

# Outdoor LoRaWAN Gateway

## User Manual

USR-LG280



V2.0

**Be Honest & Do Best**

Your Trustworthy Smart Industrial IoT Partner

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# 1. Introduction

USR-LG280 is a robust 8-channel outdoor LoRaWAN® gateway. Adopting SX1302 LoRa chip and high-performance quad-core CPU, LG280 supports connection with more than 2000 nodes. LG280 has line of sight up to 15 km and can cover about 2km in urbanized environment, which is ideally suited to smart office, smart building and many other outdoor applications.

LG280 supports not only multiple back-haul backups with Ethernet, Wi-Fi and cellular, but also has integrated mainstream network servers (such as The Things Industries, ChirpStack, etc.) and built-in network server for easy deployment.

## 1.1. Features

### Benefits

- Built-in industrial CPU and big memory
- Ethernet, 2.4GHz Wi-Fi and global 2G/3G/LTE options make it easy to get connected
- Embedded network server and compliant with several third party network servers
- MQTT(s) or HTTP(s) protocol for data transmission to application server
- Rugged enclosure, optimized for wall or pole mounting

### Security & Reliability

- Automated failover/failback between Ethernet and Cellular
- Enable unit with security frameworks like IPsec/OpenVPN/GRE/L2TP/PPTP/ DMVPN
- Embedded hardware watchdog to automatically recover from various failure and ensure highest level of availability

### Easy Maintenance

- DeviceHub provides easy setup, mass configuration, and centralized management of remote devices
- The user-friendly web interface design and various upgrading options help administrator to manage the device as easy as pie
- WEB GUI and CLI enable the admin to achieve quick configuration and simple management among a large quantity of devices
- Users can efficiently manage the remote devices on the existing platform through the industrial standard SNMP

### Capabilities

- Link remote devices in an environment where communication technologies are constantly changing
- Industrial quad core 64-bit ARM Cortex-A53 processor, high-performance operating up to 1.5GHz with low power consumption, and 8GB eMMC available to support more applications
- Support wide operating temperature ranging from -40°C to 70°C

## 1.2. Parameters table

**Table 1. Parameters of USR-LG280**

| Items           | Description   |  |
|-----------------|---|--|
| Processor       | Quad-core 1.5GHz, 64-bit ARM Cortex-A53   |  |
| Power Supply    | 1 × 802.3 af PoE Input,<br>12 VDC with M12 Connector  |  |
| Working Current | Typical 3.6W, Max 4.8W  |  |
| LoRaWAN         |   |  |
| Radio Chip      | SX1302  |  |
| Frequency       | <b>AU915:</b> (902-928M)<br><br>FDD:B1/B2/B3/B4/B5/B7/B8/B28<br><br>TDD:B40<br><br>WCDMA:B1/B2/B4/B5/B8<br><br>GSM/EDGE:B2/B3/B5/B8 | <b>EU868:</b> (868-873MHz)<br><br>FDD: B1/B3/B7/B8/B20/B28A<br><br>TDD: B38/B40/B41<br><br>WCDMA:B1/B8<br><br>GSM/EDGE:B3/B8 |
| Tx Power        | 27dBm Max   |  |
| Rx Sensitivity  | '-140dBm @292bps  |  |
| Protocol        | V1.0 Class A/Class B/Class C and V1.0.2 Class A/Class B/Class C   |  |
| Antenna         | 2 × 50 Ω N-Female External Connectors, fiber antenna  |  |
| Ethernet        |   |  |
| Ports           | 1*10/100/1000Mbps RJ45(PoE PD supported),<br>auto MDI/MDIX, full or half duplex (auto-sensing)                                      |  |
| WiFi            |   |  |

|                       |   |
|-----------------------|---|
| Standard              | IEEE 802.11 b/g/n, 2.4 GHz  |
| Antenna               | Fully Integrated and Internal Antenna   |
| Tx Power              | 802.11b: 18 dBm +/-2.0 dBm (11 Mbps)<br>802.11g: 15 dBm +/-2.0 dBm (6 Mbps)<br>802.11g: 15 dBm +/-2.0 dBm (54 Mbps)<br>802.11n@2.4 GHz: 14 dBm +/-2.0 dBm (MCS0_HT20)<br>802.11n@2.4 GHz: 14 dBm +/-2.0 dBm (MCS7_HT20)<br>802.11n@2.4 GHz: 13 dBm +/-2.0 dBm (MCS0_HT40)<br>802.11n@2.4 GHz: 13 dBm +/-2.0 dBm (MCS7_HT40) |
| Cellular              |   |
| Antenna               | Internal Antenna  |
| SIM Slot              | 1*mini-SIM(2FF)   |
| GPS                   |   |
| Antenna               | Internal Antenna  |
| Sensitivity           | -167dBm@Tracking, -149dBm@Acquisition, -161dBm@Re-acquisition   |
| Position Accuracy     | <2.5m CEP   |
| Physical Property     |   |
| Casing material       | PC+Aluminium ADC12, IP67 protection   |
| Dimensions            | 240 x 164 x 90.9 mm   |
| Weight                | 1671.7g   |
| Installation          | Wall or Pole Mounting   |
| Operating temperature | -40°C to +70°C  |
| Storage temperature   | -40°C to +85°C  |
| Operating humidity    | 0% to 95% (non-condensing)  |
| Software Function     |   |
| Network Protocols     | PPPoE, SNMP v1/v2c/v3, TCP, UDP, DHCP, DDNS, HTTP, HTTPS, DNS, SNTP, Telnet, SSH, MQTT, MQTTS, BACnet/IP, etc.  |
| VPN Tunnel            | DMVPN/IPsec/OpenVPN/PPTP/L2TP/GRE   |
| Firewall              | ACL/DMZ/Port Mapping/MAC Binding  |
| Management            | Web, CLI, SMS, On-demand dial up, DeviceHub   |
| APPROVALS             |   |

|            |     |
|------------|-----|
| Regulatory | RCM |
|------------|-----|

## 1.3. Dimension

Unit: mm

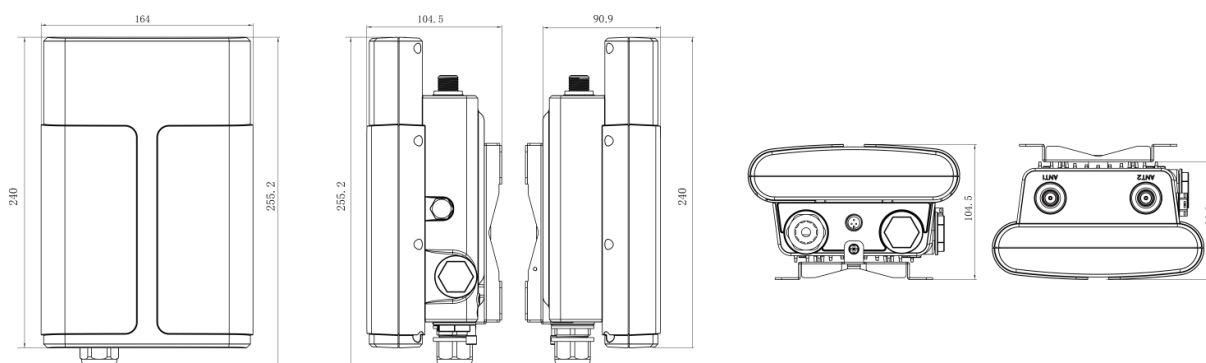


Figure 1. Dimension of USR-LG280

## 2. Get Started

### 2.1. Login router

Power on the LoRaWAN gateway, connect PC to LG280 via LAN port or via Wi-Fi, users can login router via Chrome or the other browser. The default network parameters are shown in the following table:

Table 2. Default network parameters

| Parameter      | Default value               |
|----------------|-----------------------------|
| SSID           | Gateway-xxxxxx              |
| LAN IP         | 192.168.10.1                |
| Username       | admin                       |
| Password       | password                    |
| Wi-Fi password | <a href="#">iotpassword</a> |

Open the browser, enter 192.168.10.1 in the URL blank, and press Enter, it will navigate to the following webpage. After entering the login password, clicking login, the web page will show configuration page of USR-LG280.



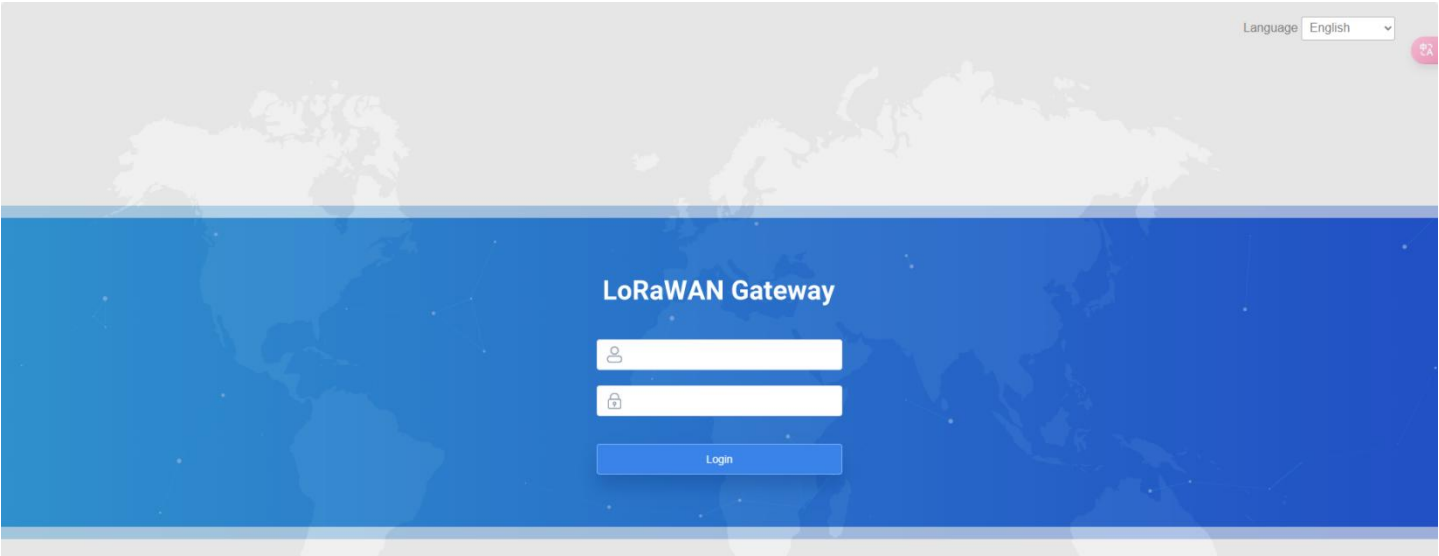


Figure 2. Login webpage

**Note:** If you enter the username or password incorrectly more than 5 times, the login page will be locked for 10 minutes.

2.2. Brief view of the webpage

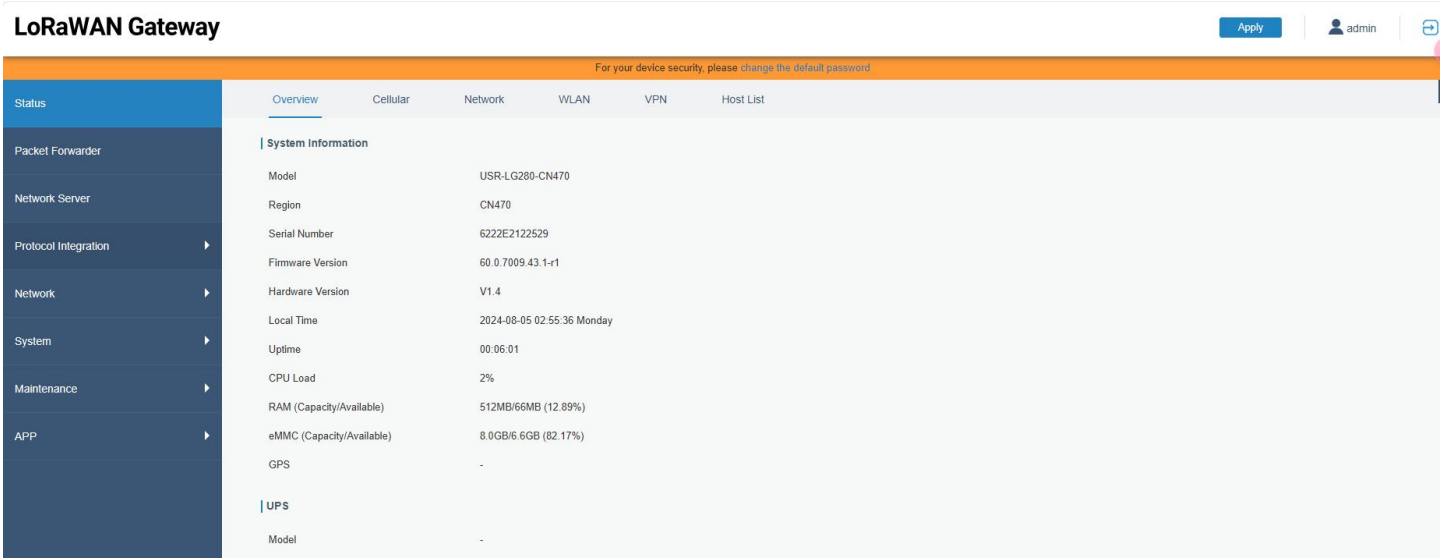


Figure 3. Status webpage

3. Status

3.1. Overview

You can view the system information of the gateway on this page.

## LoRaWAN Gateway

For your device security, please change the default password

**Status**  
 Packet Forwarder  
 Network Server  
 Protocol Integration  
 Network  
 System  
 Maintenance  
 APP

**Overview** Cellular Network WLAN VPN Host List  
 System Information  
 Model USR-LG280-CN470  
 Region CN470  
 Serial Number 6222E2122529  
 Firmware Version 60.0.7009.43.1-r1  
 Hardware Version V1.4  
 Local Time 2024-08-05 02:55:36 Monday  
 Uptime 00:06:01  
 CPU Load 2%  
 RAM (Capacity/Available) 512MB/66MB (12.89%)  
 eMMC (Capacity/Available) 8.0GB/6.6GB (82.17%)  
 GPS -  
 UPS  
 Model -  
 Serial Number

| Item                      | Description  |
|---------------------------|--|
| Model                     | Show the model name of gateway.                                |
| Region                    | Show the LoRaWAN® frequency region of gateway.                 |
| Serial Number             | Show the serial number of gateway.                             |
| Firmware Version          | Show the currently firmware version of gateway.                |
| Hardware Version          | Show the currently hardware version of gateway.                |
| Local Time                | Show the currently local time of system.                       |
| Uptime                    | Show the information on how long the gateway has been running. |
| CPU Load                  | Show the current CPU utilization of the gateway.               |
| RAM (Capacity/Available)  | Show the RAM capacity and the available RAM memory.            |
| eMMC (Capacity/Available) | Show the eMMC capacity and the available eMMC memory.          |
| GPS                       | Show GPS data of the gateway.                                  |

### 3.2. Cellular

You can view the cellular network status of gateway on this page.

## LoRaWAN Gateway

| For your device security, please change the default password |  |
|--|--|
| Status   | Overview Cellular Network WLAN VPN Host List |
| Packet Forwarder   | Modem  |
| Network Server   | Status No SIM Card                           |
| Protocol Integration   | Model EC20F                                  |
| Network  | Version EC20CEFHLGR08A01M1G                  |
| System   | Signal Level no enough signa 99asu           |
| Maintenance  | Register Status Not registered               |
| APP  | IMEI 863812071492239                         |
|  | IMSI   |
|  | ICCID  |
|  | ISP  |
|  | Network Type                                 |
|  | PLMN ID                                      |
|  | LAC  |
|  | Cell ID                                      |

| Item            | Description  |
|-----------------|--|
| Status          | Show corresponding detection status of module and SIM card.    |
| Model           | Show the model name of cellular module.                        |
| Version         | Show the version of cellular module.                           |
| Signal Level    | Show the cellular signal level.                                |
| Register Status | Show the registration status of SIM card.                      |
| IMEI            | Show the IMEI of the module.                                   |
| IMSI            | Show IMSI of the SIM card.                                     |
| ICCID           | Show ICCID of the SIM card.                                    |
| ISP             | Show the network provider which the SIM card registers on.     |
| Network Type    | Show the connected network type, such as LTE, 3G, etc.         |
| PLMN ID         | Show the current PLMN ID, including MCC, MNC, LAC and Cell ID. |
| LAC             | Show the location area code of the SIM card.                   |
| Cell ID         | Show the Cell ID of the SIM card location.                     |

| Network             |                  |
|---------------------|------------------|
| Status              | Disconnected     |
| IP Address          | 0.0.0.0          |
| Netmask             | 0.0.0.0          |
| Gateway             | 0.0.0.0          |
| DNS                 | 0.0.0.0          |
| Connection Duration | 0 days, 00:00:00 |

| Item | Description |
|------|-------------|
|------|-------------|

|                     |   |
|---------------------|---|
| Status              | Show the connection status of cellular network.                       |
| IP Address          | Show the IP address of cellular network.                              |
| Netmask             | Show the netmask of cellular network.                                 |
| Gateway             | Show the gateway of cellular network.                                 |
| DNS                 | Show the DNS of cellular network.                                     |
| Connection Duration | Show information on how long the cellular network has been connected. |

### 3.3. Network

On this page you can check the Ethernet port status of the gateway.

<

| Item       | Description   |
|------------|---|
| Port       | Show the name of the Ethernet port.   |
| Status     | Show the status of the Ethernet port. "Up" refers to a status that WAN is enabled and Ethernet cable is connected. "Down" means Ethernet cable is disconnected or WAN function is disabled.                   |
| Type       | Show the dial-up type of the Ethernet port.   |
| IP Address | Show the IP address of the Ethernet port.   |
| Netmask    | Show the netmask of the Ethernet port.  |
| Gateway    | Show the gateway of the Ethernet port.  |
| DNS        | Show the DNS of the Ethernet port.  |
| Duration   | Show the information about how long the Ethernet cable has been connected to the Ethernet port when the port is enabled. Once the port is disabled or Ethernet cable is disconnected, the duration will stop. |

### 3.4. WLAN

You can check Wi-Fi status on this page, including the information of access point and client.

| Overview            | Cellular          | Network | WLAN | VPN | Host List |
|---------------------|-------------------|---------|------|-----|-----------|
| <b>WLAN Status</b>  |                   |         |      |     |           |
| Wireless Status     | Enabled           |         |      |     |           |
| MAC Address         | 24:e1:24:f0:e2:26 |         |      |     |           |
| Interface Type      | AP                |         |      |     |           |
| SSID                | Gateway_F0E226    |         |      |     |           |
| Channel             | Auto              |         |      |     |           |
| Encryption Type     | No Encryption     |         |      |     |           |
| Status              | Up                |         |      |     |           |
| IP Address          | 192.168.1.1       |         |      |     |           |
| Netmask             | 255.255.255.0     |         |      |     |           |
| Connection Duration | 4 days, 21:12:11  |         |      |     |           |

| Item                | Description  |
|---------------------|--|
| Wireless Status     | Show the wireless status.  |
| MAC Address         | Show the MAC address.  |
| Interface Type      | Show the interface type, such as "AP" or "Client".                 |
| SSID                | Show the SSID.   |
| Channel             | Show the wireless channel.   |
| Encryption Type     | Show the encryption type.  |
| Status              | Show the connection status.  |
| IP Address          | Show the IP address of the gateway.                                |
| Netmask             | Show the wireless MAC address of the gateway.                      |
| Gateway             | Show the gateway address in wireless network.                      |
| Connection Duration | Show information on how long the Wi-Fi network has been connected. |

#### Associated Stations

| IP Address          | MAC Address  | Connection Duration |
|---------------------|--|---------------------|
| Item                | Description  |                     |
| IP Address          | Show the IP address of access point or client.                     |                     |
| MAC Address         | Show the MAC address of the access point or client.                |                     |
| Connection Duration | Show information on how long the Wi-Fi network has been connected. |                     |

### 3.5. VPN

You can check VPN status on this page, including PPTP, L2TP, IPsec, OpenVPN and DMVPN.

Overview

Cellular

Network

WLAN

VPN

Host List

PPTP Tunnel

| Name   | Status       | Local IP | Remote IP |
|--------|--------------|----------|-----------|
| pptp_1 | Disconnected | -        | -         |
| pptp_2 | Disconnected | -        | -         |
| pptp_3 | Disconnected | -        | -         |

L2TP Tunnel

| Name   | Status       | Local IP | Remote IP |
|--------|--------------|----------|-----------|
| l2tp_1 | Disconnected | -        | -         |
| l2tp_2 | Disconnected | -        | -         |
| l2tp_3 | Disconnected | -        | -         |

| Item      | Description                              |
|-----------|--|
| Name      | Show the name of the VPN tunnel.         |
| Status    | Show the status of the VPN tunnel.       |
| Local IP  | Show the local tunnel IP of VPN tunnel.  |
| Remote IP | Show the remote tunnel IP of VPN tunnel. |

### 3.6. Host List

You can view the host information on this page.

Overview

Cellular

Network

WLAN

VPN

Host List

DHCP Leases

| IP | MAC | Lease Remaining Time |
|----|-----|----------------------|
|----|-----|----------------------|

MAC Binding

| IP | MAC |
|----|-----|
|----|-----|

| Item                 | Description  |
|----------------------|--|
| DHCP Leases          |  |
| IP Address           | Show IP address of DHCP client                           |
| MAC Address          | Show MAC address of DHCP client                          |
| Lease Time Remaining | Show the remaining lease time of DHCP client.            |
| MAC Binding          |  |
| IP & MAC             | Show the IP address and MAC address set in the Static IP |

|  |                       |
|--|-----------------------|
|  | list of DHCP service. |
|--|-----------------------|

## 4. LoraWAN

### 4.1. Packet Forwarder

#### 4.1.1. General

General
Radios
Advanced
Custom
Traffic

**General Setting**

Gateway EUI: 24E124FFFEF35F39

Gateway ID:

Frequency-Sync:


Data Retransmission: ☐

**Multi-Destination**

| ID | Enable  | Type        | Server Address | Connect Status | Operation  |
|----|---------|-------------|----------------|----------------|--|
| 0  | Enabled | Embedded NS | localhost      | Disconnected   | <input type="text"/> <input type="text"/> <input type="text"/> |


| Item                | Description   |
|---------------------|---|
| Gateway EUI         | Show the unique identifier of the gateway and it's non-editable.  |
| Gateway ID          | Fill in the corresponding ID which you've used for registering the gateway to the remote network server. It is usually the same as gateway EUI and can be changed.  |
| Frequency-Sync      | Sync frequency configurations from the network server by selecting the corresponding multi-destination ID.  |
| Data Retransmission | When the gateway connects to a single Chirpstack/Semtech/Remote Embedded NS/Basic Station type package forwarder, it supports data storage of up to 1 million pieces of data when the network is disconnected and re-transmits the data after network recovery. |
| Multi-Destination   | The gateway will forward the data to the network server address that was created and enabled in the list.   |
| Connection Status   | Show the connection status of the package forwarder.  |

**| Packet Filters**


Filters by NetID default mode **White List** 

Proprietary Message Filter ☒


Filters by NetID 

White List 


  




Filters by JoinEUI 

Black List 


  

To  

Filters by DevEUI 

White List 

To  

| Parameters                    | Description  |
|-------------------------------|--|
| Filters by NetID Default Mode | <p>Select the filter mode as black list or white list.</p> <p>White List: Only forward the packets on this list to the network server.</p> <p>Black List: Only forward the packets except this list to the network server.</p> |
| Filters by NetID              | Forward/Not forward the uplink packets that match the NetID.   |
| Filters by JoinEUI            | Forward/Not forward the join request packets that match the JoinEUI range.   |
| Filters by DevEUI             | Forward/Not forward the join request packets that match the DevEUI range.  |
| List                          | Set the specific filtering value or range list. Every condition supports to add 5 lists at most.   |

**Note:**

1. When join EUI and dev EUI are both configured, only packets that match both conditions will be forwarded.
2. This feature is not supported when the packet forwarder type is Lorient or Everynet.
3. When a third-party network server assigns filter condition to gateway, the gateway will use network server settings in priority.

**Related Configuration Example**

[Packet forwarder configuration](#)



## 4.1.2. Radios

**Radio Channel Setting**

Region US915 Noise Analyzer

| Name    | Center Frequency/MHz               |
|---------|------------------------------------|
| Radio 0 | <input type="text" value="904.3"/> |
| Radio 1 | <input type="text" value="905.1"/> |

| Item             | Description   | Default   |
|------------------|---|---|
| Region           | Choose the LoRaWAN® frequency plan used for the upstream and downlink frequencies and datarates. Available channel plans depend on the gateway's model. | Based on the gateway's model  |
| Center Frequency | Change the frequencies to receive packets from LoRaWAN® nodes.  | Based on what is specified in the LoRaWAN® regional parameters document |

**Multi Channels Setting**

| Enable                              | Index | Radio                | Frequency/MHz                      |
|-------------------------------------|-------|----------------------|------------------------------------|
| <input checked="" type="checkbox"/> | 0     | <span>Radio 0</span> | <input type="text" value="923.2"/> |
| <input checked="" type="checkbox"/> | 1     | <span>Radio 0</span> | <input type="text" value="923.4"/> |
| <input checked="" type="checkbox"/> | 2     | <span>Radio 0</span> | <input type="text" value="923.6"/> |
| <input checked="" type="checkbox"/> | 3     | <span>Radio 1</span> | <input type="text" value="922.2"/> |
| <input checked="" type="checkbox"/> | 4     | <span>Radio 1</span> | <input type="text" value="922.4"/> |
| <input checked="" type="checkbox"/> | 5     | <span>Radio 1</span> | <input type="text" value="922.6"/> |
| <input checked="" type="checkbox"/> | 6     | <span>Radio 1</span> | <input type="text" value="922.8"/> |
| <input checked="" type="checkbox"/> | 7     | <span>Radio 1</span> | <input type="text" value="923.0"/> |

| Item          | Description   | Default                                 |
|---------------|---|---|
| Enable        | Click to enable this channel to transmit packets.                             | Enabled                                 |
| Index         | Indicate the ordinal of the list.   | /                                       |
| Radio         | Choose Radio 0 or Radio 1 as center frequency.                                | Radio 0                                 |
| Frequency/MHz | Enter the frequency of this channel.<br>Range: center frequency $\pm$ 0.4625. | Based on the LoRaWAN® regional document |

**LoRa Channel Setting**

| Enable                              | Radio                | Frequency/MHz                      | Bandwidth/KHz       | Spread Factor    |
|-------------------------------------|----------------------|------------------------------------|---------------------|------------------|
| <input checked="" type="checkbox"/> | <span>Radio 0</span> | <input type="text" value="923.8"/> | <span>250KHZ</span> | <span>SF7</span> |

| Item | Description | Default |
|------|-------------|---------|
|------|-------------|---------|

|               |   |   |
|---------------|---|---|
| Enable        | Click to enable this channel to transmit packets.   | Enabled   |
| Radio         | Choose Radio 0 or Radio 1 as center frequency.  | Radio 0   |
| Frequency/MHz | Enter the frequency of this channel.<br>Range: center frequency $\pm$ 0.9.  | Based on the supported frequency  |
| Bandwidth/MHz | Enter the bandwidth of this channel.  | 500KHz  |
| Spread Factor | Choose the selectable spreading factor.<br>The channel with large spreading factor corresponds to a low rate, while the small one corresponds to a high rate. | Based on what is specified in the LoRaWAN® regional parameters document |

FSK Channel Setting

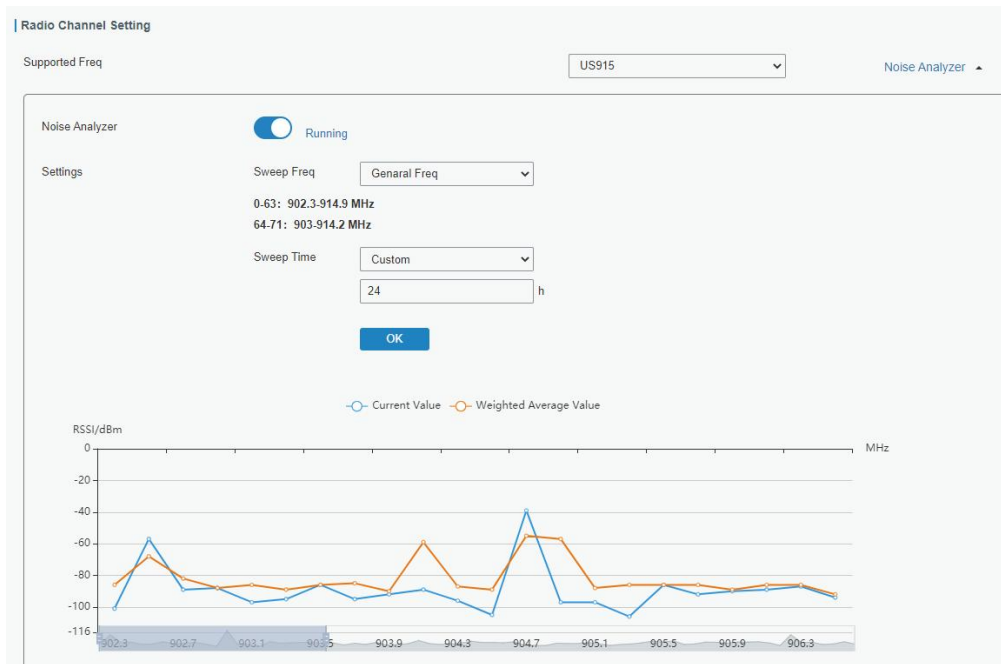
| Enable                              | Radio   | Frequency/MHz | Bandwidth/KHz | DataRate |
|-------------------------------------|---------|---------------|---------------|----------|
| <input checked="" type="checkbox"/> | Radio 0 | 924.0         | 125KHz        | 50000    |

| Item          | Description   | Default                          |
|---------------|---|----------------------------------|
| Enable        | Click to enable this channel to transmit packets.                                 | Disabled                         |
| Radio         | Choose Radio 0 or Radio 1 as center frequency.                                    | Radio 0                          |
| Frequency/MHz | Enter the frequency of this channel.<br>Range: center frequency $\pm$ 0.9.        | Based on the supported frequency |
| Bandwidth/MHz | Enter the bandwidth of this channel.<br>Recommended value: 125KHz, 250KHz, 500KHz | Based on the supported frequency |
| Data Rate     | Enter the data rate. Range: 500-25000.  | 500                              |

### 4.1.3. Noise Analyzer

Noise analyzer is used for scanning the noise of every frequency channel and giving a diagram for users to analyze the environment interference condition and select best deployment. RSSI indicates the sensitivity for every channel.

Lower the RSSI value, better the signal. It's not suggested to enable this feature when using package forwarder since it will affect the downlink transmission.



| Item       | Description  | Default      |
|------------|--|--------------|
| Enable     | Click to enable noise analyzer feature.  | Disabled     |
| Sweep Freq | Select the frequency sweeping range.<br>General Freq: frequencies based on the LoRaWAN® regional parameters document<br>Custom: custom the frequency range   | General Freq |
| Sweep Time | Enable the noise analyzer continuously or within a period of time.<br>If Custom is selected, the noise analyzer will stop automatically after the pre-configured time.<br>Note: It's suggested to custom the time since noise analyzer feature will affect the normal data transmission. | Custom/24h   |

#### 4.1.4. Advanced

This section is about settings in details of beacon transmitting and validating.

| General                 | Radios | Advanced  | Custom | Traffic |
|-------------------------|--------|-----------|--------|---------|
| <b>  Beacon Setting</b> |        |           |        |         |
| Beacon Period           |        | 0         | s      |         |
| Beacon Freq             |        | 508300000 | Hz     |         |
| Beacon Datarate         |        | SF10      |        |         |
| Beacon Channel Number   |        | 3         |        |         |
| Beacon Freq Step        |        | 200000    | Hz     |         |
| Beacon Bandwidth        |        | 125000    | Hz     |         |
| Beacon TX Power         |        | 14        | dBm    |         |

| Item                  | Description   | Default                          |
|-----------------------|---|----------------------------------|
| Beacon Period         | Interval of gateway sending beacons for Class B device time synchronization. 0 means the gateway will not send beacons. | 0                                |
| Beacon Freq           | The frequency of beacons.   | Based on the supported frequency |
| Beacon Datarate       | The datarate of beacons.  | Based on the supported frequency |
| Beacon Channel Number | When selecting Custom, it allows users to custom range from 1 to 8.   | 1                                |
| Beacon Freq Step      | Frequency interval of beacons.  | 200000                           |
| Beacon Bandwidth      | The bandwidth of beacons. Unit: Hz  | 12500 Hz                         |
| Beacon TX Power       | The TX power of beacons.  | Based on the supported frequency |

**Intervals Setting**

Keep Alive Interval

10

s

Stat Interval

30

s

Push Timeout

100

ms

**Forward CRC Setting**

Forward CRC Disabled

☐

Forward CRC Error

☐

Forward CRC Valid

☒

| Item                 | Description  | Default  |
|----------------------|--|----------|
| Keep Alive Interval  | Enter the interval of keepalive packet which is sent from gateway to network server to keep the connection stable and alive.<br>Range: 1-3600. | 10       |
| Stat Interval        | Enter the interval to update the network server with gateway statistics. Range: 1-3600.  | 30       |
| Push Timeout         | Enter the timeout to wait for the response from server after the gateway sends data of node. Rang: 1-1999.                                     | 100      |
| Forward CRC Disabled | Enable to send packets received with CRC disabled to the network server.   | Disabled |
| Forward CRC Error    | Enable to send packets received with CRC errors to the network server.   | Disabled |
| Forward CRC Valid    | Enable to send packets received with CRC valid to the network server.  | Enabled  |

Table 3-2-1-9 Advanced Parameters

**LBT Settings**

Enable

☒

RSSI Target

-80

dBm

| Item        | Description   | Default  |
|-------------|---|----------|
| Enable      | Enable or disable LBT feature. Listen before talk (LBT) is used to detect whether the downlink channel is idle and avoid channel access conflicts.<br>Note: AU915 and US915 do not support LBT feature. | Disabled |
| RSSI Target | Enter the criteria of an idle channel. If actual RSSI of a channel is less than the criteria/target, the channel is   | -80      |

|  |                                   |  |
|--|-----------------------------------|--|
|  | considered as idle. Range: -120~0 |  |
|--|-----------------------------------|--|

#### 4.1.5. Custom

When Custom Configuration mode is enabled, you can write your own packet forwarder configuration file in the edit box to configure packet forwarder. Click “Save” to save your custom configuration file content, and click “Apply” to take effect. You can click “Clear” to erase all content in the edit box. If you don’t know how to write configuration file, please click “Example” to go to reference page.

**Note:** customized configuration will overwrite the packet forward configurations of web GUI.

General Radios Advanced **Custom** Traffic

**Custom Configuration**

Enable ☒

[Example](#)

```
{
  "SX1302_conf": {
    "spidev_path": "/dev/spidev0.0",
    "lorawan_public": true,
    "clksrc": 0,
    "antenna_gain": 0, /* antenna gain, in dBi */
    "antenna_cfg": "ITXIRX",
    "full_duplex": false,
    "precision_timestamp": {
      "enable": false,
      "max_ts_metrics": 255,
      "nb_symbols": 1
    },
  },
  "radio_0": {
    "enable": true,
    "type": "SX1250",
    "freq": 863000000
  }
}
```

#### 4.1.6. Traffic

When navigating to the traffic page, any recent traffic received by the gateway will display. To watch live traffic, click **Refresh**.

Traffic Setting

[Refresh](#) [Clear](#)

| Rfch | Direction | Time | Ticks      | Frequency | Datarate | Coderate | RSSI | SNR   |
|------|-----------|------|------------|-----------|----------|----------|------|-------|
| 1    | up        | -    | 83002508   | 922.8     | SF9BW125 | 4/5      | -103 | -13.2 |
| 1    | up        | -    | 71108156   | 922.6     | SF9BW125 | 4/5      | -102 | -13.2 |
| 1    | up        | -    | 35426956   | 922.8     | SF9BW125 | 4/5      | -103 | -9.8  |
| 1    | up        | -    | 3171639508 | 922.6     | SF9BW125 | 4/5      | -100 | -10.5 |
| 1    | up        | -    | 3159744804 | 922.6     | SF9BW125 | 4/5      | -102 | -13.0 |
| 1    | up        | -    | 3155781348 | 922.6     | SF9BW125 | 4/5      | -101 | -12.2 |
| 1    | up        | -    | 3147851660 | 922.6     | SF9BW125 | 4/5      | -102 | -13.8 |
| 1    | up        | -    | 3143888916 | 922.8     | SF9BW125 | 4/5      | -102 | -13.2 |
| 1    | up        | -    | 3139922740 | 922.8     | SF9BW125 | 4/5      | -100 | -12.2 |
| 1    | up        | -    | 3124065788 | 922.8     | SF9BW125 | 4/5      | -100 | -12.8 |

Figure 3-2-1-12

| Item      | Description                                    |
|-----------|--|
| Refresh   | Click to obtain the latest data.               |
| Clear     | Click to clear all data.                       |
| Rfch      | Show the channel of this packet.               |
| Direction | Show the direction of this packet.             |
| Time      | Show the receiving time of this packet.        |
| Ticks     | Show the ticks of this packet.                 |
| Frequency | Show the frequency of the channel.             |
| Datarate  | Show the datarate of the channel.              |
| Coderate  | Show the coderate of this packet.              |
| RSSI      | Show the received signal strength.             |
| SNR       | Show the signal to noise ratio of this packet. |

## 4.2. Network Server

### 4.2.1. General

**General Setting**

Enable ☒

Platform Mode ☐

NetID

Join Delay  sec

RX1 Delay  sec

Lease Time  hh-mm-ss

Log Level

**Global Channel Plan Setting**

Channel Plan

Channel

| Item                   | Description                          | Default |
|------------------------|--------------------------------------|---------|
| <b>General Setting</b> |                                      |         |
| Enable                 | Click to enable Network Server mode. | Enabled |
| NetID                  | Enter the network identifier.        | 010203  |

|                      |   |                                    |
|----------------------|---|------------------------------------|
| Join Delay           | Enter the interval time between when the end-device sends a Join_request_message to network server and when the end-device prepares to open RX1 to receive the Join_accept_message sent from network server.  | 5                                  |
| RX1 Delay            | Enter the interval time between when the end-device sends uplink packets and when the end-device prepares to open RX1 to receive the downlink packet.   | 1                                  |
| Lease Time           | Enter the amount of time till a successful join expires. The format is hours-minutes-seconds. If the join-type is OTAA, then the end-devices need to join the network server again when it exceeds the lease time.  | 876000-00-00                       |
| Log level            | Choose the log level.   | Info                               |
| Channel Plan Setting |   |                                    |
| Channel Plan         | Choose LoRaWAN® channel plan used for the upstream and downlink frequencies and datarates. Available channel plans depend on the gateway's model.   | Depend on the gateway 's frequency |
| Channel              | <p>Allow end devices to communicate with specific frequency channels.</p> <p>Leave it blank means using all the default standard usable channels specified in the LoRaWAN® regional parameters document.</p> <p>It allows to enter the index of the channels.</p> <p>Examples:</p> <p>1, 40: Enabling Channel 1 and Channel 40</p> <p>1-40: Enabling Channel 1 to Channel 40</p> <p>1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60</p> | Depend on the gateway 's frequency |

**Note:** For some regional variants, if allowed by your LoRaWAN® region, you can use Additional Plan to configure additional channels undefined by the LoRaWAN® Regional Parameters, like EU868 and KR920, as the following picture shows:

| Additional Channels |              |              |   |
|---------------------|--------------|--------------|---|
| Frequency(MHz)      | Min Datarate | Max Datarate | Operation   |
|                     |              |              |  |



| Additional Channels |   |                  |
|---------------------|---|------------------|
| Item                | Description   | Default          |
| Frequency/MHz       | Enter the frequency of the additional plan.   | Null.            |
| Max Datarate        | Enter the max datarate for the end-device.<br>The range is based on what is specified in the LoRaWAN® regional parameters document. | DR0(SF12,125kHz) |
| Min Datarate        | Enter the min datarate for the end-device.<br>The range is based on what is specified in the LoRaWAN® regional parameters document. | DR3(SF9,125kHz)  |

Table 3-2-2-2 Additional Plan Parameters

## 4.2.2. Application

An application is a collection of devices with the same purpose/of the same type. Users can add a series of devices to the same application which needs to send to the same server.

You can edit the application by clicking  or create a new application by clicking .

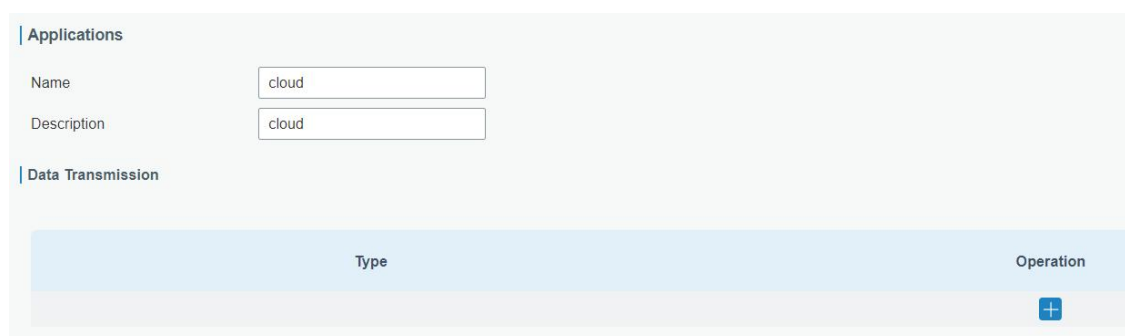


Figure 3-2-2-3

| Application       |   |
|-------------------|---|
| Item              | Description   |
| Name              | Enter the name of the application profile.<br>E.g smoker-sensor-app.  |
| Description       | Enter the description of this application.<br>E.g an application for smoker sensor.   |
| Data Transmission | Data will be sent to your custom server using the MQTT, HTTP, HTTPS or BACnet/IP protocol. One application can add 3 data transmissions at most and every protocol can be selected only once. |

Table 3-2-2-3 Application Parameters

## MQTT Integration

Type MQTT

Status -

**General**

Broker Address

Broker Port

Client ID

Connection Timeout/s

Keep Alive Interval/s

**User Credentials**

Enable ☒

Username

Password

**TLS**

Enable ☒

Mode CA signed server certificate

Figure 3-2-2-4

**Topic**

| Data Type               | topic                |       |
|-------------------------|----------------------|-------|
| Uplink data             | <input type="text"/> | QoS 0 |
| Downlink data           | <input type="text"/> | QoS 0 |
| Multicast downlink data | <input type="text"/> | QoS 0 |
| Join notification       | <input type="text"/> | QoS 0 |
| ACK notification        | <input type="text"/> | QoS 0 |
| Error notification      | <input type="text"/> | QoS 0 |
| Request data            | /event/request       | QoS 0 |
| Response data           | /event/response      | QoS 0 |

Figure 3-2-2-5

| MQTT Settings  |   |
|----------------|---|
| Item           | Description   |
| <b>General</b> |   |
| Broker Address | MQTT broker address to receive data.                          |
| Broker Port    | MQTT broker port to receive data.                             |
| Client ID      | Client ID is the unique identity of the client to the server. |

|                         |  |
|-------------------------|--|
|                         | It must be unique when all clients are connected to the same server, and it is the key to handle messages at QoS 1 and 2.  |
| Connection Timeout/s    | If the client does not get a response after the connection timeout, the connection will be considered as broken. The Range: 1-65535  |
| Keep Alive Interval/s   | After the client is connected to the server, the client will send heartbeat packet to the server regularly to keep alive. Range: 1-65535   |
| <b>User Credentials</b> |  |
| Enable                  | Enable user credentials.   |
| Username                | The username used for connecting to the MQTT broker.   |
| Password                | The password used for connecting to the MQTT broker.   |
| <b>TLS</b>              |  |
| Enable                  | Enable the TLS encryption in MQTT communication.   |
| Mode                    | Select from "Self signed certificates" , "CA signed server certificate" .<br>CA signed server certificate: verify with the certificate issued by Certificate Authority (CA) that pre-loaded on the device.<br>Self signed certificates: upload the custom CA certificates(.crt or .pem), client Certificates(.crt) and secret key(.key) for verification.  |
| <b>Topic</b>            |  |
| Data Type               | Data type to communicate with MQTT broker:<br>Uplink Data: receive device uplink packets<br>Downlink Data: send downlink commands to device<br>Multicast Downlink Data: send downlink commands to multicast group<br>Join Notification: receive join request packets from devices<br>ACK Notification: receive ACK packets from devices<br>Error Notification: receive error packets from devices<br>Request data: send requests to enquire and configure the gateway NS<br>Response data: receive the request responses |
| Topic                   | Topic name of the data type used for publishing.   |
| QoS                     | QoS 0 - Only Once<br>This is the fastest method and requires only 1 message. It is also the most unreliable transfer mode.<br>QoS 1 - At Least Once<br>This level guarantees that the message will be delivered at least once, but may be delivered more than once.<br>QoS 2 - Exactly Once<br>QoS 2 is the highest level of service in MQTT. This level guarantees that each message is received only once by the intended recipients. QoS 2 is the safest and slowest quality of service level.                        |

Table 3-2-2-4 MQTT Settings Parameters

**Note:** if MQTT broker type is HiveMQ, please enable **TLS** and set the option as **CA signed server certificate**.

### HTTP/HTTPS Integration

The screenshot displays the configuration interface for HTTP/HTTPS integration. It is divided into two main sections: 'HTTP Header' and 'URL'.

**HTTP Header Section:**

| Header Name | Header Value | Operation |
|-------------|--------------|-----------|
| +           |              |           |

**URL Section:**

| Data Type          | URL                  |
|--------------------|----------------------|
| Uplink data        | <input type="text"/> |
| Join notification  | <input type="text"/> |
| ACK notification   | <input type="text"/> |
| Error notification | <input type="text"/> |

Figure 3-2-2-6

| HTTP/HTTPS Settings |  |
|---------------------|--|
| Item                | Description                                      |
| HTTP Header         |  |
| Header Name         | A core set of fields in the HTTP header.         |
| Header Value        | Value of the HTTP header.                        |
| URL                 |  |
| Data Type           | Data type sent to HTTP/HTTPS server.             |
| Topic               | Topic name of the data type used for publishing. |
| URL                 | HTTP/HTTPS server URL to receive data.           |

Table 3-2-2-5 HTTP/HTTPS Settings Parameters

### Related Configuration Example

[Application configuration](#)

### 4.2.3. Payload Codec

Users can customize the payload codec of other brands of devices or adjust the uplink and downlink contents as requirements.

Inbuilt Payload Codec Library

Library Version

1.0.0

Obtaining Type

Online

Obtain

Note: Ensure that the Internet access is available.

| Name           | Payload decoder function | Payload encoder function | Details |
|----------------|--------------------------|--------------------------|---------|
| AM103 & AM103L | ✓                        | ✓                        | !       |
| AM104          | ✓                        | ✓                        | !       |
| AM107          | ✓                        | ✓                        | !       |
| AM307          | ✓                        | ✓                        | !       |
| AM308          | ✓                        | ✓                        | !       |
| AM319-HCHO     | ✓                        | ✓                        | !       |
| AM319-HCHO-IR  | ✓                        | ✓                        | !       |
| AM319-O3       | ✓                        | ✓                        | !       |
| EM300-TH       | ✓                        | ✓                        | !       |
| WS101          | ✓                        | ✓                        | !       |

Showing 1 to 10 of 30 rows

10 ▲ rows per page

<

1

2

3

>

Figure 3-2-2-7

| Inbuilt Payload Codec Library    |   |
|----------------------------------|---|
| Item                             | Description   |
| Library Version                  | Show the version of the LoRaWAN node payload codec library.   |
| Obtaining Type                   | <p>Select the type to update the devices payload codec library.</p> <p>Online: update automatically if gateway detects there is version update every time gateway powers on and accesses the Internet. Users can also click Obtain button to check update status manually.</p> <p>Local Upload: click Browse to upload the zip format payload codec package and click Import to update the library.</p> |
| Name                             | Show the corresponding product model of the payload codec.  |
| Payload decoder/encoder function | Show if decoder and encoder are existed.  |
| Details                          | Show the details of decoder and encoder. If this does not meet your requirement, please customize your payload codec.   |

Table 3-2-2-6 Inbuilt Payload Codec Library Parameters

Name

Description

Template

None

Payload decoder

Payload decoder function

```

1 // Decode decodes an array of bytes into an object.
// - fPort contains the LoRaWAN fPort number
// - bytes is an array of bytes, e.g. [225, 230, 255, 0]
// The function must return an object, e.g. {"temperature": 22.5}
function Decode(fPort, bytes) {
  return {};
}

```

Payload encoder

Payload encoder function

```

1 // Encode encodes the given object into an array of bytes.
// - fPort contains the LoRaWAN fPort number
// - obj is an object, e.g. {"temperature": 22.5}
// The function must return an array of bytes, e.g. [225, 230, 255, 0]
function Encode(fPort, obj) {
  return [];
}

```

Payload Codec Test

☒

```

1 // input decoded test payload or encoded test payload
// decoded bytes
// 01 75 5C 03 67 34 01 04 68 65 05 6A 49 00 06 65 1C 00 79 00 14 00 07 7D E7 04 08 7D 07 00 09 73 3F 27
// encoded obj's
// {}

```

Figure 3-2-2-8

| Custom Payload Codec             |   |
|----------------------------------|---|
| Item                             | Description   |
| Name                             | Enter the unique name of the custom payload codec.  |
| Description                      | Enter the description of this payload codec.  |
| Template                         | Select an existing inbuilt payload codec as a template.   |
| Payload Decoder/Encoder Function | Customize the device payload decoder or encoder. Note that the function header should be the same as the example on the blanks. |
| Payload Codec test               | Disable or enable payload codec test.   |
| fPort                            | Application port of LoRaWAN devices. It ' s 85 by default for LoRaWAN devices.  |
| Decode                           | Enter the hex format raw data and click Decode to check the result.   |
| Encode                           | Enter the JSON format command and check Encode to check the result.   |

Table 3-2-2-7 Custom Payload Codec Parameters

#### 4.2.4. Profiles

A Profile defines the device capabilities and boot parameters that are needed by the Network Server for setting the LoRaWAN<sup>®</sup> radio access service. These information elements shall be provided by the end-device manufacturer. LG280 has pre-configured 8 device files and users can also create a new device profile.





| General         | Applications | Payload Codec | Profiles                | Device  | Multicast Groups | Gateway Fleet | Packets |
|-----------------|--------------|---------------|-------------------------|---|------------------|---------------|---------|
| Device Profiles |              |               |                         |   |                  |               |         |
| Name            | Max TXPower  | Join Type     | Class Type              | Operation   |                  |               |         |
| ClassA-ABP      | 0            | ABP           | Class A                 |   |                  |               |         |
| ClassA-OTAA     | 0            | OTAA          | Class A                 |   |                  |               |         |
| ClassB-ABP      | 0            | ABP           | Class A Class B         |   |                  |               |         |
| ClassB-OTAA     | 0            | OTAA          | Class A Class B         |   |                  |               |         |
| ClassC-ABP      | 0            | ABP           | Class A Class C         |   |                  |               |         |
| ClassC-OTAA     | 0            | OTAA          | Class A Class C         |   |                  |               |         |
| ClassCB-ABP     | 0            | ABP           | Class A Class B Class C |   |                  |               |         |
| ClassCB-OTAA    | 0            | OTAA          | Class A Class B Class C |   |                  |               |         |
|                 |              |               |                         |    |                  |               |         |

Figure 3-2-2-9

Device Profiles

Name

Max TXPower

0

Join Type

OTAA

Class Type

☒ Class A
 ☐ Class B
 ☐ Class C

Advanced

☐

Figure 3-2-2-10

| Device Profiles Settings |   |
|--------------------------|---|
| Item                     | Description   |
| Name                     | Enter the name of the device profile.   |
| Max TXPower              | Enter the maximum transmit power.<br>The TXPower indicates power levels relative to the Max EIRP level of the end-device. 0 means using the max EIRP. EIRP refers to the Equivalent Isotropically Radiated Power. |
| Join Type                | Select from: "OTAA" and "ABP".  |
| Class Type               | Class A is fixed as enabled. Users can check the box of Class B or Class C to add the class type.<br>Note: Beacon period should be set to nonzero value in Packet Forwarder > Advanced if using Class B.          |

Table 3-2-2-8 Device Profiles Setting Parameters

|                              |                                     |
|------------------------------|-------------------------------------|
| Advanced                     | <input checked="" type="checkbox"/> |
| MAC Version                  | 1.0.2                               |
| Regional Parameters Revision | B                                   |
| RX1 Datarate Offset          | 0                                   |
| RX2 Datarate                 | DR0 (SF12, 125 kHz)                 |
| RX2 Channel Frequency        | 505300000 Hz                        |
| Frequency List               | Hz                                  |
| Device Channel               |                                     |

Figure 3-2-2-11

| Device Profile Advanced Settings |  |   |
|----------------------------------|--|---|
| Item                             | Description  | Default   |
| MAC Version                      | Choose the version of the LoRaWAN® supported by the end-device.  | 1.0.2   |
| Regional Parameter Revision      | Revision of the Regional Parameters document supported by the end-device.  | B   |
| RX1 Datarate Offset              | The offset which used for calculating the RX1 data-rate, based on the uplink data-rate.  | Based on what is specified in the LoRaWAN® regional parameters document |
| RX2 Datarate                     | Enter the RX2 datarate which used for the RX2 receive-window.  |   |
| RX2 Channel Frequency            | RX2 channel frequency which used for the RX2 receive-window.   |   |
| Frequency List                   | List of factory-preset frequencies. The range is based on what is specified in the LoRaWAN® regional parameters document.  | Null  |
| Device Channel                   | Change this device frequency channel by typing the channel indexes. When configured, it takes precedence over the global channel. This setting only works for CN470/US915/AU915 gateway. | Null  |
| PingSlot Period                  | Period of opening the pingslot.  | Every Second  |
| PingSlot DataRate                | Datarate of the node receiving downlinks.  | Based on the supported frequency  |
| PingSlot Freq                    | Frequency of the node receiving downlinks.   | Based on the supported  |



|             |   |                            |
|-------------|---|----------------------------|
|             |   | frequency                  |
| ACK Timeout | The time for confirmed downlink transmissions. This option is only applicable to class B and class C. | Class B: 10<br>Class C: 10 |

Table 3-2-2-9 Device Profiles Advanced Setting Parameters

## 4.2.5. Device

A device is the end-device connecting to, and communicating over the LoRaWAN® network.

| Device  |                  |                |             |             |           |                                     |
|---|------------------|----------------|-------------|-------------|-----------|-------------------------------------|
| <div> Add Bulk Import Delete All </div> <div>Search</div> |                  |                |             |             |           |                                     |
| Device Name   | Device EUI       | Device-Profile | Application | Last Seen   | Activated | Operation                           |
| 24E124414B032563  | 24E124414B032563 | classB         | cloud       | 11 days ago | ✓         | <a href="#">✎</a> <a href="#">✕</a> |
| 24E124414A501971  | 24E124414A501971 | OTAA-calsB     | cloud       | 28 days ago | ✓         | <a href="#">✎</a> <a href="#">✕</a> |
| 1152-test   | 24E1612290821375 | ClassC-OTAA    | cloud       | 63 days ago | ✓         | <a href="#">✎</a> <a href="#">✕</a> |
| Showing 1 to 3 of 3 rows                                  |                  |                |             |             |           |                                     |


| Item           | Description   |
|----------------|---|
| Add            | Add a device.   |
| Bulk Import    | Download template and import multiple devices.  |
| Delete All     | Delete all devices in the list.   |
| Device Name    | Show the name of the device.  |
| Device EUI     | Show the EUI of the device.   |
| Device-Profile | Show the name of the device's device profile.   |
| Application    | Show the name of the device's application.  |
| Last Seen      | Show the time of last packet received.  |
| Activated      | Show the status of the device .  means that the device has been activated. |
| Operation      | Edit or delete the device.  |

Table 3-2-2-10 Device Parameters

|                              |   |
|------------------------------|---|
| Device Name                  | <input type="text" value="lora-sensor"/>                      |
| Description                  | <input type="text" value="a short description of your node"/> |
| Device EUI                   | <input type="text" value="24e1641194784358"/>                 |
| Device-Profile               | <input type="text" value="ClassC-OTAA"/>                      |
| Application                  | <input type="text" value="cloud"/>                            |
| Payload Codec                | <input type="text"/>  |
| fPort                        | <input type="text" value="1"/>                                |
| Modbus RTU Data Transmission | <input type="text" value="Modbus RTU over TCP"/>              |
| Modbus RTU Fport             | <input type="text"/>  |
| TCP Port                     | <input type="text"/>  |
| Frame-counter Validation     | <input type="checkbox"/>                                      |
| Application Key              | <input type="text"/>  |
| Device Address               | <input type="text"/>  |
| Network Session Key          | <input type="text"/>  |
| Application Session Key      | <input type="text"/>  |
| Uplink Frame-counter         | <input type="text" value="0"/>                                |
| Downlink Frame-counter       | <input type="text" value="0"/>                                |

Figure 3-2-2-13

| Device Configuration         |   |
|------------------------------|---|
| Item                         | Description   |
| Device Name                  | Enter the name of this device.  |
| Description                  | Enter the description of this device.   |
| Device EUI                   | Enter the EUI of this device.   |
| Device-Profile               | Choose the device profile.  |
| Application                  | Choose the application profile.   |
| Payload Codec                | Choose the payload codec existed on Payload Codec page.   |
| fPort                        | Enter the downlink port of device, it's 85 by default for devices.  |
| Modbus RTU Data Transmission | <p>Choose from: "Disable", "Modbus RTU to TCP", "Modbus RTU over TCP". This feature is only applicable to LoRaWAN® controllers.</p> <p>Modbus RTU to TCP: TCP client can send Modbus TCP commands to ask for controller Modbus data.</p> <p>Modbus RTU over TCP: TCP client can send Modbus RTU commands to ask for controller Modbus data.</p> |
| Modbus RTU Fport             | <p>Enter the LoRaWAN® frame port for transparent transmission between LoRaWAN® controllers and LG280.</p> <p>Range: 2-84, 86-223.</p>   |

|                          |  |
|--------------------------|--|
|                          | Note: this value must be the same as the LoRaWAN® controller's Fport.  |
| TCP Port                 | Enter the TCP port for data transmission between the TCP Client and LG280 (as TCP Server). Range: 1-65535.   |
| Frame-Counter Validation | If disable the frame-counter validation, it will compromise security as it enables people to perform replay-attacks.   |
| Application Key          | Whenever an end-device joins a network via over-the-air activation, the application key is used for derive the Application Session key.  |
| Device Address           | The device address identifies the end-device within the current network.   |
| Network Session Key      | The network session key specific for the end-device. It is used by the end-device to calculate the MIC or part of the MIC (message integrity code) of all uplink data messages to ensure data integrity.   |
| Application Session Key  | The AppSKey is an application session key specific for the end-device. It is used by both the application server and the end-device to encrypt and decrypt the payload field of application-specific data messages.  |
| Uplink Frame-counter     | <p>The number of data frames which sent uplink to the network server. It will be incremented by the end-device and received by the end-device.</p> <p>Users can reset the a personalized end-device manually, then the frame counters on the end-device and the frame counters on the network server for that end-device will be reset to 0.</p> |
| Downlink Frame-counter   | <p>The number of data frames which received by the end-device downlink from the network server. It will be incremented by the network server.</p> <p>Users can reset the a personalized end-device manually, then the frame counters on the end-device and the frame counters on the network server for that end-device will be reset to 0.</p>  |

Table 3-2-2-11 Device Setting Parameters

### Related Configuration Example

[Device configuration](#)

#### 4.2.6. Multicast Groups

gateways support for creating Class B or Class C multicast groups to send downlink messages to a group of end devices. A multicast group is a virtual ABP device (i.e. shared session keys), does not support uplink, confirmed downlink nor MAC commands.

Multicast Groups

Add

Search

| Multicast Address         | Group Name | Number of Devices | Operation |
|---------------------------|------------|-------------------|-----------|
| No matching records found |            |                   |           |

Figure 3-2-2-14

| Item              | Description                          |
|-------------------|--------------------------------------|
| Add               | Add a multicast group.               |
| Group Name        | Show the name of the group.          |
| Number of Devices | Show the device number of the group. |
| Operation         | Edit or delete the multicast group.  |

Table 3-2-2-12 Multicast Group Parameters

Group Name

Multicast Address

Multicast Network Session Key

Multicast Application Session Key

Class Type

Class C

Datarate

DR8(SF12,500KHz)

Frequency

923300000

Hz

Frame-counter

0

Selected Devices

Add Device

Figure 3-2-2-15

| Multicast Group Configuration |  |
|-------------------------------|--|
| Item                          | Description  |
| Group Name                    | Enter the name of this multicast group.                            |
| Multicast Address             | Device address (Dev Addr) of all devices in this group.            |
| Multicast Network Session Key | The network session key (Netwks Key) of all devices in this group. |
| Multicast Application         | The application session key(AppSKey) of all devices in this group. |

|                       |  |
|-----------------------|--|
| Session Key           |  |
| Class Type            | Class B and Class C are optional.  |
| Datarate              | Datarate of the node receiving downlinks   |
| Frequency             | Downlink frequency of all devices in this group.   |
| Frame-counter         | The number of data frames which received by the end-device downlink from the network server. It will be incremented by the network server. |
| Ping Slot Periodicity | Period of opening the pingslot. This is only applied to Class B end devices.   |
| Selected Devices      | Show all device names in this group.   |
| Add Device            | Add devices in the pull-down list.   |

Table 3-2-2-13 Multicast Group Setting Parameters

## 4.2.7. Gateway Fleet

gateways can connect to LG280 network server. A gateway supports to add 100 gateways at most.




| Gateway Fleet    |               |           |                     |   |
|------------------|---------------|-----------|---------------------|---|
| Gateway ID       | Name          | Status    | Last Seen           | Operation   |
| 24E124FFFEF12263 | Local Gateway | Connected | 2021-04-19 16:12:27 |   |
|                  |               |           |                     |    |

Figure 3-2-2-16

| Item       | Description                                |
|------------|--|
| Gateway ID | Show the gateway ID.                       |
| Name       | Show the name of the gateway.              |
| Status     | Show the connection status of the gateway. |
| Last Seen  | Show the time of last packet received.     |
| Operation  | Edit or delete the gateway.                |

Table 3-2-2-14 Gateway Fleet Parameters

Gateway ID

Name

Location

GPS info will be displayed by default or can be changed manually

Latitude

Longitude

Altitude

 m

Figure 3-2-2-17

| Item       | Description   |
|------------|---|
| Gateway ID | Enter the unique gateway ID to recognize the gateway.   |
| Name       | Enter the name of this gateway.   |
| Location   | GPS data of the gateway can be edited here. If gateway sends GPS data it will replace your customized data. |

Table 3-2-2-15 Gateway Setting Parameters

## 4.2.8. Packets

**Send Data To Device**

| Device EUI       | Type  | Payload | Port | Confirmed                |                       |
|------------------|-------|---------|------|--------------------------|-----------------------|
| 0000000000000000 | ASCII |         | 85   | <input type="checkbox"/> | <button>Send</button> |

**Send Data to Multicast Group**

| Multicast Group | Type  | Payload | Port |                       |
|-----------------|-------|---------|------|-----------------------|
|                 | ASCII |         | 85   | <button>Send</button> |

**Network Server**

Clear

| Device EUI/Group          | Gateway ID | Frequency | Datarate | RSSI/SNR | Size | Fcnt | Type | Time | Details |
|---------------------------|------------|-----------|----------|----------|------|------|------|------|---------|
| No matching records found |            |           |          |          |      |      |      |      |         |


Figure 3-2-2-18

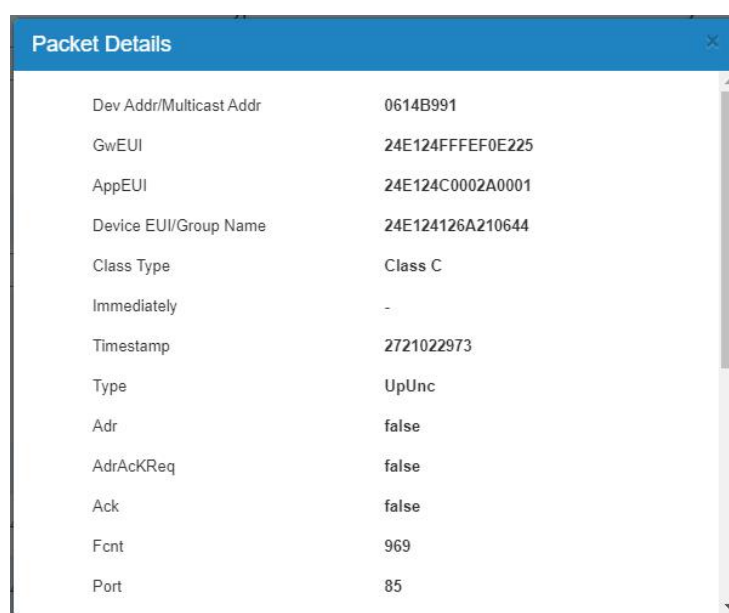
| Send Data To Device/Multicast Group |  |
|-------------------------------------|--|
| Item                                | Description  |
| Device EUI                          | Enter the EUI of the device to receive the payload.  |
| Multicast Group                     | Select the multicast group to send downlinks. Multicast groups can be added under Multicast Groups tab.  |
| Type                                | Choose the payload type to enter in the payload Input box: ASCII, Hex, base64.   |
| Payload                             | Enter the message to be sent to this device.   |
| Port                                | Enter the LoRaWAN® frame port for packet transmission between device and Network Server.   |
| Confirmed                           | After enabled, the end device will receive downlink packet and should answer "confirmed" to the network server. Multicast feature does not support confirmed downlink. |

Table 3-2-2-16 Send Data to Device Parameters

| Network Server   |   |
|------------------|---|
| Item             | Description   |
| Device EUI/Group | Show the EUI of the device or multicast group.  |
| Frequency        | Show the used frequency to transmit packets.  |
| Datarate         | Show the used datarate to transmit packets.   |
| SNR              | Show the signal-noise ratio.  |
| RSSI             | Show the received signal strength indicator.  |
| Size             | Show the size of payload.   |
| Fcnt             | Show the frame counter.   |
| Type             | Show the type of the packet:<br>JnAcc - Join Accept Packet<br>JnReq - Join Request Packet<br>UpUnc - Uplink Unconfirmed Packet<br>UpCnf - Uplink Confirmed Packet - ACK response from network requested<br>DnUnc - Downlink Unconfirmed Packet<br>DnCnf - Downlink Confirmed Packet- ACK response from end-device requested |
| Time             | Show the time of packet was sent or received.   |

Table 3-2-2-17 Packet Parameters

Click  to get more details about the packet. As shown:



| Packet Details          |                  |
|-------------------------|------------------|
| Dev Addr/Multicast Addr | 0614B991         |
| GwEUI                   | 24E124FFFEF0E225 |
| AppEUI                  | 24E124C0002A0001 |
| Device EUI/Group Name   | 24E124126A210644 |
| Class Type              | Class C          |
| Immediately             | -                |
| Timestamp               | 2721022973       |
| Type                    | UpUnc            |
| Adr                     | false            |
| AdrAckReq               | false            |
| Ack                     | false            |
| Fcnt                    | 969              |
| Port                    | 85               |

Figure 3-2-2-19

| Item                  | Description                                     |
|-----------------------|---|
| Dev<br>Addr/Multicast | Show the address of the device/multicast group. |

|                   |   |
|-------------------|---|
| Addr              |   |
| GwEUI             | Show the EUI of the gateway.  |
| AppEUI            | Show the EUI of the application.  |
| DevEUI/Group Name | Show the EUI of the device/multicast group name.  |
| Class Type        | Show the class type of the device or multicast group.   |
| Immediately       | True: Device may transmit an explicit (possibly empty) acknowledgement data message immediately after the reception of a data message requiring a confirmation.   |
| Timestamp         | Show the timestamp of this packet.  |
| Type              | Show the type of the packet:<br>JnAcc - Join Accept Packet<br>JnReq - Join Request Packet<br>UpUnc - Uplink Unconfirmed Packet<br>UpCnf - Uplink Confirmed Packet - ACK response from network requested<br>DnUnc - Downlink Unconfirmed Packet<br>DnCnf - Downlink Confirmed Packet- ACK response from end-device requested   |
| Adr               | True: The end-node has enabled ADR.<br>False: The end-node has not enabled ADR.   |
| AdrAckReq         | In order to validate that the network is receiving the uplink messages, nodes periodically transmit ADRACKReq message. This is 1 bit long.<br>True: Network should respond in ADR_ACK_DELAY time to confirm that it is receiving the uplink messages.<br>False: ADR is disabled or Network does not respond in ADR_ACK_DELAY. |
| Ack               | True: This frame is ACK.<br>False: This frame is not ACK.   |
| Fcnt              | Show the frame-counter of this packet. The network server tracks the uplink frame counter and generates the downlink counter for each end-device.   |
| FPort             | FPort is a multiplexing port field. If the frame payload field is not empty, the port field must be present. If present, a FPort 16 value of 0 indicates that the FRMPayload contains MAC commands only. When this is the case, the FOptsLen field must be zero. FOptsLen is the length of the FOpts field in bytes.          |
| Modulation        | LoRa means the physical layer uses the LoRa modulation.   |
| Bandwidth         | Show the bandwidth of this channel.   |



|               |  |
|---------------|--|
| SpreadFactor  | Show the spreadFactor of this channel.   |
| Bitrate       | Show the bitrate of this channel.  |
| CodeRate      | Show the coderate of this channel.   |
| SNR           | Show the SNR of this channel.  |
| RSSI          | Show the RSSI of this channel.   |
| Power         | Show the transmit power of the device.   |
| Payload (b64) | Show the application payload of this packet.   |
| Payload (hex) | Show the application payload of this packet.   |
| Json          | Show the data after decoded.   |
| MIC           | Show the MIC of this packet. MIC is a cryptographic message integrity code, computed over the fields MHDR, FHDR, FPort and the encrypted FRMPayload. |

Table 3-2-2-18 Packets Details Parameters

## Related Topic

[Send Data to Device](#)

## 4.3. Protocol Integration

### 4.3.1. BACnet Server

LG280 can work as LoRaWAN to BACnet gateway to integrate with BMS system easily.

#### 4.3.1.1. Server

Server

Enable

☒

UDP Port

47808

Device ID

40185

Device Name

UG67-6222B4620088

BBMD

☒

IP Address

IP Port

47808

Time TO Live

60000

s

Figure 3-3-1-1

| Server Settings |   |
|-----------------|---|
| Item            | Description                               |
| Enable          | Enable or disable BACnet server function. |

|              |   |
|--------------|---|
| UDP Port     | Set communication port of BACnet/IP. Range: 1-65535.<br>The default port is 47808.                                      |
| Device ID    | The unique BACnet device identifier which needs to avoid conflict with other devices.                                   |
| Device Name  | The device name to represent the device.  |
| BBMD         | Enable BBMD(BACnet/IP Broadcast Management Device) if BACnet devices of different network subnets should work together. |
| IP Address   | Fill in the IP address of BBMD device or external device registrar.   |
| IP Port      | Fill in the UDP/IP port for external device registration.   |
| Time TO Live | Number of seconds used on external device registration.   |

Table 3-3-1-1 Server Parameters

#### 4.3.1.2. BACnet Object

| Object Name                 | Object Type  | Object Instance Nr | Present Value   | Units    | Updates | Update time         | COV      | Operation |
|-----------------------------|--------------|--------------------|-----------------|----------|---------|---------------------|----------|-----------|
| 24E124592B322496.button_... | Analog-Input | 0                  | 1670892748800.0 | no-units | 539     | 2022-12-13 08:52:06 | Disabled |           |

Showing 1 to 1 of 1 rows

Figure 3-3-1-2

| Item               | Description  |
|--------------------|--|
| Add                | Add a BACnet object. The gateway supports adding 2000 objects at most. |
| Bulk Import        | Download template and import multiple BACnet objects.                  |
| Bulk Export        | Export all generated BACnet object settings.                           |
| Delete All         | Delete all objects in the list.  |
| Object Name        | Show the name of the BACnet object.                                    |
| Object Type        | Show the type of this object.  |
| Object Instance Nr | Show the instance number of this object.                               |
| Present Value      | Show the latest value of object.                                       |
| Units              | Show the unit of this object value.                                    |
| Updates            | Show the update times of this object value.                            |
| Update time        | Show the time for this object to get and update the data.              |
| COV                | Show if COV (Change of value) is enabled.                              |
| Operation          | Edit or delete the object.   |

Table 3-3-1-2 BACnet Object List Parameters

**BACnet Object**

Device Name

AM308 ▼

LoRa Object

temperature ▼

Object Name

AM308.temperature

Object Type

Analog-Input ▼

The Object Instance

0

Units

°C(62) ▼

Description

COV

☐

Figure 3-3-1-3

| BACnet Object Configuration |  |
|-----------------------------|--|
| Item                        | Description  |
| Device Name                 | Select the device added on Network Server > Device page.   |
| LoRa Object                 | Select one of device variables as an object.   |
| Object Name                 | Customize an unique name for this object.  |
| Object Type                 | Select the object type as binary input/output/value, analog input/output/value, multistate input/output/value and charcterString value.  |
| The Object Instance         | Customize the object instance.   |
| Description                 | Enter the description of this object.  |
| Analog Input/Output/Value   |  |
| Units                       | Select the unit of this object value.  |
| COV                         | When object value changes, the BACnet server (gateway) will send notification of new value to BACnet client. This only applies to analog type objects.                           |
| COV Increment               | Only when the object value reaches or over this increment, the BACnet server (gateway) will send the notification.   |
| Relinquish Default          | If there is no command, the analog output will be set as this relinquish default value.  |
| Binary Input/Output/Value   |  |
| Polarity                    | Define the binary input/output status as Normal or Reverse.  |
| Active Text                 | Characterize the intended effect of active state of binary type object value. Example: when a button is pressed and binary input is 1, active text can be defined as "Pressed" . |
| Inactive Text               | Characterize the intended effect of inactive state of binary type  |

|                               |  |
|-------------------------------|--|
|                               | object value. Example: for a button, inactive text can be defined as "Unpressed" .                       |
| Relinquish Default            | If there is no command, the analog output or binary output will be set as this relinquish default value. |
| MultiState Input/Output/Value |  |
| Number of States              | Set the number of states and define the name of every state.   |
| Relinquish Default            | If there is no command, the multistate output will be set as this relinquish default value.              |

Table 3-3-1-3 BACnet Object Configuration Parameters

### 3.4 Network

#### 4.3.2. Interface

##### 4.3.2.1. Port

The Ethernet port can be connected with Ethernet cable to get Internet access. It supports 3 connection types.

- **Static IP:** configure IP address, netmask and gateway for Ethernet WAN interface.
- **DHCP Client:** configure Ethernet WAN interface as DHCP Client to obtain IP address automatically.
- **PPPoE:** configure Ethernet WAN interface as PPPoE Client.

The screenshot shows the configuration page for 'Port\_1'. It includes the following fields and values:

| Field                | Value                               |
|----------------------|-------------------------------------|
| Port                 | eth 0                               |
| Connection Type      | Static IP                           |
| IP Address           | 192.168.23.150                      |
| Netmask              | 255.255.255.0                       |
| Gateway              | 192.168.23.1                        |
| MTU                  | 1500                                |
| Primary DNS Server   | 8.8.8.8                             |
| Secondary DNS Server | 223.5.5.5                           |
| Enable NAT           | <input checked="" type="checkbox"/> |

Figure 3-4-1-1

| Port Setting |  |         |
|--------------|--|---------|
| Item         | Description                                      | Default |
| Port         | The port that is fixed as eth0 port and enabled. | eth 0   |

|                      |  |           |
|----------------------|--|-----------|
| Connection Type      | Select from "Static IP", "DHCP Client" and "PPPoE".  | Static IP |
| MTU                  | Set the maximum transmission unit.   | 1500      |
| Primary DNS Server   | Set the primary DNS.   | 8.8.8.8   |
| Secondary DNS Server | Set the secondary DNS.   | 223.5.5.5 |
| Enable NAT           | Enable or disable NAT function. When enabled, a private IP can be translated to a public IP. | Enable    |

Table 3-4-1-1 Port Parameters

Related Configuration Example

Ethernet Connection

1. Static IP Configuration

If the external network assigns a fixed IP for the Ethernet port, user can select “Static IP” mode.

Port\_1

Port

eth 0

Connection Type

Static IP

IP Address

192.168.23.150

Netmask

255.255.255.0

Gateway

192.168.23.1

MTU

1500

Primary DNS Server

8.8.8.8

Secondary DNS Server

223.5.5.5

Enable NAT

☒

Multiple IP Address

| IP Address | Netmask | Operation              |
|------------|---------|------------------------|
|            |         | <div><div></div></div> |

Figure 3-4-1-2

| Static IP           |  |                |
|---------------------|--|----------------|
| Item                | Description                                      | Default        |
| IP Address          | Set the IP address which can access Internet.    | 192.168.23.150 |
| Netmask             | Set the Netmask for Ethernet port.               | 255.255.255.0  |
| Gateway             | Set the gateway's IP address for Ethernet port.  | 192.168.23.1   |
| Multiple IP Address | Set the multiple IP addresses for Ethernet port. | Null           |

Table 3-4-1-2 Static IP Parameters

2. DHCP Client

If the external network has DHCP server enabled and has assigned IP addresses to the Ethernet WAN interface, user can select “DHCP client” mode to obtain IP address automatically.

Port\_1

Port

eth 0

Connection Type

DHCP Client

MTU

1500

Use Peer DNS

☐

Primary DNS Server

8.8.8.8

Secondary DNS Server

223.5.5.5

Enable NAT

☒

Figure 3-4-1-3

| DHCP Client  |  |
|--------------|--|
| Item         | Description  |
| Use Peer DNS | Obtain peer DNS automatically during PPP dialing. DNS is necessary when user visits domain name. |

Table 3-4-1-3 DHCP Client Parameters

3. PPPoE

PPPoE refers to a point to point protocol over Ethernet. User has to install a PPPoE client on the basis of original connection way. With PPPoE, remote access devices can get control of each user.

Port\_1

Port

eth 0

Connection Type

PPPoE

Username

Password

Link Detection Interval(s)

60

Max Retries

0

MTU

1500

Use Peer DNS

☐

Primary DNS Server

8.8.8.8

Secondary DNS Server

223.5.5.5

Enable NAT

☒

Figure 3-4-1-4

| PPPoE                       |  |
|-----------------------------|--|
| Item                        | Description  |
| Username                    | Enter the username provided by your Internet Service Provider (ISP).                             |
| Password                    | Enter the password provided by your Internet Service Provider (ISP).                             |
| Link Detection Interval (s) | Set the heartbeat interval for link detection. Range: 1-600.                                     |
| Max Retries                 | Set the maximum retry times after it fails to dial up. Range: 0-9.                               |
| Use Peer DNS                | Obtain peer DNS automatically during PPP dialing. DNS is necessary when user visits domain name. |

Table 3-4-1-4 PPPOE Parameters

#### 4.3.2.2. WLAN

This section explains how to set the related parameters for Wi-Fi network. LG280 supports 802.11 b/g/n, as AP or client mode.

The screenshot displays the WLAN configuration page with the following settings:

- WLAN**
  - Enable: ☒
  - Work Mode: AP (dropdown)
  - SSID Broadcast: ☒
  - AP Isolation: ☐
  - Radio Type: 802.11n(2.4GHz) (dropdown)
  - Channel: Auto (dropdown)
  - SSID: (text input)
  - BSSID: (text input)
  - Encryption Mode: No Encryption (dropdown)
  - Bandwidth: 20MHz (dropdown)
  - Max Client Number: 10 (text input)
- IP Setting**
  - Protocol: Static IP (dropdown)
  - IP Address: (text input)
  - Netmask: (text input)
  - DHCP Settings: (link)

Figure 3-4-1-5

**WLAN**

Enable ☒

Work Mode Client Scan

SSID

BSSID

Encryption Mode WPA-PSK/WPA2-PSK

Cipher Auto

Key

**IP Setting**

Protocol Static IP

IP Address

Netmask 255.255.255.0

Gateway

Figure 3-4-1-6

| WLAN Settings             |  |
|---------------------------|--|
| Item                      | Description  |
| Enable                    | Enable/disable WLAN.   |
| Work Mode                 | Select gateway's work mode. The options are "Client" or "AP".  |
| BSSID                     | Fill in the MAC address of the access point. Either SSID or BSSID can be filled to join the network.   |
| SSID                      | Fill in the SSID of the access point.  |
| Client Mode               |  |
| Scan                      | Click "Scan" button to search the nearby access point.   |
| Encryption Mode           | Select encryption mode. The options are "No Encryption", "WEP Open System", "WEP Shared Key", "WPA-PSK", "WPA2-PSK", "WPA-PSK/WPA2-PSK", "WPA-Enterprise", "WPA2-Enterprise" and "WPA-Enterprise/WPA2-Enterprise". |
| Cipher                    | Select cipher. The options are "Auto", "AES", "TKIP" and "AES/TKIP".   |
| Key                       | Fill the pre-shared key of WEP/WPA encryption.   |
| XSupplicant Type          | Select from "Peap", "Leap", "TLS" and "TTLS".  |
| User                      | Fill the user of WPA/WPA2-Enterprise.  |
| Anonymous Identity        | Fill the anonymous identity of WPA/WPA2-Enterprise.  |
| Phase2                    | Fill the phase2 of WPA/WPA2-Enterprise.  |
| Public Server Certificate | The public server certificate used for verifying with WPA/WPA2-Enterprise access point.  |
| AP Mode                   |  |
| SSID Broadcast            | When SSID broadcast is disabled, other wireless devices can't  |



|                   |   |
|-------------------|---|
|                   | not find the SSID, and users have to enter the SSID manually to access to the wireless network.   |
| AP Isolation      | When AP isolation is enabled, all users which access to the AP are isolated without communication with each other.                            |
| Radio Type        | Select Radio type. The options are " 802.11b (2.4 GHz)", "802.11g (2.4 GHz)", "802.11n (2.4 GHz)" " .   |
| Channel           | Select wireless channel. The options are "Auto", "1", "2"....."11".   |
| Encryption Mode   | Select encryption mode. The options are " No Encryption", "WEP Open System" , "WEP Shared Key", "WPA-PSK", "WPA2-PSK" and "WPA-PSK/WPA2-PSK". |
| Cipher            | Select cipher. The options are " Auto", " AES", " TKIP" and "AES/TKIP".   |
| Key               | Fill the pre-shared key of WPA encryption. The default password is iotpassword.   |
| Bandwidth         | Select bandwidth. The options are "20MHz" and "40MHz".  |
| Max Client Number | Set the maximum number of client to access when the gateway is configured as AP.  |
| <b>IP Setting</b> |   |
| Protocol          | Set the protocol in wireless network.   |
| IP Address        | Set the IP address in wireless network.   |
| Netmask           | Set the netmask in wireless network.  |
| Gateway           | Set the gateway in wireless network.  |

Table 3-4-1-5 WLAN Parameters

Port

WLAN

Cellular

Loopback

< GoBack

| SSID                | Channel | Signal | Cipher | BSSID             | Security         | Frequency |                         |
|---------------------|---------|--------|--------|-------------------|------------------|-----------|-------------------------|
| Vison Sensor_006602 | Auto    | -94dBm | Auto   | 24:e1:24:00:66:02 | No Encryption    | 2462MHz   | <div>Join Network</div> |
| Milesight_Test      | Auto    | -88dBm | AES    | ec:26:ca:99:3a:a4 | WPA-PSK/WPA2-PSK | 2437MHz   | <div>Join Network</div> |

Figure 3-4-1-7

| <b>Client Mode-Scan</b> |  |
|-------------------------|--|
| SSID                    | Show SSID.                                     |
| Channel                 | Show wireless channel.                         |
| Signal                  | Show wireless signal.                          |
| BSSID                   | Show the MAC address of the access point.      |
| Security                | Show the encryption mode.                      |
| Frequency               | Show the frequency of radio.                   |
| Join Network            | Click the button to join the wireless network. |

Table 3-4-1-6 WLAN Scan Parameters

### 4.3.2.3. Cellular (Cellular Version Only)

This section explains how to set the related parameters for cellular network.

Cellular Setting

Enable

☒

Network Type

Auto

APN

Username

Password

Access Number

PIN Code

Authentication Type

None

Roaming

☒

Customize MTU

☒

MTU

1500

Enable IMS

☐

SMS Center

Figure 3-4-1-8

Connection Setting

☐

Enable NAT

☒

Restart When Dial-up failed

☐

ICMP Server

8.8.8.8

Secondary ICMP Server

223.5.5.5

ICMP Detection Max Retries

3

ICMP Detection Timeout

5

s

ICMP Detection Interval

15

s

SMS Settings

SMS Mode

PDU

Figure 3-4-1-9

| General Settings |   |
|------------------|---|
| Item             | Description   |
| Enable           | Check the option to enable cellular feature.  |
| Network Type     | Select from "Auto" , "Auto 3G/4G" , "4G Only" and "3G Only".<br>Auto: connect to the network with the strongest signal automatically.<br>4G Only: connect to 4G network only. |

|                             |  |
|-----------------------------|--|
|                             | And so on.   |
| APN                         | Enter the Access Point Name for cellular dial-up connection provided by local ISP.   |
| Username                    | Enter the username for cellular dial-up connection provided by local ISP.  |
| Password                    | Enter the password for cellular dial-up connection provided by local ISP.  |
| Access Number               | Enter the dial-up center NO. For cellular dial-up connection provided by local ISP.  |
| PIN Code                    | Enter a 4-8 characters PIN code to unlock the SIM.   |
| Authentication Type         | Select from "None", "PAP", "CHAP".   |
| Roaming                     | Enable or disable roaming.   |
| Customized MTU              | Enable or disable to customize the maximum transmission units. When disabled, the device will use operator's MTU settings. |
| MTU                         | Set the maximum transmission units. Range: 68-1500.  |
| Enable IMS                  | Enable or disable IMS function.  |
| SMS Center                  | Enter the local SMS center number for storing, forwarding, converting and delivering SMS message.                          |
| Enable NAT                  | Enable or disable NAT function.  |
| Restart When Dial-up failed | When this function is enabled, the gateway will restart automatically if the dial-up fails several times.                  |
| ICMP Server                 | Set the ICMP detection server's IP address.  |
| Secondary ICMP Server       | Set the secondary ICMP detection server's IP address.  |
| ICMP Detection Max Retries  | Set max number of retries when ICMP detection fails.   |
| ICMP Detection Timeout      | Set timeout of ICMP detection.   |
| ICMP Detection Interval     | Set interval of ICMP detection.  |
| SMS Mode                    | Select SMS mode from "TEXT" and "PDU" .  |

Table 3-4-1-7 Cellular Parameters

|                    |                                     |
|--------------------|-------------------------------------|
| Connection Setting | <input checked="" type="checkbox"/> |
| Connection Mode    | Connect on Demand ▼                 |
| Redial Interval(s) | 5                                   |
| Max Idle Time(s)   | 60                                  |
| Triggered by Call  | <input type="checkbox"/>            |
| Triggered by SMS   | <input type="checkbox"/>            |

Figure 3-4-1-10

| Item               | Description  |
|--------------------|--|
| Connection Mode    |  |
| Connection Mode    | Select from "Always Online" and "Connect on Demand".   |
| Redial Interval(s) | Set the time interval between redials. Range: 0-3600.  |
| Max Idle Time(s)   | Set the maximum duration of the gateway when current link is under idle status. Range: 10-3600.  |
| Triggered by Call  | The gateway will switch from offline mode to cellular network mode automatically when it receives a call from the specific phone number.         |
| Call Group         | Select a call group for call trigger. Go to "System > General Settings > Phone" to set up phone group.   |
| Triggered by SMS   | The gateway will switch from offline mode to cellular network mode automatically when it receives a specific SMS from the specific mobile phone. |
| SMS Group          | Select a SMS group for trigger. Go to "System > General Settings > Phone" to set up SMS group.   |
| SMS Text           | Fill in the SMS content for triggering.  |

Table 3-4-1-8 Cellular Parameters

#### 4.3.2.4. Loopback

Loopback interface is used for replacing gateway's ID as long as it is activated. When the interface is DOWN, the ID of the gateway has to be selected again which leads to long convergence time of OSPF. Therefore, Loopback interface is generally recommended as the ID of the gateway.

Loopback interface is a logic and virtual interface on gateway. Under default conditions, there's no loopback interface on gateway, but it can be created as required.

Figure 3-4-1-11

| Loopback              |   |           |
|-----------------------|---|-----------|
| Item                  | Description   | Default   |
| IP Address            | Unalterable   | 127.0.0.1 |
| Netmask               | Unalterable   | 255.0.0.0 |
| Multiple IP Addresses | Apart from the IP above, user can configure other IP addresses. | Null      |

Table 3-4-1-9 Loopback Parameters

#### 4.3.2.5. VLAN Trunk


LG280 gateway supports the Ethernet port working as VLAN Trunk client and be assigned a VLAN ID, which easy to traffic classification. When VLAN ID is set, port on **"Network" > "Interface" > "Port"** can be chosen as eth0.x with x being VLAN ID. VLAN Setting is blank by default, you can add a new VLAN label to certain interface by clicking .

Figure 3-4-1-12

| VLAN Trunk |  |
|------------|--|
| Item       | Description                                    |
| Interface  | Select the VLAN interface, it's fixed as eth0. |
| VID        | Set the label ID of the VLAN. Range: 1-4094.   |

Table 3-4-1-10 VLAN Trunk Parameters

#### 4.3.3. Firewall

This section describes how to set the firewall parameters, including website block, ACL, DMZ, Port Mapping

and MAC Binding.

The firewall implements corresponding control of data flow at entry direction (from Internet to local area network) and exit direction (from local area network to Internet) according to the content features of packets, such as protocol style, source/destination IP address, etc. It ensures that the gateway operate in a safe environment and host in local area network.

4.3.3.1. Security

Security

ACL

DMZ

Port Mapping

MAC Binding

| Website Blocking by URL Address

URL Address

http://

×

+

| Website Blocking by Keyword

Keyword

×

+

Figure 3-4-2-1

| Website Blocking |  |
|------------------|--|
| URL Address      | Enter the HTTP address which you want to block.  |
| Keyword          | You can block specific website by entering keyword. The maximum number of character allowed is 64. |

Table 3-2-2-1 Security Parameters

4.3.3.2. ACL

Access control list, also called ACL, implements permission or prohibition of access for specified network traffic (such as the source IP address) by configuring a series of matching rules so as to filter the network interface traffic. When gateway receives packet, the field will be analyzed according to the ACL rule applied to the current interface. After the special packet is identified, the permission or prohibition of corresponding packet will be implemented according to preset strategy.

The data package matching rules defined by ACL can also be used by other functions requiring flow distinction.

The screenshot displays the ACL configuration page. The 'ACL Setting' section includes a 'Default Filter Policy' dropdown set to 'Accept'. The 'Access Control List' section contains several input fields: 'Type' (extended), 'ID' (empty), 'Action' (permit), 'Protocol' (ip), 'Source IP' (empty), 'Source Wildcard Mask' (0.0.0.0), 'Destination IP' (empty), 'Destination Wildcard Mask' (0.0.0.0), and 'Description' (empty). 'Save' and 'Cancel' buttons are located below these fields. The 'Interface List' section at the bottom features a table with columns: Interface, In ACL, Out ACL, and Operation. A blue plus button is in the bottom right corner of the table area.

Figure 3-4-2-2

| Item                       | Description   |
|----------------------------|---|
| <b>ACL Setting</b>         |   |
| Default Filter Policy      | Select from "Accept" and "Deny".<br>The packets which are not included in the access control list will be processed by the default filter policy. |
| <b>Access Control List</b> |   |
| Type                       | Select type from "Extended" and "Standard".   |
| ID                         | User-defined ACL number. Range: 1-199.  |
| Action                     | Select from "Permit" and "Deny".  |
| Protocol                   | Select protocol from "ip", "icmp", "tcp", "udp", and "1-255".   |
| Source IP                  | Source network address (leaving it blank means all).  |
| Source Wildcard Mask       | Wildcard mask of the source network address.  |
| Destination IP             | Destination network address (0.0.0.0 means all).  |
| Destination Wildcard Mask  | Wildcard mask of destination address.   |
| Description                | Fill in a description for the groups with the same ID.  |
| ICMP Type                  | Enter the type of ICMP packet. Range: 0-255.  |
| ICMP Code                  | Enter the code of ICMP packet. Range: 0-255.  |
| Source Port Type           | Select source port type, such as specified port, port range, etc.   |
| Source Port                | Set source port number. Range: 1-65535.   |
| Start Source Port          | Set start source port number. Range: 1-65535.   |

|                        |  |
|------------------------|--|
| End Source Port        | Set end source port number. Range: 1-65535.                            |
| Destination Port Type  | Select destination port type, such as specified port, port range, etc. |
| Destination Port       | Set destination port number. Range: 1-65535.                           |
| Start Destination Port | Set start destination port number. Range: 1-65535.                     |
| End Destination Port   | Set end destination port number. Range: 1-65535.                       |
| More Details           | Show information of the port.  |
| <b>Interface List</b>  |  |
| Interface              | Select network interface for access control.                           |
| In ACL                 | Select a rule for incoming traffic from ACL ID.                        |
| Out ACL                | Select a rule for outgoing traffic from ACL ID.                        |

Table 3-4-2-2 ACL Parameters

#### 4.3.3.3. DMZ

DMZ is a host within the internal network that has all ports exposed, except those forwarded ports in port mapping.

Figure 3-4-2-3

| DMZ            |  |
|----------------|--|
| Item           | Description  |
| Enable         | Enable or disable DMZ.   |
| DMZ Host       | Enter the IP address of the DMZ host on the internal network.                          |
| Source Address | Set the source IP address which can access to DMZ host. "0.0.0.0/0" means any address. |

Table 3-4-2-3 DMZ Parameters

#### 4.3.3.4. Port Mapping (DNAT)

When external services are needed internally (for example, when a website is published externally), the external address initiates an active connection. And, the router or the gateway on the firewall receives the connection. Then it will convert the connection into the an internal connection. This conversion is called



DNAT, which is mainly used for external and interval services.

Click  to add a new port mapping rules.

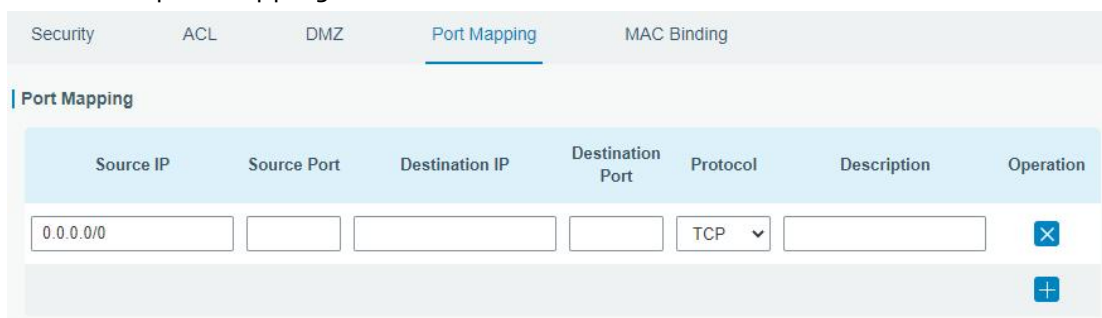


Figure 3-4-2-4

| Port Mapping     |   |
|------------------|---|
| Item             | Description   |
| Source IP        | Specify the host or network which can access local IP address. 0.0.0.0/0 means all.                                   |
| Source Port      | Enter the TCP or UDP port from which incoming packets are forwarded. Range: 1-65535.                                  |
| Destination IP   | Enter the IP address that packets are forwarded to after being received on the incoming interface.                    |
| Destination Port | Enter the TCP or UDP port that packets are forwarded to after being received on the incoming port(s). Range: 1-65535. |
| Protocol         | Select from "TCP" and "UDP" as your application required.   |
| Description      | The description of this rule.   |

Table 3-4-2-4 Port Mapping Parameters

#### 4.3.3.5. MAC Binding

MAC Binding is used for specifying hosts by matching MAC addresses and IP addresses that are in the list of allowed outer network access.

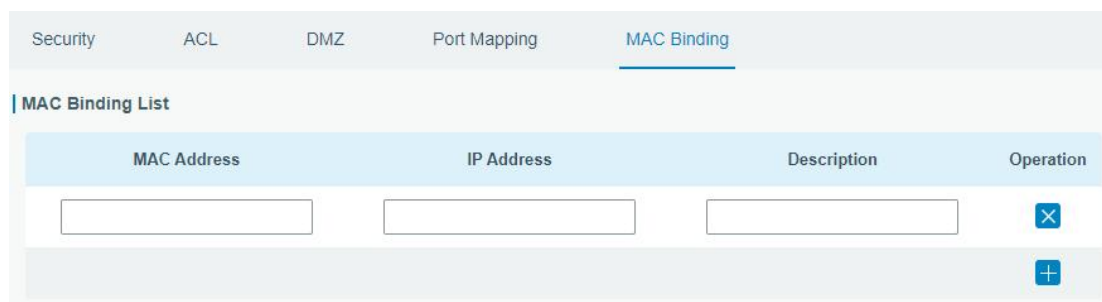


Figure 3-4-2-5

| MAC Binding List |             |
|------------------|-------------|
| Item             | Description |

|             |  |
|-------------|--|
| MAC Address | Set the binding MAC address.   |
| IP Address  | Set the binding IP address.  |
| Description | Fill in a description for convenience of recording the meaning of the binding rule for each piece of MAC-IP. |

Table 3-4-2-5 MAC Binding Parameters

#### 4.3.4. DHCP

LG280 can be set as a DHCP server to distribute IP address when Wi-Fi work as AP mode.

Figure 3-4-3-1

| DHCP Server   |  |               |
|---------------|--|---------------|
| Item          | Description  | Default       |
| Enable        | Enable or disable DHCP server.   | Enable        |
| Interface     | Only wlan interface is allowed to distribute IP addresses.                             | wlan0         |
| Start Address | Define the beginning of the pool of IP addresses which will be leased to DHCP clients. | 192.168.1.100 |
| End Address   | Define the end of the pool of IP addresses which will be leased to DHCP clients.       | 192.168.1.199 |
| Netmask       | Define the subnet mask of IP address obtained by DHCP clients from DHCP server.        | 255.255.255.0 |
| Lease Time    | Set the lease time on which the client can use the IP                                  | 1440          |

|                      |   |         |
|----------------------|---|---------|
| (Min)                | address obtained from DHCP server. Range: 1-10080.  |         |
| Primary DNS Server   | Set the primary DNS server.   | 8.8.8.8 |
| Secondary DNS Server | Set the secondary DNS server.   | Null    |
| Windows Name Server  | Define the Windows Internet Naming Service obtained by DHCP clients from DHCP sever. Generally you can leave it blank.      | Null    |
| Static IP            |   |         |
| MAC Address          | Set a static and specific MAC address for the DHCP client (it should be different from other MACs so as to avoid conflict). | Null    |
| IP Address           | Set a static and specific IP address for the DHCP client (it should be outside of the DHCP range).                          | Null    |

Table 3-4-3-1 DHCP Server Parameters

### 4.3.5. DDNS

Dynamic DNS (DDNS) is a method that automatically updates a name server in the Domain Name System, which allows user to alias a dynamic IP address to a static domain name.

DDNS serves as a client tool and needs to coordinate with DDNS server. Before starting configuration, user shall register on a website of proper domain name provider and apply for a domain name.

Figure 3-4-4-1

| DDNS         |  |
|--------------|--|
| Item         | Description                              |
| Name         | Give the DDNS a descriptive name.        |
| Interface    | Set interface bundled with the DDNS.     |
| Service Type | Select the DDNS service provider.        |
| Username     | Enter the username for DDNS register.    |
| User ID      | Enter User ID of the custom DDNS server. |
| Password     | Enter the password for DDNS register.    |

|           |  |
|-----------|--|
| Server    | Enter the name of DDNS server.                         |
| Hostname  | Enter the hostname for DDNS.                           |
| Append IP | Append your current IP to the DDNS server update path. |

Table 3-4-4-1 DDNS Parameters

### 4.3.6. Link Failover

This section describes how to configure link failover strategies, such as VRRP strategies.

#### Configuration Steps

1. Define one or more SLA operations (ICMP probe).
2. Define one or more track objects to track the status of SLA operation.
3. Define applications associated with track objects, such as VRRP or static routing.

#### 4.3.6.1. SLA

SLA setting is used for configuring link probe method. The default probe type is ICMP.

The screenshot shows the 'SLA' configuration page with tabs for 'SLA', 'Track', and 'WAN Failover'. Under the 'SLA' tab, there is a section titled 'SLA Entry' containing a table with the following data:

| ID | Type      | Destination Address | Secondary Destination Address | Data Size | Interval(s) | Timeout(ms) | Packet Loss Count | Start Time | Operation |
|----|-----------|---------------------|-------------------------------|-----------|-------------|-------------|-------------------|------------|-----------|
| 1  | icmp-echo | 8.8.8.8             | 223.5.5.5                     | 56        | 15          | 5000        | 3                 | now        | [X] [ ]   |

Figure 3-4-5-1

| SLA                           |  |           |
|-------------------------------|--|-----------|
| Item                          | Description  | Default   |
| ID                            | SLA index. Up to 10 SLA settings can be added. Range: 1-10.                                      | 1         |
| Type                          | ICMP-ECHO is the default type to detect if the link is alive.                                    | icmp-echo |
| Destination Address           | The detected IP address.   | 8.8.8.8   |
| Secondary Destination Address | The secondary detected IP address.   | 223.5.5.5 |
| Data Size                     | User-defined data size. Range: 0-1000.   | 56        |
| Interval (s)                  | User-defined detection interval. Range: 1-608400.  | 30        |
| Timeout (ms)                  | User-defined timeout for response to determine ICMP detection failure. Range: 1-300000.          | 5000      |
| Packet Loss Count             | Define packet loss count in each SLA probe. SLA probe fails when the preset packet loss count is | 5         |

|            |  |  |
|------------|--|--|
|            | exceeded.  |  |
| Start Time | Detection start time; select from "Now" and blank character. Blank character means this SLA now detection doesn't start. |  |

Table 3-4-5-1 SLA Parameters

#### 4.3.6.2. Track

Track setting is designed for achieving linkage among SLA module, Track module and Application module. Track setting is located between application module and SLA module with main function of shielding the differences of various SLA modules and providing unified interfaces for application module.

##### Linkage between Track Module and SLA module

Once you complete the configuration, the linkage relationship between Track module and SLA module will be established. SLA module is used for detection of link status, network performance and notification of Track module. The detection results help track status change timely.

- For successful detection, the corresponding track item is Positive.
- For failed detection, the corresponding track item is Negative.

##### Linkage between Track Module and Application Module

After configuration, the linkage relationship between Track module and Application module will be established. When any change occurs in track item, a notification that requires corresponding treatment will be sent to Application module.

Currently, the application modules like VRRP and static routing can get linkage with track module.

If it sends an instant notification to Application module, the communication may be interrupted in some circumstances due to routing's failure like timely restoration or other reasons. Therefore, user can set up a period of time to delay notifying application module when the track item status changes.

| ID | Type | SLA ID | Interface | Negative Delay(s) | Positive Delay(s) | Operation |
|----|------|--------|-----------|-------------------|-------------------|-----------|
| 1  | sla  | 1      | wlan0     | 0                 | 1                 | [X] [ ]   |

Figure 3-4-5-2

| Item      | Description  | Default   |
|-----------|--|-----------|
| Index     | Track index. Up to 10 track settings can be configured. Range: 1-10. | 1         |
| Type      | The options are "sla" and "interface".                               | SLA       |
| SLA ID    | Defined SLA ID.  | 1         |
| Interface | Select the interface whose status will be detected.                  | cellular0 |

|                    |   |   |
|--------------------|---|---|
| Negative Delay (s) | When interface is down or SLA probing fails, it will wait according to the time set here before actually changing its status to Down. Range: 0-180 (0 refers to immediate switching). | 0 |
| Positive Delay (s) | When failure recovery occurs, it will wait according to the time set here before actually changing its status to Up. Range: 0-180 (0 refers to immediate switching).                  | 1 |

Table 3-4-5-2 Track Parameters

#### 4.3.6.3. WAN Failover

WAN failover refers to failover between Ethernet WAN interface and cellular interface. When service transmission can't be carried out normally due to malfunction of a certain interface or lack of bandwidth, the rate of flow can be switched to backup interface quickly. Then the backup interface will carry out service transmission and share network flow so as to improve reliability of communication of data equipment.

When link state of main interface is switched from up to down, system will have the pre-set delay works instead of switching to link of backup interface immediately. Only if the state of main interface is still down after delay, will the system switch to link of backup interface. Otherwise, system will remain unchanged.

Figure 3-4-5-3

| WAN Failover      |   |         |
|-------------------|---|---------|
| Parameters        | Description   | Default |
| Main Interface    | Select a link interface as the main link.   | --      |
| Backup Interface  | Select a link interface as the backup link.   | --      |
| Startup Delay (s) | Set how long to wait for the startup tracking detection policy to take effect. Range: 0-300.  | 30      |
| Up Delay (s)      | When the primary interface switches from failed detection to successful detection, switching can be delayed based on the set time. Range: 0-180 (0 refers to immediate switching) | 0       |
| Down Delay (s)    | When the primary interface switches from successful detection to failed detection, switching can be delayed   | 0       |

|          |  |    |
|----------|--|----|
|          | based on the set time. Range: 0-180 (0 refers to immediate switching). |    |
| Track ID | Track detection, select the defined track ID.                          | -- |

Table 3-4-5-3 WAN Failover Parameters

### 4.3.7. VPN

Virtual Private Networks, also called VPNs, are used to securely connect two private networks together so that devices can connect from one network to the other network via secure channels.

LG280 supports DMVPN, IPsec, GRE, L2TP, PPTP, OpenVPN, as well as GRE over IPsec and L2TP over IPsec.

#### 4.3.7.1. DMVPN

A dynamic multi-point virtual private network (DMVPN), combining mGRE and IPsec, is a secure network that exchanges data between sites without passing traffic through an organization's headquarter VPN server or gateway.

Figure 3-4-6-1

Figure 3-4-6-2

| DMVPN |             |
|-------|-------------|
| Item  | Description |

|                          |   |
|--------------------------|---|
| Enable                   | Enable or disable DMVPN.  |
| Hub Address              | The IP address or domain name of DMVPN Hub.   |
| Local IP address         | DMVPN local tunnel IP address.  |
| GRE Hub IP Address       | GRE Hub tunnel IP address.  |
| GRE Local IP Address     | GRE local tunnel IP address.  |
| GRE Netmask              | GRE local tunnel netmask.   |
| GRE Key                  | GRE tunnel key.   |
| Negotiation Mode         | Select from "Main" and "Aggressive".  |
| Authentication Algorithm | Select from "DES", "3DES", "AES128", "AES192" and "AES256".   |
| Encryption Algorithm     | Select from "MD5" and "SHA1".   |
| DH Group                 | Select from "MODP768_1", "MODP1024_2" and "MODP1536_5".   |
| Key                      | Enter the preshared key.  |
| Local ID Type            | Select from "Default", "ID", "FQDN", and "User FQDN"  |
| IKE Life Time (s)        | Set the lifetime in IKE negotiation. Range: 60-86400.   |
| SA Algorithm             | Select from "DES_MD5", "DES_SHA1", "3DES_MD5", "3DES_SHA1", "AES128_MD5", "AES128_SHA1", "AES192_MD5", "AES192_SHA1", "AES256_MD5" and "AES256_SHA1". |
| PFS Group                | Select from "NULL", "MODP768_1", "MODP1024_2" and "MODP1536-5".   |
| Life Time (s)            | Set the lifetime of IPsec SA. Range: 60-86400.  |
| DPD Interval Time (s)    | Set DPD interval time   |
| DPD Timeout (s)          | Set DPD timeout.  |
| Cisco Secret             | Cisco Nhrp key.   |
| NHRP Holdtime (s)        | The holdtime of Nhrp protocol.  |

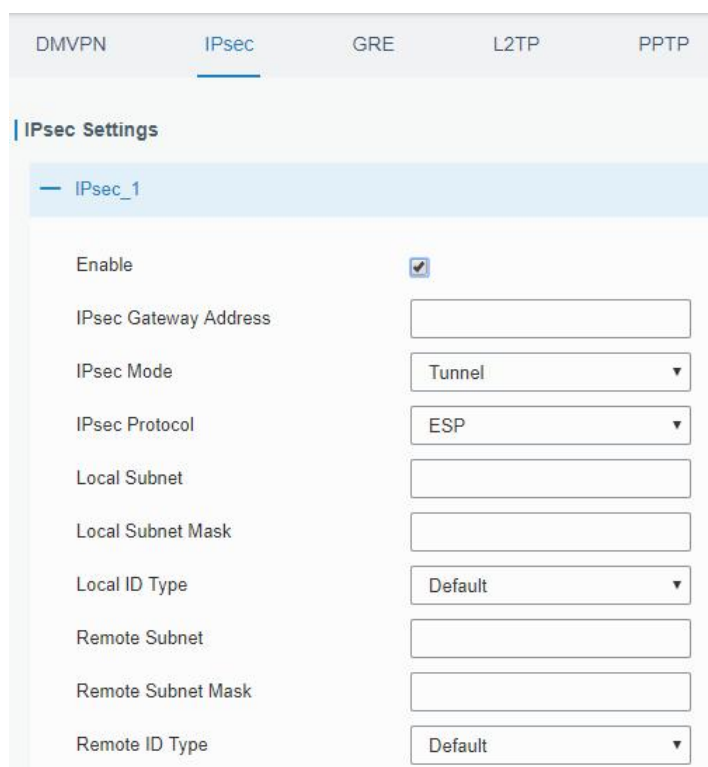
Table 3-4-6-1 DMVPN Parameters

#### 4.3.7.2. IPsec

IPsec is especially useful for implementing virtual private networks and for remote user access through dial-up connection to private networks. A big advantage of IPsec is that security arrangements can be handled without requiring changes to individual user computers.

IPsec provides three choices of security service: Authentication Header (AH), Encapsulating Security Payload (ESP), and Internet Key Exchange (IKE). AH essentially allows authentication of the senders' data. ESP supports both authentication of the sender and data encryption. IKE is used for cipher code exchange. All of them can protect one and more data flows between hosts, between host and gateway, and between gateways.





DMVPN IPsec GRE L2TP PPTP

**IPsec Settings**

— IPsec\_1

Enable ☒

IPsec Gateway Address

IPsec Mode Tunnel ▼

IPsec Protocol ESP ▼

Local Subnet

Local Subnet Mask

Local ID Type Default ▼

Remote Subnet

Remote Subnet Mask

Remote ID Type Default ▼

Figure 3-4-6-3

| IPsec                 |   |
|-----------------------|---|
| Item                  | Description   |
| Enable                | Enable IPsec tunnel. A maximum of 3 tunnels is allowed.     |
| IPsec Gateway Address | Enter the IP address or domain name of remote IPsec server. |
| IPsec Mode            | Select from "Tunnel" and "Transport".                       |
| IPsec Protocol        | Select from "ESP" and "AH".                                 |
| Local Subnet          | Enter the local subnet IP address that IPsec protects.      |
| Local Subnet Netmask  | Enter the local netmask that IPsec protects.                |
| Local ID Type         | Select from "Default", "ID", "FQDN", and "User FQDN".       |
| Remote Subnet         | Enter the remote subnet IP address that IPsec protects.     |
| Remote Subnet Mask    | Enter the remote netmask that IPsec protects.               |
| Remote ID type        | Select from "Default", "ID", "FQDN", and "User FQDN".       |

Table 3-4-6-2 IPsec Parameters

|                          |                                     |
|--------------------------|-------------------------------------|
| <b>IKE Parameter</b>     | <input checked="" type="checkbox"/> |
| IKE Version              | IKEv1 ▼                             |
| Negotiation Mode         | Main ▼                              |
| Encryption Algorithm     | DES ▼                               |
| Authentication Algorithm | MD5 ▼                               |
| DH Group                 | MODP768-1 ▼                         |
| Local Authentication     | PSK ▼                               |
| Local Secrets            | <input type="text"/>                |
| XAUTH                    | <input type="checkbox"/>            |
| Lifetime(s)              | 10800                               |
| <b>SA Parameter</b>      | <input checked="" type="checkbox"/> |
| SA Algorithm             | DES-MD5 ▼                           |
| PFS Group                | NULL ▼                              |
| Lifetime(s)              | 3600                                |
| DPD Time Interval(s)     | 30                                  |
| DPD Timeout(s)           | 150                                 |
| <b>IPsec Advanced</b>    | <input checked="" type="checkbox"/> |
| Enable Compression       | <input type="checkbox"/>            |
| VPN Over IPsec Type      | NONE ▼                              |

Figure 3-4-6-4

| IKE Parameter            |   |
|--------------------------|---|
| Item                     | Description   |
| IKE Version              | Select from "IKEv1" and "IKEv2".  |
| Negotiation Mode         | Select from "Main" and "Aggressive".  |
| Encryption Algorithm     | Select from "DES", "3DES", "AES128", "AES192" and "AES256".   |
| Authentication Algorithm | Select from "MD5" and "SHA1".   |
| DH Group                 | Select from "MODP768_1", "MODP1024_2" and "MODP1536_5".   |
| Local Authentication     | Select from "PSK" and "CA".   |
| Local Secrets            | Enter the preshared key.  |
| XAUTH                    | Enter XAUTH username and password after XAUTH is enabled.   |
| Lifetime (s)             | Set the lifetime in IKE negotiation. Range: 60-86400.   |
| SA Parameter             |   |
| SA Algorithm             | Select from "DES_MD5", "DES_SHA1", "3DES_MD5", "3DES_SHA1", "AES128_MD5", "AES128_SHA1", "AES192_MD5", "AES192_SHA1", "AES256_MD5" and "AES256_SHA1". |

|                       |   |
|-----------------------|---|
| PFS Group             | Select from "NULL", "MODP768_1" , "MODP1024_2" and "MODP1536_5".        |
| Lifetime (s)          | Set the lifetime of IPsec SA. Range: 60-86400.                          |
| DPD Interval Time(s)  | Set DPD interval time to detect if the remote side fails.               |
| DPD Timeout(s)        | Set DPD timeout. Range: 10-3600.  |
| <b>IPsec Advanced</b> |   |
| Enable Compression    | The head of IP packet will be compressed after it's enabled.            |
| VPN Over IPsec Type   | Select from "NONE", "GRE" and "L2TP" to enable VPN over IPsec function. |

Table 3-4-6-3 IPsec Parameters

#### 4.3.7.3. GRE

Generic Routing Encapsulation (GRE) is a protocol that encapsulates packets in order to route other protocols over IP networks. It's a tunneling technology that provides a channel through which encapsulated data message can be transmitted and encapsulation and decapsulation can be realized at both ends.

In the following circumstances the GRE tunnel transmission can be applied:

- GRE tunnel can transmit multicast data packets as if it were a true network interface. Single use of IPSec cannot achieve the encryption of multicast.
- A certain protocol adopted cannot be routed.
- A network of different IP addresses shall be required to connect other two similar networks.

Figure 3-4-6-5

| GRE                       |   |
|---------------------------|---|
| Item                      | Description   |
| Enable                    | Check to enable GRE function.   |
| Remote IP Address         | Enter the real remote IP address of GRE tunnel.                                     |
| Local IP Address          | Set the local IP address.   |
| Local Virtual IP Address  | Set the local tunnel IP address of GRE tunnel.                                      |
| Netmask                   | Set the local netmask.  |
| Peer Virtual IP Address   | Enter remote tunnel IP address of GRE tunnel.                                       |
| Global Traffic Forwarding | All the data traffic will be sent out via GRE tunnel when this function is enabled. |
| Remote Subnet             | Enter the remote subnet IP address of GRE tunnel.                                   |
| Remote Netmask            | Enter the remote netmask of GRE tunnel.   |
| MTU                       | Enter the maximum transmission unit. Range: 64-1500.                                |
| Key                       | Set GRE tunnel key.   |
| Enable NAT                | Enable NAT traversal function.  |

Table 3-4-6-4 GRE Parameters

#### 4.3.7.4. L2TP

Layer Two Tunneling Protocol (L2TP) is an extension of the Point-to-Point Tunneling Protocol (PPTP) used by an Internet service provider (ISP) to enable the operation of a virtual private network (VPN) over the Internet.

The screenshot displays the configuration page for L2TP\_1. At the top, there are tabs for DMVPN, IPsec, GRE, L2TP (which is selected), and PPTP. Below the tabs, the configuration for L2TP\_1 is shown. The 'Enable' checkbox is checked. The 'Remote IP Address' field is empty. The 'Username' and 'Password' fields are also empty. The 'Authentication' dropdown menu is set to 'Auto'. The 'Global Traffic Forwarding' checkbox is unchecked. The 'Remote Subnet' field contains the value '10.5.22.0'. The 'Remote Subnet Mask' field contains the value '255.255.255.0'. The 'Key' field is empty. The 'Use L2TP Peer DNS' checkbox is checked.

Figure 3-4-6-6

| Item                      | Description  |
|---------------------------|--|
| Enable                    | Check to enable L2TP function.   |
| Remote IP Address         | Enter the public IP address or domain name of L2TP server.                               |
| Username                  | Enter the username that L2TP server provides.  |
| Password                  | Enter the password that L2TP server provides.  |
| Authentication            | Select from "Auto", "PAP", "CHAP", "MS-CHAPv1" and "MS-CHAPv2".                          |
| Global Traffic Forwarding | All of the data traffic will be sent out via L2TP tunnel after this function is enabled. |
| Remote Subnet             | Enter the remote IP address that L2TP protects.  |
| Remote Subnet Mask        | Enter the remote netmask that L2TP protects.   |
| Key                       | Enter the password of L2TP tunnel.   |
| Use L2TP Peer DNS         | Enable to use the DNS address of peer L2TP server .                                      |

Table 3-4-6-5 L2TP Parameters

|                             |                                     |
|-----------------------------|-------------------------------------|
| Advanced Settings           | <input checked="" type="checkbox"/> |
| Local IP Address            | <input type="text"/>                |
| Peer IP Address             | <input type="text"/>                |
| Enable NAT                  | <input checked="" type="checkbox"/> |
| Enable MPPE                 | <input checked="" type="checkbox"/> |
| Address/Control Compression | <input type="checkbox"/>            |
| Protocol Field Compression  | <input type="checkbox"/>            |
| Asyncmap Value              | <input type="text" value="ffffff"/> |
| MRU                         | <input type="text" value="1500"/>   |
| MTU                         | <input type="text" value="1500"/>   |
| Link Detection Interval(s)  | <input type="text" value="60"/>     |
| Max Retries                 | <input type="text" value="0"/>      |
| Expert Options              | <input type="text"/>                |

Figure 3-4-6-7

| Advanced Settings |  |
|-------------------|--|
| Item              | Description  |
| Local IP Address  | Set tunnel IP address of L2TP client. Client will obtain tunnel IP address automatically from the server when it's null. |
| Peer IP Address   | Enter tunnel IP address of L2TP server.  |
| Enable NAT        | Enable NAT traversal function.   |
| Enable MPPE       | Enable MPPE encryption.  |

|                             |   |
|-----------------------------|---|
| Address/Control Compression | For PPP initialization. User can keep the default option.   |
| Protocol Compression Field  | For PPP initialization. User can keep the default option.   |
| Asyncmap Value              | One of the PPP protocol initialization strings. User can keep the default value. Range: 0-ffffff.             |
| MRU                         | Set the maximum receive unit. Range: 64-1500.   |
| MTU                         | Set the maximum transmission unit. Range: 64-1500   |
| Link Detection Interval (s) | Set the link detection interval time to ensure tunnel connection. Range: 0-600.                               |
| Max Retries                 | Set the maximum times of retry to detect the L2TP connection failure. Range: 0-10.                            |
| Expert Options              | User can enter some other PPP initialization strings in this field and separate the strings with blank space. |

Table 3-4-6-6 L2TP Parameters

#### 4.3.7.5. PPTP

Point-to-Point Tunneling Protocol (PPTP) is a protocol that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. Effectively, a corporation uses a wide-area network as a single large local area network.

The screenshot displays the 'PPTP Settings' configuration page. At the top, there are tabs for 'DMVPN', 'IPsec', 'GRE', 'L2TP', and 'PPTP'. The 'PPTP' tab is selected. Below the tabs, the 'PPTP Settings' section is visible. Under this section, there is a sub-section for 'PPTP\_1'. The configuration options for 'PPTP\_1' are as follows:

- Enable:** A checkbox that is checked.
- Remote IP Address:** A text input field.
- Username:** A text input field.
- Password:** A text input field.
- Authentication:** A dropdown menu set to 'Auto'.
- Global Traffic Forwarding:** A checkbox that is unchecked.
- Remote Subnet:** A text input field.
- Remote Subnet Mask:** A text input field.

Figure 3-4-6-8

| PPTP              |  |
|-------------------|--|
| Item              | Description  |
| Enable            | Enable PPTP client. A maximum of 3 tunnels is allowed. |
| Remote IP Address | Enter the public IP address or domain name of PPTP     |

|                           |   |
|---------------------------|---|
|                           | server.   |
| Username                  | Enter the username that PPTP server provides.                                       |
| Password                  | Enter the password that PPTP server provides.                                       |
| Authentication            | Select from "Auto", "PAP", "CHAP", "MS-CHAPv1", and "MS-CHAPv2".                    |
| Global Traffic Forwarding | All of the data traffic will be sent out via PPTP tunnel once enable this function. |
| Remote Subnet             | Set the peer subnet of PPTP.  |
| Remote Subnet Mask        | Set the netmask of peer PPTP server.  |

Table 3-4-6-7 PPTP Parameters

Advanced Settings ☒

Local IP Address

Peer IP Address

Enable NAT ☒

Enable MPPE ☒

Address/Control Compression ☐

Protocol Field Compression ☐

Asyncmap Value

MRU

MTU

Link Detection Interval(s)

Max Retries

Expert Options

Figure 3-4-6-9

| PPTP Advanced Settings      |   |
|-----------------------------|---|
| Item                        | Description   |
| Local IP Address            | Set IP address of PPTP client.  |
| Peer IP Address             | Enter tunnel IP address of PPTP server.   |
| Enable NAT                  | Enable the NAT faction of PPTP.   |
| Enable MPPE                 | Enable MPPE encryption.   |
| Address/Control Compression | For PPP initialization. User can keep the default option.   |
| Protocol Field Compression  | For PPP initialization. User can keep the default option.   |
| Asyncmap Value              | One of the PPP protocol initialization strings. User can keep the default value. Range: 0-ffffff. |

|                             |   |
|-----------------------------|---|
| MRU                         | Enter the maximum receive unit. Range: 0-1500.  |
| MTU                         | Enter the maximum transmission unit. Range: 0-1500.   |
| Link Detection Interval (s) | Set the link detection interval time to ensure tunnel connection. Range: 0-600.                               |
| Max Retries                 | Set the maximum times of retrying to detect the PPTP connection failure. Range: 0-10.                         |
| Expert Options              | User can enter some other PPP initialization strings in this field and separate the strings with blank space. |

Table 3-4-6-8 PPTP Parameters

#### 4.3.7.6. OpenVPN Client

OpenVPN is an open source virtual private network (VPN) product that offers a simplified security framework, modular network design, and cross-platform portability. LG280 supports running at most 3 OpenVPN clients at the same time. You can import the ovpn file directly or configure the parameters on this page to set clients.

Figure 3-4-6-10

| OpenVPN Client - File Configuration |  |
|-------------------------------------|--|
| Item                                | Description  |
| Browse                              | Click to browse the client configuration ovpn format file including the settings and certificate contents. Please refer to the client configuration file according to sample: <b>client.conf</b> |
| Edit                                | Click to edit the imported file.   |
| Export                              | Export the server configuration file.  |
| Delete                              | Click to delete the configuration file.  |

Table 3-4-6-9 OpenVPN Client Parameters



Configuration Method: Page Configuration

Protocol: UDP

Remote IP Address:

Port: 1194

Interface: tun

Authentication: None

Local Tunnel IP:

Remote Tunnel IP:

Enable NAT: ☒

Compression: LZO

Link Detection Interval(s): 60

Link Detection Timeout(s): 300

Cipher: None

MTU: 1500

Max Frame Size: 1500

Verbose Level: ERROR

Expert Options:

Local Route:

Subnet: Subnet Mask: Operation:

Figure 3-4-6-10

| OpenVPN Client - Page Configuration |  |  |
|-------------------------------------|--|--|
| Item                                | Description  |  |
| Protocol                            | Select a transport protocol used by connecting UDP and TCP.  |  |
| Remote IP Address                   | Enter remote OpenVPN server's IP address or domain name.   |  |
| Port                                | Enter the TCP/UCP service number of remote OpenVPN server. Range: 1-65535.   |  |
| Interface                           | Select virtual VPN network interface type from TUN and TAP. TUN devices encapsulate IPv4 or IPv6 (OSI Layer 3) while TAP devices encapsulate Ethernet 802.3 (OSI Layer 2).   |  |
| Authentication Type                 | <p>Select authentication type used to secure data sessions.</p> <p>Pre-shared: use the same secret key as server to complete the authentication. After selecting, go to Network &gt; VPN &gt; Certifications page to import a static.key to PSK field.</p> <p>Username/Password: use username/password which is preset in server side to complete the authentication.</p> <p>X.509 cert: use X.509 type certificate to complete the authentication. After selecting, go to Network &gt; VPN &gt; Certifications page to import CA certificate, client certificate and client private key to corresponding fields.</p> <p>X.509 cert + user: use both username/password and X.509 cert authentication type.</p> |  |
| Local Virtual IP                    | Set local tunnel address when authentication type is None or Pre-shared.   |  |
| Remote Virtual IP                   | Set remote tunnel address when authentication type is None or Pre-shared.  |  |
| Global                              | Traffic  | All the data traffic will be sent out via OpenVPN tunnel when this |

|                             |     |  |
|-----------------------------|-----|--|
| Forwarding                  |     | function is enabled.   |
| Enable Authentication       | TLS | <p>Disable or enable TLS authentication when authentication type is X.509 cert. After being enabled, go to Network &gt; VPN &gt; Certifications page to import a ta.key to TA field.</p> <p>Note: this option only supports tls-auth. For tls-crypt, please add this format string on expert option: tls-crypt /etc/openvpn/openvpn-client1-ta.key</p> |
| Compression                 |     | Select to enable or disable LZO to compress data.  |
| Link Detection Interval (s) |     | Set link detection interval time to ensure tunnel connection. If this is set on both server and client, the value pushed from server will override the client local values. Range: 10-1800 s.  |
| Link Detection Timeout (s)  |     | OpenVPN will be reestablished after timeout. If this is set on both server and client, the value pushed from server will override the client local values. Range: 60-3600 s.   |
| Cipher                      |     | Select from NONE, BF-CBC, DES-CBC, DES-EDE3-CBC, AES-128-CBC, AES-192-CBC and AES-256-CBC.   |
| MTU                         |     | Enter the maximum transmission unit. Range: 128-1500.  |
| Max Frame Size              |     | Set the maximum frame size. Range: 128-1500.   |
| Verbose Level               |     | Select from ERROR, WARNING, NOTICE and DEBUG.  |
| Expert Options              |     | <p>User can enter some initialization strings in this field and separate the strings with semicolon.</p> <p>Example: ncp-ciphers AES-128-GCM; key direction 1</p>  |
| Local Route                 |     |  |
| Subnet                      |     | Set the local route's IP address.  |
| Subnet Mask                 |     | Set the local route's netmask.   |

Table 3-4-6-9 OpenVPN Client Parameters

#### 4.3.7.7. OpenVPN Server

LG280 supports OpenVPN server to create secure point-to-point or site-to-site connections in routed or bridged configurations and remote access facilities. You can import the ovpn file directly or configure the parameters on this page to set this server.

OpenVPN Server Settings

Enable ☒

Configuration Method File Configuration

Configuration File  Browse Import Export Delete

Figure 3-4-6-12

#### OpenVPN Server - File Configuration

| Item | Description |
|------|-------------|
|------|-------------|

|        |   |
|--------|---|
| Browse | Click to browse the server configuration ovpn format file including the settings and certificate contents. Please refer to the server configuration file according to sample: server.conf |
| Edit   | Click to edit the imported file.  |
| Export | Export the server configuration file.   |
| Delete | Click to delete the configuration file.   |

Table 3-4-6-11 OpenVPN Server Parameters

**OpenVPN Server Settings**

Enable

☒

Configuration Method

Page Configuration ▼

Protocol

UDP ▼

Port

1194

Listening IP

Interface

tun ▼

Authentication

None ▼

Local Virtual IP

Remote Virtual IP

Enable NAT

☒

Compression

LZO ▼

Link Detection Interval

60

Link Detection Timeout

150

Cipher

None ▼

MTU

1500

Max Frame Size

1500

Verbose Level

ERROR ▼

Expert Options

Figure 3-4-6-11

| Account  |          |           |  |
|----------|----------|-----------|--|
| Username | Password | Operation |  |
|          |          | +         |  |

| Local Route |         |           |  |
|-------------|---------|-----------|--|
| Subnet      | Netmask | Operation |  |
|             |         | +         |  |

| Client Subnet |        |         |           |
|---------------|--------|---------|-----------|
| Name          | Subnet | Netmask | Operation |
|               |        |         | +         |

Figure 3-4-6-12

| OpenVPN Server - Page Configuration |  |
|-------------------------------------|--|
| Item                                | Description  |
| Protocol                            | Select a transport protocol used by connection from UDP and TCP.   |
| Listening IP                        | Enter the local hostname or IP address for bind. If left blank, OpenVPN server will bind to all interfaces.  |
| Port                                | Enter the TCP/UCP service number for OpenVPN client connection. Range: 1-65535.  |
| Interface                           | Select virtual VPN network interface type from TUN and TAP. TUN devices encapsulate IPv4 or IPv6 (OSI Layer 3) while TAP devices encapsulate Ethernet 802.3 (OSI Layer 2).   |
| Authentication Type                 | <p>Select authentication type used to secure data sessions.</p> <p>Pre-shared: use the same secret key as server to complete the authentication. After select, go to Network &gt; VPN &gt; Certifications page to import a static.key to PSK field.</p> <p>Username/Password: use username/password which is preset in server side to complete the authentication.</p> <p>X.509 cert: use X.509 type certificate to complete the authentication. After select, go to Network &gt; VPN &gt; Certifications page to import CA certificate, client certificate and client private key to corresponding fields.</p> <p>X.509 cert + user: use both username/password and X.509 cert authentication type.</p> |
| Local Virtual IP                    | Set local tunnel address when authentication type is None or Pre-shared.   |
| Remote Virtual IP                   | Set remote tunnel address when authentication type is None or Pre-shared.  |
| Client Subnet                       | Define an IP address pool for openVPN client.  |
| Client Netmask                      | Set the client subnet netmask to limit the IP address range.   |
| Renegotiation Interval              | Renegotiate data channel key after this interval. 0 means disable.   |
| Max Clients                         | <p>Limit server to a maximum of concurrent clients, range: 1-20.</p> <p>Note: please adjust log severity to Info if you need to connect many</p>   |

|                             |   |
|-----------------------------|---|
|                             | clients.  |
| Enable CRL                  | Enable or disable CRL verify.   |
| Enable Client to Client     | When enabled, openVPN clients can communicate with each other.  |
| Enable Dup Client           | Allow multiple clients to connect with the same common name or certification.   |
| Enable TLS Authentication   | <p>Disable or enable TLS authentication when authentication type is X.509 cert. After being enabled, go to Network &gt; VPN &gt; Certifications page to import a ta.key to TA field.</p> <p>Note: this option only supports tls-auth. For tls-crypt, please add this format string on expert option: <code>tls-crypt /etc/openvpn/openvpn-client1-ta.key</code></p> |
| Compression                 | Select to enable or disable LZO to compress data.   |
| Link Detection Interval (s) | Set link detection interval time to ensure tunnel connection. If this is set on both server and client, the value pushed from server will override the client local values. Range: 10-1800 s.   |
| Link Detection Timeout (s)  | OpenVPN will be reestablished after timeout. If this is set on both server and client, the value pushed from server will override the client local values. Range: 60-3600 s.  |
| Cipher                      | Select from NONE, BF-CBC, DES-CBC, DES-EDE3-CBC, AES-128-CBC, AES-192-CBC and AES-256-CBC.  |
| MTU                         | Enter the maximum transmission unit. Range: 64-1500.  |
| Max Frame Size              | Set the maximum frame size. Range: 64-1500.   |
| Verbose Level               | Select from ERROR, WARNING, NOTICE and DEBUG.   |
| Expert Options              | <p>User can enter some initialization strings in this field and separate the strings with semicolon.</p> <p>Example: <code>ncp-ciphers AES-128-GCM; key direction 1</code></p>  |
| <b>Account</b>              |   |
| Username & Password         | Set username and password for OpenVPN client when authentication type is username/password.   |
| <b>Local Route</b>          |   |
| Subnet                      | Set the local route's IP address.   |
| Subnet Mask                 | Set the local route's netmask.  |
| <b>Client Subnet</b>        |   |
| Name                        | Set the name as OpenVPN client certificate common name.   |
| Subnet                      | Set the subnet of OpenVPN client.   |
| Subnet Mask                 | Set the subnet netmask of OpenVPN client.   |

Table 3-4-6-10 OpenVPN Server Parameters

#### 4.3.7.8. Certifications

When working as OpenVPN server, OpenVPN client or IPsec Server, user can import/export necessary

certificate and key files to this page according to the authentication types.

OpenVPN Client

OpenVPN client\_1

|               |                      |        |        |        |        |
|---------------|----------------------|--------|--------|--------|--------|
| CA            | <input type="text"/> | Browse | Import | Export | Delete |
| Public Key    | <input type="text"/> | Browse | Import | Export | Delete |
| Private Key   | <input type="text"/> | Browse | Import | Export | Delete |
| TA            | <input type="text"/> | Browse | Import | Export | Delete |
| Preshared Key | <input type="text"/> | Browse | Import | Export | Delete |
| PKCS12        | <input type="text"/> | Browse | Import | Export | Delete |

OpenVPN client\_2

OpenVPN client\_3

Figure 3-4-6-13

OpenVPN Server

OpenVPN Server

|               |                      |        |        |        |        |
|---------------|----------------------|--------|--------|--------|--------|
| CA            | <input type="text"/> | Browse | Import | Export | Delete |
| Public Key    | <input type="text"/> | Browse | Import | Export | Delete |
| Private Key   | <input type="text"/> | Browse | Import | Export | Delete |
| DH            | <input type="text"/> | Browse | Import | Export | Delete |
| TA            | <input type="text"/> | Browse | Import | Export | Delete |
| CRL           | <input type="text"/> | Browse | Import | Export | Delete |
| Preshared Key | <input type="text"/> | Browse | Import | Export | Delete |

Figure 3-4-6-14

IPsec

IPsec\_1

|             |                      |        |        |        |        |
|-------------|----------------------|--------|--------|--------|--------|
| CA          | <input type="text"/> | Browse | Import | Export | Delete |
| Client Key  | <input type="text"/> | Browse | Import | Export | Delete |
| Server Key  | <input type="text"/> | Browse | Import | Export | Delete |
| Private Key | <input type="text"/> | Browse | Import | Export | Delete |
| CRL         | <input type="text"/> | Browse | Import | Export | Delete |

Figure 3-4-6-15

## 4.4. System

This section describes how to configure general settings, such as administration account, access service, system time, common user management, SNMP, event alarms, etc.

## 4.4.1. General Settings

### 4.4.1.1. General

General settings include system info, access service and HTTPS certificates.

The screenshot shows the 'General' settings page. At the top are tabs: General, System Time, SMTP, Phone, and Email. The 'General' tab is selected. Below the tabs, there are three main sections:

- System:** Contains 'Hostname' set to 'GATEWAY' and 'Web Login Timeout(s)' set to '1800'.
- Access Service:** A table with columns 'Enable', 'Service', and 'Port'.
 

| Enable                              | Service | Port |
|-------------------------------------|---------|------|
| <input checked="" type="checkbox"/> | HTTP    | 80   |
| <input checked="" type="checkbox"/> | HTTPS   | 443  |
| <input type="checkbox"/>            | TELNET  | 23   |
| <input checked="" type="checkbox"/> | SSH     | 22   |
- HTTPS Certificates:** Fields for 'Certificate' (https.crt) and 'Key' (https.key), each with 'Browse', 'Import', 'Export', and 'Delete' buttons.

Figure 3-5-1-1

| General               |   |         |
|-----------------------|---|---------|
| Item                  | Description   | Default |
| System                |   |         |
| Hostname              | User-defined gateway name, needs to start with a letter.  | GATEWAY |
| Web Login Timeout (s) | You need to log in again if it times out. Range: 100-3600.  | 1800    |
| Access Service        |   |         |
| Port                  | Set port number of the services. Range: 1-65535.  | --      |
| HTTP                  | Users can log in the device locally via HTTP to access and control it through Web after the option is checked.            | 80      |
| HTTPS                 | Users can log in the device locally and remotely via HTTPS to access and control it through Web after option is checked.  | 443     |
| TELNET                | Users can log in the device locally and remotely via TELNET to access and control it through Web after option is checked. | 23      |

|                    |   |    |
|--------------------|---|----|
| SSH                | Users can log in the device locally and remotely via SSH after the option is checked.   | 22 |
| HTTPS Certificates |   |    |
| Certificate        | Click "Browse" button, choose certificate file on the PC, and then click "Import" button to upload the file into gateway. Click "Export" button will export the file to the PC. Click "Delete" button will delete the file. | -- |
| Key                | Click "Browse" button, choose key file on the PC, and then click "Import" button to upload the file into gateway. Click "Export" button will export file to the PC. Click "Delete" button will delete the file.             | -- |

Table 3-5-1-1 General Setting Parameters

#### 4.4.1.2. System Time

This section explains how to set the system time including time zone and time synchronization type.

**Note:** to ensure that the gateway runs with the correct time, it's recommended that you set the system time when configuring the gateway.

Figure 3-5-1-2

| System Time          |  |
|----------------------|--|
| Item                 | Description  |
| Current Time         | Show the current system time.  |
| Time Zone            | Click the drop down list to select the time zone you are in.   |
| Sync Type            | Click the drop down list to select the time synchronization type.<br>Sync with Browser: Synchronize time with browser.<br>Sync with NTP Server: Synchronize time with NTP Server.<br>Set up Manually: configure the time manually. |
| Sync with NTP Server |  |
| NTP Server Address   | Set NTP server address (domain name/IP).   |
| Enable NTP Server    | After checked, NTP client on the network can achieve time synchronization with gateway.  |



Table 3-5-1-2 System Time Parameters

#### 4.4.1.3. SMTP

SMTP, short for Simple Mail Transfer Protocol, is a TCP/IP protocol used in sending and receiving e-mail. This section describes how to configure email settings.

Figure 3-5-1-3

| SMTP                 |   |
|----------------------|---|
| Item                 | Description                             |
| SMTP Client Settings |   |
| Enable               | Enable or disable SMTP client function. |
| Email Address        | Enter the sender's email address.       |
| Username             | Enter the sender's email username.      |
| Password             | Enter the sender's email password.      |
| SMTP Server Address  | Enter SMTP server's domain name.        |
| Port                 | Enter SMTP server port. Range: 1-65535. |
| Enable TLS           | Enable or disable TLS encryption.       |

Table 3-5-1-3 SMTP Setting

#### 4.4.1.4. Phone

Phone settings involve in call/SMS trigger and SMS alarm for events. This is only applied to gateway with cellular feature.

GeneralSystem TimeSMTPPhoneEmail

Phone Number List

| Name                               | Number                                     | Operation                           |
|------------------------------------|--|-------------------------------------|
| <input type="text" value="List1"/> | <input type="text" value="654321;123456"/> | <div><div>✕</div><div>+</div></div> |

Save

Figure 3-5-1-4

| Phone             |  |
|-------------------|--|
| Item              | Description  |
| Phone Number List |  |
| Name              | Set phone group name.  |
| Number            | Enter the telephone number. Digits, "+" and "-" are allowed. You can divide multiple numbers by ";;" . |

Table 3-5-1-4 Phone Settings

4.4.1.5. Email

Email settings involve email alarm for events.

GeneralSystem TimeSMTPPhoneEmail

Email List

| Name                               | Email Address   | Operation                           |
|------------------------------------|---|-------------------------------------|
| <input type="text" value="list1"/> | <input type="text" value="sam@user.com;hot@gmail.com"/> | <div><div>✕</div><div>+</div></div> |

Save

Figure 3-5-1-5

| Email         |  |
|---------------|--|
| Item          | Description  |
| Email List    |  |
| Name          | Set Email group name.  |
| Email Address | Enter the Email address. You can divide multiple Email addresses by ";;" . |

Table 3-5-1-5 Email Settings

4.4.2. User Management

4.4.2.1. Account

Here you can change the login username and password of the administrator.

**Note:** it is strongly recommended that you modify them for the sake of security.

The screenshot shows a web interface with two tabs: 'Account' and 'User Management'. The 'Account' tab is selected. Below the tabs is a section titled 'Change Account Info'. It contains four input fields: 'Username' with the value 'admin', 'Old Password', 'New Password', and 'Confirm New Password'. A blue 'Save' button is located at the bottom of the form.

Figure 3-5-2-1

| Account              |  |
|----------------------|--|
| Item                 | Description  |
| Username             | Enter a new username. You can use characters such as a-z, 0-9, "_", "-". The first character can't be a digit. |
| Old Password         | Enter the old password.  |
| New Password         | Enter a new password. You can use any ASCII characters except blank.   |
| Confirm New Password | Enter the new password again.  |

Table 3-5-2-1 Account Information

#### 4.4.2.2. User Management

This section describes how to create common user accounts.

The common user permission includes Read-Only and Read-Write.

The screenshot shows a web interface with two tabs: 'Account' and 'User Management'. The 'User Management' tab is selected. Below the tabs is a section titled 'User List'. It contains a table with four columns: 'Username', 'Password', 'Permission', and 'Operation'. The table lists two users: 'steve' with 'Read-Write' permission and 'test' with 'Read-Only' permission. Each row has a delete icon (X) and a plus icon (+) at the bottom right.

Figure 3-5-2-2

| User Management |  |
|-----------------|--|
| Item            | Description  |
| Username        | Enter a new username. You can use characters such as a-z, 0-9, "_", "-". The first character can't be a digit. |
| Password        | Set password. You can use any ASCII characters except blank.   |
| Permission      | Select user permission from "Read-Only" and "Read-   |

|  |   |
|--|---|
|  | <p>Write” .</p> <p>Read-Only: users can only view the configuration of gateway in this level.</p> <p>Read-Write: users can view and set the configuration of gateway in this level.</p> |
|--|---|

Table 3-5-2-2 User Management

### 4.4.3. SNMP

SNMP is widely used in **network management** for **network monitoring**. SNMP exposes management data with variables form in managed system. The system is organized in a **management information base** (MIB) which describes the system status and configuration. These variables can be remotely queried by managing applications.

Configuring SNMP in networking, NMS, and a management program of SNMP should be set up at the Manager.

Configuration steps are listed as below for achieving query from NMS:

- 1.Enable SNMP setting.
- 2.Download MIB file and load it into NMS.
- 3.Configure MIB View.
- 4.Configure VACM.

#### 4.4.3.1. SNMP

LG280 supports SNMPv1, SNMPv2c and SNMPv3 version. SNMPv1 and SNMPv2c employ community name authentication. SNMPv3 employs authentication encryption by username and password.

Figure 3-5-3-1

| SNMP Settings        |   |
|----------------------|---|
| Item                 | Description   |
| Enable               | Enable or disable SNMP function.                                    |
| Port                 | Set SNMP listened port. Range: 1-65535.<br>The default port is 161. |
| System Name          | Fill in the system name to represent the gateway.                   |
| SNMP Version         | Select SNMP version; support SNMP v1/v2c/v3.                        |
| Location Information | Fill in the location information.                                   |
| Contact Information  | Fill in the contact information.                                    |

Table 3-5-3-1 SNMP Parameters

#### 4.4.3.2. MIB View

This section explains how to configure MIB view for the objects.

| View Name | View Filter | View OID      | Operation |
|-----------|-------------|---------------|-----------|
| All       | Included    | 1             | X         |
| system    | Included    | 1.3.6.1.2.1.1 | X         |

Figure 3-5-3-2

| MIB View    |  |
|-------------|--|
| Item        | Description  |
| View Name   | Set MIB view's name.                                       |
| View Filter | Select from "Included" and "Excluded".                     |
| View OID    | Enter the OID number.                                      |
| Included    | You can query all nodes within the specified MIB node.     |
| Excluded    | You can query all nodes except for the specified MIB node. |

Table 3-5-3-2 MIB View Parameters

#### 4.4.3.3. VACM

This section describes how to configure VACM parameters.

| Community | Permission | MIB View | Network   | Operation |
|-----------|------------|----------|-----------|-----------|
| private   | Read-write | All      | 0.0.0.0/0 | X         |
| public    | Read-only  | none     | 0.0.0.0/0 | X         |
|           |            |          |           | +         |

Figure 3-5-3-3

| VACM                   |  |
|------------------------|--|
| Item                   | Description  |
| SNMP v1 & v2 User List |  |
| Community              | Set the community name.  |
| Permission             | Select from "Read-Only" and "Read-Write".                                    |
| MIB View               | Select an MIB view to set permissions from the MIB view list.                |
| Network                | The IP address and bits of the external network accessing the MIB view.      |
| Read-Write             | The permission of the specified MIB node is read and write.                  |
| Read-Only              | The permission of the specified MIB node is read only.                       |
| SNMP v3 User List      |  |
| Group Name             | Set the name of SNMPv3 group.  |
| Security Level         | Select from "NoAuth/NoPriv", "Auth/NoPriv", and "Auth/Priv".                 |
| Read-Only View         | Select an MIB view to set permission as "Read-only" from the MIB view list.  |
| Read-Write View        | Select an MIB view to set permission as "Read-write" from the MIB view list. |
| Inform View            | Select an MIB view to set permission as "Inform" from the MIB view list.     |

Table 3-5-3-3 VACM Parameters

#### 4.4.3.4. Trap

This section explains how to enable network monitoring by SNMP trap.

|                |                                     |
|----------------|-------------------------------------|
| Enable         | <input checked="" type="checkbox"/> |
| SNMP Version   | SNMPv2                              |
| Server Address |                                     |
| Port           |                                     |
| Name           |                                     |

Figure 3-5-3-4

| SNMP Trap      |   |
|----------------|---|
| Item           | Description   |
| Enable         | Enable or disable SNMP Trap function.   |
| SNMP Version   | Select SNMP version; support SNMP v1/v2c/v3.  |
| Server Address | Fill in NMS's IP address or domain name.  |
| Port           | Fill in UDP port. Port range is 1-65535. The default port is 162.                       |
| Name           | Fill in the group name when using SNMP v1/v2c; fill in the username when using SNMP v3. |
| Auth/Priv Mode | Select from "NoAuth & No Priv", "Auth & NoPriv", and "Auth & Priv".                     |

Table 3-5-3-4 Trap Parameters

### 3.5.3.5 MIB

This section describes how to download MIB files.

Figure 3-5-3-5

| MIB      |   |
|----------|---|
| Item     | Description   |
| MIB File | Select the MIB file you need.                           |
| Download | Click "Download" button to download the MIB file to PC. |

Table 3-5-3-5 MIB Download

## 4.4.4. Device Management

### 4.4.4.1. Auto Provision

Users can customize and select the configuration profile from Development Platform. When Auto Provision is enabled and the device is connected to Internet, the device will receive the profile to achieve initial configuration. This feature will work even the device does not configure to connect Development Platform.

**Auto Provision**

Enable ☒

Status Connection Failed

**Save & Apply**

### 3.5.4.2 Management Platform

You can connect the device to the DeviceHub or Development Platform on this page so as to manage the gateway centrally and remotely.

**Management Platform**

Enable ☒

Platform Type DeviceHub 1.0

Activation Server Address

Device Management Server Address

Activation Method By ID

ID

Password

Status Disconnected

**Save & Apply**

Figure 3-5-5-1

| Management Platform |   |
|---------------------|---|
| Item                | Description   |
| Enable              | Enable or disable to connect gateway to management platform.                |
| Platform Type       | DeviceHub 1.0 or Development Platform is optional.                          |
| Status              | Show the connection status between the gateway and the management platform. |



| DeviceHub 1.0                |        |  |
|------------------------------|--------|--|
| Activation Server Address    | Server | IP address or domain of the DeviceHub.   |
| DeviceHub Management Address |        | The URL address for the device to connect to the DeviceHub, e.g. http://220.82.63.79:8080/acs.                           |
| Activation Method            |        | Select activation method to connect the gateway to the DeviceHub server, options are "By Authentication ID" and "By ID". |
| Authentication Code          |        | Fill in the authentication code generated from the DeviceHub.  |
| ID                           |        | Fill in the registered DeviceHub account (email) and password.   |
| Password                     |        |  |

Table 3-5-5-1

#### 4.4.5. Events

Event feature is capable of sending alerts by Email when certain system events occur.

##### 4.4.5.1. Events

You can view alarm messages on this page.

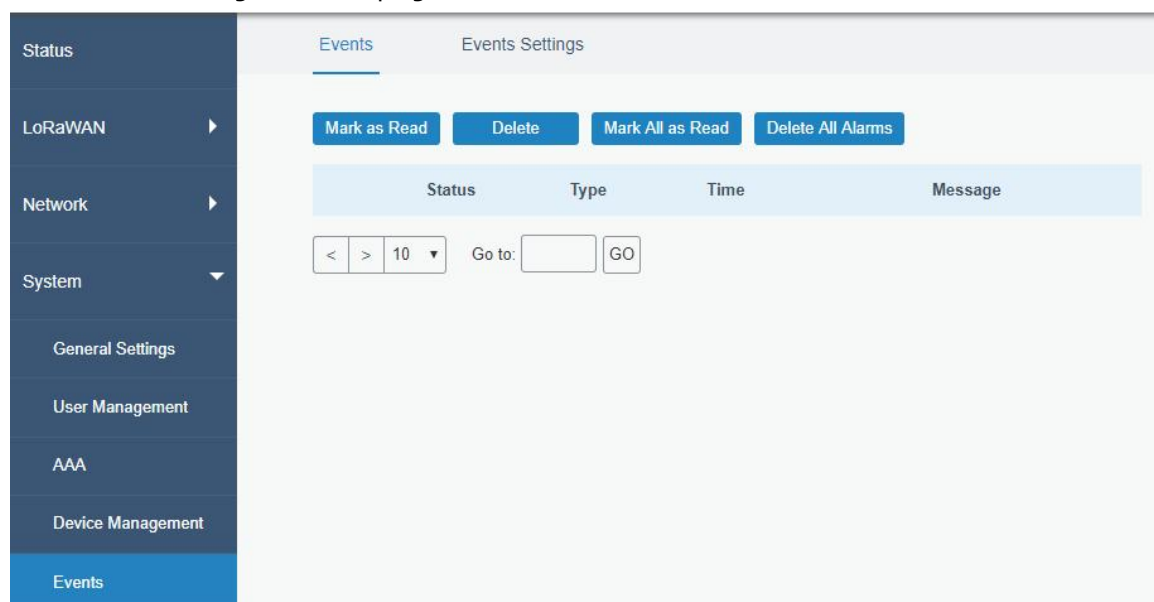


Figure 3-5-6-1

| Events           |  |
|------------------|--|
| Item             | Description                            |
| Mark as Read     | Mark the selected event alarm as read. |
| Delete           | Delete the selected event alarm.       |
| Mark All as Read | Mark all event alarms as read.         |

|                   |  |
|-------------------|--|
| Delete All Alarms | Delete all event alarms.                     |
| Status            | Show the reading status of the event alarms. |
| Type              | Show the event type that should be alarmed.  |
| Time              | Show the alarm time.                         |
| Message           | Show the alarm content.                      |

Table 3-5-6-1 Events Parameters

#### 4.4.5.2. Events Settings

In this section, you can decide what events to record and whether you want to receive email and SMS notifications when any change occurs.

**Events Settings**

Enable ☒

Phone for Notification

Email for Notification

| Events                                 | Record                              | Email<br>Email Setting   | SMS<br>SMS Setting       |
|--|-------------------------------------|--------------------------|--------------------------|
| Cellular Up                            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| Cellular Down                          | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| WAN Up                                 | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| WAN Down                               | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| VPN Up                                 | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| VPN Down                               | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| Power On                               | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| Power Off                              | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |
| Connect to UPS External Power Supplies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Connect to UPS Internal Battery        | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| UPS Low Power (20%)                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| UPS Abnormal Charging                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Disconnect the UPS                     | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Event Settings         |  |
|------------------------|--|
| Item                   | Description                                |
| Enable                 | Check to enable "Events Settings".         |
| Phone for Notification | Select phone group to receive SMS alarm.   |
| Email for              | Select Email group to receive Email alarm. |

|               |   |
|---------------|---|
| Notification  |   |
| Events        | Event type the gateway supports to record.  |
| Record        | The relevant content of event alarm will be recorded on "Event" page if this option is checked. |
| Email         | The relevant content of event alarm will be sent out via email if this option is checked.       |
| Email Setting | Click and you will be redirected to the page "Email" to configure the Email group.              |
| SMS           | The relevant content of event alarm will be sent out via SMS if this option is checked.         |
| SMS Setting   | Click and you will be redirected to the page of "Phone" to configure phone group list.          |

Table 3-5-6-2 Events Parameters

## 4.5. Maintenance

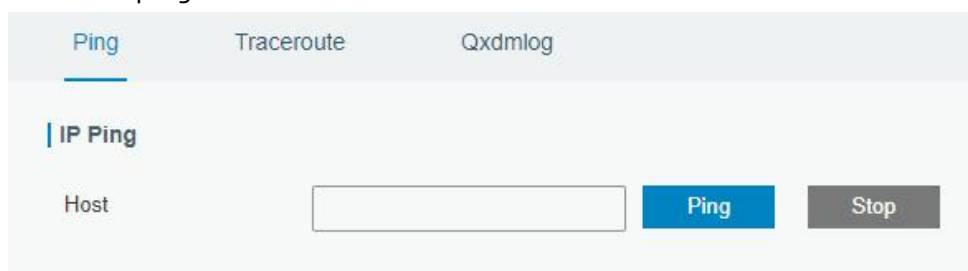
This section describes system maintenance tools and management.

### 4.5.1. Tools

Troubleshooting tools includes ping and traceroute.

#### 4.5.1.1. Ping

Ping tool is engineered to ping outer network.



| PING |                                      |
|------|--------------------------------------|
| Item | Description                          |
| Host | Ping outer network from the gateway. |

#### 4.5.1.2. Traceroute

Traceroute tool is used for troubleshooting network routing failures.

Figure 3-6-1-2

| Traceroute |   |
|------------|---|
| Item       | Description                                     |
| Host       | Address of the destination host to be detected. |

Table 3-6-1-2 Traceroute Parameters

### 4.5.1.3. Qxdmlog

This section allow collecting diagnostic logs of cellular module via QXDM tool.

Figure 3-6-1-3

## 4.5.2. Schedule

This section explains how to configure scheduled reboot on the gateway.

Figure 3-6-2-1

| Schedule |                        |
|----------|------------------------|
| Item     | Description            |
| Schedule | Select schedule event: |

|               |   |
|---------------|---|
|               | Reboot: Reboot the gateway regularly.         |
| Frequency     | Select the frequency to execute the schedule. |
| Hour & Minute | Select the time to execute the schedule.      |

### 4.5.3. Log

The system log contains a record of informational, error and warning events that indicates how the system processes. By reviewing the data contained in the log, an administrator or user troubleshooting the system can identify the cause of a problem or whether the system processes are loading successfully. Remote log server is feasible, and gateway will upload all system logs to remote log server such as Syslog Watcher.

#### 4.5.3.1. System Log

This section describes how to download log file and view the recent log on web.

The screenshot shows a web interface for 'System Log' with two tabs: 'System Log' and 'Log Settings'. Under the 'System Log' tab, there are two main sections: 'Download' and 'Log'. In the 'Download' section, there is a 'File' dropdown menu set to 'Log File' and a blue 'Download' button. In the 'Log' section, there is a 'View recent(lines)' dropdown menu set to '20'. Below this is a scrollable text area displaying system log entries. At the bottom of the 'Log' section is a blue 'Clear Log' button.

Figure 3-6-3-1

| System Log          |   |
|---------------------|---|
| Item                | Description                             |
| Download            | Download log file.                      |
| View recent (lines) | View the specified lines of system log. |
| Clear Log           | Clear the current system log.           |

Table 3-6-3-1 System Log Parameters

#### 4.5.3.2. Log Settings

This section explains how to enable remote log server and local log setting.

Figure 3-6-3-2

| Log Settings          |   |
|-----------------------|---|
| Item                  | Description   |
| Remote Log Server     |   |
| Enable                | With “Remote Log Server” enabled, gateway will send all system logs to the remote server. |
| Syslog Server Address | Fill in the remote system log server address (IP/domain name).                            |
| Port                  | Fill in the remote system log server port.  |
| Local Log File        |   |
| Storage               | User can store the log file in memory.  |
| Size                  | Set the size of the log file to be stored.  |
| Log Severity          | The list of severities follows the syslog protocol.                                       |

Table 3-6-3-2 System Log Parameters

#### 4.5.3.3. Upgrade

This section describes how to upgrade the gateway firmware via web. Generally you don't need to do the firmware upgrade.

**Note: any operation on web page is not allowed during firmware upgrade, otherwise the upgrade will be interrupted, or even the device will break down.**

Upgrade

Gateway

Firmware Version60.0.0.42-r5

Reset Configuration to Factory Default☐

Upgrade Firmware

Browse

Upgrade

Figure 3-6-4-1

| Upgrade                                |   |
|--|---|
| Item                                   | Description   |
| Firmware Version                       | Show the current firmware version.  |
| Reset Configuration to Factory Default | When this option is checked, the gateway will be reset to factory defaults after upgrade.       |
| Upgrade Firmware                       | Click "Browse" button to select the new firmware file, and click "Upgrade" to upgrade firmware. |

Table 3-6-4-1 Upgrade Parameters

4.5.4. Backup and Restore

This section explains how to create a complete backup of the whole system configurations to a file, replicate parts of important configuration only for batch backup, restore the config file to the gateway and reset to factory defaults.

Backup and Restore

Restore Config

Config File

Browse

Import

Backup Running-config

Full Backup

Batch Backup

Restore Factory Defaults

Reset

Figure 3-6-5-1

| Backup and Restore |  |
|--------------------|--|
| Item               | Description  |
| Config File        | Click "Browse" button to select configuration file, and then click |

|              |   |
|--------------|---|
|              | "Import" button to upload the configuration file to the gateway.  |
| Full Backup  | Click "Full Backup" to export the current configuration file to the PC.   |
| Batch Backup | Click "Batch Backup" to export current configuration except gateway ID of packet forwarder, all embedded NS settings, static IP address of WAN, WLAN settings, user management settings, DeviceHub authentication code, all APP settings. |
| Reset        | Click "Reset" button to reset factory default settings. gateway will restart after reset process is done.   |

Table 3-6-5-1 Backup and Restore Parameters

### 3.6.6 Reboot

On this page you can reboot the gateway and return to the login page. We strongly recommend clicking "Save" button before rebooting the gateway so as to avoid losing the new configuration.

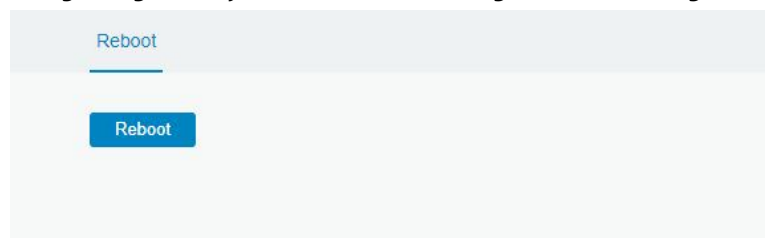


Figure 3-6-6-1

## 4.6. APP

### 4.6.1. Python

Python is an object-oriented programming language that has gained popularity because of its clear syntax and readability.

As an **interpreted language**, Python has a design philosophy that emphasizes code **readability**, notably using **whitespace** indentation to delimit **code blocks** rather than curly brackets or keywords, and a syntax that allows programmers to express concepts in fewer **lines of code** than it's used in other languages such as **C++** or **Java**. The language provides constructs and intends to enable writing clear programs on both small and large scale.

Users can use Python to quickly generate the prototype of the program, which can be the final interface of the program, rewrite it with a more appropriate language, and then encapsulate the extended class library that Python can call.

This section describes how to view the relevant running status such as App-manager, SDK version, extended storage, etc. Also you can change the App-manager configuration, and import the Python App package from here.



#### 4.6.1.1. Python

Figure 3-7-1-1

| Python            |   |
|-------------------|---|
| Item              | Description   |
| AppManager Status | Show AppManager's running status, like "Uninstalled", "Running" or "Stopped". |
| SDK Version       | Show the version of the installed SDK.  |
| SDK Path          | Show the SDK installation path.   |
| Available Storage | Select available storage to install SDK.                                      |
| SDK Upload        | Upload and install SDK for Python.  |
| Uninstall         | Uninstall SDK.  |
| View              | View application status managed by AppManager.                                |

Table 3-7-1-1 Python Parameters

#### 4.6.1.2. App Manager Configuration

Figure 3-7-1-2

| AppManager Configuration |             |
|--------------------------|-------------|
| Item                     | Description |

|                       |  |
|-----------------------|--|
| Enable                | After enabling Python AppManager, user can click "View" button on the "Python" webpage to view the application status managed by AppManager. |
| <b>App Management</b> |  |
| ID                    | Show the ID of the imported App.   |
| App Command           | Show the name of the imported App.   |
| Logfile Size(MB)      | User-defined Logfile size. Range: 1-50.  |
| Uninstall             | Uninstall APP.   |
| <b>App Status</b>     |  |
| App Name              | Show the name of the imported App.   |
| App Version           | Show the version of the imported App.  |
| SDK Version           | Show the SDK version which the imported App is based on.   |

Table 3-7-1-2 APP Manager Parameters

### 3.7.1.3 Python App

Figure 3-7-1-3

| Python APP        |   |
|-------------------|---|
| Item              | Description                                     |
| App Package       | Select App package and import.                  |
| App Name          | Select App to import configuration.             |
| App Configuration | Select configuration file and import.           |
| Debug File        | Export script file.                             |
| Debug Script      | Select Python script to be debugged and import. |

Table 3-7-1-3 APP Parameters

### 3.7.2 Node-RED

Node-RED is a flow-based development tool for visual programming and wiring together hardware devices, APIs and online services as part of the Internet of Things. Node-RED provides a web-browser-based flow editor, which can easily wire together flows using the wide range of nodes in the palette. For more guidance and documentation please refer to [Node-RED official website](#).

#### 3.7.2.1 Node-RED

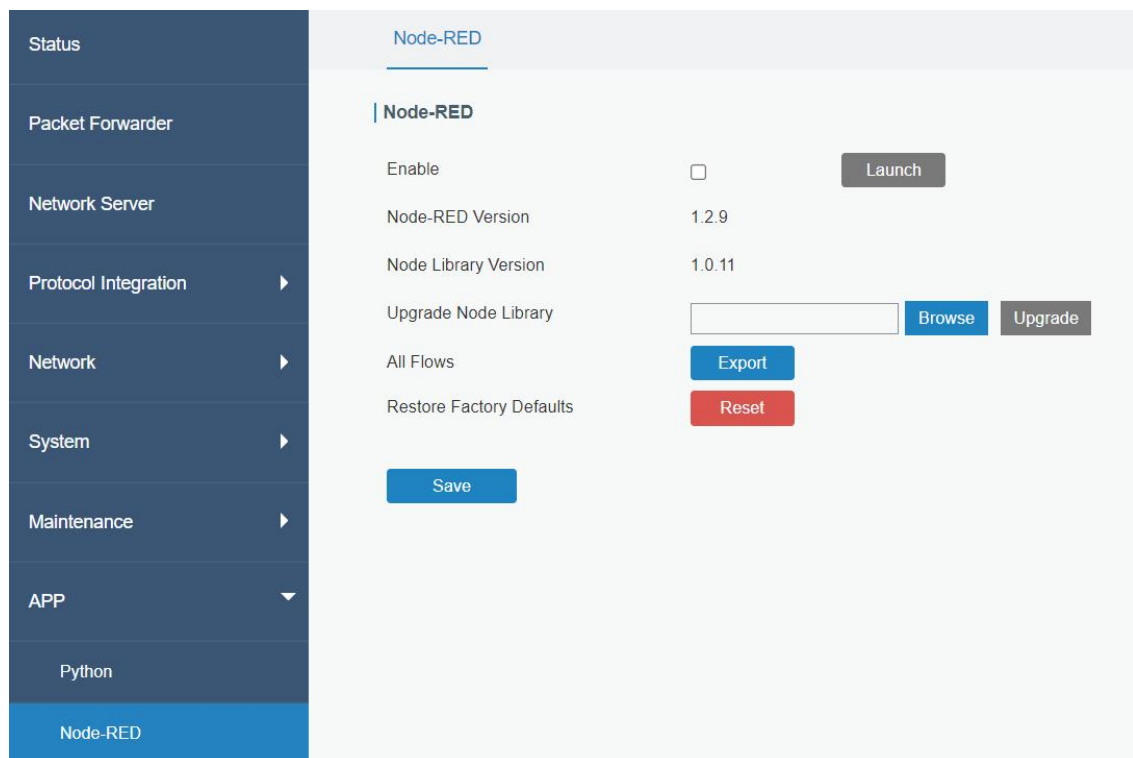
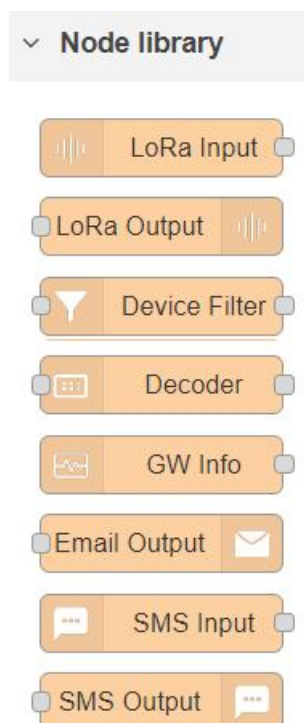


Figure 3-7-2-1

| Node-RED                |   |
|-------------------------|---|
| Item                    | Description   |
| Enable                  | Enable the Node-RED.  |
| Launch                  | Click to launch the web GUI of Node-RED.  |
| Node-RED Version        | Show the version of the Node-RED. The Node-RED version can be upgraded only when you upgrade the gateway. |
| Node Library Version    | Show the version of the node library.   |
| Upgrade Node Library    | Upgrade the node library by importing the library package.  |
| All Flows Export        | Export all flows as a JSON format file.   |
| Restore Factory Default | Erase all flows data of Node-RED.   |

Table 3-7-2-1 Node-RED Parameters

provides a customized node library to use the interfaces of the gateway.



| Node Library  |  |
|---------------|--|
| Node          | Description  |
| LoRa Input    | Receive LoRaWAN® packets from the gateway. This only works when the network server is enabled.   |
| LoRa Output   | Send downlink commands to LoRaWAN® nodes.  |
| Device Filter | Filter out the data of one or more specific LoRaWAN® nodes via device EUIs.  |
| GW Info       | Monitor events of gateway, this needs to ensure the event detection is enabled in General > Events > Events Settings.  |
| Email Output  | Send an Email. If you select SMTP option as " Same as the gateway" , it is necessary to go to System > General Settings > SMTP page to configure SMTP client settings. |
| SMS Input     | Receive SMS message. This only works when the cellular is connected.   |
| SMS Output    | Send an SMS message. This only works when the cellular is connected.   |

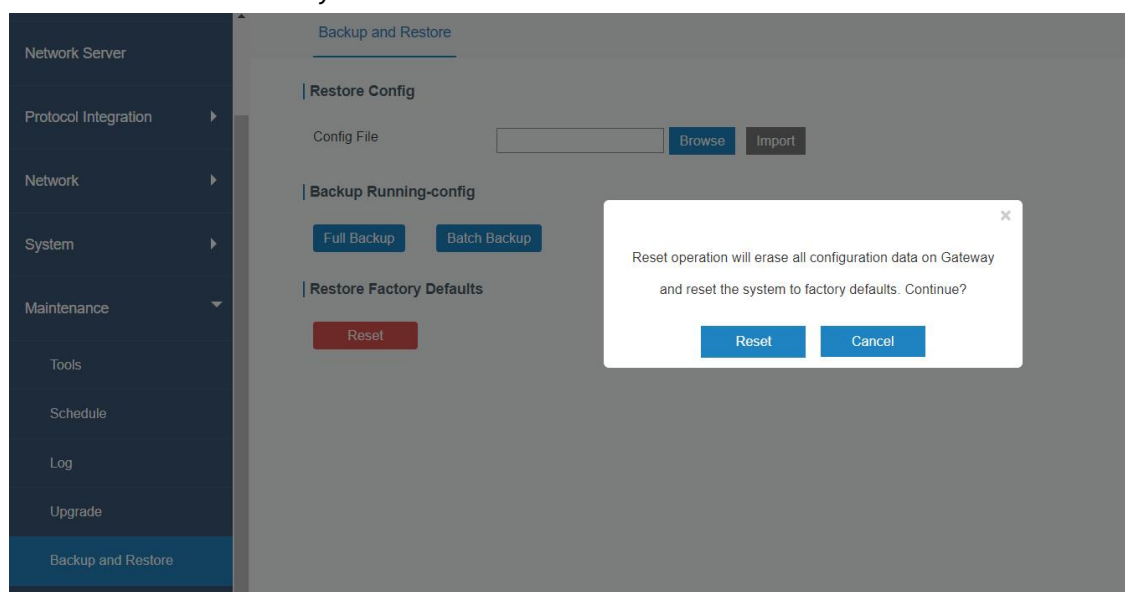
Table 3-7-2-2 Node Library Parameters

## Chapter 4 Application Examples

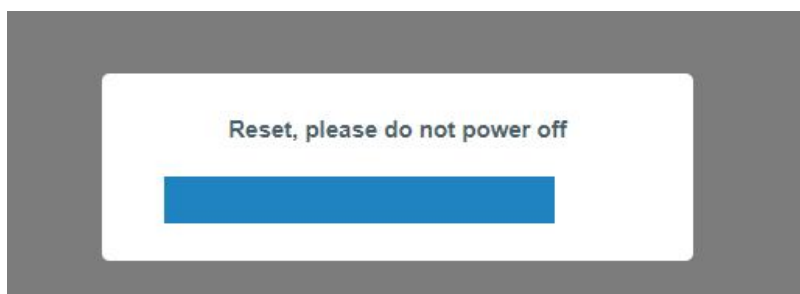
### 4.1 Restore Factory Defaults

#### Method 1:

Log in web interface, and go to **Maintenance > Backup and Restore**, click **Reset** button, you will be asked to confirm if you'd like to reset it to factory defaults. Then click **Reset** button.



Then the gateway will reboot and restore to factory settings immediately.



Please wait till SYS light statically and the login page pops up again, which means the gateway has already been reset to factory defaults successfully.

#### Related Topic

[Restore Factory Defaults](#)

#### Method 2:

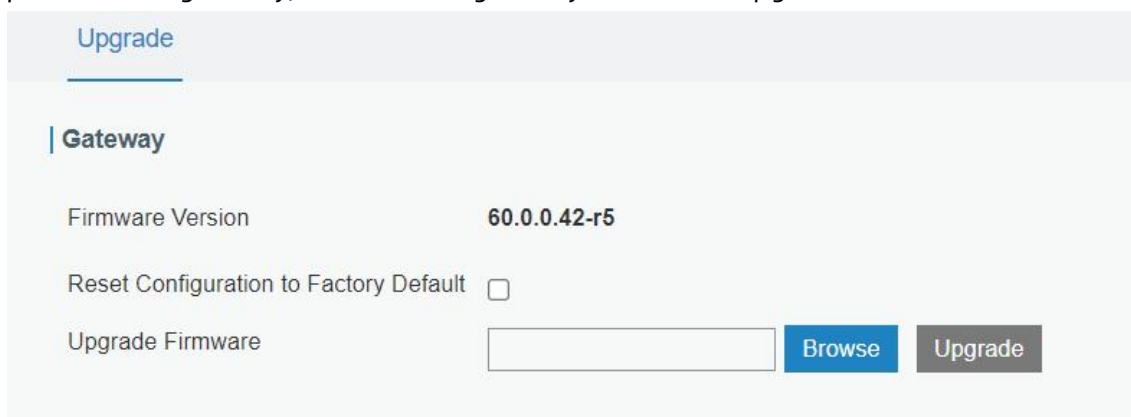
Locate the reset button on the gateway, press and hold the reset button for more than 5s until the SYS LED blinks.

## 4.2 Firmware Upgrade

It is suggested that you contact technical support first before you upgrade gateway firmware. Gateway firmware file suffix is “.bin” .

After getting firmware file please refer to the following steps to complete the upgrade.

- 1.Go to “Maintenance > Upgrade” .
- 2.Click “Browse” and select the correct firmware file from the PC.
- 3.Click “Upgrade” and the gateway will check if the firmware file is correct. If it’s correct, the firmware will be imported to the gateway, and then the gateway will start to upgrade.



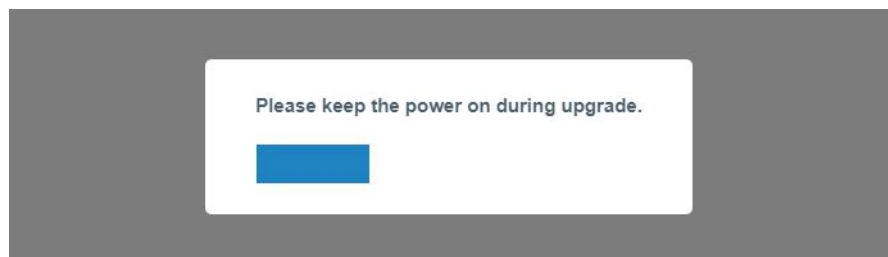
Upgrade

Gateway

Firmware Version 60.0.0.42-r5

Reset Configuration to Factory Default ☐

Upgrade Firmware  Browse Upgrade



### Related Topic

[Upgrade](#)

## 4.3 Ethernet Connection

- 1.Go to “ Network > Interface > Port ” page to select the connection type and configure Ethernet port configuration, click “Save & Apply” for configuration to take effect.

| Port                 | WLAN                                | Cellular | Loopback | VLAN Trunk |
|----------------------|-------------------------------------|----------|----------|------------|
| Port_1               |                                     |          |          |            |
| Port                 | eth 0                               |          |          |            |
| Connection Type      | Static IP                           |          |          |            |
| IP Address           | 192.168.44.186                      |          |          |            |
| Netmask              | 255.255.255.0                       |          |          |            |
| Gateway              | 192.168.44.1                        |          |          |            |
| MTU                  | 1500                                |          |          |            |
| Primary DNS Server   | 8.8.8.8                             |          |          |            |
| Secondary DNS Server | 223.5.5.5                           |          |          |            |
| Enable NAT           | <input checked="" type="checkbox"/> |          |          |            |

2. Connect Ethernet port of gateway to devices like router or modem.

3. Go to "Maintenance > Tools > Ping" to check network connectivity.

| Network Server   | Protocol Integration | Network | System | Maintenance | Tools |
|--|----------------------|---------|--------|-------------|-------|
| <div> <div>Ping</div> <div>Traceroute</div> <div>Qxdmlog</div> </div> <div> <div>IP Ping</div> <div> <div>Host</div> <div>www.google.com</div> <div>Ping</div> <div>Stop</div> </div> <div> <div>PING www.google.com (172.217.25.4): 56 data bytes</div> <div>64 bytes from 172.217.25.4: seq=0 ttl=117 time=20.090 ms</div> <div>64 bytes from 172.217.25.4: seq=1 ttl=117 time=19.786 ms</div> <div>64 bytes from 172.217.25.4: seq=2 ttl=117 time=19.797 ms</div> <div>64 bytes from 172.217.25.4: seq=3 ttl=117 time=19.750 ms</div> <div>---</div> <div>www.google.com ping statistics ---</div> <div>4 packets transmitted, 4 packets received, 0% packet loss</div> <div>round-trip min/avg/max = 19.750/19.855/20.090 ms</div> </div> </div> |                      |         |        |             |       |

## 4.4 Cellular Connection (Cellular Version Only)

1. Go to "Network > Interface > Cellular > Cellular Setting" and configure the necessary cellular info of SIM card, lick "Save" and "Apply" for configuration to take effect.

**Cellular Setting**

|                     |                                     |
|---------------------|-------------------------------------|
| Enable              | <input checked="" type="checkbox"/> |
| Network Type        | Auto ▼                              |
| APN                 | <input type="text"/>                |
| Username            | <input type="text"/>                |
| Password            | <input type="text"/>                |
| Access Number       | <input type="text"/>                |
| PIN Code            | <input type="text"/>                |
| Authentication Type | None ▼                              |
| Roaming             | <input checked="" type="checkbox"/> |
| Customize MTU       | <input checked="" type="checkbox"/> |
| MTU                 | 1500                                |
| Enable IMS          | <input type="checkbox"/>            |
| SMS Center          | <input type="text"/>                |

2. Go to “Status > Cellular” to view the status of the cellular connection. If it shows 'Connected', SIM has dialed up successfully.

| Overview        | Packet Forward            | Cellular | Network | WLAN |
|-----------------|---------------------------|----------|---------|------|
| Modem           |                           |          |         |      |
| Status          | Ready                     |          |         |      |
| Model           | EC25                      |          |         |      |
| Version         | EC25ECGAR06A07M1G         |          |         |      |
| Signal Level    | 23asu (-67dBm)            |          |         |      |
| Register Status | Registered (Home network) |          |         |      |
| IMEI            | 860425047368939           |          |         |      |
| IMSI            | 460019425301842           |          |         |      |
| ICCID           | 89860117838009934120      |          |         |      |
| ISP             | CHN-UNICOM                |          |         |      |
| Network Type    | LTE                       |          |         |      |
| PLMN ID         |                           |          |         |      |
| LAC             | 5922                      |          |         |      |
| Cell ID         | 340db83                   |          |         |      |
| Network         |                           |          |         |      |
| Status          | Connected                 |          |         |      |
| IP Address      | 10.132.132.59             |          |         |      |
| Netmask         | 255.255.255.240           |          |         |      |
| Gateway         | 10.132.132.60             |          |         |      |

## Related Topic

[Cellular Setting](#)



## Cellular Status

### 4.5 Wi-Fi Application Example

#### 4.5.1 AP Mode

##### Application Example

Configure LG280 as AP to allow connection from users or devices.

##### Configuration Steps

1. Go to “Network > Interface > WLAN” to configure wireless parameters as below.

| Port              | WLAN                                | Cellular | Loopback |
|-------------------|-------------------------------------|----------|----------|
| <b>WLAN</b>       |                                     |          |          |
| Enable            | <input checked="" type="checkbox"/> |          |          |
| Work Mode         | AP                                  |          |          |
| SSID Broadcast    | <input checked="" type="checkbox"/> |          |          |
| AP Isolation      | <input type="checkbox"/>            |          |          |
| Radio Type        | 802.11n(2.4GHz)                     |          |          |
| Channel           | Auto                                |          |          |
| SSID              | Gateway_F1200F                      |          |          |
| BSSID             | 24:e1:24:f1:20:0f                   |          |          |
| Encryption Mode   | No Encryption                       |          |          |
| Bandwidth         | 20MHz                               |          |          |
| Max Client Number | 10                                  |          |          |

Click “Save” and “Apply” buttons after all configurations are done.

2. Use a smart phone to connect the access point of gateway. Go to “Status > WLAN” , and you can check the AP settings and information of the connected client/user.

| Overview            | Packet Forward    | Cellular | Network | WLAN | VPN |
|---------------------|-------------------|----------|---------|------|-----|
| <b>WLAN Status</b>  |                   |          |         |      |     |
| Wireless Status     | Enabled           |          |         |      |     |
| MAC Address         | 24:e1:24:f1:20:0f |          |         |      |     |
| Interface Type      | AP                |          |         |      |     |
| SSID                | Gateway_F1200F    |          |         |      |     |
| Channel             | Auto              |          |         |      |     |
| Encryption Type     | No Encryption     |          |         |      |     |
| Status              | Up                |          |         |      |     |
| IP Address          | 192.168.1.1       |          |         |      |     |
| Netmask             | 255.255.255.0     |          |         |      |     |
| Connection Duration | 0 days, 02:40:52  |          |         |      |     |

## 4.5.2 Client Mode

### Application Example

Configure LG280 as Wi-Fi client to connect to an access point to have Internet access.

### Configuration Steps

1. Go to “Network > Interface > WLAN” and click “Scan” to search for WiFi access point.

Port
WLAN
Cellular
Loopback

GoBack

| SSID | Channel | Signal | Cipher | BSSID             | Security         | Frequency |              |
|------|---------|--------|--------|-------------------|------------------|-----------|--------------|
| AAA  | Auto    | -61dBm | AES    | 24:e1:24:f0:c4:13 | WPA-PSK/WPA2-PSK | 2412MHz   | Join Network |

2. Select one access point and click “Join Network” , then type the password of the access point.

| Port              | WLAN                                | Cellular | Loopback |
|-------------------|-------------------------------------|----------|----------|
| <b>WLAN</b>       |                                     |          |          |
| Enable            | <input checked="" type="checkbox"/> |          |          |
| Work Mode         | Client                              |          | Scan     |
| SSID              | AAA                                 |          |          |
| BSSID             | 24:e1:24:f0:c4:13                   |          |          |
| Encryption Mode   | WPA-PSK/WPA2-PSK                    |          |          |
| Cipher            | AES                                 |          |          |
| Key               | *****                               |          |          |
| <b>IP Setting</b> |                                     |          |          |
| Protocol          | DHCP Client                         |          |          |

Click “Save” and “Apply” buttons after all configurations are done.

3. Go to “Status > WLAN” , and you can check the connection status of the client.

| Overview            | Packet Forward    | Cellular | Network | WLAN |
|---------------------|-------------------|----------|---------|------|
| <b>WLAN Status</b>  |                   |          |         |      |
| Wireless Status     | Enabled           |          |         |      |
| MAC Address         | 24:e1:24:f0:de:14 |          |         |      |
| Interface Type      | Client            |          |         |      |
| SSID                | AAA               |          |         |      |
| Channel             | Auto              |          |         |      |
| Encryption Type     | WPA-PSK/WPA2-PSK  |          |         |      |
| Cipher              | AES               |          |         |      |
| Status              | Connected         |          |         |      |
| IP Address          | 192.168.1.145     |          |         |      |
| Netmask             | 255.255.255.0     |          |         |      |
| Connection Duration | 0 days, 02:44:45  |          |         |      |

## Related Topic

[WLAN Setting](#)

[WLAN Status](#)

## 4.6 Packet Forwarder Configuration

LG280 gateway has installed multiple packet forwarders including Semtech, Basic station, Chirpstack-

Generic MQTT broker, etc. Before connecting make sure the gateway has connected to network.

1.Go to “Packet Forwarder” > “General” .

General Radios Advanced Custom Traffic

**General Setting**

Gateway EUI 24E124FFFEF12257

Gateway ID 24E124FFFEF12257

Frequency-Sync Disabled

**Multi-Destination**

| ID | Enable  | Type        | Server Address | Connect Status | Operation |
|----|---------|-------------|----------------|----------------|-----------|
| 0  | Enabled | Embedded NS | localhost      | Connected      |           |

2.Click to add a new network server. Fill in the network server information and enable this server.

Enable ☒

Type Semtech

Server Address eu1.cloud.thethings.network

Port Up 1700

Port Down 1700

**Save**

3.Go to “Packet Forwarder > Radio” page to configure center frequency and channels. The channels of the gateway and network server need to be the same.

Region US915

| Name    | Center Frequency/MHz |
|---------|----------------------|
| Radio 0 | 904.3                |
| Radio 1 | 905.0                |

**Multi Channels Setting**

| Enable                              | Index | Radio   | Frequency/MHz |
|-------------------------------------|-------|---------|---------------|
| <input checked="" type="checkbox"/> | 0     | Radio 0 | 903.9         |
| <input checked="" type="checkbox"/> | 1     | Radio 0 | 904.1         |
| <input checked="" type="checkbox"/> | 2     | Radio 0 | 904.3         |
| <input checked="" type="checkbox"/> | 3     | Radio 0 | 904.5         |
| <input checked="" type="checkbox"/> | 4     | Radio 1 | 904.7         |
| <input checked="" type="checkbox"/> | 5     | Radio 1 | 904.9         |
| <input checked="" type="checkbox"/> | 6     | Radio 1 | 905.1         |
| <input checked="" type="checkbox"/> | 7     | Radio 1 | 905.3         |

4.Add the gateway on network server page. For more details about the network server connection please

refer to **IoT Support portal**.

5.Go to “Traffic” page to view the data communication of LG280.

GeneralRadiosAdvancedCustomTraffic

Traffic Setting

StopClear

| Rfch | Direction | Time     | Ticks          | Frequency | Datarate  | Coderate | RSSI | SNR  |
|------|-----------|----------|----------------|-----------|-----------|----------|------|------|
| 0    | up        | 05:57:30 | 212136749<br>3 | 903.9     | SF10BW125 | 4/5      | -51  | 13.2 |
| 0    | up        | 05:57:29 | 211944923<br>1 | 904.5     | SF7BW125  | 4/5      | -95  | 8.5  |
| 0    | up        | 05:57:13 | 210431205<br>7 | 904.6     | SF8BW500  | 4/5      | -51  | 11.5 |
| 0    | up        | 05:57:06 | 209699855<br>6 | 903.9     | SF7BW125  | 4/5      | -65  | 14.2 |

## 4.7 Application Configuration

You can create a new application on this page, which is mainly used to define the method of decoding the data sent from end-device and choosing the data transport protocol to send data to another server address. The data will be sent to your custom server address using MQTT, HTTP or HTTPS protocol.

1.Go to “Network Server” > “Application” .

2.Click  to enter the configuration page, displayed as the following picture :

Applications


Name

cloud

Description

cloud

3.Click “Save” to create this application.

4.Click  to add a data transmission type.

### HTTP or HTTPS:

Step 1: select HTTP or HTTPS as transmission protocol.

Type

HTTP

Step 2: Enter the destination URL. Different types of data can be sent to different URLs.

| URL

| Data Type          | URL                  |
|--------------------|----------------------|
| Uplink data        | <input type="text"/> |
| Join notification  | <input type="text"/> |
| ACK notification   | <input type="text"/> |
| Error notification | <input type="text"/> |

Enter the header name and header value if there is user credentials when accessing the HTTP(s) server.

| HTTP Header

| Header Name          | Header Value         | Operation                        |
|----------------------|----------------------|----------------------------------|
| <input type="text"/> | <input type="text"/> | <input type="button" value="X"/> |
|                      |                      | <input type="button" value="+"/> |

## MQTT:

Step 1: select the transmission protocol as MQTT.

Step 2: Fill in MQTT broker general settings.

| General

|                       |                                 |
|-----------------------|---------------------------------|
| Broker Address        | <input type="text"/>            |
| Broker Port           | <input type="text"/>            |
| Client ID             | <input type="text"/>            |
| Connection Timeout/s  | <input type="text" value="30"/> |
| Keep Alive Interval/s | <input type="text" value="60"/> |

Step 3: Select the authentication method required by the server.

If you select user credentials for authentication, you need to enter the username and password for authentication.

User Credentials

Enable

☒

Username

Password

If certificate is necessary for verification, please select mode and import CA certificate, client certificate and client key file for authentication.

TLS

Enable

☒

Mode

Self signed certificates

CA File

Browse

Import

Delete

Client Certificate File

Browse

Import

Delete

Client Key File

Browse

Import

Delete

Step 4: Enter the topic to receive data and choose the QoS.

| Data Type               | topic  |       |
|-------------------------|--|-------|
| Uplink data             | <input type="text" value="device/test"/>     | QoS 0 |
| Downlink data           | <input type="text"/>                         | QoS 0 |
| Multicast downlink data | <input type="text"/>                         | QoS 0 |
| Join notification       | <input type="text"/>                         | QoS 0 |
| ACK notification        | <input type="text"/>                         | QoS 0 |
| Error notification      | <input type="text"/>                         | QoS 0 |
| Request data            | <input type="text" value="/event/request"/>  | QoS 0 |
| Response data           | <input type="text" value="/event/response"/> | QoS 0 |

## 4.8 Device Configuration

Go to “Device” page and click “Add” to add LoRaWAN® node devices. Please select correct device profile according to device type.

Device

Add

Bulk Import

Delete All

Search

| Device Name               | Device EUI | Device-Profile | Application | Last Seen | Activated | Operation |
|---------------------------|------------|----------------|-------------|-----------|-----------|-----------|
| No matching records found |            |                |             |           |           |           |

|                          |   |
|--------------------------|---|
| Device Name              | <input type="text" value="lora-sensor"/>                      |
| Description              | <input type="text" value="a short description of your node"/> |
| Device EUI               | <input type="text" value="0000000000000000"/>                 |
| Device-Profile           | <input type="text" value="ClassA-OTAA"/>                      |
| Application              | <input type="text" value="cloud"/>                            |
| Payload Codec            | <input type="text"/>  |
| fPort                    | <input type="text" value="1"/>                                |
| Frame-counter Validation | <input type="checkbox"/>                                      |
| Application Key          | <input type="text"/>  |
| Device Address           | <input type="text"/>  |
| Network Session Key      | <input type="text"/>  |
| Application Session Key  | <input type="text"/>  |
| Uplink Frame-counter     | <input type="text" value="0"/>                                |
| Downlink Frame-counter   | <input type="text" value="0"/>                                |

[Save & Apply](#)

You can also click “Bulk Import” if you want to add many nodes all at once.

[Browse](#)
[Import](#)
[Template Download](#)

Click “Template Download” to download template file and add device information to this file. Application and device profile should be the same as you created on web page.

|   | A                | B           | C                | D           | E             | F                                | G       | H       | I       |
|---|------------------|-------------|------------------|-------------|---------------|----------------------------------|---------|---------|---------|
| 1 | name             | description | deveui           | application | deviceprofile | appkey                           | devaddr | appskey | nwkskey |
| 2 | 24e1242191323266 |             | 24e1242191323266 | cloud       | ClassC-OTAA   | 112233445566778899aa112233445566 |         |         |         |
| 3 |                  |             |                  |             |               |                                  |         |         |         |
| 4 |                  |             |                  |             |               |                                  |         |         |         |
| 5 |                  |             |                  |             |               |                                  |         |         |         |

Import this file to add bulks of devices.

## 4.9 Send Data to Device

1. Go to “Network Server” > “Packets” , check the packet in the network server list to make sure that the device has joined the network successful.

|            |           |          |     |     |    |   |       |                           |  |
|------------|-----------|----------|-----|-----|----|---|-------|---------------------------|--|
| 1122612191 | 868100000 | SF7BW125 | -   | -   | 17 | 0 | JnAcc | 2019-08-06T09:22:29+08:00 |  |
| 112261219  | 868100000 | SF7BW125 | 9.5 | -77 | 18 | 0 | JnReq | 2019-08-06T09:22:29+08:00 |  |



2. Fill in the device EUI or select the multicast group which you need to send downlinks. Then fill in the downlink commands, ports.

Send Data To Device

| Device EUI  | Type  | Payload | Fport | Confirmed                           |
|-------------|-------|---------|-------|-------------------------------------|
| 11226121913 | ASCII | 15      | 15    | <input checked="" type="checkbox"/> |

3. Click "Send" .



4. Check the packet in the network server list to make sure that the device has received this message successful. It's suggested to enable "Confirmed" . Multicast feature does not support confirmed downlinks.

Send Data To Device

| Device EUI  | Type  | Payload | Fport | Confirmed                           |
|-------------|-------|---------|-------|-------------------------------------|
| 11226121913 | ASCII | 15      | 15    | <input checked="" type="checkbox"/> |

You can click "Refresh" to refresh the list or set automatic refreshing frequency for the list.

If the device's class type is Class C, then the device will constantly receive packets.

This packet's type is DnCnf (Downlink Confirmed Packet) and if the packet's color is gray, then it means the packet cannot be transmitted now because at least one message has been in the queue. If the packet record is white, it means the packet has been delivered successfully.

|                  |           |           |   |   |   |   |       |                           |         |   |
|------------------|-----------|-----------|---|---|---|---|-------|---------------------------|---------|---|
| 1122612191311123 | 869525000 | SF12BW125 | - | - | 6 | 2 | DnCnf | 2019-08-06T09:22:55+08:00 | Success | ! |
| 1122612191311123 | 0         |           |   |   | 6 | 2 | DnCnf |                           | Pending | ! |

If the device receives this downlink confirmed packet, then the device will reply "ACK" when delivering next.

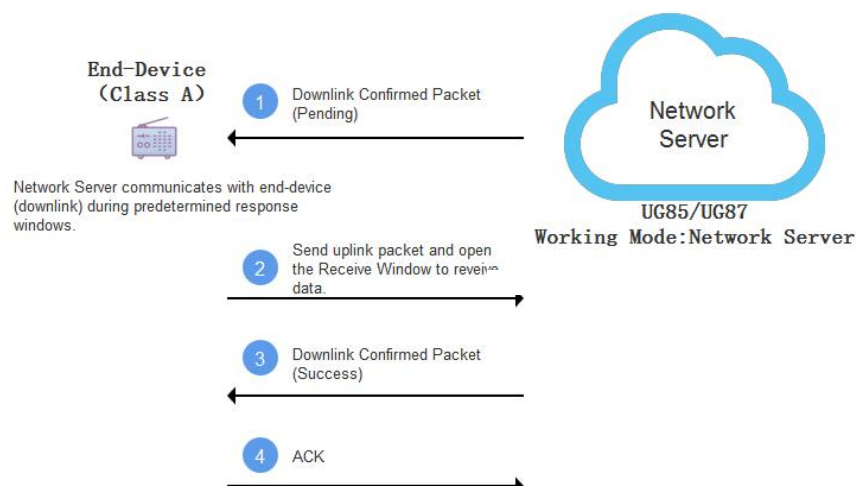
| Device EUI  | Frequency | Datarate  | SNR  | RSSI | Size | Fcnt | Type  | Time                      | Details |
|-------------|-----------|-----------|------|------|------|------|-------|---------------------------|---------|
| 11226121913 | 868300000 | SF10BW125 | -    | -    | 0    | 3    | DnUnc | 2019-08-06T09:23:44+08:00 | !       |
| 11226121913 | 868300000 | SF10BW125 | 10.5 | -75  | 64   | 2    | UpCnf | 2019-08-06T09:23:44+08:00 | !       |
| 11226121913 | 869525000 | SF12BW125 | -    | -    | 6    | 2    | DnCnf | 2019-08-06T09:22:55+08:00 | !       |
| 11226121913 | 0         |           |      |      | 6    | 2    | DnCnf |                           | !       |
| 11226121913 | 868500000 | SF10BW125 | -    | -    | 0    | 1    | DnUnc | 2019-08-06T09:22:49+08:00 | !       |

| Packets Details |                  |
|-----------------|------------------|
| Dev Addr        | 07e7             |
| GwEUI           | 24e124ff         |
| AppEUI          | 557240           |
| DevEUI          | 1122612191311123 |
| Immediately     | -                |
| Timestamp       | 874346044        |
| Type            | UpCnf            |
| Adr             | false            |
| AdrAckReq       | false            |
| Ack             | true             |
| Fcnt            | 21               |
| Fport           | 55               |
| Modulation      | LORA             |

Ack is “true” means that the device has received this packet.

If the device’s class type is Class A, only after the device sends out an uplink packet will the network server sends out data to the device.

| Network Server                     |           |           |      |      |      |      |       |                           |         |
|------------------------------------|-----------|-----------|------|------|------|------|-------|---------------------------|---------|
| <div>Clear</div> <div>Search</div> |           |           |      |      |      |      |       |                           |         |
| Device EUI                         | Frequency | Datarate  | SNR  | RSSI | Size | Fcnt | Type  | Time                      | Details |
| 1122612191311123                   | 868300000 | SF10BW125 | -    | -    | 0    | 19   | DnUnc | 2019-08-06T09:49:38+08:00 | !       |
| 1122612191311123                   | 868300000 | SF10BW125 | 10.8 | -76  | 64   | 21   | ACK   | 2019-08-06T09:49:38+08:00 | !       |
| 1122612191311123                   | 868300000 | SF10BW125 | 10.8 | -76  | 64   | 21   | UpCnf | 2019-08-06T09:49:38+08:00 | !       |
| 1122612191311123                   | 868100000 | SF10BW125 | -    | -    | 6    | 18   | DnCnf | 2019-08-06T09:48:43+08:00 | Success |
| 1122612191311123                   | 868100000 | SF10BW125 | 9.8  | -77  | 64   | 20   | UpCnf | 2019-08-06T09:48:43+08:00 | !       |
| 1122612191311123                   | 0         |           |      |      | 6    | 18   | DnCnf | Pending                   | !       |
| 1122612191311123                   | 868500000 | SF10BW125 | -    | -    | 0    | 17   | DnUnc | 2019-08-06T09:47:38+08:00 | !       |
| 1122612191311123                   | 868500000 | SF10BW125 | 8.0  | -76  | 64   | 19   | UpCnf | 2019-08-06T09:47:38+08:00 | !       |
| 1122612191311123                   | 868100000 | SF10BW125 | -    | -    | 0    | 16   | DnUnc | 2019-08-06T09:46:38+08:00 | !       |
| 1122612191311123                   | 868100000 | SF10BW125 | 11.2 | -74  | 64   | 18   | UpCnf | 2019-08-06T09:46:37+08:00 | !       |



Network Server

Clear

Search

| Device EUI       | Frequency | Datarate  | SNR  | RSSI | Size | Fcnt | Type  | Time                      | Details |
|------------------|-----------|-----------|------|------|------|------|-------|---------------------------|---------|
| 1122612191311123 | 868300000 | SF10BW125 | -    | -    | 0    | 19   | DnUnc | 2019-08-06T09:49:38+08:00 | !       |
| 1122612191311123 | 868300000 | SF10BW125 | 10.8 | -76  | 64   | 21   | ACK   | 2019-08-06T09:49:38+08:00 | !       |
| 1122612191311123 | 868300000 | SF10BW125 | 10.8 | -76  | 64   | 20   | UpCnf | 2019-08-06T09:49:38+08:00 | !       |
| 1122612191311123 | 868100000 | SF10BW125 | 9.6  | -77  | 64   | 18   | DnCnf | 2019-08-06T09:48:43+08:00 | !       |
| 1122612191311123 | 868100000 | SF10BW125 | 9.8  | -77  | 64   | 20   | UpCnf | 2019-08-06T09:48:43+08:00 | !       |
| 1122612191311123 | 0         |           |      |      | 6    | 18   | DnCnf |                           | !       |
| 1122612191311123 | 868500000 | SF10BW125 | -    | -    | 0    | 17   | DnUnc | 2019-08-06T09:47:38+08:00 | !       |
| 1122612191311123 | 868500000 | SF10BW125 | 8.0  | -76  | 64   | 19   | UpCnf | 2019-08-06T09:47:38+08:00 | !       |
| 1122612191311123 | 868100000 | SF10BW125 | -    | -    | 0    | 16   | DnUnc | 2019-08-06T09:46:38+08:00 | !       |
| 1122612191311123 | 868100000 | SF10BW125 | 11.2 | -74  | 64   | 18   | UpCnf | 2019-08-06T09:46:37+08:00 | !       |

Showing 51 to 60 of 355 rows 10 rows per page

Manual Refresh Refresh

means the device has received the packet you send.

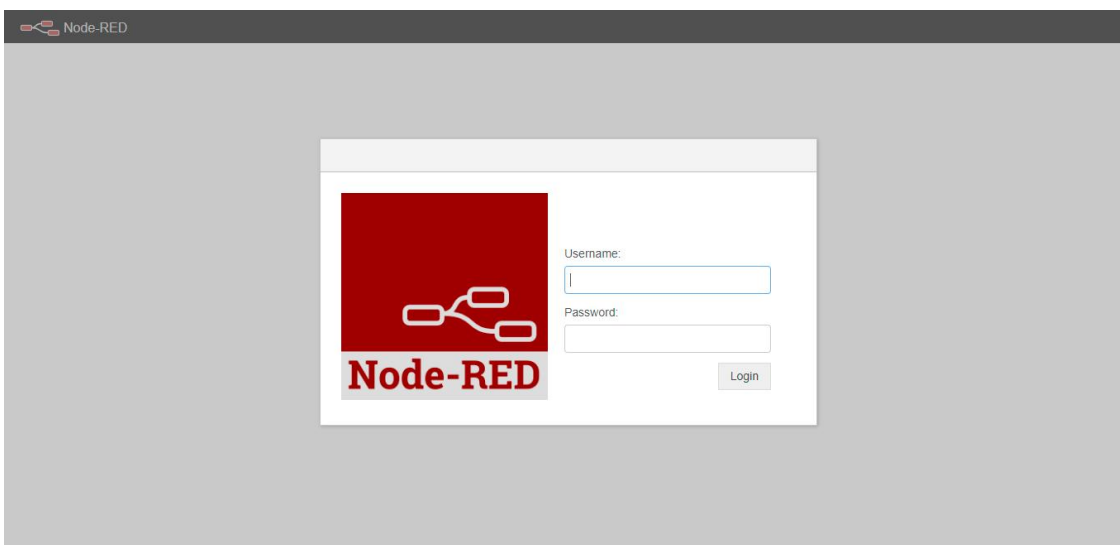
## Related Topic

### [Packets](#)

## 4.10 Node-RED

### 4.10.1 Start the Node-RED

1. Go to "App > Node-RED" to enable the Node-RED feature.
2. After enabled, click "Launch" to go to the Node-RED web GUI and to log in with the same username and password as gateway.



### 4.10.2 Send Data by Email

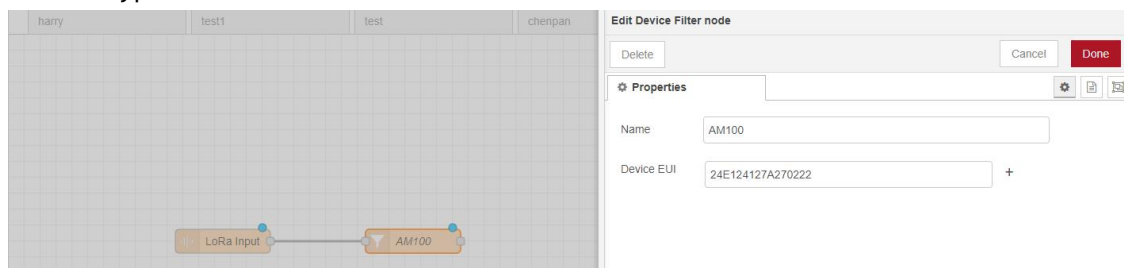
## Application Example

Send AM104 device data by Email.

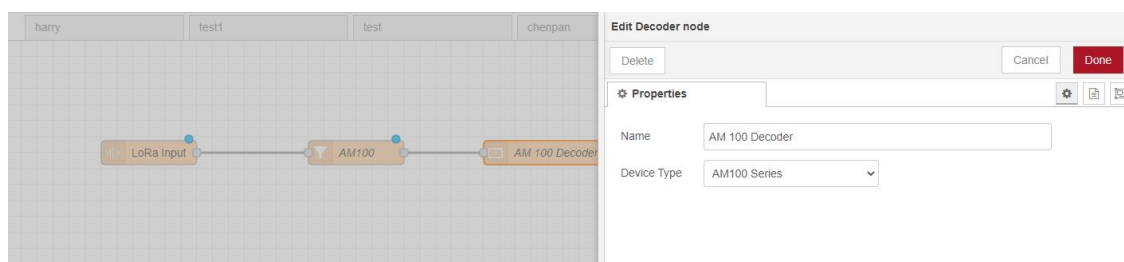


## Configuration Steps

1. Add a “LoRa Input” node. Before adding please ensure network server mode is enabled and LoRaWAN devices have joined the network.
2. If you add many devices and only need one device data, add “Device Filter” node behind the “LoRa Input” and type the device EUI.



3. Add a “Decoder” node to decode the sensor data.



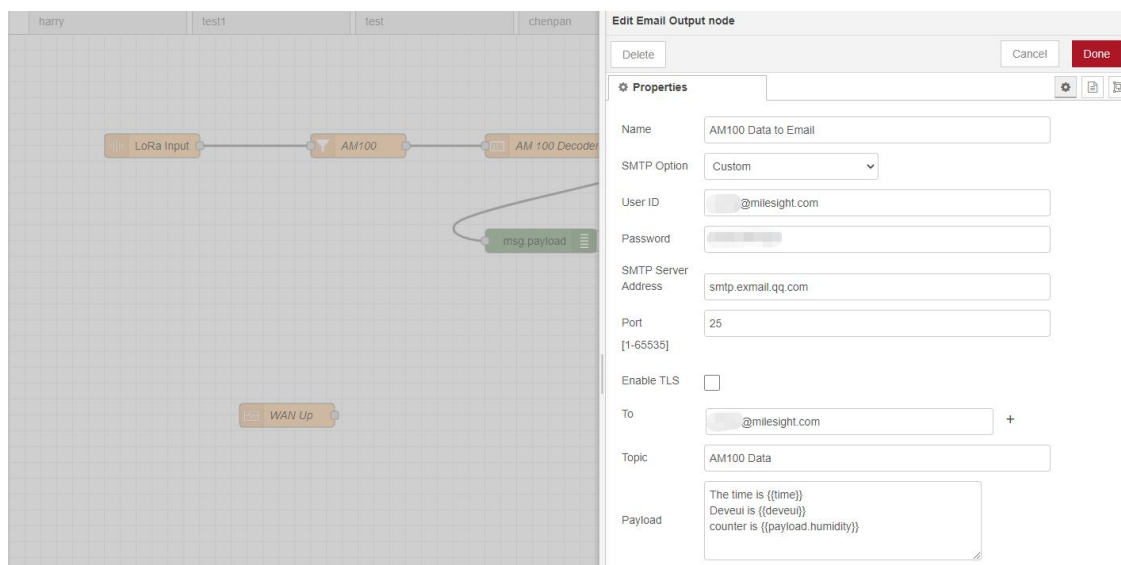
4. Add an “Email Output” and type the SMTP client settings, destination email address and contents.

Example content:

*The time is {{time}}*

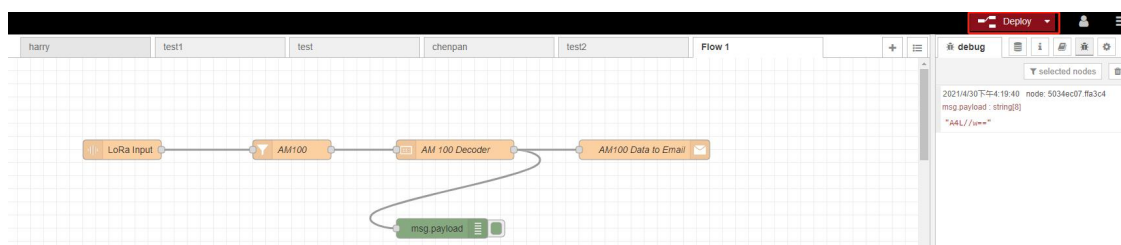
*Deveui is {{deveui}}*

*Humidity is {{payload.humidity}}*



**Note:**

- 1) When you select SMTP Option as "Same as Gateway" , go to "System -> General Settings -> SMTP" to configure the SMTP clients.
- 2) Basic format to call LoRaWAN node data is `{{property name}}`, you can click "Help" page for more info about the Email or SMS payload format.
- 3) If you need to check the output content in every node, please add debug node.
5. After completing the configuration, click "Deploy" to save all your configuration.



6. When AM104 sends data to gateway, gateway will transfer the data to email.



**Related Topic**

## 5. Contact Us

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