

1. Compactlogix PLC and MQTT Library

You have to use a physical PLC. This will not work with FT Logix Eco.

You can see the results on this video

https://youtu.be/Y6_UtErWmb4

This belongs to Common application library to be download from Rockwell download page.

<https://compatibility.rockwellautomation.com/pages/search.aspx?crumb=117&q=Common%20Application%20Libraries%20-%20April%202023>

The screenshot shows the Rockwell Automation website's download center. The search bar at the top contains "Common Application Libraries - April 2023". The results table shows one item: "Common Application Libraries - April 2023" with a download link and an "Add To Download Cart" button. A sidebar on the right lists various download categories with counts: All (1), Products (0), Downloads (1), Features (0), Related Products (0), Categories (0), Families (0), and Standard Views (0). The "Downloads" category is selected.

The screenshot shows the Rockwell Automation Downloads page. The main area is a grid of software components for different editions of Studio 5000 Logix Designer. Components include Machine Builder Libraries, Independent Cart Technology Libraries, Common Application Libraries, and Studio 5000 Application Code Manager. Each component has a "Select Files" and "Firmware Only" checkbox. The grid includes columns for Studio 5000 Logix Designer, FactoryTalk View Machine Edition, FactoryTalk View Site Edition, and RapidLaunch. A legend at the top indicates icons for Selections, Compare, and Legend.

You will get these content on C:\RA

📁 ApplicationCodeManagerLibraries	4/14/2023 9:44 PM	File folder
📁 GeneralDocuments	4/14/2023 9:33 PM	File folder
📁 ReferenceManuals	4/14/2023 9:44 PM	File folder
📁 CommonApplicationLibraries_20230415	7/29/2023 5:38 PM	ZIP archive
📄 ReadMe	8/24/2022 7:26 PM	Text Document
⚙️ Setup	8/24/2022 7:25 PM	Windows Command ...
		15,609 KB
		1 KB
		5 KB

First install ACM, then run Setup.

The library will be installed on your ACM environment.

You can find this AOI RM-raC_Opr_MQTT on this library “CommonApplicationLibraries_20230415”

Windows (C:) > RA > Common application libraries > ReferenceManuals

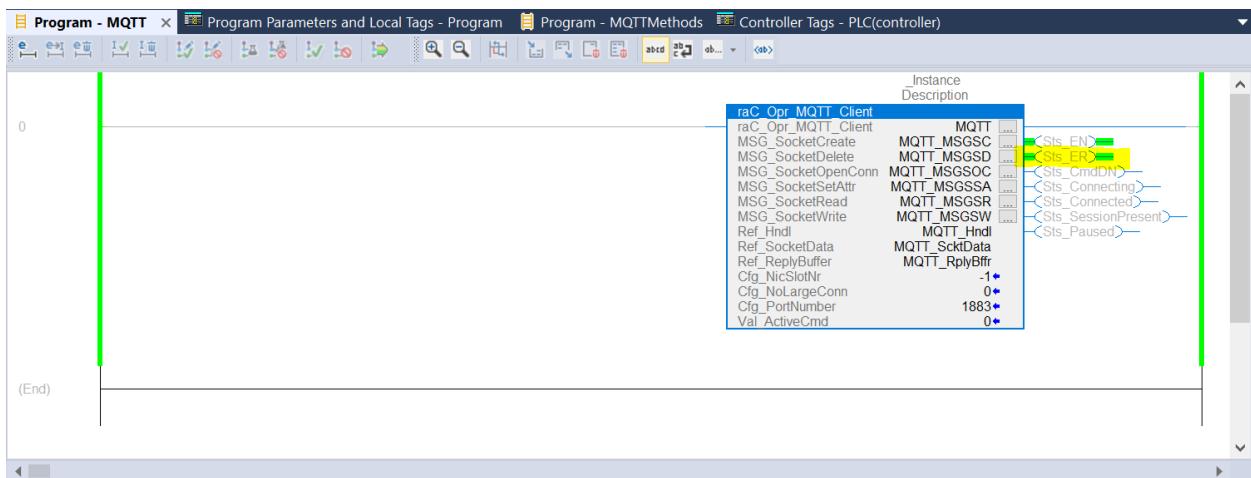
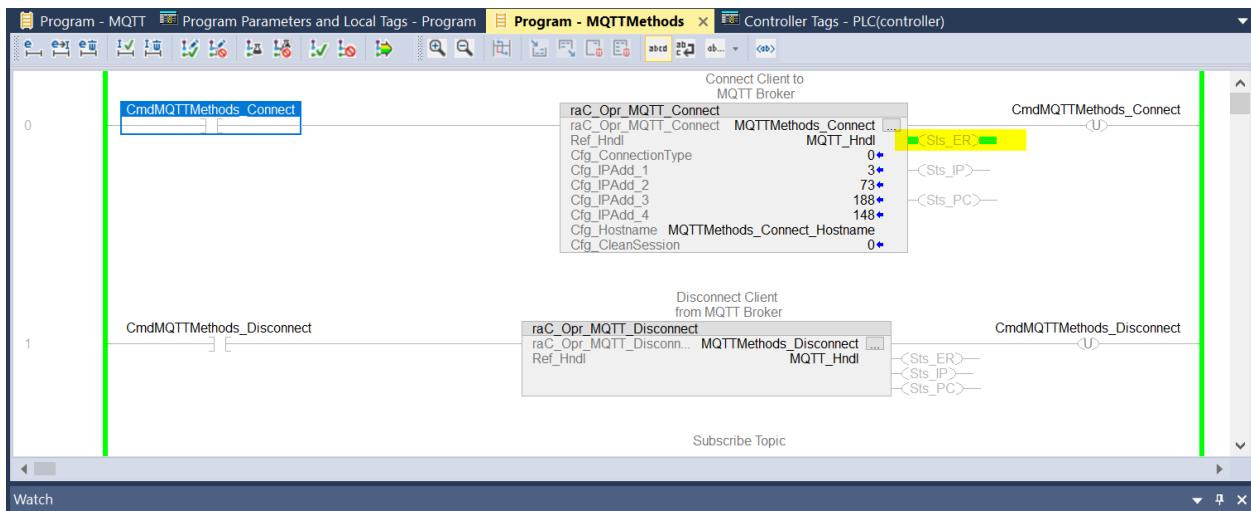
Name	Date modified	Type	Size
RM-raC_Opr_CapturePV_REAL	8/24/2022 7:05 PM	Documento Adobe A...	607 KB
RM-raC_Opr_HTTP	4/14/2023 9:08 PM	Documento Adobe A...	1,273 KB
RM-raC_Opr_MQTT	4/14/2023 9:08 PM	Documento Adobe A...	1,471 KB
RM-raC_Tec_CnvtLen	8/24/2022 7:05 PM	Documento Adobe A...	630 KB
RM-raC_Tec_CnvtVel_LinLin	8/24/2022 7:05 PM	Documento Adobe A...	695 KB
RM-raC_Tec_CnvtVel_LinRot	8/24/2022 7:05 PM	Documento Adobe A...	735 KB
RM-raC_Tec_DeadTime	8/24/2022 7:05 PM	Documento Adobe A...	762 KB
RM-raC_Tec_DINTCompress	8/24/2022 7:05 PM	Documento Adobe A...	484 KB
RM-raC_Tec_DINTExpand	8/24/2022 7:05 PM	Documento Adobe A...	484 KB

Create the program with ACM following the instructions manuals

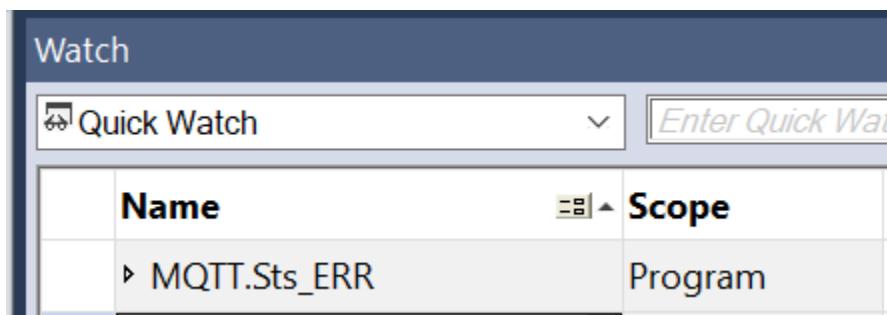
You have to use a physical PLC. This will not work with FT Logix Eco.

When testing the application you will probably get some error codes.

Toggle the Connect contact bit. You get an error



To see the error you can check



First of all is code 1015 "Unable to create Socket" on page 8 of manual

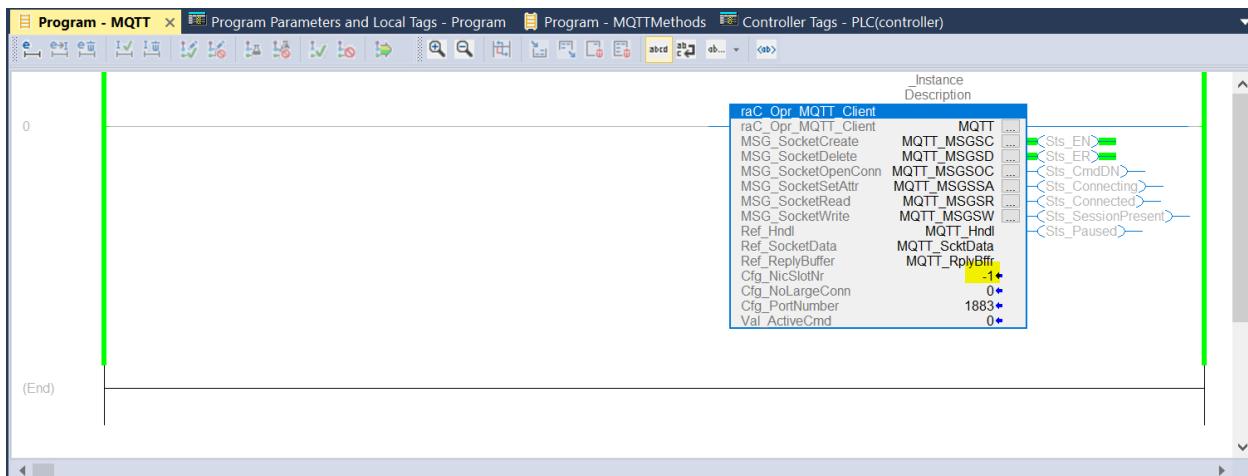
Common Libraries

ERR value	Description
1009	Cfg_KeepAliveTime is greater than 65536 or less than 0
1010	Unsupported command in Cmd_CPT
1011	Command Timed out
1012	Payload too big to send
1014	Received more data than payload can contain
1015	Unable to create socket. Refer Socket Create Message Error Code.
1016	Unable to connect to server. Refer Socket Open Connection Message Error Code.
1017	Failed to write. Refer Socket Write Message Error Code.

We can change the NIC slot number from PLC as stated on page 7

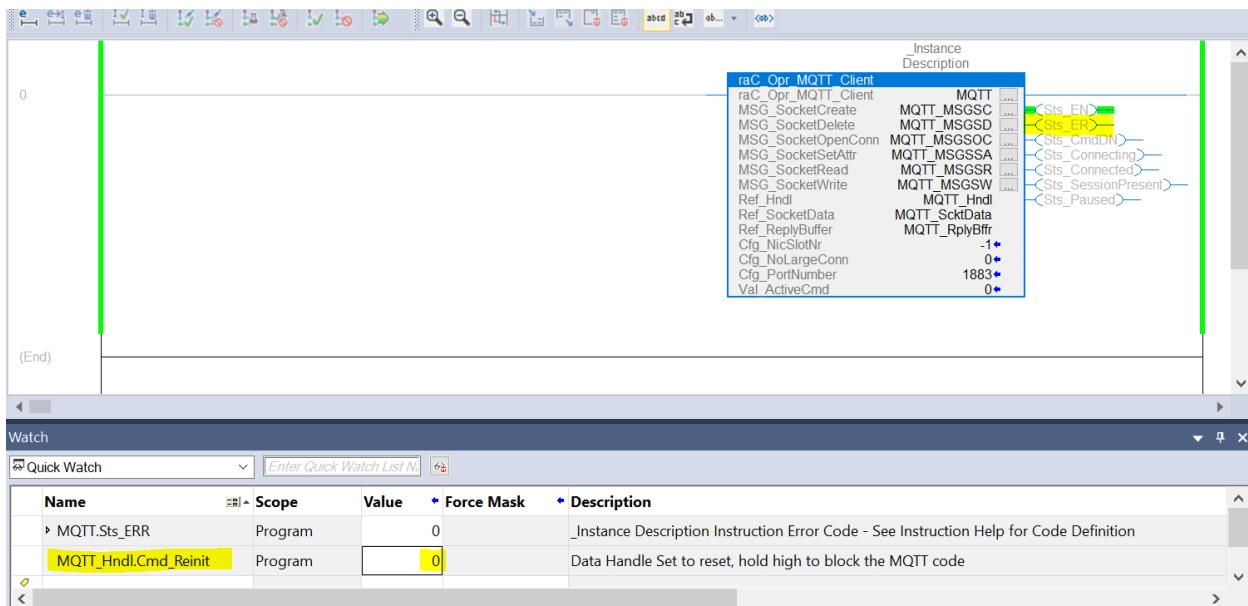
2.5 Input Data

Input	Function / Description	Datatype
Cfg_NicSlotNr	Logix slot number of the sockets capable network interface. For 1769 slot number is 0. For 5069 and 1756-L8x the slot number is -1. When using a 1756-ENxT(R), EWEB this is the slot number of the ethernet card.	DINT



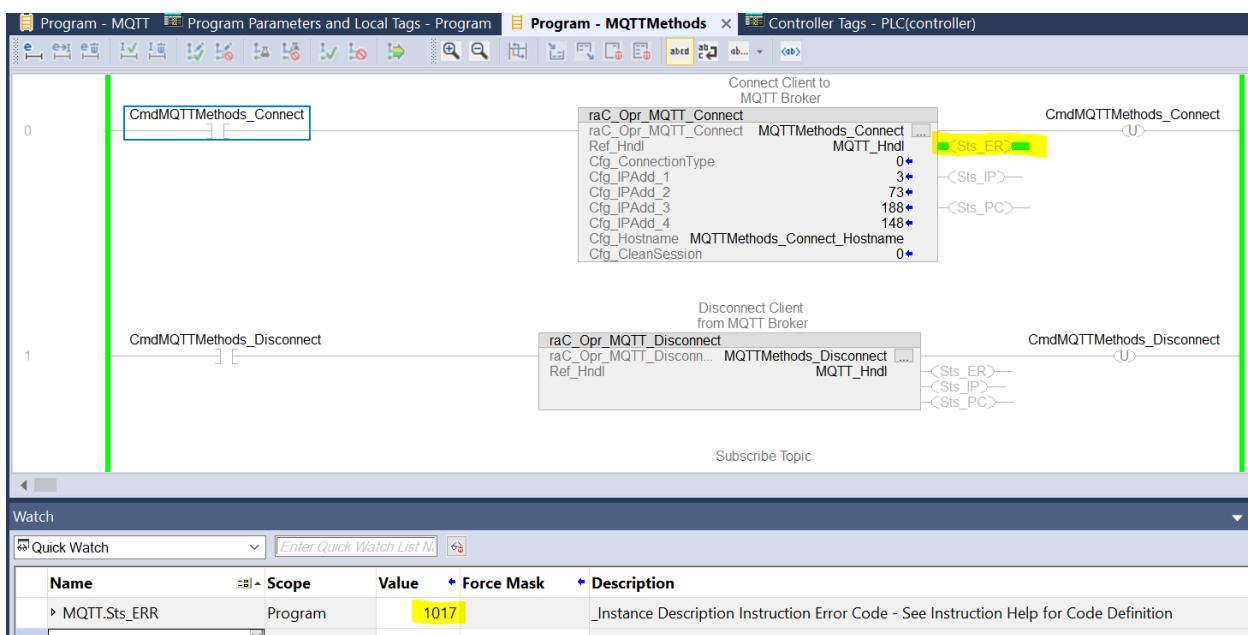
Let's save the project and download to reset the fault.

You can also reset the fault with `MQTT_Hndl.Cmd_Reinit`, setting to 1



Toggle connect bit again

Now you will get another error message 1017

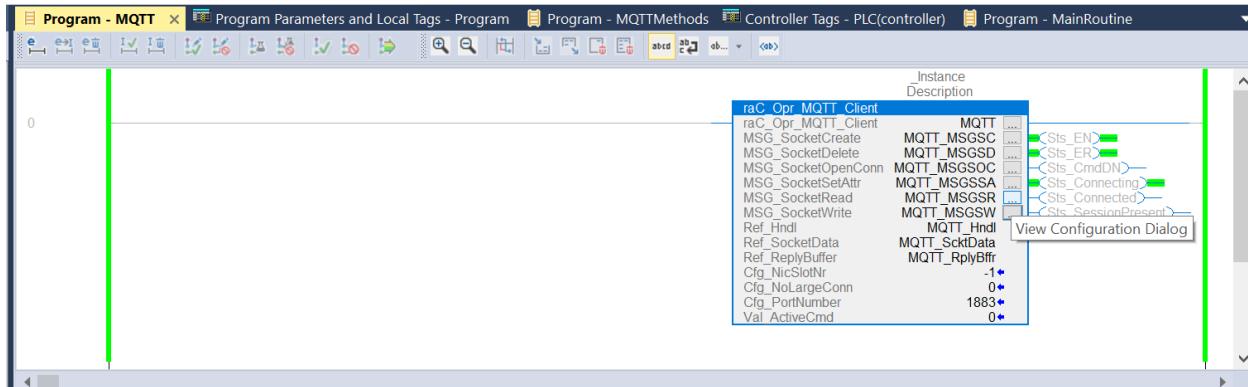


Common Libraries

ERR value	Description
1009	Cfg_KeepAliveTime is greater than 65536 or less than 0
1010	Unsupported command in Cmd_CPT
1011	Command Timed out
1012	Payload too big to send
1014	Received more data than payload can contain
1015	Unable to create socket. Refer Socket Create Message Error Code.
1016	Unable to connect to server. Refer Socket Open Connection Message Error Code.
1017	Failed to write. Refer Socket Write Message Error Code.

Next you have to setup read and write socket path

Hardware			MQTT Client Cfg		Socket Read and Write MSG Setting			
Controller	Backplane CommCard	CommCard SlotNumber	NICSlotNr	NoLargeConn	Path	Connected	Cached	Large Connection
1756-L8x	Not Used	Not Applicable	-1	0	THIS	0	0	0
1756-L8x	1756-Enxx	6	6	0	1,6	1	1	1
1756-L8x	1756-EWEB	6	6	1	1,6	0	0	0
1756-L7x	1756-ENxx	6	6	0	1,6	1	1	1
1756-L7x	1756-EWEB	6	6	1	1,6	0	0	0
5069	Not Applicable	NA	-1	0	THIS	0	0	0
1769	Not Applicable	NA	0	1	1,0	0	0	0



Message Configuration - MQTT_MSGSR

Configuration Communication Tag

Path: **THIS**

THIS

Broadcast:

Communication Method

CIP DH+ Channel: 'A' Destination Link:

CIP With Source ID Source Link: Destination Node: (Octal)

Connected Cache Connections Large Connection

Enable Enable Waiting Start Done Done Length: 0

Error Code: 16#00ff Extended Error Code: 16#0000_0036 Timed Out *

Error Path: THIS
Error Text: General Error

Message Configuration - MQTT_MSGSW

X

Configuration Communication Tag

Path: THIS

[Browse...](#)

THIS

Broadcast:

Communication Method

CIP

DH+

Channel:

'A'

Destination Link:

0

CIP With
Source ID

Source Link:

0

Destination Node:

0 (Octal)

Connected

Cache Connections 

Large Connection

Enable

Enable Waiting

Start

Done

Done Length: 4

Error Code:

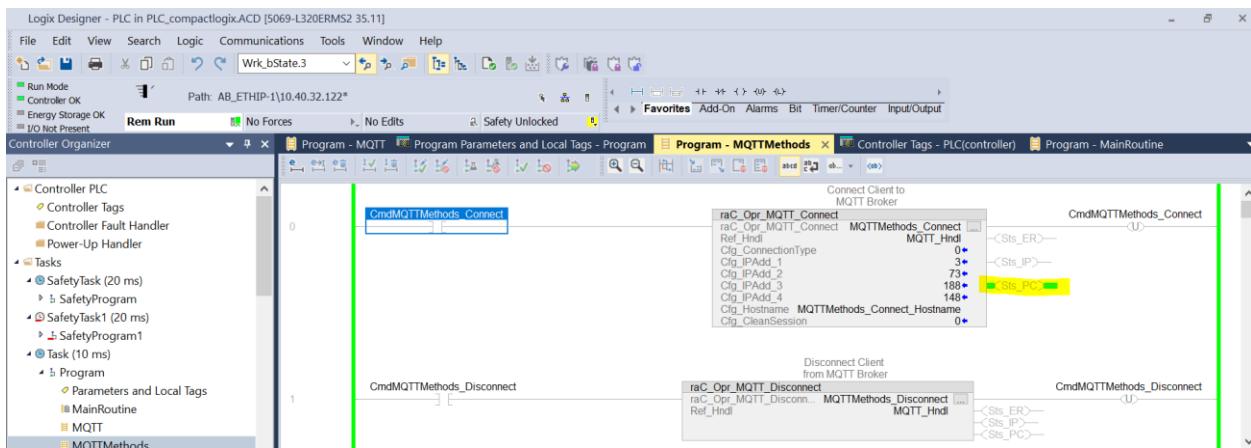
Extended Error Code:

Timed Out 

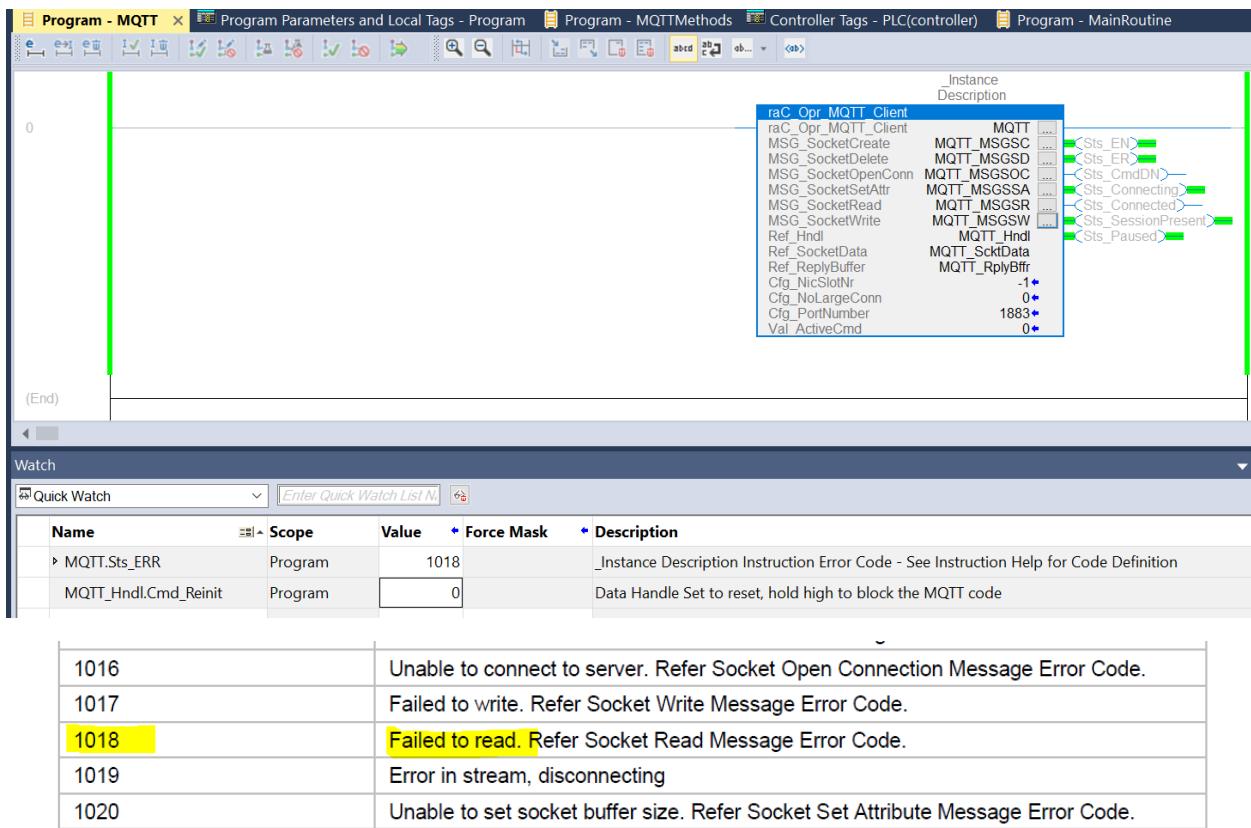
Error Path: THIS

Error Text:

Success on connecting



But error



Message Configuration - MQTT_MSGSR

Configuration Communication Tag

Message Type: CIP Generic

Service Type: ReadSocket

Source Element: QTT_ScktData.Src[0]

Source Length: 8 (Bytes)

Service Code: 4d (Hex) Class: 342 (Hex)

Destination Element: QTT_ScktData.Dst[0]

Instance: 27277 Attribute: 0 (Hex)

New Tag...

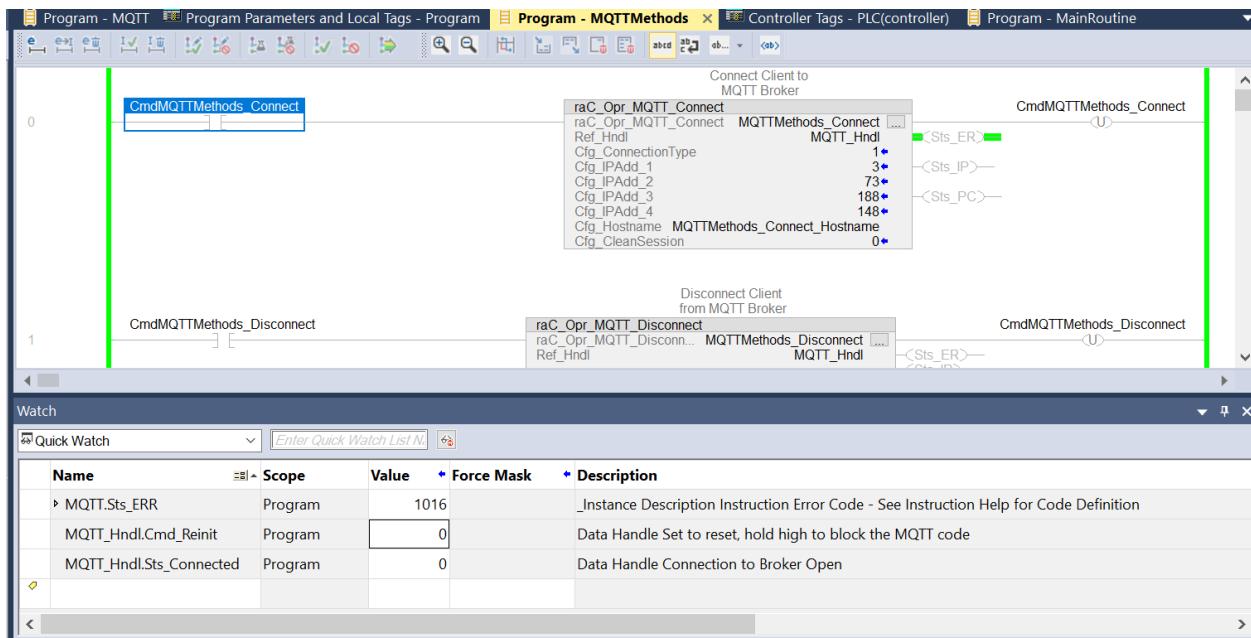
○ Enable ○ Enable Waiting ○ Start ○ Done Done Length: 0

● Error Code: 16#00ff Extended Error Code: 16#0000_0036 Timed Out

Error Path: THIS
Error Text: General Error

OK Cancel Apply Help

Let's try Connection type to use server address name instead of server address IP.



Common Libraries

ERR value	Description
1009	Cfg_KeepAliveTime is greater than 65536 or less than 0
1010	Unsupported command in Cmd_CPT
1011	Command Timed out
1012	Payload too big to send
1014	Received more data than payload can contain
1015	Unable to create socket. Refer Socket Create Message Error Code.
1016	Unable to connect to server. Refer Socket Open Connection Message Error Code.

Let's try with a local broker

1.1. Mosquitto local broker

You have to use a physical PLC. This will not work with FT Logix Eco.

Let's use the wifi IP address of computer as the mosquito local broker

For instance

10.40.32.117

Let's use this config file

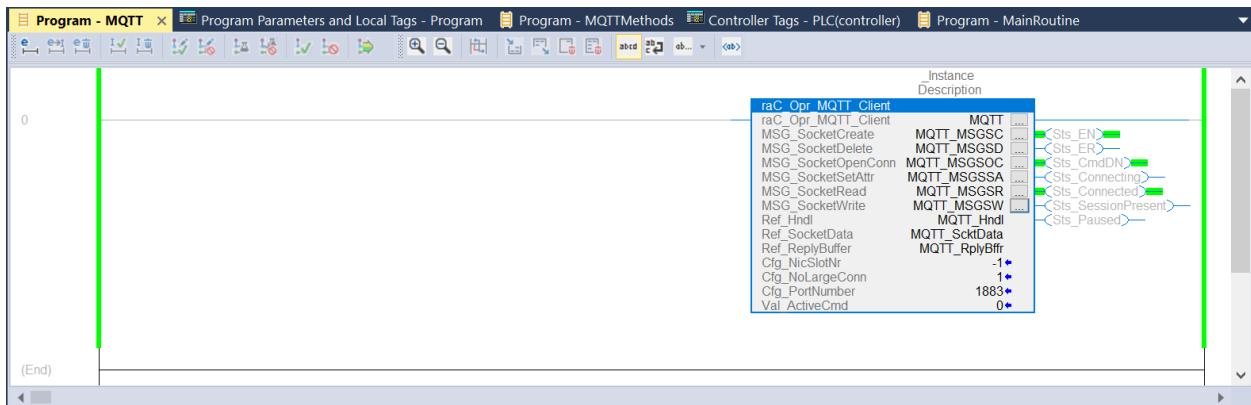
```
listener 1883 10.40.32.117
allow_anonymous true
```

```

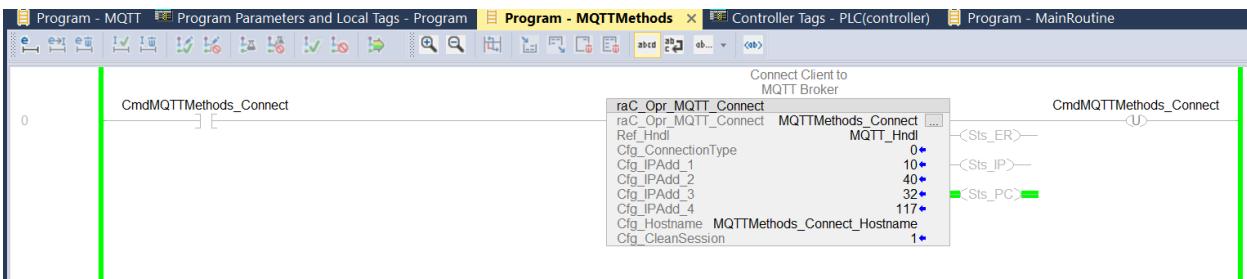
c:\ Command Prompt - mosquitto -c localip.conf -v
C:\mos>mosquitto -c localip.conf -v
1693317758: mosquitto version 2.0.10 starting
1693317758: Config loaded from localip.conf.
1693317758: Opening ipv4 listen socket on port 1883.
1693317758: mosquitto version 2.0.10 running
1693317788: New connection from 10.40.32.117:62236 on port 1883.
1693317788: New client connected from 10.40.32.117:62236 as nodered_dd5d462a7517895e (p2, c1, k60).
1693317788: No will message specified.
1693317788: Sending CONNACK to nodered_dd5d462a7517895e (0, 0)
1693317788: Received SUBSCRIBE from nodered_dd5d462a7517895e
1693317788:     plc (QoS 2)
1693317788: nodered_dd5d462a7517895e 2 plc
1693317788: Sending SUBACK to nodered_dd5d462a7517895e
1693317796: Received PUBLISH from nodered_dd5d462a7517895e (d0, q0, r0, m0, 'plc', ... (11 bytes))
1693317796: Sending PUBLISH to nodered_dd5d462a7517895e (d0, q0, r0, m0, 'plc', ... (11 bytes))
1693317856: Received PINGREQ from nodered_dd5d462a7517895e
1693317856: Sending PINGRESP to nodered_dd5d462a7517895e
1693317872: New connection from 10.40.32.122:56181 on port 1883.
1693317916: Received PINGREQ from nodered_dd5d462a7517895e
1693317916: Sending PINGRESP to nodered_dd5d462a7517895e
1693317962: Client <unknown> has exceeded timeout, disconnecting.
1693317976: Received PINGREQ from nodered_dd5d462a7517895e
1693317976: Sending PINGRESP to nodered_dd5d462a7517895e
1693318036: Received PINGREQ from nodered_dd5d462a7517895e
1693318036: Sending PINGRESP to nodered_dd5d462a7517895e
1693318069: New connection from 10.40.32.122:62886 on port 1883.
1693318069: New client connected from 10.40.32.122:62886 as MQTT (p2, c1, k1000).
1693318069: No will message specified.
1693318069: Sending CONNACK to MQTT (0, 0)
1693318096: Received PINGREQ from nodered_dd5d462a7517895e
1693318096: Sending PINGRESP to nodered_dd5d462a7517895e
1693318113: Received UNSUBSCRIBE from nodered_dd5d462a7517895e
1693318113:     plc
1693318113: nodered_dd5d462a7517895e plc
1693318113: Sending UNSUBACK to nodered_dd5d462a7517895e
1693318113: Received DISCONNECT from nodered_dd5d462a7517895e
1693318113: Client nodered_dd5d462a7517895e disconnected.
1693318113: New connection from 10.40.32.117:63135 on port 1883.
1693318113: New client connected from 10.40.32.117:63135 as nodered_e8bf7c5a27b22329 (p2, c1, k60).
1693318113: No will message specified.
1693318113: Sending CONNACK to nodered_e8bf7c5a27b22329 (0, 0)

```

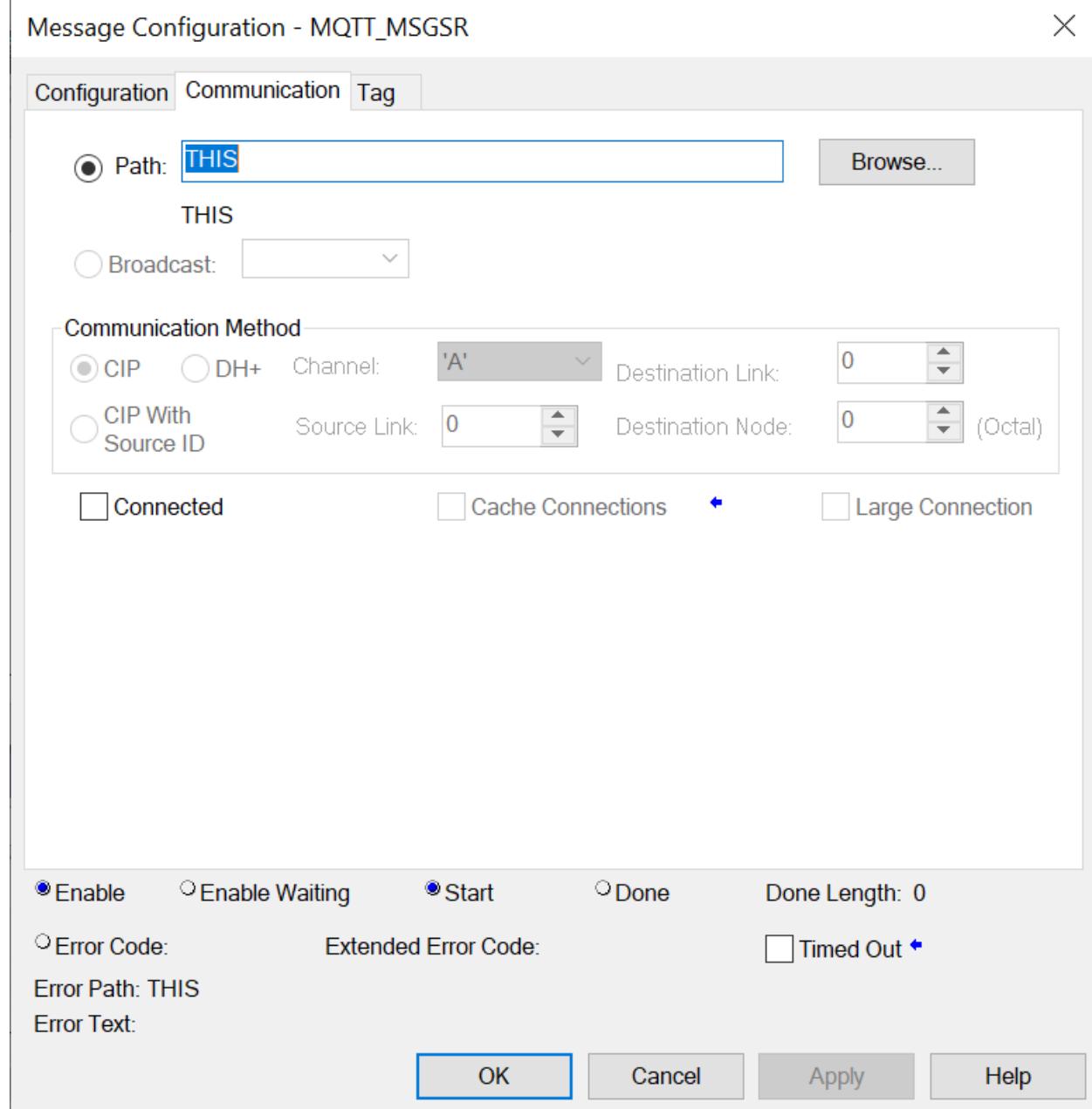
Let's use the instruction configuration



And this connect configuration



Let's use this socket configuration



Message Configuration - MQTT_MSGSW

X

Configuration Communication Tag

Path: THIS

[Browse...](#)

THIS

Broadcast:

Communication Method

CIP

DH+

Channel:

'A'

Destination Link:

0

CIP With
Source ID

Source Link:

0

Destination Node:

0 (Octal)

Connected

Cache Connections

Large Connection

Enable

Enable Waiting

Start

Done

Done Length: 4

Error Code:

Extended Error Code:

Timed Out

Error Path: THIS

Error Text:

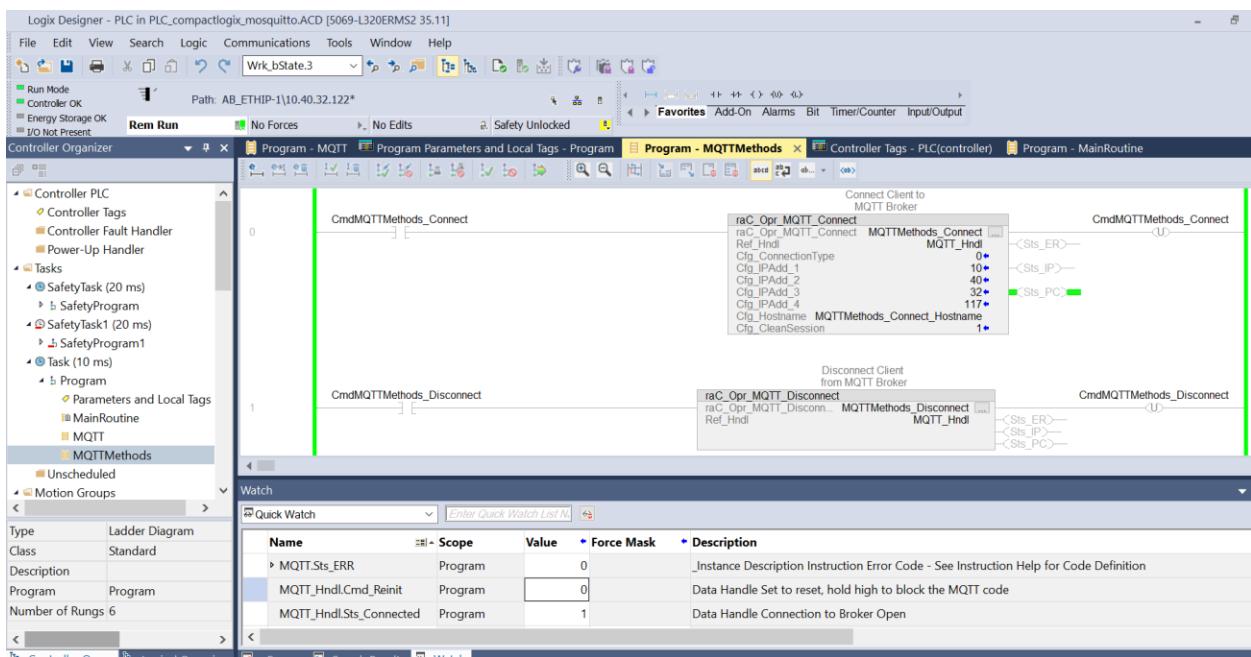
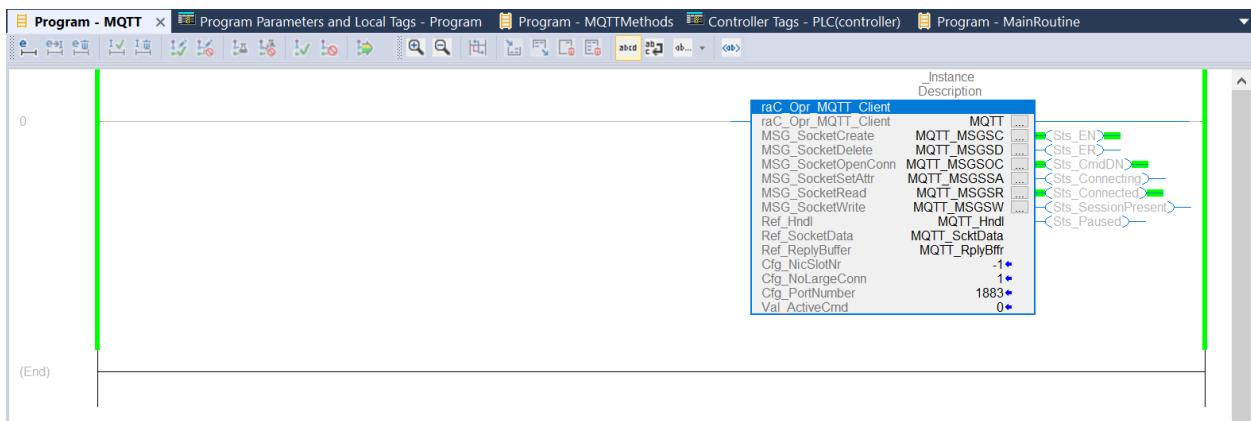
OK

Cancel

Apply

Help

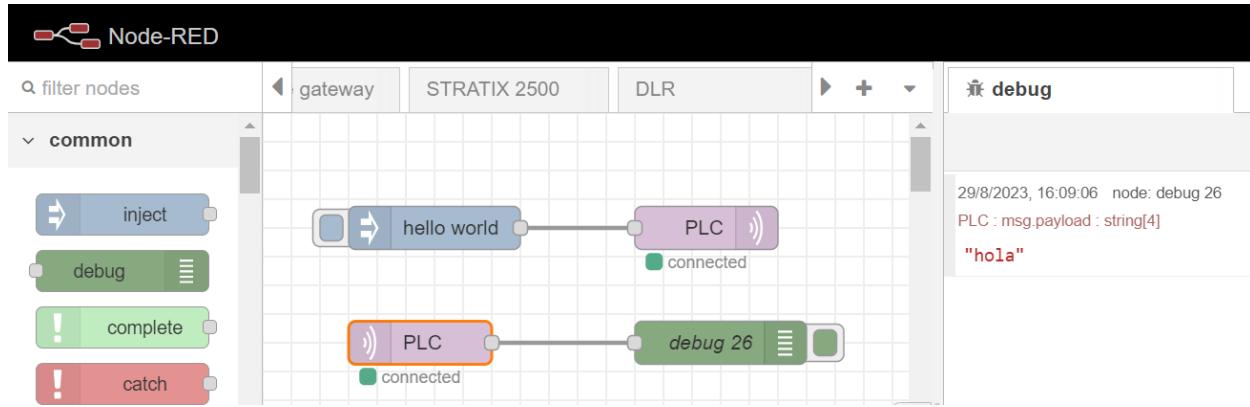
We are connected with no errors



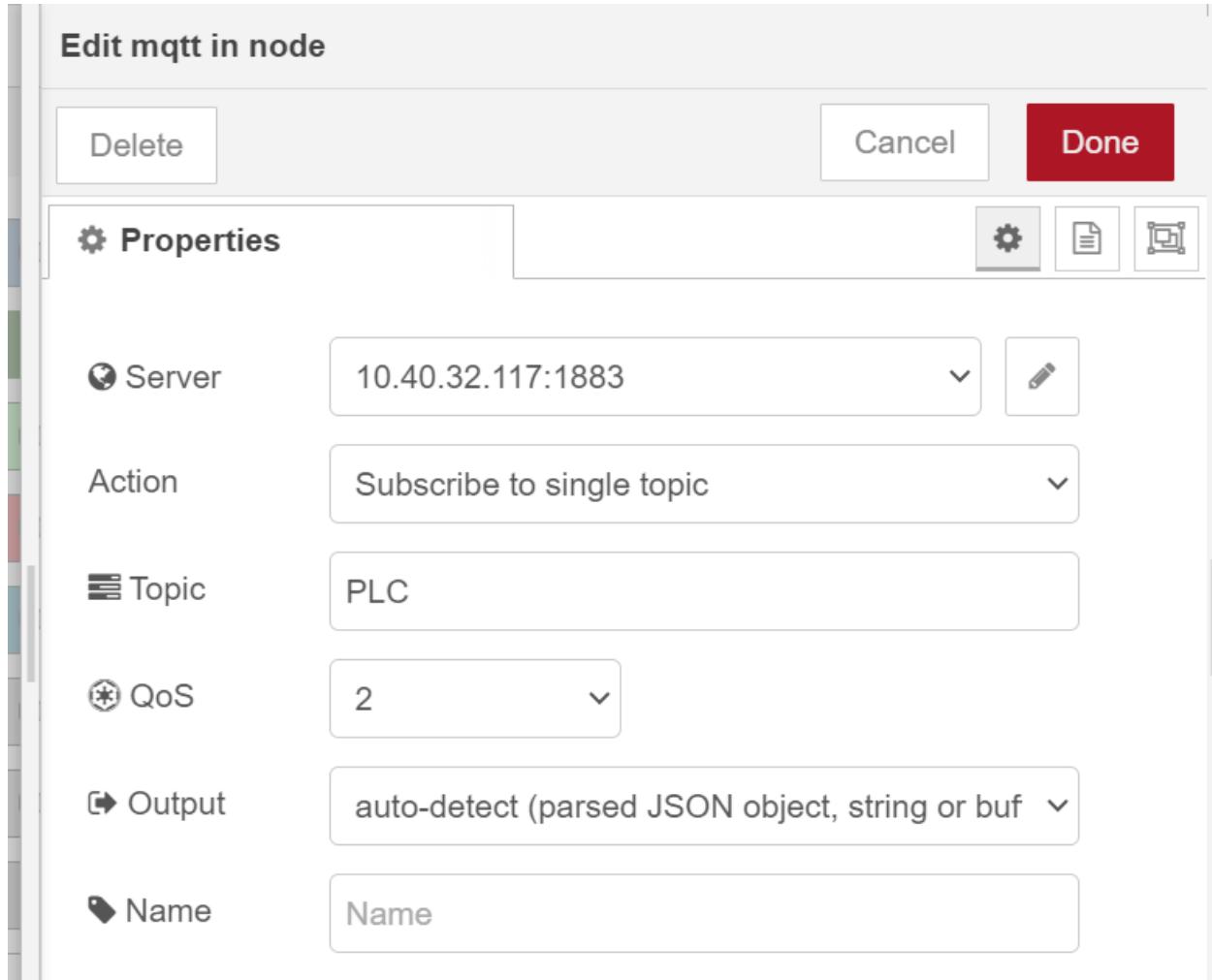
Let's use this publish configuration

Name	Usage	Value	Force Mask	Style	Data Type	Class	Description
MQTTMethods_Connect_Hostname	Local	'broker.hivemq.com'	{...}		STRING	Standard	
MQTTMethods_Disconnect	Local		{...}		raC_Opr_MQTT_Disconnect	Standard	Disconnect
MQTTMethods_Monitor	Local		{...}		raC_Opr_MQTT_Monitor	Standard	Monitor Topic
MQTTMethods_Monitor_Payload	Local	"	{...}		raC_STR_Opr_MQTT_Monitor_Payload	Standard	MQTT payload
MQTTMethods_Monitor_Topic	Local	"	{...}		STRING	Standard	
MQTTMethods_Publish	Local		{...}		raC_Opr_MQTT_Publish	Standard	Publish Topic
MQTTMethods_Publish_Payload	Local	'holo'	{...}		raC_STR_Opr_MQTT_Publish_Payload	Standard	MQTT payload
MQTTMethods_Publish_Topic	Local	'PLC'	{...}		STRING	Standard	
MQTTMethods_Subscribe	Local		{...}		raC_Opr_MQTT_Subscribe	Standard	Subscribe Topic
MQTTMethods_Subscribe_Topic	Local	"	{...}		STRING	Standard	

Let's toggle the publish bit



This is the MQTT node configuration

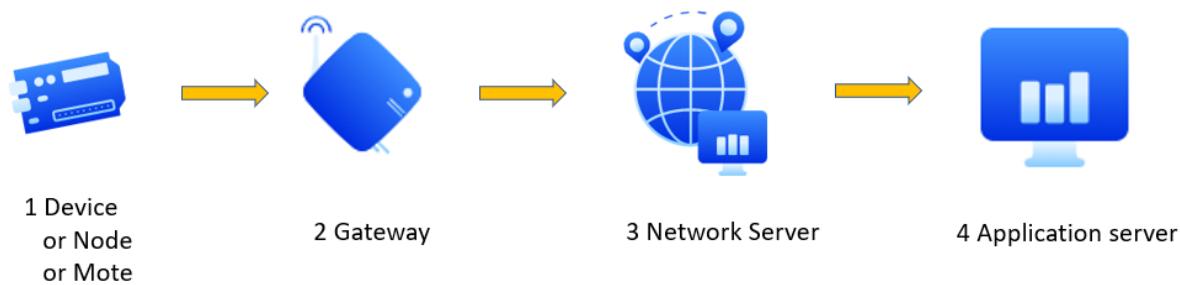


As you can see on this video

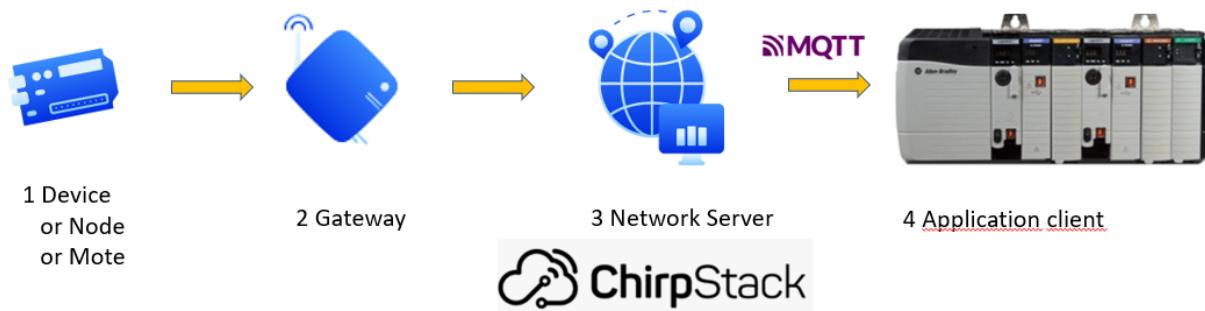
https://youtu.be/Y6_UtErWmb4

1.2. PLC as LoRaWAN sensors concentrator

Normally in LoRAWAN we have this architecture



But let's imagine this architecture



You can see the final result here

<https://youtu.be/dizwvWjFMbE>

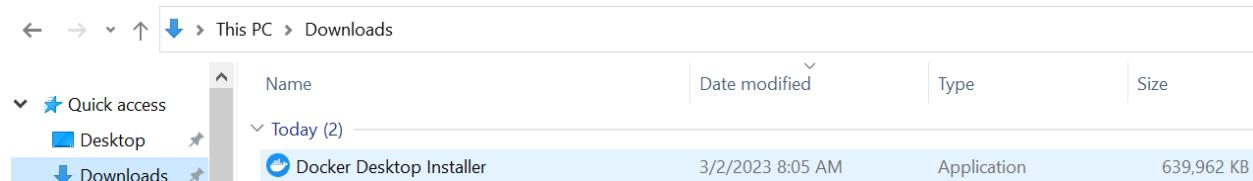
1.2.1. Installing Docker on Windows

These steps have been done using this guide:

<https://docs.docker.com/desktop/install/windows-install/>

Download the executable from this link and place on a known folder. For instance on downloads.

<https://desktop.docker.com/win/main/amd64/Docker%20Desktop%20Installer.exe>



Execute Docker desktop installer.

Then move to the known folder and execute this command on terminal window:

```
start /w "" "Docker Desktop Installer.exe" install
```

Probably you will be asked to install WSL Windows System Limux.

You can do it with this command on the terminal.

```
wsl --install
```

You will have this environment installed. Docker Desktop includes also Docker compose.

A screenshot of the Docker Desktop application. The left sidebar has icons for Containers, Images, Volumes, Dev Environments (Beta), Extensions, and Add Extensions. The main area is titled 'Containers' with a sub-section 'Run a Sample Container' featuring a blue cube icon and a 'Run a Sample Container' button. Below it is a command input field with 'docker run -d -p 80:80 docker/getting-started' and a copy icon. A link 'Explore more in the Docker Docs' is also present. At the bottom, there are sections for 'Guides' (Redis, NGINX) and system status (RAM 4.21 GB, CPU 47.30%, Not connected to Hub).

A screenshot of the Docker Desktop application showing the list of containers. The left sidebar is identical to the previous screenshot. The main area shows a table with columns: Name, Image, Status, Port(s), Started, and Actions. A search bar is at the top of the table. A checkbox 'Only show running containers' is checked. The table currently has no entries.

1.2.2. Installing Chirpstack

Next step is to download the Chirpstack docker image from this link:

<https://github.com/brocaar/chirpstack-docker.git>

The screenshot shows a GitHub repository page for the 'chirpstack-docker' project. The 'Code' tab is selected. The repository has 4 branches and 0 tags. The master branch is currently active. On the right side, there is a 'Clone' section with options for Local, Codespaces (New), HTTPS, SSH, and GitHub CLI. The HTTPS URL is displayed as <https://github.com/chirpstack/chirpstack-docker>. Below the clone options are links for 'Open with GitHub Desktop' and 'Download ZIP'. A yellow box highlights the 'Download ZIP' button.

Unzip the file on a known directory like for instance

C:\Users\xavier.florensa\Documents\Marketing\Products\LoRaWAN\Chirpstack\chirpstack-docker-master

Then use this command on such directory on terminal window

```
docker-compose up
```

You will get some messages like this

```
C:\Users\Risoul\Documents\Marketing\Products\LoRaWAN\Chirpstack\chirpstack-docker-master>docker-compose up
[+] Running 2/12
 - chirpstack Pulling
   - 548fcab5fe88 Waiting
   - 9fa8b4800116 Waiting
[+] Running 2/32e Waiting
 - chirpstack Pulling
   - 548fcab5fe88 Waiting
   - 9fa8b4800116 Waiting
[+] Running 2/32e Waiting
 - chirpstack Pulling
   - 548fcab5fe88 Waiting
   - 9fa8b4800116 Waiting
[+] Running 3/32e Waiting
 - chirpstack Pulling
   - 548fcab5fe88 Waiting
   - 9fa8b4800116 Waiting
[+] Running 4/32e Waiting
 - chirpstack Pulling
   - 548fcab5fe88 Waiting
   - 9fa8b4800116 Waiting
  2.4s
  0.1s
  0.1s
  0.1s
  0.1s
  2.5s
  0.2s
  0.2s
  0.2s
  0.2s
  2.6s
  0.3s
  0.3s
  0.3s
  0.3s
  0.3s
  2.7s
  0.4s
  0.4s
  0.4s
  0.4s
  0.4s
  2.8s
  0.5s
  0.5s
```

After some time you will see this on the terminal

```
chirpstack-docker-master-postgres-1 | running bootstrap script ... ok
chirpstack-docker-master-chirpstack-gateway-bridge-eu868-1 | time="2023-02-03T19:39:11.348579113Z" level=info msg="starting ChirpStack Gateway Bridge" docs="https://www.chirpstack.io/gateway-bridge/" version="0.0.0.1700"
chirpstack-docker-master-chirpstack-gateway-bridge-eu868-1 | time="2023-02-03T19:39:11.348735481Z" level=info msg="backend/semtechudp: starting gateway udp listener" addr="1675453151: New connection from 172.18.0.6:39970 on port 1883.
chirpstack-docker-master-mosquitto-1 | 1675453151: New client connected from 172.18.0.6:39970 as auto-83371C64-96EE-EB33-FE36-0BDF73FD2146 (p2, c1, k30).
chirpstack-docker-master-chirpstack-gateway-bridge-eu868-1 | time="2023-02-03T19:39:11.350567498Z" level=warning msg="[store]    memorystore wiped" module=mqtt
chirpstack-docker-master-chirpstack-gateway-bridge-eu868-1 | time="2023-02-03T19:39:11.35066326Z" level=info msg="integration/mqtt: connected to mqtt broker"
chirpstack-docker-master-postgres-1 | sh: locale: not found
chirpstack-docker-master-chirpstack-1 | 2023-02-03 19:39:11.690 UTC [31] WARNING: no usable system locales were found
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999523Z INFO chirpstack::cmd::root: Starting ChirpStack LoRaWAN Network Server version="4.2.0" docs="https://www.chirpstack.io/"
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999592Z INFO chirpstack::region: Setting up regions
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999630Z INFO setup{common_name=AS923 region_id=as923}: chirpstack::region: Configuring region
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999669Z INFO setup{common_name=AS923_2 region_id=as923_2}: chirpstack::region: Configuring region
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999685Z INFO setup{common_name=AS923_3 region_id=as923_3}: chirpstack::region: Configuring region
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999700Z INFO setup{common_name=AS923_4 region_id=as923_4}: chirpstack::region: Configuring region
chirpstack-docker-master-mosquitto-1 | 1675453152: New connection from 172.18.0.5:34636 on port 1883.
chirpstack-docker-master-chirpstack-1 | 2023-02-03T19:39:11.999741Z INFO setup{common_name=AU915 region_id=au915_0}: chirpstack::region: Configuring region
```

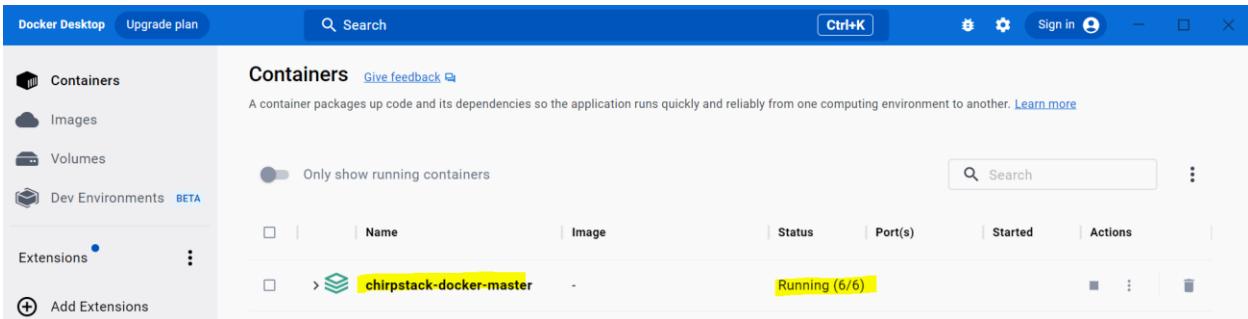
Then when it stops sending messages you are ready to use Chirpstack

```

1675453165: New client connected from 172.18.0.5:42306 as b7636d485dc725eb (p2, c0, k38).
2023-02-03T19:39:25.157001Z INFO chirpstack::gateway::backend::mqtt: Connected to MQTT broker region_config_id=us91
2023-02-03T19:39:25.157107Z INFO chirpstack::gateway::backend: Setting up gateway backend for region region_id=us91
1675453165: New connection from 172.18.0.5:42318 on port 1883.
2023-02-03T19:39:25.157202Z INFO chirpstack::gateway::backend::mqtt: Starting MQTT consumer loop
2023-02-03T19:39:25.157219Z INFO chirpstack::gateway::backend::mqtt: Subscribing to gateway event topic region_config_id=us91
2023-02-03T19:39:25.157356Z INFO chirpstack::gateway::backend::mqtt: Connecting to MQTT broker region_config_id=us91
1675453166: New client connected from 172.18.0.5:42318 as 91779cece6dd959 (p2, c0, k38).
2023-02-03T19:39:26.161721Z INFO chirpstack::gateway::backend::mqtt: Connected to MQTT broker region_config_id=us91
2023-02-03T19:39:26.161812Z INFO chirpstack::gateway::backend: Setting up gateway backend for region region_id=us91
1675453166: New connection from 172.18.0.5:42318 on port 1883.
2023-02-03T19:39:26.161842Z INFO chirpstack::gateway::backend::mqtt: Starting MQTT consumer loop
2023-02-03T19:39:26.161862Z INFO chirpstack::gateway::backend::mqtt: Subscribing to gateway event topic region_config_id=us91
2023-02-03T19:39:26.162349Z INFO chirpstack::gateway::backend::mqtt: Connecting to MQTT broker region_config_id=us91
1675453166: New client connected from 172.18.0.5:49546 as e14d44ecf300aaef (p2, c0, k38).
2023-02-03T19:39:27.165162Z INFO chirpstack::gateway::backend::mqtt: Connected to MQTT broker region_config_id=us91
2023-02-03T19:39:27.165292Z WARN chirpstack::backend::config: Config exists, but region is not enabled. To enable it, run 'chirpstack config enable'.
2023-02-03T19:39:27.165302Z WARN chirpstack::backend::config: Config exists, but region is not enabled. To enable it, run 'chirpstack config enable'.
2023-02-03T19:39:27.165304Z WARN chirpstack::backend::config: Config exists, but region is not enabled. To enable it, run 'chirpstack config enable'.
2023-02-03T19:39:27.165306Z WARN chirpstack::backend::config: Config exists, but region is not enabled. To enable it, run 'chirpstack config enable'.
2023-02-03T19:39:27.165308Z WARN chirpstack::backend::config: Config exists, but region is not enabled. To enable it, run 'chirpstack config enable'.
2023-02-03T19:39:27.165312Z INFO chirpstack::storage: Setting up Redis client
2023-02-03T19:39:27.165317Z INFO chirpstack::storage: Setting up PostgreSQL connection pool
2023-02-03T19:39:27.165344Z INFO chirpstack::gateway::backend::mqtt: Starting MQTT consumer loop
2023-02-03T19:39:27.165355Z INFO chirpstack::gateway::backend::mqtt: Subscribing to gateway event topic region_config_id=us91
2023-02-03T19:39:27.347663Z INFO chirpstack::storage: Applying schema migrations
2023-02-03T19:39:27.519101Z INFO chirpstack::downlink: Setting up Class-B/C scheduler loop
2023-02-03T19:39:27.519137Z INFO chirpstack::downlink: Setting up multicast scheduler loop
2023-02-03T19:39:27.519142Z INFO chirpstack::api: Setting up API interface bind=0.0.0.0:8080
2023-02-03T19:39:27.519306Z WARN chirpstack::api: Backend interfaces API is disabled
2023-02-03T19:40:07.071047Z INFO http[method='GET' uri=/ version=HTTP/1.1]: chirpstack::api: Finished processing request
2023-02-03T19:40:07.087653Z INFO http[method='GET' uri=/static/js/main.60b14769.js version=HTTP/1.1]: chirpstack::api: Finished processing request
2023-02-03T19:40:07.102730Z INFO http[method='GET' uri=/static/css/main.fc4b565.css version=HTTP/1.1]: chirpstack::api: Finished processing request
2023-02-03T19:40:07.250282Z INFO gRPC(uri=/api.TenantService/List): chirpstack::api: Finished processing request
2023-02-03T19:40:07.262308Z INFO gRPC(uri=/api.InternalService/Settings): chirpstack::api: Finished processing request
2023-02-03T19:40:07.262629Z INFO http[method='GET' uri=/icon.png version=HTTP/1.1]: chirpstack::api: Finished processing request
2023-02-03T19:40:07.264450Z INFO http[method='GET' uri=/icon.png version=HTTP/1.1]: chirpstack::api: Finished processing request

```

You will see this on Docker Desktop



If you open the item:

The screenshot shows the Docker Desktop interface. On the left, there's a sidebar with icons for Containers, Images, Volumes, and Dev Environments (BETA). Below that is an 'Extensions' section with a 'Add Extensions' button. The main area is titled 'Containers' with a 'Give feedback' link. It contains a brief description: 'A container packages up code and its dependencies so the application runs quickly and reliably from one computing environment to another.' Below this is a search bar and a 'Only show running containers' toggle. A table lists seven running containers:

	Name	Image	Status	Port(s)	Started	Actions
<input type="checkbox"/>	chirpstack-docker-master	-	Running (6/6)			... ⋮ ⋮
<input type="checkbox"/>	redis-1 cc53cffd3732	redis:7-alpine	Running		24 hours ago	... ⋮ ⋮
<input type="checkbox"/>	postgres-1 e93ffcc934239	postgres:14-alpine	Running		24 hours ago	... ⋮ ⋮
<input type="checkbox"/>	mosquitto-1 e2040f5ad392	eclipse-mosquitto:2	Running	1883:1883	24 hours ago	... ⋮ ⋮
<input type="checkbox"/>	chirpstack-1 2625e35e594f	chirpstack/chirpstack:4	Running	8080:8080	24 hours ago	... ⋮ ⋮
<input type="checkbox"/>	chirpstack-gateway-bridge-eu a61a598b94b5	chirpstack/chirpstack-gateway	Running	1700:1700 (UDP)	24 hours ago	... ⋮ ⋮
<input type="checkbox"/>	chirpstack-rest-api-1 2feba9effed75	chirpstack/chirpstack-rest-api	Running	8090:8090	24 hours ago	... ⋮ ⋮

Showing 7 items

You are ready to go!

1.2.3. Running Chirpstack

Just open your explorer with Localhost and port 8080

Username: admin

Password: admin

← → ⌛ 127.0.0.1:8080/#/login

Rockwell Node-RED : node-r... TTN Login TTN Login | Microsoft 365 Microsoft 365 Office

ChirpStack login

* Username / email:

* Password:

Submit

← → ⌛ 127.0.0.1:8080/#/dashboard

Rockwell Node-RED : node-r... TTN Login TTN Login | Microsoft 365 Microsoft 365 Office

ChirpStack Search... ? admin

ChirpStack ▼

Network Server / Dashboard

Dashboard

Active devices Active gateways Device data-rate usage

No Data No Data No Data

Tenants Users API keys Device-profile templates Regions

Tenant Gateway map

1.2.4. Setting up your LoRAWAN Gateway

Let's try the LPS8 Dragino LoRaWAN Gateway

This was de TTN eui

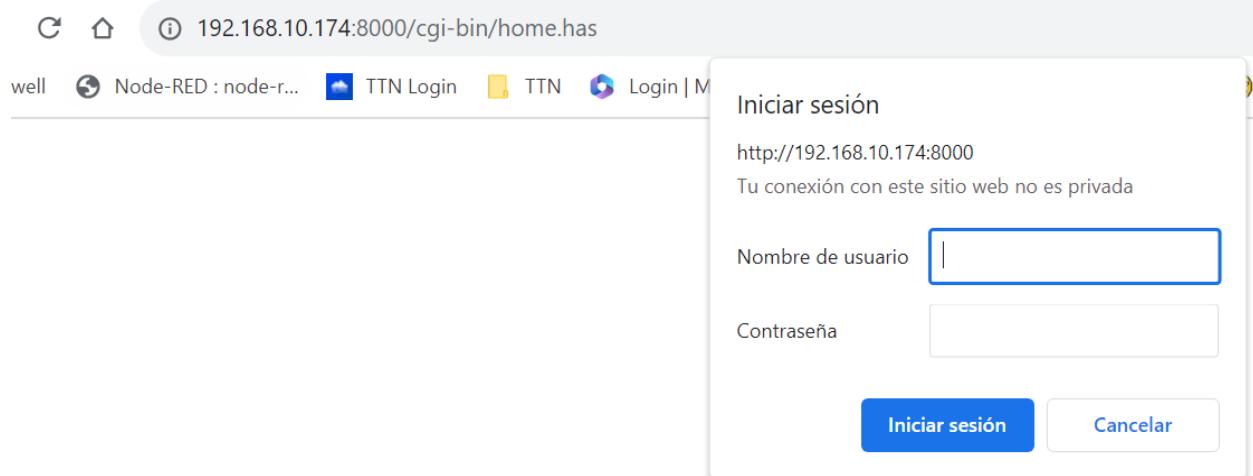
A8404120CF6C4150

Let's connect to a router

3	dragino-20cf6c Wired	192.168.10.174 A8:40:41:20:CF:6E	↑ 0.33 Kbps ↓ 0.22 Kbps	---	00:05:09		
---	-------------------------	-------------------------------------	----------------------------	-----	----------	--	--

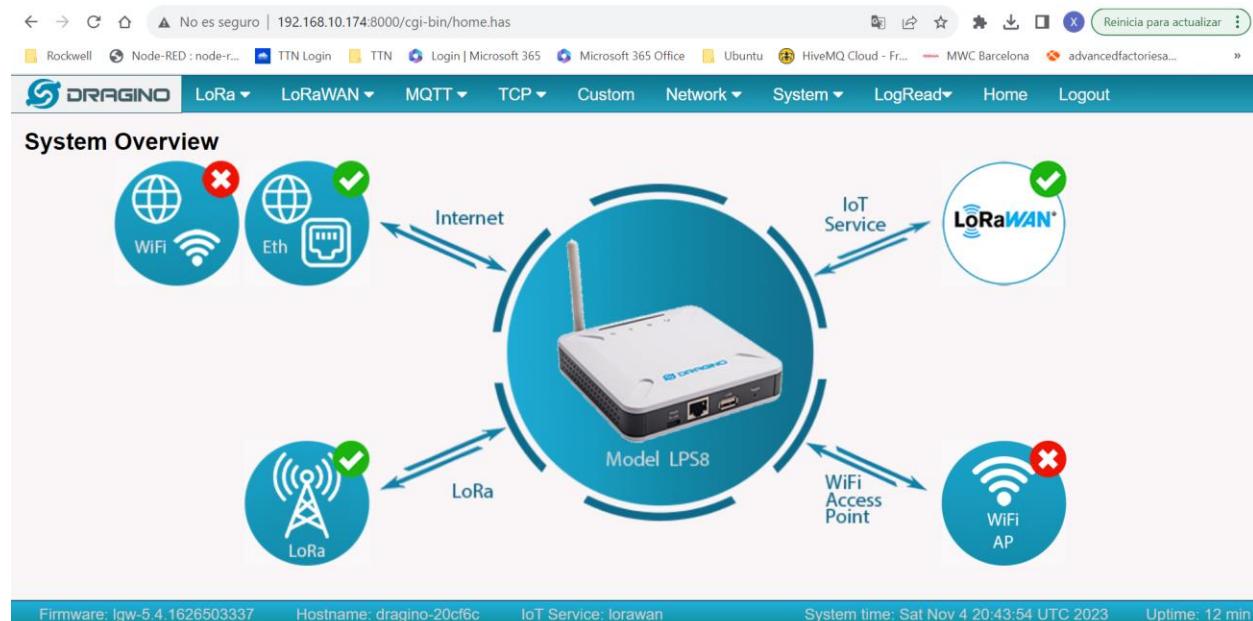
Let's enter the web server on port 8000

<http://192.168.10.174:8000>



root

dragino



Modify accordingly

DRAGINO LoRa ▾ LoRaWAN ▾ MQTT ▾ TCP ▾ Custom Network ▾ System ▾ LogRe

LoRaWAN Configuration

General Settings

Email	farmaciaflorensa@gmail.com
Gateway ID	a8404120cf6c4150

Primary LoRaWAN Server

Service Provider	Custom / Private LoRaWAN	Server Address	192.168.10.105
Uplink Port	1700	Downlink Port	1700

Packet Filter

Fport Filter ?	0	DevAddr Filter ?	0
----------------	---	------------------	---

Current Mode: LoRaWAN Semtech UDP

[Save&Apply](#) [Cancel](#)

Note the gateway id

a8404120cf6c4150

Now go to Chirpstack network server

The screenshot shows the ChirpStack interface with the following details:

- Header:** localhost:8080/#/tenants/52f14cd4-c6f1-4fb1-8f87-4025e1d49242/gateways
- Top Bar:** Reinicia para actualizar, admin
- Left Sidebar:**
 - ChirpStack
 - Network Server
 - Dashboard
 - Tenants
 - Users
 - API Keys
 - Device Profile Templates
 - Regions
 - Tenant
 - Dashboard
 - Users
- Central Content:**
 - Tenants / ChirpStack / Gateways
 - Gateways** table header: Last seen, Gateway ID, Name, Region ID, Region common-name.
 - The table body displays "No data" with a small icon.
 - Buttons: Add gateway, Selected gateways.

Add a new gateway

localhost:8080/#/tenants/52f14cd4-c6f1-4fb7-8f87-4025e1d49242/gateways/create

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ChirpStack

Search... ? admin

ChirpStack

Network Server

- Dashboard
- Tenants
- Users
- API Keys
- Device Profile Templates
- Regions

Tenant

- Dashboard

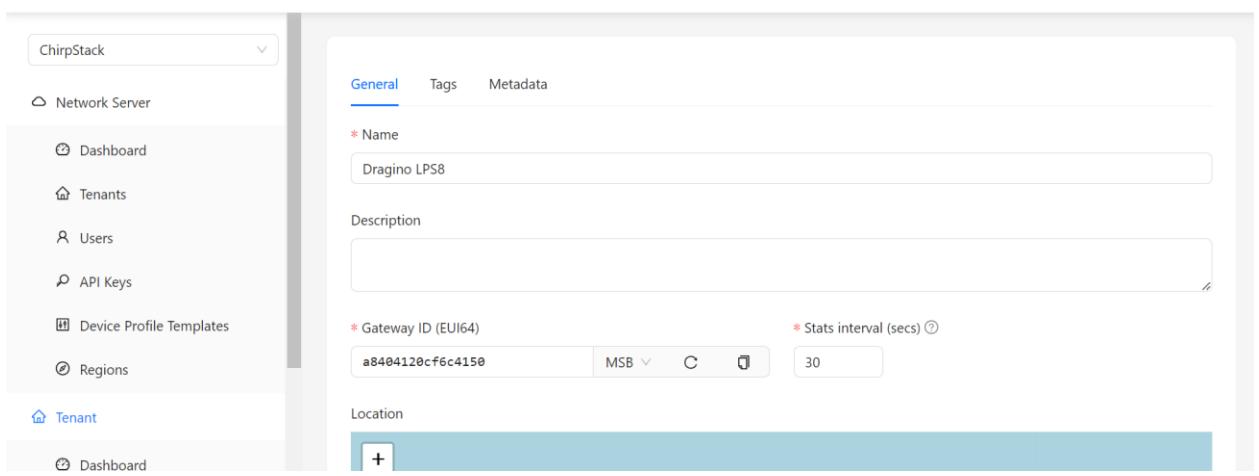
General Tags Metadata

* Name Dragino LPS8

Description

* Gateway ID (EUI64) a8404120cf6c4150 Stats interval (secs) 30

Location +



Submit

localhost:8080/#/dashboard

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Reinicia para actualizar admin

ChirpStack

Search... ? admin

ChirpStack

Network Server / Dashboard

Dashboard

Active devices No data

Active gateways



Never seen Offline
Online

Device data-rate usage



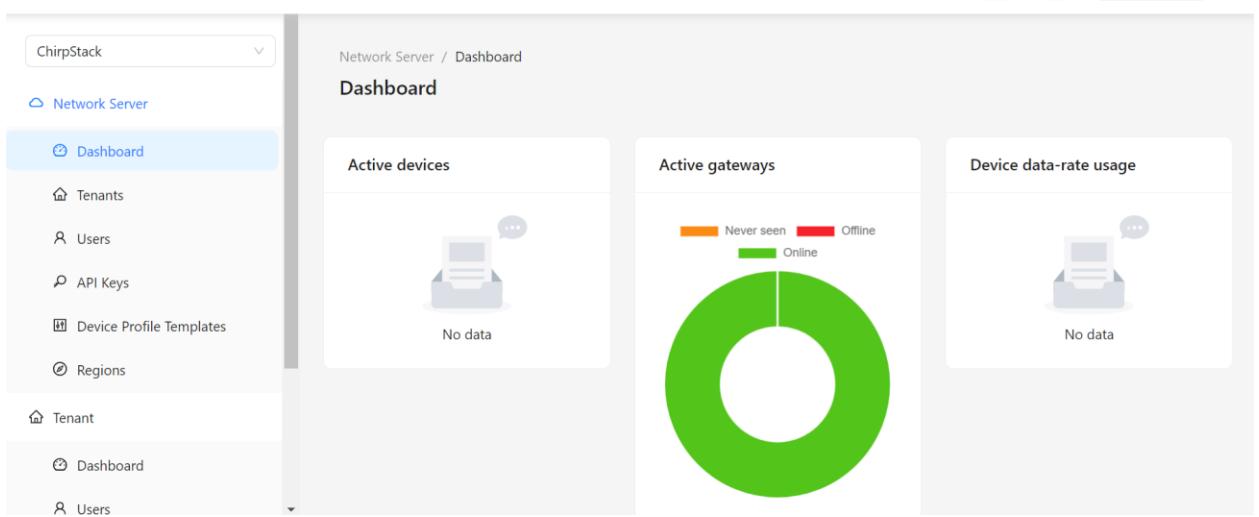
No data

Network Server

- Dashboard
- Tenants
- Users
- API Keys
- Device Profile Templates
- Regions

Tenant

- Dashboard
- Users



The screenshot shows the ChirpStack web interface at localhost:8080/#/tenants/52f14cd4-c6f1-4fb8-8f87-4025e1d49242/gateways. The left sidebar has 'Gateways' selected. The main area is titled 'Tenants / ChirpStack / Gateways' and shows a table for 'Gateways'. One row is visible:

	Last seen	Gateway ID	Name	Region ID	Region common-name
<input type="checkbox"/>	● Online 2023-11-04 21:52:39	a8404120cf6c4150	Dragino LPS8	eu868	EU868

Pagination controls show page 1 of 10.

1.2.5. Setting up a LoRaWAN sensor

Now let's declare a LORAWAN sensor,

First let's create a Device profile

The screenshot shows the ChirpStack web interface at localhost:8080/#/tenants/52f14cd4-c6f1-4fb8-8f87-4025e1d49242/device-profiles. The left sidebar has 'Device Profiles' selected. The main area is titled 'Tenants / ChirpStack / Device profiles' and shows a table for 'Device profiles'. The table is currently empty, displaying 'No data'.

Name	Region	MAC version	Revision	Supports OTAA	Supports Class-B	Supports Class-C
No data						

The screenshot shows the ChirpStack Device Profiles creation interface. On the left, a sidebar lists various management options like Users, API Keys, Device Profile Templates, Regions, Tenant, Dashboard, Users, API Keys, Device Profiles (which is selected and highlighted in blue), Gateways, and Applications. The main content area is titled 'Add device profile' and shows a 'General' tab selected. It has fields for 'Name' (containing 'Device profile') and 'Description'. A 'Region' dropdown is present, with a note 'Region configuration' and a 'Region configuration' link. A 'Select device-profile template' button is also visible.

The screenshot shows the ChirpStack Device Profiles list interface. The sidebar is identical to the previous screenshot. The main content area is titled 'Device profiles' and displays a table with one row. The table columns are Name, Region, MAC version, Revision, Supports OTAA, Supports Class-B, and Supports Class-C. The single entry is 'Device profile' with values EU868, LoRaWAN 1.0.3, A, yes, no, and yes respectively. Navigation controls like a page number (1) and a '10 / page' dropdown are at the bottom right of the table.

Now let's declare a LoRaWAN sensor like the LIDAR distance sensor from Dragino



First, create an application

localhost:8080/#/tenants/52f14cd4-c6f1-4fb1-8f87-4025e1d49242/applications/create

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ChirpStack

Search... ? admin

Add application

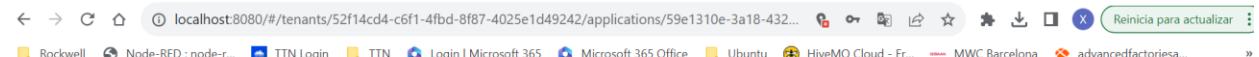
Name: LLDS12_lidar_distance_sensor

Description: LLDS12_lidar_distance_sensor

Submit

Users API Keys Device Profile Templates Regions Tenant Dashboard Users API Keys Device Profiles Gateways Applications

Add device



ChirpStack

Tenants / ChirpStack / Applications / LLDS12_lidar_distance_sensor

LLDS12_lidar_distance_sensor application id: 59e1310e-3a18-4324-9e2a-63fcfb6b70db

Delete application

Devices Multicast groups Relays Application configuration Integrations

Add device Selected devices

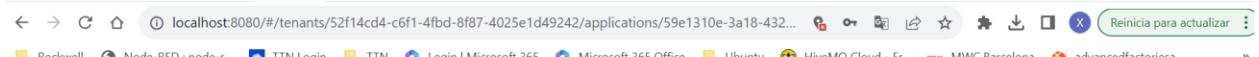
Last seen	DevEUI	Name	Device profile	Battery
No data				

Reinicia para actualizar

Search...

admin

Users API Keys Device Profile Templates Regions Tenant Applications



ChirpStack

Tenants / ChirpStack / Applications / LLDS12_lidar_distance_sensor / Add device

Add device

Device Tags Variables

* Name
LLDS12

Description

* Device EUI (EUI64)
A840413671834210 MSB C

Join EUI (EUI64) 40000000000101 MSB C

Reinicia para actualizar

Search...

admin

Users API Keys Device Profile Templates Regions Tenant Applications

Device created

The screenshot shows the ChirpStack application management interface. On the left, a sidebar lists various sections: Users, API Keys, Device Profile Templates, Regions, Tenant (Dashboard, Users, API Keys, Device Profiles, Gateways), and Applications (selected). The main content area displays device details for LLDS12, including its device eui: a840413671834210. It shows the Dashboard tab selected, with information like Last seen: Never, Device profile: Device profile, and Enabled: yes. Below this are sections for Link metrics (Received, RSSI, SNR) and Device metrics. A red "Delete device" button is located in the top right corner.

Device activated

The screenshot shows the ChirpStack activation configuration interface for device LLDS12. The sidebar is identical to the previous screenshot. The main content area shows the Activation tab selected. It requires entering the Device address (012af23a) and Network session key (LoRaWAN 1.0) (1f0f2681aa36fd211bb606191639ce55). The Application session key (LoRaWAN 1.0) field contains b5baf104c6152b48b681ce90a9c5448c. Below these fields are Uplink frame-counter (1) and Downlink frame-counter (1) input fields. A red "Delete device" button is also present in the top right.

LoRaWAN frames

The screenshot shows the ChirpStack web interface for managing a LoRaWAN gateway. The left sidebar has sections for Tenant (Dashboard, Users, API Keys, Device Profiles, Gateways, Applications), and the Applications section is currently selected. The main content area shows a list of received LoRaWAN frames for device LLDS12. The frames are listed by timestamp: 2023-11-04 22:09:57 (UnconfirmedDataDown), 2023-11-04 22:09:55 (UnconfirmedDataUp), 2023-11-04 22:09:46 (JoinAccept), and 2023-11-04 22:09:45 (JoinRequest). Each frame entry includes DevAddr, DevEUI, and Gateway ID details. A red 'Delete device' button is visible in the top right of the main content area.

Let's change the uplink period

Payload decoder

By default this is the payload decoder

```
// Decode uplink function.

//
// Input is an object with the following fields:
// - bytes = Byte array containing the uplink payload, e.g. [255, 230, 255, 0]
// - fPort = Uplink fPort.
// - variables = Object containing the configured device variables.
//
// Output must be an object with the following fields:
// - data = Object representing the decoded payload.

function decodeUplink(input) {
    return {
        data: {
            temp: 22.5
        }
    };
}
```

```

}

// Encode downlink function.

//
// Input is an object with the following fields:
// - data = Object representing the payload that must be encoded.
// - variables = Object containing the configured device variables.
//
// Output must be an object with the following fields:
// - bytes = Byte array containing the downlink payload.

function encodeDownlink(input) {
  return {
    bytes: [225, 230, 255, 0]
  };
}

```

Let's change to the one suggested by the manufacturer

<https://github.com/dragino/dragino-end-node-decoder/commit/02c77119fe29b7e4eb150943b558e12d9866a0f5>

Let's try with this other sensor

LDDs75 ultrasonic distance sensor

Dev EUI A84041259182C93F

Join EUI A000000000000101

App Key AEA21A2A59555935A69DCF883B766B4C

Let's declare on Chirpstack

Use the payload given by manufacturer

Payload: frm_payload:"0cff028200000001"

Go to events



Search... ?

admin

Users

API Keys

Device Profile Templates

Regions

Tenant

Dashboard

Users

API Keys

Device Profiles

Gateways

Tenants / ChirpStack / Applications / ldds75 / Devices / ldds75

llds75 device eui: a84041259182c93f

Delete device

Dashboard Configuration OTAA keys Activation Queue

Events LoRaWAN frames

2023-11-05 08:40:35

Q up

DR: 5 Data: 0ce9027b00000001 FCnt: 181 FPort: 2

2023-11-05 08:40:21

Q up

DR: 5 Data: 0ce9027c00000001 FCnt: 180 FPort: 2

2023-11-05 08:40:18

Q up

DR: 5 Data: 0ce9027c00000001 FCnt: 180 FPort: 2

data. Dataserializer

object: {} 5 keys

TempC_DS18B20: "0.00 °C"

Interrupt_flag: 0

Sensor_flag: 1

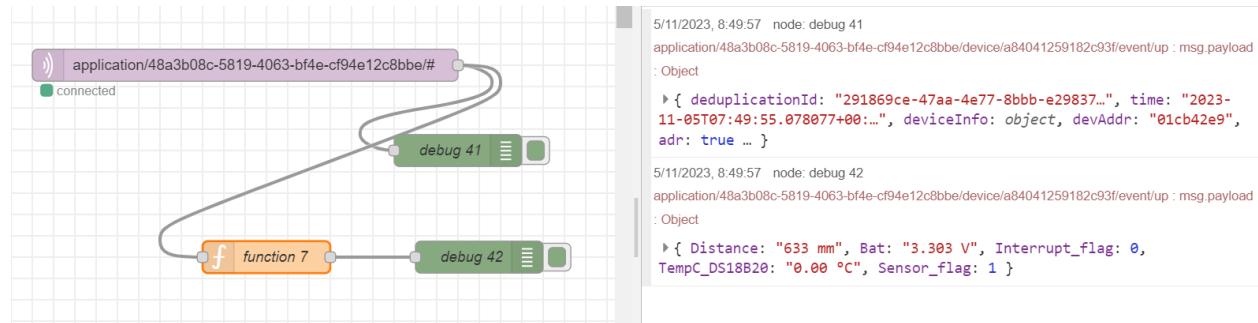
Distance: "635 mm"

Bat: "3.307 V"

rxInfo: [] 1 item

Let's get the data thru MQTT with node-red

Integration



Edit mqtt in node

Delete Cancel Done

Properties

Server	127.0.0.1:1883	
Action	Subscribe to single topic	
Topic	application/48a3b08c-5819-4063-bf4e-cf94e12c8bbe/#	
QoS	2	
Output	auto-detect (parsed JSON object, string or buffer)	
Name	Name	

Edit function node

Delete Cancel Done

Properties

Name	function 7	
------	------------	--

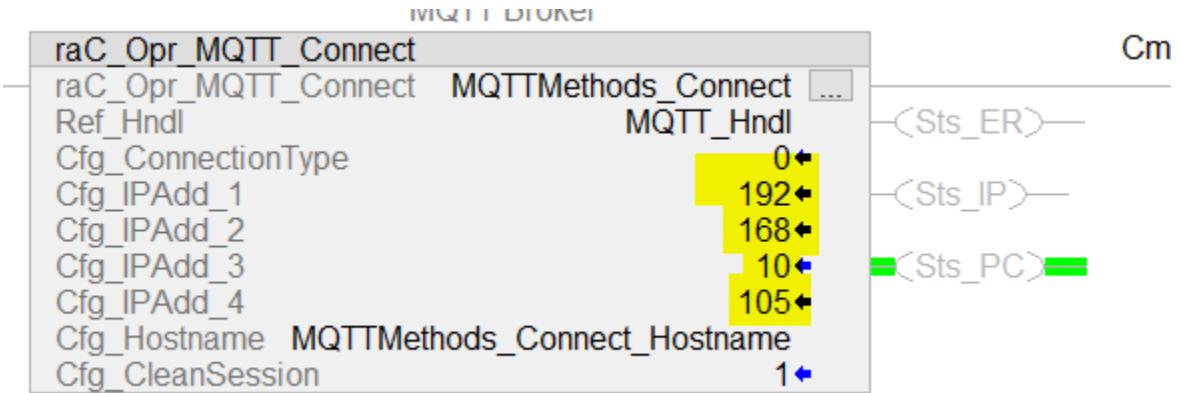
Setup **On Start** **On Message** **On Stop**

```
1 msg.payload=msg.payload.object;
2 return msg;
```

1.2.6. Setting up PLC to subscribe to Chirpstack

Let's try to subscribe from our PLC

Use this configuration



Subscribe topic

'application/48a3b08c-5819-4063-bf4e-cf94e12c8bbe/device/a84041259182c93f/event/up'

Program Parameters and Local Tags - Program		Program - MQTT	Program - MQTTMethods	Controller Tags - PLC(controller)
Scope:	Program	Show:	All Tags	Enter Name Filter...
Name		Value		
> MQTT_Hndl.Cfg_WillQos		0		
MQTT_Hndl.Cfg_WillRetain		0		
MQTT_Hndl.Cfg_CleanSession		1		
> MQTT_Hndl.Cfg_UserName		" "		
> MQTT_Hndl.Cfg_Password		" "		
MQTT_Hndl.Cmd_Connect		0		
MQTT_Hndl.Cmd_Disconnect		0		
MQTT_Hndl.Cmd_Reinit		0		
> MQTT_Hndl.Cmd_CPT		0		
MQTT_Hndl.Set_Topic		'application/48a3b08c-5819-4063-bf4e-cf94e12c8bbe/#'		

Watch		
Scope:	Quick Watch	Enter Quick Watch List Name
Name	Sco	Value
> MQTTMethods_Subscribe_Topic.DATA	Pr...	{...}
MQTT_Hndl.Cfg_IPAddress	Pr...	{...}
MQTTMethods_Monitor_Payload.DATA	Pr...	{"deduplicationId": "0cb40ccf-c4d6-4062-a6eb-c990e5c64093", "time": "2023-11-05T08:54:52.388673+00:00", "deviceInfo": {"tenantId": "...", "deviceName": "...", "ipAddress": "..."}, "topic": "application/48a3b08c-5819-4063-bf4e-cf94e12c8bbe/device/a84041259182c93f/event/up"}
MQTT_RplyBffr.Buffer[0].Topic	Pr...	'application/48a3b08c-5819-4063-bf4e-cf94e12c8bbe/device/a84041259182c93f/event/up'
MQTT_RplyBffr.Buffer[0].Payload	Pr...	{"deduplicationId": "ba58f9b0-eca7-4c41-b04d-e9494b8b8e7e", "time": "2023-11-05T08:58:12.385894+00:00", "deviceInfo": {"tenantId": "...", "deviceName": "...", "ipAddress": "..."}, "topic": "application/48a3b08c-5819-4063-bf4e-cf94e12c8bbe/device/a84041259182c93f/event/up"}

It works!!

```
{"deduplicationId":"ba58f9b0-eca7-4c41-b04d-e9494b8b8e7e","time":"2023-11-05T08:58:12.385894+00:00","deviceInfo":{"tenantId":"52f14cd4-c6f1-4fb8-8f87-4025e1d49242","tenantName":"ChirpStack","applicationId":"48a3b08c-5819-4063-bf4e-cf94e12c8bbe","applicationName":"Idds75","deviceProfileId":"4c3123d0-b5ee-46f0-961c-e57bc02b14e9","deviceProfileName":"Device profile 3","deviceName":"Idss75","devEui":"a84041259182c93f","deviceClassEnabled":"CLASS_A","tags":{},"devAddr":"01eb07ce","adr":true,"dr":5,"fCnt":37,"fPort":2,"confirmed":false,"data":"DOACpAAAAAE=","object":{"Bat":3.296,"Distance":676,"TempC":18,"B20":0.00,"C2B0C":0.0,"Sensor_flag":1.0,"Interrupt_flag":0.0}, "rxInfo":[{"gatewayId":"a8404120cf6c4150","uplinkId":42075,"time":"2023-11-05T08:58:12.385894+00:00","rssi":-91,"snr":7.0,"channel":2,"rfChain":1,"location":{},"context":{"HSxiw==},"metadata":{"region_config_id":"eu868","region_common_name":"EU868"},"crcStatus":"CRC_OK"}],"txInfo":{"frequency":868500000,"modulation":{"lora":{"bandwidth":125000,"spreadingFactor":7,"codeRate":"CR_4_5"}}}}
```

As you can see here

<https://youtu.be/dizvvWjFMbE>