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Category	□FAQ ■SOP	Related OS N/A				
Abstract	How to Send WISE-400	4000 IO Data to Azure IoT Hub via MQTT				
Keyword	WISE, Azure IoT Hub, c	b, cloud upload, push notification				
Related Product	WISE-40XX series					

Problem Description:

This document shows that how to connect with <u>Azure IoT Hub</u> and make sure push data successfully. Utilize <u>Node-Red</u> to **monitor the pushed data.**

■ <u>Brief Solution - Step by Step</u>:

Azure could be connected with end device through HTTP and MQTT protocol. WISE utilize HTTP protocol to connect with <u>Azure IoT Hub</u>. WISE does not need an extract gateway to connect with the service.

WISE pushes data to Azure event hub (figure 1 (A)) and upload .csv file to Azure Blob Storage account (figure 1 (B)). SOP video of both functions can be found in the same archive folder of this document. This document shows the details about pushing real-time data (figure 1 (C)).

	Upload file	Push data
Data format	CSV	JSON
Data type	A batch of historical record.	The last real-time data.
Support resume data	Yes.	No. Will discard the data after
after the connection		retry 3 times.
is restored.		
Link	https://youtu.be/xfI6bSPa8jA	https://youtu.be/scvNMPtwLuc



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Figure 1. (A)(B) WISE FW **support cloud upload/push data** to <u>Azure IoT Hub</u> (C) The topology of this documentation.

JSON messages does not storage in any file, it **only temporary storage in event hub for few hours.** Unless a user utilize these messages for another application, these messages will be deleted.

Step1. Refer to the website of Microsoft and create an account.

https://docs.microsoft.com/en-us/azure/iot-hub/

In the Azure portal, click New > Internet of Things > IoT Hub.

https://portal.azure.com/?signIn=1#home



Figure 1. Create an account.

Step 2. Fill in the connection information in WISE-4000 GUI page.

Information			WISE-4000 GUI
F Configuration	🖋 Configurati	on	
Lull I/O Status	Information Cellular	Positioning Network App Time & Date Control Cloud Firmware	
🚓 Site Survey	Cloud Configurat	tion	
Data Logger	1 Sel	ect Service Azure MQTT ~	
Diagnostician	Setting		
2	UUID	WISE-4671-S617TUA_6159297	
3	Connection String	HostName=WI	0lq7PfeKkPCrV
4	Port Number	8883	
5	 Heartbeat Frequency (sec) 	60	
6	Publish QoS	1 Subscribe QoS	1
			8 Submit

- 1. Select "Azure MQTT" function in CLOUD configuration page.
- 2. UUID: which is set in **configuration/information** page. Cannot connect multiple devices with the same UUID.

WISE-4671-S617TUA	
Information	WISE-4000 GUI
✗ Configuration	🖋 Configuration
Lul I/O Status	Information Cellular Positioning Network App Time & Date Cont
🎄 Site Survey	Information
🗱 Advanced 🔻	
	Module Information
	Model Name WISE-4671-S617TUA
	UUID WISE-4671-S617TUA_6159297
	Description

 Connection String: copy-paste from Azure GUI page -> shared access policies/iothubowner/primary connection string

Microsoft Azure		P Search revolutors, services, and docs (G+7)	
Home WSE-series WISE-series Sha	red access policies 🤌 –		AZURE GUI
P Search	Shared access policies may be used to ge	merate security tokens to consume lof hub functionality. Lown more	Promise ker
IoT.Edge	Connect using shared access policies		
Configurations + Deployments	🗟 Save 🦻 Docard drunge		Secondary key
 Updates 	(8) Allow		4.
P Queries	C Dety		Primary connection string
Hub settings	Manage shared access policies		
* Built-in endosints	+ Add shared access policy C Ref.		
Messige.couting			Permission
Ele upload	Policy Name	Permissions	
Ealover	iothubownar	Registry Read, Registry Write, Service Connect, Device Connect	E Registry Write
L1 Excertiss	T wrvice	Service Connect	Service Connect
E Loda			Device Connect
Security settings	device	Device Connect	
s identify	registry/lead	Registry Read	
Shared, access policies	regutyfiead/inite	Registry Read, Registry Write	
Electworking			
Certificates			

- 4. Port: 8883 (TLS)
- 5. Heartbeat: 60 for example
- 6. Publish QoS: less than 2
- 7. Subscribe QoS: less than 2
- 8. **Submit** the modification

Step 3. Check the system clock in your WISE module. The connection key is available within 365 days. If the WISE module timing is far different from the Azure server timing, the server will disconnect the client (WISE) automatically. If a user is using WISE-4012E (figure 2), the system clock needs to be correctness after power-on every time due to there is no RTC hardware in this model.

WISE-4012E	SE-4000 GUU		https://www.google.com.tw/search?
			All Images News Maps
Information			About 9,130,000,000 results (0.92 seconds
🗲 Configuration	🖋 Configuration		
l <u>∎il</u> I/O Status ¢\$ Advanced <i>◄</i>	Information Wireless Netwo	ork App	4:11 PM Thursday, November 22, 2018 (Giv Time in Taipei City, Neihu District, }
	Local Time	ne de la companya de	Current Local Time in Taipei, Te https://www.timeanddate.com/worldclocl Current local time in Taiwan – Tainei, Get T
	Current Time	1970-01-01T09:17:55+08:00	C
	Time Zone	(GMT+08:00) Taipei	v E
	Time Calibration	🖋 Click Me	E

Figure 2. The system clock needs to be synchronized.

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Step 4. Enable push notification function of WISE-4000 (figure 3).

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Push Notification (JSON format)		WISE-4000 GUI
I/O Log		
System Log	OFF	
	Push MAC Address	
	Push Timestamp	
	Timestamp Format	Local Date and Time(GMT)

Figure 3. Enable PUSH notification.

Step 5. Open **Device** panel in Azure GUI and **Add** a new device (figure 4 & figure 5). The **Device ID** should be the same as **UUID** in WISE web utility. **Authentication Type** please set as **Symmetric Key**, enables the **Auto Generate Keys**, and **Enable** the **Connect device to IoT Hub** setting.

Noted: The UUID is setup in Configuration page of WISE web utility (figure 6).

WISE-series Device	es 🖈 …				A 71	
	View, create, delete, and update devices in y	our IoT Hub. Learn more			AL	
Overview *	+ Add Device Refresh @ Assign					
Activity log	enter device ID	s: All + Add filter				
Access control (IAM)						
Tags	Device ID	Туре	Status	Last status update	Authentication type	C2D messages queued
Diagnose and solve problems						
Events	WISE-4471-S251UA_1730208	IoT Device	Enabled		Secret Access Signature	
• Pricing and scale	ECUhaleyTest	IoT Device	Enabled		Secret Access Signature	
Device management	WISE-4012_00D0C9FAC804	IoT Device	Enabled		Secret Access Signature	
Devices 1.	WISE-4050_74FE4868FA55	IoT Device	Enabled		Secret Access Signature	
Configurations + Deployments	WISE-4671-S617TUA_6159297	IoT Device	Enabled		Secret Access Signature	
Updates	ECU1051_AEtest	IoT Device	Enabled		Secret Access Signature	0

Figure 4. <u>Azure IoT Hub</u> with **Device** panel.

<u>E</u> X	Azure GUI
Device ID * ①	
WISE-4012_00D0C9FAC804	
IoT Edge Device 3,	
Authentication type ①	
Symmetric key X.509 Self-Signed X.509 CA Signed	ed
Auto-generate keys ①	
Connect this device to an IoT hub ①	
Enable Disable	
Parent device ①	
No parent device	
Set a parent device	

Figure 5. Device setting of adding a new device in <u>Azure IoT Hub</u>.

	Information					1000 0	
	Module Information				VVISE	-4000 G	
	Model	UUID WISE	4012 4012_00D0C9FAC804				
÷	Desc WISE-series De	ription		<u>``</u> 0	Information		
م		« lie v, cre	ate, delete, and update devices in	your loT Hub. Learn	Madule		
3 Ov	rerview tivity.log	Add ▼ entropy	d Device 🕐 Refresh ⊘ Assi	gn tags 🗊 Delete		Model Name	WISE-4012 WISE-4012
* Ao	cess control (IAM) gs agnose and solve problems		Device ID	Туре			WISE-4012_00D0C9FAC804
۶ Ev	ents			IoT Device		Location	
O Pri	cing and scale		ECUhaleyTest	IoT Device			
Device	management		WISE-4012_00D0C9FAC804	loT Device		Description	
 De Io1 	vices Edge			IoT Device			SF-4000 GUI
<u>e</u> co	nfigurations + Deployments			IoT Device			
🌒 Up	odates		ECU1051_AEtest	IoT Device			

Figure 6. WISE web utility with the same **Device ID** as on<u>Azure IoT Hub</u>. Step 6. Use <u>Node-Red</u> which helps monitoring the data that WISE uploaded/pushed. After <u>Node-Red</u> is executed, click **setting menu** from the **top-right corner** and choose **Manager palette** to find the plug-in function.

Noted: Download and install Node.js & Node-Red from the official website: Node.js Node-RED



Figure 7.**Install plug-in function** of <u>Node-Red</u> to monitor WISE-4000's data from <u>Azure Iot</u><u>Hub</u>.

Step 7. Click install tag and type "azure-iot-hub" to find and install "node-red-contribazure-iot-hub" which is the plug-in function monitoring data from Azure (figure 8).

Noted: The introduction guide of the function, please see the link bellowed. node-red-contrib-azure-iot-hub (node) - Node-RED

	User Settings		
Node-Red GUI			Close
	View	Nodes	tall
	Palette		± sort: ↓ = a-z recent 2
		Q azure-iot-hub	4/4095 🗙
	Keyboard	@@tsib/node-red-azure-lot-hub-mo Connector to azure on Node-Red 0.3.0	install
		 0.4.0 th 5 years ago node-red-contrib-azure-iot-hub-se Node to send Azure IoT C2D messag 0.0.2 th 2 years, 11 months ago 	installed end-c2d (2* ges. install
		@brayit/node-red-contrib-bray-liot Bray valve liot nodes 0.1.1	t Ø

Figure 8. Install plug-in function for monitoring data from <u>Azure Iot Hub</u>.

Step 8. Shown as figure 9, After the function is installed, you can **drag the nodes** from the **nodes bar** at the left side of the website.

Q filter nodes	4051	4060	4012	
oll sort o				
●∋ Batch				
✓ parser				
12 CSV				
🖸 html 🖗				
🔂 json 🖻				
🖸 🔿 xml 🖕				
Y yaml				
~ storage				
write file				
e 🕒 read file 👂				
Q watch				
√ cloud	l			
Azure IoT Hub				
Azure IoT Hub Registry				
Azure IoT Hub Receiver				
Azure IoT				
	Q filter nodes Q filter nodes II sort II sort <td< th=""><th>Q. filter nodes 4051 Q. filter nodes 4051 III soft III soft III soft</th><th>Q. filter nodes 4051 4060 III sort • • parser • parser • iii iii iiiiiiiiiiiiiiiiiiiiiiiiiiii</th><th>Q. filter nodes 4051 4060 4012 Q. filter nodes 4051 4060 4012 III sort V parser III sort V parser III sort V parser III sort III sort V parser III sort III sort</th></td<>	Q. filter nodes 4051 Q. filter nodes 4051 III soft III soft III soft	Q. filter nodes 4051 4060 III sort • • parser • parser • iii iii iiiiiiiiiiiiiiiiiiiiiiiiiiii	Q. filter nodes 4051 4060 4012 Q. filter nodes 4051 4060 4012 III sort V parser III sort V parser III sort V parser III sort III sort V parser III sort III sort

Figure 9. Nodes of Node-Red monitoring data from WISE-4000 through Azure IoT Hub

Step 9. Drag a "Azure IoT Hub Receiver" node to receive the data from <u>Azure IoT Hub</u>. Drag and connect a debug node with "Azure IoT Hub receiver" node as Figure 10 shown.

Node-Red GUI	
	Azure IoT Hub Receiver
	Received
	debug 1

Figure 10. Connect Azure IoT Hub Receiver node with a "debug" node.

Step 10. Double click "Azure IoT Hub Receiver" node and enter the ConnectionString for your Azure IoT Hub Receiver and click Done.

Noted: Following steps to get ConnectionString for your Azure IoT Hub.

A. Go to Azure website and **click** IoT-Hub.

Azure GU

Azure services								
<u>Create a</u> resource accounts	Disk Accesses	Collections	(P) Monitor	K IoT Hub	IoT Central Applications	<u>Connections</u>	Firewall Manager	More services
Resources								
Recent Favorite								
Name			Туре				Last Viewed	
WISE-series		IoT Hub a few seconds ago						ago
cs110033fffa794effc		Storage account 28 minutes ago						
cs150183205987ex4f67x85d			Storage	account			42 minutes ag	>
wise4012e		Storage account an hour ago						
() <u>WISE-7510</u>		Resource group 22 hours ago						
test1104ae	IoT Central Application 23 hours ago							
custom-s0n201vxz1			IoT Cer	tral Application			23 hours ago	
1 IAG011 IAG AE			Subscri	ption			3 months ago	
ADAM-series			IoT Hut	1			a year ago	
wisedoudupload			Storage	account			a year ago	
WISE-Analyze			Stream	Analytics job			2 years ago	
ADAM_stream			Stream	Analytics job			5 years ago	
See all								

B. Hub setting \rightarrow Built-in endpoint

	Q	Search	
Azure GUI		Overview	
	-	Activity log	
*		Access control (IAM)	
	۲	<u>Tags</u>	
	ß	Diagnose and solve problems	
	۶	<u>Events</u>	
	0	Pricing and scale	
	De	vice management	
		<u>Devices</u>	
	•	<u>IoT Edge</u>	
	Ŕ	Configurations + Deployments	
	۲	<u>Updates</u>	
	N	Queries	
	Hu	b settings	
	•	<u>Built-in endpoints</u>	
	K	Message routing	
		File upload	
	~	<u>Failover</u>	
	ili	Properties	i
	Α	Locks	

C. Copy the text from Event Hub-compatible endpoint.



D. Paste the text to Azure IoT Hub-Receiver node

Node-Red GUI	Flow 1	Edit Azure IoT Hub Receiver node	Edit Azure IoT Hub Receiver node					
		Delete	Cancel Done					
		© Properties						
	Azure IoT Hub Receiver	Name Azure IoT Hub Re	ceiver					
	Connected	ConnectionString Endpoint=sb://ihsi	uprodbyres045dednamespace.s					

Results. Monitor the data which is pushed by WISE to <u>Azure IoT Hub</u> (figure 11). Click the bug icon then <u>Node-Red</u> will show the logs from WISE.

