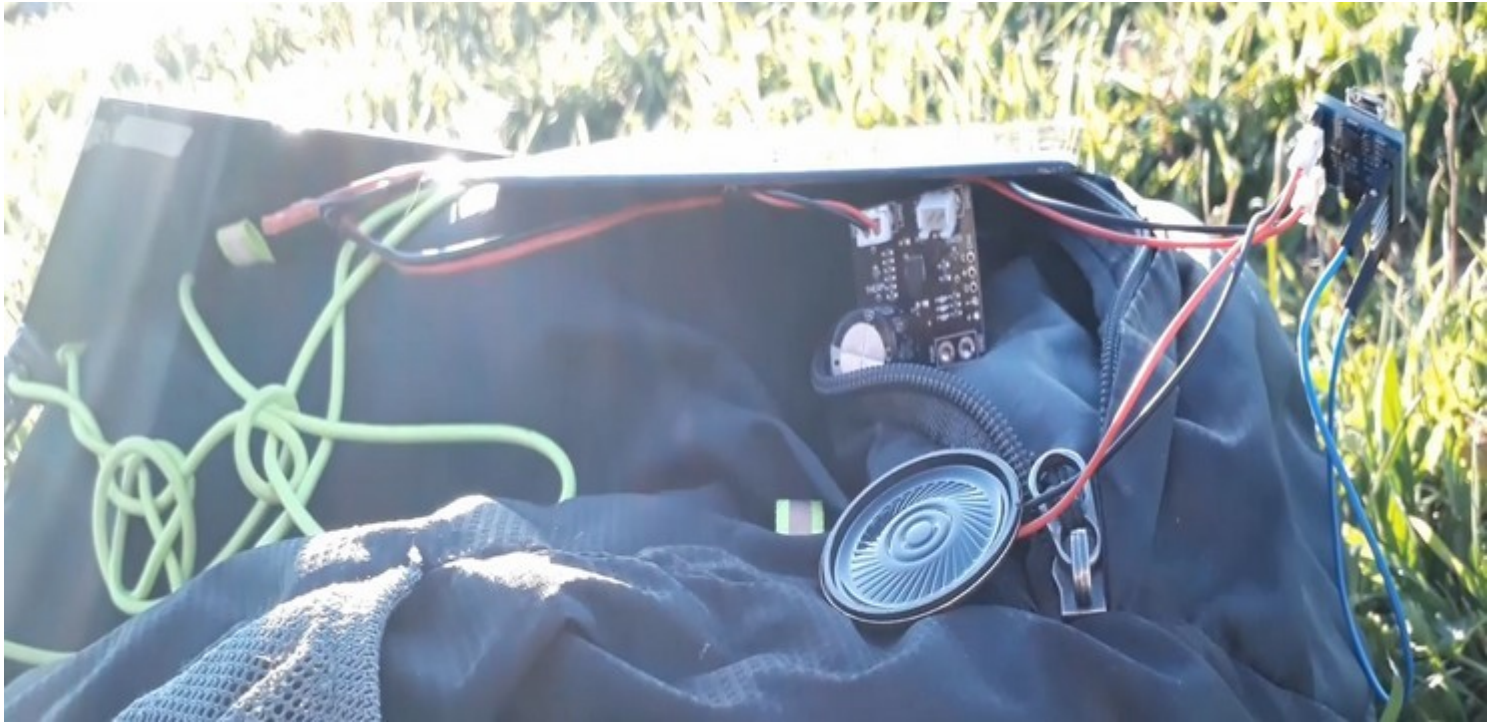
Atelier DIY Électronique
10 Janvier 2019

- Musique Solaire
- Contrôleur NeoPixels
- Synthé Arduino
- Mon installation VPS LoRaWan / NodeRed

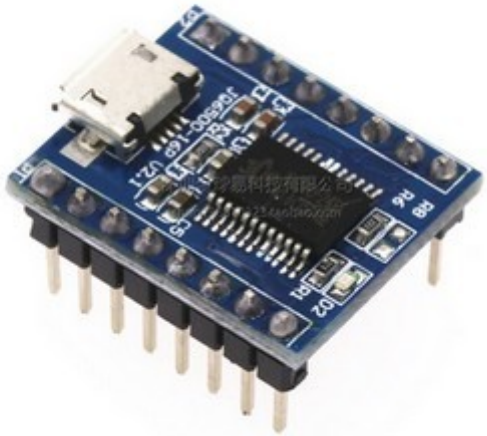
https://discord.gg/PysSZb8
remi@madnerd.org

Musique Solaire



Objectif : Boite à musique MP3 qui marche à l’énergie solaire

Composants



JQ6500

DIYMORE MCP73871

Speaker 0.5W

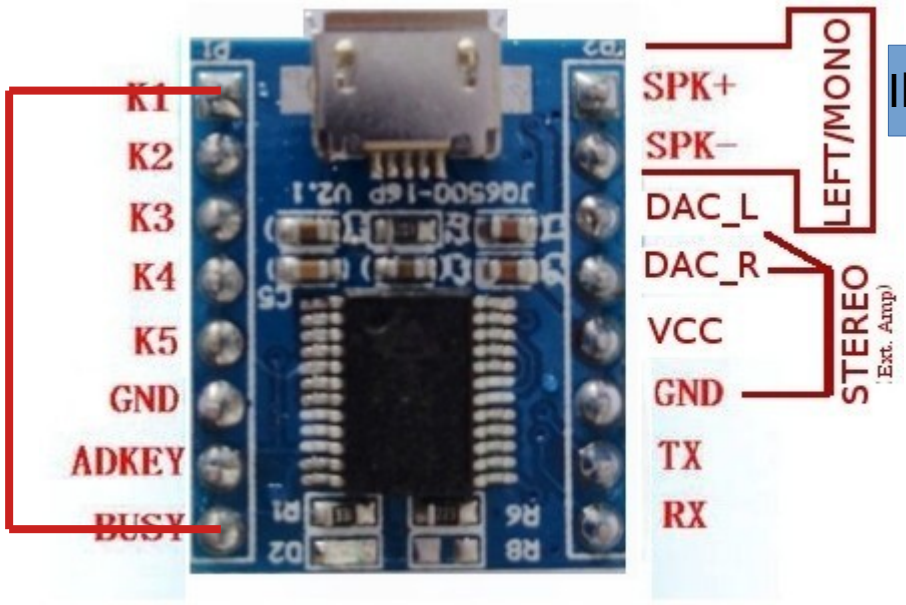
Panneau Solaire 5v 165x165

Objectif : Une batterie est optionnel

Branchement

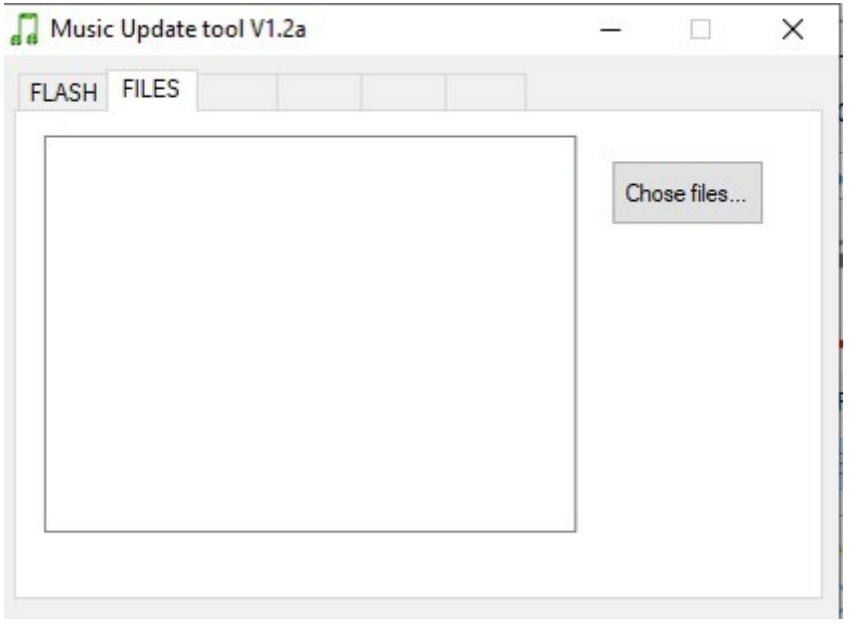
https://sparks.gogo.co.nz/jq6500/index.html

Jouer en boucle Musique 1



Il y a un ampli sur la carte

Copie MP3



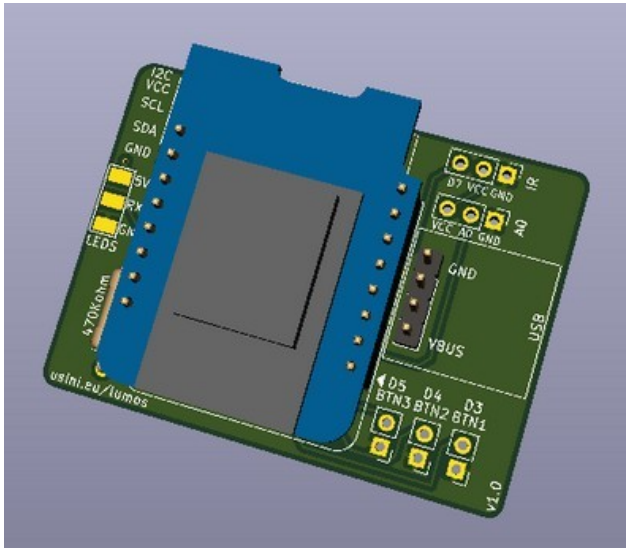
Limite de 2mo

Alternative

Arduino Nano (ou mini) avec des capteurs pour réagir à l’environnement (luminosité/vent)

Contrôleur Strip de Led

https://github.com/toblum/McLighting



Objectif : Strip de LED contrôlable par une interface web / websocket / DMX
Alimenté par un powerbank

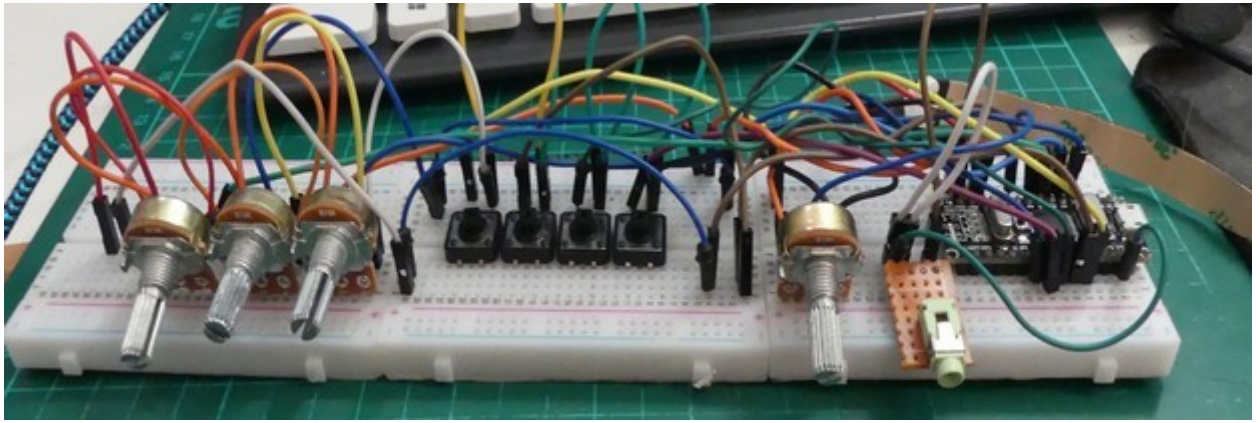
Le projet est développé actuellement par le fablab de luenen (allemagne)
On peut donc améliorer le programme en collaboration avec eux

Amélioration

- Passez par un ESP32 (Bluetooth)
- Améliorer l’application Android
- Mode hors connexion (sans connexion rien ne marche)

Mini Synthé Arduino

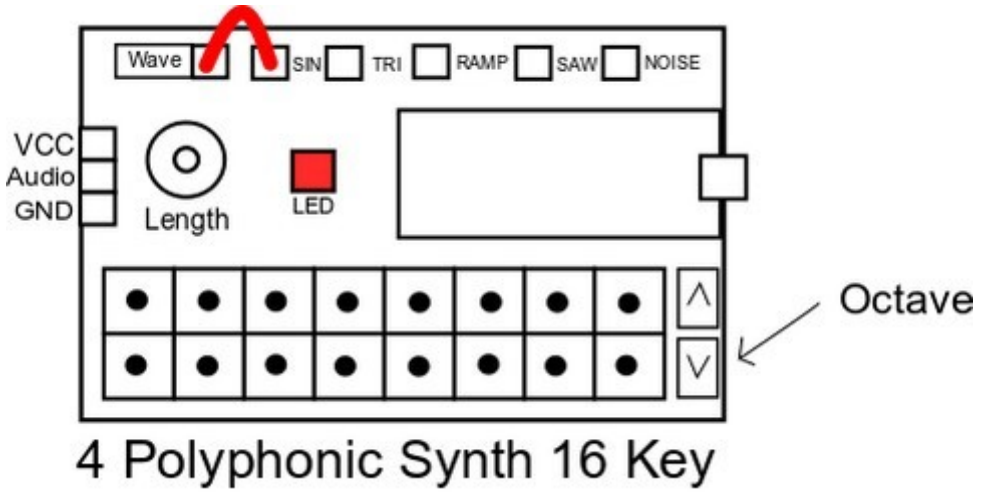
https://github.com/dzlonline/the_synth

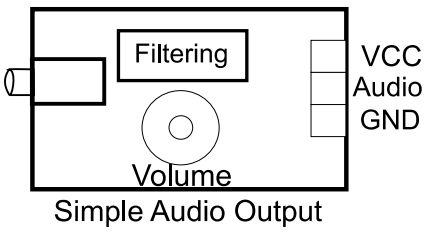


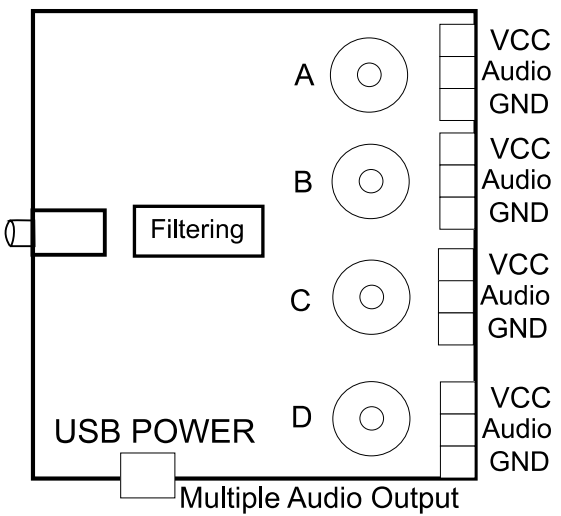
Mini synthé – Minimum de composants possibles et un code simple

Mini Synthé Arduino

https://github.com/dzlonline/the_synth







Serveur LoRaWan / MQTT

https://www.ovh.com/fr/vps/

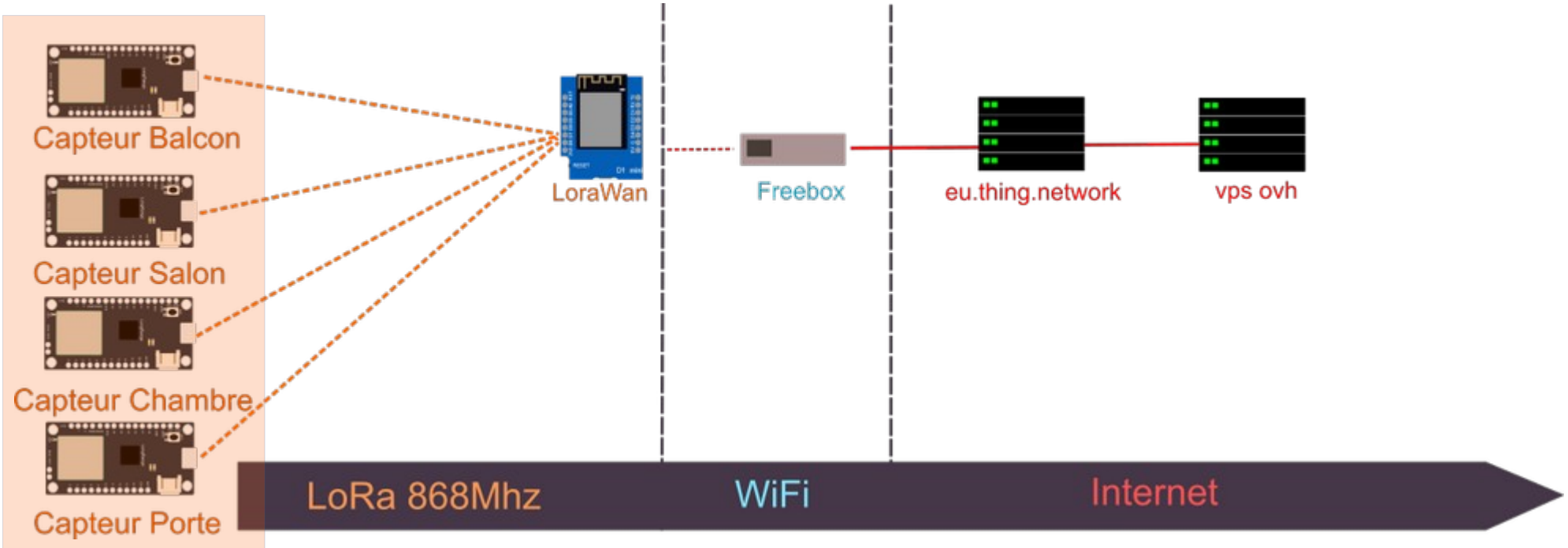
VPS SSD	VPS Cloud	VPS Cloud RAM
SLA 99,95 % Le VPS performant et accessible	SLA 99,99 % Le VPS à la disponibilité garantie	SLA 99,99 % Le VPS boosté en RAM
Abonnement annuel à partir de : 2,99 € HT/mois (soit 3,59 € TTC)*	Abonnement annuel à partir de : 7,99 € HT/mois (soit 9,59 € TTC)*	Abonnement annuel à partir de : 7,99 € HT/mois (soit 9,59 € TTC)*
Sélectionner	Sélectionner	Sélectionner

LoRaWan

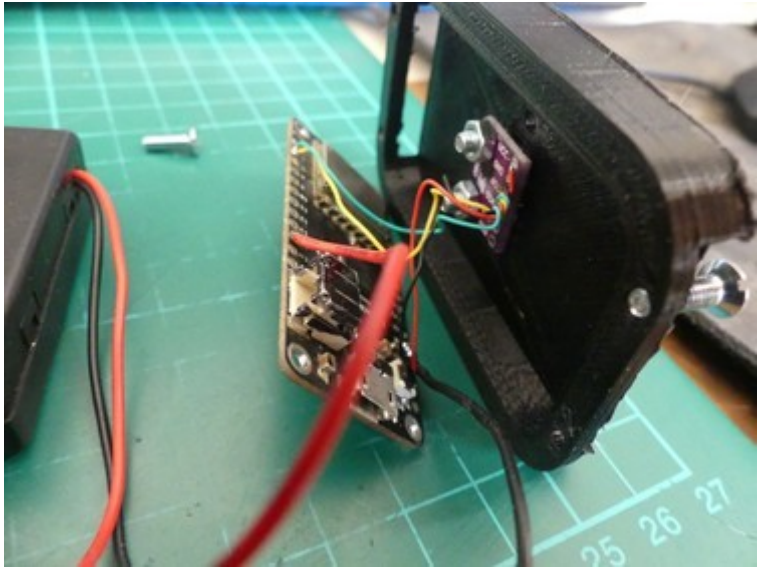
Lora32u4

- 2 Capteurs BME280 LiPo
- 1 Capteur BMP280 Pile AAA
- 1 Capteurs 2 ReedSwitch LiPo
- 1 Passerelle LoRaWan 1 Channel USB

Infrastructure

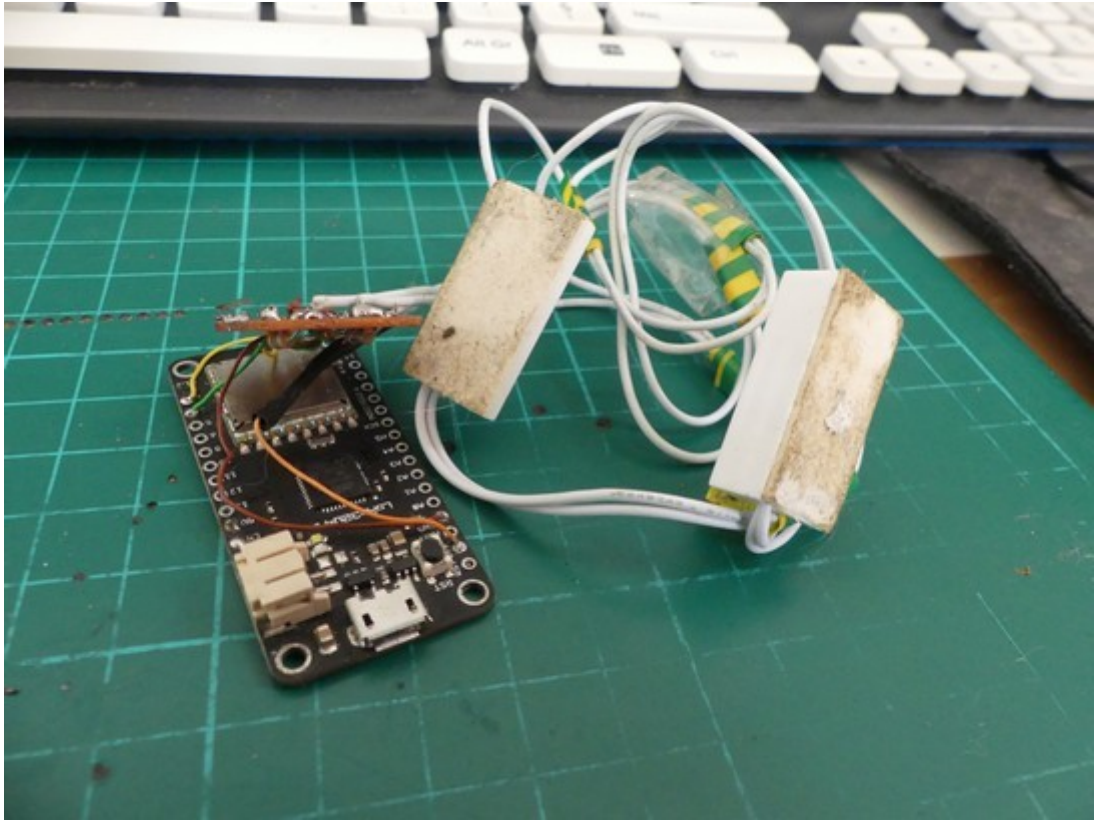


Capteur Salon

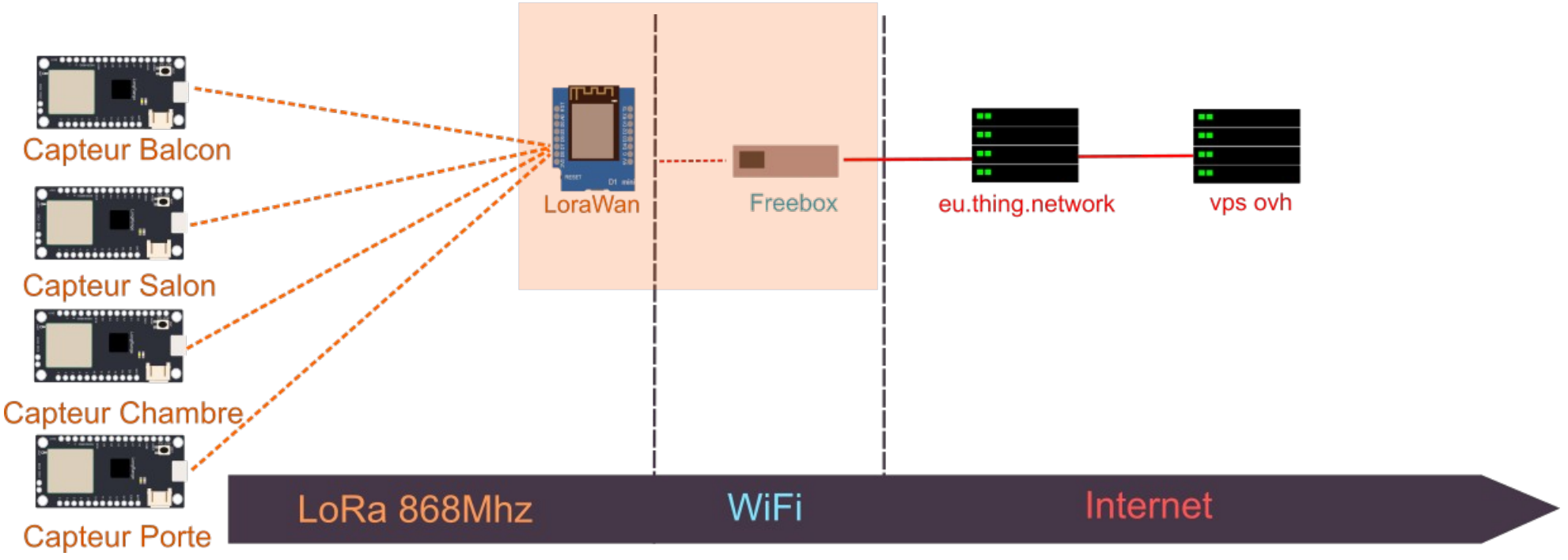


Capteur Chambre / Balcon

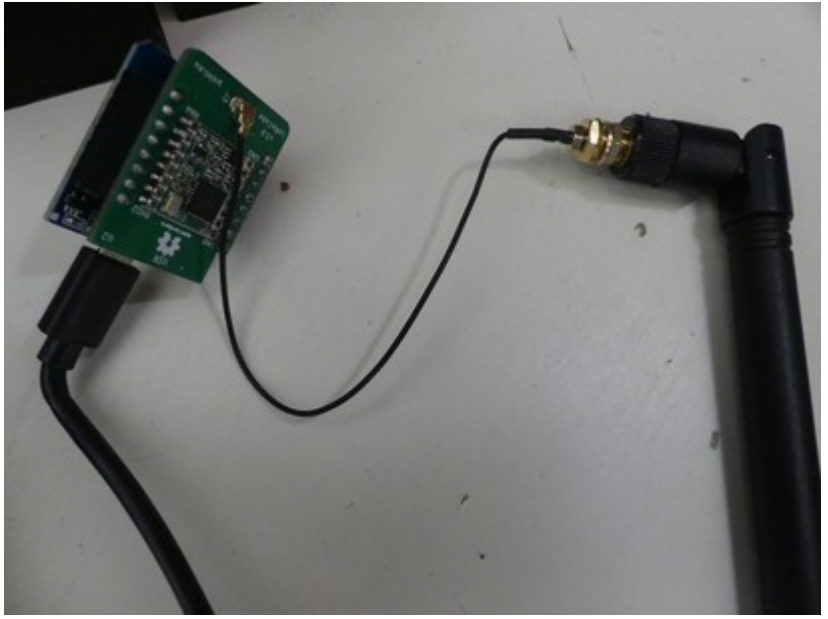
Capteur Porte



Infrastructure



Passerelle LoraWan



1 Channel

Interface Web Passerelle LoRa

ESP Gateway Config

Version: V3.3.3.H; 180826a
ESP alive since Friday 10-1-2020 13:41:01, Uptime: 0-01:27:18
Current time Thursday 7-2-2036 08:55:21

Documentation | Expert Mode | Log Files

Package Statistics

Counter	C 0	C 1	C 2	Pkgs	Pkgs/hr
Packages Downlink				0	
Packages Uplink Total				53	0
Packages Uplink OK				50	
SF7 recvd	50	0	0	50	94 %
SF8 recvd	0	0	0	0	0 %
SF9 recvd	0	0	0	0	0 %
SF10 recvd	0	0	0	0	0 %
SF11 recvd	0	0	0	0	0 %
SF12 recvd	0	0	0	0	0 %

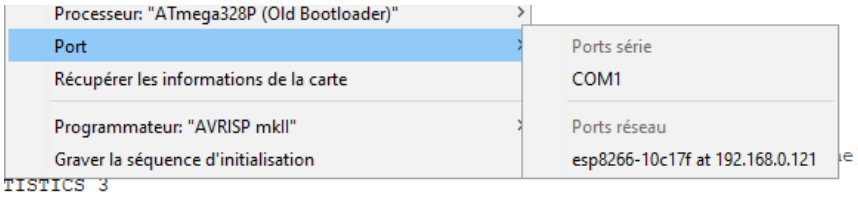
Message History

Time	Node	C	Freq	SF	pRSSI
Thursday 7-2-2036 08:54:33	26 01 19 bf	0	868100000	7	-99
Thursday 7-2-2036 08:53:56	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:52:23	44 71 12 d0	0	868100000	7	-119
Thursday 7-2-2036 08:51:06	26 01 12 f0	0	868100000	7	-113
Thursday 7-2-2036 08:48:55	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:48:46	26 01 19 bf	0	868100000	7	-99
Thursday 7-2-2036 08:46:06	26 01 12 f0	0	868100000	7	-113
Thursday 7-2-2036 08:43:53	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:42:59	26 01 19 bf	0	868100000	7	-98
Thursday 7-2-2036 08:41:05	26 01 12 f0	0	868100000	7	-115
Thursday 7-2-2036 08:38:52	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:37:11	26 01 19 bf	0	868100000	7	-98
Thursday 7-2-2036 08:36:05	26 01 12 f0	0	868100000	7	-114
Thursday 7-2-2036 08:33:51	26 01 1a 45	0	868100000	7	-96
Thursday 7-2-2036 08:31:24	26 01 19 bf	0	868100000	7	-99
Thursday 7-2-2036 08:31:04	26 01 12 f0	0	868100000	7	-115
Thursday 7-2-2036 08:28:50	26 01 1a 45	0	868100000	7	-96
Thursday 7-2-2036 09:26:04	26 01 12 f0	0	868100000	7	-114
Thursday 7-2-2036 09:25:37	26 01 19 bf	0	868100000	7	-98
Thursday 7-2-2036 09:23:49	26 01 1a 45	0	868100000	7	-97

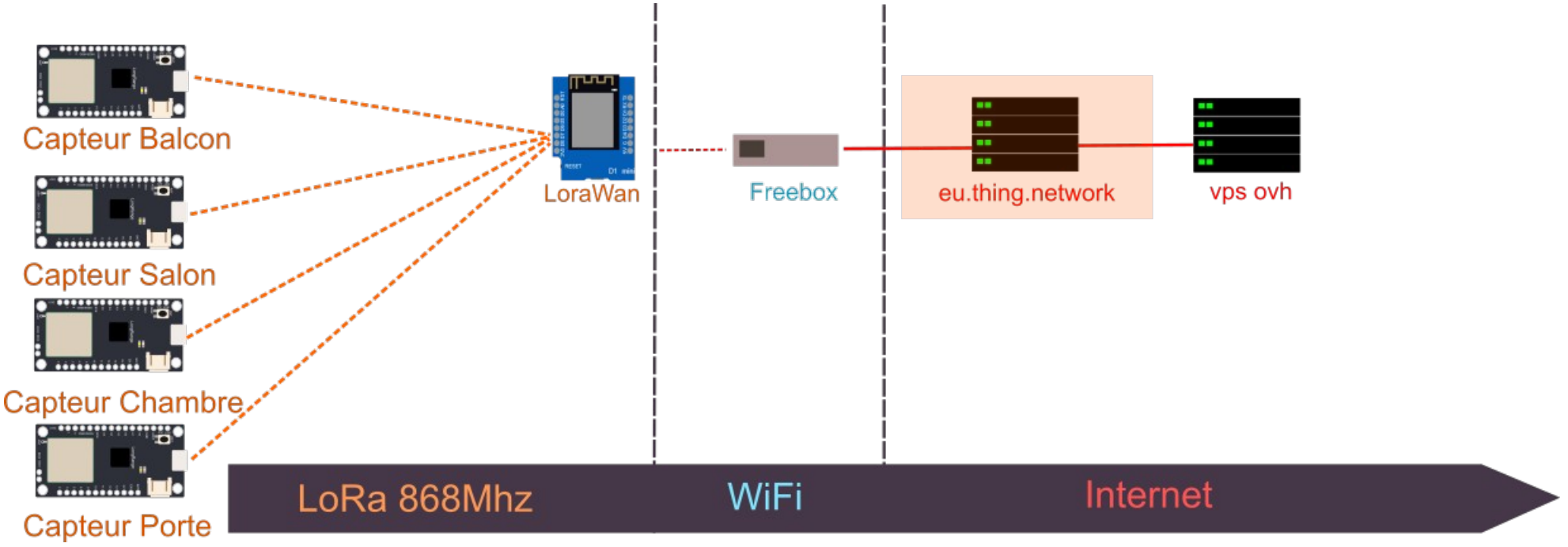
Passerelle LoRaWan

https://things4u.github.io/

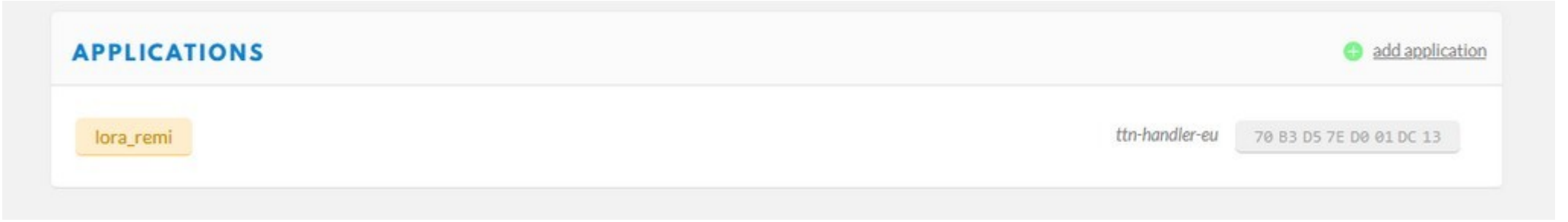
- Capteurs / Passerelle à la fois
- OTA (Over the air update)
- WiFiManager
- Répéteur
- Écran OLED
- Communication UDP

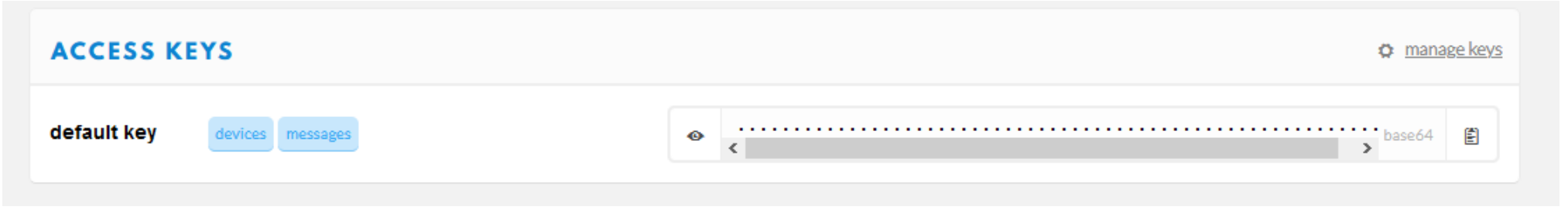


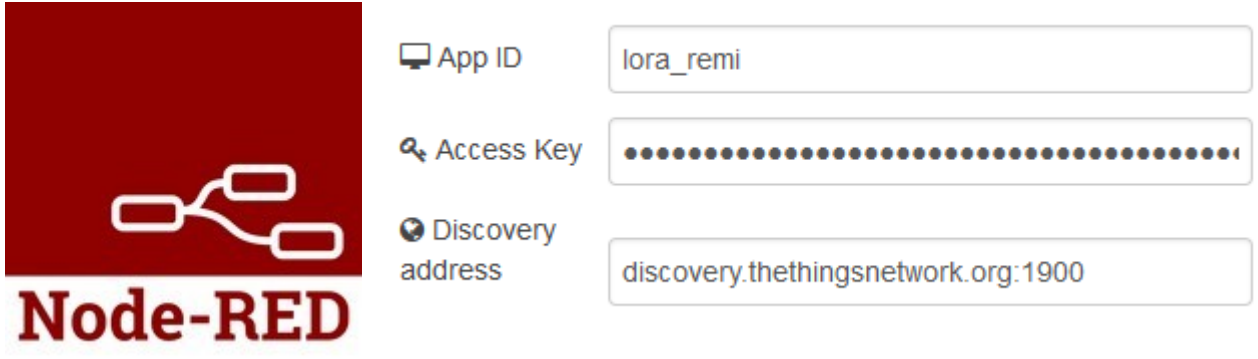
Infrastructure



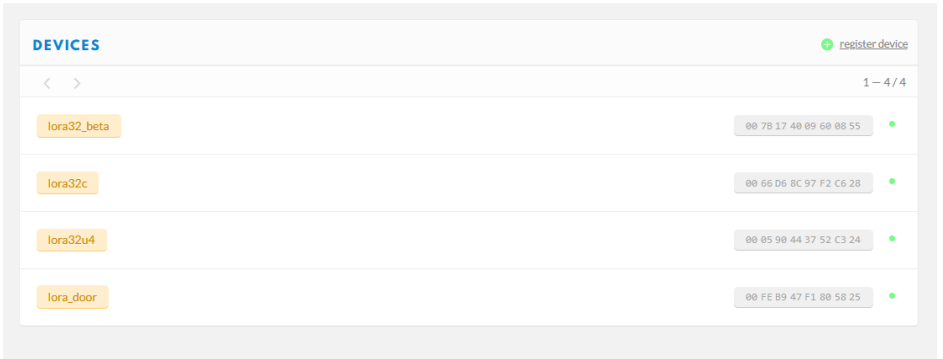
Console TTN


APPLICATIONS
add application
lora_remi
ttn-handler-eu
70 B3 D5 7E D0 01 DC 13


ACCESS KEYS
manage keys
default key
devices
messages
base64


Node-RED
App ID
lora_remi
Access Key
Discovery address
discovery.thethingsnetwork.org:1900

TTN Device



Application ID lora_remi

Device ID lora32_beta

Activation Method ABP

Device EUI 00 7B 17 40 09 60 08 55

Application EUI 70 B3 D5 7E D0 01 DC 13

Device Address 26 01 1A 45

Network Session Key ••••••••••••••••••••••••••••••••

App Session Key ••••••••••••••••••••••••••••••••

Status 2 minutes ago

Frames up 1440 reset frame counters

Frames down 0

Interface Web Passerelle LoRa

ESP Gateway Config

Version: V.5.3.3.H; 180825a
ESP alive since Friday 10-1-2020 13:41:01, Uptime: 0-01:27:18
Current time Thursday 7-2-2036 08:55:21

Documentation | Expert Mode | Log Files

Package Statistics

Counter	C 0	C 1	C 2	Pkgs	Pkgs/hr
Packages Downlink				0	
Packages Uplink Total				53	0
Packages Uplink OK				50	
SF7 rcvd	50	0	0	50	94 %
SF8 rcvd	0	0	0	0	0 %
SF9 rcvd	0	0	0	0	0 %
SF10 rcvd	0	0	0	0	0 %
SF11 rcvd	0	0	0	0	0 %
SF12 rcvd	0	0	0	0	0 %

Message History

Time	Node	C	Freq	SF	pRSSI
Thursday 7-2-2036 08:54:33	26 01 19 bf	0	868100000	7	-99
Thursday 7-2-2036 08:53:56	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:52:23	44 71 12 d0	0	868100000	7	-119
Thursday 7-2-2036 08:51:06	26 01 12 f0	0	868100000	7	-113
Thursday 7-2-2036 08:48:55	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:48:46	26 01 19 bf	0	868100000	7	-99
Thursday 7-2-2036 08:46:06	26 01 12 f0	0	868100000	7	-113
Thursday 7-2-2036 08:43:53	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:42:59	26 01 19 bf	0	868100000	7	-98
Thursday 7-2-2036 08:41:05	26 01 12 f0	0	868100000	7	-115
Thursday 7-2-2036 08:38:52	26 01 1a 45	0	868100000	7	-93
Thursday 7-2-2036 08:37:11	26 01 19 bf	0	868100000	7	-98
Thursday 7-2-2036 08:36:05	26 01 12 f0	0	868100000	7	-114
Thursday 7-2-2036 08:33:51	26 01 1a 45	0	868100000	7	-96
Thursday 7-2-2036 08:31:24	26 01 19 bf	0	868100000	7	-99
Thursday 7-2-2036 08:31:04	26 01 12 f0	0	868100000	7	-115
Thursday 7-2-2036 08:28:50	26 01 1a 45	0	868100000	7	-96
Thursday 7-2-2036 09:26:04	26 01 12 f0	0	868100000	7	-114
Thursday 7-2-2036 09:25:37	26 01 19 bf	0	868100000	7	-98
Thursday 7-2-2036 09:23:49	26 01 1a 45	0	868100000	7	-97

Décodage du Payload

time	counter	port		
14:31:48	1440	1	dev id: lora32_beta	payload: 09 2E 00 01 8E F6 degreesC: 23.5 pressure: 1021.34

decoder | converter | validator | encoder

remove decoder

```
    console.log("BMP");
    decoded.degreesC = (bytes[0]<<24>>16 | bytes[1]) /100;
    decoded.pressure = ((bytes[2] << 24) + (bytes[3] << 16) + (bytes[4] << 8) + (bytes[5])) / 100;
  }
  else if(bytes.length == 4) {
    decoded.switch1 = (bytes[0]);
    decoded.switch2 = (bytes[1]);
    decoded.vbat = (bytes[2]<<24>>16 | bytes[3]) /100;
  } else {
  decoded.degreesC = (bytes[0]<<24>>16 | bytes[1]) /100;
  decoded.humidity = (bytes[2]<<24>>16 | bytes[3]) /100;
  decoded.pressure = ((bytes[4] << 24) + (bytes[5] << 16) + (bytes[6] << 8) + (bytes[7])) / 100;
```

decoder has no changes

Payload

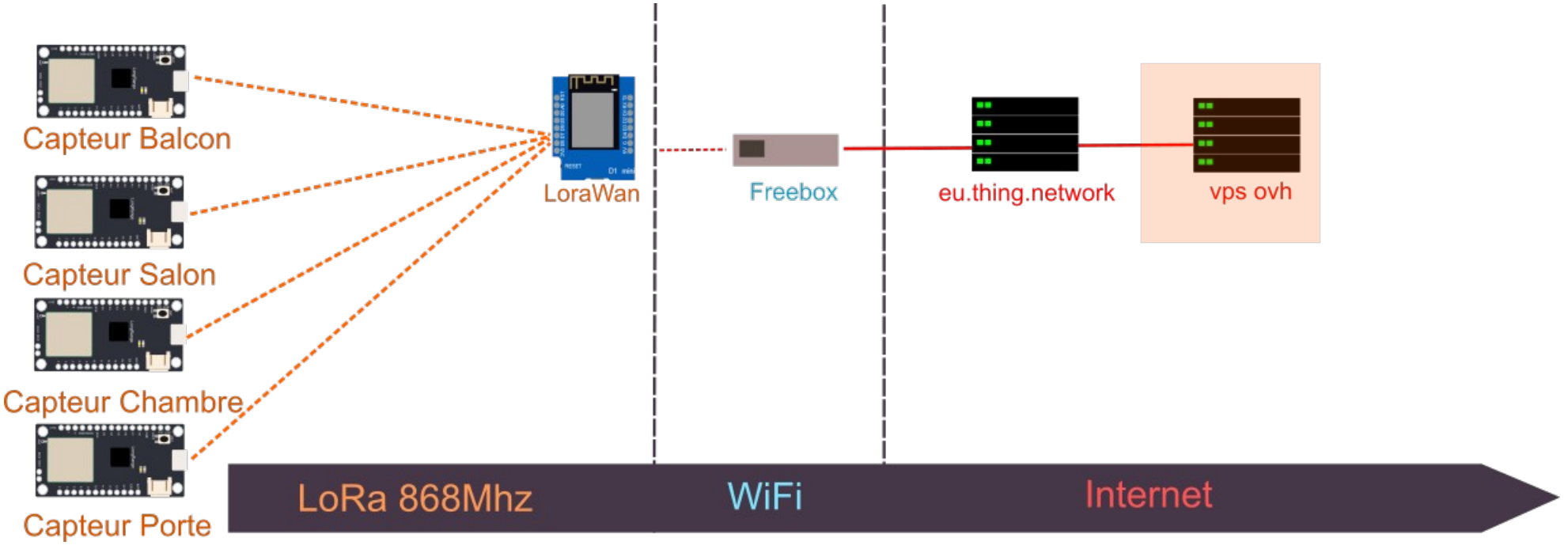
0 bytes | 1 | Test

Node-RED

Function

```
1  msg.payload = msg.payload.degreesC
2  return msg;
```

Infrastructure



VPS OVH

Logique
Interface Web

Communication
Objet Connecté

Base de données chronologique

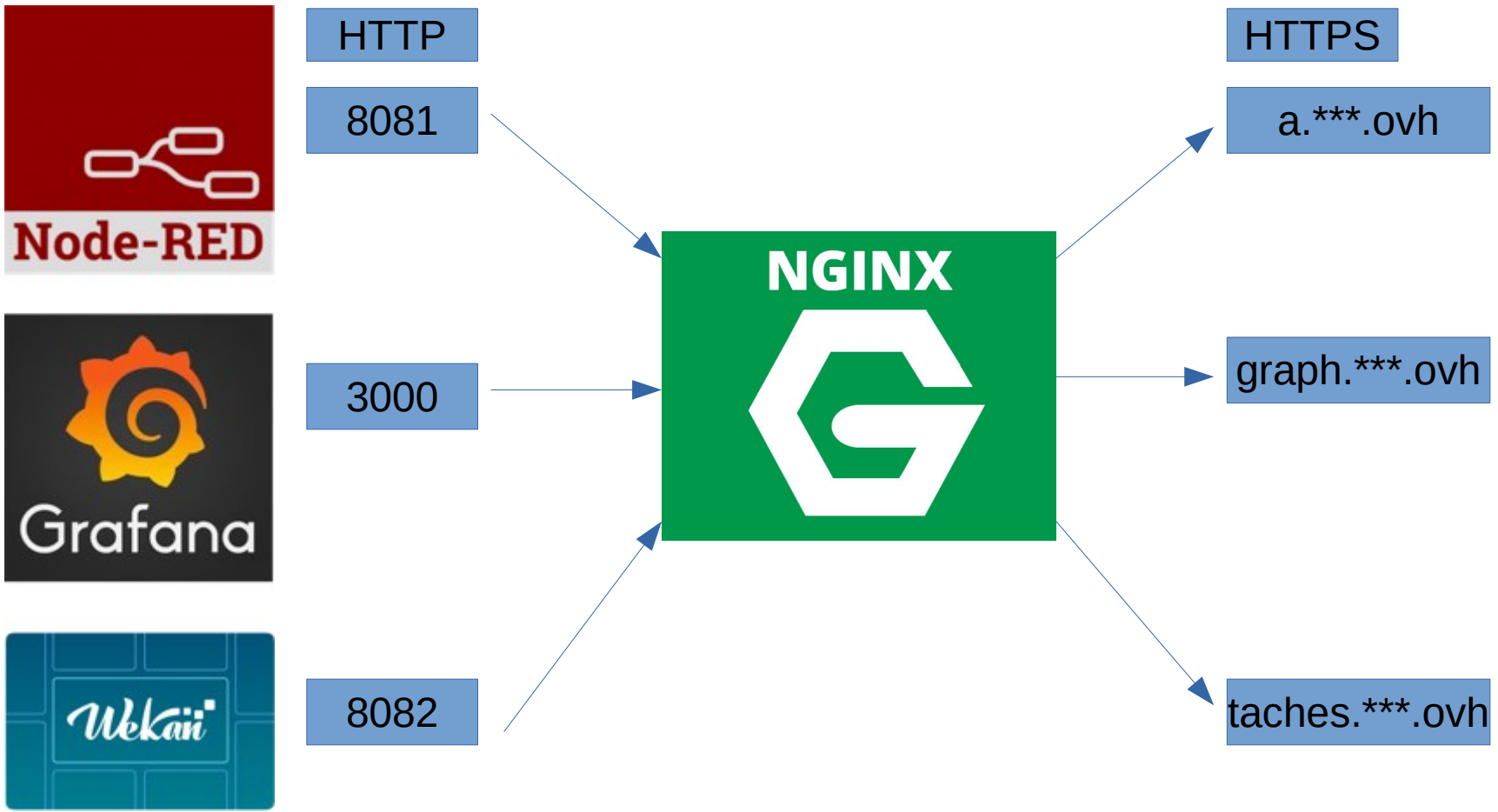
Visualisation des données

Kanban (Gestion de projets)

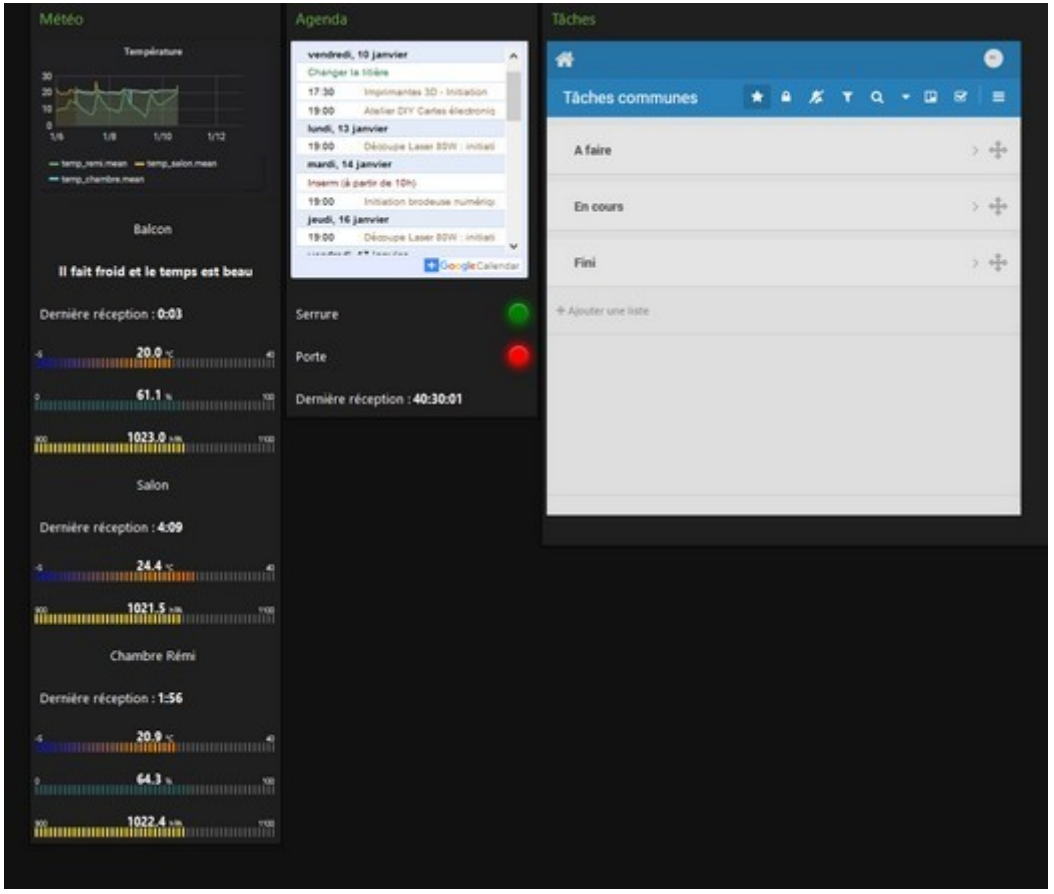
Protection contre le brute force

Parefeu

Proxy NGINX


Node-RED
Grafana
Wekan
HTTP
8081
3000
8082
NGINX
HTTPS
a.***.ovh
graph.***.ovh
taches.***.ovh

Node-Red Accueil



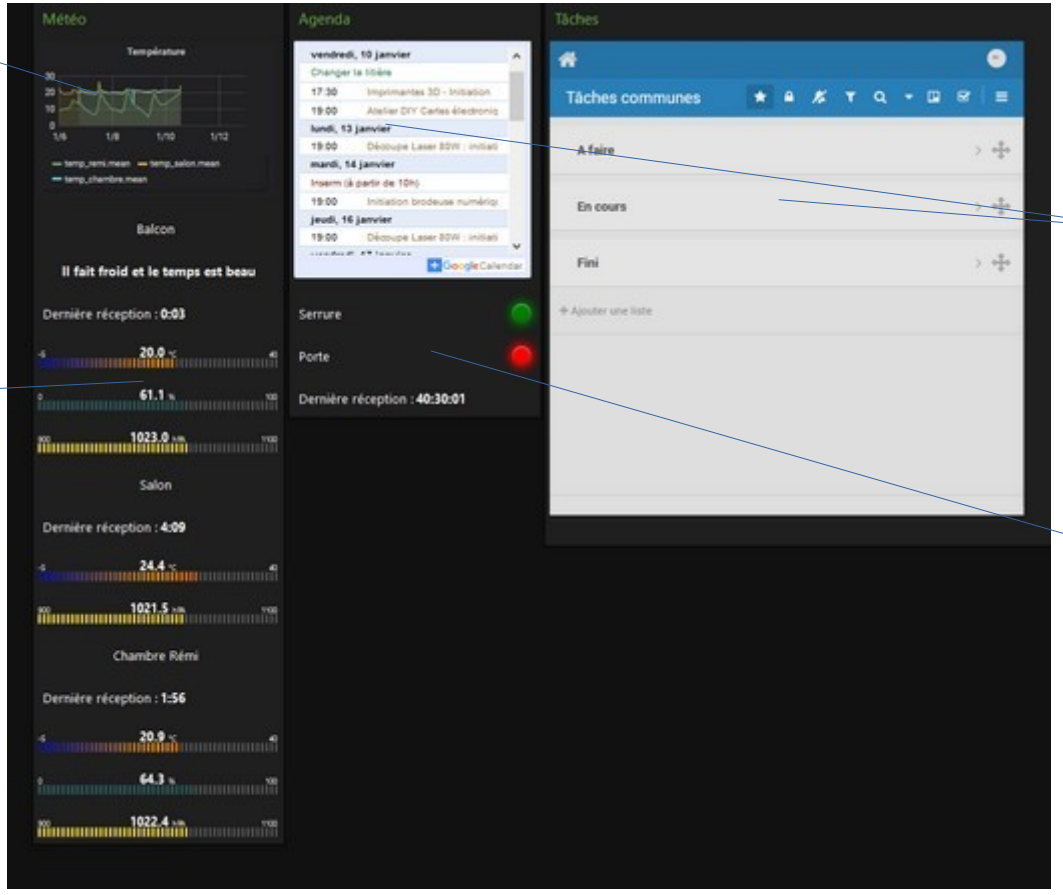
Node-Red Accueil

Template (iframe)

Level

Template (iframe)

LED

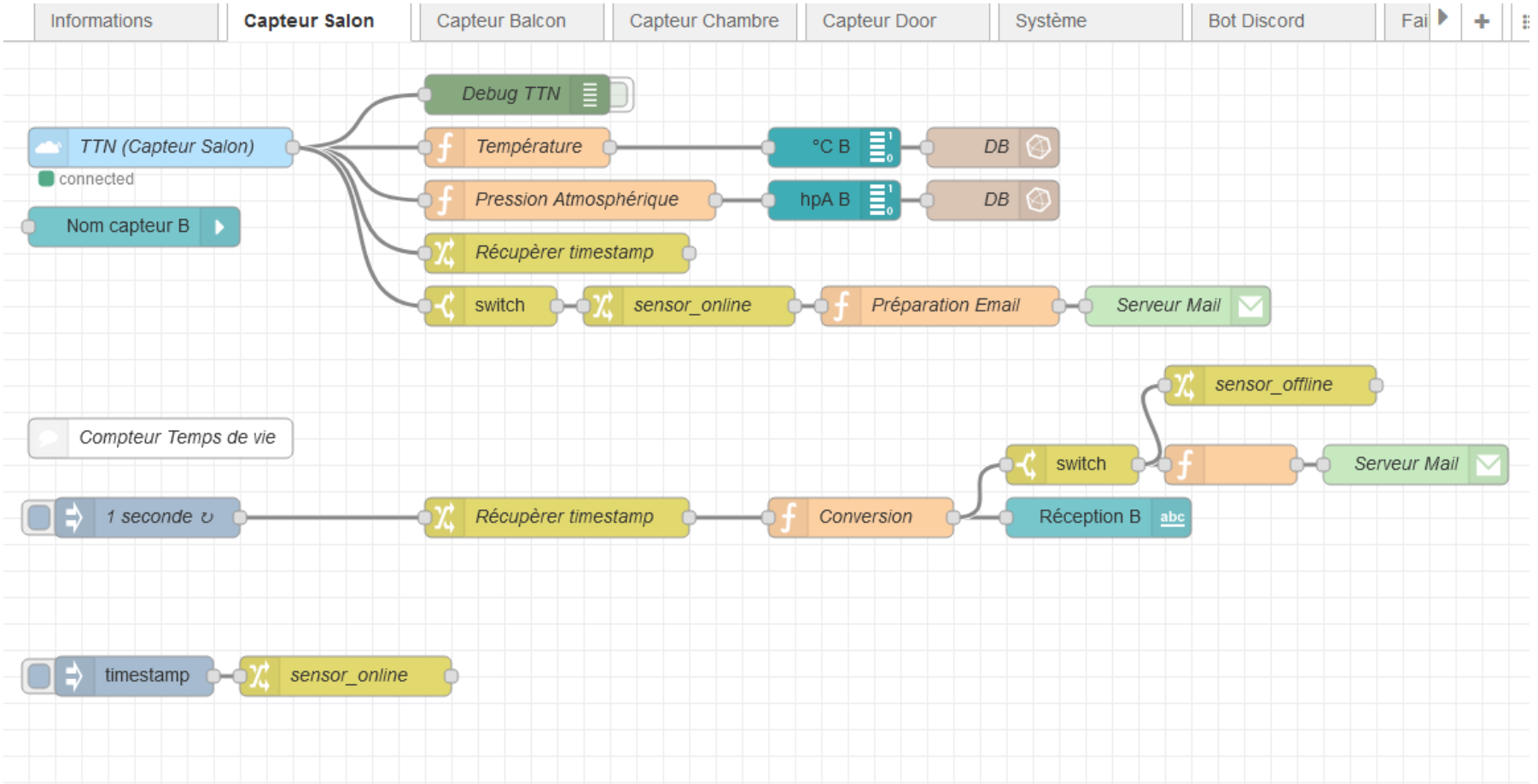


Node Red Interface Web

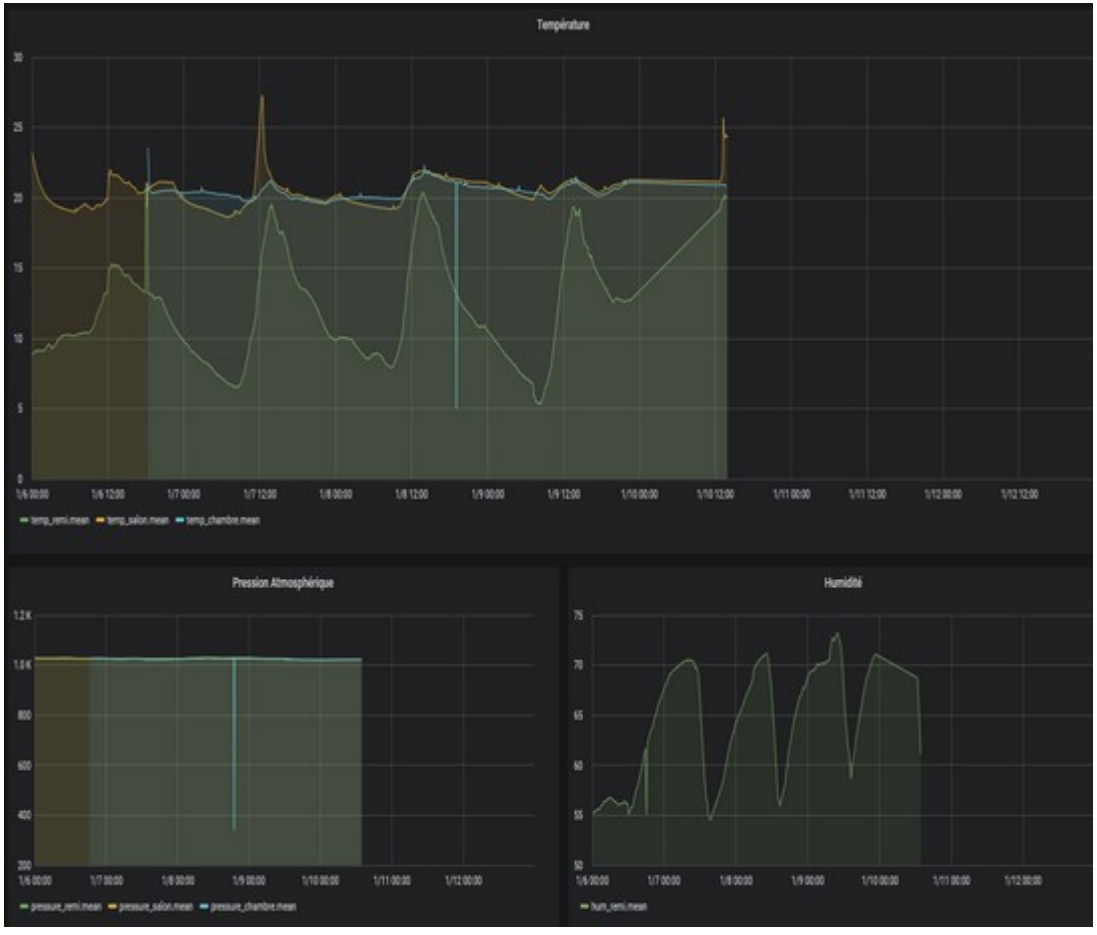
Value-Trail

Gauge

Node-Red Éditeur



Grafana


Température
30
25
20
15
10
5
0
1/6 00:00
1/6 12:00
1/7 00:00
1/7 12:00
1/8 00:00
1/8 12:00
1/9 00:00
1/9 12:00
1/10 00:00
1/10 12:00
1/11 00:00
1/11 12:00
1/12 00:00
1/12 12:00
temp_remi.mean
temp_salon.mean
temp_chambre.mean
Pression Atmosphérique
1.2 K
1.0 K
800
600
400
200
1/6 00:00
1/7 00:00
1/8 00:00
1/9 00:00
1/10 00:00
1/11 00:00
1/12 00:00
pressure_remi.mean
pressure_salon.mean
pressure_chambre.mean
Humidité
75
70
65
60
55
50
1/6 00:00
1/7 00:00
1/8 00:00
1/9 00:00
1/10 00:00
1/11 00:00
1/12 00:00
hum_remi.mean