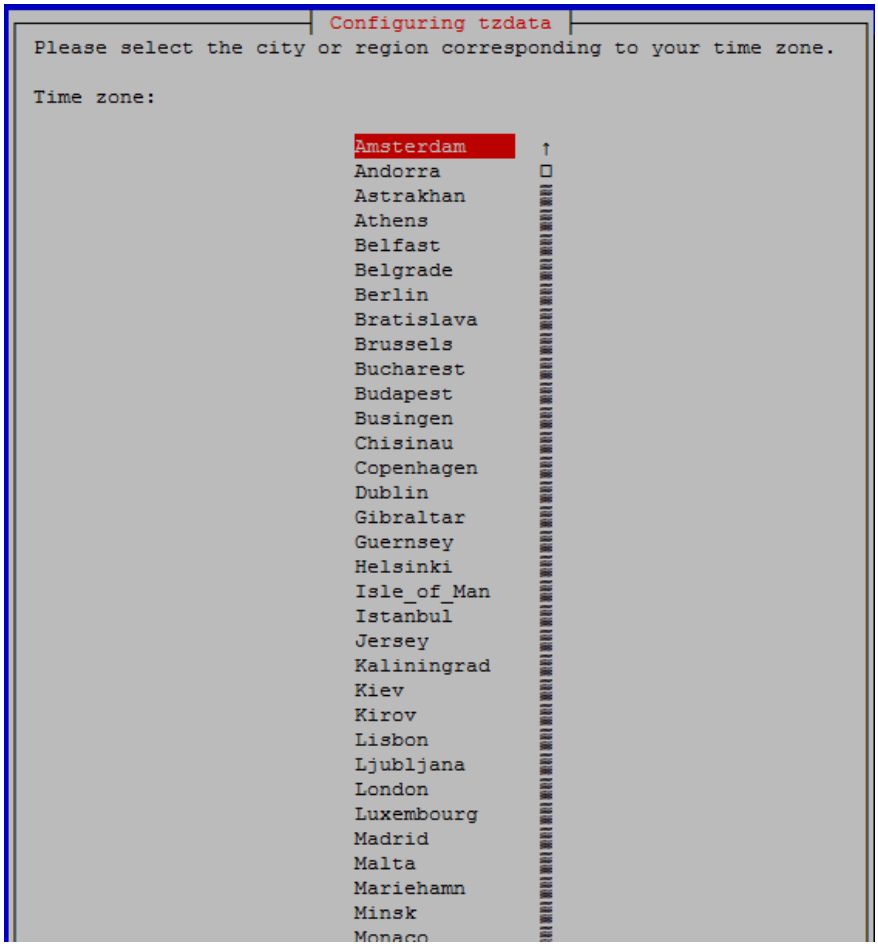


then select change Timezone



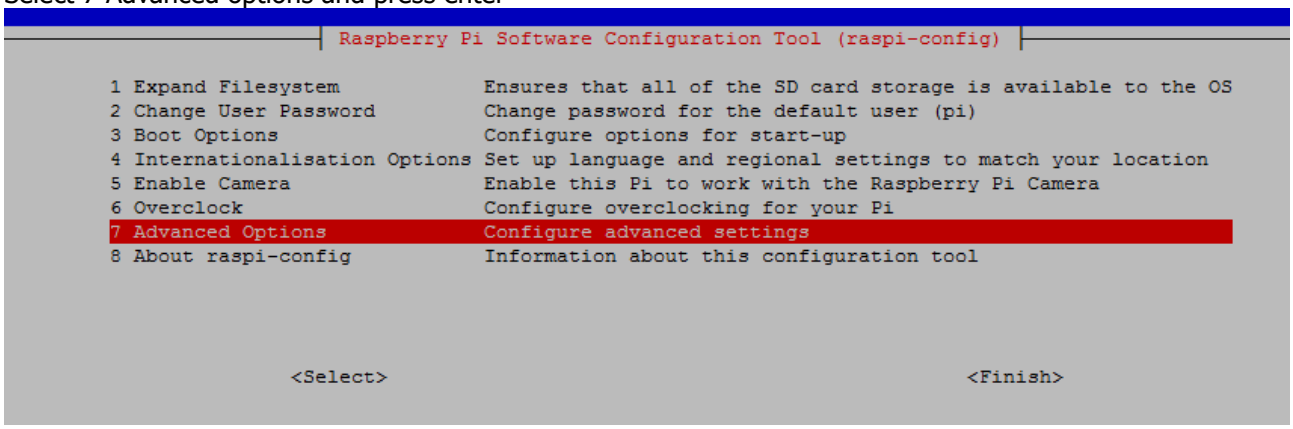
select the next screens to the location where you are



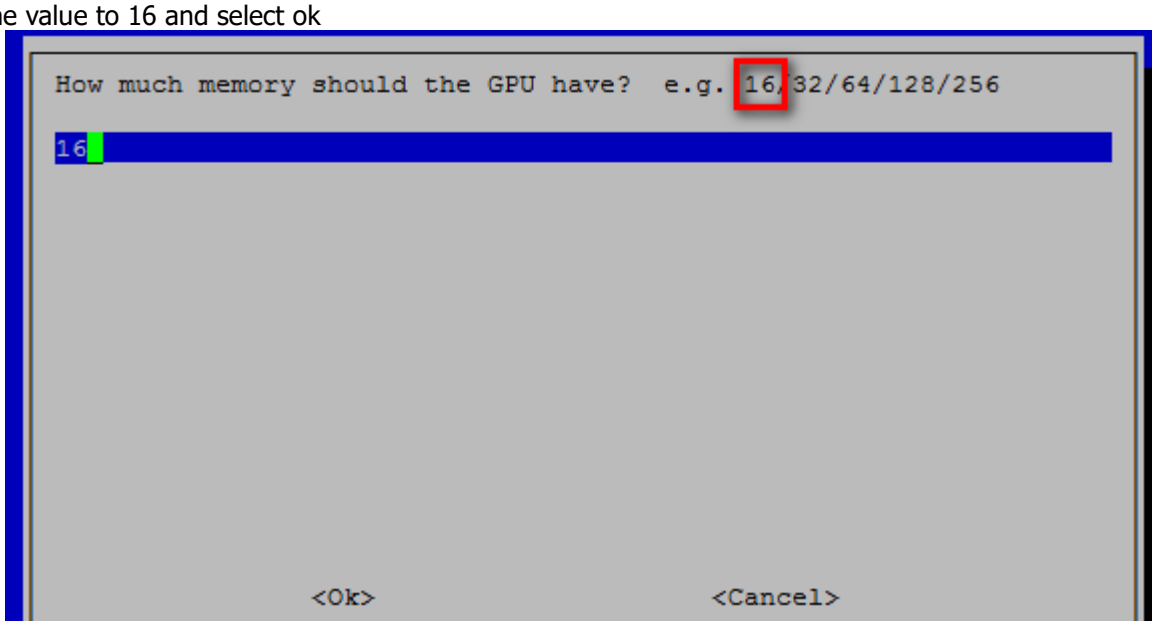


and press enter. It will automaticly send you back to the main screen.

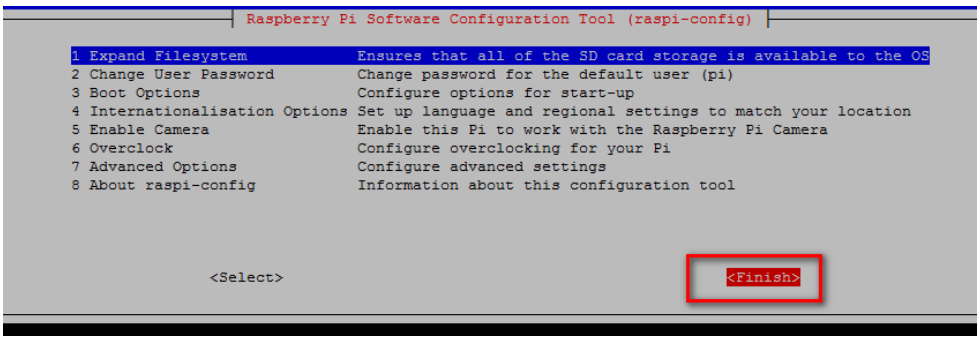
Select 7 Advanced options and press enter



First select A3 Memory Split and press enter
set the value to 16 and select ok



ok all done.
Click finish



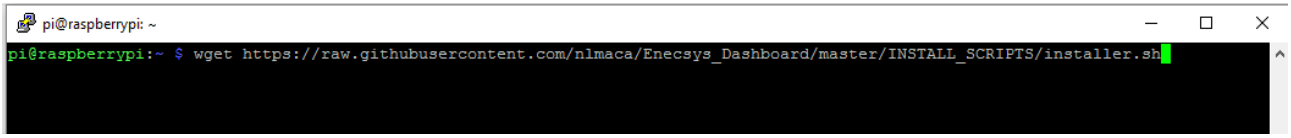
It will ask for a reboot. Press yes.

After the RPI has been rebooted. The rpi is pretty quick in rebooting. So just wait a minute. Again connect to it with Putty (see step 5). However, now connect with the new password you have set.

STEP 7

Ok. time to start the installer process. Use only the url in this documentation, i had to use another one, because i created the documentation first before i uploaded the code

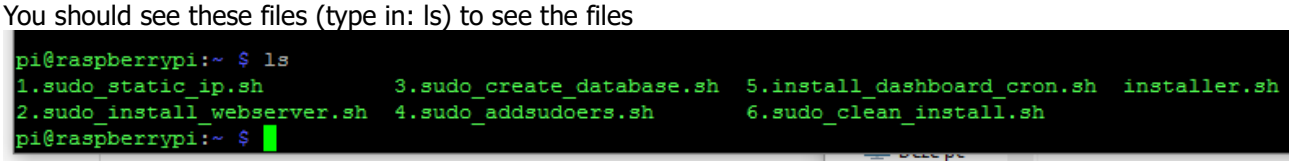
Download the Installer first
wget https://raw.githubusercontent.com/nlmaca/Enecsys_Dashboard/master/INSTALL_SCRIPTS/installer.sh



after this you have to set executable rights:
chmod +x installer.sh

Ok. Now we are going to run the installer which will download all the necessary other installer scripts. Run the installer
./installer.sh

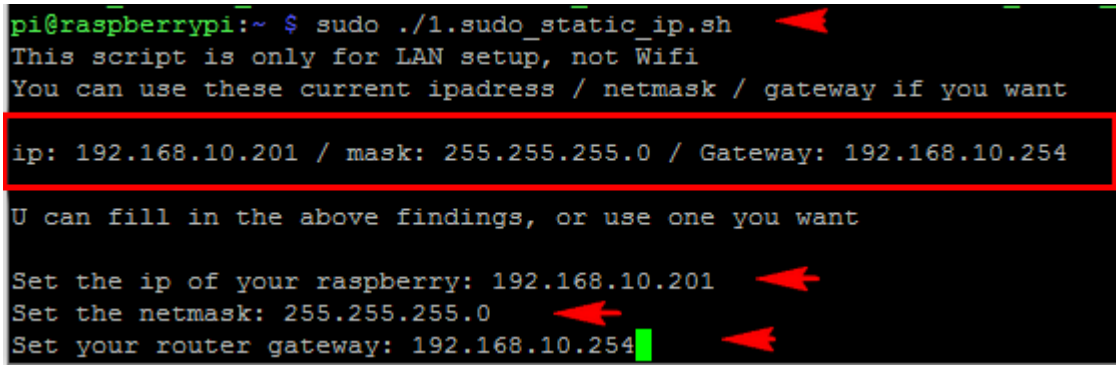
You should see these files (type in: ls) to see the files



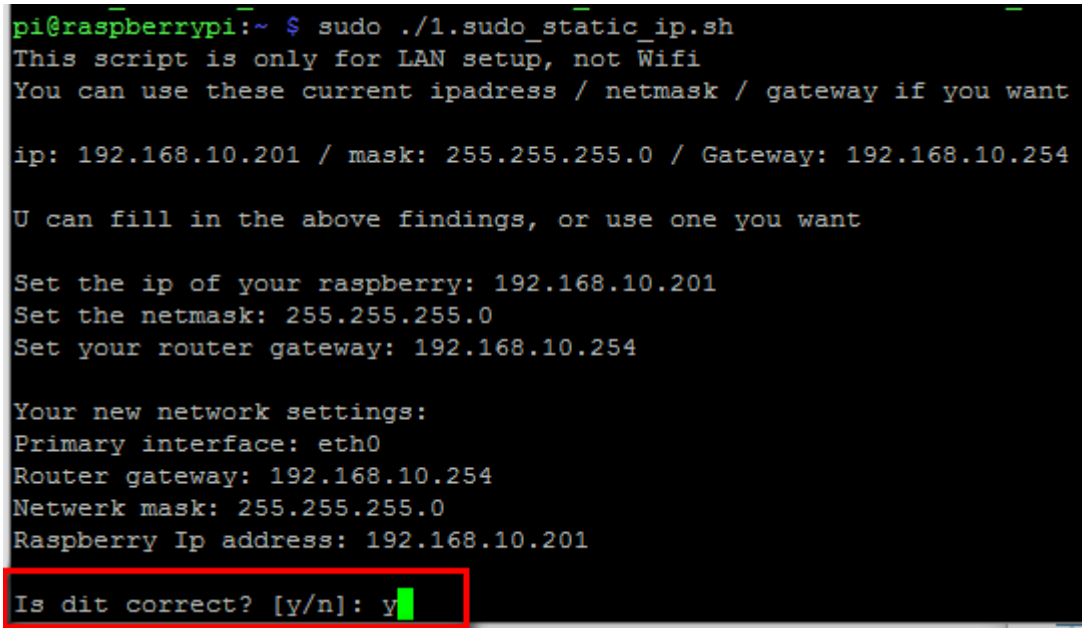
All these files are needed for the dashboard installation. So lets start with the first one

STEP 8

sudo_static_ip.sh will give you the current ipadress, netmask and gateway of your rpi. It is recommended to use these settings. Just type them in the question box.
Run the command WITH SUDO!!
sudo ./1.sudo_static_ip.sh



press enter it will ask for approval. Make sure the settings are correct, otherwise after a reboot you cant connect to it.



it will show a message:
The new settings will be applyed on the primary network interface in '/etc/network/interfaces'
After a reboot you can find your rpi on this ipaddress: 192.168.10.201
For further dashboard installation start script No. 2

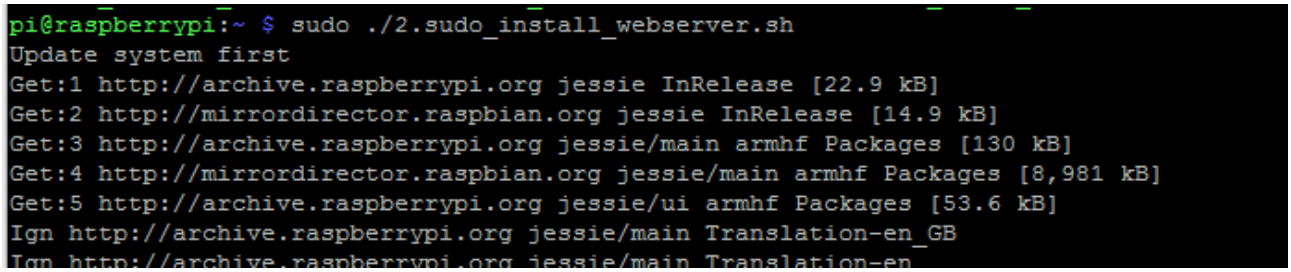
For now, we dont reboot. We go on to the next step.

STEP 9

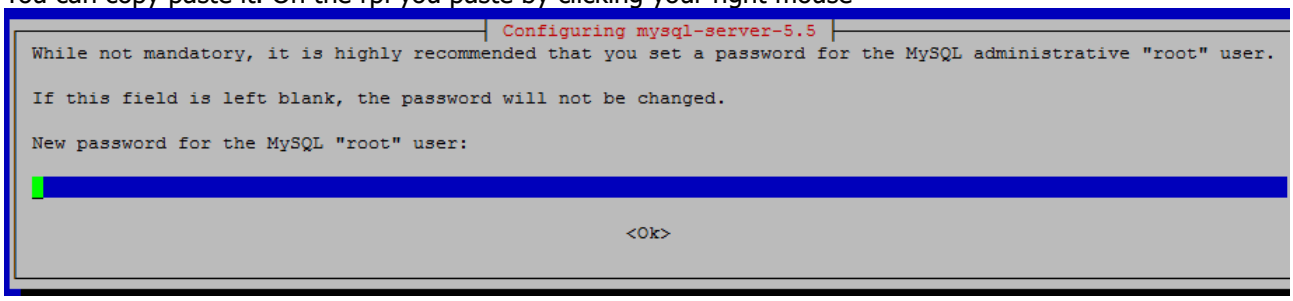
ok. the next script wil take a bit longer. It will update the rpi and install the mysql server, webserver, php, phpmyadmin
You have to set a new MySQL root password for it. So make sure to note it down, because you need it in the next process. Also save the passwords on a safe place

use this url to generate a random password:
https://www.random.org/passwords/?num=1&len=12&format=html&rnd=new

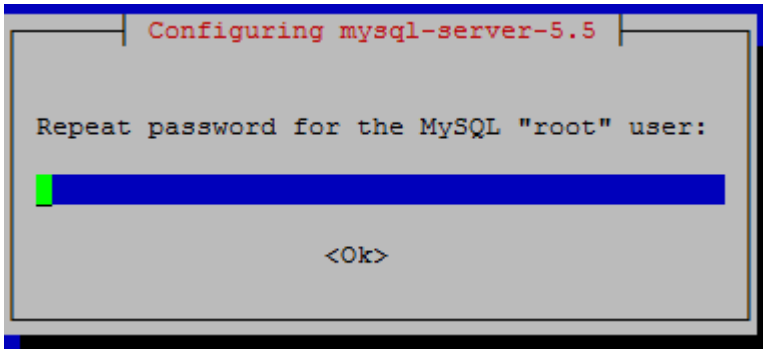
also. Run this one WITH SUDO
sudo ./2.sudo_install_webserver.sh



it will ask you to set a new mysql root password:
You can copy paste it. On the rpi you paste by clicking your right mouse



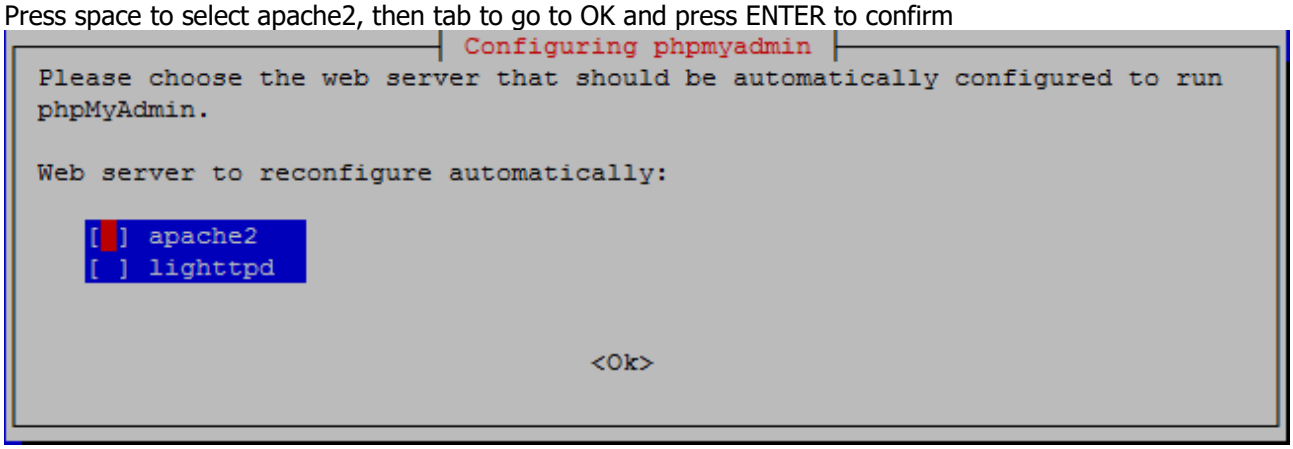
it will ask you again



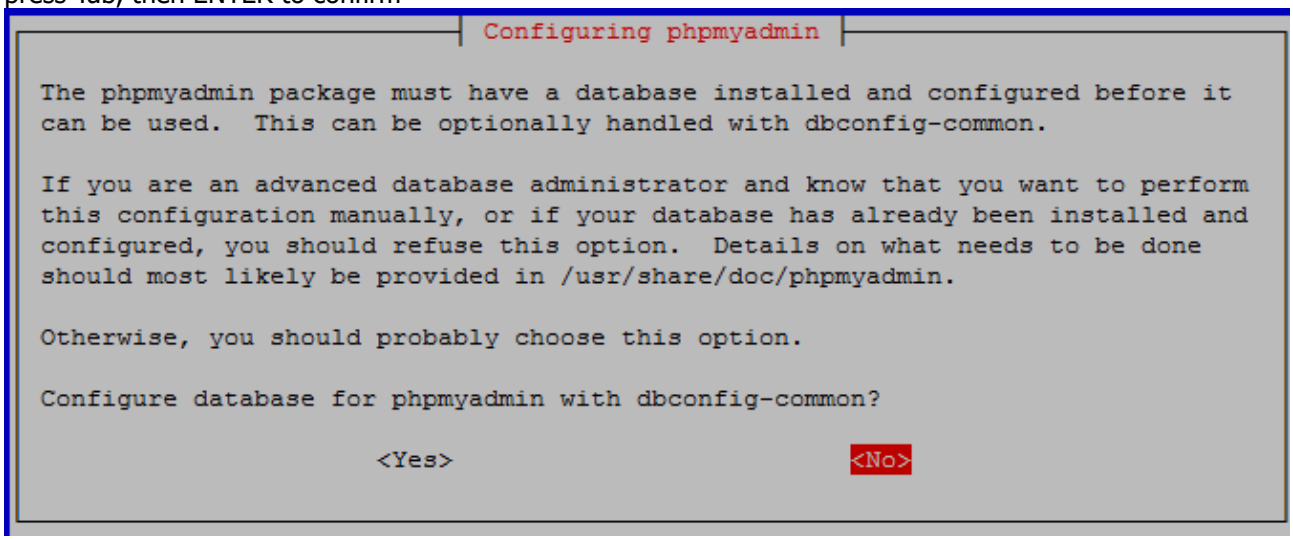
paste the password again. And press tab and then enter to confirm

The install process continues. It can take some time. Don;t worry when nothing happens. A lot is happening on the background.

The next question is this one: here you have to select apache.
Press space to select apache2, then tab to go to OK and press ENTER to confirm



next question is for phpmyadmin. Select no
press Tab, then ENTER to confirm



This will install the last process and restart mysql (database server) and the webserver.
Step 5: echo add line to apache config ServerName 127.0.0.1

Step 6: restart apache and mysql

Installation Done! > Go to script No 3

ok. instalation done. On to the next script

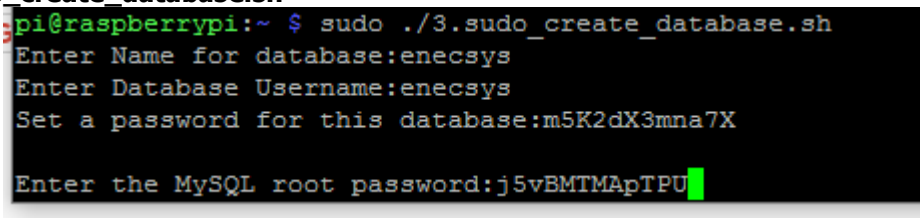
STEP 10

No we are going to create a database for our dashboard. You have to set a database_name, username and password for the database. Again, safe the credentials. You also nee the mysql root password you have set in STEP 9.

Use the link again to create a password

i will use these settings as an example
database name: enecsys
username: enecsys
password: m5K2dX3mna7X

So. start the script again WITH SUDO
sudo ./3.sudo_create_database.sh



Ok. installation went without problems. The database is created

```
pi@raspberrypi:~ $ sudo ./3.sudo_create_database.sh
Enter Name for database:enecsys
Enter Database Username:enecsys
Set a password for this database:m5K2dX3mna7X

Enter the MySQL root password:j5vBMTMApTPU
First check if the database exists or not
Database does not exist. A new one will be created with your given credentials
The database will be created with the settings you gave
----------------------------------------
 Database has been created successfully ,save these credentials!!
----------------------------------------
 Database Info:

 Database Name     : enecsys
 Database User     : enecsys
 Database Password: m5K2dX3mna7X

----------------------------------------
------------------------------------------------------------
MySQL Installation Done!
Note the database name, username and password on a safe place. You will also need them
in the install process
Start script No 4.
```

Again, save the credentials, you will need them later on.

STEP 11

The next script is an easy one, it will add the apache user to the sudo list, so you are able to reboot the RPI from within the dashboard. It will also grant the apache user permissions to run the cronjobs

run the script WITH SUDO

sudo ./4.sudo_addsudoers.sh

```
pi@raspberrypi:~ $ sudo ./4.sudo_addsudoers.sh
Line added to sudoers
Installation Done. Go to step No 5.
pi@raspberrypi:~ $
```

STEP 12

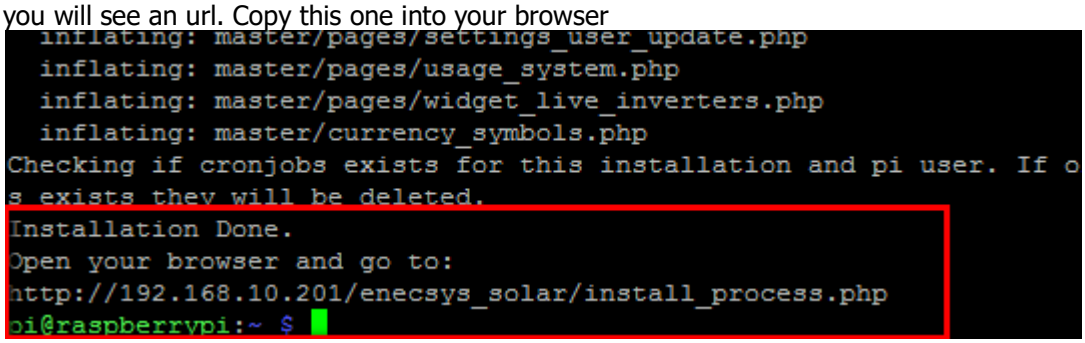
ok. this is an important one to run it right. You have to set a webdirectory as a parameter, so for example if you want to see it in the browser as http://192,168,10,201/enecsys_solar you have to set **enecsys_solar** as parameter. This wil also install all the cronjobs on the pi user based on the parameter you set. You can use enecsys_solar if you don't know what i mean;).

This command will download all the files from my github page to your RPI and will unpack it into the webdirectory. So the hard part is done for you automaticly :D

You have to run this script WITHOUT SUDO. So don't set sudo in front of it. Because we need everything to run on the pi user, and NOT on the root

./5.install_dashboard_cron.sh enecsys_solar

It will donload the files, unpack them, install them, install the cronjobs. After that you will get this message. In there you will see an url. Copy this one into your browser

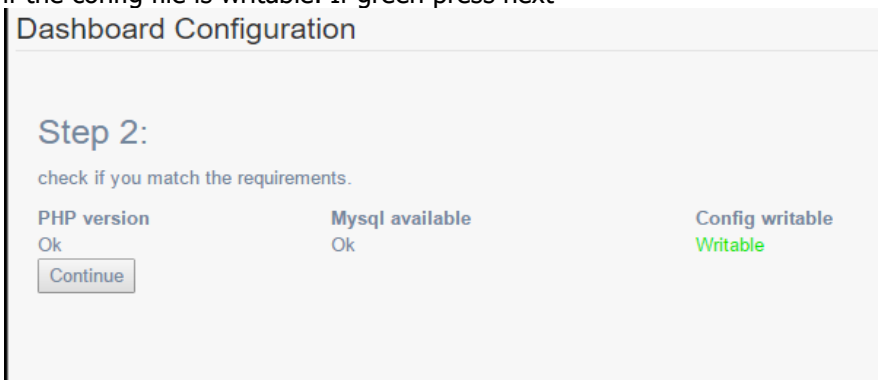


STEP 13

on to the webinstaller. Open the url in your browser to start the dashboard installation, make sure to enter the complete url. In my case: http://192.168.10.201/enecsys_solar/install_process.php

after that agree to the disclaimer and press continue

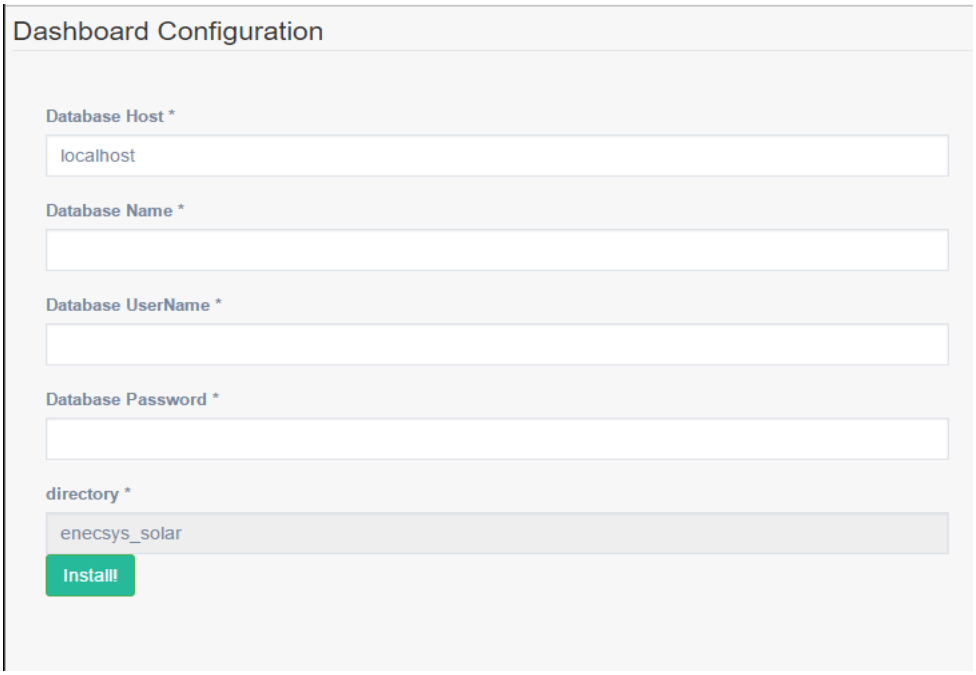
next it will check if the config file is writable. If green press next



Next screen is where we have to set the database credentials you have set in STEP 10

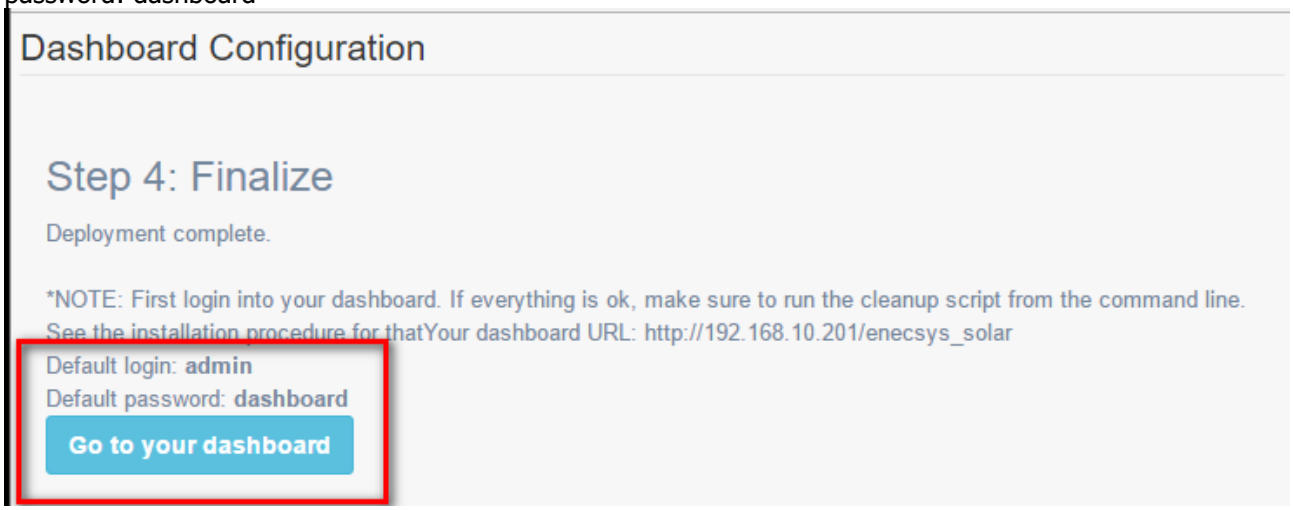
You only have to set:

- Database Name
- Database UserName
- Database Password



ok. almost done. Below will show a link you can click to go to your dashboard.

The default credentials are:
username: admin
password: dashboard

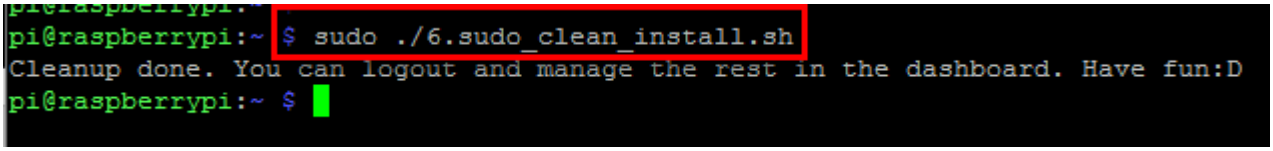


Click on: go to your dashboard and bookmark the page.

NOTE. YOU ARE NOT DONE YET.
Follow this last step

STEP 14

Please go the last step to cleanup the INSTALL files. Run the last script



Ok. now you are done. Logout of the RPI by using this command:
exit

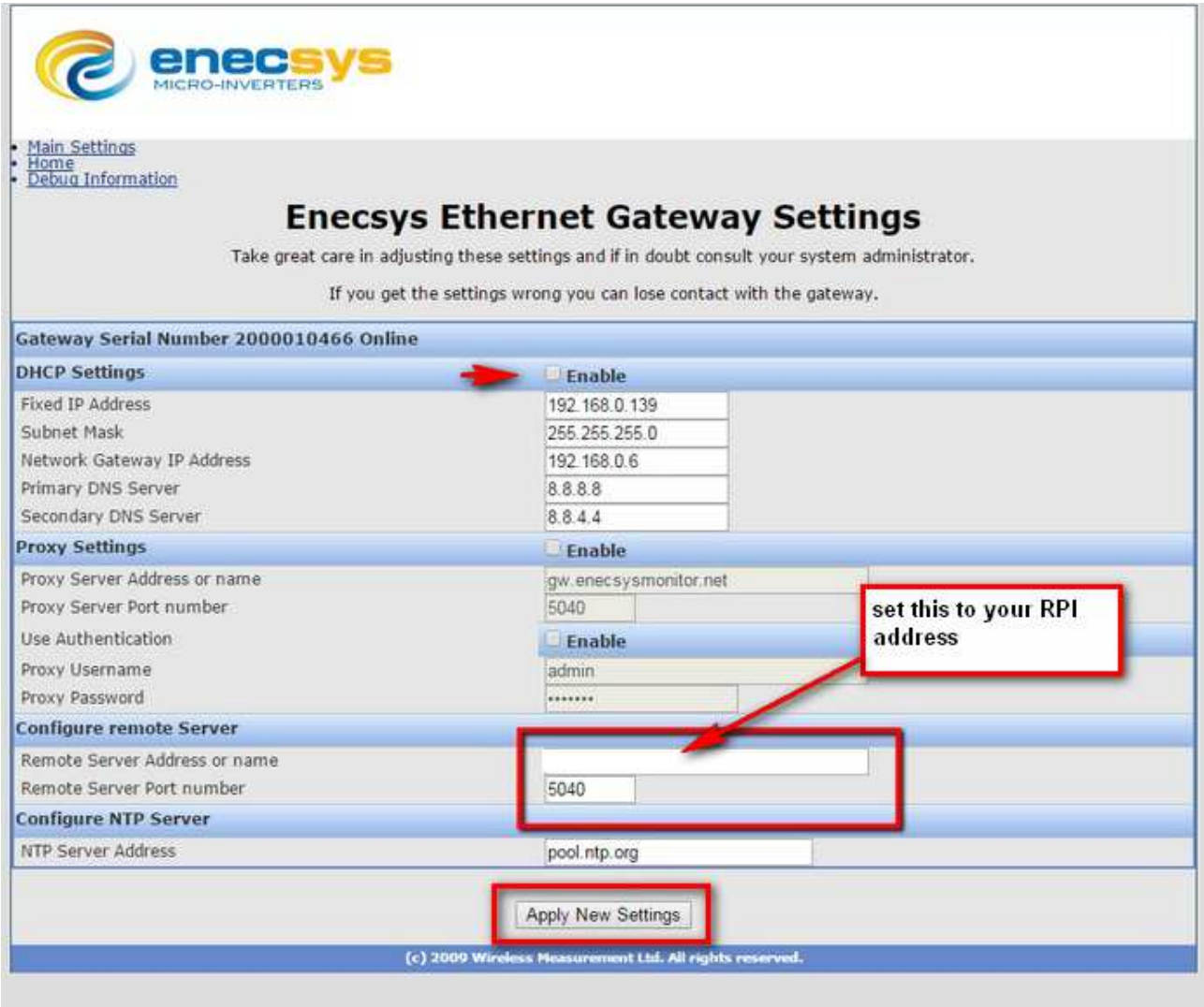
STEP 15

The next step is to set your Enecsys Gateway to the new RPI address. You can find the ipaddress of the Enecsys gateway on the gateway itself

It is best to set the Enecsys Gateway to a static ipaddress. You can do that by deselecting the DHCP because in my experience the gateway will change ipadresses when you reboot your router.

Go to the ipadress of your enecsys gateway in the browser and login (i don't have the credentials, you should have them). Default credentials are:
username: admin
password: password

Make sure DHCP settings is not selected
In the Remote server address or name enter the ipaddress of the RPI. In my case that would be 192.168.10.201



After that Apply New settings.

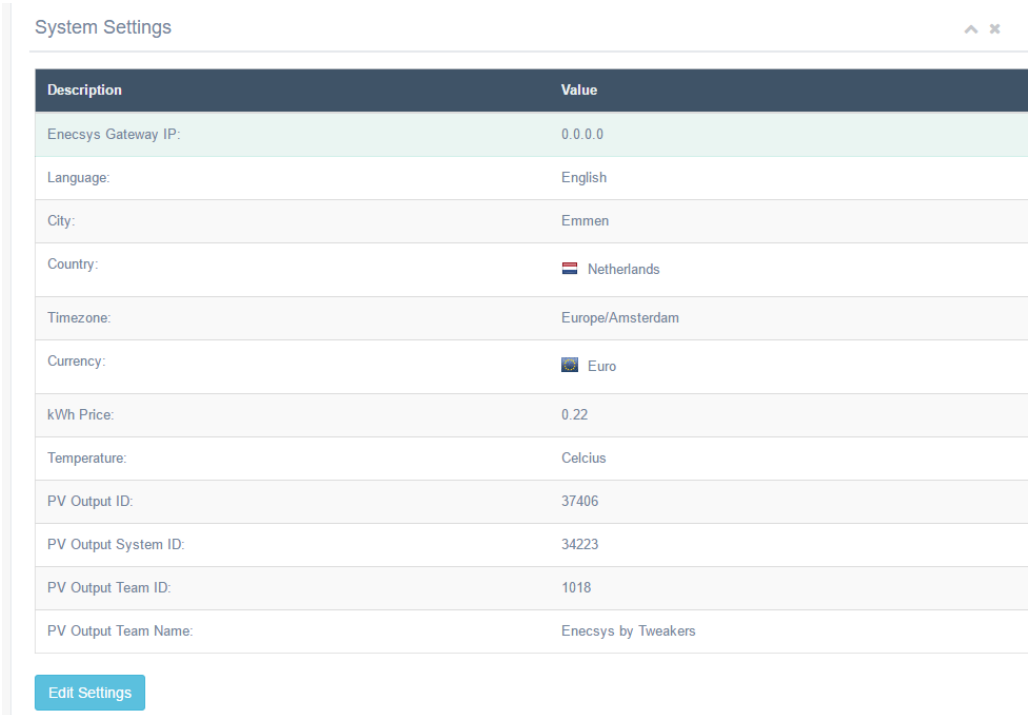
Ok almost done. Time to go the dashboard to input your inverters, and configure all the settings

STEP 16

Dashboard configuration
Almost done. There are 2 pages you have to edit in the dashboard. Login in your browser with the url you got from step 10

go to settings-> E2PV
make sure these fields are adjusted: **common mistake is that users add the personal id in the systemid field. So make sure you set the correct one!!**

After that set the general settings. The data is not depending on it, but its best to configure the settings first fill them to your needs



The last setting for now is the Settings → Inverters
you will have to set all the inverter serial numbers you have

Inverter: The inverter serial number.
Inverter type: select the type of your panels
part nr: optional
build date: optional
Duo single: select the inverter type duo/single
Watt panel 1, 2 . Set the watt for each panel
Alias: example: top left panels or bottom roof

After you have set all your inverters and settings its time to reboot the rpi.
YOU NEED TO REBOOT EVERY TIME YOU CHANGE THE E2PV SETTINGS!!

Go to System-> reboot/Shutdown
Click on Reboot RPI to confirm all the changes and to reboot the RPI.
After the reboot you have to wait for data coming in. (so you need daylight)

Ok. now you are done. There is a help page in the dashboard with common issues and a short knowledge base.
Have fun

regards,
NLMaca / Jeroen van Marion