

How to connect the Schneider Edge Box to TTN (The things Network)

TTN console

We see our Decentlab sensor is sending data each 10 minutes

The screenshot shows the TTN Console interface. The top navigation bar includes 'Gateways' and 'Traffic'. The main content area is divided into two sections: 'GATEWAY TRAFFIC' and 'APPLICATION DATA'.

GATEWAY TRAFFIC

time	frequency	mod.	CR	data rate	airtime (ms)	cnt
10:19:57	867.5	lor	4/5	SF 7 BW 125	82.2	192
10:10:00	867.9	lor	4/5	SF 7 BW 125	82.2	191
09:59:57	867.1	lor	4/5	SF 7 BW 125	82.2	190

APPLICATION DATA

time	counter	port	dev id	payload
10:19:57	192	1	dev id: 3054	02 0B EE 00 7F 09 40 61 A8 78 BA C4 AF 01 61 00 8A 82 6F 00 00 91 B8 00 4A 00 B9
10:10:00	191	1	dev id: 3054	02 0B EE 00 7F 09 40 61 7E 78 BCC4 B3 00 A4 00 3D 82 6C 00 00 91 D4 00 33 00 B7
09:59:57	190	1	dev id: 3054	02 0B EE 00 7F 09 40 61 5B 78 F5 C4 EA 00 AD 00 42 82 67 00 00 91 F8 00 56 00 B5

Node-red

We use just a MQTT node to get data from TTN console (Server located on the Netherlands)

The screenshot shows the Node-RED interface. The left sidebar contains various input nodes like inject, catch, status, link, mqtt, http, websocket, tcp, and udp. The main workspace shows a flow with a MQTT node configured to receive data from TTN. The debug console on the right displays the received MQTT messages, which are JSON objects containing sensor data.

```
2020-03-20 10:19:57 node:780742:888888
decentlab1632020vieww3054up: msg.payload: string[400]

{"app_id":"decentlab1632020","dev_id":"3054","hardware_serial":"7883057648888888","port":1,"counter":192,"payload_raw":"020BEE007F094061A878BAC4AF0161008A826F000091B8004A00B9","time":"2020-03-20T09:59:57.6883058Z","frequency":867.5,"modulation":"LORA","data_rate":"SF7Bw125","airtime":82.16888,"coding_rate":"4/5","gateways":[{"ghn_id":"eui-58a0c0bffe80175a","timestamp":256666664,"time":"2020-03-20T09:59:57.53812384Z","channel":0,"rx_l1":57,"snr":17.75,"rf_chain":0}]}

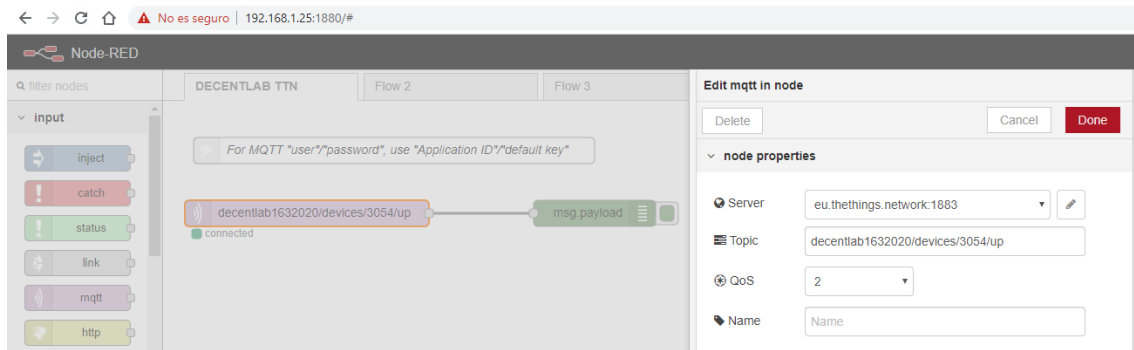
2020-03-20 10:10:00 node:780742:888888
decentlab1632020vieww3054up: msg.payload: string[400]

{"app_id":"decentlab1632020","dev_id":"3054","hardware_serial":"7883057648888888","port":1,"counter":191,"payload_raw":"020BEE007F0940617E78BCC4B300A4003D826C000091D4003300B7","time":"2020-03-20T09:59:57.6883058Z","frequency":867.9,"modulation":"LORA","data_rate":"SF7Bw125","airtime":82.16888,"coding_rate":"4/5","gateways":[{"ghn_id":"eui-58a0c0bffe80175a","timestamp":256666664,"time":"2020-03-20T09:59:57.53812384Z","channel":0,"rx_l1":57,"snr":17.75,"rf_chain":0}]}

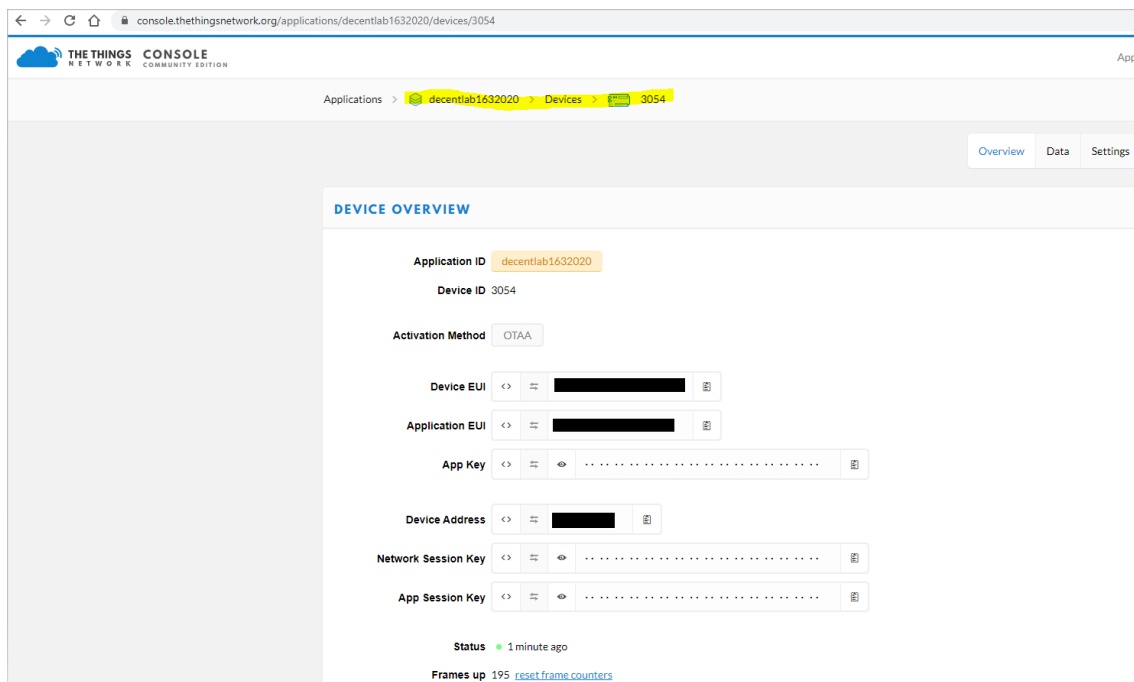
2020-03-20 09:59:57 node:780742:888888
decentlab1632020vieww3054up: msg.payload: string[400]

{"app_id":"decentlab1632020","dev_id":"3054","hardware_serial":"7883057648888888","port":1,"counter":190,"payload_raw":"020BEE007F0940615B78F5C4EA00AD00428267000091F8005600B5","time":"2020-03-20T09:59:57.6883058Z","frequency":867.1,"modulation":"LORA","data_rate":"SF7Bw125","airtime":82.16888,"coding_rate":"4/5","gateways":[{"ghn_id":"eui-58a0c0bffe80175a","timestamp":256666664,"time":"2020-03-20T09:59:57.53812384Z","channel":0,"rx_l1":57,"snr":17.75,"rf_chain":0}]}

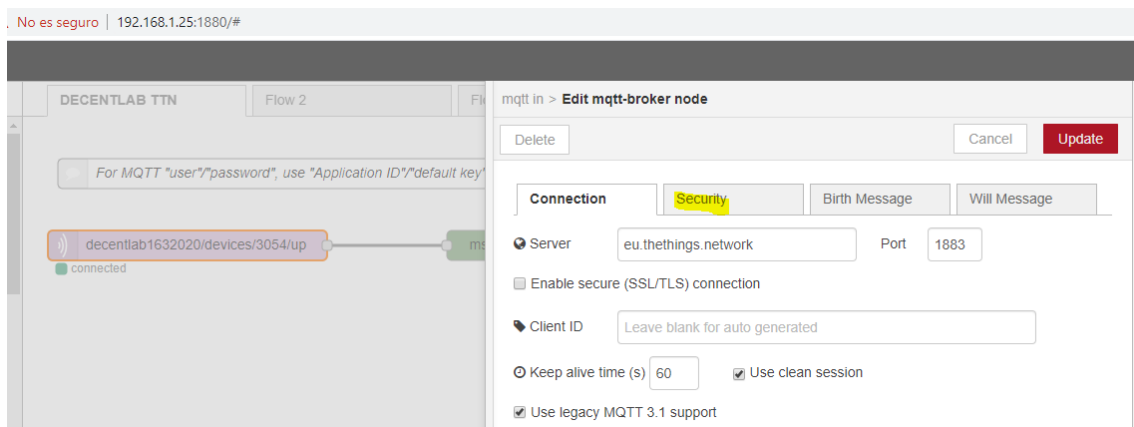
```



On topic, you have to insert your “application id”/devices/”device id”/up from your ttn console



And also your credentials. Let’s edit the mqtt server



Be sure to add your credentials from your TTN application on Security Tab

mqtt in > **Edit mqtt-broker node**

Delete Cancel Update

Connection Security Birth Message Will Message

Username decentlab1632020

Password

This is the password

console.thethingsnetwork.org/applications/decentlab1632020

THE THINGS NETWORK CONSOLE COMMUNITY EDITION

Applications > decentlab1632020

APPLICATION EUIS manage euis

70 B3 D5 7E D0 00 06 B2

DEVICES register device manage devices

1 registered device

COLLABORATORS manage collaborators

xavierflorensa collaborators delete devices settings

ACCESS KEYS manage keys

default key devices messages

base64

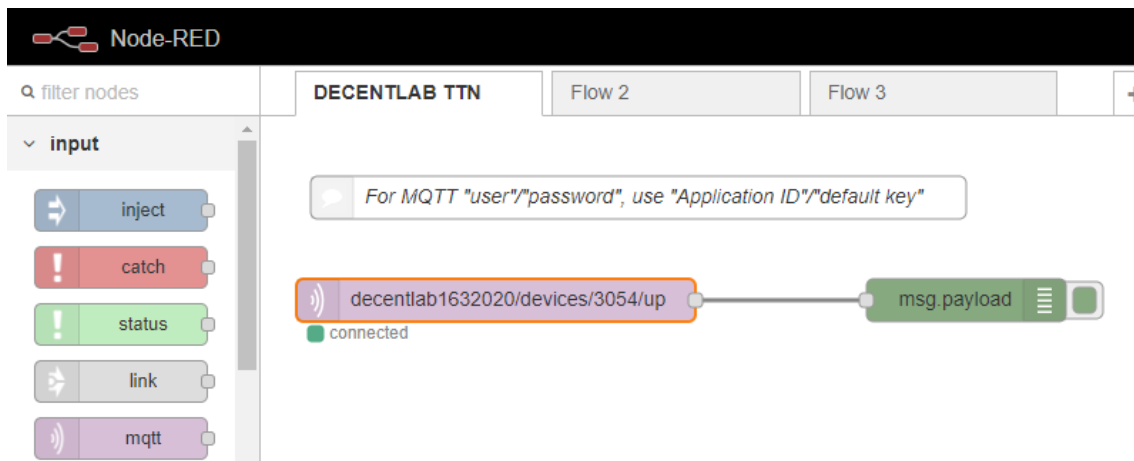
This way

Name For MQTT "user"/"password", use "Application ID"/"default key"

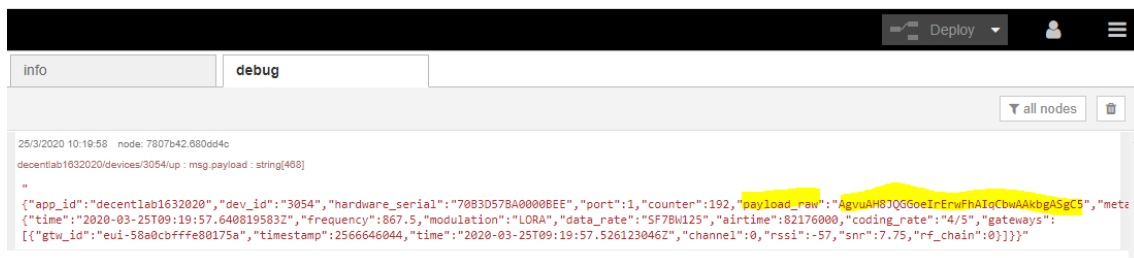
h1 h2 h3 B I </> [List Icons]

- 1
- 2 1) Sign in to TTN and go to your application page where "app_1" is your "Application ID" e.g. https://console.thethingsnetwork.org/applications/app_1
- 3
- 4
- 5 2) For MQTT User, use "Application ID"
- 6
- 7 3) For MQTT password, scroll to bottom and use "default key" (you need to press the "eye" to see the long text)

Yes so easy as this Flow!



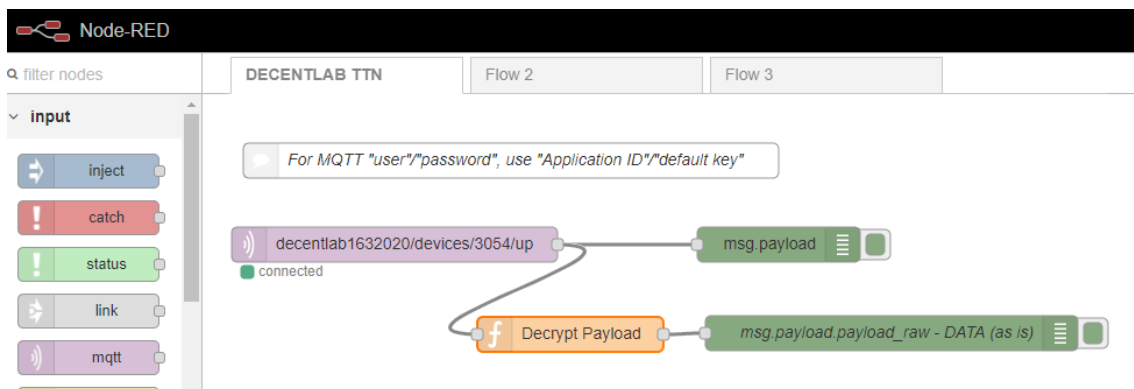
And this is the payload

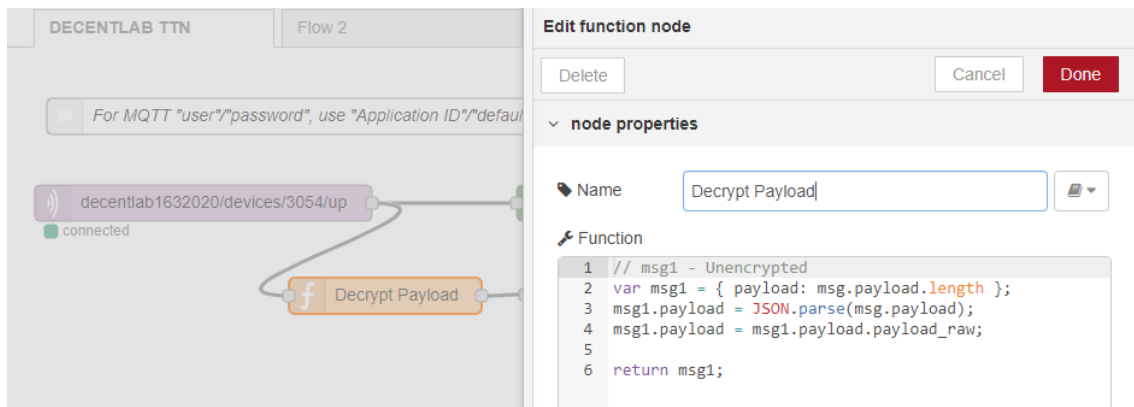


But we have to parse and decode this payload

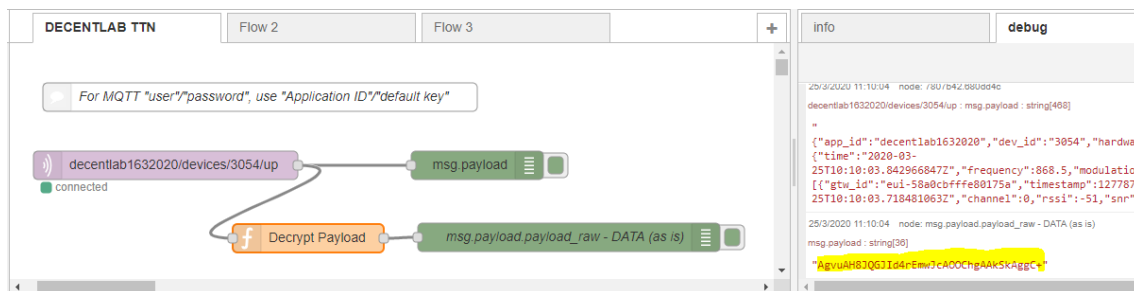
How to parse?

Like this

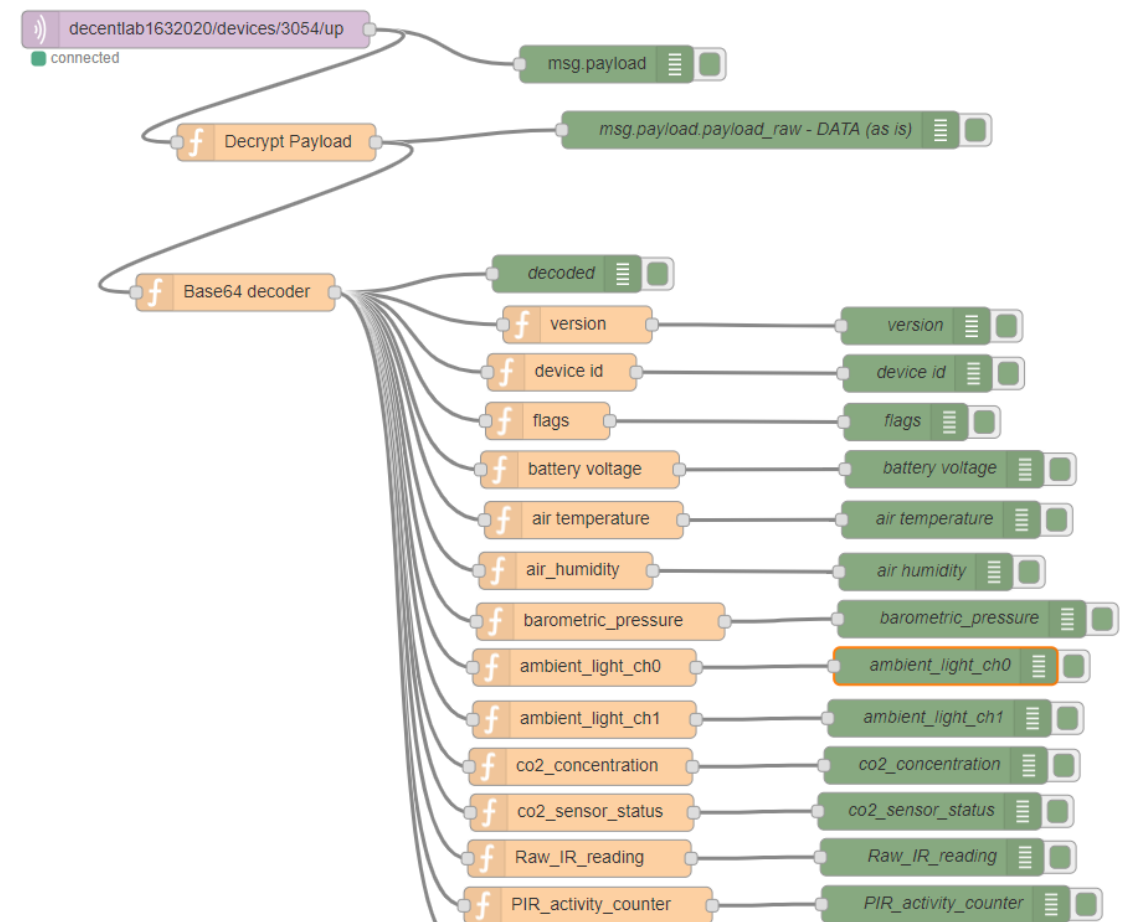




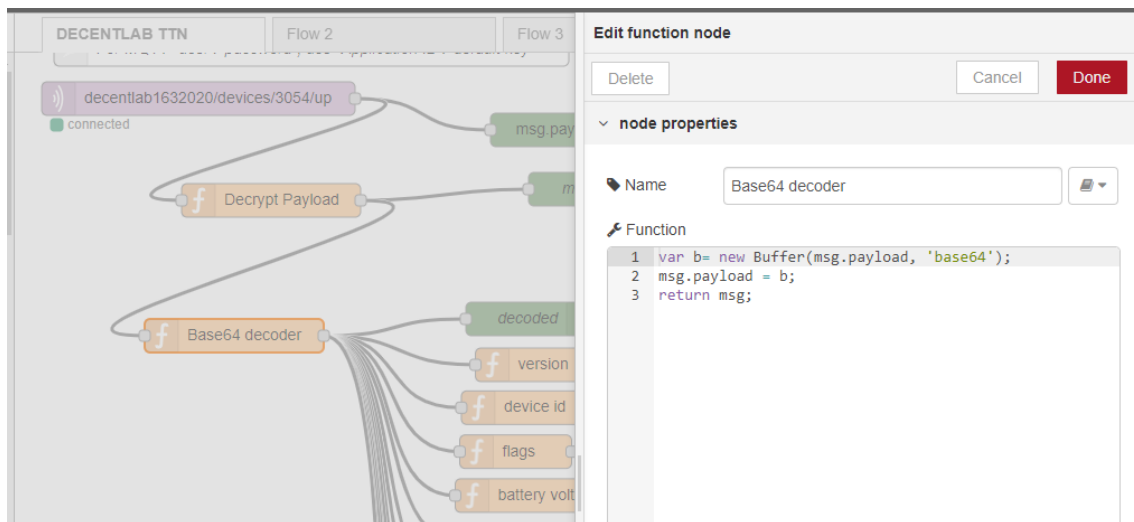
Here we have the payload



Now let's decode it



Attention, before decoding, the data is base64 encoded



DETAILS

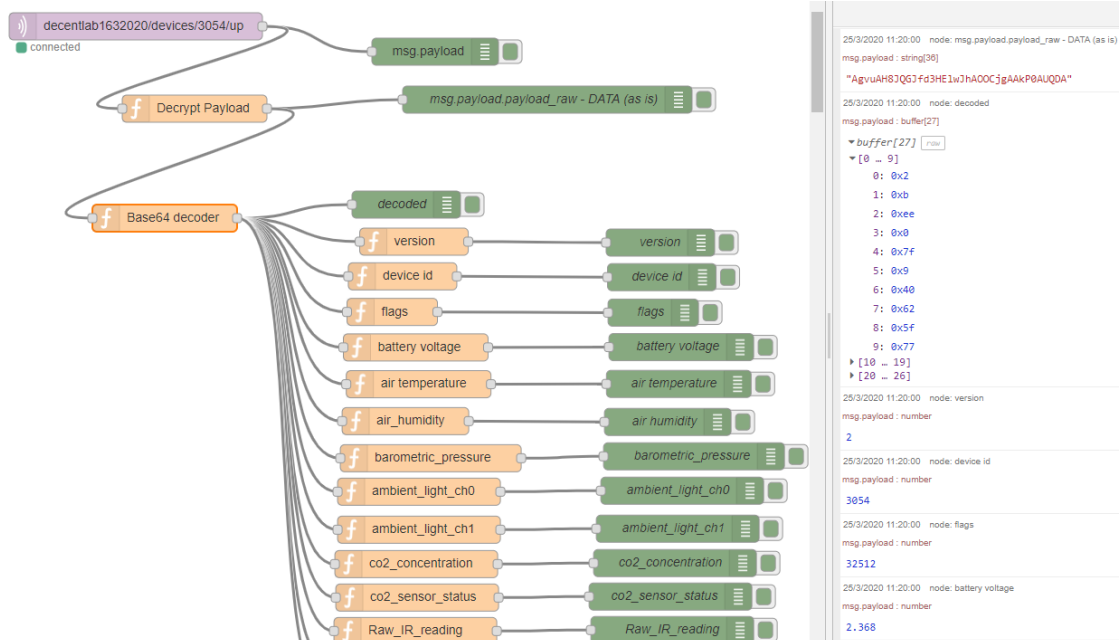
FIELD	PARAMETER NAME	TYPE	CONVERSION	UNIT
Header	Version	uint8		
Header	Device ID	uint16		
Header	Flags	uint16		
Sensor 0	Battery voltage	uint16	$x / 1000$	V
Sensor 1	Air temperature	uint16	$x / 65535 \cdot 175 - 45$	°C
Sensor 1	Air humidity	uint16	$x / 65535 \cdot 100$	%
Sensor 2	Barometric pressure	uint16	$x \cdot 2$	Pa
Sensor 3	Ambient light CH0 (visible + infrared)	uint16	x	
Sensor 3	Ambient light CH1 (infrared)	uint16	x	
Sensor 4	CO ₂ concentration	uint16	$x - 32768$	ppm
Sensor 4	CO ₂ sensor status	uint16	x	
Sensor 4	Raw IR reading	uint16	x	
Sensor 5	PIR sensor: activity counter	uint16	x	
Sensor 6	Gas sensor: total VOC	uint16	x	ppb

EXAMPLE 1 (ALL SENSOR DATA INCLUDED)

Message (hex):

020bbd007f0b926a515d48bc4e0262006981c7000093d4000b0111

02	Version	=	2	
0bbd	Device ID	=	3005	
007f	Flags	=	0b0000000001111111	
0b92	Battery voltage	=	2.96	V
6a51	Air temperature	=	27.68	deg
5d48	Air humidity	=	36.44	%
bc4e	Barometric pressure	=	96412	Pa
0262	Ambient light CH0	=	610	
0069	Ambient light CH1	=	105	
81c7	CO2 concentration	=	455	ppm
0000	CO2 sensor status	=	0	
93d4	Raw IR reading	=	37844	
000b	PIR activity counter	=	11	
0111	Gas sensor: total VOC	=	273	ppb
	Illuminance	=	679	lx



info

debug

25/3/2020 11:20:00 node: msg.payload.payload_raw - DATA (as is)

msg.payload : string[36]

"AgvuAH8JQGJfd3HE1wJhA0OCjgAAkP0AUQDA"

25/3/2020 11:20:00 node: decoded

msg.payload : buffer[27]

▼ buffer[27] raw

▼ [0 ... 9]

0: 0x2

1: 0xb

2: 0xee

3: 0x0

4: 0x7f

5: 0x9

6: 0x40

7: 0x62

8: 0x5f

9: 0x77

▶ [10 ... 19]

▶ [20 ... 26]

25/3/2020 11:20:00 node: version

msg.payload : number

2

25/3/2020 11:20:00 node: device id

msg.payload : number

3054

25/3/2020 11:20:00 node: flags

msg.payload : number

32512

25/3/2020 11:20:00 node: battery voltage

msg.payload : number

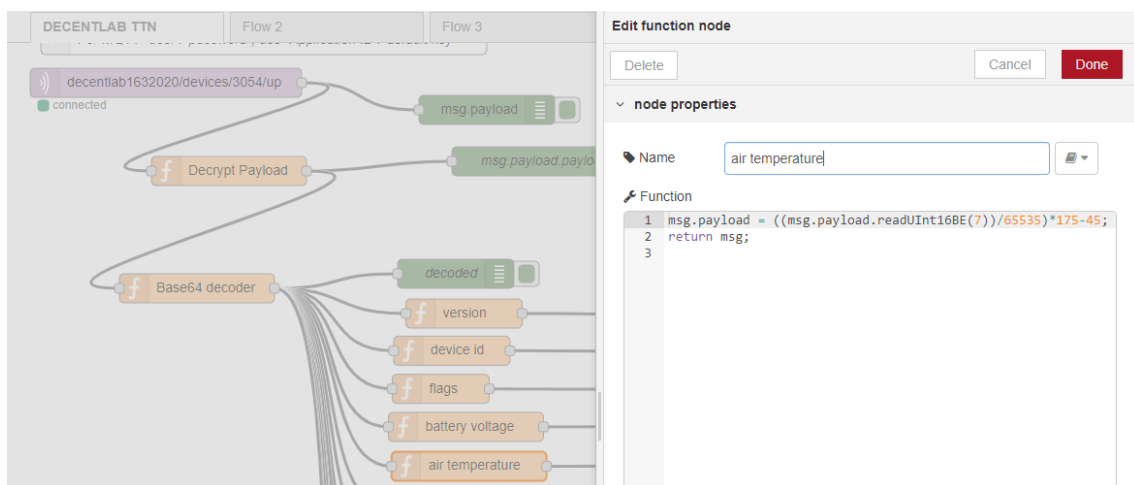
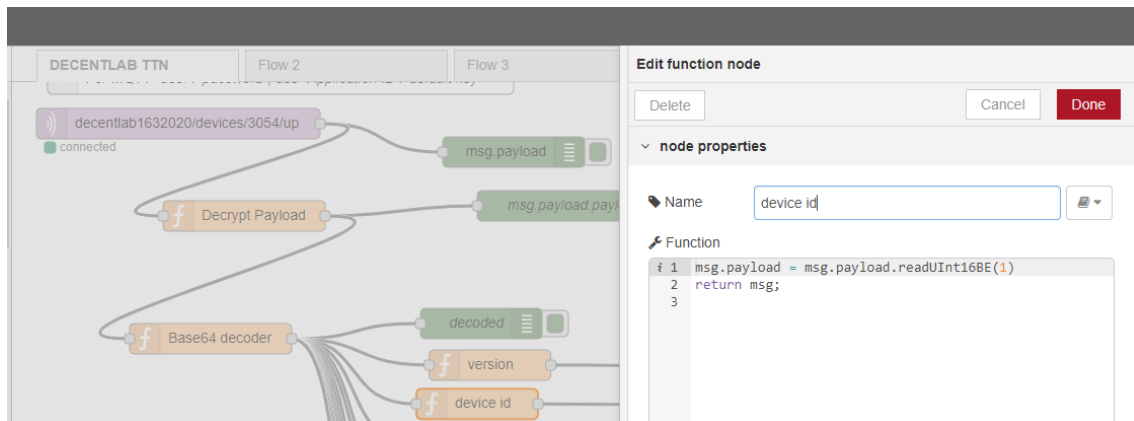
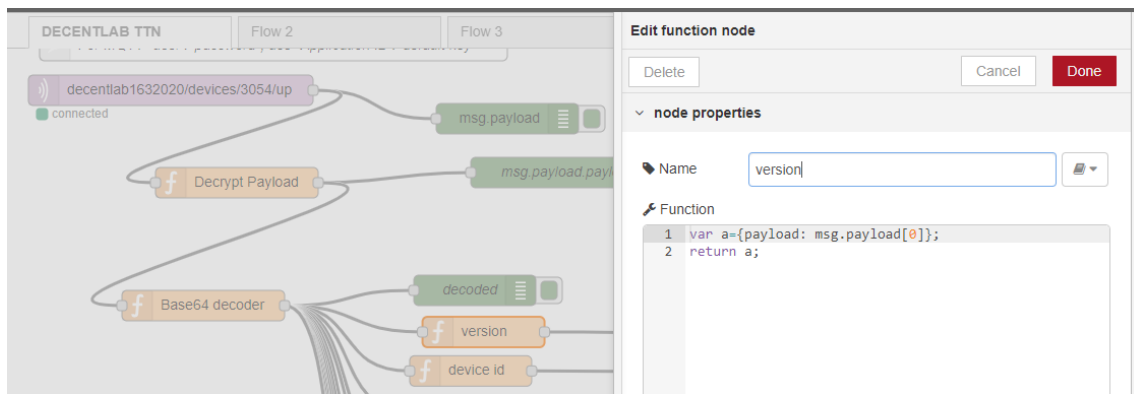
2.368

25/3/2020 11:20:00 node: air temperature

msg.payload : number

info	debug
25/3/2020 11:20:00 node: battery voltage	
msg.payload : number	
2.368	
25/3/2020 11:20:00 node: air temperature	
msg.payload : number	
22.246890974288547	
25/3/2020 11:20:00 node: air humidity	
msg.payload : number	
46.65751125352865	
25/3/2020 11:20:00 node: barometric_pressure	
msg.payload : number	
100654	
25/3/2020 11:20:00 node: ambient_light_ch0	
msg.payload : number	
609	
25/3/2020 11:20:00 node: ambient_light_ch1	
msg.payload : number	
227	
25/3/2020 11:20:00 node: co2_concentration	
msg.payload : number	
654	
25/3/2020 11:20:00 node: co2_sensor_status	
msg.payload : number	
0	
25/3/2020 11:20:00 node: Raw_IR_reading	
msg.payload : number	
37117	
25/3/2020 11:20:00 node: PIR_activity_counter	
msg.payload : number	
81	

Here we see some of the parse and scale nodes



InfluxDB Cloud

Now let's send the data to a platform like InfluxDB

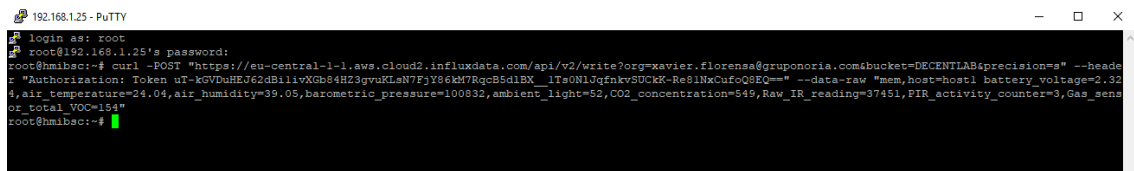
battery_voltage=2.323,air_temperature=21.64,air_humidity=44.52,barometric_pressure=100570,ambient_light=38,CO2_concentration=580,Raw_IR_reading=37596,PIR_activity_counter=0Gas_sensor_total_VOC=283 : msg.payload : buffer[27]

In this way

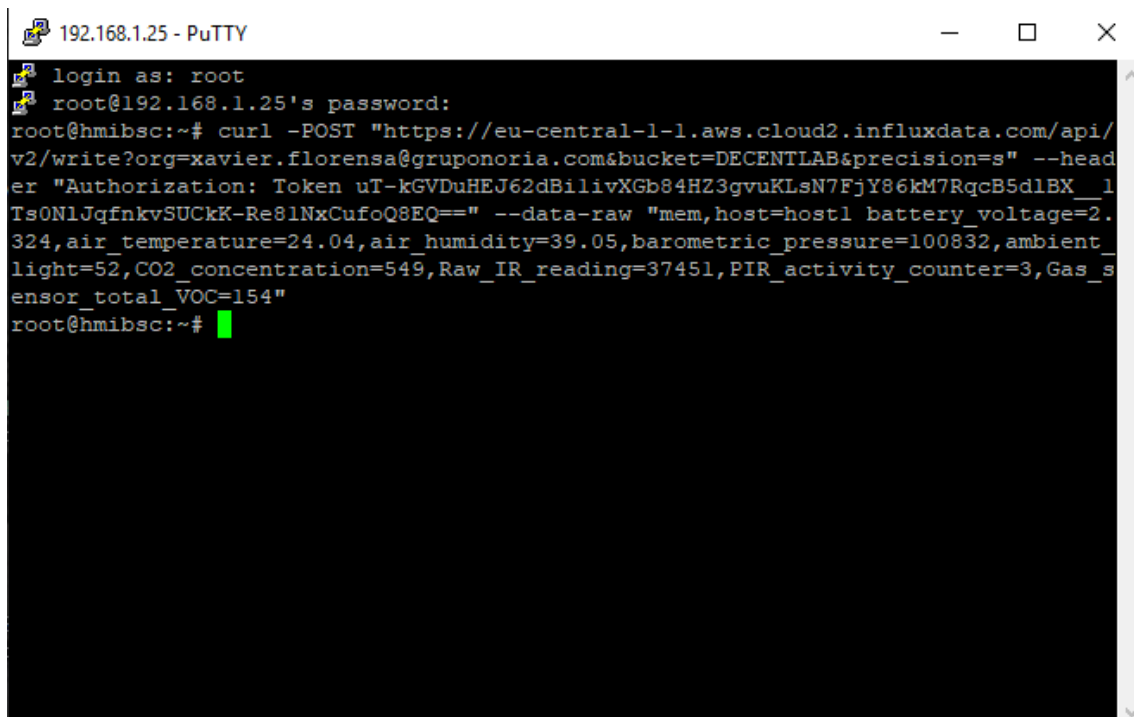
```
curl -POST "https://eu-central-1-1.aws.cloud2.influxdata.com/api/v2/write?org=xavier.florensa@gruponoria.com&bucket=DECENTLAB&precision=s" --header "Authorization: Token uT-kGVdUHEJ62dBilivXGb84HZ3gvuKLn7FjY86kM7RqcB5dlBX__1Ts0NlJqfnkvSUCkK-Re81NxCufoQ8EQ==" --data-raw "mem,host=host1 battery_voltage=2.323,air_temperature=21.64,air_humidity=44.52,barometric_pressure=100570,ambient_light=38,CO2_concentration=580,Raw_IR_reading=37596,PIR_activity_counter=0Gas_sensor_total_VOC=283"
```

```
curl -POST "https://eu-central-1-1.aws.cloud2.influxdata.com/api/v2/write?org=xavier.florensa@gruponoria.com&bucket=DECENTLAB&precision=s" --header "Authorization: Token uT-kGVdUHEJ62dBilivXGb84HZ3gvuKLn7FjY86kM7RqcB5dlBX__1Ts0NlJqfnkvSUCkK-Re81NxCufoQ8EQ==" --data-raw "mem,host=host1 battery_voltage=2.324,air_temperature=24.04,air_humidity=39.05,barometric_pressure=100832,ambient_light=52,CO2_concentration=549,Raw_IR_reading=37451,PIR_activity_counter=3,Gas_sensor_total_VOC=154"
```

We try on the Terminal of Edge Box, and we get no error

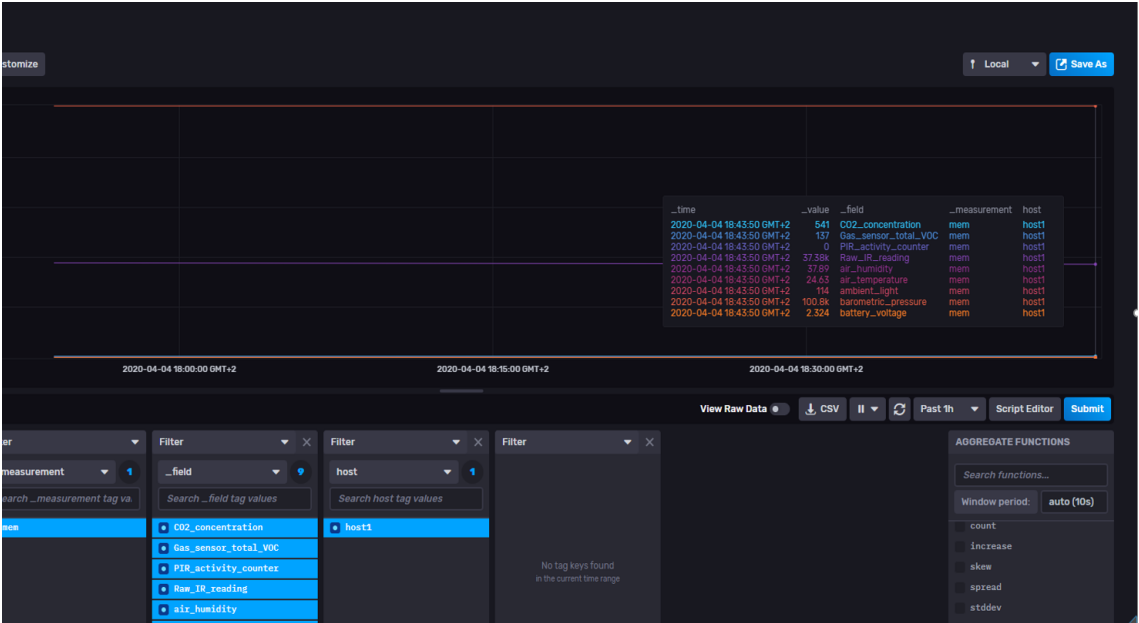


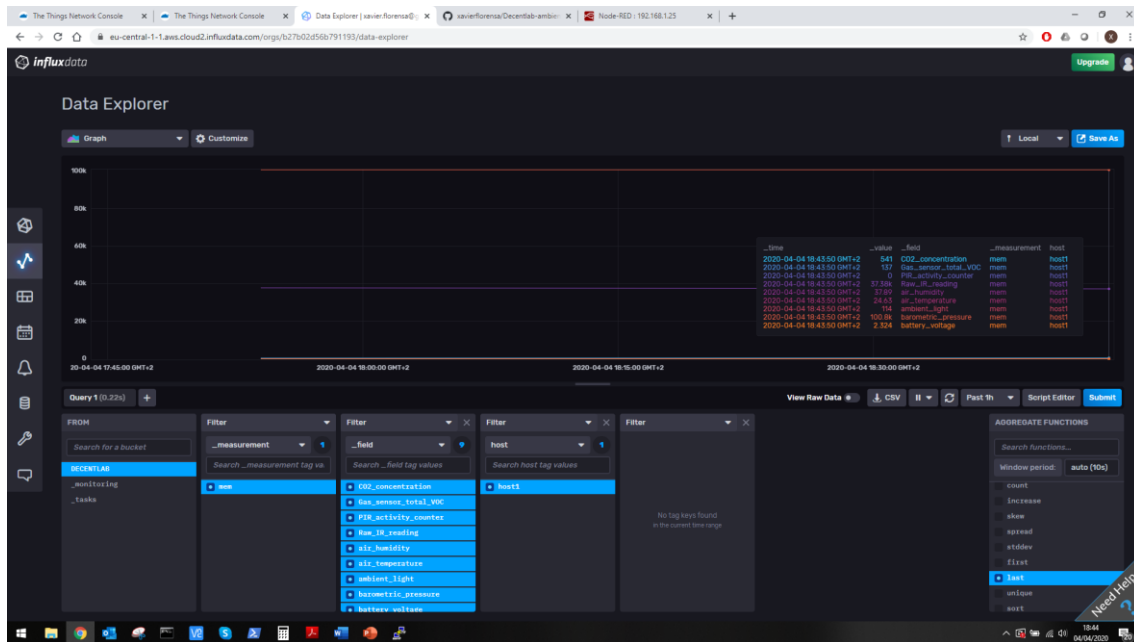
```
192.168.1.25 - PuTTY
login as: root
root@192.168.1.25's password:
root@hmibsc:~# curl -POST "https://eu-central-1-1.aws.cloud2.influxdata.com/api/v2/write?org=xavier.florensa@gruponoria.com&bucket=DECENTLAB&precision=s" --header "Authorization: Token uT-kGVdUHEJ62dBilivXGb84HZ3gvuKLn7FjY86kM7RqcB5dlBX__1Ts0NlJqfnkvSUCkK-Re81NxCufoQ8EQ==" --data-raw "mem,host=host1 battery_voltage=2.324,air_temperature=24.04,air_humidity=39.05,barometric_pressure=100832,ambient_light=52,CO2_concentration=549,Raw_IR_reading=37451,PIR_activity_counter=3,Gas_sensor_total_VOC=154"
root@hmibsc:~#
```



```
192.168.1.25 - PuTTY
login as: root
root@192.168.1.25's password:
root@hmibsc:~# curl -POST "https://eu-central-1-1.aws.cloud2.influxdata.com/api/v2/write?org=xavier.florensa@gruponoria.com&bucket=DECENTLAB&precision=s" --header "Authorization: Token uT-kGVdUHEJ62dBilivXGb84HZ3gvuKLn7FjY86kM7RqcB5dlBX__1Ts0NlJqfnkvSUCkK-Re81NxCufoQ8EQ==" --data-raw "mem,host=host1 battery_voltage=2.324,air_temperature=24.04,air_humidity=39.05,barometric_pressure=100832,ambient_light=52,CO2_concentration=549,Raw_IR_reading=37451,PIR_activity_counter=3,Gas_sensor_total_VOC=154"
root@hmibsc:~#
```

And we get the data on InfluxDB Cloud





Now we have to do this on node-red

Edit function node

node properties

Name: topic=data

Function

```

1 msg.topic = "battery_voltage=2.324,air_temperature=24.04,air_humidity=39.05,barometric_pressure=100032,ambient_light=52,CO2_concentration=549,Raw_IR_reading=37451,PIR_activity_counter=3,Gas_sensor_total_VOC=154";
2 return msg;

```

Node-RED

Edit function node

node properties

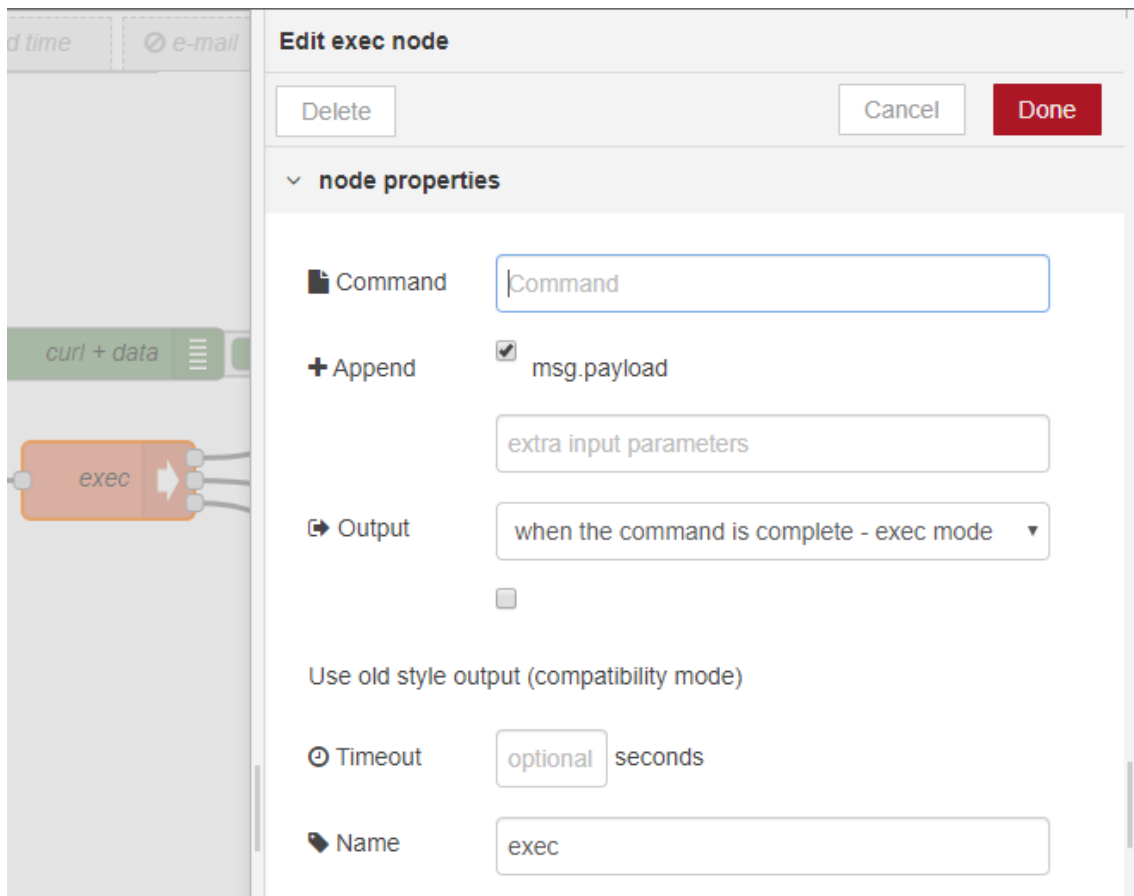
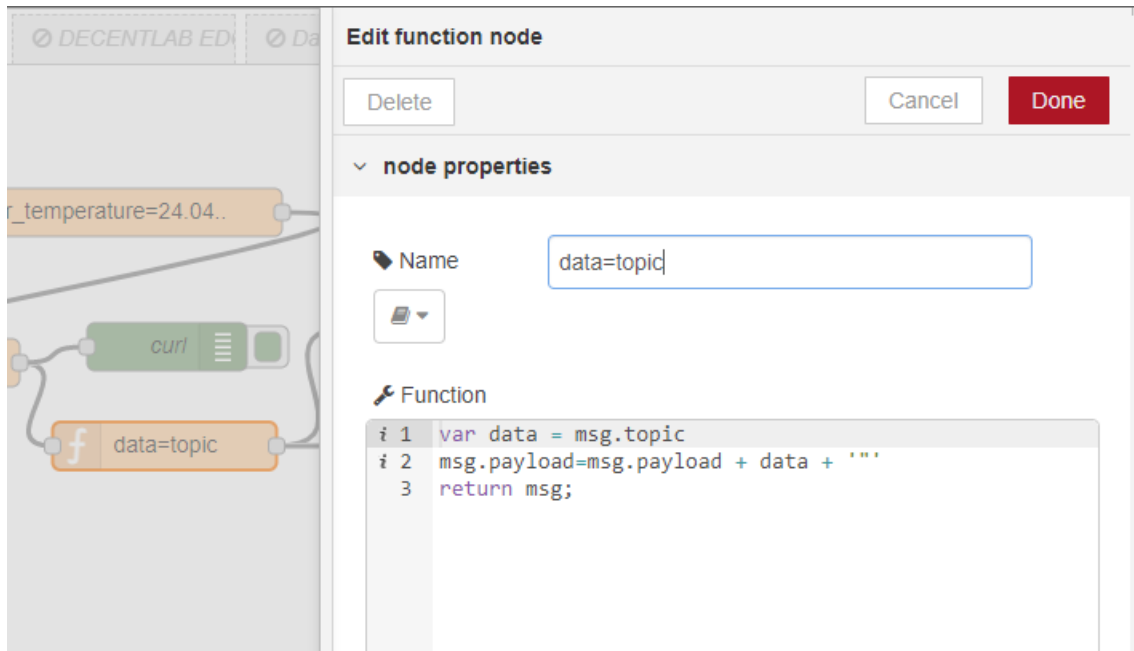
Name: curl

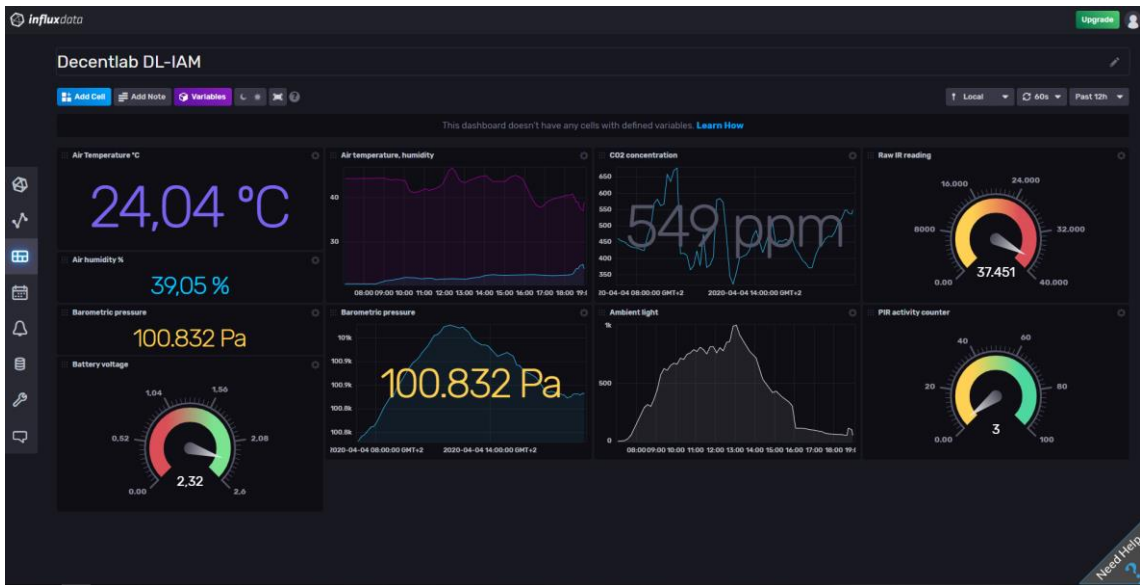
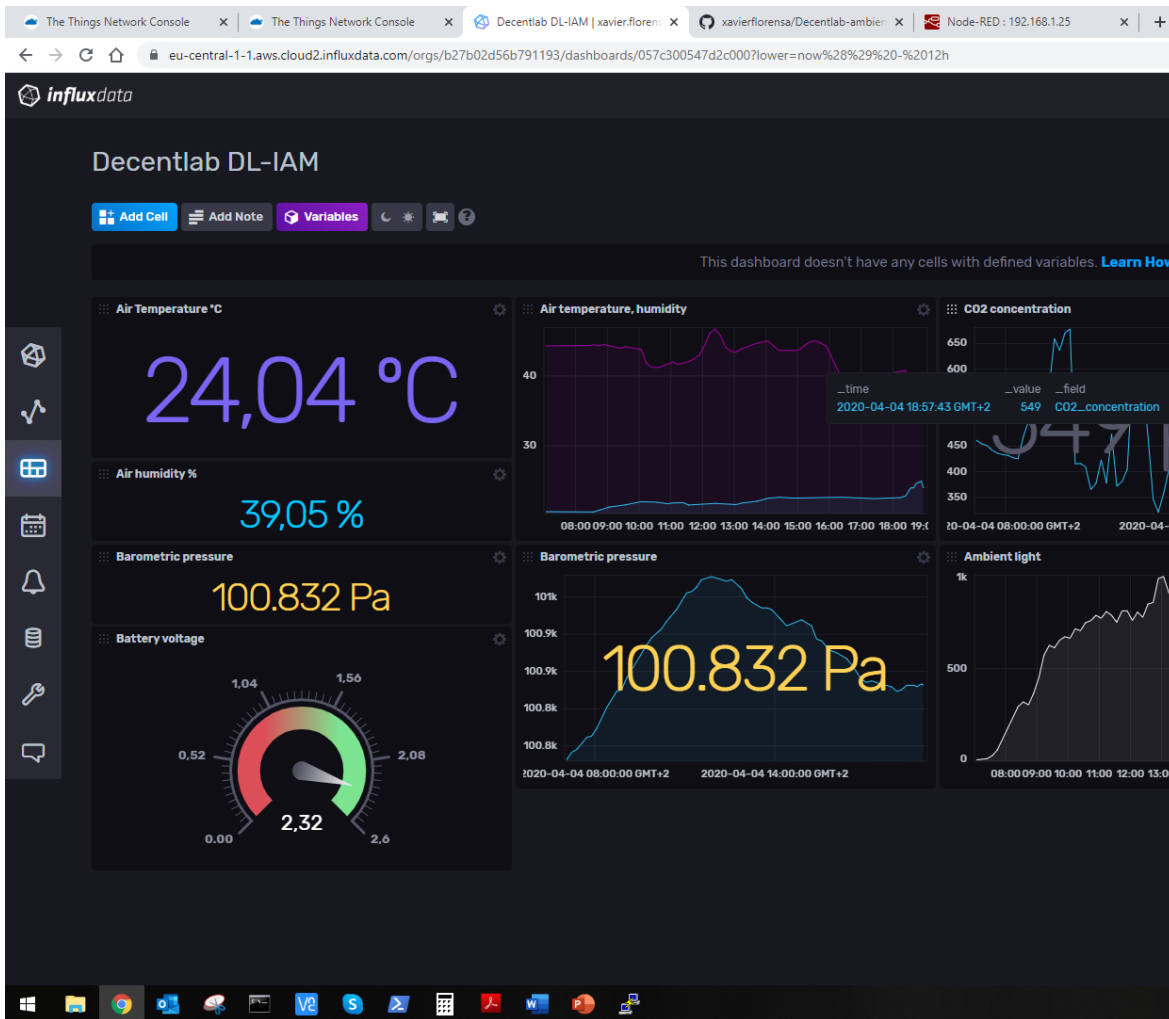
Function

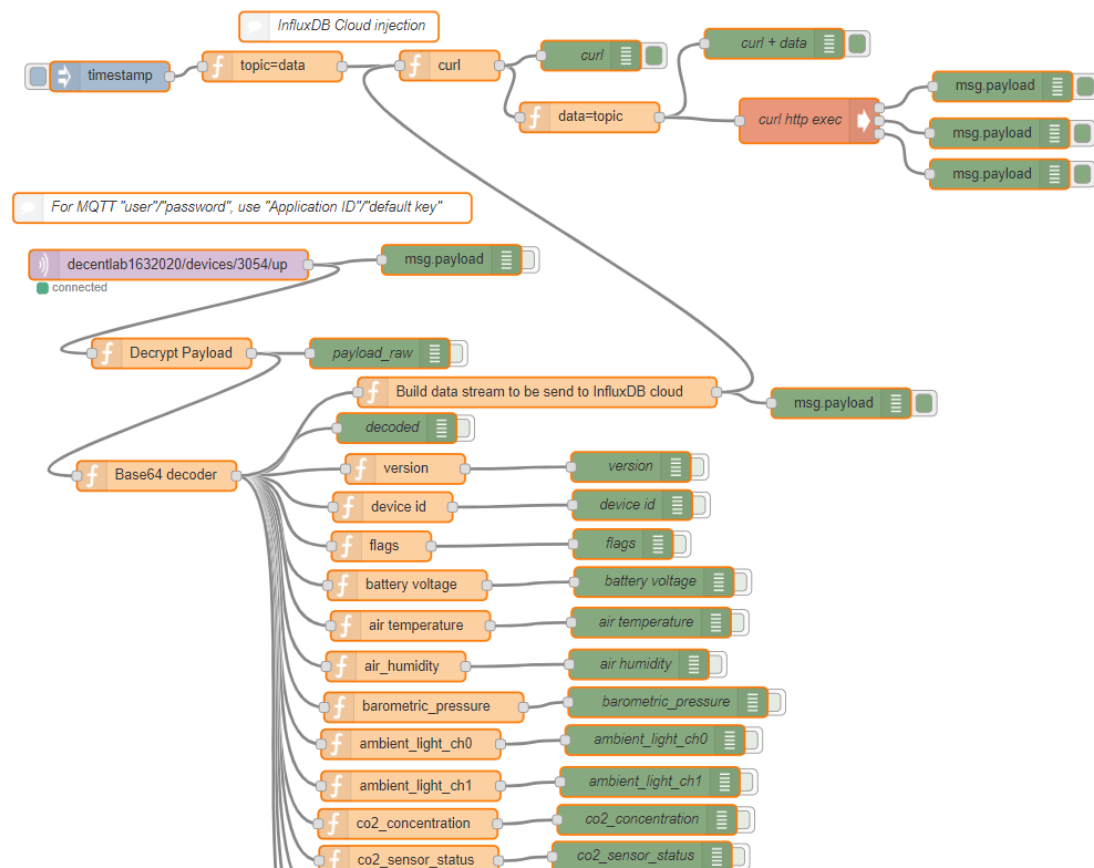
```

1 if (msg.payload === "curl_POST") {
2   curl_POST("https://eu-central-1-1.aws.cloud2.influxdata.com/api/v2/write?org=xavier.florensa@gruponorla.com&bucket=decentlab&precision=s", {
3     headers: {
4       "Authorization": "Token ut-k0DuHf362lB11vKB84H23gukL307fY86M7q85d18x"
5     }
6   });
7 }
8 return msg;

```







Just formatting the data of our sensor on this way with life data

battery_voltage=2.323,air_temperature=21.64,air_humidity=44.52,barometric_pressure=100570,ambient_light=38,CO2_concentration=580,Raw_IR_reading=37596,PIR_activity_counter=0Gas_sensor_total_VOC=283

Edit function node

Delete

node properties

Name
Build data stream to be send to InfluxDB cloud

Function

```

1 var version = msg.payload[0];
2 var device_id = msg.payload.readUInt16BE(1);
3 var flags = msg.payload.readUInt16LE(3);
4 var battery_voltage = msg.payload.readUInt16BE(5)/1000;
5 var air_temperature = parseFloat((((msg.payload.readUInt16BE(7))/65535)*175-45).toFixed(2));
6 var air_humidity = parseFloat((((msg.payload.readUInt16BE(9))/65535)*100).toFixed(2));
7 var barometric_pressure = (msg.payload.readUInt16BE(11))*2;
8 var ambient_light_CH0 = msg.payload.readUInt16BE(13);
9 var ambient_light_CH1 = msg.payload.readUInt16BE(15);
10 var co2_concentration = (msg.payload.readUInt16BE(17))-32768;
11 var co2_sensor_status = msg.payload.readUInt16BE(19);
12 var Raw_IR_reading = msg.payload.readUInt16BE(21);
13 var PIR_activity_counter = msg.payload.readUInt16BE(23);
14 var Gas_sensor_total_VOC = msg.payload.readUInt16BE(25);
15
16 msg.topic = 'battery_voltage=' + battery_voltage +
17 'air_temperature=' + air_temperature +
18 'air_humidity=' + air_humidity +
19 'barometric_pressure=' + barometric_pressure +
20 'ambient_light=' + ambient_light_CH0 +
21 'CO2_concentration=' + co2_concentration +
22 'Raw_IR_reading=' + Raw_IR_reading +
23 'PIR_activity_counter=' + PIR_activity_counter +
24 'Gas_sensor_total_VOC=' + Gas_sensor_total_VOC;
25
26 return msg;

```

Outputs
1

Edit function node

Delete
Cancel
Done

node properties

Name
curl

Function

```

1 msg.payload = 'curl -POST "https://eu-central-1-
2 return msg;

```

```

msg.payload = 'curl -POST "https://eu-central-1-
1.aws.cloud2.influxdata.com/api/v2/write?org=xavier.florensa@gruponoria.com&bucket=DECENTLAB&precision=s" --header
"Authorization: Token uT-kGVdUHEJ62dBi1vXGb84HZ3gvuKLsN7FjY86kM7RqcB5dIBX__1Ts0NIJqfnkvSUCKK-
Re81NxCufoQ8EQ==" --data-raw "mem,host=host1 '
return msg;

```

Edit function node

Delete

▼ node properties

🔑 Name

🔧 Function

```
i 1 var data = msg.topic  
i 2 msg.payload=msg.payload + data + ''  
3 return msg;
```

Edit exec node

Delete

Cancel

Done

▼ node properties

📄 Command

+ Append ☒ msg.payload

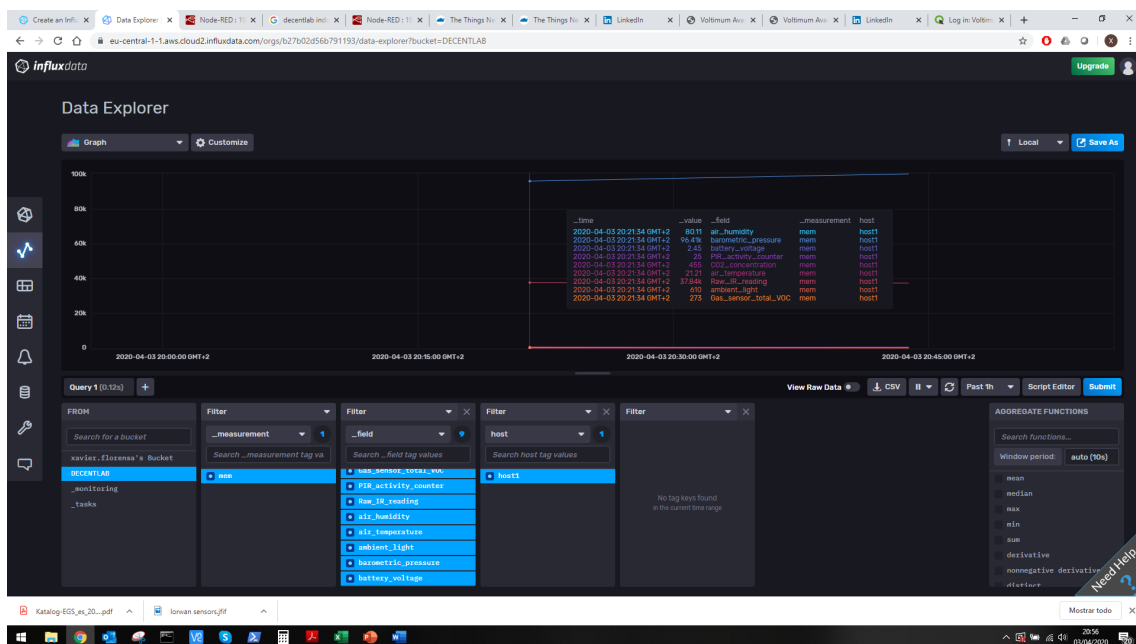
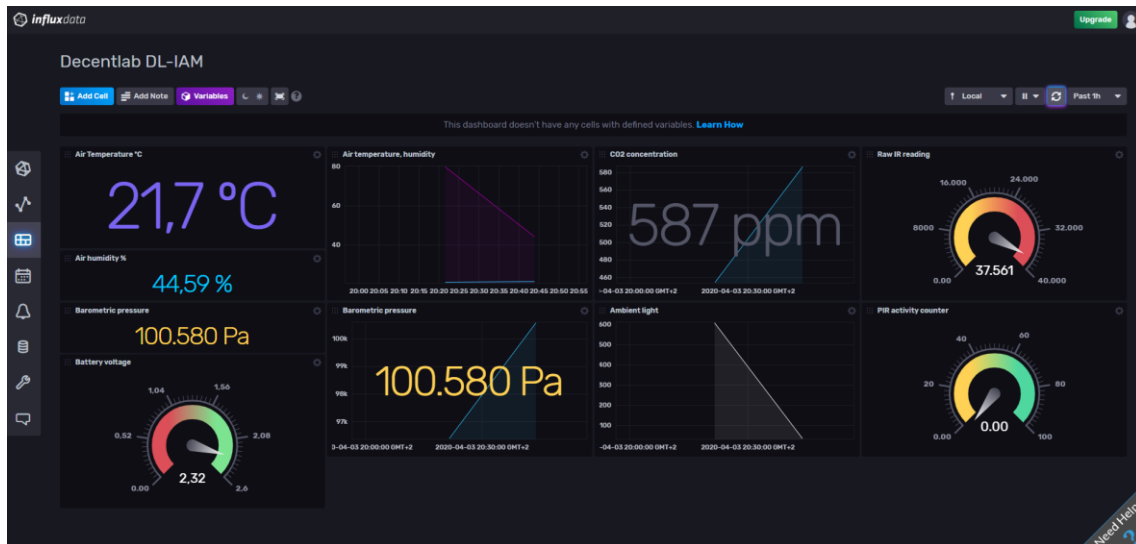
🔗 Output

☐

Use old style output (compatibility mode)

⌚ Timeout seconds

🔑 Name



eu-central-1-1.aws.cloud2.influxdata.com/orgs/b27b02d56b791193/data-explorer?bucket=DECENTLAB

Data Explorer

Graph Customize

_time	_value	_field	_measurement	host
2020-04-03 20:21:34 GMT+2	80.11	air_humidity	mem	host1
2020-04-03 20:21:34 GMT+2	96.41k	barometric_pressure	mem	host1
2020-04-03 20:21:34 GMT+2	2.45	battery_voltage	mem	host1
2020-04-03 20:21:34 GMT+2	25	PIR_activity_counter	mem	host1
2020-04-03 20:21:34 GMT+2	455	CO2_concentration	mem	host1
2020-04-03 20:21:34 GMT+2	21.21	air_temperature	mem	host1
2020-04-03 20:21:34 GMT+2	37.84k	Raw_IR_reading	mem	host1
2020-04-03 20:21:34 GMT+2	610	ambient_light	mem	host1
2020-04-03 20:21:34 GMT+2	273	Gas_sensor_total_VOC	mem	host1

Query 1 (0.12s) View Raw Data CSV

FROM: Search for a bucket
xavier.florensa's Bucket
_monitoring
_tasks

Filter: _measurement
Search _measurement tag values
mem

Filter: _field
Search _field tag values
was_sensor_total_vul
PIR_activity_counter
Raw_IR_reading
air_humidity
air_temperature
ambient_light
barometric_pressure
battery_voltage

Filter: host
Search host tag values
host1

No tag keys found in the current time range

Katalog-EGS_es_20...pdf lonwan sensors.jiff

eu-central-1-1.aws.cloud2.influxdata.com/orgs/b27b02d56b791193/dashboard/057c300547d3c000?lower=now%2B%29%20-%20%20h

Decentlab DL-IAM

Local Past 1h

This dashboard doesn't have any cells with defined variables. [Learn How](#)

Air Temperature °C
25.97 °C

Air humidity %
37.46 %

Barometric pressure
100.598 Pa

Battery voltage
2.32

Air temperature, humidity
2020-04-03 20:30:00 GMT+2

Barometric pressure
2020-04-03 21:00:0

CO2 concentration
643 ppm

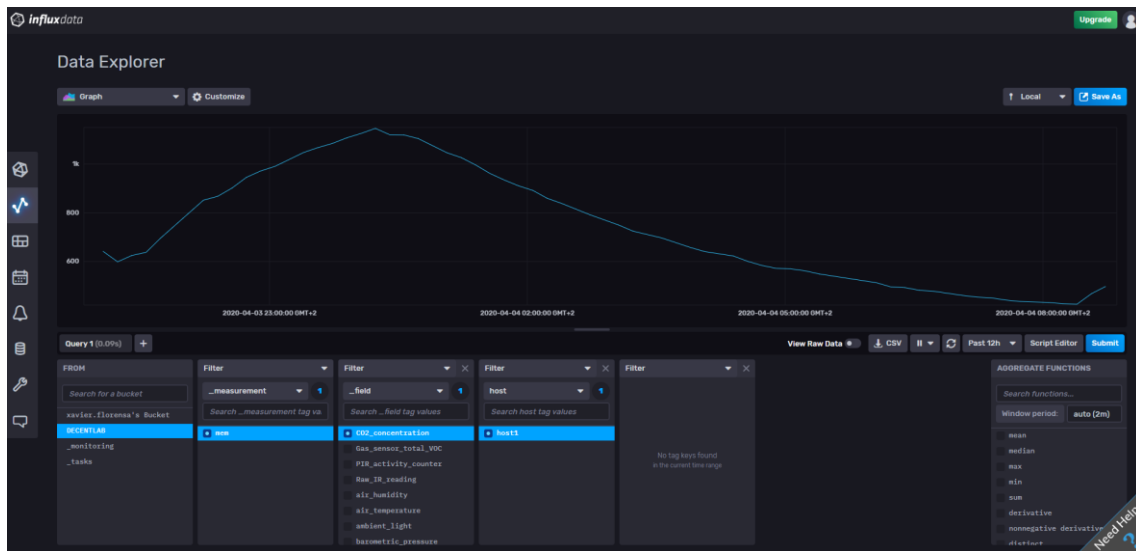
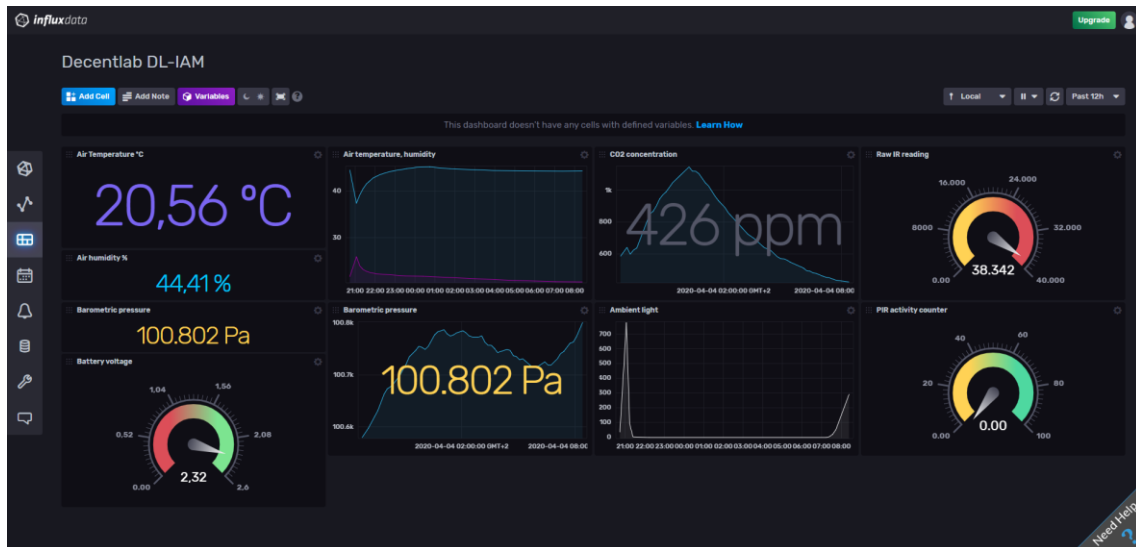
Ambient light
2020-04-03 20:30:00 GMT+2

Raw IR reading
36.877

PIR activity counter
239

Katalog-EGS_es_20...pdf lonwan sensors.jiff

2104 03/04/2020



CSV export

	A
1	#group,false,false,true,true,false,false,true,true,true
2	#datatype,string,long,dateTime:RFC3339,dateTime:RFC3339,dateTime:RFC3339,double,string,string,string
3	#default,_result,,,,,,,,
4	,result,table,_start,_stop,_time,_value,_field,_measurement,host
5	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T19:03:46Z,643,CO2_concentration,mem,host1
6	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T19:13:54Z,600,CO2_concentration,mem,host1
7	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T19:23:46Z,626,CO2_concentration,mem,host1
8	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T19:33:49Z,639,CO2_concentration,mem,host1
9	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T19:43:51Z,697,CO2_concentration,mem,host1
10	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T19:53:52Z,750,CO2_concentration,mem,host1
11	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T20:03:47Z,800,CO2_concentration,mem,host1
12	„0,2020-04-03T18:50:44.020194633Z,2020-04-04T06:50:44.020194633Z,2020-04-03T20:13:48Z,853,CO2_concentration,mem,host1

