



QUICK START GUIDE

VIA SOM-9X50-STK

AWS IoT Core



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Revision History

Version	Date	Remarks
1.02	15/05/2023	Section 1 Introduction: Added new sections 1.1 and 1.2 for the VIA SOM-9X50 Module and Carrier Board. Updated descriptions in section 1.3 for directing data from a VIA SOM-9X50-STK device to AWS IoT Core. Section 2 Connecting to AWS IoT Core: Updated descriptions in sections 2.1, 2.2, 2.3, 2.6, 2.7 and 2.9. Added new sections 2.4.1 and 2.5 for hardware setup requirements and developer environment setup.
1.01	10/01/2023	Updated descriptions in sections 2.1, 2.2, 2.3, 2.5 and 2.6 for Connecting to AWS IoT Core. Added a new section 2.8 for troubleshooting AWS IoT Core connection issues.
1.00	07/11/2022	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-9X50-STK device.

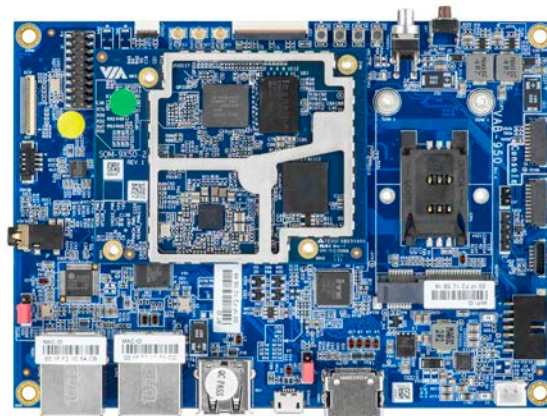
**Note:**

A VIA SOM-9X50-STK device includes the VIA SOM-9X50 module and the Carrier Board.

1.1 VIA SOM-9X50 Module

The VIA SOM-9X50 module is powered by the high-performance octa-core MediaTek Genio 500 SoC, with upto 4GB LPDDR4 SDRAM and 16GB eMMC flash memory in a compact form factor to deliver blistering edge processing and multimedia performance. Besides quad-core ARM Cortex-A73 and quad-core Cortex-A53 processors, the Genio 500 SoC also includes:

- An integrated AI processor, for deep learning, neural network acceleration, and computer vision applications, including facial recognition, object identification, and OCR.
- Hardware-accelerated graphics processing and full HD H.265/H.264 video decoding.



1.2 Carrier Board

Combining the optional Carrier Board offers a wide variety of wireless and I/O connectivity options, such as an integrated SIM card slot for LTE/4G, dual-band 802.11ac Wi-Fi, 10/100Mbps Ethernet ports, Bluetooth 5.0, and USB 2.0 and Micro USB 2.0 ports. Additional HDMI, MIPI DSI, and MIPI CSI-2 interfaces with multi-function pins for I²C, SPI and GPIO provide support for display and camera connectivity, making it the ideal solution for an unlimited array of home, commercial, industrial, and educational applications and use cases.



Refer to the datasheet and user manual on the [VIA SOM-9X50](#) product page for detailed information.

1.3 Directing Data from a VIA SOM-9X50-STK Device to AWS IoT Core

To direct data from VIA SOM-9X50-STK devices to a cloud implementation, the AWS IoT Core Web Service must be set up and configured to receive data coming from VIA SOM-9X50-STK devices.

Follow the steps below to set up your AWS services in order to connect a VIA SOM-9X50-STK device to an AWS backend:

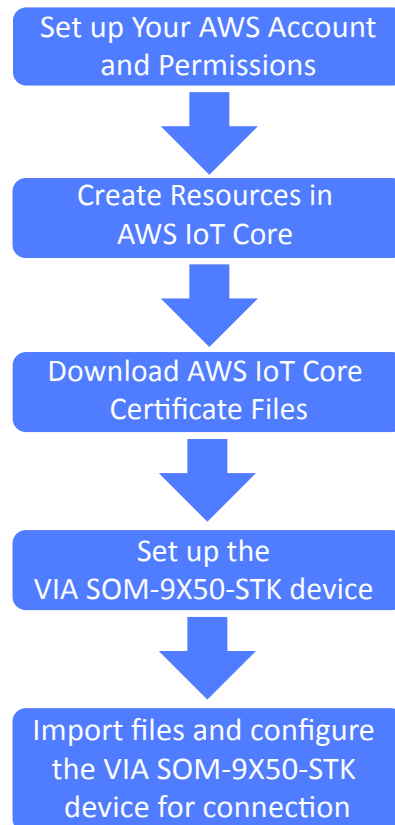
- Follow the steps listed in [Section 2.3](#) to register an AWS IoT Thing and to acquire the AWS IoT certificate files for the VIA SOM-9X50-STK devices.
 - Acquire the certificate (*.certificate.pem) and the private key (*.private.pem.key) files associated with the IoT thing created, as described in [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-9X50-STK devices and AWS IoT Core, including how to add and manage VIA SOM-9X50-STK 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-9X50-STK 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](#)



Sign in as IAM user

Account ID (12 digits) or account alias

IAM user name

Password

☐ Remember this account

Sign in

[Sign in using root user email](#)

[Forgot password?](#)



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-9X50-STK device:

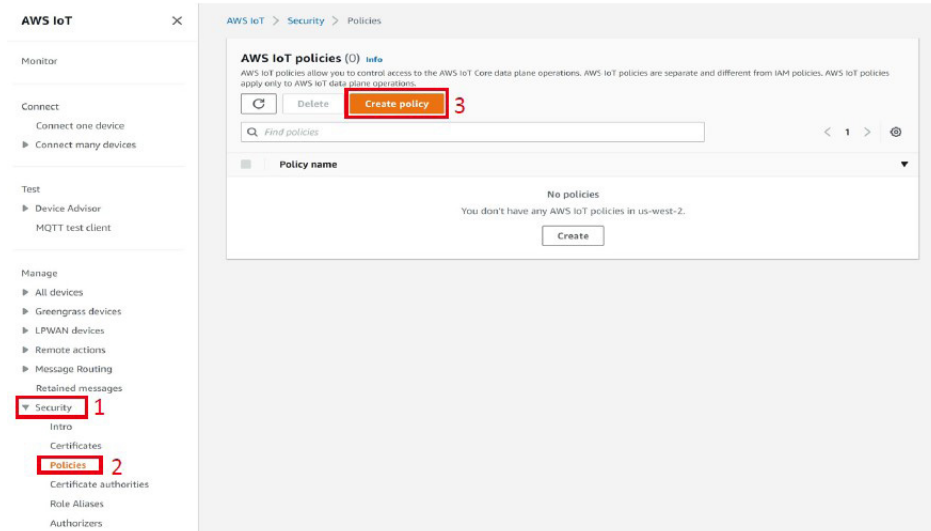
- [Create an AWS IoT policy](#)
- [Create a thing object](#)

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-9X50-STK device.

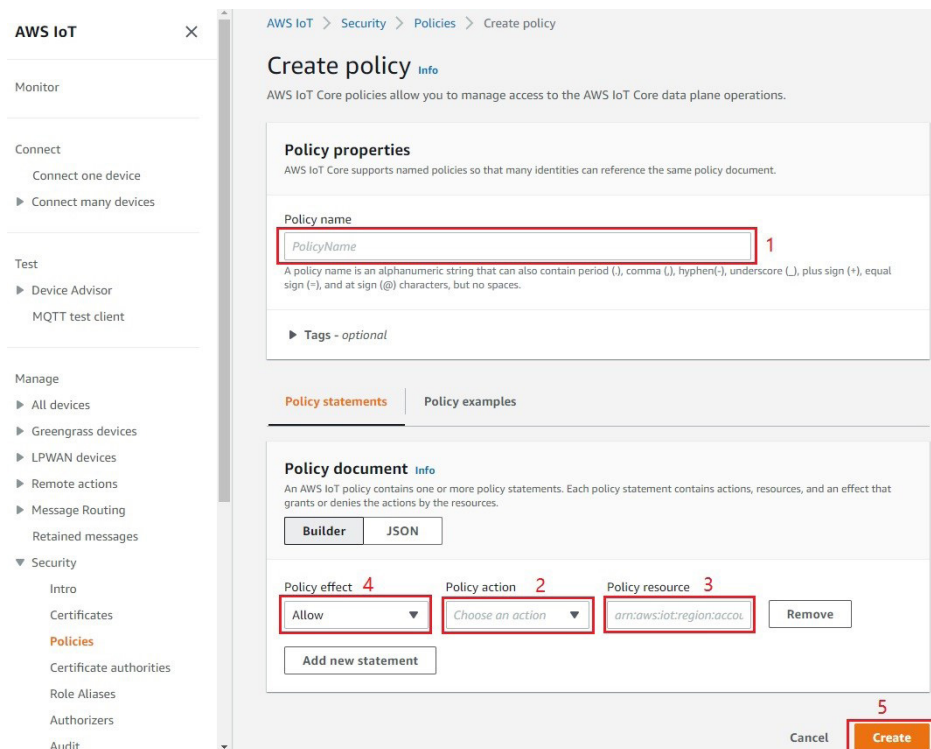
Step 1

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

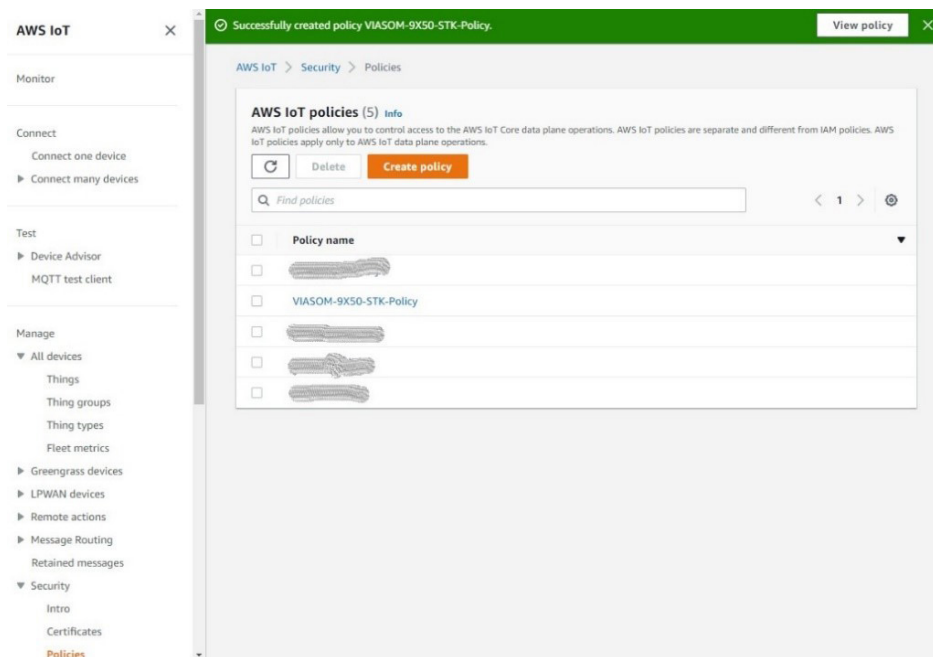


Step 2

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.

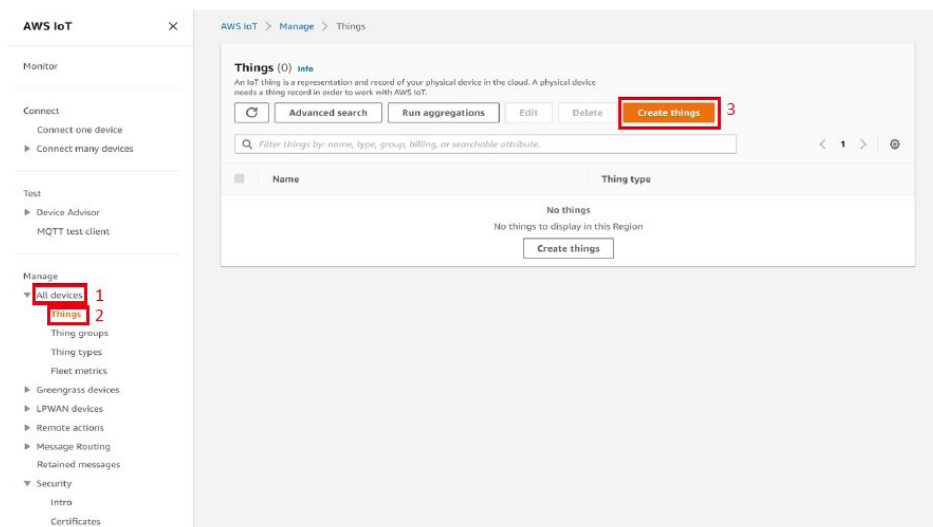


After clicking the 'Create' button, the new policy's name will be listed on the right panel.



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".

AWS IoT > Manage > Things > Create things

Create things 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.

Number of things to create

☒ **Create single thing**
Create a thing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS IoT.

☐ **Create many things**
Create a task that creates multiple thing resources to register devices and provision the resources those devices require to connect to AWS IoT.

Cancel **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.

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
 1
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
- ▶ Searchable thing attributes - optional
- ▶ Thing groups - optional
- ▶ Billing group - optional

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)** **2**
A thing can have only one unnamed shadow.

▶ Edit shadow statement - optional

Cancel **Next** **3**

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-9X50-STK 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 SOM-9X50-STK 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-9X50-STK device.

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

9343d69552f...te.pem.crt

Deactivate certificate

1

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.

2

Public key file

9343d69552f9c8ec36ed625...80ba201-public.pem.key

Download

Private key file

9343d69552f9c8ec36ed625...0ba201-private.pem.key

Download

3

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.

4

Amazon trust services endpoint

RSA 2048 bit key: Amazon Root CA 1

Download

Amazon trust services endpoint

ECC 256 bit key: Amazon Root CA 3

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](#)

5

Done

Step 8

Click on the created IoT thing's name under 'Things' to view your VIA SOM-9X50-STK device's Thing and Device Shadow details, including the MQTT topic prefix.



Note:

The MQTT topic prefix is for binding your VIA SOM-9X50-STK device with AWS IoT Core Web services. The VIA SOM-9X50-STK 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.

The screenshot shows the AWS IoT console interface. The top navigation bar includes 'Monitor', 'Connect', 'Test', and 'Manage'. The 'Manage' section is expanded, showing 'All devices', 'Things', and 'Thing groups'. The 'Things' page displays a list of IoT things, with 'VIASOM-9X50-STK' selected. The 'Device Shadows' page for this device is shown, displaying the 'Thing details' and the 'Device Shadows' table.

Thing details:

- Name: VIASOM-9X50-STK
- ARN: arn:aws:iot:ap-northeast-1:444128012201:thing/VIASOM-9X50-STK
- Type: -
- Billing group: -

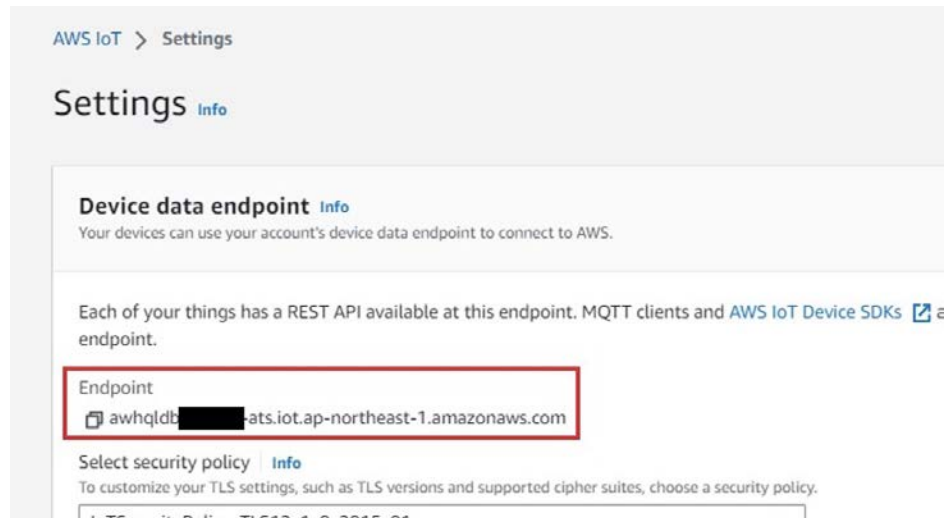
Device Shadows (1) info:

Device Shadows allow connected devices to sync their state with AWS. You can also get, update or delete the state information about this thing's Device Shadows by using HTTPS and MQTT topics.

Name	MQTT topic prefix	Fleet indexing status	Last updated date
Classic Shadow	\$aws/things/VIASOM-9X50-STK/shadow	Not indexed	September 06, 2022, 16:34:11 (UTC+0800)

Step 9

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



2.4 Set up Your Hardware

2.4.1 Requirements

Following are the requirements for the hardware setup:

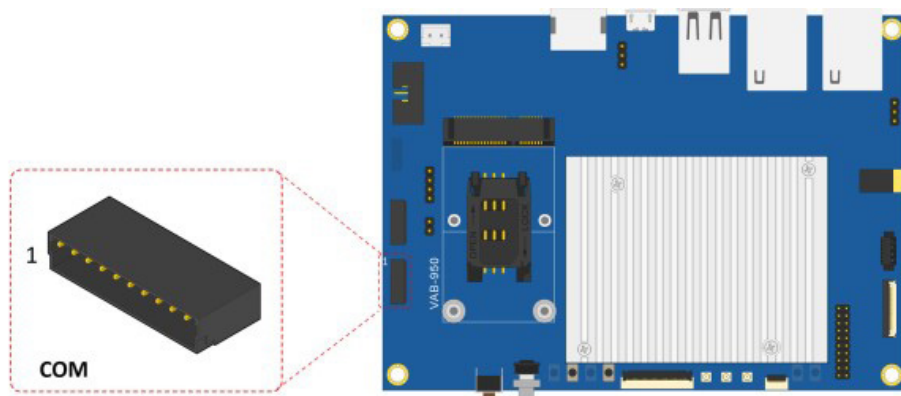
- A debug cable and a USB flash drive
- A serial port communication program such as [PuTTY](#) or [Tera Term](#)

2.4.2 Set up Your VIA SOM-9X50-STK Device

Set up VIA SOM-9X50-STK device as described in the steps below:

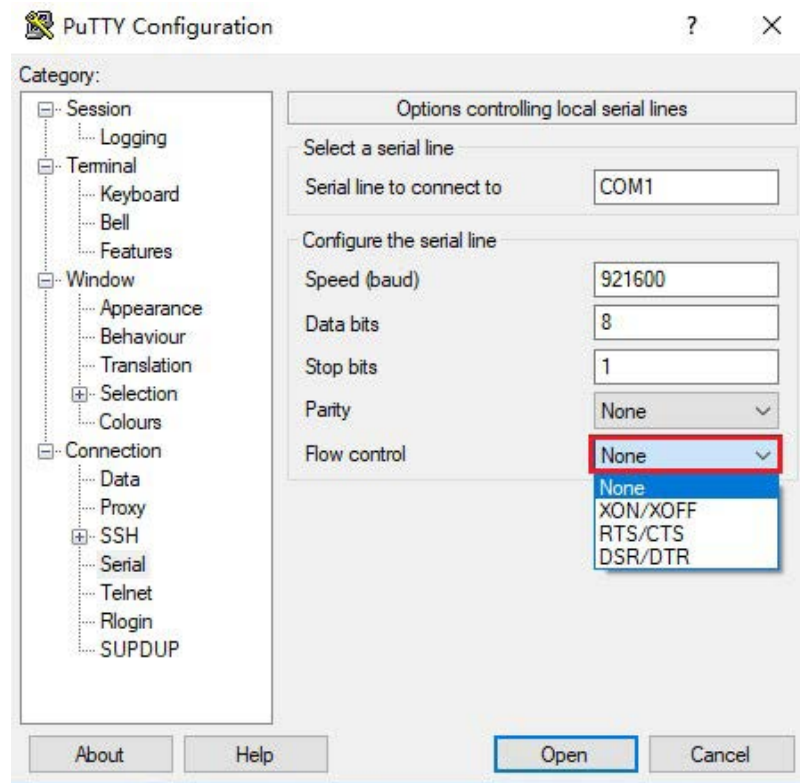
Step 1

Connect a host machine and the VIA SOM-9X50-STK through the onboard COM connector labeled as "COM".



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".



2.5 Set up your Development Environment

The VIA SOM-9X50 BSP supports the Yocto 3.1 and Android 10.0 operating systems. To enable hardware functionality, download the VIA SOM-9X50 Yocto 3.1 and Android 10.0 EVK packages, and refer to the corresponding EVK Quick Start Guides on the [VIA SOM-9X50](#) product page.

Software



VIA SOM-9X50 BSP

The VIA SOM-9X50 BSP supports Yocto 2.6 and Android 10.0. VIA SOM-9X50 Yocto 3.1 and Android 10.0 EVK packages to enable the hardware functionality can be downloaded here. A full set of software customization services that speed up time to market and minimize development costs is also available.

Package	Size	Version	Release Date
Yocto 3.1 EVK	[304.9 MB]	v1.1.0	2022-02-14
Android 10.0 EVK	[668.6 MB]	v1.4.0	2022-04-22

Important: By downloading these software packages, you indicate your acceptance of the [VIA Software License agreement](#). If you do not agree with any of the terms and conditions, do not continue to download the software.

Documentation

Datasheet		2023-04-20
User Manual	v2.00	2021-11-18
STK Yocto 3.1 EVK Quick Start Guide	v1.01	2022-04-15
STK Android 10.0 EVK Quick Start Guide	v1.01	2022-05-06
AWS IoT Core Quick Start Guide	v1.01	2023-01-11
Amazon KVS Quick Start Guide	v1.00	2023-03-09
Product Gallery		

2.6 Connecting with the Yocto 3.1 EVK

The VIA SOM-9X50-STK Yocto 3.1 EVK includes an "IoTSDKSample" application which establishes a connection between the physical sensors/actuators on the VIA SOM-9X50-STK device and the AWS IoT Core web service.

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

Step 1

Copy the device certificate (CertFile), private key file (PvkFile) and the Amazon Root CA certificate (CAFile) created in [Step 7 of section 2.3](#) to "/data/aws/certs".

Open the "/data/aws/iot.json" settings file and modify the following values based on the AWS IoT Core setup:

- **Endpoint:** Input the Device Data Endpoint obtained in [Step 9 of section 2.3](#) as the Endpoint in line 1.
- **CAFile:** Input the name of the Amazon Root CA certificate in line 4.
- **CertFile:** Input the name of the Certificate file in line 5.
- **PvkFile:** Input the name of the Private Key file in line 6.
- **ThingName:** Insert the defined "ThingName" in line 7.
- **ClientID:** Insert the defined "ClientID" in line 8. This value can be randomly generated but must be unique.

Save the changes made to the settings file.

```
{
  "Endpoint" : "awshqldb[REDACTED]-ats.iot.ap-northeast-1.amazonaws.com",
  "Certs" : {
    "FolderFullName" : "/data/aws/certs",
    "CAFile" : "AmazonRootCA1.pem",
    "CertFile" : "9343d69552f9c8ec36ed625ffbc826e3dlb4259fe744585b46e759f9280ba201-certificate.pem.crt",
    "PvkFile" : "9343d69552f9c8ec36ed625ffbc826e3dlb4259fe744585b46e759f9280ba201-private.pem.key"
  },
  "ThingName" : "VIASOM-9X50-STK",
  "ClientId" : "python-sdk-client-id-001"
}
```

Step 2

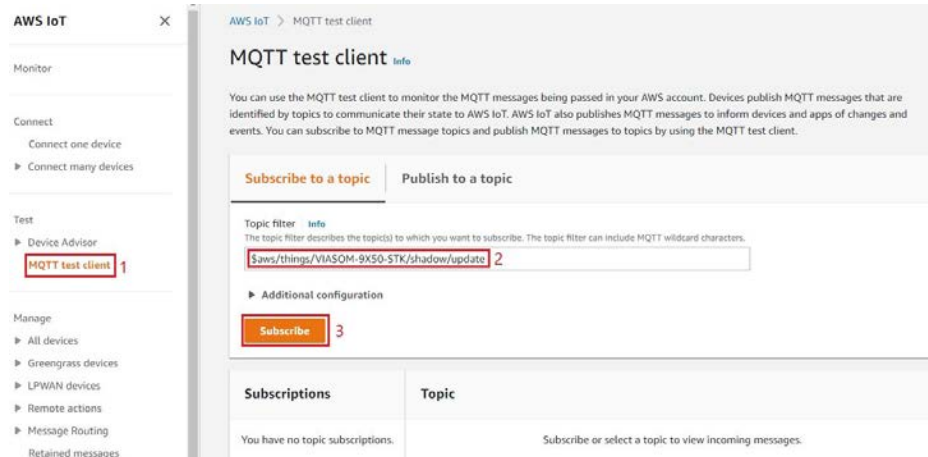
Run the "IoTSDKSample" application as shown below:

```
root@aiv8385-linux:~# IotSDKSample
```

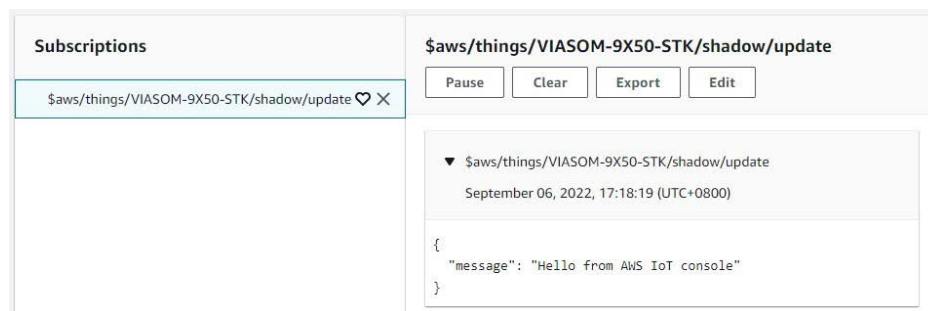
Step 3

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 in the "iot.json" settings file described in step 1.



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



2.7 Connecting with the Android 10.0 EVK

The VIA SOM-9X50-STK Android 10.0 EVK includes an "IoTDeviceSDKSample" application which establishes a connection between the VIA SOM-9X50-STK 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:

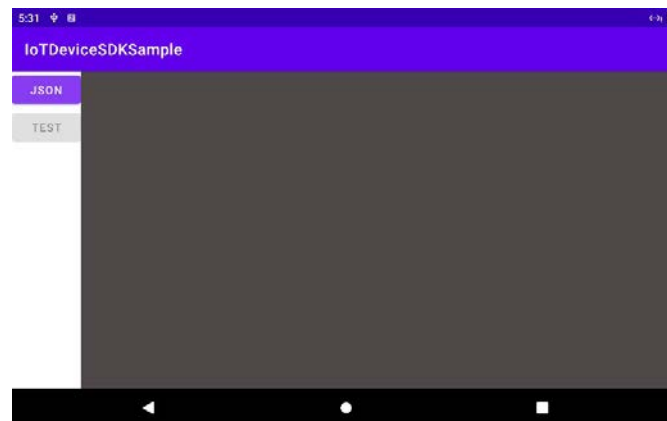
- **thingName:** Insert the defined thing's name.
- **ca:** Input the content text of the thing's Amazon Root CA certificate.
- **cert:** Input the content text of the thing's Certificate file.
- **key:** Input the content text of the thing's Private Key file.
- **ReqRetry:** Number of retries for establishing 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.

```
{
  "thingName" : "VIASOM-9X50-STK",
  "ca" : "-----BEGIN CERTIFICATE-----MIIDQTCCAimgAwIBAgITBmyfz5m/jAo54vB
  "cert" : "MIIDWjCCAkKgAwIBAgIVAPTLXFFh4PL8yo0OLs9WpHxOTKcKMA0GCSqGSIb3
  "key" : "-----BEGIN RSA PRIVATE KEY-----MIIEowIBAAKCAQEAwtvzFPtmEgpd2
  "ReqRetry" : 10,
  "topic" : "$aws/things/VIASOM-9X50-STK/shadow",
  "endpoint" : "awhqldb[REDACTED]-ats.iot.ap-northeast-1.amazonaws.com"
}
```

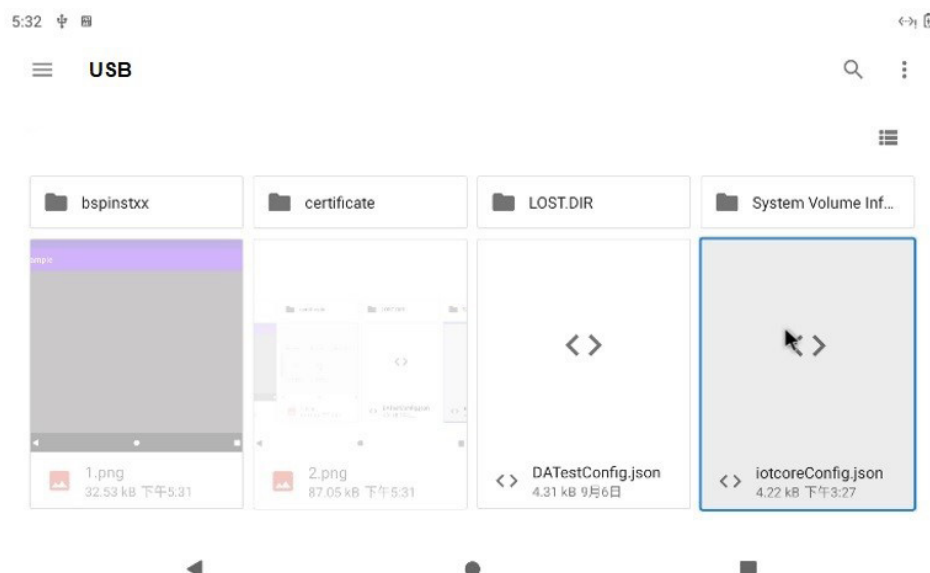
Step 2

Run the "IoTDeviceSDKSample" application as shown below.

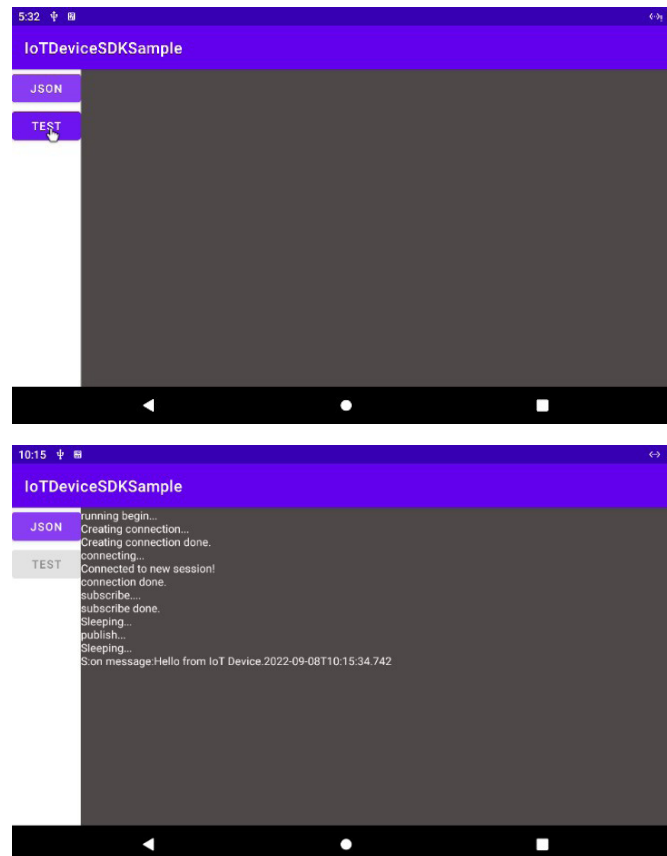


Step 3

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



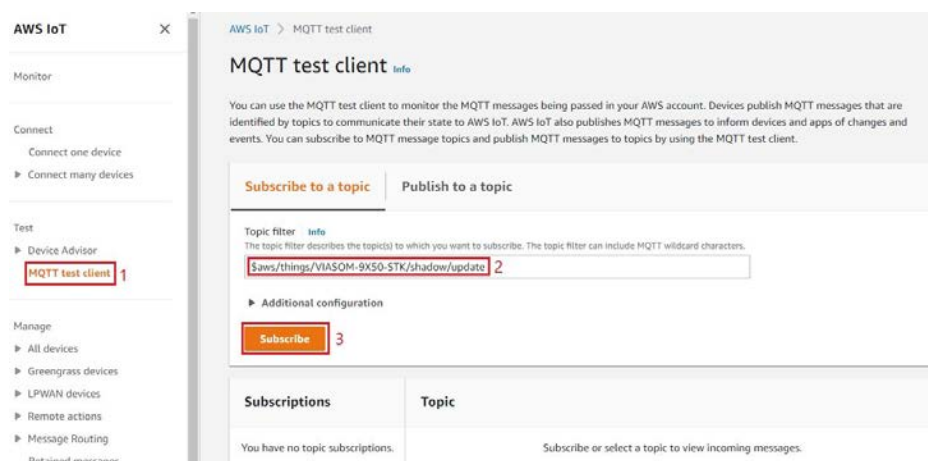
Click the "TEST" button to run the MQTT subscription publishing process as shown below.





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.



Subscriptions

\$aws/things/VIASOM-9X50-STK/shadow/update  

\$aws/things/VIASOM-9X50-STK/shadow/update

Pause

Clear

Export

Edit

▼ \$aws/things/VIASOM-9X50-STK/shadow/update

September 06, 2022, 17:18:19 (UTC+0800)

```
{  
  "message": "Hello from AWS IoT console"  
}
```

Open a console (e.g. Putty) and configure as described in [Section 2.4](#). 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-9X50-STK device.

```
$ ls /bin
```

[illegible]

2.9 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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">Confirm that the date and time is synchronized.Verify the AWS endpoint in the "iot.json" (Yocto 3.1 EVK) or "iot-coreConfig.json" (Android 10.0) settings file.Verify that appropriate certificates and keys are loaded on the VIA SOM-9X50-STK device.Verify the IoT Core thing and policies set on AWS IoT Core.



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