

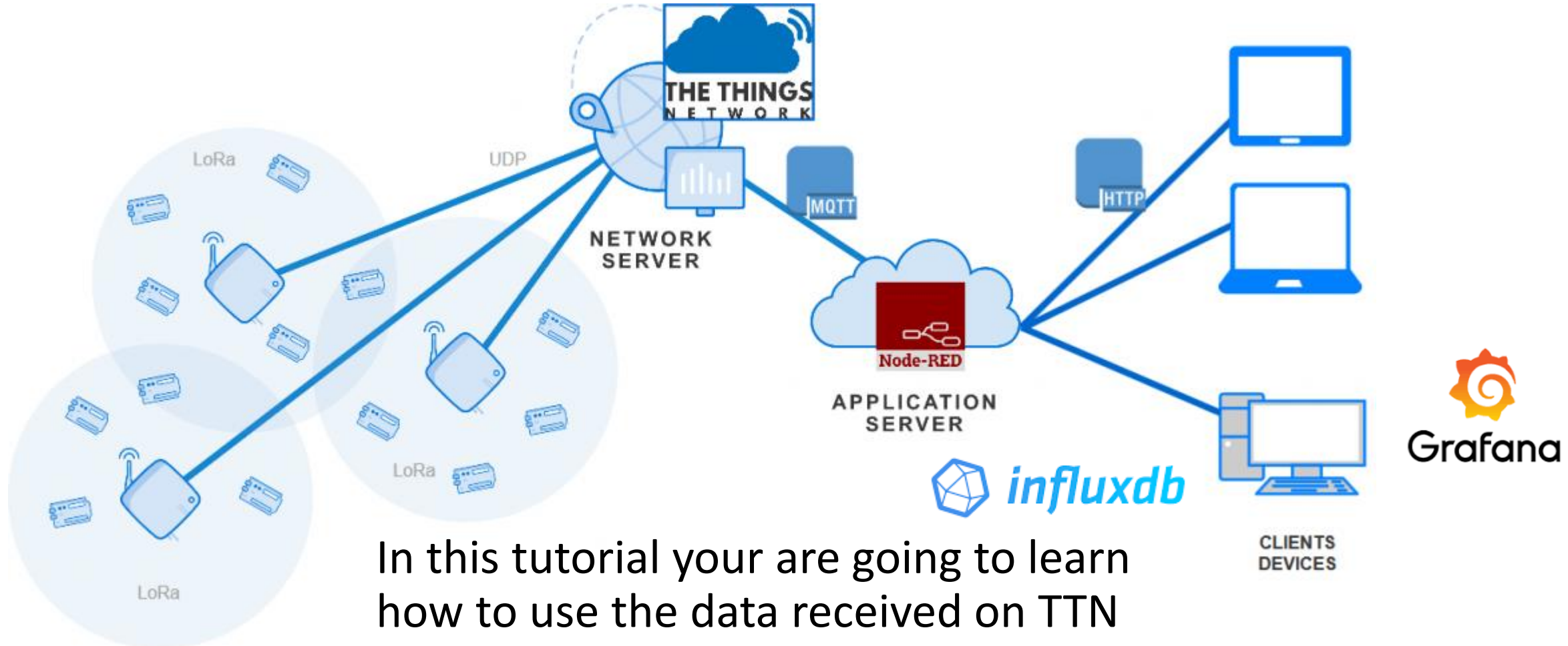
IoT LoRa application service Tutorial

F. Ferrero, J. Lanteri

V.1.3



Node Red – InFluxDB - GRAFANA

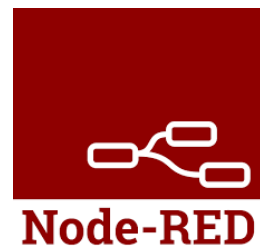


Outline

1/ Definition

2/ Tutorial

Node Red



- Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.
- It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palette that can be deployed to its runtime in a single-click.
- Built on Node.js
 - The light-weight runtime is built on Node.js, taking full advantage of its event-driven, non-blocking model. This makes it ideal to run at the edge of the network on low-cost hardware such as the Raspberry Pi as well as in the cloud.

Outline

1/ Definition

2/ Tutorial

Node-Red

First install Node.JS : <https://nodejs.org/en/download/>

Then : Install Node-red :

<https://nodered.org/docs/getting-started/windows>

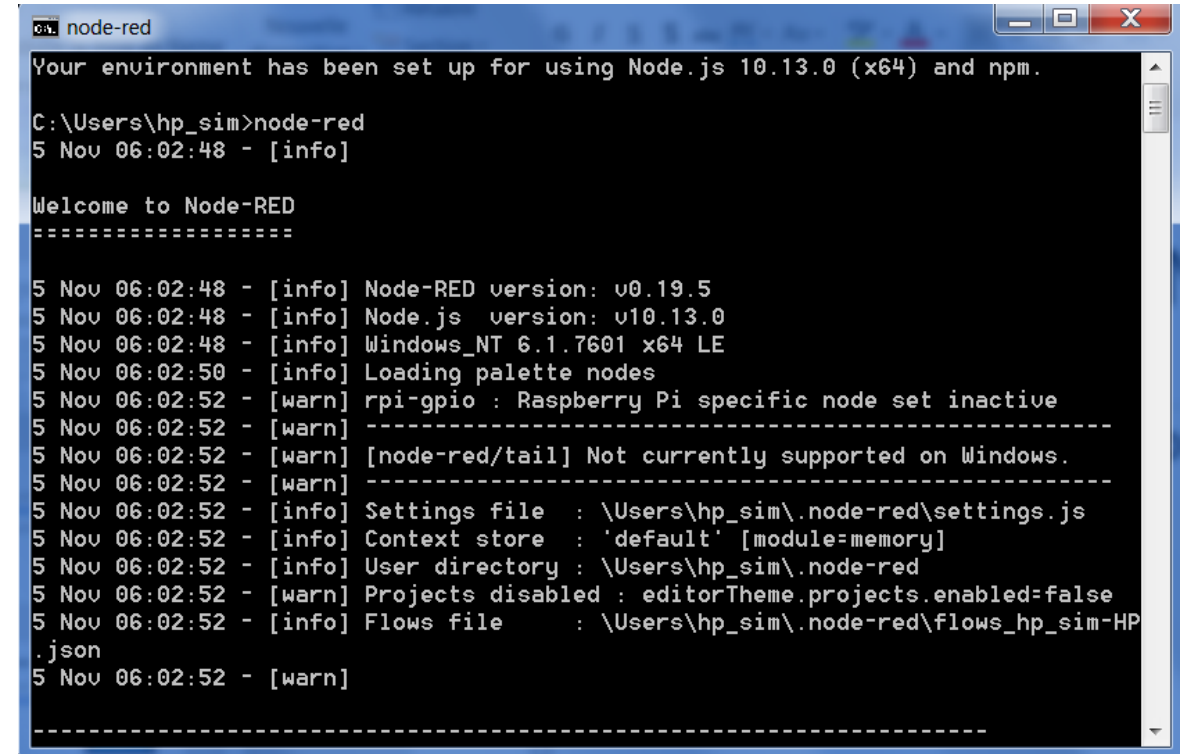
Install package in Node Red :

node-red-node-email

Install git : <https://git-scm.com/downloads>

Connecting to TTN

- Start NODE.js command prompt
- Run : node-red
- Open your web browser and go to <http://127.0.0.1:1880>



```
node-red
Your environment has been set up for using Node.js 10.13.0 (x64) and npm.

C:\Users\hp_sim>node-red
5 Nov 06:02:48 - [info]

Welcome to Node-RED
=====

5 Nov 06:02:48 - [info] Node-RED version: v0.19.5
5 Nov 06:02:48 - [info] Node.js version: v10.13.0
5 Nov 06:02:48 - [info] Windows_NT 6.1.7601 x64 LE
5 Nov 06:02:50 - [info] Loading palette nodes
5 Nov 06:02:52 - [warn] rpi-gpio : Raspberry Pi specific node set inactive
5 Nov 06:02:52 - [warn] -----
5 Nov 06:02:52 - [warn] [node-red/tail] Not currently supported on Windows.
5 Nov 06:02:52 - [warn] -----
5 Nov 06:02:52 - [info] Settings file   : \Users\hp_sim\.node-red\settings.js
5 Nov 06:02:52 - [info] Context store  : 'default' [module=memory]
5 Nov 06:02:52 - [info] User directory : \Users\hp_sim\.node-red
5 Nov 06:02:52 - [warn] Projects disabled : editorTheme.projects.enabled=false
5 Nov 06:02:52 - [info] Flows file     : \Users\hp_sim\.node-red\flows_hp_sim-HP
.json
5 Nov 06:02:52 - [warn] -----
```

Connecting to TTN

- You have the graphical Node-red editor
- Add mqtt in node
- Edit mqtt
- Choose « Add new mqtt-broker ... » in App and click on edit
- Output is a parsed JSON object

Name

Connection | Security | Messages

Server Port

☐ Enable secure (SSL/TLS) connection

Client ID

☒ Keep alive time (s) ☒ Use clean session

☐ Use legacy MQTT 3.1 support

The image shows the Node-RED graphical editor interface. On the left, a sidebar contains a palette of nodes. Under the 'network' category, the 'mqtt in' node is highlighted. In the main workspace, an 'mqtt' node is placed on a grid. A dialog box titled 'Edit mqtt in node' is open, showing the configuration for the selected node. The dialog has tabs for 'Properties', 'Security', and 'Messages'. The 'Properties' tab is active, showing fields for 'Server' (TTN), 'Topic' (v3/uca-project@ttn/devices/uca/up), 'QoS' (2), 'Output' (a parsed JSON object), and 'Name' (Name). The dialog also includes 'Delete', 'Cancel', and 'Done' buttons.

Connecting to TTN

- Update security and topic:
- Go to you application in TTN
- Copy past the User name and keys (generate new API Keys)
- Add topic :
`v3/uca-project@ttn/devices/device_name/up`

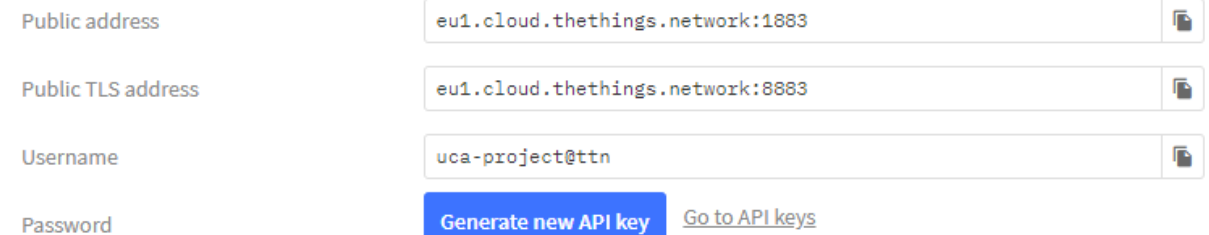


The screenshot shows the TTN application configuration interface. At the top, there is a 'Name' field with a small icon to its left. Below this are three tabs: 'Connection', 'Security', and 'Messages'. The 'Security' tab is currently selected. Under the 'Security' tab, there are two fields: 'Username' and 'Password'. The 'Username' field is empty, and the 'Password' field contains a series of dots, indicating it is masked.

MQTT

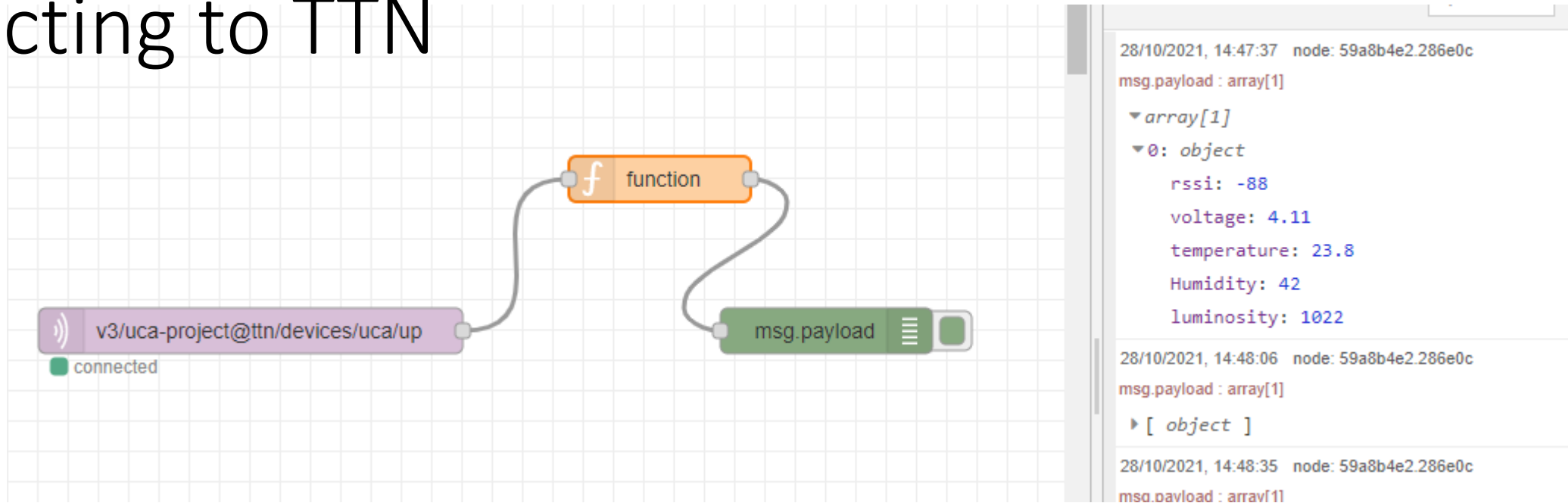
The Application Server exposes an MQTT server to work with streaming events. In order to use the MQTT server you need to create a new API key, which will function as connection password. You can also use an existing API key, as long as it has the necessary rights granted. Use the connection information below to connect.

Connection credentials



The screenshot shows the 'Connection credentials' section of the TTN interface. It contains four fields: 'Public address' with the value 'eu1.cloud.thethings.network:1883', 'Public TLS address' with the value 'eu1.cloud.thethings.network:8883', 'Username' with the value 'uca-project@ttn', and 'Password'. To the right of the 'Password' field is a blue button labeled 'Generate new API key' and a link labeled 'Go to API keys'.

Connecting to TTN

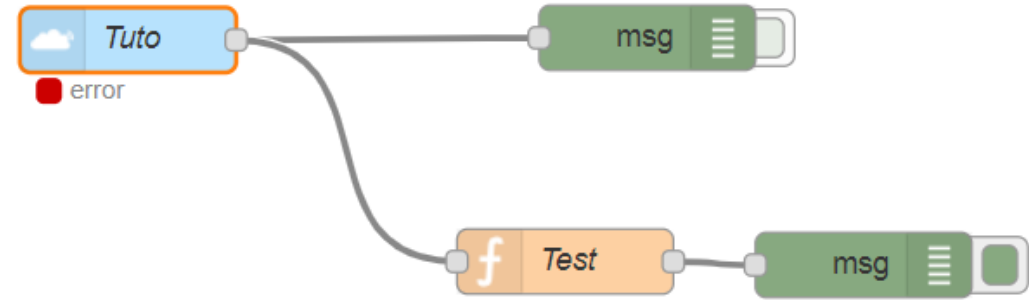


```
var logMsgs = [];  
logMsgs[0]=({payload: {  
rssi: msg.payload.uplink_message.rx_metadata[0].rssi,  
voltage: msg.payload.uplink_message.decoded_payload.analog_in_3,  
temperature: msg.payload.uplink_message.decoded_payload.temperature_1,  
humidity: msg.payload.uplink_message.decoded_payload.relative_humidity_2,  
luminosity: msg.payload.uplink_message.decoded_payload.luminosity_4  
}  
});  
return logMsgs;
```

Connecting to TTN

- If you want to extract only 1 data,
- As an exemple the RSSI (received signal Strength indicator
- Use a function to extract the desired data

```
var tmp = {};  
tmp.payload = msg.payload.uplink_message.decoded_payload.luminosity_4  
return tmp;
```



14/03/2021, 21:36:02 node: e0e31eb9.79c5e

msg : Object

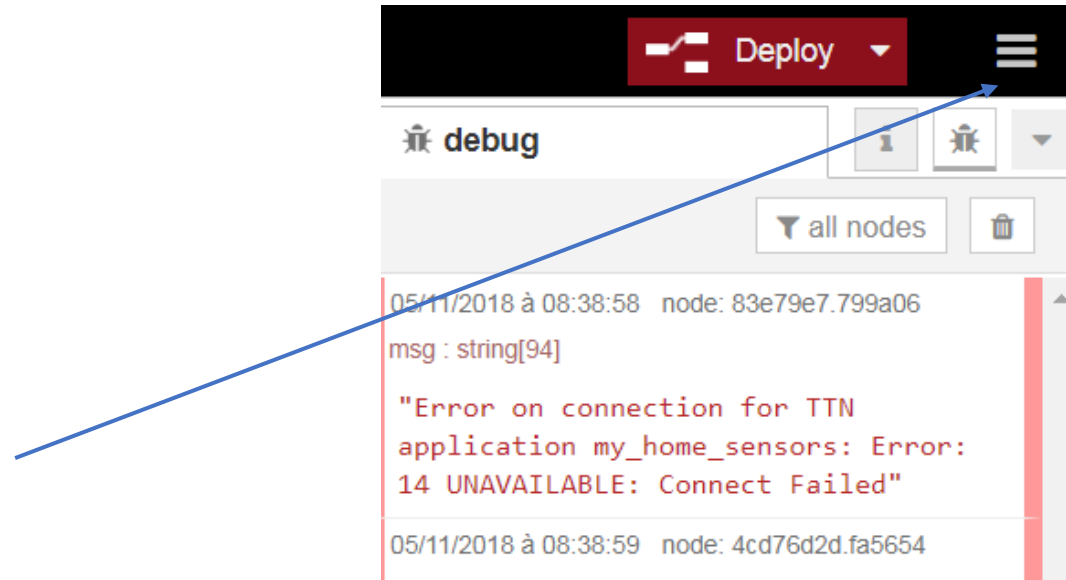
▼ object

payload: 241

_msgid: "572f7153.ffebf"

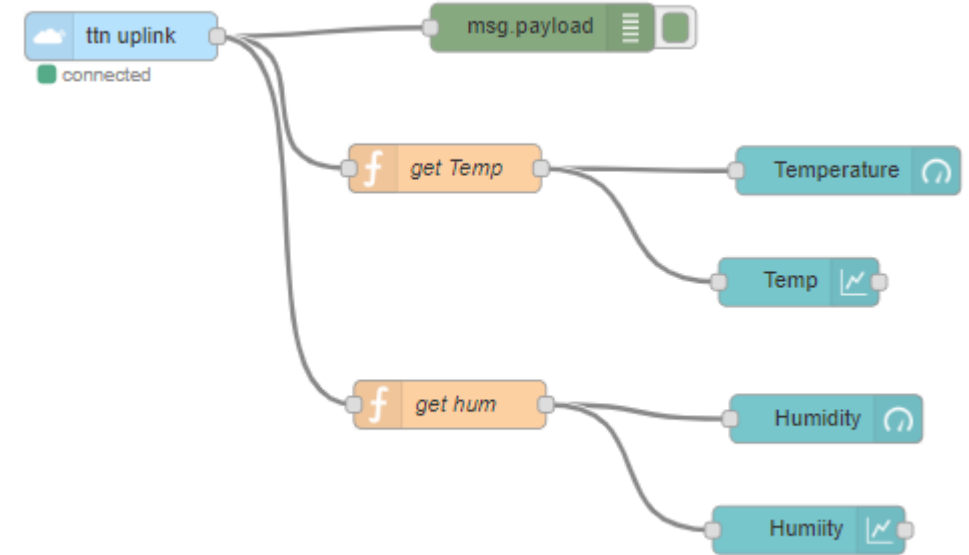
Connecting to TTN

- On the editor, click here
- And go to palette editor
- Install :
- node-red-dashboard



Add a Dashboard

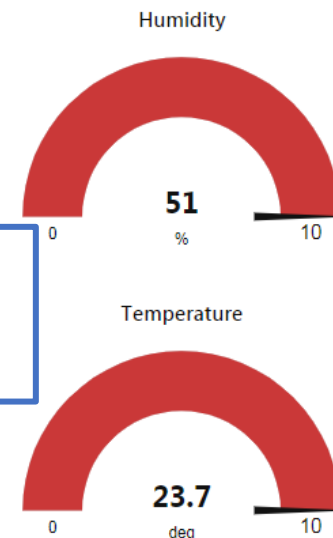
- Go to Manage Palette, select Install
- Install : node-red-dashboard
- Add a function to extract sensor values (Temp, Hum, luminosity...)
- Add Gauge and Graph for Dashboard section
- Add a new UI group in the Gauge and Graph
- Go to : <http://127.0.0.1:1880/ui/>



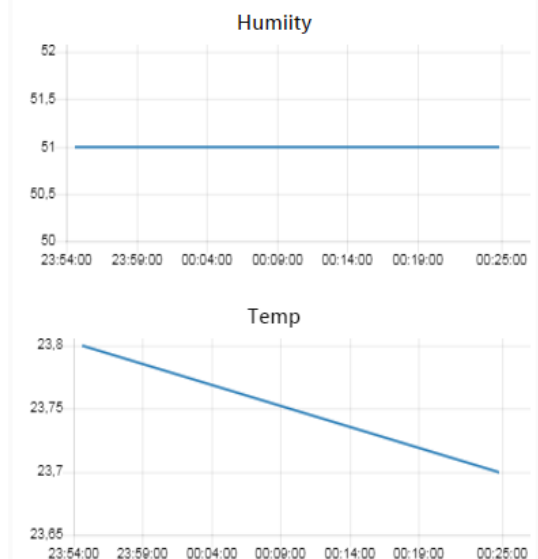
```
var tmp = {};  
tmp.payload = msg.payload.uplink_message.decoded_payload.luminosity_4  
return tmp;
```

```
var tmp = {};  
tmp.payload = msg.payload.uplink_message.decoded_payload.luminosity_4  
return tmp;
```

test

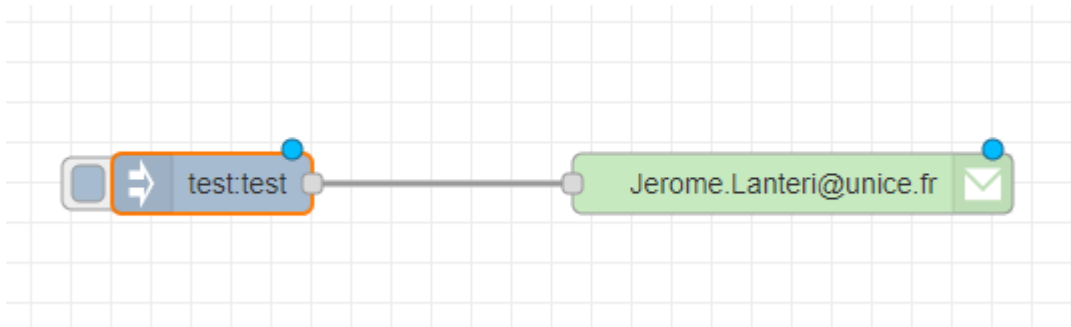


Test



Send an email

- Go to Manage Palette, select Install
- Install : node-red-node-email
- Configure your email with unice credential (use your ENT account)
- Use a timestamp to test (click to trigger it)
- Email object is defined in msg.topic
- Email content is defined in msg.payload



Edit email node

Delete

Cancel

Done

⚙ Properties

⚙

📄

🖼

✉ To

Jerome.Lanteri@unice.fr

🌐 Server

smtp.unice.fr

🔌 Port

587

☐ Use secure connection.

👤 Userid

ferrero@unice.fr

🔒 Password

.....

🔒 Use TLS?

☒

🏷 Name

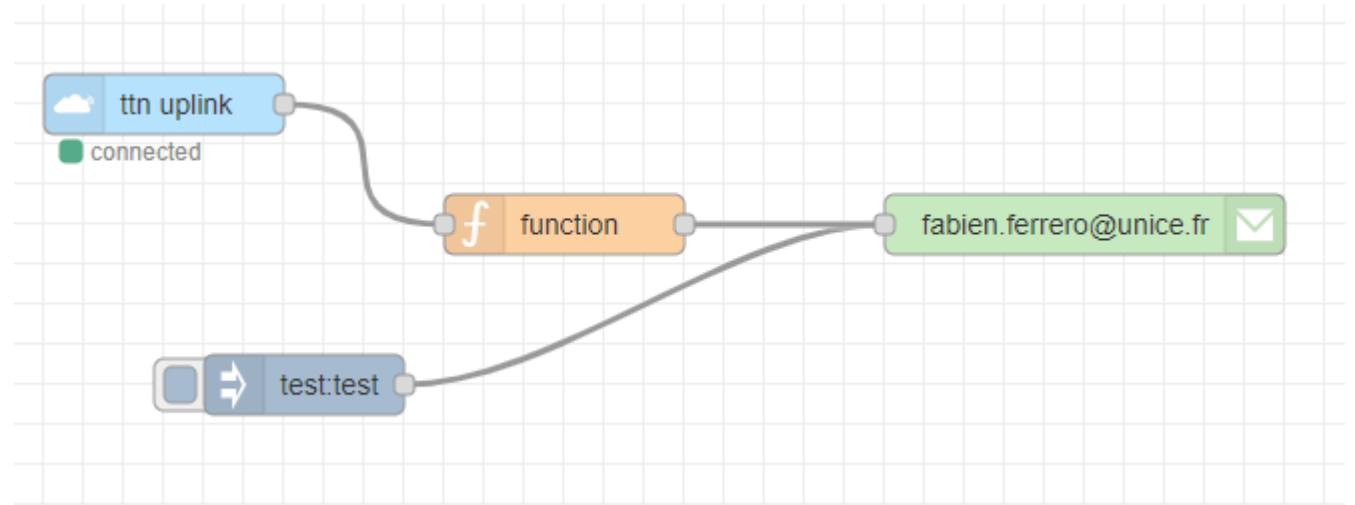
Name

Send an email triggered on luminosity level

- Add a function to detect if the luminosity overpass a threshold
- Send an email with a sentence

```
1 var tmp = {};  
2 var lum = msg.payload.uplink_message.decoded_payload.luminosity_4;  
3 tmp.topic = "information capteur";  
4 if (lum>200)  
5 tmp.payload = "il y a de la lumiere";  
6 else  
7 tmp.payload = "il n'y a pas de lumiere";  
8 return tmp;
```

```
var tmp = {};  
var lum  
=msg.payload.uplink_message.decoded_payload.luminosity_4;  
tmp.topic = "information capteur";  
if (lum>200)  
tmp.payload = "il y a de la lumiere";  
Else  
tmp.payload = "il n'y a pas de lumiere";  
return tmp;
```



Principale			Réseaux sociaux	Promotions
<input type="checkbox"/>	☆	➤ Fabien.Ferrero	Information sur le capteur - il n'y a pas de lumière	
<input type="checkbox"/>	☆	➤ Fabien.Ferrero	Information sur le capteur - il n'y a pas de lumière	
<input type="checkbox"/>	☆	➤ Fabien.Ferrero	Information sur le capteur - il y a de la lumière	
<input type="checkbox"/>	☆	➤ Fabien.Ferrero	Information sur le capteur - il y a de la lumière	
<input type="checkbox"/>	☆	➤ Fabien.Ferrero	Information sur le capteur - il y a de la lumière	

Good luck for your projects !

