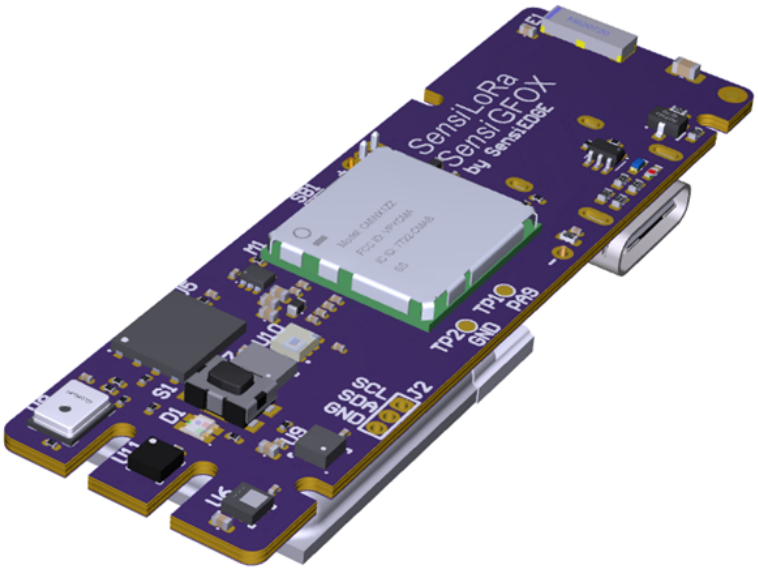
*Sensi*GFOX | LoRa 2.0

Getting Started

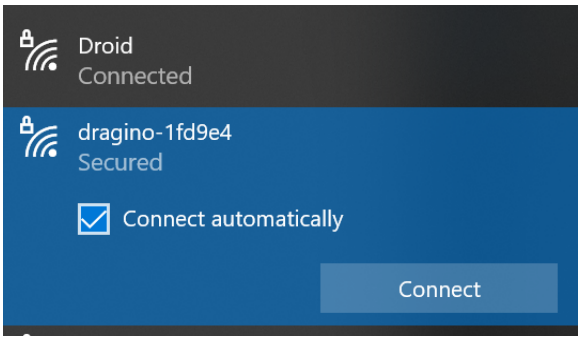


1 Config Dragino Pico Station

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

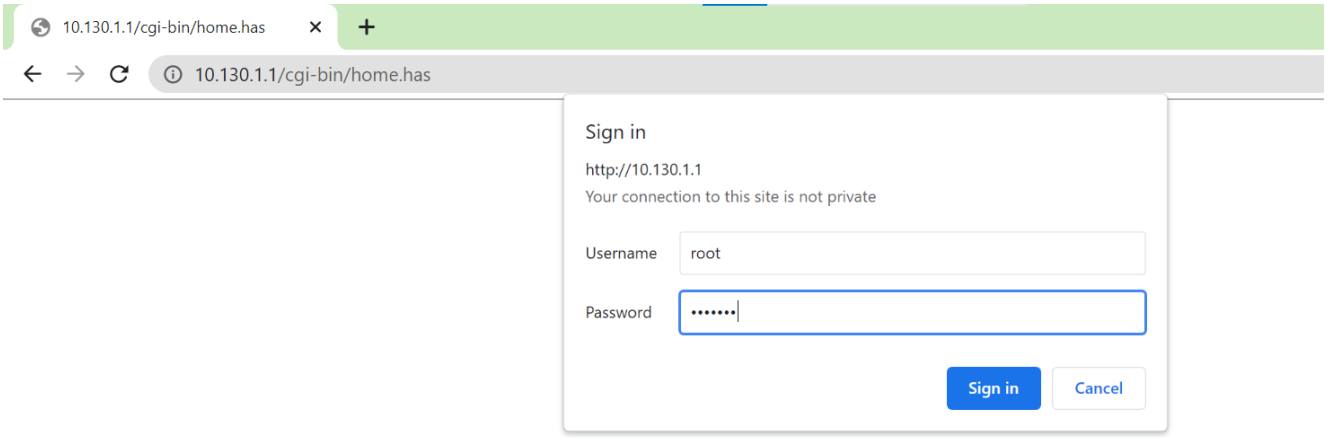


2. When connected to the device, open the browser and enter the address: http://10.130.1.1/ and enter (Figure 2):

User Name: root

Password: dragino

Figure 2. Site



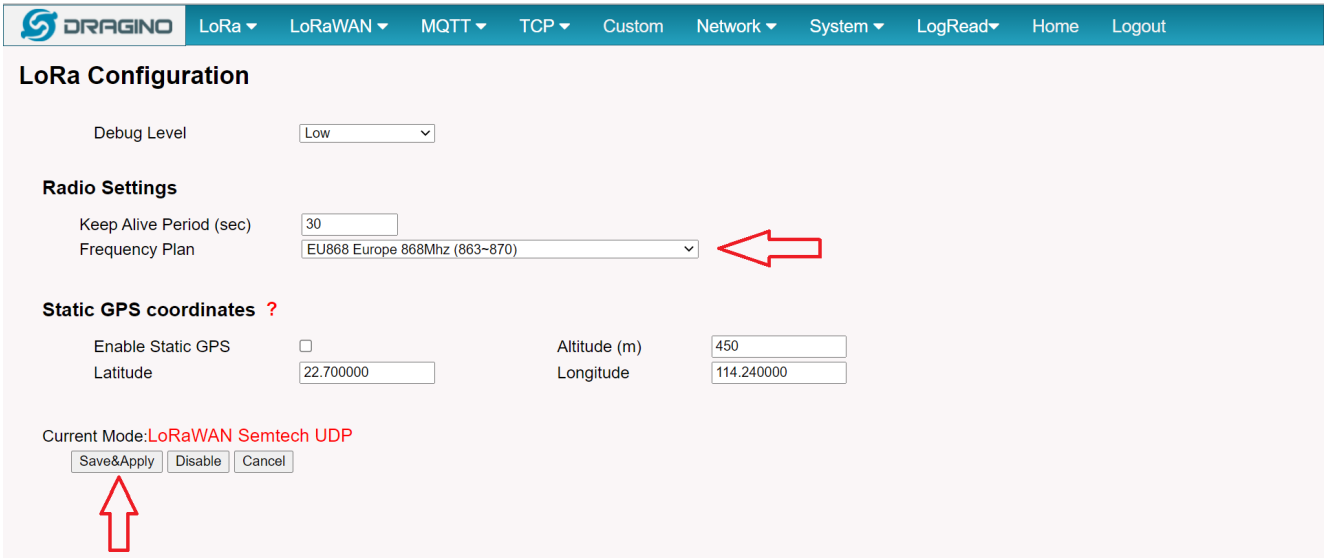
3. Go to network settings Lora (Figure 3).

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).

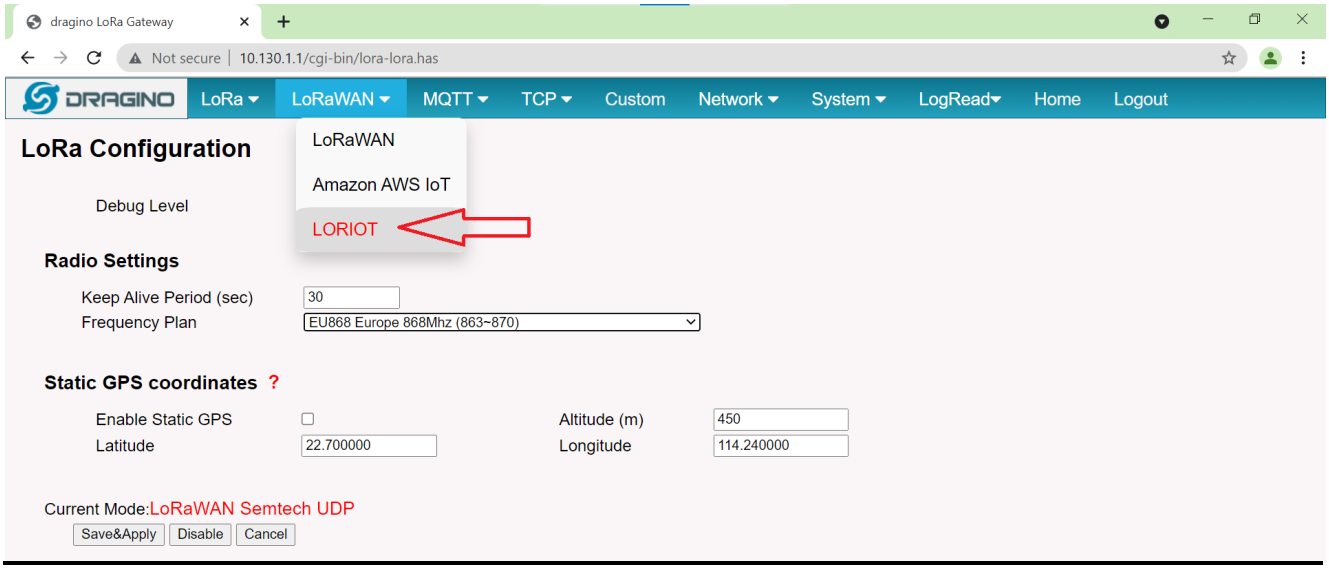
Figure 4. Configuration Lora



1.3 Configuration LORIOT

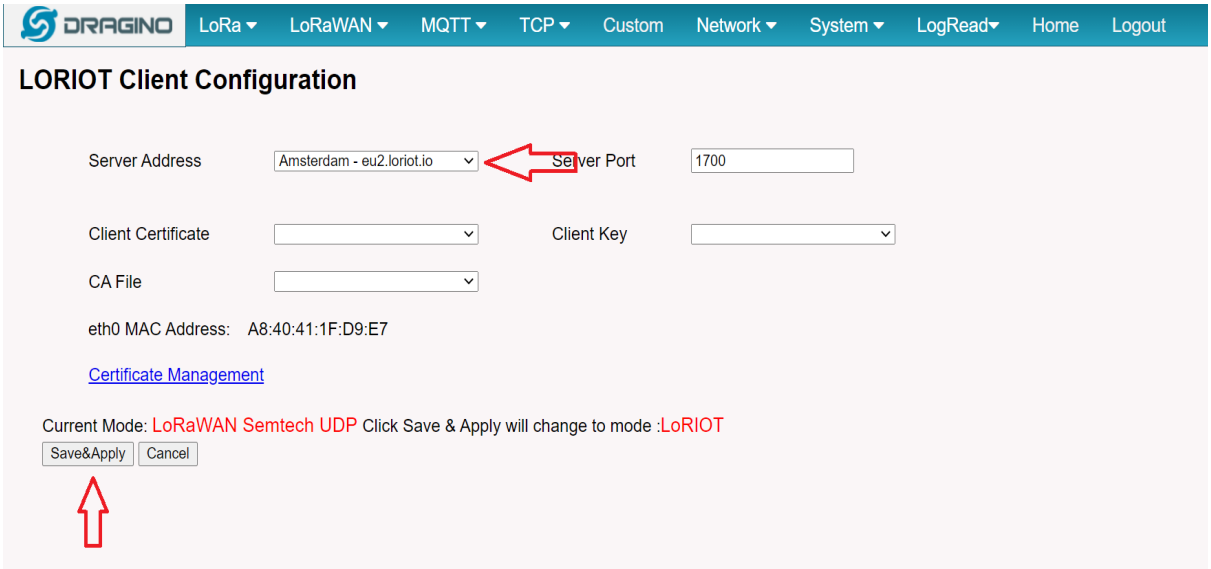
1. Go to configuration **LORIOT** (Figure 5).

Figure 5. Go to Loriot settings



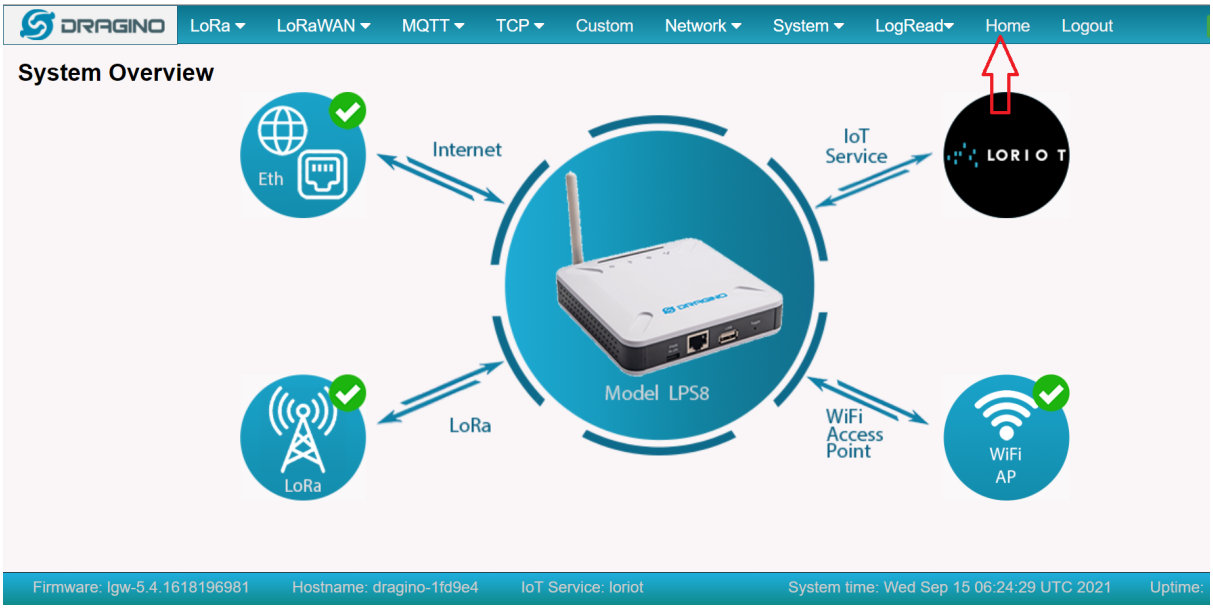
2. In the configuration LORIOT, select the desired server (example: **Amsterdam - eu2.loriot.io**) and click on **Save&Apply** (Figure 6).

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

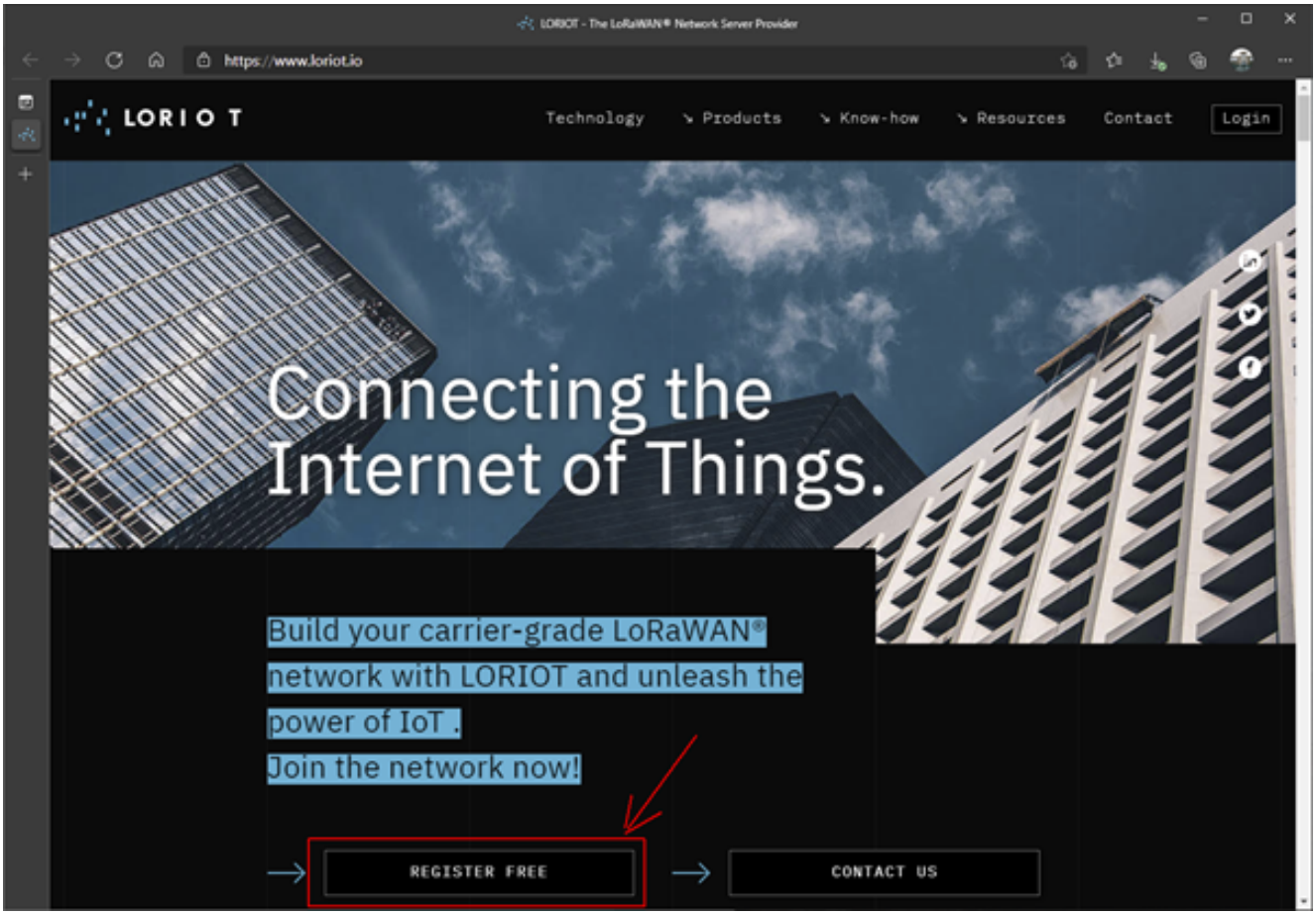


2 Registration in Loriot

2.1 Registration in Server

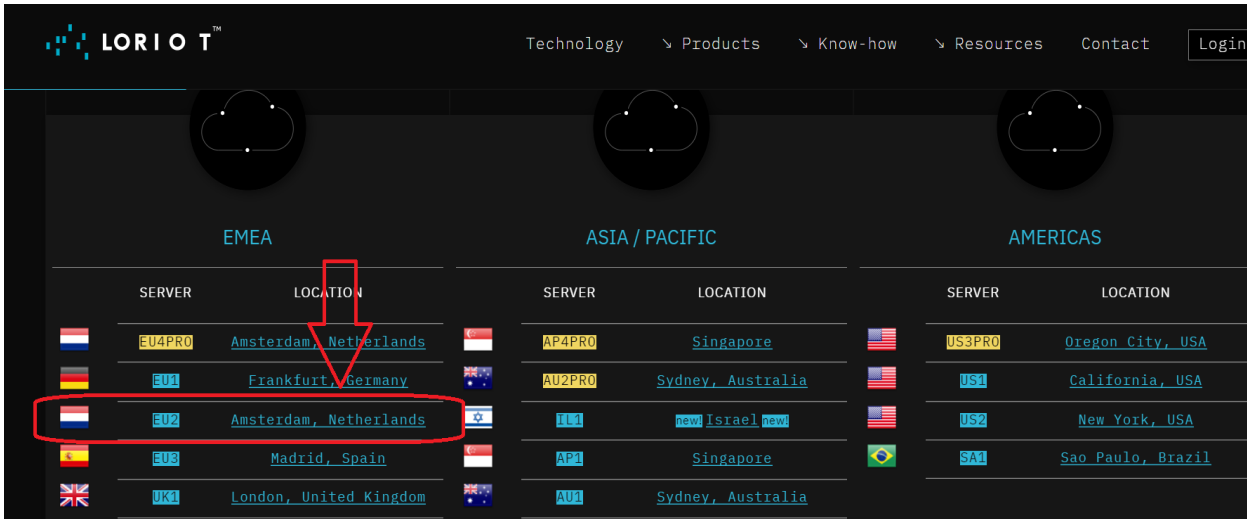
1 Go to https://www.loriot.io/ and press **REGISTER FREE** (Figure 8).

Figure 8. Loriot site



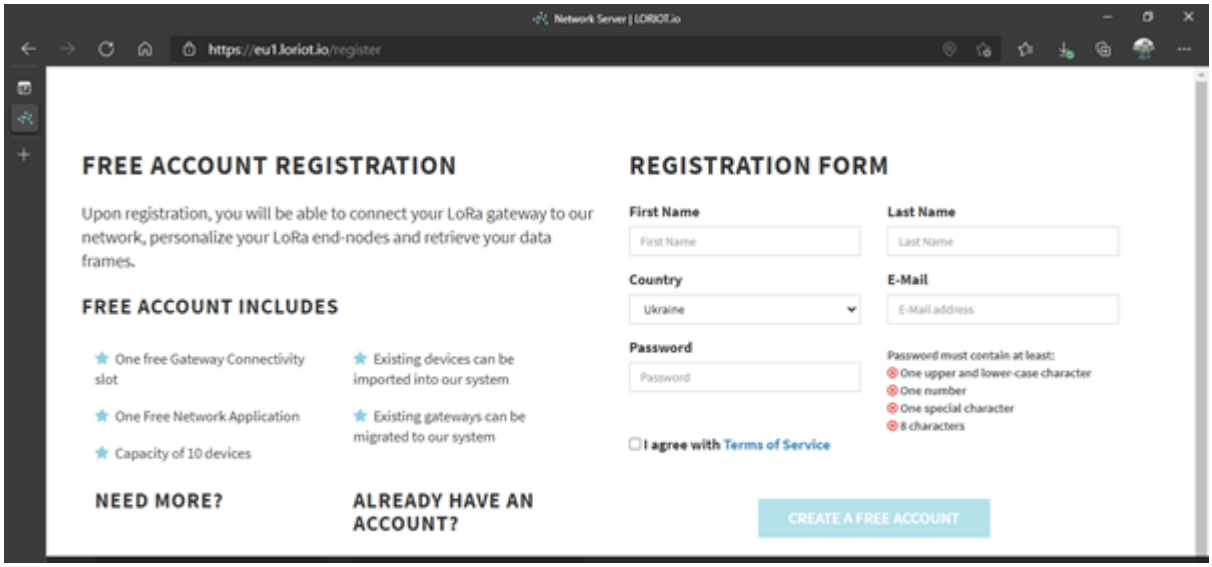
2 Select server **EU2 Amsterdam, Netherlands** (Figure 9).

Figure 9. Select server



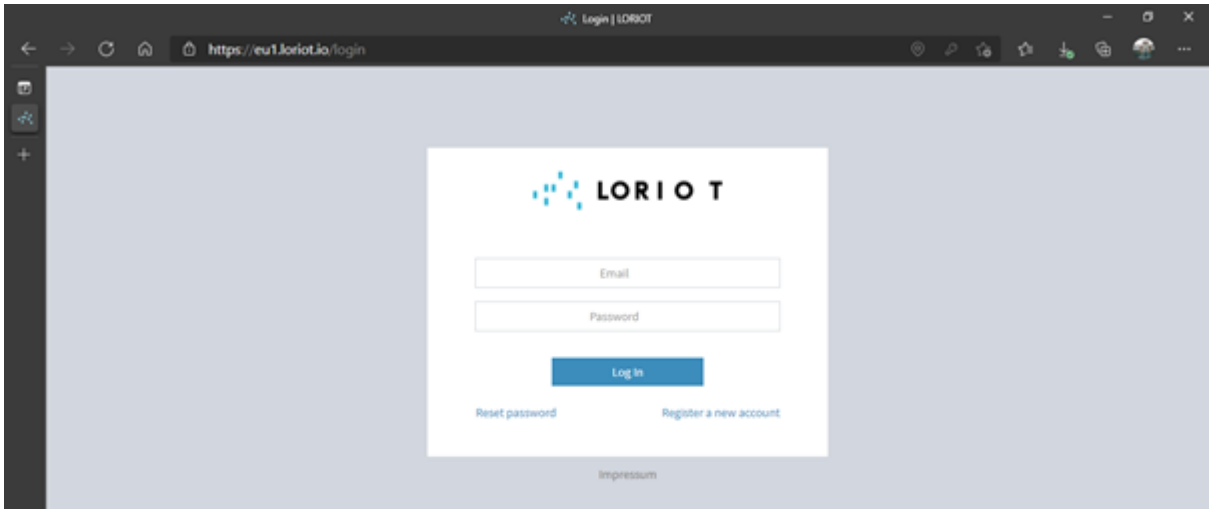
3 Input all data and press the button **CREATE A FREE ACCOUNT** (Figure 10).

Figure 10. Create account



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

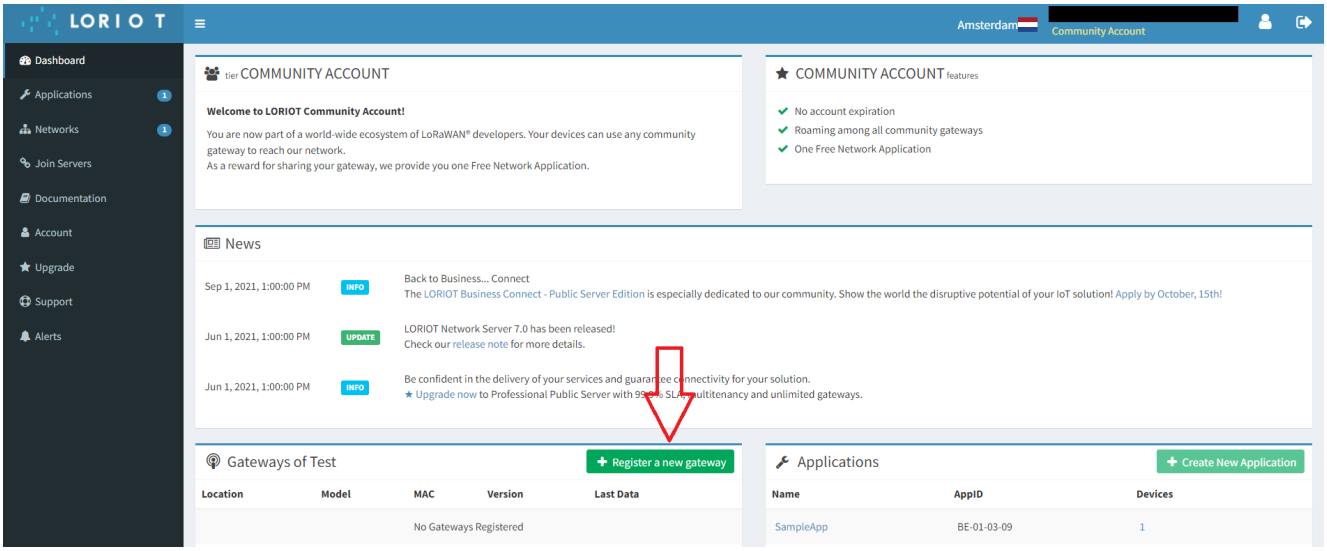
Figure 11. Login to server



2.2 Register a gateway

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

Figure 12. Register gateway

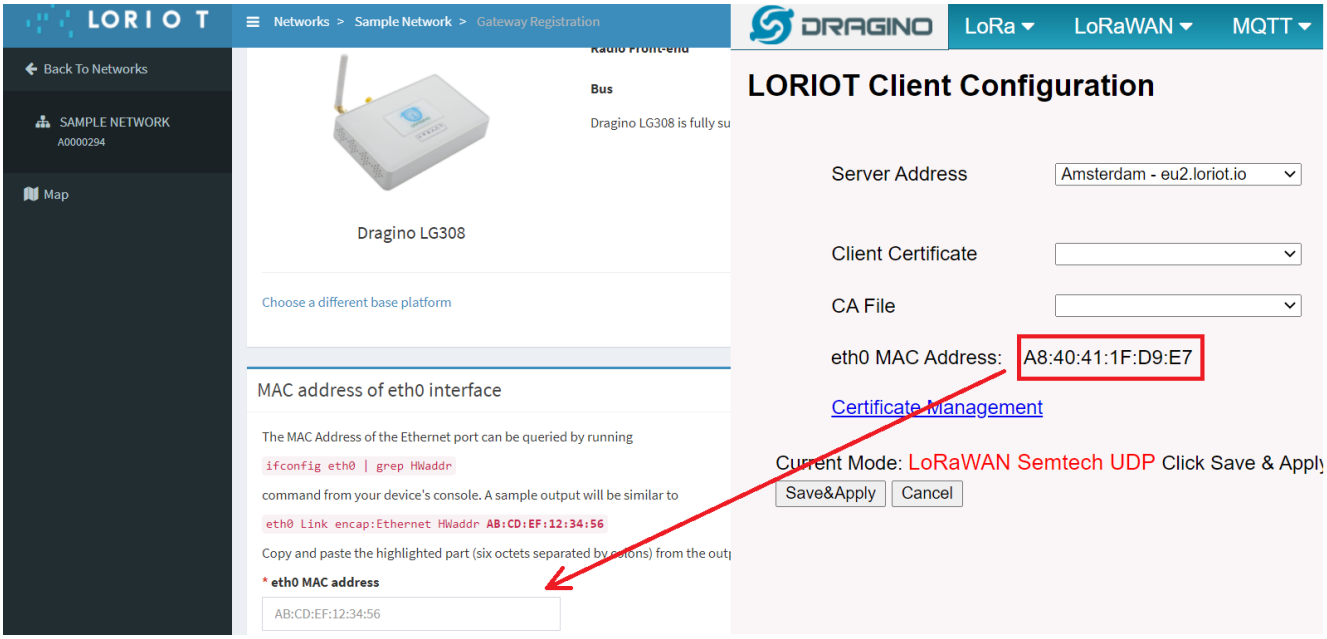


2. Scroll down and select **Dragino LG308** if you use Dragino pico station LPS8 or LG308 (Figure 13).

Figure 13. Add the Dragino

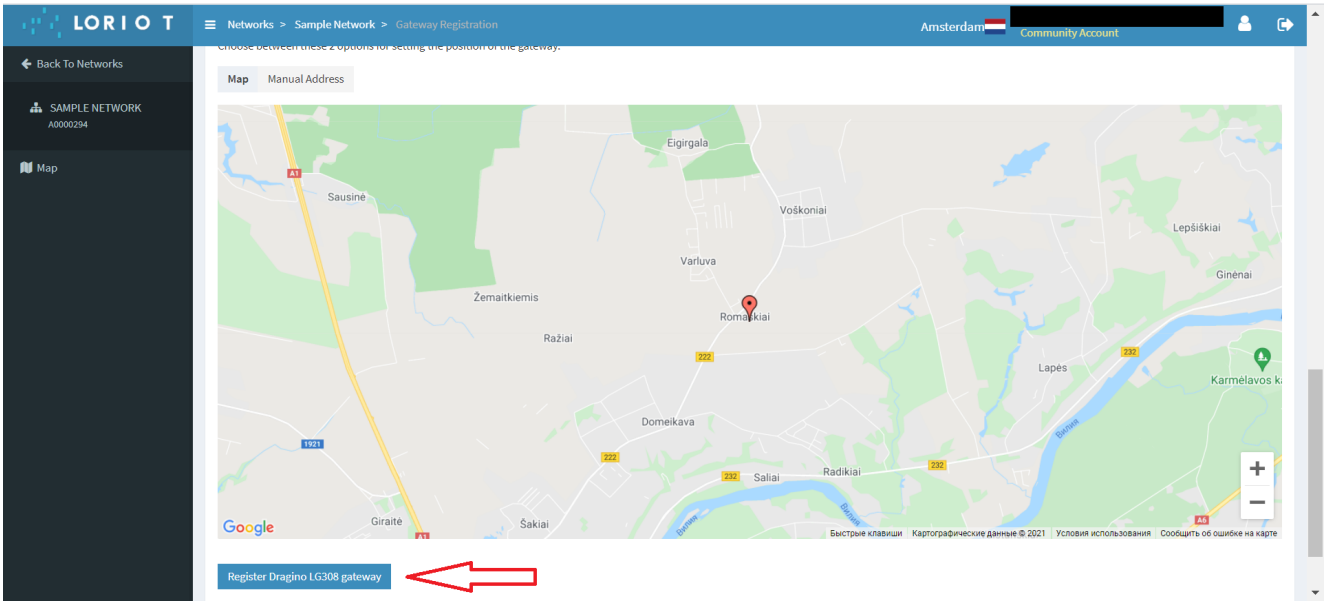
3. Scroll a little below and you will see a field for entering the device address (Figure 14). If a Dragoni Pico Station is used, then the Eth0 Mac address can be taken on a *web-based GUI Dragino website* in LORIOT Client Configuration 1.3 Configuration LORIOT.

Figure 14. Eth0 Mac address



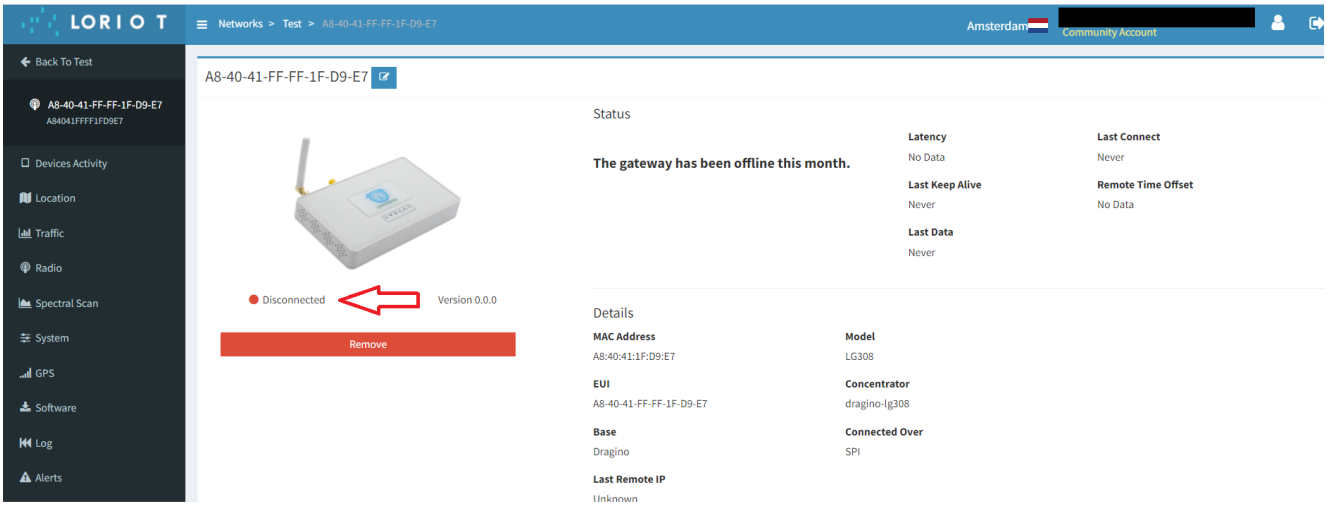
4. Scroll down and here indicates the location of the modem and then click on **Register Dragino LG308 gateway (Figure 15)**.

Figure 15. Register Gateway



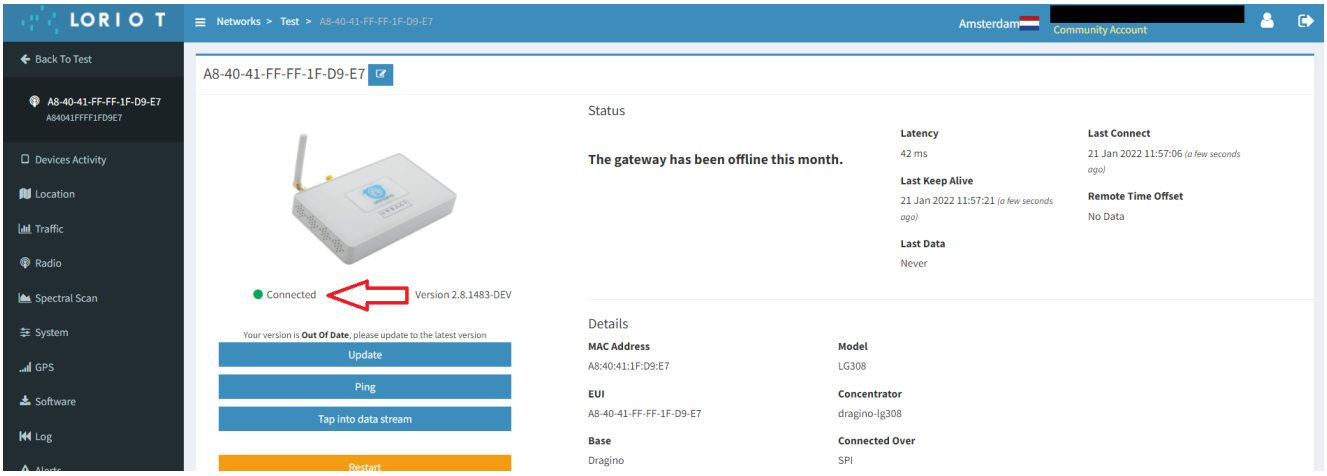
5. After registering the gateway, a page with the gateway status will appear where it will be written that the connection status is **Disconnected** (Figure 16).

Figure 16. Gateway status



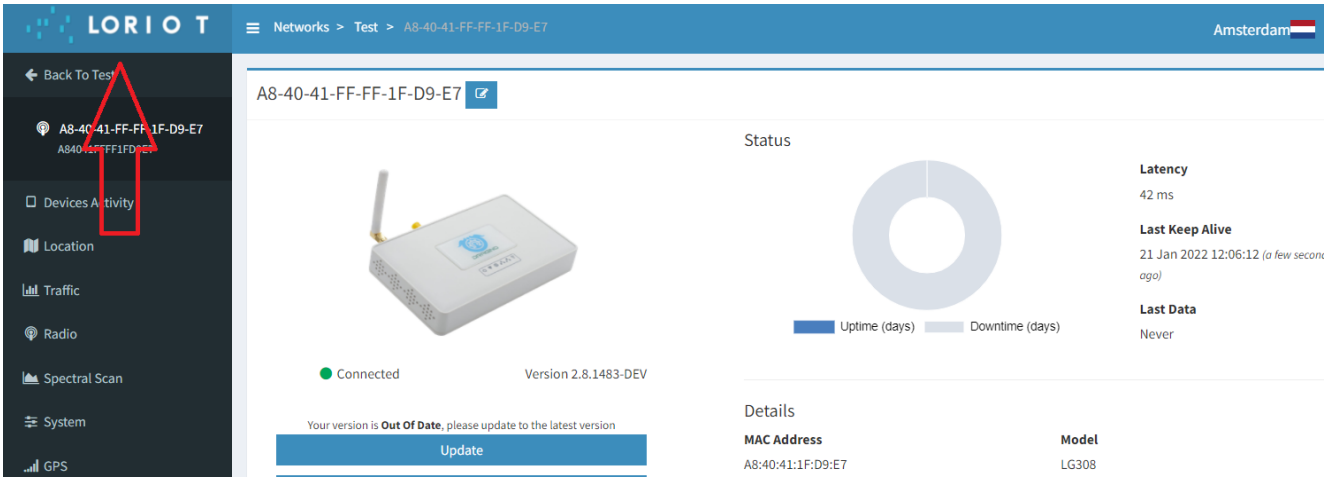
6. To speed up the procedure for connecting the gateway to the server, you need to reboot the gateway. Need to refresh the page and wait until the gateway status changes to connected (Figure 17).

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

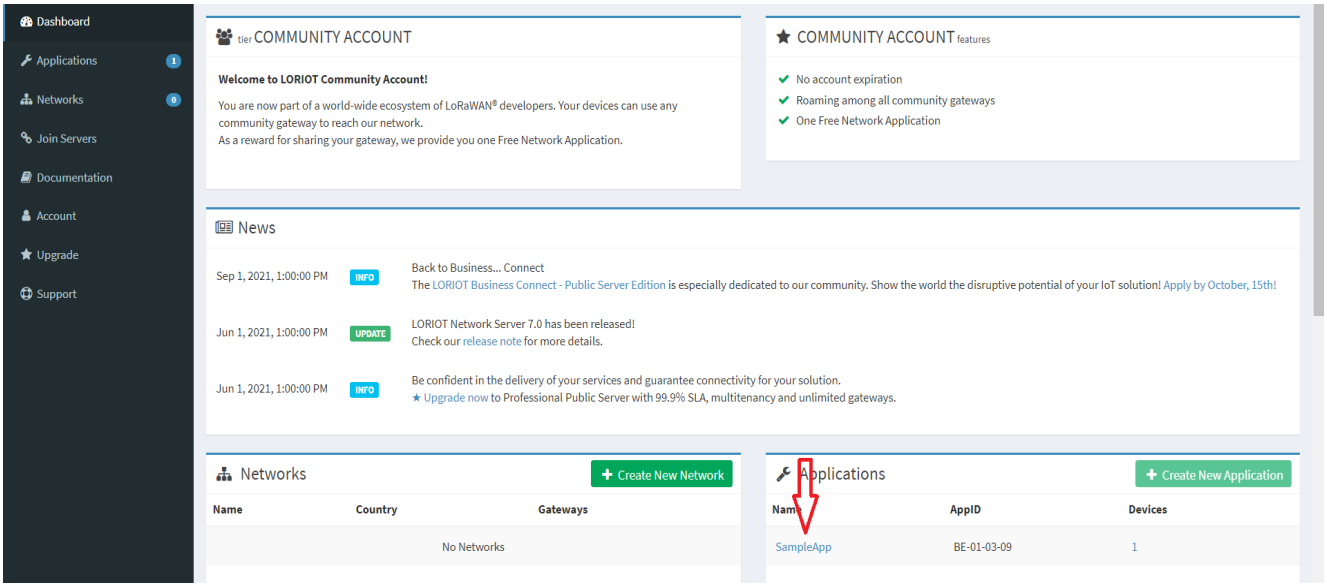


2.3 Add a Device

1. In order to add SensiLora 2.0 device, you need now him **AppKey**, **JoinEui** and **DevEui** keys. The keys can be found using the SensiConfigurator program, download: Ссылка на программу . Use Getting Started SensiConfigurator document section 3.2 Device Information

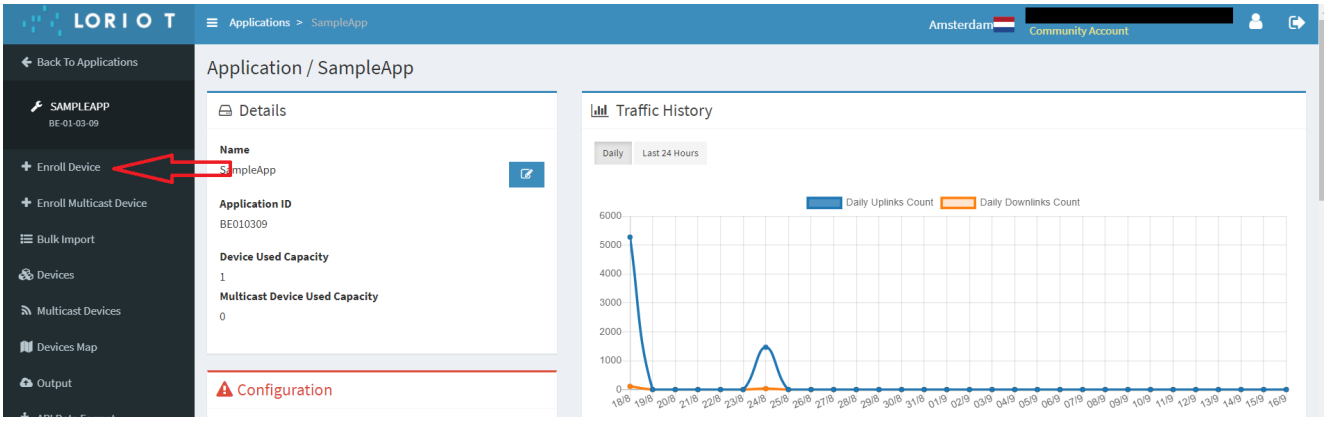
2. Add a Device. In the tab, Dashboard clicks on **SampleApp**.(Figure 19)

Figure 19. Go to SampleApp



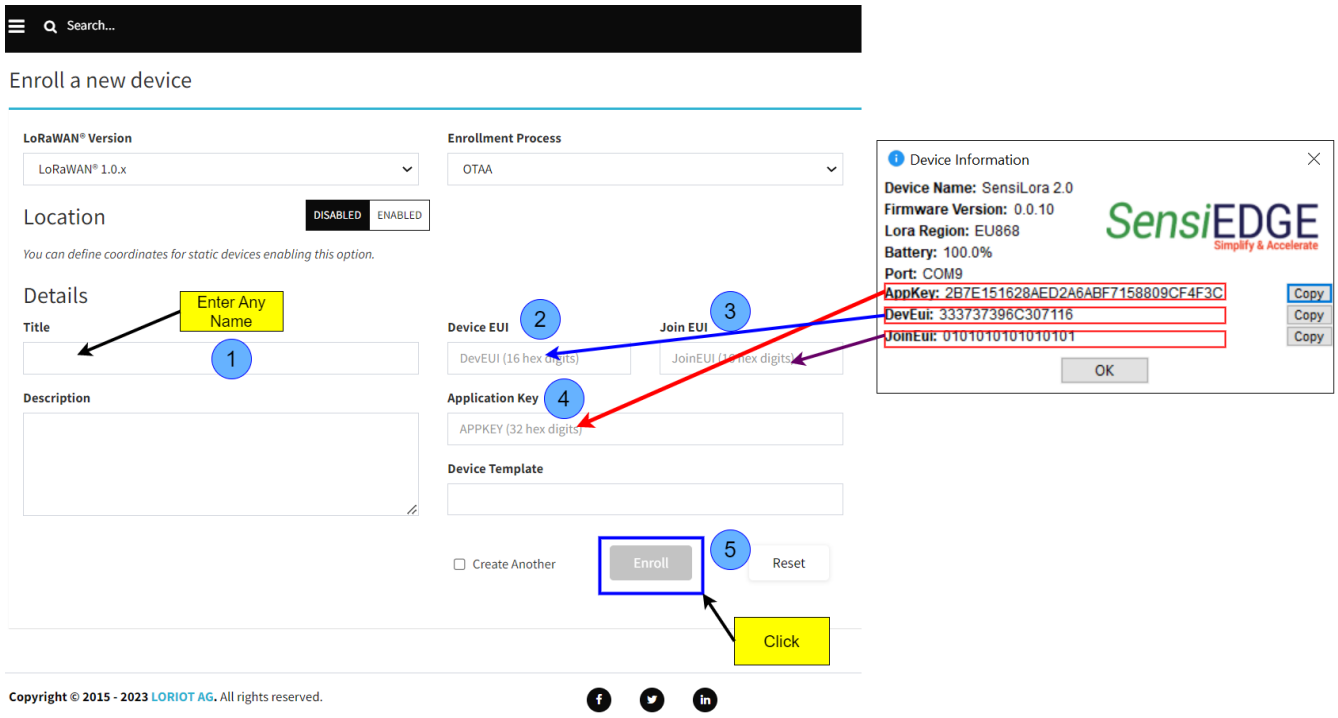
3. Click on **Enroll Device** (Figure 20).

Figure 20. Enroll Device



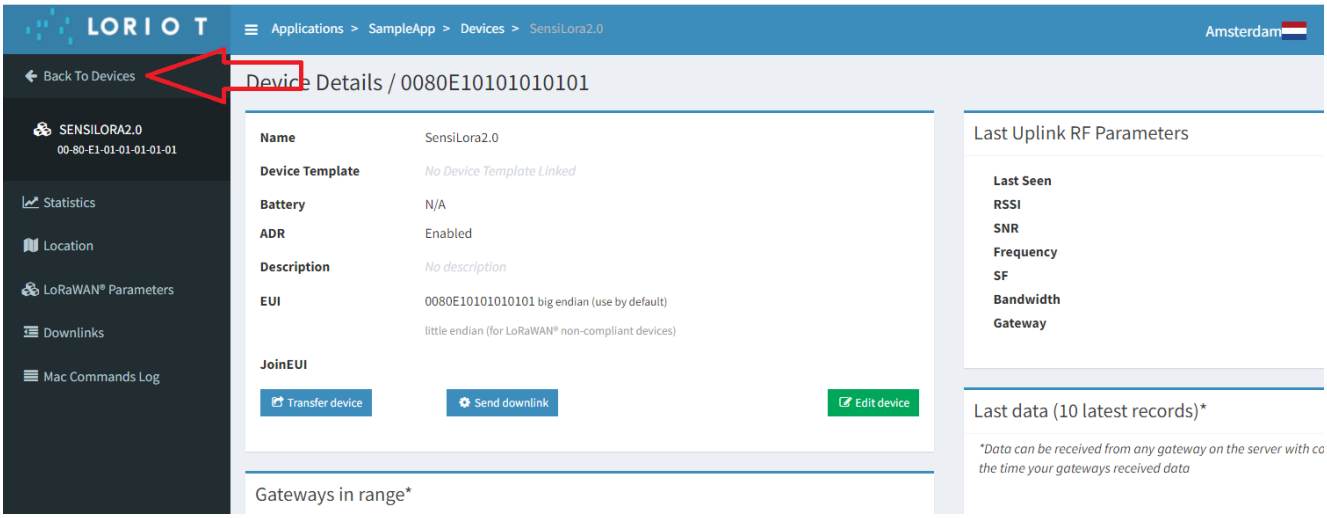
4. In the tab Enroll Device, enter any Name in **Title** (step 1), then enter **Application key** (step 4), **Device EUI** (step 2) and **Join Eui** (step 3), (this keys can be found using the SensiConfigurator program, download: Ссылка на программу . Use Getting Started SensiConfigurator document section 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



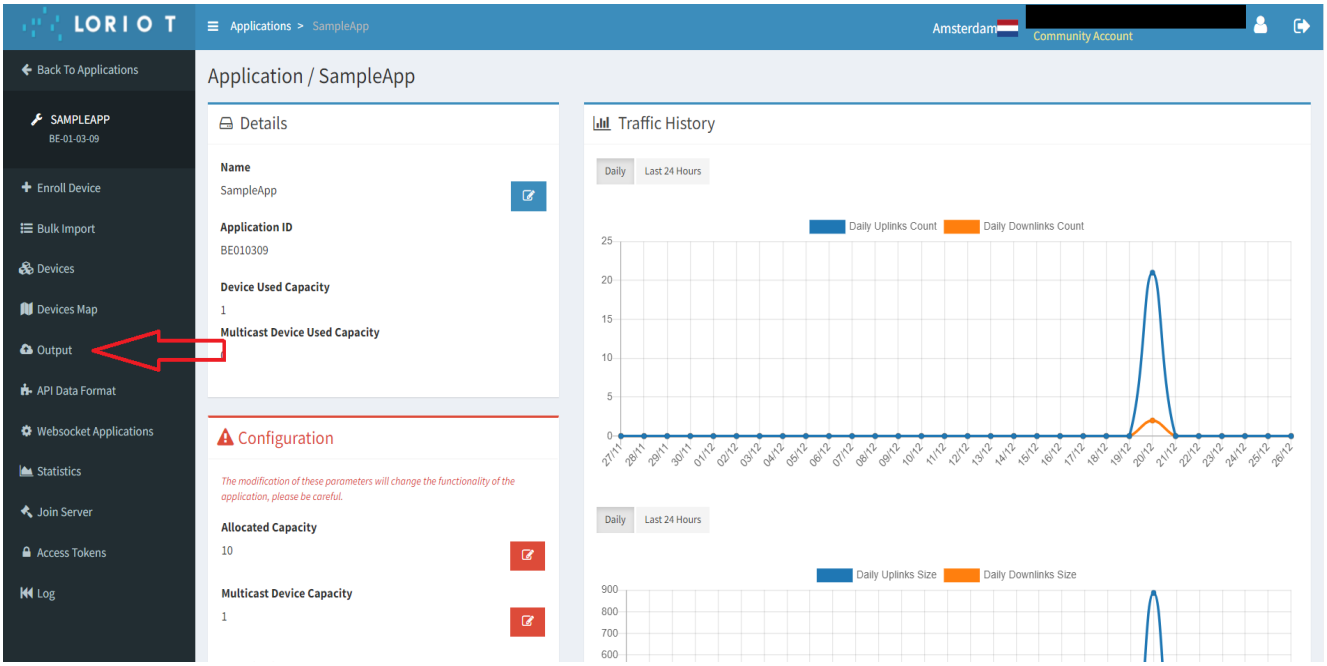
6. In the **Devices** tab, you can view the addition of a device. When the added device connects to the server then we should see the value: **RSSI, SNR, devSNR, SF and BAT,** for example, in Figure 23.

Figure 23. Status device

2.4 Loriot Uplink

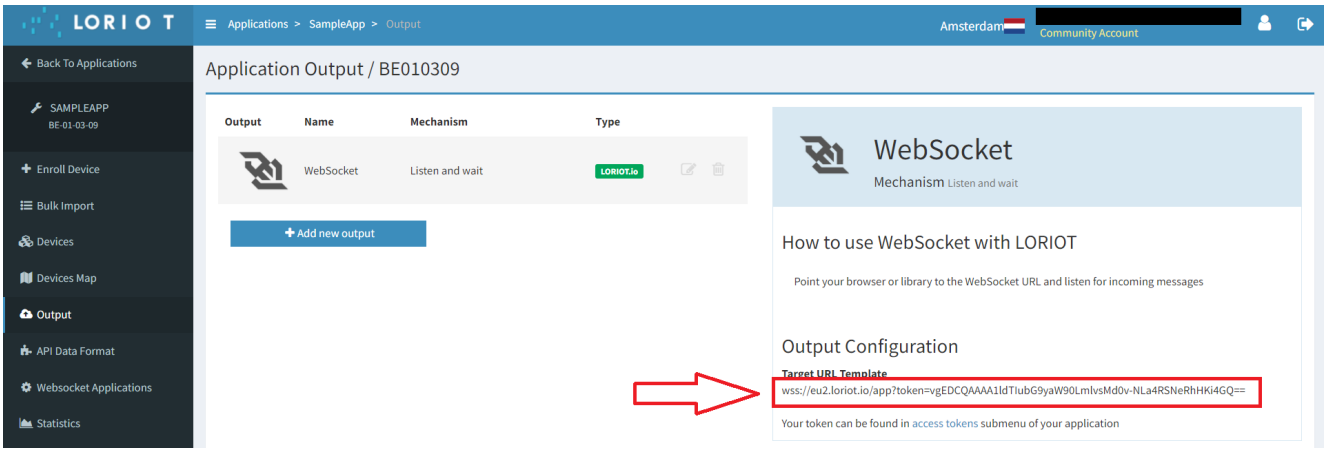
1. In the SampleApp, go to the **Output** (Figure 24).

Figure 24. Go to Output



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

Figure 25. Target URL link



3 LORIOT Integration to Thingsboard

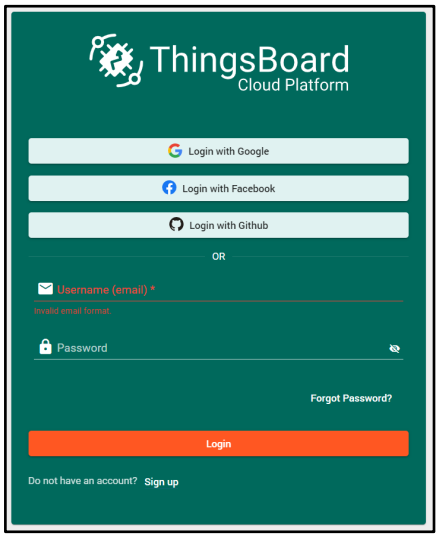
3.1 Overview

1. After integrating LORIOT with the ThingsBoard, you can connect, communicate, process and visualize data from devices in the ThingsBoard IoT platform. For 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

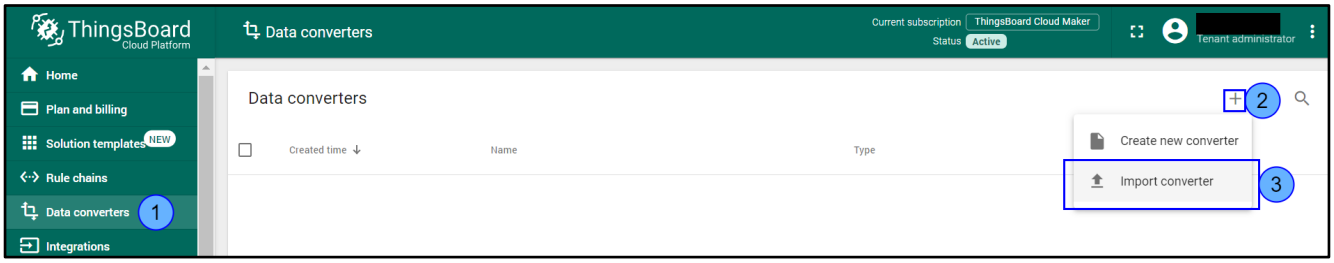


3.3 Import a Data Converter

1. After registering and entering the clouds Download DataConverter: SensiLora2_0_DataConverterV0.1.json.

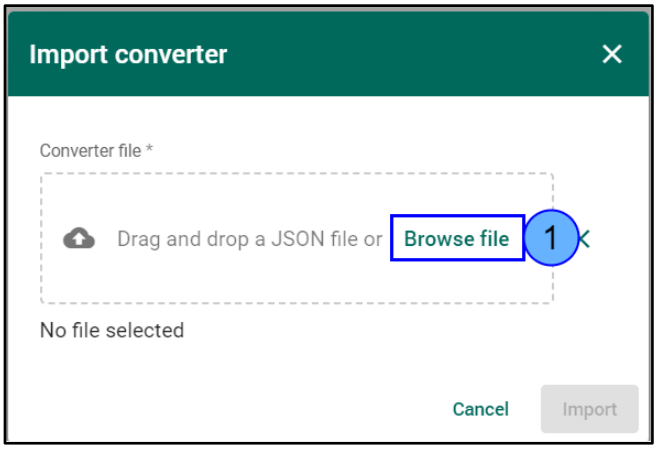
2., Add a Data Converter in ThingsBoard for this, go to **Data converters** (step 1), click **+** (step 2), and choose **Import converter** (step 3).

Figure 27. Import a Data Converter



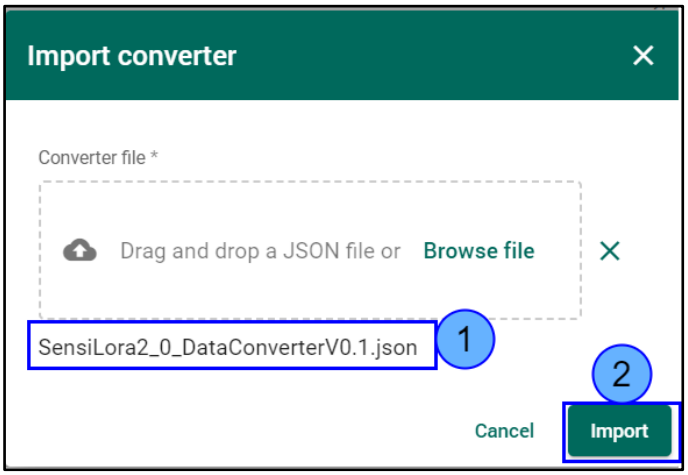
2. In the window, Import Convert drag the downloaded Data Converter or click on the **Browse file**(step 1) and select the **SensiLora2_0_DataConverterV0.1.json**.

Figure 28. Choose a Data Converter



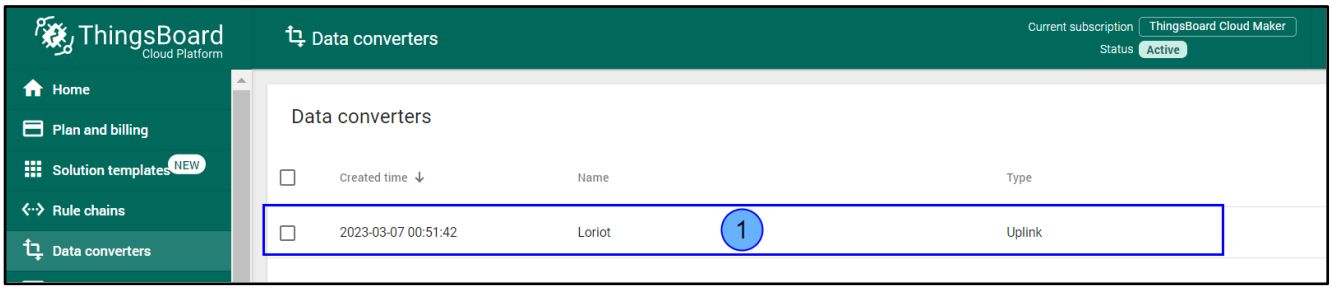
3. The selected Data converter will appear (step 1) and then click on **Import** (step 2).

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).

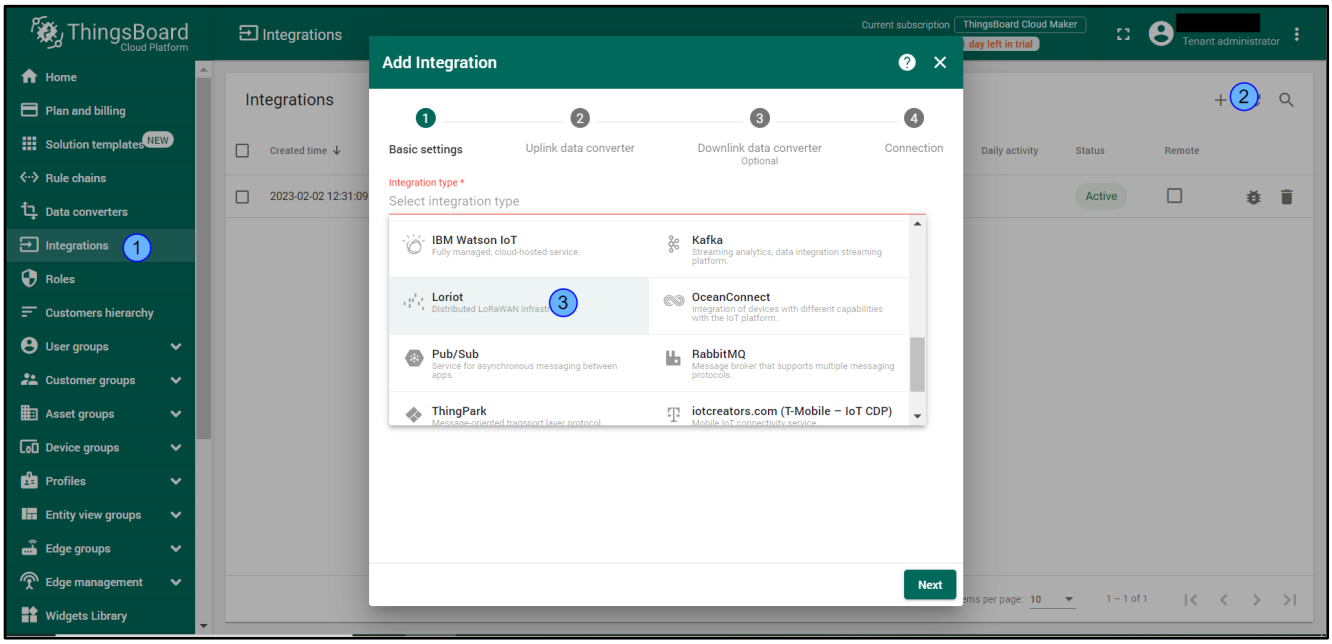
Figure 30. Loriot Data Converter



3.4. Create Integration

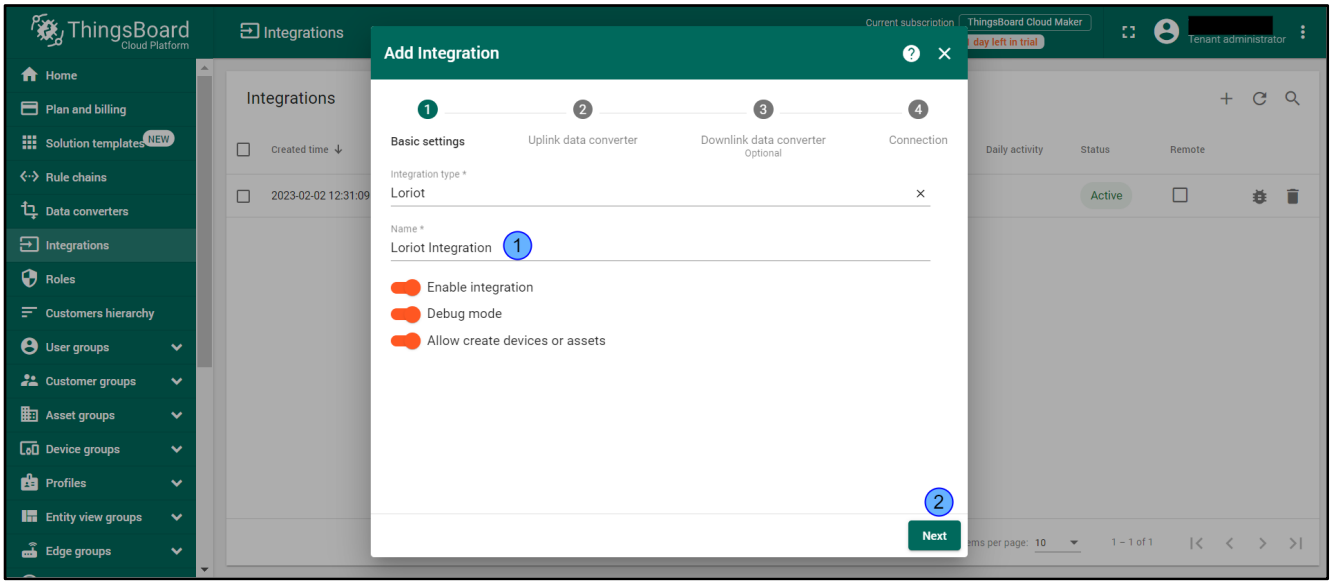
1. After importing Data Converter move on to the creation of Integration. Go to **Integrations** (step 1), click on **+** (step 2), and in Integration type choose **Loriot** (step 3).

Figure 31. Add Integration



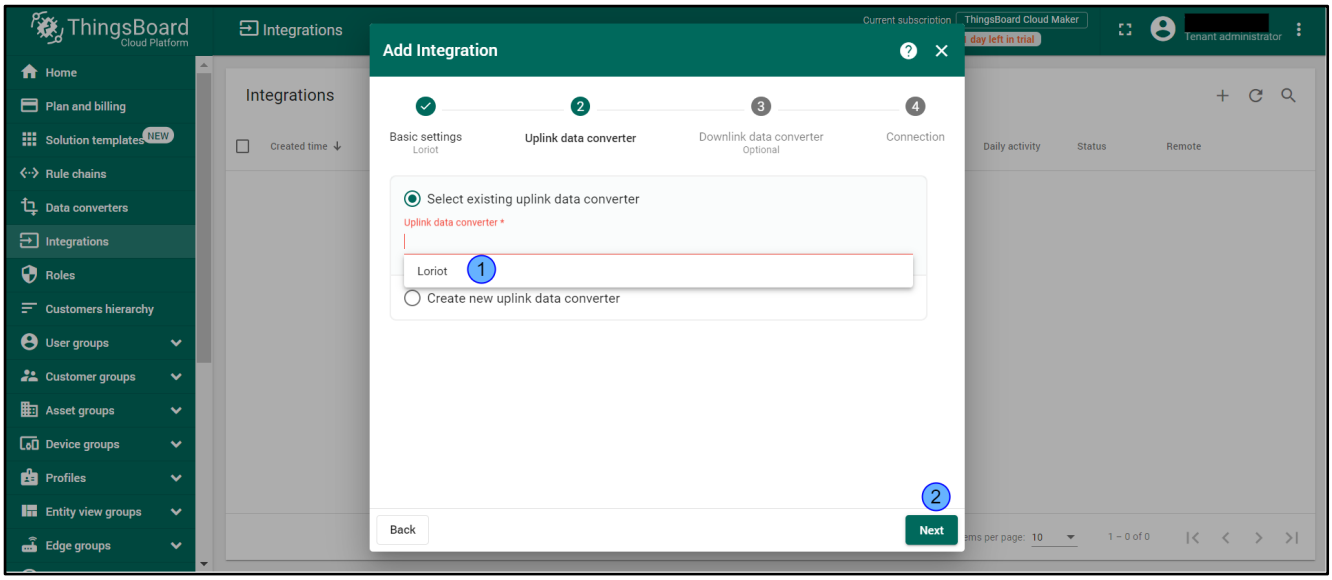
2. In line, **Name** enters the name **Loriot Integration** (step 1) and click **Next** (step 2).

Figure 32. Basic settings Integration



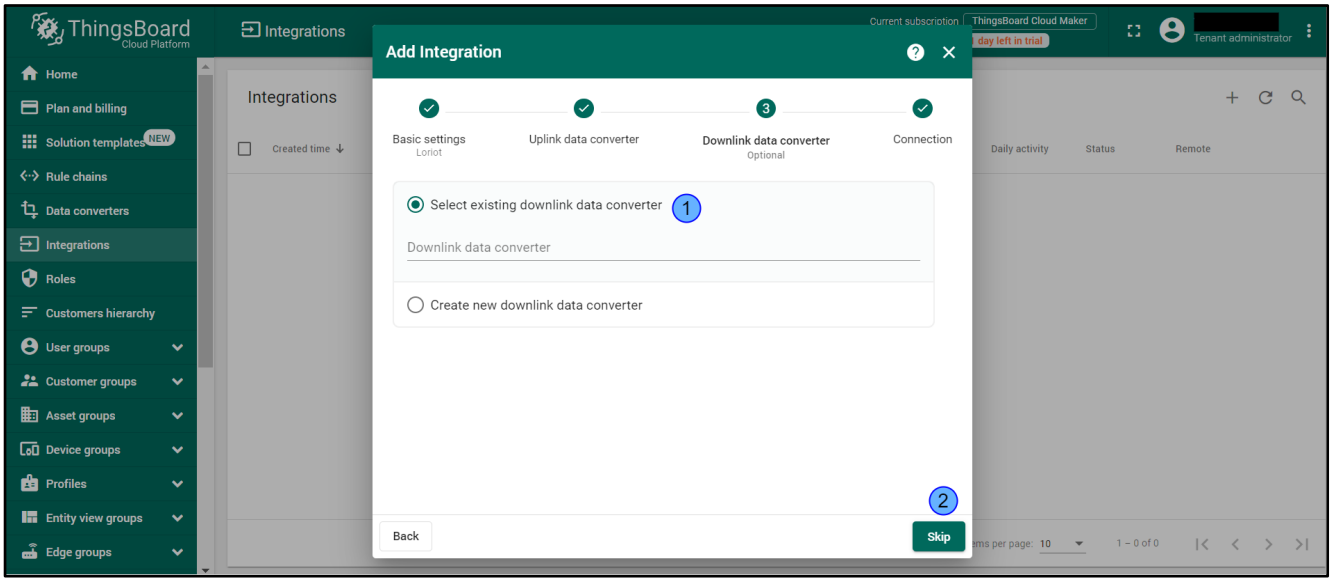
3. In Uplink Data Converter choose **Loriot** (step 1) and click **Next** (step 2).

Figure 33. Choose Loriot



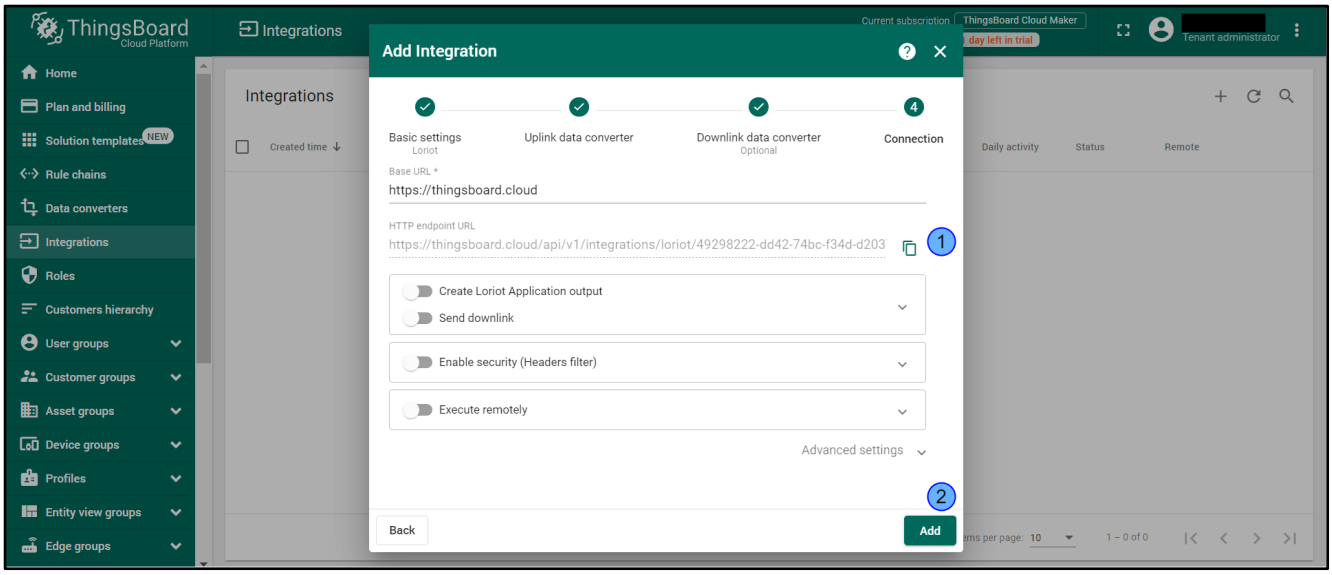
4. Choose **Select existing downlink data converter** and click to **Skip**.

Figure 34. Select the existing downlink data converter



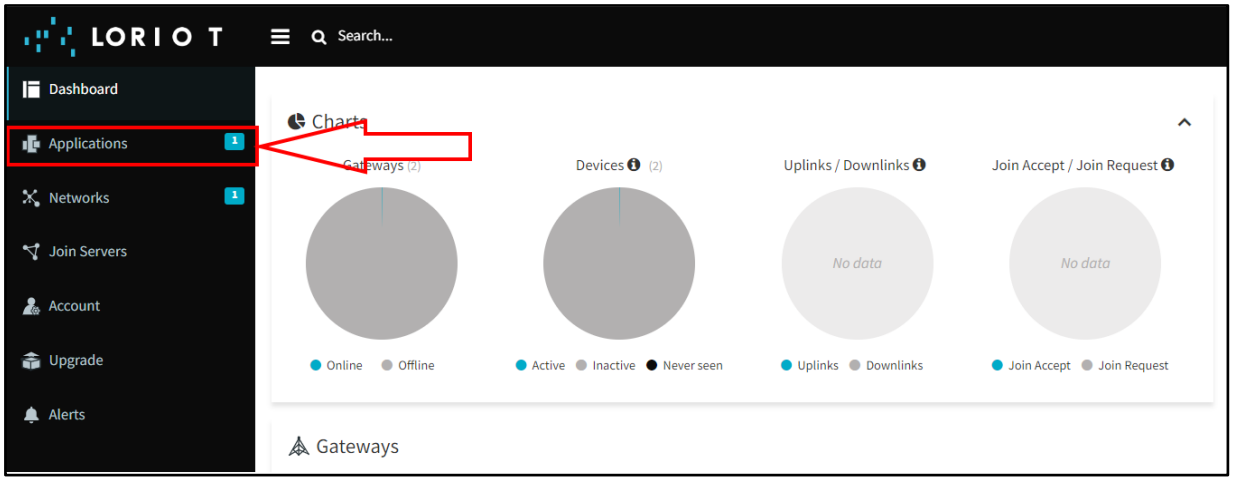
5. Click to **Copy HTTP endpoint URL** and click **Add**.

Figure 35. Copy HTTP



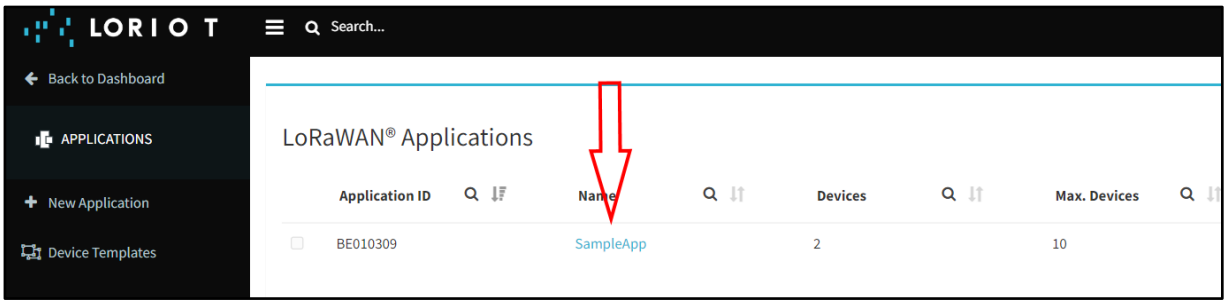
6. Go to **Applications** in LORIOT.

Figure 36. Go to Applications



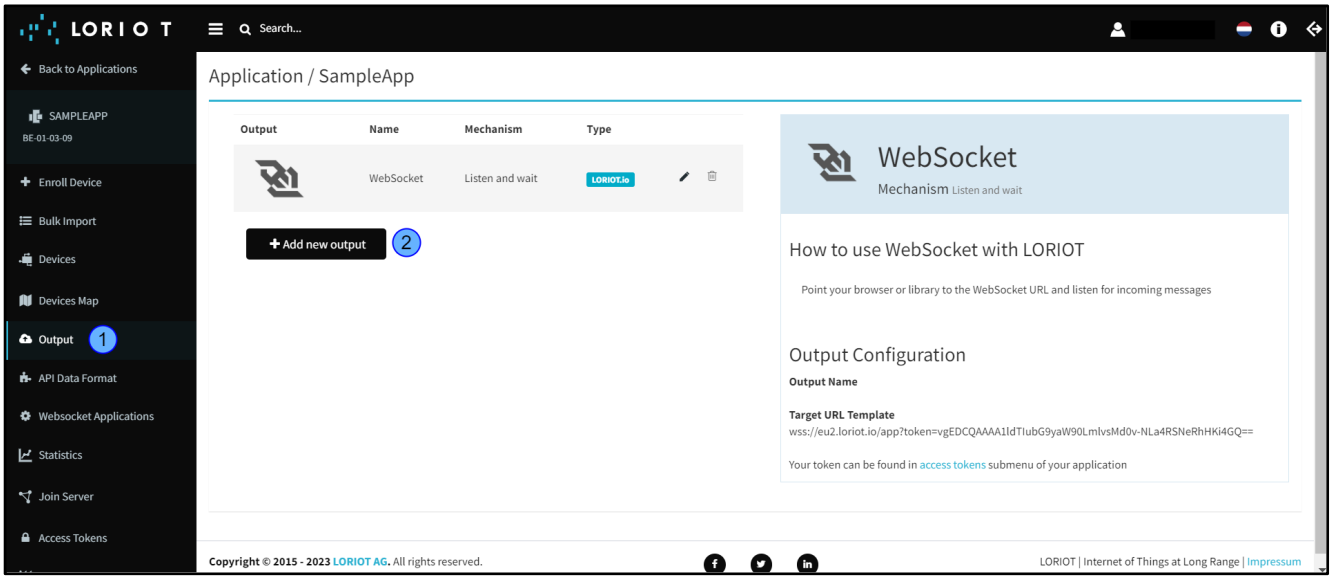
7. Select Application.

Figure 37. Select Application



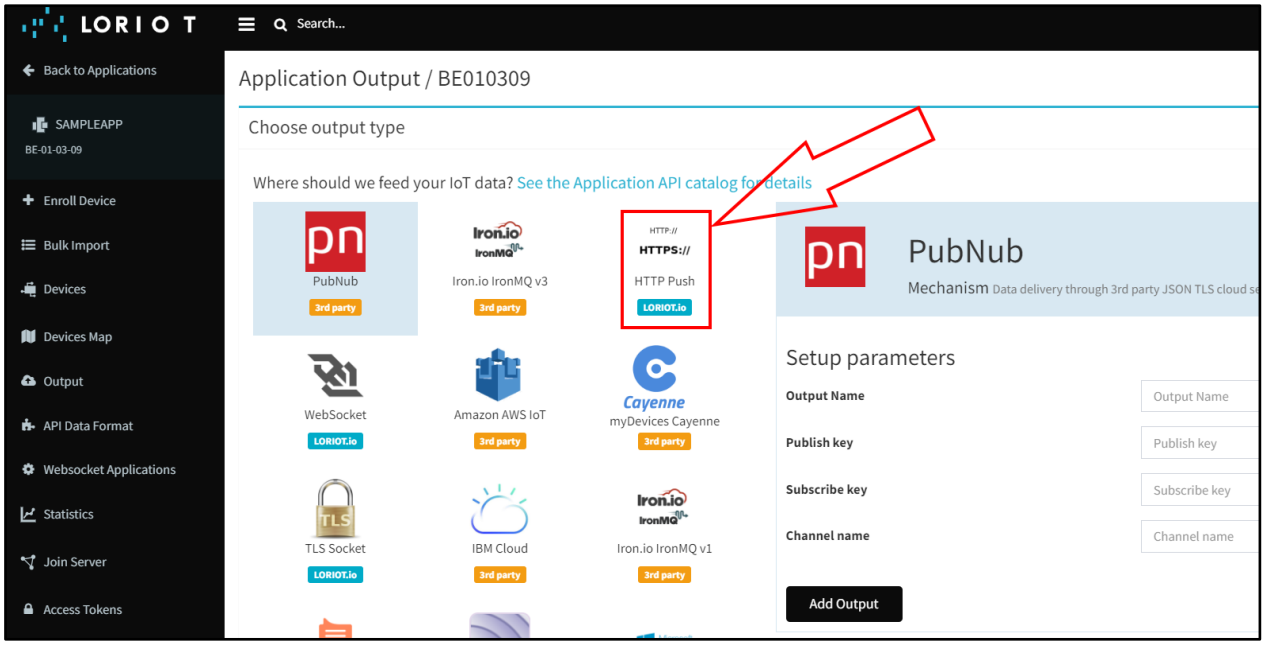
8. In Application go to **Output** (step 1) and click to **Add new output** (step 2).

Figure 38. Add Output



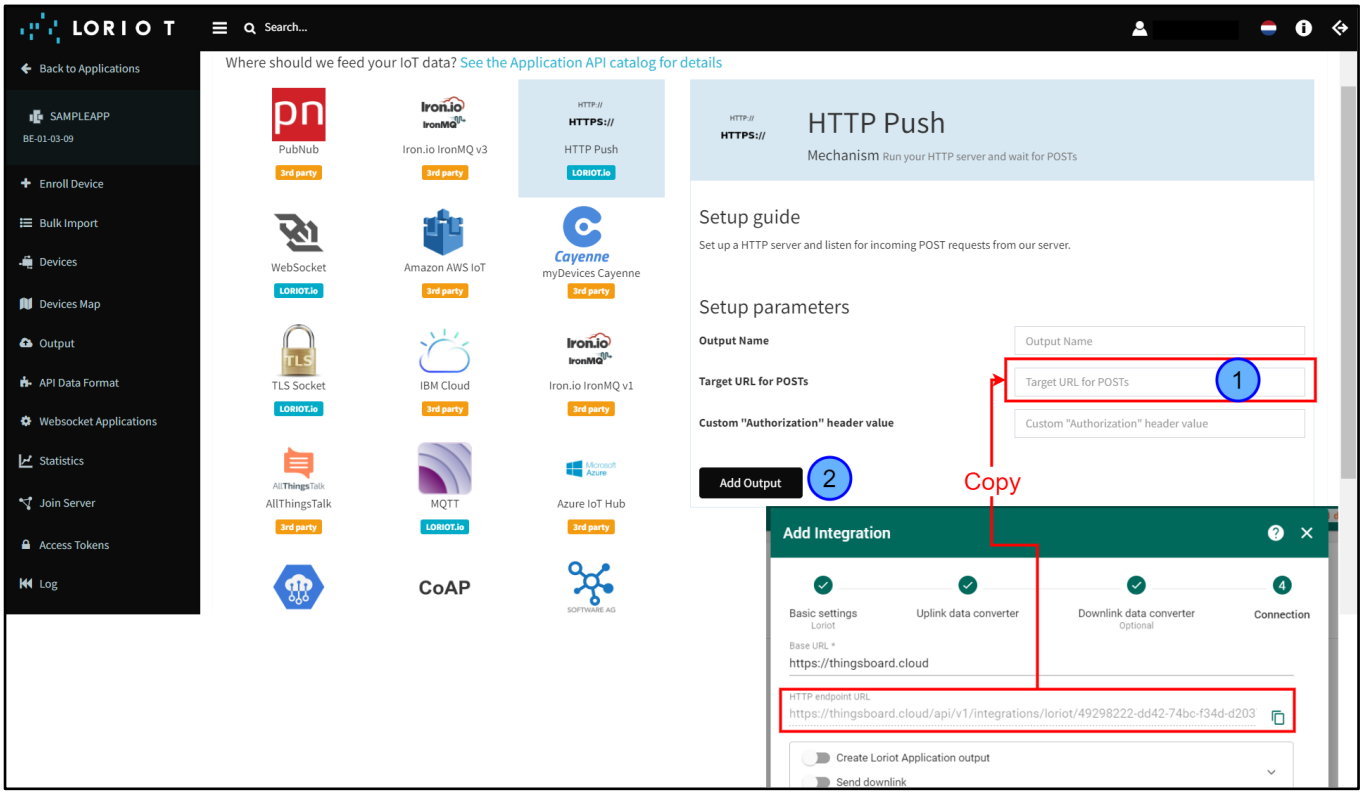
9. Select **HTTP PUSH** type.

Figure 39. Select HTTP Push



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

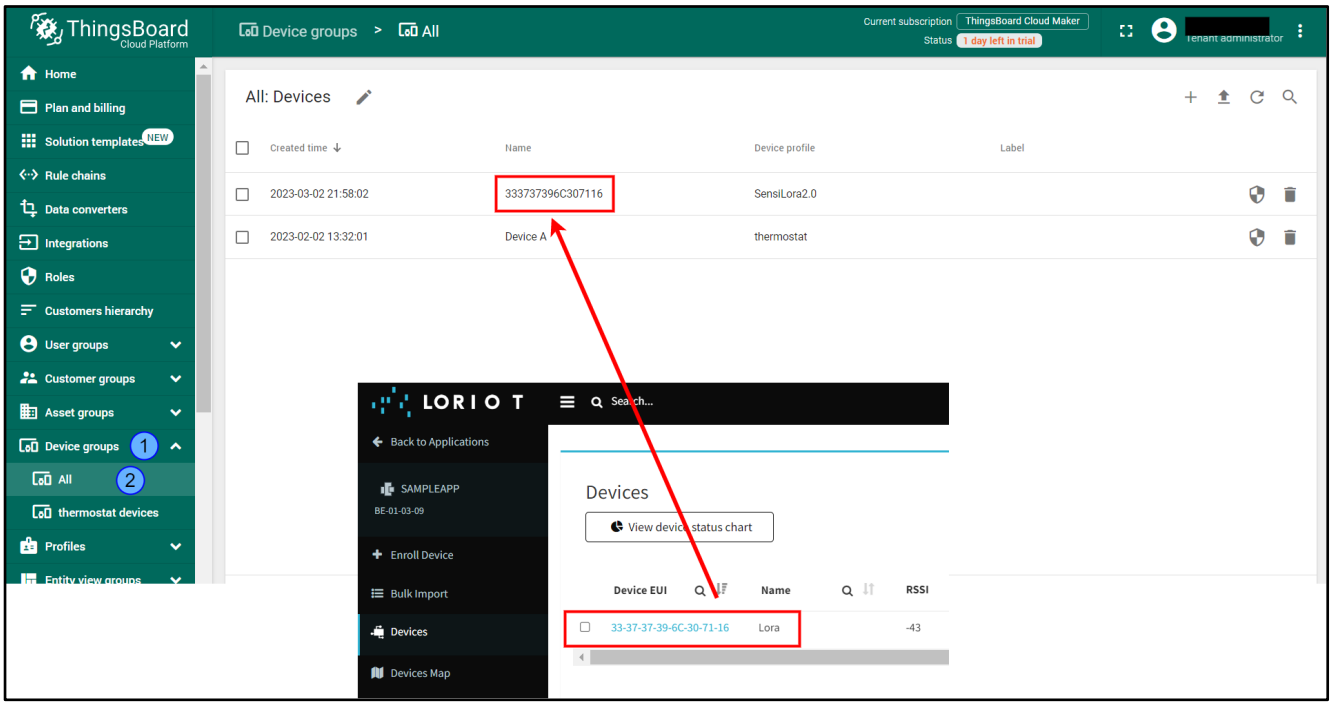
Figure 40. Paste HTTP



3.5 Device

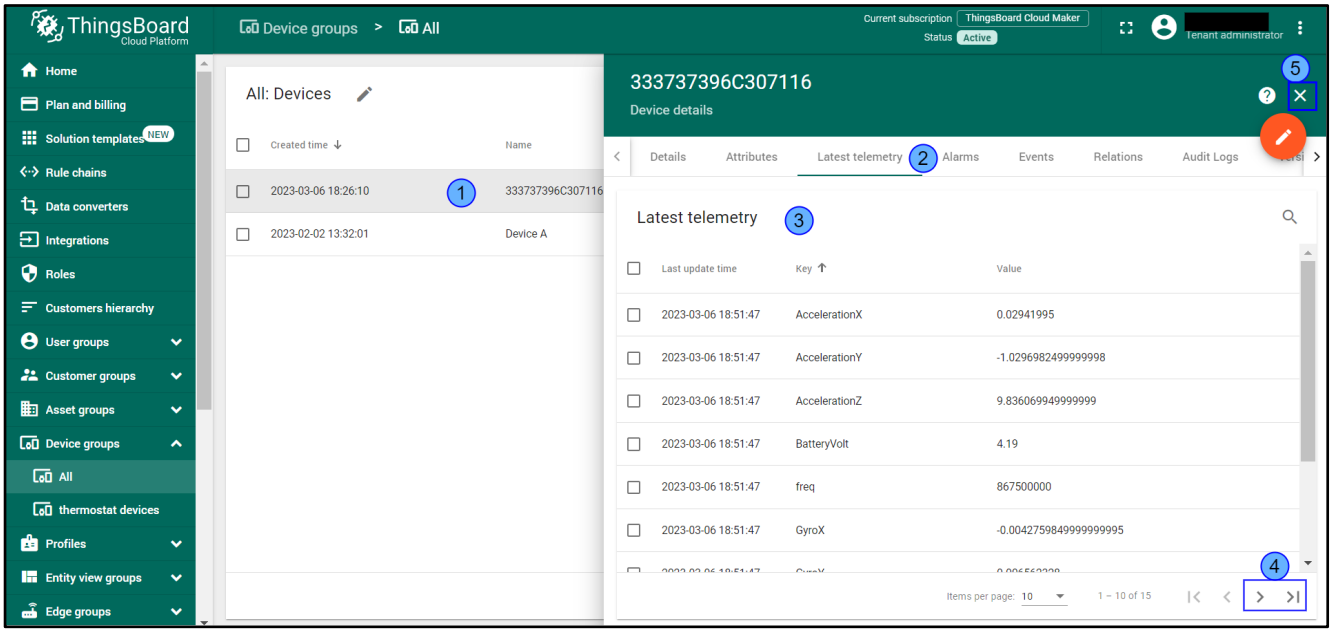
1. To view, the active SensiLora 2.0 device go to **Device groups** (step 1), **All** (step 2), and in the window, **All: Devices** will contain a device that is connected to the Loriot server and transmits data to it.

Figure 41. Active Devices



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



3.6 Dashboard

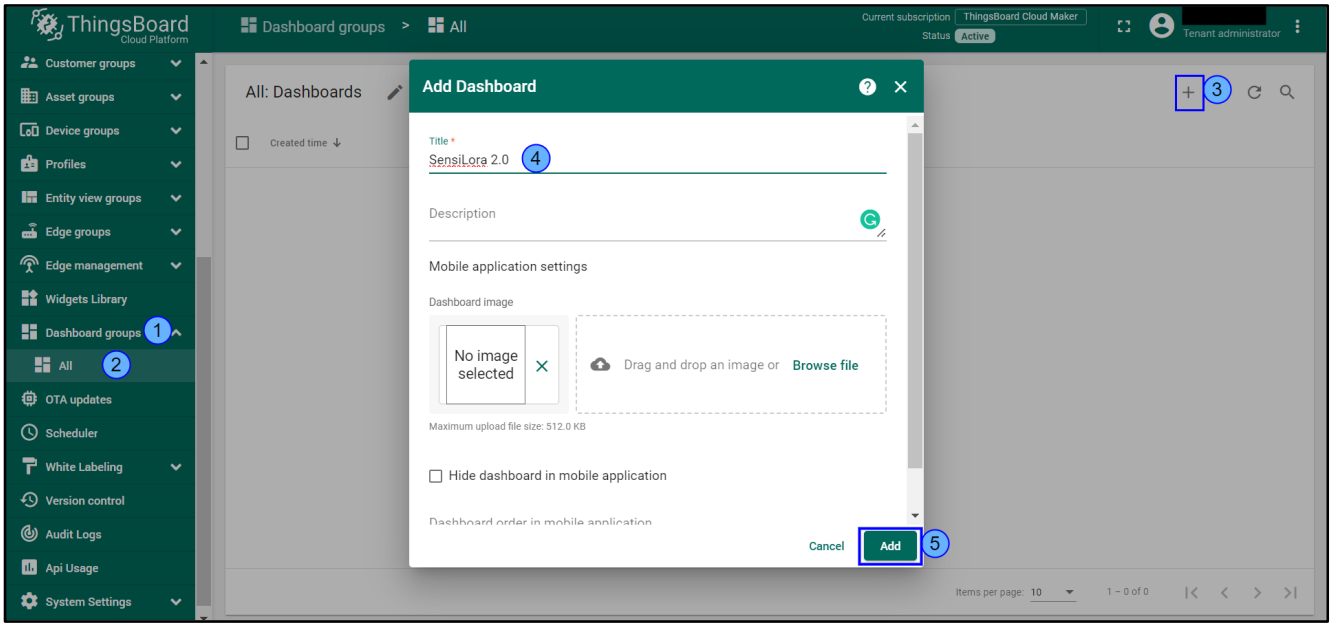
3.6.1 Overview

1. You can create a Dashboard or import a Dashboard and skip the next steps, for this go to section 3.6.5 Import Dashboard.

3.6.2 Add Dashboard

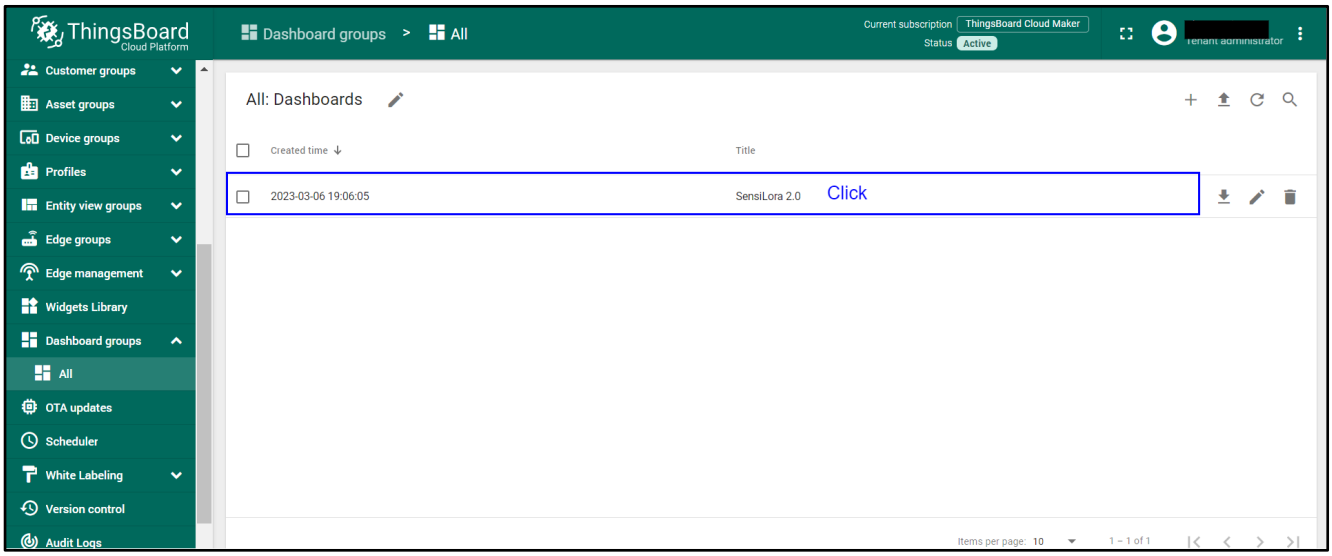
1. Add Dashboard, go to **Dashboard groups** (step 1), **All** (step 2), and click **+** (step 3). Enter a **SensiLora 2.0** in the **Title** field (step 4) and click **Add** (step 5).

Figure 43. Add Dashboard



2. Click on SesnsiLora 2.0 Dashboard.

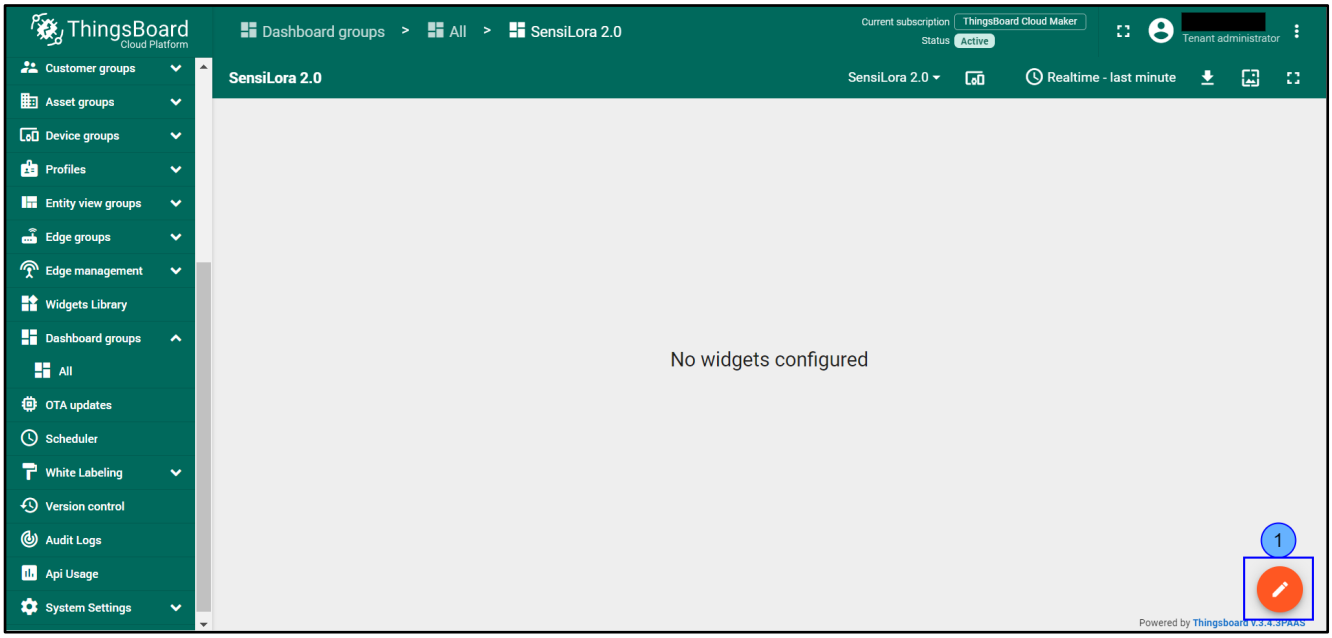
Figure 44. Go to SesnsiLora 2.0 Dashboard



3.6.3 Add Entity aliases

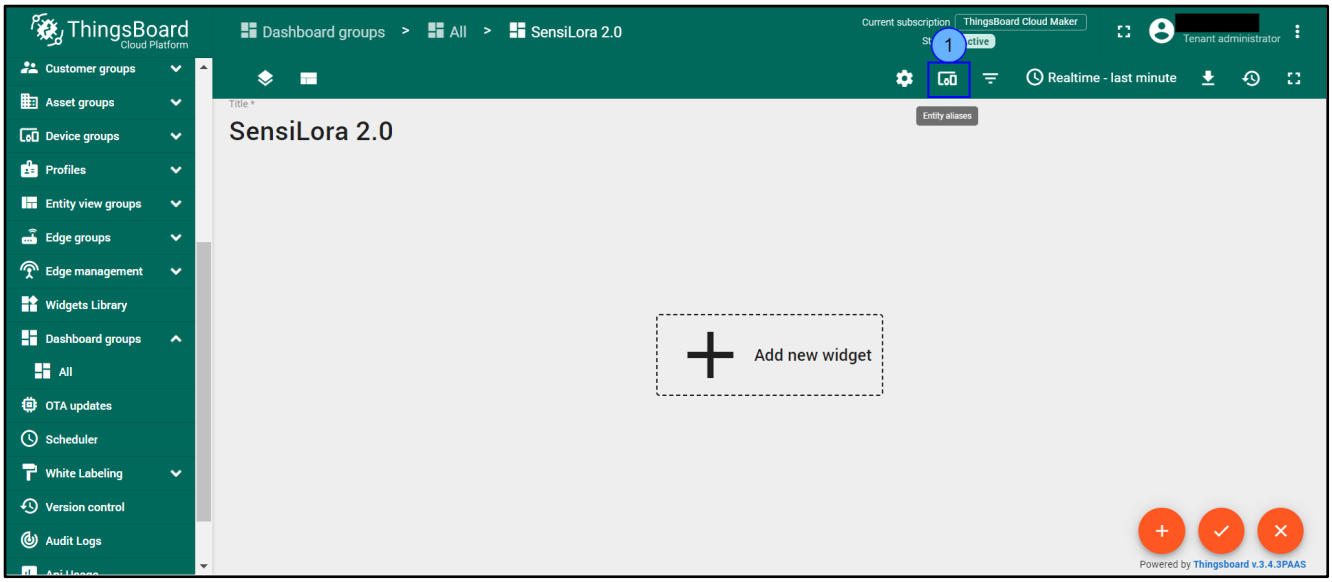
1. Click on **Change** Dashboard (step 1).

Figure 45. Change Dashboard



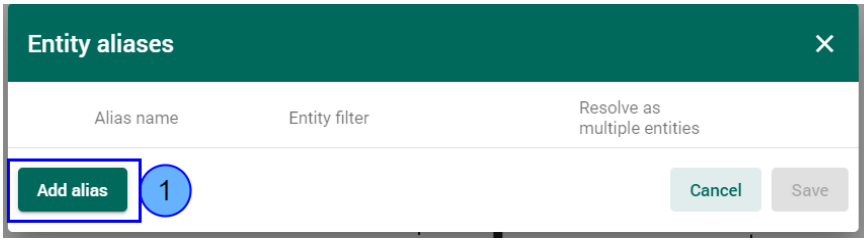
2. Click on **Entity aliases** (step 1).

Figure 46. Entity aliases



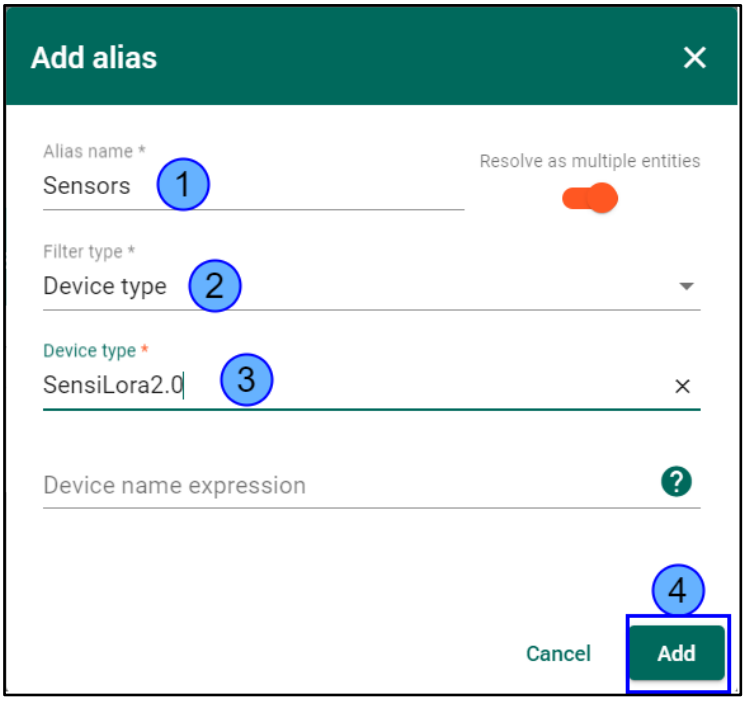
3. Click on **Add alias** (step 1).

Figure 47. Go to Add alias



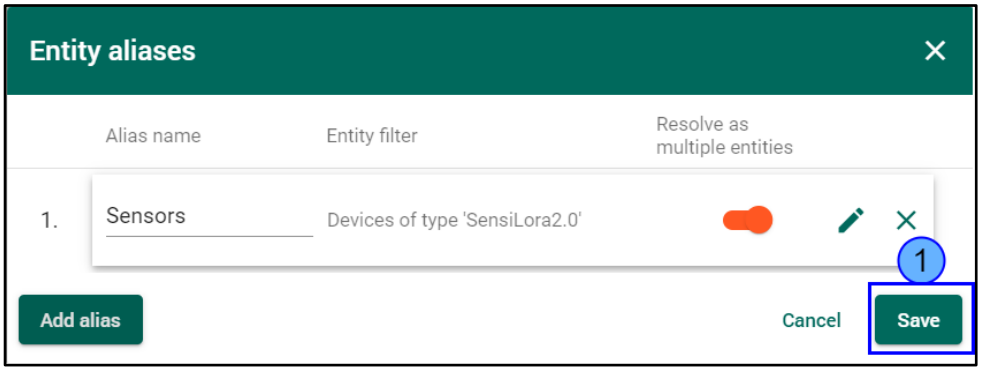
4. In Add alias enters the name: **Sensors** (step 1), and next choose **Device type** (step 2), in Device type, enter the **SensiLora 2.0** type (step 3), and click **Add** (step 4).

Figure 48. Filling Add alias



5. Click to **Save** (step 1).

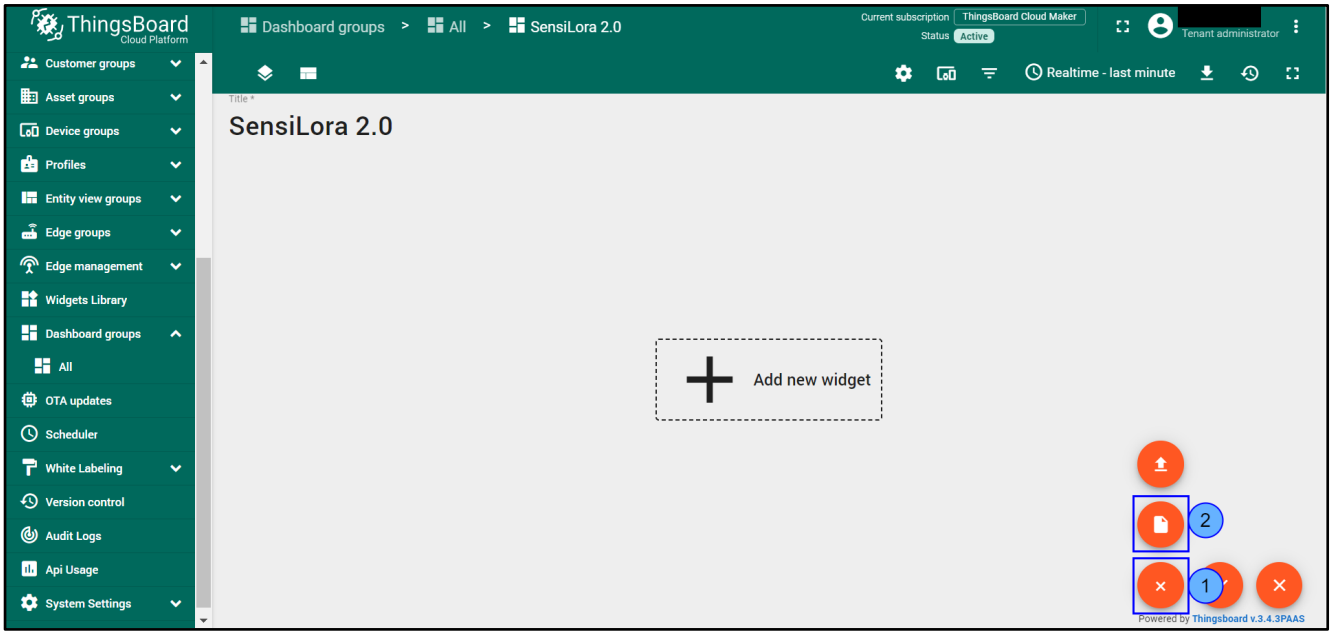
Figure 49. Save alias



3.6.4 Add Temperature widget

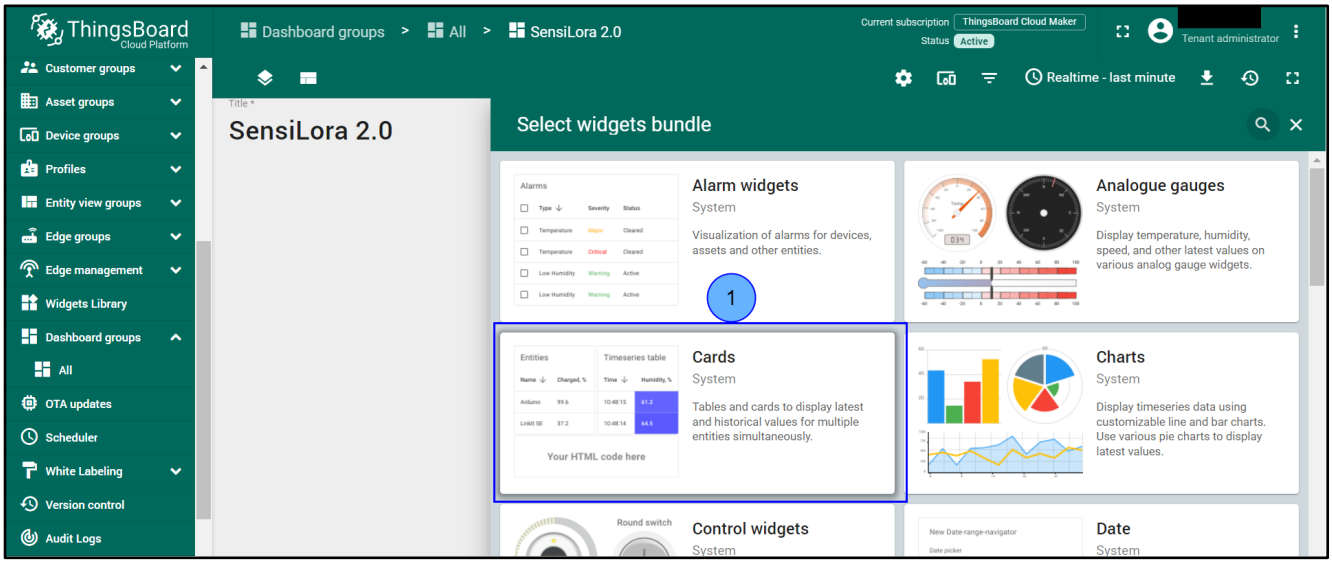
1. Add a new widget. For this click **Add new widget** (step 1) and choose to **Create new widget** (step 2).

Figure 50. Add widget



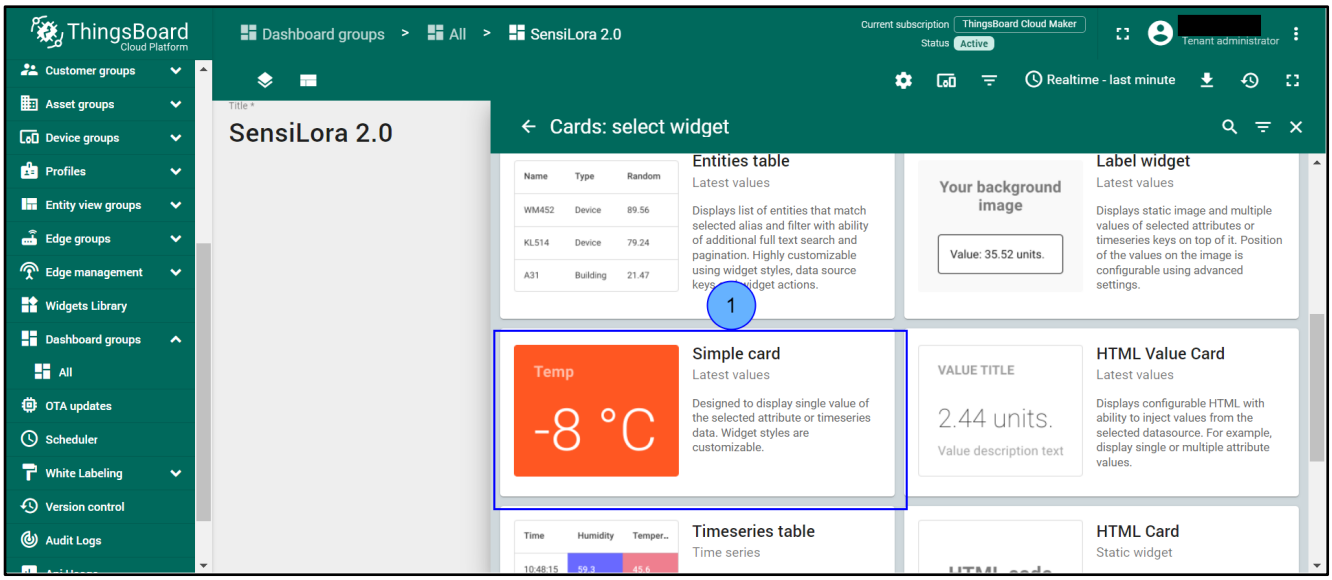
2. Choose the **Cards** widget bundle (step 1).

Figure 51. Choose the Cards widget



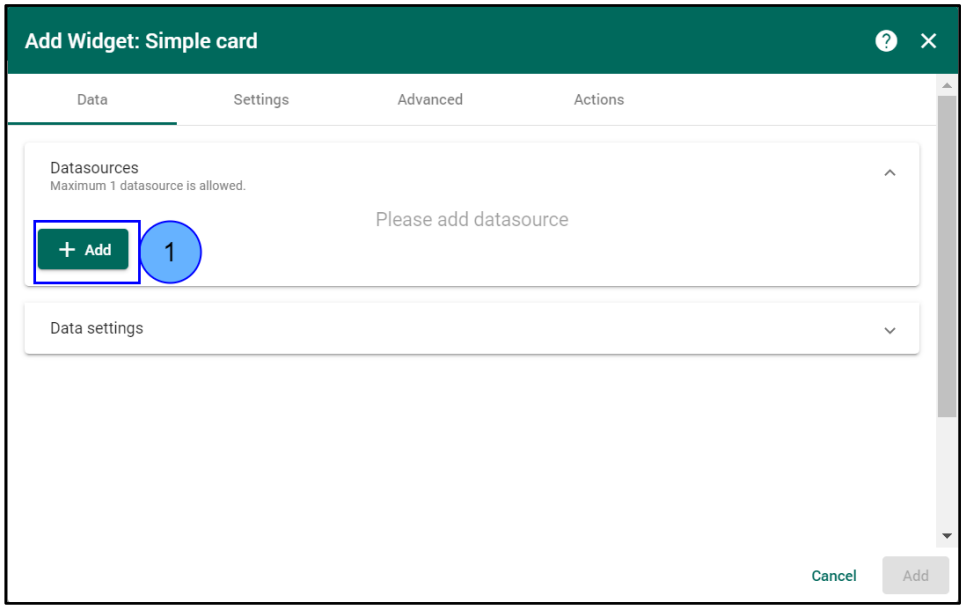
3. Choose the **Simple card** widget (step 1).

Figure 52. Choose the Simple card



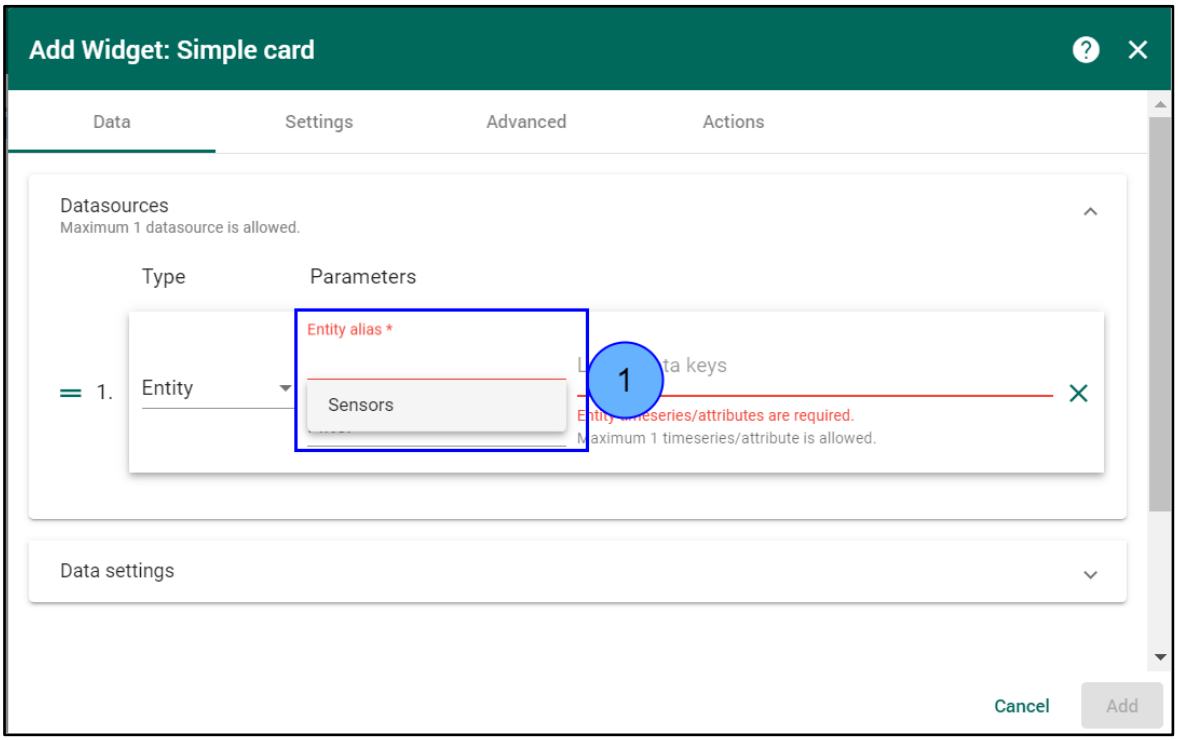
4. Click to **Add** datasource (step 1).

Figure 53. Add Datasource



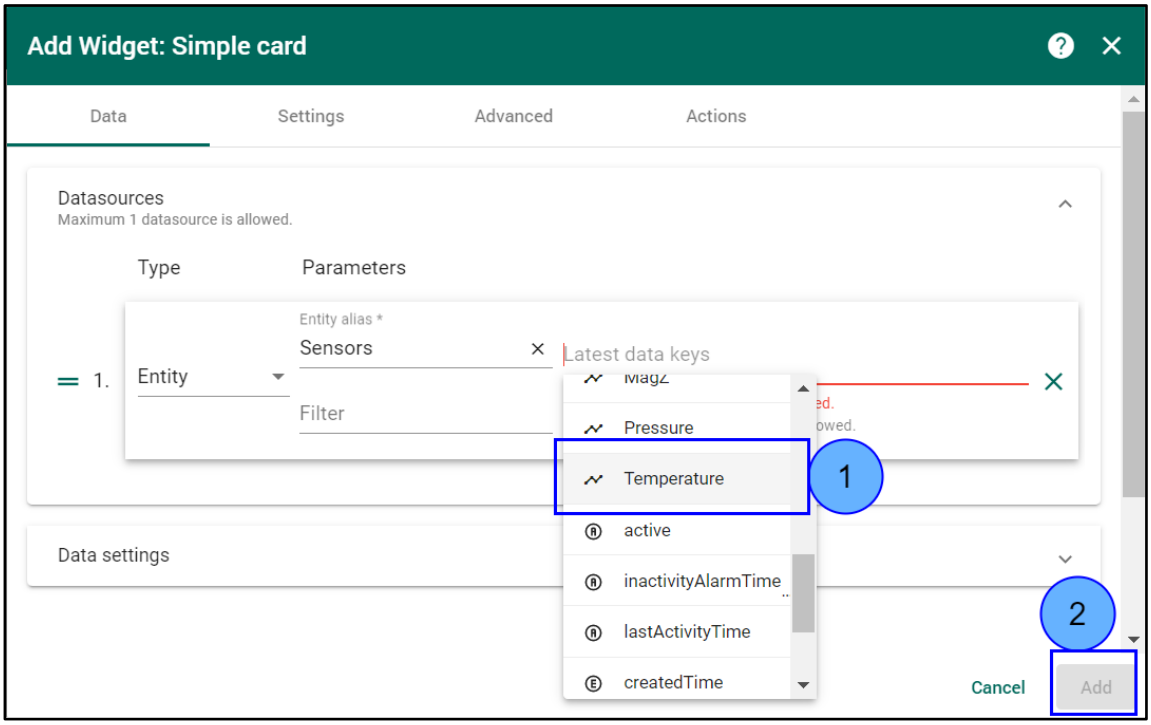
5. In **Entity alias** choose **Sensors** (Step 1).

Figure 54. Entity alias



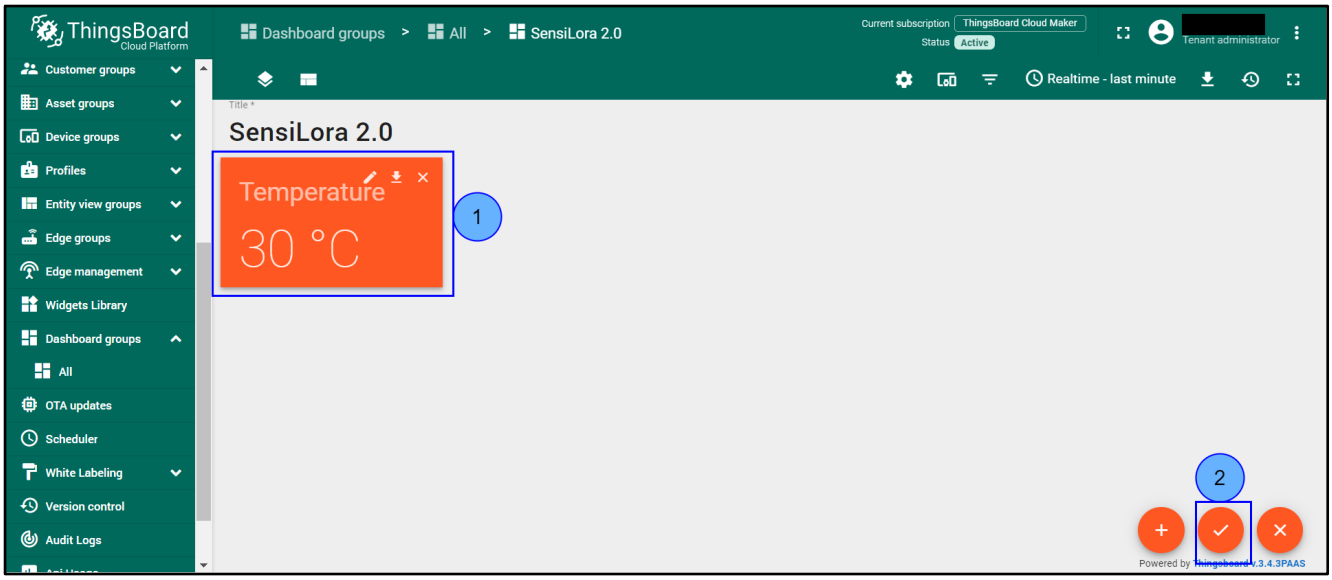
6. Choose the **Temperature** key (step 1) and click **Add** (step 2).

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

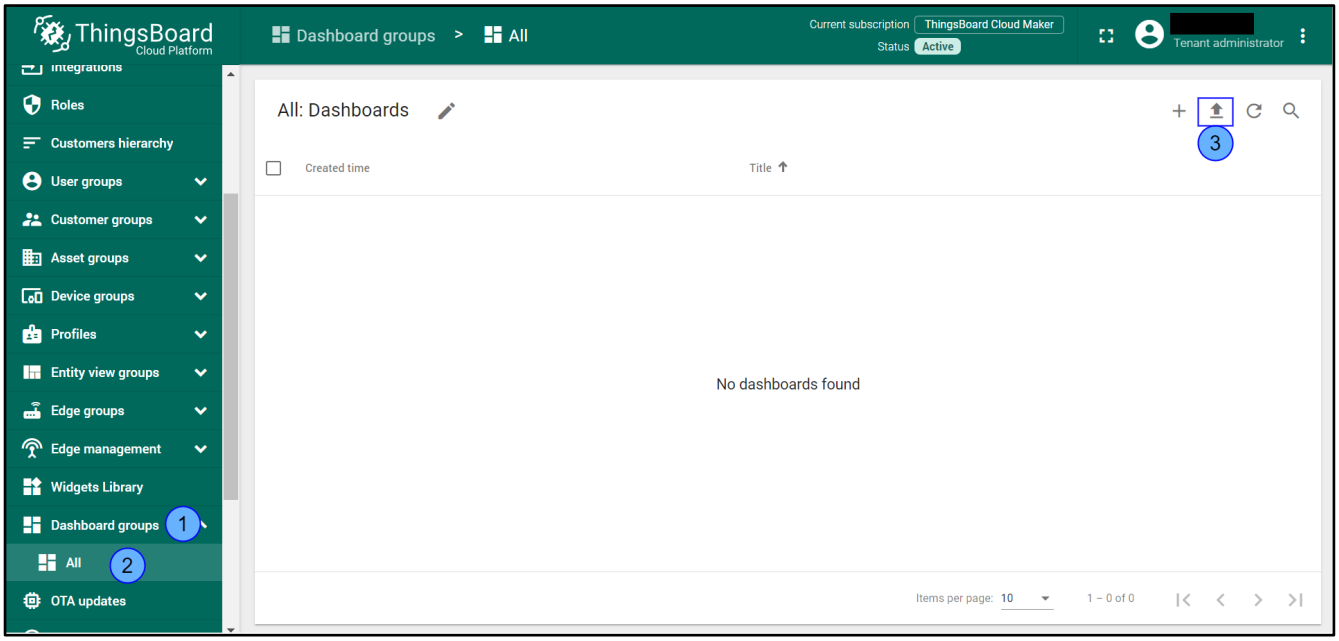


3.6.5 Import Dashboard

1. Download the Dashboard: [sensiLora2_0_DashboardV0.1.json]

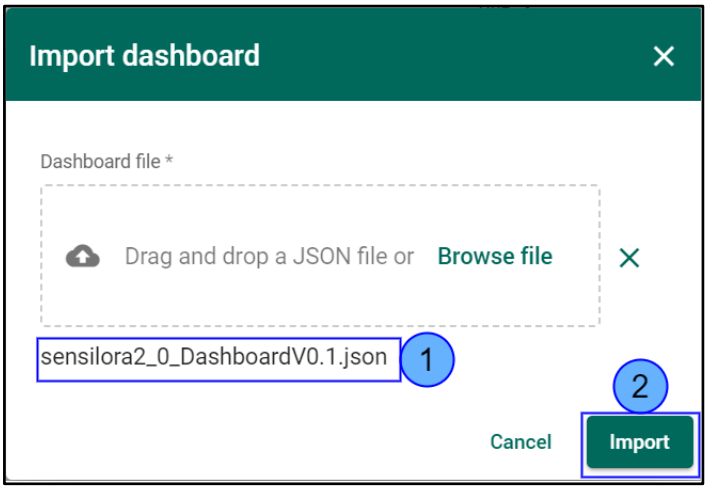
2. Go to **Dashboard groups** (step 1), **All** (step 2), and click **Import dashboard** (step 3).

Figure 57. Choose Import Dashboard



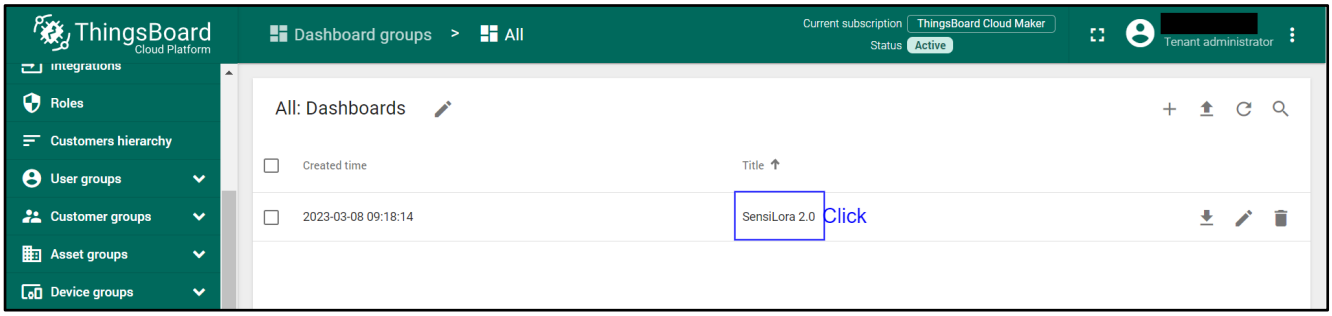
3. Drag and drop the download Dashboard. Import Dashboard should be displayed (step 1), after clicking Import (step 2).

Figure 58. Import Dashboard



4. Go to SensiLora 2.0 Dashboard.

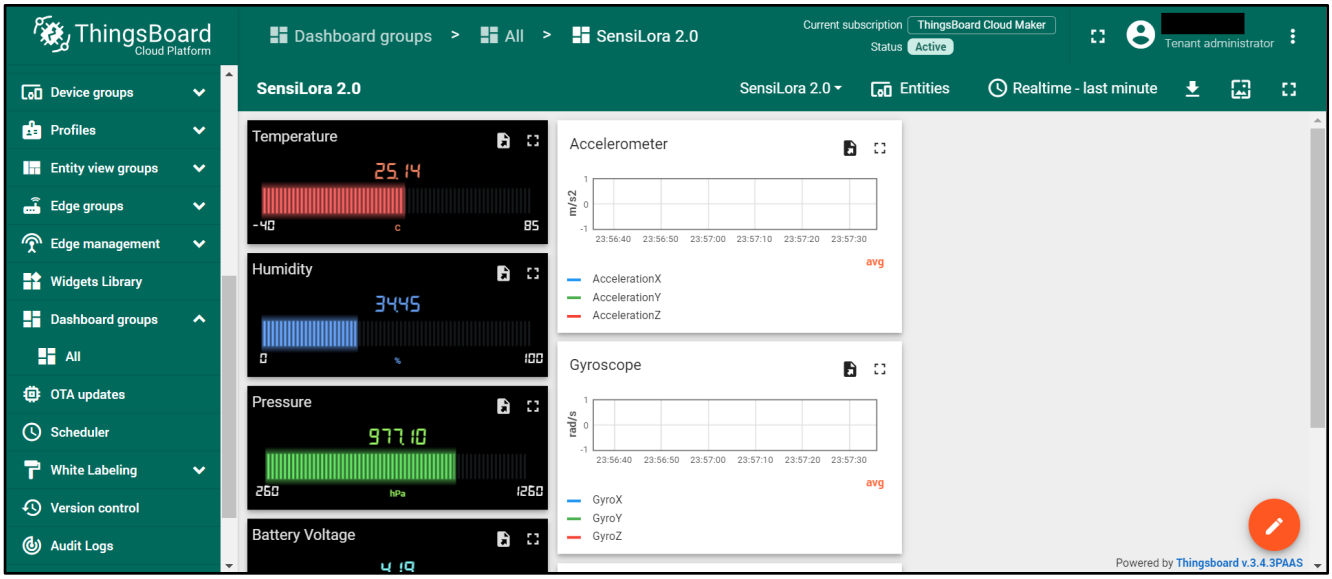
Figure 59. Go to Dashboard



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/s2
- **Gyroscope**, units: rad/sec
- **Magnetometer**, units: µT

Figure 60. SensiLora 2.0 Dashboard

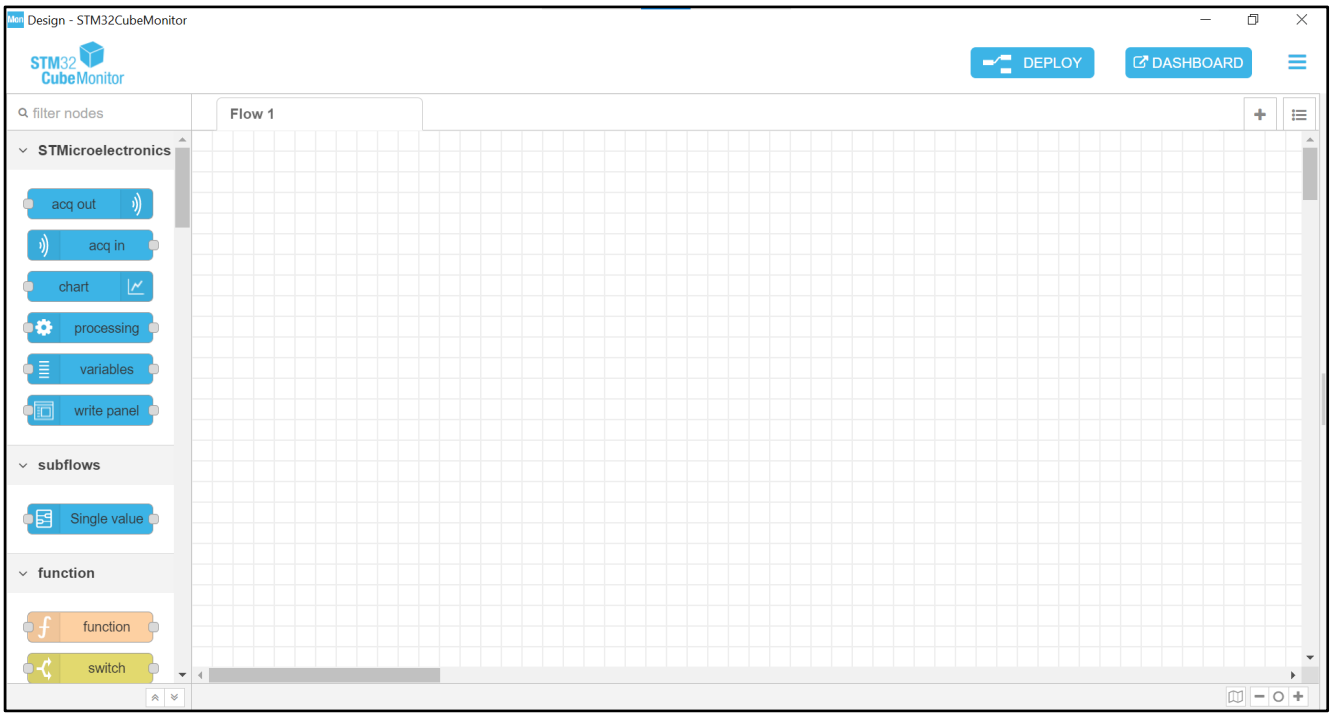


4 STM32CubeMonitor

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.

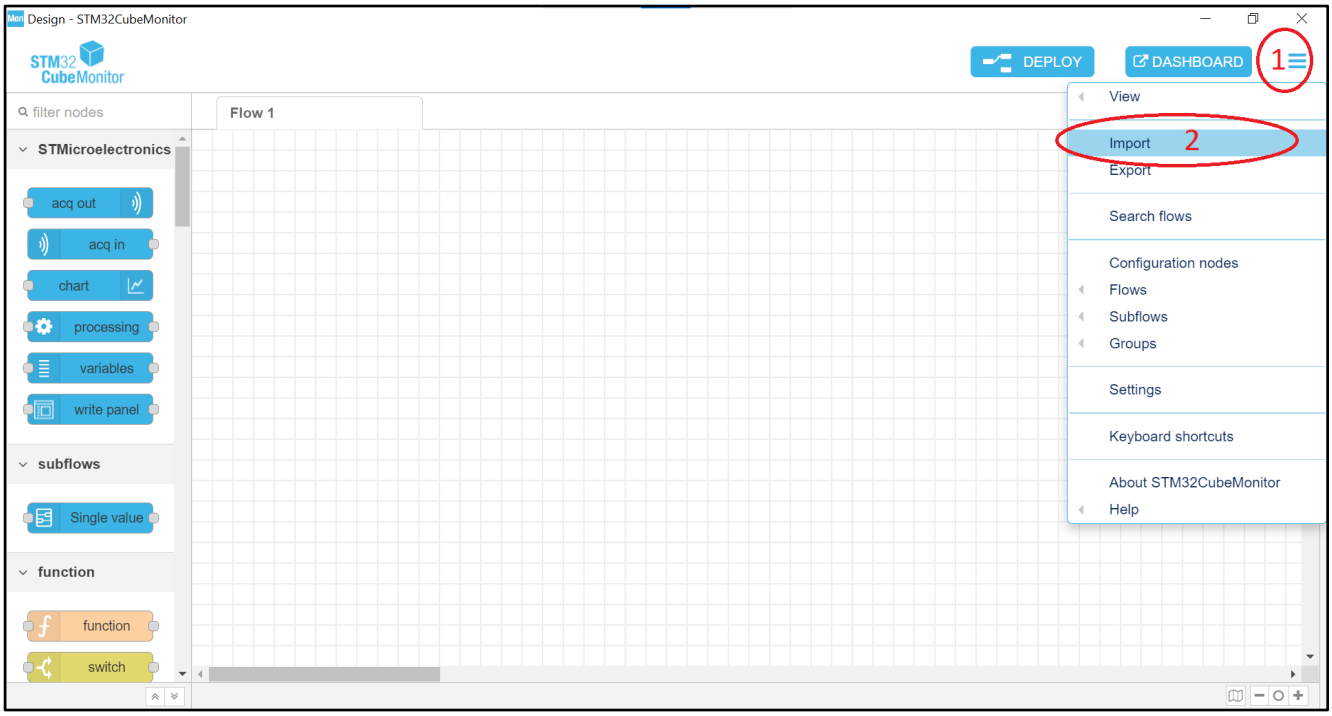
Figure 61. Main window STM32CubeMonitor



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.

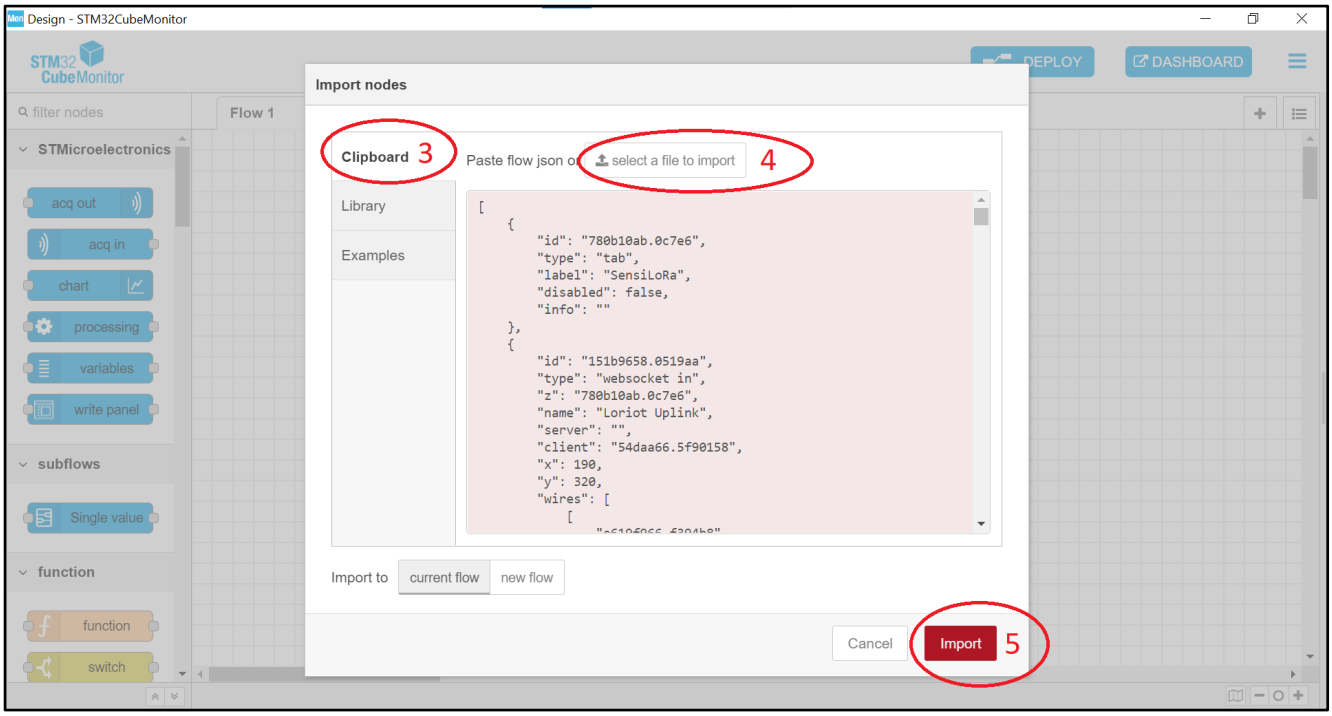
Figure 62. Selection Import menu



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.

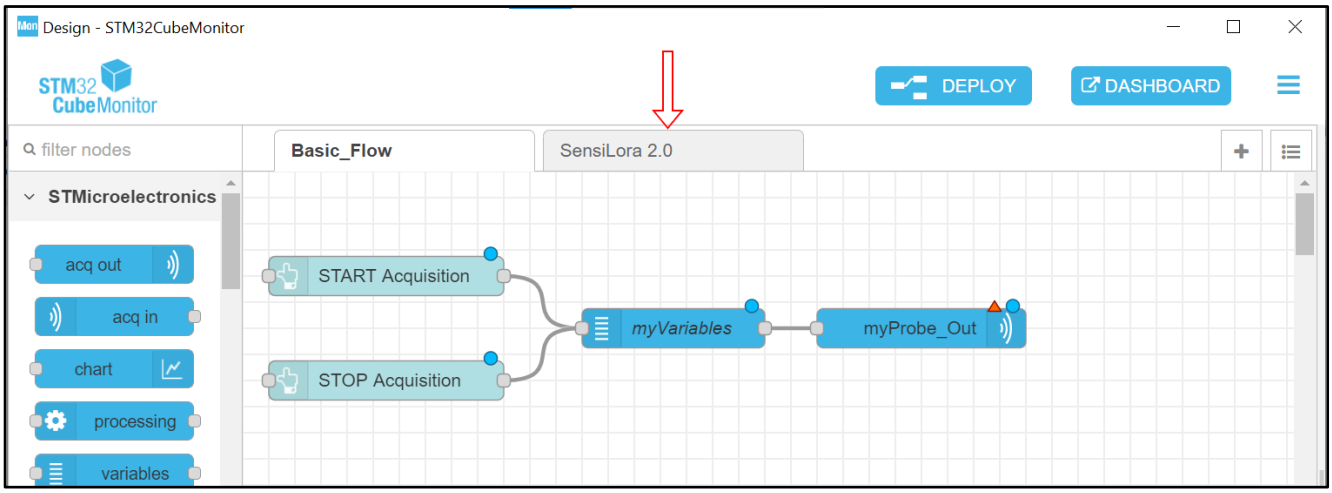
Figure 63. Import project



4.3 Configuration Loriot Uplink

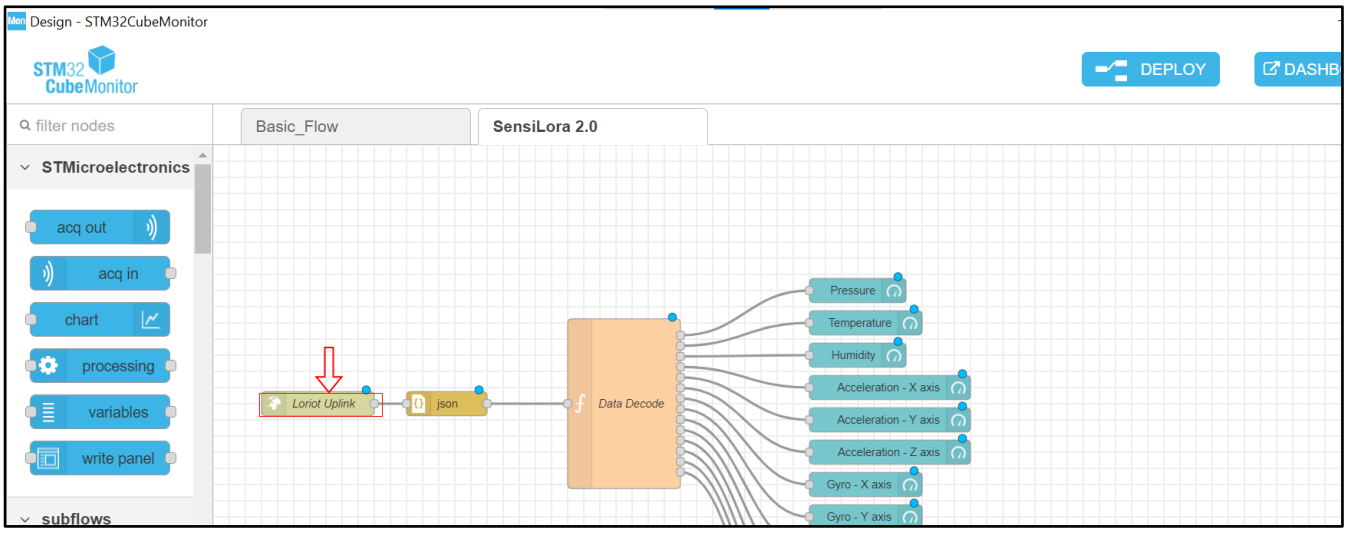
1. Go to the tab SensiLora 2.0 (Figure 64).

Figure 64. Go to the SensiLora project



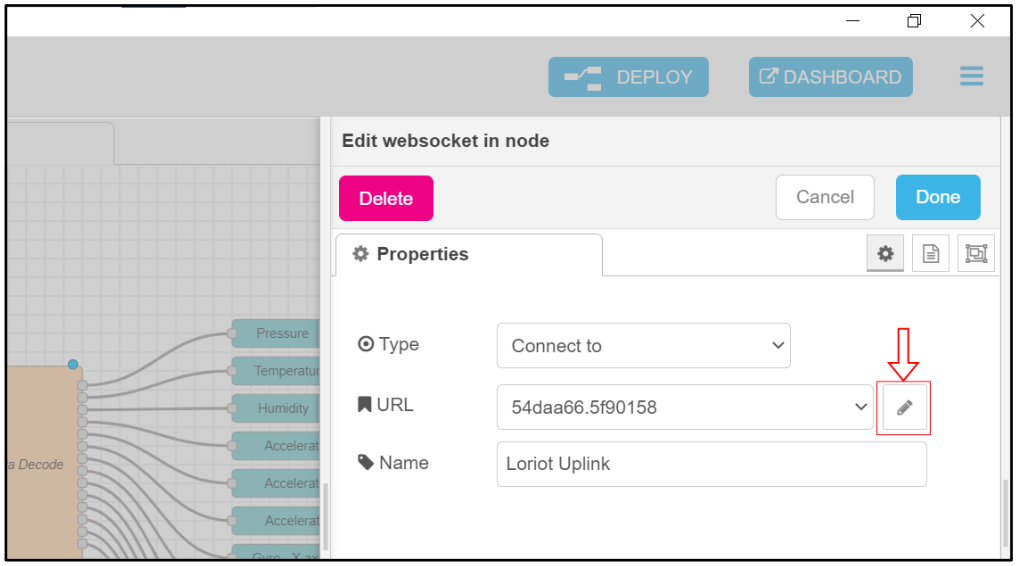
2. Configure the WebSocket **Loriot Uplink**, and double-click on it to open settings (Figure 65).

Figure 65. Open Loriot Uplink



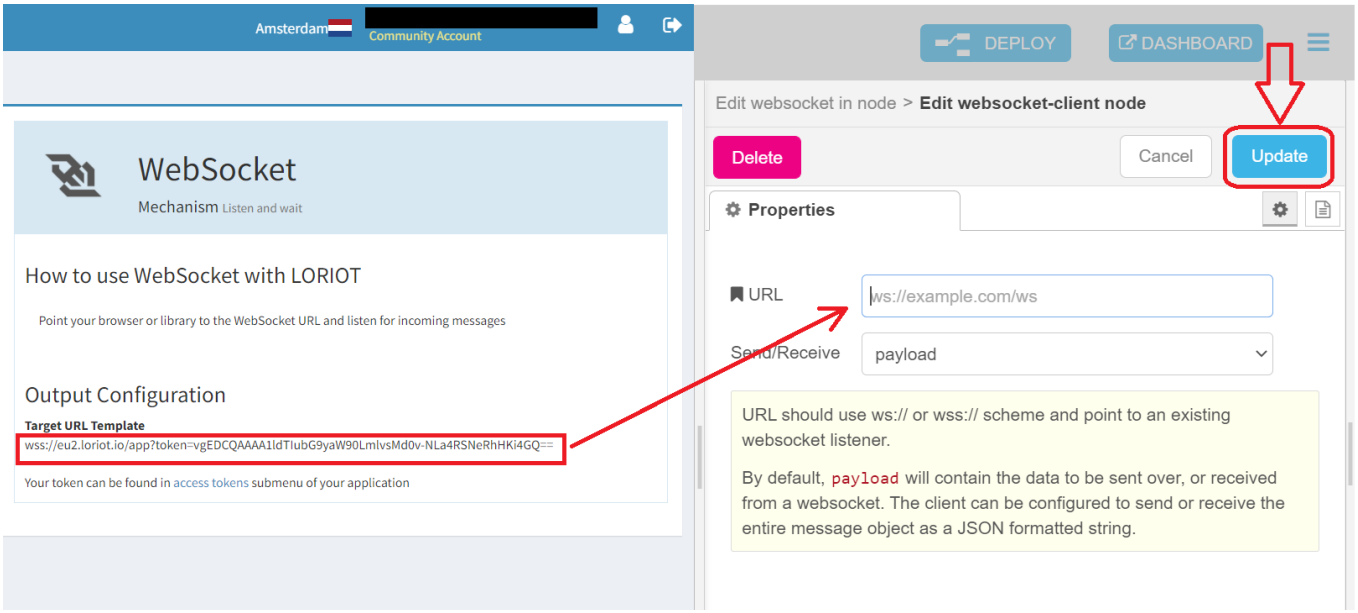
3. When opening the setting window, here we click on the **URL editing icon** (Figure 66).

Figure 66. Setting the Loriot Uplink



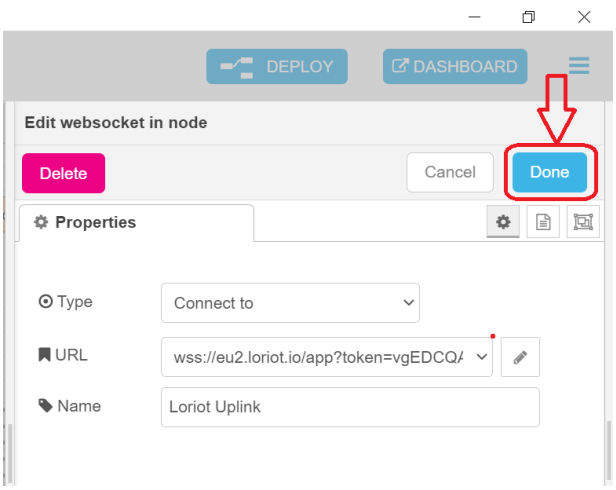
4. In this window, we must insert the URL. If the Loriot server is used, then the link must be taken from 2.4 Loriot Uplink. After inserting the URL, click on **Update**. This action is illustrated in Figure 67.

Figure 67. URL



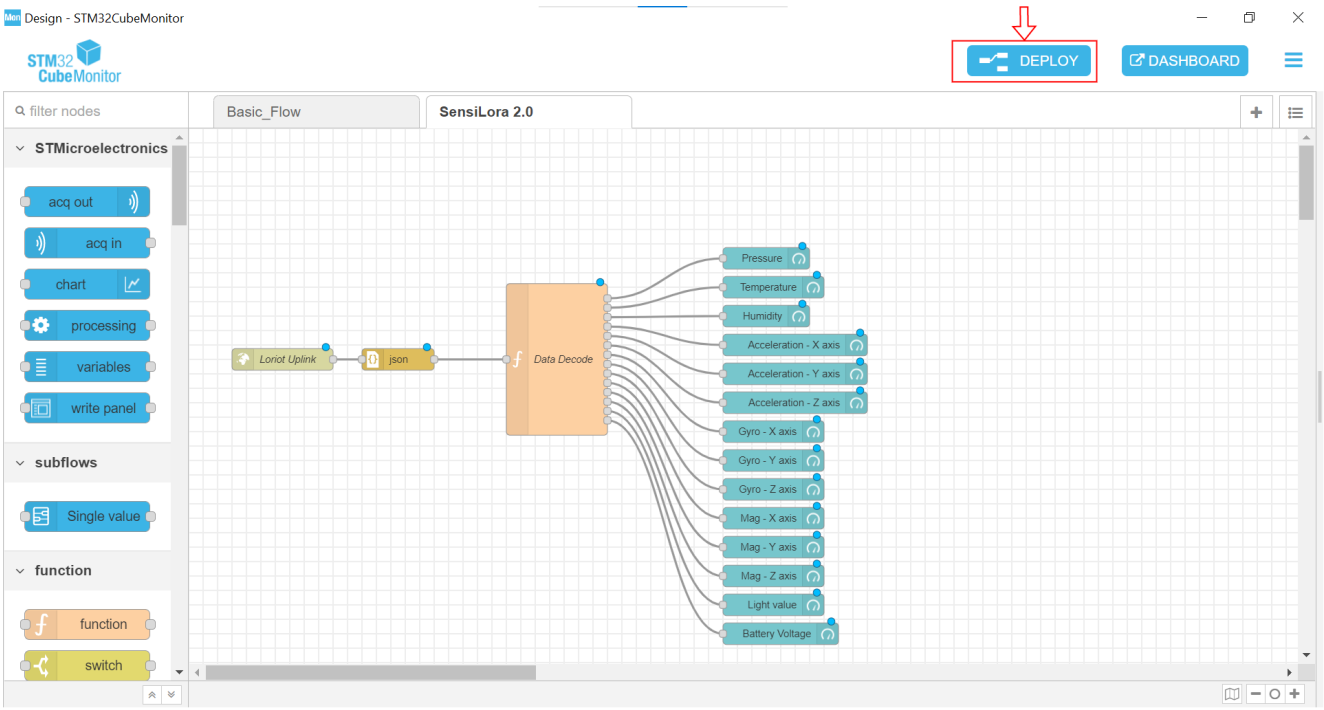
5. Click on **Done** (Figure 67) to save the URL.

Figure 67. Save the URL



6. Click on **Deploy** (Figure 68) so that our changes are saved and take effect.

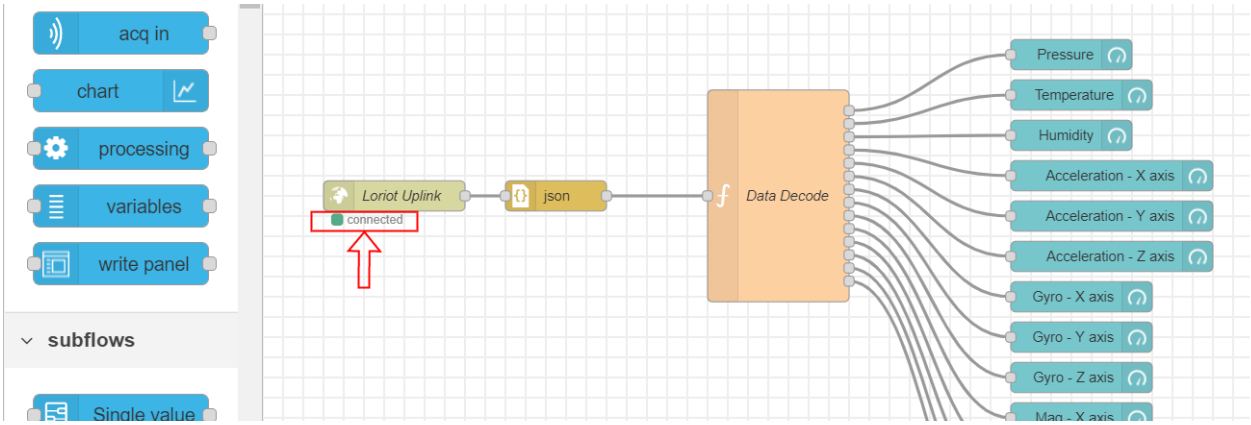
Figure 68. Deploy



4.4 Dashboard

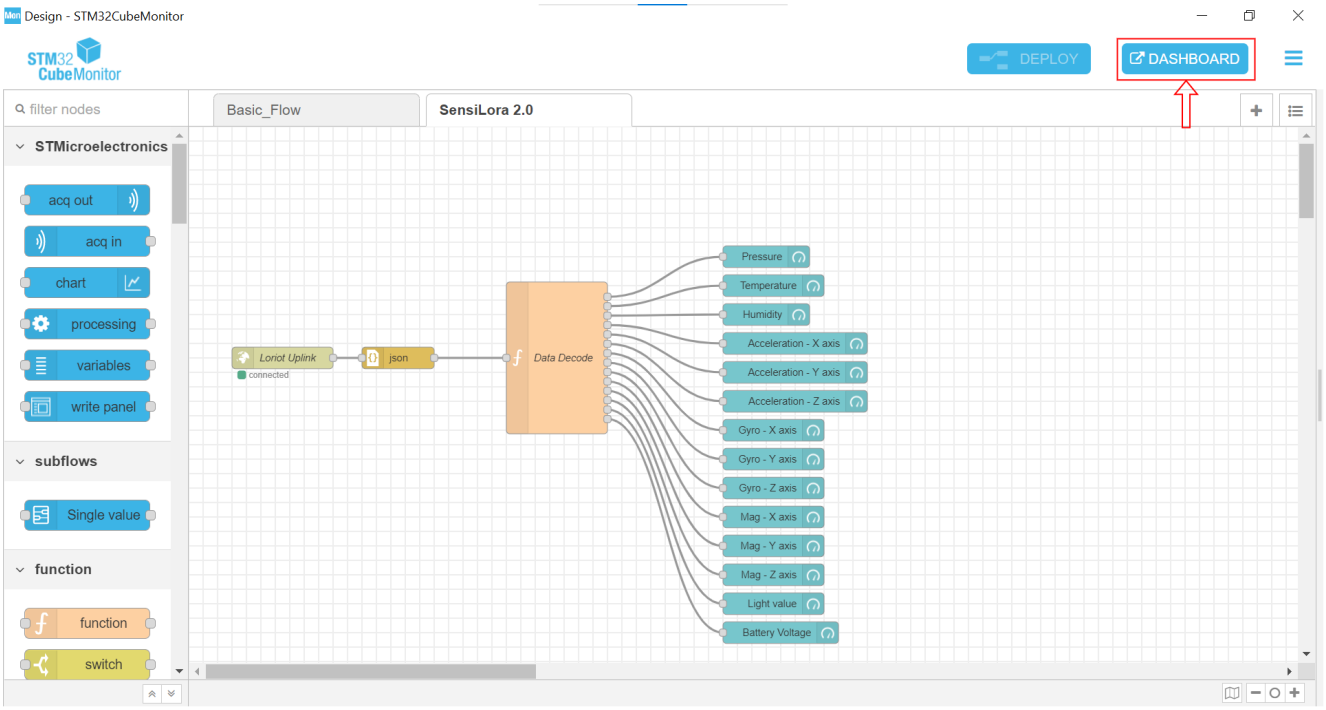
1. When we have changed the Server URL to the necessary and their status should be **connected** (Figure 69).

Figure 69. Status Loriot



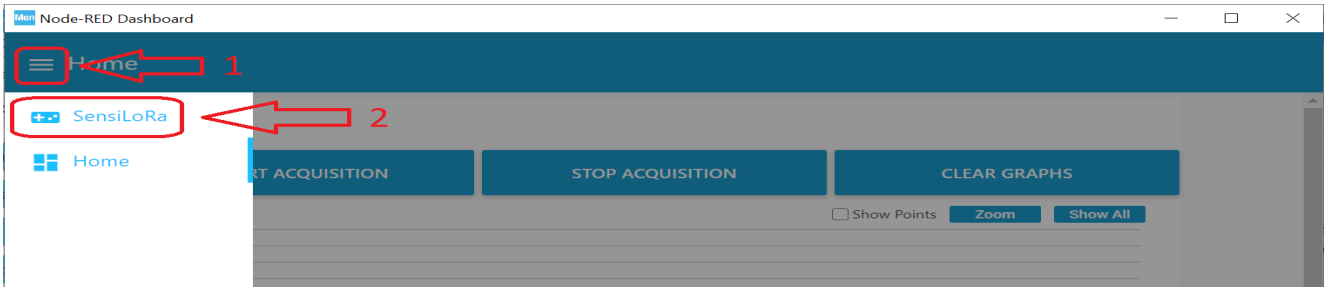
2. Click the **DASHBOARD** (Figure 70).

Figure 70. Go to the Dashboard



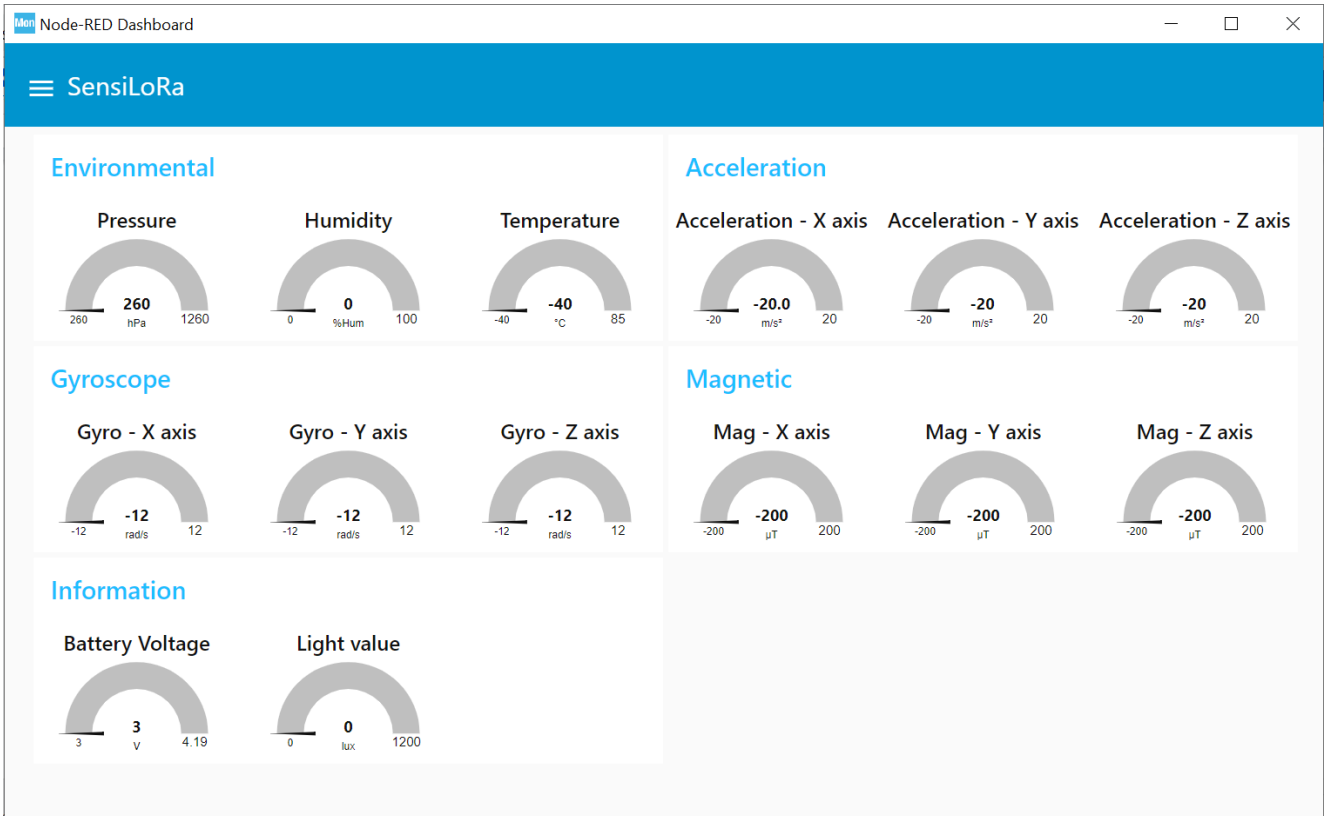
3. If several projects are open, then we need to go to the tab of our project, for this we click on the selection project (step 1) and then click on **Sensilora** (step 2). This action is illustrated in Figure 71.

Figure 71. Selection of a project



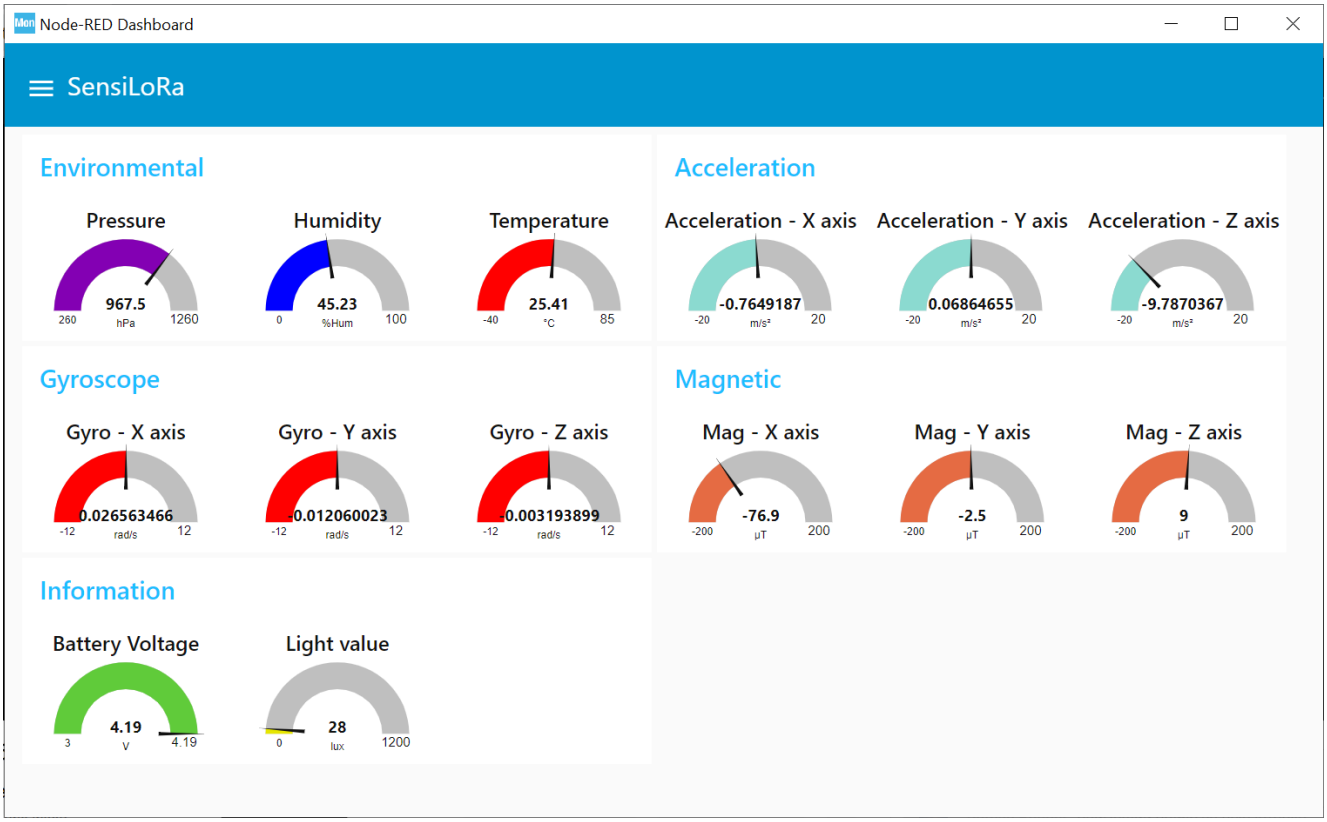
4. After selecting the project, we should see a window (Figure 72).

Figure 72. 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 73).

Figure 73. Data with sensors

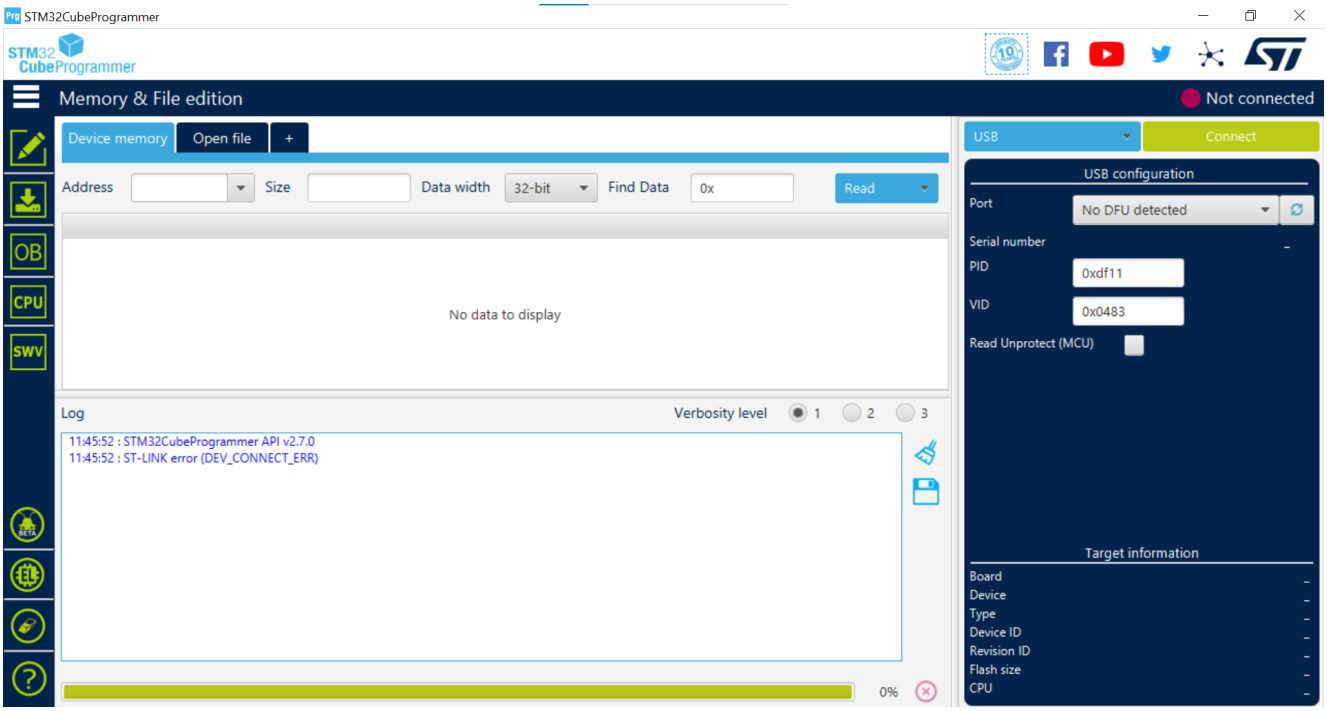

Node-RED Dashboard
SensiLoRa
Environmental
Pressure
967.5
hPa
260
1260
Humidity
45.23
%Hum
0
100
Temperature
25.41
°C
-40
85
Acceleration
Acceleration - X axis
-0.7649187
m/s²
-20
20
Acceleration - Y axis
0.06864655
m/s²
-20
20
Acceleration - Z axis
-9.7870367
m/s²
-20
20
Gyroscope
Gyro - X axis
0.026563466
rad/s
-12
12
Gyro - Y axis
-0.012060023
rad/s
-12
12
Gyro - Z axis
-0.003193899
rad/s
-12
12
Magnetic
Mag - X axis
-76.9
µT
-200
200
Mag - Y axis
-2.5
µT
-200
200
Mag - Z axis
9
µT
-200
200
Information
Battery Voltage
4.19
V
3
4.19
Light value
28
lux
0
1200

5 Flashing SensiLora 2.0

5.1 Install STM32CubeProgrammer

1. Download and install STM32CubeProgrammer from the ST site at this link: STM32CubeMonitor (Figure 74). 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).

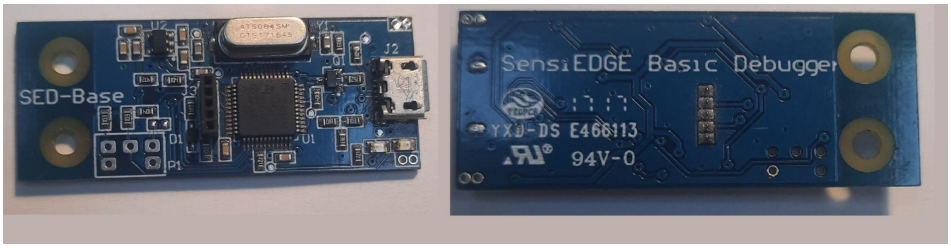
Figure 74. STM32CubeProgrammer



5.2 Flashing with SensiEdge Basic Debugger

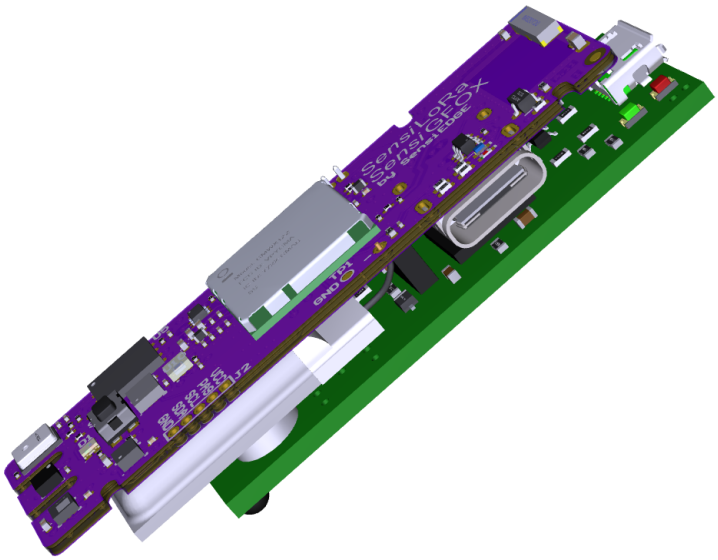
1. For the programming SensiLora 2.0 use the programmer SensiEdge Basic Debugger (Figure 74), if you don't have one, then go to 4.3 Flashing via USB Type-c.

Figure 74. SensiEdge Basic Debugger



2. Connect the SensiLora 2.0 to the programmer SensiEdge Basic Debugger (Figure 75) and then connect the USB to the programmer.

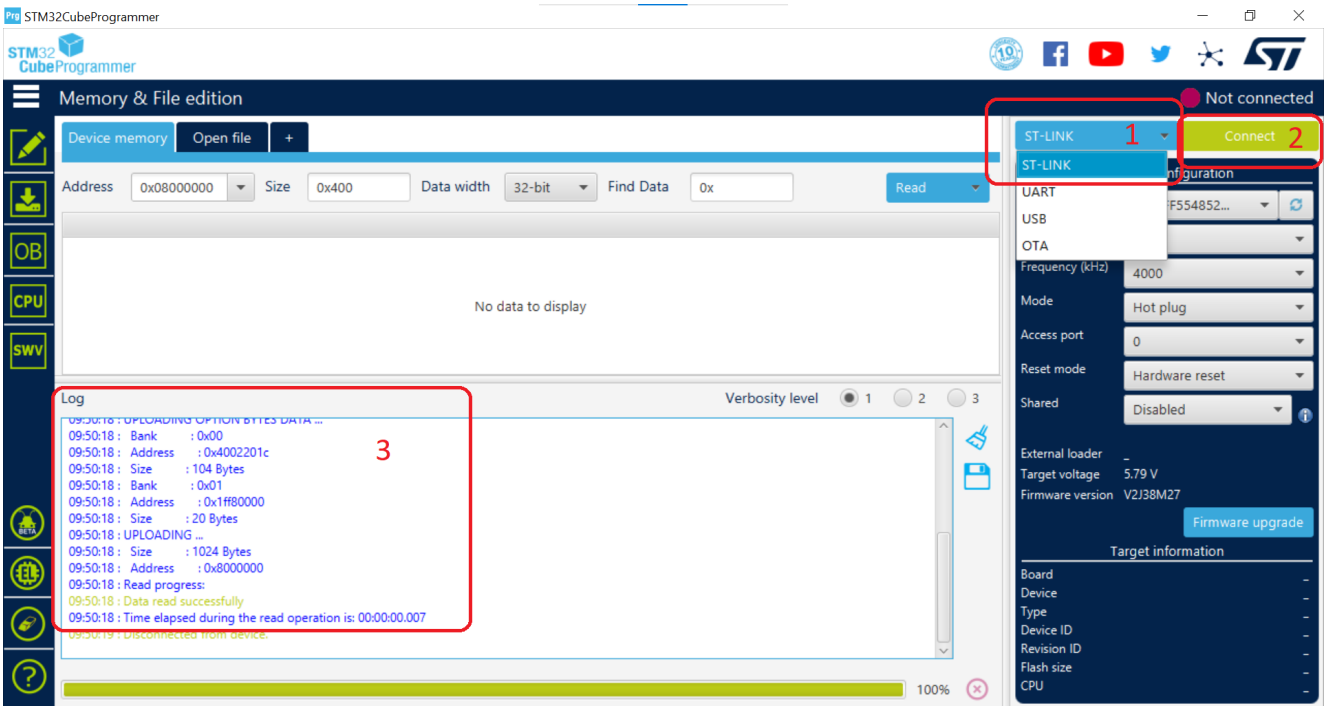
Figure 75. Connect to programmer



3. Open the program STM32CubeProgrammer and select the **ST_LINK** (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 76.

Figure 76. Connect to SensiLoRa 2.0

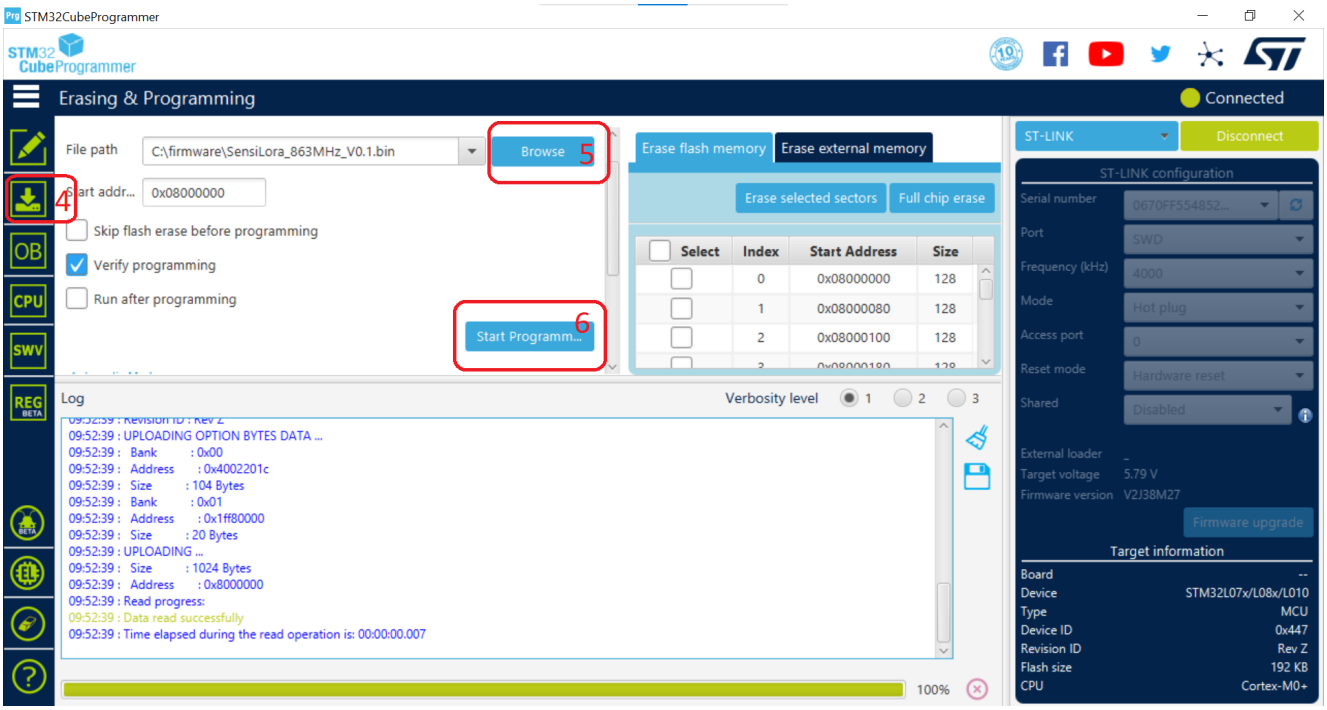


4. After successfully connecting to the controller, select the tab **Erasing & Programming** (step 4) then click on the button **Browse** (step 5) a window will open where we have to specify the firmware file. Where to get the firmware file is described in 4.1 Install STM32CubeProgrammer.

After selecting the firmware file, press **Start Programm…**. This action is illustrated in Figure 77.

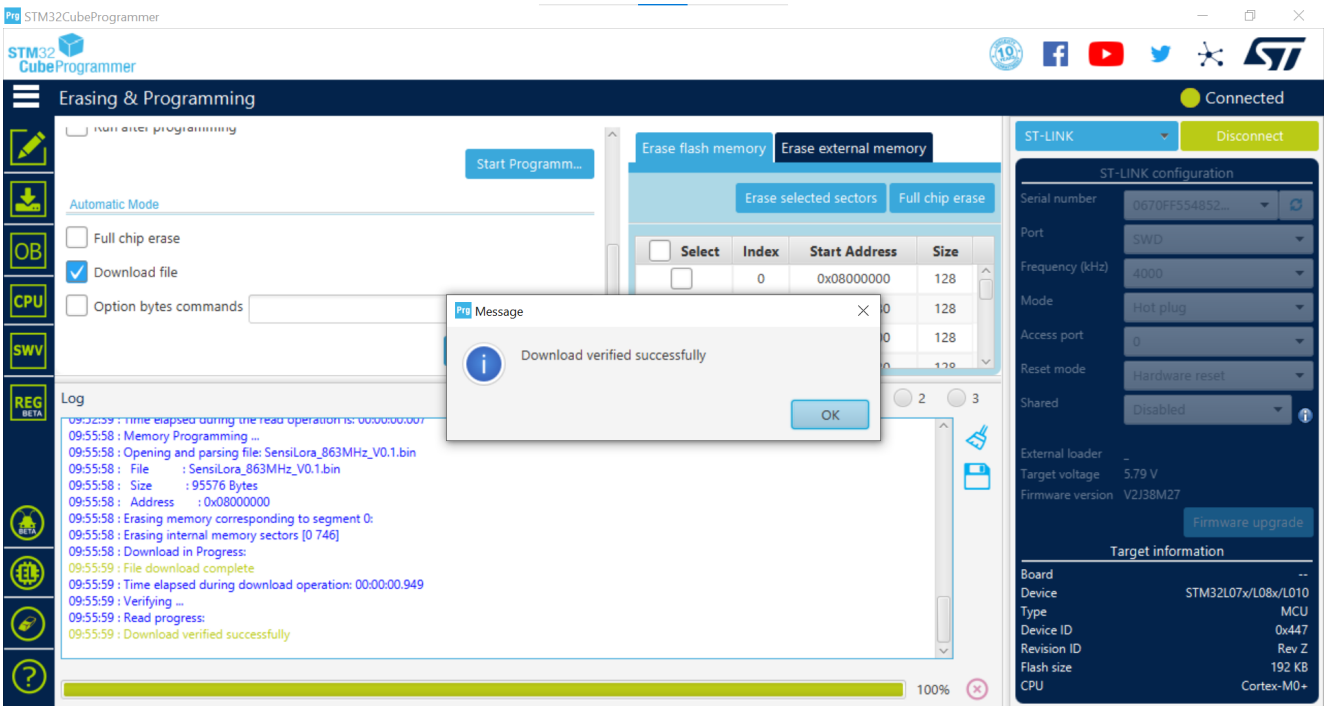
Warning: There are several versions of the firmware, which differ in the operating frequencies of the LoRa, so pay attention to the name of the firmware, the operating frequency is indicated there.

Figure 77. Connect to SensiLoRa 2.0



5. After successfully loading the firmware, we should see the message Download verified successfully (Figure 78).

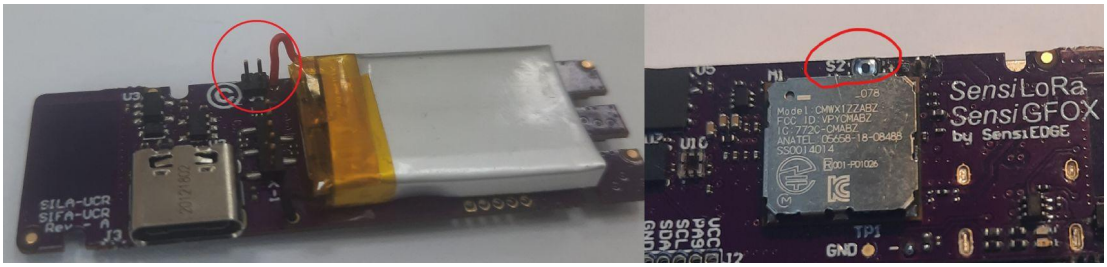
Figure 78. Successful programming



4.3 Flashing via USB Type-c

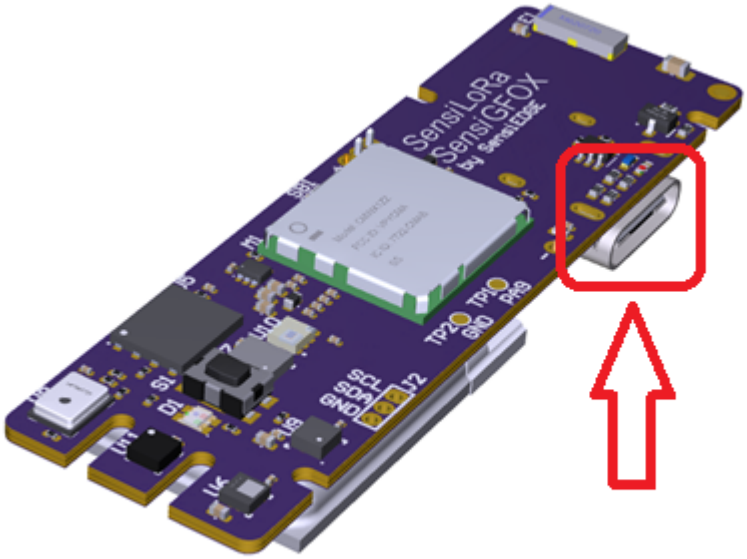
1. For flashing we will use such a program STM32CubeProgramming. First, we must disconnect the battery by disconnecting the jumper J4 (Figure 79), then we must hold down button S2 (Figure 52).

Figure 79. Jumper J4 and Button S2



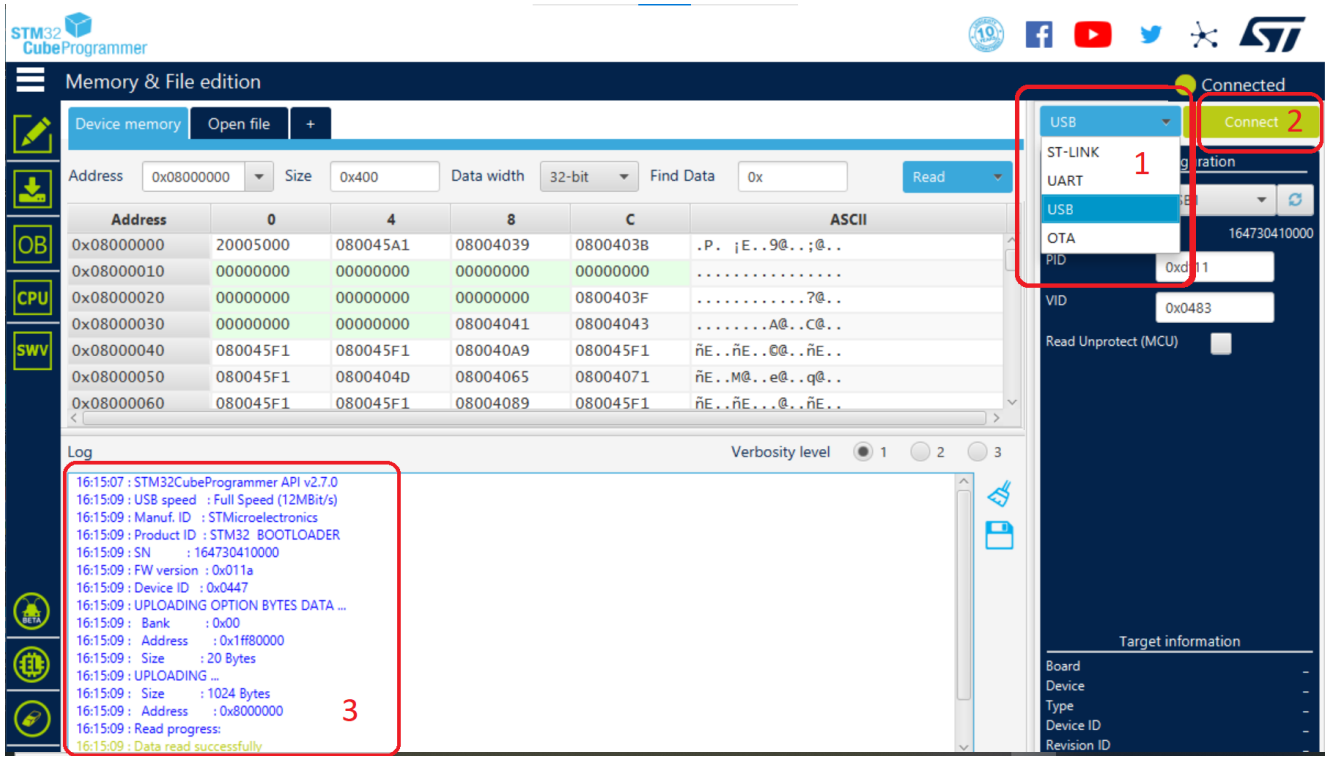
2. When holding down button S2 connect the cable USB Type-c (Figure 80) and after a couple of seconds we release the button with this combination, and the board enters the programming mode.

Figure 80. Connect USB



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 81.

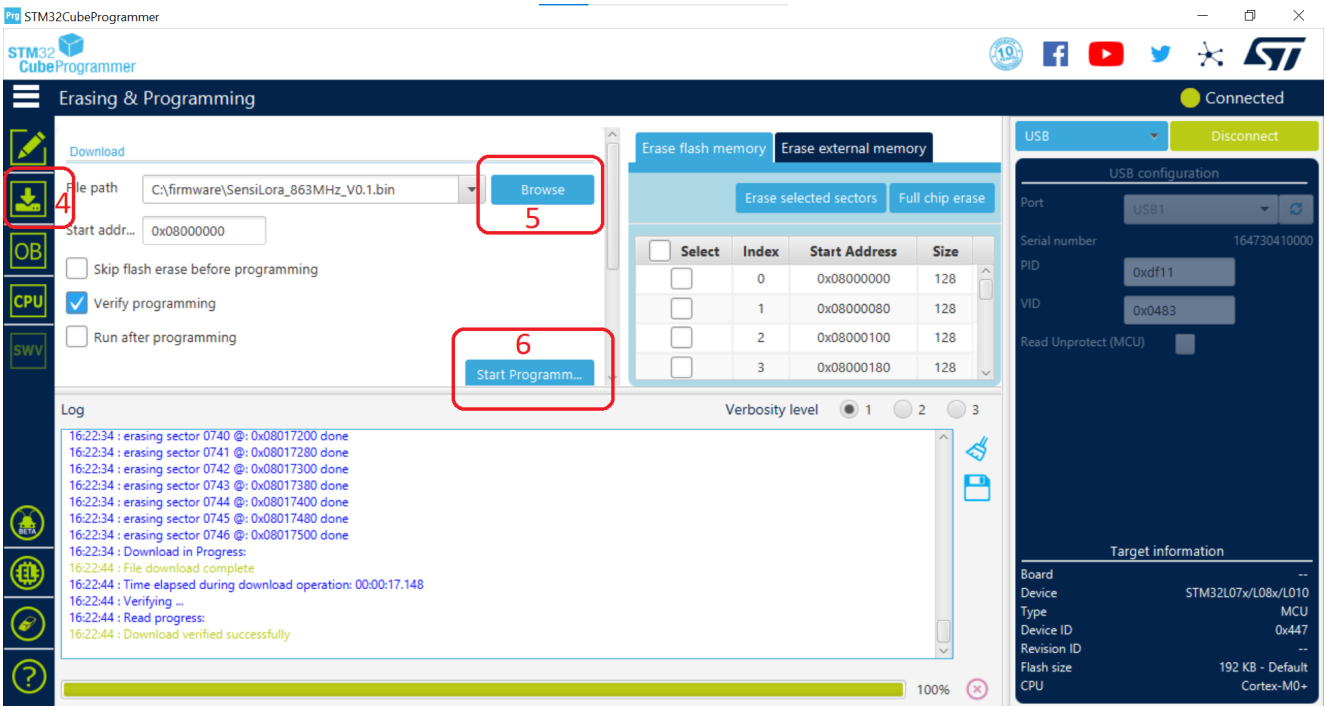
Figure 81. Connect via USB



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 82.

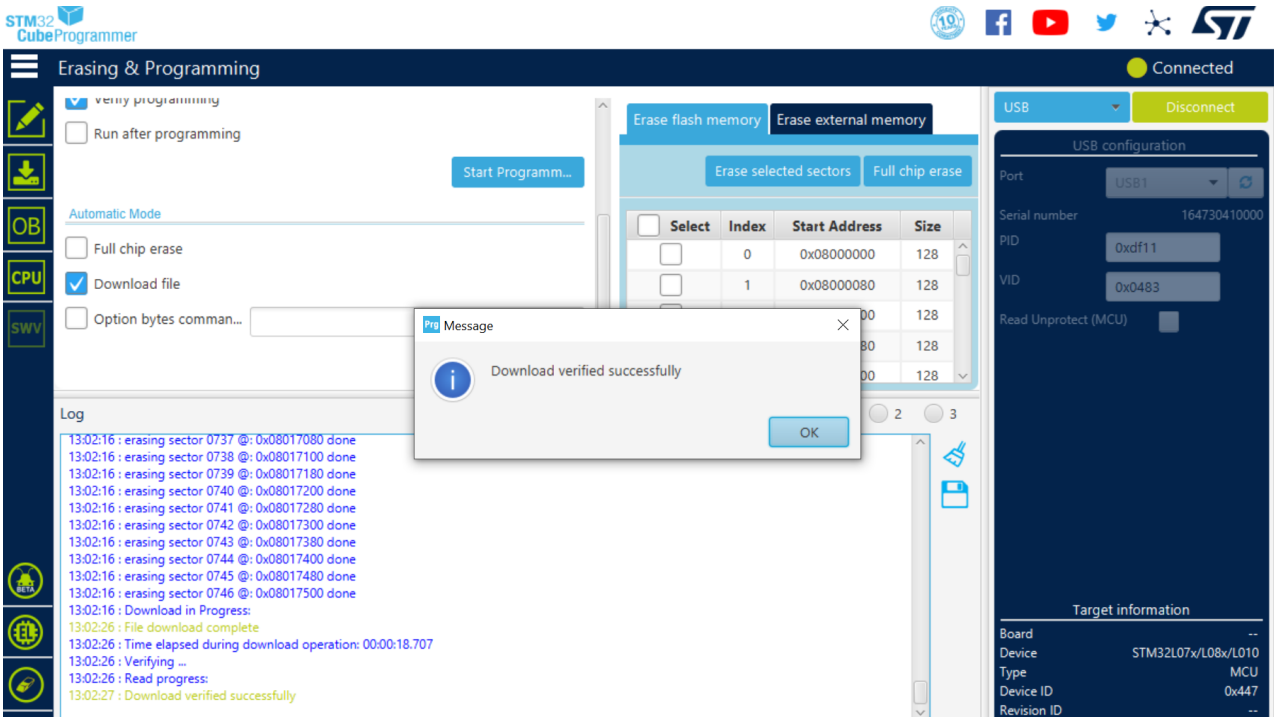
Warning: There are several versions of the firmware, which differ in the operating frequencies of the LoRa, so pay attention to the name of the firmware, the operating frequency is indicated there.

Figure 82. Programming via USB



5. After successfully loading the firmware, we should see the message Download verified successfully (Figure 83).

Figure 83. Successful programming



5.4 Battery power

1. SensiGFOX | LoRa 2.0 integrating **SILA-UCR** (LoRa) and **SIFA-UCR** (Sigfox). Same hardware but different Software Firmware. Every board comes with a Rechargeable battery of 140mA**.** 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 84).

Figure 84. Battery power