

USR-N5X0 Quick Start Guide with AWS IoT



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1. AWS IoT

USR-N5X0 supports connecting to AWS IoT platform via MQTT, which can be achieved via simple MQTT and SSL parameter configuration.

1.1. Basic Parameters

- MQTT Version: Supports MQTT-3.1 and MQTT 3.1.1.
- Client ID: MQTT client identifier.
- Server Address: MQTT server domain name or IP address.
- Remote Port NO.: MQTT server port.
- Reconnection Interval: The interval between the current connection failure and the next MQTT connection.
- Last Will: MQTT connection flag. When the network connection is closed, the server must publish this will message.
- SSL protocol: Supports TLS1.0 and TLS1.2 versions, and the authentication mode can choose none certificate authentication, CA signed server and self signed certificate.

1.2. Publish Settings

- Topic: Publish topic name.
- QOS: Message quality of published topics.
- Retained message: MQTT retains the message flag, which is used by the server to store this application message and its quality of service (QoS).

1.3. Subscribe Settings

- Topic: Subscribe topics.
- QOS: Message quality of subscribed topics.

2. AWS Connection Test

In this case, we will show how to connect USR-N5X0 to AWS.

2.1. Preparations

- USR-N5X0*1
- RS485 serial to USB cable*1
- Ethernet cable*1

- 12V/1A power adaptor*1

2.2. Configuration of AWS

2.2.1. Login

1. Login <https://www.amazonaws.cn/en/>
2. Login to the account. If you do not have an account, please create one firstly.

Sign in as IAM user

Account ID (12 digits) or account alias

IAM user name

Password [Forgot password?](#)

Remember this account

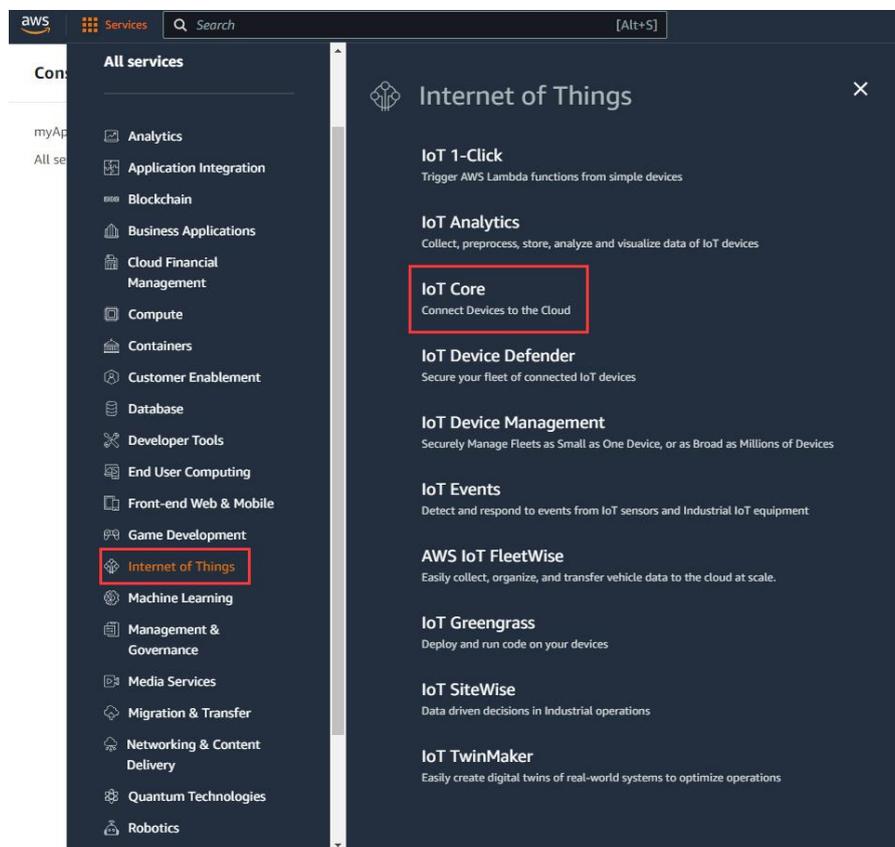
Sign in

[New to Amazon Web Services?](#)

[Create a new Amazon Web Services account](#)

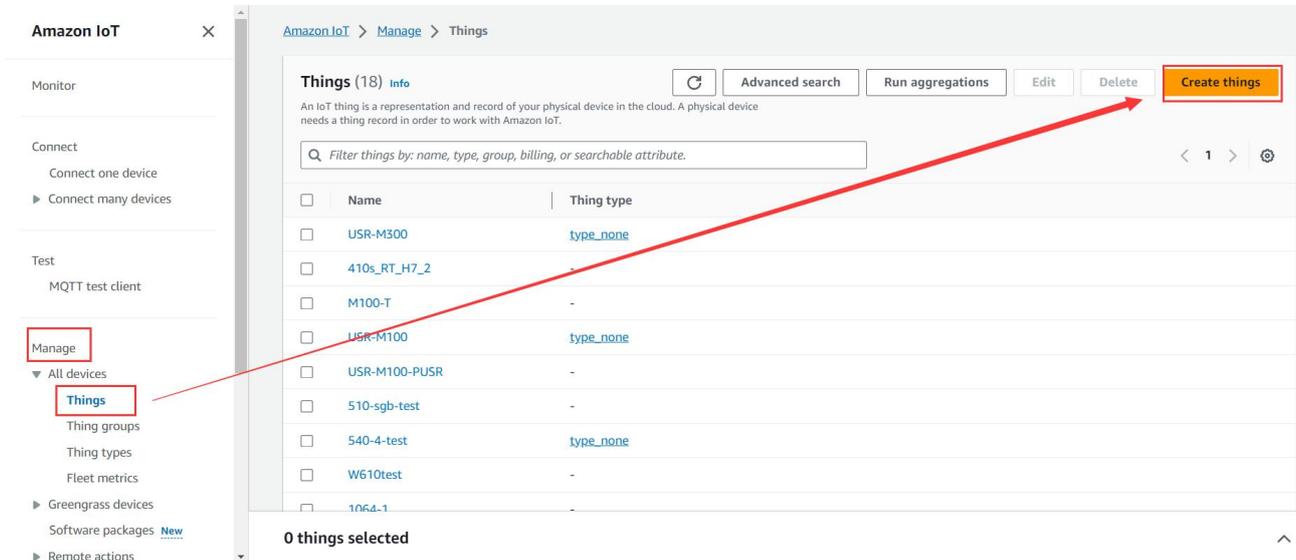


3. Find IoT Core in Internet of Things.

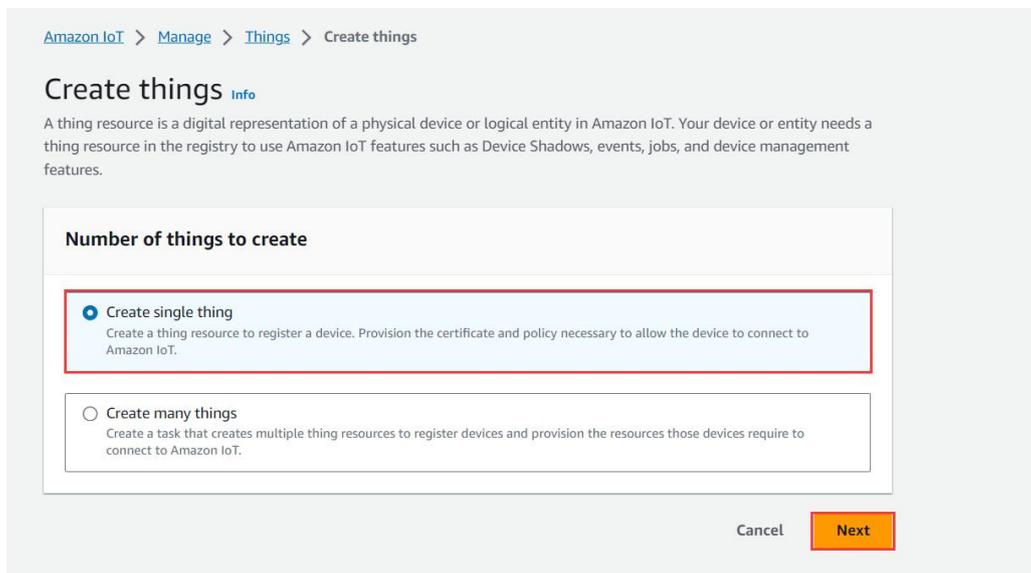


2.2.2. Create Things and Certificates

1. In **Manage->All devices->Things**, click **Create things** to add the device.



2. Choose **Create signal thing**, fill in the **Thing name** and **Thing type**, here we configure the thing name to “USR-N5X0-Test” , configure the thing type to “type_none” .



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

Specify thing properties Info

A thing resource is a digital representation of a physical device or logical entity in AWS IoT. Your device or entity needs a thing resource in the registry to use AWS IoT features such as Device Shadows, events, jobs, and device management features.

Thing properties Info

Thing name

Enter a unique name containing only: letters, numbers, hyphens, colons, or underscores. A thing name can't contain any spaces.

Additional configurations
 You can use these configurations to add detail that can help you to organize, manage, and search your things.

▼ **Thing type - optional**

Thing types are an optional way to store description and configuration information that is common to things that have the same thing type.

Thing type

Add searchable attributes to allow your thing to be grouped and searched without using fleet indexing.

No searchable attributes are associated with the selected thing type.

► **Non-searchable thing attributes - optional**

► **Thing groups - optional**

► **Billing group - optional**

► **Packages and versions - optional**

Device Shadow Info

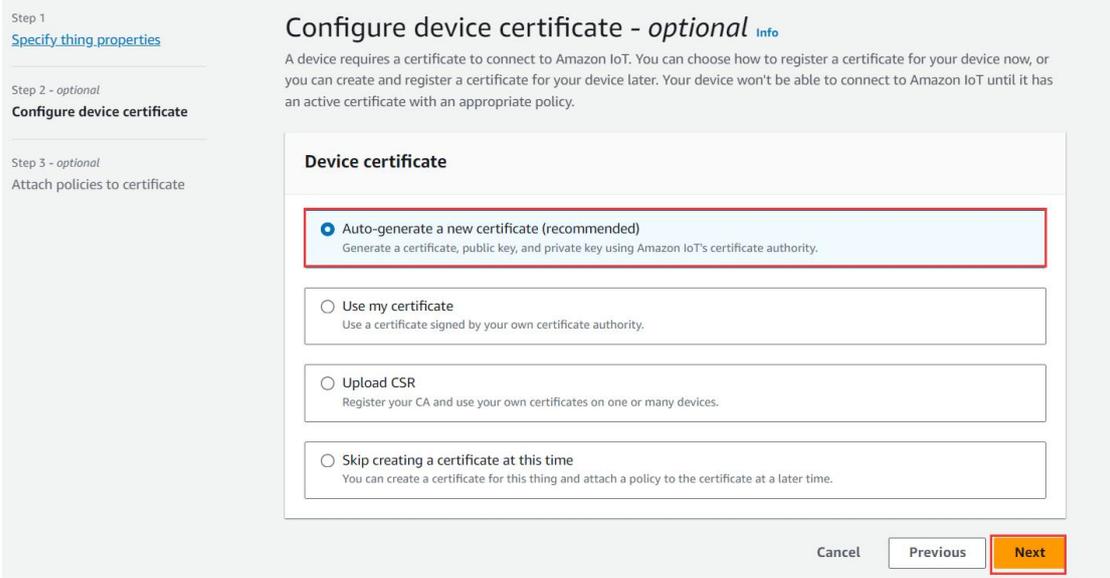
Device Shadows allow connected devices to sync states with Amazon Web Services. You can also get, update, or delete the state information of this thing's shadow using either HTTPs or MQTT topics.

No shadow

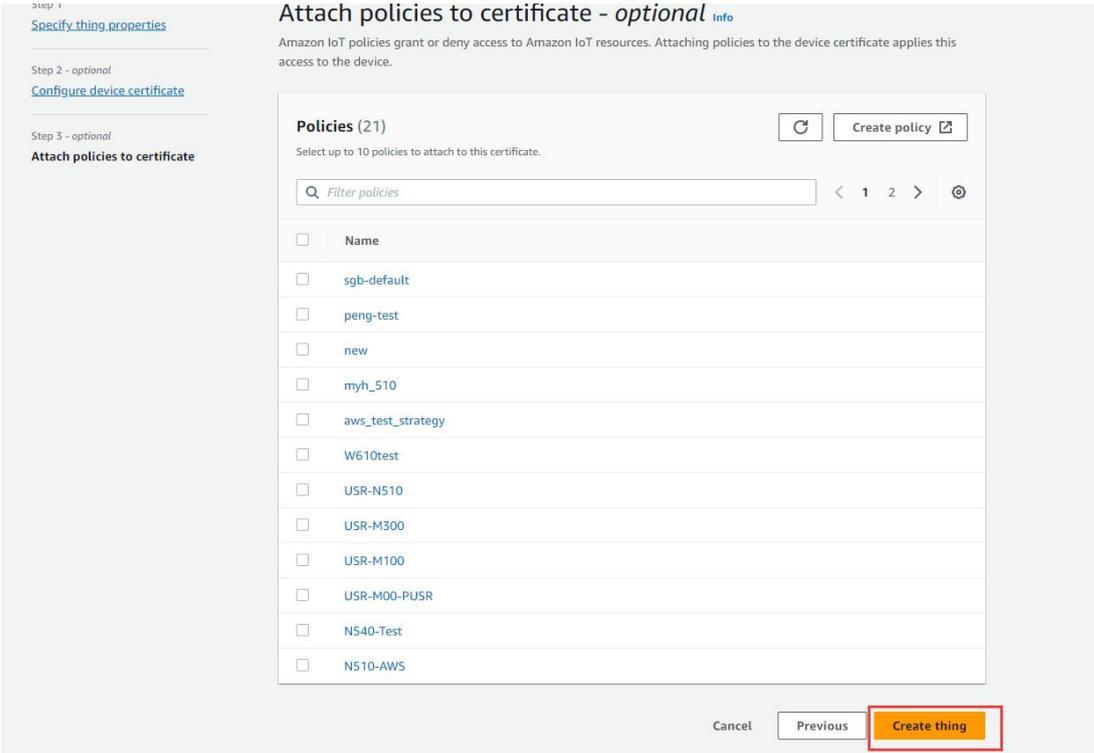
Named shadow
 Create multiple shadows with different names to manage access to properties, and logically group your devices properties.

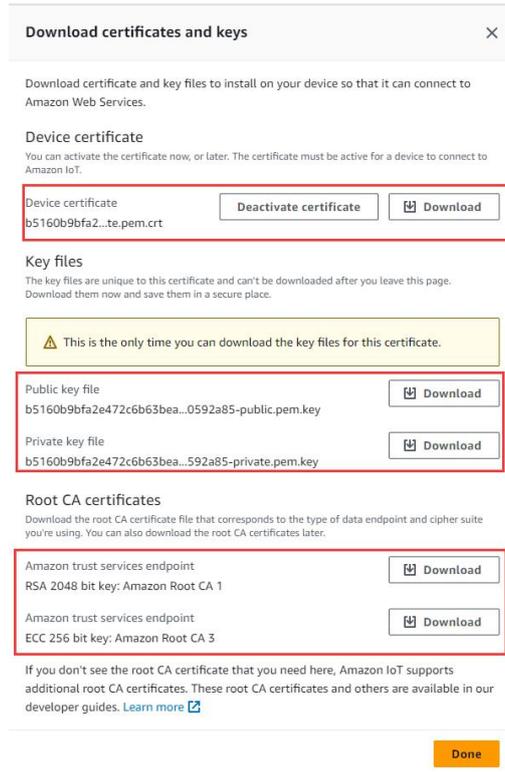
Unnamed shadow (classic)
 A thing can have only one unnamed shadow.

- Next, choose **Auto-generate a new certificate**, you can also choose others if you have your own certificates. Then click **Next**.



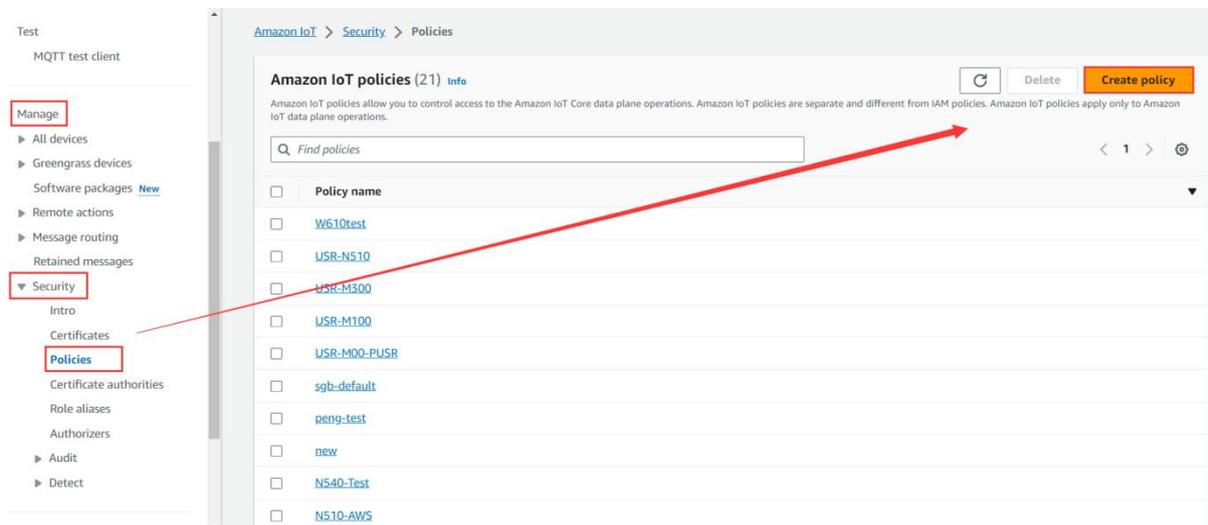
- 4. Do not create policies, directly click **Create thing**. Then it will show the certificates interface. Download the certificate and key files, then click **Done** to back to the things interface.





2.2.3. Create Policies

1. In **Manage->Security->Policies** interface, click **Create policy**.



2. Fill in the **Policy name**, add new statement in **Policy document**. There is a default statement which can be directly operated.
3. Add 4 policies: `iot:Connect`, `iot:Publish`, `iot:Receive`, `iot:Subscribe`.
4. Policy resource format: `arn:aws:iot:region:AWS-account-ID:Resource-type/Resource-name`, AWS-account-ID is your account ID of AWS.
5. Then click **Create** to create the policies.

Create policy Info

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

Policy properties
 AWS IoT Core supports named policies so that many identities can reference the same policy document.

Policy name

A policy name is an alphanumeric string that can also contain period (.), comma (,), hyphen(-), underscore (_), plus sign (+), equal sign (=), and at sign (@) characters, but no spaces.

► Tags - optional

Policy statements | Policy examples

Policy document Info [Builder](#) [JSON](#)

An Amazon 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.

Policy effect	Policy action	Policy resource	
Allow	iot:Connect	arn:aws:iot:cn-north-1:944284229783:client/*	Remove
Allow	iot:Publish	arn:aws:iot:cn-north-1:944284229783:topic/*	Remove
Allow	iot:Receive	arn:aws:iot:cn-north-1:944284229783:topic/*	Remove
Allow	iot:Subscribe	arn:aws:iot:cn-north-1:944284229783:topicfilter/*	Remove

[Add new statement](#)

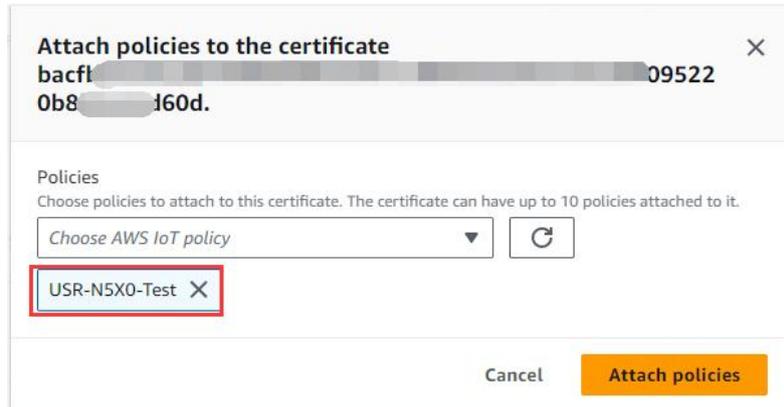
2.2.4. Attach Polices to Certificate

1. We have bound certificate and the thing when creating the device, so we can directly find the device in **Manage->All devices->Things**, click **Certificates** in **USR-N5X0-Test**.

The screenshot shows the AWS IoT console interface. On the left, a navigation menu has 'Things' highlighted. The main content area shows the details for a thing named 'USR-N5X0-Test'. The 'Certificates' tab is selected, displaying a table with one certificate entry that is 'Active'.

2. Find **Polices** under certificate, click **Attach policies**, choose the polices you have created.

The screenshot shows the 'Attach policies' step in the AWS IoT console. The 'Policies' tab is selected, and the 'Attach policies' button is highlighted. Below the button, a message states 'No policies' and 'You don't have any policies attached to this certificate.'

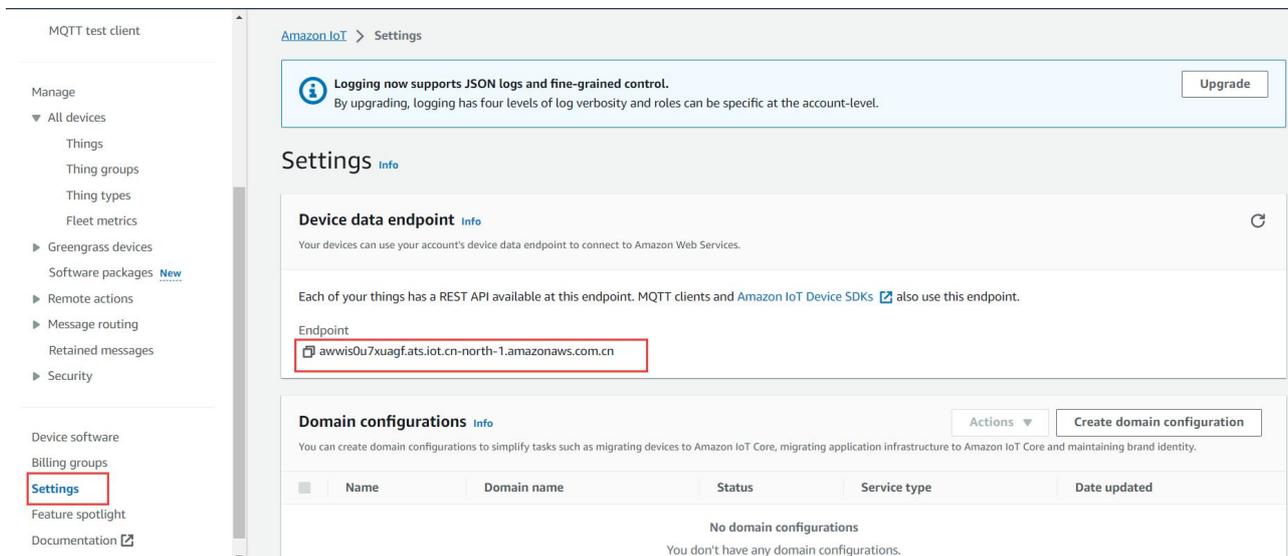


2.2.5. Obtain Product Information

1. Client ID is the Things name of the device, you can find the device name in **Manage->All devices->Devices**.

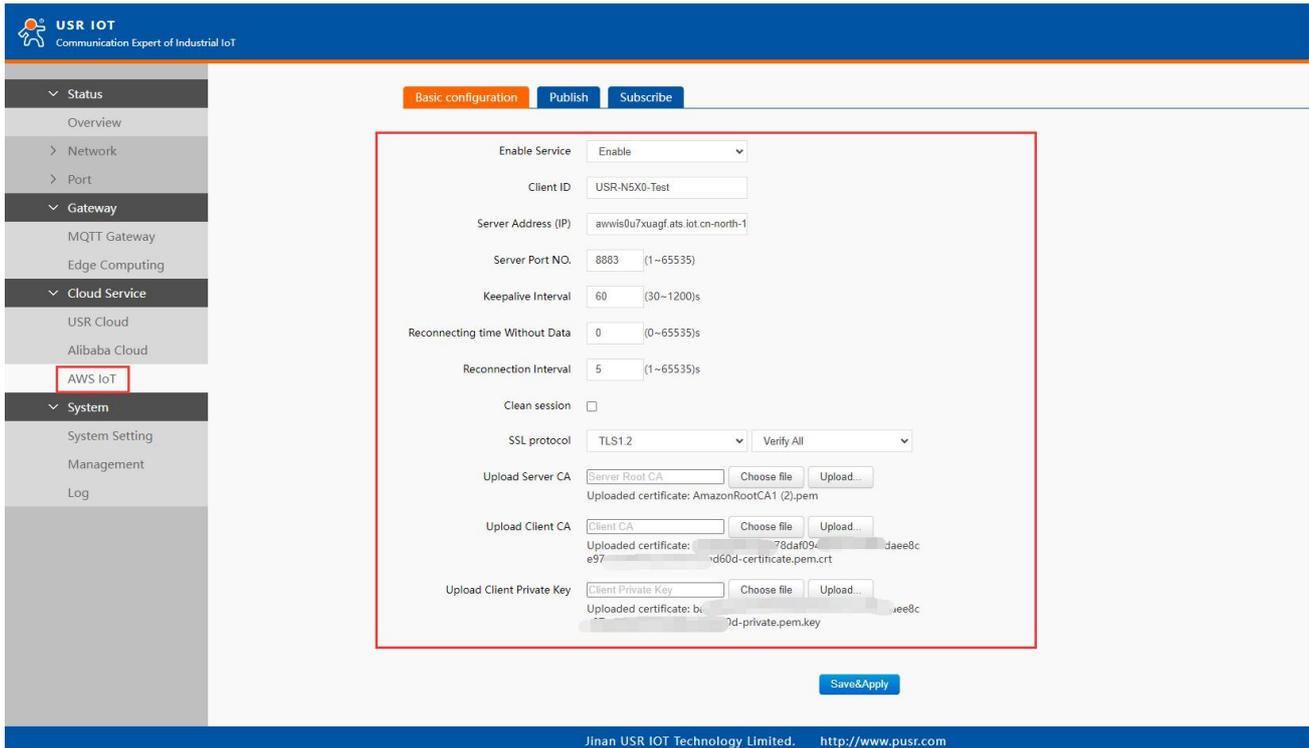


2. Find the server domain address that N5X0 device needs to connect in **Settings**, port defaults to **8883**.



2.3. Device Configuration

1. Enable AWS IoT Service.
2. Configure the **Client ID**, **Remote port 8883** and **Server address**.
3. Add the SSL certificates, configure the **SSL protocol to TLS1.2**, **Verify All**. Upload the **RootCA1.pem**, **certificate.pem.crt** and **private.pem.key** files.

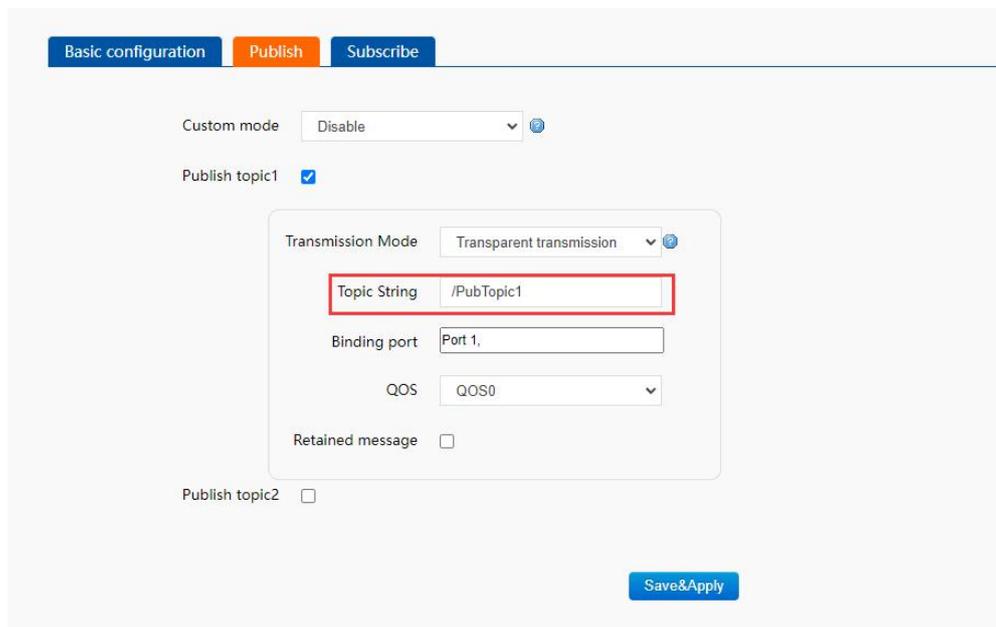


4. After above configurations, click **Save&Apply** to take the parameters effect.

2.4. Data Transmission Test

2.4.1. Transparent Transmission

1. After configuring the MQTT server parameters, click “Continue” to configure the topics. Enable **Publish topic1** in **Publish**, configure the publish topic in topic string.



2. Enable **Subscribe topic1** in **Subscribe**, configure the subscribe topic in topic string.

Basic configuration Publish **Subscribe**

Subscribe topic1

Transmission Mode Without Topic

Topic String /SubTopic1

Binding port Port 1

QOS QOS0

Subscribe topic2

Save&Apply

3. Also need to configure the serial parameters of USR-N5X0 device to be consistent with your serial RS232/RS485 device.

USR IOT
Communication Expert of Industrial IoT

Status
Overview
Network
Port
Websocket to Serial
Gateway
Cloud Service
System
System Setting
Management
Log

UART TO ETH
Data transmission parameter configuration

SETTING
Port Socket

Baud rate 115200 (600~921600)bps

Data bits 8 bit

Parity None

Stop bits 1

Flow ctrl NONE

UART Packet Length 0 (0~1460)bytes

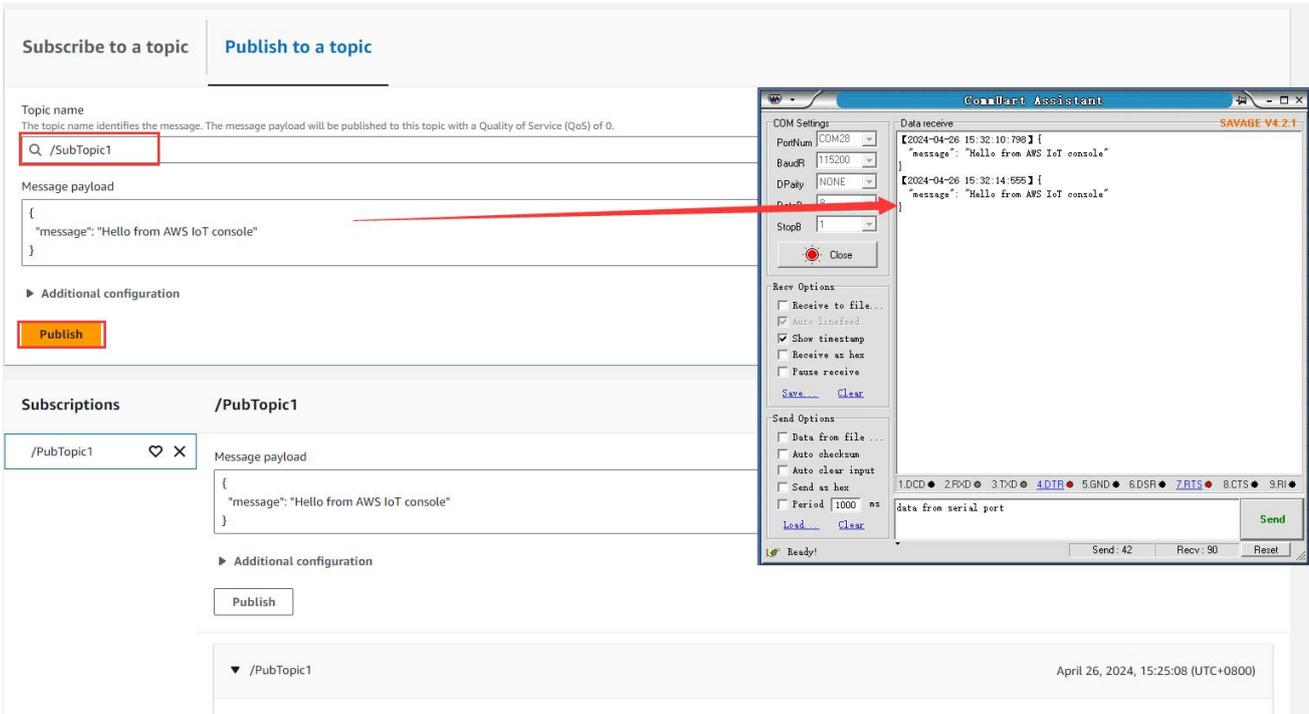
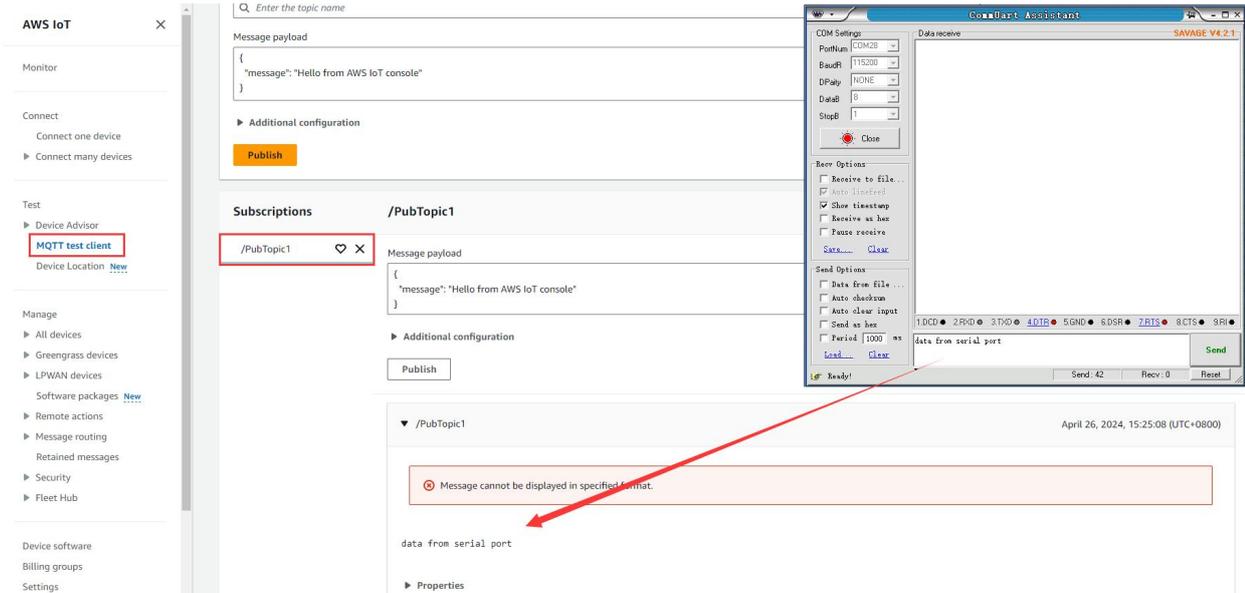
UART Packet Time 0 (0~255)ms

Sync Baudrate(RFC2217) ON

Enable Uart Heartbeat

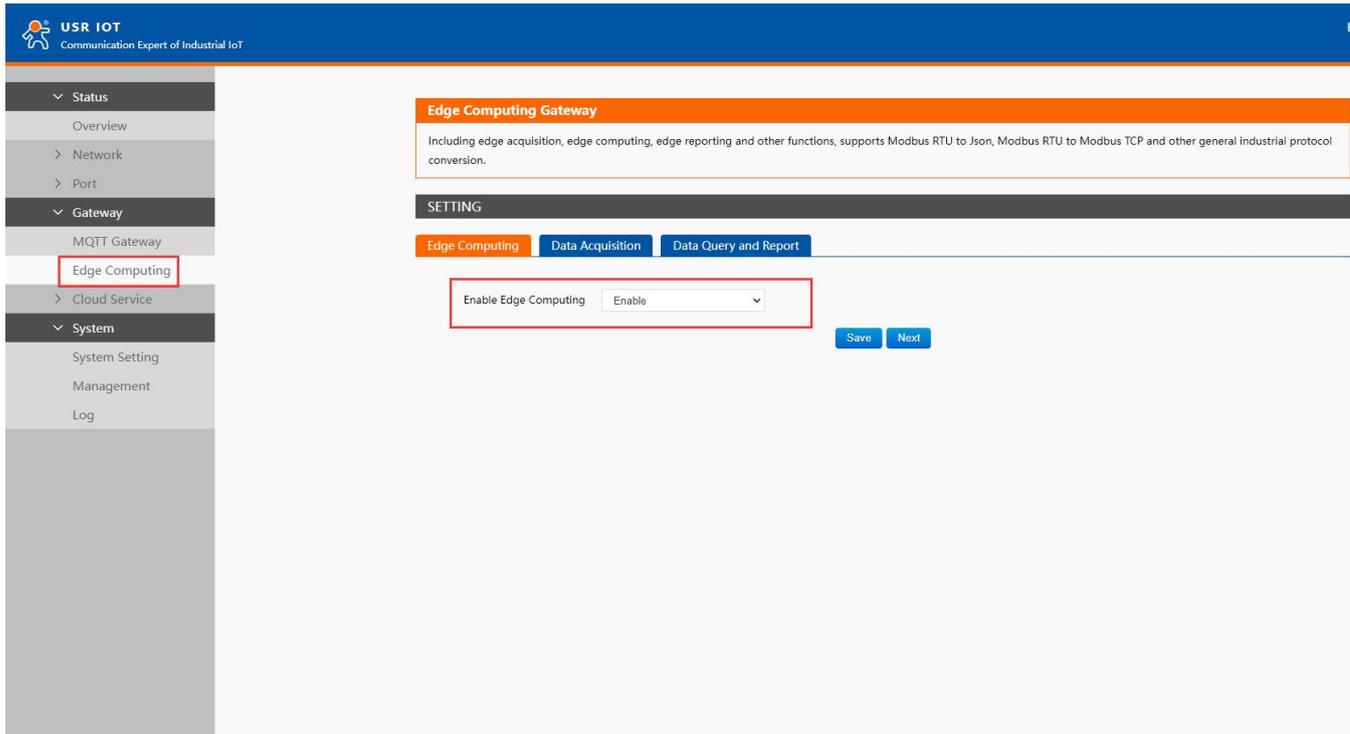
Save&Apply

4. Here we connect the RS485 port of N5X0 to the PC via an RS485 to USB cable. After the MQTT connection is established, we can achieve the data transmission between AWS and N5X0 serial port.

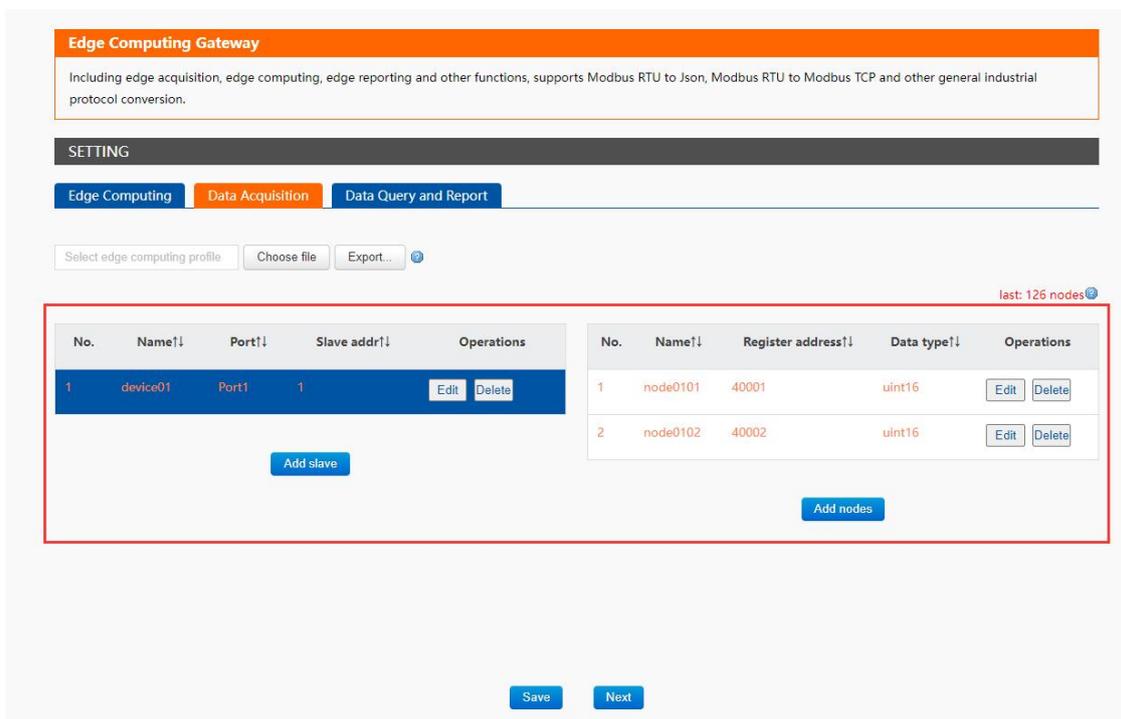


2.4.2. Edge Computing

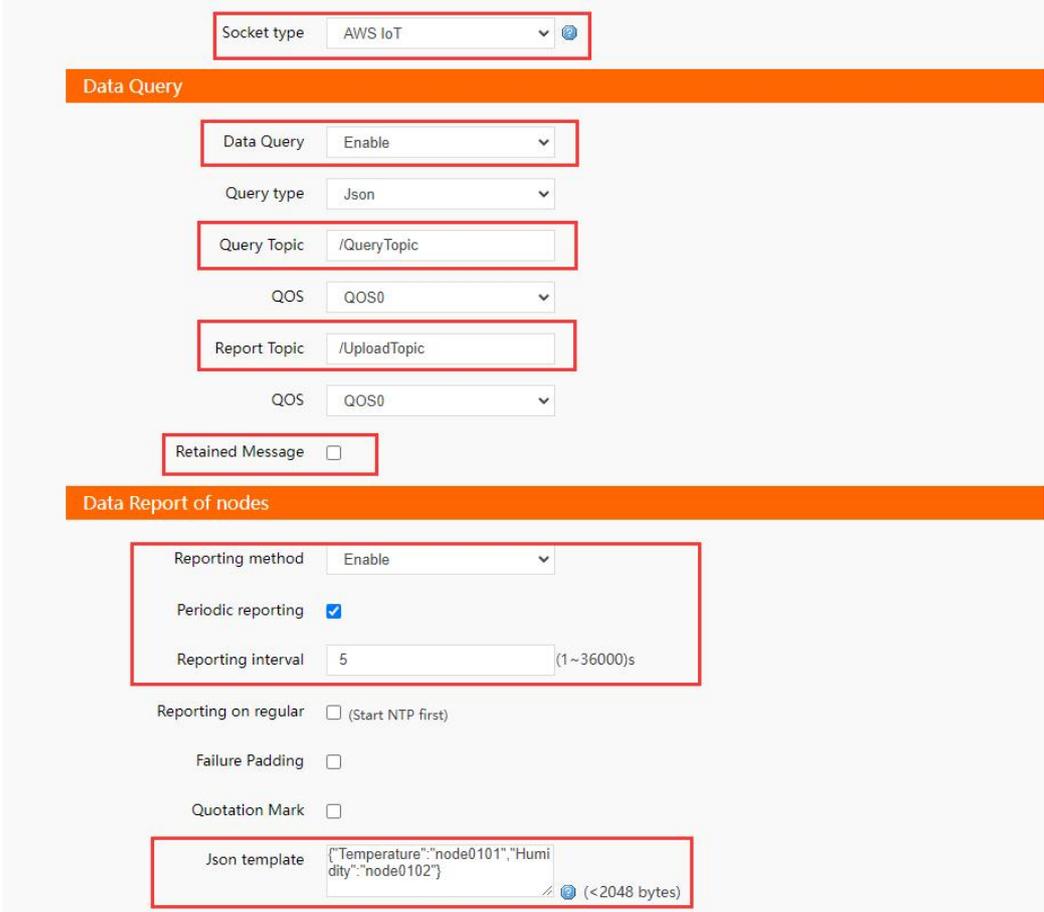
- 1. Enable **Edge Computing** function.



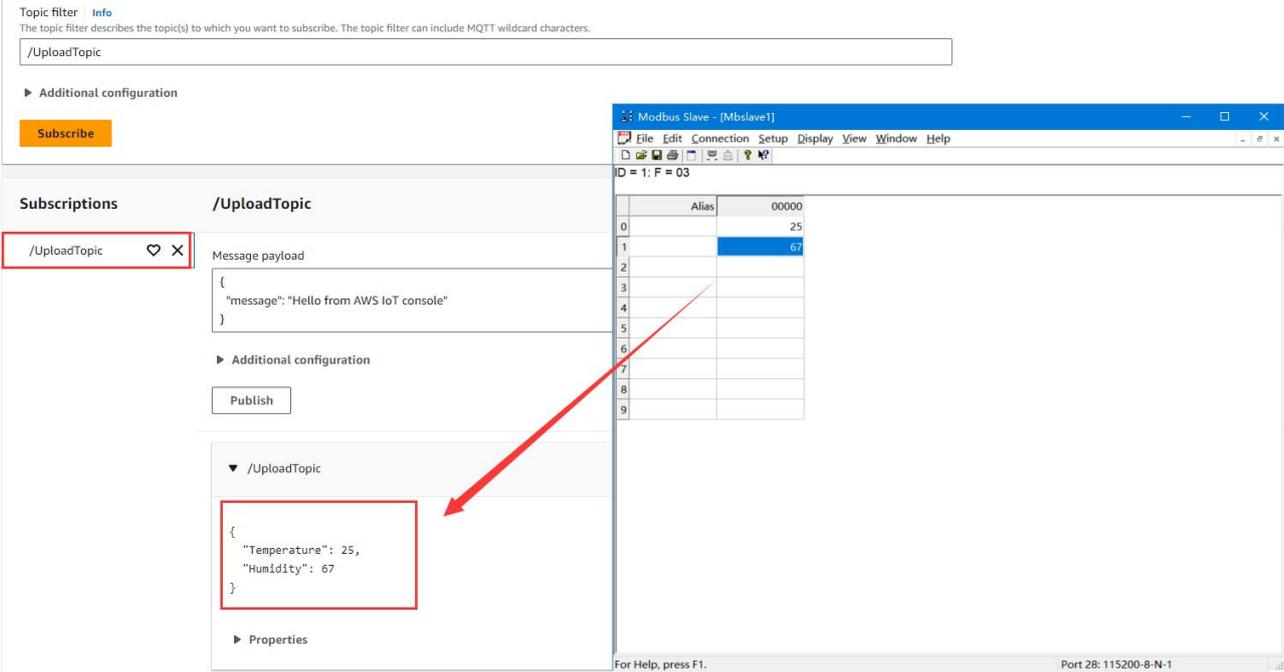
2. Add a Modbus RTU slave device, configure the Modbus registers that you need to read. Click **Next**.



3. Select the socket type to **AWS IoT**, enable **Data Query** and **Reporting method**. Configure the parameters according to your needs. Please do not enable **Retained Message** when connecting to AWS.



- 4. After configuring all the parameters, restart the device to take the parameters effect.
- 5. In this test, we use Modbus Slave software to simulate a serial sensor. After N5X0 device read the temperature and humidity data from serial port, it will convert to JSON format and send to AWS platform.





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