

1. Introduction

All of Infinite's devices that support the MQTT protocol, are capable to connect to any local or remote MQTT Broker. Microsoft Azure, commonly referred to as Azure, is a cloud computing service created by Microsoft for building, testing deploying, and managing applications and services through Microsoft-managed centers.

This document is a brief how-to guide for all device communications between Infinite's devices and Microsoft Azure.

2. Generating Self-Signed Device Certificate and Key

Azure requires TLS communications so we will have to create our own self-signed certificate and key for our device. We do that with the commercial-grade TLS toolkit openssl. The easiest way to do that is to simply install <u>git</u> on your computer and locate the openssl.exe file in this directory: C:\Program
Files\Git\usr\bin\openssl.exe.

Open a Command Prompt or PowerShell window in the above directory and type the following commands to create the device certificate and key: req -x509 -nodes -sha256 -days 365 -newkey rsa:2048 -keyout device.key -out device.crt - creates device certificate and private key

(These commands are for testing purposes and should be adjusted for different requirements.)

3. Creating an IoT Hub

After creating a Microsoft Account, the first step of this procedure is to create an IoT Hub. On the homepage of Microsoft Azure, click Create a resource and then search for IoT Hub.

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Create a resource	IoT Hub	Subscriptions	Event Grid Topics	Event Grid Domains	Event Grid Partner	Azure Resource Mover	Function App	Event Hubs	More servic
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Create an IoT Hub by filling out the project details and creating a new Resource group. You must choose East US as your region for the time being as Microsoft is working on enabling TLS1.2 on all regions.

Home > Create a resource > IoT Hub > IoT hub … Microsoft		
Basics Networking Management	Tags Review + create	
Create an IoT hub to help you connect, mo	nitor, and manage billions of your IoT assets. Learn more	
Project details		
Choose the subscription you'll use to mana organize and manage resources.	ge deployments and costs. Use resource groups like folders to help you	
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	Create new	
Instance details		
IoT hub name * 🔅	MyVeryFirstHub	~
Region * 🛈	East US	\sim

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Make sure that you	configure	the	minimum	TLS	version	as	well.
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efender for IoT Turn on Defender for IoT and add an	Off extra layer of threat	protection to IoT Hub, IoT Edge, and you	ır devices. Learn mo
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3.1 Creating a device

While you are on your IoT Hub page, enter the IoT devices tab and click New to create an IoT device.

Home > MyVeryFirstHub			
MyVeryFirstHub Ic	oT devices 🛷 …		
Search (Ctrl+/)	+ New 🖒 Refresh 🛛	🗒 Delete	
X Overview	View, create, delete, and update	e devices in your IoT Hub.	
Activity log	Field		
Access control (IAM)	+ × select or er	nter a property name	\sim
🗳 Tags	+ Add a new clause		
Diagnose and solve problems	Query devices		
🗲 Events			
Settings	Device ID	Status	Last
Shared access policies	No devices found		
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↔ Networking			
🔎 Certificates			
Built-in endpoints			
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🔒 Locks			
Explorers			
🔎 Query explorer			
IoT devices			

On the next page name your device, choose X.509 Self-Signed as the authentication type and enter your certificates Primary Thumbprint. You can find this thumbprint by opening the device.crt file we created earlier.



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General	Details	Certification Pat	h	
Show:	<all></all>		~	
Field			Value	/
🗐 Su	ubject		subber, Internet Widgits P	ty L
E Pu	ublic key		RSA (2048 Bits)	
Pu	ublic key pa	arameters	05 00	
🕢 Su	ubject Key	Identifier	0ae3163acb6dc845efa0ec	47a
_		y Identifier	KeyID=0ae3163acb6dc84	5efa
💦 Ba	asic Constr	aints	Subject Type=CA, Path Le	ngt
	numbprint		b5ddbecd4ff84727f2a65b(`
		f84727f2a6	b5ddbecd4ff84727f2a65b0	`

Home > MyVeryFirstHub > 📯 Create a device 👘 \times ď Find Certified for Azure IoT devices in the Device Catalog ľ Device ID * 🕡 NewDevice $^{\prime}$ Authentication type 🕕 Symmetric key X.509 Self-Signed X.509 CA Signed Primary Thumbprint * 🛈 b5ddbecd4ff84727f2a65b0fa9bd0837b8249285 \checkmark Secondary Thumbprint * 🛈 b5ddbecd4ff84727f2a65b0fa9bd0837b8249285 Connect this device to an IoT hub ③ Enable Disable Parent device (i) No parent device Set a parent device



4. Device Configuration with WA Manager

In the Edit Device window in WA Manager, tick the Use SSL box.

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neral Analog Inpu	uts Counters	SDI-12 MODBUS	Data Transmission MQTT P	arameters SSL Parameter	ers
ii , s	/N: 1	Type: ADS-300	Autonomous NB-IoT No	de Firmware Ve	rsion 1.2
Unit Identificat	ion				
Device name	ADS-300			Unit ID	0
NB-lot Identific		meters PSM Mode	: ◯ On ● Off	Phone	
	-	PSM Mode	e ◯ On ● Off UTC Time □	Phone Offset 0	
Use SSL	-	PSM Mode			
Use SSL	-	PSM Mode			
Use SSL	-	PSM Mode			
Use SSL	-	PSM Mode			
Use SSL	-	PSM Mode			

Next, we configure the MQTT parameters.

Although Azure supports MQTT connectivity, it is not a pure MQTT Broker and so it has some limitations regarding its MQTT paramaters.

For the Broker IP, the IoT Hub endpoint must be used that can be found in the IoT Hub page.

MyVeryFirstHub	\$			
	$ ightarrow$ Move \lor 📋 De	lete 💍 Refresh		
X Overview	∧ Essentials			
Activity log	Resource group (change	e) : indinf	Hostname	: MyVeryFirstHub.azure-devices.net
Access control (IAM)	Status	: Active	Pricing and scale tier	: F1 - Free
🗳 Tags	Current location	: East US	Number of IoT Hub units	s : 1
	Subscription (change)	: Azure subscription 1	Minimum TLS Version	: 1.0
Diagnose and solve problems	Subscription ID	: c4c26b13-c221-43a5-a467-6bfff4e176a9		
🗲 Events	Tags (change)	: Click here to add tags		



For the Client ID, the Device ID must be used that we used to create our device.

-	puts Counters SDI-12 MODBUS Data Transmission MQTT Paramet	SSE Parameters	
GPRS Connec	tion Settings		
User name			
Password			
APN String	iot.1nce.net		
IP Version	4 ~		
TCP Paramete	ers		
Broker IP	MyVeryFirstHub.azure-		
Port	8883		
MQTT Param	eters		
Client ID	NewDevice		
User Name	MyVeryFirstHub.azure-devices.net/NewDevice		
Password			
Topic	ADS-300/TILT		

The username must be of this format based on the name of our DeviceID and IoT Hub name: MyVeryFirstHub.azure-devices.net/NewDevice/?api-version=2018-06-30

Lastly, in the SSL Parameters tab, we copy and paste the three files needed for the TLS communication: Server Certificate (CA), Device Certificate and Device Private Key.



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The Server Certificate is <u>this</u> Digicert CA, the Device Certificate is the device.crt file and the Device Private Key is the device.key file. These files should be first opened with Notepad++ and their contents should be copy and pasted in the above tab. All files must be PEM formatted.

Your device can now connect Azure and send your encrypted data safely.

Disclaimer:

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