MQTT Instruction Manual for FBox

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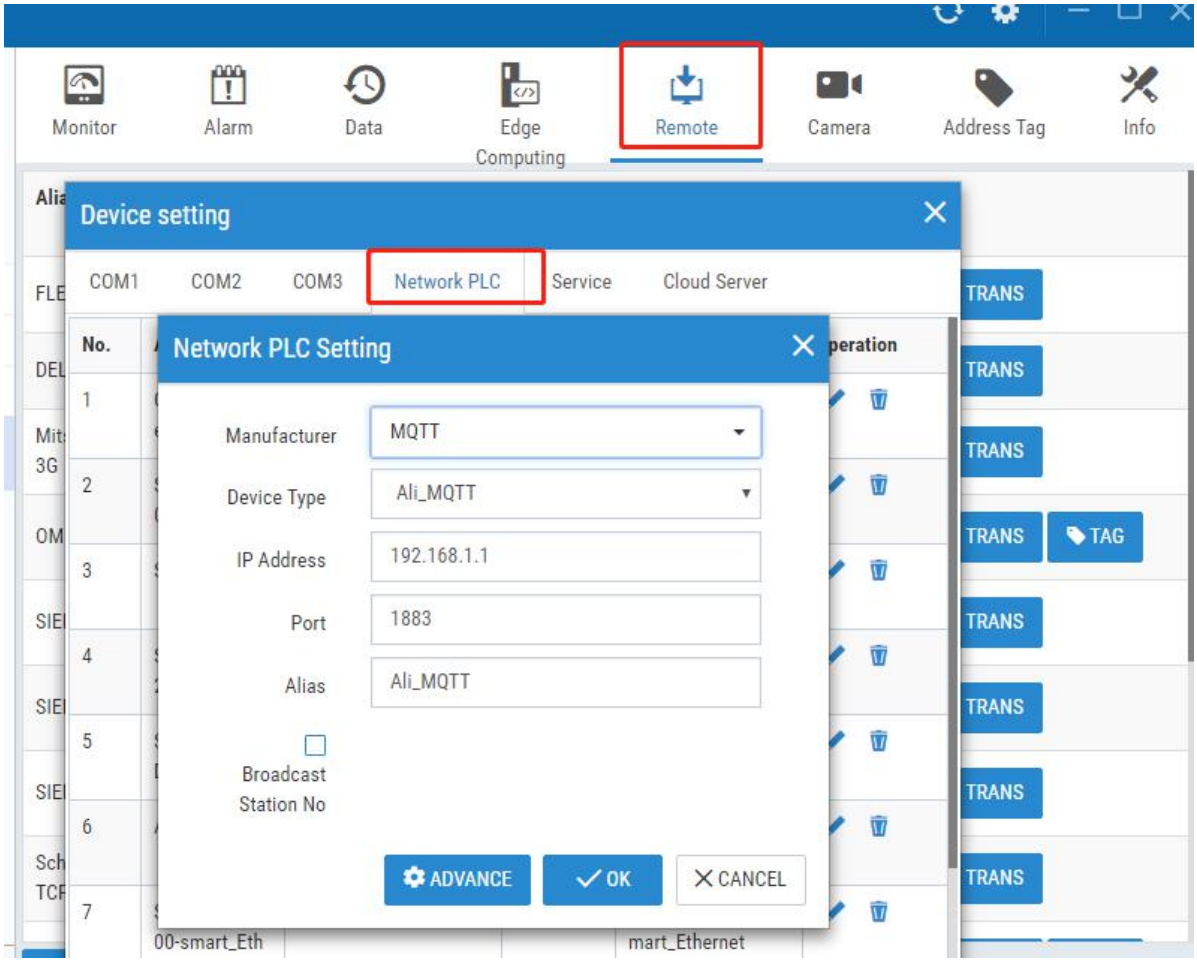
1.Configure cloud services

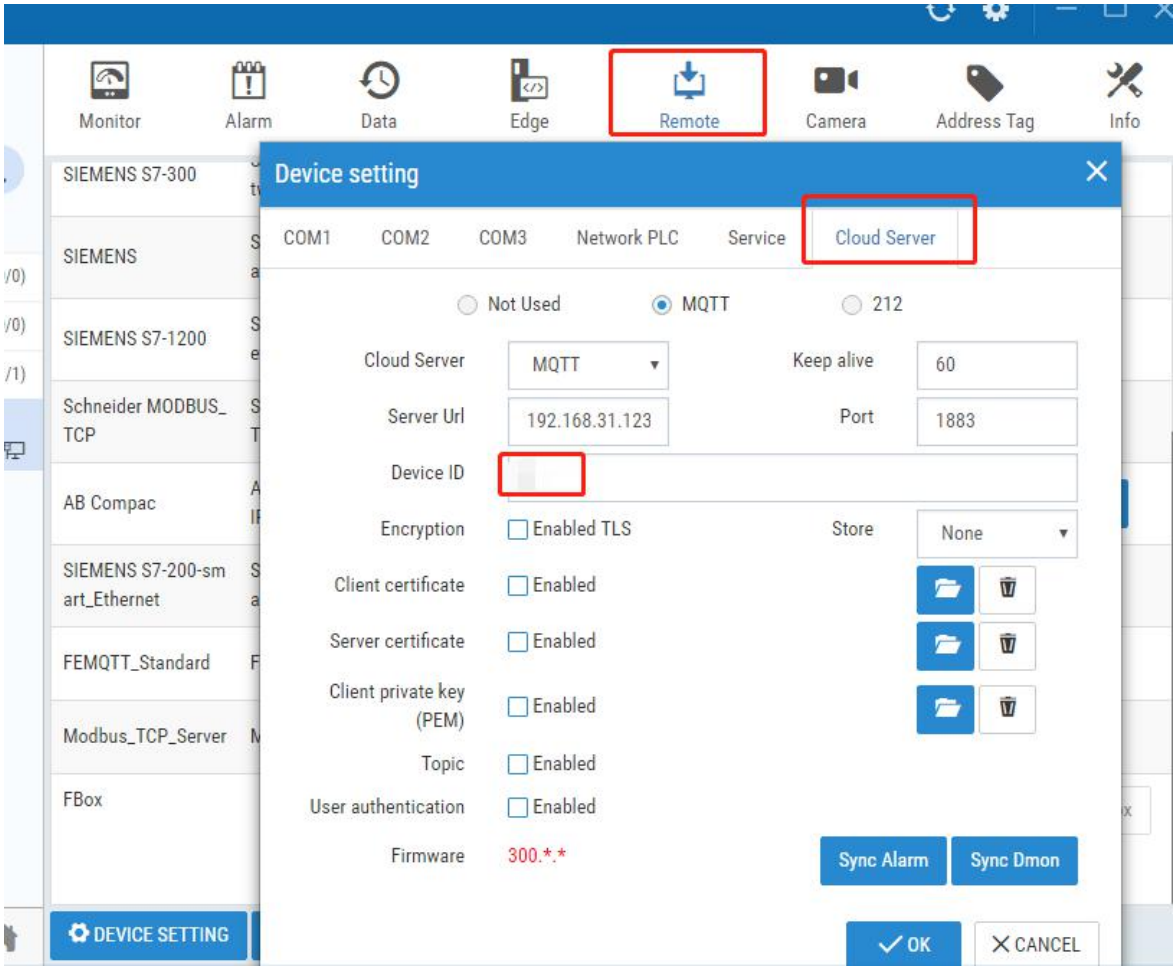
Fbox: a gateway

1. Create an MQTT connection device in FlexManager by the step:'Remote-->DEVICE SETTING—>Network PLC'



In the device added here, the IP address and port are ignored, and the IP address (service address) and port number are set in the next configuration cloud service.

2. Then configure the server address, port number, device ID, login user name and password that push by the MQTT : Remote --> DEVICE SETTING--> Cloud Server



Cloud Server： FLEXEM MQTT is an designated MQTT service protocol

Keep alive： Heartbeat package time, unit: second

Sever Url： Server address pushed by MQTT

Device ID： The device ID used to specify the box (such as the box serial number, or a user-defined ID)

Encryption： Enable encryption, support box and MQTT server to communicate using TLS (SSL)

Store： Allows the push message to be cached to the SD card or U-disk while the MQTT is offline. If no cache is required, select 'None'.

Client certificate： The client certificate can be enabled if TLS encryption is enabled. The certificate is for the box

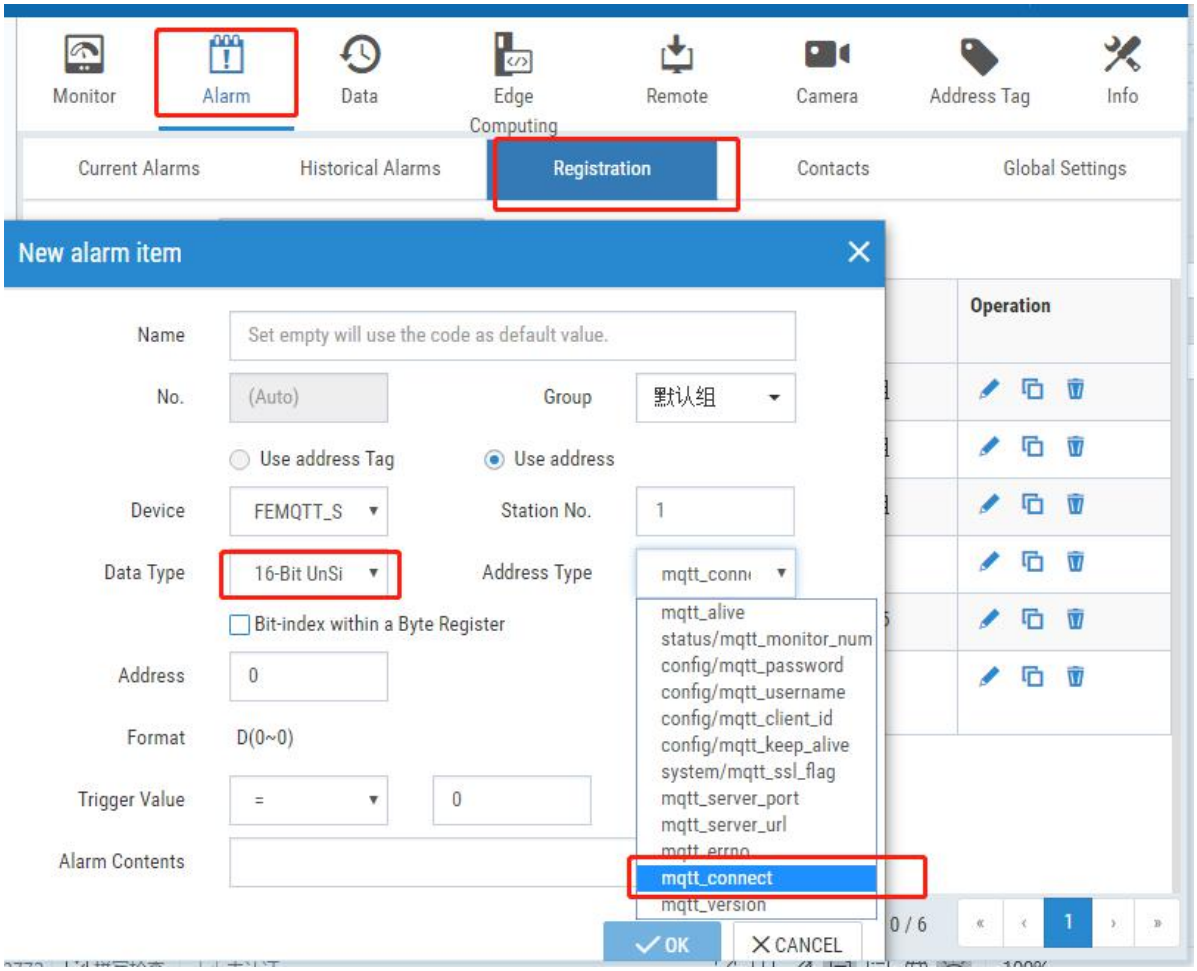
Sever certificate： The server certificate can be enabled if TLS encryption is enabled. This certificate is used by the MQTT server. Enable this if the box requires two-way encryption, otherwise it does not need to be enabled

Topic ： Support for custom topic prefixes. If not customized, this prefix is used by default: Topic/flexem/fbox/.

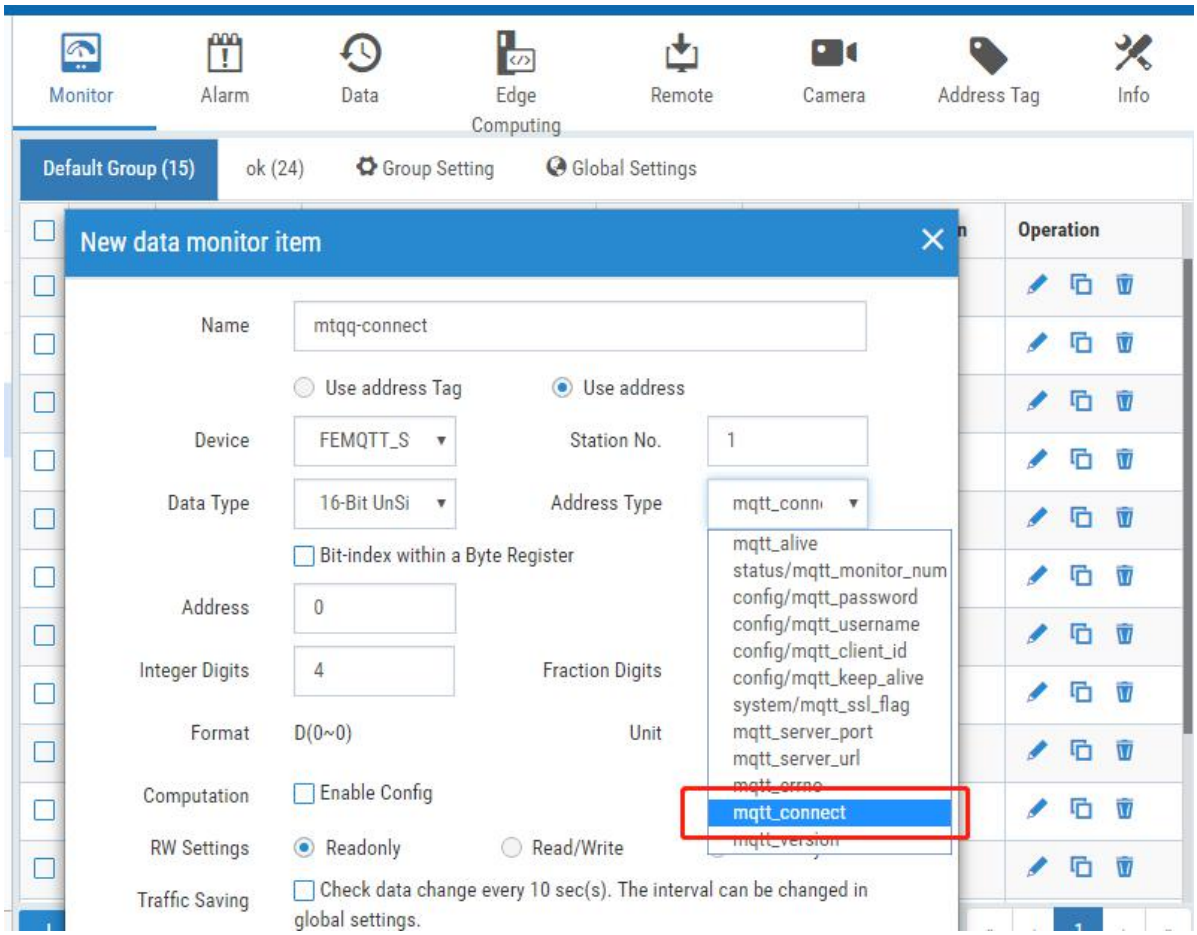
Take the box serial number 222218030009 as an example. The topic of the restart is: Topic/flexem/fbox/222218030009/system/Reboot. If the custom prefix is: office/room1/, the restart topic is: office/room1/222218030009/system /Reboot

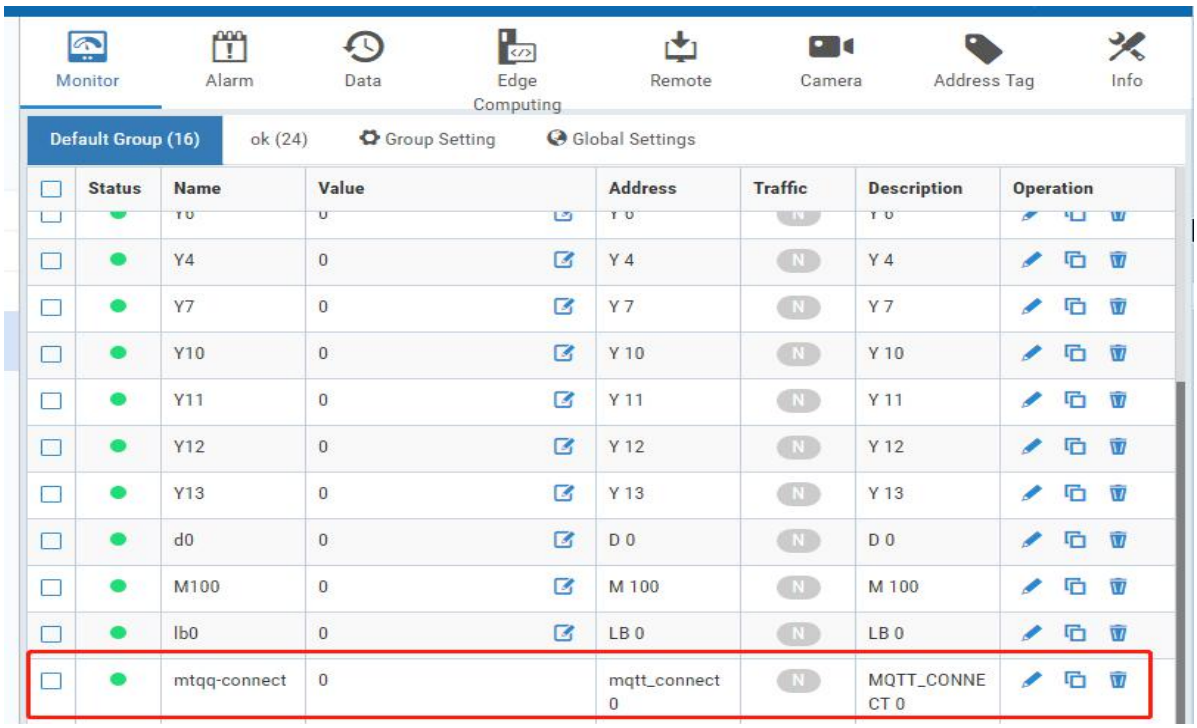
Note: Custom topic must end with "/". If there is / before the custom topic, the subscription topic is also added with the corresponding /.

User autherticcation：The user information verification required for the box to log in to the MQTT server.
Sync Alarm, Sync Dmon： If you are using the MQTT service for the first time, after adding a monitoring items or alarm entry, you need to click “Sync Alarm” or “Sync Don” to make the added item push MQTT take effect; if it is not the first time you need to click “Sync Alarm” or “Sync Dmon” After that, restart the device to make the added entry push MQTT take effect. If you do not want to use an alarm, then no need to set synchronize alarms.
Note：
When FBox uses MQTT to push data, it needs to reference any variable of mqtt address in the alarm record (for example, mqtt-connect). After setting the alarm entry, you need to click the sync alarm point in the cloud service configuration window. As shown below.



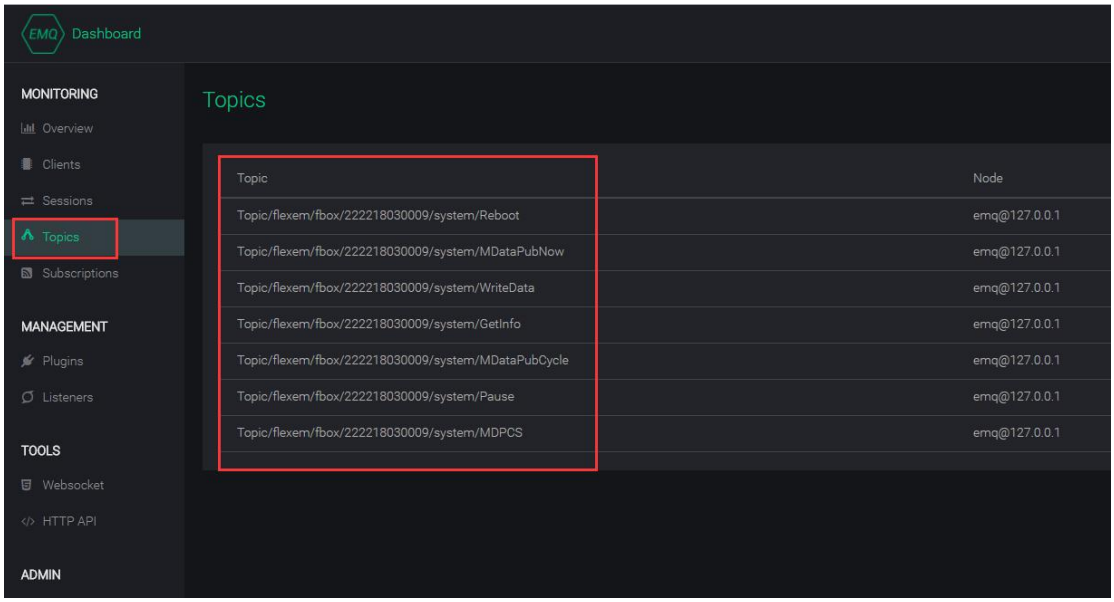
3. Verify that the MQTT server is connected to the client or not. Add a monitoring point with the address type "mqtt_connect" in the data monitoring. When the value is 1, it means connectivity. If the value is 0, it means there is no connectivity. You need to check if the first two configuration of the steps is correct or not.


Monitor
Alarm
Data
Edge Computing
Remote
Camera
Address Tag
Info
Default Group (15)
ok (24)
Group Setting
Global Settings
Operation
New data monitor item
Name
mtqq-connect
Use address Tag
Use address
Device
FEMQTT_S
Station No.
1
Data Type
16-Bit UnSi
Address Type
mqtt_conn
Bit-index within a Byte Register
Address
0
Integer Digits
4
Fraction Digits
Format
D(0~0)
Unit
Computation
Enable Config
RW Settings
Readonly
Read/Write
Traffic Saving
Check data change every 10 sec(s). The interval can be changed in global settings.
mqtt_alive
status/mqtt_monitor_num
config/mqtt_password
config/mqtt_username
config/mqtt_client_id
config/mqtt_keep_alive
system/mqtt_ssl_flag
mqtt_server_port
mqtt_server_url
mqtt_connect


Monitor
Alarm
Data
Edge Computing
Remote
Camera
Address Tag
Info
Default Group (16)
ok (24)
Group Setting
Global Settings
Status
Name
Value
Address
Traffic
Description
Operation
Y4 0 Y 4 N Y 4
Y7 0 Y 7 N Y 7
Y10 0 Y 10 N Y 10
Y11 0 Y 11 N Y 11
Y12 0 Y 12 N Y 12
Y13 0 Y 13 N Y 13
d0 0 D 0 N D 0
M100 0 M 100 N M 100
lb0 0 LB 0 N LB 0
mtqq-connect 0 mqtt_connect 0 N MQTT_CONNECT 0

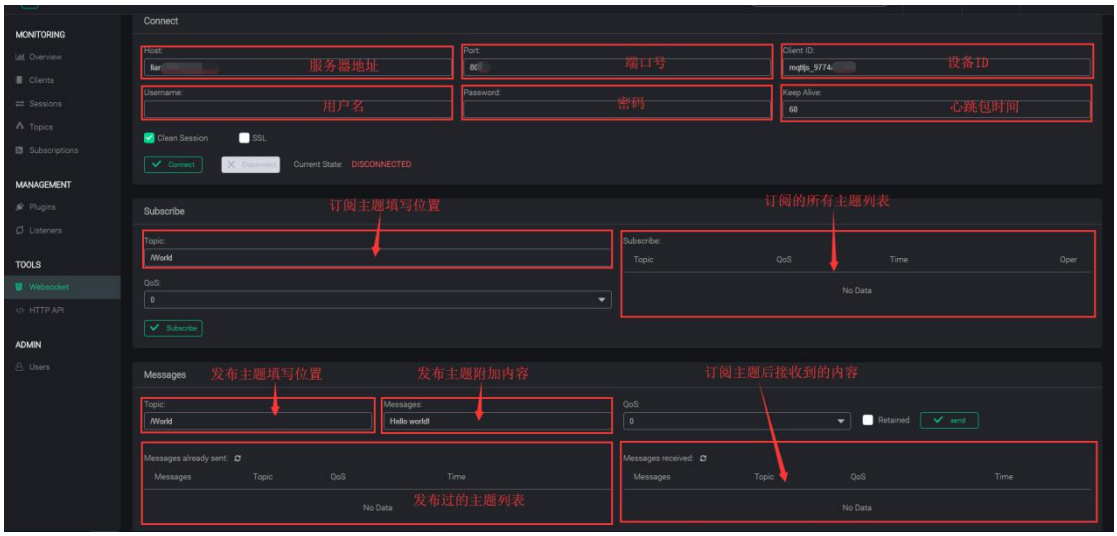
2.FBox subscription and publishing topics

After the MQTT server is connected to the box client, For example, log in to the MQTT web client, and the topic can be subscribed and published. On the MQTT client, you can view the Topic list of the device. The Topic of FLEXEM MQTT (hereinafter referred to as Topic) is transmitted in json format. View the device's topic list as shown in the figure: (taking box 222218030009 as an example)



The topics that have already subscribed to will be displayed in this place.

Subscribe and post topics in the MQTT client "Websocket" menu. When you fill in please note:capitalization or lower case



2.1 Publish Topic

Fill in these topics at the subscription of the MQTT client and receive the corresponding information from the box. (Taking the box 222218030009 as an example, and the theme is not customized, the default is:Topic/flexem/fbox/）

2.1.1 Real-time data

This topic is the topic that the box actively publishes. It is released according to the default release period (10s). When the MQTT client subscribes to this theme, it can receive the push of the box entry.
Example: There is a monitoring point in the box. When the MQTT client subscribes to the topic, it will receive the monitoring point content pushed in the box:

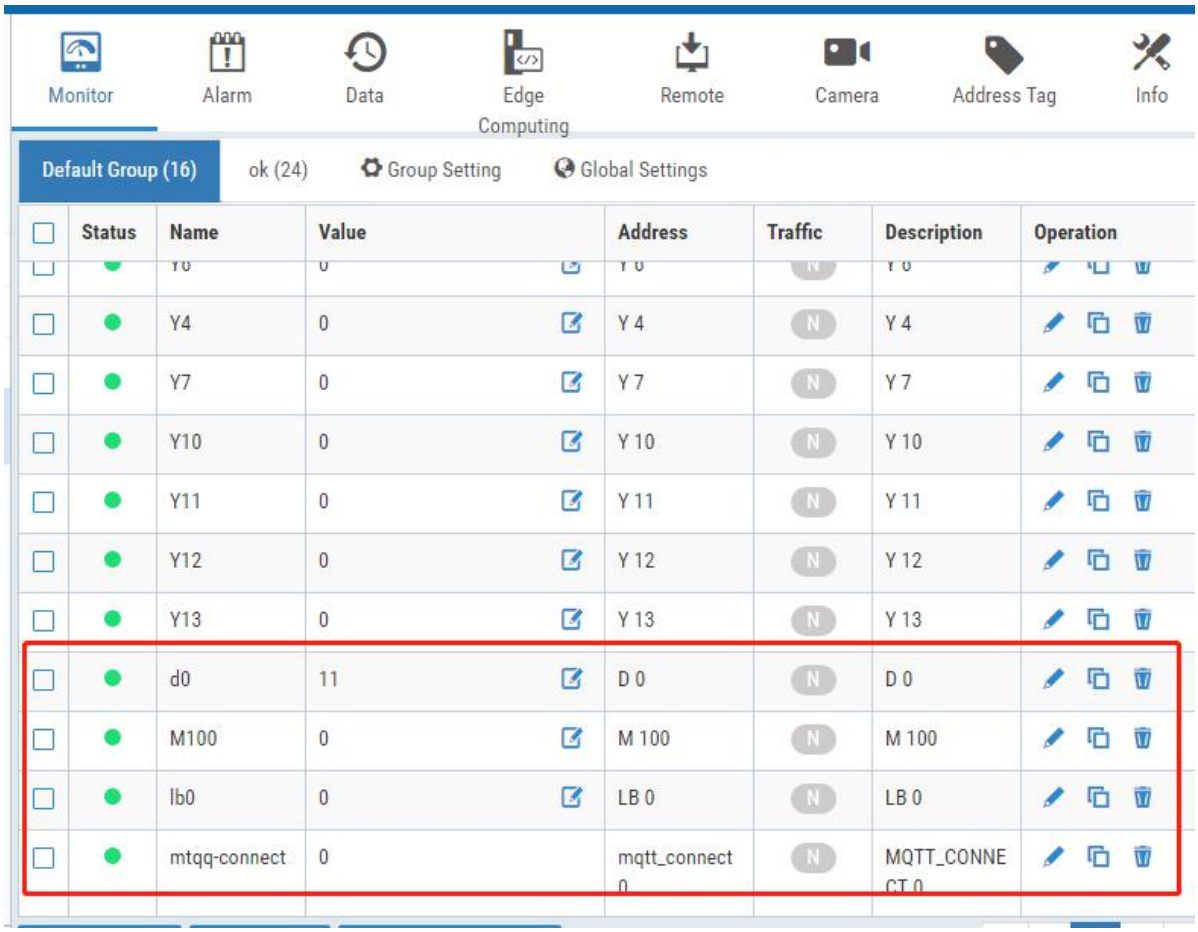
Topic	Topic/flexem/fbox/{Box serial number}/system/MonitorData （example：Topic/flexem/fbox/222218030009/system/MonitorData）
Type	publish

Content	{
	"time":"2018-4-26 17:33:16",
	"Data":[{"name":"Temp","value","124"},
	{"name":"mqtt_connect","value","1"},
	{"name":"bit","value","0"},
	{"name":"single","value","45.500473"}
	]
	}

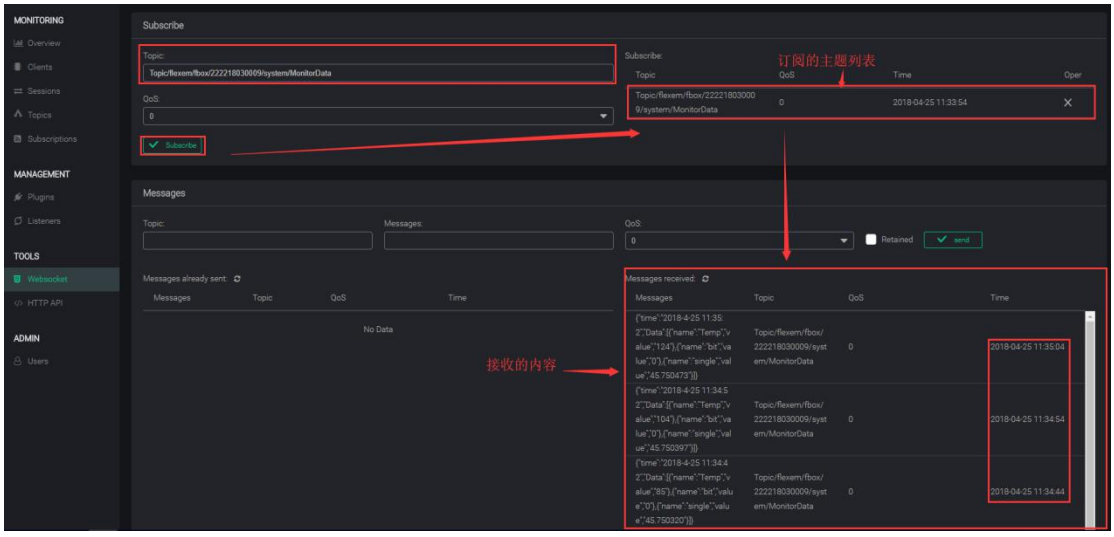
"Time": Item monitoring point push time
"name": Monitoring point name
"value": Monitor point value

Note: The maximum number of monitoring points for an MQTT message is 50. When the number of monitoring points that need to be uploaded exceeds 50, the box is divided into multiple message pushes. The time stamps of the messages sent separately are the same, and the packets can be grouped according to this.

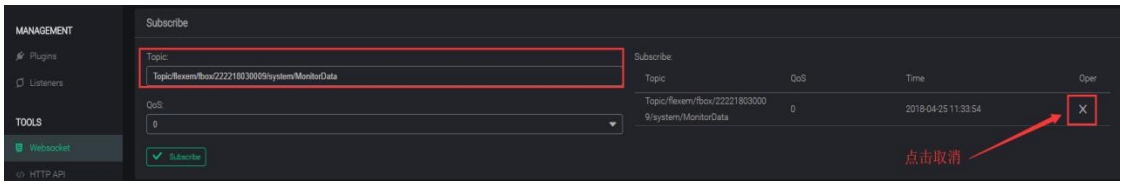
You can view the monitoring points added to the box in the box client (FlexManager):



Fill the topic in "Subscribe-->Topic":Topic/flexem/fbox/222218030009/system/MonitorData, Click "Subscribe", the subject of the MQTT client subscription will be displayed in the list on the right, and the received information will be received in the "Messages received" list at the bottom right, according to the default release period.



If you want to unsubscribe from the topic, you can cancel the topic in the list of subscribed topics.



2.1.2 Publish box related status or information

When the box receives some relevant information or status topics, it needs to be published on this topic. After the MQTT client subscribes to the topic, it will get information about the box.

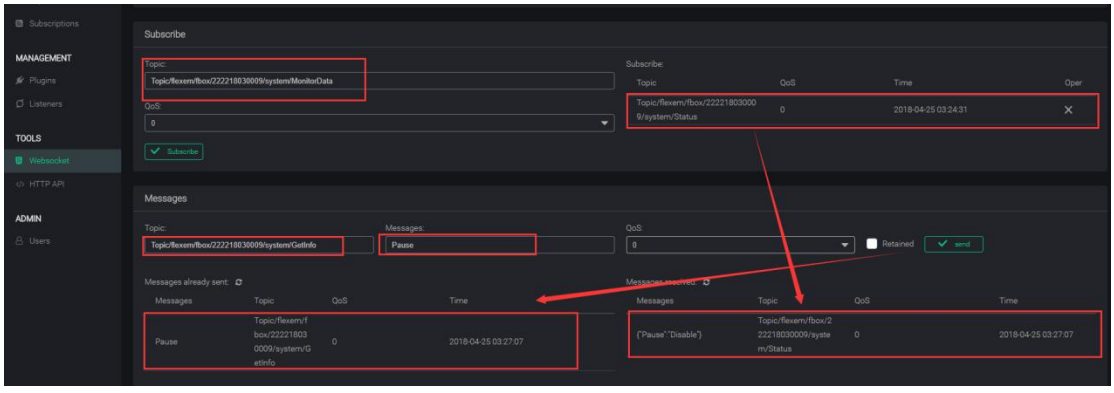
Topic	Topic/flexem/fbox/222218030009/system/Status	
Type	publish	

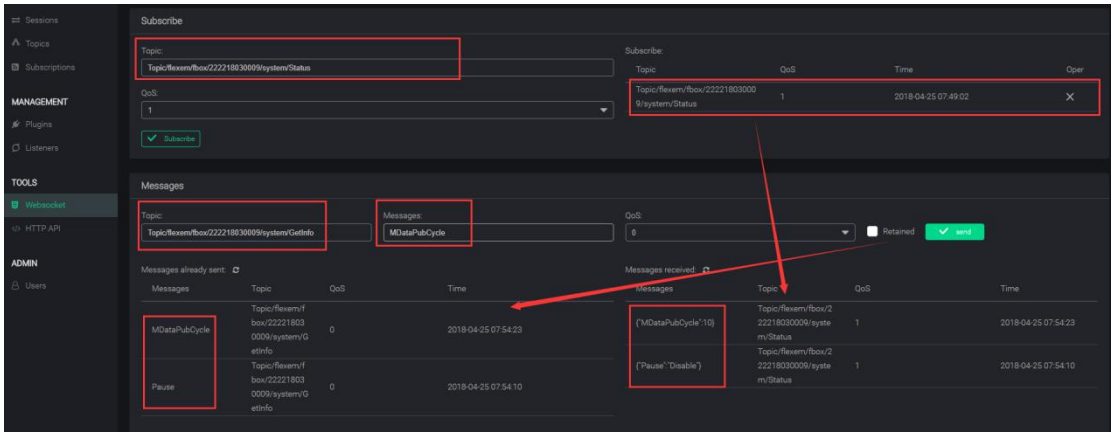
Content	{
	Status Type: Status Value
	}	

Status：Pause	{"Pause":"Enable"} or{"Pause":"Disable"}	paused or not
Status：MDataPubCycle	{"MDataPubCycle":10}	Monitoring point publish period value

Note： The box does not actively publish the theme. When the box receives the topic Topic/flexem/fbox/222218030009/system/GetInfo and the content is Pause or MDataPubCycle, the box related status or information will be published. When MQTT client subscribes to the topic will received corresponding information.

Fill the topic in "Subscribe-->Topic": Topic/flexem/fbox/222218030009/system/Status, and click "Subscribe" to subscribe to the topic. Fill the topic in "Messages-->Topic": Topic/flexem/fbox/222218030009/system/GetInfo, fill in the content "Pause" in "Messages-->Messages", and you will get the status of the box in the paused push entry. When fill in "MDataPubCycle" will get the value of the box monitoring point publish period.





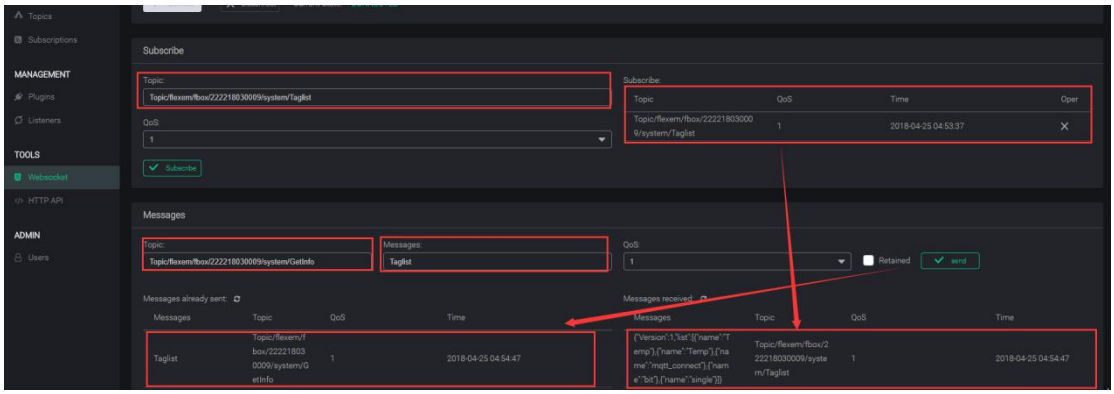
2.1.3 Publish an entry information list

After the MQTT client subscribes to the topic, it will get the monitoring point information in the box.

Topic	Topic/flexem/fbox/222218030009/system/Taglist
Type	Publish
Content	{"Version":1, "list":[{"name":"Temp"}, {"name":"mqtt_connect"}, {"name":"bit"}, {"name":"single"}] }

Note: The box will not actively publish the topic, when the box receives the box information, the topic is Topic/flexem/fbox/222218030009/system/GetInfo
And when the content is Taglist, it means to get a list of item information of the box, then the box will be published by:
Topic/flexem/fbox/222218030009/system/Taglist.

Fill the topic in "Subscribe-->Topic": Topic/flexem/fbox/222218030009/system/Taglist, and click "Subscribe" to subscribe to the topic. Fill in the topic "Tops/flexem/fbox/222218030009/system/GetInfo" in "Messages-->Topic", and fill in the content "Taglist" in "Messages-->Messages" to get all the monitoring point entries in the box.



2.1.4 Publish topic list

The topic list is the system default topic. After the MQTT client subscribes to the topic, you can get a list of topics supported by the device. Where sub indicates that the topic is the subject of the box subscription, and pub indicates the theme that the box can publish.

Topic	Topic/flexem/fbox/222218030009/system/Topiclist
Type	Publish
Content	{ "topicVer": 1, "topicList": [{ "topicname": "WriteData", "type": "sub"}, { "topicname": "GetInfo", "type": "sub"}, { "topicname": "Reboot", "type": "sub"}, { "topicname": "Pause", "type": "sub"}, { "topicname": "MDataPubCycle", "type": "sub"}, { "topicname": "MonitorData", "type": "pub"}, "topicname": "Status", "type": "pub"}, {

	"topicname": "Taglist", "type": "pub"}, "topicname": "Topiclist", "type": "pub"}]}

"topicVer"： Theme version number

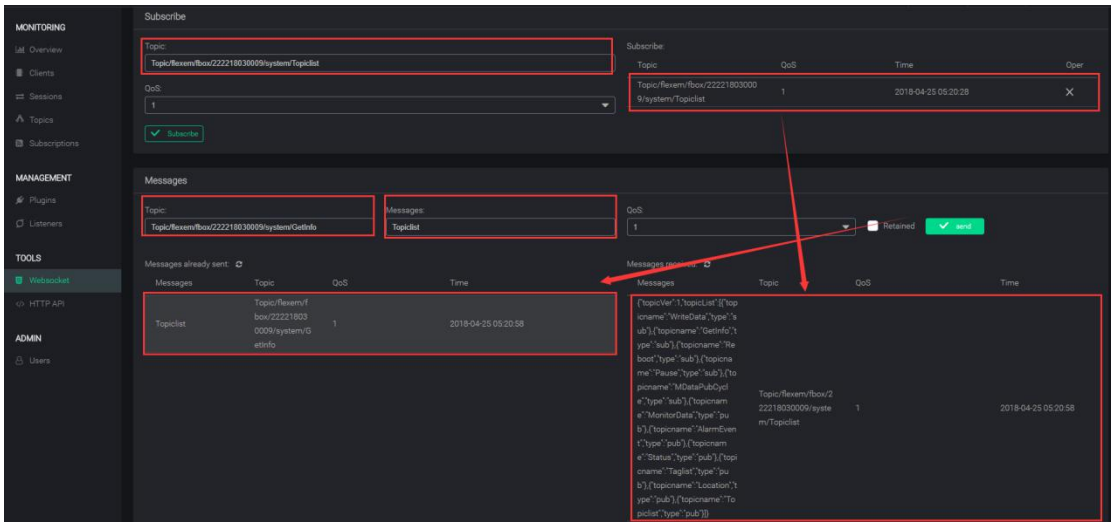
"topicList"： A list of topics supported by the device, sub indicates that the topic is the subject of the box subscription, and pub indicates the theme that the box can publish

The prefix for all topics is the default Topic/flexem/fbox/222218030009/system/. So you only need to reply to the last level.

Note：The box does not actively publish the topic, the same reason, when the box receives the subject of getting the box information Topic/flexem/fbox/222218030009/system/GetInfo

And when the content is Topiclist, it means to get a list of item information of the box, then the box will be publish by: Topic/flexem/fbox/222218030009/system/Topiclist

Fill the topic in "Subscribe-->Topic": Topic/flexem/fbox/222218030009/system/Topiclist, and click "Subscribe" to subscribe to the topic. In "Messages-->Topic", fill out the topic: Topic/flexem/fbox/222218030009/system/GetInfo, and fill in the content "Topiclist" in "Messages-->Messages" to get a list of topics supported by the device.



2.2 Subscribe to topics

The following topics are box subscription topics, which are filled in at the publish topic of the MQTT client before the box can subscribe to receive this information. (Taking the box 222218030009 as an example, and the theme is not customized, the default is: Topic/flexem/fbox/)

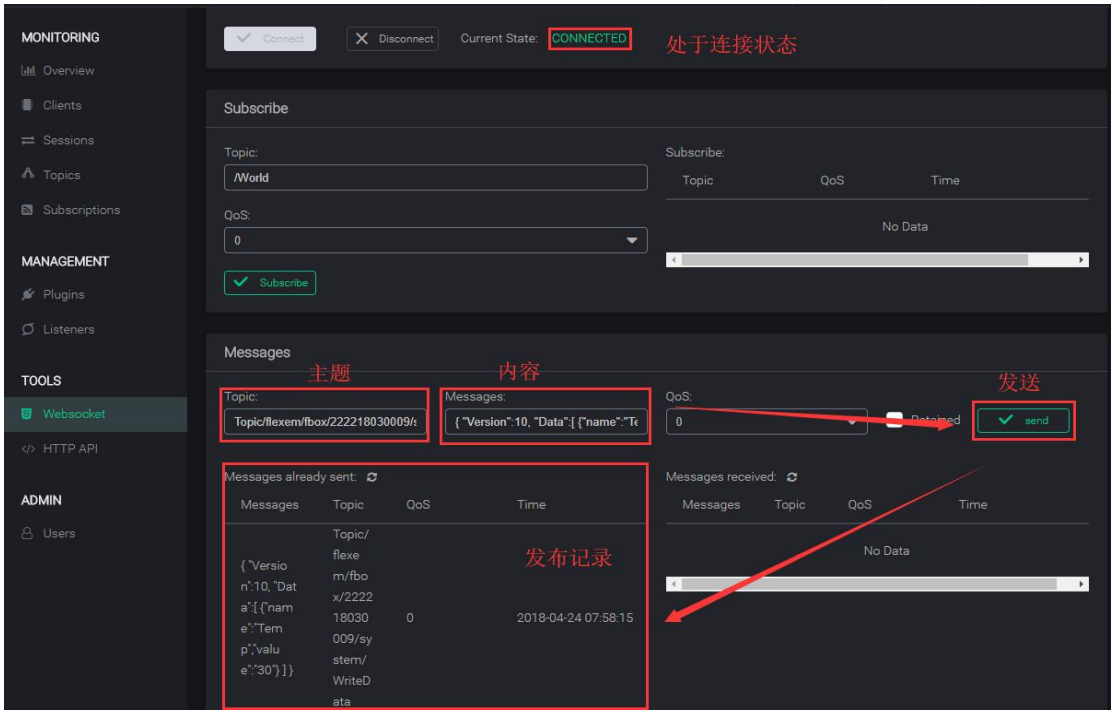
2.2.1 Set monitoring point

Setting the monitoring point will control the box to write to the monitoring point. Currently, th e FLEXEM MQTT write operation only supports writing one variable value at a time.
Example: There is a monitoring point named "Temp" in the box, and the value is modified in t he MQTT client by 30:

Topic	Topic/flexem/fbox/222218030009/system/WriteData
Type	subscription
Content	{"Version":10, "Data":[{"name":"Temp","value":"30"}]}

"Version":10：The version number of the topic
"name": Monitoring point name to be modified
"value": Monitoring point value to be modified

Fill the topic in "Messages-->Topic": Topic/flexem/fbox/222218030009/system/WriteData, fill in the contents of the modified monitoring point in "Messages-->Messages", click "send", after the box receives the topic, perform a write operation.



Note: Do not use entries with the same name when registering entries
MQTT does not support string entries

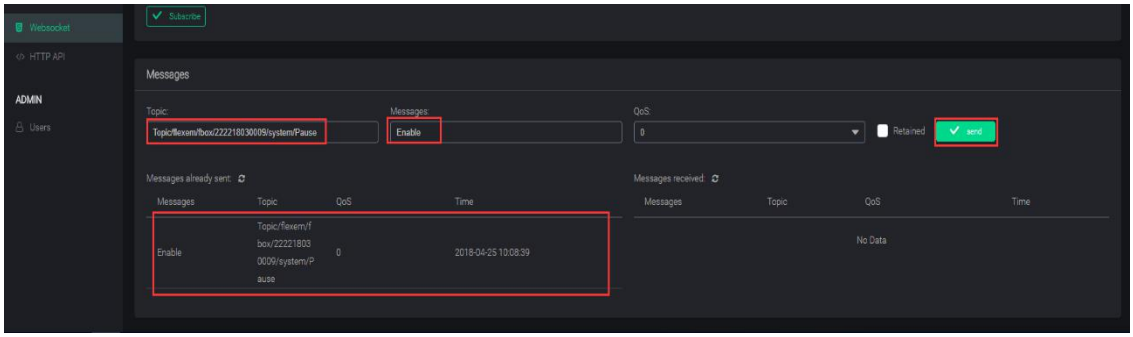
2.2.2 Pause data push

The server can suspend the publish of real-time data of MQTT. You can also use this topic to open the unpause publish of real-time data.

Topic	Topic/flexem/fbox/222218030009/system/Pause
Type	subscription
Content	"Enable" or "Disable"

"Enable": Indicates to suspend the publish of all current real-time data
"Disable": Indicates that the suspension is cancelled and the real-time data continues to be Published

Fill the topic in "Messages-->Topic": Topic/flexem/fbox/222218030009/system/Pause, fill in "Enable " or "Disable" in "Messages-->Messages", the box receives the subject, according to the content will " Pause or unpause monitoring of the push of the item.
Take a pause push entry as an example:



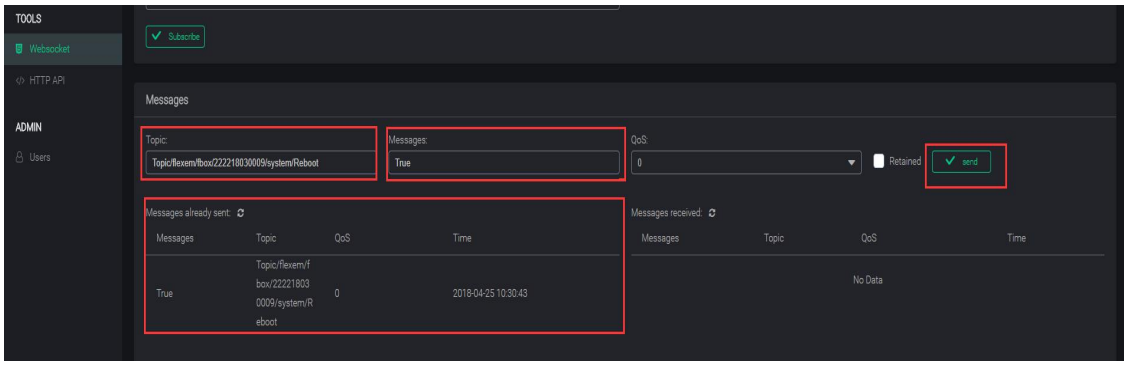
Note： Pause push for a single entry is not supported.

2.2.3 Restart the box

After the box receives the topic, it will restart immediately. At this point, the MQTT server should actively disconnect the existing link and release the subscribed topic. After the box is restarted, it will re-register the device, get a list, and so on.

Topic	Topic/flexem/fbox/222218030009/system/Reboot
Type	subscription
Content	"True"（Content can be empty）

Fill topic in 'Messages-->Topic'： Topic/flexem/fbox/222218030009/system/Reboot,Fill "True" in "Messages-->Messages" (can be empty),*After the box receives the command, it will restart immediately.*



Note： *If the MQTT client publishes the topic multiple times, the MQTT server will continue to send message without transmission completion when the box logs in again.*

For example, the MQTT client continuously sends 10 restart commands. After the box receives a restart command, it immediately restarts. At this time, the MQTT server still records that there are still 9 restart commands that are not communicated. After the next box is started, the MQTT will continue to send.

2.2.4 Let the box publish the monitoring point immediately

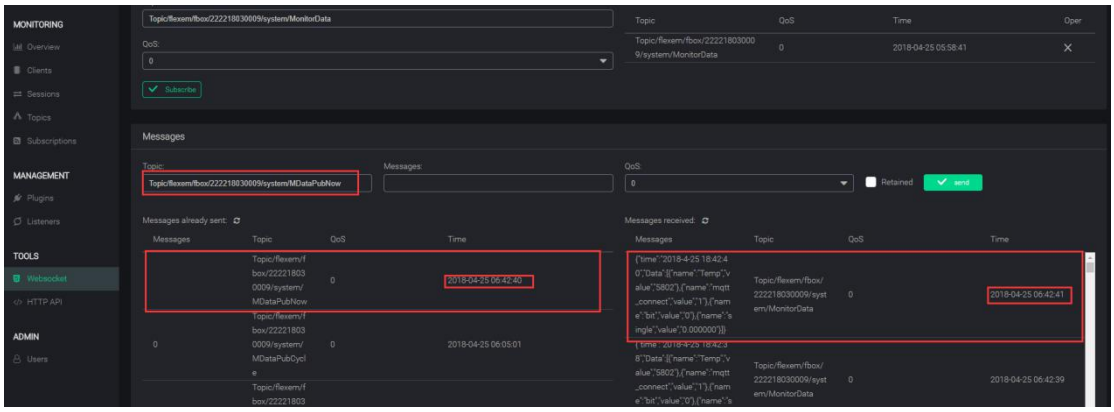
After the box received the topic, it immediately publishes the Topic/flexem/fbox/222218030009/system/MonitorData , which is the value of the current item to be collected.

Topic	Topic/flexem/fbox/222218030009/system/MDataPubNow
Type	Subscription
Content	Any content, even empty is ok

If the set monitoring item period is long, but you want to get the monitoring item immediately, the client can publish the topic. When the FBox receives the topic, it will publish the monitoring item with Topic/flexem/fbox/222218030009/system/MonitorData.

First fill the topic in "Subscribe-->Topic": Topic/flexem/fbox/222218030009/system/MonitorData, get the monitoring point of the box, it is convenient to observe the transmission of monitoring points after the modification publish period.

Fill the topic in "Messages-->Topic": Topic/flexem/fbox/222218030009/system/MDataPubNow, click Send, you can get the box monitoring point data immediately.



2.2.5 Set the monitoring point entry release cycle

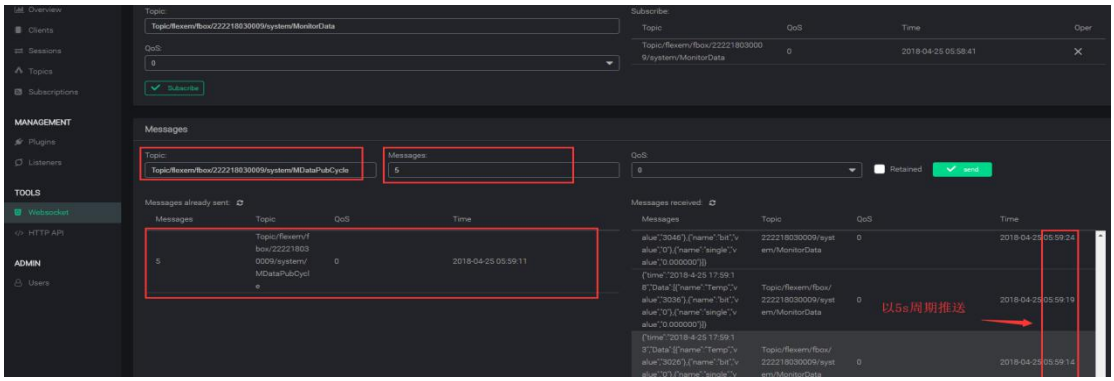
Allows the publish period of monitoring points to be set through topic interaction.

Topic	Topic/flexem/fbox/222218030009/system/MDataPubCycle
Type	Subscription
Content	5

The topic is published on the MQTT client. When the box receives the topic and content, it indicates that the monitoring entry publish period is set to 5S. When set to 0, the default 10S is restored. (Unit: Second)

First fill the topic in "Subscribe-->Topic": Topic/flexem/fbox/222218030009/system/MonitorData, get the monitoring point of the box, which is convenient observe the transmission of monitoring points after the modification publish period.

Fill the topic in "Messages-->Topic": Topic/flexem/fbox/222218030009/system/MDataPubCycle, and fill in "5" in "Messages-->Messages" (modified publilsh period, unit: Second),*After the box receives the command, it will immediately modify the publish period of the monitoring point.*



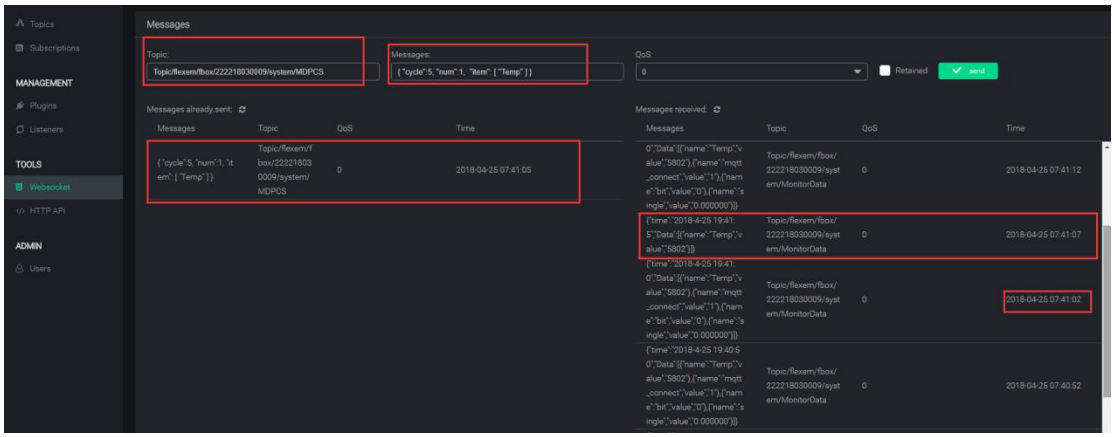
2.2.6 Set single or multiple monitoring point entry publish cycles

The topic is published on the MQTT client, and the single or multiple monitoring points set will be published according to the set publish period. If the monitoring item period set by the topic is not used, the default period or the period set by MDataPubCycle will be used.

When set to 0, the monitoring entry uses the global release cycle.

Topic	Topic/flexem/fbox/222218030009/system/MDPCS
Type	subscription
Content num:The number of settings	{"cycle":10, "num":3, "item": ["ItemName1", "ItemName2", "ItemName3"] }

"cycle": Modified publish cycle time, unit: second
"num": Set the number of modified monitoring points
"item": The name of the monitoring point entry
First fill the topic in "Subscribe-->Topic": Topic/flexem/fbox/222218030009/system/MonitorData, get the monitoring point of the box, It is convenient to observe the transmission of monitoring points after the modification publish period.
Fill the topic in "Messages-->Topic": Topic/flexem/fbox/222218030009/system/MDPCS,
Fill the corresponding content in "Messages-->Messages". After receiving the topic, the box will change the push period of the set monitoring point.



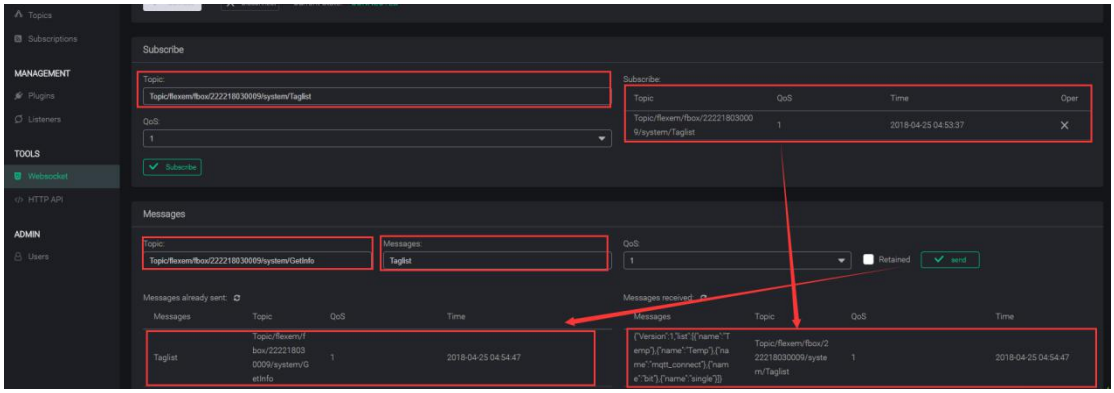
2.2.7 Get the status or information about the box

When the box receives different access information, it is published with the specified topic. This topic is used in the previous section.

Topic		Topic/flexem/fbox/222218030009/system/GetInfo
Type		subscription
	Taglist	Get the current list of entries
	Topiclist	Get the topic of the current box (subscription and publishable)
	Pause	Get the pause status of the current box (whether it is paused)
	MDataPubCycle	Get the push cycle of the current box monitoring entry

1)Taglist
Topic/flexem/fbox/300216080083/system/GetInfo Taglist
When the box receives the topic and content, it publishes the Topic/flexem/fbox/222218030009/system/Taglist.
The content is:
{
"Version":1,
"list":[{"name":"Temp"},

{"name":"mqtt_connect"},
{"name":"bit"},
{"name":"single"}
]
}

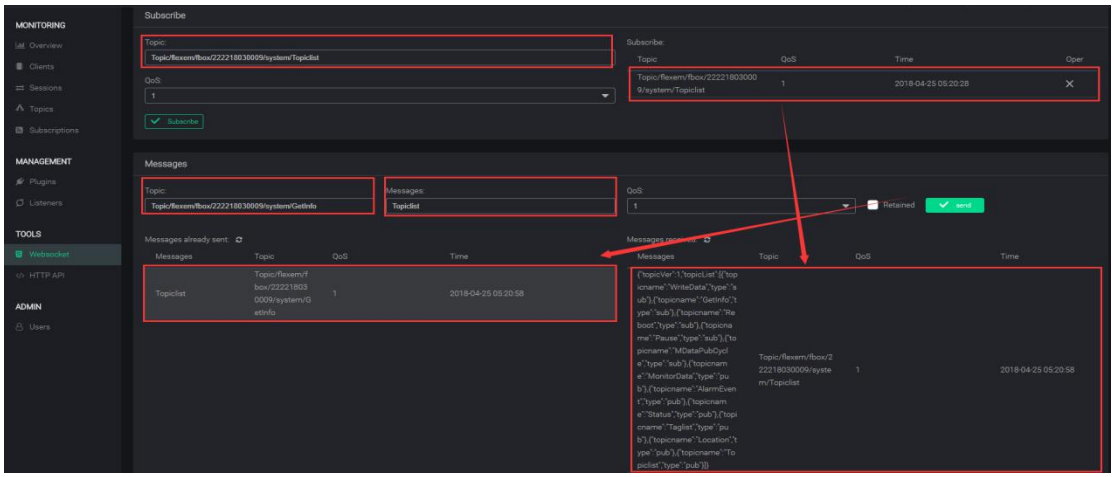


2）Topiclist Get the topic of the current box
Topic/flexem/fbox/300216080083/system/GetInfo Topiclist

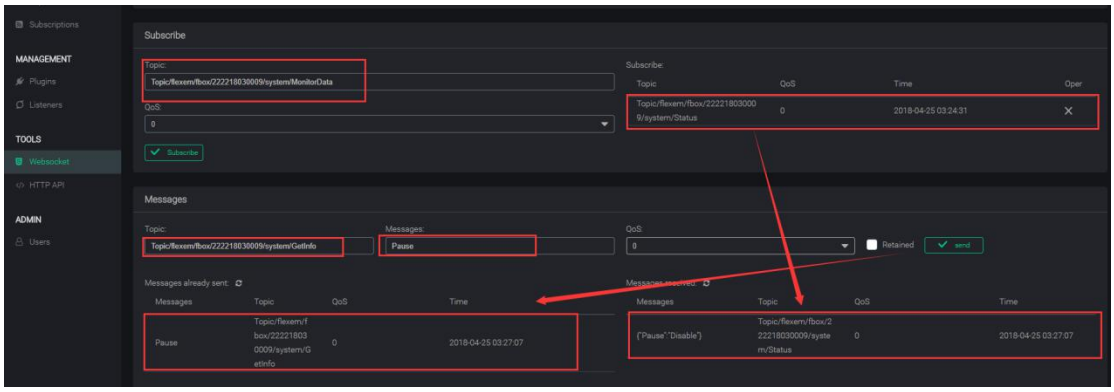
When the box receives the topic and content, then published,Topic/flexem/fbox/222218030009/system/Topiclist, the content is

{"topicVer": 1,
"topicList": [
{"topicname": "WriteData","type": "sub"},
{"topicname": "GetInfo","type": "sub"},
{"topicname": "Reboot","type": "sub"},
{"topicname": "Pause","type": "sub"},
{"topicname": "MDataPubCycle","type": "sub"},
{"topicname": "MonitorData","type": "pub"},
{"topicname": "Status","type": "pub"},
{"topicname": "Taglist","type": "pub"},
{"topicname": "Topiclist","type": "pub"},
]}

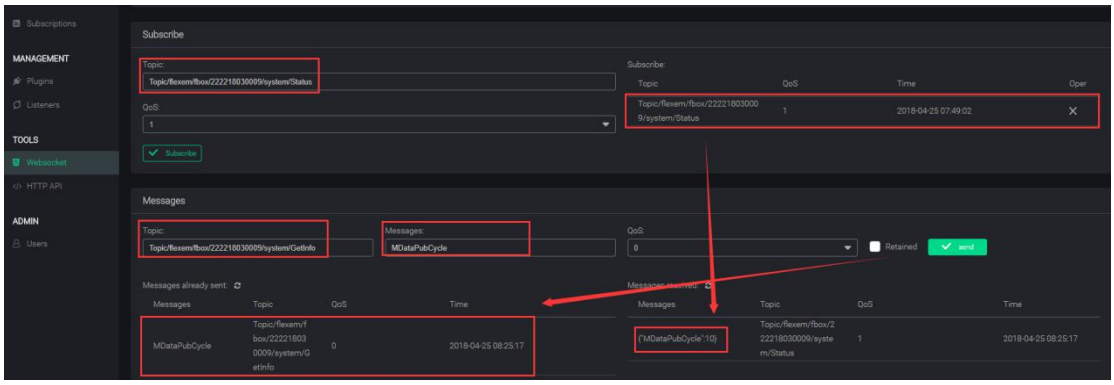
The prefix for all topics is the default Topic/flexem/fbox/222218030009/system/, so you only need to reply to the last level.



3）Pause:　Get the pause status of the current box (whether it is paused)
Topic/flexem/fbox/222218030009/system/GetInfo　Pause
When the box receives the topic and content,　Topic/flexem/fbox/222218030009/system/Status is posted, the content is:
{"Pause":"Enable"} or {"Pause":"Disable"}



4）MDataPubCycle : Get the push cycle of the current box monitoring
entryTopic/flexem/fbox/222218030009/system/GetInfo　MDataPubCycle
When the box receives the topic and content,　it posts
Topic/flexem/fbox/222218030009/system/Status , which reads:
{"MDataPubCycle ":10}


Subscriptions
MANAGEMENT
Plugins
Listeners
TOOLS
Websocket
HTTP API
ADMIN
Users
Subscribe
Topic:
Topic/flexem/fbox/222218030009/system/Status
QoS:
1
Subscribe
Subscribe:
Topic
QoS
Time
Oper
Topic/flexem/fbox/22221803000 9/system/Status
1
2018-04-25 07:49:02
Messages
Topic:
Topic/flexem/fbox/222218030009/system/GetInfo
Messages:
MDataPubCycle
QoS:
0
Retained
send
Messages already sent:
Messages
Topic
QoS
Time
MDataPubCycle
Topic/flexem/fbox/22221803 0009/system/G etInfo
0
2018-04-25 08:25:17
Messages received:
Messages
Topic
QoS
Time
{"MDataPubCycle":10}
Topic/flexem/fbox/2 22218030009/syste m/Status
1
2018-04-25 08:25:17