PUSR®
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Industrial Edge Gateway

USR-M300

User Manual

V2.0

Be Honest & Do Best

Your Trustworthy Smart Industrial IoT Partner

Content

1. Introduction

1.1. Overview

USR-M300 is a high-performance and scalable edge IOT gateway. This device integrates edge collection, data calculation, data reading and writing, active reporting, linkage control, IO collection and control and other functions. The collection protocol includes standard Modbus protocol and a variety of common PLC protocols, as well as industry-specific protocols. At the same time, the product also has routing and VPN as well as graphical programming functions to ensure data transmission security. Using graphical programming, users can develop independently to achieve the required functions.

USR-M300 is embedded in Linux kernel, with a main frequency of up to 1.2Ghz. It can access the Internet via Ethernet port, ADSL and LTE cat4 cellular network to achieve easy network deployment.

It is widely used in various industrial intelligent solutions such as industrial robot, smart factories, smart agriculture, smart water management system etc.

1.2. Features

- Dual-core professor with ultra-high performance, the main frequency is up to 1.2Ghz, providing high-performance processing resources for edge computing.
- Supports Python development, for developing user custom applications.
- Supports graphical programming to facilitate user development.
- LTE 4G and Ethernet network serve as backups for each other to ensure stable network transmission without downtime.
- Integrated 1*WAN/LAN and 1*LAN Ethernet port, VPN and firewall protection to ensure safe data transmission.
- Integrated 2 serial ports: 1*RS232/485, 1*RS485, which can transform traditional serial devices into IOT devices.
- Comes with IO interface: 2*DI, 2*DO, 2*AI, flexible expandable IO module is supported.
- Powerful edge gateway function: supports edge collection, edge computing, group reporting, and supports real-time collection of up to 2000 points.
- Supports major industrial protocols including Modbus TCP/RTU, PLC protocols and OPC UA Server.
- Support 2 socket channels, each channel supports TCP(SS)/UDP, MQTT(S) protocols.
- Cloud support: MQTT via AWS IOT, Alibaba Cloud, and PUSR Cloud.

2. Get Started

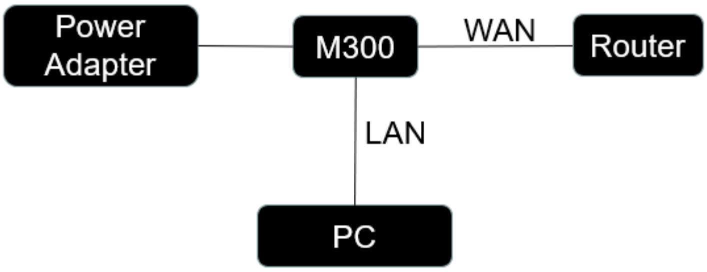
2.1. Hardware connection

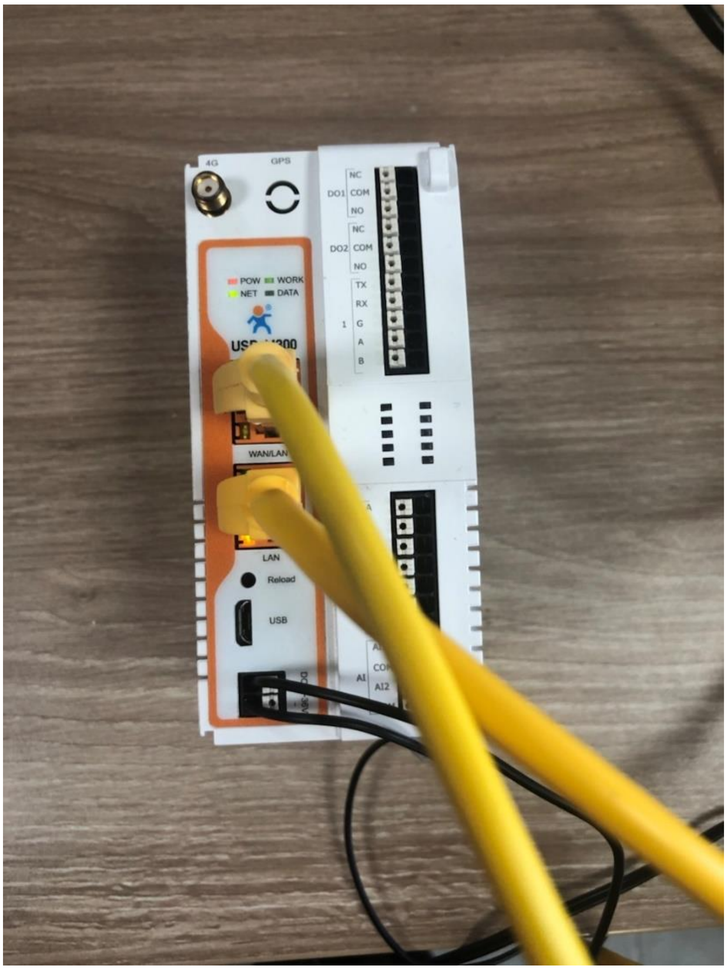
Preparation:

Power adapter 12V/1A * 1

Network cable * 1

The hardware connection diagram is like the following:





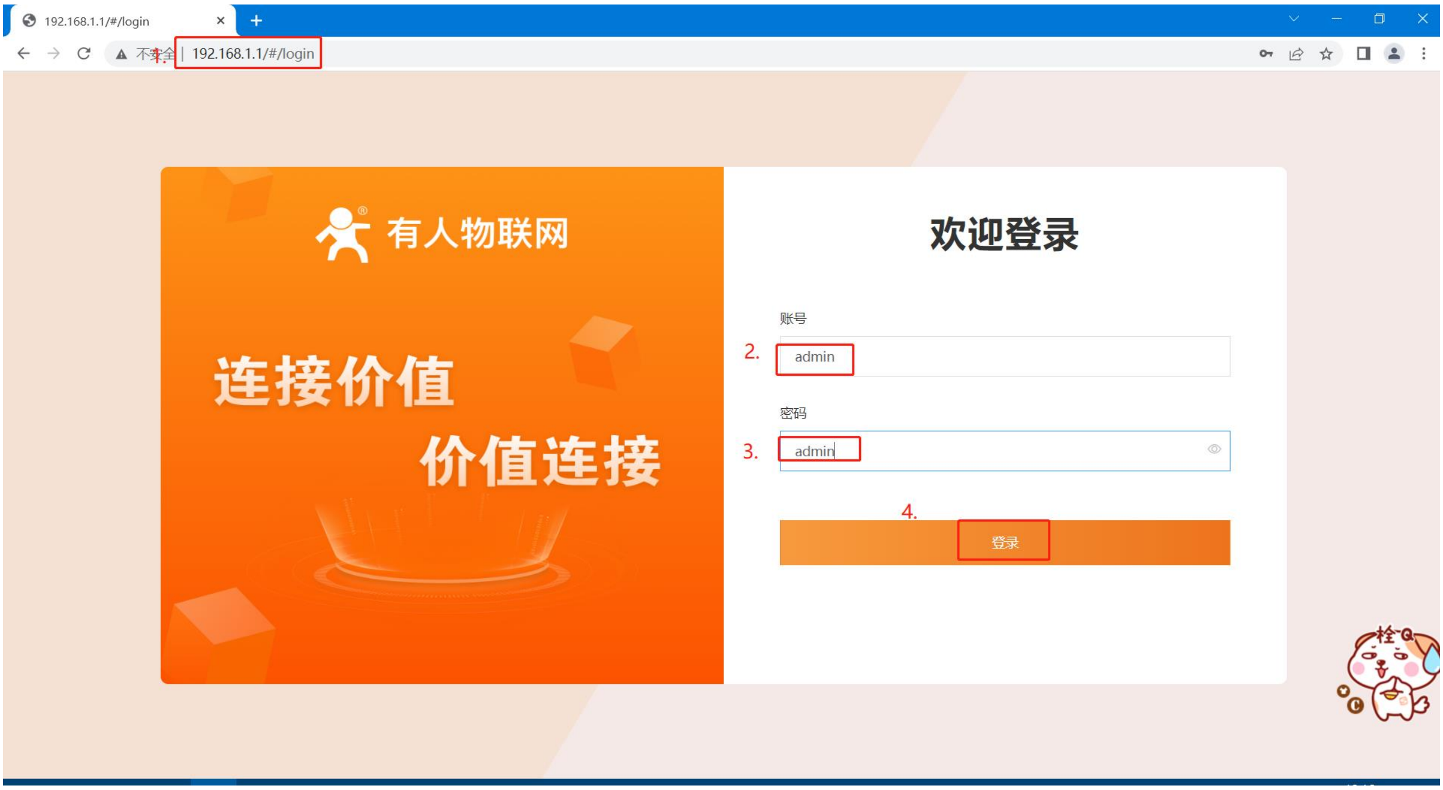
2.2. Login Gateway

Power on the USR-M300, connect PC to M300 via LAN port, users can login the gateway via Chrome or the other browser. The default network parameters are shown in the following table:

Table 1. Default network parameters

Parameter	Default value
LAN IP	192.168.1.1
Username	admin
Password	admin

Open the browser, enter 192.168.1.1 in the URL blank, and press Enter, it will navigate to the following webpage. After entering the login password, clicking login, the web page will show configuration page of USR-M300.



2. 账号: admin

3. 密码: admin

4. 登录

Figure 1. Login webpage

2.3. Brief introduction of the webpage

There are several tabs on the top of the webpage, users can set parameters of USR-M300 on the tab pages.

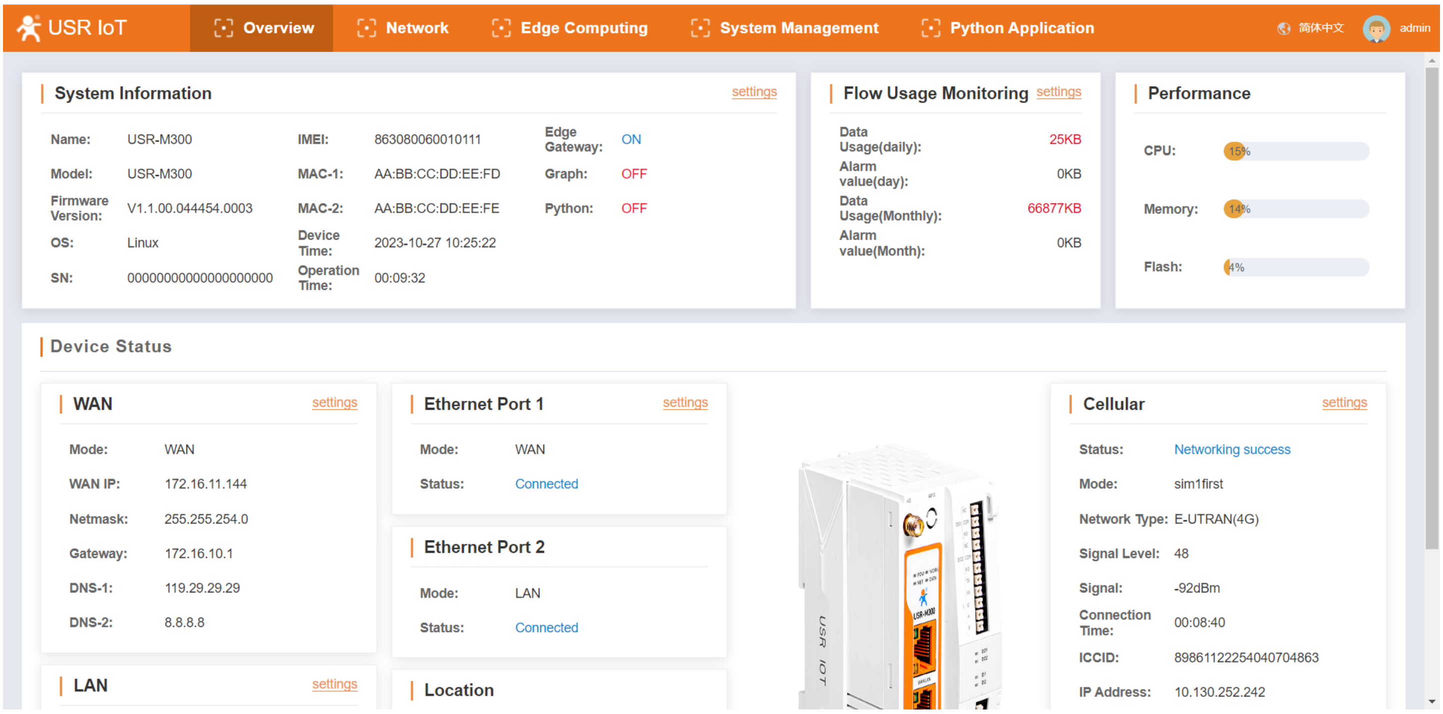
- Overview: On this page, users can quickly learn about the running status of the gateway, like system information, device status, cellular information and etc.
- Network: In this interface, there are many categories related to network connection. Users can set parameters such as WAN port, LAN port and cellular network.
- Edge Computing: With this functionality, the M300 gateway serves as host and actively sends the polling acquisition command to periodically obtain the point data of the serial and Ethernet devices

and the data collected by the I/O interface.

- System Management: In this webpage, users can check the log information, and set the system time and so on.
- Python Application: With this functionality, users can deploy Python applications.

3. Overview Information

In this page, it includes system information, device status, cellular information, flow usage monitoring and performance of processor chipset.



System Information

Name:	USR-M300	IMEI:	863080060010111	Edge Gateway:	ON
Model:	USR-M300	MAC-1:	AA:BB:CC:DD:EE:FD	Graph:	OFF
Firmware Version:	V1.1.00.044454.0003	MAC-2:	AA:BB:CC:DD:EE:FE	Python:	OFF
OS:	Linux	Device Time:	2023-10-27 10:25:22		
SN:	00000000000000000000	Operation Time:	00:09:32		

Flow Usage Monitoring

Data Usage(daily):	25KB
Alarm value(day):	0KB
Data Usage(Monthly):	66877KB
Alarm value(Month):	0KB

Performance

CPU:	15%
Memory:	14%
Flash:	4%

Device Status

WAN

Mode:	WAN
WAN IP:	172.16.11.144
Netmask:	255.255.254.0
Gateway:	172.16.10.1
DNS-1:	119.29.29.29
DNS-2:	8.8.8.8

Ethernet Port 1

Mode:	WAN
Status:	Connected

Ethernet Port 2

Mode:	LAN
Status:	Connected

Cellular

Status:	Networking success
Mode:	sim1first
Network Type:	E-UTRAN(4G)
Signal Level:	48
Signal:	-92dBm
Connection Time:	00:08:40
ICCID:	89861122254040704863
IP Address:	10.130.252.242

LAN

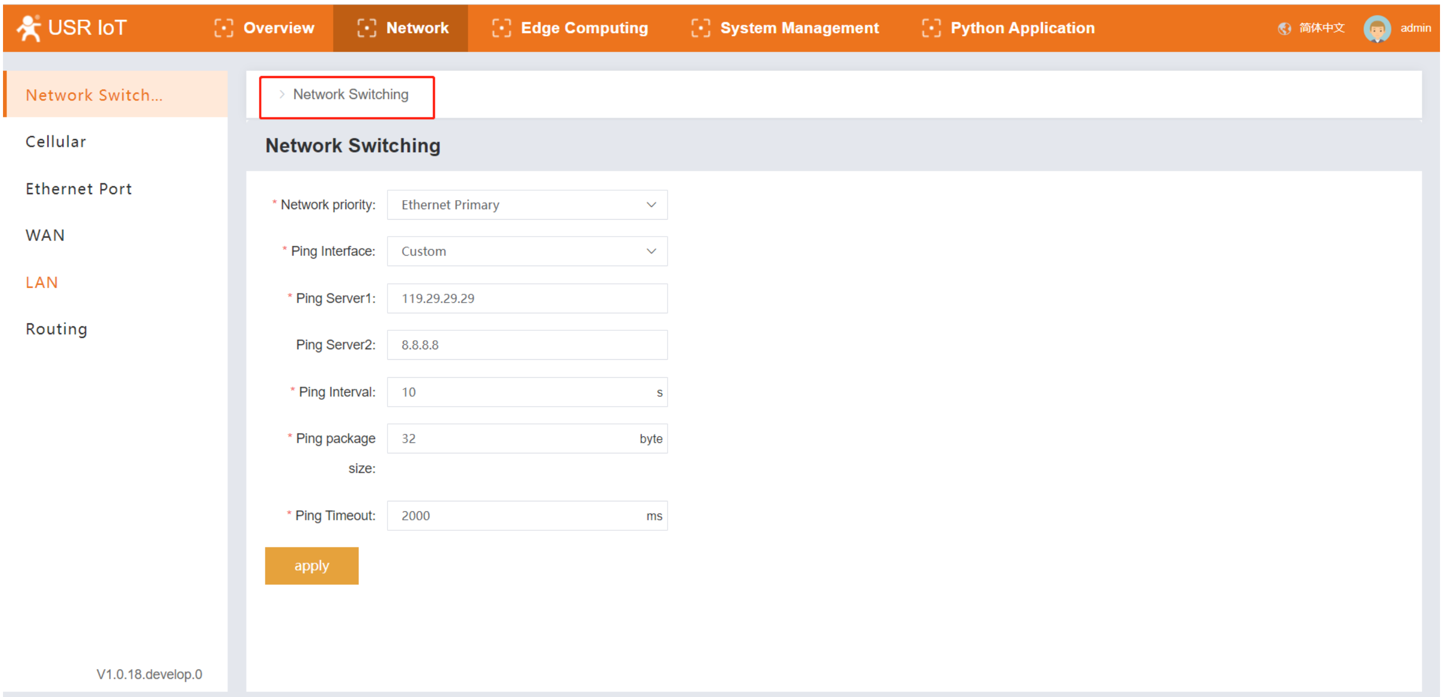
Location

Figure 2. Status webpage

4. Network

4.1. Network switching

On this page, users can select the Internet connectivity priority, and can also set the information of PING detection.

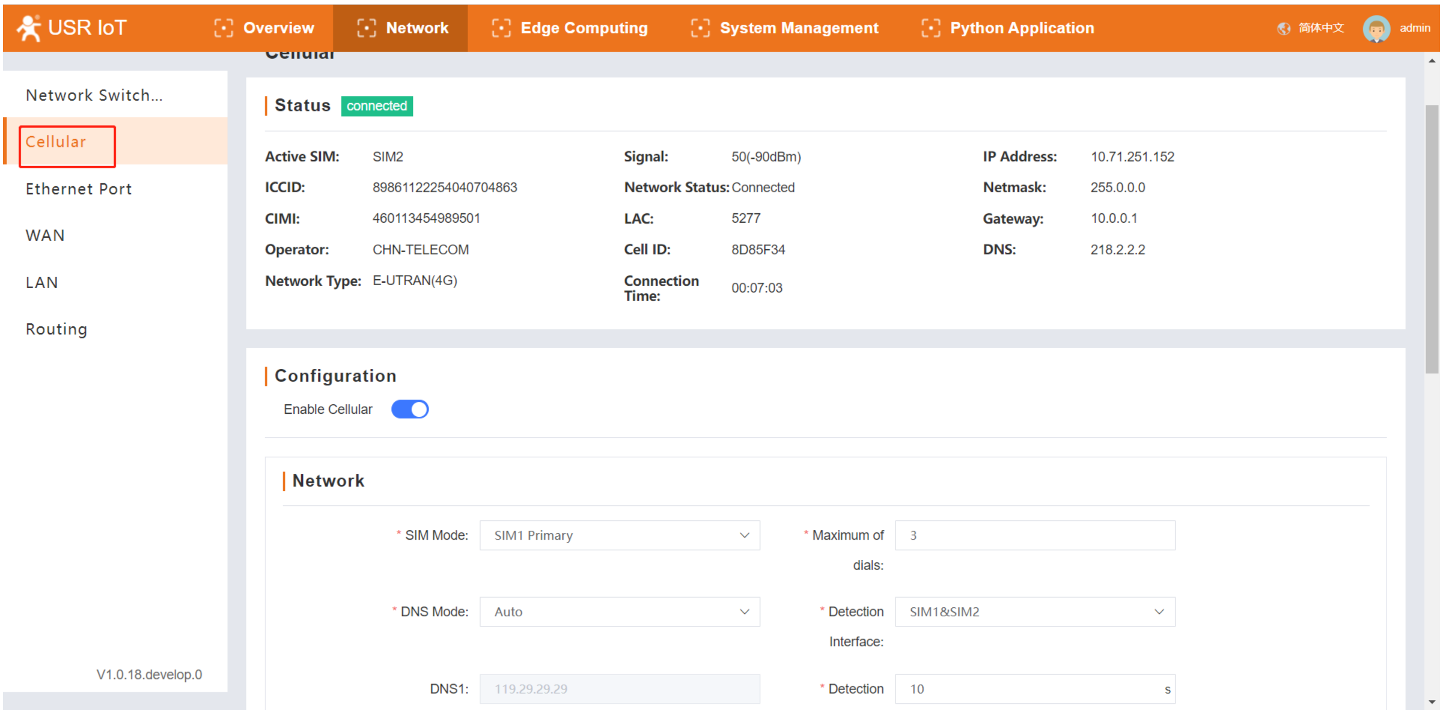


Network Switching

- * Network priority: Ethernet Primary
- * Ping Interface: Custom
- * Ping Server1: 119.29.29.29
- Ping Server2: 8.8.8.8
- * Ping Interval: 10 s
- * Ping package size: 32 byte
- * Ping Timeout: 2000 ms

4.2. Cellular

On this page, users can check the cellular information like the signal strength, IP address and so on. The APN information can be set in this page also.



Status connected

Active SIM:	SIM2	Signal:	50(-90dBm)	IP Address:	10.71.251.152
ICCID:	89861122254040704863	Network Status:	Connected	Netmask:	255.0.0.0
CIMI:	460113454989501	LAC:	5277	Gateway:	10.0.0.1
Operator:	CHN-TELECOM	Cell ID:	8D85F34	DNS:	218.2.2.2
Network Type:	E-UTRAN(4G)	Connection Time:	00:07:03		

Configuration

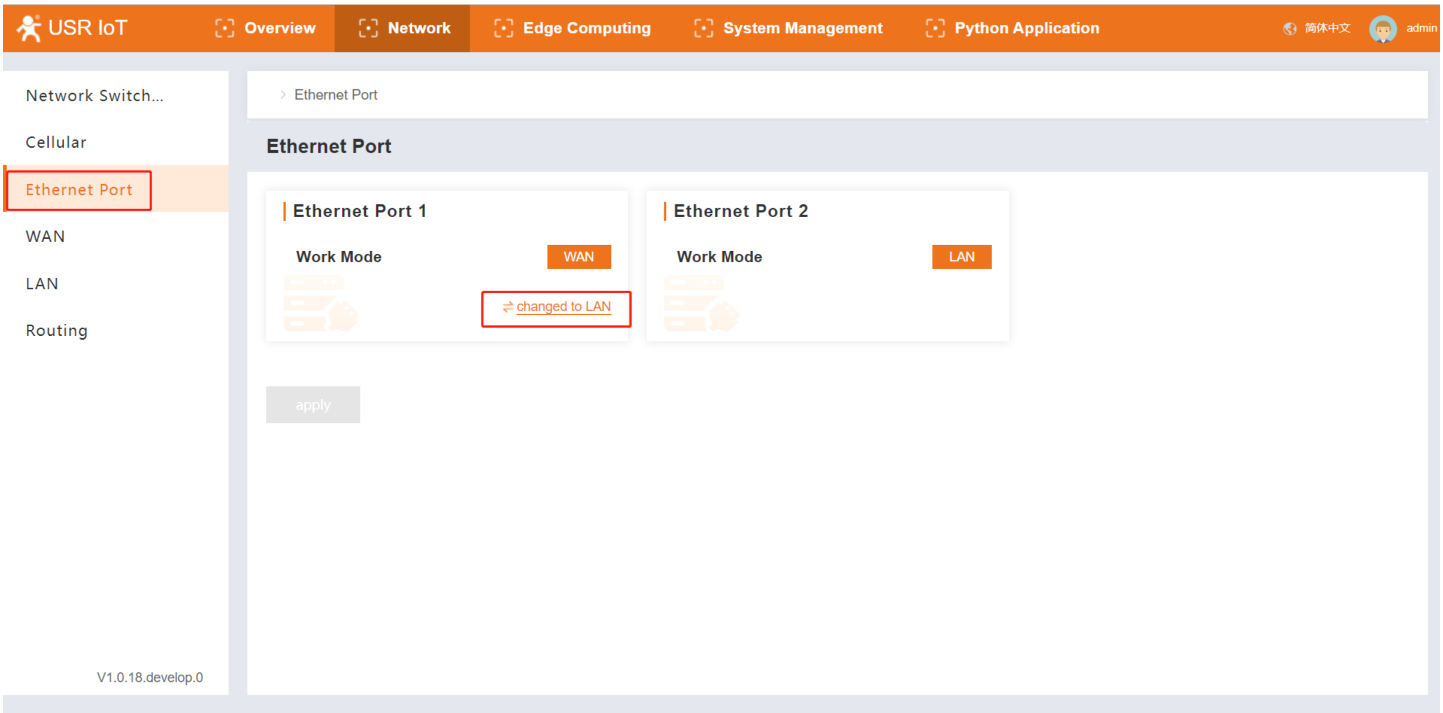
Enable Cellular

Network

- * SIM Mode: SIM1 Primary
- * Maximum of dials: 3
- * DNS Mode: Auto
- * Detection Interface: SIM1&SIM2
- DNS1: 119.29.29.29
- * Detection 10 s

4.3. Ethernet Port

On this page, users can change the work mode of Ethernet Port1. This port is WAN mode by default. And it can be changed to LAN mode. Then the users can get 2 Ethernet ports.



Ethernet Port 1

Work Mode: WAN

⇄ changed to LAN

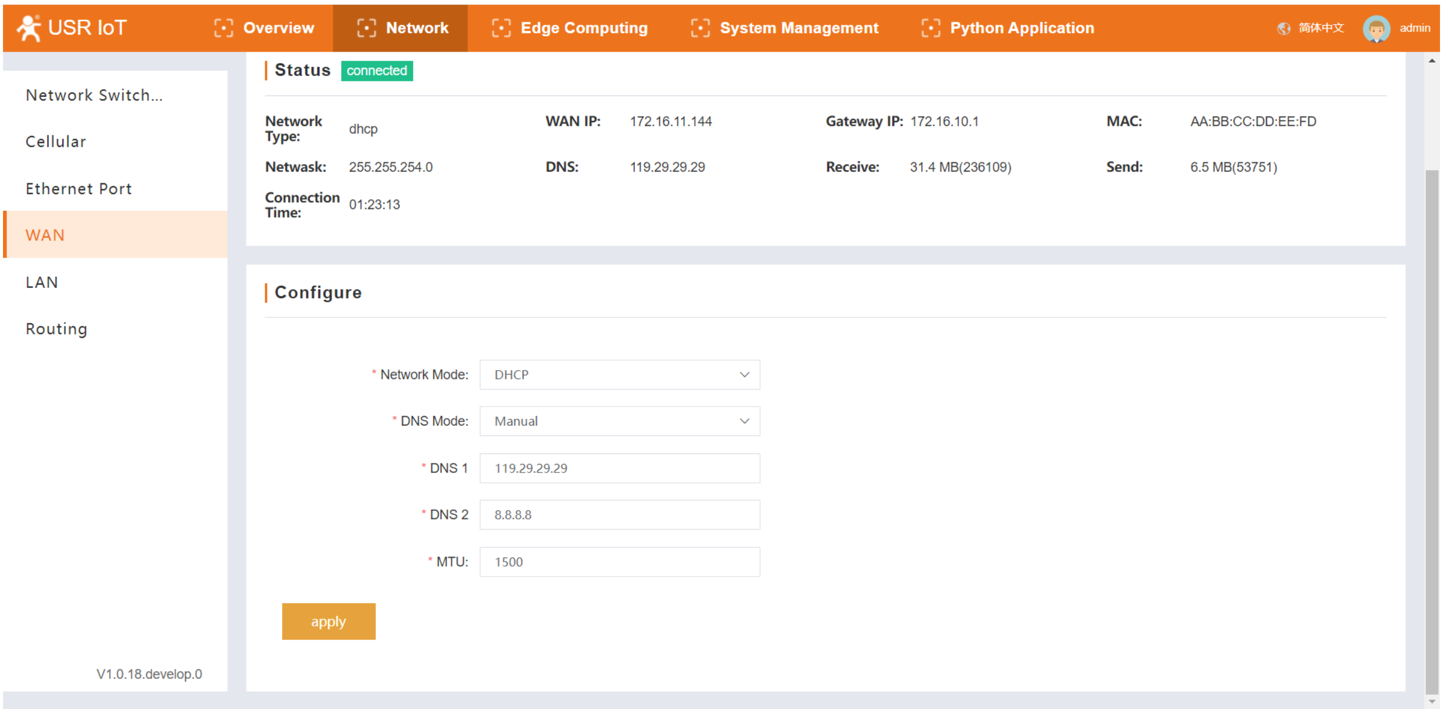
Ethernet Port 2

Work Mode: LAN

apply

4.4. WAN Interface

User can set the parameters of WAN port like network mode, DNS mode and MTU.



Status connected

Network Type: dhcp
WAN IP: 172.16.11.144
Gateway IP: 172.16.10.1
MAC: AA:BB:CC:DD:EE:FD
Netwask: 255.255.254.0
DNS: 119.29.29.29
Receive: 31.4 MB(236109)
Send: 6.5 MB(53751)
Connection Time: 01:23:13

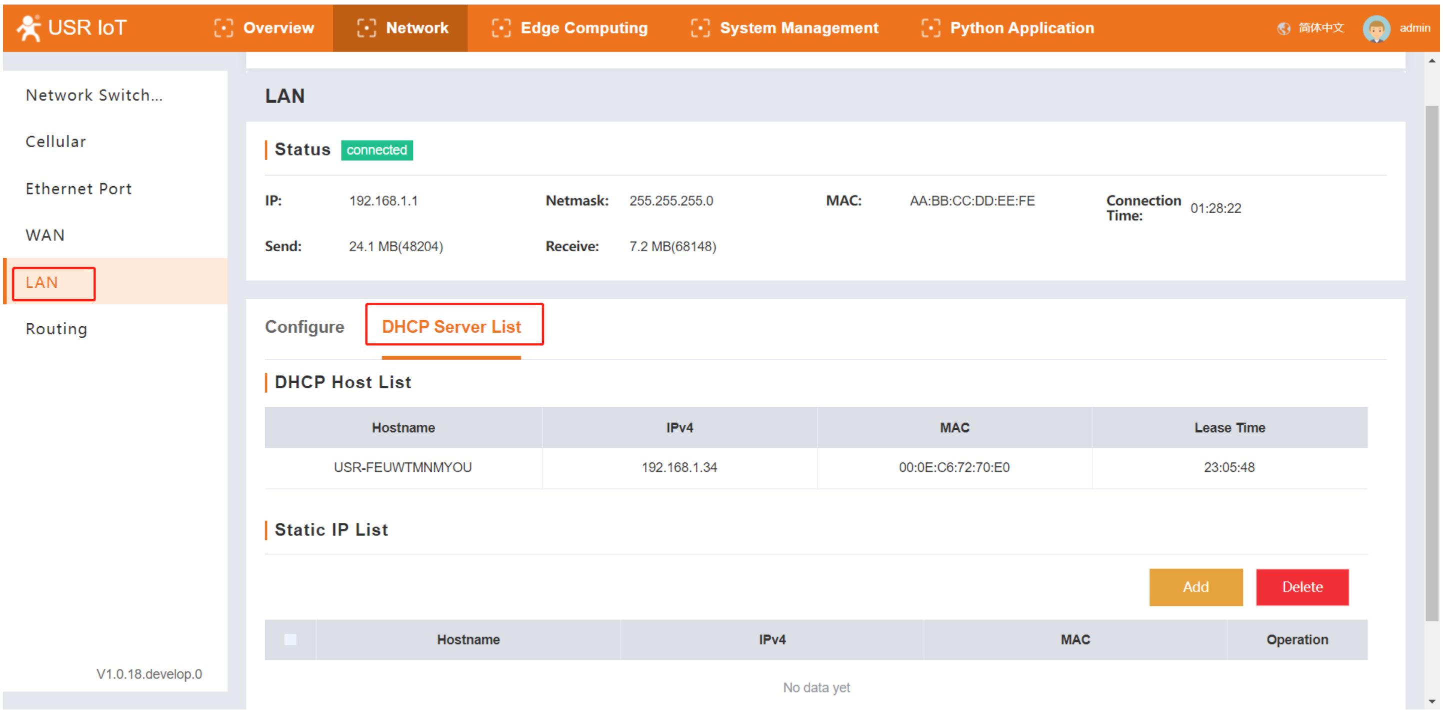
Configure

* Network Mode: DHCP
* DNS Mode: Manual
* DNS 1 119.29.29.29
* DNS 2 8.8.8.8
* MTU: 1500

apply

4.5. LAN Interface

Users can set the basic information of LAN port like IP address, netmask and DHCP service. When the M300 enables the DHCP service, it can assign IP address to the terminal device connected to M300 via LAN port.



LAN

Status connected

IP:	192.168.1.1	Netmask:	255.255.255.0	MAC:	AA:BB:CC:DD:EE:FE	Connection Time:	01:28:22
Send:	24.1 MB(48204)	Receive:	7.2 MB(68148)				

Configure | DHCP Server List

DHCP Host List

Hostname	IPv4	MAC	Lease Time
USR-FEUWTMNMYOU	192.168.1.34	00:0E:C6:72:70:E0	23:05:48

Static IP List

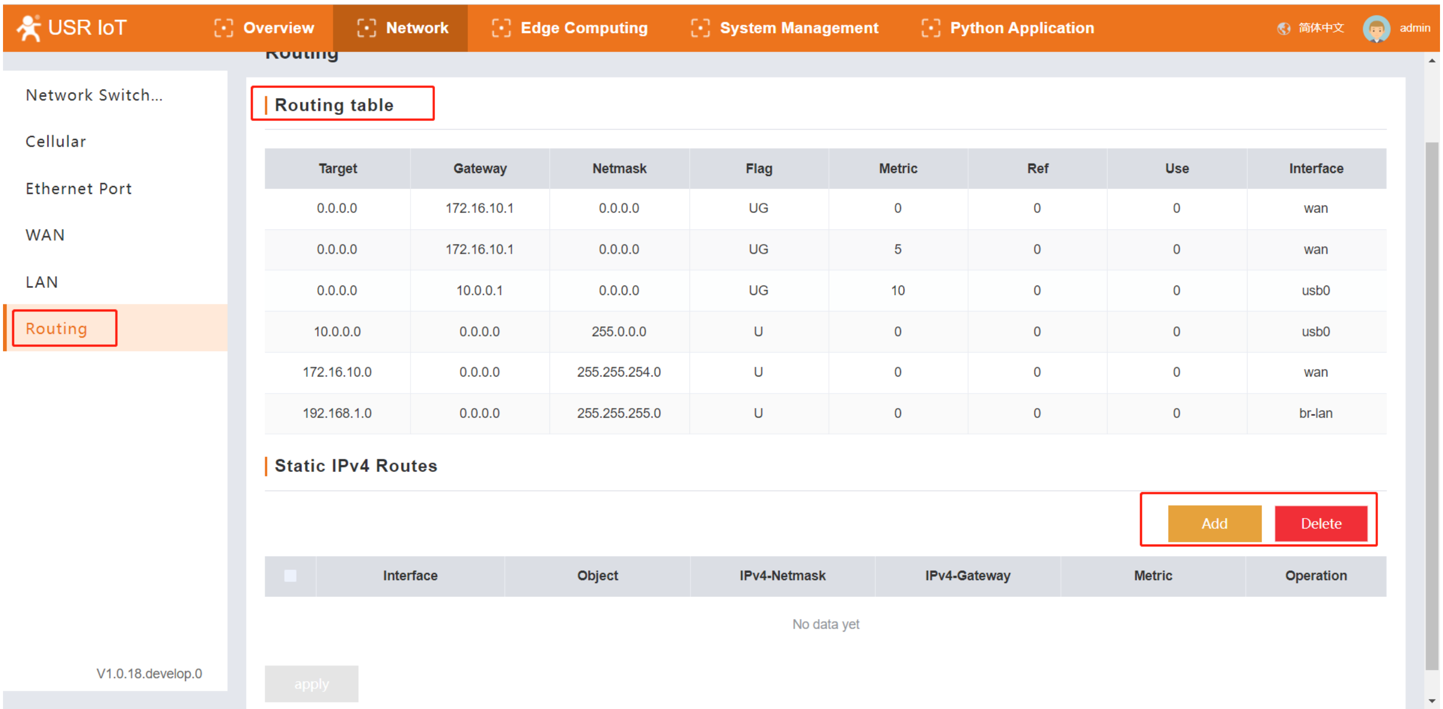
Add Delete

□	Hostname	IPv4	MAC	Operation

No data yet

4.6. Routing

On this page, users can check the routing table and add needed static routing to USR-M300.



Routing table

Target	Gateway	Netmask	Flag	Metric	Ref	Use	Interface
0.0.0.0	172.16.10.1	0.0.0.0	UG	0	0	0	wan
0.0.0.0	172.16.10.1	0.0.0.0	UG	5	0	0	wan
0.0.0.0	10.0.0.1	0.0.0.0	UG	10	0	0	usb0
10.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0	usb0
172.16.10.0	0.0.0.0	255.255.254.0	U	0	0	0	wan
192.168.1.0	0.0.0.0	255.255.255.0	U	0	0	0	br-lan

Static IPv4 Routes

Add Delete

□	Interface	Object	IPv4-Netmask	IPv4-Gateway	Metric	Operation

No data yet

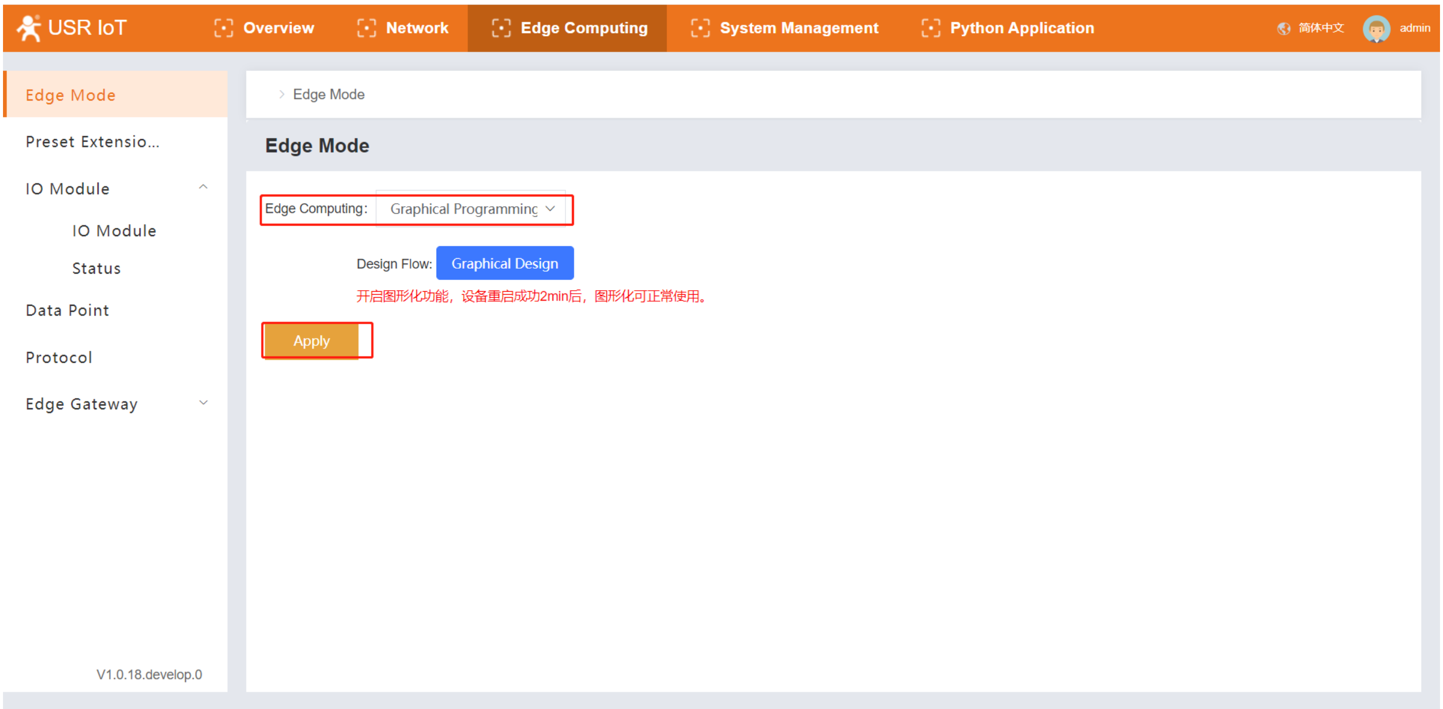
apply

5. Edge Computing

5.1. Edge Mode

The edge mode is edge gateway by default. User can change the mode to Graphical Programming mode. The Graphical Programming is based on Node RED, in this mode, user can develop the application about the edge computing that they need.

Note: This setting needs to reboot the M300 gateway. Waiting another 2 minutes after the M300 starting, then the Graphical Design page can be opened.

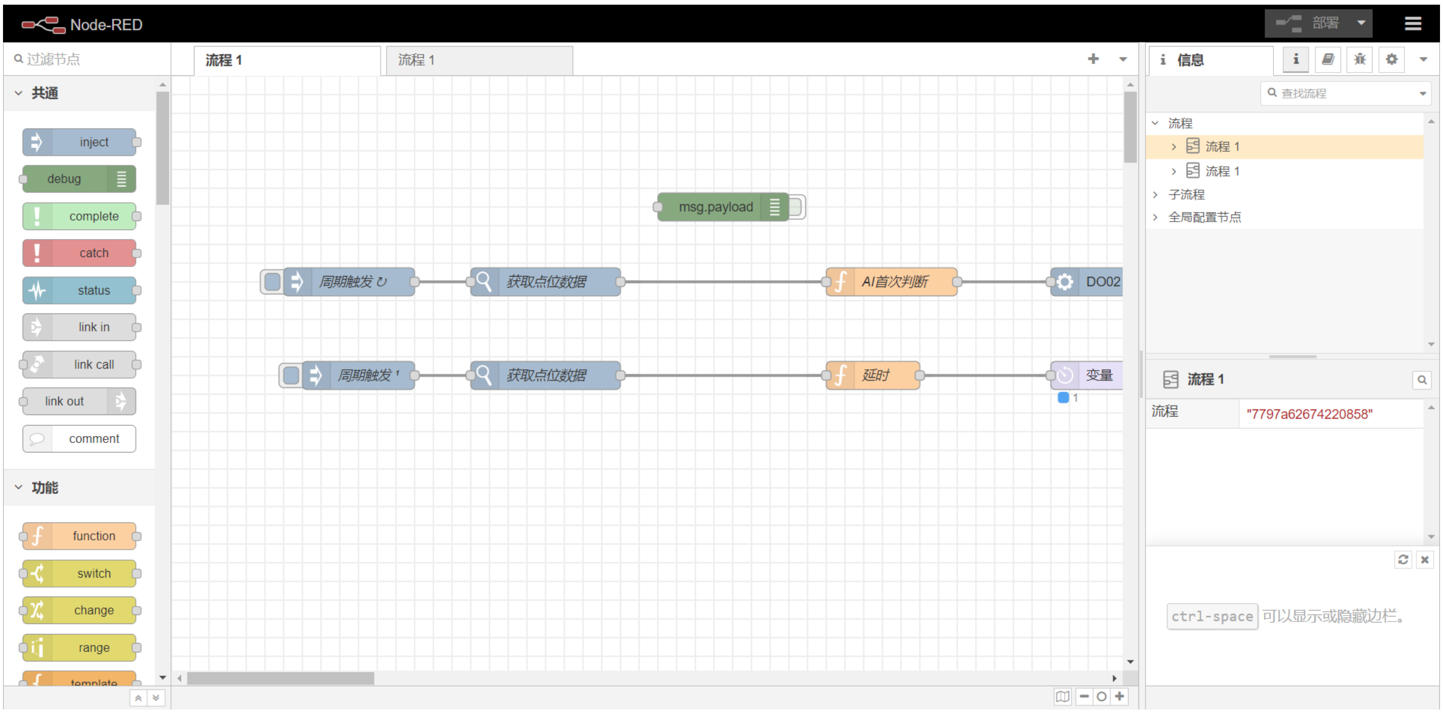


Edge Computing: Graphical Programming

Design Flow: Graphical Design

开启图形化功能，设备重启成功2min后，图形化可正常使用。

Apply



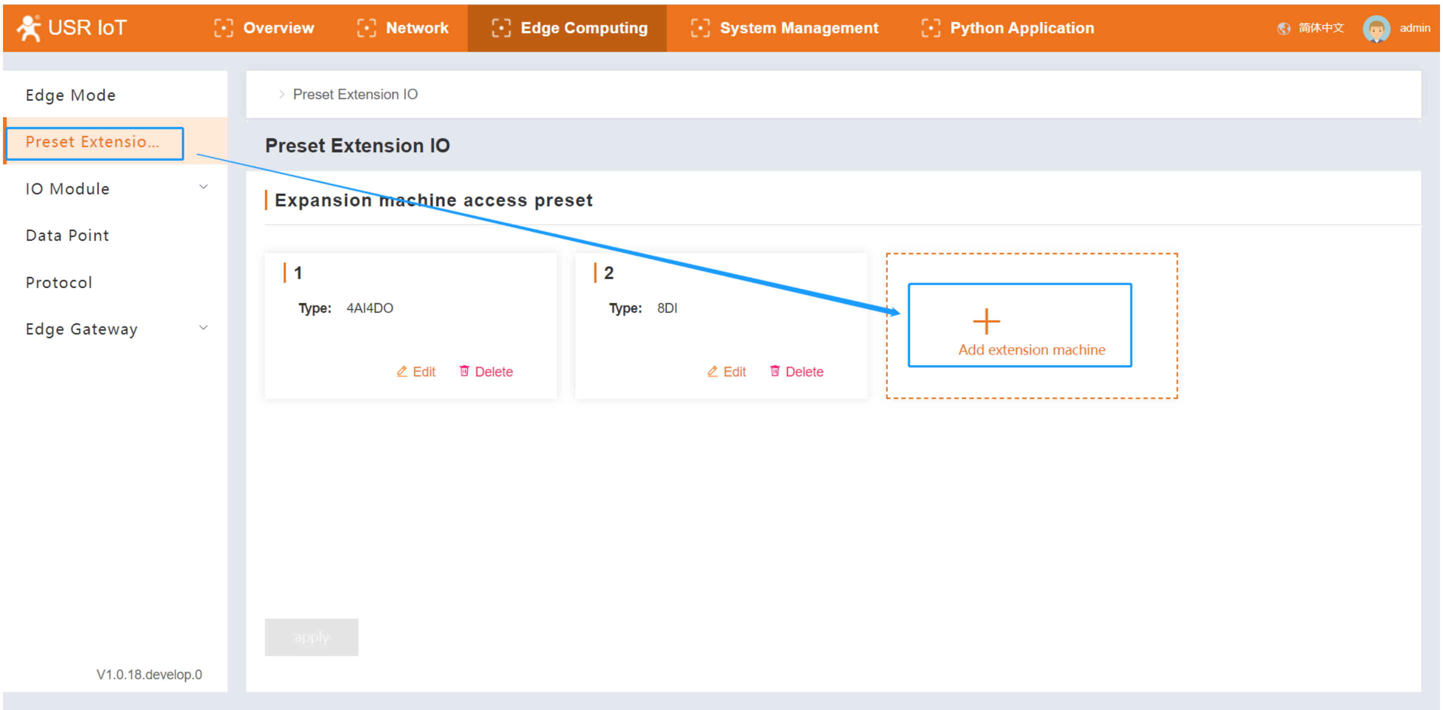
流程 "7797a62674220858"

ctrl-space 可以显示或隐藏边栏。

5.2. Preset Extension IO

As we all know, the M300 can work with extendable IO module to extend the IO numbers. If the extendable IO modules are connected to M300, users need to preset the IO modules on webpage. The IO modules sequence should be kept the same with the actual hardware sequence.

If the sequence on webpage is different from the hardware sequence of extendable IO modules, the work indicators on M300 will fast blink, and the work indicators on IO extendable modules will blink 4 times/s, then keep off for 2s.



5.3. IO Module

There are 2 parts in this function, the detail information and the status of IO modules.

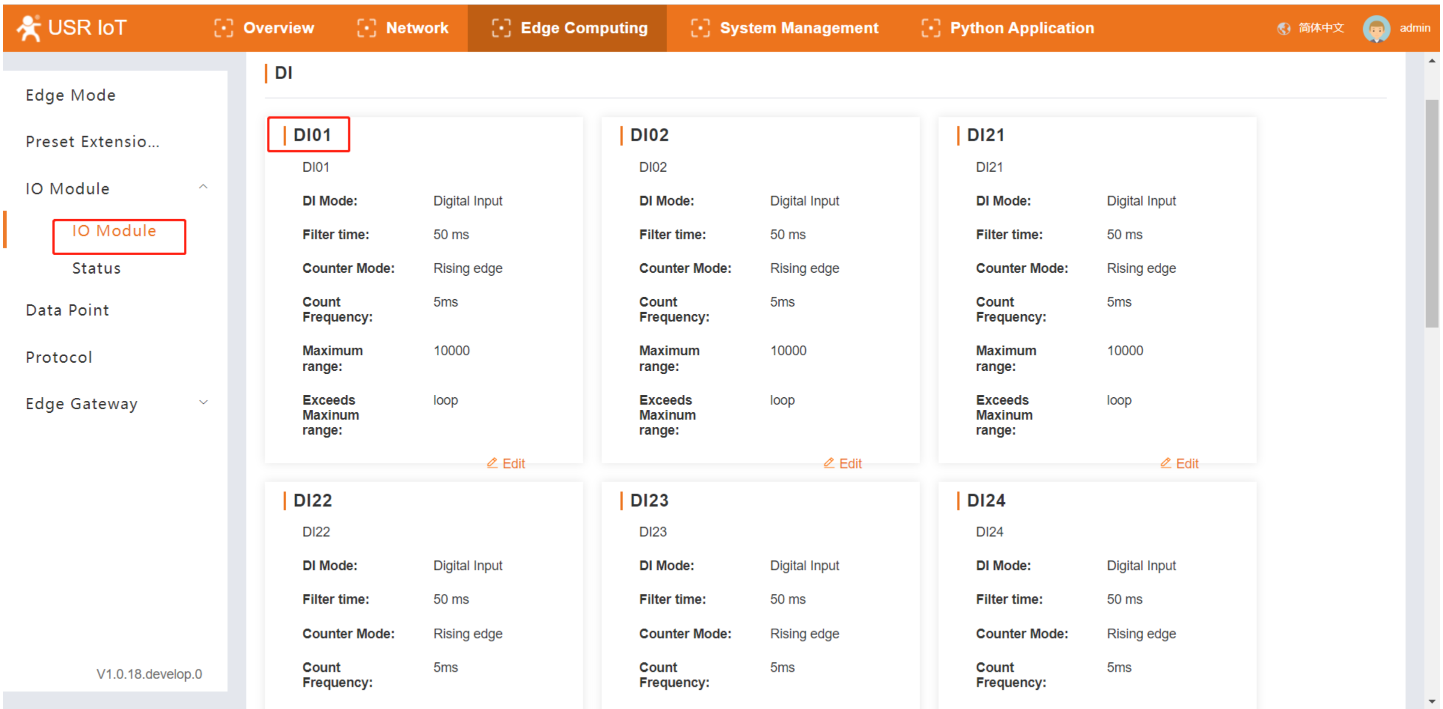
5.3.1. DI Interface

On this page, users can check the settings of digital input interfaces, and can also set the work mode of DI interfaces.

DI01: It means the first DI interface of USR-M300

DI22: It means the second DI input of the second extendable IO module.

DI27: It means the seventh DI input of the second extendable IO module.



DI

DI01
DI01
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms
Maximum range: 10000
Exceeds Maxinum range: loop

DI02
DI02
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms
Maximum range: 10000
Exceeds Maxinum range: loop

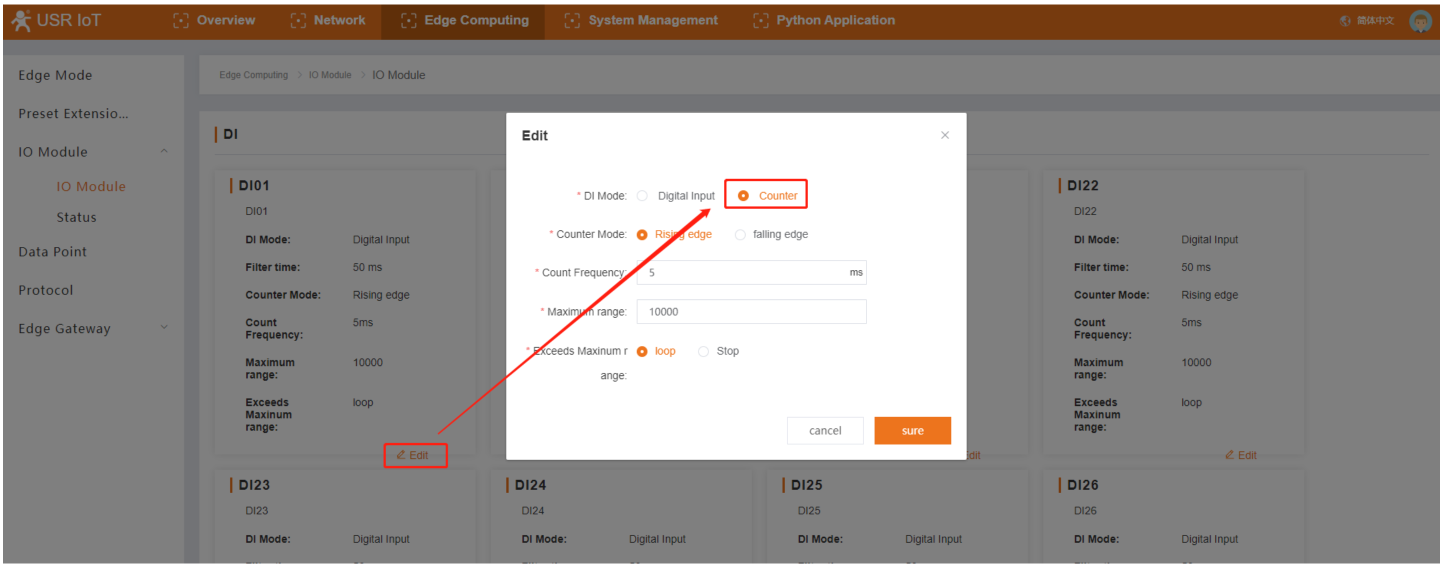
DI21
DI21
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms
Maximum range: 10000
Exceeds Maxinum range: loop

DI22
DI22
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms

DI23
DI23
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms

DI24
DI24
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms

The default DI mode is Digital Input, users can click “Edit” to modify the settings.

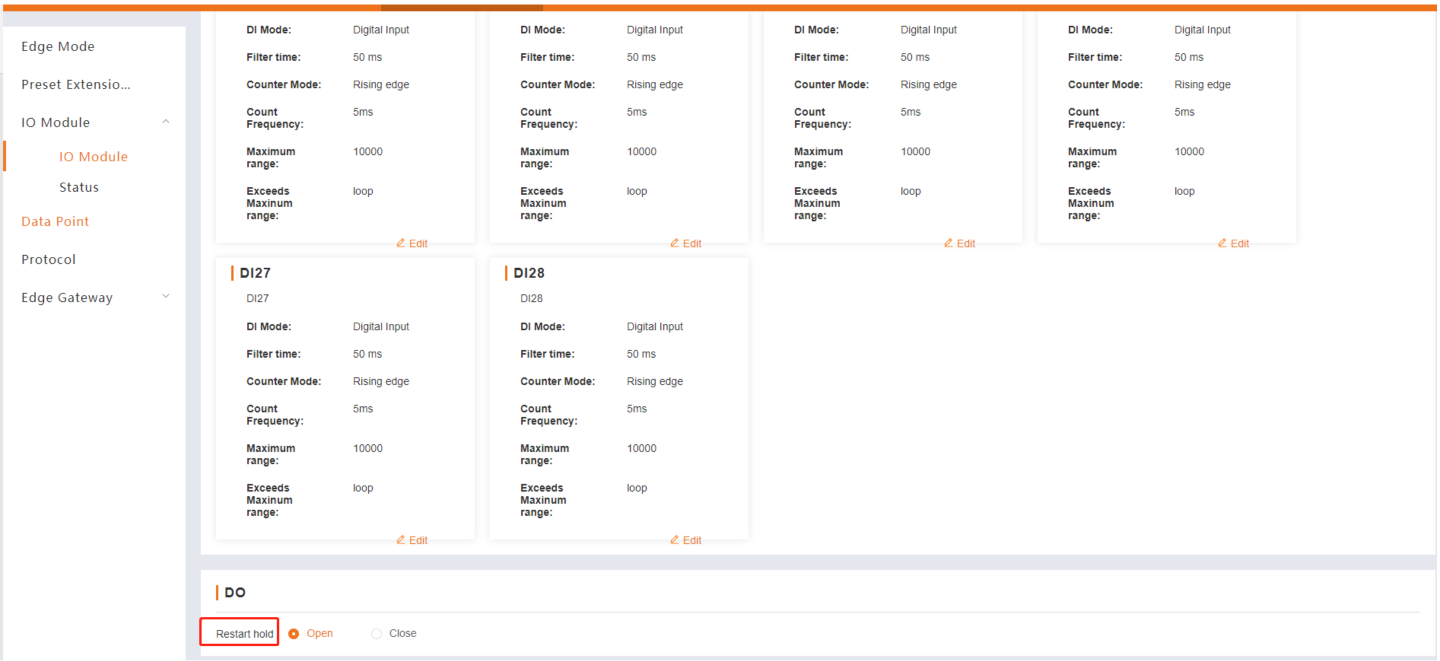


Edit

* DI Mode: ○ Digital Input ● Counter
* Counter Mode: ● Rising edge ○ falling edge
* Count Frequency: 5 ms
* Maximum range: 10000
* Exceeds Maxinum range: ● loop ○ Stop

There is another function can be set on this page: Restart Hold of DO. This function is closed by default.

If the Restart Hold function is enabled, when we restart the M300, the DO will remain in the state before the power outage.



DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms
Maximum range: 10000
Exceeds Maxinum range: loop

DI27

DI27

DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms
Maximum range: 10000
Exceeds Maxinum range: loop

DI28

DI28

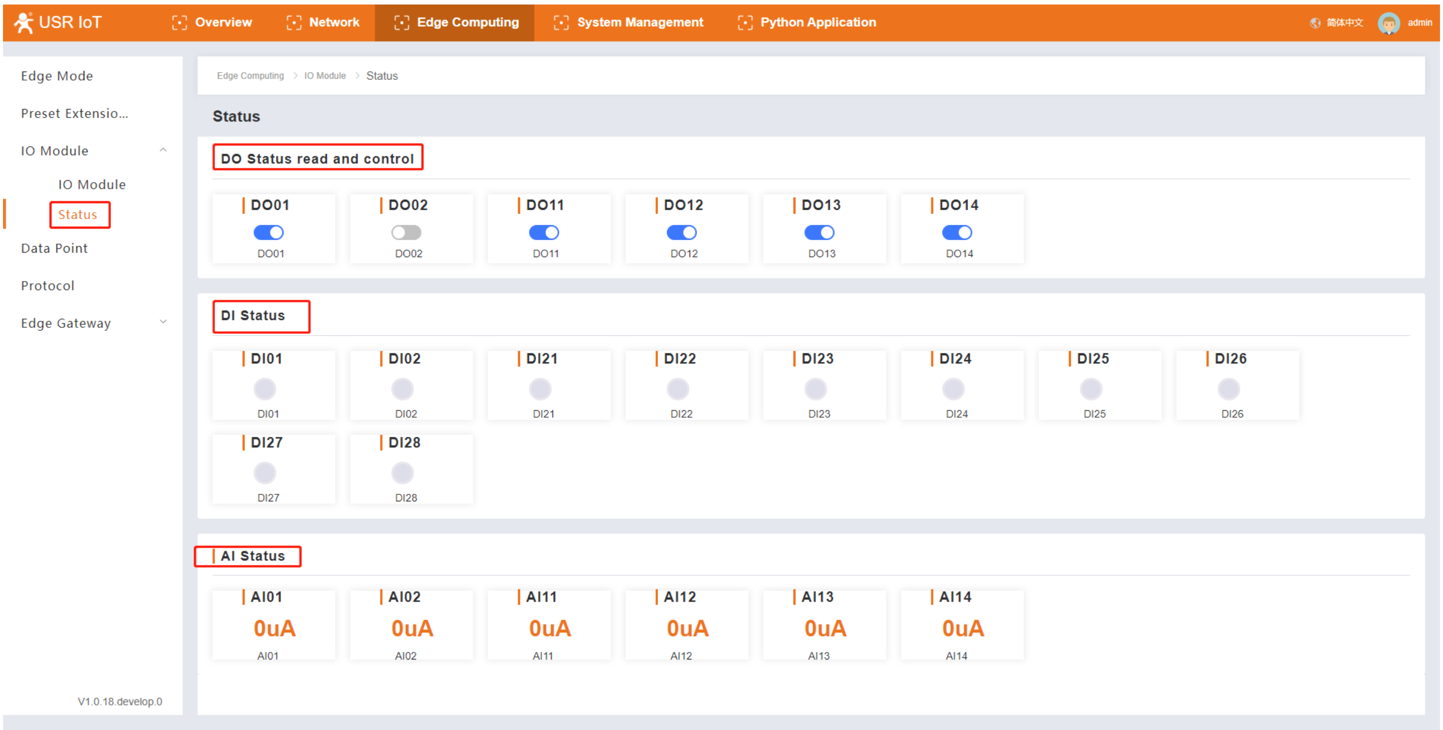
DI Mode: Digital Input
Filter time: 50 ms
Counter Mode: Rising edge
Count Frequency: 5ms
Maximum range: 10000
Exceeds Maxinum range: loop

DO

Restart hold ● Open ○ Close

5.3.2. Status of IO modules

On this page, users can check the status of IO interface. And can also control the DO interface. Click the DO button, the indicators of DO will turn on or turn off.



Status

DO Status read and control

DO01	DO02	DO11	DO12	DO13	DO14
●	○	●	●	●	●
DO01	DO02	DO11	DO12	DO13	DO14

DI Status

DI01	DI02	DI21	DI22	DI23	DI24	DI25	DI26
○	○	○	○	○	○	○	○
DI01	DI02	DI21	DI22	DI23	DI24	DI25	DI26

DI27	DI28
○	○
DI27	DI28

AI Status

AI01	AI02	AI11	AI12	AI13	AI14
0uA	0uA	0uA	0uA	0uA	0uA
AI01	AI02	AI11	AI12	AI13	AI14

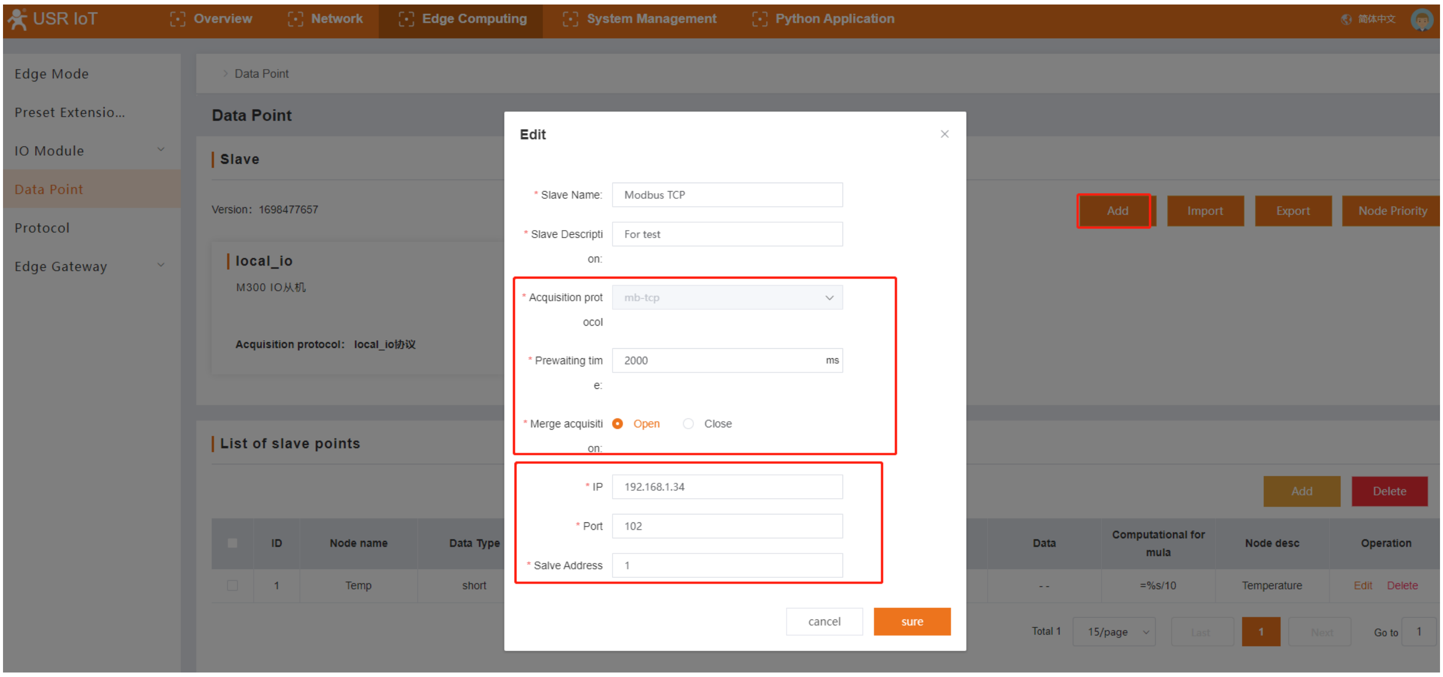
5.4. Data Point

Data Point Table is the core database of the edge computing gateway. The data and data-related information used by the edge gateway for acquisition, reporting, data reading and writing, protocol conversion and linkage control are all obtained from this point table. Therefore, during use, it is very important to add the data point table correctly and in detail.

The data point table contains two main elements: slaves and data points. Up to 20 slaves can be added, IO slaves and virtual slaves are fixed. The remaining 18 Slaves can be added as needed. Corresponding data points can be added to each slave. Except for the virtual slave, the total number of data points of all other slaves is up to 2000. The data points of each slave are actively polled and collected from the corresponding interface according to the protocol specified when adding the slave, and the collected data is correspondingly stored in the virtual register in the product.

For virtual slaves, up to 500 points can be added.

Let's add a slave first, the Modbus TCP protocol is used in this case.



Version: 1698477657

local_io

M300 IO从机

Acquisition protocol: local_io协议

* Slave Name: Modbus TCP

* Slave Description: For test

* Acquisition protocol: mb-tcp

* Prewaiting time: 2000 ms

* Merge acquisition: ● Open ○ Close

* IP: 192.168.1.34

* Port: 102

* Salve Address: 1

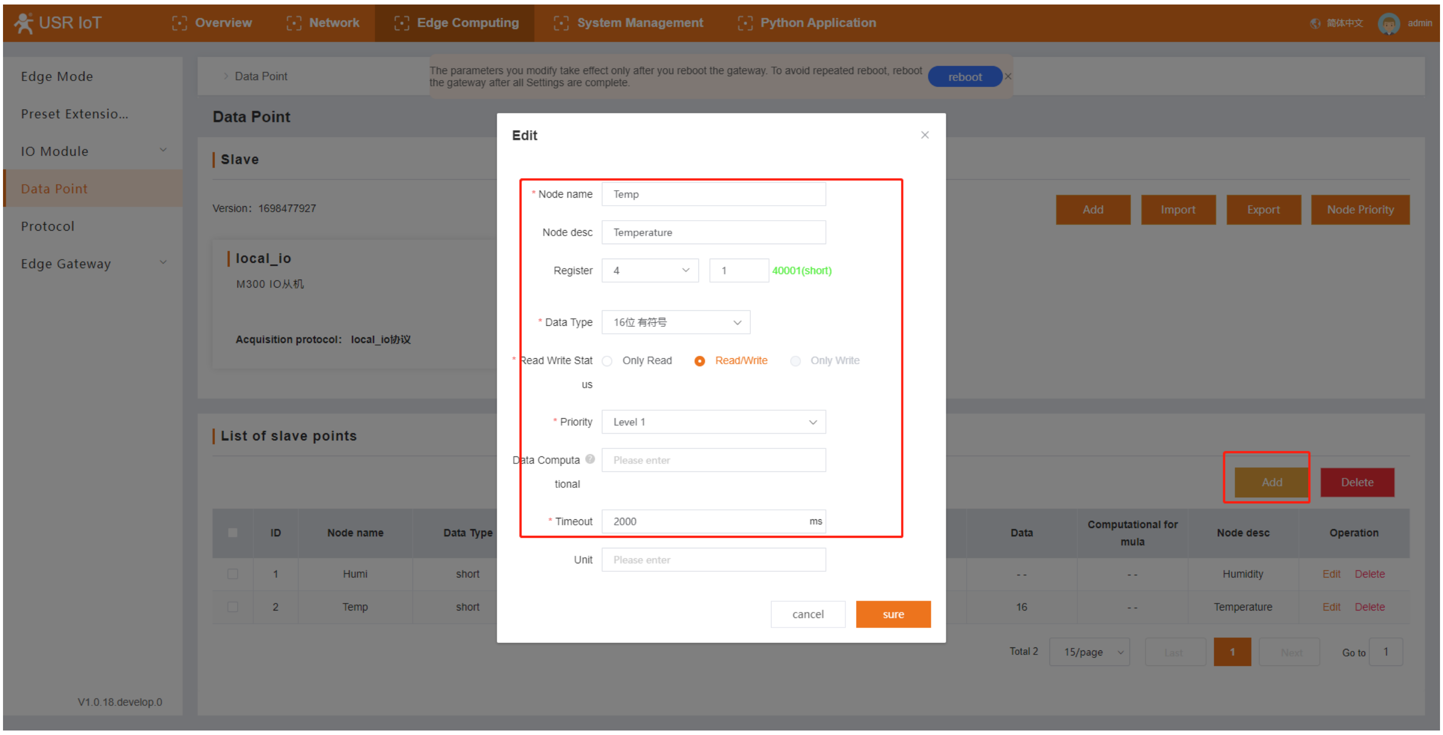
□	ID	Node name	Data Type	Data	Computational formula	Node desc	Operation
□	1	Temp	short	- -	=%s/10	Temperature	Edit Delete

Total 1 15/page Last 1 Next Go to 1

Then add the data points of the Modbus TCP slave:

1> Click the Modbus TCP Slave

2> If we didn't add the data points before, the list of slave points is blank. Click the "Add" button to enter the point information.



The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

Version: 1698477927

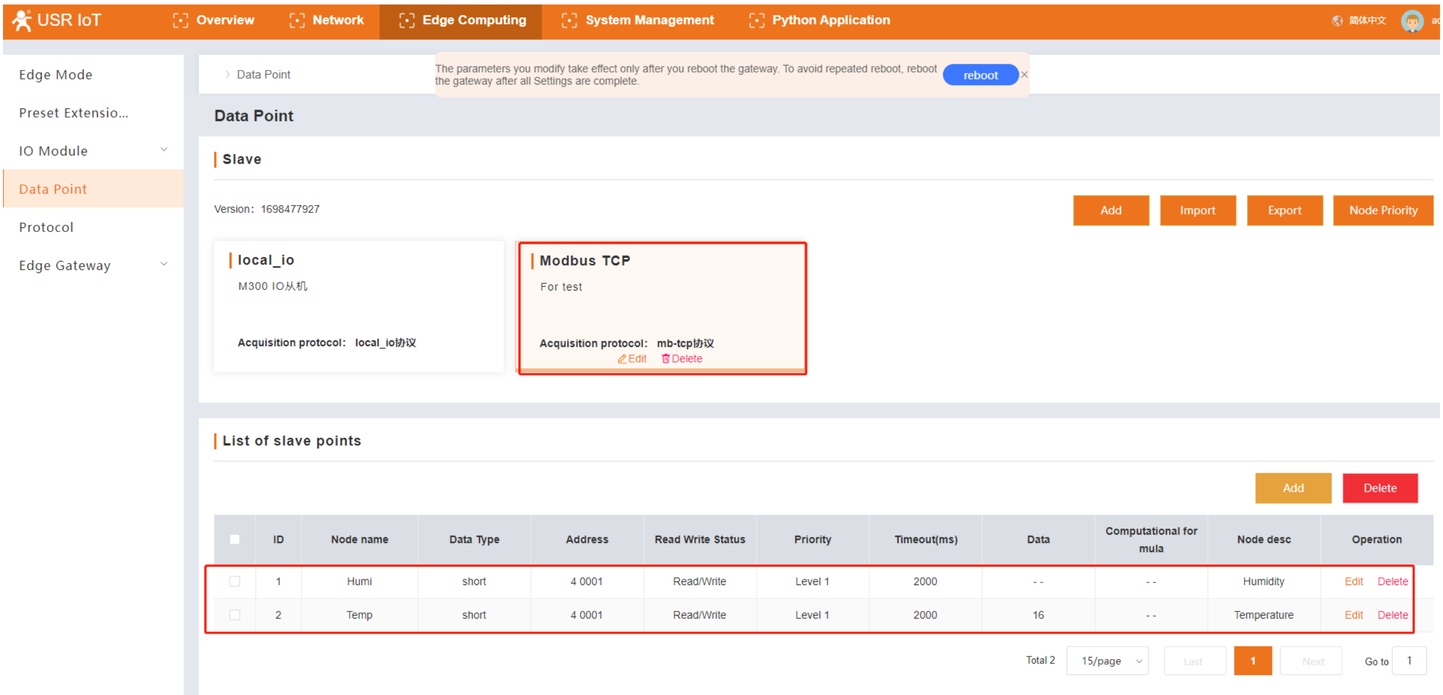
local_io
M300 IO从机
Acquisition protocol: local_io协议

Edit

- * Node name: Temp
- Node desc: Temperature
- Register: 4 | 1 | 40001(short)
- * Data Type: 16位 有符号
- * Read Write Status: ○ Only Read ● Read/Write ○ Only Write
- * Priority: Level 1
- Data Computational: Please enter
- * Timeout: 2000 ms
- Unit: Please enter

cancel | sure

3> Added slave and data points:



The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

Data Point

Slave

Version: 1698477927

local_io
M300 IO从机
Acquisition protocol: local_io协议

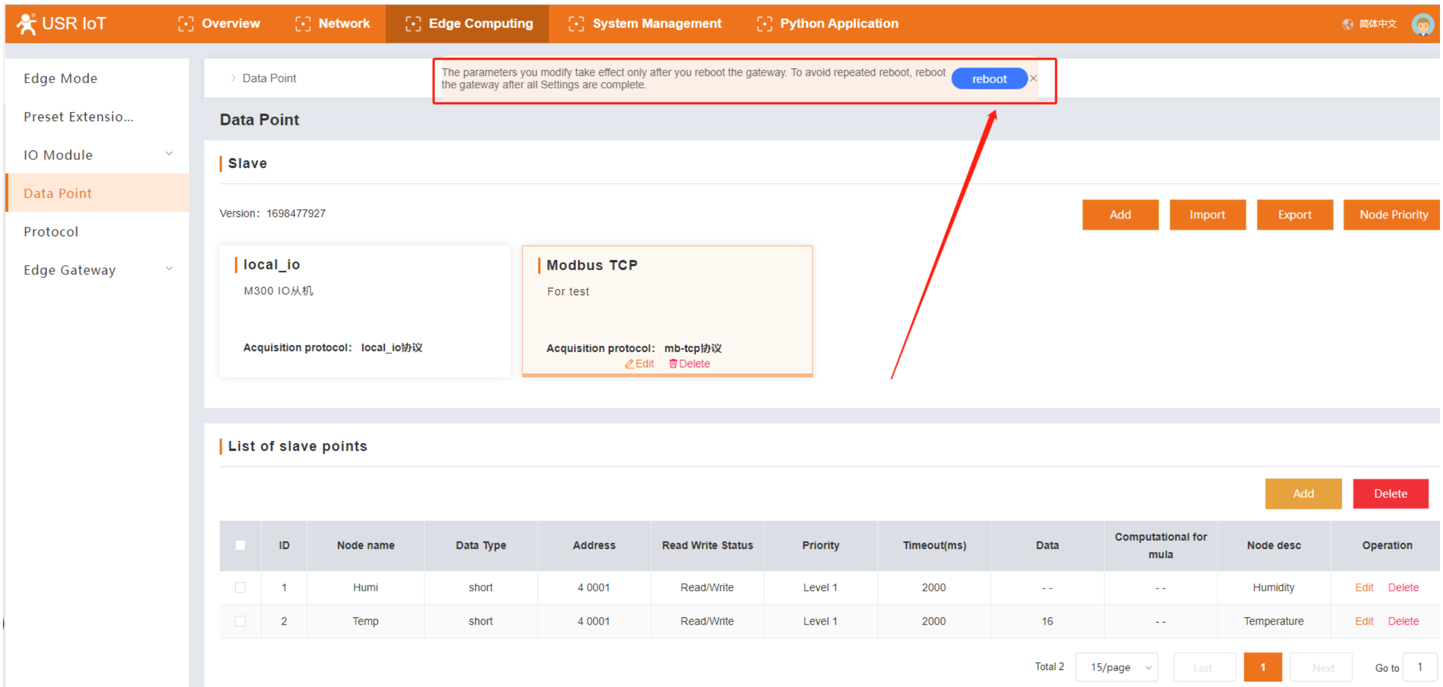
Modbus TCP
For test
Acquisition protocol: mb-tcp协议
Edit Delete

List of slave points

□	ID	Node name	Data Type	Address	Read Write Status	Priority	Timeout(ms)	Data	Computational formula	Node desc	Operation
□	1	Humi	short	4 0001	Read/Write	Level 1	2000	- -	- -	Humidity	Edit Delete
□	2	Temp	short	4 0001	Read/Write	Level 1	2000	16	- -	Temperature	Edit Delete

Total 2 | 15/page | Last | 1 | Next | Go to 1

4> After all the slave and data points are added, and other settings are ok, please reboot the M300 to make the changed parameters take effect.



The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

Data Point

Slave

Version: 1698477927

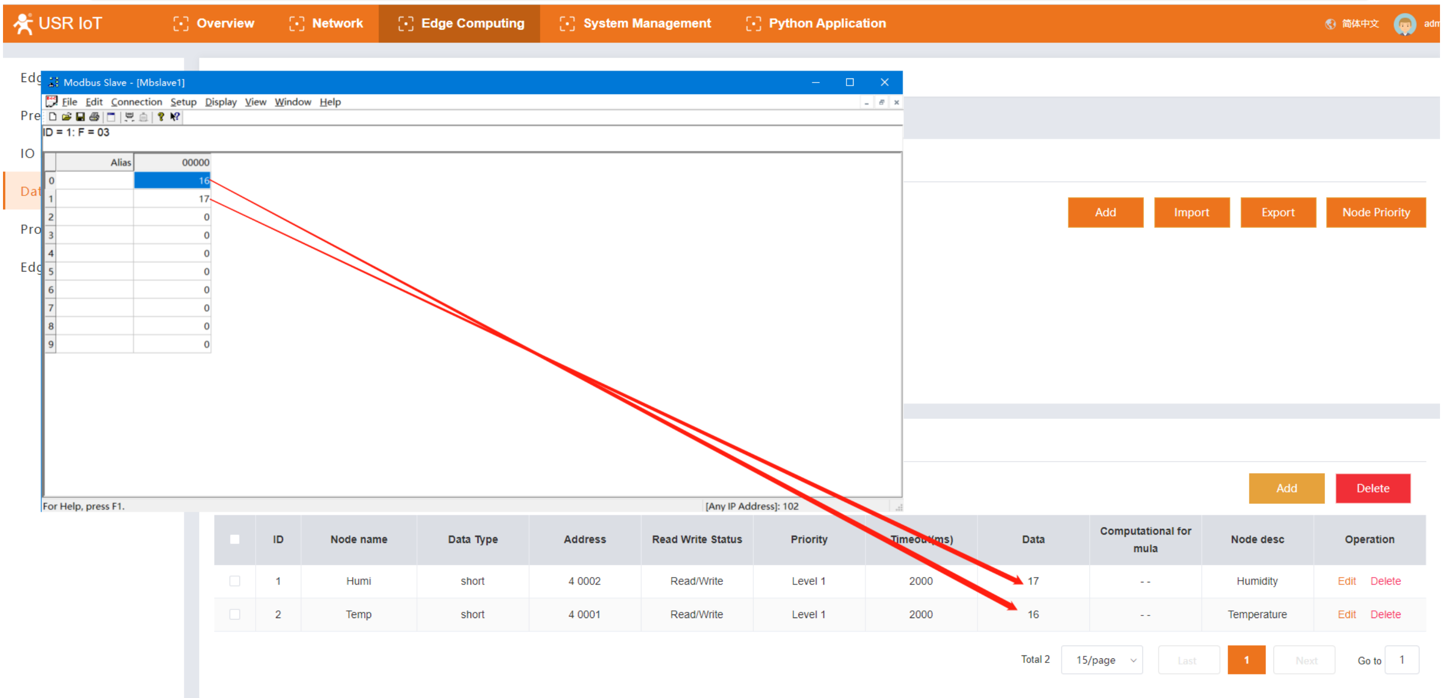
local_io
M300 IO从机
Acquisition protocol: local_io协议

Modbus TCP
For test
Acquisition protocol: mb-tcp协议

List of slave points

□	ID	Node name	Data Type	Address	Read Write Status	Priority	Timeout(ms)	Data	Computational formula	Node desc	Operation
□	1	Humi	short	4 0001	Read/Write	Level 1	2000	- -	- -	Humidity	Edit Delete
□	2	Temp	short	4 0001	Read/Write	Level 1	2000	16	- -	Temperature	Edit Delete

5> Check the collected data.



ID = 1: F = 03

	Alias	00000
0		16
1		17
2		0
3		0
4		0
5		0
6		0
7		0
8		0
9		0

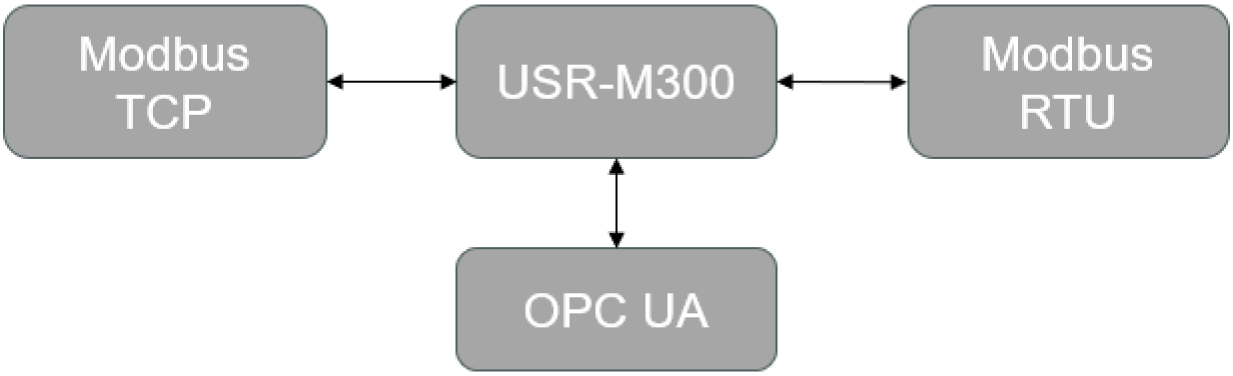
For Help, press F1.　[Any IP Address]: 102

□	ID	Node name	Data Type	Address	Read Write Status	Priority	Timeout(ms)	Data	Computational formula	Node desc	Operation
□	1	Humi	short	4 0002	Read/Write	Level 1	2000	17	- -	Humidity	Edit Delete
□	2	Temp	short	4 0001	Read/Write	Level 1	2000	16	- -	Temperature	Edit Delete

5.5. Protocol

USR-M300 supports mutual conversion between different protocols, such as Modbus RTU/TCP, Modbus TCP and OPC UA, Modbus RTU and OPC UA. More protocol conversions are in development.

With this function, users no need to worry about being unable to communicate due to different protocols between the terminal device and the server, because the M300 will convert the point data of all slave devices into a unified protocol format, making it easier for the server to issue and collect data using a unified protocol.



We have added Modbus TCP slave in section 5.4. In this section, will convert Modbus RTU to Modbus TCP using the protocol conversion function.

- Basic settings:

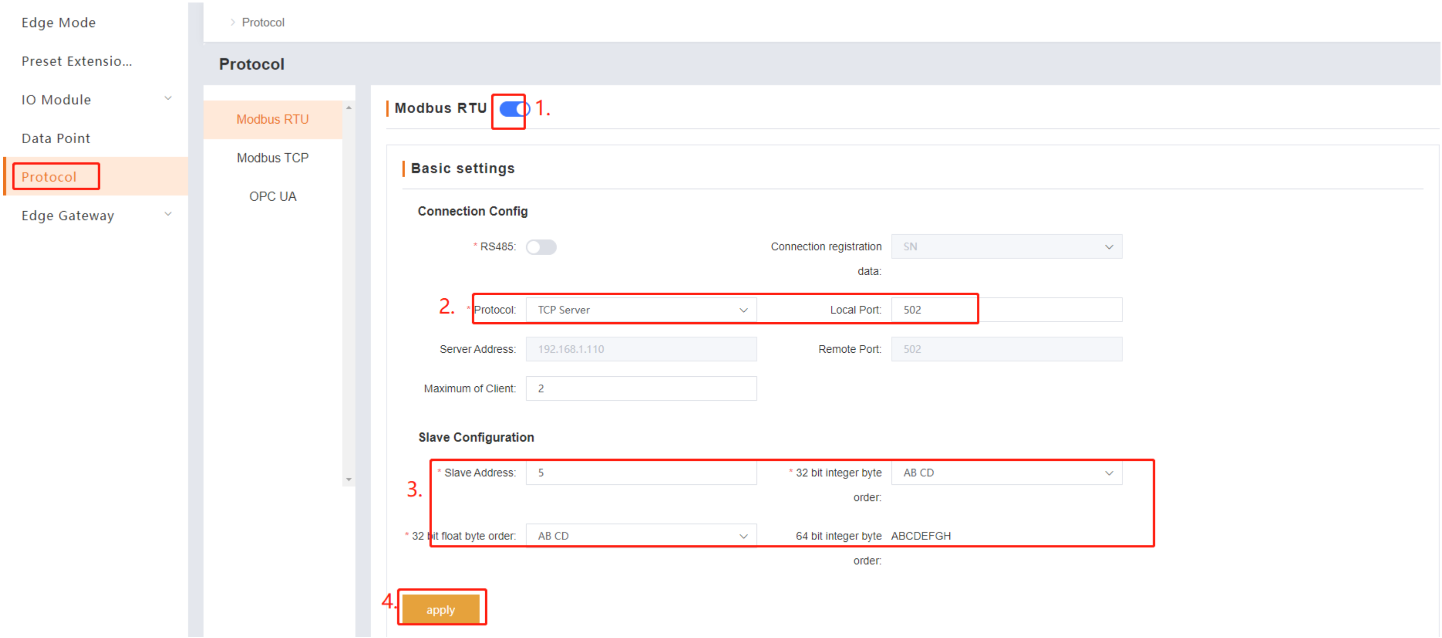
1> Enable Modbus RTU function,

2> Set protocol and local port, in this case, keep them the default patameters

3> Set the Slave address to 5, we add the 16 bit points in Section 5.4, so keep the 32 bit data the default parameters.

4> Click “Apply”, then the window will pop up prompting you to reboot M300 device. We can reboot device after setting all parameters.

Then continue to set mapping point table parameters.



Modbus RTU 1.

Basic settings

Connection Config

* RS485:

Connection registration data: SN

2. * Protocol: TCP Server

Local Port: 502

Server Address: 192.168.1.110

Remote Port: 502

Maximum of Client: 2

Slave Configuration

3. * Slave Address: 5

* 32 bit integer byte order: AB CD

* 32 bit float byte order: AB CD

64 bit integer byte order: ABCDEFGH

4. apply

- Node mapping table

1> Click “Add” button,

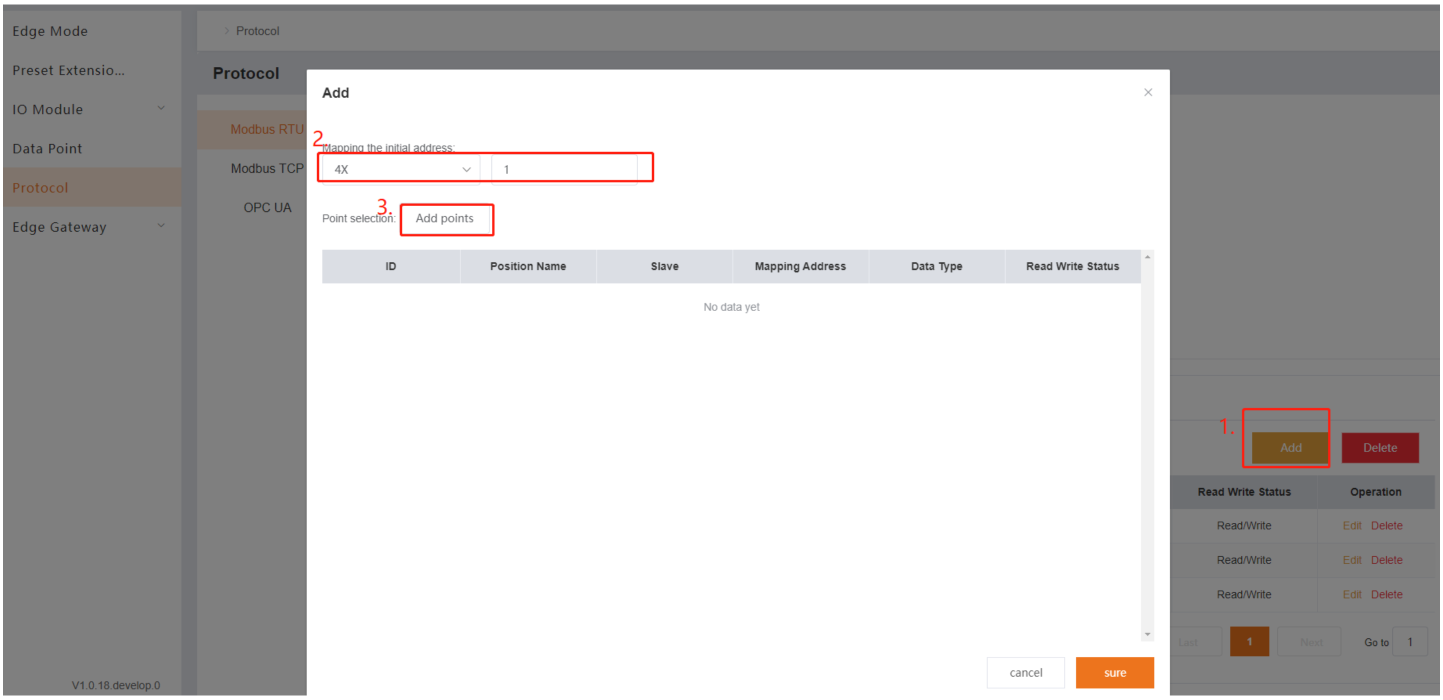
2> Select the register type and enter the initial register address, 3> Click “Add points”,

4> Select the slave just added: Modbus TCP,

5> Select the needed data points,

6> Click “Sure”

7> Reboot USR-M300



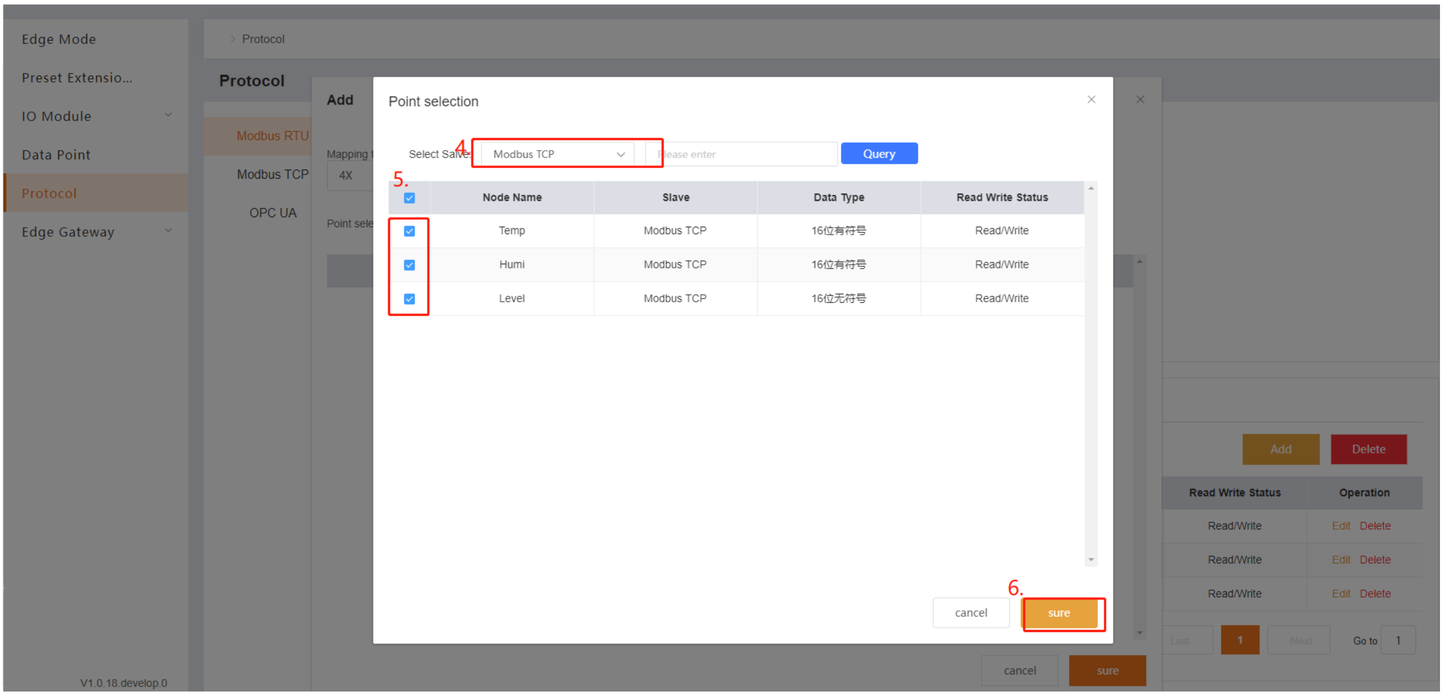
Mapping the initial address: 4X 1

Point selection: Add points

ID	Position Name	Slave	Mapping Address	Data Type	Read Write Status

No data yet

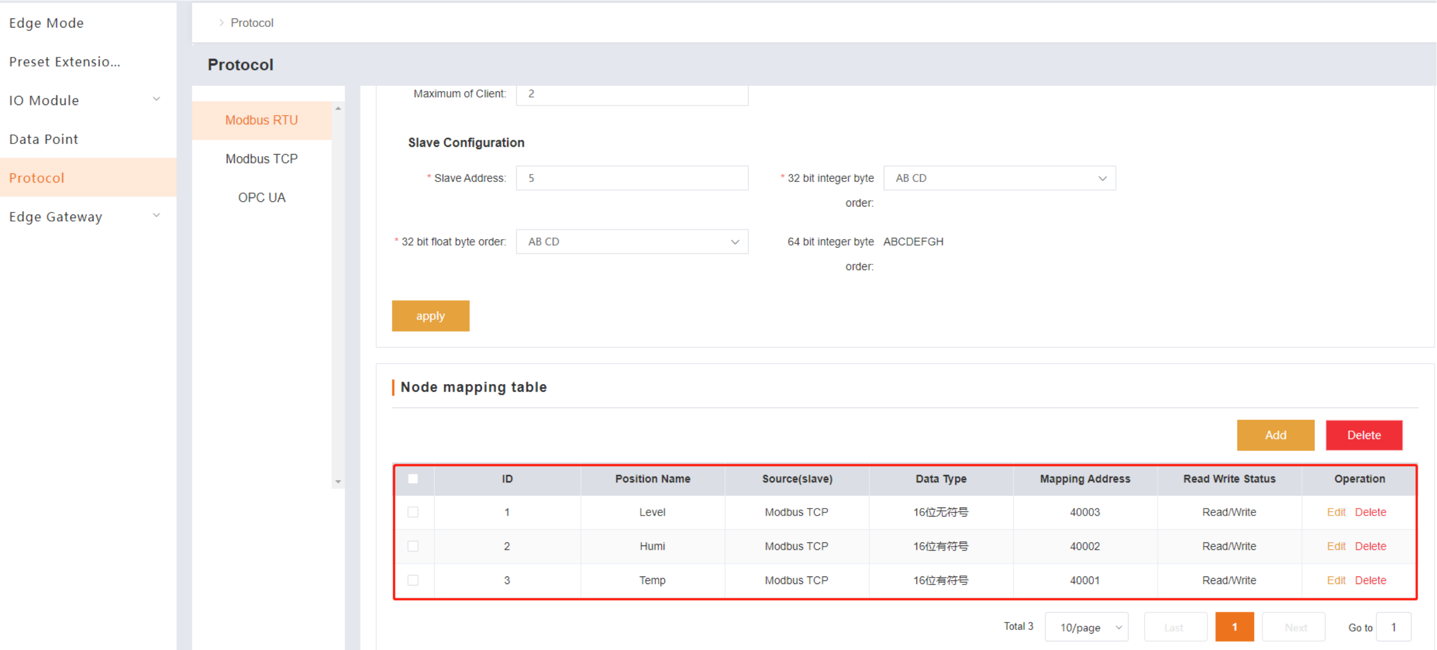
Read Write Status	Operation
Read/Write	Edit Delete
Read/Write	Edit Delete
Read/Write	Edit Delete



Select Salve: Modbus TCP Please enter

☑	Node Name	Slave	Data Type	Read Write Status
☑	Temp	Modbus TCP	16位有符号	Read/Write
☑	Humi	Modbus TCP	16位有符号	Read/Write
☑	Level	Modbus TCP	16位无符号	Read/Write

Read Write Status	Operation
Read/Write	Edit Delete
Read/Write	Edit Delete
Read/Write	Edit Delete



Maximum of Client: 2

Slave Configuration

* Slave Address: 5

* 32 bit integer byte order: AB CD

* 32 bit float byte order: AB CD

64 bit integer byte order: ABCDEFGH

apply

Node mapping table

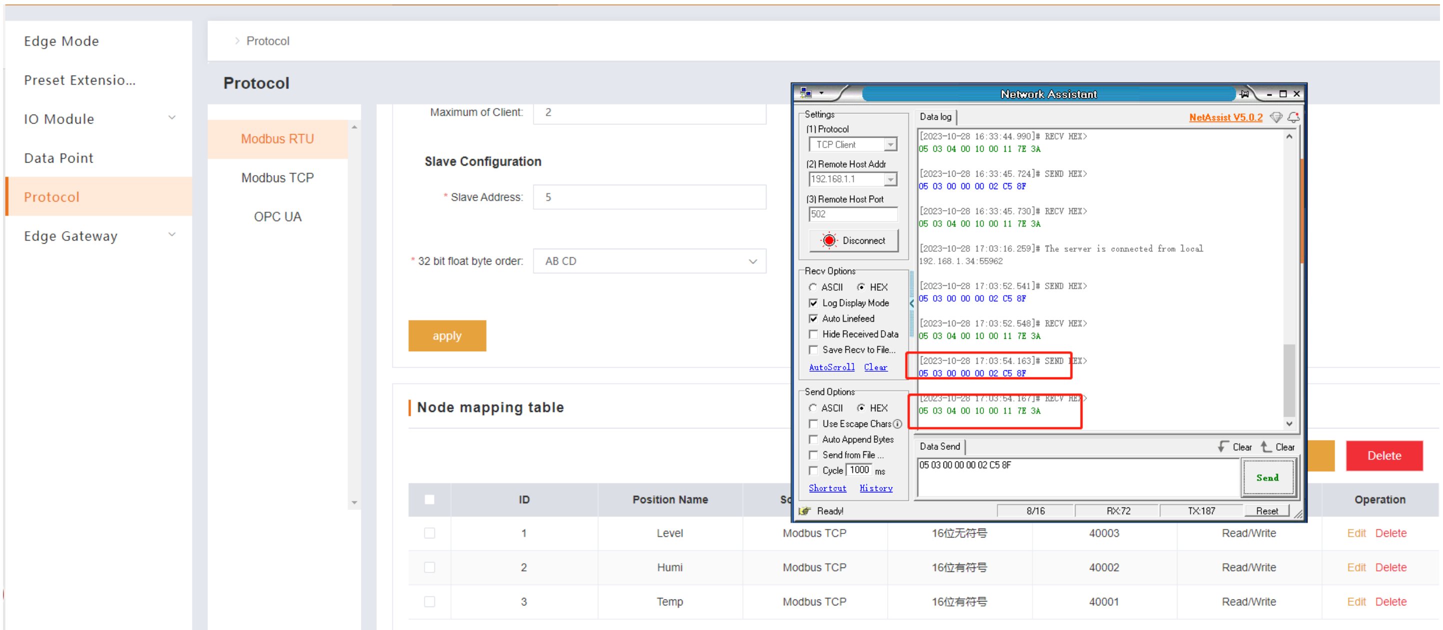
Add Delete

□	ID	Position Name	Source(slave)	Data Type	Mapping Address	Read Write Status	Operation
□	1	Level	Modbus TCP	16位无符号	40003	Read/Write	Edit Delete
□	2	Humi	Modbus TCP	16位有符号	40002	Read/Write	Edit Delete
□	3	Temp	Modbus TCP	16位有符号	40001	Read/Write	Edit Delete

Total 3 10/page Last 1 Next Go to 1

➢ To test the function

Send Modbus RTU command to query data point, and the green part is the response from M300.



Maximum of Client: 2

Slave Configuration

* Slave Address: 5

* 32 bit float byte order: AB CD

apply

Node mapping table

Settings

(1) Protocol: TCP Client

(2) Remote Host Addr: 192.168.1.1

(3) Remote Host Port: 502

Recv Options: ○ ASCII ● HEX; ☑ Log Display Mode; ☑ Auto Linefeed; □ Hide Received Data; □ Save Recv to File...

Send Options: ○ ASCII ● HEX; □ Use Escape Chars; □ Auto Append Bytes; □ Send from File ...; □ Cycle 1000 ms

```
[2023-10-28 16:33:44.990]# RECV HEX>
05 03 04 00 10 00 11 7E 3A

[2023-10-28 16:33:45.724]# SEND HEX>
05 03 00 00 00 02 C5 8F

[2023-10-28 16:33:45.730]# RECV HEX>
05 03 04 00 10 00 11 7E 3A

[2023-10-28 17:03:16.259]# The server is connected from local
192.168.1.34:55962

[2023-10-28 17:03:52.541]# SEND HEX>
05 03 00 00 00 02 C5 8F

[2023-10-28 17:03:52.548]# RECV HEX>
05 03 04 00 10 00 11 7E 3A

[2023-10-28 17:03:54.163]# SEND HEX>
05 03 00 00 00 02 C5 8F

[2023-10-28 17:03:54.167]# RECV HEX>
05 03 04 00 10 00 11 7E 3A
```

Data Send: 05 03 00 00 00 02 C5 8F

Delete

□	ID	Position Name	So				Operation
□	1	Level	Modbus TCP	16位无符号	40003	Read/Write	Edit Delete
□	2	Humi	Modbus TCP	16位有符号	40002	Read/Write	Edit Delete
□	3	Temp	Modbus TCP	16位有符号	40001	Read/Write	Edit Delete

5.6. Edge Gateway

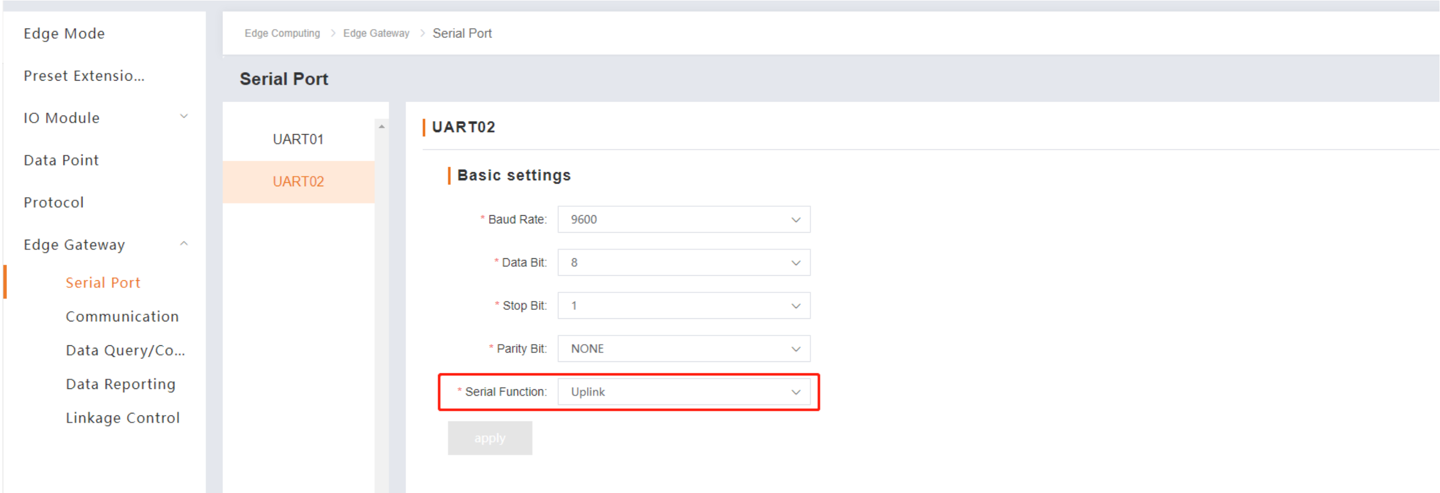
5.6.1. Serial Port

On this page, users can set the basic parameters of UART, like baud rate, data bit, stop bit and parity bit.

For UART2, it has one more parameter: Serial Function. The default is "Downlink".

Downlink: The device connected to the serial port is Slave device,

Uplink: The device connected to the serial port is Master device.



Serial Port

UART02

Basic settings

* Baud Rate: 9600

* Data Bit: 8

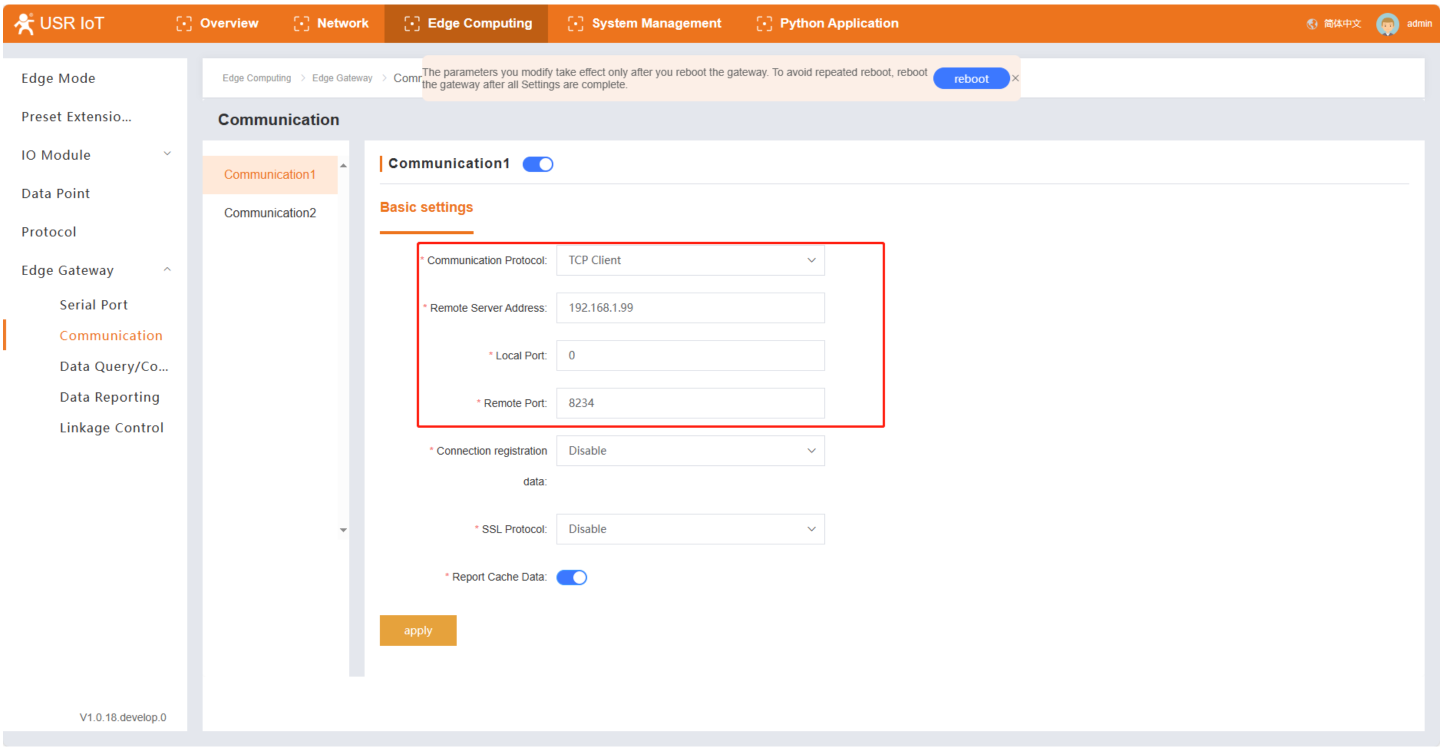
* Stop Bit: 1

* Parity Bit: NONE

* Serial Function: Uplink

5.6.2. Communication

USR-M100 supports 2 independent communication channels. It provides multiple communication modes like TCP client/TCP server/UDP/MQTT client/http client. It has the AWS cloud built-in, users can use it conveniently. In this case, we set the communication parameters like the following picture.



The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

Communication

Communication1

Basic settings

* Communication Protocol: TCP Client

* Remote Server Address: 192.168.1.99

* Local Port: 0

* Remote Port: 8234

* Connection registration data: Disable

* SSL Protocol: Disable

* Report Cache Data:

5.6.3. Data Query/Control

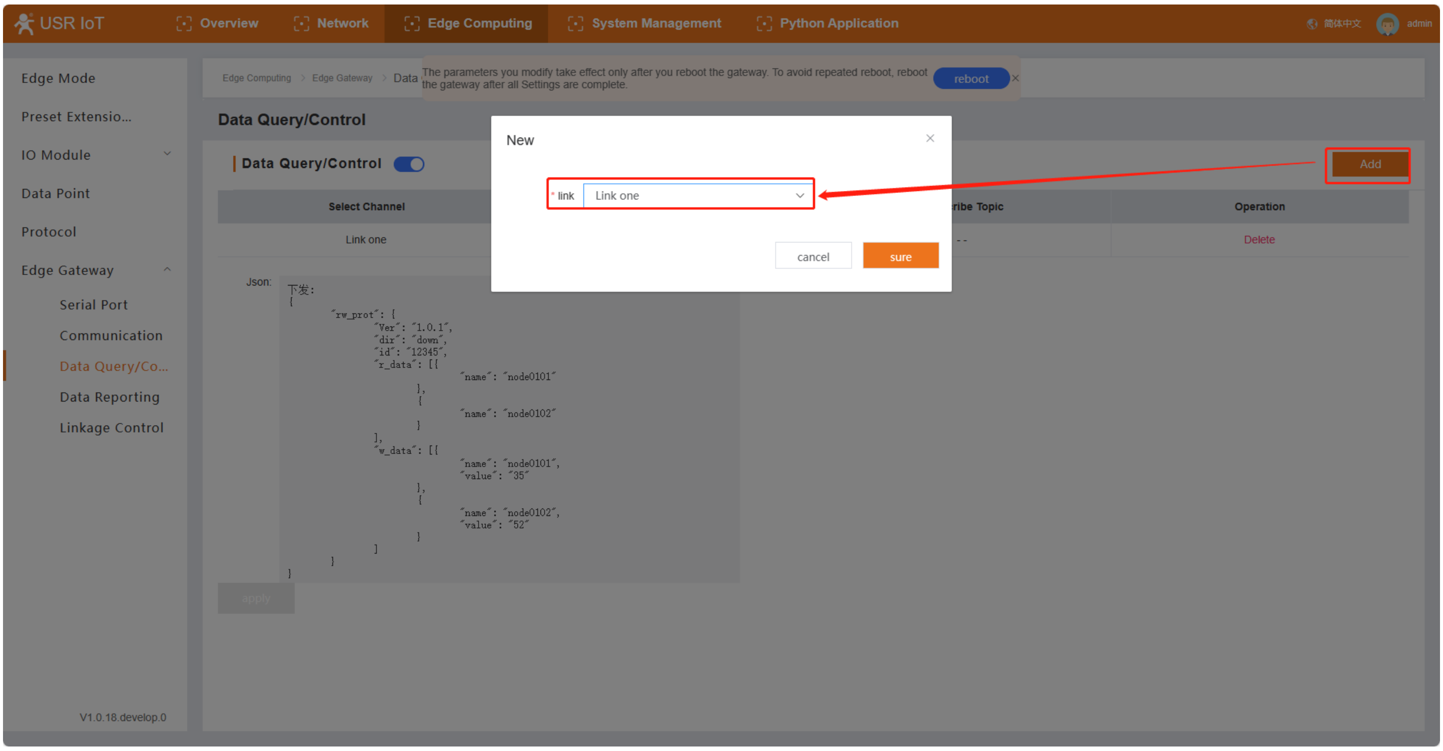
With this function, users can query and control data points via Json format. Click “Add” to add link channel, in this case, we choose the Link1.

The Json command format is like the following:

{"rw_prot": {"Ver": "Protocol Version","dir": "Data Direction","id": "Information ID","r_data": [{"name": "Node Name"}],"w_data": [{"name": "Node Name","value": "data"}]}}

Description of items:

Field Name	Description
rw_prot	Protocol Header
Ver	Protocol Version
dir	Data Direction
id	User defined parameter. The id is same in query/control and response data. Sometimes, the query/control data is high frequency, the response data may be disordered. The program in network can confirm the relevant response data by the id.
r_data	The data load for querying data
w_data	The data load for controlling data
name	The node name descripted on section 5.4
value	Means the data need to be sent to the data points described



The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

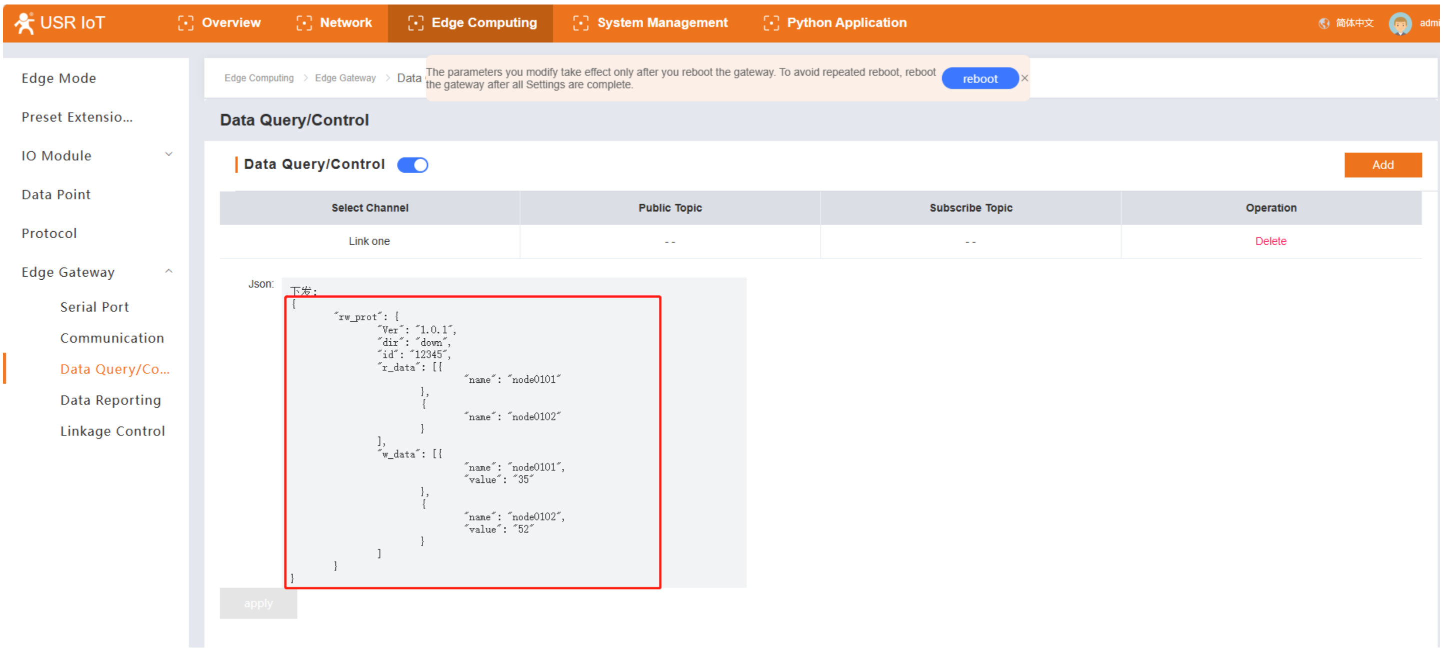
* link: Link one

Select Channel: Link one

Json:

```
下发:
{
        "rw_prot": {
                "Ver": "1.0.1",
                "dir": "down",
                "id": "12345",
                "r_data": [{
                                "name": "node0101"
                        },
                        {
                                "name": "node0102"
                        }
                ],
                "w_data": [{
                                "name": "node0101",
                                "value": "35"
                        },
                        {
                                "name": "node0102",
                                "value": "52"
                        }
                ]
        }
}
```

In section 5.4, the added data points have data already, now we can collect the data to the server. Set the Network Assistant as TCP server, the local port is 8234, USR-M300 work as TCP client to connect the TCP server. Then send Json command to collect the temperature and Humidity data, to control the level data at the same time. User can copy the Json command sample and change the query and control command based on the sample.



The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

Data Query/Control

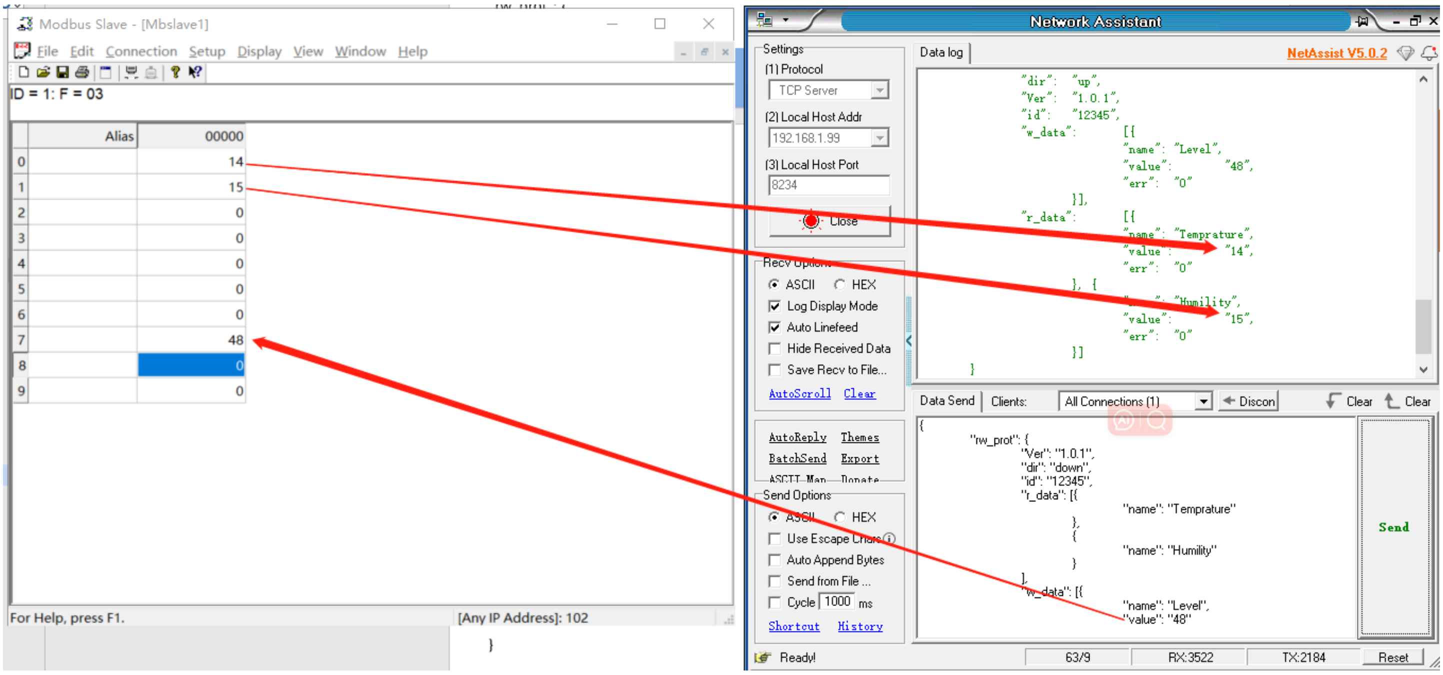
Data Query/Control

Select Channel	Public Topic	Subscribe Topic	Operation
Link one	- -	- -	Delete

Json:

```
下发:
{
        ″rw_prot″: {
                ″Ver″: ″1.0.1″,
                ″dir″: ″down″,
                ″id″: ″12345″,
                ″r_data″: [{
                                ″name″: ″node0101″
                        },
                        {
                                ″name″: ″node0102″
                        }
                ],
                ″w_data″: [{
                                ″name″: ″node0101″,
                                ″value″: ″35″
                        },
                        {
                                ″name″: ″node0102″,
                                ″value″: ″52″
                        }
                ]
        }
}
```

```
{
"rw_prot": {
"Ver": "1.0.1",
"dir": "down",
"id": "12345",
"r_data": [{
"name": "Temprature"
},
{
"name": "Humidity"
}
],
"w_data": [{
"name": "Level",
"value": "48"
}
```


Modbus Slave - [Mbslave1]
File Edit Connection Setup Display View Window Help
ID = 1: F = 03

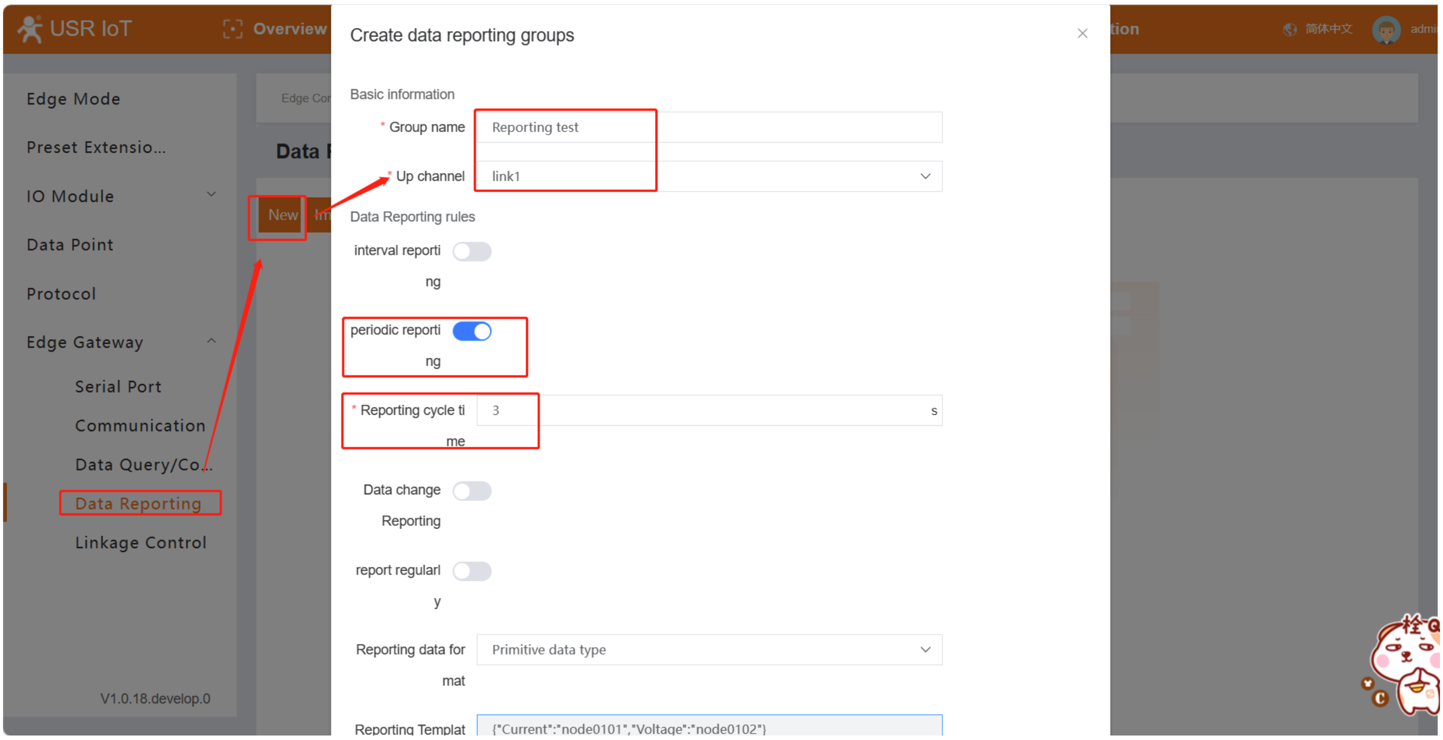
	Alias	00000
0		14
1		15
2		0
3		0
4		0
5		0
6		0
7		48
8		0
9		0

```
                "dir":   "up",
                "Ver":   "1.0.1",
                "id":    "12345",
                "w_data":        [{
                                "name":  "Level",
                                "value":         "48",
                                "err":   "0"
                        }],
                "r_data":        [{
                                "name":  "Temprature",
                                "value":         "14",
                                "err":   "0"
                        }, {
                                "name":  "Humility",
                                "value":         "15",
                                "err":   "0"
                        }]
        }
```

```
{
        "rw_prot": {
                "Ver": "1.0.1",
                "dir": "down",
                "id": "12345",
                "r_data": [{
                                "name": "Temprature"
                        },
                        {
                                "name": "Humility"
                        }
                ],
                "w_data": [{
                                "name": "Level",
                                "value": "48"
```

5.6.4. Data Reporting

The data reporting function will report the collected data on data point page to server actively. Users can send the data in different methods. The Reporting Template will be introduced later.



Create data reporting groups

Basic information

* Group name: Reporting test

* Up channel: link1

Data Reporting rules

interval reporting: off

periodic reporting: on

* Reporting cycle time: 3 s

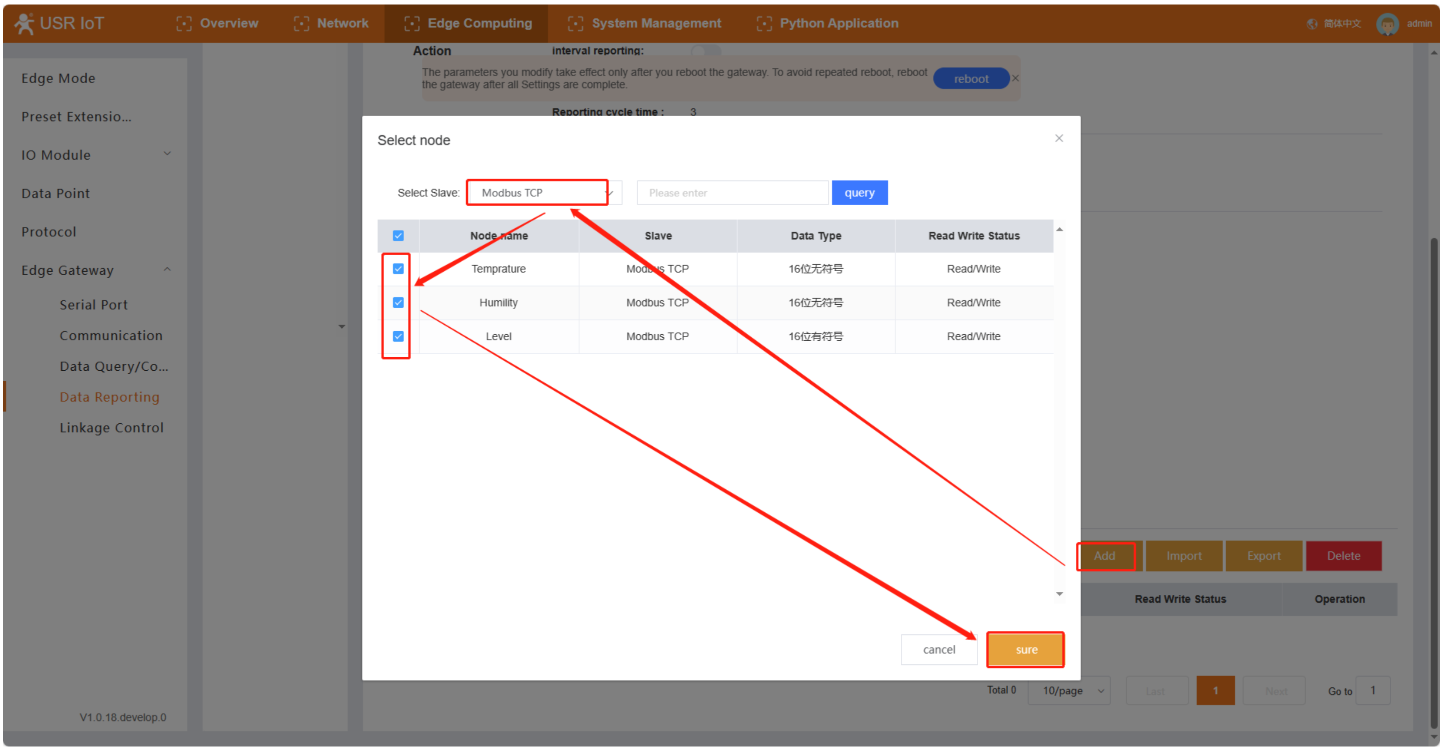
Data change Reporting: off

report regularly: off

Reporting data format: Primitive data type

Reporting Templat: {"Current":"node0101","Voltage":"node0102"}

Then add the data points that need to be reported.



interval reporting:

The parameters you modify take effect only after you reboot the gateway. To avoid repeated reboot, reboot the gateway after all Settings are complete.

Reporting cycle time : 3

Select node

Select Slave: Modbus TCP

Please enter

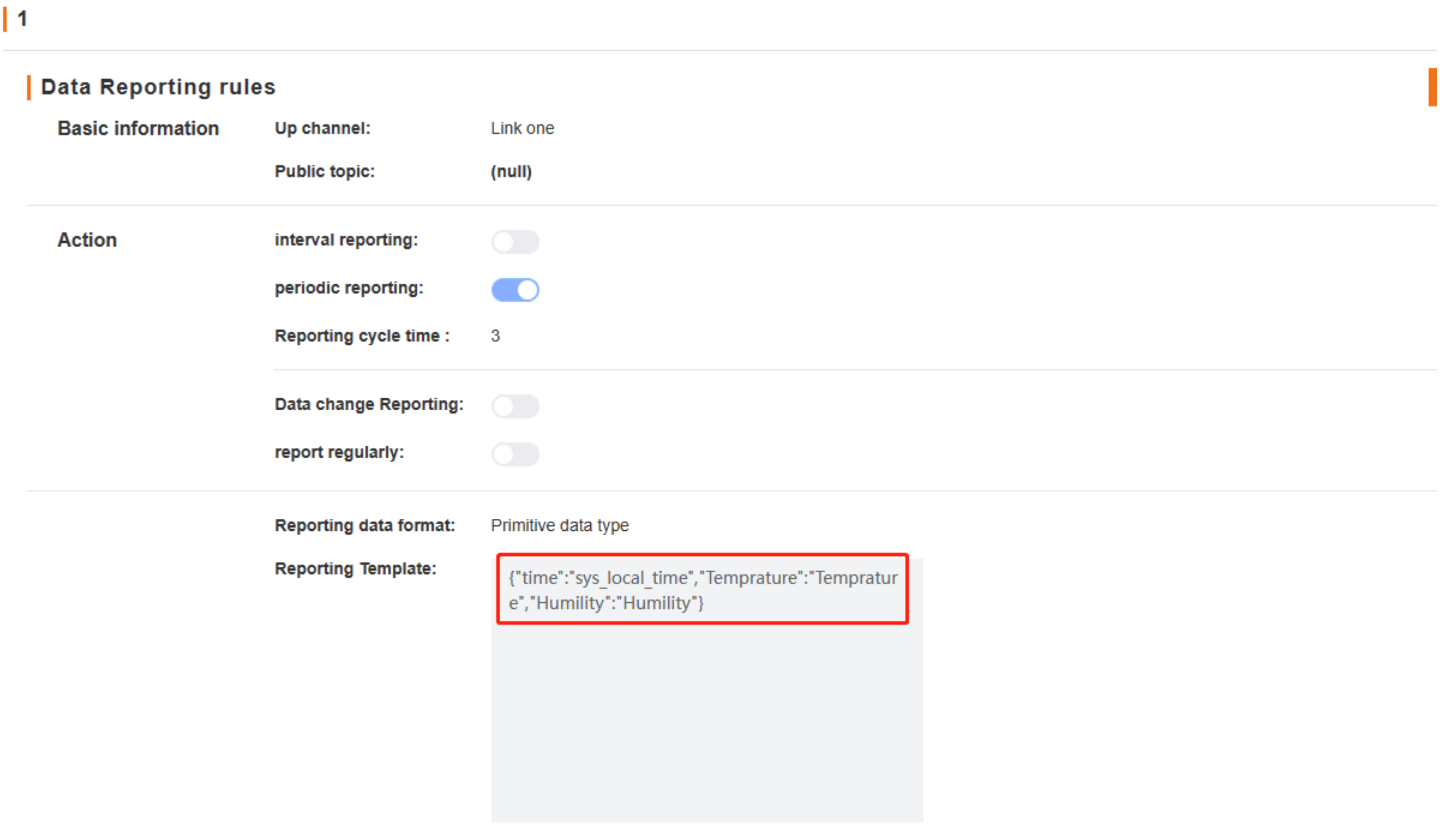
☑	Node name	Slave	Data Type	Read Write Status
☑	Temprature	Modbus TCP	16位无符号	Read/Write
☑	Humility	Modbus TCP	16位无符号	Read/Write
☑	Level	Modbus TCP	16位有符号	Read/Write

Json Template:

The data reporting function will upload point data to the server in Json format. Customers can customize the Json template according to the server's requirements to ensure that the uploaded data format meets the server's parsing requirements. The actual data points can be defined in the Json template.

In addition to data points, the Json template can also add some specific identifiers, such as the product's firmware version, SN, MAC and other parameters. These parameters can be processed as the unique identifier of the device. Directly add the relevant identification name in the value position of the Json template. During the reporting process, the device will substitute the data corresponding to the identification name and report it. For example, to report timestamp, set the Json template to {"time":"sys_local_time"},

Items	Description	Example
sys_ver	Firmware version	V1.0.14.000000.0000
sys_imei	IMEI	864452061930390
sys_sn	SN	02700122093000012356
sys_mac	MAC	D4AD20474662
sys_iccid	ICCID	89861122219045577705
sys_local_time	Local time	2023-05-27,22:35:44
sys_utc_time	UTC time	2023-01-12T18:15:02Z
sys_unix_time	Timestamp	1681985788

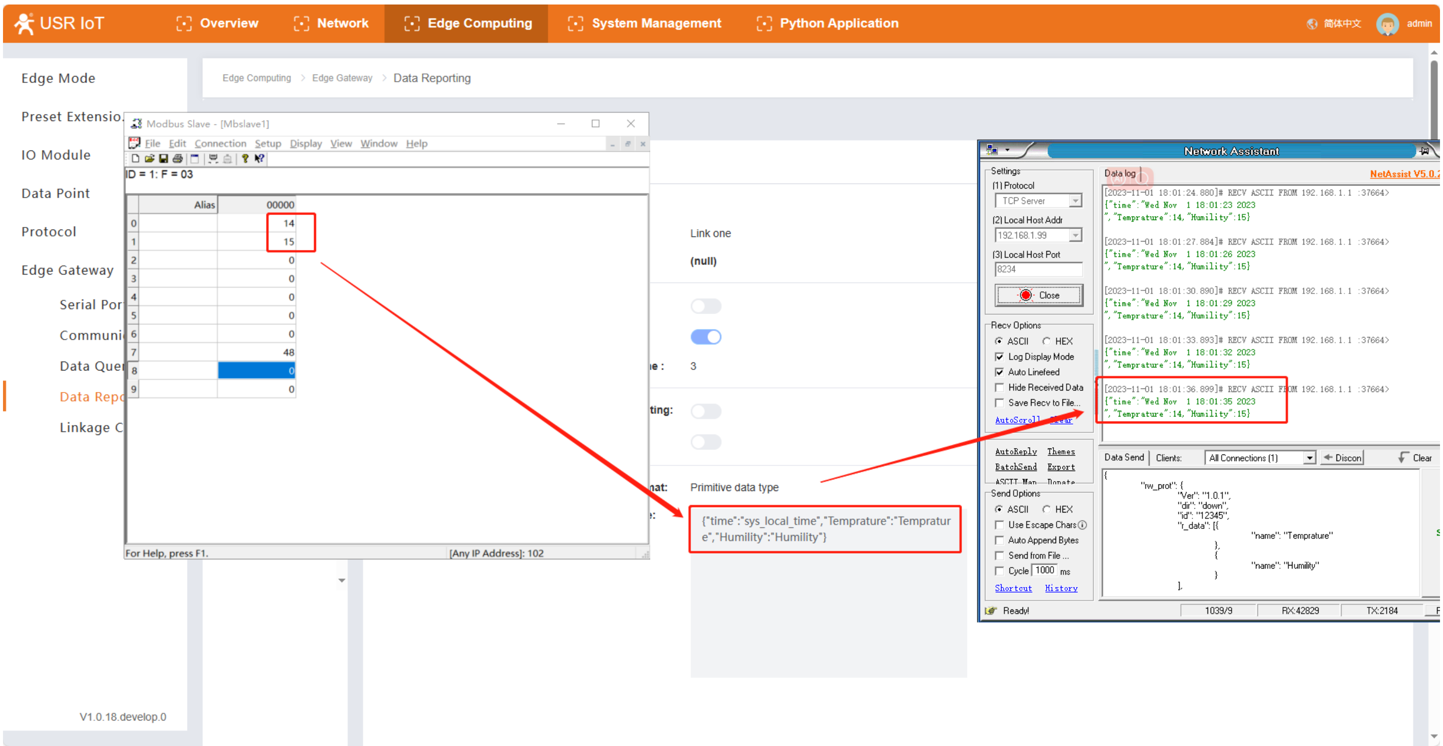


1

Data Reporting rules

Basic information	Up channel:	Link one
	Public topic:	(null)
Action	interval reporting:	○
	periodic reporting:	●
	Reporting cycle time :	3
	Data change Reporting:	○
	report regularly:	○
	Reporting data format:	Primitive data type
	Reporting Template:	{"time":"sys_local_time","Temprature":"Temprature","Humility":"Humility"}

The test result: USR-M300 reports the collected data according to the period cycle time and the content of the Json template.



ID = 1: F = 03

	Alias	00000
0		14
1		15
2		0
3		0
4		0
5		0
6		0
7		48
8		0
9		0

Link one

(null)

3

Primitive data type

{"time":"sys_local_time","Temprature":"Temprature","Humility":"Humility"}

Settings
(1) Protocol: TCP Server
(2) Local Host Addr: 192.168.1.99
(3) Local Host Port: 8234

Recv Options: ● ASCII ○ HEX; ☑ Log Display Mode; ☑ Auto Linefeed; □ Hide Received Data; □ Save Recv to File...

Send Options: ● ASCII ○ HEX; □ Use Escape Chars; □ Auto Append Bytes; □ Send from File ...; □ Cycle 1000 ms

Data log

```
[2023-11-01 18:01:24.880]# RECV ASCII FROM 192.168.1.1 :37664>
{"time":"Wed Nov  1 18:01:23 2023
","Temprature":14,"Humility":15}

[2023-11-01 18:01:27.884]# RECV ASCII FROM 192.168.1.1 :37664>
{"time":"Wed Nov  1 18:01:26 2023
","Temprature":14,"Humility":15}

[2023-11-01 18:01:30.890]# RECV ASCII FROM 192.168.1.1 :37664>
{"time":"Wed Nov  1 18:01:29 2023
","Temprature":14,"Humility":15}

[2023-11-01 18:01:33.893]# RECV ASCII FROM 192.168.1.1 :37664>
{"time":"Wed Nov  1 18:01:32 2023
","Temprature":14,"Humility":15}

[2023-11-01 18:01:36.899]# RECV ASCII FROM 192.168.1.1 :37664>
{"time":"Wed Nov  1 18:01:35 2023
","Temprature":14,"Humility":15}
```

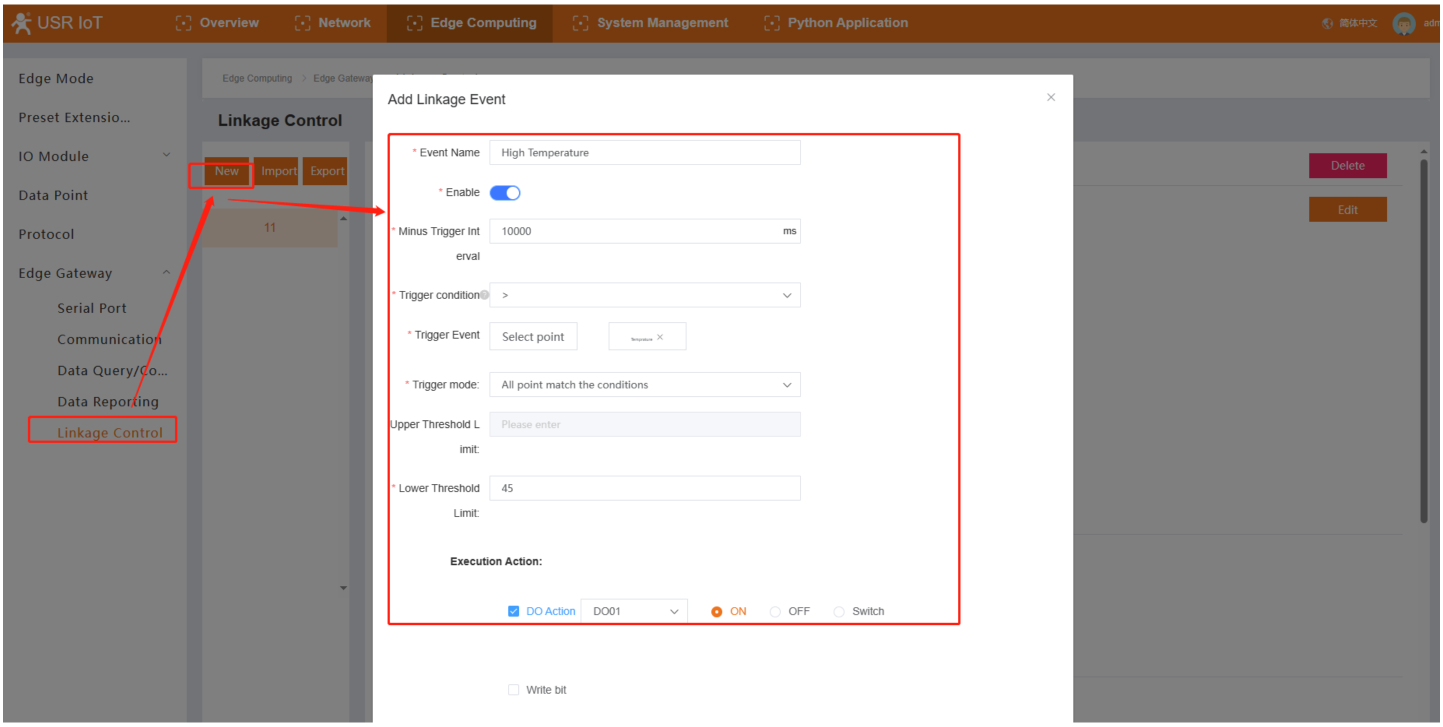
Data Send Clients: All Connections (1)

```
{
        "rw_prot": {
                "Ver": "1.0.1",
                "dir": "down",
                "id": "12345",
                "r_data": [{
                                "name": "Temprature"
                        },
                        {
                                "name": "Humility"
                        }
                ],
```

Ready! 1039/9 RX:42829 TX:2184

5.6.5. Linkage Control

The linkage function is mainly used to realize local closed-loop management, rapid alarm and emergency applications. The product can support 50 linkage events internally.



Add Linkage Event

* Event Name: High Temperature

* Enable: On

* Minus Trigger Interval: 10000 ms

* Trigger condition: >

* Trigger Event: Select point

* Trigger mode: All point match the conditions

Upper Threshold Limit: Please enter

* Lower Threshold Limit: 45

Execution Action:

☑ DO Action DO01 ● ON ○ OFF ○ Switch

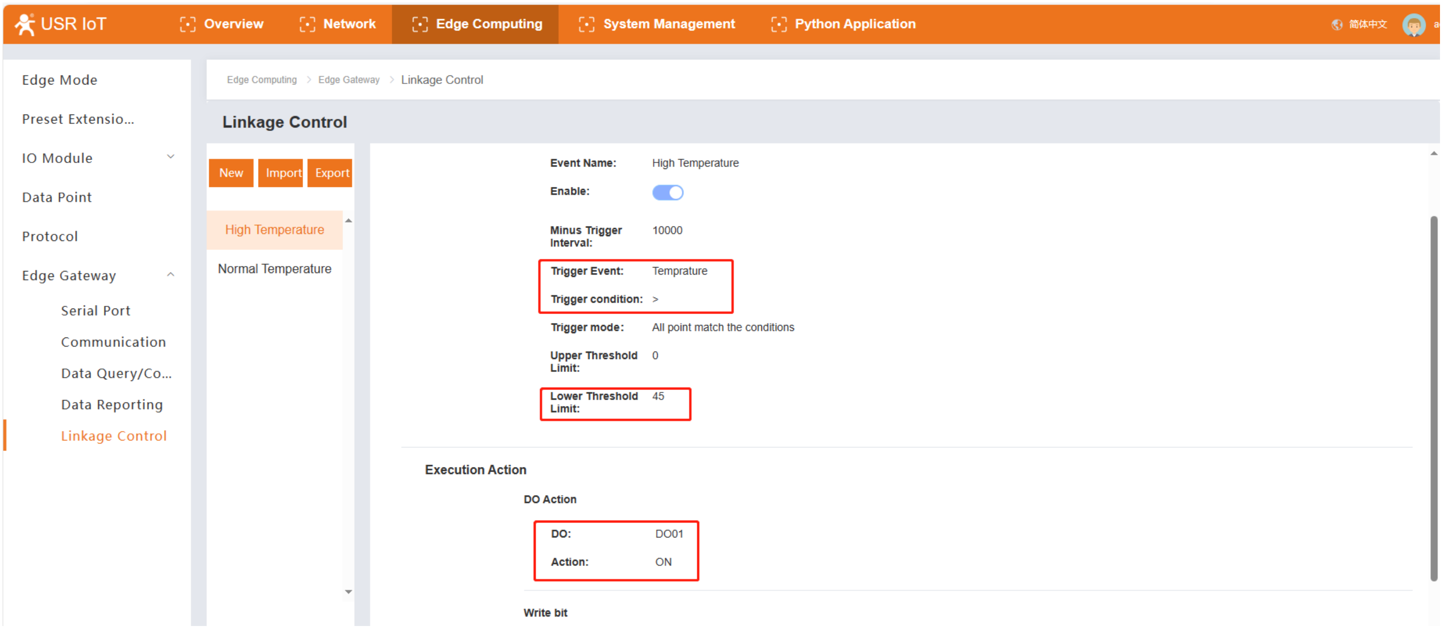
□ Write bit

Items	Description	Default Parameter
Event Name		None
Enable	Weather to enable the linkage control	Off
Minus Trigger Interval	When the trigger condition is met for several times in a short period, the trigger takes effect only when the interval between two triggers is greater than the set value.	None
Trigger condition	The action can be executed if the conditions are met, A total of 10 conditions are supported.	None
Trigger Event	Select the data point to start the trigger event.	
Trigger mode	All points match the conditions Any point matches the conditions	None
Upper Threshold Limit	The value range: 0~20000	None
Lower Threshold Limit	The value range: 0~20000	None

Description of trigger condition:

Trigger condition	Description	Extro
Forward Follow	If DI is high level, DO outputs high level. If DI is low level, DO outputs low level.	Only available for coil value.
Reverse Follow	If DI is high level, DO outputs low level. If DI is low level, DO outputs high level.	Only available for coil value.
Greater than	The collected value exceeds the threshold, an action is triggered.	Only the lower of the thresholds need be set.
Equal or greater than	The collected value is greater than or equal to the threshold, an action is triggered.	Only the lower of the thresholds need be set.
Less than	The collected value is less than the threshold, an action is triggered.	Only the upper of the thresholds need be set.
Equal or less than	The collected value is less than or equal to the threshold, an action is triggered.	Only the upper of the thresholds need be set.
In the Range (Including boundary data)	An action is triggered when the collected value is within the threshold range, and an action is triggered each time the collected value is within the range.	Upper and lower limits of the thresholds need be set.
In the Range (Excluding boundary data)	An action is triggered when the collected value is within the threshold range, and an action is triggered each time the collected value is within the range.	Upper and lower limits of the thresholds need be set.
Out of the Range(including boundary data)	An action is triggered when the collected value is outside the threshold range, and an action is triggered each time the collected value is outside the range.	Upper and lower limits of the thresholds need be set.
Out of the Range(excluding boundary data)	An action is triggered when the collected value is outside the threshold range, and an action is triggered each time the collected value is outside the range.	Upper and lower limits of the thresholds need be set.

In this case, we add 2 events: High Temperature and Normal temperature,



Event Name: High Temperature

Enable:

Minus Trigger Interval: 10000

Trigger Event: Temprature

Trigger condition: >

Trigger mode: All point match the conditions

Upper Threshold Limit: 0

Lower Threshold Limit: 45

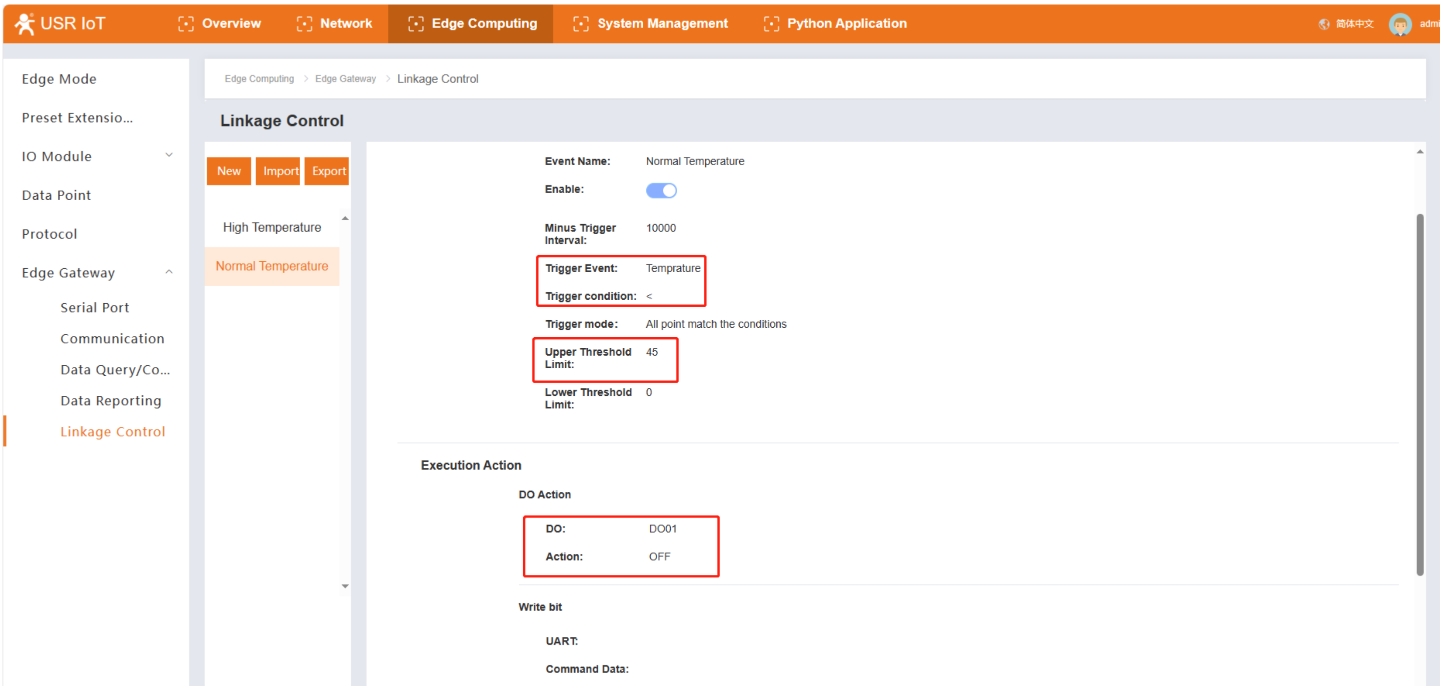
Execution Action

DO Action

DO: DO01

Action: ON

Write bit



Event Name: Normal Temperature

Enable:

Minus Trigger Interval: 10000

Trigger Event: Temprature

Trigger condition: <

Trigger mode: All point match the conditions

Upper Threshold Limit: 45

Lower Threshold Limit: 0

Execution Action

DO Action

DO: DO01

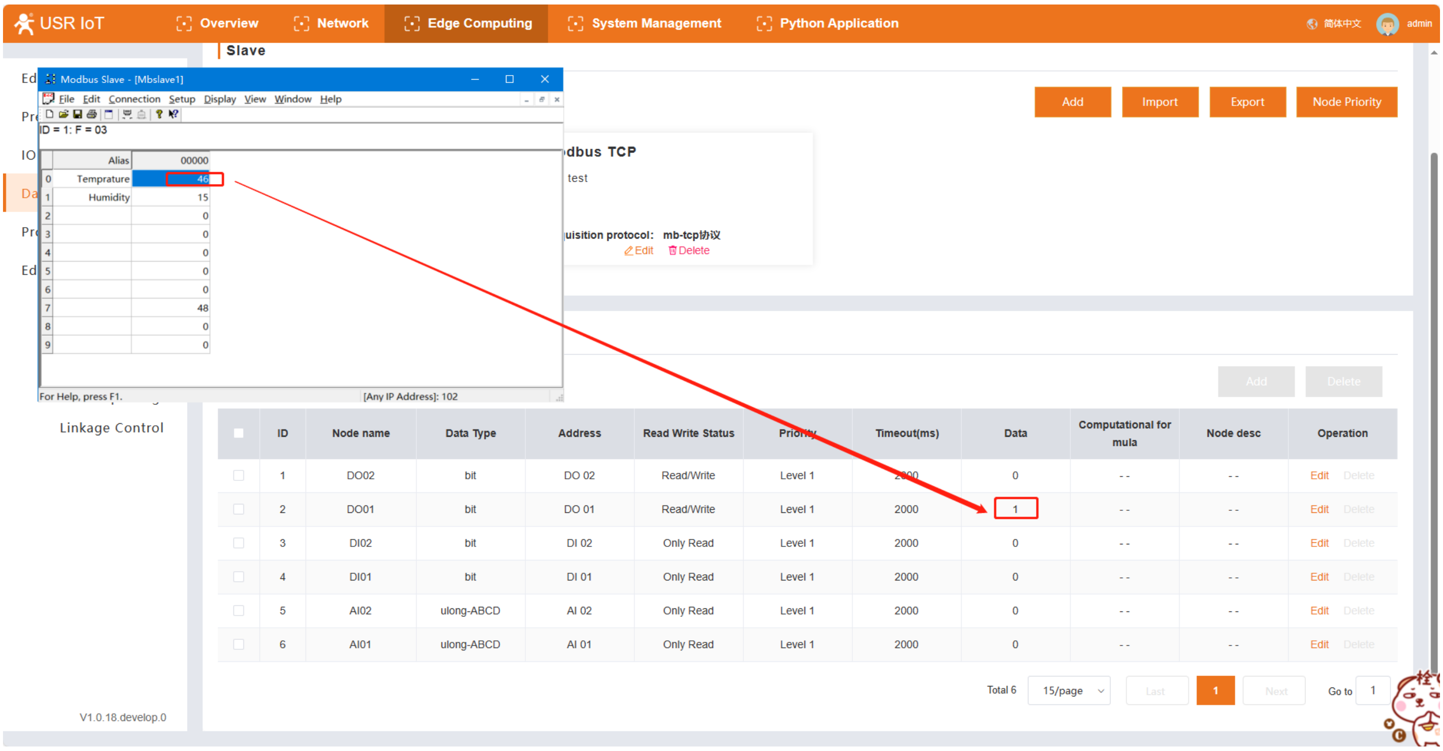
Action: OFF

Write bit

UART:

Command Data:

In High Temperature, if the value of temperature is higher than 45, then turn on DO1.



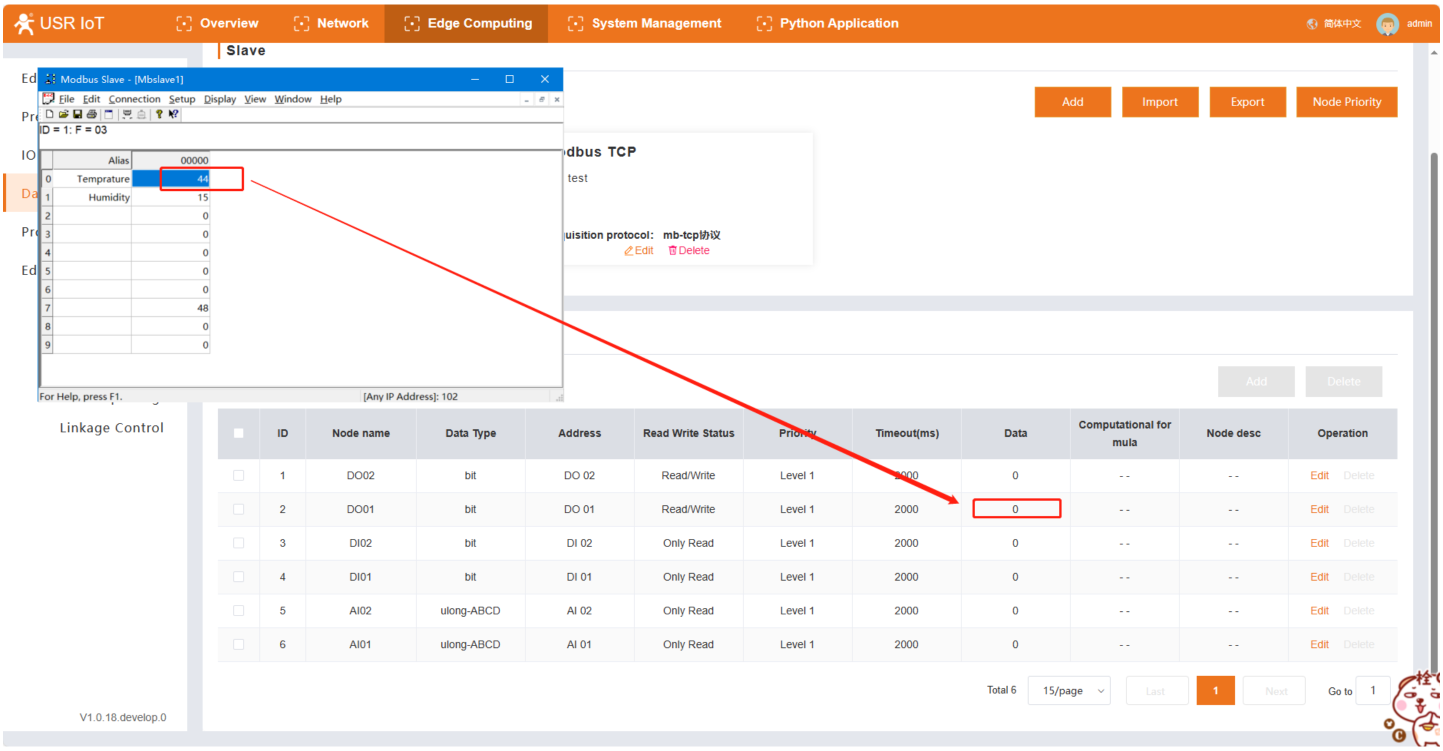
ID = 1: F = 03

	Alias	00000
0	Temprature	46
1	Humidity	15
2		0
3		0
4		0
5		0
6		0
7		48
8		0
9		0

For Help, press F1. [Any IP Address]: 102

□	ID	Node name	Data Type	Address	Read Write Status	Priority	Timeout(ms)	Data	Computational formula	Node desc	Operation
□	1	DO02	bit	DO 02	Read/Write	Level 1	2000	0	--	--	Edit Delete
□	2	DO01	bit	DO 01	Read/Write	Level 1	2000	1	--	--	Edit Delete
□	3	DI02	bit	DI 02	Only Read	Level 1	2000	0	--	--	Edit Delete
□	4	DI01	bit	DI 01	Only Read	Level 1	2000	0	--	--	Edit Delete
□	5	AI02	ulong-ABCD	AI 02	Only Read	Level 1	2000	0	--	--	Edit Delete
□	6	AI01	ulong-ABCD	AI 01	Only Read	Level 1	2000	0	--	--	Edit Delete

In Normal temperature, if the value of temperature is lower than 45, then turn off DO1.



ID = 1: F = 03

	Alias	00000
0	Temprature	44
1	Humidity	15
2		0
3		0
4		0
5		0
6		0
7		48
8		0
9		0

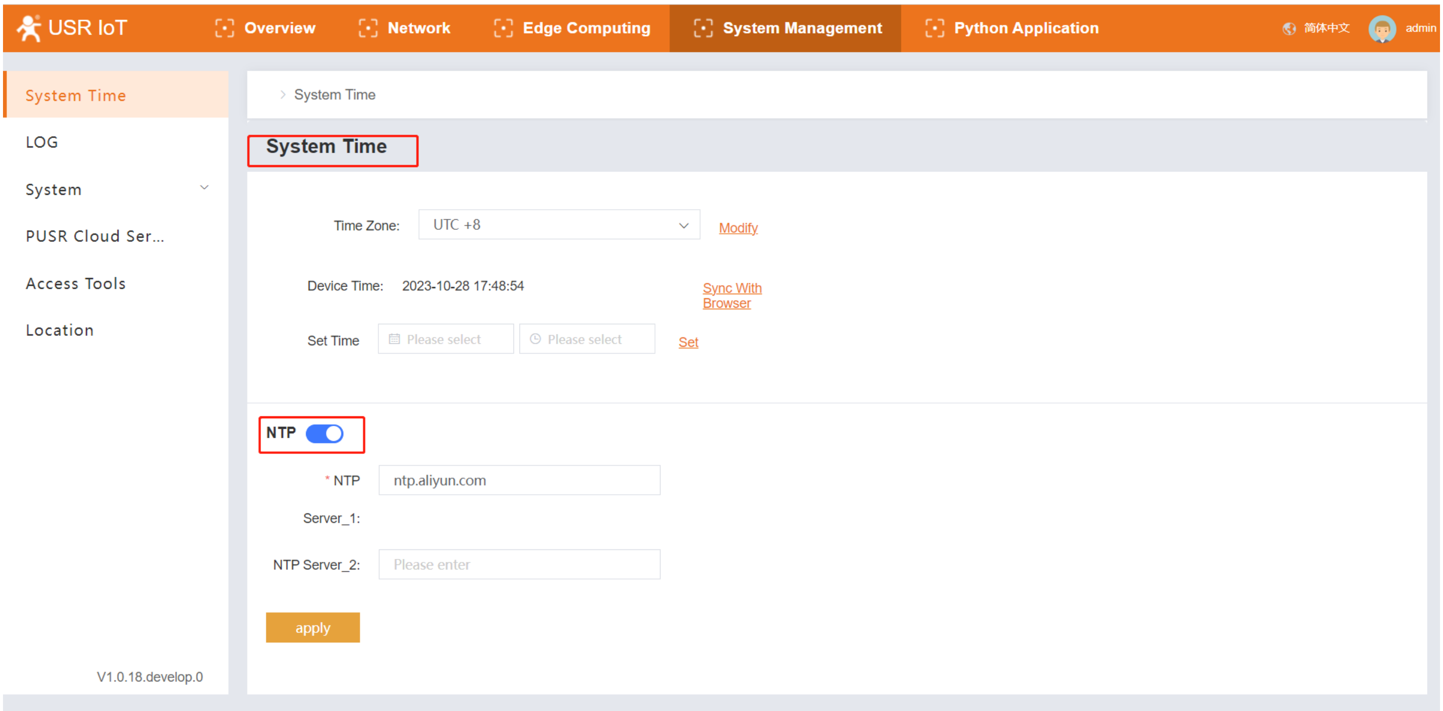
For Help, press F1. [Any IP Address]: 102

□	ID	Node name	Data Type	Address	Read Write Status	Priority	Timeout(ms)	Data	Computational formula	Node desc	Operation
□	1	DO02	bit	DO 02	Read/Write	Level 1	2000	0	--	--	Edit Delete
□	2	DO01	bit	DO 01	Read/Write	Level 1	2000	0	--	--	Edit Delete
□	3	DI02	bit	DI 02	Only Read	Level 1	2000	0	--	--	Edit Delete
□	4	DI01	bit	DI 01	Only Read	Level 1	2000	0	--	--	Edit Delete
□	5	AI02	ulong-ABCD	AI 02	Only Read	Level 1	2000	0	--	--	Edit Delete
□	6	AI01	ulong-ABCD	AI 01	Only Read	Level 1	2000	0	--	--	Edit Delete

6. System Management

6.1. System Time

On this page, users can select Time Zone or set time manual. And can also set the NTP server.



System Time

Time Zone: UTC +8

Device Time: 2023-10-28 17:48:54

Set Time: Please select | Please select

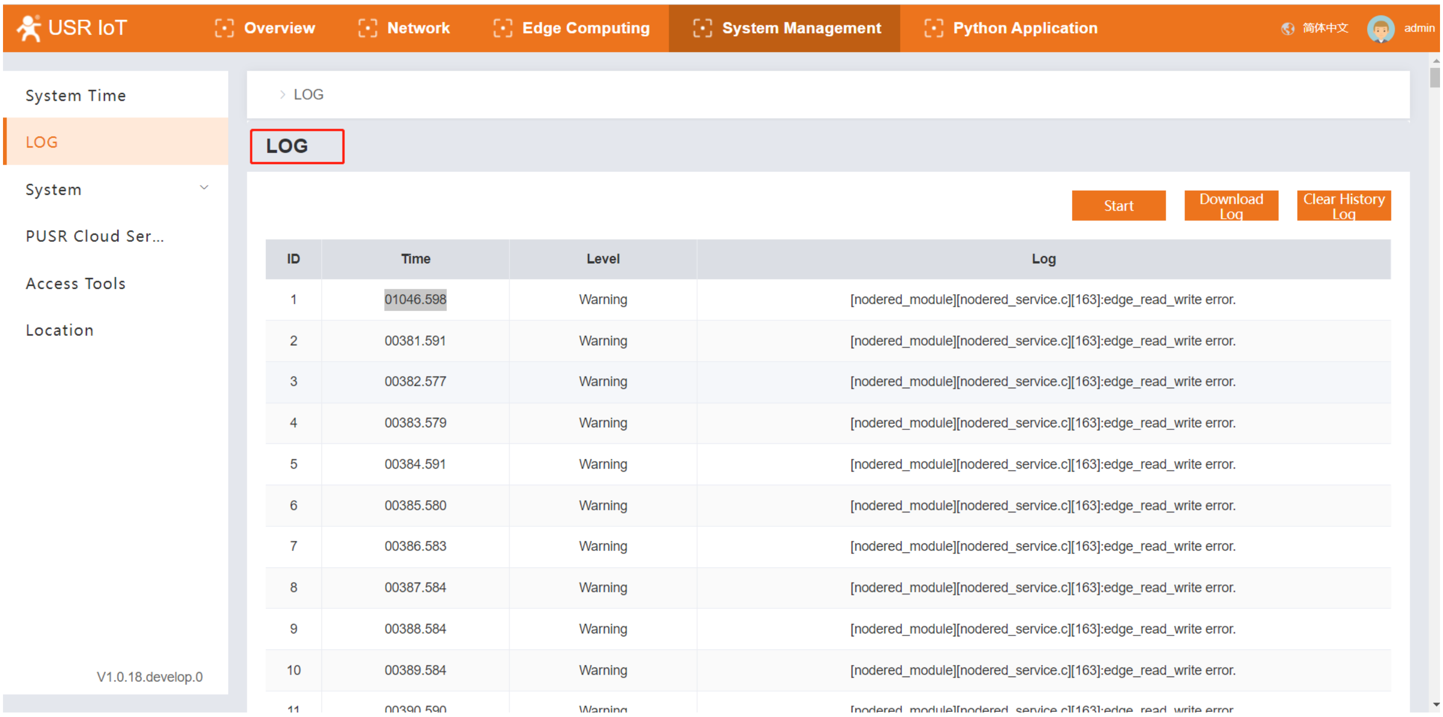
NTP: on

* NTP Server_1: ntp.aliyun.com

NTP Server_2: Please enter

6.2. Log

Users can check and download log information on this page.



LOG

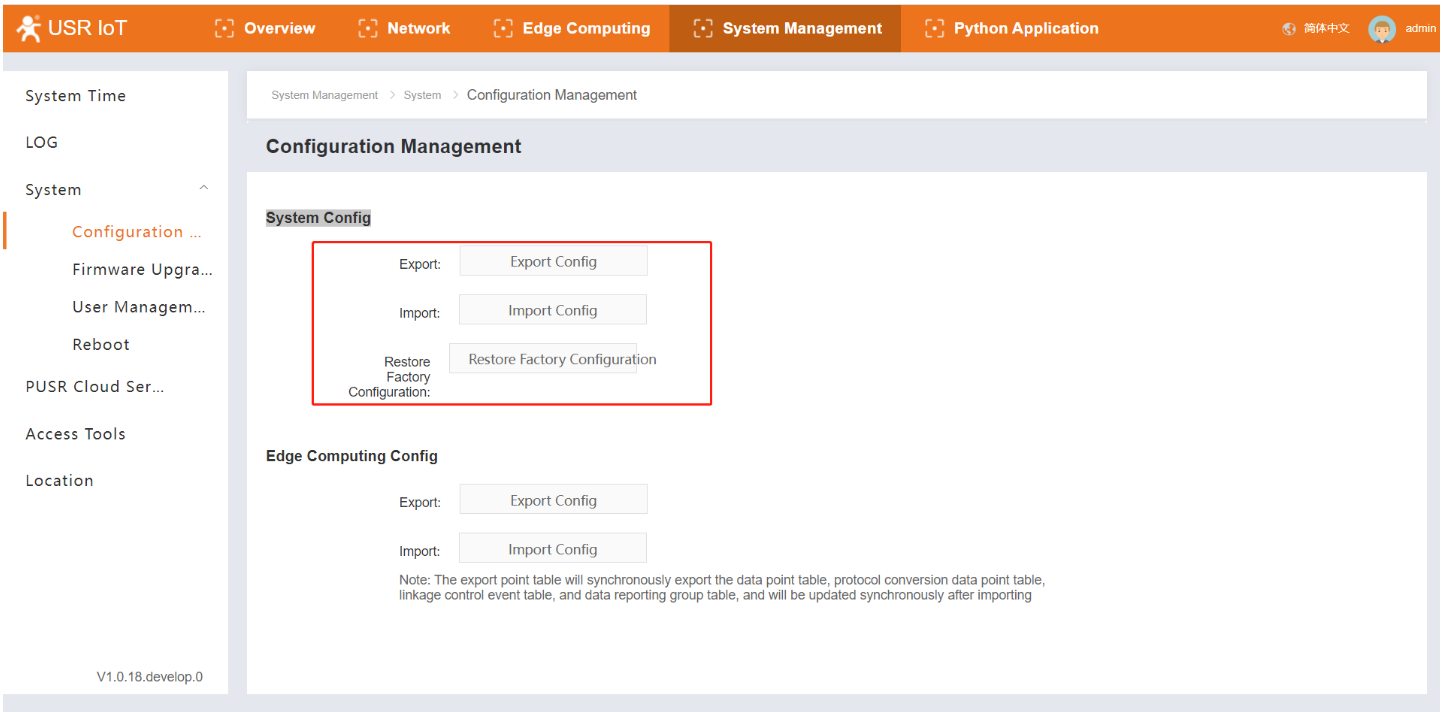
ID	Time	Level	Log
1	01046.598	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
2	00381.591	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
3	00382.577	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
4	00383.579	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
5	00384.591	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
6	00385.580	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
7	00386.583	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
8	00387.584	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
9	00388.584	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
10	00389.584	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.
11	00390.590	Warning	[nodered_module][nodered_service.c][163]:edge_read_write error.

6.3. System

6.3.1. Configuration Management

- System Config

This function mainly includes parameter export, import, and restore to factory settings. Using this function, users can quickly copy product parameters.



Configuration Management

System Config

Export: Export Config

Import: Import Config

Restore Factory Configuration: Restore Factory Configuration

Edge Computing Config

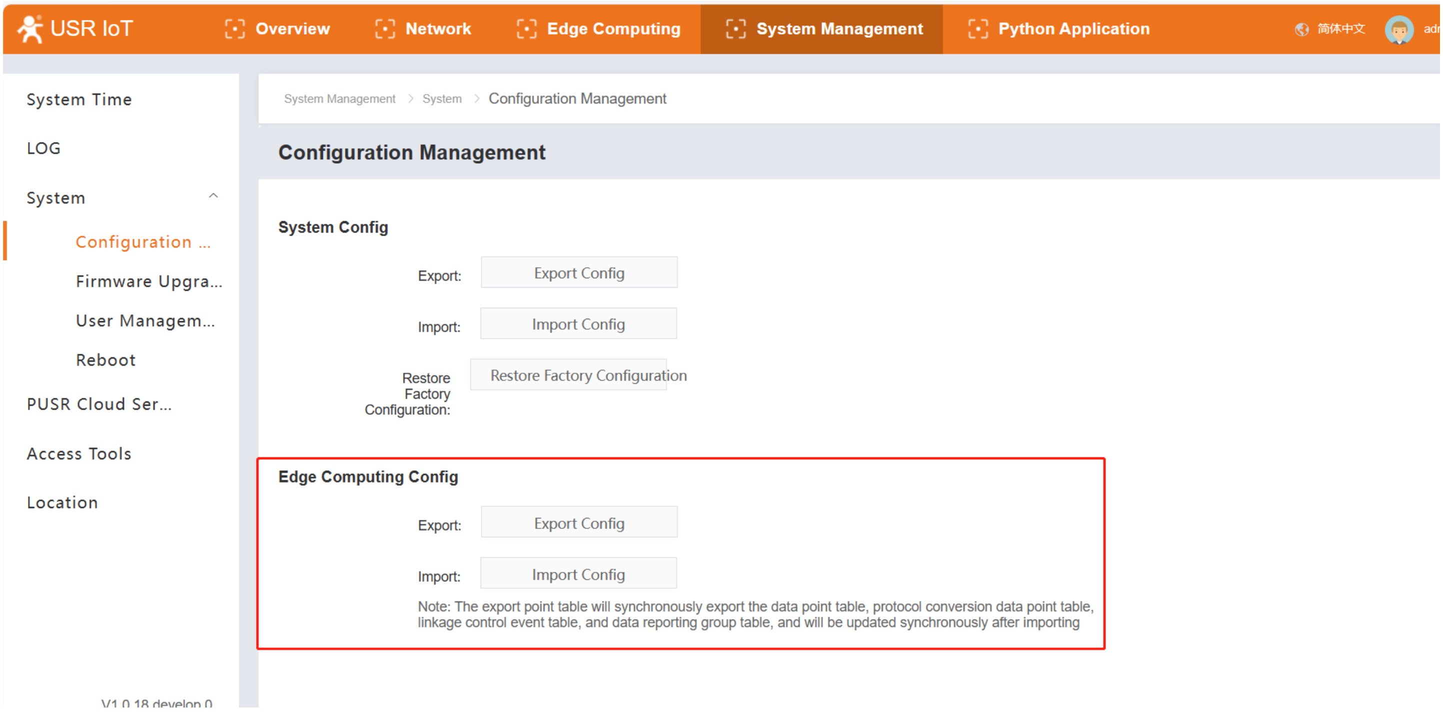
Export: Export Config

Import: Import Config

Note: The export point table will synchronously export the data point table, protocol conversion data point table, linkage control event table, and data reporting group table, and will be updated synchronously after importing

- ➢ Edge Computing Config

The export point table will synchronously export the data point table, protocol conversion data point table, linkage control event table, and data reporting group table, and will be updated synchronously after importing.



Configuration Management

System Config

Export: Export Config

Import: Import Config

Restore Factory Configuration: Restore Factory Configuration

Edge Computing Config

Export: Export Config

Import: Import Config

Note: The export point table will synchronously export the data point table, protocol conversion data point table, linkage control event table, and data reporting group table, and will be updated synchronously after importing

6.3.2. Firmware Upgrade

On this page, the current firmware version is displayed, and it provides firmware upgrade operations. Select a valid firmware and click Start Upgrade to wait for the automatic upgrade of the product.

6.3.3. User Management

This function is mainly to set the username and password for logging in to the built-in web page. The username supports 4-30 characters, and the password supports 1-30 characters.

6.3.4. Reboot

Users can restart the device immediately or add a scheduled restart task and set the restart time on the same day. Restart tasks can be performed in 24 hours, accurate to the minute.

6.4. PUSR Cloud Service

This function is to facilitate customers to quickly connect to the public PUSR platform, through which equipment maintenance can be carried out. If it is a private deployed PUSR platform, users can enable the private deployment button and fill in the private IP address and port to connect.

6.5. Location

For now, the USR-M300 supports only LBS location, the GPS function is in development. It's coming soon.

7. Contact Us

Jinan USR IOT Technology Limited

Address : Floor 12 and 13, CEIBS Alumni Industrial Building, No. 3 Road of Maolingshan, Lixia District, Jinan, Shandong, China

Official website: https://www.pusr.com

Official shop: https://shop.usriot.com

Technical support: http://h.usriot.com/

Email : sales@usriot.com

Tel : +86-531-88826739

Fax : +86-531-88826739-808

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Skype & WhatsApp: +86 13405313834

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