LoRaWAN Gateway Embedded with NS User Manual	Ver.	Class
	V1.0.5	
	Product: LoRaWAN Gateway Embedded with NS	

LoRaWAN Gateway Embedded with NS User Manual

Hotline：400-8838 -199
Tel:+86-592-6300320
Fax:+86-592-5912735
Website:www.four-faith.com
Add:Floor 11,A06 building, No.370,Chengyi Street,Jimei District, Xiamen,China

Document Revision Record

Data	Ver	Description	Author
2020-04-30	V1.0.0	Original version	SGK
2020-05-15	V1.0.1	Modify data topology, and so on	YSL SGK
2020-05-21	V1.0.2	Add note for web browser	SGK
2020-06-22	V1.0.3	Improve document	SGK
2020-08-06	V1.0.4	Improve document	SGK
2020-09-27	V1.0.5	Function change update	SGK ZQG

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

Copyright Notice

All contents in the files are protected by copyright law, and all copyrights are reserved by Xiamen Four-Faith Communication Technology Co., Ltd. Without written permission, all commercial use of the files from Four-Faith are forbidden, such as copy, distribute, reproduce the files, etc., but non-commercial purpose, downloaded or printed by individual (all files shall be not revised, and the copyright and other proprietorship notice shall be reserved) are welcome.

Trademark Notice

Four-Faith、四信、 、 、 are all registered trademarks of Xiamen Four-Faith Communication Technology Co., Ltd., illegal use of the name of Four-Faith, trademarks and other marks of Four-Faith is forbidden, unless written permission is authorized in advance.

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

Content

Preface 6
1 Product Introduction 7
1.1 Embedded NS location in LoRaWAN network 8
1.2 Features 8
2 page introduction 10
2.1 Open the web 10
2.2 Login 10
2.2.1 Menu directory 11
2.3 Status 12
2.3.1 Overview 12
2.3.2 LoRa Packet Logger 13
2.3.3 System Log 13
2.4 Network 14
2.4.1 WAN interface 14
2.4.2 Wi-Fi 15
2.4.3 Network Diagnose 15
2.4.4 Firewall 16
2.5 LoRa Gateway 16
2.5.1 LoRa gateway 16
2.6 LoRa Network Server 18
2.6.1 Status 18
2.6.2 Basic setting 19
2.6.3 Gateway 19
2.6.4 Application 20
2.6.5 Global integration 22
2.7 Device 24
2.7.1 Overview 24
2.7.2 Configure 25
2.7.3 Activiation 25
2.7.4 Downlink 26
2.7.5 Live Device Data 27
2.8 System 27
2.8.1 System information 27
2.8.2 Change Password 28
2.8.3 Reboot 28
2.8.4 Restore Default 29
3 Common operations 30
3.1 Enter the management platform 30
3.2 Use Public NS 30

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

3.3 Use Build-in NS 31
3.3.1 Basic 31
3.3.2 Application - Device 31
3.4 MQTT data Uplink and Downlink 33
3.4.1 Configurations 33
3.4.2 Uplink data 34
3.4.3 Downlink data 35
4 DATA Format 36
4.1 Uplink Data 36
4.2 Join Notification 37
4.3 Downlink Data 37

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

Preface

Overview

This user manual suits F8926-GW/F8L10GW embedded with NS version. F8926-GW/F8L10GW embedded with NS version can be configured as a common LoRaWAN gateway to transparently transmit data to an external NS server, or set as an embedded NS to directly connect to the customer platform, or set as multiple gateways , using one of the gateways as the NS server, the others as general gateway, and finally forms a gateway group from its web configuration page. Combined with LoRaWAN standard products, including LoRaWAN module, LoRaWAN terminal, LoRaWAN gateway and base station.

You can quickly understand the architecture and functions of the embedded NS, and quickly build a LoRaWAN network using the embedded NS by reading this document.

Readers

This manual is mainly intended for the following engineers:

- System Design Engineer
- Software Engineer
- Test Engineer
- Technical Support Engineer
- Customer

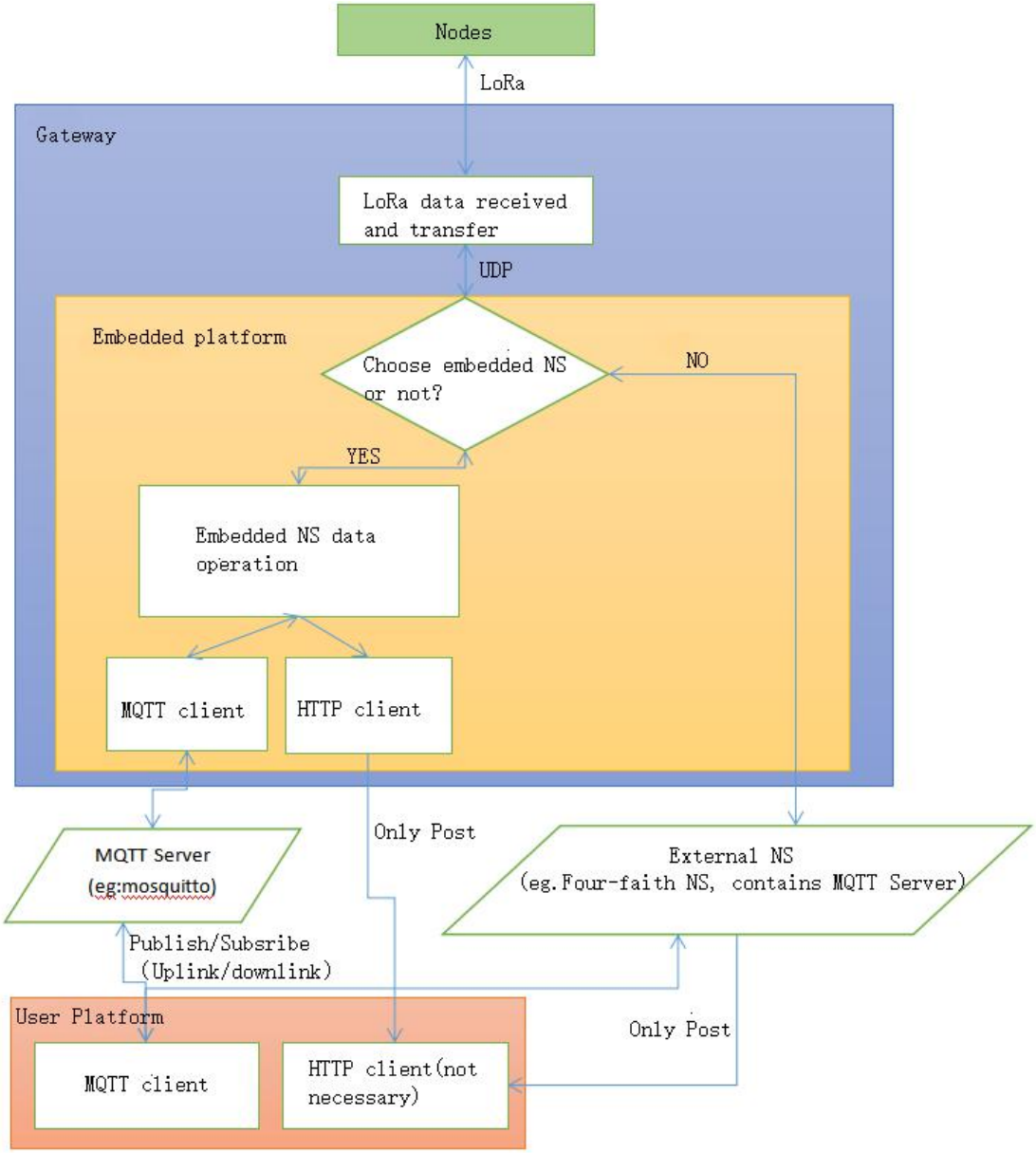
Brief Introduction

This document includes 4 chapters, as followings:

Chapter	Content
1.Product Introduction	Graphical overall architecture, including interfaces, etc.
2.Page Introduction	Each web page function introduction
3.Common operations	Common setting steps
4.Data Format	Various data formats for docking clients

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

1 Product Introduction



Data Topology

As shown in the figure above, LoRa data receiving and forwarding is the data transfer processing program in the original gateway, this program is to transmit LoRa uplink and downlink data transparently. It receives and packs data simply then forward to NS, or receives NS downlink data and sends to LoRa concentrator, then sends to device. Now the program is modified to communicate with the embedded NS (UDP port is 1699 by default); The data flow direction can be configured in the embedded NS. It will be the same as the traditional mode if the flow is to the external NS, the embedded NS is only for data forwarding and statistical information function. Greatly facilitates

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

customers to observe the nearby LoRa network environment, so that channel conflicts can be avoided by modifying the frequency grouping. The data will be transferred to embedded NS for processing if it is configured as a embedded NS, and the data will communicate with external clients through the following MQTT or HTTP. The data format is exactly the same as the original Four-Faith external NS.

Embedded NS is used as the LoRaWAN core network. The product can theoretically support a large number of gateways and nodes to access, it manages LoRaWAN equipment network addition, data encryption and decryption, data uplink and downlink, and data push. The uplink data is decrypted by LoRaWAN and establishes a relationship with the client through the interface, and the uplink data is sent to the client platform. Users can download data through MQTT and send it to devices after being encrypted by LoRaWAN.

This document describes the functions of LoRaWAN gateway embedded NS in detail , the meaning of each function module, and the related operations and parameter meanings.

1.1 Embedded NS location in LoRaWAN network

Four-Faith LoRaWAN gateway Embedded NS is safe and reliable. It supports ADR(Auto Data Rate) feature. It uses UDP to communicate between embedded NS and base station, and the protocol is LoRa Alliance Standard protocol. Users don’t need external NS if use this LoRaWAN gateway Embedded NS.

1.2 Features

- Can switch to embedded NS or external NS at any time
- Statistics on the data reported from gateway, and compares the uplink data and data rate
- View gateway real-time data report
- View system operation log and set log level
- View and configure wan port, WiFi, firewall parameters
- Check network connection, configure the gateway's uplink and downlink frequency points, and choose the default group or custom frequency point
- LoRa network server adopts a hierarchical management mechanism, which is convenient for device management. It’s divided into applications and devices to meet different application scenarios from different industries
- Support ClassA, ClassC
- Support LoRaWAN version (V1.0.2)
- Support to modify the device communication rate range, such as set to SF7-SF12
- Support to modify the downlink transmit power
- Support OTAA method

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

- Add devices automatically, no need to add in advance
- Real-time view of the device uplink and downlink data
- Multi-gateway can be added, and judge gateway real- time online status
- Provide HTTP push or MQTT subscription and publishing externally to achieve data uplink and downlink
- Support to switch between Chinese and English
- WIFI IP is fixed for easy configuration management
- Node data packet loss rate statistics
- Support a large number of nodes, up to 1000 for one single embedded NS
- Support multiple gateways to form a gateway group, where the main gateway opens the embedded NS, and other data flows to the main gateway, the number of main gateways can be up to 10

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2 page introduction

Note: The order of introduction on following pages is from left to right, top to bottom

2.1 Open the web

1) Method 1:

After the gateway is powered on, the default wifi name: Four-Faith-LoRaWAN, the default password is 123456, after connected, open the browser: http://192.168.240.1:8080

2) Method 2:

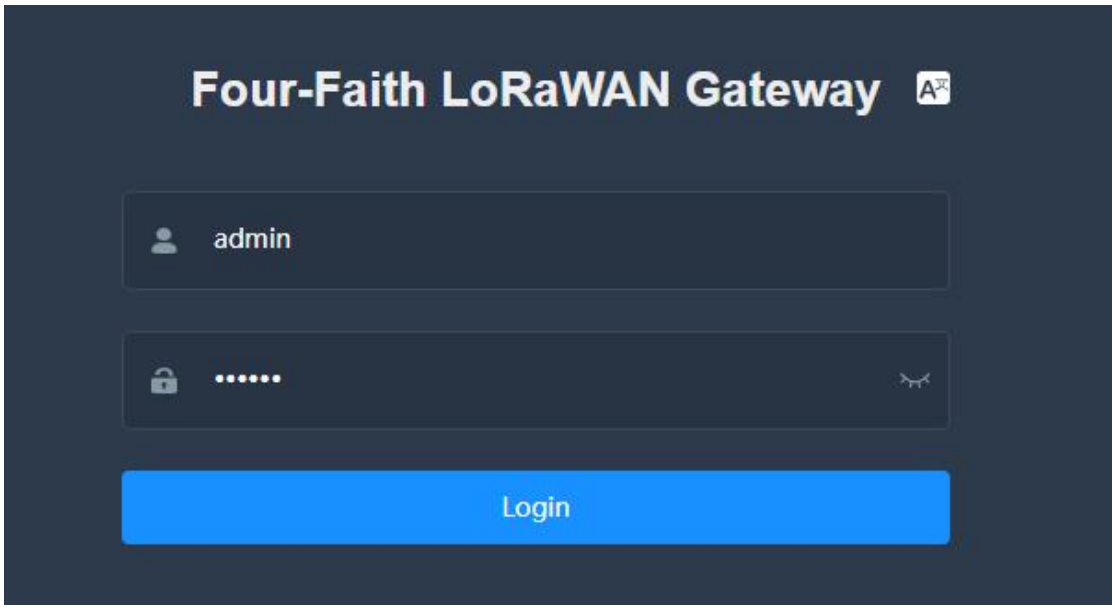
The gateway WAN address (if set to static IP-192.168.1.88), you can directly visit http://192.168.1.88:8080

3) If the page is abnormal or you cannot log in (such as modifying the gateway IP, network connection type, etc.), try to refresh page by CTRL+F5 or use the incognito mode to browse

Note: Please use Google Chrome, other browsers may have compatibility issues

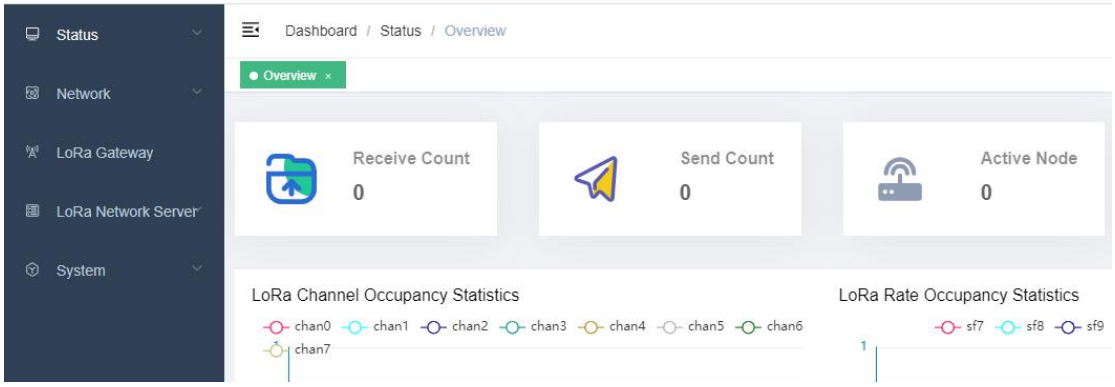
2.2 Login

In the upper right corner, you can switch between Chinese and English. After entering the user name and password, click Login. Default user name: admin, password: 123456



Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.2.1 Menu directory

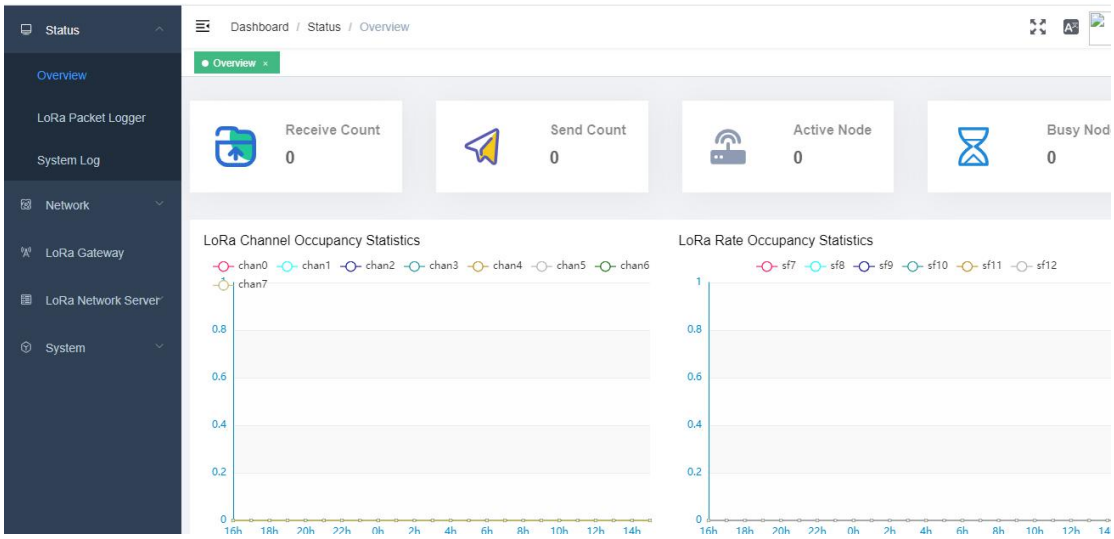


- As shown in the figure above, the menu on the left is briefly introduced from top to bottom as follows
- Status: Display the data reported by the gateway, display the channel occupancy and data rate of the reported data, view the real-time log of the uplink and downlink, and view the system log
- You can view and set routing related parameters, and also detect the current network environment
- LoRa Gateway: Built-in or external NS can be configured, and the uplink frequency of the gateway can be configured
- LoRa network server: When the data is configured as the built-in NS, When the device is added to the network, the parameters can be automatically added after the successful verification, without adding the device list in advance
- System: View and configure system related parameters, modify user password and restart the system, etc.
- Upper right corner-Right 1: Click the drop down to log out
- Upper right corner-right 2: switch between Chinese and English
- Upper right corner-right 3: Full screen, click to restore normal screen after full screen
- The middle button on the right: display the theme and other settings

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.3 Status

2.3.1 Overview

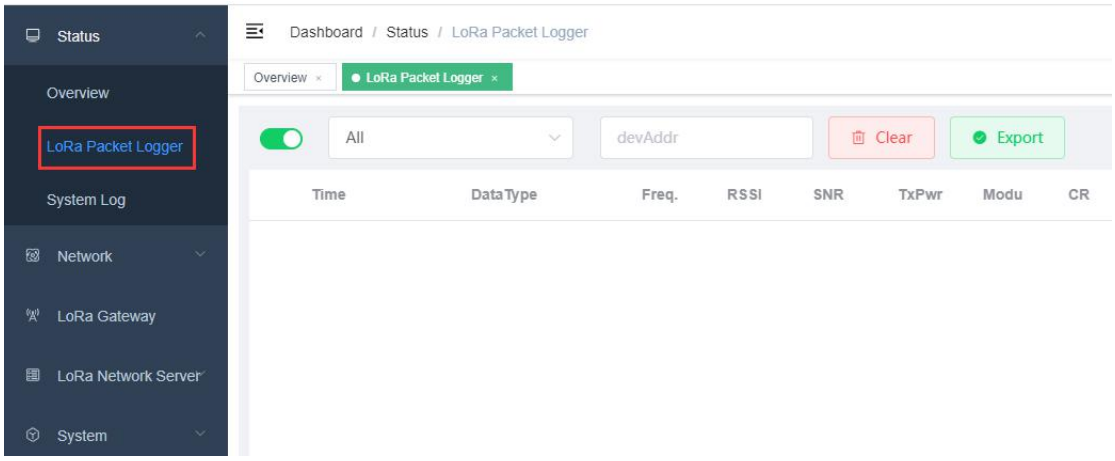


As shown in the figure above: It mainly contains some statistical information (statistical information will be re-stated after the gateway restarts). The following details are introduced:

- Receive Count：the number of messages received since the system started
- Send Count：the number of messages sent when the system starts
- Active Node：the number of uplink nodes received by the gateway
- Busy node: the node is regarded as a busy node if it is sending twice data in 10 seconds, and the number in the past 1 hour is counted here
- LoRa Channel Occupancy：channel occupancy in each period in the past 24 hours
- LoRa Rate Occupancy Statistics：the rate occupancy of each period in the past 24 hours
- LoRa network server: system startup time, LoRa protocol, number of devices, number of NS devices uplink, number of NS devices downlink, NS MQTT connection status
- System: host name, lan mac, wan mac, wireless mac, wan ip, lan ip, wan protocol respectively
- Wireless: wireless switch, mode, network mode, name, channel, transmission power respectively

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

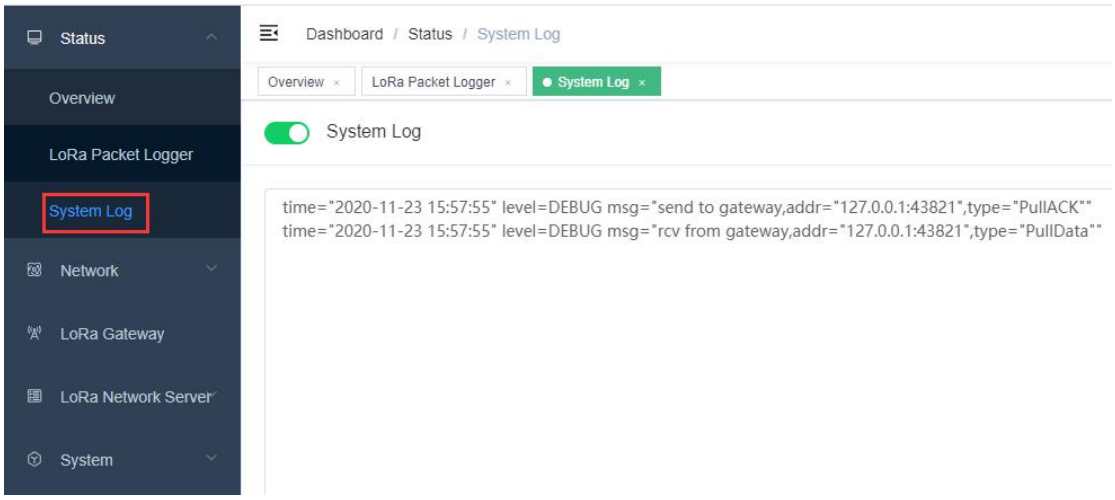
2.3.2 LoRa Packet Logger



As shown above: The main function is to display the data reported by the gateway in real time. The details are as follows:

- Switch: open by default, can be paused, data is only stored in the background for 10s , will be deleted when it expires
- Type Selection： include ALL/Join Request/Join Accept/Unconfirmed Data Up/Unconfirmed Data Down/Confirmed Data Up/Confirmed Data Down
- devAddr： Enter the short address allocated by the network, then only the relevant data information of the address will be displayed
- Clear: clear the displayed data
- Export: Export the data to excel

2.3.3 System Log



As shown in the figure above: The main function is to display the real-time log of the system running, which is convenient for checking the running status. The details are as follows:

- Switch: open by default, can be paused
- Copy: Copy all the displayed logs and paste them on the notepad by

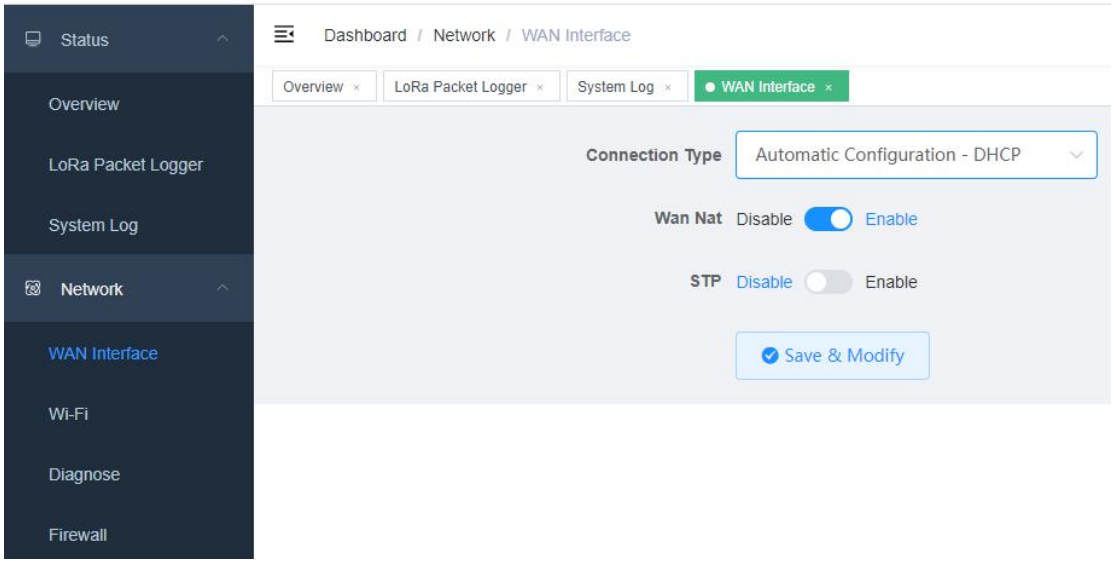
Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

pressing CTRL+V

- Clear: clear all current logs

2.4 Network

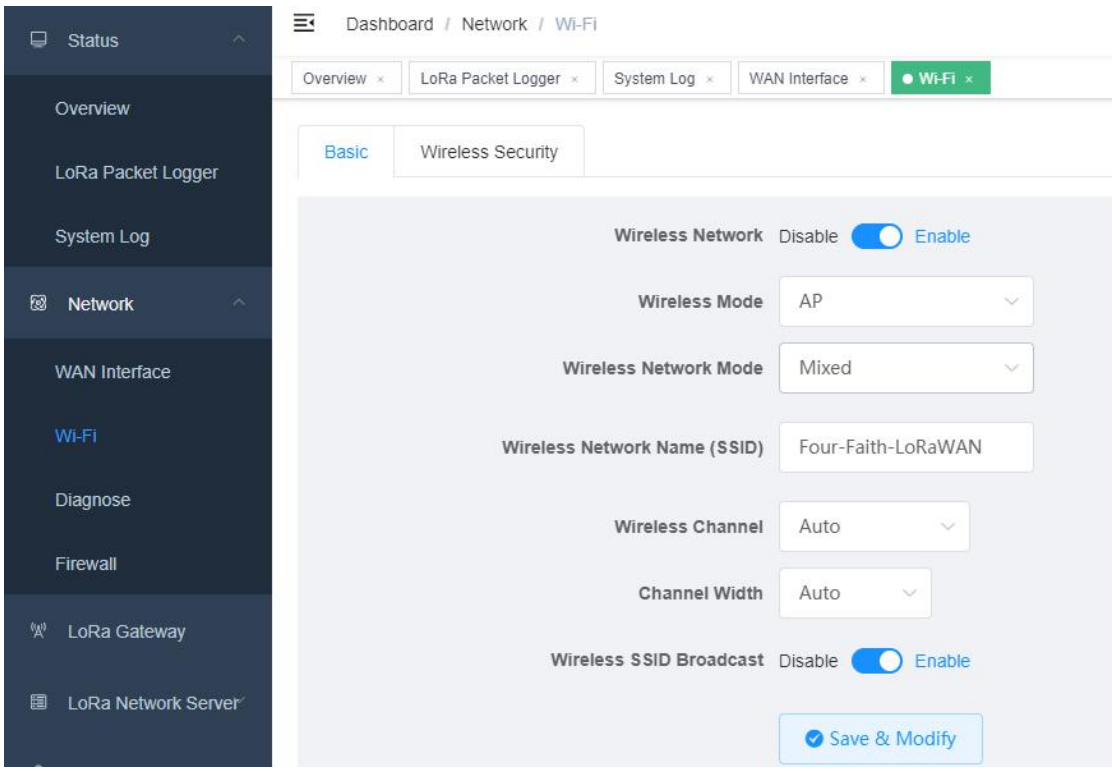
2.4.1 WAN interface



- network configuration, such as static IP or DHCP

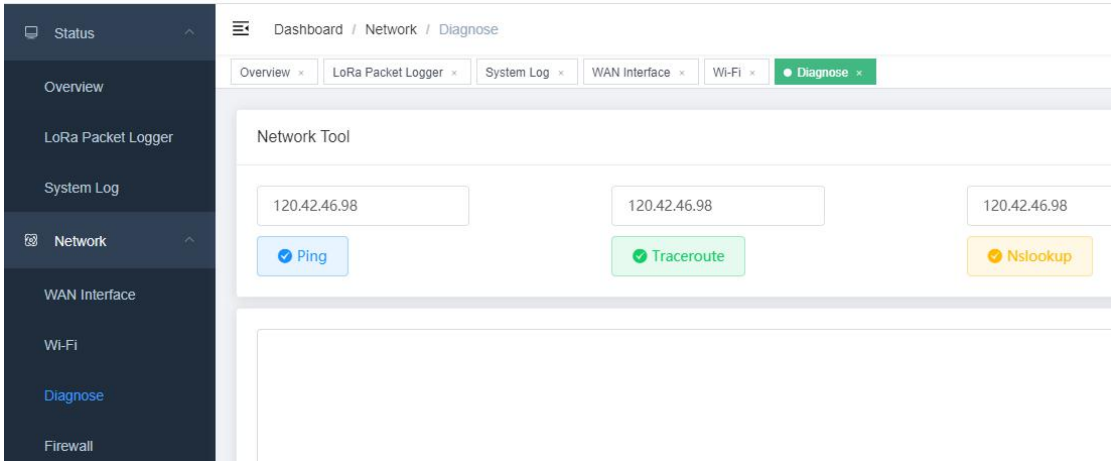
Add: Floor 11, A06, No. 370 Chenyi Street Jimei, Xiamen, Fujian, China
http: //www.four-faith.com Tel: 400-8838-199 Fax: 0592-5912735

2.4.2 Wi-Fi



- Configure wireless parameters, including mode selection and wireless security settings
- After the parameter is modified here, the wifi will restart, and device need to reconnect to the wifi to use it

2.4.3 Network Diagnose



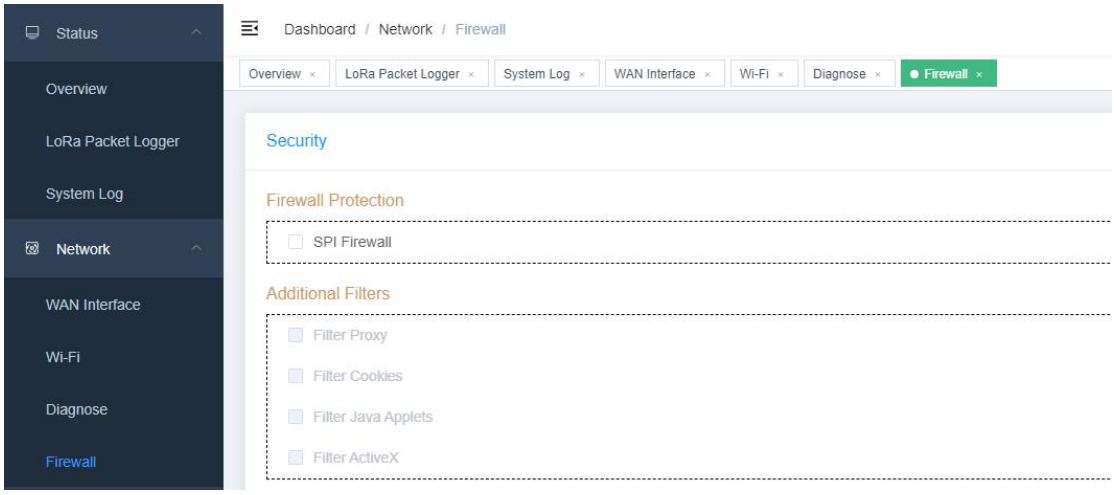
As shown in the figure above: The function is to diagnose the current network environment of the router. The execution commands are as follows:

- Ping: ping -c 4 120.42.46.98

Add: Floor 11, A06, No. 370 Chenyi Street Jimei, Xiamen, Fujian, China
http: //www.four-faith.com Tel: 400-8838-199 Fax: 0592-5912735

- Traceroute: traceroute -n -m 4 -q 3 -w 2 120.42.46.98
- Nslookup: nslookup 120.42.46.98
- Copy: copy log
- Clear：Clear the log

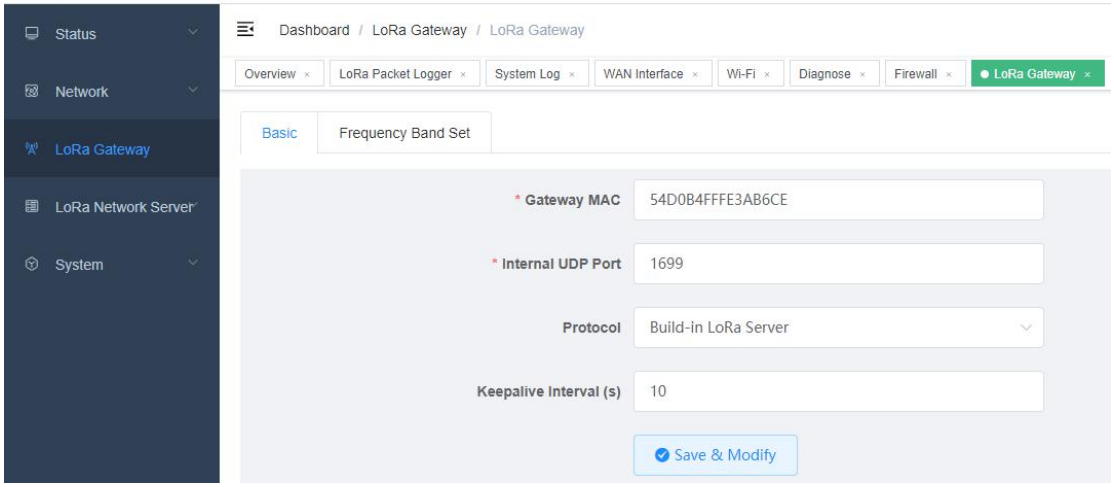
2.4.4 Firewall



- Configure firewall related parameters
-

2.5 LoRa Gateway

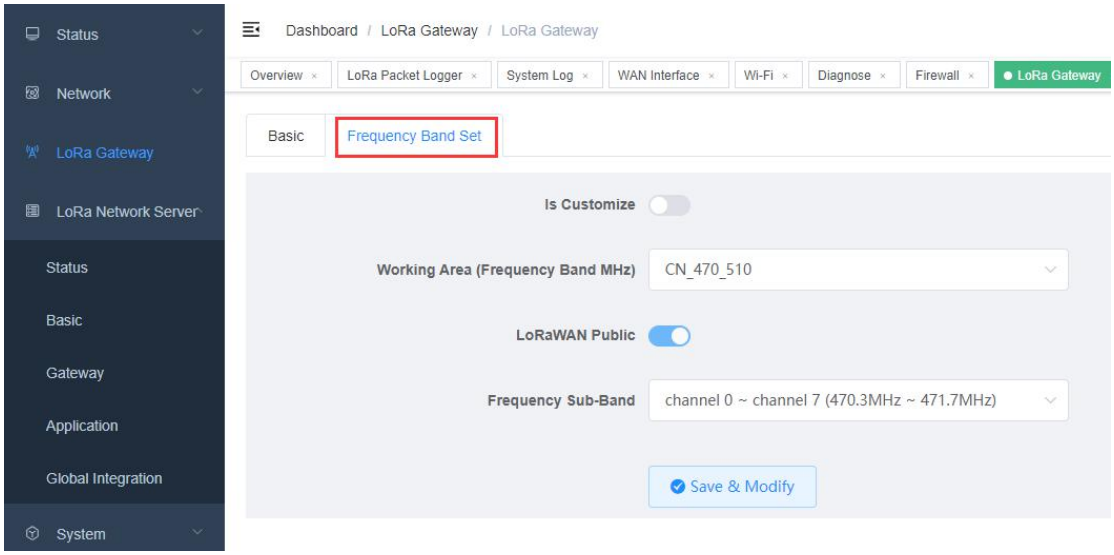
2.5.1 LoRa gateway



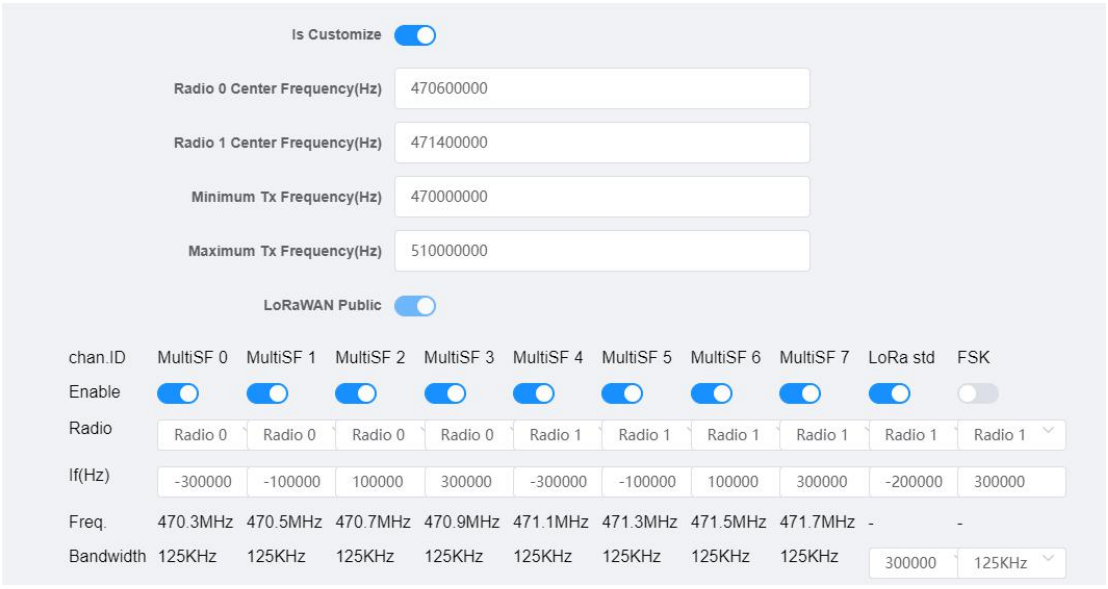
- Currently is external NS mode, it can be modified to built-in NS
- When configured as gateway cascade, the internal communication port and server port (UDP) cannot be the same
- Device information (including network information) when switching between internal and external NSs is different on different NS, and devices

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

generally need to be re-joined



- Support to choose between custom and non-custom modes
- Non-custom mode (recommended)-select the frequency band (such as CN470), select the corresponding group (the group contains the start-end value of the frequency point, a total of 8 frequency points, 0.2MHz interval)
- Custom mode-can manually modify the center frequency point and frequency point offset (as shown below)
- The frequency band and frequency parameters set here are lora radio frequency transceiver parameters. After modification, the gateway's receiving frequency of lora signal and other information will be adjusted



- The custom mode is mainly to meet the special frequency needs of customers

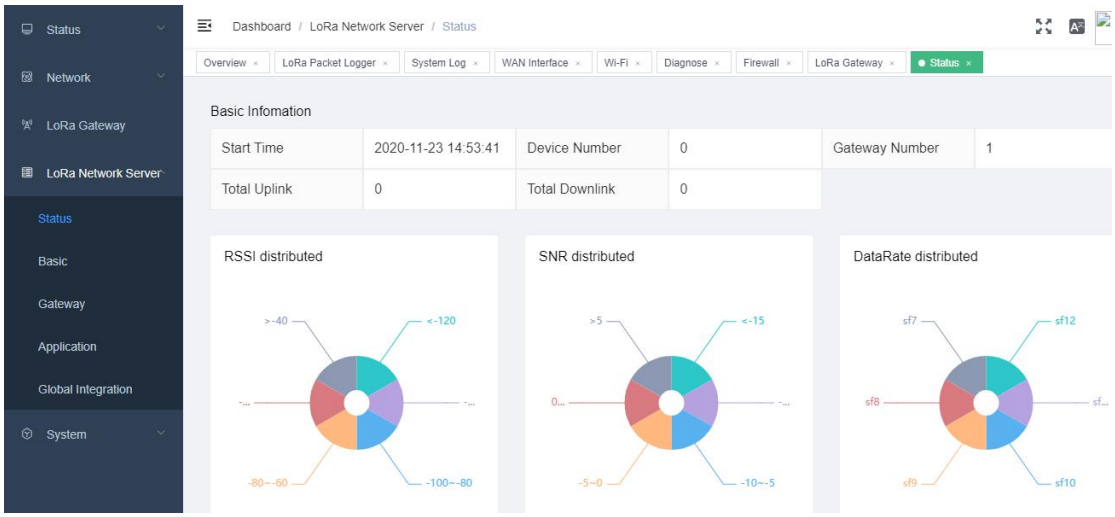
Add: Floor 11, A06, No. 370 Chenyi Street Jimei, Xiamen, Fujian, China
http: //www.four-faith.com Tel: 400-8838-199 Fax: 0592-5912735

- Each parameter in the picture can be modified, but due to the limitation of the radio frequency board hardware, it still needs to be configured according to the LoRaWAN specification
-

2.6 LoRa Network Server

LoRa network server: As the LoRa core network, it carries the encryption, decryption and network operations of LoRaWAN data

2.6.1 Status



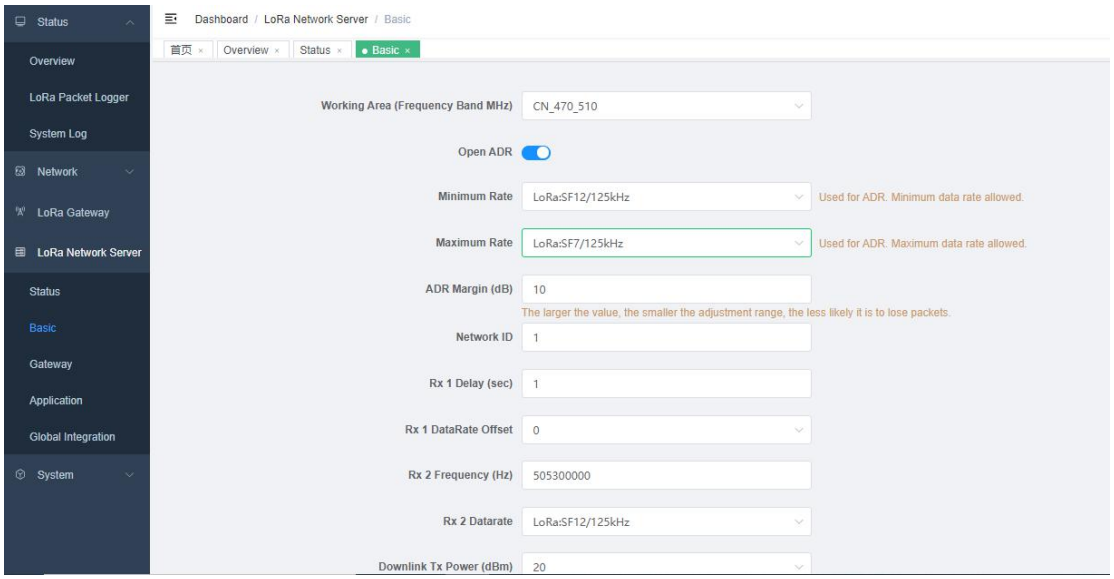
As shown in the figure above: To use this function, you need to configure the protocol in the LoRa gateway as Build-in LoRa Server, and the data will flow to the LoRa network server. The functions are described as follows:

- Start-up time: system start-up time
- Number of devices: the number of devices that have been added
- Number of gateways: the number of gateways that have been added
- Total Uplink：The total number of uplink packets of the added device since the system starts
- Total Downlink: The total number of downlink packets of the added device since the system starts
- RSSI distributed：Upstream data RSSI distribution of all devices in the past 24 hours
- SNR distributed：SNR distribution of uplink data of all devices in the past 24 hours
- DataRate distributed：DataRate distribution of uplink data of all devices in the past 24 hours
- Communication distributed：the distribution of the uplink and downlink data

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

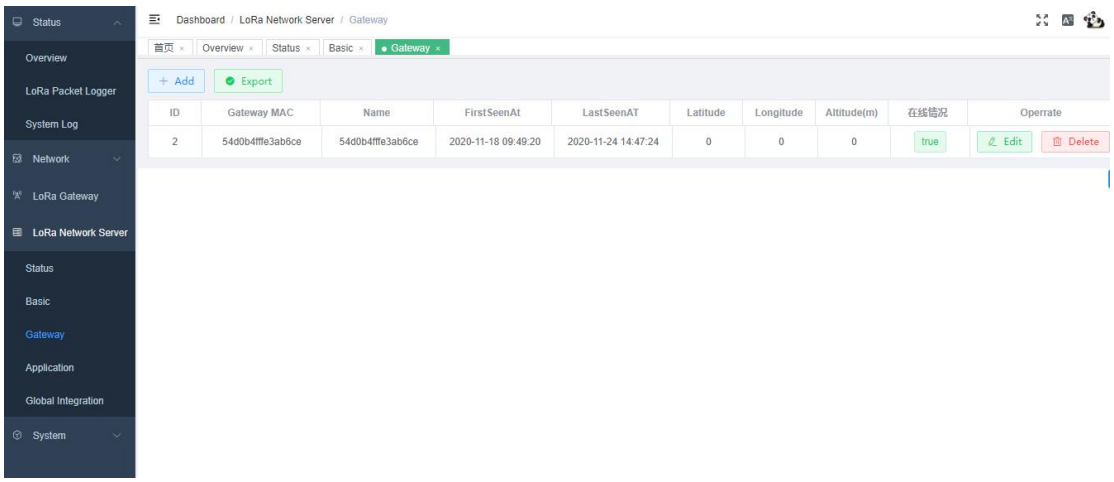
of each time period in the past 24 hours

2.6.2 Basic setting



- Working Area :the frequency of lora network server,after modifying the frequency band, parameters such as RX2 Frequency will be adjusted to the default values along with it.
- ADR: auto-adjust datarate, include minimum rate、maximum rate and ADR Margin

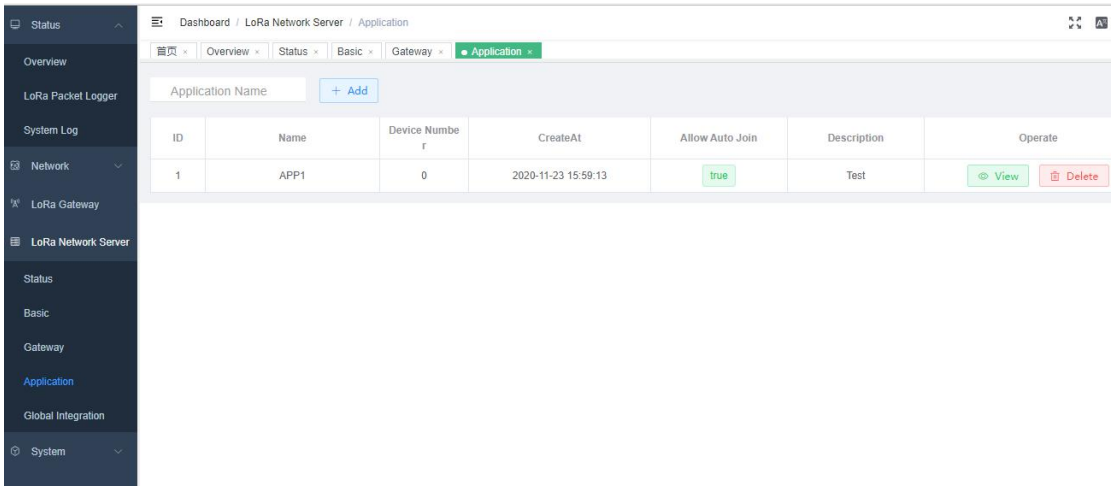
2.6.3 Gateway



- Add or delete lorawan gateway,can monitor gateway online or not.
- When the gateway reports data to the platform, the gateway will be added automatically, no need to add manually.

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

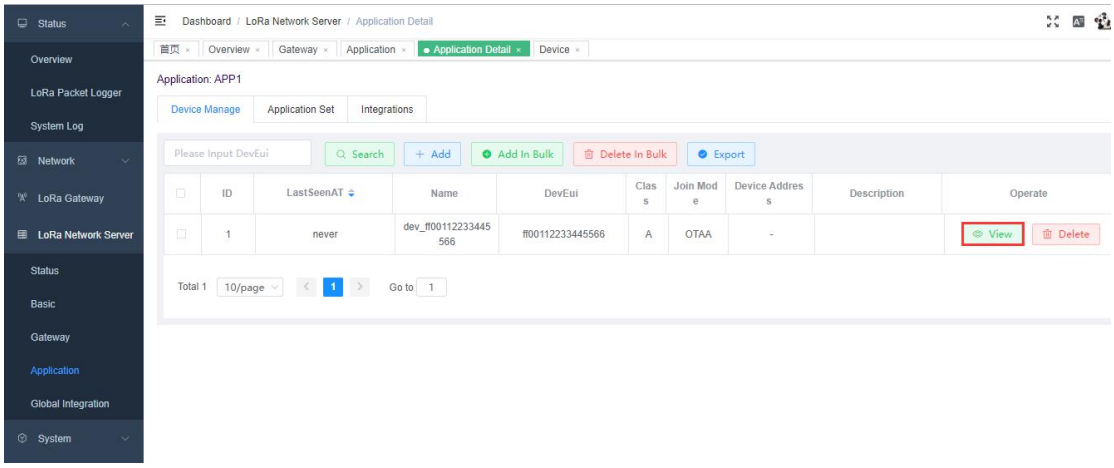
2.6.4 Application



As shown above: The function is to display the existing applications, enter or delete operations, as follows:

- Application name: click "Add" to create an application, and jump to the application setting interface
- View: View application configuration and device list under application, etc.
- Delete: delete the current application, it cannot be deleted when there is a device under the application, you need to delete the device first

2.6.4.1 Application-Application detail-Device manage



As the figure shown:

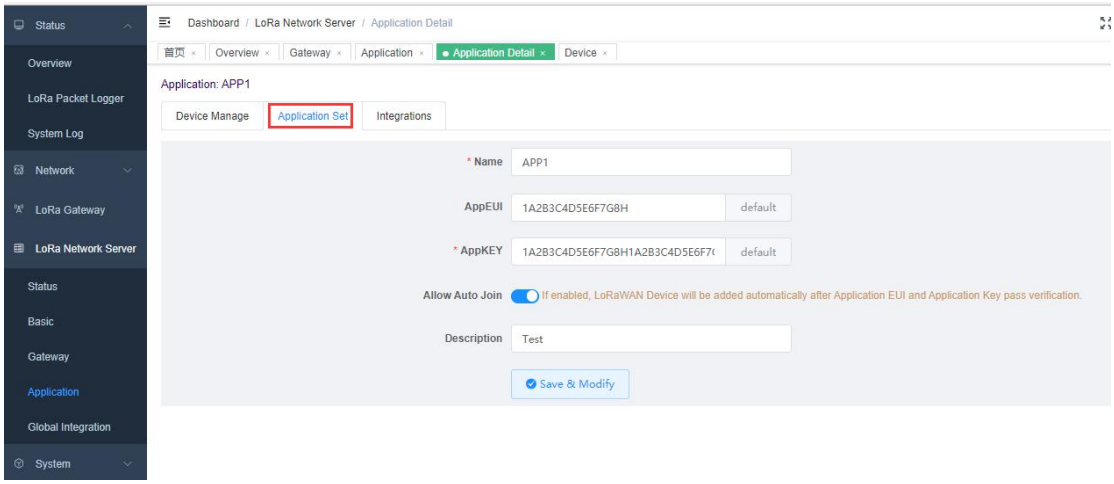
- Please input DevEui: here you can enter the complete DevEui and click "Add" to add a new device. It can also be used as a search condition to find the corresponding device
- Search: Fuzzy search device based on DevEui content
- Add: add new DeviceEUI
- Add in bulk: A continuous number of devices can be added in batches, for

Add: Floor 11, A06, No. 370 Chenyi Street Jimei, Xiamen, Fujian, China
http://www.four-faith.com Tel: 400-8838-199 Fax: 0592-5912735

example: start devEui=ff00000000000001,number=2, then two devices will be added, namely ff00000000000001 and ff00000000000002

- Delete in bulk：Check the box on the left side of the device to be deleted, you can delete it in batches
- Export：export the device list with excel
- View：the detail parameters for device
- Delete：delete this device

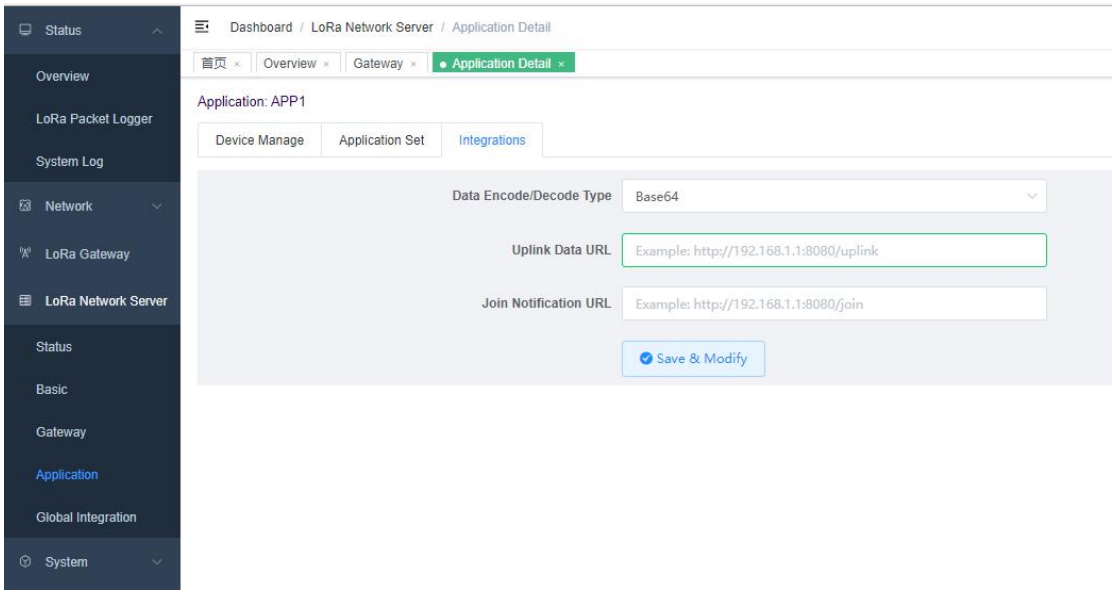
2.6.4.2 Application-Application detail-Application set



- Name：application name
- AppEUI：used to verify when auto join network，default:click defaul it will switch to Four-Faith value
- AppKEY：used to verify when auto join network，default:click defaul it will switch to Four-Faith value
- Allow auto join: no need to add the device in advance, the first time when device try join network , if the Application EUI and the application key are consistent with the device side, the device will be allowed to network and automatically add the device
- Description：to describle the APP

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.6.4.3 Application-Application detail-Integrations

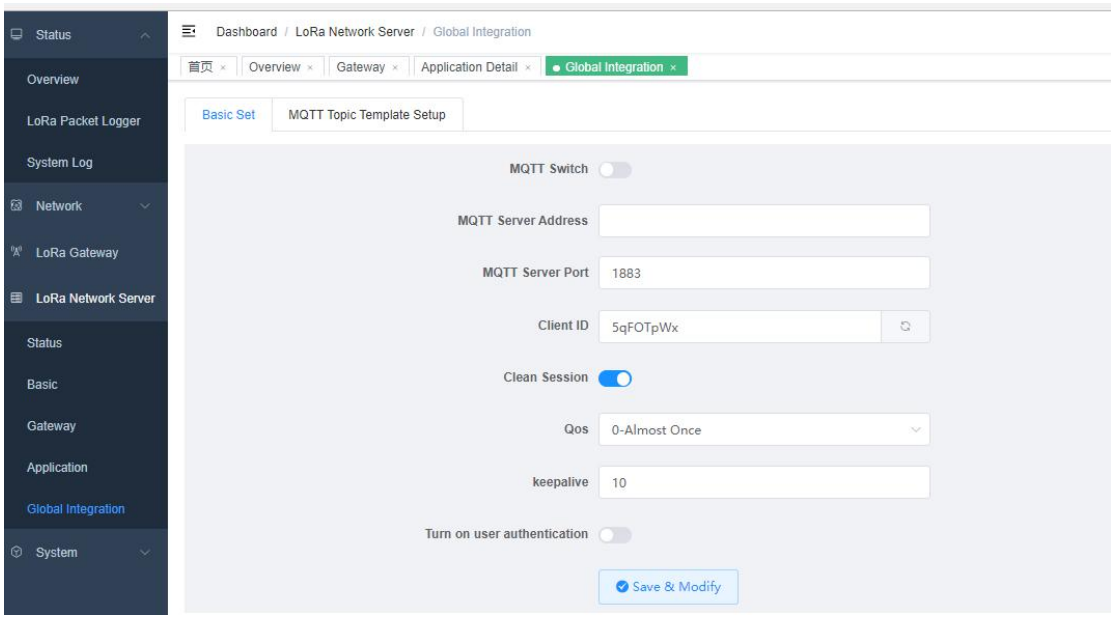


As above shown，can use HTTP POST to push data,only work as http client：

- Data Encode/Decode Type：the data format to push
- Uplink data URL：the address of uplink data
- Join notification URL：the pushing address of join package

2.6.5 Global integration

2.6.5.1 Basic set



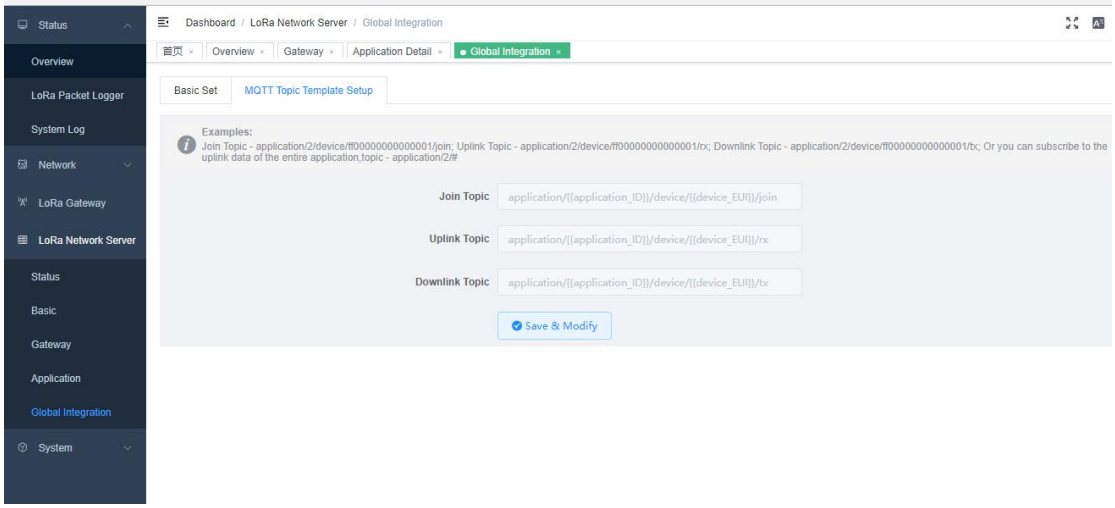
MQTT server address: the address of mqtt broker
MQTT server port: port of your mqtt broker
Client ID:define by user

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

Turne on user authentication: fill in the username and password when MQTT broker require it

Other setting pls keep consistant with server side

2.6.5.2 MQTT Topic Template Setup



- Join Topic: application/2/device/ff00000000000001/join
- Uplink Topic：application/2/device/ff00000000000001/rx
- Subscrible total Topic：application/2/#
- Downlink Topic：application/2/device/ff00000000000001/tx,The format of the downlink data is as follows: (where the data content is base64 encoded data)

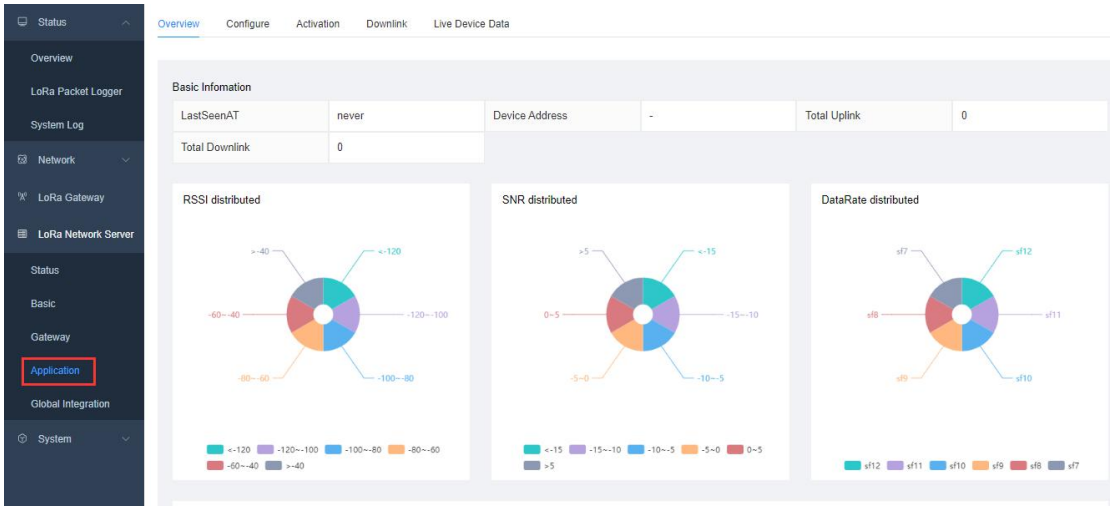
```
{
    "confirmed":false,
    "fPort":10,
    "data":"YWJjZA=="
}
```


Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.7 Device

Note: the device page entry is in section 2.6.4.1, click the button on the right side of the device-view

2.7.1 Overview



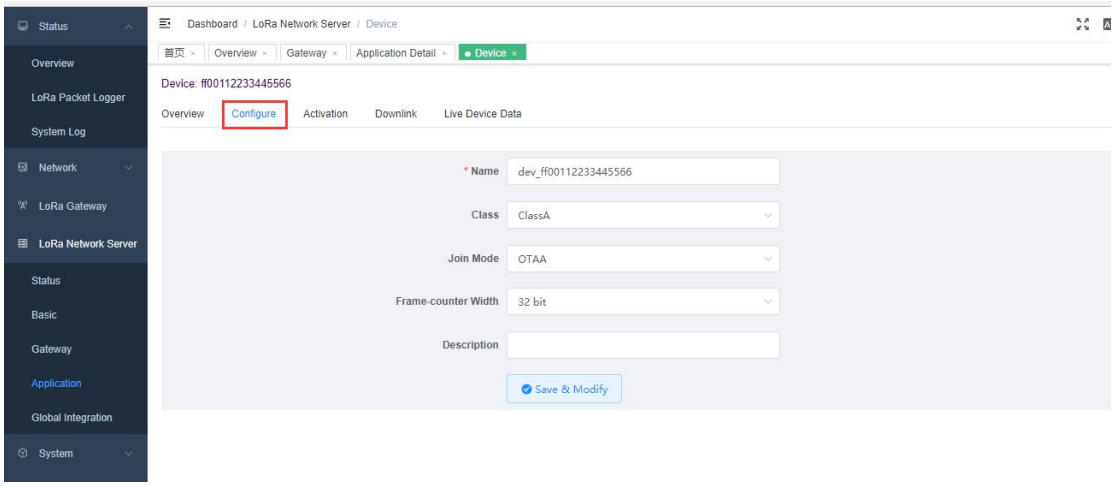
Statistics will be re-stated after the statistics gateway restarts：

- LastseenAT：The time of last uplink for this device
- Device Address：the short ID when device join network
- Total Uplink：The number of uplink packets of the device after system is started
- Total Downlink：The number of downlink packets of the device after system is started
- RSSI distributed：RSSI distribution of the device's uplink data in the past 24 hours
- SNR distributed：SNR distribution of the device's uplink data in the past 24 hours
- DataRate distributed：Datarate distribution of the device's uplink data in the past 24 hours

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

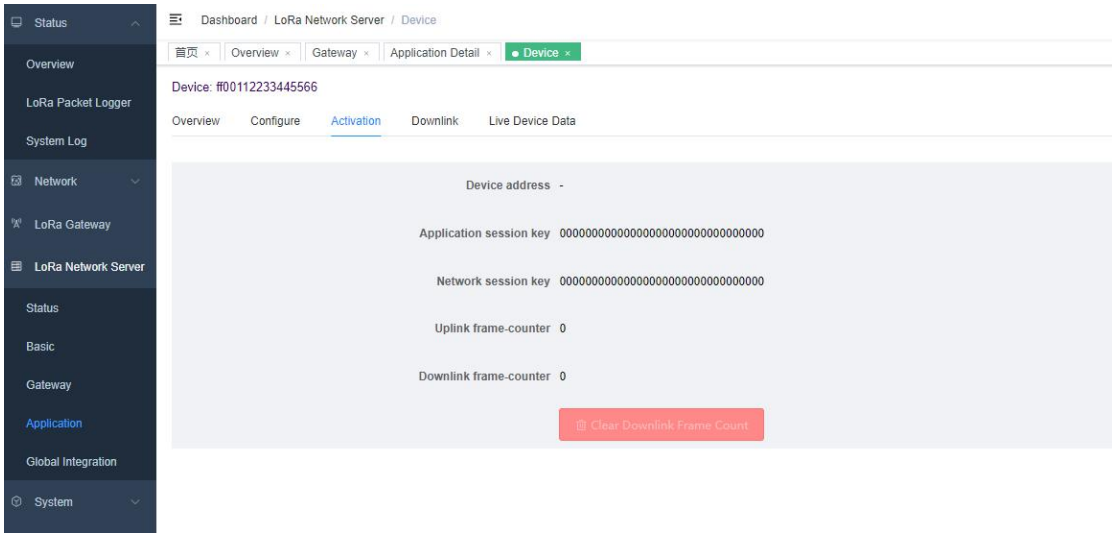
- Communication distributed：The distribution of the uplink and downlink data of the device in the past 24 hours

2.7.2 Configure



- Name：named with deviceEUI
- Class：can choose classA or classC
- Join Mode：OTAA
- Frame-counter Width：Frame count bits
- Description： to describle this device,if the device auto join network,the default description is “auto join device”

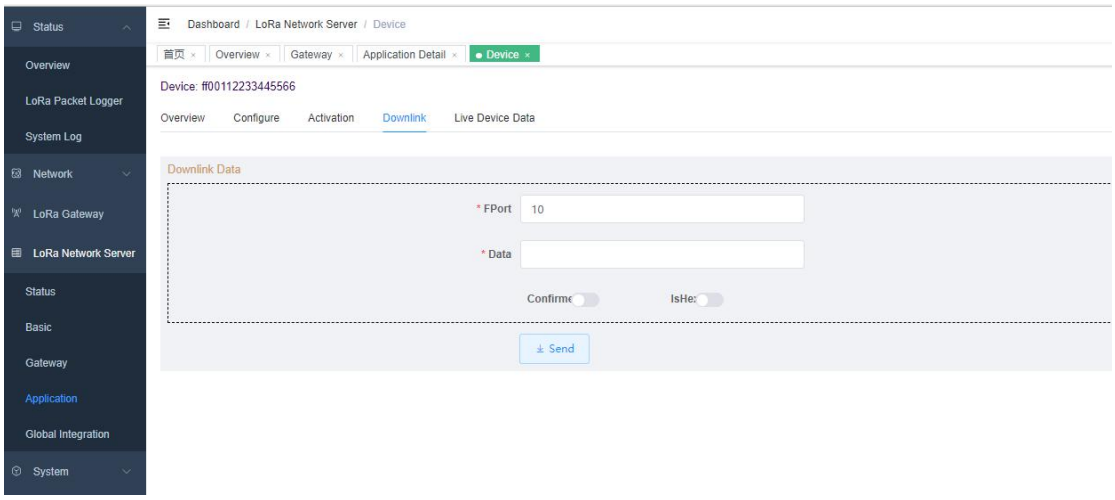
2.7.3 Activiation



- Display the secret key information and frame count value generated when the device is added to the network,can also clear the downlink frame count value

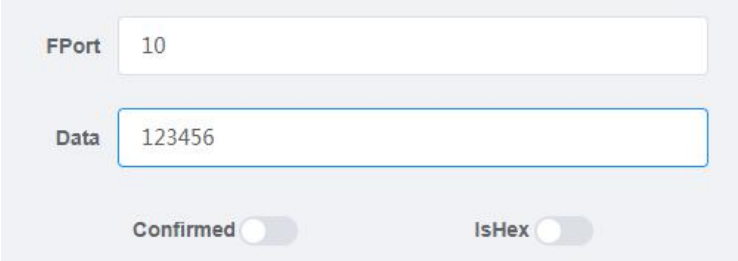
Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.7.4 Downlink

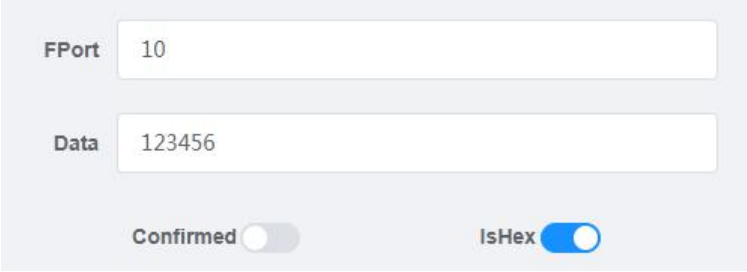


- FPort：downlink port，default is 10
- Data：downlink data,you can choose Ascii or Hex format
- Confirmed：whether confirm the packet or not
- IsHex：to choose if send downlink data with hex format

Example 1：send string 123456 to device，as the folloing setting：

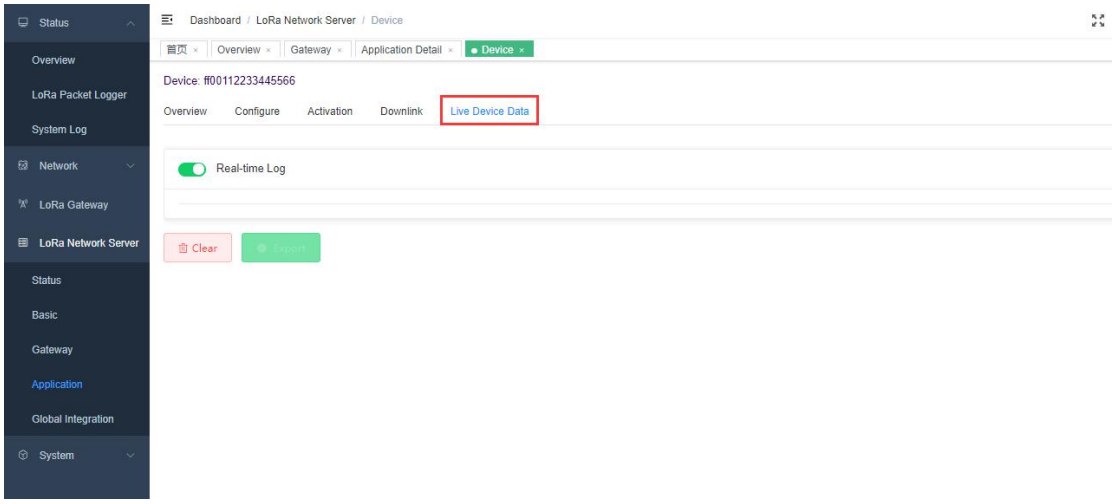


Example 2：send 0x12 0x34 0x56 to device，as the following setting：



Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

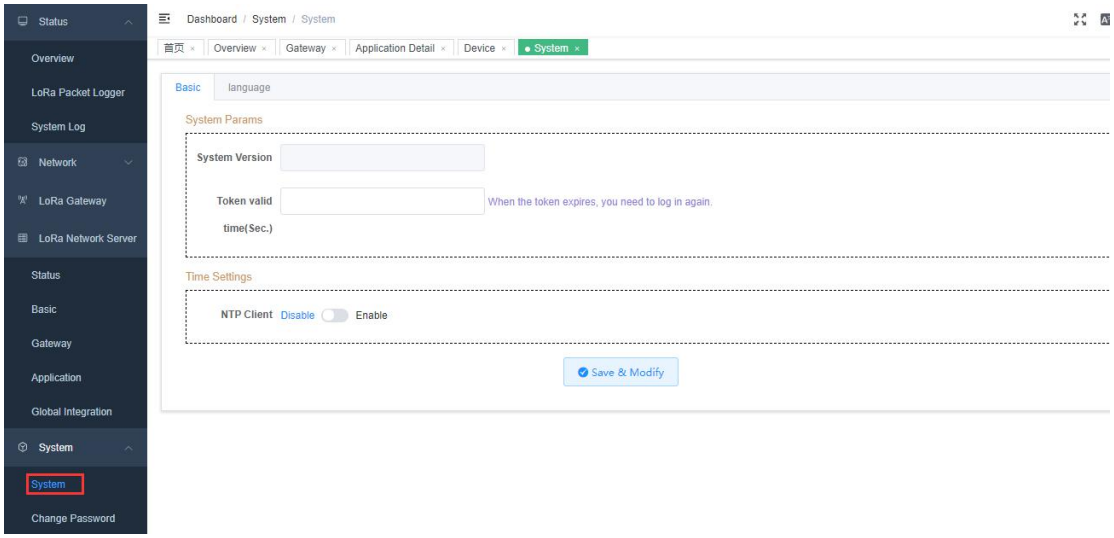
2.7.5 Live Device Data



- Real-time log：enable or disable the real-time logs,defaul is enable
- Clear：Clear logs information
- Export：Export logs information

2.8 System

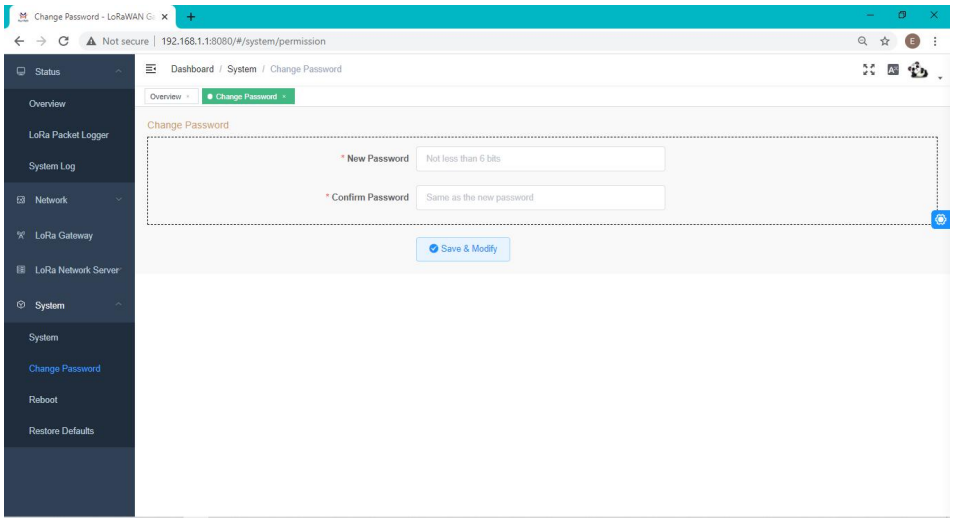
2.8.1 System information



- Check the verison of embeded network server
- Set Token valid time: the longer the time,the longer the web page re-login interval longer
- NTP setting

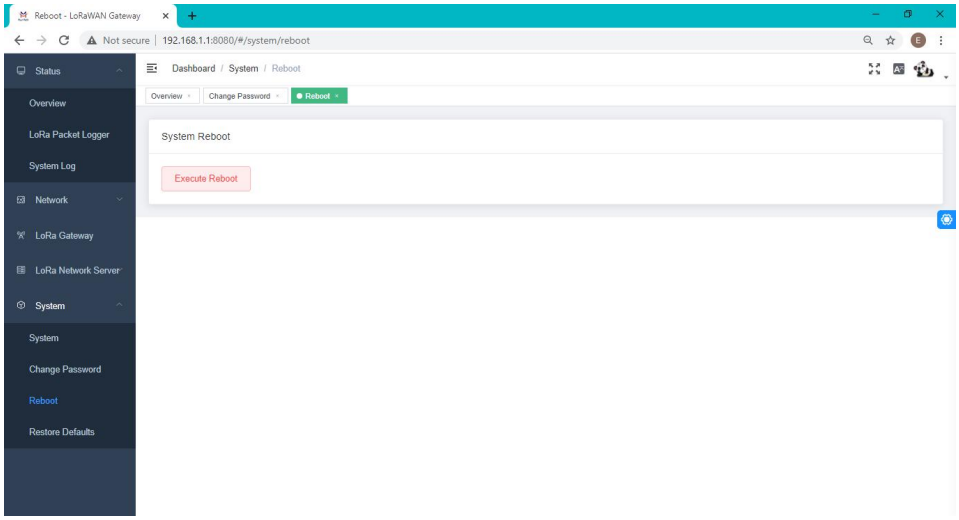
Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.8.2 Change Password



➢ With this page,you can change password of NS

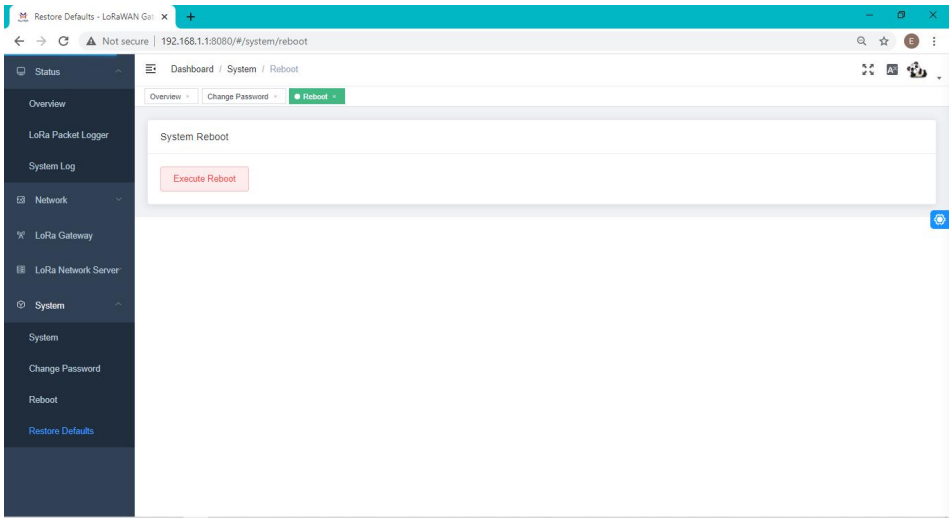
2.8.3 Reboot



➢ With this option,you can reboot NS

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

2.8.4 Restore Default



➢ With this option,you can reset the NS to factory settings

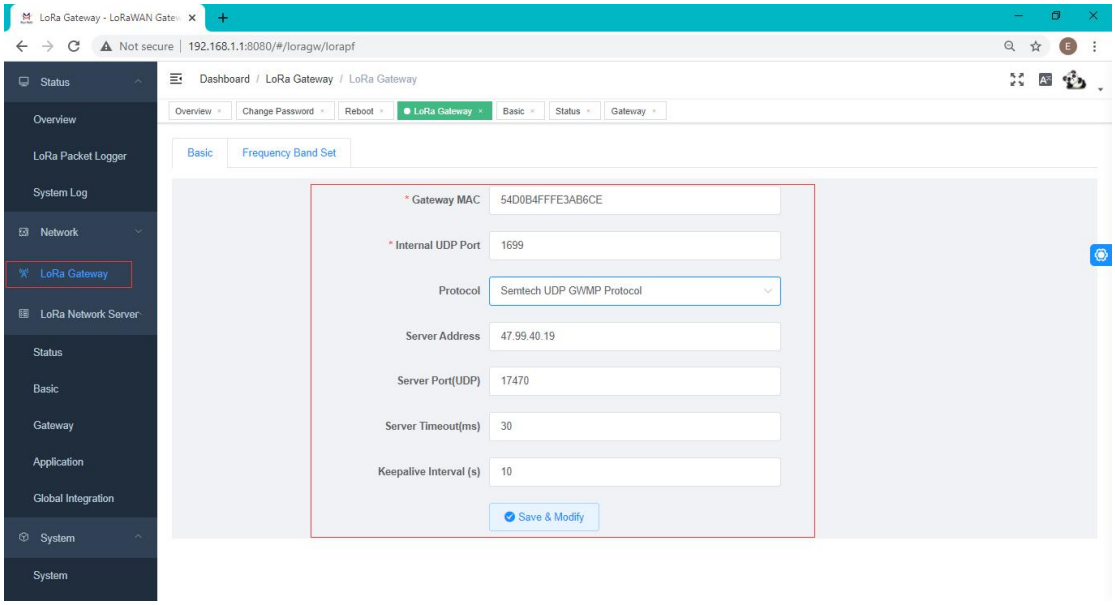
Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

3 Common operations

3.1 Enter the management platform

- Power on,Device WIFI is on as default,Laptop connect WIFI,SSID: Four-Faith-LoRaWAN
- Use Chrome open http://192.168.240.1:8080 to enter configurations web UI
- Support login via WAN IP:8080, For example: http://192.168.9.50:8080
- Input user：admin，password：123456, enter web UI
- If web page open fail, try CTRL+F5 to refresh

3.2 Use Public NS

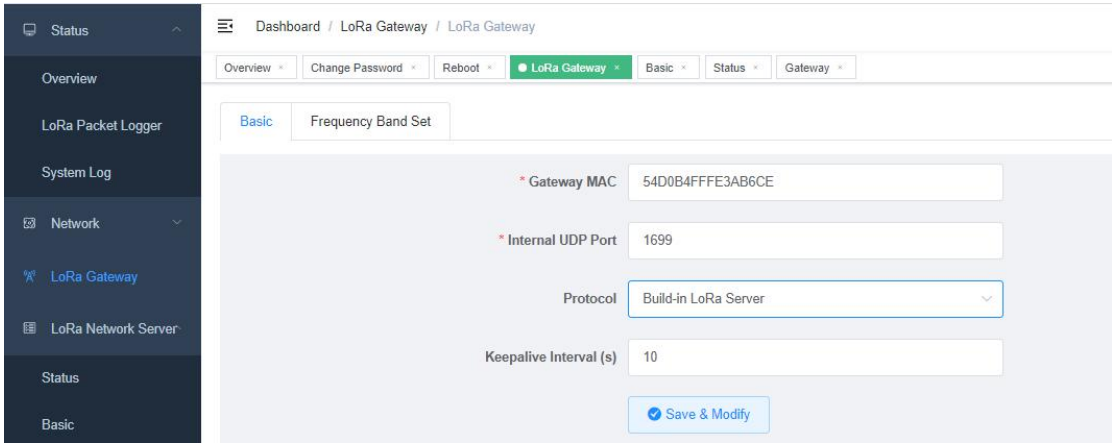


- Go to LoRa gateway ->Basic ->Protocol ->Semtech UDP GWMP Protocol, it will show server IP and port,input correct values,LoRa network serve's is same,only need to input once.
- Click Save&Modify button to apply
- Now the data will not go to Embeded LoRaWAN NS,but LoRa-LoRa package record uplink and downlink data as always

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

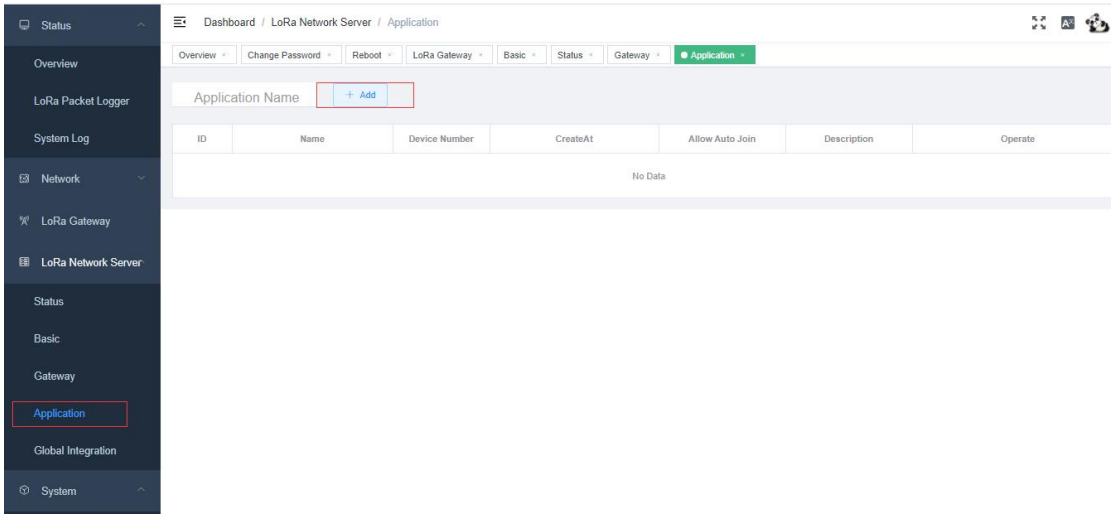
3.3 Use Build-in NS

3.3.1 Basic



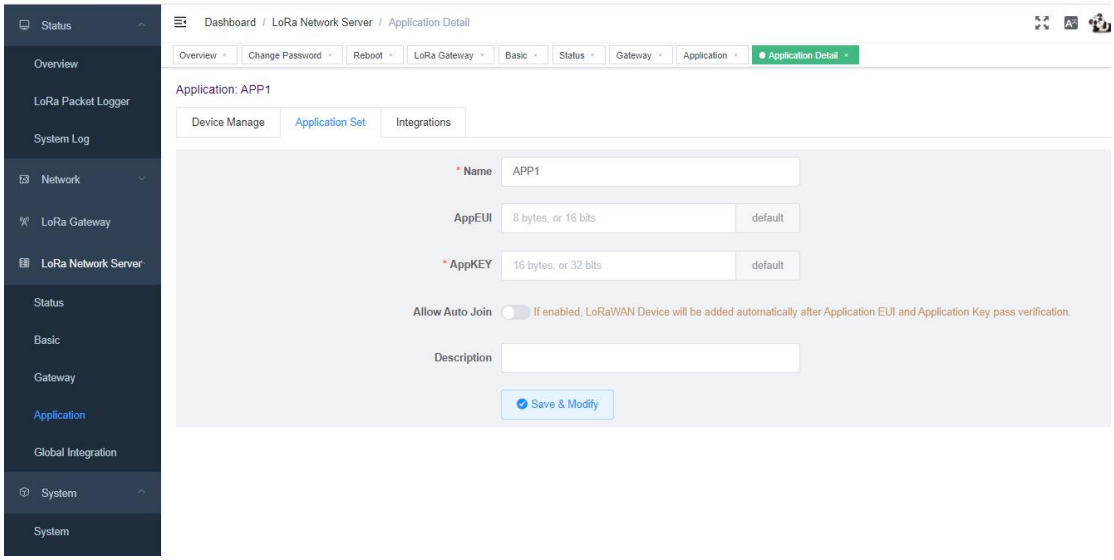
- Go to LoRa Gateway ->Basic->Protocol-> Build-in LoRa Server
- Save and apply

3.3.2 Application - Device

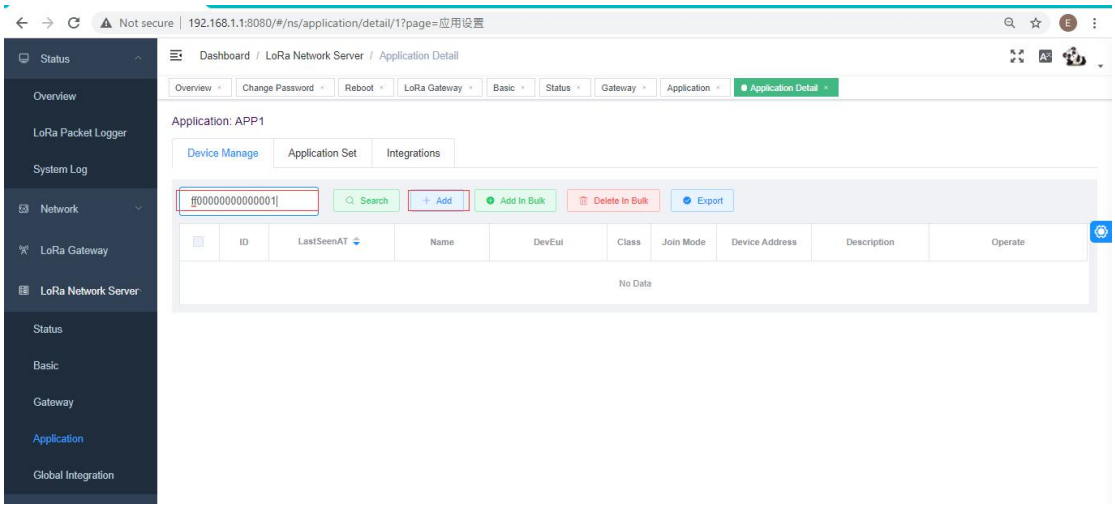


- Click add and it will go to next page

Add: Floor 11, A06, No. 370 Chenyi Street Jimei, Xiamen, Fujian, China
http: //www.four-faith.com Tel: 400-8838-199 Fax: 0592-5912735



✧ At this time, if you want the device to be added automatically, configure the corresponding settings AppEUI and AppKEY, and the device will be automatically added by sending a network request

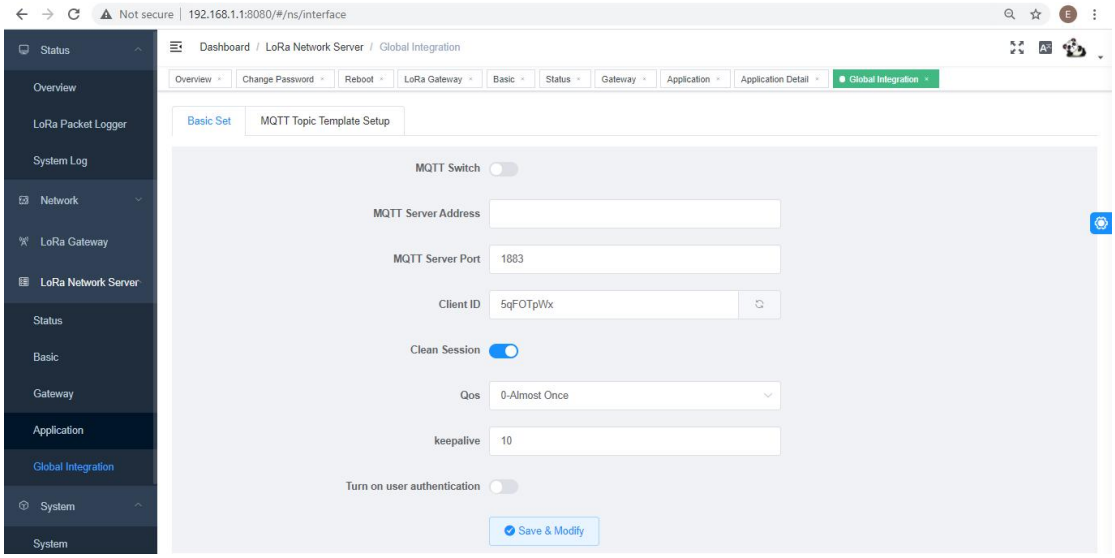


✧ The device can also be added to the network by adding the device first. At this time, the AppEUI and AppKEY of the application may not be configured. If configured, the information will not be verified.

Add: Floor 11, A06, No. 370 Chenyi Street Jimei, Xiamen, Fujian, China
http: //www.four-faith.com Tel: 400-8838-199 Fax: 0592-5912735

3.4 MQTT data Uplink and Downlink

3.4.1 Configurations

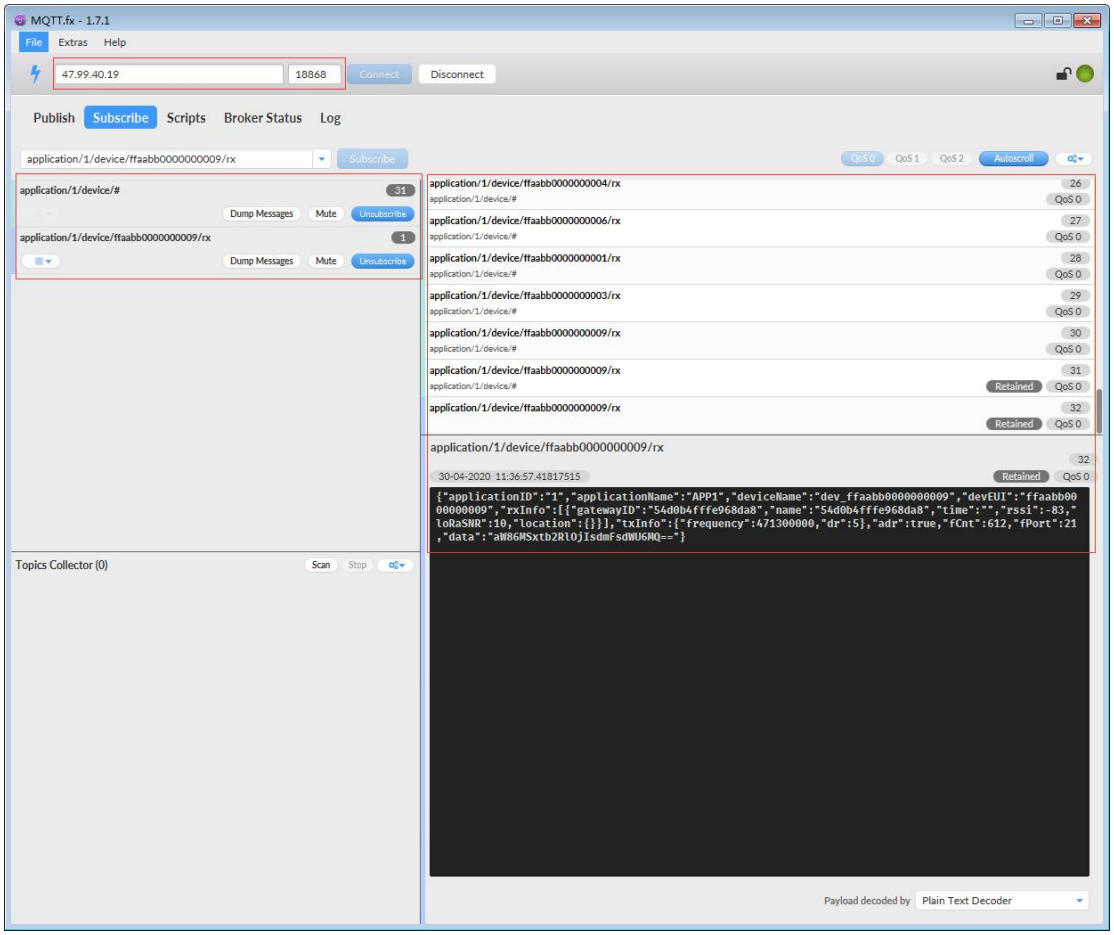


Go to LoRa Network Server - Globe Integration - configure MQTT server information - Save

Noote：The customer needs to run an MQTT server externally,At this time, both the gateway and client program can be published and subscribed as MQTT clients

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

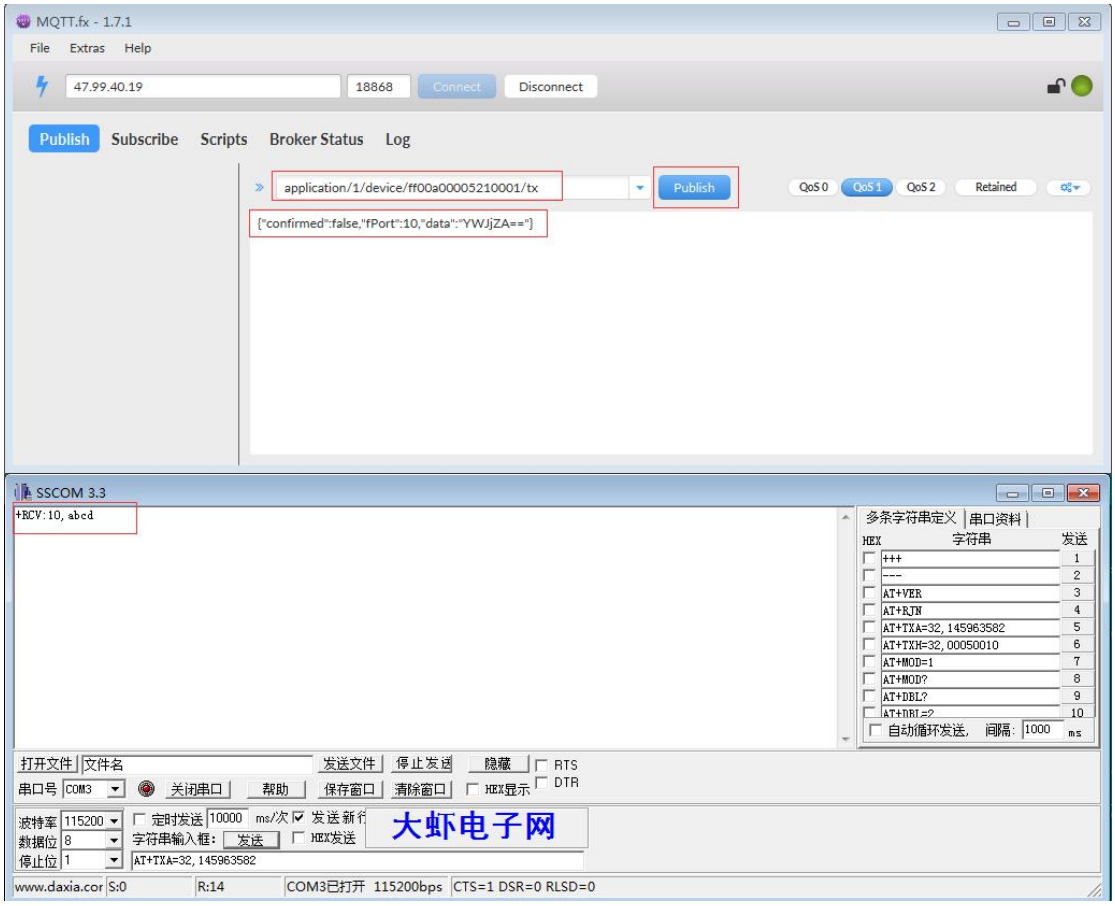
3.4.2 Uplink data



As shown in the figure above, the MQTT server address configured by this tool is the same as the gateway. If you subscribe to a single device and the entire application, you can get the device's uplink data.

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

3.4.3 Downlink data



- ✧ Use MQTT tool to publish data
- ✧ Topic：application/1/device/ff00a00005210001/tx
- ✧ Data content：{"confirmed":false,"fPort":10,"data":"YWJjZA=="}
- ✧ Device tyep:ClassC,so it receive downlink data directly,if type = classA the data will be sent down the next time the device uplinks

Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

4 DATA Format

Note 1： data after // are comments

Note 2：base64 tool link-https://base64.us/

4.1 Uplink Data

HTTP push or MQTT data are same,as follows：

```
{
   "applicationID":"1",                        // Application ID
   "applicationName":"APP1",                   // Application name
   "deviceName":"dev_ffaabb0000000009",    // device name
   "devEUI":"ffaabb0000000009",                // device unique id
   "rxInfo":[{
      "gatewayID":"54d0b4fffe968da8",     // gateway unique id
      "name":"54d0b4fffe968da8",           // gateway name
      "time":"",      // gateway upload time stamp(valid only when there is gps signal)
      "rssi":-83,                              // RSSI
      "loRaSNR":6.5,                           // SINR
      "location":{              // location info(need GPSsignal)，if not, it will show{}
          "latitude": 0.0,
          "longitude": 0.0,
          "altitude": 0.0
       }
   }],
   "txInfo":{
     "frequency":470700000,                // uplink frequency
        "dr":5                               // data rate
   },
   "adr":true,                              // adr enable
   "fCnt":673,                              // uplink frame count
   "fPort":21,                              // port
   "data":"aW86MSxtb2RlOjIsdmFsdWU6MQ==" // uplink data content，base64 coding
}
```


Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735

4.2 Join Notification

HTTP push or MQTT subscribe data format are same，as follows：

```
{
    "applicationID":"1",
    "applicationName":"APP1",
    "deviceName":"dev_ff00a00005210001",
    "devEui":"ff00a00005210001",
     "devAddr":"02648930"
}
```

4.3 Downlink Data

Only supports MQTT publish，format as follows：

```
{
   "confirmed":false,   // enable confirm package
   "fPort":10,            // port
   "data":"YWJjZA=="    // downlink data content,base64 coding
}
```


Add：Floor 11,A06, No.370 Chenyi Street Jimei,Xiamen,Fujian,China
http：//www.four-faith.com Tel：400-8838-199 Fax：0592-5912735