ThingsPro Gateway Software User's Manual

Version 11.0, July 2020

www.moxa.com/product



ThingsPro Gateway Software User's Manual

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The ThingsPro® Gateway is a software package built on Debian Linux, 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 Software on Eligible Devices

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 Software on Eligible Devices

NOTE Ensure that your device is a ThingsPro eligible device. A list of eligible devices is available in the product datasheet and the ThingsPro product page on Moxa's website.

Download the ThingsPro Gateway software package from the Moxa website on to your computer.

- We recommend that you use the latest version of ThingsPro Gateway software. In addition to new features, we include enhancements and bug fixes in newer versions of the ThingsPro Gateway software.
 - You can use the installation file for ThingsPro Gateway software V2.6.0 to upgrade previous versions V2.5.1 and V2.5.2 to V2.6.0.

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

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

### ### ###			###	###	###	11 11 11 11			##	
###		#				####	####	#	##	
			##	###	###	###	##	#	##	
11 11 11		##	##	##	##	###	#	#	###	
###	#	#	##	###	###	###	##	##	###	
## #:	#	#	##	###	##	##	##	#	##	
## #:	##	##	##	##	##	##	##	#	###	
## ;	##	#	##	##	##	#	##	###	####	
## ;	##	#	##	###	###	##	###	#	##	
##	###		##	###	###	##	###	#	###	
##	###		##	##	##	##	###	##	##	
##	###		##	##	##	#	###	#	##	
#######	#	##	###	# #####	### #	######	######	#####	######	
r furthe tp://www				tion chec /	k:					
u are u	sing ange	Mo _th	xa e	29 15:51 embedded efault pa	compute	r.				security level or disable the default user, mo

- 2. Upload the installation file directly to the device or copy it to an SD card.
- 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.
- 4. 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 Files for Moxa Industrial Linux (Debian 9)
moxa@Moxa:~$ 1s
thingspro.sh
```

thingspro_release-thingspro_v2.6.0_xxxxx_202006xx-xxxxxx.frm

 $thingspro_release-thingspro_v2.6.0_xxxxx_202006xx-xxxxxx.frm.md5$

You should see the following three files.

- The installation script: **thingspro.sh**
- The ThingsPro Gateway v2.6.0 installation package: thingspro_release-thingspro_v2.6.0_xxxxx_202006xx-xxxxx.frm:
- The md5 checksum file for the firmware: thingspro_release-thingspro_v2.6.0_xxxxx_202006xx-xxxxxx.frm.md5:
- 5. Run the following command on the device to install ThingsPro Gateway 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_202006xx-xxxxxx.log

You can use the **Upgrade Gateway software** function to upgrade to the latest ThingsPro Gateway version.

Maintenance	
Upgrade Gateway software	P
Export Gateway configuration	۵
Import Gateway configuration	\odot
Reboot Gateway	ņ
Export Syslog	۵

You can use the following command to check the upgrade log. moxa@Moxa:~\$ sudo tail -f /var/log/upgrade.log

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

mo	xa@Moxa:~\$	sudo	<pre>mx-tp-ctl -e <n></n></pre>
•	<n> = 0: St</n>	op the	ThingsPro Gateway

<n> = 1: Start the ThingsPro Gateway

NOTE The start/stop function is available in ThingsPro Gateway V2.5.0 and higher versions.

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 (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 Settings

- > 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.

ΜΟΧΛ	€
Things Pro	
Your Industrial IoT, Simplified	
GET STARTED EXPLORE	
6	

 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

мо	×∧
Email * admin@ <u>moxa</u> .com	
Password *	
Remember me	
	SIGN IN

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

Memory

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.

≡ м				
	Spatem Storage 45 K		2.9 CPU (%)	Memory 40 to the second s
Device	e Information	C	Maintenance	
ń	Hostname	Moxa 🧨	Upgrade system	
	Device name	UC-8112-LX-CG 🧨	Export system config	٥
B	Software version	2.1 Build 17071004	Import system config	Ð
G	Uptime	an hour	Reboot system	ů.
٥	Memory size	245 MB	Export syslog	٥
Dashboa	rd Component	Description		
Storage		-	e system or external storage	capacity is used
CPU		Indicates the curr		

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

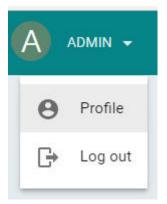
Indicates the current system memory usage

		🔥 admin 🗸 🖨 🌣
System Storage 32 5 5 5 5	40 CPU (%)	Memory 20 %
Device Information C	Maintenance	
🔒 Hostname Moxa 🖍	Upgrade Gateway software	n -
P Device name UC-5112-LX-CG 🧨	Export Gateway configuration	٥
Software version 2.5.0 Build 18103023	Import Gateway configuration	Θ
Uptime 3 hours	Reboot Gateway (<u>ب</u>
تع Memory size 500 MB	Export Syslog	٥
Online		

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.

	Account List								C	=+
	Name 🛧	Company	Email		R	ble				
A	user		user@moxa.com		u	ser			1	P ¹
admin				Page:	1 🕶	1 - 1 of 1	К	<	>	Ж
admin@moxa.com										

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

Account Profile	>	<
Name *		-
admin		I
Company		
Role * Administrator	•	
New Password		l
Confirm Password		
SAVE		Ţ

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

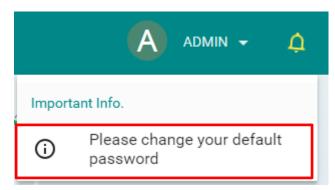


Checking System Notifications (V2.5.0 or above)

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 prot	tect your accounts, please change the default password immediately.
	Change Your Password
	Old Password *
	New Password *
	Confirm Password *
	CHANGE IT LATER SUBMIT

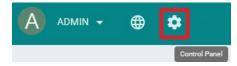
Choosing a Language for the User Interface

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

¢	۲	\$
Engli	sh	
繁體	 中文	
		▲ English 繁體中文

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.

Cont	rol Panel	×
NETW	ORK	
\Box	SSH	
Ê	Syslog	
Q	SSDP	
\bigcirc	Web Access from WAN	
•	Fixed DNS	
	wwan0	
X	DHCP (eth0)	
X	DHCP (eth1)	
\bigcirc	WIFI (wlan0)	
SYSTE	м	
P.	Upgrade Gateway software	
0	Export Gateway Configuration	
Ð	Import Gateway Configuration	on
Ü	Reboot Gateway	
6	Export Syslog	



WARNING

 $\label{eq:constraint} \mbox{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 I	nformation		G
ŧ	Hostname	Моха	
pa.	Device name	ThingsPro	1
	Software version	2.0 Build 1	7030204
0	Uptime		in 5 days
٥	Memory size		246 MB

Editing the Hostname

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

Moxa



1.5
1.0
1
10.00

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

Edit Hostname	×
Name	
Моха	
	SAVE

Editing the Device Name

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

	Device name	ThingsPro	1
--	-------------	-----------	---

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

Edit Device Na	me	×
Name ThingsPro		
	SAVE	

Checking the Software Version

Software version

You can check the software version from the control panel.



2.0 Build 17030204

Checking the System Uptime

You can check the system uptime from the control panel.



in 4 hours

Checking the System Memory Size

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



Memory size

246 MB

Maintenance

This section allows users to update various system settings.

Maintenance	
Upgrade Gateway software	P.
Export Gateway configuration	0
Import Gateway configuration	Ð
Reboot Gateway	Ģ
Export Syslog	0

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.

p.

```
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.

Click to select a file or drop a file here!	Upgrade Sy	stem	×
Click to select a file or drop a file here!	1		1
1		Click to select a file or drop a file here!	1 1
1 I I	1		1



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

0

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		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	Ethernet	Cellular
DHCP Server	DNS	Serial
Time	Port Forwarding	OpenVPN Client
Data Logger (Overwrite Only)	Applications	User Programs
CS Remote Control		
		Τ.
1		1
The second se		E.
- I		
1	Click to select a file or drop a file here	
		1
		Ĩ

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 maintain the uniqueness of the Edge Node ID 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		Ģ
Click Yes to reboot the gatewa	ay.	
Would you like to reboot the sy You will need to wait a few minutes while the s		
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

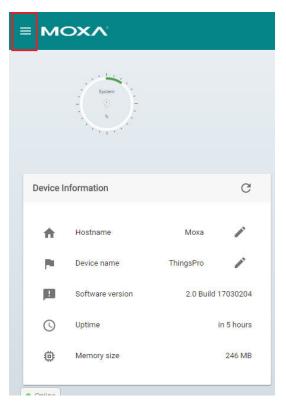
0	
-	

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

Configuration Settings

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.

\$ Gateway	*
Network	
Firewall	
System	

Configuring Network Settings

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

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

letwork Settings	Network Overview	
Network Overview	WAN LAN	
> Ethernet	ETHO WWANO TUNO	
WIFI	Ethernet	
Cellular 👻	Network Status	٢
Routing	Connection Type	Static IP
C DHCP Server	lb	192.168.3.127
DNS	Netmask	255.255.255.0
OpenVPN Client	Gateway	192.168.3.254
SSH SSH	DNS 1	10.144.200.13
	DNS 2	10.144.200.12
	MAC Address	00.90.e8.6c:00.36

Configuring Ethernet Settings

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

Vetwor	rk Settings	Ethernet	C 🏢
0	Network Overview	ETHO ETH1	
(···)	Ethernet	Туре	LAN
•	WIFI	IP	192.168.4.127
	Cellular	Netmask	255.255.255.0

To configure the Ethernet settings:

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

Ethernet		C III
ETHO	ETH1	
Туре		WAN
IP		192.168.31.89
Netmask		255.255.255.0
DNS 1		10.128.8.8
DNS 2		10.128.8.5
3. Select Setti	ngs.	
Informatio	n 🚯	

4. Configure the Ethernet interface settings.

Ċ

Settings

NOTE The ETHO 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

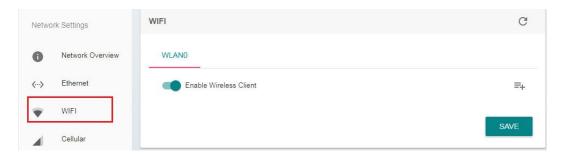
hernet	G	
ETH0 ETH1		
O DHCP		
Static IP		
lb »		
192.168.31.89		
Netmask *		
Netmask * 255.255.255.0		
200.200.200.0		
Gateway		
192.168.31.254		
DNS 1		
10.128.8.1		
DNS 2		
10.128.8.2		
	6	
	SAVE	

Ethernet		С 🏢	
ETHO	ETH1		
O DHCP			
Static	P		
IP *			
192.168.4.	27		
Netmask *			
255.255.25	5.0		
		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.



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

WIFI	C
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**.

	C
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)	C		×
	AAEONWireless-EC-G			P	
	Black howler	Ô		P	
	Guest-13B0			P	
	MHQ-NB	Ô		P	
	MHQ-Mobile	Ô		P	
	MHQ-Visitor	Ô		P	

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**.

I		C
CLIENT	IP SETTINGS	
О рнср		
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		

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.

	Network Overview	WWAND			
->	Ethernet	Basic Information		Current Profile: SIM1	
ř.	WIFI	SIONAL STRENGTH			APN Type
E	Cellular •	-89 dBm		E SIM1	Static Sim Slot 1
	Cellular Status Cellular Settings	Excellent Good 🔳	Fair 📕 Poor 📕 No Signal	SIM	
Þ	Routing	Connection Information		IMSI ICCID PIN Validity	466924252676719 89886920042526767194 3
¢	DHCP Server	Status O RSSI	connected	Location	
=	DNS	ECIO Operating Mode Operator Name	te Chunghwa Telecom	TAC ICCID	3138 2750700
9	OpenVPN Client			Module	
	SSH	Network Information		IMEI Connection Keep- Alive	353251080018759 Or
		iP Netmask Gateway DNS 1 DNS 2	10.47.48.211 255.0.0 10.47.48.212 168.95.1.1 168.95.192.1	Camler	
		Data Usage			
		bata osage			

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

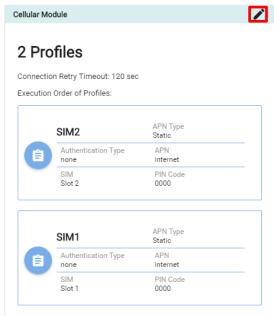
To modify the cellular network settings for your device, click on the **Cellular Settings** link (**Gateway** > **Network** > **Cellular** > **Cellular Settings**).

,	Network Overview	WWAN				
		-	-			
	Ethernet	Cellular	Module	/	Keep-alive	
	WIFI	2 0	rofiles		Target Host	8.8.8
		2 P	romes		Ping Interval Reboot Setting	6
	Cellular 🔺	Conne	ction Retry Timeout: 120 se	c	Neboot setting -	
		Execut	ion Order of Profiles:		1	
	Cellular Status					
			SIM2	APN Type Static		
	Cellular Settings	C	Authentication Type none	APN Internet		
	Routing		SIM Slot 2	PIN Code 0000		
	DHCP Server					
	DNS		SIM1	APN Type Statio		
			Authentication Type none	APN Internet		
	OpenVPN Client		SIM Siet 1	PIN Code 0000		
1	SSH		01011	0000		

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
Ê	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.

Cellular Module	×
Enable Cellular Module 2 Profiles	•
#1 SIM2 Static APN	
# 2 SIM1 Static APN	Î
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

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.

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.
- Refer to your carrier instruction to use Static or Dynamic APN and configure the corresponding settings.
- If your carrier offers private network services, you may choose chap, pap, or both in the Authentication Type.
- 5. Enter your Username and Password to log in to the service network.
- 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 **SAVE** button to save the **Profile Settings.**
- 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 \times icon on the upper right corner.

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.

Profile Settings	×
Profile Name *	
SIM2	
Static APN	
O Dynamic APN	
Authentication Type	
none	Ψ
APN	
internet	
PDP CID	
1	
SIM	
2	~
Pin Code	
0000	
	SAVE

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

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

Keep-alive	1
Target Host	8.8.8.8
Ping Interval	60
Reboot Setting	Off

2. Enable the Keep-alive function

(eep-alive	
Enable Keep-alive	-
Tarpet Host	
8.8.8.8	
Pogisteval	
60	

- 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 **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.

Netwo	ork Settings	Routing		C
0	Network Overview	Default Route		
<···>	Ethernet	Priority	Default gateway	Interface
Ŧ	WIFI	0		tun0
	Cellular	1		wlan0
¢	Routing	2		wwan0
X	DHCP Server	3	•	eth0
	DNS	$\wedge \downarrow$		
¢	OpenVPN Client			SAVE
	SSH			

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.

Routing		G
Set routing priority		
Priority	Default gateway	Interface
0		tun0
1		wlan0
2		wwan0
3	S	eth0
$\wedge \lor$		
		SAVE

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

Routing		C
Set routing priority		
Priority	Default gateway	Interface
0		wlan0
1		tun0
2		wwan0
3	⊘	eth0
$\uparrow \downarrow$		SAVE
		SAVE

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

Routing			G
Set r	outing priority		
	Priority	Default gateway	Interface
	0		wlan0
	1		tun0
	2		wwan0
	3	•	eth0
\uparrow	\checkmark		
			SAVE

- 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

Netwo	rk Settings	DHCP Server	C III
0	Network Overview	ETH0 ETH1	
< >	Ethernet	Status	0
Ŧ	WIFI	Start IP	192.168.3.200
	Cellular	End IP	192.168.3.250
×	DHCP Server	Netmask	255.255.255.0
	DNS	Lease time	3600 sec
¢	OpenVPN Client	Primary DNS	8.8.8.8
	SSH	Secondary DNS 1	8.8.4.4
		Secondary DNS 2	
		Domain name	

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

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

DHCP Server	C 🏢
ETH0 ETH1	
Status	\oslash
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.



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**.

HCP Server	C	
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		
Secondary DNS		
8.8.4.4		
Secondary DNS		
127.0.0.1		

Configuring DNS Settings

Click $\ensuremath{\textbf{DNS}}$ to view the current DNS settings.

Netwo	rk Settings	DNS	C	
0	Network Overview	Active network interface		eth0
<··>	Ethernet	Primary DNS		
Ŧ	WIFI	Secondary DNS		
	Cellular			
X	DHCP Server			
	DNS			
¢	OpenVPN Client			
	SSH			

To configure the DNS settings, click the edit icon.

eth0
3.8.8
3.8.5

Select **Settings** to continue.

Status	0
Settings	\$

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

DNS		C	
Enable static DNS			
Primary DNS			
127.0.0.1			
Secondary DNS			
127.0.0.1			
		ONT	

Configuring Open VPN Client Settings

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

Netwo	rk Settings	OpenVPN	C	
0	Network Overview	Connection status		C
<···>	Ethernet	Local IP		n/a
Ŧ	WIFI	Remote IP		n/a
	Cellular			
X	DHCP Server			
	DNS			
C°	OpenVPN Client			
	SSH			

To configure the settings, click the edit icon.

OpenVPN	G	
Connection Status		C
Local IP		n/a
Remote IP		n/a

Select Settings.

Information	0
Settings	\$

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

OpenVPN	C 🏢
Upload your certificate and key as per this sample file	<u>*</u>
Enable	
Configuration File	SELECT
	SAVE

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.

OpenVPN	C 🏢
Connection status	¢
Local IP	10.128.1.1
Remote IP	10.128.1.2

Configuring SSH Settings

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

Netwo	rk Settings	SSH	G	
0	Network Overview	Status		0
<··>	Ethernet			
Ŧ	WIFI			
	Cellular			
×	DHCP Server			
8	DNS			
¢	OpenVPN Client			
	SSH			

To configure the settings, click the edit icon.

SSH	C	
Status		0

Select **Settings** to continue.

Status	0
Settings	\$

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

SSH	C	
Enable		
Password		
	SAVE	

Configuring Firewall Settings

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

ф	Gateway	*
	Network	
	Firewall	
	System	

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

Firewall Settings	Port Forwarding					C
< Port Forward	Port Forward Rules L	st				≡+
	Status Name 个	Protocol	Internal IP	Internal Por	t External Port	
	4		Page:		-of < <)	+

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

Port Forwarding								C	
Port-Forwarding Rules	6						1	=+	
Status Name 个	Protocol	Inter	nal IP	Internal p	ort	Ex	ternal p	000000000000000000000000000000000000000	a Rul
4								•	
		Page:	1 🔻	0 - 0 of 0	K	<	>	>I	

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**.

Edit rule	×
Enable	
Name *	
Internal IP * 127.0.0.1	
Protocol *	*
Internal Port*	
External Port *	
	SAVE

Configuring System Settings

Select **System** from the Gateway menu.

۵	Gateway	*
	Network	
	Firewall	9
	System	

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

Systen	n Settings	Serial Ports				C	
ŧŧŧ	Serial	PORT 1	PORT 2				
Ċ	Time	Interface				/dev/	ttyM0
[. 0	Admin	Mode				F	RS232
9	GPS						
(CS Remote Control						
٩	Maintenance						

Configuring Serial Settings

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

System	n Settings	Serial Ports			C	
ţţţ	Serial	PORT 1	PORT 2			
Ċ	Time	Interface			/dev/	ttyM0
0	GPS	Mode			F	RS232
(;	CS Remote Control					
٩	Maintenance					

To configure the serial settings, click the edit icon.

Serial Ports		C III
PORT 1	PORT 2	
Interface		/dev/ttyM0
Mode		RS232

Select Settings.

Status	0
Settings	\$

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

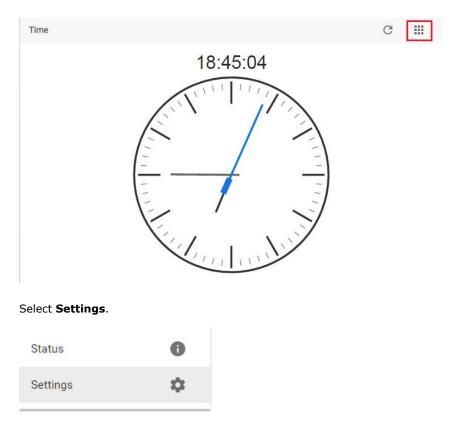
Ser	ial Ports	C	
	PORTO PORT1		
	RS-232		
	RS-485-2W		
	RS-422/RS-485-4W		

Configuring the System Time

Select Time to view the current system time.

System Setti	ngs	Time	C 🏢
Seri	al	18:43:25	
C) Tim	e		
GPS GPS	3	E'''	1
CS F	Remote Control		
🔾 Mai	ntenance		
		The second second	
		Date	2017-03-07
		Time Zone	Asia/Taipei
		Synchronization Mode	Auto
		Time Server	pool.ntp.org
		Time Interval	3600sec

To configure the system time, click the edit icon.



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

Time	C	
Time Zone *		
Asia/Taipei Synchronization Mode		•
Time Server * pool.ntp.org		
Time Interval * 3600		
	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.

System	n Settings	Admin	G	
ŧŧŧ	Serial	HTTP Server		
Ċ	Time	Enabled		0
60	Admin	Port		80
0	GPS	HTTPS Server		
(CS Remote Control	Enabled		0
4	Maintenance	Port		443

Click the edit icon to configure the Admin settings.

Systen	n Settings	Admin	C	
÷÷÷	Serial	HTTP Server		
Ċ	Time	Enabled		0
[0]	Admin	Port		80
0	GPS	HTTPS Server		
Î	CS Remote Control	Enabled		0
4	Maintenance	Port		443

Select Settings.

Status	0
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**.

Syster	n Settings	Admin	(
ţţţ	Serial	Enable HTTPS	
O	Time	HTTPS server port* 443	
[0]	Admin		
•	GPS	Enable HTTP	
()•	CS Remote Control	80	
٩	Maintenance		5

Configuring GPS Settings

Select GPS to view the current GPS settings.

Systen	n Settings	GPS	G	
ŧŧŧ	Serial	Latitude		11
Ô	Time	Longitude		22
0	GPS			
Î	CS Remote Control			
2	Maintenance			

To configure the GPS settings, click the edit icon.

GPS	G	
Latitude		11
Longitude		22

S۵	loct	Settings.
Se	iecι	Settings.

Status	0
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**.

PS	G	
Find out your location : <u>http://www.latlong.net/</u>		
Enable (only available in v2.3 or above) Latitude* 0		
Longitude * O		
	SAVE	

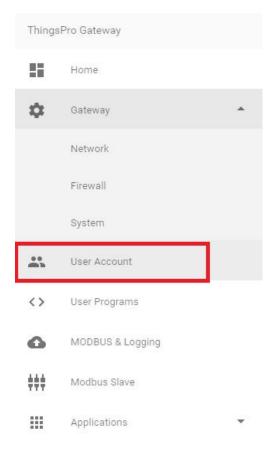
System Maintenance

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

Syster	n Settings	Maintenance	
†††	Serial	Upgrade system	P.
Ċ	Time	Export system config	۵
9	GPS	Import system config	9
Î	CS Remote Control	Reboot system	ő
٩	Maintenance	Export syslog	۵

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.

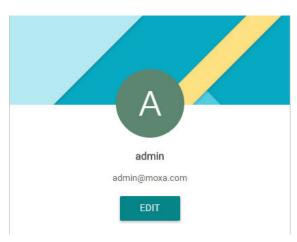
Account List								C	≡+
🗌 Name 个	Company	Email		Role				Cre	ate Accoun
user		user@moxa.com		user				-	^p
			Page:	1 💌	1 - 1 of 1	<	<	>	×

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

Account Profile	×
Email *	
Name *	
Company	
Role *	*
New Password	
Confirm Password	
SAVE	

Editing the Administrator Information

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



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

Name * admin	
Company	
Role *	
Administrator	Ŧ
New Password	
Confirm Password	l.

Updating User Account Information

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

1 is selected				Î
Name 个	Company	Email	Role	
user		user@moxa.com	user	1
			Page: 1 ▼ 1-1 of 1 <	< > >

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**.

Name * user Company Role * User * New Password	¢
user Company Role * User	
Role * User	_
Role * User	
User 👻	
New Password	
Confirm Password	
SAVE	

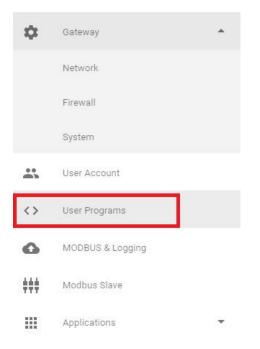
Deleting a User Account

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

1 is selected							Î
Name 🛧	Company	Email	Role			Remo	ove Account
user		user@moxa.com	user			/	P3
			Page: 1 ▼ 1-	-1 of 1 🛛 🔀	<	>	Я

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.

Custom Programs						G
Program List						≡+
Status	Program name 🕇	Arguments	Log File	Program File	Last Run	Add a program
				Page: 1 🔻	0-of K <	> >

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.
- Create a working directory on the ThingsPro Gateway. moxa@Moxa:~\$ mkdir myproject
- 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.

- 4. 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 .
- 6. 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		-1
Script file myproject.tar.gz	SELECT	
Arguments time.google.com		
Timeout *		1
Run automatically at star Run periodically At intervals of* 1	tup	
	SAVE	ļ

7. 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.

A adm	in @moxa.com	
Menu		
==	Home	
\$	Gateway	*
	User Account	
<>	User Programs	
۵	Modbus Data Acquisition	
‡‡‡	Modbus Slave	
	Applications	*

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.

TEMPLATE N	IANAGEMENT		MODBUS MANAGEMENT			
Template Management						C
Template List						<u>≜</u> =+
Name 个	Tag Count	Template Action				Tag Action
ioLogik-E1210	16	Ē	1	≡+		٠
ioLogik-E1211	31	G	1	≡+		•
ioLogik-E1212	32		1	≡+		•
ioLogik-E1213	28		1	≡+		•
ioLogik-E1214	18		i	≡+	ē	•
ioLogik-E1240	8		1	≡+		٠
ioLogik-E1241	8		i	≡+		۰
ioLogik-E1242	20		1	≡+		٠
ioLogik-E1260	6		i	≡+		٠
ioLogik-E1261H-T	44		1	≡+		•
			Page: 1 💌 1-10 of 19	<	<	> >

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.

Template Management			C
1 template(s) selected			<u>*</u> 1
Name 🔨	Tag Count	Template Action	Tag Action
ioLogik-E1210	16		/ =+ 🗋 🔖

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

Uploading a Template

To upload a template, click upload icon.

Template Management			C
Template List			1 ≡+
Name 🔨	Tag Count	Template Action	Tag Action
ioLogik-E1210	16	Ū	1 =+ 🗋 🗣

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.

Template Management			C
Template List			± =+
Name 个	Tag Count	Template Action	Add a template Tag Action
ioLogik-E1210	16		T=+

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

Edit Template	e Name 🛛 🗙
Name	
	SAVE

Copying a Template

Select the device, and then click the copy icon.

emplate Management						C
1 template(s) selected						± ii
Name 🔨	Tag Count	Template Action			2	Tag Action
ioLogik-E1210	16		1	≡+		•
ioLogik-E1211	31	Copy template	1	≡+		•

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

Edit Template Na	me ×
Name	
ioLogik-E1210	
s	AVE
	ALL ALL ALL

Removing a Template

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

Template Management						G
1 template(s) selected						± 🗊
Name 🔨	Tag Count	Template Action			3	Remove templates
ioLogik-E1210	16		/	≡+		•
ioLogik-E1211	31		1	=+	ē	•

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.

Template Management					G
1 template(s) selected					± i
Name 🔨	Tag Count	Template Action		ì	Tag Action
ioLogik-E1210	16		▶ =+	Ē	•
ioLogik-E1211	31	Ē	Update tag	ē	•

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

Template: ioLogik-E1	210
Tag List	
diO	*
ag Name *	
diO	
unction *	
read-discrete-inputs	*
Address *	
0	
lata Type	
boolean	Ŧ
luantity *	
1	

Adding a Device Tag

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

Template Management			C
1 template(s) selected			±î
Name 个	Tag Count	Template Action	Tag Action
ioLogik-E1210	16		1
ioLogik-E1211	31		Add tag

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

Edit Tag	×	Edit Tag	×
		Unit	
Template: ioLogik-E1210			
		Description	
Tag Name *		0,0,1,10,	
Function *	•	Enable Byte Order	
1911 I.S.		Enable Auto Scaling)
Address *		Slope-intercept	
		O Point-slope	
Data Type		0	
Quantity *		Slope *	
1			
		Offset *	
Enable Invalid Value			
Invalid Value *		SAVE	
		2	
Unit			
	+		

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 command for the device. The commands 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.

emplate Management					G
1 template(s) selected					± î
Name 🔨	Tag Count	Template Action			Tag Action
ioLogik-E1210	16	Ū	1	≡+	
ioLogik-E1211	31		1	≡+	Copy tag

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

Template: ioLo	gik-E1210
Tag List	
di0	•

Showing a Tag List

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

Template Management						C
1 template(s) selected						± i
Name 🛧	Tag Count	Template Action				Tag Action
ioLogik-E1210	16	Ē	/	≡+		۲
ioLogik-E1211	31		1	≡+	ē	Show tag list

The tag list will be shown.

Tag List

Name 个	Function	Address	Unit	Туре	Quantity	Byte Order	Invalid Value	Scaling	Description
di0	read-discrete-inputs	0		boolean	1				
di1	read-discrete-inputs	1		boolean	1				
di10	read-discrete-inputs	10		boolean	1				
di11	read-discrete-inputs	11		boolean	1				
di12	read-discrete-inputs	12		boolean	1				
di13	read-discrete-inputs	13		boolean	1				
di14	read-discrete-inputs	14		boolean	1				
di15	read-discrete-inputs	15		boolean	1				
di2	read-discrete-inputs	2		boolean	1				
di3	read-discrete-inputs	3		boolean	1				

Page: 1 - 1 - 10 of 16 |< < >

Creating Equipment Virtual Tags

NOTE In ThingsPro Gateway versions prior to v2.5.1, this page is called **Custom Equipment Management**.

You can create a virtual tag for equipment and specify the details.

Virtual Tag							C
Virtual Tag List						Add	+ virtual tags
	Page:	1 🕶	0 - 0 of 0	K	<	>	×

To add an equipment to the list,

- 1. Click the add equipment icon.
- 2. Provide the necessary information in the Edit Custom Equipment page.

Edit Virtual Tag	ļ							>
Name *								
Notice: Tag name must	be unique.							
Virtual Tag Nam Data	а Тур 🔻 Асс	cess Ty 🔻 g	Size *	Descri	ption		AD	D
Virtual Tag Name	Data Type	Access Ty	ре	Size	Des	cription		
		Page:	1 💌	0 - 0 of 0	<	<	>	>
							SA	VE

- 3. Click ADD.
- 4. 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.

lodbus Management								С
MODBUS/RTU MODBUS/	TCP							
Name 个	Interval	Port	Baud Rate	Parity	Stopbits			
Modbus_Gateway_1	5 sec	PORT 1	115200	none	1	-	0	≡+
							0	≡+

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

odbus Management								G
MODBUS / RTU MODBU	JS / TCP							
RTU List								
Name 个	Interval	Port	Baud Rate	Parity	Stopbits			
Modbus_Gateway_1	5 sec	PORT 1	115200	none	1	1	0	≡+
Modbus_Gateway_2	5 sec	PORT 2	115200	none	1	1	0	≡+
					Page: 1 💌	1-2 of 2 K	<	> >

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.

nano akaima ing pananan akaima								
S/RTU MODBU	S / TCP							
bus selected								
Name 🛧	Interval	Port	Baud Rate	Parity	Stopbits			
Modbus_Gateway_1	5 sec	PORT 1	115200	none	1	1	0	≡+
Modbus_Gateway_2	5 sec	PORT 2	115200	none	1		0	≡+
	S/RTU MODBU bus selected Modbus_Gateway_1 Modbus_Gateway_2	Ander Steelen Ste Steelen Steelen Ste	Asme ↑ Interval Port Modbus_Gateway_1 5 sec PORT 1	Asame ↑ Interval Port Baud Rate Modbus_Gateway_1 5 sec PORT 1 115200	Name Modbus_Gateway_1 5 sec PORT 1 115200 none	Asame ↑ Interval Port Baud Rate Parity Stopbits Modbus_Gateway_1 5 sec PORT 1 115200 none 1	Asame ↑ Interval Port Baud Rate Parity Stopbits Modbus_Gateway_1 5 sec PORT 1 115200 none 1	Asame ↑ Interval Port Baud Rate Parity Stoppits Modbus_Gateway_1 5 sec PORT 1 115200 none 1

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

nterface Name *	
Modbus_Gateway_1	
fort	
PORT 1	
laud Rate *	
115200	*
arity *	
none	¥
topbits *	
Í	*
lesponse Timeout *	
500	
nterval Period *	
5000	
nter-char Timeout *	
100	

Adding a Modbus/TCP Device

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

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

Modbus Management						G
MODBUS / RTU MODBUS / TCP						
TCP List						≡+
Name 🔨	Interval	Port	Host IP			
		Page:	1 🔻 0-0 of 0	I< <	>	×

2. Edit the TCP interface settings.

Edit TCP Interfa	ce Settings X
Interface Name *	
Host IP *	
127.0.0.1	
Port *	
Interval *	
-	
Response Timeout *	
	SAVE

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

Modbus Management									G	
MODBUS / RTU	MODBUS / TCP									
TCP List									=+	
🗌 Name 🛧	Interval	Port	Host IP							
uc-8100	0.1 sec	20	192.168.4.20				/	0	=+	
				Page:	1 🔻	1 - 1 of 1	1<	<	> Add a connect	ted devic

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

Edit Device	×
Device Name *	
Template *	•
Unit ID *	
TEST	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.

Thing	Pro Gateway	
	Home	
\$	Gateway	्र
•••	User Account	
$\langle \rangle$	User Programs	
۵	MODBUS & Logging	
†††	Modbus Slave	
	Applications	Ŧ

Click the add icon.

Modbus Slave			C
Modbus Address List			Disabled 💽 🗮
Tag Name 🔨	Modbus Address	Тад Туре	Equipment
		Page: 1 💌	0-of < < >>

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

Add a Modbus slave Address	×
Select a function *	Ŧ
Select an equipment type *	•
Select a tag *	Ŧ
Modbus Address *	
	SAVE

A new Modbus Slave device will be added.

odbus Slave						C
Modbus Address List				Disabled	Ø	≡+
Tag Name 🛧	Modbus Address	Тад Туре	Equipment			
di0	0x10000	modbus	afdff	-		
		Page:	1 💌 0-of	1< <	>	>

Enabling a Modbus Slave Device

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

Modbus Slave						C
Modbus Address List				Disabled		≡+
Tag Name	Modbus Address	Тад Туре	Equipment			
di0	0x10000	modbus	afdff	/		
		Page:	1 v 0 · of	K <	>	Ж

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	
Any address	
Any address	

Editing a Modbus Slave Device

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

Modbus Slave				C
1 rules are selected				
🗾 Tag Name 🔨	Modbus Address	Тад Туре	Equipment	
di0	0x10000	modbus	afdff	1
		Page:	1 ▼ 0-of	< < > >

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

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

Deleting a Modbus Slave Device

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

Modbus Slave								G
1 rules are selected							[Î
🗾 Tag Name 个	Modbus Address	Tag Type		Equipment				
dio	0x10000	modbus		afdff		/		
		P	age: 1	• 0 - of	<	<	>	>

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.

A adm	in @moxa.com	
Menu		
55	Home	
\$	Gateway	
*	User Account	
<>	User Programs	
0	Modbus Data Acquisition	
ŧŧŧ	Modbus Slave	
	Applications	
	Aliyun	
	AWS IOT	
	Azure	
	Generic MQTT client	
	Sparkplug	
	Tag Uploader	
	Wonderware	

Adding a Data Log Profile

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

Profile Management									G
Profile List								E	≡+
Name 🔨	Target URL	File Format				Storage	e Size		
			Page:	1 ¥	0 - 0 of 0	K	<	>	×

Edit the profile interface in the following page.

Edit Profile				×
Enable				*
Name *				
Target URL *				1
HTTP Authentication				
No Check Certificate				
Enable Compression				
File Rotate Count *				1
File Format *				
json			Ť	
File destination * Internal (/var/mxc)			×	
Schedule				
Hour	٣	Minute	Ŧ	•

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	Select this option to enable HTTP basic authentication
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.

Profile Manage	ment						C
1 profile se	elected						Ĩ
	Name 个	Target URL	File Format	Storage Size			
	fdsfsf	http://localhost	json	100 MB	<u>±</u>	> 🖍	• /
				Pag	e: 1 🕶	1-1 of 1 🛛 🔀	< > >

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

Edit Profile		×
		*
Calle Enable		
Name *		
fdsfsf		
Target URL *		
http://localhost		
HTTP Authentication No Check Certificate Enable Compression		
File Rotate Count *		
10 File Format *		
json		*
File destination *		
Internal (/var/mxc)		*
Schedule		
Hour	▼ Minute	· ·

Uploading a Log Profile

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

Profile Manag	ement									C
1 profile s	elected									Î
	Name 个	Target URL	File Format	Storage Size						
	fdsfsf	http://localhost	json	100 MB		±	>	/	0	1
					Page:	1 •	1 - 1 of 1	<	<	> >

Deleting a Log Profile

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

ofile Manage	ement								C
1 profile se	elected								Î
	Name 个	Target URL	File Format	Storage Size					
	fdsfsf	http://localhost	json	100 MB	±	>	/	0	/
				Pa	age: 1 🕶	1 - 1 of 1	[<	<	> >

Testing Target Connection

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

E	QUIPMENT TEMPLATE		MODBU	IS DEVICE			LOG U	PLOAD		
Profile Management										G
Profile List										=+
	Name 🛧	Target URL	File Format	Storage Size						
	upload-1	http://localhost	json	100 MB		±	>	/	0	1
					Page:	1 🕶	1 - 1 of 1	Κ	<	> >

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, <u>How to Build an IoT</u> <u>Application with Moxa's ThingsPro and AWS IoT Service</u>.

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.

\$	Gateway	AWS IoT	G
	Network	Enable	
	Firewall	Connection Status	8
	System	Target Host *	
	User Account	Port * 8883	
<>	User Programs	_Topic *	
0	MODBUS & Logging	Client ID *	
‡ ‡‡	Modbus Slave	My Thing Name *	
	Applications		SELECT
	AWS IOT	Root CA File E.g.: ****-G5.pem	
	Generic MQTT client	Certificate File E.g.: ****-certificate.pem.crt	SELECT
	Snarkplug		
		Private Key File E.g.: ****-private.pem.key	SELECT
		SELECT TAGS	
		Logging data when network is disconnected	
			SAVE

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**.

lelect a d 2242 - -					
2 items are	selected				
Name 个	Log On Change	Description	Unit	Data Type	
AI_0				int16	
AI_1				int16	
AL_2				int16	
				boolean	
DI_1				boolean	
DI_2				boolean	
SAVE.	Page:	1 - 1-60	of6 K	< > > SAVE	
Logging dat	ta when network i	s disconnected			
File destination Internal(/var/mx	(C)				
Max. Storage for Log 2000	(MB) *				
					3

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.

Enable	
Connection Status	٩

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	Generic MQTT Client
	Network	
	Firewall	D Enable
	System	Connection Status
	User Account	Target Host *
<>	User Programs	Port * 1883
0	MODBUS & Logging	Keepalive (sec.) 30
‡‡‡	Modbus Slave	
	Applications 4	User Name
	AWSIOT	Password (include no., alphabet and >5 characters)
	Generic MQTT client	Topic * 00:90:e8:6f:93:0f
1	Snarkplug	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.

Applications	Sparkplug								C
AWS IOT	Broker List								≡+
-	Broker Name	Connection Status		IP			Port		
Generic MQTT Client			Page:	1 🕶	0 - of	<	<	>	\geq
Sparkplug									

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.

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.

Sparkplug								G	
Broker List								≡+	
Broker Name	Connection Status		IP			Port		Add Broke	
		Page:	1 🕶	0 - of	<	<	>	>	

2. Specify the Broker Name.

Add Broker	×
Broker Name	
14 <u></u>	
	_
	SAVE

3. Click **SAVE**.

Configuring Broker Settings

To configure/modify Broker settings, do the following:

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

Sparkplug							C
Broker List						ø	≡+
Broker Name	Connection Status	IP		Port			
test_broker	•	10.144.4.249		1883		1	
			Page:	1 ▼ 0-of	К	< >	>

2. Enter the broker configuration details.

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

Edit Broker	×	Edit Broker		×
Broker Name * test	ŕ	Enable TLS	•	
IP *	k	Private Key Password *		
127.0.0.1	- 1	Trusted CA Certificate	SELECT	
Port *	-1		SELECT	
Username *	- 1	Client Certificate	SELECT	1
Password *	- 1	Client Private Key	SELECT	
Send by Interval	÷		SAVE	d
Interval *	•			-

3. Click SAVE.

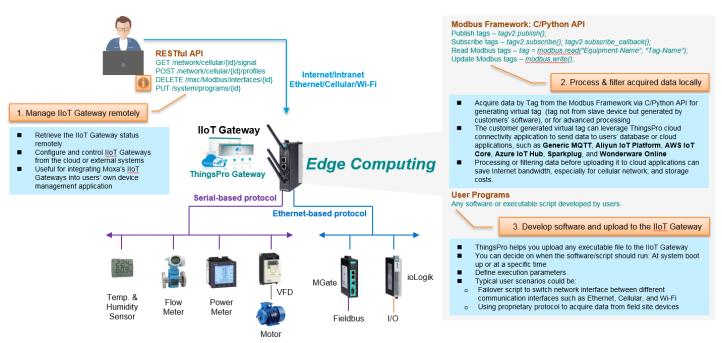
Software Development

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.
 - 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 <u>https://thingspro-programming-guide.netlify.com/.</u>