

# Getting Started LoRaWAN®

Guide for the first steps with LoRaWAN®

**thermokon®**  
HOME OF SENSOR TECHNOLOGY

Revision D - Subject to technical changes

## Intended Goal

- Set up a LoRaWAN® gateway
- Set up and use a cloud LoRaWAN® network server
- Commission a Thermokon LoRaWAN® device
- See LoRaWAN® data on network server
- Visualize sensordata at IoT platform

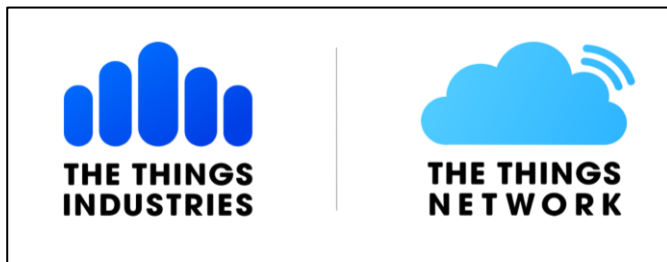
## Required equipment

- Gateway LRW Indoor Femto
- MCS LRW



## Used Software

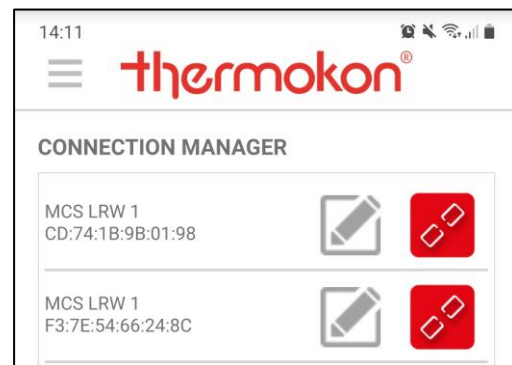
- Network-server - The Things Network



- IoT platform Datacake



- Thermokon LoRaWAN® configuration app



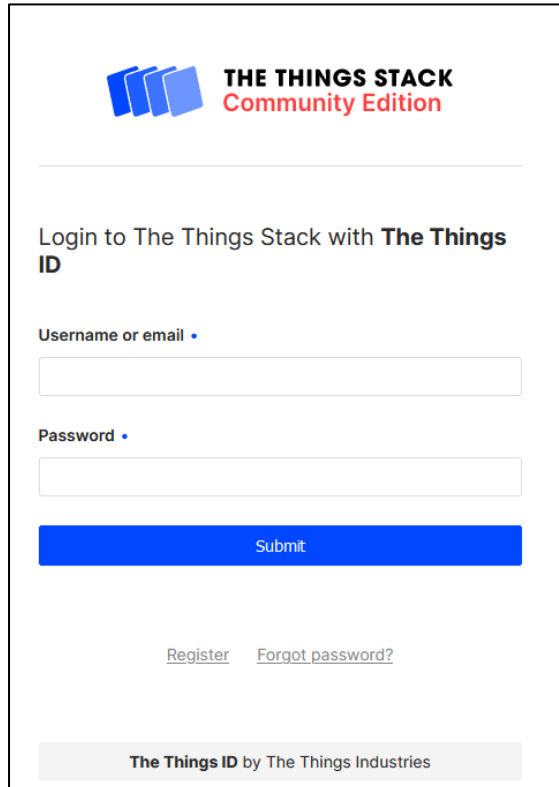
## Overview

1. Set up an account at The Things Network
2. Connect the Gateway to the LoRaWAN® networkserver
3. Setup your LoRaWAN® application
4. Commission the LoRaWAN® device
5. Connect The Things Network server with IoT platform
6. Visualize sensor data

## 1. The Things Network – Account

- Create an account at The Things Network:

[https://id.thethingsnetwork.org/oidc/interaction/GFUq9WWgy9R1zzp\\_8CeQ2](https://id.thethingsnetwork.org/oidc/interaction/GFUq9WWgy9R1zzp_8CeQ2)



The screenshot shows the login interface for The Things Stack Community Edition. At the top left is the logo, which consists of three blue squares of increasing size to the left of the text "THE THINGS STACK" in bold black and "Community Edition" in red. Below the logo is a horizontal line. The main heading is "Login to The Things Stack with **The Things ID**". There are two input fields: "Username or email" and "Password", both with a small blue dot to their right. Below these fields is a blue "Submit" button. At the bottom of the form area are two links: "Register" and "Forgot password?". A footer bar at the very bottom contains the text "The Things ID by The Things Industries".

**THE THINGS STACK**  
Community Edition

---

Login to The Things Stack with **The Things ID**

Username or email •

Password •

Submit

[Register](#) [Forgot password?](#)

The Things ID by The Things Industries

## 2. Gateway connection

- Connect the gateway (power supply, antenna, network/internet connection)

- Gateway provides a wifi network  
(SSID: AP-xxxx)

- Connect to the wifi network

- Open the WebGUI and login  
(IP adress: 192.168.55.1)  
(Username: admin; Password: admin)

- Check the gateway's internet connection

AP-D8F341

Status

Overview

Routes

System Log

Kernel Log

Processes

Realtime Graphs

### Network

#### IPv4 WAN Status

Type: DHCP

Address: 192.168.0.171

Netmask: 255.255.255.0

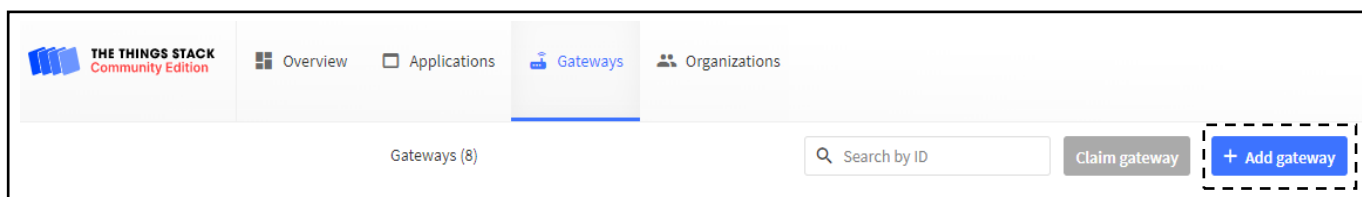
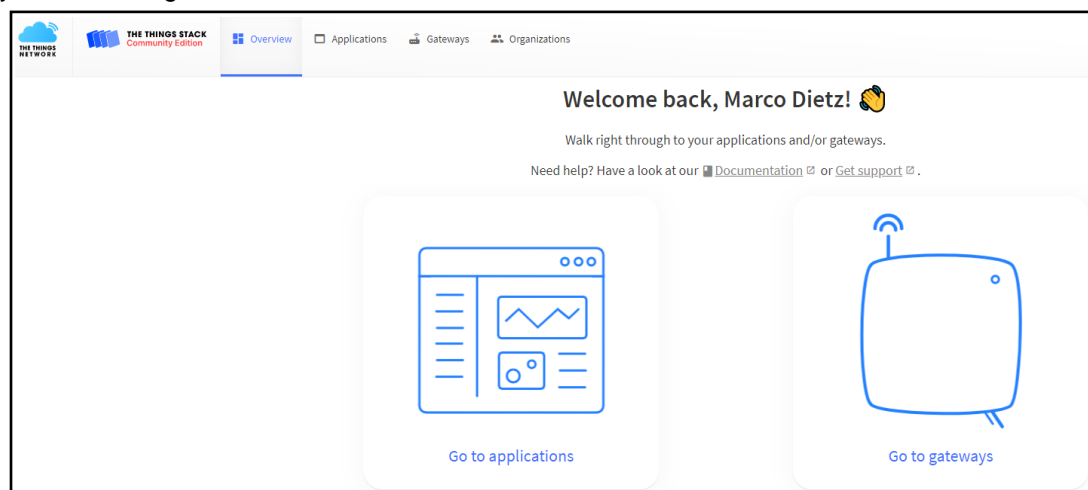
eth0.2 Gateway: 192.168.0.1

DNS 1: 192.168.0.1

Connected: 0h 8m 35s

Active Connections 54 / 16384 (0%)

- Connect the gateway to "The Things Network" account



- Connect gateway and network server

## TheThings Network

### Add gateway

**General settings**

Owner\*  
mdietz

Gateway ID ⓘ  
getting-started-lrw-gateway

Gateway EUI ⓘ  
00 00 80 02 9C D6 56 55

Gateway name ⓘ  
First LoRaWAN gateway

Gateway description ⓘ  
From Thermokon starter-kit

Optional gateway description; can also be used to save notes about the gateway

Gateway Server address  
eu1.cloud.thethings.network

The address of the Gateway Server to connect to

LoRaWAN options

Frequency plan ⓘ\*  
Europe 863-870 MHz (SF9 for RX2 - recommended)

## LRW Gateway

### Gateway Info

Gateway ID: 80029cd65655

Server Address: eu1.cloud.thethings.network

Server Uplink Port: 1700 (1~65535)

Server Downlink Port: 1700 (1~65535)

Keep Alive Interval: 10 (seconds)

Statistics display Interval: 30 (seconds)


Push Timeout: 100 (milliseconds)

#### Remark:

Set Uplink and Downlink Port to 1700

Add four leading zeros to the Gateway EUI at The Things Network input mask

- Gateway is now connected


**First LoRaWAN gateway**  
 ID: getting-started-lrw-gateway

↑ 9 ↓ 0 • Last activity just now ⓘ

1 Collaborator 0 API keys

**General information**

Gateway ID: getting-started-lrw-gateway

Gateway EUI: 00 00 80 02 9C D6 56 55

Gateway description: From Thermokon starter-kit

Created at: Jan 20, 2022 10:58:20

Last updated at: Jan 20, 2022 10:58:20

Gateway Server address: eu1.cloud.thethings.network

**LoRaWAN information**

Frequency plan: EU\_863\_870\_TTN

Global configuration: [Download global\\_conf.json](#)

**Live data** [See all activity →](#)

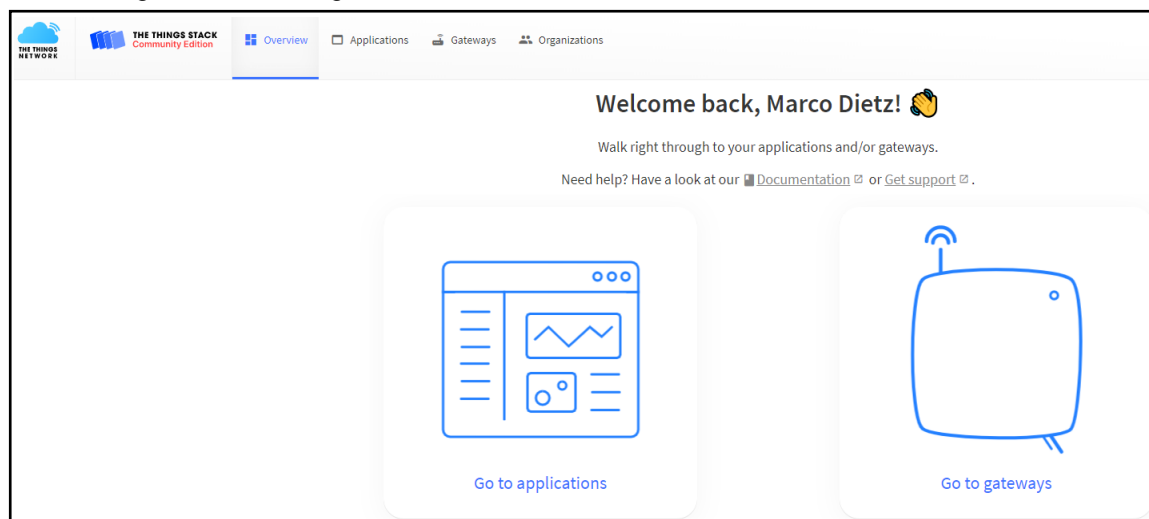
Time	Event	DevAddr	FCnt	FP
11:00:43	Receive gateway status	Metrics: { ackr: 100, rxfw: 9, rxin: 5 }		
↑ 11:00:39	Receive uplink message	26 08 0D 2B	FCnt: 810	FP
↑ 11:00:39	Receive uplink message	06 ED E0 EA	FCnt: 22878	
↑ 11:00:37	Receive uplink message	26 08 F1 7A	FCnt: 9926	F
↑ 11:00:35	Receive uplink message	26 08 92 7D	FCnt: 32320	
↑ 11:00:33	Receive uplink message	26 08 F7 15	FCnt: 37072	

**Location** [Change location settings →](#)

No location information available

### 3. LoRaWAN® application

- Navigate to The Things Network main menu



- Create a new application

### Add application

Owner \*

mdietz

Application ID \*

first-lrw-application

Application name

LoRaWAN getting started

Description

Description for my new application

Optional application description; can also be used to save notes about the application

Create application

- Add the provided Thermokon payload decoder to the application

Applications > LoRaWAN getting started > Payload formatters > Uplink

### Default uplink payload formatter

You can use the "Payload formatter" tab of individual end devices to test uplink payload formatters and to define individual payload formatter settings per end device.

Setup

Formatter type \*

Javascript

Formatter parameter \*

```

1 var LPP_PARSER = 0x0000;
2 var LPP_DUMMY = 0x0001;
3 var LPP_TEMP = 0x0010;
4 var LPP_RHUM = 0x0011;
5 var LPP_CO2 = 0x0012;
6 var LPP_VOC = 0x0013;
7 var LPP_ATM_P = 0x0030;
8 var LPP_DP = 0x0031;
9 var LPP_FLOW = 0x0032;
10 var LPP_VISIBLE_LIGHT = 0x0040;
11 var LPP_OCCU0 = 0x0041;
12 var LPP_REED0 = 0x0050;
13 var LPP_CONDENSATION = 0x0051;
14 var LPP_VBAT = 0x0054;
15 var LPP_SETPOINT = 0x0063;

```

Save changes

*Remark:  
Remove  
existing  
javascript  
decoder  
before*

## 4. Device commissioning

- The following LoRaWAN® credentials are required:
  - DevEUI
  - AppEUI (also named JoinEUI)
  - AppKey
- The LoRaWAN® credentials can be read out via
  - Configuration App (LRWapp) (Device Information Section)
  - Data Matrix Code Reader (Code on Label)

**thermokon®**

**DEVICE INFORMATION**

Name:	MCS LRW
Production Date:	27.1.2022
Software Version:	0.2
Hardware Version:	255.255

**LORAWAN INFORMATION**

Device EUI:	70 B3 D5 58 1F FF 87 16
AppEUI:	B3 70 58 D5 00 10 00 00
AppKey:	01 85 5D 3B 07 00 00 00 A7 12 58 ED CD AD 32 52
LoRaWAN Version:	1.0.4
Regional Parameter Version:	RP002-1.0.1
Region:	EU868



Scan the data matrix code on the device label to read out the required data. In case of problem with scanning the code use the *Scandit App*.

*Please note: Due to security reasons just DevEUI and JoinEUI are displayed on the label*

### c) Provision by list

On request the LoRaWAN® credentials can be provided as List (.csv) for automated processing

- Add a new device to your The Things Network application

**LoRaWAN getting started**  
ID: first-lrw-application

No recent activity ☹️

0 End devices 1 Collaborator 0 API keys

**General information**

Application ID	first-lrw-application
Created at	Jan 20, 2022 11:58:59
Last updated at	Jan 20, 2022 11:58:59

**Live data** See all activity →

11:58:59 first-lrw- Create application

End devices (0)

Search by ID Import end devices **+ Add end device**

ID	Name	DevEUI	JoinEUI	Last activity
No items found				

- Choose network credentials as follows (red) and device credentials (blue) according to read out device values

### Register end device

From The LoRaWAN Device Repository [Manually](#)

Frequency plan <sup>?</sup> \*

Europe 863-870 MHz (SF9 for RX2 - recommended) | v

LoRaWAN version <sup>?</sup> \*

MAC V1.0.4 | v

Regional Parameters version <sup>?</sup> \*

PHY V1.0.1 | v

[Show advanced activation, LoRaWAN class and cluster settings](#) v

DevEUI <sup>?</sup> \*

70 B3 D5 58 1F FF 03 65 [Generate](#) 0/50 used

JoinEUI <sup>?</sup> \*

B3 70 58 D5 00 10 00 00 [Fill with zeros](#)

AppKey <sup>?</sup> \*


01 85 5D 3B 01 00 00 00 A7 12 58 ED CD AD 32 52 [Generate](#)

End device ID <sup>?</sup> \*

first-mcs-lrw

This value is automatically prefilled using the DevEUI

- Device is active now and shows measurement values at incoming live data


**first-mcs-lrw**  
 ID: first-mcs-lrw

↑ 1 ↓ n/a Last activity 6 seconds ago <sup>?</sup>

[Overview](#) [Live data](#) [Messaging](#) [Location](#) [Payload formatters](#) [Claiming](#) [General settings](#)

**General information**

End device ID: first-mcs-lrw

Description: This end device has no description

Created at: Jan 20, 2022 12:43:53

**Activation information**

JoinEUI: B3 70 58 D5 00 10 00 00

DevEUI: 70 B3 D5 58 1F FF 00 00

Root key ID: n/a

AppKey: .....

NwkKey: n/a

**Session information**

No data available

**Live data** See all activity →

- ↓ 12:45:04 Schedule data downlink for transmission on Gateway Server Rx1
- ✎ 12:45:04 Update end device [ "activated\_at" ]
- ↑ 12:45:04 Forward uplink data message MAC payload: C0 00 03 2F 41 03
- ↑ 12:45:04 Successfully processed data message DevAddr: 26 0B 9C CE
- ↑ 12:45:00 Forward join-accept message
- 📡 12:44:59 Accept join-request

**Location** Change location settings →

No location information available

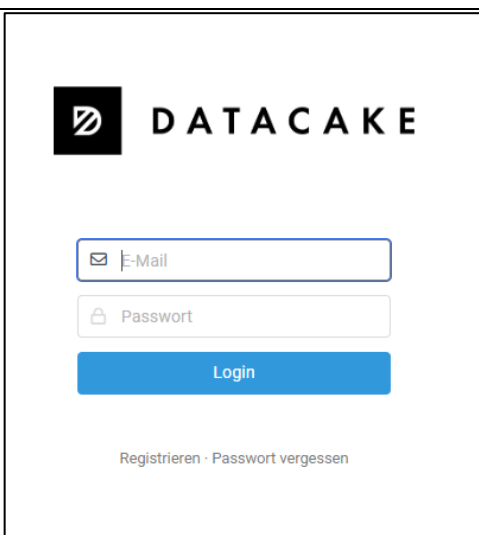
↑ 12:51:12 Forward uplink data message Payload: { RHUM: 43, TEMP: 22.3 } 10 00 DF 11 2B FPort: 2 Data rate: SF7BW125 SNR: 10.5 RSSI: -66

↑ 12:51:12 Successfully processed dat... DevAddr: 26 0B 9C CE FCnt: 5 FPort: 2 Data rate: SF7BW125 SNR: 10.5 RSSI: -66

Example: Temperature: 22,3°C and relative humidity 43%

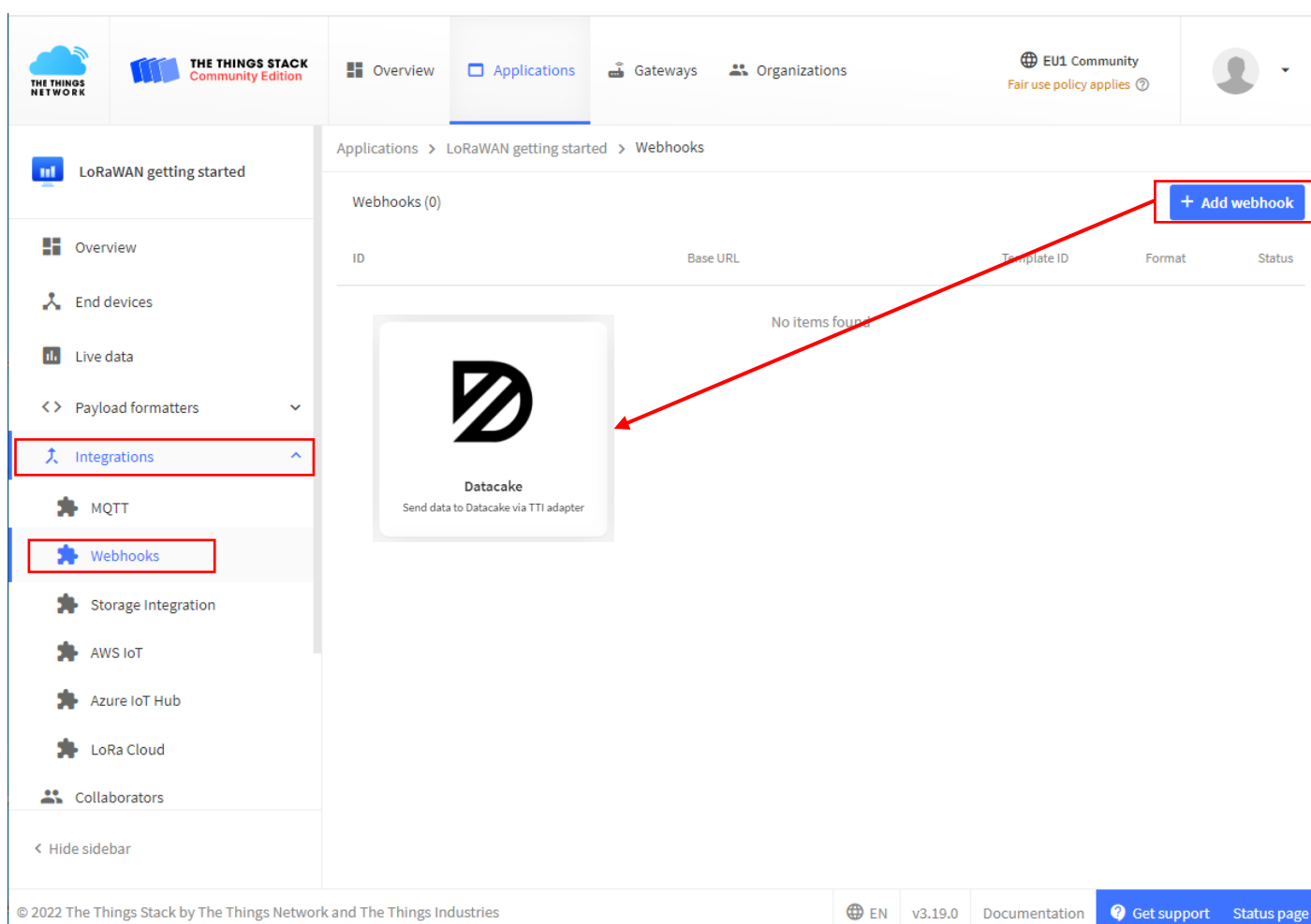
## 5. Connect The Things Network server with IoT platform Datacake

- Setup an account at datacake.io  
(<https://app.datacake.de/login>)



The image shows the Datacake login interface. At the top is the Datacake logo. Below it are two input fields: 'E-Mail' and 'Passwort'. A blue 'Login' button is positioned below the password field. At the bottom, there is a link that says 'Registrieren · Passwort vergessen'.

- Setup an Datacake webhook integration at your The Things Network application




The screenshot displays the 'Applications' section of The Things Stack. The breadcrumb trail is 'Applications > LoRaWAN getting started > Webhooks'. In the left sidebar, the 'Integrations' menu is expanded, and the 'Webhooks' option is highlighted with a red box. In the main content area, there is a table titled 'Webhooks (0)' with columns for ID, Base URL, Template ID, Format, and Status. The table is currently empty, showing 'No items found'. A red arrow points from the '+ Add webhook' button in the top right corner of the table to a 'Datacake' integration card. The card features the Datacake logo and the text 'Send data to Datacake via TTI adapter'.



- Configure the Webhook

## Add custom webhook

### Template information




**Datacake**  
Send data to Datacake via TTI adapter  
[About Datacake](#) | [Documentation](#)

### Template settings

Webhook ID \*

Token \*



Datacake API Token

Create datacake webhook

- Take the API Token from your Datacake account

M

Marco Dietz

M



Marco Dietz

0 Devices | 1 Members

Add Workspace

Edit Profile

Logout

Members


Rules

Workspace

Integrations

White Label

Billing

 **DATA CAKE**

Flotte > Devices

Devices

DEVICE	LOCATION
<div><div>My Account</div><div>Password</div><div>API</div></div>	<div><p>Datacake offers both a RESTful API for simple tasks as well as a feature-rich GraphQL API. For both, you need an API token. Please note that your API token gives access to your whole account, so treat it with caution!</p><div><div>You can find your API token below.</div><div>.....</div><div>Show</div></div></div>

Showing 0 to 0 of 0 results

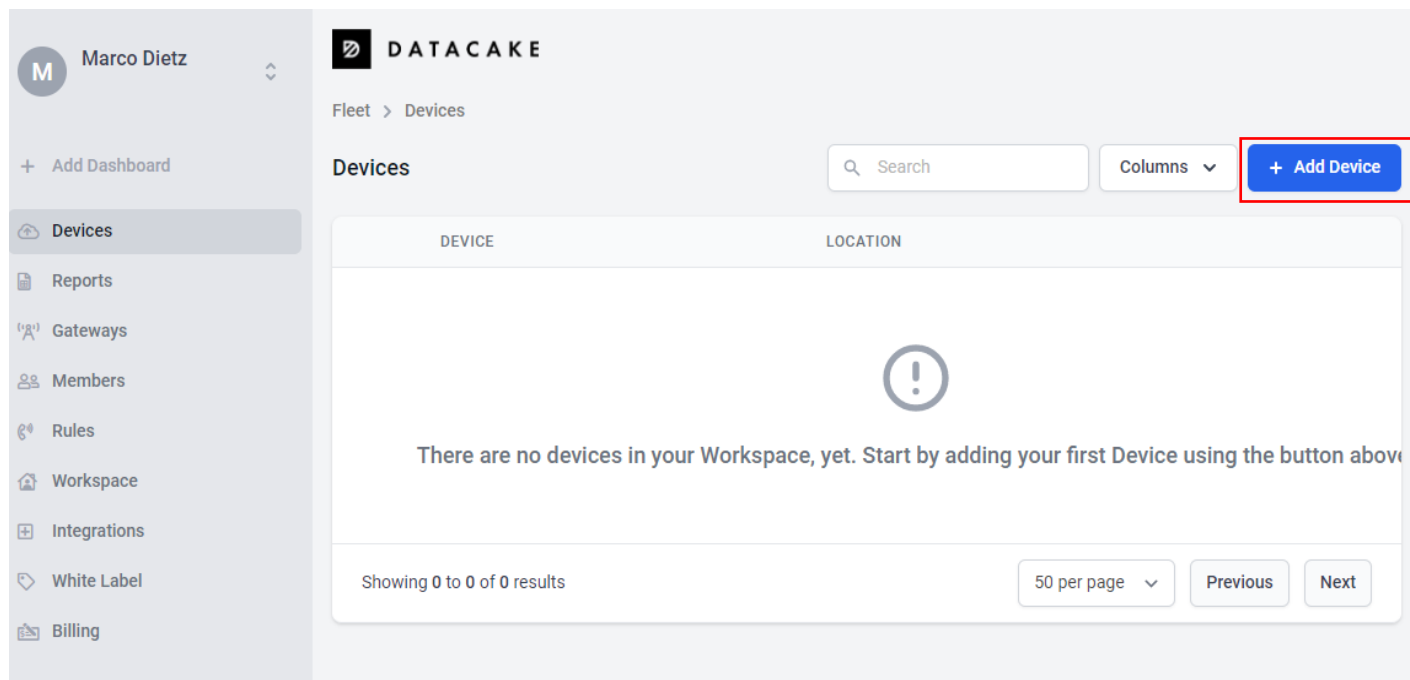
50 per page

Previous

Next


## 6. Visualize sensordata


- Add the MCS LRW device at Datacake workspace





- Choose “New Product from Template” as search for the Thermokon MCS LRW Template


### Add Device


  
LoRaWAN

  
Particle

  
API

  
D Zero

  
D Zero LTE

  
PINCODE

**STEP 1**  
Product


**STEP 2**  
Network Server

**STEP 3**  
Devices

**STEP 4**  
Plan


### Network Server

Please choose the LoRaWAN Network Server that your devices are connected to.




**The Things Stack V3**  
 TTN V3 / Things Industries

Uplinks
Downlinks

☐


**helium**  
 Helium

Uplinks
Downlinks


☐



**LORIO T**  
 LORIO T


Uplinks
Downlinks


- Choose The Things Stack V3


### Add Device


  
LoRaWAN

  
Particle

  
API

  
D Zero

  
D Zero LTE

  
PINCODE

**STEP 1**  
Product

**STEP 2**  
Network Server


**STEP 3**  
Devices



**STEP 4**  
Plan

### Add Devices

Enter one or more LoRaWAN Device EUIs and the names they will have on Datacake.

**New:** You can now upload a CSV file with either one column (just the device's DevEUI) or two columns (DevEUI and Name), which will populate the form below.

 Drag and drop a .csv file here or click to choose one

DEVEUI	NAME
 70 B3 D5 58 10 00 00 2E 8 bytes	 MCS LRW

- Add the Device EUI of the MCS LRW and choose a name

Thermokon Sensortechnik GmbH, Platanenweg 1, 35756 Mittenaar, Deutschland · Tel: +49 2778/6960-0 · Fax: -400 · www.thermokon.de email@thermokon.de  
 LoRaWAN\_Getting\_Started\_Guide\_en.docx © 2023

### Add Device

LoRaWAN
 Particle
 API
 D Zero
 D Zero LTE
 PINCODE

STEP 1 Product

STEP 2 Network Server

STEP 3 Devices

STEP 4 Plan

**Free**

0.00€ / month

7 days data retention

500 datapoints / day

max. 2 per workspace

Cancel any time

**Light**

1.00€ / month

1 month data retention

1,000 datapoints / day

Cancel any time

**Standard**

3.00€ / month

3 months data retention

2,500 datapoints / day

Cancel any time

**Plus**

5.00€ / month

12 months data retention

7,500 datapoints / day

Cancel any time

Have a code?

- Go for the Free Plan and add the MCS LRW

- After sending data for the next time the MCS LRW is displayed at datacake

## DATA CAKE

Fleet > Devices

Devices

Columns ▾

	DEVICE	SERIAL NUMBER	LAST SEEN	PRODUCT	
	MCS LRW	70B3D5581000002E	just now	Thermokon MCS LRW Multi-Compact-Sensor	

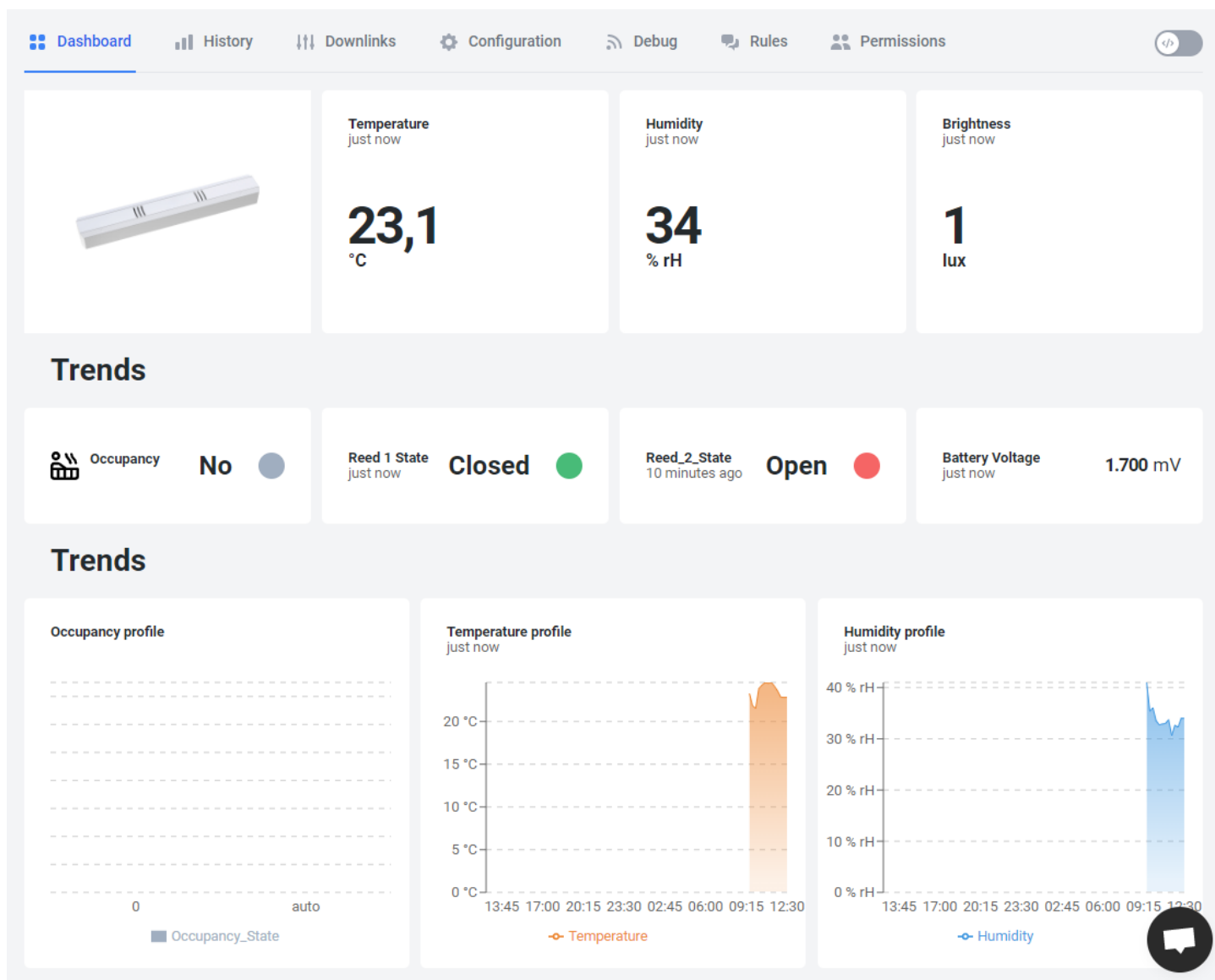
Showing 1 to 1 of 1 results

50 per page ▾

Previous

Next

- After selecting the device the value visualization at the dashboard is ready



Note: Depending on the MCS LRW type some values won't be available. (eg. Occupancy if no it is just a MCS LRW Temp\_rh).