How to Build an IoT Application with Moxa's ThingsPro and AWS IoT Service

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Contents

1	Introduction	2
2	Application Scenario	2
3	Prerequisites	3
4	Solution	3
5	Additional Reading	8

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About Moxa

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things. With over 30 years of industry experience, Moxa has connected more than 50 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures. Information about Moxa's solutions is available at www.moxa.com.

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Using Moxa ThingsPro and AWS IoT Service

1 Introduction

Moxa's ThingsPro[™] 2.0 Suite simplifies the development of IoT applications and facilitates data acquisition as well as remote device management. ThingsPro provides Modbus communications, data acquisition, wireless networking, and device management, in a few simple steps, allowing users to focus on developing applications instead of complex system integration.



For users who develop data acquisition and asset management software programs on their own, ThingsPro provides the ability to transfer field data to the AWS IoT service without requiring any additional programming on the gateway. ThingsPro 2.0 includes generic Modbus protocol and AWS IoT support, which you can use to easily configure protocol data polling tables and AWS IoT connection settings. You can then upload the data collected to the AWS IoT service. In this article, we describe how to configure the MODBUS device template in ThingsPro, retrieve data from ThingsPro, and upload the data to a remote HTTP server.

2 Application Scenario

Set up an environment to send real-time device data updates to the AWS IoT service using ThingsPro 2.0. Here, ThingsPro is used as a Modbus data logger and the AWS function provided by ThingsPro is used to configure the connection to the AWS IoT service.

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3 Prerequisites

1. Moxa UC-8112 gateway computer with Internet access, and ThingsPro 2.0 Gateway and SD card installed.

For information about setting up a Moxa UC-8112, refer to the *ThingsPro User's Manual*.

- 2. PC/notebook with Chrome browser and Microsoft Device Explorer installed
- 3. Modbus device (e.g., Moxa ioLogik-E2242)
- 4. <u>AWS IoT configuration: thing name, CA certificate, device certificate, device private key,</u> <u>mqtt topics, and mqtt endpoint</u>

4 Solution

Complete the following steps to create your IoT application using ThingsPro and AWS IoT service:

1. Choose an equipment template.

a. In the ThingsPro Gateway web page, click \equiv (Menu).

	OXA						- ⊕	•
	Dia Gage	(37 CPU (%))			
Device I	nformation	G	Maintenance					
+	Hostname	Moxa 🎤	Upgrade system	P				
1.0	Device name	ThingsPro 🧨	Export system config	6				
jii i	Software version	2.0 Build 17031708	Import system config	Ð				
O	Uptime	in 29 minutes	Reboot system	Ϋ́				
٥	Memory size	246 MB	Export syslog	0				
Online								

Using Moxa ThingsPro and AWS IoT Service

b. In the ThingsPro Gateway menu, click on the **Modbus & Logging** link.

A admin admin@	n moxa.com
Menu	
55	Home
\$	Gateway 👻
-	User Account
<>	User Programs
6	MODBUS & Logging
ŧŧŧ	Modbus Slave
	Applications 🔻

• Online

c. Open the EQUIPMENT TEMPLATE tab

d. Browse through the **Template List** to locate the template corresponding to the Modbus device or create a new template.

For details on creating a new template, refer to the ThingsPro User's Manual.

EQUIPMENT TEMPLATE		MODBUS DEVICE	LOG UPLOAD
-			~
Template Management			G
Template List			± =+
Name 🛧	Tag Count	Template Action	Tag Action
ioLogik-E1210	16	Ū	i 🖍 🎫 🗖 🕨
ioLogik-E1211	31		🖍 =+ 🗖 🕨
ioLogik-E1212	32		🖍 =+ 🗖 🔖
ioLogik-E1213	28	Ē	1 =+ 🗋 🔖
ioLogik-E1214	18		🖍 =+ 🗍 🕨
ioLogik-E1240	8		🖍 =+ 🗖 🔖
ioLogik-E1241	8		i 🖍 🎫 🗖 🕨
ioLogik-E1242	20		i 🖍 🎫 🗖 🕨
ioLogik-E1260	6	Ē	/ =+ 🗇 🔖

In this article, we use the Modbus device **E2242**, which is already listed in the **Template** List.

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- 2. Create an instance of the Modbus device.
 - a. Select the **MODBUS DEVICE** tab.
 - b. Configure the Modbus device with a communication interface (serial or Ethernet).
 Because the connected device (E2242) uses Modbus TCP protocol, click on the
 MODBUS/TCP tab.

								A	ADMIN 👻
EQUIPMEN	T TEMPLATE		MODBUS DEVICE]			LOG UPI	LOAD	
Modbus Management									C
MODBUS / RTU	MODBUS / TCP	ĸ							
TCP List									=+
Name 🔨	Interval	Port	Host IP						
				Page:	1 •	1 - 2 of 2	Κ	< >	×

- i. Click =+ (Add TCP interface).
- ii. Fill in the TCP interface settings and click **SAVE**.

E2242 Host IP * 192.168.4.123 Port * 502	
Host IP * 192.168.4.123 Port * 502	
192.168.4.123 Port * 502	
Port * 502	
502	
Interval 8	
111051761	
1000	
Response Timeout *	
5000	

The Modbus/TCP interface for E2242 is added to the **TCP List**.

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iii. Click on the (Add connected device) button corresponding to E2242 to add a connected device.

EQUIPMEN	T TEMPLATE		MODBUS DEVICE		LOG I	JPLOAD
Modbus Management						G
MODBUS / RTU	MODBUS / TCP					
TCP List						≡+
Name 🛧	Interval	Port	Host IP			
E2242	1 sec	502	192.168.4.123	1	0	/ =+

- iv. Fill in the **Device Name**.
- v. Select a **Template** to combine MODBUS/TCP interface with the Modbus device.
- vi. Specify the **Unit ID** for the device and click **SAVE**.

Device Name + F2242	
Template + ioLogik-E2242	•
Unit ID +	

ThingsPro will now start continuously polling data from the device.

To check the status, click <a>(Show connected devices).

If the **Request Status** is green, ThingsPro is able to send requests to the Modbus TCP device and receive data.

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- 3. Use the AWS IoT service for real-time data update.
 - a. In the ThingsPro Gateway menu, click on the **AWS IoT** link in the **Applications** section.



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b. Fill in the AWS IoT service details.

Enable	
Enable	
Vpdate on change	
Target Host *	
Port *	
8883	
Topic *	
Client ID *	
My Thing Name *	
Root CA File E.g.: ****-G5.pem	SELECT
	SELECT
Certificate File E.g.: ****-certificate.pem	
Certificate File E.g.: ****-certificate.pem	
Certificate File E.g.: *****-certificate.pem	
Certificate File E.g.: ****-certificate.pem	
Certificate File E.g.: ****-certificate.pem Private Key File E.g.: ****-private.pem.key	SELECT
Certificate File E.g.: ****-certificate.pem Private Key File E.g.: ****-private.pem.key	SELECT
Certificate File E.g.: ****-certificate.pem Private Key File E.g.: ****-private.pem.key	SELECT

- c. Select the **Enable** option
- d. Click SAVE

The AWS IoT interface will use the information provided to create a connection with the AWS IoT service. Once the connection is established, data can be uploaded to the AWS IoT service in real time.

5 Additional Reading

Getting Started with AWS IoT