

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	1 / 15

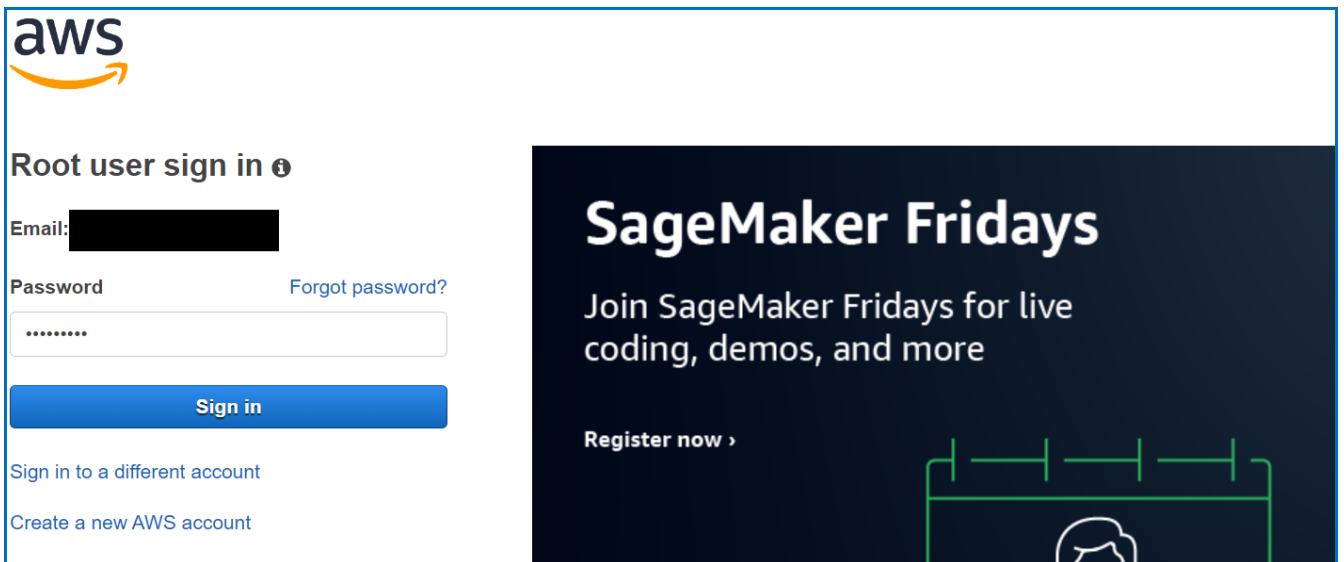
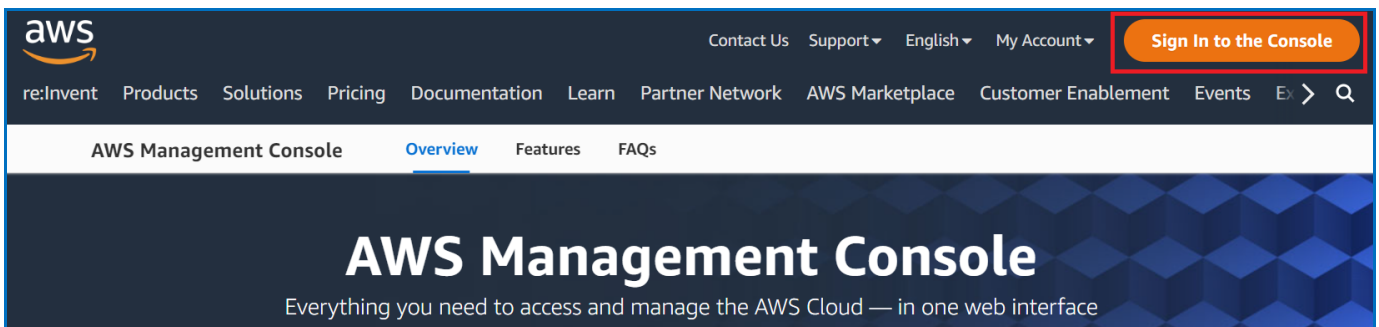
FAQ-CNV-08: UA Web UI Function Wizard – Module Communication Conversion - How do UA series upload data to AWS?

This FAQ introduces the UA series to use MQTT to upload Modbus data to AWS.

Set up the AWS environment

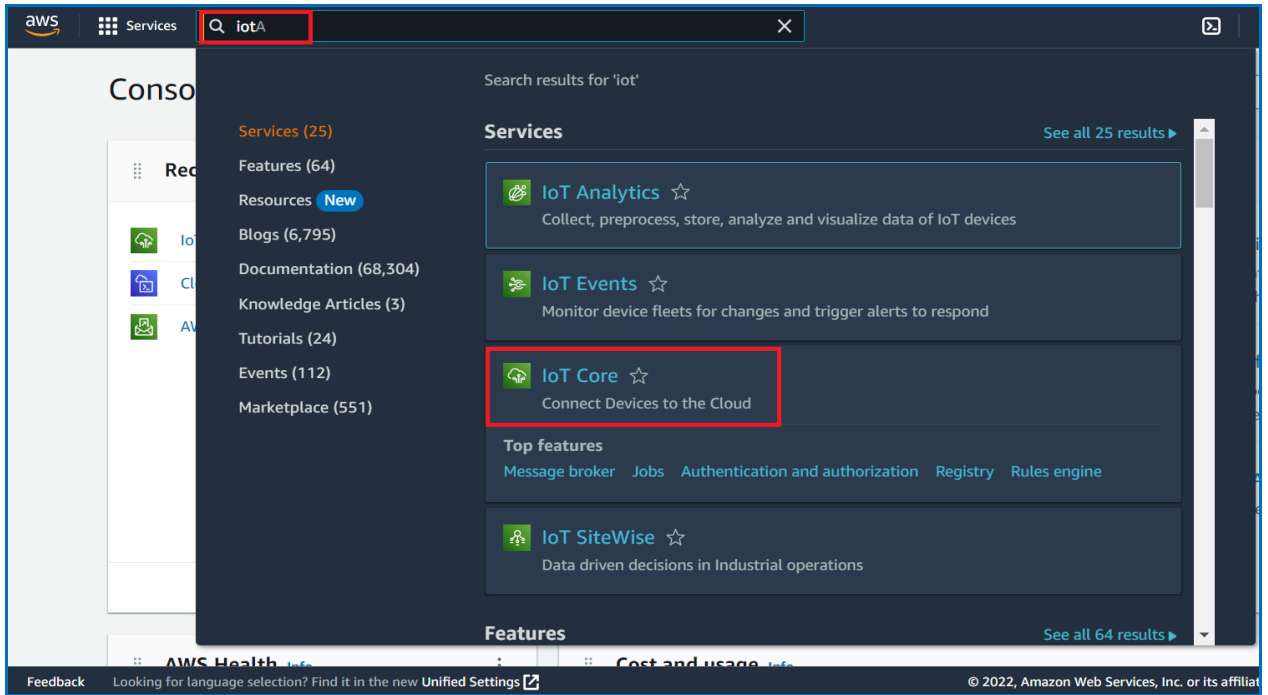
1. Log in to AWS and AWS IOT

Use a browser to log in to the AWS website.



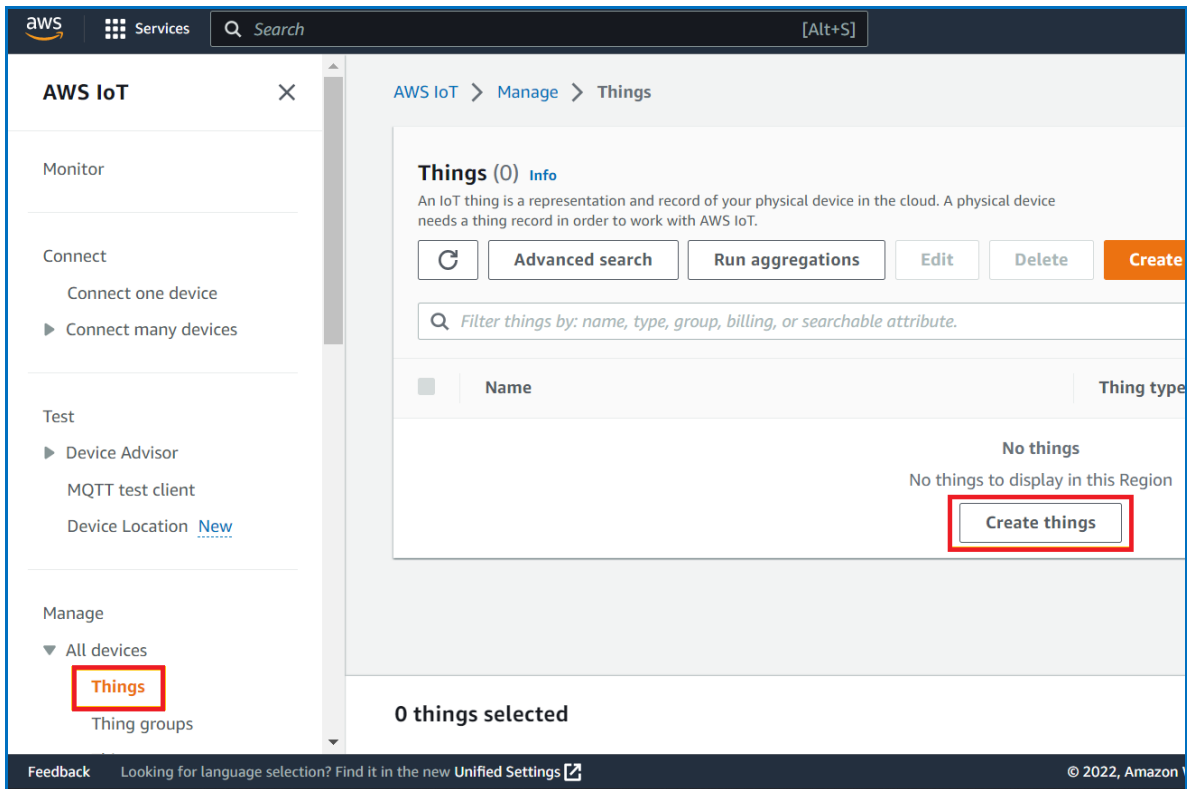
Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	2 / 15

Fill in "iot" in the search box of AWS Service, select "IoT Core" service.

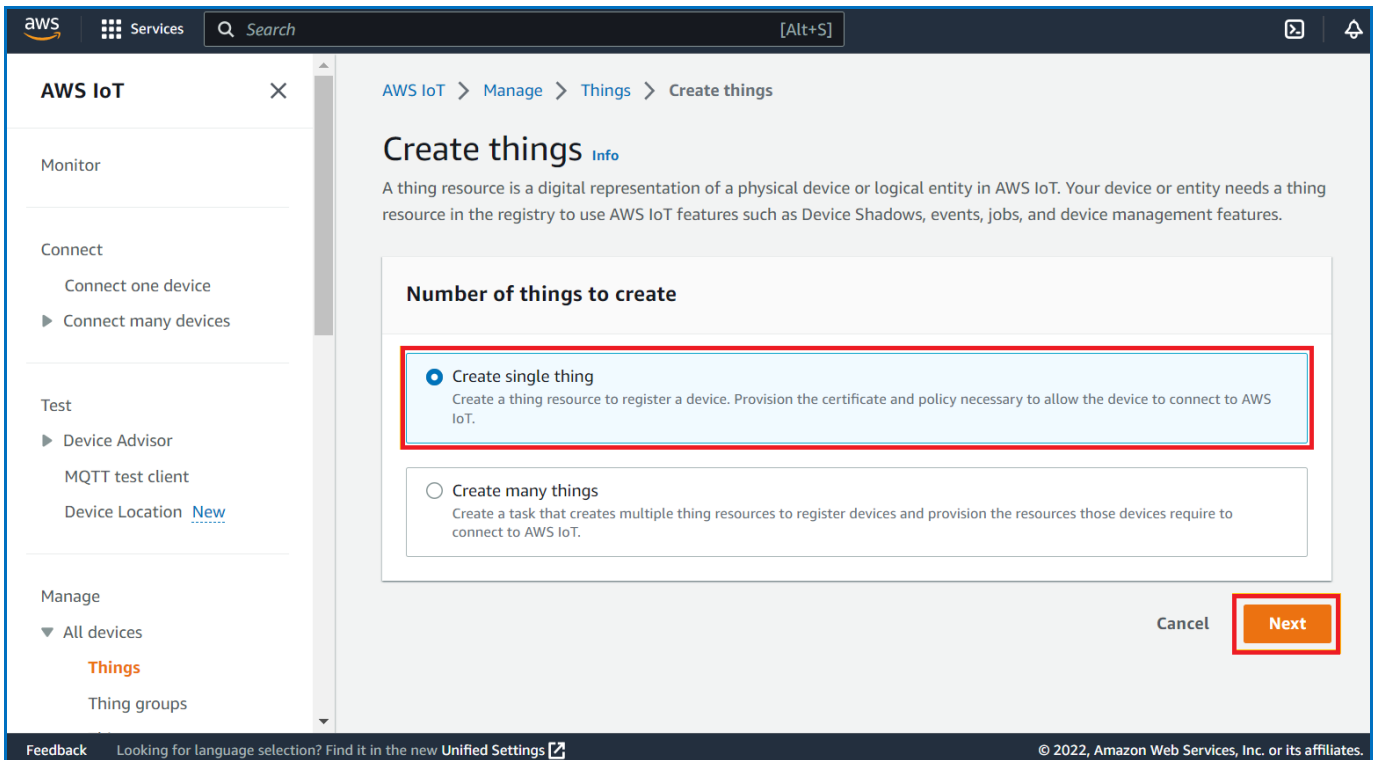


2. Create Device Things

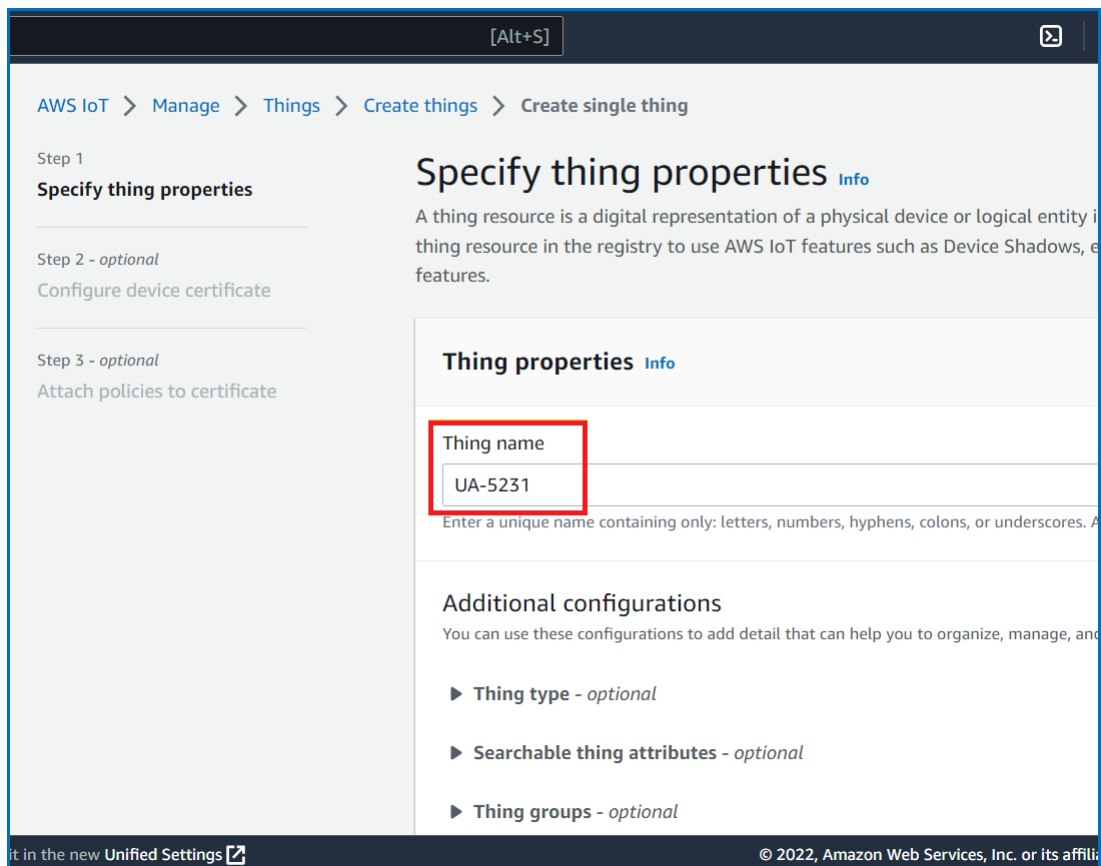
On AWS IoT Service, select "Manage -> Things" on the left, and click "Create things" to create the IoT device.



Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	3 / 15



Fill in the device name in the “**Thing name**” field, for example: UA-5231.



Classification	UA-Series English Function Wizard FAQ-CNV-08							
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	4 / 15	

Then go to the bottom of the page and select **Next**.

Device Shadow [Info](#)

Device Shadows allow connected devices to sync states with AWS. You can also get, update, or delete the state information of this thing's shadow using either HTTPs or MQTT topics.

- No shadow
- Named shadow
Create multiple shadows with different names to manage access to properties, and logically group your devices properties.
- Unnamed shadow (classic)
A thing can have only one unnamed shadow.

Cancel Next

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Activate the certificate and link to the device.

AWS IoT > Manage > Things > Create things > Create single thing

Step 1
[Specify thing properties](#)

Step 2 - optional
[Configure device certificate](#)

Step 3 - optional
Attach policies to certificate

Attach policies to certificate - *optional* [Info](#)

AWS IoT policies grant or deny access to AWS IoT resources. Attaching policies to the device certificate applies this access to the device.

Policies (0) [Refresh](#) [Create policy](#)

Select up to 10 policies to attach to this certificate.

< 1 > [Settings](#)

<input type="checkbox"/>	Name
<p>No policies</p> <p style="font-size: x-small;">No policies could be found in us-east-1.</p>	

Cancel Previous Create thing

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	5 / 15

Download all Certificates and Key files to the local PC for storage, and then click **Done** to complete.

Download certificates and keys
✕

Download certificate and key files to install on your device so that it can connect to AWS.

Device certificate

You can activate the certificate now, or later. The certificate must be active for a device to connect to AWS IoT.

Device certificate
63f0cdd1883...te.pem.crt

Deactivate certificate
Download

Key files

The key files are unique to this certificate and can't be downloaded after you leave this page. Download them now and save them in a secure place.

⚠ This is the only time you can download the key files for this certificate.

Public key file
63f0cdd188303490f986216...2e9d7fd-public.pem.key

Download
Download

Private key file
63f0cdd188303490f986216...e9d7fd-private.pem.key

Download
Download

Root CA certificates

Download the root CA certificate file that corresponds to the type of data endpoint and cipher suite you're using. You can also download the root CA certificates later.

Amazon trust services endpoint
RSA 2048 bit key: Amazon Root CA 1

Download
Download

Amazon trust services endpoint
ECC 256 bit key: Amazon Root CA 3

Download
Download

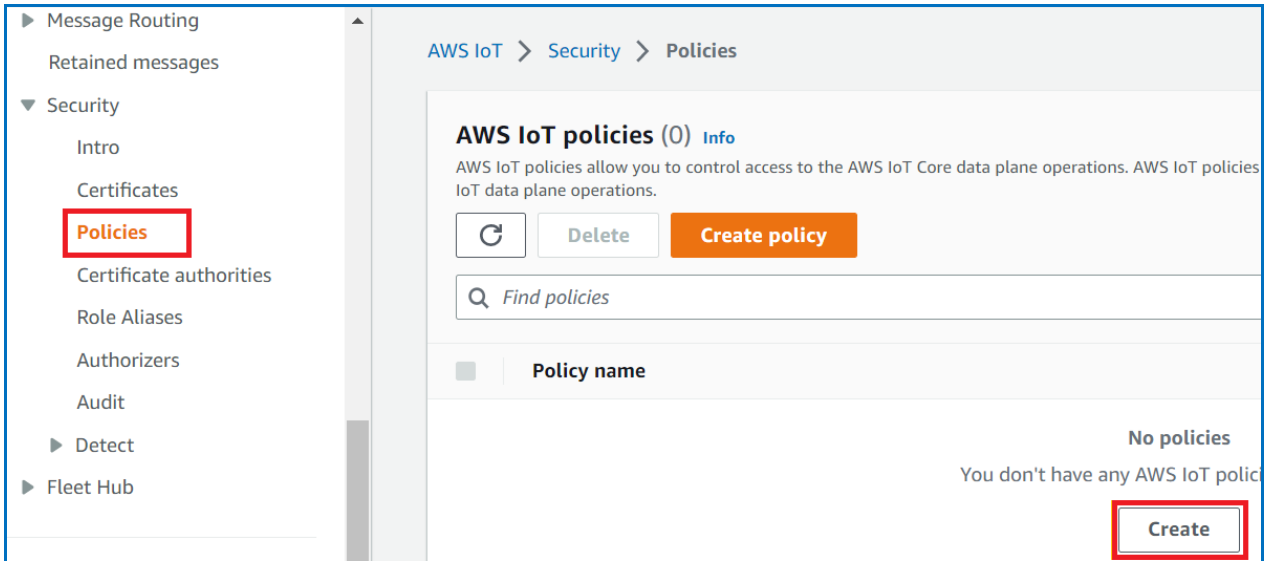
If you don't see the root CA certificate that you need here, AWS IoT supports additional root CA certificates. These root CA certificates and others are available in our developer guides. [Learn more](#)

Done

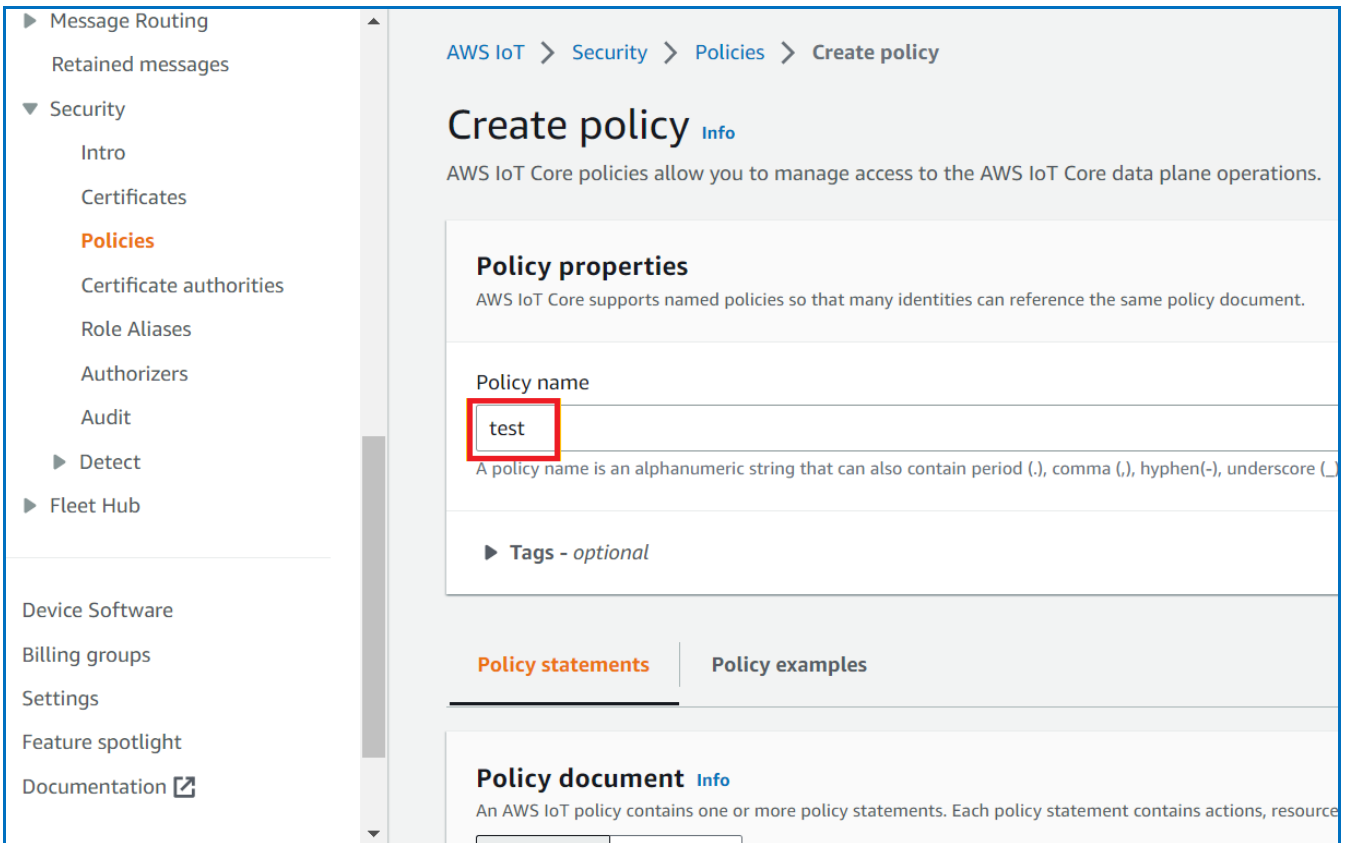
Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	6 / 15

3. Create an AWS IoT Policy and link to the certificate

Click **“Security -> Policies”** to create a Policy.



Set up access permissions and device sources. You can refer to the figure below and set it as no restriction.



Classification	UA-Series English Function Wizard FAQ-CNV-08							
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	7 / 15	

► Tags - optional

Policy statements | Policy examples

Policy document [Info](#)
 An AWS IoT policy contains one or more policy statements. Each policy statement contains actions, resources, and an effect that grants or denies the actions by the resources.

Builder | JSON

Policy effect	Policy action	Policy resource	
Allow ▼	* ▼	*	Remove

Add new statement

Cancel **Create**

After settings, you can view the Policy in the list.

Successfully created policy test. [View policy](#)

AWS IoT > Security > Policies

AWS IoT policies (1) [Info](#)
 AWS IoT policies allow you to control access to the AWS IoT Core data plane operations. AWS IoT policies are separate and different from IAM policies. AWS IoT policies apply only to AWS IoT data plane operations.

Refresh Delete **Create policy**

Find policies

Policy name
test

Click "Security -> Certificates" to create an "Attach policies".

Security

- Intro
- Certificates**
- Policies
- Certificate authorities
- Role Aliases
- Authorizers
- Audit
- Detect
- Fleet Hub

Subject
CN=AWS IoT Certificate

Expires
January 01, 2050, 07:59:59 (UTC+0800)

Issuer
OU=Amazon Web Services O=Amazon.com Inc. L=Seattle
ST=Washington C=US

Policies | Things | Noncompliance

Policies (0) [Info](#)

Refresh Detach policies **Attach policies**

Classification	UA-Series English Function Wizard FAQ-CNV-08							
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	8 / 15	

Select the Policy.

Attach policies to the certificate
✕

63f0cdd188303490f986216c9c69b93505c9bd2b54bb74e971a83848e2e9d7fd.

Policies

Choose policies to attach to this certificate. The certificate can have up to 10 policies attached to it.

Choose AWS IoT policy ▾

↻

test ✕

Cancel

Attach policies

Completing the setting is shown in the figure below.

arn:aws:iot:us-east-1:834573312232:cert/63f0cdd188303490f986216c9c69b93505c9bd2b54bb74e971a83848e2e9d7fd

Subject
CN=AWS IoT Certificate

Issuer
OU=Amazon Web Services O=Amazon.com Inc. L=Seattle
ST=Washington C=US

Valid
December 01, 2022, 16:27:47 (UTC+0800)

Expires
January 01, 2050, 07:59:59 (UTC+0800)

Policies
Things
Noncompliance

Policies (1) [Info](#)

AWS IoT policies allow you to control access to the AWS IoT Core data plane operations.

↻

Detach policies

<input type="checkbox"/>	Name
<input type="checkbox"/>	test

Classification	UA-Series English Function Wizard FAQ-CNV-08							
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	9 / 15	

Set up the UA series MQTT

Please check if your UA product is connected to the router/Internet and powered on.

● Create MQTT Connection

Select an MQTT Function Wizard to create a Modbus (or other) / MQTT project (please choose according to your project needs).

The screenshot shows the 'Function Wizard' dropdown menu with the following options:

- Function Wizard (Click here)
- Function Wizard (Click here)
- Module Communication Conversion**
- (Master) Modbus RTU / OPC UA
- (Master) Modbus TCP / OPC UA
- (Master) Modbus ASCII / OPC UA
- MQTT / OPC UA
- (EtherNet/IP) EIP / OPC UA
- (Master) Modbus RTU / MQTT** (highlighted)
- (Master) Modbus TCP / MQTT
- (Master) Modbus ASCII / MQTT
- (EtherNet/IP) EIP / MQTT
- (Master) Modbus RTU / MQTT JSON
- (Master) Modbus TCP / MQTT JSON
- (Master) Modbus ASCII / MQTT JSON
- Internal / OPC UA

The screenshot shows the 'Modbus TCP Module List' configuration page. The breadcrumb trail is: **Module Setting** > MQTT Certificate > MQTT Broker Setting > Enable Converting Module > Save Project > Run the project.

The sidebar on the left shows the following module selection options:

- Modbus
 - RTU Module (Master)
 - TCP Module (Master)**
 - ASCII Module (Master)
- MQTT
 - MQTT Module
- EtherNet/IP
 - ICPDAS Module
- Internal
 - Internal Module

The main content area shows the 'Modbus TCP Module List' configuration:

- LAN: LAN
- Load ICPDAS Module: Select The Module
- Update ICPDAS Module List button
- Select All:
- Table with columns: No., *Module Name / Nickname, Edit
- Table content: 1, Name
- Copy, Remove buttons
- Page navigation: < 0 / 0 >
- Remove all, Save buttons

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	10 / 15

1. Modbus Module Setting

2. MQTT Certificate Setting

(a) Upload the **AmazonRootCA3.pem** downloaded from AWS IoT to UA via the **Trusted Certificate** item.

MQTT Client

Remove the File

Trusted Certificate	<input type="button" value="Remove"/>
Certificate	<input type="button" value="Remove"/>
Private Key	<input type="button" value="Remove"/>

Upload the file to the controller

Trusted Certificate	<input type="button" value="Select File"/> AmazonRootCA3.pem	<input type="button" value="Upload"/>
Certificate	<input type="button" value="Select File"/>	<input type="button" value="Upload"/>
Private Key	<input type="button" value="Select File"/>	<input type="button" value="Upload"/>

(b) Upload the **xxxxxxxxx-certificate.pem.crt** downloaded from AWS IoT to UA via the **Certificate** item.

MQTT Client

Remove the File

Trusted Certificate	<input type="button" value="Remove"/>
Certificate	<input type="button" value="Remove"/>
Private Key	<input type="button" value="Remove"/>

Upload the file to the controller

Trusted Certificate	<input type="button" value="Select File"/>	<input type="button" value="Upload"/> Success.
Certificate	<input type="button" value="Select File"/> xxxxxxxxx-certificate.pem.crt	<input type="button" value="Upload"/>
Private Key	<input type="button" value="Select File"/>	<input type="button" value="Upload"/>

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	11 / 15

(c) Upload the **xxxxxxxx-private.pem.key** downloaded from AWS IoT to UA via the **Private Key** item.

MQTT Client

Remove the File

Trusted Certificate	<input type="button" value="Remove"/>
Certificate	<input type="button" value="Remove"/>
Private Key	<input type="button" value="Remove"/>

Upload the file to the controller

Trusted Certificate	<input type="button" value="Select File"/>	<input type="button" value="Upload"/>	Success.
Certificate	<input type="button" value="Select File"/>	<input type="button" value="Upload"/>	Success.
Private Key	<input type="button" value="Select File"/> 8e2e9d7fd-private.pem.key	<input type="button" value="Upload"/>	

3. MQTT Broker Setting

(a) In MQTT Connection, set up a Remote Broker.

Module Setting > MQTT Certificate > MQTT Broker Setting > Enable Converting Module > Save Project >

Run the project

System Setting
Module Setting
IoT Platform Setting
Convert Setting
Advanced Setting
Logger Setting

I/O Status
File Setting

IoT Platform Setting
Remote Broker

MQTT Connection

Local Broker

Remote Broker

MQTT Group Connection

Microsoft Azure Platform

OPC UA Connection

Local Server

Remote Broker List

	Remove	Broker Name	IP / Domain	Port
+		Name1		
-	<input type="checkbox"/>	AWS	127.0.0.1	1883

< 1 / 1 >

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	12 / 15

System Setting Module Setting **IoT Platform Setting** Convert Setting Advanced Setting

I/O Status File Setting

IoT Platform Setting > Remote Broker > Broker Content Settings

MQTT Connection

- Local Broker
- Remote Broker**
- MQTT Group Connection
- Microsoft Azure Platform

OPC UA Connection

- Local Server

Broker Content Settings

Broker Name	AWS
IP / Domain	a[redacted]us-east-
Port	8883
Keep Alive Time(second)	60
SSL/TLS	<input checked="" type="checkbox"/> Enabled
Trusted Certificate	AmazonRootCA3.pem
Certificate	63f0cdd188303490f986216c!
Private Key	63f0cdd188303490f986216c!
Anonymous Login	<input checked="" type="checkbox"/> Enabled

(b) In the **Broker Content Settings > IP/Domain** item, fill in the **Endpoint** item data on the **AWS IoT > Settings** page.

Retained messages

- ▼ Security
 - Intro
 - Certificates
 - Policies
 - Certificate authorities
 - Role Aliases
 - Authorizers
 - Audit
 - ▶ Detect
 - ▶ Fleet Hub
- Device Software
- Billing groups
- Settings**
- Feature spotlight
- Documentation

AWS IoT > Settings

Settings [Info](#)

Device data endpoint [Info](#)

Your devices can use your account's device data endpoint to connect to AWS.

Each of your things has a REST API available at this endpoint. MQTT clients and AWS IoT endpoint.

Endpoint

Domain configurations

You can create domain configurations to simplify tasks such as migrating devices to AWS IoT Core, migrating devices to AWS IoT Core and maintaining brand identity.

[Actions](#) ▼ [Create domain configuration](#)

	Name	Domain name	Status	Service type
<input type="checkbox"/>				

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	13 / 15

(c) Broker Content Settings > **Port**: 8883

(d) Broker Content Settings > **SSL/TLS**: check Enabled
Trusted Certificate, Certificate and Private Key: select previously uploaded files in order.

(e) Anonymous Login: check Enabled

4. Enable Converting Module

After completing Broker settings, select the Modbus device Tag to be converted. ([Message QoS set to 0 or 1](#))

MQTT Client Setting

No.	<input type="text" value="1"/>
Module Name	<input type="text" value="simulate"/>
Scan Rate(ms)	<input type="text" value="1000"/>
Dead Band	<input type="text" value="0"/>
Will Topic	<input type="text"/>
Will	<input type="text"/>
MQTT Connection	<input type="checkbox"/> Broker (Local) <input checked="" type="checkbox"/> AWS (Remote)

Publish & Subscribe

Details Show Hide

Name	Subscribe Topic	Subscribe QoS	Publish Topic	Publish QoS	Retain	Enabled
<input type="text" value="Tag0"/>	/MTCP_No.1_simulate/Holding_Registers/Tag0/Subscribe	1 ▼	/MTCP_No.1_simulate/Holding_Registers/Tag0/Publish	1 ▼	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="text" value="Tag1"/>	/MTCP_No.1_simulate/Holding_Registers/Tag1/Subscribe	1 ▼	/MTCP_No.1_simulate/Holding_Registers/Tag1/Publish	1 ▼	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="text" value="Tag2"/>	/MTCP_No.1_simulate/Holding_Registers/Tag2/Subscribe	1 ▼	/MTCP_No.1_simulate/Holding_Registers/Tag2/Publish	1 ▼	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5. Save the project and run the project

After completing the preceding steps, save and run the project following the wizard steps.

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	14 / 15

Test

1. Please click the **MQTT test client** on the **AWS IoT** service page, and use “**Subscribe to a topic**” to check whether the data has been uploaded successfully.

The screenshot shows the AWS IoT console interface. On the left sidebar, under the 'Test' section, the 'MQTT test client' option is highlighted with a red box. The main content area displays the 'Subscribe to a topic' configuration page. The 'Topic filter' field contains '#'. Under 'Additional configuration', the 'Number of messages to keep' is set to 10, and 'Quality of Service 1 - Message will be delivered at least once' is selected. The 'MQTT payload display' option 'Display payloads as strings (more accurate)' is also selected. A red box highlights the 'Subscribe' button at the bottom of the configuration panel.

The screenshot shows the 'Subscriptions' list in the AWS IoT console. The table has columns for 'Subscriptions' and '#'. There are two subscription entries, both for the topic '/MTCP_No.1_simulate/Holding_Registers/Tag1/Publish'. The first entry shows a message ID of 289 and a timestamp of December 01, 2022, 17:29:10 (UTC+0800). The second entry shows a message ID of 287 and the same timestamp. Each entry has a 'Properties' link below it. At the top right of the list, there are buttons for 'Pause', 'Clear', 'Export', and 'Edit'.

Classification	UA-Series English Function Wizard FAQ-CNV-08						
Author	Eva Li	Version	1.0.0	Date	2022, 12	Page	15 / 15

2. Click **MQTT test client** on the AWS IoT service page, and use “**Publish to a topic**” to check whether the **UA** series has successfully received the data.