

M015 Uf1 IoT



TheThingsNetwork 1

Curs: 2019-20

CFGs: DAM2

Alumne : Arnau Subirós Puigarnau

Data : 03-02-2020
(versió 3 a partir de la pàgina 18)

Nom i Cognoms

Arnau Subirós Puigarnau

Data

10-02-2020

Accedim a <https://www.thethingsnetwork.org/>

Creacio d'un dispositiu

DEVICES :dam2_iot1

THE THINGS NETWORK CONSOLE COMMUNITY EDITION

Applications > dam2_sapaar2020 > Devices

REGISTER DEVICE [bulk import devices](#)

Device ID
This is the unique identifier for the device in this app. The device ID will be immutable.
dam2_iot1

Device EUI
The device EUI is the unique identifier for this device on the network. You can change the EUI later.
0 bytes

App Key
The App Key will be used to secure the communication between you device and the network.
this field will be generated

App EUI
70 B3 D5 7E D0 02 96 96

- Afegim les credencials del dispositiu al Node-Red

Flow 11 | Flow 1

ttn uplink

Edit ttn uplink node > **Edit ttn app node**

Delete Cancel Update

Properties

App ID: dam2_sapaar2020

Access Key:

Discovery address: discovery.thethingsnetwork.org:1900

info

Information

Node: "a1256a85.824488"

Type: ttn app

Description

Node Help

A node to share The Things Network application configurations between n

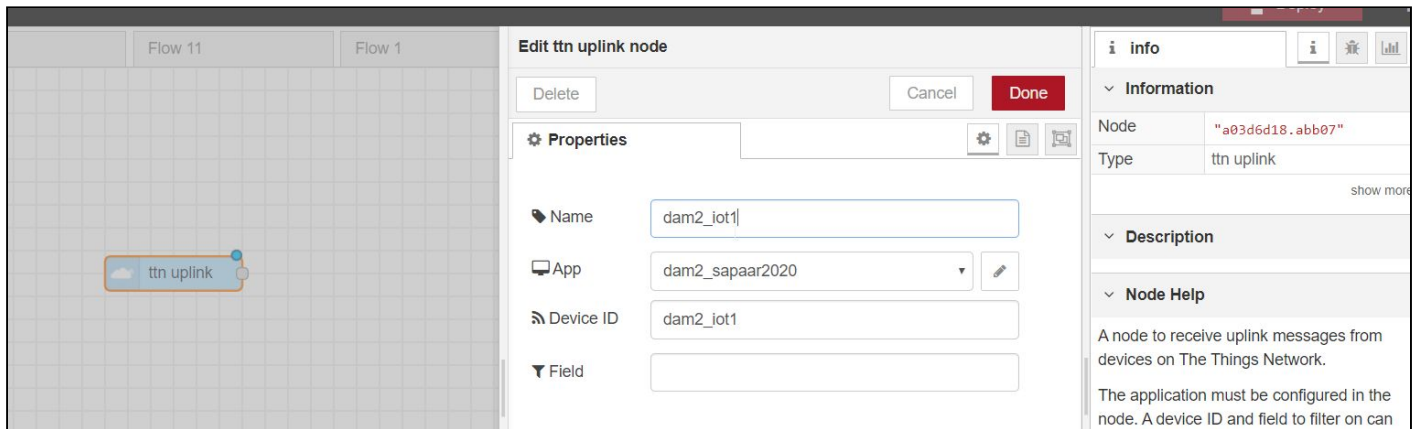
Use the following information of the

Nom i Cognoms

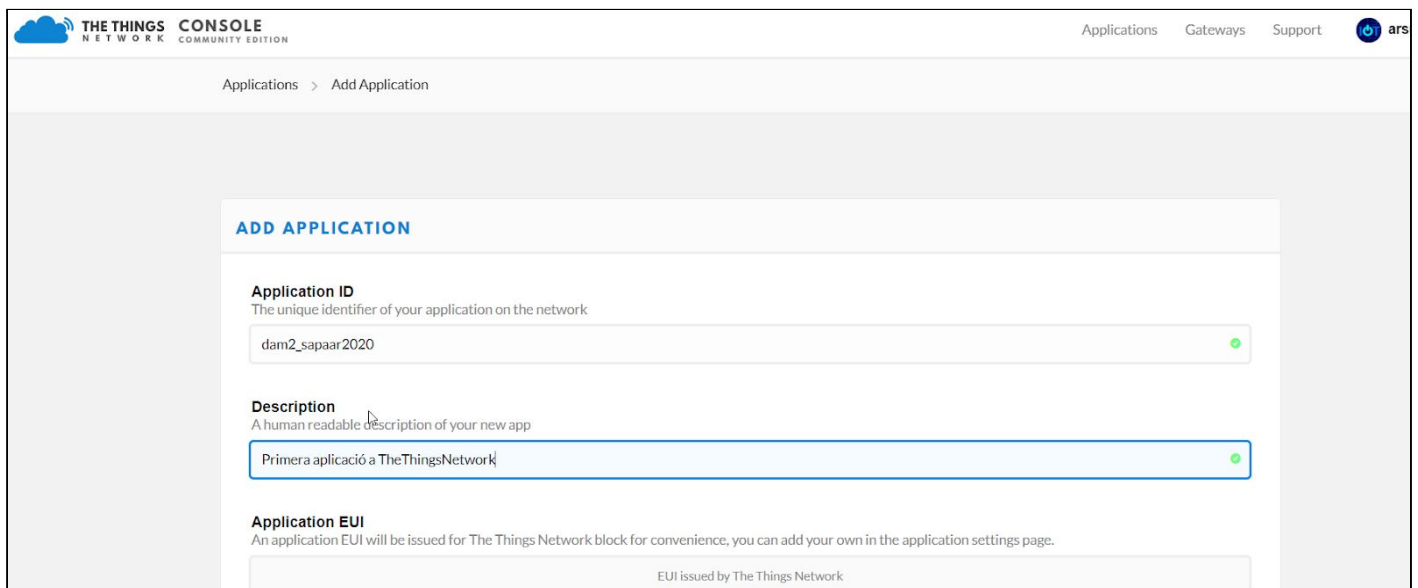
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10-02-2020



Application ID : **dam2_sapaar2020**



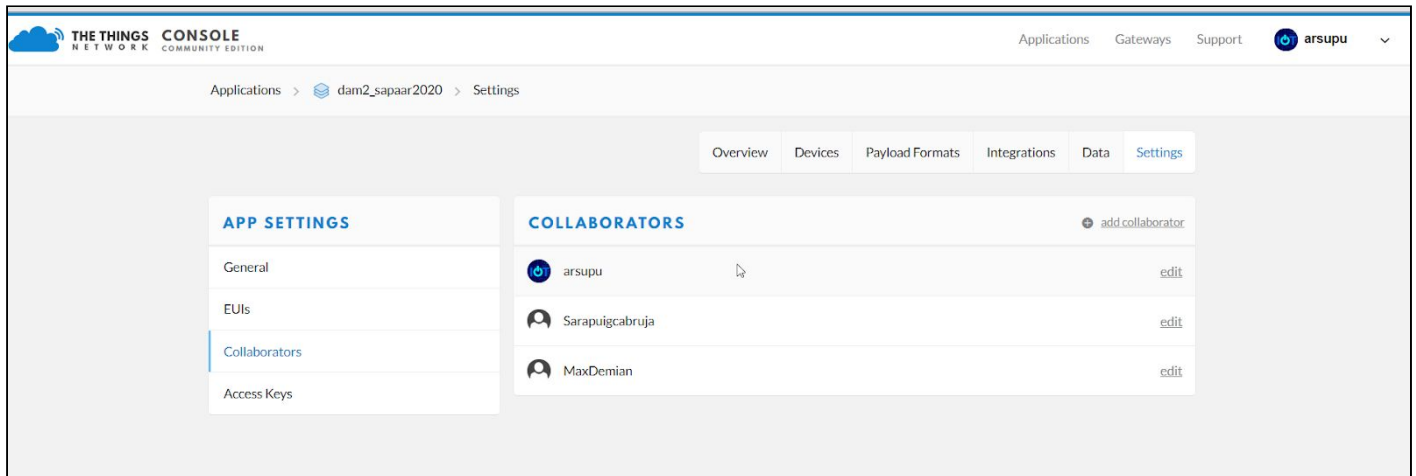
Nom i Cognoms

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Data

10-02-2020

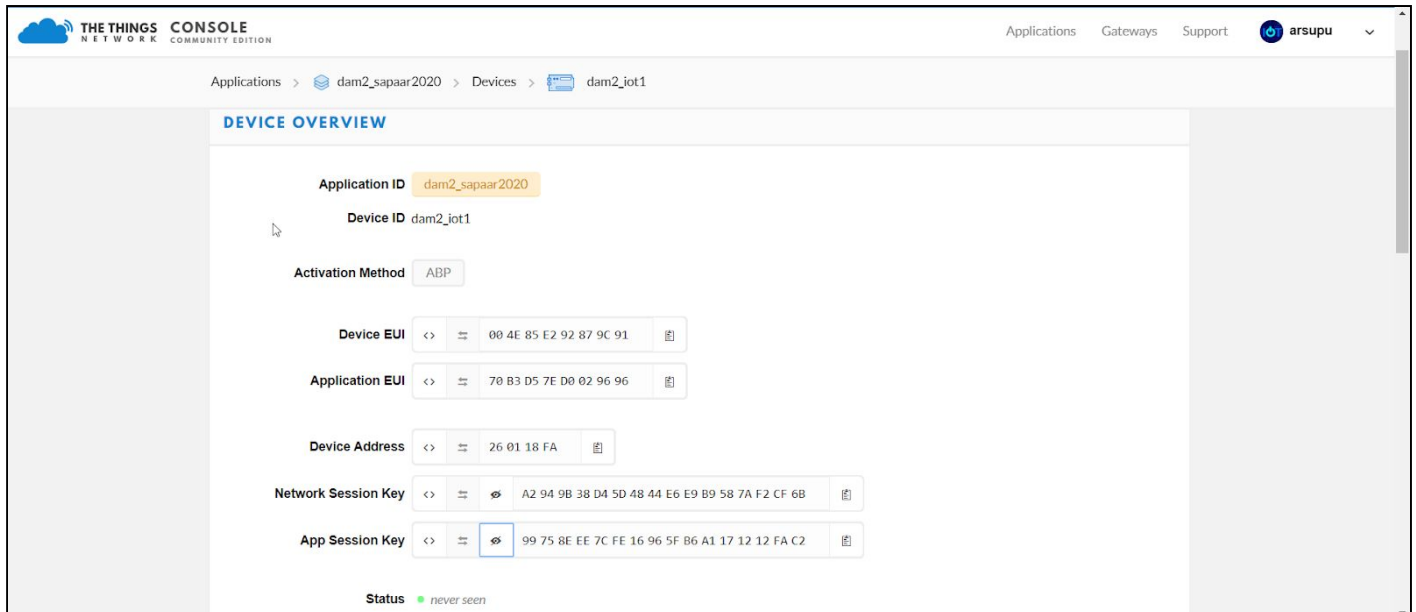
Afegim els col·laboradors:



The screenshot shows the 'THE THINGS CONSOLE' interface. The breadcrumb trail is 'Applications > dam2_sapaar2020 > Settings'. The 'Settings' tab is selected, and the 'COLLABORATORS' sub-tab is active. On the left, the 'APP SETTINGS' sidebar has 'Collaborators' selected. The main area shows a list of collaborators: 'arsupu', 'Sarapuigcabruja', and 'MaxDemian', each with an 'edit' link. An 'add collaborator' button is at the top right of the list.

Anotem les següents dades :

- Device Address : **260118FA**
- Network Session Key: { 0xA2, 0x94, 0x9B, 0x38, 0xD4, 0x5D, 0x48, 0x44, 0xE6, 0xE9, 0xB9, 0x58, 0x7A, 0xF2, 0xCF, 0x6B }
- App Session Key : { 0x99, 0x75, 0x8E, 0xEE, 0x7C, 0xFE, 0x16, 0x96, 0x5F, 0xB6, 0xA1, 0x17, 0x12, 0x12, 0xFA, 0xC2 }



The screenshot shows the 'THE THINGS CONSOLE' interface. The breadcrumb trail is 'Applications > dam2_sapaar2020 > Devices > dam2_iot1'. The 'DEVICE OVERVIEW' page is displayed for device 'dam2_iot1'. It shows the 'Application ID' as 'dam2_sapaar2020' and 'Device ID' as 'dam2_iot1'. The 'Activation Method' is 'ABP'. Below, several fields are shown with their values and a copy icon: 'Device EUI' (00 4E 85 E2 92 87 9C 91), 'Application EUI' (70 B3 D5 7E D0 02 96 96), 'Device Address' (26 01 18 FA), 'Network Session Key' (A2 94 9B 38 D4 5D 48 44 E6 E9 B9 58 7A F2 CF 6B), and 'App Session Key' (99 75 8E EE 7C FE 16 96 5F B6 A1 17 12 12 12 FA C2). The 'Status' is 'never seen'.

Nom i Cognoms

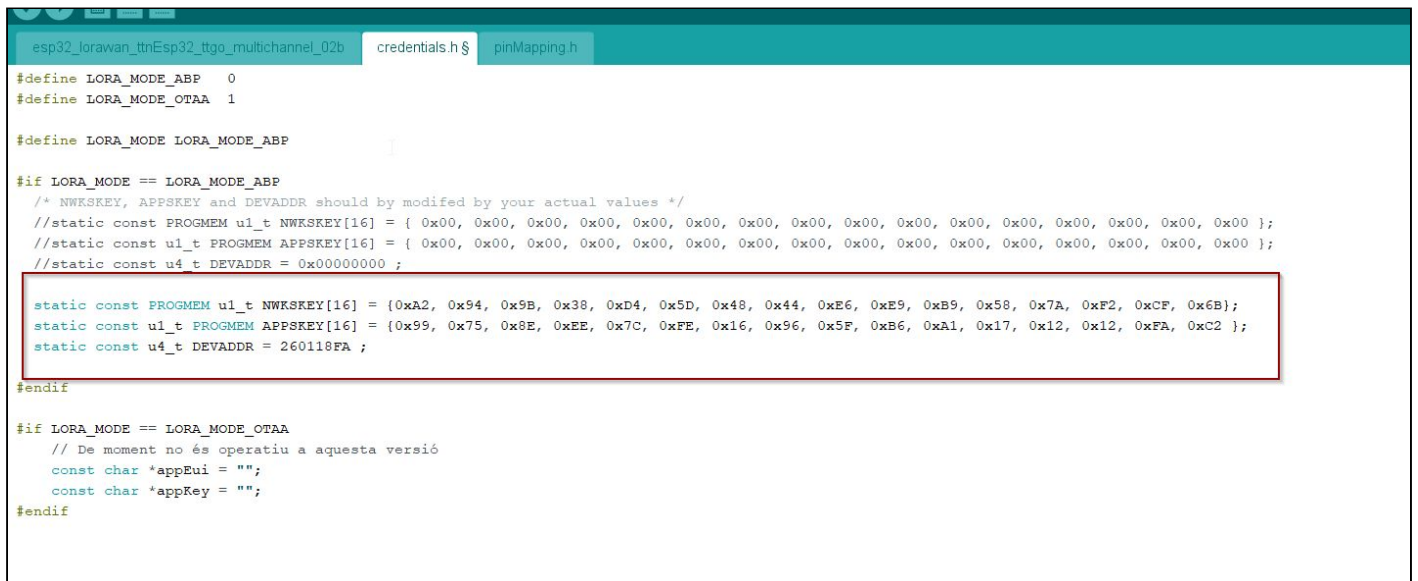
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Data

10-02-2020

❖ Codi font per a actualitzar amb els valors de The Things Network:

- https://github.com/jordibinefa/arduino-IDE-codes/tree/master/esp32_lorawan_ttnEsp32_ttgo_multichannel_02b
- Anotem el codi al Arduino IDE i afegim els valors de Network Session Key y App Key



```

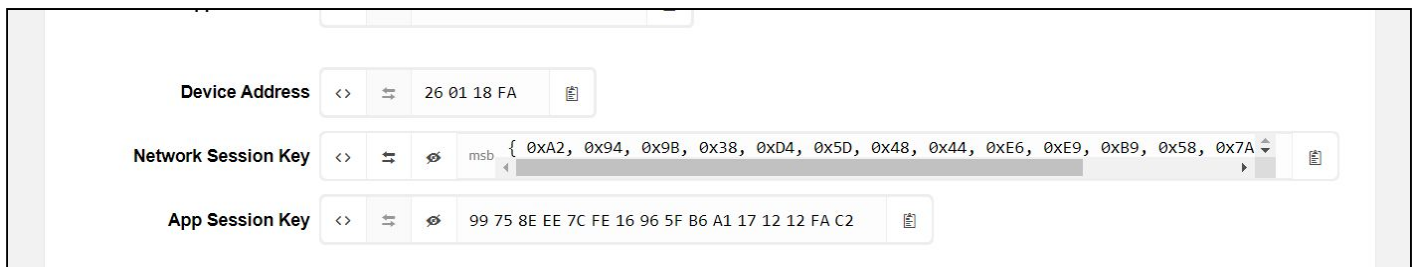
esp32_lorawan_ttnEsp32_ttgo_multichannel_02b | credentials.h | pinMapping.h
#define LORA_MODE_ABP 0
#define LORA_MODE_OTAA 1

#define LORA_MODE LORA_MODE_ABP

#if LORA_MODE == LORA_MODE_ABP
/* NWKSKEY, APPKEY and DEVADDR should be modified by your actual values */
//static const PROGMEM u1_t NWKSKEY[16] = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };
//static const u1_t PROGMEM APPKEY[16] = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };
//static const u4_t DEVADDR = 0x00000000 ;

static const PROGMEM u1_t NWKSKEY[16] = {0xA2, 0x94, 0x9B, 0x38, 0xD4, 0x5D, 0x48, 0x44, 0xE6, 0xE9, 0xB9, 0x58, 0x7A, 0xF2, 0xCF, 0x6B};
static const u1_t PROGMEM APPKEY[16] = {0x99, 0x75, 0x8E, 0xEE, 0x7C, 0xFE, 0x16, 0x96, 0x5F, 0xB6, 0xA1, 0x17, 0x12, 0x12, 0xFA, 0xC2 };
static const u4_t DEVADDR = 260118FA ;
#endif

#if LORA_MODE == LORA_MODE_OTAA
// De moment no és operatiu a aquesta versió
const char *appEui = "";
const char *appKey = "";
#endif
  
```



Device Address: <> 26 01 18 FA

Network Session Key: <> msb { 0xA2, 0x94, 0x9B, 0x38, 0xD4, 0x5D, 0x48, 0x44, 0xE6, 0xE9, 0xB9, 0x58, 0x7A, 0xF2, 0xCF, 0x6B }

App Session Key: <> 99 75 8E EE 7C FE 16 96 5F B6 A1 17 12 12 FA C2

Hem d'afegir la placa ESP-32

<https://randomnerdtutorials.com/installing-the-esp32-board-in-arduino-ide-windows-instructions/>

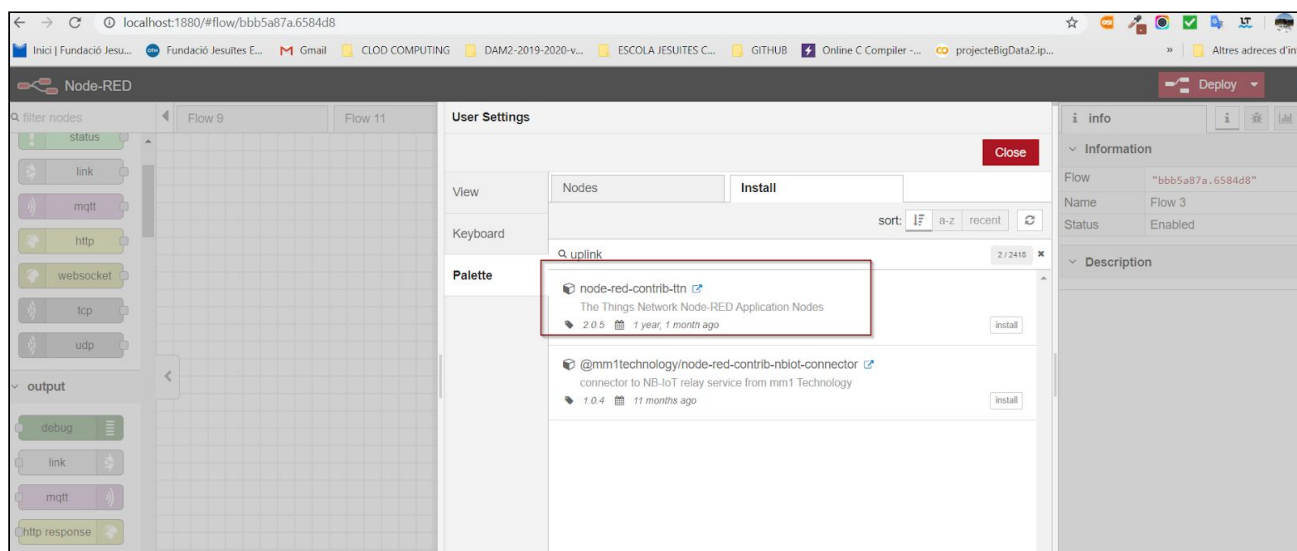
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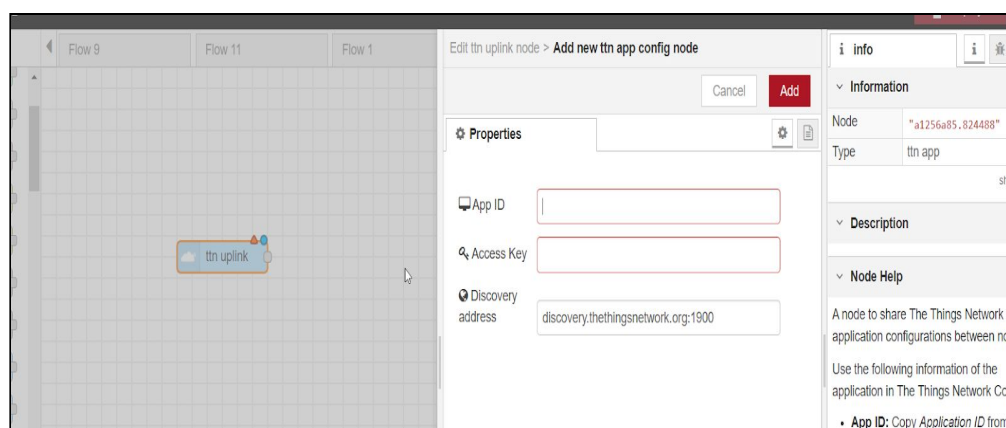
Data

10-02-2020

- Obrim el NODE-RED i afegim el següent node node-red-contrib-ttn



- configurem el node uplink

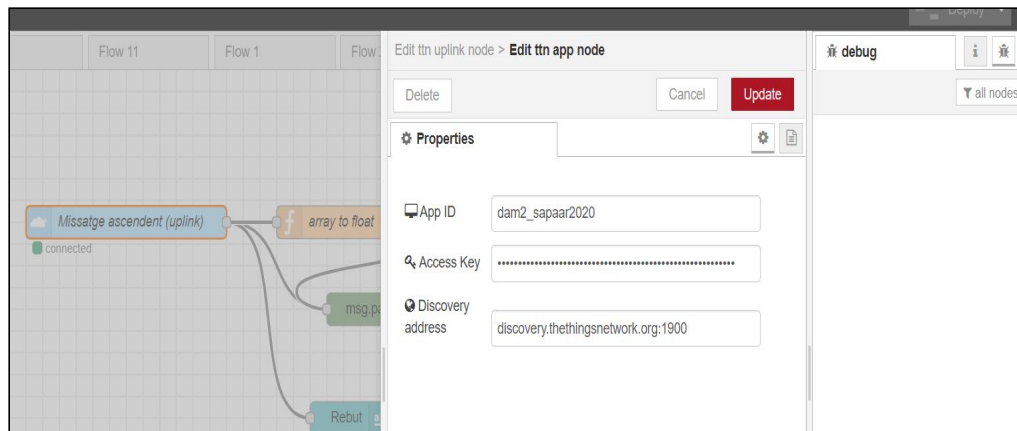


Nom i Cognoms

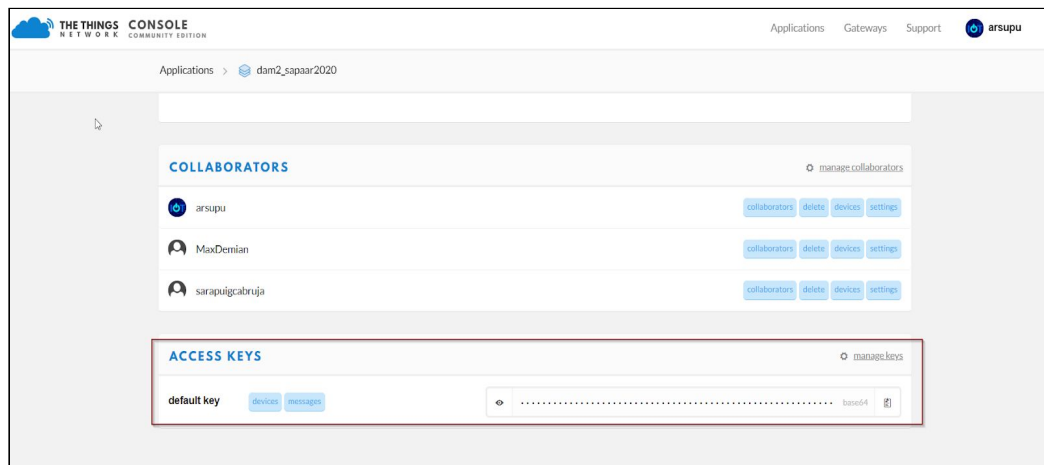
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Data

10-02-2020



Al NODE-RED hem d'afegir l'accés key



- Arduino IDE i utilitzem el següent codi
https://github.com/jordibinefa/arduino-IDE-codes/tree/master/esp32_lorawan_ttnEsp32_ttgo_multichannel_02b

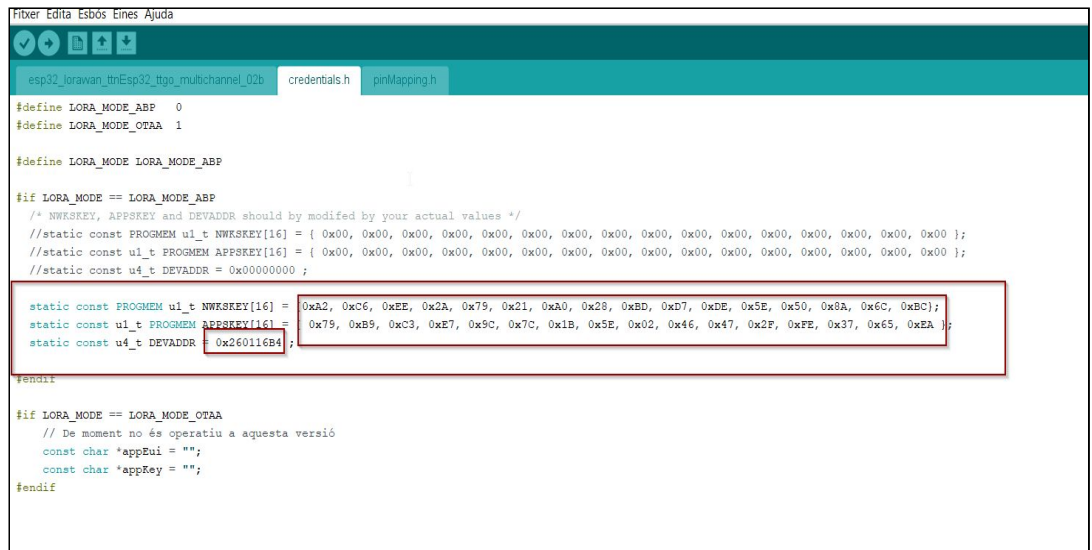
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Data

10-02-2020

- Anotem les credencials



```

esp32_lorawan_ttnEsp32_ttgo_multichannel_02b - credentials.h - pinMapping.h

#define LORA_MODE_ABP 0
#define LORA_MODE_OTAA 1


#define LORA_MODE LORA_MODE_ABP

#if LORA_MODE == LORA_MODE_ABP
/* NWKKEY, APPKEY and DEVADDR should be modified by your actual values */
//static const PROGMEM ui_t NWKKEY[16] = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };
//static const ui_t PROGMEM APPKEY[16] = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };
//static const ui_t DEVADDR = 0x00000000;

static const PROGMEM ui_t NWKKEY[16] = {0xA2, 0xC6, 0xEE, 0x2A, 0x79, 0x21, 0xA0, 0x28, 0xBD, 0xD7, 0xDE, 0x5E, 0x50, 0x8A, 0x6C, 0xBC};
static const ui_t PROGMEM APPKEY[16] = {0x79, 0xB9, 0xC3, 0xE7, 0x9C, 0x7C, 0x1B, 0x5E, 0x02, 0x46, 0x47, 0x2F, 0xFE, 0x37, 0x65, 0xEA};
static const ui_t DEVADDR = 0x260116B4;

#endif

#if LORA_MODE == LORA_MODE_OTAA
// De moment no és operatiu a aquesta versió
const char *appEui = "";
const char *appKey = "";
#endif
  
```



```

esp32_lorawan_ttnEsp32_ttgo_multichannel_02b - credentials.h | Arduino 1.8.5
Fitxer Edita Esbós Eines Ajuda
Format automàtic Ctrl+T
Arxiva el programari
Arregla la codificació i recarrega
Monitor sèrie Ctrl+Shift+M
Plotter sèrie Ctrl+Shift+L
WiFi101 Firmware Updater
Tarja: "DOIT ESP32 DEVKIT V1"
Flash Frequency: "80MHz"
Upload Speed: "921600"
Core Debug Level: "Cap"
Port: "COM5"
Informació de la placa
Programador: "AVRISP mkII"
Carrega Bootloader

#define LORA_M
#define LORA_M

#define LORA_M

#if LORA_MODE
/* NWKKEY,
//static con
//static con
//static con

static const
static const
static const

#endif

#if LORA_MODE == LORA_MODE_OTAA
// De moment no és operatiu a aquesta versió
const char *appEui = "";
  
```

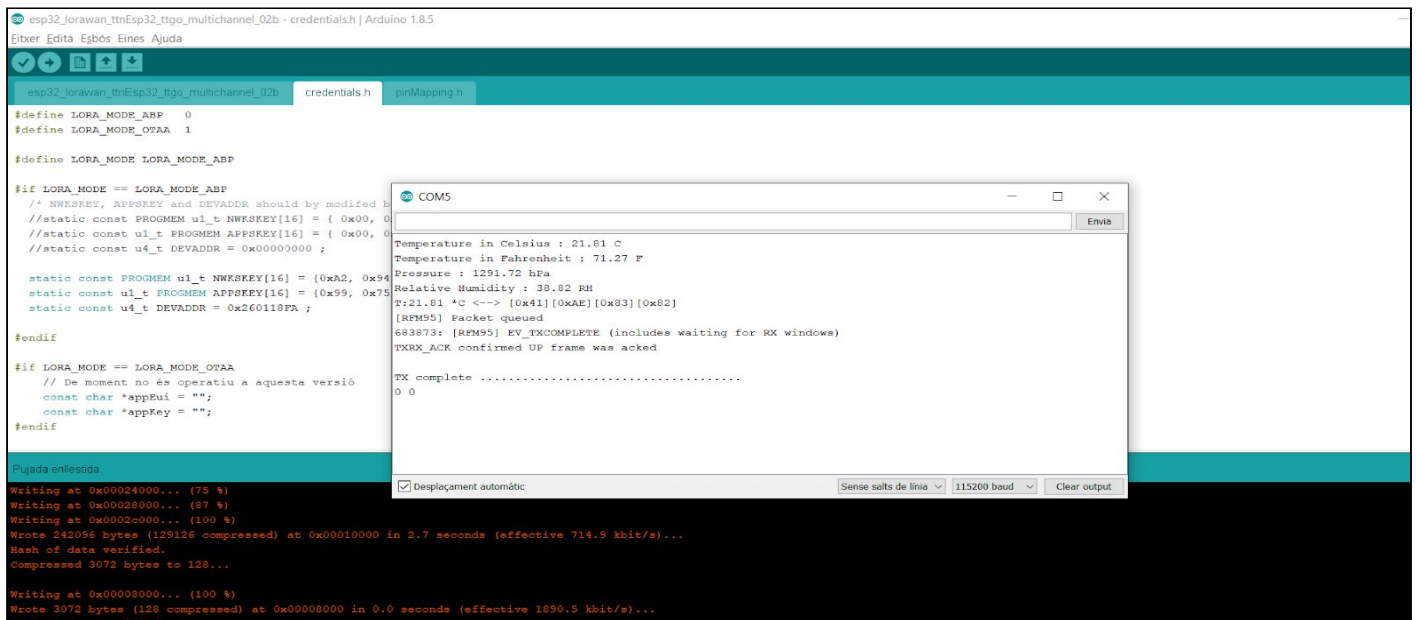

Nom i Cognoms

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Data

10-02-2020

- Apretem el botó de la placa ESP-32



```

esp32_lorawan_ttnEsp32_ttn_multichannel_02b - credentials.h | Arduino 1.8.5
Edit Edit Esgs Eines Ajuda

esp32_lorawan_ttnEsp32_ttn_multichannel_02b credentials.h pinMapping.h

#define LORA_MODE_ABP 0
#define LORA_MODE_OTAA 1

#define LORA_MODE LORA_MODE_ABP

#if LORA_MODE == LORA_MODE_ABP
/* NWSEKEY, APPKEY and DEVADDR should be modified by user
//static const PROGMEM u1_t NWSEKEY[16] = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
//static const u1_t PROGMEM APPKEY[16] = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x07, 0x08, 0x09, 0x0A, 0x0B, 0x0C, 0x0D, 0x0E, 0x0F };
//static const u4_t DEVADDR = 0x00000000;

static const PROGMEM u1_t NWSEKEY[16] = {0xA2, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94};
static const u1_t PROGMEM APPKEY[16] = {0x99, 0x75, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94, 0x82, 0x94};
static const u4_t DEVADDR = 0x260118FA;

#endif

#if LORA_MODE == LORA_MODE_OTAA
// De moment no és operatiu a aquesta versió
const char *appEui = "";
const char *appKey = "";
#endif

Pujada enviada.
Writing at 0x00024000... (75 %)
Writing at 0x00028000... (87 %)
Writing at 0x0002c000... (100 %)
Wrote 242096 bytes (129126 compressed) at 0x00010000 in 2.7 seconds (effective 714.9 kbit/s)...
Hash of data verified.
Compressed 3072 bytes to 128...
Writing at 0x00008000... (100 %)
Wrote 3072 bytes (128 compressed) at 0x00008000 in 0.0 seconds (effective 1850.5 kbit/s)...

```

COM5

```

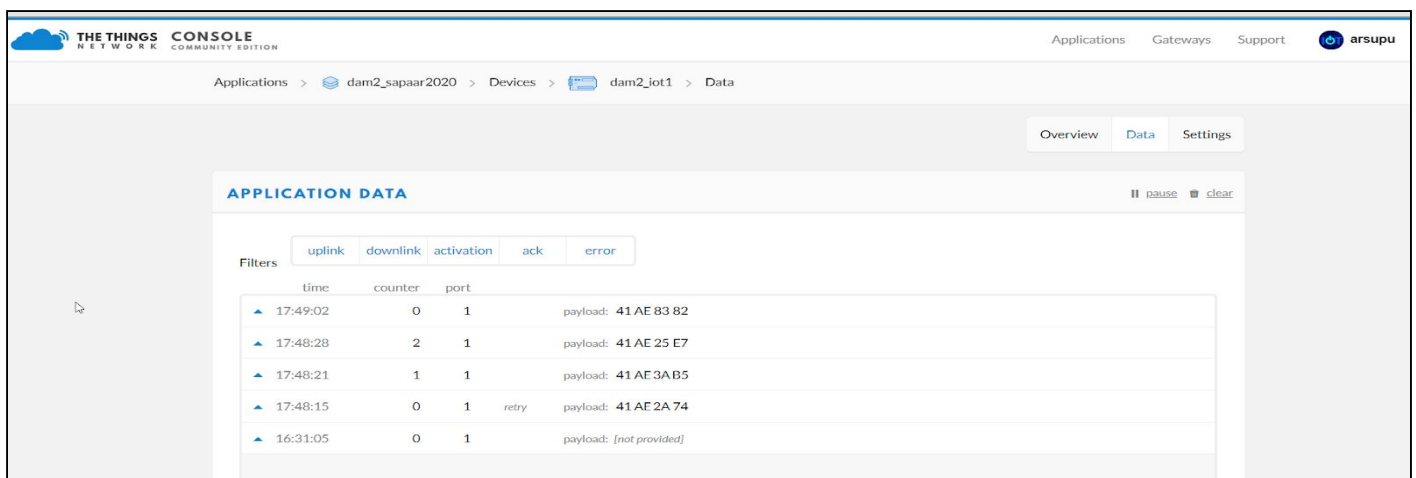
Temperature in Celsius : 21.81 C
Temperature in Fahrenheit : 71.27 F
Pressure : 1291.72 hPa
Relative Humidity : 38.82 RH
T:21.81 *C <--> [0x41][0xAE][0x83][0x82]
[RFM95] Packet queued
683873: [RFM95] EV_TXCOMPLETE (includes waiting for RX windows)
TXRX_ACK confirmed UP frame was acked

TX complete .....
0 0

```

Desplacament automàtic Sense salts de línia 115200 baud Clear output

- Accedim com usuari registrat a <https://www.thethingsnetwork.org/> , seleccionem l'opció “console” i seleccionem l'aplicació creada, posteriorment escollim “application data” on es confirmem que està rebent dades de la placa esp-32.



THE THINGS NETWORK CONSOLE COMMUNITY EDITION

Applications > dam2_sapaar2020 > Devices > dam2_iot1 > Data

Overview Data Settings

APPLICATION DATA

Filters: uplink downlink activation ack error

time	counter	port	payload
17:49:02	0	1	payload: 41 AE 83 82
17:48:28	2	1	payload: 41 AE 25 E7
17:48:21	1	1	payload: 41 AE 3AB5
17:48:15	0	1	retry payload: 41 AE 2A 74
16:31:05	0	1	payload: [not provided]

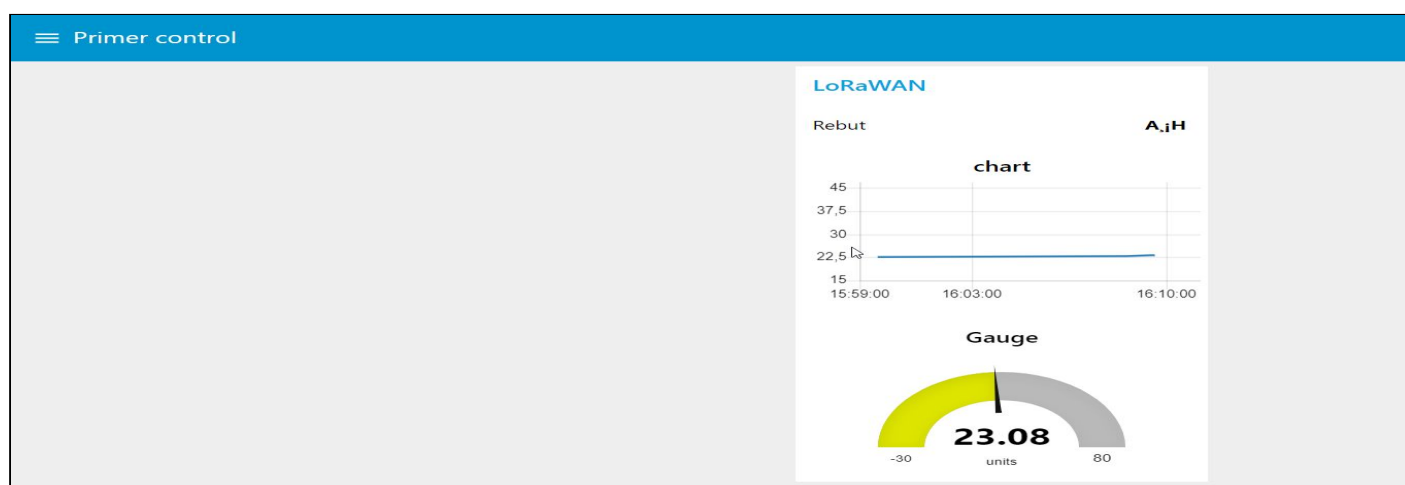
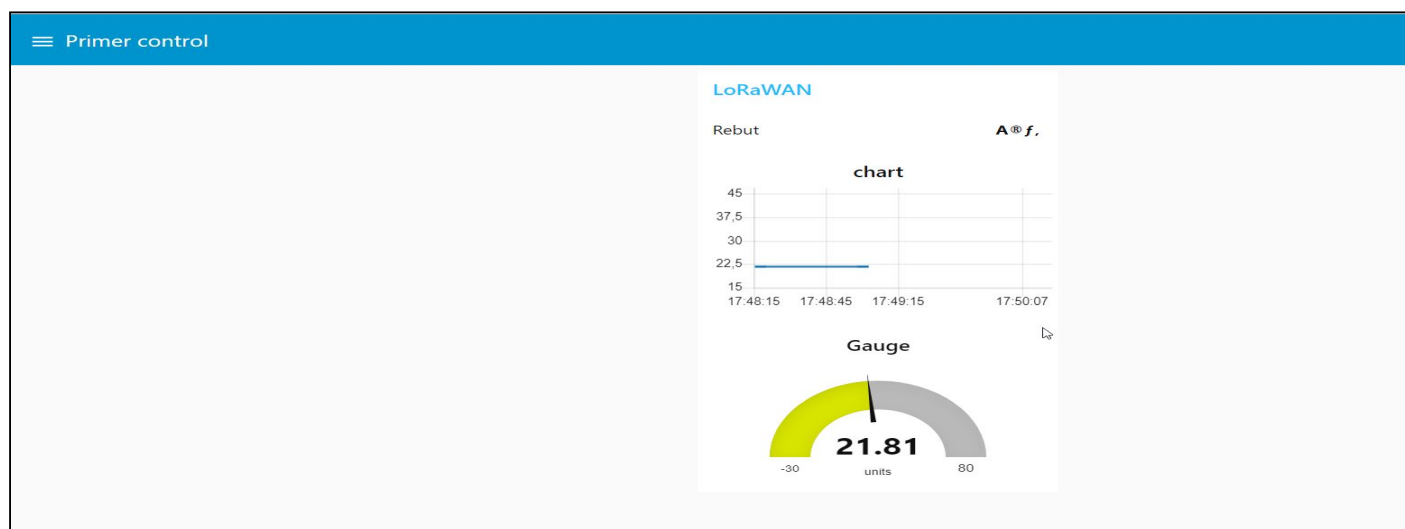
Nom i Cognoms

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Data

10-02-2020

- Visualitzem en el Dashboard de Node-Red



Nom i Cognoms

Data

Arnau Subirós Puigarnau

10-02-2020

Ampliació 28/01/2020

- Afegim les dades al INFLUXDB .
 - Windows 10 - Primer de tot activem el servidor

```
D:\InfluxDB\influxdb-1.7.9-1\influx.exe

88888888      d888 888      88888888b. 8888888b.
888      d88P" 888      888  "Y88b 888  "88b
888      888  888      888  888 888  .88P
888 888888b. 888888 888 888 888 888 888 88888888K.
888 888 "88b 888 888 888 888 Y8bd8P" 888 888 888 "Y88b
888 888 888 888 888 888 888 X88K 888 888 888 888
888 888 888 888 888 Y88b 888 .d8""8b. 888 .d88P 888 d88P
88888888 888 888 888 888 "Y88888 888 888 8888888P" 88888888P"

2020-01-28T14:16:05.606709Z info InfluxDB starting {"log_id": "0Kc7~6uG000", "version": "1.7.9", "branch":
"1.7", "commit": "23bc63d43a8dc05f53afa46e3526ebb5578f3d88"}
2020-01-28T14:16:05.620867Z info Go runtime {"log_id": "0Kc7~6uG000", "version": "go1.12.6", "maxprocs": 12}

2020-01-28T14:16:05.797738Z info Using data dir {"log_id": "0Kc7~6uG000", "service": "store", "path": "C:\\Users
\\arnau\\.influxdb\\data"}
2020-01-28T14:16:05.798758Z info Compaction settings {"log_id": "0Kc7~6uG000", "service": "store", "max_concu
rrent_compactions": 6, "throughput_bytes_per_second": 50331648, "throughput_bytes_per_second_burst": 50331648}
2020-01-28T14:16:05.798758Z info Open store (start) {"log_id": "0Kc7~6uG000", "service": "store", "trace_id"
: "0Kc7~78w000", "op_name": "tsdb_open", "op_event": "start"}
2020-01-28T14:16:05.884816Z info Reading file {"log_id": "0Kc7~6uG000", "engine": "tsm1", "service": "cachelo
ader", "path": "C:\\Users\\arnau\\.influxdb\\wal\\_internal\\monitor\\10\\_00001.wal", "size": 403412}
2020-01-28T14:16:05.884816Z info Reading file {"log_id": "0Kc7~6uG000", "engine": "tsm1", "service": "cachelo
ader", "path": "C:\\Users\\arnau\\.influxdb\\wal\\_internal\\monitor\\7\\_00001.wal", "size": 7012205}
2020-01-28T14:16:05.904763Z info Opened file {"log_id": "0Kc7~6uG000", "engine": "tsm1", "service": "filestor
e", "path": "C:\\Users\\arnau\\.influxdb\\data\\_internal\\monitor\\6\\000000003-000000002.tsm", "id": 0, "duration": "1
q 947ms"}
q 947ms"
```

- Accedim al usuari iot

```
D:\InfluxDB\influxdb-1.7.9-1\influx.exe

Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> show databases
name: databases
name
----
_internal
aula507
test01
ldrDB
iot2020
> create database iot2020
> show databases
name: databases
name
----
_internal
aula507
test01
ldrDB
iot2020
> GRANT ALL ON "iot2020" TO "iot"
> GRANT READ ON "iot2020" TO "convidat"
```

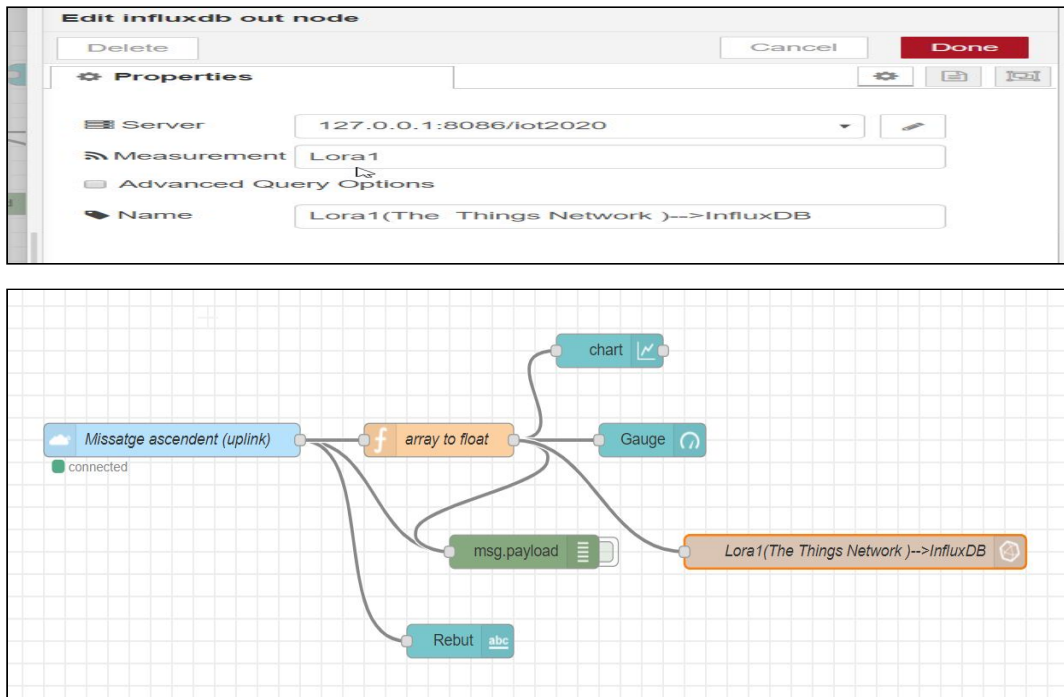
Nom i Cognoms

Arnau Subirós Puigarnau

Data

10-02-2020

- Afegim un node per emmagatzemar les dades a InfluxDB



- Accedim a InfluxDB com usuari **iot** i visualizem les dades de la base de dades **iot2020**

```

Indicador d'ordres - influx -username iot -password iot
D:\InfluxDB\influxdb-1.7.9-1>dir
El volumen de la unidad D es Data
El número de serie del volumen es: 1453-DA8F
Directorio de D:\InfluxDB\influxdb-1.7.9-1
12/01/2020 18:41 <DIR> .
12/01/2020 18:41 <DIR> ..
12/10/2019 23:32 56.042.496 influx.exe
12/10/2019 23:32 67.971.073 influx.exe drecera.lnk
12/10/2019 23:32 21.309 influxd.exe drecera.lnk
12/10/2019 23:32 19.516.416 influxdb.conf
12/10/2019 23:32 11.612.160 influx_inspect.exe
12/10/2019 23:32 21.034.496 influx_stress.exe
12/10/2019 23:32 21.034.496 influx_tsm.exe
8 archivos 176.199.490 bytes
2 dirs 460.523.868.160 bytes libres
D:\InfluxDB\influxdb-1.7.9-1>influx -username iot -password iot
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> show databases
name: databases
----
internal
aula507
test01
ldrdb
iot2020
> use iot2020
Using database iot2020
  
```

Nom i Cognoms

Arnau Subirós Puigarnau

Data

10-02-2020

```

C:\> Indicador d'ordres - influx -username iot -password iot

12/01/2020 18:41 <DIR> .
12/01/2020 18:41 <DIR> ..
27/10/2019 23:32 56.042.496 influx.exe
12/01/2020 18:41 768 influx.exe drecera.lnk
27/10/2019 23:32 67.971.072 influxd.exe
12/01/2020 18:40 773 influxd.exe drecera.lnk
27/10/2019 23:32 21.309 influxdb.conf
27/10/2019 23:32 19.516.416 influx_inspect.exe
27/10/2019 23:32 11.612.160 influx_stress.exe
27/10/2019 23:32 21.034.496 influx_tsm.exe
8 archivos 176.199.490 bytes
2 dirs 460.523.868.160 bytes llibres

D:\InfluxDB\influxdb-1.7.9-1>influx -username iot -password iot
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> show databases
name: databases
name
----
_ininternal
aula507
test01
ldrDB
iot2020
> use iot2020
Using database iot2020
> select * from Lora1
name: Lora1
time value
----
1580223578561308900 22.59
1580224105732222400 22.95
1580224112386221950 22.94
1580224165838094500 23.06
1580224175493695700 23.08

```

- Accedim a Grafana com usuari [admin](#)

Nom i Cognoms

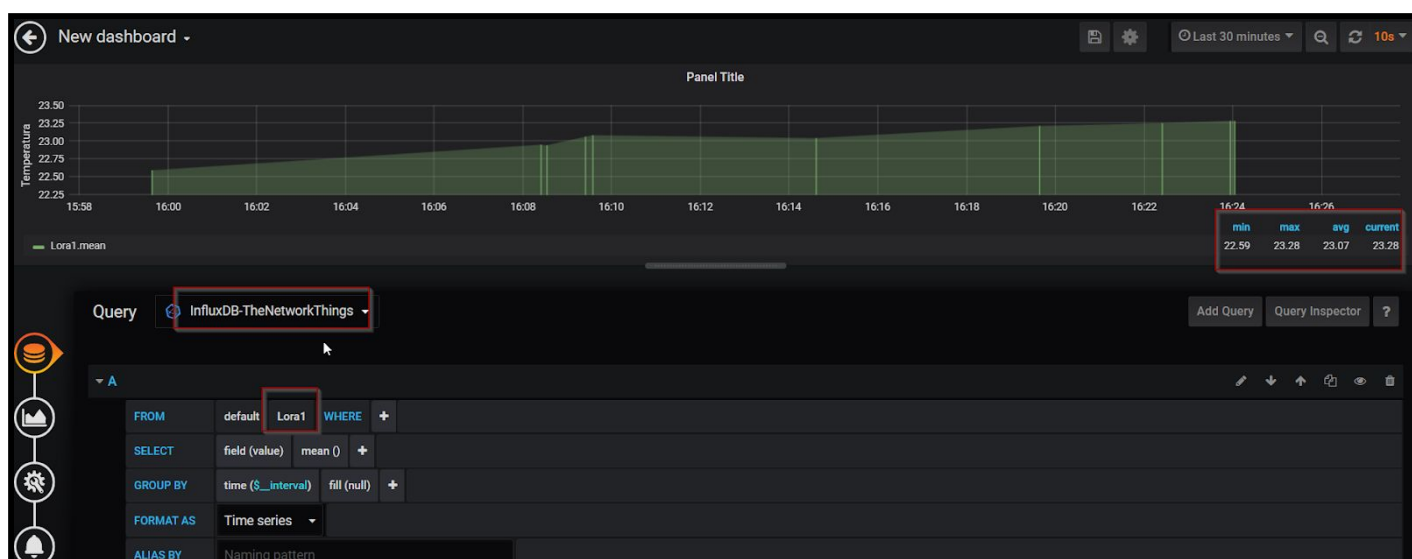
Arnau Subirós Puigarnau

Data

10-02-2020

- Configurem la base de dades(anteriorment hem seleccionat que faríem servir InfluxDB)

- Confirmem que s'ha configurat correctament



Nom i Cognoms


Arnau Subirós Puigarnau

Data

10-02-2020

Ampliació 03/02/2020

- _Per repassar, hem creat un nou dispositiu, ja que per error el dispositiu de la pràctica es va eliminar.

Applications >  dam2_arsupu

Overview Devices Payload Formats Integrations Data Settings

APPLICATION OVERVIEW

[documentation](#)

Application ID dam2_arsupu

Description TESTER - The Things Network


Created 32 minutes ago


Handler ttn-handler-eu (current handler)

Application ID dam2_arsupu


Device ID arnau_device



Activation Method ABP


Device EUI <> ⇄ 00 D4 7E 68 68 65 A6 DB 

Application EUI <> ⇄ 70 B3 D5 7E D0 02 9D 3A 

Device Address <> ⇄ 26 01 14 DD 

Network Session Key <> ⇄  

App Session Key <> ⇄  

Status  2 minutes ago

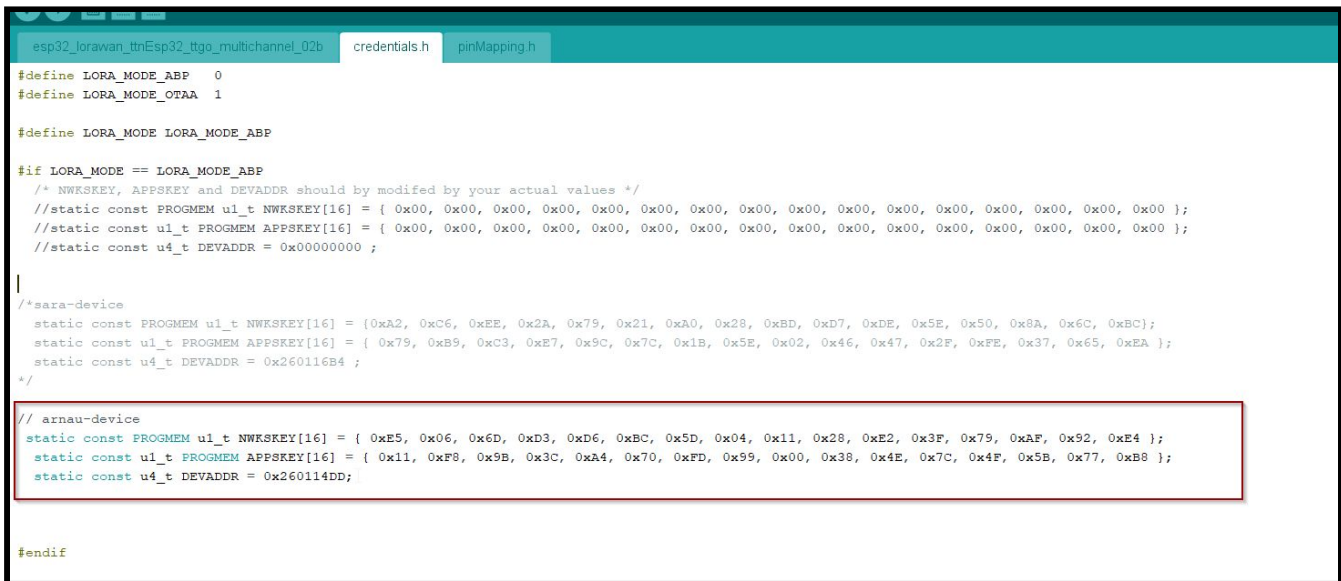
Nom i Cognoms

Arnau Subirós Puigarnau

Data

10-02-2020

- El el arduino IDE hem d'afegir les claus del dispositiu : Device Address, Network Key, App Session Key



```
esp32_forawan_ttnEsp32_ttgo_multichannel_02b  credentials.h  pinMapping.h

#define LORA_MODE_ABP 0
#define LORA_MODE_OTAA 1

#define LORA_MODE LORA_MODE_ABP

#if LORA_MODE == LORA_MODE_ABP
/* NWKSKEY, APPSKEY and DEVADDR should be modified by your actual values */
//static const PROGMEM u1_t NWKSKEY[16] = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };
//static const u1_t PROGMEM APPSKEY[16] = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00 };
//static const u4_t DEVADDR = 0x00000000 ;

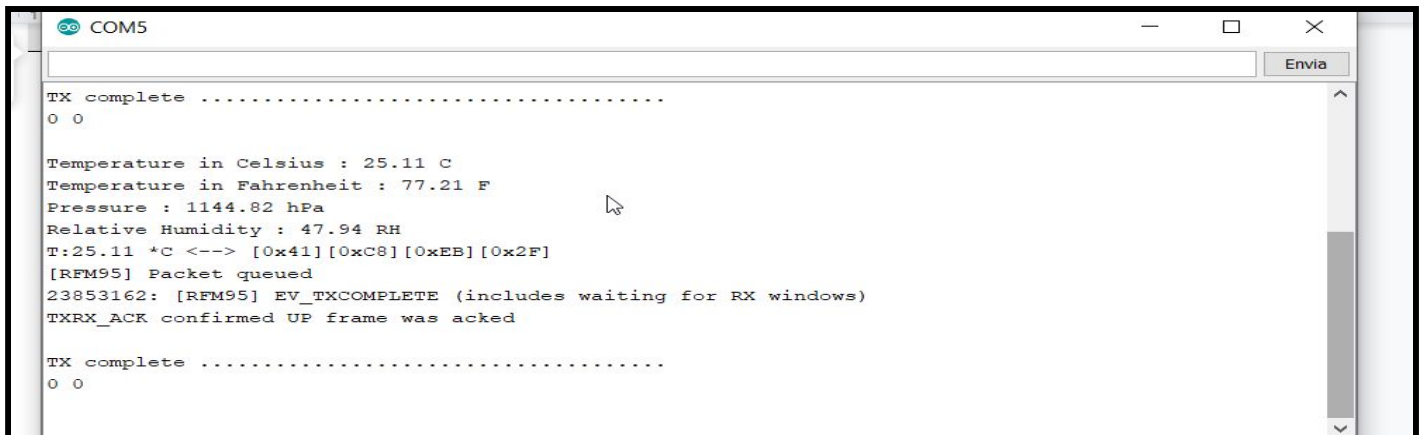
|

/*sara-device
static const PROGMEM u1_t NWKSKEY[16] = { 0xA2, 0xC6, 0xEE, 0x2A, 0x79, 0x21, 0xA0, 0x28, 0xBD, 0xD7, 0xDE, 0x5E, 0x50, 0x8A, 0x6C, 0xBC };
static const u1_t PROGMEM APPSKEY[16] = { 0x79, 0xB9, 0xC3, 0xE7, 0x9C, 0x7C, 0x1B, 0x5E, 0x02, 0x46, 0x47, 0x2F, 0xFE, 0x37, 0x65, 0xEA };
static const u4_t DEVADDR = 0x260116B4 ;
*/

// arnau-device
static const PROGMEM u1_t NWKSKEY[16] = { 0xE5, 0x06, 0x6D, 0xD3, 0xD6, 0xBC, 0x5D, 0x04, 0x11, 0x28, 0xE2, 0x3F, 0x79, 0xAF, 0x92, 0xE4 };
static const u1_t PROGMEM APPSKEY[16] = { 0x11, 0xF8, 0x9B, 0x3C, 0xA4, 0x70, 0xFD, 0x99, 0x00, 0x38, 0x4E, 0x7C, 0x4F, 0x5B, 0x77, 0xB8 };
static const u4_t DEVADDR = 0x260114DD;

#endif
```

- Apretem el boto de la placa esp-32



```
COM5

TX complete .....
0 0

Temperature in Celsius : 25.11 C
Temperature in Fahrenheit : 77.21 F
Pressure : 1144.82 hPa
Relative Humidity : 47.94 RH
T:25.11 *C <--> [0x41][0xC8][0xEB][0x2F]
[RFM95] Packet queued
23853162: [RFM95] EV_TXCOMPLETE (includes waiting for RX windows)
TXRX_ACK confirmed UP frame was acked

TX complete .....
0 0
```

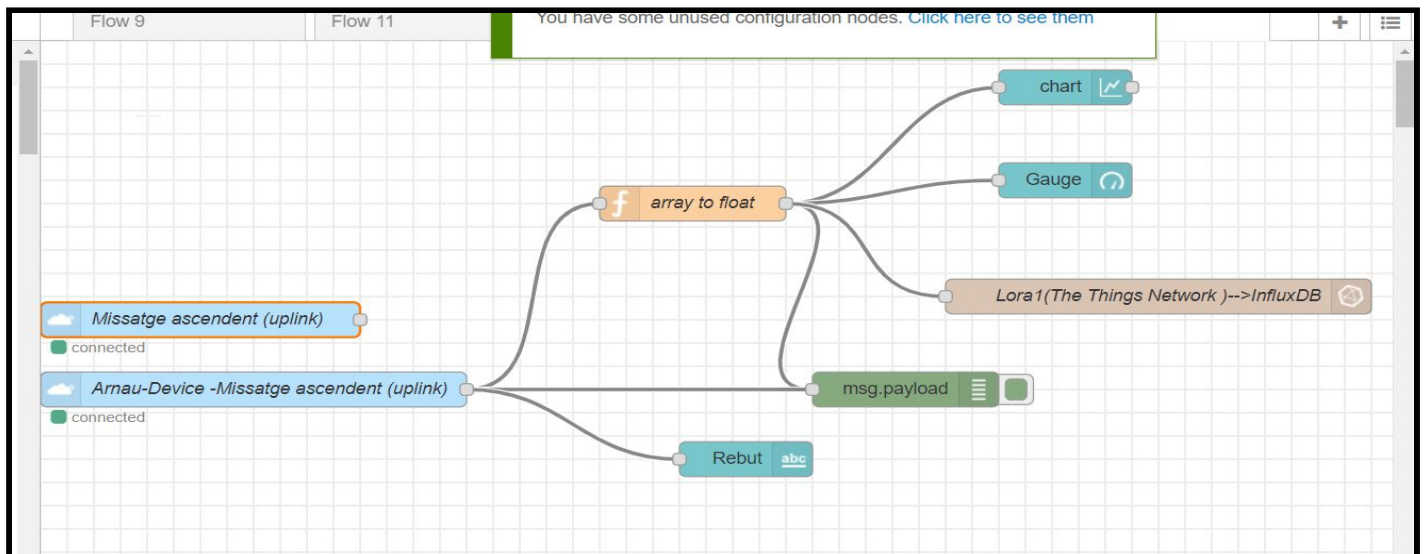

Nom i Cognoms

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Data

10-02-2020

- Configuració al Node-Red



- He tingut un problema al node-red, ja que el nom del dispositiu dam2_arsupu ja estava (el dispositiu que es va eliminar) , s'han eliminat i s'ha tornat a fer, solucionant el problema.
- Volem reflexar l'humitat i la pressió haurem de modificar el codi en el Arduino IDE

```

esp32_lorawan_ttnEsp32_ttnEsp32_multichannel_02b $ credentials.h pinMapping.h
109 // Prepare buffer
110 unsigned char data[4];
111 float fTc, fTf, fP, fRH;
112 //data[0] = (autoincrement >> 24) & 0xFF;
113 //data[1] = (autoincrement >> 16) & 0xFF;
114 //data[2] = (autoincrement >> 8) & 0xFF;
115 //data[3] = (autoincrement >> 0) & 0xFF;
116 //float2Bytes(fT,data);
117 vReadBME280(&fTc, &fTf, &fP, &fRH);
118 if (fTc > -10.f && fTc < 90.) {
119     Serial.print("T:");
120     Serial.print(fTc);
121     Serial.print(" *C <--> ");
122     float2Bytes(fTc, data);
123     for (int i = 0; i < 4; i++) {
124         Serial.print("[0x");
125         Serial.print(data[i], HEX);
126         Serial.print("]");
127     }
128     Serial.println();
129
130     // Prepare upstream data transmission at the next possible time.
131     // Parameters are port, data, length, confirmed
132     LMIC_setTxData2(1, data, 4, 0);
133
134     Serial.println(F("[RFM95] Packet queued"));
135 }

```

Nom i Cognoms

Data

Arnau Subirós Puigarnau

10-02-2020

```

Eitxer  Editar  Esborjar  Eines  Ajuda
[Icons]

esp32_lorawan_ttnEsp32_tigo_multichannel_02b$  credentials.h  pinMapping.h

309 // Prepare buffer
310 unsigned char data[12]; // s'ha de modificar 4 bytes Temperatura + 4 bytes Pressio +4 bytes Humitat
311 float fTc, fTf, fP, fRH;
312 //data[0] = (autoincrement >> 24) & 0xFF;
313 //data[1] = (autoincrement >> 16) & 0xFF;
314 //data[2] = (autoincrement >> 8) & 0xFF;
315 //data[3] = (autoincrement >> 0) & 0xFF;
316 //float2Bytes(fT,data);
317 vReadBME280(&fTc, &fTf, &fP, &fRH);
318 if (fTc > -10.f && fTc < 90.) {
319     Serial.print("T:");
320     Serial.print(fTc);
321     Serial.print(" *C <--> ");
322
323
324     float2Bytes(fTc, data);
325     float2Bytes(fP, &data[4]);
326     float2Bytes(fRH, &data[8]);
327
328     for (int i = 0; i < 12; i++) {
329         Serial.print("[0x");
330         Serial.print(data[i], HEX);
331         Serial.print("]");
332     }
333
334     Serial.println();
335
336 // Prepare upstream data transmission at the next possible time.
337 // Parameters are port, data, length, confirmed
338 LMIC_setTxData2(1, data, 12, 0);
339 //-----
340 Serial.println(F("[RFM95] Packet queued"));
341 }
342 //-----

```

```

X);

transmission a
ta, length, c
2, 0);
Packet queued
TX_COMPLETE

COM5
[Envia]

Temperature in Celsius : 22.80 C
Temperature in Fahrenheit : 73.03 F
Pressure : 1249.18 hPa
Relative Humidity : 52.11 RH
T:22.80 *C <--> [0x41][0xB6][0x5F][0x2E][0x44][0x9C][0x25][0xAD][0x42][0x50][0x70][0x45]
[RFM95] Packet queued
4135091: [RFM95] EV_TXCOMPLETE (includes waiting for RX windows)
TXRX_ACK confirmed UP frame was acked
TX complete .....
0 0

```

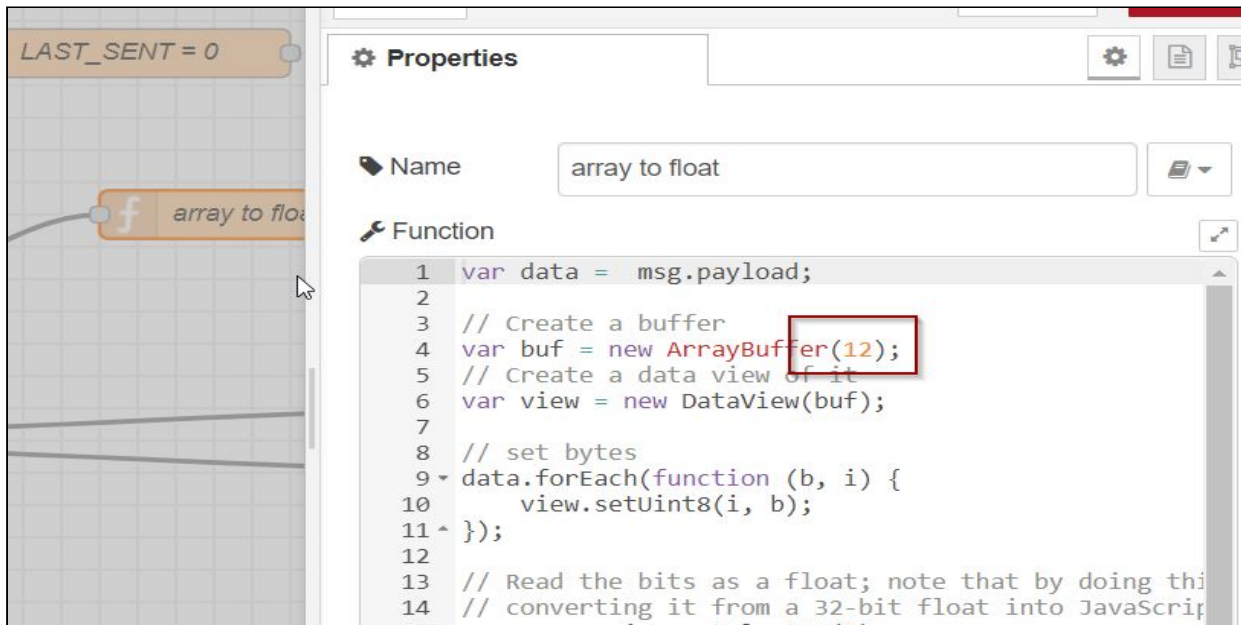
Nom i Cognoms

Arnau Subirós Puigarnau

Data

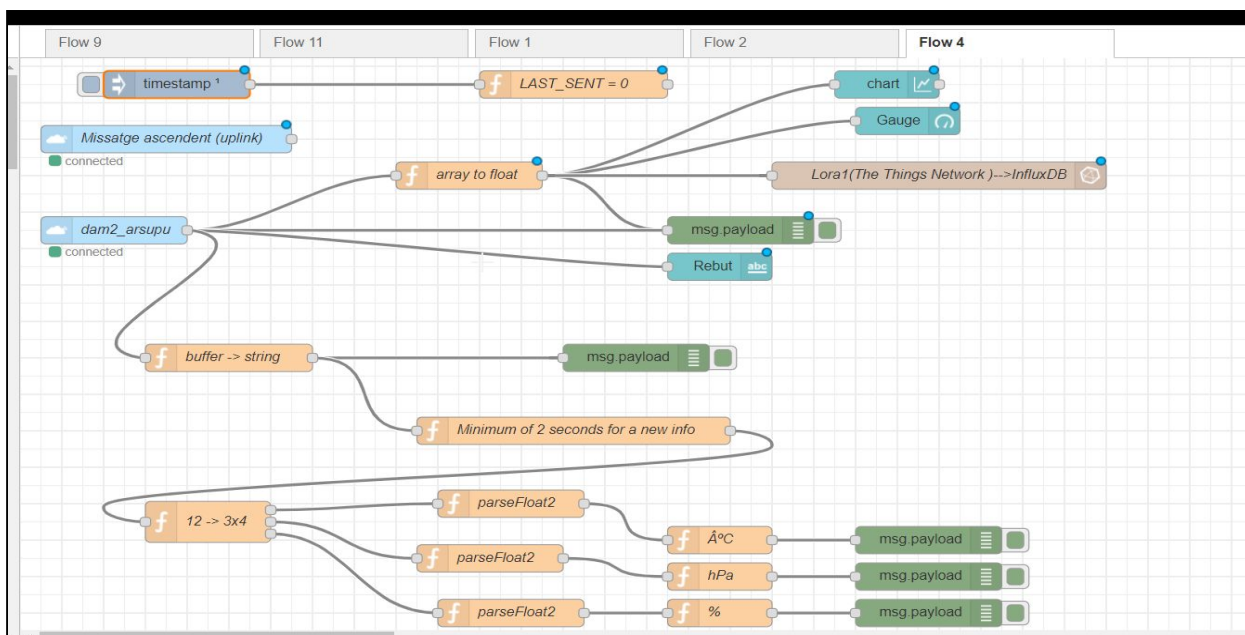
10-02-2020

- En el NODE-RED basant-nos en el codi
https://wiki.binefa.cat/index.php?title=Trametre_3_floats_en_12_bytes_i_visualitzar-los_al_NodeRED
 - Farem una sèrie de modificacions per poder visualitzar les tres variables



```

1 var data = msg.payload;
2
3 // Create a buffer
4 var buf = new ArrayBuffer(12);
5 // Create a data view of it
6 var view = new DataView(buf);
7
8 // set bytes
9 data.forEach(function (b, i) {
10     view.setUint8(i, b);
11 });
12
13 // Read the bits as a float; note that by doing this
14 // converting it from a 32-bit float into JavaScript
  
```



Nom i Cognoms

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Data

10-02-2020

Edit ttn uplink node

Delete Cancel Done

Properties

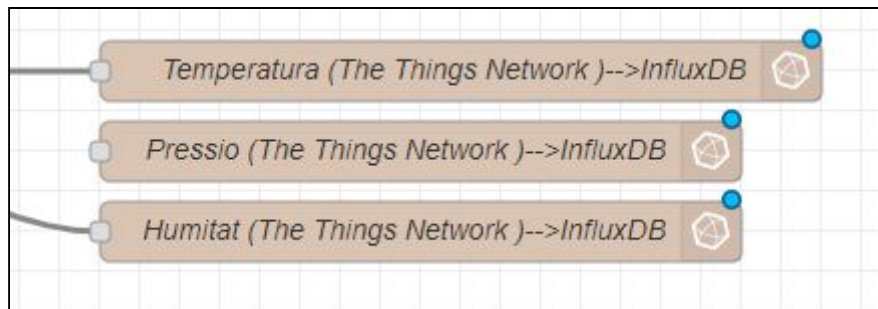
Name dam2_arsupu

App dam2_arsupu

Device ID arnau_device

Field

- Crearem 3 taules a la base de dades iot2020 ,anteriorment hi havia Lora1 per fer proves.



Nom i Cognoms

Arnau Subirós Puigarnau

Data

10-02-2020

Edit influxdb out node

Delete
Cancel
Done

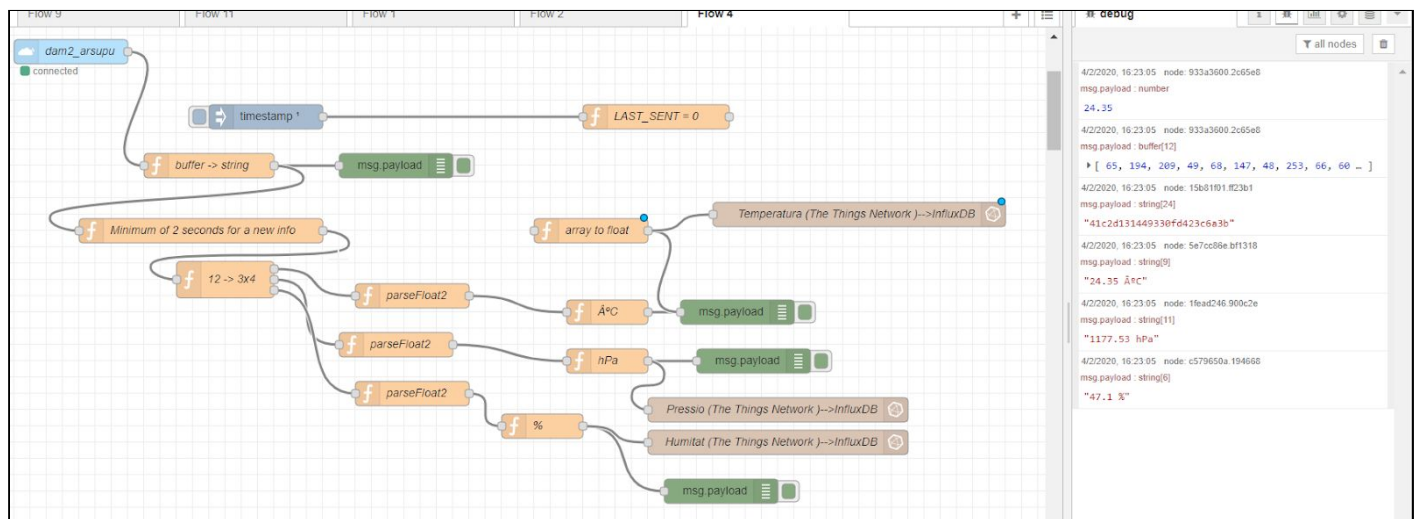
Properties

Server
127.0.0.1:8086/iot2020

Measurement
Temperatura

☐ Advanced Query Options

Name
Temperatura (The Things Network)-->InfluxDB



Nom i Cognoms

Data

Arnau Subirós Puigarnau

10-02-2020

- Accedim al InfluxDB com usuari iot per veure les dades emmagatzemades de temperatura, pressió i humitat

```

C:\> Indicador d'ordres - influx -username iot -password iot
Microsoft Windows [Versión 10.0.18363.628]
(c) 2019 Microsoft Corporation. Todos los derechos reservados.

C:\Users\arnau>D:

D:\>cd InfluxDB

D:\InfluxDB>cd influxdb-1.7.9-1

D:\InfluxDB\influxdb-1.7.9-1>influx -username iot -password iot
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> use iot2020
Using database iot2020
>

```

```

C:\> Indicador d'ordres - influx -username iot -password iot
1580748965033240500 25.43
select * from Temperatura
name: Temperatura
time: value
1580829171534085500 24.23
select * from Humitat
select * from Pressio
select * from Pressio
select * from Humitat
select * from Pressio
select * from Temperatura
name: Temperatura
time: value
1580829171534085500 24.23
1580829212387097300 24.2
select * from Pressio
name: Pressio
time: value
1580829408195995200 1183.63 hPa
select * from Pressio
name: Pressio
time: value
1580829408195995200 1183.63 hPa
1580829611829341400 1180.91 hPa
1580829652163091500 1179 hPa
1580829684828264000 1178.26 hPa
1580829755924137000 1175.29 hPa
1580829785718444800 1177.53 hPa
select * from Humitat
name: Humitat
time: value
1580829684829259300 47.41 %
1580829755925141300 47.71 %
1580829785718444800 47.1 %
>

```

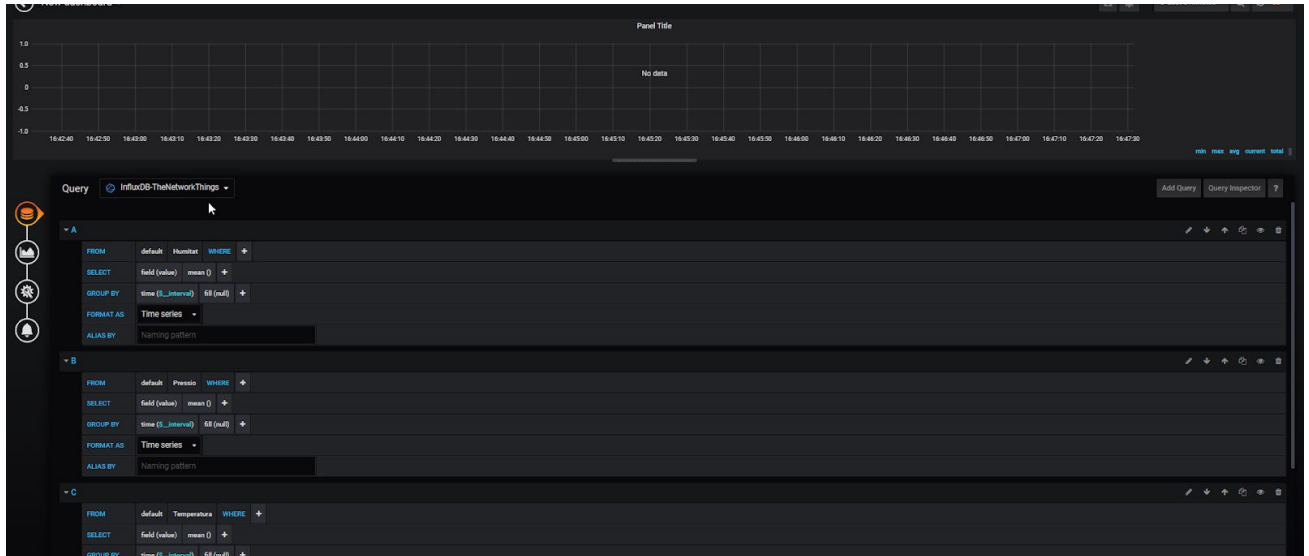
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Data

10-02-2020

- Errors per visualitzar-ho al Dashboard del Node-Red
- S'ha creat un Dashboard a grafana ja que l'InfluxDB hem aconseguit emmagatzemar les variables però de moment no em funciona



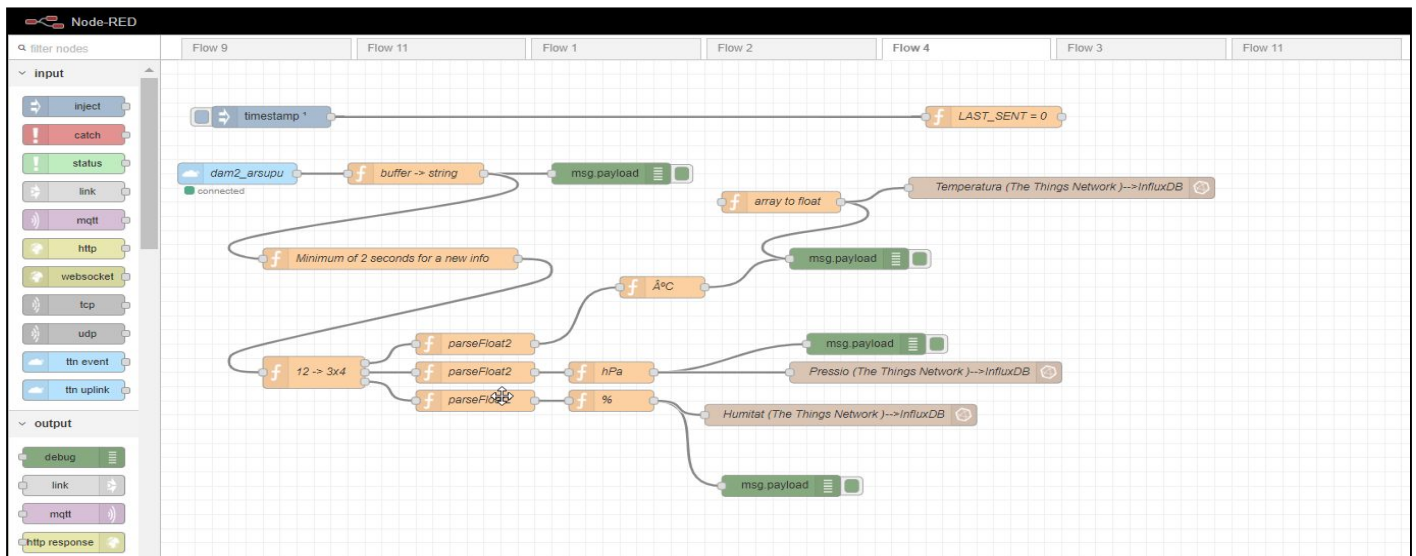
Nom i Cognoms

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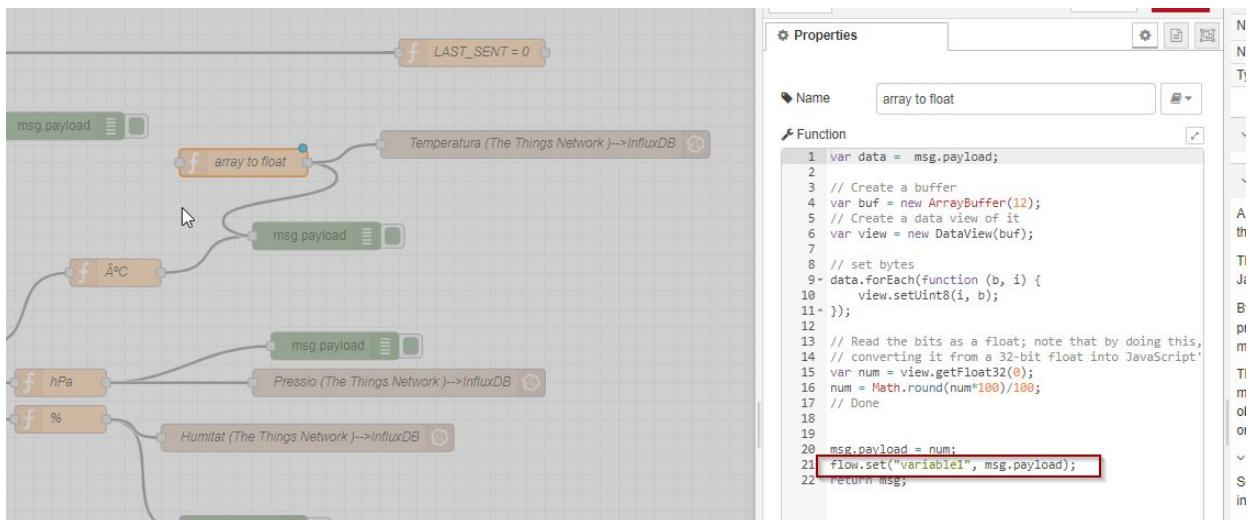
Data

10-02-2020

Ampliació 10/2/2020



- Modifiquem el node funcio : array to float afegim un setter



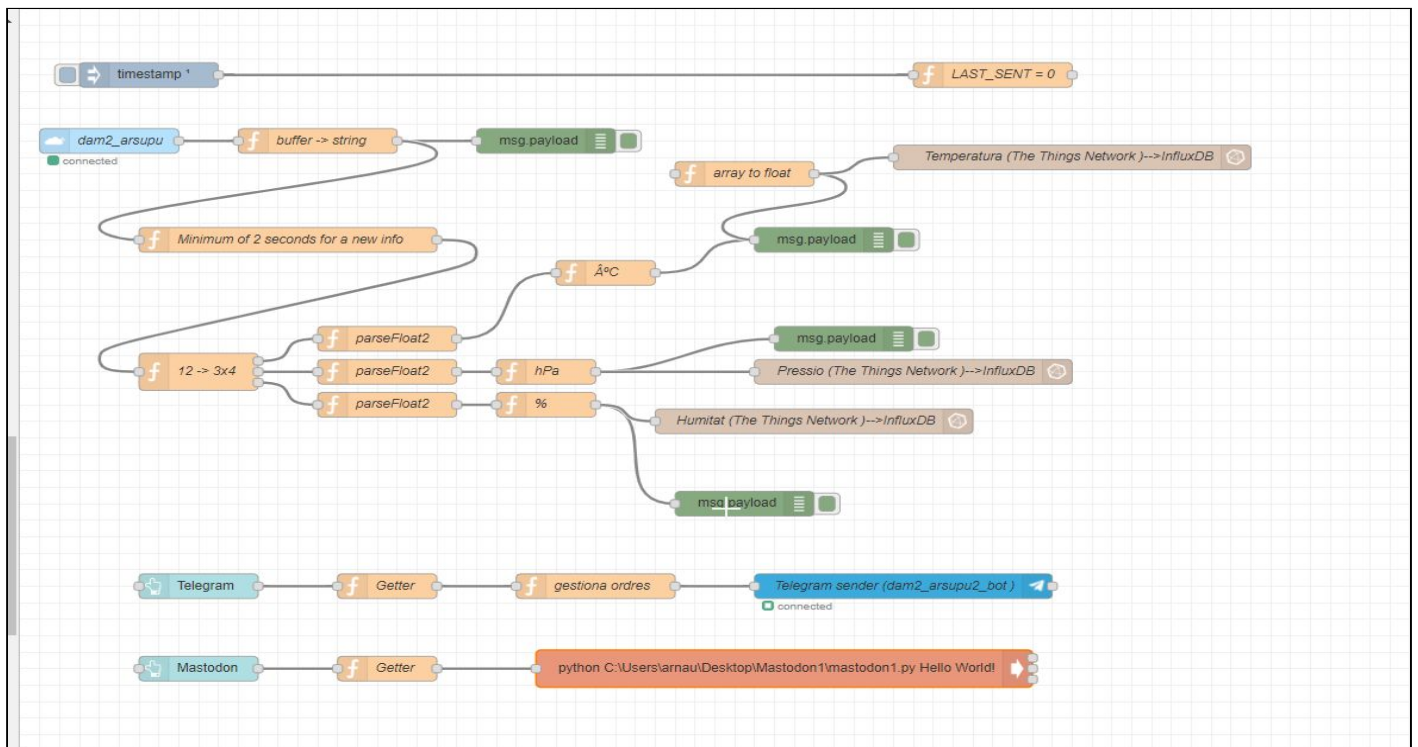
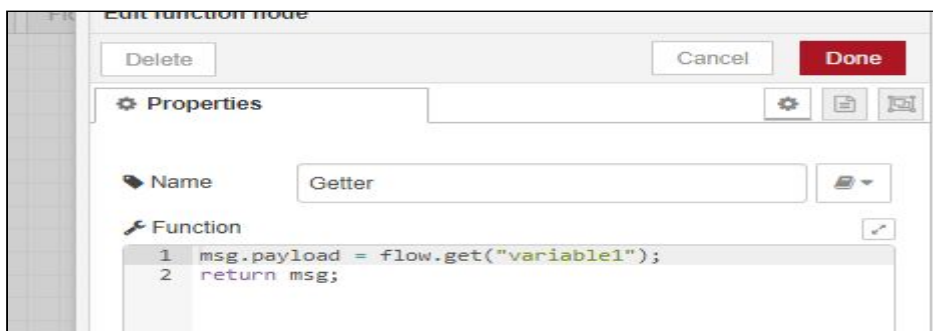
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Data

10-02-2020

- Crearem 2 botons(Telegram i Mastodon) , pel Dash Board de Node -Red un node ,utilitzant la variable anterior , crearem una funcio getter on:
 - (Telegram) la vinculem a : un node funcio on especificarem el id del chat (del bot o del grup) i ho enviarem al node "Telegram sender"
 - (Mastodon): la vinculem a un node exec on s'executa un programa amb llenguatge python on li pases un argument i s'envia a la compte ja configurada de Mastodon)



Nom i Cognoms

Arnau Subirós Puigarnau

Data

10-02-2020

☰ DAM2

ESP32-Lora

TELEGRAM

MASTODON