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USR-W610 (Qualcomm version)

High-Performance WIFI Serial Device Server

User Manual



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1. Product introduction

USR-W610s is a WiFi high-performance serial server built with Qualcomm solution, which has the characteristics of WiFi transmission far, wide connection, low latency and high stability. 4G WIFI，802. 11b/g/n wireless protocol, Ethernet port(1WAN/LAN+1LAN),RS232+RS485, support STA/AP/AP+STA/bridging/routing mode, port forwarding, can provide stable and reliable networking solutions for different scenarios and industries.

The product adopts industrial standard, wide temperature and wide voltage, strong hardware protection, and has passed many harsh environment tests; it has 1*RS232/1*RS485 serial port, supports TCP, UDP, MQTT, HTTP, MODBUS, PUSR Cloud, Alibaba Cloud, AWS cloud, SNMP and other transmission protocols; built-in hardware and software dual watchdog, fault recovery and other mechanisms; it can adapt to different industry scenarios, and still operates stably and reliably in harsh environments.

The product has a hanging ear installation mode and is widely used in scenarios requiring WIFI centralized large connection requirements, such as: production inspection, intelligent storage, intelligent medical treatment, intelligent factory, video surveillance, unmanned parking lot, industrial automation, intelligent transportation, smart city and other scenarios.

1.1. Product feature

Stable and reliable

- Full industrial design, protection class IP30;
- Support horizontal desktop placement and wall-mounted installation;
- Wide voltage DC 9-36V input, with power reverse protection;
- Industrial wide temperature -25℃ ~ +70℃ wide temperature design, EMC3 protection;
- Built-in hardware watchdog, fault self-test, self-repair, firmware backup restore function, ensure system stability does not crash;

Flexible networking

- Support 802.11 b/g/n, STA/AP/AP+STA/bridge/routing mode;
- Support 1*WAN/LAN,1*LAN port;
- Support RS232/RS485, can work independently, serial data acquisition is easier;
- Compatible with mainstream industrial protocols: TCP/UDP/HTTP/MQTT/MODBUS/SNMP and so on;
- Support port forwarding function;

Powerful Functions

- Support edge computing, active data collection, data computing, data reporting and protocol

conversion;

- Support WiFi signal surveying and wireless link testing, effectively improving the rational deployment of on-site equipment;
- Support connection to Alibaba Cloud, Amazon Cloud and People Cloud platform, so that devices can easily go to the cloud;
- Support a complete anti-drop mechanism to ensure the stability of data transmission;
- Support wired/STA multi-network intelligent backup function, keep the link unblocked at all times;
- Support cloud service, open built-in web page of wireless client through cloud service, facilitate centralized management of equipment system and improve operation and maintenance efficiency;
- Support SNMP,NTP time calibration,MAC-IP binding, anti-question restrictions and other features.

1.2. Technical parameters

The parameters of USR-W610s

Table 1 Basic parameters of USR-W610s

Project		Model/Specification
WiFi	Wireless standards	IEEE 802.11b/g/n
	Frequency Range	2.412GHz-2.484GHz
	WiFi mode	AP/STA/AP+STA/Bridging/Routing
	Number of client connections	8
	Data rate	300 Mbps
	MIMO	2x2
	Power out	HT20（18dBm）；HT40(17dBm)
	WiFi Antenna	1* Rod antenna （5 dBi）
	Coverage distance	Outdoor open/unobstructed, coverage radius up to 400 meters
	Socket mode	TCPS/TCPC/UDPS/UDPC/MODBUS/MQTT/HTTP/ Alibaba Cloud/AWS/PUSR CLOUD
	Heartbeat package/ Registration package	Support

DTU	Serial port baud rate	RS232 interface: 1200/2400/4800/9600/19200/38400/57600/115200/230400 RS485 interface: 1200/2400/4800/9600/19200/38400/57600/115200/230400
	Data bits	7，8
	Stop bit	1，2
	Parity bit	NONE,ODD,EVEN
	Serial port type	1*RS232/1*RS485
Physical property	Operating temperature	-25℃~ +75℃
	Storage temperature	-40℃~+125℃
	Operating humidity	5%~95%RH (no condensation)
	Storage humidity	1%~95%RH (no condensation)
	Service voltage	DC 9-36V
	Adapter	12V/1A
	Working Current	Average current 155 mA（DC12V） Max current 270 mA at（DC12V）
	Size	89*103.7*26mm (L*W*H)
	Installation method	Wall mount, horizontal desktop placement
	EMC class	Grade 3
Hardware interface	Net opening	1*WAN/LAN+1*LAN RJ45 interface: 10/100Mbps adaptive, compliant with IEEE802.3
	Indicator light	PWR、WORK、WLAN、485、232
	Power interface	2P terminal, size 5.08mm* 2P, with reverse polarity protection
	Terminal interface	RS232 interface: DB9 RS485 interface: 3P Phoenix terminal
	Reload key	Press and hold for 3 to 15 seconds, then release to restore the factory settings
	Ground protection	Ground screw

1.3. Power consumption parameters

Table 2 USR-W610s power consumption table

Working	Service voltage	Average current	Maximum current
Full-load operation	DC12V	173mA	265mA

1.4. Status indicator lamp

There are 5 status indicators with the following meanings:

Table 3 Indicator lamp description table

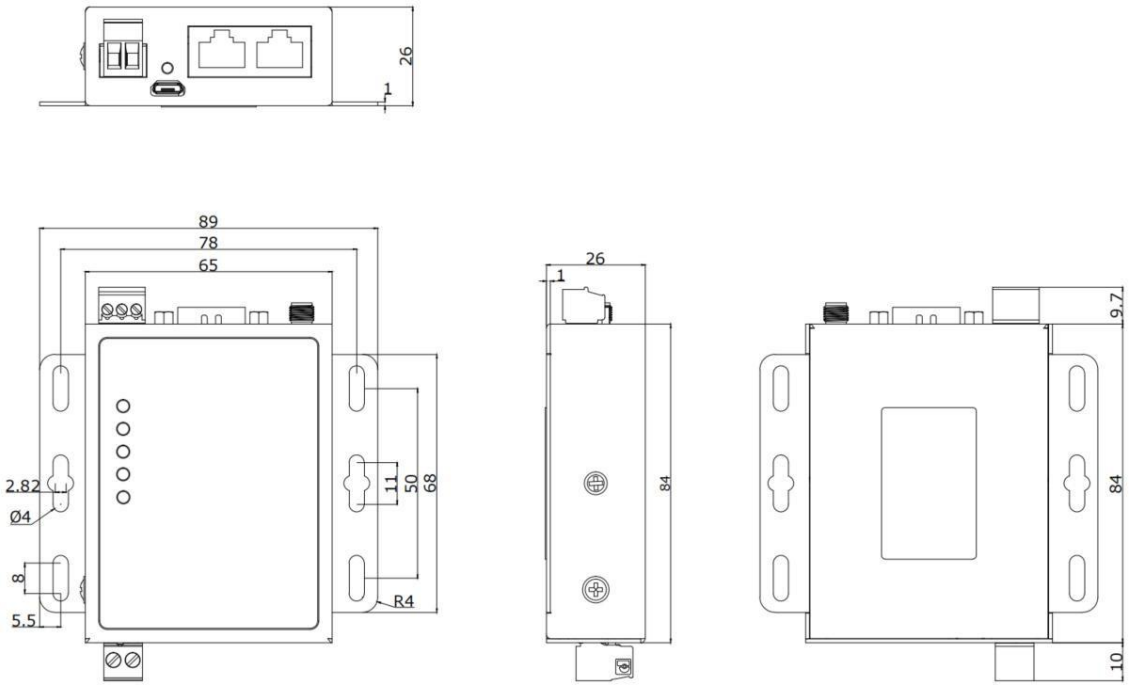
Name	Explain
PWR	Power indicator light, long on after correct power-on
WORK	The indicator light is used, and the internal system is always on when it is started. After it is fully started, it flashes periodically for 500ms. During the upgrade process, it flashes periodically for 250ms
WLAN	Off: STA not turned on; Green light:RSSI≥-60dBm,WLAN access AP green light; Green light flashing: RSSI≥-60dBm, WLAN access and data communication is flashing; Green light off: RSSI≥-60dBm, WLAN not green light off; Red light always on:RSSI<-60dBm,WLAN access AP red light always on; Red light flashing: RSSI <-60dBm, WLAN access and in data communication, red light flashing; Red light out: RSSI <-60dBm, the red light is off without WLAN access;
485	The uplink data indicator flashes red and the downlink data indicator flashes green
232	The upward data indicator flashes red, and the downward data indicator flashes green

Description:

- Network port1 connection/data transmission, WAN/LAN port has a network cable connection when the long light, send data flashing;
- Network port2 connection/data transmission, LAN port has a network cable connection when the long light, send data flashing;
- When the network cable is connected and the network equipment at the opposite end is also working,

the corresponding WAN/LAN indicator will flash;

Size description



Unit: mm

Figure1 USR-W610s size diagram

- Sheet metal housing, fixing holes on both sides, compatible with rail mounting parts;
- Product Dimensions: 89*103. 7*26mm(L*W*H)

2. Basic functions

2.1. Web page settings

When using the USR-W610s for the first time, you can connect the LAN port of the USR-W610s or connect the W610s WIFI through the PC, and then configure the functions with the web management page. SSID,IP addresses and user names and passwords are as follows:

Table 4 USR-W610s network default settings table

Parameter	Default setting
2.4G SSID	USR-W610s-XXXX
LAN port IP address	192.168.1.1
user name	admin
password	admin
wireless password	None

Description:

- XXXX represents the last four digits of the MAC of the device.
- First of all, use the PC's wireless network card or Ethernet card, the default SSID of the USR-W610s is USR-W610s-xxxx, and operate the PC to join the wireless network. After the wireless connection is completed, open the browser and enter 192.168.1.1. Fill in your user name and password(both admin)and click OK to log in.

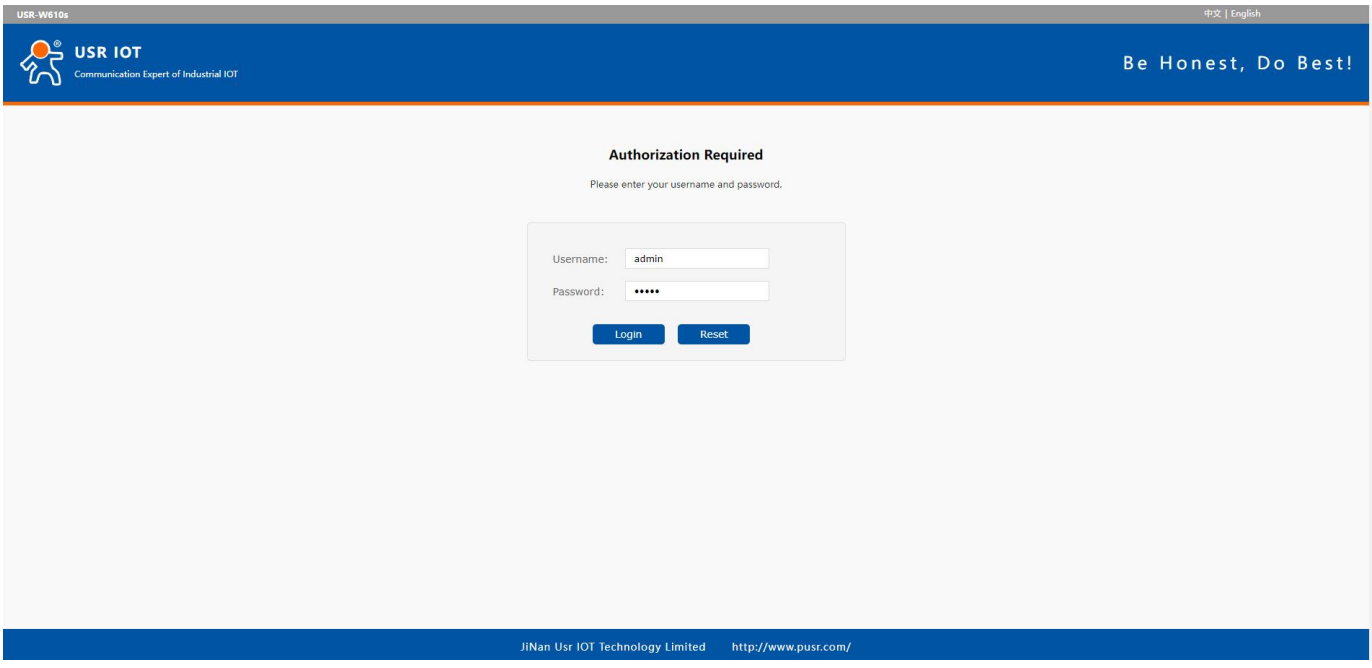


Fig. 2 Home Page

2.2. Web Features Introduction

On the left side of the web page is a tab page, where you can specifically set some parameters of the device.

- Status: mainly displays device name information, firmware version, routing table, running status, serial communication status, etc.;
- Network: WAN, LAN, network handover, WiFi hot spot, wireless client, DHCP, network interface mode, network diagnosis;
- Serial server function: serial parameter setting, communication protocol setting, network AT configuration, serial heartbeat configuration, no data reconnection, restart setting;
- Service functions: manned cloud service, DDNS, SNMP service;
- System: host name / password setting, timing restart, HTTP port setting, NTP time synchronization, access restriction, log, backup / upgrade, factory recovery, restart, etc;

2.3. System architecture diagram

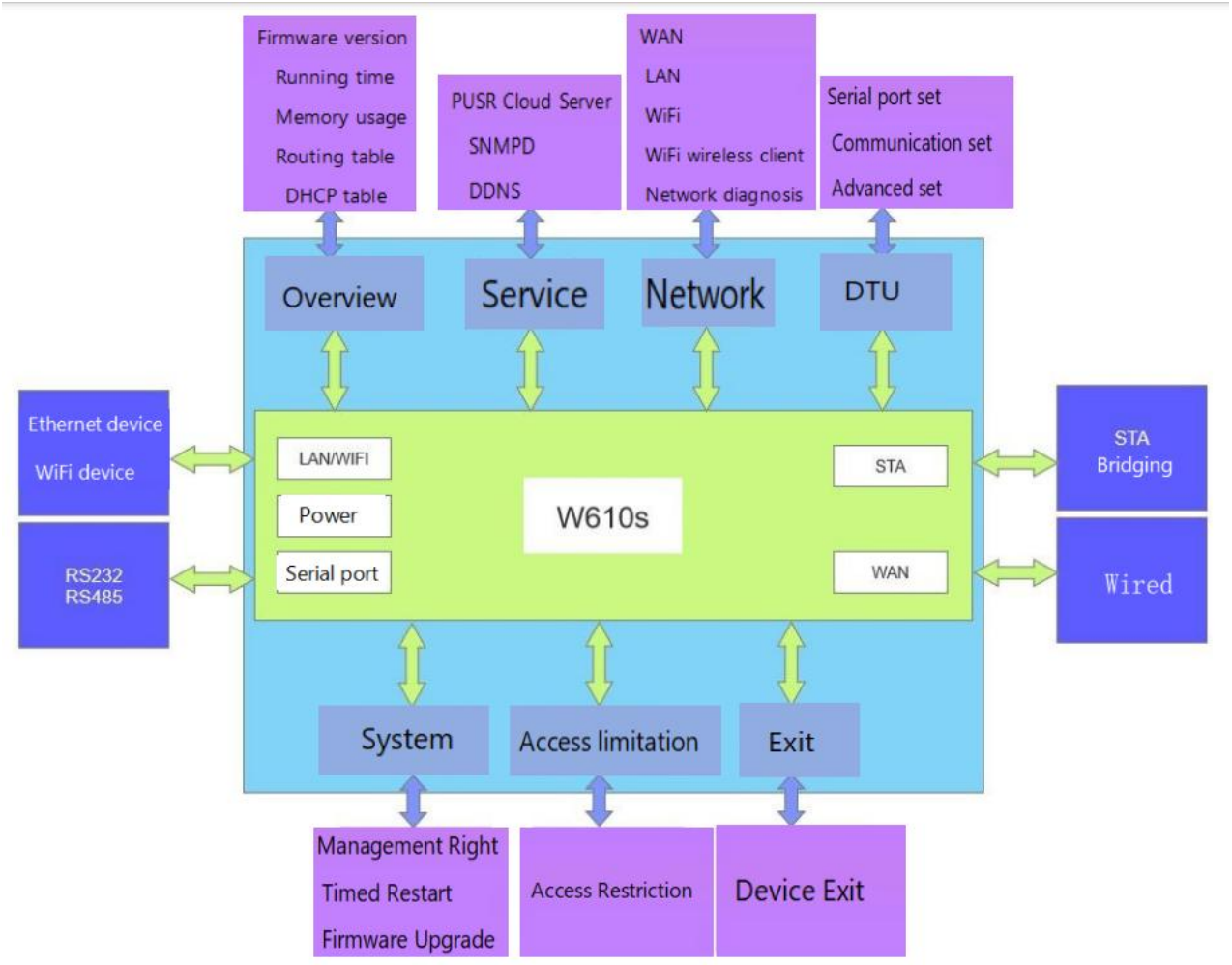


Figure3 Product frame diagram

3. System state

Overview Product information, memory usage, network connection status, connection sites, serial server communications, routing tables, DHCP allocation situation.

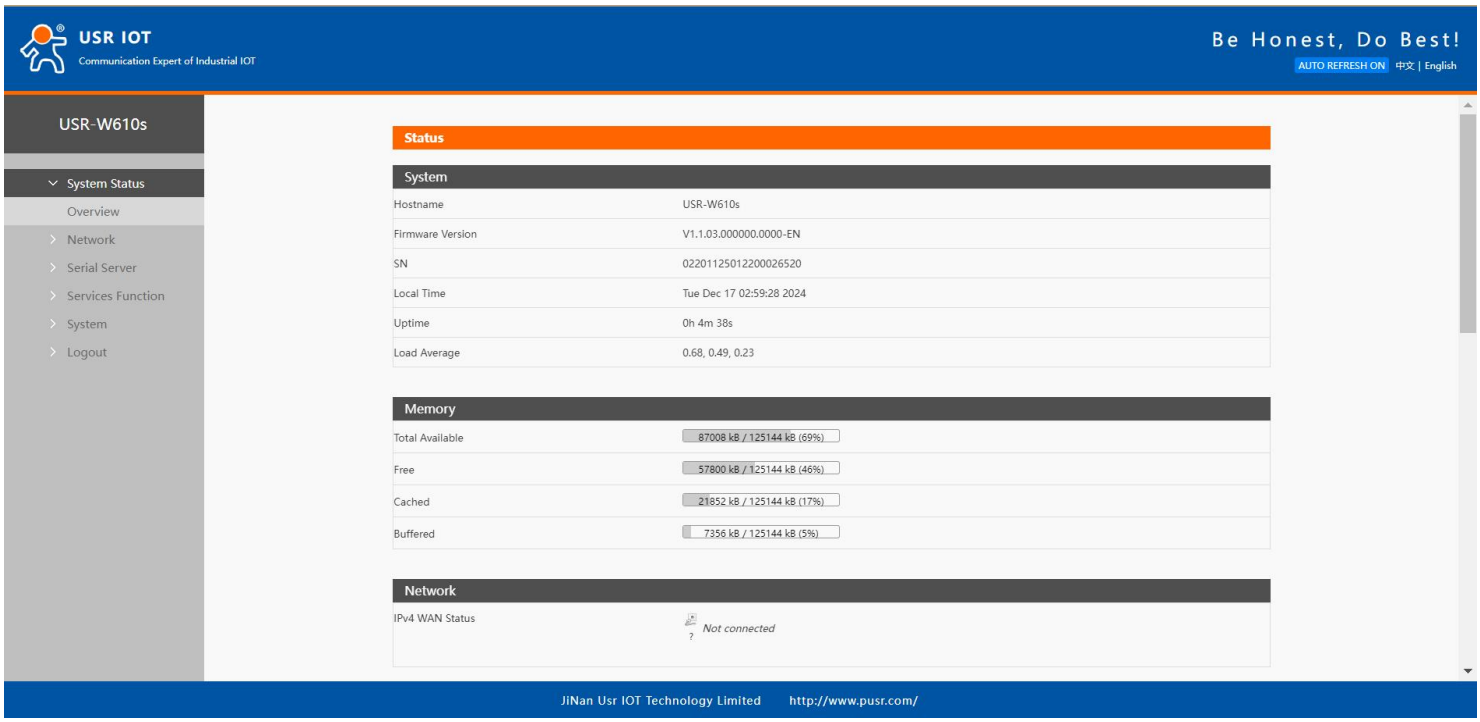


Figure 4 Overview interface

The MAC address description:

Mac on the device tag, the address is Wan mac, Lan Mac Is the wan mac + 1, The AP MAC in the WiFi 2.4G band is Wan mac + 2，The AP MAC in the WiFi 5G band is Wan mac + 3.

4. Network function settings

4.1. WAN port

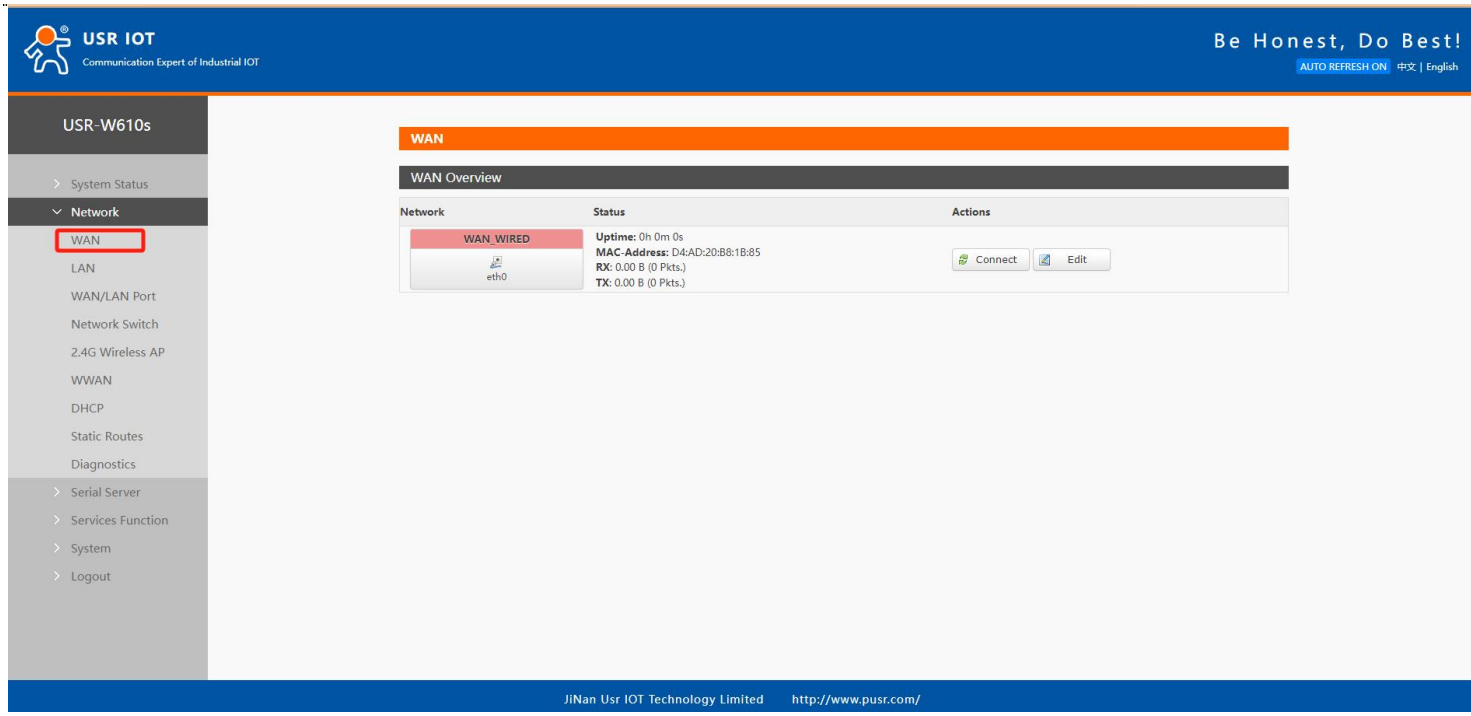


Fig5 The WAN port setting page

- 1*wired WAN port, 1*wireless WAN port, WAN port is WAN interface;
- Support DHCP client, static IP,PPPOE mode(only line WAN port);
- Default DHCP client;
- WAN port IP cannot be the same segmentas LAN port IP
- The WAN port can be configured as LAN, which is convenient for customers to communicate with multiple devices in the local area network. Please refer to the network port mode configuration for specific settings.

4.2. DHCP client

The upper-level router must enable the DHCP service, plug in the upper-level router LAN and the local wireless client WAN with a network cable, andthenUSR-W610scan obtain IP.

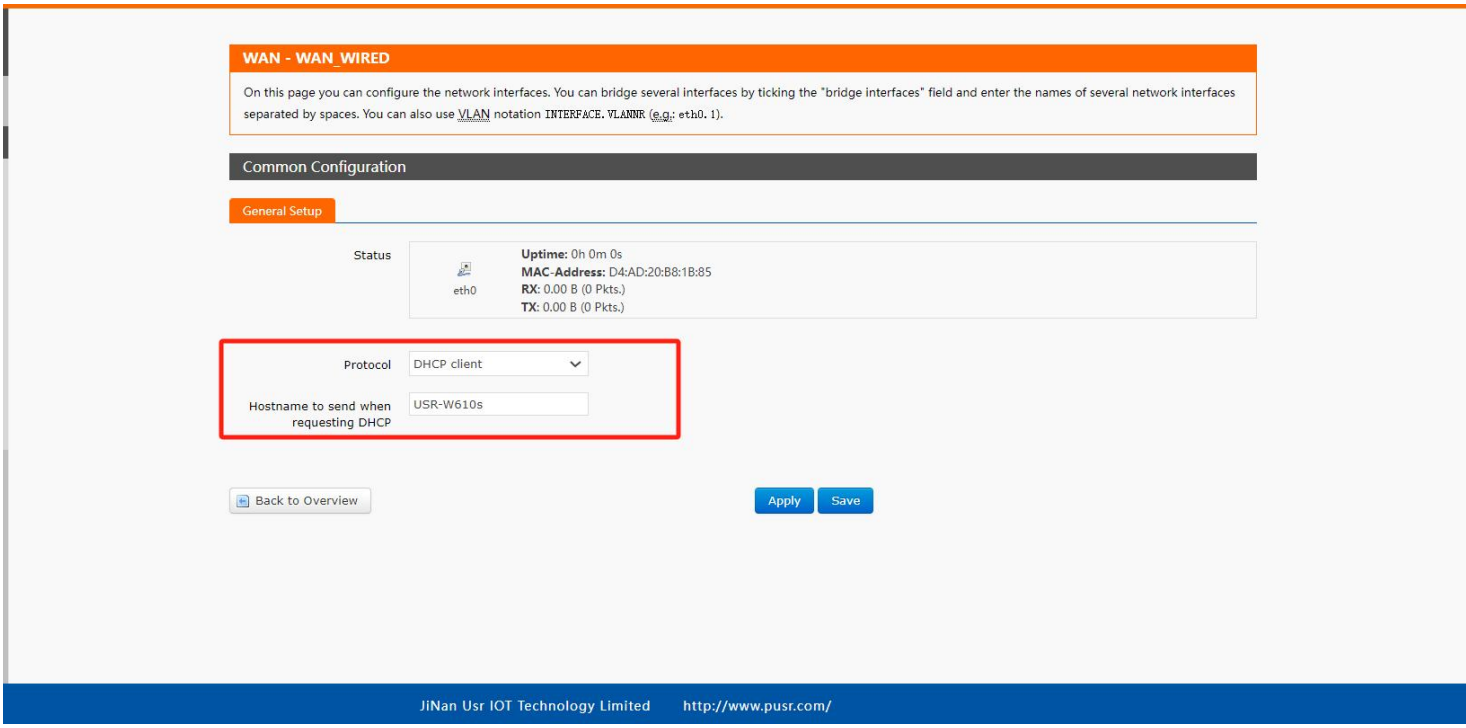


Fig. 6 WAN Port Settings-DHCP

4.3. Static IP

IP, gateway and subnet mask of the same network segment as that of the superior router should be filled in correctly. If it is a dedicated public network cable,IP, subnet mask, gateway and DNS server should be filled in correctly according to the IP

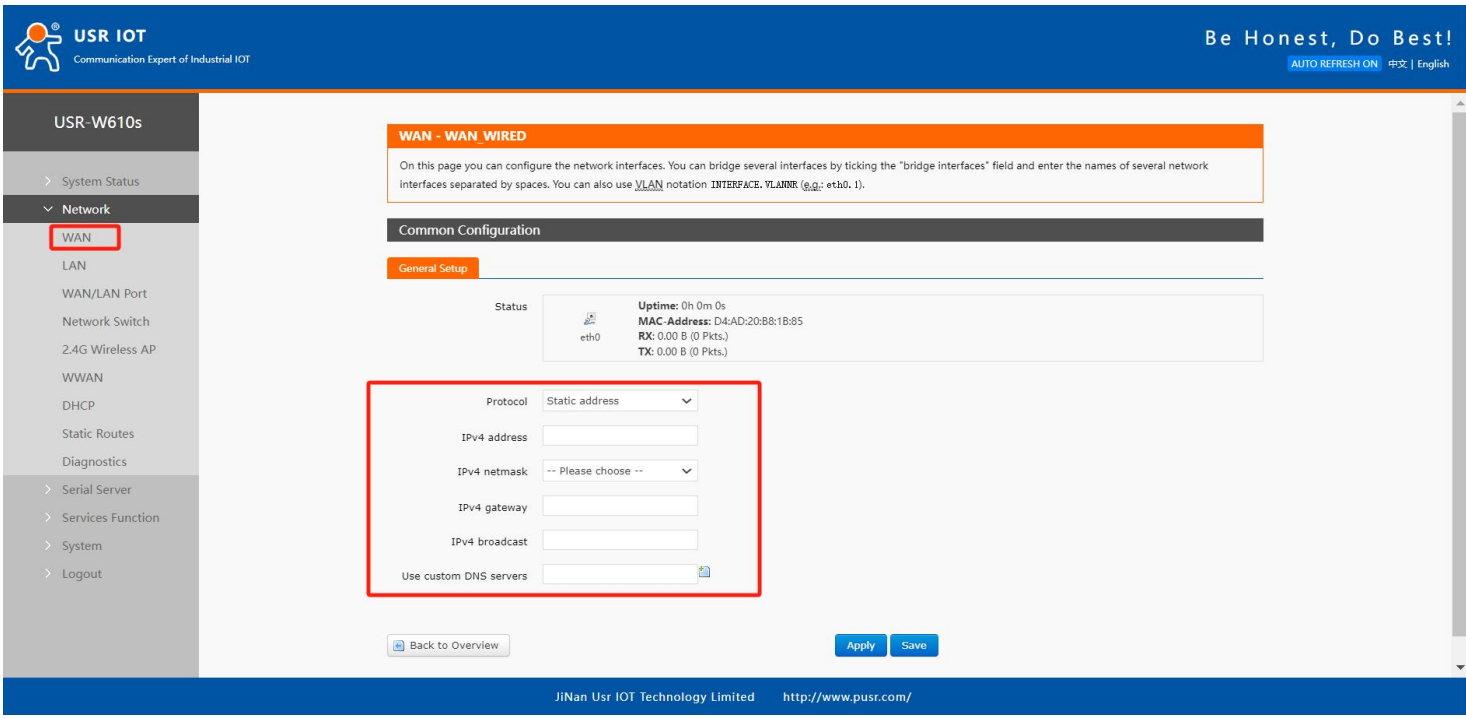


Fig. 7 WAN Port Settings-StaticIP

4.4. PPPoE

Only wired WAN can be set up, which needs to be filled in according to the correct username and password given by the operator.

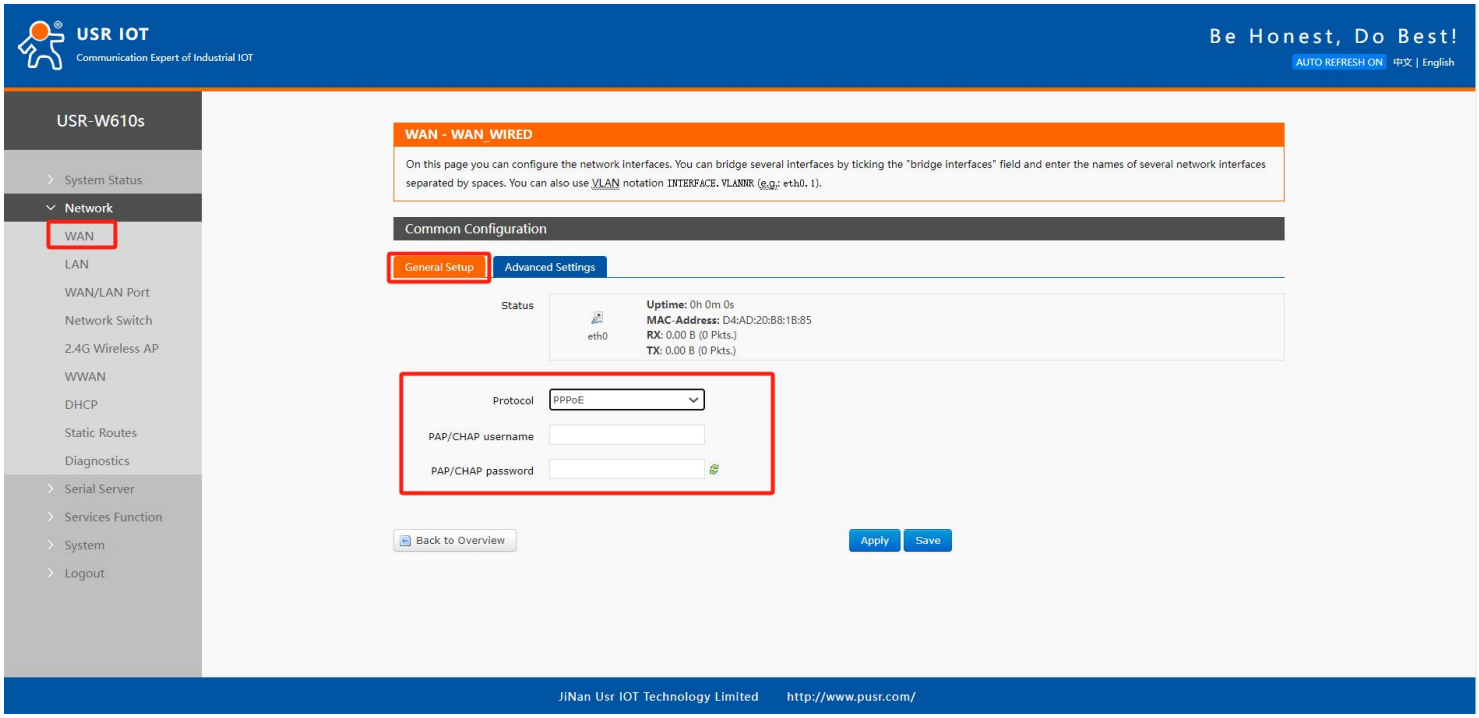


Figure8 WAN Port Settings-PPPoE

4.5. LAN interface

LAN port is a local area network, with 1 LAN port and 1 WAN/LAN port switchable.

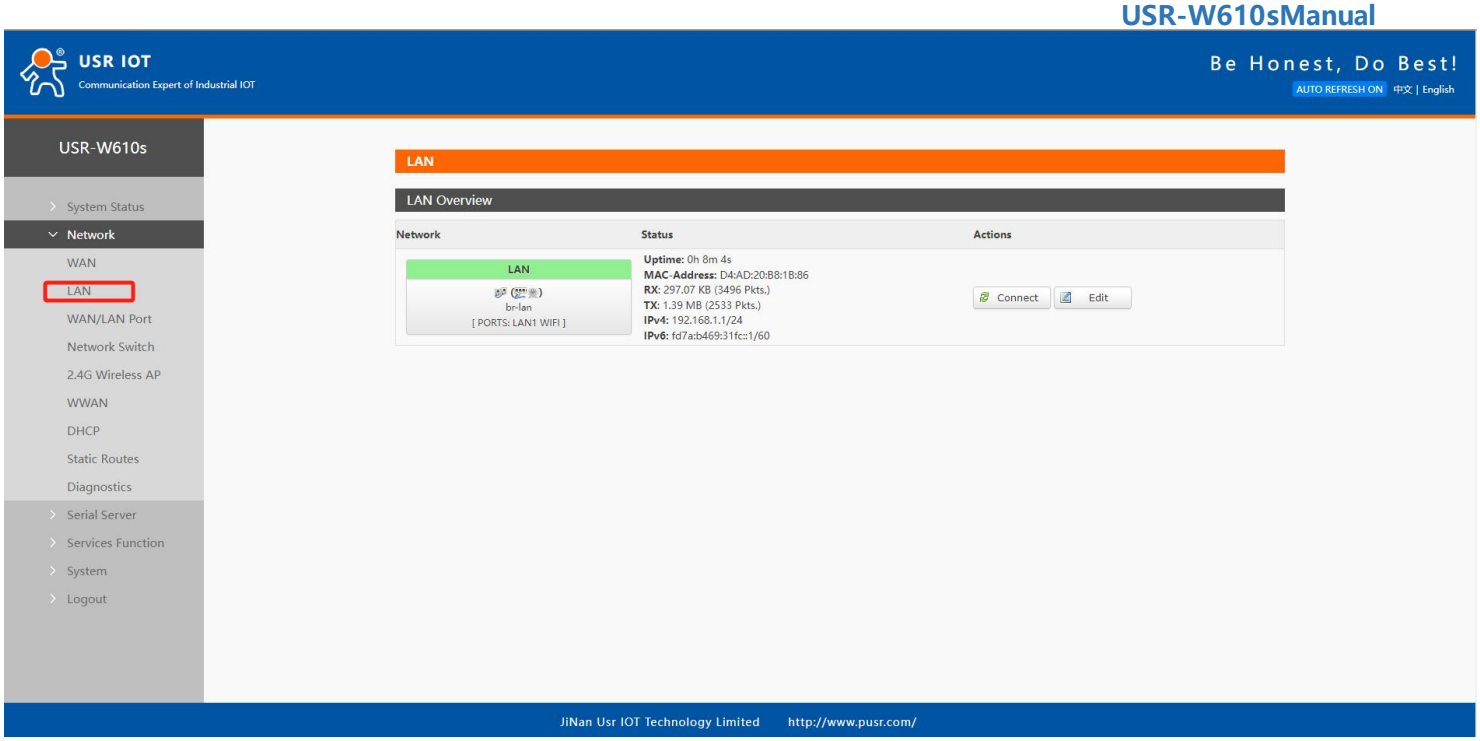


Figure9 LAN Port Settings Page

Description:

- 1 LAN port, 1 WAN/LAN switching;
- The default static IP address is192. 168. 1. 1, subnet mask 255. 255. 255. 0
  This parameter can be modified, such as staticIPmodifiedto192. 168. 2. 1;
- WIFI interface bridge to LAN port;
- By default,the DHCP server function is enabled, and all devices connected to the LAN port of the wireless client can automatically obtain the IP address;
- Have simple status statistics function;

4.6. Basic setup

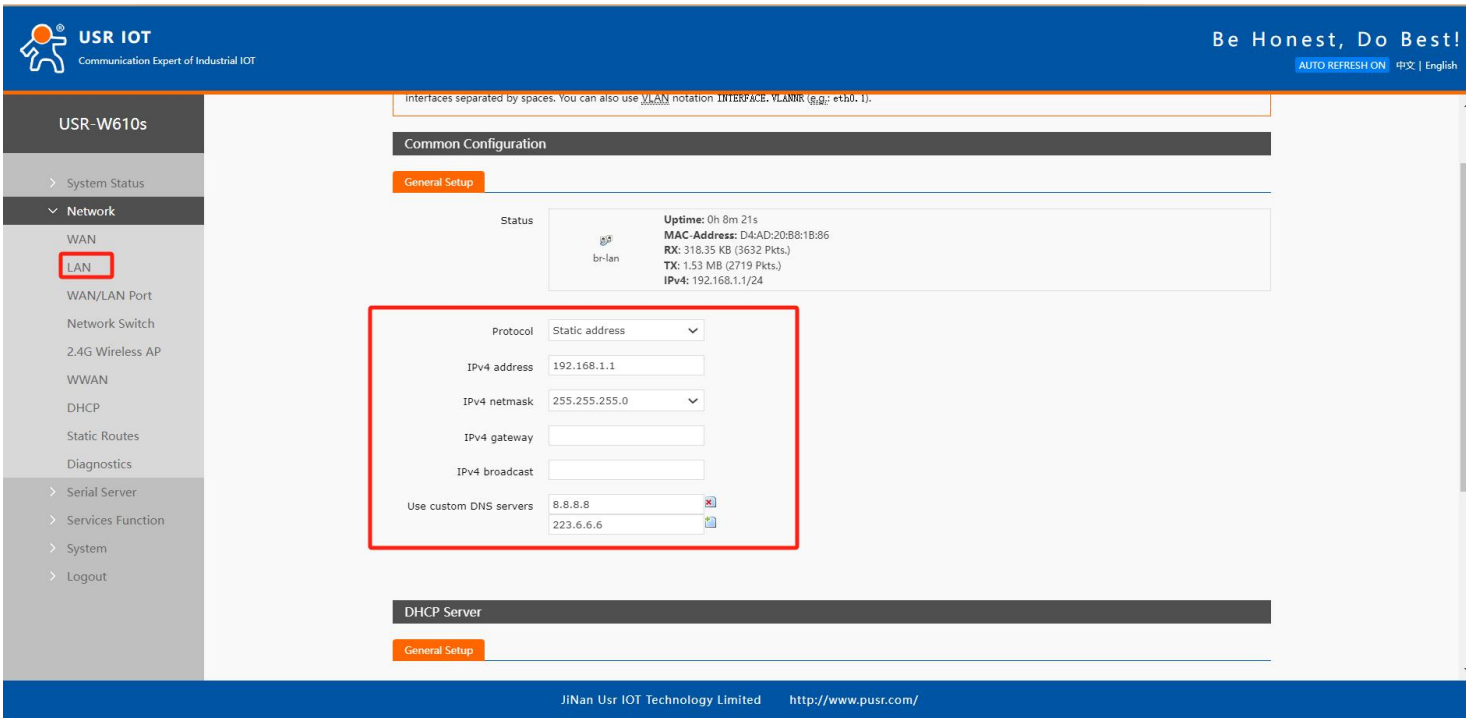


Fig. 10 LAN Settings Page

4.6.1. DHCP function

DHCP Server function of LAN port is enabled by default(can be selected to be disabled), and all network devices connected to LAN port can automatically obtain IP address.

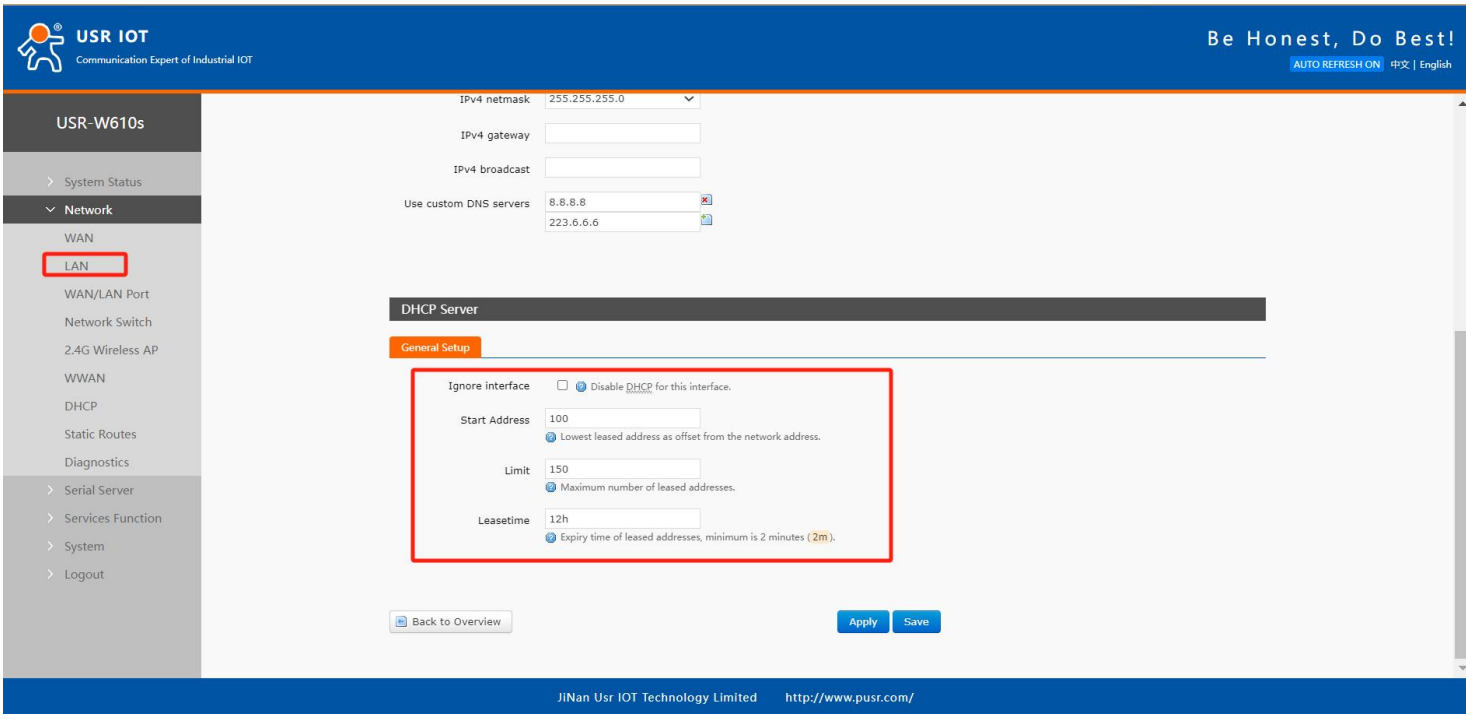


Figure11 DHCP Settings Page

- You can adjust the DHCP pool start address, as well as address lease time;
- The default DHCP allocation range starts from 192.168.1.100;
- Default lease 12hours

4.6.2. Network mode

WAN/LAN switching for setting up Port 1.

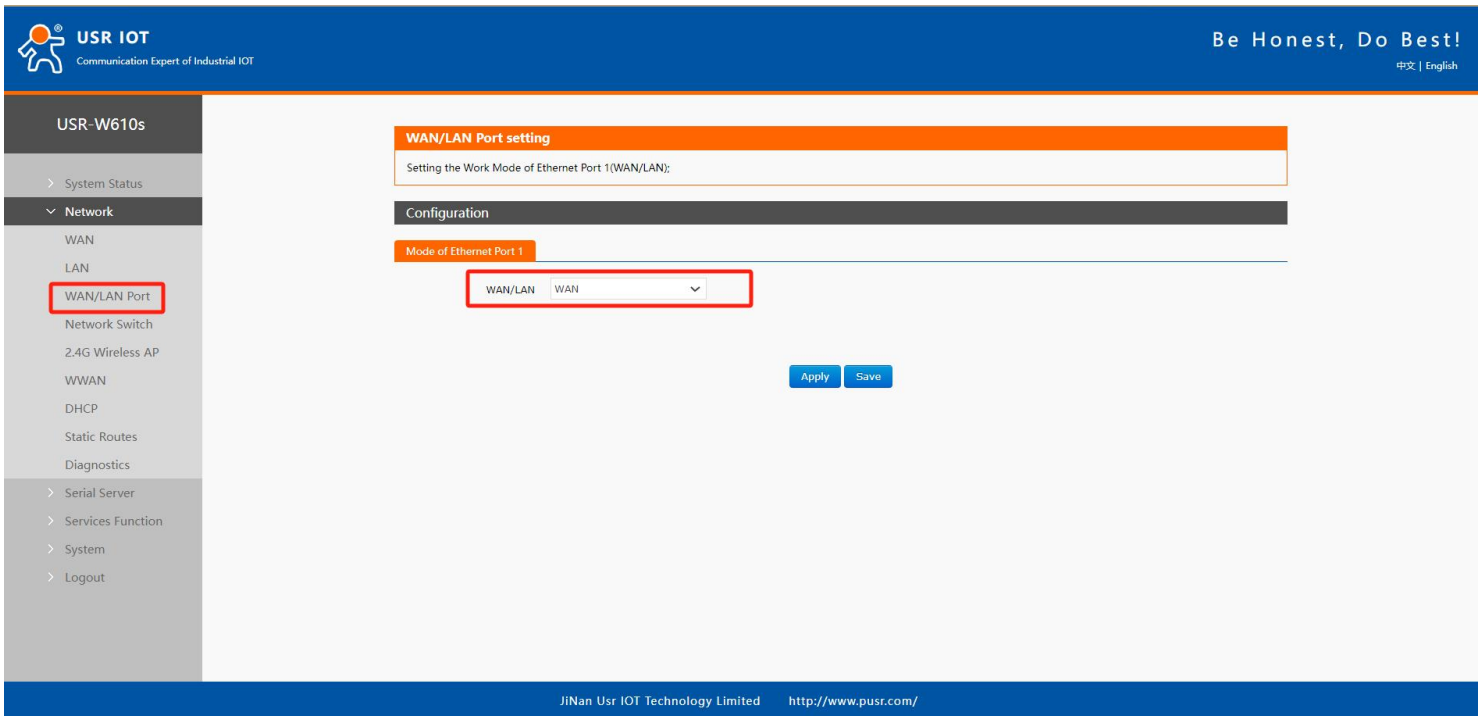


FIG. 12 Gateway Mode Settings

4.7. Network switching

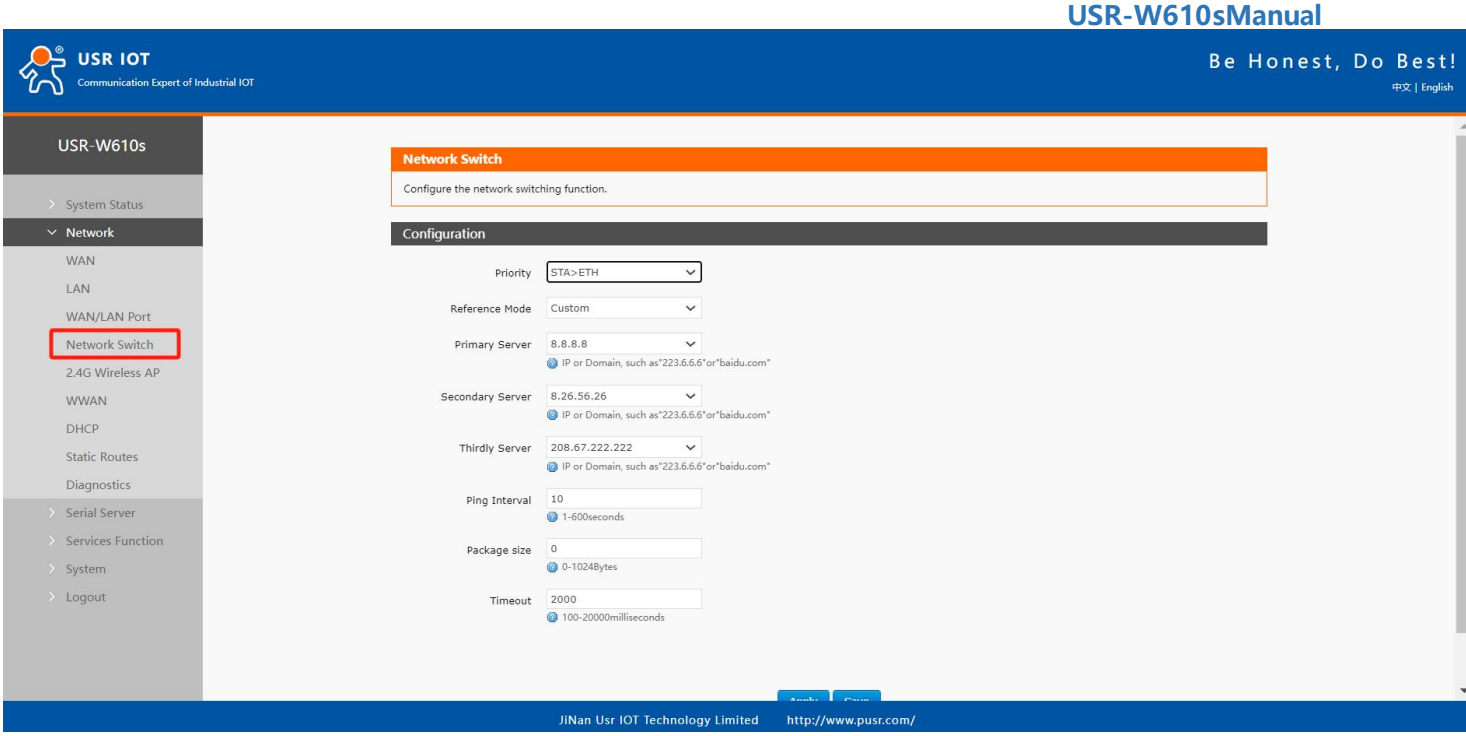


FIG. 13 Network handover configuration

Table5 Network Handover Configuration

Name	Describe	Default parameters
Priority	Wired> Wireless: priority networking as indicated> Wireless> Wired: priority networking as indicated> Disable: disable network switching function, use current Internet access mode to surf the Internet	Wireless> Wired
Reference mode	Custom: Determine network status based on custom reference addresses Gateway: Refer to Gateway to determine network status	Custom
Reference address1	IP/Domain name can be set	223.6.6.6
Reference address2	IP/Domain name can be set	119.29.29.29
Reference address3	IP/Domain name can be set	223.5.5.5
Detection interval (unit: s)	Set link detection interval:1-600s can be set	10
Ping packet size （bytes）	Packet size when detecting link: 0-1024 bytes can be set	0
Ping timeout （ms）	Set ping timeout time：100-20000ms	2000

Description:

- Configure network priority detection rules, enabled by default, default network switching order: wired network priority;
- Set 3 IP addresses for detecting networking status, and sequentially perform ping packets. If ping can be

communicated, it is judged that the network is normal and no network-cutting configuration is performed;

- If none of the 3 groups of detection rules cannot be passed, perform the network cutting operation and continue the ping packet detection
- If both the wired network and the wireless network cannot be ping, it is judged that the wireless client cannot be connected to the external network.

4.8. Wireless hot spot

USR-W610s with 802. 11b/g/n protocol: support2. 4GbandWIFI, support SSID, password, channel and other modification configurations; dual-band WI FI AP can be turned on at the same time,or one of the AP can be set to be turned off, and 8 clients can be connected simultaneously.

4.8.1. 2.4G Wireless Hot spot Configuration

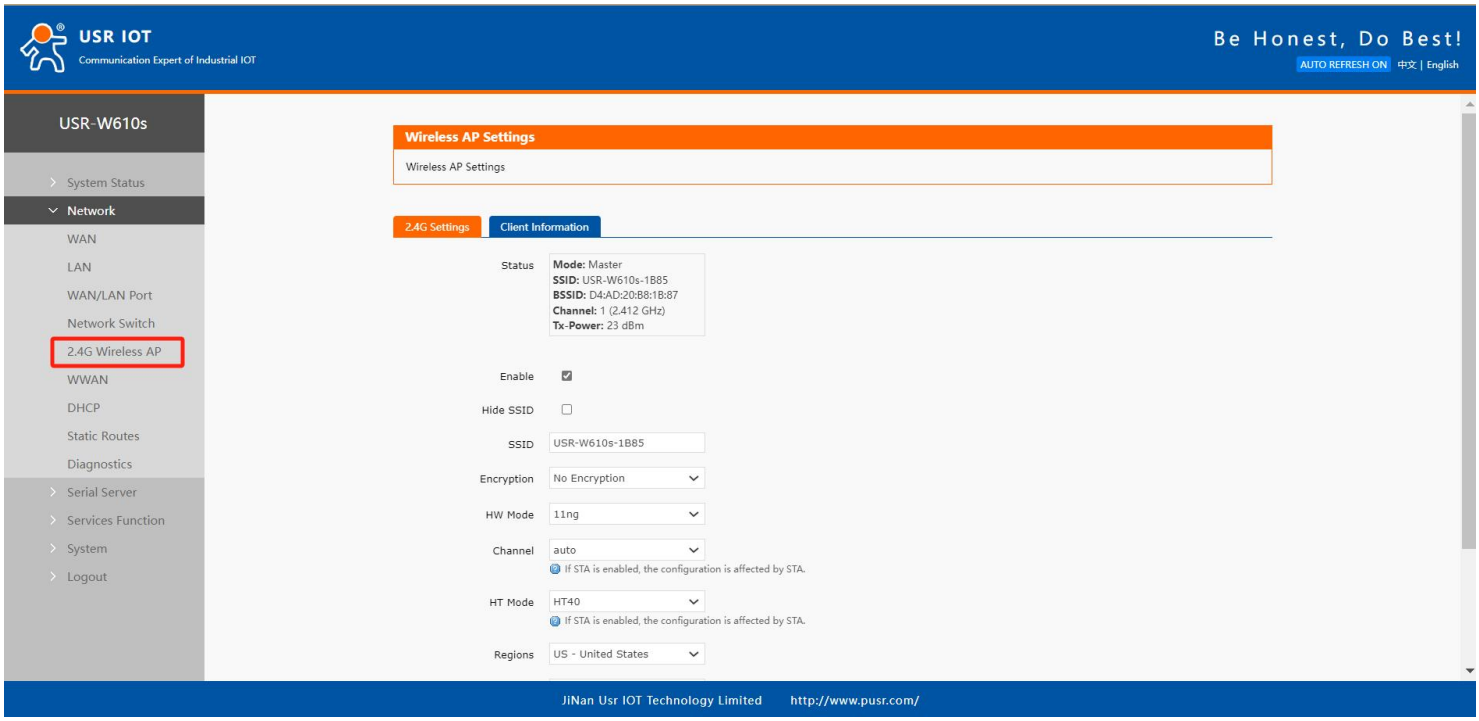


Figure 14 2.4G AP configuration interface

Table 6 2.4G AP set the parameter list

Name	Implication	Default
Start using	Whether to enable 2. 4GAP: Checked: Enabled 2.4GAP Unchecked: Off 2.4G AP	check

Hide SSID	Check: AP can be hidden, if there is a client need to connect manually Enter correct SSID and password	Not checked
WIFI Name	AP name, Chinese can be set	USR-W610s-XXXX
Encryption	Encryption mode of the AP: WPA-PSK(TKIP)/WPA1-PSK(CCMP)/WPA-PSK/WPA2-PSK(TKIP,CCMP)/WPA2-PSK/WPA3-SAE(CCMP)/No encryption	No encryption
Password	Wifi password settings	www. usr. cn
Network mode	Set network mode:11ng/11ng/11g/11b/11bgn/11bg	11ng
WiFi channel	You can set wifi channels: Automatic/1~13	Voluntarily
Frequency bandwidth	setting bandwidth HT40/HT20	HT40
Countries and regions	Can set the country area code function	00-World
Transmitted power	1-27dbm	27dbm

4.8.2. Client list

You can see from the client list how many clients connect to wireless clients.

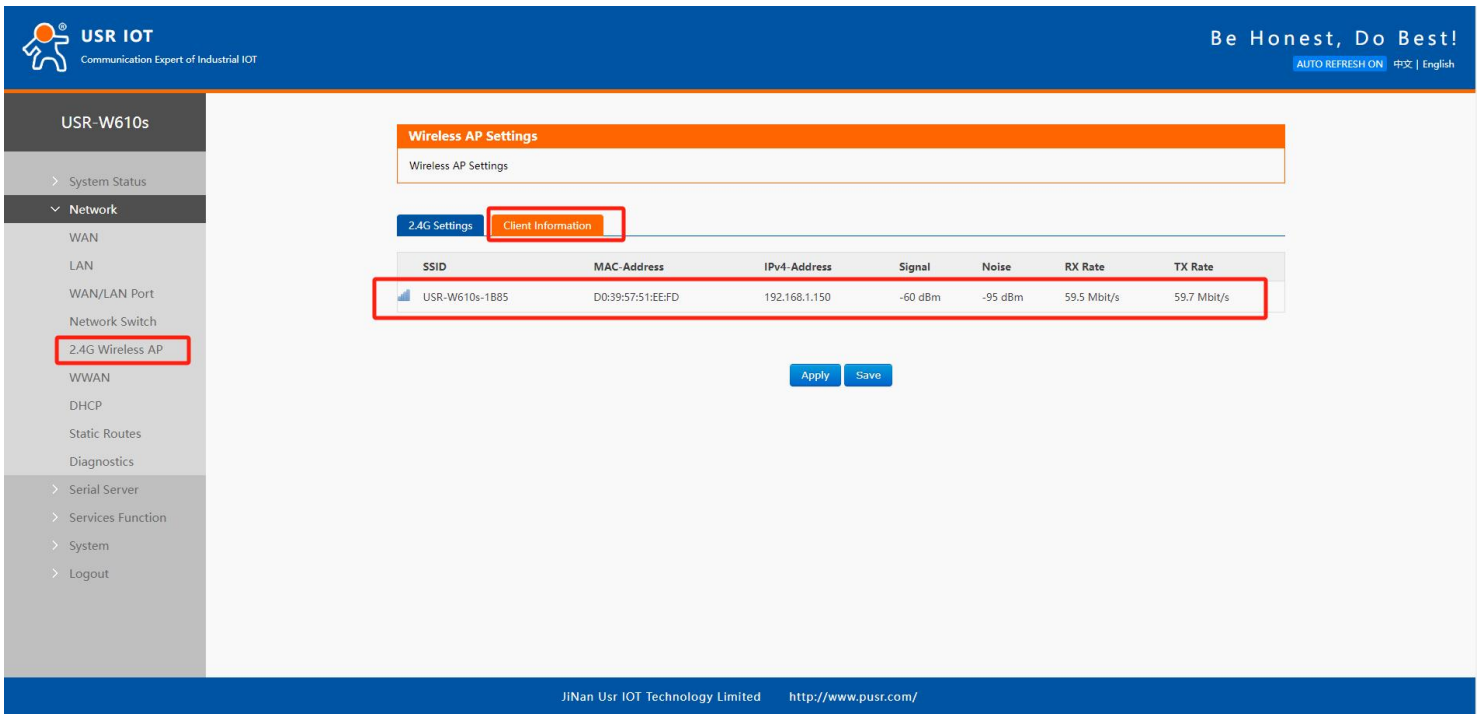


Figure15 Client List Interface

4.9. Wireless client

You need to start from the basic configuration2.4Gconfiguration, and then configure to connect AP hot spot parameters.

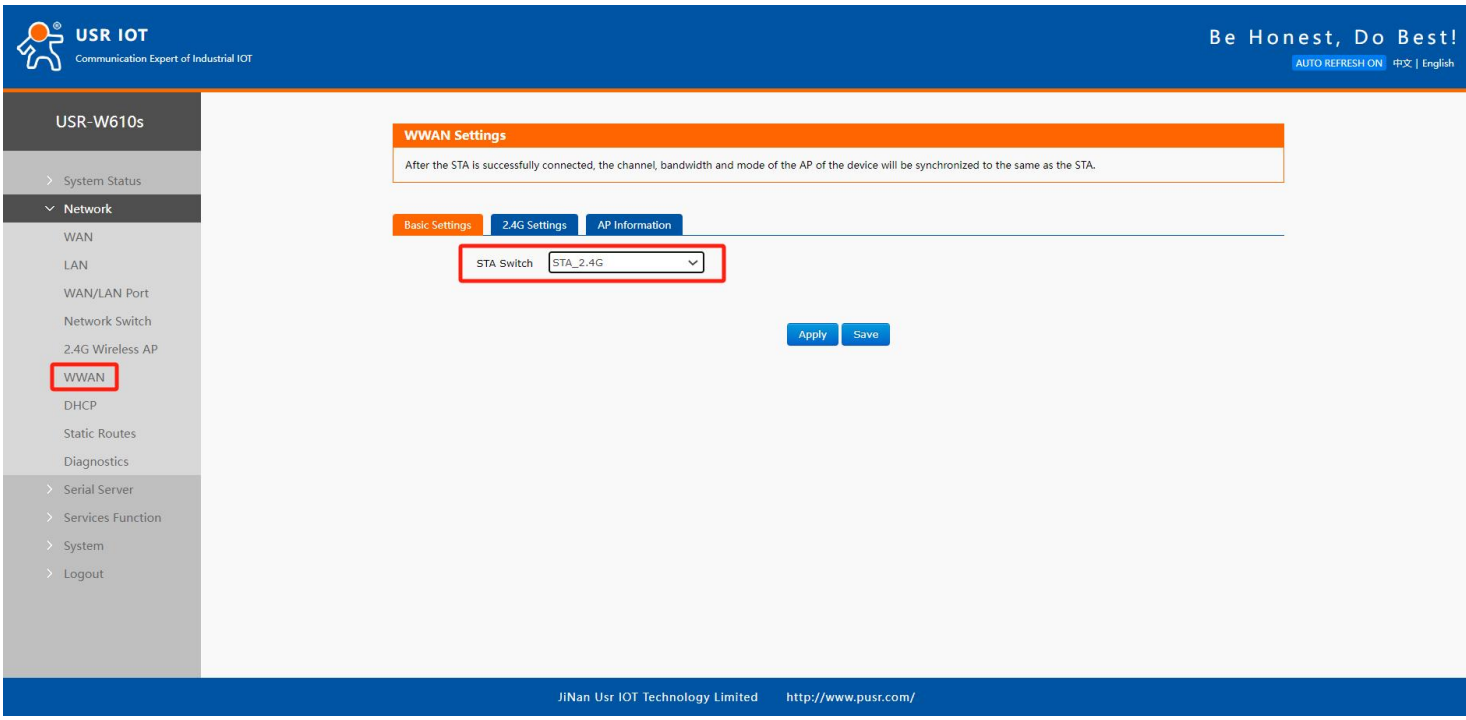


Figure16 Wireless Client Switch

4.9.1. 2.4G STA Configuration

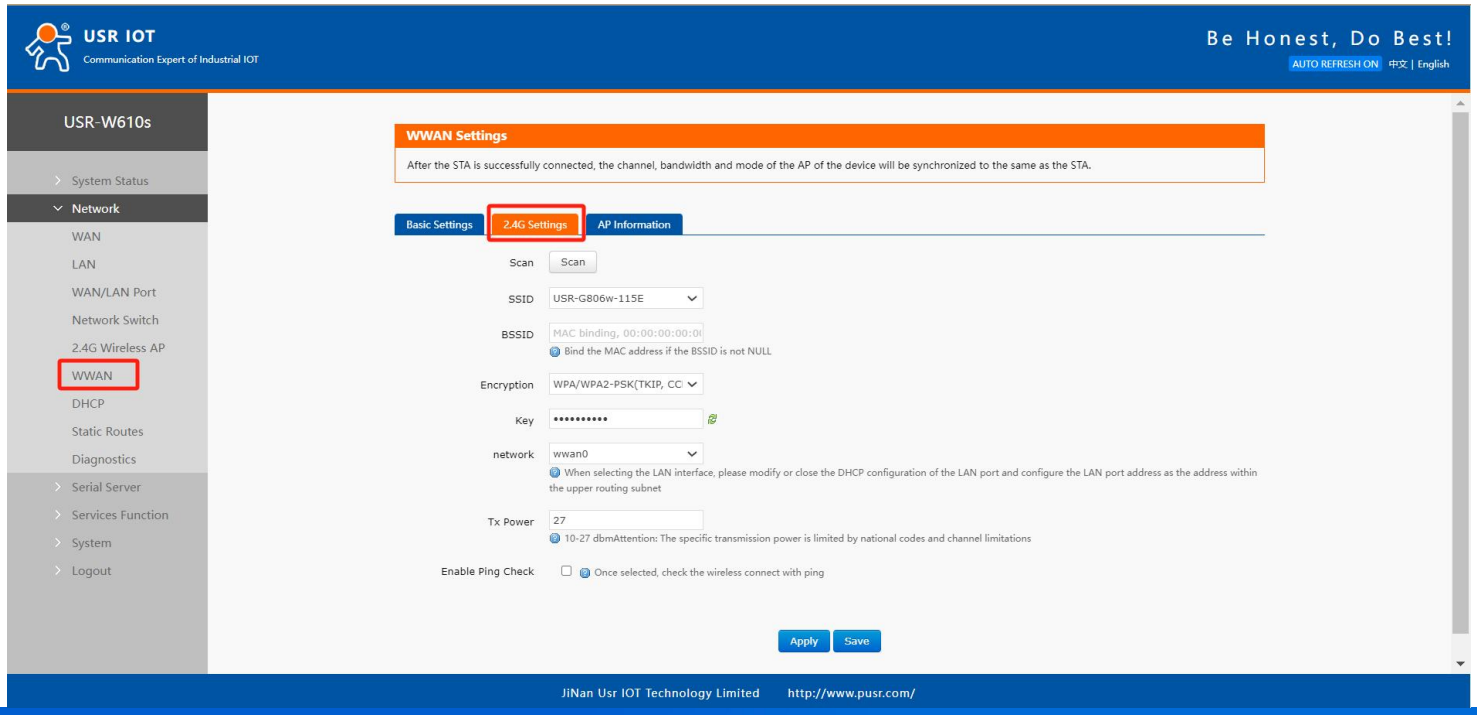


Figure 17 Wireless client setup

Table 7 List of the STA setting parameters

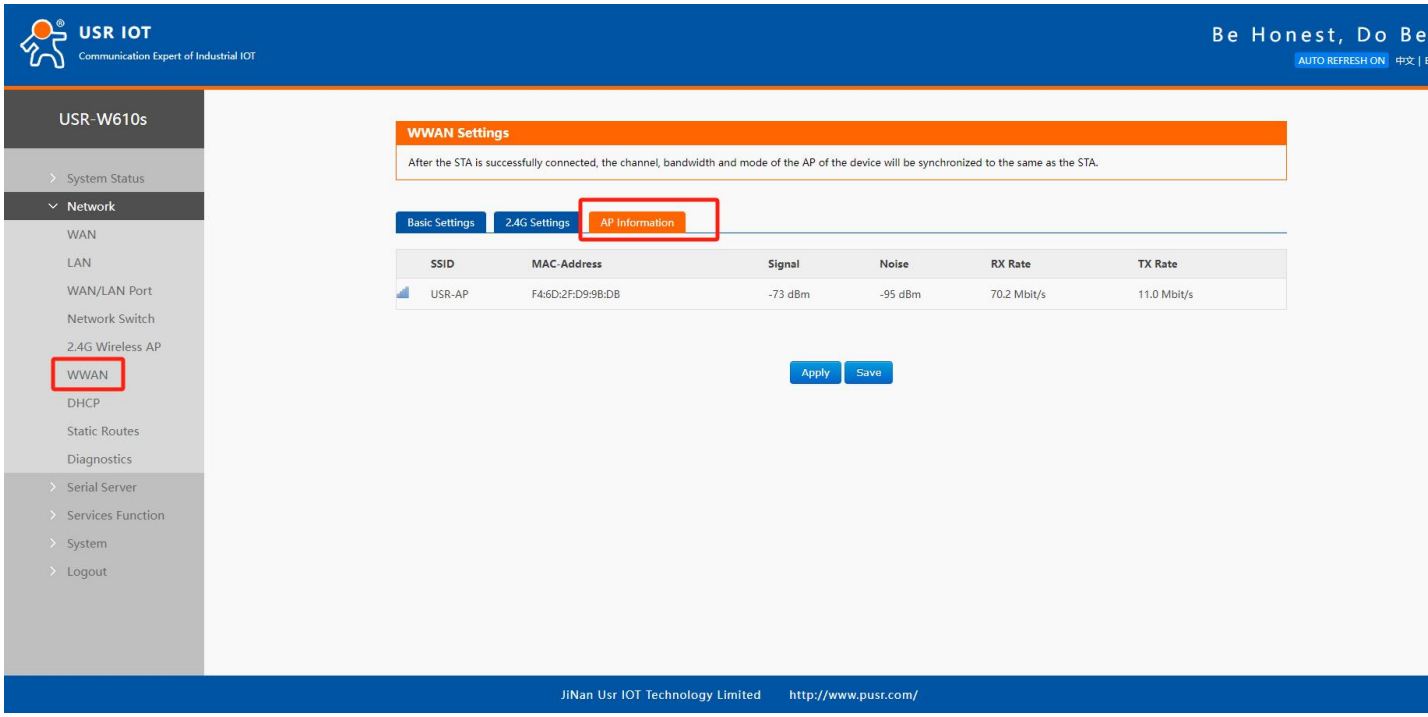
Name	Implication	Default
Search	You can click the search button to search for the current 2.4G WIFI Hot spots	Not have
WIFI Name	AP name to connect	WIFI-STA
MAC binding	BSSID settings, bind specified AP MAC	Not have
Encryption method	Choose according to whether the AP is encrypted: No encryption//WPA/WPA2-PSK(TKIP,CCMP)	No encryption
Network	wwan1:relay mode lan: bridge mode	wwan1 lan
Forcefully update LAN IP address	If checked,STA connection will restart lan	Not checked
Enable ping	STA keep-alive mechanism In LAN bridge mode, add ping detection to keep alive, specify add ressping, and reconnect W I F I after multiple ping timeout, which is consistent with ping abnormal processing under W W A N. After enabling ping detection, continue to add prompt: "IP address segment of ping needs to be consistent with IP address segment of LAN, and IP gateway address cannot be set" When p in g detection function is turned on, p in g address cannot be empty.	Not checked
Reference address	Gateway: Connected Server Address: You can specify the address where ping is	Gateway
Ping address	IP or domain name can be set	Empty

Description:

- For example, after opening STA, you need to set the static IP of STA, please enter the network- WAN for setting;
- If the bridge is set to the LAN port, it is necessary to close the DHCP through the br-lan interface, and set the LAN port address to the same network segment of the AP

4.9.2. Hot spot information

After connecting to AP, you can view connection information from hot spot information.



4.10. DHCP

Static Address Assignment: Set at Network-DH CP. This feature is an extension of the LAN interface DHCP settings and is used to assign fixed IP addresses and host identifiers to DHCP clients.

Use Add to add new lease entries. Identify hosts using MAC-address,IPv4-address assignment address, host name assignment identifier.

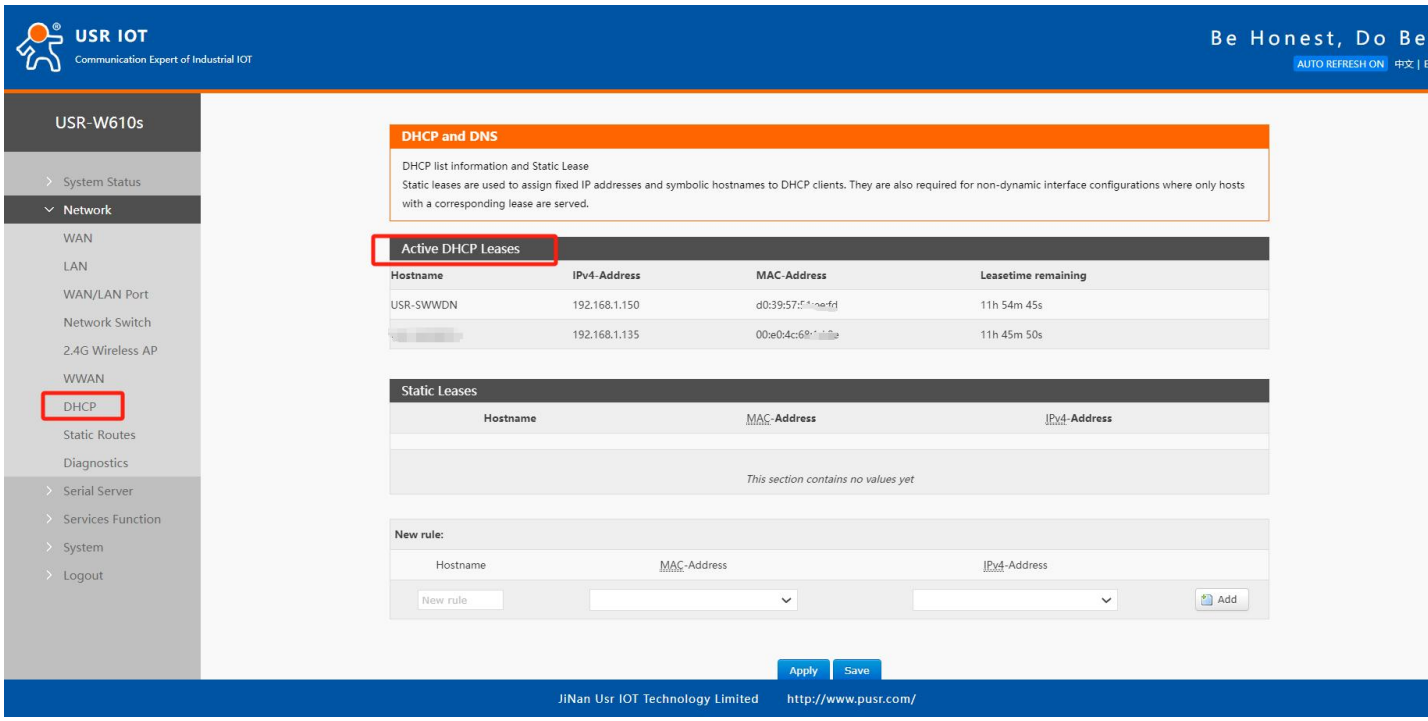


Figure19 DHCP Settings Page

Description:

- You can add up to 100 DHCP rules.

4.11. Static route

Fill in the IP of the same network segment as the superior router. The IP, gateway and subnet mask should be filled in correctly. If the dedicated line public network cable, it should be filled in correctly according to the IP, subnet mask, gateway and DNS server given by the operator.

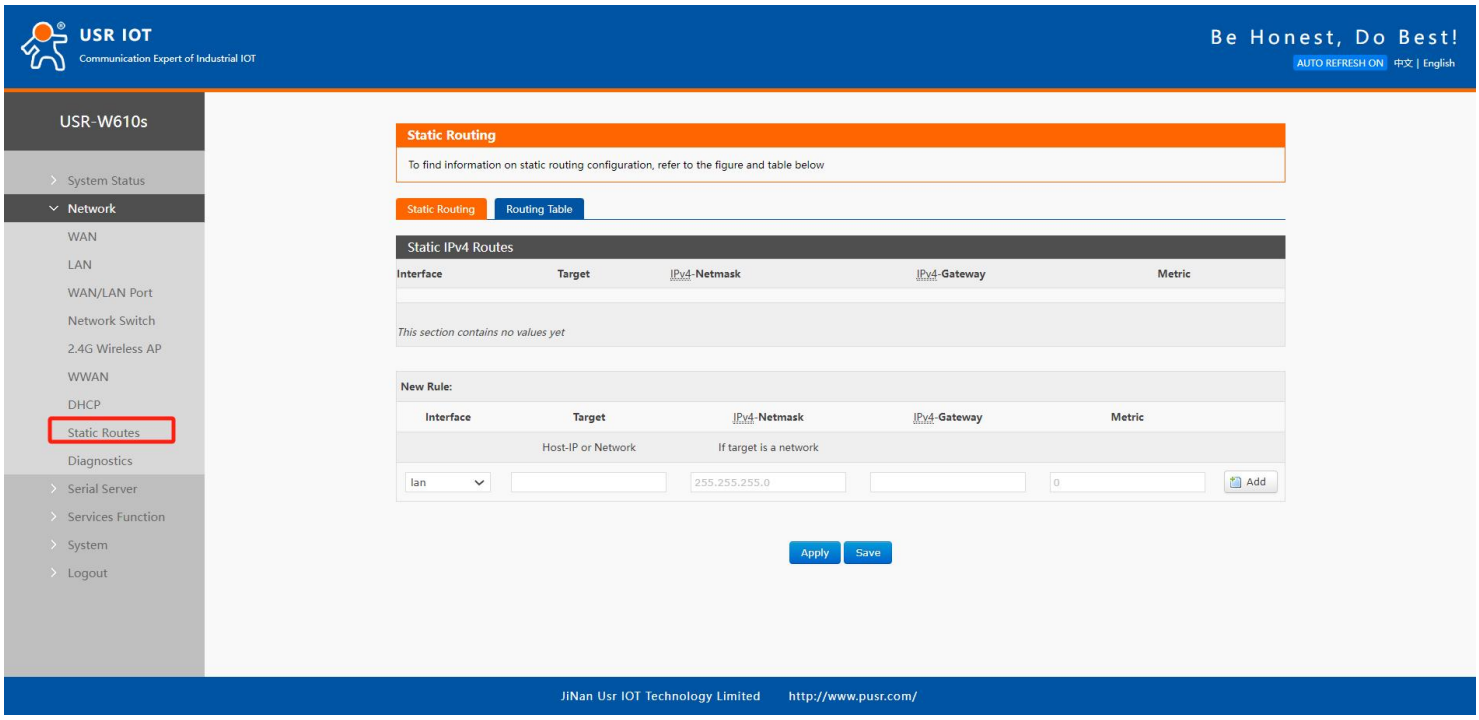


FIG. 20 Static route settings

4.12. Network diagnosis

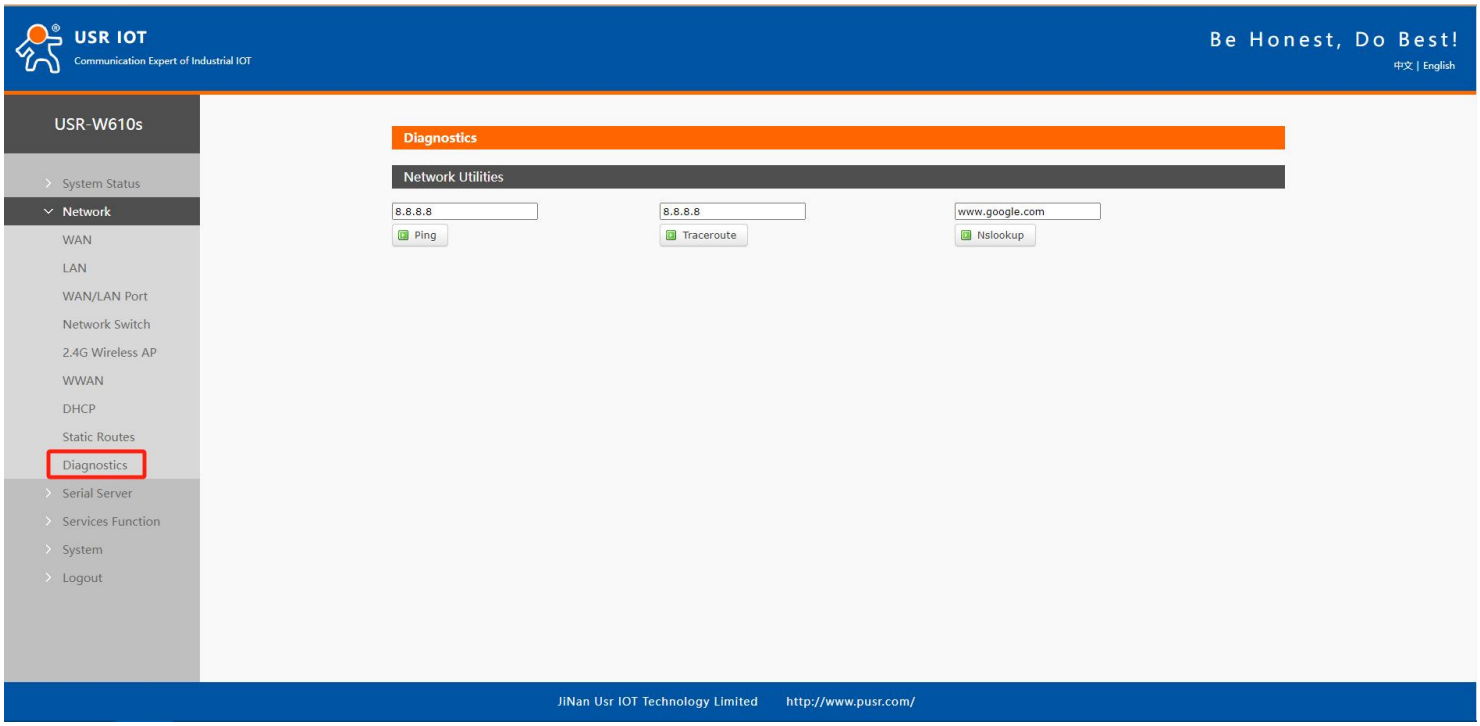


Figure 21 The Network diagnosis page

- On-line diagnosis function, including Ping tool, route analysis tool,DNS viewing tool;
- Ping is a Ping tool that can directly test a specific address on the wireless client side;
- Trace route is a routing analysis tool that can obtain the routing path through which an address is accessed;
- Nslookup is a DNS viewing tool that resolves domain names to IP addresses.

5. Wireless Signal Test

5.1. WiFi Environment Survey

Used for on-siteWiFienvironment monitoring, supports signal scanning in the 2.4G band. The scanned signal status is displayed as shown in the figure below, including: signal, SSID, channel, channel width, mode, BSSID. The top display uses icons, with the X-axis representing the channel and the Y-axis representing signal strength. The bottom displays theWiFisignal list

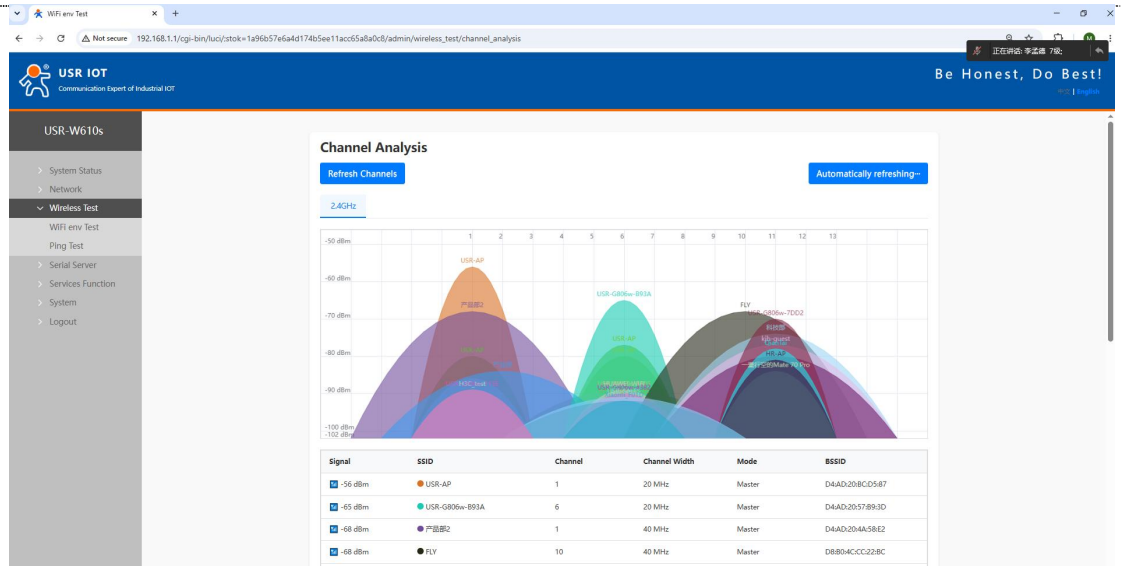


Fig. 22 WiFi Environment Survey

5.2. Wireless Link Test

The network connection PING detection function quickly diagnoses network connectivity, latency, and stability by sending data packets to the target address and measuring their round-trip time.

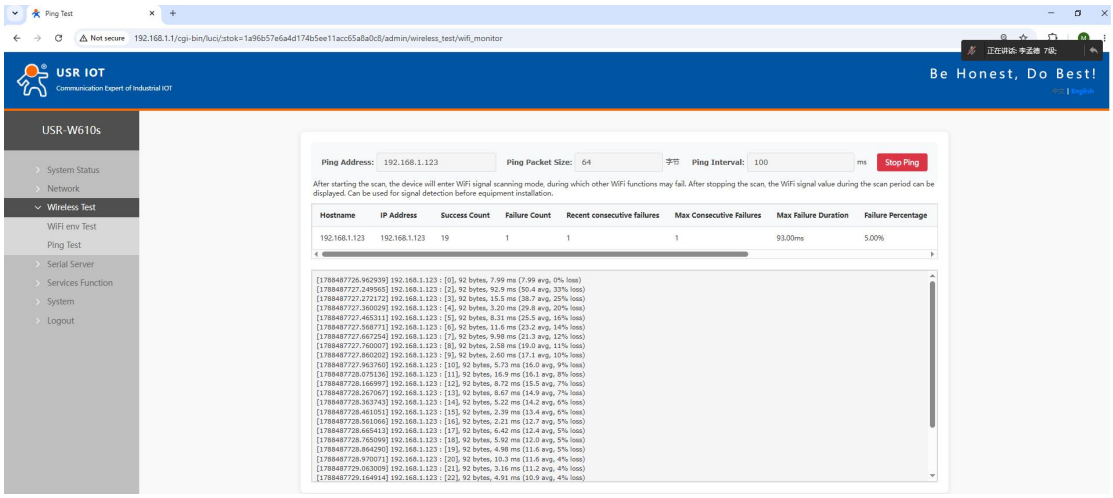


Fig. 23 Wireless Link Test

6. Serial port server function

W610s has RS232/RS485, supports TCP, UDP, MODBUS, MQTT, HTTPD and other network protocols, and supports heartbeat packets, registration packets and AT features.

6.1. Serial port settings

In this interface, you can set parameters such as baud rate and data bit of serial port.

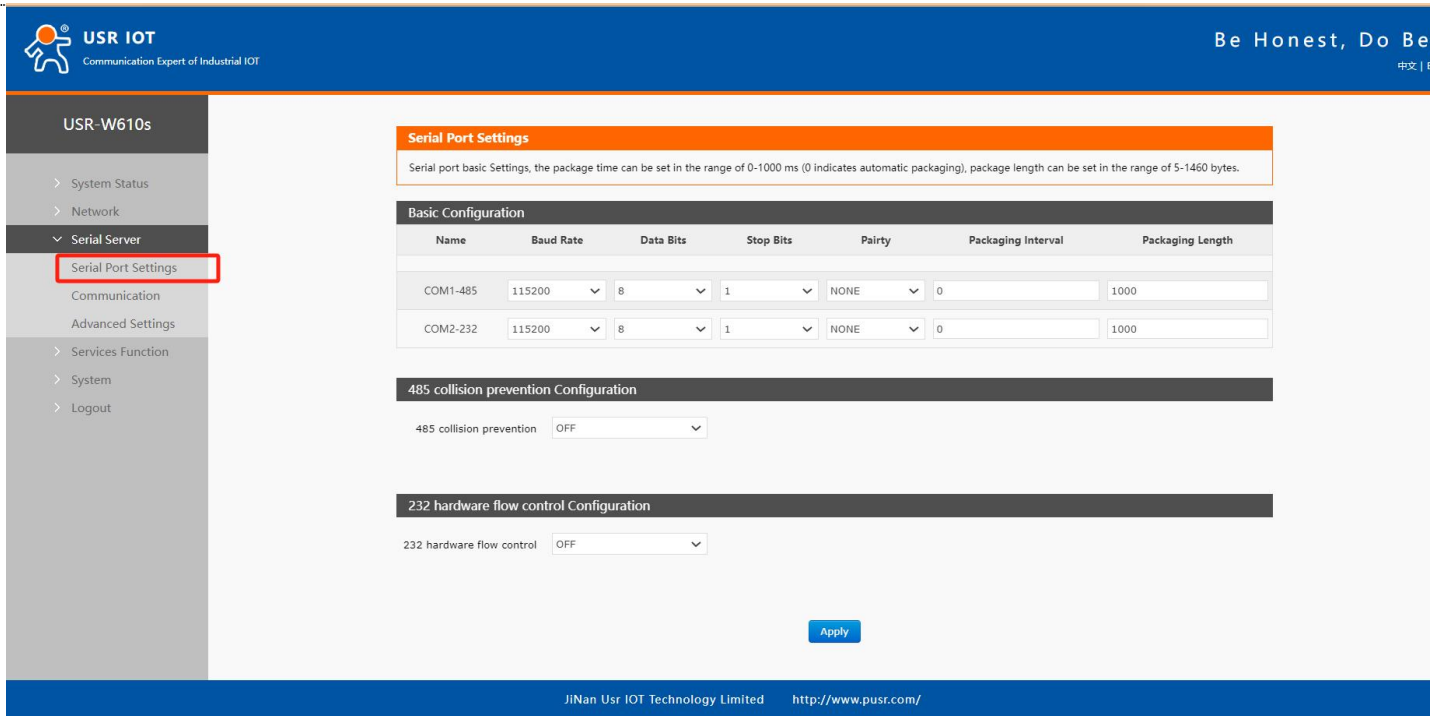


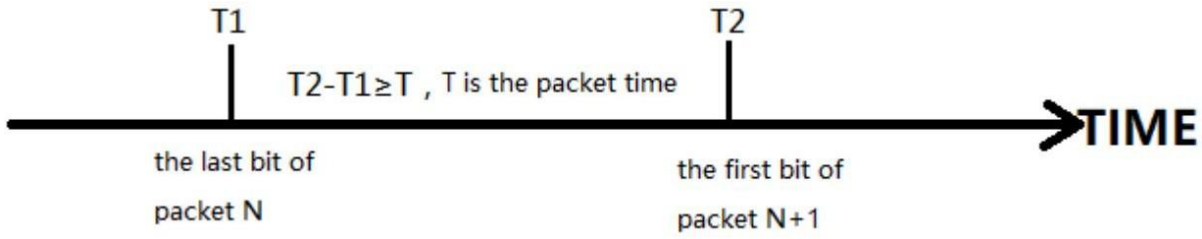
Figure22 Serial port setting interface

Table8 Serial port setting parameter table

Name	Functional description	Default
Baud rate	Set the baud rate of RS232 or RS485, which can be set to:1200/2400/4800/9600/19200/38400/57600/115200/230400 Note:RS485 only supports 230400	115200
Data bits	Set RS232 or RS485data bits, settable: 7/8	8
Stop bit	Set RS232 or RS485stop bit, settable: 1/2	1
Parity bit	SetRS232or RS485check bit, can be set: NONE/ODD/EVEN	NONE
Packing time	Set RS232 or RS485data packing time Unit:ms (range:10-60000ms)	0
Packing length	Set RS232 or RS485packet length Unit: bytes (range: 5-1500bytes)	1000
Conflict Prevention	Put collision detection mechanism, monitor bus, detect abnormal signal stop sending and buffer retransmission	OFF
232 hardware flow control	In the process of data transmission, the data transmission rate is directly controlled by hardware signals to ensure reliable transmission	OFF

6.1.1. Time triggered mode

When receiving data from UART, the W610s constantly checks the interval between adjacent 2 bytes. If the interval time is greater than or equal to a certain "time threshold", it is considered that a frame is over,

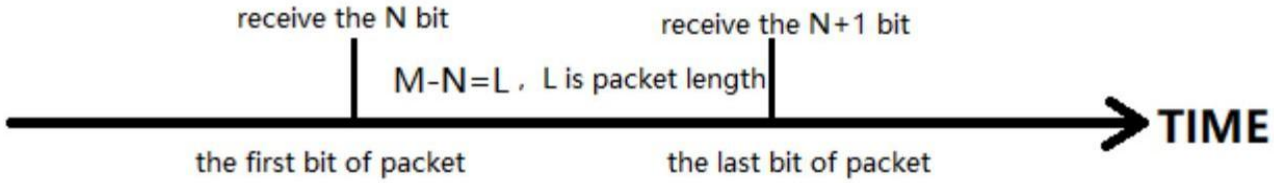


otherwise the data is received until it is greater than or equal to the packet length (default is 1000bytes). This frame of data is sent as a packet to the network. The "time threshold" here is the packing interval time. It can be set from10ms to 255 ms. Factory default 50 ms.

FIG. 23 Time triggered mode

6.1.2. Length Trigger Mode

When receiving data from UART, the W610s constantly checks the number of bytes received. If the number of bytes received reaches a certain "length threshold," a frame is considered to have ended. This



frame of data is sent to the network as a TCP or UDP packet. The "length threshold" here is the packing length. The settable range is 5 to 1500 bytes. Factory default 1000 bytes.

FIG. 24 Length Trigger Mode

6.2. Communication configuration

In this interface, you can set DTU function network configuration.

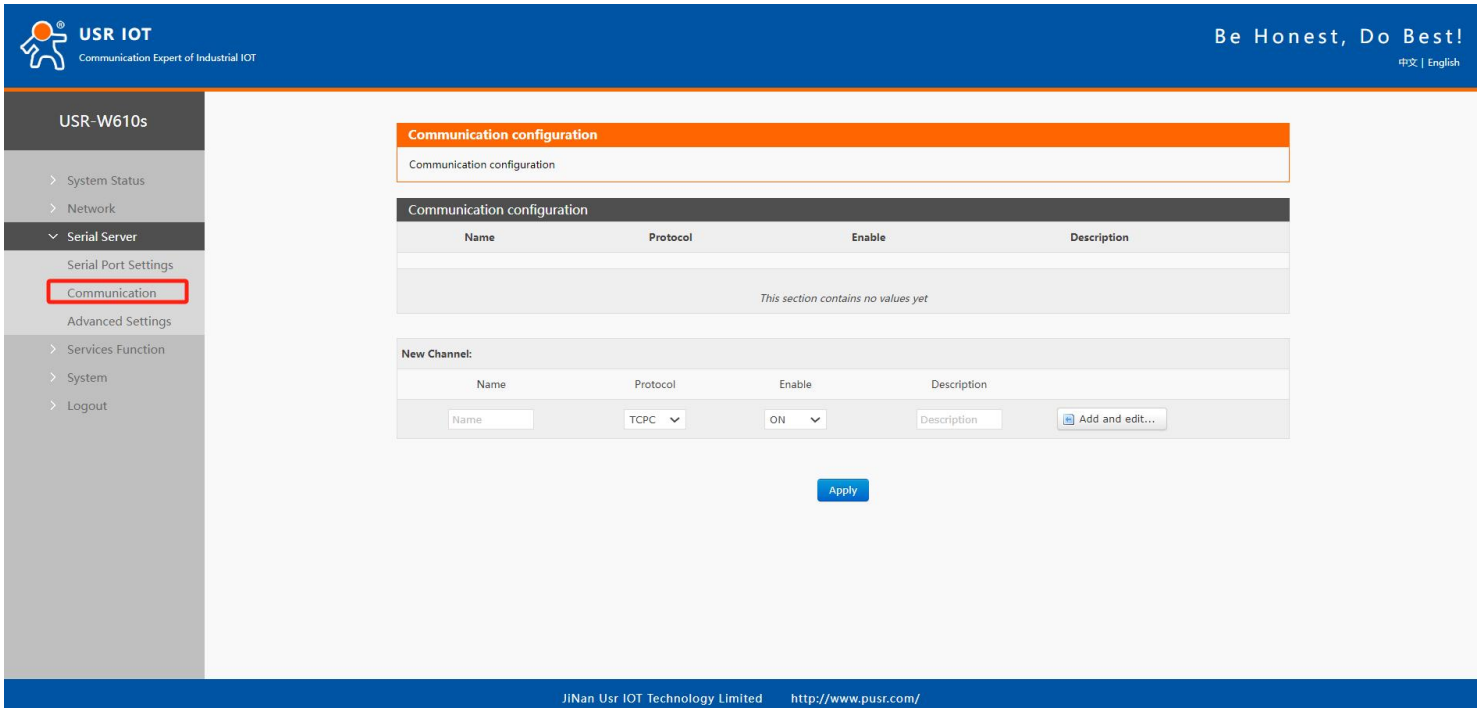


Figure25 Communication Configuration

Table9 Communication Configuration Parameter Table

Name	Functional description	Default
Name	Set the name of this link	Empty
Agreement	Select the network protocol, you can choose: TCPC/TCPS/UDPC/UDPS/HTTPD/MQTT/AWS/ALI	TCPC
Start using	Whether this link is enabled,ON(enabled)/ OFF(disabled)	Start using
Describe	Set comments for this link	Empty

Description:

- Follow-up Each protocol option is different, and the "Add and Edit" interface will be different accordingly;
- Up to 6 links can be set.

6.2.1. TCPC mode (TCP Client mode)

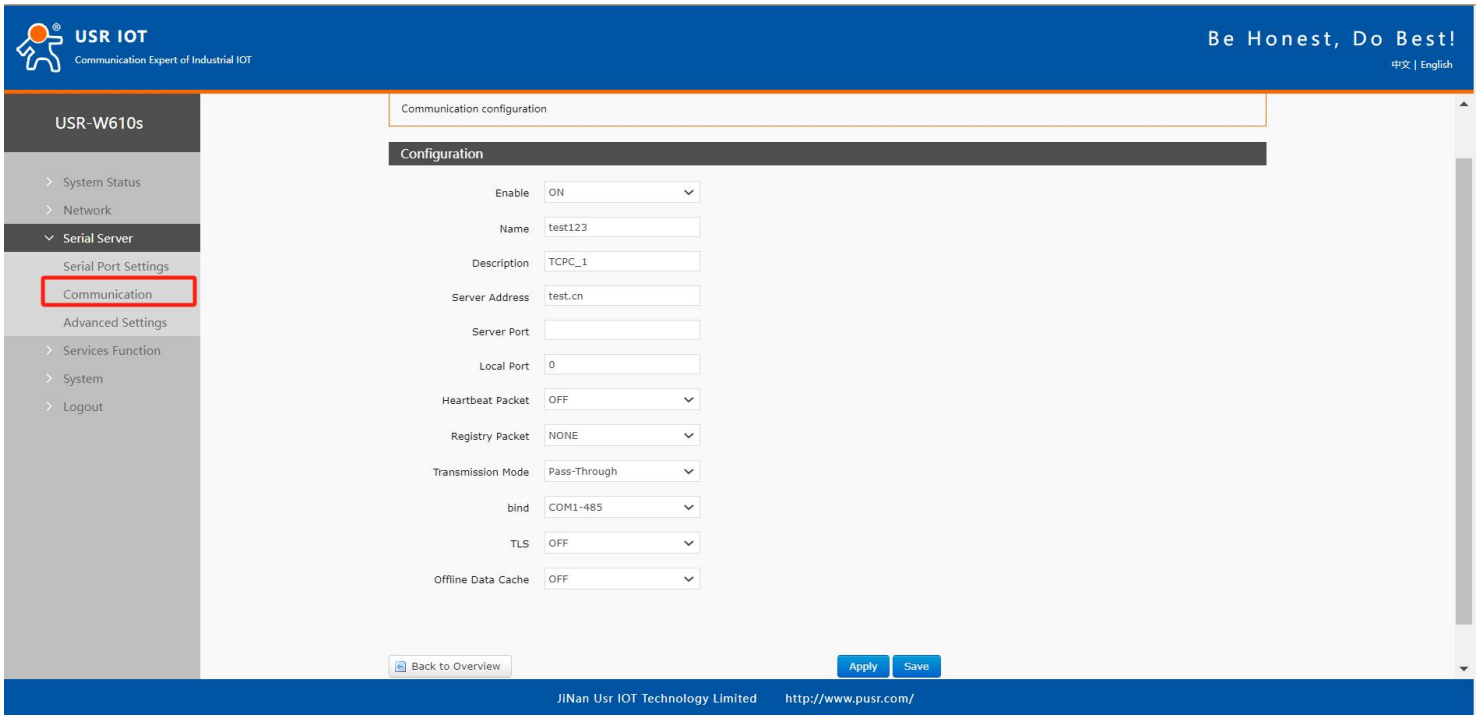


Fig 26 TCPC, configuration interface

Table 10 TCPC Parameters Table

Name	Functional description	Default
Start using	Is this link enabled,ON/OFF	ON
Name	Set the name of this link	TCPC_X
Describe	Set this link comment information	TCPC_X
Server address	Server address:IP or domain name form	empty
Port	server port number	empty
Heartbeat packet	Set whether to enable heartbeat packet function,ON/OFF	OFF
Heartbeat packet type	HEX:hexadecimal type ASCII: Character type	HEX
Heartbeat packet data	Heartbeat packet data content	empty
Heartbeat time	The time interval between heartbeat packets sent, in seconds	60
Registration packet	NONE: Close Heartbeat Package Custom: Customize registration package content MAC: Use device WAN MAC as registration package PUSR cloud: Use the registration package way to connect	NONE

	someone cloud platform SN: Use device SN as registration package content	
Register Package Type	Custom registration package type; HEX: 16 decimal type; ASCII: Character type;	HEX
Register package data	Register package data content	empty
Register package sending method	Send a registration packet when connecting to the server; Add registration packets to the front of every packet sent to the server	Send once on connection
Transmission mode	Pass-Through: pass-through mode Modbus RTU: Modbus RTUand Modbus TCP interconversion	Pass-Through
Host polling	OFF: Modbus RTU and Modbus TCP inter conversion; ON: multi-host polling	OFF
Channel binding	COM1-485:Transfers datausing onlyRS485channels COM2- 232:Transfers data using onlyRS232 COM1+COM2:Transfer data using RS232or RS485 channels	COM1-485
TLS	Version number: TLS1.0 and TLS1.2 The authentication mode can be selected from non-authentication certificate, authentication server certificate and bidirectional authentication certificate	OFF
Offline data cache	Data overflow processing method selection, cache method, cache length setting, etc., length limit up to 7300Byte, packet number limit up to 10packets; Data overflow handling method, optional discard new data/old data	OFF

TLS authentication method	No certificate verification: that is, only data layer transmission decryption is implemented, and the authentication server certificate of the other party is not verified during the handshake process: that is, the client will verify the server certificate during the handshake, andthe root certificate of the server needs to be preset by the client. Two-way authentication: that is, the client and the server verify each other's identity, and the server root certificate needs to be preset. Book, Client Certificate, Client Private Key	Do not verify certificates

- TCP Client Mode can be used with the USR custom indicator. When TCP Client, the USR indicator is connected to the server.
- Support TLS encryption transmission, offline data cache function

6.2.2. TCPS mode (TCP Server mode)

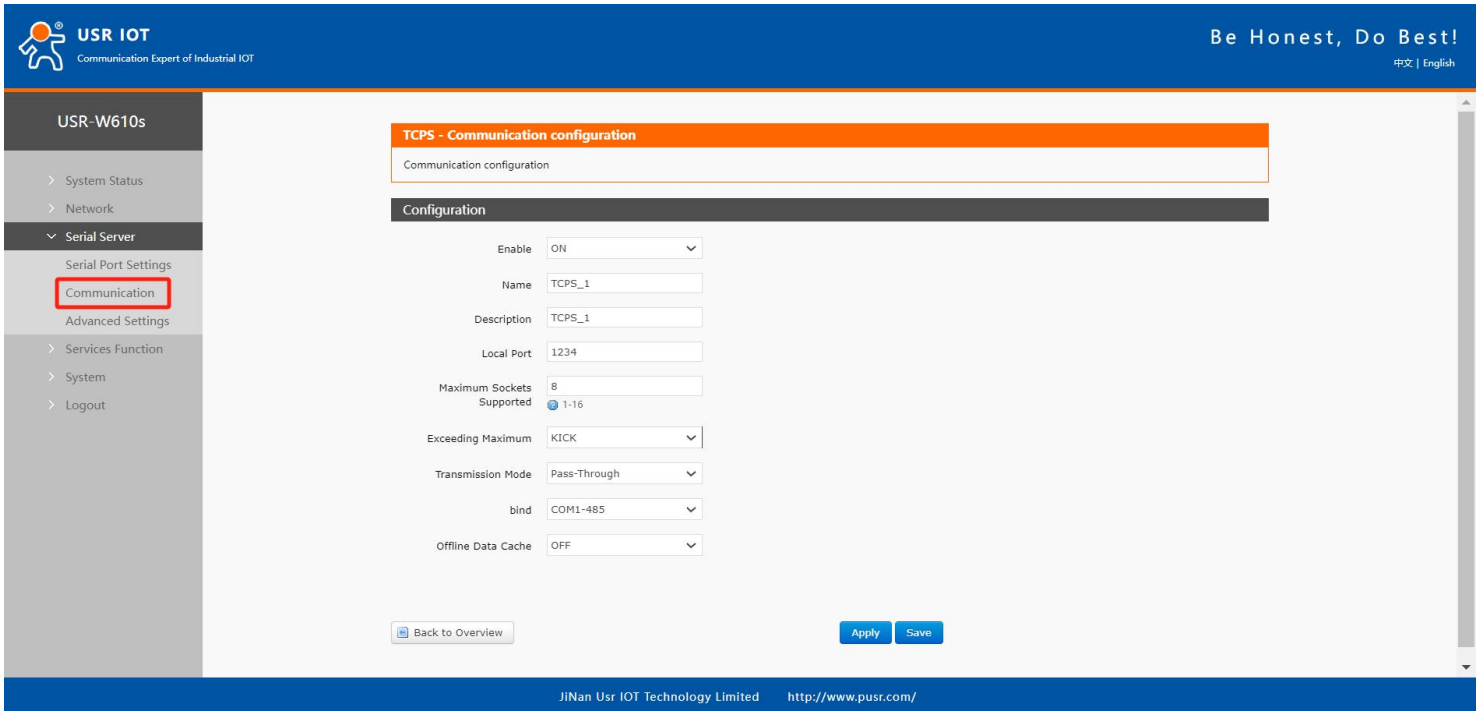


Fig 27 TCPS, with the configuration interface

Table 11 The TCPS parameter table

Name	Functional description	Default
Start using	Is this link enabled,ON/OFF	ON
Name	Set the name of this link	TCPS_X
Describe	Set this link comment information	TCPS_X
Port	local port number	empty
Maximum number of client connections supported	Number of clients accepted, 1-16	Default8
Transmission mode	Pass-Through: pass-through mode	Pass-Through
Number of connections exceeded	KICK: Out of range kick;KEEP: Keep connected	KICK
Channel binding	COM1-485:Transfers data only using RS485 COM2-232:Transfers data using RS232 COM1+COM2:Transfer data using RS232 or RS485 channels	COM1-485
Offline data cache	Data overflow processing method selection, cache method, cache length setting, etc., length limit up to 7300 Byte, packet number limit up to 10packets; Data overflow handling method, optional discard new data/old data	OFF

Description:

- TCP Server mode can be used in conjunction with a USR custom indicator, which lights up when a client is connected to the service;
- Up to 16 clients can connect to this TCP Server at the same time, such as the 17th client connection is not connected.

6.2.3. UDPC mode(UDP Client mode)

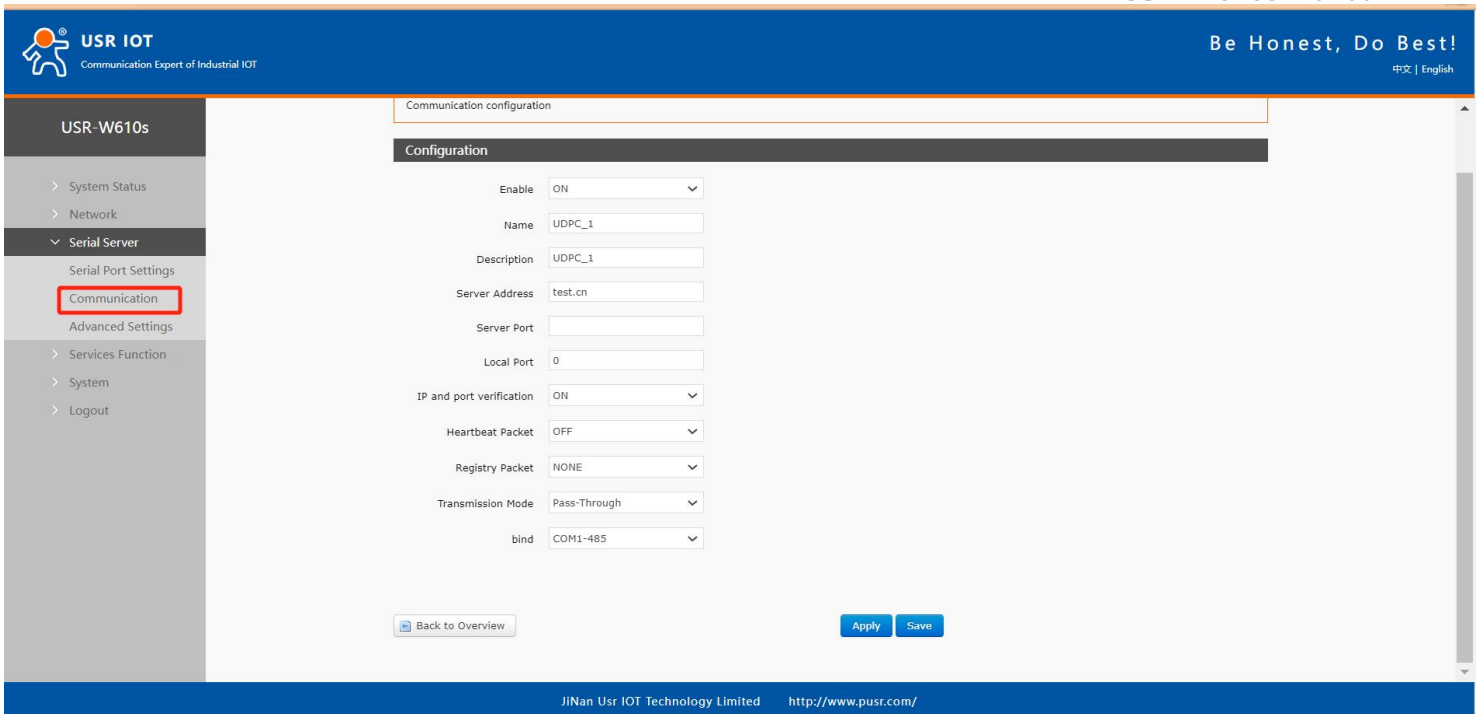


Fig 28 UDPC with the configuration interface

Table 12: UDPC parameter setting table

Name	Functional description	Default
Start using	Is this link enabled,ON/OFF	ON
Name	Set the name of this link	UDPC_X
Describe	Set this link comment information	UDPC_X
Server address	Server address:IPor domain name form	empty
Server port	server port number	empty
Local port	local port number	0
Check port	Check port, no check port	check port
Heartbeat packet	Set whether to enable heartbeat packet function,ON/OFF	OFF
Heartbeat packet type	HEX:hexadecimal type ASCII: Character type	HEX
Heartbeat packet data	Heartbeat packet data content	empty
Heartbeat time	The time interval between heartbeat packets sent, in seconds	60
Registration packet	NONE: Close Heartbeat Package Custom: Customize registration package content	NONE

	MAC: Use the device WAN MAC as the content of the registration package	
Register Package Type	Custom Registration Package Type HEX:hexadecimal type ASCII: Character type	HEX
Register package data	Register package data content	empty
Register package sending method	Send a registration packet when connecting to the server Add registration packets to the front of every packet sent to the server	Send once on connection
Transmission mode	Pass-Through: pass-through mode	Pass-Through
Channel binding	COM1-485:Transfers datausing onlyRS485channels COM2-232:Transfers datausing only RS232 COM1+COM2:Transfer datausing RS232or RS485 channels	COM1-485

Description:

- UDP Clent mode can be combined with USR custom indicator light, when connected to the server after the USR indicator light on;

6.2.4. UDPS Mode (UDP Server Mode)

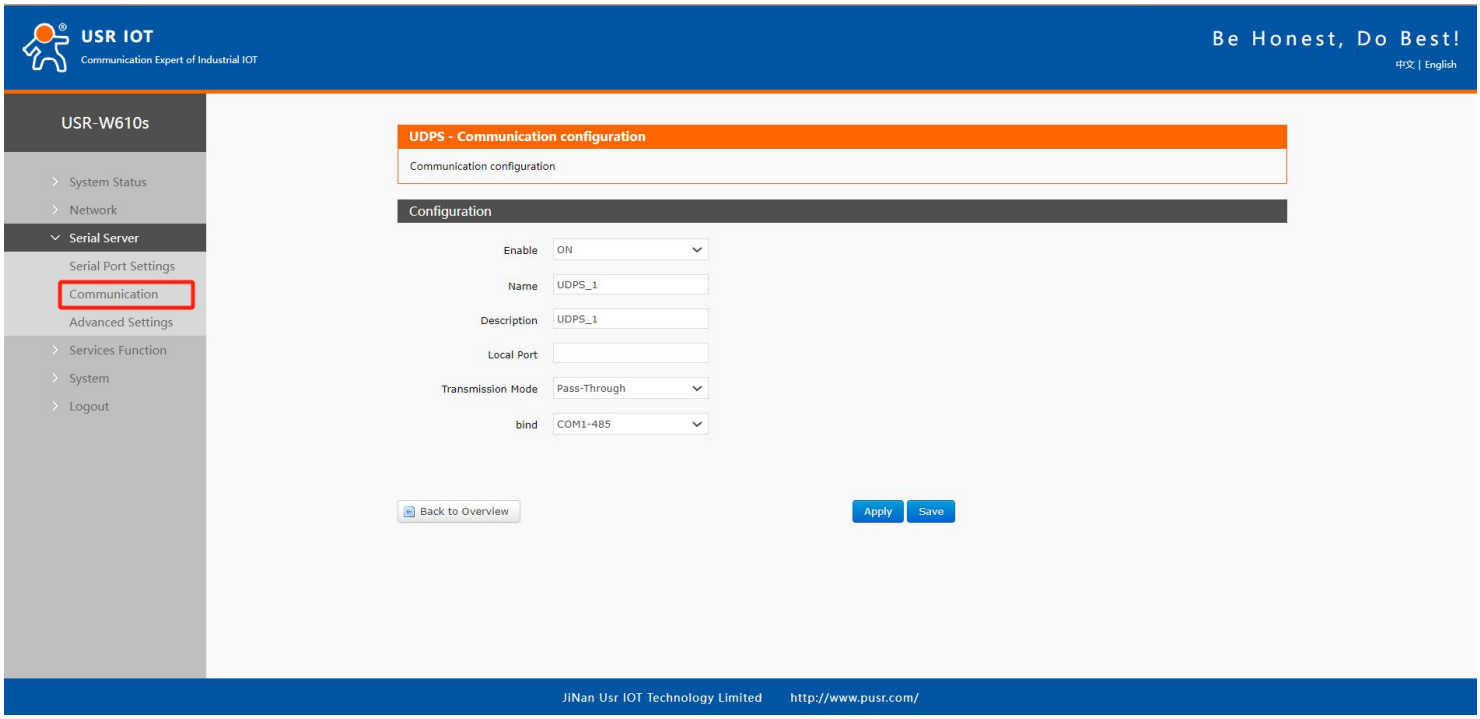


Fig 29 UDPS, with the configuration interface

Table 13 UDPS Parameter Table

Name	Functional description	Default
Start using	Is this link enabled,ON/OFF	ON
Name	Set the name of this link	UDPS_X
Describe	Set this link comment information	UDPS_X
Local port	local port number	empty
Transmission mode	Pass-Through: pass-through mode	Pass-Through
Channel binding	COM1-485:Transfers datausing only RS485 channels COM2-232:Transfers datausing onlyRS232 COM1+COM2:Transfer datausing RS232 or RS485 channels	COM1-485

Description:

- UDP Server mode can be used in conjunction with a USR custom indicator, which lights up when a client is connected to the service;
- Use the client that last connected to this service as the actual client.

6.2.5. MQTT Mode

The device supports MQTT Clint function, and users can easily access their own private MQTT server through simple configuration. Both data publishing and data subscription support multi-topicadding configuration. Users can send serial data to a topic or push data from the server to a bound serial port by configuring it. Data transmission.

6.2.5.1.MQTT Basic Configuration

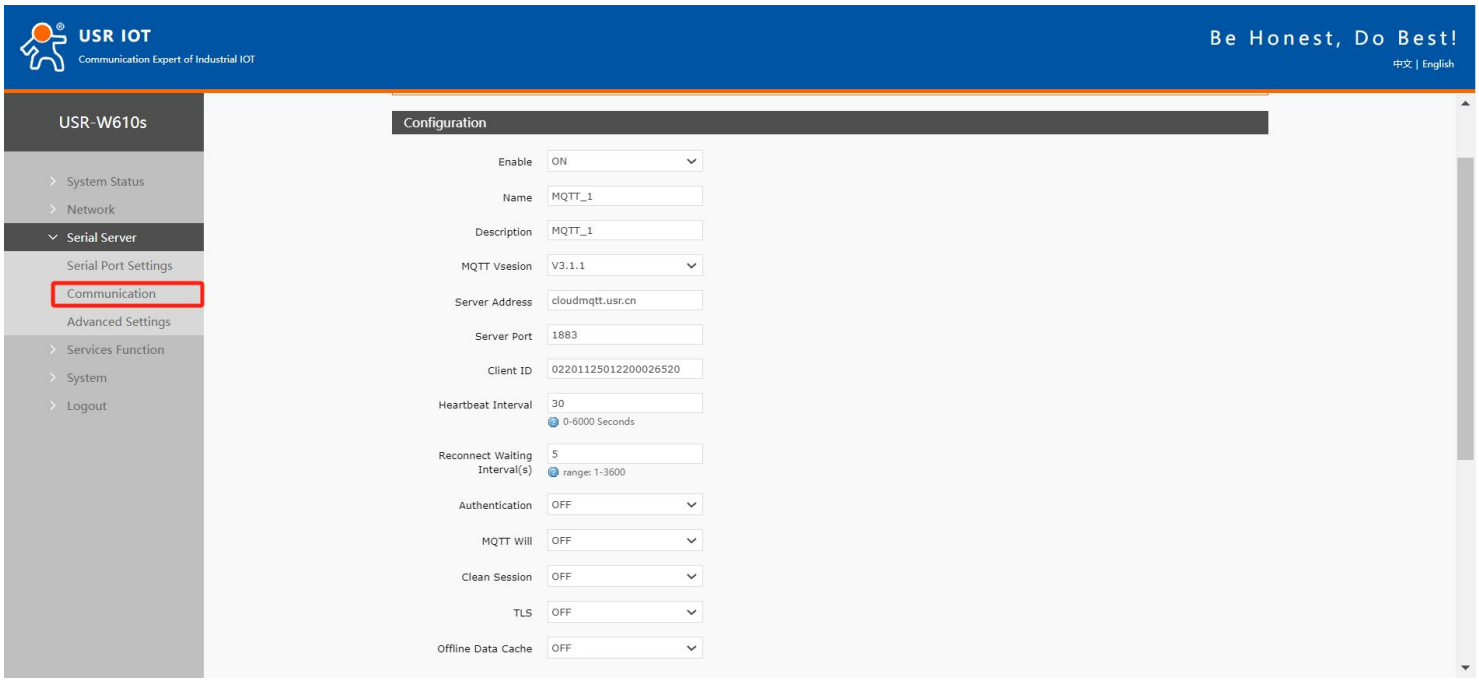


Figure 30 MQTT, with the configuration interface

Table 14 The MQTT parameters table

Name	Functional description	Default
Start using	Is this link enabled,ON/OFF	ON
Name	Name of this link	MQTT_X
Describe	Comments for this link	MQTT_X
MQTT version	Available options:MQTTV3. 1. 1/V3. 1version	V3. 1. 1
Server address	MQTT Server Address:IP or Domain Name	Cloud mqtt. usr. cn
Server port	MQTT Server Port	1883
Client ID	MQTT client identifier	0220112412180000 6105
Heartbeat time	MQTT protocol heartbeat time, unit: seconds	30

Reconnection detection interval	Next reconnection interval after MQTT disconnection, unit: seconds	5
Authentication	If the server requires a username password authentication needs to be enabled ON: Enable MQTT username password authen tication OFF: Disable MQTT username password authentication	OFF
Last words	MQTT connection flag. When the network is disconnected abnormally, the server will publish this will message to other clients who subscribe to this will topic. **ON**: Enable Subscriptions to Wills Topics **OFF**: Close subscription to Wills topic	OFF
Theme	Last words the metopic	empty
Last words	Set Last Words	empty
QOS	QOS for setting wills,can be set: **0** at most once **1** at least once **2** exactly once	0
Reservation message	Do you want to turn on the message function? ON: Open OFF: OFF	OFF
Cleanup session	MQTT protocol connection flag bit, used to control the lifetime of the session state, OFF and ON	OFF
TLS	Version number: **TLS1.0** and **TLS1.2** The authentication mode can be selected from non-authentication certificate, authentication server certificate and bidirectional authentication certificate	OFF
TLS authentication method	**Do not verify the certificate**: that is, only the data layer transmission decryption, not the verification of the identity during the handshake; **Verify the server certificate**: that is, the client will verify the server certificate when shaking hands, and the client is required to preset the root certificate of the server; **Two-way verification:** that is, the client and the	

	server verify each other's identity, requiring preset the server root certificate, client certificate and client private key	
Offline data cache	Data overflow processing mode selection, cache mode, cache length setting, etc., length limit to 7300 Byte, the number of packages limited to 10 packages; data overflow processing mode, optional discard new / old data	OFF

6.2.5.2.Subscribe/Publish

The topic adding function is mainly used to add published or subscribed topics. The configuration parameters include basic parameters such as name,TOC,QS,and whether to keep messages. Serial port association is used to associate a topic with a serial port. When publishing, the original data of the serial port will be sent as Payload of this topic. When receiving the subscription message,Payload of the subscription topic will be sentas the original data to the serial port.

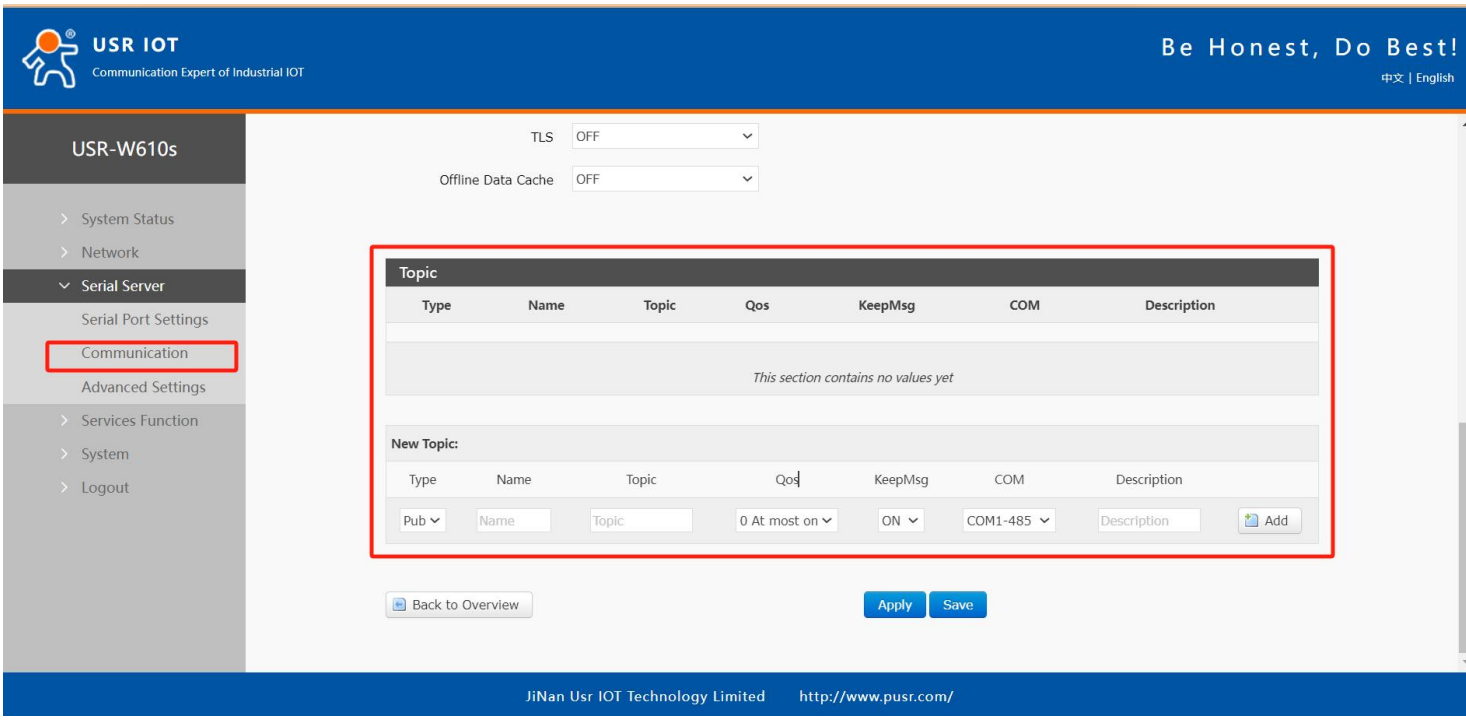


Fig 31 The MQTT topic configuration interface

Table 15 The MQTT topic parameters table

Name	Functional description	Default
type	Topic type: optional publish/subscribe	issue
name	the name of the topic	empty
theme	Subject: Subject Content	empty
Qos	Subject message quality, settable: 0 atmost once 1 least1 2 Exactly once	0
reservation message	Set whether to keep messages, ON/OFF	ON
aisle	COM1-485:Data communicationusing485 COM2-232:Data communicationusing232channelsCOM1+COM2:Data transmissionusing RS232or RS485 channels	COM1-485
describe	Set comments for this theme rule	empty

Description:

- A maximum of 16 theme rules can be set.

6.2.6. Connect to Amazon

In this mode, user terminal data can send request data to AWS platform through this device. Data publishing and data subscription with terminal devices can be performed on the AWS platform. Both support multi-theme adding configuration. Users can send serial data to a certain theme through configuration, or send data pushed by the server to the bound serial port. Data transmission between serial port and server.

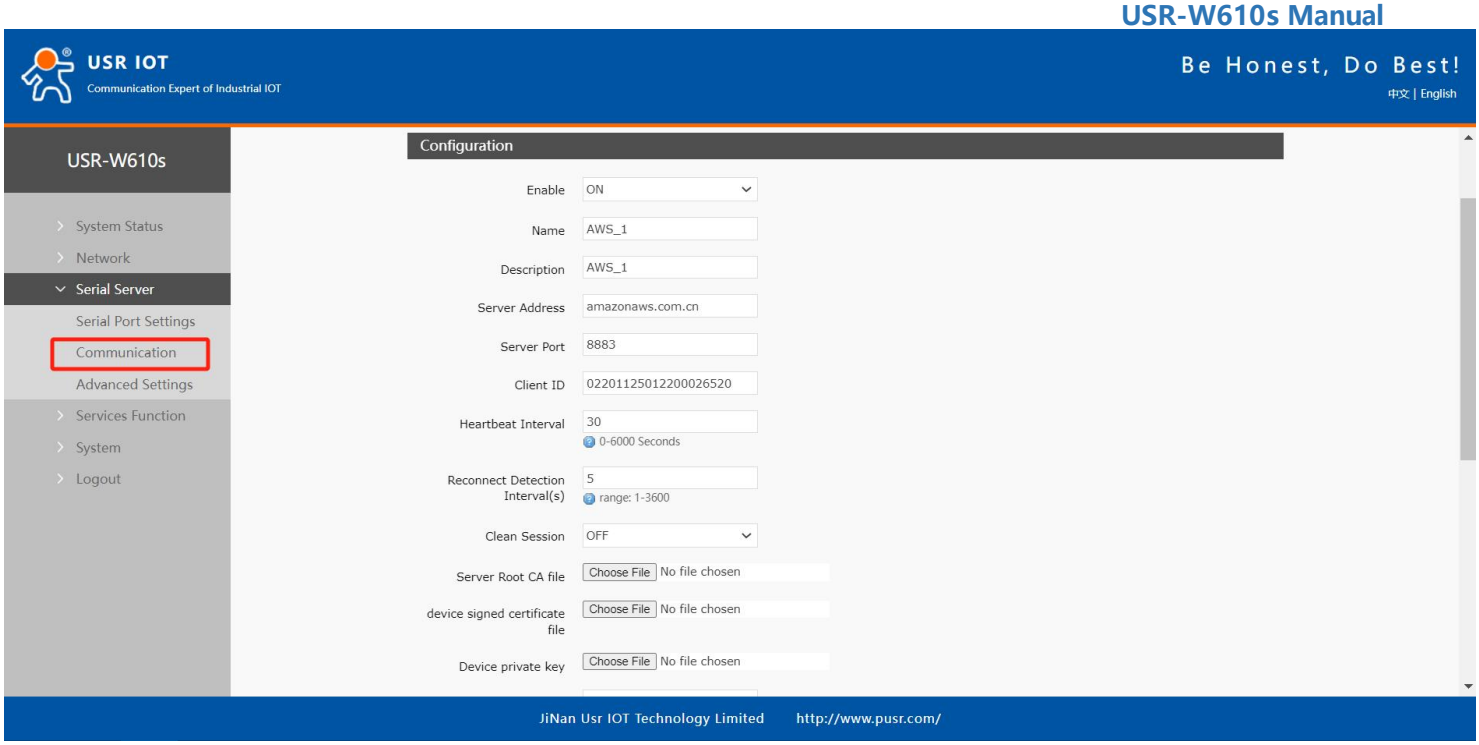


Figure 32 The AWS configuration interface

Table 16 AWS, Parameter Table

name	functional description	default
start using	Link enabled,ON/OFF	ON
name	Name of AWS Platform Link	AWS_2
describe	AWS Platform Link Remarks	AWS_2
server address	AWS platform MQTT server connection address:IP or domain name	amazonaws. com. cn
server port	AWS Platform MQTT Server Port	1883
Client ID	AWS Platform MQTT Client Identifier	02201124121800006105
heartbeat time	MQTT protocol heartbeat time, unit: seconds	30

Reconnection detection interval	Next reconnection interval after MQTT disconnection, unit: seconds	5
cleanup session	MQTT protocol connection flag bit, used to control the lifetime of the session state, OFF, ON Open	OFF
server root certificate	Select corresponding file	not have
Equipment Signature Certificate	Select corresponding file	not have
device private key	Select corresponding file	not have
Offline data cache	Data overflow processing method selection, cache method, cache length setting, etc., length limit up to 7300Byte, packet number limit up to 10packets; Data overflow handling method, optional discard new data/old data	OFF

6.2.6.1.Subscribe/Publish

The topic adding function is mainly used to add published or subscribed topics. The configuration parameters include basic parameters such as name,TOC,QS,and whether to Serial port association is used to associate a topic with a serial port. Up to16 theme rules can be set.

6.2.7. Connect to Alibaba Cloud Platform

Alibaba Cloud IoT Platform is a very popular public cloud platform at present. The equipment supports MQTT protocol to access Alibaba Cloud IoT Platform, supports industrial and enterprise instances, supports SSL function, and supports certificateless, one-way authentication and two-way authentication to access Alibaba Cloud. In this mode, data publishing and data subscription with terminal devices can be carried out on Alibaba Cloud platform, and multi-topic addition configuration is supported. Users can send serial data to a certain topic through configuration, or push data from the server to a bound string. Port, realize serial port and server data transmission.

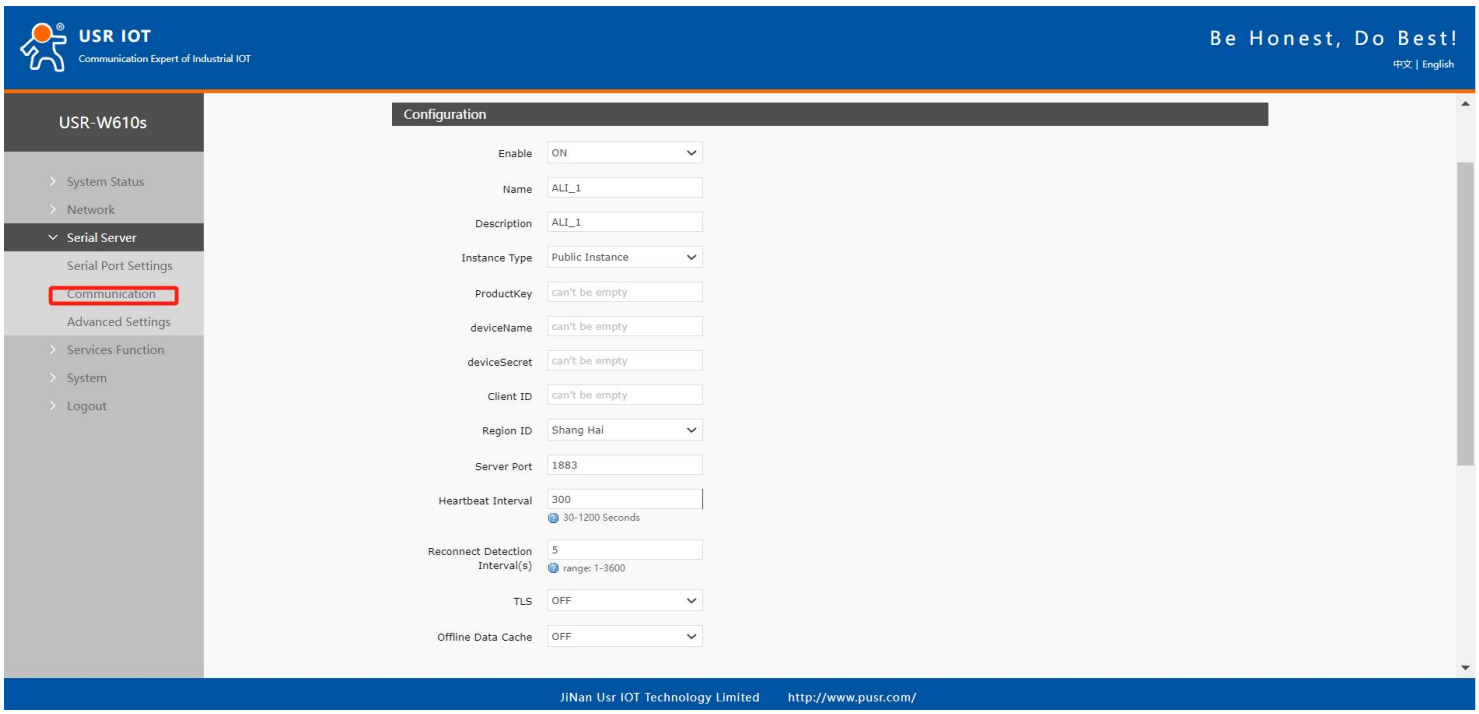


Fig 33 The ALI configuration interface

Table 17 ALI, Parameter Table

Name	Functional description	Default
Start using	Link enabled,ON/OFF	ON
Name	ALI Platform Link Name	ALI_2
Describe	ALI Platform Link Remarks	ALI_2
Instance type	Support Alibaba Cloud public instances and enterprise instances	public instance
Product Key	Device properties, Alibaba Cloud adds Product Key of triplet in device	not have
Device Name	Device name, Aliyun adds Device Name	not have

Device Secret	Device key, ALI Cloud adds one of the triplets in the device Device Secre	not have
Client ID	Support custom client ID for splicing MQTT client	not have
Territory	ALI regional code, for example, East China2 (Shanghai):cn-shanghai	East China2-Shanghai
Server port	ALI Platform MQTT Server Port	1883
Heartbeat time	MQTT protocol heartbeat time, unit: seconds	300
Reconnection detection interval	Next reconnection interval after MQTT disconnection, unit: seconds	5
Cleanup session	MQTT protocol connection flag bit, used to control the lifetime of the session state, OFF, ON Open	OFF
TLS	Version number: TLS1.0 and TLS1.2 The authentication mode can be selected from non-authentication certificate, authentication server certificate and bidirectional authentication certificate	OFF
TLS authentication method	No certificate verification: that is, only data layer transmission decryption is implemented, and the authentication server certificate of the other party is not verified during the handshake process: that is, the client will verify the server certificate during the handshake, and the root certificate of the server needs to be preset by the client. Two-way authentication: that is, the client and the server verify each other's identity, and the server root certificate needs to be preset. Book, Client Certificate, Client Private Key	Do not verify certificates
Offline data cache	Data overflow processing method selection, cache method, cache length setting, etc., length limit up to 7300Byte, packet number limit up to 10packets; Data overflow handling method, optional discard new data/old data	OFF

6.2.7.1.Subscribe/Publish

The topic adding function is mainly used to add published or subscribed topics. The configuration parameters include basic parameters such as name,TOC,QS,and whether to Serial port association is used to associate a topic with a serial port. Up to16 theme rules can be set.

6.2.8. HTTPD Mode (HTTP Client Mode)

In this mode, the user's terminal device can send request data to the specified HTTP server through this device, and then the device receives the data from the HTTP server, parses the data and sends the result to the serial device.

Users do not need to pay attention to the data conversion process between serial data and network data packets, and only need to set simple parameters to realize the data request from serial devices to HTTPservers.

By default, the device filters the received data and outputs only part of the user data to the serial port. The customer can choose whether to filter HTTPD data using the AT command.

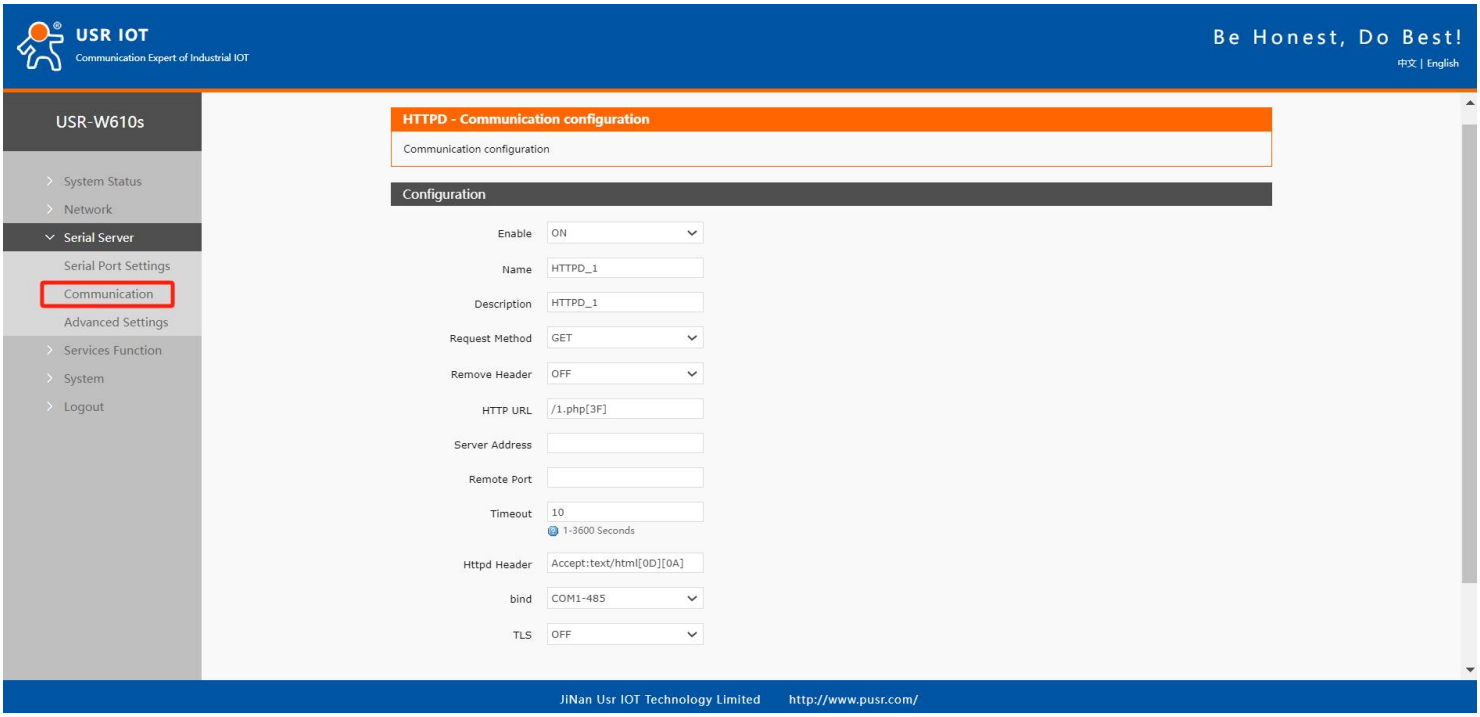


Fig 34 The HTTPD configuration interface

Table18 HTTPD Parameter Table

Name	Functional description	Default
start using	Enable this link channel:ON(enabled)/ OFF(disabled)	ON
name	Name of this link	HTTPD_X
describe	Remarks for this link	HTTPD_X
request method	How to request data from HTTP servers GET/POST	GET
filter head	Set whether to filter HTTP headers ON(filtered)/ OFF(unfiltered)	ON
HTTP URL	Add URLs to visit	/1. php[3F]
server address	HTTP server address,IP or domain name	empty
remote port	HTTP Server Port Number	empty
overtime	If the server does not actively disconnect within the timeout period, the local end needs to wait for disconnection. Time in seconds	10
Request header information	HTTP header information	Accept:text/html[0D][0A]
channel bindin	COM1-485: Data communication using 485 channels; COM1-485: Data communication using 485 channels; COM1-485: Data communication using 485 channels;	COM1-485
TLSencryption	Support TLS1.0 \TLS1.2 \OFF	OFF

6.2.9. Registration Package/Heartbeat Package Features

6.2.9.1.Registration package description

Registration package: A password used to enable the server to identify the device from which the data originated, or as authorization for server functionality. Registration packets can be sent when the device establishes a connection with the server It is also possible to splice the registration packet data at the forefront of each packet as a packet. The registration packet data can be MAC or custom registration data.

Description:

- Select MAC,then WAN port MAC as registration packet content;
- This function is available only when the link is set to tcpc and udpc mode.

6.2.9.2.Network heartbeat packet description

Network heartbeat packet: sent to the network, the main purpose is to let the server know that the terminal W610s is online, so as to maintain a long connection with the server.

Description:

- This function is available only when the link is set to tcpc and udpc mode.

6.3. Advanced setup

- Can configure network AT, serial heartbeat packet and no data action.

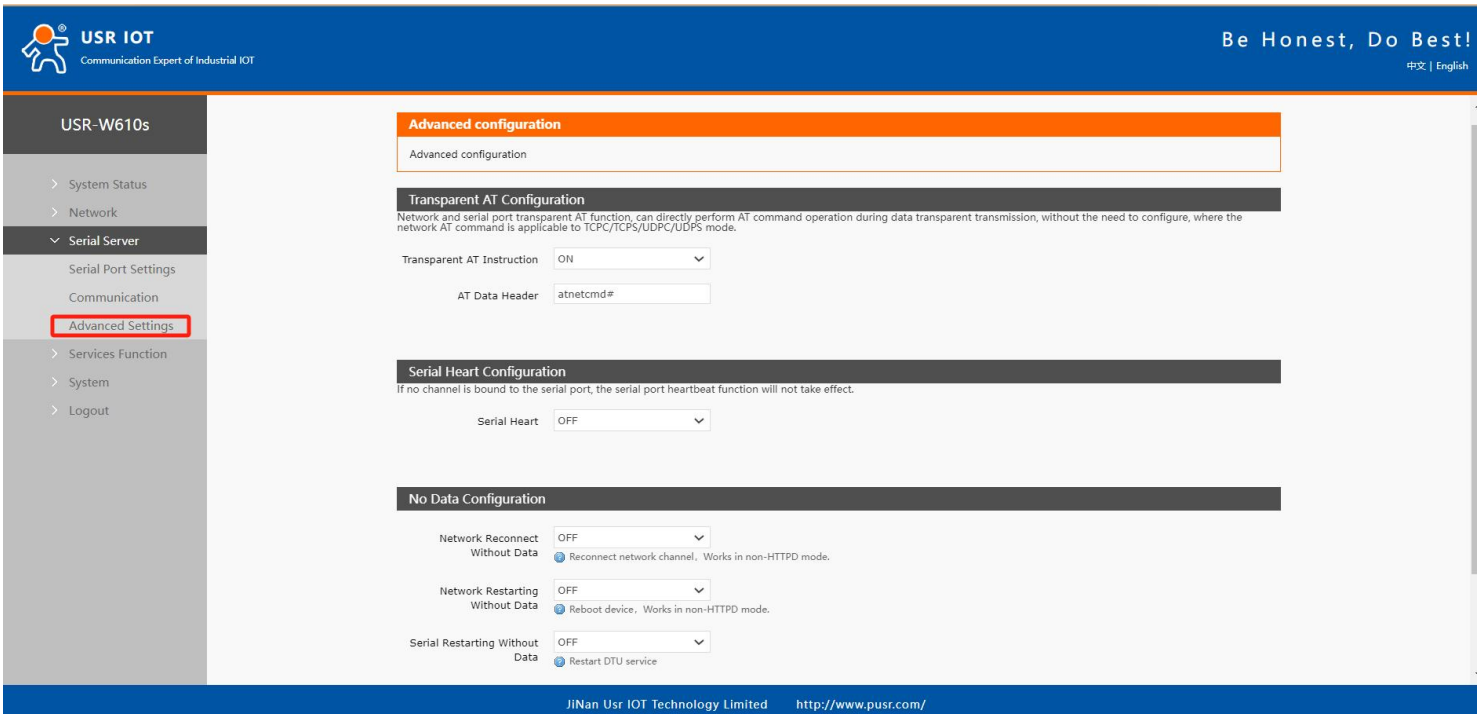


FIG. 35 Advanced Configuration Interface

Table19 Parameters of Advanced Configuration Interface

Name	Functional description	Default
Network AT command	ON(enabled)/ OFF(disabled)	ON
Network ATcipher word	Network AT password	atnetcmd#
Serial heartbeat	ON:Enable sending heartbeat packet to serial port OFF: Disable sending heartbeat packets to serial port	OFF
Heartbeat packet type	HEX:hexadeci mal typeASCII: character type Heartbeat package description refer to 8.2.7.2section	HEX
Heartbeat packet data	Heartbeat packet data content	empty
Heartbeat time	The time interval between heartbeat packets sent, in seconds	60
Serial port binding	COM1-485:Data communicationusing485 COM2-232:Data communicationusing232channelsCOM1+COM2:Data transmission using RS232or RS485 channels	COM1+COM2
Network Channel No Data Reconnection Enable	Each channel does not receive network data within the set time, triggering reconnection For non-HTTP protocols, see the following for details	OFF
Reconnection detection interval	Set time interval in seconds	3600
Network Channel No Data Restart Enable	All channels fail to receive network data within the set time, triggering device restart For non-HTTP protocols, see the following for details	OFF
Restart detection interval	Set time interval in seconds	36000

Serial port no data restart enable	Configure serial port channel No serial port data received, trigger DTU restart If dual serial ports are configured,DTU restart will be triggered if serial port data is not received within one channel.	OFF
Effective serial port	COM1-485/COM2-232/COM1+COM2	COM1-485

Description:

- Serial Heartbeat Package: Link channel (at least one communication configuration) must exist for this feature to take effect;
- Network channel no data reconnection: TCPC/UDPC/MQTT, when the set time expires and the network end time is not received, it will trigger its own link reconnection;
- Network channel no data reconnection: TCPS, when the set time expires, if no data is received from a client, the corresponding client will be kicked off actively;
- Network channel no data reconnection:UDPS,then in the set time, did not receive a client data, will not send serial data to UDPC;
- Network channel no data restart: all link channels in the set time, did not receive the network end data, then the device restart;
- Network channel no data restart: if the TCPC connection success data is received within the set time, the count is reset;
- Serial port channel no data restart: when the set time expires, no serial port data is received, DTU restarts;
- Serial port channel no data restart: IfCOM1 + COM2 dual channel is set, one of the channels will not receive serial port data when the set time expires, DTU restarts.

6.4. Edge Computing

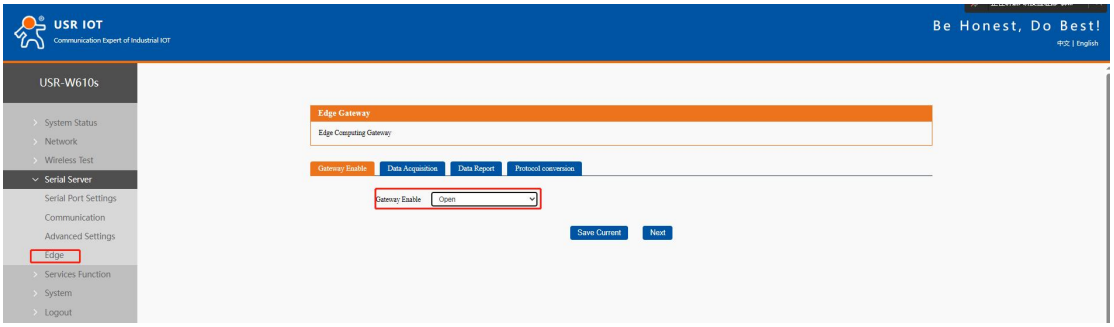
The edge gateway includes functions such as active data collection, data computation, active data reporting, and data reading/writing.

Data collection mainly involves Modbus RTU polling. Protocol conversion supports conversion to Modbus TCP and JSON. Active data reporting can be configured with custom JSON templates for platform integration. In the edge computing gateway function, the gateway device acts as the initiator of polling, autonomously and periodically reading, parsing, and calculating user-preset data information from terminal devices. At the same time, the gateway device can selectively report data based on user-presets reporting logic, completing data collection tasks without active participation from remote servers, greatly improving cloud server resource utilization and allowing more devices to be managed.

6.4.1. Gateway Enablement

Before using the edge gateway, enablement configuration is required. USR Cloud edge collection and edge gateway cannot be used simultaneously because the edge gateway configures point information through the device's built-in web page, while USR Cloud can directly下发 point configuration from the cloud to the device for

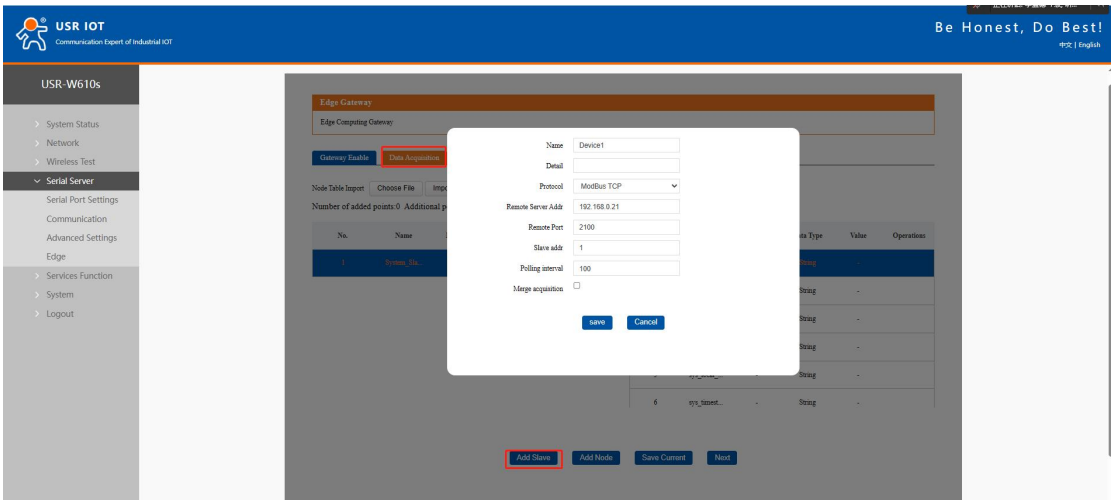
edge functionality. Therefore, both USR Cloud and edge gateway can independently implement edge functionality.



6.4.2. Data Collection

The data collection function mainly refers to the device acting as the master, actively issuing polling collection commands, periodically obtaining point data from serial or network port devices, and saving it to the device's virtual registers. The prerequisite for implementing the device's edge collection function is that the customer configures the slave address and point register information of the devices to be collected in advance. Slave and point information are added to the device in the form of a point table. The total number of slave points supports up to 1000, supporting collection points, system points, and calculation points (results of calculations between multiple points). The protocols that W610 (Qualcomm version) can parse at the edge include Modbus RTU and DL/T645-2007 meter protocol.

6.4.2.1.Slave Configuration



- Device Name: The name string used in the gateway to manage this slave.
- Details: Slave description information.
- Protocol Type: The collection protocol, mainly supporting Modbus RTU/TCP,DL/T645,Virtual.
- Slave Address: TheModbusaddress of the collected device or the DL/T645 meter number.
- Polling Interval: The time interval between the completion of the previous polling command and the execution of the next polling command. When set to 0, the default minimum time interval is used.
- Merged Collection:Merge multiple consecutive data points under this slave into a single collection commandfor data polling.

6.4.2.2.Data Point Configuration

Multiple points can be added under each slave, or only one point can be added, but the total number of points under all slaves supports up to1000.

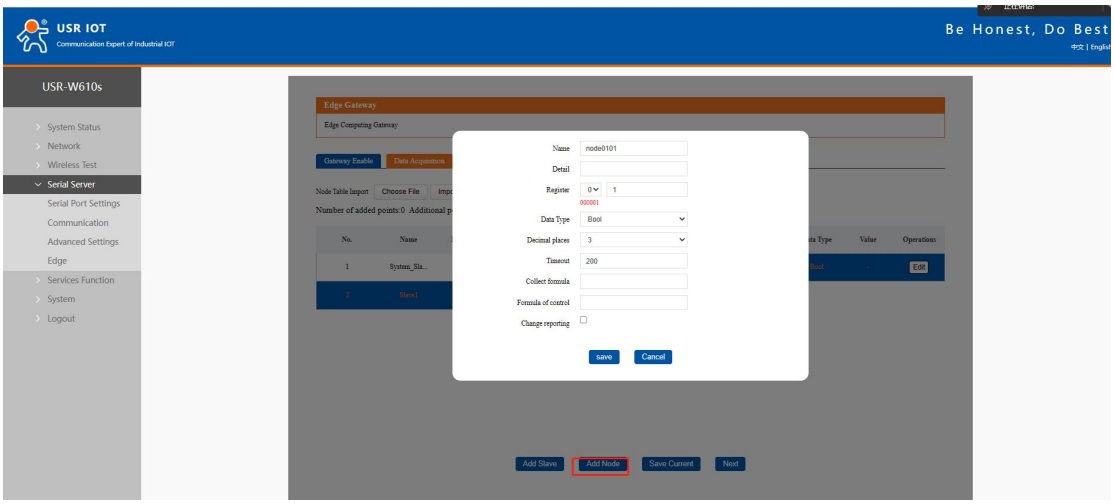


Fig. 1 Data Point Configuration

- Data Point Name: The unique identifier of the data point, used in theJSONtemplates for data reporting and data query functions.
- Details:Pointdescription information.
- Function Code: TheModbusfunction code used when collecting the data point.
- Register Address: The register address of the data point.
- Data Type: The data type of the data point, indicating the data length and the expected parsing method by the edge computing gateway.
- Timeout: The maximum waiting time for a response when polling this data point. If timed out, it is treated as a query failure.
- Change Reporting: After obtaining the data point, compare it with historical data. If it exceeds the set change range, report the data immediately.
- Change Range: The judgment range for whether to report after the data point changes.
- Collection Formula: Enter the calculation formula to perform simple addition, subtraction, multiplication, and division operations on the collected data points. %s represents the actual collected data, e.g., =%s+1, which adds 1 to the parsed value before reporting. In the virtual register calculation formula, %s represents other points. For example, if Virtual Register Value = Point 1 * 2 + Point 2, the formula is =%s*2+%s, node0101, node0102.

6.4.2.3.Point File Editing

In cases where a large number of data points need to be configured, the default data collection configuration can be exported in .csv format, edited in bulk using software like Office, and then imported into the device for rapid configuration.

Similarly, if multiple devices need to be configured with the same point parameters, the point configuration file can be exported to quickly implement point configuration for multiple devices, supporting up to 1000 points.

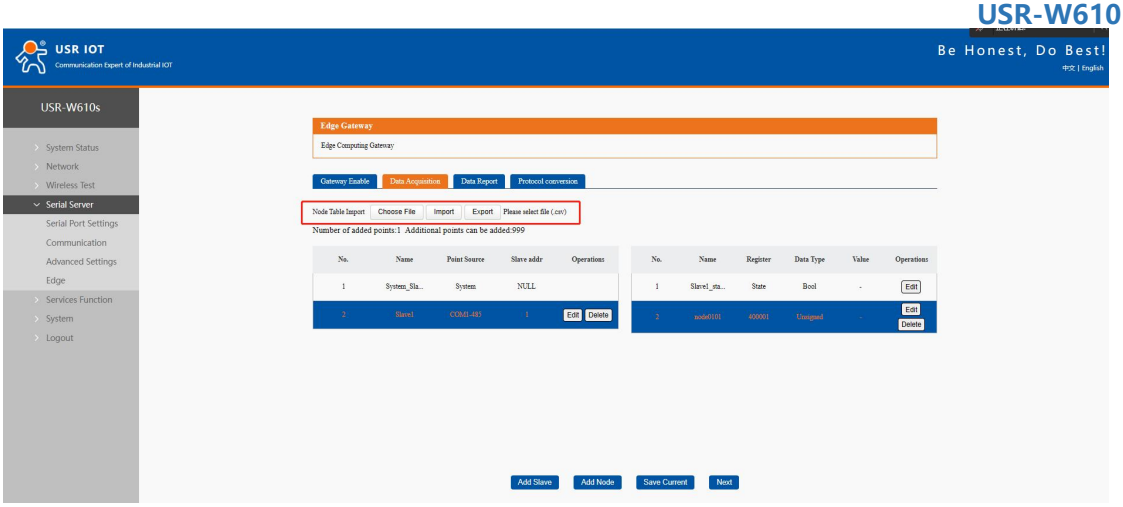


Fig. 2 Data Collection Configuration Import/Export

(1) Open the exported .csv file as shown in the figure:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	设备名称	串口号	从机地址	轮询间隔	映射地址	合并采集		数据点名称	功能码	寄存器地址	数据类型	超时时间	映射地址	数据计算	
2	device01	1	1	0	N/A	OFF		node0101	3	0	16位无符号	0	N/A	=(%s+1)*10	
3															
4															
5															
6															
7															
8															

Fig. 3 CSV File Editing

(2) Add the following data points according to the original format based on actual needs, and save the file:

设备名称	串口号	从机地址	轮询间隔	映射地址	合并采集		数据点名称	功能码	寄存器地址	数据类型	超时时间	映射地址	数据计算
device01	1	1	0	N/A	OFF		node0101	3	0	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0102	3	1	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0103	3	2	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0104	3	3	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0105	3	4	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0106	3	5	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0107	3	6	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0108	3	7	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0109	3	8	16位无符号	100	N/A	
device01	1	1	0	N/A	OFF		node0110	3	9	16位无符号	100	N/A	
device02	2	2	0	N/A	OFF		node0201	3	0	16位无符号	100	N/A	
device02	2	2	0	N/A	OFF		node0202	3	1	16位无符号	100	N/A	

从机1配置（每行内容相同）

从机1下数据点配置

从机2配置（每行内容相同）

从机2下数据点配置

Fig. 4 Data Point Addition

Note:

- Point table files exported from the Chinese interface can only be imported in the Chinese interface, and vice versa.
- Data point names must be unique across the entire table.
- Disabled functions will be filled with N/A.
- If import fails, please check if the modified parameter types, values, etc., in the configuration file are within the normal range.

6.4.2.4.Edge Computing

The calculated data from edge computing is stored in the virtual registers corresponding to the data point table. When the product actively reports or the server actively collects, the data is packaged and sent to the cloud. The

W610 (Qualcomm version) integrates edge computing functionality, moving data processing from the cloud to the gateway, greatly alleviating the cloud's data processing pressure.

Calculation Method: Edge computing supports addition, subtraction, multiplication, division, and parentheses () operations.

表 1 Calculation Example

Name	Formula Example	Description	Formula Addition Location
Single Point	=(%s+10)/2	%s represents the current point value	Current point configuration interface
Multi-Point	=(%s+10)/%s, node0101, node0102	The first %s represents the data of point node0101; the second %s represents the data of point node0102	Add calculation formula when adding a new point separately under the virtual slave

Description: In the multi-point calculation formula, calculations can be performed between up to 20 points.

6.4.3. Data Reporting

Data collected at the edge is stored in the device's virtual registers. Through the device's active reporting function, this data can be transmitted to the customer's server platform without the need for the server to issue collection commands. Edge reporting requires customers to set reporting conditions and data templates. The device transmits data to the customer's server based on the configured reporting conditions. At the same time, the server can also use the reporting channel to issue relevant collection commands to the device to obtain desired data.

6.4.3.1.Reporting Channel

After selecting the reporting channel, relevant parameter configuration needs to be performed on the corresponding channel interface to ensure that the channel can normally access the remote server.

Edge reporting supports four types of reporting conditions: periodic reporting,change reporting,scheduled reporting, and interval reporting. For the reporting channel, you can choose a singleTCP orMQTTchannel, or create groups to combine reporting channels. Groups can be created flexibly. Each group can select an independent link, reporting conditions, and reporting template. Groups are independent of each other. Up to 20 groups can be created, and the maximum reporting data template size for each group is 8KB.

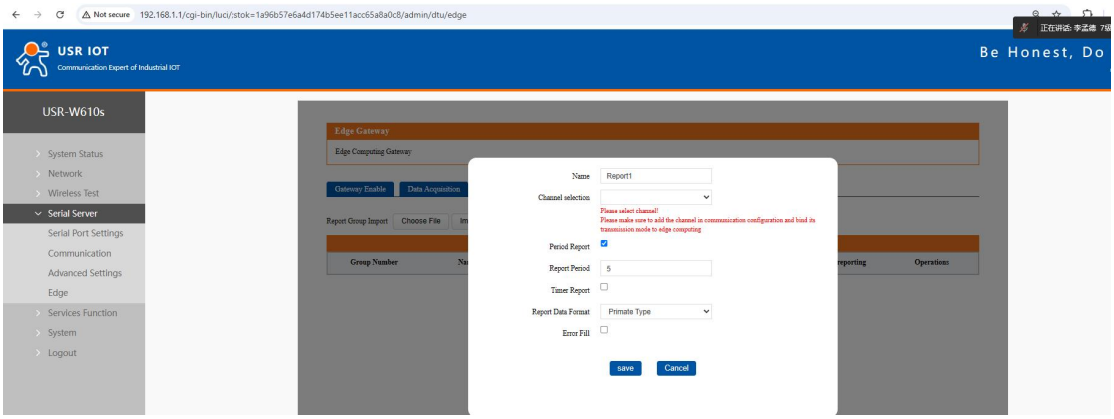


Fig. 5 Data Reporting Group Configuration Interface

- Periodic Reporting: Data is actively reported at certain time intervals. The reporting period is configurable.
- Change Reporting: When the absolute difference between the new data and the old data collected from a point is greater than or equal to the set change range, the data for that point is reported immediately. The change range is configurable.
- Scheduled Reporting: Uses the 24-hour clock. The NTP function must be enabled to correct the device clock before normal use. Four scheduling logics are supported:

  1. Hourly Reporting: Reports once every hour starting from 0:00.
  2. Quarter-Hourly Reporting: Reports every 15min starting from 0:00.
  3. Minutely Reporting: Reports every1min starting from 0:00.
  4. Fixed Time Reporting: You can choose a fixed time point each day for reporting. For example, if you select 12:05, data will be reported at 12:05 every day.

- ErrorFilling: If data point collection fails, the value in the data template will be replaced with the fill content for reporting, such as {"temperature":"error"}.
- Quote Enclosure: When reporting data, the data point values are all numeric types, such as {"temperature": 30,"humidity": 40}. If the server requires the reporting format to be string type, you can check "Quote Enclosure", and the reported data will become {"temperature": "30","humidity": "40 "}.

Reporting Data Format: When reporting data, the data point values are all numeric types, such as {"temperature": 30,"humidity": 40}. If the server requires the reporting format to be string type, you can modify the reporting data type to string, and the reported data will become {"temperature": "30","humidity": "40 "}.

6.4.3.2.JSON Template

The data reporting function will upload point data to the server inJSONformat. Customers can customize theJSONtemplate according to the server's requirements to ensure that the uploaded data format meets the server's parsing requirements. The actual names of data points can be defined in theJSONtemplate. However, the following points should be noted when configuring theJSONtemplate:

1、 The current defaultJSONtemplate format is:
{"device01":{"node0101":"node0101","node0102":"node0102"},"device02":{"node0201":"node0201","node0202": "node0202"},"time": "sys_local_time"};

2、 Key is user-defined data and can be set to the actual physical name of the data point. The key is not

modified during data reporting;

3、 Value is a character type and needs to be filled with the data point name. During data reporting, the actual collected value corresponding to the point name will be substituted.

4、 Example:

The collected values for edge points node0101 and node0102are 30and 20respectively;the collected values for node0201 and node0202 are 50 and 60 respectively;time is the local time.

JSONtemplate is set to:

{"device01":{"node0101":"node0101","node0102":"node0102"},"device02":{"node0201":"node0201","node0202": "node0202"},"time": "sys_local_time"};

The actual reported data format is:

{"device01":{"node0101":"30","node0102":"20"},"device02":{"node0201":"50","node0202": "60"},"time": "2025-03-05,22:32:41"};

In addition to data points, theJSONtemplate can also include some specific identifiers, such as product firmware version, SN, MAC, etc. These parameters can be treated as unique identifiers or device identification information. By directly adding the relevant identifier names in the value position of theJSONtemplate, the device will substitute the data corresponding to the identifier name during the reporting process. For example, to report a timestamp, set theJSONtemplate to{"time":"sys_unix_time"}, and the actual data reported by the device is{"time":"1681985788"}. The list of identifiers that can be filled in theJSONtemplate is as follows:

表 2 JSON Reporting Template Example

Identifier	Meaning	Reporting Content Example
sys_ver	Product Firmware Version Number	V1.0.14.000000.0000
sys_sn	SN	02700122093000012356
sys_mac	MAC	D4AD20474662
sys_local_time	Local Time	2023-07-07,09:30:18
sys_utc_time	UTCTime (Timezone 0)	2023-07-07T01:07:44Z
sys_unix_time	Timestamp	1681985788

Description:

System point names are listed in the point table. More system point names can be obtained from Slave System_Slave.

6.4.4. Protocol Conversion

Protocol Conversionfunction mainly allows the server to issue query and setting commands through the link channel. Through these commands, point data can be directly obtained or point data can be modified. It can run simultaneously with the active reporting function.This functionneeds to be enabled, and the protocol method for point reading and writing needs to be set. The cloud obtains and modifies point data control according to the set communication protocol.

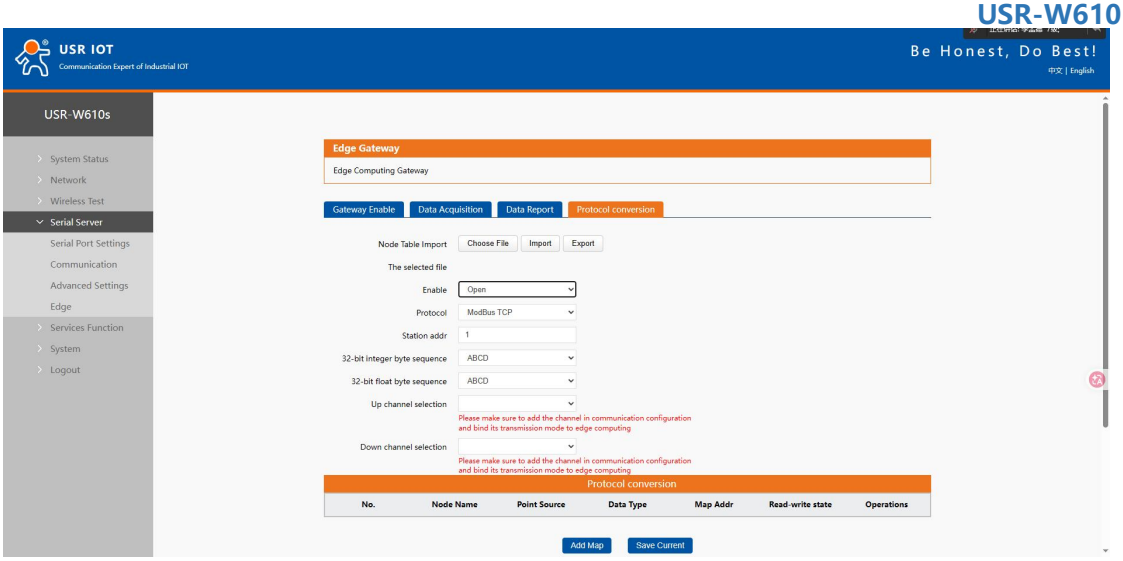


Fig. 6 Protocol Conversion

Channel Selection: There are 4 communication links to choose from,only single-path communication is supported.If you select the MQTTchannel, you need to separately configure the subscription and publication topics for reading and writing.

Read/Write Method: SupportsModbusTCP, JSON, whereJSONhas a fixed protocol.

JSONRead/Write Command Format: (Can obtain multiple point data simultaneously)

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

JSONRead/Write Command Field Description:

Field Name	Field Description	Field Selection
rw_prot	Protocol Header	
ver	Protocol Version	1.0.1
dir	Data direction, fill in "down" for server commands	down: Server command
id	Server data code, can be used for sequence identification	Customized by customer, device reply remains unchanged
r_data	Data read field	
w_data	Data control field	
name	Point name, consistent with the point name in the point table	
value	Only write commands have the value field, which is the valid value to be written	

JSON Read/Write Reply Format:

{"rw_prot": {"Ver": "Protocol Version","dir": "Data Direction","id": "Message ID","r_data": [{"name": "Point Name","value": "data","err": "Error Code"}],"w_data": [{"name": "Point Name","value": "data","err": "Error Code"}]}}

JSON Read/Write Reply Field Description:

Field Name	Field Description	Field Selection
rw_prot	Protocol Header	
ver	Protocol Version	1.0.1
dir	Data direction, fill in "up" for device replies	up: Device reply
id	Message ID, keep consistent with the command sent	
r_data	Data read field	
w_data	Data control field	
name	Point name, corresponding to the point in the point table	
value	Valid data corresponding to the point	Read error, value is empty Write error, value is the historical value
err	Error Code	0: Data executed normally 1: Data execution error

JSON Field Error Reply:

- JSON Format error: Device does not reply
- If any of the three fields ver, dir, id is incorrect, reply according to the error protocol.
- If other fields are correct and only one of r_data or w_data fields is incorrect, discard the incorrect field and reply with the correct field; if both fields are incorrect, reply according to the error protocol.
- Error Protocol: "rw_prot": {"Ver": "1.0.1","dir": "up","err":"1"}

Field Name	Field Description	Field Selection
rw_prot	Protocol Header	
ver	Protocol Version	1.0.1
dir	Data direction, two types: upload and download	up: Device reply
err	Error Code	0: Executed normally 1: Execution error

Note:

When a read/write command errors, the value field in the read command reply is empty, and the value field in the write command reply is the historical data value.

The maximum limit for read/write operations is127data points for simultaneous read and write operations.

7. System

7.1. name/password

Default password can be set, default password is root, user name cannot be set. This password is an administrative password (web login password).

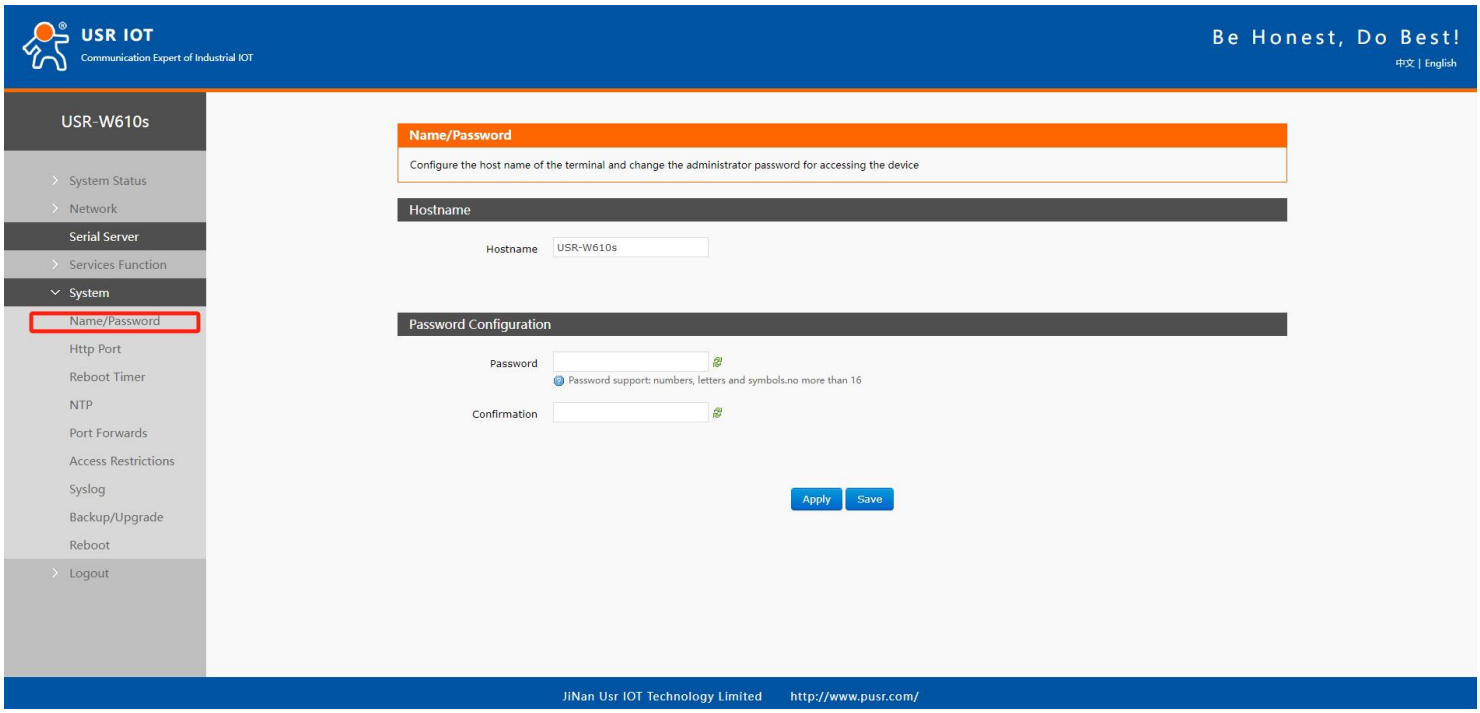


Fig. 64 Username Password Settings Page

The default host name of the wireless client is USR-W610s-XXX X.

7.2. Time setting

7.2.1. Time parameter

You can synchronize local time through "synchronize browser time", and you can set the default time zone of wireless client; wireless client can perform network time calibration, and NTP client function is started by default.

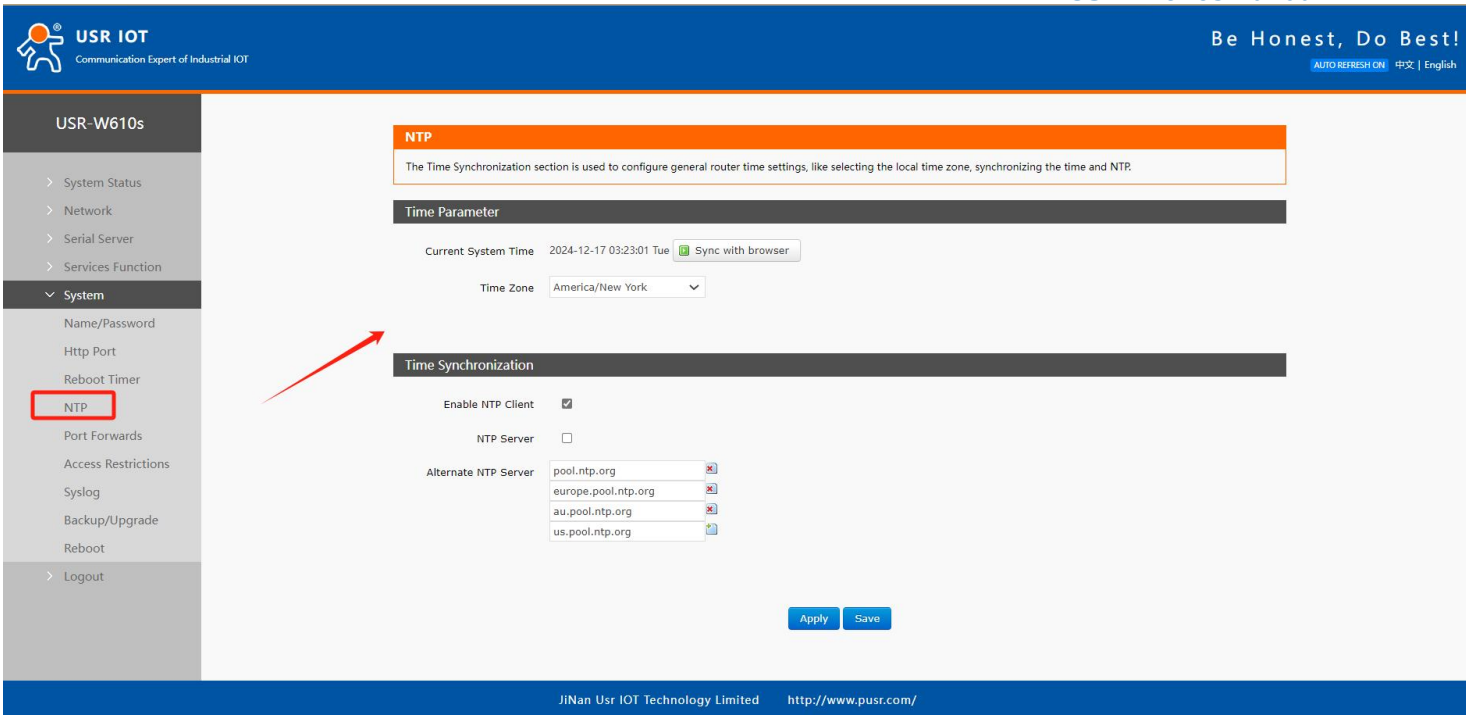


Fig65 Time zone synchronization with local time

7.3. Timed restart

Regular restart management can be performed on the wireless client at any time of the day, week or month, and the running cache can be cleared regularly to improve the stability of the wireless client. Qualitative, page settings are as follows.

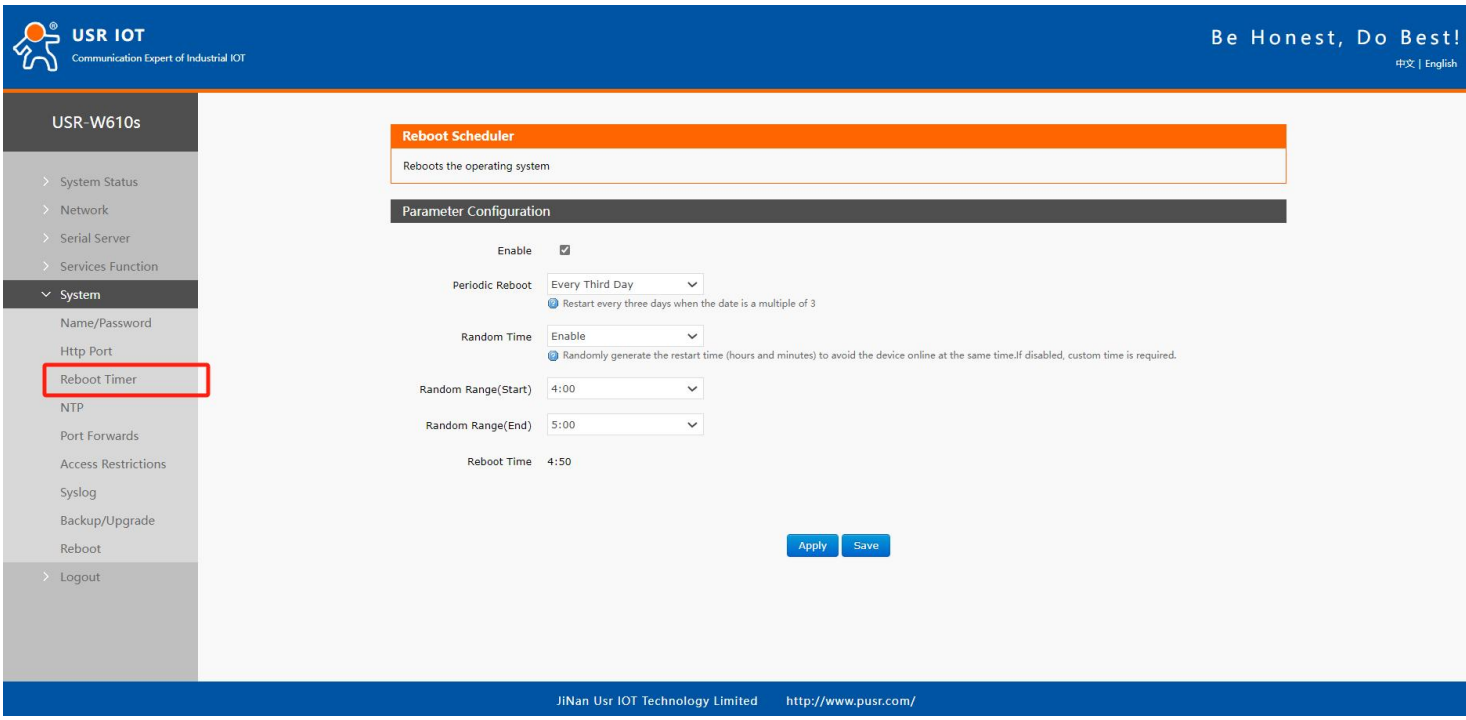


Figure66 Timing Restart Settings Page

7.4. HTTP port

The wireless client can set the login web port number to prevent non-O & M personnel from easily logging in to the wireless client for configuration.

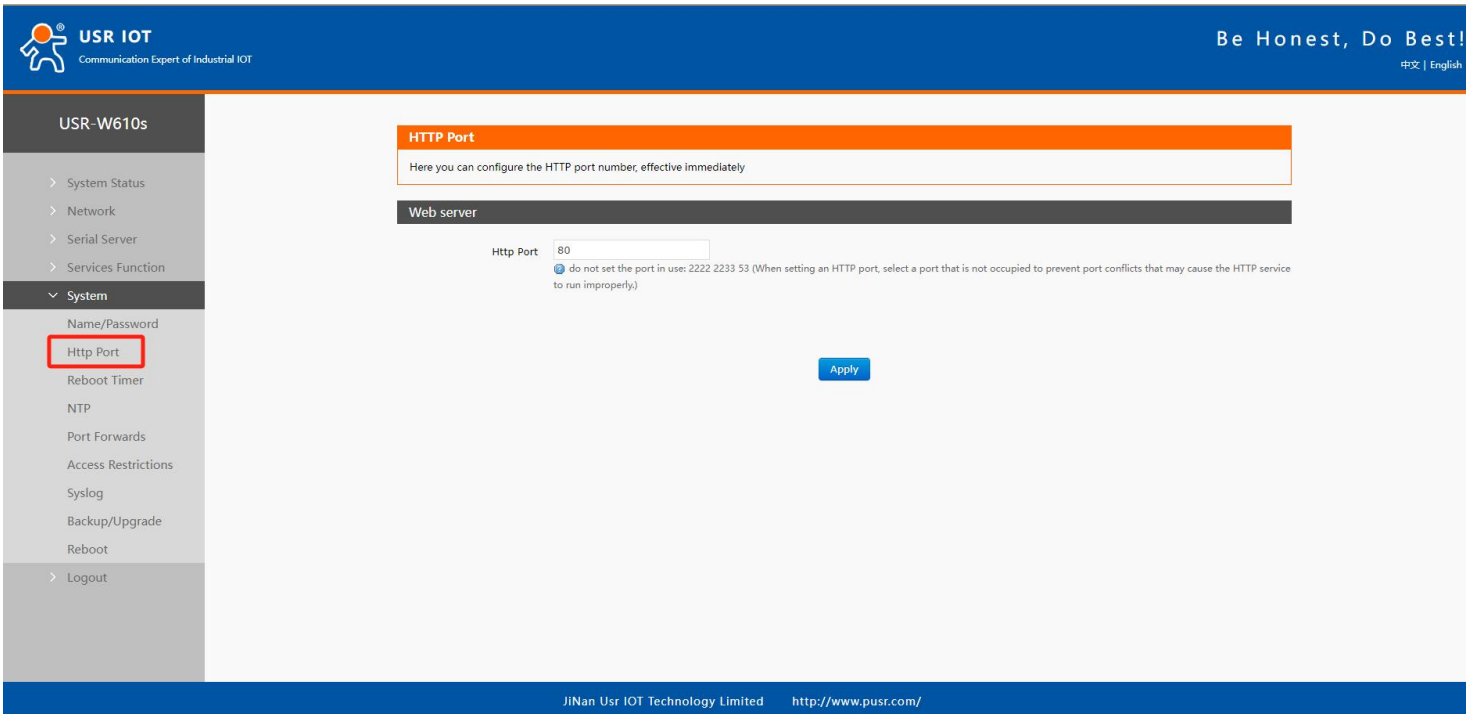


Fig67 HTTP port configuration

7.5. Port forwarding

Port forwarding allows computers from Internet to access computers or services with in aprivate local area network,i.e., maps a specified port of a WAN address to a host within the intranet.

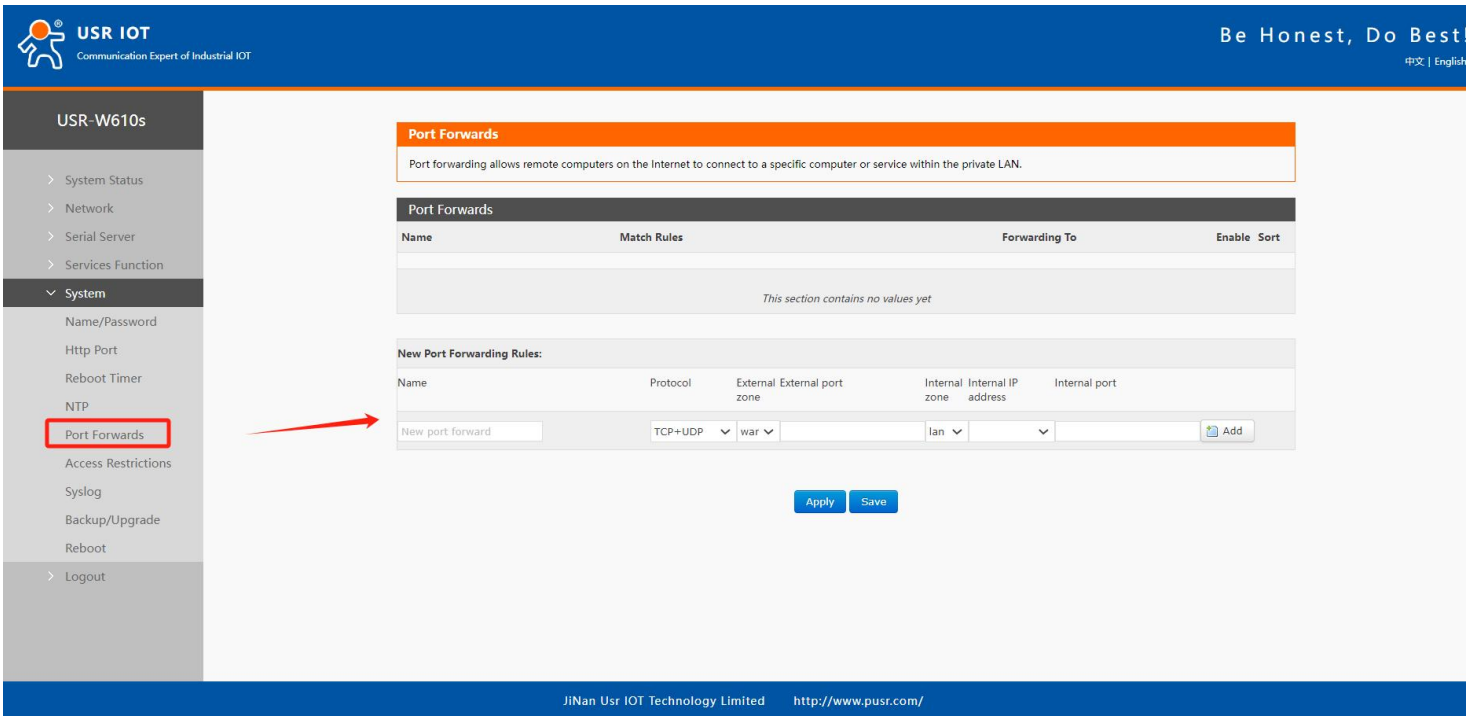


Fig. 68 port forwarding settings

➢ After setting the forwarding rule, click the Add button on the right, and then this rule will be displayed in the rule bar;

➢ Click the Apply button in the lower right corner to make the settings take effect;

➢ For example, 192.168.1.1: 80 is the router's own web server. If we want to access a device in the local area network from the external network, we need to set the mapping from the external network to the internal network, for example, set the external network port to81and the internalnetworkIPto192. 168. 1. 1, intranet port is 80;

➢ If port 81 is accessed from the WAN port, the access request will be redirected to 192.168.1.1: 80.

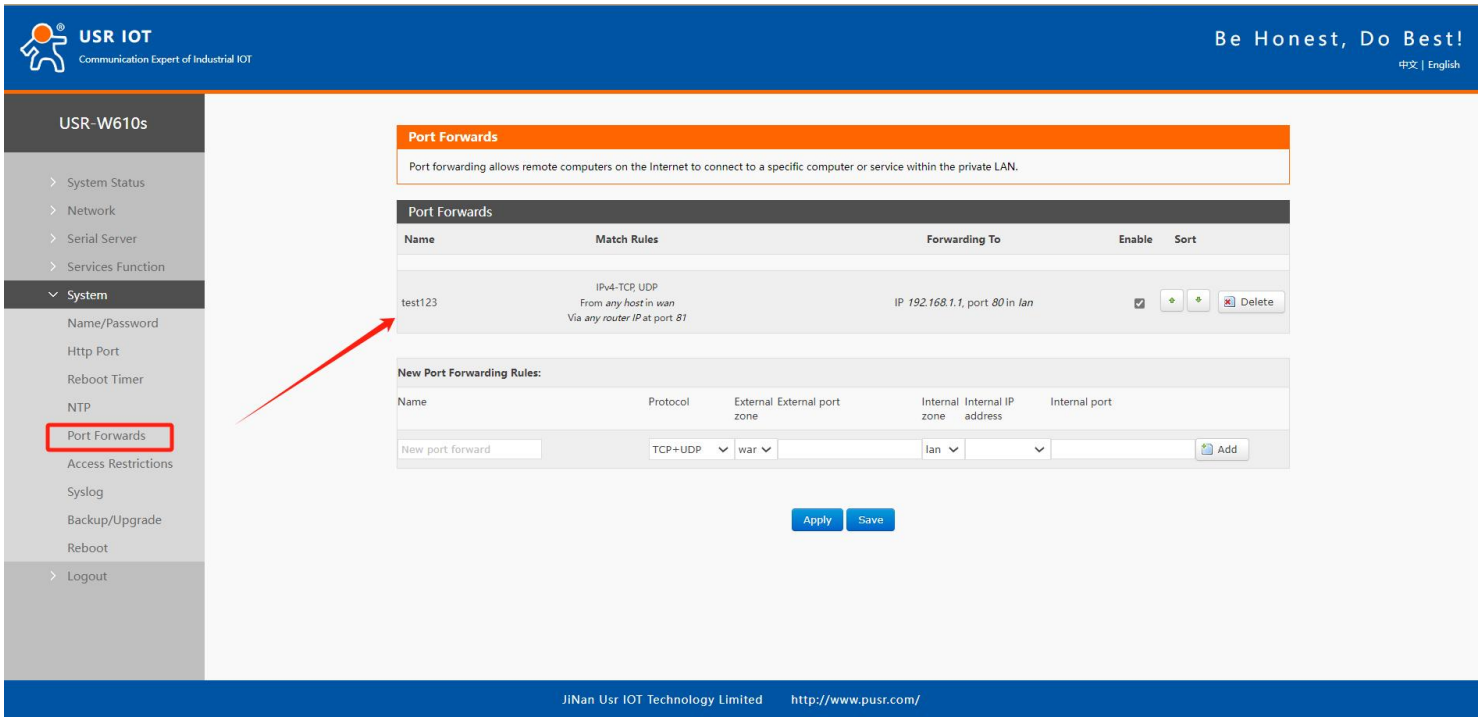


Figure69 . Port Forwarding Add Application

Table24 Port forwarding parameter table

Function	Content	Default
Name	Port forwarding name, character type	empty
Agreement	Protocol type, settable: TCP+UDP/TCP/UDP	TCP+UDP
Exterior zone	WAN	wan
External port	Port range can be set	empty
Interior region	router subnet area	LAN
Internal IP	Router LAN Are a IP Address	empty
Internal port	Port range can be set	empty

Description:

You can add up to 100 port forwarding rules.

7.6. Access restriction function

7.6.1. Access restriction

Access restrictions Implement access restrictions on specified domain names. Support blacklist and whitelist settings for domain names. When blacklist is selected, devices connected to wireless clients cannot be accessed. Ask the domain name of the blacklist, and other domain names can be accessed normally. When the whitelist is selected, the device connected to the wireless client can access the domain name address set in the whitelist. Its domain name address can not be accessed normally, blacklist and whitelist can be set more than one, this feature is turned off by default.

7.6.2. Domain name blacklist

First, select the blacklist in the mode option, click Add the name and the correct domain name, and then click save the rule to take effect immediately, the device connected to the wireless client will not be able to access the domain name. If you choose a blacklist without adding rules, the default blacklist is empty, that is, all domain names can be accessed. As shown in the figure, except for Baidu, all other domain names can be accessed normally.

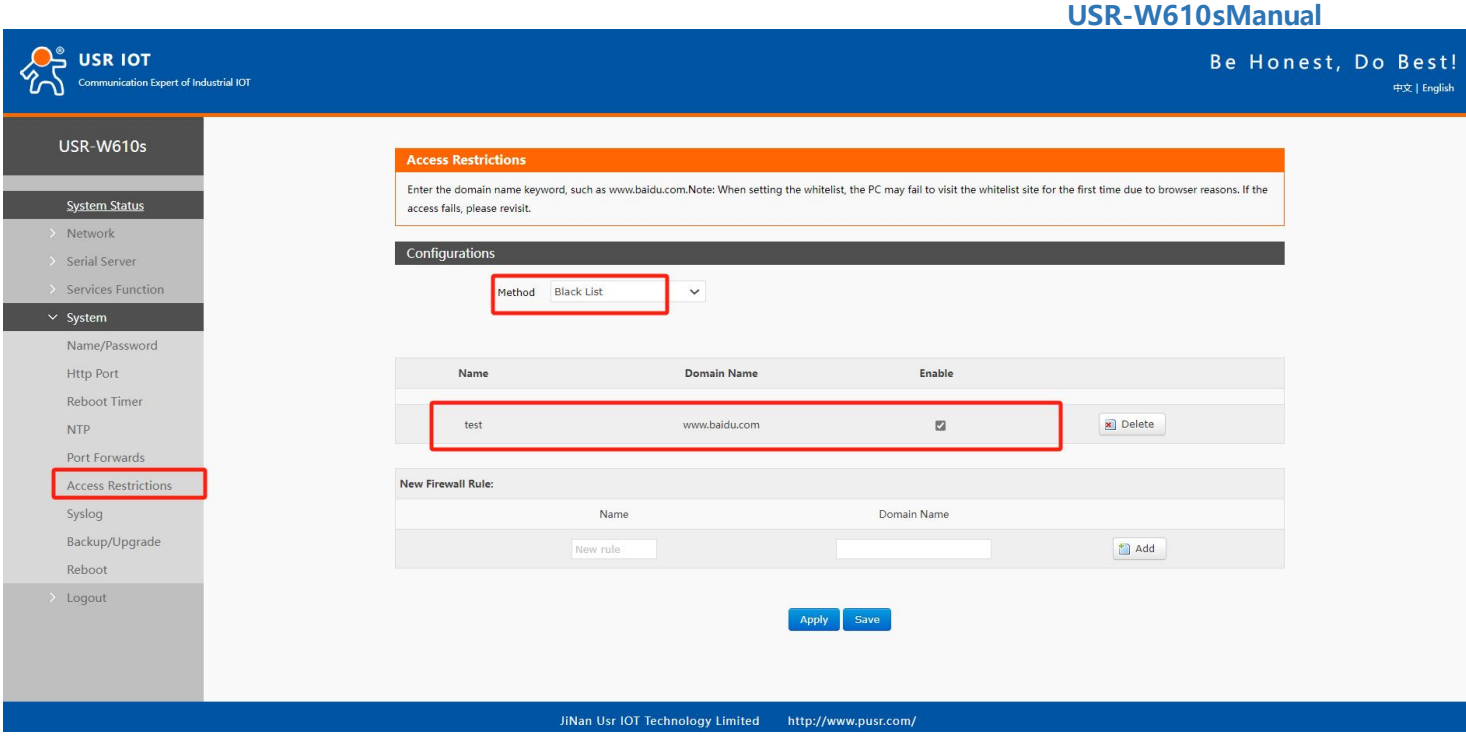


Fig70 Domain name blacklist

7.6.3. Domain name white list

First, select the white list in the mode option, click Add to enter the name of the rule and the correct domain name, and then click Save, the rule will take effect immediately, connect wireless Except for the domain name specified in the rule, other domain names cannot be accessed. If whitelist is selected and no rule is added, the default whitelist is empty, i.e. all Domain names cannot be accessed. As shown in the figure, the device can access Baidu.

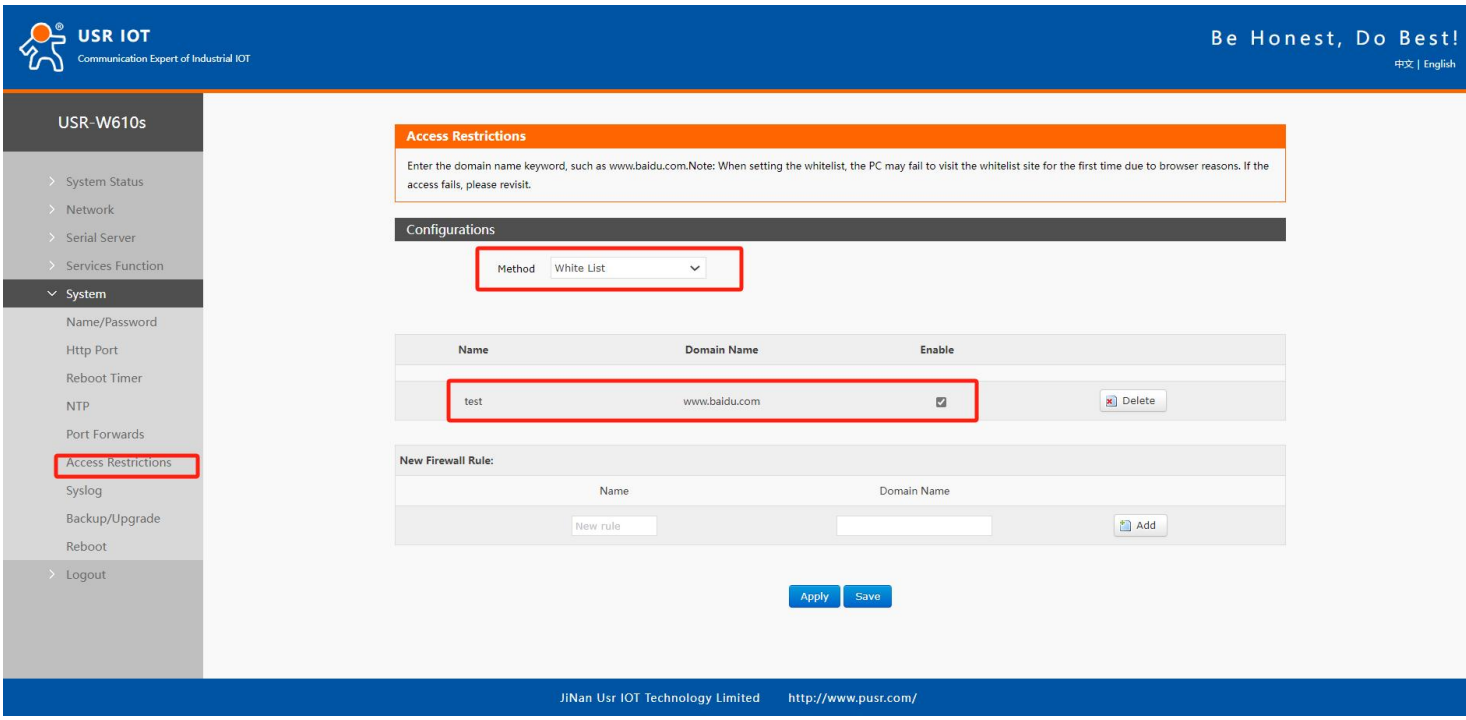


Figure71 Whitelist of domain names

8. Description:

You can add up to 100 access restriction rules.

8.1. Log

Log is divided into remote log and local log, located in the System-Log function menu.

Remote log

- Remote log server: IP of remote UDP server, when IP is0. 0. 0. Remote logging is not enabled at0
- Remote log server port: remote UDP server port;

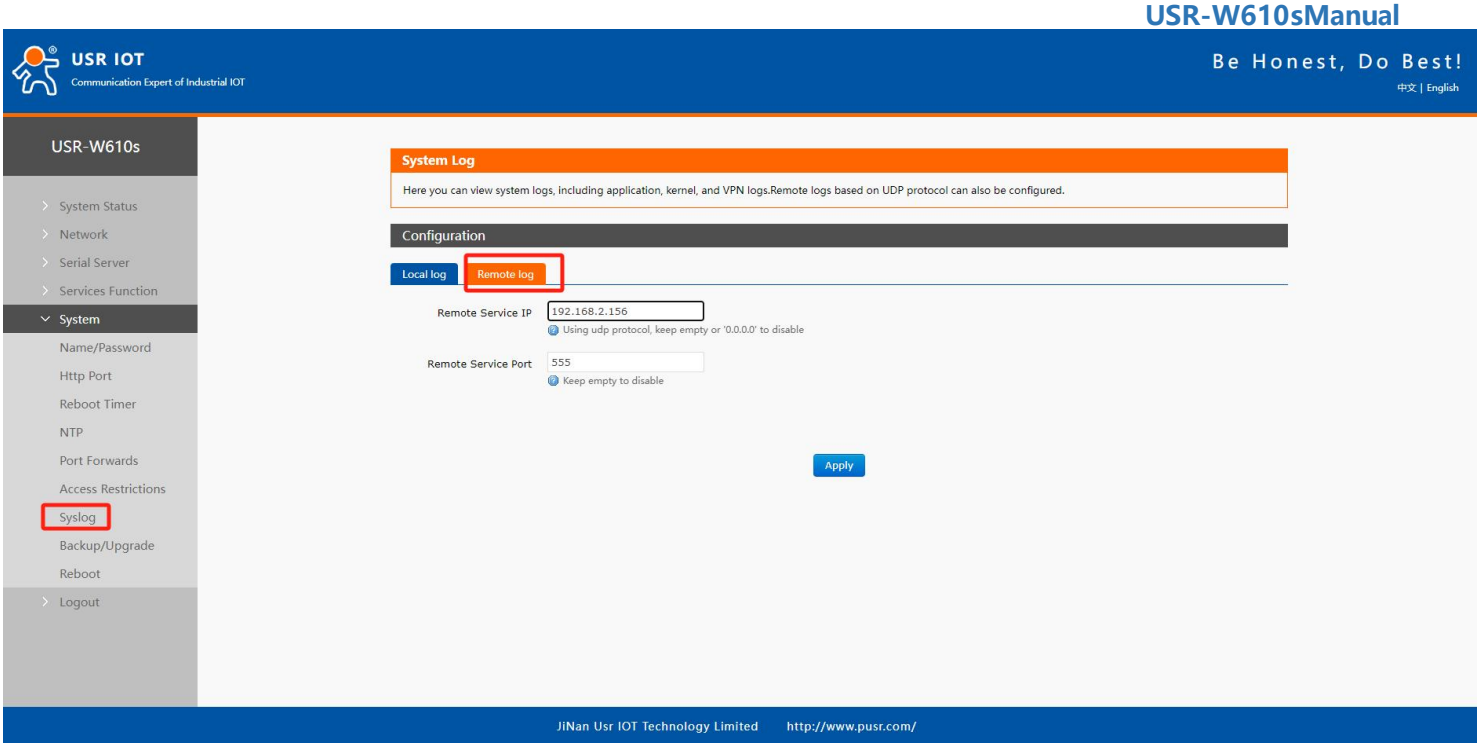


Figure72. Remote log

Local log

- Kernel log levels: debug support, info, caution, warning, error, fatal error, alert, emergency, total 8 levels; lowest in order of commissioning, highest in emergency;
- Application log level: same as above;
- Log (kernel, application) support instant view, empty, support log file export.

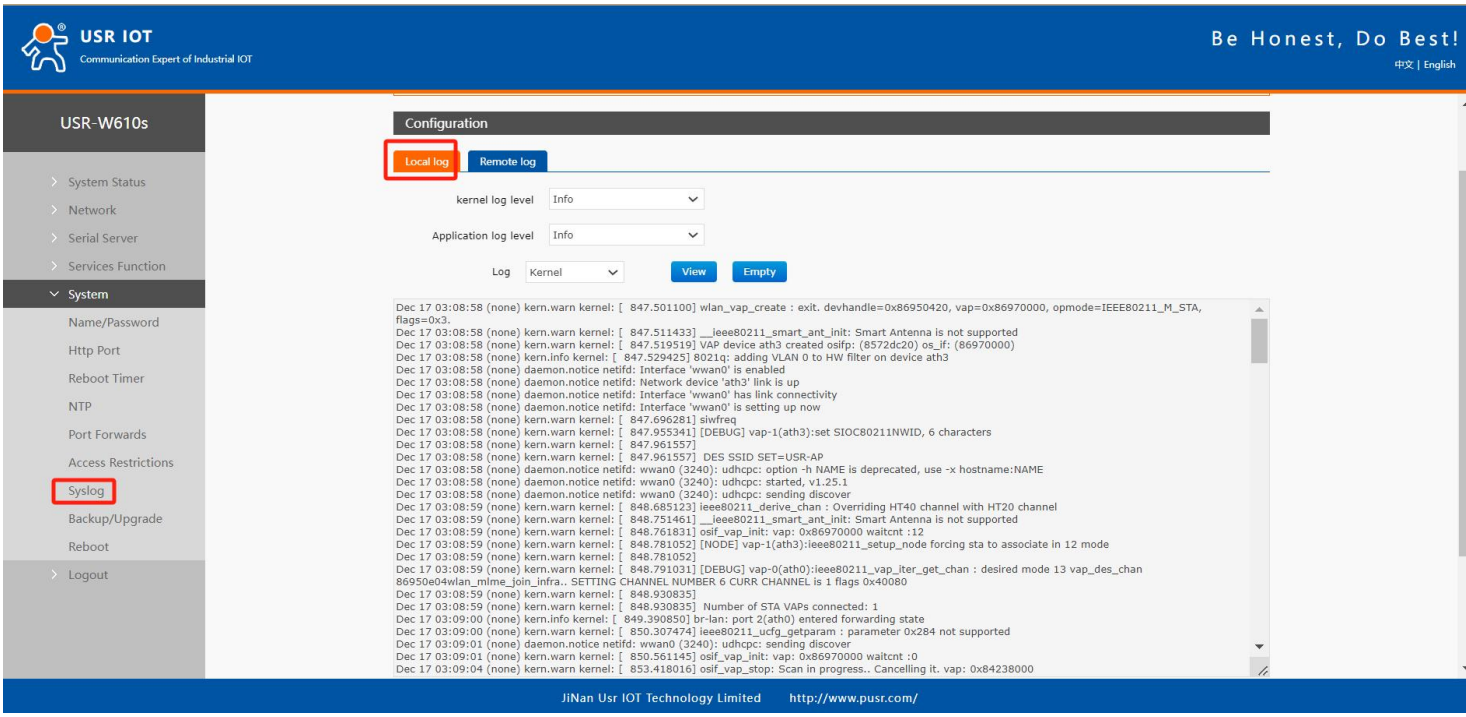


Figure73. Applicationlog

8.2. Parameter backup/upgrade

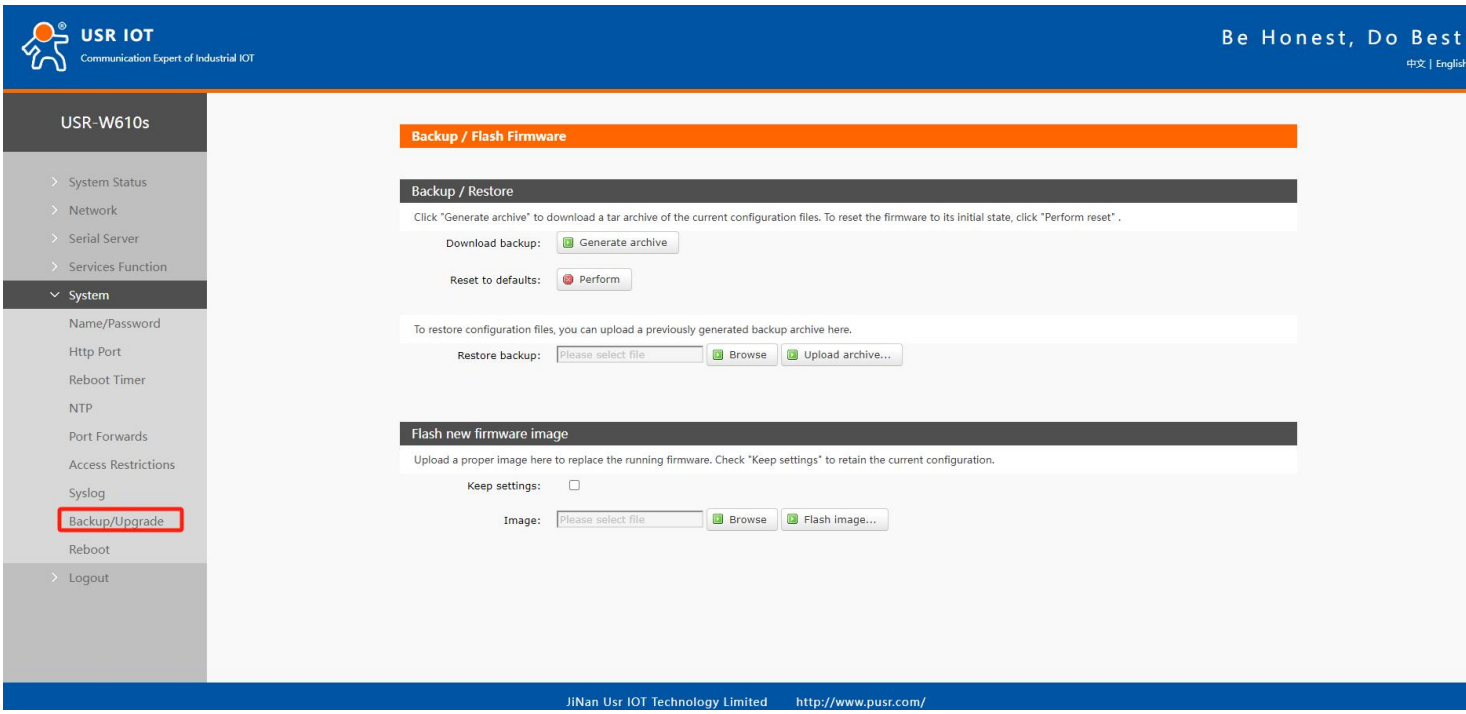


Fig74 . Backup/restore and upload page

Parameter backup: Click the "Download Backup" button to back up the current parameter file as a compressed package file, such asbackup-USR-W610s-2024-04-20. tar. GZand save locally.

Parameter upload: upload parameter file (such asbackup-USR-W610s-2024-04-20. tar. gz) uploaded to the wireless client, then the parameter file will be saved and take effect.

Description:

- Must be USR-W610s configuration file for import, otherwise configuration confusion may occur;
- Import and configure the firmware of the same version as much as possible. If the version spans a large distance, configuration confusion may occur.

8.3. Factory data reset

The factory settings can be restored through the web page.

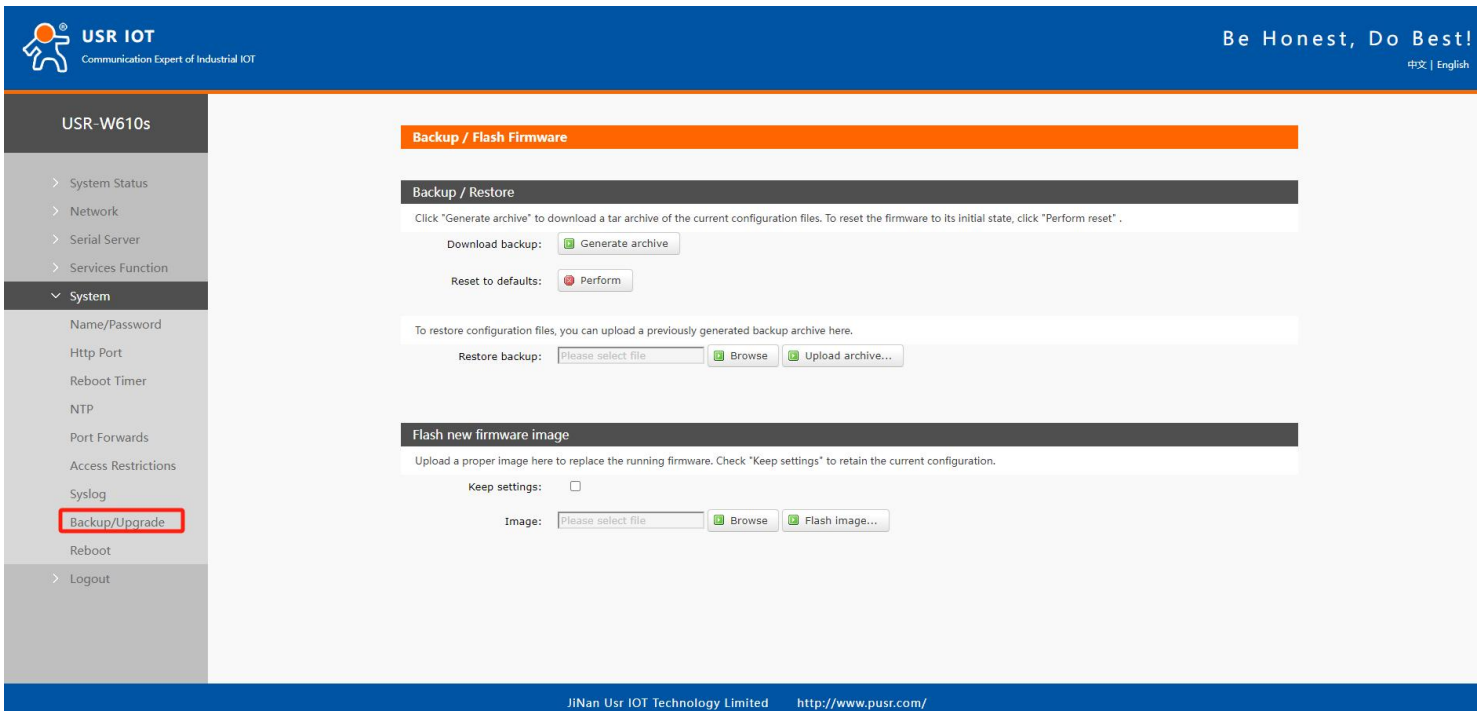


Fig. 75 Restore factory page

Click the button to restore the factory settings. This function is consistent with the function of the Reload button of the hardware.

Description:

- When the device is running normally, press and hold for 3-15s and then release it. The wireless client will automatically restore the factory parameter settings and restart automatically;
- At the moment when the restart takes effect, all the indicators will flash and then go out (the power lamp will not go out);
- The factory restoration process lasts for 3 minutes. Please do not power off the equipment during this period.

8.4. Firmware upgrade

The USR-W610s module supports online firmware upgrades in the web mode.

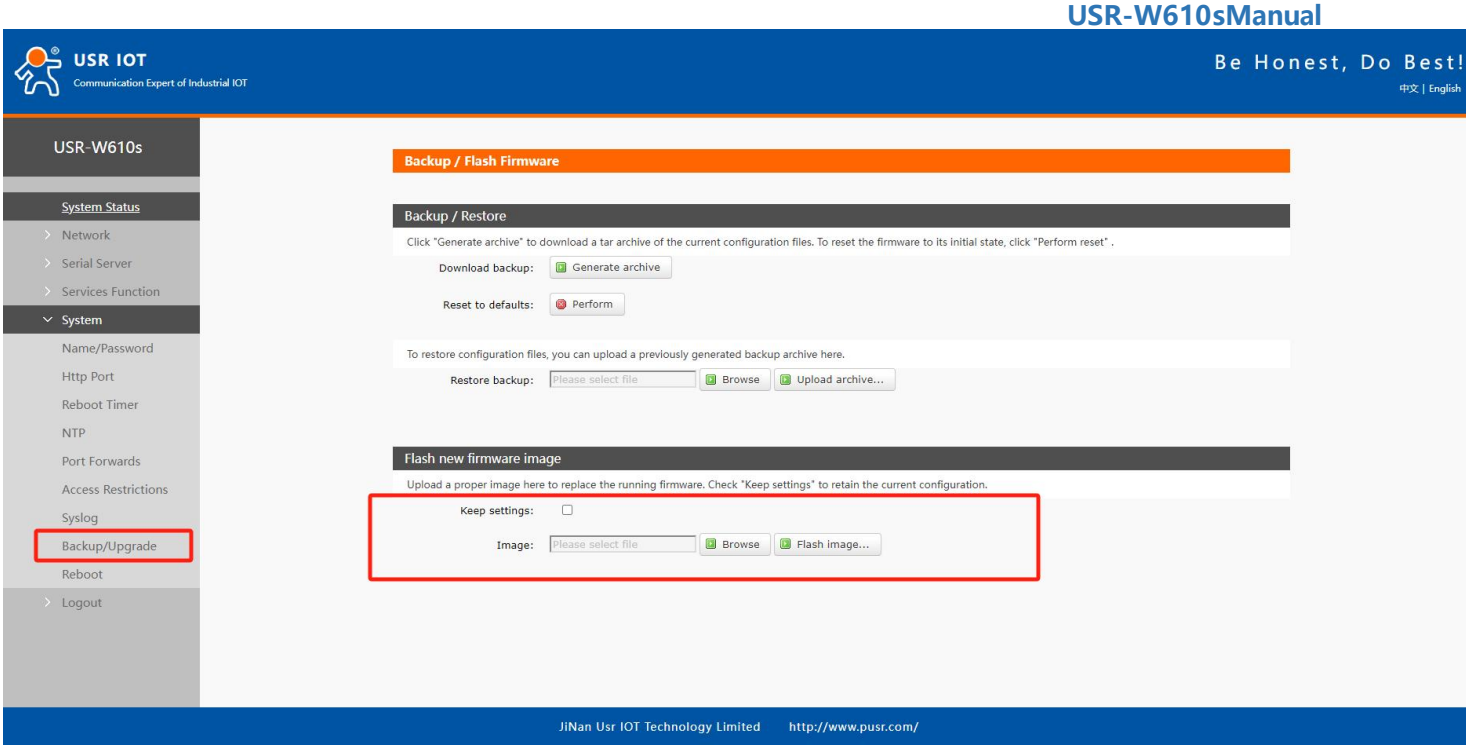


Fig76 Upgrade page

- The firmware upgrade process will last about 3-4 minutes. Please log in again after 4 minutes.
- You can choose whether to "retain the configuration", such as the version across a large "retention configuration" upgrade is not recommended;
- Please do not power off or unplug the network cable during firmware burning.

8.5. Restart

Click the button to restart the wireless client. The restart time is consistent with the power-on start-up time of the wireless client, which is about 1 minute before the complete start-up is successful.

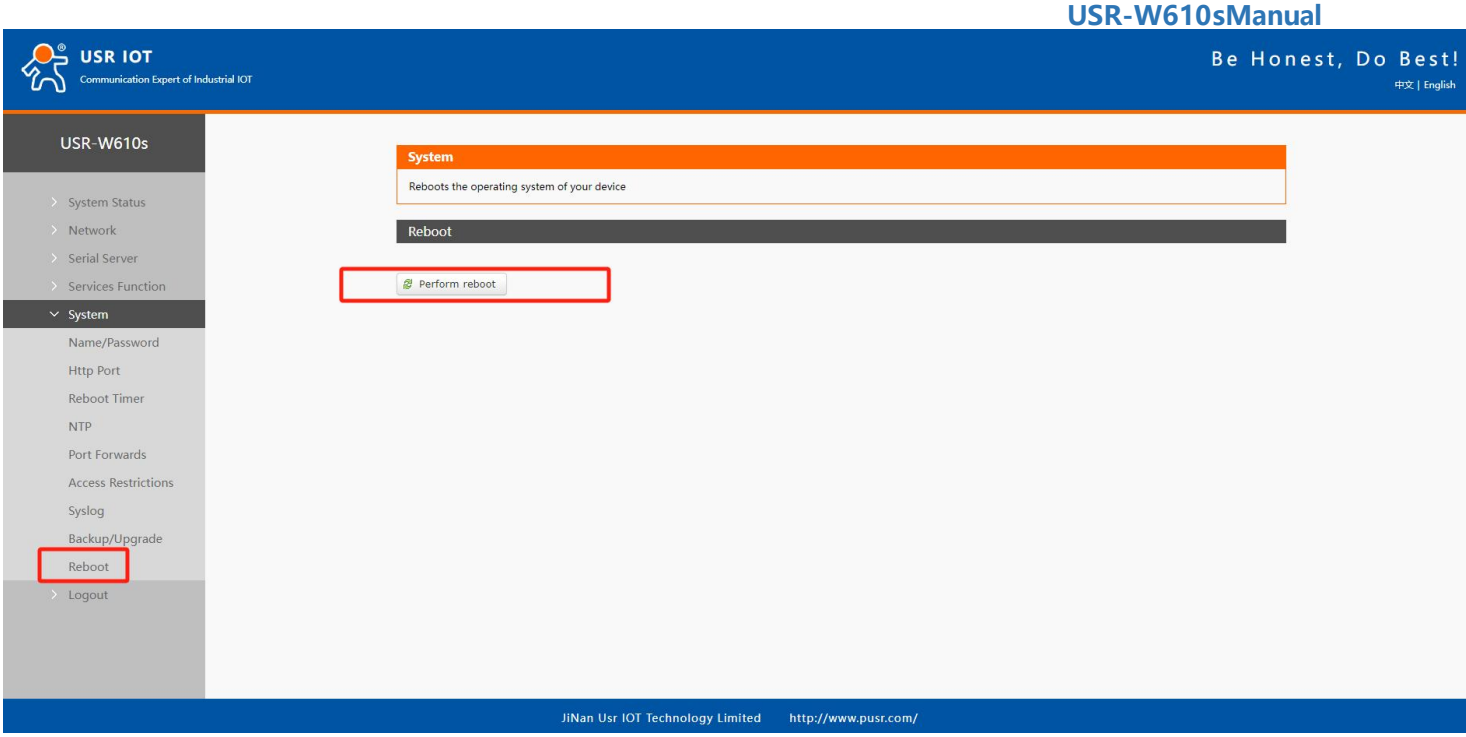


Fig77.Restart page

9. Service function

9.1. PUSR Cloud services

PUSR Cloud address: https://account.usriot.com/#/login. Using PUSR Cloud service allows wireless client devices to be monitored and controlled efficiently and uniformly managed on PUSR Cloud platform. USR-W610s enables cloud service function by default. The interface can configure reporting parameters for statistical traffic, network status, and heartbeat packets. It also supports data reporting to private deployments.

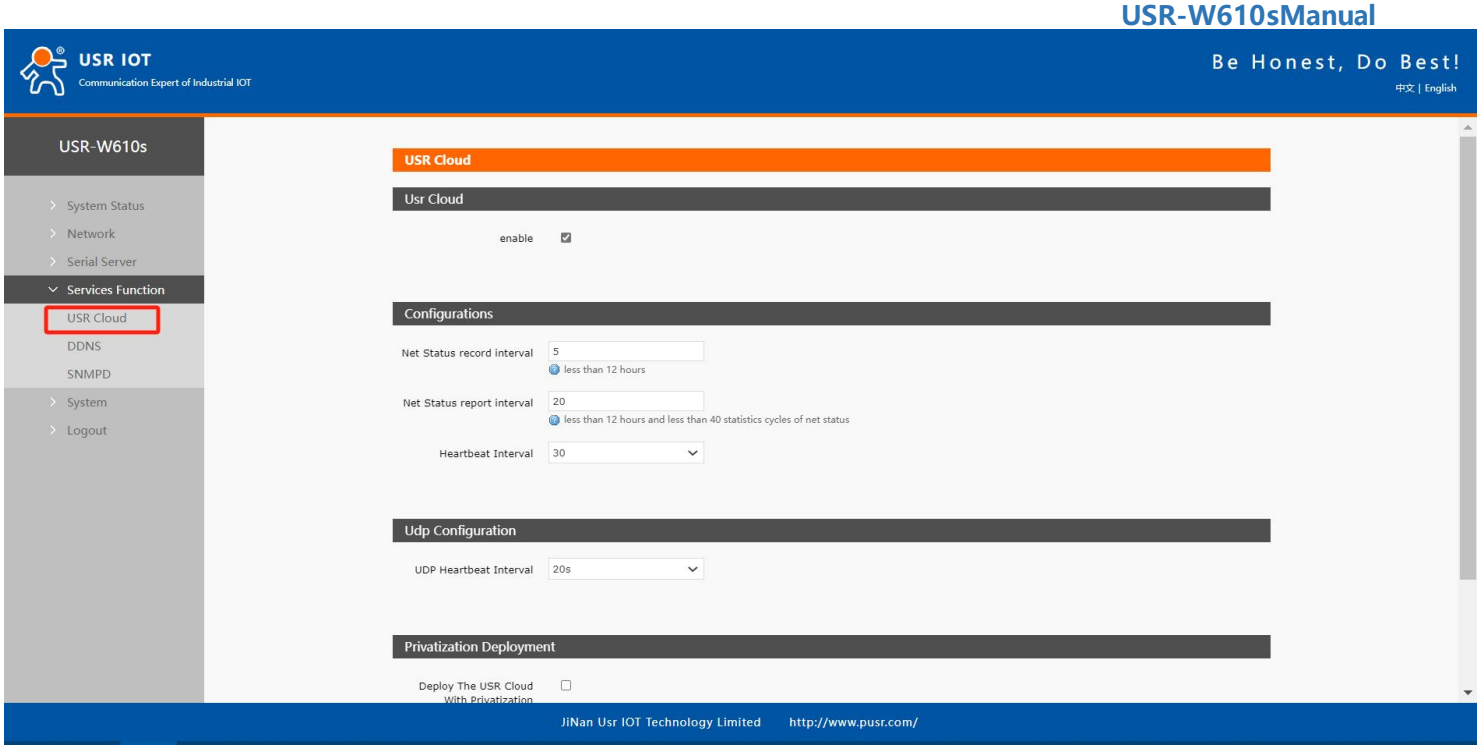


Fig36 USR-W610s manned cloud service interface

9.2. Dynamic Domain Name Resolution (DDNS)

DDNS(Dynamic Domain Name Service) maps the user's dynamicIPaddress to a fixed domain name resolution service. Each time the user connects to the network, the client program will transmit the dynamicIPaddress of the host to the server program located on the server host through information transfer. The server program is responsible for providing DNS services and implementing dynamic domain name resolution.

9.2.1. Supported services

The use of dynamic domain names can be divided into two cases. The first case is that the wireless client supports this service (check in the "Service" drop-down box and select the corresponding DDNS service provider. Here, peanut shells are used). The setting method is as follows:

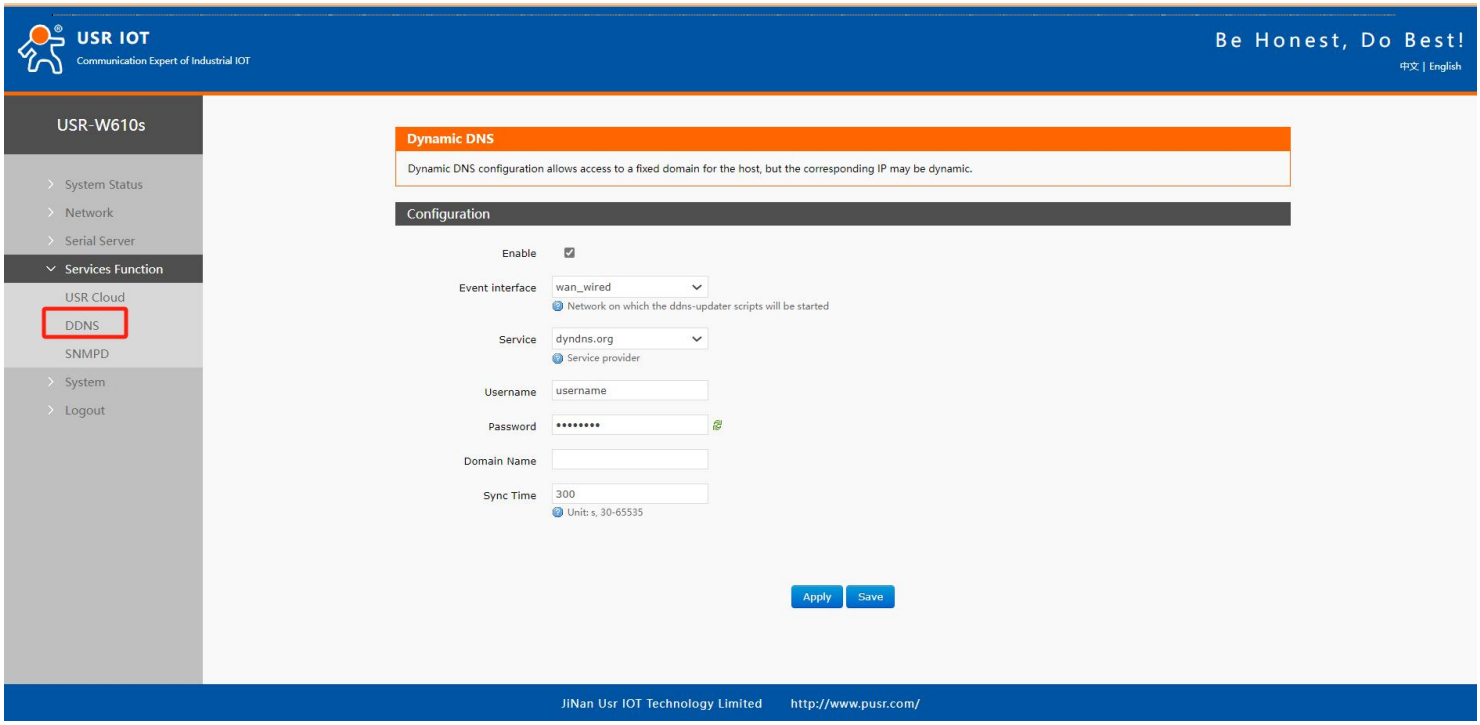


Fig 59 DDNS, Setup page

The parameter filling requirements are as foll:

Table 21 DDNS, a list of the parameters

Functional	Content	Default
Open	Check Enable DDNS function	not checked
Effective interface	WAN port selection based on demand	wan_wired
ISP internet	Please fill in the DDNS service address	dyndns. org
User name	Peanut shell account name	username
Password	peanut shell code	password
Domain name	Domain name requested by DDNS	empty
Synchronization time (s)	Time interval for detecting IP	300

9.2.2. Custom services

In the second case, the wireless client does not support the DDNS serviceit (you need to select "Custom" in the "Service" drop-down box, we still select peanut shell here). The use method is as follows:

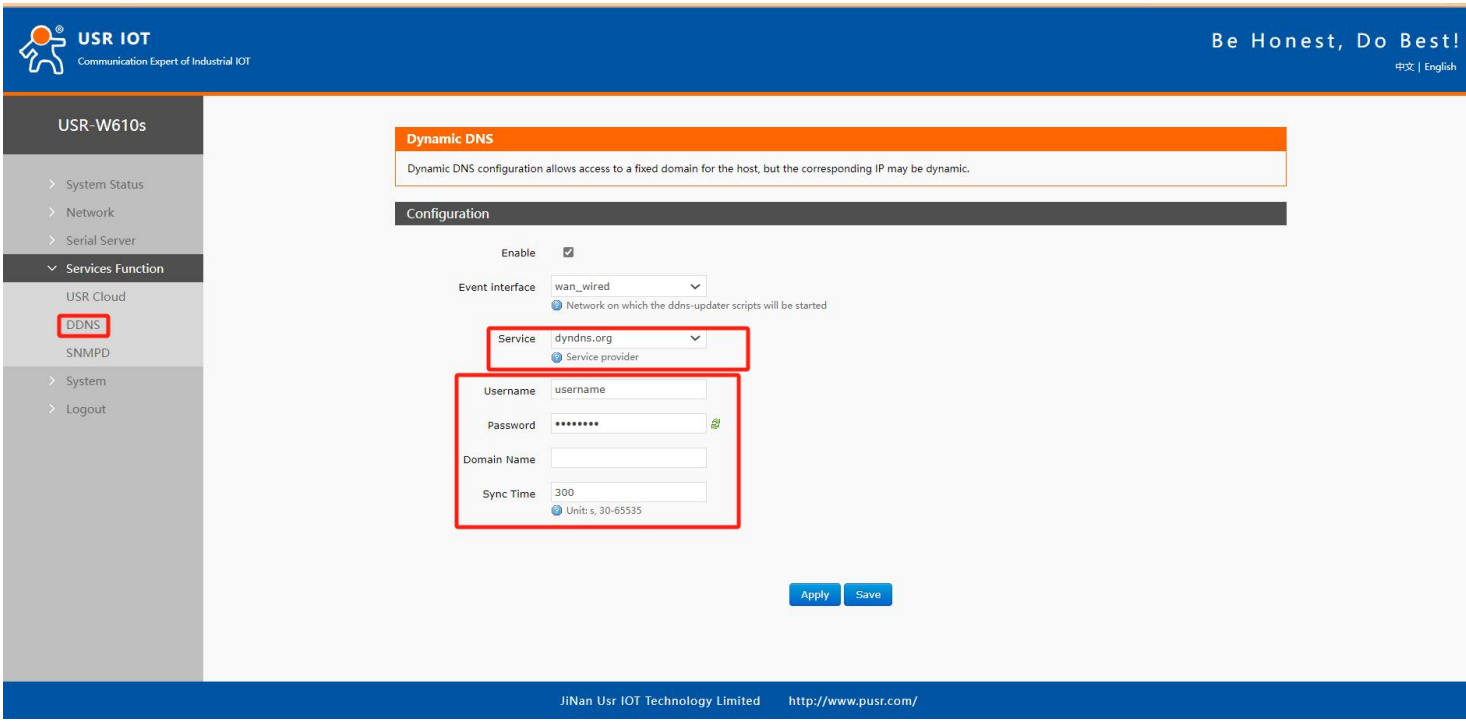


Fig 60 DDNS Custom Service Parameter Setting Page

- DDNS function, which provides a dynamic domain name resolution function for wireless clients in the external network, and applies for a domain name for itself to point to the IP address of its own WAN
- This feature allows direct access to wireless clients from remote locations via domain names.
- Parameters need to be filled in as follows (take peanut shell as an example).

Table22 DDNS Custom Service Parameter Table

Function	Content	Default
Open	Check Enable DDNS function	not open
Effective interface	Choose which WAN port to use according to your needs	wan_wired
Server provider	You can select the corresponding server, here select custom	dyndns. org
DDNSService Provider	DDNS service provider address, fill in ddns. oray. com	empty
Service/URL	Please fill in the service URL path of DDNS (take peanut shell as an example here, service selection is customized). The peanut shell URL is filled in as follows: /ph/update? hostname=%h&myip=%i	empty
User name	Peanut shell account name	username

Password	peanut shell code	password
Domain name	Domain name requested by DDNS	empty
Port	Select interface name	For example, chooseeth0. 2, that is, wired WAN
Synchronization time (s)	Time interval for detecting IP	300

9.2.3. Functional characteristics

- Please fill in the parameters strictly according to the form instructions, service/URL, domain name, username password, interface and other parameters to ensure that they are correct;
- Even if it is a wireless client under subnet, this function can also make dynamic domain name effective;
- DDNS+port mapping can realize remote access to the wireless client intranet;
- If the network where the wireless client is located is not allocated to an independent public IP, this function cannot be used.

9.3. SNMPD

W610s has SNMP(Simple Network Management Protocol)service, you can remotely view device information, modify device parameters, monitor device status and other functions through SNMP protocol, without having to go to the field to monitor and configure devices one by one.

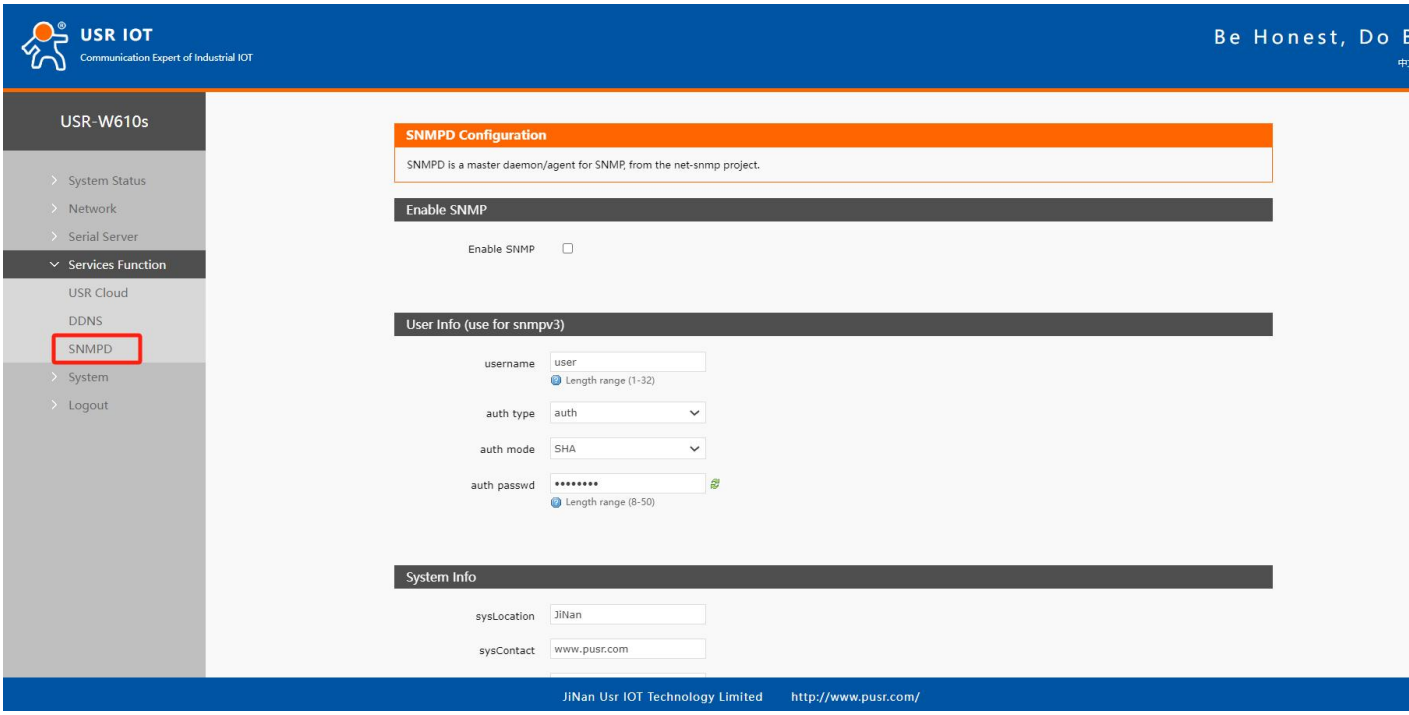


Fig63 SNMP Service Setting Interface

Tab23 SNMP parameter list

Function	Content	Default
Snmpswitch configuration	Check Enable SNMP Service	not checked
user name	Name sassigned to SNMP users	user
authentication type	Authentication or authentication and encryption	authentication
authentication mode	Authentication protocols used by users and hosts to receive traps. MD5orSha	SHA
authentication password	User authorization password	authpass
encryption type	Encryption protocol type, DES or AES	DES
encrypted passwords	Encryption password as encryption private key	privpass
alliance	Location of this equipment	JiNan
system contact	Contacts for this device	www. usr. cn
system name	System name of this device	Smart_Router

10. Contacts Us

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12. History Version

Version	Content	Time
V1.0.0	Initial version	2025-01-20
V1.0.1	Added edge computing, wireless signal survey, and MAC display on the overview page; operating temperature range adjusted to -25°C to +75°C	2026-09-13

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