BLIoTLink V1.0

User Manual

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目录

1.Overview

BLIoTLink is a software that converts various PLC protocols, Modbus RTU, Modbus TCP, DL/T645 and other protocols to Modbus TCP, OPC UA, MQTT, BACnet/IP, Huawei Cloud IoT, Amazon Cloud IoT, Ali Cloud IoT, ThingsBoard, BLIIoT IoT and other protocols.

BLIoTLink downstream supports: Various PLC protocols, Modbus RTU Master, Modbus TCP Master, DL/T645 and other protocols.

BLIoTLink upstream supports: Modbus TCP, MQTT, OPC UA, BACnet/IP, Huawei Cloud IoT, Aliyun IoT, AWS IoT, ThingsBoard BLIIoT IoT and other protocols.

BLIoTLink is available for 4 serial port inputs and 2 Ethernet port inputs.

BLIoTLink enables users to quickly connect industrial equipment to the cloud platform, as well as to SCADA, OPC UA, MES, BAS and other host computer data processing systems. Multiple platforms and host computer systems can be online at the same time. The software can meet most of the application scenarios that require protocol conversion, and it supports a clear design to guide users through the whole configuration process in a very short time.

BLIoTLink supports connecting 1 device and 256 data points for free, if you need to connect more devices or data points, please contact BLIIoT sales team to get license.

2.Software Installation

BLIIoT provides the installation package BLIoTLink.bin, you just need to put the installation package into the device and install it.

Start by giving the installer executable permissions and enter

chmod 777 BLIoTLink.bin on the command line as shown below

```
root@imx6ull:/# chmod 777 BLIoTLink.bin
```

Then execute the install command . /BLIoTLink.bin, and wait for the

installation to complete.

```
root@imx6ull:/# chmod 777 BLIoTLink.bin
root@imx6ull:/# ./BLIoTLink.bin
```

The software runs on vsftpd, we recommend users to use apt and other commands to download vsftpd and configure, if you can not download, this package will automatically install vsftpd 3.0.3.

Debian, Ubuntu system download command: sudo apt install vsftpd

After the download is complete, modify the write_enable option in the /etc/vsftpd.conf file to set write_enable=YES, and if you need to use the root user to log in, delete the root entry in the /etc/ftpusers file.

3.Software Operation

BLIoTLink needs to be used with the configuration software, run BLIoTLink first and then use the configuration software to configure it. After installation, the software runs automatically on power on by default, if you don't need it to start automatically on power on, you can turn it off through the configuration software, and after the first installation is completed, the user can run it manually or reboot the device to run the software.

Switch to the /usr/sbin directory, which contains the startup file BLIoTLink.sh and the file to end the software operation BLIoTLinkend.sh after installation, and run this software by running these two files.

Switch to the /usr/sbin directory and run the software:

```
root@imx6ull:/usr/sbin# cd /usr/sbin
root@imx6ull:/usr/sbin# ./BLIoTLink.sh
```

To confirm that the run was successful, use the ps -ef

command on the command line to see if the run was successful

```
root@imx6ull:/usr/sbin# ps -ef
```

The run reveals the following red box in . /BLIoTLink indicates a successful run

```
root     12653     1  0 01:39 ?        00:00:00 /bin/sh ./watchdog.sh
root     12660 12653  4 01:39 ?        00:00:09 ./BLIoTLink
```

End running the software:

```
root@imx6ull:/usr/sbin# ./BLIoTLinkend.sh
Terminated
```

Uninstall the software: Switch to the gateway directory and

execute uninstall.sh.

```
root@bellot:/# cd /gateway/
root@bellot:/gateway# ./uninstall.sh
```

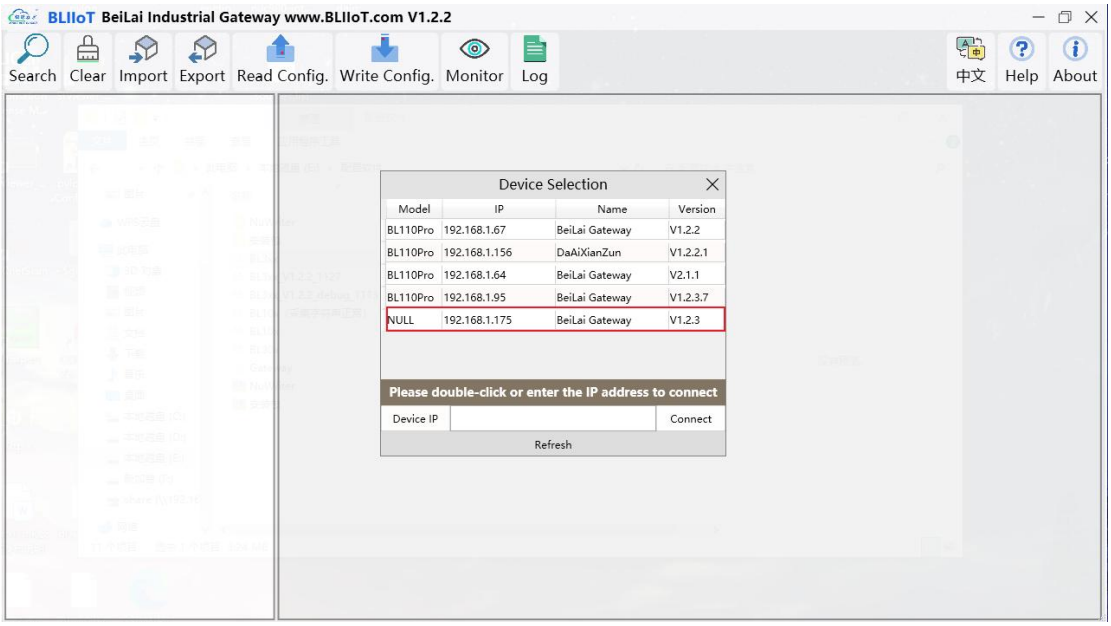
4.Software Configuration Method

4.1 Search for Devices

Open configuration software, click "Search" to search all devices on the same LAN as your computer. For example, if the network port is connected to the switch, and the computer and the device are in the same LAN, the device with IP 192.168.1.167 will be searched.

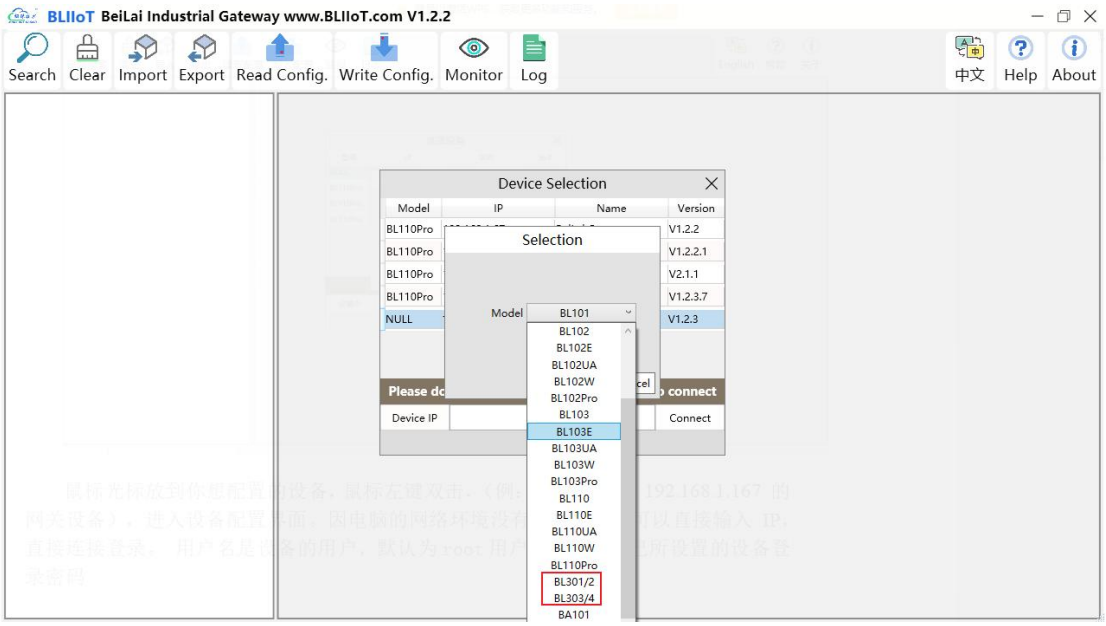
If the device cannot be found, please make sure that the device and the computer are on the same LAN, the computer UDP broadcast is normal, or the device cannot be found due to the problem of the network environment of the computer, if you know the IP of the device, you can directly enter the IP in the "Device IP" item, click Connect and log in.

Note: Any time the computer changes IP or gateway, close the configuration software and reopen it.

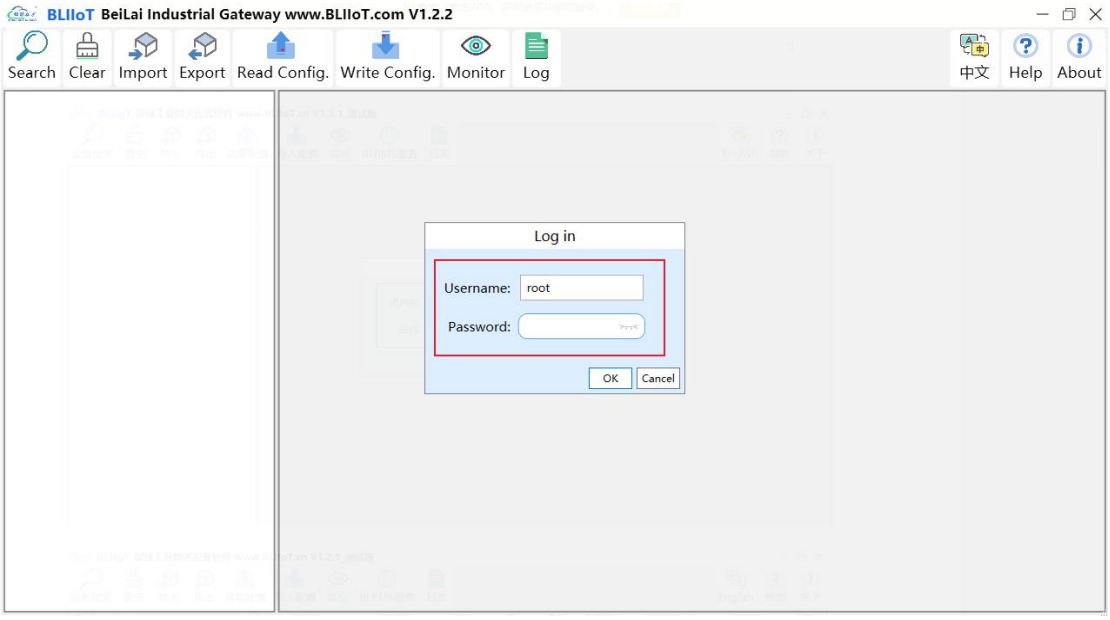


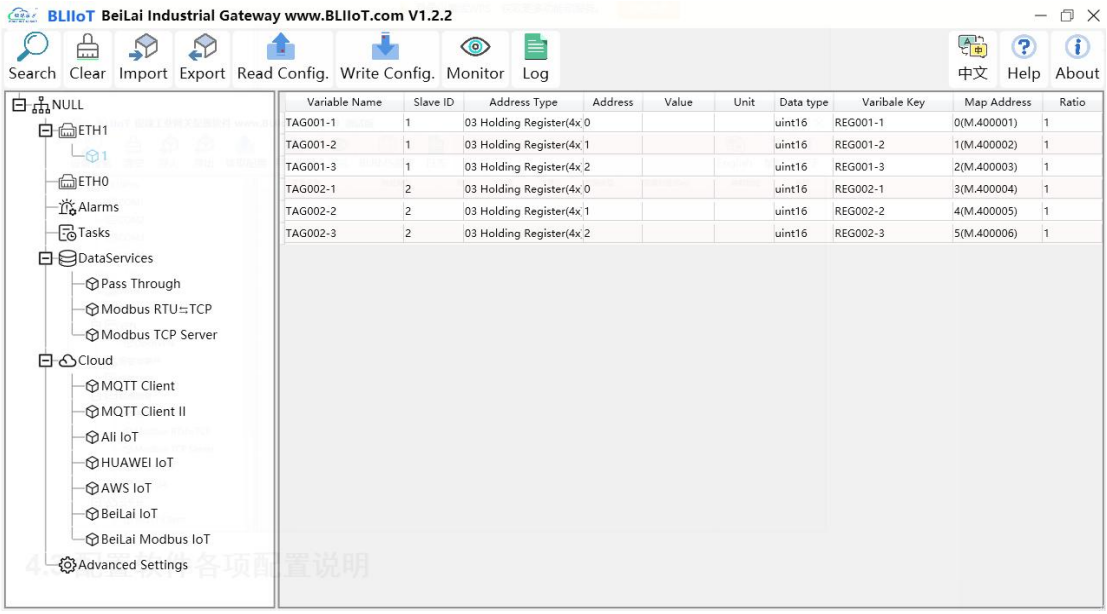
4.2 Connecting BLIoTLink

The first time to use the configuration software to connect the model is NULL, you need to select the model from BL301/2 and BL303/4. If you're not using a BLIIoT product, just pick one of these two models at random.

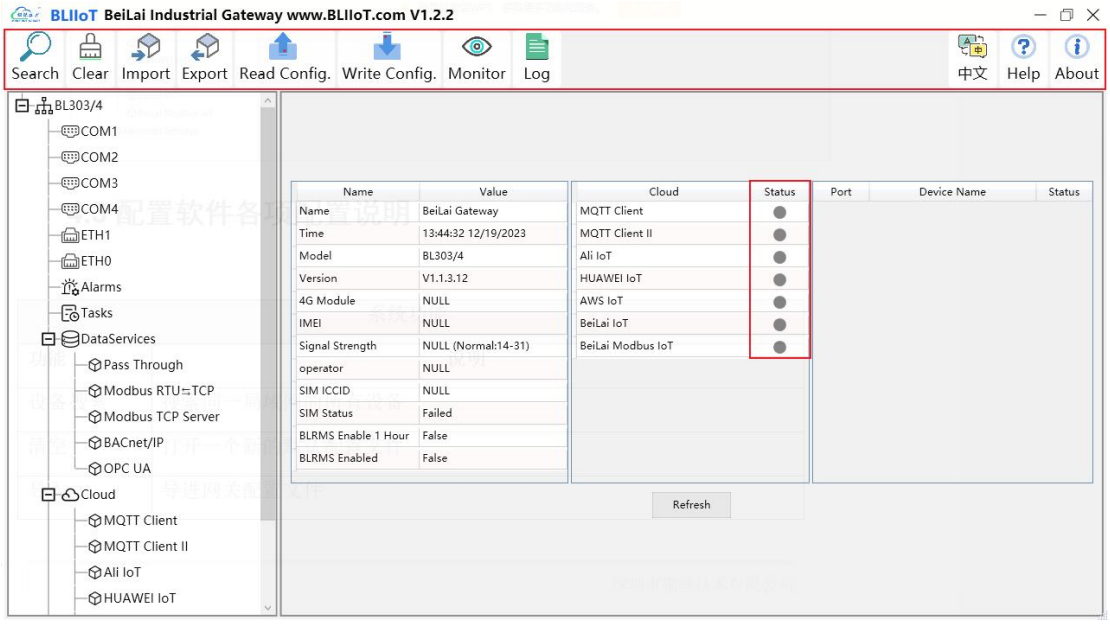


Put the mouse cursor to the device you want to configure, double click on the left mouse button, (Example: Double click on the gateway device with IP: 192.168.1.167), enter the device configuration interface. Because the network environment of the computer does not show the device, you can directly enter the IP to login. The user name is the user of the device, the default is the root, and the password is the login password of the device set by yourself.





4.3 Configuration Instructions



System Function	
Function	**Description**
Search	Search all devices on the same LAN
Clear	Open a new default profile
Import	Importing configuration files
Export	Exporting configuration files
Read Config.	Read the BLIoTLink configuration parameters of the connected

	device
Write Config.	Click this button to save all the configuration parameters to the device. After modifying the configuration of the configuration software, click "Write Configuration", and the modified parameters will take effect only after BLIoTLink reboots automatically. After BLIoTLink reboots automatically, it takes time to start up, wait for about 10 seconds, and then use the configuration software to search again.
Monitor	Monitors the value of the currently connected BLIoTLink data point and displays the data in the "Value" section of the Display Data Points screen.
Log	Logs of system operation
English	Click to switch language to English
Help	The help file is in the process of being improved
Status	Green means Connected, Gray means Disconnected

4.3.1 COM Port Instructions

The configuration of all 4 COMs are the same, and the following is an example of COM1 configuration.

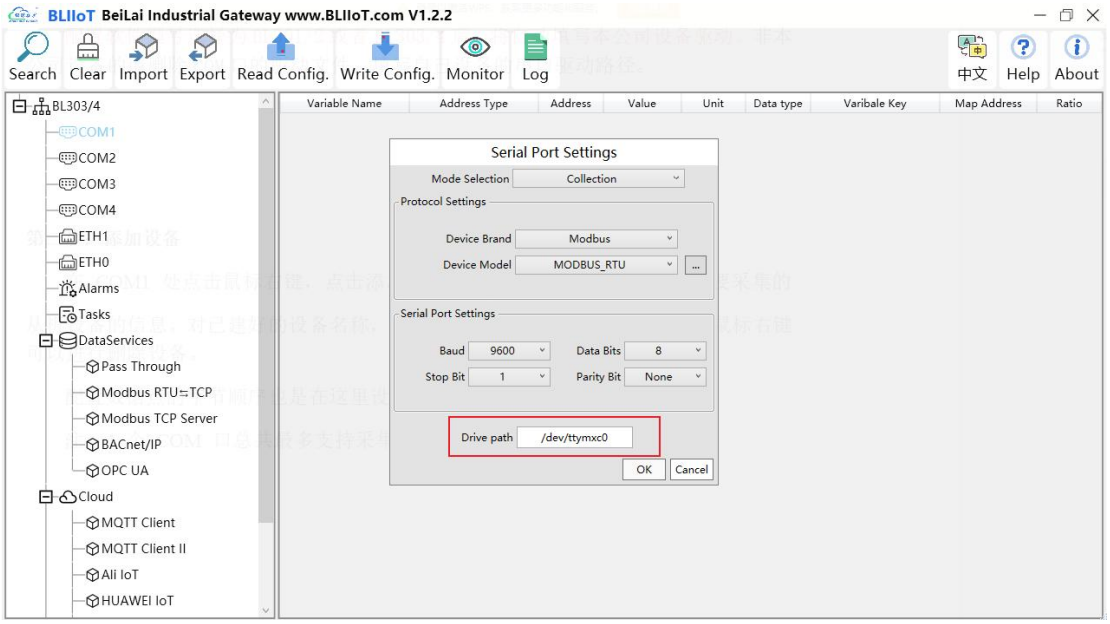
Step 1: Configure the COM port

Double click COM1 with the left mouse button to bring up the COM port property box and configure the COM parameters. Select the corresponding mode, protocol, and data settings of the serial port, as shown in the figure demonstrates that the COM1 port is used to collect the data of Modbus RTU protocol, and the baud rate of the serial port is set to 9600. Note that you must fill in the serial driver file of the device to drive the serial port, and the specific path name of the serial driver file can be found in the instruction manual of the device.

The devices corresponding to COM1, COM2, COM3 and COM4 of BLIIoT BL301/2 device serial driver are /dev/ttymxc1, /dev/ttymxc2, /dev/ttymxc5 and /dev/ttymxc4 respectively.

BL303/4 series device serial driver COM1, COM2, COM3 and COM4 corresponding to the device were /dev/ttymxc0, /dev/ttymxc1, /dev/ttymxc3 and /dev/ttymxc2, of which COM2 for the debugging of the serial port, COM2 need to be converted to an ordinary serial port if you need to use it, please do not fill in the COM2 driver /dev/ttymxc1 directly before conversion, in order to avoid the program to run errors.

After selecting BL301/2 or BL303/4 as the model number of the configuration software, the driver of BLIIoT device will be filled in automatically. If you are not using BLIIoT device, please delete the driver file of COM port and fill in the path of serial port driver of your own device.

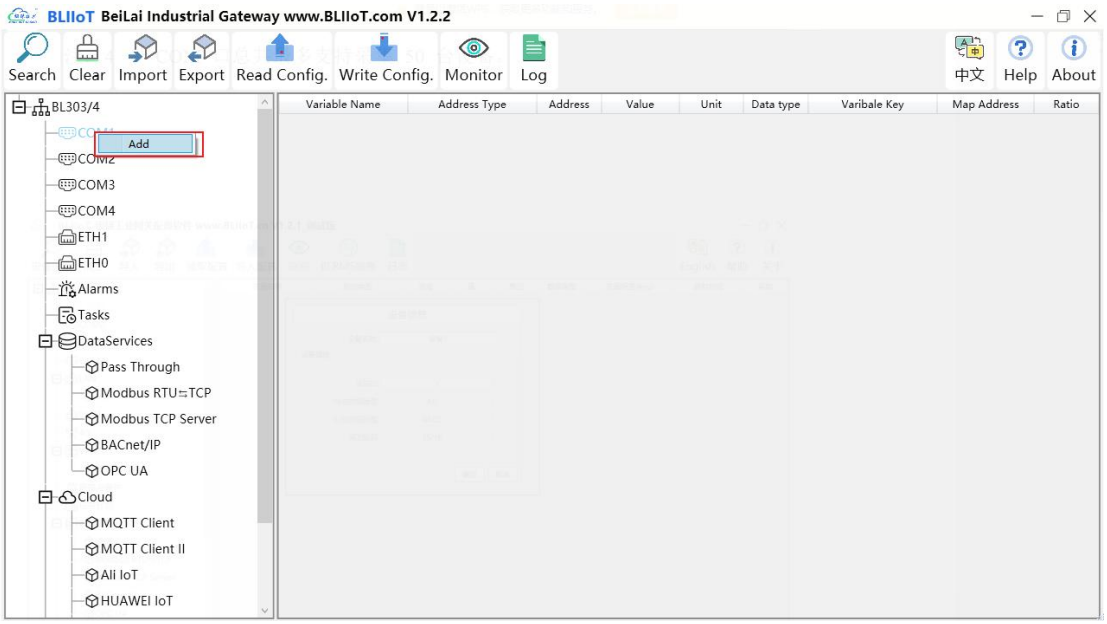


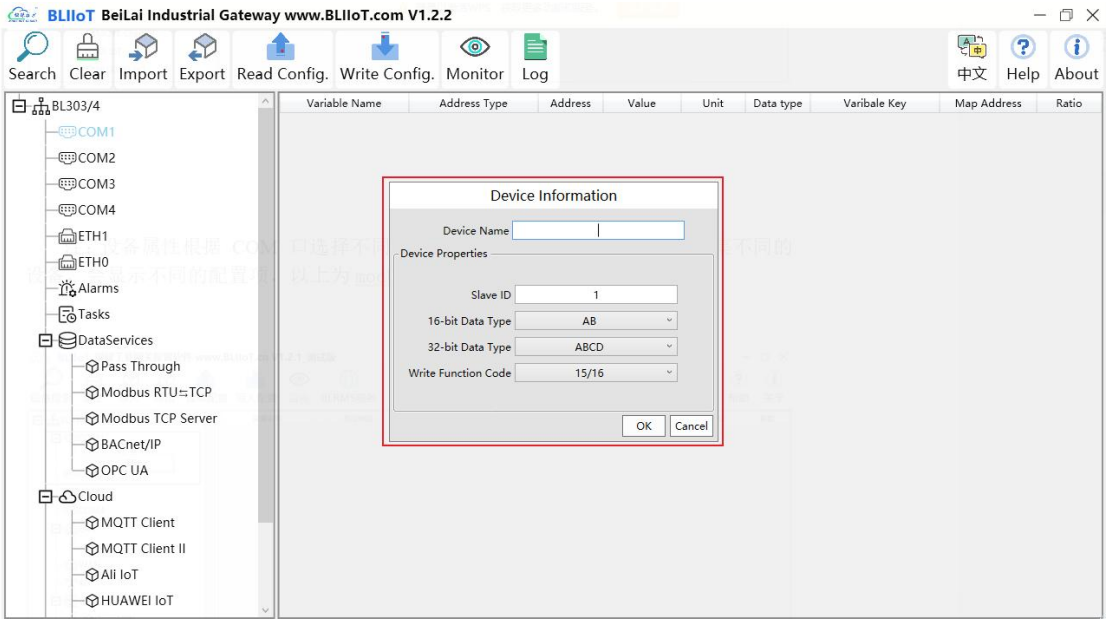
Step 2: Add a device

Right-click at COM1 and click Add Device to bring up the Device Information configuration box to configure the information to be collected from the slave device. Double-click on the created device name to bring up the configuration information of the device, and right-click to delete the device.

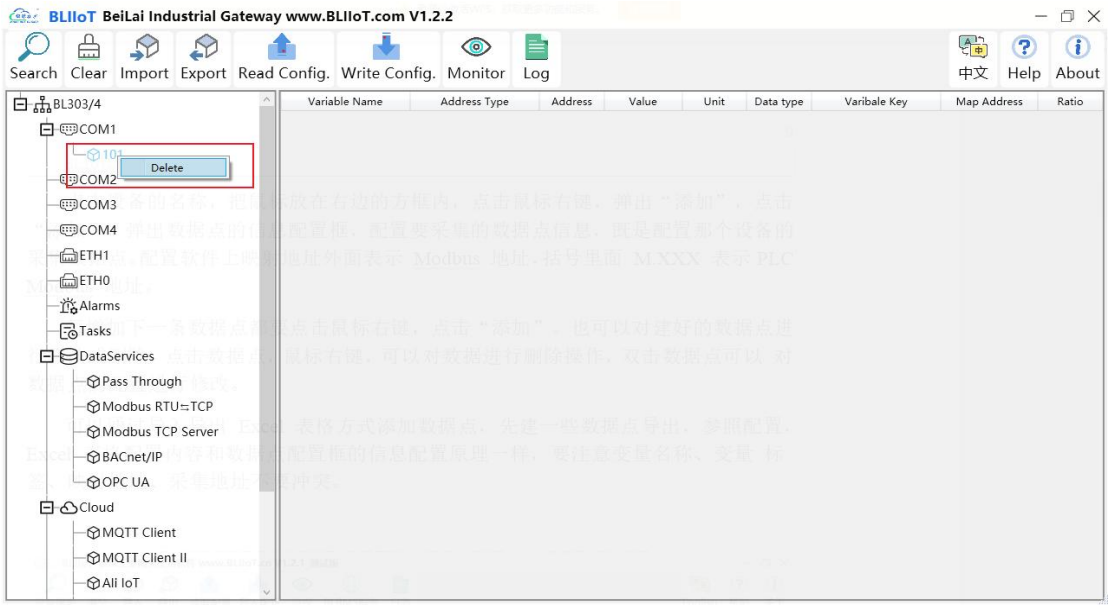
The byte order of the configuration data points is also set here.

Note: The 4 COM ports support the acquisition of up to 50 devices in total.





In device properties, select different protocols, different brands according to COM port, and the configuration items will change according to the collected devices, and the above are the default items of Modbus protocol.

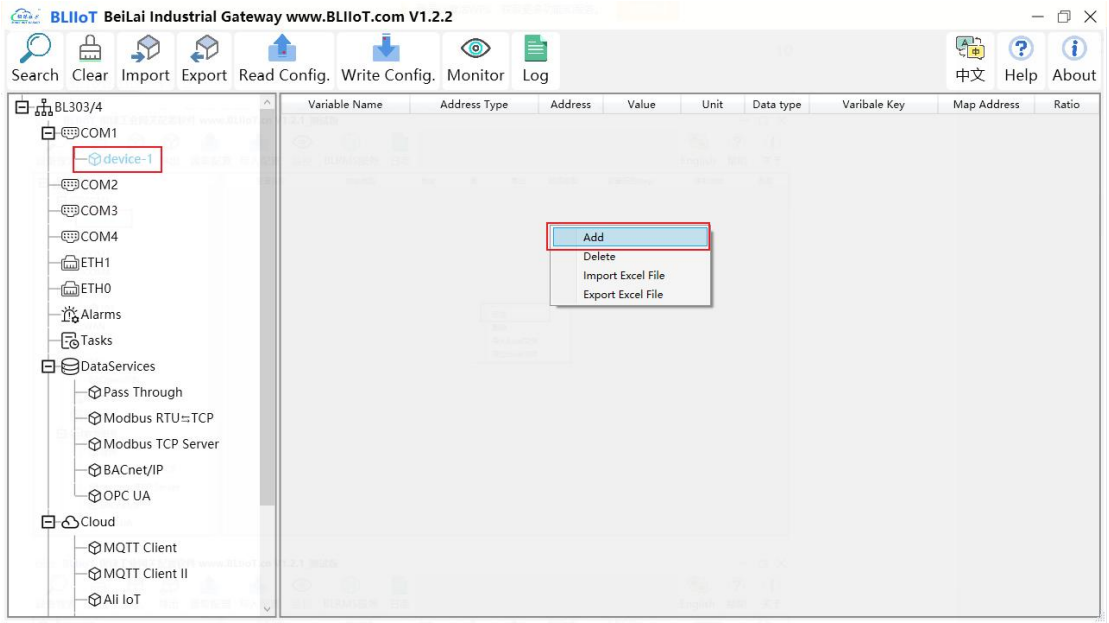


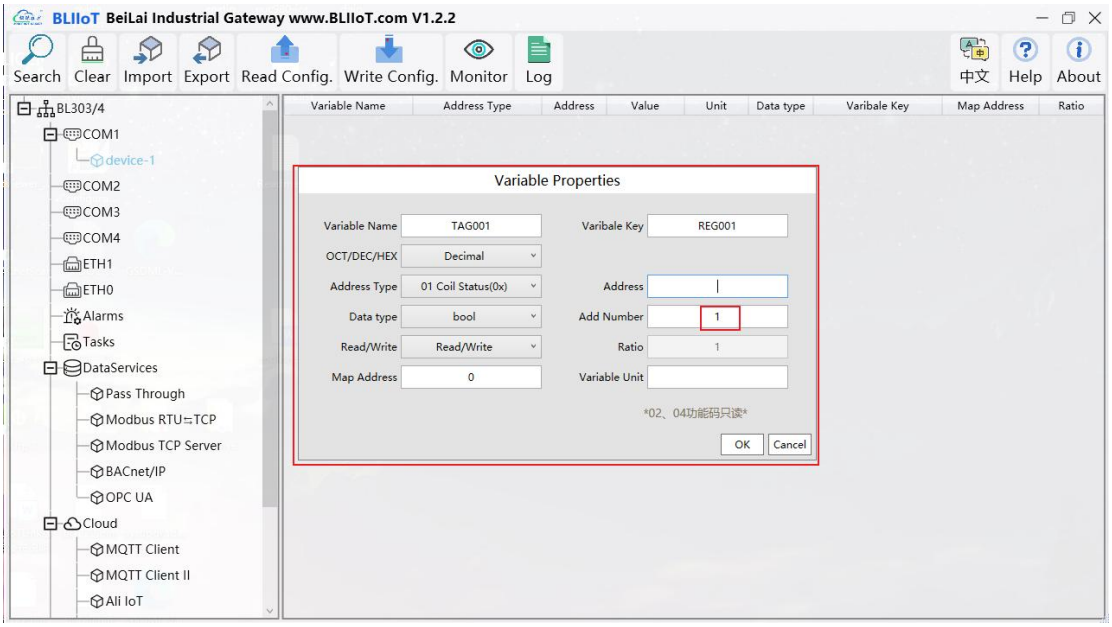
Step 3: Add the data points to be collected by the device

Click the name of the device, put the mouse in the right box, click the right mouse button, pop-up "Add", click "Add", pop-up variable properties, configure the data points to be collected. The outside of the mapped address on the configuration software indicates the Modbus address, and the inside of the parentheses M.XXX indicates the PLC Modbus address.

Click the right mouse button and click "Add" for each data point. Data points can also be modified or deleted by clicking on the data point and right clicking on the data point to delete the data, and double clicking on the data point to modify the configuration of the data point.

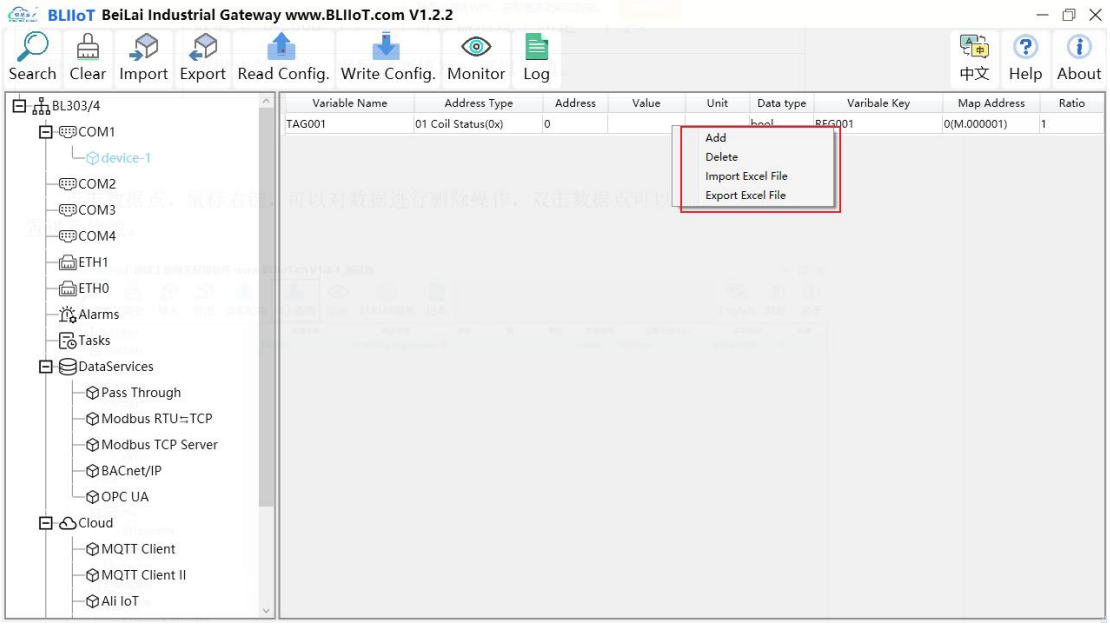
You can add data points by importing and exporting Excel table, first build some data points to export, Excel table configuration and data point configuration box information configuration principle is the same, pay attention to the variable name, variable labeling, mapping address, collection address do not conflict.



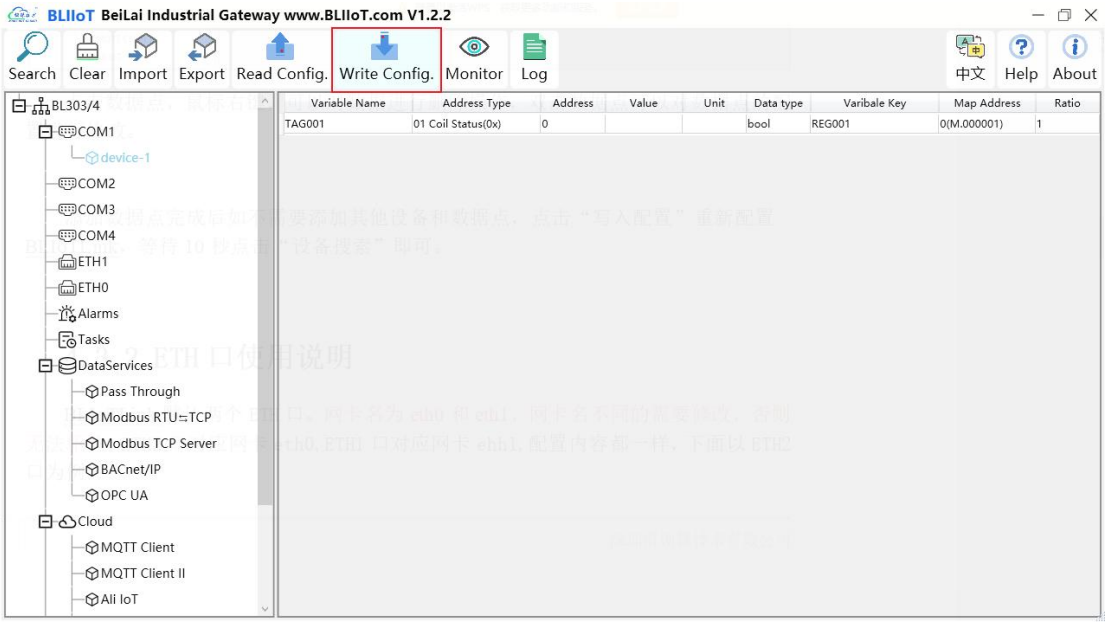


Configuration of Data Points	
Function	**Description**
Variable Name	Naming of collected data points for users to identify different data points themselves
Variable Key	The MQTT identifier of the data point, which can be filled in arbitrarily, but the Key cannot be duplicated for two data points.
OCT/DEC/HEX	Select from "decimal", "octal" and "hexadecimal" according to the acquisition address.
Address Type	Select the device's register type, which is displayed differently for different protocols.

Address	Collect the address of the slave device's data point
Data Type	“Boolean" is selected for Boolean, and "16-bit Unsigned Integer", "16-bit Signed Integer", "32-bit Unsigned Integer", "32-bit Signed Integer", "32-bit Single-precision Floating-point" are available for numeric type according to different registers.
Add Number	The number of data points to add
Read/Write	Choose from "read-only", "read-write".
Ratio	Only numeric data can be set, how many times it can be scaled up or down to upload to the platform.
Map Address	Modbus address of the data point stored in the gateway device, range: Boolean 0 to 2000. Numeric 0-2000. A register address space is one word.
Variable Unit	The unit of the data point, which is filled in when needed, can be left blank.



Click on the data point and right mouse button to delete the data, double click on the data point to modify the configuration of the data point.



After adding data points, if you don't need to add other devices and data points, click "Write Configuration" to reconfigure BLIoTLink, wait for 10 seconds and click "Search".

4.3.2 ETH Port Instructions

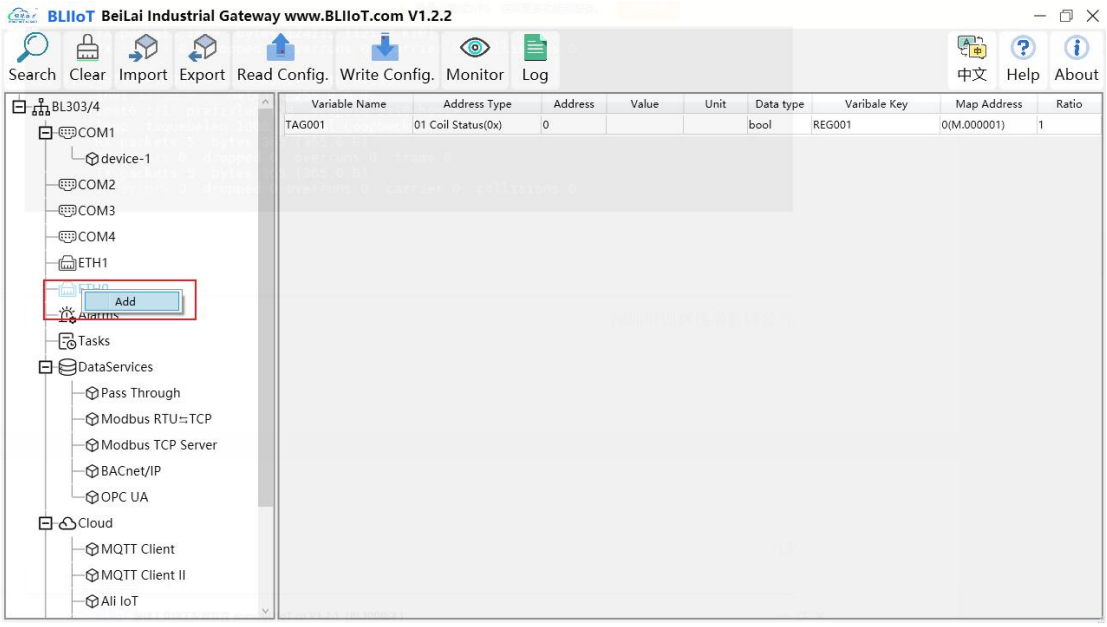
BLIoTLink has two ETH ports by default. NIC name is eth0 and eth1, if the NIC name is different, you need to modify it, otherwise it can't be driven, ETH0 port corresponds to NIC eth0, ETH1 port corresponds to NIC eth1, the configuration content is the same, the following ETH0 port as an example.

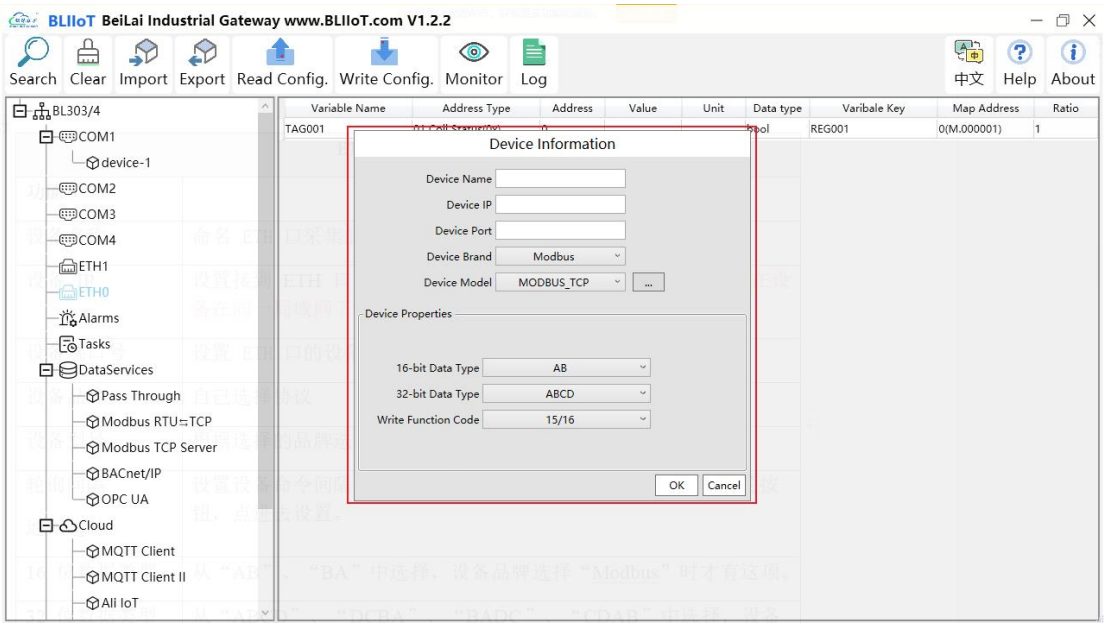
Right-click on ETH0 and click "Add" to bring up the configuration box to add the device of ETH0 port. the ETH0 port can be directly connected to the slave device, or it can be connected to the switch to collect the device connected to the switch.

Note: The ETH1 and ETH0 ports support the acquisition of a total of 50 devices.

View NIC Commands: ifconfig

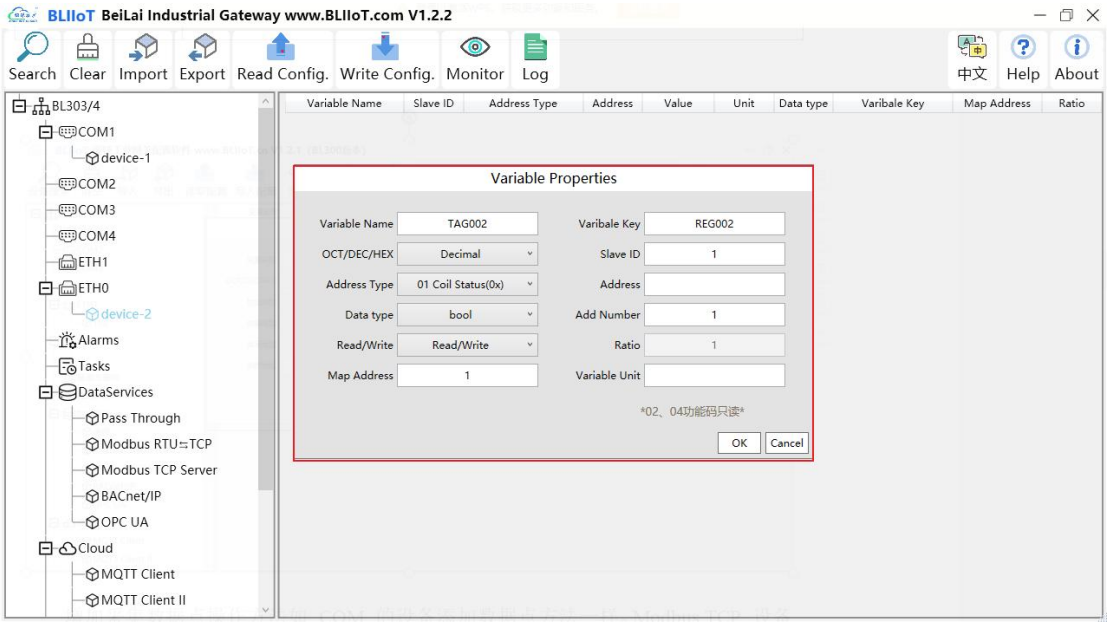
```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.250  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::5090:f1ff:fe14:da62  prefixlen 64  scopeid 0x20<link>
        ether 52:90:f1:14:da:62  txqueuelen 1000  (Ethernet)
        RX packets 3280  bytes 260209 (254.1 KiB)
        RX errors 0  dropped 131  overruns 0  frame 0
        TX packets 1879  bytes 124215 (121.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 5  bytes 365 (365.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 5  bytes 365 (365.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```





ETH Port Configuration	
Function	**Description**
Device Name	Name of the device collected by the ETH port
Device IP	Set the IP address of the slave device connected to the ETH port, which needs to be under the same LAN as the BLIoTLink device.
Device Port	Set the port number of the device
Device Brand	Choose a protocol
Device Model	Select the model of the acquisition device according to the chosen

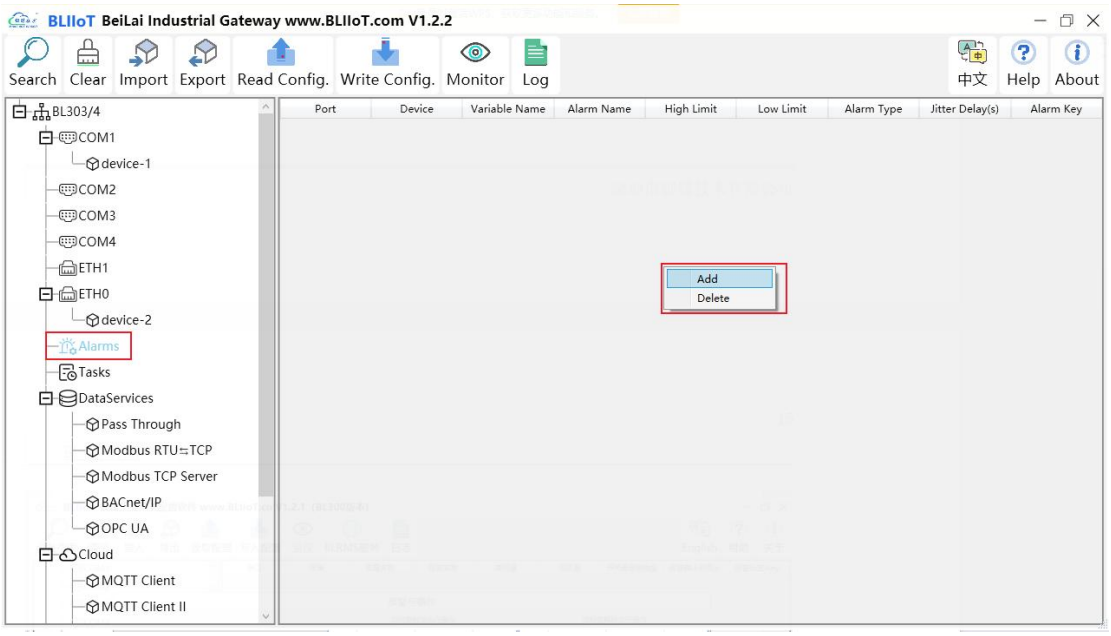
	brand
Polling Interval Communication Timeout	To set the device command interval and device return timeout, tap the button next to the device model number to set it.
16-bit Data Type	Select from "AB", "BA", only available when "Modbus" is selected for the device brand.
32-bit Data Type	Select from "ABCD", "DCBA", "BADC", "CDAB" and only available when "Modbus" is selected for the device brand.
Write Function Code	Select from "05/06", "15/16"

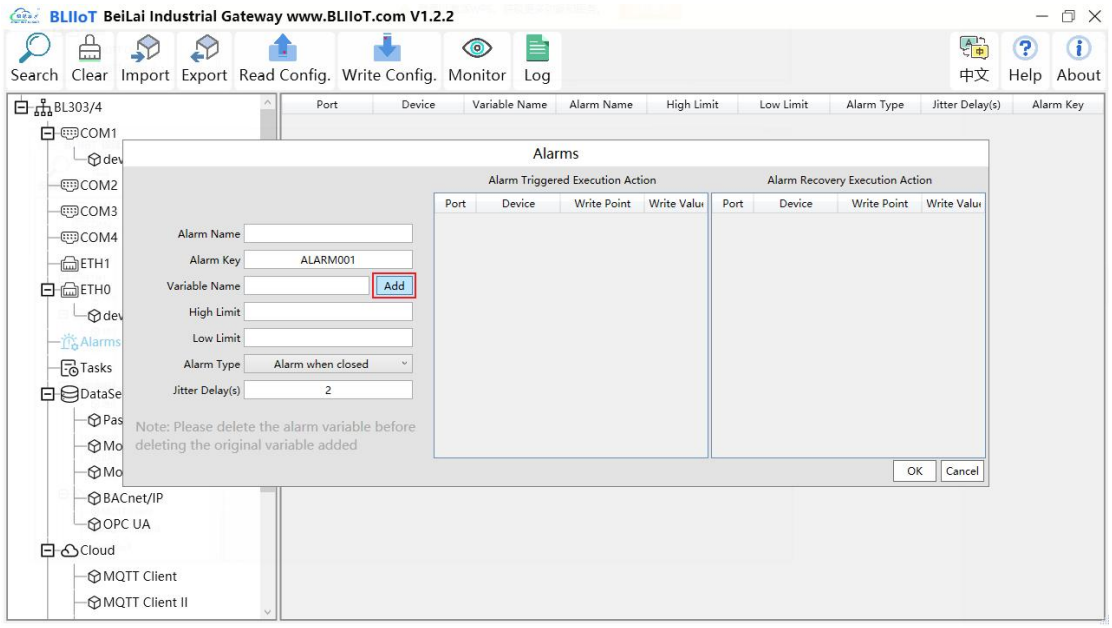


Adding an acquisition data point is done in the same way as adding a data point to a COM device.The device ID of the Modbus TCP device is configured in the Data Point Configuration box.

4.3.3 Alarm Configuration

Click "Alarms", move the mouse to the right box, click the right button of the mouse, and then "Add" will pop up. Click "Add" and then "Alarms" will pop up, and you can configure the data points that need to be alarmed, the actions that should be carried out by the alarm, and the actions that should be carried out by the alarm recovery according to the requirements.





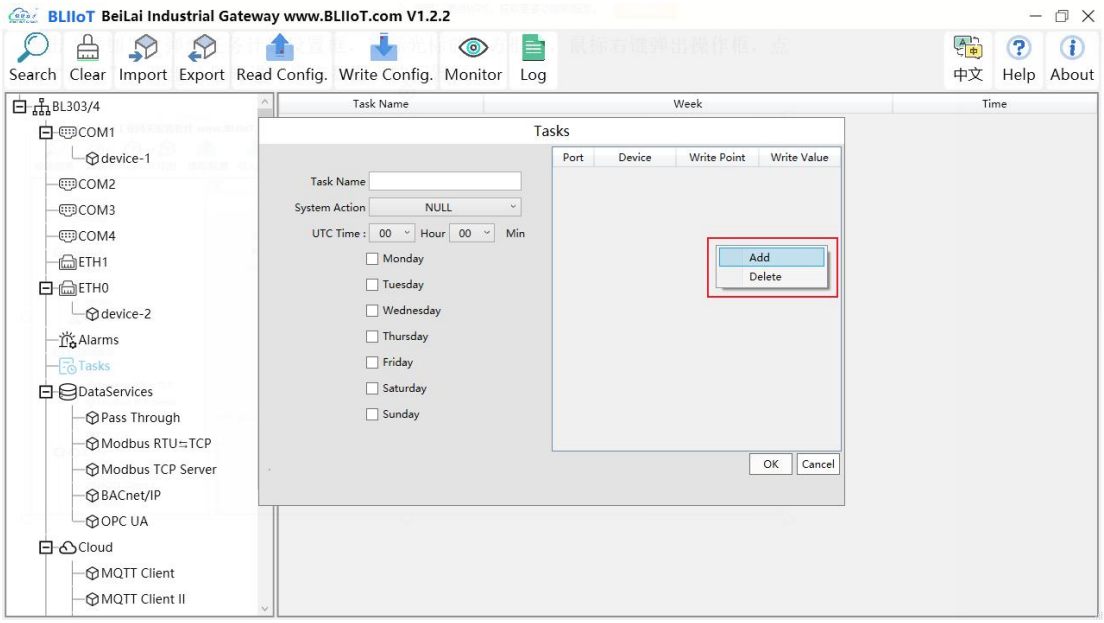
Alarms	
Function	**Description**
Alarm Name	Name the alarm point
Alarm Key	The MQTT identifier of the alarm point, which can be filled in arbitrarily.
Variable Name	Select the data point to be alarmed. Click "Add" to bring up the data points, click the data point for which you want to set an alarm, and

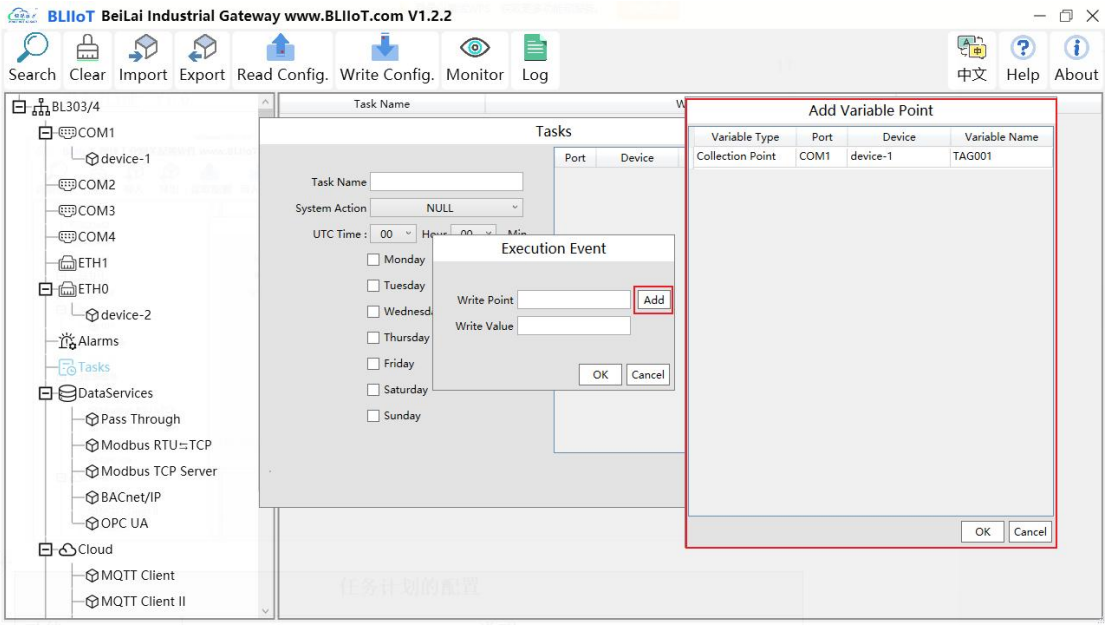
	click "OK".
High Limit	The high limit alarm value for numeric type data points, this can only be configured when the data point is numeric.
Low Limit	Low limit alarm value for numeric type data points, this can only be configured when the data point is numeric.
Alarm Type	Digital input alarm mode selection, select from "Normally open", "Normally closed".
Jitter Delay	During the alarm acknowledgement time, data is recovered and no alarm occurs.

Put the mouse cursor in "Alarm Triggered Execution Action", the right mouse button pops up a prompt box, click "Add" to pop up the event configuration box, set the alarm needs to be performed when the operation. Similarly, if you place the mouse cursor in the "Alarm Recovery Execute Operation", the operation is to set the operation of alarm disarming, the operation mode is the same as setting the operation to be executed when alarm is triggered.

4.3.4 Tasks Configuration

Left mouse button click on "Task Plan", move the mouse to the right side of the box, click the right mouse button, pop-up "Add", click "Add", pop-up Tasks Settings Box, move the mouse cursor to the right side of the box, click the right mouse button to pop up the operation box, Click "Add" to bring up the configuration box for the data point you plan to operate on.

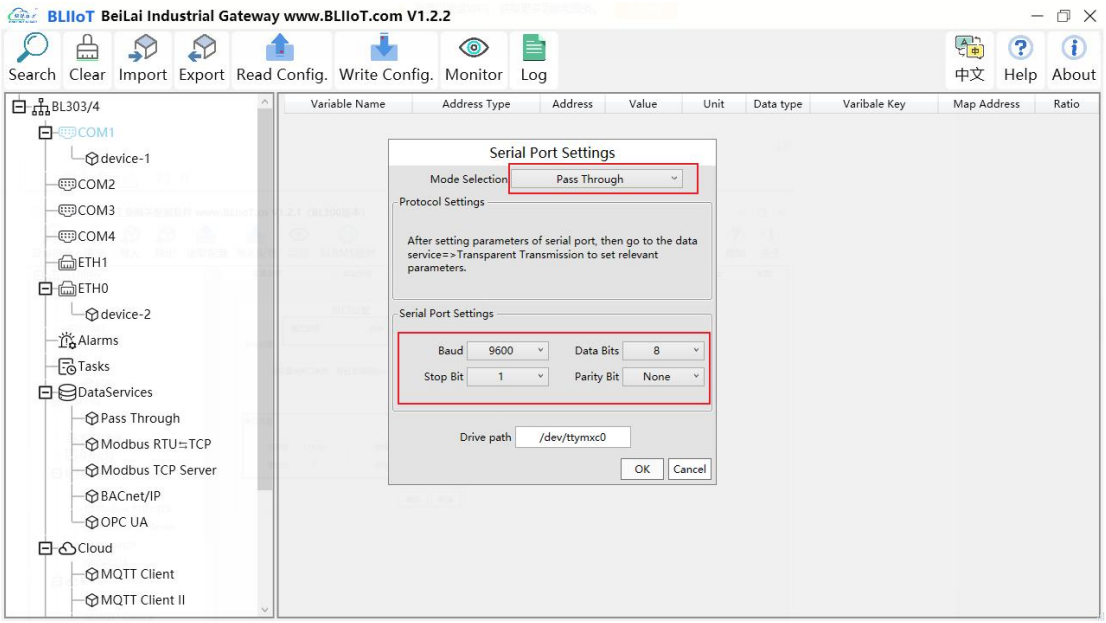


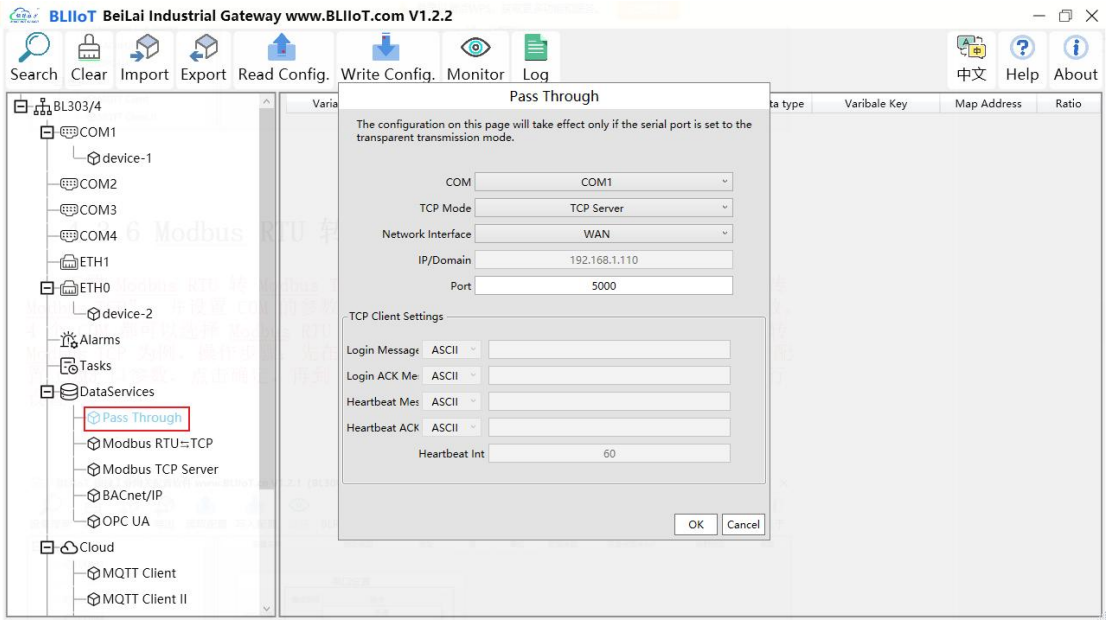


Tasks	
Function	**Description**
Task Name	Name the tasks
System Action	Select "NULL".
UTC Time	Set the time to perform the tasks, which is the time of the device where BLIoTLink is located.
Week	Setting the week for task
Write Point	Based on the selected data point, the write point name is automatically generated, and you can click "Add" to select the data point to be operated. Click the data point and then click "OK".
Write Value	Write the value of the data point on which the operation is planned to be performed

4.3.5 Pass Through

To configure the pass through protocol, first set the COM mode to "Pass Through" and set the COM parameters, and then configure the parameters of the pass through protocol. All 4 COMs can do pass through, and the procedure is the same. Take COM2 as First, select the Pass Through mode in COM2, configure the COM2 attribute parameters, and click OK. Then go to "Data Services" to set "Pass Through".

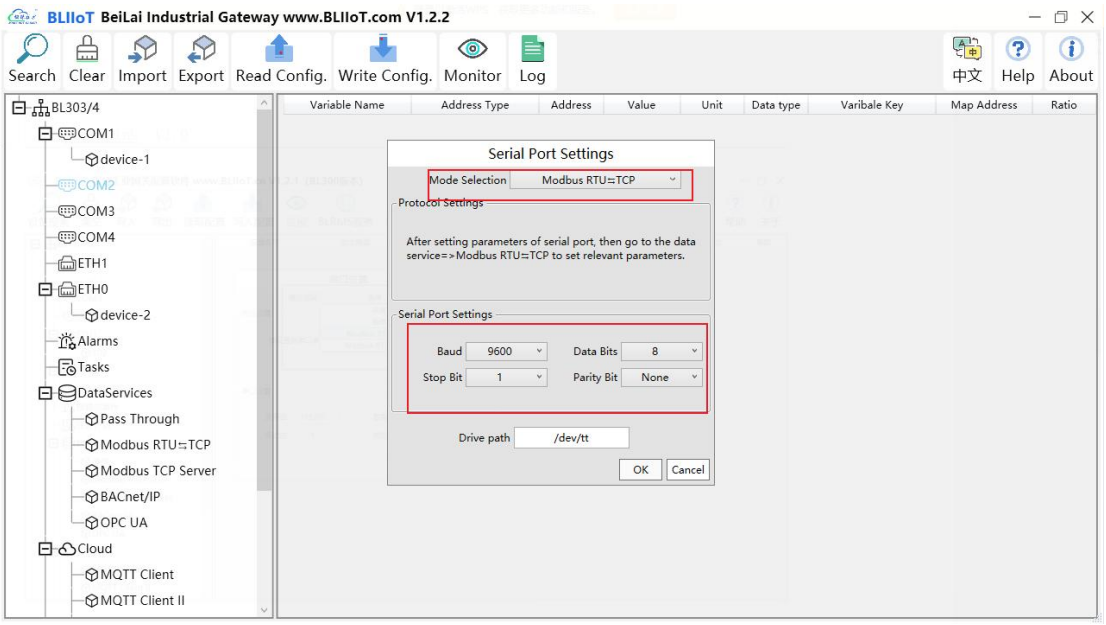


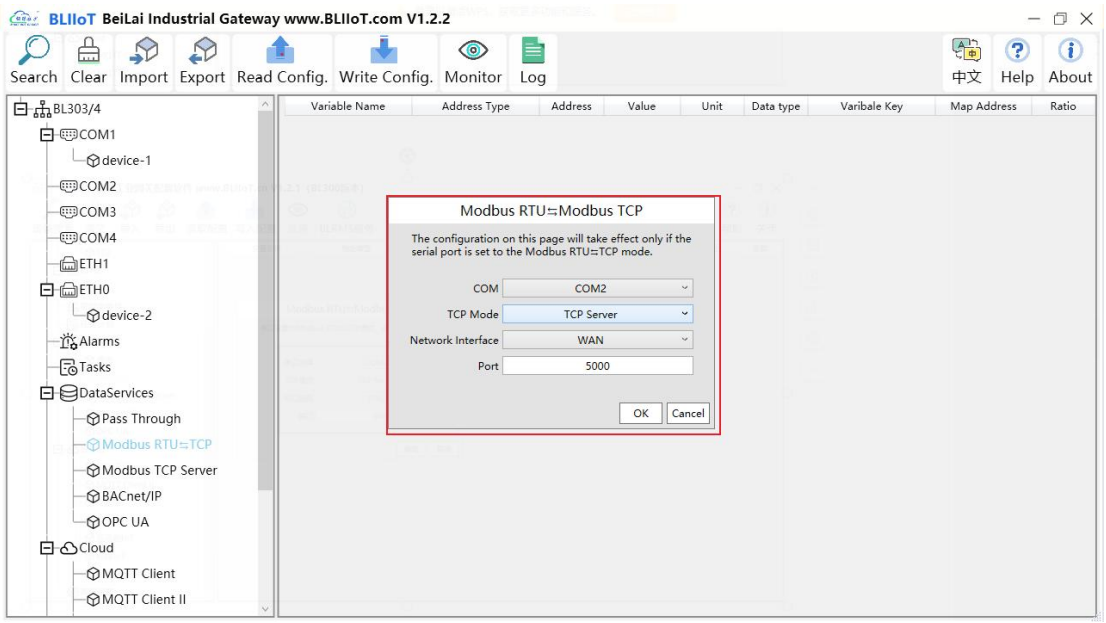


4.3.6 Modbus RTU to Modbus TCP

To configure Modbus RTU to Modbus TCP protocol, first set the mode of COM to "Modbus RTU to Modbus TCP" and set the parameters of COM, then configure the parameters of Modbus RTU to Modbus TCP protocol.All 4 COMs can select Modbus RTU to Modbus TCP protocol, take COM2 as an example of Modbus RTU to Modbus TCP.

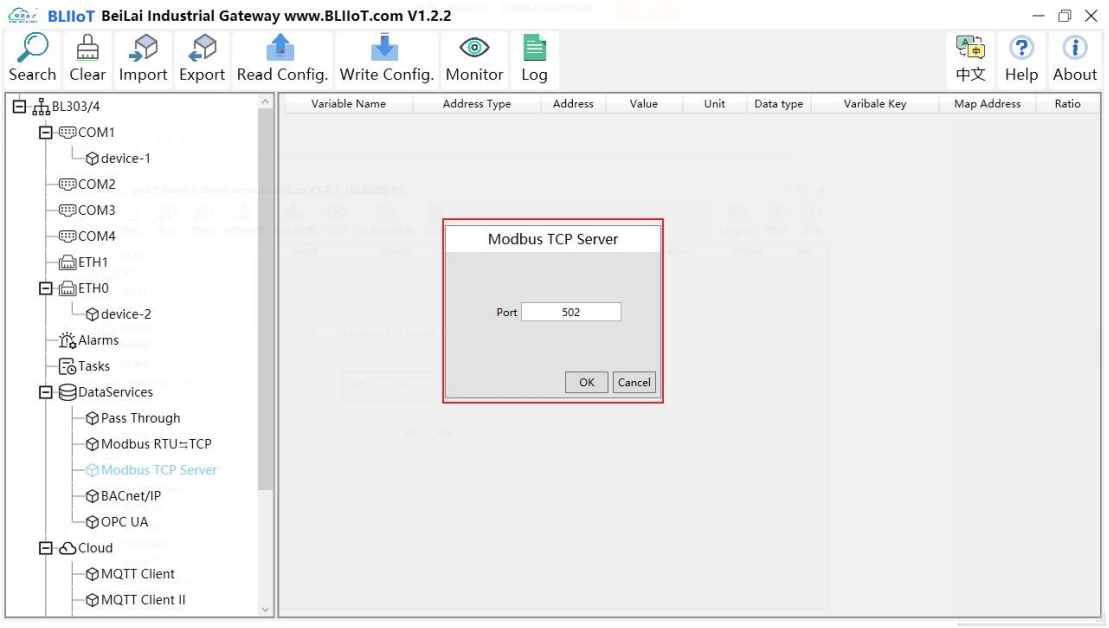
Steps: Select Modbus RTU to Modbus TCP mode in COM2, configure the parameters of COM2 port, click OK, and then go to "Modbus RTU to Modbus TCP" in "Data Service" to set it.





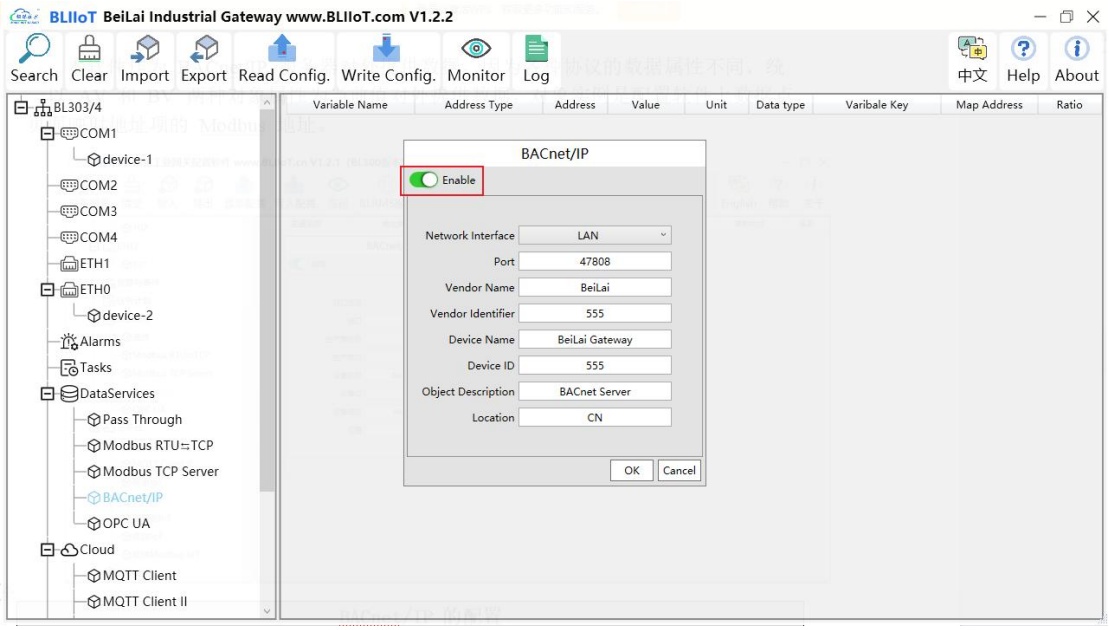
4.3.7 Modbus TCP Server

The Modbus TCP Server provides data to the outside. Modbus TCP Server is always enabled, just configure the local listening port.



4.3.8 BACnet/IP

BLIoTLink provides data as a BACnet/IP server. Since the data attributes of various protocols are different, the current values of the two object attributes, AV and BV, are standardized to provide data to the outside.The object instance is the Modbus address of the mapped address entry on the Data Points page of the configuration software.

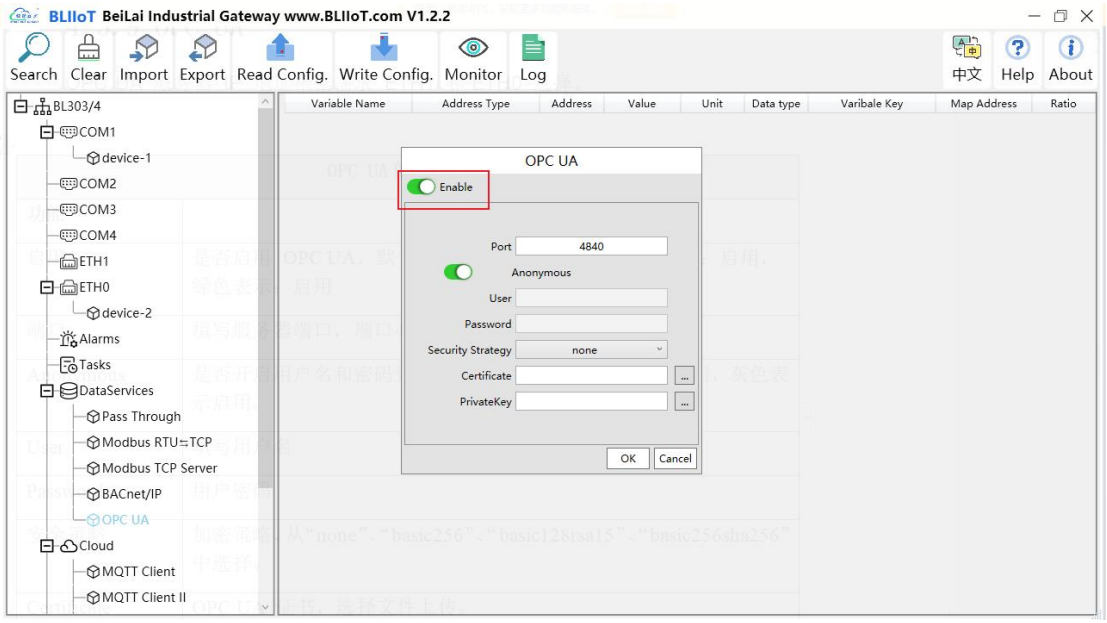


BACnet/IP Configuration	
Function	**Description**
Enable	Whether to enable BACnet/IP, default is off, click the button to

	enable. Gray means Enable, Green means Enable
Network Interface	Choose from "ETH1", "ETH0".
Port	Fill in the server port, the port must be filled in. Default: 47808.
Vendor Name	Default is "BeiLai", which can be filled in arbitrarily.
Vendor Identifier	The default is "555", which can be filled in arbitrarily.
Device Name	Default is "BeiLai Gateway", you can fill in arbitrarily.
Device ID	Default "555", device object instance, if there is also a BACnet device in the downstream, be careful not to conflict.
Object Description	Default is "BACnet Server", which can be filled in arbitrarily.
Location	Default "CN", can be filled in arbitrarily.

4.3.9 OPC UA

The OPC UA server IP address is selected according to the requirements ETH1 and ETH0.



OPC UA Configuration	
Function	**Description**

Enable	Whether to enable OPC UA or not, default is off, click the button to enable. Gray means Enable, Green means Enable
Port	Fill in the server port, the port must be filled in. Default: 4840.
Anonymous	Whether to enable user name and password login, default is not enabled, green means not enable, gray means enable.
User	Fill in the user name
Password	User password
Security Strategy	Encryption policy, select from "none", "basic256", "basic128rsa15", "basic256sha256".
Certificate	OPC UA certificates, select File Upload.
PrivateKey	OPC UA key, select File Upload.

4.3.10 MQTT Client

MQTT Client can be connected to cloud with certificate or without certificate.

MQTT Client data format only supports JSON data format of "Beilai", "thingsboard", and "sparkplug b". MQTT data format can be customized. More JSON data format and customized JSON data format will be supported in the future.Connect to the ThingsBoard platform, select JSON data format of "thingsboard-telemetry-gateway". ThingsBoard platform domain name is thingsboard.cloud.

"thingsboard-telemetry-gateway". ThingsBoard platform domain name is thingsboard.cloud.

Connect to a platform that supports Sparkplug B, such as the ignition, select the JSON data format of "sparkplug b", click the button next to the data template item, configure the group ID and edge node ID in the configuration box.

MQTT Client supports multiple publishing topics, click "Add" in the publishing topic item to fill in the publishing topic, and you can view the publishing topic name in the drop-down box of the publishing topic item. Select the release topic name and click "Delete" to delete the release topic to be deleted.

MQTT Client also supports the selection of different data points for each publishing topic to publish. Put the mouse cursor in the right box, click the right button, a prompt box will pop up, click "Add", a data point box will pop up, click the data point to be published, Click "OK". Double-click a data point to view the properties.

As shown in the figure below: The publishing topic "topic" only publishes the data point

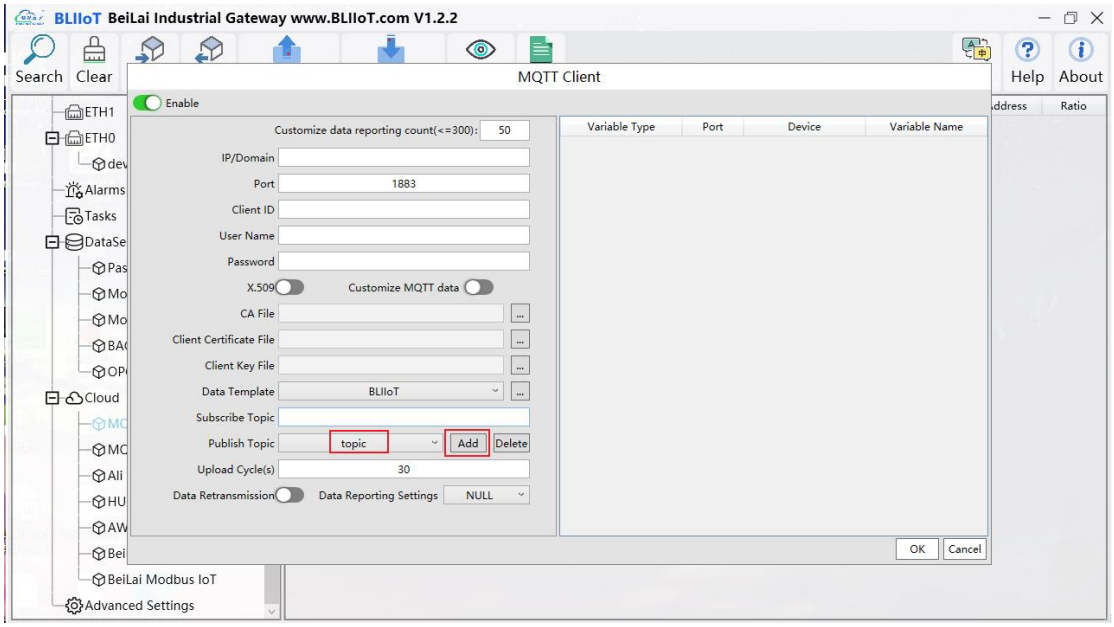
"TAG001" of the "Device 1" of "COM1", and other data points are not published.

The "Beilai" JSON data format of MQTT Client and MQTT Client II is the same as that of Beilai MQTT. Refer to chapter 7 Beilai MQTT Data Format

"thingsboard-telemetry-gateway" JSON data format, publish and subscribe topic format refer to the thingsboard official website documentation.

"sparkplug b" JSON data format, publish and subscribe topic format refer to Sparkplug specification.

Note: The data point box is blank by default, if no data point is selected, all data points are published. If there are multiple publishing topics, only one publishing topic can be blank, and other topics must select the published data points, and cannot be left blank.



MQTT Client Configuration	
Item	**Description**
Enable	Green indicates MQTT Client is enabled Gray indicates MQTT Client is disabled
IP/Domain Name	Fill in the IP/domain name to connect to the MQTT server
Port	Fill in the port to connect to the server, default is 1883, the port must be filled in.
Client ID	The client identifier used in the MQTT connection message, and the

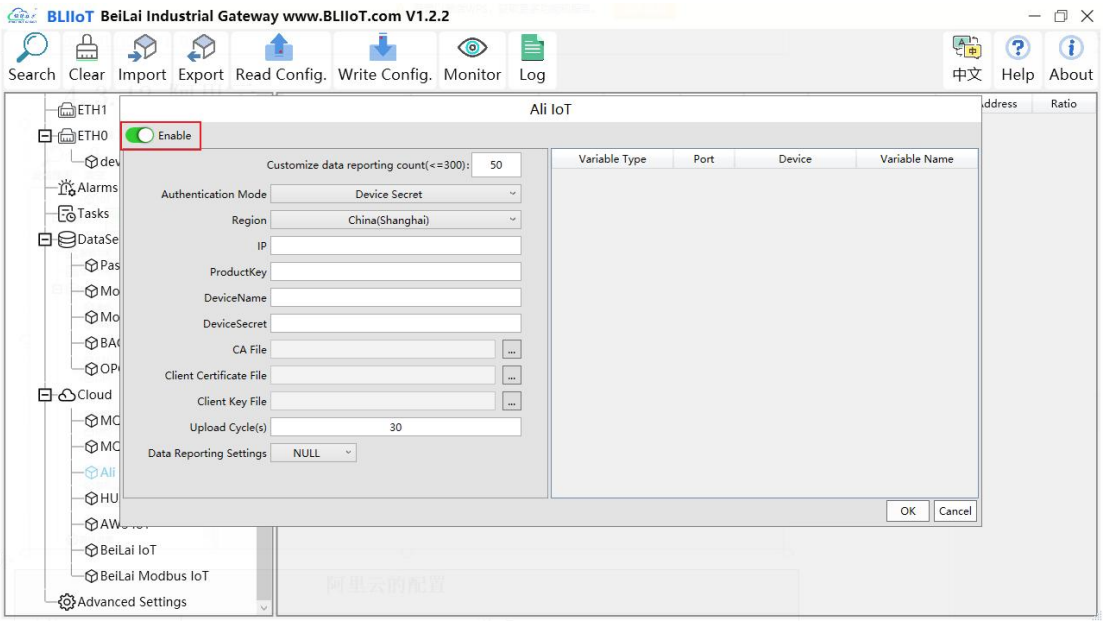
	server uses the client identifier to identify the client.
User Name	The username used in the MQTT connection message, the server can use it for authentication and authorization.
Password	The password used by the MQTT connection message, the server can use it for authentication and authorization.
X.509	Click the button to enable. Gray: Disabled, Green: enabled.
CA File	Select File Upload(Select Certificate Connection to fill in)
Client certificate file	Select File Upload(Select Certificate Connection to fill in)
Client Key file	Select File Upload(Select Certificate Connection to fill in)
Data template	Json data format selection, choose from "Beilai", "thingsboard-telemetry-gateway", "sparkplug b", "yundee", "dl". Default: Beilai. Some data templates have special configuration, click the button next to it to configure, such as the group ID and edge node ID of the "sparkplug b" template.
Subscribe Topic	Topic of MQTT subscription message. After subscription, the server can send a publish message to the client for control.
Publish Topic	Topic of MQTT publishing message. It's used for MQTT to identify message channel of sending valid load data. Wildcard can't be included in publishing message topic name. Click Add to add more public topics. Click Delete to delete Public Topic
Upload Cycle	Cycle time of MQTT data sending. Default is 30s
Data Retransmission	Green indicates offline data will be transmitted once network recovers; Gray indicates retransmission disable. Max 100,000 data points can be re-transmitted. The previous ones will be deleted if data point more than that.
Selection of published data points	Default is blank, means all data uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.

4.3.11 MQTT Client II

MQTT Client II Configuration is the same as MQTT Client

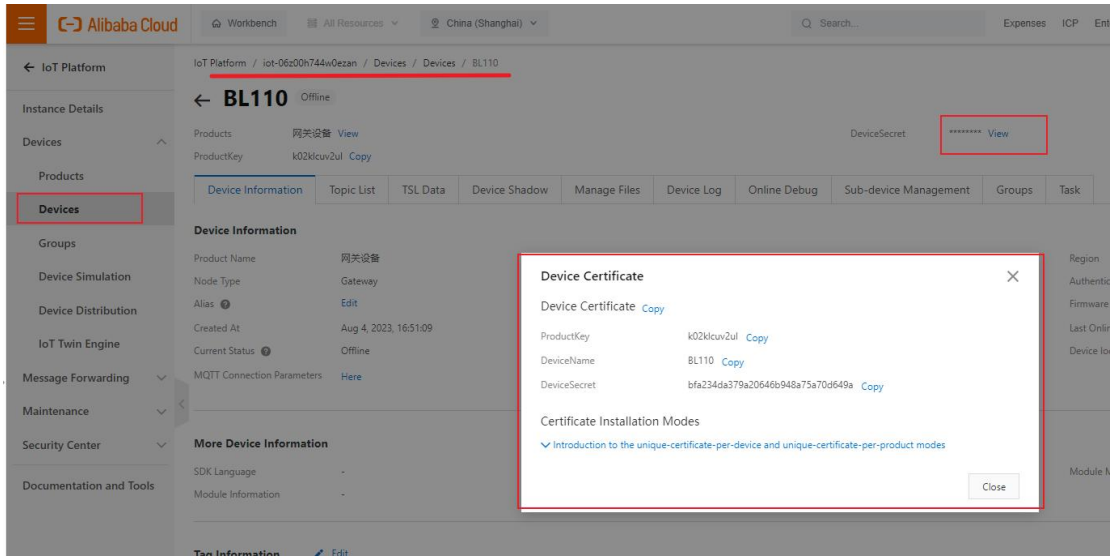
MQTT Client II subscribe topic will not be working. MQTT Client Two is used for view data but not control data from cloud.

4.3.12 Ali Cloud



Ali Cloud Configuration	
Item	**Description**
Enable	Green indicates Ali Cloud is enabled Gray indicates Ali cloud is disabled
Authentication Mode	Default is Device Secret. Select the key or certificate according to your needs, and choose from "Device Secret" and "X.509".
Region	Select Alibaba Cloud Region, default is China(Shanghai)
IP	The IP address of Alibaba Cloud Enterprise Edition, not required for the public edition.
ProductKey	Set the same ProductKey as the one in Ali Cloud. See below image (Device-Click DeviceSecret to view it)
DeviceName	Set the same DeviceName as the one in Ali Cloud See below image (Device-Click DeviceSecret to view it)
DeviceSecret	Set the same DeviceSecret as the one in Ali Cloud See below image (Device-Click DeviceSecret to view it)
CA File	Select File Upload(Select Certificate Connection to fill in)
Client certificate file	Select File Upload(Select Certificate Connection to fill in)
Client key file	Select File Upload(Select Certificate Connection to fill in)

Upload cycle	Cycle time of data sending. Default is 30s
Selection of published data points	Default is blank, means all data uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.



4.3.13 HUAWEI Cloud

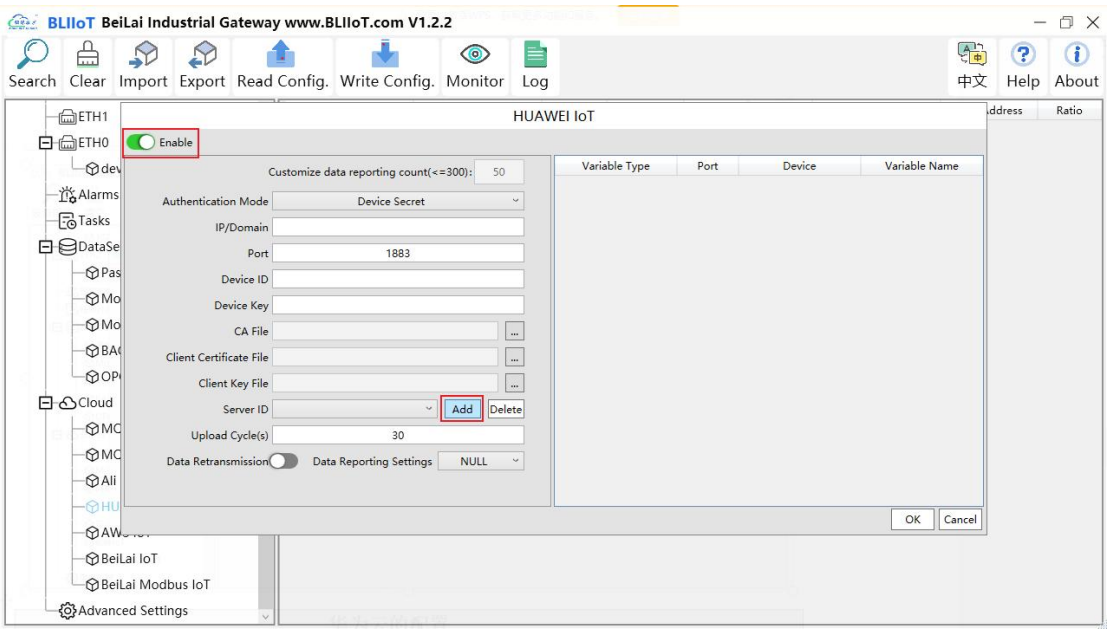
HUAWEI Cloud can be connected with or without Certificate.

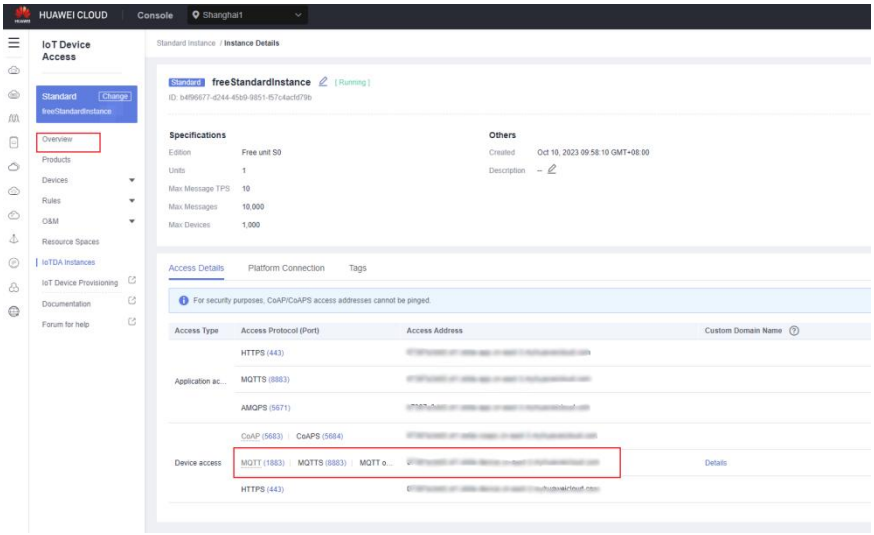
It supports multiple service IDs. Click Add to set Service ID. ID can be viewed from the drop-down list. Click Delete to delete service ID. HUAWEI Cloud supports uploading certain datapoints of each Service ID. Right click the box and click Add to enter datapoint dialog box. Select the datapoint to upload and click OK to confirm it.

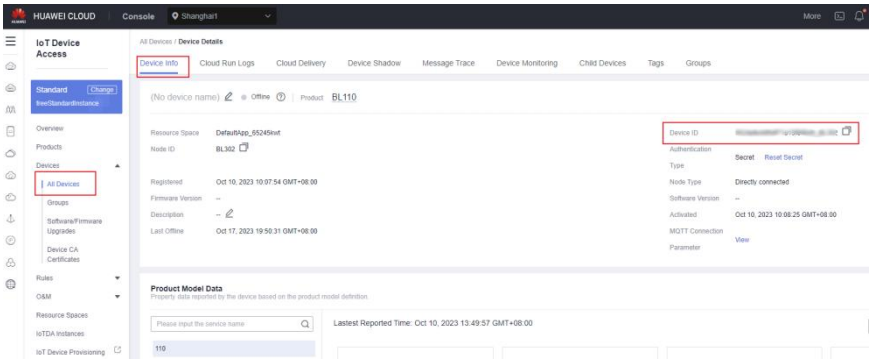
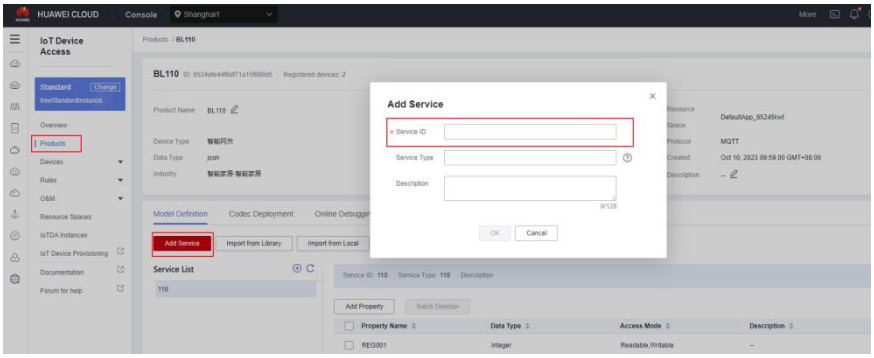
Note:

1. Datapoint box is blank by default which means all datapoints will be uploaded. If there’re multiple Service IDs, only one Service ID datapoint box can be blank. Datapoints for uploading must be selected for other Service IDs.

2, HUAWEI Cloud devices shadow is not supported, send command through synchronization command.



HUAWEI Cloud Configuration	
Item	**Description**
Enable	Default is not enable, Green indicates HUAWEI Cloud is enabled Gray indicates HUAWEI cloud is not enabled
Authentication mode	Default is device secret. Select the key or certificate according to your needs, and choose from "Device Secret" and "X.509".
IP/Domain Name	Select connecting to HUAWEI Cloud via MQTT to enter console. Click Overview to get server IP address of device connection 
Port	Default is 1883, fill in 1883 for connecting with Secret Key, fill in 8883 for connecting with Certificate (Required)
Device ID	Set the same ID as the one in HUAWEI Cloud(Device-Device

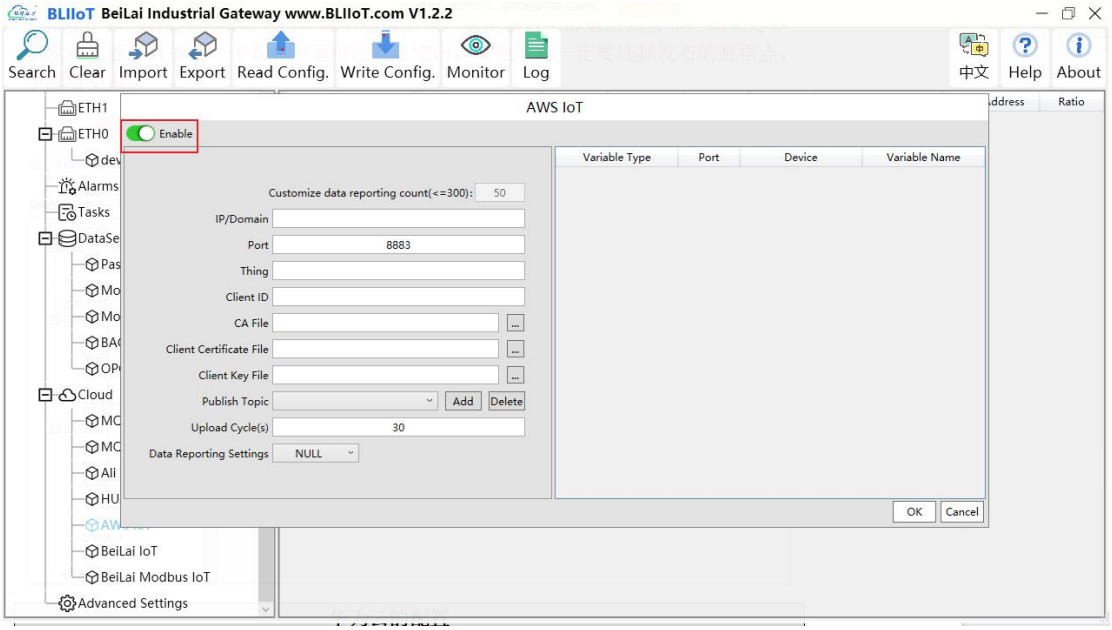
	ID 
Device Key	Set the same Device Secret Key as the one in HUAWEI Cloud when creating device in HUAWEI Cloud. It can be reset in device authentication if forgot. (Not necessary if connecting with certificate is selected)
CA File	Select File Upload(Select Certificate Connection to fill in)
Client certificate file	Select File Upload(Select Certificate Connection to fill in)
Client key file	Select File Upload(Select Certificate Connection to fill in)
Server ID	Set the same Service ID as the one in HUAWEI Cloud. (IOT Platform-Products-Add Service-Service ID) 
Upload cycle	Cycle time of data uploading. Default is 30s
Data Retransmission	Green indicates offline data will be transmitted once network recovers; Gray means retransmission disable. Max 100,000 data points can be re-transmitted. The previous data will be deleted If more than that.
Selection of published data points	Default is blank, means all data uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.

HUAWEI CLOUD platform data point settings are as follows: If multiple service IDs are set on the configuration software, and each service ID has different data points, the HUAWEI

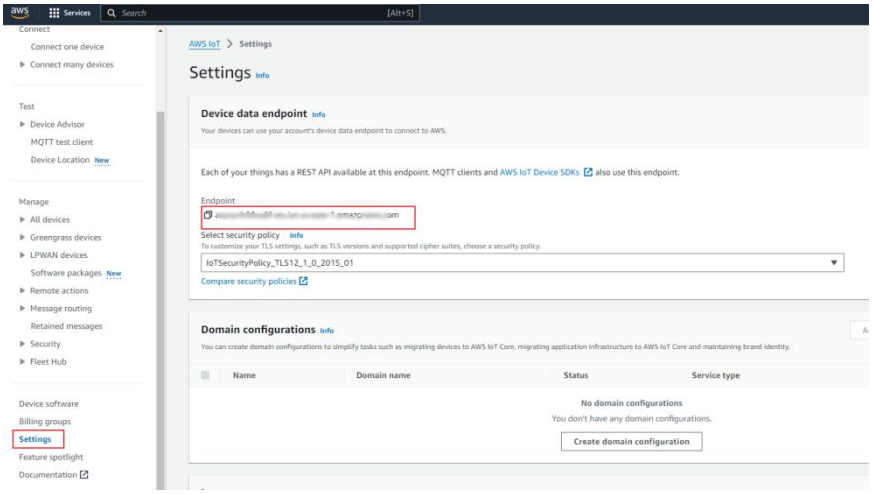
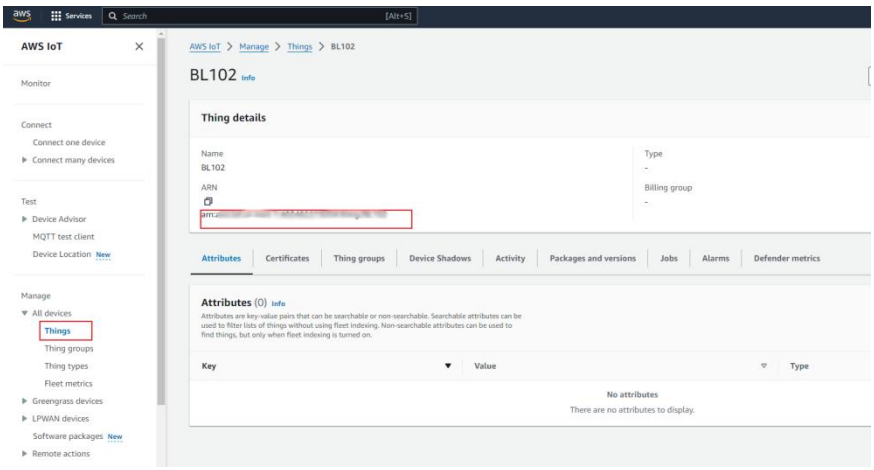
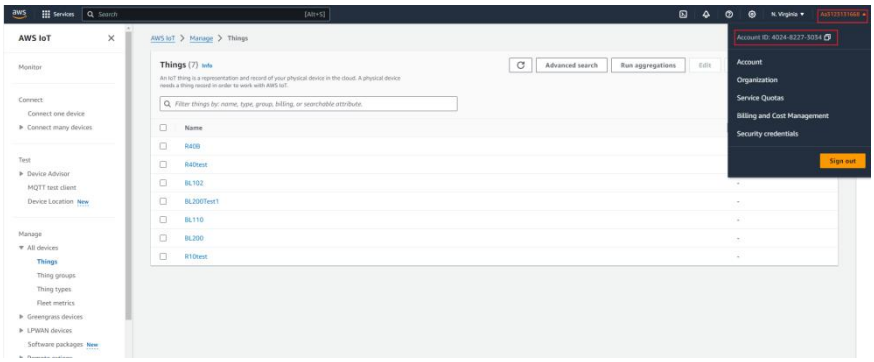
CLOUD platform needs to add attributes to the corresponding service IDs. The attribute name fills in the MQTT identifier of the corresponding data point on the configuration software. For example, if you collect S7-200SMART data point Q0.0, and the variable label on the configuration software is "Q0", the attribute name of the attribute added on Huawei Cloud should be "Q0".

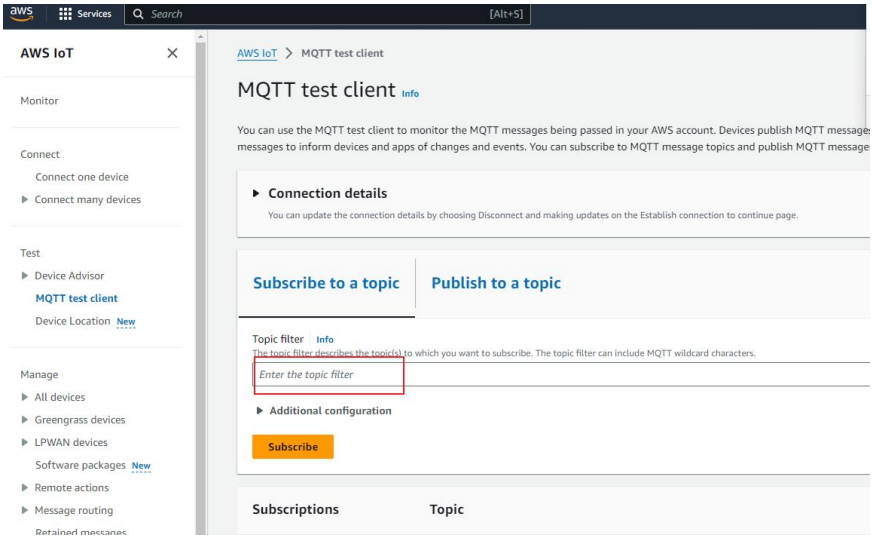
4.3.14 AWS

Note: 1. Data point box is blank in default which means all data points will be published. If multiple topics are published, only one topic data point box can be blank. For other topics, data points for publishing must be selected. 2. AWS Cloud shadow function is not supported.



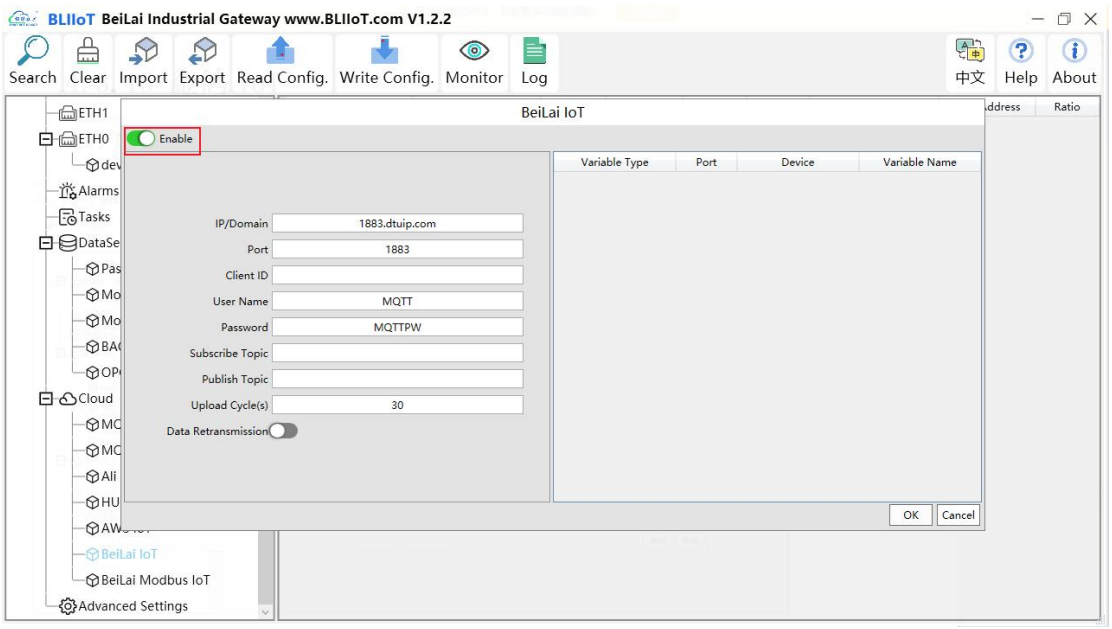
AWS Configuration	
Item	**Description**
Enable	Default is disable. Green indicates AWS is enabled Gray indicates AWS is disabled
IP/Domain Name	Fill in the terminal node, enter the console, and click "Things" -"Interact".

	
Port	8883(Required)
Thing	Fill in the ARN 
Client ID	Fill in AWS account ID 
CA File	Select File Upload
Client certificate	Select File Upload

file	
Client key file	Select File Upload
Publish Topic	Topic created when creating a rule, topic name used by MQTT to publish messages, click "Add" to fill in the published topic name. Click Add to create more Publish Topics. Select Publish Topic and click Delete to delete it. 
Upload cycle	Cycle time of data uploading. Default is 30s
Selection of published data points	Default is blank, means all data is uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.

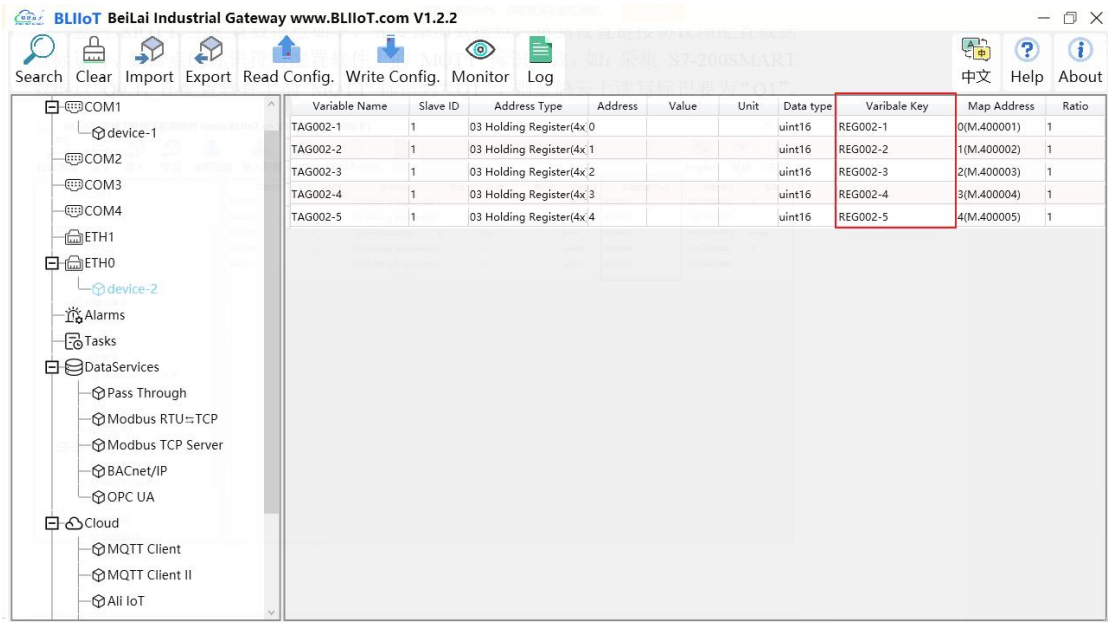
4.3.15 Beilai IoT

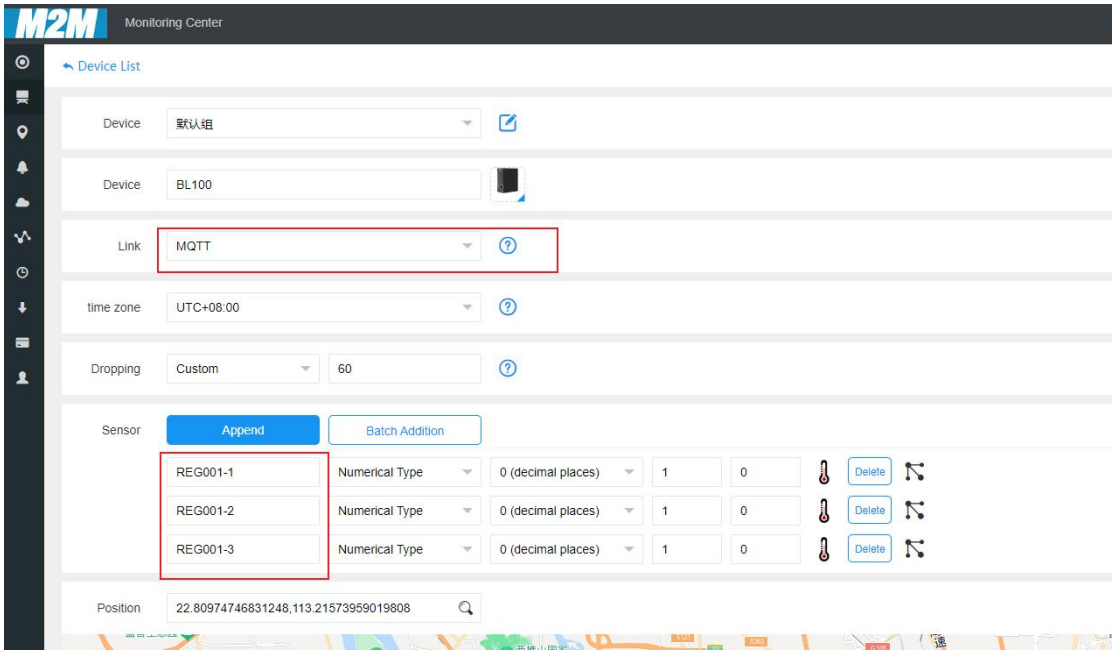
Refer to chapter 7 Beilai MQTT Data Format

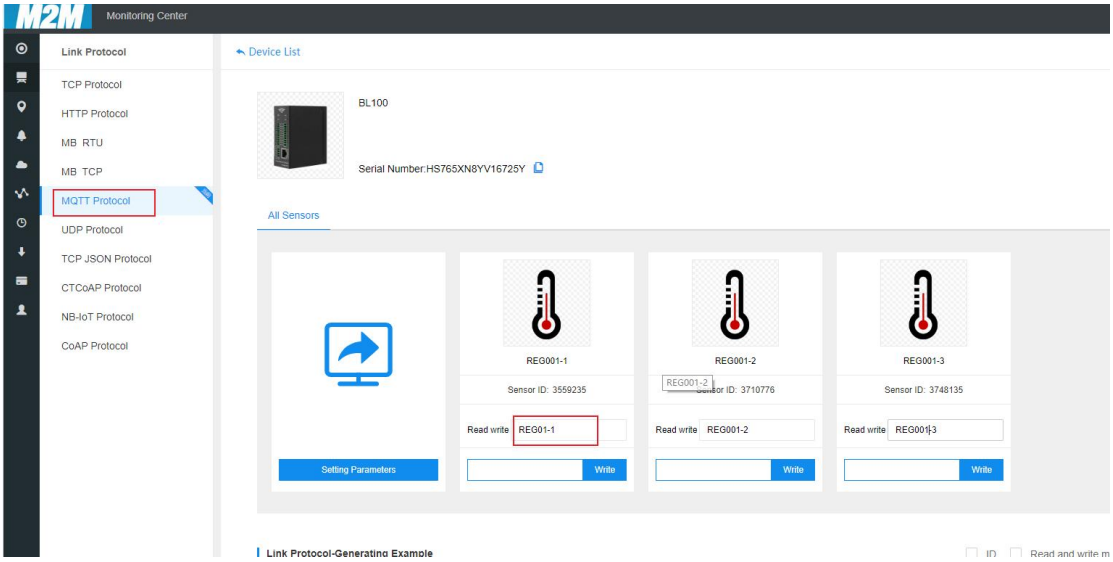


Beilai IoT Configuration	
Item	Description
Enable	Green indicates Beilai cloud via MQTT is enabled, Gray indicates disabled
IP/Domain Name	1883.dtuip.com
Port	Default 1883, must be filled in
Client ID	Fill in device serial number issued by Beilai (Contact Beilai sales to get the serial number if required to connect to Beilai cloud)
User Name	MQTT
Password	MQTTQW
Subscribe Topic	Beilai Device Serial Number/+
Publish Topic	Beilai Device Serial Number
Upload Cycle	Cycle time of MQTT data uploading. Default is 30s
Data Retransmission	Green indicates offline data will be transmitted once network recovers; Gray indicates retransmission disable. Max 100,000 data points can be re-transmitted. The previous data will be deleted if more than that.
Selection of published data points	Default is blank, means all data is uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.

Beilai MQTT data points configuration. First, add data points, and then go to the setting link protocol item to configure the data point identifier. The identifier of the data point matches the MQTT identifier on the configuration software. For example, to collect S7-200SMART data point Q0.1, the MQTT logo on the configuration software is "Q1", then the read/write logo on the Beilai Cloud should be "Q1".

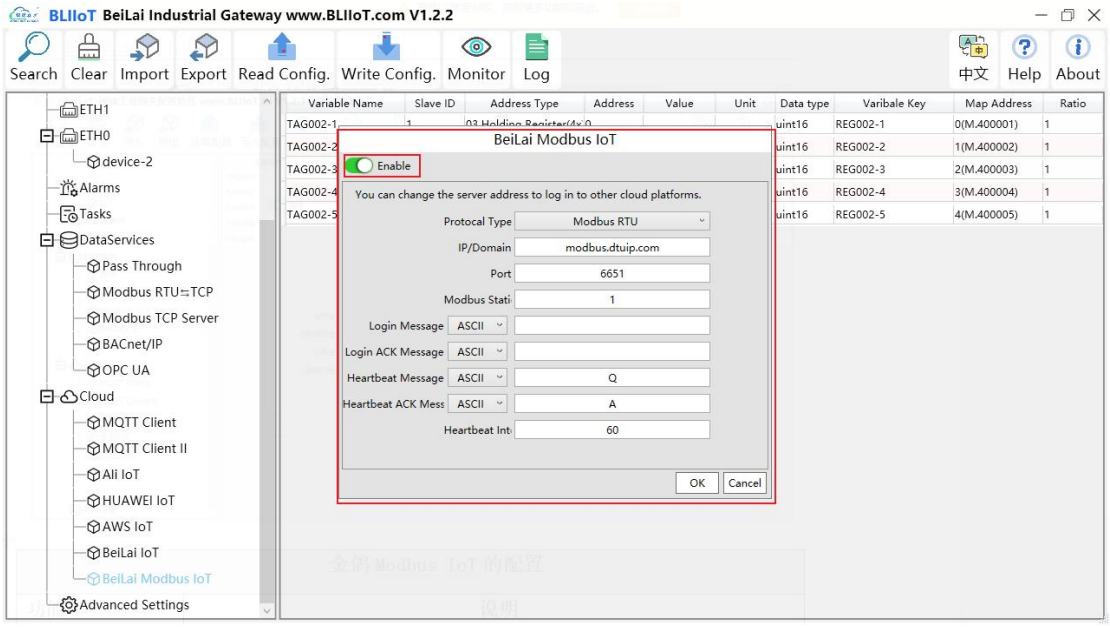






4.3.16 Beilai Modbus IoT

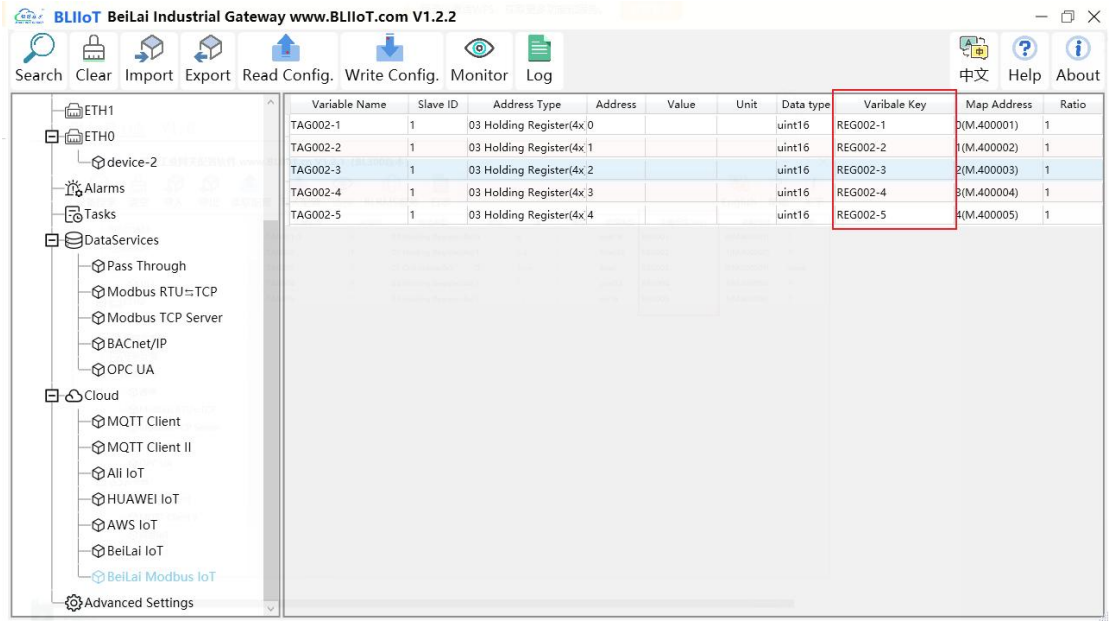
Both Beilai Cloud and custom Modbus cloud can be connected via Modbus RTU protocol. BLIoTLink supports function code 01, 05 of Boolean data and function codes 03, 06 of numerical data. 16-bit byte sequence is AB and 32-bit byte sequence is ABCD.

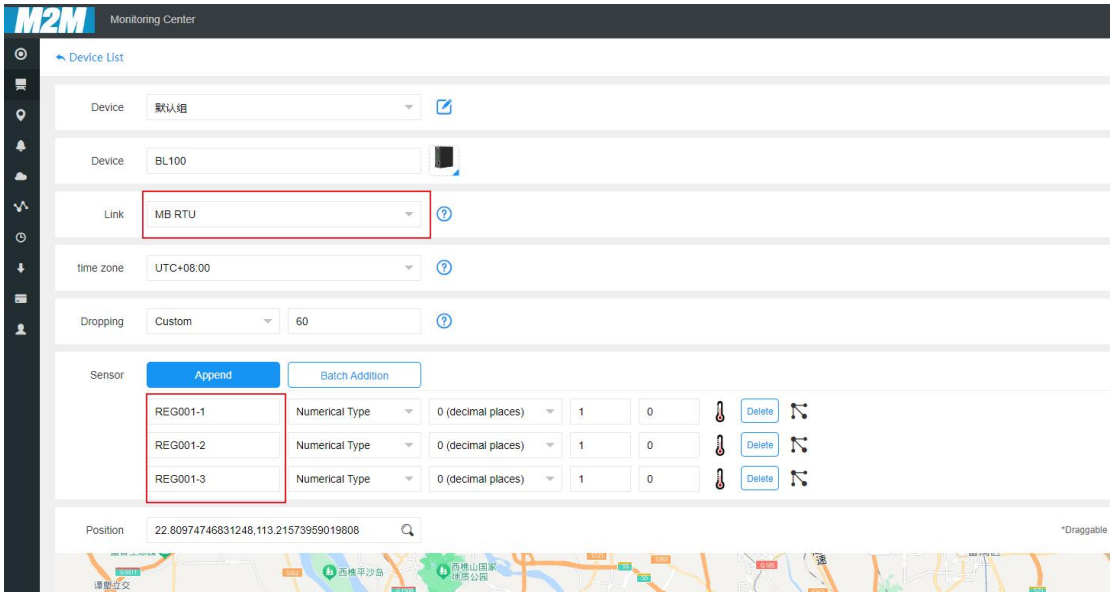


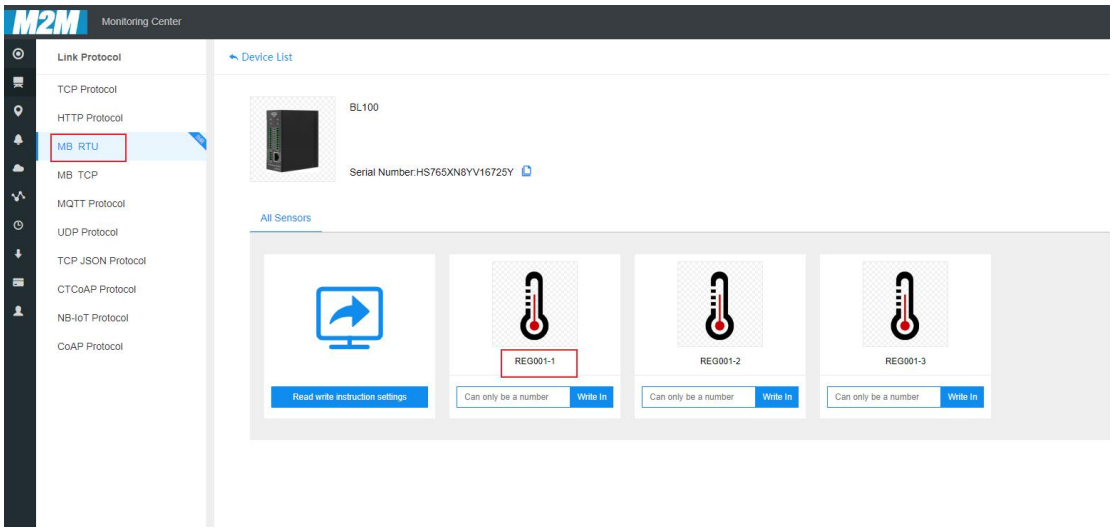
Beilai Modbus IoT Configuration	
Item	**Description**
Enable	Green indicates Beilai Cloud via Modbus is enabled Gray indicates disable
IP/Domain	modbus.dtuip.com

Name	
Port	Default is 6651, must be filled in
Modbus Station	Modbus ID, Modbus communication address
Login Message	Data package of register connect server. Contact Beilai sales for serial number if you need.
Login ACK Message	Not required for Beilai Cloud, data packet of the server responds to the registered.
Heartbeat message	Q, Heartbeat packets to maintain the connection.
Heartbeat ACK message	A, The server responds with heartbeat packets.
Heartbeat Interval	Cycle time of sending Heartbeat messages, default is 60s

Configure datapoint in Beilai Cloud as below picture. First create datapoint, then configure Modbus ID, function code, address, data format, byte sequence and data collection cycle. Modbus address in Beilai cloud and configuration software is deviated by 1.



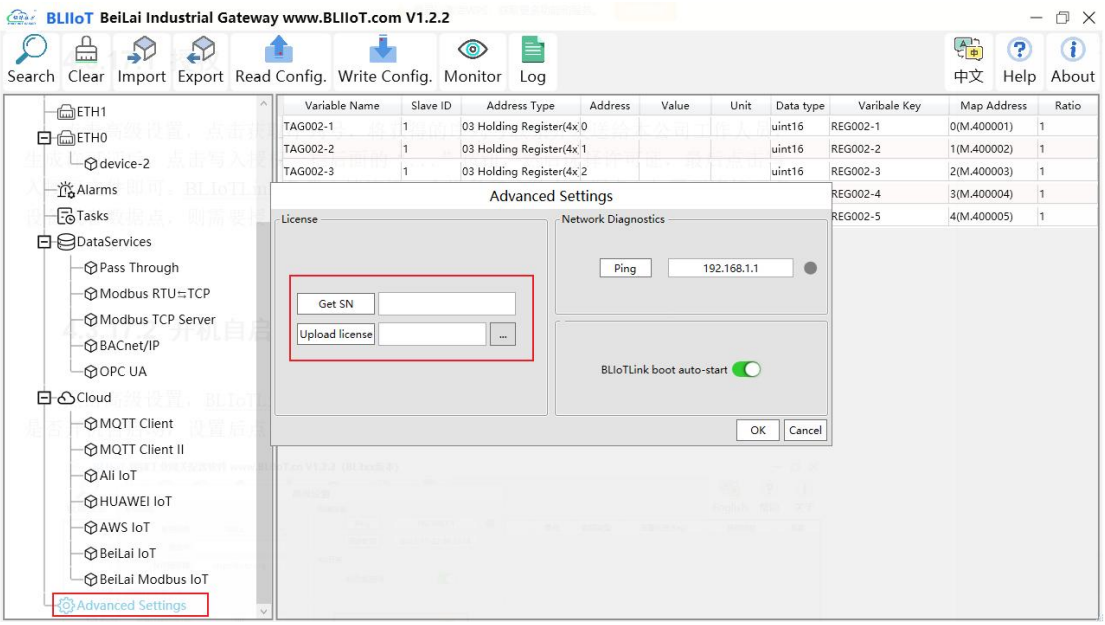




4.3.17 Advanced Settings

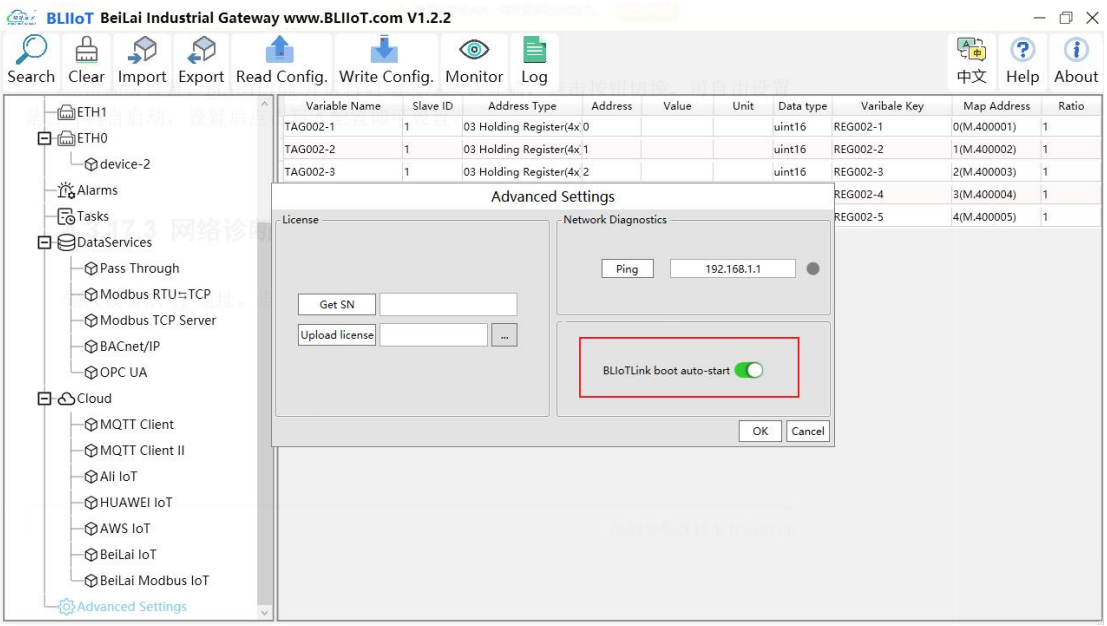
4.3.17.1 License

Click Advanced Settings, click Get SN, send the serial number to BLIIoT sales staff, and after generating the license, click "..." behind the Upload License column, then select the license, and click Upload License. BLIoTLink supports the connection of 1 device and 256 data points for free, and authorization is required if more devices or data points need to be connected.



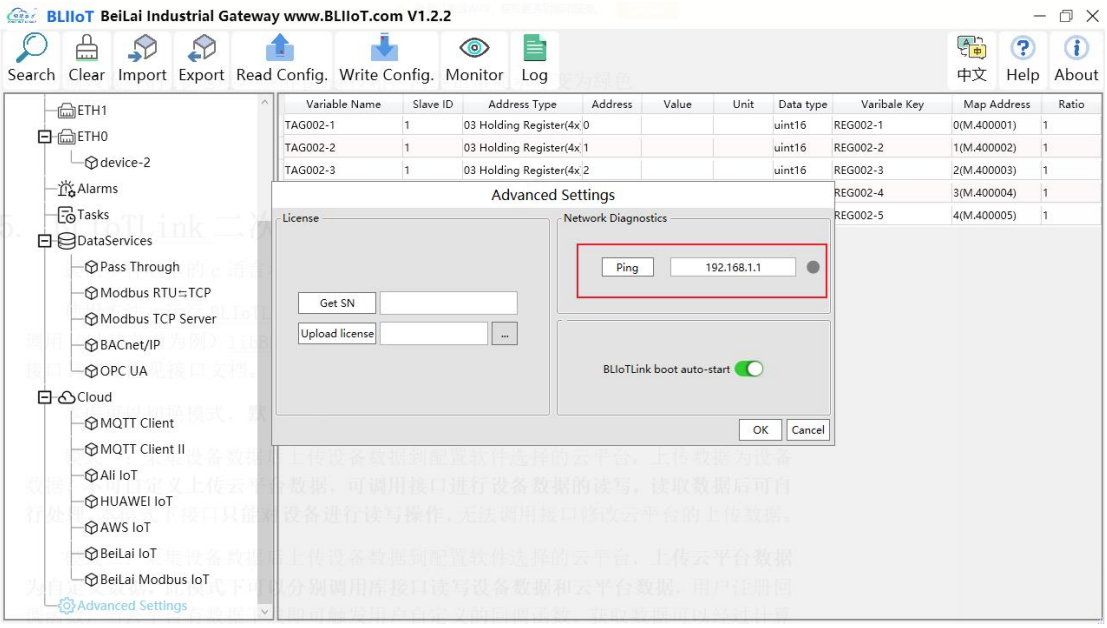
4.3.17.2 Boot and Auto-Start

Click Advanced Settings, BLIoTLink boot and auto-start option is on by default, click the button to switch, you can freely set whether to power on self-start or not, after setting, click Write Configuration.



4.3.17.3 Network Diagnostics

Enter the IP address of the device, click the ping button, the network normal light turns green.



5.BLIoTLink Secondary Development

BLIoTLink supports multiple versions of c language dynamic and static libraries, chips and systems.

After running BLIoTLink software, use configuration software to configure. After completing the program, call the interface in libBLIoTLink.so (as an example of dynamic library), you can read and write the device data for secondary development, the specific functions of the interface see the interface document.

This library can switch modes, the default is mode one, the callable interface is switched to mode two.

Mode 1: Upload device data to the cloud platform selected by the configuration software after collecting device data, the uploaded data is device data and cannot be customized to upload cloud platform data, you can call the interface to read and write the device data, and you can process the data by yourself after reading it, the interface can only read and write to the device in this mode, and you cannot call the interface to modify the uploaded data of the cloud platform.

Mode 2: Upload device data to the cloud platform selected by the configuration software after acquiring device data, upload cloud platform data for self-defined data, in this mode, you can call the library interface to read and write device data and cloud platform data respectively, the user registers a callback function, when the cloud platform has data sent to trigger the user-defined callback function. Getting data can be uploaded to the cloud platform after calculation, the data uploaded to the cloud platform in this mode is no longer the data of the device, but only the data written by the user calling the interface, and when there is no writing, the default is 0. Modbus server is an exception, and there is no mode 2.

See the api documentation and the library usage demo for details on how to use it.

6.Scope of Application

This software currently contains two types of installers with separate requirements:

1. Chip architecture armv7, support hardware floating point computing, the system for the kernel version 4.9 and above Linux 32-bit system, glibc library version 2.23 and above, recommended ubuntu 16.04 and above, debian 9 and above.

2. Chip architecture arm-v8, the system for the kernel version 4.9 and above Linux 64-bit system, glibc library version 2.23 and above, recommended ubuntu 16.04 version and above, debian 9 version and above.

Versions for other arm devices can be ported, the requirement is arm chip, linux system, x86 device running linux system currently no installation package. Since the linux system of the arm device is mostly cropped, the specific requirements are subject to the specific device.

7.Beilai MQTT Data Format

The "Beilai" JSON data format of MQTT Client and MQTT Client II is the same as that of Beilai MQTT. The details are as follows

The payload data format in the device publish message

Publish topic: serial number (corresponding to the configured publish topic setting item)

```
{
"sensorDatas": [
{
//Boolean
"flag": "Y0", //Read and write identification
"switcher": 1 //data type and value
},
{
//Numerical
"flag": "VW0", //Read and write identifiers
"value": 8 //data type and value
```

},

{

//4G Module signal value

"flag": " signal_strength ", //Read and write identifiers, fixed and cannot be modified

"value": 28 //data type and value

},

{

//GPS

"flag": "GPS", //GPS identifier

"lat": "224.1377", //Latitude data

"lng": "113.4791" //Longitude data

}

],

"state":"alarm", //Alarm identifier (the configuration software "Alarm and Event" is configured with an alarm event, which is only available when an alarm is triggered, but not in the regularly reported data)

"state":"recovery", //Alarm recovery identifier (this identifier is only available when the alarm is recovered, and the data reported regularly does not have this identifier)

"gateway_indentify": " BeiLai Gateway " //Gateway name identifier, upload gateway name

"time": "1622700769", //Time Identifier, the timestamp of when the data was published

"addTime": "2021-06-03 06:12:49" //Time identifier, time of uploading to the gateway

"retransmit":"enable" //Retransmission identifier, which represents MQTT historical data (this identifier is only available when there is retransmission historical data, and there is no such identifier for regularly reported data)

}

Note:

//Read and write identification: The character is "flag", followed by "MQTT identifier of data point", the MQTT identifier filled in when adding data points can be defined independently.

//Data type and value: According to the type, it is divided into:

Boolean: the character is "switcher", followed by "0" or "1" (0 means open, 1 means

close).

Numerical: the character is "value", followed by "specific value".

GPS position data: GPS latitude character is "lat", followed by "specific value".

GPS longitude character is "lng", followed by "specific value".

//Alarm, recovery identification: the character is "state", followed by "alarm" or "recovery" (alarm represents alarm data, recovery represents alarm recovery data).

//Gateway name identification: the character is "gateway_indentify", followed by "gateway name".

//Time identification: the character is "time", followed by "specific reporting timestamp".

//Time stamp: the character is "addtime", followed by "gateway time".

//Retransmission identifier: the character is "retransmit", followed by "enable"

The data collected during the network disconnection period will be temporarily stored on the device and republished when the network is restored. It is identified by the "retransmit" field to represent historical data. (Need to enable data retransmission on the configuration interface)

The payload data format in the device subscription message

Subscription topic: serial number/+ (corresponding to the configured subscription topic setting item)

The topic name used by Beilai 2.0 to publish messages downstream is "serial number/sensor ID", so the device subscription topic needs to add the wildcard "/+", so as to receive the data sent by the platform for control

```
{
    "sensorDatas":
    [
    {     //Send Boolean
    "sensorsId": 211267,
    //Platform Sensor   ID
    "switcher":1, //data type and value
    "flag":"Y0" //Read and write identification
    },
    {       //Send Numerical
    "sensorsId": 160239,
```

//Platform Sensor ID

"value":"10", //data type and value

"flag":"VW0" //Read and write identification

}

],

"down":"down" //Platform downlink message identifier

}

Note:

//Platform sensor ID: the character is "sensorsID", followed by the ID number (the ID is automatically generated by the platform), and the self-built platform no need.

//Data type and value: According to the type, it is divided into:

1. Switch data: the character is "switcher", followed by "0" or "1" (0 means open, 1 means closed)

2. Numerical data: the character is "value", followed by "specific value"

//Read and write flag: the character is "flag", followed by "MQTT flag representing the data point"

//Platform downlink message identification: The character is "down", followed by "down", which means this is the platform downlink data.

Note: Boolean values are delivered without double quotes, and numeric values are delivered with double quotes.

8.Technical Support

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