QUICK START GUIDE

VIA SOM-5000

AWS IoT Core

1.00-02092024

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Revision History

Version	Date	Remarks
1.00	02/09/2024	Initial release

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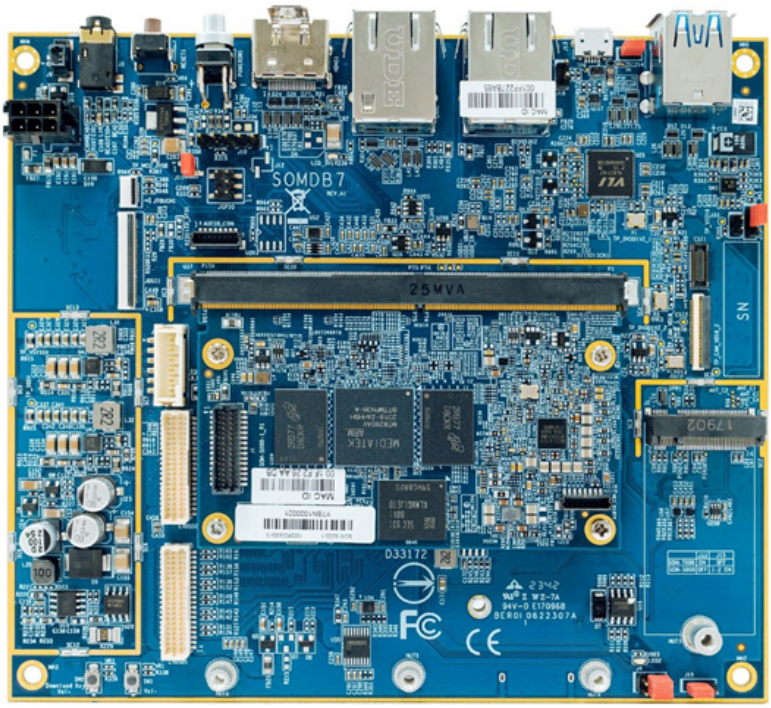
1. Introduction

This document provides instructions on how to set up AWS IoT Core to connect with a VIA SOM-5000 device.

1.1 VIA SOM-5000 Device

Powered by the high performance and energy-efficient octa-core MediaTek Genio 700 SoC, the VIA SOM-5000 Edge AI board delivers blistering edge processing and multimedia performance, while combining advanced AI technology for display, object recognition, and voice, with rich wireless and I/O connectivity features. Besides dual-core ARM Cortex-A78 and hexa-core ARM Cortex-A55 processors, the MediaTek Genio 700 platform also features an integrated AI processor providing up to 4.0 TOPS for deep learning, neural network acceleration, and computer vision applications, including facial recognition, object identification, and OCR.

Based on the 3.5" SBC 15.1cm x 13.4cm form factor, the VIA SOM-5000 board provides a wealth of camera and display integration options, including support for two MIPI CSI-2 cameras, a MIPI DSI display, plus, two HDMI and LVDS displays each. High-speed connectivity can be enabled through two Gigabit Ethernet ports, an integrated SIM card slot, and M.2 slots for optional dual-band Wi-Fi 6 and 4G LTE. Two USB 3.1 ports, an ADC/ GPIO pin header, and a MicroSD card slot allow additional I/O configuration.



Refer to the datasheet and user manual on the SOM-5000 product page for detailed information.

1.2 Directing Data from a VIA SOM-5000 Device to AWS IoT Core

To direct data from VIA SOM-5000 devices to a cloud implementation, the AWS IoT Core Web Service must be set up and configured to receive data coming from VIA SOM-5000 devices.

Follow the steps below to set up your AWS services in order to connect a VIA SOM-5000 device to an AWS backend:

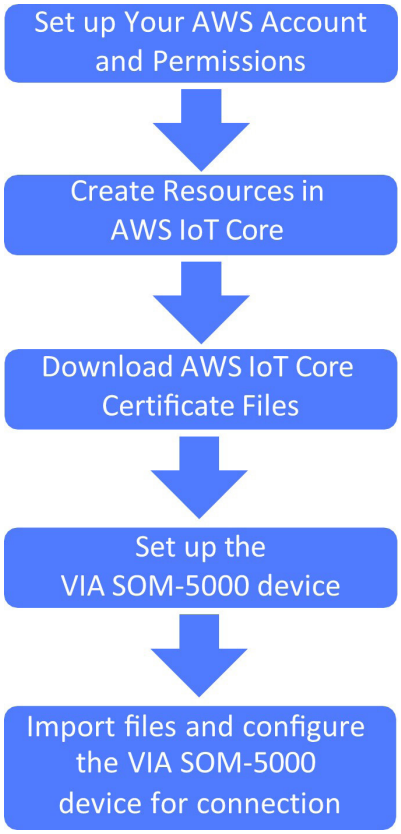
- Follow the steps listed in Section 2.3 to register an AWS IoT Thing and to acquire the AWS IoT certificate files for the VIA SOM-5000 devices.
  - Acquire the certificate (*-certificate.pem) and the private key (*-private.pem.key) files associated with the IoT thing created, as described in Step 7 of Section 2.3.
  - Acquire the Device Data Endpoint described in Step 9 of Section 2.3.

2. Connecting to AWS IoT Core

2.1 Introduction

This section provides instructions on how to establish a connection between VIA SOM-5000 devices and AWS IoT Core, including how to add and manage VIA SOM-5000 devices as an IoT Core device on AWS, set up the device, and configure the VIA IoT application.

To register an AWS IoT thing and acquire the AWS IoT certificate files for the VIA SOM-5000 device, follow the steps below:



2.2 Set up your AWS Account and Permissions

Refer to instructions in the following sections on webpage https://docs.aws.amazon.com/iot/latest/developerguide/setting-up.html to set up an AWS Account:

- Sign up for an AWS account
- Create a user and grant permissions
- Open the AWS IoT console

Pay special attention to the Notes on the AWS account setup webpage.

2.3 Create Resources in AWS IoT

Refer to instructions in the following sections on webpage https://docs.aws.amazon.com/iot/latest/developerguide/create-iot-resources.html to provision resources for your VIA SOM-5000 device:

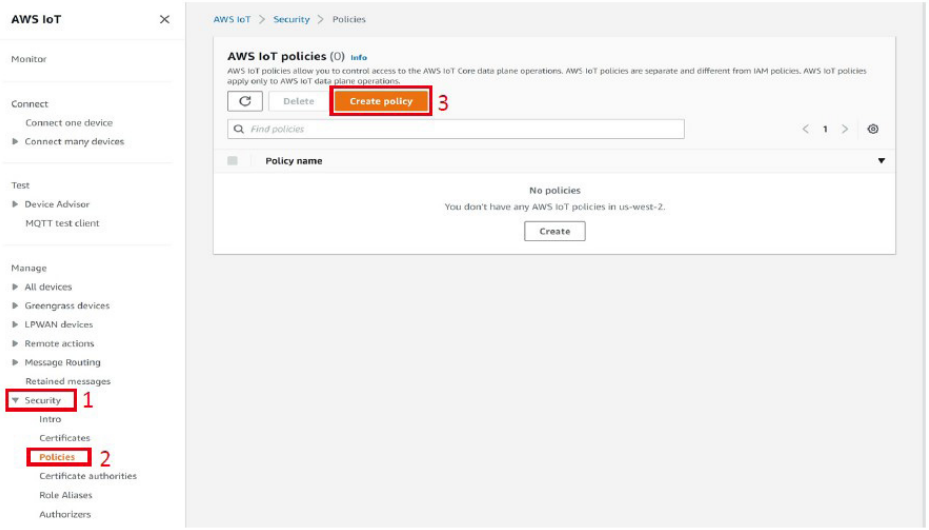
- Create an AWS IoT policy
- Create a thing object

Pay special attention to the Notes on the AWS IoT resource creation webpage.

The following instructions demonstrate how to create an AWS IoT Policy and a thing object, and acquiring the required AWS IoT certificate files and Device Data Endpoint for the VIA SOM-5000 device.

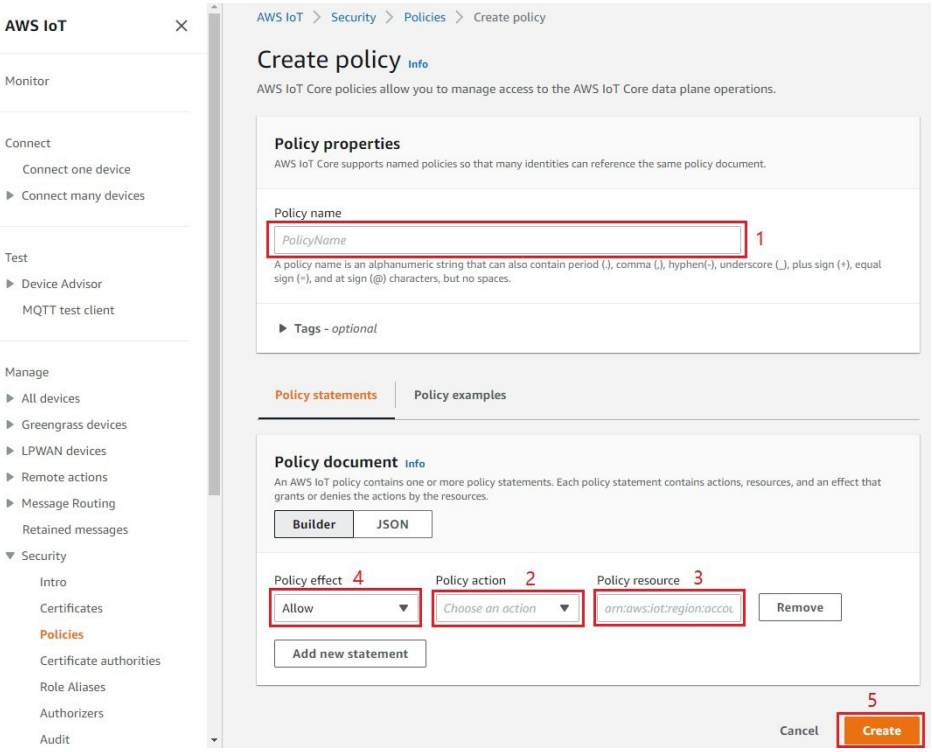
Step 1

Click on ‘Security/Policies’ in the left panel and then click on the ‘Create policy’ button in the right panel.

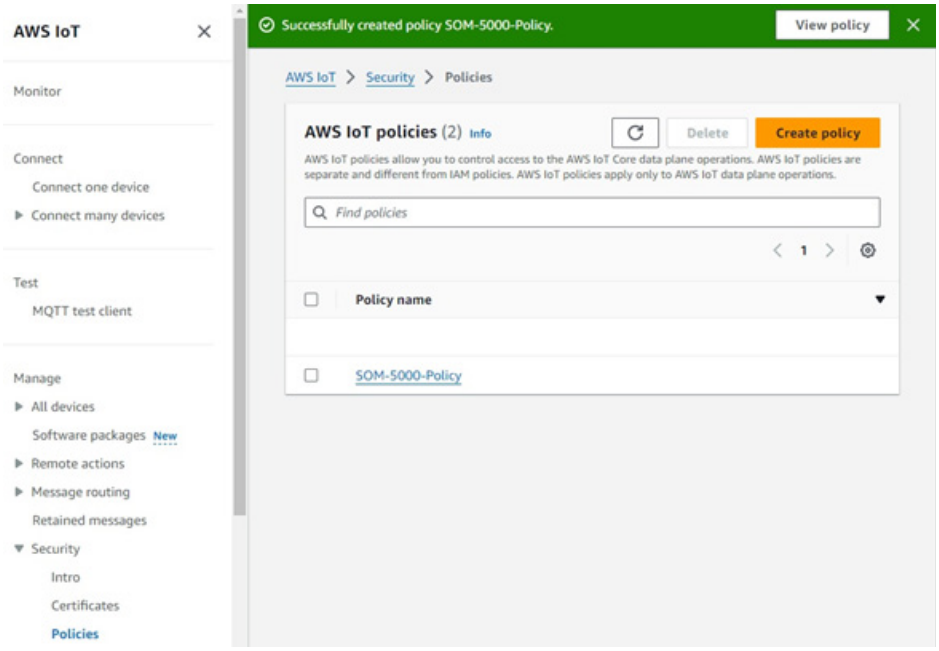


Step 2

In the "Create policy" form, fill in the "Policy name" in the "Policy properties" section. In the "Policy document" section, select the "Policy effect" and "Policy action", and fill in the "Policy resource" name. Then, click the ‘Create’ button to submit.

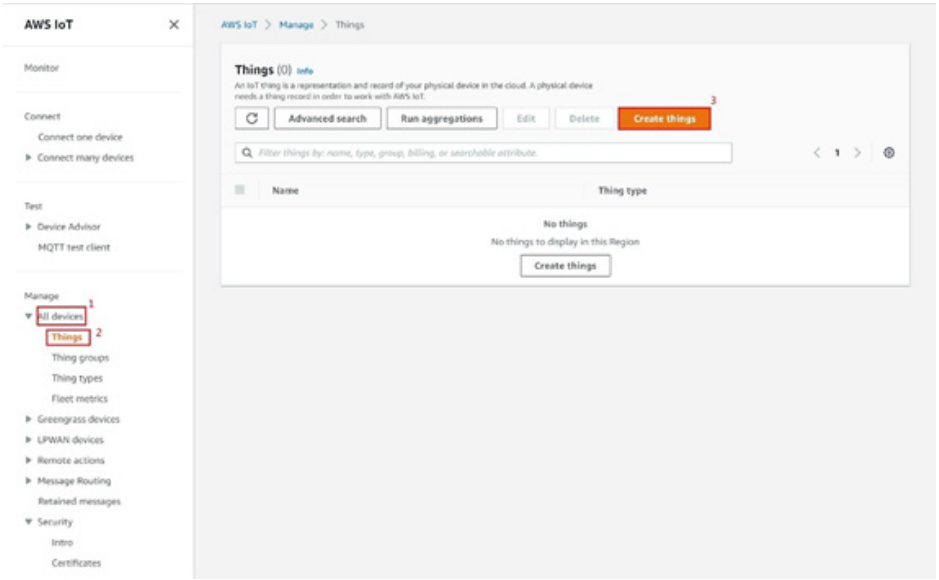


After clicking the ‘Create’ button, the new policy's name will be listed on the right panel.

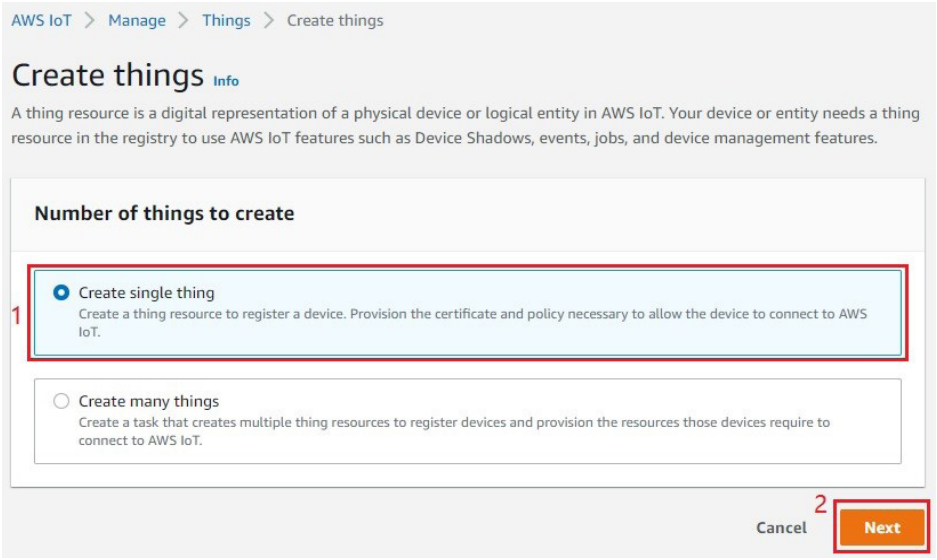


Step 3

To create a new ‘IoT Thing’ resource with the new policy and to create certificate files for this resource, click on ‘All devices/Things’ in the left panel and then click on the ‘Create things’ button in the right panel.

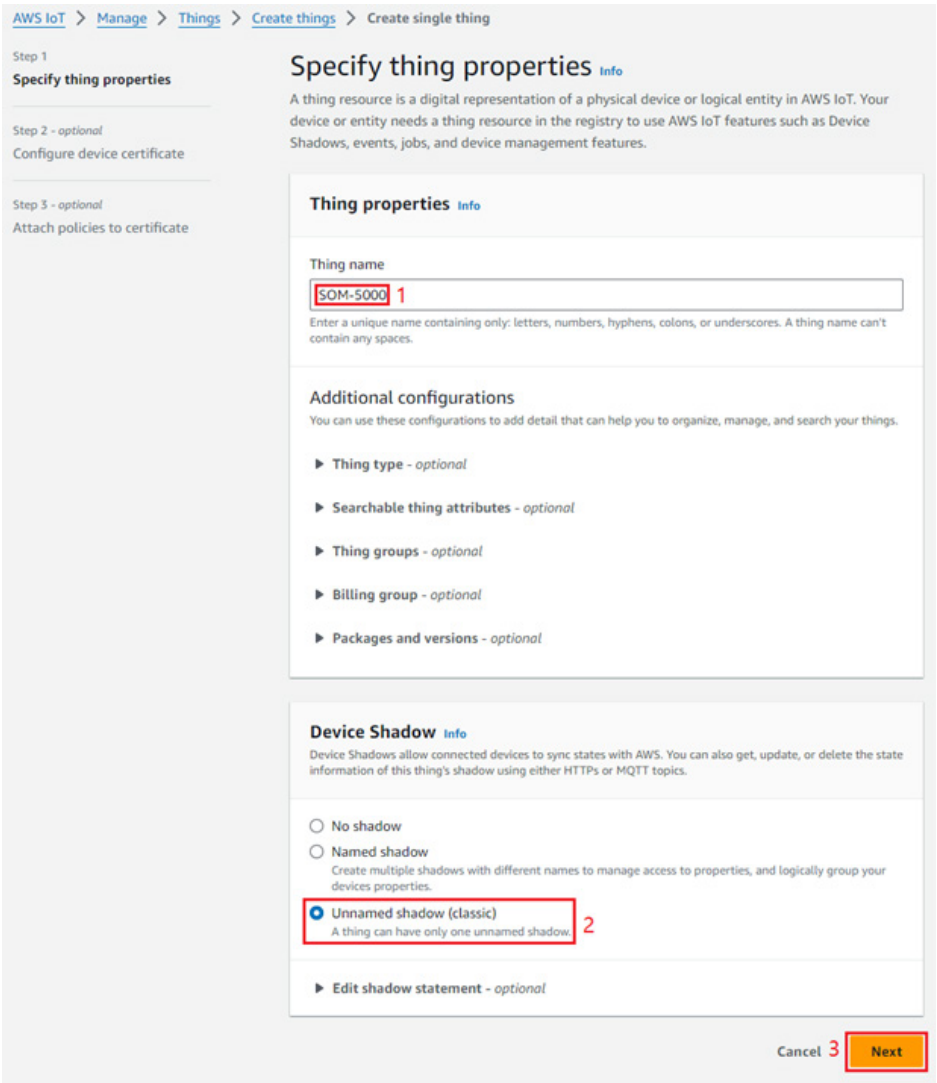


Next, select ‘Create single thing’ and click on "Next".



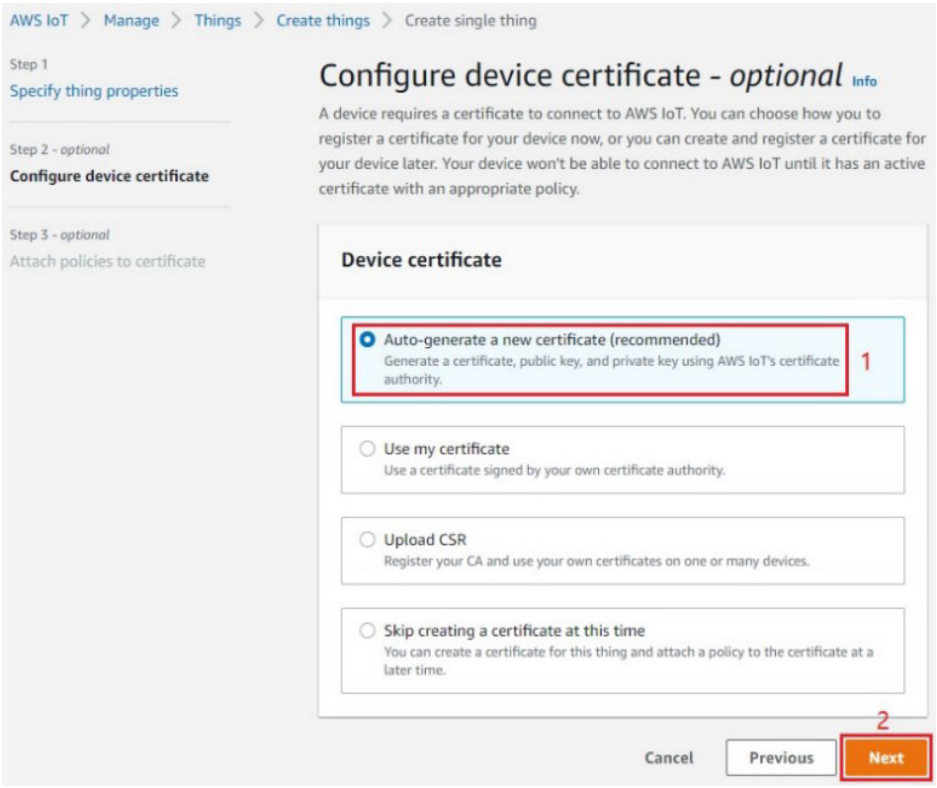
Step 4

Under 'Thing properties' in the right panel, enter the 'Thing Name'. Under 'Device Shadow', select 'Unnamed shadow (classic)' and click on the 'Next' button to continue.



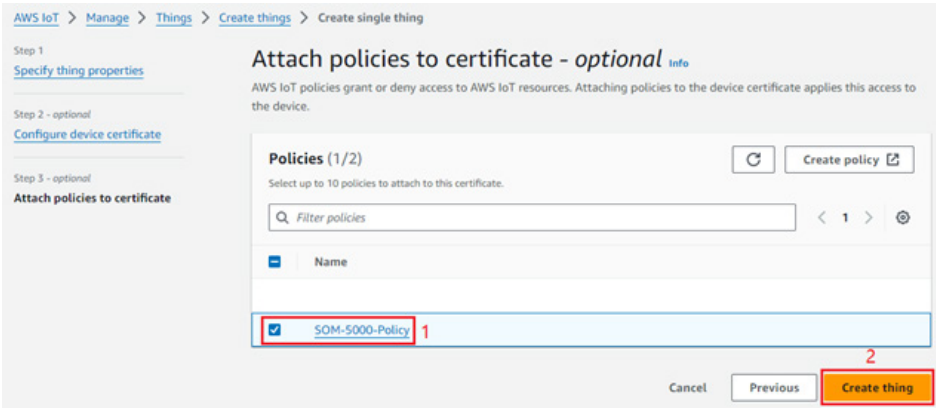
Step 5

Under 'Device certificate', select 'Auto-generate a new certificate (recommended)' and click on the 'Next' button to configure a device certificate for your VIA SOM-5000 device.



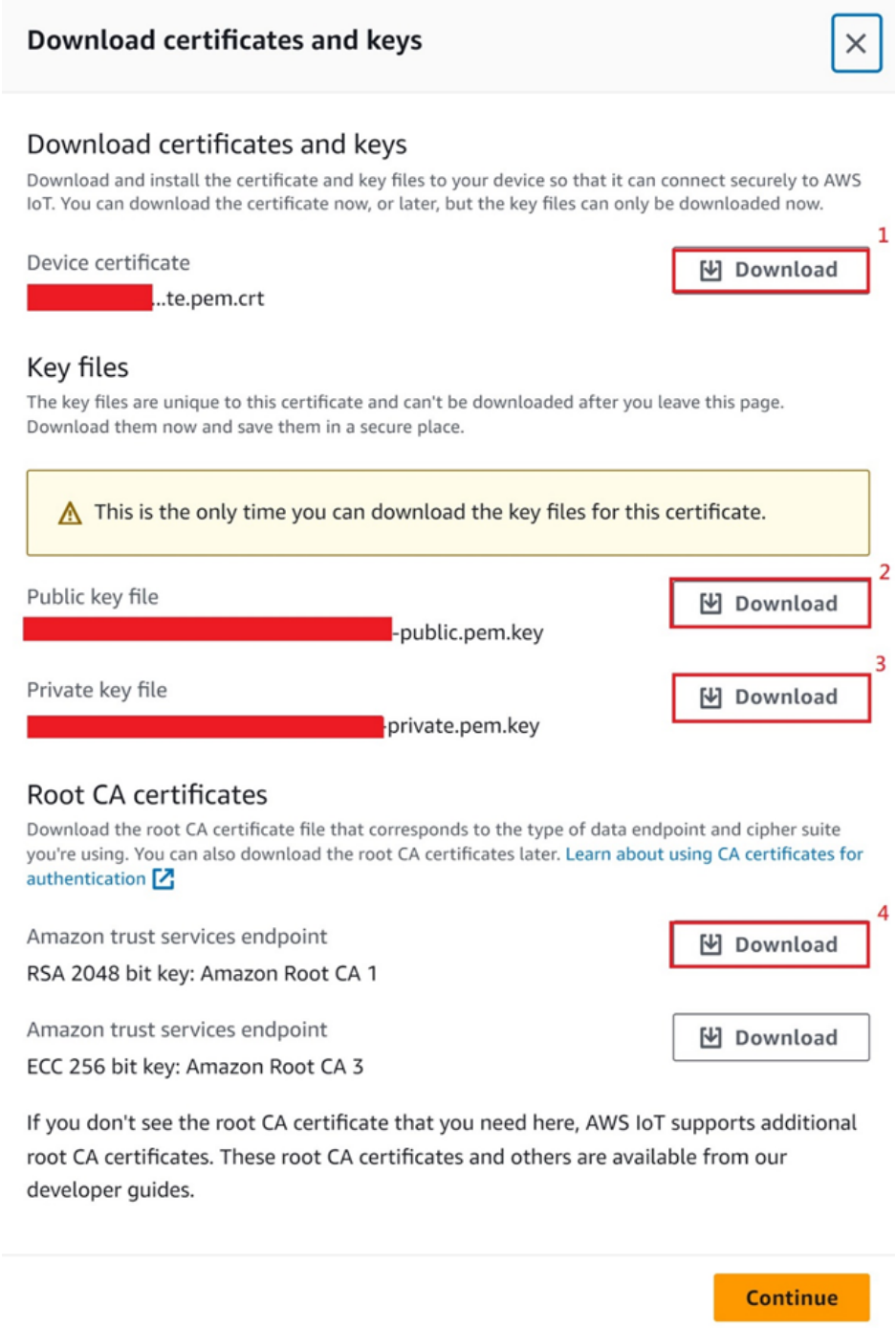
Step 6

Click on the new policy's name and click on the 'Create Thing' button to attach policies to the device certificate for your VIA VAB-3000 device and to complete creating a new 'IoT Thing'.



Step 7

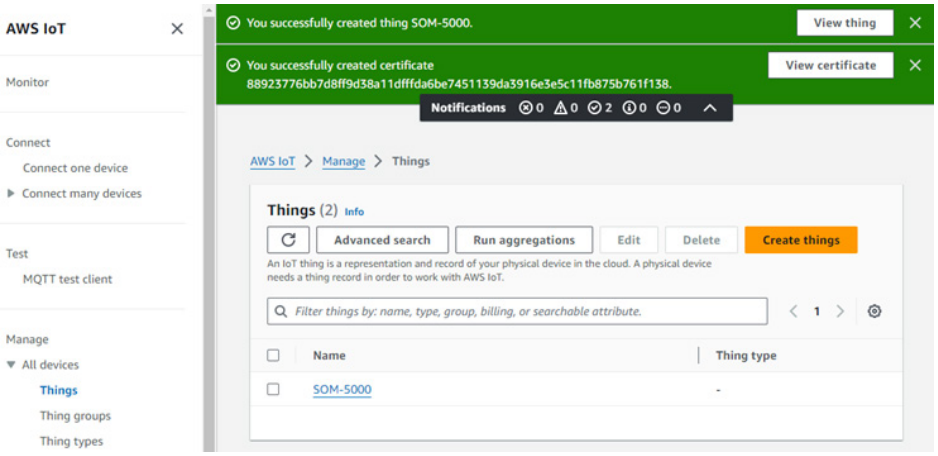
Download the device certificate (CertFile), the private key file (PvkFile) and the 2048-bit Amazon Root CA 1 certificate (CAFile) to a local folder and click on 'Done' to complete the certificate creation process for your VIA SOM-5000 device.

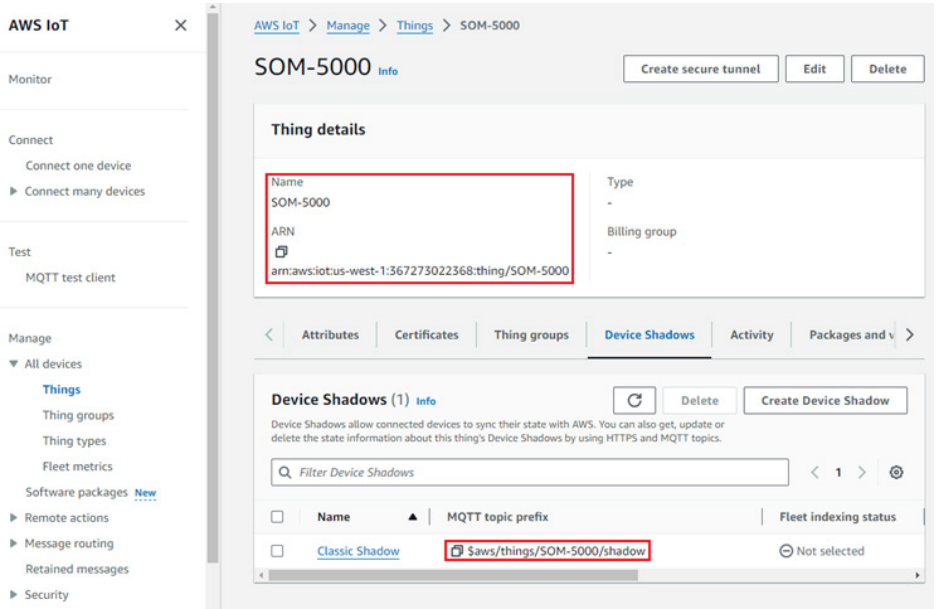


Step 8

Click on the created IoT thing's name under 'Things' to view your VIA SOM-5000 device's Thing and Device Shadow details, including the MQTT topic prefix.

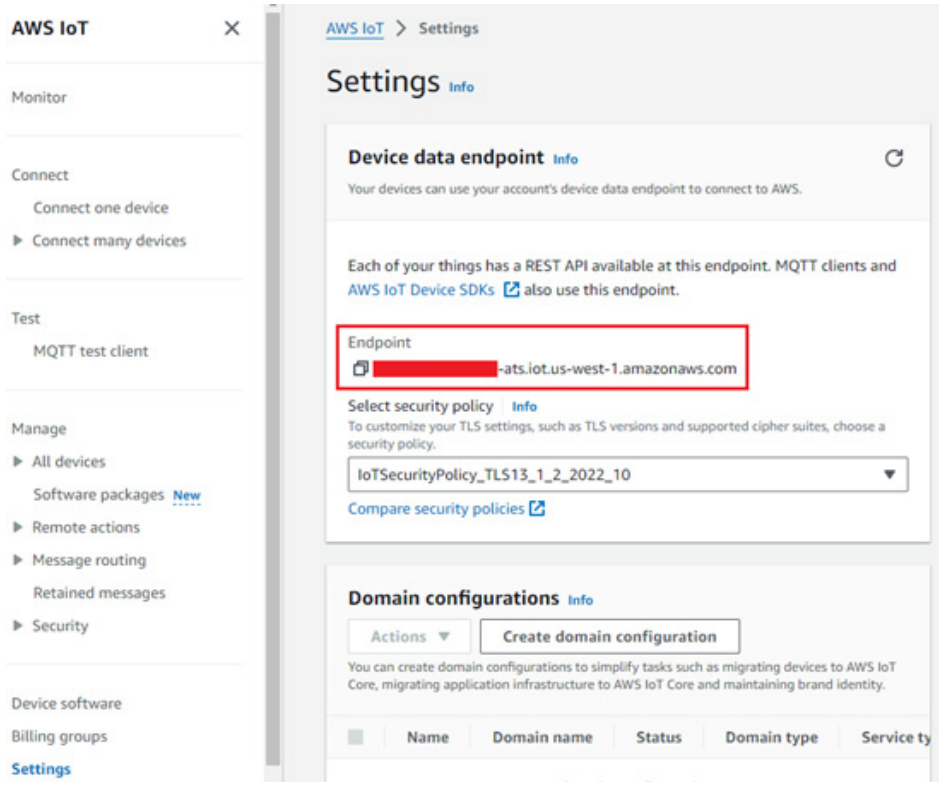
Note:
The MQTT topic prefix is for binding your VIA SOM-5000 device with AWS IoT Core Web services. The VIA SOM-5000 device will use the specified MQTT topic to interact with AWS IoT Core Web services. Some MQTT topics listed on the AWS webpage are reserved.





Step 9

In the left "AWS-IoT" panel, select "Settings". The "Endpoint" is displayed in the "Device data endpoint" section.



2.4 Image Installation

The VIA SOM-5000 BSP supports Android 13.0 operating systems. To enable hardware functionality, download the VIA SOM-5000 Android 13.0 EVK package, and refer to the corresponding EVK Quick Start Guide included in the package to flash the device.

2.5 Connecting the VIA SOM-5000 Device to AWS IoT Core

2.5.1 Connecting the Debug Console

The first step is to connect the VIA SOM-5000 device to the debug console for setting up a connection between the VIA SOM-5000 device and AWS IoT Core. The debug cable of the VIA SOM-5000 and a serial port communication program such as PuTTY or Tera Term are required for the setup.

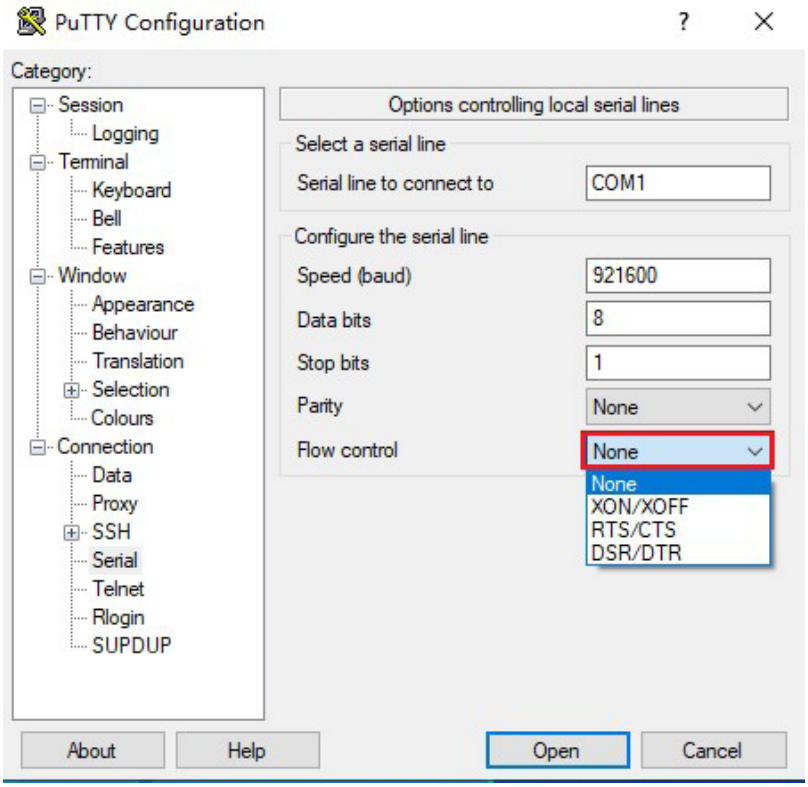
Follow the steps below to connect the VIA SOM-5000 device to the debug console:

Step 1

Refer to section 3.1 of the VIA SOM-5000 Android 13.0 EVK Quick Start Guide for instructions on connecting Windows host machine and the VIA SOM-5000 device through the provided debug cable.

Step 2

Use a serial port communication program such as PuTTY or Tera Term to connect the debug console. Set the console Baud Rate to "921600".



Step 3

Power on the VIA SOM-5000 device to initiate the boot process.

Step 4

When the boot process has completed, log in to the debug console.

Step 5

Refer to the section 2.5.2 to connect the VIA SOM-5000 device to your AWS IoT Core Web service.

2.5.2 Connecting with the Android 13.0 EVK

The VIA SOM-5000 Android 13.0 EVK includes an "IoTDeviceSDKSample" application which establishes a connection between the VIA SOM-5000 device and the AWS IoT Core Web service.

This section guides developers on how to enable and run the "IoTDeviceSDKSample" application.

Step 1

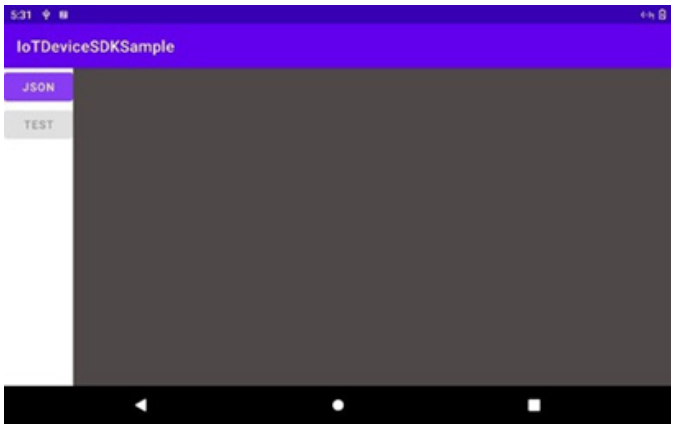
Edit the "iotcoreConfig.json" settings file and modify the following values based on the AWS IoT Core setup:

- **thingName:** Insert the defined thing's name.
- **ca:** Input the content text of the thing's Amazon Root CA certificate.
- **cert:** Input the content text of the thing's Certificate file.
- **key:** Input the content text of the thing's Private Key file.
- **ReqRetry:** Number of retries for establishing the connection between the device and the IoT Core server when the connection is disrupted or not successful.
- **topic:** The MQTT topic.
- **endpoint:** Input the domain name from the Device Data Endpoint obtained in Step 9 of Section 2.3.

Save the settings file to a USB flash drive and plug it to the device's USB port.

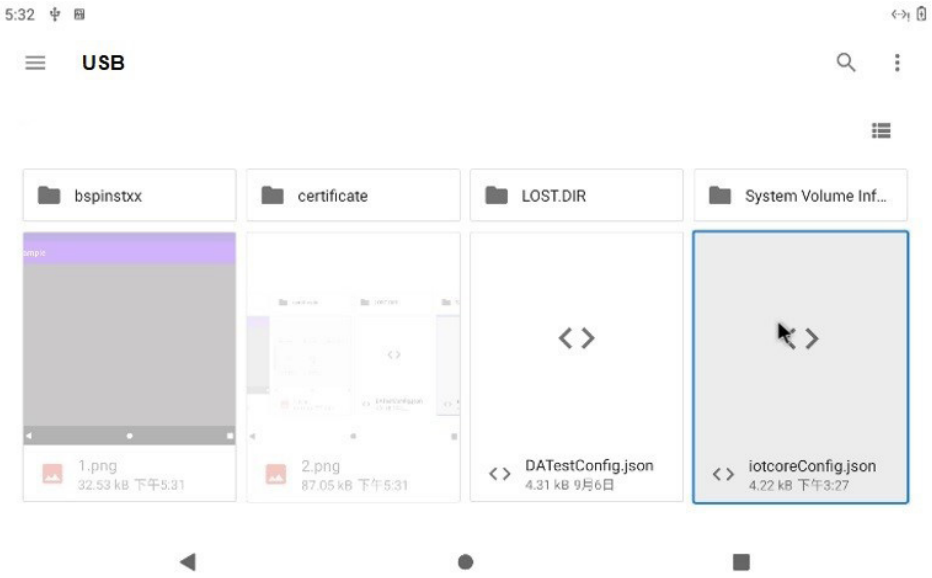
Step 2

Run the "IoTDeviceSDKSample" application as shown below.

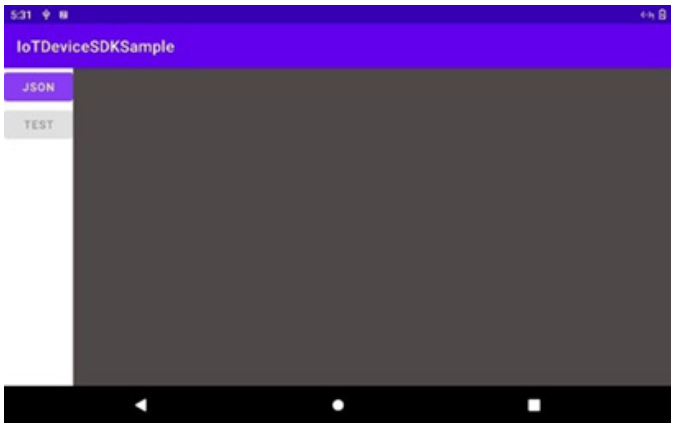


Step 3

Click the "JSON" button to select the "iotcoreConfig.json" created in Step 1 from USB flash drive.



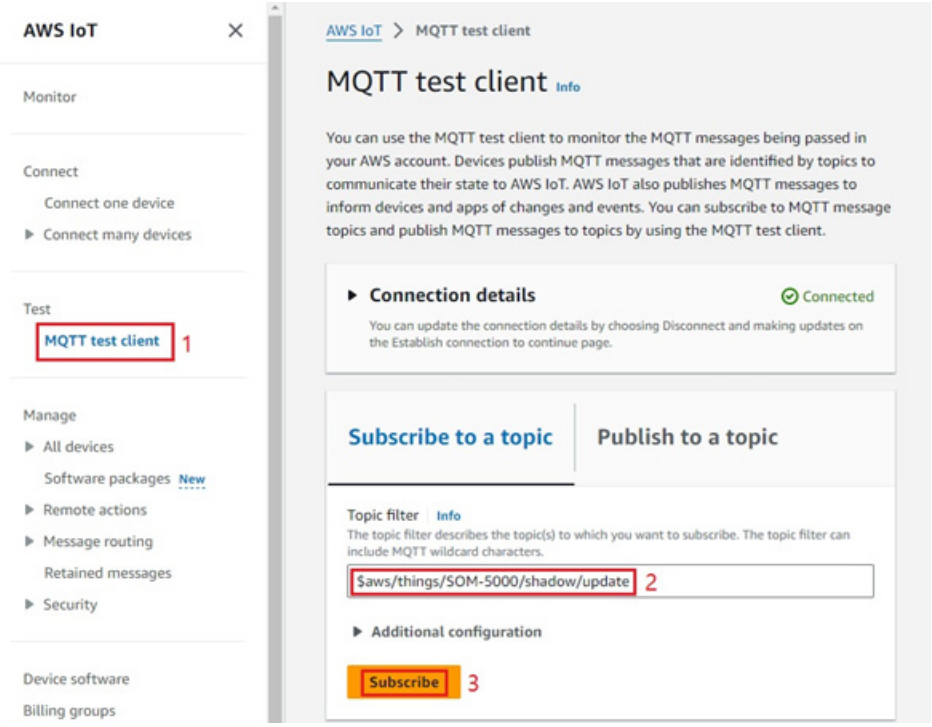
Click the "TEST" button to run the MQTT subscription publishing process as shown below.



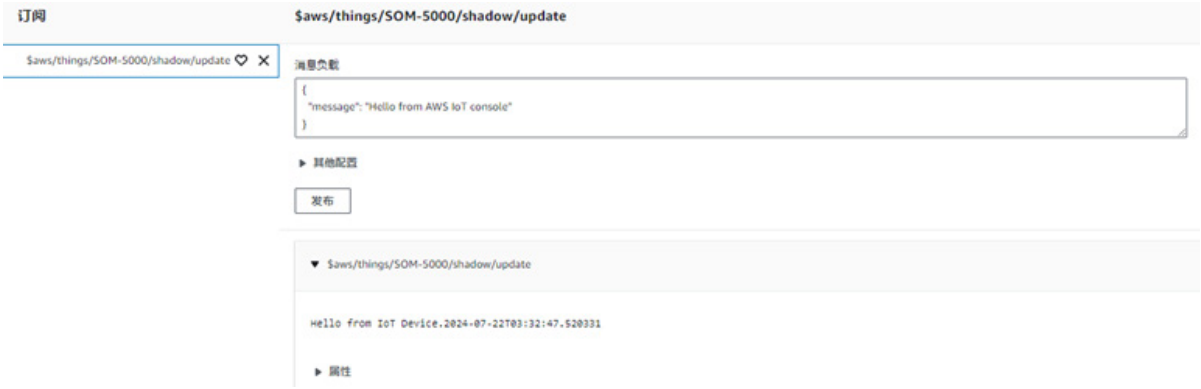
Step 4

Verify the "IoTSDKSample" application using the AWS IoT Core Web service console. Click on the 'MQTT test client' tab.

To subscribe to the interaction topic with the MQTT topic prefix obtained in step 8 of Section 2.3 "$aws/things/ThingName/shadow/update", enter a topic filter name and click the 'Subscribe' button in the 'Subscribe to a topic' tab in the right panel. The value of "thingName" must be the same as the value of "iotcoreConfig.json" settings file.



The last updated message will be shown in the AWS IoT MQTT test client.



2.6 Debugging

Open a console (e.g. Putty) and configure as described in Section 2.5.1. The boot up messages will be presented with a command line interface as well as debug output. Use busybox commands "in /bin" to set up and debug the VIA SOM-5000 device.

```
$ ls /bin
```

2.7 Troubleshooting

Check the table below for troubleshooting common AWS IoT Core connection issues that may arise during development:

Issue	Solution
Device does not connect to the Internet	Confirm that the SIM card is inserted properly. Confirm that the SIM card is activated by the service provider. Verify the APN settings.
Device does not connect to AWS	Confirm that the date and time is synchronized. Verify the AWS endpoint in the "iot- coreConfig.json" (Android 13.0) settings file. Verify that appropriate certificates and keys are loaded on the VIA SOM-5000 device. Verify the IoT Core thing and policies set on AWS IoT Core.

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