SEMTECH

LoRa® End-Device

WIRELESS & SENSING PRODUCTS

User Guide

From LoraMac-Node

to TTN & myDevices

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1 Introduction

This user guide is a step by step guide describing how to use a LoraMac-node stack to send a payload to The Things Networks (TTN), then to myDevices / Cayenne in Low Power Payload (LPP) format.
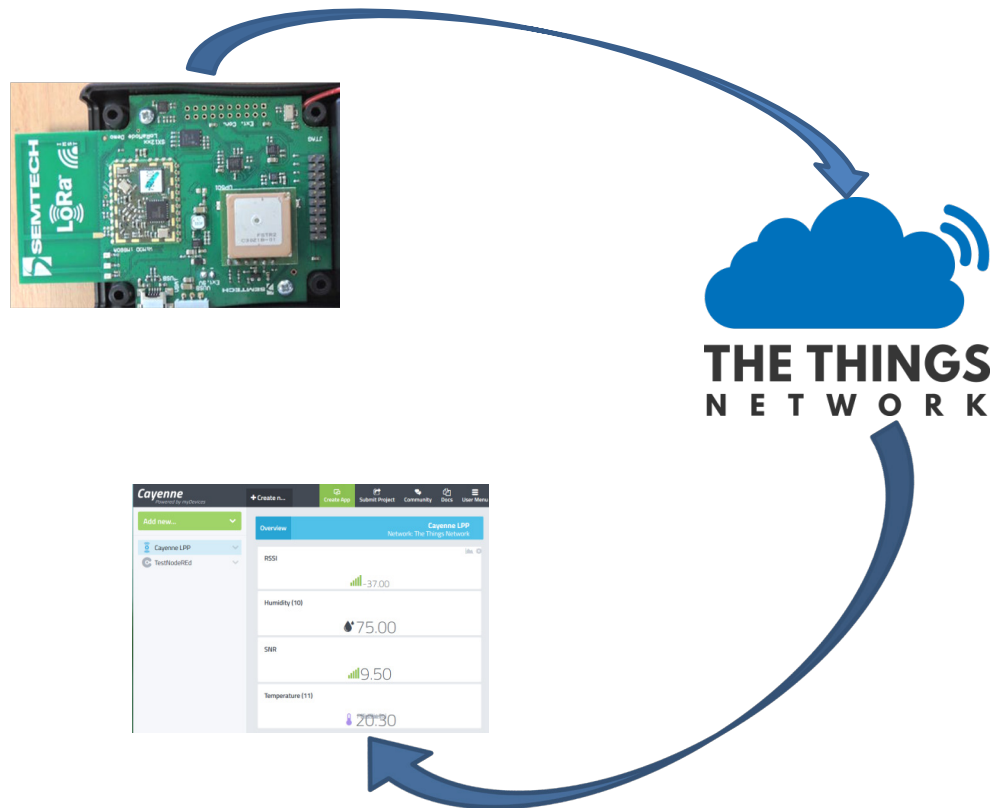
Figure 1: Communication Overview

1.1 Required Tools

- A board supported by LoraMac-Node
- LoraMac-Node stack available at https://github.com/Lora-net/LoRaMac-node

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2 The Things Network Configuration

2.1 Step 1: Account Creation

If you don't have a TTN account, create one at https://account.thethingsnetwork.org/register.

Then login at http://console.thethingsnetwork.org/

2.2 Step 2: Application Creation

2.2.1   Step 2.1: Select Application Console

Click on "Applications"
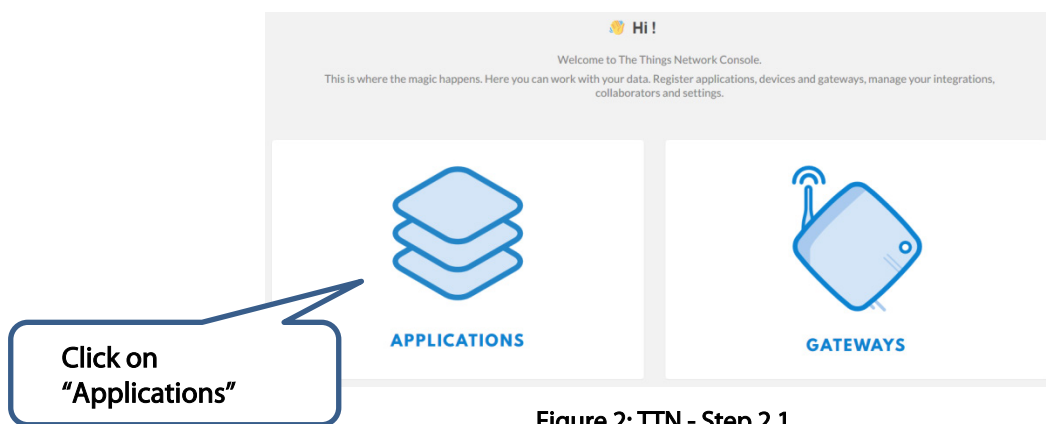
Figure 2: TTN - Step 2.1

2.2.2   Step 2.2: Add Application

Click on "Add applications"

Figure 3: TTN - Step 2.2

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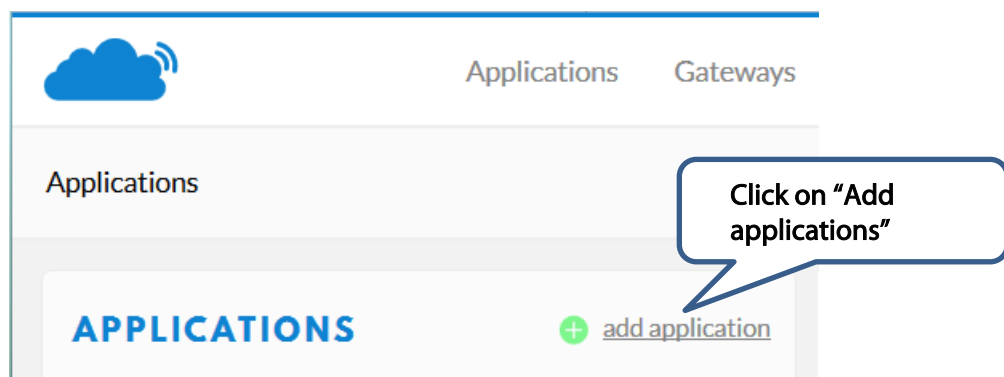
2.2.3　　Step 2.3: Application Registration

Figure 4: TTN - Step 2.3

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2.3 Step 3: Node Creation

2.3.1   Step 3.1: Node Creation

APPLICATION OVERVIEW

documentation

Application ID loramac_node_user_guide

Description Test application from LoraMac-Node to MyDevices

Created 52 seconds ago

Handler ttn-handler-eu *(current handler)*

APPLICATION EUIS   ⚙ manage euis

> Click on "register device"

DEVICES   ● register device ⚙ manage devices

0 registered devices
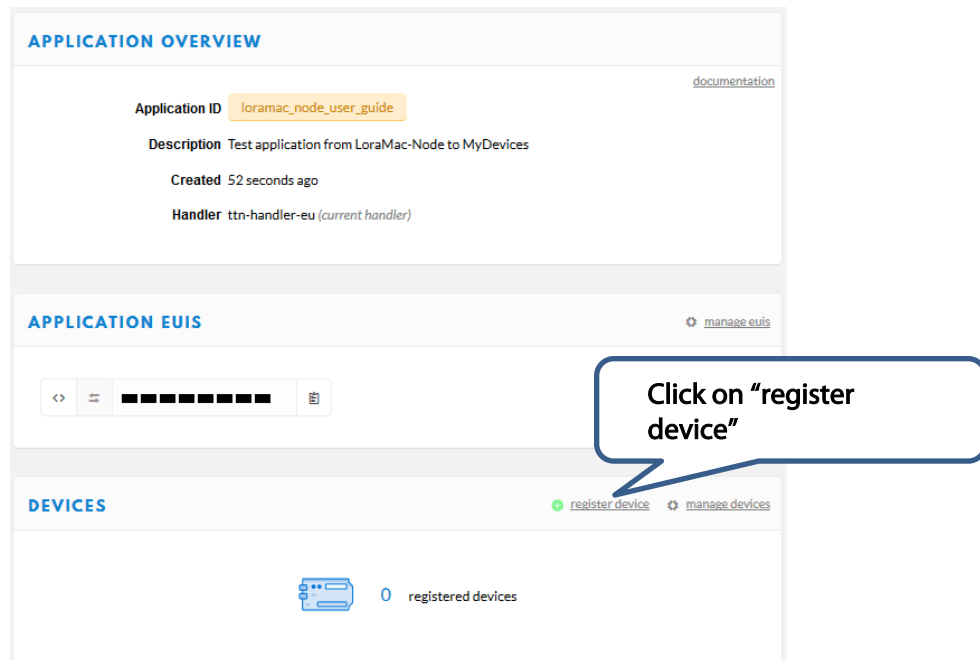
Figure 5: TTN - Step 3.1

2.3.2   Step 3.2: Node Registration

REGISTER DEVICE   bulk import devices

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

> 1. Add device ID

Device EUI
The device EUI is the uni
the EUI later.

> 2. Click on "generate" button

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

✏ this field will be generated

App EUI

70 B3 D5 7E F0 00 60 B5

> 2. Click on "Register"

Cancel   Register

Figure 6: TTN - Step 3.2

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2.3.3   Step 3.3: Save IDs

Save "Device EUI", "Application EUI" and "App Key" for later use.

Figure 7: TTN - Step 3.3

2.3.4   Step 3.4: Payload Format

Go back to the "Application Overview" page.

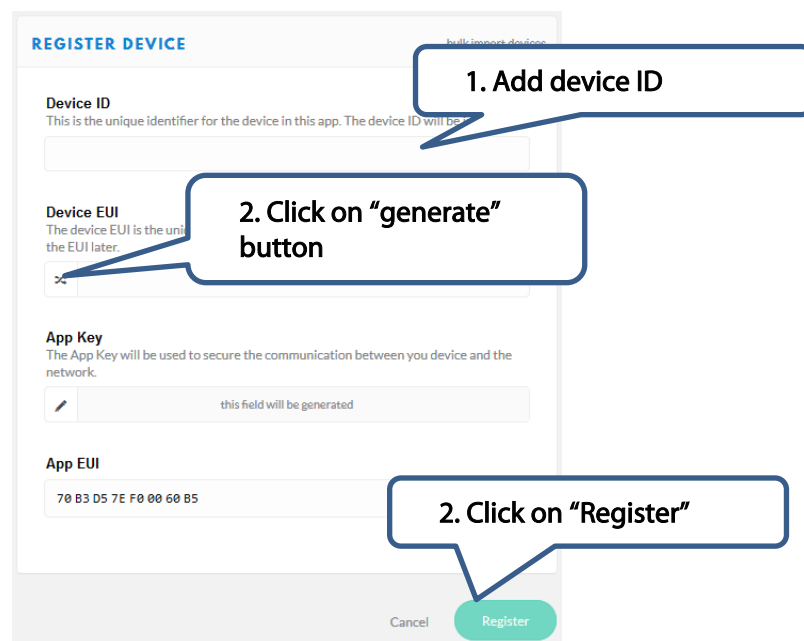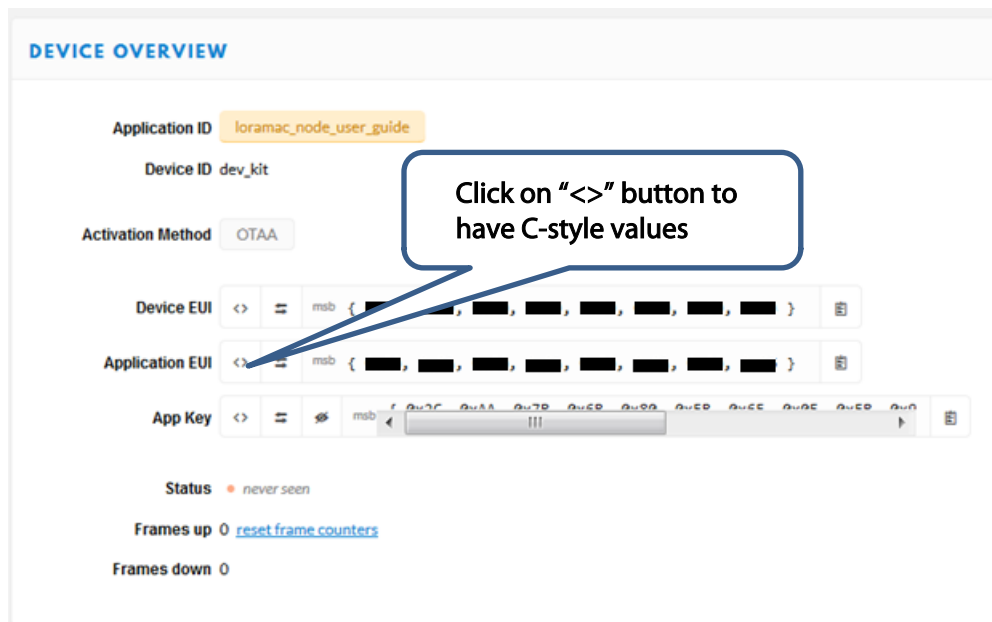**Figure 8: TTN - Step 3.4**

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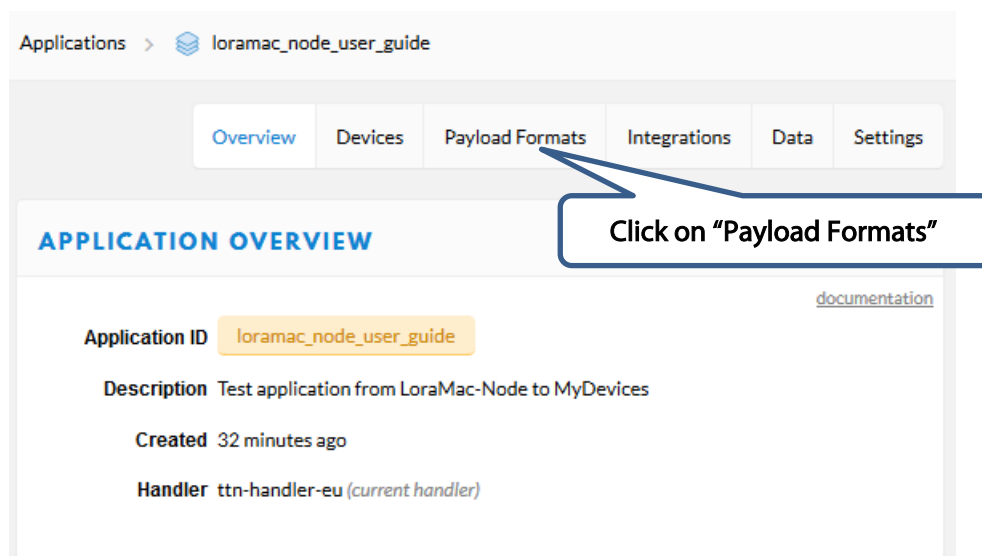Final Rev 1.0
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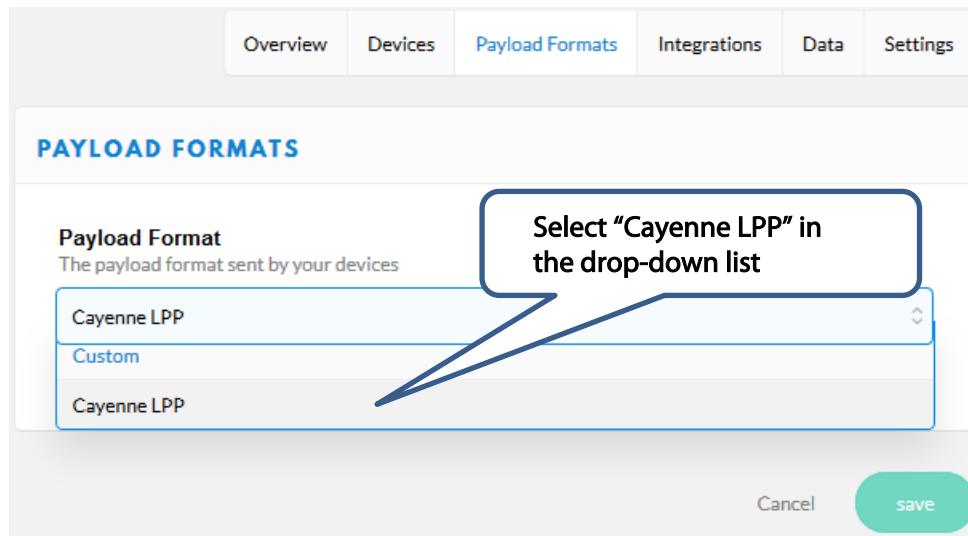## 2.3.5 Step 3.5: Cayenne LPP Format

Figure 9: TTN – Step 3.5

2.3.6 Step 3.6: myDevices Integration

In order to use Cayenne, TTN must be told to redirect data to myDevices.

Figure 10: TTN – Step 3.6

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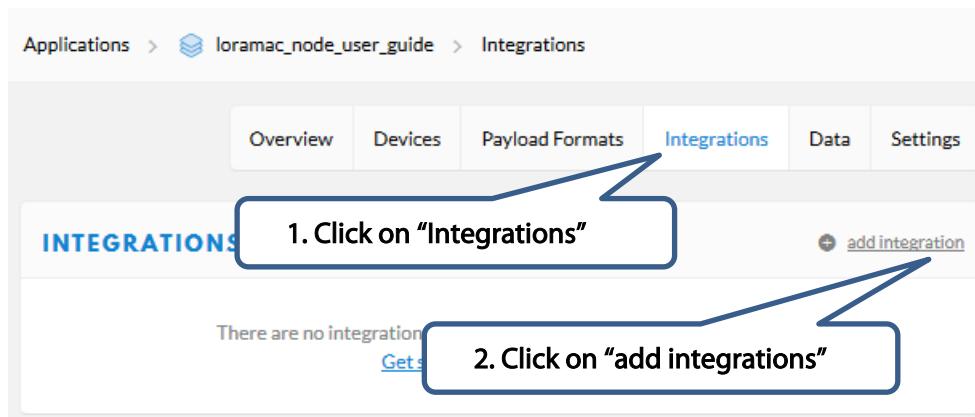
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2.3.7   Step 3.7: Cayenne Integration
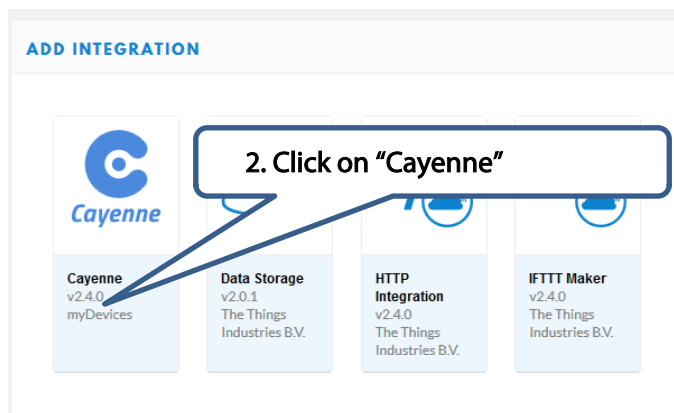
Figure 11: TTN – Step 3.7

2.3.8   Step 3.8: Cayenne Integration Settings

Figure 12: TTN – Step 3.8

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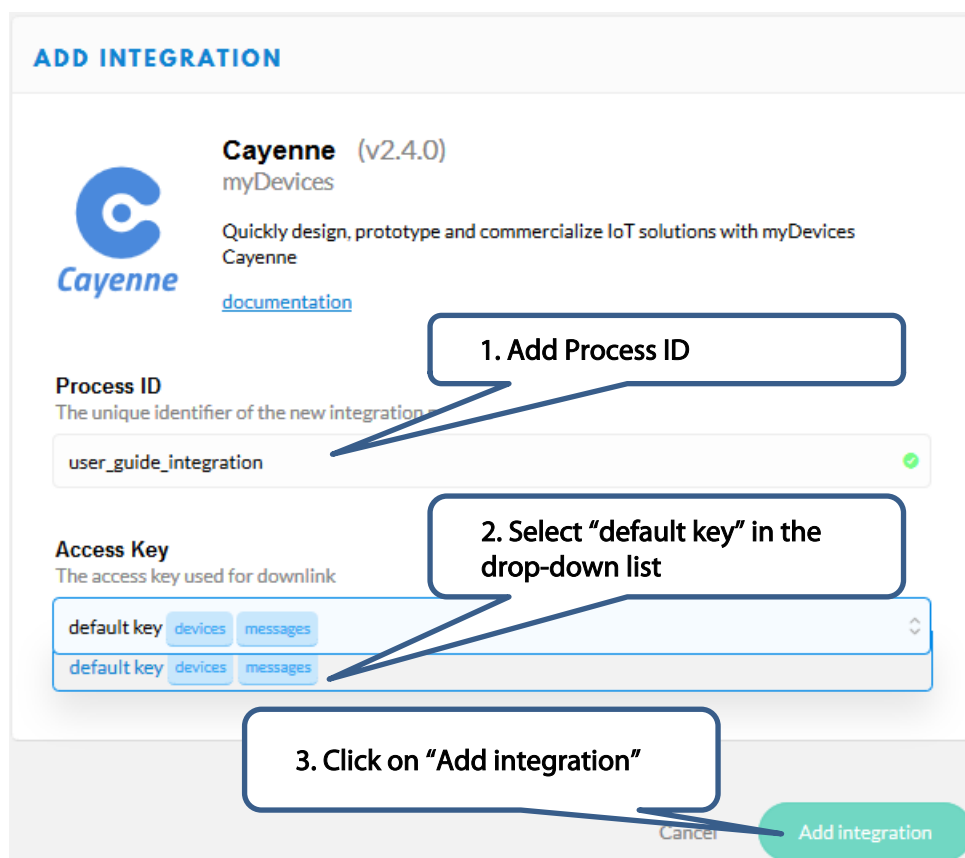
3 myDevices Configuration

3.1 Step 1: Account Creation

If you have do not have a myDevices account, create one at

https://cayenne.mydevices.com/cayenne/signup

Then, login at https://cayenne.mydevices.com/cayenne/login

3.2 Step 2: Device Creation

3.2.1   Step 2.1: Add a New Device

Figure 13: Cayenne – Step 2.1

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3.2.2   Step 2.2: Select TTN Lora Provider
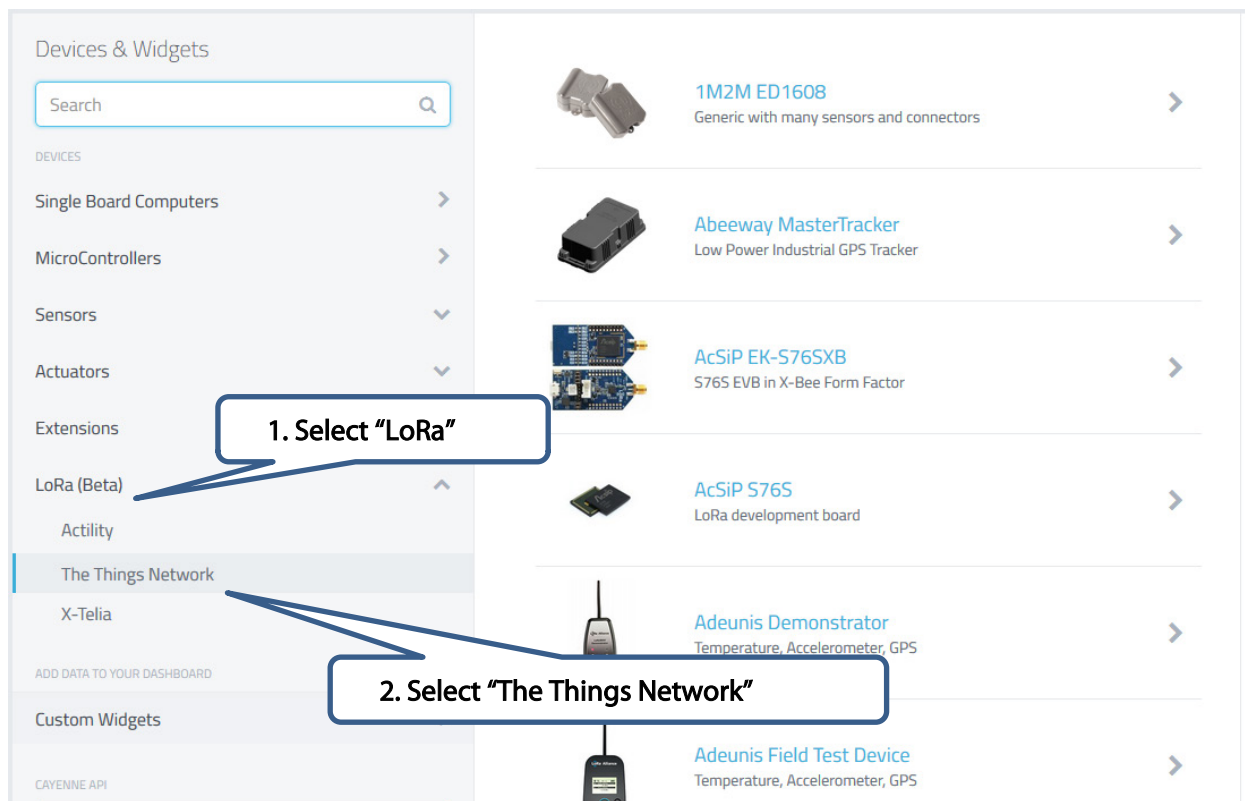
Figure 14: Cayenne – Step 2.2

3.2.3   Step 2.3 : Cayenne LPP Device Selection
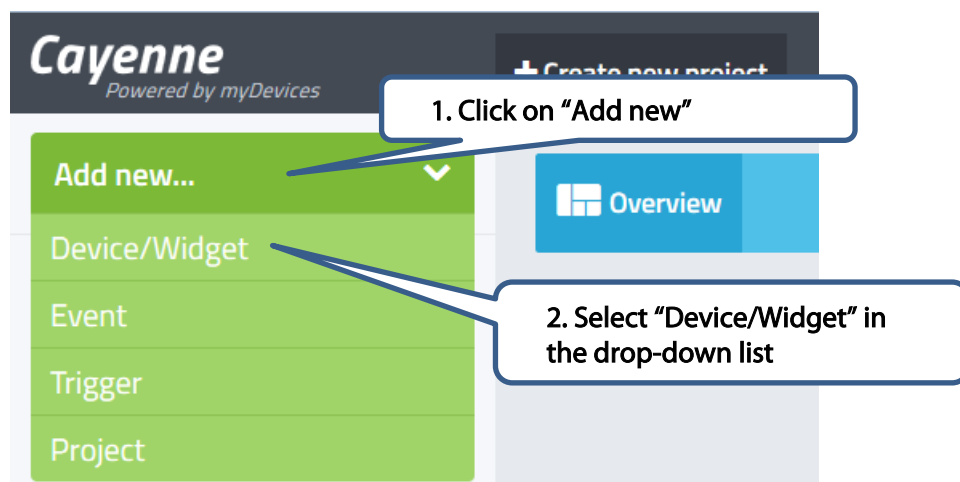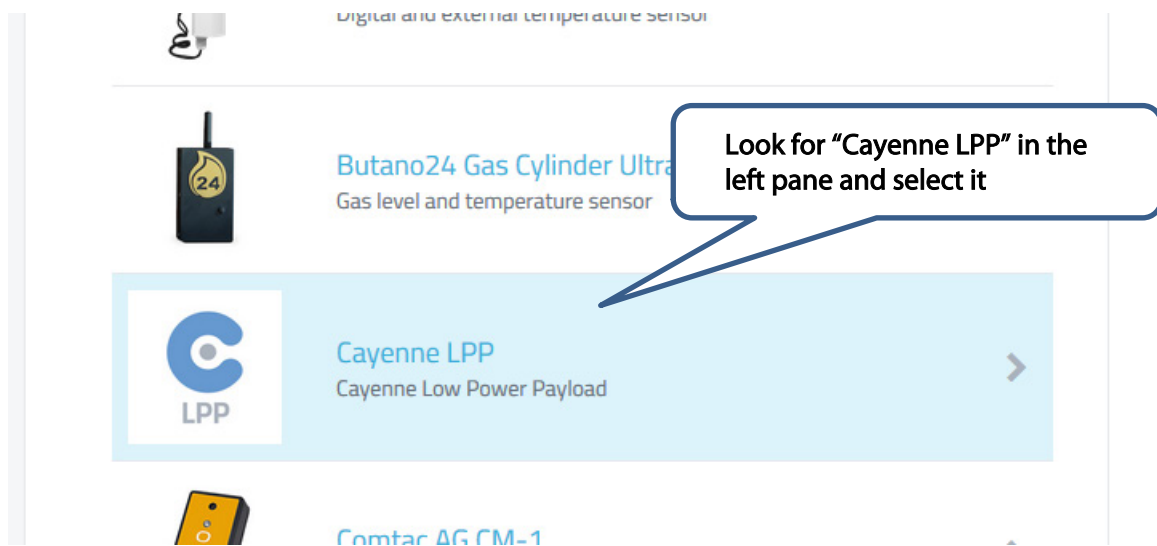

Figure 15: Cayenne - Step 2.3

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3.2.4   Step 2.4 : Cayenne LPP Device Configuration

Figure 16: Cayenne – Step 2.4

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4 LoraMac-Node Configuration

4.1 Step 1: Open Project

Open a "LoraMac/classA" project corresponding to your IDE/Board, or create it.

This user guide uses Keil/STM32L052.

4.2 Step 2: Set Regional Flavor

Set your regional flavor by using "`REGION_XXXXX`" to defined or preconfigured IDE values, if any.

Current defined values are:

- REGION_AS923

- REGION_AU915

- REGION_CN780

- REGION_EU433

- REGION_EU868

- REGION_KR920

- REGION_IN865

- REGION_US915

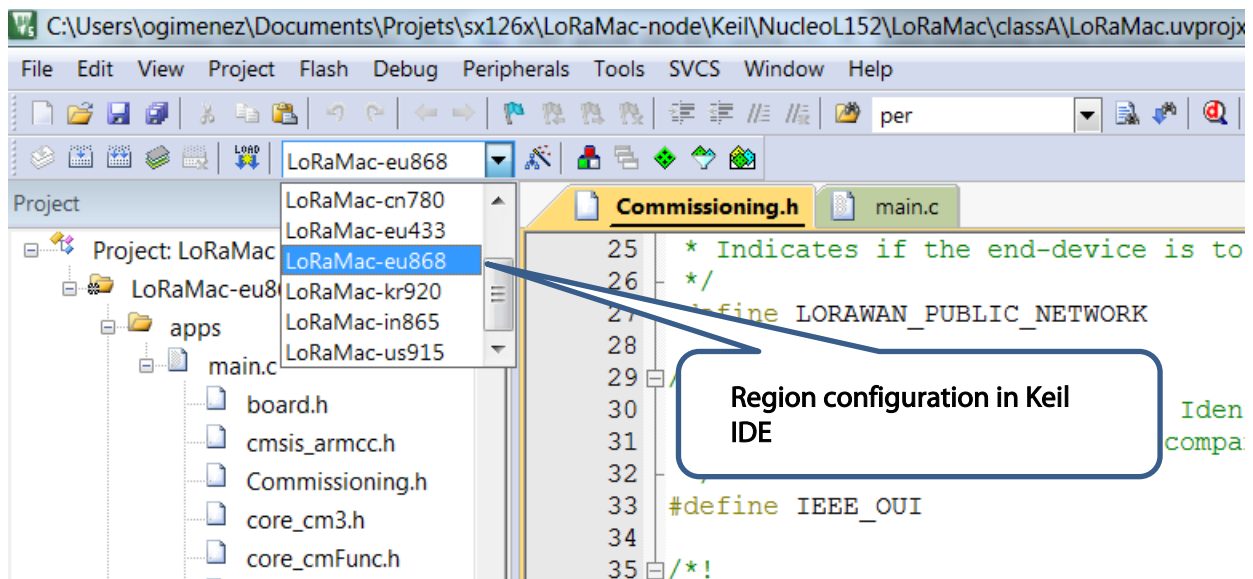Figure 17: Screenshot of Regional Configuration Path

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4.3 Step 3: Commissioning

"*commissioning.h*" file must be edited to personalize the device

- Change "`#define OVER_THE_AIR_ACTIVATION`" to 1

- Change "`#define LORAWAN_DEVICE_EUI`" to TTN value

- Change "`#define LORAWAN_APPLICATION_EUI`" to TTN value

- Change "`#define LORAWAN_APPLICATION_KEY`" to TTN value

4.4 Step 4: Cayenne Application

The application with Cayenne payload must be added in "*main.c*"

- Change "`#define LORAWAN_APP_PORT`" to 3

- In function "`int main( void )`", delete following lines in order to use the DevEUI defined in "commissioning.h" file

```
// Initialize LoRaMac device unique ID
BoardGetUniqueId( DevEui );
```

- In function "`static void PrepareTxFrame( uint8_t port )`", add a new case to "`switch( port )`" instruction:

```
case 3:
  /* Send a static payload in Cayenne LPP format
  * Channel 10, humidity = 75 %
  * Channel 11; humidity = 20.3 °C
  * See https://mydevices.com/cayenne/docs/lora/#lora-cayenne-low-power-payload
  */
  AppDataSize = 7;
  AppData[0] = 10;  // Channel
  AppData[1] = 104; // Type
  AppData[2] = 150;
  AppData[3] = 11;  // Channel
  AppData[4] = 103; // Type
  AppData[5] = 0;
  AppData[6] = 203;
  break;
```

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4.5 Step 5: Build and flash

Build the program then flash your board.

5   Output

After all these steps have been performed, data should appear in TTN and myDevices.

5.1 TTN

Go to the page Application -> Device -> Data:
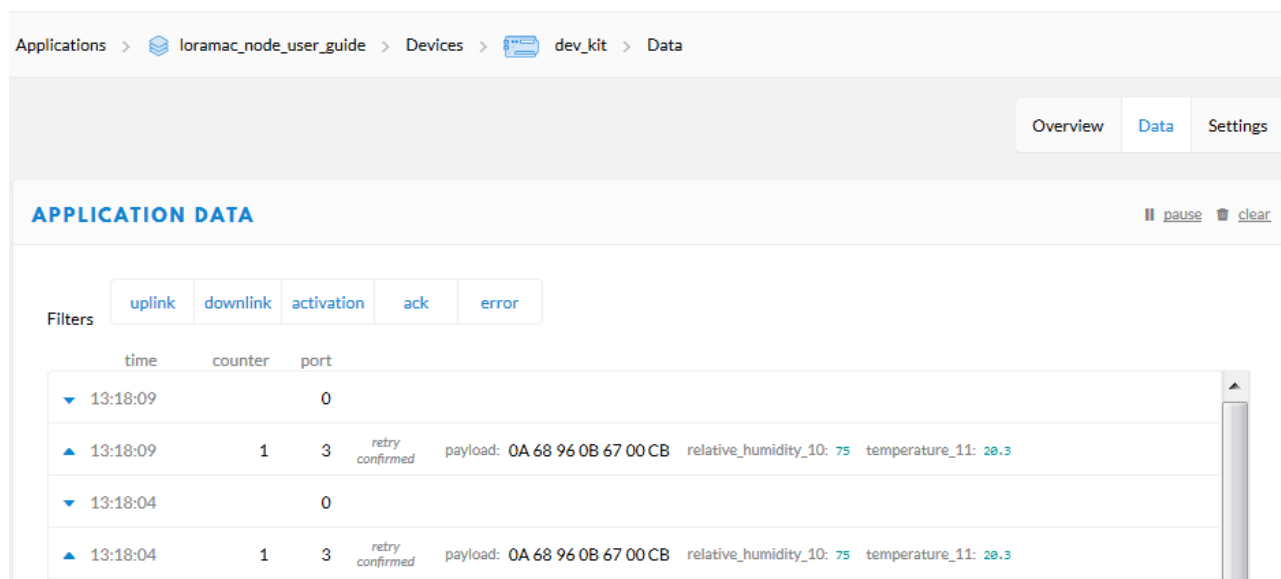
Figure 18: TTN data

5.2 myDevices

Widgets automatically appear in the dashboard when myDevices receives a packet.
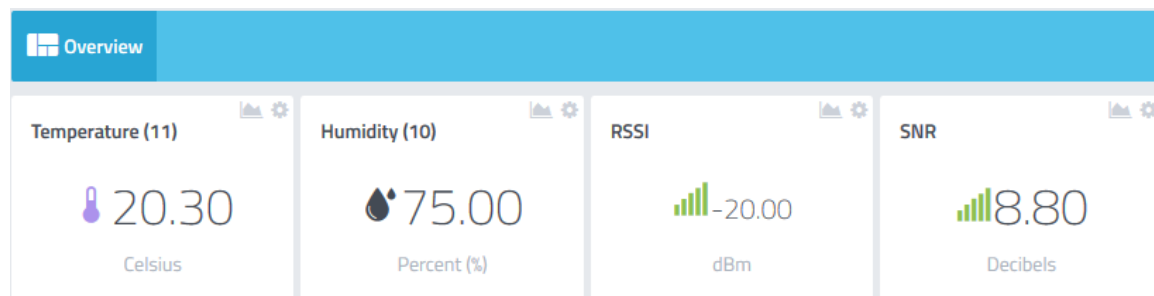
Figure 19: myDevices data

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6 Revision History

Version	Date	Modifications
1.0	September 2017	First Release

7 Glossary

LoRa®   LOng RAnge modulation technique
LoRaWAN   LoRa® low power Wide Area Network protocol
LPP   Low Power Payload
TTN   The Things Network

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