

FC41D AWS IoT Platform Access Guide

Wi-Fi&Bluetooth Module Series

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About the Document

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-	2022-01-26	Brave LIU	Creation of the document
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Contents

Ab	out the Doc	sument	
Co	ntents		
Fig	bie index		
Fig			
1	Introduction	on	
2	Configure	AWS IoT Platform	
	2.1. Crea	ate AWS Account	
	2.2. Get	Certificates	
	2.2.1.	Create a Shortcut for IoT Core	
	2.2.2.	Register Device	
	2.2.3.	Get Certificates	
	2.2.4.	Create a Policy	
	2.2.5.	Attach a Policy to Certificate(s)	
	2.2.6.	Attach a Thing to Certificate(s)	
	2.3. Com	nmunicate with AWS IoT Core	
3	Data Com	munication	
	3.1. MQ	TT Protocol	
4	Appendix	References	



Table Index

Table 1: Related Documents	20
Table 2: Terms and Abbreviations	20



Figure Index

Figure 1: Register Device - A	9
Figure 2: Register Device - B	9
Figure 3: Register Device - C 1	0
Figure 4: Get Certificates – Add a Certificate for Your Thing 1	1
Figure 5: Get Certificates – Download Certificates 1	1
Figure 6: Create a Policy – Choose "Create" 1	2
Figure 7: Create a Policy 1	2
Figure 8: Attach Policy – A 1	3
Figure 9: Attach Policy – B 1	3
Figure 10: Attach Policy – C 1	4
Figure 11: Attach Policy – D 1	4
Figure 12: Attach Thing - A 1	5
Figure 13: Attach Thing - B 1	5
Figure 14: Attach Thing - C 1	6
Figure 15: Communicate with AWS IoT Core - A 1	6
Figure 16: Communicate with AWS IoT Core - B 1	7
Figure 17: Certificates List 1	7

1 Introduction

AWS IoT provides the cloud services that connect your IoT devices to other devices and AWS cloud services. It provides an easy way to help you manage IoT devices.

This document introduces how to access AWS IoT with Quectel FC41D module.

2 Configure AWS IoT Platform

2.1. Create AWS Account

Before accessing AWS cloud, it is necessary to make some configuration on AWS IoT platform for your devices, including device registration, certificate acquisition, policy creation and attachment, etc.

Before using AWS IoT services, you must set up an AWS account. If you already have an AWS account and an IAM user (see the link <u>user</u> for details) for yourself, you can use them to <u>Open the AWS IoT</u> <u>console</u>. Otherwise, open this <u>link</u> for a new account registration.

2.2. Get Certificates

The certificates are used to authenticate your devices to connect to AWS IoT. Follow the steps below to get certificates for your devices.

2.2.1. Create a Shortcut for IoT Core

Sign in to the AWS IoT platform. For more details on how to register the devices, refer to the <u>AWS IoT</u> <u>Core Documentation</u> center.

In the "AWS Management Console", a shortcut for "IoT Core" can be created simply by dragging it to the menu bar.

2.2.2. Register Device

Open your AWS IoT console, then

- a) Click "IoT Core",
- b) Choose "Manage" \rightarrow "Things" in the left navigation bar.
- c) Click "Create"
- d) Clidk "Create a single thing".



aws	Services ~	Resource Groups 👻	🎁 loT Core	\$	û test ∙	Ohio - S	upport 👻
AWS IOT		Things	a)			•	reate
Monitor		Search things		Q Configure fleet indexing (1)	C)	Ca	rd 🔹 🕀
Onboard							
Manage Things Types Thing Groups Billing Groups Jobs Greengrass Secure Defend	b)	quectel_device1	••				
Act							
Test							
				We've added a new, powerful fleet index			<u>Skip quick tour</u>
Software				Next			
Settings							
Leam 正在德語 us.east-2 control	e aws amazon com	enae co		© 2008 - 2019, Amazon Web Services, Inc. or its atiliaites. A	I rights reserved.	Privacy Policy	Terms of Use

Figure 1: Register Device - A

aws Services - Resource Groups - 🍅	IoT Core 🕈	¢	TEST ¥	Ohio
	Creating AWS IoT things			
	An IoT thing is a representation and record of your physical device in the cloud. Any physical device needs a thing record in order to work with AWS IoT. Learn more.			
	Register a single AWS IoT thing Create a thing in your registry Create a single thing			
	Bulk register many AWS IoT things Create things in your registry for a large number of devices already using AWS IoT, or register devices so they are ready to connect to AWS IoT.			
	Cancel d) Create a single thing			

Figure 2: Register Device - B

Then add your device to the thing registry according to the provided steps. Take the device named as "mytestthing" as an example:



Add your device to	the thing registry	1			1/3
This step creates an entry i	n the thing registry and	a thing shadov	v for your device.		
Name					
mytestthing					
Apply a type to this thing					
Using a thing type simplifie Types provide things with a a description.	es device management l a common set of attribu	by providing co Ites, which desc	nsistent registry da ribe the identity ar	ata for things that sha nd capabilities of you	are a type. r device, and
Thing Type					
No type selected	-	Create a type]		
Add this thing to a group					
Adding your thing to a gro	up allows you to manag	e devices remo	tely using jobs.		
Thing Group	. , ,		, ,,		
Groups /				Create grou	p Change
Set searchable thing attrik	outes (optional)				
Enter a value for one or mo	ore of these attributes s	o that you can s	search for your thir	ngs in the registry.	
Attribute key		Value	-		
Provide an attribute key,	e.g. Manufacturer	Provid	le an attribute valu	ie, e.g. Acme-Corpo	Clear



2.2.3. Get Certificates

X.509 certificates protects the connection between a device and AWS IoT platform. The certificates have to be activated before using.



aws Services 🗸 Resource Groups 🗸 🎼	IoT Core 🕈		Å TEST ¥ Ohio ¥ Su	pport 👻
¢	CREATE A THREE Add a certificate for your thing	511P 2/3		0 (9)
	A certificate is used to authenticate your device's connection to AWS IoT. One-click certificate creation (recommended) This will generate a certificate, public key, and private key using AWS IoT's certificate authority.	Create certificate		
	Create with CSR Upload your own certificate signing request (CSR) based on a private key you own.	± Create with CSR		
	Use my certificate Register your CA certificate and use your own certificates for one or many devices.	Get started		
	Skip certificate and create thing You will need to add a certificate to your thing later before your device can connect to AWS IoT.	Create thing without certificate		

Figure 4: Get Certificates – Add a Certificate for Your Thing

Download certificates and root CA and save them in your PC. Select "**Starfield Root CA Certificate**" for the root CA.

aws Services - Resource Groups -	🏐 loT Core 🔹 🕈	众 TEST ▾ Ohio ▾ Support ▾
	Certificate created!	
	Download these files and save them in a safe place. Certificates can be retrieved at any time, but the private and public keys cannot be retrieved after you close this page. In order to connect a device, you need to download the following:	
	Cancel Done Attach a policy	

Figure 5: Get Certificates – Download Certificates

2.2.4. Create a Policy

Thing policy variables allow you to write AWS IoT Core policies that grant or deny permissions based on thing properties like thing names, thing types, and thing attribute values.

Open your AWS IoT console and from the left menu, then



- a) Click "IoT Core" menu.
- b) Click "Secure" \rightarrow "Policies" in the left navigation bar.
- c) Click "Create".

aws	Services 🗸 Resource Groups 🗸 🇌 IoT Core 🕈	Å TEST ▼ Ohio ▼ Support ▼
🏠 AWS IOT	Policies a)	Create 0
Monitor	Asserts policies	Card 👻 🖉
Onboard Manage	quectel_policy_all_allo@ quectel_device1-Policy	
Greengrass	0 0	
Certificates		
CAs Role Allases	b)	
Authorizers	,	
Act		
Test		
Software		
Settings		
Learn		
Feedback	Endish (US) B 2008 - 2019 Amazon Web Services Ioc or its affin	ites. All rights reserved. Privacy Policy Terms of Use

Figure 6: Create a Policy – Choose "Create"

AWS Services - Resource Groups -	🎼 lo T Core 🕈	↓ TEST ▼ Ohio ▼ Support ▼
۴	Create a policy	Д Ф Ф
	Create a policy to define a set of authorized actions. You can authorize actions on one or more resources (things, topics, topic filters). To learn more about IoT policies go to the AWS IoT Policies documentation page.	
	Add statements Policy statements define the types of actions that can be performed by a resource. Advanced mode Action	
	Resource ARN	
	Effect Allow Deny Remove	
	Add statement	
Feedback G English (US)	© 2008 - 2019, Amazon Web Servi	ces, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use

Figure 7: Create a Policy

2.2.5. Attach a Policy to Certificate(s)

In your AWS IoT console page and from the left menu,

- a) Click "IoT Core" menu.
- b) Click "Secure" \rightarrow "Certificates" in the left navigation bar.
- c) Click a certificate to show details.
- d) Click "Actions" \rightarrow "Attach policy".
- e) Select a policy and click "Attach".

aws	Services 🗸 Resource Groups 🗸 🃦 IoT Core	♦ Dest v Ohio v Support v
💮 AWS IOT	Certificates	Create D.
Monitor	Search certificates	Q Card •
Onboard Manage	89943c0f45b4b4555c.® ●	
Secure Certificates Policies CAs		
Role Allases Authorizers		
Defend Act		
Test		

Figure 8: Attach Policy – A



Figure 9: Attach Policy – B



AWS Services - Resource Groups - 🎲 IoT Cor	• • •	لِ TEST + Ohio + Support +
¢.	Attach policies to certificate(s)	<u>.</u>
ct 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Policies will be attached to the following certificate(s): 89943c0f45b4b4555c325579e56a9e68ee147f209ec54d5454725a08a629d7d6 Choose one or more policies e search policies e quectel_policy_all_allow View 1 policy selected Ease Charles Services 0(>4mazon.com inc: 1L+Seattle STL+Washington CL+US Subject Charles State B Charles State B	€ Actions -
	Jan 1. 2050 7:59:59 AM +0800	

Figure 10: Attach Policy – C

aws Services	Q Search for s	ervices, features, blogs, docs, and more [Alt+S]
🐼 loT Core		
AWS IoT	×	AWS IoT > Settings
Monitor		Settings Info
Activity		
Connect		Device data endpoint Inf
Manage		Your devices can use your account's device data endpoint to connect to AWS.
Overview		
Things		
Types		Each of your things has a REST API available at this endpoint. MQTT clients and AWS IOT Device SDKs 🔀 also use this endpoint.
Thing groups		Endpoint
Billing groups		alsrr3vo833bl6-ats.iot.us-east-1.amazonaws.com
Jobs		
Job templates		
Tunnels		
Retained messages		Domain configurations
Fleet metrics		You can create domain configurations to simplify tasks such as migrating devices to AWS IoT
Fleet Hub		Actions = Croate domain configuration
Greengrass		
Wireless connectivity		Name Domain name Status Service type Date updated
Secure		No domain configurations
Overview		You don't have any domain configurations.
Certificates		Create demain configuration
Policies		Create domain configuration
CAs		
Role Aliases		
Authorizers		Logs Info Manage logs
		You can manage AWS IoT logging to log helpful information to CloudWatch Logs.
Detend		
Act		As massages from your devices pass through the message broker and the rules engine. AWS InT loss process events which can be beleful in
Test		troubleshooting.
		Role Log level
oftware		Log role is not available
Settings		Log role is not available
Learn		
Feature spotlight	-	

Figure 11: Attach Policy – D

2.2.6. Attach a Thing to Certificate(s)

Remember the certificate to which you attached the policy and attach the thing to the certificate.

In your AWS IoT console page and from the left menu,

- f) Click "IoT Core" menu.
- g) Click "Secure" \rightarrow "Certificates" in the left navigation bar.
- h) Click a certificate to show details.
- i) Click "Actions" \rightarrow "Attach policy".
- j) Select a thing and click "Attach".

aws service	es 🗸 Resource Groups 🤟 🧊 IoT Core 🕈	∆ TEST ▼ Ohio ▼ Support ▼
AWS IOT	Certificates	Create 💭
Monitor	Search certificates Q	Card +
Onboard Manage	89943c0f45b4b4555c.⊛●	
Greengrass	ALINE	
Secure Certificates		
CAs Role Allases		
Authorizers		
Act		
Test		

Figure 12: Attach Thing - A

aws Services - Resource Groups -	🎁 loT Core 🛛 🕈			, TEST ▾	Ohio 👻 Support 👻
	Certificates > 89943c0f Certificate 89943c0f45 Active	4554b4555c32 5b4b4555c325579e56a9e68ee147f209ec54d5454725a08a	3629d7d6 Actions •		0 8
	Details Policies Things Non-compliance	Certificate ARN A certificate Amazon Resource Name (ARN) uniquely identifies this certificate. Learn more arn:avs:lot:us-east-2:130703169408:cert/80943/c0f45b6b45556325579656a Details Details Usawr OUI-Amazon Web Services OL=Amazon.com Inc. LL=Seattle STL=Washington CL=U5 Subject OUI-Amazon Web Services OL=Amazon.com Inc. LL=Seattle STL=Washington CL=U5 Subject CN=AWS IoT Certificate Create date Sup 23, 2019-253:37 PM +0800 EMpiration date Jan 1, 2050 7:59:59 AM +0800	Activate Deactivate Revolat Majoet transfer Unijeet transfer Start transfer Attach policy Attach policy Download Delete		

Figure 13: Attach Thing - B



AWS Services - Resource Groups -	🎲 loT Core 🛭 🕈		↓ TEST ▼ Ohio ▼ Support ▼
	Certificates > 895	Attach things to certificate(s)	φ
	Currencure 89943c0 Active Details Policies Thong Non-compilant	Things will be attached to the following certificate(s): 89943c0f45b4b4555c325579e56a9e68ee147f209ec54d5454725a08a629d7d6 Choose one or more things Q. Search things Q. Search things Q. Search things Things selected Cancel Antach Search Characon Web Services OL-Amazon.com Inc. LL=Seartle STL=Washington CL=US Subject Characon Web Services OL-Amazon.com Inc. LL=Seartle STL=Washington CL=US Subject Characon Stat 23847 PM -0800 Effective date Search date Jam 1, 2007;55:55 AM -0800 Effective date Jam 1, 2007;55:55 AM -0800	

Figure 14: Attach Thing - C

2.3. Communicate with AWS IoT Core

The AWS IoT device endpoints support communication between your IoT devices and AWS IoT. The device endpoints are specific to your account. Refer to the following steps to find your endpoint.



Figure 15: Communicate with AWS IoT Core - A



AWS Services - Resource Groups -	📦 loT Core 🛛 🕇		Д TEST ★ Ohio ★ Support ★
*	Things > quectel_device1		Д Ф
	THING quectel_devic	e1	() ()
	NO TYPE	Actions -	
	Details	This thing already appears to be connected. Connect a device	
	Security Thing Groups	нттрѕ	
	Billing Groups	Update your Thing Ehadow using this Rest API Endpoint. Learn mere	
	Interact	a3pupxb4was62j-ats.iot.us-east-2.amazonaws.com	
	Jobs	MQTT	
	Violations Defender metrics	Learn more	
		Update to this thing shadow \$aws/things/quectel_devicel/shadow/update	
		Update to this thing shadow was accepted	
		Update this thing shadow documents	
		\$aws/things/quectel_devicei/shadow/update/documents	
🗬 Feedback 🛛 🚱 English (US)	_	Update to this thing shadow was rejected Saus/thines/ouectel_devicel/shadow/update/rejected @ 2008 - 2018, Amazon Viv	b Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use

Figure 16: Communicate with AWS IoT Core - B

```
work (E:) > mqtt > aws > quectel_device1
```

Name	Date modified	Туре	Size
🔄 89943c0f45-certificate.pem.crt	9/23/2019 2:33 PM	Security Certificate	2 KB
89943c0f45-private.pem.key	9/23/2019 2:33 PM	KEY File	2 KB
89943c0f45-public.pem.key	9/23/2019 2:33 PM	KEY File	1 KB
AmazonRootCA1.pem	9/23/2019 2:32 PM	PEM File	2 KB
connect_device_package.zip	9/23/2019 3:02 PM	WinRAR ZIP 压缩	4 KB

Figure 17: Certificates List

3 Data Communication

3.1. MQTT Protocol

AWS IoT Core supports devices and clients that use the MQTT and the MQTT over WebSocket Secure (WSS) protocols to publish and subscribe to messages.

After configuring AWS IoT platform, you can perform communication between the module and AWS IoT platform as the example shown below. For details of the AT commands, see

```
AT+QSSLCERT="CA",2,1187
OK
AT+QSSLCERT="User Cert",2,1220
OK
AT+QSSLCERT="User Key",2,1675
OK
AT+QSSLCFG="ciphersuite",1,0xFFFF
OK
AT+QMTCFG="session",1,1
OK
AT+QMTCFG="ssl",1,1,1
OK
AT+QSSLCF="sni",1,0
OK
AT+QSSLCFG="verify",1,2
OK
AT+QMTOPEN=1,"a1srr3yo833bl6-ats.iot.us-east-2.amazonaws.com",8883
OK
+QMTOPEN: 1,0
AT+QMTCONN=1,"my_quething"
OK
+QMTCONN: 1,0,0
AT+QMTSUB=1,1,"$aws/things/mytestthing/shadow/update/accepted",0
```

OK



```
+QMTSUB: 1,1,0,0
AT+QMTSUB=1,1,"$aws/things/mytestthing/shadow/update/rejected",0
OK
+QMTSUB: 1,1,0,0
AT+QMTPUB=1,1,1,0,"$aws/things/mytestthing/shadow/update"
>
{
  "state": {
    "reported": {
        "color": "red"
       }
   }
}
OK
+QMTPUB: 1,1,0
+QMTRECV: 1,0,"$aws/things/mytestthing/shadow/update/accepted","{"state":{"reported":{"colo
r":"red"}},"metadata":{"reported":{"color":{"timestamp":1610616830}}},"version":3,"timestamp":
1610616830}"
```

4 Appendix References

Table 1: Related Documents

Document Name

[1] Quectel_FC41D_AT_Commands_Manual

Table 2: Terms and Abbreviations

Abbreviation	Description
AWS	Amazon Web Services
IoT	Internet of Things
MQTT	Message Queuing Telemetry Transport
WSS	WebSocket Secure