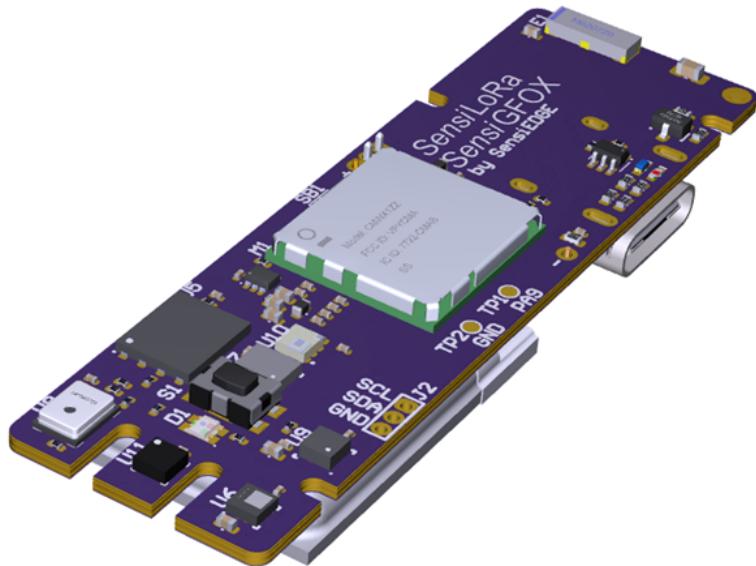


# SensiLoRa 2.0

# Getting Started



---

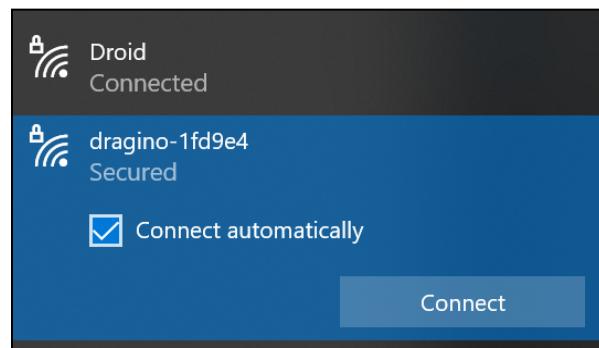
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# 1 Config Dragino Pico Station

## 1.1 Connect to Dragino

1. Connect the antenna, and network cable and turn on the device. After starting the device, it should be defined on the Wi-Fi network as "dragino-xxxxxx" (Figure 1). When the device is found, we connect to it and enter the default password: "**dragino+dragino**".

**Figure 1. Wi-Fi network**

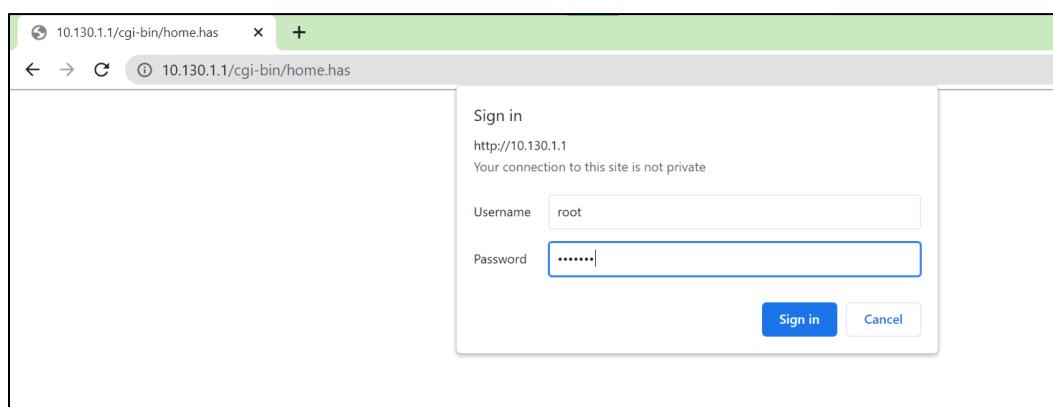


2. When connected to the device, open the browser and enter the address: <http://10.130.1.1> and enter (Figure 2):

**User Name:** root

**Password:** dragino

**Figure 2. Site**



3. Go to network settings LoRa (Figure 3).

**Figure 3. Go to LoRa settings**



## 1.2 Configuration LoRa

1. In LoRa Configuration select the desired frequency (EU868 or US915) and click on Save&Apply (Figure 4).

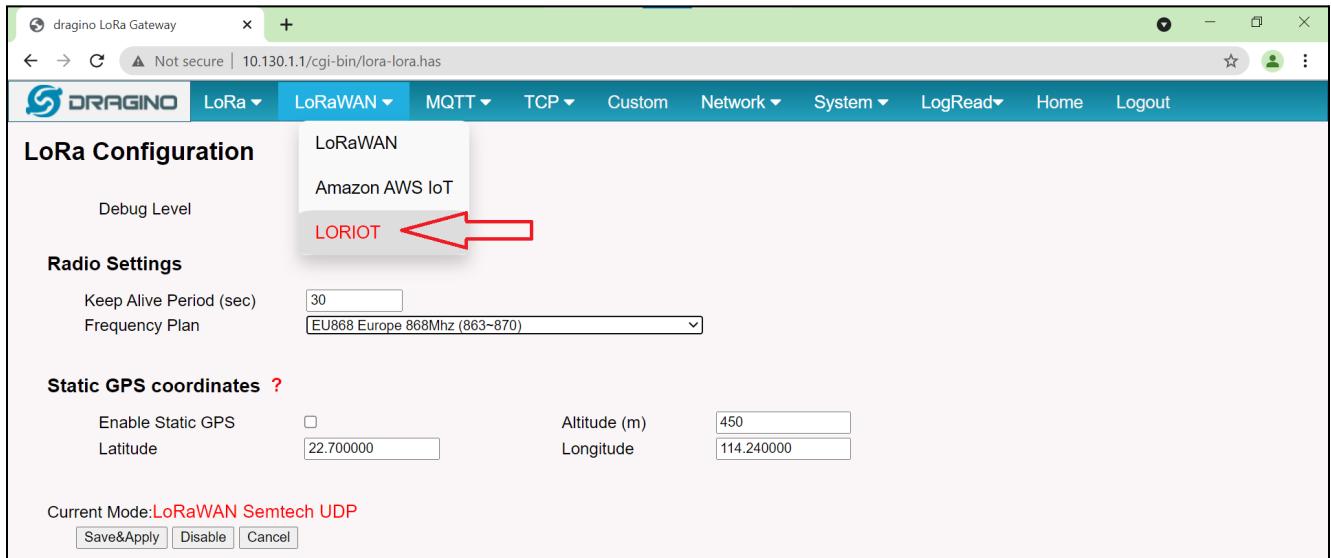
**Figure 4. Configuration Lora**

The screenshot shows the 'LoRa Configuration' page. The top navigation bar includes tabs for LoRa, LoRaWAN, MQTT, TCP, Custom, Network, System, LogRead, Home, and Logout. The main configuration area is titled 'LoRa Configuration'. It contains several sections: 'Radio Settings' (with 'Keep Alive Period (sec)' set to 30 and 'Frequency Plan' set to 'EU868 Europe 868Mhz (863-870)'), 'Static GPS coordinates?' (with checkboxes for 'Enable Static GPS' and 'Latitude' set to 22.700000, and fields for 'Altitude (m)' and 'Longitude' both set to 450), and a note 'Current Mode:LoRaWAN Semtech UDP'. At the bottom of the configuration area are three buttons: 'Save&Apply' (highlighted with a red arrow), 'Disable', and 'Cancel'.

## 1.3 Configuration LORIOT

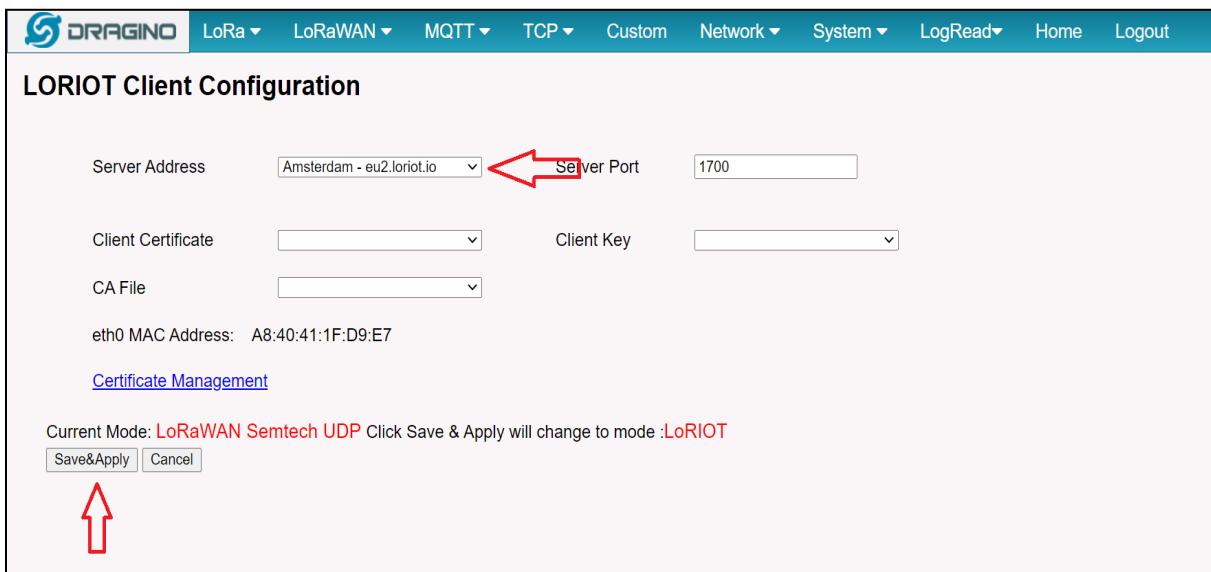
1. Go to configuration LORIOT (Figure 5).

**Figure 5. Go to Loriot settings**



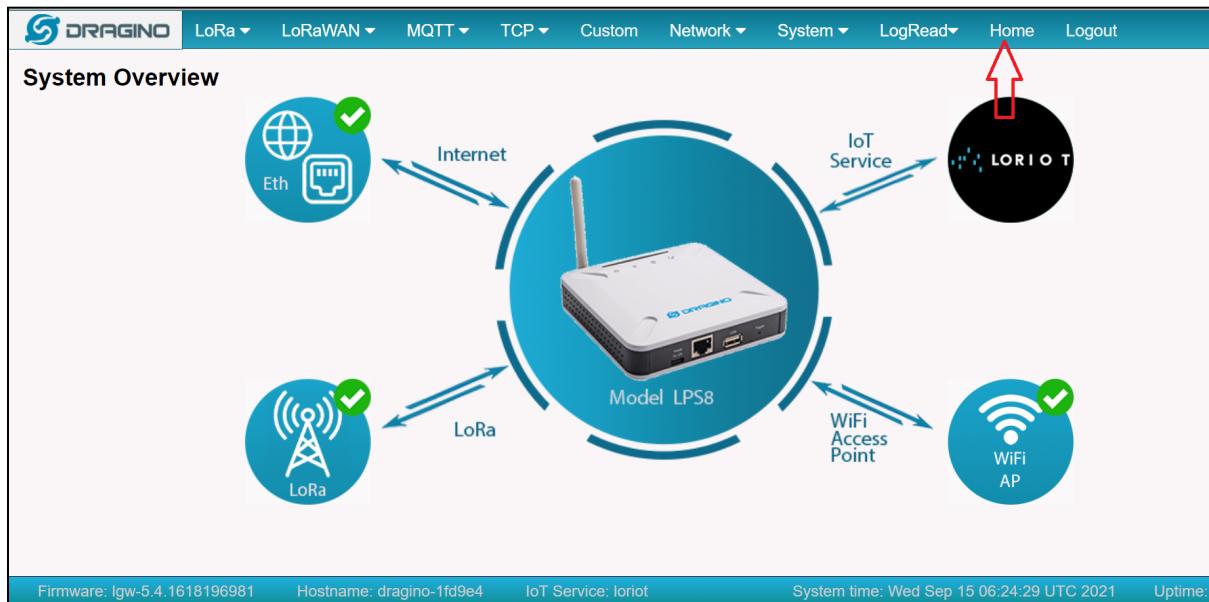
2. In the configuration LORIOT, select the desired server (example: **Amsterdam - eu2.loriot.io**) and click on Save&Apply (Figure 6).

**Figure 6. Configuration Loriot**



3. After configuring the LORIOT, go to the **Home** tab and you should see green checkmarks as in the picture, this means that everything is working (Figure 7).

Figure 7. Home page

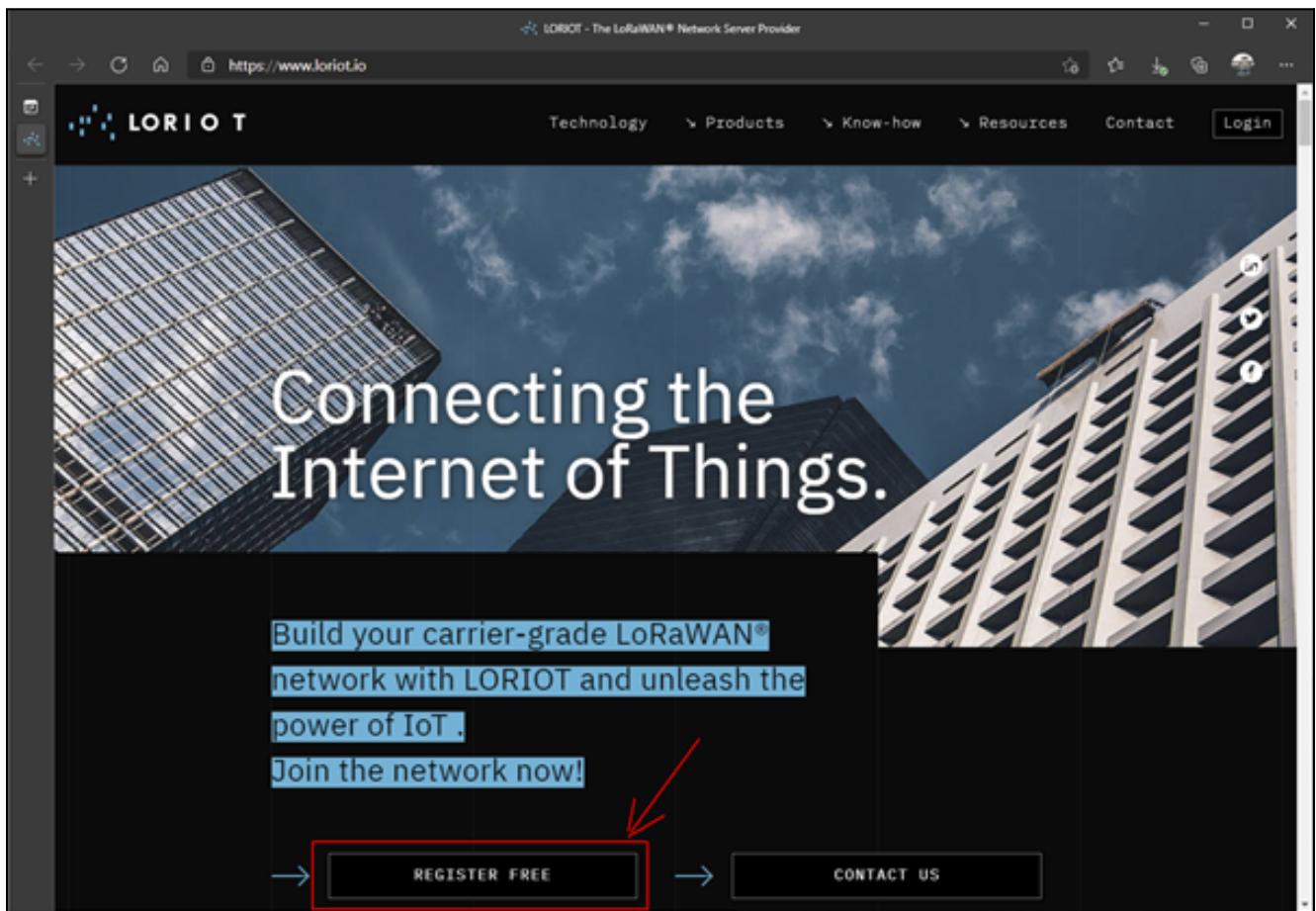


## 2 Registration in LORIOT

### 2.1 Registration in Server

1. Go to <https://www.loriot.io/> and press **REGISTER FREE** (Figure 8).

Figure 8. LORIOT site



2. Select server EU2 Amsterdam, Netherlands (Figure 9).

**Figure 9. Select server**

EMEA		ASIA / PACIFIC		AMERICAS	
SERVER	LOCATION	SERVER	LOCATION	SERVER	LOCATION
EU4PRO	Amsterdam, Netherlands	AP4PRO	Singapore	US3PRO	Oregon City, USA
EU1	Frankfurt, Germany	AU2PRO	Sydney, Australia	US1	California, USA
EU2	Amsterdam, Netherlands	IL1	new! Israel new!	US2	New York, USA
EU3	Madrid, Spain	AP1	Singapore	SA1	Sao Paulo, Brazil
UK1	London, United Kingdom	AU1	Sydney, Australia		

3. Input all data and press the button CREATE A FREE ACCOUNT (Figure 10).

**Figure 10. Create account**

#### FREE ACCOUNT REGISTRATION

Upon registration, you will be able to connect your LoRa gateway to our network, personalize your LoRa end-nodes and retrieve your data frames.

**FREE ACCOUNT INCLUDES**

- ★ One free Gateway Connectivity slot
- ★ Existing devices can be imported into our system
- ★ One Free Network Application
- ★ Existing gateways can be migrated to our system
- ★ Capacity of 10 devices

**NEED MORE?**

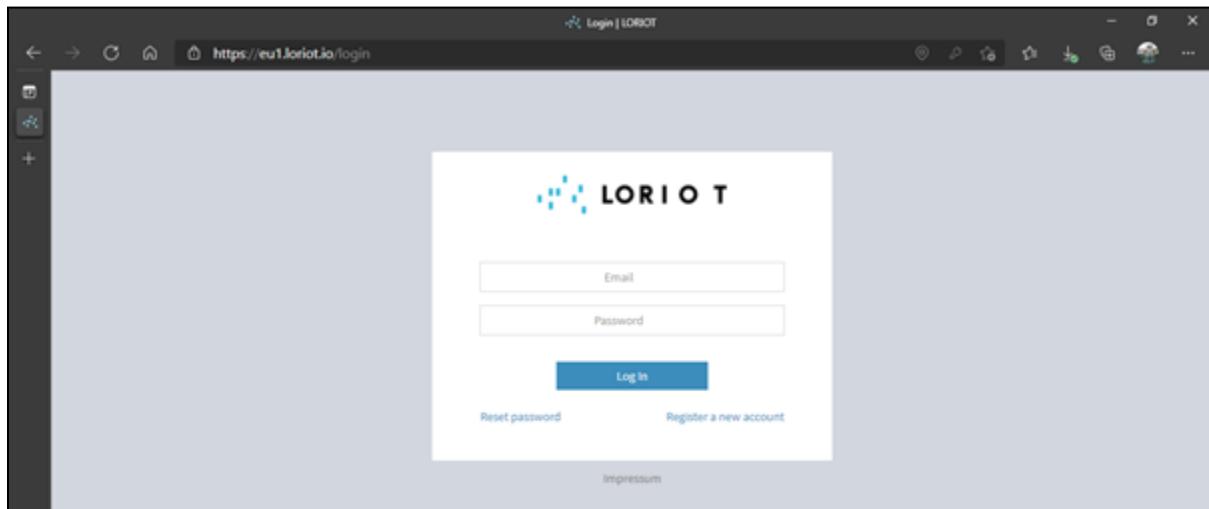
#### REGISTRATION FORM

First Name	Last Name
<input type="text"/>	<input type="text"/>
Country	E-Mail
<input type="text"/>	<input type="text"/>
Password	Password must contain at least:
<input type="password"/>	<input checked="" type="radio"/> One upper and lower-case character <input checked="" type="radio"/> One number <input checked="" type="radio"/> One special character <input checked="" type="radio"/> 8 characters
<input type="checkbox"/> I agree with <a href="#">Terms of Service</a>	

[NEED MORE?](#)
[ALREADY HAVE AN ACCOUNT?](#)
[CREATE A FREE ACCOUNT](#)

4. After confirmation via email enter the site (Figure 11).

Figure 11. Login to server



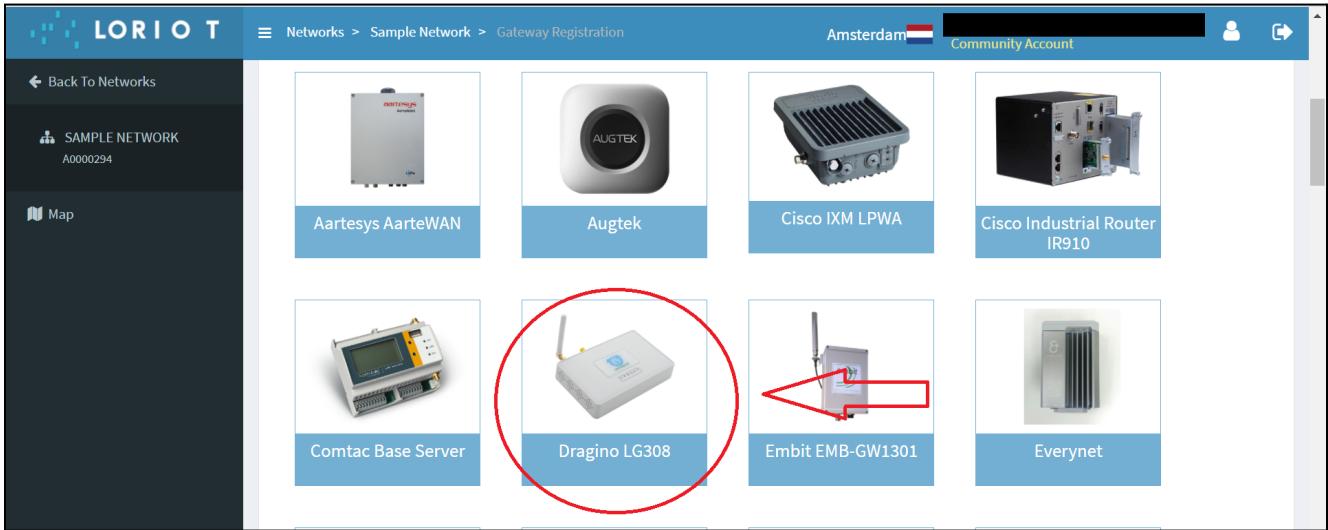
## 2.2 Register a gateway

1. Add Gateway. Press the button **Register a new gateway** (Figure 12).

Figure 12. Register gateway

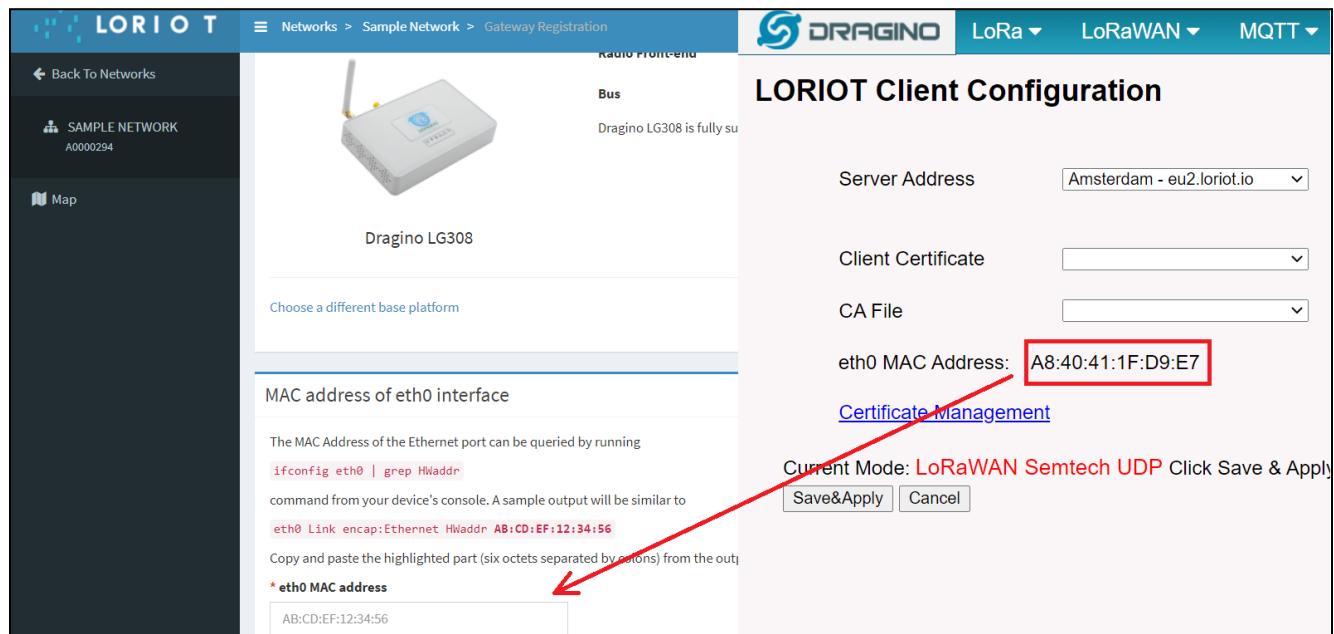
2. Scroll down and select **Dragino LG308** if you use Dragino pico station LPS8 or LG308 (Figure 13).

**Figure 13. Add the Dragino**



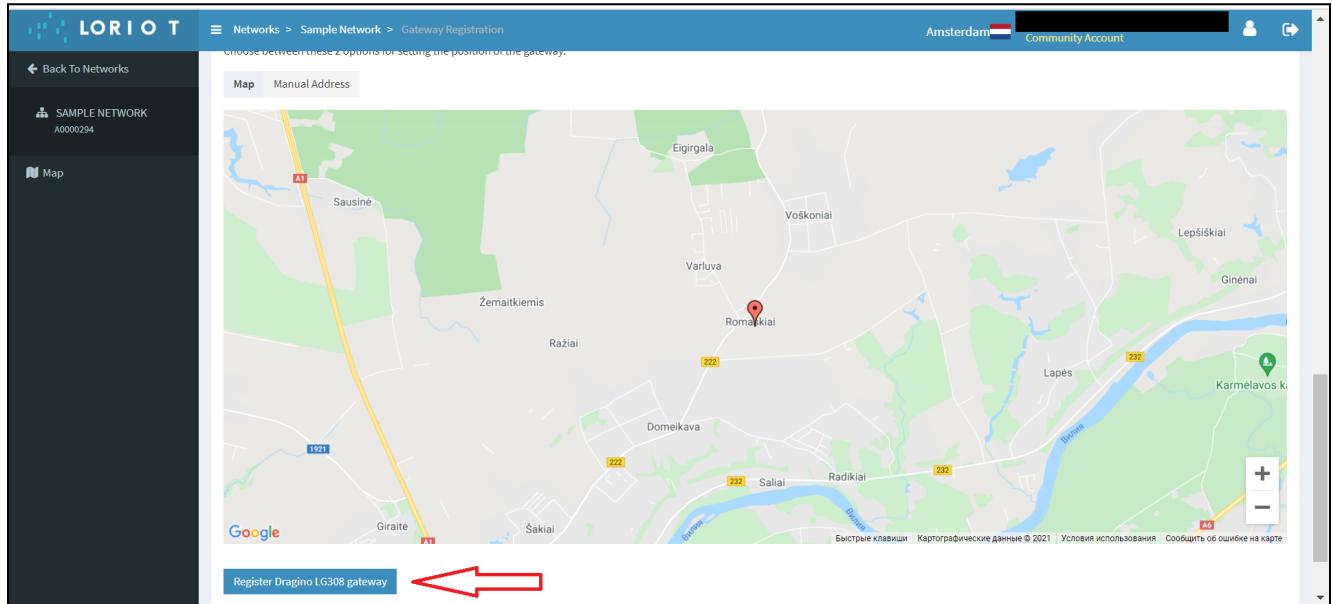
3. Scroll a little below and you will see a field for entering the device address (Figure 14). If a Dragino Pico Station is used, then the Eth0 Mac address can be taken on a *web-based GUI Dragino* website in LORIOT Client Configuration [1.3 Configuration LORIOT](#).

**Figure 14. Eth0 Mac address**



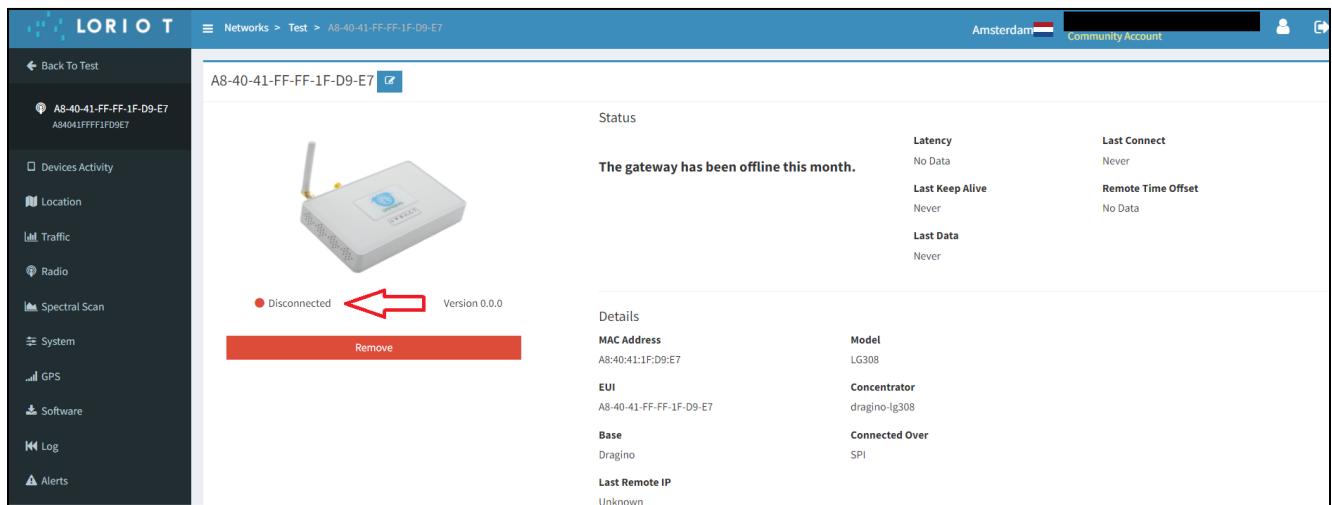
4. Scroll down and here indicates the location of the modem and then click on [Register Dragino LG308 gateway \(Figure 15\)](#).

**Figure 15. Register Gateway**



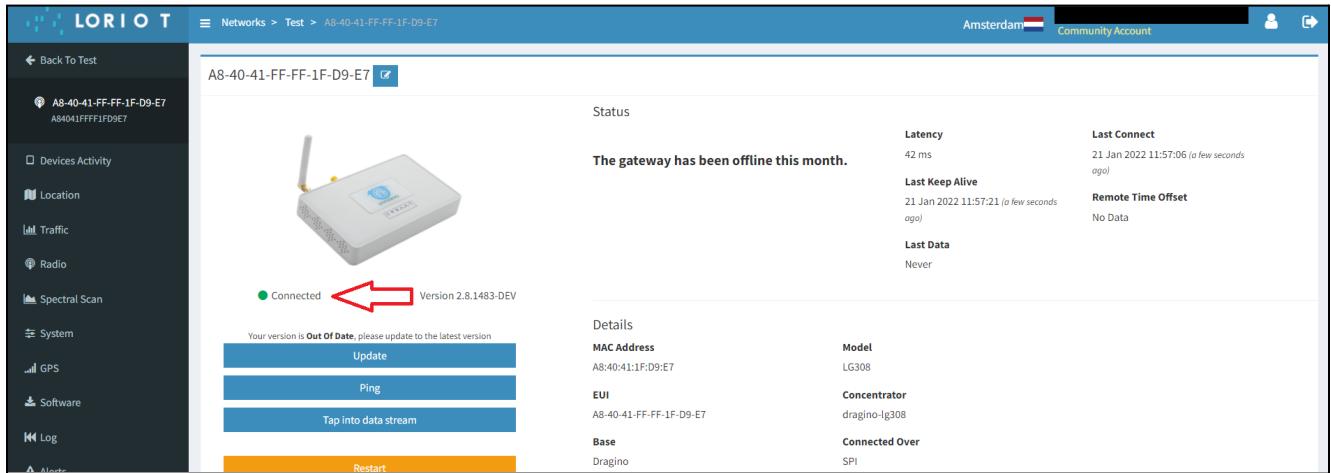
5. After registering the gateway, a page with the gateway status will appear where it will be written that the connection status is **Disconnected** (Figure 16).

**Figure 16. Gateway status**



6. To speed up the procedure for connecting the gateway to the server, you need to reboot the gateway. Need to refresh the page and wait until the gateway status changes to connected (Figure 17).

**Figure 17. Gateway Connected**



7. Go to the main page of the server by clicking on the icon LORIOT (Figure 18).

**Figure 18. Go to the main page**



### 2.3 Add a Device

1. In order to add the SensiLoRa 2.0 device, you need now him **AppKey**, **JoinEui** and **DevEui** keys. The keys can be found using the SensiConfigurator program, download: [Download SensiConfigurator Windows](#). Use [Getting Started SensiConfigurator](#) document section [3.2 Device Information](#).

2. Add a Device. In the tab, Dashboard clicks on **SampleApp**. (Figure 19)

**Figure 19. Go to SampleApp**

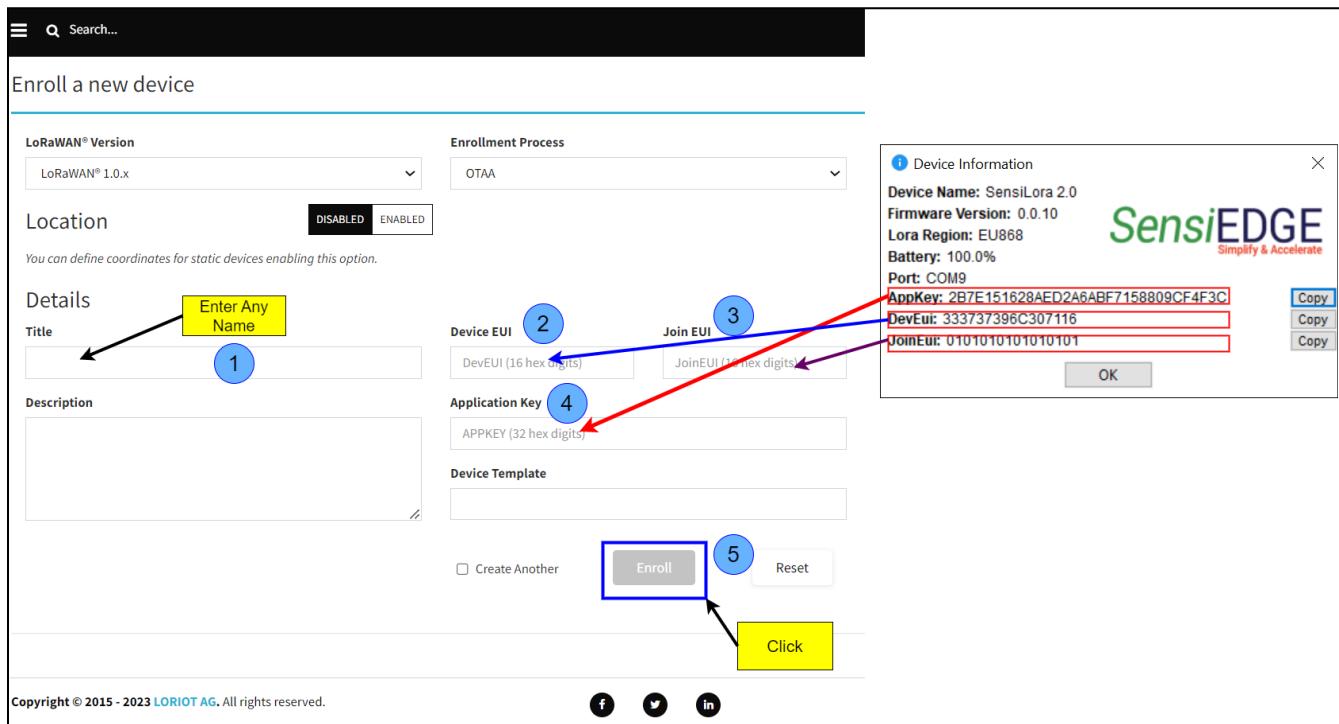
Name	AppID	Devices
SampleApp	BE-01-03-09	1

3. Click on **Enroll Device** (Figure 20).

**Figure 20. Enroll Device**

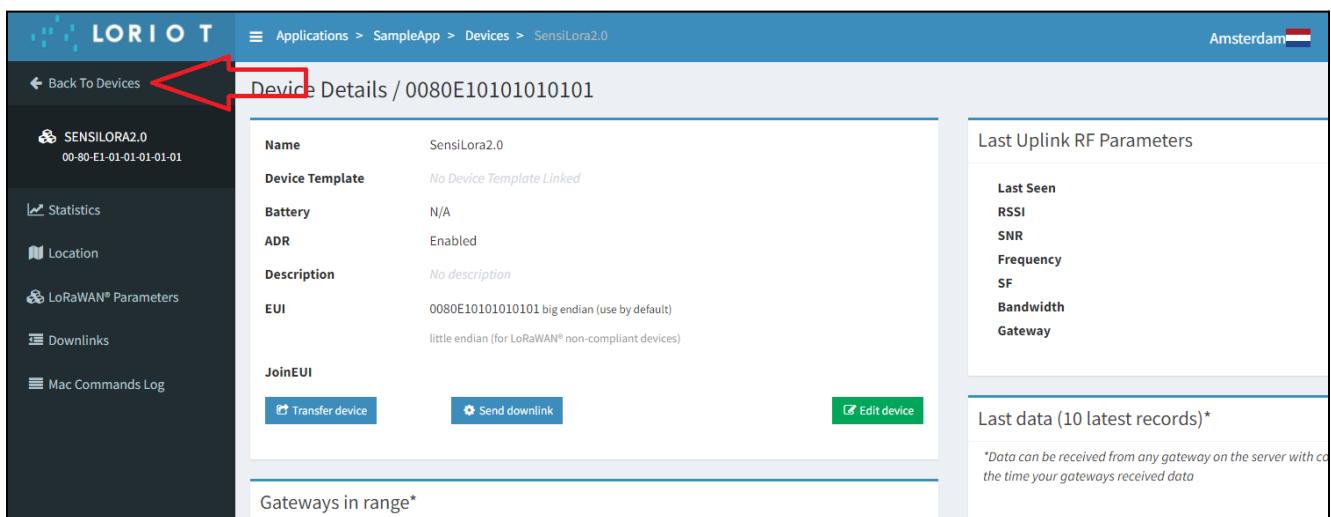
4. In the tab Enroll Device, enter any Name in **Title** (step 1), then enter **Application key** (step 4), **Device EUI** (step 2) and **Join Eui** (step 3), (this keys can be found using the SensiConfigurator program, download: [Download SensiConfigurator Windows](#) . Use [Getting Started SensiConfigurator](#) document section [3.2 Device Information](#)). Click **Enroll** (step 5) (Figure 21).

Figure 21. Add device



5. Go to the Devices page by clicking on the icon **Back To Devices** (Figure 22).

Figure 22. Back to Devices



6. In the **Devices** tab, you can view the addition of a device. When the added device connects to the server then we should see the value: **RSSI**, **SNR**, **devSNR**, **SF** and **BAT**, for example, in Figure 23.

Figure 23. Status device



The screenshot shows the 'Devices' section of the Loriot web interface. A single device entry is displayed with the following details:

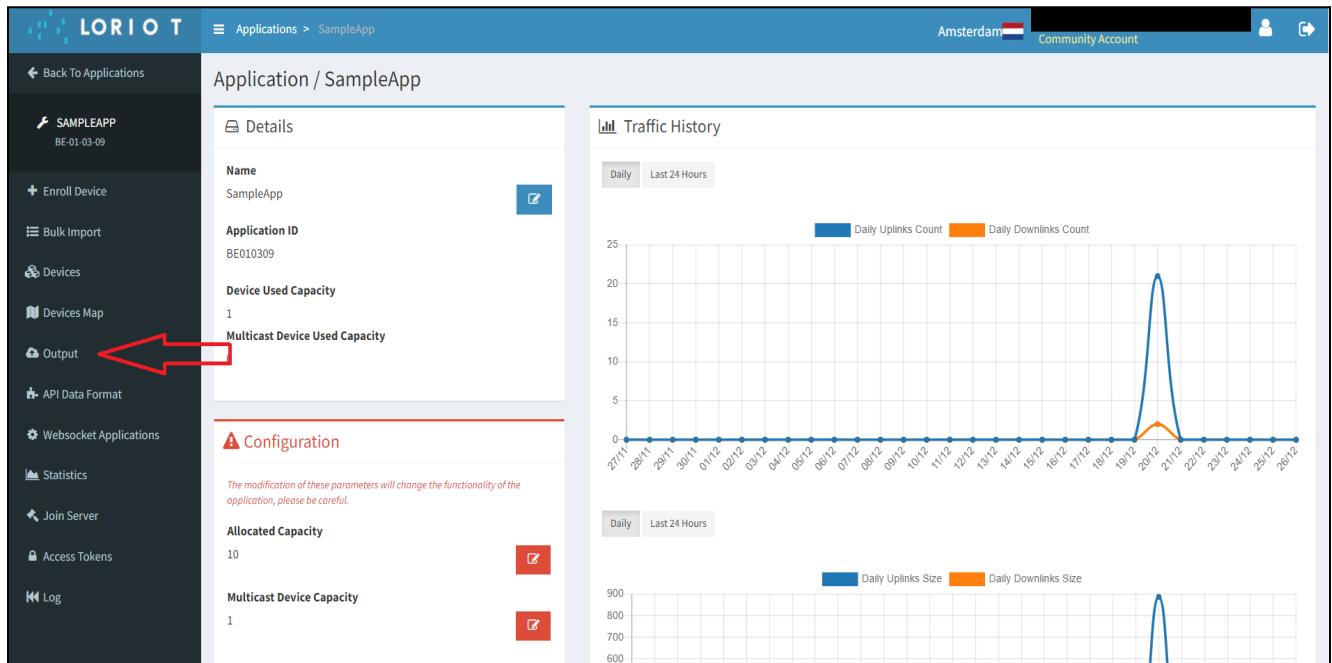
Device EUI	Name	RSSI (dBm)	SNR (dB)	devSNR (dB)	SF	BAT
00-80-E1-01-01-01-01-01	SensiLora2.0	-88	9	6	12	100%

A red box highlights the columns for RSSI, SNR, devSNR, SF, and BAT. A large red arrow points upwards from the bottom of the table towards the status parameters.

## 2.4 Loriot Uplink

1. In the SampleApp, go to the **Output** (Figure 24).

Figure 24. Go to Output



The screenshot shows the 'Output' section of the Loriot web interface for the SampleApp. On the left, there is a sidebar with various application management options. The 'Output' option is highlighted with a red arrow. The main area displays two traffic history graphs:

- Traffic History:** Shows Daily and Last 24 Hours data for Daily Uplinks Count (blue line) and Daily Downlinks Count (orange line). The graph shows a significant peak in uplinks on December 21st.
- Daily Uplinks Size vs Date:** Shows Daily and Last 24 Hours data for Daily Uplinks Size (blue line) and Daily Downlinks Size (orange line). The graph shows a sharp peak in uplinks size on December 21st.

2. Data output link. Example: Use the **Target URL Template**, for example, Stm32CubeMonitor (Figure 25).

**Figure 25. Target URL link**

The screenshot shows the LORIOT web interface with the following details:

- Left Sidebar:** Includes links for Back To Applications, SAMPLEAPP BE-01-03-09, Enroll Device, Bulk Import, Devices, Devices Map, Output (selected), API Data Format, Websocket Applications, and Statistics.
- Header:** Applications > SampleApp > Output, Location: Amsterdam, Community Account.
- Main Content:** Application Output / BE010309. Shows a table with one row:
 

Output	Name	Mechanism	Type
WebSocket		Listen and wait	LORIOT.io

 A blue button labeled "+ Add new output" is visible below the table.
- Right Panel:** Shows a WebSocket configuration section with a mechanism icon, "WebSocket", "Mechanism Listen and wait", and a "How to use WebSocket with LORIOT" section. It includes a placeholder URL: `wss://eu2.loriot.io/app?token=vgEDCQAAA1ldTlubG9yaW90LmlvsMd0v-NLa4RSNeRhHKi4GQ==`. This URL is highlighted with a red box and a red arrow points to it from the left sidebar's Output link.

## 3 LORIOT Integration to Thingsboard

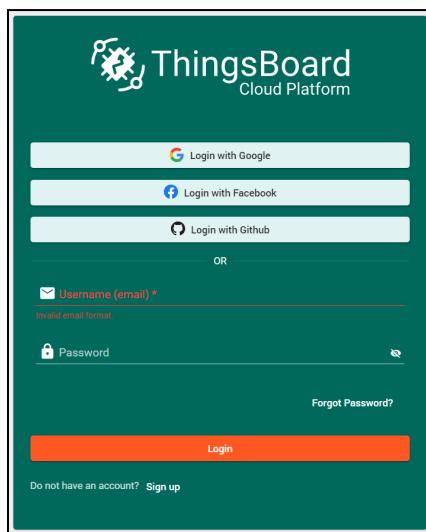
### 3.1 Overview

1. After integrating LORIOT with the ThingsBoard, you can connect, communicate, process and visualize data from devices in the ThingsBoard IoT platform. For Integration LORIOT need use **Professional Edition**, his edition is paid, it costs from \$10/month, but upon registration a trial (free) period of 30 days is given. For more information visit the website [LORIOT Integration](#).

### 3.2 Registration

1. Go to [ThingsBoard.cloud](#) suit and register in the cloud

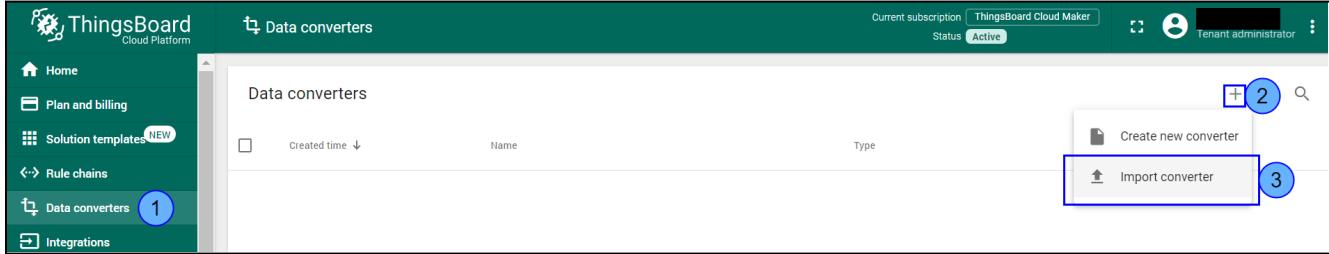
**Figure 26. ThingsBoard Registration**



### 3.3 Import a Data Converter

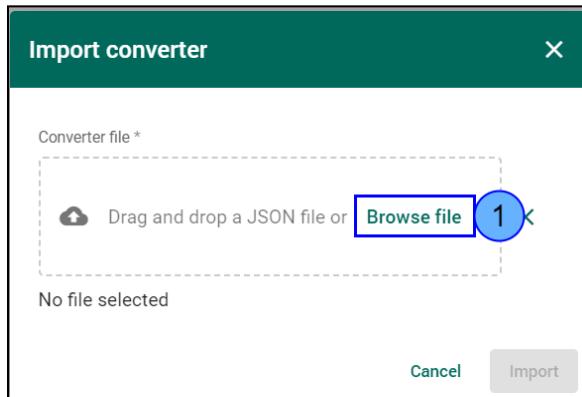
1. After registering and entering the clouds Download DataConverter: [SensiLoRa2\\_0\\_DataConverterV0.1.json](#).
2. Add a Data Converter in ThingsBoard for this, go to **Data converters** (step 1), click **+** (step 2), and choose **Import converter** (step 3).

**Figure 27. Import a Data Converter**



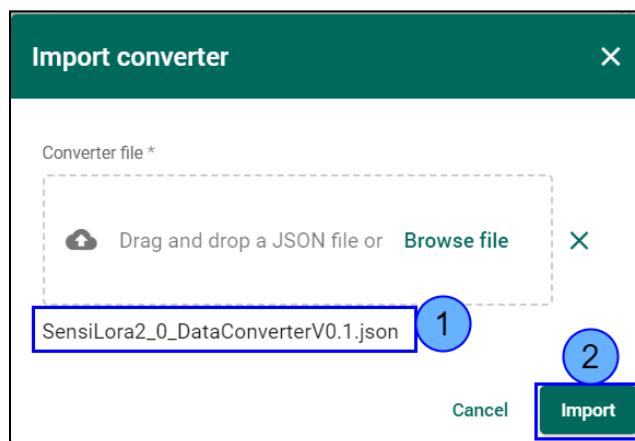
2. In the window, Import Convert drag the downloaded Data Converter or click on the Browse file(step 1) and select the **SensiLora2\_0\_DataConverterV0.1.json**.

**Figure 28. Choose a Data Converter**



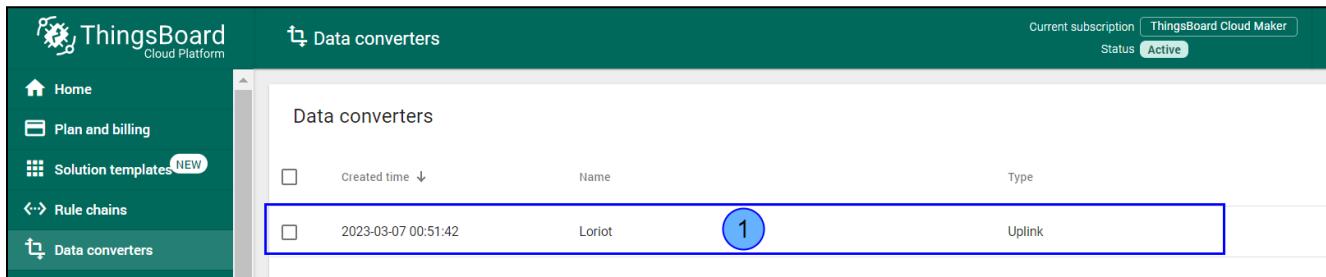
3. The selected Data converter will appear (step 1) and then click on Import (step 2).

**Figure 29. Click Import a Data Converter**



4. After Importing, a Data Converter with the name Loriot will appear in the window Data converters (step 1).

**Figure 30. Loriot Data Converter**

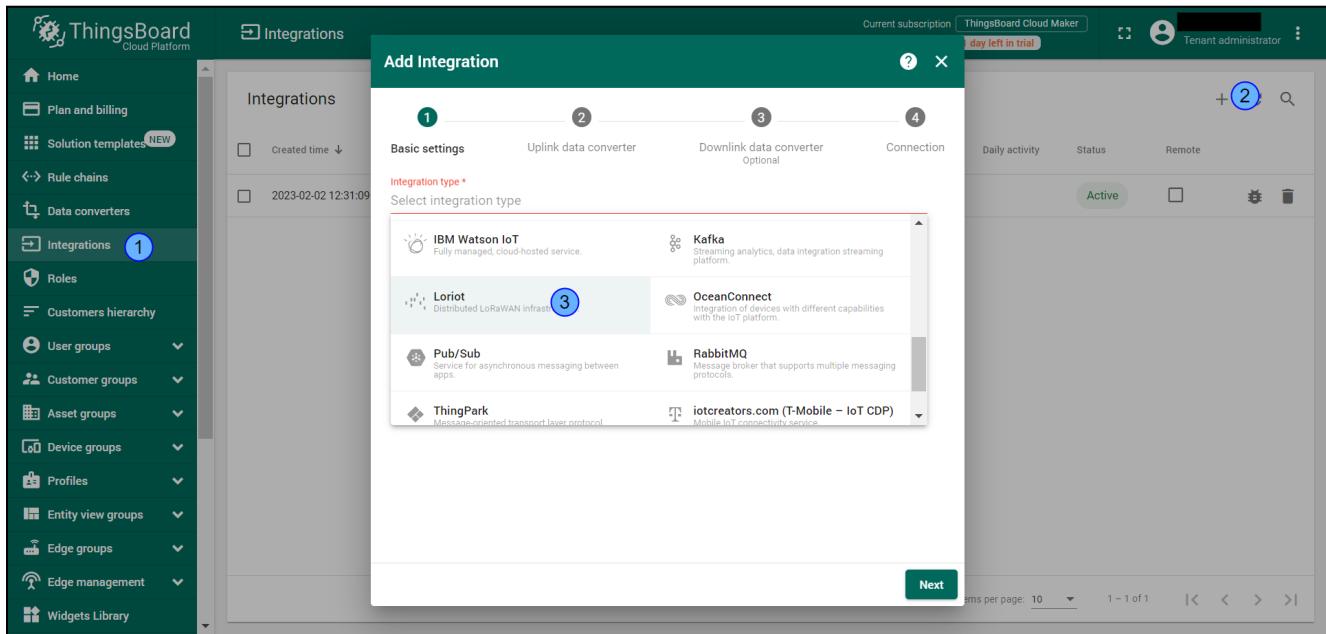


Created time	Name	Type
2023-03-07 00:51:42	Loriot	1

### 3.4. Create Integration

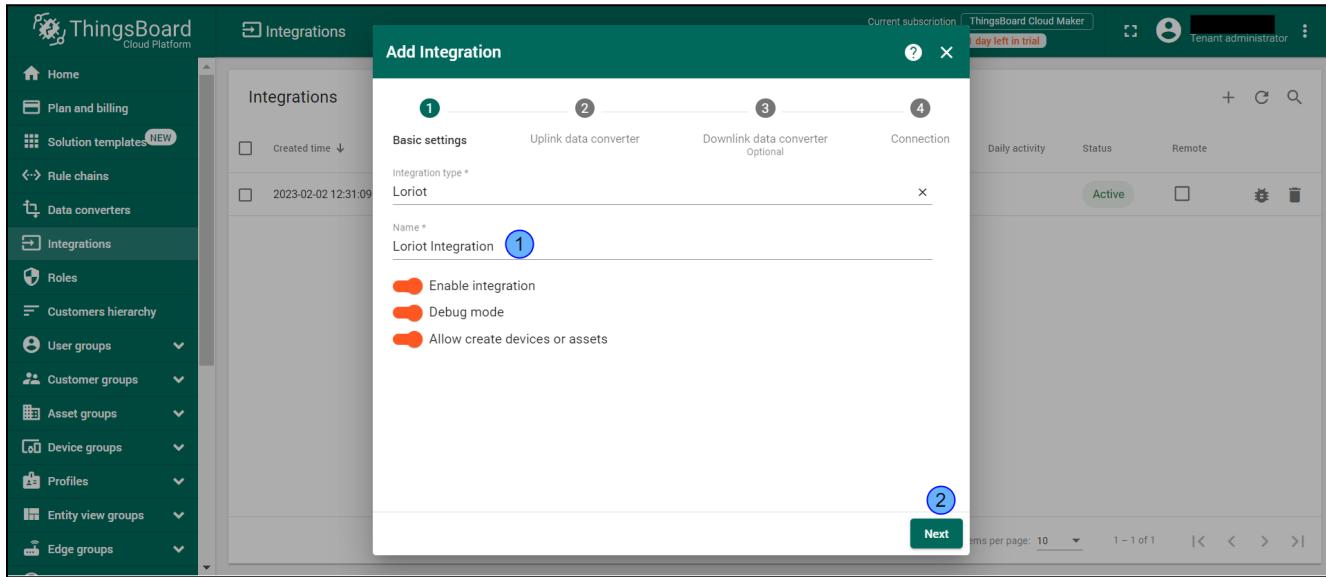
1. After importing Data Converter move on to the creation of Integration. Go to [Integrations](#) (step 1), click on [+](#) (step 2), and in Integration type choose [Loriot](#) (step 3).

**Figure 31. Add Integration**



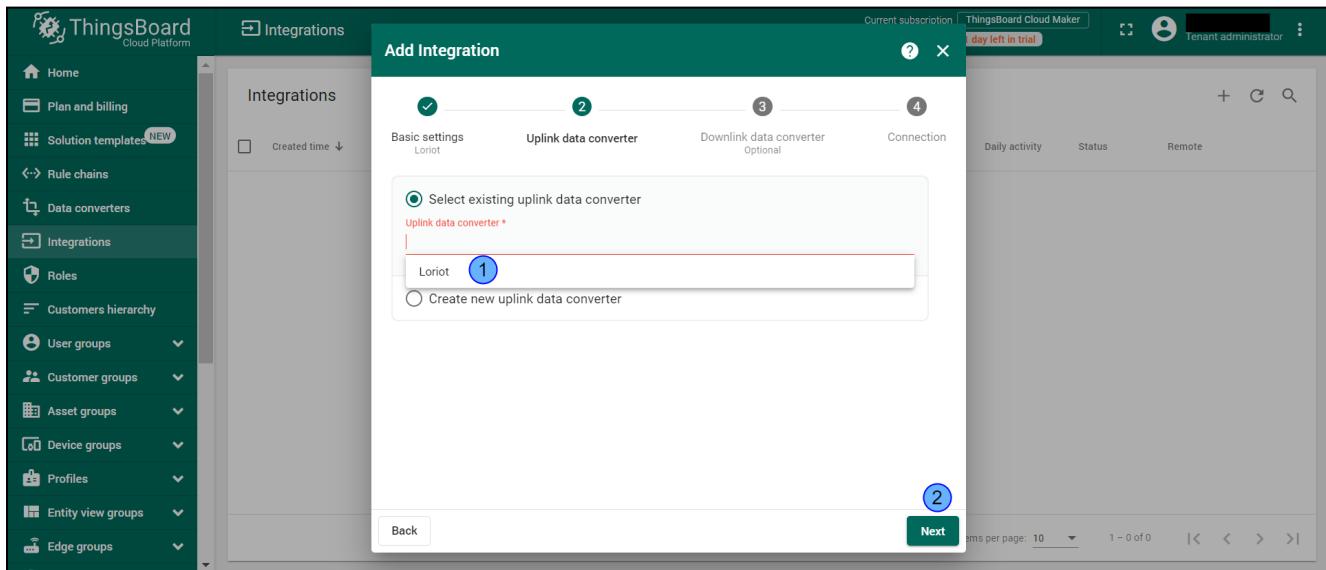
2. In line, Name enters the name **Loriot Integration** (step 1) and click [Next](#) (step 2).

**Figure 32. Basic settings Integration**



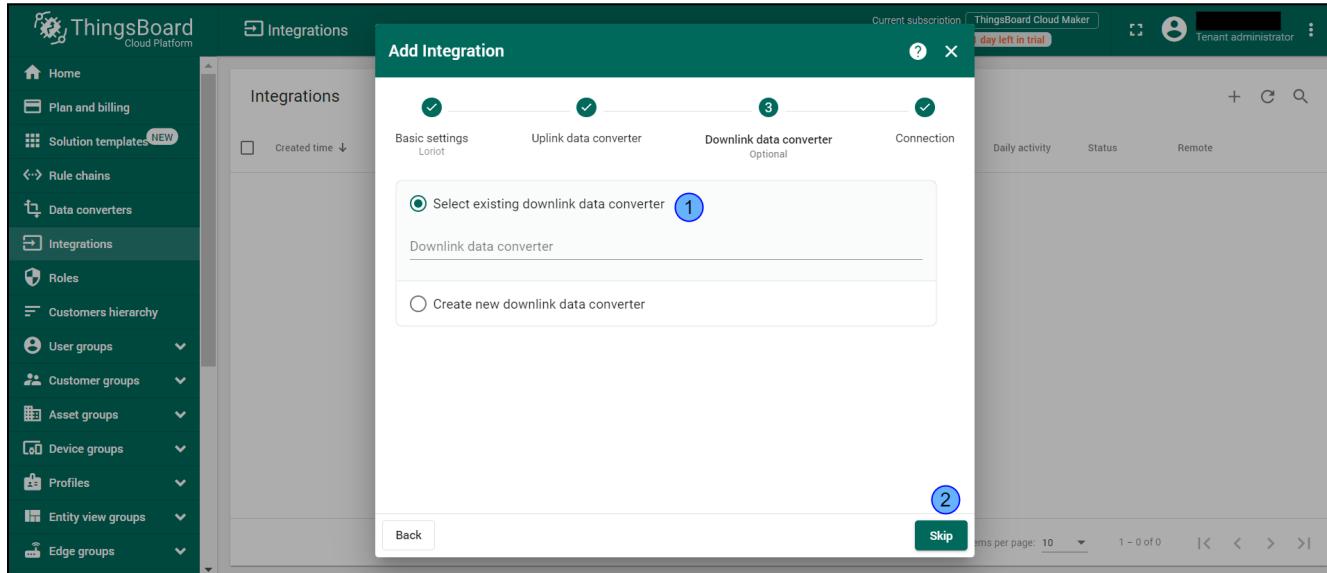
3. In Uplink Data Converter choose Loriot (step 1) and click Next (step 2).

**Figure 33. Choose Loriot**



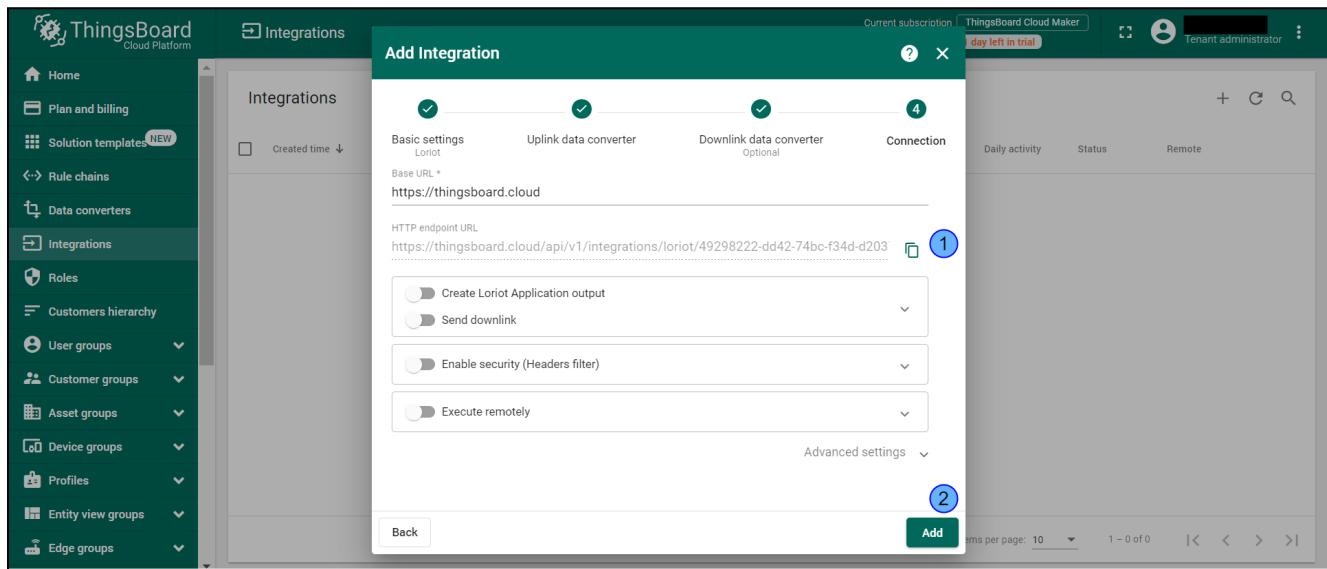
4. Choose Select existing downlink data converter and click to Skip.

**Figure 34. Select the existing downlink data converter**



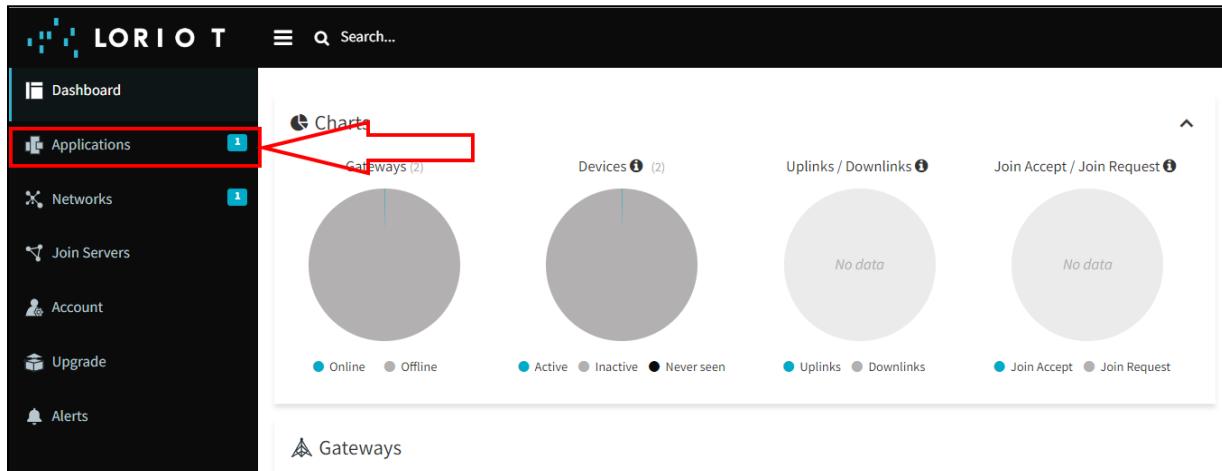
5. Click to Copy HTTP endpoint URL and click Add.

**Figure 35. Copy HTTP**



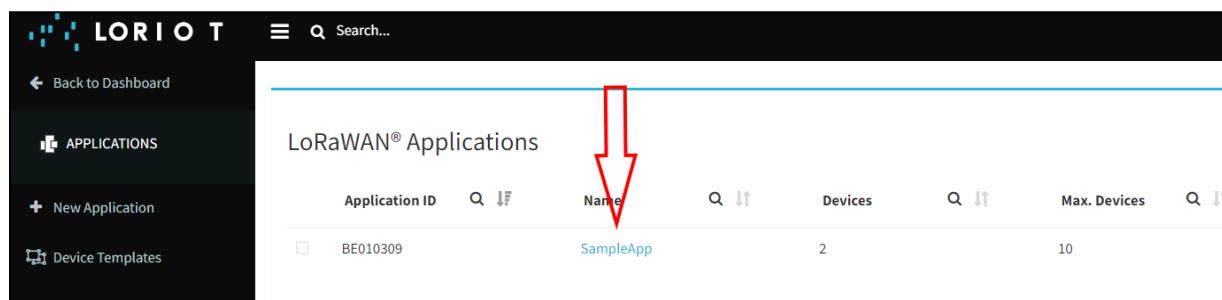
6. Go to Applications in LORIOT.

Figure 36. Go to Applications



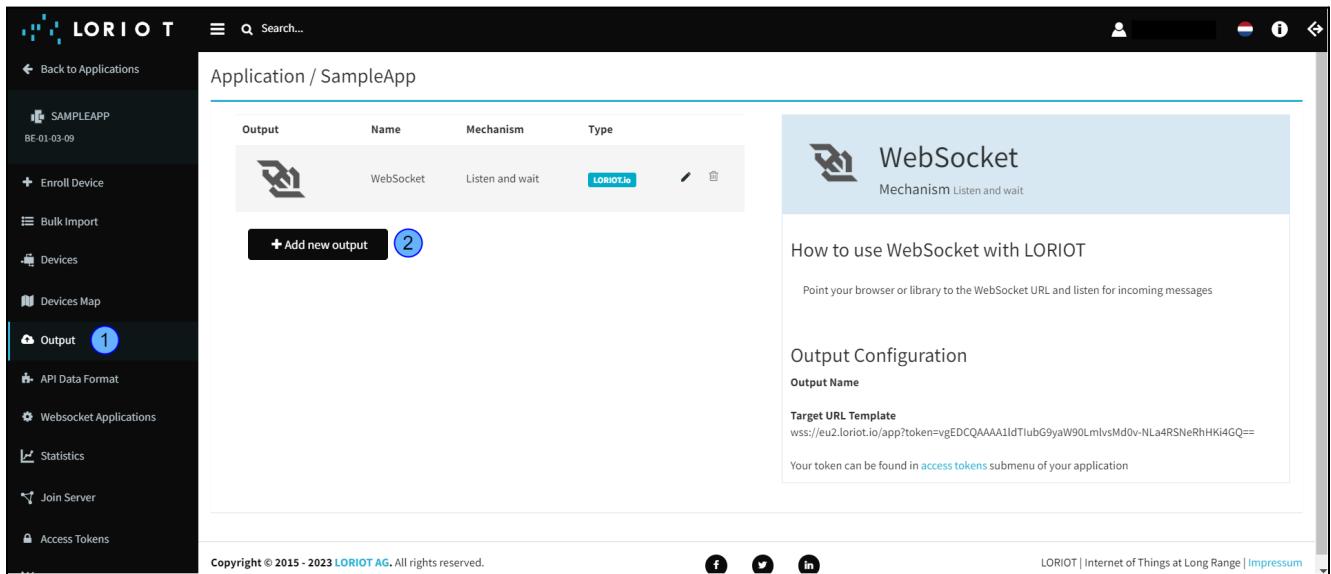
7. Select Application.

Figure 37. Select Application



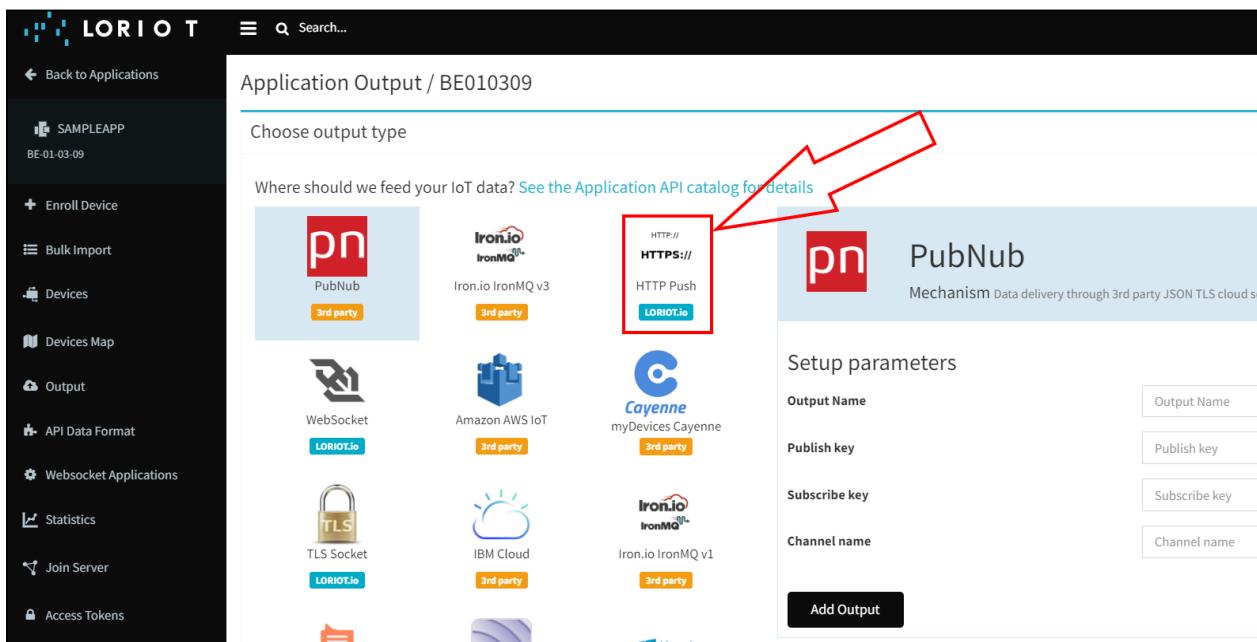
8. In Application go to Output (step 1) and click to Add new output (step 2).

Figure 38. Add Output



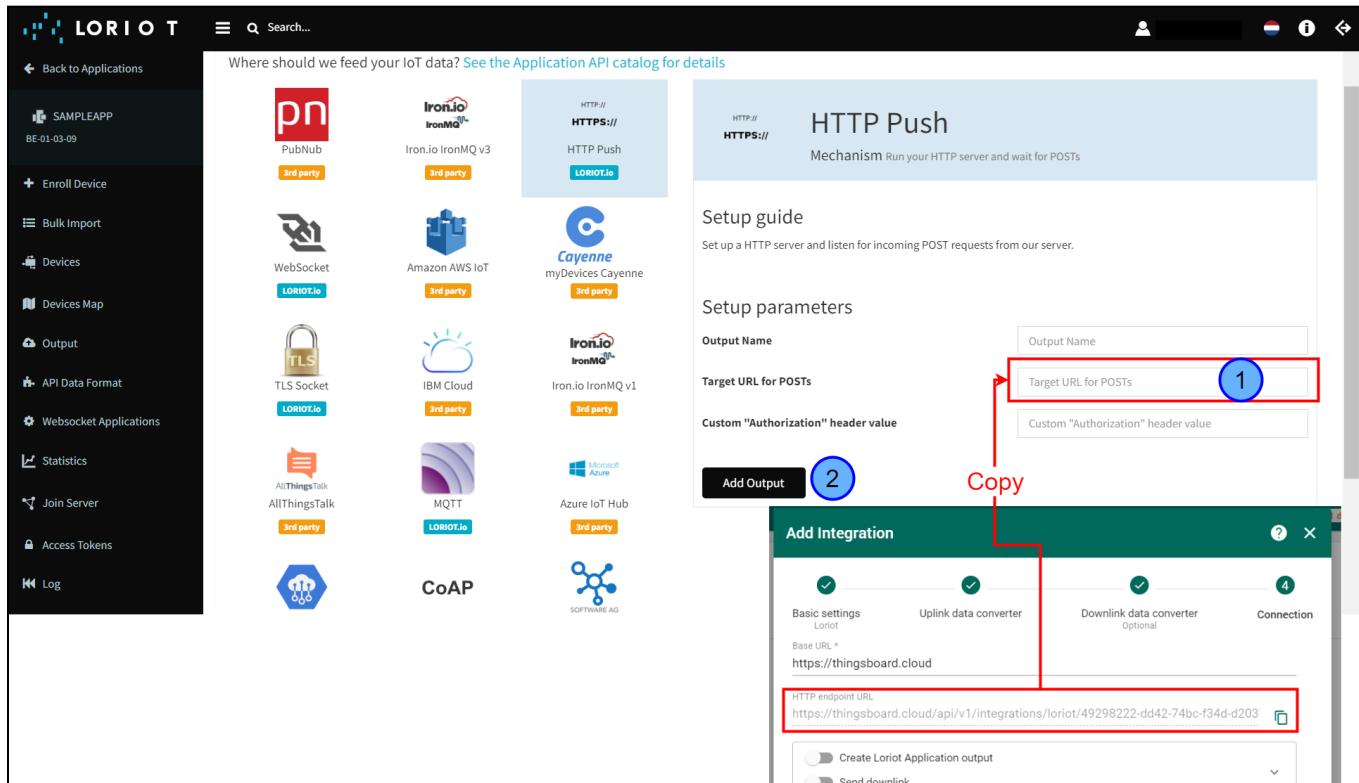
### 9. Select HTTP PUSH type.

Figure 39. Select HTTP Push



10. In **Target URL for POSTs** paste the HTTP URL with ThingsBoard (step 1) and click **Add Output** (step 2).

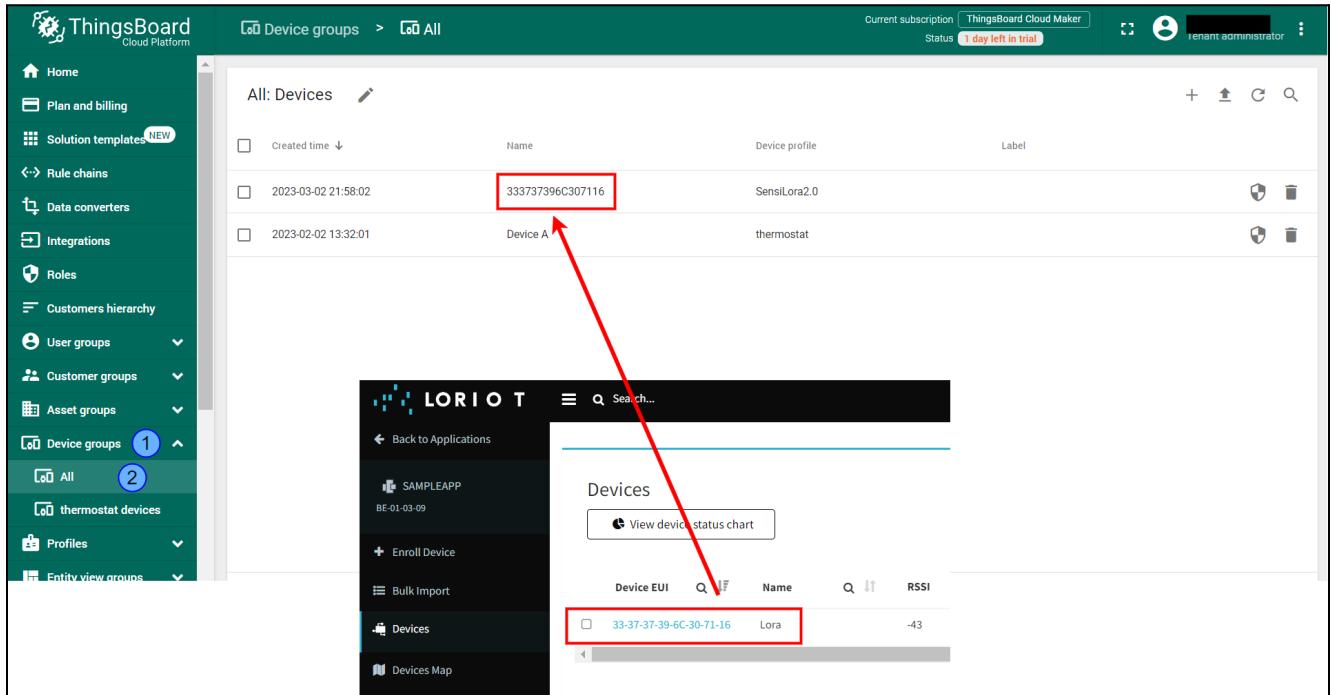
**Figure 40. Paste HTTP**



### 3.5 Device

1. To view the active SensiLora 2.0 device go to **Device groups** (step 1), **All** (step 2), and in the window, **All: Devices** will contain a device that is connected to the Loriot server and transmits data to it.

**Figure 41. Active Devices**



The screenshot shows two interfaces side-by-side. On the left is the ThingsBoard Cloud Platform interface, and on the right is the LORIOT interface.

**ThingsBoard Cloud Platform:**

- Left sidebar: Home, Plan and billing, Solution templates (NEW), Rule chains, Data converters, Integrations, Roles, Customers hierarchy, User groups, Customer groups, Asset groups, Device groups (highlighted with a blue circle containing '1'), All (highlighted with a blue circle containing '2'), thermostat devices, Profiles, Entity view groups.
- Main area: Device groups > All. A table lists devices:
 

	Name	Device profile	Label
<input type="checkbox"/>	2023-03-02 21:58:02	333737396C307116	SensiLoRa2.0
<input type="checkbox"/>	2023-02-02 13:32:01	Device A	thermostat

**LORIOT:**

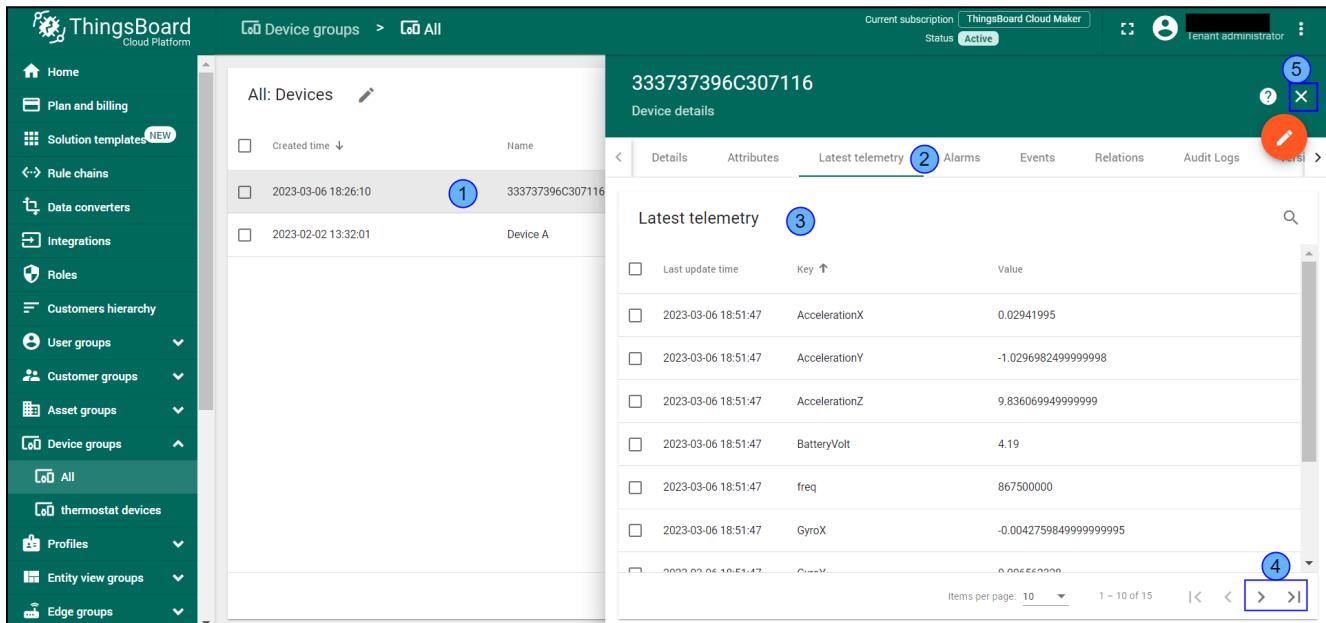
- Left sidebar: Back to Applications (SAMPLEAPP, BE-01-03-09), Enroll Device, Bulk Import, Devices (highlighted with a blue circle containing '1'), Devices Map.
- Main area: Devices table:
 

Device EUI	Name	RSSI
33-37-37-39-6C-30-71-16	Lora	-43

A red arrow points from the highlighted row in the ThingsBoard table to the highlighted row in the LORIOT table, indicating a connection between the two devices.

2. To view the received data from the sensors click on Device **SensiLora2.0** (step 1), next choose the **Latest telemetry** (step 2) and here you can see the readings of the sensors that the device measured (step 3), to view the rest of the readings you need to click on the **>** (step 4). To close the Device details click on the **X** (step 5).

**Figure 42. Latest telemetry**



The screenshot shows the ThingsBoard Cloud Platform interface. On the left is a sidebar with various navigation options. The main area shows a list of devices under 'Device groups > All'. One device, '333737396C307116' (Device A), is selected and highlighted with a blue circle labeled 1. The 'Latest telemetry' tab is active, indicated by a blue circle labeled 2. Below this, a table displays the latest telemetry data for Device A, with a blue circle labeled 3 pointing to it. The table includes columns for 'Last update time', 'Key ↑', and 'Value'. The data shown is as follows:

Last update time	Key ↑	Value
2023-03-06 18:51:47	AccelerationX	0.02941995
2023-03-06 18:51:47	AccelerationY	-1.0296982499999998
2023-03-06 18:51:47	AccelerationZ	9.836069949999999
2023-03-06 18:51:47	BatteryVolt	4.19
2023-03-06 18:51:47	freq	867500000
2023-03-06 18:51:47	GyroX	-0.004275984999999995

At the bottom right of the table, there are buttons for 'Items per page' (set to 10), '1 – 10 of 15', and page navigation arrows. The top right corner of the interface has a tenant administrator icon and a help/x icon, with a blue circle labeled 5 pointing to it.

## 3.6 Dashboard

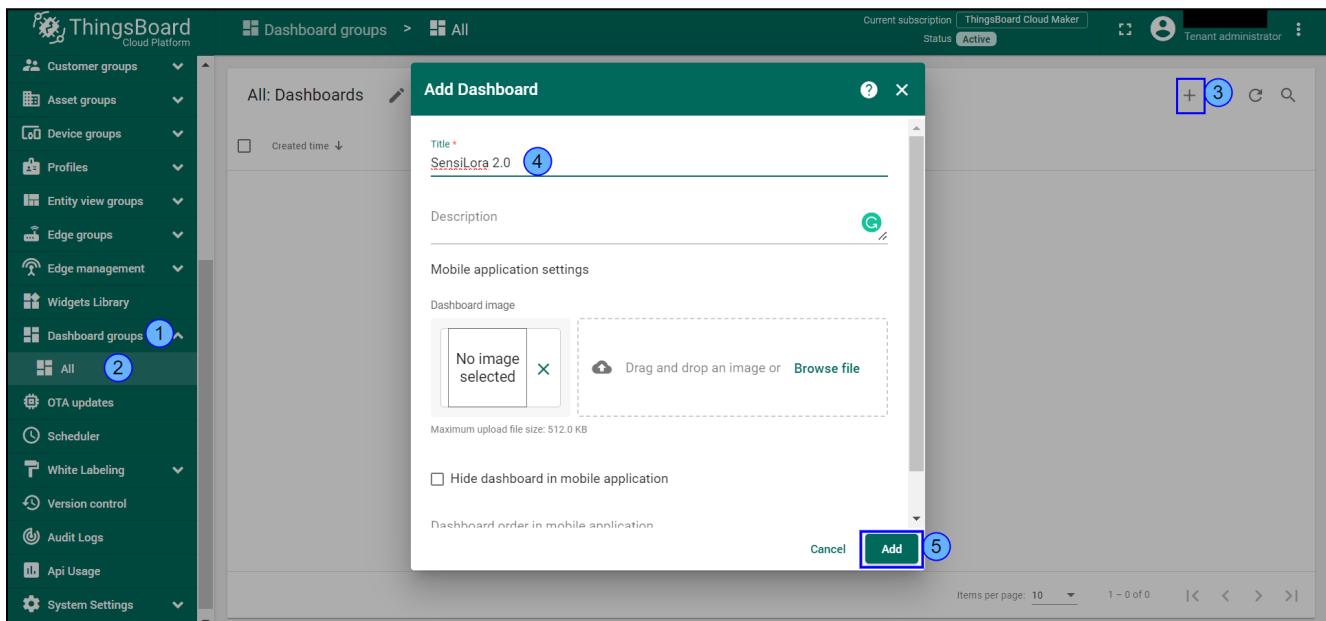
### 3.6.1 Overview

1. You can import a Dashboard and skip the next steps, for this go to section [3.6.5 Import Dashboard](#).

### 3.6.2 Add Dashboard

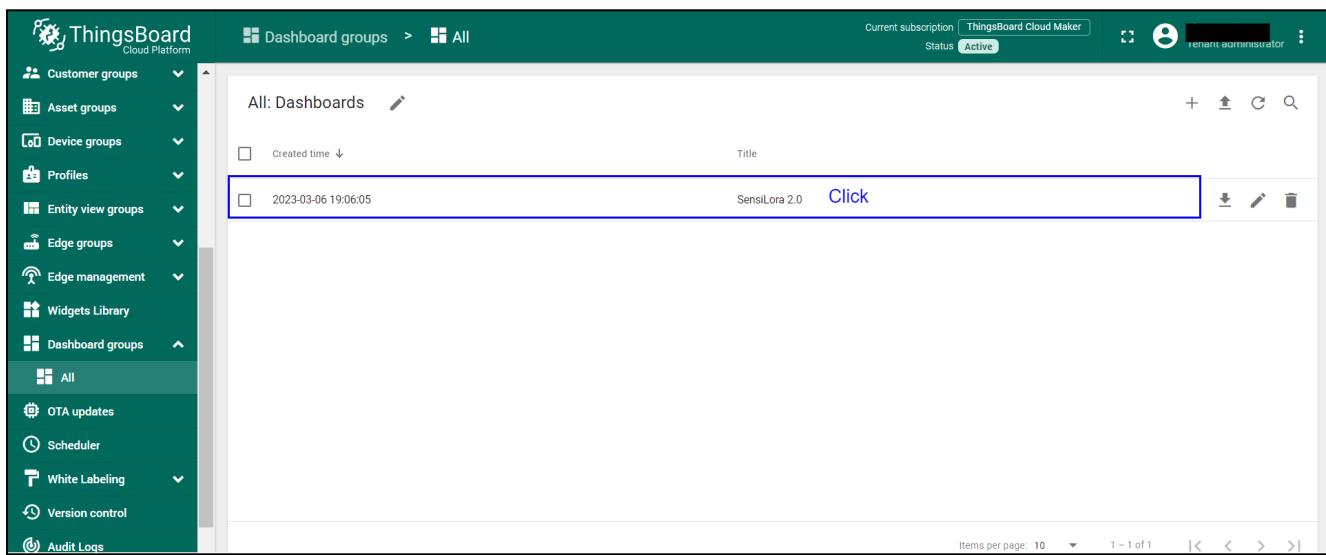
1. Add Dashboard, go to **Dashboard groups** (step 1), **All** (step 2), and click **+** (step 3). Enter a **SensiLora 2.0** in the **Title** field (step 4) and click **Add** (step 5).

**Figure 43. Add Dashboard**



2. Click on SesnsiLoRa 2.0 Dashboard.

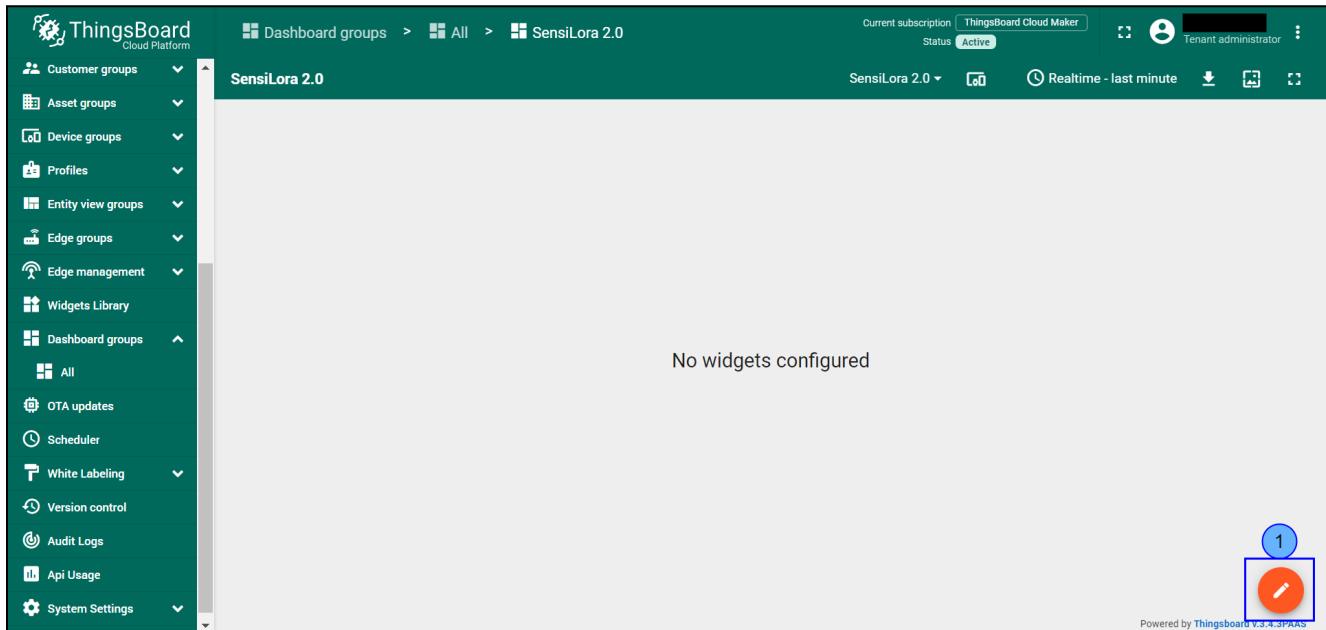
**Figure 44. Go to SesnsiLoRa 2.0 Dashboard**



### 3.6.3 Add Entity aliases

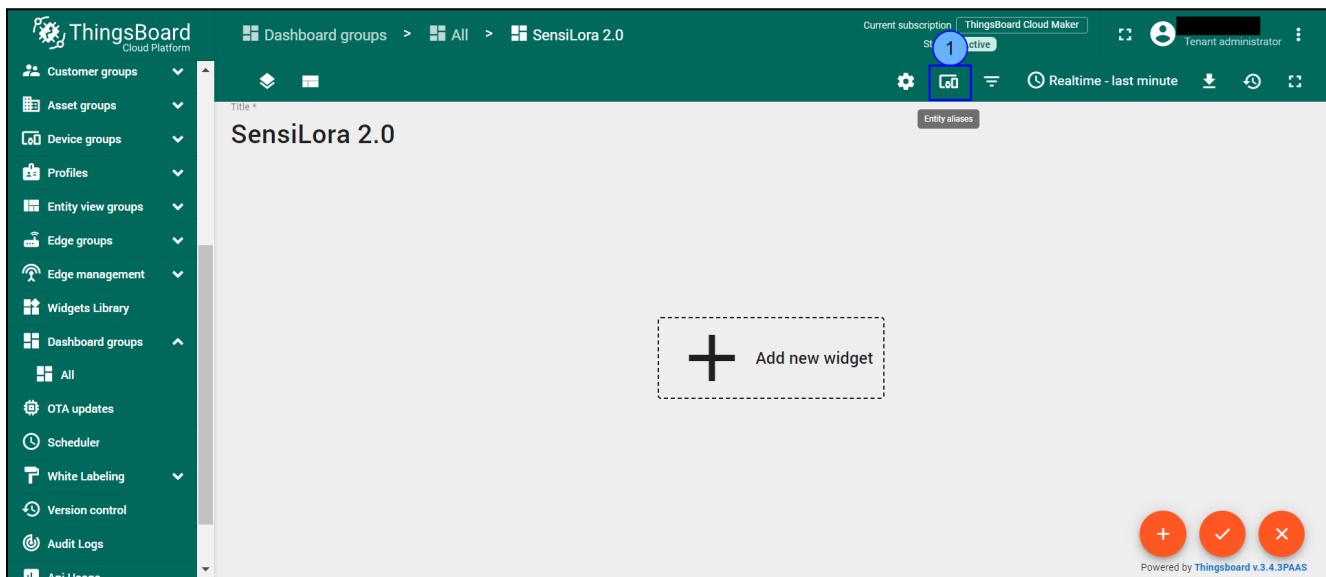
1. Click on Change Dashboard (step 1).

**Figure 45. Change Dashboard**



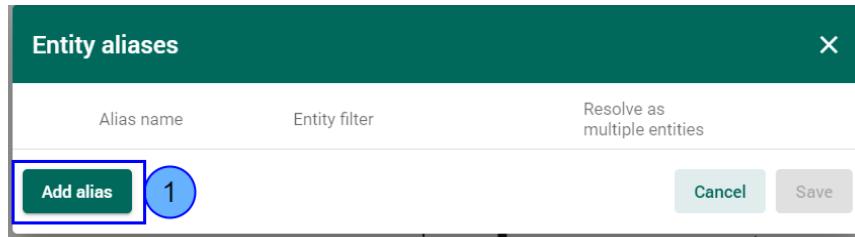
2. Click on Entity aliases (step 1).

**Figure 46. Entity aliases**



3. Click on **Add alias** (step 1).

**Figure 47. Go to Add alias**



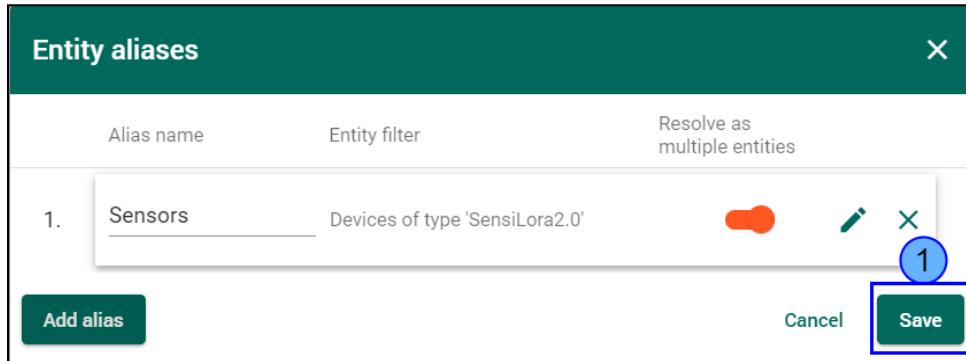
4. In Add alias enters the name: **Sensors** (step 1), and next choose **Device type** (step 2), in Device type, enter the **SensiLora 2.0** type (step 3), and click **Add** (step 4).

**Figure 48. Filling Add alias**

The screenshot shows a dark-themed 'Add alias' dialog box. The 'Alias name \*' field contains 'Sensors' with a blue circle and number '1' over it. The 'Resolve as multiple entities' toggle switch is turned on, indicated by a red circle. The 'Filter type \*' section shows 'Device type' selected with a blue circle and number '2'. The 'Device type \*' dropdown menu is open, showing 'SensiLora2.0' with a blue circle and number '3' over it. At the bottom right is a green 'Add' button with a white border, which has a blue box and a circled number '4' over it. Below the 'Add' button are 'Cancel' and a question mark icon.

5. Click to Save (step 1).

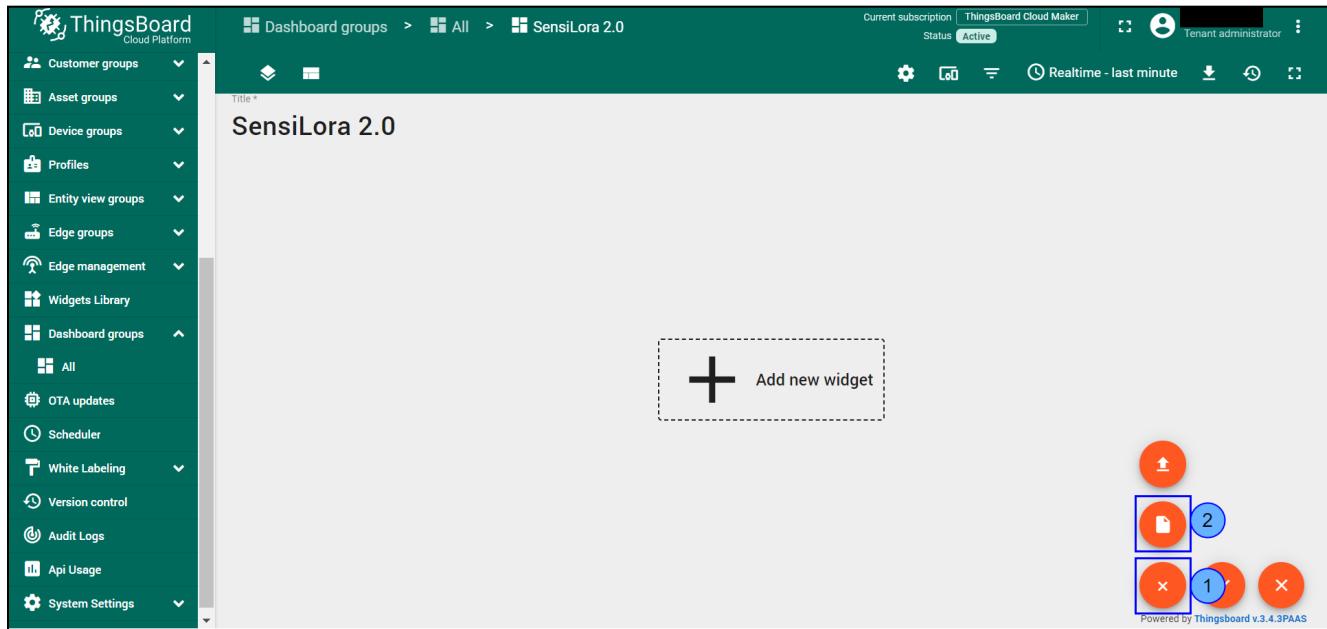
**Figure 49. Save alias**



### 3.6.4 Add Temperature widget

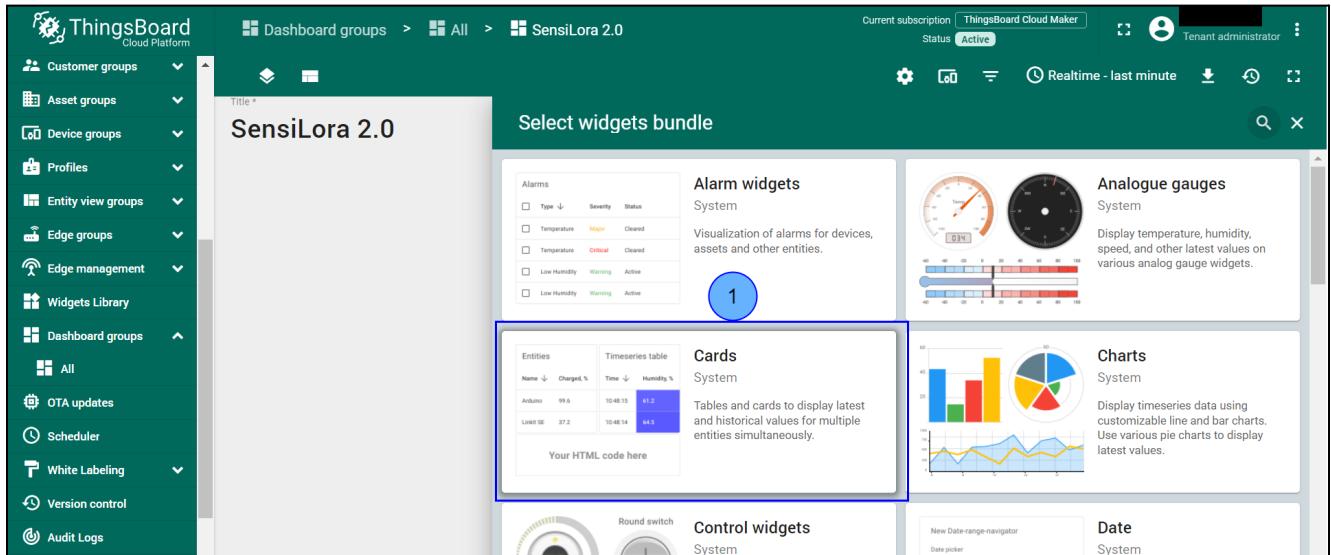
1. Add a new widget. For this click Add new widget (step 1) and choose to Create new widget ( step 2).

**Figure 50. Add widget**



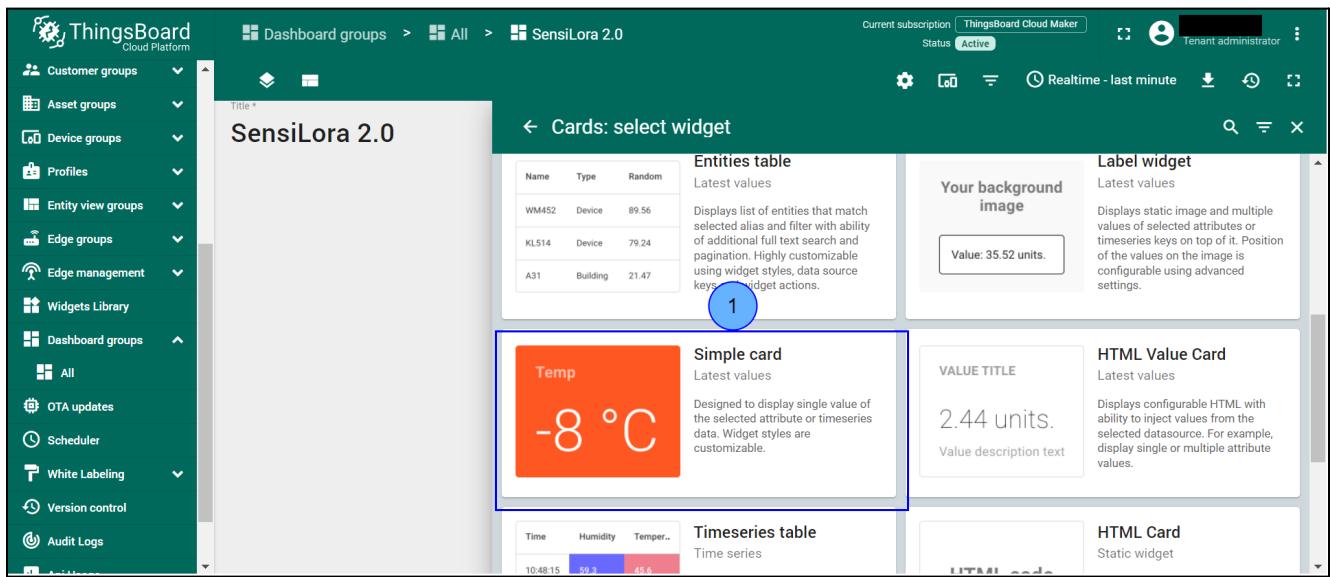
2. Choose the Cards widget bundle (step 1).

Figure 51. Choose the Cards widget



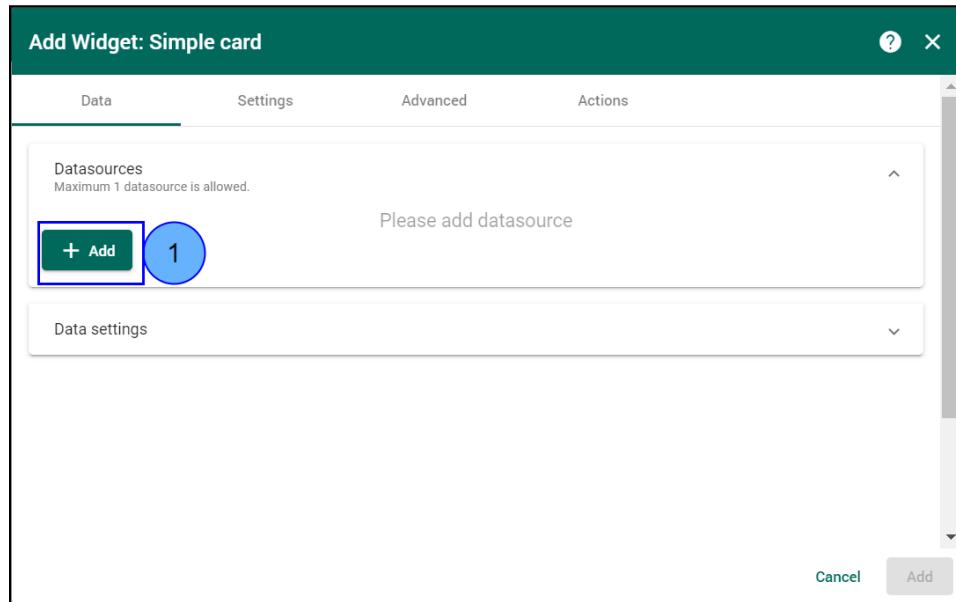
3. Choose the Simple card widget (step 1).

Figure 52. Choose the Simple card



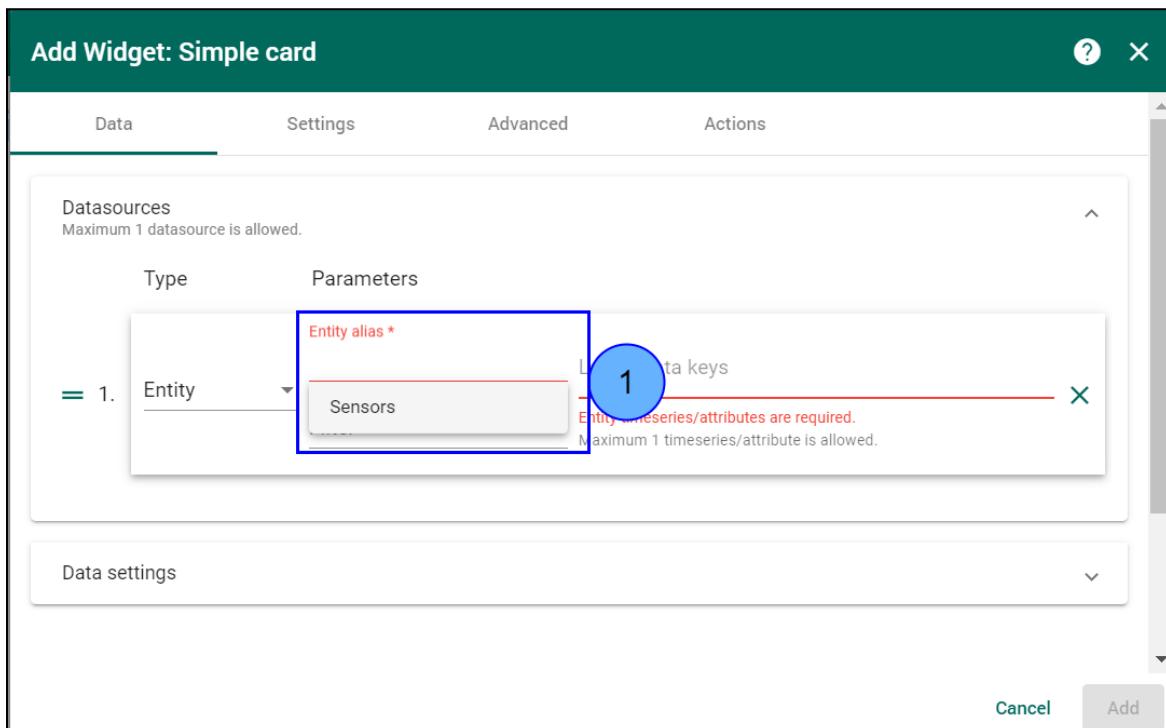
4. Click to Add datasource (step 1).

**Figure 53. Add Datasource**



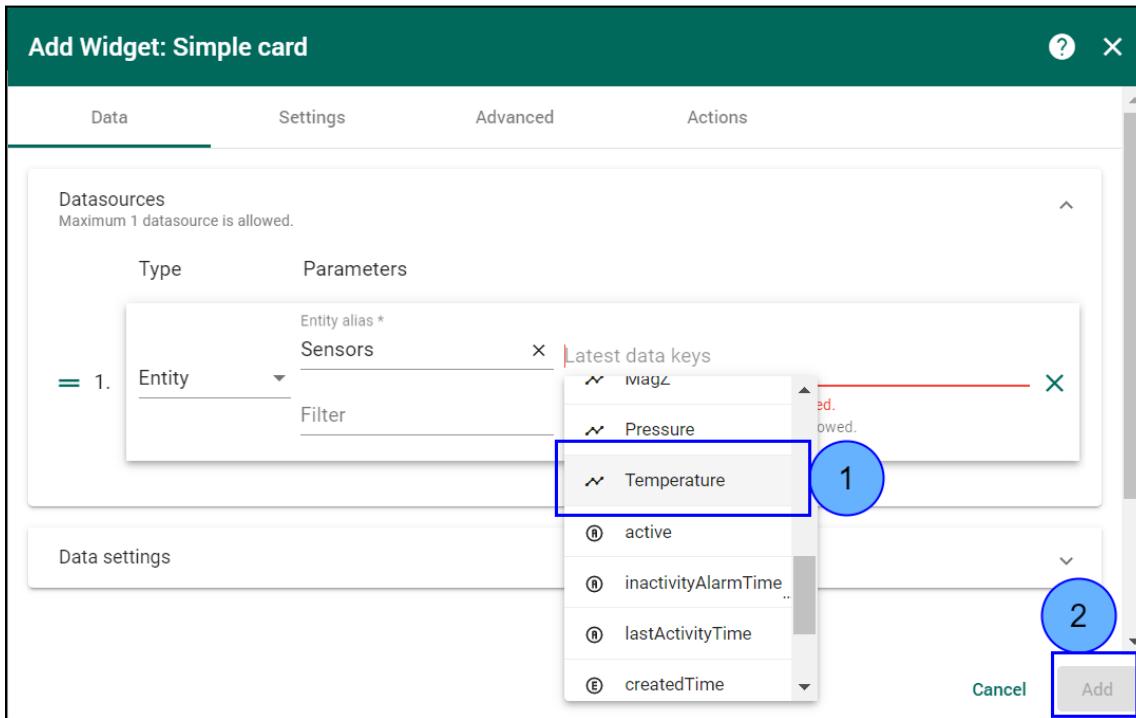
5. In Entity alias choose Sensors (Step 1).

**Figure 54. Entity alias**



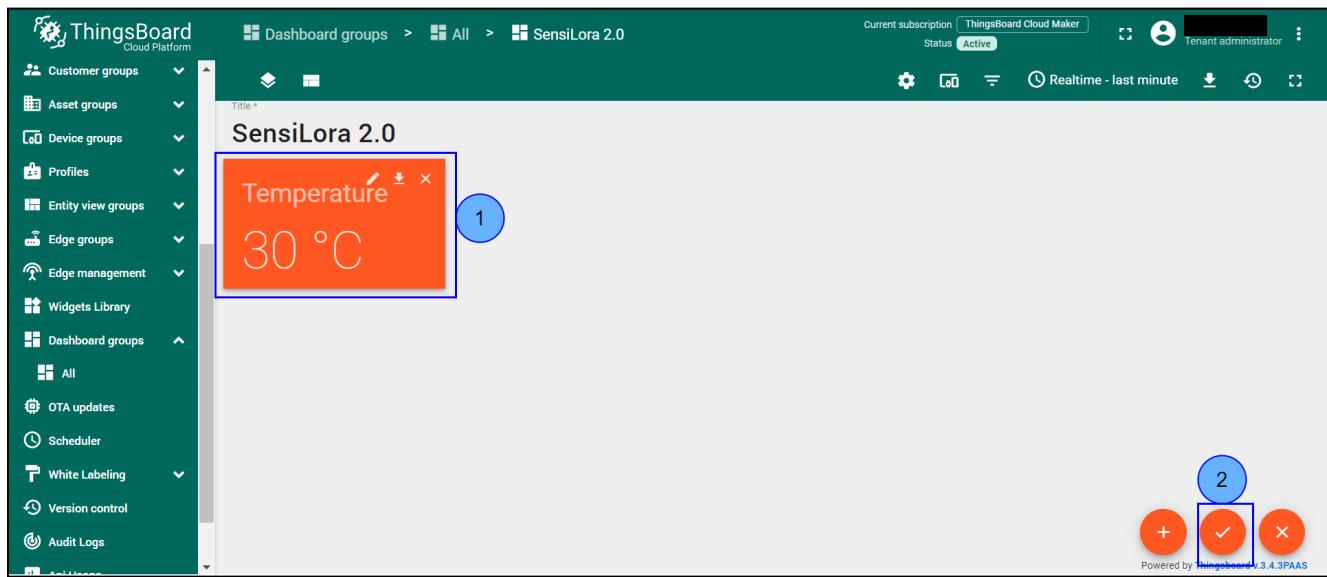
6. Choose the Temperature key (step 1) and click Add (step 2).

**Figure 55. Add a Simple card**



7. The added widget can be seen on the Dashboard (step 1) click to Save changes (step 2).

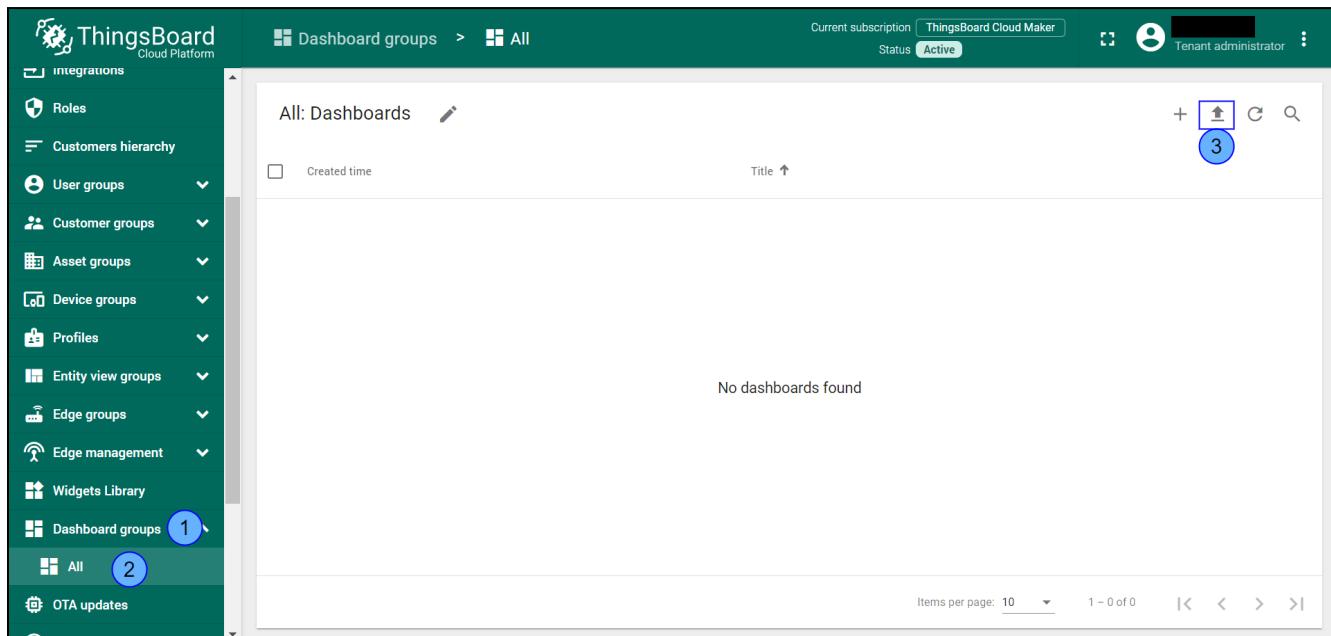
**Figure 56. Save Dashboard**



### 3.6.5 Import Dashboard

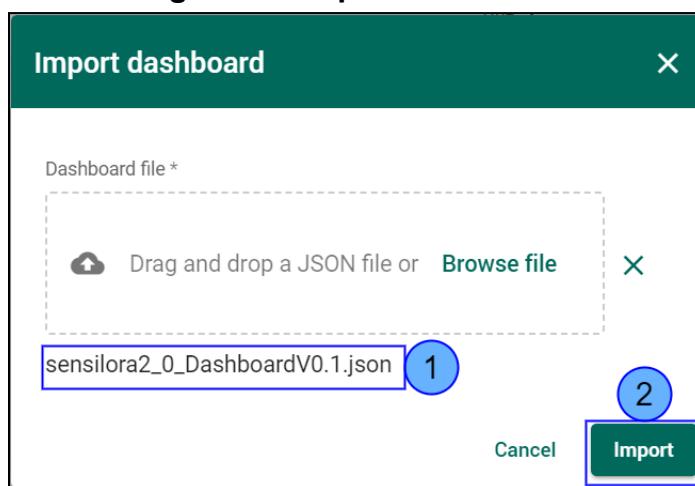
1. Download the Dashboard: [SensiLoRa2\\_0\\_DashboardV0.1.json](#)
2. Go to **Dashboard groups** (step 1), **All** (step 2), and click **Import dashboard** (step 3).

**Figure 57. Choose Import Dashboard**



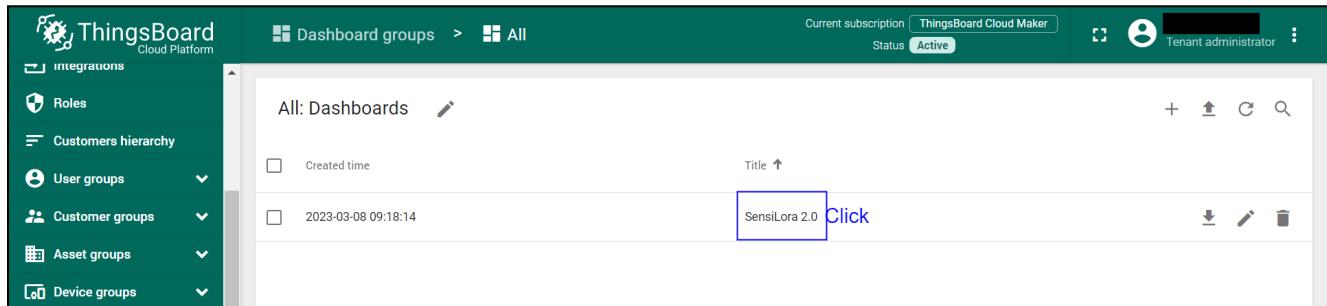
3. Drag and drop the download Dashboard. Import Dashboard should be displayed (step 1), after clicking Import (step 2).

**Figure 58. Import Dashboard**



#### 4. Go to SensiLoRa 2.0 Dashboard.

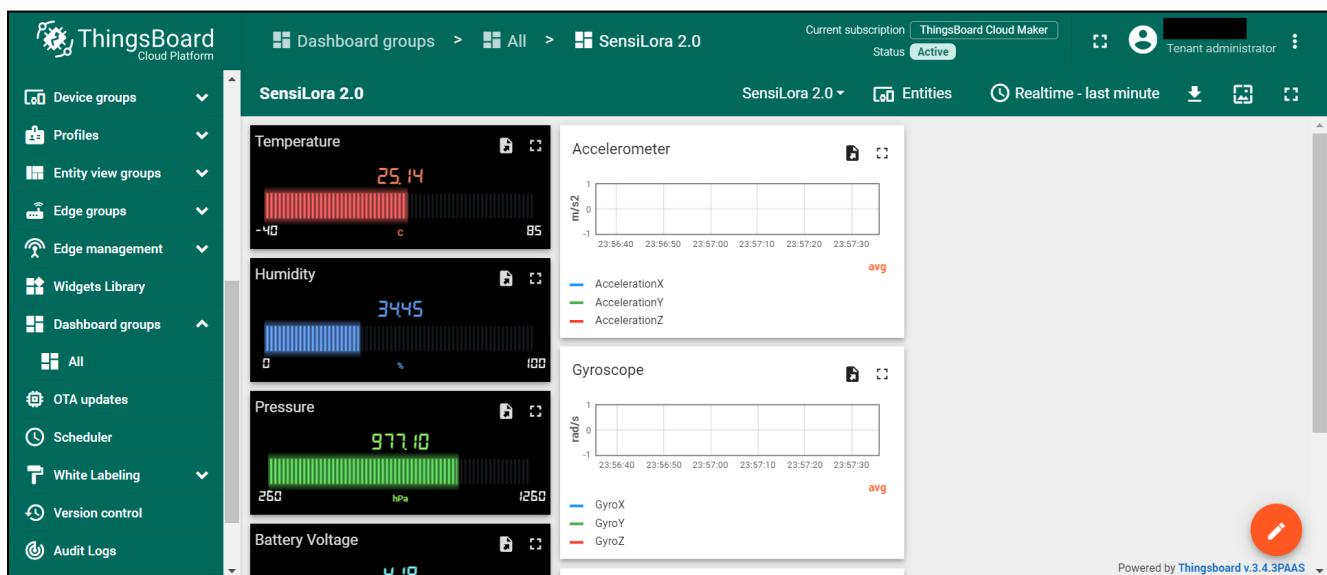
**Figure 59. Go to Dashboard**



#### 5. In SensiLoRa 2.0 Dashboard the following widgets are located:

- **Temperature**, units: °C
- **Humidity**, units: %
- **Pressure**, units: hPa
- **Battery voltage**, units: V
- **Light**, units: lux
- **Accelerometer**, units: m/s<sup>2</sup>
- **Gyroscope**, units: rad/sec
- **Magnetometer**, units: µT

**Figure 60. SensiLoRa 2.0 Dashboard**

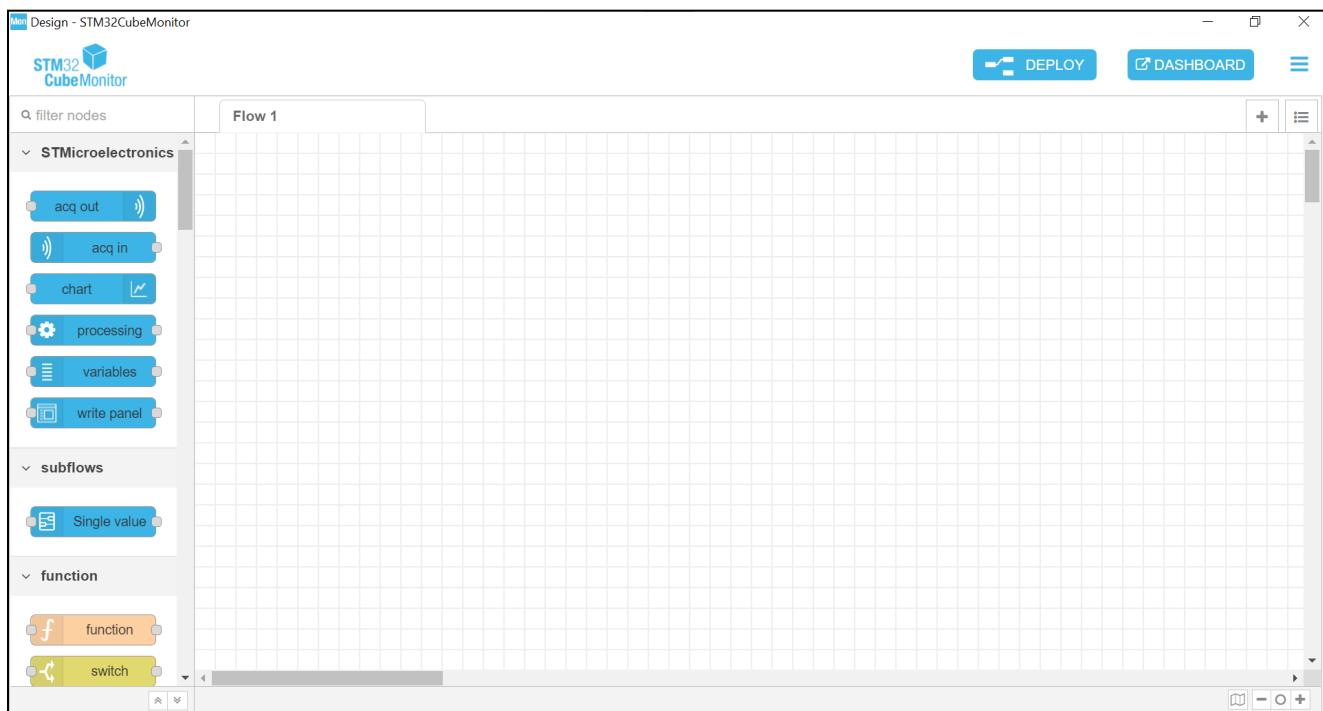


## 4 STM32CubeMonitor

### 4.1 Install STM32CubeMonitor

1. Download and install a program from the ST site at this link [STM32CubeMonitor](#) and download an example project by this link [SensiLoRaCubeMonitorV0.3.json](#). The main window STM32CubeMonitor is illustrated in Figure 61.

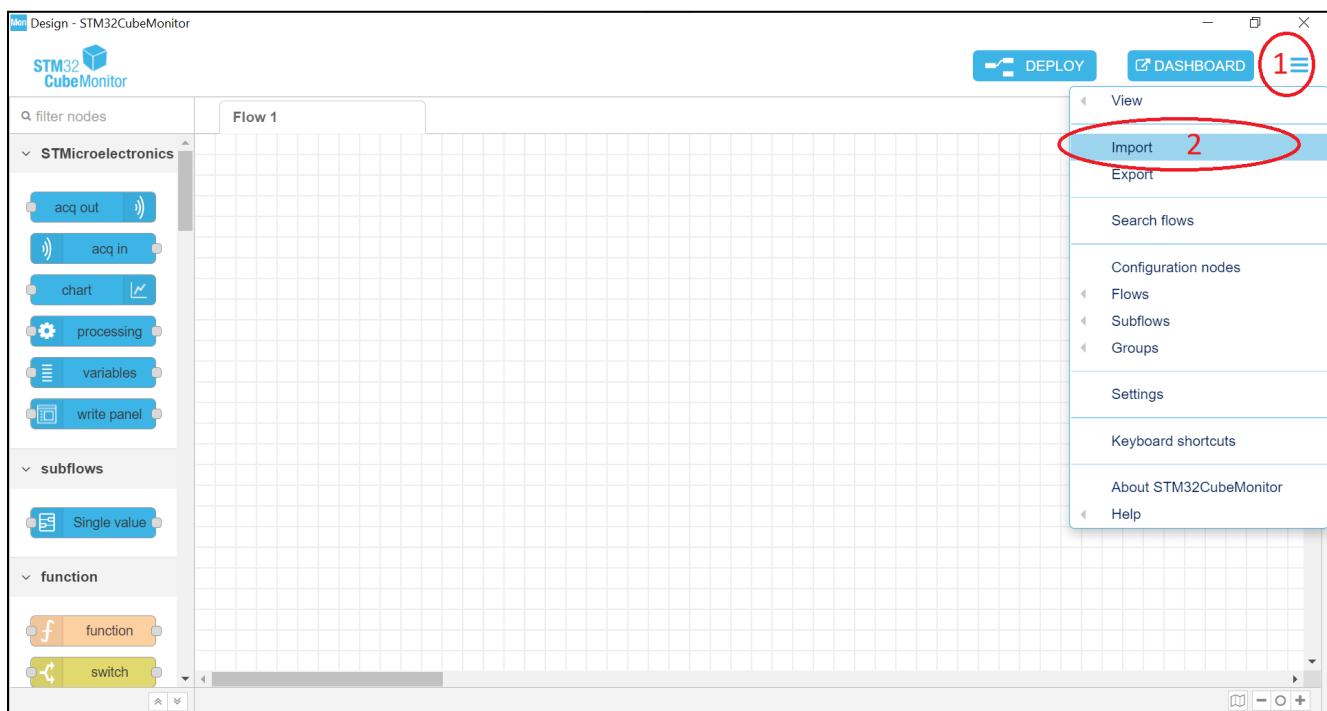
**Figure 61. Main window STM32CubeMonitor**



## 4.2 Import project

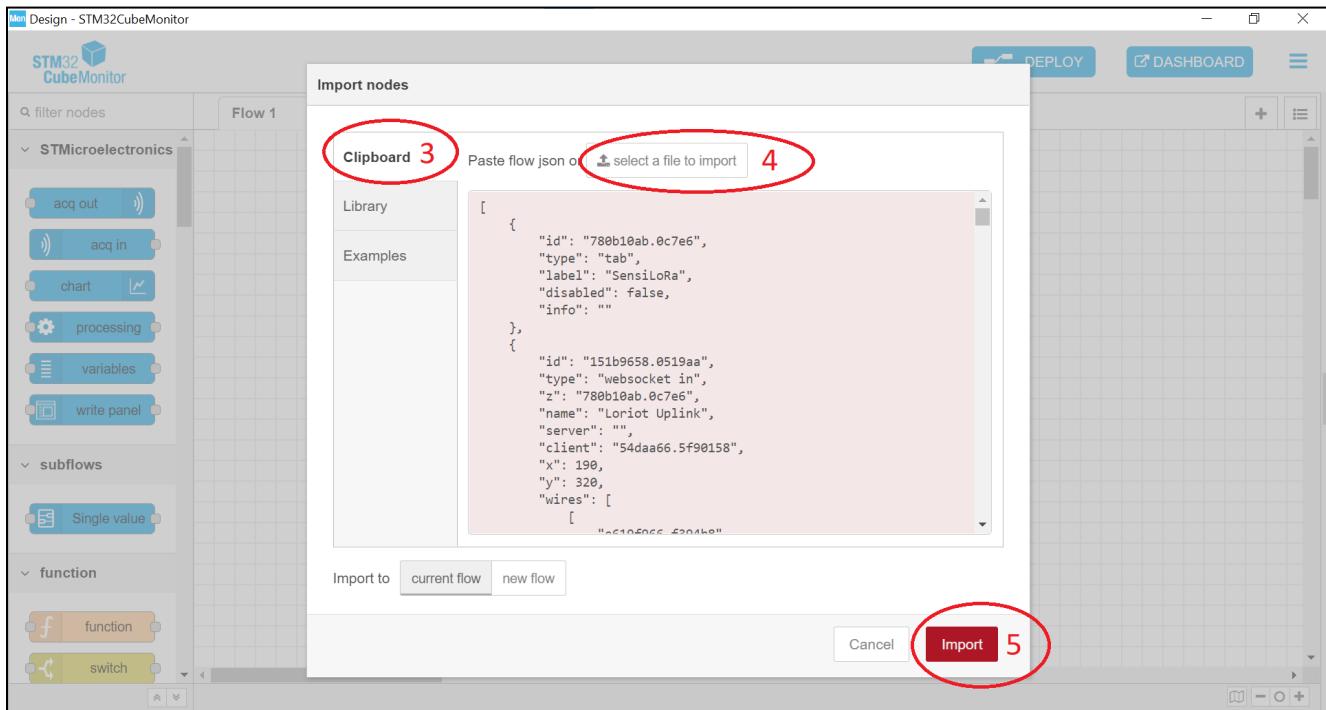
1. Opening the program and clicking on the **selection tab** (step 1), a selection menu will open, and then select **Import** (step 2). This action is illustrated in Figure 62.

**Figure 62. Selection Import menu**



2. A window will open with the choice of a file to import. In the import window, select **Clipboard** (step 3), then click on **select a file to import** (step 4) and select the file [SensiLoRaCubeMonitorV0.3.json](#) which we downloaded. After selecting the file click on **Import** (step 5). This action is illustrated in Figure 63.

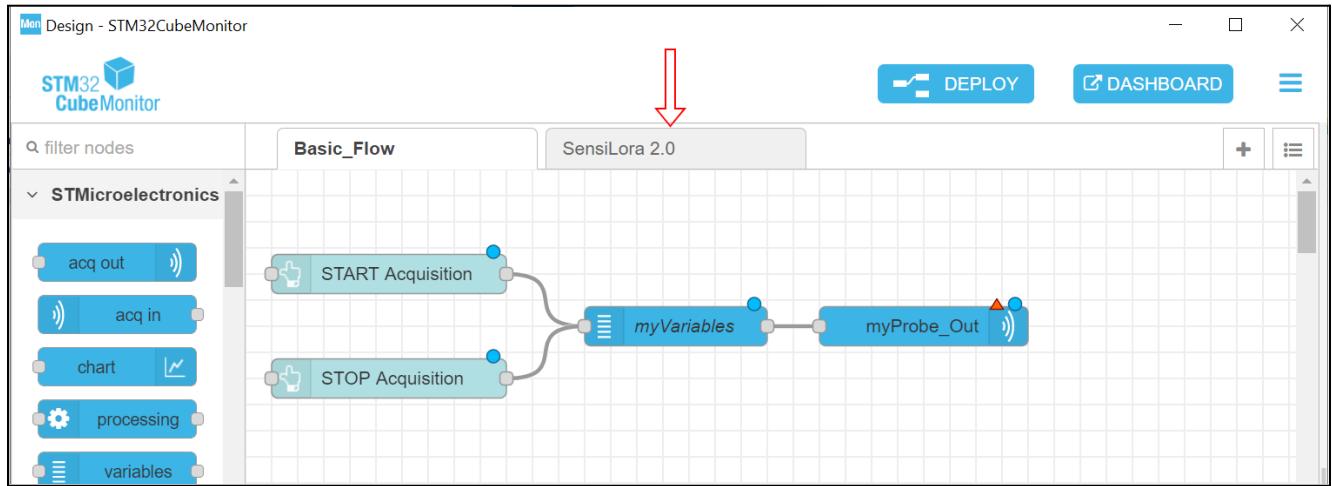
Figure 63. Import project



## 4.3 Configuration Loriot Uplink

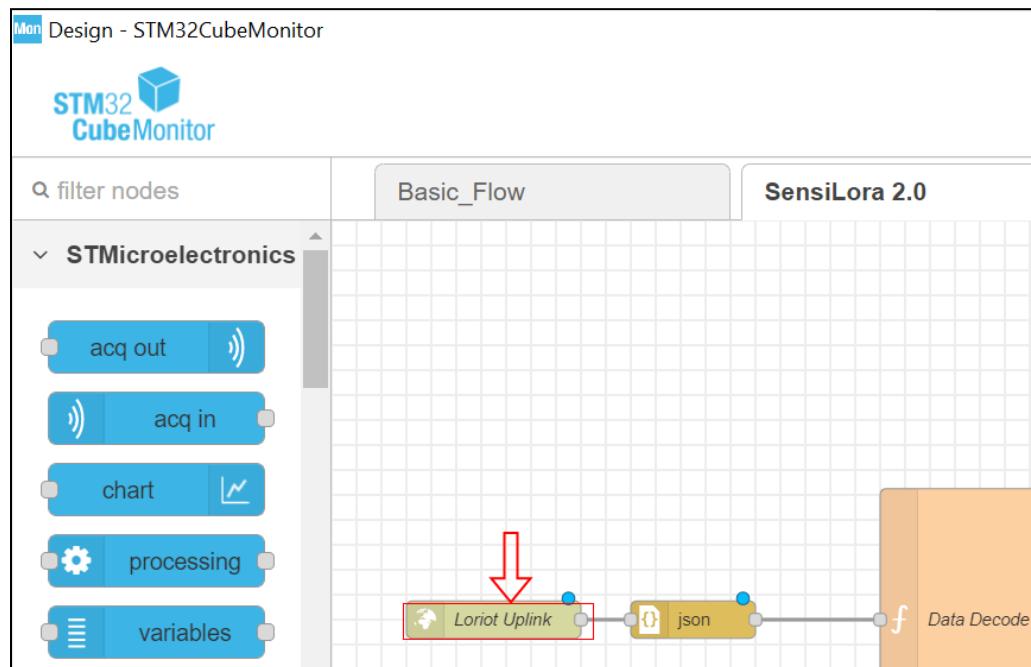
1. Go to the tab SensiLoRa 2.0 (Figure 64).

**Figure 64. Go to the SensiLoRa project**



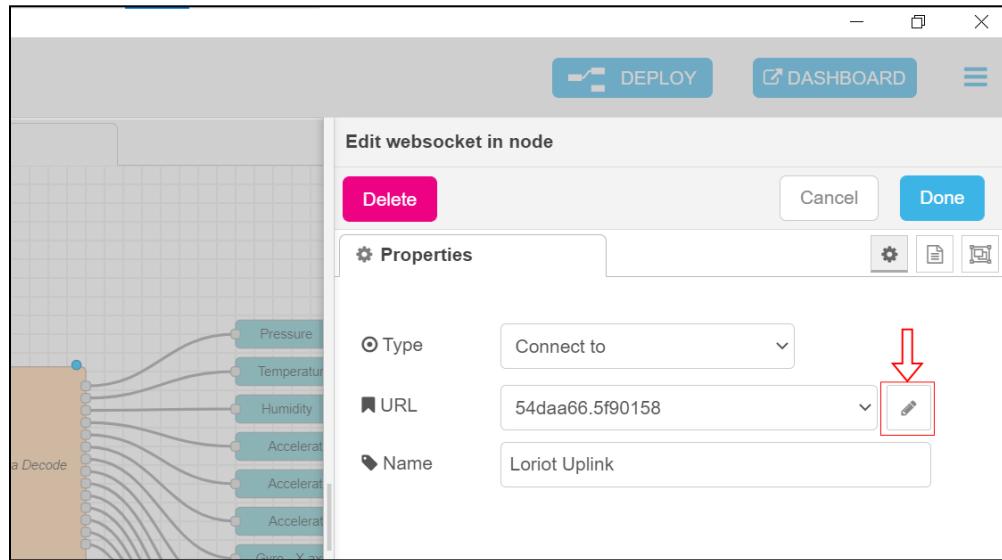
2. Configure the WebSocket Loriot Uplink, and double-click on it to open settings (Figure 65).

**Figure 65. Open Loriot Uplink**



3. When opening the setting window, here we click on the **URL editing icon** ( Figure 66).

Figure 66. Setting the Loriot Uplink

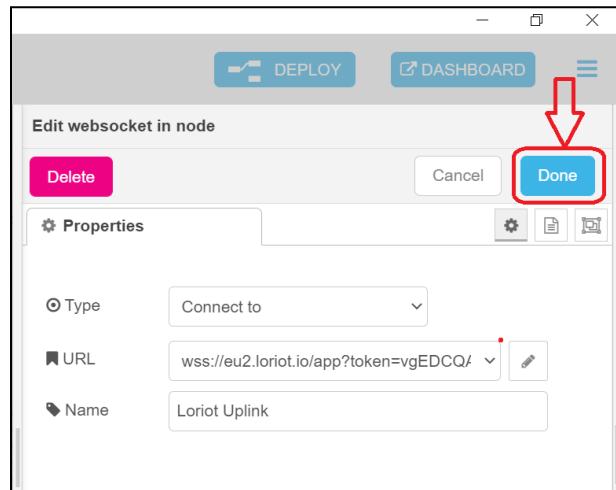


4. In this window, we must insert the URL. If the Loriot server is used, then the link must be taken from [2.4 Loriot Uplink](#). After inserting the URL, click on **Update**. This action is illustrated in Figure 67.

Figure 67. URL

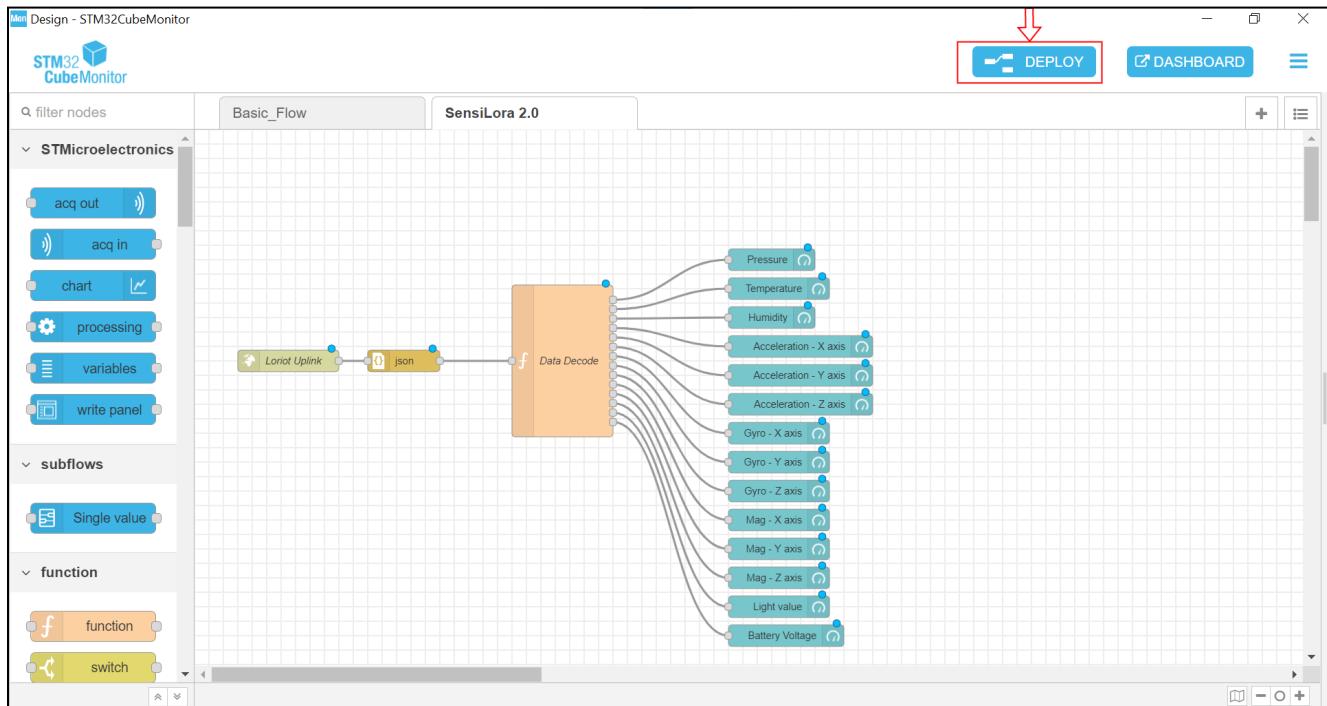
5. Click on **Done** (Figure 68) to save the URL.

**Figure 68. Save the URL**



6. Click on Deploy (Figure 69) so that our changes are saved and take effect.

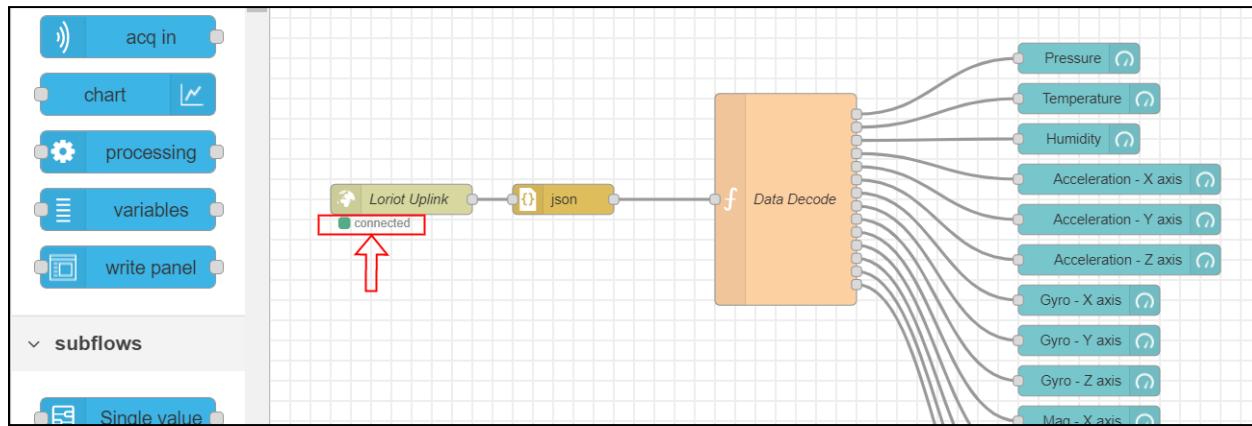
**Figure 69. Deploy**



## 4.4 Dashboard

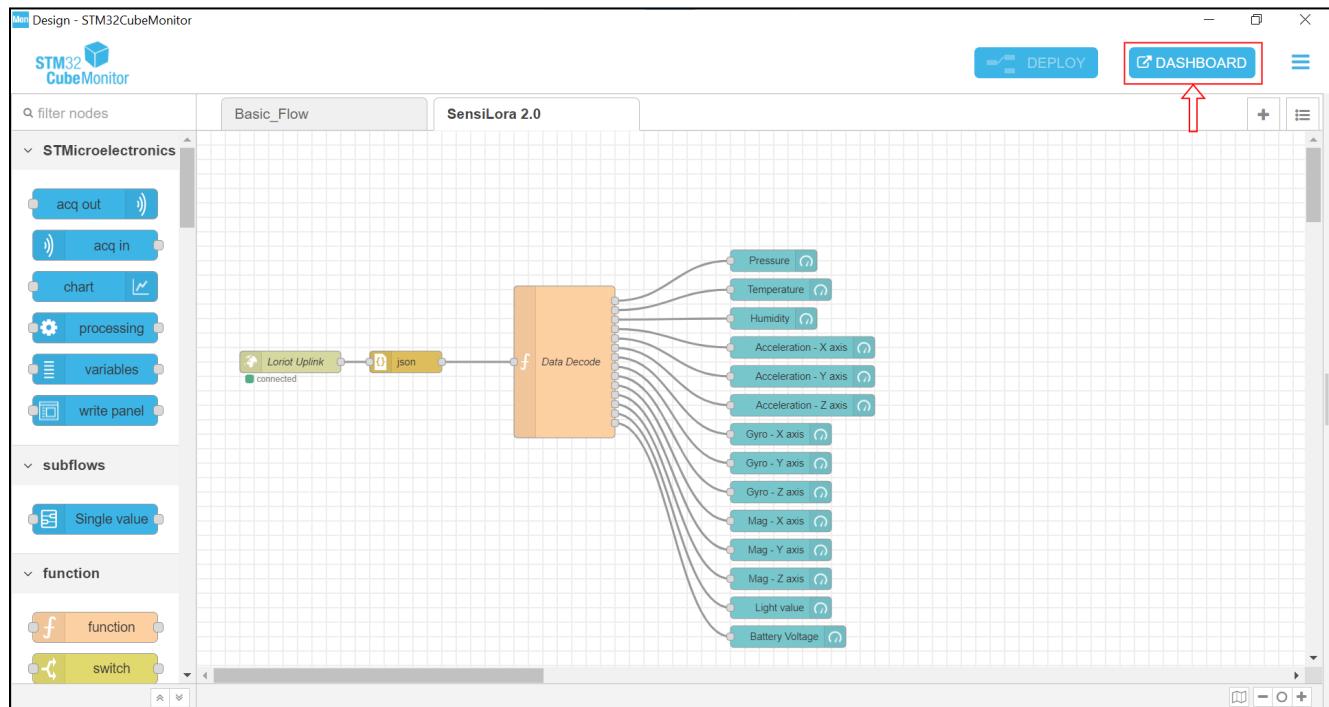
- When we have changed the Server URL to the necessary and their status should be connected (Figure 70).

**Figure 70. Status Loriot**



- Click the DASHBOARD (Figure 71).

**Figure 71. Go to the Dashboard**



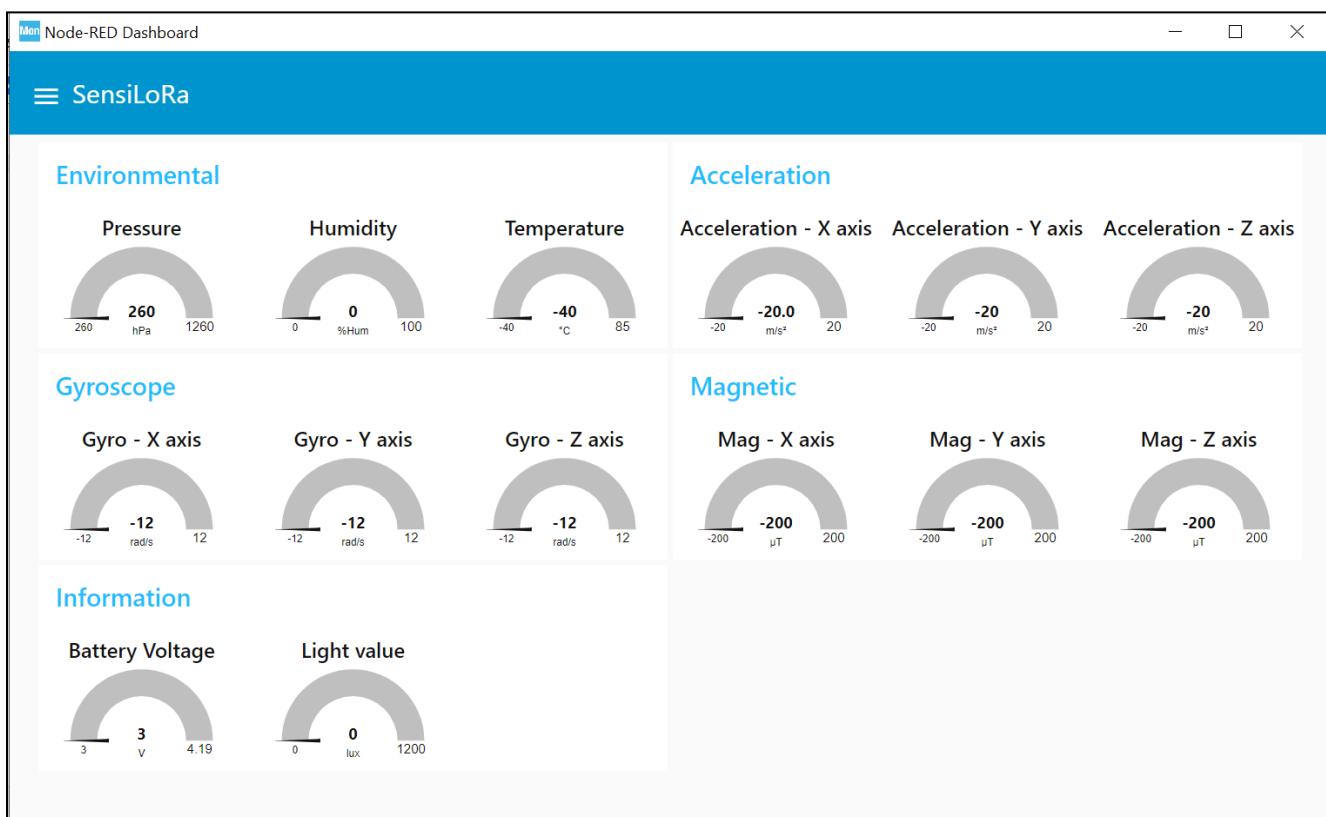
3. If several projects are open, then we need to go to the tab of our project, for this we click on the selection project (step 1) and then click on **SensiLoRa** (step 2). This action is illustrated in Figure 72.

**Figure 72. Selection of a project**



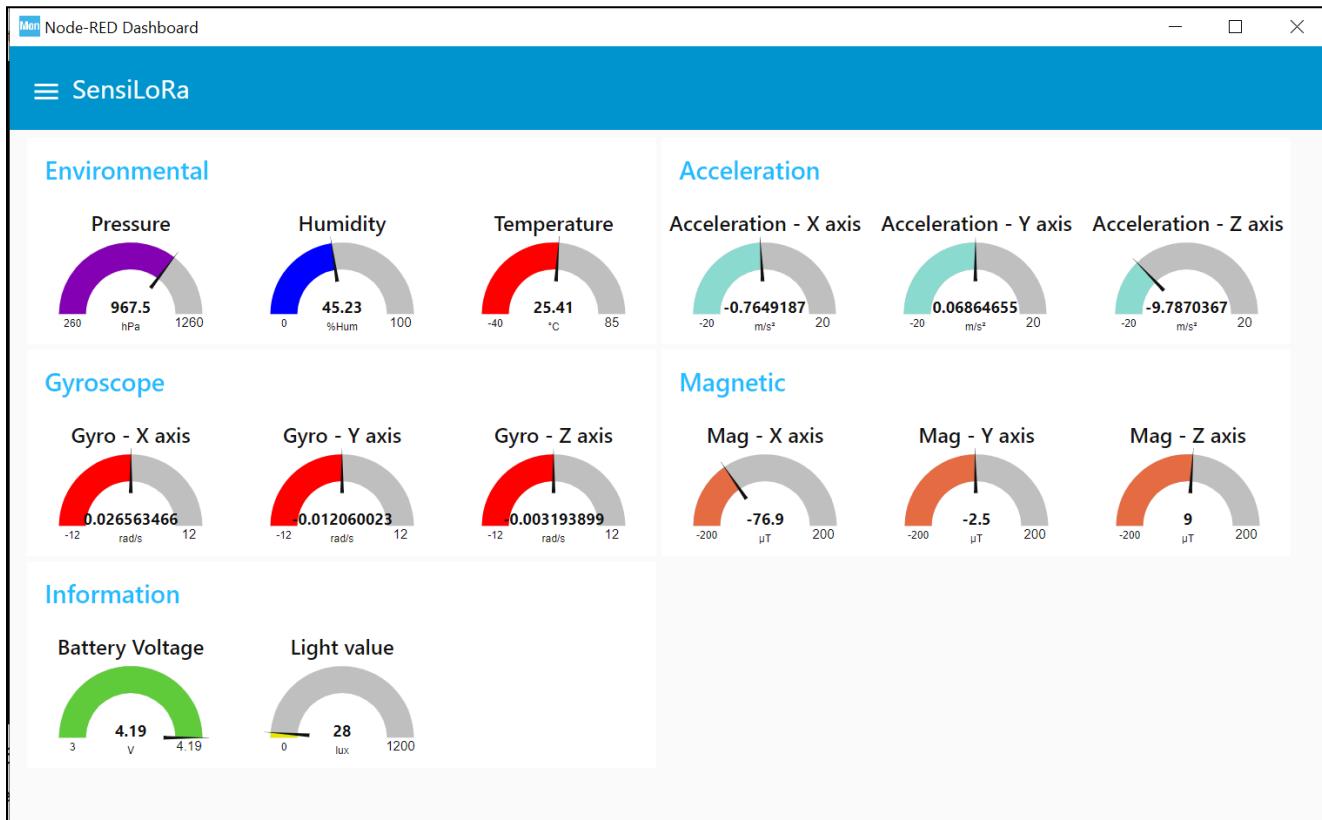
4. After selecting the project, we should see a window (Figure 73).

**Figure 73. Dashboard SensiLoRa**



5. When the data is sent by SensiLoRa 2.0 to the server Loriot, we will see the value of the sensors (Figure 74).

**Figure 74. Data with sensors**

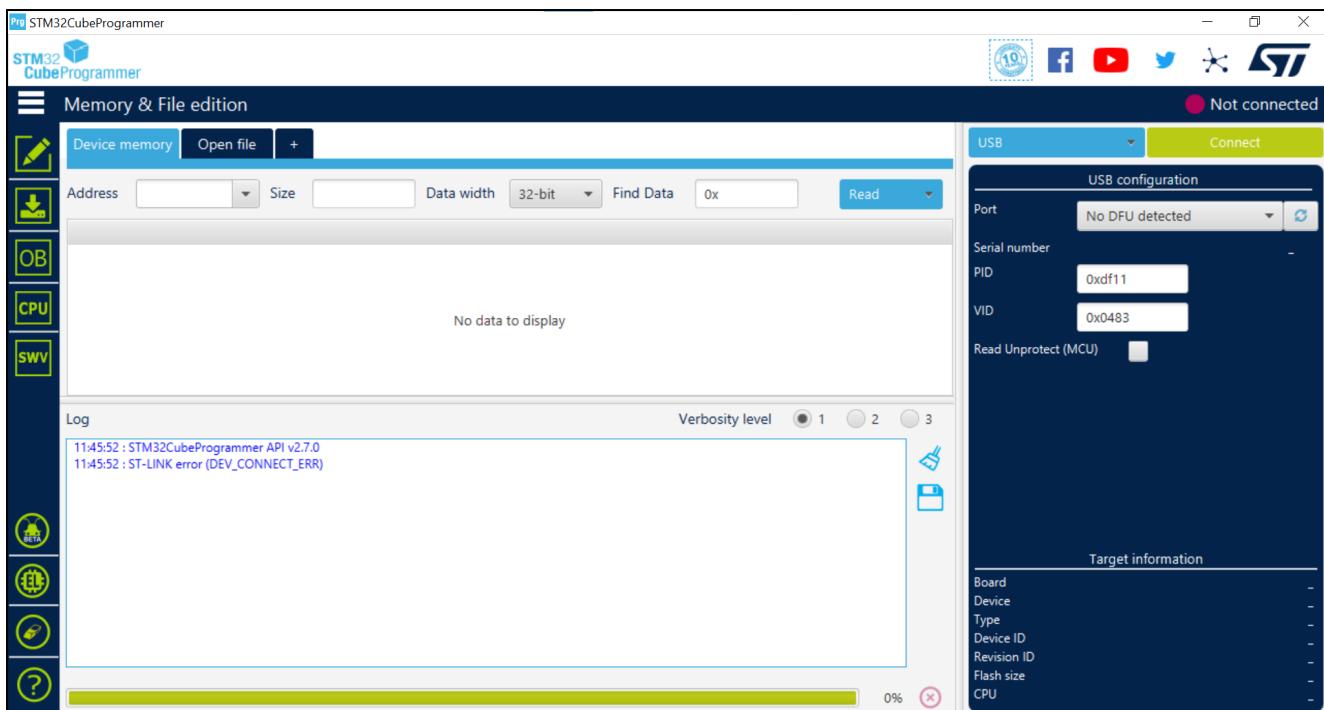


## 5 Flashing SensiLoRa 2.0

### 5.1 Install STM32CubeProgrammer

1. Download and install STM32CubeProgrammer from the ST site at this link: [STM32CubeMonitor](#) (Figure 75). There are several versions of the firmware, which differ in the operating frequencies of the LoRa, so pay attention to the name of the firmware, the operating frequency is indicated there. Download the firmware: ([Firmware SensiLoRa 2.0](#)).

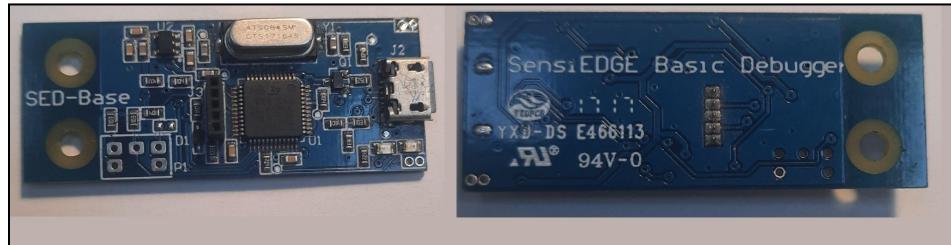
**Figure 75. STM32CubeProgrammer**



## 5.2 Flashing with SensiEdge Basic Debugger

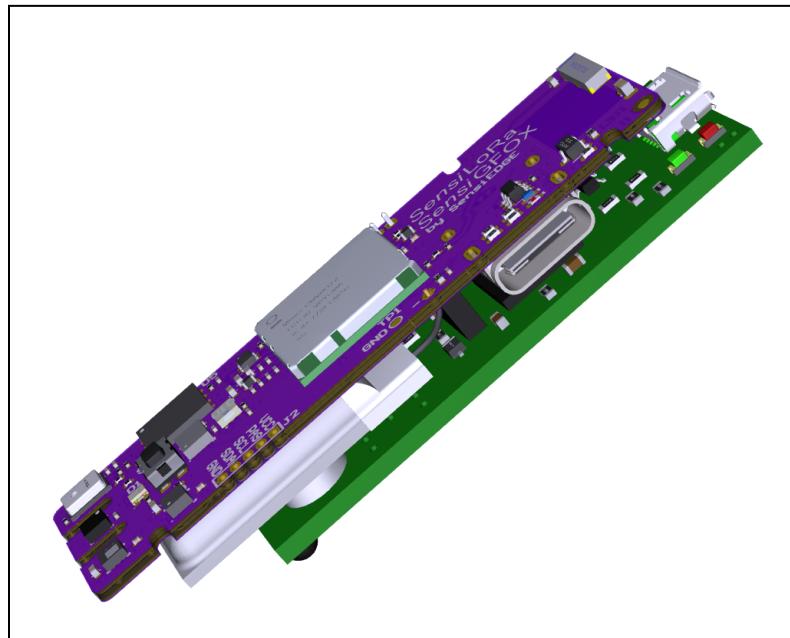
1. For the programming SensiLoRa 2.0 use the programmer SensiEdge Basic Debugger (Figure 76), if you don't have one, then go to [4.3 Flashing via USB Type-c.](#)

**Figure 76. SensiEdge Basic Debugger**



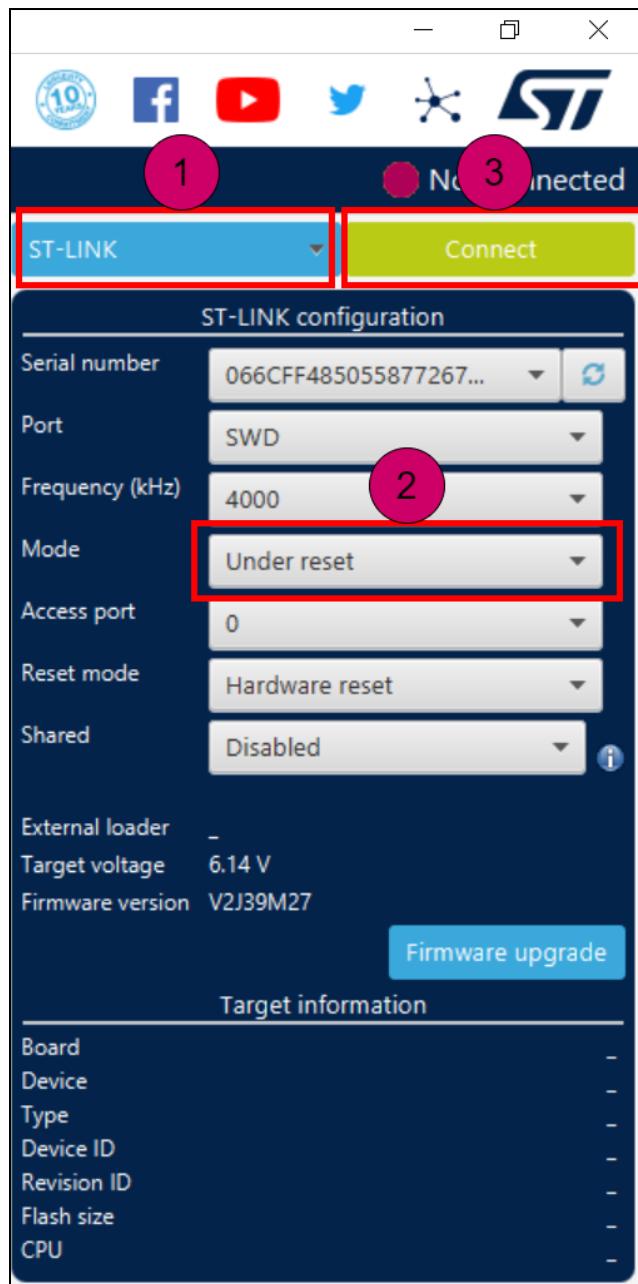
2. Connect the SensiLoRa 2.0 to the programmer SensiEdge Basic Debugger (Figure 77) and then connect the USB to the programmer.

**Figure 77. Connect to programmer**



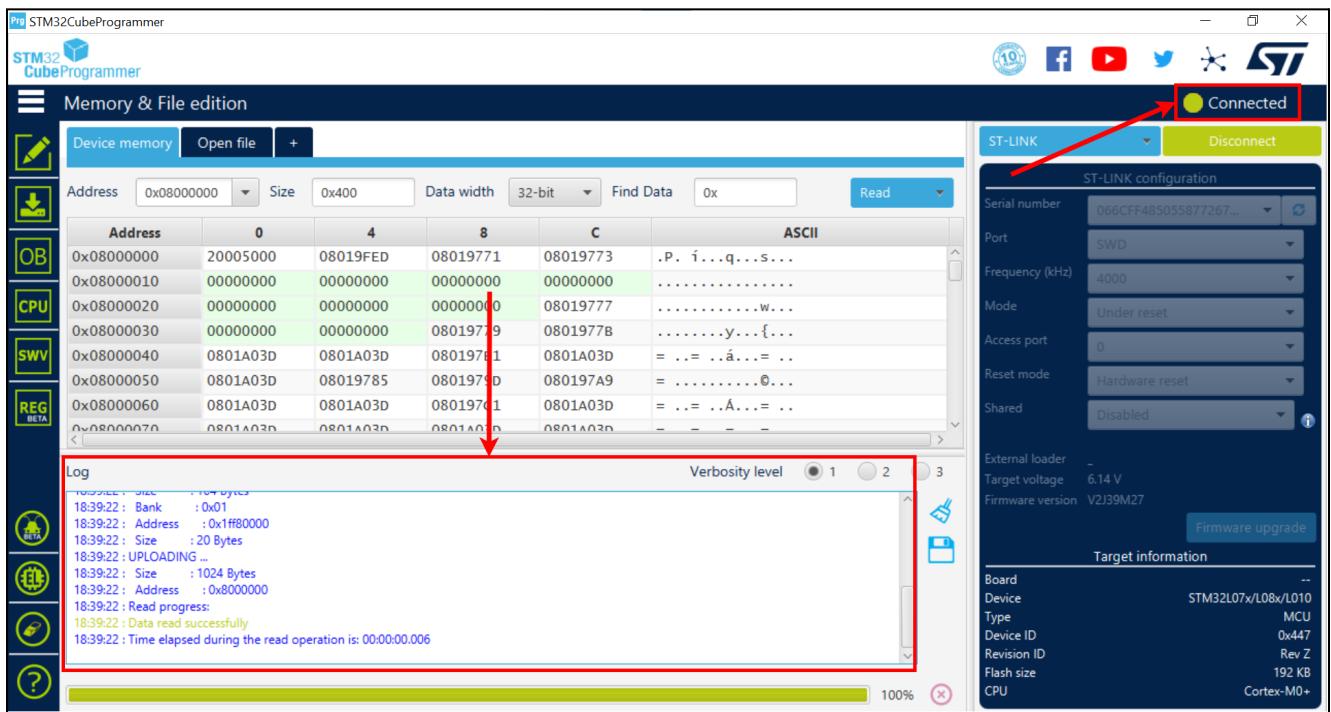
3. Open the program STM32CubeProgrammer and select the **ST LINK** (step 1), in **Mode** select **Under reset** (step 2) and then click on **Connect** (step 3). This action is illustrated in Figure 78.

Figure 78. Connect to SensiLoRa 2.0



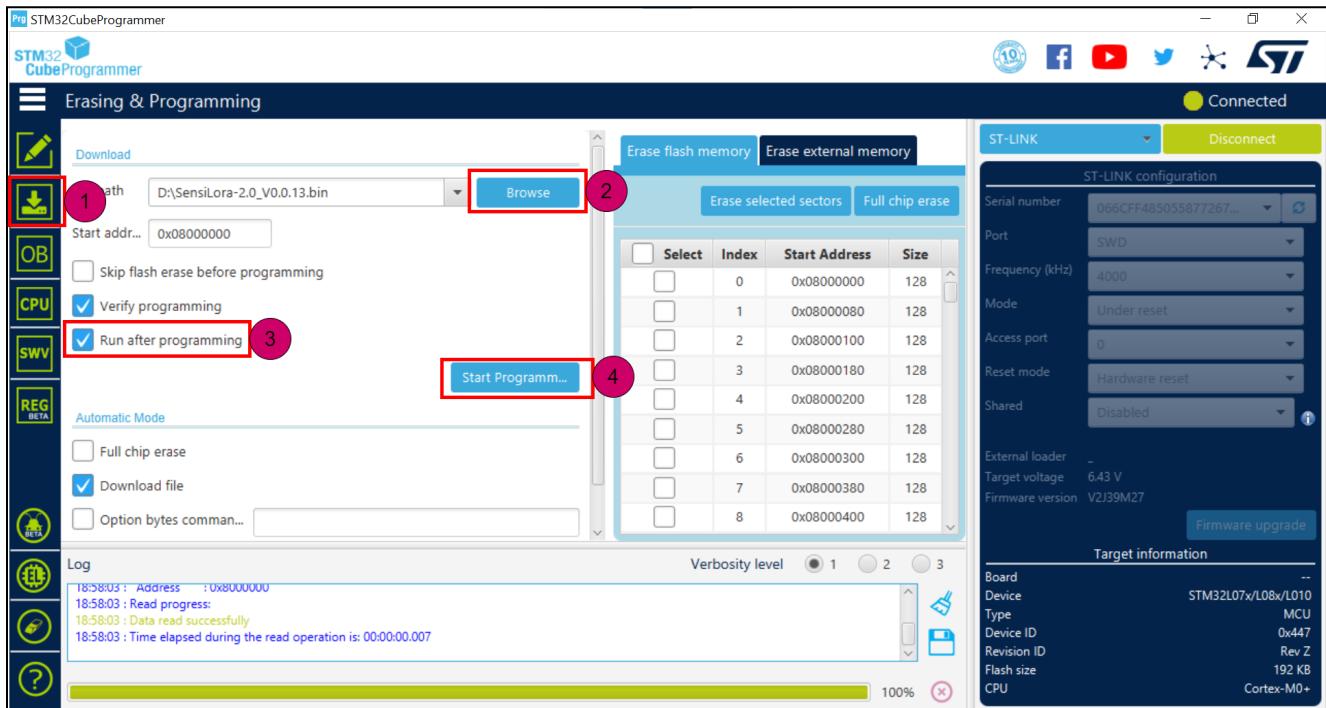
4. If the connection was successful, then we should see information about the controller and status must be **Connected**. This action is illustrated in Figure 79.

**Figure 79. Connect successfully**



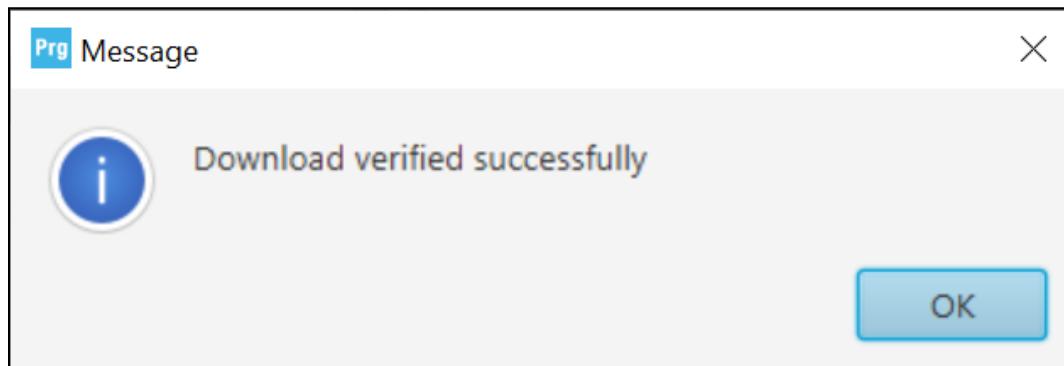
5. After successfully connecting to the controller, select the tab **Erasing & Programming** (step 1) then click on the button **Browse** (step 2) a window will open where we have to specify the firmware file. Where to get the firmware file is described in [4.1 Install STM32CubeProgrammer](#). Check the box for **Run after programming** (step 3) and click **Start Programm....** (step 4). This action is illustrated in Figure 80.

**Figure 80. Programming SensiLoRa 2.0**



6. After successfully loading the firmware, we should see the message Download verified successfully (Figure 81).

**Figure 81. Successful programming**



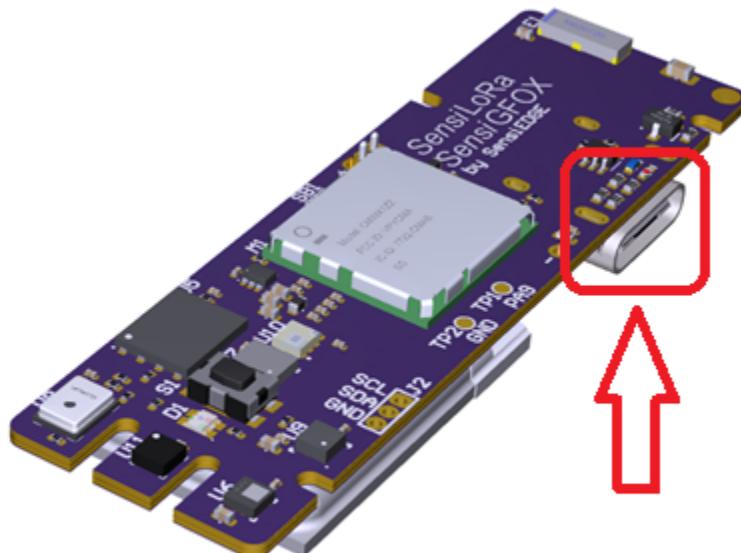
### 5.3 Flashing via USB Type-c

1. For flashing we will use such a program STM32CubeProgramming. First, we must disconnect the battery by disconnecting the jumper **J4** (Figure 82), then we must hold down button **S2** (Figure 82) and connect the cable **USB Type-c** (Figure 83) and after a couple of seconds we release the button, and the board enters the programming mode.

**Figure 82. Jumper J4 and Button S2**

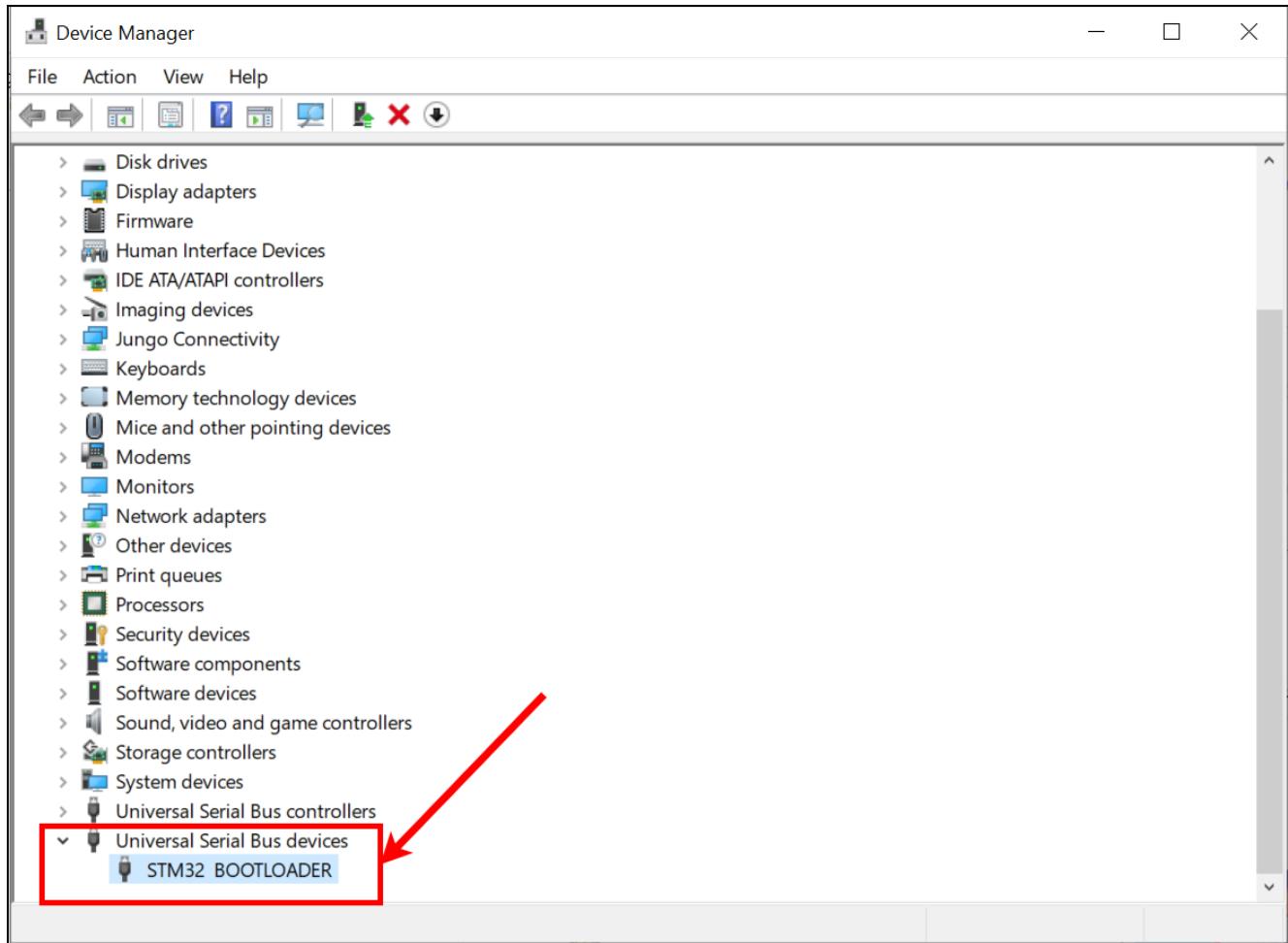


**Figure 83. Connect USB**



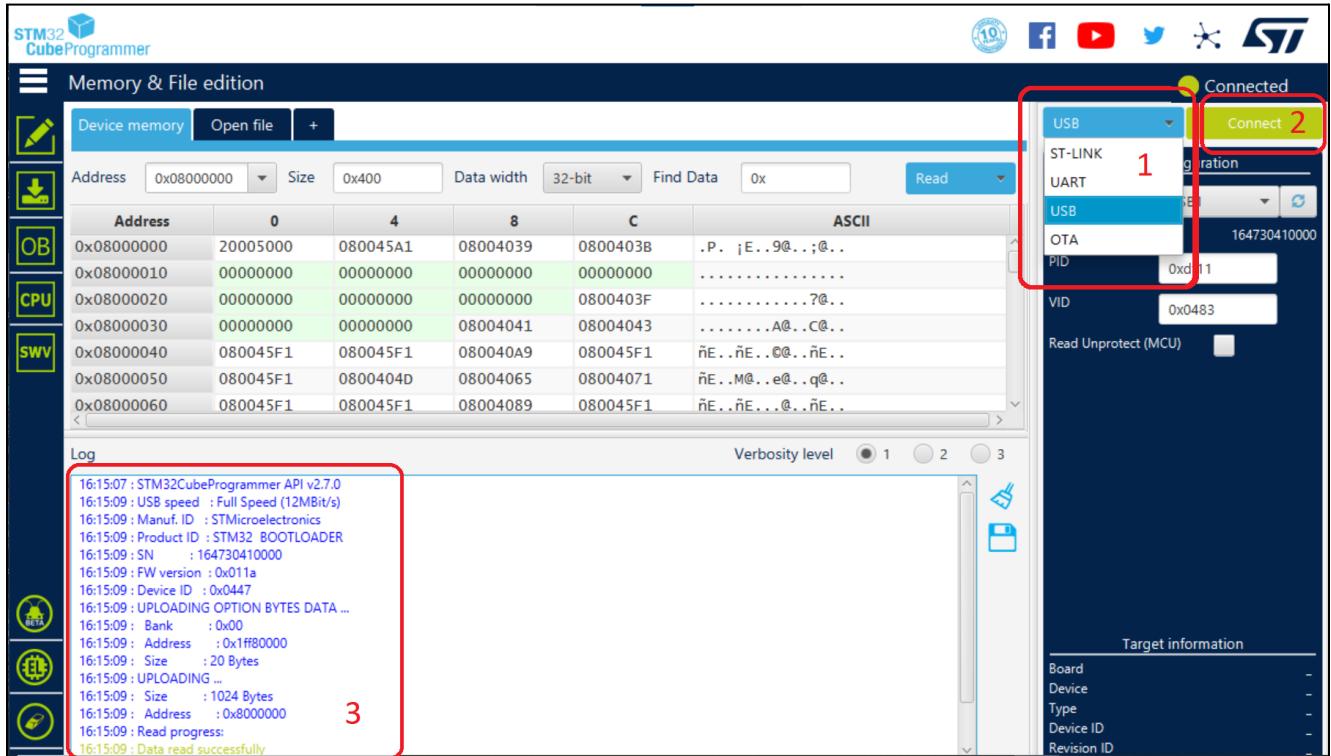
2. In Device Manager should appear STM32 BOOTLOADER (Figure 84). If this does not happen, repeat step 1.

Figure 84. STM32 BOOTLOADER



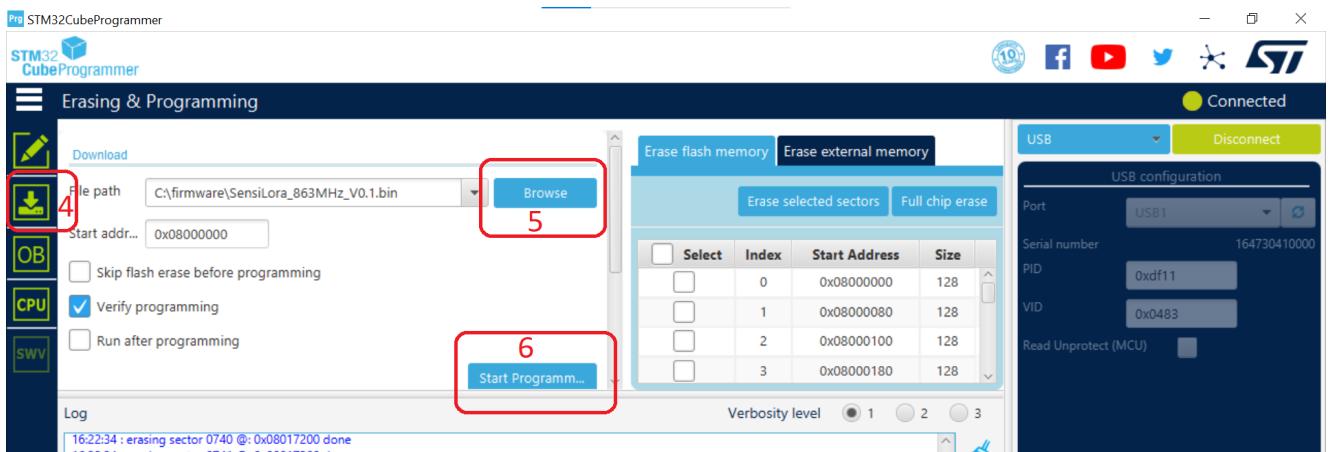
3. Open the program STM32CubeProgrammer and select the USB (step 1) and then click on Connect (step 2) and if the connection was successful, then we should see information about the controller (step 3). This action is illustrated in Figure 85.

Figure 85. Connect via USB



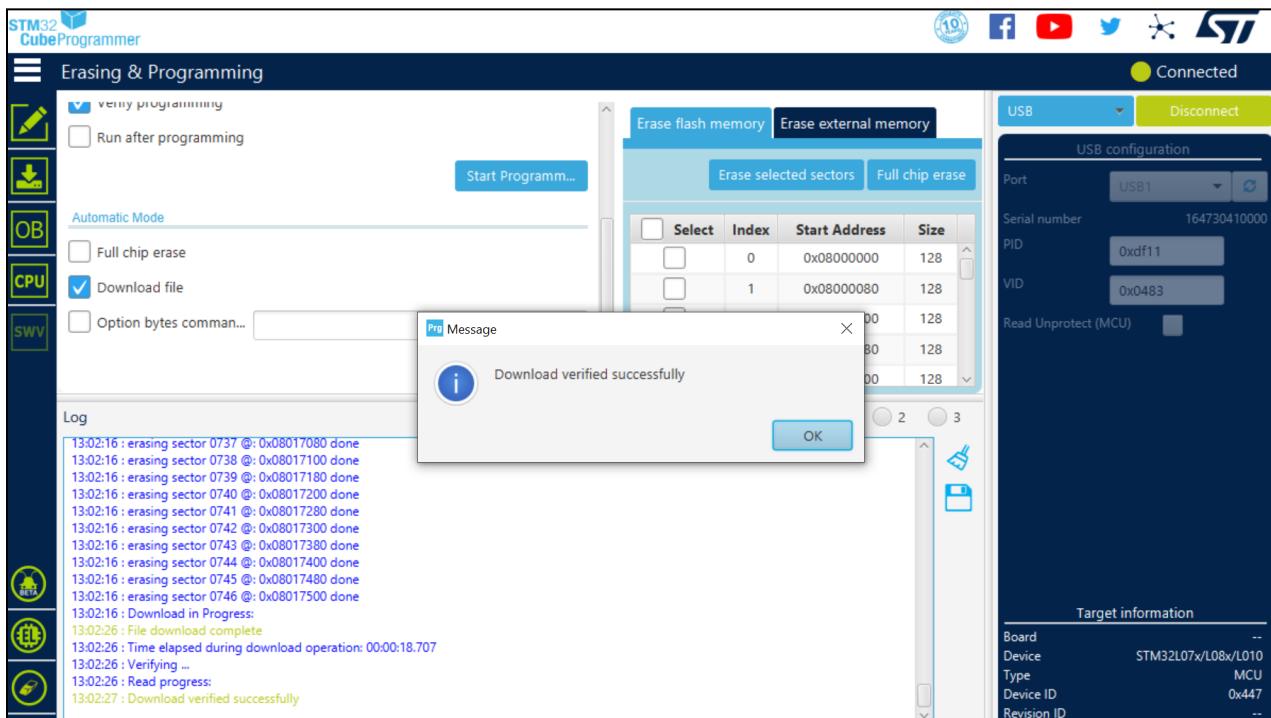
4. After successfully connecting to the controller, select the tab **Erasing & Programming** (step 4) then click on the button **Browse** (step 5) a window will open where we have to specify the firmware file. Where to get the firmware file is described in [4.1 Install STM32CubeProgrammer](#). After selecting the firmware file, press **Start Programm....** This action is illustrated in Figure 86.

Figure 86. Programming via USB



5. After successfully loading the firmware, we should see the message Download verified successfully (Figure 87). After that, you can disconnect the device from the computer and return the jumper J4.

**Figure 87. Successful programming**

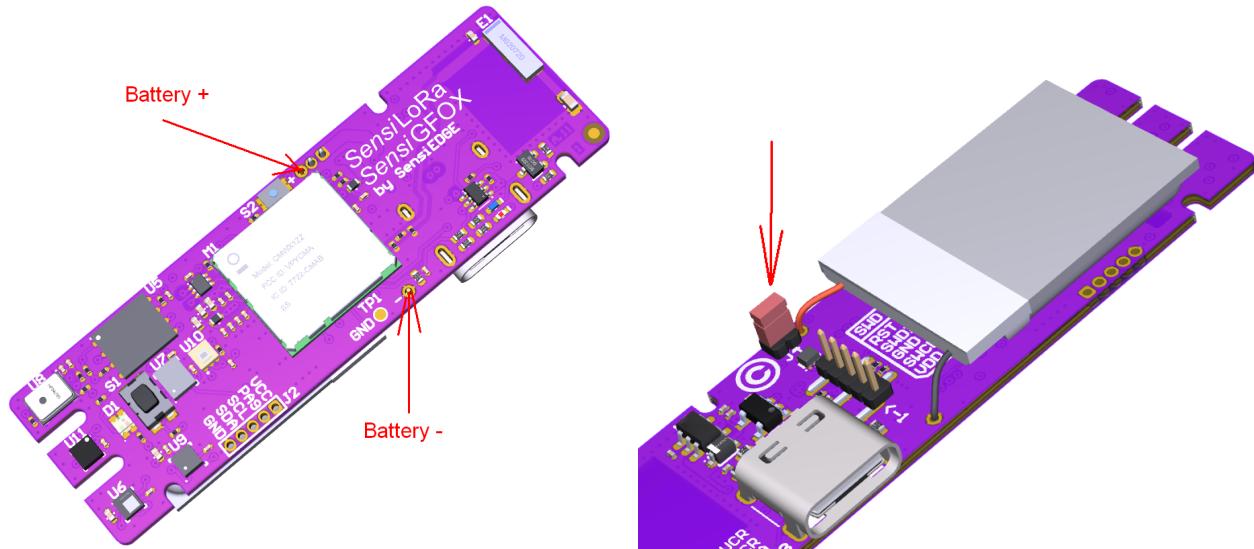


## 6 Battery power

### 6.1 Overview

1. SensiLoRa 2.0 integrating **SILA-UCR** (LoRa) and **SIFA-UCR** (Sigfox). Same hardware but different Software Firmware. Every board comes with a Rechargeable battery of 100mA. The battery is soldered but disconnected until the user will close the jumper. Install a jumper in J4 to operate the device on battery power (Figure 88).

**Figure 88. Battery power**



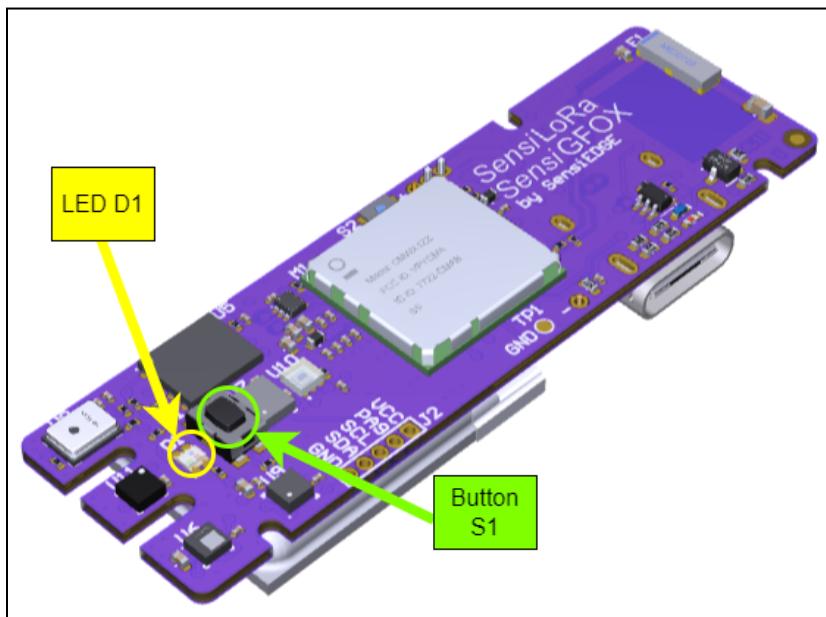
**Warning:** During USB charging additional heating is influence on Temperature and Pressure sensor. Be advised to use the measurement of those sensors only from battery operation.

## 7 Turn on/off SensiLoRa 2.0

### 7.1 Turn on board

1. The SensiLoRa 2.0 board automatically turns on when power is applied.
2. To start the board after turning it off, you need to press the button **S1** (Figure 89) once and after that the **LED D1** (Figure 90) should light up in red for a short period.

**Figure 89. Button and LED placement**



### 7.2 Turn off board

1. to turn off the board, you need to hold down the button **S1** (at least 2 seconds) (Figure 89) until the **LED D1** turns green (Figure 89).
2. The green **LED D1** (Figure 89) should turn off after 2 seconds, after that the SensiLoRa 2.0 board goes into deep sleep and stops sending data to the LoRa server.

3. In sleep mode, the SensiLoRa 2.0 device consumes minimal power from the battery. A fully charged battery will last for 30 days. To completely de-energize the SensiLoRa 2.0 board, you need to disconnect the battery by removing the jumper from the jumper **J4**.

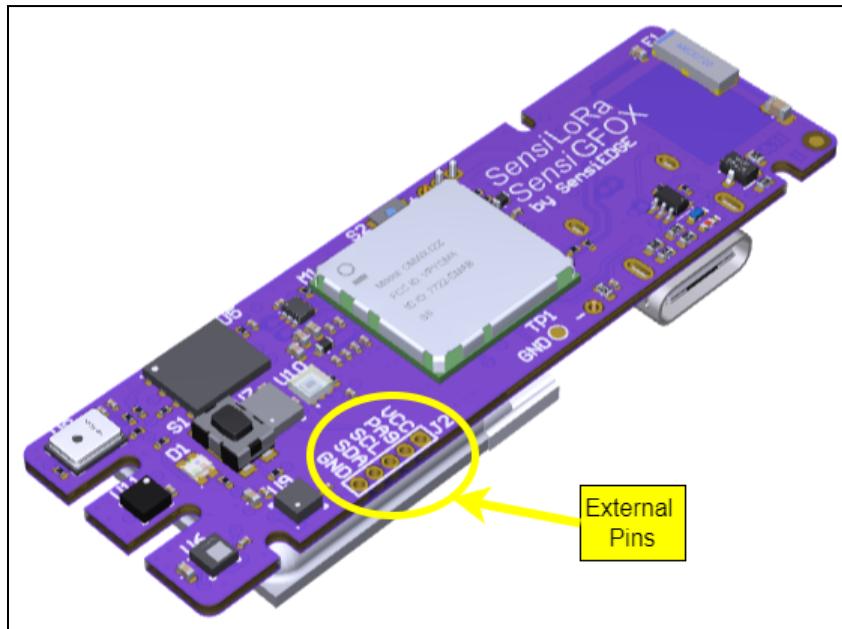
## 8 External pins

### 8.1 Overview

1. The SensiLoRa 2.0 board has a connector **J2** for external connection (Figure 90), it has such pins:

- **VCC** - 3.0 volt supply
- **PA9** - UART TX, for debug information
- **SCL** - the clock signal for I2C
- **SDA** - the data signal for I2C
- **GND** - ground

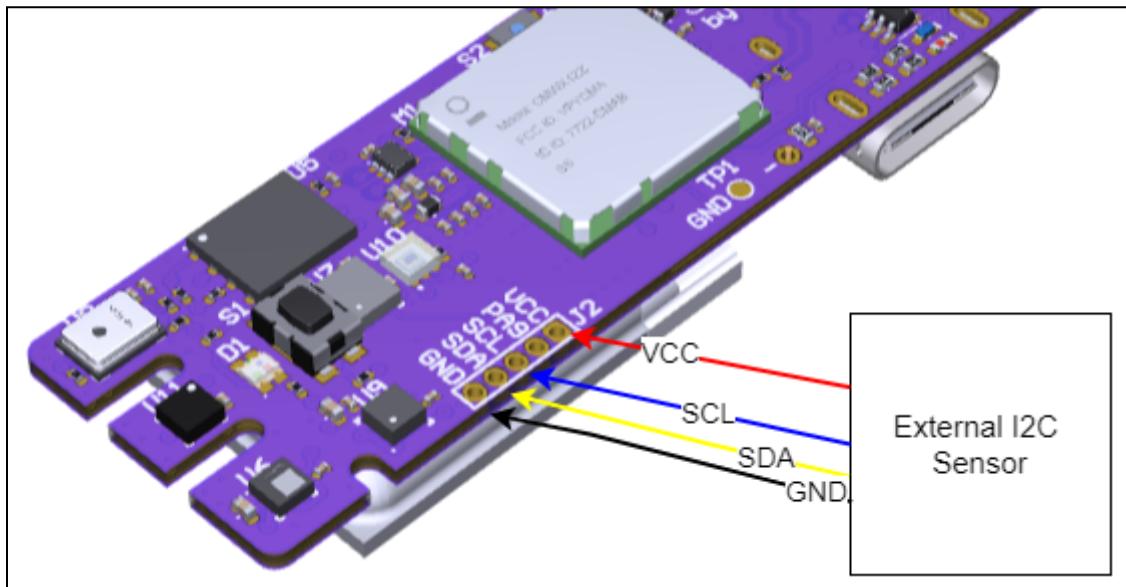
**Figure 90. External Pins**



### 8.2 External I2C

1. To connect an external sensor with an interface I2C for the SensiLoRa 2.0, you need to connect the sensor, as done in (Figure 91).

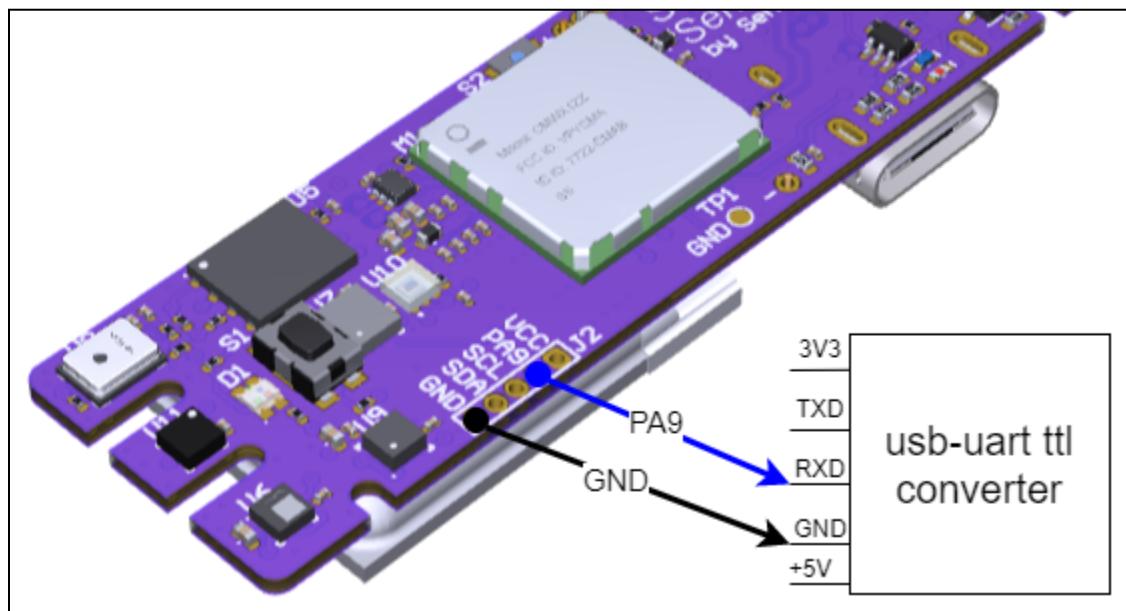
Figure 91. Connect Sensor



### 8.3 Debug information PA9 pin

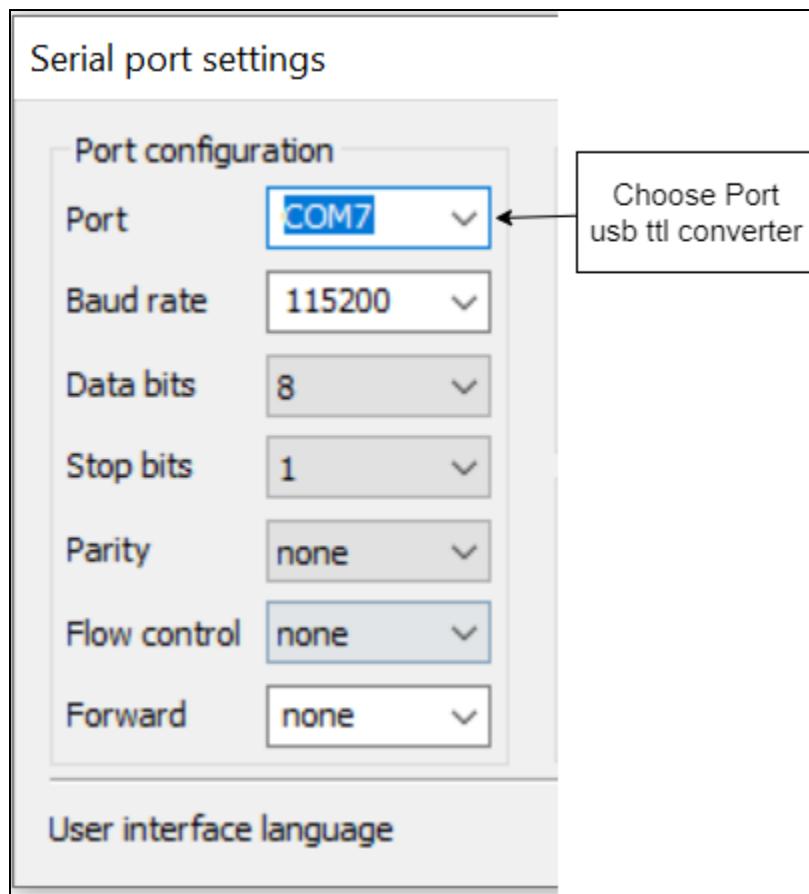
1. To see the debug information you need to use a [usb-uart ttl converter](#) and connect it to the SensiLoRa 2.0, as shown in the (Figure 92).

Figure 92. Button and LED placement



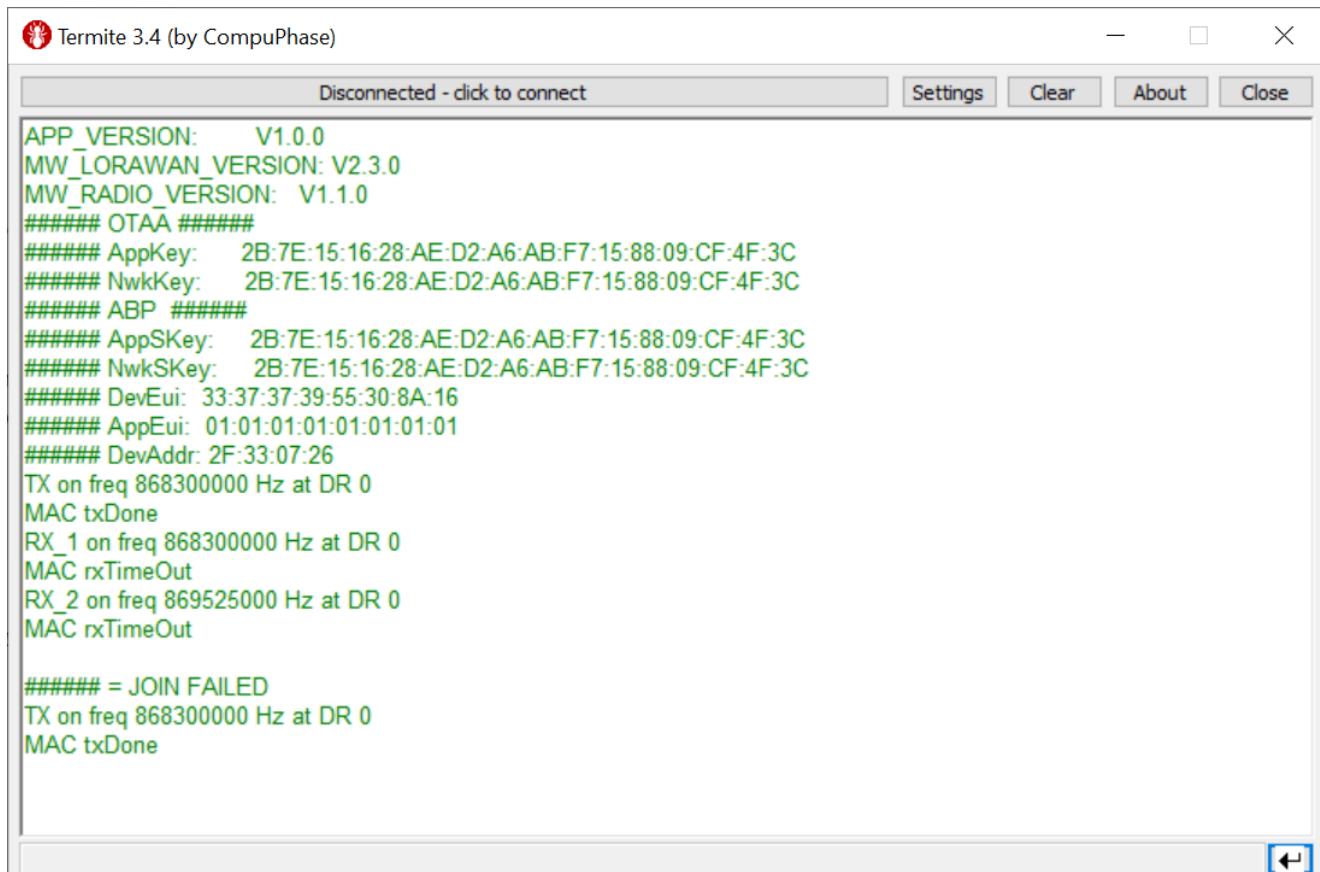
2. Any Terminal can be used to display Debug information. In the **Port settings** in the Terminal, select the USB TTL converter port and other settings as in the (Figure 93), then open the port.

Figure 93. Port Settings



3. When the board starts, the output of the information shown in the (Figure 94) will begin. Also here you can see the keys: AppKey, DevEui and JoinEui(AppEui), that are used to connect the device to the LoRa server.

**Figure 94. Debug Information**



The screenshot shows the Termite 3.4 application window titled "Termite 3.4 (by CompuPhase)". The main window displays a series of debug messages in green text. The messages include:

```

APP_VERSION: V1.0.0
MW_LORAWAN_VERSION: V2.3.0
MW_RADIO_VERSION: V1.1.0
##### OTAA #####
##### AppKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### NwkKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### ABP #####
##### AppSKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### NwkSKey: 2B:7E:15:16:28:AE:D2:A6:AB:F7:15:88:09:CF:4F:3C
##### DevEui: 33:37:37:39:55:30:8A:16
##### AppEui: 01:01:01:01:01:01:01:01
##### DevAddr: 2F:33:07:26
TX on freq 868300000 Hz at DR 0
MAC txDone
RX_1 on freq 868300000 Hz at DR 0
MAC rxTimeOut
RX_2 on freq 869525000 Hz at DR 0
MAC rxTimeOut

##### = JOIN FAILED
TX on freq 868300000 Hz at DR 0
MAC txDone

```