MQTT And Azure IoT

For more information on these topics, see MQTT Protocol and Introduction to Microsoft IoT Hub.

Quick video tutorial (no audio)

System Requirements

The requirements for a successful configuration of MQTT and Azure are listed below:

- MQTT Driver version 0.2.1
- Microsoft Azure IoT Hub Account
- Visual Studio Code with an Azure IoT Hub

Configuration Settings

Visual Studio Code

Visual Studio Code is an open-source, streamlined code editor with support for development operations like debugging, task running, and version control. Visual Studio Code can be downloaded here.

To download the extension that allows interactions to Visual Studio, Azure IoT Hub, and IoT Device Management, click here.

↑↑ This guide assumes that an IoT Hub already exists within the Azure Portal account.

After installing the extension, open the VSCode application. In the explorer pane of the VS Code, click the "Azure IoT Hub" tab in the bottom left corner (1 below), and click "Select IoT Hub" (2) in the context menu.

If you are not signed into Azure, a pop-up will appear in the bottom right corner to prompt you sign in to Azure (3).



Your Azure Subscription list will appear after you sign in. Select the Azure Subscription and IoT Hub. After a few seconds, devices and endpoints will appear in the Azure IoT Hub tab.

New IoT Devices can be created through the Azure IoT Hub extension. Select the context menu (1 below), click on Create Device (2), and enter a Device ID for the new IoT device.

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> 🛄 NewDevice		8
> Endpoints	Select IoT Hub	0 🗛
	Set IoT Hub Connection String	
	Create IoT Hub	
	Create Device	loT
	Create IoT Edge Device	w b
	Generate SAS Token for IoT Hub	
	Start Monitoring Built-in Event Endpoint	reate
	Stop Monitoring Built-in Event Endpoint	
	Copy IoT Hub Connection String	
	Update Distributed Tracing Setting (Preview)	elle

Now that your device is created, you need to setup your Connection String and SAS Token.

To do this, right click on your device and select Get Device info. You should see information displayed in the output window.

Review the Connection String that was created for the device and record the following pieces of information from this string:

HostName = TatsoftTestHub.azure-devices.net DeviceId = NewDevice

Right click on the device, select Generate SAS Token for lot Hub, and enter the expiration time. You should see the information displayed in the output window.

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Endpoints ↓	Show Welcome Page Send D2C Message to tot 11ub Selctof Hub Selctof Hub Connection String Create IoT Hub Canate Device Canate IoT Hub Canate Data Data Device Generate SAS: Token for IoT Hub Stat Monitoring Built in Event Endpoint Stop Monitoring Built in Event Endpoint Capp IoT Hub Connection String Update Uktributed Tracing Setting Preview)	[SACIORen] SAS taken f SharedAccessSignature	nr [10] Hub] is generated and copied t sr TatsoftTestHub.azure-devices.net&s	ro «13phoned: ig-poxxc2xt2006d30e9141Spr	n TR 10940-fy i pokkavn TQP7 c 45 UM-sko-i at huho	vnerikse-1593000673

Record the following pieces of information from this string:

Password = SharedAccessSignature sr=TatsoftTestHub.azure-devices.net&sig=pzzXCZK%2
BQ6dJUe2Hf1SptTR1oPMbfyip0K9M4TQPZc4%3D&skn=iothubowner&se=1593008673

To verify that data is flowing from the MQTT Driver to the cloud-based Azure IoT Hub, right click on the device and select "Start Monitoring Built-In Event Endpoint".

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OPEN EDITORS Welcome to A: Untitled-1 OUTLINE NO FOLDER OPENED	- zure IoT Hub Extensi			Þ	Event Hubs twinEndpoint Service Bus queue Service Bus topic Blob storage	Generate Code Generate SAS Token for Device Get Device Info
 > TIMELINE > AZURE IOT HUB > TatsoftTestHub > Devices > Endpoints 	Send D2C Message to Send C2D Message to Invoke Device Direct I Edit Device Twin Start Monitoring Built Start Receiving C2D M Generate Code Generate SAS Token fo Get Device Info Copy Device Connect Delete Device	PROBLEMS OUTPUT [IOTHubMonitor] [IOTHubMonitor] [IOTHubMonitor] Do Device Method t-in Event Endpoint Message for Device ion String	DEBUG CONSOLE TE Start monitoring Created partition Created partition	RMINAL message a i receiver	arrived in built-i [0] for consumer [1] for consumer	n endpoint for device [NewDevice] Group [\$Default] Group [\$Default]

MQTT Driver

In your project's Engineering environment, navigate to *Devices > Channels* and add a new MQTT channel by selecting it from the Installed Protocols menu.

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Edit ^{Draw Run Info}	Installed F	rotocols: MQTT -	Message Queuing Telemetry Transpo	rt 💽 🚍	Help		
of Tags		Channel: Cre	ate new				
Ο	Drag a coli	umn header here t	o group		_		Filter by Name:
Security	Name	Protocol	ProtocolOptions Interface	Settings	Timeout	InitialState	Description
	MQTT	MQTT	TCPIP				MQTT - Message Queuing Telemetry Transport
Devices							

In Devices > Nodes, add a node for the newly created MQTT Channel. The primary station's configuration is made as follows:

For the IoT Hub and the device configured in VSCode, the parameters are as follows.

```
URL = TatsoftTestHub.azure-devices.net Port = 8883
Client ID = NewDevice
Username = TatsoftTestHub.azure-devices.net/NewDevice
Password = SharedAccessSignature sr=TatsoftTestHub.azure-devices.net&sig=pzzXCZK%2
BQ6dJUe2Hf1SptTRloPMbfyip0K9M4TQPZc4%3D&skn=iothubowner&se=1593008673
TLS Version = <TLSv1.0> X059 Certificate =
QoS = AtMostOnce Keep Alive = 1
```

Edit Draw Run Info	Channels Nodes Protocol: MQTT Node: MOTT1	Points AccessTypes
Jags	Drag a column header here to group	
Security	Name Channel	PrimaryStation
Devices	ΜΩΤΤ1 ΜΩΤΤ	F9AFFC2FFC2FFCAFFC6FFC0FFC6FFC0FFC6FFCFFC8FFC9FF;TLSv1.0;:AtMostOnce;1 URL TatsoftTestHub.azure-devices.net Port 8883 ClientID NewDevice
Datasets		Username TatsofTestHub.azure-devices.net/N Password •••••••••••••••••
Scripts		X509Certificate QoS AtMostOnce
		KeepAlive (sec.) 1

Finally, in *Devices > Points*, fill in the address information according to the syntax below:

devices/NewDevice/messages/events/

devices/ <device id="">/messages/events/</device>
For this example device, the correct topic is:

Info

</t

Once the device configuration is complete, go to *Run* > *Startup* and execute the project. Enable the Debug and Devices options by clicking on settings and selecting the corresponding boxes. Open the TraceWindow and monitor the communication exchange.

1	TraceWindow - MqttAzure					— — ×
Fil	ter Message by					Auto-Scroll Always on to
Drag a column header here to group by that column.						
	Date Time	Туре	Module Name	Info 1	Info 2	Message
	23/06/2020 13:10:25.267	Info	Device	MQTT		Initializing Device Module
	23/06/2020 13:10:25.268	Debug	Device	MQTT		Device.OnStart :: Reading channel configuration
	23/06/2020 13:10:25.356	Debug	Device	MQTT		Device.OnStart :: Creating tag points list
	23/06/2020 13:10:25.377	Debug	Device	MQTT		Device.OnStart :: Loading driver assembly
	23/06/2020 13:10:25.380	Info	Device	MQTT		Protocol: MQTT loaded. (Version : 3.0.2.1)
	23/06/2020 13:10:25.380	Debug	Device	MQTT		Device.OnStart :: Loading driver assembly
	23/06/2020 13:10:25.384	Debug	Device	MQTT		Device.OnStart :: Creating list of COMAPIs
	23/06/2020 13:10:25.403	Debug	Device	MQTT		Device.OnStart :: Creating group configuration
1	23/06/2020 13:10:25.433	Debug	Device	MQTT		Device.OnStart :: Creating events and fill groups
	23/06/2020 13:10:25.449	Debug	Device	MQTT		Device.OnStart :: Creating threading pool
	23/06/2020 13:10:25.450	Debug	Device	MQTT		Device.OnStart :: Finalizing initialization
	23/06/2020 13:10:25.450	Info	Device	MQTT		Device Module Initialized Successfuly
	23/06/2020 13:10:26.415	Debug	Device	MQTT		Connecting to Broker OK.
	23/06/2020 13:10:26.416	Debug	Device	MQTT		Initalization ok
	23/06/2020 13:10:26.416	Debug	Device	MQTT		Treating Topic:devices/NewDevice/messages/events/
	23/06/2020 13:10:26.429	Debug	Device	MQTT		Subscribing Topics
	23/06/2020 13:10:26.435	Info	Device	MQTT1	ok	ID: 1 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:27.457	Info	Device	MQTT1	ok	ID: 2 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:29.473	Info	Device	MQTT1	ok	ID: 3 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:31.474	Info	Device	MQTT1	ok	ID: 4 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:33.473	Info	Device	MQTT1	ok	ID: 5 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:35.149	Debug	Device	MQTT		Sending Message: Topic: devices/NewDevice/messages/events/ Value: Message 1 TimeStamp: 23/05/2020 13:10:35 -03:00
	23/06/2020 13:10:35.149	Info	Device	MQTT1	ok	ID: 6 - Command Success. (Master) devices/NewDevice/messages/events/ Value: Message 1
	23/06/2020 13:10:35.495	Info	Device	MQTT1	ok	ID: 7 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:37.479	Info	Device	MQTT1	ok	ID: 8 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:39.483	Info	Device	MQTT1	ok	ID: 9 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:41.507	Info	Device	MQTT1	ok	ID: 10 - Command Success. (Master) devices/NewDevice/messages/events/
	23/06/2020 13:10:42.302	Debug	Device	MQTT		Sending Message: Topic: devices/NewDevice/messages/events/ Value: Message Test TimeStamp: 23/06/2020 13:10:42 -03:00
	23/06/2020 13:10:42.302	Info	Device	MQTT1	ok	ID: 11 - Command Success. (Master) devices/NewDevice/messages/events/ Value: Message Test
	23/06/2020 13:10:43.505	Info	Device	MQTT1	ok	ID: 12 - Command Success. (Master) devices/NewDevice/messages/events/

Back on VSCode, you should see the received messages in the output window.

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✓ OPEN EDITORS	Event Hubs Generate Code					
× 🗅 Welcome to Azure IoT Hub Extensi	twinendpoint					
🕒 Untitled-1	PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL Azure IoT Hub 🗸					
> OUTLINE	[IoTHubMonitor] Stopping built-in event endpoint monitoring					
> NO FOLDER OPENED	[IoTHubMonitor] Built-in event endpoint monitoring stopped.					
> TIMELINE	[IoTHubMonitor] Start monitoring message arrived in built-in endpoint for all devices					
✓ AZURE IOT HUB	[IoTHubMonitor] Created partition receiver [0] for consumerGroup [\$Default]					
💦 TatsoftTestHub	[IoTHubMonitor] Created partition receiver [1] for consumerGroup [\$Default]					
✓ Devices	"Mescane 1"					
> 💭 NewDevice 🖒	[IoTHubMonitor] [1:10:42 PM] Message received from [NewDevice]:					
> Endpoints	"Message Test"					