Contents

How to get Modbus data in Json format via MQTT

This is a quick guide to show you how to get your Modbus data from your IoT sensor and convert it to JSON format, then transfer the data to cloud via MQTT.

1. Get Ready

1) Bivocom IoT Gateway TG451

2) MQTT broker and client

3) Modbus IoT sensor(in this case, we use a software to simulate a sensor to collect data)

2. Get Started

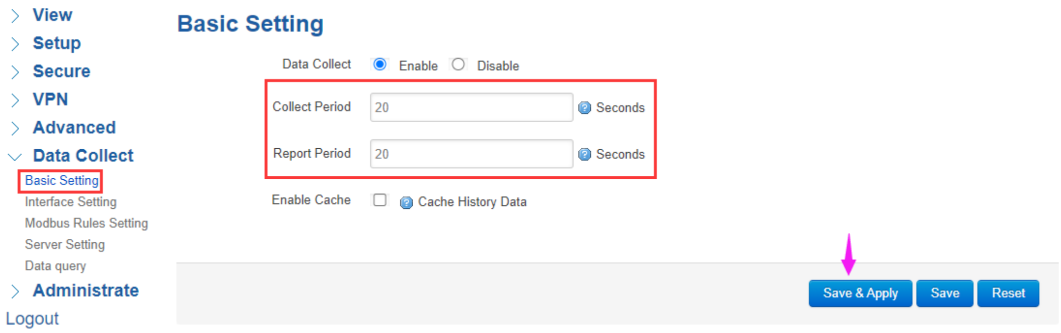
Make sure your Bivocom TG451 is online and successfully connect to 4G cellular network(How to make TG451 online?)

After that, connect your TG451 LAN port to laptop's ethernet port via ethernet cable, and connect the RS232 cable to RX, TX and GND of the TG451, use a RS232 to USB converter to connect to your laptop. (If your laptop doesn't have DB9 RS232 port)

2.1 Enable Data Collect of TG451

2.1.1 Basic Setting

Choose the collect and report period time you want.



Basic Setting

Data Collect ● Enable ○ Disable

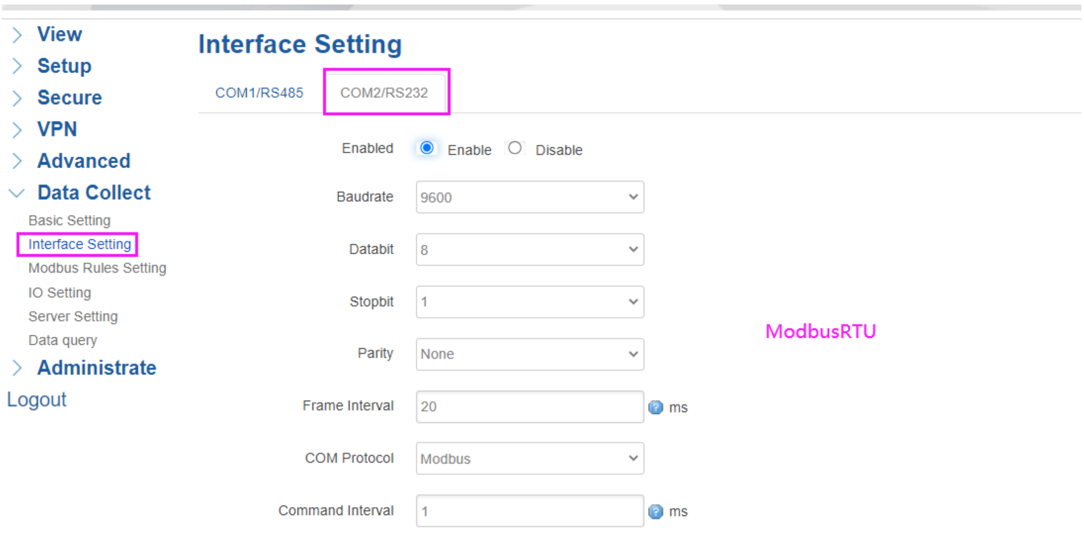
Collect Period 20 Seconds

Report Period 20 Seconds

Enable Cache □ Cache History Data

2.1.2 COM port config

Enable the COM port of RS232, and configure the baud rate to communicate with your IoT sensor accordingly. COM port protocol use Modbus.



Interface Setting

COM1/RS485 | COM2/RS232

Enabled ● Enable ○ Disable

Baudrate 9600

Databit 8

Stopbit 1

Parity None

Frame Interval 20 ms

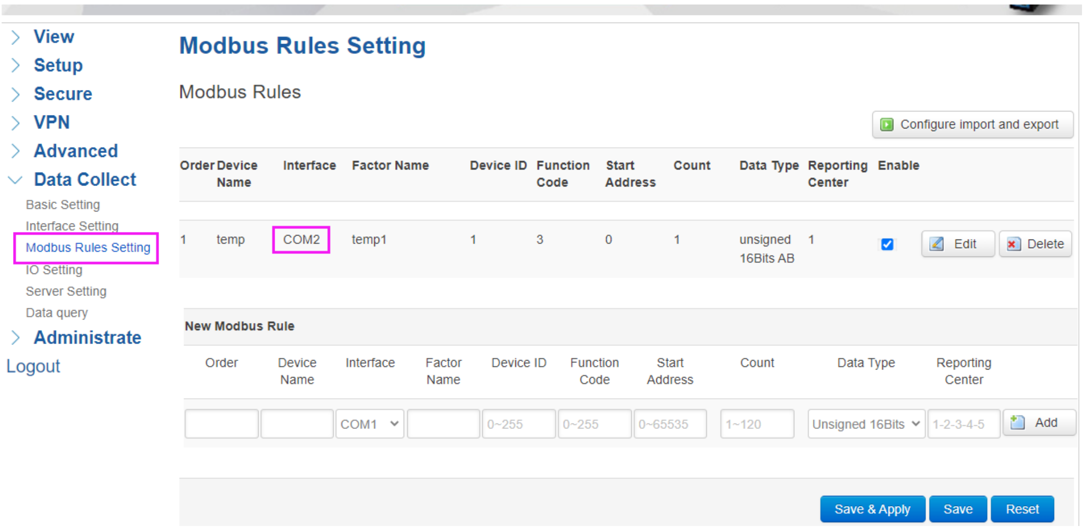
COM Protocol Modbus

Command Interval 1 ms

ModbusRTU

2.1.3 Modbus Rules Setting

Setting order device name, interface, factor name, device ID, etc.



Modbus Rules Setting

Modbus Rules

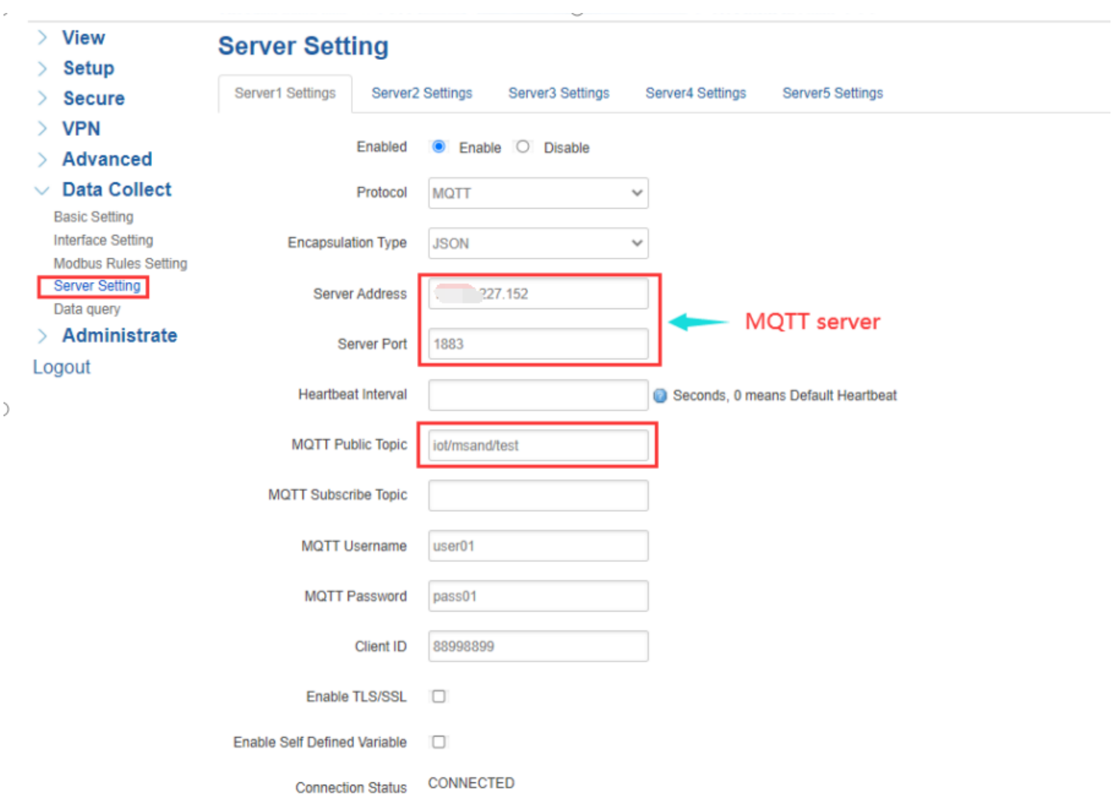
Order	Device Name	Interface	Factor Name	Device ID	Function Code	Start Address	Count	Data Type	Reporting Center	Enable
1	temp	COM2	temp1	1	3	0	1	unsigned 16Bits AB	1	☑

New Modbus Rule

Order	Device Name	Interface	Factor Name	Device ID	Function Code	Start Address	Count	Data Type	Reporting Center
		COM1		0~255	0~255	0~65535	1~120	Unsigned 16Bits	1-2-3-4-5

2.2 MQTT Broker Server Setting

Input your MQTT broker’s server IP and port, and the topic you want to subscribe.



Server Setting

Enabled ● Enable ○ Disable

Protocol: MQTT

Encapsulation Type: JSON

Server Address: [redacted]227.152

Server Port: 1883

Heartbeat Interval: Seconds, 0 means Default Heartbeat

MQTT Public Topic: iot/msand/test

MQTT Subscribe Topic:

MQTT Username: user01

MQTT Password: pass01

Client ID: 88998899

Enable TLS/SSL □

Enable Self Defined Variable □

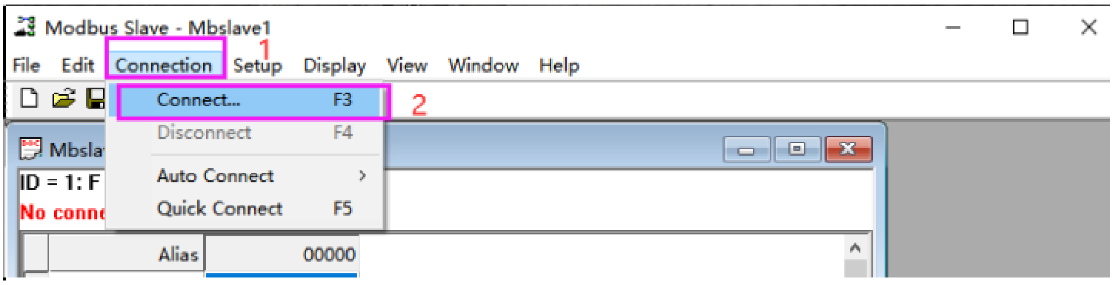
Connection Status: CONNECTED

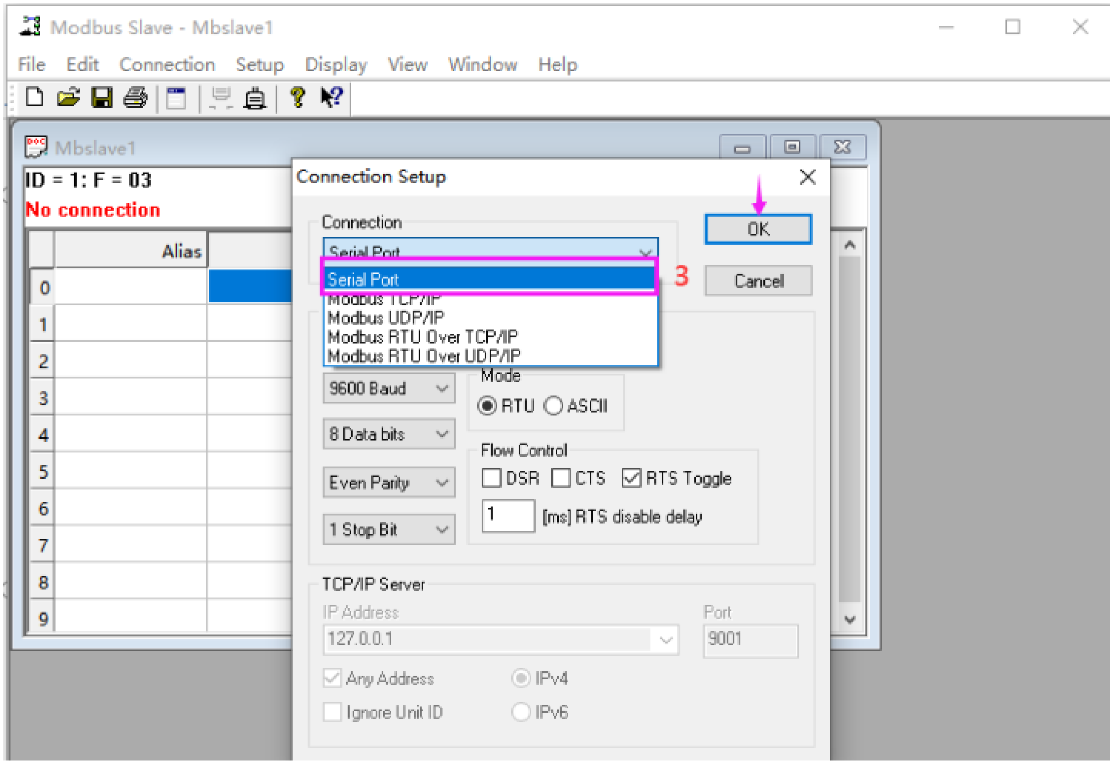
2.3 IoT Sensor Setting

In this case, we use software to simulate Modbus slave sensor

2.3.1 Establish connection

Choose the right serial port and parameters (such as baud rate) same as TG451 config in 2.1.2





ID = 1: F = 03

No connection

Connection: Serial Port

9600 Baud

8 Data bits

Even Parity

1 Stop Bit

Mode: ● RTU ○ ASCII

Flow Control: □ DSR □ CTS ☑ RTS Toggle

1 [ms] RTS disable delay

IP Address: 127.0.0.1

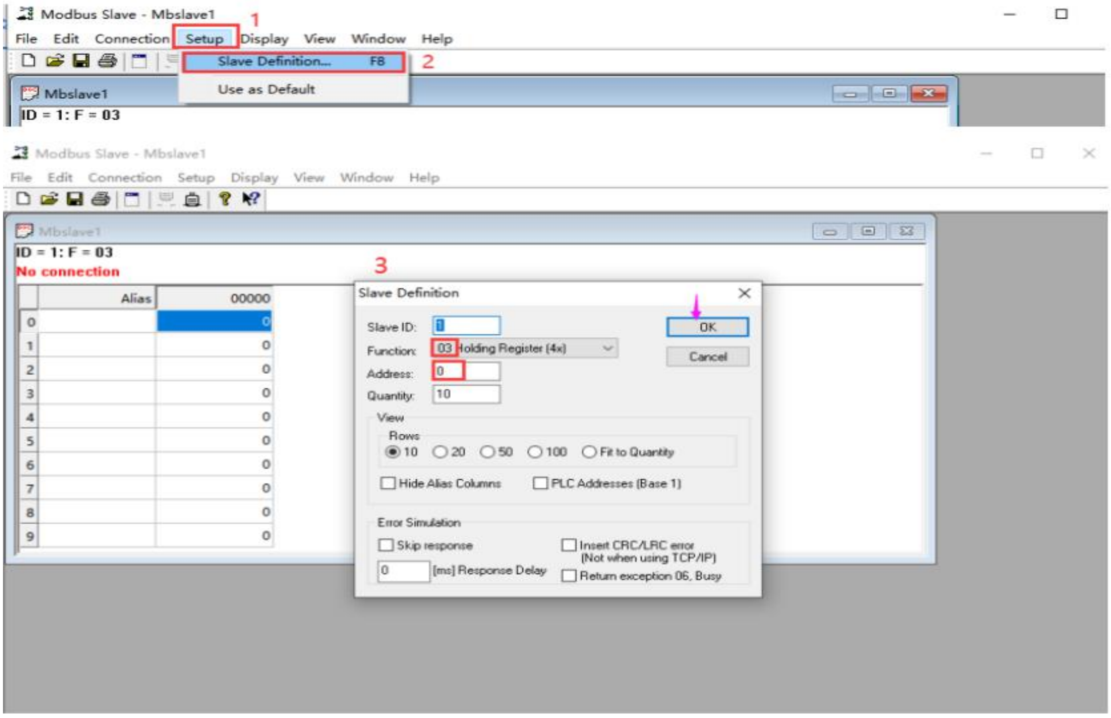
Port: 9001

☑ Any Address ● IPv4

□ Ignore Unit ID ○ IPv6

2.3.2 Define parameters

Setting the parameters consistent with the web UI config of TG451 in 2.1.3



ID = 1: F = 03
No connection

	Alias	00000
0		0
1		0
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

Slave ID: 1

Function: 03 Holding Register (4x)

Address: 0

Quantity: 10

View

Rows

● 10 ○ 20 ○ 50 ○ 100 ○ Fit to Quantity

□ Hide Alias Columns □ PLC Addresses (Base 1)

Error Simulation

□ Skip response

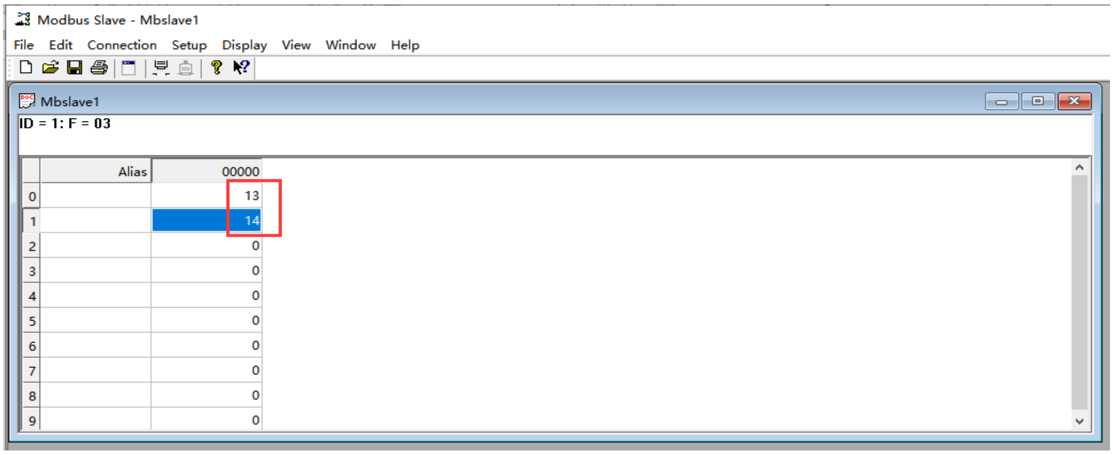
0 [ms] Response Delay

□ Insert CRC/LRC error
(Not when using TCP/IP)

□ Return exception 06, Busy

2.3.3 Input value

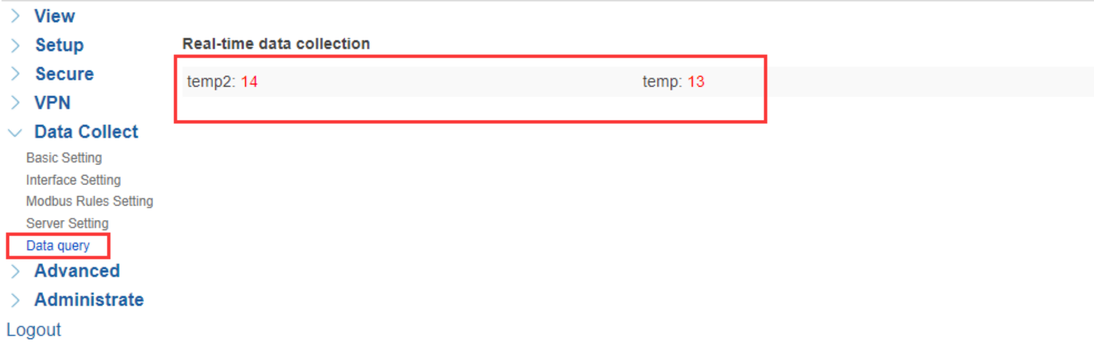
Input a value to simulate the data from IoT sensor



ID = 1: F = 03

	Alias	00000
0		13
1		14
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

Then you can go to Data query to view the data on Web UI of TG451.



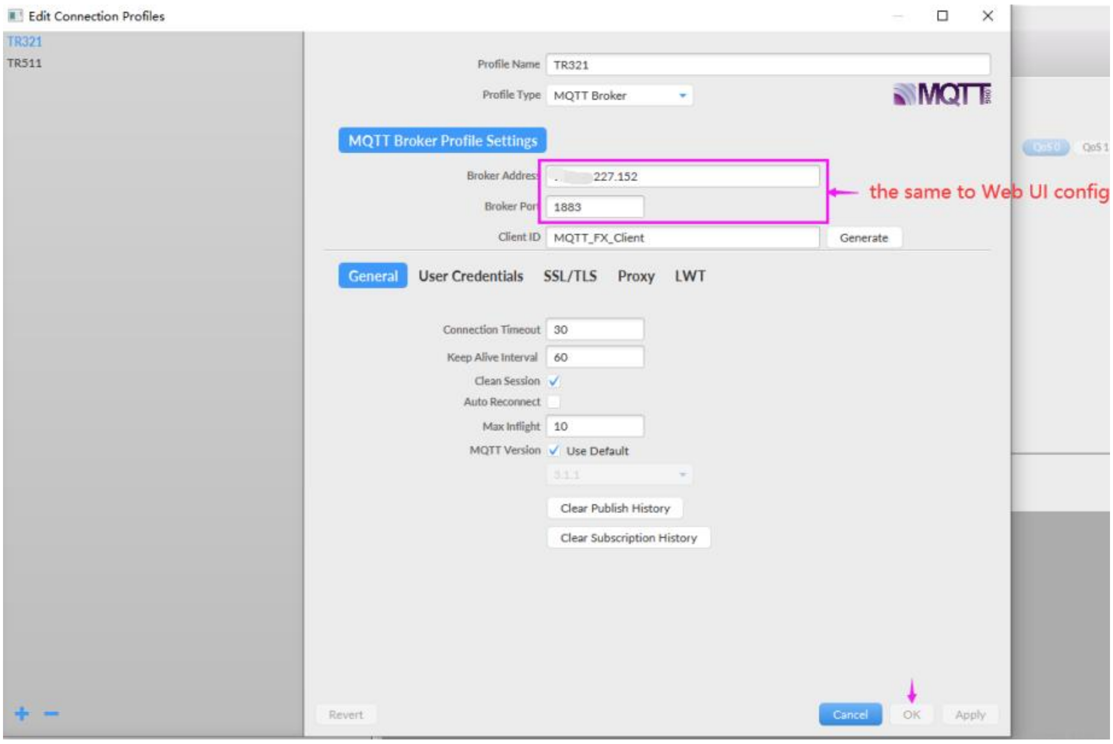
Real-time data collection

temp2: 14 temp: 13

2.3 Open MQTT.fx client

In this quick guide, we use MQTT client from https://www.jensd.de/

2.3.1 Edit connection profiles


Edit Connection Profiles

TR321
TR511

Profile Name: TR321
Profile Type: MQTT Broker

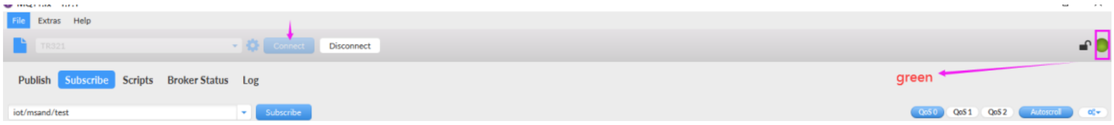
MQTT Broker Profile Settings

Broker Address: . 227.152
Broker Port: 1883
Client ID: MQTT_FX_Client

the same to Web UI config

Connection Timeout: 30
Keep Alive Interval: 60
Clean Session: ✓
Auto Reconnect: □
Max Inflight: 10
MQTT Version: ✓ Use Default
3.1.1

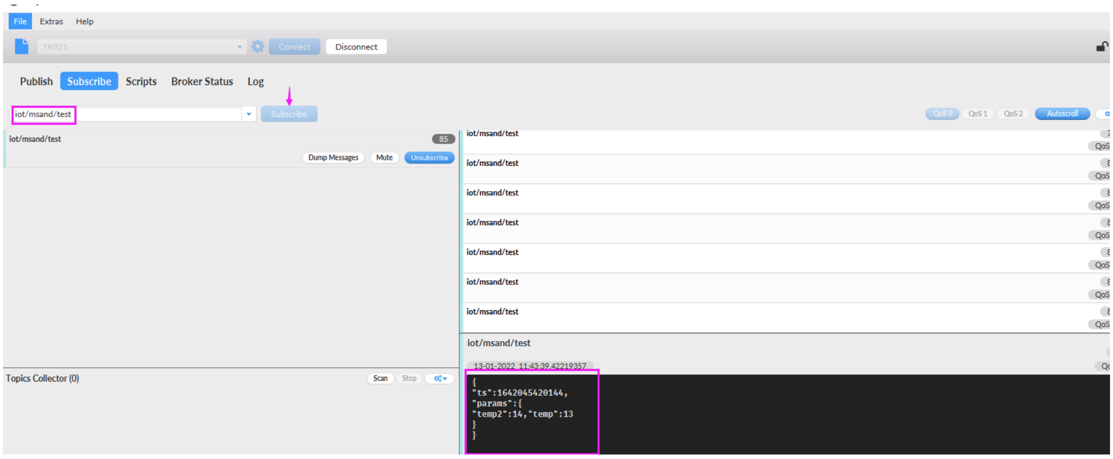
2.3.2 Start connect button



green

iot/msand/test

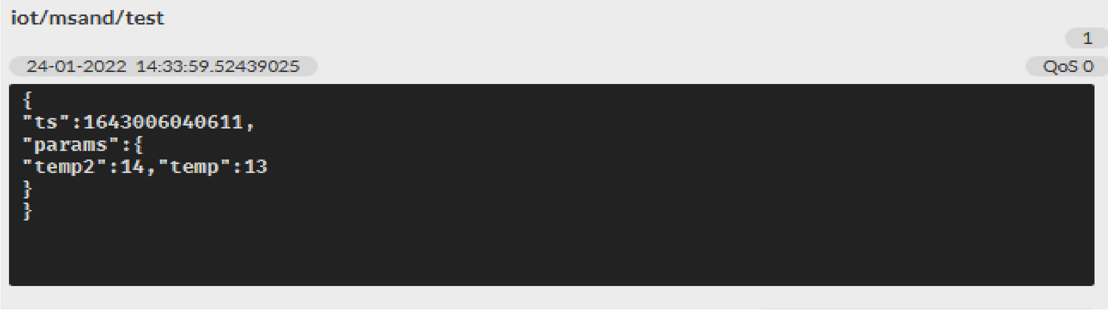
2.3.3 Subscribe the topics



```
{
"ts":1642045420144,
"params":{
"temp2":14,"temp":13
}
}
```

2.3.4 Report data

Then you can receive the data based on the topic you subscribe.



```
{
"ts":1643006040611,
"params":{
"temp2":14,"temp":13
}
}
```