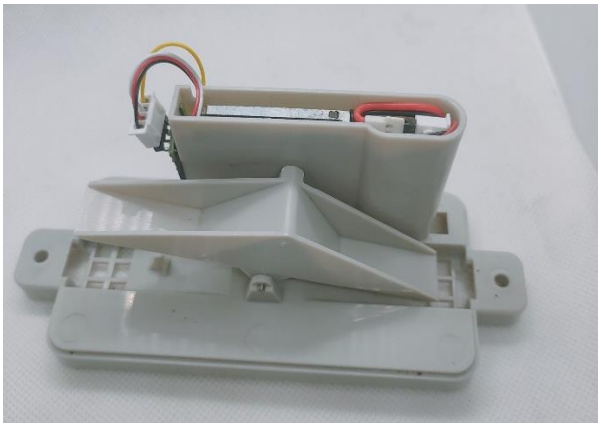
RAINGUAGE

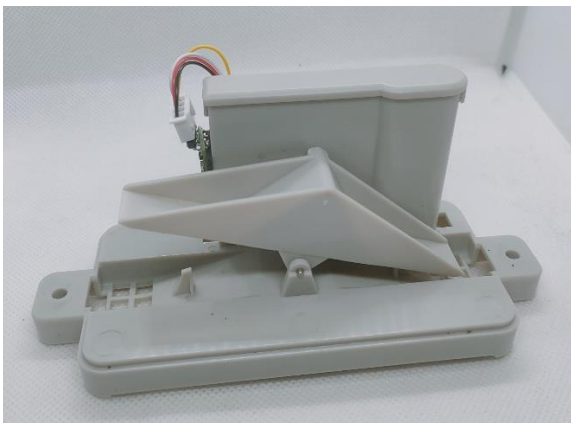
Contents

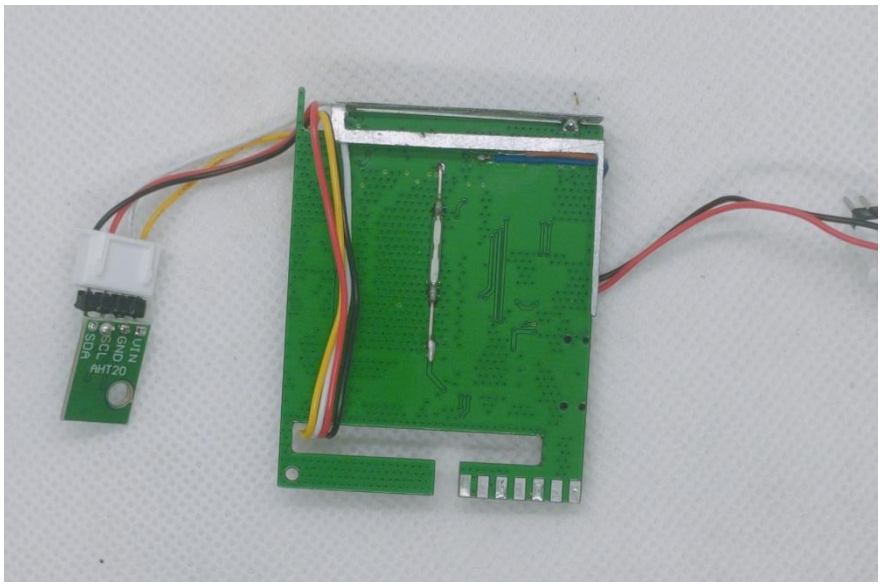
1. Product Overview

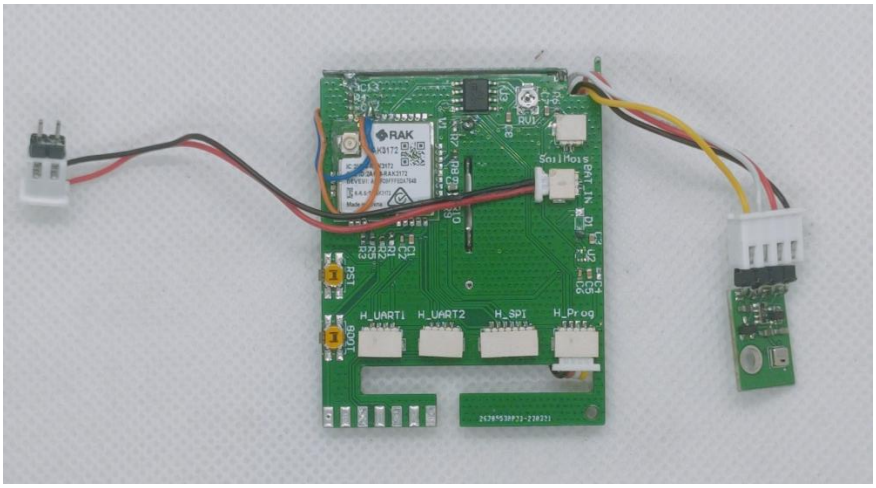
RainGuage - This is a rainfall device with a built-in temperature and humidity sensor.

- MCU: Rak3172 base on stm32wle5ccu6.
- Sensor: AHT20 humidity & temperatue, Reed sensor.





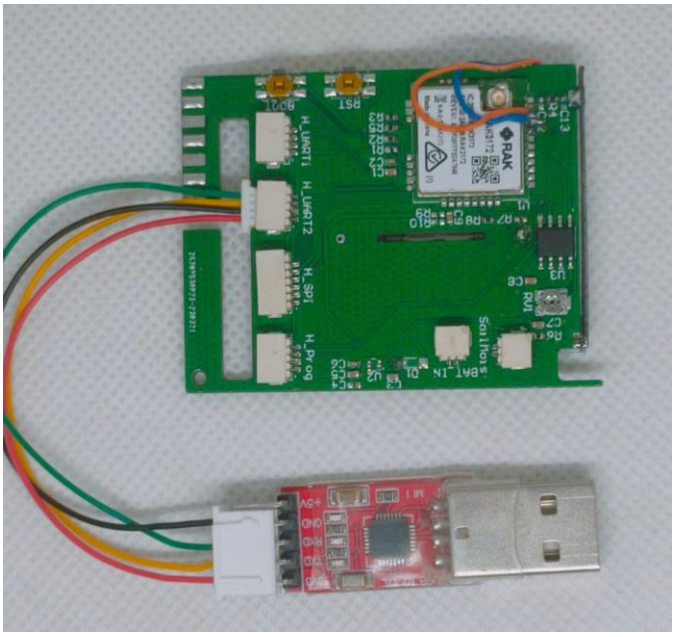




2. Load Code With Arduino

2.1. Hardware connect

To load the code for the device. Need to connect device to usb uart using grove connecter UART2. Connect as shown in the picture below

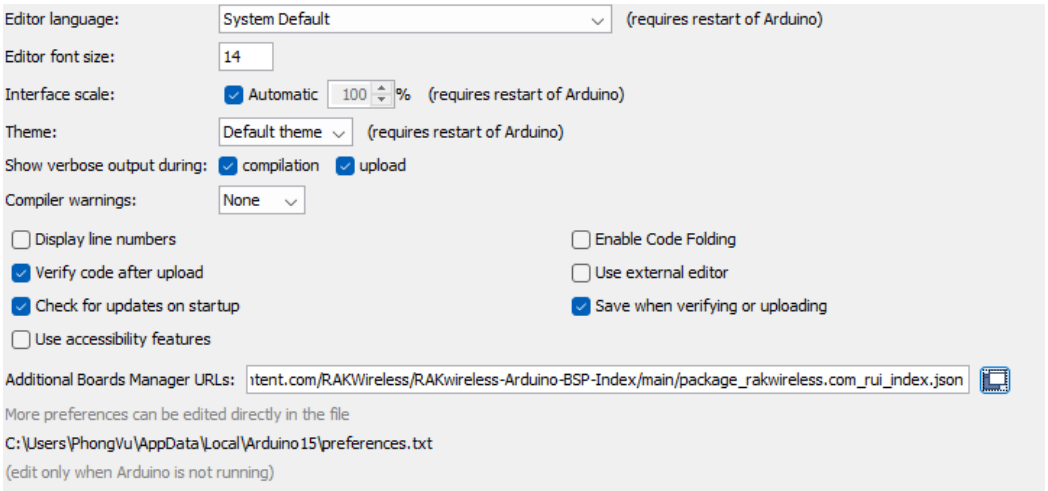


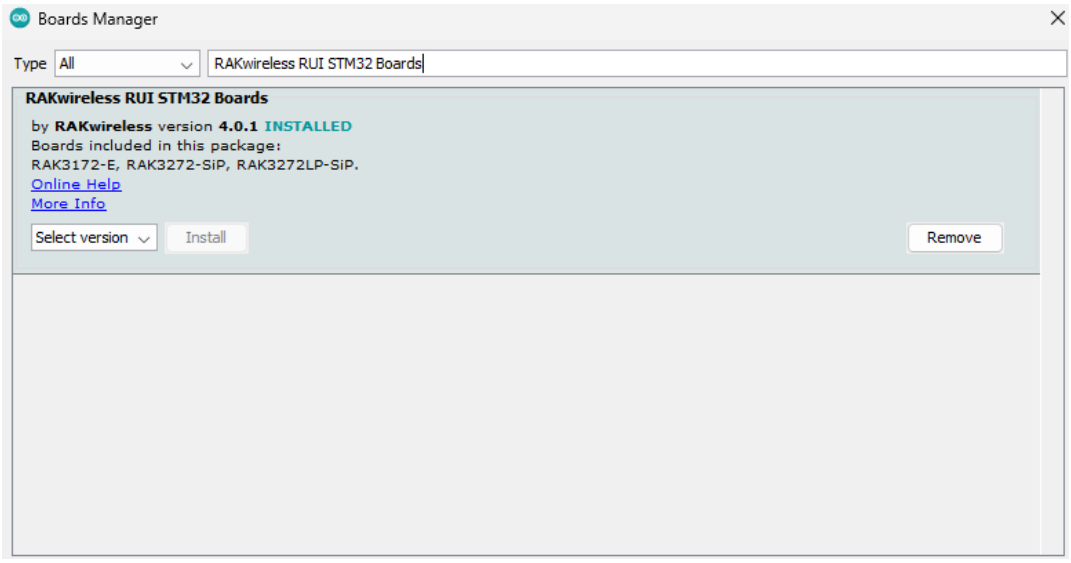
2.2. Install on arduino

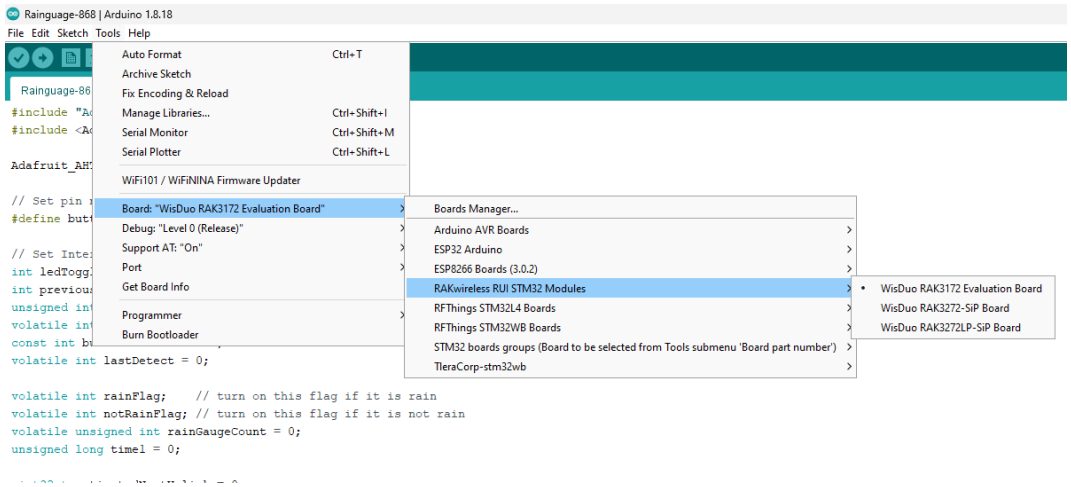
Add RAK3172 as a supported board in Arduino IDE by updating Board Manager URLs in Preferences settings of Arduino IDE with the JSON URL below.

https://raw.githubusercontent.com/RAKWireless/RAKwireless-Arduino-BSP-Index/main/package_rakwireless.com_rui_index.json

After that, you can then add RAKwireless RUI STM32 Boards via Arduino board manager.





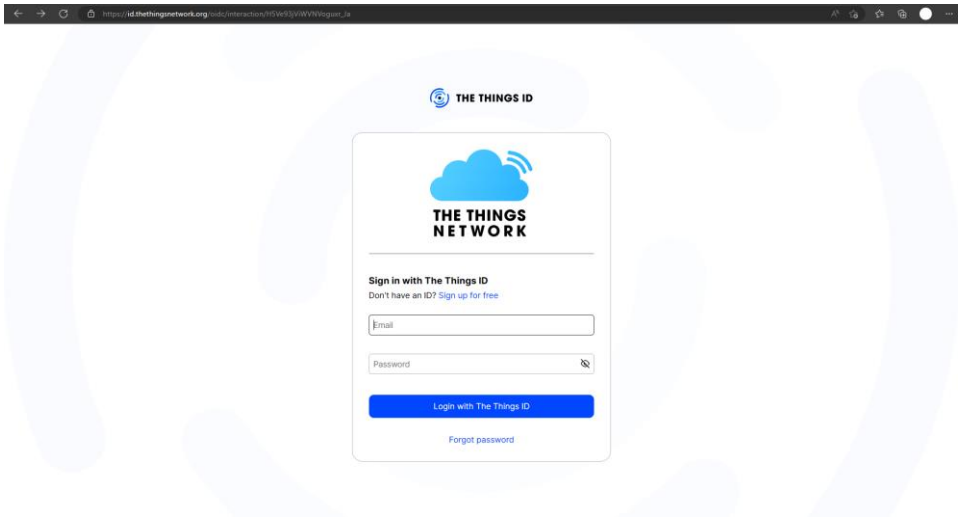


After completing the config on the arduino you can start programming.

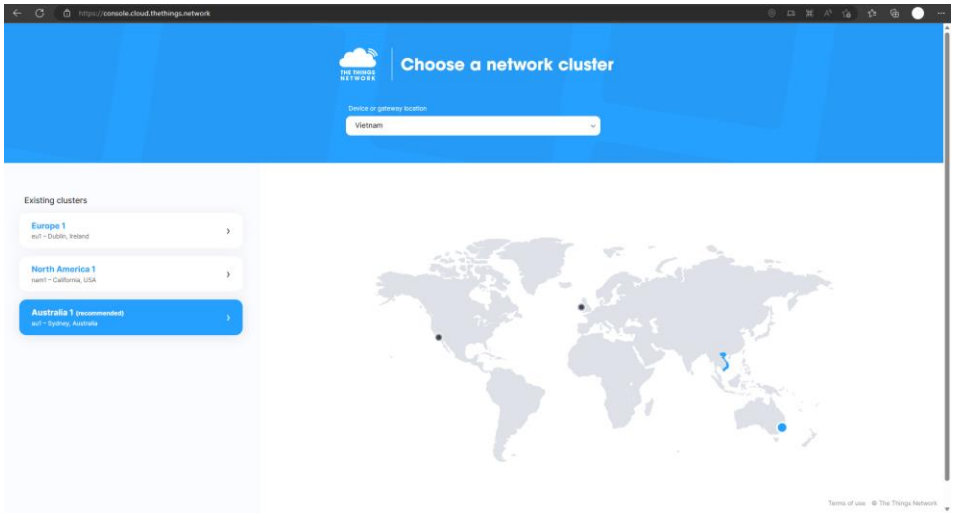
2.3. The things network

To use TheThingsNetwork server

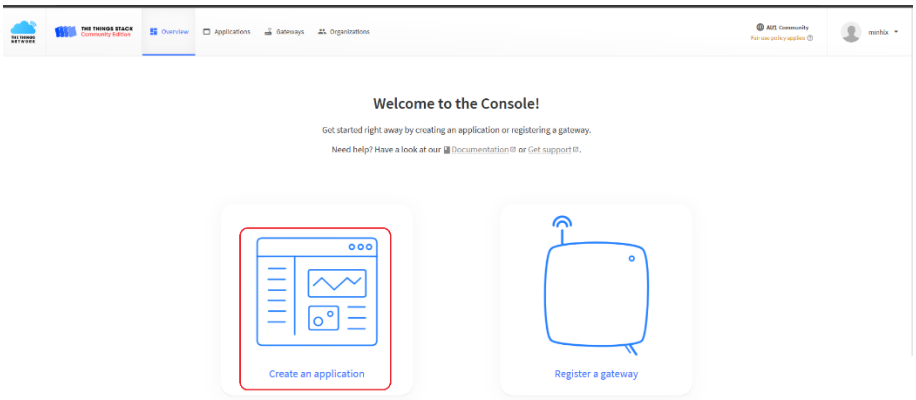
- Create an account on the TTN website.

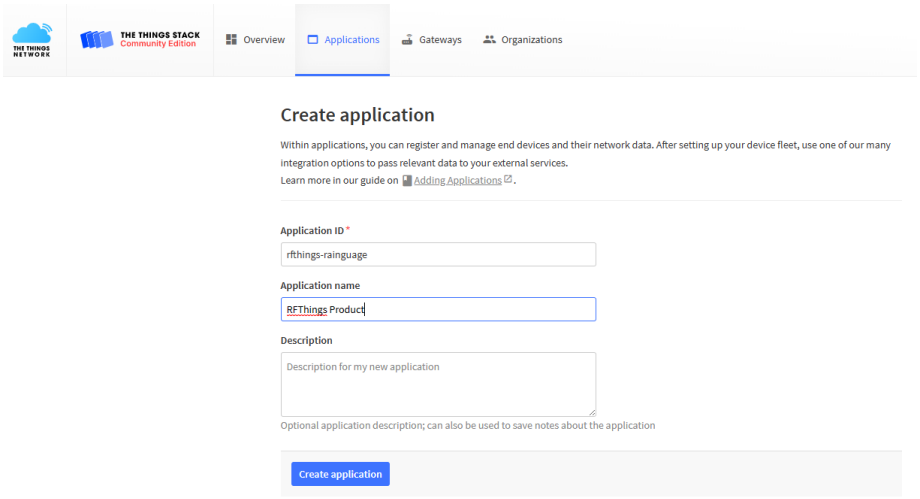


- If you already have an account, go to: https://console.cloud.thethings.network/ choose your region . I choose the au1 region here because I'm in Vietnam

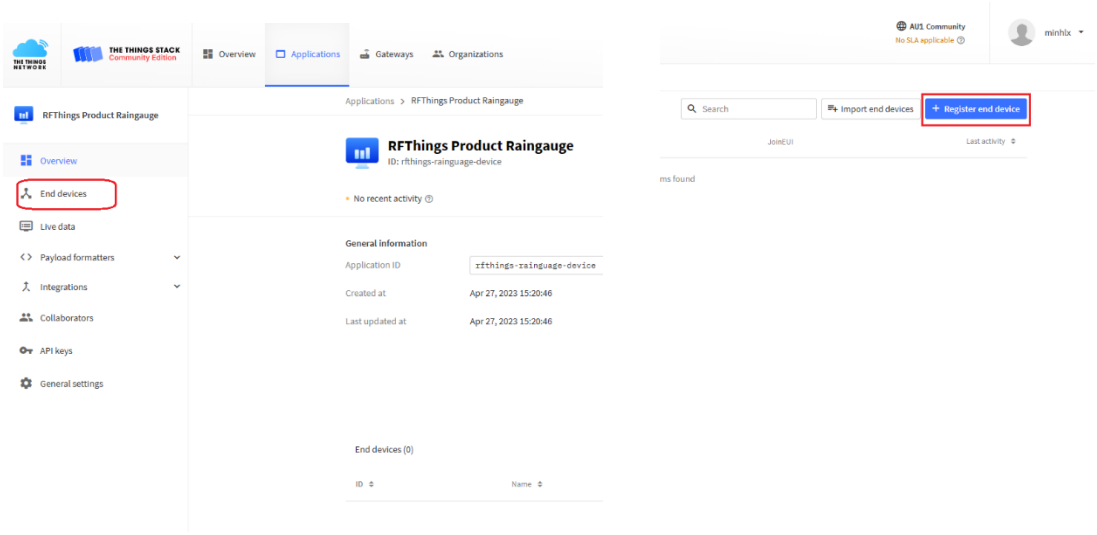


- Create an application on TTN.

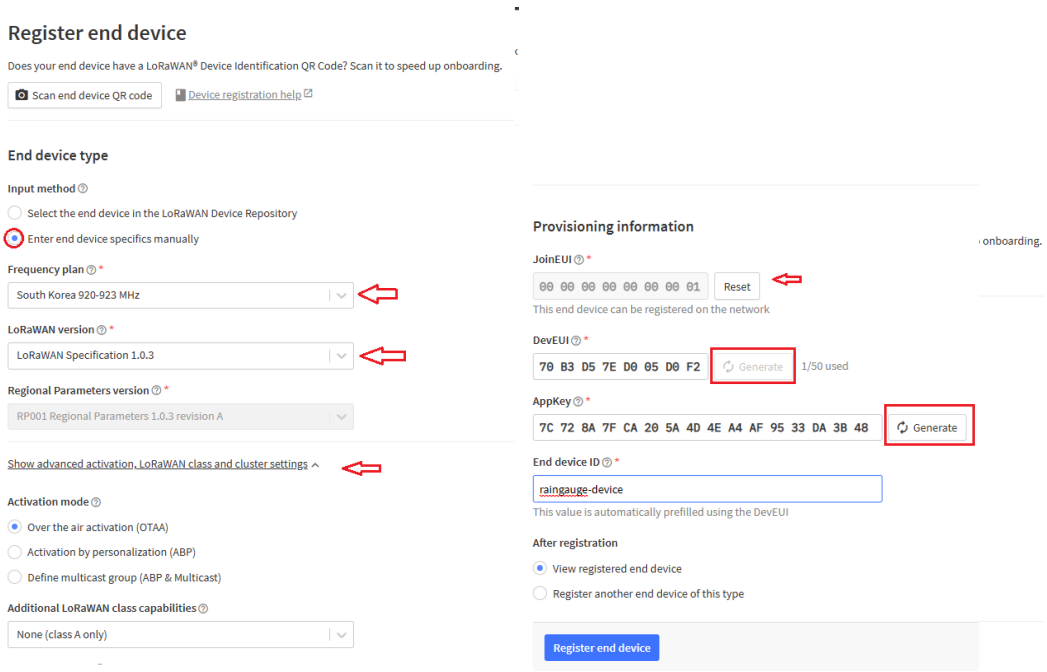




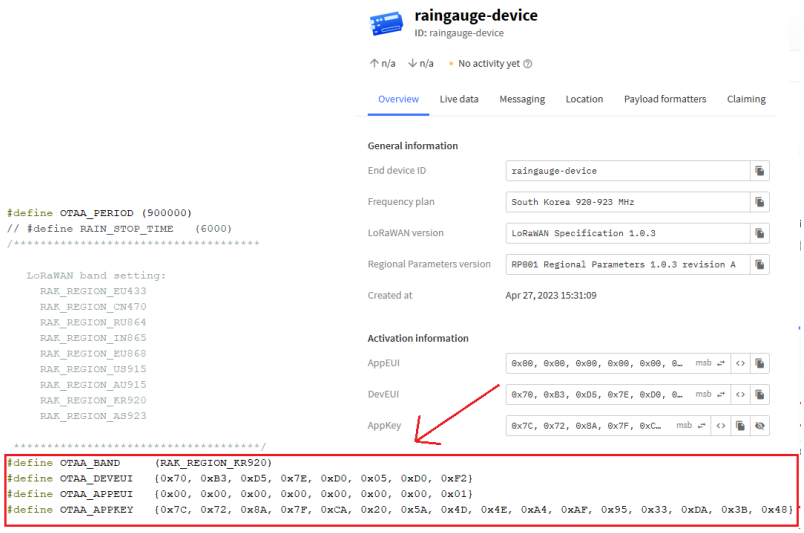
- Register your device on TTN.



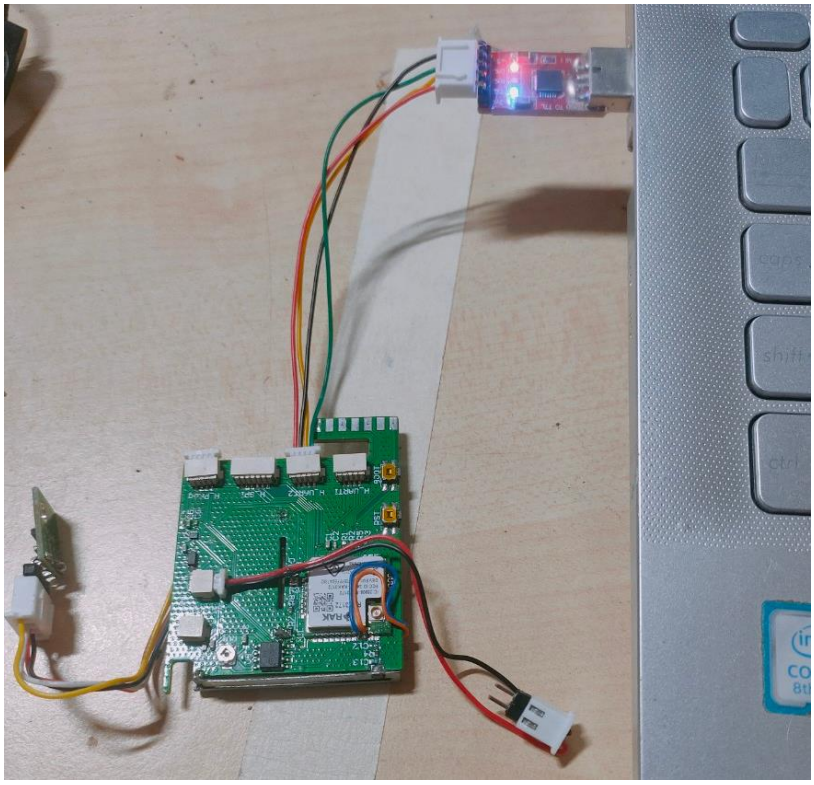
- Configure your device to communicate with TTN.



- Set up integrations to connect your device data to other systems.



- Test and verify that your device is successfully sending data to TTN.

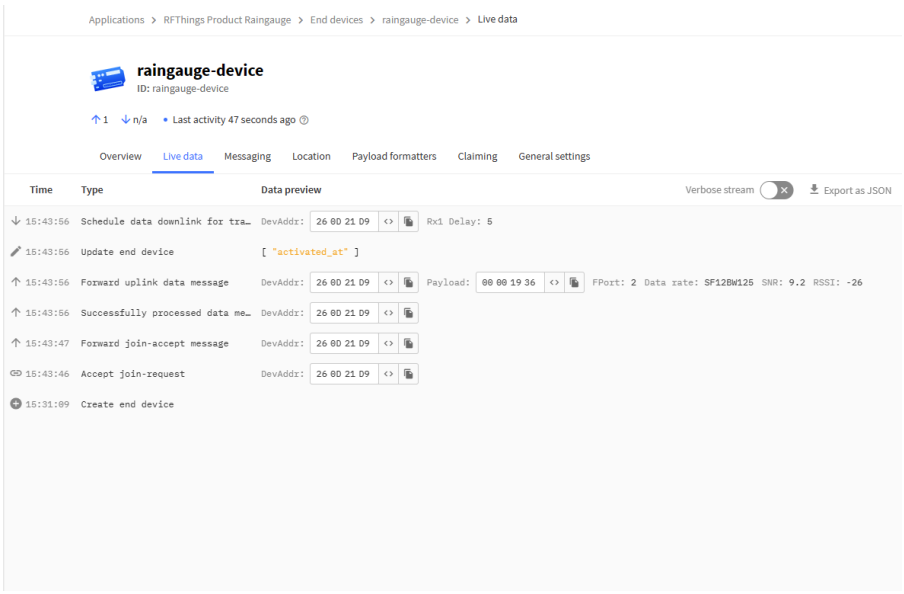


Rainguage-868

```
uint32_t estimatedNextUplink = 0;

// Set sensor variables
int temper;
int humi;

// Rain Stop Time
uint64_t lastRain = 0; // the last time when it was rain
uint64_t elapsedRain;
uint64_t spendTime; // the remaining time before wake up in period OTAA

bool bucketPositionA = false; // one of the two positions of tipping-bucket
// const double bucketAmount = 0.01610595;   // inches equivalent of ml to trip tipping-bucket

#define OTAA_PERIOD (900000)
// #define RAIN_STOP_TIME    (6000)
/**********************************

   LoRaWAN band setting:
     RAK_REGION_EU433
     RAK_REGION_CN470
     RAK_REGION_RU864
     RAK_REGION_IN865
     RAK_REGION_EU868
     RAK_REGION_US915
     RAK_REGION_AU915
     RAK_REGION_KR920
     RAK_REGION_AS923
```

Done uploading.

```
[S] TRANSMISSION: block 188 (seq=189) sent
[S] TRANSMISSION: block 189 (seq=190) sent
[S] TRANSMISSION: block 190 (seq=191) sent
[S] TRANSMISSION: Reached EOF
[S] TRANSMISSION: EOT sent and awaiting ACK
[S] TRANSMISSION: Finished (ACK received)
[S] TRANSMISSION: SEND NULL

Entering boot mode
Device is in boot mode
Upgrade Complete
```



- In case of loading the code for the device, there is an error:

```
Done uploading.
Sketch uses 164216 bytes (81%) of program storage space. Maximum is 200704 bytes.
Global variables use 28704 bytes (59%) of dynamic memory, leaving 19936 bytes for local variables. Maximum is 48640 bytes.
Device is not in boot mode
Detecting baudrate..................
Detect baudrate fail, can not get the baudrate
```

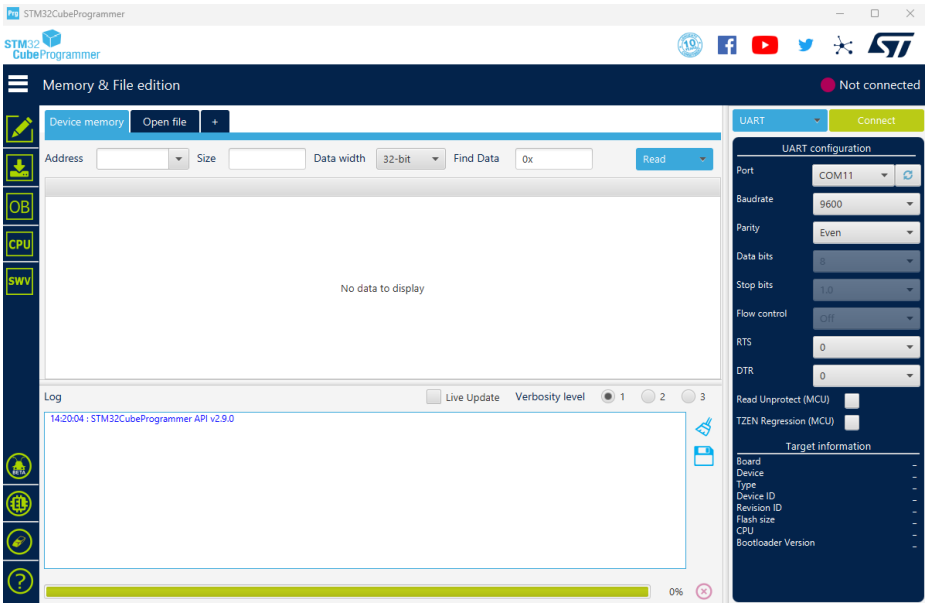
You need to double-check your code, which may cause the MCU to stop and not be able to load the code.

To be able to reload the code you need to reload the firmware for your device

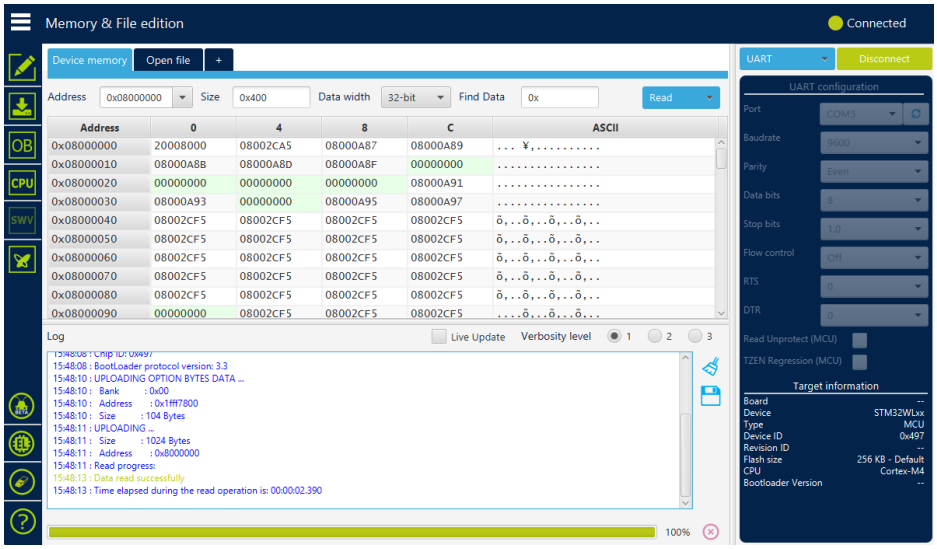
3. Firmware reload for rak3172

Using stm32progaming 2.9.0 to upload firmwave RUI3 for rak3172

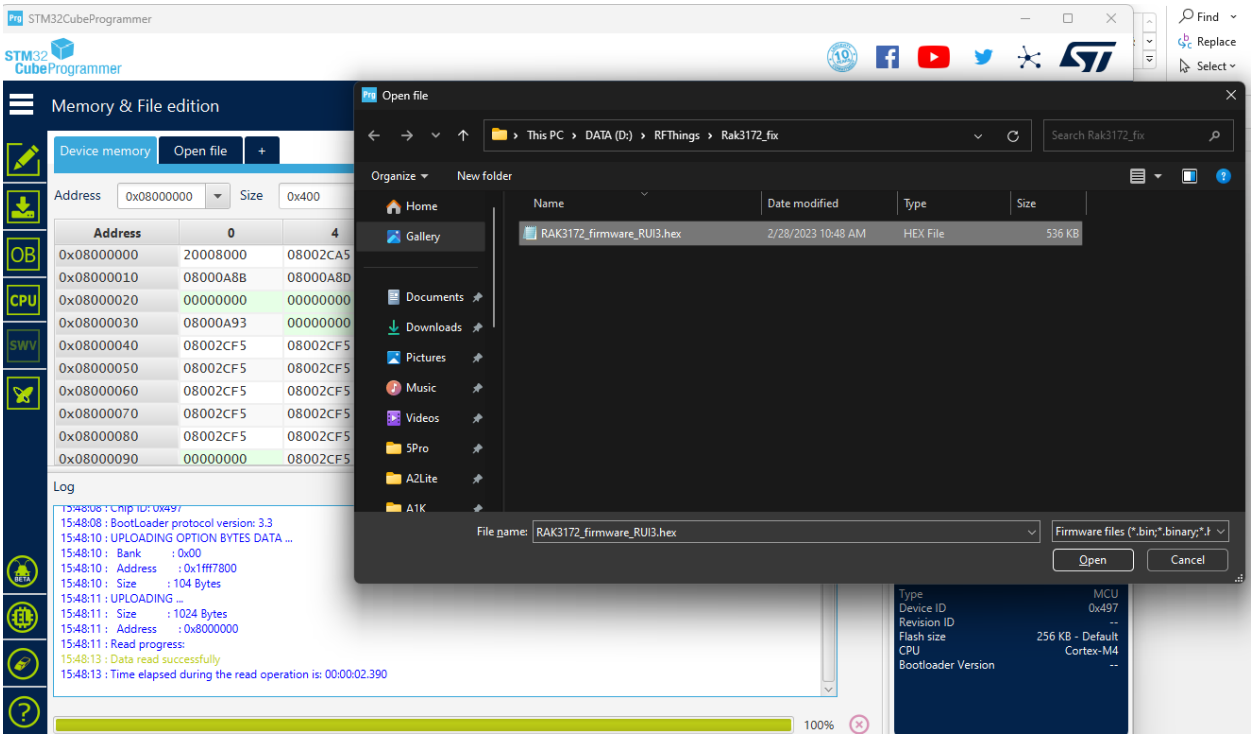
https://www.st.com/en/development-tools/stm32cubeprog.html



To upload firmware, you must leave the device in boot state, hold down the boot button and press reset.



Select Open file -> rak3172_firmwave_RUI3.hex-> download



Now you can use the arduino IDE to load the device code.