

ThingsPro® Gateway Software User's Manual

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www.moxa.com/product



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ThingsPro® Gateway Software

User's Manual

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The ThingsPro® Gateway is a software package built on the Debian Linux platform, an open platform that enables the integration of Fieldbus communications, computing, data acquisition, and wireless networking in a few simple steps. Featuring the Data Logger and Wireless Manager tools, ThingsPro empowers you to focus primarily on application development instead of the complex integration between devices in the field and services in a centralized computing facility.

The following topics are covered in this chapter:

- ❑ **Introduction**
- ❑ **Installing ThingsPro Gateway on Eligible Devices**
 - Installing ThingsPro Gateway V2.5.1 on an Eligible Device

Introduction

The ThingsPro Gateway offers easy-to-use remote configuration for systems, peripherals, and wireless functions. With ThingsPro, you do not need comprehensive Modbus knowledge. You can easily configure and manage the connections to all your remote Modbus/RTU and Modbus/TCP devices and acquire data from these devices in just a few steps. In addition, ThingsPro lets you schedule configuration and upgrade tasks on remote devices, essentially reducing human effort and maintenance cost. ThingsPro is a cellular-ready platform that provides the capability to keep the 4G-communication link always active, facilitating network troubleshooting and reducing system downtime.

Installing ThingsPro Gateway on Eligible Devices

NOTE Refer to the ThingsPro datasheet or product page on the Moxa website for a list of eligible devices.

Installing ThingsPro Gateway V2.5.1 on an Eligible Device

Ensure that your device is a ThingsPro eligible device. A list of all eligible devices is available in the ThingsPro datasheet and product page. Download the ThingsPro Gateway V2.5.1 software package on to your computer from Moxa's website:

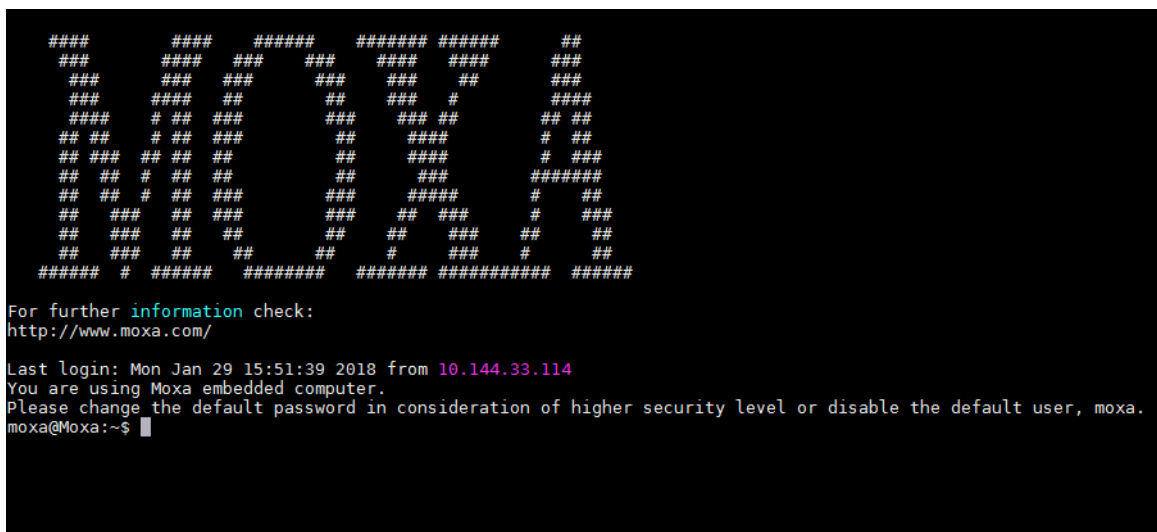
<https://www.moxa.com/en/products/industrial-computing/system-software/thingspro-2#resources>

NOTE

- We recommend that you use the latest version of ThingsPro Gateway software. In addition to new features, we include enhancements and bug-fix in newer versions of ThingsPro Gateway software.
- You can use the installation file to upgrade a previous version of ThingsPro Gateway to V2.5.1 for versions higher than ThingsPro Gateway V2.1. If you want to upgrade from ThingsPro Gateway V2.1 to V2.5.1, you must first upgrade to ThingsPro Gateway V2.3, then to ThingsPro Gateway V2.5.1.

To install the software on an eligible device, do the following:

1. Log in to your device using a valid username and password.



```

#####
###      ###      #####      #####      ##
###      ###      ###      ###      ###      ##
###      ###      ###      ###      ###      ##
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#####      #      #      #      #      #      #
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#####      #      #      #      #      #      #
#####      #      #      #      #      #      #

For further information check:
http://www.moxa.com/

Last login: Mon Jan 29 15:51:39 2018 from 10.144.33.114
You are using Moxa embedded computer.
Please change the default password in consideration of higher security level or disable the default user, moxa.
moxa@moxa:~$

```

2. Upload the installation file directly to the device or copy it to an SD card.
 3. If the installation file is stored in an SD card, insert the card into the SD card slot of the device.
- For instructions on installing the SD card in the SD-card slot of your device, refer to the quick installation guide or the hardware user's manual for the device.

- Switch the working directory to the directory in which the installation file is stored and extract the contents of the installation file to the same directory.

Installation File for Moxa Industrial Linux (Debian 9)

```
moxa@Moxa:~$ ls
thingspro.sh
thingspro_release-thingspro_v2.5.1_armhf_20190613-181448.frm
thingspro_release-thingspro_v2.5.1_armhf_20190613-181448.frm.md5
```

You should see the following three files.

- thingspro.sh:** The installation script
- thingspro_release-thingspro_v2.5.1_armhf_20190613-181448.frm:** The ThingsPro Gateway v2.5.1 installation package
- thingspro_release-thingspro_v2.5.1_armhf_20190613-181448.frm.md5:** The md5 checksum file for the firmware

Installation File for Debian 8

```
moxa@Moxa:~$ ls
thingspro.sh
thingspro_v2.5.1-jessie_amd64_20190613-180657.frm
thingspro_v2.5.1-jessie_amd64_20190613-180657.frm.md5
thingspro_v2.5.1-jessie_armhf_20190613-181333.frm
```

You should see the following five files.

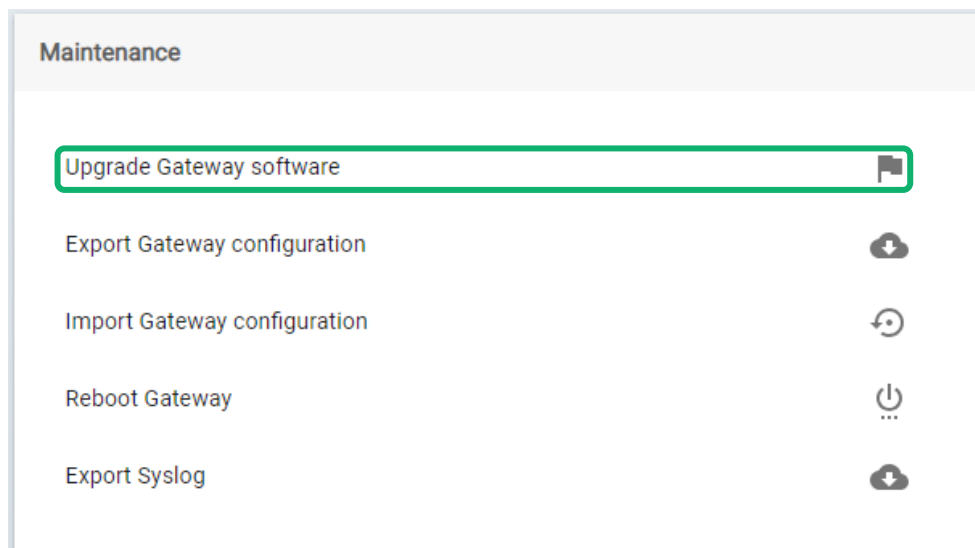
- thingspro.sh:** The installation script
 - thingspro_v2.5.1-jessie_amd64_20190613-180657.frm:** The ThingsPro Gateway v2.5.1 installation package for x86 computers
 - thingspro_v2.5.1-jessie_amd64_20190613-180657.frm.md5:** The md5 checksum file for installing the firmware on x86 computers.
 - thingspro_v2.5.1-jessie_armhf_20190613-181333.frm:** The ThingsPro Gateway v2.5.1 installation package for Arm-based computers
 - thingspro_v2.5.1-jessie_armhf_20190613-181333.frm.md5:** The md5 checksum file for installing the firmware on Arm-based computers
- Run the following command on the device to install ThingsPro Gateway V2.5.1 software.

```
moxa@Moxa:~$ sudo bash thingspro.sh install
```

You can check the installation log by typing the following command.

```
moxa@Moxa:~$ sudo nano /var/log/thingspro_install_20181129-030138.log
```

You can use the **Upgrade Gateway software** function on your existing ThingsPro 2 version to upgrade to the latest version.



You can use the following command to check the upgrade log.

```
moxa@moxa:~$ sudo tail -f /var/log/upgrade.log
```

6. A start/stop function is included starting with ThingsPro Gateway V2.5.0.

Use the following command to start/stop the ThingsPro Gateway services.

```
moxa@moxa:~$ sudo mx-tp-ctl -e <n>
```

- <n> = 0: Stop the ThingsPro Gateway
- <n> = 1: Start the ThingsPro Gateway

If the ThingsPro Gateway services are no longer required, use the following command to remove them from the system.

```
moxa@moxa:~$ sudo thingspro.sh uninstall
```

This command removes all ThingsPro Gateway configuration files from the system; reconfirm that you want to remove all configuration files before you run this command and only use it if you intend to completely remove ThingsPro Gateway software from your device.

Configuring the ThingsPro Gateway

This chapter describes how to configure the ThingsPro Gateway.

The following topics are covered in this chapter:

❑ **Basic Configuration**

- Accessing Your ThingsPro Gateway
- Viewing the Dashboard Status
- Editing User Profiles
- Checking System Notifications (only available in V2.5.0 or above)
- Choosing a Language for the User Interface

❑ **Using the Control Panel**

- Device Information
- Editing the Hostname
- Editing the Device Name
- Checking the Software Version
- Checking the System Uptime
- Checking the System Memory Size

❑ **Maintenance**

- Upgrading the ThingsPro Gateway
- Exporting the Gateway Configuration File
- Importing a Gateway Configuration File
- Rebooting the Gateway
- Exporting the System Log Files

❑ **Configuration Menu**

- Configuring the Gateway
- Managing User Accounts
- Managing User Programs
- Configuring Modbus Settings for Data Acquisition
- Modbus Management
- Managing Modbus Slave Devices
- Managing Log Profiles
- Managing IIoT Applications

Basic Configuration

Accessing Your ThingsPro Gateway

1. Open a browser and connect to <https://192.168.4.127>.



2. Click **Get Started** to continue and type the default username and password:

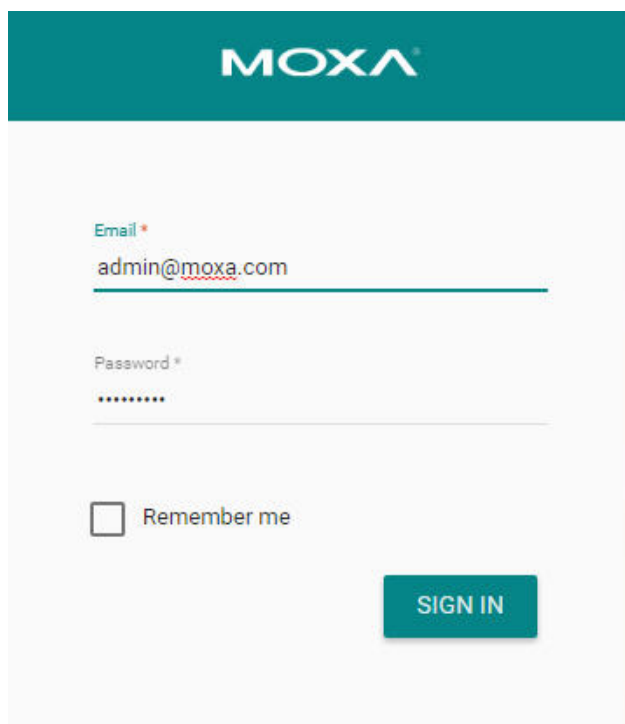
Username: **admin@moxa.com**

Password: **admin1234**

For the root account, use the following information:

Username: root@moxa.com

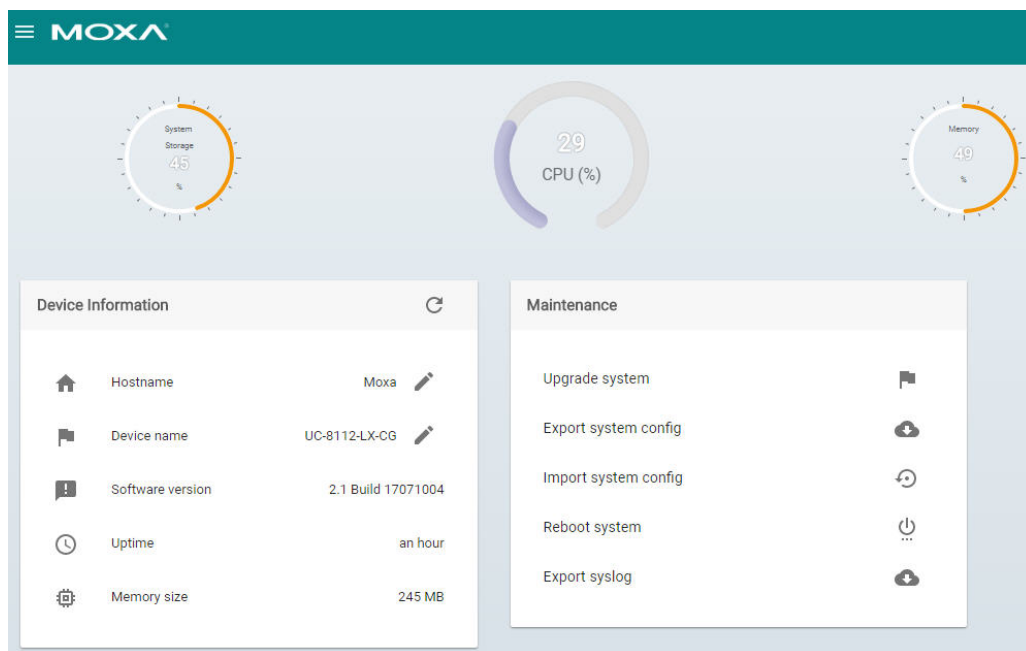
Password: root1234

The image shows the ThingsPro login form. It has a teal header with the MOXA logo. Below the header is a white form area. The form contains two input fields: 'Email' with a red asterisk and 'Password' with a red asterisk. The 'Email' field contains the text 'admin@moxa.com'. Below the 'Password' field is a 'Remember me' checkbox. At the bottom right of the form is a teal button labeled 'SIGN IN'.

3. Click **Sign In** to continue. The ThingsPro dashboard and configuration page is displayed.

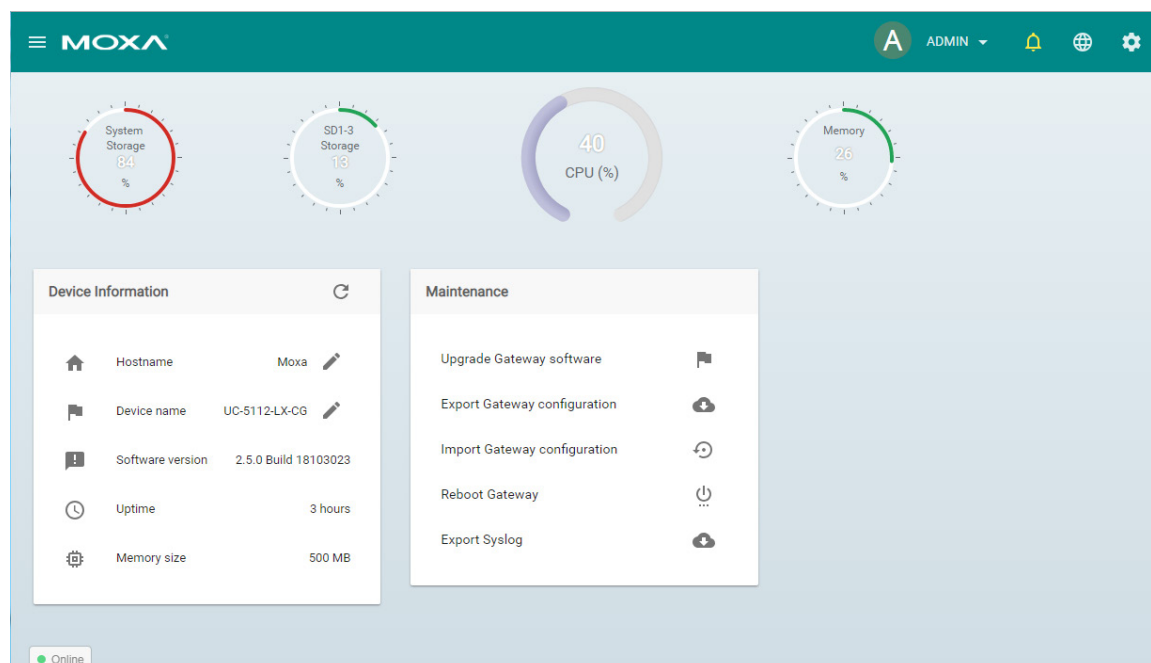
Viewing the Dashboard Status

The dashboard shows the real-time (update interval could be 15 to 30 seconds) status of your device. The information shown includes CPU, Memory, and Storage usage.



Dashboard Component	Description
Storage	Indicates how the system or external storage capacity is used
CPU	Indicates the current CPU usage
Memory	Indicates the current system memory usage

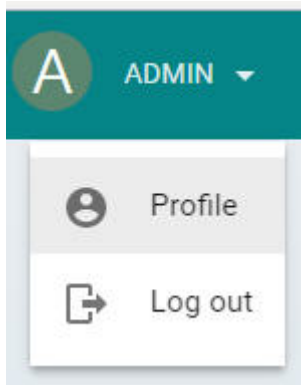
If an external storage device, such as an SD card or USB disk, has been inserted, the external storage icon will appear. All values are shown as percentages.



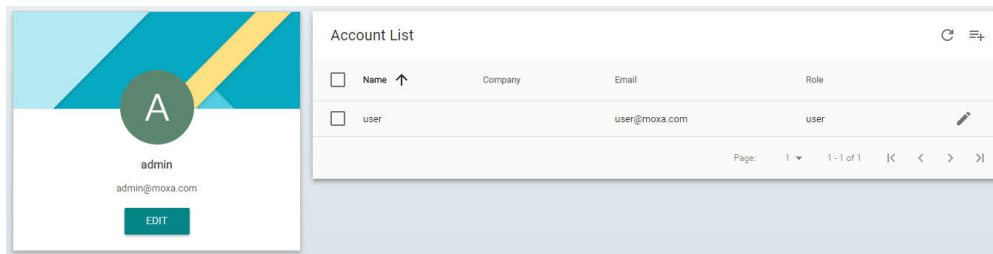
You may change the "Hostname" or "Device name" here. Also, you may proceed Maintenance tasks such as Upgrade system, export or import system configuration the quick maintenance panel.

Editing User Profiles

After you have successfully connected to the gateway, you can start configuring the ThingsPro Gateway functions. You might want to update your user profile first. Click on the **ADMIN** box on the upper-right corner of the main page and select **Profile**.



Click on **EDIT** to edit the profile.



Type the account profile and information in the fields. When finished, click **SAVE** to complete.

A screenshot of the 'Account Profile' form. The form has a teal header with the title 'Account Profile' and a close button. It contains five input fields: 'Name *' with the value 'admin', 'Company', 'Role *' with a dropdown menu showing 'Administrator', 'New Password', and 'Confirm Password'. A teal 'SAVE' button is located at the bottom right of the form.

To add new users, click the add icon on the top right corner of the screen.

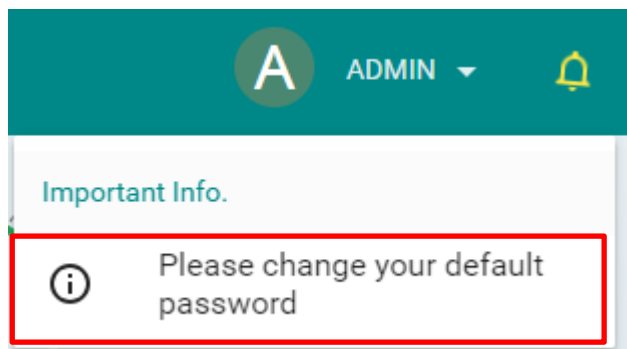


Checking System Notifications (only available in V2.5.0 or above)

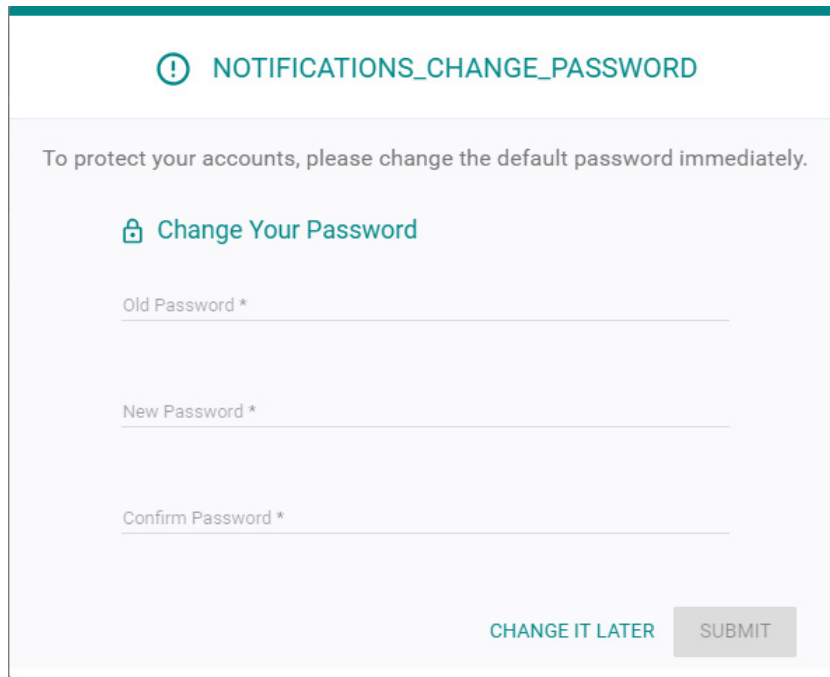
You can view the system notifications by clicking on the bell icon on the top-right corner of the main configuration page. The bell icon turns yellow and take the “ringing” position when there are unread notifications.



The system notifications consist of important system information that users are required to pay attention to or take actions. For example, users should change the default password to make the system more secure. When the system detects default passwords, it will send a notification to remind users to change their default passwords.




Usually, the system offers a quick and easy way to proceed with corrective actions. Take the example of the default password change; Users can click on the notification “Please change your default password” to open a dialog to change the password.



NOTIFICATIONS_CHANGE_PASSWORD

To protect your accounts, please change the default password immediately.

 **Change Your Password**

Old Password *

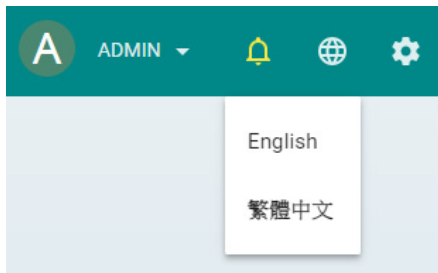
New Password *

Confirm Password *

[CHANGE IT LATER](#)

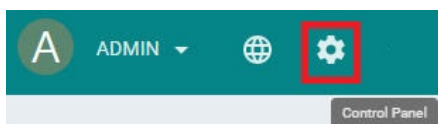
Choosing a Language for the User Interface

ThingsPro Gateway currently offers English and Traditional Chinese interfaces. Select from the language icon in the main configuration page.



Using the Control Panel

ThingsPro Gateway provides a control panel that you can use to view, enable, or disable the some specific system settings. Click the Control Panel icon from the main page to access the panel.












View the current status of the settings from the page below. You can enable or disable the settings directly from the Control Panel page.






Control Panel

×

NETWORK

	SSH	<input checked="" type="checkbox"/>
	Syslog	<input checked="" type="checkbox"/>
	SSDP	<input checked="" type="checkbox"/>
	Web Access from WAN	<input checked="" type="checkbox"/>
	Fixed DNS	<input type="checkbox"/>
	wwan0	<input checked="" type="checkbox"/>
	DHCP (eth0)	<input type="checkbox"/>
	DHCP (eth1)	<input type="checkbox"/>
	WIFI (wlan0)	<input type="checkbox"/>

SYSTEM

	Upgrade Gateway software
	Export Gateway Configuration
	Import Gateway Configuration
	Reboot Gateway
	Export Syslog



**WARNING**



Turning off the **Web Access from WAN** setting will disconnect the ThingsPro Gateway from the Server.


Device Information


This section allows users to update system hostname and device name, and view the system status, such as software version, system uptime, and system memory size.


Device Information

 Hostname Moxa 

 Device name ThingsPro 

 Software version 2.0 Build 17030204

 Uptime in 5 days

 Memory size 246 MB

Editing the Hostname

In **Device Information**, click the edit icon, and edit the hostname.

 Hostname

Moxa



Provide the hostname in the field. When finished, click **SAVE**.

Edit Hostname

Name

Moxa

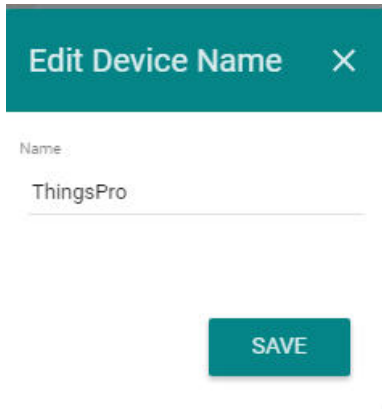
SAVE

Editing the Device Name

In **Device Information**, click the edit icon, and edit the device name



Provide the device name in the field. When finished, click **SAVE**.



Checking the Software Version

You can check the software version from the control panel.



Checking the System Uptime

You can check the system uptime from the control panel.



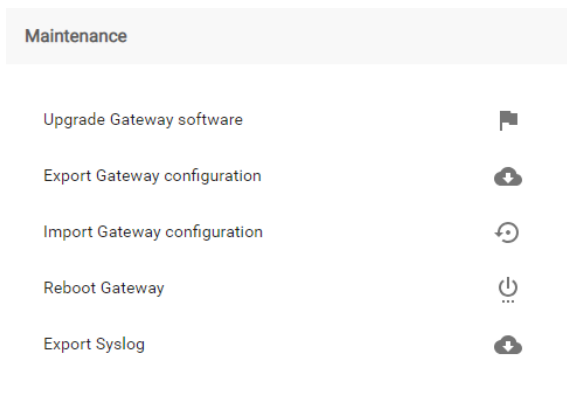
Checking the System Memory Size

You can check the system memory size from the control panel.



Maintenance

This section allows users to update various system settings.



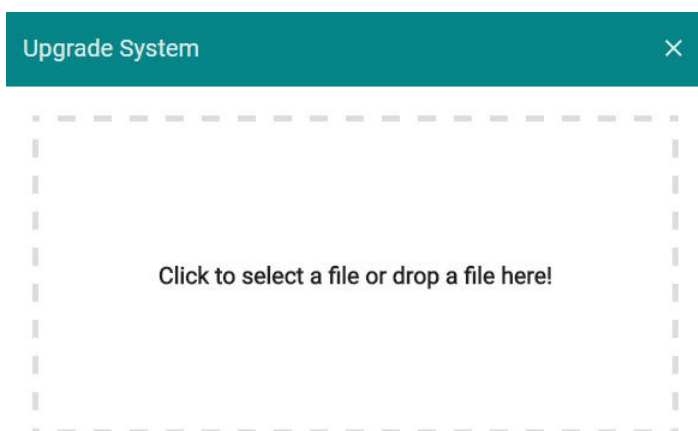
Upgrading the ThingsPro Gateway

To upgrade the ThingsPro Gateway with the software packages provided by Moxa, click on the **Upgrade Gateway Software** icon in the **Maintenance** section.

Upgrade Gateway software



Select the software package file in **.frm** format on your computer, or drop the file into the upgrade page. Wait for a few minutes for the system to upgrade.



ATTENTION

A system upgrade with incorrect firmware can cause system damage or failure. Contact Moxa technical support before upgrading your system.

Exporting the Gateway Configuration File

In the **Maintenance** section, click on the icon to export the gateway configuration file.

Export Gateway configuration



A gateway configuration file in the **tar.gz** format will be downloaded on to your computer.

Importing a Gateway Configuration File

In **Maintenance** section, click the icon to import the gateway configuration file. This function can help restore your system to the previous status, or save you time when configuring multiple gateways with similar configuration.

Import Gateway configuration



You can select the specific items you want to recover, or select **All** to recover the whole system.

Import System Config

☐ All

☐ System

☐ DHCP Server

☐ Time

☐ Data Logger (Overwrite Only)

☐ CS Remote Control

☐ Ethernet

☐ DNS

☐ Port Forwarding

☐ Applications

☐ Cellular

☐ Serial

☐ OpenVPN Client

☐ User Programs

Click to select a file or drop a file here!

NOTE

- The GPS configuration is included in the system settings. If you want to export/import GPS configuration, select the **All** or **System** option.
- In Sparkplug, the MAC Address of a device is used as the default Edge Node ID and serves as the unique identity of the device. We strongly recommend that you change the default Edge Node ID of your devices to make them unique to prevent the issue of duplicate Edge Node IDs when you configure the basic settings for Sparkplug.

Rebooting the Gateway

In **Maintenance**, click on the **Reboot Gateway** icon to reboot the gateway.

Reboot Gateway



Click **Yes** to reboot the gateway.

Would you like to reboot the system ?

You will need to wait a few minutes while the system restarts.

CANCEL

YES

The following screen will appear; wait for the gateway to reboot.

Connection is down because system is rebooting.

Wait for the system to reboot before reconnecting, and please note that the IP address may change.

Exporting the System Log Files

In **Maintenance**, click the icon to export the system.

Export syslog

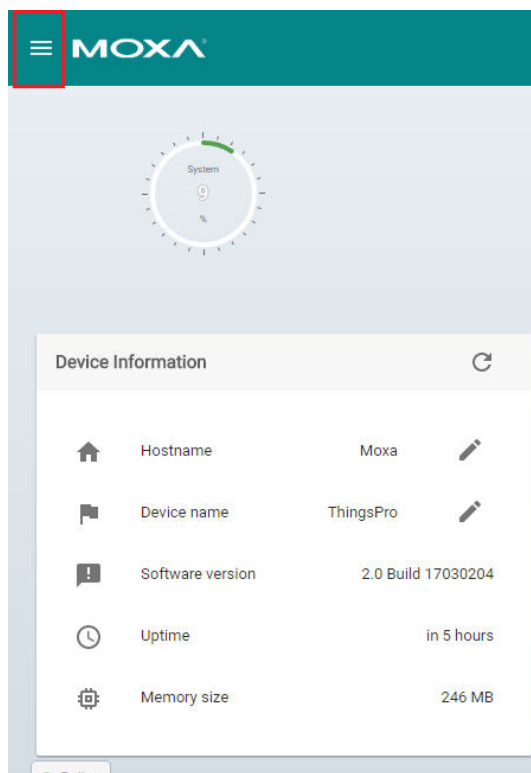


A system log file in **tar.gz** format will be downloaded to your system.

Configuration Menu

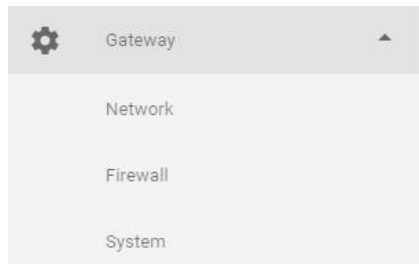
You can use the configuration menu for various ThingsPro Gateway settings.

Click the menu bar icon to access the configuration menu.



Configuring the Gateway

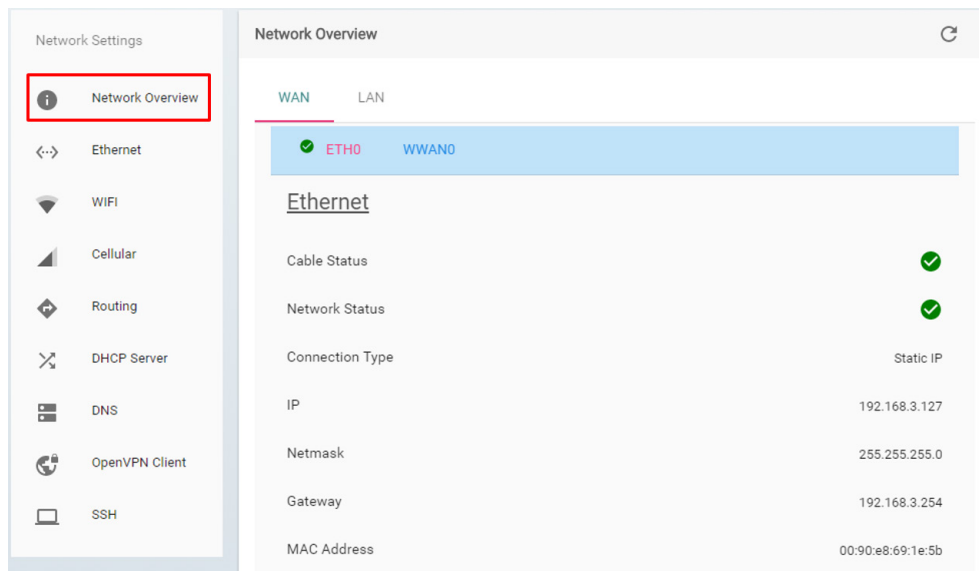
Click on the **Gateway** link to configure gateway settings, such as Network, Firewall, and System.



Configuring Network Settings

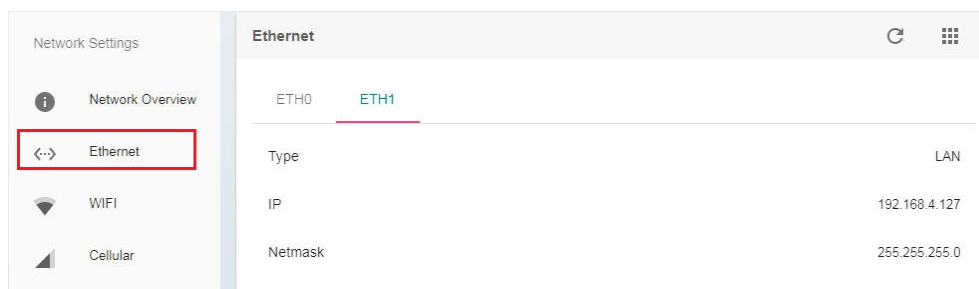
This section includes various network settings such as Ethernet, cellular, routing (only available in v2.3 and above), DHCP Server, DNS, Open VPN Client, and SSH.

Click **Network Overview** (only available in ThingsPro V2.3 and above) to check the current network status.



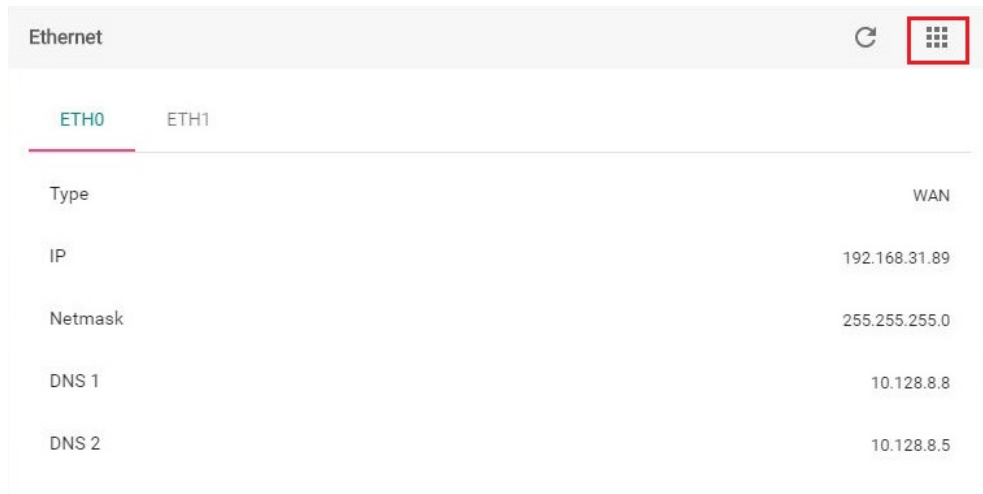
Configuring Ethernet Settings

Click **Ethernet** to view the current Ethernet settings.



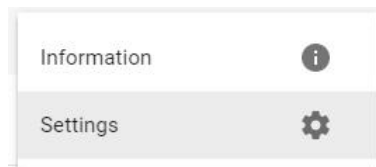
To configure the Ethernet settings:

1. Click on the tab for the Ethernet interface.
2. Click on the edit icon.



The screenshot shows the 'Ethernet' configuration page. At the top, there is a header bar with the title 'Ethernet', a refresh icon, and a grid icon (edit icon) which is highlighted with a red box. Below the header, there are two tabs: 'ETH0' (selected) and 'ETH1'. The main content area displays the configuration for the selected interface. It includes fields for 'Type' (set to 'WAN'), 'IP' (192.168.31.89), 'Netmask' (255.255.255.0), 'DNS 1' (10.128.8.8), and 'DNS 2' (10.128.8.5).

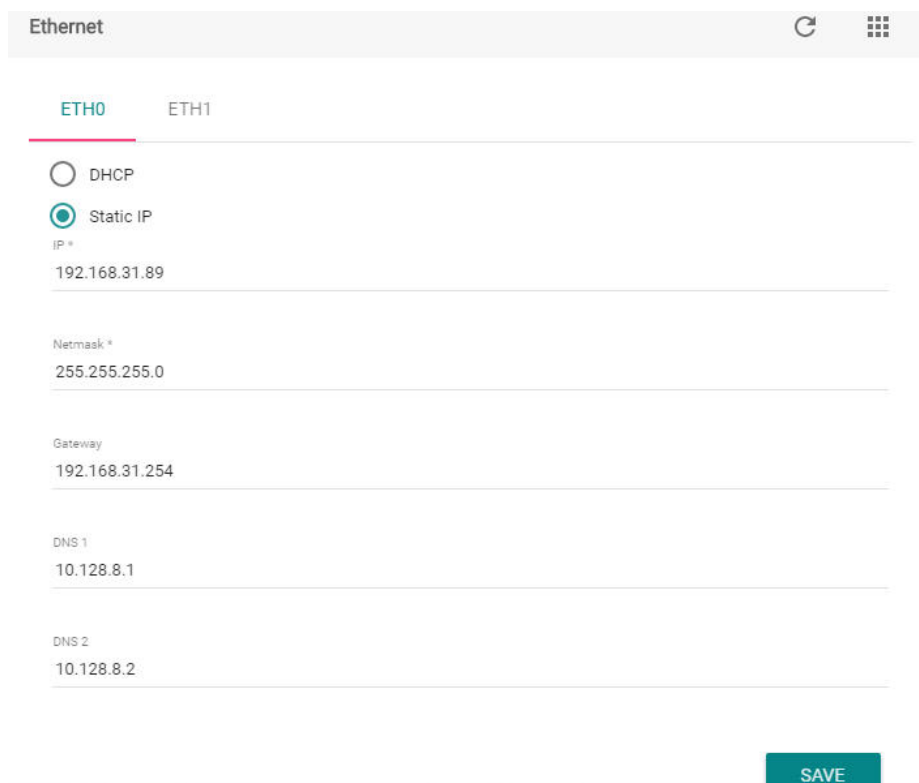
3. Select **Settings**.



The screenshot shows a menu with two options: 'Information' with an information icon (i) and 'Settings' with a settings icon (gear). The 'Settings' option is highlighted with a grey background.

4. Configure the Ethernet interface settings.

NOTE The **ETH0** Ethernet interface is used for the WAN and the **ETH1** interface is used for the LAN. The default IP addresses are:
eth0=192.168.3.127
eth1=192.168.4.127



The screenshot shows the 'Ethernet' configuration page with the 'Static IP' option selected. The 'DHCP' option is unselected. The 'Static IP' option is selected with a radio button. Below it, there are input fields for 'IP *' (192.168.31.89), 'Netmask *' (255.255.255.0), 'Gateway' (192.168.31.254), 'DNS 1' (10.128.8.1), and 'DNS 2' (10.128.8.2). At the bottom right, there is a 'SAVE' button.

Ethernet

ETH0 ETH1

☐ DHCP

☒ Static IP

IP *

192.168.4.127

Netmask *

255.255.255.0

SAVE

5. Click **SAVE**.

Configuring Wi-Fi Settings

Click **WiFi** to check the current Wi-Fi status. Check **Enable Wireless Client** if you want this function to be activated.

Network Settings

Network Overview

Ethernet

WiFi

Cellular

WIFI

WLAN0

Enable Wireless Client

SAVE

To add a Wi-Fi network, click the add icon.

WIFI

WLAN0

Enable Wireless Client

+

SAVE

Click the **CLIENT** tab and enter the SSID, security mode, and the password for the wireless network you want to connect to. When finished, click **SAVE**.

WIFI

CLIENT

IP SETTINGS

SCAN

SSID *

Security Mode *

Password *


BACK

SAVE

You can also click **SCAN** to scan for all of the available access points that your computer can connect to. Select an access point to automatically fill in its SSID and security mode, then enter its password. You can also click the refresh icon to refresh the list.

AP List			
AAEONWireless-EC-G			
Black howler			
Guest-13B0			
MHQ-NB			
MHQ-Mobile			
MHQ-Visitor			

Click the **IP SETTINGS** tab to configure the IP settings. You may choose to set your IP using DHCP or static IP. If you select Static IP, enter all the necessary information in the text fields. When finished, click **SAVE**.

WIFI 

CLIENT

IP SETTINGS

☐ DHCP

☒ Static IP

IP *

127.0.0.1

Netmask *

255.255.255.0

Gateway

127.0.0.1

DNS 1

127.0.0.1

DNS 2

127.0.0.1

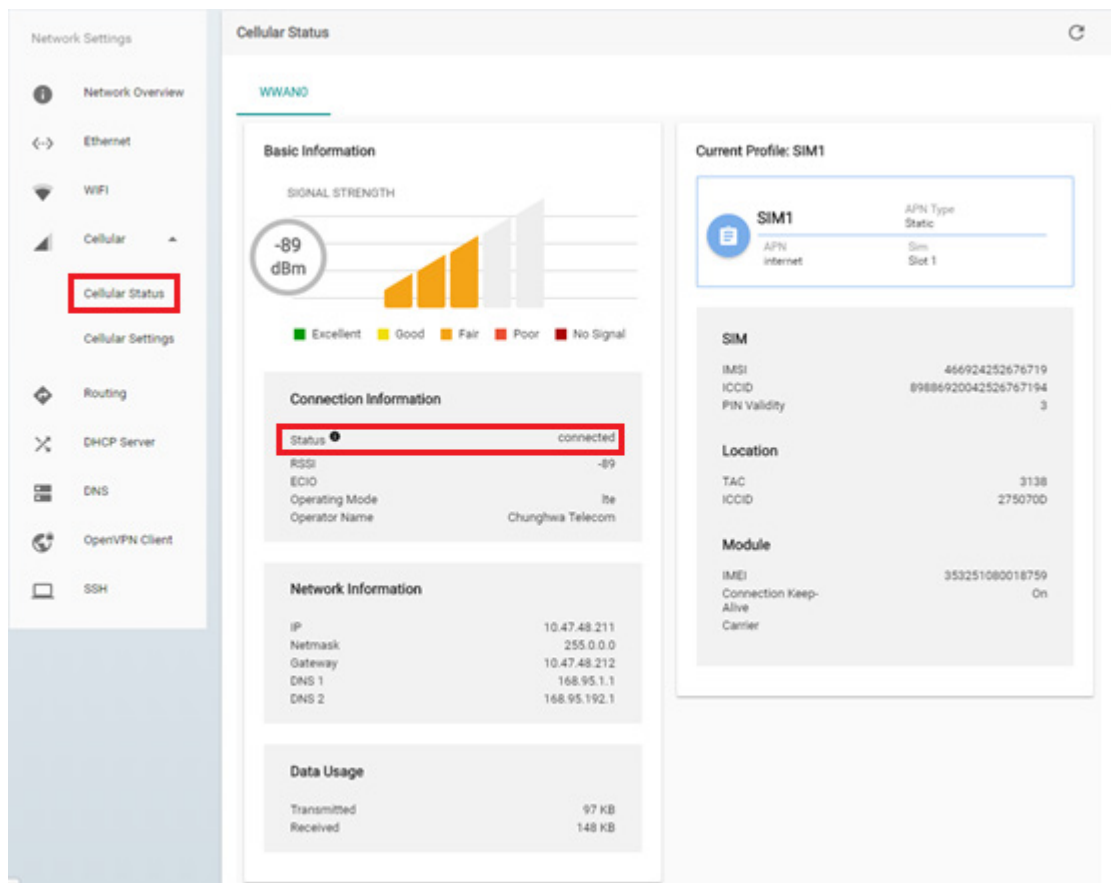
BACK

SAVE

Configuring Cellular Settings

Viewing the Cellular Status

Click on the **Cellular Status** link to view the current settings. The **Basic Information** section shows a clear picture of the status of your cellular network including Signal Strength, Connection Information, Network Information, and Data Usage.



The table below lists the different statuses of a cellular connection and what they indicate.

Status	Description
initializing	Retrieving cellular module and SIM card information and unlocking the SIM card (if the SIM card is locked)
nosim	No SIM card detected or SIM card error
pin	SIM card is locked with a PIN code
ready	SIM card is ready for a connection
connecting	Establishing a connection
connect_failure	Connection failure or keep-alive function failure (if keep-alive is enabled)
connected	Connection succeeded with keep-alive enabled or disabled
powr_cycle	Power-cycling the cellular module
service_searching	Roaming*
service_attached	Connected to a base station
pin_error	PIN code error
switching_carrier	Switching between telecom carriers.
switching_sim	Switching between SIM card slots (only available in dual-SIM models).
initialize_failed	Initialization error

NOTE (*) If your device is stuck in the “service_searching” status for more than 5 minutes even though your SIM card works fine and the signal strength is good enough for a successful cellular connection, this might be due to the accidental activation of the flight mode. However, such cases are rare. When this happens, log in to your device’s console and type the following command:

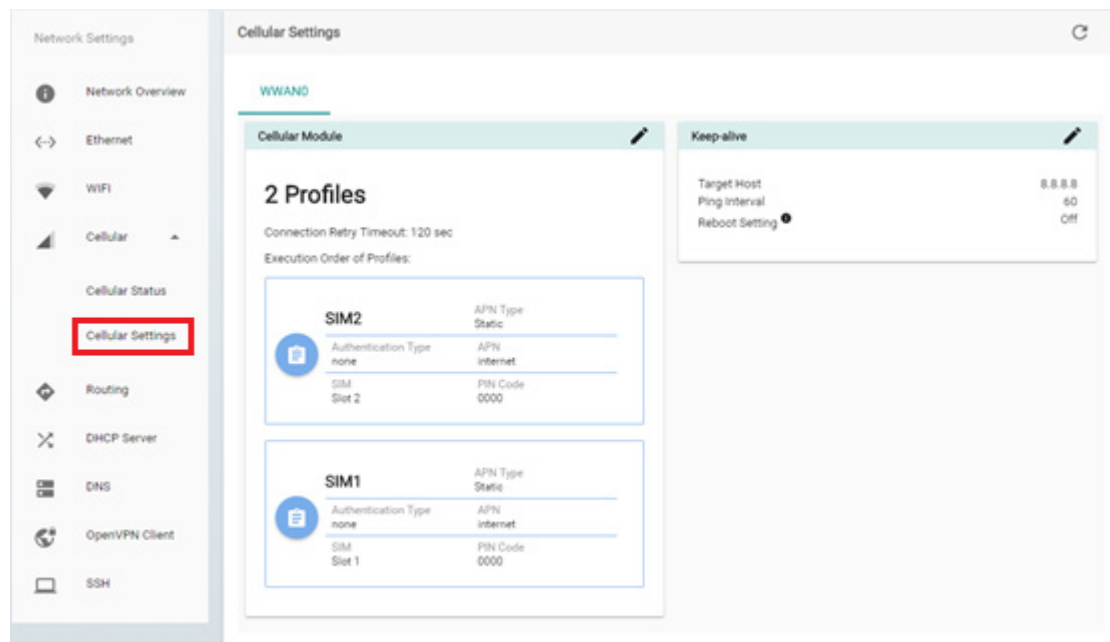
```
moxa@moxa:/home/moxa$ sudo cell_mgmt set_flight_mode 0
```

For additional details on the cell_mgmt utility, refer to the *Arm-based Linux User’s Manual*.

The **Current Profile** of your cellular connection (only available in V2.5.0 or above) along with the **SIM**, **Location**, and **Module** information is also displayed on the **Cellular Status** page.


Configuring the Cellular Settings

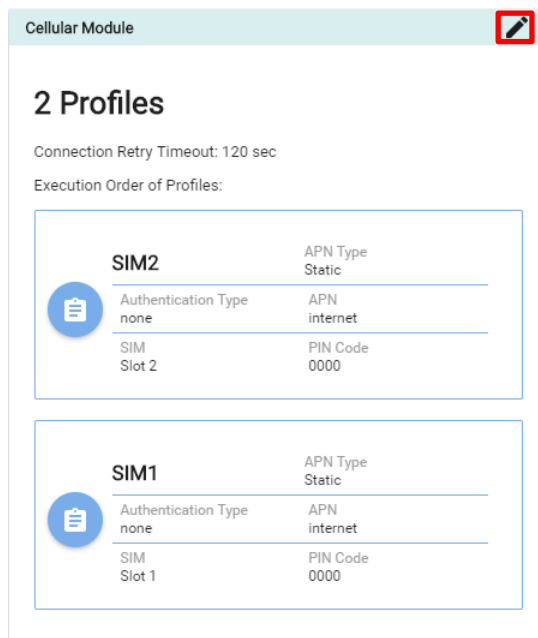
To modify the cellular network settings for your device, click on the **Cellular Settings** link (**Gateway > Network > Cellular > Cellular Settings**).







You can check the status of the **Cellular Module** and **Keep-alive** function and modify the settings of your device's cellular network here.

To modify the settings of your cellular module, do the following:

1. Click on the edit  icon corresponding to the **Cellular Module** section.



2. Configure the cellular module settings.

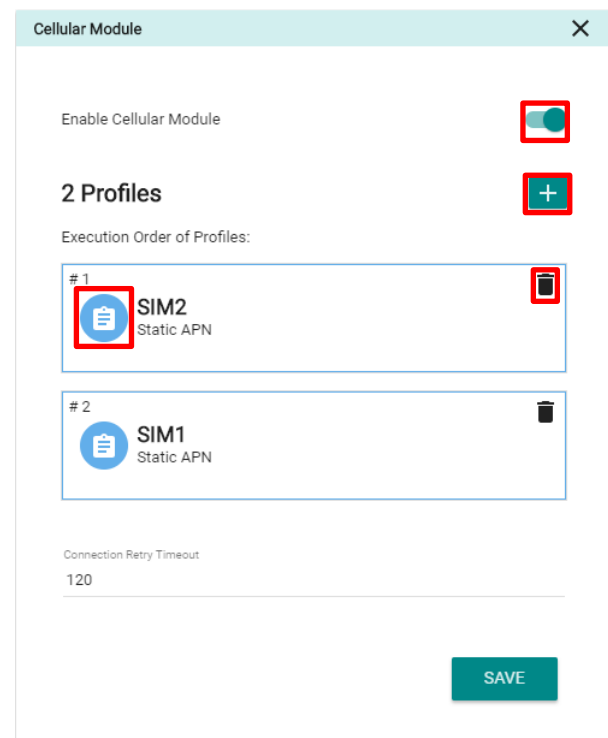
	Enable/disable the cellular module
	Add a new connection profile
	Modify an existing connection profile
	Remove an existing profile from the device

You can rearrange the profile boxes to change the priority in which the profiles are to be used, and specify the **Connection Retry Timeout** value.


3. If you are operating in the North American region, you will be able to switch between service providers.


4. Click **SAVE** to apply the changes.

To delete an existing profile, click on the delete icon for the profile. Click **SAVE** to confirm the deletion or **CANCEL** to retain the profile.







Cellular Module

Enable Cellular Module 

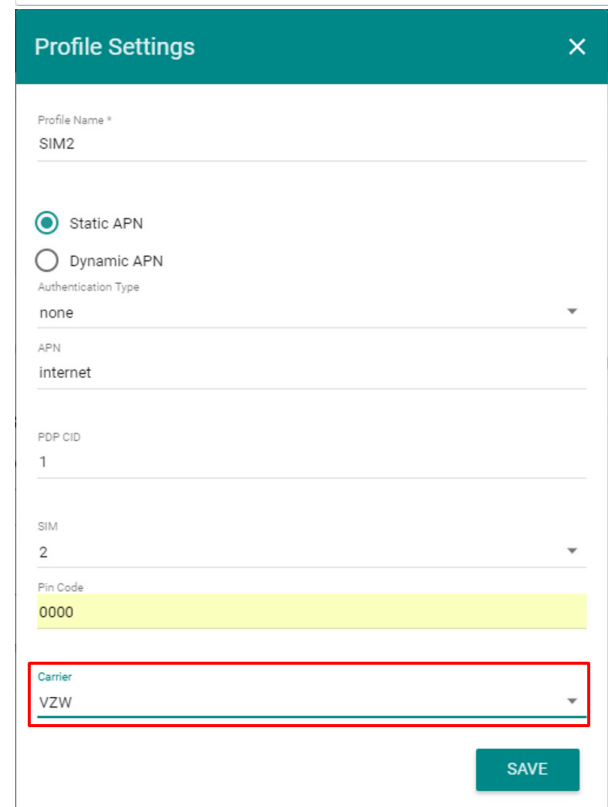
2 Profiles 

Execution Order of Profiles:

- # 1  **SIM2** Static APN 
- # 2  **SIM1** Static APN 

Connection Retry Timeout
120

SAVE



Profile Settings

Profile Name *
SIM2

☒ Static APN
☐ Dynamic APN

Authentication Type
none

APN
internet

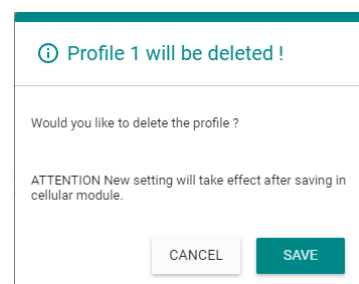
PDP CID
1


SIM
2

Pin Code
0000

Carrier
VZW

SAVE







 **Profile 1 will be deleted !**


Would you like to delete the profile ?


ATTENTION New setting will take effect after saving in cellular module.

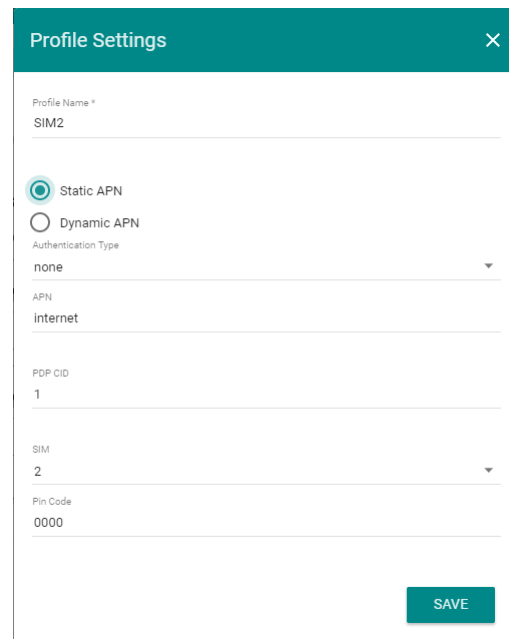
CANCEL **SAVE**

To create a new connection profile, do the following:

1. Click on the add  icon.
2. Specify a unique name to the profile.
3. Refer to your carrier instruction to use **Static** or **Dynamic APN** and configure the corresponding settings.
4. If your carrier offers private network services, you may choose , , or  in the **Authentication Type**.
5. Enter your Username and Password to log in to the service network.
6. Enter the **PIN Code**, if your SIM card requests it (three wrong attempts will lock the SIM card).
In ThingsPro V2.5.0 or above, ThingsPro supports Dual-SIM feature for eligible devices that have two SIM slots. You can assign a SIM card slot for each profile.

7. Click the **SAVE**  button to save the **Profile Settings**.
8. Save the module settings by clicking on the **SAVE** button in the **Cellular Module** section.

NOTE: You can discard the changes at any time by clicking on the Cancel  icon on the upper right corner.




The screenshot shows a 'Profile Settings' dialog box. It has a teal header bar with the title 'Profile Settings' and a close button (X) on the right. Below the header, there are several input fields: 'Profile Name *' with the value 'SIM2', 'Authentication Type' with radio buttons for 'Static APN' (selected) and 'Dynamic APN', 'Authentication Type' dropdown menu with 'none' selected, 'APN' with the value 'internet', 'PDP CID' with the value '1', 'SIM' dropdown menu with '2' selected, and 'Pin Code' with the value '0000'. At the bottom right, there is a teal 'SAVE' button.

When you click on the SAVE button on the **Cellular Module** section the module is restarted to apply the changes. The settings will take effect after the cellular module is successfully initialized.

Keep-alive

Cellular carriers may disconnect user equipment (UE) when they are idle or do not transmit data via their cellular network for a certain period of time, depending on their policy. Once disconnected, your device will have to redial to connect back to the cellular network. The **Keep-alive** function will help you maintain the connection between your device and the carrier service by pinging a specific host on the Internet at periodic intervals.

To manage the **Keep-alive** settings for your cellular network, do the following.

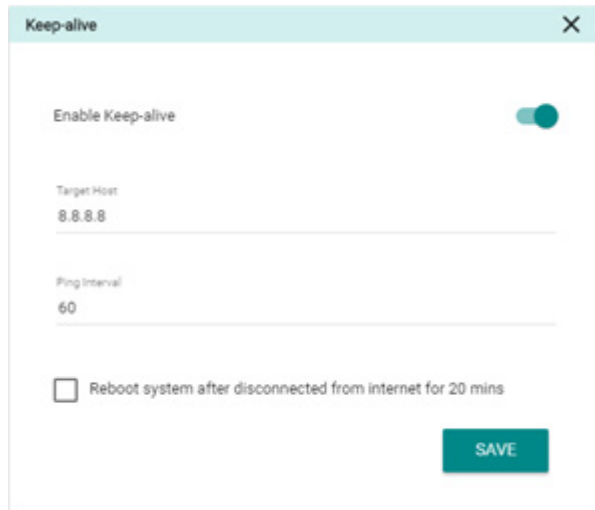
1. Click the edit  icon on keep-alive section.



Keep-alive

Target Host	8.8.8.8
Ping Interval	60
Reboot Setting	Off

2. Enable the Keep-alive function



Keep-alive


Enable Keep-alive ☒

Target Host
8.8.8.8

Ping Interval
60

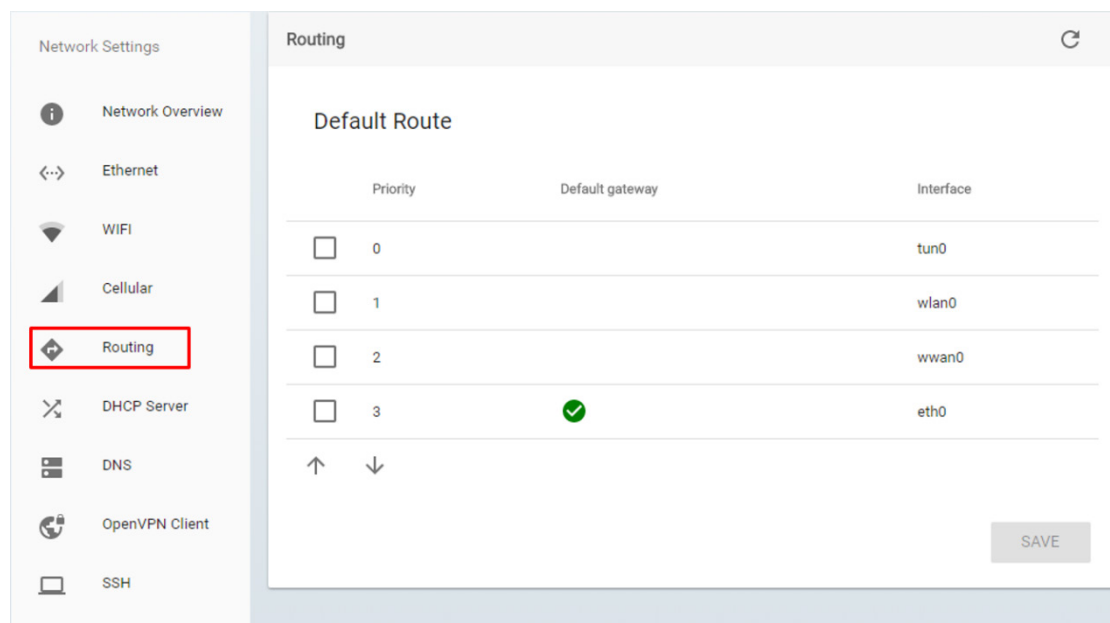
☐ Reboot system after disconnected from internet for 20 mins

SAVE

3. Specify the **Target Host** and the **Ping Interval** in seconds.
4. In some circumstances, a system reboot might bring an unstable or malfunctioning device back to normal state. You can select the **Reboot system after disconnected from Internet for 20 mins** to enable the system reboot function.
5. Click the SAVE  button to apply the changes

Configuring Routing Settings (only available in v2.3 and above)

Click **Routing** to view the current default route settings.




Network Settings

- Network Overview
- Ethernet
- WIFI
- Cellular
- Routing**
- DHCP Server
- DNS
- OpenVPN Client
- SSH

Routing

Default Route

	Priority	Default gateway	Interface
<input type="checkbox"/>	0		tun0
<input type="checkbox"/>	1		wlan0
<input type="checkbox"/>	2		wwan0
<input type="checkbox"/>	3		eth0

↑ ↓

SAVE

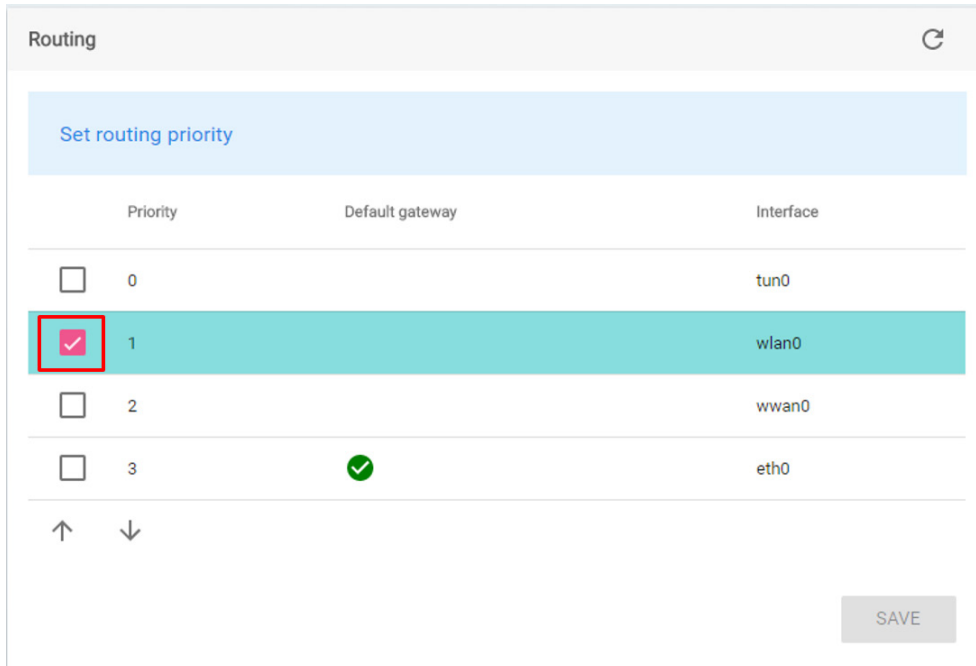
The routing sequence depends on the priority settings, with higher priorities (0 is the highest) given precedence. ThingsPro Gateway will use the interface associated with highest priority interface that is available.

Interfaces of your eligible device could include:

- *tun0*: VPN Tunnel
- *wlan0*: Wi-Fi
- *wwan0*: Cellular
- *eth0*: Ethernet (usually LAN1 when the default setting is WAN).

To change the priority of a certain interface, select the checkbox in front of the interface, and then click the arrow button to move the priority higher (move up) or lower (move down). Click the "SAVE" button to confirm the change. For example, the following steps apply to the Wi-Fi interface (*wlan0*):

1. Select the "wlan0" (Wi-Fi) interface checkbox.



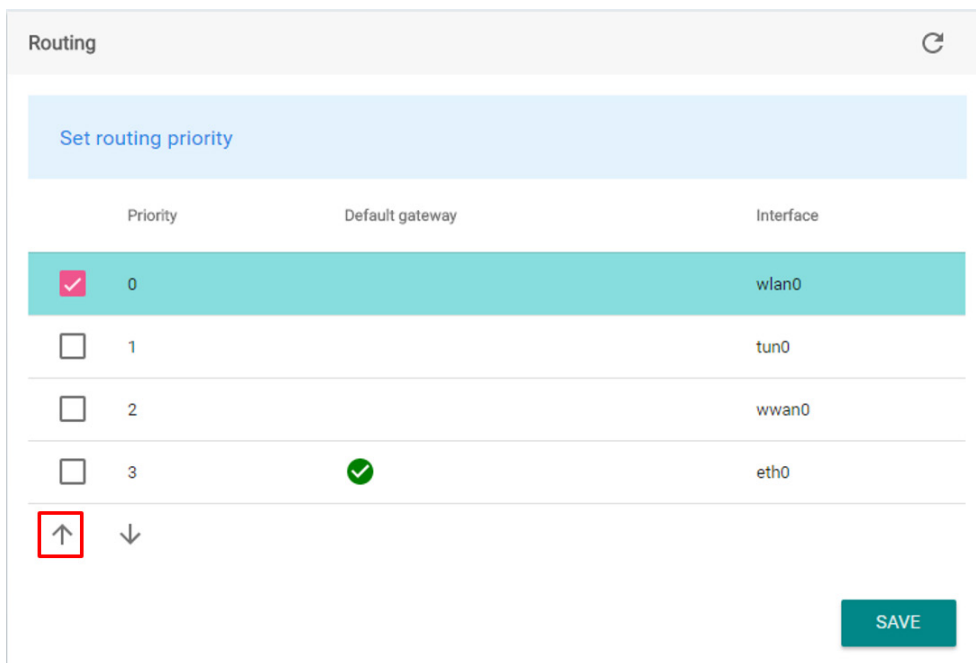
The screenshot shows the 'Routing' configuration page. At the top, there is a 'Set routing priority' section. Below it is a table with three columns: 'Priority', 'Default gateway', and 'Interface'. The table lists four interfaces: *tun0*, *wlan0*, *wwan0*, and *eth0*. The *wlan0* interface is highlighted in teal, and its checkbox is checked. The *eth0* interface has a green checkmark in the 'Default gateway' column. At the bottom right, there is a 'SAVE' button.

	Priority	Default gateway	Interface
<input type="checkbox"/>	0		<i>tun0</i>
<input checked="" type="checkbox"/>	1		<i>wlan0</i>
<input type="checkbox"/>	2		<i>wwan0</i>
<input type="checkbox"/>	3	✓	<i>eth0</i>

↑ ↓

SAVE

2. Click the "Up" arrow to set a higher priority.



The screenshot shows the 'Routing' configuration page after the first step. The *wlan0* interface is now at priority 0 and is highlighted in teal. The *eth0* interface remains the default gateway. The 'Up' arrow button at the bottom left is highlighted with a red box.

	Priority	Default gateway	Interface
<input checked="" type="checkbox"/>	0		<i>wlan0</i>
<input type="checkbox"/>	1		<i>tun0</i>
<input type="checkbox"/>	2		<i>wwan0</i>
<input type="checkbox"/>	3	✓	<i>eth0</i>

↑ ↓

SAVE

- Click the "SAVE" button to confirm the changes to the routing settings.

Routing

Set routing priority

Priority	Default gateway	Interface
<input checked="" type="checkbox"/> 0		wlan0
<input type="checkbox"/> 1		tun0
<input type="checkbox"/> 2		wwan0
<input type="checkbox"/> 3		eth0

↑ ↓

SAVE

- NOTE**
- If you are using a Gemalto cellular module, you might see an error message after you click on the SAVE button. You can ignore this warning, which is a result of Gemalto naming the cellular interface in their model as "Eth2". You can be assured that the default route was configured correctly.
 - If no cellular module is installed on the device, you will see a timeout warning. This warning is displayed based on a comprehensive check of each communication interface that is implemented in the software. You can ignore this message; however, if this warning message still appears even when a cellular module is installed in the device, this could be because of a hardware malfunction or because the module is not installed properly.

Configuring DHCP Settings

Click **DHCP Server** to view the current DHCP server settings on the main page.

Network Settings

DHCP Server

ETH0 ETH1

Status

Start IP 192.168.3.200

End IP 192.168.3.250

Netmask 255.255.255.0

Lease time 3600 sec

Primary DNS 8.8.8.8

Secondary DNS 1 8.8.4.4

Secondary DNS 2

Domain name

To configure the DHCP server settings, click the edit icon.

DHCP Server

ETH0

ETH1

Status

Start IP

192.168.3.200

End IP

192.168.3.250

Netmask

255.255.255.0

Lease time

3600 sec

Primary DNS

8.8.8.8

Secondary DNS 1

8.8.4.4

Secondary DNS 2

Domain name

Select **Settings**.

Information

Settings

Configure the DHCP server for **ETH1**. Provide the necessary information, such as **Start IP**, **End IP**, **Netmask**, **Lease time**, **Primary DNS**, **Secondary DNS**, and **Domain name**. When finished, click **SAVE**.

DHCP Server

ETH0

ETH1

Enable

Start IP

192.168.4.200

End IP

192.168.4.250

Netmask

255.255.255.0

Lease time

3600

Primary DNS

8.8.8.8

Secondary DNS

8.8.4.4

Secondary DNS

127.0.0.1

Configuring DNS Settings

Click **DNS** to view the current DNS settings.

Network Settings

Network Overview

Ethernet

WiFi

Cellular

DHCP Server

DNS

OpenVPN Client

SSH

DNS

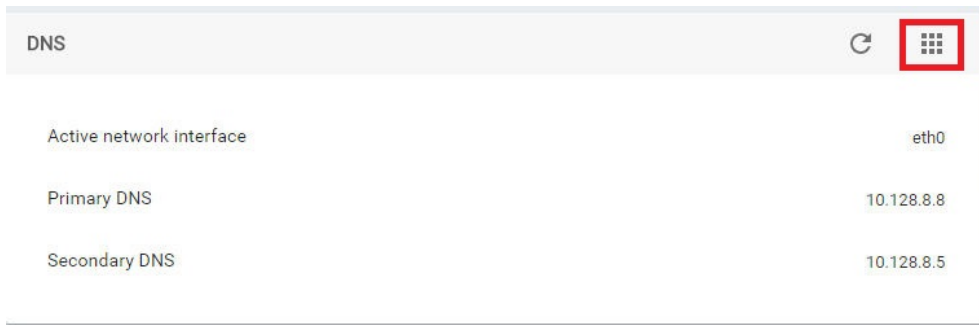
Active network interface

eth0

Primary DNS

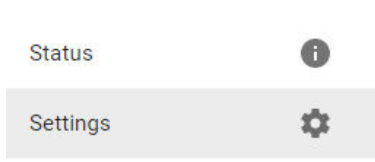
Secondary DNS

To configure the DNS settings, click the edit icon.



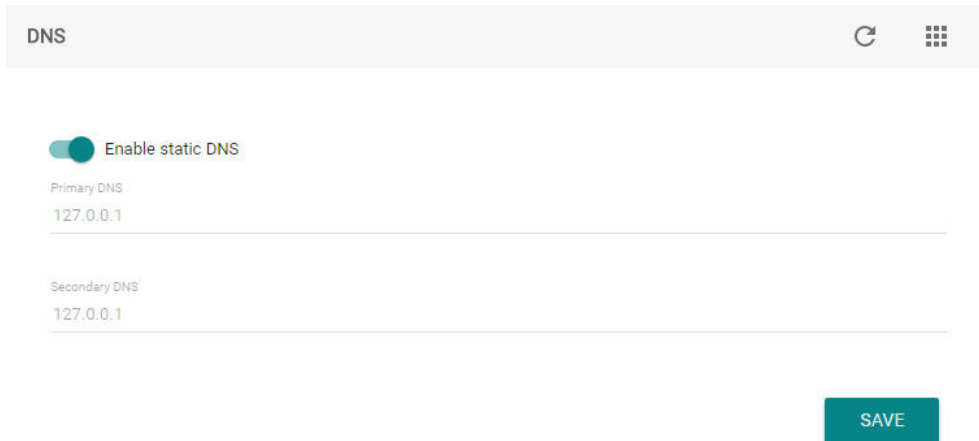
DNS		⌂	⌂
Active network interface	eth0		
Primary DNS	10.128.8.8		
Secondary DNS	10.128.8.5		

Select **Settings** to continue.



Status	i
Settings	⚙

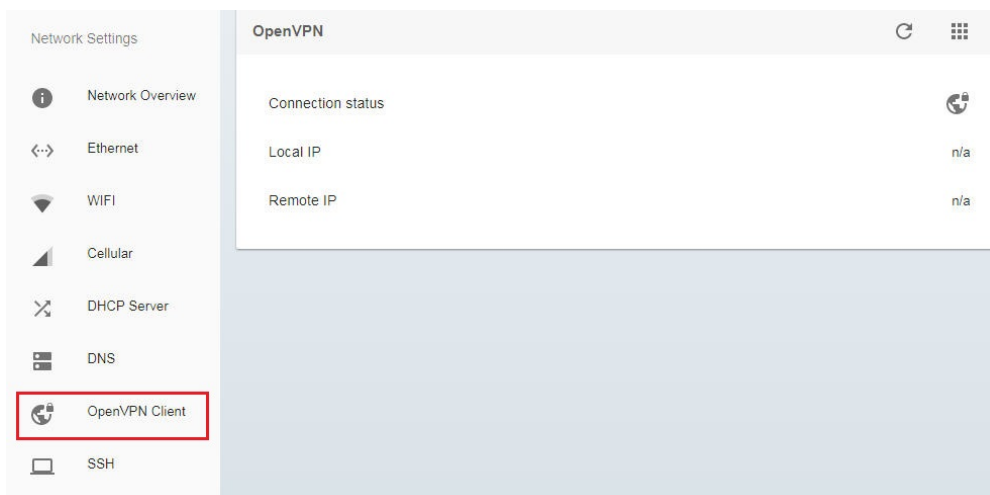
Select **Enable static DNS**, and provide **Primary DNS** and **Secondary DNS**. When finished, click **SAVE**.



DNS		⌂	⌂
<input checked="" type="checkbox"/> Enable static DNS			
Primary DNS	127.0.0.1		
Secondary DNS	127.0.0.1		
<div>SAVE</div>			

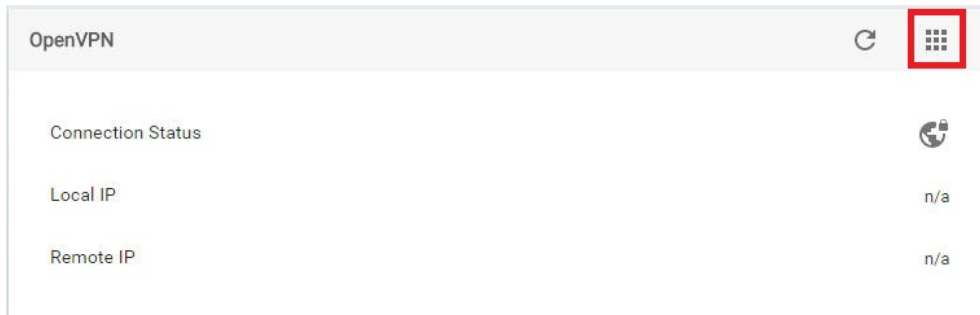
Configuring Open VPN Client Settings

Click **OpenVPN Client** to view the current OpenVPN settings.

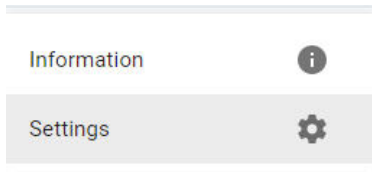


Network Settings		OpenVPN		⌂	⌂
i	Network Overview	Connection status	🌐		
↔	Ethernet	Local IP	n/a		
📶	WiFi	Remote IP	n/a		
📶	Cellular				
🔌	DHCP Server				
🌐	DNS				
🌐	OpenVPN Client				
💻	SSH				

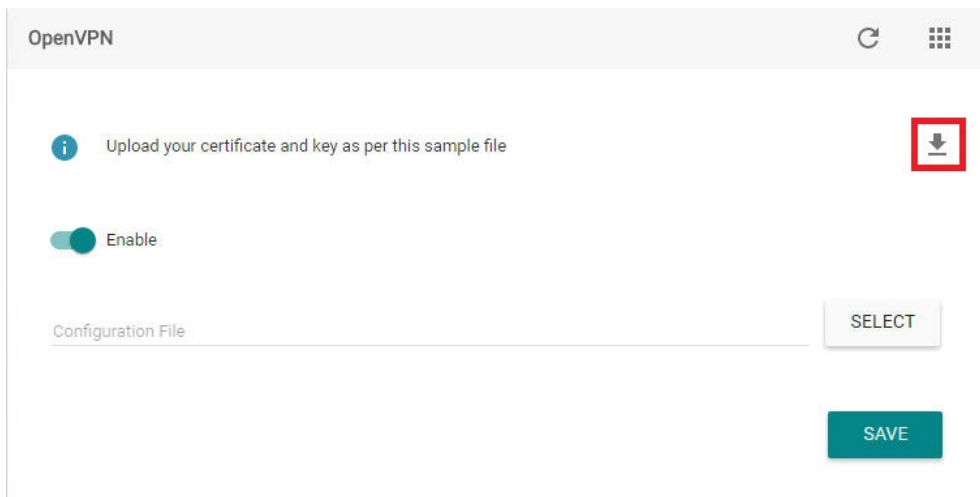
To configure the settings, click the edit icon.



Select **Settings**.

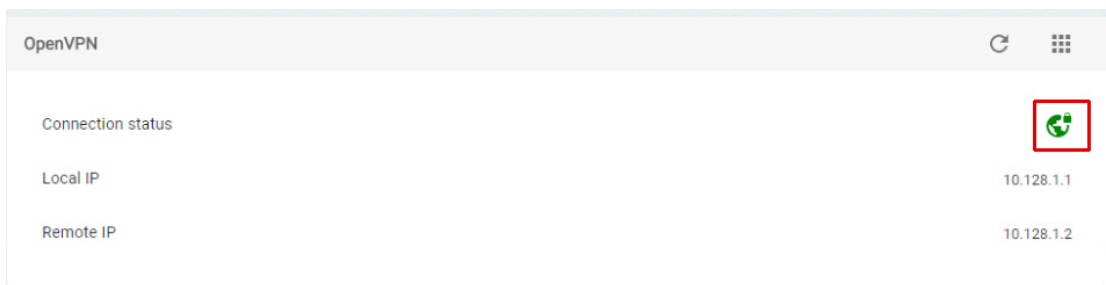


You can download an OpenVPN setting sample file by clicking on the download icon.



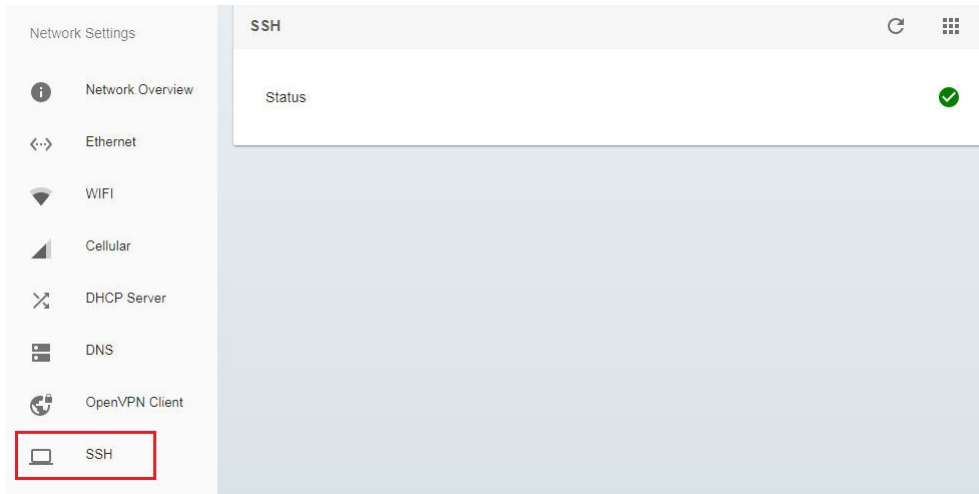
Select **Enable**, and then select the file from your computer, and then upload to the ThingsPro Gateway. When finished, click **SAVE**.

Check the **Connection status** icon. If the icon is green, the OpenVPN client is connected. If the icon remains gray, the client is not connected.



Configuring SSH Settings

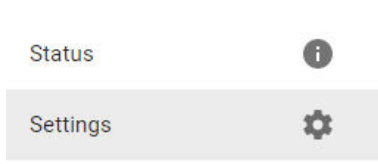
Click **SSH** to view the current SSH settings.



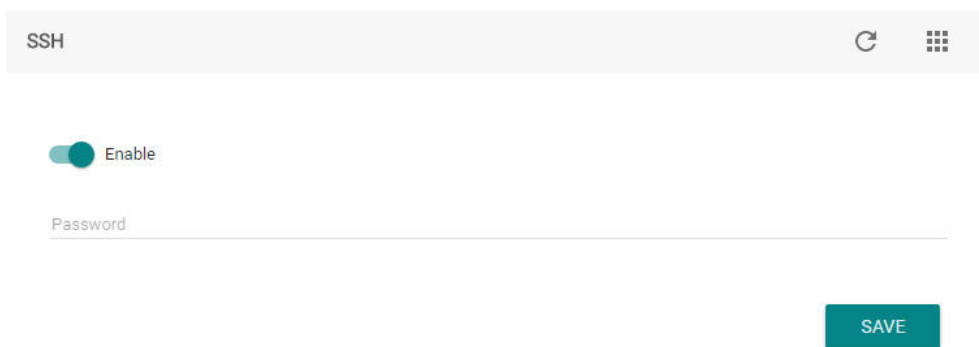
To configure the settings, click the edit icon.



Select **Settings** to continue.



Select **Enable** and provide password. When finished, click **SAVE**.

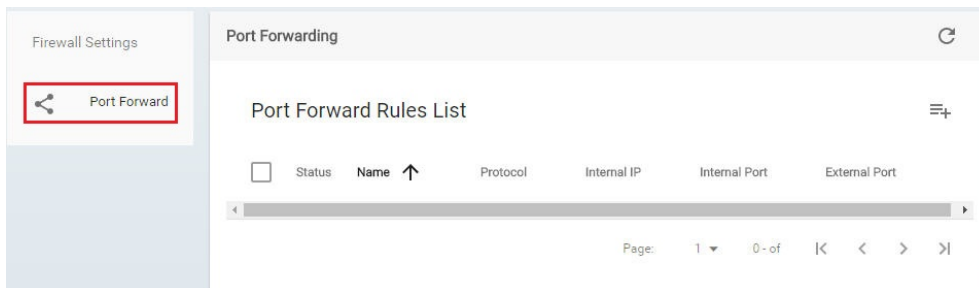


Configuring Firewall Settings

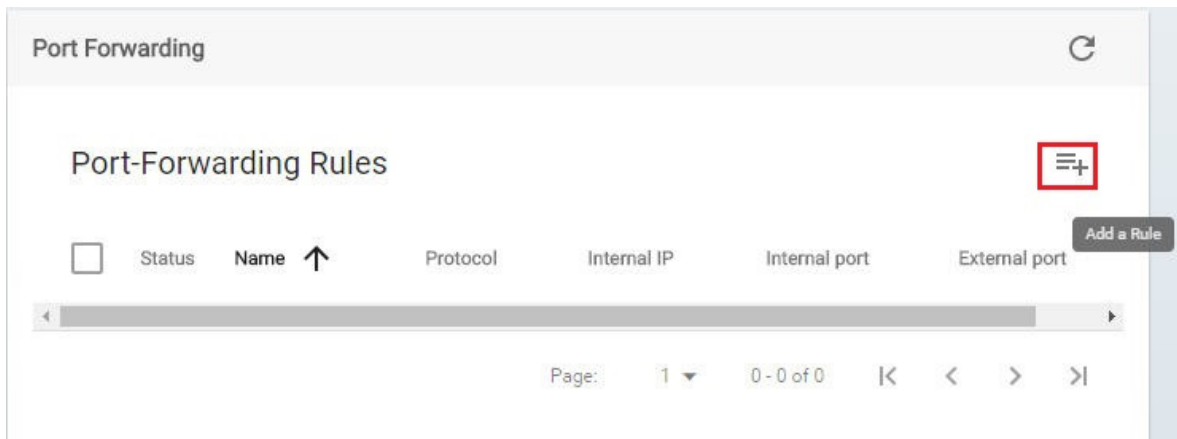
To configure firewall settings, select **Firewall** from the Gateway main menu.



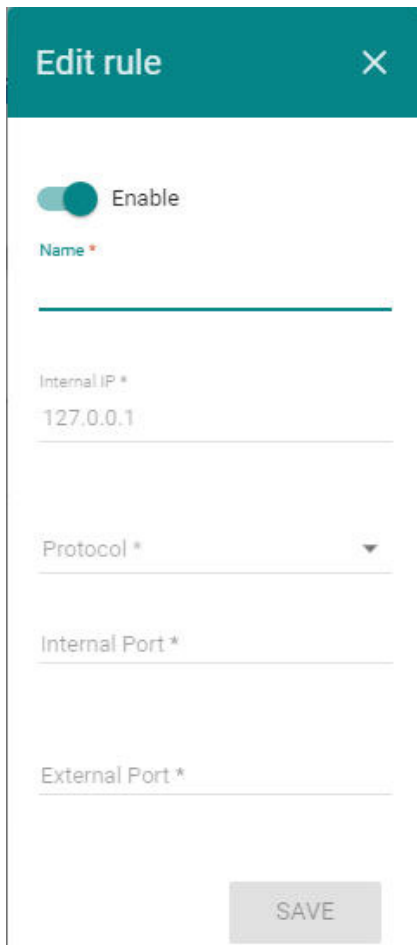
Select **Port Forward** to view the current firewall settings.



To add a new rule for port forward, click the icon.

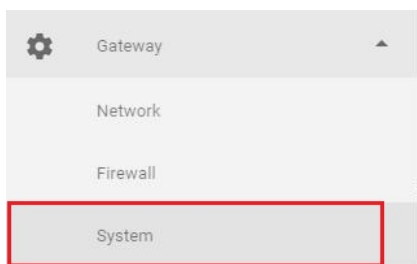


Select **Enable**, and then provide the necessary information such as **Name**, **Internal IP**, **Protocol**, **Internal Port**, and **External Port** in the specific fields. When finished, click **SAVE**.

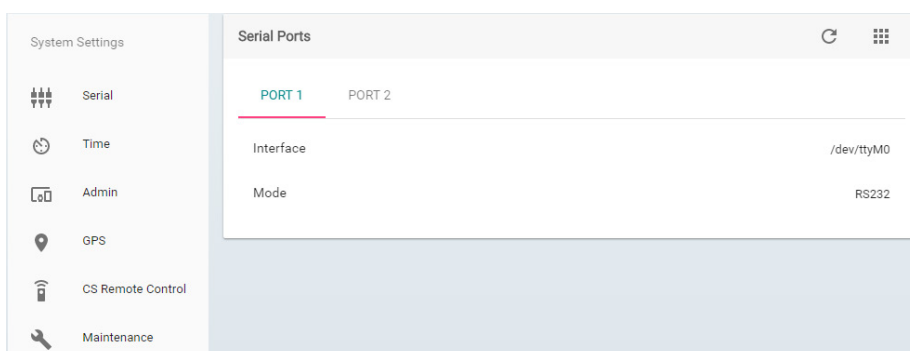


Configuring System Settings

Select **System** from the Gateway menu.

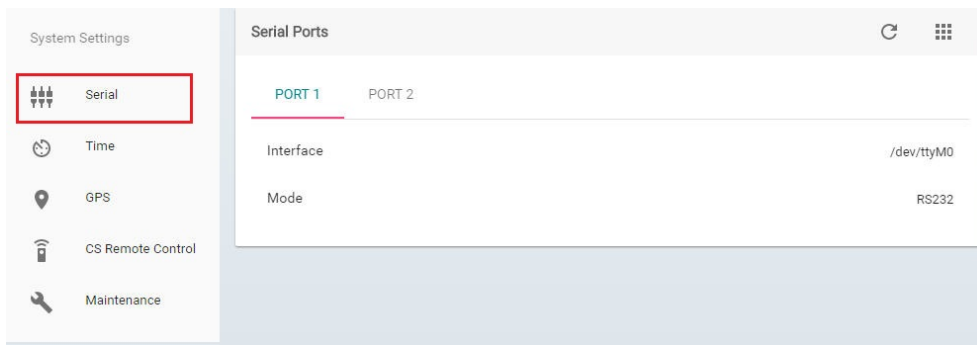


System settings include various options, such as **Serial**, **Time**, **Admin** (only available in v2.3 and above), **GPS**, **CS Remote Control** and **Maintenance**.

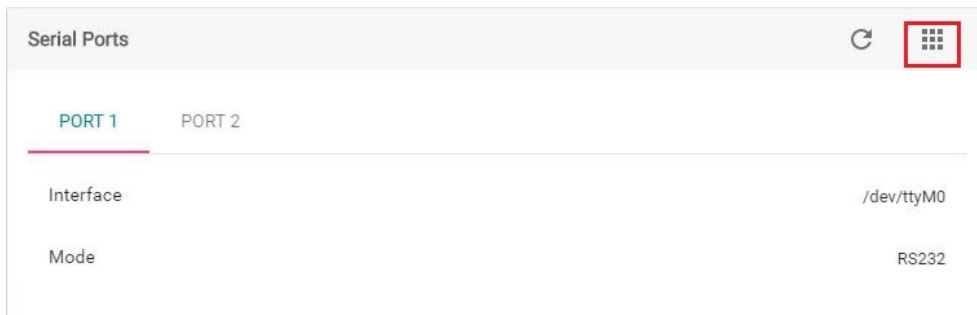


Configuring Serial Settings

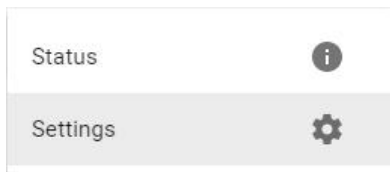
Select **Serial** to view the current serial settings.



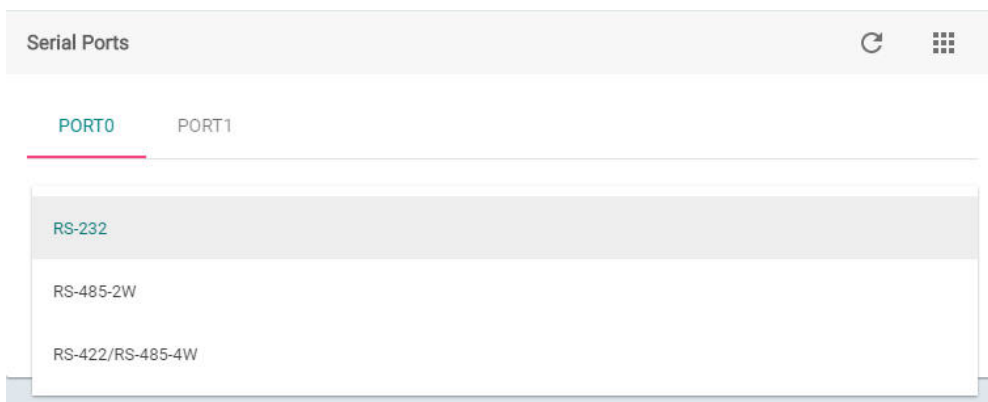
To configure the serial settings, click the edit icon.



Select **Settings**.

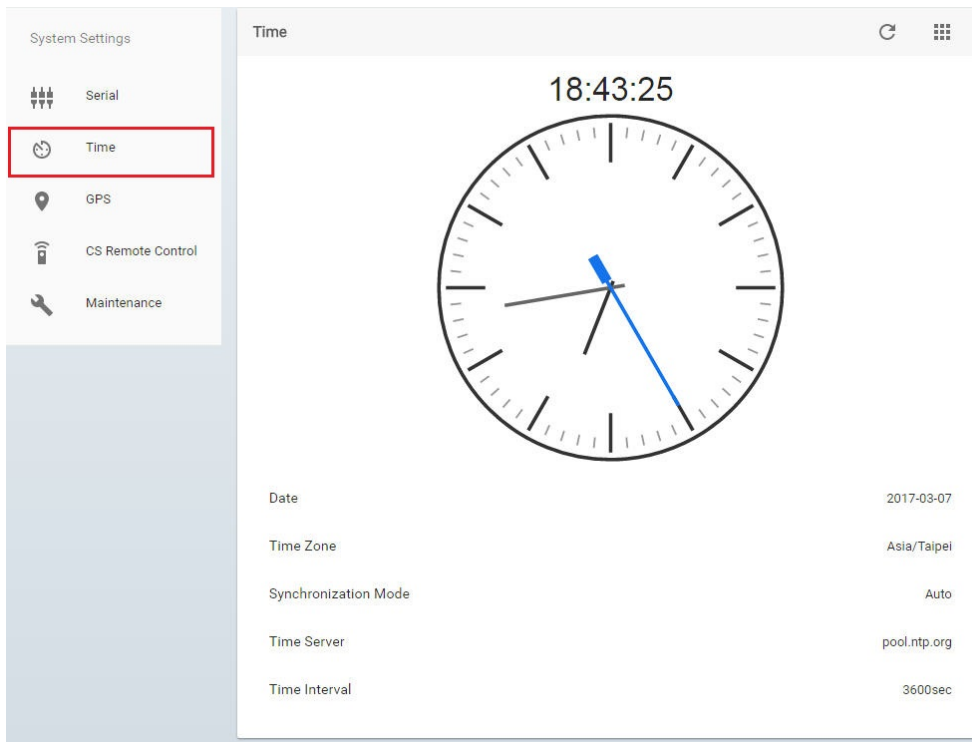


Configure the serial port interface by selecting from the drop-down list. When finished, click **SAVE**.

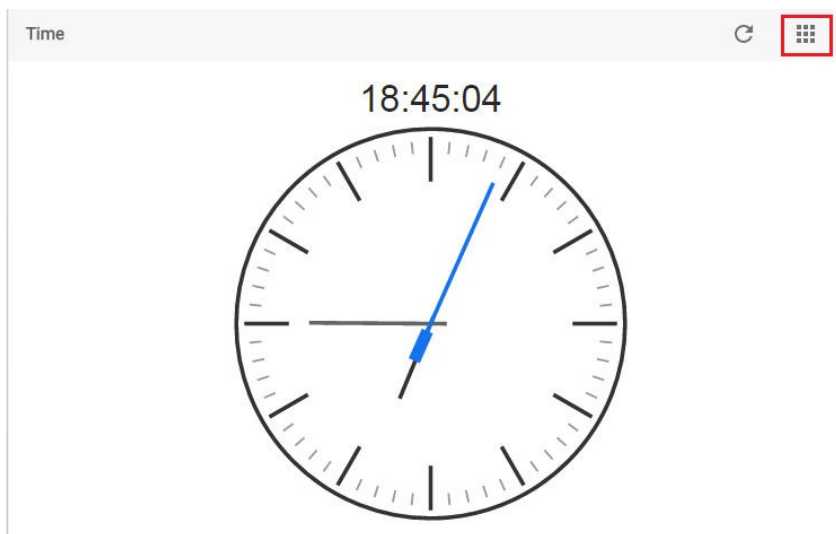


Configuring the System Time

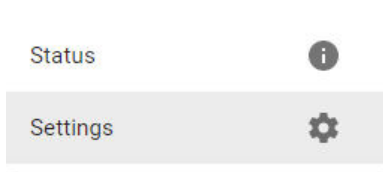
Select Time to view the current system time.



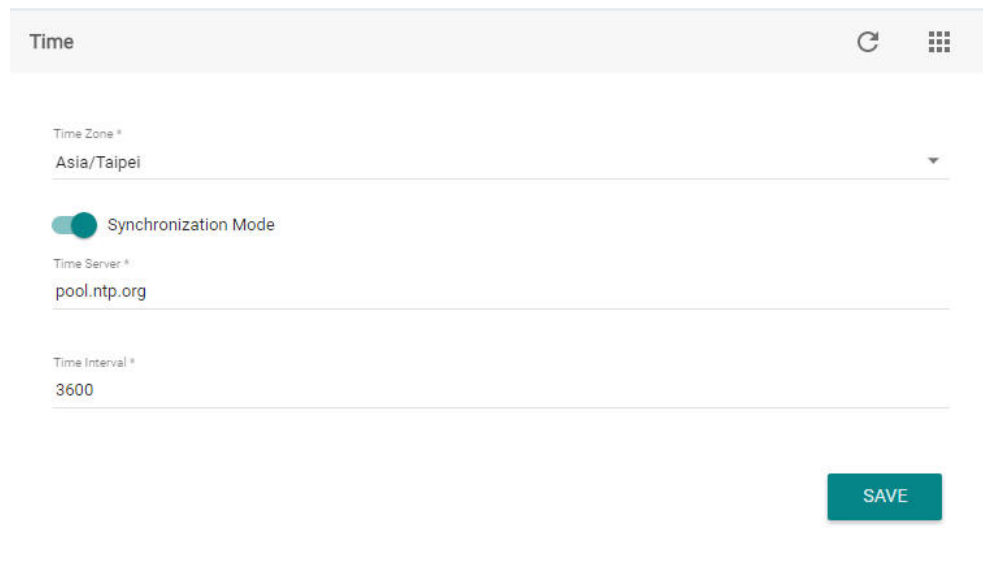
To configure the system time, click the edit icon.



Select **Settings**.

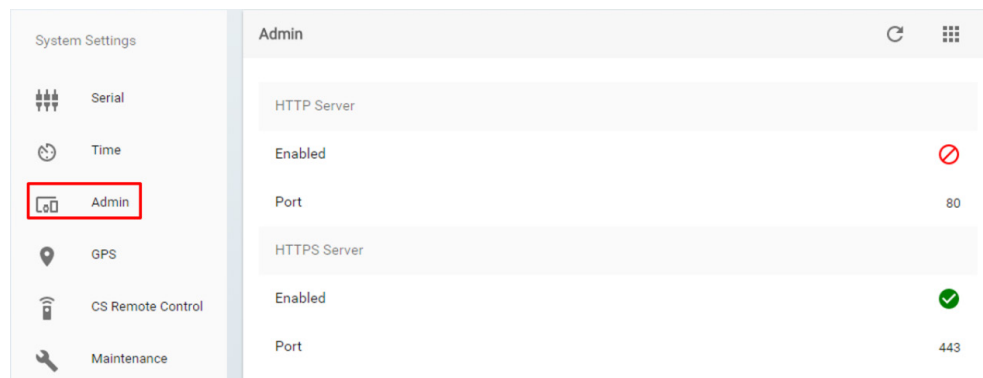


Select if you want to use **Synchronization Mode**, and offer the **Time Server** name and **Time Interval** value. When finished, click **SAVE**.

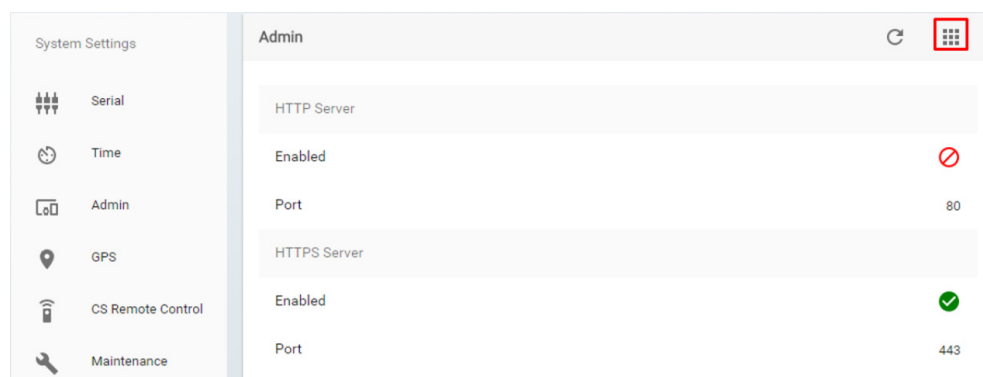


Configuring Admin Settings (only available with v2.3 and higher)

Click **Admin** to view the current HTTP/HTTPS services settings and corresponding port number.



Click the edit icon to configure the Admin settings.



Select **Settings**.



Use the Toggle bars to enable/disable HTTPS and HTTP services for the current ThingsPro Gateway. You can assign a port to each of these two services. When finished, click **SAVE**.

System Settings

- Serial
- Time
- Admin
- GPS
- CS Remote Control
- Maintenance

Admin

Enable HTTPS

HTTPS server port *

443

Enable HTTP

HTTP server port *

80

SAVE

Configuring GPS Settings

Select GPS to view the current GPS settings.

System Settings

- Serial
- Time
- GPS
- CS Remote Control
- Maintenance

GPS

Latitude 11

Longitude 22

To configure the GPS settings, click the edit icon.

GPS

Latitude 11

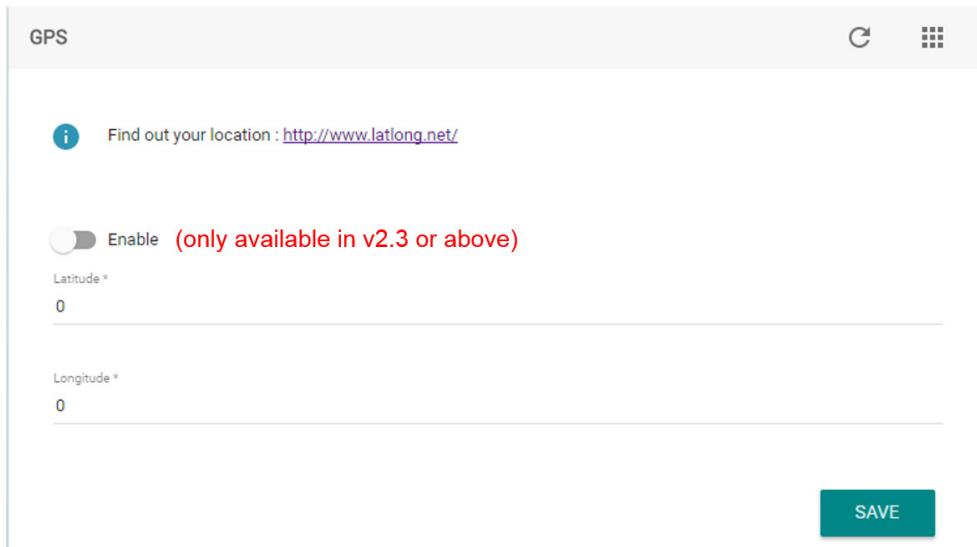
Longitude 22

Select **Settings**.

Status

Settings

Provide the Latitude and Longitude values in the appropriate fields. Starting with ThingsPro v2.3, you may get the location information from the GPS data retrieved by your eligible device if you have purchased and installed the cellular module w/ GPS feature. You can enable this function to get GPS data automatically. When finished, click **SAVE**.



GPS

Find out your location : <http://www.latlong.net/>

☐ Enable (only available in v2.3 or above)

Latitude *

0

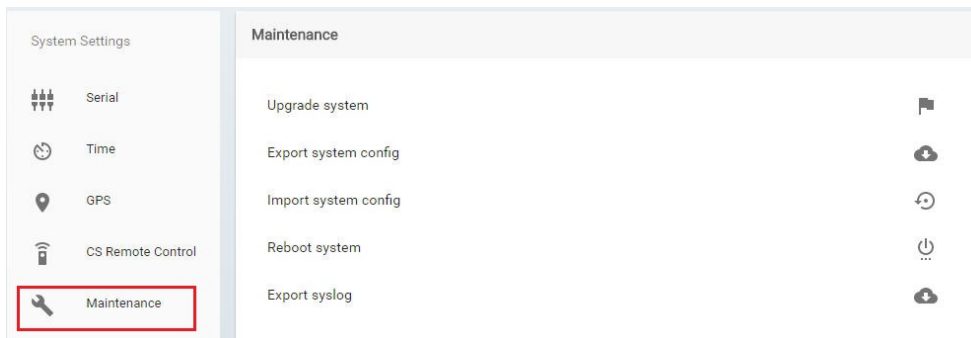
Longitude *

0

SAVE

System Maintenance

This section is the same as the procedure in Maintenance in the main menu section. Refer to **Maintenance** section.



System Settings

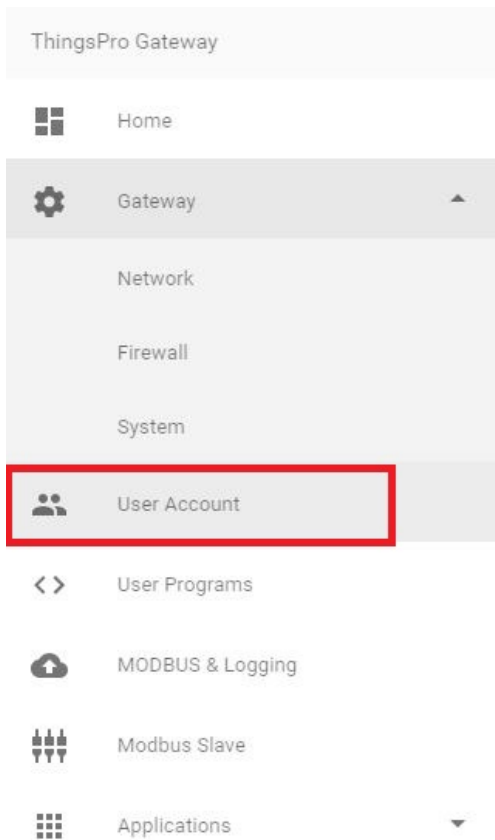
- Serial
- Time
- GPS
- CS Remote Control
- Maintenance**

Maintenance

- Upgrade system
- Export system config
- Import system config
- Reboot system
- Export syslog

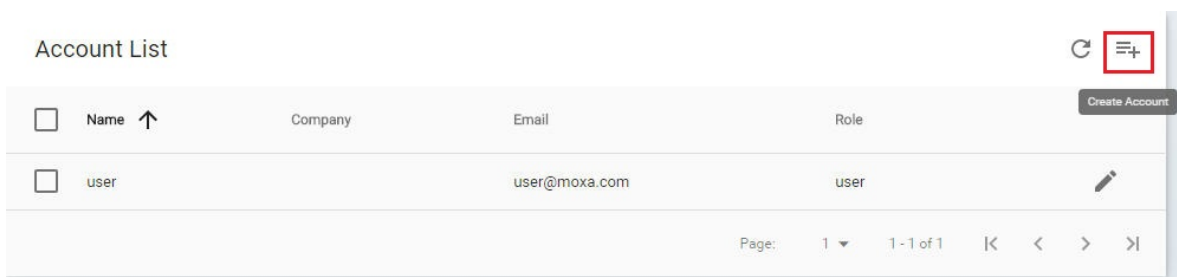
Managing User Accounts

This section describes how to add new account, and manage the existing account. Select **User Account** from the menu.

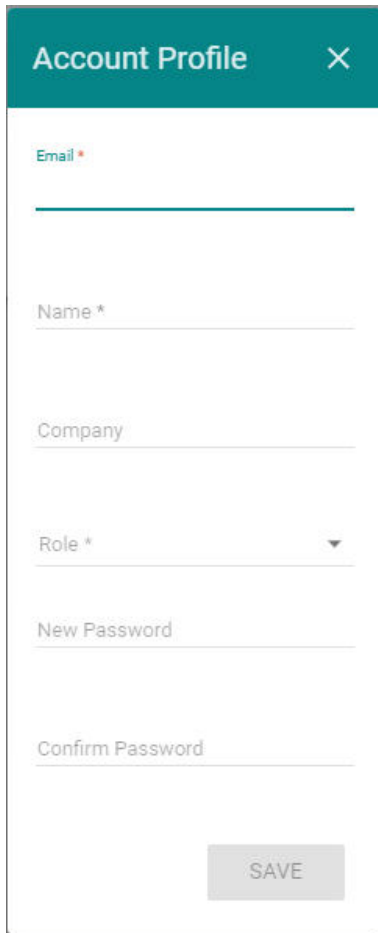


Creating a New Account

To create a new account, select the icon.



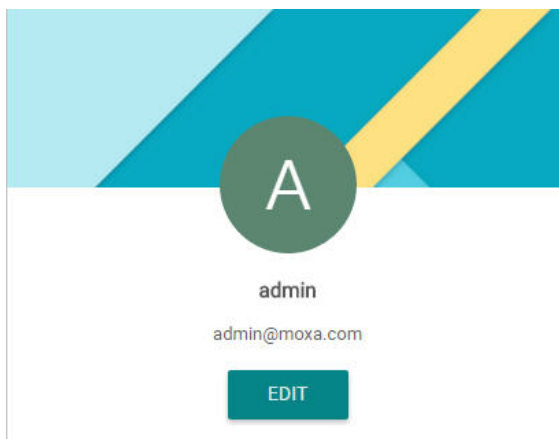
Provide the necessary information for the new account. When finished, click **SAVE**.



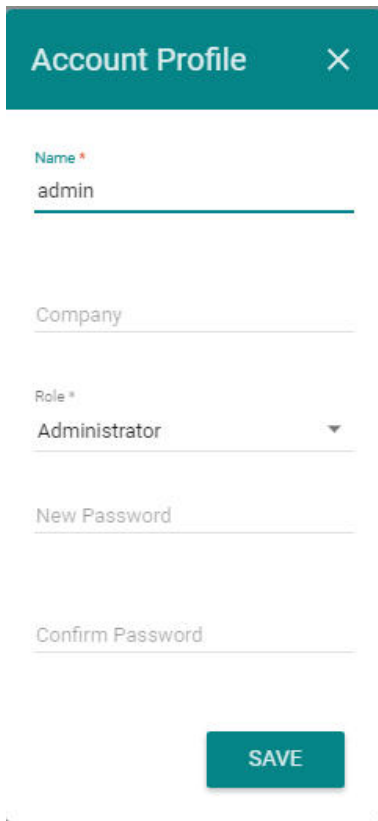
The 'Account Profile' form is a vertical rectangle with a teal header bar containing the title 'Account Profile' and a close icon. Below the header, the form contains several input fields: 'Email *' with a red asterisk, 'Name *' with a red asterisk, 'Company', 'Role *' with a red asterisk and a dropdown arrow, 'New Password', and 'Confirm Password'. At the bottom right of the form is a grey 'SAVE' button.

Editing the Administrator Information

To edit the administrator information, click **Edit**.



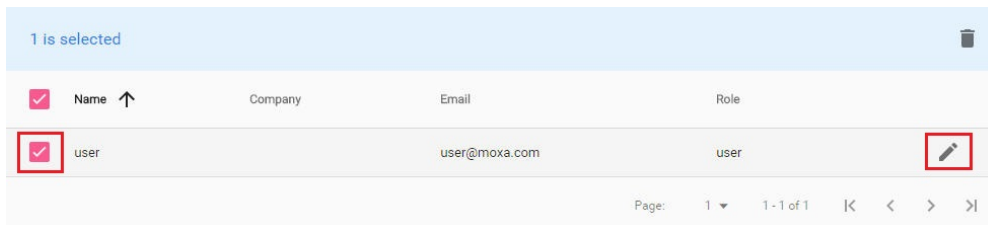
Edit the information in the specific fields. When finished, click **SAVE**.



The 'Account Profile' form is a vertical layout with a teal header bar containing the title 'Account Profile' and a close icon. Below the header, there are five input fields: 'Name' (with a red asterisk and the value 'admin'), 'Company', 'Role' (with a red asterisk and a dropdown menu showing 'Administrator'), 'New Password', and 'Confirm Password'. At the bottom right of the form is a teal 'SAVE' button.

Updating User Account Information

To update an existing user, check the user, and then select the edit icon.



The table shows a list of users. The first row is a header with columns: Name (with a checkbox and an upward arrow), Company, Email, and Role. The second row is a data row for a user named 'user' with email 'user@moxa.com' and role 'user'. The checkbox for the 'user' row is checked and highlighted with a red box. The edit icon (a pencil) in the same row is also highlighted with a red box. The table has a light blue header bar that says '1 is selected' and a trash icon. The footer shows 'Page: 1' and '1 - 1 of 1'.

<input checked="" type="checkbox"/>	Name ↑	Company	Email	Role
<input checked="" type="checkbox"/>	user		user@moxa.com	user

For access rights of the root, admin, and user, refer to the following table.

	Configuration	API Token
root	read/write	write
admin	read/write	N/A
user	read	N/A

Edit the information in the specific fields. When finished, click **SAVE**.

Account Profile ×

Name *

user

Company

Role *

User



New Password

Confirm Password

SAVE

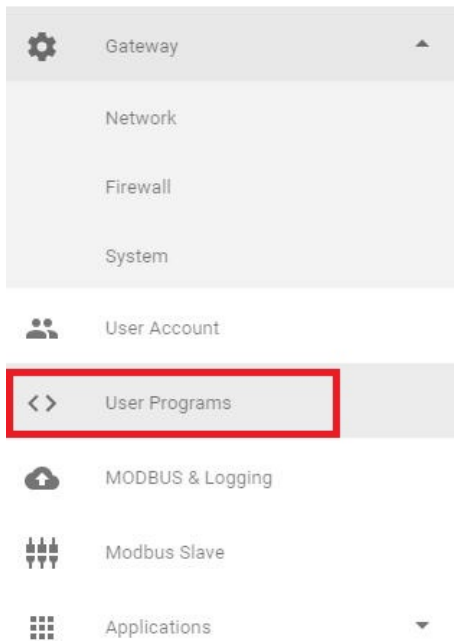
Deleting a User Account

To delete an account, select the account, and then click the delete icon.

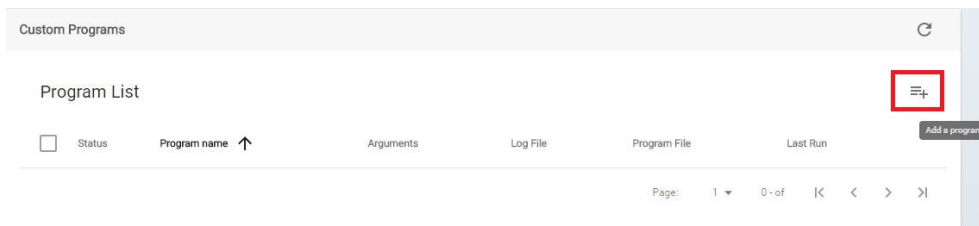
1 is selected					
<input checked="" type="checkbox"/>	Name ↑	Company	Email	Role	Remove Account
<input checked="" type="checkbox"/>	user		user@moxa.com	user	
Page: 1 1 - 1 of 1					

Managing User Programs

ThingsPro Gateway allows developers to develop their own programs or applications and upload them to ThingsPro Gateway. Select the **User Programs** tab from the main menu.



To add a program, click the add icon.



Select **Enable**, provide the name of the program, and select the file from a specific location (refer to the following example to create the file you want to upload). You can also specify when the program should run. For example, whenever the system starts up or at a periodic interval. When finished, click **SAVE**.

Example

Scenario: Synchronize system time with network time server every minute.

Follow the steps below to create the script file and upload it to ThingsPro gateway:

1. Connect to the UC-8112-LX computer through the console port or via an Ethernet cable. Log in to the computer.
2. Create a working directory on the ThingsPro Gateway.

```
moxa@moxa:~$ mkdir myproject
```
3. Enter this working directory and create a shell script file in this folder. The name of this file must be "exec". The content of this example shell script is:

```
#!/bin/sh
ntpdate $1
```

Note: The UC-8112-LX computer generally supports C, C++, Python, shell script, and JavaScript. You may use these programming languages to develop your program.

- When you finish developing the program, set the "exec" file to have execution permissions.

```
moxa@moxa:~/myproject$ chmod +x exec
```
- Use the tar command to compress all files created in this folder.

```
moxa@moxa:~/myproject$ tar cvzf myproject.tar.gz .
```
- Enter a name for the program, then click **Select** to upload the compressed file. The shell script needs an argument to specify the network time server. ThingsPro Gateway will terminate the user program after the "timeout" value expires. If the timeout value is set to 0, then ThingsPro Gateway will leave the user program running permanently.

Edit a Program ×

☒ Enable

Program Name *
sync-time

Script file
myproject.tar.gz **SELECT**

Arguments
time.google.com

Timeout *
0

☐ Run automatically at startup

☒ Run periodically

At intervals of *
1

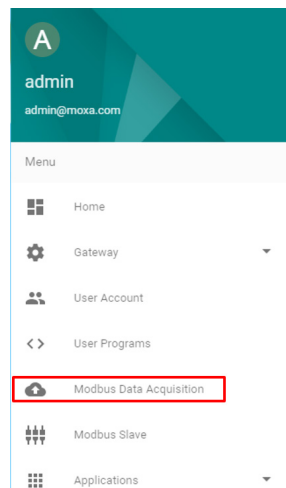
SAVE

- After clicking the **SAVE** button, the program will be available under the **User Programs** section of the main menu.

For more details on creating user programs, download the [ThingsPro Programmer's Guide](#).

Configuring Modbus Settings for Data Acquisition

This section describes how to configure Modbus settings and logging. Select **Modbus Data Acquisition** on the main menu.



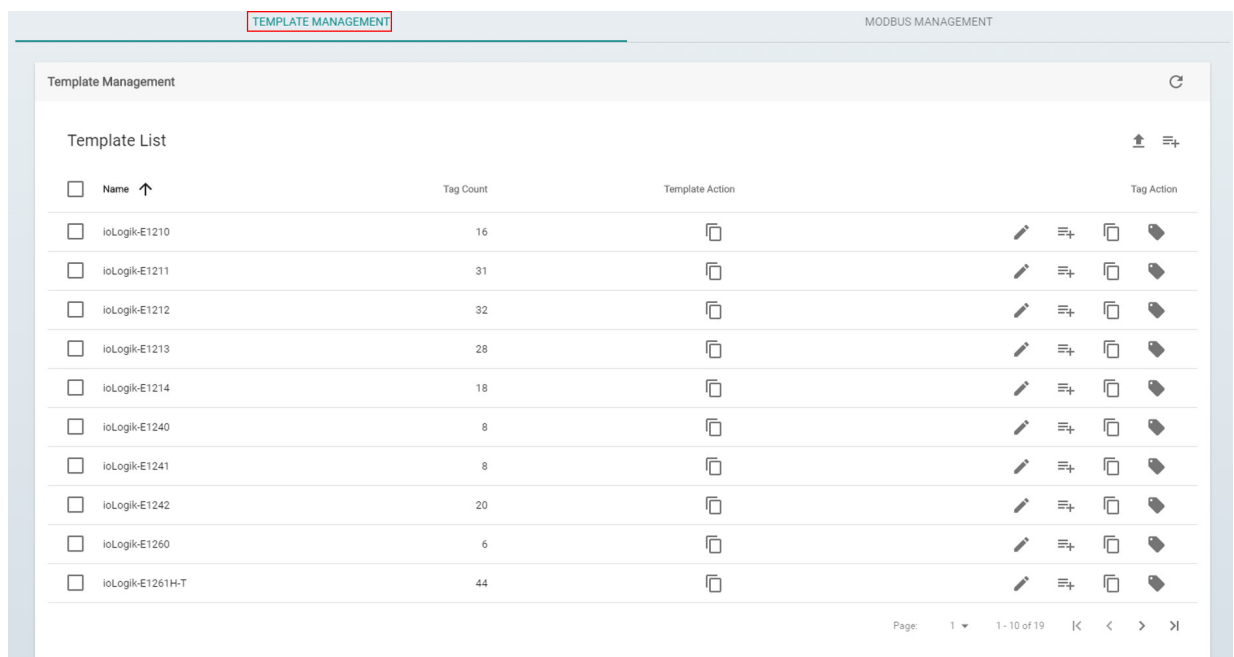
Equipment Template and Data Tag Management

You can use Modbus compatible templates to configure field devices in ThingsPro, and connect the devices to the gateway. By default, ThingsPro software includes preconfigured templates for Moxa ioLogik series. You can modify the ioLogik templates to set up connections to Modbus /RTU or Modbus /TCP devices.

You can add, remove, or update equipment templates in the **Template Management** List section on the Settings page.

To configure a Modbus device in ThingsPro and connect it to the gateway, do the following:

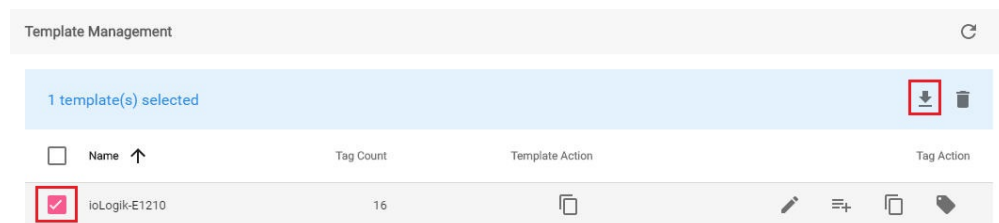
1. Select a template from the **Template Management List**
or
Create a new template in the **Template Management List**.
2. Define a tag for the device in the template, and specify the device details.
3. Add the device to the ThingsPro system.



Downloading a Template

To download an equipment template, do the following:

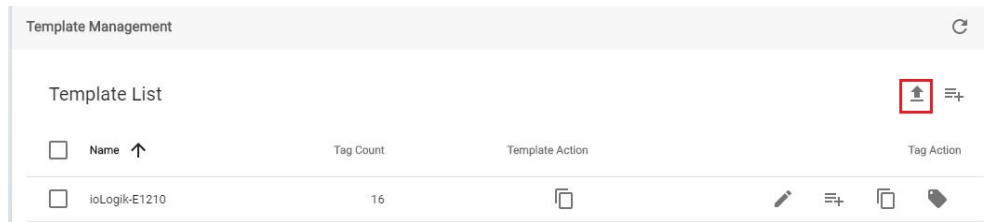
In the **Template Management** List, select the device and click download icon to download the current template to your local computer.



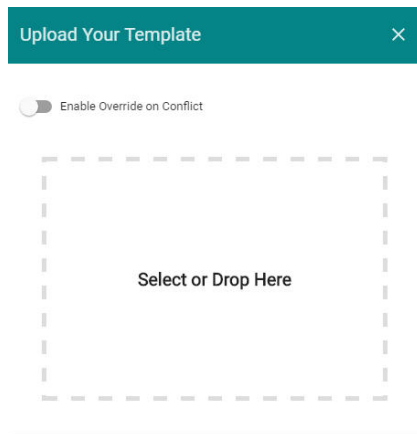
You can also select more devices and download all templates at one time.

Uploading a Template

To upload a template, click upload icon.

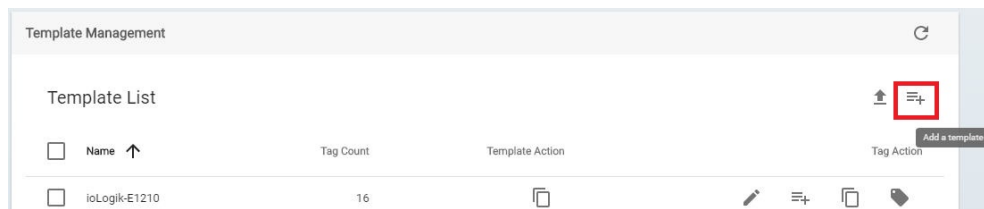


Select the template file from the local folder, and wait for a few second to complete the upload process.

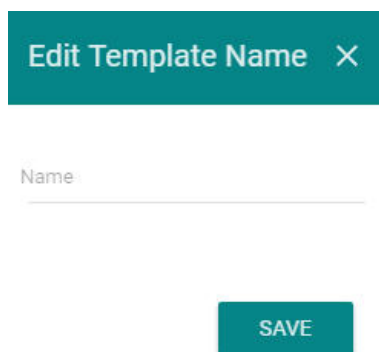


Adding a Template

To add a template, click the add icon.

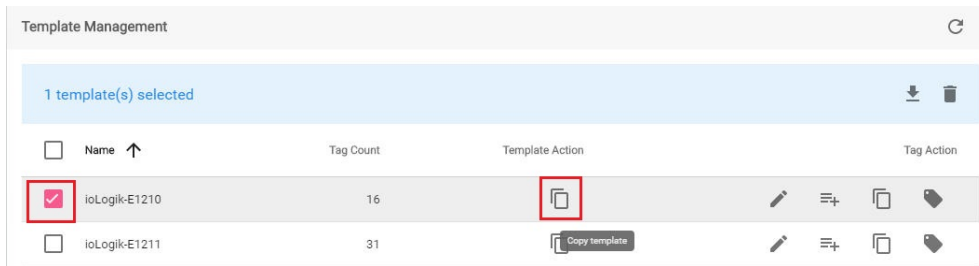


Add the template name. When finished, click **SAVE**.

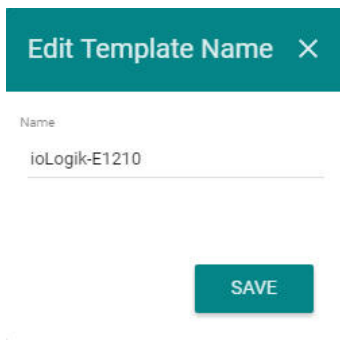


Copying a Template

Select the device, and then click the copy icon.

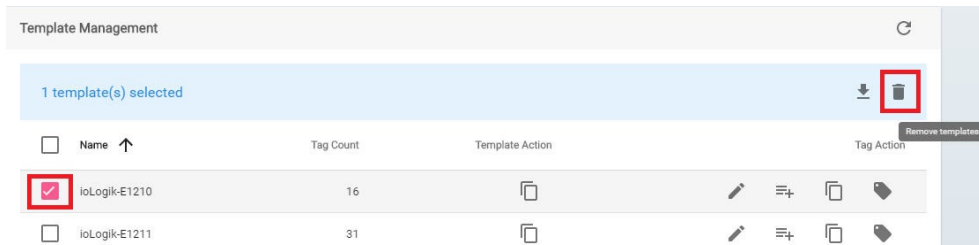


You can edit the new template name. When finished, click **SAVE**.



Removing a Template

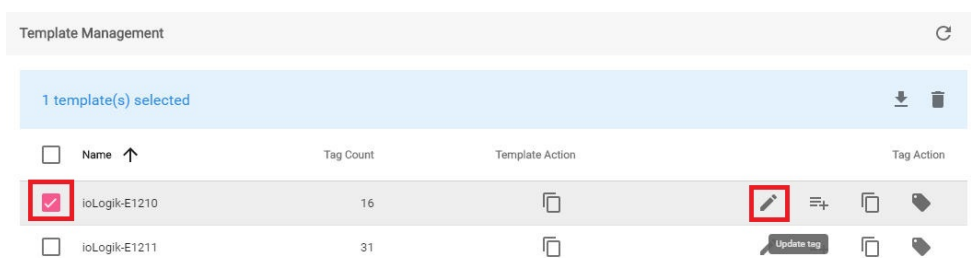
Select the device, and then click the remove icon. The template will be removed.



Note that if a Modbus template is being used, you cannot remove the template, and a device tag cannot be updated. Remove the device in Modbus Management page first.

Updating a Device Tag

Select the device, and then click the update tag icon.



Update the tag in the following page. When finished, click **SAVE**.

Edit Tag

Template: ioLogik-E1210

Tag List

di0

Tag Name *

di0

Function *

read-discrete-inputs

Address *

0

Data Type

boolean

Quantity *

1

☐ Enable Invalid Value

Unit

Adding a Device Tag

Select the device, and click the add tag icon to add a device tag.

Template Management

1 template(s) selected

<input type="checkbox"/>	Name ↑	Tag Count	Template Action	Tag Action
<input checked="" type="checkbox"/>	ioLogik-E1210	16		
<input type="checkbox"/>	ioLogik-E1211	31		

Edit the tag information in the related fields. When finished, click **SAVE**.

Edit Tag

Template: ioLogik-E1210

Tag Name *

Function *

Address *

Data Type

Quantity *

1

Enable Invalid Value

Invalid Value *

Unit

Edit Tag

Unit

Description

0,0,1,10,

Enable Byte Order

Enable Auto Scaling

Slope-intercept

Point-slope

Slope *

Offset *

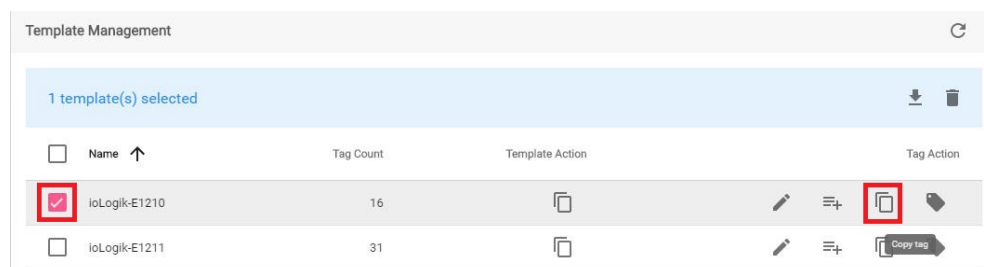
SAVE

Refer to the following table for the description of the Modbus device details.

Field	Description
Tag Name	Assigns a tag name for the device
Function	Selects the Modbus read function for the device. The read functions supported include read-coils, read-input-registers, read-discrete-inputs, read-holding-registers, write-single-coil, write-single-register, write-multiple-coils, and write-multiple-registers.
Address	Specifies the read/write address of the device
Data Type	Specifies the data type for this tag/register for the device read operation (e.g.: uint16, uint8, uint32, float32, and float64). This field is mandatory.
Quantity	Specifies the amount of data read/write per read operation. For coil and discrete input, 1 means 1 bit; for input register and holding register, 1 means 1 word (16-bit).
Enable Invalid Value	Sets the specified number as an invalid value. First select the Enable Invalid Value option and then specify the value that you want to set as invalid in the field. When an invalid value is specified, ThingsPro will ignore the value and will retain only the valid value. This option will essentially reduce system loading and improve system efficiency. For example, if you do not want to receive 1, then 1 is set as an invalid value. When ThingsPro receives the value 1, it will ignore this value.
Unit	Specifies the unit that should be written into the logs for all the valid values received. For example, you can set the unit as MB, in which case, all values received will be logged with the unit "MB" next to the values. This option provides a way to make the logs more readable, which in turn makes it convenient for system administrators to analyze the data they receive.
Description	Provides additional description for the tag.
Enable Byte Order	Enables byte ordering of the composite data frame.
Enable Auto Scaling	Enables auto scaling of the value read from the device. The auto scaling is calculated based on the following formulas: Slope-intercept: $OUTPUT = Slope * INPUT + Offset$ Point-slope: $OUTPUT = ((INPUT - sourceMin) * (targetMax - targetMin) / (sourceMax - sourceMin)) + targetMin$

Copying a Device Tag

Select the tag you want to copy, and click the copy tag icon to copy a device tag.



Select the tag from the list, and then click **SAVE**.

Copy Tag

Template: ioLogik-E1210

Tag List

di0

SAVE

Showing a Tag List

Select the device, and click the show tag list icon to show a tag list.

Template Management

1 template(s) selected

<input type="checkbox"/>	Name ↑	Tag Count	Template Action	Tag Action
<input checked="" type="checkbox"/>	ioLogik-E1210	16		
<input type="checkbox"/>	ioLogik-E1211	31		

The tag list will be shown.

Tag List

<input type="checkbox"/>	Name ↑	Function	Address	Unit	Type	Quantity	Byte Order	Invalid Value	Scaling	Description
<input type="checkbox"/>	di0	read-discrete-inputs	0		boolean	1				
<input type="checkbox"/>	di1	read-discrete-inputs	1		boolean	1				
<input type="checkbox"/>	di10	read-discrete-inputs	10		boolean	1				
<input type="checkbox"/>	di11	read-discrete-inputs	11		boolean	1				
<input type="checkbox"/>	di12	read-discrete-inputs	12		boolean	1				
<input type="checkbox"/>	di13	read-discrete-inputs	13		boolean	1				
<input type="checkbox"/>	di14	read-discrete-inputs	14		boolean	1				
<input type="checkbox"/>	di15	read-discrete-inputs	15		boolean	1				
<input type="checkbox"/>	di2	read-discrete-inputs	2		boolean	1				
<input type="checkbox"/>	di3	read-discrete-inputs	3		boolean	1				

Page: 1 1 - 10 of 16

Custom Equipment Management

ThingsPro Gateway offers custom equipment list. To add an equipment, click the add equipment icon.

Custom Equipment Management

Custom Equipment List

☐ Name

Add equipment

Provide the necessary information in the Edit Custom Equipment page. Click **Add** to add new equipment.

Edit Custom Equipment

Name *

Tag Name *
Data Type *
Access Type *
Size *
Description
ADD

Tag Name
Data Type
Access Type
Size
Description

Page: 1 0 - 0 of 0

SAVE

When finished, click **SAVE**.

Modbus Management

This section helps users manage the Modbus/RTU, and Modbus/TCP devices.

Add a Modbus/RTU Device

To add a Modbus/RTU device, do the following:

1. Click **MODBUS MANAGEMENT** tab.

TEMPLATE MANAGEMENT
MODBUS MANAGEMENT

Modbus Management

MODBUS / RTU
MODBUS / TCP

RTU List

<input type="checkbox"/>	Name ↑	Interval	Port	Baud Rate	Parity	Stopbits	
<input type="checkbox"/>	Modbus_Gateway_1	5 sec	PORT 1	115200	none	1	
<input type="checkbox"/>	Modbus_Gateway_2	5 sec	PORT 2	115200	none	1	

Page: 1 1 - 2 of 2

2. Select **MODBUS/RTU** tab, select under what port that you want to add a new device, and then click the add icon.

Modbus Management

MODBUS / RTU
MODBUS / TCP

RTU List

<input type="checkbox"/>	Name ↑	Interval	Port	Baud Rate	Parity	Stopbits	
<input type="checkbox"/>	Modbus_Gateway_1	5 sec	PORT 1	115200	none	1	
<input type="checkbox"/>	Modbus_Gateway_2	5 sec	PORT 2	115200	none	1	

Page: 1 1 - 2 of 2

3. Edit the information for the new device. You can click **Test** for a testing connection, or **SAVE** to complete.

Edit Device

×

Device Name *

Template *


Unit ID *

TEST

SAVE

Edit Modbus/RTU Interface Settings

Click the edit icon.

Modbus Management							
MODBUS / RTU							
1 modbus selected							
<input type="checkbox"/>	Name ↑	Interval	Port	Baud Rate	Parity	Stopbits	
<input checked="" type="checkbox"/>	Modbus_Gateway_1	5 sec	PORT 1	115200	none	1	  
<input type="checkbox"/>	Modbus_Gateway_2	5 sec	PORT 2	115200	none	1	  
Page: 1 1 - 2 of 2							

Edit the RTU interface settings in the following page. When finished, click **SAVE**.

Edit RTU Interface Settings

×

Interface Name *

Modbus_Gateway_1

Port

PORT 1

Baud Rate *

115200

Parity *

none

Stopbits *

1

Response Timeout *

500

Interval Period *

5000

Inter-char Timeout *

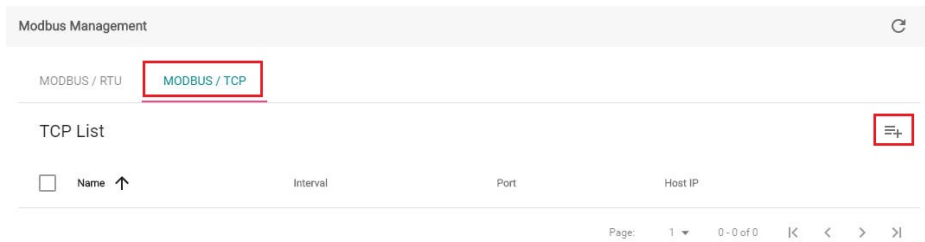
100

SAVE

Add a Modbus/TCP Device

To add a Modbus/TCP device, do the following:

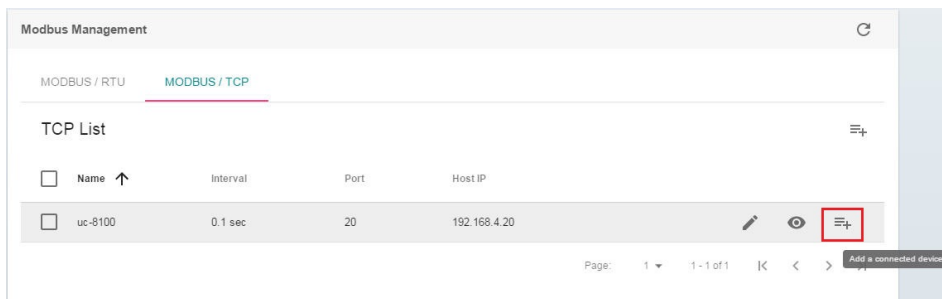
1. Select MODBUS/TCP tab, and click the add icon.



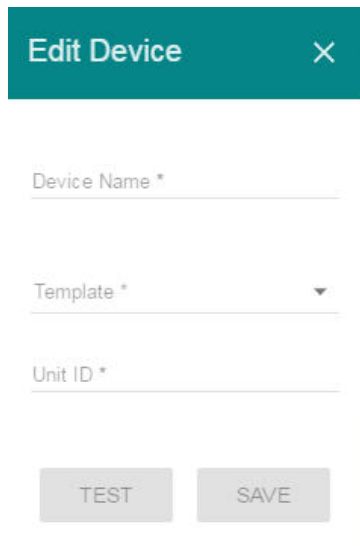
2. Edit the TCP interface settings.

The screenshot shows the 'Edit TCP Interface Settings' dialog box. It has a teal header with the title 'Edit TCP Interface Settings' and a close button 'X'. Below the header are five input fields: 'Interface Name *', 'Host IP *' (with the value '127.0.0.1'), 'Port *', 'Interval *', and 'Response Timeout *'. At the bottom center is a grey 'SAVE' button.

3. When finished, click **SAVE**.
4. When a new TCP device is added, click Add a connected device to check the connection status.



5. Edit device in the fields, and click **SAVE** to complete.



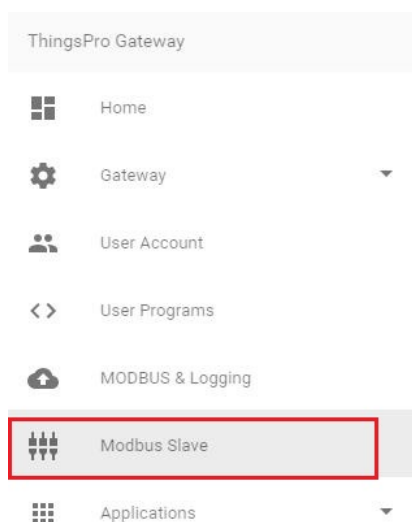
The 'Edit Device' form is a modal window with a teal header bar containing the title 'Edit Device' and a close button (X). Below the header, there are three input fields: 'Device Name *', 'Template *' (with a dropdown arrow), and 'Unit ID *'. At the bottom of the form, there are two buttons: 'TEST' and 'SAVE'.

Managing Modbus Slave Devices

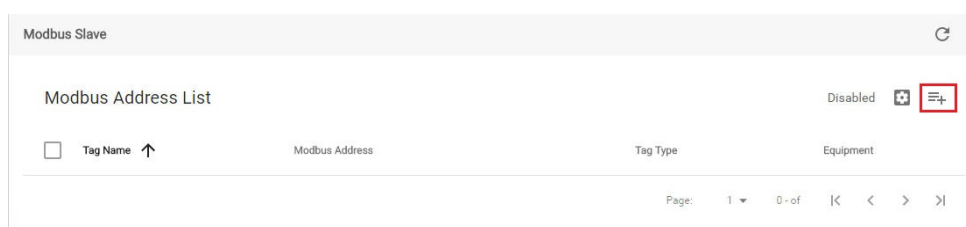
This section helps users manage Modbus Slave devices. The Modbus slave function helps users easily poll data from the connected end devices via ThingsPro Gateway to their system using Modbus protocol. This is a convenient design for users to acquire end-device data via ThingsPro Gateway without applying MQTT, which is useful for existing systems such as local SCADA.

Adding a New Modbus Slave Device

To add a Modbus Slave device, select **Modbus Slave** on the menu.



Click the add icon.



The 'Modbus Slave' interface shows a 'Modbus Address List' table. Above the table, there is a 'Disabled' status indicator, a plus icon, and a red box containing an equals sign followed by a plus sign (=+). The table has columns for 'Tag Name' (with an upward arrow), 'Modbus Address', 'Tag Type', and 'Equipment'. At the bottom right, there is a pagination bar showing 'Page: 1', '0 of', and navigation icons.

Provide the necessary information. When finished, click **SAVE**.

Add a Modbus slave Address

Select a function *

Select an equipment type *

Select a tag *

Modbus Address *

SAVE

A new Modbus Slave device will be added.

Modbus Slave

Modbus Address List

Disabled

<input type="checkbox"/>	Tag Name ↑	Modbus Address	Tag Type	Equipment
<input type="checkbox"/>	di0	0x10000	modbus	afdff

Page: 1 0 of

Enabling a Modbus Slave Device

To enable a Modbus Slave device, click Basic Settings icon.

Modbus Slave

Modbus Address List

Disabled

<input type="checkbox"/>	Tag Name ↑	Modbus Address	Tag Type	Equipment
<input type="checkbox"/>	di0	0x10000	modbus	afdff

Page: 1 0 of

Check **Enable**, and configure the basic settings. When finished, click **SAVE**. If **ignore unit ID** is not checked, the Modbus master needs to set the same unit ID for Modbus access.

Basic Settings

☒ Enable

☐ Ignore unit ID

Unit ID *

255

☒ Any address

Host *

0.0.0.0

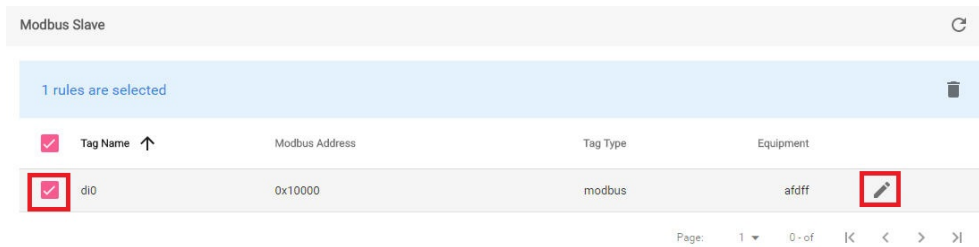
Port *

502

SAVE

Editing a Modbus Slave Device

To edit a Modbus Slave device, select the device, and click the edit icon.



Edit the device, and click **SAVE** to finish.

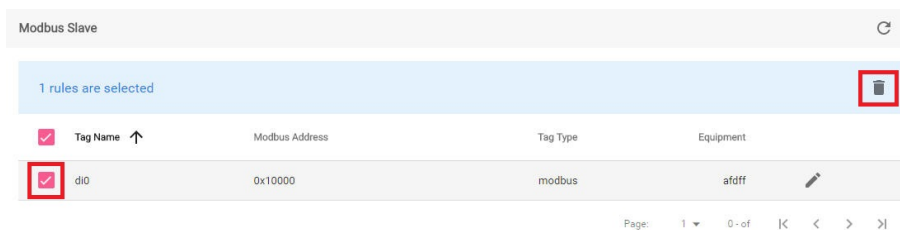
The 'Edit Modbus slave address' dialog box is shown. It has a title bar with a close button. The form contains the following fields:

- Select a function *: Discrete Inputs
- Select an equipment type *: afdff
- Select a tag *: di0
- Modbus Address *: 0x10000

A green 'SAVE' button is at the bottom right.

Deleting a Modbus Slave Device

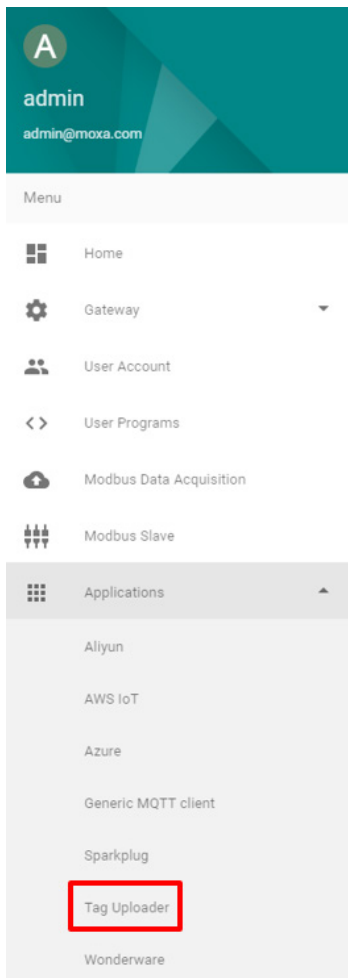
To delete a Modbus Slave device, select the device, and then click the delete icon.



Managing Log Profiles

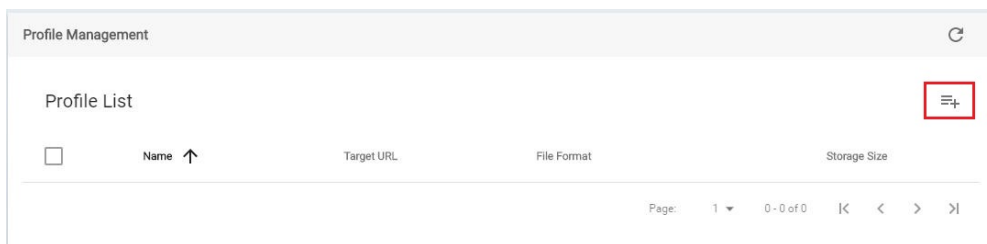
Log profiles are used to configure storage instructions for data files generated by ThingsPro. Once you have created a log profile, you can use it to automatically send data log files to a specified remote server. For example, you can connect a Modbus I/O module to a gateway, pull in data from the field devices and sensors connected to the I/O module, and store the data in the gateway. You can configure a log profile in ThingsPro to specify the remote server to which the data log files should be sent and the interval at which to send them. ThingsPro will send the log files to the remote server at the intervals that you have specified in the log profile.

To configure a log profile, update an existing one, or delete a log profile, click on the **Tag Uploader** link on the main menu.



Adding a Data Log Profile

To add a new data log profile, click the add icon.



Edit the profile interface in the following page.

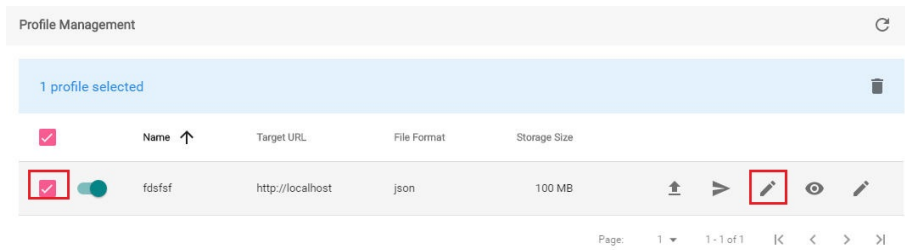
Refer to the following table for the detailed description.

Field	Description
Profile Name	Specify a name for the new log profile. Length: 3-255 characters Format: a-z, A-Z, 0-9, '_', '-'
Target URL	Specify the complete URL of the remote server to which the data log files associated with this profile should be uploaded.
Enable HTTP Basic Authentication	Select this option to enable HTTP basic authentication
No Check Certificate	Select this option to skip the certificate check on the HTTPS connection.
Enable Compression	Enable file compression of the data files.
File Rotate Count	Select file rotation unit. 1 unit is 1 MB. A file with capacity more than 1 MB will be generated as a new file.
File Format	Select a file format: XML, JSON, or CSV NOTE: These formats are not that of the device log file, but are the file formats that you can use to download/upload data from the data logger.
File Destination	Specifies the temporary storage destination when the log profile capacity is exceeded. ThingsPro will detect if there's an external storage device, such as an SD card, inserted. If an external storage is detected then you can specify the log files to be stored in this storage. If not, the log profile files can be saved only in the internal storage, "internal (var/mxc)".
Schedule	Sets an upload schedule for the data log files. For example, daily at a specified time, hourly, or even every minute. A data log file is uploaded only when the data size exceeds 1 MB as described below: 1. When a data log entry is generated, it will be saved in the RAM. 2. When this log increases and exceeds 1 MB, the data is saved as a file to the File Destination that you specify. 2. The log files can be retrieved by the minute, hour, or day, based on your configuration settings.
Options: create headers	Provide optional name and value for new headers.

When finished, click **SAVE**.

Updating a Log Profile

To update a log profile, select the device and click edit icon.



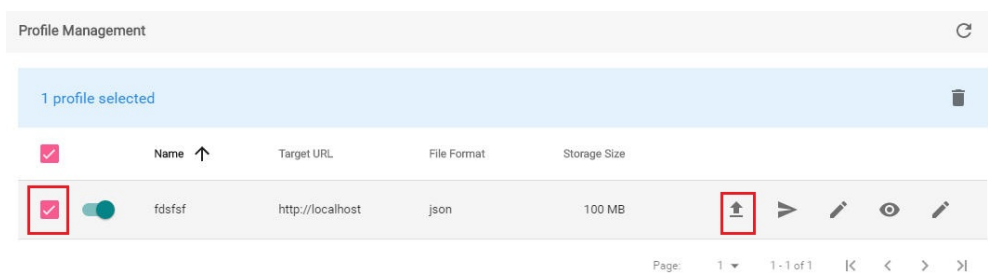
Update the information in the following page. When finished, click **SAVE**.

The screenshot shows the 'Edit Profile' dialog box. It has a teal header with a close icon. The form contains the following fields and controls:

- Enable:** A toggle switch that is currently turned on.
- Name *:** A text input field containing 'fdsfsf'.
- Target URL *:** A text input field containing 'http://localhost'.
- HTTP Authentication:** A toggle switch that is currently turned on.
- No Check Certificate:** A toggle switch that is currently turned off.
- Enable Compression:** A toggle switch that is currently turned off.
- File Rotate Count *:** A text input field containing '10'.
- File Format *:** A dropdown menu with 'json' selected.
- File destination *:** A dropdown menu with 'Internal (/var/mxc)' selected.
- Schedule:** A dropdown menu with 'Hour' selected.
- Minute:** A dropdown menu with 'Minute' selected.

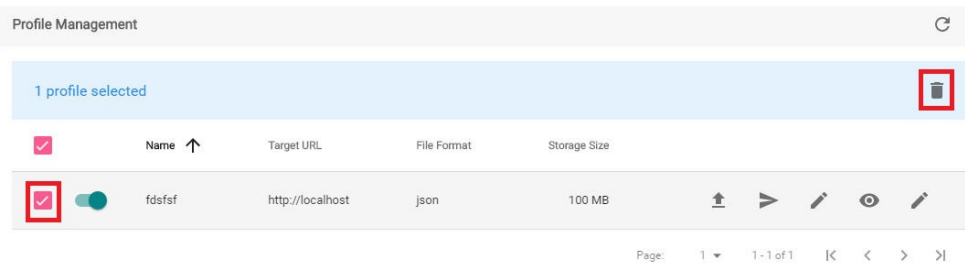
Uploading a Log Profile

To upload a log profile, select the log, and click the upload icon.



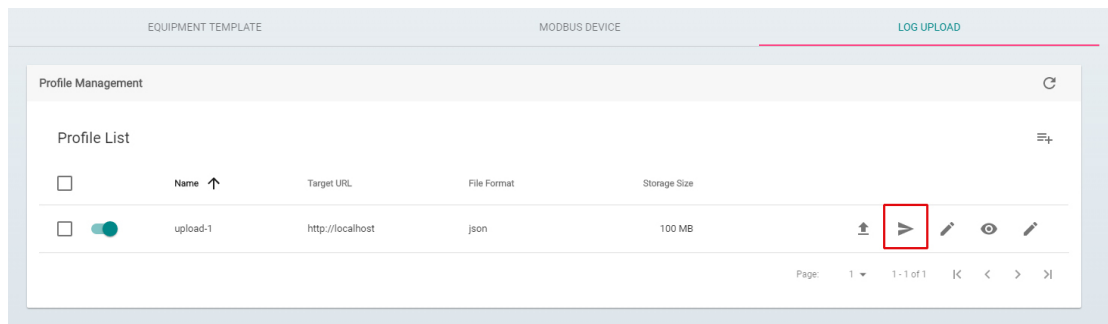
Deleting a Log Profile

To delete a log profile, select the log, and click the delete icon.



Testing Target Connection

Click Test target connect icon to test if the connection to target URL is successful.



Managing IIoT Applications

This section describes how to manage the IIoT applications integrated with the ThingsPro Gateway.

NOTE The data transfer speed via the integrated IIoT applications, both to an on-premise database and to cloud application, is highly dependent on your network infrastructure.

Managing AWS IoT Service for IoT Applications

To manage the AWS IoT Service for your IoT application, select **AWS IoT** from the main menu. Select **Enable** and fill in the AWS IoT service parameters. For details on obtaining the parameters of the AWS IoT service, refer to the *How to get the AWS IoT parameters for ThingsPro* section in the tech note, [How to Build an IoT Application with Moxa's ThingsPro and AWS IoT Service](#).

NOTE You will need to register an AWS account on the [Amazon Web Services website](#) to be able to managing the AWS IoT service for your IoT application.

The screenshot displays the 'AWS IoT' configuration page in the ThingsPro Gateway Software. The left sidebar shows the 'Gateway' menu with 'AWS IoT' highlighted. The main configuration area includes an 'Enable' toggle, a 'Connection Status' indicator, and several input fields for AWS IoT parameters: 'Target Host *', 'Port *' (8883), 'Topic *', 'Client ID *', 'My Thing Name *', 'Root CA File E.g.: ****-G5.pem' (with a SELECT button), 'Certificate File E.g.: ****-certificate.pem.crt' (with a SELECT button), and 'Private Key File E.g.: ****-private.pem.key' (with a SELECT button). There is also a 'SELECT TAGS' button and a checkbox for 'Logging data when network is disconnected'. A 'SAVE' button is located at the bottom right.

Click on the **SELECT TAGS** button (only available in v2.3 and above) to select the tags you want to upload to the AWS IoT service. If you want to enable data caching in the Gateway when the network connection is down, check the **Logging data when network is disconnected** (only available in v2.3 and above) option and specify the **File destination** and the **Max. Storage for Log**.

Edit upload tag setting

Select a d...
2242

2 items are selected

	Name	Log On Change	Description	Unit	Data Type
<input checked="" type="checkbox"/>	AI_0	<input type="checkbox"/>		<input type="checkbox"/>	int16
<input type="checkbox"/>	AI_1	<input type="checkbox"/>			int16
<input type="checkbox"/>	AI_2	<input type="checkbox"/>			int16
<input checked="" type="checkbox"/>	DI_0	<input type="checkbox"/>			boolean
<input type="checkbox"/>	DI_1	<input type="checkbox"/>			boolean
<input type="checkbox"/>	DI_2	<input type="checkbox"/>			boolean

Page: 1 1 - 6 of 6

SAVE

Click **SAVE**.

☒ Logging data when network is disconnected

File destination
Internal(/var/mxc)

Max. Storage for Log (MB) *
2000

Max. Days for Log
3.2 days

SAVE

The built-in AWS IoT client will use the information provided here to establish a connection with the AWS IoT service. Data collected from your AWS IoT application is then uploaded to the AWS IoT service in real time.

The **Connection Status** (only available in v2.3 and above) icon turns green once the AWS Client App successfully connects to the AWS service.





If you have selected the **Logging data when network is disconnected** option, the data collected from your IoT application will be cached locally in the gateway when the network connection is down. The cached data will be transmitted to the AWS IoT service once the network connection is restored.


NOTE The **SELECT TAGS**, **Logging data when the network is disconnected**, and **connection status** functions are only available with ThingsPro version v2.3 and above and also apply to other IoT applications such as Generic MQTT Client, Aliyun (Alibaba Cloud), Microsoft Azure, Sparkplug, and Wonderware Online.


Managing a Generic MQTT Client


The ThingsPro Gateway offers generic MQTT protocol support for your IIoT applications. To manage the MQTT Client, select the **Generic MQTT Client** item on the main menu. Select **Enable**. Check **Update on change** if you want to save data transmission workload as data will be updated only when the data tag has been changed from your Modbus devices. Provide all necessary information on the configuration page. Click **SAVE** to finish.


 Gateway


 Network


 Firewall


 System


 User Account

 User Programs


 MODBUS & Logging

 Modbus Slave

 Applications

 AWS IoT

Generic MQTT client

 Sparkplug

Generic MQTT Client

Enable

Connection Status

Target Host *

Port *
1883

Keepalive (sec.)
30

User Name

Password (include no., alphabet and >5 characters)

Topic *
00:90:e8:6f:93:0f

QoS
1

Client ID
00:90:e8:6f:93:0f

Payloadtype
2

SELECT TAGS

☐ Logging data when network is disconnected

☐ Retain

☒ Clean Session


☐ More Options

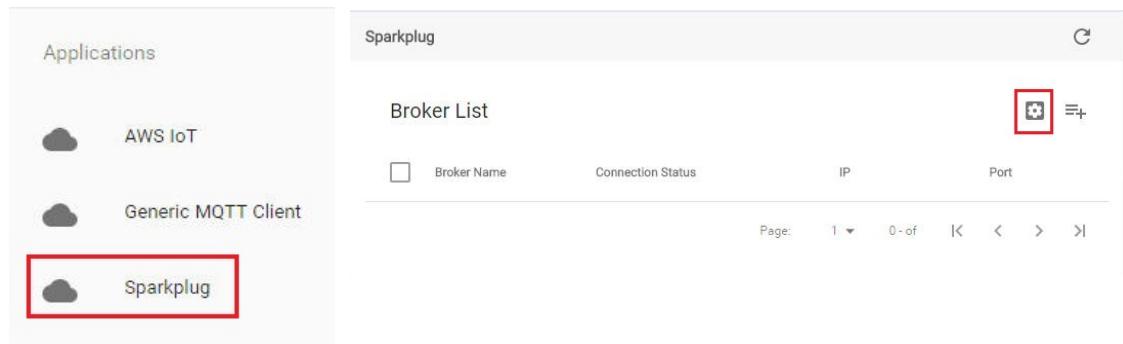
☐ Enable TLS

Managing Sparkplug Connections

Sparkplug is a specification for MQTT-enabled devices and applications to send and receive messages in a stateful way. Sparkplug also provides a mechanism for ensuring that the messages from remote device or application are current and valid. ThingsPro provides an interface to enable sparkplug-based communication between the Server, Gateway, and edge devices.

To enable the sparkplug interface on ThingsPro, do the following:

1. Click on the **Sparkplug** link in the **Applications** section of the main menu.
2. Click on the  (Basic Settings) icon.



3. Click on **Enable Sparkplug** to activate the function.

The Edge Node ID will be automatically retrieved and displayed.
You will also need to provide the group ID.

Settings ×

Basic Settings

☒ **Enable Sparkplug**

Edge Node ID *

00:90:e8:6f:93:0f

Group ID *

Sparkplug B Devices

Primary Host ID

SELECT TAGS


☐ Logging data when network is disconnected

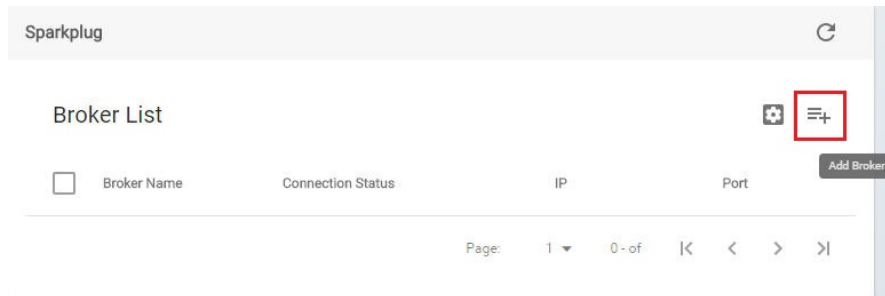
SAVE

4. Click **SAVE**.

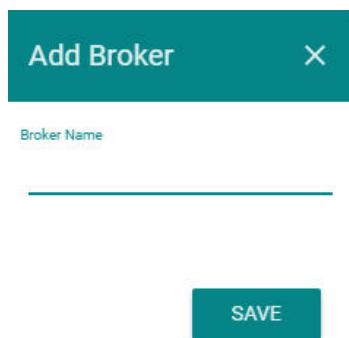
Adding a Message Broker

You must create a message broker in the Sparkplug interface.
To create a message broker, do the following:

1. Click on the  (Add Broker) icon.




2. Specify the **Broker Name**.

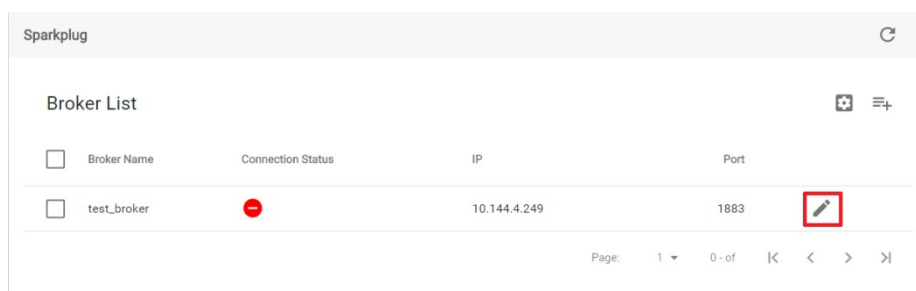


3. Click **SAVE**.

Configuring Broker Settings

To configure/modify Broker settings, do the following:

1. Click on the  (Edit Broker) icon on the Sparkplug configuration page.



2. Enter the broker configuration details.

If necessary, enable TLS and fill in the certificate information for the TLS connection.

The image displays two side-by-side 'Edit Broker' configuration windows. The left window contains the following fields: 'Broker Name *' with the value 'test', 'IP *' with the value '127.0.0.1', 'Port *', 'Username *', 'Password *', and 'Send by Interval' with a dropdown arrow. The right window contains: 'Enable TLS' (checked), 'Private Key Password *', 'Trusted CA Certificate' with a 'SELECT' button, 'Client Certificate' with a 'SELECT' button, 'Client Private Key' with a 'SELECT' button, and a 'SAVE' button at the bottom.

3. Click **SAVE**.

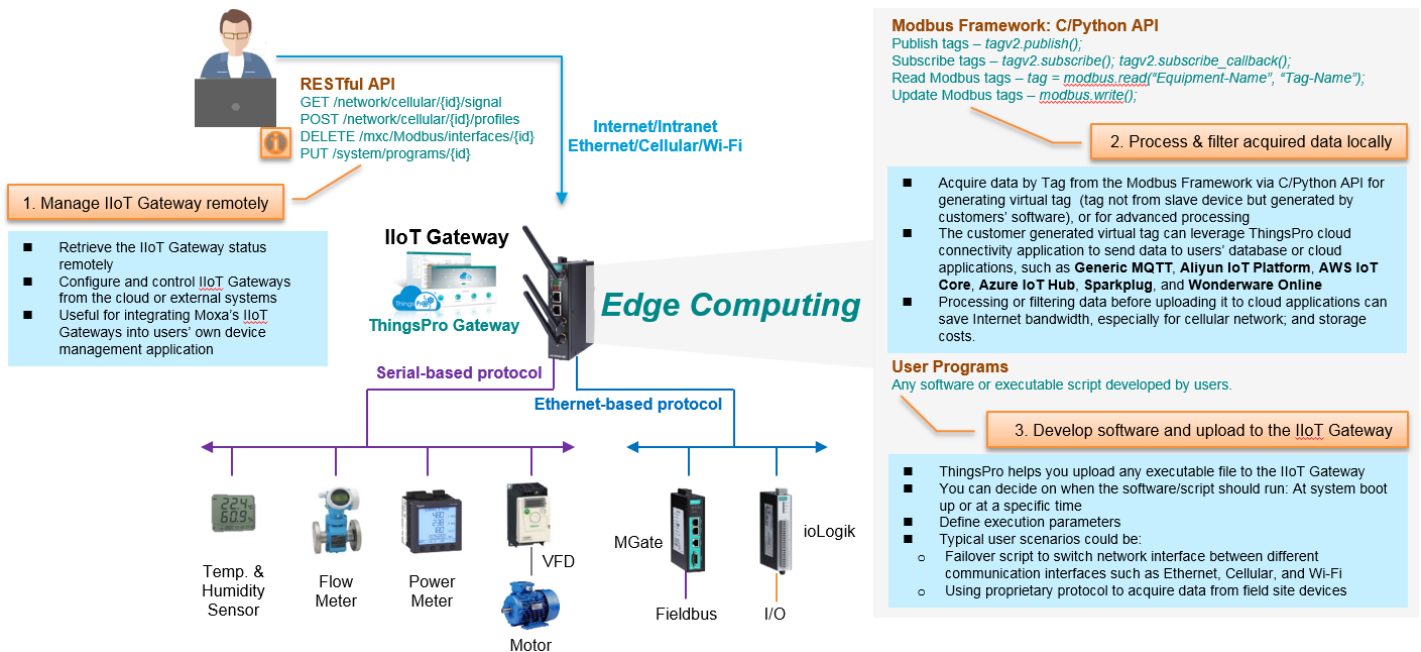
Software Development

The following topics are covered in this chapter:

- ❑ **Rapid Development**

Rapid Development

The ThingsPro Gateway software supports programmability for users to develop software that interacts with the software locally or remotely. The concepts and user scenarios are as follows:



- ① Users need a remote monitoring and control solution so that they can easily manage various end devices and assets at field sites. The IIoT Gateway connects to customers' end devices through different network interfaces by various protocols. ThingsPro Gateway software, installed on the IIoT Gateway, offers RESTful API for users to manage the gateway remotely, including over the cloud.
 - i) Use the ThingsPro RESTful API to retrieve system status and properties such as signal strength of cellular network.
 - ii) The RESTful API is quite useful when you need to manage Moxa's IIoT Gateways with your own device management software.
 - iii) You can control and configure IIoT Gateways from external systems or from your cloud. For example, you can add a new cellular profile for using SIM card 2 slots, delete a Modbus interface, or add a user program on the IIoT Gateway.
- ② Users can deploy Moxa's UC/MC computer (with ThingsPro Gateway software installed) as an IIoT Gateway at the field site. For customers who would like to program the IIoT Gateway for edge computing capability, Moxa offers C and Python APIs for Modbus data acquisition and to process and filter data at the field site.
 - i) Process or filter data before sending it to the cloud or a database. For example, you may only upload the average water level each hour when the rain gauge shows it is a sunny day, even though the IIoT Gateway is polling data from water-level sensor every minute. This will save Internet bandwidth for data transmission and cloud storage. A study indicates that over 90% of the data on the cloud could be garbage.
 - ii) Read or write a Modbus tag for any data type from the connected devices, process the tag to generate a new tag. We call this a virtual tag, which is different from the I/O tag that is generated by slave device directly. This is very useful for scaling your system.
 - iii) The virtual tag can be used as an I/O tag when you want to use a Northbound application to send data to the cloud. Which means that you can leverage ThingsPro's cloud connectivity when you are not acquiring raw data from the field.
- ③ Users can run software and scripts on the remote IIoT Gateway. These could be anything from software programs to a shell script.
 - i) ThingsPro allows you to upload software and scripts via a built-in, easy-to-use web GUI.
 - ii) You can decide on when the software/script should run.

iii) Define/set the execution parameters for the software/script.

In short, you can use programs and scripts to do almost anything. Some of our customers develop their own data-acquisition program for their proprietary devices. They then use the platform that we provide to upload and manage the data-acquisition software, store the acquired data in virtual tags, and upload data to the cloud.

For details on how to develop programs that integrate with our ThingsPro Gateway software, refer to our programming guide at <https://thingspro-programming-guide.netlify.com/>.