Final objective of this guide

It is a question of realizing a connected box equipped with sensors which sends the data to a Cloud platform.

User Guide

Plan Bee

Members

Jeremy COLZY
Keïta EFFOUDOU MEZI
Lucas GUEDON
Valentine YAO

EI-2I 4 II
Group 3

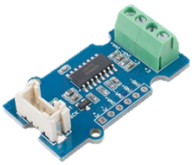
Jeremy COLZY
Keïta EFFOUDOU MEZI
Lucas GUEDON
Valentine YAO

EI-2I 4 II
Groupe 3

Summary

Jeremy COLZY
Keïta EFFOUDOU MEZI
Lucas GUEDON
Valentine YAO

I. Required components

Solar cell of 5,5 V/360 mA	
Arduino MKR FOX 1200 board ABX00014 with SigFox interface	
LiPo Rider Pro (Power adapter card)	
Temperature and humidity sensor DHT22	
Temperature sensors	
Weight sensor	 
Li-Ion battery 3,7V 1050 mAh	

Jeremy COLZY
Keïta EFFOUDOU MEZI
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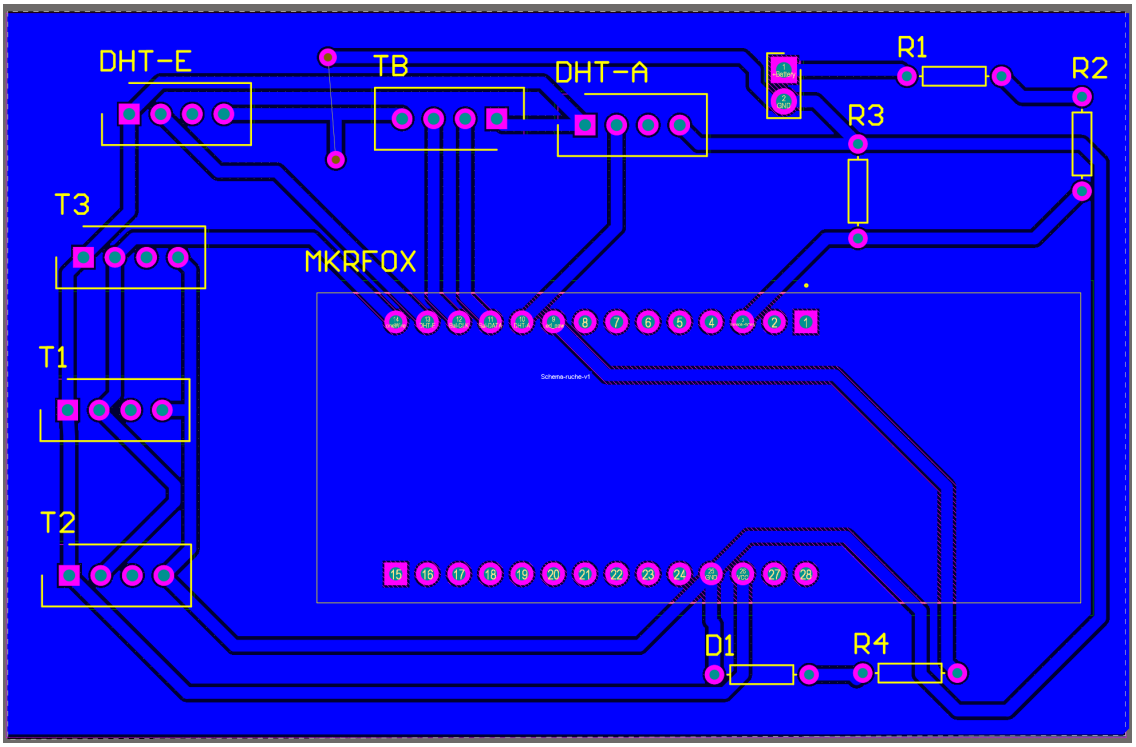
II. Electrical diagram and PCB

The purpose of our PCB is to connect the different sensors together with the MKR FOX 1200 board. To design our PCB we used a software called altium designer. The electrical schematic and PCB files are available on our github.



Here are below the values of the components that we used :

- R1 : 80KΩ
- R2 : 10KΩ
- R3 : 330KΩ
- R4 : 100KΩ

for other fingerprints, the following devices must be connected:

- T1 : temperature sensor numbers 1
- T2 : temperature sensor numbers 2
- T3 : temperature sensor numbers 3
- TB : weight sensor
- DHT-E : outdoor humidity and temperature sensor (DHT22)
- DHT-A : indoor humidity and temperature sensor (DHT22)
- MKRFOX : MKR FOX 1200 board (microcontroller)
- D1 : diode

III. Code resources

To access the code that we have designed as well as our electrical diagram and PCB plan, we have created a folder on github that you can find at the following link: https://github.com/Mostogo/Plan-Bee

On this git you have 2 folders, one with the code to deploy on the MKR board and one with the plans to design our PCB.

Inside the main.ino code, you will have to change the sensor address of your One wire sensor. To do that, please change the value here :

```
/* Sensors address */
const byte SENSOR_ADDRESS_1[] = { 0x28,  0x94,  0xFC,  0xC9,  0xB,  0x0,  0x0,  0x9F};
```

You can add multiple of One wire sensor (maximum capacity is 3 One wire)

Jeremy COLZY
Keïta EFFOUDOU MEZI
Lucas GUEDON
Valentine YAO

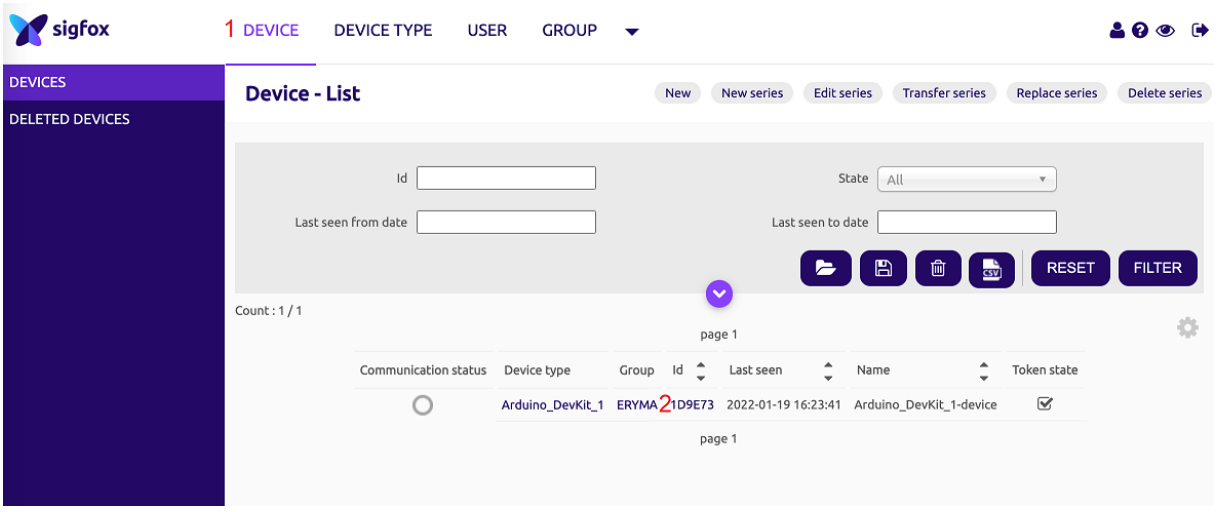
IV. Sigfox

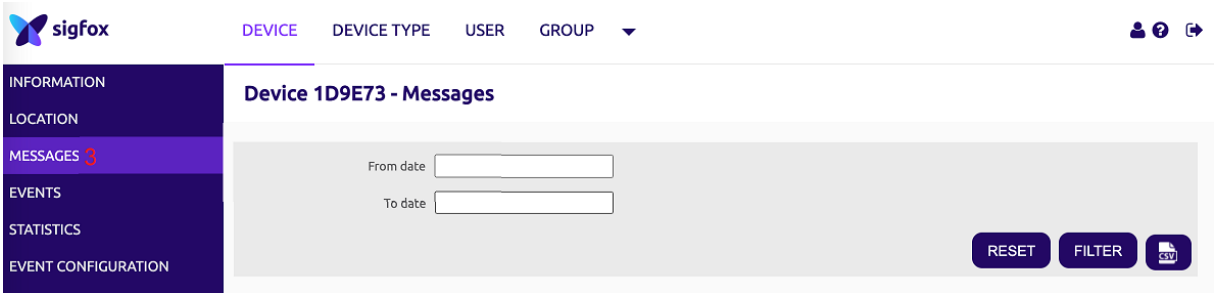
To access the recovered data, you must connect to the account at https://backend.sigfox.com/ with the following login:

Email: 001D9E73@yopmail.com

Password: Sigfox21#

After being connected, to view the messages received from the sensors and the battery, follow these steps:



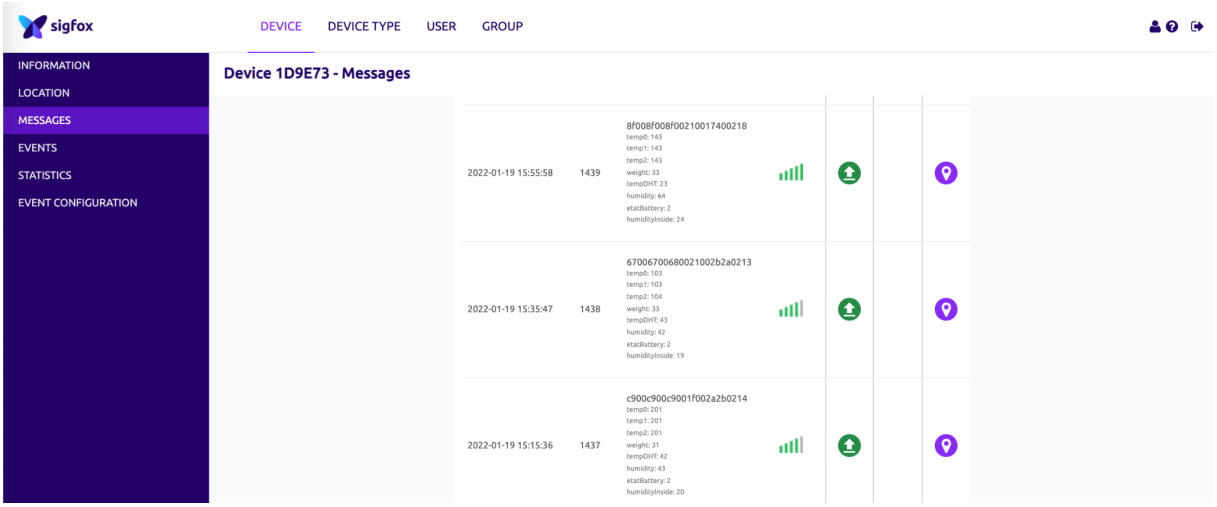


1) Click on Device

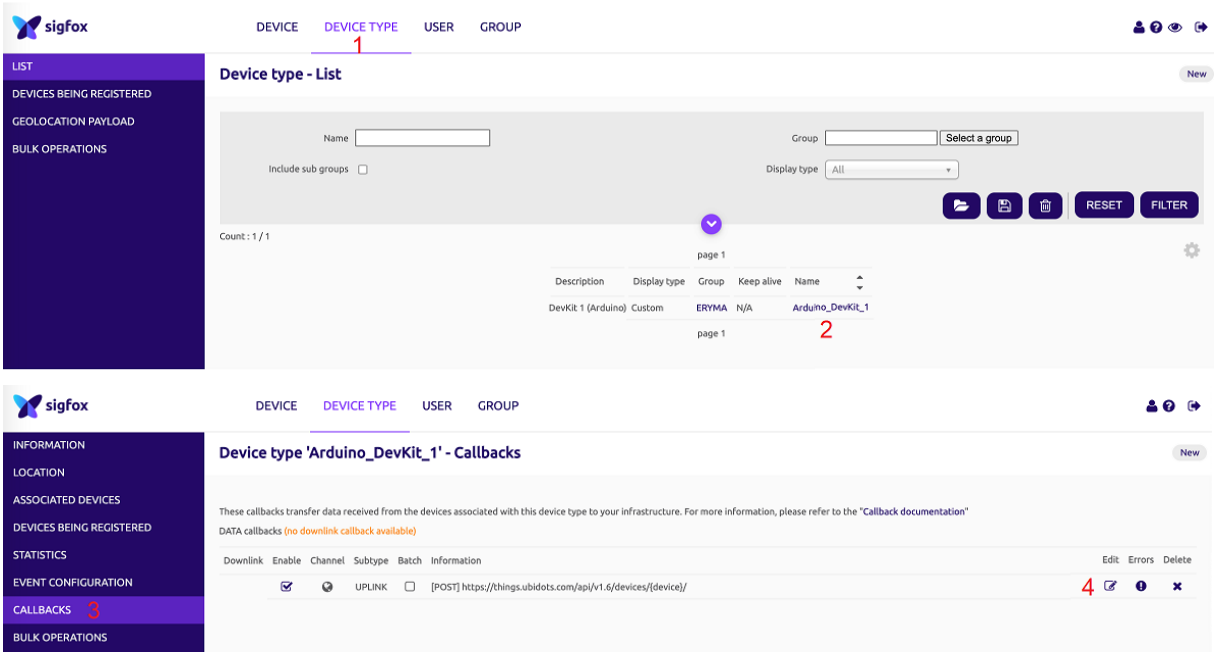
2) Click on the Id 1D9E73

3) Click on Messages

After these steps, you can observe below the messages that are sent every twenty minutes.



To receive data on Ubidots, part presented just after, we use the Callbacks function on Sigfox. To learn more, here is how to access it to take a look.



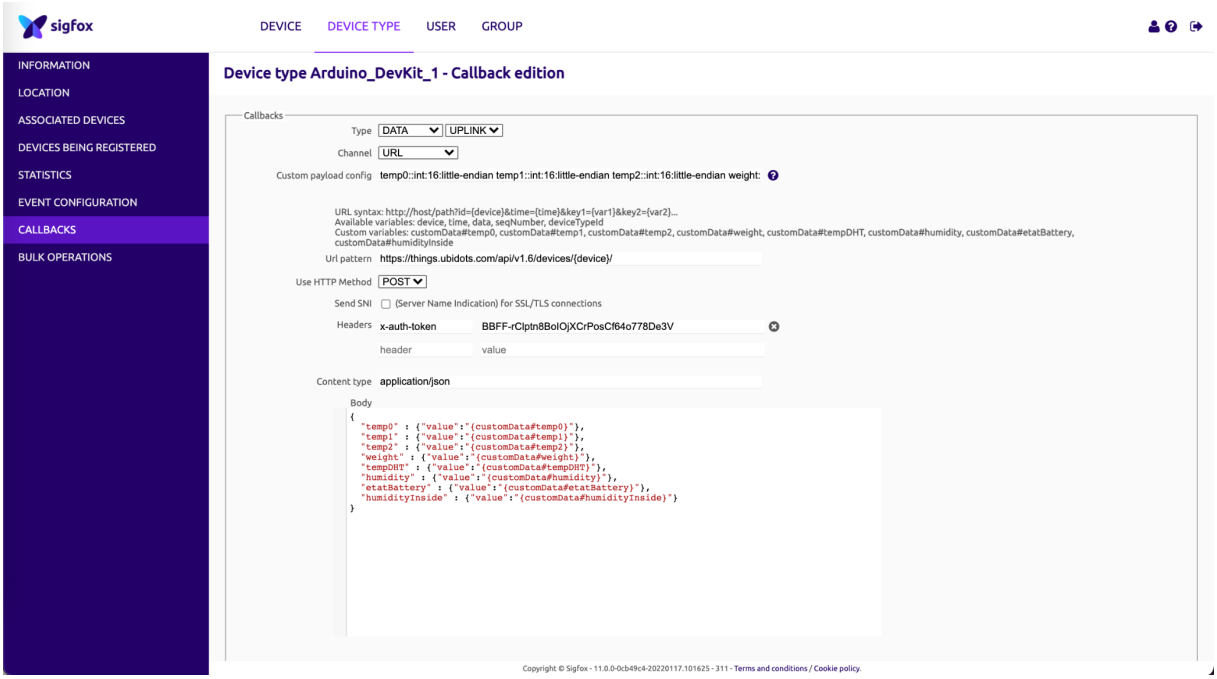
1) Click on Device Type

2) Click on the Name Arduino_DevKit_1

3) Click on Callbacks

4) Click on the edit symbol

After these steps, you can observe below the reminders that are going to be sent to Ubidots.



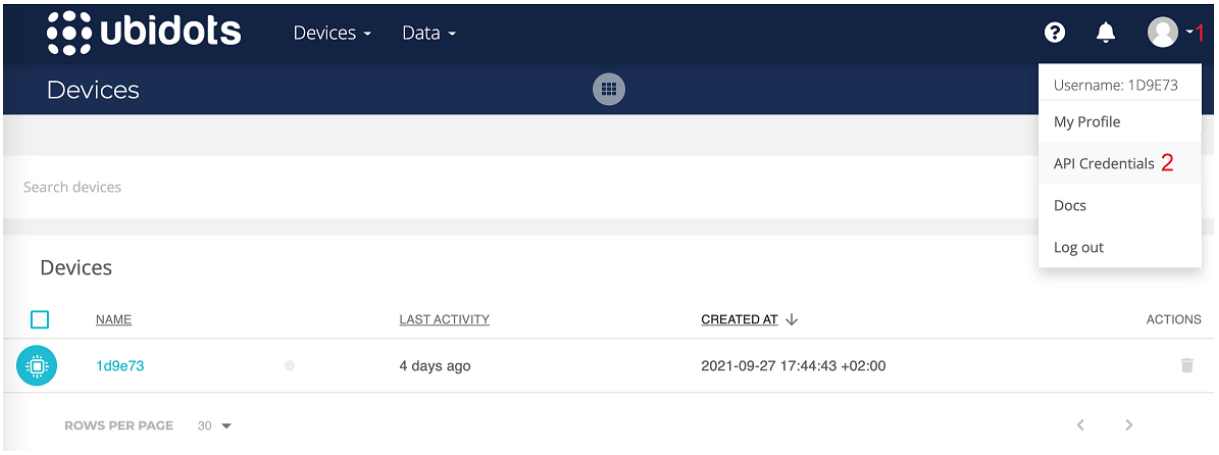
V. Ubidots

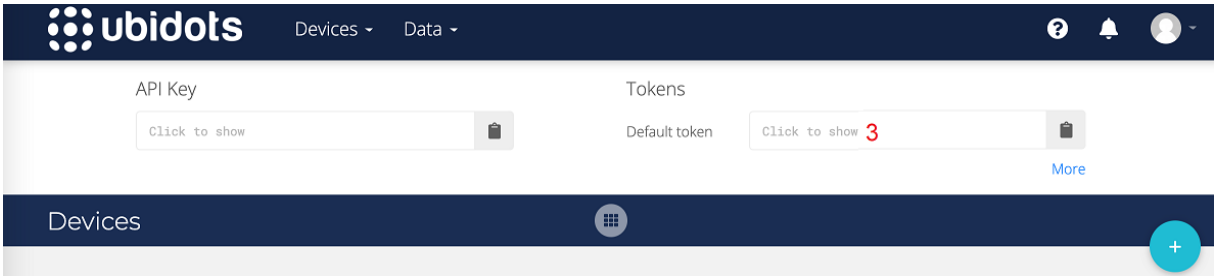
To view the Sigfox data sent to Ubidots in the form of graphs, you must connect to the account at https://industrial.ubidots.com/ with the following login:

Username: 1D9E73

Password: Sigfox21#

Before receiving any data, you must retrieve the Ubidots token and fill it in the requested box on Sigfox. To achieve this, follow these steps:



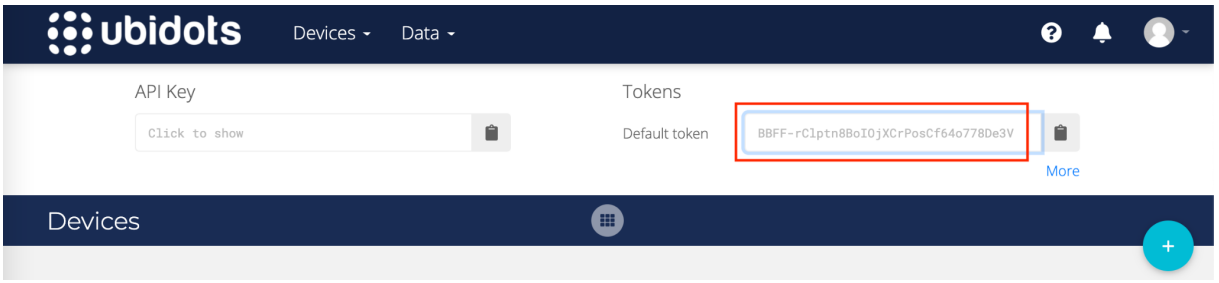


1) Click on the symbol

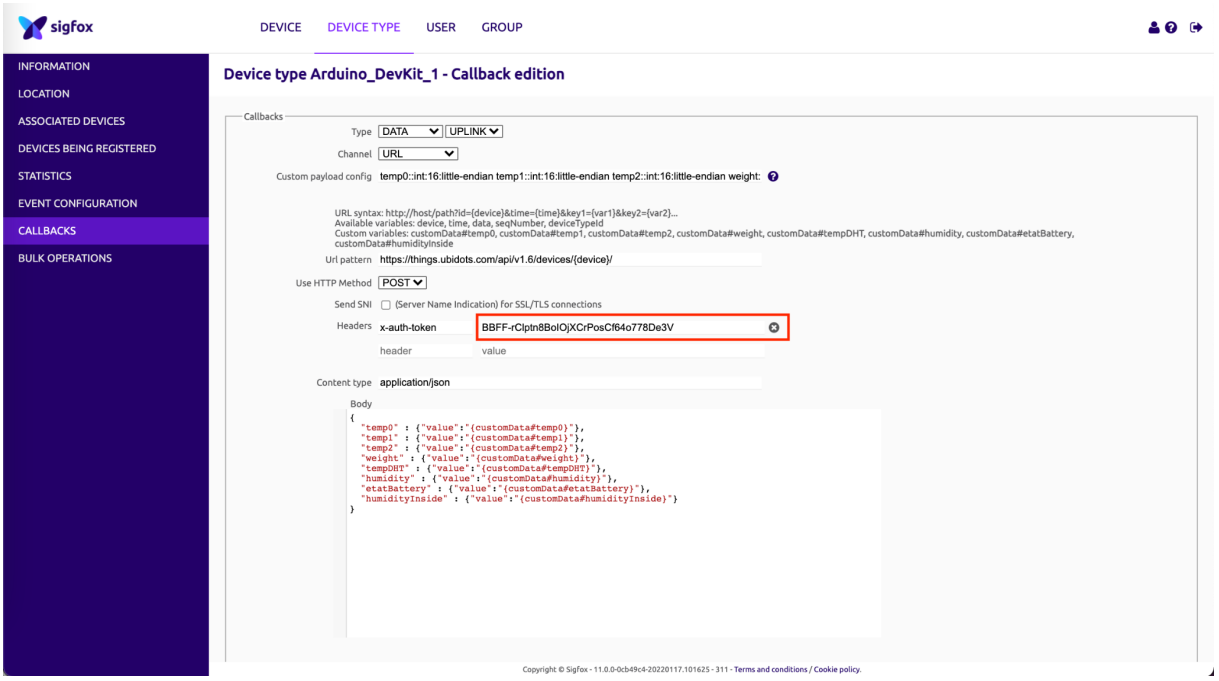
2) Click on API Credentials

3) Click on Click to show

The token will appear following the click :



You will have to copy it to paste it into Sigfox on the Callbacks page seen just before and paste it in the caption part below. It was forgotten to specify but you must fill in the boxes filled in on this Callbacks page as in the photo for it to work with the token of your Ubidots.

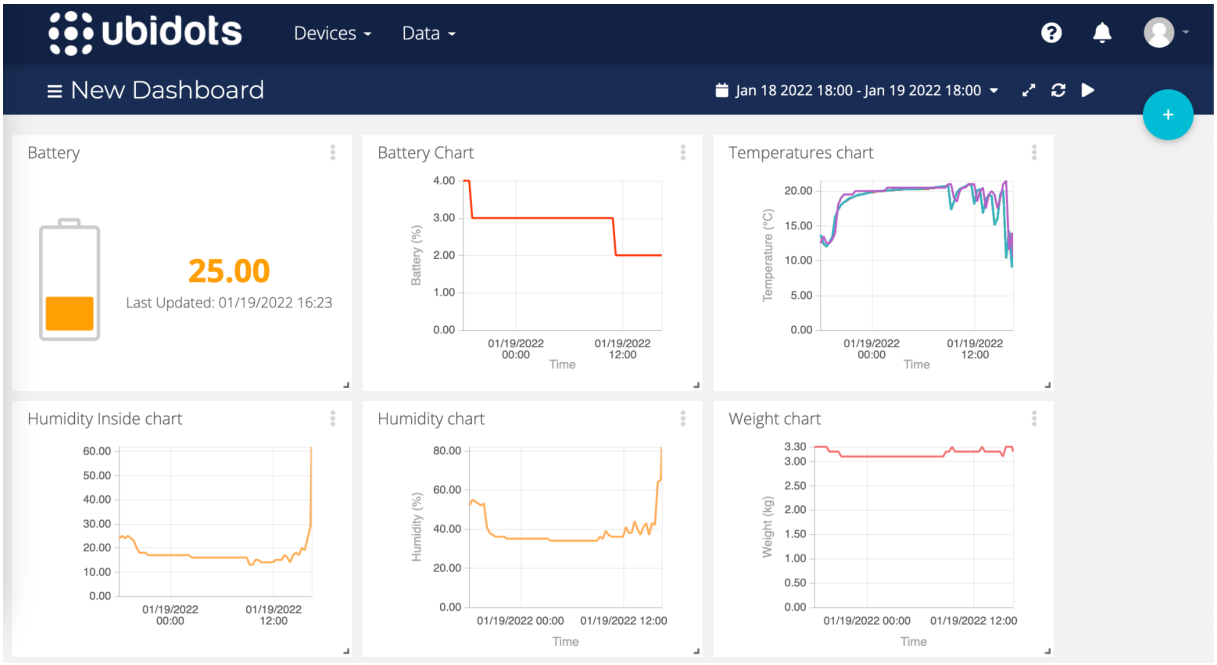


So after that, if we take into account that the graphs have been added, to view graphs of temperature sensors, humidity sensors, hive weight sensor and battery level, follow these steps:

1) Click on Data

2) Click on Dashboards

After these steps, you can observe below the graphs of the data received on Sigfox thanks to the Callbacks function.



Also, if the battery level is low (here defined from 12.50%), an email will be sent to warn of the battery status. We have not dealt with this subject but an email could also be sent to warn of a theft of the hive.

Thanks to Ubidots, it is possible to visualize the state of our system to monitor the hive.

VI. Installation of the system on the hive

Below you can see a diagram of the complete installation on the hive.