

Advantech AE Technical Share Document

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Category	<input type="checkbox"/> FAQ <input checked="" type="checkbox"/> SOP	Related OS	N/A
Abstract	How to connect Mosquitto with iSensing MQTT?		
Keyword	WISE, Mosquitto, cloud upload, push notification, control end device		
Related Product	WISE-40XX series, WISE-42XX, WISE-44XX		

■ Problem Description:

This document shows that how to connect with Mosquitto and make sure upload/push data successfully. Utilize 3rd party MQTT broker to monitor the pushed data and control the status of WISE.

The iSensing MQTT for WISE is a bit different from ADAM-4000 and ADAM-6000. It supports MQTT with **websocket** format and **SSL** encryption package.

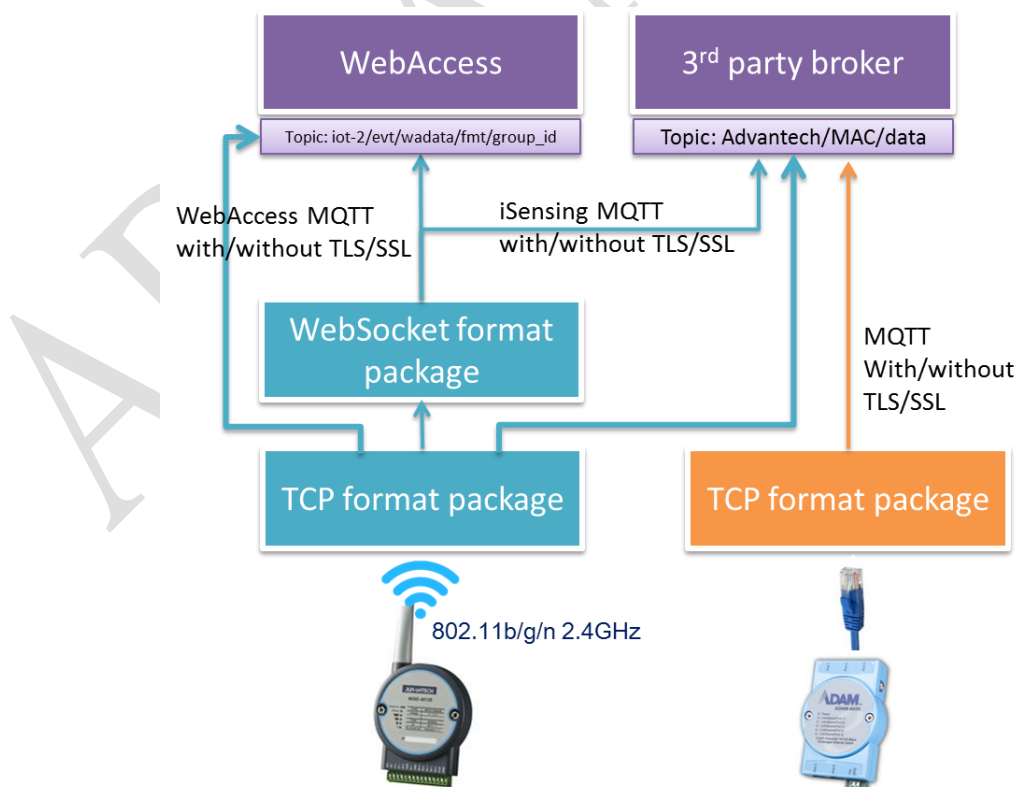


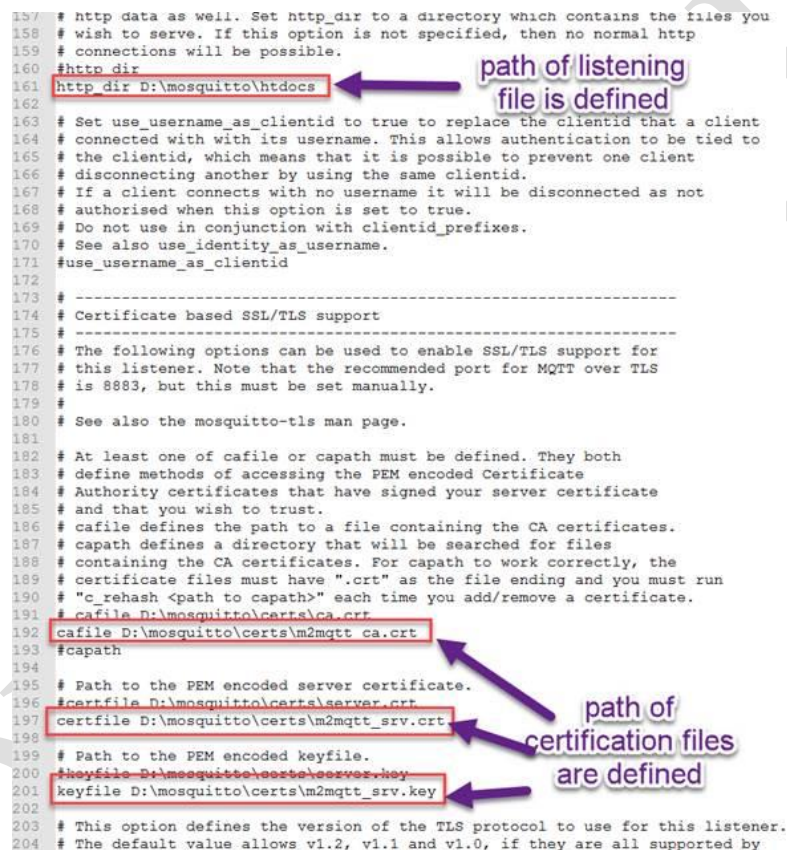
Figure 1. The MQTT for WISE and ADAM.

■ **Brief Solution - Step by Step:**

SOP video:

Please check the video attached with this document.

NOTATION: Mosquitto holds TCP connection as default protocol. The attached Mosquitto .zip file is compiled with plug-in websocket library. Some of the setting is defined in the “mosquitto.tls.conf” file. **Please storage the broker under the exactly “D:\” folder in the demonstration steps.**



```

157 # http data as well. Set http_dir to a directory which contains the files you
158 # wish to serve. If this option is not specified, then no normal http
159 # connections will be possible.
160 #http_dir
161 http_dir D:\mosquitto\htdocs
162
163 # Set use_username_as_clientid to true to replace the clientid that a client
164 # connected with with its username. This allows authentication to be tied to
165 # the clientid, which means that it is possible to prevent one client
166 # disconnecting another by using the same clientid.
167 # If a client connects with no username it will be disconnected as not
168 # authorised when this option is set to true.
169 # Do not use in conjunction with clientid_prefixes.
170 # See also use_identity_as_username.
171 #use_username_as_clientid
172
173 # -----
174 # Certificate based SSL/TLS support
175 # -----
176 # The following options can be used to enable SSL/TLS support for
177 # this listener. Note that the recommended port for MQTT over TLS
178 # is 8883, but this must be set manually.
179 #
180 # See also the mosquitto-tls man page.
181
182 # At least one of cafile or capath must be defined. They both
183 # define methods of accessing the PEM encoded Certificate
184 # Authority certificates that have signed your server certificate
185 # and that you wish to trust.
186 # cafile defines the path to a file containing the CA certificates.
187 # capath defines a directory that will be searched for files
188 # containing the CA certificates. For capath to work correctly, the
189 # certificate files must have ".crt" as the file ending and you must run
190 # "c_rehash <path to capath>" each time you add/remove a certificate.
191 # cafile D:\mosquitto\certs\ca.crt
192 cafile D:\mosquitto\certs\m2mqtt ca.crt
193 #capath
194
195 # Path to the PEM encoded server certificate.
196 #certfile D:\mosquitto\certs\server.crt
197 certfile D:\mosquitto\certs\m2mqtt_srv.crt
198
199 # Path to the PEM encoded keyfile.
200 #keyfile D:\mosquitto\certs\server.key
201 keyfile D:\mosquitto\certs\m2mqtt_srv.key
202
203 # This option defines the version of the TLS protocol to use for this listener.
204 # The default value allows v1.2, v1.1 and v1.0, if they are all supported by

```

Figure. The execute path are pre-defined.

In this document, we demonstrate how to make sure the connection between WISE and MQTT broker is successful. There are 2 demonstration topologies. One is using 3rd party MQTT client to subscribe the data published by WISE. Another one is to publish data, which can control the status of WISE.

The demonstration topology for DI channel is shown in figure 2, and DO channel control is shown in figure 3.

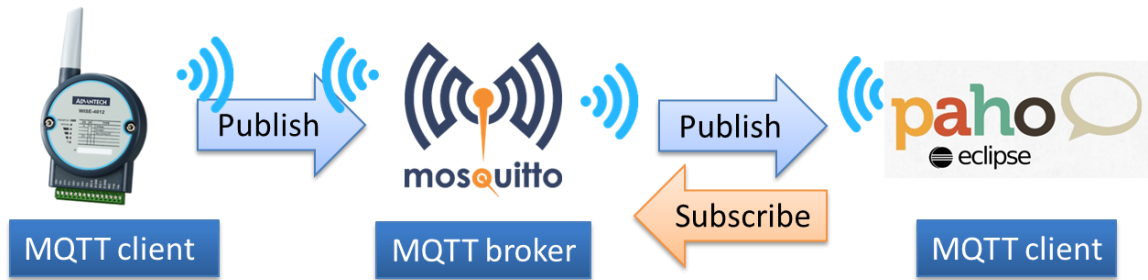


Figure 2. The demonstration topology – WISE is a publisher. (push DI)



Figure 3. The demonstration topology – WISE is a subscriber (control DO)

There are 3 topics for WISE modules:

- Advantech/MAC_of_WISE/Device_Status
- Advantech/MAC_of_WISE/data
- Advantech/MAC_address/ctl/do#

Part I, WISE push DI channel status to MQTT broker.

Step1. Open command prompt from windows “Start Menu”. Change the folder to the one which store Mosquitto. In the figure 4, the default port is 8443 (configurable). Please note that this command should not be switched off during MQTT process.

```

C:\Windows\system32>D:
D:\>cd mosquitto
D:\mosquitto>mosquitto.exe -c mosquitto.tls.conf -v
1510879146: mosquitto version 1.4.2 (build date 2017/08/24 12:26:05.80) starting
1510879146: Config loaded from mosquitto.tls.conf.
1510879146: Opening websockets listen socket on port 8443.
  
```

(a)

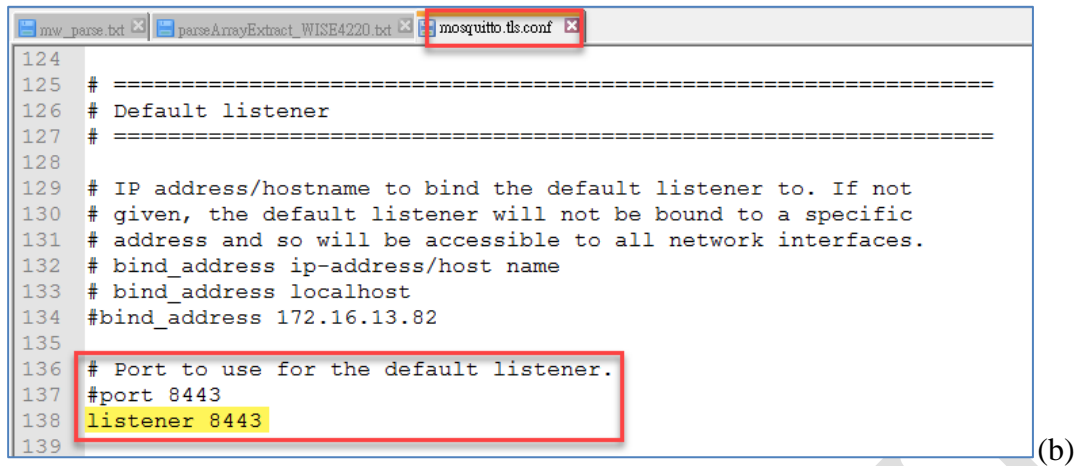


Figure 4. (a) Command prompt. (b) Configuration of the broker.

Step 2. Open web browser and enter URL: https://IP_addr_of_PC:8443/. If the page shows as figure 5, which means Mosquitto open successfully and user can proceed to use MQTT client to connect to MQTT Broker. Click on Paho to open another tab for 3rd party MQTT client. Please note that this browser should **not** be turned off during MQTT process.



Figure 5. The message from browser.

If you get the result as figure 6. Which means the certification of Mosquitto we provided did not have the Website credentials. Just need simply go to advance option and go to the web address (figure 7).

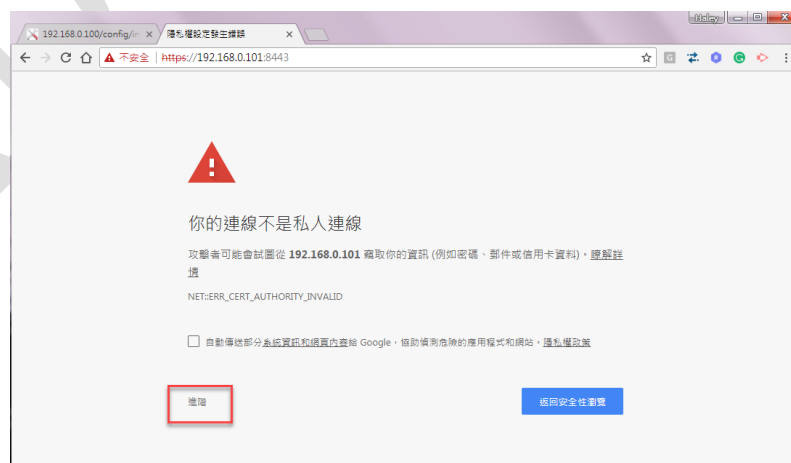


Figure 6. Error message.



Figure 7. Go to the address of your broker.

Step 3. Please configure the WISE as figure 8. Remember to enable **SSL secure**.

In the .zip file of Mosquitto, there is no definition about user name and password. Please leave those parameters empty.

Figure 8. The configuration page of WISE.

Step 4. Enable push function of the WISE module.

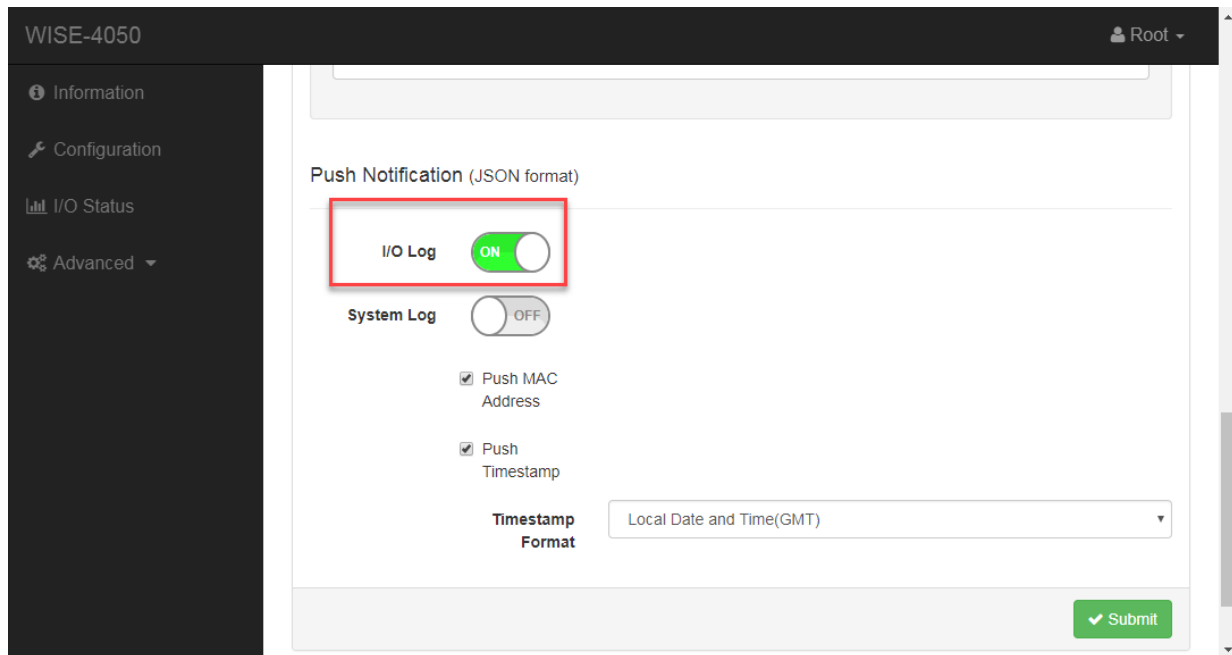


Figure 9. Enable push function of the WISE module

Step 5. Click on the Eclipse Paho option in the figure 10. The same as the link in red rectangle in step 2, which is a 3rd party MQTT client. If the setting is correct, it will show “connected” after click “connect”.

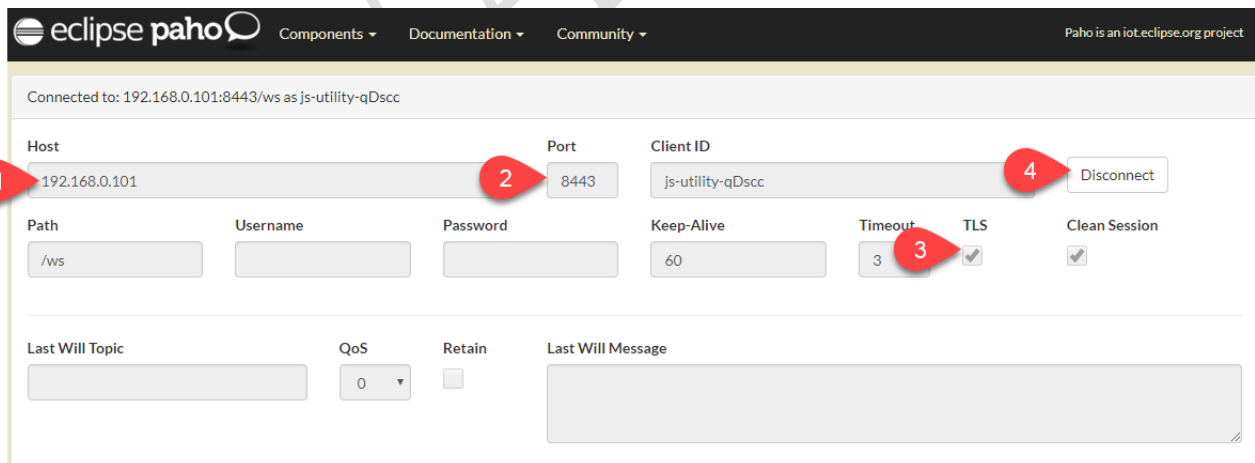


Figure 10. The configuration page of ECLIPSE PAHO.

Step 6. Subscribe the messages published by WISE refers to the topology in figure 2.
Add a new subscription with topic [Advantech/MAC_of_WISE/data](#).

Figure 11. A new subscriptions.

Results of receiving DI status.

Monitor the data while WISE is uploading/pushing data to MQTT broker. As shown in figure 12, there will be lots of messages receiving from WISE.

```

C:\> 系統管理員: 命令提示字元 - mosquitto.exe -c mosquitto.tls.conf -v
1528940509: Received SUBSCRIBE from WISE-4050
1528940509:   Advantech/00D0C9FCB033/ctl/+ <QoS 0>
1528940509: WISE-4050 0 Advantech/00D0C9FCB033/ctl/+
1528940509: Sending SUBACK to WISE-4050
1528940509: Received PUBLISH from WISE-4050 <d0, q0, r1, m0, 'Advantech/00D0C9FCB033/data', ... <92 bytes>>
1528940509: Received PUBLISH from WISE-4050 <d0, q0, r1, m0, 'Advantech/00D0C9FCB033/data', ... <95 bytes>>
1528940509: Received PUBLISH from WISE-4050 <d0, q0, r1, m0, 'Advantech/00D0C9FCB033/data', ... <92 bytes>>
  
```

(A) Messages received from WISE (QoS=0) on command panel.

```

C:\> 系統管理員: 命令提示字元 - mosquitto.exe -c mosquitto.tls.conf -v
1528940761: Received SUBSCRIBE from WISE-4050
1528940761:   Advantech/00D0C9FCB033/ctl/+ <QoS 1>
1528940761: WISE-4050 1 Advantech/00D0C9FCB033/ctl/+
1528940761: Sending SUBACK to WISE-4050
1528940761: Received PUBLISH from WISE-4050 <d0, q1, r1, m5, 'Advantech/00D0C9FCB033/data', ... <92 bytes>>
1528940761: Sending PUBLISH to js-utility-qhrB7 <d0, q1, r0, m8, 'Advantech/00D0C9FCB033/data', ... <92 bytes>>
1528940761: Sending PUBACK to WISE-4050 <Mid: 5>
1528940761: Received PUBACK from js-utility-qhrB7 <Mid: 8>
  
```

(B) Messages received from WISE (QoS=1) on command panel.


```

系統管理員: 命令提示字元 - mosquitto.exe -c mosquitto.tls.conf -v
1528940590: Received SUBSCRIBE from WISE-4050
1528940590: Advantech/00D0C9FCB033/ctl/+ <QoS 2>
1528940590: WISE-4050 2 Advantech/00D0C9FCB033/ctl/+
1528940590: Sending SUBACK to WISE-4050
1528940590: Received PUBLISH from WISE-4050 <d0, q2, r1, m5, 'Advantech/00D0C9FCB033/data', ... <92 bytes>>
1528940590: Sending PUBREC to WISE-4050 <Mid: 5>
1528940590: Received PUBREL from WISE-4050 <Mid: 5>
1528940590: Sending PUBCOMP to WISE-4050 <Mid: 5>
1528940590: Received PUBLISH from WISE-4050 <d0, q2, r1, m6, 'Advantech/00D0C9FCB033/data', ... <95 bytes>>
1528940590: Sending PUBREC to WISE-4050 <Mid: 6>
1528940590: Received PUBREL from WISE-4050 <Mid: 6>
1528940590: Sending PUBCOMP to WISE-4050 <Mid: 6>
  
```

(C) Messages received from WISE (QoS=2) on command panel.

Topic	Payload	Time	QoS
Advantech/00D0C9FCB033/data	["s":2,"t":"2018-06-14T08:52:21Z","q":192,"c":0,"do1":false,"do2":false,"do3":false,"do4":false]	2018-06-14T00:52:21.378Z	1

Figure 12. (D) Messages received from WISE on Paho (QoS=1).

Part II, WISE subscribe from MQTT broker and change DO channel status.

Step 1 – 5 are the same as in part I.

Step 6. Publish the messages, which can control the status of WISE module refers to the topology in figure 3.

Add a new topic **Advantech/MAC_of_WISE/ctl/do1** (DO0 of WISE).

Add a new message **{"v":true}** / **{"v":false}**.

Description	Example MQTT Topic	Example JSON Data	Notes
Set the value of a digital output.	Advantech/0013430C981F/ctl/do1 Advantech/0013430C981F/ctl/do2 Advantech/0013430C981F/ctl/do3	{"v":true}	MQTT: do not set the retain bit when publishing messages to this topic; otherwise, an old retained message may change the state of the output.

Figure 13. The example MQTT topic and message.

Figure 14. The example MQTT topic and message setting on ECLIPSE PAHO.

Results of controlling DO status.

Monitor the DO channel of WISE while a user is publishing data from ECLIPSE PAHO.

History			
Clear History			
Topic	Payload	Time	Qos
Advantech/00D0C9FCB033/data	{\"s\":3,\"t\":\"2018-06-14T09:28:03Z\",\"q\":192,\"c\":0,\"do1\":true,\"do2\":false,\"do3\":false,\"do4\":false}	2018-06-14T01:28:03.564Z	1
Advantech/00D0C9FCB033/data	{\"s\":2,\"t\":\"2018-06-14T09:28:03Z\",\"q\":192,\"c\":0,\"di1\":100,\"di2\":130,\"di3\":false,\"di4\":false}	2018-06-14T01:28:03.473Z	1
Advantech/00D0C9FCB033/data	{\"s\":1,\"t\":\"2018-06-14T09:28:00Z\",\"q\":192,\"c\":0,\"do1\":true,\"do2\":false,\"do3\":false,\"do4\":false}	2018-06-14T01:28:00.232Z	1
Advantech/00D0C9FCB033/data	{\"s\":0,\"t\":\"2018-06-14T09:27:58Z\",\"q\":192,\"c\":0,\"do1\":false,\"do2\":false,\"do3\":false,\"do4\":false}	2018-06-14T01:27:58.503Z	1
Advantech/00D0C9FCB033/data	{\"s\":9,\"t\":\"2018-06-14T09:27:58Z\",\"q\":192,\"c\":0,\"di1\":100,\"di2\":130,\"di3\":false,\"di4\":false}	2018-06-14T01:27:58.473Z	1

Figure 15. The results on Eclipse Paho.

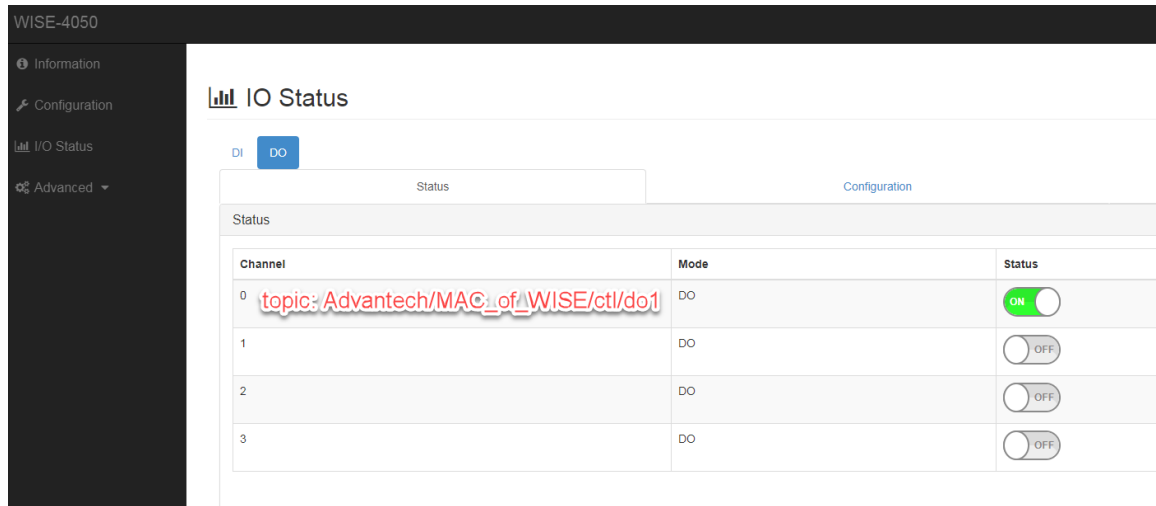


Figure 16. Ch0 is corresponding to do1 of the topic.