PUSR®
www.pusr.com

Enhanced 2.4G Wireless Bridge

ST208E/ST208S

User Manual

V2.0

Be Honest & Do Best

Your Trustworthy Smart Industrial IoT Partner

Content

1. Introduction

1.1. Overview

ST208 series are the high performance 2.4G wireless bridge. It adopts Qualcomm wireless solution which can ensure the stable and reliable data transmission. It comes with high gain antenna, the theoretical wireless rate is up to 300Mbps, and the measured coverage distance can reach 300 meters. It supports PoE injector and power adapter to power on the device and comes with 2 x 10/100Mbps RJ45 ports. PUSR offers 2 version for customers to choose from: the standard version and the external antenna version.

Point to point extend network WiFi range, extend the network in the house to your barn, garage, church, warehouse, and even neighbor's house through wireless bridge signal transmission. It can be widely used in warehouses, farms, and house lane monitoring systems.

1.2. Features

- Professional outdoor shell design, IP64 waterproof.
- 802.11n standard, up to 300Mbps rate.
- Pre-paired by default, plug and play.
- Support 9-24VDC PoE power supply input or DC power supply.
- Adjustable wireless transmission power, to avoid the same frequency interference.
- Point-to-point and point to multiple points networking.
- Support remote and centralized management with DM platform.
- It's suggested to use in environments with a height of less than 300 meters.

1.3. Specification

Model	ST208E	ST208S
Description	Standard version	External antenna version
Input voltage	9 - 24 VDC, with PoE in and DC power socket	
Pilot lamp	POW、WORK、LAN1、LAN2、SIG	
Working Current	DC: 0.3A@12V aver, 0.4A@12V max POE: 0.4A@12V aver, 0.55A@12V max	
Antennacoverage angle	Horizontal 60 °, vertical 30 °	omnidirectional antenna
Wi-Fi		
Wireless Standards	IEEE 802.11b/g/n	
Output Power	Up to 20 dBm	
Antenna gain	Internal Antenna:8dBi ; External antenna:5dBi	
Channel bandwidth	20/40Mhz	
MIMO	2*2	

Max rate	300Mbps	
Coverage Distance		
Max coverage of WiFi	300 meters (Note:300M is the distance measured in a non-interference environment, and the actual measurement shall prevail)	
Ethernet Cable	100 meters (Note:The transmission distance is related to the quality of the network cable, and the actual measurement shall prevail)	
Ethernet		
Ethernet	2*RJ45, 10/100M, LAN 2 supports PoE in	
Software		
Work Mode	Two paired parameters in one packaging box	
LAN settings	Static IP, dynamically obtained	
Wireless settings	802.11b/g/n mode; The encryption method can choose WPA/WPA2; SSID broadcast/hide; bandwidth selection; transmit power setting	
Manage	System logs; WEB login; Unified management of DM cloud platform; SSH tool	
System Tools	Ping/Traceroute/Nsloukup tool	
Other	Password modification; Firmware upgrade; Parameter import/export; Restore to factory;Scheduled restart	
Physical Parameters		
Dimension	140.7*77.39*53mm	85*76*25mm
Weight	144.4g	217.3g
Installation	Pole Mounting, wall mounting	Wall Mounting, DIN rail mounting
Shell	IP64 waterproof	Sheet metal shell
Reload	Press and hold the reload button for 5-15 seconds to release and restore to factory settings	
Operating Temperature	-40℃ ~ +70℃	
Operating Humidity	10 ~ 95 %(non-condensing)	

1.4. Indicators description

Table 1. Indicators description

LED	State	Description
PWR	ON	The device is powered on normally.
	OFF	No power supply connected or power supply is abnormal.
WORK	Flashing	The device can work normally.
	OFF/Steady ON	The device work abnormally.
LAN1/LAN2	ON	The port is connected.
	Flashing	The port is transmitting data.

	OFF	The port is disconnected or connection is abnormal.
SIG	Green	RSSI ≥ -65dBm, the wireless signal is strong.
	Yellow	-75dBm ≤ RSSI< -65dBm, the wireless signal is normal.
	Red	RSSI < -75dBm,the wireless signal is weak. Please adjustthe position and direction of the device
	OFF	The devices are not matched.

1.5. Dimension

Unit: mm

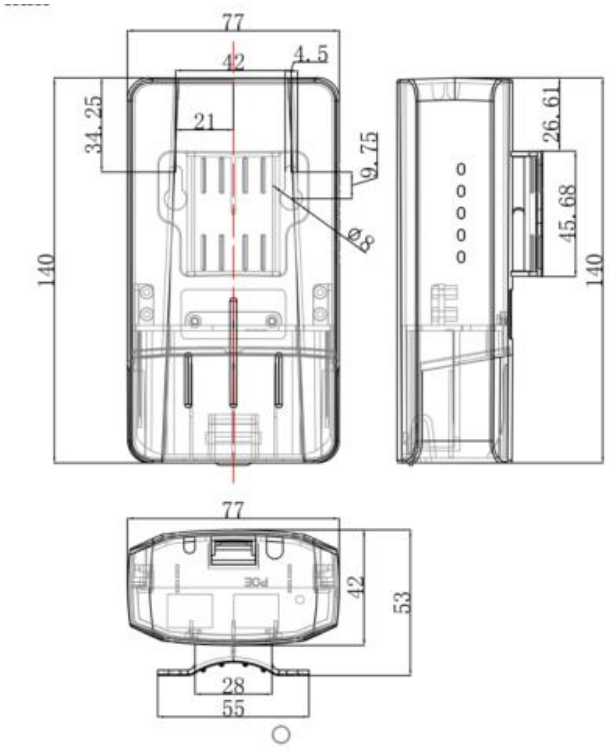


Figure 1. Dimension of ST208E

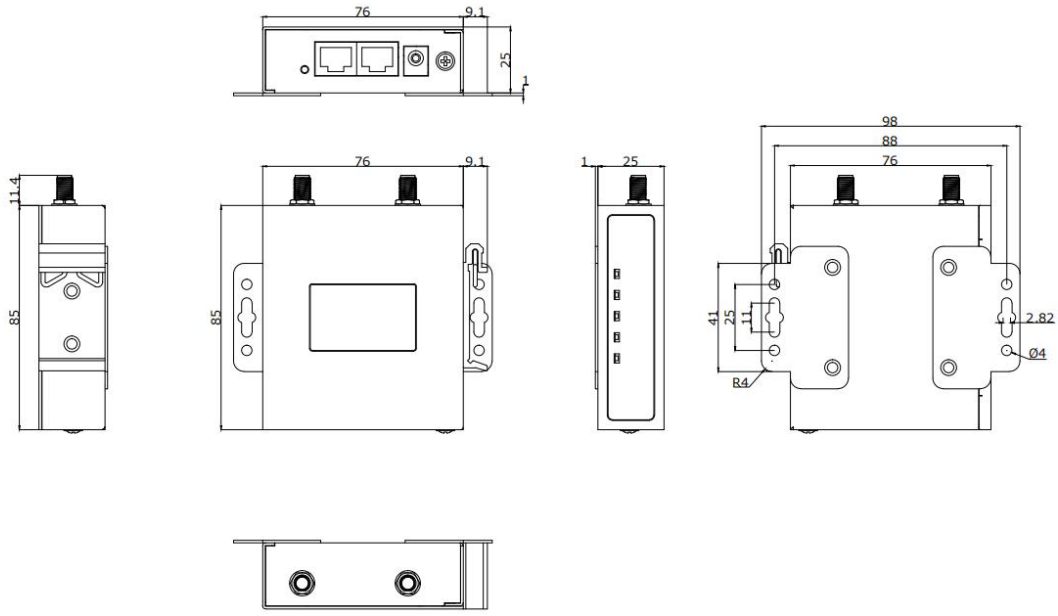


Figure 2. Dimension of ST208E

1.6. How to power

Option 1: Power with PoE injector

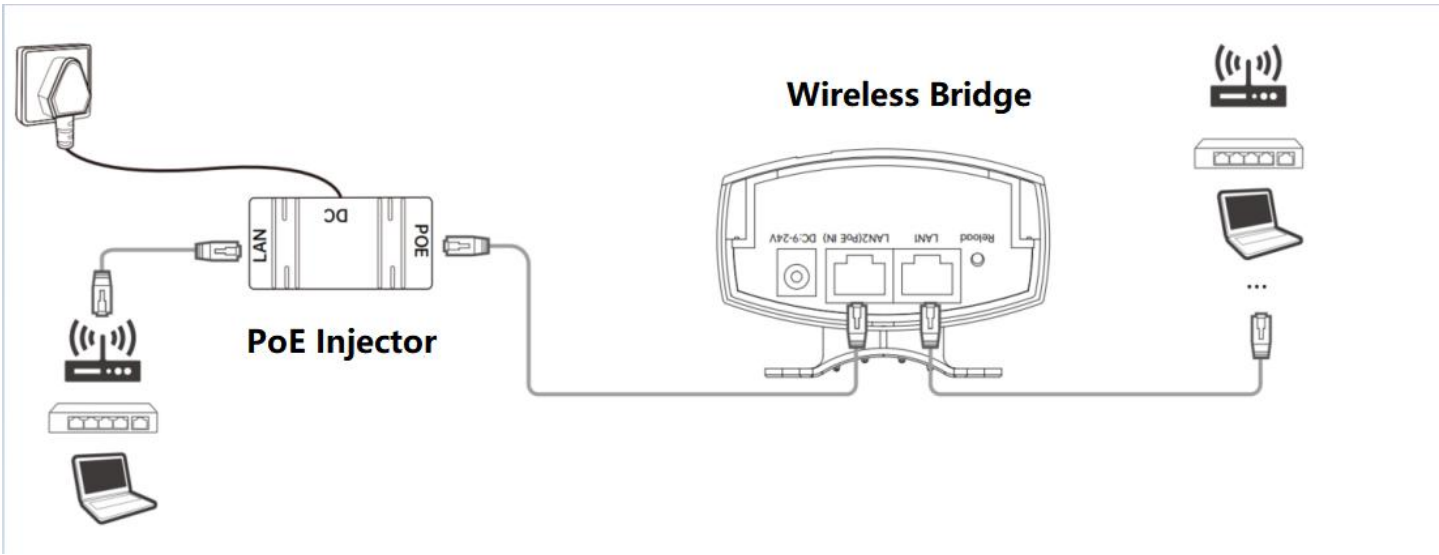


Figure 3. Power with PoE injector

Note: It's suggested to use the attached PoE injector to power on the device. If you need to use other POE injectors, you can view the "Product Parameters" to check the power parameters and select an appropriate POE injector for power supply, otherwise the bridge may be damaged.

Option 2: Power with power adapter

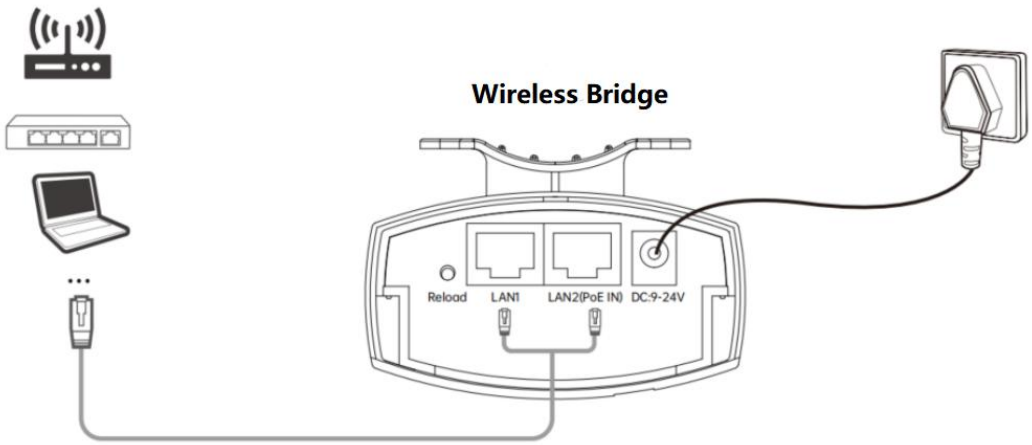


Figure 4. Power with power adapter

Note: It's suggested to use the attached Power adapter to power on the device. If you need to use other POE injectors, you can view the "Product Parameters" to check the power parameters and select an appropriate POE injector for power supply, otherwise the bridge may be damaged.

1.7. Network diagram of the bridges connections

The master bridge is suggested to connect to data centers, servers or switches. If the bridge need to access to the Internet, connect the master bridge to router or switches that can access the Internet.

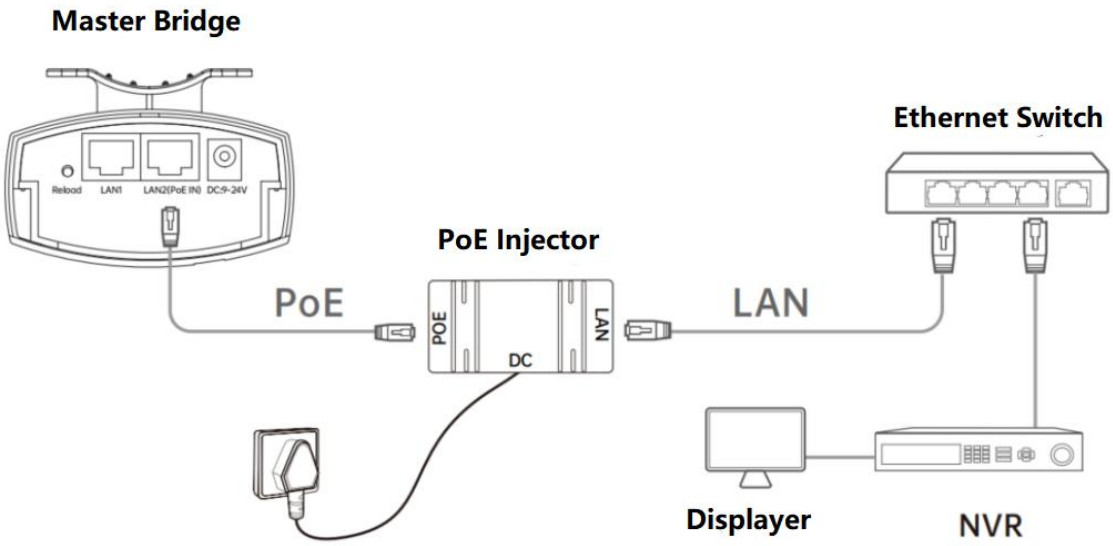


Figure 5. The mater bridge connections

The slave bridge is suggested connecting to the IP camera and the other terminal device.

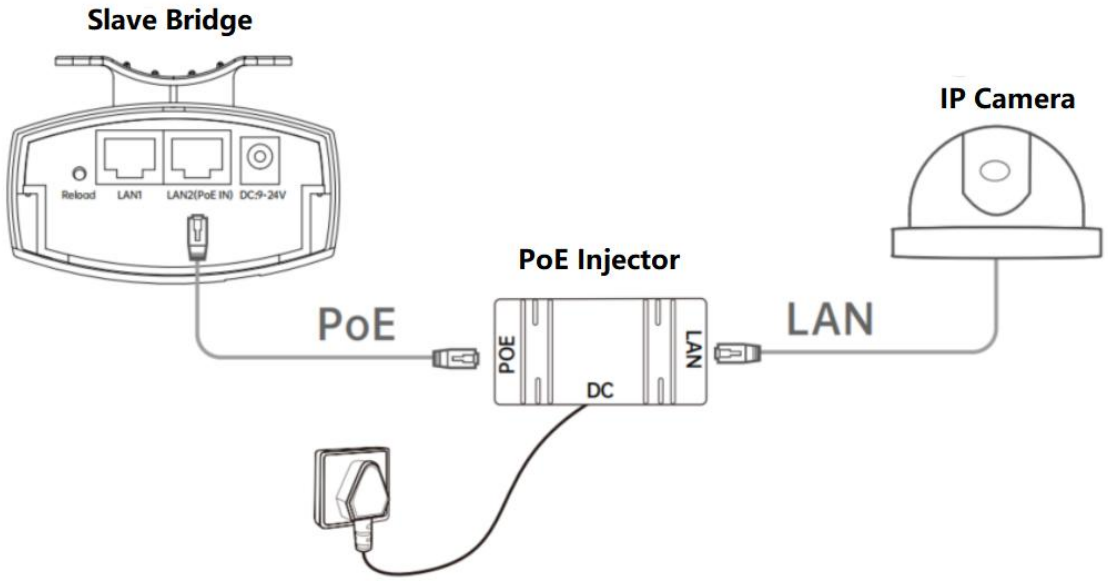


Figure 6. The slave bridge connections

2. Get Started

2.1. Hardware interface introduction

Refer to the following figure to connect the wireless bridge to the computer through a PoE adapter and an Ethernet cable.

2.2. Login setting page

Connect PC to the wireless Bridge via LAN or WiFi, and set the PC IP to static IP 192.168.2.xxx, such as 192.168.2.101. The IP should be on the same network segment as the wireless bridge.

Enter the default IP address of the wireless bridge 192.168.2.66 or 192.168.2.67 in the browser, and the browser will navigate to login page. The username is admin, the password is admin01.

Items	Value
SSID	ST208-XXXX, XXXX is the last 4 characters of the MAC address.
IP	Master bridge: 192.168.2.66 Slave bridge: 192.168.2.67
WiFi Password	www.usr.cn (only available of master bridge)
User Name	admin
Login Password	Admin01

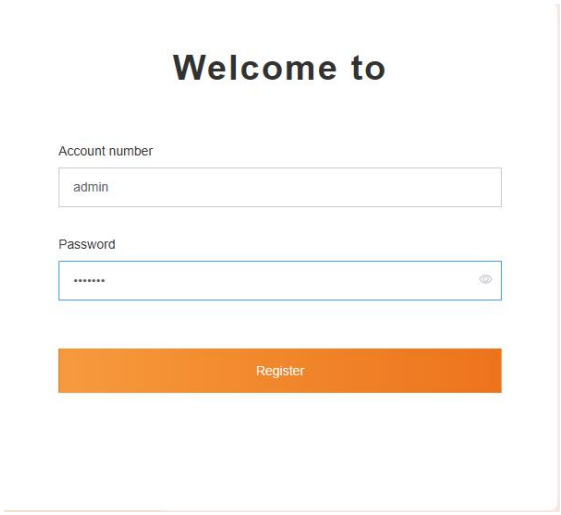


Figure 7. Login page

Instructions:

Each bridge has a fixed management IP address: 169.254.254.254. Users can login to the wireless bridge via this IP if forgetting the IP address of the bridge.

2.3. Overview Information

When you log in to the device, the web page will navigate you to the overview page. Users can check [System Information], [Equipment Status], [ARP Information] and other needed information.

The bridge in the box is pre-paired, after powering on, the master and the slave bridge can communicate already.

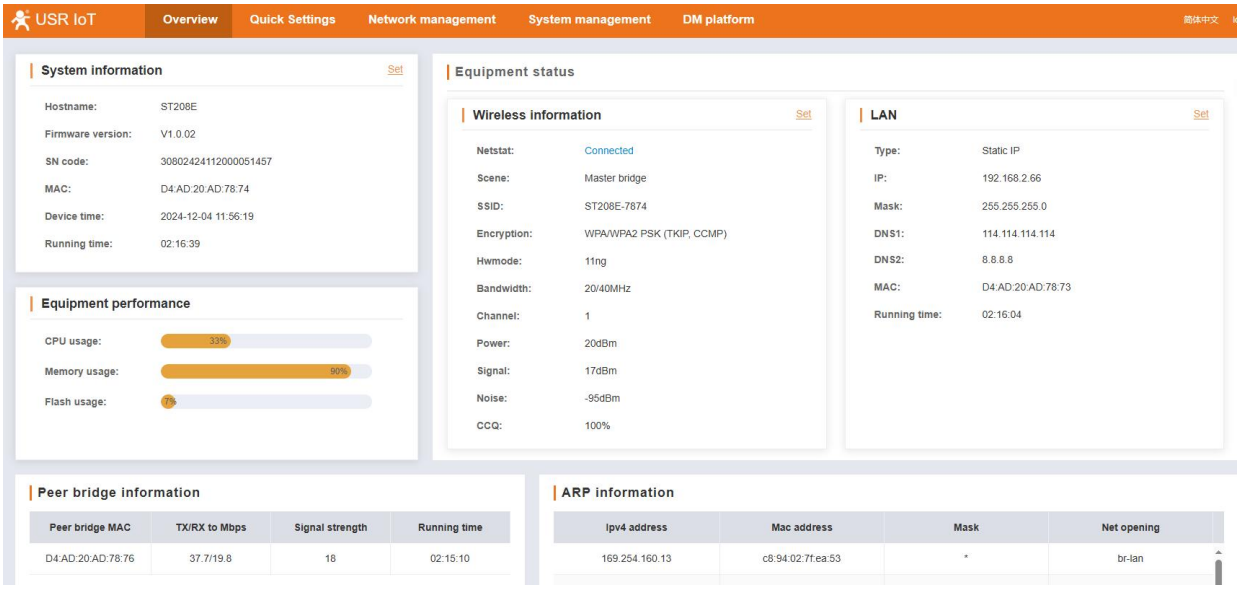


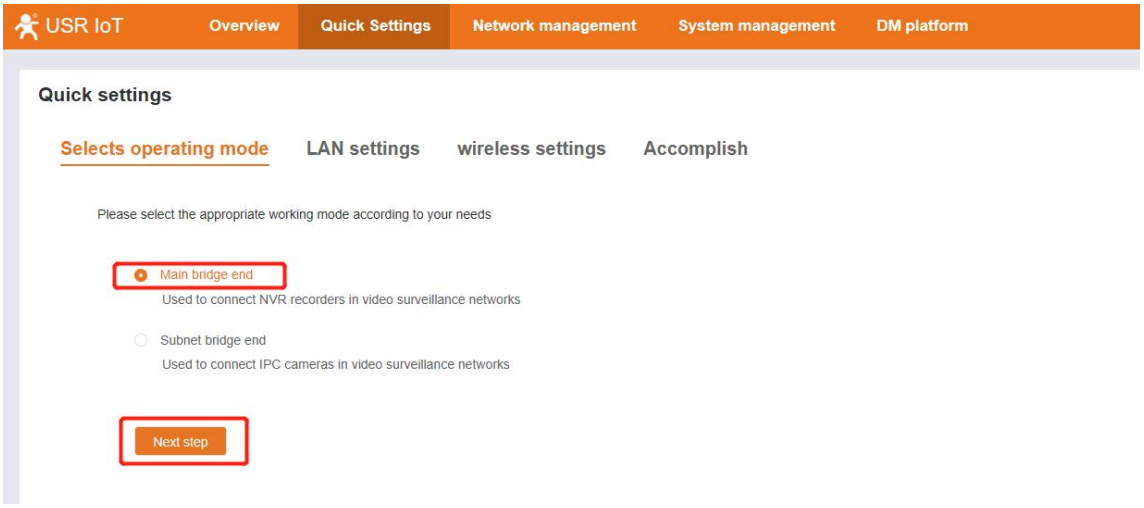
Figure 8. Initializing configuration

2.4. Quick Settings

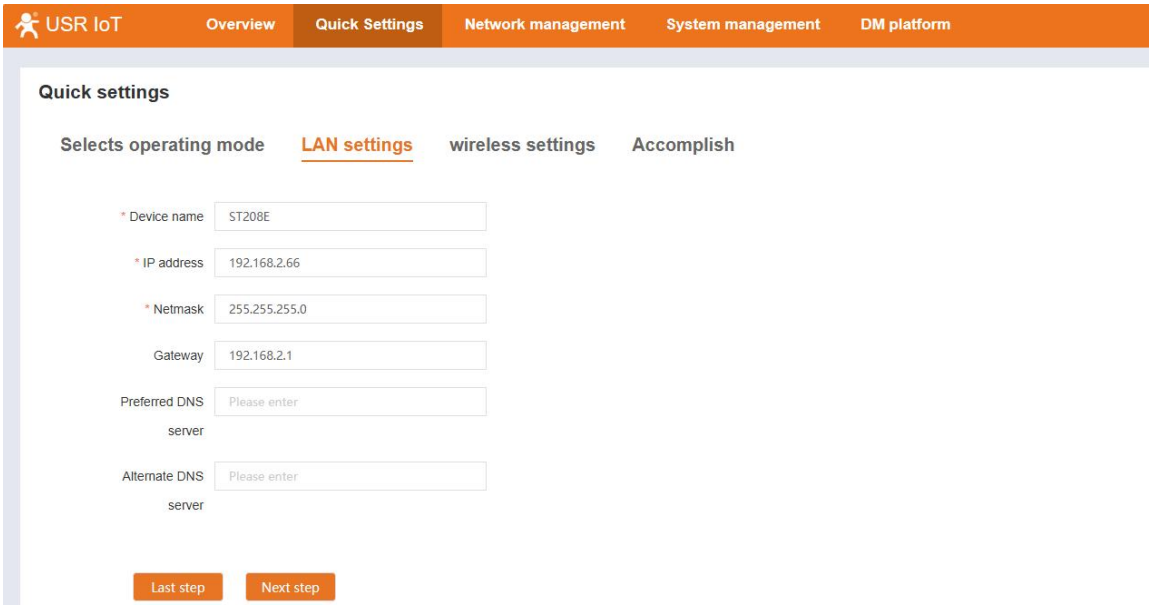
If user need to configure the bridge, it can start with quick setting.

2.4.1. Settings of Main bridge

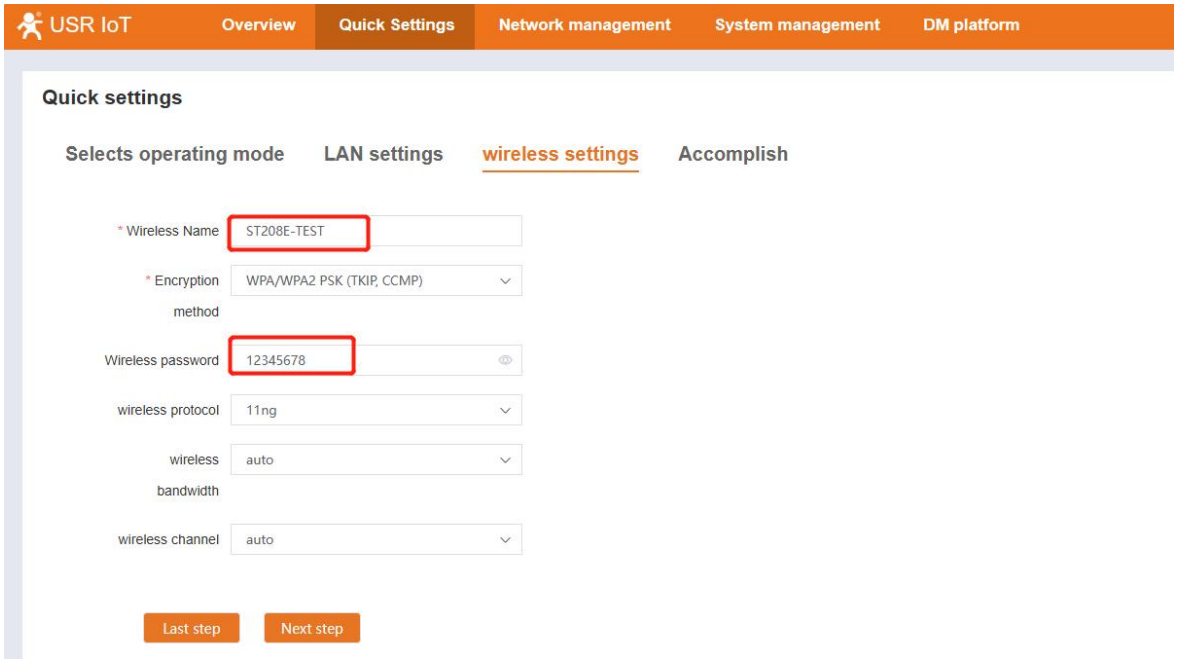
Select “Main bridge end”, then click the “next step” button.



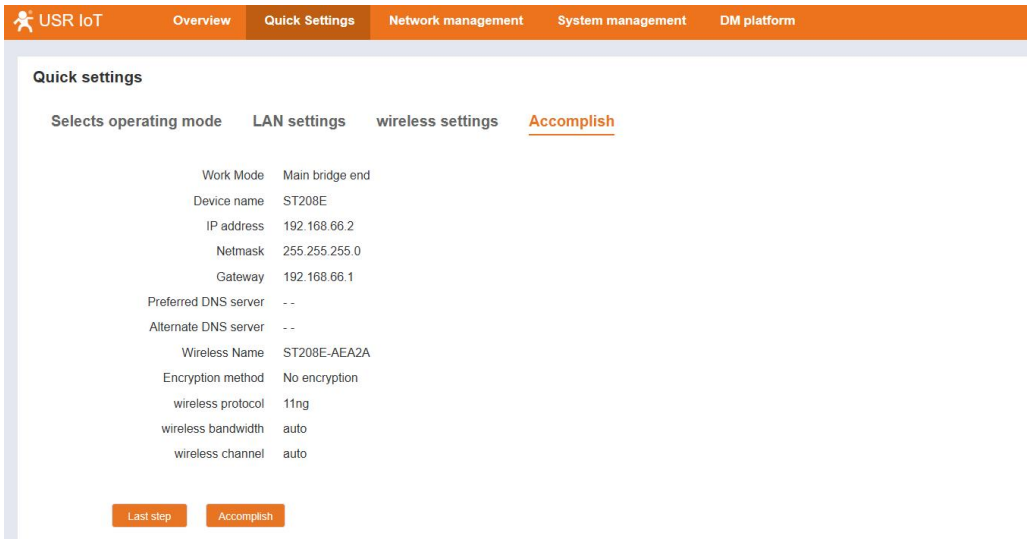
LAN settings: the IP address of master and the slave bridge should be in the same network segment. Can leave the DNS as blank if the bridge needn’t access Internet.



Wireless settings: the slave wireless bridge will connect the master bridge using this [wireless name] and [wireless password].



Check the configuration information and click Finish. The main bridge configuration is complete.



2.4.2. Settings of Slave bridge

Select the “subnet bridge end”, and the click the “Next step”.

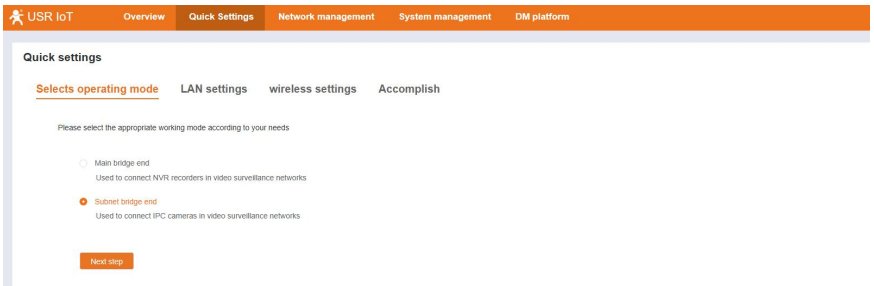


Figure 9. Select work mode

LAN settings: the IP address should be in the same network segment with the master bridge.

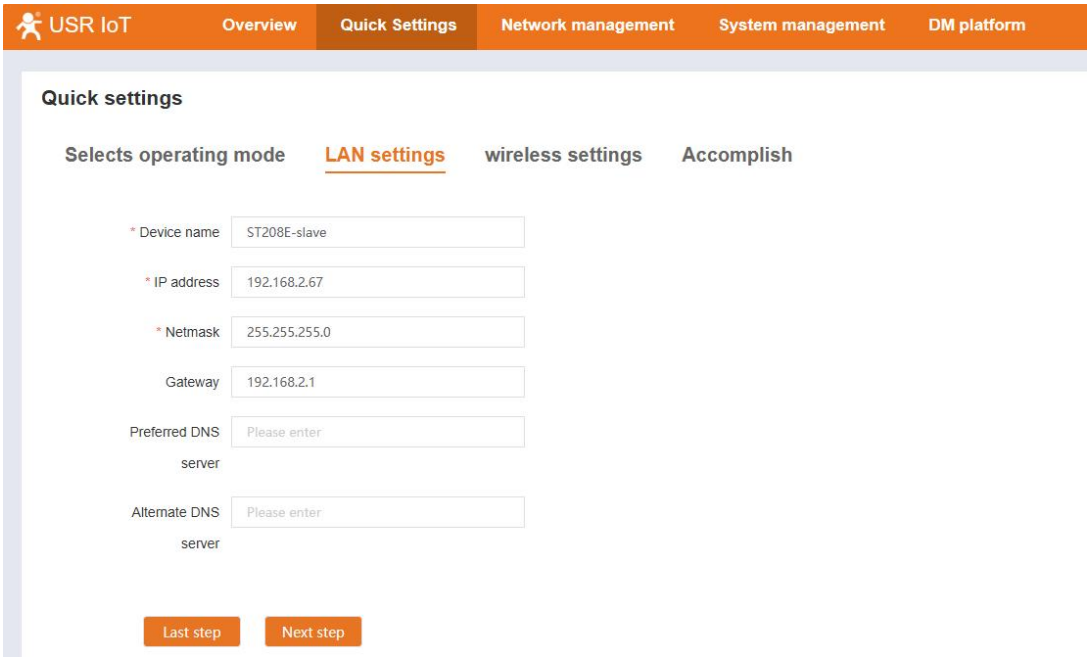


Figure 10. LAN settings

Wireless settings: users can enter the wireless name of the master bridge manually or click "scan bridge network" to scan the master's wireless.

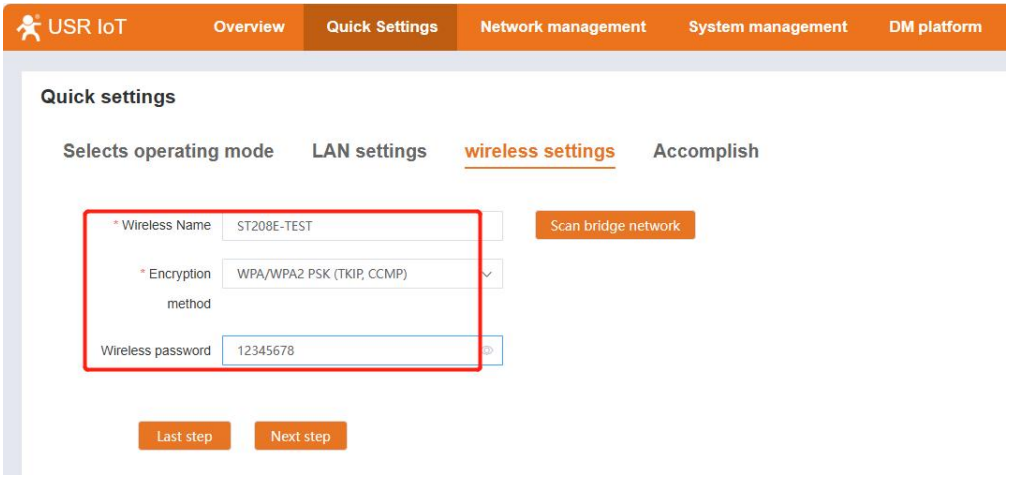


Figure 11. Wireless settings

Checking the settings, and click the "Accomplish" button to finish the settings.

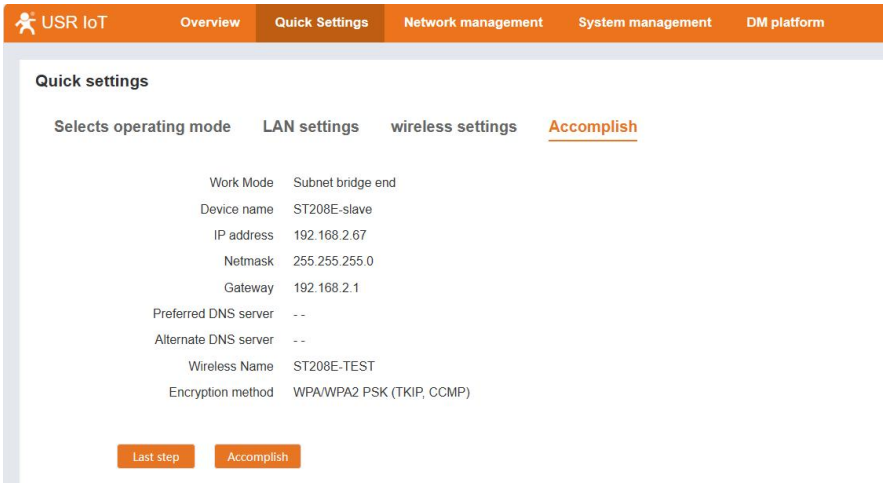


Figure 12. Accomplish settings

2.4.3. Checking the connection status

After completing the configuration, waiting for 30s-1minute, then to check if the slave bridge connected successfully. Alternatively, when the SIG indicator is on, the connection between the main and slave Bridges is successful.

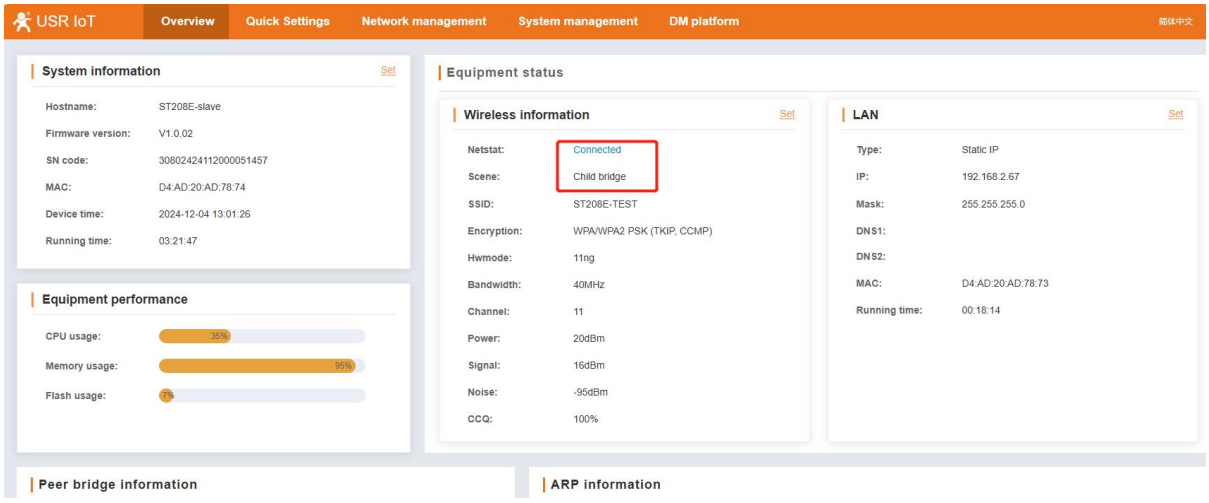


Figure 13. Status of slave bridge

PC connect to the slave bridge via LAN port, and login to the master bridge via 192.168.2.66(IP address of master bridge).

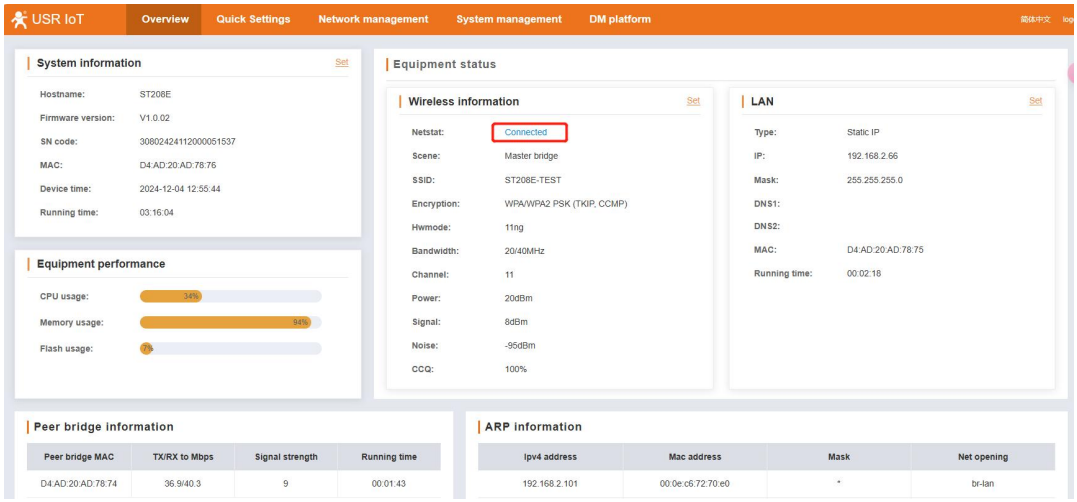


Figure 14. Status of master bridge

2.5. Network management

2.5.1. LAN settings

By default, the IP type is static IP. To facilitate device management, you can set a static IP address for the device. Ask the network administrator to set an IP address for the device as required and ensure that the IP address does not conflict with the IP address of other network devices.

The device also supports a DHCP client. When the device is connected to a network with a DHCP server, it automatically obtains an IP address.

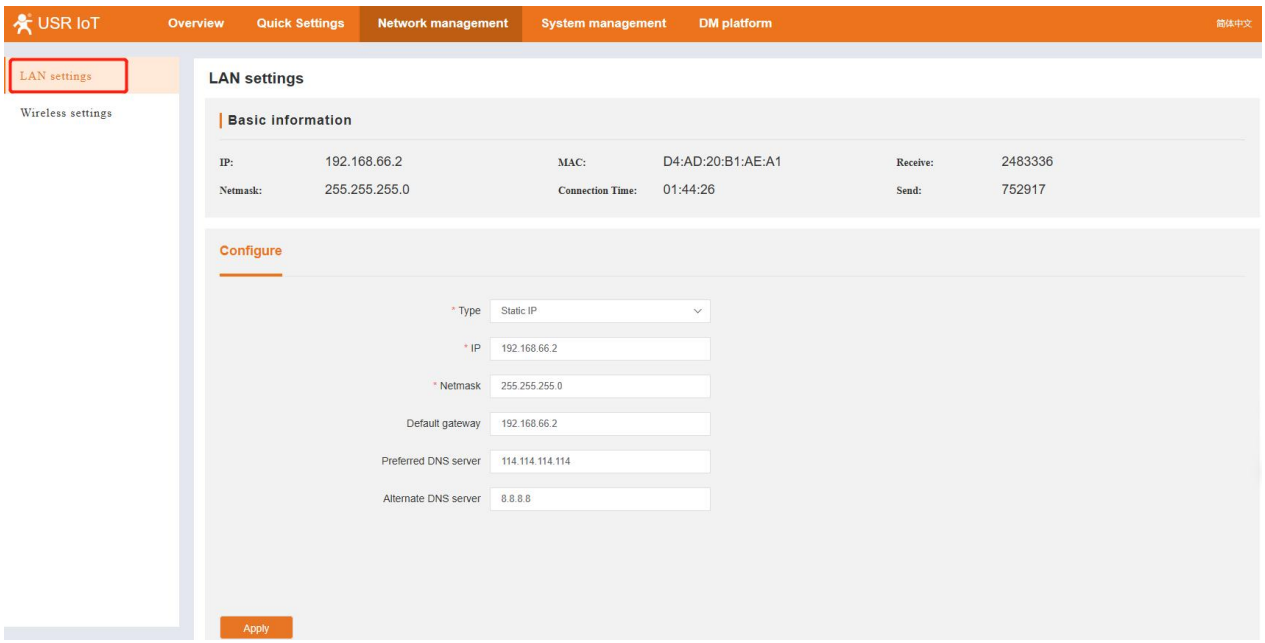


Figure 15. Static IP

DHCP protocol

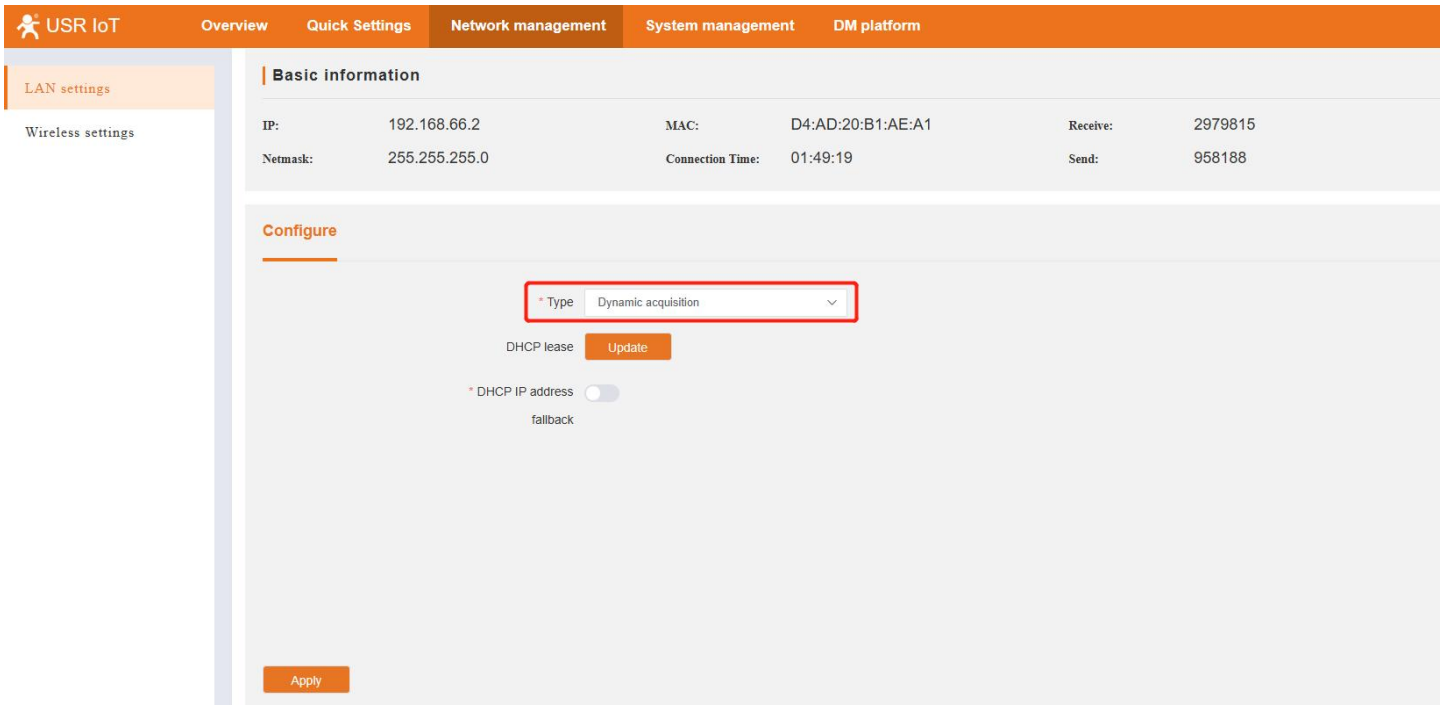


Figure 16. DHCP protocol

Table 2. Descriptions of LAN settings

Items	Description	Default Value
IP Type	Static IP: Set the network interface to a static IP address DHCP: Allocate IP to the bridge through the DHCP server	Static IP
IP Address	Set the IP address. If DHCP fails to obtain an IP, this can be an alternative IP address	Master: 192.168.2.66 Slave: 192.168.2.67
Subnet Mask	Set the subnet mask. If DHCP fails to obtain an IP, this can be an alternative subnet mask.	255.255.255.0
Default Gateway	Set the default gateway	192.168.2.1
Primary DNS Server	Set the public internet DNS address if need to access the Internet. Not required for local network communication	NONE
Alternate DNS server	Set the public internet DNS address if need to access the Internet. Not required for local network communication	NONE
DHCP lease	Click to update to restart the lease timer	NONE
DHCP IP address fallback	Off: The bridge will be without an IP when it fails to obtain an IP via DHCP	OFF

	On: Use the specified IP as the bridge IP when it fails to obtain an IP via DHCP	

2.5.2. Wireless settings

Users can set the wireless settings of the bridge in this page.

2.5.2.1. Master bridge

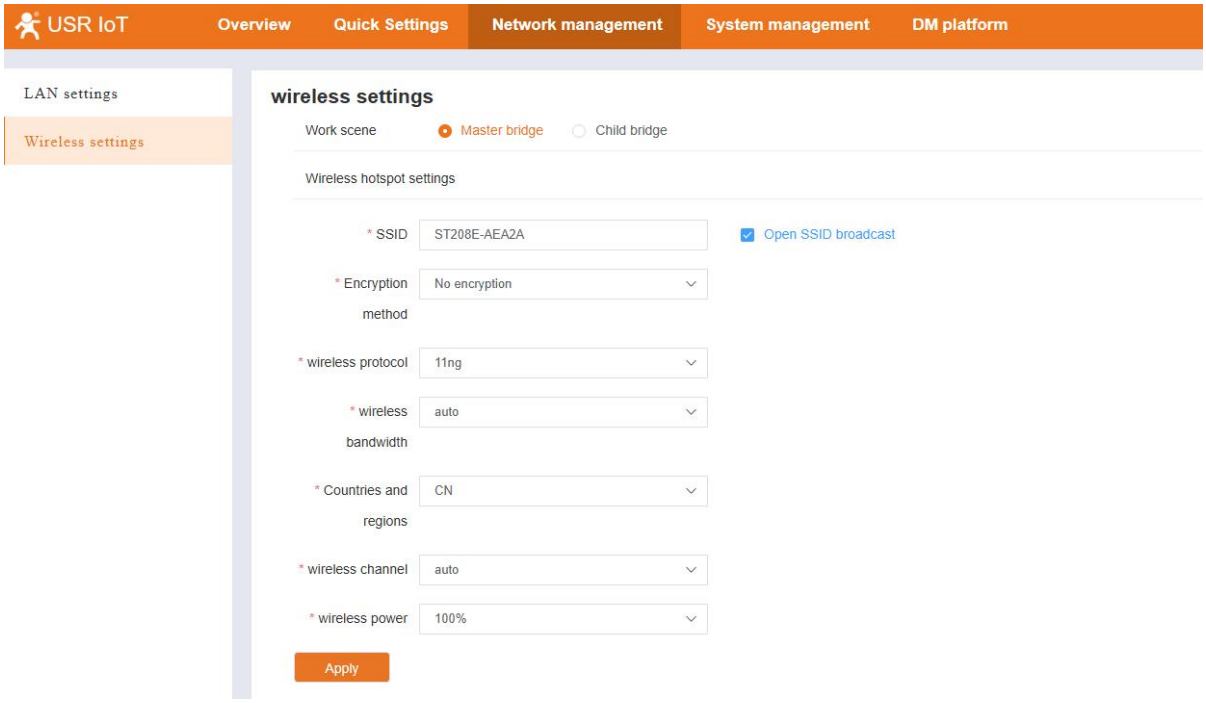


Figure 17. master bridge's wireless settings

Table 3. Descriptions of master bridge's wireless settings

Items	Description	Default Value
Work scene	Master bridge: Recommended to connect to NVR or switches at the data center end. Slave bridge: Recommended to connect to terminal devices such as cameras.	
SSID	Set the wireless name for the master bridge; the slave bridge needs to connect to this wireless name.	ST208-XXXX, XXXX is the last 4 characters of the MAC address
Open SSID broadcast	Checked: SSID is visible and can be searched for connection attempts. Unchecked: SSID is hidden and cannot be searched; the sub bridge can connect to the main bridge only by entering the	Checked

	correct SSID.	
Encryption method	Choose the encryption method for the wireless password: None, WPA/WPA2 PSK (TKIP, CCMP), WPA/WPA2 PSK (CCMP), WPA2 PSK (CCMP), WPA2 PSK (TKIP, CCMP)	WPA/WPA2 PSK (TKIP, CCMP)
Wireless password	Set the wireless password.	www.usr.cn
wireless protocol	Including 11.n/11g/11bgn/11ng/11bg/11b	11ng
wireless bandwidth	auto/20MHz/40Mhz	auto
Countries and regions	Select the country and region.	CN
wireless channel	Auto or channels 1-13.	auto
wireless power	Set the appropriate transmission power based on the environment; default is maximum power level.	100%

2.5.2.2. Slave bridge

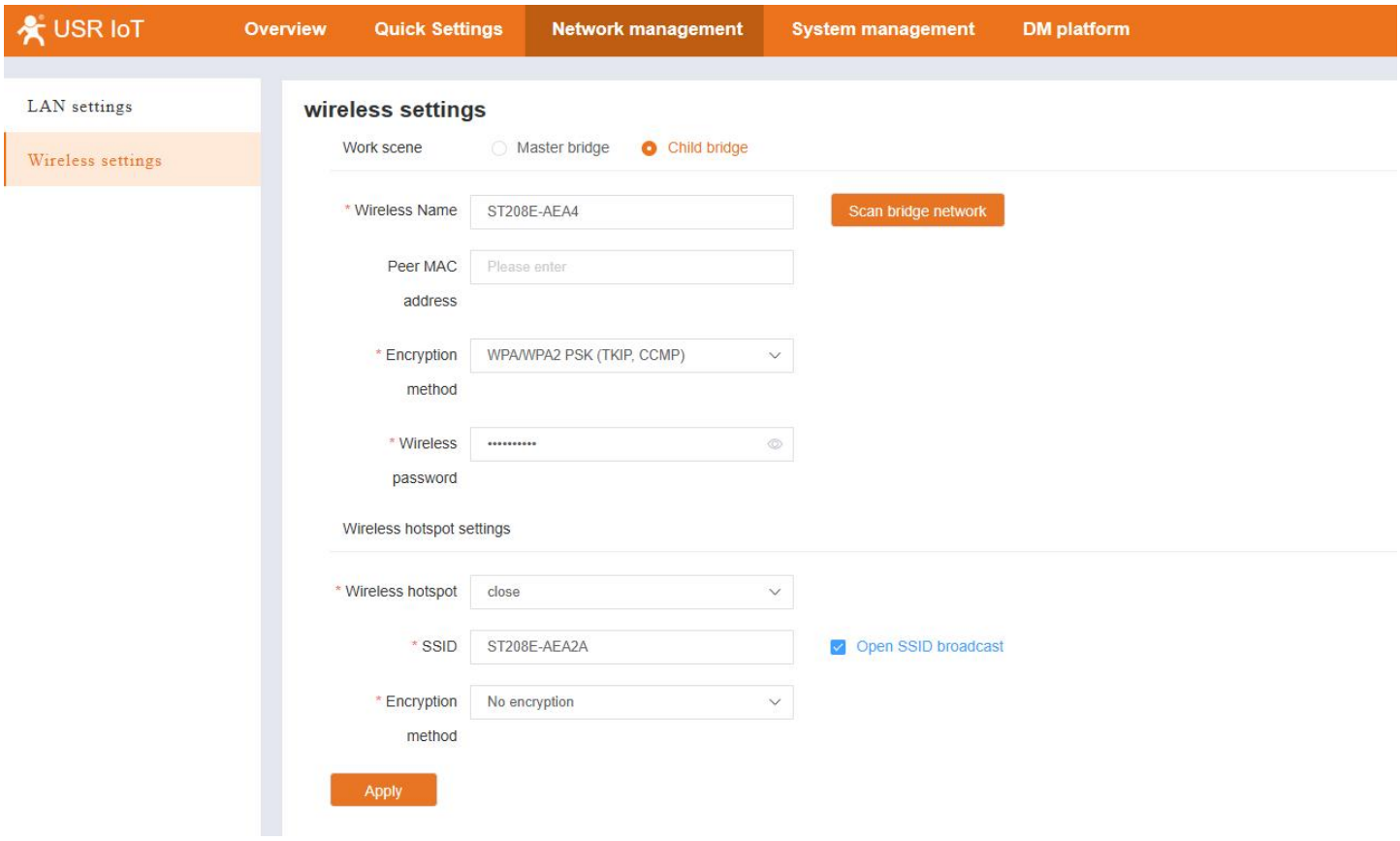


Figure 18. Wireless settings

Table 4. Descriptions of wireless settings

Items	Description	Default Value
Work scene	Master bridge: Recommended to connect to NVR or switches at the data center end. Slave bridge: Recommended to connect to terminal devices such as cameras.	
Wireless Name	Set the SSID that need to connect to.	ST208-XXXX, XXXX is the last 4 characters of the MAC address
Scan bridge network	Scan for the SSID of the master bridge on-site. If the master bridge has SSID broadcasting disabled, the slave bridge will not find the main bridge's SSID and must enter it manually.	NONE
Peer MAC address	When there are multiple devices with the same SSID, you can distinguish the target main bridge by its MAC address, e.g., D4:AD:20:AD:78:74.	NONE

Encryption method	Choose the encryption method for the wireless password: None, WPA/WPA2 PSK (TKIP, CCMP), WPA/WPA2 PSK (CCMP), WPA2 PSK (CCMP), WPA2 PSK (TKIP, CCMP)	WPA/WPA2 PSK (TKIP, CCMP)
Wireless password	Set the wireless password.	www.usr.cn
Wireless hotspot	Open : When the sub bridge enables the wireless hotspot, other wireless devices, such as smartphones, can connect to the sub bridge hotspot for communication. Close: Turns off the sub bridge hotspot function. Turn it off for 15 : The sub bridge hotspot will automatically be activated for 15 minutes after powering on, facilitating customer connection for hotspot configuration.	Close
SSID	Set the wireless name for the master bridge; the slave bridge needs to connect to this wireless name.	ST208-XXXX, XXXX is the last 4 characters of the MAC address
Open SSID broadcast	Checked: SSID is visible and can be searched for connection attempts. Unchecked: SSID is hidden and cannot be searched; the sub bridge can connect to the main bridge only by entering the correct SSID.	Checked
Encryption method	Choose the encryption method for the wireless password: None, WPA/WPA2 PSK (TKIP, CCMP), WPA/WPA2 PSK (CCMP), WPA2 PSK (CCMP), WPA2 PSK (TKIP, CCMP)	WPA/WPA2 PSK (TKIP, CCMP)
Wireless password	Set the wireless password.	www.usr.cn

Note: If a PC is connected to the hotspot of master/slave bridge, it should be set a static IP address in the same network segment as the bridge.

2.6. System management

2.6.1. System Time

Set the time zone and time of the bridge, and NTP server's parameters.

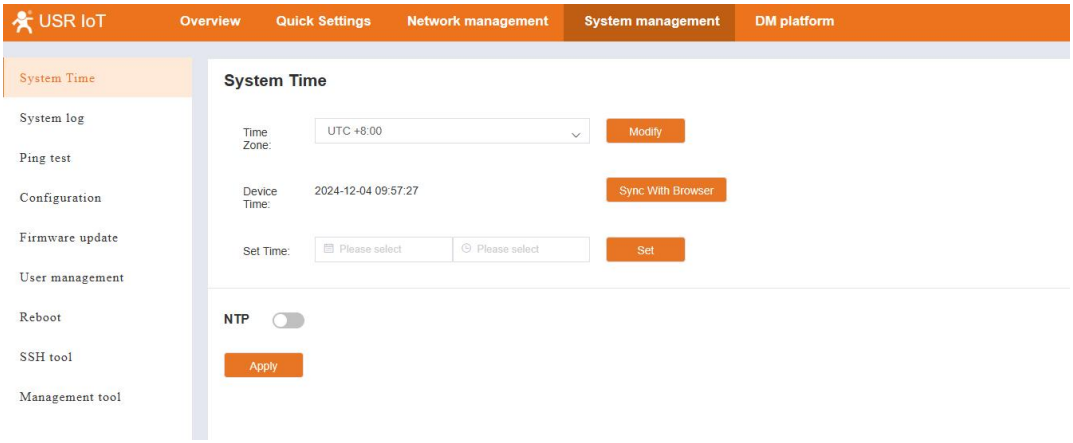


Figure 19. System time

Table 5. Descriptions of the system time

Items	Description	Default Value
Time Zone	Select the corresponding time zone based on your location	UTC +8:00
Sync with browser	Synchronize the system time with the current PC's system time	None
Set Time	Set the system time manually	None
NTP Server_1	Set the NTP server address	None
NTP Server_2	Set the NTP server address	None

2.6.2. System Log

Query or download system logs. The downloaded logs contain the logs of the last one to three days.

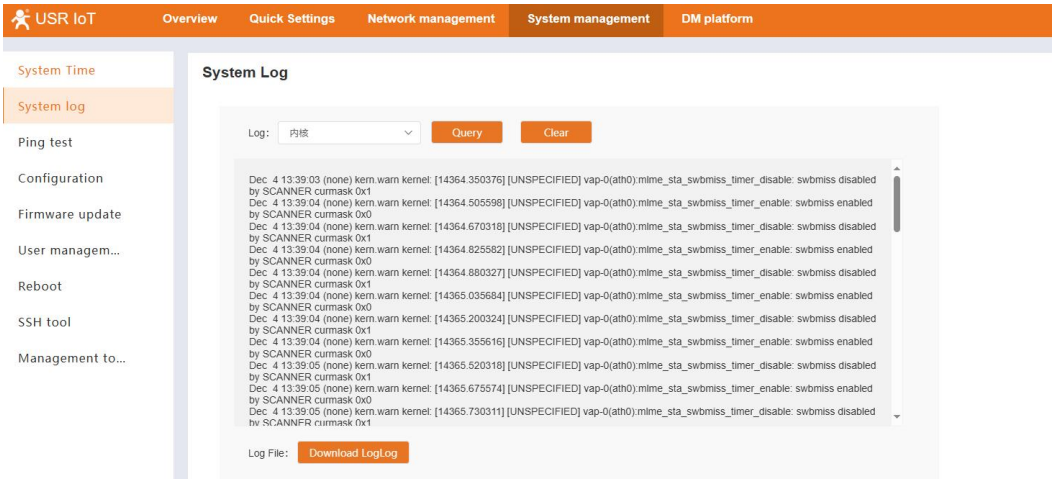


Figure 20. System log

2.6.3. Ping Test

Users can diagnose the network status using ping, traceroute and nslookup tools.

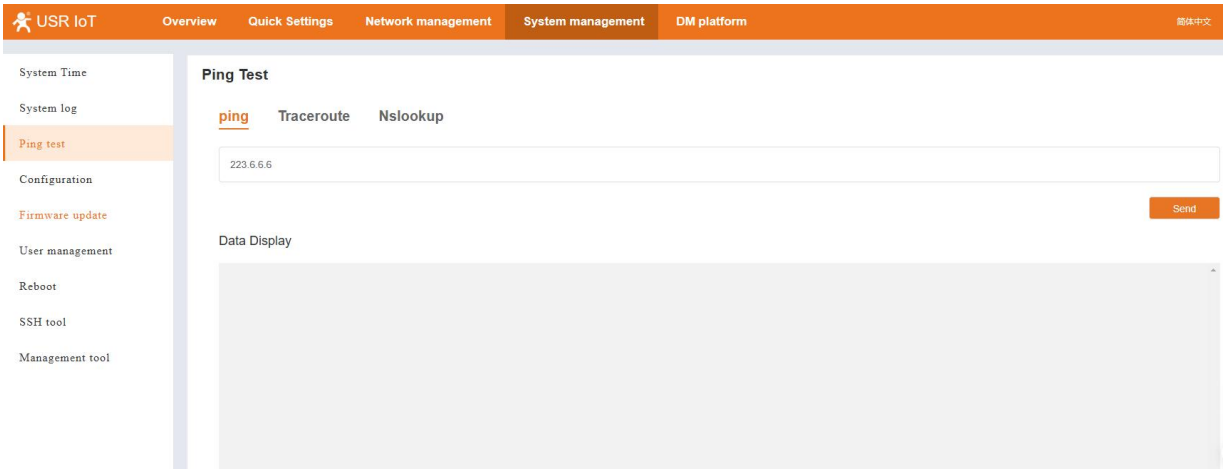


Figure 21. Network diagnose

2.6.4. Configuration

Users can reset the bridge to factory settings, export and import configuration file on this page.

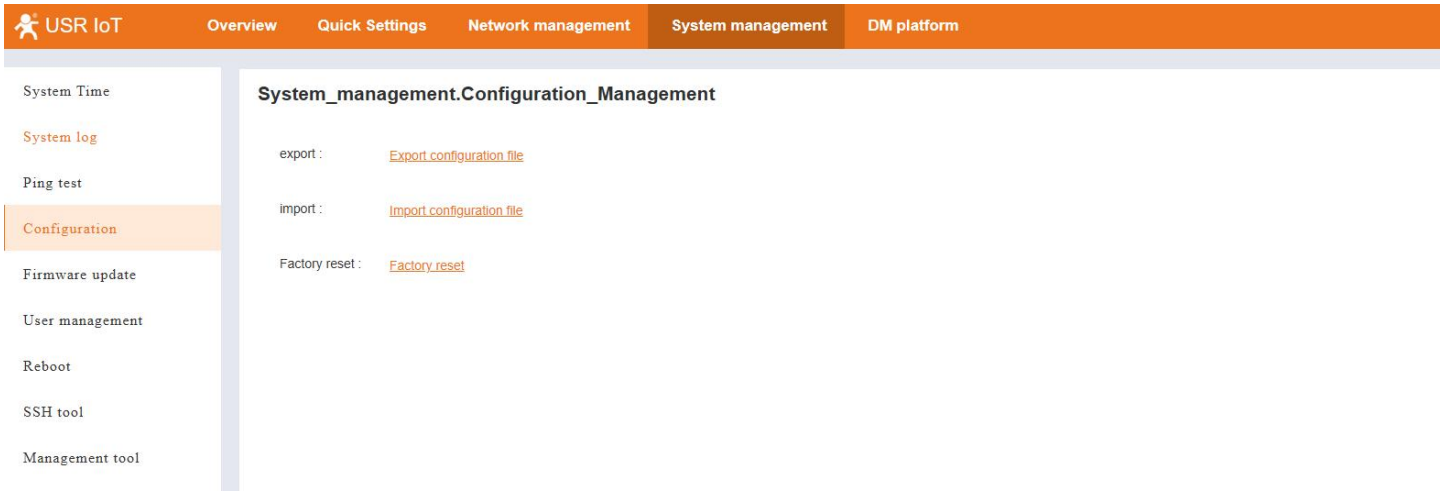


Figure 22. System configuration

Note:

If the configurations of multiple devices are the same, you can export the configurations on one of them and import the configurations on the other devices. Use the import and export functions on the Bridges of the same firmware version. Otherwise, the import may fail.

2.6.5. Firmware Upgrade

Users can check the current firmware version and upgrading firmware on this page.

Do not power off the bridge during the upgrade process. The upgrade process lasts about 3 minutes. Please wait until the WORK indicator is on and log in to the built-in web page again.

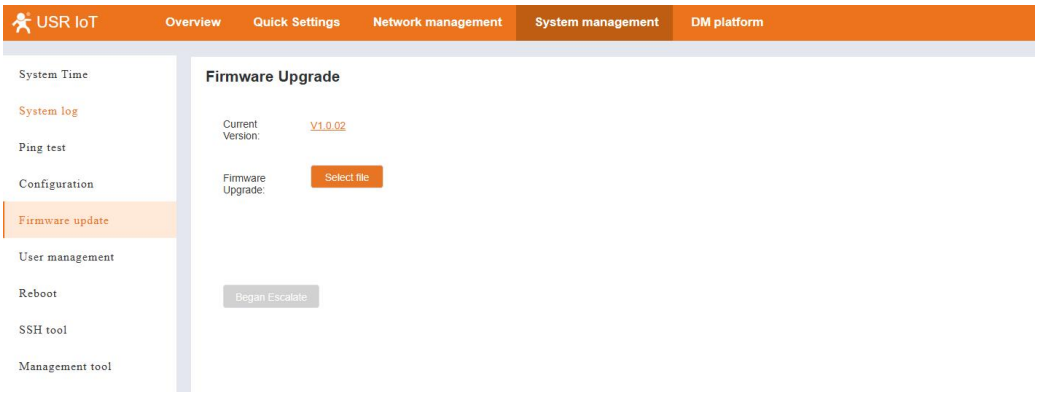


Figure 23. Firmware upgrading

Note:

The parameter set by the customer is reserved by default after the firmware upgrading.

2.6.6. User management

Users can modify the web login password on this page.

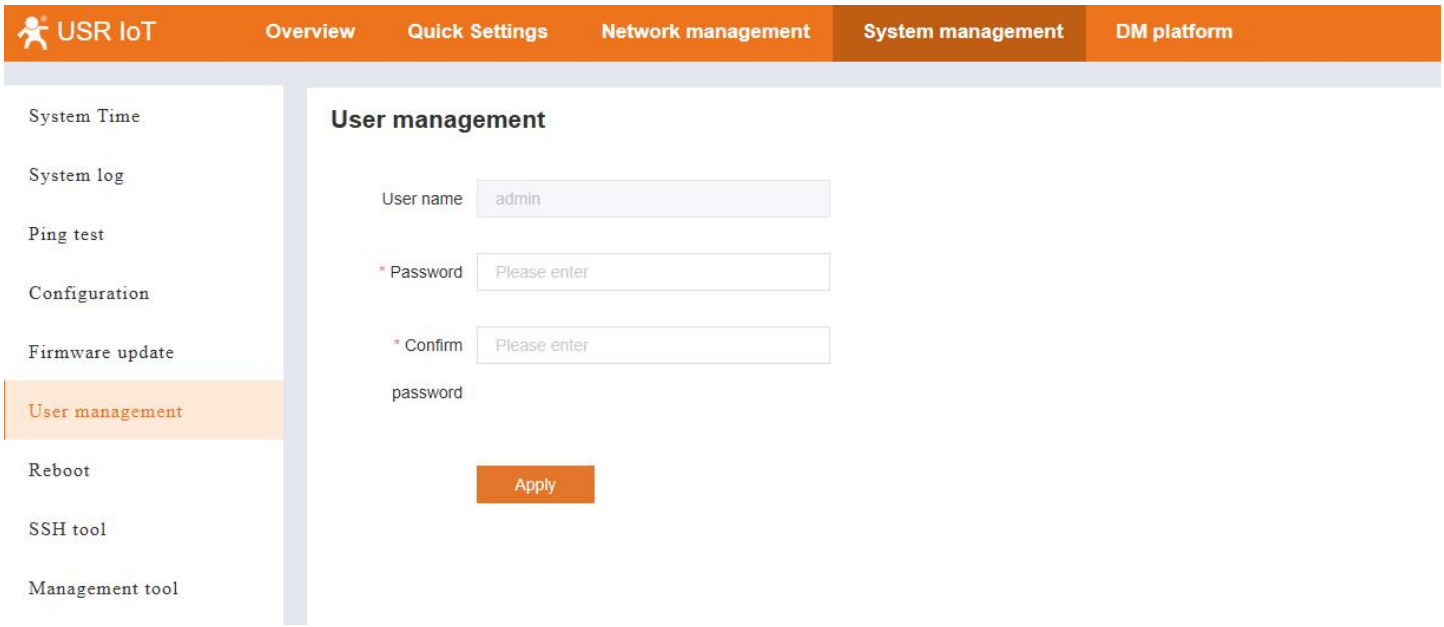


Figure 24. User management

2.6.7. System restart

Users can reboot the bridge device or set Scheduled Reboot the bridge on this page.

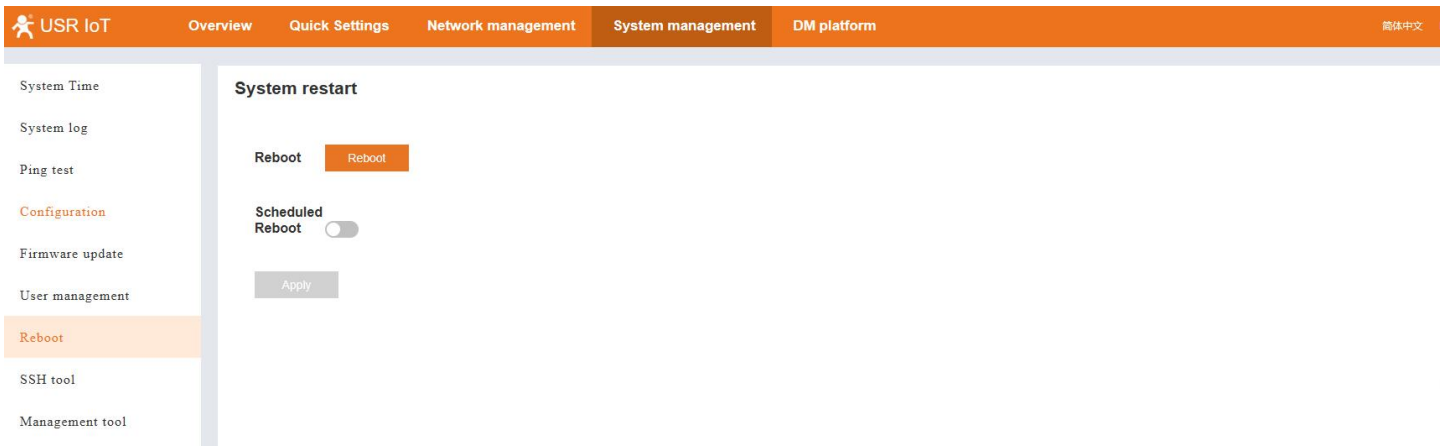


Figure 25. System restart

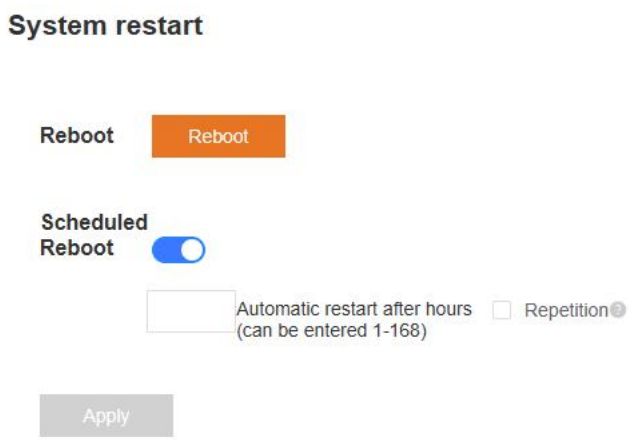


Figure 26. Scheduled Reboot

Note:

- Scheduled Reboot function is disabled by default.
- Enable scheduled reboot function. The bridge restarts at an interval of XX hours. You are advised to enable scheduled reboot to clear the running cache in time for more stable operation.

2.6.8. SSH Tool

Enable or disable the SSH management of the bridge.

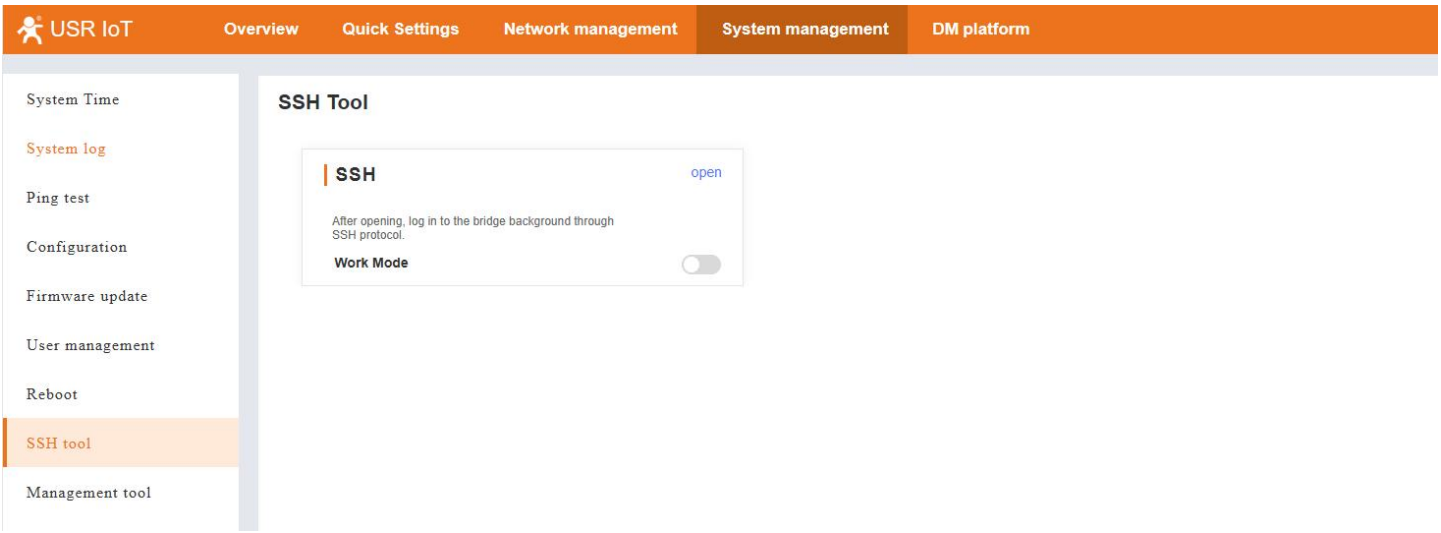


Figure 27. SSH settings page

2.6.9. Management Tool

Through the management tool, the basic bridge information, such as device information, network information, wireless information, etc. can be transferred to the customer defined server.

The bridge support 1 server and 5 rules.

2.6.9.1. Add server

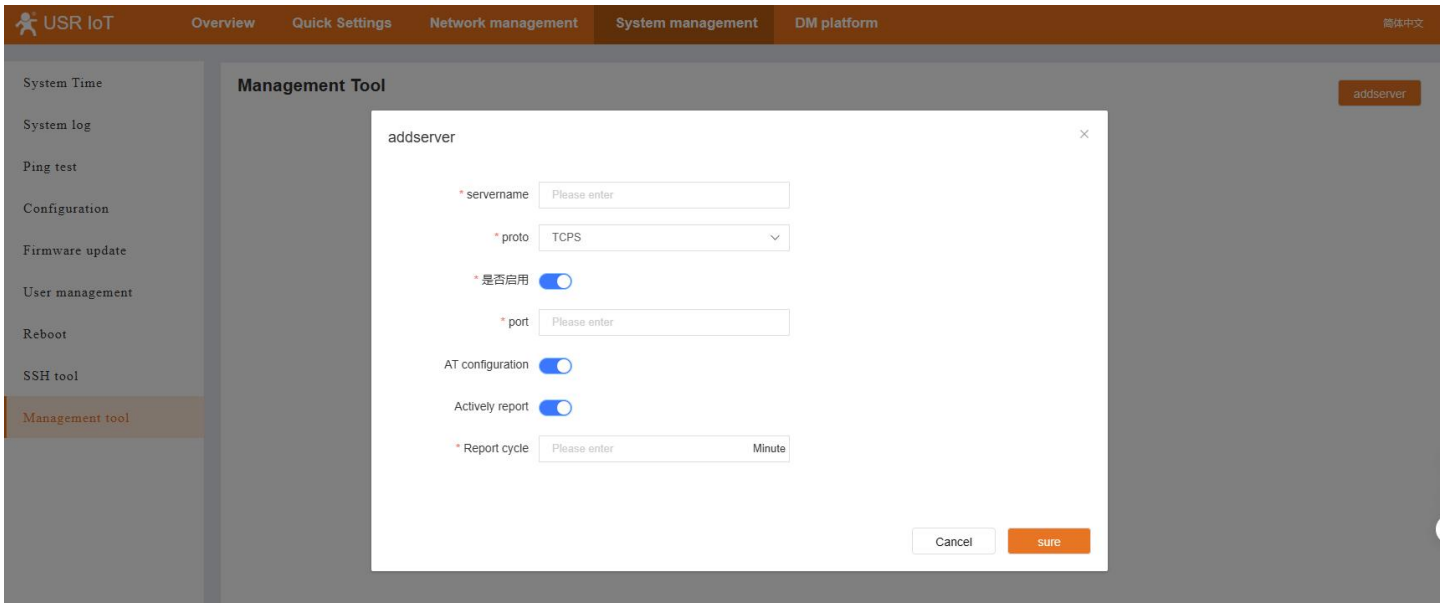


Figure 28. Server settings page

Table 6. Descriptions of the server

Items	Description	Default Value
Server name	Set server address	None
Protocol	TCPS/TCPC/UDPS/UDPC	TCPS
Enabled	Enable: Activate the service function Disable: Deactivate the server function	Enable
Server Address	Enter the target server IP address or domain name	None
Port	Enter the server port	None
AT configuration	Enable: Allow the server to send AT commands for inspection Disable : Prohibit the server from sending AT commands for inspection	Enable
Actively report	Enable: Automatically report device information Disable: Manually send commands to query	Enable
Report cycle	The data cycle for actively reporting rules list, in minutes	None
Registration packet	The content of the registration packet when connecting to the server Custom/None/SN/MAC	Custom
Register Package Type	The type of custom registration packet, ASCII or HEX	ASCII

Register package data	The registration packet data sent to the server	None
Register package sending method	Send once upon connection Send with data packets	Send once upon connection

2.6.9.2. Add rules

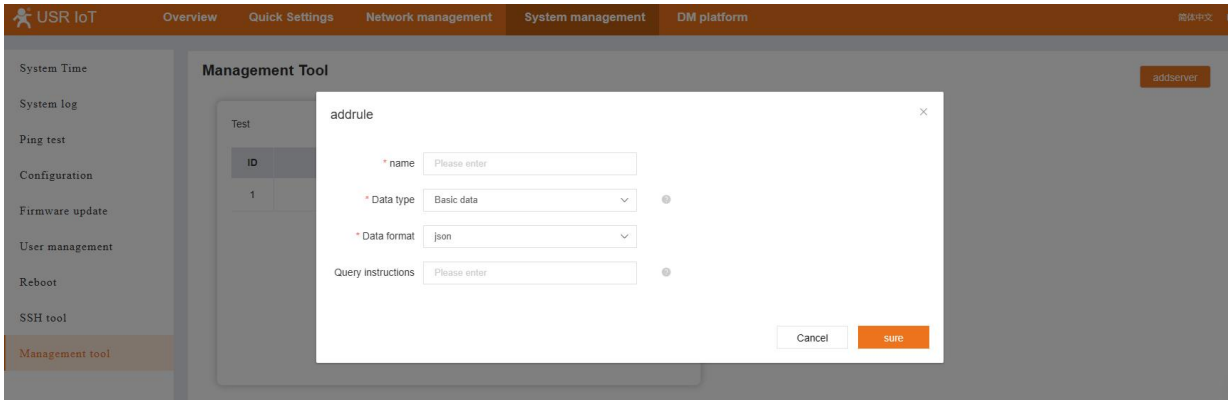


Figure 29. Rules adding page

Items	Description	Default Value
Name	Set the name of this rule, the server can send the rule name to query the bridge's corresponding status information in response style	None
Data type	Basic data/Network information/Wireless information/Bridge information/Execute AT	Basic data
Data format	JSON	Json
Query instructions	If a query command is filled in, the server will send the query command to query the information. If it's leaved blank, server can send rule name to query the information.	None

Table 7. Descriptions of the rules

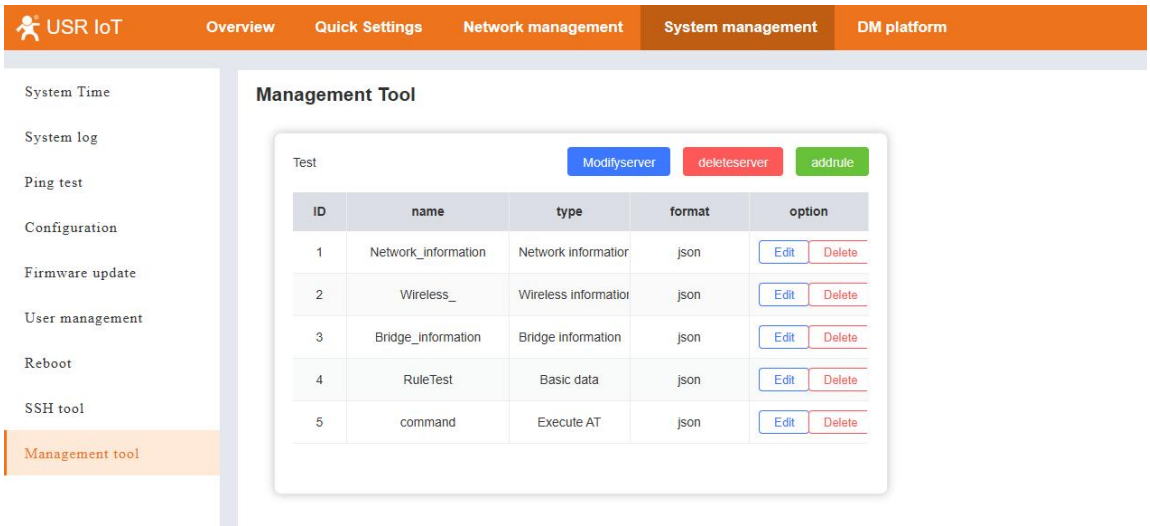


Figure 30. The added rules

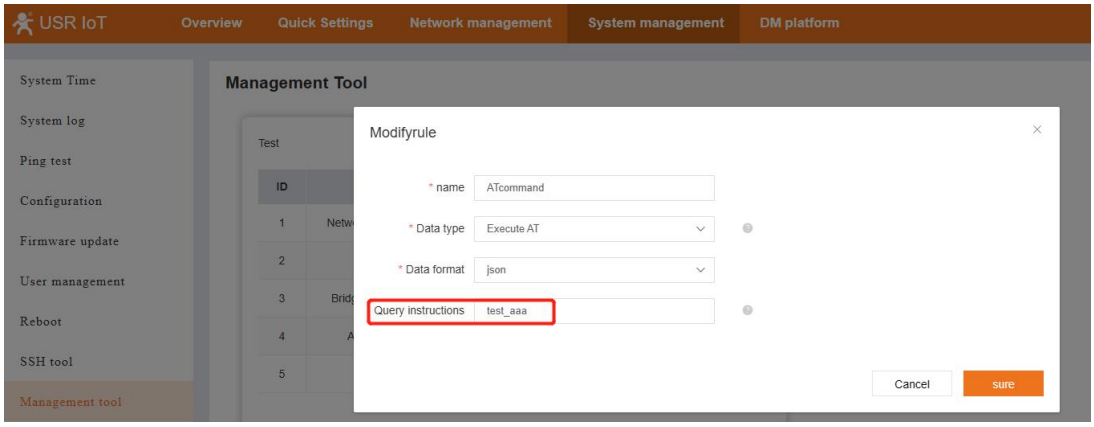


Figure 31. AT command rules

After setting the rules, the bridge will send the information of the device to server in the set interval as the following picture.

Users can also send AT command to query information of the bridge device. When sending AT command from the server, it need add the "Query instructions" before the AT command like the AT command format in the following picture.

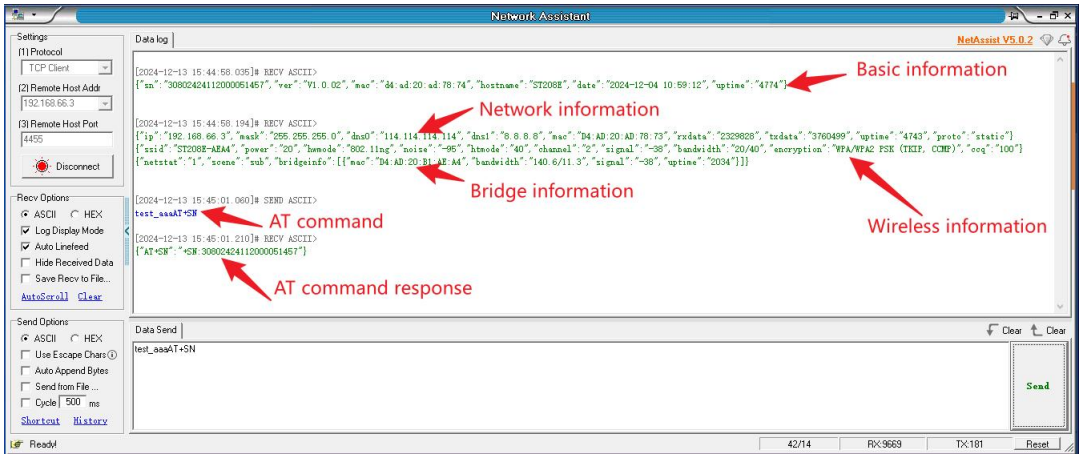


Figure 32. Query device information with rule

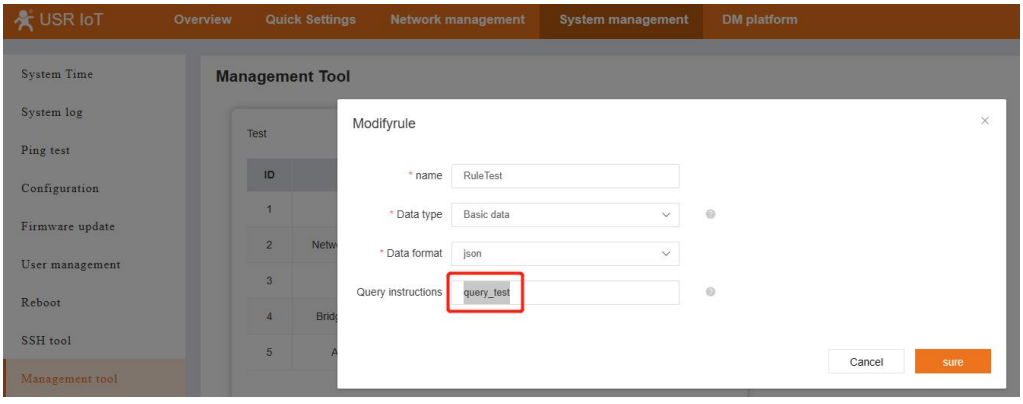


Figure 33. Basic data rules detail

When the data type is not AT command, if the query instructions is filled in, user can send the query instructions to query device information like the following picture.

Note: in this case, users can't send rule name to query the information of the bridge device.

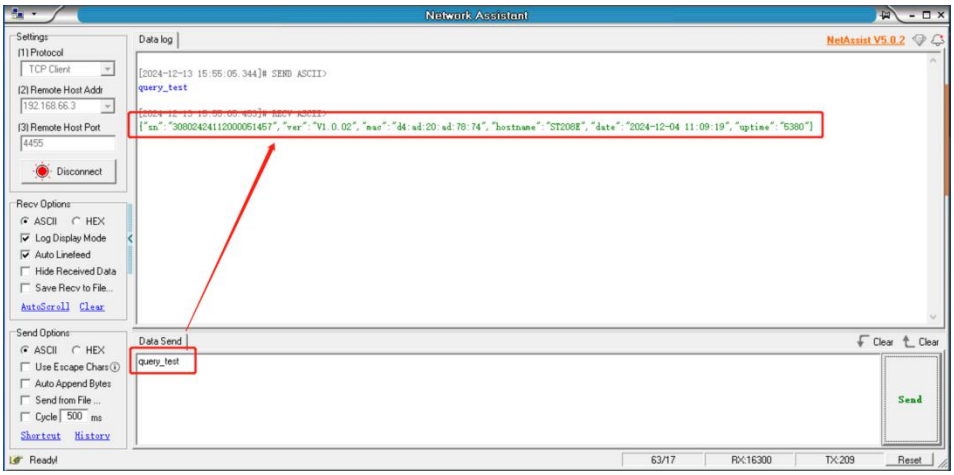


Figure 34. Query device information using query instruction

If the query instructions is leaved blank, users can send rule name to query device information like the following picture.

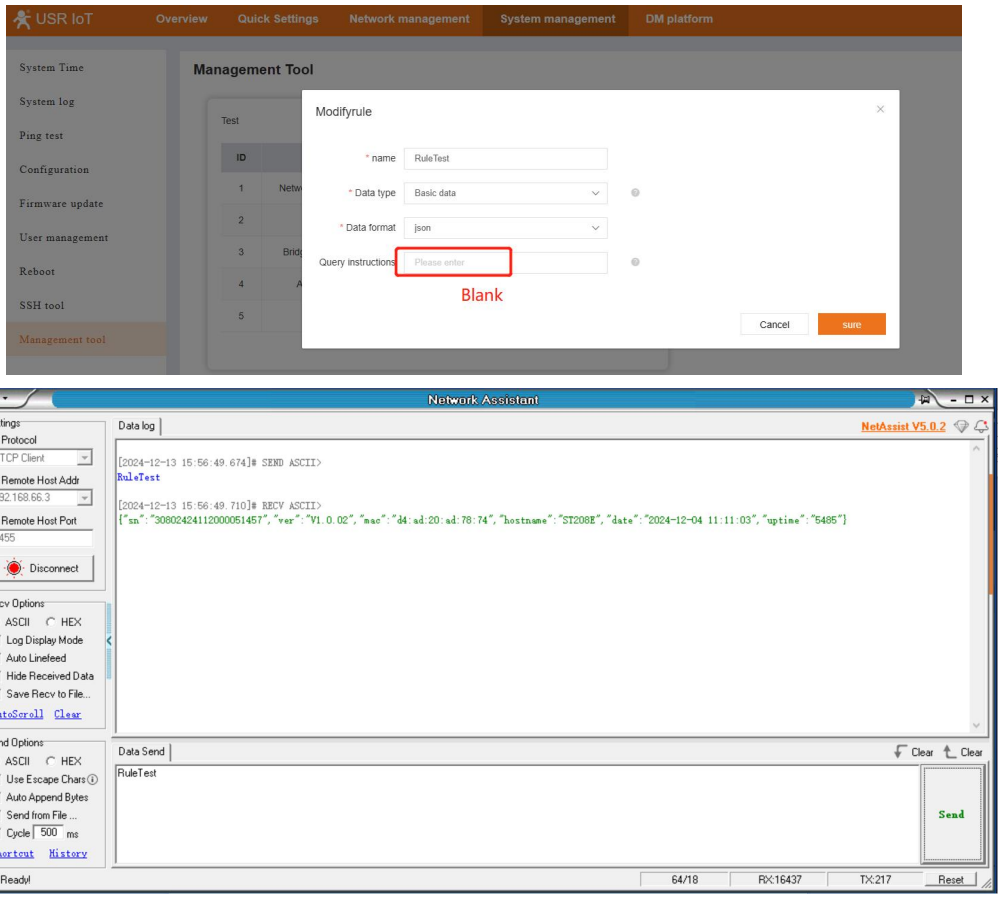


Figure 35. Query device information using rule name

2.6.9.3. Query device information via HTTP protocol

Query basic information: http://device IP/cgi-bin/usr_dataclient.cgi?get_base

Query Network information: http://device IP/cgi-bin/usr_dataclient.cgi?get_network

Query wireless information: http://device IP/cgi-bin/usr_dataclient.cgi?get_wirelss

Query bridge information: http://device IP/cgi-bin/usr_dataclient.cgi?get_bridge

Figure 36. Query Device information via http

2.6.9.4. AT command

Table 8. AT command description

AT command	Description
AT+SN	Query the device's SN
AT+LAN	Query LAN port information
AT+POWER	Query the TX power
AT+SIGNAL	Query the signal strength
AT+HTMODE	Query or set the bandwidth parameters: aoto/20/40MHHz
AT+R	Reboot the bridge

2.7. DM Platform

Users can manage, configure and view the bridge device online in the DM platform.

Login website: mp.usriot.com

Note:

- Add all the master/slave bridges that you want to manage in the DM platform.
- For unified management, add all Bridges that need to be managed by the platform to one account.

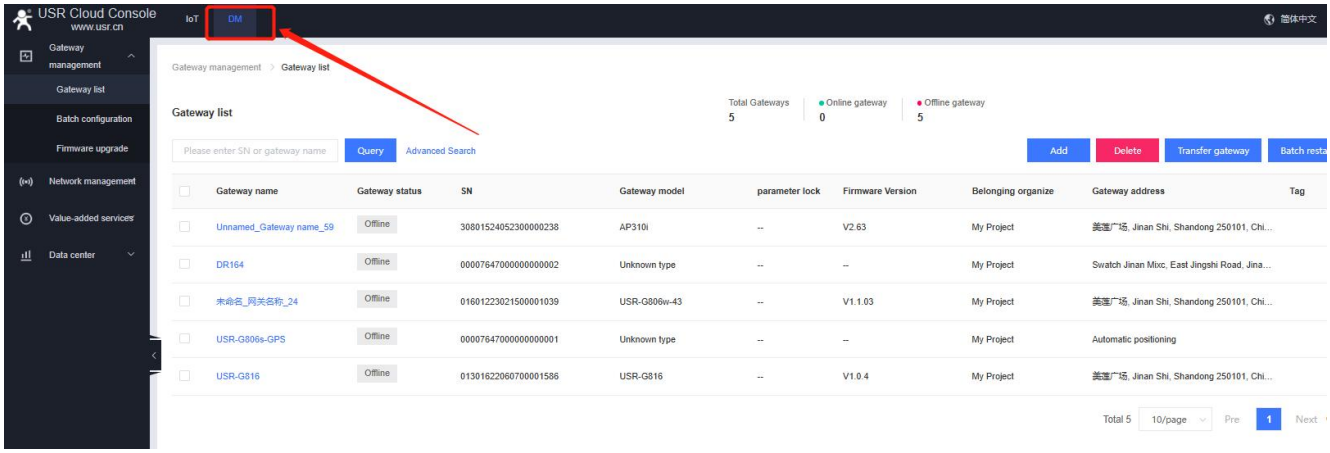


Figure 37. Click DM

2.7.1. Add bridge device in DM platform

Add bridge using SN and MAC. Users can get the SN and MAC on the back label or on the GUI of the bridge.

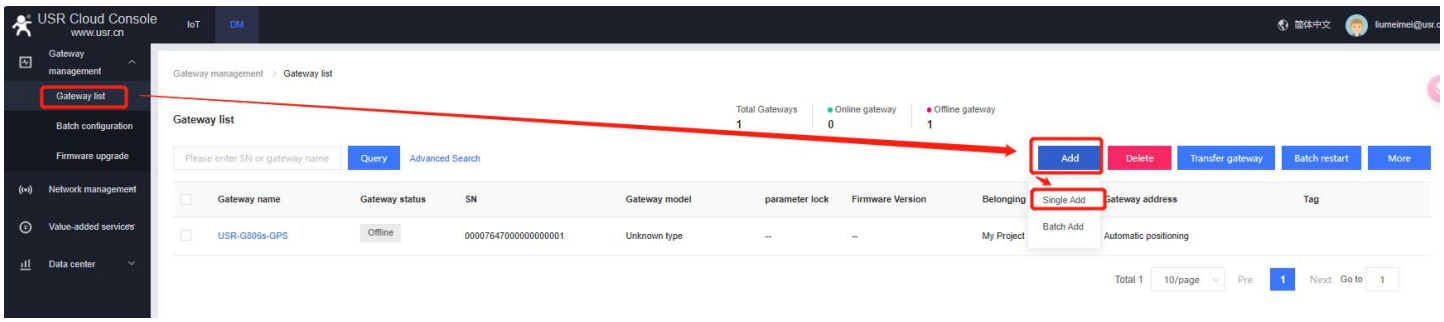


Figure 38. Add bridge

1> Add master bridge and slave bridge

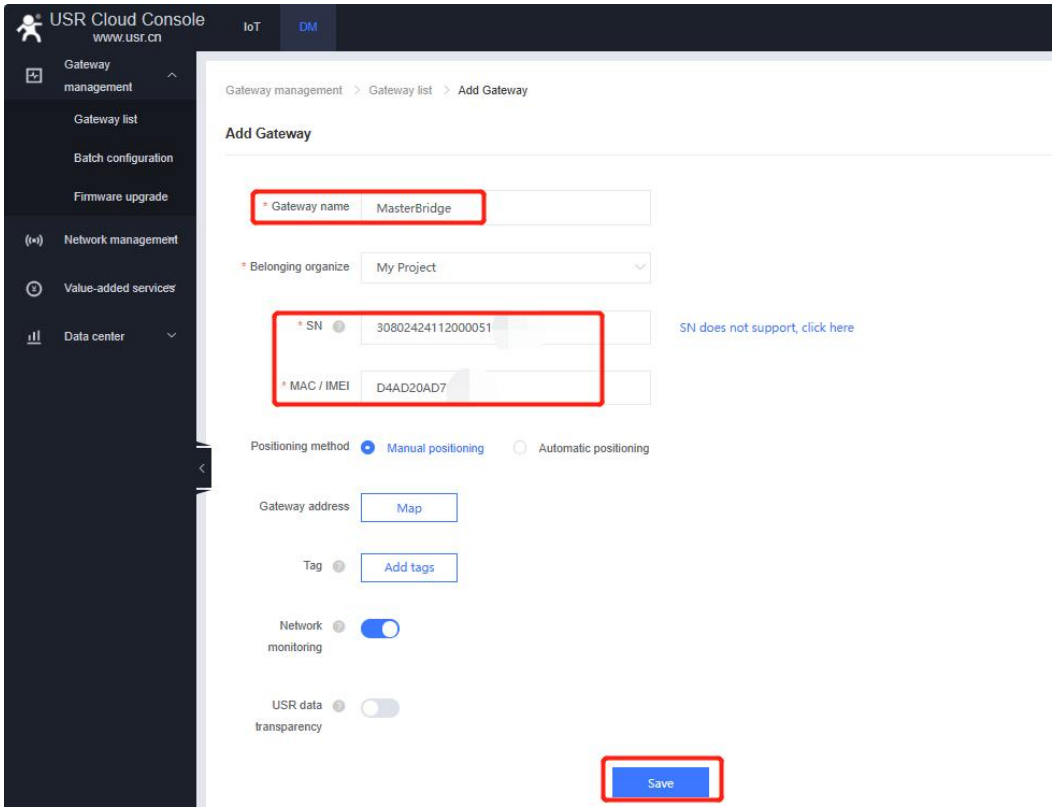


Figure 39. Add bridge

2> Add bridge device successfully

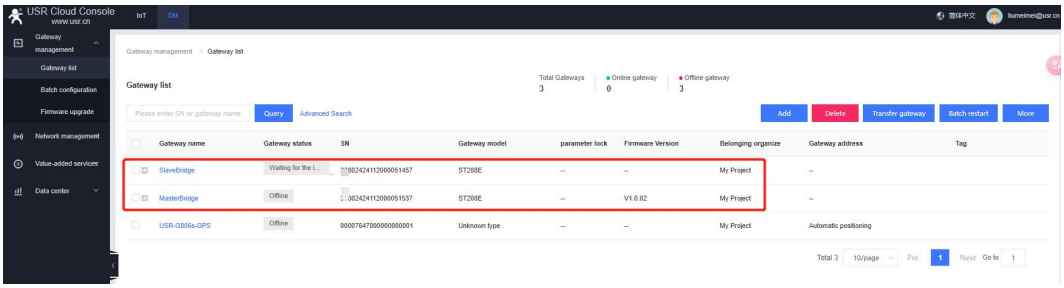


Figure 40. Add bridge device successfully

2.7.2. Set bridge device

Enable the DM platform. This function is enabled by default.

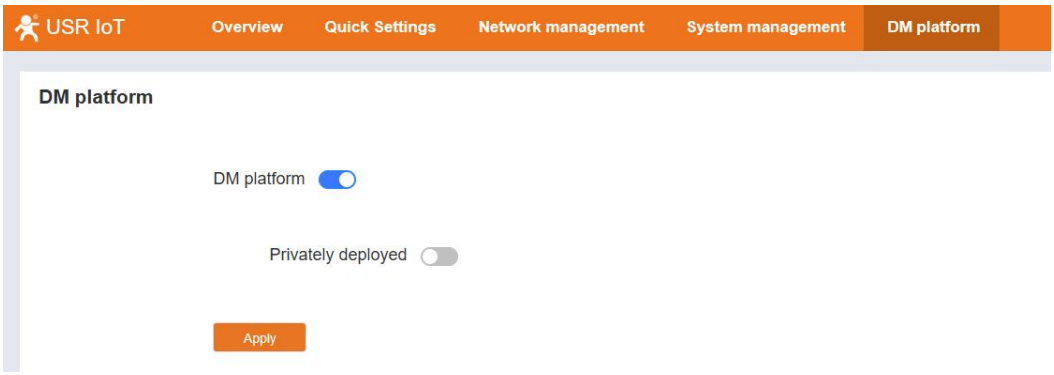


Figure 41. Enable DM platform

Connect the master bridge to a router that can access the Internet, and the master/slave bridge has been paired, the we can see the bridges get online.

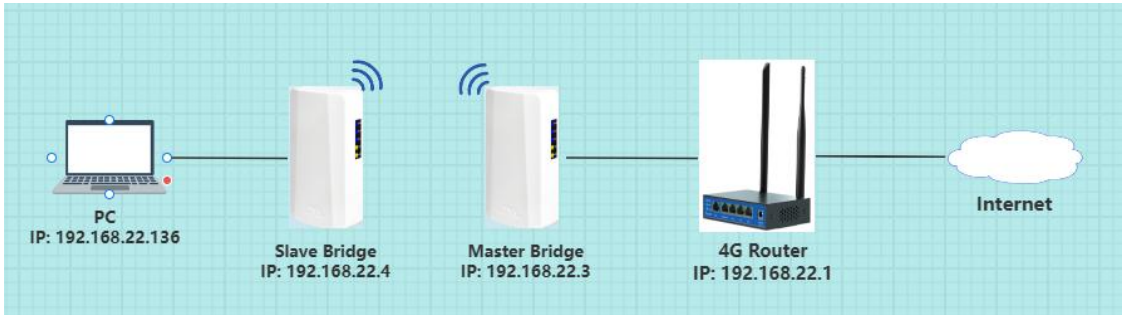


Figure 42. Network Diagram

Settings of the master bridge: if the bridge need to access the Internet, the DNS server must be set.

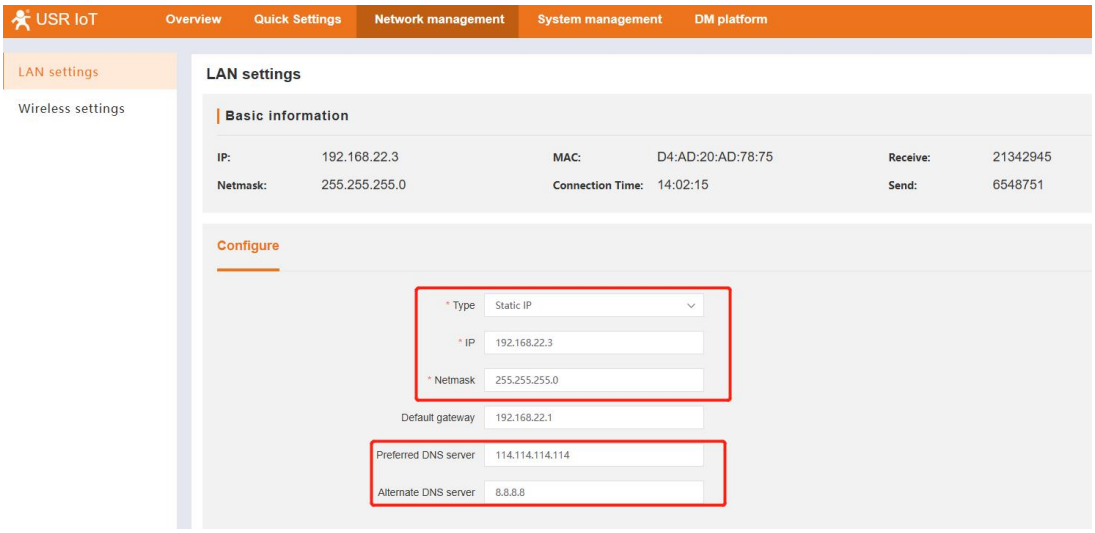


Figure 43. Settings of the master bridge

Settings of the slave bridge: if the bridge need to access the Internet, the DNS server must be set.

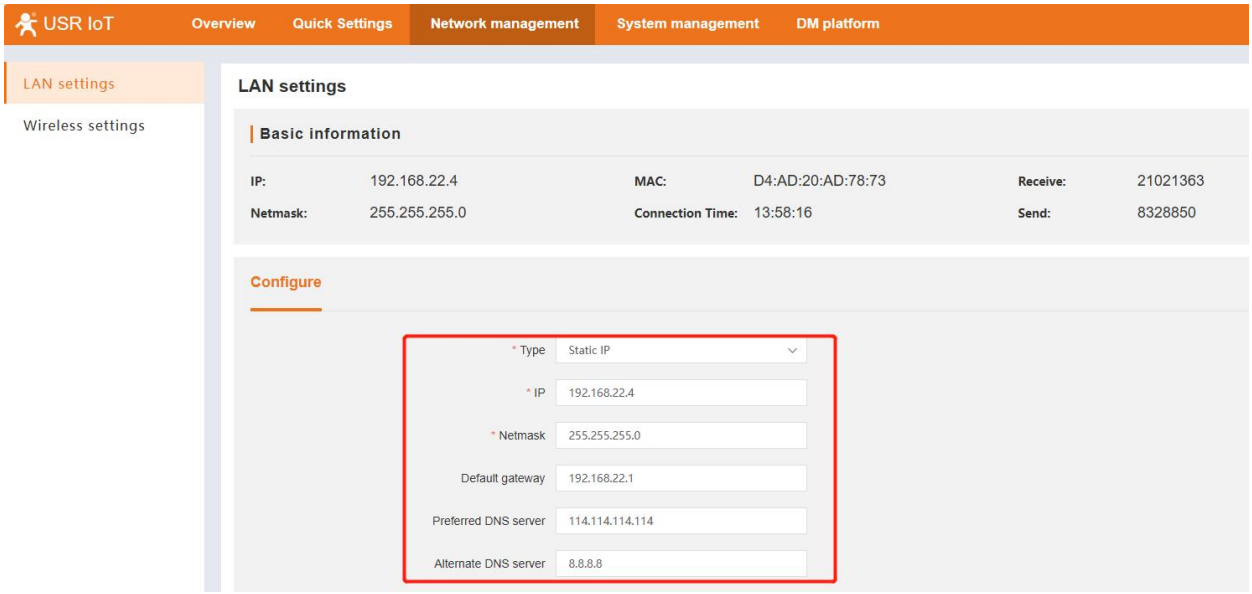


Figure 44. Settings of the slave bridge

2.7.3. The bridge get online

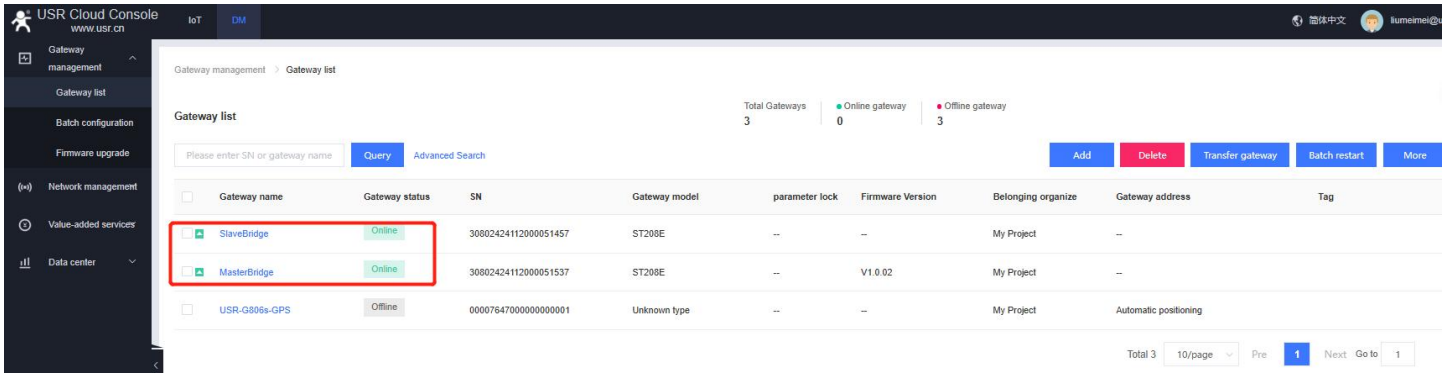
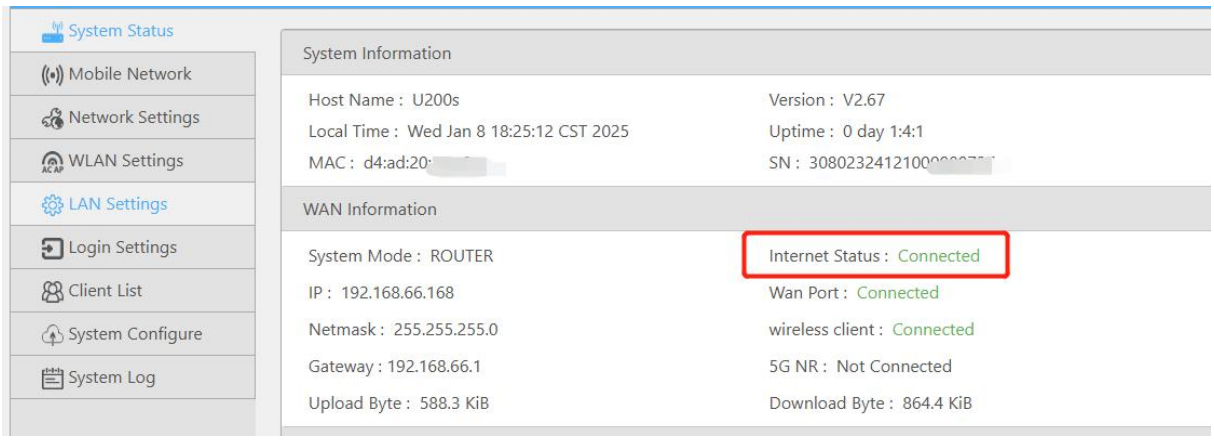


Figure 45. Get online



Users can also check the paired bridges on the platform. In this case there is one slave bridge is paired with master bridge.

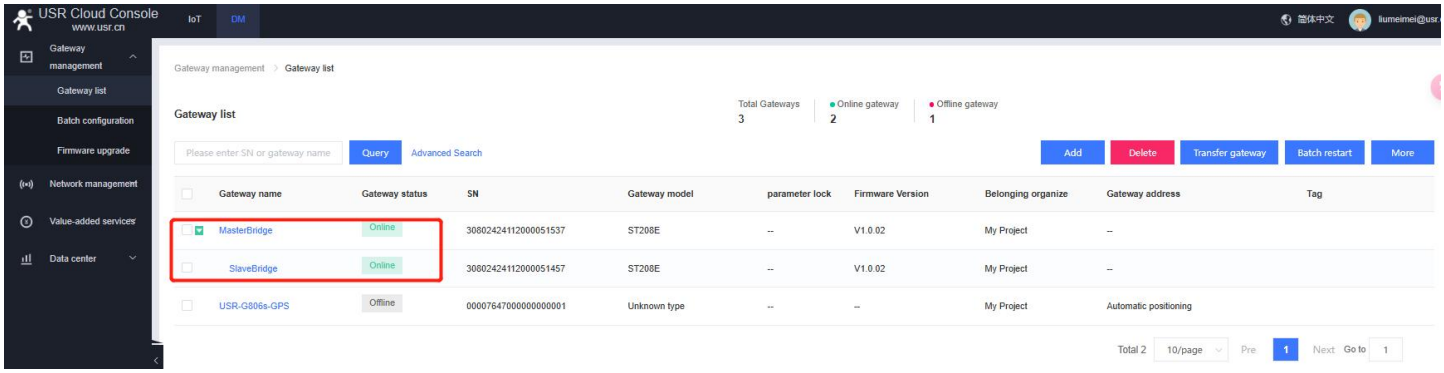


Figure 46. Paired bridges

Click the gateway name, it will display the bridge details.

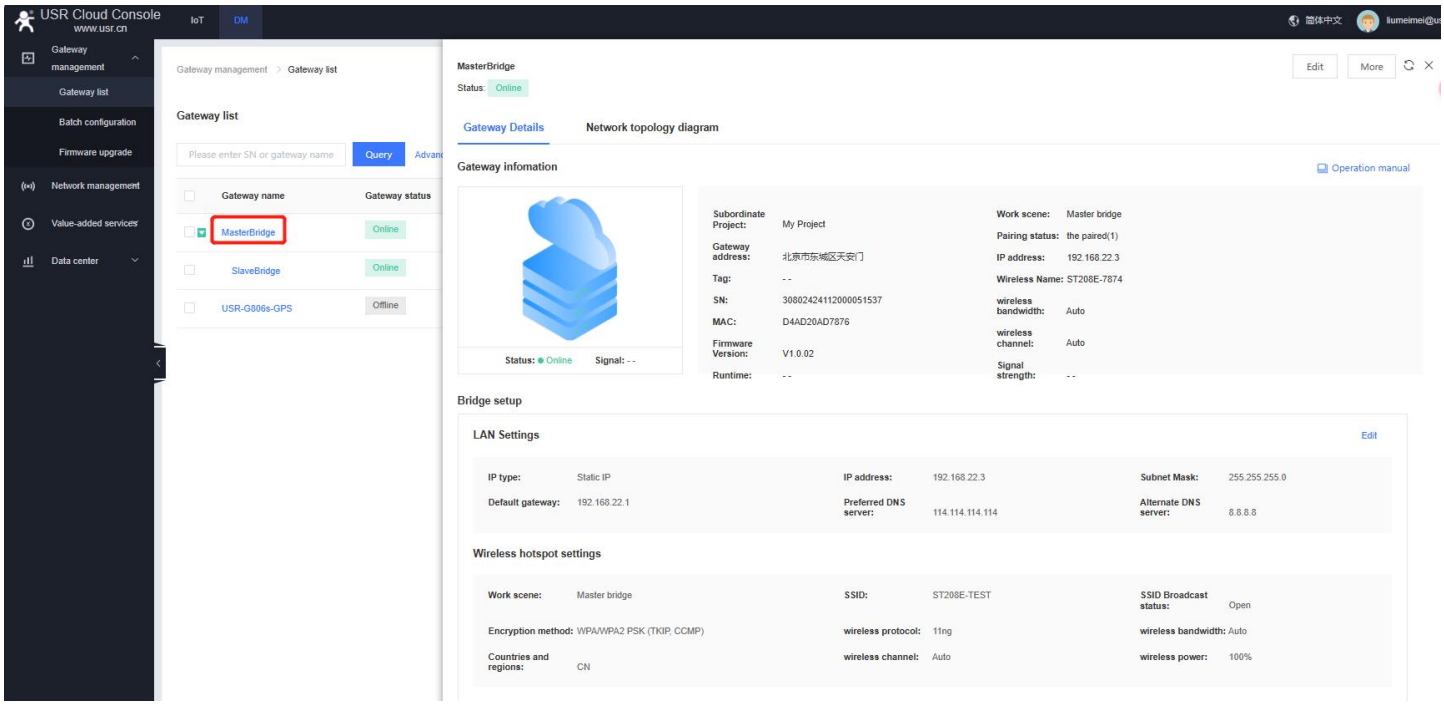


Figure 47. Bridge details

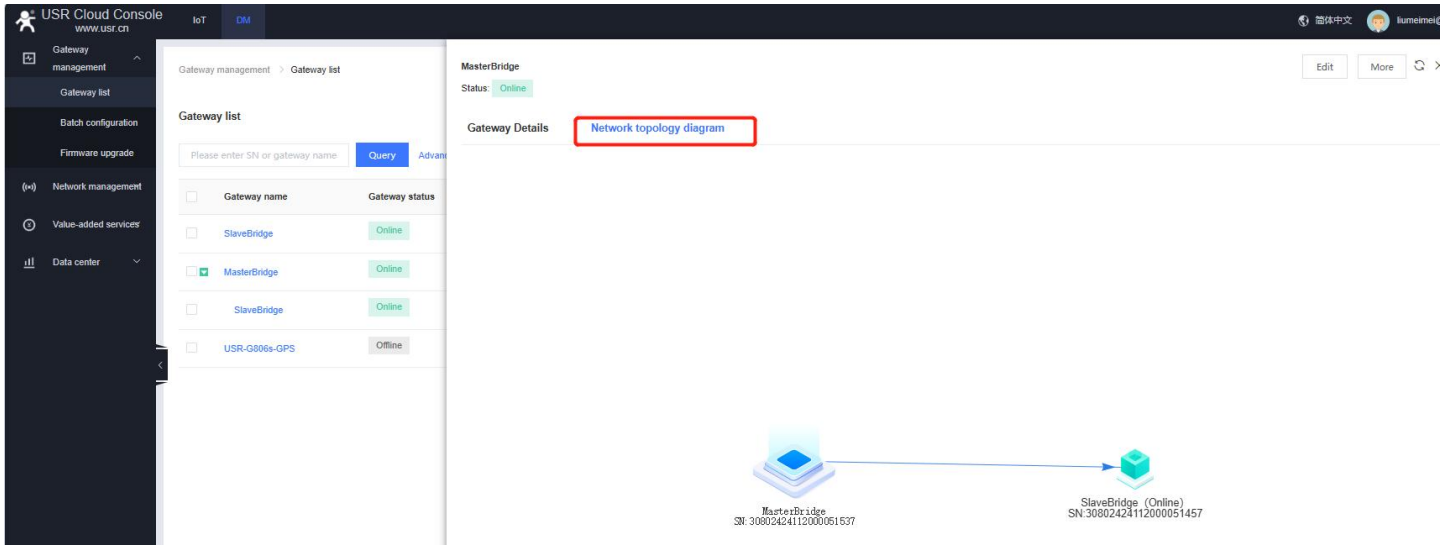


Figure 48. Network topology diagram

2.7.4. Open the GUI on platform

Click the “More” button to open the configuration page.

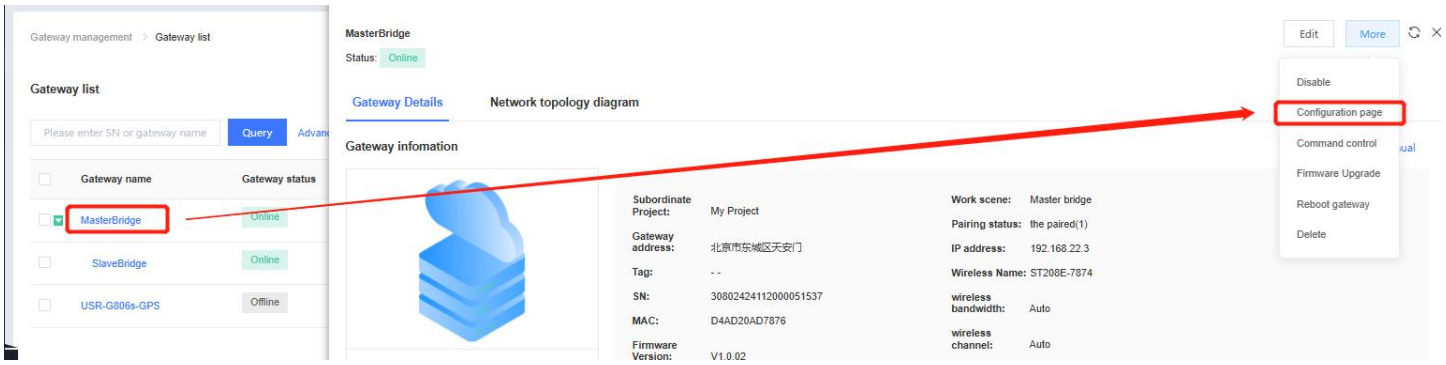


Figure 49. Open configuration page

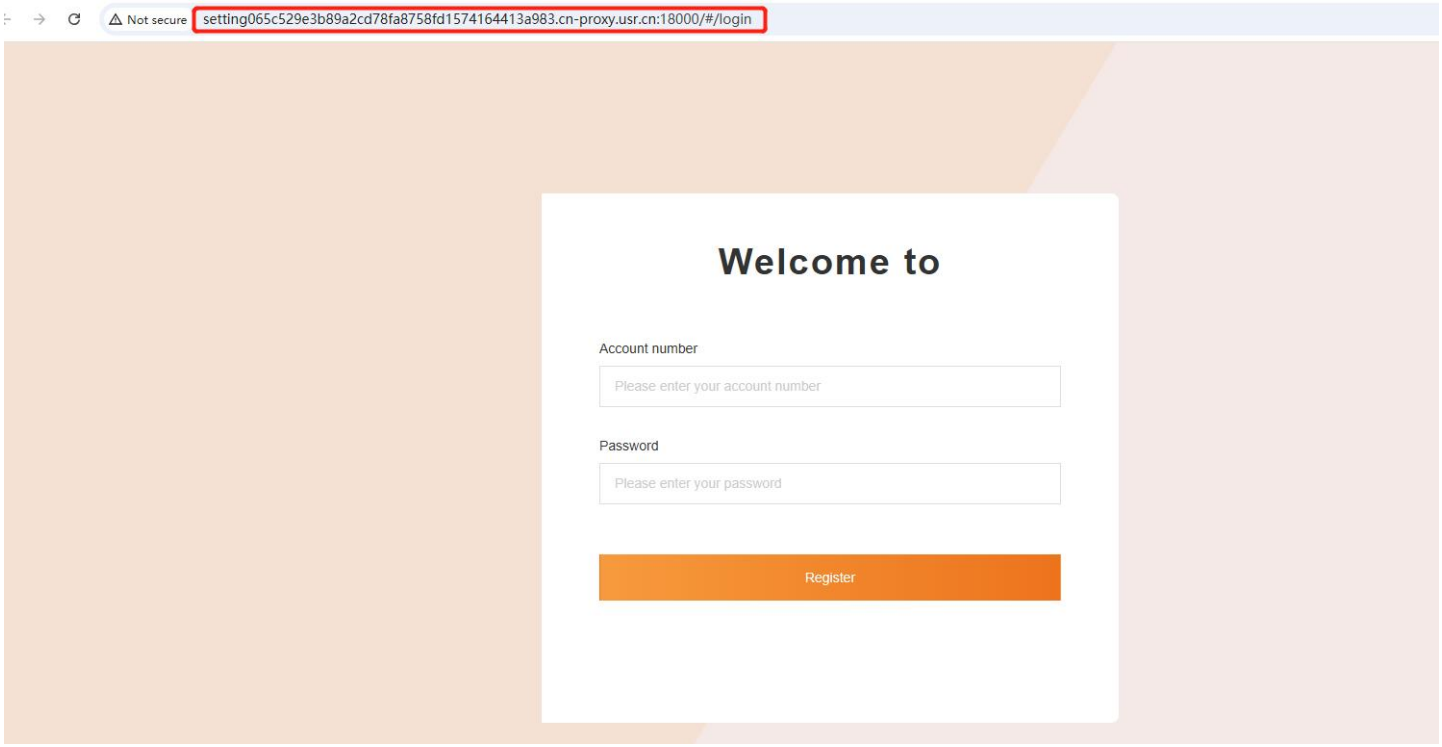


Figure 50. The login page

2.7.5. Firmware upgrading

Users can open the firmware upgrade page in 2 ways:

The first way:

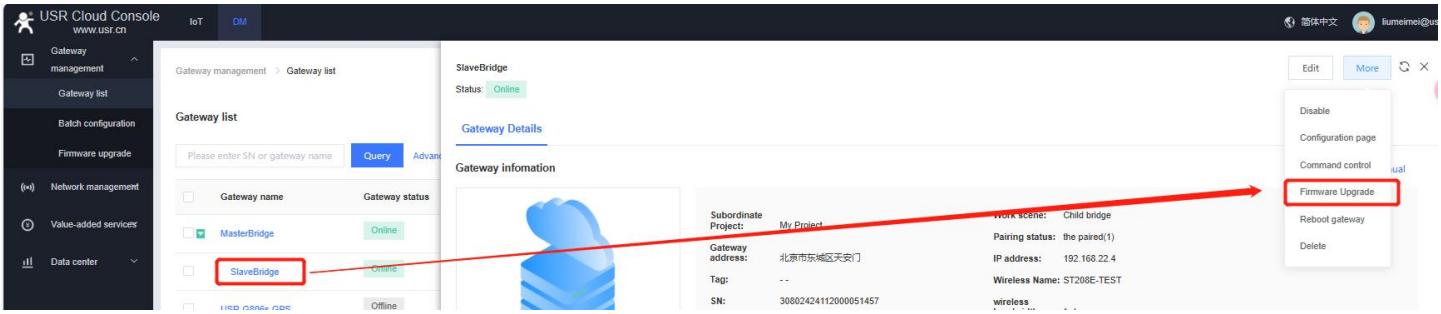


Figure 51. Firmware upgrade

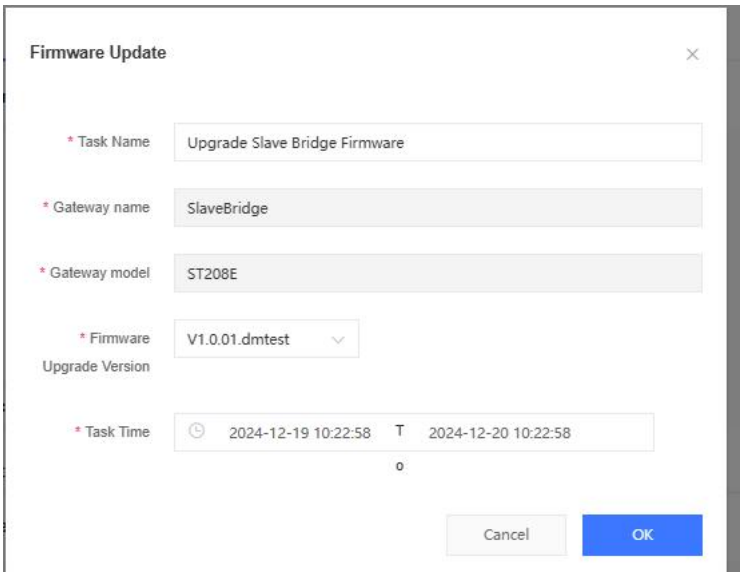


Figure 52. Firmware upgrade settings

The second way:

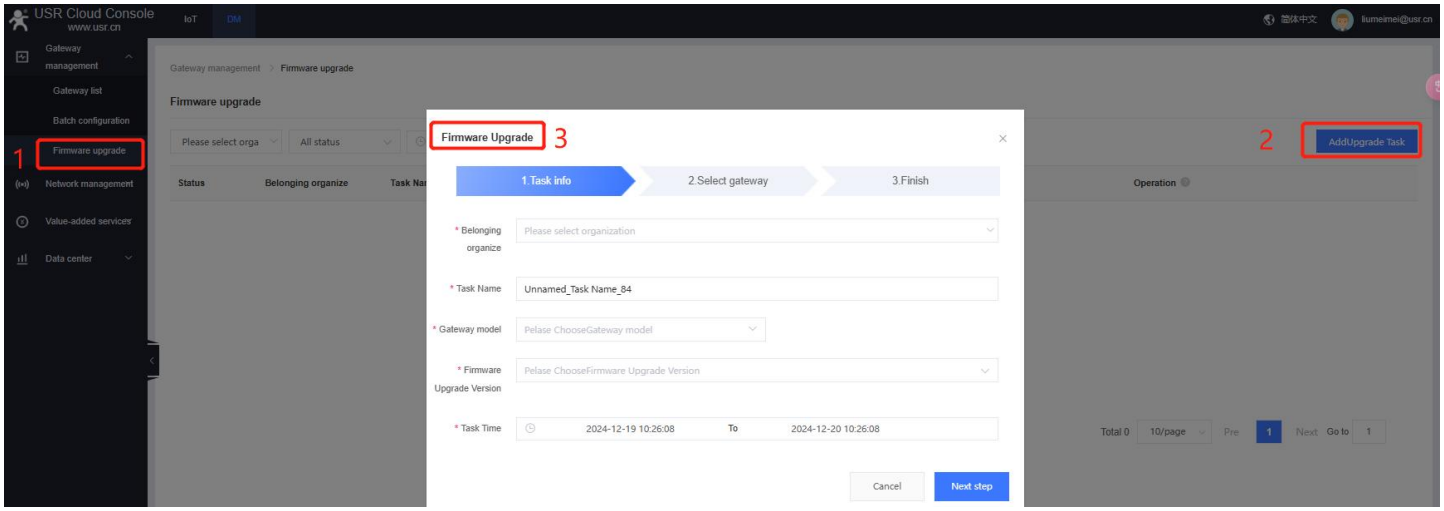


Figure 53. Firmware upgrading

2.7.6. Delete bridge device

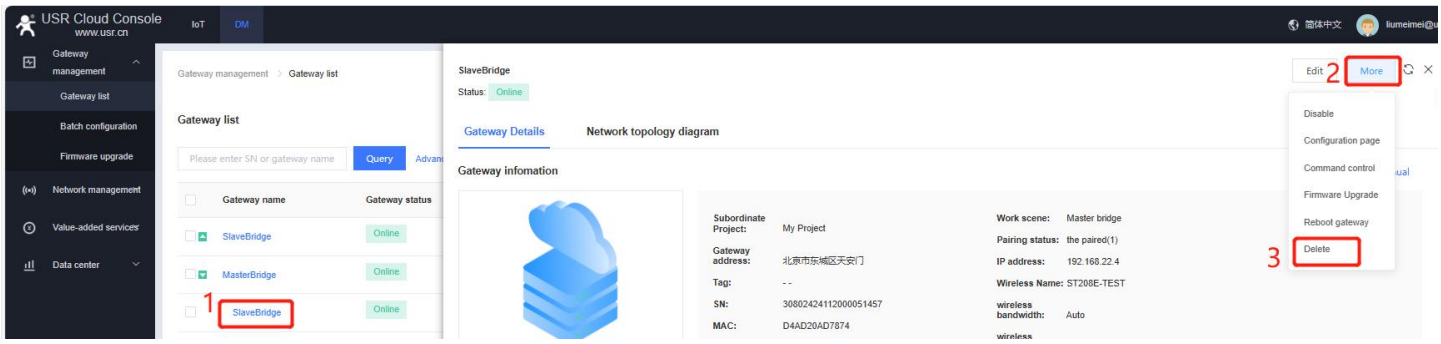


Figure 54. Delete bridge device

3. Warranty

4. Contact Us

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6. Revision History

Version	Date	Author	Description
V1.0.0	2023-11-17		Established
V1.0.1	2024-01-27	May Liu	Translation

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