



SENSECAP

Connect M2 Multi-Platform Gateway to The Things Network

The main building blocks of the public community LoRaWAN® network are gateways. This tutorial will guide you connecting your M2 Multi-Platform Gateway to The Things Network.

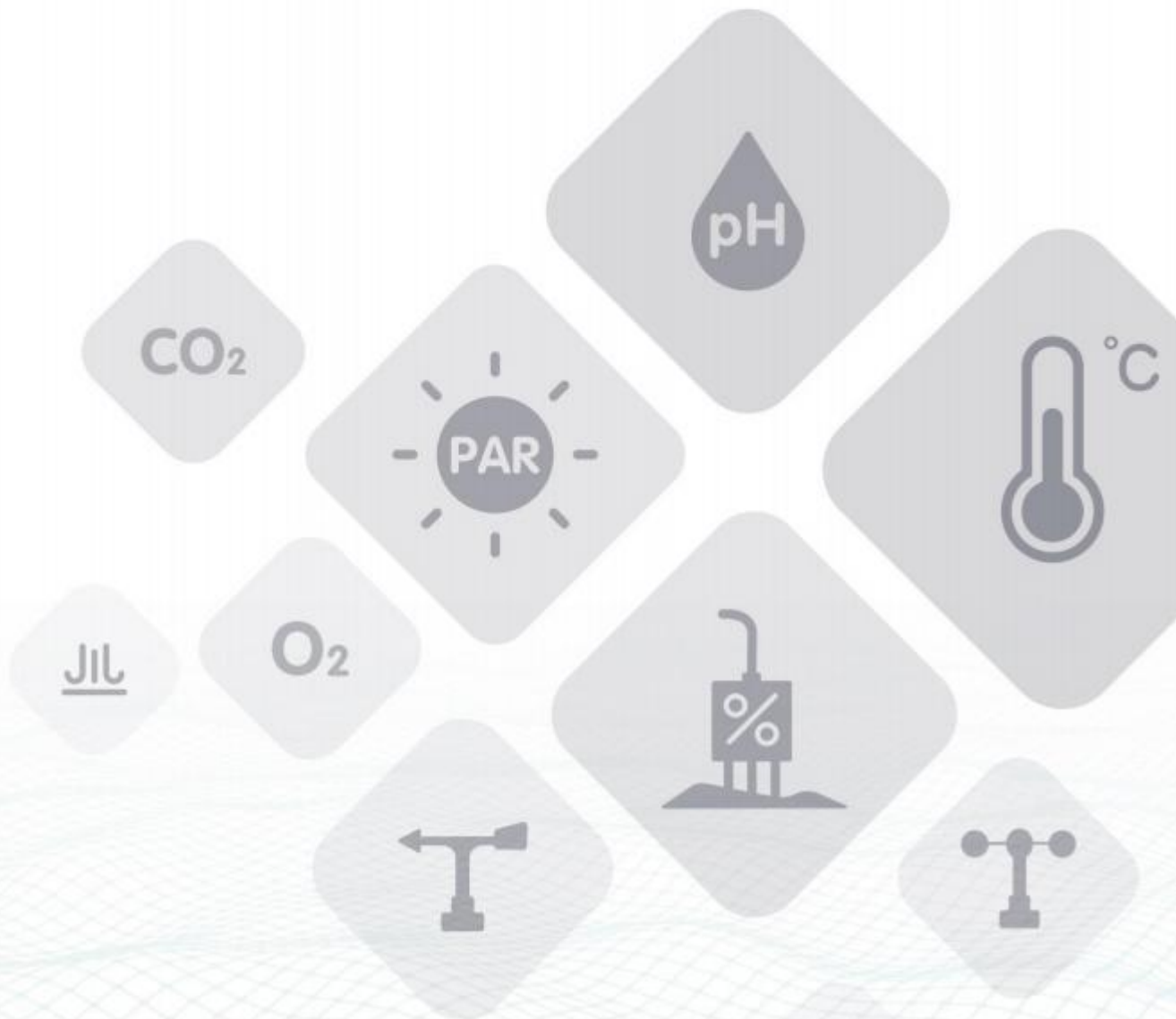


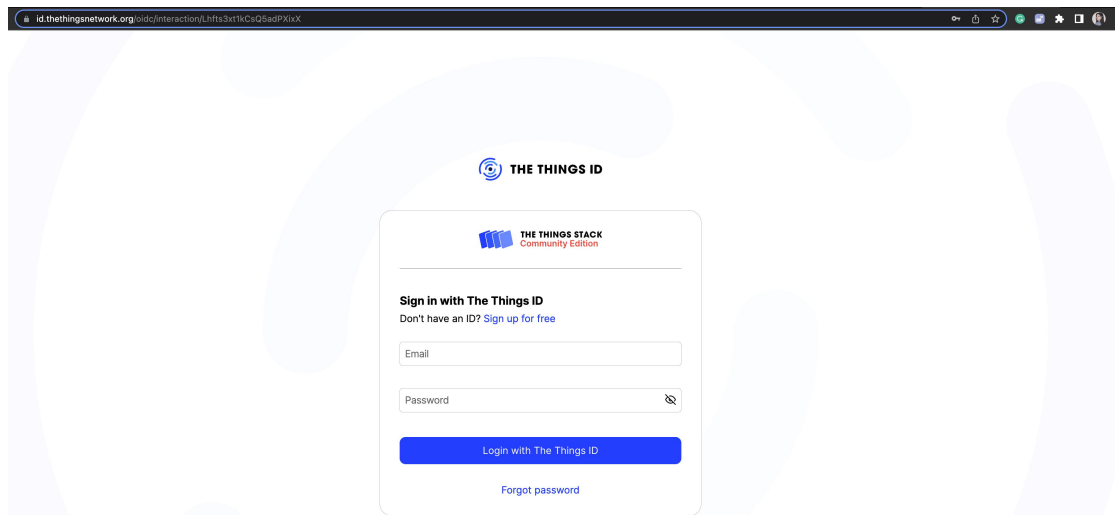
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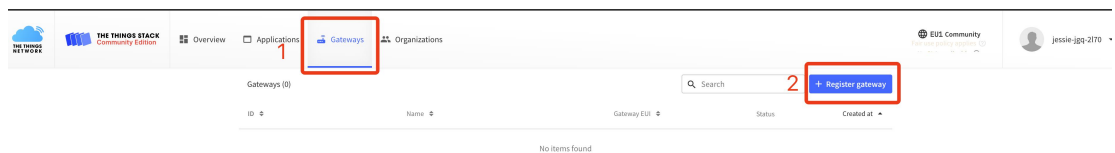
1. Connecting via Packet Forwarders

1.1 TTN Configuration

Log into [The Things Stack](#). If you don't have a TTN account, please register first.



Register the gateway



Gateway EUI: Gateway EUI can be found on the device label or Local Console

Gateway ID: A unique identifier for your gateway(the ID must contain only lowercase letters, numbers, and dashes)

Gateway name: A name of your gateway

Frequency plan: Select the corresponding frequency according to your gateway version

The screenshot shows the 'Register gateway' form in the SenseCAP web interface. The form includes the following fields and options:

- Gateway EUI:** A text input field containing '2CF7F' and a 'Reset' button.
- Gateway ID:** A text input field containing 'eui-2cf7f'.
- Gateway name:** A text input field containing 'M2 MP'.
- Frequency plan:** A dropdown menu set to 'Europe 863-870 MHz (SF12 for RX2)'.
- Require authenticated connection:** An unchecked checkbox with a note: 'Choose this option eg, if your gateway is powered by LoRa Basic Station'.
- Share gateway information:** Two checked checkboxes: 'Share status within network' and 'Share location within network'.
- Register gateway:** A blue button at the bottom of the form.

You can check the Gateway in the overview after successful registration.

The screenshot shows the 'Gateway overview' page for a gateway named 'M2 MP' with ID 'eui-2cf7f'. The page is divided into several sections:

- Header:** Shows the gateway name 'M2 MP' and ID 'eui-2cf7f'. It indicates the gateway is 'Disconnected' and shows '1 Collaborator' and '0 API keys'.
- General information:** A table listing details:

Gateway ID	eui-2cf7f
Gateway EUI	2CF7F1
Gateway description	None
Created at	Oct 8, 2022 11:33:37
Last updated at	Oct 8, 2022 11:33:37
Gateway Server address	eu1.cloud.thethings.network
- LoRaWAN information:**
 - Frequency plan: EU_863_870
 - Global configuration: [Download global_conf.json](#)
- Live data:** A section titled 'Live data' with a timestamp '11:33:37' and a 'Create gateway' button. Below it is a 'Location' section with a world map and the text 'No location information available'.

1.2 Gateway Configuration

Configure the gateway via the Web UI, please check the [Quick Start](#) to log into Local Console first.

- **Step 1: LoRa Network Settings**

Navigate to **LoRa > LoRa Network**



Mode: Packet Forward

Packet Forwarder Settings:

Gateway EUI: It will automatically get the EUI of the connected gateway

Server Address: The link to The Things Network server(eg: For Europe is eu1.cloud.thethings.network)

Server Port(Up/Down): 1700

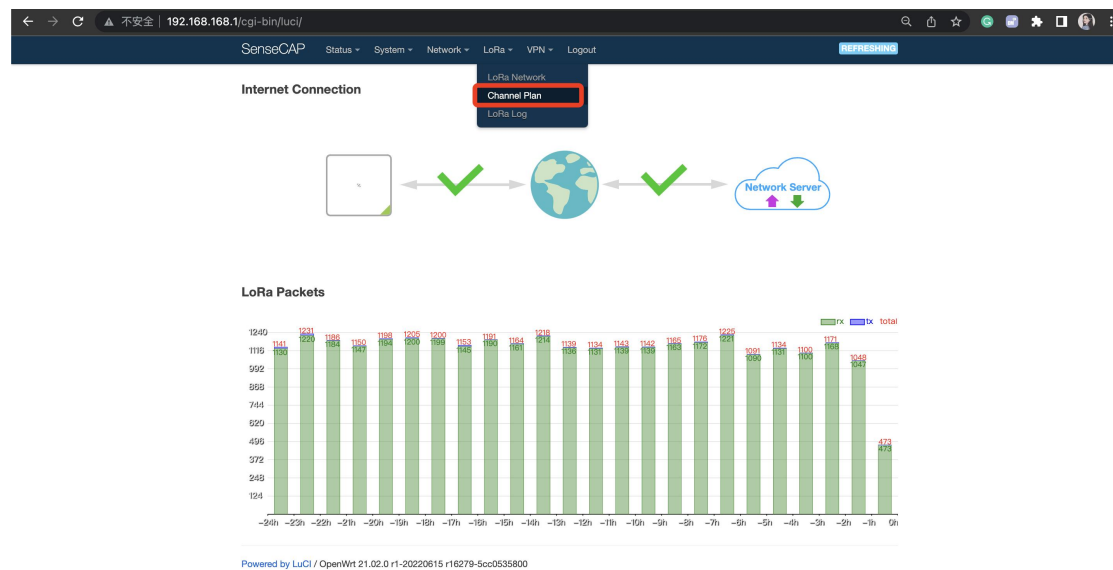
Other settings can be left as default, or can be changed to suit your requirements.

The screenshot shows the 'LoRaWAN Network Settings' page. The 'Mode' dropdown is set to 'Packet Forwarder'. Under 'Packet Forwarder Settings', the 'Gateway EUI' is '2CF7F1', 'Server Address' is 'eu1.cloud.thethings.network', 'Server Port (Up)' is '1700', and 'Server Port (Down)' is '1700'. A 'Save & Apply' button is located at the bottom right of the settings section.

Click **Save&Apply** to apply your settings.

- **Step 2: Channel Plan Settings**

Navigate to **LoRa > Channel Plan**



Select the Region and Frequency plan according to the actual choice.

The screenshot shows the SenseCAP web interface for the 'Channel Plan' settings. The navigation menu includes Status, System, Network, LoRa, VPN, and Logout. The 'Channel Plan' settings are displayed, with a dropdown menu for 'Region' set to 'EU863-870' and a dropdown menu for 'Frequency plan' set to 'Europe 863-870 MHz (SF9 for R)'. A 'Save & Apply' button is visible at the bottom right of the settings area.

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After setting, click **Save&Apply**

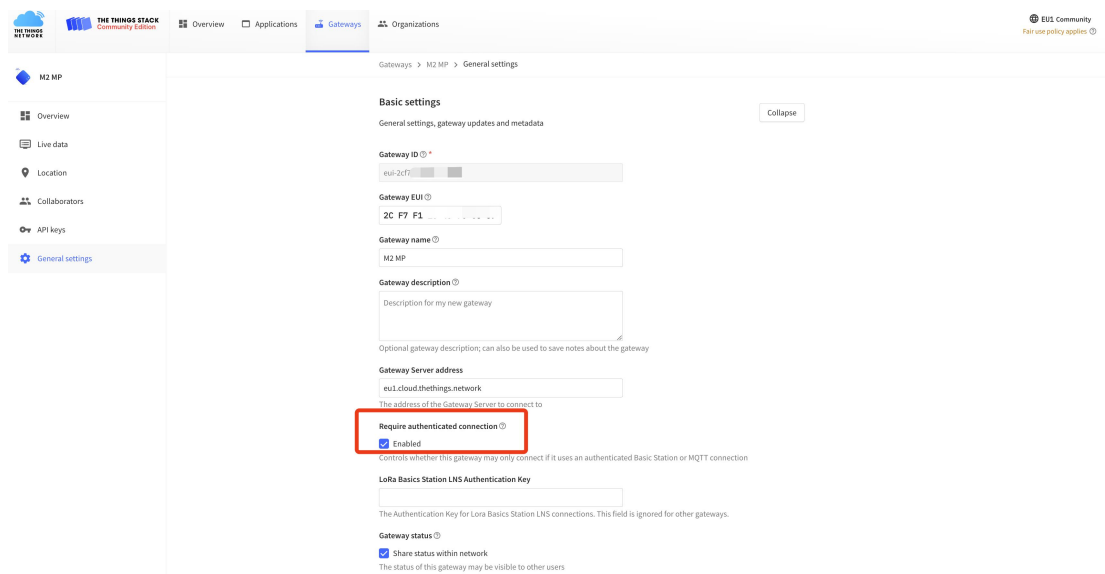
2. Connecting via Basic Station

2.1 TTN Configuration

Please refer to 1.1 for adding a gateway

- **Step 1:** Enable Require authenticated connection

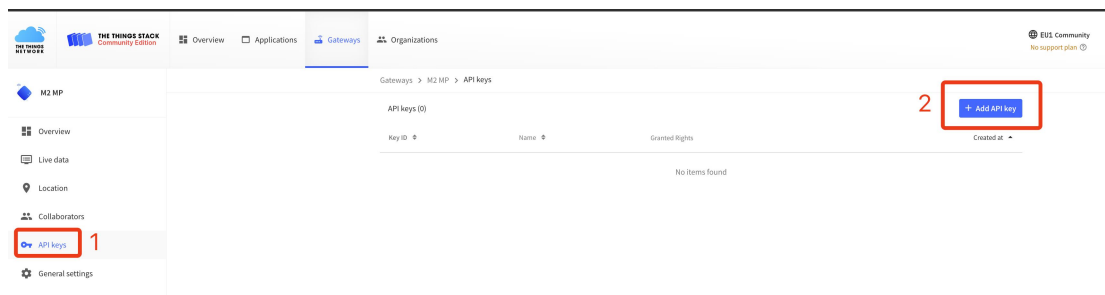
This will only allow a gateway to connect if it uses a TLS enabled Basic Station or MQTT connection. It will not allow connections from UDP packet forwarders.



The screenshot shows the 'General settings' page for a gateway named 'M2 MP'. The 'Require authenticated connection' checkbox is checked and highlighted with a red box. Other settings include Gateway ID (eu-2cf7), Gateway EUI (2C F7 F1), Gateway name (M2 MP), Gateway description (Description for my new gateway), Gateway Server address (eu1.cloud.thethings.network), LoRa Basics Station LNS Authentication Key, and Gateway status (Share status within network checked).

- **Step 2:** Create an API key

Navigate to **API keys**, click Add API key



The screenshot shows the 'API keys' page for the gateway 'M2 MP'. The 'API keys' tab is selected and highlighted with a red box and a '1'. The 'Add API key' button is highlighted with a red box and a '2'. The page shows a table with columns for Key ID, Name, Granted Rights, and Created at, and a message 'No items found'.

Choose **Grant individual rights** > Link as Gateway to a Gateway Server for traffic exchange, i.e. write uplink and read downlink

The screenshot shows the 'Add API key' form in the SenseCAP web interface. The form is titled 'Add API key' and is located in the 'API keys' section of the 'M2 MP' gateway. The form includes the following fields and options:

- Name:** A text input field containing 'My new API key'.
- Expiry date:** A date picker field showing '28 / 11 / 21'.
- Rights:** A list of permissions with radio buttons and checkboxes.
 - Grant all current and future rights
 - Grant individual rights
 - Select all
 - Delete gateway
 - View gateway information
 - Link as Gateway to a Gateway Server for traffic exchange, i.e. write uplink and read downlink
 - View gateway location
 - Retrieve secrets associated with a gateway
 - View and edit gateway API keys
 - Edit basic gateway settings
 - View and edit gateway collaborators
 - View gateway status
 - Write downlink gateway traffic
 - Read gateway traffic
 - Store secrets for a gateway

A red box highlights the 'Create API key' button at the bottom of the form.

2.2 Gateway Configuration

Mode: Basics Station

Basic Station Settings:

Gateway EUI: It will automatically get the EUI of the connected gateway

Server: LNS Server

URL: The link to The Things Network server(eg: For Europe is eu1.cloud.thethings.network); Port:8887

Authentication Mode: TLS server authentication and Client token

trust: Select the [certificate](#) you need and download it, recommend: [Let's Encrypt ISRG Root X1 Trust](#)

Copy the data content of the certificate file (the certificate can be opened in text form)

token: Authorization: Your_API_Key

Other settings can be left as default, or can be changed to suit your requirements.

The screenshot displays the 'LoRaWAN Network Settings' page in the SenseCAP web interface. The page is organized into several sections:

- LoRaWAN Network Settings:** Gateway EUI is set to 2CF7F110. Mode is set to 'Basics Station'.
- Basic Station Settings:** Gateway EUI is 2CF7F110. Server is 'LNS Server'. URI is 'wss://eier s.8887'. A note below states: 'For example CLUPS https://server-address:443, LNS wss://server-address:8887'.
- Authentication Mode:** Set to 'TLS Server Authentication and C'.
- trust:** A text area contains a certificate block starting with '-----BEGIN CERTIFICATE-----' and ending with '-----END CERTIFICATE-----'. The content is a long alphanumeric string.
- token:** Set to 'Authorization:NNSXS.URG'.

A 'Save & Apply' button is located at the bottom right of the settings area. At the very bottom of the page, it says 'Powered by LuCI / OpenWrt 21.02.0 r1-20220615 r16279-5cc0535800'.

3. Check the Gateway Status

After the settings are completed, we can view the live data of your gateway.

You can see that your gateway is connected to TTN now.

The screenshot shows the 'Live data' view for an M2MP gateway. The interface includes a sidebar with navigation options like Overview, Live data, Location, Collaborators, API keys, and General settings. The main area displays a table of received uplink messages and gateway status metrics.

Time	Type	Data preview
11:48:16	Receive uplink message	DevAddr: 27 80 BE 80 FCnt: 2370 FPort: 3 Confirmed uplink Data rate: SF78M125 SNR: 14 RSSI: -97
11:48:03	Receive uplink message	JoinEUI: A8 40 41 08 C DevEUI: A8 40 41 11 2 Data rate: SF128M125 SNR: 2.2 RSSI: -114
11:48:01	Receive uplink message	DevAddr: 01 5A 5F 5F FCnt: 23724 FPort: 199 Data rate: SF128M125 SNR: 6.8 RSSI: -98
11:47:56	Receive uplink message	DevAddr: 27 80 3E FE FCnt: 31 FPort: 3 Confirmed uplink Data rate: SF78M125 SNR: -7.5 RSSI: -120
11:47:56	Receive uplink message	DevAddr: 48 80 08 A3 FCnt: 78 FPort: 2 Confirmed uplink Data rate: SF128M125 SNR: 9 RSSI: -95
11:47:53	Receive uplink message	DevAddr: 27 80 62 D6 FCnt: 12021 FPort: 3 Data rate: SF78M125 SNR: 12.5 RSSI: -93
11:47:37	Receive uplink message	DevAddr: 27 80 DF 90 FCnt: 4289 FPort: 3 Data rate: SF78M125 SNR: 14 RSSI: -100
11:47:31	Receive uplink message	DevAddr: 27 80 82 71 FCnt: 2867 FPort: 3 Confirmed uplink Data rate: SF78M125 SNR: 6.2 RSSI: -112
11:47:21	Receive uplink message	DevAddr: 48 80 08 A4 FCnt: 3396 FPort: 2 Confirmed uplink Data rate: SF78M125 SNR: 13.8 RSSI: -93
11:47:19	Receive uplink message	DevAddr: 48 80 88 A8 FCnt: 2435 FPort: 3 Confirmed uplink Data rate: SF78M125 SNR: -8 RSSI: -128
11:47:18	Receive uplink message	DevAddr: 27 80 05 37 FCnt: 4333 FPort: 3 Confirmed uplink Data rate: SF78M125 SNR: 18.2 RSSI: -107
11:47:15	Receive gateway status	Metrics: { txin: 0, txok: 0, temp: 35.2, rxin: 4, txok: 4, rxfa: 4, ackr: 100 } Versions: { ttn-lw-gateway-server: "3.22.0-rc0-SNAPSHOT-98bc67982" }
11:47:04	Receive uplink message	DevAddr: 26 88 6A 27 FCnt: 2566 FPort: 2 Data rate: SF78M125 SNR: 14 RSSI: -94
11:47:03	Receive uplink message	DevAddr: 27 80 5F 89 FCnt: 13277 FPort: 3 Data rate: SF78M125 SNR: 14 RSSI: -95
11:46:53	Receive uplink message	DevAddr: 27 80 62 D6 FCnt: 12020 FPort: 3 Data rate: SF78M125 SNR: 15 RSSI: -93
11:46:49	Receive uplink message	DevAddr: 48 80 08 A3 FCnt: 77 FPort: 2 Confirmed uplink Data rate: SF128M125 SNR: 7 RSSI: -97
11:46:45	Receive gateway status	Metrics: { rxin: 5, rxok: 4, rxfa: 4, ackr: 88, txin: 0, txok: 0, temp: 35.2 } Versions: { ttn-lw-gateway-server: "3.22.0-rc0-SNAPSHOT-98bc67982" }
11:46:44	Receive uplink message	DevAddr: 27 80 D6 50 FCnt: 4824 FPort: 3 Confirmed uplink Data rate: SF78M125 SNR: 4.2 RSSI: -112
11:46:39	Receive uplink message	DevAddr: 27 80 16 A2 FCnt: 3885 FPort: 3 Data rate: SF78M125 SNR: 12 RSSI: -95